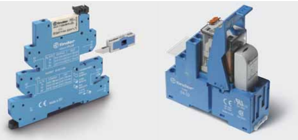
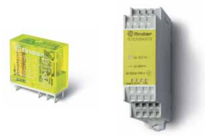
finder

SWITCH TO THE FUTURE

2014 - 2015 Catalogue

PCB relays
Industrial relays
Relay interface modules
Sockets and accessories
Timers
Monitoring relays
Energy meters
Surge protection devices
Industrial thermostat
Modular solid state relays (SSR)
Switch mode power supplies
Filter fan
Light dependent relays
Electronic step relays
Modular contactors
Time switches
Electronic staircase timers
Dimmers
PIR movement detectors
Thermostats and Cronotermostats

		Series	
	Industrial and PCB relays (EMR/SSR)	30, 32, 34, 36, 40, 41, 43 44, 45, 46, 55, 56, 60, 62 65, 66, 67, RB, RR, 99	A
	Relay interface modules (EMR/SSR) Interface modules	38, 39, 48, 49, 4C, 58, 59 19	B
	Relays with forcibly guided contacts	50, 7S	C
	Power solid state relays (SSR)	77	D
	Monitoring relays Energy meters Surge Protection Devices (SPD)	70, 71, 72 7E 7P	E
	Switch mode power supplies	78	F
	Panel thermostats Filter fans	7T 7F	G
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	Light dependent relays Time switches Electronic staircase timers Dimmers	10, 11 12 14 15	I
	Movement detectors	18	J
	Electronic step relays Mechanical step relays	13 20, 26, 27	K
	Modular contactors and modular monostable relays	22	L
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	General technical information		*i*

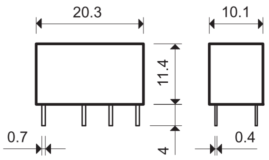
Features

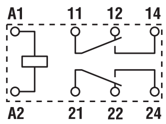
Printed circuit mount
2 A signal relay

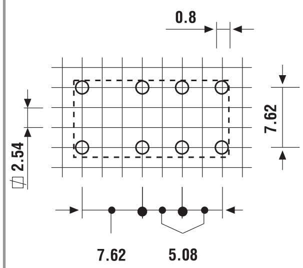
- 2 Pole changeover contacts
  Low level switching capability
- Subminiature - industry standard DIL package
- Sensitive DC coil - 200 mW
- Wash tight: RT III
- Cadmium Free contact material

30.22

- Low coil power
- Au clad contacts
- PCB mount







Copper side view

Contact specification		
Contact configuration		2 CO (DPDT)
Rated current/Maximum peak current	A	2/3
Rated voltage/Maximum switching voltage	V AC	125/250
Rated load AC1	VA	125
Rated load AC15 (230 V AC)	VA	25
Single phase motor rating (230 V AC)	kW	—
Breaking capacity DC1: 30/110/220 V	A	2/0.3/—
Minimum switching load	mW (V/mA)	10 (0.1/1)
Standard contact material		AgNi + Au
Coil specification		
Nominal voltage (U_N)	V AC (50/60 Hz)	—
	V DC	5 - 6 - 9 - 12 - 24 - 48
Rated power AC/DC	VA (50 Hz)/W	—/0.2
Operating range	AC	—
	DC	See table page 3
Holding voltage	AC/DC	—/0.35 U_N
Must drop-out voltage	AC/DC	—/0.05 U_N
Technical data		
Mechanical life AC/DC	cycles	—/10 · 10^6
Electrical life at rated load AC1	cycles	100 · 10^3
Operate/release time	ms	6/2
Insulation between coil and contacts (1.2/50 μs)	kV	1.5
Dielectric strength between open contacts	V AC	750
Ambient temperature range	°C	–40…+85
Environmental protection		RT III
Approvals (according to type)		

Ordering information

Example: 30 series PCB relay, 2 CO (DPDT) - 2 A contacts, 12 V sensitive DC coil.

3	0	.	2	2	.	7	.	0	1	2	.	0 (A)	0 (B)	1 (C)	0 (D)

Series — 3 0

Type — 2
2 = PCB mount

No. of poles — 2
2 = 2 pole, 2 A

Coil version — 7
7 = Sensitive DC

Coil voltage — 0 1 2
See coil specifications

A: Contact material
0 = Standard
AgNi + Au

B: Contact circuit
0 = CO (DPDT)

C: Options
1 = None

D: Special versions
0 = Wash tight (RT III)

Technical data

Insulation according to EN 61810-1			
Nominal voltage of supply system	V AC	230/400	120...240 single phase
Rated insulation voltage	V AC	250	125
Pollution degree		1	2
Insulation between coil and contact set			
Type of insulation		Basic	Basic
Overvoltage category		I	II
Rated impulse voltage	kV (1.2/50 μs)	1.5	1.5
Dielectric strength	V AC	1,000	1,000
Insulation between adjacent contacts			
Type of insulation		Basic	Basic
Overvoltage category		I	II
Rated impulse voltage	kV (1.2/50 μs)	1.5	1.5
Dielectric strength	V AC	1,500	1,500
Insulation between open contacts			
Type of disconnection		Micro-disconnection	Micro-disconnection
Dielectric strength	V AC/kV (1.2/50 μs)	750/1	750/1
Other data			
Bounce time: NO/NC	ms	1/3	
Vibration resistance (5…55)Hz: NO/NC	g	15/15	
Shock resistance	g	16	
Power lost to the environment	without contact current W	0.2	
	with rated current W	0.4	
Recommended distance between relays mounted on PCB	mm	≥ 5	

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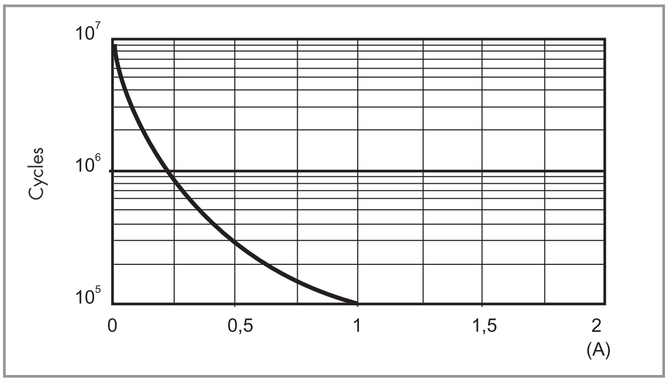
Contact specification

F 30 - Electrical life (AC1) v contact current (125 V)



Note:
The rated current of 2 A corresponds to the limiting continuous current.

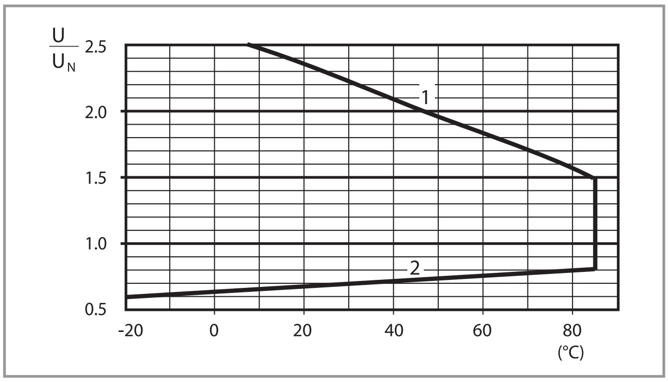
Coil specifications

DC coil data - 0.2 W sensitive

Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
5	**7**.005	3.7	7.5	125	40
6	**7**.006	4.5	9	180	33
9	**7**.009	6.7	13.5	405	22
12	**7**.012	8.4	18	720	16
24	**7**.024	16.8	36	2,880	8.3
48*	**7**.048	36	72	10,000	4.8

* Rated power: 0.23 W

R 30 - DC coil operating range v ambient temperature



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

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32 Series - Subminiature PCB relays 6 A

Features

Printed circuit mount 6 A relay

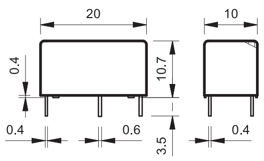
- 1 Pole changeover contacts or
  1 Pole normally open contact
- Subminiature, low profile package
- Sensitive DC coil - 200 mW
- Wash tight: RT III
- Cadmium Free contact material option

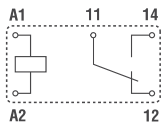
32.21-x000

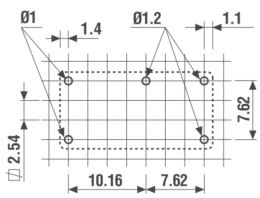
- 1 CO (SPDT), 6 A
- Low coil power
- PCB mount

32.21-x300

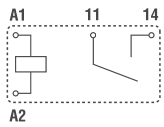
- 1 NO (SPST-NO), 6 A
- Low coil power
- PCB mount

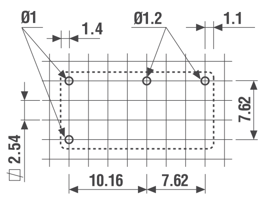






Copper side view





Copper side view

		32.21-x000	32.21-x300
Contact specification			
Contact configuration		1 CO (SPDT)	1 NO (SPST-NO)
Rated current/Maximum peak current	A	6/15	6/15
Rated voltage/Maximum switching voltage	V AC	250/400	250/400
Rated load AC1	VA	1,500	1,500
Rated load AC15 (230 V AC)	VA	250	250
Single phase motor rating (230 V AC)	kW	0.185	0.185
Breaking capacity DC1: 30/110/220 V	A	3/0.35/0.2	3/0.35/0.2
Minimum switching load	mW (V/mA)	500 (10/5)	500 (10/5)
Standard contact material		$AgSnO_2$	$AgSnO_2$
Coil specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	—	—
	V DC	5 - 12 - 24 - 48	5 - 12 - 24 - 48
Rated power AC/DC	VA (50 Hz)/W	—/0.2	—/0.2
Operating range	AC	—	—
	DC	(0.78...1.5)U_N	(0.78...1.5)U_N
Holding voltage	AC/DC	—/0.4 U_N	—/0.4 U_N
Must drop-out voltage	AC/DC	—/0.1 U_N	—/0.1 U_N
Technical data			
Mechanical life AC/DC	cycles	—/20 · 10^6	—/20 · 10^6
Electrical life at rated load AC1	cycles	50 · 10^3	50 · 10^3
Operate/release time	ms	6/4	6/2
Insulation between coil and contacts (1.2/50 μs)	kV	5	5
Dielectric strength between open contacts	V AC	1,000	1,000
Ambient temperature range	°C	–40…+85	–40…+85
Environmental protection		RT III	RT III
Approvals (according to type)			

A

Ordering information

Example: 32 series PCB, 1 NO (SPDT-NO) - 6 A contacts, 24 V sensitive DC coil.

					A	B	C	D
3 2	. 2	1	. 7	. 0 2 4	. 4	3	0	0

Series

Type
2 = PCB mount

No. of poles
1 = 1 pole, 6 A

Coil version
7 = Sensitive DC

Coil voltage
See coil specifications

A: Contact material
4 = Standard $AgSnO_2$

B: Contact circuit
0 = CO (SPDT)
3 = NO (SPST)

D: Special versions
0 = Wash tight (RT III)

C: Options
0 = None

Selecting features and options: only combinations in the same row are possible.
Preferred selections for best availability are shown in **bold.**

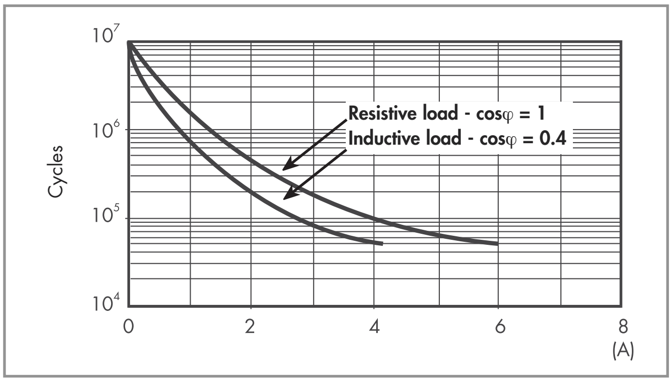
Type	Coil version	A	B	C	D
32.21	sens. DC	**4**	**0 - 3**	**0**	**0**

Technical data

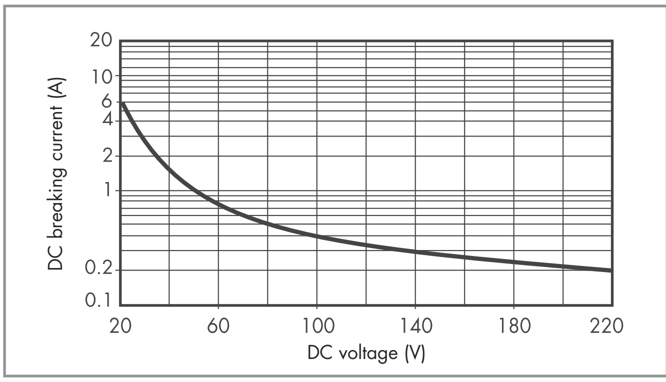
Insulation according to EN 61810-1			
Nominal voltage of supply system	V AC	230/400	
Rated insulation voltage	V AC	250	
Pollution degree		2	
Insulation between coil and contact set			
Type of insulation		Basic	
Overvoltage category		III	
Rated impulse voltage	kV (1.2/50 μs)	5	
Dielectric strength	V AC	4,000	
Insulation between open contacts			
Type of disconnection		Micro-disconnection	
Dielectric strength	V AC/kV (1.2/50 μs)	1,000/1.5	
Conducted disturbance immunity			
Burst (5…50)ns, 5 kHz, on A1 - A2		EN 61000-4-4	level 4 (4 kV)
Surge (1.2/50 μs) on A1 - A2 (differential mode)		EN 61000-4-5	level 3 (2 kV)
Other data			
Bounce time: NO/NC	ms	2/10 (changeover)	2/— (normally open)
Vibration resistance (5…55)Hz: NO/NC	g	10/10 (changeover)	10/— (normally open)
Shock resistance	g	20	
Power lost to the environment — without contact current	W	0.2	
with rated current	W	0.5	
Recommended distance between relays mounted on PCB	mm	≥ 5	

Contact specification

F 32 - Electrical life (AC) v contact current



H 32 - Maximum DC1 breaking capacity



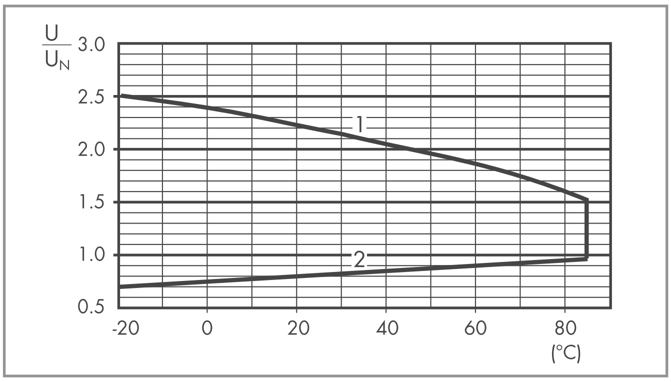
- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of ≥ $50 \cdot 10^3$ can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load. Note: the release time for the load will be increased.

Coil specifications

DC coil data - 0.2 W sensitive

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
5	**7**.005	3.9	7.5	125	40
12	**7**.012	9.4	18	720	16
24	**7**.024	18.7	36	2,880	8.3
48	**7**.048	37.4	72	11,520	4

R 32 - DC coil operating range v ambient temperature



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

Features

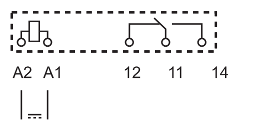
Ultra-slim 1 Pole - 6 A relay

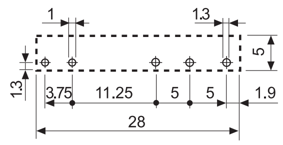
Printed circuit mount
- direct or via PCB socket
35 mm rail mount
- via screw, screwless or push-in terminal sockets

- 1 Pole changeover contacts or 1 Pole normally open contact
- Ultra slim, 5 mm, package
- Sensitive DC coil - 170 mW (Dual AC/DC coil drive possible using 93 series sockets)
- UL Listing (certain relay/socket combinations)
- Cadmium Free contact materials
- 8/8 mm clearance/creepage distance
- 6 kV (1.2/50 μs) insulation, coil-contacts

34.51

- 5 mm wide
- Low coil power
- PCB or 93 series sockets





For UL ratings see:
"General technical information" page V

For outline drawing see page 5

Copper side view

		34.51
Contact specification		
Contact configuration		1 CO (SPDT)
Rated current/Maximum peak current	A	6/10
Rated voltage/Maximum switching voltage	V AC	250/400
Rated load AC1	VA	1,500
Rated load AC15 (230 V AC)	VA	300
Single phase motor rating (230 V AC)	kW	0.185
Breaking capacity DC1: 30/110/220 V	A	6/0.2/0.12
Minimum switching load	mW (V/mA)	500 (12/10)
Standard contact material		AgNi
Coil specification		
Nominal voltage (U_N)	V AC (50/60 Hz)	—
	V DC	5 - 12 - 24 - 48 - 60
Rated power AC/DC	VA (50 Hz)/W	—/0.17
Operating range	AC	—
	DC	(0.7…1.5)U_N
Holding voltage	AC/DC	—/0.4 U_N
Must drop-out voltage	AC/DC	—/0.05 U_N
Technical data		
Mechanical life AC/DC	cycles	—/10 · 10^6
Electrical life at rated load AC1	cycles	60 · 10^3
Operate/release time	ms	5/3
Insulation between coil and contacts (1.2/50 μs)	kV	6 (8 mm)
Dielectric strength between open contacts	V AC	1,000
Ambient temperature range	°C	–40…+85
Environmental protection		RT II
Approvals (according to type)		RINA

34 Series - Slim solid state PCB relays (SSR) 0.1 - 2 A

Features

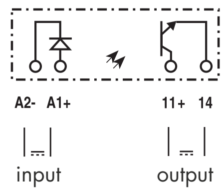
Ultra-slim - Solid State Relays

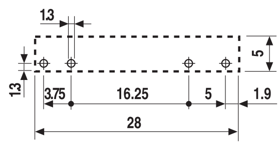
Printed circuit mount
- direct or via PCB socket
35 mm rail mount
- via screw, screwless or push-in terminal sockets

- Single circuit output switching options
  - 2 A 24 V DC
  - 0.1 A 48 V DC
  - 2 A 240 V AC
- Silent, high speed switching with long electrical life
- Ultra slim, 5 mm, package
- Sensitive DC Input circuits (Dual AC/DC input drive possible using 93 series sockets)
- UL Listing (certain relay/socket combinations)
- Wash tight: RT III
- 2,500 V insulation, input-output

34.81-9024

- 2 A, 24 V DC output switching
- PCB or 93 series sockets

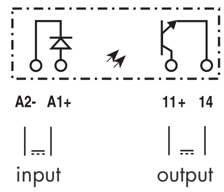


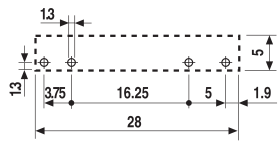


Copper side view

34.81-7048

- 0.1 A, 48 V DC output switching
- PCB or 93 series sockets

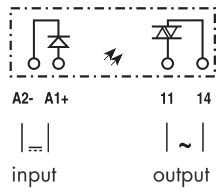


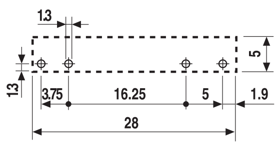


Copper side view

34.81-8240

- 2 A, 240 V AC output switching
- Zero crossing switching
- PCB or 93 series sockets





Copper side view

For outline drawing see page 5

		34.81-9024	34.81-7048	34.81-8240
Output circuit				
Contact configuration		1 NO (SPST-NO)	1 NO (SPST-NO)	1 NO (SPST-NO)
Rated current/Maximum peak current (10 ms)	A	2/20	0.1/0.5	2/40
Rated voltage/Maximum blocking voltage	V	(24/33)DC	(48/60)DC	(240/—)AC
Switching voltage range	V	(1.5…24)DC	(1.5…48)DC	(12…275)AC
Repetitive peak off-state voltage	V_{pk}	—	—	600
Minimum switching current	mA	1	0.05	22
Max. "OFF-state" leakage current	mA	0.001	0.001	1.5
Max. "ON-state" voltage drop	V	0.12	1	1.6

Input circuit		34.81-9024				34.81-7048		34.81-8240			
Nominal voltage	V DC	5	12	24	60	24	60	5	12	24	60
Rated power AC/DC	W	0.035	0.087	0.17	0.18	0.17	0.18	0.060	0.087	0.17	0.18
Operating range	V DC	3.5…12	8…17	16…30	35…72	16…30	35…72	3.5…10	8…17	16…30	35…72
Control current	mA	7	7.2	7	3	7	3	12	7.2	7	3
Release voltage	V DC	1	4	10	20	10	20	1	4	10	20
Impedance	Ω	715	1,940	3,200	21,300	3,200	21,300	416	1,940	3,200	21,300

Technical data		34.81-9024	34.81-7048	34.81-8240
Operate/release time	ms	0.1/0.6*	0.04/0.6*	12/12*
Dielectric strength between input/output	V	2,500	2,500	2,500
Ambient temperature range	°C	–20…+60	–20…+60	–20…+60
Environmental protection		RT III	RT III	RT III
Approvals (according to type)				

* Note: all technical data relates to using the relay directly on PCB or PCB socket type 93.11.
If the relay is used with 35 mm rail socket type 93.51, refer to the technical data of 38 Series; if used with types 93.60, 93.61, 93.62, 93.63, 93.64, 93.65, 93.66, 93.67,93.68 and 93.69, refer to the technical data of the Master***INTERFACE*** 39 Series.

Ordering information

Electromechanical relay (EMR)

Example: 34 series slim electromechanical relay, 1 CO (SPDT) 6 A contacts, 24 V sensitive DC coil.

3 4 . 5 1 . 7 . 0 2 4 . 0 0 1 0 (A B C D)

Series

Type
5 = Electromechanical type

No. of poles
1 = 1 pole, 6 A

Coil version
7 = Sensitive DC

Coil voltage
See coil specifications

A: Contact material
0 = Standard AgNi
4 = $AgSnO_2$
5 = AgNi + Au

B: Contact circuit
0 = CO (SPDT)
3 = NO (SPST)

D: Special versions
0 = Flux proof (RT II)
9 = Flat version

C: Options
1 = None

Selecting features and options: only combinations in the same row are possible.
Preferred selections for best availability are shown in **bold.**

Type	Coil version	A	B	C	D
34.51	sens. DC	**0** - 4 - 5	**0** - 3	**1**	**0**
34.51	sens. DC	0 - 4 - 5	0	1	9

Solid state relay (SSR)

Example: 34 series SSR relay, 2 A output, 24 V DC supply.

3 4 . 8 1 . 7 . 0 2 4 . 9 0 2 4

Series

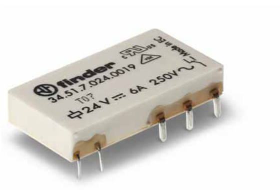
Type
8 = SSR type

Output
1 = 1 NO (SPST-NO)

Input circuit
See input specifications

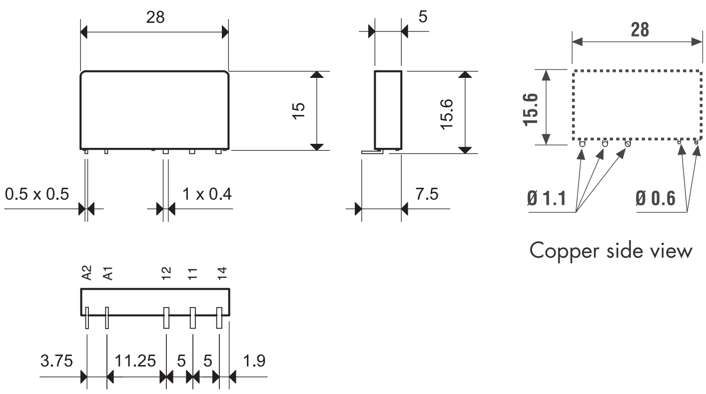
Output circuit
9024 = 2 A - 24 V DC
7048 = 0.1 A - 48 V DC
8240 = 2 A - 240 V AC

Flat pack version



Option = 34.51.7xxx.x019

Environmental protection RT I



Copper side view

Electromechanical relay

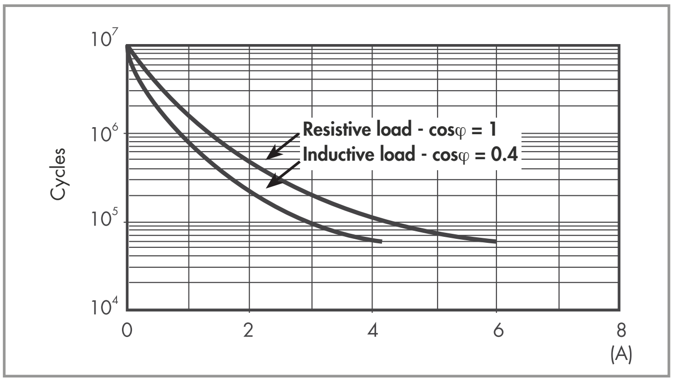
A

Technical data

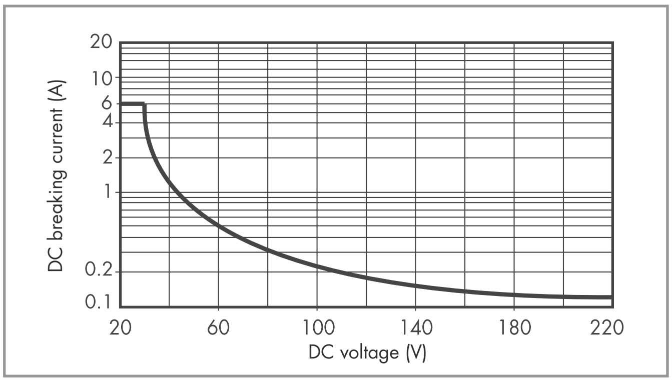
Insulation according to EN 61810-1			
Nominal voltage of supply system	V AC	230/400	
Rated insulation voltage	V AC	250	400
Pollution degree		3	2
Insulation between coil and contact set			
Type of insulation		Reinforced	
Overvoltage category		III	
Rated impulse voltage	kV (1.2/50 μs)	6	
Dielectric strength	V AC	4,000	
Insulation between open contacts			
Type of disconnection		Micro-disconnection	
Dielectric strength	V AC/kV (1.2/50 μs)	1,000/1.5	
Conducted disturbance immunity			
Burst (5…50)ns, 5 kHz, on A1 - A2		EN 61000-4-4	level 4 (4 kV)
Surge (1.2/50 μs) on A1 - A2 (differential mode)		EN 61000-4-5	level 3 (2 kV)
Other data			
Bounce time: NO/NC	ms	1/6	
Vibration resistance (5…55)Hz: NO/NC	g	10/5	
Shock resistance	g	20/14	
Power lost to the environment without contact current	W	0.2	
with rated current	W	0.5	
Recommended distance between relays mounted on PCB	mm	≥ 5	

Contact specification

F 34 - Electrical life (AC) v contact current



H 34 - Maximum DC1 breaking capacity



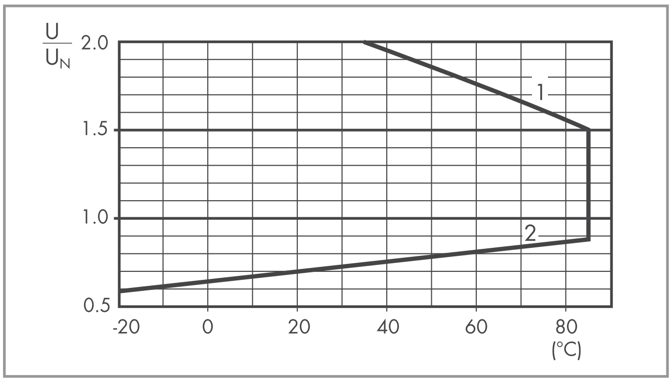
- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of ≥ $60 \cdot 10^3$ can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load. Note: the release time for the load will be increased.

Coil specifications

DC coil data

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
5	**7**.005	3.5	7.5	130	38.4
12	**7**.012	8.4	18	840	14.2
24	**7**.024	16.8	36	3,350	7.1
48	**7**.048	33.6	72	12,300	3.9
60	**7**.060	42	90	19,700	3

R 34 - DC coil operating range v ambient temperature



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

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Solid state relay

A

Technical data

EMC specifications		Reference standard	
Electrostatic discharge	contact discharge	EN 61000-4-2	4 kV
	air discharge	EN 61000-4-2	8 kV
Fast transients on supply terminals (burst 5/50 ns, 5 kHz)		EN 61000-4-4	2 kV
Voltage pulses on supply terminals (surge 1.2/50 μs)	common mode	EN 61000-4-5	0.5 kV
	differential mode	EN 61000-4-5	0.5 kV
Other data			
Power lost to the environment	without output current	W	0.17
	with rated current	W	0.4

Input specification

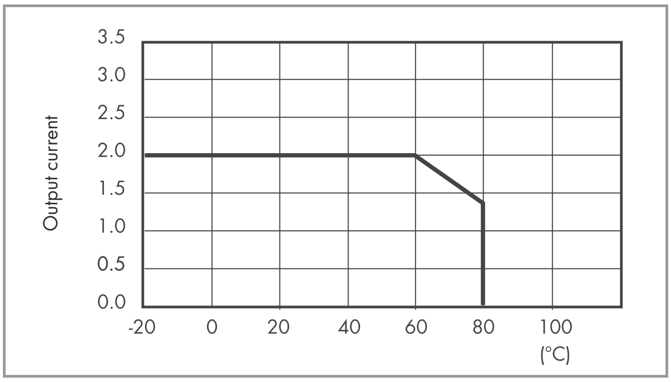
Input data - DC types

Nominal voltage U_N	Input code	Operating range U_{min}	U_{max}	Release voltage	Impedance	Control current I at U_N
V		V	V	V	Ω	mA
5	**7**.005	3.5	12 (10*)	1	715 (416*)	7 (12*)
12	**7**.012	8	17	4	1,940	7.2
24	**7**.024	16	30	10	3,200	7
60	**7**.060	35	72	20	21,300	3

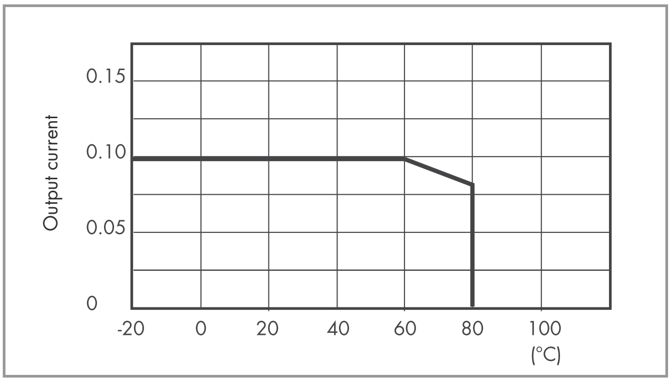
* AC Output version.

Output specification

L 34 - Output current v ambient temperature
SSR - 2 A DC & AC output types

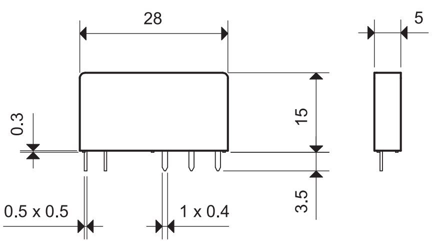


L 34 - Output current v ambient temperature
SSR - 0.1 A DC output types

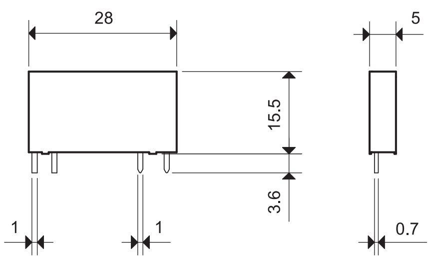


Outline drawings

Type 34.51



Type 34.81



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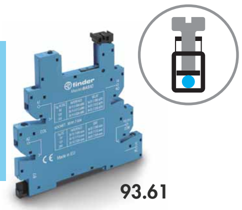
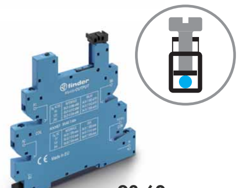
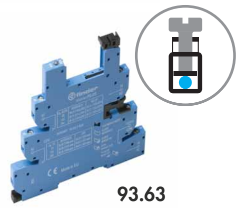
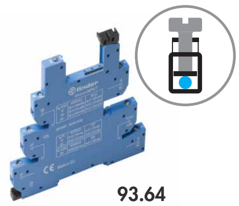

93.61


93.62


93.63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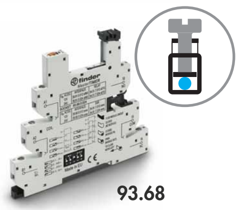

93.68

Approvals
(according to type):

Screw terminal socket 35mm rail mounting (EN 60715) NEW

Common features

- Space saving 6.2 mm wide
- Connections for 16-way jumper link
- Integral coil indication and protection circuit
- Secure retention and easy ejection by plastic clip
- Dual screw head (blade+cross) terminals

For technical data and supply versions, refer to the *Master**INTERFACE*** **39 Series** – “Relay interface module”

Electromechanical Relay - EMR

Supply voltage	Relay type	Socket type (reference with the 39 Series)				
		*Master**BASIC*** (39.11.....)	*Master**PLUS*** (39.31.....)	*Master**INPUT*** (39.41.....)	*Master**OUTPUT*** (39.21.....)	*Master**TIMER*** (39.81.....)
6 V AC/DC	34.51.7.005.xx10	93.61.7.024	93.63.7.024	93.64.7.024	93.62.7.024	—
12 V AC/DC	34.51.7.012.xx10	93.61.7.024	93.63.7.024	93.64.7.024	93.62.7.024	93.68.0.024
24 V AC/DC	34.51.7.024.xx10	93.61.7.024	93.63.7.024	93.64.7.024	93.62.7.024	93.68.0.024
60 V AC/DC	34.51.7.060.xx10	—	93.63.7.060	—	—	—
(110...125)V AC/DC*	34.51.7.060.xx10	—	93.63.3.125	—	—	—
(220...240)V AC*	34.51.7.060.xx10	—	93.63.3.230	—	—	—
(110...125)V AC/DC	34.51.7.060.xx10	93.61.0.125	93.63.0.125	93.64.0.125	93.62.0.125	—
(24...240)V AC/DC	34.51.7.024.xx10	—	93.63.0.240	—	—	—
(220...240)V AC	34.51.7.060.xx10	93.61.8.230	93.63.8.230	93.64.8.230	93.62.8.230	—
(110...125) V DC	34.51.7.060.xx10	—	93.63.7.125	—	—	—
220 V DC	34.51.7.060.xx10	—	93.63.7.220	—	—	—

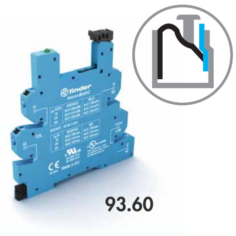
* Leakage current suppression

Solid State Relay - SSR

Supply voltage	Relay type	Socket type (reference with the 39 Series)				
		*Master**BASIC*** (39.10.....)	*Master**PLUS*** (39.30.....)	*Master**INPUT*** (39.40.....)	*Master**OUTPUT*** (39.20.....)	*Master**TIMER*** (39.80.....)
12 V AC/DC	34.81.7.012.xxxx	—	—	—	—	93.68.0.024
24 V AC/DC	34.81.7.024.xxxx	—	93.63.0.024	93.64.0.024	—	93.68.0.024
(110...125)V AC/DC*	34.81.7.060.xxxx	—	93.63.3.125	—	—	—
(220...240)V AC*	34.81.7.060.xxxx	—	93.63.3.230	—	—	—
(110...125)V AC/DC	34.81.7.060.xxxx	93.61.0.125	93.63.0.125	93.64.0.125	93.62.0.125	—
(24...240)V AC/DC	34.81.7.024.xxxx	—	93.63.0.240	—	—	—
(220...240)V AC	34.81.7.060.xxxx	93.61.8.230	93.63.8.230	93.64.8.230	93.62.8.230	—
6 V DC	34.81.7.005.xxxx	93.61.7.024	93.63.7.024	93.64.7.024	93.62.7.024	—
12 V DC	34.81.7.012.xxxx	93.61.7.024	93.63.7.024	93.64.7.024	93.62.7.024	—
24 V DC	34.81.7.024.xxxx	93.61.7.024	93.63.7.024	93.64.7.024	93.62.7.024	—
60 V DC	34.81.7.060.xxxx	—	93.63.7.060	—	—	—
(110...125) V DC	34.81.7.060.xxxx	—	93.63.7.125	—	—	—
220 V DC	34.81.7.060.xxxx	—	93.63.7.220	—	—	—

* Leakage current suppression

Accessories		
16-way jumper link		093.16 (blue), 093.16.0 (black), 093.16.1 (red)
Dual-purpose plastic separator		093.60
Sheet of marker tags		060.72
Technical data		
Rated values		6 A – 250 V
Dielectric strength		6 kV (1.2/50 μs) between coil and contacts
Protection category		IP20
Ambient temperature	°C	–40…+70
Screw torque	Nm	0.5
Wire strip length	mm	10
Max wire size		Solid wire and stranded wire
	mm^2	1 x (0.2...2.5) / 2 x 1.5
	AWG	1 x (24...14) / 2 x 16

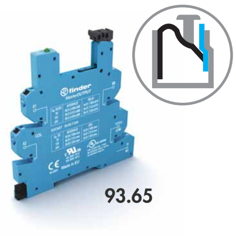

93.60

Push-In terminal socket 35mm rail mounting (EN 60715) NEW

Common features

- Space saving 6.2 mm wide
- Connections for 16-way jumper link
- Terminal doubler 093.62
- Integral coil indication and protection circuit
- Secure retention and easy ejection by plastic clip

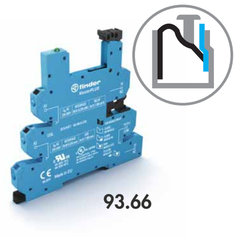
For technical data and supply versions, refer to the *Master***INTERFACE 39 Series** – “Relay interface module”

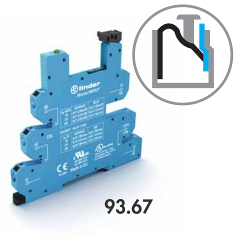

93.65

Electromechanical Relay - EMR

Supply voltage	Relay type	**Socket type** (reference with the 39 Series)				
		*Master***BASIC** (39.01…..)	*Master***PLUS** (39.61…..)	*Master***INPUT** (39.71…..)	*Master***OUTPUT** (39.51…..)	*Master***TIMER** (39.91…..)
6 V AC/DC	34.51.7.005.xx10	93.60.7.024	93.66.7.024	93.67.7.024	93.65.7.024	—
12 V AC/DC	34.51.7.012.xx10	93.60.7.024	93.66.7.024	93.67.7.024	93.65.7.024	93.69.0.024
24 V AC/DC	34.51.7.024.xx10	93.60.7.024	93.66.7.024	93.67.7.024	93.65.7.024	93.69.0.024
60 V AC/DC	34.51.7.060.xx10	—	93.66.7.060	—	—	—
(110…125)V AC/DC*	34.51.7.060.xx10	—	93.66.3.125	—	—	—
(220…240)V AC*	34.51.7.060.xx10	—	93.66.3.230	—	—	—
(110…125)V AC/DC	34.51.7.060.xx10	93.60.0.125	93.66.0.125	93.67.0.125	93.65.0.125	—
(24…240)V AC/DC	34.51.7.024.xx10	—	93.66.0.240	—	—	—
(220…240)V AC	34.51.7.060.xx10	93.60.8.230	93.66.8.230	93.67.8.230	93.65.8.230	—
(110…125) V DC	34.51.7.060.xx10	—	93.66.7.125	—	—	—
220 V DC	34.51.7.060.xx10	—	93.66.7.220	—	—	—

* Leakage current suppression


93.66


93.67

Solid State Relay - SSR

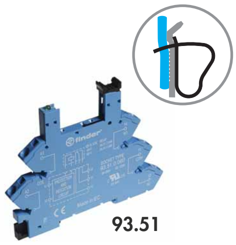
Supply voltage	Relay type	**Socket type** (reference with the 39 Series)				
		*Master***BASIC** (39.00…..)	*Master***PLUS** (39.60…..)	*Master***INPUT** (39.70…..)	*Master***OUTPUT** (39.50…..)	*Master***TIMER** (39.90…..)
12 V AC/DC	34.81.7.012.xxxx	—	—	—	—	93.69.0.024
24 V AC/DC	34.81.7.024.xxxx	—	93.66.0.024	93.67.0.024	—	93.69.0.024
(110…125)V AC/DC*	34.81.7.060.xxxx	—	93.66.3.125	—	—	—
(220…240)V AC*	34.81.7.060.xxxx	—	93.66.3.230	—	—	—
(110…125)V AC/DC	34.81.7.060.xxxx	93.60.0.125	93.66.0.125	93.67.0.125	93.65.0.125	—
(24…240)V AC/DC	34.81.7.024.xxxx	—	93.66.0.240	—	—	—
(220…240)V AC	34.81.7.060.xxxx	93.60.8.230	93.66.8.230	93.67.8.230	93.65.8.230	—
6 V DC	34.81.7.005.xxxx	93.60.7.024	93.66.7.024	93.67.7.024	93.65.7.024	—
12 V DC	34.81.7.012.xxxx	93.60.7.024	93.66.7.024	93.67.7.024	93.65.7.024	—
24 V DC	34.81.7.024.xxxx	93.60.7.024	93.66.7.024	93.67.7.024	93.65.7.024	—
60 V DC	34.81.7.060.xxxx	—	93.66.7.060	—	—	—
(110…125) V DC	34.81.7.060.xxxx	—	93.66.7.125	—	—	—
220 V DC	34.81.7.060.xxxx	—	93.66.7.220	—	—	—

* Leakage current suppression


93.69

Approvals
(according to type):

Accessories		
16-way jumper link		093.16 (blue), 093.16.0 (black), 093.16.1 (red)
Dual-purpose plastic separator		093.60
Terminal doubler		093.62
Sheet of marker tags		060.72
Technical data		
Rated values		6 A – 250 V
Dielectric strength		6 kV (1.2/50 μs) between coil and contacts
Protection category		IP20
Ambient temperature	°C	–40…+70
Wire strip length	mm	8
Max wire size		Solid wire and stranded wire
	mm^2	1 x (0.2…2.5)
	AWG	1 x (24…14)



93.51

Approvals
(according to type):

RINA

Certain relay/socket combinations

Screw less terminal socket 35mm rail mounting (EN 60715)

Common features

- Space saving 6.2 mm wide
- Connections for 20-way jumper link
- Integral coil indication and protection circuit
- Secure retention and easy ejection by plastic clip

For technical data and supply versions, refer to the **38 Series** – "Relay interface module"

Electromechanical Relay - EMR and Solid State Relay - SSR

Supply voltage	**Relay type** (reference with the 38 Series)		Socket type
	Electromechnanical relay - EMR (38.61.....)	**Solid State Relay - SSR** (38.81.....)	
12 V AC/DC	34.51.7.012.xx10	—	93.51.0.024
24 V AC/DC	34.51.7.024.xx10	—	93.51.0.024
(110...125)V AC/DC	34.51.7.060.xx10	34.81.7.060.xxxx	93.51.0.125
(220...240)V AC/DC	34.51.7.060.xx10	34.81.7.060.xxxx	93.51.0.240
(110...125)V AC/DC *	34.51.7.060.xx10	34.81.7.060.xxxx	93.51.3.125
(220...240)V AC *	34.51.7.060.xx10	34.81.7.060.xxxx	93.51.3.240
(220...240)V AC	34.51.7.060.xx10	34.81.7.060.xxxx	93.51.8.240
12 V DC	34.51.7.012.xx10	34.81.7.012.xxxx	93.51.7.024
24 V DC	34.51.7.024.xx10	34.81.7.024.xxxx	93.51.7.024
60 V DC	34.51.7.060.xx10	34.81.7.060.xxxx	93.51.7.060

* Leakage current suppression

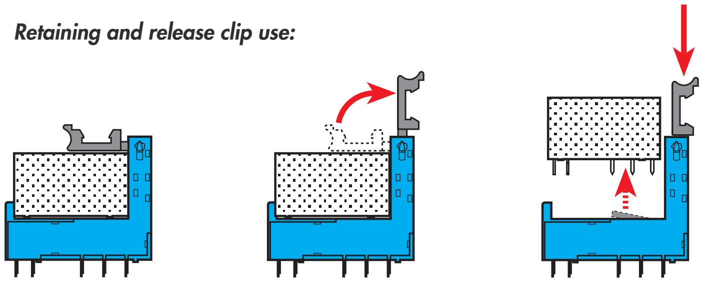
Accessories		
20-way jumper link		093.20
Plastic separator		093.01
Sheet of marker tags		093.64
Technical data		
Rated values		6 A – 250 V
Dielectric strength		6 kV (1.2/50 μs) between coil and contacts
Protection category		IP20
Ambient temperature (U_N≤ 60 V/> 60 V)	°C	–40...+70/–40...+55
Wire strip length	mm	10
Max wire size		Solid wire and stranded wire
	mm2	1 x 2.5 / 2 x 1.5
	AWG	1 x 14 / 2 x 16

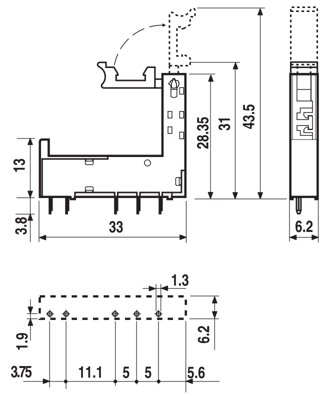

93.11

Approvals
(according to type):

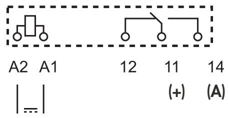
PCB socket with retaining and release clip	**93.11 (blue)**
For relay type	34.51, 34.81
Technical data	
Rated values	6 A - 250 V
Dielectric strength	≥ 6 kV (1.2/50 μs) between coil and contacts
Protection category	IP 20
Ambient temperature °C	–40…+70

Retaining and release clip use:





Copper side view



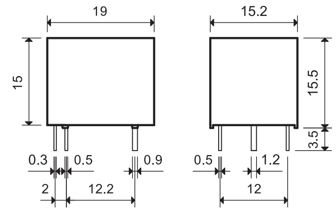
Features

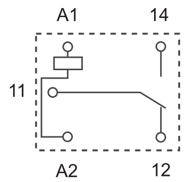
Printed circuit mount 10 A relay

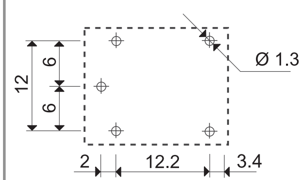
- New smaller size
- 1 Pole changeover contacts
- Miniature - "Sugar cube" package
- DC coil - 360 mW
- Wash tight: RT III
- Cadmium Free contact material
- RoHS conform

36.11-4011

- 1 CO (SPDT), 10 A
- Sugar cube size
- PCB mount







Copper side view

Contact specification		
Contact configuration		1 CO (SPDT)
Rated current/Maximum peak current	A	10/15
Rated voltage/Maximum switching voltage	V AC	250/250
Rated load AC1	VA	2,500
Rated load AC15 (230 V AC)	VA	500
Single phase motor rating (230 V AC)	kW	0.37
Breaking capacity DC1: 30/110/220 V	A	10/0.3/0.12
Minimum switching load	mW (V/mA)	500 (5/100)
Standard contact material		$AgSnO_2$
Coil specification		
Nominal voltage (U_N)	V AC (50/60 Hz)	–
	V DC	3 - 5 - 6 - 9 - 12 - 18 - 24 - 48
Rated power AC/DC	VA (50 Hz)/W	–/0.36
Operating range	AC	–
	DC	$(0.75\ldots1.3)U_N$
Holding voltage	AC/DC	–/0.4 U_N
Must drop-out voltage	AC/DC	–/0.1 U_N
Technical data		
Mechanical life AC/DC	cycles	$–/10 \cdot 10^6$
Electrical life at rated load AC1	cycles	$50 \cdot 10^3$
Operate/release time	ms	10/5
Insulation between coil and contacts (1.2/50 μs)	kV	4
Dielectric strength between open contacts	V AC	750
Ambient temperature range	°C	–40…+85
Environmental protection		RT III
Approvals (according to type)		

III-2014, www.findernet.com

Ordering information

Example: 36 series miniature PCB relay, 1 CO (SPDT) - 10 A contacts, 12 V DC coil.

					A	B	C	D
3 6	. 1	1	. 9	. 0 1 2	. 4	0	1	1

Series

Type
1 = PCB mount

No. of poles
1 = 1 pole, 10 A

Coil version
9 = DC

Coil voltage
See coil specifications

A: Contact material
4 = $AgSnO_2$

B: Contact circuit
0 = CO (SPDT)

D: Special versions
1 = Wash tight (RT III)

C: Options
1 = None

Selecting features and options: only combinations in the same row are possible.
Preferred selections for best availability are shown in **bold.**

Type	Coil version	A	B	C	D
36.11	DC	**4**	**0**	**1**	**1**

Technical data

Insulation according to EN 61810-1		
Nominal voltage of supply system	V AC	230/400
Rated insulation voltage	V AC	250
Pollution degree		2
Insulation between coil and contact set		
Type of insulation		Basic
Overvoltage category		II
Rated impulse voltage	kV (1.2/50 μs)	4
Dielectric strength	V AC	2,500
Insulation between open contacts		
Type of disconnection		Micro-disconnection
Dielectric strength	V AC/kV (1.2/50 μs)	750/1.5
Other data		
Shock resistance	g	10
Bounce time: NO/NC	ms	1/6
Vibration resistance (5…55Hz): NO/NC	g	14/8
Power lost to the environment		
without contact current	W	0.4
with rated current	W	1.4
Recommended distance between relays mounted on PCB	mm	≥ 5

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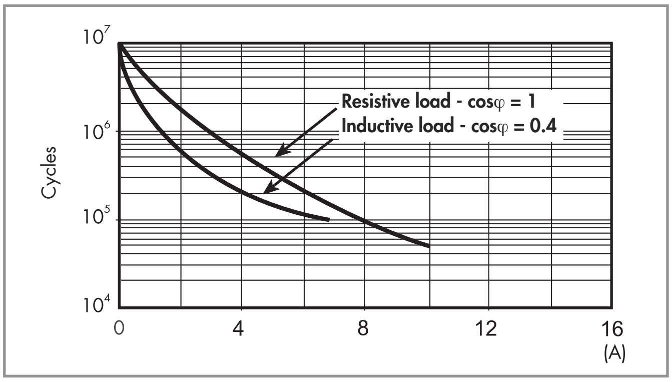
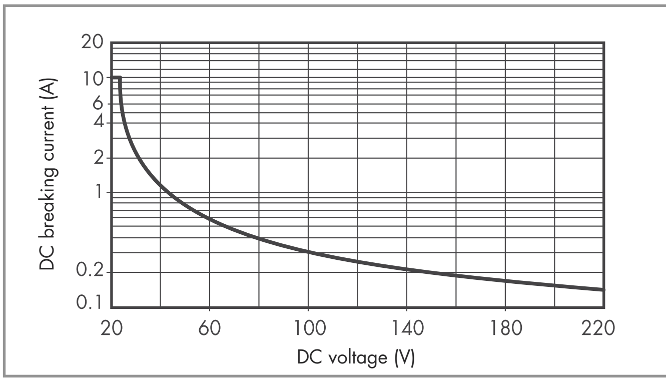
Contact specification

F 36 - Electrical life (AC) v contact current



H 36 - Maximum DC1 breaking capacity



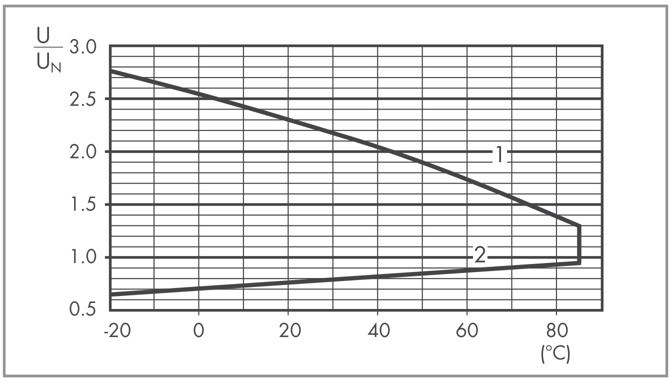
- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of ≥ $50 \cdot 10^3$ can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load. Note: the release time for the load will be increased.

Coil specifications

DC coil data

Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
3	**9**.003	2.2	3.9	25	120
5	**9**.005	3.7	6.5	70	72
6	**9**.006	4.5	7.8	100	60
9	**9**.009	6.7	11.7	225	40
12	**9**.012	9	15.6	400	30
18	**9**.018	13.5	23.4	900	20
24	**9**.024	18	31.2	1,600	15
48	**9**.048	36	62.4	6,400	7.5

R 36 - DC coil operating range v ambient temperature



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

Features

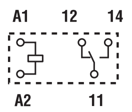
1 & 2 Pole relay range
40.31 - 1 Pole 10 A (3.5 mm pin pitch)
40.51 - 1 Pole 10 A (5 mm pin pitch)
40.52 - 2 Pole 8 A (5 mm pin pitch)

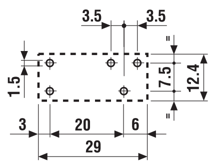
PCB mount
- direct or via PCB socket
35 mm rail mount
- via screw and screwless sockets

- DC coils (standard or sensitive) & AC coils
- Cadmium Free contact material
- 8 mm, 6 kV (1.2/50 μs) isolation, coil-contacts
- UL Listing (certain relay/socket combinations)
- Flux proof: RT II standard, (RT III option)
- 95 series sockets
- Coil EMC suppression
- Timer accessories 86 series

40.31

- 3.5 mm contact pin pitch
- 1 Pole 10 A
- PCB or 95 series sockets



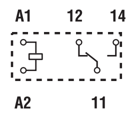


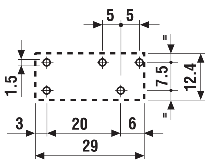
Copper side view

Pin length 5.3 mm for PCB or sockets

40.51

- 5 mm contact pin pitch
- 1 Pole 10 A
- PCB or 95 series sockets



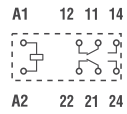


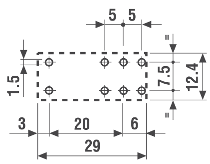
Copper side view

Pin length 5.3 mm for PCB or sockets

40.52

- 5 mm contact pin pitch
- 2 Pole 8 A
- PCB or 95 series sockets





Copper side view

Pin length 5.3 mm for PCB or sockets

For UL ratings see:
"General technical information" page V

For outline drawing see page 10

		40.31	40.51	40.52
Contact specification				
Contact configuration		1 CO (SPDT)	1 CO (SPDT)	2 CO (DPDT)
Rated current/Maximum peak current	A	10/20	10/20	8/15
Rated voltage/Maximum switching voltage	V AC	250/400	250/400	250/400
Rated load AC1	VA	2,500	2,500	2,000
Rated load AC15 (230 V AC)	VA	500	500	400
Single phase motor rating (230 V AC)	kW	0.37	0.37	0.3
Breaking capacity DC1: 30/110/220 V	A	10/0.3/0.12	10/0.3/0.12	8/0.3/0.12
Minimum switching load	mW (V/mA)	300 (5/5)	300 (5/5)	300 (5/5)
Standard contact material		AgNi	AgNi	AgNi
Coil specification				
Nominal voltage (U_N)	V AC (50/60 Hz)	6 - 12 - 24 - 48 - 60 - 110 - 120 - 230 - 240		
	V DC	5 - 6 - 7 - 9 - 12 - 14 - 18 - 21 - 24 - 28 - 36 - 48 - 60 - 90 - 110 - 125		
Rated power AC/DC/sens. DC	VA (50 Hz)/W/W	1.2/0.65/0.5	1.2/0.65/0.5	1.2/0.65/0.5
Operating range	AC	(0.8…1.1)U_N	(0.8…1.1)U_N	(0.8…1.1)U_N
	DC/sens. DC	(0.73…1.5)U_N/(0.73…1.5)U_N	(0.73…1.5)U_N/(0.73…1.5)U_N	(0.73…1.5)U_N/(0.73…1.5)U_N
Holding voltage	AC/DC	0.8 U_N /0.4 U_N	0.8 U_N /0.4 U_N	0.8 U_N /0.4 U_N
Must drop-out voltage	AC/DC	0.2 U_N /0.1 U_N	0.2 U_N /0.1 U_N	0.2 U_N /0.1 U_N
Technical data				
Mechanical life	cycles	$10 \cdot 10^6$	$10 \cdot 10^6$	$10 \cdot 10^6$
Electrical life at rated load AC1	cycles	$200 \cdot 10^3$	$200 \cdot 10^3$	$100 \cdot 10^3$
Operate/release time	ms	7/3 - (12/4 sensitive)	7/3 - (12/4 sensitive)	7/3 - (12/4 sensitive)
Insulation between coil and contacts (1.2/50 μs)	kV	6 (8 mm)	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts	V AC	1,000	1,000	1,000
Ambient temperature range	°C	–40…+85	–40…+85	–40…+85
Environmental protection		RT II**	RT II**	RT II**
Approvals (according to type)		RINA		

** See general technical information "Guidelines for automatic flow solder processes" page II .

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40 Series - Miniature PCB/Plug-in relays 8 - 10 - 12 - 16 A

Features

40.61 - 1 Pole 16 A (5 mm pin pitch)
40.xx.6 - Bistable versions of the 40.31, 40.51, 40.52 & 40.61 relays

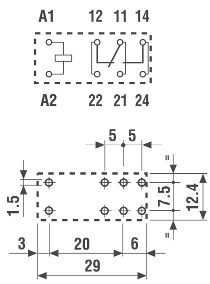
PCB mount
- **direct or via PCB socket**

35 mm rail mount
- **via screw and screwless sockets**

- DC coils & AC coils
- Cadmium Free option available
- 8 mm, 6 kV (1.2/50 μs) isolation, coil-contacts
- UL Listing (certain 40.61 relay/socket combinations)
- Flux proof: RT II standard, (RT III option)
- 95 series sockets
- Coil EMC suppression
- Timer accessories 86 series

40.61

- 5 mm contact pin pitch
- 1 Pole 16 A
- PCB or 95 series sockets



Copper side view

Pin length 5.3 mm for PCB or sockets

40.xx.6

- Bistable (single coil) versions of 40.31/51/52/61
- PCB or 95 series sockets

Bistable version (1 coil) types:

40.31.6...
40.51.6...
40.52.6...
40.61.6...

For wiring diagrams see page 9

Pin length 5.3 mm for PCB or sockets

For UL ratings see:
"General technical information" page V

For outline drawing see page 10

	40.61	40.xx.6
Contact specification		
Contact configuration	1 CO (SPDT)	
Rated current/Maximum peak current A	16/30*	
Rated voltage/Maximum switching voltage V AC	250/400	See relays
Rated load AC1 VA	4,000	40.31
Rated load AC15 (230 V AC) VA	750	40.51
Single phase motor rating (230 V AC) kW	0.55	40.52
Breaking capacity DC1: 30/110/220 V A	16/0.3/0.12	40.61
Minimum switching load mW (V/mA)	500 (10/5)	
Standard contact material	AgCdO	
Coil specification		
Nominal voltage (U_N) V AC (50/60 Hz)	6-12-24-48-60-110-120-230-240	5 - 6 - 12 - 24 - 48 - 110
V DC	***See table	5 - 6 - 12 - 24 - 48 - 110
Rated power AC/DC/sens. DC VA (50 Hz)/W/W	1.2/0.65/0.5	1.0/1.0/—
Operating range AC	(0.8…1.1)U_N	(0.8…1.1)U_N
DC/sens. DC	(0.73…1.5)U_N/(0.8…1.5)U_N	(0.8…1.1)U_N/—
Holding voltage AC/DC	0.8 U_N /0.4 U_N	—
Must drop-out voltage AC/DC	0.2 U_N /0.1 U_N	—
Technical data		
Mechanical life cycles	10 · 10^6	See relays
Electrical life at rated load AC1 cycles	100 · 10^3	40.31
Operate/release time ms	7/3 - (12/4 sensitive)	40.51
Insulation between coil and contacts (1.2/50 μs) kV	6 (8 mm)	40.52
Dielectric strength between open contacts V AC	1,000	40.61
Ambient temperature range °C	–40…+85	Min. impulse duration
Environmental protection	RT II**	≥ 20 ms
Approvals (according to type)		

* With the $AgSnO_2$ material the maximum peak current is 120 A - 5 ms on normally open contact.

*** Nominal voltage (U_N):
5 - 6 - 7 - 9 - 12 - 14 - 18 - 21 - 24 - 28 - 36 - 48 - 60 - 90 - 110 - 125 V DC

RINA

** See general technical information "Guidelines for automatic flow solder processes" page II.

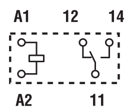
Features

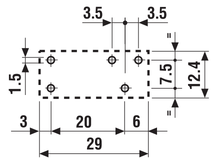
1 Pole relay range
40.31 - 1 Pole 12 A (3.5 mm pin pitch)
40.61 - 1 Pole 16 A (5 mm pin pitch)

- Pin length 3.5 mm for pcb mount
- Pin length 5.3 mm as Plug-in relay
- DC standard (0.65 W) or sensitive (0.5 W) coils available
- Cadmium Free contact material available
- 6 kV (1.2/50 μs) isolation coil-contacts
- 8 mm creepage and clearance distances between coil and contacts
- Meets EN 60335-1 glow wire requirements
- Flux proof: RT II standard or wash tight RT III
- AC inductive load rating (related to AC15 utilisation category) 4 A 250 V approved according to EN 61810-1:2008 (Annex B tables B1, B2, B3)

40.31

- 3.5 mm contact pin pitch
- 1 Pole 12 A (on PCB; 10 A with socket)
- PCB or 95 series sockets





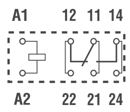
Copper side view

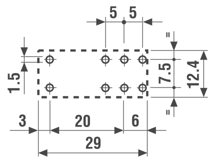
Pin length 3,5 mm for PCB only
Pin length 5.3 mm for PCB or sockets

See ordering information

40.61

- 5 mm contact pin pitch
- 1 Pole 16 A
- PCB or 95 series sockets





Copper side view

Pin length 3,5 mm for PCB only
Pin length 5.3 mm for PCB or sockets

See ordering information

* mounted on sockets ≤ 10 A

For outline drawing see page 10

		40.31	40.61
Contact specification			
Contact configuration		1 CO (SPDT)	1 CO (SPDT)
Rated current/Maximum peak current	A	12*/20	16/30
Rated voltage/Maximum switching voltage	V AC	250/400	250/400
Rated load AC1	VA	3,000	4,000
Rated load AC15 (230 V AC)	VA	1,000	1,000
Single phase motor rating (230 V AC)	kW	0.55	0.55
Breaking capacity DC1: 30/110/220 V	A	12/0.3/0.12	16/0.3/0.12
Minimum switching load	mW (V/mA)	300 (5/5)	500 (10/5)
Standard contact material		AgNi	AgCdO
Coil specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	—	—
	V DC	12 - 24	12 - 24
Rated power DC/sensitive DC	W	0.65/0.5	0.65/0.5
Operating range	AC	—	—
	DC/sensitive DC	(0.73…1.5)U_N/(0.73…1.5)U_N	(0.73…1.5)U_N/(0.8…1.5)U_N
Holding voltage	DC	0.4 U_N	0.4 U_N
Must drop-out voltage	DC	0.1 U_N	0.1 U_N
Technical data			
Mechanical life	cycles	$10 \cdot 10^6$	$10 \cdot 10^6$
Electrical life at rated load AC1	cycles	$200 \cdot 10^3$	$100 \cdot 10^3$
Operate/release time	ms	7/3 (10/3 sensitive)	7/3 (10/3 sensitive)
Insulation between coil and contacts (1.2/50 μs)	kV	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts	V AC	1,000	1,000
Ambient temperature range	°C	–40…+85	–40…+85
Environmental protection		RT II**	RT II**
Approvals (according to type)			RINA

** See general technical information “Guidelines for automatic flow solder processes” page II.

Features

A

1 Pole relay range
- 1 Pole 10 A (Flat pack)

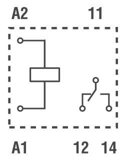
- DC coils
- Cadmium Free option available
- 8 mm, 6 kV (1.2/50 μs) isolation, coil-contacts

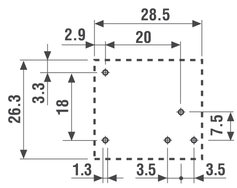
FOR UL RATINGS SEE:
"General technical information" page V

For outline drawing see page 10

40.11

- 1 Pole 10 A
- Flat pack
- PCB mount





Copper side view

Pin length 3.5 mm for PCB only

Contact specification		
Contact configuration		1 CO (SPDT)
Rated current/Maximum peak current	A	10/20
Rated voltage/Maximum switching voltage	V AC	250/400
Rated load AC1	VA	2,500
Rated load AC15 (230 V AC)	VA	500
Single phase motor rating (230 V AC)	kW	0.37
Breaking capacity DC1: 30/110/220 V	A	10/0.3/0.12
Minimum switching load	mW (V/mA)	300 (5/5)
Standard contact material		AgCdO
Coil specification		
Nominal voltage (U_N)	V AC (50/60 Hz)	—
	V DC	6 - 12 - 24 - 48 - 60
Rated power AC/DC/sens. DC	VA (50 Hz)/W/W	—/—/0.5
Operating range	AC	—
	DC/sens. DC	—/(0.73…1.75)U_N
Holding voltage	AC/DC	—/0.4 U_N
Must drop-out voltage	AC/DC	—/0.1 U_N
Technical data		
Mechanical life	cycles	$20 \cdot 10^6$
Electrical life at rated load AC1	cycles	$200 \cdot 10^3$
Operate/release time	ms	12/4
Insulation between coil and contacts (1.2/50 μs)	kV	6 (8 mm)
Dielectric strength between open contacts	V AC	1,000
Ambient temperature range	°C	–40…+70
Environmental protection		RT I
Approvals (according to type)		

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Ordering information

Example: 40 series PCB relay, 2 CO (DPDT), 230 V AC coil.

									A	B	C	D
4	0	. 5	. 2	. 8	. 2	3	0	.	0	0	0	0

Series

Type
1 = PCB - 3.5 mm pinning, flat
3 = PCB/Plug-in - 3.5 mm pinning
5 = PCB/Plug-in - 5 mm pinning
6 = PCB/Plug-in - 5 mm pinning

No. of poles
1 = 1 pole
2 = 2 pole

Coil version
6 = AC/DC bistable
7 = Sensitive DC, 0.5 W
8 = AC (50/60 Hz)
9 = Standard DC, 0.65 W

Coil voltage
See coil specifications

A: Contact material
See table below

B: Contact circuit
0 = CO (nPDT)
3 = NO (nPST)

D: Special versions
0 = Standard
1 = Wash tight (RT III)
3 = High temperature (+ 125 °C) wash tight

C: Options
0 = Pins length 5.3 mm (Plug-in relays)
2 = Pins length 3.5 mm (PCB relays)

Selecting features and options: only combinations in the same row are possible.
Preferred selections for best availability are shown in **bold**.

Terminal pin	Type	Coil version	A	B	C	D
PCB relay,	40.11	Sensitive DC	**2** (AgCdO) - 4 ($AgSnO_2$)	**0**	**0**	**0**
pin length 3.5 mm	40.31*	Standard DC/sensitive DC	**1** (AgNi)	**0** - 3	**2**	**0** - 1
	40.61*	Standard DC/sensitive DC	1 (AgNi) - **2** (AgCdO)	**0** - 3	**2**	**0** - 1
PCB/Plug-in relay,	40.31*/51	AC/sensitive DC	**0** (AgNi) - 2 (AgCdO) - 5 (AgNi+Au)	**0** - 3	**0**	**0** - 1
pin length 5.3 mm	40.31*/51	Standard DC	**0** (AgNi) - 2 (AgCdO) - 5 (AgNi+Au)	**0** - 3	**0**	**0** - 1 - 3
	40.52	AC/sensitive DC	**0** (AgNi) - 2 (AgCdO) - 5 (AgNi+Au)	**0** - 3	**0**	**0** - 1
	40.52	Standard DC	**0** (AgNi) - 2 (AgCdO) - 5 (AgNi+Au)	**0** - 3	**0**	**0** - 1 - 3
	40.61*	AC/sensitive DC	**0** (AgCdO) - 4 ($AgSnO_2$)	**0** - 3	**0**	**0** - 1
	40.61*	Standard DC	**0** (AgCdO) - 4 ($AgSnO_2$)	**0** - 3	**0**	**0** - 1 - 3
	40.31/51/52	Bistable	**0** (AgNi)	**0**	**0**	**0**
	40.61	Bistable	**0** (AgCdO)	**0**	**0**	**0**

40.31	**40.31 New**	**40.61**	**40.61 New**
1 pole 10 A	1 pole 12 A	1 pole 16 A	1 pole 16 A
			
3.5 mm pin pitch For socket** or pcb mount pin length 5.3 mm		5 mm pin pitch For socket or pcb mount pin length 5.3 mm	

* As the result of new production lines and increased production capacity, the design/specification of the DC versions with standard contact material is being changed to align with PCB relay versions 40.x1...20. For full technical data refer to page 3.
** For 40.31 relays mounted on sockets, the maximum rated current must be limited to 10 A.

A

Technical data

Insulation according to EN 61810-1						
			1 pole		2 pole	
Nominal voltage of supply system		V AC	230/400		230/400	
Rated insulation voltage		V AC	250	400	250	400
Pollution degree			3	2	3	2
Insulation between coil and contact set						
Type of insulation			Reinforced (8 mm)		Reinforced (8 mm)	
Overvoltage category			III		III	
Rated impulse voltage		kV (1.2/50 μs)	6		6	
Dielectric strength		V AC	4,000		4,000	
Insulation between adjacent contacts						
Type of insulation			—		Basic	
Overvoltage category			—		II	
Rated impulse voltage		kV (1.2/50 μs)	—		2.5	
Dielectric strength		V AC	—		2,000	
Insulation between open contacts						
Type of disconnection			Micro-disconnection		Micro-disconnection	
Dielectric strength		V AC/kV (1.2/50 μs)	1,000/1.5		1,000/1.5	
Conducted disturbance immunity						
Burst (5…50)ns, 5 kHz, on A1 - A2			EN 61000-4-4		level 4 (4 kV)	
Surge (1.2/50 μs) on A1 - A2 (differential mode)			EN 61000-4-5		level 3 (2 kV)	
Other data						
Bounce time: NO/NC		ms	2/5			
Vibration resistance (10…150)Hz: NO/NC		g	20/5 (1 changeover)		14/2 (2 changeover)	
Shock resistance NO/NC		g	20/13 (1 changeover)		20/12 (2 changeover)	
Power lost to the environment	without contact current	W	0.65			
	with rated current	W	1.2 (40.11/31/51)		2 (40.61/52)	
Recommended distance between relays mounted on PCB		mm	≥ 5			

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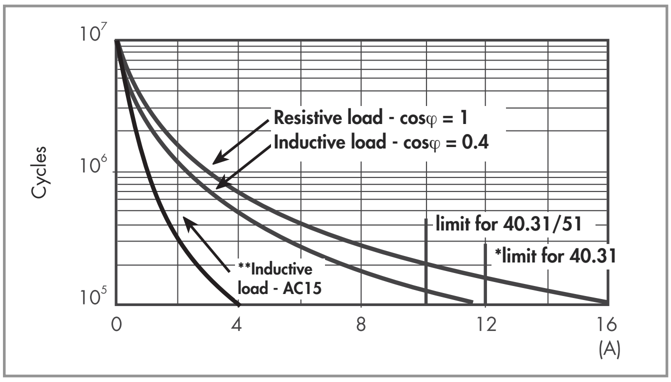
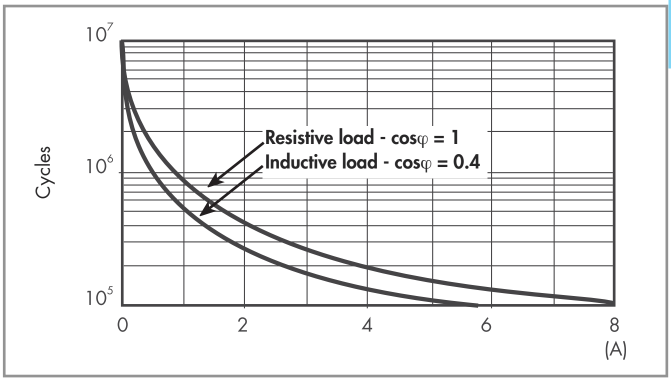
Contact specification

F 40 - Electrical life (AC) v contact current
Types 40.31/51/61

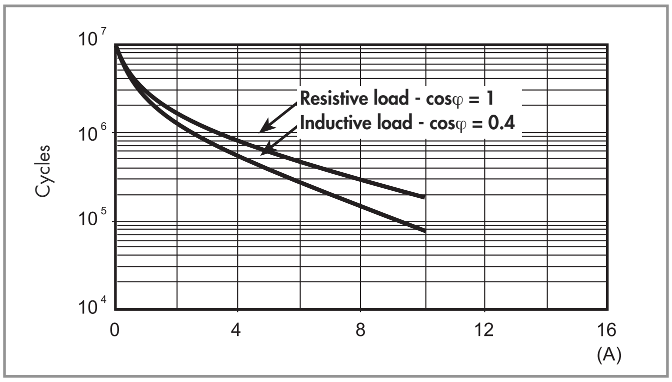


* limit for 40.31, see page 3
** Inductive load - AC15 for 40.31/61, see page 3

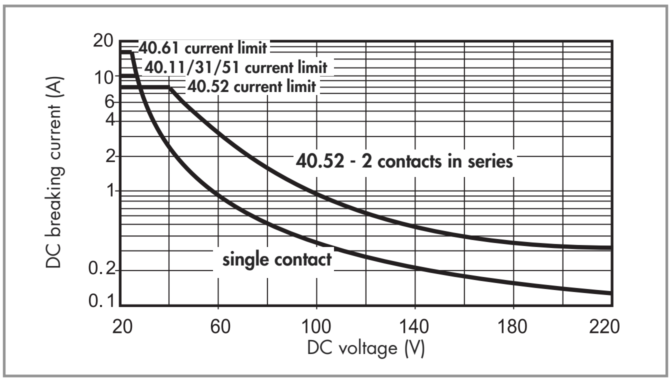
F 40 - Electrical life (AC) v contact current
Type 40.52



F 40 - Electrical life (AC) v contact current
Type 40.11



H 40 - Maximum DC1 breaking capacity



- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of ≥ $100 \cdot 10^3$ can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load. Note: the release time for the load will be increased.

Coil specifications

A

DC coil data - 0.65 W standard (types 40.31/51/52/61)

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
5	**9**.005	3.65	7.5	38	130
6	**9**.006	4.4	9	55	109
7	**9**.007	5.1	10.5	75	94
9	**9**.009	6.6	13.5	125	72
12	**9**.012	8.8	18	220	55
14	**9**.014	10.2	21	300	47
18	**9**.018	13.1	27	500	36
21	**9**.021	15.3	31.5	700	30
24	**9**.024	17.5	36	900	27
28	**9**.028	20.5	42	1,200	23
36	**9**.036	26.3	54	2,000	18
48	**9**.048	35	72	3,500	14
60	**9**.060	43.8	90	5,500	11
90	**9**.090	65.7	135	12,500	7.2
110	**9**.110	80.3	165	18,000	6.2
125	**9**.125	91.2	188	23,500	5.3

DC coil data - 0.5 W sensitive (types 40.31/51/52/61)

Nominal voltage U_N	Coil code	Operating range U_{min}*	U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
5	**7**.005	3.7	7.5	50	100
6	**7**.006	4.4	9	75	80
7	**7**.007	5.1	10.5	100	70
9	**7**.009	6.6	13.5	160	56
12	**7**.012	8.8	18	288	42
14	**7**.014	10.2	21	400	35
18	**7**.018	13.2	27	650	27.7
21	**7**.021	15.4	31.5	900	23.4
24	**7**.024	17.5	36	1,150	21
28	**7**.028	20.5	42	1,600	17.5
36	**7**.036	26.3	54	2,600	13.8
48	**7**.048	35	72	4,800	10
60	**7**.060	43.8	90	7,200	8.4
90	**7**.090	65.7	135	16,200	5.6
110	**7**.110	80.3	165	23,500	4.7
125	**7**.125	91.2	188	32,000	3.9

*U_{min} = 0.8 U_N for 40.61

DC coil data - 0.5 W sensitive (type 40.11)

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
6	**7**.006	4.4	10.5	75	80
12	**7**.012	8.8	21	300	40
24	**7**.024	17.5	42	1,200	20
48	**7**.048	35	84	4,600	10.4
60	**7**.060	43.8	105	7,200	8.3

AC coil data (types 40.31/51/52/61)

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N (50Hz)
V		V	V	Ω	mA
6	**8**.006	4.8	6.6	21	168
12	**8**.012	9.6	13.2	80	90
24	**8**.024	19.2	26.4	320	45
48	**8**.048	38.4	52.8	1,350	21
60	**8**.060	48	66	2,100	16.8
110	**8**.110	88	121	6,900	9.4
120	**8**.120	96	132	9,000	8.4
230	**8**.230	184	253	28,000	5
240	**8**.240	192	264	31,500	4.1

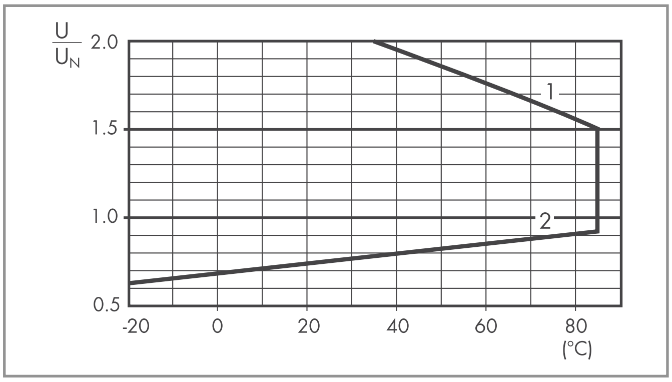
AC/DC coil data - bistable (types 40.31/51/52/61)

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N	DC: Release resistance** R_{DC}
V		V	V	Ω	mA	Ω
5	**6**.005	4	5.5	23	215	37
6	**6**.006	4.8	6.6	33	165	62
12	**6**.012	9.6	13.2	130	83	220
24	**6**.024	19.2	26.4	520	40	910
48	**6**.048	38.4	52.8	2,100	21	3,600
110	**6**.110	88	121	11,000	10	16,500

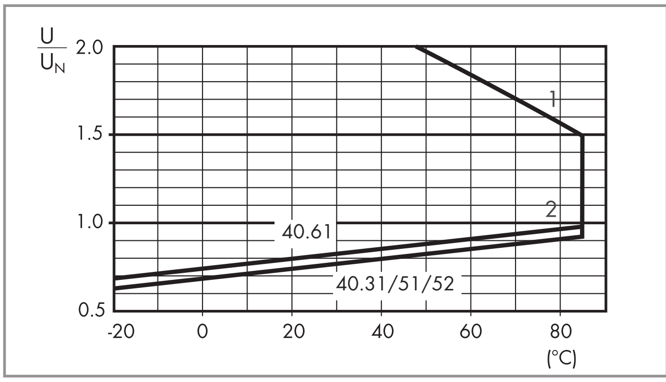
** R_{DC} = Resistance in DC, R_{AC} = 1.3 x R_{DC} 1W

Coil specifications

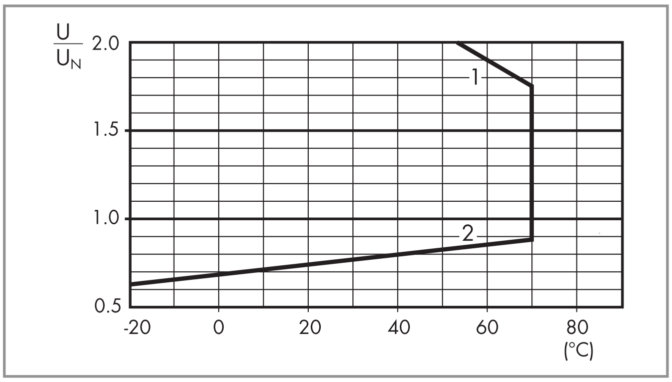
R 40 - DC coil operating range v ambient temperature
Standard coil



R 40 - DC coil operating range v ambient temperature
Sensitive coil, types 40.31/51/52/61

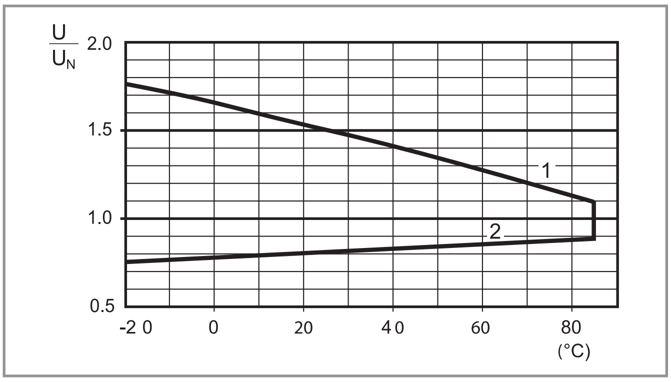


R 40 - DC coil operating range v ambient temperature
Sensitive coil, type 40.11



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

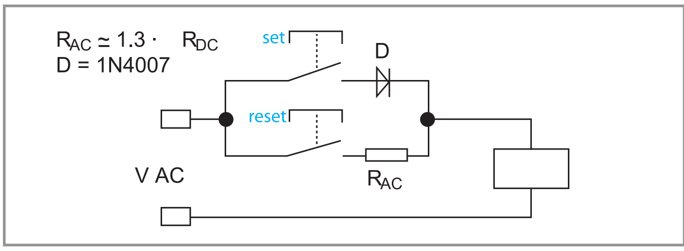
R 40 - AC coil operating range v ambient temperature



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

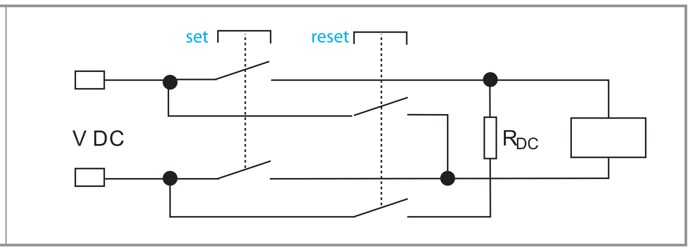
Wiring diagram for 40 series bistable coil version

AC Operation



On momentary closure of the SET switch the relay is magnetised through the diode and the relay contacts transfer to the set position and remain in this position.
On momentary closure of the RESET switch the relay is demagnetised through limiting resistor (R_{AC}) and the contacts return to the reset position.

DC Operation



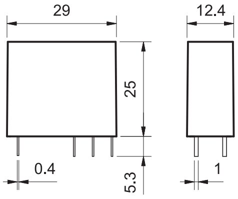
On momentary closure of the SET switch the relay is magnetised and the relay contacts transfer to the set position and remain in this position.
On momentary closure of the RESET switch the relay is demagnetised through limiting resistor (R_{DC}) and the contacts return to the reset position.

Notes: The minimum SET or RESET impulse time is 20 ms. The maximum time can be continuous. In practice, always ensure that the SET and RESET contacts cannot be operated simultaneously.

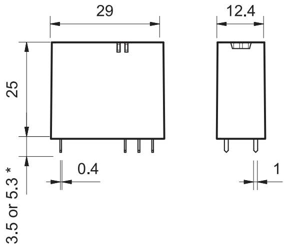
A

Outline drawings

Type 40.31/51/52/61

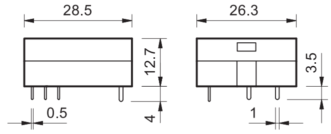


Type 40.31/61



* (3.5 or 5.3) mm see ordering code

Type 40.11



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95.05
See page 12

Module	Socket	Relay	Description	Mounting	Accessories
99.02 	95.03 95.05	40.31 40.51 40.52 40.61	**Screw terminal (Box clamp) socket** - Top terminals - Contacts - Bottom terminals - Coil	Panel or 35 mm rail (EN 60715) mount	- Coil indication and EMC suppression modules - Jumper link - Timer modules - Plastic retaining and release clip

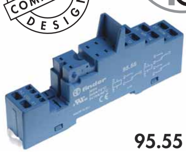
95.85.3
See page 13

Module	Socket	Relay	Description	Mounting	Accessories
99.80 	95.83.3 95.85.3	40.31 40.51 40.52 40.61	**Screw terminal (Box clamp) socket** 95.83.3 wiring: - Top terminals - Contacts - Bottom terminals - Coil	Panel or 35 mm rail (EN 60715) mount	- Coil indication and EMC suppression modules - Jumper link - Plastic retaining and release clip

95.95.3
See page 14

Module	Socket	Relay	Description	Mounting	Accessories
99.80 	95.93.3 95.95.3	40.31 40.51 40.52 40.61	**Screw terminal (Box clamp) socket** - Top terminals - Contacts - Bottom terminals - Coil	Panel or 35 mm rail (EN 60715) mount	- Coil indication and EMC suppression modules - Jumper link - Plastic retaining and release clip

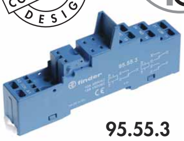
REGISTERED COMMUNITY DESIGN



95.55
See page 15

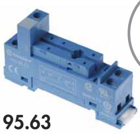
Module	Socket	Relay	Description	Mounting	Accessories
99.02 	95.55	40.51 40.52 40.61	**Screwless terminal socket** - For fast cable connections - Top terminals - Contacts - Bottom terminals - Coil	Panel or 35 mm rail (EN 60715) mount	- Coil indication and EMC suppression modules - Timer modules - Plastic retaining and release clip

REGISTERED COMMUNITY DESIGN



95.55.3
See page 16

Module	Socket	Relay	Description	Mounting	Accessories
99.80 	95.55.3	40.51 40.52 40.61	**Screwless terminal socket** For fast cable connections - Top terminals - Contacts - Bottom terminals - Coil	Panel or 35 mm rail (EN 60715) mount	- Coil indication and EMC suppression modules - Plastic retaining and release clip



95.63
See page 17

Module	Socket	Relay	Description	Mounting	Accessories
99.01 	95.63	40.31	**Screw terminal (Box clamp) socket** - Top terminals - Contacts - Bottom terminals - Coil	Panel or 35 mm rail (EN 60715) mount	- Coil indication and EMC suppression modules - Metal retaining clip

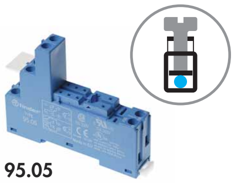
95.65
See page 17

Module	Socket	Relay	Description	Mounting	Accessories
—	95.65	40.51 40.52 40.61	**Screw terminal (Box clamp) socket**	Panel or 35 mm rail (EN 60715) mount	- Metal retaining clip

95.13.2
See page 18

Module	Socket	Relay	Description	Mounting	Accessories
— —	95.13.2 95.15.2	40.31 40.51 40.52 40.61	**PCB socket**	PCB mounting	- Metal retaining clip - Plastic retaining clip

A

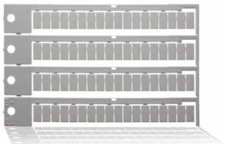


95.05

Approvals
(according to type):

c UL us Certain relay/socket combinations

095.01

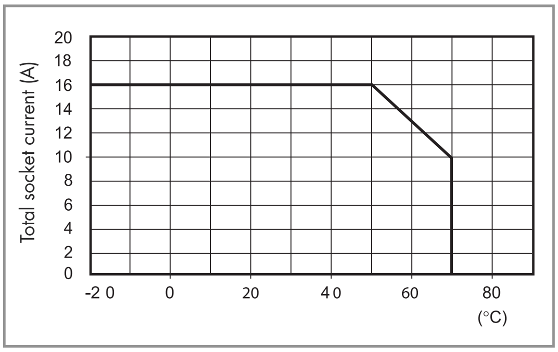


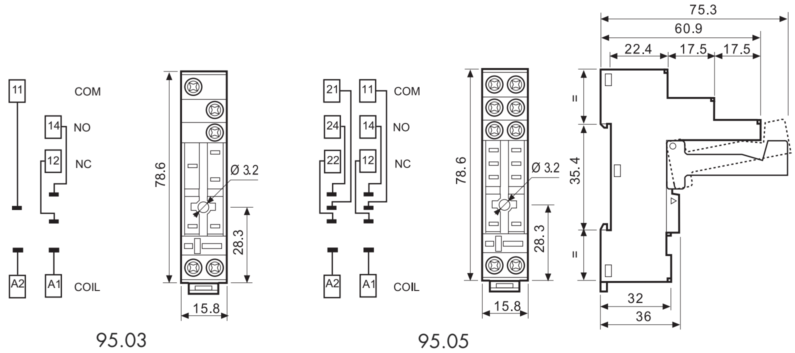
060.72

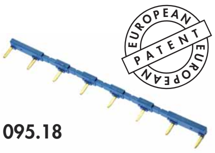
Screw terminal (Box clamp) socket panel or 35 mm rail mount	**95.03 (blue)**	**95.03.0 (black)**	**95.05 (blue)**	**95.05.0 (black)**
For relay type	40.31		40.51, 40.52, 40.61	
Accessories				
Metal retaining clip	095.71			
Plastic retaining and release clip (supplied with socket - packaging code SPA)	095.01	095.01.0	095.01	095.01.0
8-way jumper link	095.18	095.18.0	095.18	095.18.0
Identification tag	095.00.4			
Modules (see table below)	99.02			
Timer modules (see table below)	86.30			
Sheet of marker tags for retaining and release clip 095.01 plastic, 72 tags, 6x12 mm	060.72			
Technical data				
Rated values	10 A - 250 V *			
Dielectric strength	6 kV (1.2/50 μs) between coil and contacts			
Protection category	IP 20			
Ambient temperature °C	–40…+70 (see diagram L95)			
Screw torque Nm	0.5			
Wire strip length mm	8			
Max. wire size for 95.03 and 95.05 sockets	solid wire		stranded wire	
mm²	1x6 / 2x2.5		1x4 / 2x2.5	
AWG	1x10 / 2x14		1x12 / 2x14	

* For currents >10 A, contact terminals must be connected in parallel (21 with 11, 24 with 14, 22 with 12).
With the relay 40.51 the change-over contact will be 21-12-14.

L 95 - Total socket current vs ambient temperature (95.05)

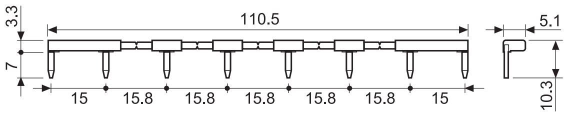






095.18

8-way jumper link for 95.03 and 95.05 sockets	095.18 (blue)	095.18.0 (black)
Rated values	10 A - 250 V	



86.30

86 series timer modules	
(12…24)V AC/DC; Bi-function: AI, DI; (0.05s…100h)	86.30.0.024.0000
(110…125)V AC; Bi-function: AI, DI; (0.05s…100h)	86.30.8.120.0000
(230…240)V AC; Bi-function: AI, DI; (0.05s…100h)	86.30.8.240.0000

Approvals (according to type):

99.02

Approvals
(according to type):

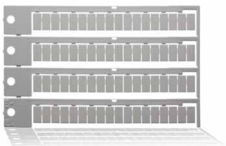
DC Modules with non-standard polarity (+A2) on request.

99.02 coil indication and EMC suppression modules for 95.03 and 95.05 sockets		
Diode (+A1, standard polarity)	(6…220)V DC	99.02.3.000.00
LED	(6…24)V DC/AC	99.02.0.024.59
LED	(28…60)V DC/AC	99.02.0.060.59
LED	(110…240)V DC/AC	99.02.0.230.59
LED + Diode (+A1, standard polarity)	(6…24)V DC	99.02.9.024.99
LED + Diode (+A1, standard polarity)	(28…60)V DC	99.02.9.060.99
LED + Diode (+A1, standard polarity)	(110…220)V DC	99.02.9.220.99
LED + Varistor	(6…24)V DC/AC	99.02.0.024.98
LED + Varistor	(28…60)V DC/AC	99.02.0.060.98
LED + Varistor	(110…240)V DC/AC	99.02.0.230.98
RC circuit	(6…24)V DC/AC	99.02.0.024.09
RC circuit	(28…60)V DC/AC	99.02.0.060.09
RC circuit	(110…240)V DC/AC	99.02.0.230.09
Residual current by-pass	(110…240)V AC	99.02.8.230.07

95.85.3

Approvals
(according to type):

095.91.3

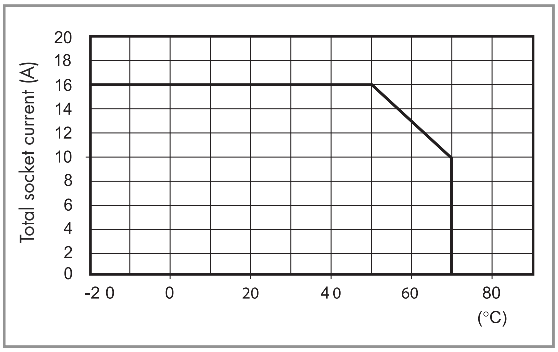


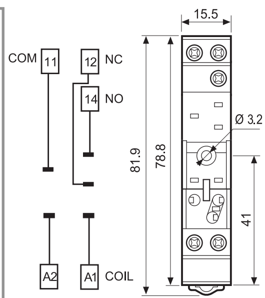
060.72

Screw terminal (Box clamp) socket panel or 35 mm rail mount		95.83.3 (blue)	95.83.30 (black)	95.85.3 (blue)	95.85.30 (black)
For relay type		40.31		40.51, 40.52, 40.61	
Accessories					
Metal retaining clip		095.71			
Plastic retaining and release clip (supplied with socket - packaging code SPA)		095.91.3	095.91.30	095.91.3	095.91.30
8-way jumper link		095.08	095.08.0	095.08	095.08.0
Identification tag		095.80.3			
Modules (see table below)		99.80			
Sheet of marker tags for retaining and release clip 095.91.3 plastic, 72 tags, 6x12 mm		060.72			
Technical data					
Rated values		10 A - 250 V *			
Dielectric strength		6 kV (1.2/50 µs) between coil and contacts (95.83.3 only)			
Protection category		IP 20			
Ambient temperature	°C	–40…+70 (see diagram L95)			
Screw torque	Nm	0.5			
Wire strip length	mm	7			
Max. wire size for 95.83.3 and 95.85.3 sockets		solid wire		stranded wire	
	m^2	1x6 / 2x2.5		1x4 / 2x2.5	
	AWG	1x10 / 2x14		1x12 / 2x14	

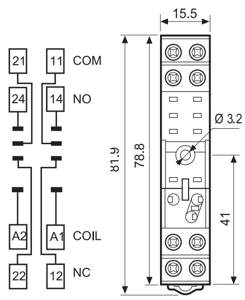
* For currents >10 A, contact terminals must be connected in parallel (21 with 11, 24 with 14, 22 with 12).
With the relay 40.51 the change-over contact will be 21-12-14.

L 95 - Total socket current vs ambient temperature (95.85.3)

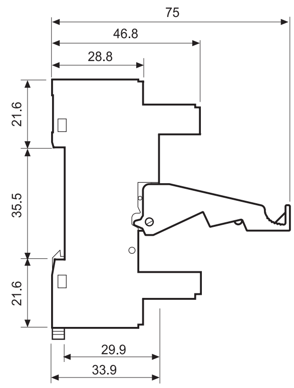


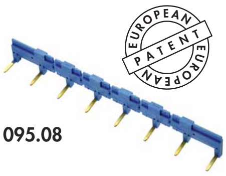


95.83.3



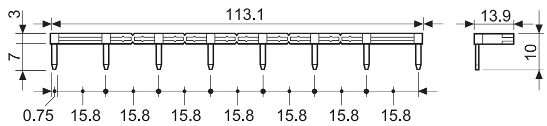
95.85.3





095.08

8-way jumper link for 95.83.3 and 95.85.3 sockets	095.08 (blue)	095.08.0 (black)
Rated values	10 A - 250 V	



99.80

Approvals
(according to type):

99.80 coil indication and EMC suppression modules for 95.83.3 and 95.85.3 sockets		
		Blue*
Diode (+A1, standard polarity)	(6…220)V DC	99.80.3.000.00
LED	(6…24)V DC/AC	99.80.0.024.59
LED	(28…60)V DC/AC	99.80.0.060.59
LED	(110…240)V DC/AC	99.80.0.230.59
LED + Diode (+A1, standard polarity)	(6…24)V DC	99.80.9.024.99
LED + Diode (+A1, standard polarity)	(28…60)V DC	99.80.9.060.99
LED + Diode (+A1, standard polarity)	(110…220)V DC	99.80.9.220.99
LED + Varistor	(6…24)V DC/AC	99.80.0.024.98
LED + Varistor	(28…60)V DC/AC	99.80.0.060.98
LED + Varistor	(110…240)V DC/AC	99.80.0.230.98
RC circuit	(6…24)V DC/AC	99.80.0.024.09
RC circuit	(28…60)V DC/AC	99.80.0.060.09
RC circuit	(110…240)V DC/AC	99.80.0.230.09
Residual current by-pass	(110…240)V AC	99.80.8.230.07

* Modules in Black housing are available on request.

Green LED is standard. Red LED available on request.

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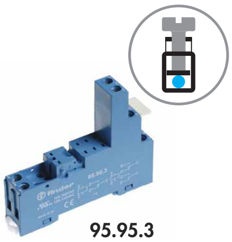
A



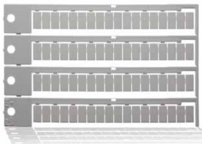
95.95.3

Approvals
(according to type):

Screw (Box clamp) terminal socket panel or 35 mm rail mount		**95.93.3 (blue)**	**95.93.30 (black)**	**95.95.3 (blue)**	**95.95.30 (black)**
For relay type		40.31		40.51, 40.52, 40.61	
Accessories					
Metal retaining clip		095.71			
Plastic retaining and release clip		095.91.3	095.91.30	095.91.3	095.91.30
8-way jumper link		095.08	095.08.0	095.08	095.08.0
Identification tag		095.80.3			
Modules (see table below)		99.80			
Sheet of marker tags for retaining and release clip 095.91.3 plastic, 72 tags, 6x12 mm		060.72			
Technical data					
Rated values		10 A - 250 V *			
Dielectric strength		6 kV (1.2/50 μs) between coil and contacts			
Protection category		IP 20			
Ambient temperature	°C	–40…+70 (see diagram L95)			
Screw torque	Nm	0.5			
Wire strip length	mm	8			
Max. wire size for 95.93.3 and 95.95.3 sockets		solid wire		stranded wire	
	m^2	1x6 / 2x2.5		1x4 / 2x2.5	
	AWG	1x10 / 2x14		1x12 / 2x14	

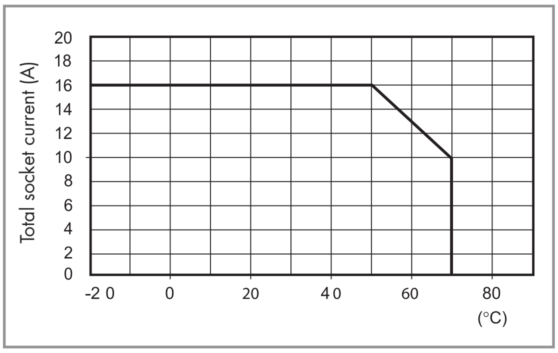
* For currents >10 A, contact terminals must be connected in parallel (21 with 11, 24 with 14, 22 with 12).
With the relay 40.51 the change-over contact will be 21-12-14.

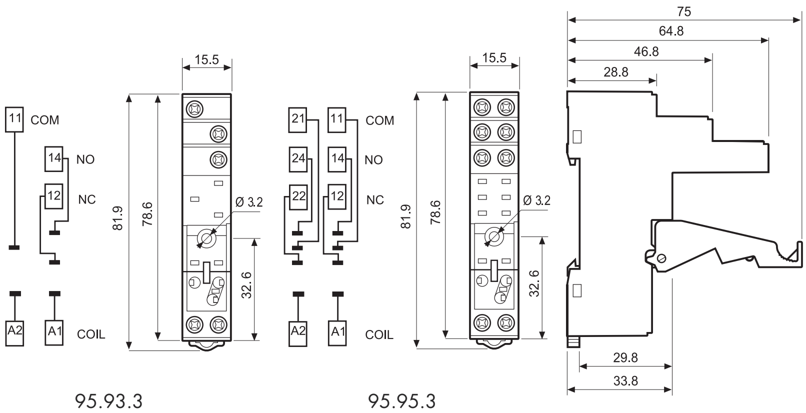
095.91.3



060.72

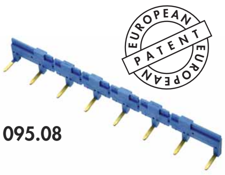
L 95 - Total socket current vs ambient temperature (95.95.3)





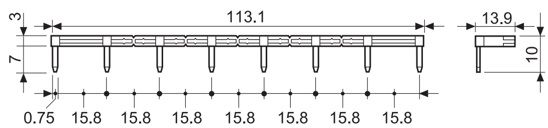
95.93.3

95.95.3



095.08

8-way jumper link for 95.93.3 and 95.95.3 sockets	095.08 (blue)	095.08.0 (black)
Rated values	10 A - 250 V	



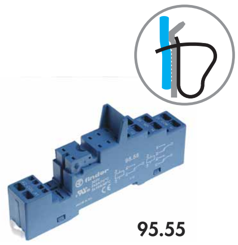
99.80

Approvals
(according to type):

* Modules in Black housing are available on request.

Green LED is standard. Red LED available on request.

99.80 coil indication and EMC suppression modules for 95.93.3 and 95.95.3 sockets		
		Blue*
Diode (+A1, standard polarity)	(6...220)V DC	99.80.3.000.00
LED	(6...24)V DC/AC	99.80.0.024.59
LED	(28...60)V DC/AC	99.80.0.060.59
LED	(110...240)V DC/AC	99.80.0.230.59
LED + Diode (+A1, standard polarity)	(6...24)V DC	99.80.9.024.99
LED + Diode (+A1, standard polarity)	(28...60)V DC	99.80.9.060.99
LED + Diode (+A1, standard polarity)	(110...220)V DC	99.80.9.220.99
LED + Varistor	(6...24)V DC/AC	99.80.0.024.98
LED + Varistor	(28...60)V DC/AC	99.80.0.060.98
LED + Varistor	(110...240)V DC/AC	99.80.0.230.98
RC circuit	(6...24)V DC/AC	99.80.0.024.09
RC circuit	(28...60)V DC/AC	99.80.0.060.09
RC circuit	(110...240)V DC/AC	99.80.0.230.09
Residual current by-pass	(110...240)V AC	99.80.8.230.07



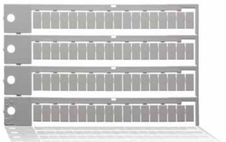
95.55

Approvals
(according to type):

Screwless terminal socket panel or 35 mm rail mount	95.55 (blue)	95.55.0 (black)
For relay type	40.51, 40.52, 40.61	
Accessories		
Metal retaining clip	095.71	
Plastic retaining and release clip (supplied with socket - packaging code SPA)	095.91.3	
Modules (see table below)	99.02	
Timer modules (see table below)	86.30	
Sheet of marker tags for retaining and release clip 095.91.3 plastic, 72 tags, 6x12 mm	060.72	
Technical data		
Rated values	10 A - 250 V *	
Dielectric strength	6 kV (1.2/50 μs) between coil and contacts	
Protection category	IP 20	
Ambient temperature °C	–25…+70 (see diagram L95)	
Wire strip length mm	8	
Max. wire size for 95.55 socket	solid wire	stranded wire
mm²	2x(0.2…1.5)	2x(0.2…1.5)
AWG	2x(24…18)	2x(24…18)

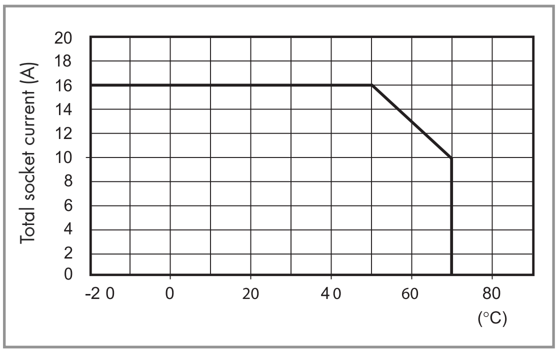
* For currents >10 A, contact terminals must be connected in parallel (21 with 11, 24 with 14, 22 with 12). With the relay 40.51 the change-over contact will be 21-12-14.

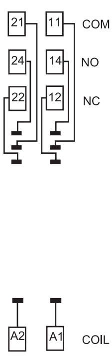
095.91.3

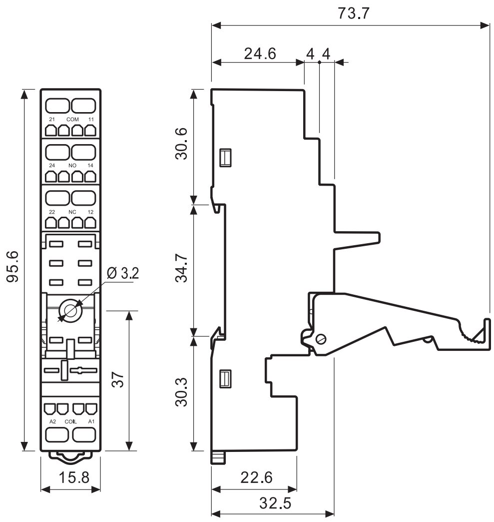


060.72

L 95 - Total socket current vs ambient temperature







86.30

86 series timer modules	
(12…24)V AC/DC; Bi-function: AI, DI; (0.05s…100h)	86.30.0.024.0000
(110…125)V AC; Bi-function: AI, DI; (0.05s…100h)	86.30.8.120.0000
(230…240)V AC; Bi-function: AI, DI; (0.05s…100h)	86.30.8.240.0000

Approvals
(according to type):

99.02

Approvals
(according to type):

DC Modules with non-standard polarity (+A2) on request.

99.02 coil indication and EMC suppression modules for 95.55 socket		
Diode (+A1, standard polarity)	(6…220)V DC	99.02.3.000.00
LED	(6…24)V DC/AC	99.02.0.024.59
LED	(28…60)V DC/AC	99.02.0.060.59
LED	(110…240)V DC/AC	99.02.0.230.59
LED + Diode (+A1, standard polarity)	(6…24)V DC	99.02.9.024.99
LED + Diode (+A1, standard polarity)	(28…60)V DC	99.02.9.060.99
LED + Diode (+A1, standard polarity)	(110…220)V DC	99.02.9.220.99
LED + Varistor	(6…24)V DC/AC	99.02.0.024.98
LED + Varistor	(28…60)V DC/AC	99.02.0.060.98
LED + Varistor	(110…240)V DC/AC	99.02.0.230.98
RC circuit	(6…24)V DC/AC	99.02.0.024.09
RC circuit	(28…60)V DC/AC	99.02.0.060.09
RC circuit	(110…240)V DC/AC	99.02.0.230.09
Residual current by-pass	(110…240)V AC	99.02.8.230.07

A

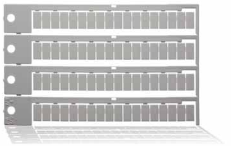
95.55.3

Approvals
(according to type):

Screwless terminal socket panel or 35 mm rail mount	95.55.3 (blue)	95.55.30 (black)
For relay type	40.51, 40.52, 40.61	
Accessories		
Metal retaining clip	095.71	
Plastic retaining and release clip (supplied with socket - packaging code SPA)	095.91.3	
Modules (see table below)	99.80	
Sheet of marker tags for retaining and release clip 095.91.3 plastic, 72 tags, 6x12 mm	060.72	
Technical data		
Rated values	10 A - 250 V *	
Dielectric strength	6 kV (1.2/50 µs) between coil and contacts	
Protection category	IP 20	
Ambient temperature °C	–25…+70 (see diagram L95)	
Wire strip length mm	8	
Max. wire size for 95.55.3 socket	solid wire	stranded wire
mm²	2x(0.2...1.5)	2x(0.2...1.5)
AWG	2x(24...18)	2x(24...18)

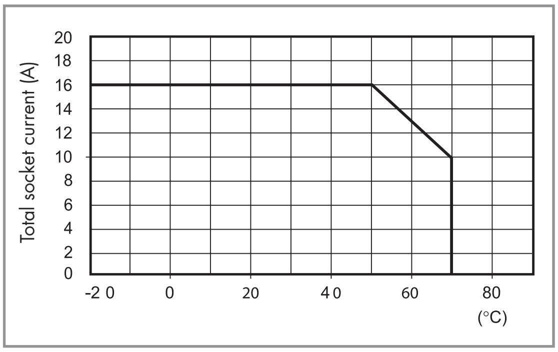
* For currents >10 A, contact terminals must be connected in parallel (21 with 11, 24 with 14, 22 with 12).
With the relay 40.51 the change-over contact will be 21-12-14.

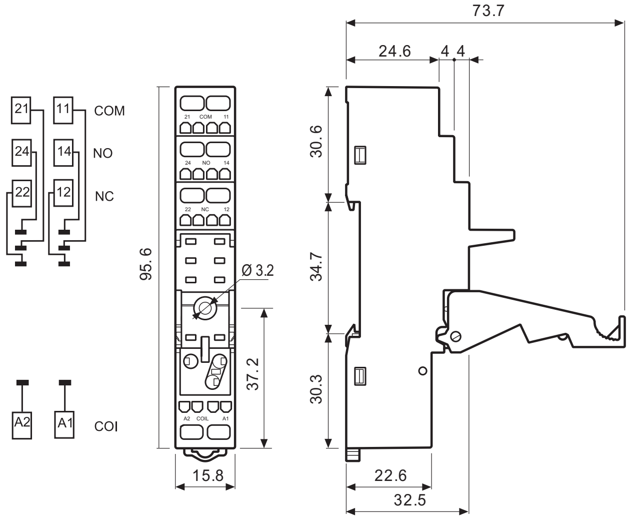
095.91.3



060.72

L 95 - Total socket current vs ambient temperature





99.80

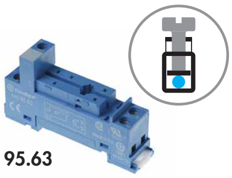
Approvals
(according to type):

* Modules in Black housing are available on request.

Green LED is standard.
Red LED available on request.

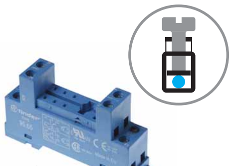
99.80 coil indication and EMC suppression modules for 95.55.3 socket		Blue*
Diode (+A1, standard polarity)	(6...220)V DC	99.80.3.000.00
LED	(6...24)V DC/AC	99.80.0.024.59
LED	(28...60)V DC/AC	99.80.0.060.59
LED	(110...240)V DC/AC	99.80.0.230.59
LED + Diode (+A1, standard polarity)	(6...24)V DC	99.80.9.024.99
LED + Diode (+A1, standard polarity)	(28...60)V DC	99.80.9.060.99
LED + Diode (+A1, standard polarity)	(110...220)V DC	99.80.9.220.99
LED + Varistor	(6...24)V DC/AC	99.80.0.024.98
LED + Varistor	(28...60)V DC/AC	99.80.0.060.98
LED + Varistor	(110...240)V DC/AC	99.80.0.230.98
RC circuit	(6...24)V DC/AC	99.80.0.024.09
RC circuit	(28...60)V DC/AC	99.80.0.060.09
RC circuit	(110...240)V DC/AC	99.80.0.230.09
Residual current by-pass	(110...240)V AC	99.80.8.230.07

VI-2014, www.findernet.com



95.63

Approvals (according to type):



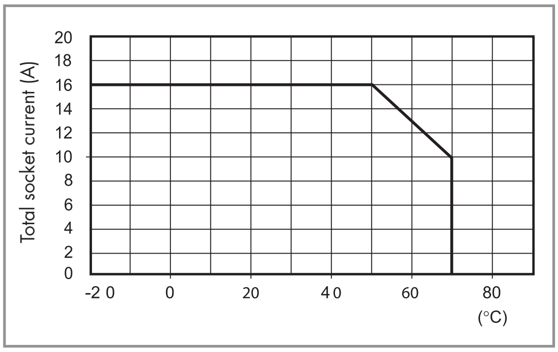
95.65

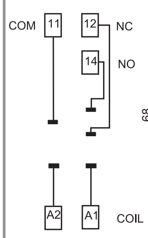
Approvals (according to type):

Screw terminal (Box clamp) socket panel or 35 mm rail mount	**95.63 (blue)**	**95.65 (blue)**
For relay type	40.31	40.51, 40.52, 40.61
Accessories		
Metal retaining clip	095.71	
8-way jumper link	095.08	095.08
Modules (see table below)	99.01	—
Technical data		
Rated values	10 A - 250 V *	
Dielectric strength (between coil and contacts)	6 kV (1.2/50 μs)	2 kV AC
Protection category	IP 20	
Ambient temperature °C	–40…+70 (see diagram L95)	
Screw torque Nm	0.5	
Wire strip length mm	7	
Max. wire size for 95.63 and 95.65 sockets	solid wire	stranded wire
m^2	1x6 / 2x2.5	1x4 / 2x2.5
AWG	1x10 / 2x14	1x12 / 2x14

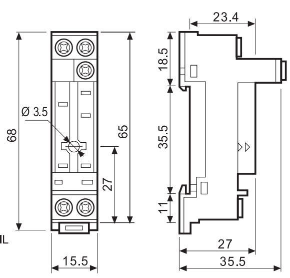
* For currents >10 A, contact terminals must be connected in parallel (21 with 11, 24 with 14, 22 with 12). With the relay 40.51 the change-over contact will be 21-12-14.

L 95 - Total socket current vs ambient temperature

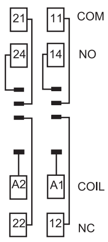




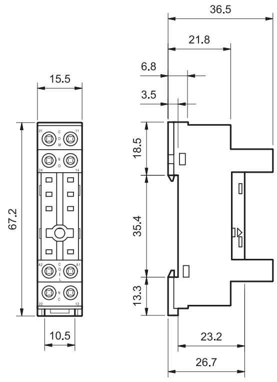
95.63



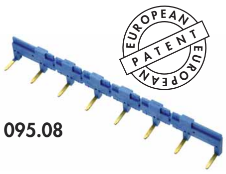
95.63



95.65

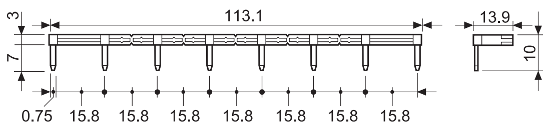


95.65



095.08

8-way jumper link for 95.63 and 95.65 sockets	095.08 (blue)
Rated values	10 A - 250 V



99.01

Approvals (according to type):

* Modules in Black housing are available on request.

Green LED is standard. Red LED available on request.

99.01 coil indication and EMC suppression modules for type 95.63 socket		
		Blue*
Diode (+A1, standard polarity)	(6…220)V DC	99.01.3.000.00
Diode (+A2, non-standard polarity)	(6…220)V DC	99.01.2.000.00
LED	(6…24)V DC/AC	99.01.0.024.59
LED	(28…60)V DC/AC	99.01.0.060.59
LED	(110…240)V DC/AC	99.01.0.230.59
LED + Diode (+A1, standard polarity)	(6…24)V DC	99.01.9.024.99
LED + Diode (+A1, standard polarity)	(28…60)V DC	99.01.9.060.99
LED + Diode (+A1, standard polarity)	(110…220)V DC	99.01.9.220.99
LED + Diode (+A2, non-standard polarity)	(6…24)V DC	99.01.9.024.79
LED + Diode (+A2, non-standard polarity)	(28…60)V DC	99.01.9.060.79
LED + Diode (+A2, non-standard polarity)	(110…220)V DC	99.01.9.220.79
LED + Varistor	(6…24)V DC/AC	99.01.0.024.98
LED + Varistor	(28…60)V DC/AC	99.01.0.060.98
LED + Varistor	(110…240)V DC/AC	99.01.0.230.98
RC circuit	(6…24)V DC/AC	99.01.0.024.09
RC circuit	(28…60)V DC/AC	99.01.0.060.09
RC circuit	(110…240)V DC/AC	99.01.0.230.09
Residual current by-pass	(110…240)V AC	99.01.8.230.07

A

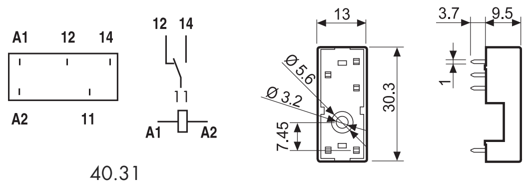
95.13.2

95.15.2

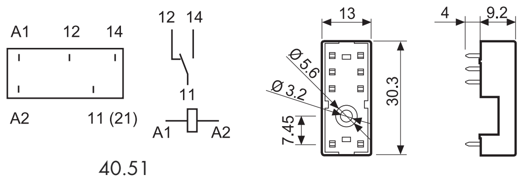
Approvals
(according to type):

PCB socket	95.13.2 (blue)	95.13.20 (black)	95.15.2 (blue)	95.15.20 (black)
For relay type	40.31		40.51, 40.52, 40.61	
Accessories				
Metal retaining clip (supplied with socket - packaging code SMA)	095.51			
Plastic retaining clip	095.52			
Technical data				
Rated values	12 A - 250 V		10 A - 250 V *	
Dielectric strength	6 kV (1.2/50 μs) between coil and contacts			
Protection category	IP 20			
Ambient temperature °C	–40…+70			

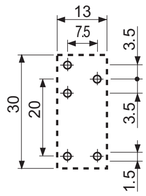
* For currents >10 A, contact terminals must be connected in parallel (21 with 11, 24 with 14, 22 with 12).
With the relay 40.51 the change-over contact will be 21-12-14.



40.31

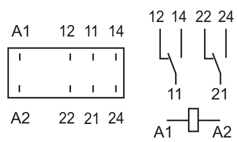


40.51

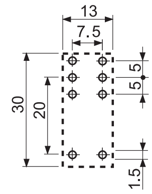


95.13.2

Copper side view

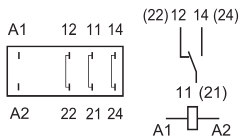


40.52



95.15.2

Copper side view



40.61

Packaging codes

How to code and identify retaining clip and packaging options for sockets.

Example:

9 5 . 0 5 S P A

A Standard packaging

SM Metal retaining clip
SP Plastic retaining clip

9 5 . 0 5

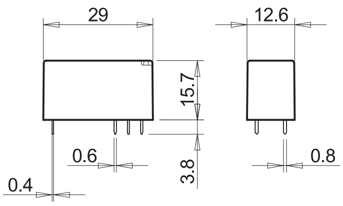
Without retaining clip

Features

1 & 2 Pole - Low profile (15.7 mm height)
41.31 - 1 Pole 12 A (3.5 mm pin pitch)
41.52 - 2 Pole 8 A (5 mm pin pitch)
41.61 - 1 Pole 16 A (5 mm pin pitch)

PCB mount
- direct or via PCB socket
35 mm rail mount
- via screw and screwless sockets

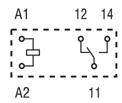
- AC and DC coils
- 8 mm, 6 kV (1.2/50 μs) isolation, coil-contacts
- Cadmium Free contact materials
- Flux proof: RT II standard, (RT III option)

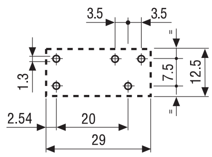


For UL ratings see:
"General technical information" page V

41.31

- 3.5 mm contact pin pitch
- 1 Pole 12 A
- PCB direct or via socket

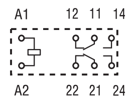


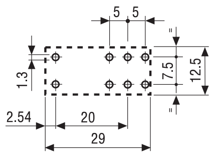


Copper side view

41.52

- 5 mm contact pin pitch
- 2 Pole 8 A
- PCB direct or via socket

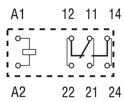


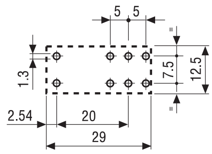


Copper side view

41.61

- 5 mm contact pin pitch
- 1 Pole 16 A
- PCB direct or via socket





Copper side view

		41.31	41.52	41.61
Contact specification				
Contact configuration		1 CO (SPDT)	2 CO (DPDT)	1 CO (SPDT)
Rated current/Maximum peak current	A	12/25	8/15	16/30
Rated voltage/Maximum switching voltage	V AC	250/400	250/400	250/400
Rated load AC1	VA	3,000	2,000	4,000
Rated load AC15 (230 V AC)	VA	600	400	750
Single phase motor rating (230 V AC)	kW	0.5	0.3	0.5
Breaking capacity DC1: 30/110/220 V	A	12/0.3/0.12	8/0.3/0.12	16/0.3/0.12
Minimum switching load	mW (V/mA)	300 (5/5)	300 (5/5)	300 (5/5)
Standard contact material		AgNi	AgNi	AgNi
Coil specification				
Nominal voltage (U_N)	V AC (50/60 Hz)	24 - 115 - 230	24 - 115 - 230	24 - 115 - 230
	V DC	5 - 6 - 12 - 24 - 48 - 60 - 110	5 - 6 - 12 - 24 - 48 - 60 - 110	5 - 6 - 12 - 24 - 48 - 60 - 110
Rated power AC/DC	VA (50 Hz)/W	0.75/0.4	0.75/0.4	0.75/0.4
Operating range	AC	(0.8…1.1)U_N	(0.8…1.1)U_N	(0.8…1.1)U_N
	DC	(0.7…1.5)U_N	(0.7…1.5)U_N	(0.7…1.5)U_N
Holding voltage	AC/DC	0.8/0.4U_N	0.8/0.4 U_N	0.8/0.4 U_N
Must drop-out voltage	AC/DC	0.15/0.1U_N	0.15/0.1 U_N	0.15/0.1 U_N
Technical data				
Mechanical life AC/DC	cycles	$10 \cdot 10^6/10 \cdot 10^6$	$10 \cdot 10^6/10 \cdot 10^6$	$10 \cdot 10^6/10 \cdot 10^6$
Electrical life at rated load AC1	cycles	$60 \cdot 10^3$	$60 \cdot 10^3$	$50 \cdot 10^3$
Operate/release time	ms	8/6	8/6	8/6
Insulation between coil and contacts (1.2/50 μs)	kV	6 (8 mm)	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts	V AC	1,000	1,000	1,000
Ambient temperature range	°C	–40…+70 (AC); +85 (DC)	–40…+70 (AC); +85 (DC)	–40…+70 (AC); +85 (DC)
Environmental protection		RT II	RT II	RT II
Approvals (according to type)		RINA		

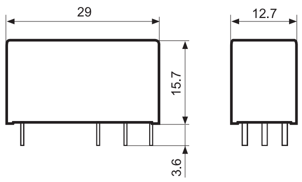
41 Series - Bistable low profile PCB relays 8 - 16 A

Features

1 & 2 Pole - Polarized bistable, Low profile (15.7 mm height)
41.52 - 2 Pole 8 A (5 mm pin pitch)
41.61 - 1 Pole 16 A (5 mm pin pitch)

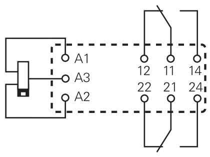
Printed Circuit mount

- Polarized bistable relay with 2 coils
- 10 mm, 6 kV (1.2/50μs) isolation, coil-contacts
- Cadmium Free contact materials
- Flux proof: RT II standard

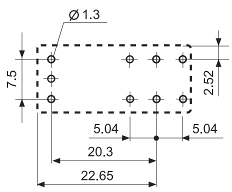


41.52.6.xxx

- 2 Pole, 8 A
- PCB direct mount



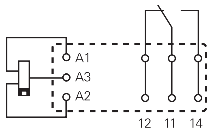
2 coil version:
A3(+) A2 (–) = Set
A3(+) A1 (–) = Reset



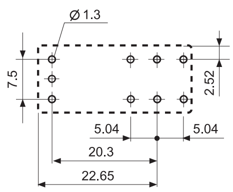
Copper side view

41.61.6.xxx

- 1 Pole, 16 A
- PCB direct mount



2 coil version:
A3(+) A2 (–) = Set
A3(+) A1 (–) = Reset



Copper side view

		41.52.6.xxx	41.61.6.xxx
Contact specification			
Contact configuration		2 CO (DPDT)	1 CO (SPDT)
Rated current/Maximum peak current (I_N/I_{max})	A	8 / 15	16 / 30
Rated voltage/Maximum switching voltage (U_N/U_{max})	V AC	250 / 400	250 / 400
Rated load AC1	VA	2,000	4,000
Rated load AC15 (230 V AC)	VA	350	750
Single phase motor rating (230 V AC)	kW	0.37	0.55
Breaking capacity DC1: 30/110/220 V	A	8/0.3/0.12	16/0.3/0.12
Minimum switching load	mW (V/mA)	500 (5/100)	500 (5/100)
Standard contact material		$AgSnO_2$	$AgSnO_2$
Coil specification			
Nominal voltage (U_N)	V DC	5 - 12 - 24	5 - 12 - 24
Rated power (P_N)	W	0.65	0.65
Operating range	DC	$(0.7 \ldots 1.1)U_N$	$(0.7 \ldots 1.1)U_N$
Min. impulse duration	ms	20	20
Max. impulse duration	s	30	30
Technical data			
Mechanical life DC	cycles	$5 \cdot 10^6$	$5 \cdot 10^6$
Electrical life at rated load AC1	cycles	$30 \cdot 10^3$	$30 \cdot 10^3$
Operate/release time	ms	10 / 5	10 / 10
Insulation between coil and contacts (1.2/50 μs)	kV	6 (10 mm)	6 (10 mm)
Dielectric strength between open contacts	V AC	1,000	1,000
Ambient temperature range	°C	–40…+85	–40…+85
Environmental protection		RT II	RT II
Approvals (according to type)		—	

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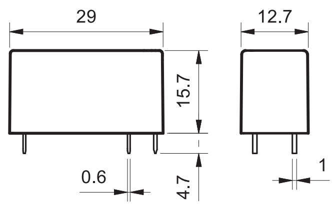
Features

Solid State Relays

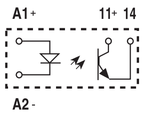
Printed circuit mount:
- direct or via PCB socket
35 mm rail mount:
- via screw or screwless sockets

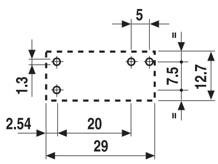
- Single circuit output switching options
  - 5 A 24 V DC
  - 3 A 240 V AC
- Silent, high speed switching with long electrical life
- LED indicator
- Low profile (15.7 mm)
- Wash tight: RT III
- 2,500 V AC insulation, input-output



41.81 - 9024

- 5 A, 24 V DC output switching
- PCB or 93 Series sockets

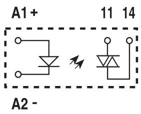


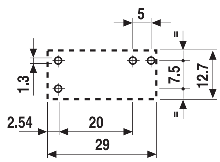


Copper side view

41.81 - 8240

- 3 A, 240 V AC output switching
- Zero crossing switching
- PCB or 93 Series sockets





Copper side view

		41.81 - 9024		41.81 - 8240	
Output circuit					
Contact configuration		1 NO (SPST-NO)		1 NO (SPST-NO)	
Rated current/Maximum peak current (10 ms)	A	5/40		3/40	
Rated voltage/Maximum blocking voltage	V	(24/35)DC		(240/—)AC	
Switching voltage range	V	(1.5…24)DC		(12…275)AC	
Repetitive peak off-state voltage	V_{pk}	—		600	
Minimum switching current	mA	1		50	
Max. "OFF-state" leakage current	mA	0.01		1	
Max. "ON-state" voltage drop	V	0.3		1.1	
Input circuit					
Nominal voltage	V DC	12	24	12	24
Operating range	V DC	8…17	14…32	8…17	14…32
Control current	mA	5.5	9	8.8	9
Release voltage	V DC	4	9	4	9
Impedance	Ω	1,550	2,600	1,030	2,600
Technical data					
Operate/release time	ms	0.05/0.25		10/10	
Dielectric strength between input/output	V AC	2,500		2,500	
Ambient temperature range	°C	–20…+60		–20…+60	
Environmental protection		RT III		RT III	
Approvals (according to type)					

Ordering information

A

Electromechanical relay (EMR)

Example: 41 series low-profile PCB relay, 2 CO (DPDT), 24 V DC coil.

						A	B	C	D
4 1	. 5	2	. 9	. 0 2 4	.	0	0	1	0

Series

Type
3 = PCB - 3.5 mm pinning
5 = PCB - 5 mm pinning
6 = PCB - 5 mm pinning

No. of poles
1 = 1 pole for
41.31, 12 A
41.61, 16 A
2 = 2 pole for
41.52, 8 A

Coil version
6 = DC bistable, 2 coils
8 = AC
9 = DC

Coil voltage
See coil specifications

A: Contact material
0 = Standard AgNi
4 = $AgSnO_2$
5 = AgNi + Au

B: Contact circuit
0 = CO (nPDT)
3 = NO (nPST)

D: Special versions
0 = Flux proof (RT II)
1 = Wash tight (RT III)
6 = Bistable version (RT II)

C: Options
0 = Production line 0
1 = Production line 1

Selecting features and options: only combinations in the same row are possible.
Preferred selections for best availability are shown in **bold.**

Type	Coil version	A	B	C	D
41.31	DC	**0** - 4 - 5	**0** - 3	**1**	**0** - 1
41.52	DC	**0** - 5	**0** - 3	**1**	**0** - 1
41.61	DC	**0** - 4	**0** - 3	**1**	**0** - 1
41.31/52/61	AC	**0**	**0**	**0**	**0**
41.52	DC bistable	4	**0**	**1**	**6**
41.61	DC bistable	4	**0** - 3	**1**	**6**

Solid state relay (SSR)

Example: 41 series SSR relay, 5 A output, 24 V DC supply.

4 1	. 8	1	. 7	. 0 2 4	. 9 0 2 4

Series

Type
8 = SSR type

Output
1 = 1 NO (SPST-NO)

Input circuit
See input specifications

Output circuit
9024 = 5 A - 24 V DC
8240 = 3 A - 240 V AC

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Electromechanical relay

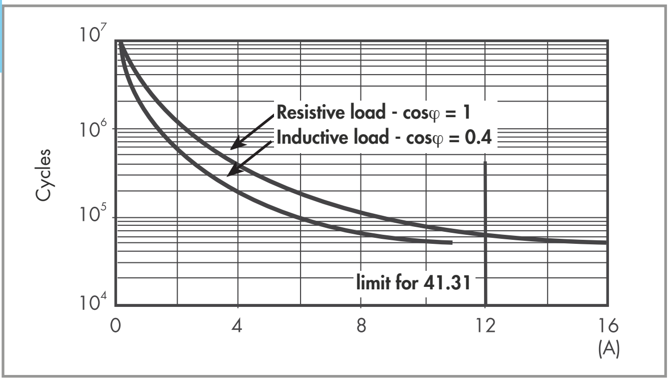
Technical data

Insulation according to EN 61810-1								
		1 pole		1 pole bistable	2 pole		2 pole bistable
Nominal voltage of supply system	V AC	230/400		230/400	230/400		230/400
Rated insulation voltage	V AC	250	400	250	250	400	250
Pollution degree		3	2	2	3	2	2
Insulation between coil and contact set							
Type of insulation		Reinforced (8 mm)		Reinforced (10 mm)	Reinforced (8 mm)		Reinforced (10 mm)
Overvoltage category		III		III	III		III
Rated impulse voltage	kV (1.2/50 μs)	6		6	6		6
Dielectric strength	V AC	4,000		4,000	4,000		4,000
Insulation between adjacent contacts							
Type of insulation		—		—	Basic		Basic
Overvoltage category		—		—	III		III
Rated impulse voltage	kV (1.2/50 μs)	—		—	4		4
Dielectric strength	V AC	—		—	2,000		2,000
Insulation between open contacts							
Type of disconnection		Micro-disconnection			Micro-disconnection		
Dielectric strength	V AC/kV (1.2/50 μs)	1,000/1.5			1,000/1.5		
Conducted disturbance immunity							
Burst (5…50)ns, 5 kHz, on A1 - A2		EN 61000-4-4			level 4 (4 kV)		
Surge (1.2/50 μs) on A1 - A2 (differential mode)		EN 61000-4-5			level 3 (2 kV)		

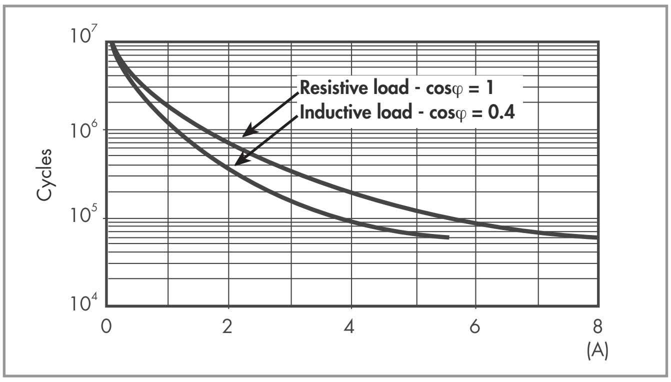
Other data					
Bounce time: NO/NC		ms	4/6 (monostable) - 2/10 (bistable)		
Vibration resistance (5…55)Hz: NO/NC		g	15/2 (monostable) - 5/3 (bistable)		
Shock resistance		g	16 (monostable) - 10 (bistable)		
Power lost to the environment	without contact current	W	0.4 (monostable)		
	with rated current	W	1.7 (41.31)	1.2 (41.52)	1.8 (41.61)
Recommended distance between relays mounted on PCB		mm	≥ 5		

Contact specification

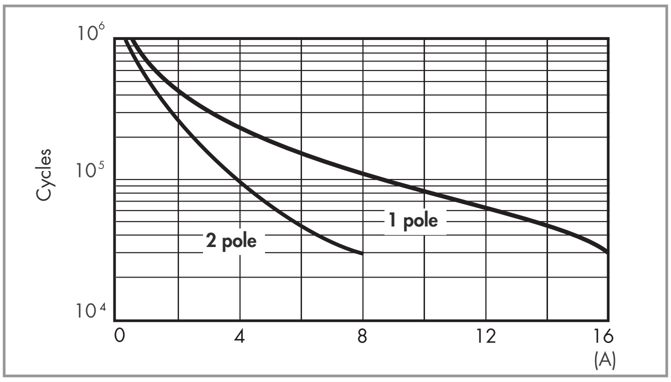
F 41 - Electrical life (AC) v contact current (monostable)
Types 41.31/61



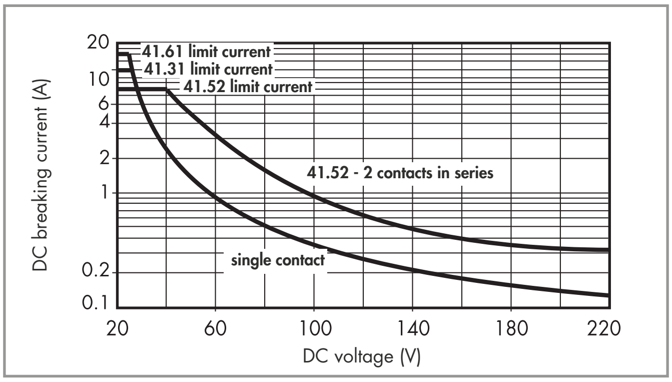
F 41 - Electrical life (AC) v contact current (monostable)
Type 41.52



F 41 - Electrical life (AC) v contact current (bistable)



H 41- Maximum DC1 breaking capacity



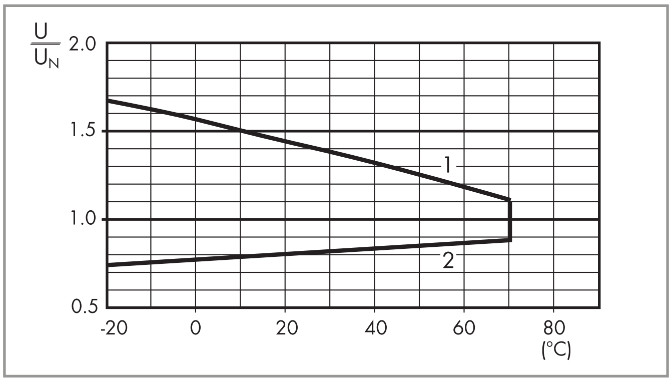
- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of ≥ $100 \cdot 10^3$ can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load. Note: the release time for the load will be increased.

Coil specifications

AC coil data

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
24	**8**.024	19.2	26.4	350	31.6
115	**8**.115	92	126.5	8,100	6
230	**8**.230	184	253	32,500	3.2

R 41 - AC coil operating range v ambient temperature

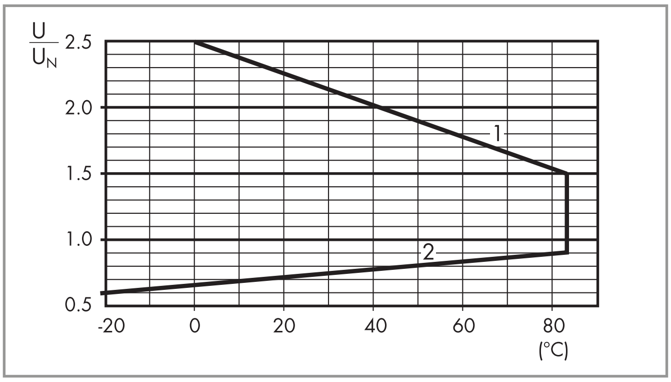


1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

DC coil data

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
5	**9**.005	3.5	7.5	62	80
6	**9**.006	4.2	9	90	66.7
12	**9**.012	8.4	18	360	33.3
24	**9**.024	16.8	36	1,440	16.7
48	**9**.048	33.6	72	5,760	8.3
60	**9**.060	42	90	9,000	6.6
110	**9**.110	77	165	24,200	4.5

R 41 - DC coil operating range v ambient temperature



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

DC coil data (bistable)

Nominal voltage U_N	Coil code	Operating range Set U_{min}	Reset U_{min}	Set/Reset U_{max}	Resistance R	Rated coil power
V		V	V	V	Ω	mW
5	**6**.005	3.5	3.5	5.5	38	650
12	**6**.012	8.4	8.4	13.2	220	650
24	**6**.024	16.8	16.8	26.4	885	650

Solid state relay

Technical data

Other data			41.81 - 9024	41.81 - 8240
Power lost to the environment	without current	W	0.25	0.25
	with maximum current	W	1.75	3.5

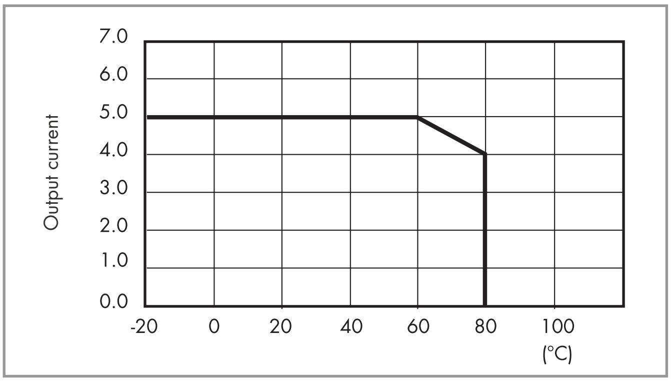
Input specification

Input data - DC types

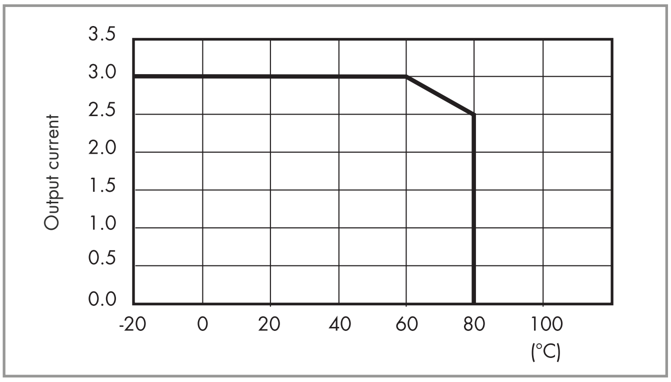
Nominal voltage U_N	Input code	Operating range U_{min}	Operating range U_{max}	Release voltage	Impedance	Control current I at U_N
V		V	V	V	Ω	mA
12	**7**.012	8	17	4	1,550	5.5
24	**7**.024	14	32	9	2,600	9

Output specification

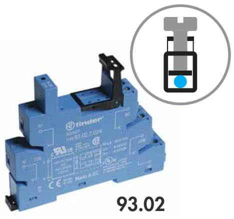
L 41 - Output current v ambient temperature
SSR - 5 A DC output types



L 41 - Output current v ambient temperature
SSR - 3 A AC output types

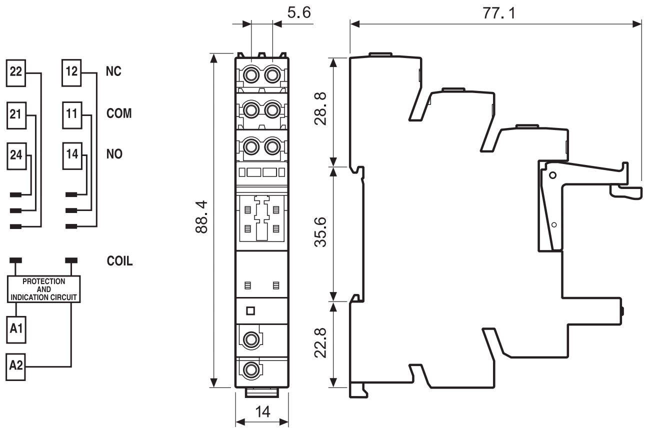


A



Approvals
(according to type):

Screw terminal socket 35 mm (EN 60715) mounting		
Supply voltage	**Relay type**	**Socket type**
6 V AC/DC	41.52.9.005.0010 or 41.61.9.005.0010	93.02.0.024
12 V AC/DC	41.52.9.012.0010 or 41.61.9.012.0010	93.02.0.024
24 V AC/DC	41.52/61.9.024.0010 or 41.81.7.024.xxxx	93.02.0.024
60 V AC/DC	41.52.9.060.0010 or 41.61.9.060.0010	93.02.0.060
(110...125)V AC/DC	41.52.9.110.0010 or 41.61.9.110.0010	93.02.0.125
(220...240)V AC/DC	41.52.9.110.0010 or 41.61.9.110.0010	93.02.0.240
(230...240)V AC	41.52.9.110.0010 or 41.61.9.110.0010	93.02.8.230
6 V DC	41.52.9.005.0010 or 41.61.9.005.0010	93.02.7.024
12 V DC	41.52/61.9.012.0010 or 41.81.7.012.xxxx	93.02.7.024
24 V DC	41.52/61.9.024.0010 or 41.81.7.024.xxxx	93.02.7.024
48 V DC	41.52.9.048.0010 or 41.61.9.048.0010	93.02.7.060
60 V DC	41.52.9.060.0010 or 41.61.9.060.0010	93.02.7.060
Accessories		
8-way jumper link	093.08 (see specification next page)	
Plastic separator	093.01 (see specification next page)	
Sheet of marker tags, 72 tags	060.72 (see specification next page)	
Technical data		
Rated values	10 A - 250 V	
Dielectric strength	6 kV (1.2/50 μs) between coil and contacts	
Protection category	IP 20	
Ambient temperature ($U_N \leq$ 60 V/> 60 V) °C	–40...+70/–40...+55	
Screw torque Nm	0.5	
Wire strip length mm	8	
Max. wire size for 93.02 socket	solid wire	stranded wire
mm²	1x6 / 2x2.5	1x4 / 2x2.5
AWG	1x10 / 2x14	1x12 / 2x14

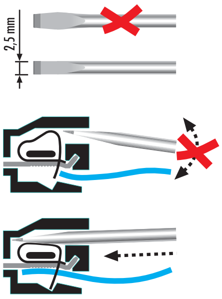


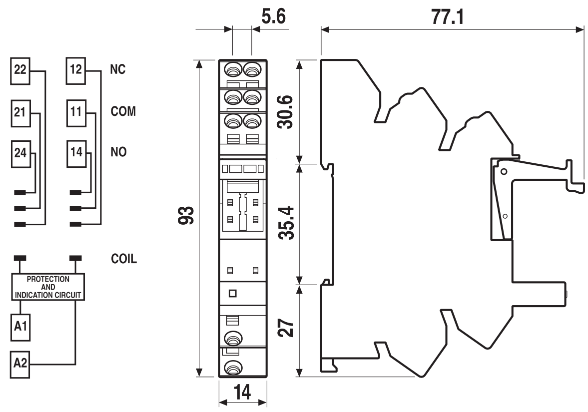
Note: Not for bistable relays

93.52

Approvals (according to type):

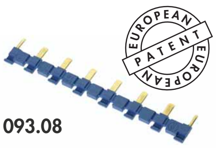
Screwless terminal socket 35 mm (EN 60715) mounting		
Supply voltage	**Relay type**	**Socket type**
6 V AC/DC	41.52.9.005.0010 or 41.61.9.005.0010	93.52.0.024
12 V AC/DC	41.52.9.012.0010 or 41.61.9.012.0010	93.52.0.024
24 V AC/DC	41.52/61.9.024.0010 or 41.81.7.024.xxxx	93.52.0.024
60 V AC/DC	41.52.9.060.0010 or 41.61.9.060.0010	93.52.0.060
(110...125)V AC/DC	41.52.9.110.0010 or 41.61.9.110.0010	93.52.0.125
(220...240)V AC/DC	41.52.9.110.0010 or 41.61.9.110.0010	93.52.0.240
(230...240)V AC	41.52.9.110.0010 or 41.61.9.110.0010	93.52.8.230
6 V DC	41.52.9.005.0010 or 41.61.9.005.0010	93.52.7.024
12 V DC	41.52/61.9.012.0010 or 41.81.7.012.xxxx	93.52.7.024
24 V DC	41.52/61.9.024.0010 or 41.81.7.024.xxxx	93.52.7.024
48 V DC	41.52.9.048.0010 or 41.61.9.048.0010	93.52.7.060
60 V DC	41.52.9.060.0010 or 41.61.9.060.0010	93.52.7.060
Accessories		
8-way jumper link	093.08 (see table below)	
Plastic separator	093.01 (see table below)	
Sheet of marker tags, 72 tags	060.72 (see table below)	
Technical data		
Rated values	10 A - 250 V	
Dielectric strength	6 kV (1.2/50 μs) between coil and contacts	
Protection category	IP 20	
Ambient temperature ($U_N \leq$ 60 V/> 60 V) °C	–40...+70 /–40...+55	
Wire strip length mm	8	
Max. wire size for 93.52 socket	solid wire	stranded wire
mm²	1x2.5	1x2.5
AWG	1x14	1x14





Note: Not for bistable relays

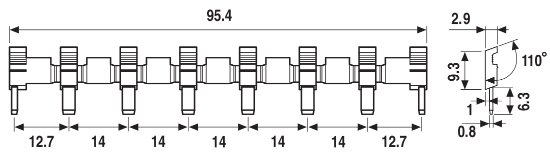
Accessories



093.08

Approvals (according to type):

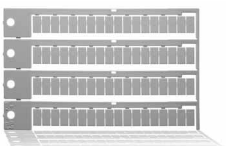
8-way jumper link for 93.02 and 93.52 sockets	093.08 (blue)	093.08.0 (black)	093.08.1 (red)
Rated values	10 A - 250 V		



093.01

Plastic separator for 93.02 and 93.52 sockets	093.01

Thickness 2 mm, required at the start and the end of a group of interfaces.
Can be used for visual separation group, must be used for:
- protective separation of different voltages of neighbouring PLC interfaces according to VDE 0106-101
- protection of cut jumper links



060.72

Sheet of marker tags for 38.x2, plastic, 72 tags, 6x12 mm	060.72

93 Series - Sockets and accessories for 41 series relays

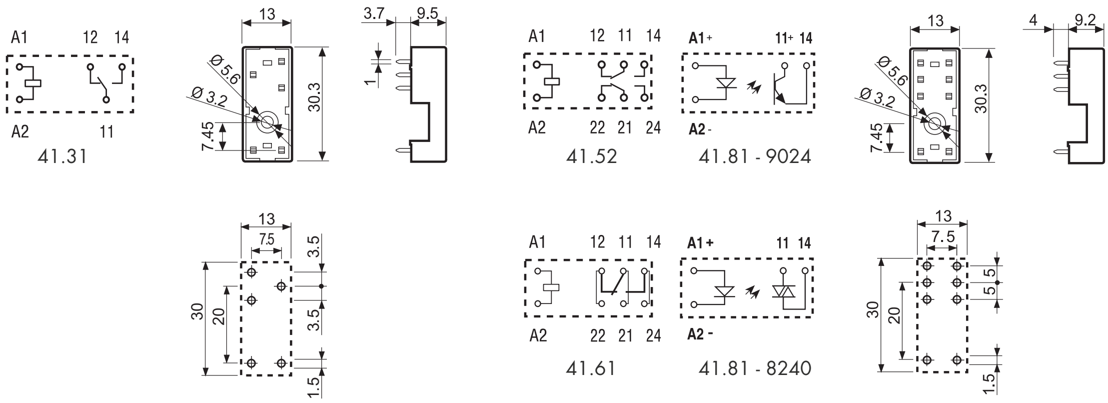
95.13.2

95.15.2

Approvals
(according to type):

PCB socket	95.13.2 (blue)	95.13.20 (black)	95.15.2 (blue)	95.15.20 (black)
For relay type	41.31		41.52, 41.61, 41.81[(1)]	
Accessories				
Plastic retaining clip	095.42			
Technical data				
Rated values	10 A - 250 V *			
Dielectric strength	6 kV (1.2/50 μs) between coil and contacts			
Protection category	IP 20			
Ambient temperature °C	–40…+70			

* For currents >10 A, contact terminals must be connected in parallel (21 with 11, 24 with 14, 22 with 12).
[(1)] With the relay 41.81 the NO change-over contact will be 11-14.



95.13.2
Copper side view

95.15.2
Copper side view

Note: Not for bistable relays

Packaging codes

How to code and identify retaining clip and packaging options for sockets.

Example:

9 5 . 1 3 . 2 S L A

A	Standard packaging
SL	Plastic retaining clip

9 5 . 1 3 . 2 → Without retaining clip

X-2014, www.findernet.com

Features

1 Pole - Low profile (15.4 mm height)
43.41 - 1 Pole, 10 A (3.2 mm pin pitch)
43.41-0300 - 1 Pole NO, 10 A (5 mm pin pitch)
43.61-0300 - 1 Pole NO, 16 A (5 mm pin pitch)

PCB mount - direct or via PCB socket (43.41 version)

- Sensitive DC coil:
  - 250 mW (10 A version)
  - 400 mW (16 A version)
- Very high coil-contact isolation 10 mm, 6 kV (1.2/50 μs)
- Cadmium Free contacts (preferred version)
- Flux proof: RT II standard, (RT III option)

43.41

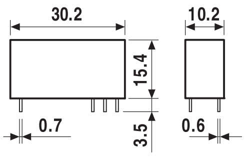
- 3.2 mm contact pin pitch
- 1 Pole CO, 10 A
- PCB direct or via socket

43.41-0300

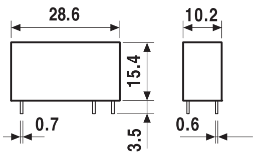
- 5 mm contact pin pitch
- 1 Pole NO, 10 A
- PCB mount

43.61-0300

- 5 mm contact pin pitch
- 1 Pole NO, 16 A
- PCB mount

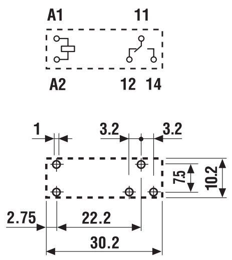


43.41

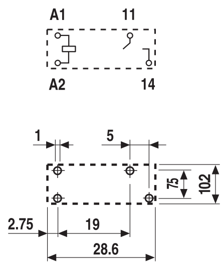


43.41-0300
43.61-0300

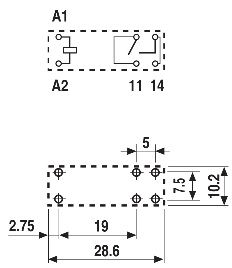
For UL ratings see:
"General technical information" page V



Copper side view



Copper side view



Copper side view

		43.41	43.41-0300	43.61-0300
Contact specification				
Contact configuration		1 CO (SPDT)	1 NO (SPST-NO)	1 NO (SPST-NO)
Rated current/Maximum peak current	A	10/15	10/15	16/25
Rated voltage/Maximum switching voltage	V AC	250/400	250/400	250/400
Rated load AC1	VA	2,500	2,500	4,000
Rated load AC15 (230 V AC)	VA	500	500	750
Single phase motor rating (230 V AC)	kW	—	—	—
Breaking capacity DC1: 30/110/220 V	A	10/0.3/0.12	10/0.3/0.12	16/0.3/0.12
Minimum switching load	mW (V/mA)	300 (5/5)	300 (5/5)	300 (5/5)
Standard contact material		AgNi	AgNi	AgNi
Coil specification				
Nominal voltage (U_N)	V AC (50/60 Hz)	—	—	—
	V DC	3 - 6 - 9 - 12 - 18 - 24 - 36 - 48	3 - 6 - 9 - 12 - 18 - 24 - 36 - 48	12 - 24 - 48
Rated power AC/DC	VA (50 Hz)/W	—/0.25	—/0.25	—/0.4
Operating range	AC	—	—	—
	DC	(0.7…1.5)U_N	(0.7…1.5)U_N	(0.7…1.2)U_N
Holding voltage	AC/DC	—/0.4 U_N	—/0.4 U_N	—/0.4 U_N
Must drop-out voltage	AC/DC	—/0.05 U_N	—/0.05 U_N	—/0.05 U_N
Technical data				
Mechanical life AC/DC	cycles	—/10 · 10^6	—/10 · 10^6	—/10 · 10^6
Electrical life at rated load AC1	cycles	100 · 10^3	100 · 10^3	50 · 10^3
Operate/release time	ms	6/4	6/2	6/2
Insulation between coil and contacts (1.2/50 μs)	kV	6 (10 mm)	6 (10 mm)	6 (10 mm)
Dielectric strength between open contacts	V AC	1,000	1,000	1,000
Ambient temperature range	°C	–40…+85	–40…+85	–40…+85
Environmental protection		RT II	RT II	RT II
Approvals (according to type)				

Ordering information

Example: 43 series low-profile PCB relay, 1 CO (SPDT), 24 V DC coil.

										A	B	C	D
4	3	.	4	1	.	7	.	0	2	4	.	2	0	0	0

Series

Type
4 = PCB - 3.2 mm pinning (CO/SPDT, 10 A)
PCB - 5 mm pinning (NO/SPST-NO, 10 A)
6 = PCB - 5 mm pinning (NO/SPST-NO, 16 A)

No. of poles
1 = 1 pole

Coil version
7 = Sensitive DC (only for 43.41)
9 = DC (only for 43.61)

Coil voltage
See coil specifications

A: Contact material
0 = AgNi
2 = AgCdO
4 = $AgSnO_2$
5 = AgNi + Au

B: Contact circuit
0 = CO (SPDT) - (for 43.41 only)
3 = NO (SPST)

D: Special versions
0 = Flux proof (RT II)
1 = Wash tight (RT III)

C: Options
0 = None

Selecting features and options: only combinations in the same row are possible.
Preferred selections for best availability are shown in **bold.**

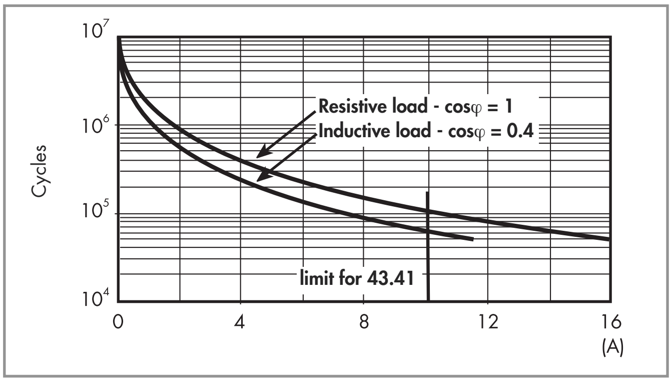
Type	Coil version	A	B	C	D
43.41	sensitive DC	**0** - 2 - 4 - 5	**0** - 3	**0**	**0** - 1
43.61	DC	**0** - 2 - 4	**3**	**0**	**0**

Technical data

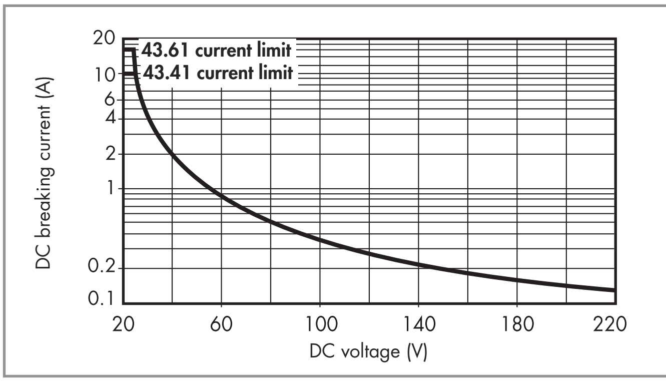
Insulation according to EN 61810-1			
Nominal voltage of supply system	V AC	230/400	
Rated insulation voltage	V AC	250	400
Pollution degree		3	2
Insulation between coil and contact set			
Type of insulation		Reinforced (10 mm)	
Overvoltage category		III	
Rated impulse voltage	kV (1.2/50 μs)	6	
Dielectric strength	V AC	4,000	
Insulation between open contacts			
Type of disconnection		Micro-disconnection	
Dielectric strength	V AC/kV (1.2/50 μs)	1,000/1.5	
Conducted disturbance immunity			
Burst (5…50)ns, 5 kHz, on A1 - A2		EN 61000-4-4	level 4 (4 kV)
Surge (1.2/50 μs) on A1 - A2 (differential mode)		EN 61000-4-5	level 3 (2 kV)
Other data			
Bounce time: NO/NC	ms	3/6	
Vibration resistance (5…55)Hz: NO/NC	g	15/3	
Shock resistance	g	15	
Power lost to the environment — without contact current	W	0.25 (43.41)	0.4 (43.61)
with rated current	W	1.3 (43.41)	2 (43.61)
Recommended distance between relays mounted on PCB	mm	≥ 5	

Contact specification

F 43 - Electrical life (AC) v contact current



H 43 - Maximum DC1 breaking capacity



- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of ≥ $100 \cdot 10^3$ for 43.41 and ≥ $50 \cdot 10^3$ for 43.61 can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load. Note: the release time for the load will be increased.

Coil specifications

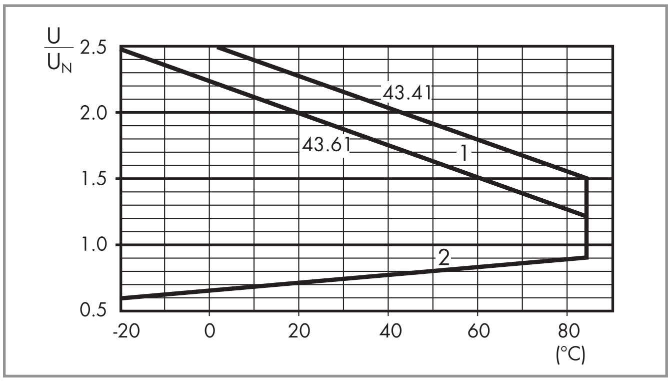
DC coil data - 0.25 W sensitive (type 43.41)

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
3	**7**.003	2.2	4.5	36	83.5
6	**7**.006	4.2	9	150	40
9	**7**.009	6.5	13.5	324	27.7
12	**7**.012	8.4	18	580	20.7
18	**7**.018	13	27	1,300	13.8
24	**7**.024	16.8	36	2,200	10.9
36	**7**.036	25.2	54	5,200	6.9
48	**7**.048	33.6	72	9,200	5.2

DC coil data - 0.4 W standard (type 43.61)

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
12	**9**.012	8.4	14.4	360	33.3
24	**9**.024	16.8	28.8	1,400	17.1
48	**9**.048	33.6	57.6	5,760	8.3

R 43 - DC coil operating range v ambient temperature



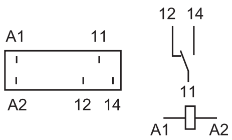
1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

A

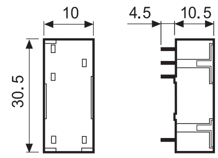
95.23

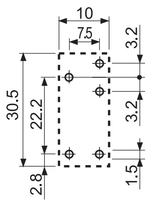
Approvals
(according to type):

PCB socket (for changeover contacts only)	**95.23 (blue)**	**95.23.0 (black)**
For relay type	43.41	43.41
Accessories		
Metal retaining clip (supplied with socket - packaging code SNA)	095.43	
Technical data		
Rated values	10 A - 250 V	
Insulation	6 kV (1.2/50 μs) between coil and contacts	
Protection category	IP 20	
Ambient temperature °C	–40…+70	



43.41





Copper side view

Packaging codes

How to code and identify retaining clip and packaging options for sockets.

Example:

9 5 . 2 3 S N A

A	Standard packaging
SN	Metal retaining clip
	Without retaining clip

9 5 . 2 3

Features

2 Pole relay range
44.52 - 2 Pole 6 A (5 mm pin pitch)
44.62 - 2 Pole 10 A (5 mm pin pitch)

PCB mount - direct or via PCB socket
35 mm rail mount - via screw and screwless sockets

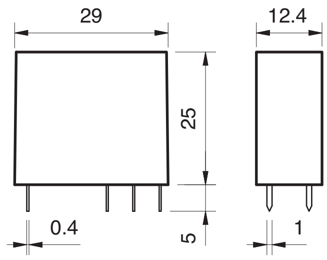
- High physical separation between adjacent contacts
- DC coils (Standard or sensitive)
- Cadmium Free contact materials
- 8 mm, 6 kV (1.2/50 μs) isolation, coil-contacts
- UL Listing (certain relay/socket combinations)
- Flux proof: RT II
- 95 series sockets
- Coil EMC suppression
- Timer accessories 86 series

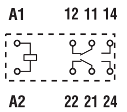
44.52

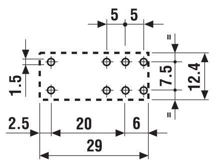
- 2 Pole, 6 A
- 5 mm contact pin pitch
- PCB or 95 series sockets

44.62

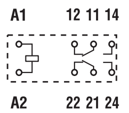
- 2 Pole, 10 A
- 5 mm contact pin pitch
- PCB or 95 series sockets

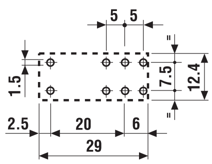






Copper side view





Copper side view

For UL ratings see:
"General technical information" page V

		44.52	44.62
Contact specification			
Contact configuration		2 CO (DPDT)	2 CO (DPDT)
Rated current/Maximum peak current	A	6/10	10/20
Rated voltage/Maximum switching voltage	V AC	250/400	250/400
Rated load AC1	VA	1,500	2,500
Rated load AC15 (230 V AC)	VA	250	500
Single phase motor rating (230 V AC)	kW	0.185	0.37
Breaking capacity DC1: 30/110/220 V	A	6/0.3/0.13	10/0.3/0.13
Minimum switching load	mW (V/mA)	300 (5/5)	300 (5/5)
Standard contact material		AgNi	AgNi
Coil specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	–	–
	V DC	6 - 9 - 12 - 14 - 24 - 28 - 48 - 60 - 110 - 125	6 - 9 - 12 - 14 - 24 - 28 - 48 - 60 - 110 - 125
Rated power AC/DC/sens. DC	VA (50 Hz)/W/W	–/0.65/0.5	–/0.65/0.5
Operating range	AC	–	–
	DC/sens. DC	(0.73…1.5)U_N/(0.73…1.7)U_N	(0.73…1.5)U_N/(0.8…1.7)U_N
Holding voltage	AC/DC	–/0.4 U_N	–/0.4 U_N
Must drop-out voltage	AC/DC	–/0.1 U_N	–/0.1 U_N
Technical data			
Mechanical life AC/DC	cycles	–/20 · 10^6	–/20 · 10^6
Electrical life at rated load AC1	cycles	150 · 10^3	100 · 10^3
Operate/release time	ms	8/5 - (12/5 sensitive)	8/5 - (12/5 sensitive)
Insulation between coil and contacts (1.2/50 μs)	kV	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts	V AC	1,000	1,000
Ambient temperature range	°C	–40…+85	–40…+85
Environmental protection		RT II	RT II
Approvals (according to type)		RINA	

A

Ordering information

Example: 44 series PCB relay, 2 CO (DPDT) 10 A contacts, 24 V DC coil.

					A	B	C	D
4 4	. 6	2	. 9	. 0 2 4	. 0	0	0	0

Series

Type
5 = PCB - 5 mm pinning
6 = PCB - 5 mm pinning

No. of poles
2 = 2 pole for
44.52, 6 A
44.62, 10 A

Coil version
7 = Sensitive DC
9 = DC

Coil voltage
See coil specifications

A: Contact material
0 = Standard AgNi
4 = $AgSnO_2$
for 44.62 only
5 = AgNi + Au
for 44.52 only

B: Contact circuit
0 = CO (DPDT)

D: Special versions
0 = Flux proof (RT II)

C: Options
0 = None

Selecting features and options: only combinations in the same row are possible.
Preferred selections for best availability are shown in **bold.**

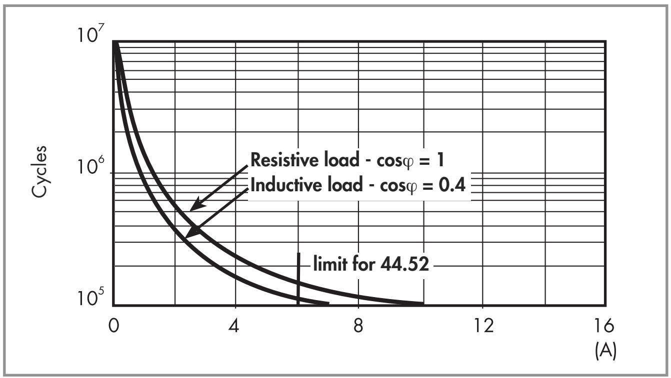
Type	Coil version	A	B	C	D
44.52	DC - sens. DC	**0** - 5	**0**	**0**	**0**
44.62	DC - sens. DC	**0** - 4	**0**	**0**	**0**

Technical data

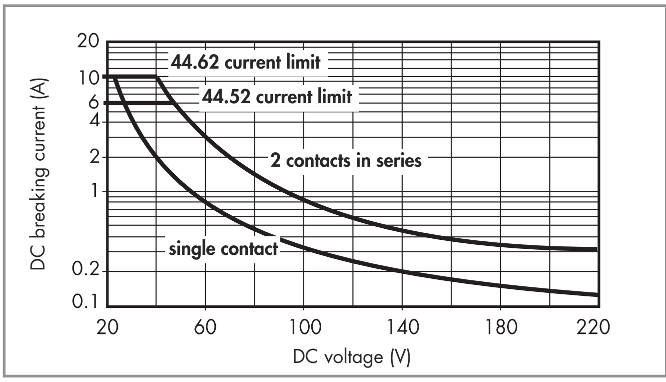
Insulation according to EN 61810-1			
Nominal voltage of supply system	V AC	230/400	
Rated insulation voltage	V AC	250	400
Pollution degree		3	2
Insulation between coil and contact set			
Type of Insulation		Reinforced (8 mm)	
Overvoltage category		III	
Rated impulse voltage	kV (1.2/50 μs)	6	
Dielectric strength	V AC	4,000	
Insulation between adjacent contacts			
Type of insulation		Basic	
Overvoltage category		III	
Rated impulse voltage	kV (1.2/50 μs)	4	
Dielectric strength	V AC	2,500	
Insulation between open contacts			
Type of disconnection		Micro-disconnection	
Dielectric strength	V AC/kV (1.2/50 μs)	1,000/1.5	
Conducted disturbance immunity			
Burst (5…50)ns, 5 kHz, on A1 - A2		EN 61000-4-4	level 4 (4 kV)
Surge (1.2/50 μs) on A1 - A2 (differential mode)		EN 61000-4-5	level 3 (2 kV)
Other data			
Bounce time: NO/NC	ms	4/4	
Vibration resistance (5…55)Hz: NO/NC	g	15/12	
Shock resistance	g	16	
Power lost to the environment — without contact current	W	0.6	
with rated current	W	1.2 (44.52)	2.7 (44.62)
Recommended distance between relays mounted on PCB	mm	≥ 5	

Contact specification

F 44 - Electrical life (AC) v contact current



H 44 - Maximum DC1 breaking capacity



- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of ≥ $100 \cdot 10^3$ can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load. Note: the release time for the load will be increased.

Coil specifications

DC coil data - 0.65 W standard

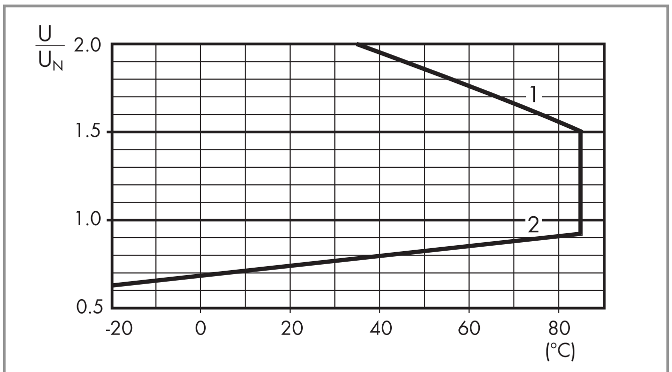
Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
6	**9**.006	4.4	9	55	109
9	**9**.009	6.6	13.5	125	72
12	**9**.012	8.8	18	220	55
14	**9**.014	10.2	21	300	47
24	**9**.024	17.5	36	900	27
28	**9**.028	20.5	42	1,200	23
48	**9**.048	35	72	3,500	14
60	**9**.060	43.8	90	5,500	11
110	**9**.110	80.3	165	18,000	6.2
125	**9**.125	91.2	188	23,500	5.3

DC coil data - 0.5 W sensitive

Nominal voltage U_N	Coil code	Operating range U_{min}*	U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
6	**7**.006	4.4	10.2	75	80
9	**7**.009	6.6	15.3	160	56
12	**7**.012	8.8	20.4	300	40
14	**7**.014	10.2	23.8	400	35
24	**7**.024	17.5	40.8	1,200	20
28	**7**.028	20.5	47.6	1,600	17.5
48	**7**.048	35	81.6	4,800	10
60	**7**.060	43.8	102	7,200	8.4
110	**7**.110	80.3	187	23,500	4.7
125	**7**.125	100	219	32,000	3.9

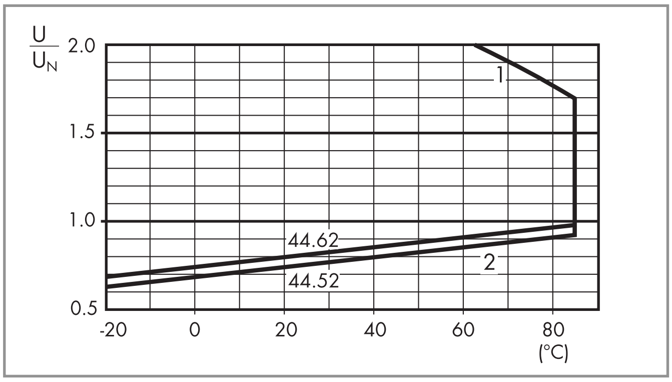
*U_{min} = 0.8 U_N for 44.62

R 44 - DC coil operating range v ambient temperature
Standard coil



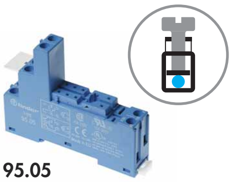
1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

R 44 - DC coil operating range v ambient temperature
Sensitive coil



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

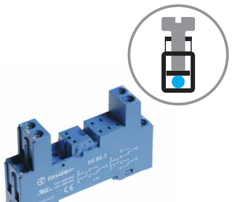
95 Series - Socket overview for 44 series relays



95.05

See page 5

Module	Socket	Relay	Description	Mounting	Accessories
99.02 	95.05	44.52 44.62	**Screw terminal (Box clamp) socket** - Top terminals - Contacts - Bottom terminals - Coil	Panel or 35 mm rail (EN 60715) mount	- Coil indication and EMC suppression modules - Jumper link - Timer modules - Plastic retaining and release clip



95.85.3

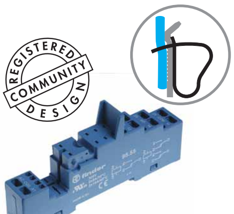
See page 6

Module	Socket	Relay	Description	Mounting	Accessories
99.80 	95.85.3	44.52 44.62	**Screw terminal (Box clamp) socket**	Panel or 35 mm rail (EN 60715) mount	- Coil indication and EMC suppression modules - Plastic retaining and release clip

95.95.3

See page 7

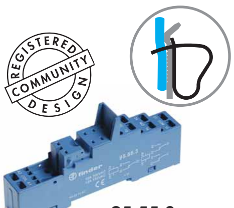
Module	Socket	Relay	Description	Mounting	Accessories
99.80 	95.95.3	44.52 44.62	**Screw terminal (Box clamp) socket** - Top terminals - Contacts - Bottom terminals - Coil	Panel or 35 mm rail (EN 60715) mount	- Coil indication and EMC suppression modules - Plastic retaining and release clip



95.55

See page 8

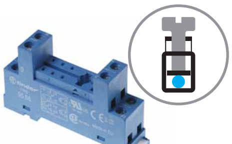
Module	Socket	Relay	Description	Mounting	Accessories
99.02 	95.55	44.52 44.62	**Screwless terminal socket** - For fast cable connections - Top terminals - Contacts - Bottom terminals - Coil	Panel or 35 mm rail (EN 60715) mount	- Coil indication and EMC suppression modules - Timer modules - Plastic retaining and release clip



95.55.3

See page 9

Module	Socket	Relay	Description	Mounting	Accessories
99.80 	95.55.3	44.52 44.62	**Screwless terminal socket** - For fast cable connections - Top terminals - Contacts - Bottom terminals - Coil	Panel or 35 mm rail (EN 60715) mount	- Coil indication and EMC suppression modules - Plastic retaining and release clip



95.65

See page 10

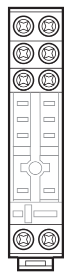
Module	Socket	Relay	Description	Mounting	Accessories
—	95.65	44.52 44.62	**Screw terminal (Box clamp) socket**	Panel or 35 mm rail (EN 60715) mount	- Metal retaining clip

95.15.2

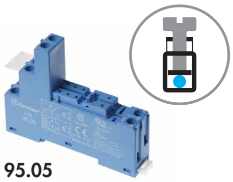
See page 11

Module	Socket	Relay	Description	Mounting	Accessories
—	95.15.2	44.52 44.62	**PCB socket**	PCB mounting	- Metal retaining clip

Top terminals



Bottom terminals

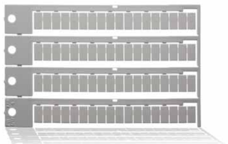


95.05

Approvals (according to type):

c UL us Certain relay/socket combinations

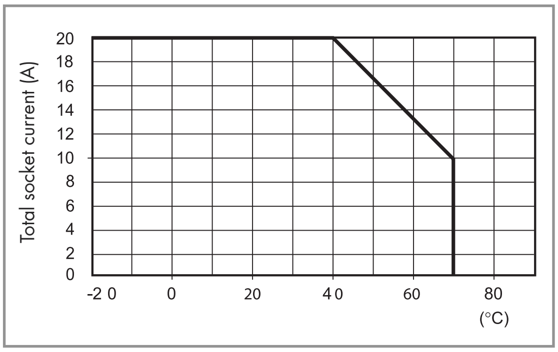
095.01

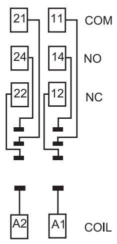


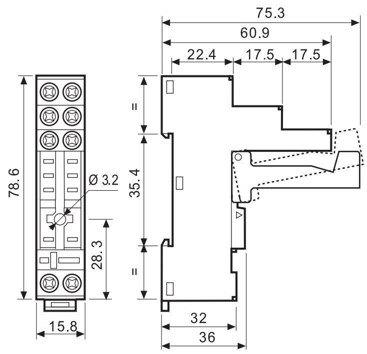
060.72

Screw terminal (Box clamp) socket panel or 35 mm rail mount		95.05 (blue)	95.05.0 (black)
For relay type		44.52, 44.62	
Accessories			
Metal retaining clip		095.71	
Plastic retaining and release clip (supplied with socket - packaging code SPA)		095.01	095.01.0
8-way jumper link		095.18	095.18.0
Identification tag		095.00.4	
Modules (see table below)		99.02	
Timer modules (see table below)		86.30	
Sheet of marker tags for retaining and release clip 095.01 plastic, 72 tags, 6x12 mm		060.72	
Technical data			
Rated values		10 A - 250 V	
Dielectric strength		6 kV (1.2/50 μs) between coil and contacts	
Protection category		IP 20	
Ambient temperature	°C	–40…+70 (see diagram L95)	
Screw torque	Nm	0.5	
Wire strip length	mm	8	
Max. wire size for 95.05 socket		solid wire	stranded wire
	mm^2	1x6 / 2x2.5	1x4 / 2x2.5
	AWG	1x10 / 2x14	1x12 / 2x14

L 95 - Total socket current vs ambient temperature

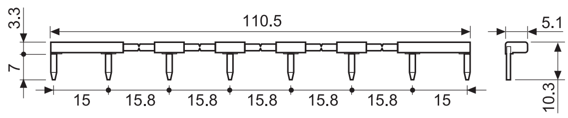






095.18

8-way jumper link for 95.05 socket	095.18 (blue)	095.18.0 (black)
Rated values	10 A - 250 V	



86.30

86 series timer modules	
(12…24)V AC/DC; Bi-function: AI, DI; (0.05s…100h)	86.30.0.024.0000

Approvals (according to type):

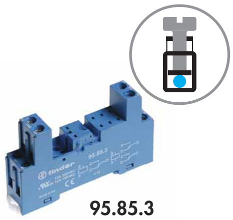
99.02

Approvals (according to type):

DC Modules with non-standard polarity (+A2) on request.

99.02 coil indication and EMC suppression modules for 95.05 socket		
Diode (+A1, standard polarity)	(6…220)V DC	99.02.3.000.00
LED	(6…24)V DC/AC	99.02.0.024.59
LED	(28…60)V DC/AC	99.02.0.060.59
LED	(110…240)V DC/AC	99.02.0.230.59
LED + Diode (+A1, standard polarity)	(6…24)V DC	99.02.9.024.99
LED + Diode (+A1, standard polarity)	(28…60)V DC	99.02.9.060.99
LED + Diode (+A1, standard polarity)	(110…220)V DC	99.02.9.220.99
LED + Varistor	(6…24)V DC/AC	99.02.0.024.98
LED + Varistor	(28…60)V DC/AC	99.02.0.060.98
LED + Varistor	(110…240)V DC/AC	99.02.0.230.98
RC circuit	(6…24)V DC/AC	99.02.0.024.09
RC circuit	(28…60)V DC/AC	99.02.0.060.09
RC circuit	(110…240)V DC/AC	99.02.0.230.09
Residual current by-pass	(110…240)V AC	99.02.8.230.07

A

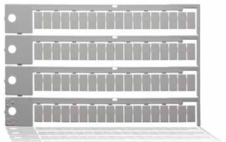


95.85.3

Approvals
(according to type):

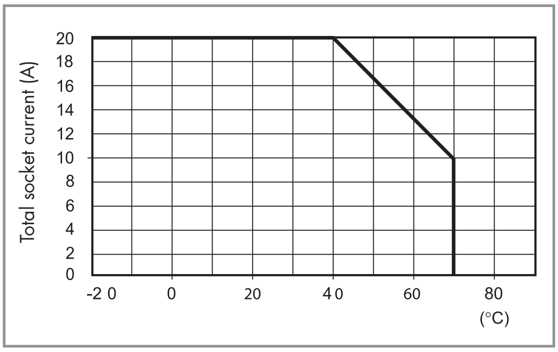
Screw terminal (Box clamp) socket panel or 35 mm rail mount	**95.85.3 (blue)**	**95.85.30 (black)**
For relay type	44.52, 44.62	
Accessories		
Metal retaining clip	095.71	
Plastic retaining and release clip (supplied with socket - packaging code SPA)	095.91.3	095.91.30
8-way jumper link	095.08	095.08.0
Identification tag	095.80.3	
Modules (see table below)	99.80	
Sheet of marker tags for retaining and release clip 095.91.3 plastic, 72 tags, 6x12 mm	060.72	
Technical data		
Rated values	10 A - 250 V	
Dielectric strength	6 kV (1.2/50 μs) between coil and contacts	
Protection category	IP 20	
Ambient temperature °C	–40…+70 (see diagram L95)	
Screw torque Nm	0.5	
Wire strip length mm	7	
Max. wire size for 95.85.3 sockets	solid wire	stranded wire
mm²	1x6 / 2x2.5	1x4 / 2x2.5
AWG	1x10 / 2x14	1x12 / 2x14

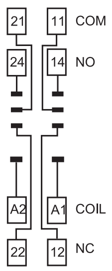
095.91.3

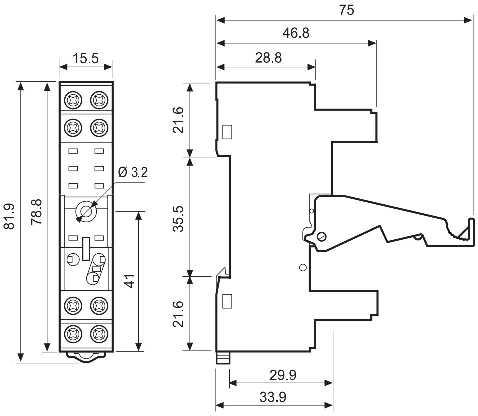


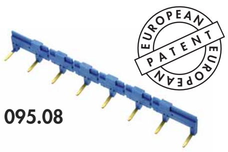
060.72

L 95 - Total socket current vs ambient temperature



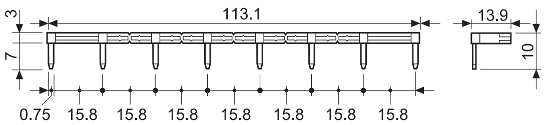






095.08

8-way jumper link for 95.85.3 socket	095.08 (blue)	095.08.0 (black)
Rated values	10 A - 250 V	



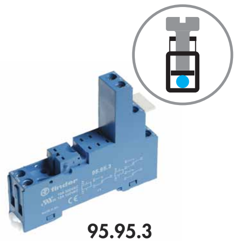
99.80

Approvals
(according to type):

* Modules in Black housing are available on request.

Green LED is standard. Red LED available on request.

99.80 coil indication and EMC suppression modules for 95.85.3 socket		
		Blue*
Diode (+A1, standard polarity)	(6…220)V DC	99.80.3.000.00
LED	(6…24)V DC/AC	99.80.0.024.59
LED	(28…60)V DC/AC	99.80.0.060.59
LED	(110…240)V DC/AC	99.80.0.230.59
LED + Diode (+A1, standard polarity)	(6…24)V DC	99.80.9.024.99
LED + Diode (+A1, standard polarity)	(28…60)V DC	99.80.9.060.99
LED + Diode (+A1, standard polarity)	(110…220)V DC	99.80.9.220.99
LED + Varistor	(6…24)V DC/AC	99.80.0.024.98
LED + Varistor	(28…60)V DC/AC	99.80.0.060.98
LED + Varistor	(110…240)V DC/AC	99.80.0.230.98
RC circuit	(6…24)V DC/AC	99.80.0.024.09
RC circuit	(28…60)V DC/AC	99.80.0.060.09
RC circuit	(110…240)V DC/AC	99.80.0.230.09
Residual current by-pass	(110…240)V AC	99.80.8.230.07

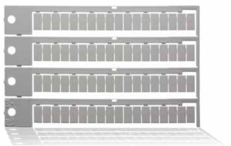


95.95.3

Approvals
(according to type):

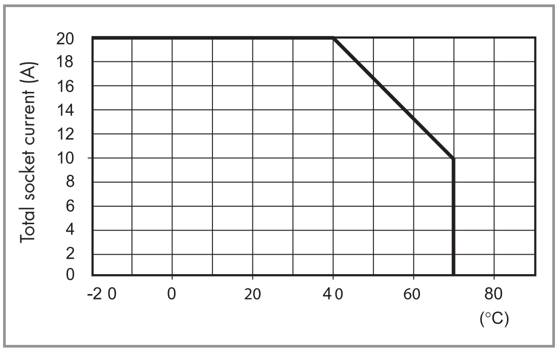
Screw terminal (Box clamp) socket panel or 35 mm rail mount		95.95.3 (blue)	95.95.30 (black)
For relay type		44.52, 44.62	
Accessories			
Metal retaining clip		095.71	
Plastic retaining and release clip (supplied with socket - packaging code SPA)		095.91.3	095.91.30
8-way jumper link		095.08	095.08.0
Identification tag		095.80.3	
Modules (see table below)		99.80	
Sheet of marker tags for retaining and release clip 095.91.3 plastic, 72 tags, 6x12 mm		060.72	
Technical data			
Rated values		10 A - 250 V	
Dielectric strength		6 kV (1.2/50 µs) between coil and contacts	
Protection category		IP 20	
Ambient temperature	°C	–40…+70 (see diagram L95)	
Screw torque	Nm	0.5	
Wire strip length	mm	8	
Max. wire size for 95.95.3 sockets		solid wire	stranded wire
	m^2	1x6 / 2x2.5	1x4 / 2x2.5
	AWG	1x10 / 2x14	1x12 / 2x14

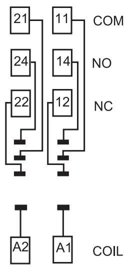
095.91.3

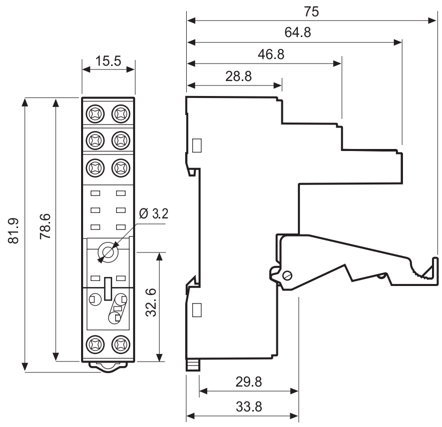


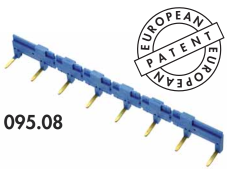
060.72

L 95 - Total socket current vs ambient temperature



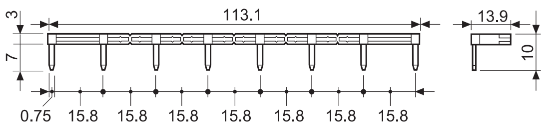






095.08

8-way jumper link for 95.95.3 socket	095.08 (blue)	095.08.0 (black)
Rated values	10 A - 250 V	



99.80

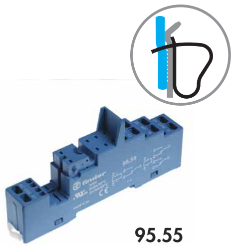
Approvals
(according to type):

*Modules in Black housing are available on request.

Green LED is standard. Red LED available on request.

99.80 coil indication and EMC suppression modules for 95.95.3 socket		Blue*
Diode (+A1, standard polarity)	(6…220)V DC	99.80.3.000.00
LED	(6…24)V DC/AC	99.80.0.024.59
LED	(28…60)V DC/AC	99.80.0.060.59
LED	(110…240)V DC/AC	99.80.0.230.59
LED + Diode (+A1, standard polarity)	(6…24)V DC	99.80.9.024.99
LED + Diode (+A1, standard polarity)	(28…60)V DC	99.80.9.060.99
LED + Diode (+A1, standard polarity)	(110…220)V DC	99.80.9.220.99
LED + Varistor	(6…24)V DC/AC	99.80.0.024.98
LED + Varistor	(28…60)V DC/AC	99.80.0.060.98
LED + Varistor	(110…240)V DC/AC	99.80.0.230.98
RC circuit	(6…24)V DC/AC	99.80.0.024.09
RC circuit	(28…60)V DC/AC	99.80.0.060.09
RC circuit	(110…240)V DC/AC	99.80.0.230.09
Residual current by-pass	(110…240)V AC	99.80.8.230.07

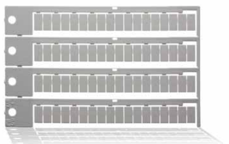
A



95.55

Approvals
(according to type):

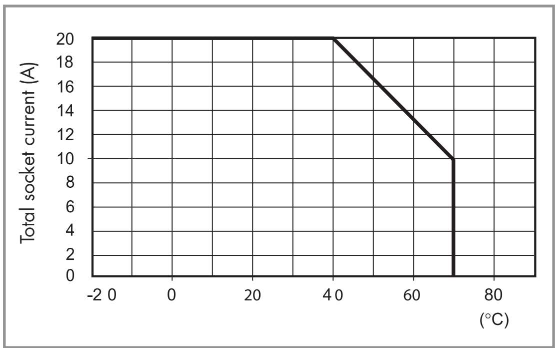
095.91.3

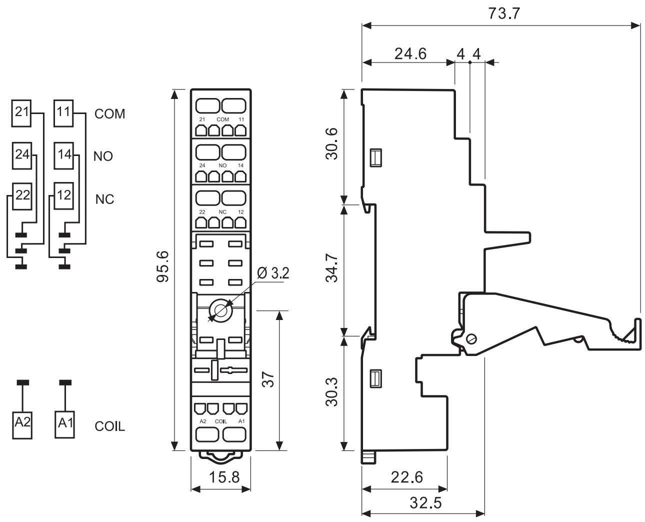


060.72

Screwless terminal socket panel or 35 mm rail mount		**95.55 (blue)**	**95.55.0 (black)**
For relay type		44.52, 44.62	
Accessories			
Metal retaining clip		095.71	
Plastic retaining and release clip (supplied with socket - packaging code SPA)		095.91.3	
Modules (see table below)		99.02	
Timer modules (see table below)		86.30	
Sheet of marker tags for retaining and release clip 095.91.3 plastic, 72 tags, 6x12 mm		060.72	
Technical data			
Rated values		10 A - 250 V	
Dielectric strength		6 kV (1.2/50 μs) between coil and contacts	
Protection category		IP 20	
Ambient temperature	°C	–25…+70 (see diagram L95)	
Wire strip length	mm	8	
Max. wire size for 95.55 socket		solid wire	stranded wire
	mm^2	2x(0.2...1.5)	2x(0.2...1.5)
	AWG	2x(24...18)	2x(24...18)

L 95 - Total socket current vs ambient temperature





86.30

86 series timer modules	
(12…24)V AC/DC; Bi-function: AI, DI; (0.05s…100h)	86.30.0.024.0000

Approvals
(according to type):

99.02

Approvals
(according to type):

DC Modules with non-standard polarity (+A2) on request.

99.02 coil indication and EMC suppression modules for 95.55 socket		
Diode (+A1, standard polarity)	(6...220)V DC	99.02.3.000.00
LED	(6...24)V DC/AC	99.02.0.024.59
LED	(28...60)V DC/AC	99.02.0.060.59
LED	(110...240)V DC/AC	99.02.0.230.59
LED + Diode (+A1, standard polarity)	(6...24)V DC	99.02.9.024.99
LED + Diode (+A1, standard polarity)	(28...60)V DC	99.02.9.060.99
LED + Diode (+A1, standard polarity)	(110...220)V DC	99.02.9.220.99
LED + Varistor	(6...24)V DC/AC	99.02.0.024.98
LED + Varistor	(28...60)V DC/AC	99.02.0.060.98
LED + Varistor	(110...240)V DC/AC	99.02.0.230.98
RC circuit	(6...24)V DC/AC	99.02.0.024.09
RC circuit	(28...60)V DC/AC	99.02.0.060.09
RC circuit	(110...240)V DC/AC	99.02.0.230.09
Residual current by-pass	(110...240)V AC	99.02.8.230.07

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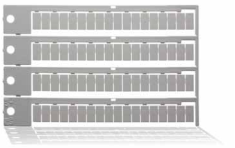
95.55.3

Approvals
(according to type):

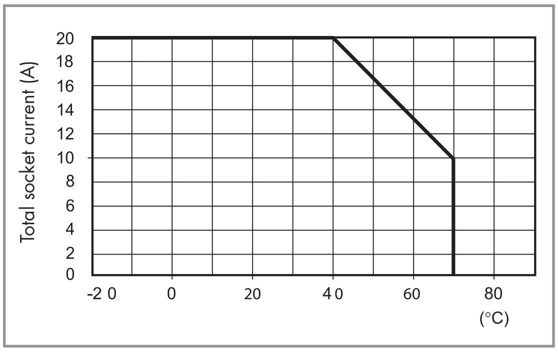
095.91.3

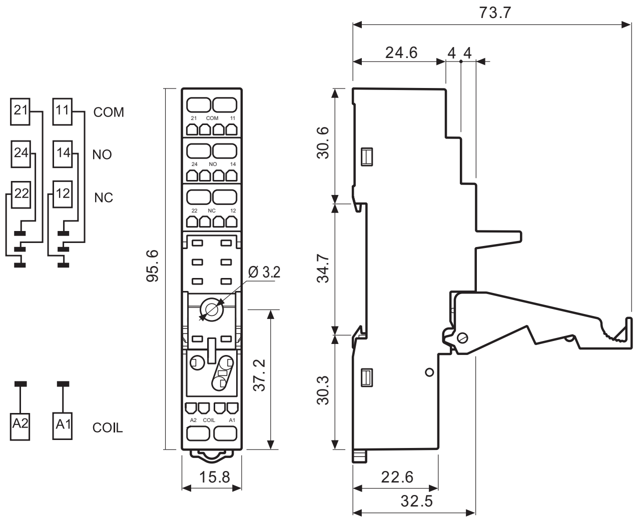


060.72

Screwless terminal socket panel or 35 mm rail mount		**95.55.3 (blue)**	**95.55.30 (black)**
For relay type		44.52, 44.62	
Accessories			
Metal retaining clip		095.71	
Plastic retaining and release clip (supplied with socket - packaging code SPA)		095.91.3	
Modules (see table below)		99.80	
Sheet of marker tags for retaining and release clip 095.91.3 plastic, 72 tags, 6x12 mm		060.72	
Technical data			
Rated values		10 A - 250 V	
Dielectric strength		6 kV (1.2/50 μs) between coil and contacts	
Protection category		IP 20	
Ambient temperature	°C	–25…+70 (see diagram L95)	
Wire strip length	mm	8	
Max. wire size for 95.55.3 socket		solid wire	stranded wire
	mm^2	2x(0.2…1.5)	2x(0.2…1.5)
	AWG	2x(24…18)	2x(24…18)

L 95 - Total socket current vs ambient temperature





99.80

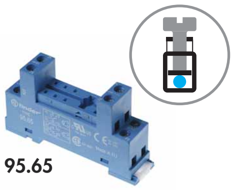
Approvals
(according to type):

* Modules in Black housing are available on request.

Green LED is standard. Red LED available on request.

99.80 coil indication and EMC suppression modules for 95.55.3 socket		
		Blue*
Diode (+A1, standard polarity)	(6…220)V DC	99.80.3.000.00
LED	(6…24)V DC/AC	99.80.0.024.59
LED	(28…60)V DC/AC	99.80.0.060.59
LED	(110…240)V DC/AC	99.80.0.230.59
LED + Diode (+A1, standard polarity)	(6…24)V DC	99.80.9.024.99
LED + Diode (+A1, standard polarity)	(28…60)V DC	99.80.9.060.99
LED + Diode (+A1, standard polarity)	(110…220)V DC	99.80.9.220.99
LED + Varistor	(6…24)V DC/AC	99.80.0.024.98
LED + Varistor	(28…60)V DC/AC	99.80.0.060.98
LED + Varistor	(110…240)V DC/AC	99.80.0.230.98
RC circuit	(6…24)V DC/AC	99.80.0.024.09
RC circuit	(28…60)V DC/AC	99.80.0.060.09
RC circuit	(110…240)V DC/AC	99.80.0.230.09
Residual current by-pass	(110…240)V AC	99.80.8.230.07

A

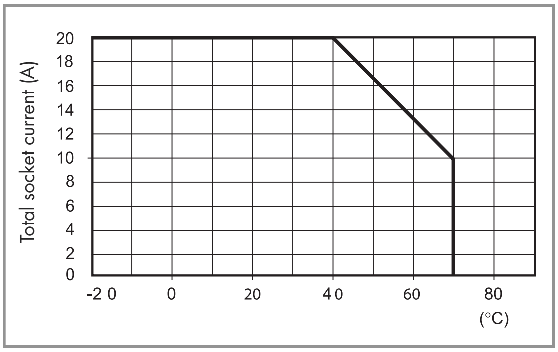


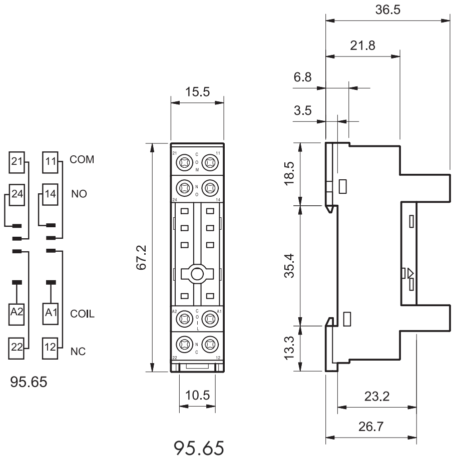
95.65

Approvals
(according to type):

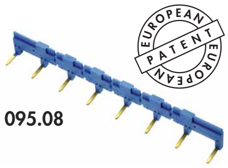
Screw terminal (Box clamp) socket panel or 35 mm rail mount		**95.65 (blue)**	
For relay type		44.52, 44.62	
Accessories			
Metal retaining clip		095.71	
8-way jumper link		095.08	
Modules		—	
Technical data			
Rated values		10 A - 250 V	
Dielectric strength (between coil and contacts)		2 kV AC	
Protection category		IP 20	
Ambient temperature	°C	–40…+70 (see diagram L95)	
Screw torque	Nm	0.5	
Wire strip length	mm	7	
Max. wire size for 95.65 sockets		solid wire	stranded wire
	m^2	1x6 / 2x2.5	1x4 / 2x2.5
	AWG	1x10 / 2x14	1x12 / 2x14

L 95 - Total socket current vs ambient temperature



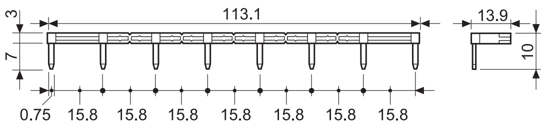


95.65



095.08

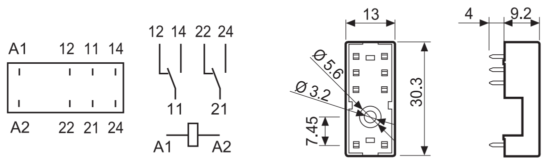
8-way jumper link for 95.65 sockets	095.08 (blue)
Rated values	10 A - 250 V

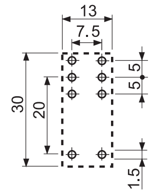


95.15.2

Approvals
(according to type):

PCB socket	95.15.2 (blue)	95.15.20 (black)
For relay type	44.52, 44.62	
Accessories		
Metal retaining clip (supplied with socket - packaging code SMA)	095.51	
Plastic retaining clip	095.52	
Technical data		
Rated values	10 A - 250 V	
Dielectric strength	6 kV (1.2/50 μs) between coil and contacts	
Protection category	IP 20	
Ambient temperature °C	–40…+70	





Copper side view

Packaging codes

How to code and identify retaining clip and packaging options for sockets.

Example:

9 5 . 0 5 S P A

A	Standard packaging
SM	Metal retaining clip
SP	Plastic retaining clip

9 5 . 0 5 → Without retaining clip

Features

Relay for +105 °C ambient use
PCB mount - direct for coil and contact terminals
- 45.31, 1 Pole normally open
(≥ 3 mm contact gap)

Relays for +125 °C ambient use
PCB mount - Faston 250 contact connections
- 45.71, 1 Pole normally open or normally closed
- 45.91, 1 Pole normally open
(≥ 3 mm contact gap)

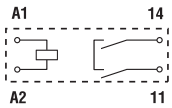
- Contact gap ≥ 3 mm according to EN 60730-1 (45.31 and 45.91 type)
- Sensitive DC coil - 360 mW
- Cadmium Free option available
- Reinforced insulation between coil and contacts according to EN 60335-1 (VDE 0700), with safe separation and 8 mm clearance and creepage distance
- 6 kV (1.2/50 μs) isolation, coil-contacts
- Flux proof: RT II standard, (RT III option)

For outline drawing see page 3

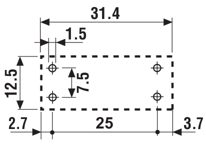
For UL ratings see:
"General technical information" page V

NEW 45.31

- 1 NO (SPST-NO), ≥ 3 mm gap
- Max ambient temperature +105°C
- PCB mounting



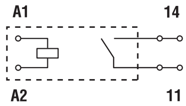
45.31...0310
(1 NO / SPST-NO)



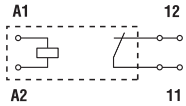
Copper side view

45.71

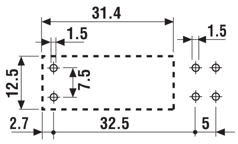
- 1 NO or 1 NC (SPST-NO or SPST-NC)
- Max ambient temperature +125°C
- PCB mounting + Faston 250



45.71...0310
(1 NO) / (SPST-NO)



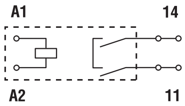
45.71...0410
(1 NC) / (SPST-NC)



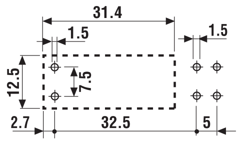
Copper side view

45.91

- 1 NO (SPST-NO), ≥ 3 mm gap
- Max ambient temperature +125°C
- PCB mounting + Faston 250



45.91...0310
(1 NO / SPST-NO)



Copper side view

		45.31	45.71	45.91
Contact specification				
Contact configuration		1NO (SPST-NO) ≥ 3 mm gap	1NO or 1NC (SPST-NO or SPST-NC)	1NO (SPST-NO) ≥ 3 mm gap
Rated current/Maximum peak current	A	16/30	16/30	16/30
Rated voltage/Maximum switching voltage	V AC	250/400	250/400	250/400
Rated load AC1	VA	4,000	4,000	4,000
Rated load AC15 (230 V AC)	VA	750	750	750
Single phase motor rating (230 V AC)	kW	0.55	0.55	0.55
Breaking capacity DC1: 30/110/220 V	A	16/4/1	16/0.3/0.13	16/4/1
Minimum switching load	mW (V/mA)	500 (10/5)	500 (10/5)	500 (10/5)
Standard contact material		AgNi	AgCdO	AgNi
Coil specification				
Nominal voltage (U_N)	V AC (50/60 Hz)	—	—	—
	V DC	6 - 12 - 24 - 48 - 60	6 - 12 - 24 - 48 - 60	6 - 12 - 24 - 48 - 60
Rated power AC/DC	VA (50 Hz)/W	—/0.36	—/0.36	—/0.36
Operating range	AC	—	—	—
	DC	$(0.7\ldots1.2)U_N$	$(0.7\ldots1.2)U_N$	$(0.7\ldots1.2)U_N$
Holding voltage	AC/DC	—/0.4 U_N	—/0.4 U_N	—/0.4 U_N
Must drop-out voltage	AC/DC	—/0.1 U_N	—/0.1 U_N	—/0.1 U_N
Technical data				
Mechanical life AC/DC	cycles	$—/10 \cdot 10^6$	$—/10 \cdot 10^6$	$—/10 \cdot 10^6$
Electrical life at rated load AC1	cycles	$30 \cdot 10^3$	$100 \cdot 10^3$	$30 \cdot 10^3$
Operate/release time	ms	12/2	10/2	12/2
Insulation between coil and contacts (1.2/50 μs)	kV	6 (8 mm)	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts	V AC	2,500	1,000	2,500
Ambient temperature range	°C	–40…+105	–40…+125	–40…+125
Environmental protection		RT II	RT II	RT II
Approvals (according to type)				

A

Ordering information

Example: 45 series for PCB relay + Faston 250, 1 NO (SPST-NO), 12 V DC coil.

						A	B	C	D
4 5	. 7	1	. 7	. 0 1 2	.	0	3	1	0

Series

Type
3 = PCB mount, ≥ 3 mm contact gap
7 = PCB + Faston 250 mount
9 = PCB + Faston 250 mount, ≥ 3 mm contact gap

No. of poles
1 = 1 pole, 16 A

Coil version
7 = Sensitive DC

Coil voltage
See coil specifications

A: Contact material
0 = Standard AgCdO for 45.71, Standard AgNi for 45.31 and 45.91
1 = AgNi
2 = AgCdO

B: Contact circuit
3 = NO (SPST)
4 = NC (SPST) 45.71 only

D: Special versions
0 = Flux proof (RT II)
1 = Wash tight (RT III) 45.71 and 45.91 only

C: Options
1 = None

Selecting features and options: only combinations in the same row are possible.

Type	Coil version	A	B	C	D
45.31	sensitive DC	0 - 2	3	1	0
45.71	sensitive DC	0 - 1	3 - 4	1	0 - 1
45.91	sensitive DC	0 - 2	3	1	0 - 1

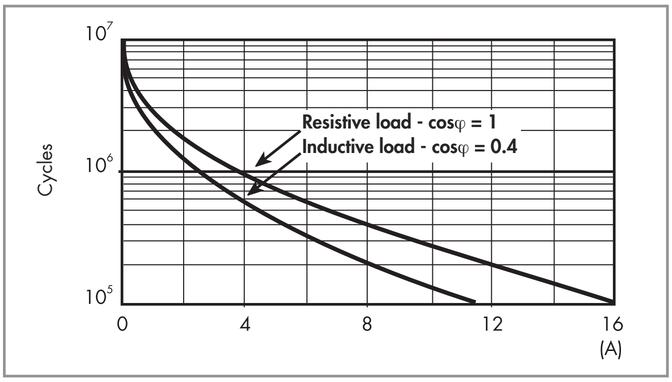
Technical data

Insulation according to EN 61810-1					
		45.71		**45.31 / 45.91**	
Nominal voltage of supply system	V AC	230/400		230/400	
Rated insulation voltage	V AC	250	400	250	400
Pollution degree		3	2	3	2
Insulation between coil and contact set					
Type of insulation		Reinforced (8 mm)		Reinforced (8 mm)	
Overvoltage category		III		III	
Rated impulse voltage	kV (1.2/50 μs)	6		6	
Dielectric strength	V AC	4,000		4,000	
Insulation between open contacts					
Type of disconnection		Micro-disconnection		Full-disconnection	
Overvoltage category		—		III	
Rated impulse voltage	kV (1.2/50 μs)	—		4	
Dielectric strength	V AC/kV (1.2/50 μs)	1,000/1.5		2,500/4	
Conducted disturbance immunity					
Burst (5…50)ns, 5 kHz, on A1 - A2		EN 61000-4-4		level 4 (4 kV)	
Surge (1.2/50 μs) on A1 - A2 (differential mode)		EN 61000-4-5		level 3 (2 kV)	
Other data		**45.71**		**45.31 / 45.91**	
Bounce time: NO/NC	ms	3/3		2/—	
Vibration resistance (10…150)Hz: NO/NC	g	20/10		20/—	
Shock resistance	g	20			
Power lost to the environment — without contact current	W	0.4			
Power lost to the environment — with rated current	W	1.8			
Recommended distance between relays mounted on PCB	mm	≥ 5			

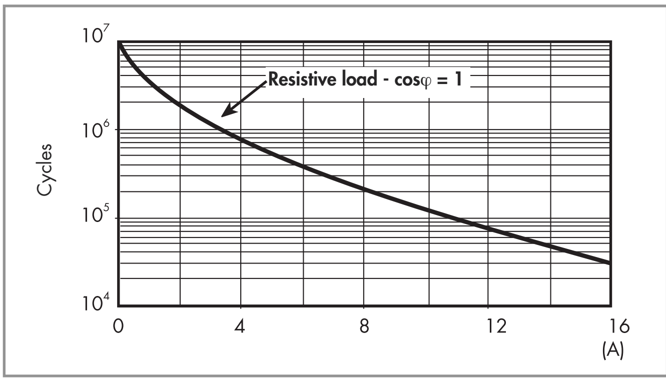
I-2014, www.findernet.com

Contact specification

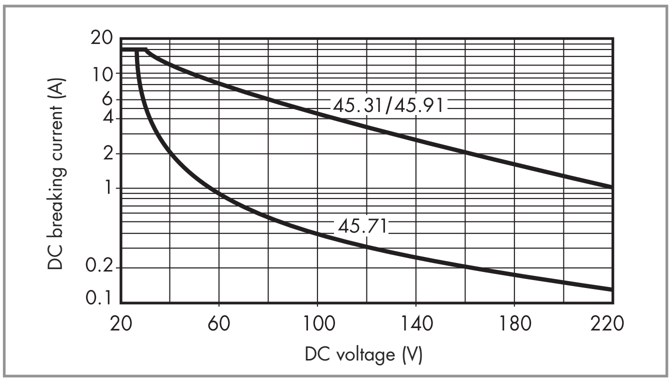
F 45 - Electrical life (AC) v contact current
Type 45.71



F 45 - Electrical life (AC) v contact current
Type 45.31 / 45.91



H 45 - Maximum DC1 breaking capacity



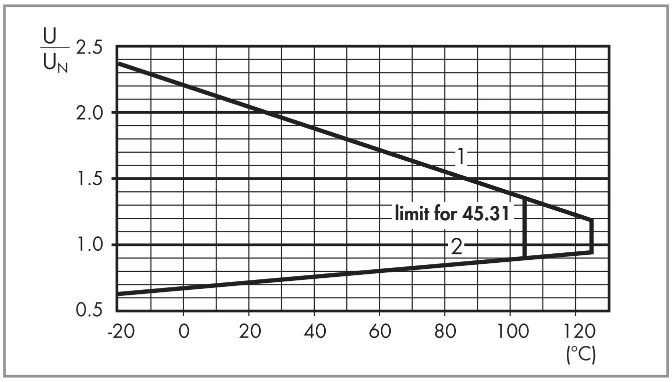
- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of ≥ $100 \cdot 10^3$ cycles (45.71) and ≥ $30 \cdot 10^3$ cycles (45.31, 45.91) can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load. Note: the release time for the load will be increased.

Coil specifications

DC coil data - 0.36 W sensitive

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
6	**7**.006	4.2	7.2	100	60
12	**7**.012	8.4	14.4	400	30
24	**7**.024	16.8	28.8	1,600	15
48	**7**.048	33.6	57.6	6,400	7.5
60	**7**.060	42	72	10,000	6

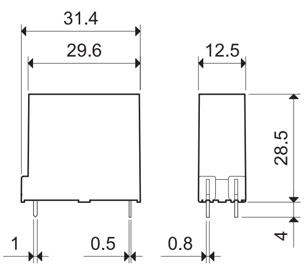
R 45 - DC coil operating range v ambient temperature



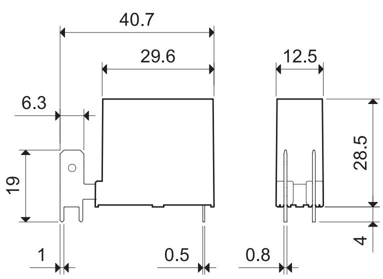
1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

Outline drawings

Type 45.31



Type 45.71 / 91



Features

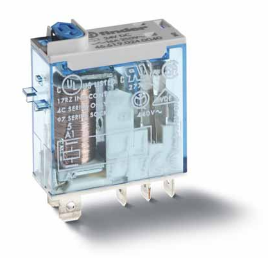
1 & 2 Pole relay range
46.52 - 2 Pole 8 A
46.61 - 1 Pole 16 A

- Socket mount or direct connection via Faston connectors
- AC coils & DC coils
- Available with: lockable test button, mechanical indicator & LED indicator
- 8 mm, 6 kV (1.2/50 μs) isolation, coil-contacts
- Cadmium Free contacts
- European Patent

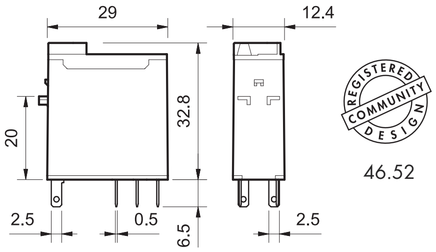
46.52

- 2 Pole CO, 8 A
- Plug-in/Solder terminals

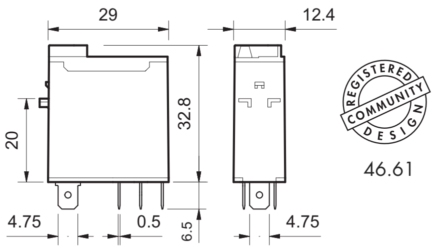
46.61



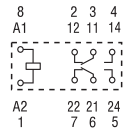
- 1 Pole CO, 16 A
- Plug-in/Faston 187

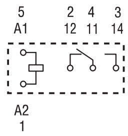


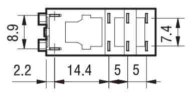
46.52

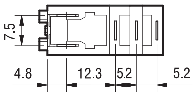


46.61









For UL ratings see:
"General technical information" page V

		46.52	46.61
Contact specification			
Contact configuration		2 CO (DPDT)	1 CO (SPDT)
Rated current/Maximum peak current	A	8/15	16/25 *
Rated voltage/Maximum switching voltage	V AC	250/440	250/440
Rated load AC1	VA	2,000	4,000
Rated load AC15 (230 V AC)	VA	350	750
Single phase motor rating (230 V AC)	kW	0.37	0.55
Breaking capacity DC1: 30/110/220 V	A	6/0.5/0.15	12/0.5/0.15
Minimum switching load	mW (V/mA)	300 (5/5)	300 (5/5)
Standard contact material		AgNi	AgNi
Coil specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	12 - 24 - 48 - 110 - 120 - 230 - 240	
	V DC	12 - 24 - 48 - 110 - 125	
Rated power	VA/W	1.2/0.5	1.2/0.5
Operating range	AC	$(0.8...1.1)U_N$	$(0.8...1.1)U_N$
	DC	$(0.73...1.1)U_N$	$(0.73...1.1)U_N$
Holding voltage	AC/DC	$0.8U_N$ / $0.4U_N$	$0.8U_N$ / $0.4U_N$
Must drop-out voltage	AC/DC	$0.2U_N$ / $0.1U_N$	$0.2U_N$ / $0.1U_N$
Technical data			
Mechanical life AC/DC	cycles	$10 \cdot 10^6$	$10 \cdot 10^6$
Electrical life at rated load AC1	cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Operate/release time	ms	10/3	15/5
Insulation between coil and contacts (1.2/50 μs)	kV	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts	V AC	1,000	1,000
Ambient temperature range	°C	–40 ... +70	–40 ... +70
Environmental protection		RT II	RT II
Approvals (according to type)		CE ANCE CCC EAC Lloyd's Register RINA cULus VDE	

* With the $AgSnO_2$ material the maximum peak current is 80 A - 5 ms on normally open contact.

A

Ordering information

Example: 46 series Miniature industrial relay, 1 CO (SPDT), 24 V DC coil, lockable test button and mechanical indicator.

					A	B	C	D
4 6	. 6	1	. 9	. 0 2 4	. 0	0	4	0

Series

Type
5 = Spade/blade solder terminal (2.5x0.5)mm
6 = Spade/blade terminal Faston 187 (4.8x0.5)mm

No. of poles
1 = 1 pole, 16 A
2 = 2 poles, 8 A

Coil version
9 = DC
8 = AC (50/60 Hz)

Coil voltage
See coil specifications

A: Contact material
0 = AgNi
4 = $AgSnO_2$ (46.61 only)
5 = AgNi + Au

B: Contact circuit
0 = CO (nPDT)

D: Special versions
0 = Standard

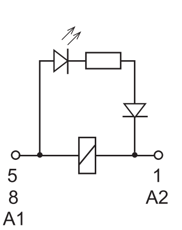
C: Options
2 = Mechanical indicator
4 = Lockable test button + mechanical indicator
54 = Lockable test button + LED (AC) + mechanical indicator
74 = Lockable test button + double LED (DC non-polarized) + mechanical indicator

Selecting features and options: only combinations in the same row are possible.
Preferred selections for best availability are shown in **bold**.

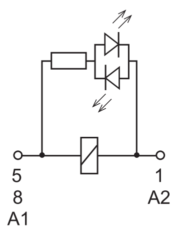
Type	Coil version	A	B	C	D
46.52	AC - DC	**0** - 5	**0**	2 - **4**	**0**
	AC	0 - 5	0	54	/
	DC	0 - 5	0	74	/
46.61	AC - DC	**0** - 4 - 5	**0**	2 - **4**	**0**
	AC	0 - 4 - 5	0	54	/
	DC	0 - 4 - 5	0	74	/

Special versions for Rail Applications on request

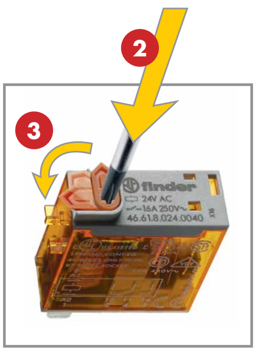
Descriptions: Options



C: Option 54
LED (AC)



C: Option 74
LED (DC, non-polarized)



Lockable test button and mechanical flag indicator (0040, 0054, 0074)

EUROPEAN PATENT

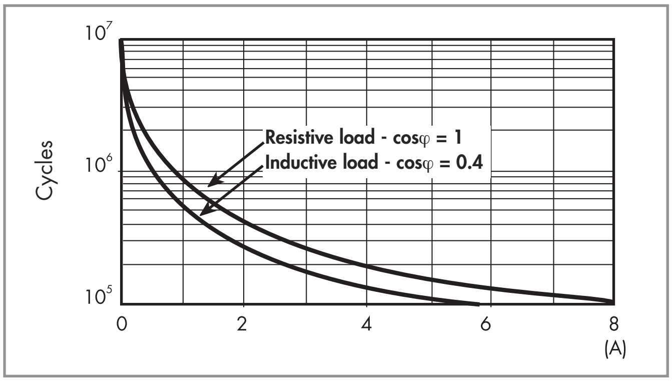
The dual-purpose Finder test button can be used in two ways:
Case 1) The plastic pip (located directly below the test button) remains intact. In this case, when the test button is pushed, the contacts operate. When the test button is released the contacts return to their former state.
Case 2) The plastic pip is broken-off (using an appropriate cutting tool). In this case, (in addition to the above function), when the test button is pushed and rotated, the contacts are latched in the operating state, and remain so until the test button is rotated back to its former position.
In both cases ensure that the test button actuation is swift and decisive.

Technical data

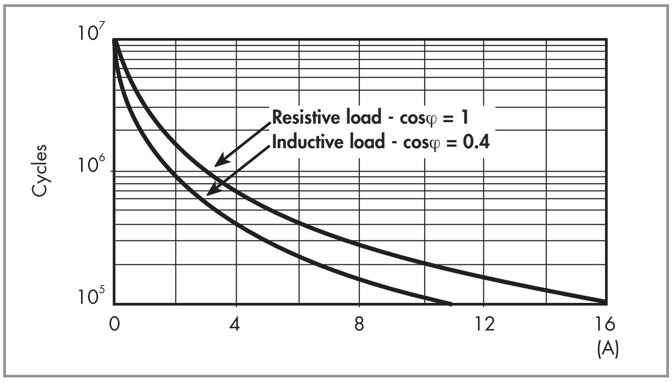
Insulation according to EN 61810-1		1 pole		2 pole	
Nominal voltage of supply system	V AC	230/400		230/400	
Rated insulation voltage	V AC	250	400	250	400
Pollution degree		3	2	3	2
Insulation between coil and contact set					
Type of insulation		Reinforced (8 mm)		Reinforced (8 mm)	
Overvoltage category		III		III	
Rated impulse voltage	kV (1.2/50 μs)	6		6	
Dielectric strength	V AC	4,000		4,000	
Insulation between adjacent contacts					
Type of insulation		—		Basic	
Overvoltage category		—		III	
Rated impulse voltage	kV (1.2/50 μs)	—		4	
Dielectric strength	V AC	—		2,000	
Insulation between open contacts					
Type of disconnection		Micro-disconnection		Micro-disconnection	
Dielectric strength	V AC/kV (1.2/50 μs)	1,000/1.5		1,000/1.5	
Conducted disturbance immunity					
Burst (5…50)ns, 5 kHz, on A1 - A2		EN 61000-4-4		level 4 (4 kV)	
Surge (1.2/50 μs) on A1 - A2 (differential mode)		EN 61000-4-5		level 3 (2 kV)	
Other data		**46.61**		**46.52**	
Bounce time: NO/NC	ms	2/6		1/4	
Vibration resistance (10…150)Hz: NO/NC	g	20/12		20/15	
Shock resistance	g	20		20	
Power lost to the environment — without contact current	W	0.6		0.6	
Power lost to the environment — with rated current	W	1.6		2	
Recommended distance between relays mounted on PCB	mm	≥ 5			

Contact specification

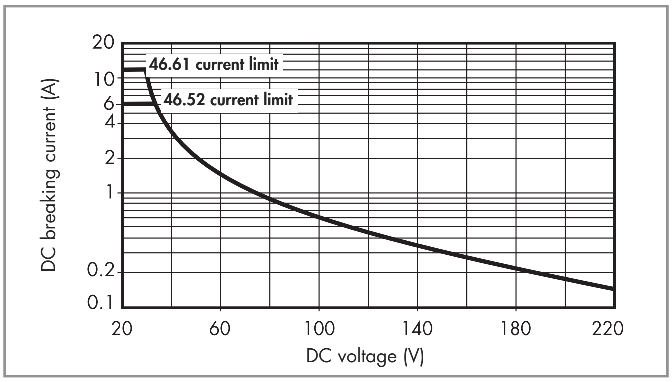
F 46 - Electrical life (AC) v contact current
Type 46.52



F 46 - Electrical life (AC) v contact current
Type 46.61



H 46 - Maximum DC1 breaking capacity



- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of ≥ $100 \cdot 10^3$ can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load. Note: the release time for the load will be increased.

A

Coil specifications

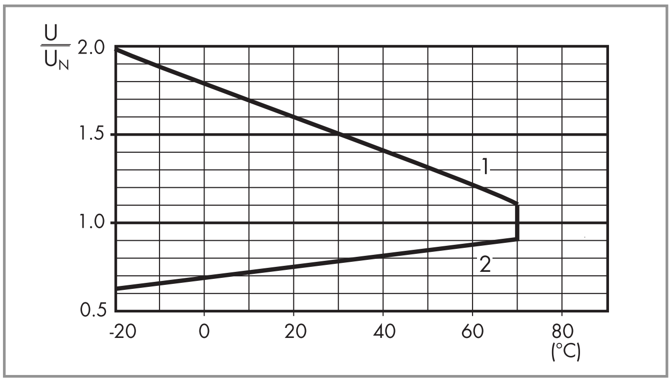
DC coil data

Nominal voltage U_N	Coil code	Operating range U_{min}		Resistance R	Rated coil consumption I at U_N
			U_{max}		
V		V	V	Ω	mA
12	**9**.012	8.8	13.2	300	40
24	**9**.024	17.5	26.4	1,200	20
48	**9**.048	35	52.8	4,800	10
110	**9**.110	80	121	23,500	4.7
125	**9**.125	91.2	138	32,000	3.9

AC coil data

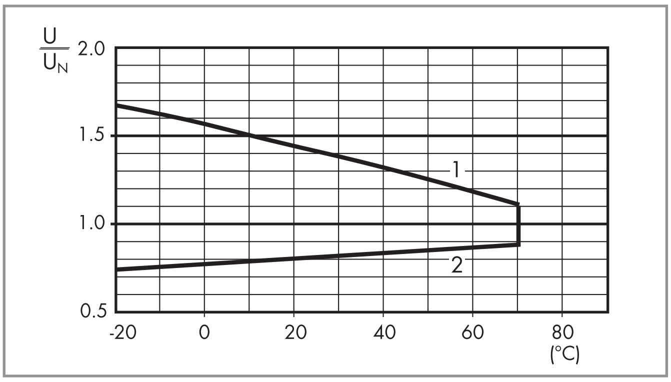
Nominal voltage U_N	Coil code	Operating range U_{min}		Resistance R	Rated coil consumption I at U_N
			U_{max}		
V		V	V	Ω	mA
12	**8**.012	9.6	13.2	80	90
24	**8**.024	19.2	26.4	320	45
48	**8**.048	38.4	52.8	1,350	21
110	**8**.110	88	121	6,900	9.4
120	**8**.120	96	132	9,000	8.4
230	**8**.230	184	253	28,000	5
240	**8**.240	192	264	31,500	4.1

R 46 - DC coil operating range v ambient temperature



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

R 46 - AC coil operating range v ambient temperature



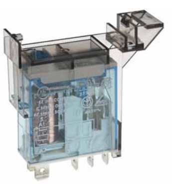
1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

Accessories

046.05

046.05 with relay

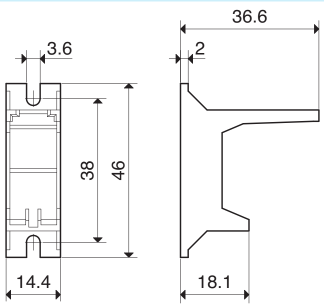
046.07



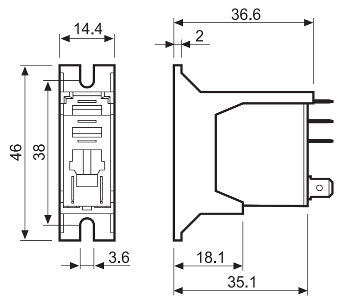
046.07 with relay

060.72

Flange mount adaptor for relays types 46.52 and 46.61	046.05

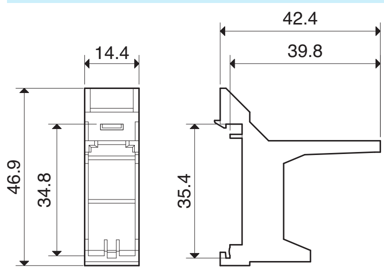


046.05

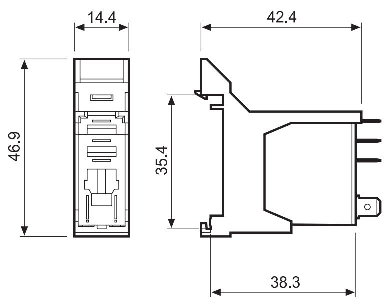


046.05 with relay

35 mm rail adaptor for relays types 46.52 and 46.61	046.07

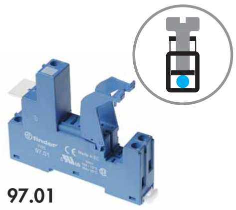


046.07



046.07 with relay

Sheet of marker tags for relays types 46.52 and 46.61 (72 tags), 6x12mm	060.72



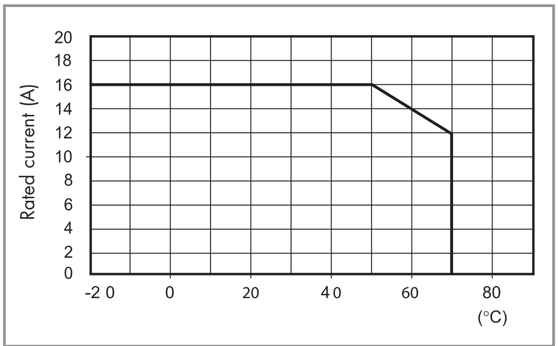
97.01

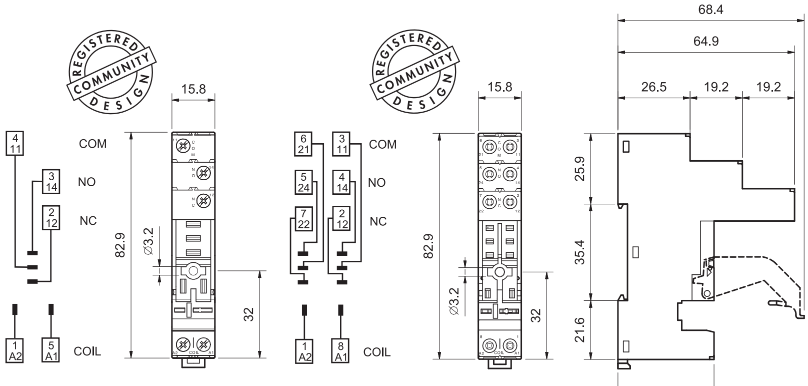
Approvals
(according to type):

097.01

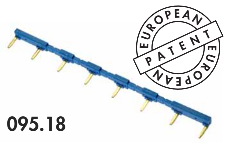
Screw terminal socket panel or 35 mm rail (EN 60715) mount		**97.01 (blue)**	**97.01.0 (black)**	**97.02 (blue)**	**97.02.0 (black)**
For relay type		46.61		46.52	
Accessories					
Plastic retain and release clip (supplied with socket - packaging code SPA)		097.01			
Metal retaining clip		097.71			
Identification tag		095.00.4			
8-way jumper link		095.18 (blue)		095.18.0 (black)	
Modules (see table below)		99.02			
Timer modules (see table below)		86.30			
Technical data					
Rated current		16 A - 250 V AC		8 A - 250 V AC	
Dielectric strength		6 kV (1.2/50 μs) between coil and contacts			
Protection category		IP 20			
Ambient temperature	°C	–40…+70 (see diagram L97)			
Screw torque	Nm	0.8			
Wire strip length	mm	8			
Max. wire size for 97.01 and 97.02 sockets		solid wire		stranded wire	
	mm²	1x6 / 2x2.5		1x4 / 2x2.5	
	AWG	1x10 / 2x14		1x12 / 2x14	

L 97 - Rated current vs ambient temperature
(for 46.61 relay / 97.01 socket combination)



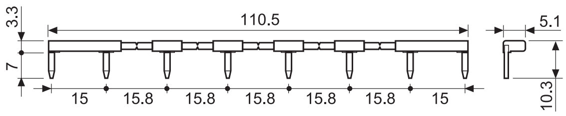


97.01 97.01 97.02 97.02



095.18

8-way jumper link for 97.01 and 97.02 sockets	095.18 (blue)	095.18.0 (black)
Rated values	10 A - 250 V	



86.30

86 series timer module	
(12…24)V AC/DC; Bi-function: AI, DI; (0.05s…100h)	86.30.0.024.0000
(110…125)V AC; Bi-function: AI, DI; (0.05s…100h)	86.30.8.120.0000
(230…240)V AC; Bi-function: AI, DI; (0.05s…100h)	86.30.8.240.0000

Approvals
(according to type):

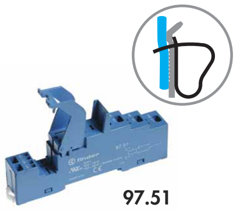
99.02

Approvals
(according to type):

DC Modules with non-standard polarity (+A2) on request.

99.02 coil indication and EMC suppression modules for 97.01 and 97.02 sockets		
Diode (+A1, standard polarity)	(6…220)V DC	99.02.3.000.00
LED	(6…24)V DC/AC	99.02.0.024.59
LED	(28…60)V DC/AC	99.02.0.060.59
LED	(110…240)V DC/AC	99.02.0.230.59
LED + Diode (+A1, standard polarity)	(6…24)V DC	99.02.9.024.99
LED + Diode (+A1, standard polarity)	(28…60)V DC	99.02.9.060.99
LED + Diode (+A1, standard polarity)	(110…220)V DC	99.02.9.220.99
LED + Varistor	(6…24)V DC/AC	99.02.0.024.98
LED + Varistor	(28…60)V DC/AC	99.02.0.060.98
LED + Varistor	(110…240)V DC/AC	99.02.0.230.98
RC circuit	(6…24)V DC/AC	99.02.0.024.09
RC circuit	(28…60)V DC/AC	99.02.0.060.09
RC circuit	(110…240)V DC/AC	99.02.0.230.09
Residual current by-pass	(110…240)V AC	99.02.8.230.07

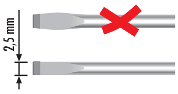
A

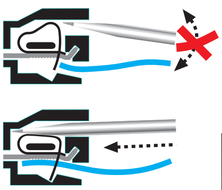


97.51

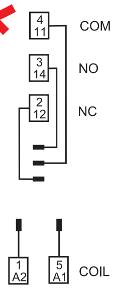
Approvals
(according to type):

097.01

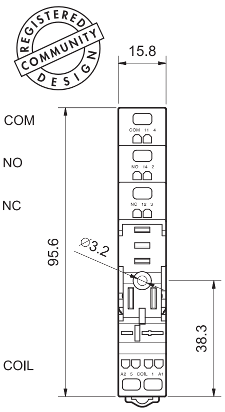




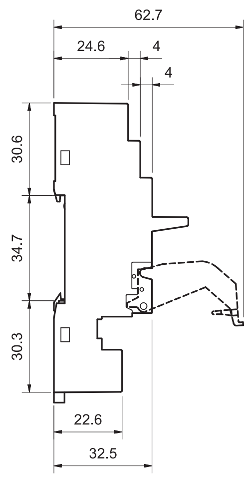
Screwless terminal socket panel or 35 mm rail (EN 60715) mount		**97.51 (blue)**	**97.51.0 (black)**	**97.52 (blue)**	**97.52.0 (black)**
For relay type		46.61		46.52	
Accessories					
Plastic retain and release clip (supplied with socket - packaging code SPA)		097.01			
Metal retaining clip		097.71			
Modules (see table below)		99.02			
Timer modules (see table below)		86.30			
Technical data					
Rated current		10 A - 250 V AC		8 A - 250 V AC	
Dielectric strength		6 kV (1.2/50 μs) between coil and contacts			
Protection category		IP 20			
Ambient temperature	°C	–25…+70			
Wire strip length	mm	8			
Max. wire size for 97.51 and 97.52 sockets		solid wire		stranded wire	
	mm²	2x(0.2...1.5)		2x(0.2...1.5)	
	AWG	2x(24...18)		2x(24...18)	

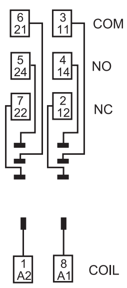


97.51

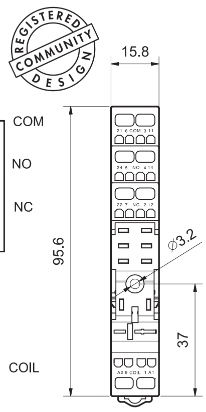


97.51

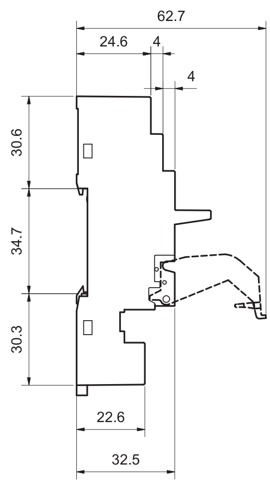




97.52



97.52



86.30

86 series timer module	
(12…24)V AC/DC; Bi-function: AI, DI; (0.05s…100h)	86.30.0.024.0000
(110…125)V AC; Bi-function: AI, DI; (0.05s…100h)	86.30.8.120.0000
(230…240)V AC; Bi-function: AI, DI; (0.05s…100h)	86.30.8.240.0000

Approvals (according to type):

99.02

Approvals
(according to type):

DC Modules with non-standard polarity (+A2) on request.

99.02 coil indication and EMC suppression modules for 97.51 and 97.52 sockets		
Diode (+A1, standard polarity)	(6…220)V DC	99.02.3.000.00
LED	(6…24)V DC/AC	99.02.0.024.59
LED	(28…60)V DC/AC	99.02.0.060.59
LED	(110…240)V DC/AC	99.02.0.230.59
LED + Diode (+A1, standard polarity)	(6…24)V DC	99.02.9.024.99
LED + Diode (+A1, standard polarity)	(28…60)V DC	99.02.9.060.99
LED + Diode (+A1, standard polarity)	(110…220)V DC	99.02.9.220.99
LED + Varistor	(6…24)V DC/AC	99.02.0.024.98
LED + Varistor	(28…60)V DC/AC	99.02.0.060.98
LED + Varistor	(110…240)V DC/AC	99.02.0.230.98
RC circuit	(6…24)V DC/AC	99.02.0.024.09
RC circuit	(28…60)V DC/AC	99.02.0.060.09
RC circuit	(110…240)V DC/AC	99.02.0.230.09
Residual current by-pass	(110…240)V AC	99.02.8.230.07

97.11

Approvals
(according to type):

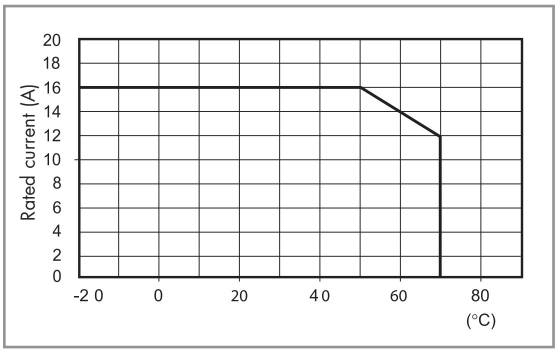
97.12

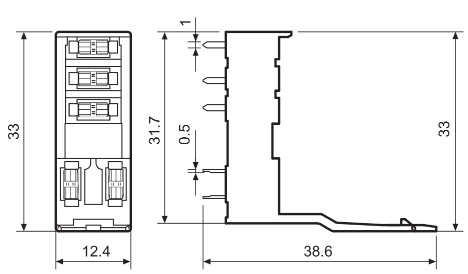
Approvals
(according to type):

PCB socket		**97.11 (blue)**	**97.12 (blue)**
For relay type		46.61	46.52
Technical data			
Rated values		12 A - 250 V (see diagram L97)	8 A - 250 V
Dielectric strength		6 kV (1.2/50 μs) between coil and contacts	
Protection category		IP 20	
Ambient temperature	°C	–40…+70	

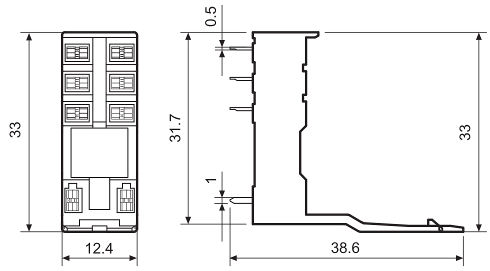
A

L 97 - Rated current vs ambient temperature
(for 46.61 relay / 97.11 socket combination)

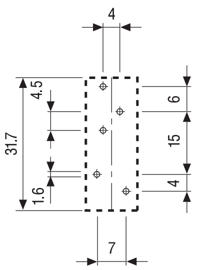


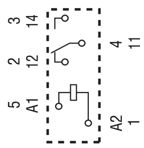


97.11

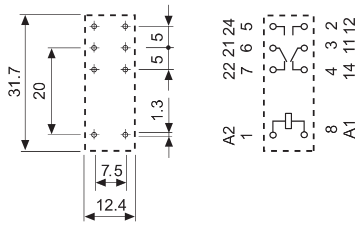


97.12





Copper side view



Copper side view

Packaging codes

How to code and identify retaining clip and packaging options for sockets.

Example:

9	7	.	0	1	S	P	A

A	Standard packaging
SM	Metal retaining clip
SP	Plastic retaining clip
	Without retaining clip

9	7	.	0	1		

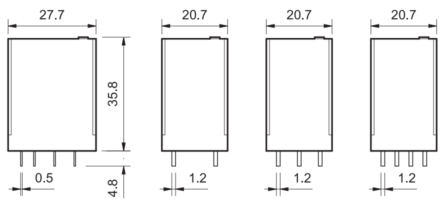
Features

Printed circuit mount, general purpose 2, 3 & 4 Pole relays

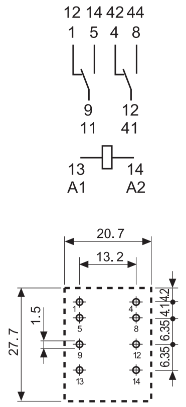
55.12 - 2 Pole 10 A
55.13 - 3 Pole 10 A
55.14 - 4 Pole 7 A

- AC coils & DC coils
- Cadmium Free contacts
- Contact material options
- RT III (wash tight) option available

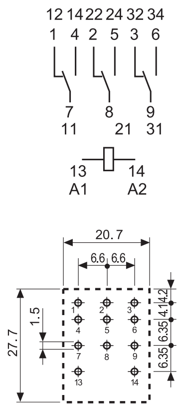
55.12	55.13	55.14
		
• 2 pole, 10 A • PCB mount	• 3 pole, 10 A • PCB mount	• 4 pole, 7 A • PCB mount



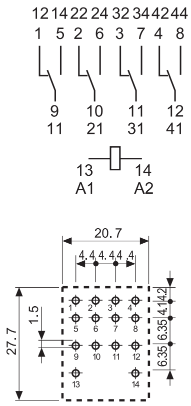
55.12 55.13 55.14



Copper side view



Copper side view



Copper side view

For UL ratings see:
"General technical information" page V

		55.12	55.13	55.14
Contact specification				
Contact configuration		2 CO (DPDT)	3 CO (3PDT)	4 CO (4PDT)
Rated current/Maximum peak current	A	10/20	10/20	7/15
Rated voltage/Maximum switching voltage	V AC	250/400	250/400	250/250
Rated load AC1	VA	2,500	2,500	1,750
Rated load AC15 (230 V AC)	VA	500	500	350
Single phase motor rating (230 V AC)	kW	0.37	0.37	0.125
Breaking capacity DC1: 30/110/220V	A	10/0.25/0.12	10/0.25/0.12	7/0.25/0.12
Minimum switching load	mW (V/mA)	300 (5/5)	300 (5/5)	300 (5/5)
Standard contact material		AgNi	AgNi	AgNi
Coil specification				
Nominal voltage (U_N)	V AC (50/60 Hz)	6 - 12 - 24 - 48 - 60 - 110 - 120 - 230 - 240		
	V DC	6 - 12 - 24 - 48 - 60 - 110 -125 - 220		
Rated power AC/DC	VA (50 Hz)/W	1.5/1	1.5/1	1.5/1
Operating range	AC	$(0.8...1.1)U_N$	$(0.8...1.1)U_N$	$(0.8...1.1)U_N$
	DC	$(0.8...1.1)U_N$	$(0.8...1.1)U_N$	$(0.8...1.1)U_N$
Holding voltage	AC/DC	$0.8\ U_N/0.5\ U_N$	$0.8\ U_N/0.5\ U_N$	$0.8\ U_N/0.5\ U_N$
Must drop-out voltage	AC/DC	$0.2\ U_N/0.1\ U_N$	$0.2\ U_N/0.1\ U_N$	$0.2\ U_N/0.1\ U_N$
Technical data				
Mechanical life AC/DC	cycles	$20 \cdot 10^6/50 \cdot 10^6$	$20 \cdot 10^6/50 \cdot 10^6$	$20 \cdot 10^6/50 \cdot 10^6$
Electrical life at rated load AC1	cycles	$200 \cdot 10^3$	$200 \cdot 10^3$	$150 \cdot 10^3$
Operate/release time	ms	10/5	10/5	11/3
Insulation between coil and contacts (1.2/50 μs)	kV	4	4	4
Dielectric strength between open contacts	V AC	1,000	1,000	1,000
Ambient temperature range	°C	–40…+85	–40…+85	–40…+85
Environmental protection		RT I	RT I	RT I
Approvals (according to type)		ANCE CCC D EAC FI Lloyd's Register N RINA S cULus VDE		

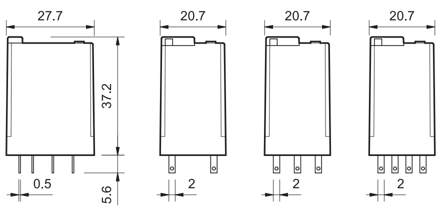
55 Series - General purpose relays 7 - 10 A

Features

Plug-in mount, general purpose
2, 3 & 4 Pole relays

55.32 - 2 Pole 10 A
55.33 - 3 Pole 10 A
55.34 - 4 Pole 7 A

- Lockable test button and mechanical flag indicator as standard on 2 & 4 pole types
- AC coils & DC coils
- UL Listing (certain relay/socket combinations)
- Cadmium Free contacts
- Contact material options
- 94 series sockets
- Coil EMC suppression
- Timer accessories 86 series
- European Patent

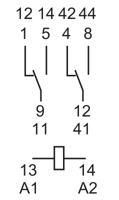


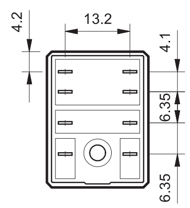
55.32 55.33 55.34

For UL ratings see:
"General technical information" page V

55.32

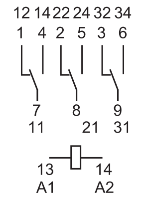
- 2 pole, 10 A
- Plug-in 94 series sockets

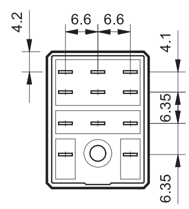




55.33

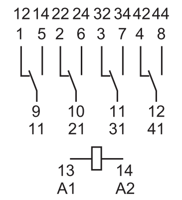
- 3 pole, 10 A
- Plug-in 94 series sockets

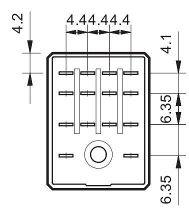




55.34

- 4 pole, 7 A
- Plug-in 94 series sockets





		55.32	55.33	55.34
Contact specification				
Contact configuration		2 CO (DPDT)	3 CO (3PDT)	4 CO (4PDT)
Rated current/Maximum peak current	A	10/20	10/20	7/15
Rated voltage/Maximum switching voltage	V AC	250/400	250/400	250/250
Rated load AC1	VA	2,500	2,500	1,750
Rated load AC15 (230 V AC)	VA	500	500	350
Single phase motor rating (230 V AC)	kW	0.37	0.37	0.125
Breaking capacity DC1: 30/110/220 V	A	10/0.25/0.12	10/0.25/0.12	7/0.25/0.12
Minimum switching load	mW (V/mA)	300 (5/5)	300 (5/5)	300 (5/5)
Standard contact material		AgNi	AgNi	AgNi
Coil specification				
Nominal voltage (U_N)	V AC (50/60 Hz)	6 - 12 - 24 - 48 - 60 - 110 - 120 - 230 - 240		
	V DC	6 - 12 - 24 - 48 - 60 - 110 - 125 - 220		
Rated power AC/DC	VA (50 Hz)/W	1.5/1	1.5/1	1.5/1
Operating range	AC	$(0.8…1.1)U_N$	$(0.8…1.1)U_N$	$(0.8…1.1)U_N$
	DC	$(0.8…1.1)U_N$	$(0.8…1.1)U_N$	$(0.8…1.1)U_N$
Holding voltage	AC/DC	$0.8\ U_N/0.5\ U_N$	$0.8\ U_N/0.5\ U_N$	$0.8\ U_N/0.5\ U_N$
Must drop-out voltage	AC/DC	$0.2\ U_N/0.1\ U_N$	$0.2\ U_N/0.1\ U_N$	$0.2\ U_N/0.1\ U_N$
Technical data				
Mechanical life AC/DC	cycles	$20 \cdot 10^6/50 \cdot 10^6$	$20 \cdot 10^6/50 \cdot 10^6$	$20 \cdot 10^6/50 \cdot 10^6$
Electrical life at rated load AC1	cycles	$200 \cdot 10^3$	$200 \cdot 10^3$	$150 \cdot 10^3$
Operate/release time	ms	10/5	10/5	11/3
Insulation between coil and contacts (1.2/50 μs)	kV	4	4	4
Dielectric strength between open contacts	V AC	1,000	1,000	1,000
Ambient temperature range	°C	–40…+85	–40…+85	–40…+85
Environmental protection		RT I	RT I	RT I
Approvals (according to type)				

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Ordering information

Example: 55 series plug-in relay, 4 CO (4PDT), 12 V DC coil, lockable test button and mechanical indicator.

								A	B	C	D
5	5 .	3	4 .	9 .	0	1	2 .	0	0	4	0

Series

Type
1 = PCB
3 = Plug-in

No. of poles
2 = 2 pole, 10 A
3 = 3 pole, 10 A
4 = 4 pole, 7 A

Coil version
8 = AC (50/60 Hz)
9 = DC

Coil voltage
See coil specifications

A: Contact material
0 = Standard AgNi
5 = AgNi + Au

B: Contact circuit
0 = CO (nPDT)

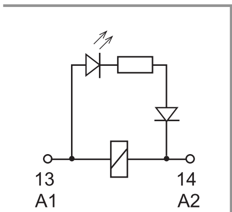
D: Special versions
0 = Standard
1 = Wash tight (RT III) for 55.12, 55.13 and 55.14 only

C: Options
0 = None
1 = Lockable test button
2 = Mechanical indicator
3 = LED (AC)
4 = Lockable test button+mechanical indicator
5 = Lockable test button + LED (AC)
54 = Lockable test button + LED (AC) + mechanical indicator
6* = Double LED (DC non-polarized)
7* = Lockable test button + double LED (DC non-polarized)
74* = Lockable test button + double LED (DC non-polarized) + mechanical indicator
8* = LED + diode (DC, polarity positive to pin A1/13)
9* = Lockable test button + LED + diode (DC, polarity positive to pin A1/13)
94* = Lockable test button + LED + diode (DC, polarity positive to pin A1/13) + mechanical indicator
* Option not available for the 220 V DC version.

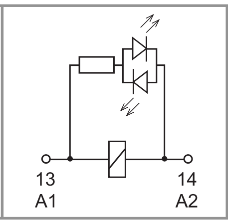
Selecting features and options: only combinations in the same row are possible.
Preferred selections for best availability are shown in **bold.**

Type	Coil version	A	B	C	D
55.32/34	AC-DC	0 - 5	0	0	0
	AC	**0** - 5	**0**	2 - 3 - **4** - 5	**0**
	AC	0 - 5	0	54	/
	DC	**0** - 5	**0**	2 - **4** - 6 - 7 - 8 - 9	**0**
	DC	0 - 5	0	74 - 94	/
55.33	AC-DC	**0** - 5	**0**	**0**	**0**
	AC	0 - 5	0	1 - 3 - 5	0
	DC	0 - 5	0	1 - 6 - 7 - 8 - 9	0
55.12/13/14	AC-DC	**0** - 5	**0**	**0**	**0** - 1

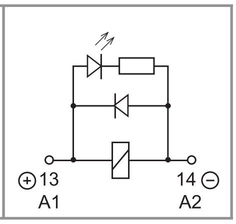
Descriptions: options and special versions



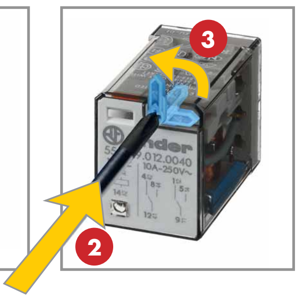
C: Option 3, 5, 54
LED (AC)



C: Option 6, 7, 74
Double LED
(DC non-polarized)



C: Option 8, 9, 94
LED + diode (DC, polarity positive to pin A1/13)



Lockable test button and mechanical flag indicator (0010, 0040, 0050, 0054, 0070, 0074, 0090, 0094)

EUROPEAN PATENT EUROPEAN

The dual-purpose Finder test button can be used in two ways:
Case 1) The plastic pip (located directly above the test button) remains intact. In this case, when the test button is pushed, the contacts operate. When the test button is released the contacts return to their former state.
Case 2) The plastic pip is broken-off (using an appropriate cutting tool). In this case, (in addition to the above function), when the test button is pushed and rotated, the contacts are latched in the operating state, and remain so until the test button is rotated back to its former position. In both cases ensure that the test button actuation is swift and decisive.

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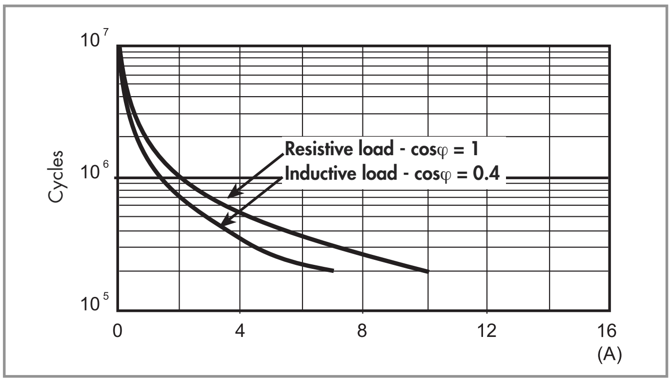
Technical data

A

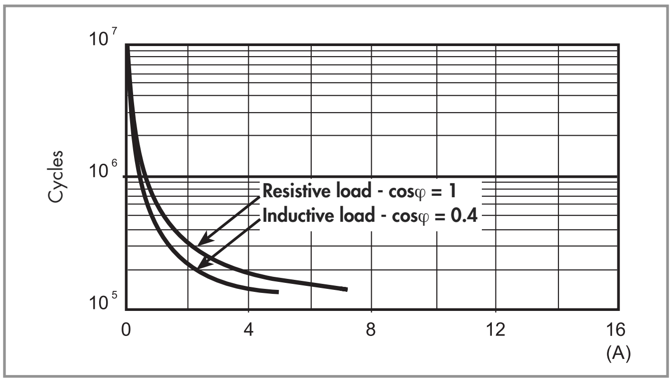
Insulation according to EN 61810-1		2 pole - 3 pole	4 pole
Nominal voltage of supply system	V AC	230/400	230
Rated insulation voltage	V AC	400	250
Pollution degree		2	2
Insulation between coil and contact set			
Type of Insulation		Basic	Basic
Overvoltage category		III	III
Rated impulse voltage	kV (1.2/50 µs)	4	4
Dielectric strength	V AC	2,000	2,000
Insulation between adjacent contacts			
Type of insulation		Basic	Basic
Overvoltage category		III	II
Rated impulse voltage	kV (1.2/50 µs)	4	2.5
Dielectric strength	V AC	2,000	2,000
Insulation between open contacts			
Type of disconnection		Micro-disconnection	Micro-disconnection
Dielectric strength	V AC/kV (1.2/50 µs)	1,000/1.5	1,000/1.5
Conducted disturbance immunity			
Burst (5…50)ns, 5 kHz, on A1 - A2		EN 61000-4-4	level 4 (4 kV)
Surge (1.2/50 µs) on A1 - A2 (differential mode)		EN 61000-4-5	level 4 (4 kV)
Other data			
Bounce time: NO/NC	ms	1/3	
Vibration resistance (5…55)Hz: NO/NC	g	15/15	
Shock resistance	g	16	
Power lost to the environment — without contact current	W	1	
with rated current	W	3 (2 pole) 4 (3 pole)	3 (4 pole)
Recommended distance between relays mounted on PCB	mm	≥ 5	

Contact specification

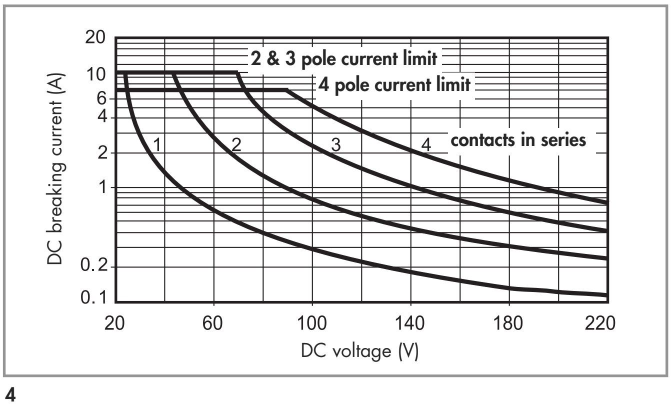
F 55 - Electrical life (AC) v contact current
2 and 3 pole relays



F 55 - Electrical life (AC) v contact current
4 pole relay



H 55 - Maximum DC1 breaking capacity



- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of ≥ $100 \cdot 10^3$ can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load. Note: the release time for the load will be increased.

Coil specifications

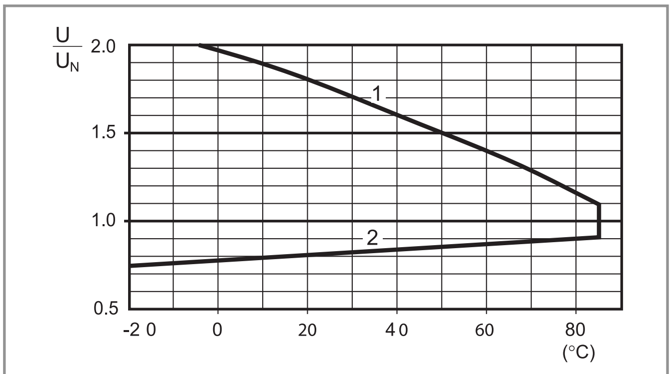
DC coil data

Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
6	**9**.006	4.8	6.6	40	150
12	**9**.012	9.6	13.2	140	86
24	**9**.024	19.2	26.4	600	40
48	**9**.048	38.4	52.8	2,400	20
60	**9**.060	48	66	4,000	15
110	**9**.110	88	121	12,500	8.8
125	**9**.125	100	138	17,300	7.2
220	**9**.220	176	242	54,000	4

AC coil data

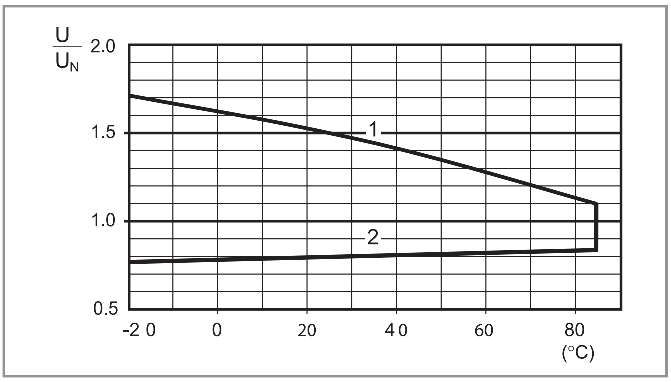
Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Rated coil consumption I at U_N (50Hz)
V		V	V	Ω	mA
6	**8**.006	4.8	6.6	12	200
12	**8**.012	9.6	13.2	50	97
24	**8**.024	19.2	26.4	190	53
48	**8**.048	38.4	52.8	770	25
60	**8**.060	48	66	1,200	21
110	**8**.110	88	121	4,000	12.5
120	**8**.120	96	132	4,700	12
230	**8**.230	184	253	17,000	6
240	**8**.240	192	264	19,100	5.3

R 55 - DC coil operating range v ambient temperature



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

R 55 - AC coil operating range v ambient temperature



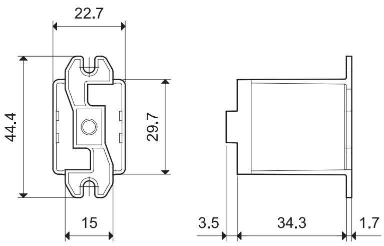
1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

Accessories

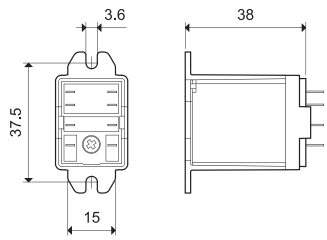
056.25

056.25 with relay

Top flange mount adaptor for 55.32, 55.33, 55.34	056.25



056.25

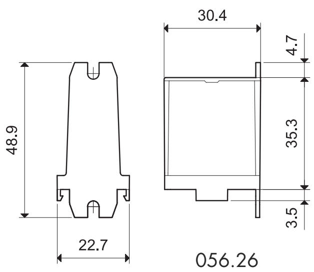


056.25 with relay

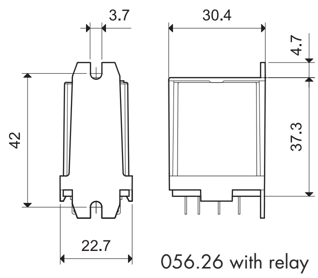
056.26

056.26 with relay

Rear flange mount adaptor for 55.32, 55.33, 55.34	056.26



056.26

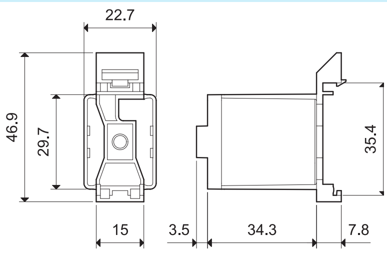


056.26 with relay

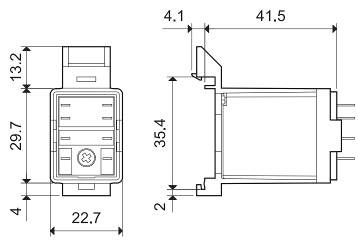
056.27

056.27 with relay

Top 35 mm rail (EN 60715) adaptor for 55.32, 55.33, 55.34	056.27



056.27



056.27 with relay

94 Series - Socket overview for 55 series relays


94.04

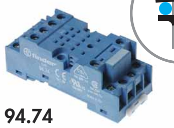
See page 7

Module	Socket	Relay	Description	Mounting	Accessories
99.02	94.02	55.32	**Screw terminal (Box clamp) socket**	Panel or 35 mm rail	- Coil indication and EMC
	94.03	55.33	- Top terminals - Contacts	(EN 60715) mount	suppression modules
	94.04	55.32	- Bottom terminals - Coil		- Jumper link
		55.34			- Timer modules
					- Plastic retaining and release clip


94.54

See page 8

Module	Socket	Relay	Description	Mounting	Accessories
99.02	94.54	55.32	**Screwless terminal socket**	Panel or 35 mm rail	- Coil indication and EMC
		55.34	- For fast cable connections	(EN 60715) mount	suppression modules
			- Top terminals - Contacts		- Jumper link
			- Bottom terminals - Coil		- Timer modules
					- Plastic retaining and release clip




94.74

See page 9

Module	Socket	Relay	Description	Mounting	Accessories
99.01	94.72	55.32	**Screw terminal (Plate clamp) socket**	Panel or 35 mm rail	- Coil indication and EMC
	94.73	55.33		(EN 60715) mount	suppression modules
	94.74	55.32			- Metal retaining clip
		55.34			


94.82

See page 9

Module	Socket	Relay	Description	Mounting	Accessories
99.01	94.82	55.32	**Screw terminal (Plate clamp) socket**	Panel or 35 mm rail	- Coil indication and EMC
			- 23 mm wide for space saving	(EN 60715) mount	suppression modules
					- Metal retaining clip


94.84.3

See page 10

Module	Socket	Relay	Description	Mounting	Accessories
99.80	94.84.2	55.32	**Screw terminal (Box clamp) socket**	Panel or 35 mm rail	- Coil indication and EMC
		55.34		(EN 60715) mount	suppression modules
	94.82.3	55.32			- Jumper link
	94.84.3	55.32			- Plastic retainig and release
		55.34			clip


94.94.3

See page 11

Module	Socket	Relay	Description	Mounting	Accessories
99.80	94.92.3	55.32	**Screw terminal (Box clamp) socket**	Panel or 35 mm rail	- Coil indication and EMC
	94.94.3	55.32	- Top terminals - Contacts	(EN 60715) mount	suppression modules
		55.34	- Bottom terminals - Coil		- Jumper link
					- Plastic retaining and release clip

94.14

See page 12

Module	Socket	Relay	Description	Mounting	Accessories
—	94.12	55.32	**PCB sockets**	PCB mounting	- Metal retaining clip
—	94.13	55.33			
—	94.14	55.32			
		55.34			

94.22

See page 12

Module	Socket	Relay	Description	Mounting	Accessories
—	94.22	55.32	**Panel mount**	Panel mount on 1 mm	- Metal retaining clip
—	94.23	55.33	**with solder connections**	thick panel	
—	94.24	55.32			
		55.34			

94.34

See page 13

Module	Socket	Relay	Description	Mounting	Accessories
—	94.32	55.32	**Panel mount**	M3 screw fixing	- Metal retaining clip
—	94.33	55.33	**with solder connections**		
—	94.34	55.32			
		55.34			

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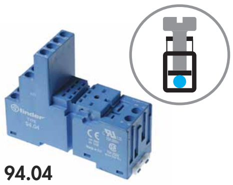
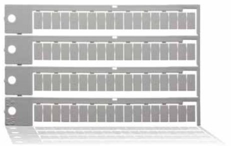


94.04

Approvals
(according to type):

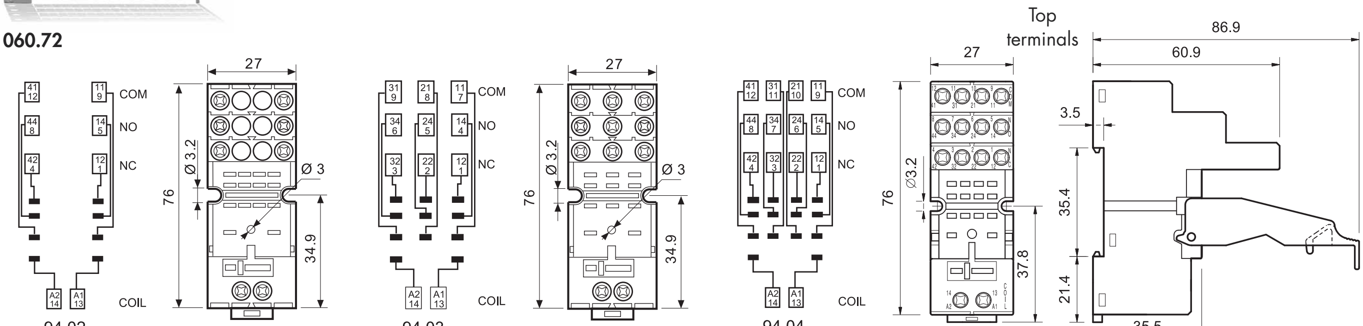
Certain relay/socket combinations

094.91.3

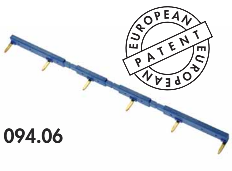


060.72

Screw terminal (Box clamp) socket panel or 35 mm (EN 60715) rail mount		94.02 Blue	94.02.0 Black	94.03 Blue	94.03.0 Black	94.04 Blue	94.04.0 Black
For relay type		55.32		55.33		55.32, 55.34	
Accessories							
Metal retaining clip		094.71					
Plastic retaining and release clip (supplied with socket - packaging code SPA)		094.91.3	094.91.30	094.91.3	094.91.30	094.91.3	094.91.30
6-way jumper link		094.06	094.06.0	094.06	094.06.0	094.06	094.06.0
Identification tag		094.00.4					
Modules (see table below)		99.02					
Timer modules (see table below)		86.30					
Sheet of marker tags for retaining and release clip 094.91.3 plastic, 72 tags, 6x12 mm		060.72					
Technical data							
Rated values		10 A - 250 V					
Dielectric strength		2 kV AC					
Protection category		IP 20					
Ambient temperature	°C	–40…+70					
Screw torque	Nm	0.5					
Wire strip length	mm	8					
Max. wire size for 94.02/03/04 sockets		solid wire			stranded wire		
	mm^2	1x6 / 2x2.5			1x4 / 2x2.5		
	AWG	1x10 / 2x14			1x12 / 2x14		

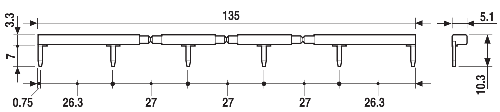


94.02 94.02 94.03 94.03 94.04 94.04



094.06

6-way jumper link for 94.02, 94.03 and 94.04 sockets	094.06 (blue)	094.06.0 (black)
Rated values	10 A - 250 V	



86.30

86 series timer modules	
(12…24)V AC/DC; Bi-function: AI, DI; (0.05s…100h)	86.30.0.024.0000
(110…125)V AC; Bi-function: AI, DI; (0.05s…100h)	86.30.8.120.0000
(230…240)V AC; Bi-function: AI, DI; (0.05s…100h)	86.30.8.240.0000

Approvals
(according to type):

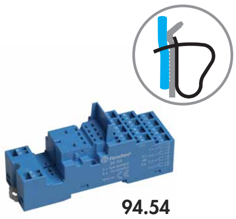
99.02

Approvals
(according to type):

DC Modules with non-standard polarity (+A2) on request.

99.02 coil indication and EMC suppression modules for 94.02, 94.03 and 94.04 sockets		
Diode (+A1, standard polarity)	(6…220)V DC	99.02.3.000.00
LED	(6…24)V DC/AC	99.02.0.024.59
LED	(28…60)V DC/AC	99.02.0.060.59
LED	(110…240)V DC/AC	99.02.0.230.59
LED + Diode (+A1, standard polarity)	(6…24)V DC	99.02.9.024.99
LED + Diode (+A1, standard polarity)	(28…60)V DC	99.02.9.060.99
LED + Diode (+A1, standard polarity)	(110…220)V DC	99.02.9.220.99
LED + Varistor	(6…24)V DC/AC	99.02.0.024.98
LED + Varistor	(28…60)V DC/AC	99.02.0.060.98
LED + Varistor	(110…240)V DC/AC	99.02.0.230.98
RC circuit	(6…24)V DC/AC	99.02.0.024.09
RC circuit	(28…60)V DC/AC	99.02.0.060.09
RC circuit	(110…240)V DC/AC	99.02.0.230.09
Residual current by-pass	(110…240)V AC	99.02.8.230.07

A

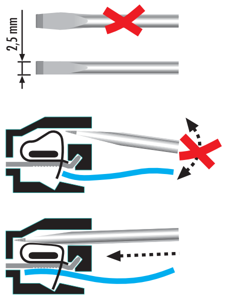


94.54

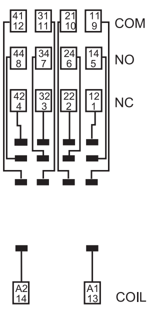
Approvals
(according to type):

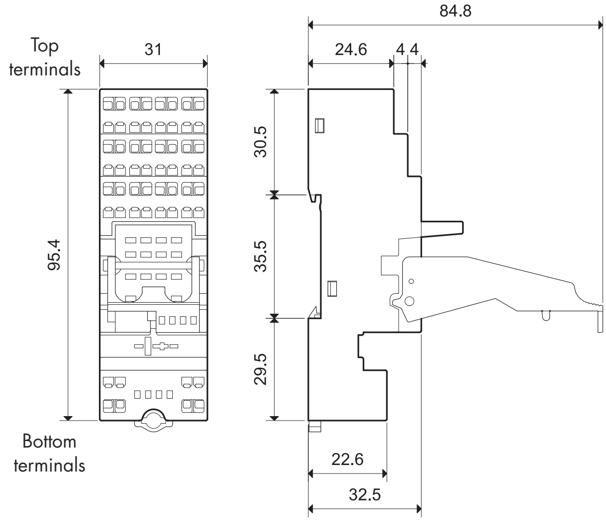
094.91.3

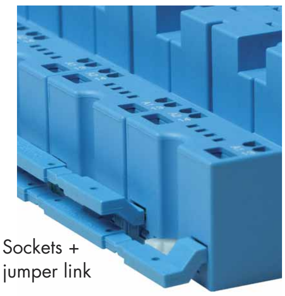
060.72



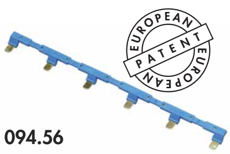
Screwless terminal socket 35 mm rail (EN 60715) mount		**94.54 (blue)**	
For relay type		55.32, 55.34	
Accessories			
Metal retaining clip		094.71	
Plastic retaining and release clip		094.91.3	
6-way jumper link		094.56	
Modules (see table below)		99.02, 86.30	
Sheet of marker tags, 72 tags, 6x12 mm		060.72	
Technical data			
Rated values		10 A - 250 V	
Dielectric strength		2 kV AC	
Protection category		IP 20	
Ambient temperature	°C	–25…+70	
Wire strip length	mm	10	
Max. wire size for 94.54 socket		solid wire	stranded wire
	mm²	2x(0.2…1.5)	2x(0.2…1.5)
	AWG	2x(24…14)	2x(24…14)





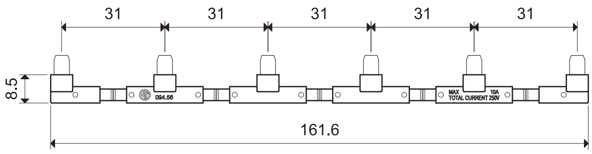


Sockets +
jumper link



094.56

6-way jumper link	094.56 (blue)
Rated values	10 A - 250 V



86.30

86 series timer modules	
(12…24)V AC/DC; Bi-function: AI, DI; (0.05s…100h)	86.30.0.024.0000
(110…125)V AC; Bi-function: AI, DI; (0.05s…100h)	86.30.8.120.0000
(230…240)V AC; Bi-function: AI, DI; (0.05s…100h)	86.30.8.240.0000

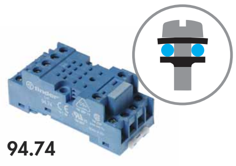
Approvals
(according to type):

99.02

Approvals
(according to type):

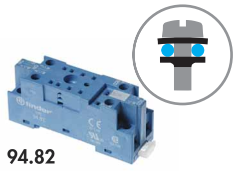
99.02 coil indication and EMC suppression modules for 94.54 sockets		
Diode (+A1, standard polarity)	(6…220)V DC	99.02.3.000.00
LED	(6…24)V DC/AC	99.02.0.024.59
LED	(28…60)V DC/AC	99.02.0.060.59
LED	(110…240)V DC/AC	99.02.0.230.59
LED + Diode (+A1, standard polarity)	(6…24)V DC	99.02.9.024.99
LED + Diode (+A1, standard polarity)	(28…60)V DC	99.02.9.060.99
LED + Diode (+A1, standard polarity)	(110…220)V DC	99.02.9.220.99
LED + Varistor	(6…24)V DC/AC	99.02.0.024.98
LED + Varistor	(28…60)V DC/AC	99.02.0.060.98
LED + Varistor	(110…240)V DC/AC	99.02.0.230.98
RC circuit	(6…24)V DC/AC	99.02.0.024.09
RC circuit	(28…60)V DC/AC	99.02.0.060.09
RC circuit	(110…240)V DC/AC	99.02.0.230.09
Residual current by-pass	(110…240)V AC	99.02.8.230.07

DC Modules with
non-standard polarity
(+A2) on request.



94.74

Approvals
(according to type):



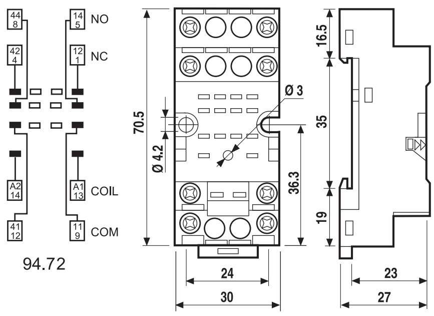
94.82

Approvals
(according to type):

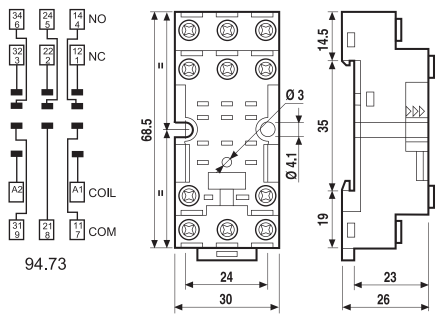
Screw terminal (Plate clamp) socket panel or 35 mm (EN 60715) rail mount	**94.72 Blue**	**94.72.0 Black**	**94.73 Blue**	**94.73.0 Black**	**94.74 Blue**	**94.74.0 Black**
For relay type	55.32		55.33		55.32, 55.34	
Accessories						
Metal retaining clip (supplied with socket - packaging code SMA)	094.71					
Modules (see table below)	99.01					

Screw terminal (Plate clamp) socket: panel or 35 mm rail mount	**94.82 (blue)**	**94.82.0 (black)**
For relay type	55.32	55.32
Accessories		
Metal retaining clip (supplied with socket - packaging code SMA)	094.71	
Modules (see table below)	99.01	

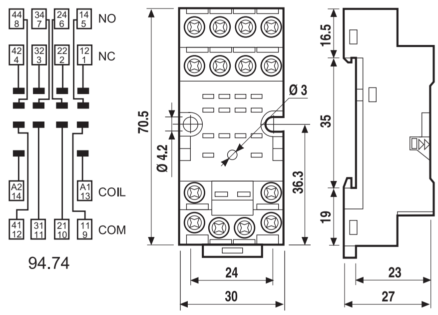
Technical data		
Rated values	10 A - 250 V	
Dielectric strength	2 kV AC	
Protection category	IP 20	
Ambient temperature °C	–40…+70	
Screw torque Nm	0.5	
Wire strip length mm	8 (94.72/73/74)	9 (94.82)
Max. wire size for 94.72/73/74 and 94.82 sockets	solid wire	stranded wire
mm^2	1x2.5 / 2x1.5	1x2.5 / 2x1.5
AWG	1x14 / 2x16	1x14 / 2x16



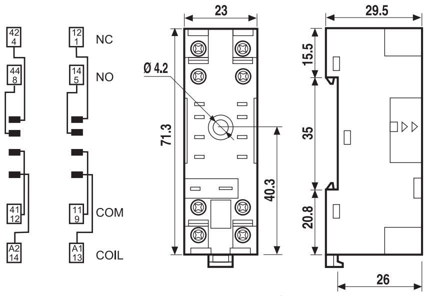
94.72



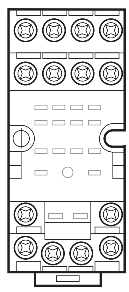
94.73



94.74



94.82



99.01

Approvals
(according to type):

* Modules in Black housing are available on request.

Green LED is standard. Red LED available on request.

99.01 coil indication and EMC suppression modules for 94.72, 94.73, 94.74 and 94.82 sockets		
		Blue*
Diode (+A1, standard polarity)	(6…220)V DC	99.01.3.000.00
Diode (+A2, non standard polarity)	(6…220)V DC	99.01.2.000.00
LED	(6…24)V DC/AC	99.01.0.024.59
LED	(28…60)V DC/AC	99.01.0.060.59
LED	(110…240)V DC/AC	99.01.0.230.59
LED + Diode (+A1, standard polarity)	(6…24)V DC	99.01.9.024.99
LED + Diode (+A1, standard polarity)	(28…60)V DC	99.01.9.060.99
LED + Diode (+A1, standard polarity)	(110…220)V DC	99.01.9.220.99
LED + Diode (+A2, non standard polarity)	(6…24)V DC	99.01.9.024.79
LED + Diode (+A2, non standard polarity)	(28…60)V DC	99.01.9.060.79
LED + Diode (+A2, non standard polarity)	(110…220)V DC	99.01.9.220.79
LED + Varistor	(6…24)V DC/AC	99.01.0.024.98
LED + Varistor	(28…60)V DC/AC	99.01.0.060.98
LED + Varistor	(110…240)V DC/AC	99.01.0.230.98
RC circuit	(6…24)V DC/AC	99.01.0.024.09
RC circuit	(28…60)V DC/AC	99.01.0.060.09
RC circuit	(110…240)V DC/AC	99.01.0.230.09
Residual current by-pass	(110…240)V AC	99.01.8.230.07

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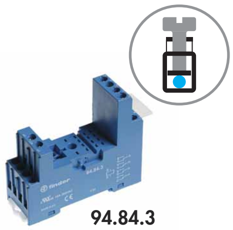
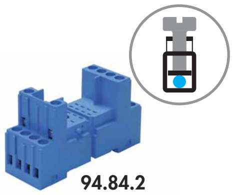
A



94.84.3

Approvals
(according to type):

Screw terminal (Box clamp) socket panel or 35 mm (EN 60715) rail mount	**94.82.3** **Blue**	**94.82.30** **Black**	**94.84.3** **Blue**	**94.84.30** **Black**
For relay type	55.32		55.32, 55.34	
Accessories				
Metal retaining clip (supplied with socket - packaging code SMA)	094.71			
Plastic retaining and release clip	094.91.3	094.91.30	094.91.3	094.91.30
6-way jumper link	094.06	094.06.0	094.06	094.06.0
Identification tag	094.80.3			
Modules (see table next page)	99.80			
Sheet of marker tags for retaining and release clip 094.91.3 plastic, 72 tags, 6x12 mm	060.72			

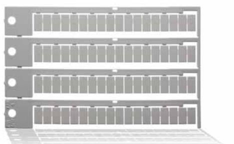


94.84.2

Approvals
(according to type):

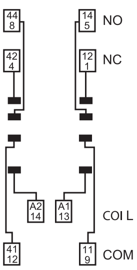
Screw terminal (Box clamp) socket panel or 35 mm (EN 60715) rail mount	**94.84.2** **Blue**	**94.84.20** **Black**
For relay type	55.32, 55.34	
Accessories		
Metal retaining clip (supplied with socket - packaging code SMA)	094.71	
Plastic retaining and release clip	094.91.3	094.91.30
6-way jumper link	094.06	094.06.0
Identification tag	094.80.3	
Modules (see table next page)	99.80	
Sheet of marker tags for retaining and release clip 094.91.3 plastic, 72 tags, 6x12 mm	060.72	

094.91.3

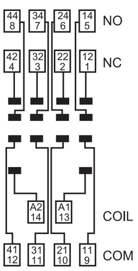


060.72

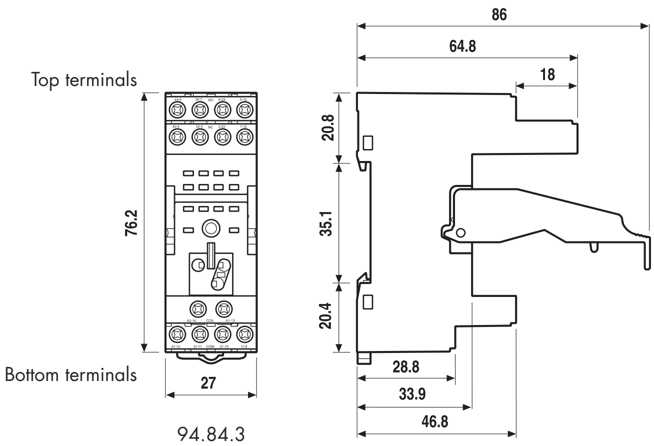
Technical data			
Rated values		10 A - 250 V	
Dielectric strength		2 kV AC	
Protection category		IP 20	
Ambient temperature	°C	–40…+70	
Screw torque	Nm	0.5	
Wire strip length	mm	7	
Max. wire size for 94.82.3, 94.84.3 and 94.84.2 sockets		solid wire	stranded wire
	mm^2	1x6 / 2x2.5	1x4 / 2x2.5
	AWG	1x10 / 2x14	1x12 / 2x14



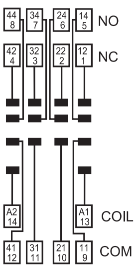
94.82.3



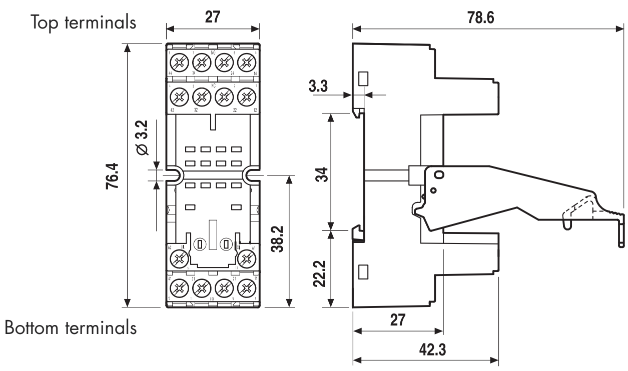
94.84.3



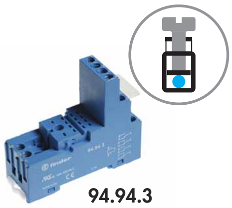
94.84.3



94.84.2



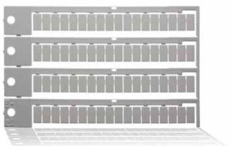
94.84.2



94.94.3

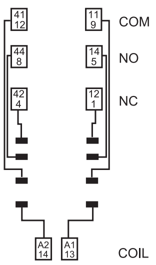
Approvals (according to type):

094.91.3

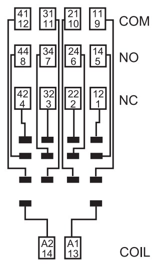


060.72

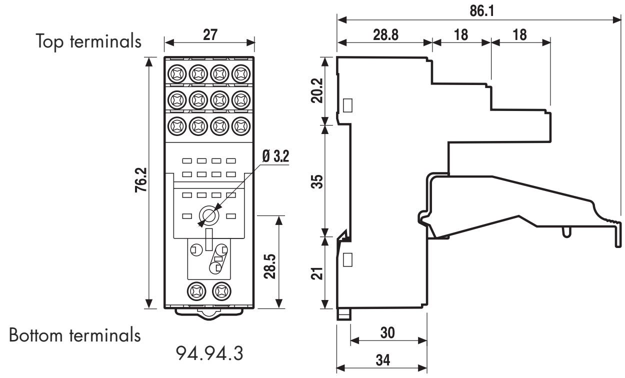
Screw terminal (Box clamp) socket panel or 35 mm rail mount		**94.92.3 (blue)**	**94.92.30 (black)**	**94.94.3 (blue)**	**94.94.30 (black)**
For relay type		55.32		55.32, 55.34	
Accessories					
Metal retaining clip		094.71			
Plastic retaining and release clip		094.91.3	094.91.30	094.91.3	094.91.30
6-way jumper link		094.06	094.06.0	094.06	094.06.0
Identification tag		094.80.3			
Modules (see table below page)		99.80			
Sheet of marker tags for retaining and release clip 094.91.3 plastic, 72 tags, 6x12 mm		060.72			
Technical data					
Rated values		10 A - 250 V			
Dielectric strength		2 kV AC			
Protection category		IP 20			
Ambient temperature	°C	–25…+70			
Screw torque	Nm	0.5			
Wire strip length	mm	8			
Max. wire size for 94.92.3 and 94.94.3 sockets		solid wire		stranded wire	
	mm^2	1x6 / 2x2.5		1x4 / 2x2.5	
	AWG	1x10 / 2x14		1x12 / 2x14	



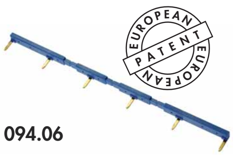
94.92.3



94.94.3

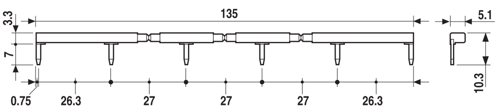


94.94.3



094.06

6-way jumper link for 94.84.2, 94.82.3, 94.84.3, 94.92.3 and 94.94.3 sockets	094.06 (blue)	094.06.0 (black)
Rated values	10 A - 250 V	



99.80

Approvals (according to type):

*Modules in Black housing are available on request.

Green LED is standard. Red LED available on request.

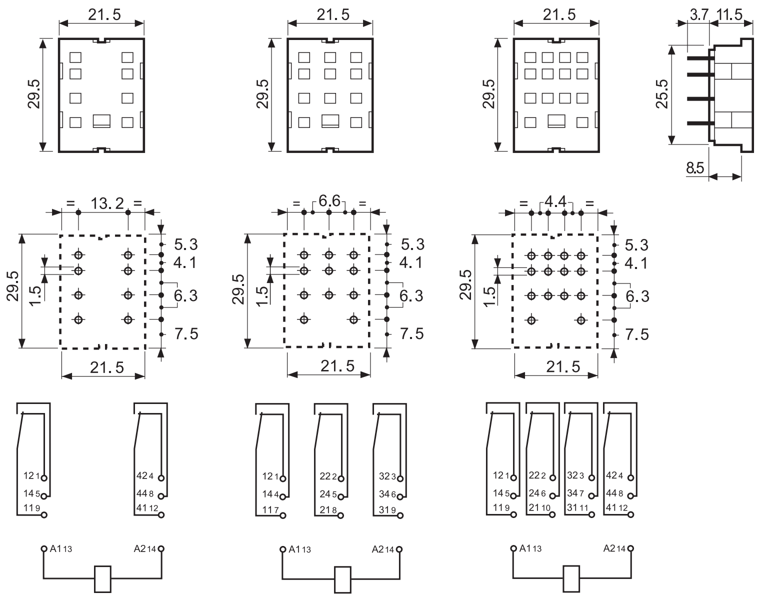
99.80 coil indication and EMC suppression modules for 94.84.2, 94.82.3, 94.84.3, 94.92.3 and 94.94.3 sockets		
		Blue*
Diode (+A1, standard polarity)	(6…220)V DC	99.80.3.000.00
LED	(6…24)V DC/AC	99.80.0.024.59
LED	(28…60)V DC/AC	99.80.0.060.59
LED	(110…240)V DC/AC	99.80.0.230.59
LED + Diode (+A1, standard polarity)	(6…24)V DC	99.80.9.024.99
LED + Diode (+A1, standard polarity)	(28…60)V DC	99.80.9.060.99
LED + Diode (+A1, standard polarity)	(110…220)V DC	99.80.9.220.99
LED + Varistor	(6…24)V DC/AC	99.80.0.024.98
LED + Varistor	(28…60)V DC/AC	99.80.0.060.98
LED + Varistor	(110…240)V DC/AC	99.80.0.230.98
RC circuit	(6…24)V DC/AC	99.80.0.024.09
RC circuit	(28…60)V DC/AC	99.80.0.060.09
RC circuit	(110…240)V DC/AC	99.80.0.230.09
Residual current by-pass	(110…240)V AC	99.80.8.230.07

94.14

Approvals
(according to type):

PCB socket	94.12 Blue	94.12.0 Black	94.13 Blue	94.13.0 Black	94.14 Blue	94.14.0 Black
For relay type	55.32		55.33		55.32, 55.34	
Accessories						
Metal retaining clip (supplied with socket - packaging code SMA)	094.51					
Technical data						
Rated values	10 A - 250 V					
Dielectric strength	2 kV AC					
Ambient temperature °C	–40…+70					

Copper side view

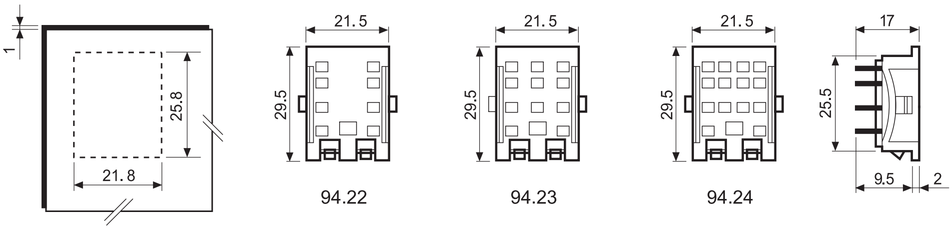


94.12 94.13 94.14

94.22

Approvals
(according to type):

Panel mount solder socket 1 mm thick panel	94.22 Blue	94.22.0 Black	94.23 Blue	94.23.0 Black	94.24 Blue	94.24.0 Black
For relay type	55.32		55.33		55.32, 55.34	
Accessories						
Metal retaining clip (supplied with socket - packaging code SMA)	094.51					
Technical data						
Rated values	10 A - 250 V					
Dielectric strength	2 kV AC					
Ambient temperature °C	–40…+70					



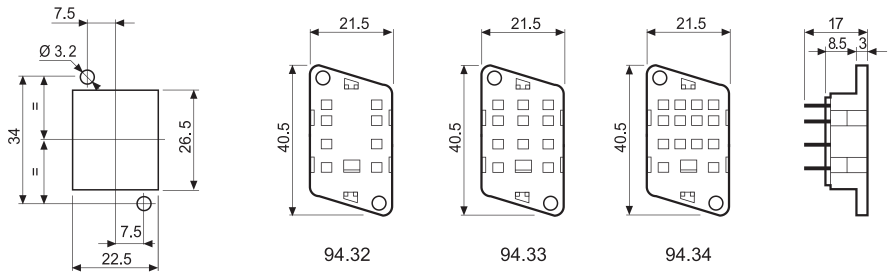
94.22 94.23 94.24

94.34

Approvals
(according to type):

Panel mount socket M3 screw fixing - solder connections		94.32 Blue	94.32.0 Black	94.33 Blue	94.33.0 Black	94.34 Blue	94.34.0 Black
For relay type		55.32		55.33		55.32, 55.34	
Accessories							
Metal retaining clip (supplied with socket - packaging code SMA)		094.51					
Technical data							
Rated values		10 A - 250 V					
Dielectric strength		2 kV AC					
Ambient temperature	°C	–40…+70					

A



94.32 94.33 94.34

Packaging codes

How to code and identify retaining clip and packaging options for sockets.

Example:

9 4	.	0	4	S P	A

Code	Description
A	Standard packaging
SM	Metal retaining clip
SP	Plastic retaining clip

9 4	.	0	4		

Without retaining clip

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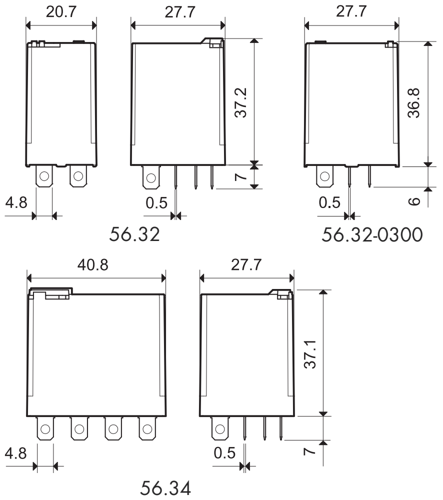
Features

Plug-in - 12 A Power relay, 2 & 4 pole

- Flange mount option -
  (Faston 187, 4.8x0.5 mm termination)
- AC coils & DC coils
- Lockable test button and mechanical flag indicator
- Cadmium Free contacts (standard version)
- Contact material options
- 96 series sockets
- Coil EMC suppression
- Accessories
- European Patent



* For 4 CO (4PDT) only.

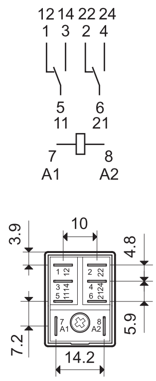
For UL ratings see:
"General technical information" page V

56.32/56.34

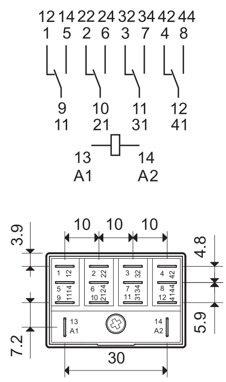
- 2 or 4 pole changeover contact
- Plug-in/Faston 187

56.32-0300

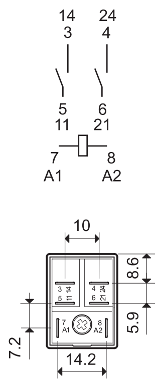
- 2 pole normally open contact (≥1.5 mm gap)
- Plug-in/Faston 187



56.32



56.34



56.32-0300

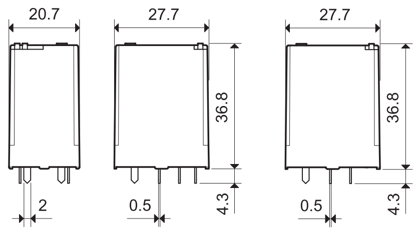
<table>
<tr><th colspan="2">Contact specification</th><th>56.32</th><th>56.34</th><th>56.32-0300</th></tr>
<tr><td>Contact configuration</td><td></td><td>2 CO (DPDT)</td><td>4 CO (4PDT)</td><td>2NO (DPST-NO) - ≥1.5mm gap</td></tr>
<tr><td>Rated current/Maximum peak current</td><td>A</td><td colspan="2">12/20</td><td>12/20</td></tr>
<tr><td>Rated voltage/Maximum switching voltage</td><td>V AC</td><td colspan="2">250/400</td><td>250/400</td></tr>
<tr><td>Rated load AC1</td><td>VA</td><td colspan="2">3,000</td><td>3,000</td></tr>
<tr><td>Rated load AC15 (230 V AC)</td><td>VA</td><td colspan="2">700</td><td>700</td></tr>
<tr><td>Single phase motor rating (230 V AC)</td><td>kW</td><td colspan="2">0.55</td><td>0.55</td></tr>
<tr><td>Breaking capacity DC1: 30/110/220 V</td><td>A</td><td colspan="2">12/0.5/0.25</td><td>12/1/0.5</td></tr>
<tr><td>Minimum switching load</td><td>mW (V/mA)</td><td colspan="2">500 (10/5)</td><td>500 (10/5)</td></tr>
<tr><td>Standard contact material</td><td></td><td colspan="2">AgNi</td><td>AgNi</td></tr>
<tr><th colspan="5">Coil specification</th></tr>
<tr><td>Nominal voltage (U_N)</td><td>V AC (50/60 Hz)</td><td colspan="3">6 - 12 - 24 - 48 - 60 - 110 - 120 - 230 - 240 - 400*</td></tr>
<tr><td></td><td>V DC</td><td colspan="2">6 - 12 - 24 - 48 - 60 - 110 - 125 - 220</td><td>—</td></tr>
<tr><td>Rated power AC/DC</td><td>VA (50 Hz)/W</td><td>1.5/1</td><td>2/1.3</td><td>1.5/—</td></tr>
<tr><td>Operating range</td><td>AC</td><td colspan="2">(0.8…1.1)U_N</td><td>(0.85…1.1)U_N</td></tr>
<tr><td></td><td>DC</td><td>(0.8…1.1)U_N</td><td>(0.85…1.1)U_N</td><td>—</td></tr>
<tr><td>Holding voltage</td><td>AC/DC</td><td colspan="2">0.8 U_N/0.6 U_N</td><td>0.85 U_N/—</td></tr>
<tr><td>Must drop-out voltage</td><td>AC/DC</td><td colspan="2">0.2 U_N/0.1 U_N</td><td>0.2 U_N/—</td></tr>
<tr><th colspan="5">Technical data</th></tr>
<tr><td>Mechanical life AC/DC</td><td>cycles</td><td colspan="2">$20 \cdot 10^6/50 \cdot 10^6$</td><td>$20 \cdot 10^6$/—</td></tr>
<tr><td>Electrical life at rated load AC1</td><td>cycles</td><td colspan="2">$100 \cdot 10^3$</td><td>$100 \cdot 10^3$</td></tr>
<tr><td>Operate/release time</td><td>ms</td><td>8/3</td><td>10/4</td><td>8/4</td></tr>
<tr><td>Insulation between coil and contacts (1.2/50 μs)</td><td>kV</td><td>4</td><td>5</td><td>4</td></tr>
<tr><td>Dielectric strength between open contacts</td><td>V AC</td><td colspan="2">1,000</td><td>2,000</td></tr>
<tr><td>Ambient temperature range</td><td>°C</td><td colspan="2">–40…+70</td><td>–40…+70</td></tr>
<tr><td>Environmental protection</td><td></td><td colspan="2">RT I</td><td>RT I</td></tr>
<tr><td>Approvals (according to type)</td><td></td><td colspan="3">Lloyds Register RINA</td></tr>
</table>

56 Series - Miniature power relays 12 A

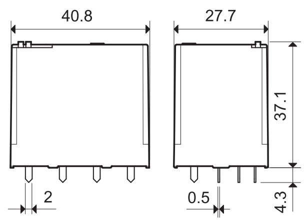
Features

Printed circuit mount
12 A Power relay

- 2 & 4 pole
- AC coils & DC coils
- Cadmium Free contacts (standard version)
- Contact material option
- RT III (wash tight) option available



56.42 56.42-0300



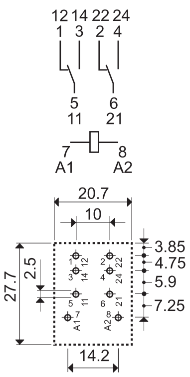
56.44

* For 4 CO (4PDT) only.

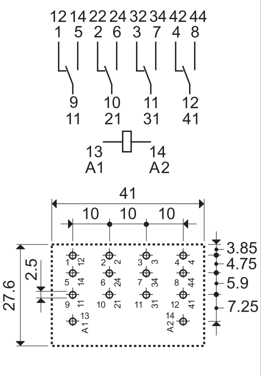
For UL ratings see:
"General technical information" page V

56.42/56.44

- 2 or 4 pole changeover contact
- PCB mount



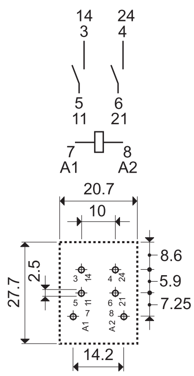
56.42
Copper side view



56.44
Copper side view

56.42-0300

- 2 pole normally open contact (≥ 1.5 mm gap)
- PCB mount



56.42-0300
Copper side view

		56.42	56.44	56.42-0300
Contact specification				
Contact configuration		2 CO (DPDT)	4 CO (4PDT)	2NO (DPST-NO) - ≥1.5mm gap
Rated current/Maximum peak current	A	12/20		12/20
Rated voltage/Maximum switching voltage	V AC	250/400		250/400
Rated load AC1	VA	3,000		3,000
Rated load AC15 (230 V AC)	VA	700		700
Single phase motor rating (230 V AC)	kW	0.55		0.55
Breaking capacity DC1: 30/110/220 V	A	12/0.5/0.25		12/1/0.5
Minimum switching load	mW (V/mA)	500 (10/5)		500 (10/5)
Standard contact material		AgNi		AgNi
Coil specification				
Nominal voltage (U_N)	V AC (50/60 Hz)	6 - 12 - 24 - 48 - 60 - 110 - 120 - 230 - 240 - 400*		
	V DC	6 - 12 - 24 - 48 - 60 - 110 - 125 - 220		—
Rated power AC/DC	VA (50 Hz)/W	1.5/1	2/1.3	1.5/—
Operating range	AC	(0.8…1.1)U_N		(0.85…1.1)U_N
	DC	(0.8…1.1)U_N	(0.85…1.1)U_N	—
Holding voltage	AC/DC	0.8 U_N/0.6 U_N		0.85 U_N/—
Must drop-out voltage	AC/DC	0.2 U_N/0.1 U_N		0.2 U_N/—
Technical data				
Mechanical life AC/DC	cycles	$20 \cdot 10^6 / 50 \cdot 10^6$		$20 \cdot 10^6$/—
Electrical life at rated load AC1	cycles	$100 \cdot 10^3$		$100 \cdot 10^3$
Operate/release time	ms	8/3	10/4	8/4
Insulation between coil and contacts (1.2/50 μs)	kV	4	5	4
Dielectric strength between open contacts	V AC	1,000		2,000
Ambient temperature range	°C	–40…+70		–40…+70
Environmental protection		RT I		RT I
Approvals (according to type)				

I-2014, www.findernet.com

Ordering information

Example: 56 series plug-in relay, 2 CO (DPDT), 12 V DC coil, lockable test button and mechanical indicator.

						A	B	C	D
5 6	. 3	2	. 9	. 0 1 2	.	0	0	4	0

Series

Type
3 = Plug-in
4 = PCB

No. of poles
2 = 2 pole, 12 A
4 = 4 pole, 12 A

Coil version
8 = AC (50/60 Hz)
9 = DC

Coil voltage
See coil specifications

A: Contact material
0 = Standard AgNi
2 = AgCdO
4 = $AgSnO_2$

B: Contact circuit
0 = CO (nPDT)
3 = NO (nPST), ≥ 1.5 mm contact gap

D: Special versions
0 = Standard
1 = Wash tight (RT III) for 56.42 and 56.44 only
6 = Rear flange mount (4 pole only)
8 = Rear 35 mm rail mount (4 pole only)
For other mounting options see page 6

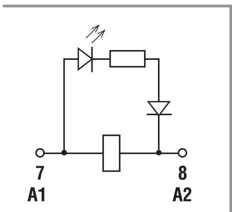
C: Options
0 = None
2 = Mechanical indicator
3* = LED (AC)
4 = Lockable test button+mechanical indicator
5* = Lockable test button + LED (AC)
54* = Lockable test button + LED (AC) + mechanical indicator
6* = Double LED (DC non-polarized)
7* = Lockable test button + double LED (DC non-polarized)
74* = Lockable test button + double LED (DC non-polarized) + mechanical indicator
8* = LED + diode (DC, polarity positive to pin 7) for 56.32 only
9* = Lockable test button + LED + diode (DC, polarity positive to pin 7) for 56.32 only
94* = Lockable test button + LED + diode (DC, polarity positive to pin 7) + mechanical indicator for 56.32 only
* Options not available for 220 V DC and 400 V AC versions.

Selecting features and options: only combinations in the same row are possible.
Preferred selections for best availability are shown in **bold**.

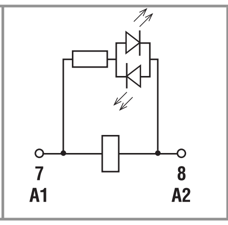
Type	Coil version	A	B	C	D
56.32	AC	**0** - 2 - 4	**0**	0 - 2 - 3 - **4** - 5	**0**
	AC	0 - 2 - 4	0	54	/
	AC	0 - 2 - 4	3	0 - 3 - 5	0
	DC	**0** - 2 - 4	**0**	0 - 2 - **4** - 6 - 7 - 8 - 9	**0**
	DC	0 - 2 - 4	0	74 - 94	/
56.34	AC	**0** - 2 - 4	**0**	**0** - 2 - 3 - **4** - 5	**0** - 6 - 8
	AC	0 - 2 - 4	0	54	/
	DC	**0** - 2 - 4	**0**	**0** - 2 - **4** - 6 - 7	**0** - 6 - 8
	DC	0 - 2 - 4	0	74	/
56.42	DC	**0** - 2 - 4	**0**	**0**	**0** - 1
	AC	0 - 2 - 4	0 - 3	0	0 - 1
56.44	AC-DC	**0** - 2 - 4	**0**	**0**	**0** - 1

Special versions for Rail Applications on request

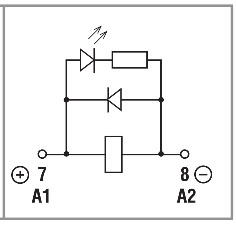
Descriptions: options and special versions



C: Option 3, 5, 54
LED (AC)

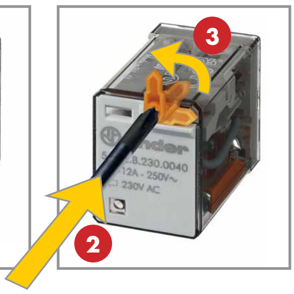


C: Option 6, 7, 74
Double LED
(DC non-polarized)



C: Option 8, 9, 94
LED + diode (DC, polarity positive to pin 7) - (56.32 only)

EUROPEAN PATENT



Lockable test button and mechanical flag indicator (0040, 0050, 0054, 0070, 0074, 0090, 0094)

The dual-purpose Finder test button can be used in two ways:

Case 1) The plastic pip (located directly above the test button) remains intact. In this case, when the test button is pushed, the contacts operate. When the test button is released the contacts return to their former state.

Case 2) The plastic pip is broken-off (using an appropriate cutting tool). In this case, (in addition to the above function), when the test button is pushed and rotated, the contacts are latched in the operating state, and remain so until the test button is rotated back to its former position.

In both cases ensure that the test button actuation is swift and decisive.

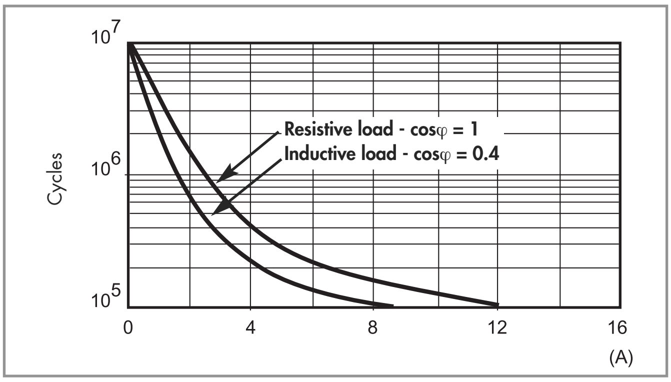
Technical data

*Only in applications where over voltage category II is permitted. In applications of over voltage category III: Micro-disconnection.

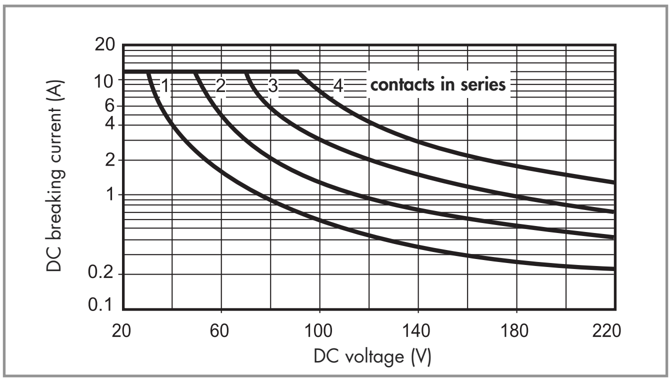
Insulation according to EN 61810-1		**2 CO - 4 CO**		**2 NO**	
Nominal voltage of supply system	V AC	230/400		230/400	
Rated insulation voltage	V AC	250	400	250	400
Pollution degree		3	2	3	2
Insulation between coil and contact set					
Type of insulation		Basic		Basic	
Overvoltage category		III		III	
Rated impulse voltage	kV (1.2/50 μs)	4		4	
Dielectric strength	V AC	2,500		2,500	
Insulation between adjacent contacts					
Type of insulation		Basic		Basic	
Overvoltage category		III		III	
Rated impulse voltage	kV (1.2/50 μs)	4		4	
Dielectric strength	V AC	2,500		2,500	
Insulation between open contacts					
Type of disconnection		Micro-disconnection		Full-disconnection*	
Overvoltage category		—		II	
Rated impulse voltage	kV (1.2/50 μs)	—		2.5	
Dielectric strength	V AC/(1.2/50 μs)	1,000/1.5		2,000/3	
Conducted disturbance immunity					
Burst (5…50) ns, 5 kHz, on A1 - A2		EN 61000-4-4		level 4 (4 kV)	
Surge (1.2/50 μs) on A1 - A2 (differential mode)		EN 61000-4-5		level 4 (4 kV)	
Other data					
Bounce time: NO/NC	ms	1/4 (changeover)		3/— (normally open)	
Vibration resistance (10…150 Hz): NO/NC	g	17/14			
Shock resistance NO/NC	g	20/14			
Power lost to the environment — without contact current	W	1 (56.32, 56.42)		1.3 (56.34, 56.44)	
Power lost to the environment — with rated current	W	3.8 (56.32, 56.42)		6.9 (56.34, 56.44)	
Recommended distance between relays mounted on PCB	mm	≥ 5			

Contact specification

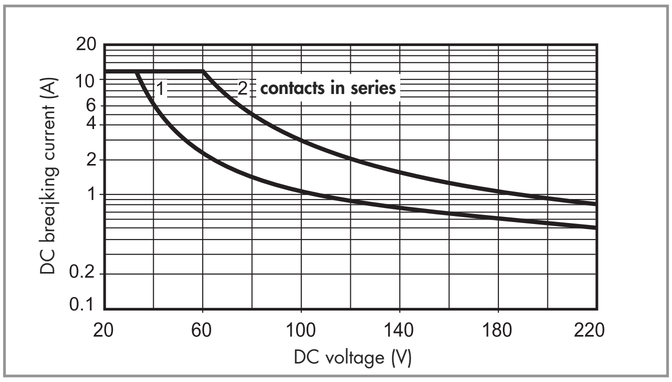
F 56 - Electrical life (AC) v contact current
2 - 4 pole relays



H 56 - Maximum DC1 breaking capacity
Changeover version



H 56 - Maximum DC1 breaking capacity
Normally open version



- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of ≥ $100 \cdot 10^3$ can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load.
  Note: the release time of the load will be increased.

Coil specifications

DC coil data, 2 pole relay

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
6	**9**.006	4.8	6.6	40	150
12	**9**.012	9.6	13.2	140	86
24	**9**.024	19.2	26.4	600	40
48	**9**.048	38.4	52.8	2,400	20
60	**9**.060	48	66	4,000	15
110	**9**.110	88	121	12,500	8.8
125	**9**.125	100	138	17,300	7.2
220	**9**.220	176	242	54,000	4

AC coil data, 2 pole relay

Nominal voltage U_N	Coil code	Operating range U_{min}*	U_{max}	Resistance R	Rated coil consumption I at U_N (50Hz)
V		V	V	Ω	mA
6	**8**.006	4.8	6.6	12	200
12	**8**.012	9.6	13.2	50	97
24	**8**.024	19.2	26.4	190	53
48	**8**.048	38.4	52.8	770	25
60	**8**.060	48	66	1,200	21
110	**8**.110	88	121	3,940	12.5
120	**8**.120	96	132	4,700	12
230	**8**.230	184	253	17,000	6
240	**8**.240	192	264	19,100	5.3

* U_{min} = 0.85 U_N for normally open version.

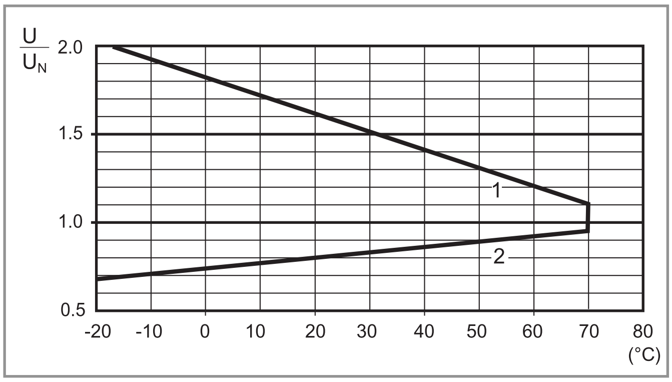
DC coil data, 4 pole relay

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
6	**9**.006	5.1	6.6	32.5	185
12	**9**.012	10.2	13.2	123	97
24	**9**.024	20.4	26.4	490	49
48	**9**.048	40.8	52.8	1,800	27
60	**9**.060	51	66	3,000	20
110	**9**.110	93.5	121	10,400	10.5
125	**9**.125	107	138	14,200	8.8
220	**9**.220	187	242	44,000	5

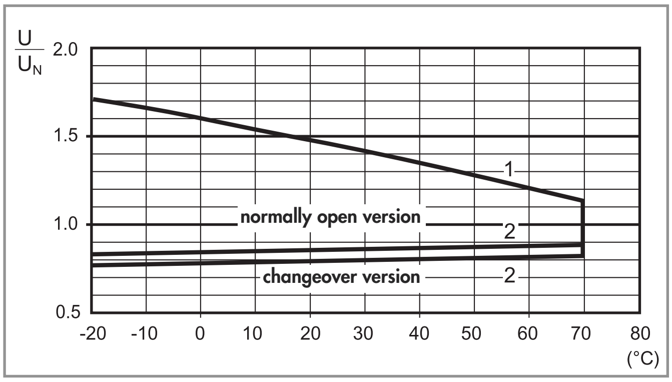
AC coil data, 4 pole relay

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N (50Hz)
V		V	V	Ω	mA
6	**8**.006	4.8	6.6	5.7	300
12	**8**.012	9.6	13.2	22	150
24	**8**.024	19.2	26.4	81	90
48	**8**.048	38.4	52.8	380	37
60	**8**.060	48	66	600	30
110	**8**.110	88	121	1,900	16.5
120	**8**.120	96	132	2,560	13.4
230	**8**.230	184	253	7,700	9
240	**8**.240	192	264	10,000	7.5
400	**8**.400	320	440	26,000	4.9

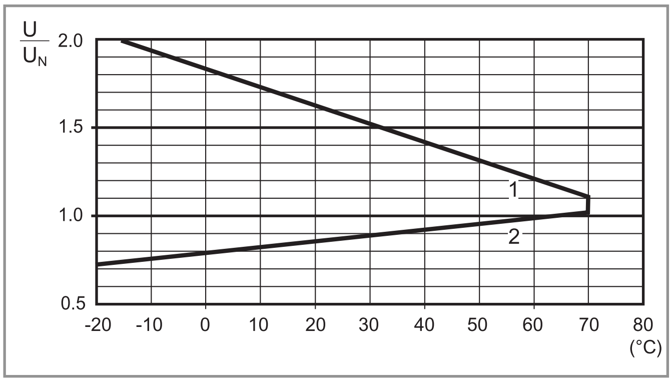
R 56 - DC coil operating range v ambient temperature
2 pole relay



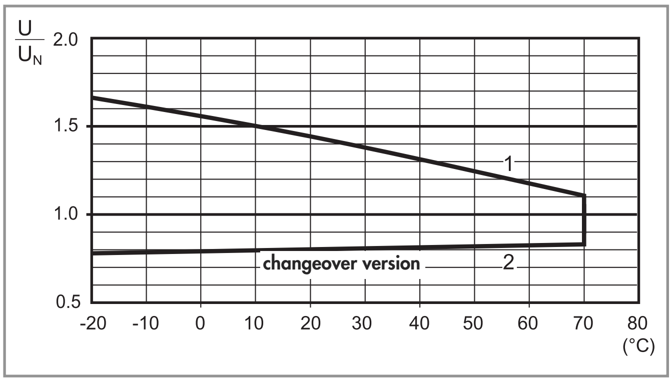
R 56 - AC coil operating range v ambient temperature
2 pole relay



R 56 - DC coil operating range v ambient temperature
4 pole relay



R 56 - AC coil operating range v ambient temperature
4 pole relay



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

56 Series - Miniature power relays 12 A

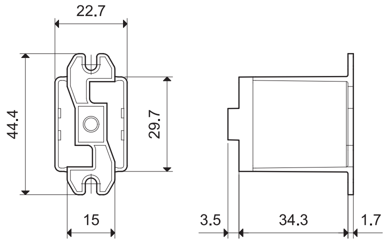
Accessories

A

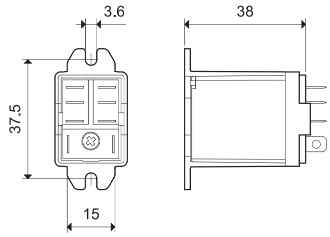

056.25


056.25 with relay

Top flange mount adaptor for 56.32	056.25



056.25

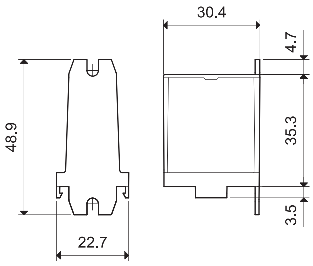


056.25 with relay

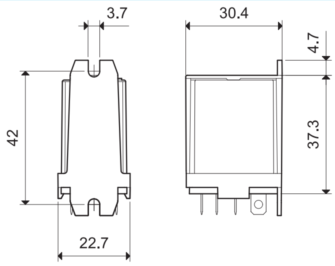

056.26


056.26 with relay

Rear flange mount adaptor for 56.32	056.26



056.26

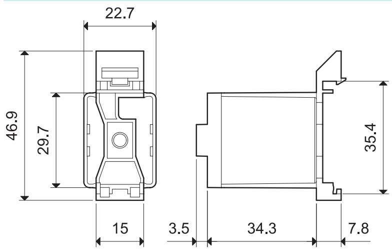


056.26 with relay

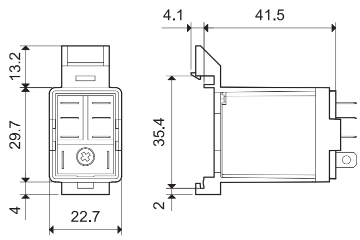

056.27


056.27 with relay

Top 35 mm rail (EN 60715) adaptor for 56.32	056.27



056.27

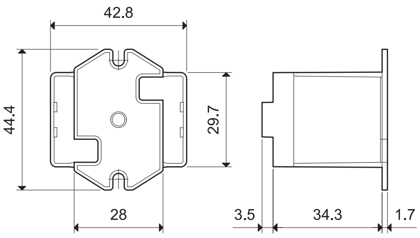


056.27 with relay

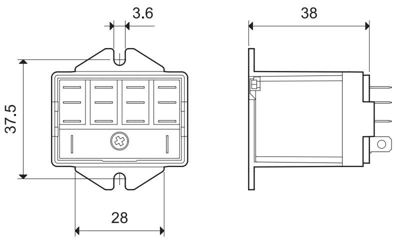

056.45


056.45 with relay

Top flange mount adaptor for 56.34	056.45



056.45

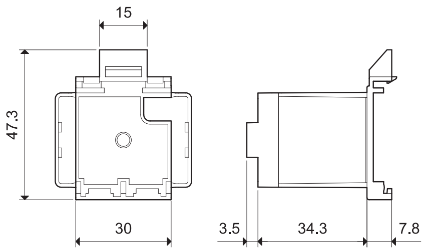


056.45 with relay

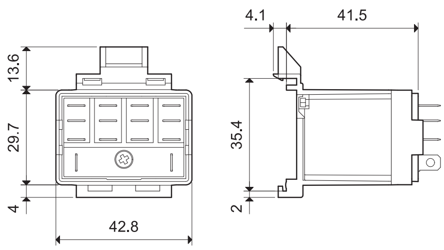

056.47


056.47 with relay

Top 35 mm rail (EN 60715) adaptor for 56.34	056.47



056.47

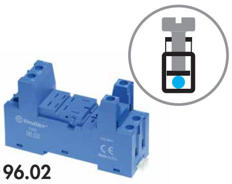


056.47 with relay


060.72

Sheet of marker tags for relay type 56.34, plastic, 72 tags, 6x12 mm	060.72

96 Series - Sockets and accessories for 56 series relays



96.02

Approvals (according to type):

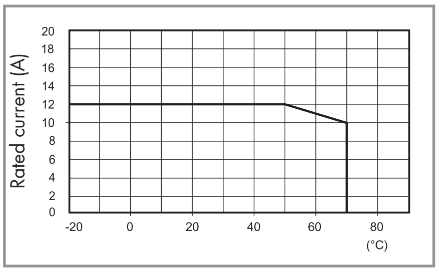
96.04

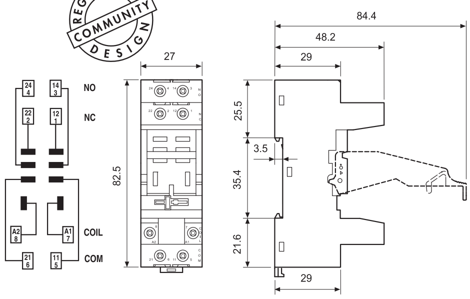
Approvals (according to type):

094.91.3

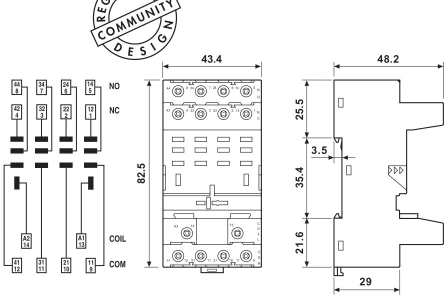
Screw terminal (Box clamp) socket panel or 35 mm **(EN 60715)** rail mount		**96.02 Blue**	**96.02.0 Black**	**96.04 Blue**	**96.04.0 Black**
For relay type		56.32		56.34	
Accessories					
Metal retaining clip (supplied with socket - packaging code SMA)		094.71		096.71	
Plastic retaining and release clip (supplied with socket - packaging code SPA)		094.91.3	094.91.30	—	—
6-way jumper link		094.06	094.06.0	—	—
Identification tag		095.00.4		090.00.2	
Modules (see table below)		99.02			
Timer modules (see table below)		86.30		86.00, 86.30	
Sheet of marker tags for retaining and release clip 094.91.3 plastic, 72 tags, 6x12 mm		060.72		—	
Technical data					
Rated values		12 A - 250 V			
Dielectric strength		2 kV AC			
Protection category		IP 20			
Ambient temperature	°C	–40…+70 (see diagram L96)			
Screw torque	Nm	0.8			
Wire strip length	mm	8			
Max. wire size for 94.02/04 sockets		solid wire		stranded wire	
	mm^2	1x6 / 2x2.5		1x4 / 2x2.5	
	AWG	1x10 / 2x14		1x12 / 2x14	

L 96 - Rated current vs ambient temperature

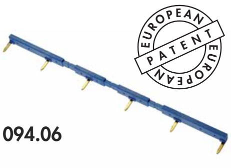




96.02 96.02

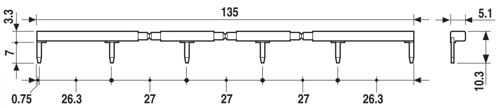


96.04 96.04



094.06

6-way jumper link for 96.02 socket	094.06 (blue)	094.06.0 (black)
Rated values	10 A - 250 V	



86.00

86.30

86 series timer modules	
Multi-voltage: (12…240)V AC/DC; Multi-functions: AI, DI, SW, BE, CE, DE, EE, FE; (0.05 s…100 h)	86.00.0.240.0000
(12…24)V AC/DC; Bi-function: AI, DI; (0.05 s…100 h)	86.30.0.024.0000
(110…125)V AC; Bi-function: AI, DI; (0.05s…100h)	86.30.8.120.0000
(230…240)V AC; Bi-function: AI, DI; (0.05 s…100 h)	86.30.8.240.0000

Approvals (according to type):

99.02

Approvals (according to type):

DC Modules with non-standard polarity (+A2) on request.

99.02 coil indication and EMC suppression modules for 96.02 and 96.04 sockets		
Diode (+A1, standard polarity)	(6…220)V DC	99.02.3.000.00
LED	(6…24)V DC/AC	99.02.0.024.59
LED	(28…60)V DC/AC	99.02.0.060.59
LED	(110…240)V DC/AC	99.02.0.230.59
LED + Diode (+A1, standard polarity)	(6…24)V DC	99.02.9.024.99
LED + Diode (+A1, standard polarity)	(28…60)V DC	99.02.9.060.99
LED + Diode (+A1, standard polarity)	(110…220)V DC	99.02.9.220.99
LED + Varistor	(6…24)V DC/AC	99.02.0.024.98
LED + Varistor	(28…60)V DC/AC	99.02.0.060.98
LED + Varistor	(110…240)V DC/AC	99.02.0.230.98
RC circuit	(6…24)V DC/AC	99.02.0.024.09
RC circuit	(28…60)V DC/AC	99.02.0.060.09
RC circuit	(110…240)V DC/AC	99.02.0.230.09
Residual current by-pass	(110…240)V AC	99.02.8.230.07

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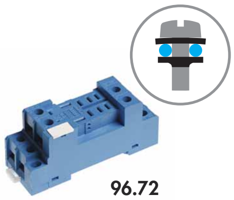
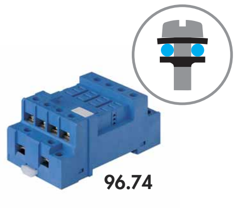
96 Series - Sockets and accessories for 56 series relays



96.72

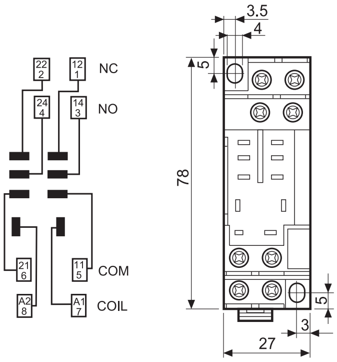
Approvals
(according to type):



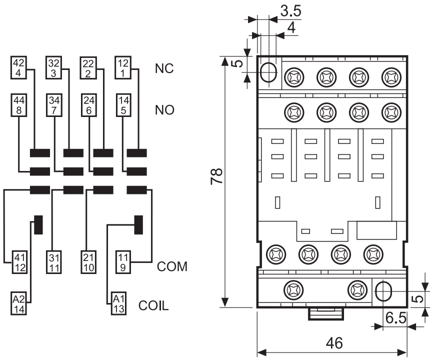
96.74

Approvals
(according to type):

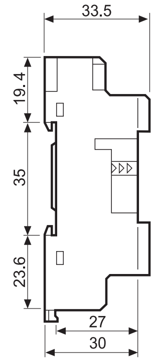
Screw terminal (Plate clamp) socket panel or 35 mm rail (EN 60715) mount		**96.72** **Blue**	**96.72.0** **Black**	**96.74** **Blue**	**96.74.0** **Black**
For relay type		56.32		56.34	
Accessories					
Metal retaining clip (supplied with socket - packaging code SMA)		094.71		096.71	
Modules (see table below)		99.01			
Technical data					
Rated values		12 A - 250 V			
Dielectric strength		2 kV AC			
Protection category		IP 20			
Ambient temperature	°C	–40…+70			
Screw torque	Nm	0.8			
Wire strip length	mm	10			
Max. wire size for 96.72 and 96.74 sockets		solid wire		stranded wire	
	mm^2	1x4 / 2x4		1x4 / 2x2.5	
	AWG	1x12 / 2x12		1x12 / 2x14	



96.72



96.74



99.01

Approvals
(according to type):

99.01 coil indication and EMC suppression modules for types 96.72 and 96.74 sockets		**Blue***
Diode (+A1, standard polarity)	(6…220)V DC	99.01.3.000.00
Diode (+A2, non-standard polarity)	(6…220)V DC	99.01.2.000.00
LED	(6…24)V DC/AC	99.01.0.024.59
LED	(28…60)V DC/AC	99.01.0.060.59
LED	(110…240)V DC/AC	99.01.0.230.59
LED + Diode (+A1, standard polarity)	(6…24)V DC	99.01.9.024.99
LED + Diode (+A1, standard polarity)	(28…60)V DC	99.01.9.060.99
LED + Diode (+A1, standard polarity)	(110…220)V DC	99.01.9.220.99
LED + Diode (+A2, non-standard polarity)	(6…24)V DC	99.01.9.024.79
LED + Diode (+A2, non-standard polarity)	(28…60)V DC	99.01.9.060.79
LED + Diode (+A2, non-standard polarity)	(110…220)V DC	99.01.9.220.79
LED + Varistor	(6…24)V DC/AC	99.01.0.024.98
LED + Varistor	(28…60)V DC/AC	99.01.0.060.98
LED + Varistor	(110…240)V DC/AC	99.01.0.230.98
RC circuit	(6…24)V DC/AC	99.01.0.024.09
RC circuit	(28…60)V DC/AC	99.01.0.060.09
RC circuit	(110…240)V DC/AC	99.01.0.230.09
Residual current by-pass	(110…240)V AC	99.01.8.230.07

* Modules in Black housing are available on request.

Green LED is standard. Red LED available on request.

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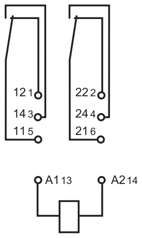
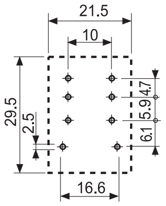
96.12

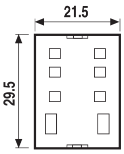
Approvals
(according to type):

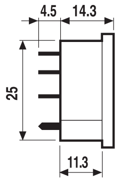
PCB socket	96.12 (blue)	96.12.0 (black)	96.14 (blue)	96.14.0 (black)
For relay type	56.32		56.34	
Accessories				
Metal retaining clip (supplied with socket - packaging code SMA)	094.51			
Technical data				
Rated values	15 A - 250 V			
Dielectric strength	2 kV AC			
Protection category	IP 20			
Ambient temperature °C	–40…+70			

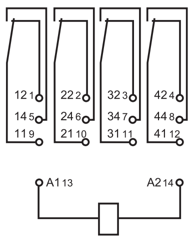


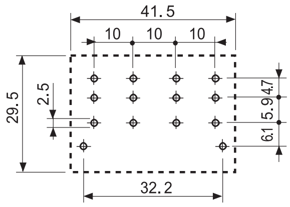


Copper side view
96.12

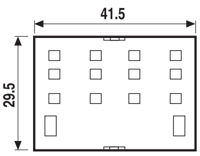


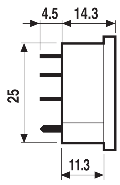






Copper side view
96.14





Packaging code

How to code and identify retaining clip and packaging options for sockets.

Example:

9 6 . 7	4	S M	A

A Standard packaging

SM Metal retaining clip
SP Plastic retaining clip

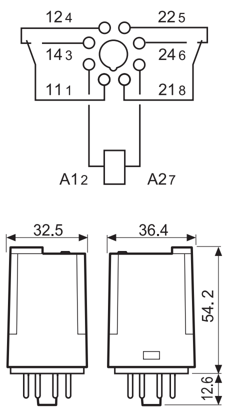
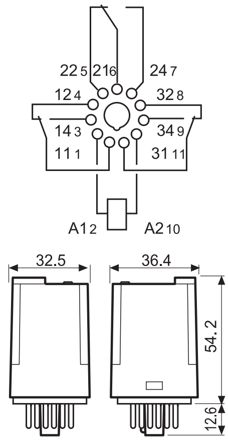
9 6 . 7	4		

Without retaining clip

Features

Plug-in mount
10 A General purpose relay

- 2 & 3 pole changeover contacts
- Cadmium Free contacts (preferred version)
- AC coils & DC coils
- UL Listing (certain relay/socket combinations)
- Contact material options
- Lockable test button with mechanical flag indicator (preferred version)
- 90 series sockets
- Coil EMC suppression
- Timer accessories 86 series
- European Patent

60.12	60.13
	
• 2 pole, 10 A power contacts • 8 pin plug-in	• 3 pole, 10 A power contacts • 11 pin plug-in
	

For UL ratings see:
"General technical information" page V

		60.12	60.13
Contact specification			
Contact configuration		2 CO (DPDT)	3 CO (3PDT)
Rated current/Maximum peak current	A	10/20	10/20
Rated voltage/Maximum switching voltage	V AC	250/400	250/400
Rated load AC1	VA	2,500	2,500
Rated load AC15 (230 V AC)	VA	500	500
Single phase motor rating (230 V AC)	kW	0.37	0.37
Breaking capacity DC1: 30/110/220 V	A	10/0.4/0.15	10/0.4/0.15
Minimum switching load	mW (V/mA)	500 (10/5)	500 (10/5)
Standard contact material		AgNi	AgNi
Coil specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	6 - 12 - 24 - 48 - 60 - 110 - 120 - 230 - 240 - 400	
	V DC	6 - 12 - 24 - 48 - 60 - 110 -125 - 220	
Rated power AC/DC	VA (50 Hz)/W	2.2/1.3	2.2/1.3
Operating range	AC	$(0.8\ldots1.1)U_N$	$(0.8\ldots1.1)U_N$
	DC	$(0.8\ldots1.1)U_N$	$(0.8\ldots1.1)U_N$
Holding voltage	AC/DC	$0.8\ U_N/0.5\ U_N$	$0.8\ U_N/0.5\ U_N$
Must drop-out voltage	AC/DC	$0.2\ U_N/0.1\ U_N$	$0.2\ U_N/0.1\ U_N$
Technical data			
Mechanical life AC/DC	cycles	$20 \cdot 10^6/50 \cdot 10^6$	$20 \cdot 10^6/50 \cdot 10^6$
Electrical life at rated load AC1	cycles	$200 \cdot 10^3$	$200 \cdot 10^3$
Operate/release time	ms	11/4	11/4
Insulation between coil and contacts (1.2/50 μs)	kV	4	3.6
Dielectric strength between open contacts	V AC	1,000	1,000
Ambient temperature range	°C	–40…+70	–40…+70
Environmental protection		RT I	RT I
Approvals (according to type)		RINA	

60 Series - General purpose relays 6 - 10 A

Features

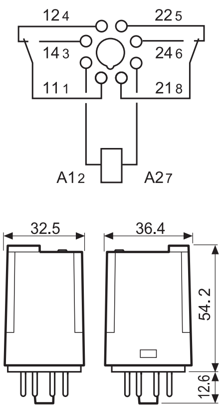
A

Plug-in mount - 6 A
Bifurcated contacts for low level switching

- 2 & 3 pole changeover contacts
- Cadmium Free contacts (Gold plated Silver Nickel)
- AC coils & DC coils
- Lockable test button with mechanical flag indicator (preferred version)
- 90 series sockets
- Coil EMC suppression
- Timer accessories 86 series
- European Patent

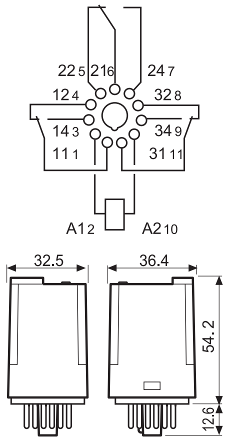
60.12 - 5200

- 2 pole, 6 A bifurcated contacts
- 8 pin plug-in



60.13 - 5200

- 3 pole, 6 A bifurcated contacts
- 11 pin plug-in



For UL ratings see:
"General technical information" page V

		60.12 - 5200	60.13 - 5200
Contact specification			
Contact configuration		2 CO (DPDT)	3 CO (3PDT)
Rated current/Maximum peak current	A	6/10	6/10
Rated voltage/Maximum switching voltage	V AC	250/400	250/400
Rated load AC1	VA	1,500	1,500
Rated load AC15 (230 V AC)	VA	250	250
Single phase motor rating (230 V AC)	kW	0.185	0.185
Breaking capacity DC1: 30/110/220 V	A	6/0.3/0.12	6/0.3/0.12
Minimum switching load	mW (V/mA)	50 (5/5)	50 (5/5)
Standard contact material		AgNi + Au bifurcated contacts	AgNi + Au bifurcated contacts
Coil specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	6 - 12 - 24 - 48 - 60 - 110 - 120 - 230 - 240 - 400	
	V DC	6 - 12 - 24 - 48 - 60 - 110 -125 - 220	
Rated power AC/DC	VA (50 Hz)/W	2.2/1.3	2.2/1.3
Operating range	AC	(0.8…1.1)U_N	(0.8…1.1)U_N
	DC	(0.8…1.1)U_N	(0.8…1.1)U_N
Holding voltage	AC/DC	0.8 U_N/0.5 U_N	0.8 U_N/0.5 U_N
Must drop-out voltage	AC/DC	0.2 U_N/0.1 U_N	0.2 U_N/0.1 U_N
Technical data			
Mechanical life AC/DC	cycles	$20 \cdot 10^6/50 \cdot 10^6$	$20 \cdot 10^6/50 \cdot 10^6$
Electrical life at rated load AC1	cycles	$250 \cdot 10^3$	$250 \cdot 10^3$
Operate/release time	ms	11/4	11/4
Insulation between coil and contacts (1.2/50 μs)	kV	4	3.6
Dielectric strength between open contacts	V AC	1,000	1,000
Ambient temperature range	°C	–40…+70	–40…+70
Environmental protection		RT I	RT I
Approvals (according to type)			

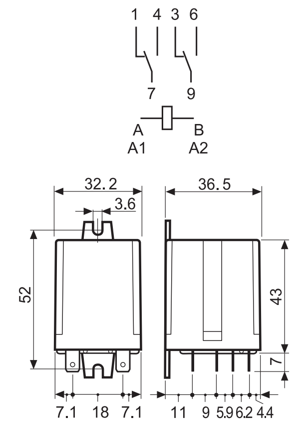
Features

Flange mount - General purpose relay 10 A

- Faston 187, 4.8x0.8 mm
- 2 & 3 pole changeover contacts
- AC coils & DC coils
- Cadmium Free contacts
- Contacts material options

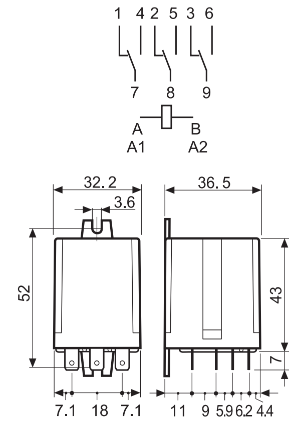
60.62

- 2 pole, 10 A power contacts
- Flange mount/Faston 187



60.63

- 3 pole, 10 A power contacts
- Flange mount/Faston 187



For UL ratings see:
"General technical information" page V

		60.62	60.63
Contact specification			
Contact configuration		2 CO (DPDT)	3 CO (3PDT)
Rated current/Maximum peak current	A	10/20	10/20
Rated voltage/Maximum switching voltage	V AC	250/400	250/400
Rated load AC1	VA	2,500	2,500
Rated load AC15 (230 V AC)	VA	500	500
Single phase motor rating (230 V AC)	kW	0.37	0.37
Breaking capacity DC1: 30/110/220 V	A	10/0.4/0.15	10/0.4/0.15
Minimum switching load	mW (V/mA)	500 (10/5)	500 (10/5)
Standard contact material		AgNi	AgNi
Coil specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	6 - 12 - 24 - 48 - 60 - 110 - 120 - 230 - 240 - 400	
	V DC	6 - 12 - 24 - 48 - 60 - 110 -125 - 220	
Rated power AC/DC	VA (50 Hz)/W	2.2/1.3	2.2/1.3
Operating range	AC	(0.8…1.1)U_N	(0.8…1.1)U_N
	DC	(0.8…1.1)U_N	(0.8…1.1)U_N
Holding voltage	AC/DC	0.8 U_N/0.5 U_N	0.8 U_N/0.5 U_N
Must drop-out voltage	AC/DC	0.2 U_N/0.1 U_N	0.2 U_N/0.1 U_N
Technical data			
Mechanical life AC/DC	cycles	$20 \cdot 10^6/50 \cdot 10^6$	$20 \cdot 10^6/50 \cdot 10^6$
Electrical life at rated load AC1	cycles	$200 \cdot 10^3$	$200 \cdot 10^3$
Operate/release time	ms	11/4	11/4
Insulation between coil and contacts (1.2/50 μs)	kV	4	3.6
Dielectric strength between open contacts	V AC	1,000	1,000
Ambient temperature range	°C	–40…+70	–40…+70
Environmental protection		RT I	RT I
Approvals (according to type)		RINA	

Ordering information

Example: 60 series plug-in relay, 3 CO (3PDT), 12 V DC coil, test button and mechanical indicator.

					A	B	C	D
6 0	. 1	3	. 9	. 0 1 2	. 0	0	4	0

Series

Type
1 = 8/11 pin plug-in
6 = Faston 187 (4.8x0.8 mm)
with flange mount

No. of poles
2 = 2 pole
3 = 3 pole

Coil version
4 = Current sensing (60.12/13 only)
8 = AC (50/60 Hz)
9 = DC

Coil voltage
See coil specifications

A: Contact material
0 = Standard
5 = AgNi + Au

B: Contact circuit
0 = CO (nPDT)
2 = Bifurcated contacts
60.12/13 - 6 A only

D: Special versions
0 = Standard

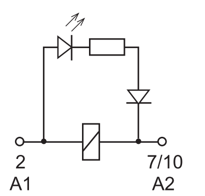
C: Options
0 = None
2 = Mechanical indicator
3 = LED (AC)
4 = Lockable test button + mechanical indicator
5* = Lockable test button + LED (AC)
54* = Lockable test button + LED (AC) + mechanical indicator
6* = LED + diode (DC, polarity positive to pin 2)
7* = Lockable test button + LED + diode (DC, polarity positive to pin 2)
74* = Lockable test button + LED + diode (DC, polarity positive to pin 2) + mechanical indicator

* Options not available for 220 V DC and 400 V AC versions.

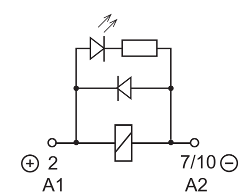
Selecting features and options: only combinations in the same row are possible.
Preferred selections for best availability are shown in **bold.**

Type	Coil version	A	B	C	D
60.12/13	AC	**0**	**0**	0 - 2 - 3 - **4** - 5	**0**
	AC	0	0	54	/
	AC	5	0 - 2	0 - 2 - 3 - 4 - 5	0
	AC	5	0 - 2	54	/
	DC	**0**	**0**	0 - 2 - **4** - 6 - 7	**0**
	DC	0	0	74	/
	DC	5	0 - 2	0 - 2 - 4 - 6 - 7	0
	DC	5	0 - 2	74	/
	current sensing	0	0	4	0
60.62/63	AC-DC	**0** - 5	**0**	**0**	**0**

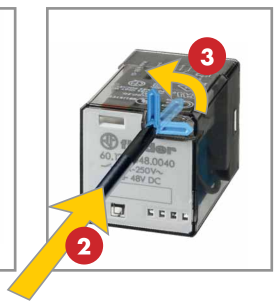
Descriptions: Options and Special versions



C: Option 3, 5, 54
LED (AC)



C: Option 6, 7, 74
LED + diode (DC, polarity positive to pin 2)



Lockable test button and mechanical flag indicator (0040, 0050, 0054, 0070, 0074)

EUROPEAN PATENT

The dual-purpose Finder test button can be used in two ways:
Case 1) The plastic pip (located directly above the test button) remains intact. In this case, when the test button is pushed, the contacts operate. When the test button is released the contacts return to their former state.
Case 2) The plastic pip is broken-off (using an appropriate cutting tool). In this case, (in addition to the above function), when the test button is pushed and rotated, the contacts are latched in the operating state, and remain so until the test button is rotated back to its former position. In both cases ensure that the test button actuation is swift and decisive.

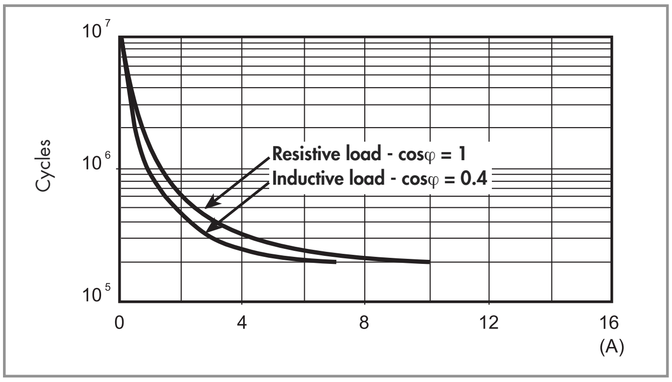
A

Technical data

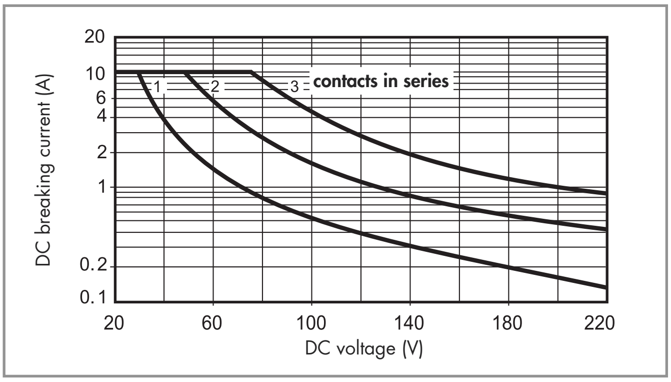
Insulation according to EN 61810-1		2 pole		3 pole	
Nominal voltage of supply system	V AC	230/400		230/400	
Rated insulation voltage	V AC	250	400	250	400
Pollution degree		3	2	3	2
Insulation between coil and contact set					
Type of insulation		Basic		Basic	
Overvoltage category		III		III	
Rated impulse voltage	kV (1.2/50 μs)	4		3.6	
Dielectric strength	V AC	2,000		2,000	
Insulation between adjacent contacts					
Type of insulation		Basic		Basic	
Overvoltage category		III		III	
Rated impulse voltage	kV (1.2/50 μs)	4		3.6	
Dielectric strength	V AC	2,000		2,000	
Insulation between open contacts					
Type of disconnection		Micro-disconnection		Micro-disconnection	
Dielectric strength	V AC/kV (1.2/50 μs)	1,000/1.5		1,000/1.5	
Conducted disturbance immunity					
Burst (5…50)ns, 5 kHz, on A1 - A2		EN 61000-4-4		level 4 (4 kV)	
Surge (1.2/50 μs) on A1 - A2 (differential mode)		EN 61000-4-5		level 4 (4 kV)	
Other data					
Bounce time: NO/NC	ms	1/4			
Vibration resistance (5…55)Hz: NO/NC	g	22/22			
Shock resistance	g	20			
Power lost to the environment — without contact current	W	1.3		1.3	
Power lost to the environment — with rated current	W	2.7 (60.12, 60.62)		3.4 (60.13, 60.63)	

Contact specification

F 60 - Electrical life (AC) v contact current



H 60 - Maximum DC1 breaking capacity



- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of ≥ 100·10³ can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load.
  Note: the release time for the load will be increased.

Coil specifications

DC coil data

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
6	**9**.006	4.8	6.6	28	214
12	**9**.012	9.6	13.2	110	109
24	**9**.024	19.2	26.4	445	53.9
48	**9**.048	38.4	52.8	1,770	27.1
60	**9**.060	48	66	2,760	21.7
110	**9**.110	88	121	9,420	11.7
125	**9**.125	100	138	12,000	10.4
220	**9**.220	176	242	37,300	5.8

AC coil data

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N (50Hz)
V		V	V	Ω	mA
6	**8**.006	4.8	6.6	4.6	367
12	**8**.012	9.6	13.2	19	183
24	**8**.024	19.2	26.4	74	90
48	**8**.048	38.4	52.8	290	47
60	**8**.060	48	66	450	37
110	**8**.110	88	121	1,600	20
120	**8**.120	96	132	1,940	18.6
230	**8**.230	184	253	7,250	10.5
240	**8**.240	192	264	8,500	9.2
400	**8**.400	320	440	19,800	6

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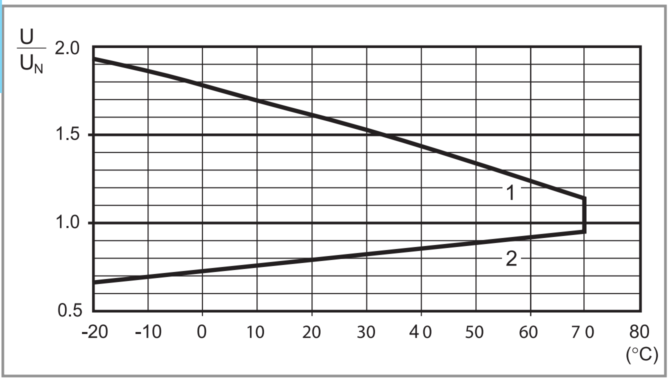
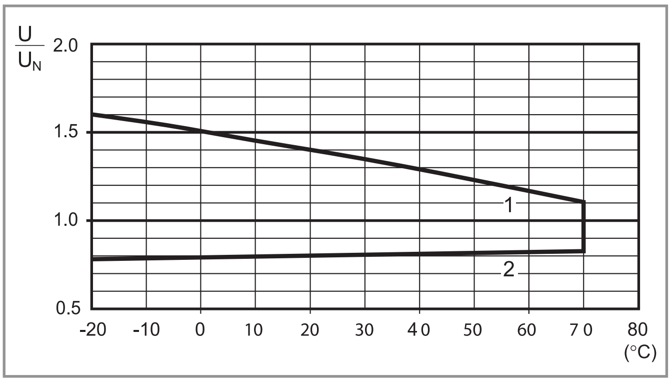
Coil specifications

R 60 - DC coil operating range v ambient temperature



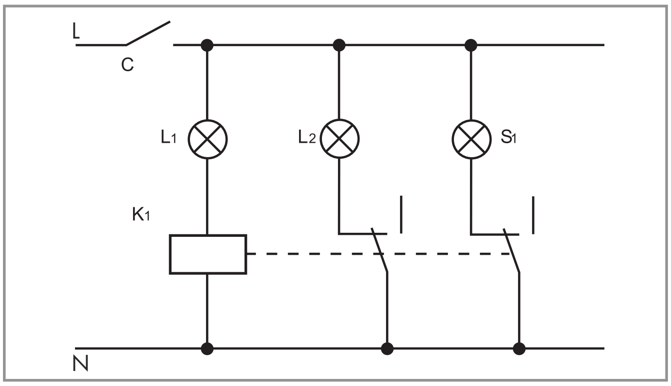
1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

R 60 - AC coil operating range v ambient temperature



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

Current sensing version



Typical application with current sensing relays.
An open circuit filiment of lamp L1 is detected by the current sensing relay coil (K1) which causes the back-up safety lamp L2 to be energised, and indication of failure at the control panel via lamp S1.
Example: navigation light.
L1 = Light
L2 = Safety light
S1= Control light
K1 = Relay

Current sensing DC coil data

Coil code	I_{min} (A)	I_N (A)	I_{max} (A)	R (Ω)
4202	1.7	2.0	2.4	0.15
4182	1.5	1.8	2.2	0.19
4162	1.4	1.6	1.9	0.24
4142	1.2	1.4	1.7	0.31
4122	1.0	1.2	1.4	0.42
4102	0.85	1.0	1.2	0.61
4092	0.8	0.9	1.1	0.75
4062	0.5	0.6	0.7	1.70
4032	0.25	0.3	0.4	6.70
4012	0.085	0.1	0.15	61

Current sensing AC coil data

Coil code	I_{min} (A)	I_N (A)	I_{max} (A)	R (Ω)
4251	2.1	2.5	3.0	0.05
4181	1.5	1.8	2.2	0.10
4161	1.4	1.6	1.9	0.12
4121	1.0	1.2	1.4	0.22
4101	0.85	1.0	1.2	0.32
4051	0.42	0.5	0.6	1.28
4041	0.34	0.4	0.5	2.00
4031	0.25	0.3	0.4	3.57
4021	0.17	0.2	0.25	8.0
4011	0.085	0.1	0.15	32.1

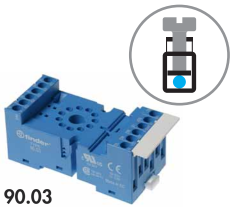
Other types of current sensing relays are available on request.

Accessories

060.72

Sheet of marker tags for relay types 60.12 and 60.13, plastic, 72 tags, 6x12 mm	060.72

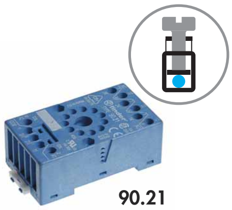
90 Series - Socket overview for 60 series relays



90.03

See page 8

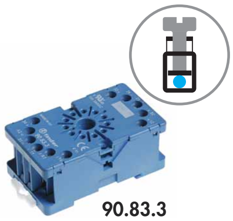
Module	Socket	Relay	Description	Mounting	Accessories
99.02	90.02	60.12	**Screw terminal (Box clamp) socket**	Panel or 35 mm rail	- Coil indication and EMC suppression modules
	90.03	60.13	Double A1 terminal	(EN 60715) mount	- Jumper link
					- Timer modules
					- Metal retaining clip



90.21

See page 9

Module	Socket	Relay	Description	Mounting	Accessories
99.01	90.20	60.12	**Screw terminal (Box clamp) socket**	Panel or 35 mm rail	- Coil indication and EMC suppression modules
	90.21	60.13		(EN 60715) mount	- Metal retaining clip
					



90.83.3

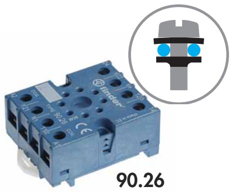
See page 10

Module	Socket	Relay	Description	Mounting	Accessories
—	90.82.3	60.12	**Screw terminal (Box clamp) socket**	Panel or 35 mm rail	- Metal retaining clip
—	90.83.3	60.13		(EN 60715) mount	

90.23

See page 10

Module	Socket	Relay	Description	Mounting	Accessories
—	90.22	60.12	**Screw terminal (Box clamp) socket**	Panel or 35 mm rail	- Metal retaining clip
—	90.23	60.13		(EN 60715) mount	



90.26

See page 11

Module	Socket	Relay	Description	Mounting	Accessories
—	90.26	60.12	**Screw terminal (Plate clamp) socket**	Panel or 35 mm rail	- Metal retaining clip
—	90.27	60.13		(EN 60715) mount	

90.12

See page 1

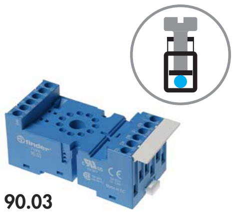
Module	Socket	Relay	Description	Mounting	Accessories
—	90.12	60.12	**Flange mount solder socket**	M3 screw fixing	—
—	90.13	60.13			

90.15

See page 12

Module	Socket	Relay	Description	Mounting	Accessories
—	90.14	60.12	**PCB socket**	PCB	—
—	90.14.1	60.12			
—	90.15	60.13			
—	90.15.1	60.13			

A

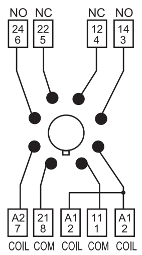


90.03

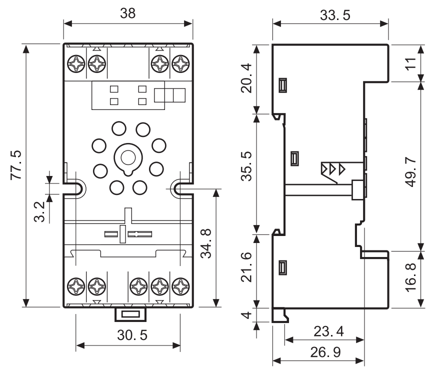
Approvals (according to type):

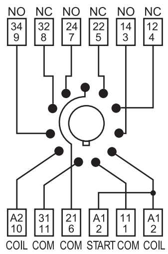
cULus Certain relay/socket combinations

Screw terminal (Box clamp) socket panel or 35 mm rail (EN 60715) mount		90.02 Blue	90.02.0 Black	90.03 Blue	90.03.0 Black
For relay type		60.12		60.13	
Accessories					
Metal retaining clip		090.33			
6-way jumper link		090.06			
Identification tag		090.00.2			
Modules (see table below)		99.02			
Timer modules (see table below)		86.00, 86.30			
Technical data					
Rated values		10 A - 250 V			
Dielectric strength		2 kV AC			
Protection category		IP 20			
Ambient temperature	°C	–40…+70			
Screw torque	Nm	0.6			
Wire strip length	mm	10			
Max. wire size for 90.02 and 90.03 sockets		solid wire		stranded wire	
	mm^2	1x6 / 2x2.5		1x4 / 2x2.5	
	AWG	1x10 / 2x14		1x12 / 2x14	

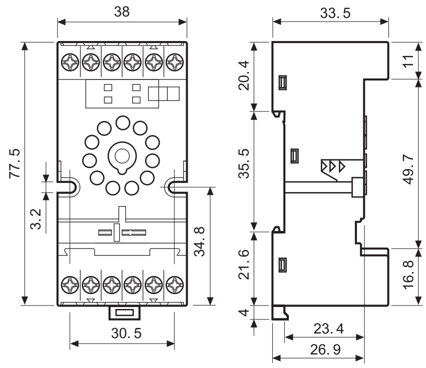


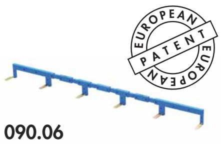
90.02





90.03

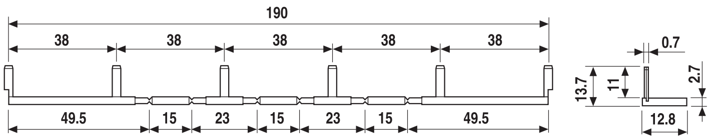




090.06

6-way jumper link for 90.02 and 90.03 sockets	090.06 (blue)	090.06.0 (black)
Rated values	10 A - 250 V	

Approvals (according to type):



86.00

86.30

86 series timer modules	
Multi-voltage: (12…240)V AC/DC; Multi-functions: AI, DI, SW, BE, CE, DE, EE, FE; (0.05 s…100 h)	86.00.0.240.0000
(12…24)V AC/DC; Bi-function: AI, DI; (0.05 s…100 h)	86.30.0.024.0000
(110…125)V AC; Bi-function: AI, DI; (0.05s…100h)	86.30.8.120.0000
(230…240)V AC; Bi-function: AI, DI; (0.05 s…100 h)	86.30.8.240.0000

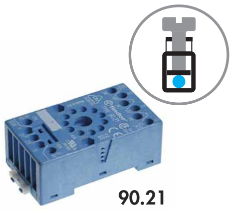
Approvals (according to type):

99.02

Approvals (according to type):

99.02 coil indication and EMC suppression modules for 90.02 and 90.03 sockets		
Diode (+A1, standard polarity)	(6…220)V DC	99.02.3.000.00
LED	(6…24)V DC/AC	99.02.0.024.59
LED	(28…60)V DC/AC	99.02.0.060.59
LED	(110…240)V DC/AC	99.02.0.230.59
LED + Diode (+A1, standard polarity)	(6…24)V DC	99.02.9.024.99
LED + Diode (+A1, standard polarity)	(28…60)V DC	99.02.9.060.99
LED + Diode (+A1, standard polarity)	(110…220)V DC	99.02.9.220.99
LED + Varistor	(6…24)V DC/AC	99.02.0.024.98
LED + Varistor	(28…60)V DC/AC	99.02.0.060.98
LED + Varistor	(110…240)V DC/AC	99.02.0.230.98
RC circuit	(6…24)V DC/AC	99.02.0.024.09
RC circuit	(28…60)V DC/AC	99.02.0.060.09
RC circuit	(110…240)V DC/AC	99.02.0.230.09
Residual current by-pass	(110…240)V AC	99.02.8.230.07

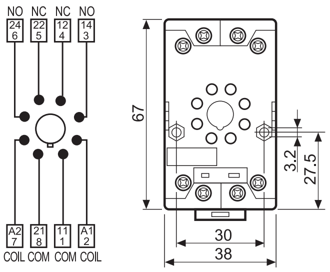
DC Modules with non-standard polarity (+A2) on request.



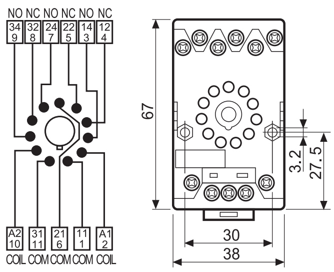
90.21

Approvals (according to type):

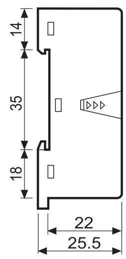
Screw terminal (Box clamp) socket panel or 35 mm rail (EN 60715) mount		90.20 Blue	90.20.0 Black	90.21 Blue	90.21.0 Black
For relay type		60.12		60.13	
Accessories					
Metal retaining clip (supplied with socket - packaging code SMA)		090.33			
Modules (see table below)		99.01			
Technical data					
Rated values		10 A - 250 V			
Dielectric strength		2 kV AC			
Protection category		IP 20			
Ambient temperature	°C	–40…+70			
Screw torque	Nm	0.5			
Wire strip length	mm	10			
Max. wire size for 90.20 and 90.21 sockets		solid wire		stranded wire	
	mm^2	1x6 / 2x2.5		1x6 / 2x2.5	
	AWG	1x10 / 2x14		1x10 / 2x14	



90.20



90.21



99.01

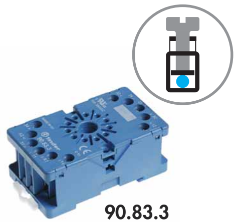
Approvals (according to type):

* Modules in Black housing are available on request.

Green LED is standard. Red LED available on request.

99.01 coil indication and EMC suppression modules for 90.20 and 90.21 sockets		
See technical data page 215/216		**Blue***
Diode (+A1, standard polarity)	(6...220)V DC	99.01.3.000.00
Diode (+A2, non-standard polarity)	(6...220)V DC	99.01.2.000.00
LED	(6...24)V DC/AC	99.01.0.024.59
LED	(28...60)V DC/AC	99.01.0.060.59
LED	(110...240)V DC/AC	99.01.0.230.59
LED + Diode (+A1, standard polarity)	(6...24)V DC	99.01.9.024.99
LED + Diode (+A1, standard polarity)	(28...60)V DC	99.01.9.060.99
LED + Diode (+A1, standard polarity)	(110...220)V DC	99.01.9.220.99
LED + Diode (+A2, non-standard polarity)	(6...24)V DC	99.01.9.024.79
LED + Diode (+A2, non-standard polarity)	(28...60)V DC	99.01.9.060.79
LED + Diode (+A2, non-standard polarity)	(110...220)V DC	99.01.9.220.79
LED + Varistor	(6...24)V DC/AC	99.01.0.024.98
LED + Varistor	(28...60)V DC/AC	99.01.0.060.98
LED + Varistor	(110...240)V DC/AC	99.01.0.230.98
RC circuit	(6...24)V DC/AC	99.01.0.024.09
RC circuit	(28...60)V DC/AC	99.01.0.060.09
RC circuit	(110...240)V DC/AC	99.01.0.230.09
Residual current by-pass	(110...240)V AC	99.01.8.230.07

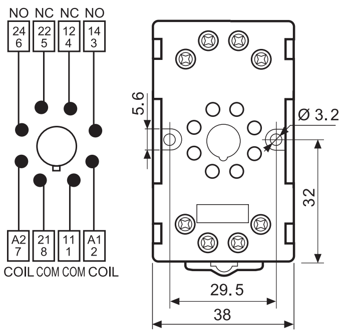
A



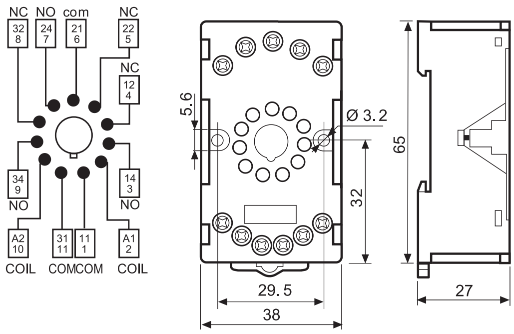
90.83.3

Approvals
(according to type):

Screw terminal (Box clamp) socket panel or 35 mm rail (EN 60715) mount	90.82.3 Blue	90.82.30 Black	90.83.3 Blue	90.83.30 Black
For relay type	60.12		60.13	
Accessories				
Metal retaining clip	090.33			
Technical data				
Rated values	10 A - 250 V			
Dielectric strength	2 kV AC			
Protection category	IP 20			
Ambient temperature °C	–40…+70			
Screw torque Nm	0.8			
Max. wire size for 90.82.3 and 90.83.3 sockets	solid wire		stranded wire	
mm²	1x6 / 2x4		1x6 / 2x4	
AWG	1x10 / 2x14		1x10 / 2x14	



90.82.3

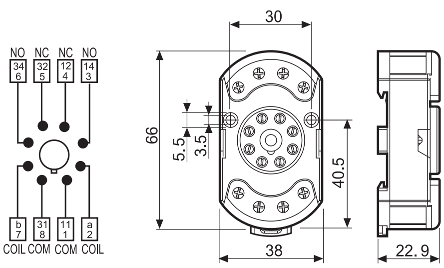


90.83.3

90.23

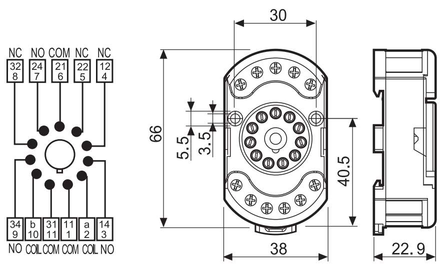
Approvals
(according to type):

Screw (Box clamp) terminal socket panel or 35 mm rail (EN 60715) mount	90.22 Blue	90.23 Blue
For relay type	60.12	60.13
Accessories		
Metal retaining clip (supplied with socket - packaging code SMA)	090.33	
Technical data		
Rated values	10 A - 250 V	
Dielectric strength	2 kV AC	
Protection category	IP 20	
Ambient temperature °C	–40…+70	
Screw torque Nm	0.5	
Wire strip length mm	7	
Max wire size for 90.22 and 90.23 sockets	solid wire	stranded wire
mm²	1x6 / 2x2.5	1x6 / 2x2.5
AWG	1x10 / 2x14	1x10 / 2x14



90.22

REGISTERED COMMUNITY DESIGN



90.23

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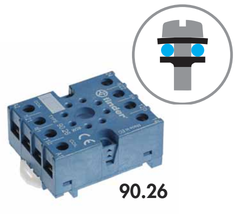
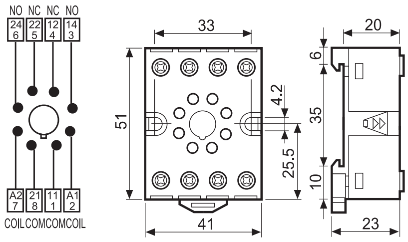


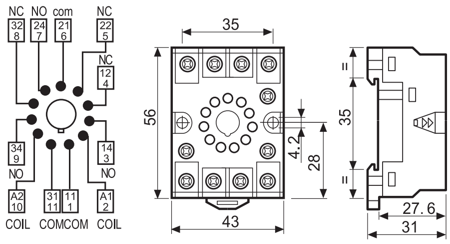
90.26

Approvals
(according to type):

Screw terminal (Plate clamp) socket panel or 35 mm rail (EN 60715) mount		90.26 Blue	90.26.0 Black	90.27 Blue	90.27.0 Black
For relay type		60.12		60.13	
Accessories					
Metal retaining clip (supplied with socket - packaging code SMA)		090.33			
Technical data					
Rated values		10 A - 250 V			
Dielectric strength		2 kV AC			
Protection category		IP 20			
Ambient temperature	°C	–40…+70			
Screw torque	Nm	0.8			
Wire strip length	mm	10			
Max. wire size for 90.26 and 90.27 sockets		solid wire		stranded wire	
	mm^2	1x4 / 2x2.5		1x4 / 2x2.5	
	AWG	1x12 / 2x14		1x12 / 2x14	



90.26

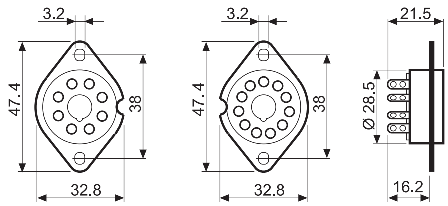


90.27

90.12

Approvals
(according to type):

Flange mount solder socket mount with M3 screw		90.12 (black)	90.13 (black)
For relay type		60.12	60.13
Technical data			
Rated values		10 A - 250 V	
Dielectric strength		2 kV AC	
Ambient temperature	°C	–40…+70	



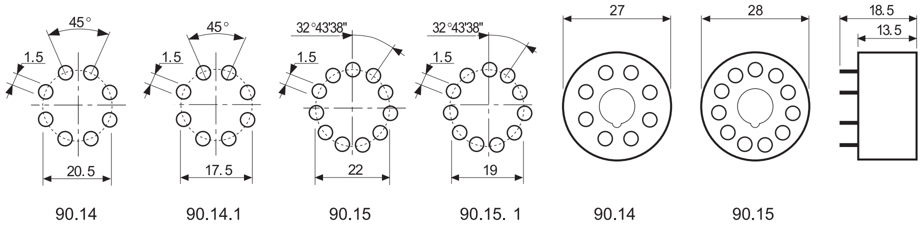
90.12 90.13

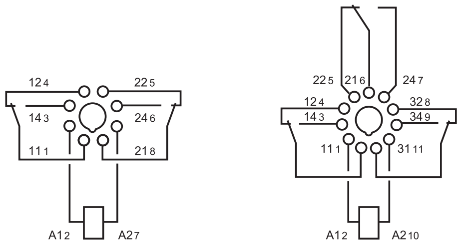
A

90.15

Approvals
(according to type):

PCB socket	Blue	90.14 (Ø 20.5 mm)	90.15 (Ø 22 mm)
	Blue	90.14.1 (Ø 17.5 mm)	90.15.1 (Ø 19 mm)
For relay type		60.12	60.13
Technical data			
Rated values		10 A - 250 V	
Dielectric strength		2 kV AC	
Ambient temperature	°C	–40…+70	





90.14 90.15

Packaging code

How to code and identify retaining clip and packaging options for sockets.

Example:

9 0 . 2 1 S M A

A Standard packaging

SM Metal retaining clip

9 0 . 2 1 → Without retaining clip

Features

Printed circuit mount
16 A Power relay

- 2 & 3 Pole changeover contacts or NO (≥ 3 mm contact gap)
- AC coils & DC coils
- Reinforced insulation between coil and contacts according to EN 60335-1, with 6 mm clearance & 8 mm creepage distance
- SELV coil-contact separator option
- Cadmium Free contact material options

62.22 / 62.23

- 2 & 3 pole changeover contact
- PCB mount

62.22-0300 / 62.23-0300

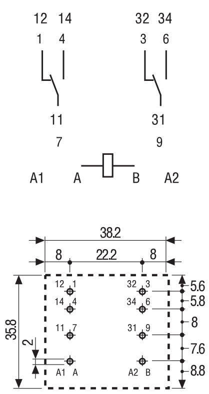
- 2 & 3 pole normally open contact (≥ 3 mm contact gap)
- PCB mount

* Distance between contacts ≥ 3 mm (EN 60730-1).

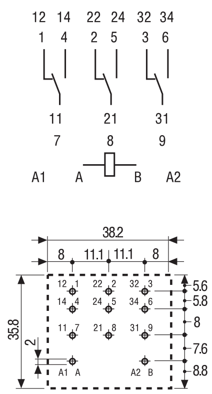
** With the $AgSnO_2$ material the maximum peak current is 120 A - 5 ms (NO contact).

For UL ratings see:
"General technical information" page V

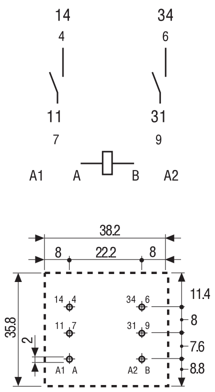
For outline drawing see page 10



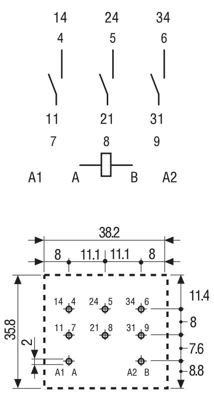
62.22
Copper side view



62.23
Copper side view



62.22 - 0300
Copper side view



62.23 - 0300
Copper side view

		62.22	62.23	62.22-0300	62.23-0300
Contact specification					
Contact configuration		2 CO (DPDT)	3 CO (3PDT)	2 NO (DPST-NO), ≥ 3 mm*	3 NO (3PST-NO), ≥ 3 mm*
Rated current/Maximum peak current	A	16/30**		16/30**	
Rated voltage/Maximum switching voltage	V AC	250/400		250/400	
Rated load AC1	VA	4,000		4,000	
Rated load AC15 (230 V AC)	VA	750		750	
Motor rating (230/400 V AC)	kW	0.8/—	0.8/1.5	0.8/—	0.8/1.5
Breaking capacity DC1: 30/110/220 V	A	16/0.6/0.4		16/1.1/0.7	
Minimum switching load	mW (V/mA)	1,000 (10/10)		1,000 (10/10)	
Standard contact material		AgCdO		AgCdO	
Coil specification					
Nominal voltage (U_N)	V AC (50/60 Hz)	6 - 12 - 24 - 48 - 60 - 110 - 120 - 230 - 240 - 400			
	V DC	6 - 12 - 24 - 48 - 60 - 110 - 125 - 220			
Rated power AC/DC	VA (50 Hz)/W	2.2/1.3		3/3	
Operating range	AC	$(0.8\ldots1.1)U_N$		$(0.85\ldots1.1)U_N$	
	DC	$(0.8\ldots1.1)U_N$		$(0.85\ldots1.1)U_N$	
Holding voltage	AC/DC	$0.8\ U_N/0.6\ U_N$		$0.8\ U_N/0.6\ U_N$	
Must drop-out voltage	AC/DC	$0.2\ U_N/0.1\ U_N$		$0.2\ U_N/0.1\ U_N$	
Technical data					
Mechanical life AC/DC	cycles	$10 \cdot 10^6/30 \cdot 10^6$		$10 \cdot 10^6/30 \cdot 10^6$	
Electrical life at rated load AC1	cycles	$100 \cdot 10^3$		$100 \cdot 10^3$	
Operate/release time	ms	11/4		15/3	
Insulation between coil and contacts (1.2/50 μs)	kV	6		6	
Dielectric strength between open contacts	V AC	1,500		2,500	
Ambient temperature range	°C	–40…+70		–40…+50	
Environmental protection		RT I		RT I	
Approvals (according to type)		RINA			

62 Series - Power relays 16 A

finder

A

Features

Plug-in mount/Faston 187
16 A Power relay

- Plug-in (92 series sockets) or Faston 187 (4.8x0.5 mm) with optional mounting adaptors
- 2 & 3 Pole changeover contacts or NO (≥ 3 mm contact gap)
- AC coils & DC coils
- UL Listing (certain relay/socket combinations)
- LED, mechanical indicator & test button options
- Reinforced insulation between coil and contacts according to EN 60335-1, with 6 mm clearance & 8 mm creepage distance
- SELV coil-contact separator option
- Cadmium Free contact material options
- Sockets and accessories
- European Patent

* Distance between contacts ≥ 3 mm (EN 60730-1).

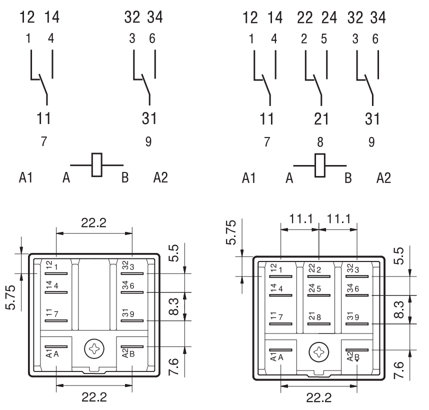
** With the $AgSnO_2$ material the maximum peak current is 120 A - 5 ms (NO contact).

For UL ratings see:
"General technical information" page V

For outline drawing see page 10

62.32 / 62.33

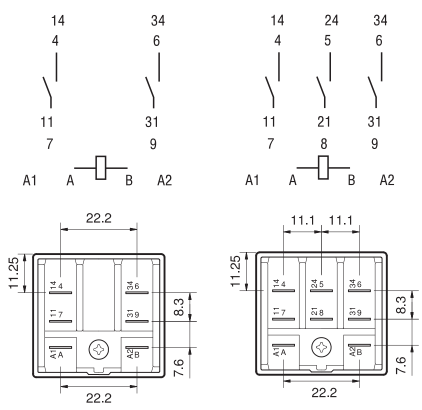
- 2 & 3 pole changeover contact
- Plug-in / Faston 187



62.32 62.33

62.32-0300 / 62.33-0300

- 2 & 3 pole normally open contact (≥ 3 mm contact gap)
- Plug-in / Faston 187



62.32-0300 62.33-0300

		62.32	62.33	62.32-0300	62.33-0300
Contact specification					
Contact configuration		2 CO (DPDT)	3 CO (3PDT)	2 NO (DPST-NO), ≥ 3 mm*	3 NO (3PST-NO), ≥ 3 mm*
Rated current/Maximum peak current	A	16/30**		16/30**	
Rated voltage/Maximum switching voltage	V AC	250/400		250/400	
Rated load AC1	VA	4,000		4,000	
Rated load AC15 (230 V AC)	VA	750		750	
Motor rating (230/400 V AC)	kW	0.8/—	0.8/1.5	0.8/—	0.8/1.5
Breaking capacity DC1: 30/110/220 V	A	16/0.6/0.4		16/1.1/0.7	
Minimum switching load	mW (V/mA)	1,000 (10/10)		1,000 (10/10)	
Standard contact material		AgCdO		AgCdO	
Coil specification					
Nominal voltage (U_N)	V AC (50/60 Hz)	6 - 12 - 24 - 48 - 60 - 110 - 120 - 230 - 240 - 400			
	V DC	6 - 12 - 24 - 48 - 60 - 110 - 125 - 220			
Rated power AC/DC	VA (50 Hz)/W	2.2/1.3		3/3	
Operating range	AC	(0.8…1.1)U_N		(0.85…1.1)U_N	
	DC	(0.8…1.1)U_N		(0.85…1.1)U_N	
Holding voltage	AC/DC	0.8 U_N/0.6 U_N		0.8 U_N/0.6 U_N	
Must drop-out voltage	AC/DC	0.2 U_N/0.1 U_N		0.2 U_N/0.1 U_N	
Technical data					
Mechanical life AC/DC	cycles	$10 \cdot 10^6/30 \cdot 10^6$		$10 \cdot 10^6/30 \cdot 10^6$	
Electrical life at rated load AC1	cycles	$100 \cdot 10^3$		$100 \cdot 10^3$	
Operate/release time	ms	11/4		15/3	
Insulation between coil and contacts (1.2/50 μs)	kV	6		6	
Dielectric strength between open contacts	V AC	1,500		2,500	
Ambient temperature range	°C	–40…+70		–40…+50	
Environmental protection		RT I		RT I	
Approvals (according to type)		CE EAC Lloyd's Register RINA c US			

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Features

Flange mount/Faston 250
16 A Power relay

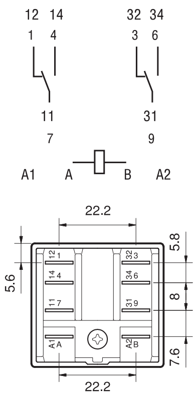
- Faston 250 (6.3x0.8 mm) termination Flange or optional mounting adaptors
- 2 & 3 Pole changeover contacts or NO (≥ 3 mm contact gap)
- AC coils & DC coils
- LED, mechanical indicator & test button options
- Reinforced insulation between coil and contacts according to EN 60335-1, with 6 mm clearance & 8 mm creepage distance
- SELV coil-contact separator option
- Cadmium Free contact material options
- European Patent

62.82 / 62.83

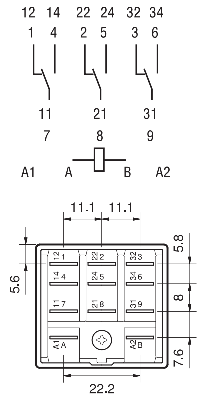
- 2 & 3 pole changeover contact
- Flange mount / Faston 250

62.82-0300 / 62.83-0300

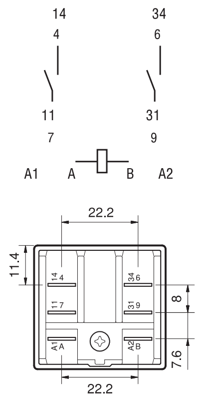
- 2 & 3 pole normally open contact (≥ 3 mm contact gap)
- Flange mount / Faston 250



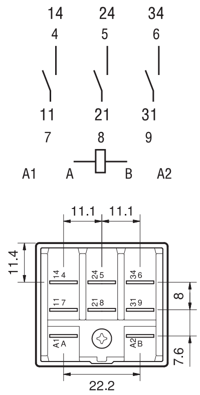
62.82



62.83



62.82-0300



62.83-0300

* Distance between contacts ≥ 3 mm (EN 60730-1).

** With the $AgSnO_2$ material the maximum peak current is 120 A - 5 ms (NO contact).

For UL ratings see:
"General technical information" page V

For outline drawing see page 10

		62.82	62.83	62.82-0300	62.83-0300
Contact specification					
Contact configuration		2 CO (DPDT)	3 CO (3PDT)	2 NO (DPST-NO), ≥ 3 mm*	3 NO (3PST-NO), ≥ 3 mm*
Rated current/Maximum peak current	A	16/30**		16/30**	
Rated voltage/Maximum switching voltage	V AC	250/400		250/400	
Rated load AC1	VA	4,000		4,000	
Rated load AC15 (230 V AC)	VA	750		750	
Motor rating (230/400 V AC)	kW	0.8/—	0.8/1.5	0.8/—	0.8/1.5
Breaking capacity DC1: 30/110/220 V	A	16/0.6/0.4		16/1.1/0.7	
Minimum switching load	mW (V/mA)	1,000 (10/10)		1,000 (10/10)	
Standard contact material		AgCdO		AgCdO	
Coil specification					
Nominal voltage (U_N)	V AC (50/60 Hz)	6 - 12 - 24 - 48 - 60 - 110 - 120 - 230 - 240 - 400			
	V DC	6 - 12 - 24 - 48 - 60 - 110 - 125 - 220			
Rated power AC/DC	VA (50 Hz)/W	2.2/1.3		3/3	
Operating range	AC	$(0.8...1.1)U_N$		$(0.85...1.1)U_N$	
	DC	$(0.8...1.1)U_N$		$(0.85...1.1)U_N$	
Holding voltage	AC/DC	$0.8\ U_N/0.6\ U_N$		$0.8\ U_N/0.6\ U_N$	
Must drop-out voltage	AC/DC	$0.2\ U_N/0.1\ U_N$		$0.2\ U_N/0.1\ U_N$	
Technical data					
Mechanical life AC/DC	cycles	$10 \cdot 10^6/30 \cdot 10^6$		$10 \cdot 10^6/30 \cdot 10^6$	
Electrical life at rated load AC1	cycles	$100 \cdot 10^3$		$100 \cdot 10^3$	
Operate/release time	ms	11/4		15/3	
Insulation between coil and contacts (1.2/50 μs)	kV	6		6	
Dielectric strength between open contacts	V AC	1,500		2,500	
Ambient temperature range	°C	–40…+70		–40…+50	
Environmental protection		RT I		RT I	
Approvals (according to type)		Lloyds Register RINA c US			

62 Series - Power relays 16 A

Features

Plug-in mount/Faston 187
Magnetic blow power relay

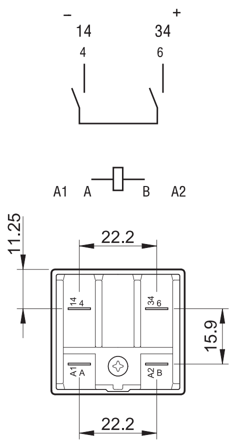
- Plug-in (92 series sockets) or Faston 187 (4.8x0.5 mm) with optional mounting adaptors
- 1 & 2 Pole NO contacts
- High DC load (resistive and inductive) switching capability
- DC coils
- Reinforced insulation between coil and contacts according to EN 60335-1, with 6 mm clearance & 8 mm creepage distance
- Cadmium Free contact material
- Sockets and accessories

NEW 62.31-4800

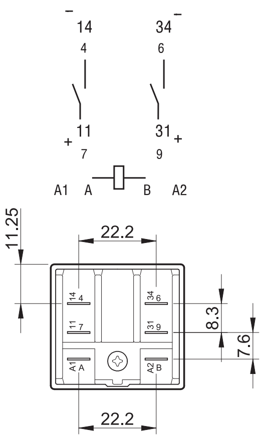
- 1 pole normally open contact (double break, ≥ 4.2 mm contact gap)
- Plug-in / Faston 187

NEW 62.32-4800

- 2 pole normally open contact (≥ 2.1 mm contact gap)
- Plug-in / Faston 187



62.31-4800



62.32-4800

* Maximum peak current 120 A - 5 ms.

For outline drawing see page 10

	62.31-4800	62.32-4800
Contact specification		
Contact configuration	1 NO (SPST-NO) double break, ≥ 4.2 mm	2 NO (DPST-NO), ≥ 2.1 mm
Rated current/Maximum peak current A	16/30*	16/30*
Rated voltage/Maximum switching voltage V AC	250/400	250/400
Rated load AC1 VA	4,000	4,000
Breaking capacity DC1: 30/125/220 V A	16/16/12	16/12/6
Breaking capacity DC inductive (L/R = 40 ms): 30/125/220 V A	16/5/3	10/2/1.2
Minimum switching load mW (V/mA)	1,000 (10/10)	1,000 (10/10)
Standard contact material	$AgSnO_2$	$AgSnO_2$
Coil specification		
Nominal voltage (U_N) V DC	6 - 12 - 24 - 48 - 60 - 110 - 125 - 220	
Rated power DC W	1.3	1.3
Operating range DC	$(0.85\ldots1.1)U_N$	$(0.85\ldots1.1)U_N$
Holding voltage DC	0.6 U_N	0.6 U_N
Must drop-out voltage DC	0.1 U_N	0.1 U_N
Technical data		
Mechanical life DC cycles	$10 \cdot 10^6$	$10 \cdot 10^6$
Electrical life at rated load DC1 cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Operate/release time ms	16/5	16/5
Insulation between coil and contacts (1.2/50 μs) kV	6	6
Dielectric strength between open contacts V AC	3,000	2,000
Ambient temperature range °C	–40…+70	–40…+70
Environmental protection	RT I	RT I
Approvals (according to type)	CE cURus	

Ordering information

Example: 62 series power relay + Faston 250 (6.3x0.8 mm), rear flange mount, 2 NO (DPST-NO), 12 V DC coil.

							A	B	C	D
6 2	. 8	2	. 9	. 0 1 2	. 0	3	0	0		

(A = 0, B = 3, C = 0, D = 0)

Series

Type
2 = PCB
3 = Plug-in
8 = Faston 250 (6.3x0.8 mm) with rear flange mount

No. of poles
1 = 1 pole (double break)
2 = 2 pole
3 = 3 pole

Coil version
8 = AC (50/60 Hz)
9 = DC

Coil voltage
See coil specifications

A: Contact material
0 = Standard AgCdO
4 = $AgSnO_2$ (standard for versions 4800)

B: Contact circuit
0 = CO (nPDT)
3 = NO (nPST), ≥ 3 mm contact gap
5 = CO (nPDT) + additional physical separator between coil and contacts (for SELV applications)
6 = NO (nPST), ≥ 3 mm contact gap + additional physical separator between coil and contacts (for SELV applications)
8 = NO (1 pole double break or 2 pole) with magnetic blow

D: Special versions
0 = Standard
6 = Rear flange mount
9 = Type 62.82/83 without rear flange mount

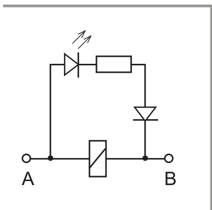
C: Options
0 = None
2 = Mechanical indicator
3 = LED (AC)
4 = Lockable test button + mechanical indicator
5* = Lockable test button + LED (AC)
54* = Lockable test button + LED (AC) + mechanical indicator
6* = LED + diode (DC, polarity positive to pin A/A1)
7* = Lockable test button + LED + diode (DC, polarity positive to pin A/A1)
74* = Lockable test button + LED + diode (DC, polarity positive to pin A/A1) + mechanical indicator

* Options not available for 220 V DC and 400 V AC versions.

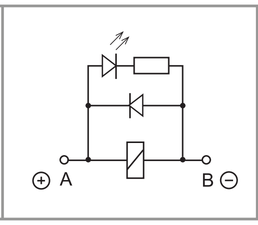
Selecting features and options: only combinations in the same row are possible.
Preferred selections for best availability are shown in **bold**.

Type	Coil version	A	B	C	D
62.22/23	AC-DC	**0** - 4	**0** - 3 - 5 - 6	**0**	**0**
62.32/33	AC-DC	0 - 4	0 - 3 - 5 - 6	0	0 - 6
	AC-DC	**0** - 4	**0** - 5	2 - **4**	**0** - 6
	AC	**0** - 4	**0**	2 - 3 - **4** - 5	**0** - 6
	AC	0 - 4	0 - 3	3	0 - 6
	AC	0 - 4	0	54	/
	DC	**0** - 4	**0**	**4** - 6 - 7	**0** - 6
	DC	0 - 4	0 - 3	6	0 - 6
	DC	0 - 4	0	74	/
62.31/32	DC	**4**	**8**	**0**	**0**
62.82/83	AC-DC	**0** - 4	**0** - 3 - 5 - 6	**0**	**0** - 9
	AC-DC	0 - 4	0 - 5	2 - 4	0
	AC	0 - 4	0	2 - 3 - 4 - 5	0
	AC	0 - 4	0 - 3	3	0
	DC	0 - 4	0	4 - 6 - 7	0
	DC	0 - 4	0 - 3	6	0

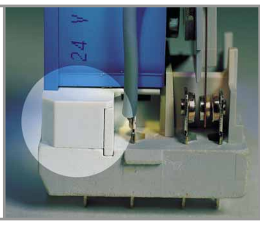
Descriptions: Options and Special versions



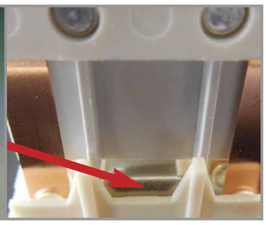
C: Option 3, 5, 54
LED (AC)



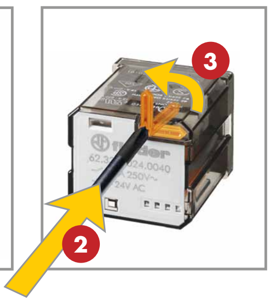
C: Option 6, 7, 74
LED + diode (DC, polarity positive to pin A/A1)



B: Contact circuit 5, 6
Additional physical separator between coil and contacts (for SELV applications)



B: Contact circuit 8
Magnetic blow



Lockable test button and mechanical flag indicator (0040, 0050, 0054, 0070, 0074)

The dual-purpose Finder test button can be used in two ways:

Case 1) The plastic pip (located directly above the test button) remains intact. In this case, when the test button is pushed, the contacts operate. When the test button is released the contacts return to their former state.

Case 2) The plastic pip is broken-off (using an appropriate cutting tool). In this case, (in addition to the above function), when the test button is pushed and rotated, the contacts are latched in the operating state, and remain so until the test button is rotated back to its former position. In both cases ensure that the test button actuation is swift and decisive.

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Technical data

A

Insulation according to EN 61810-1		2 CO - 3 CO	2 NO - 3 NO	1 NO*	2 NO*
Nominal voltage of supply system	V AC	230/400	230/400	230/400	230/400
Rated insulation voltage	V AC	400	400	400	400
Pollution degree		3	3	3	3
Insulation between coil and contact set					
Type of insulation		Reinforced	Reinforced	Reinforced	Reinforced
Overvoltage category		III	III	III	III
Rated impulse voltage	kV (1.2/50 μs)	6	6	6	6
Dielectric strength	V AC	4,000	4,000	4,000	4,000
Insulation between adjacent contacts					
Type of insulation		Basic	Basic	—	Basic
Overvoltage category		III	III	—	III
Rated impulse voltage	kV (1.2/50 μs)	4	4	—	4
Dielectric strength	V AC	2,500	2,500	—	2,500
Insulation between open contacts					
Type of disconnection		Micro-disconnection	Full-disconnection	Full-disconnection	Full-disconnection**
Overvoltage category		—	III	III	II
Rated impulse voltage	kV (1.2/50 μs)	—	4	4	2.5
Dielectric strength	V AC/kV (1.2/50 μs)	1,500/2	2,500/4	3,000/4	2,000/2.5
Conducted disturbance immunity					
Burst (5…50)ns, 5 kHz, on A1 - A2		EN 61000-4-4		level 4 (4 kV)	
Surge (1.2/50 μs) on A1 - A2 (differential mode)		EN 61000-4-5		level 4 (4 kV)	
Other data					
Bounce time: NO/NC	ms	1/5 (changeover)	3/— (normally open)	3/— (normally open)	3/— (normally open)
Vibration resistance (10…150)Hz: NO/NC	g	20/8			
Shock resistance	g	15			

Power lost to the environment		2 pole (CO)	3 pole (CO)	2 pole (NO)	3 pole (NO)	1 pole (NO)*	2 pole (NO)*
without contact current	W	1.3	1.3	3	3	1.3	1.3
with rated current	W	3.3	4.3	5	6	3	3.3
Recommended distance between relays mounted on PCB	mm	≥ 5				—	

* Magnetic blow version
** Only in applictaions where over voltage category II is permitted. In applications of over voltage category III: Micro-disconnection.

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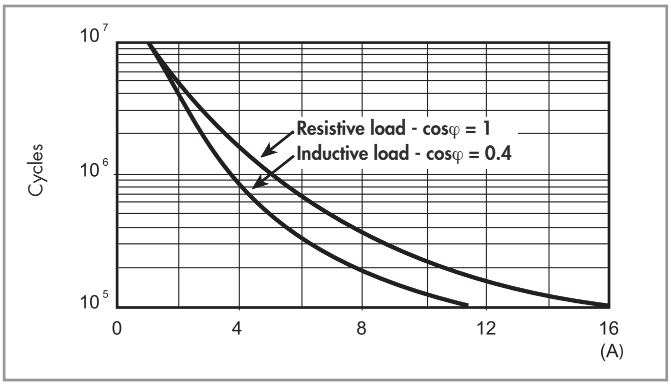
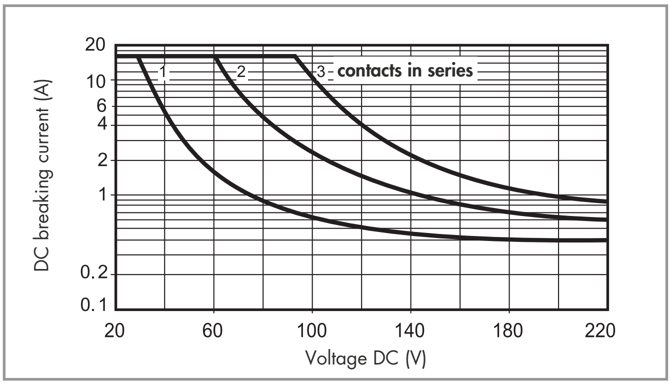
Contact specification

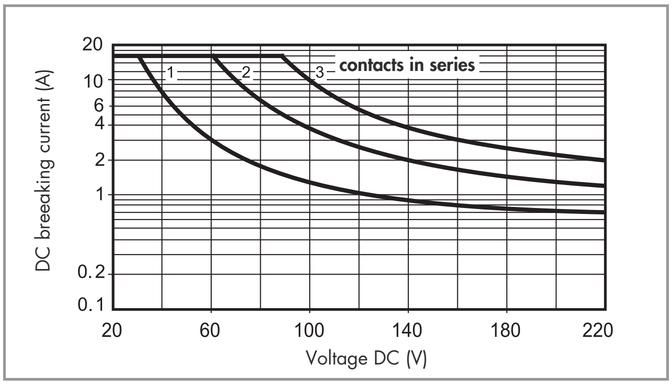
F 62 - Electrical life (AC) v contact current



H 62 - Maximum DC1 breaking capacity
Changeover contacts

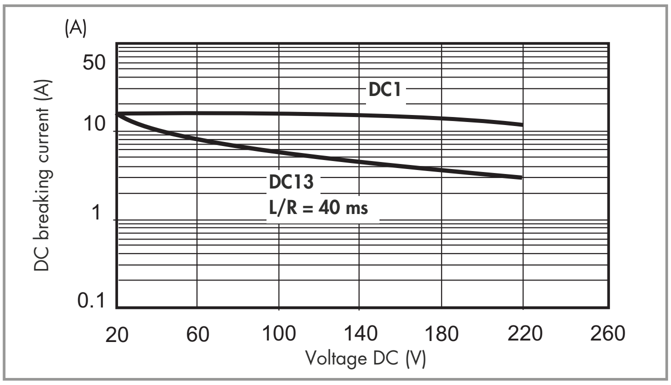


H 62 - Maximum DC1 breaking capacity
Normally open contacts

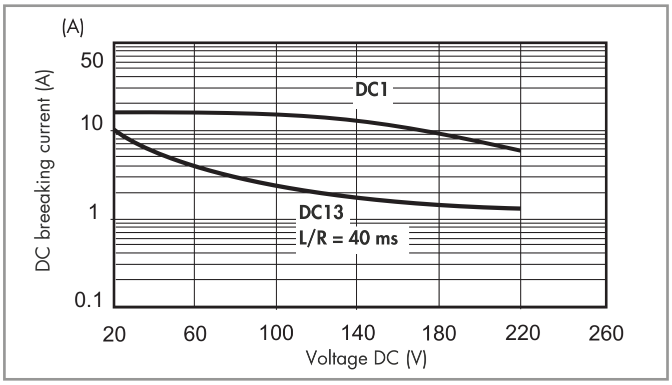


- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of ≥ 100·10³ can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load.
  Note: the release time of the load will be increased.

H 62 - Maximum DC breaking capacity 62.31.9.xxx.4800



H 62 - Maximum DC breaking capacity 62.32.9.xxx.4800



- When switching a resistive load (DC1), or a DC13 load with a diode in parallel to the load, having voltage and current values under the DC1 curve, an electrical life of ≥ 100·10³ can be expected. Note: the release time for the load will be increased.
- When switching a DC13 load without a diode in parallel to the load, the DC13 curve applies and an electrical life of ≥ 80·10³ can be expected.

A

Coil specifications

DC version data

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
6	9.006	4.8	6.6	28	214
12	9.012	9.6	13.2	110	109
24	9.024	19.2	26.4	445	54
48	9.048	38.4	52.8	1,770	27
60	9.060	48	66	2,760	21.7
110	9.110	88	121	9,420	11.7
125	9.125	100	138	12,000	10.4
220	9.220	176	242	37,300	5.8

AC version data

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N (50Hz)
V		V	V	Ω	mA
6	8.006	4.8	6.6	4.6	367
12	8.012	9.6	13.2	19	183
24	8.024	19.2	26.4	74	90
48	8.048	38.4	52.8	290	47
60	8.060	48	66	450	37
110	8.110	88	121	1,600	20
120	8.120	96	132	1,940	18.6
230	8.230	184	253	7,250	10.5
240	8.240	192	264	8,500	9.2
400	8.400	320	440	19,800	6

DC (NO/nPST-NO) version data - ≥ 3 mm

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
6	9.006	5.1	6.6	12	500
12	9.012	10.2	13.2	48	250
24	9.024	20.4	26.4	192	125
48	9.048	40.8	52.8	770	63
60	9.060	51	66	1,200	50
110	9.110	93.5	121	4,200	26
125	9.125	106	138	5,200	24
220	9.220	187	242	17,600	12.5

AC (NO/nPST-NO) version data - ≥ 3 mm

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N (50Hz)
V		V	V	Ω	mA
6	8.006	5.1	6.6	4	540
12	8.012	10.2	13.2	14	275
24	8.024	20.4	26.4	62	130
48	8.048	40.8	52.8	220	70
60	8.060	51	66	348	55
110	8.110	93.5	121	1,200	30
120	8.120	106	137	1,350	24
230	8.230	196	253	5,000	14
240	8.240	204	264	6,300	12.5
400	8.400	340	440	14,700	7.8

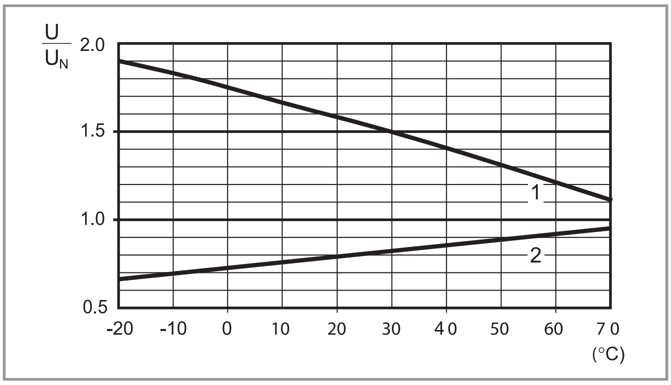
DC (NO/nPST-NO) magnetic blow version - > 2.1 mm or > 4.2 mm

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
6	9.006	5.1	6.6	28	214
12	9.012	10.2	13.2	110	109
24	9.024	20.4	26.4	445	54
48	9.048	40.8	52.8	1,770	27
60	9.060	51	66	2,760	21.7
110	9.110	93.5	121	9,420	11.7
125	9.125	106	138	12,000	10.4
220	9.220	154*	242	37,300	5.8

* Special version with U_{min} = 70 % U_N

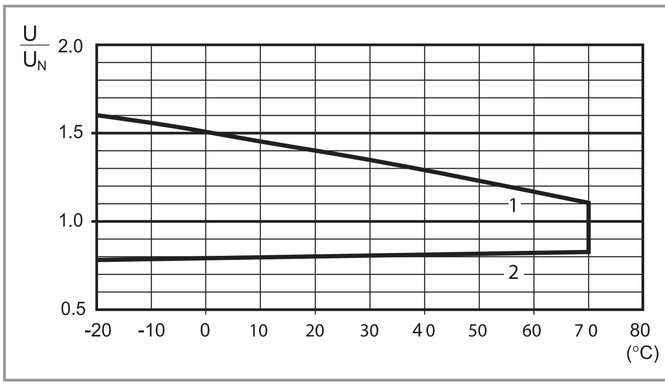
Coil specifications

R 62 - DC coil operating range v ambient temperature
Changeover contacts



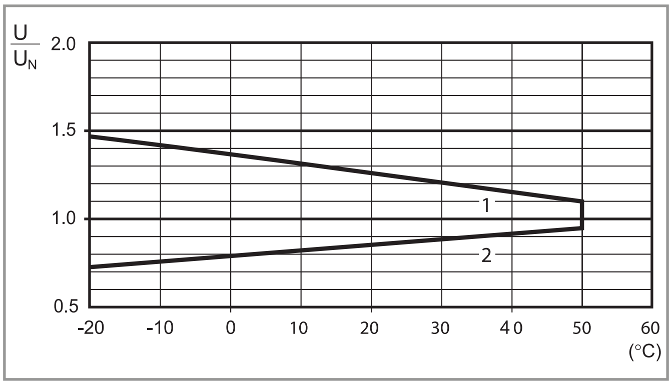
1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

R 62 - AC coil operating range v ambient temperature
Changeover contacts



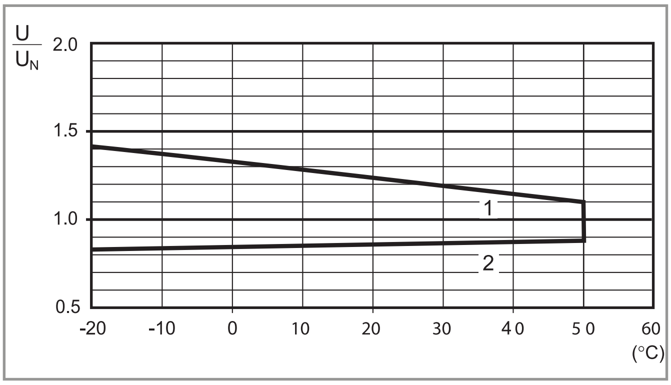
1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

R 62 - DC coil operating range v ambient temperature
Normally open contacts



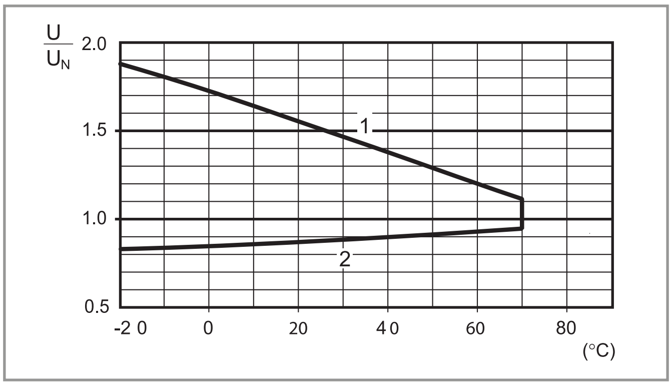
1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

R 62 - AC coil operating range v ambient temperature
Normally open contacts



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

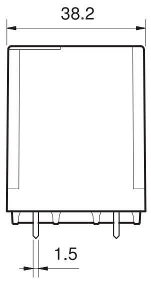
R 62 - DC coil operating range v ambient temperature
Normally open contacts - magnetic blow version



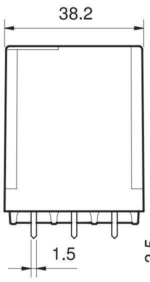
1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

Outline drawings

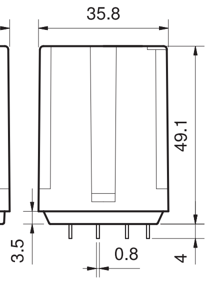
Type 62.22
62.22-0300



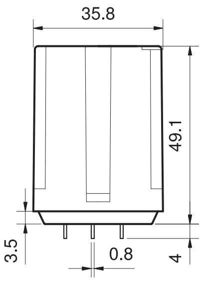
Type 62.23
62.23-0300



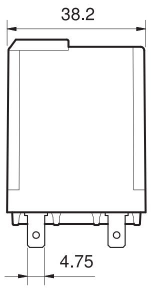
Type 62.2x



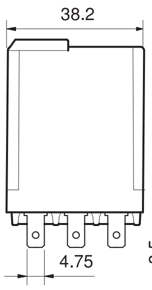
Type 62.2x-0300



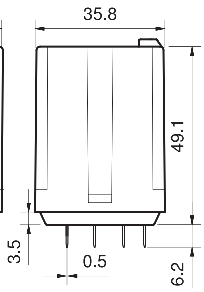
Type 62.32
62.32-0300



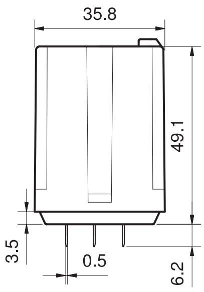
Type 62.33
62.33-0300



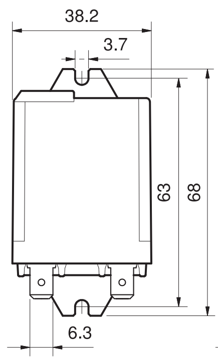
Type 62.3x



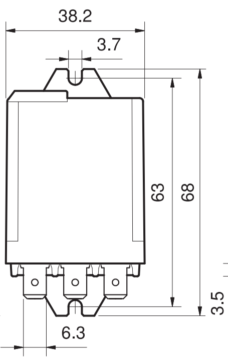
Type 62.3x-0300



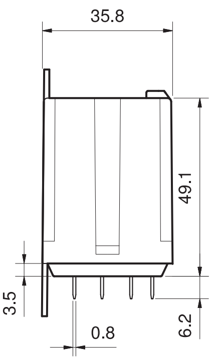
Type 62.82
62.82-0300



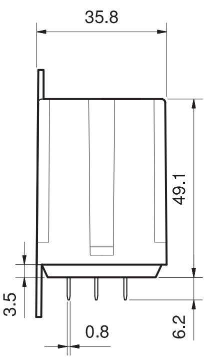
Type 62.83
62.83-0300



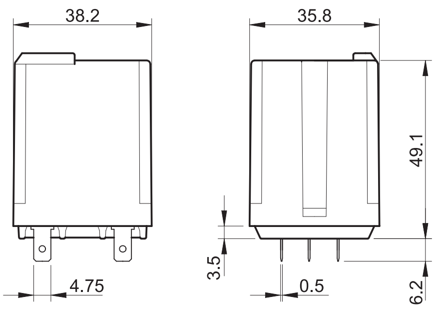
Type 62.8x



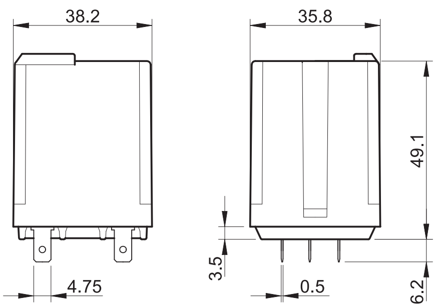
Type 62.8x-0300



Type 62.31-4800



Type 62.32-4800

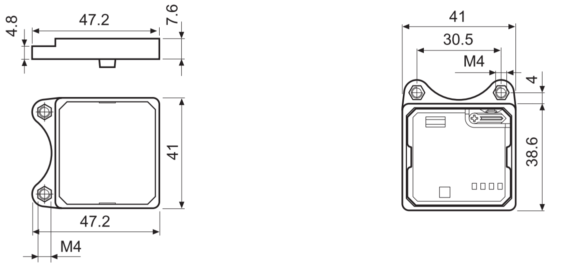


Accessories

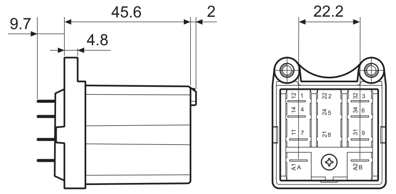
062.10

062.10 with relay

Mounting adaptor for types 62.3x and 62.8x.xxxx.xxx9 (M4)	062.10



062.10

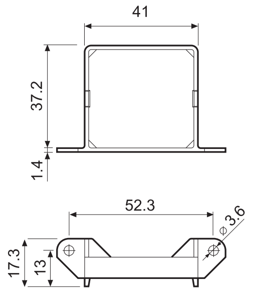


062.10 with relay

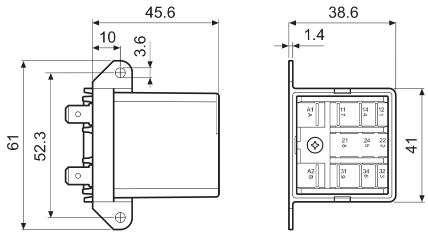
062.60

062.60 with relay

Flange mounting adaptor for types 62.3x and 62.8x.xxxx.xxx9	062.60



062.60

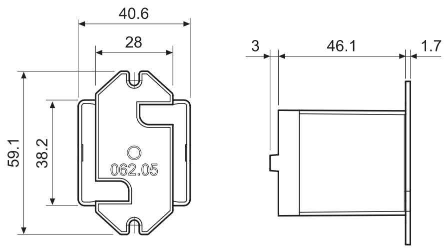


062.60 with relay

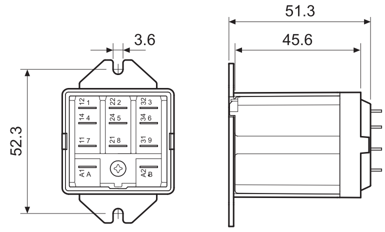
062.05

062.05 with relay

Top flange mount for types 62.3x and 62.8x.xxxx.xxx9	062.05



062.05

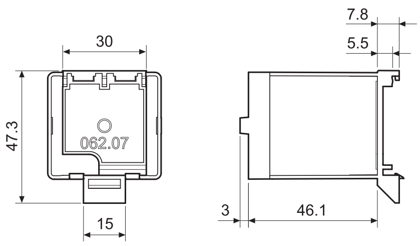


062.05 with relay

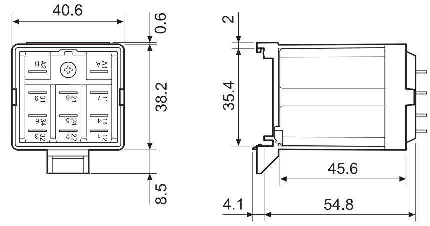
062.07

062.07 with relay

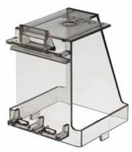
Top 35 mm rail (EN 60715) mount for types 62.3x and 62.8x.xxxx.xxx9	062.07



062.07



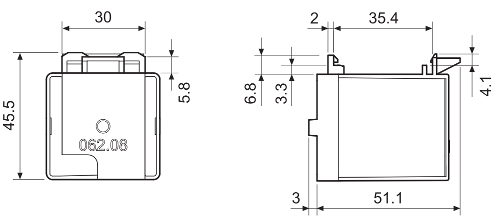
062.07 with relay



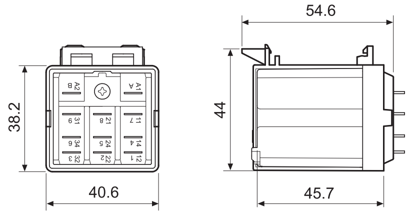
062.08

062.08 with relay

Rear 35 mm rail (EN 60715) mount for types 62.3x and 62.8x.xxxx.xxx9	062.08



062.08



062.08 with relay

Sheet of marker tags for 62 series relays, plastic, 72 tags, 6x12 mm	060.72

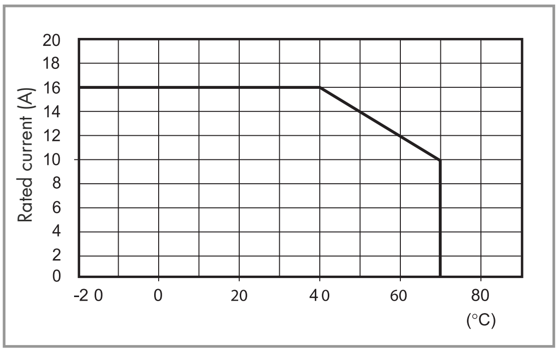
060.72

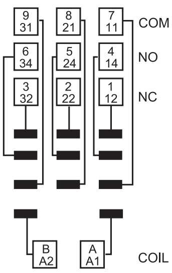
92.03

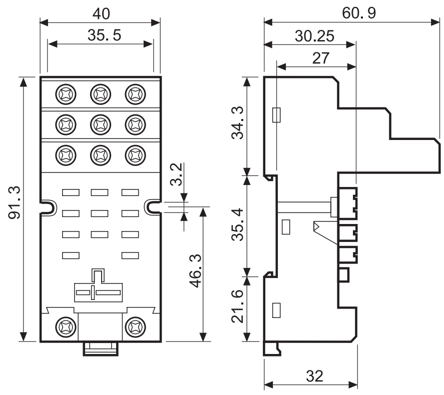
Approvals
(according to type):

Screw terminal (Box clamp) socket panel or 35 mm rail (EN 60715) mount		92.03 Blue	92.03.0 Black
For relay type		62.31, 62.32, 62.33	
Accessories			
Metal retaining clip (supplied with socket - packaging code SMA)		092.71	
Identification tag		092.00.2	
Modules (see table below)		99.02	
Timer modules (see table below)		86.00, 86.30	
Technical data			
Rated values		16 A - 250 V	
Dielectric strength		6 kV (1.2/50 μs) between coil and contacts	
Protection category		IP 20	
Ambient temperature	°C	–40…+70 (see diagram L92)	
Screw torque	Nm	0.8	
Wire strip length	mm	10	
Max. wire size for 92.03 socket		solid wire	stranded wire
	mm^2	1x10 / 2x4	1x6 / 2x4
	AWG	1x8 / 2x12	1x10 / 2x12

L 92 - Rated current vs ambient temperature







86.00

86.30

86 series timer modules	
Multi-voltage: (12…240)V AC/DC; Multi-functions: AI, DI, SW, BE, CE, DE, EE, FE; (0.05s…100h)	86.00.0.240.0000
(12…24)V AC/DC; Bi-function: AI, DI; (0.05s…100h)	86.30.0.024.0000
(110…125)V AC; Bi-function: AI, DI; (0.05s…100h)	86.30.8.120.0000
(230…240)V AC; Bi-function: AI, DI; (0.05s…100h)	86.30.8.240.0000

Approvals
(according to type):

99.02

Approvals
(according to type):

DC Modules with
non-standard polarity
(+A2) on request.

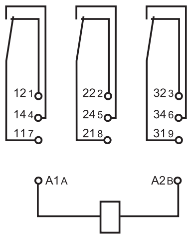
99.02 coil indication and EMC suppression modules for 92.03 socket		
Diode (+A1, standard polarity)	(6…220)V DC	99.02.3.000.00
LED	(6…24)V DC/AC	99.02.0.024.59
LED	(28…60)V DC/AC	99.02.0.060.59
LED	(110…240)V DC/AC	99.02.0.230.59
LED + Diode (+A1, standard polarity)	(6…24)V DC	99.02.9.024.99
LED + Diode (+A1, standard polarity)	(28…60)V DC	99.02.9.060.99
LED + Diode (+A1, standard polarity)	(110…220)V DC	99.02.9.220.99
LED + Varistor	(6…24)V DC/AC	99.02.0.024.98
LED + Varistor	(28…60)V DC/AC	99.02.0.060.98
LED + Varistor	(110…240)V DC/AC	99.02.0.230.98
RC circuit	(6…24)V DC/AC	99.02.0.024.09
RC circuit	(28…60)V DC/AC	99.02.0.060.09
RC circuit	(110…240)V DC/AC	99.02.0.230.09
Residual current by-pass	(110…240)V AC	99.02.8.230.07

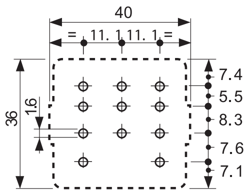
A

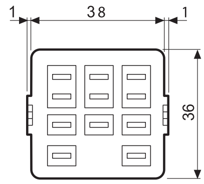
92.13

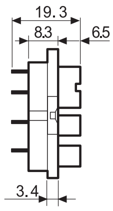
Approvals
(according to type):

PCB socket	92.13 (blue)	92.13.0 (black)
For relay type	62.31, 62.32, 62.33	
Accessories		
Metal retaining clip (supplied with socket - packaging code SMA)	092.54	
Technical data		
Rated values	10 A - 250 V	
Dielectric strength	2.5 kV AC	
Ambient temperature °C	–40…+70	







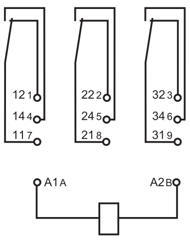


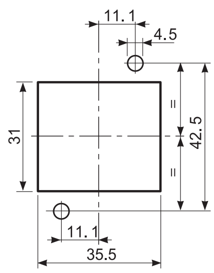
62.3x plug on 92.13 is 63.3 mm high

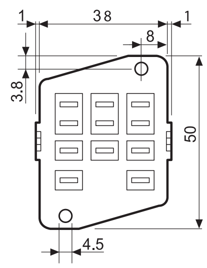
92.33

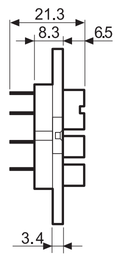
Approvals
(according to type):

Panel mount solder socket mounted with M3 screw	92.33 (blue)
For relay type	62.31, 62.32, 62.33
Accessories	
Metal retaining clip (supplied with socket - packaging code SMA)	092.54
Technical data	
Rated values	10 A - 250 V
Dielectric strength	2.5 kV AC
Ambient temperature °C	–40…+70









Packaging code

How to code and identify retaining clip and packaging options for sockets.

Example:

9	2	.	0	3	S	M	A

A Standard packaging

SM Metal retaining clip

9	2	.	0	3			

Without retaining clip

Features

20 A Power relays
1 NO + 1 NC (SPST-NO + SPST-NC)

65.31 **Flange mount**
Faston 250 connections

65.61 **PCB mount**

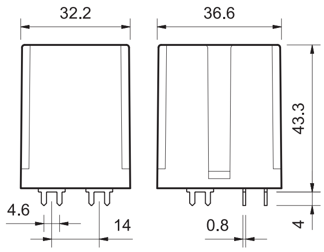
- AC coils & DC coils
- Cadmium Free option available

65.31

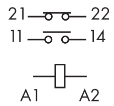
- 20 A rated contacts
- Flange mount/Faston 250 (6.3x0.8 mm) connection

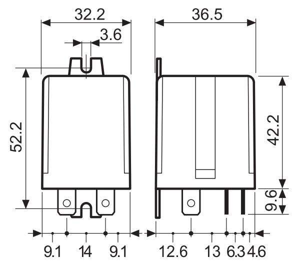
65.61

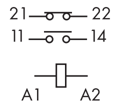
- 20 A rated contacts
- PCB mount - bifurcated terminals

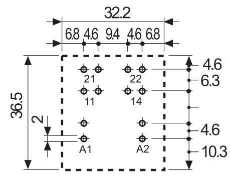


65.61









Copper side view

*With the $AgSnO_2$ material the maximum peak current is 120 A - 5 ms on NO contact.

For UL ratings see:
"General technical information" page V

	65.31	65.61
Contact specification		
Contact configuration	1NO+1NC (SPST-NO+SPST-NC)	1NO+1NC (SPST-NO+SPST-NC)
Rated current/Maximum peak current A	20/40*	20/40*
Rated voltage/Maximum switching voltage V AC	250/400	250/400
Rated load AC1 VA	5,000	5,000
Rated load AC15 (230 V AC) VA	1,000	1,000
Single phase motor rating (230 V AC) kW	1.1	1.1
Breaking capacity DC1: 30/110/220 V A	20/0.8/0.5	20/0.8/0.5
Minimum switching load mW (V/mA)	1,000 (10/10)	1,000 (10/10)
Standard contact material	AgCdO	AgCdO
Coil specification		
Nominal voltage (U_N) V AC (50/60 Hz)	6 - 12 - 24 - 48 - 60 - 110 - 120 - 230 - 240 - 400	
V DC	6 - 12 - 24 - 48 - 60 - 110 - 125 - 220	
Rated power AC/DC VA (50 Hz)/W	2.2/1.3	2.2/1.3
Operating range AC	$(0.8...1.1)U_N$	$(0.8...1.1)U_N$
DC	$(0.85...1.1)U_N$	$(0.85...1.1)U_N$
Holding voltage AC/DC	$0.8\ U_N/0.6\ U_N$	$0.8\ U_N/0.6\ U_N$
Must drop-out voltage AC/DC	$0.2\ U_N/0.1\ U_N$	$0.2\ U_N/0.1\ U_N$
Technical data		
Mechanical life AC/DC cycles	$10 \cdot 10^6/30 \cdot 10^6$	$10 \cdot 10^6/30 \cdot 10^6$
Electrical life at rated load AC1 cycles	$80 \cdot 10^3$	$80 \cdot 10^3$
Operate/release time ms	10/12	10/12
Insulation between coil and contacts (1.2/50 μs) kV	4	4
Dielectric strength between open contacts V AC	1,500	1,500
Ambient temperature range °C	–40…+75	–40…+75
Environmental protection	RT I	RT I
Approvals (according to type)		

65 Series - Power relays 20 - 30 A

Features

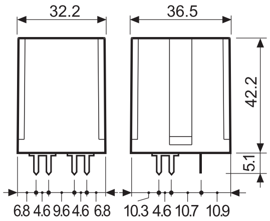
30 A Power relays
1 NO (SPST-NO)

65.31-0300 Flange mount
Faston 250 connections
65.61-0300 PCB mount

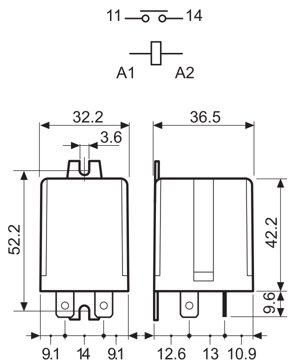
- ≥ 3 mm contact gap
- AC coils & DC coils
- Cadmium Free option available

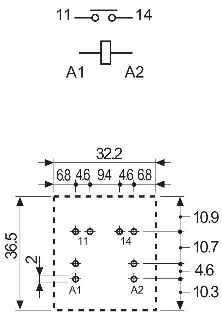
A

65.31-0300	65.61-0300
	
• 30 A rated contacts • Flange mount/Faston 250 (6.3x0.8 mm) connection	• 30 A rated contacts • PCB mount - bifurcated terminals



65.61-0300





Copper side view

* Distance between contacts ≥ 3 mm (EN 60335-1).
** With the $AgSnO_2$ material the maximum peak current is 120 A - 5 ms on NO contact.

For UL ratings see:
"General technical information" page V

		65.31-0300	65.61-0300
Contact specification			
Contact configuration		1 NO (SPST-NO), ≥ 3 mm*	1 NO (SPST-NO), ≥ 3 mm*
Rated current/Maximum peak current	A	30/50**	30/50**
Rated voltage/Maximum switching voltage	V AC	250/400	250/400
Rated load AC1	VA	7,500	7,500
Rated load AC15 (230 V AC)	VA	1,250	1,250
Single phase motor rating (230 V AC)	kW	1.5	1.5
Breaking capacity DC1: 30/110/220 V	A	30/1.1/0.7	30/1.1/0.7
Minimum switching load	mW (V/mA)	1,000 (10/10)	1,000 (10/10)
Standard contact material		AgCdO	AgCdO
Coil specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	6 - 12 - 24 - 48 - 60 - 110 - 120 - 230 - 240 - 400	
	V DC	6 - 12 - 24 - 48 - 60 - 110 -125 - 220	
Rated power AC/DC	VA (50 Hz)/W	2.2/1.3	2.2/1.3
Operating range	AC	$(0.8\ldots1.1)U_N$	$(0.8\ldots1.1)U_N$
	DC	$(0.85\ldots1.1)U_N$	$(0.85\ldots1.1)U_N$
Holding voltage	AC/DC	$0.8\ U_N/0.6\ U_N$	$0.8\ U_N/0.6\ U_N$
Must drop-out voltage	AC/DC	$0.2\ U_N/0.1\ U_N$	$0.2\ U_N/0.1\ U_N$
Technical data			
Mechanical life AC/DC	cycles	$10 \cdot 10^6/30 \cdot 10^6$	$10 \cdot 10^6/30 \cdot 10^6$
Electrical life at rated load AC1	cycles	$50 \cdot 10^3$	$50 \cdot 10^3$
Operate/release time	ms	15/4	15/4
Insulation between coil and contacts (1.2/50 μs)	kV	4	4
Dielectric strength between open contacts	V AC	2,500	2,500
Ambient temperature range	°C	–40…+75	–40…+75
Environmental protection		RT I	RT I
Approvals (according to type)			

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Ordering information

Example: 65 series power relay, PCB with bifurcated terminals, 1 NO + 1 NC (SPST-NO + SPST-NC) contact, 12 V DC coil.

6 5	.	6	1	.	9	.	0 1 2	.	0 (A)	0 (B)	0 (C)	0 (D)

Series

Type
3 = Faston 250 (6.3x0.8 mm) with rear flange mount
6 = PCB with bifurcated terminals

No. of poles
1 = 1 NO + 1 NC (SPST-NO + SPST-NC)

Coil version
8 = AC (50/60 Hz)
9 = DC

Coil voltage
See coil specifications

A: Contact material
0 = Standard AgCdO
4 = $AgSnO_2$

B: Contact circuit
0 = 1 NO + 1 NC (SPST-NO + SPST-NC)
3 = NO (≥ 3 mm contact gap)

C: Options
0 = None

D: Special versions
0 = Standard
9 = Type 65.31 without rear flange mount

Selecting features and options: only combinations in the same row are possible.
Preferred selections for best availability are shown in **bold.**

Type	Coil version	A	B	C	D
65.31	AC-DC	**0** - 4	**0** - 3	**0**	**0** - 9
65.61	AC-DC	**0** - 4	**0** - 3	**0**	**0**

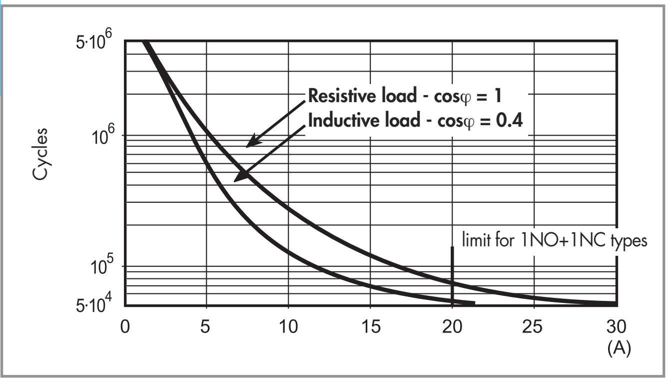
Technical data

Insulation according to EN 61810-1					
		1 NO + 1 NC		**1 NO**	
Nominal voltage supply system	V AC	230/400		230/400	
Rated insulation voltage	V AC	250	400	250	400
Pollution degree		3	2	3	2
Insulation between coil and contact set					
Type of insulation		Basic		Basic	
Overvoltage category		III		III	
Rated impulse voltage	kV (1.2/50 μs)	4		4	
Dielectric strength	V AC	2,500		2,500	
Insulation between open contacts					
Type of disconnection		Micro-disconnection		Full-disconnection	
Overvoltage category		—		III	
Rated impulse voltage	kV (1.2/50 μs)	—		4	
Dielectric strength	V AC/kV (1.2/50 μs)	1,500/2		2,500/4	
Conducted disturbance immunity					
Burst (5…50)ns, 5 kHz, on A1 - A2		EN 61000-4-4		level 4 (4 kV)	
Surge (1.2/50 μs) on A1 - A2 (differential mode)		EN 61000-4-5		level 4 (4 kV)	
Other data					
Bounce time: NO/NC	ms	5/6 (1 normally open + 1 normally closed)		7/— (normally open)	
Vibration resistance (10…150)Hz: NO/NC	g	20/13			
Shock resistance	g	20			
Power lost to the environment — without contact current	W	1.3			
Power lost to the environment — with rated current	W	2.1 (65.31, 65.61)		3.1 (65.31/.61.0300)	
Recommended distance between relays mounted on PCB	mm	≥ 5			

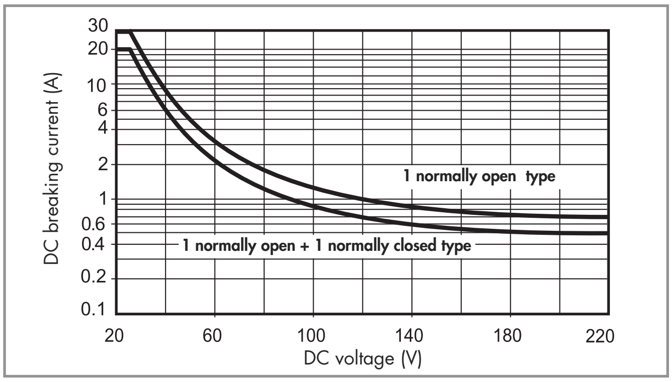
A

Contact specification

F 65 - Electrical life (AC) v contact current



H 65 - Maximum DC1 breaking capacity



- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of ≥ $80 \cdot 10^3$ can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load. Note: the release time for the load will be increased.

Coil specifications

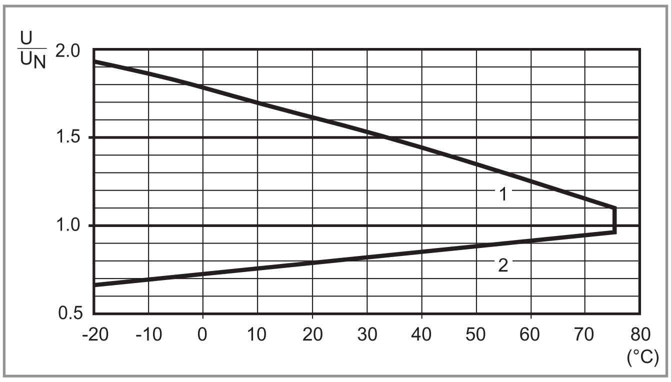
DC coil data

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
6	**9**.006	5.1	6.6	28	214
12	**9**.012	10.2	13.2	110	109
24	**9**.024	20.4	26.4	445	54
48	**9**.048	40.8	52.8	1,770	27.1
60	**9**.060	51	66	2,760	21.7
110	**9**.110	93.5	121	9,420	11.7
125	**9**.125	106	138	12,000	10.4
220	**9**.220	187	242	37,300	5.8

AC coil data

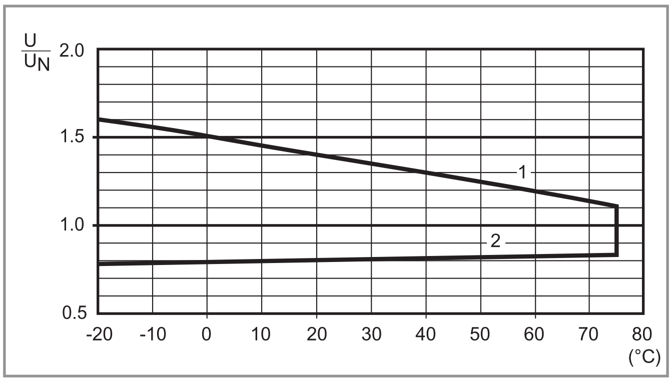
Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N (50Hz)
V		V	V	Ω	mA
6	**8**.006	4.8	6.6	4.6	367
12	**8**.012	9.6	13.2	19	183
24	**8**.024	19.2	26.4	74	90
48	**8**.048	38.4	52.8	290	47
60	**8**.060	48	66	450	37
110	**8**.110	88	121	1,600	20
120	**8**.120	96	132	1,940	18.6
230	**8**.230	184	253	7,250	10.5
240	**8**.240	192	264	8,500	9.2
400	**8**.400	320	440	19,800	6

R 65 - DC coil operating range v ambient temperature



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

R 65 - AC coil operating range v ambient temperature



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

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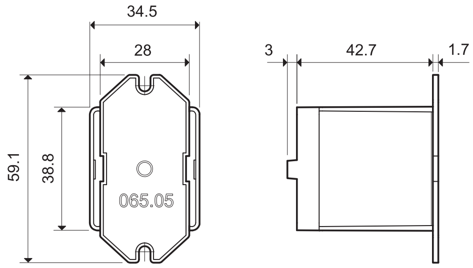
Accessories


065.05


065.05 with relay

Top flange mount for types 65.31.xxxx.xxx9	065.05



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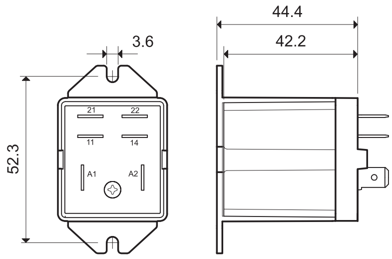
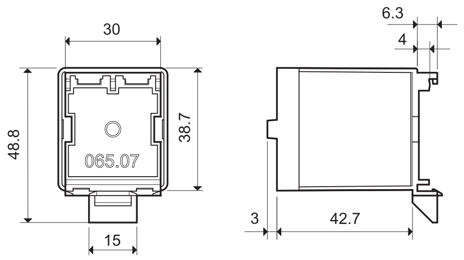


065.05 with relay


065.07


065.07 with relay

Top 35 mm rail (EN 60715) mount for types 65.31.xxxx.xxx9	065.07



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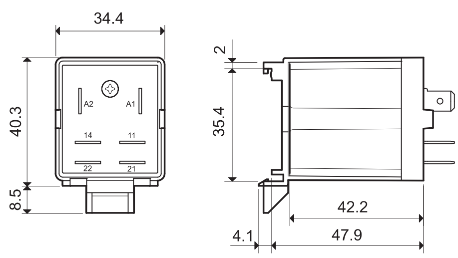
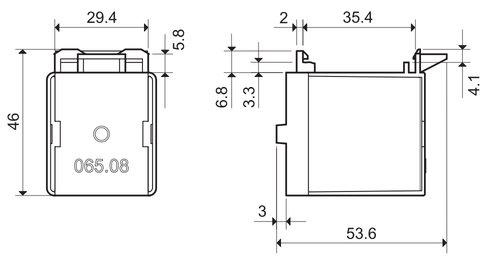


065.07 with relay


065.08


065.08 with relay

Rear 35 mm rail (EN 60715) mount for types 65.31.xxxx.xxx9	065.08



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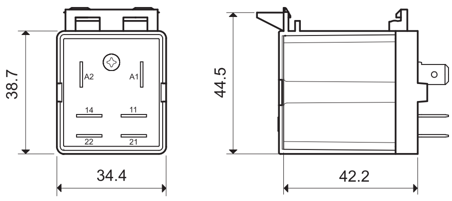


065.08 with relay

A

Features

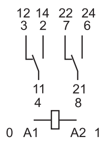
2 Pole Changeover (DPDT)
30 A Power relay

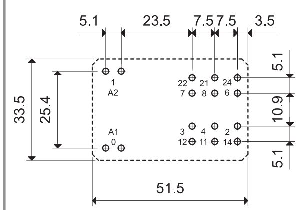
66.22	**PCB connections & mount**
66.82	**Faston 250 connections - Flange mount**

- Reinforced insulation between coil and contacts according to EN 60335-1; 8 mm creepage and clearance distances
- AC coils & DC coils
- Cadmium Free option available
- ATEX compliant (EX nC) option available

66.22

- 30 A rated contacts
- PCB mount - bifurcated terminals

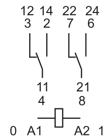


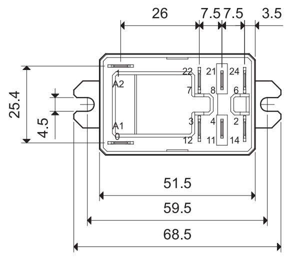


Copper side view

66.82

- 30 A rated contacts
- Flange mount
- Faston 250 connections





For outline drawing see page 7

For UL ratings see:
"General technical information" page V

		66.22	66.82
Contact specification			
Contact configuration		2 CO (DPDT)	2 CO (DPDT)
Rated current/Maximum peak current	A	30/50 (NO) - 10/20 (NC)	30/50 (NO) - 10/20 (NC)
Rated voltage/Maximum switching voltage	V AC	250/440	250/440
Rated load AC1	VA	7,500 (NO) - 2,500 (NC)	7,500 (NO) - 2,500 (NC)
Rated load AC15 (230 V AC)	VA	1,200 (NO)	1,200 (NO)
Single phase motor rating (230 V AC)	kW	1.5 (NO)	1.5 (NO)
Breaking capacity DC1: 30/110/220 V	A	25/0.7/0.3 (NO)	25/0.7/0.3 (NO)
Minimum switching load	mW (V/mA)	1,000 (10/10)	1,000 (10/10)
Standard contact material		AgCdO	AgCdO
Coil specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	6 - 12 - 24 - 110/115 - 120/125 - 230 - 240	
	V DC	6 - 12 - 24 - 110 - 125	
Rated power AC/DC	VA (50 Hz)/W	3.6/1.7	3.6/1.7
Operating range	AC	$(0.8…1.1)U_N$	$(0.8…1.1)U_N$
	DC	$(0.8…1.1)U_N$	$(0.8…1.1)U_N$
Holding voltage	AC/DC	$0.8\ U_N/0.5\ U_N$	$0.8\ U_N/0.5\ U_N$
Must drop-out voltage	AC/DC	$0.2\ U_N/0.1\ U_N$	$0.2\ U_N/0.1\ U_N$
Technical data			
Mechanical life AC/DC	cycles	$10 \cdot 10^6$	$10 \cdot 10^6$
Electrical life at rated load AC1	cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Operate/release time	ms	8/15	8/15
Insulation between coil and contacts (1.2/50 µs)	kV	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts	V AC	1,500	1,500
Ambient temperature range	°C	–40…+70	–40…+70
Environmental protection		RT II	RT II
Approvals (according to type)		RINA	

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A

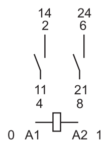
Features

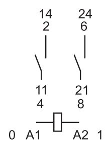
2 Pole NO (DPST-NO)
30 A Power relay

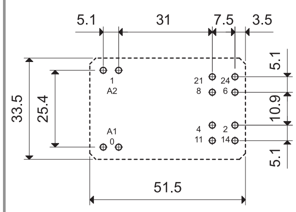
66.22-x300 **PCB mount**
66.82-x300 **Faston 250 connections - Flange mount**

- Reinforced insulation between coil and contacts according to EN 60335-1; 8 mm creepage and clearance distances
- AC coils & DC coils
- Cadmium Free option available
- ATEX compliant (EX nC) option available

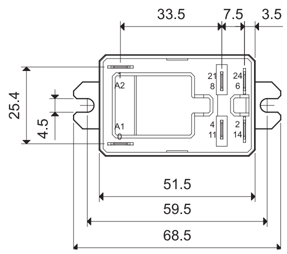
66.22-x30x	**66.82-x30x**
	
• 30 A rated contacts • PCB mount - bifurcated terminals	• 30 A rated contacts • Flange mount • Faston 250 connections







Copper side view



For outline drawing see page 7

For UL ratings see:
"General technical information" page V

		66.22-x30x	66.82-x30x
Contact specification			
Contact configuration		2 NO (DPST-NO)	2 NO (DPST-NO)
Rated current/Maximum peak current	A	30/50	30/50
Rated voltage/Maximum switching voltage	V AC	250/440	250/440
Rated load AC1	VA	7,500	7,500
Rated load AC15 (230 V AC)	VA	1,200	1,200
Single phase motor rating (230 V AC)	kW	1.5	1.5
Breaking capacity DC1: 30/110/220 V	A	25/0.7/0.3	25/0.7/0.3
Minimum switching load	mW (V/mA)	1,000 (10/10)	1,000 (10/10)
Standard contact material		AgCdO	AgCdO
Coil specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	6 - 12 - 24 - 110/115 - 120/125 - 230 - 240	
	V DC	6 - 12 - 24 - 110 -125	
Rated power AC/DC	VA (50 Hz)/W	3.6/1.7	3.6/1.7
Operating range	AC	$(0.8\ldots1.1)U_N$	$(0.8\ldots1.1)U_N$
	DC	$(0.8\ldots1.1)U_N$	$(0.8\ldots1.1)U_N$
Holding voltage	AC/DC	$0.8\ U_N/0.5\ U_N$	$0.8\ U_N/0.5\ U_N$
Must drop-out voltage	AC/DC	$0.2\ U_N/0.1\ U_N$	$0.2\ U_N/0.1\ U_N$
Technical data			
Mechanical life AC/DC	cycles	$10 \cdot 10^6$	$10 \cdot 10^6$
Electrical life at rated load AC1	cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Operate/release time	ms	8/10	8/10
Insulation between coil and contacts (1.2/50 μs)	kV	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts	V AC	1,500	1,500
Ambient temperature range	°C	–40…+70	–40…+70
Environmental protection		RT II	RT II
Approvals (according to type)		RINA	

Features

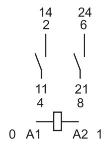
2 Pole NO (DPST-NO), ≥1.5mm contact gap
30 A Power relay

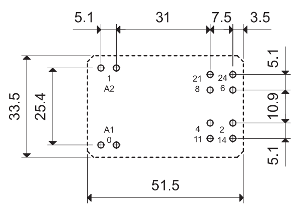
66.22-x600	**PCB mount**
66.22-x600S	**PCB mount - 5 mm gap between PCB and relay base**
66.82-x600	**Faston 250 connections - Flange mount**

- ≥1.5 mm contact gap (according to VDE 0126-1-1 for solar inverter applications)
- Reinforced insulation between coil and contacts according to EN 60335-1; 8 mm creepage and clearance distances
- Wash tight version (RT III) available
- DC coils
- Cadmium Free option available
- ATEX compliant (EX nC) option available

NEW 66.22-x60x

- PCB mount - bifurcated terminals

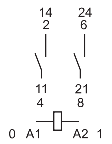


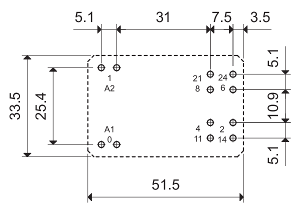


Copper side view

NEW 66.22-x60xS

- PCB mount - bifurcated terminals
- 5 mm gap between PCB and relay base

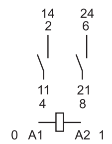


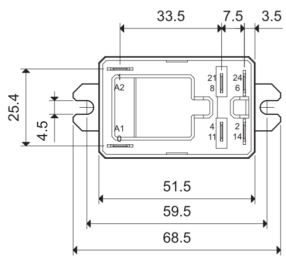


Copper side view

NEW 66.82-x60x

- Flange mount
- Faston 250 connections





For outline drawing see page 7

For UL ratings see:
"General technical information" page V

		66.22-x60x	66.22-x60xS	66.82-x60x
Contact specification				
Contact configuration		2 NO (DPST-NO)	2 NO (DPST-NO)	2 NO (DPST-NO)
Rated current/Maximum peak current	A	30/50	30/50	30/50
Rated voltage/Maximum switching voltage	V AC	250/440	250/440	250/440
Rated load AC1	VA	7,500	7,500	7,500
Rated load AC15 (230 V AC)	VA	1,200	1,200	1,200
Single phase motor rating (230 V AC)	kW	1.5	1.5	1.5
Breaking capacity DC1: 30/110/220 V	A	25/1.2/0.5	25/1.2/0.5	25/1.2/0.5
Minimum switching load	mW (V/mA)	1,000 (10/10)	1,000 (10/10)	1,000 (10/10)
Standard contact material		AgCdO	AgCdO	AgCdO
Coil specification				
Nominal voltage (U_N)	V AC (50/60 Hz)	—		
	V DC	6 - 12 - 24 - 110 -125		
Rated power AC/DC	VA (50 Hz)/W	—/1.7	—/1.7	—/1.7
Operating range	AC	—	—	—
	DC	(0.8…1.1)U_N	(0.7…1.1)U_N	(0.8…1.1)U_N
Holding voltage	AC/DC	—/0.5 U_N	—/0.5 U_N	—/0.5 U_N
Must drop-out voltage	AC/DC	—/0.1 U_N	—/0.1 U_N	—/0.1 U_N
Technical data				
Mechanical life	cycles	$10 \cdot 10^6$	$10 \cdot 10^6$	$10 \cdot 10^6$
Electrical life at rated load AC1	cycles	$100 \cdot 10^3$	$100 \cdot 10^3$	$100 \cdot 10^3$
Operate/release time	ms	15/4	15/4	15/4
Insulation between coil and contacts (1.2/50 μs)	kV	6 (8 mm)	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts	V AC	2,500	2,500	2,500
Ambient temperature range	°C	–40…+70	–40…+70	–40…+70
Environmental protection		RT II	RT II	RT II
Approvals (according to type)				

A

Ordering information

Example: 66 series relay, Faston 250 (6.3x0.8 mm) with top flange mount, 2 CO (DPDT) 30 A contacts, 24 V DC coil.

					A	B	C	D	
6 6	. 8	2	. 9	. 0 2 4	. 0	0	0	0	

Series

Type
2 = PCB
8 = Faston 250 (6.3x0.8 mm) with top flange mount

No. of poles
2 = 2 pole 30 A (versions 0, 1)
2 = 2 pole 25 A (version 3)

Coil version
8 = AC (50/60 Hz)
9 = DC

Coil voltage
See coil specifications

A: Contact material
0 = Standard AgCdO
1 = AgNi

B: Contact circuit
0 = CO (nPDT)
3 = NO (nPST)
6 = NO (nPST), ≥1.5 mm contact gap

S = PCB version with 5 mm gap between PCB and relay base (only 66.22)

D: Special versions
0 = Standard
1 = Wash tight (RT III)
3 = ATEX compliant (Ex nC)

C: Options
0 = None

Selecting features and options: only combinations in the same row are possible.
Preferred selections for best availability are shown in **bold**.

Type	Coil version	A	B	C	D
66.22	AC-DC	**0** - 1	**0** - 3	**0**	0 - **1**
	DC	**0** - 1	**6**	**0**	0 - **1**
66.22....S	DC	**0** - 1	**6**	**0**	0 - **1** - 3
66.82	AC-DC	**0** - 1	**0** - 3	**0**	**0** - 1 - 3
	DC	**0** - 1	**6**	**0**	**0** - 1 - 3

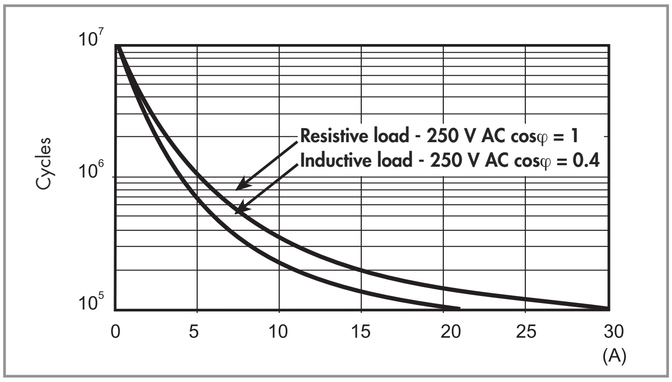
Technical data

Insulation according to EN 61810-1			
Nominal voltage of supply system	V AC	230/400	
Rated insulation voltage	V AC	400	
Pollution degree		3	
Insulation between coil and contact set			
Type of insulation		Reinforced (8 mm)	
Overvoltage category		III	
Rated impulse voltage	kV (1.2/50 μs)	6	
Dielectric strength	V AC	4,000	
Insulation between adjacent contacts			
Type of insulation		Basic	
Overvoltage category		III	
Rated impulse voltage	kV (1.2/50 μs)	4	
Dielectric strength	V AC	2,500	
Insulation between open contacts		**2 CO**	**2 NO, ≥1.5mm (x60x version)**
Type of disconnection		Micro-disconnection	Full-disconnection *
Overvoltage category		—	II
Rated impulse voltage	kV (1.2/50 μs)	—	2.5
Dielectric strength	V AC/kV (1.2/50 μs)	1,500/2	2,500/3
Conducted disturbance immunity			
Burst (5…50)ns, 5 kHz, on A1 - A2		EN 61000-4-4	level 4 (4 kV)
Surge (1.2/50 μs) on A1 - A2 (differential mode)		EN 61000-4-5	level 4 (4 kV)
Other data			
Bounce time: NO/NC	ms	7/10	
Vibration resistance (10…150)Hz: NO/NC	g	20/19	
Shock resistance	g	20	
Power lost to the environment — without contact current	W	2.3	
Power lost to the environment — with rated current	W	5	
Recommended distance between relays mounted on PCB	mm	≥ 10	

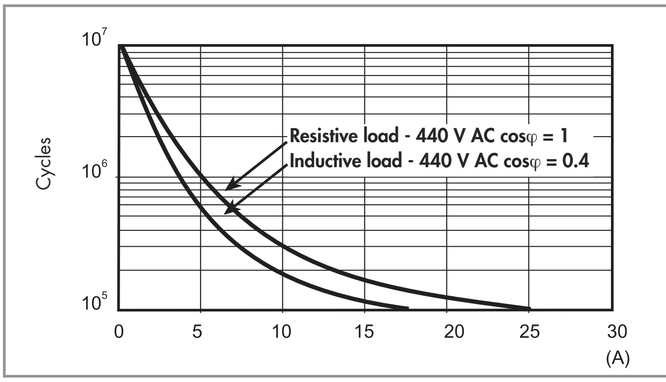
* Only in applications where over voltage category II is permitted. In applications of over voltage category III: Micro-disconnection.

Contact specification

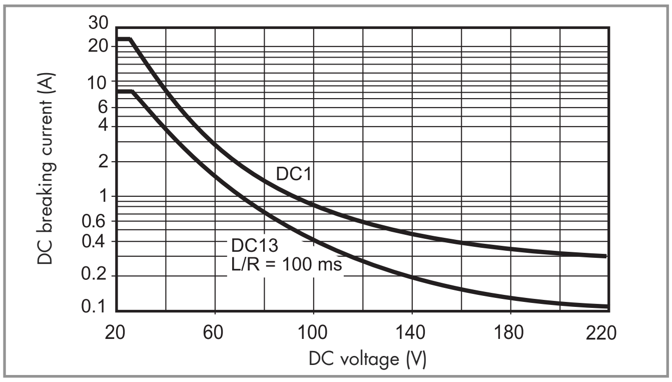
F 66 - Electrical life (AC) v contact current
250 V (normally open contact)



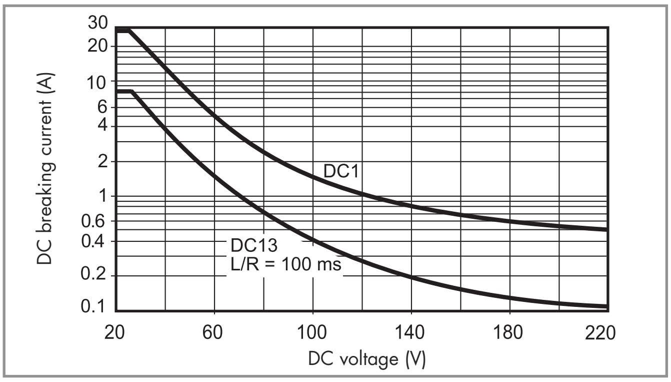
F 66 - Electrical life (AC) v contact current
440 V (normally open contact)



H 66 - Maximum DC breaking capacity



H 66 - Maximum DC breaking capacity, x60x versions (>1.5mm contact gap)



- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of ≥ $100 \cdot 10^3$ can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load.
  Note: the release time for the load will be increased.

Coil specifications

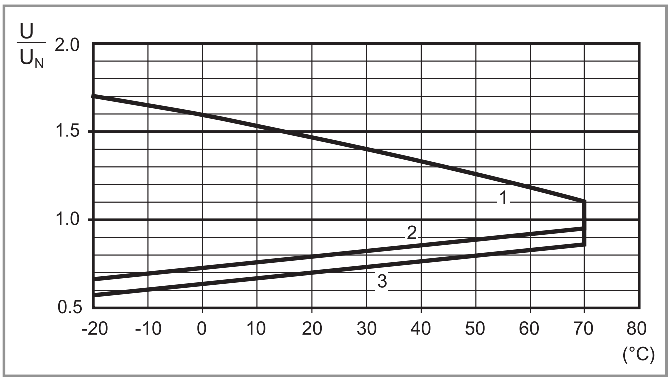
DC coil data

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
6	**9**.006	4.8	6.6	21	283
12	**9**.012	9.6	13.2	85	141
24	**9**.024	19.2	26.4	340	70.5
110	**9**.110	88	121	7,000	15.7
125	**9**.125	100	138	9,200	13.6

AC coil data

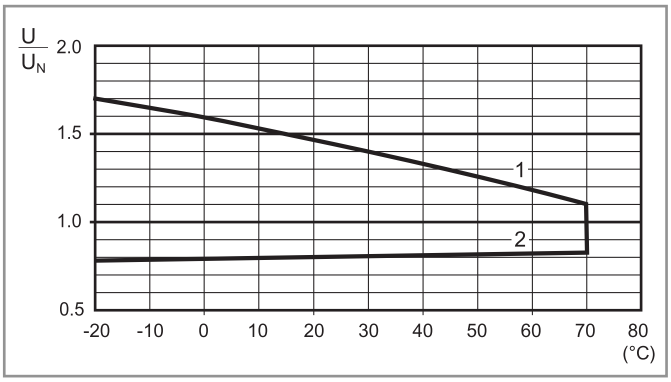
Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N (50Hz)
V		V	V	Ω	mA
6	**8**.006	4.8	6.6	3	600
12	**8**.012	9.6	13.2	11	300
24	**8**.024	19.2	26.4	50	150
110/115	**8**.110	88	126	930	32.6
120/125	**8**.120	96	137	1,050	30
230	**8**.230	184	253	4,000	15.7
240	**8**.240	192	264	5,500	15

R 66 - DC coil operating range v ambient temperature



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.
3 - Min. pick-up voltage with coil at ambient temperature (66.22-x60xS).

R 66 - AC coil operating range v ambient temperature

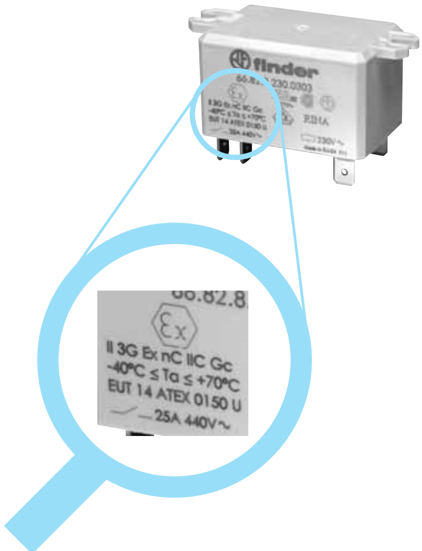


1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

A

Features compliant variant ATEX, II 3G Ex nC IIC Gc

MARKING	
Ex Specific marking of explosion protection	
II Component for surface plant (different from mines)	
3 Category 3: normal level of protection	
GAS	**G** Explosive atmosphere due to presence of combustible gas vapour or mist
GAS	**Ex nC** Sealed device (type of protection for category 3G)
GAS	**IIC** Gas group
GAS	**Gc** Equipment Protection Level
-40°C ≤ Ta ≤ +70°C Ambient temperature	
EUT 14 ATEX 0150 U EUT: laboratory which issues the CE type certificate 14: year of issue of certificate 0150: number of CE type certificate U: ATEX component	



Electrical characteristics

Characteristics of terminals		
Rated current/Maximum peak current	A	25/50 (NO) – 10/20 (NC)
Rated voltage/Maximum switching voltage	V AC	250/400
Rated load AC1	VA	6,250 (NO) – 2,500 (NC)
Rated load AC15	VA	1,200 (NO)
Capacity for single phase motor (230 V AC)	kW	1.5 (NO)
Breaking capacity DC1: 30/110/220 V	A	25/0.7/0.3 (NO)
Characteristics of coil		
Rated voltage (U_N)	V AC (50/60 Hz)	6 - 12 - 24 - 110/115 - 120/125 - 230 - 240
	V DC	6 - 12 - 24 - 110 - 125
Rated Power AC/DC	VA (50 Hz)/W	3.6 / 1.7
Operating range	AC/DC	$(0.8...1.1)U_N$
General characteristics		
Ambient temperature	°C	–40...+70

Special condition for safe use

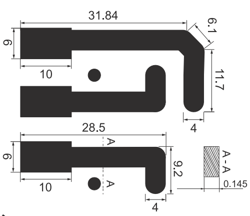
The component must be placed inside an enclosure that meets the general requirements for enclosures as per clause 6.3 of EN 60079-15. The connections must be made in compliance with the requirements of clause 7.2.4 or 7.2.5 of EN 60079-15.

Wiring

The cross-section of conductors connected to the terminals, must be at least 4 mm^2 for the Type 66.82.

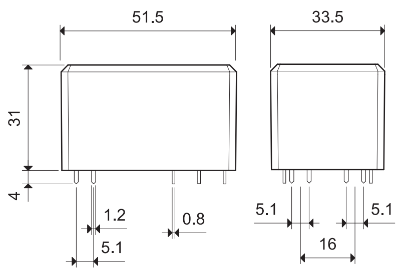
Layout pcb

The minimum cross-section of the tracks of the printed circuit board must be 0.58 mm^2, while the width must be at least 4 mm for Types “66.22” and “66.22....S”.

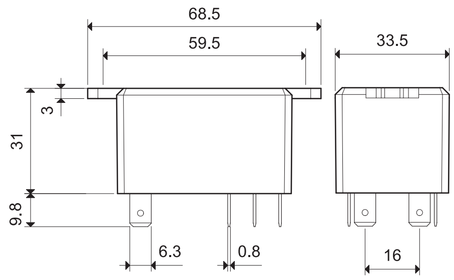


Outline drawings

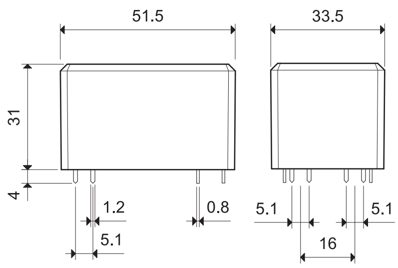
Type 66.22



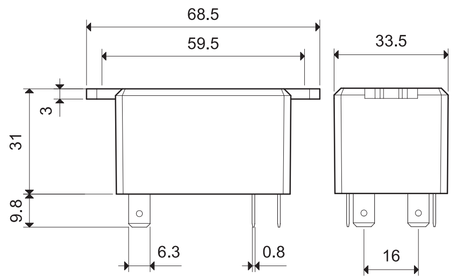
Type 66.82



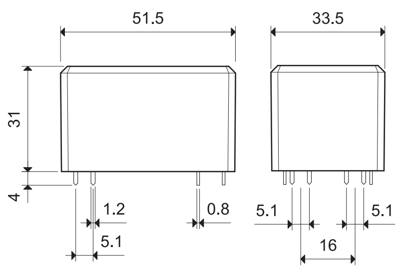
Type 66.22-0300



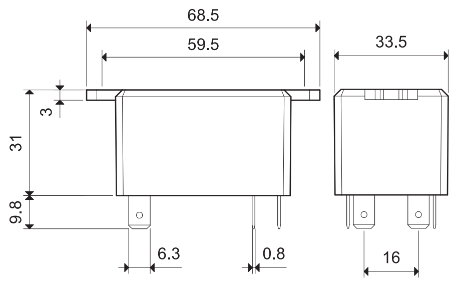
Type 66.82-0300



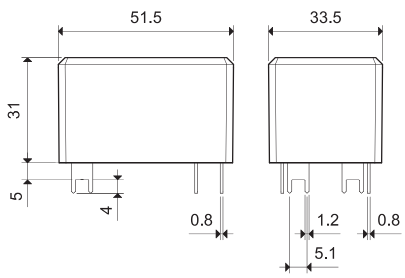
Type 66.22-0600



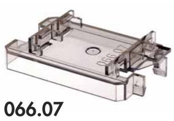
Type 66.82-0600



Type 66.22-0600S



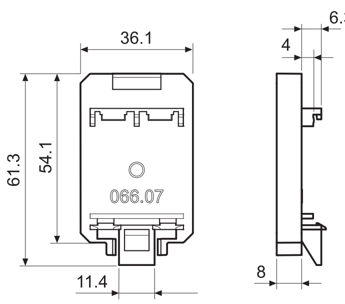
Accessories



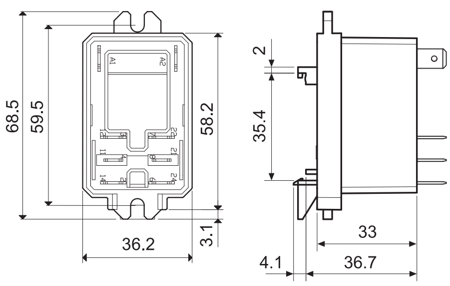
066.07

066.07 with relay

Top 35 mm rail (EN 60715) mount for types 66.82.xxxx.0x00	066.07



066.07



066.07 with relay

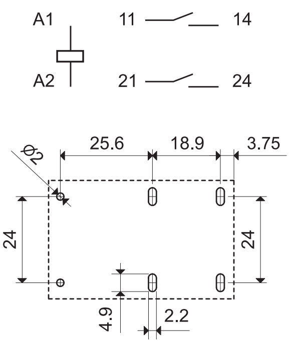
Features

Printed circuit mount - 3 mm contact gap
50 A Power relay for photovoltaic inverters

- 2 and 3 pole versions (NO, double break contacts)
- Contact gap ≥ 3 mm (according to VDE 0126-1-1, EN 62109-1, EN 62109-2)
- DC coils, with only 170 mW holding power
- Reinforced insulation between coil and contacts
- 1.5 mm gap between PCB and relay base
- Suitable for use at ambient temperatures up to 85 °C (with energy-saving coil energization) or 70 °C (with standard coil energization)
- Meets the EN 60335-1 requirements of resistance to heat and fire (GWIT 775 °C and GWFI 850 °C)

NEW 67.22-4300

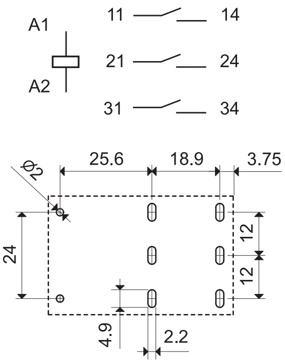
- 2 NO
- Contact gap ≥ 3 mm
- PCB mount



Copper side view

NEW 67.23-4300

- 3 NO
- Contact gap ≥ 3 mm
- PCB mount



Copper side view

For outline drawing see page 6

	67.22-4300	67.23-4300
Contact specification		
Contact configuration	2 NO (DPST-NO)	3 NO (3PST-NO)
Contact gap mm	≥ 3	≥ 3
Rated current/Maximum peak current (for 5 ms) A	50/150	50/150
Rated voltage/Maximum switching voltage V AC	400/690	400/690
Rated load AC1/AC7a (per pole) VA	20,000	20,000
Rated load AC15 (per pole @ 230 V AC) VA	2,300	2,300
Single-phase motor rating (230 V AC) kW	2	2
Three-phase motor rating (480 V AC) kW	—	7
Breaking capacity DC1: 24/110/220 V A	50/4/1	50/4/1
Minimum switching load mW (V/mA)	1,000 (10/10)	1,000 (10/10)
Standard contact material	$AgSnO_2$	$AgSnO_2$
Coil specification		
Nominal voltage (U_N) V DC	5 - 6 - 8 - 12 - 24 - 48 - 60 - 110	
Rated power W	1.7	1.7
Operating range (–40…+70°C) DC	(0.90 …1.1) U_N	(0.90 …1.1) U_N
Energy-saving mode (–40…+85)°C		
Operating range for 1s	(0.95…2.5) U_N	(0.95…2.5) U_N
Holding voltage range DC	(0.32…0.65) U_N	(0.32…0.65) U_N
Minimum holding power W	0.17	0.17
Must drop-out voltage DC	0.05 U_N	0.05 U_N
Technical data		
Mechanical life cycles	$1 \cdot 10^6$	$1 \cdot 10^6$
Electrical life at rated load AC7a cycles	$30 \cdot 10^3$	$30 \cdot 10^3$
Operate/release time ms	25/5	25/5
Ambient temperature range (energy-saving mode) °C	–40…+70 (–40…+85)	–40…+70 (–40…+85)
Environmental protection	RTII	RTII
Approvals (according to type)	EAC, c UR us	

67 Series - Solar relay 50 A

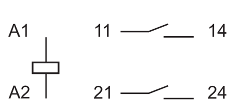
Features

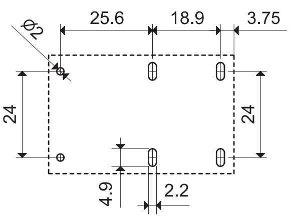
Printed circuit mount - 5.2 mm contact gap
50 A Power relay for photovoltaic inverters

- 2 and 3 pole versions (NO double break contacts)
- Contact gap ≥ 5.2 mm (according to VDE 0126-1-1, EN 62109-1, EN 62109-2)
- Suitable for inverters with DC input up to 1,500 V and AC output up to 690 V, installations up to 4,000 m above sea level
- DC coils, with only 170 mW holding power
- Reinforced insulation between coil and contacts
- 1.5 mm gap between PCB and relay base
- Suitable for use at ambient temperatures up to 85 °C (with energy-saving coil energization) or 60 °C (with standard coil energization)
- Meets the EN 60335-1 requirements of resistance to heat and fire (GWIT 775 °C and GWFI 850 °C)

NEW 67.22-4500

- 2 NO
- Contact gap ≥ 5.2 mm
- PCB mount

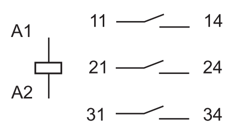


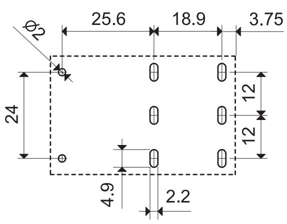


Copper side view

NEW 67.23-4500

- 3 NO
- Contact gap ≥ 5.2 mm
- PCB mount





Copper side view

For outline drawing see page 6

		67.22-4500	67.23-4500
Contact specification			
Contact configuration		2 NO (DPST-NO)	3 NO (3PST-NO)
Contact gap	mm	≥ 5.2	≥ 5.2
Rated current/Maximum peak current (for 5 ms)	A	50/150	50/150
Rated voltage/Maximum switching voltage	V AC	400/690	400/690
Rated load AC1/AC7a (per pole)	VA	20,000	20,000
Rated load AC15 (per pole @ 230 V AC)	VA	2,300	2,300
Single-phase motor rating (230 V AC)	kW	2	2
Three-phase motor rating (480 V AC)	kW	—	7
Breaking capacity DC1: 24/110/220	A	50/7/2	50/7/2
Minimum switching load	mW (V/mA)	1,000 (10/10)	1,000 (10/10)
Standard contact material		$AgSnO_2$	$AgSnO_2$
Coil specification			
Nominal voltage (U_N)	V DC	5 - 6 - 8 - 12 - 24 - 48 - 60 - 110	
Rated power	W	2.7	2.7
Operating range (–40…+60°C)	DC	(0.90 …1.1) U_N	(0.90 …1.1) U_N
Energy-saving mode (–40…+85)°C			
Operating range for 1s		(0.95…2.5) U_N	(0.95…2.5) U_N
Holding voltage range	DC	(0.25…0.5) U_N	(0.25…0.5) U_N
Minimum holding power	W	0.17	0.17
Must drop-out voltage	DC	0.05 U_N	0.05 U_N
Technical data			
Mechanical life	cycles	$1 \cdot 10^6$	$1 \cdot 10^6$
Electrical life at rated load AC7a	cycles	$30 \cdot 10^3$	$30 \cdot 10^3$
Operate/release time	ms	30/4	30/4
Ambient temperature range (energy-saving mode)	°C	–40…+60 (–40…+85)	–40…+60 (–40…+85)
Environmental protection		RTII	RTII
Approvals (according to type)			

XI-2014, www.findernet.com

A

Ordering information

Example: 67 series solar relay, single PCB terminals, 2 pole NO, ≥ 3 mm contact gap .

				A	B	C	D	
6 7	2	3	9	0 1 2	4	3	0	0	

Series

Type
2= Single PCB terminals, 1.5 mm gap between PCB and relay base

No. of poles
2 = 2 pole
3 = 3 pole

Coil version
9 = DC

Coil voltage
See coil specifications

A: Contact material
4 = Standard $AgSnO_2$

B: Contact circuit
3 = NO, ≥ 3 mm contact gap
5 = NO, ≥ 5.2 mm contact gap

S = Version suggested for 100 A switching, provided the 3 contacts are connected in parallel (only 67.23...430xS)

D: Special versions
0 = Standard
1 = Wash tight (RTIII)

C: Options
0 = None

Technical data

Insulation according to EN 61810-1				
Nominal voltage of supply system	V AC	400/690 3-phase	400 1-phase	230/400
Rated insulation voltage	V AC	630	400	400
Pollution degree		3		
Insulation between coil and contact set				
Type of Insulation		Reinforced		
Overvoltage category		III		
Rated impulse voltage	kV (1.2/50 μs)	6		
Dielectric strength	V AC	4,000		
Insulation between adjacent contacts				
Type of Insulation		Basic		
Overvoltage category		III		
Rated impulse voltage	kV (1.2/50) μs	6		
Dielectric strength	V AC	2,500		
Insulation between open contacts				
Type of disconnection		Micro-disconnection *		Full-disconnection
Overvoltage category		—		III
Rated impulse voltage	kV (1.2/50) μs	—		4
Dielectric strength	V AC	2,500 (67.xx-4300) / 3,000 (67.xx-4500)		
Conducted disturbance immunity				
Burst (5...50)ns, 5 kHz, on A1 - A2		EN 61000-4-4		level 4 (4 kV)
Surge (1.2/50 μs) on A1 - A2 (differential mode)		EN 61000-4-5		level 4 (4 kV)
Other data				
Bounce time: NO	ms	2		
Vibration resistance (10...150)Hz: NO	g	15		
Shock resistance	g	35		
Power lost to the environment — without contact current	W	1.7 (67.xx-4300) / 2.7 (67.xx-4500)		
with rated current	W	8.5 (67.xx-4300) / 9.5 (67.xx-4500)		
Recommended distance between relays mounted on PCB	mm	≥ 20		

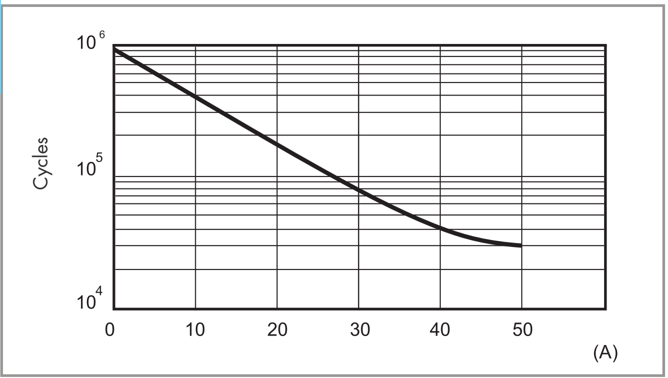
* with overvoltage category II: Full-disconnection

XI-2014, www.findernet.com

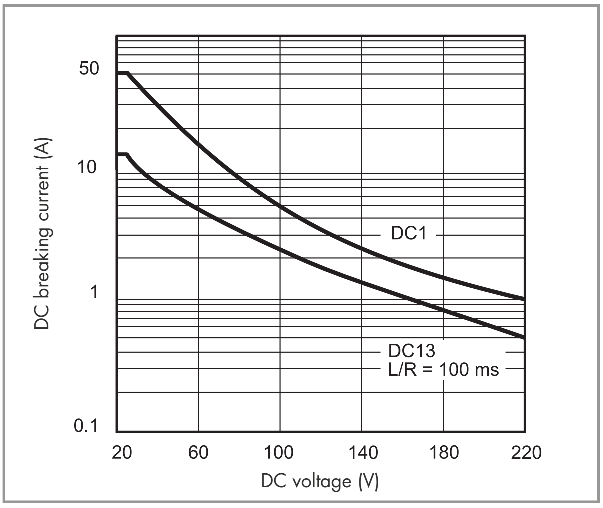
A

Contact specification

F 67 - Electrical life vs contact current (AC1/AC7a load)

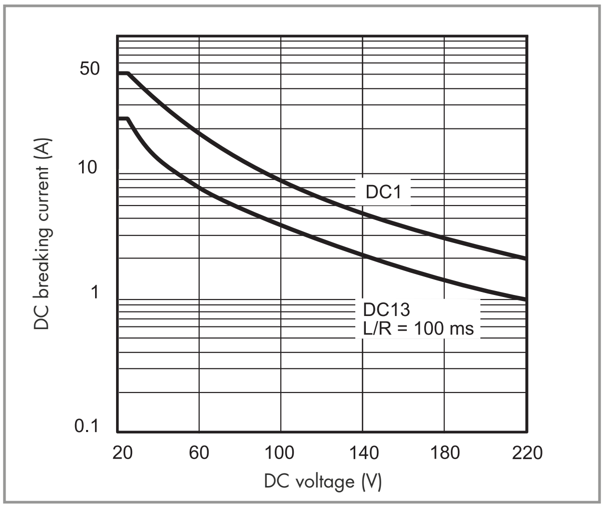


H 67 - Maximum DC breaking capacity (67.xx-4300)



When switching a resistive (DC1) or inductive (DC13) load having voltage and current values under the corresponding curve, an electrical life of > 30 000 cycles can be expected.

H 67 - Maximum DC breaking capacity (67.xx-4500)



When switching a resistive (DC1) or inductive (DC13) load having voltage and current values under the corresponding curve, an electrical life of > 30 000 cycles can be expected.

A

Coil specifications

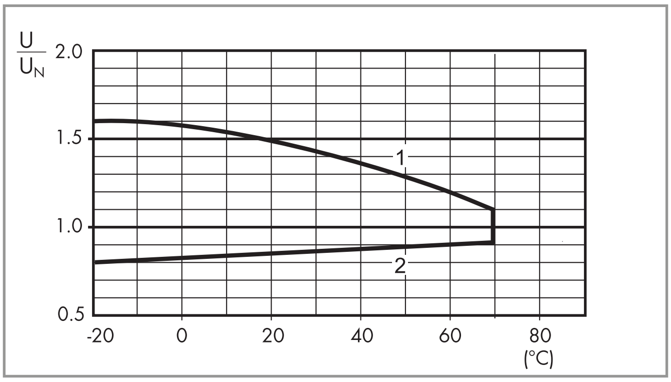
DC coil data, 67.xx-4300

Nominal voltage	Coil code	Operating range (@ 70 °C max)		Holding voltage	Resistance	Rated coil consumption I at U_N
U_N		U_{min}	U_{max}	U_h	R	I_N
V		V	V	V	Ω	mA
5	9.005	4.5	5.5	1.6	14.7	340
6	9.006	5.4	6.6	1.9	21.5	279
8	9.008	7.2	8.8	2.6	37.6	213
12	9.012	10.8	13.2	3.8	85	141
24	9.024	21.6	26.4	7.7	340	71
48	9.048	43.2	52.8	15.4	1,355	35
60	9.060	54	66	19.2	2,120	28
110	9.110	99	121	35.2	7,120	15

DC coil data, 67.xx-4500

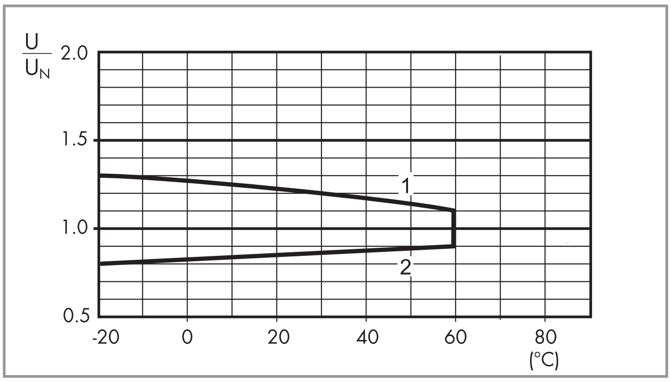
Nominal voltage	Coil code	Operating range (@ 60 °C max)		Holding voltage	Resistance	Rated coil consumption I at U_N
U_N		U_{min}	U_{max}	U_h	R	I_N
V		V	V	V	Ω	mA
5	9.005	4.5	5.5	1.25	9.3	538
6	9.006	5.4	6.6	1.5	13.5	444
8	9.008	7.2	8.8	2	23.7	338
12	9.012	10.8	13.2	3	53.5	224
24	9.024	21.6	26.4	6	213	113
48	9.048	43.2	52.8	12	855	56
60	9.060	54	66	15	1,335	45
110	9.110	99	121	27.5	4,500	24

R 67 - Operating range v ambient temperature, 67.xx-4300
with standard (continuous) coil energization (–40...+70)°C



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

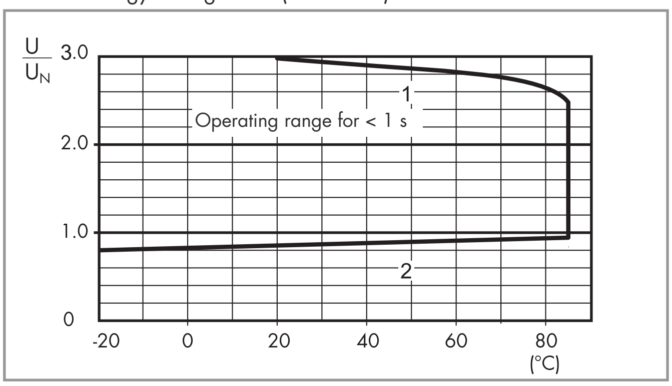
R 67 - Operating range v ambient temperature, 67.xx-4500
with standard (continuous) coil energization (–40...+60)°C



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

Energy saving mode
In some applications, such as photovoltaic inverters, it may be necessary to minimize the overall relay power dissipation and to permit use at higher ambient temperature levels (up to 85 °C). This can be achieved by initially applying a coil voltage within the Energy saving mode Operating range (see diagram to the right) and then rapidly (< 1 s) reducing the coil voltage to a level within the Holding voltage range. The lower the Holding voltage, the lower is the continuous power dissipation of the coil (0.17 W minimum).
Coil voltages as high as $2.5U_N$ may be used, when necessary, to reduce the contact operate time.

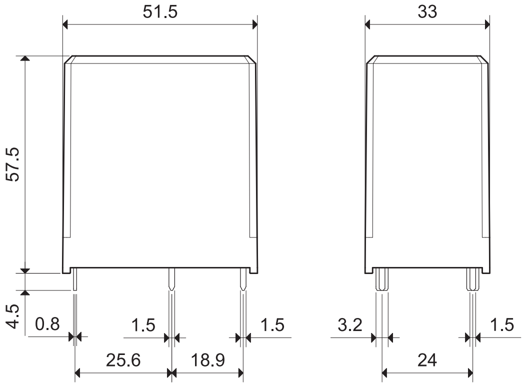
R 67 - Operating range v ambient temperature, 67.xx-4300/4500
in energy saving mode (–40...+85)°C



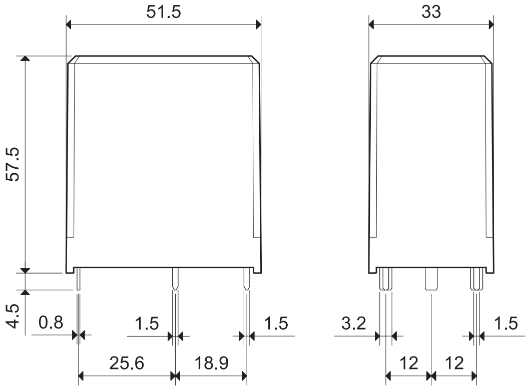
1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

Outline drawings

Type 67.22



Type 67.23

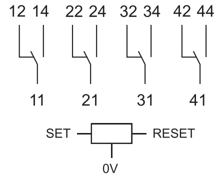


Features

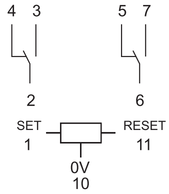
Bistable relay for control and signaling
RB.14 35 mm rail (EN 60715) mount
RB.22 11 pin socket type 90.21 mount

- 2 or 4 pole changeover contact
- DC voltage
- 2 coil type
- SET and RESET signals
- LED command status indication
- Cadmium Free contact material

RB.14



RB.22



RB.14/22
Screw terminal

For outline drawings see page 5

	RB.14	RB.22
Contact specification		
Contact configuration	4 CO (4PDT)	2 CO (DPDT)
Rated current/Maximum peak current A	8/15	8/15
Rated voltage/Maximum switching voltage V AC (50/60 Hz)	250/400	250/400
Rated load AC1 VA	2,000	2,000
Rated load AC15 VA	350	350
Single phase motor rating (230 V AC) kW	0.37	0.37
Breaking capacity DC1: 30/110/220 V A	8/0.3/0.12	8/0.3/0.12
Minimum switching load mW (V/mA)	300 (5/5)	300 (5/5)
Standard contact material	$AgSnO_2$	$AgSnO_2$
Coil specification		
Nominal voltage (U_N) V DC	24 - 48 - 110...125 - 220...250	24 - 110...125 - 220...250
Rated power DC W	7	4
Operating range V DC	(0.8...1.1) U_N	(0.8...1.1) U_N
Technical data		
Mechanical life AC/DC cycles	$2 \cdot 10^6$	$2 \cdot 10^6$
Electrical life at rated load AC1 cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Operate/release time SET/RESET ms	10/5	10/5
Insulation between coil and contacts (1.2/50 μs) kV	6 (8 mm)	4 (8 mm)
Dielectric strength between open contacts V AC	1,000	1,000
Ambient temperature range °C	–40...+55	–40...+55
Protection category	IP 20	IP 20
Approvals (according to type)		

Ordering information

Example: RB series, bistable relay, 4 CO, 125 V DC coil, 35 mm rail (EN 60715) mount.

R B	.	1	4	.	9	.	1 2 5	.	0	0	0	0

Series

Type
1 = Modular version

No. of poles
4 = 4 CO

Coil version
9 = DC

Coil voltage
024 = 24 V DC
048 = 48 V DC
125 = 110...125 V DC
250 = 220...250 V DC

Options
0000 = Modular version 35 mm rail (EN60715)

Codes / supply voltages
RB.14.9.024.0000
RB.14.9.048.0000
RB.14.9.125.0000
RB.14.9.250.0000

Example: RB series, bistable relay, 2 CO, 125 V DC coil, 11 pin socket type 90.21 mount.

R B	.	2	2	.	9	.	1 2 5	.	9	0	2	1

Series

Type
2 = 11 pin socket type 90.21 mount

No. of poles
2 = 2 CO

Coil version
9 = DC

Coil voltage
024 = 24 V DC
125 = 110...125 V DC
250 = 220...250 V DC

Options
9021 = Version plug-in 90.21 socket
0000 = Version relay only

Codes / supply voltages
RB.22.9.024.0000
RB.22.9.024.9021
RB.22.9.125.0000
RB.22.9.125.9021
RB.22.9.250.0000
RB.22.9.250.9021

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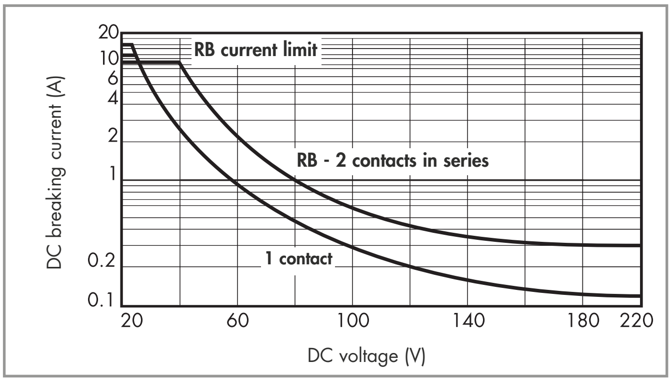
Technical data

Insulation according to EN 61810-1		2 CO	4 CO
Nominal voltage of supply system	V AC	230/400	230/400
Rated insulation voltage	V AC	250	250
Pollution degree		2	2
Insulation between coil and contact set			
Type of insulation		Reinforced (8 mm)	Reinforced (8 mm)
Overvoltage category		III	III
Rated impulse voltage	kV (1.2/50 μs)	4	6
Dielectric strength	V AC	2,000	3,000
Insulation between adjacent contacts			
Type of insulation		Basic	Basic
Overvoltage category		III	III
Rated impulse voltage	kV (1.2/50 μs)	4	4
Dielectric strength	V AC	2,000	2,500
Insulation between open contacts			
Type of disconnection		Micro-disconnection	Micro-disconnection
Dielectric strength	V AC/kV (1.2/50 μs)	1,000/1.5	1,000/1.5
Conducted disturbance immunity			
Burst (5…50)ns, 5 kHz, on A1 - A2		EN 61000-4-4	level 4 (4 kV)
Surge (1.2/50 μs) on A1 - A2 (differential mode)		EN 61000-4-5	level 3 (2 kV)
Other data			
Bounce time: SET (NO) / RESET (NC)	ms	3/6	
Vibration resistance (5…55)Hz: NO/NC	g	3/6	
Shock resistance	g	15	
Max cable lenght for push-button connection	m	100	
Terminals		**Screw terminal**	
		Solid and stranded cable	
Max. wire size	mm^2	1 x 2.5/2 x 1.5	
	AWG	1 x 14/2 x 16	

Contact specification

RB - Maximum DC1 breaking capacity



- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of ≥ $100 \cdot 10^3$ can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load. Note: the release time for the load will be increased.

Coil specifications - Type RB.14

DC coil data

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Rated coil consumption I a U_N	Rated power
V		V	V	mA	W
24	9.024	19.2	26.4	290	7
48	9.048	38.4	52.8	150	7
110…125	9.125	88	137.5	60	7
220…250	9.250	176	275	30	7

Coil specifications - Type RB.22

DC coil data

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Rated coil consumption I a U_N	Rated power
V		V	V	mA	W
24	9.024	19.2	26.4	170	4
110…125	9.125	88	137.5	35	4
220…250	9.250	176	275	18	4

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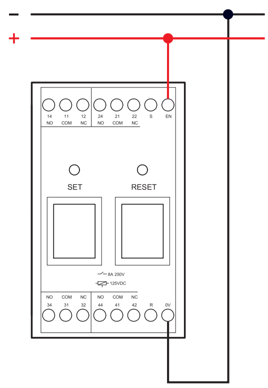
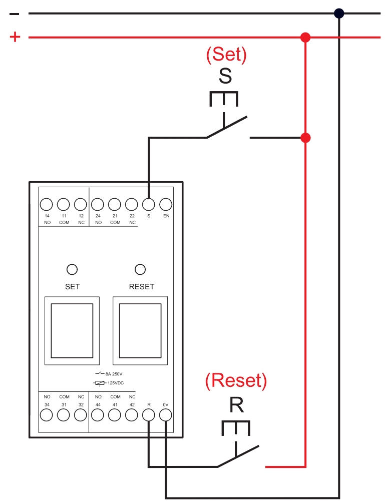
Wiring diagrams

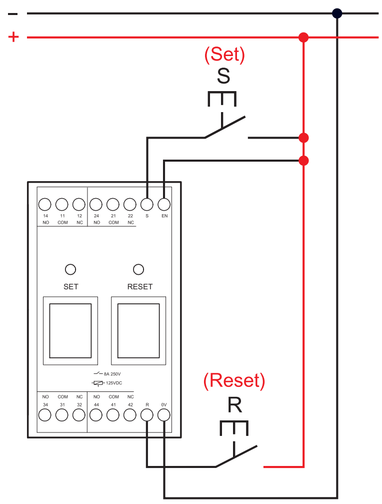
Type RB.14
Connection for only local push-buttons enable
EN = Enable - Positive voltage
0V = Negative voltage



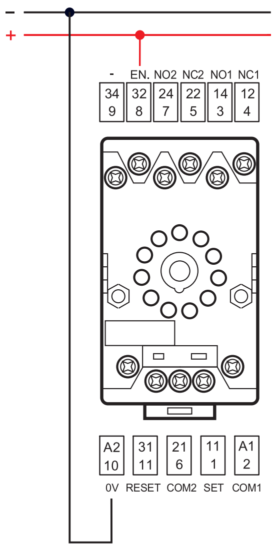
Type RB.14
Connetion for remote push-buttons enable



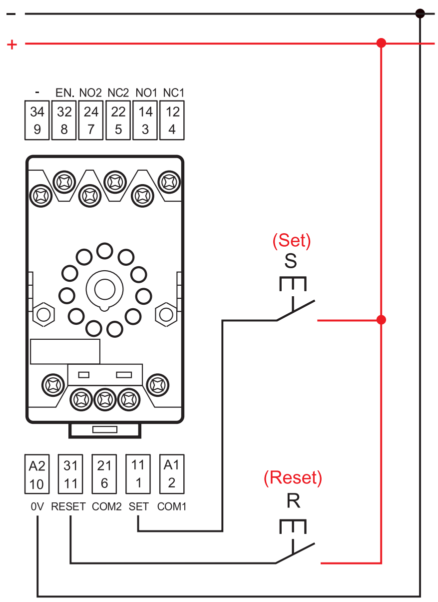
Type RB.14
Connetion for local and remote push-buttons enable



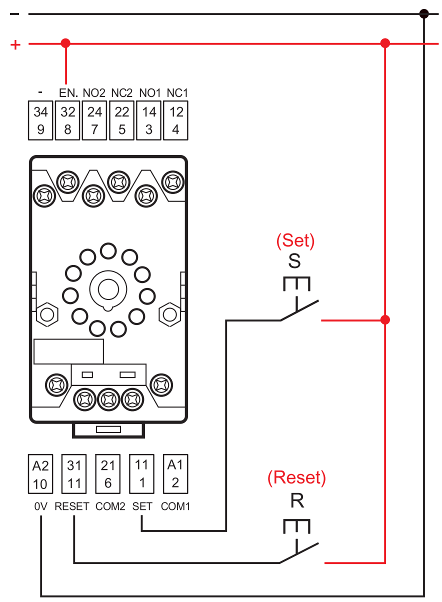
Type RB.22
Connection for only local push-buttons enable
EN = Enable - Positive voltage
0V = Negative voltage



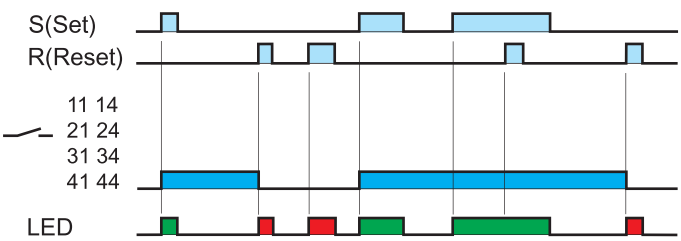
Type RB.22
Connetion for remote push-buttons enable



Type RB.22
Connetion for local and remote push-buttons enable

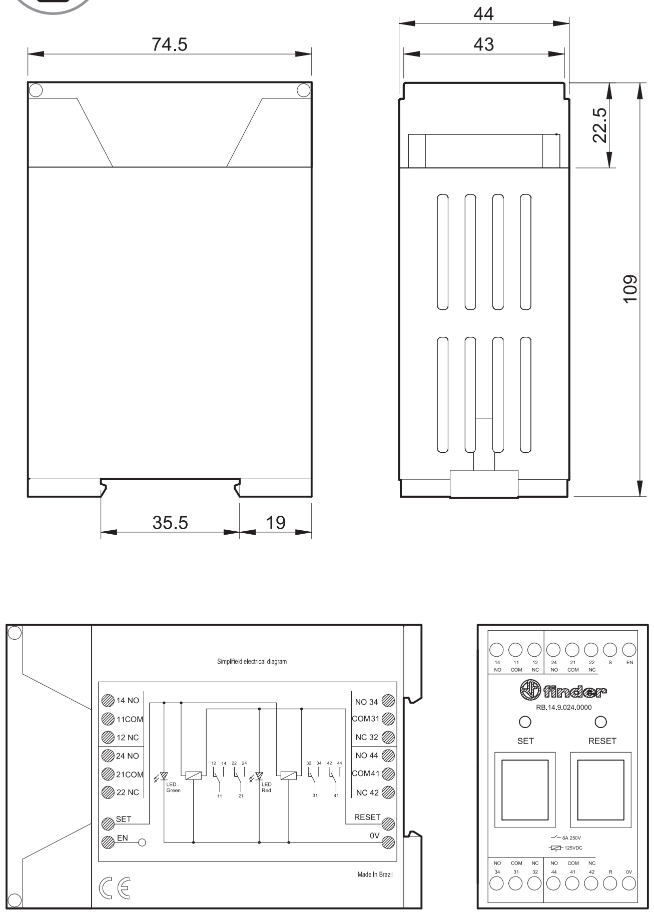


Functions

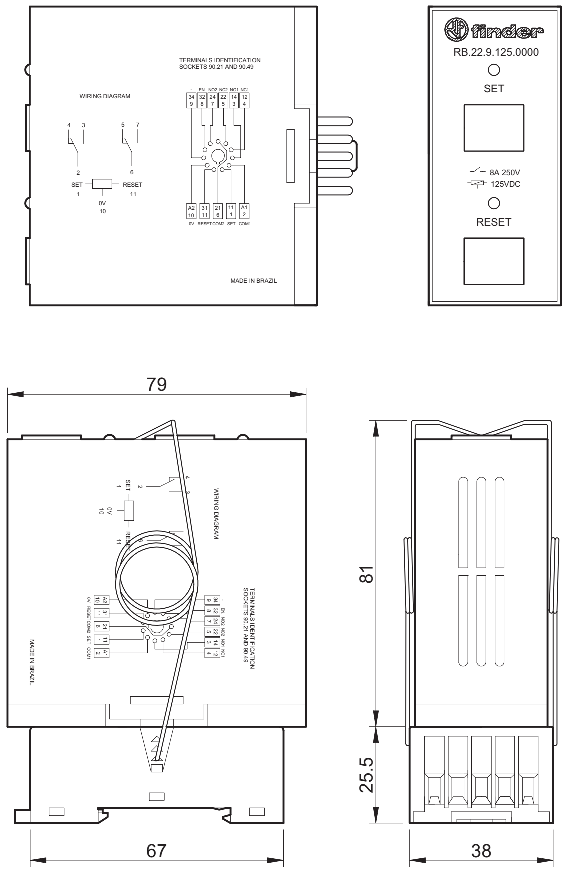


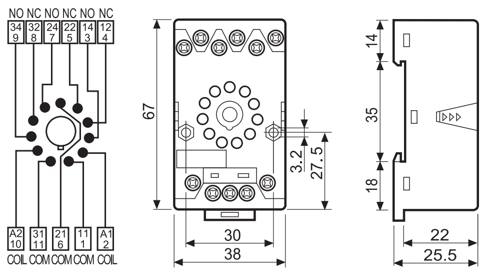
Outline drawings

RB.14
Screw terminal



RB.22
Screw terminal



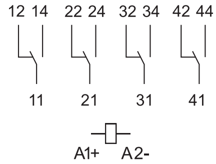
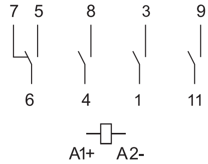


Features

Fast relay module

RR.14 35 mm rail (EN 60715) mount
RR.24 11 pin socket type 90.21 mount

- 4 pole changeover or
  3 NO + 1 changeover contacts
- DC voltage
- Operate time ≤ 3 ms
- LED command status indication
- 35 mm rail (EN 60715) mount
- 11 pin socket type 90.21 mount

RR.14	RR.24
	
	

RR.14/24
Screw terminal

For outline drawings see page 4

		RR.14	RR.24
Contact specification			
Contact configuration		4 CO (4PDT)	3 NO (SPST-NO) + 1 CO (SPDT)
Rated current/Maximum peak current	A	8/15	8/15
Rated voltage/Maximum switching voltage	V AC (50/60 Hz)	250/400	250/400
Rated load AC1	VA	2,000	2,000
Rated load AC15	VA	400	400
Single phase motor rating (230 V AC)	kW	0.3	0.3
Breaking capacity DC1: 30/110/220 V	A	8/0.3/0.12	8/0.3/0.12
Minimum switching load	mW (V/mA)	300 (5/5)	300 (5/5)
Standard contact material		AgCdO	AgCdO
Coil specification			
Nominal voltage (U_N)	V DC	24 - 48 - 110...125 - 220 - 250	24 - 110...125 - 220...250
Rated power DC	W	< 4	< 4
Operating range	V DC	(0.8...1.1) U_N	(0.8...1.1) U_N
Technical data			
Mechanical life AC/DC	cycles	$10 \cdot 10^6$	$10 \cdot 10^6$
Electrical life at rated load AC1	cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Operate/release time	ms	2.9/2.5	3/5
Insulation between coil and contacts (1.2/50 μs)	kV	6 (8 mm)	4 (8 mm)
Dielectric strength between open contacts	V AC	1,000	1,000
Ambient temperature range	°C	–40...+55	–40...+55
Protection category		IP 20	IP 20
Approvals (according to type)		CE EAC	

Ordering information

Example: RR series, fast relay module, 4 CO, 125 V DC coil, 35 mm rail (EN 60715) mount.

R R . 1 4 . 9 . 1 2 5 . 0 0 0 0

Series

Type
1 = Modular version

No. of poles
4 = 4 CO

Coil version
9 = DC

Coil voltage
024 = 24 V DC
048 = 48 V DC
125 = 110...125 V DC
220 = 220 V DC
250 = 250 V DC

Options
0000 = Modular version 35mm rail (EN60715)

Codes / supply voltages
RR.14.9.024.0000
RR.14.9.048.0000
RR.14.9.125.0000
RR.14.9.220.0000
RR.14.9.250.0000

Example: RR series, fast relay module, 3 NO + 1 CO, 125 V DC coil, 11 pin socket type 90.21 mount.

R R . 2 4 . 9 . 1 2 5 . 9 0 2 1

Series

Type
2 = Plug-in version

No. of poles
4 = 3 NO + 1 CO

Coil version
9 = DC

Coil voltage
024 = 24 V DC
125 = 110...125 V DC
250 = 220...250 V DC

Options
9021 = Relay + 90.21 sockets
0000 = Only Relay

Codes / supply voltages
RR.24.9.024.0000
RR.24.9.024.9021
RR.24.9.125.0000
RR.24.9.125.9021
RR.24.9.250.0000
RR.24.9.250.9021

Technical data

Insulation according to EN 61810-1		RR.14	RR.24
		4 CO	3 NO + 1 CO
Nominal voltage of supply system	V AC	230/400	230/400
Rated insulation voltage	V AC	250	250
Pollution degree		2	2
Insulation between coil and contact set			
Type of insulation		Reinforced (8 mm)	Reinforced (8 mm)
Overvoltage category		III	III
Rated impulse voltage	kV (1.2/50 μs)	6	4
Dielectric strength	V AC	3,500	2,000
Insulation between adjacent contacts			
Type of insulation		Basic	Basic
Overvoltage category		II	II
Rated impulse voltage	kV (1.2/50 μs)	2.5	2.5
Dielectric strength	V AC	2,000	2,000
Insulation between open contacts			
Type of disconnection		Micro-disconnection	Micro-disconnection
Dielectric strength	V AC/kV (1.2/50 μs)	1,000/1.5	1,000/1.5
Conducted disturbance immunity			
Burst (5…50)ns, 5 kHz, on A1 - A2		EN 61000-4-4	level 3 (2 kV)
Surge (1.2/50 μs) on A1 - A2 (differential mode)		EN 61000-4-5	level 3 (2 kV)
Other data			
Bounce time: NO/NC	ms	1.3/5.1	
Vibration resistance (5…55)Hz: NO/NC	g	15/3	
Shock resistance	g	13	
Terminals		**Screw terminal**	
		Solid and stranded cable	
Max. wire size	mm^2	1 x 2.5/2 x 1.5	
	AWG	1 x 14/2 x 16	

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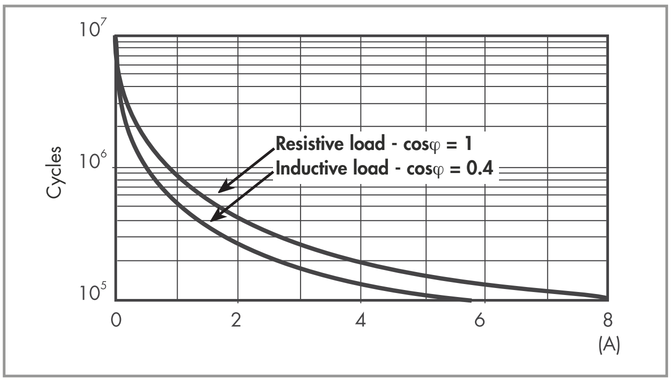
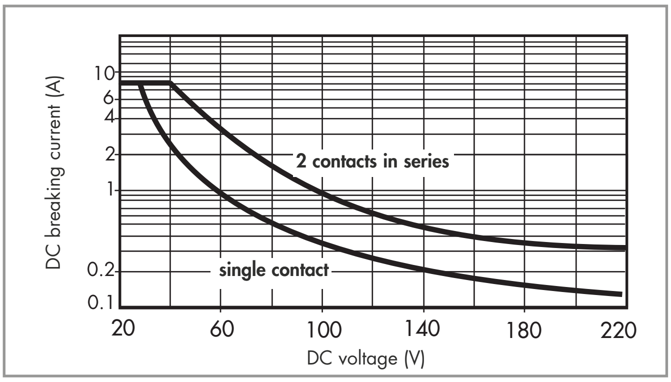
Contact specification

RR - Electrical life (AC) v contact current



RR - Maximum DC1 breaking capacity



- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of ≥ $100 \cdot 10^3$ can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load.
  Note: the release time for the load will be increased.

Coil specifications - Type RR.14

DC coil data

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Operate time	Release time	Rated power	Rated coil consumption I at U_N
V		V	V	V	V	W	mA
24	**9**.024	19.2	26.4	15	2.8	2.4	100
48	**9**.048	38.4	52.8	30	3	3.8	79
110...125	**9**.125	88	137.5	80	12	3.7	29
220	**9**.220	176	242	150	20	3.9	18
250	**9**.250	200	275	160	22	3.8	15

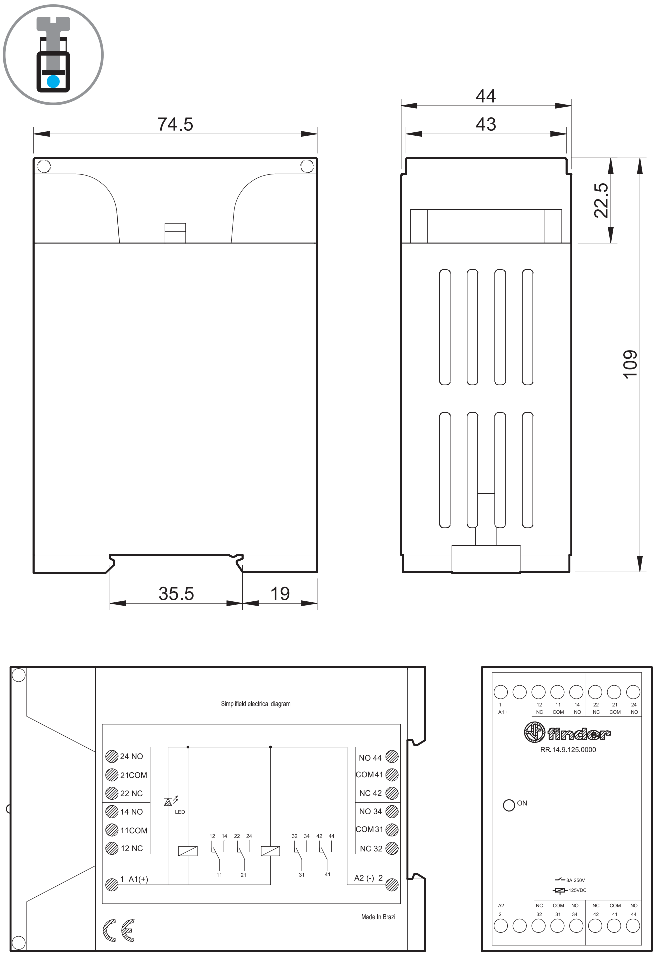
Coil specifications - Type RR.24

DC coil data

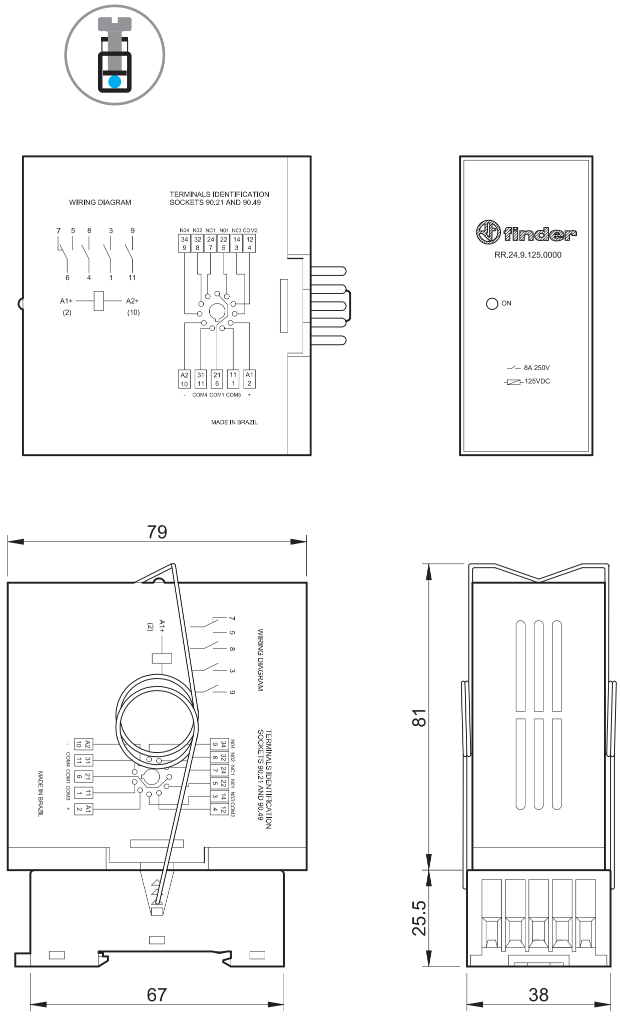
Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Operate time	Release time	Rated power	Rated coil consumption I at U_N
V		V	V	V	V	W	mA
24	**9**.024	19.2	26.4	14	2.4	2.3	95
110...125	**9**.125	88	137.5	80	12	3.7	29
220...250	**9**.250	176	275	150	20	3.9	18

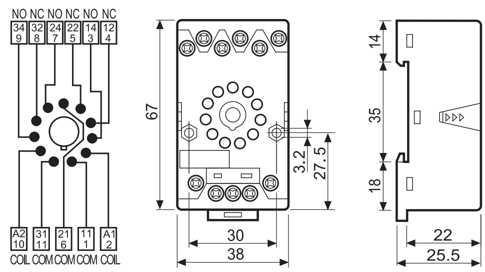
Outline drawings

RR.14
Screw terminal



RR.24
Screw terminal





99.01

Sockets	Relays
90.20	60.12
90.21	60.13
94.72	55.32
94.73	55.33
94.74	55.32, 55.34
94.82	55.32
95.63	40.31
96.72	56.32
96.74	56.34

99.02

Sockets	Relays
90.02	60.12
90.03	60.13
92.03	62.32, 62.33
94.02	55.32
94.03	55.33
94.04	55.32, 55.34
94.54	55.32, 55.34
95.03	40.31
95.05	40.51/52/61
	44.52, 44.62
95.55	40.51/52/61
	44.52, 44.62
96.02	56.32
96.04	56.34
97.01/97.51	46.61
97.02/97.52	46.52

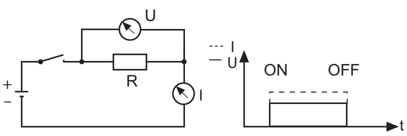
99.80

Sockets	Relays
94.82.3	55.32
94.84.3	55.32, 55.34
94.84.2	55.32, 55.34
94.92.3	55.32
94.94.3	55.32, 55.34
95.55.3	40.51/52/61
	44.52, 44.62
95.83.3	40.31
95.85.3	40.51/52/61
	44.52/62
95.93.3	40.31
95.95.3	40.51/52/61
	44.52, 44.62
97.51.3	46.61
97.52.3	46.52

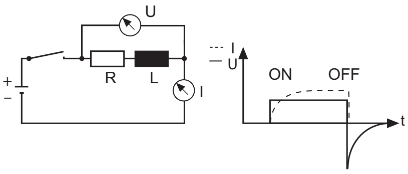
FUNCTION / OPERATING RANGE	CODE 99.01	CODE 99.02	CODE 99.80
Green LED + diode module (standard polarity)			
6 - 24 V DC 28 - 60 V DC 110 - 220 V DC	99.01.9.024.99 99.01.9.060.99 99.01.9.220.99	99.02.9.024.99 99.02.9.060.99 99.02.9.220.99	99.80.9.024.99 99.80.9.060.99 99.80.9.220.99
Green LED + Varistor module			
6 - 24 V AC/DC 28 - 60 V AC/DC 110 - 240 V AC/DC	99.01.0.024.98 99.01.0.060.98 99.01.0.230.98	99.02.0.024.98 99.02.0.060.98 99.02.0.230.98	99.80.0.024.98 99.80.0.060.98 99.80.0.230.98
Green LED module			
6 - 24 V AC/DC 28 - 60 V AC/DC 110 - 240 V AC/DC	99.01.0.024.59 99.01.0.060.59 99.01.0.230.59	99.02.0.024.59 99.02.0.060.59 99.02.0.230.59	99.80.0.024.59 99.80.0.060.59 99.80.0.230.59
Diode module (standard polarity)			
6 - 220 V DC	99.01.3.000.00	99.02.3.000.00	99.80.3.000.00
RC module			
6 - 24 V AC/DC 28 - 60 V AC/DC 110 - 240 V AC/DC	99.01.0.024.09 99.01.0.060.09 99.01.0.230.09	99.02.0.024.09 99.02.0.060.09 99.02.0.230.09	99.80.0.024.09 99.80.0.060.09 99.80.0.230.09
Residual current bypass module			
110 - 240 V AC	99.01.8.230.07	99.02.8.230.07	99.80.8.230.07

A

Voltage-current characteristic when switching a resistive load (fig. 1).



Voltage-current characteristic when switching a relay coil (fig. 2).



Switching Relay Coils.

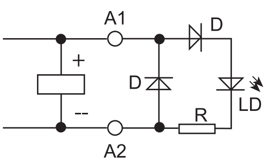
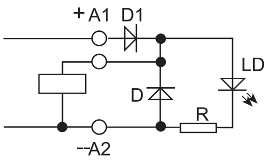
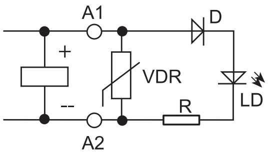
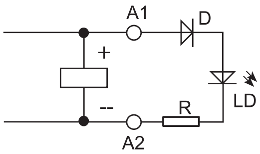
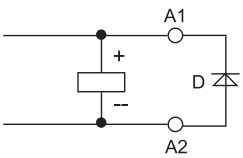
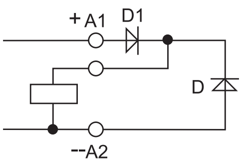
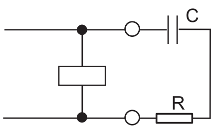
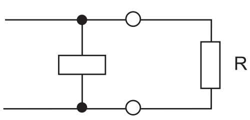
When switching a resistive load, the current follows the phase of the voltage directly (Fig 1).

When switching relay coils the current and voltage waveforms are different due to the inductive nature of the coil (Fig 2). A brief explanation of this mechanism is as follows.

On energisating the coil, the build up of the magnetic field gives rise to counter electromotive forces which in turn delay the rise in coil current. On de-energisation, the sudden interruption of the coil current causes a sudden collapse of the magnetic field, which in turn induces a high voltage of reverse polarity across the coil. This reverse polarity voltage peak can reach a value typically 15 times higher than the supply voltage, and as a consequence can disturb or destroy electronic devices.

To counteract this potentially damaging effect, relays coils can be suppressed with a Diode, a Varistor (voltage dependent resistor) or a RC (resistor/capacitor) module – dependent on the operating voltage. (See below for descriptions of the various Modules available.)

Whilst the above description is based on the working of a DC coil, the reverse polarity voltage peak on de-energisation applies similarly to AC coils. However, when energising AC coils there will also be a coil inrush current of 1.3 to 1.7 times the nominal coil current – dependent on coil size. If coils are fed via a transformer (and particularly if several are energised at the same time) then this may need to taken into account when calculating the VA rating of the transformer.

Diagrams		Functions
99.01.9.xxx.99 only 99.80.9.xxx.99 only 	99.02.9.xxx.99 only 	**Green LED + diode module (standard polarity)** Recovery diode modules + LED are used for DC only. The reverse voltage peaks of the coil are short circuited by the recovery diode (positive to terminal A1). The release time increases by an approximate factor of 3. If an increase of the release time is undesirable use a Varistor or RC module. The LED indicator lights up when the coil is energized.
		**Green LED + Varistor module** LED modules + Varistor are used for both AC and DC coils. The reverse voltage peaks of the relay coil are limited by the Varistor to approximately 2.5 times the nominal voltage of the supply. When using DC coils it is essential that positive is connected to terminal A1. The relay release time increases insignificantly.
		**Green LED module** LED modules are used for AC and DC. The LED indicator lights up when the coil is energized. When using DC it is essential that positive is connected to terminal A1.
99.01.3.000.00 only 99.80.3.000.00 only 	99.02.3.000.00 only 	**Diode module (standard polarity)** Recovery diode modules are used for DC only. The reverse voltage peaks of the coil are short circuited by the recovery diode (positive to terminal A1). The release time increases by an approximate factor of 3. If an increase of the release time is undesirable use a Varistor or RC module.
		**RC module** RC circuit modules are used for AC and DC coils. The reverse voltage peaks of the coil are limited by the RC module to approximately 2.5 times the nominal voltage of the supply. The relay release time increases insignificantly.
		**Residual current bypass module** Bypass modules are advisable if 110 or 230v AC relays show any tendency to fail to release. Failure to release can be caused by residual currents from AC proximity switches or inductive coupling caused through long parallel lying AC control lines.

Common features

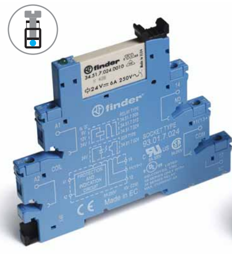
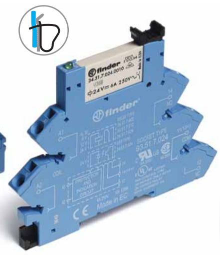
- Instant ejection of relay by plastic retaining clip
- Integral coil indication and protection circuit
- 35 mm rail (EN 60715) mounting

EMR — **Electromechanical Relays** | **SSR** — **Solid State Relays**

6.2 mm wide

- **EMR - DC, AC or AC/DC coil versions**
- **SSR - DC or AC/DC input versions**
- Screw and Screwless terminal options

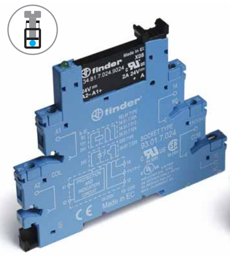
EMR: 38.51/38.61

- **1 CO - 6 A 250VAC**

Page 1

SSR: 38.81/38.91



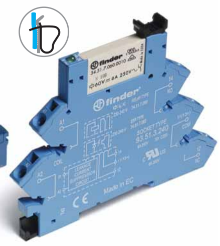

- Single solid state output: Options **0.1A 48VDC, 2A 24VDC, 2A 240VAC**
- Silent, high speed switching
- Long electrical life

Page 2

6.2 mm wide

- **Special coil / input leakage current suppression types**
- **EMR - AC or AC/DC coil versions**
- **SSR - AC or AC/DC input versions**
- Screw and Screwless terminal options

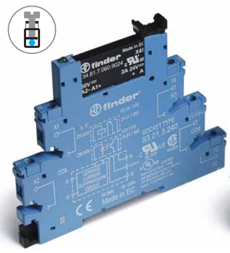
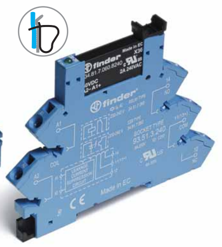
EMR: 38.51.3... - 38.61.3...

- **1 CO - 6 A 250VAC**

Page 1

SSR: 38.81.3... - 38.91.3...

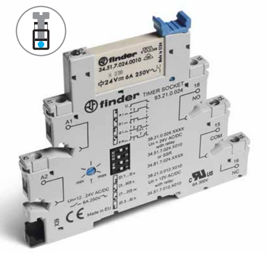
- Single solid state output: Options **0.1A 48VDC, 2A 24VDC, 2A 240VAC**
- Silent, high speed switching
- Long electrical life

Page 2

6.2 mm wide

- **Timed Interface module**
- **4 functions & 4 time scales 0.1s … 6h**
- **EMR - AC/DC (12 or 24V) supply versions**
- **SSR - AC/DC (24V) supply**
- Screw terminals

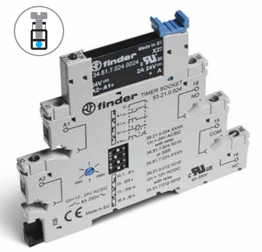
EMR: 38.21



- **1 CO - 6 A 250VAC**

Page 3

SSR: 38.21...9024-8240



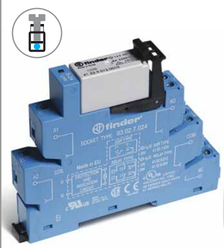
- Single solid state output: Options **2A 24VDC, 2A 240VAC**
- Silent, high speed switching
- Long electrical life

Page 3

14 mm wide

- **2 pole 8 A or 1 pole 16 A**
- **EMR - DC or AC/DC coil versions**
- **SSR - DC input versions**
- Screw and Screwless terminal options

EMR: 38.01/38.52/38.11/38.62




- **1 CO - 16 A 250VAC**
- **2 CO - 8 A 250VAC**

Page 4

SSR: 38.31/38.41


- Single solid state output: Options **5A 24VDC, 3A 240VAC**
- Silent, high speed switching
- Long electrical life

Page 5

Features

1 Pole - 6 A electromechanical relay interface modules, 6.2 mm wide.

Ideal interface for PLC and electronic systems

- Sensitive DC coil or AC/DC coil versions
- Integral coil indication and protection circuit
- Instant ejection of relay using plastic retaining clip
- UL Listing (certain relay/socket combinations)
- 35 mm rail (EN 60715) mounting

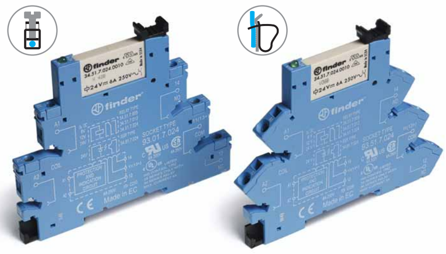
38.51 / 38.51.3
Screw terminal

38.61 / 38.61.3
Screwless terminal

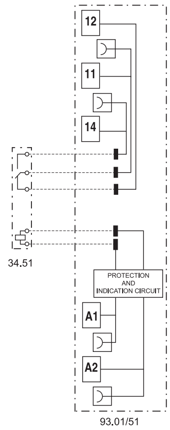
* Special version for max ambient temperature +70°C.

For outline drawing see page 12

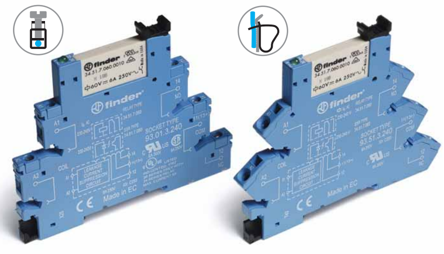
38.51/61



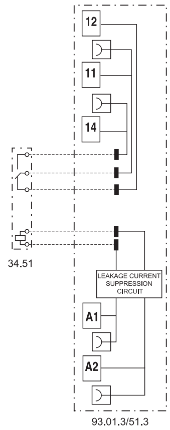
- 1 pole electromechanical relay
- Screw terminal and screwless terminal
- 35 mm rail (EN 60715) mounting



38.51.3 / 38.61.3



- Leakage current suppression
- 1 pole electromechanical relay
- Screw terminal and screwless terminal
- 35 mm rail (EN 60715) mounting



		38.51/61	38.51.3 / 38.61.3	
Contact specification				
Contact configuration		1 CO (SPDT)	1 CO (SPDT)	
Rated current/Maximum peak current	A	6/10	6/10	
Rated voltage/Maximum switching voltage	V AC	250/400	250/400	
Rated load AC1	VA	1,500	1,500	
Rated load AC15 (230 V AC)	VA	300	300	
Single phase motor rating (230 V AC)	kW	0.185	0.185	
Breaking capacity DC1: 30/110/220 V	A	6/0.2/0.12	6/0.2/0.12	
Minimum switching load	mW (V/mA)	500 (12/10)	500 (12/10)	
Standard contact material		AgNi	AgNi	
Coil specification				
Nominal voltage (U_N)	V AC/DC	12 - 24 - 48 - 60 - (110...125) - (220...240)	(110...125)	—
	V AC	(230...240)*	—	(230...240)
	V DC	6 - 12 - 24 - 48 - 60 (non polarized)	—	—
Rated power AC/DC	VA (50 Hz)/W	See page 9	1/1	0.5/—
Operating range	AC/DC	$(0.8...1.1)U_N$	(94...138)V	—
	AC	(184...264)V	—	(184...264)V
	DC	$(0.8...1.2)U_N$	—	
Holding voltage	AC/DC	$0.6\ U_N$ / $0.6\ U_N$	$0.6\ U_N$ / $0.6\ U_N$	
Must drop-out voltage	AC/DC	$0.1\ U_N$ / $0.05\ U_N$	44 V	72 V
Technical data				
Mechanical life AC/DC	cycles	$10 \cdot 10^6$	$10 \cdot 10^6$	
Electrical life at rated load AC1	cycles	$60 \cdot 10^3$	$60 \cdot 10^3$	
Operate/release time	ms	5/6	5/6	
Insulation between coil and contacts (1.2/50 μs)	kV	6 (8 mm)	6 (8 mm)	
Dielectric strength between open contacts	V AC	1,000	1,000	
Ambient temperature range ($U_N \leq$ 60 V/>60V)	°C	–40…+70/–40…+55	—/–40…+55	
Protection category		IP 20	IP 20	
Approvals relay (according to type)		CE RINA c UL us		

38 Series - Relay interface modules - Single output SSR

Features

Single output - solid state relay interface modules, 6.2 mm wide.

Ideal interface for PLC and electronic systems

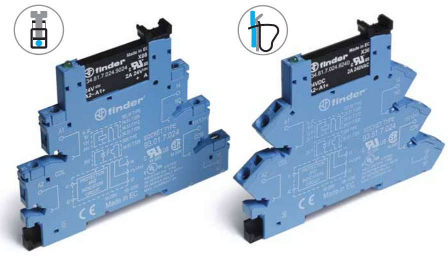
- DC, AC or AC/DC input versions
- Supplied with integral coil indication and protection circuit
- Silent, high switching speed and long electrical life
- Instant ejection of relay using plastic retaining clip
- UL Listing (certain relay/socket combinations)
- 35 mm rail (EN 60715) mounting

38.81 / 38.81.3
Screw terminal

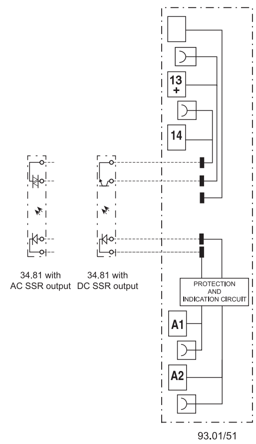
38.91 / 38.91.3
Screwless terminal

For outline drawing see page 12

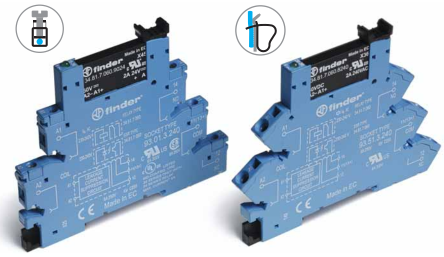
38.81/38.91



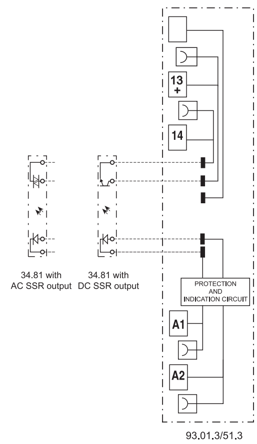
- AC or DC output switching
- SSR relay - DC input voltage
- Screw terminal and screwless terminal
- 35 mm rail (EN 60715) mounting



38.81.3/38.91.3



- Leakage current suppression
- AC or DC output
- SSR relay - AC or AC/DC input voltage
- Screw terminal and screwless terminal
- 35 mm rail (EN 60715) mounting



		38.81/38.91			38.81.3/38.91.3		
Output specification							
Contact configuration		1 NO (SPST-NO)			1 NO (SPST-NO)		
Rated current/Maximum peak current (10 ms)	A	2/20	0.1/0.5	2/40	2/20	0.1/0.5	2/40
Rated voltage/Maximum blocking voltage	V	24/33 DC	48/60 DC	240/— AC	24/33 DC	48/60 DC	240/— AC
Switching voltage range	V	(1.5…24)DC	(1.5…48)DC	(12…275)AC	(1.5…24)DC	(1.5…48)DC	(12…275)AC
Repetitive peak off-state voltage	V_{pk}	—	—	600	—	—	600
Minimum switching current	mA	1	0.05	22	1	0.05	22
Max. "OFF-state" leakage current	mA	0.001	0.001	1.5	0.001	0.001	1.5
Max. "ON-state" voltage drop	V	0.12	1	1.6	0.12	1	1.6
Input specification							
Nominal voltage (U_N)	V AC	—			230…240		
	V DC	6 - 24 - 60			—		
	V AC/DC	(110…125) - (220…240)			110…125		
Operating range	V DC	See page 10			See page 10		
Control current	mA	See page 10			See page 10		
Release voltage	V DC	See page 10			See page 10		
Technical data							
Operate/release time: ON/OFF (DC input)	ms	0.2/0.6	0.04/0.11	12/12	0.2/0.6	0.04/0.11	12/12
Dielectric strength between input/output	V AC	2,500			2,500		
Ambient temperature range	°C	–20…+55			–20…+55		
Environmental protection		IP20			IP20		
Approvals relay (according to type)		CE EAC RINA cULus					

II-2014, www.findernet.com

Features

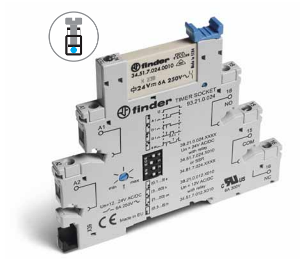
Slim timed interface module, 6.2 mm wide.
1 pole, 6 A - electromechanical relay
1 output, 2 A DC or AC - solid state relay

- Electromechanical or solid state output
- Multi-functions timer
- AC/DC supply
- 4 time scales from 0.1s to 6h
- Instant ejection of relay using plastic retaining clip
- 6.2 mm wide, 35 mm rail (EN 60715) mounting

38.21
Screw terminal

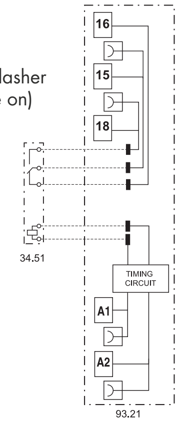
For outline drawing see page 12

38.21

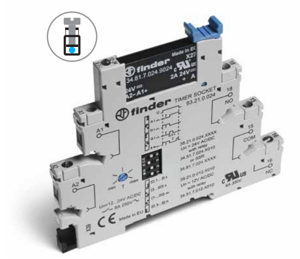


- 1 pole electromechanical output relay
- 12 or 24 V AC/DC supply
- Screw terminal
- 35 mm rail (EN 60715) mounting

AI: On-delay
DI: Interval
GI: Pulse delayed
SW: Symmetrical flasher (starting pulse on)

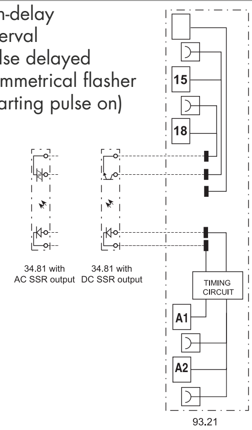


38.21...9024-8240



- DC or AC solid state output relays
- 24V AC/DC supply voltage
- Screw terminal
- 35 mm rail (EN 60715) mounting

AI: On-delay
DI: Interval
GI: Pulse delayed
SW: Symmetrical flasher (starting pulse on)



		38.21	38.21...9024-8240	
Contact specification				
Contact configuration		1 CO (SPDT)	—	
Rated current/Maximum peak current	A	6/10	—	
Rated voltage/Maximum switching voltage	V AC	250/400	—	
Rated load AC1	VA	1,500	—	
Breaking capacity DC1: 30/110/220 V	A	6/0.2/0.12	—	
Minimum switching load	mW (V/mA)	500 (12/10)	—	
Standard contact material		AgNi	—	
Output specification			**DC output (...9024)**	**AC output (...8240)**
Output configuration		—	1 NO (SPST-NO)	1 NO (SPST-NO)
Rated current/Maximum peak current	A	—	2/20	2/40
Rated voltage/Maximum blocking voltage	V	—	(24/33)DC	(240/—)AC
Switching voltage range	V	—	(1.5...24)DC	(12...275)AC
Repetitive peak off-state voltage	V_{pk}	—	—	600
Minimum switching current	mA	—	1	22
Max. "OFF-state" leakage current	mA	—	0.001	1.5
Max. "ON-state" voltage drop	V	—	0.12	1.6
Supply specification				
Nominal voltage (U_N)	V AC (50/60Hz)/DC	12 - 24	24	
Rated power	VA/W	0.5	0.5	
Operating range	AC	(0.8...1.1)U_N	(0.8...1.1)U_N	
	DC	(0.8...1.1)U_N	(0.8...1.1)U_N	
Technical data				
Specified time range		(0.1...3)s, (3...60)s, (1...20)min, (0.3...6)h		
Repeatability	%	± 1		
Recovery time	ms	≤ 50		
Setting accuracy-full range	%	5%		
Ambient temperature	°C	–40…+70	–20…+55	
Protection category		IP 20		
Approvals relay (according to type)		CE EAC RoHS cULus		

finder

B

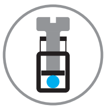
Features

Electromechanical relay interface modules, 14 mm wide.
38.01 and 38.11 - 1 Pole 16 A
38.52 and 38.62 - 2 Pole 8 A

Ideal interface for PLC and electronic systems

- Sensitive DC coil or AC/DC coil versions
- Integral coil indication and protection circuit
- Instant ejection of relay using plastic retaining clip
- UL Listing (certain relay/socket combinations)
- 35 mm rail (EN 60715) mounting

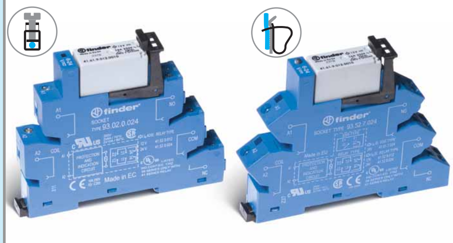
38.01/52
Screw terminal



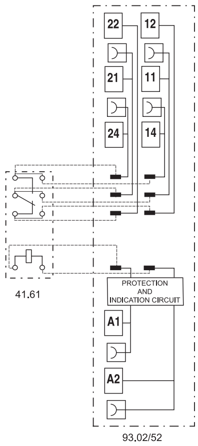
38.11/62
Screwless terminal

For outline drawing see page 12

38.01/38.11

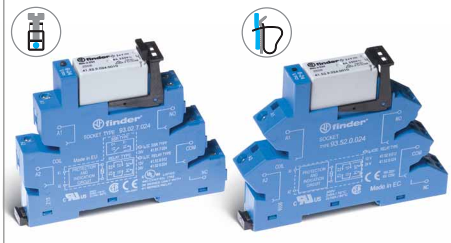


- Screw terminal and screwless terminal
- 1 pole electromechanical relay
- 35 mm rail (EN 60715) mounting

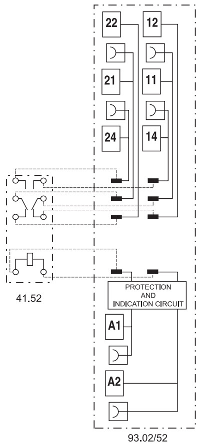


* For currents >10 A, contact terminals must be connected in parallel (21 with 11, 24 with 14, 22 with 12).

38.52/38.62



- Screw terminal and screwless terminal
- 2 pole electromechanical relay
- 35 mm rail (EN 60715) mounting



		38.01/38.11	38.52/38.62
Contact specification			
Contact configuration		1 CO (DPDT)	2 CO (DPDT)
Rated current/Maximum peak current	A	16*/30	8/15
Rated voltage/Maximum switching voltage	V AC	250/400	250/400
Rated load AC1	VA	4,000	2,000
Rated load AC15 (230 V AC)	VA	750	400
Single phase motor rating (230 V AC)	kW	0.5	0.3
Breaking capacity DC1: 30/110/220 V	A	16/0.3/0.12	8/0.3/0.12
Minimum switching load	mW (V/mA)	300 (5/5)	300 (5/5)
Standard contact material		AgNi	AgNi
Coil specification			
Nominal voltage (U_N)	V AC/DC	24 - 60 - (110...125) - (220...240)	24 - 60 - (110...125) - (220...240)
	V AC	230...240	230...240
	V DC	12 - 24 - 60	12 - 24 - 60
Rated power AC/DC	VA (50 Hz)/W	See page 9	See page 9
Operating range	AC/DC	0.8...1.1	0.8...1.1
	DC	(0.8...1.2)U_N	(0.8...1.2)U_N
Holding voltage	AC/DC	0.6 / 0.6 U_N	0.6 / 0.6 U_N
Must drop-out voltage	AC/DC	0.1 / 0.05 U_N	0.1 / 0.05 U_N
Technical data			
Mechanical life AC/DC	cycles	$10 \cdot 10^6$	$10 \cdot 10^6$
Electrical life at rated load AC1	cycles	$50 \cdot 10^3$	$60 \cdot 10^3$
Operate/release time	ms	8 / 10	8 / 10
Insulation between coil and contacts (1.2/50 μs)	kV	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts	V AC	1,000	1,000
Ambient temperature range ($U_N \leq$ 60 V/>60V)	°C	–40...+70 / –40...+55	–40...+70 / –40...+55
Protection category		IP 20	IP 20
Approvals relay (according to type)		RINA	

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Features

Single output - solid state relay interface modules, 14 mm wide.

Ideal interface for PLC and electronic systems

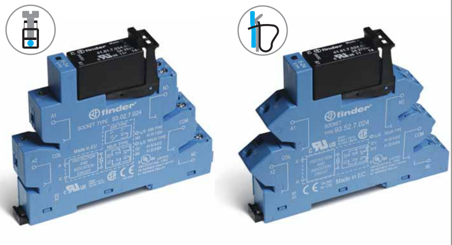
- DC input versions
- Supplied with integral coil indication and protection circuit
- Silent, high switching speed and long electrical life
- Instant ejection of relay using plastic retaining clip
- UL Listing (certain relay/socket combinations)
- 35 mm rail (EN 60715) mounting

38.31
Screw terminal

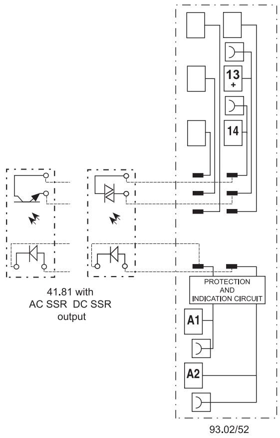
38.41
Screwless terminal

For outline drawing see page 12

38.31/38.41



- Screw terminal and screwless terminal
- AC or DC output switching
- SSR relay - DC input voltage
- 35 mm rail (EN 60715) mounting



Output specification			
Contact configuration		1 NO (SPST-NO)	1 NO (SPST-NO)
Rated current/Maximum peak current (10 ms)	A	5/40	3/40
Rated voltage/Maximum blocking voltage	V	(24/35)DC	(240/—)AC
Switching voltage range	V	(1.5…24)DC	(12…275)AC
Repetitive peak off-state voltage	V_{pk}	—	600
Minimum switching current	mA	1	50
Max. "OFF-state" leakage current	mA	0.01	1
Max. "ON-state" voltage drop	V	0.3	1.1
Input specification			
Nominal voltage (U_N)	V AC/DC	24	
	V DC	12 - 24	
Operating range	V DC	See page 10	
Control current	mA	See page 10	
Release voltage	V DC	See page 10	
Technical data			
Operate/release time: ON/OFF (DC input)	ms	0.05/0.25	12/12
Dielectric strength between input/output	V AC	2,500	
Ambient temperature range	°C	–20…+55	
Environmental protection		IP20	
Approvals relay (according to type)		RINA	

Ordering information

Electromechanical relay - 1 or 2 Pole

Example: 38 series screw terminal relay interface module, 1 CO (SPDT), sensitive 12 V DC coil.

								A	B	C	D
3	8	. 5	1	. 7	. 0	1	2	. 0	0	5	0

B

Series

Type
0 = Electromechanical 16 A relay, with screw terminal
1 = Electromechanical 16 A relay, with screwless terminal
2 = Timer multifunction (AI, DI, GI, SW), with screw terminal
5 = Electromechanical relay, with screw terminal
6 = Electromechanical relay, with screwless terminal

No. of poles
1 = 1 pole, 6 or 16 A
2 = 2 pole, 8 A

Coil version
0 = AC (50/60 Hz)/ DC
3 = Leakage current suppression for (110…125)V AC/DC - (230…240)V AC
7 = Sensitive DC, (6, 12, 24, 48, 60)V only
8 = AC (50/60 Hz)

Coil voltage
See coil specifications

D: Special versions
0 = Standard

C: Options
5 = Standard DC
6 = Standard AC or AC/DC

B: Contact circuit
0 = CO (nPDT)

A: Contact material
0 = AgNi Standard
4 = $AgSnO_2$
5 = AgNi + Au

Selecting features and options: only combinations in the same row are possible.

Type	Coil version	A	B	C	D
38.01/11	7	0 - 4	0	5	0
38.01/11	0 - 8	0 - 4	0	6	0
38.51/61	7	0 - 4 - 5	0	5	0
38.51/61	0 - 3 - 8	0 - 4 - 5	0	6	0
38.52/62	7	0 - 5	0	5	0
38.52/62	0 - 8	0 - 5	0	6	0
38.21	0	0	0	6	0

Ordering information

Solid state relay - Single output - 6.2 & 14 mm wide

Example: 38 series screw terminal SSR relay interface module, 6.2 mm wide, 2 A output, 24 V DC input.

3	8	.	8	1	.	7	.	0	2	4	.	9	0	2	4

Series

Type
21 = Timer SSR 6.2mm wide, with screw terminal
31 = SSR 14mm wide, with screw terminal
41 = SSR 14mm wide, with screwless terminal
81 = SSR 6.2mm wide, with screw terminal
91 = SSR 6.2mm wide, with screwless terminal

Input version
0 = AC/DC
3 = Leakage current suppression for (110...125)V AC/DC and (230...240)V AC SSR only
7 = DC, (6, 24, 60)V SSR only

Input voltage
See input specifications

Output version
9024 = 2 A - 24 V DC (38.21, 38.81 & 38.91)
9024 = 5 A - 24 V DC (38.31 & 38.41)
7048 = 0.1 A - 48 V DC (38.81 & 38.91)
8240 = 2 A - 240 V AC (38.21, 38.81 & 38.91)
8240 = 3 A - 240 V AC (38.31 & 38.41)

B

Selecting features and options: only combinations in the same row are possible.

Type	Input version	Output version
38.81/91	7	9024 - 7048 - 8240
38.81/91	0 - 3	9024 - 7048 - 8240
38.31/41	0 - 7	9024 - 8240
38.21	0	9024 - 8240

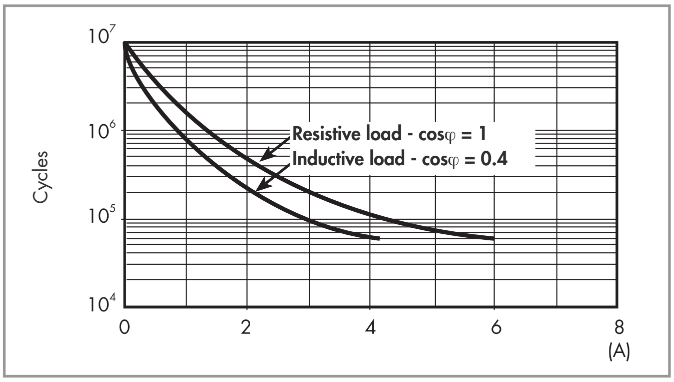
B

Technical data - 1 & 2 Pole Electromechanical Relays

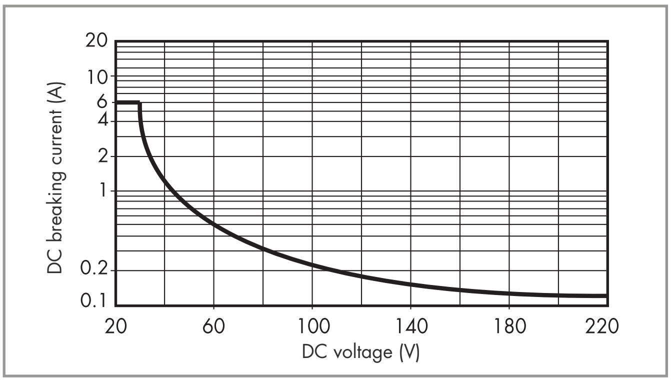
Insulation						
Insulation according to EN 61810-1	insulation rated voltage	V	250		400	
	rated impulse withstand voltage	kV	4		4	
	pollution degree		3		2	
	overvoltage category		III		III	
Insulation between coil and contacts (1.2/50 µs)		kV	6 (8 mm)			
Dielectric strength between open contacts		V AC	1,000			
Conducted disturbance immunity						
Burst (5…50)ns, 5 kHz, on A1 - A2			EN 61000-4-4		level 4 (4 kV)	
Surge (1.2/50 µs) on A1 - A2 (differential mode)			EN 61000-4-5		level 3 (2 kV)	
Other data			**1 Pole 6 A**		**1 Pole 16 A - 2 Pole 8 A**	
Bounce time: NO/NC		ms	1/6		2/5	
Vibration resistance (10…55)Hz: NO/NC		g	10/5		15/2	
Power lost to the environment	without contact current	W	0.2 (12 V) - 0.9 (240 V)		0.5 (24 V) - 0.9 (240 V)	
	with rated current	W	0.5 (12 V) - 1.5 (240 V)		1.3 (24 V) - 1.7 (240 V)	
Terminals			**38.21 / 38.51**		**38.61**	
Wire strip length		mm	10		10	
Screw torque		Nm	0.5		—	
Max. wire size			solid cable	stranded cable	solid cable	stranded cable
		mm^2	1x2.5/2x1.5	1x2.5/2x1.5	1x2.5	1x2.5
		AWG	1x14/2x16	1x14/2x16	1x14	1x14
			38.01 / 38.52		**38.11 / 38.62**	
Wire strip length		mm	10		10	
Screw torque		Nm	0.5		—	
Max. wire size			solid cable	stranded cable	solid cable	stranded cable
		mm^2	1x2.5/2x1.5	1x2.5/2x1.5	1x2.5	1x2.5
		AWG	1x14/2x16	1x14/2x16	1x14	1x14

Contact specification - 1 & 2 Pole Electromagnetic Relays

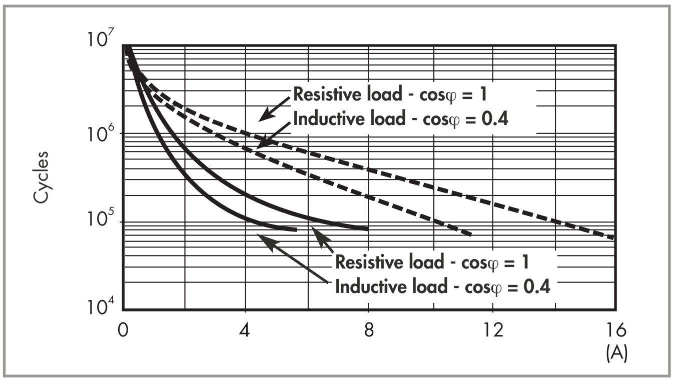
F 38 - Electrical life (AC) v contact current, 1 Pole 6 A



H 38 - Maximum DC1 breaking capacity, 1 Pole 6 A

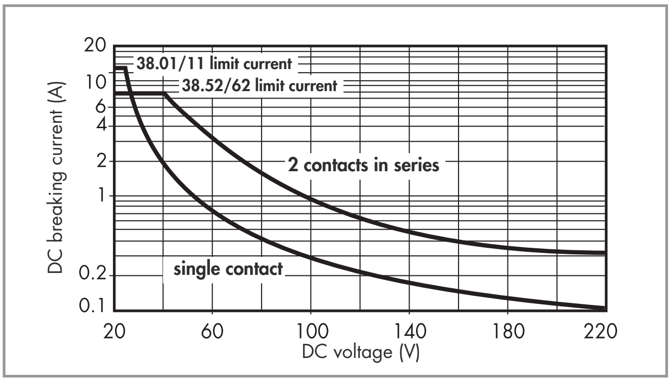


F 38 - Electrical life (AC) v contact current, 1 Pole 16 A and 2 Pole 8 A



——— : 2 Pole 8 A
--------- : 1 Pole 16 A

H 38 - Maximum DC1 breaking capacity, 1 Pole 16 A and 2 Pole 8 A



- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of ≥ $60 \cdot 10^3$ (1 Pole) or ≥ $80 \cdot 10^3$ (2 Pole) can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load. Note: the release time for the load will be increased.

Coil specifications - 1 Pole 6 A Electromechanical Relay

Coil data sensitive DC, 1 Pole

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Rated coil consumption I at U_N	Power consumption P at U_N
V		V	V	mA	W
6	**7**.006	4.8	7.2	35	0.2
12	**7**.012	9.6	14.4	15.2	0.2
24	**7**.024	19.2	28.8	10.4	0.3
48	**7**.048	38.4	57.6	6.3	0.3
60	**7**.060	48	72	7	0.4

Coil data AC/DC, 1 Pole

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Rated coil consumption I at U_N	Power consumption P at U_N
V		V	V	mA	VA/W
12	**0**.012	9.6	13.2	16	0.2/0.2
24	**0**.024	19.2	26.4	12	0.3/0.2
48	**0**.048	38.4	52.8	6.9	0.3/0.3
60	**0**.060	48	66	7	0.5/0.5
110...125	**0**.125	88	138	5(*)	0.6/0.6(*)
220...240	**0**.240	176	264	4(*)	1/0.9(*)

(*) Rated coil consumption and power consumption values relate to U_N = 125 and 240 V.

Coil data AC, 1 Pole (indicated for max ambient temperature +70°C)

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Rated coil consumption I at U_N	Power consumption P at U_N
V		V	V	mA	VA/W
(230...240) AC	**8**.240	184	264	3	0.7/0.3

Coil data, leakage current suppression types, 1 Pole

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Rated coil consumption I at U_N	Power consumption P at U_N
V		V	V	mA	VA/W
(110...125) AC/DC	**3**.125	94	138	8(*)	1/1(*)
(230...240) AC	**3**.240	184	264	7(*)	1.7/0.5(*)

(*) Rated coil consumption and power consumption values relate to U_N = 125 and 240 V.

The 38 Series interface modules (supply version 3) have built-in leakage current suppression to address industry concerns of the contacts not dropping-out when there is residual current in the circuit; at (110...125)V AC and (230...240)V AC.

This problem can occur, for example, when connecting the interface modules to PLC,s with triac outputs or when connecting via relatively long cables.

Coil specifications - 1 Pole 16 A and 2 Pole 8 A Electromechanical Relay

Coil data sensitive DC, 1 Pole 16 A and 2 Pole 8 A

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Rated coil consumption I at U_N	Power consumption P at U_N
V		V	V	mA	W
12	**7**.012	9.6	14.4	41	0.5
24	**7**.024	19.2	28.8	19.5	0.5
60	**7**.060	48	72	8	0.5

Coil data AC/DC, 1 Pole 16 A and 2 Pole 8 A

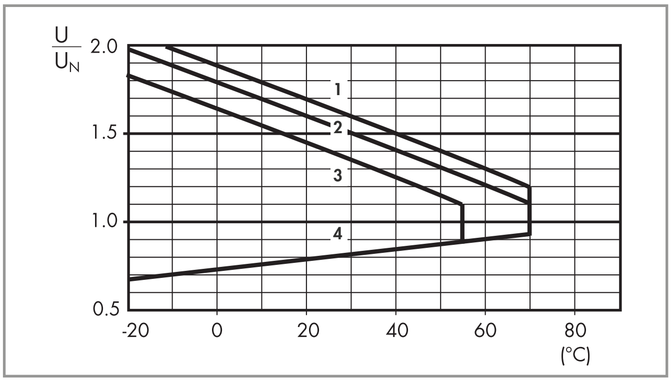
Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Rated coil consumption I at U_N	Power consumption P at U_N
V		V	V	mA	VA/W
24	**0**.024	19.2	26.4	20	0.5/0.5
60	**0**.060	48	66	7.1	0.5/0.5
110...125	**0**.125	88	138	4.6	0.6/0.6
220...240	**0**.240	184	264	3.8	0.9/0.9

Coil data AC, 1 Pole 16 A and 2 Pole 8 A

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Rated coil consumption I at U_N	Power consumption P at U_N
V		V	V	mA	VA/W
230...240	**8**.230	184	264	5.3	1.2/0.6

Coil specification - 1 & 2 Pole Electromagnetic Relays

R 38 - DC coil operating range v ambient temperature
1 Pole and 2 Pole



1 - Max. permitted coil voltage at nominal load (DC coil).
2 - Max. permitted coil voltage at nominal load (AC/DC coils U ≤ 60 V).
3 - Max. permitted coil voltage at nominal load (AC/DC coils U > 60 V).
4 - Min pick-up voltage with coil at ambient temperature.

B

Technical data - Solid State Relays

Other data			38.81/38.91		38.31/38.41	
Power lost to the environment	without output current	W	0.25 (24 V DC)		0.5	
	with rated current	W	0.4		2.2 (DC output) / 3 (AC output)	
Terminals			**38.81**		**38.91**	
Wire strip length		mm	10		10	
Screw torque		Nm	0.5		—	
Max. wire size			solid cable	stranded cable	solid cable	stranded cable
		mm^2	1x2.5 / 2x1.5	1x2.5 / 2x1.5	1x2.5	1x2.5
		AWG	1x14 / 2x16	1x14 / 2x16	1x14	1x14
			38.31		**38.41**	
Wire strip length		mm	10		10	
Screw torque		Nm	0.5		—	
Max. wire size			solid cable	stranded cable	solid cable	stranded cable
		mm^2	1x2.5 / 2x1.5	1x2.5 / 2x1.5	1x2.5	1x2.5
		AWG	1x14 / 2x16	1x14 / 2x16	1x14	1x14

Input specifications - Solid State Relays type 38.81 and 38.91 - 6.2 mm wide

Input data DC

Nominal voltage U_N	Supply code	Operating range		Release voltage U	Rated coil consumption I at U_N	Power consumption P
		U_{min}	U_{max}			
V		V	V	V	mA	W
6	**7**.006	5	7.2	2.4	7	0.2
24	**7**.024	16.8	30	10	10.5	0.3
60	**7**.060	35.6	72	20	6.5	0.4

Input data AC/DC

Nominal voltage U_N	Supply code	Operating range		Release voltage U	Rated coil consumption I at U_N	Power consumption P
		U_{min}	U_{max}			
V		V	V	V	mA	VA/W
110...125	**0**.125	88	138	22	5.5*	0.7/0.7
220...240	**0**.240	184	264	44	3.5*	1/0.9

(*) Rated coil consumption and power consumption values relate to U_N = 125 and 240 V.

Input data - Leakage current suppression types

Nominal voltage U_N	Supply code	Operating range		Release voltage U	Rated coil consumption I at U_N	Power consumption P at U_N
		U_{min}	U_{max}			
V		V	V		mA	W
110...125 AC/DC	**3**.125	94	138	44	8(*)	1/1(*)
230...240 AC	**3**.240	184	264	72	6.5(*)	1.6/0.6(*)

(*) Rated coil consumption and power consumption values relate to U_N = 125 and 240 V.

The 38 Series interface modules (supply version 3) have built-in leakage current suppression to address industry concerns of the contacts not dropping-out when there is residual current in the circuit; at (110...125)V AC and (230...240)V AC.

This problem can occur, for example, when connecting the interface modules to PLC,s with triac outputs or when connecting via relatively long cables.

Input specification - Solid State Relay types 38.31 and 38.41 - 14 mm wide

Input data DC

Nominal voltage U_N	Supply code	Operating range		Release voltage U	Rated coil consumption I at U_N	Power consumption P
		U_{min}	U_{max}			
V		V	V	V	mA	W
12	**7**.012	9.6	18	5	9	0.2
24	**7**.024	16.8	30	5	12	0.3

Input data AC/DC

Nominal voltage U_N	Supply code	Operating range		Release voltage U	Rated coil consumption I at U_N	Power consumption P
		U_{min}	U_{max}			
V		V	V	V	mA	W
24	**0**.024	16.8	30	9	16.5	0.3

Additional technical data - Timed Interface Module

EMC specifications			
Type of test		**Reference standard**	
Electrostatic discharge	contact discharge	EN 61000-4-2	4 kV
	air discharge	EN 61000-4-2	8 kV
Radio-frequency electromagnetic field (80 ÷ 1,000 MHz)		EN 61000-4-3	10 V/m
Fast transients (burst) (5-50 ns, 5 kHz) on Supply terminals		EN 61000-4-4	4 kV
Surges (1.2/50 μs) on Supply terminals	common mode	EN 61000-4-5	4 kV
	differential mode	EN 61000-4-5	4 kV
Radio-frequency common mode (0.15 ÷ 80 MHz) on Supply terminals		EN 61000-4-6	10 V
Radiated and conducted emission		EN 55022	class B
Other data		**EMR**	**SSR**
Power lost to the environment	without contact current W	0.1	0.1
	with rated current W	0.6	0.5
Terminals		**38.21**	
Wire strip length	mm	10	
Screw torque	Nm	0.5	
Max. wire size		solid cable	stranded cable
	mm^2	1x2.5 / 2x1.5	1x2.5 / 2x1.5
	AWG	1x14 / 2x16	1x14 / 2x16

Times scales

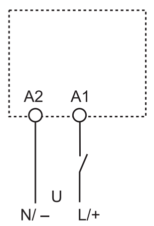
(0.1…3)s (3…60)s (1…20)min (0.3…6)h

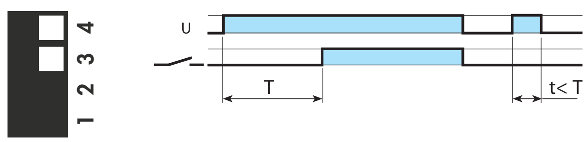
Functions

LED	Supply voltage	NO contact/output
	OFF	Open
	ON	Open (time in progress)
	ON	Closed

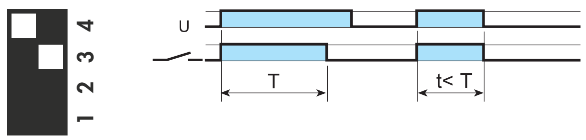
Wiring diagram

U = Supply voltage = Output contact

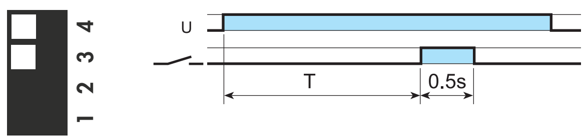




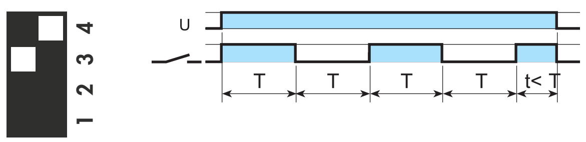
(AI) On-delay.
Apply power to timer.
Output contacts transfer after preset time has elapsed.
Reset occurs when power is removed.



(DI) Interval.
Apply power to timer.
Output contacts transfer immediately.
After the preset time has elapsed, contacts reset.



(GI) Pulse delayed.
Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs after a fixed time of 0.5s.

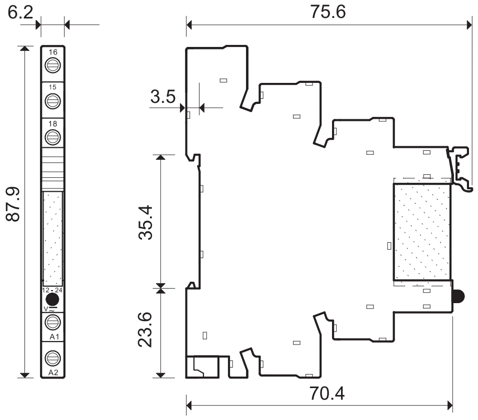


(SW) Symmetrical flasher (starting pulse on).
Apply power to timer.
Output contacts transfer immediately and cycle between ON and OFF for as long as power is applied.
The ratio is 1:1 (time on = time off).

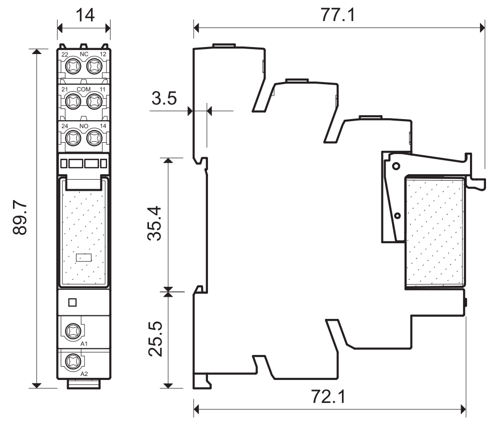
B

Outline drawings

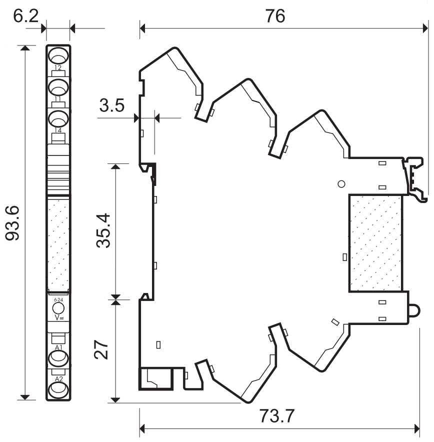
38.21
38.51 / 38.51.3
38.81 / 38.81.3
Screw terminal



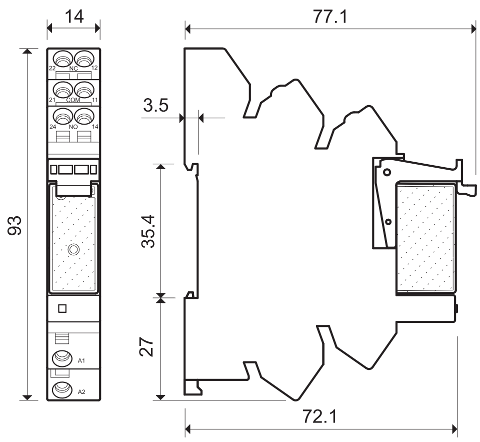
38.01
38.31
38.52
Screw terminal

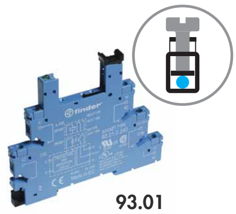


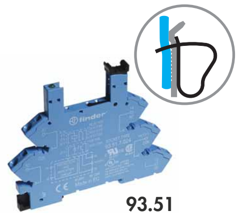
38.61 / 38.61.3
38.91 / 38.91.3
Screwless terminal



38.11
38.41
38.62
Screwless terminal




93.01

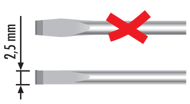

93.51

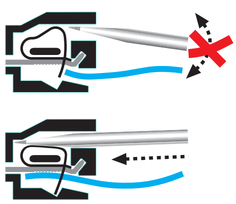

93.02


93.52

Approvals
(according to type):

Certain relay/socket combinations





Electromechanical Relay & Socket Combinations

Screw terminal - 1 Pole relay 6 A

Interface Module Code	Coil voltage	Relay	Socket
38.51.0.012.0060	12 V AC/DC	34.51.7.012.0010	93.01.0.024
38.51.0.024.0060	24 V AC/DC	34.51.7.024.0010	93.01.0.024
38.51.0.048.0060	48 V AC/DC	34.51.7.048.0010	93.01.0.060
38.51.0.060.0060	60 V AC/DC	34.51.7.060.0010	93.01.0.060
38.51.0.125.0060	(110...125)V AC/DC	34.51.7.060.0010	93.01.0.125
38.51.0.240.0060	(220...240)V AC/DC	34.51.7.060.0010	93.01.0.240
38.51.3.125.0060	(110...125)V AC/DC	34.51.7.060.0010	93.01.3.125
38.51.3.240.0060	(230...240)V AC	34.51.7.060.0010	93.01.3.240
38.51.7.006.0050	6 V DC	34.51.7.005.0010	93.01.7.024
38.51.7.012.0050	12 V DC	34.51.7.012.0010	93.01.7.024
38.51.7.024.0050	24 V DC	34.51.7.024.0010	93.01.7.024
38.51.7.048.0050	48 V DC	34.51.7.048.0010	93.01.7.060
38.51.7.060.0050	60 V DC	34.51.7.060.0010	93.01.7.060
38.51.8.240.0060	(230...240)V AC	34.51.7.060.0010	93.01.8.240

Screwless terminal - 1 Pole relay 6 A

Interface Module Code	Coil voltage	Relay	Socket
38.61.0.012.0060	12 V AC/DC	34.51.7.012.0010	93.51.0.024
38.61.0.024.0060	24 V AC/DC	34.51.7.024.0010	93.51.0.024
38.61.0.125.0060	(110...125)V AC/DC	34.51.7.060.0010	93.51.0.125
38.61.0.240.0060	(220...240)V AC/DC	34.51.7.060.0010	93.51.0.240
38.61.3.125.0060	(110...125)V AC/DC	34.51.7.060.0010	93.51.3.125
38.61.3.240.0060	(230...240)V AC	34.51.7.060.0010	93.51.3.240
38.61.7.012.0050	12 V DC	34.51.7.012.0010	93.51.7.024
38.61.7.024.0050	24 V DC	34.51.7.024.0010	93.51.7.024
38.61.8.240.0060	(230...240)V AC	34.51.7.060.0010	93.51.8.240

Screw terminal - 1 Pole relay 16 A

Interface Module Code	Coil voltage	Relay	Socket
38.01.7.012.0050	12 V DC	41.61.9.012.0010	93.02.7.024
38.01.7.024.0050	24 V DC	41.61.9.024.0010	93.02.7.024
38.01.7.060.0050	60 V DC	41.61.9.060.0010	93.02.7.060
38.01.0.024.0060	24 V AC/DC	41.61.9.024.0010	93.02.0.024
38.01.0.060.0060	60 V AC/DC	41.61.9.060.0010	93.02.0.060
38.01.0.125.0060	125 V AC/DC	41.61.9.110.0010	93.02.0.125
38.01.0.240.0060	240 V AC/DC	41.61.9.110.0010	93.02.0.240
38.01.8.230.0060	230 V AC	41.61.9.110.0010	93.02.8.230

Screwless terminal - 1 Pole relay 16 A

Interface Module Code	Coil voltage	Relay	Socket
38.11.7.012.0050	12 V DC	41.61.9.012.0010	93.52.7.024
38.11.7.024.0050	24 V DC	41.61.9.024.0010	93.52.7.024
38.11.7.060.0050	60 V DC	41.61.9.060.0010	93.52.7.060
38.11.0.024.0060	24 V AC/DC	41.61.9.024.0010	93.52.0.024
38.11.0.060.0060	60 V AC/DC	41.61.9.060.0010	93.52.0.060
38.11.0.125.0060	125 V AC/DC	41.61.9.110.0010	93.52.0.125
38.11.0.240.0060	240 V AC/DC	41.61.9.110.0010	93.52.0.240
38.11.8.230.0060	230 V AC	41.61.9.110.0010	93.52.8.230

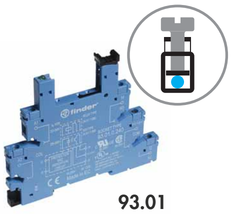
Screw terminal - 2 Pole relay 8 A

Interface Module Code	Coil voltage	Relay	Socket
38.52.0.024.0060	24 V AC/DC	41.52.9.024.0010	93.02.0.024
38.52.0.060.0060	60 V AC/DC	41.52.9.060.0010	93.02.0.060
38.52.0.125.0060	(110...125)V AC/DC	41.52.9.110.0010	93.02.0.125
38.52.0.240.0060	(220...240)V AC/DC	41.52.9.110.0010	93.02.0.240
38.52.7.012.0050	12 V DC	41.52.9.012.0010	93.02.7.024
38.52.7.024.0050	24 V DC	41.52.9.024.0010	93.02.7.024
38.52.7.060.0050	60 V DC	41.52.9.060.0010	93.02.7.060
38.52.8.230.0060	(230...240)V AC	41.52.9.110.0010	93.02.8.230

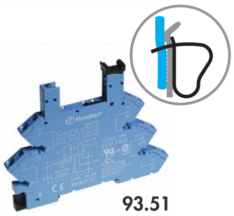
Screwless terminal - 2 Pole relay 8 A

Interface Module Code	Coil voltage	Relay	Socket
38.62.0.024.0060	24 V AC/DC	41.52.9.024.0010	93.52.0.024
38.62.0.060.0060	60 V AC/DC	41.52.9.060.0010	93.52.0.060
38.62.0.125.0060	(110...125)V AC/DC	41.52.9.110.0010	93.52.0.125
38.62.0.240.0060	(220...240)V AC/DC	41.52.9.110.0010	93.52.0.240
38.62.7.012.0050	12 V DC	41.52.9.012.0010	93.52.7.024
38.62.7.024.0050	24 V DC	41.52.9.024.0010	93.52.7.024
38.62.7.060.0050	60 V DC	41.52.9.060.0010	93.52.7.060
38.62.8.230.0060	(230...240)V AC	41.52.9.110.0010	93.52.8.230

B



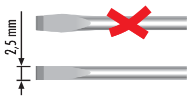
93.01

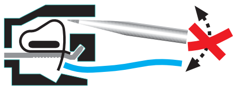


93.51

Approvals
(according to type):

Certain relay/socket combinations

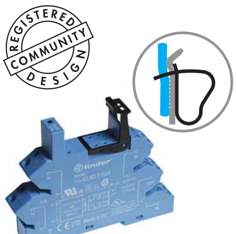




Solid State Relay & Socket Combinations - 6.2 mm wide

Screw terminal			
Interface Module Code	**Input voltage**	**Relay**	**Socket**
38.81.7.006.xxxx	6 V DC	34.81.7.005.xxxx	93.01.7.024
38.81.7.024.xxxx	24 V DC	34.81.7.024.xxxx	93.01.7.024
38.81.7.060.xxxx	60 V DC	34.81.7.060.xxxx	93.01.7.060
38.81.0.125.xxxx	(110...125)V AC/DC	34.81.7.060.xxxx	93.01.0.125
38.81.0.240.xxxx	(220...240)V AC/DC	34.81.7.060.xxxx	93.01.0.240
38.81.3.125.xxxx	(110...125)V AC/DC	34.81.7.060.xxxx	93.01.3.125
38.81.3.240.xxxx	(230...240)V AC	34.81.7.060.xxxx	93.01.3.240
Screwless terminal			
Interface Module Code	**Input voltage**	**Relay**	**Socket**
38.91.7.006.xxxx	6 V DC	34.81.7.005.xxxx	93.51.7.024
38.91.7.024.xxxx	24 V DC	34.81.7.024.xxxx	93.51.7.024
38.91.7.060.xxxx	60 V DC	34.81.7.060.xxxx	93.51.7.060
38.91.0.125.xxxx	(110...125)V AC/DC	34.81.7.060.xxxx	93.51.0.125
38.91.0.240.xxxx	(220...240)V AC/DC	34.81.7.060.xxxx	93.51.0.240
38.91.3.125.xxxx	(110...125)V AC/DC	34.81.7.060.xxxx	93.51.3.125
38.91.3.240.xxxx	(230...240)V AC	34.81.7.060.xxxx	93.51.3.240

Example: .xxxx
.9024
.7048
.8240

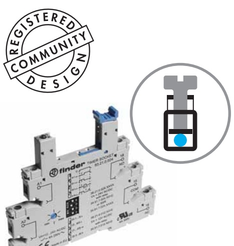


93.52

Approvals
(according to type):

Solid State Relay & Socket Combinations - 14 mm wide

Screw terminal			
Interface Module Code	**Input voltage**	**Relay**	**Socket**
38.31.0.024.xxxx	24 V AC/DC	41.81.7.024.xxxx	93.02.0.024
38.31.7.012.xxxx	12 V DC	41.81.7.012.xxxx	93.02.7.024
38.31.7.024.xxxx	24 V DC	41.81.7.024.xxxx	93.02.7.024
Screwless terminal			
Interface Module Code	**Input voltage**	**Relay**	**Socket**
38.41.0.024.xxxx	24 V AC/DC	41.81.7.024.xxxx	93.52.0.024
38.41.7.012.xxxx	12 V DC	41.81.7.012.xxxx	93.52.7.024
38.41.7.024.xxxx	24 V DC	41.81.7.024.xxxx	93.52.7.024



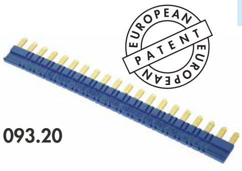
93.21

Approvals
(according to type):

SSR / EMR & Timer Socket Combinations

Screw terminal			
Interface Module Code	**Input / Coil voltage**	**Relay**	**Socket**
38.21.0.012.0060	12 V AC/DC	34.51.7.012.0010	93.21.0.024
38.21.0.024.0060	24 V AC/DC	34.51.7.024.0010	93.21.0.024
38.21.0.024.xxxx	24 V AC/DC	34.81.7.024.xxxx	93.21.0.024

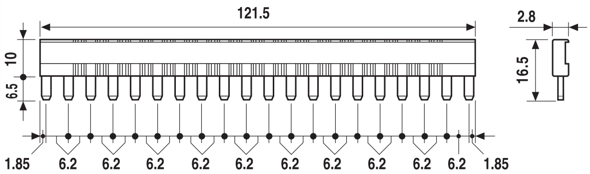
Accessories

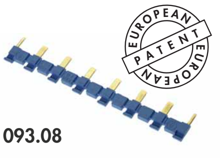


093.20

Approvals
(according to type):

20-way jumper link for 38.21/51/61/81/91	093.20 (blue)	093.20.0 (black)	093.20.1 (red)
Rated values	36 A - 250 V		

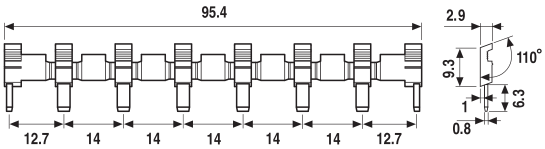




093.08

Approvals
(according to type):

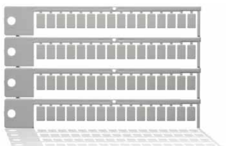
8-way jumper link for 38.01/11/31/41/52/62	093.08 (blue)	093.08.0 (black)	093.08.1 (red)
Rated values	10 A - 250 V		



093.01

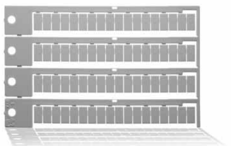
Plastic separator	093.01

Thickness 2 mm, required at the start and the end of a group of interfaces.
Can be used for visual separation group, must be used for:
- protective separation of different voltages of neighbouring PLC interfaces according to VDE 0106-101
- protection of cut jumper links



093.64

Sheet of marker tags for 38.21/51/61/81/91, plastic, 64 tags, 6x10 mm	093.64



060.72

Sheet of marker tags for 38.01/11/31/41/52/62, plastic, 72 tags, 6x12 mm	060.72

II-2014, www.findernet.com

Common features

- Space saving 6.2 mm wide
- Connections for 16-way jumper link
- Integral coil indication and protection circuit
- Secure retention and easy ejection by plastic clip
- Dual screw head (blade+cross) terminals and Push-in terminals versions
- 35 mm rail mounting (EN 60715)

EMR
Electromechanical Relays

- **1 CO 6 A 250 V AC**
- High switching capability

SSR
Solid State Relays

- 1 solid state output (options **0.1 A 48 V DC, 2 A 24 V DC, 2 A 240 V AC**)
- Silent, high speed switching, long electrical life

*Master***BASIC**

- For general use in any type of system
- **EMR: 6 to 24 and 125 V AC/DC, 230 V AC upply**
- **SSR: 6 to 24 V DC, 125 V AC/DC, 230 V AC supply**
- Screw terminal and Push-in terminal

39.11/39.01

Page 4

39.10/39.00

Page 5

*Master***PLUS**

- Accepts the output fuse module, for the easy and space efficient protection of output circuits
- **EMR: 6 to 125 V AC/DC, 125 and 220 V DC, 230 V AC and 24...240 V AC/DC supply**
- **SSR: 24 - 125 V AC/DC, 6 to 220 V DC, 230 V AC and 24...240 V AC/DC supply**
- **Special 125 V AC/DC and 230 V AC leakage current suppression types (39.31.3, 39.61.3 EMR and 39.30.3, 39.60.3 SSR)**
- Screw terminal and Push-in terminal

39.31 - 39.31.3/39.61 - 39.61.3

Page 6

39.30 - 39.30.3/39.60 - 39.60.3

Page 7

*Master***INPUT**

- Jumper link option for the quick and easy distribution of supply voltage to proximity switches and similar input devices
- **EMR: 6 to 24 V and 125 V AC/DC, 230 V AC supply**
- **SSR: 6 - 24 V DC, 24 - 125 V AC/DC, 230 V AC supply**
- Screw terminal and Push-in terminal

39.41/39.71

Page 8

39.40/39.70

Page 9

*Master***OUTPUT**

- Jumper link option for the quick and easy distribution of supply voltage to output side and its connection to electromagnetic valves and similar output devices
- **EMR: 6 to 24 V and 125 V AC/DC, 230 V AC supply**
- **SSR: 6 to 24 V DC, 125 V AC/DC, 230 V AC supply**
- Screw terminal and Push-in terminal

39.21/39.51

Page 10

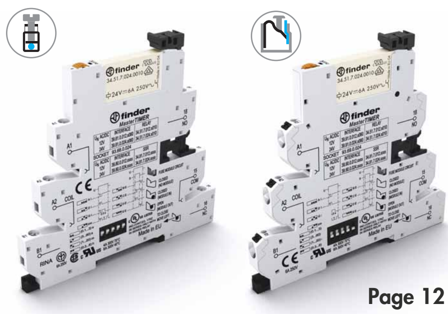
39.20/39.50

Page 11

*Master***TIMER**

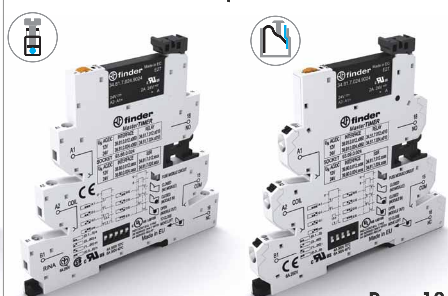
- Timer adjustment via top mounted rotary knob accessible after assembly
- Control signal terminal
- DIP-switch for selection of 4 time scales and 8 functions
- Output with fuse module option
- **EMR and SSR: 12 to 24 V AC/DC supply**
- Screw terminal and Push-in terminal

39.81/ 39.91



Page 12

39.80/39.90



Page 13

B

*Master**BASIC***

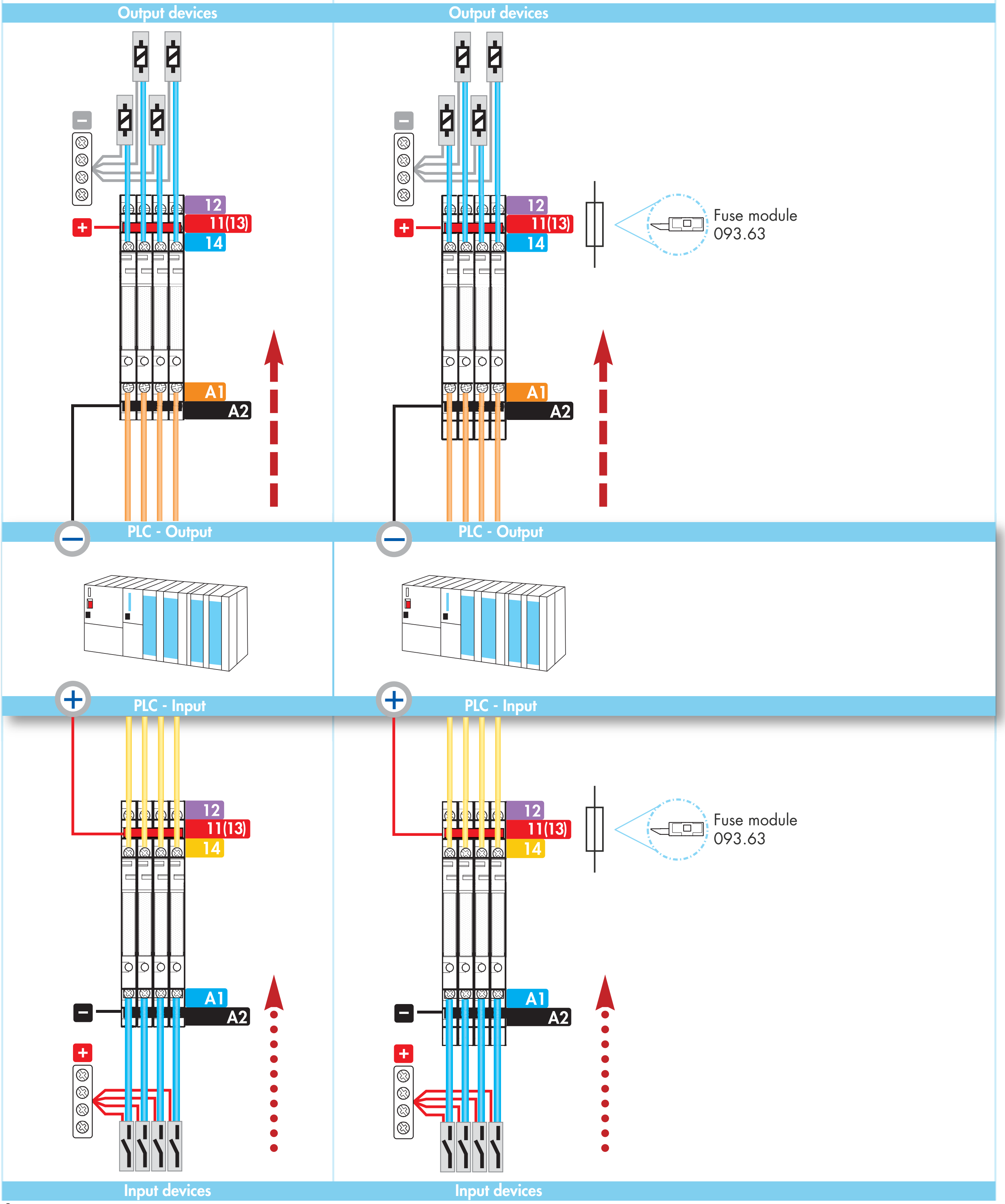
39.11 - 39.10 - 39.01 - 39.00

- For general interface use in any type of system and application.
- Can be used for input interface applications between auxiliary contacts, sensors etc. and controllers, PLCs' or motors. Or for output interface between PLC's controllers and relays, solenoids etc.

*Master**PLUS***

39.31 - 39.30 - 39.31.3 - 39.30.3 - 39.61 - 39.60 - 39.61.3 - 39.60.3

- This special version provides extra protection for the output circuit thanks to the replaceable fuse module.
- For general interface use in any type of system and application.
- Can be used for input interface applications between auxiliary contacts, sensors etc. and controllers, PLCs' or motors. Or for output interface between PLC's controllers and relays, solenoids etc.



*Master***INPUT**
39.41 - 39.40 - 39.71 - 39.70

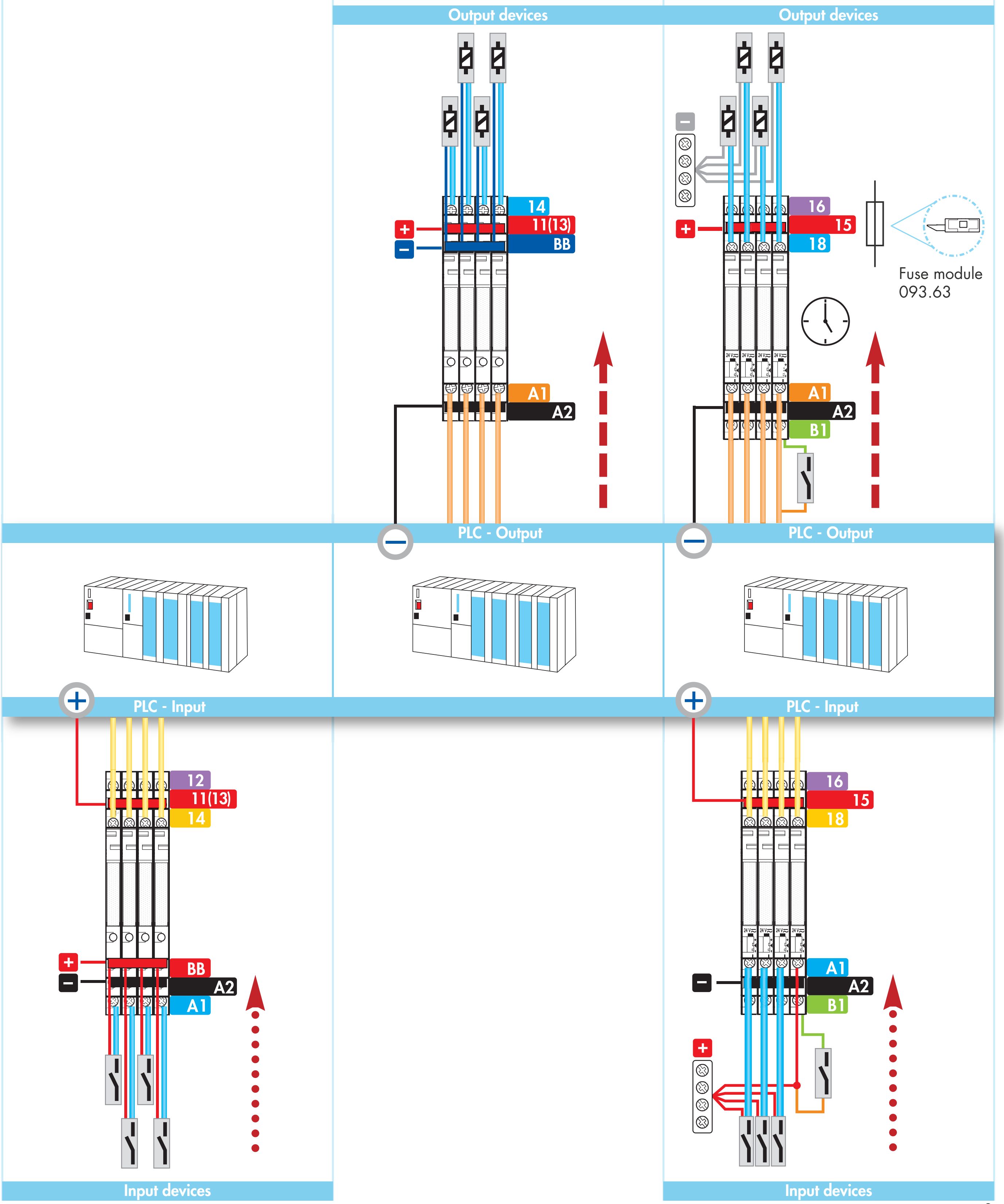
- These models allow the full termination of input device to the interface without the need for additional terminals - saving component cost, time and panel space.
- Quick and easy distribution of supply voltage through the jumper link on the Bus-Bar (BB) connection.
- Ideal for interface applications between the auxiliary contacts, sensors, limit switches and Controllers or PLC's.

*Master***OUTPUT**
39.21 - 39.20 - 39.51 - 39.50

- These models allow the full termination of output device to the interface without the need for additional terminals - saving component cost, time and panel space.
- Quick and easy distribution of supply voltage through the jumper link on the Bus-Bar (BB) connection.
- Ideal for interface applications between the PLC's or Controllers and output devices such as electomagnetic valves or motors etc..

*Master***TIMER**
39.81 - 39.80 - 39.91 - 39.90

- Slim and Multifunction Timed Interface modules.



*Master***BASIC** - EMR

Features

1 Pole interface module, 6.2 mm wide, ideal for PLC and electronic systems

- Common connection possible with optional jumper links (terminals A1, A2 and 11)
- UL Listing (certain relay/socket combinations)

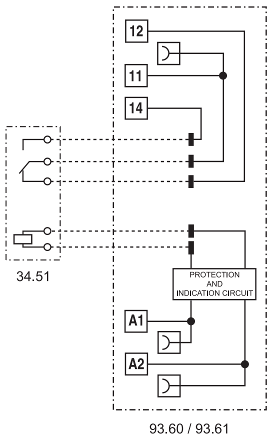
B

NEW **39.11/39.01**

- 6 A electromechanical relay
- 6 to 24 and 125 V AC/DC and 230 V AC supply
- Screw terminal and push-in terminal
- 35 mm rail (EN 60715) mounting

39.11 Screw terminal

39.01 Push-in terminal



For outline drawing see page 20, 21

Contact specification		
Contact configuration		1 CO (SPDT)
Rated current/Maximum peak current	A	6/10
Rated voltage/Maximum switching voltage	V AC	250/400
Rated load AC1	VA	1,500
Rated load AC15 (230 V AC)	VA	300
Single phase motor rating (230 V AC)	kW	0.185
Breaking capacity DC1: 30/110/220 V	A	6/0.2/0.12
Minimum switching load	mW (V/mA)	500 (12/10)
Standard contact material		AgNi
Supply specification		
Nominal voltage (U_N)	V AC/DC	6 - 12 - 24 - 110...125
	V AC (50/60 Hz)	220...240
Rated power	VA (50 Hz)/W	See page 16
Operating range		(0.8...1.1)U_N
Holding voltage		0.6 U_N
Must drop-out voltage		0.1 U_N
Technical data		
Mechanical life AC/DC	cycles	$10 \cdot 10^6$
Electrical life at rated load AC1	cycles	$60 \cdot 10^3$
Operate/release time	ms	5/6
Insulation between coil and contacts (1.2/50 µs)	kV	6 (8 mm)
Dielectric strength between open contacts	V AC	1,000
Ambient temperature range	°C	–40…+70
Protection category		IP 20
Approvals relay (according to type)		CE EAC RINA c UL us VDE

*Master***BASIC** - SSR

Features

1 Pole interface module, 6.2 mm wide, ideal for PLC and electronic systems

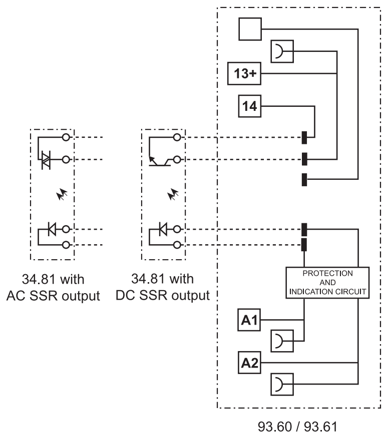
- Common connection possible with optional jumper links (terminals A1, A2 and 13+)
- UL Listing (certain relay/socket combinations)

NEW **39.10/39.00**

- 0.1 or 2 A solid state relay
- 6 to 24 V DC, 125 V AC/DC and 230 V AC supply
- Screw terminal and push-in terminal
- 35 mm rail (EN 60715) mounting

39.10
Screw terminal

39.00
Push-in terminal



For outline drawing see page 20, 21

Output specification (SSR)		**39.x0.x.xxx.9024**	**39.x0.x.xxx.7048**	**39.x0.x.xxx.8240**
Contact configuration		1 NO (SPST-NO)		
Rated current/Maximum peak current (10 ms)	A	2/20 DC	0.1/0.5 DC	2/40 AC
Rated voltage/Maximum blocking voltage	V	24/33 DC	48/60 DC	240/— AC
Switching voltage range	V	(1.5…24) DC	(1.5…48) DC	(12…275) AC
Repetitive peak off-state voltage	V_{pk}	—	—	600
Minimum switching current	mA	1	0.05	22
Max. “OFF-state” leakage current	mA	0.001	0.001	1.5
Max. “ON-state” voltage drop	V	0.12	1	1.6
Supply specification				
Nominal voltage (U_N)	V AC/DC	110...125		
	V AC (50/60 Hz)	220...240		
	V DC	6 - 12 - 24		
Rated power	VA (50 Hz)/W	See page 17		
Operating range		(0.8…1.1) U_N		
Must drop-out voltage		0.1 U_N		
Technical data				
Operate/release time	ms	0.2/0.6	0.04/0.11	12/12
Dielectric strength between input/output	V AC	2,500		
Ambient temperature range	°C	–20…+55		
Protection category		IP20		
Approvals relay (according to type)		CE EAC c UL us		

39 Series - Relay interface modules 0.1 - 2 - 6 A

REGISTERED COMMUNITY DESIGN

finder

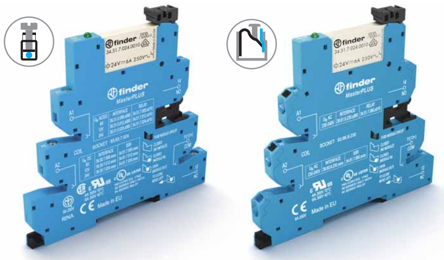
*Master**PLUS*** - EMR

Features

1 Pole interface modules, 6.2 mm wide, ideal for PLC and electronic systems

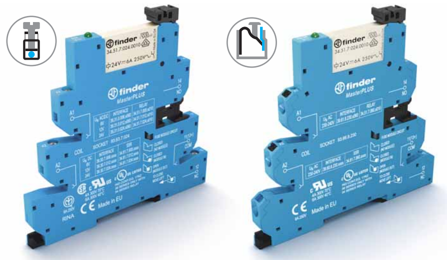
- Accepts output fuse module **093.63** (for 5 x 20 mm fuses) for quick and easy load protection, see page 24
- Common connection possible with optional jumper links (terminals A1, A2 and 11)
- UL Listing (certain relay/socket combinations)

NEW 39.31/39.61



- 6 A electromechanical relay
- 6 to 125 V AC/DC, 125 and 220 V DC, 230 V AC, 24…240 V AC/DC supply
- Screw terminal and push-in terminal
- 35 mm rail (EN 60715) mounting

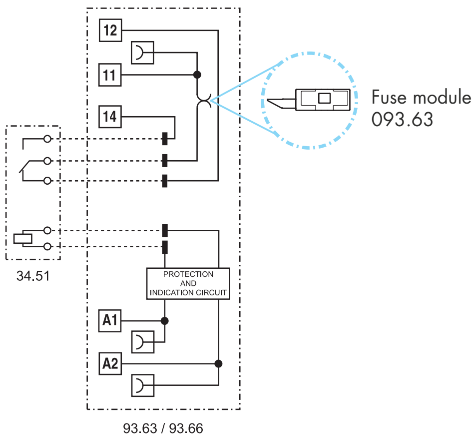
NEW 39.31.3/39.61.3



- 6 A electromechanical relay
- Leakage current suppression version, 125 V AC/DC and 230 V AC supply
- Screw terminal and push-in terminal

39.31 / 39.31.3
Screw terminal

39.61 / 39.61.3
Push-in terminal



For outline drawing see page 20, 21

		39.31/39.61	39.31.3/39.61.3
Contact specification			
Contact configuration		1 CO (SPDT)	1 CO (SPDT)
Rated current/Maximum peak current	A	6/10	6/10
Rated voltage/Maximum switching voltage	V AC	250/400	250/400
Rated load AC1	VA	1,500	1,500
Rated load AC15 (230 V AC)	VA	300	300
Single phase motor rating (230 V AC)	kW	0.185	0.185
Breaking capacity DC1: 30/110/220 V	A	6/0.2/0.12	6/0.2/0.12
Minimum switching load	mW (V/mA)	500 (12/10)	500 (12/10)
Standard contact material		AgNi	AgNi
Supply specification			
Nominal voltage (U_N)	V AC/DC	6 - 12 - 24 - 60 - 110…125 - 24…240	110…125
	V AC (50/60 Hz)	220…240	220…240
	V DC	110…125 - 220	—
Rated power	VA (50 Hz)/W	See page 16	See page 16
Operating range		(0.8…1.1) U_N	(0.8…1.1) U_N
Holding voltage		0.6 U_N	0.6 U_N
Must drop-out voltage		0.1 U_N	0.3 U_N
Technical data			
Mechanical life AC/DC	cycles	$10 \cdot 10^6$	$10 \cdot 10^6$
Electrical life at rated load AC1	cycles	$60 \cdot 10^3$	$60 \cdot 10^3$
Operate/release time	ms	5/6	5/6
Insulation between coil and contacts (1.2/50 μs)	kV	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts	V AC	1,000	1,000
Ambient temperature range	°C	–40…+70 (+55 for 220 V DC)	–40…+70
Protection category		IP20	IP20
Approvals relay (according to type)			

*Master***PLUS** - SSR

Features

1 Pole interface modules, 6.2 mm wide, ideal for PLC and electronic systems

- Accepts output fuse module **093.63** (for 5 x 20 mm fuses) for quick and easy load protection, see page 24
- Common connection possible with optional jumper links (terminals A1, A2 and 13+)
- UL Listing (certain relay/socket combinations)

NEW **39.30/39.60**

- 0.1 or 2 A solid state relay
- 24 - 125 V AC/DC, 6 to 220 V DC and 230 V AC, 24...240 V AC/DC supply
- Screw terminal and push-in terminal
- 35 mm rail (EN 60715) mounting

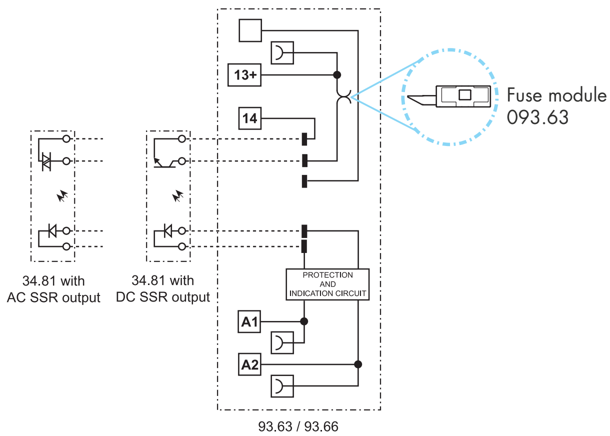
NEW **39.30.3/39.60.3**

- 0.1 or 2 A solid state relay
- Leakage current suppression version, 125 V AC/DC and 230 V AC supply
- Screw terminal and push-in terminal

B

39.30 / 39.30.3
Screw terminal

39.60 / 39.60.3
Push-in terminal



For outline drawing see page 20, 21

Output specification (SSR)		**39.x0.x.xxx.9024**	**39.x0.x.xxx.7048**	**39.x0.x.xxx.8240**	**39.x0.3.xxx.9024**	**39.x0.3.xxx.7048**	**39.x0.3.xxx.8240**
Contact configuration		1 NO (SPST-NO)			1 NO (SPST-NO)		
Rated current/Maximum peak current (10 ms)	A	2/20 DC	0.1/0.5 DC	2/40 AC	2/20 DC	0.1/0.5 DC	2/40 AC
Rated voltage/Maximum blocking voltage	V	24/33 DC	48/60 DC	240/— AC	24/33 DC	48/60 DC	240/— AC
Switching voltage range	V	(1.5…24) DC	(1.5…48)DC	(12…275) AC	(1.5…24) DC	(1.5…48)DC	(12…275) AC
Repetitive peak off-state voltage	V_{pk}	—	—	600	—	—	600
Minimum switching current	mA	1	0.05	22	1	0.05	22
Max. "OFF-state" leakage current	mA	0.001	0.001	1.5	0.001	0.001	1.5
Max. "ON-state" voltage drop	V	0.12	1	1.6	0.12	1	1.6
Supply specification							
Nominal voltage (U_N)	V AC/DC	24 - 110…125 - 24…240			110…125		
	V AC (50/60 Hz)	220…240			220…240		
	V DC	6 - 12 - 24 - 60 - 110…125 - 220			—		
Rated power	VA (50 Hz)/W	See page 17			See page 17		
Operating range		(0.8…1.1) U_N			(0.8…1.1) U_N		
Must drop-out voltage		0.1 U_N			0.3 U_N		
Technical data							
Operate/release time	ms	0.2/0.6	0.04/0.11	12/12	0.2/0.6	0.04/0.11	12/12
Dielectric strength between input/output	V AC	2,500			2,500		
Ambient temperature range	°C	–20…+55			–20…+55		
Protection category		IP20			IP20		
Approvals relay (according to type)		CE EAC PG cULus					

*Master***INPUT** - EMR

Features

1 Pole interface module, 6.2 mm wide, ideal for PLC and electronic systems

B

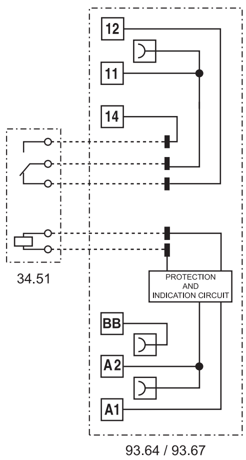
- Jumper link option for the quick and easy distribution of supply voltage to proximity switches and similar input devices (Bus-bar connection BB)
- Gold plated output contact as standard, for better compatibility with low energy PLC inputs
- UL Listing (certain relay/socket combinations)

NEW **39.41/39.71**

- 6 A electromechanical relay
- 6 - 12 - 24 - 125 V AC/DC and 230 V AC supply
- Screw terminal and push-in terminal
- 35 mm rail (EN 60715) mounting

39.41
Screw terminal

39.71
Push-in terminal



For outline drawing see page 20, 21

Contact specification		
Contact configuration		1 CO (SPDT)
Rated current/Maximum peak current	A	6/10
Rated voltage/Maximum switching voltage	V AC	250/400
Rated load AC1	VA	1,500
Rated load AC15 (230 V AC)	VA	300
Single phase motor rating (230 V AC)	kW	0.185
Breaking capacity DC1: 30/110/220 V	A	6/0.2/0.12
Minimum switching load	mW (V/mA)	50 (5/2)
Standard contact material		AgNi + Au
Supply specification		
Nominal voltage (U_N)	V AC/DC	6 - 12 - 24 - 110…125
	V AC (50/60 Hz)	220…240
Rated power	VA (50 Hz)/W	See page 16
Operating range		(0.8…1.1) U_N
Holding voltage		0.6 U_N
Must drop-out voltage		0.1 U_N
Technical data		
Mechanical life AC/DC	cycles	$10 \cdot 10^6$
Electrical life at rated load AC1	cycles	$60 \cdot 10^3$
Operate/release time	ms	5/6
Insulation between coil and contacts (1.2/50 μs)	kV	6 (8 mm)
Dielectric strength between open contacts	V AC	1,000
Ambient temperature range	°C	–40…+70
Protection category		IP20
Approvals relay (according to type)		CE RINA c UL us

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*Master*INPUT - SSR

Features

1 Pole interface modules, 6.2 mm wide, ideal for PLC and electronic systems

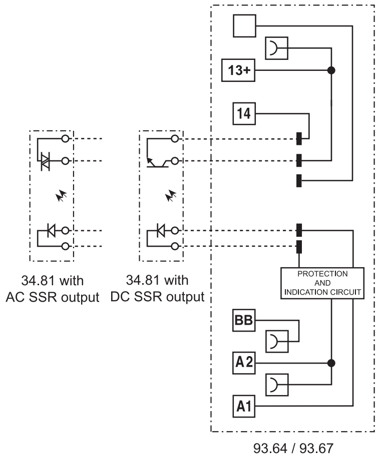
- Jumper link option for the quick and easy distribution of supply voltage to proximity switches and similar input devices (Bus-bar connection BB)
- UL Listing (certain relay/socket combinations)

NEW **39.40/39.70**

- 0.1 or 2 A solid state relay
- 6 - 12 - 24 V DC, 24 - 125 V AC/DC and 230 V AC supply
- Screw terminal and push-in terminal
- 35 mm rail (EN 60715) mounting

39.40
Screw terminal

39.70
Push-in terminal



For outline drawing see page 20, 21

Output specification (SSR)		**39.x0.x.xxx.9024**	**39.x0.x.xxx.7048**	**39.x0.x.xxx.8240**
Contact configuration		1 NO (SPST-NO)		
Rated current/Maximum peak current (10 ms)	A	2/20 DC	0.1/0.5 DC	2/40 AC
Rated voltage/Maximum blocking voltage	V	24/33 DC	48/60 DC	240/— AC
Switching voltage range	V	(1.5…24) DC	(1.5…48) DC	(12…275) AC
Repetitive peak off-state voltage	V_{pk}	—	—	600
Minimum switching current	mA	1	0.05	22
Max. “OFF-state” leakage current	mA	0.001	0.001	1.5
Max. “ON-state” voltage drop	V	0.12	1	1.6
Supply specification				
Nominal voltage (U_N)	V AC/DC	24 - 110…125		
	V AC (50/60 Hz)	220…240		
	V DC	6 - 12 - 24		
Rated power	VA (50 Hz)/W	See page 17		
Operating range		(0.8…1.1) U_N		
Must drop-out voltage		0.1 U_N		
Technical data				
Operate/release time	ms	0.2/0.6	0.04/0.11	12/12
Dielectric strength between input/output	V AC	2,500		
Ambient temperature range	°C	–20…+55		
Protection category		IP20		
Approvals relay (according to type)		CE EAC PCT cULus		

B

*Master*OUTPUT - EMR

Features

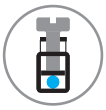
1 Pole interface modules, 6.2 mm wide, ideal for PLC and electronic systems

- Jumper link option for the quick and easy distribution of supply voltage to output side (Bus-bar connection BB) and its connection to electromagnetic valves and similar output devices
- UL Listing (certain relay/socket combinations)

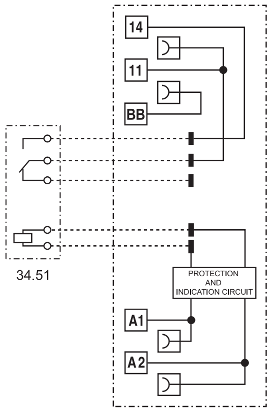
NEW **39.21/39.51**

- 6 A electromechanical relay
- 6 - 12 - 24 - 125 V AC/DC and 230 V AC supply
- Screw terminal and push-in terminal
- 35 mm rail (EN 60715) mounting

39.21
Screw terminal



39.51
Push-in terminal



For outline drawing see page 20, 21

Contact specification		
Contact configuration		1 NO (SPST-NO)
Rated current/Maximum peak current	A	6/10
Rated voltage/Maximum switching voltage	V AC	250/400
Rated load AC1	VA	1,500
Rated load AC15 (230 V AC)	VA	300
Single phase motor rating (230 V AC)	kW	0.185
Breaking capacity DC1: 30/110/220 V	A	6/0.2/0.12
Minimum switching load	mW (V/mA)	500 (12/10)
Standard contact material		AgNi
Supply specification		
Nominal voltage (U_N)	V AC/DC	6 - 12 - 24 - 110…125
	V AC (50/60 Hz)	220…240
Rated power	VA (50 Hz)/W	See page 16
Operating range		(0.8…1.1) U_N
Holding voltage		0.6 U_N
Must drop-out voltage		0.1 U_N
Technical data		
Mechanical life AC/DC	cycles	$10 \cdot 10^6$
Electrical life at rated load AC1	cycles	$60 \cdot 10^3$
Operate/release time	ms	5/6
Insulation between coil and contacts (1.2/50 μs)	kV	6 (8 mm)
Dielectric strength between open contacts	V AC	1,000
Ambient temperature range	°C	–40…+70
Protection category		IP20
Approvals relay (according to type)		CE RINA c US

B

*Master***OUTPUT - SSR**

Features

1 Pole interface modules, 6.2 mm wide, ideal for PLC and electronic systems

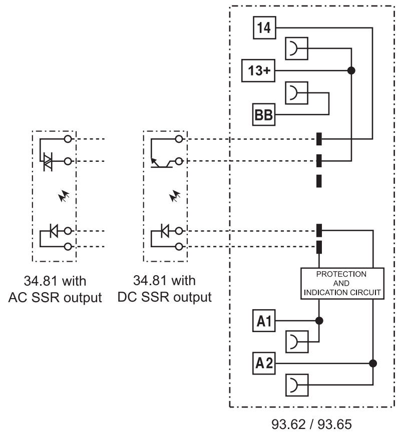
- Jumper link option for the quick and easy distribution of supply voltage to output side (Bus-bar connection BB) and its connection to electromagnetic valves and similar output devices
- UL Listing (certain relay/socket combinations)

NEW **39.20/39.50**

- 0.1 or 2 A solid state relay
- 6 to 24 V DC, 125 V AC/DC and 230 V AC supply
- Screw terminal and push-in terminal
- 35 mm rail (EN 60715) mounting

39.20
Screw terminal

39.50
Push-in terminal



For outline drawing see page 20, 21

Output specification (SSR)		**39.x0.x.xxx.9024**	**39.x0.x.xxx.7048**	**39.x0.x.xxx.8240**
Contact configuration		1 NO (SPST-NO)		
Rated current/Maximum peak current (10 ms)	A	2/20 DC	0.1/0.5 DC	2/40 AC
Rated voltage/Maximum blocking voltage	V	24/33 DC	48/60 DC	240/— AC
Switching voltage range	V	(1.5…24) DC	(1.5…48) DC	(12…275) AC
Repetitive peak off-state voltage	V_{pk}	—	—	600
Minimum switching current	mA	1	0.05	22
Max. "OFF-state" leakage current	mA	0.001	0.001	1.5
Max. "ON-state" voltage drop	V	0.12	1	1.6
Supply specification				
Nominal voltage (U_N)	V AC/DC	110…125		
	V AC (50/60 Hz)	220…240		
	V DC	6 - 12 - 24		
Rated power	VA (50 Hz)/W	See page 17		
Operating range		(0.8…1.1) U_N		
Must drop-out voltage		0.1 U_N		
Technical data				
Operate/release time	ms	0.2/0.6	0.04/0.11	12/12
Dielectric strength between input/output	V AC	2,500		
Ambient temperature range	°C	–20…+55		
Protection category		IP20		
Approvals relay (according to type)		CE EAC PCT cULus		

*Master*TIMER - EMR

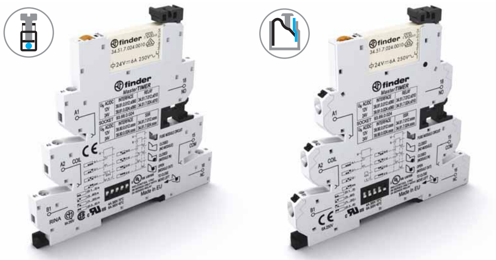
Features

Slim timed interface module, 6.2 mm wide, ideal for space-saving timing solutions in panels

- Timer adjustment via top mounted rotary knob, accessible after assembly
- Control signal terminal
- DIP-switch for selection of 4 time scales and 8 functions
- Accepts output fuse module **093.63** (for 5 x 20 mm fuses) for quick and easy load protection, see page 24
- Common connection possible with optional jumper links (terminals A1, A2 and 15)
- UL Listing (certain relay/socket combinations)

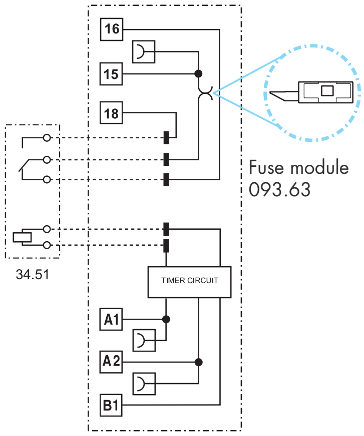
B

NEW 39.81/39.91



- 6 A electromechanical relay
- 12 - 24 V AC/DC supply
- Screw terminal and push-in terminal
- 35 mm rail (EN 60715) mounting

39.81 Screw terminal | 39.91 Push-in terminal



AI: On-delay
DI: Interval
GI: Pulse (0.5 s) delayed
SW: Symmetrical flasher (starting pulse on)
BE: Off-delay with control signal
CE: On- and off-delay with control signal
DE: Interval with control signal on
EE: Interval with control signal off

For outline drawing see page 20, 21

Contact specification		
Contact configuration		1 CO (SPDT)
Rated current/Maximum peak current	A	6/10
Rated voltage/Maximum switching voltage	V AC	250/400
Rated load AC1	VA	1,500
Rated load AC15 (230 V AC)	VA	300
Single phase motor rating (230 V AC)	kW	0.185
Breaking capacity DC1: 30/110/220 V	A	6/0.2/0.12
Minimum switching load	mW (V/mA)	500 (12/10)
Standard contact material		AgNi
Supply specification		
Nominal voltage (U_N)	V AC/DC	12 - 24
Rated power AC/DC	VA (50 Hz)/W	See page 16
Operating range		(0.8…1.1) U_N
Holding voltage		0.6 U_N
Must drop-out voltage		0.1 U_N
Technical data		
Specified time range		(0.1…3)s, (3…60)s, (1…20)min, (0.3…6)h
Repeatability	%	± 1
Recovery time	ms	≤ 50
Minimum control impulse	ms	50
Setting accuracy – full range	%	5
Electrical life at rated load AC1	cycles	60 · 10^3
Ambient temperature range	°C	–20…+50
Protection category		IP20
Approvals relay (according to type)		RINA

B

*Master***TIMER** - SSR

Features

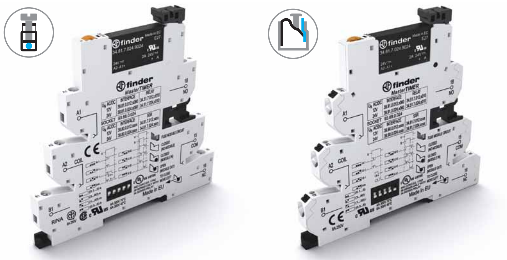
Slim timed interface module, 6.2 mm wide, ideal for space-saving timing solutions in panels

- Timer adjustment via top mounted rotary knob; accessible after assembly
- Start terminal
- DIP-switch for selection of 4 time scales and 8 functions
- Accepts output fuse module **093.63** (for 5 x 20 mm fuses) for quick and easy load protection, see page 24
- Common connection possible with optional jumper links (terminals A1, A2 and 15+)
- UL Listing (certain relay/socket combinations)

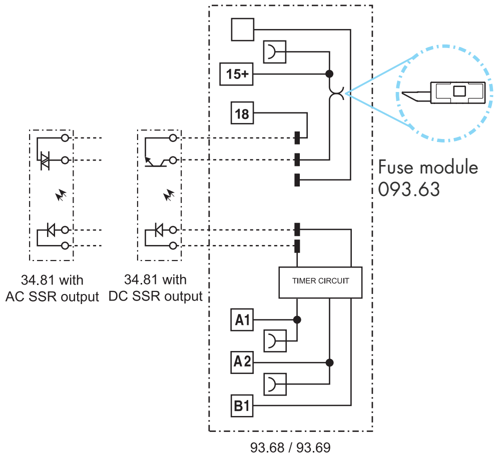
39.80 Screw terminal

39.90 Push-in terminal

NEW **39.80/39.90**



- 0.1 or 2 A solid state relay
- 12 - 24 V AC/DC supply
- Screw terminal and push-in terminal
- 35 mm rail (EN 60715) mounting



AI: On-delay
DI: Interval
GI: Pulse (0.5 s) delayed
SW: Symmetrical flasher (starting pulse on)
BE: Off-delay with control signal
CE: On- and off-delay with control signal
DE: Interval with control signal on
EE: Interval with control signal off

For outline drawing see page 20, 21

Output specification (SSR)		**39.x0.x.xxx.9024**	**39.x0.x.xxx.7048**	**39.x0.x.xxx.8240**
Contact configuration		1 NO (SPST-NO)		
Rated current/Maximum peak current (10 ms)	A	2/20 DC	0.1/0.5 DC	2/40 AC
Rated voltage/Maximum blocking voltage	V	24/33 DC	48/60 DC	240/— AC
Switching voltage range	V	(1.5…24) DC	(1.5…48) DC	(12…275) AC
Repetitive peak off-state voltage	V_{pk}	—	—	600
Minimum switching current	mA	1	0.05	22
Max. “OFF-state” leakage current	mA	0.001	0.001	1.5
Max. “ON-state” voltage drop	V	0.12	1	1.6
Supply specification				
Nominal voltage (U_N)	V AC/DC	12 - 24		
Rated power	VA (50 Hz)/W	See page 17		
Operating range		(0.8…1.1) U_N		
Holding voltage		0.6 U_N		
Must drop-out voltage		0.1 U_N		
Technical data				
Specified time range		(0.1…3)s, (3…60)s, (1…20)min, (0.3…6)h		
Repeatability	%	± 1		
Recovery time	ms	≤ 50		
Minimum control impulse	ms	50		
Setting accuracy – full range	%	5		
Ambient temperature range	°C	–20…+50		
Protection category		IP20		
Approvals relay (according to type)		CE EAC c UL us		

B

Ordering information

Example: *Master**PLUS*** 39 series screw terminal interface module, electromechanical relay output, 1 CO (SPDT), 24 V AC/DC coil.

							A	B	C	D
3 9	.	3	1	. 0	.	0 2 4	. 0	0	6	0

Series

Type
1 = *Master**BASIC***, screw terminal
0 = *Master**BASIC***, push-in terminal
3 = *Master**PLUS***, screw terminal, fuse-protectable output
6 = *Master**PLUS***, push-in terminal, fuse-protectable output
4 = *Master**INPUT***, screw terminal
7 = *Master**INPUT***, push-in terminal
2 = *Master**OUTPUT***, screw terminal
5 = *Master**OUTPUT***, push-in terminal
8 = *Master**TIMER*** multifunction, screw terminal, fuse-protectable output
9 = *Master**TIMER*** multifunction, push-in terminal, fuse-protectable output

No. of poles
1 = 1 CO (only EMR, except 39.21/51, 1 NO)
0 = 1 NO (only SSR)

Coil version, EMR / Input version, SSR
0 = AC (50/60 Hz)/DC
3 = Leakage current suppression AC (50/60 Hz)
7 = DC sensitive
8 = AC (50/60 Hz)

Coil voltage, EMR / Input voltage, SSR
See page 16

D: Special Version, EMR
0 = Standard

C: Options, EMR
6 = Standard

B: Contact circuit, EMR
0 = CO (except 39.21/51, 1 NO)

A: Contact material, EMR
0 = AgNi Standard
4 = $AgSnO_2$
5 = AgNi + Au

ABCD: Output version, SSR
7048 = 0.1 A - 48 V DC
8240 = 2 A - 230 V AC
9024 = 2 A - 24 V DC

EMR - Selecting features and options: only combinations in the same row are possible.
Preferred selections for best availability are shown in **bold**.

Type	Coil version	A	B	C	D
39.11/01	0.006 - 0.012	**0** - 4 - 5	**0**	**6**	**0**
	0.024 - 0.125 - **8.230**				
39.31/61	0.006 - 0.012	**0** - 4 - 5	**0**	**6**	**0**
	0.024 - 0.060				
	0.125 - 0.240 - **8.230**				
	7.125 - 7.220				
	3.125 - 3.230				
39.41/71	0.006 - 0.012	0 - 4 - **5**	**0**	**6**	**0**
	0.024 - 0.125				
	8.230				
39.21/51	0.006 - 0.012	**0** - 4 - 5	**0**	**6**	**0**
	0.024 - 0.125				
	8.230				
39.81/91	0.012 - **0.024**	**0**	**0**	**6**	**0**

SSR - Selecting features and options: only combinations in the same row are possible.
Preferred selections for best availability are shown in **bold**.

Type	Input version	Output version, ABCD
39.10/00	7.006 - 7.012	7048 - 8240 - **9024**
	7.024 - 0.125 - **8.230**	
39.30/60	7.006 - 7.012	7048 - 8240 - **9024**
	7.024 - 7.060	
	7.125 - 7.220	
	0.024 - 0.125 - 0.240	
	8.230	
	3.125 - 3.230	
39.40/70	7.006 - 7.012	7048 - 8240 - **9024**
	7.024 - 0.024 - 0.125	
	8.230	
39.20/50	7.006 - 7.012	7048 - 8240 - **9024**
	7.024 - 0.125	
	8.230	
39.80/90	0.012 - **0.024**	7048 - 8240 - **9024**

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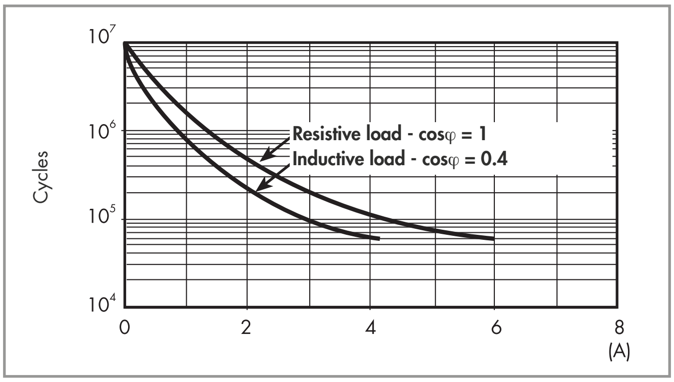
Technical data

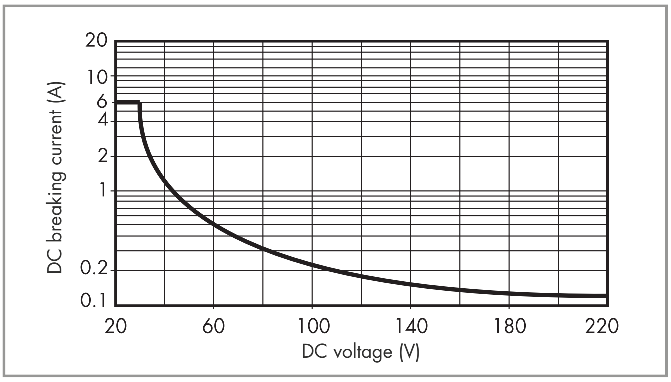
Insulation according to EN 61810-1				
Nominal voltage of supply system	V AC	230/400		
Rated insulation voltage	V AC	250	400	
Pollution degree		3	2	
Insulation between coil and contact set				
Type of Insulation		Reinforced		
Overvoltage category		III		
Rated impulse voltage	kV (1.2/50) μs	6		
Dielectric strength	V AC	4,000		
Insulation between open contacts (EMR)				
Type of disconnection		Micro-disconnection		
Dielectric strength	V AC/kV (1.2/50) μs	1,000/1.5		
Conducted disturbance immunity		**$U_N \leq 60$ V**	**$U_N = 125$ V**	**$U_N = 230$ V**
Fast transients (burst 5/50 ns, 5 kHz) according to EN 61000-4-4 at supply terminals	kV	4	4	4
Voltage pulses (surge 1.2/50 μs) according to EN 61000-4-5 at supply terminals (differential mode)	kV	0.8	2	4
Other data				
Bounce time (EMR) : NO/NC	ms	1/6		
Vibration resistance (EMR,10..55 Hz): NO/NC	g	10/15		
Power lost to the environment — without contact current	W	0.2 (24 V) – 0.4 (230 V)		
Power lost to the environment — with rated current	W	0.6 (24 V) – 0.9 (230 V)		
Terminals				
		Screw terminal	**Push-in terminal**	
Wire strip length	mm	10	8	
Screw torque	Nm	0.5	—	
		Solid and stranded cable	**Solid and stranded cable**	
Max. wire size	mm^2	1 x 2.5/2 x 1.5	1 x 2.5	
	AWG	1 x 14/2 x 16	1 x 14	
Min. wire size	mm^2	1 x 0.2	1 x 0.2	
	AWG	1 x 24	1 x 24	

Contact specification (EMR)

F 39 - Electrical life (AC) v contact current



H 39 - Maximum DC1 breaking capacity



- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of ≥ $60 \cdot 10^3$ can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load. Note: the release time for the load will be increased.

B

B

Coil specifications - Electromechanical Relay

Coil data DC, type 39.31/61

Nominal Voltage U_N	Coil code	Operating range U_{min}	U_{max}	Must drop-out voltage U_r	Rated input current at U_N I_N	Rated power at U_N
V		V	V	V	mA	W
125 (110...125)	**7**.125	88	138	12.5	4.6	0.6
220	**7**.220	176	242	22	3.0	0.6

Coil data AC/DC, type 39.11/21/31/41/01/51/61/71

Nominal Voltage U_N	Coil code	Operating range U_{min}	U_{max}	Must drop-out voltage U_r	Rated input current at U_N I_N	Rated power at U_N
V		V	V	V	mA	VA/W
6	**0**.006	4.8	6.6	0.6	35	0.2/0.2
12	**0**.012	9.6	13.2	1.5	15	0.2/0.2
24	**0**.024	19.2	26.4	2.4	11	0.25/0.25
60(1)	**0**.060	48	66	6.0	5.7	0.35/0.35
125 (110...125)	**0**.125	88	138	12.5	5.6	0.7/0.7
240 (24...240)(2)	**0**.240	20.4	264	2.4	19	1.5/0.3

(1) 60 V AC/DC for type 39.31/61 only
(2) 24...240 V AC/DC for type 39.31/61 only

Coil data AC, type 39.11/21/31/41/01/51/61/71

Nominal Voltage U_N	Coil code	Operating range U_{min}	U_{max}	Must drop-out voltage U_r	Rated input current at U_N I_N	Rated power at U_N
V		V	V	V	mA	VA/W
230 (230...240)	**8**.230	184	264	23	4.3	1/0.4

Coil data leakage current suppression versions, type 39.31.3/61.3

Nominal Voltage U_N	Coil code	Operating range U_{min}	U_{max}	Must drop-out voltage U_r	Rated input current at U_N I_N	Rated power at U_N
V		V	V	V	mA	VA/W
125 (110...125)	**3**.125	88	138	44	8.4	1.1/1
230 (230...240)	**3**.230	184	264	72	5.9	1.4/0.5

The 39 Series interface modules (supply version 3) have built-in leakage current suppression to address industry concerns of the contacts not dropping-out when there is residual current in the circuit; at (110...125)V AC/DC and (230...240)V AC. This problem can occur, for example, when connecting the interface modules to PLC,s with triac outputs or when connecting via relatively long cables.

Coil data AC/DC timer, type 39.81/91

Nominal Voltage U_N	Coil code	Operating range (AC/DC) U_{min}	U_{max}	Must drop-out voltage U_r	Rated input current at U_N DC	AC	Rated power at U_N DC	AC
V		V	V	V	mA	mA	W	VA/W
12	**0**.012	9.6	13.2	1.2	15	23	0.2	0.3/0.2
24	**0**.024	19.2	26.4	2.4	11	19	0.25	0.4/0.3

Input specifications - Solid State Relay

Input data DC, type 39.10/20/30/40/00/50/60/70

Nominal Voltage U_N	Input code	Operating range U_{min}	U_{max}	Must drop-out voltage U_r	Rated input current at U_N I_N	Rated power at U_N
V		V	V	V	mA	W
6	**7**.006	4.8	6.6	0.6	7.5	0.2
12	**7**.012	9.6	13.2	1.2	20.7	0.25
24	**7**.024	19.2	26.4	2.4	10.5	0.25
60 (1)	**7**.060	48	66	6.0	6.4	0.4
125 (1) (110...125)	**7**.125	88	138	12.5	4.6	0.6
220 (1)	**7**.220	176	242	22	3.0	0.6

(1) 60 V DC, 125 V DC and 220 V DC for type 39.30/60 only

Input data AC/DC, type 39.10/20/30/40/00/50/60/70

Nominal Voltage U_N	Input code	Operating range U_{min}	U_{max}	Must drop-out voltage U_r	Rated input current at U_N I_N	Rated power at U_N
V		V	V	V	mA	VA/W
24 (2)	**0**.024	19.2	26.4	2.4	17.5	0.4/0.3
125 (110...125)	**0**.125	88	138	12.5	5.5	0.7/0.7
240 (24...240)(3)	**0**.240	20.4	264	2.4	17.5	1.5/0.3

(2) 24 V AC/DC for type 39.30/40/60/70 only
(3) 24...240 V AC/DC for type 39.30/60 only

Input data AC, type 39.10/20/30/40/00/50/60/70

Nominal Voltage U_N	Input code	Operating range U_{min}	U_{max}	Must drop-out voltage U_r	Rated input current at U_N I_N	Rated power at U_N
V		V	V	V	mA	VA/W
230 (230...240)	**8**.230	184	264	23	4.2	1/0.4

Input data leakage current suppression versions, type 39.30.3/60.3

Nominal Voltage U_N	Input code	Operating range U_{min}	U_{max}	Must drop-out voltage U_r	Rated input current at U_N I_N	Rated power at U_N
V		V	V	V	mA	VA/W
125 (110...125)	**3**.125	88	138	44	8.4	1.1/1
230 (230...240)	**3**.230	184	264	72	5.9	1.4/0.5

The 39 Series interface modules (supply version 3) have built-in leakage current suppression to address industry concerns of the contacts not dropping-out when there is residual current in the circuit; at (110...125)V AC/DC and (230...240)V AC. This problem can occur, for example, when connecting the interface modules to PLC,s with triac outputs or when connecting via relatively long cables.

Input data AC/DC timer, type 39.80/90

Nominal Voltage U_N	Input code	Operating range (AC/DC) U_{min}	U_{max}	Must drop-out voltage U_r	Rated input current at U_N DC	Rated input current at U_N AC	Rated power at U_N DC	Rated power at U_N AC
V		V	V	V	mA	mA	W	VA/W
12	**0**.012	9.6	13.2	1.2	15	23	0.2	0.3/0.2
24	**0**.024	19.2	26.4	2.4	11	19	0.25	0.4/0.3

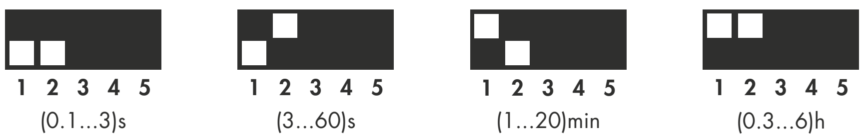
Timer specifications

EMC specifications			
Type of test		**Reference standard**	
Electrostatic discharge	contact discharge	EN 61000-4-2	4 kV
	air discharge	EN 61000-4-2	8 kV
Radio-frequency electromagnetic field	(80 ÷ 1,000 MHz)	EN 61000-4-3	10 V/m
	(1,400 ÷ 2,700 MHz)	EN 61000-4-3	10 V/m
Fast transients (burst) (5-50 ns, 5 and 100 kHz)	on Supply terminals	EN 61000-4-4	4 kV
	on control signal terminals	EN 61000-4-4	4 kV
Surges (1.2/50 μs) on supply and control signal terminals	common mode	EN 61000-4-5	2 kV
	differential mode	EN 61000-4-5	0.8 kV
Radio-frequency common mode (0.15 ÷ 80 MHz)	on Supply terminals	EN 61000-4-6	10 V
	on control signal terminals	EN 61000-4-6	3 V
Radiated and conducted emission		EN 55022	class B

Other data			
Bounce time (EMR) : NO/NC		ms	1/6
Vibration resistance (EMR,10..55 Hz): NO/NC		g	10/15
Power lost to the environment	without contact current	W	0.3
	with rated current	W	0.8

Terminals			
		Screw terminal	**Push-in terminal**
Wire strip length	mm	10	8
Screw torque	Nm	0.5	—
		Solid and stranded cable	**Solid and stranded cable**
Max. wire size	mm²	1 x 2.5/2 x 1.5	1 x 2.5
	AWG	1 x 14/2 x 16	1 x 14
Min. wire size	mm²	1 x 0.2	1 x 0.2
	AWG	1 x 24	1 x 24

Times scales

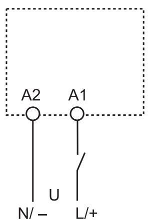


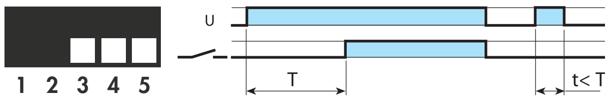
Functions

LED	Supply voltage	NO contact/output
	OFF	Open
	ON	Open
	ON	Open (timing to close in progress)
	ON	Closed

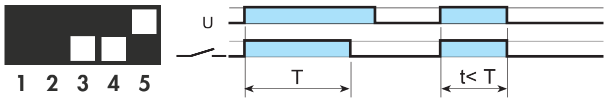
Wiring diagram **U** = Supply voltage **S** = Signal switch = Output contact

Without control signal

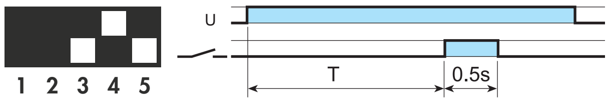




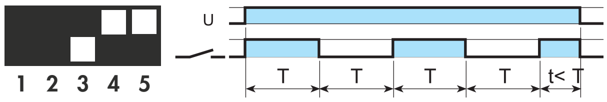
(AI) On-delay
Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs when power is removed.



(DI) Interval
Apply power to timer. Output contacts transfer immediately. After the preset time has elapsed, contacts reset.

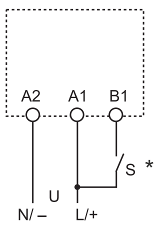


(GI) Pulse (0.5s) delayed
Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs after a fixed time of 0.5s.

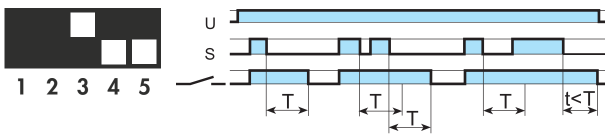


(SW) Symmetrical flasher (starting pulse on)
Apply power to timer. Output contacts transfer immediately and cycle between ON and OFF for as long as power is applied. The ratio is 1:1 (time on = time off).

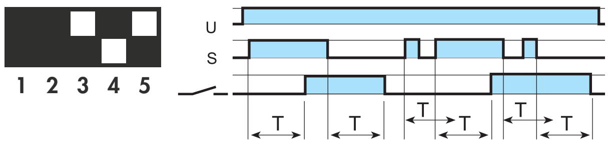
With control signal



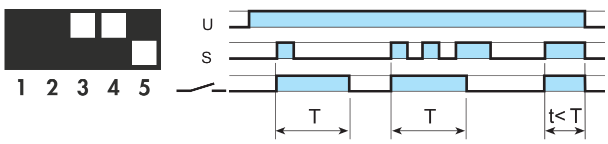
*With DC supply, positive polarity has to be conneted to B1, terminal (according to EN 60204-1).



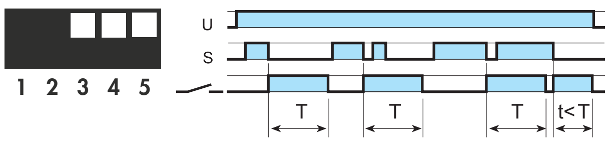
(BE) Off-delay with control signal
Power is permenently applied to the timer. The output contacts transfer immediately on closure of the Signal Switch (S). Opening the Signal Switch initiates the preset delay, after which time the output contacts reset.



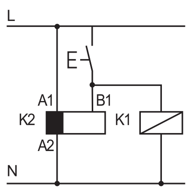
(CE) On- and off-delay with control signal
Power is permenently applied to the timer. Closing the Signal Switch (S) initiates the preset delay, after which time the output contacts transfer. Opening the Signal switch initiates the same preset delay, after which time the output contacts reset.



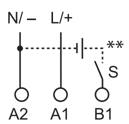
(DE) Interval with control signal on
Power is permenently applied to the timer. On momentary or maintained closure of Signal Switch (S), the output contacts transfer, and remain so for the duration of the preset delay, after which they reset.



(EE) Interval with control signal off
Power is permenently applied to the timer. On opening of the Signal Switch (S) the output contacts transfer, and remain so for the duration of the preset delay, after which they reset.



• Possible to control an external load, such as another relay coil or timer, connected to the control signal terminal B1.



** A voltage other than the supply voltage can be applied to the command Start (B1), example:
A1 - A2 = 24 V AC
B1 - A2 = 12 V DC

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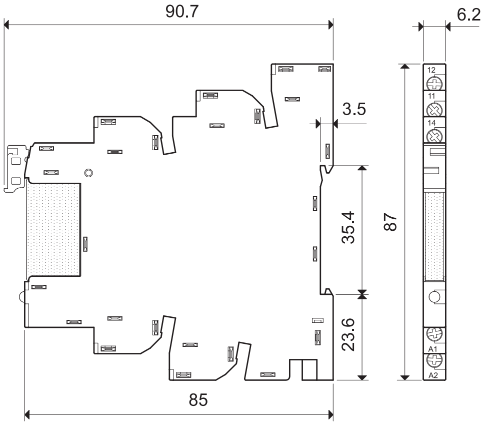
B

Outline drawings - Screw terminal sockets

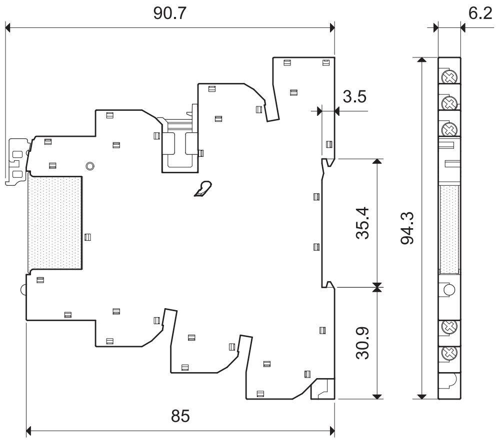
39.10 / 39.20
39.11 / 39.21
Screw terminal

REGISTERED COMMUNITY DESIGN



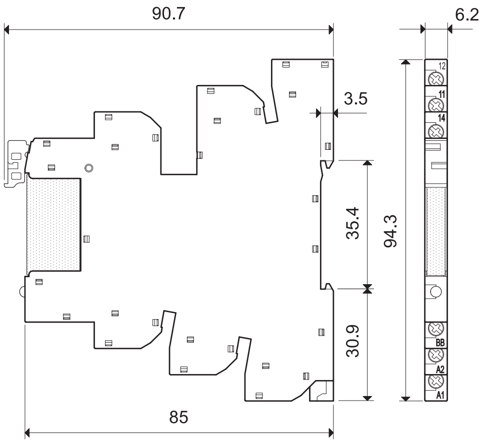
39.30 / 39.30.3
39.31 / 39.31.3
Screw terminal

REGISTERED COMMUNITY DESIGN



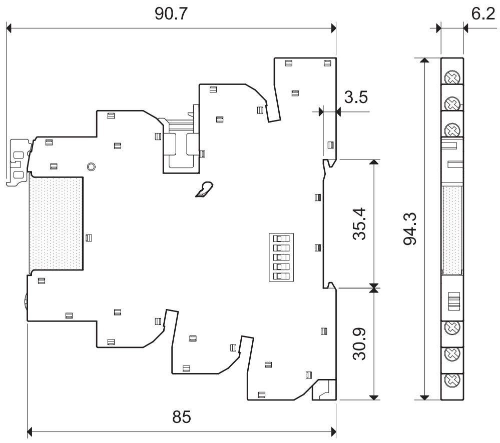
39.40
39.41
Screw terminal

REGISTERED COMMUNITY DESIGN



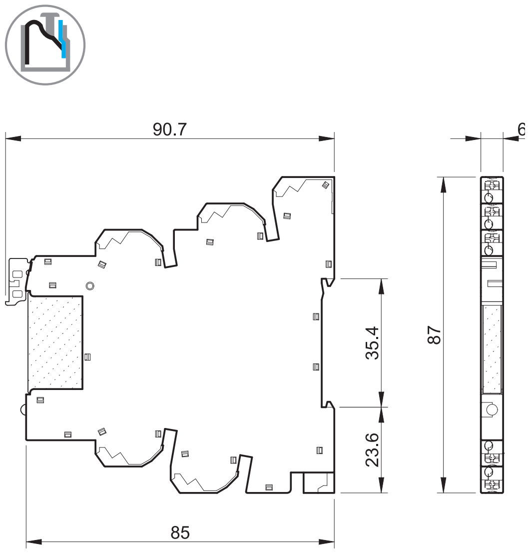
39.80
39.81
Screw terminal

REGISTERED COMMUNITY DESIGN

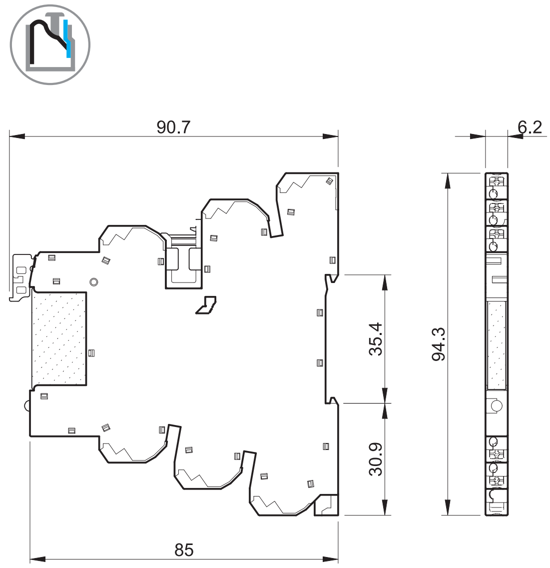


Outline drawings - Push-in terminal sockets

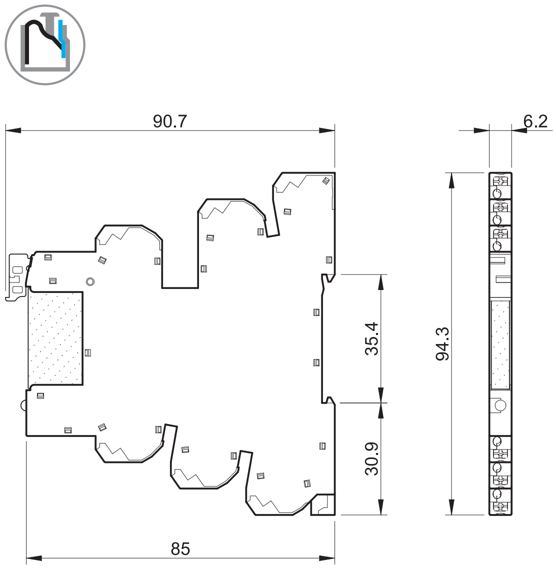
39.00 / 39.01
39.50 / 39.51
Push-in terminal



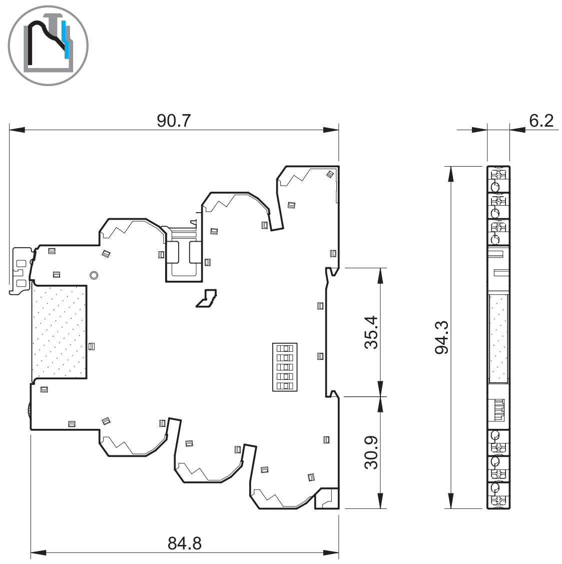
39.60 / 39.60.3
39.61 / 39.61.3
Push-in terminal



39.70
39.71
Push-in terminal



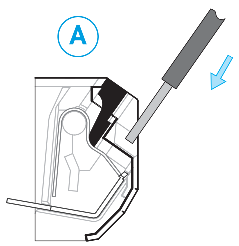
39.90
39.91
Push-in terminal

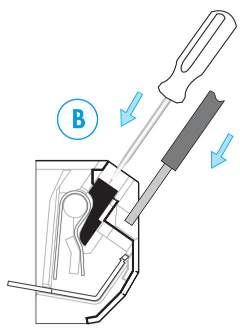


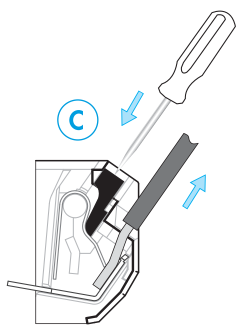
Main features

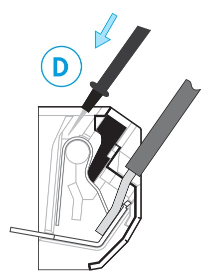
Push-in terminals

The push-in terminals permit the quick connection of solid wires or ferrules by their simple insertion into the terminal (**A**).
It is possible to open the terminal to extract the wire by first pushing down on the push-button using a screwdriver (**C**).
For stranded cable it is necessary first to open the terminal using the push button, both for the extraction (**C**) and insertion (**B**).
It is possible at any time to check the connection via the test aperture, using a 2mm diameter test probe (**D**).









B

Electromechanical Relay (1 Pole 6 A) & Screw Socket Combinations

Interface Module Code	Coil voltage	Relay	Socket
*Master**BASIC***			
39.11.0.006.0060	6 V AC/DC	34.51.7.005.0010	93.61.7.024
39.11.0.012.0060	12 V AC/DC	34.51.7.012.0010	93.61.7.024
39.11.0.024.0060	24 V AC/DC	34.51.7.024.0010	93.61.7.024
39.11.0.125.0060	(110...125)V AC/DC	34.51.7.060.0010	93.61.0.125
39.11.8.230.0060	(230...240)V AC	34.51.7.060.0010	93.61.8.230
*Master**PLUS***			
39.31.0.006.0060	6 V AC/DC	34.51.7.005.0010	93.63.7.024
39.31.0.012.0060	12 V AC/DC	34.51.7.012.0010	93.63.7.024
39.31.0.024.0060	24 V AC/DC	34.51.7.024.0010	93.63.7.024
39.31.0.060.0060	60 V AC/DC	34.51.7.060.0010	93.63.7.060
39.31.0.125.0060	(110...125)V AC/DC	34.51.7.060.0010	93.63.0.125
39.31.0.240.0060	(24...240)V AC/DC	34.51.7.024.0010	93.63.0.240
39.31.8.230.0060	(230...240)V AC	34.51.7.060.0010	93.63.8.230
39.31.7.125.0060	(110...125)V DC	34.51.7.060.0010	93.63.7.125
39.31.7.220.0060	220 V DC	34.51.7.060.0010	93.63.7.220
39.31.3.125.0060	(110...125)V AC/DC	34.51.7.060.0010	93.63.3.125
39.31.3.230.0060	(230...240)V AC	34.51.7.060.0010	93.63.3.230
*Master**INPUT***			
39.41.0.006.5060	6 V AC/DC	34.51.7.005.5010	93.64.7.024
39.41.0.012.5060	12 V AC/DC	34.51.7.012.5010	93.64.7.024
39.41.0.024.5060	24 V AC/DC	34.51.7.024.5010	93.64.7.024
39.41.0.125.5060	(110...125) V AC/DC	34.51.7.060.5010	93.64.0.125
39.41.8.230.5060	(230...240)V AC	34.51.7.060.5010	93.64.8.230
*Master**OUTPUT*** 1 NO, 6 A only			
39.21.0.006.0060	6 V AC/DC	34.51.7.005.0010	93.62.7.024
39.21.0.012.0060	12 V AC/DC	34.51.7.012.0010	93.62.7.024
39.21.0.024.0060	24 V AC/DC	34.51.7.024.0010	93.62.7.024
39.21.0.125.0060	(110...125) V AC/DC	34.51.7.060.0010	93.62.0.125
39.21.8.230.0060	(230...240)V AC	34.51.7.060.0010	93.62.8.230
*Master**TIMER***			
39.81.0.012.0060	12 V AC/DC	34.51.7.012.0010	93.68.0.024
39.81.0.024.0060	24 V AC/DC	34.51.7.024.0010	93.68.0.024

Solid State Relay (1 Pole 0.1 or 2 A) & Screw Socket Combinations

Interface Module Code	Input voltage	Relay	Socket
*Master**BASIC***			
39.10.7.006.xxxx	6 V DC	34.81.7.005.xxxx	93.61.7.024
39.10.7.012.xxxx	12 V DC	34.81.7.012.xxxx	93.61.7.024
39.10.7.024.xxxx	24 V DC	34.81.7.024.xxxx	93.61.7.024
39.10.0.125.xxxx	(110...125)V AC/DC	34.81.7.060.xxxx	93.61.0.125
39.10.8.230.xxxx	(230...240)V AC	34.81.7.060.xxxx	93.61.8.230
*Master**PLUS***			
39.30.7.006.xxxx	6 V DC	34.81.7.005.xxxx	93.63.7.024
39.30.7.012.xxxx	12 V DC	34.81.7.012.xxxx	93.63.7.024
39.30.7.024.xxxx	24 V DC	34.81.7.024.xxxx	93.63.7.024
39.30.7.060.xxxx	60 V DC	34.81.7.060.xxxx	93.63.7.060
39.30.7.125.xxxx	(110...125)V DC	34.81.7.060.xxxx	93.63.7.125
39.30.7.220.xxxx	220 V DC	34.81.7.060.xxxx	93.63.7.220
39.30.0.024.xxxx	24 V AC/DC	34.81.7.024.xxxx	93.63.0.024
39.30.0.125.xxxx	(110...125)V AC/DC	34.81.7.060.xxxx	93.63.0.125
39.30.0.240.xxxx	(24...240)V AC/DC	34.81.7.024.xxxx	93.63.0.240
39.30.8.230.xxxx	(230...240)V AC	34.81.7.060.xxxx	93.63.8.230
39.30.3.125.xxxx	(110...125)V AC/DC	34.81.7.060.xxxx	93.63.3.125
39.30.3.230.xxxx	(230...240)V AC	34.81.7.060.xxxx	93.63.3.230
*Master**INPUT***			
39.40.7.006.xxxx	6 V DC	34.81.7.005.xxxx	93.64.7.024
39.40.7.012.xxxx	12 V DC	34.81.7.012.xxxx	93.64.7.024
39.40.7.024.xxxx	24 V DC	34.81.7.024.xxxx	93.64.7.024
39.40.0.024.xxxx	24 V AC/DC	34.81.7.024.xxxx	93.64.0.024
39.40.0.125.xxxx	(110...125) V AC/DC	34.81.7.060.xxxx	93.64.0.125
39.40.8.230.xxxx	(230...240)V AC	34.81.7.060.xxxx	93.64.8.230
*Master**OUTPUT***			
39.20.7.006.xxxx	6 V DC	34.81.7.005.xxxx	93.62.7.024
39.20.7.012.xxxx	12 V DC	34.81.7.012.xxxx	93.62.7.024
39.20.7.024.xxxx	24 V DC	34.81.7.024.xxxx	93.62.7.024
39.20.0.125.xxxx	(110...125) V AC/DC	34.81.7.060.xxxx	93.62.0.125
39.20.8.230.xxxx	(230...240)V AC	34.81.7.060.xxxx	93.62.8.230
*Master**TIMER***			
39.80.0.012.xxxx	12 V AC/DC	34.81.7.012.xxxx	93.68.0.024
39.80.0.024.xxxx	24 V AC/DC	34.81.7.024.xxxx	93.68.0.024

Example: .xxxx
.9024
.7048
.8240

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B

Electromechanical Relay (1 Pole 6 A) & Push-in Socket Combinations

Interface Module Code	Coil voltage	Relay	Socket
Master**BASIC**			
39.01.0.006.0060	6 V AC/DC	34.51.7.005.0010	93.60.7.024
39.01.0.012.0060	12 V AC/DC	34.51.7.012.0010	93.60.7.024
39.01.0.024.0060	24 V AC/DC	34.51.7.024.0010	93.60.7.024
39.01.0.125.0060	(110...125)V AC/DC	34.51.7.060.0010	93.60.0.125
39.01.8.230.0060	(230...240)V AC	34.51.7.060.0010	93.60.8.230
Master**PLUS**			
39.61.0.006.0060	6 V AC/DC	34.51.7.005.0010	93.66.7.024
39.61.0.012.0060	12 V AC/DC	34.51.7.012.0010	93.66.7.024
39.61.0.024.0060	24 V AC/DC	34.51.7.024.0010	93.66.7.024
39.61.0.060.0060	60 V AC/DC	34.51.7.060.0010	93.66.7.060
39.61.0.125.0060	(110...125)V AC/DC	34.51.7.060.0010	93.66.0.125
39.61.0.240.0060	(24...240) V AC/DC	34.51.7.024.0010	93.66.0.240
39.61.8.230.0060	(230...240)V AC	34.51.7.060.0010	93.66.8.230
39.61.7.125.0060	(110...125)V DC	34.51.7.060.0010	93.66.7.125
39.61.7.220.0060	220 V DC	34.51.7.060.0010	93.66.7.220
39.61.3.125.0060	(110...125)V AC/DC	34.51.7.060.0010	93.66.3.125
39.61.3.230.0060	(230...240)V AC	34.51.7.060.0010	93.66.3.230
Master**INPUT**			
39.71.0.006.5060	6 V AC/DC	34.51.7.005.5010	93.67.7.024
39.71.0.012.5060	12 V AC/DC	34.51.7.012.5010	93.67.7.024
39.71.0.024.5060	24 V AC/DC	34.51.7.024.5010	93.67.7.024
39.71.0.125.5060	(110...125) V AC/DC	34.51.7.060.5010	93.67.0.125
39.71.8.230.5060	(230...240)V AC	34.51.7.060.5010	93.67.8.230
Master**OUTPUT** 1 NO, 6 A only			
39.51.0.006.0060	6 V AC/DC	34.51.7.005.0010	93.65.7.024
39.51.0.012.0060	12 V AC/DC	34.51.7.012.0010	93.65.7.024
39.51.0.024.0060	24 V AC/DC	34.51.7.024.0010	93.65.7.024
39.51.0.125.0060	(110...125) V AC/DC	34.51.7.060.0010	93.65.0.125
39.51.8.230.0060	(230...240)V AC	34.51.7.060.0010	93.65.8.230
Master**TIMER**			
39.91.0.012.0060	12 V AC/DC	34.51.7.012.0010	93.69.0.024
39.91.0.024.0060	24 V AC/DC	34.51.7.024.0010	93.69.0.024

Solid State Relay (1 Pole 0.1 or 2 A) & Push-in Socket Combinations

Interface Module Code	Input voltage	Relay	Socket
Master**BASIC**			
39.00.7.006.xxxx	6 V DC	34.81.7.005.xxxx	93.60.7.024
39.00.7.012.xxxx	12 V DC	34.81.7.012.xxxx	93.60.7.024
39.00.7.024.xxxx	24 V DC	34.81.7.024.xxxx	93.60.7.024
39.00.0.125.xxxx	(110...125)V AC/DC	34.81.7.060.xxxx	93.60.0.125
39.00.8.230.xxxx	(230...240)V AC	34.81.7.060.xxxx	93.60.8.230
Master**PLUS**			
39.60.7.006.xxxx	6 V DC	34.81.7.005.xxxx	93.66.7.024
39.60.7.012.xxxx	12 V DC	34.81.7.012.xxxx	93.66.7.024
39.60.7.024.xxxx	24 V DC	34.81.7.024.xxxx	93.66.7.024
39.60.7.060.xxxx	60 V DC	34.81.7.060.xxxx	93.66.7.060
39.60.7.125.xxxx	(110...125)V DC	34.81.7.060.xxxx	93.66.7.125
39.60.7.220.xxxx	220 V DC	34.81.7.060.xxxx	93.66.7.220
39.60.0.024.xxxx	24 V AC/DC	34.81.7.024.xxxx	93.66.0.024
39.60.0.125.xxxx	(110...125)V AC/DC	34.81.7.060.xxxx	93.66.0.125
39.60.0.240.xxxx	(24...240)V AC/DC	34.81.7.024.xxxx	93.66.0.240
39.60.8.230.xxxx	(230...240)V AC	34.81.7.060.xxxx	93.66.8.230
39.60.3.125.xxxx	(110...125)V AC/DC	34.81.7.060.xxxx	93.66.3.125
39.60.3.230.xxxx	(230...240)V AC	34.81.7.060.xxxx	93.66.3.230
Master**INPUT**			
39.70.7.006.xxxx	6 V DC	34.81.7.005.xxxx	93.67.7.024
39.70.7.012.xxxx	12 V DC	34.81.7.012.xxxx	93.67.7.024
39.70.7.024.xxxx	24 V DC	34.81.7.024.xxxx	93.67.7.024
39.70.0.024.xxxx	24 V AC/DC	34.81.7.024.xxxx	93.67.0.024
39.70.0.125.xxxx	(110...125) V AC/DC	34.81.7.060.xxxx	93.67.0.125
39.70.8.230.xxxx	(230...240)V AC	34.81.7.060.xxxx	93.67.8.230
Master**OUTPUT**			
39.50.7.006.xxxx	6 V DC	34.81.7.005.xxxx	93.65.7.024
39.50.7.012.xxxx	12 V DC	34.81.7.012.xxxx	93.65.7.024
39.50.7.024.xxxx	24 V DC	34.81.7.024.xxxx	93.65.7.024
39.50.0.125.xxxx	(110...125) V AC/DC	34.81.7.060.xxxx	93.65.0.125
39.50.8.230.xxxx	(230...240)V AC	34.81.7.060.xxxx	93.65.8.230
Master**TIMER**			
39.90.0.012.xxxx	12 V AC/DC	34.81.7.012.xxxx	93.69.0.024
39.90.0.024.xxxx	24 V AC/DC	34.81.7.024.xxxx	93.69.0.024

Example: .xxxx
.9024
.7048
.8240

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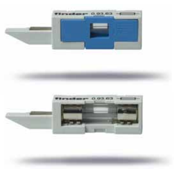
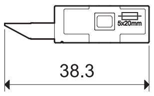
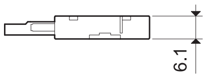
Accessories



093.63

Approvals
(according to type):





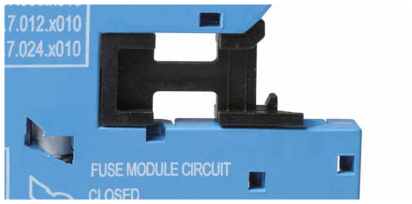
Output fuse module for 39.31/30/81/80/61/60/91/90 types	093.63

- For 5 x 20 mm fuses up to 6 A, 250 V
- Easy visibility of the fuse condition through the window
- Quick connection to socket

Notes
Safety: Because the output circuit can be reinstated (point 3 below), even with the fuse removed, it is important not to consider the removal of the fuse as a “safety disconnect”. Always isolate elsewhere before working on the circuit.
UL: According to UL508A, the fuse module cannot be installed in power circuits (in which it is mandatory that a fuse certified according to UL category JDDZ be fitted). However, where the MasterInterface is connected as an output interface to a PLC no such restrictions apply, and the fuse module can be usefully employed.

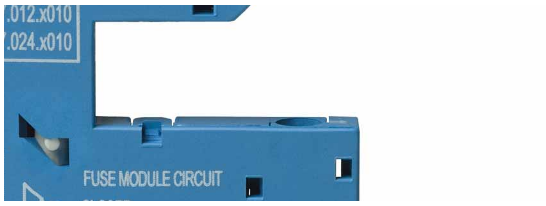
Multi-state fuse module

0. As delivered, the socket comes without a fuse module. However, the absent fuse is internally replaced with an electrical link - which allows the interface relay to be used without a fuse module.
In this state, the peg/indicator is visually hidden and the connection is protected by a special cap.

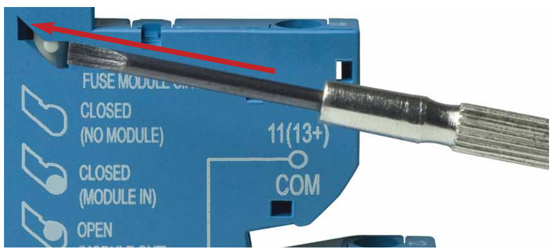


1. With fuse module inserted after removing the cap, the fuse is positioned electrically in series with the common output terminal of the interface module (11 for EMR versions, 13+ for SSR versions, 15 for EMR timer, 15+ for SSR timer).
This state is indicated by the peg/indicator.

2. If the fuse module is extracted (for example; because the fuse element has blown) the output circuit will be locked open, as this will generally be the “safe option”.
This state is indicated by the peg/indicator.



3. In order to reinstate the output circuit it is necessary to either re-insert the fuse module (complete with functional fuse), or alternatively, return the peg/indicator to position **0** by gently applying pressure in the direction of the arrow.



Accessories

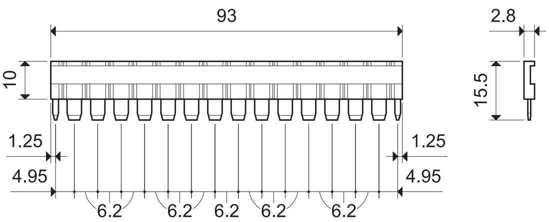
093.16

093.16.0

093.16.1

Approvals
(according to type):

16-way jumper link	093.16 (blue)	093.16.0 (black)	093.16.1 (red)
Rated values	6 A - 250 V		
Possibility of multiple connection, side by side			

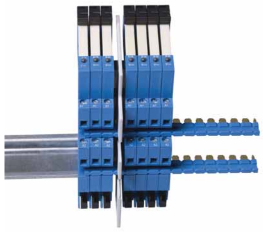


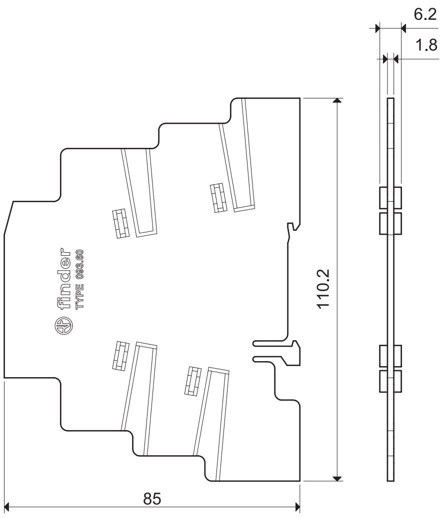
093.60

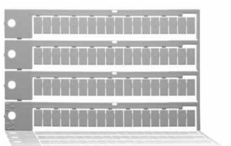
Dual-purpose plastic separator (1.8 mm or 6.2 mm separation)	093.60

1. By breaking off the protruding ribs (by hand), the separator becomes only 1.8 mm thick; useful for the visual separation of different groups of interfaces, or necessary for the protective separation of different voltages of neighbouring interfaces, or for the protection of cut ends of jumper links.

2. Leaving the ribs in place provides 6.2mm separation. Simply cutting (with scissors) the relevant segment(s) permits the interconnection across the separator of 2 different groups of interface relays, using the standard jumper link.







060.72

Sheet of marker tags, plastic, 72 tags, 6x12 mm	060.72

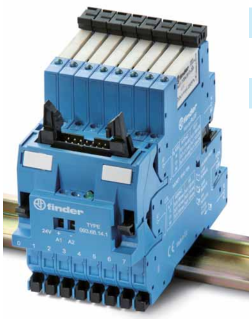
093.62

Terminal doubler (for socket Push-in only)		093.62
Total load		6 A - 300 V
Max. wire size		**Solid and stranded cable**
	mm2	2 x 1.5
	AWG	2 x 16

Accessories

093.68.14.1
Approvals
(according to type):

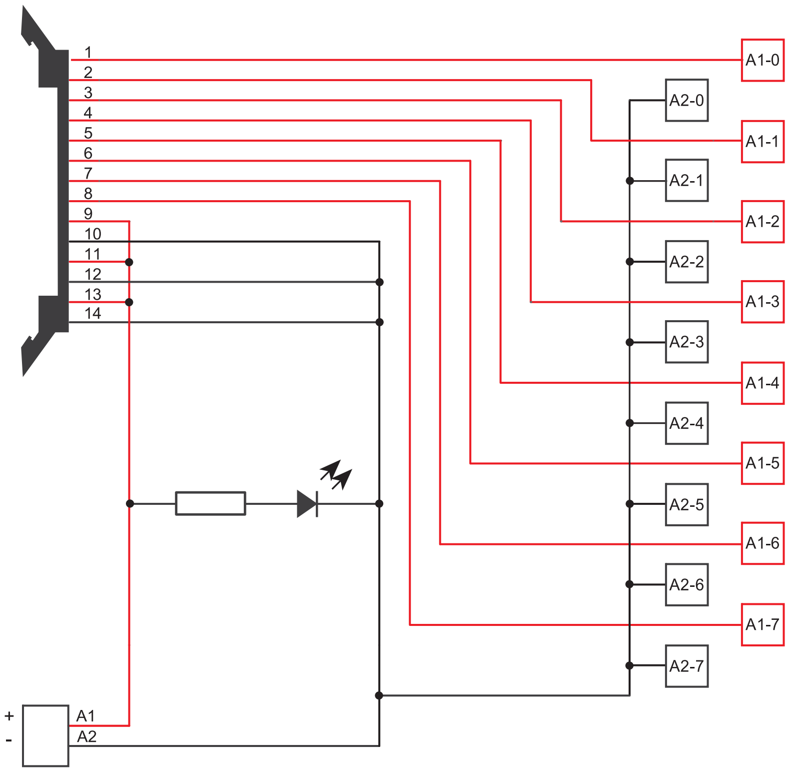
CE EAC cULus



Connected *Master***ADAPTER**

*Master***ADAPTER**		093.68.14.1
The *Master***ADAPTER** permits the easy connection of A1/A2 terminals of up to *Master***INTERFACE** modules to PLC outputs via a 14-Pole ribbon cable, plus simple 2-wire power supply connection.		
Technical data		
Rated current (per signal path)	A	1
Minimum required supply power	W	3
Nominal voltage (U_N)	V DC	24
Operating range		(0.8…1.1) U_N
Control logic		Positive switching (to A1)
Power supply status indication		Green LED
Ambient temperature range	°C	–40…+70
Terminals for 24 V control logic		
Type of connector		14 pole, according to IEC 60603-13
Terminals for 24 V power supply		
Wire strip length	mm	9.5
Screw torque	Nm	0.5
Max. wire size		
solid wire	mm^2	1 x 4/2 x 1.5
	AWG	1 x 12/2 x 16
stranded wire	mm^2	1 x 2.5/2 x 1.5
	AWG	1 x 14/2 x 16

Wiring diagram



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Features

2 Pole, forcibly guided contacts, relay interface modules, 15.8 mm wide

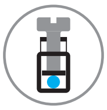
48.12 - 2 Pole 8 A (screw terminal)

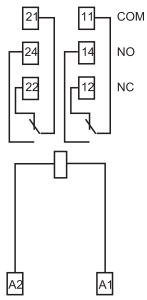
- DC sensitive coils
- Relay with forcibly guided contacts according to EN 50205 Type B
- 35 mm rail (EN 60715) mounting

48.12

- 2 pole, 8 A
- Forcibly guided contacts relay
- Screw terminal
- 35 mm rail (EN 60715) mounting

48.12
Screw terminal





According to EN 50205 only 1 NO and 1 NC (11-14 and 21-22 or 11-12 and 21-24) shall be used as forcibly guided contacts.

For outline drawing see page 7

Contact specification		
Contact configuration		2 CO (DPDT)
Rated current/Maximum peak current	A	8/15
Rated voltage/Maximum switching voltage	V AC	250/400
Rated load AC1	VA	2,000
Rated load AC15 (230 V AC)	VA	500
Single phase motor rating (230 V AC)	kW	0.37
Breaking capacity DC1: 30/110/220V	A	8/0.65/0.2
Minimum switching load	mW (V/mA)	500 (10/10)
Standard contact material		AgNi
Coil specification		
Nominal voltage (U_N)	V AC (50/60 Hz)	—
	V DC	12 - 24
Rated power AC/sens. DC	VA (50 Hz)/W	—/0.7
Operating range	AC	—
	sens. DC	$(0.75\ldots1.2)U_N$
Holding voltage	AC/DC	— /0.4 U_N
Must drop-out voltage	AC/DC	— /0.1 U_N
Technical data		
Mechanical life AC/DC	cycles	—/10 · 10^6
Electrical life at rated load AC1	cycles	100 · 10^3
Operate/release time	ms	10/4
Insulation between coil and contacts (1.2/50 μs)	kV	6 (8 mm)
Dielectric strength between open contacts	V AC	1,500
Ambient temperature range	°C	–40…+70
Protection category		IP 20
Approvals relay (according to type)		

48 Series - Relay interface modules 8 - 10 - 16 A

B

Features

1 & 2 Pole relay interface modules, 15.8 mm wide

Ideal interface for PLC and electronic systems

48.31 - 1 Pole 10 A (screw terminal)
48.52 - 2 Pole 8 A (screw terminal)
48.72 - 2 Pole 8 A (screwless terminal)

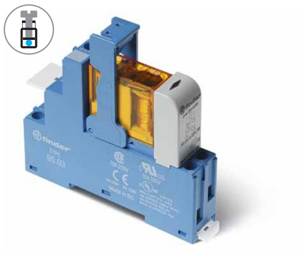
- AC coils or DC sensitive coils
- Instant ejection of relay using plastic retaining clip
- Supply status indication and EMC coil suppression module as standard
- Identification label
- UL Listing (certain relay/socket combinations)
- 35 mm rail (EN 60715) mounting

48.31 / 48.52
Screw terminal

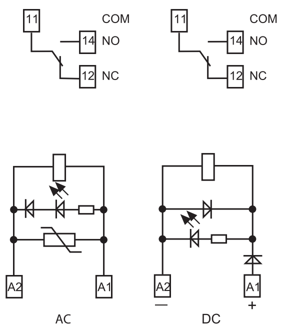
48.72
Screwless terminal

For outline drawing see page 7

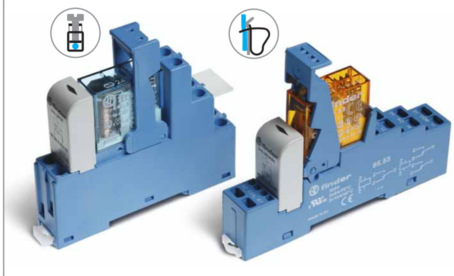
48.31



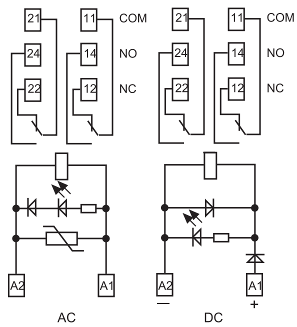
- 1 pole, 10 A
- Screw terminal
- 35 mm rail (EN 60715) mounting



48.52/72



- 2 pole, 8 A
- Screw terminal and screwless terminal
- 35 mm rail (EN 60715) mounting



		48.31	48.52/72
Contact specification			
Contact configuration		1 CO (SPDT)	2 CO (DPDT)
Rated current/Maximum peak current	A	10/20	8/15
Rated voltage/Maximum switching voltage	V AC	250/400	250/250
Rated load AC1	VA	2,500	2,000
Rated load AC15 (230 V AC)	VA	500	400
Single phase motor rating (230 V AC)	kW	0.37	0.3
Breaking capacity DC1: 30/110/220V	A	10/0.3/0.12	8/0.3/0.12
Minimum switching load	mW (V/mA)	300 (5/5)	300 (5/5)
Standard contact material		AgNi	AgNi
Coil specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	12 - 24 - 110 - 120 - 230	12 - 24 - 110 - 120 - 230
	V DC	12 - 24 - 125	12 - 24 - 125
Rated power AC/sens. DC	VA (50 Hz)/W	1.2/0.5	1.2/0.5
Operating range	AC	$(0.8...1.1)U_N$	$(0.8...1.1)U_N$
	sens. DC	$(0.73...1.5)U_N$	$(0.73...1.5)U_N$
Holding voltage	AC/DC	$0.8\ U_N$ /$0.4\ U_N$	$0.8\ U_N$ /$0.4\ U_N$
Must drop-out voltage	AC/DC	$0.2\ U_N$ /$0.1\ U_N$	$0.2\ U_N$ /$0.1\ U_N$
Technical data			
Mechanical life	cycles	$10 \cdot 10^6$	$10 \cdot 10^6$
Electrical life at rated load AC1	cycles	$200 \cdot 10^3$	$100 \cdot 10^3$
Operate/release time	ms	7/4 (AC) - 12/12 (DC)	7/4 (AC) - 12/12 (DC)
Insulation between coil and contacts (1.2/50 μs)	kV	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts	V AC	1,000	1,000
Ambient temperature range	°C	–40…+70	–40…+70
Protection category		IP 20	IP 20
Approvals relay (according to type)			

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B

Features

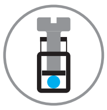
1 & 2 Pole relay interface modules, 15.8 mm wide

Ideal interface for PLC and electronic systems

48.61 - 1 Pole 16 A (screw terminal)
48.81 - 1 Pole 16 A (screwless terminal)
48.62 - 2 Pole 10 A (screw terminal)
48.82 - 2 Pole 10 A (screwless terminal)

- AC coils or DC sensitive coils
- Instant ejection of relay using plastic retaining clip
- Supply status indication and EMC coil suppression module as standard
- Identification label
- UL Listing (certain relay/socket combinations)
- 35 mm rail (EN 60715) mounting

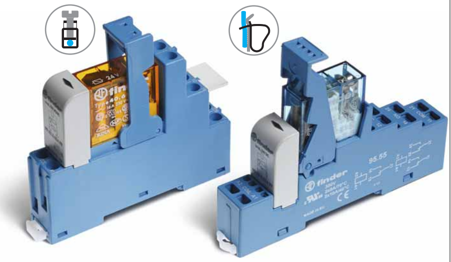
48.61 / 48.62
Screw terminal



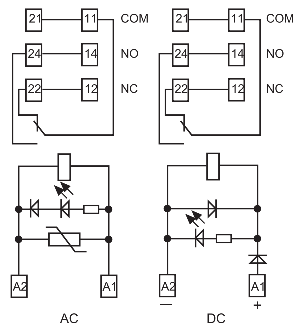
48.81 / 48.82
Screwless terminal

For outline drawing see page 7

48.61/81

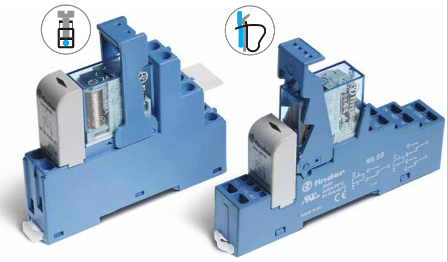


- 1 pole, 16 A
- Screw terminal and screwless terminal
- 35 mm rail (EN 60715) mounting

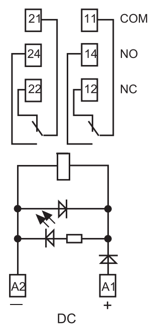


* For currents >10 A, contact terminals must be connected in parallel (21 with 11, 24 with 14, 22 with 12).

48.62/82



- 2 pole, 10 A
- Screw terminal and screwless terminal
- 35 mm rail (EN 60715) mounting



		48.61/81	48.62/82
Contact specification			
Contact configuration		1 CO (SPDT)	2 CO (DPDT)
Rated current/Maximum peak current	A	16*/30	10/20
Rated voltage/Maximum switching voltage	V AC	250/400	250/400
Rated load AC1	VA	4,000	2,500
Rated load AC15 (230 V AC)	VA	750	500
Single phase motor rating (230 V AC)	kW	0.55	0.37
Breaking capacity DC1: 30/110/220V	A	16/0.3/0.12	10/0.3/0.12
Minimum switching load	mW (V/mA)	500 (10/5)	300 (5/5)
Standard contact material		AgCdO	AgNi
Coil specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	12 - 24 - 110 - 120 - 230	—
	V DC	12 - 24 - 125	12 - 24 - 125
Rated power AC/sens. DC	VA (50 Hz)/W	1.2/0.5	—/0.5
Operating range	AC	$(0.8...1.1)U_N$	—
	sens. DC	$(0.8...1.5)U_N$	$(0.8...1.5)U_N$
Holding voltage	AC/DC	$0.8\ U_N$ /$0.4\ U_N$	—/$0.4\ U_N$
Must drop-out voltage	AC/DC	$0.2\ U_N$ /$0.1\ U_N$	—/$0.1\ U_N$
Technical data			
Mechanical life	cycles	$10 \cdot 10^6$	$20 \cdot 10^6$
Electrical life at rated load AC1	cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Operate/release time	ms	7/4 (AC) - 12/12 (DC)	12/12 (DC)
Insulation between coil and contacts (1.2/50 μs)	kV	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts	V AC	1,000	1,000
Ambient temperature range	°C	–40…+70	–40…+70
Protection category		IP 20	IP 20
Approvals relay (according to type)		CE ... RINA ...	CE ... RINA ...

B

Ordering information

Example: 48 series, 35 mm rail (EN 60715) mount, screw terminal relay interface module, 2 CO (DPDT) 8 A contacts, 24 V sensitive DC coil, green LED + diode, 99.02 coil indication.

4 8	.	5	2	.	7	.	0 2 4	.	0 (A)	0 (B)	5 (C)	0 (D)

Series

Type
Screw terminal
1 = 35 mm rail (EN 60715) mount, forcibly guided contacts relay
3 = 35 mm rail (EN 60715) mount
5 = 35 mm rail (EN 60715) mount
6 = 35 mm rail (EN 60715) mount
Screwless terminal
7 = 35 mm rail (EN 60715) mount
8 = 35 mm rail (EN 60715) mount

No. of poles
1 = 1 pole for 48.31, 10 A
48.61,48.81, 16 A
2 = 2 pole for 48.12, 48.52, 48.72, 8 A
48.62, 48.82, 10 A
(48.62, 48.82 DC only)

Coil version
7 = Sensitive DC
8 = AC (50/60 Hz)
9 = DC

Coil voltage
See coil specifications

A: Contact material
0 = Standard AgNi for 48.31/52/62/72/82
AgCdO, Standard for 48.61/81
1= AgNi, for 48.12
4 = $AgSnO_2$, for 48.61/62/81/82 only
5 = AgNi + Au, for 48.31/52/72 only

B: Contact circuit
0 = CO (nPDT)

D: Special versions
0 = Standard
2 = Standard (for 48.12 only)

C: Options
0 = Standard (for 48.12 only)
5 = Standard for DC:
green LED + diode (polarity +A1)
6 = Standard for AC:
green LED + Varistor

Selecting features and options: only combinations in the same row are possible.
Preferred selections for best availability are shown in **bold**.

Type	Coil version	A	B	C	D
48.12	DC	**1**	**0**	**0**	**2**
48.31/52/72	AC	**0** - 5	0	**6**	0
48.31/52/72	Sensitive DC	**0** - 5	0	**5**	0
48.61/81	AC	**0** - 4	0	**6**	0
48.61/81	Sensitive DC	**0** - 4	0	**5**	0
48.62/82	Sensitive DC	**0** - 4	0	**5**	0

Technical data

Insulation			**48.12/31/61/62**	**48.52/72**	**48.12/31/61/62/81/82**	
Insulation according to EN 61810-1	insulation rated voltage	V	250	250	400	
	rated impulse withstand voltage	kV	4	4	4	
	pollution degree		3	2	2	
	overvoltage category		III	III	III	
Insulation between coil and contacts (1.2/50 µs)		kV	6 (8 mm)			
Dielectric strength between open contacts		V AC	1,000; 1,500 (48.12)			
Dielectric strength between adjacent contacts		V AC	2,000 (48.52); 2,500 (48.12/62)			
Conducted disturbance immunity						
Burst (5…50)ns, 5 kHz, on A1 - A2			EN 61000-4-4		level 4 (4 kV)	
Surge (1.2/50 µs) on A1 - A2 (differential mode)			EN 61000-4-5		level 3 (2 kV)	
Other data						
Bounce time: NO/NC		ms	2/5; 2/10 (48.12)			
Vibration resistance (10…200)Hz: NO/NC		g	20/5 (for 1 pole)		15/3; 20/6 (48.12) for 2 pole	
Power lost to the environment	without contact current	W	0.7			
	with rated current	W	1.2 (48.12/31)	1.3 (48.52/72)	1.2 (48.61/62/81/82)	
Wire strip length		mm	8			
Screw torque		Nm	0.5			
Max. wire size			**Screw terminal**		**Screwless terminal**	
			solid cable	stranded cable	solid cable	stranded cable
		mm^2	1x6 / 2x2.5	1x4 / 2x2.5	2x(0.2…1.5)	2x(0.2…1.5)
		AWG	1x10 / 2x14	1x12 / 2x14	2x(24…18)	2x(24…18)

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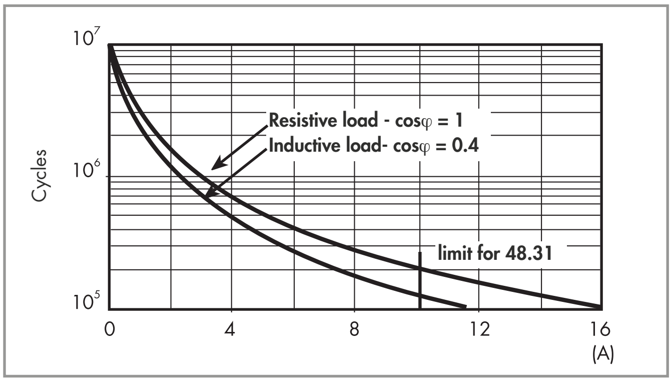
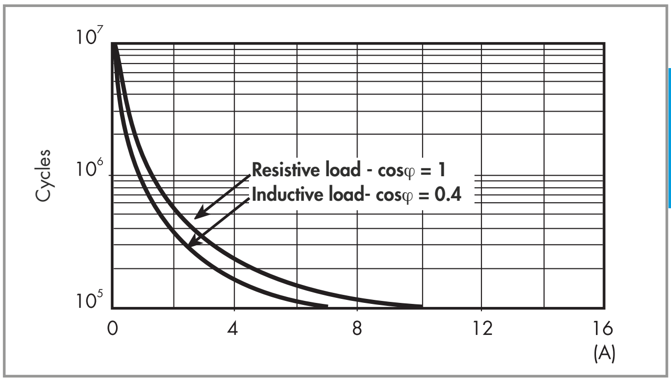
Contact specification

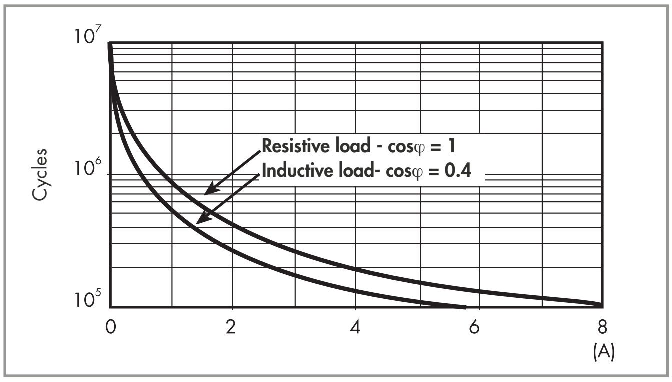
F 48 - Electrical life (AC) v contact current
Types 48.31/61/81



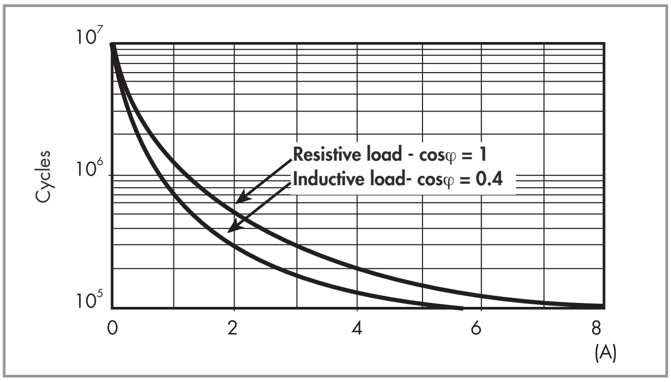
F 48 - Electrical life (AC) v contact current
Types 48.62/82



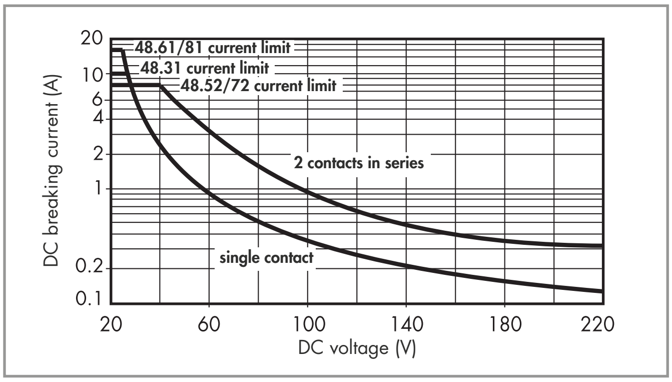
F 48 - Electrical life (AC) v contact current
Types 48.52/72



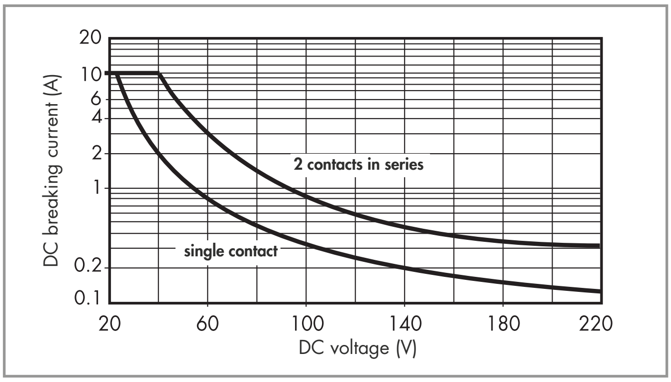
F 48 - Electrical life (AC) v contact current
Type 48.12



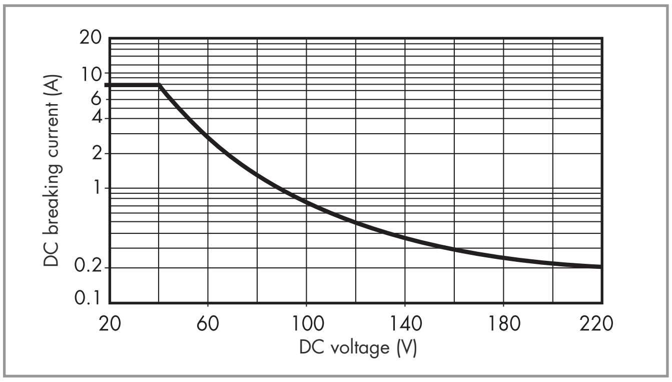
H 48 - Maximum DC1 breaking capacity
Types 48.31/52/61/72/81



H 48 - Maximum DC1 breaking capacity
Types 48.62/82



H 48 - Maximum DC1 breaking capacity
Type 48.12



- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of ≥ $100 \cdot 10^3$ can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load. Note: the release time for the load will be increased.

Coil specifications

DC coil data (0.5 W sensitive)

Nominal voltage U_N	Coil code	Operating range U_{min}*	Operating range U_{max}	Rated coil consumption I at U_N
V		V	V	mA
12	**7**.012	8.8	18	41
24	**7**.024	17.5	36	22.2
125	**7**.125	91	188	4

*U_{min} = 0.8 U_N for 48.61, 48.62, 48.81 and 48.82

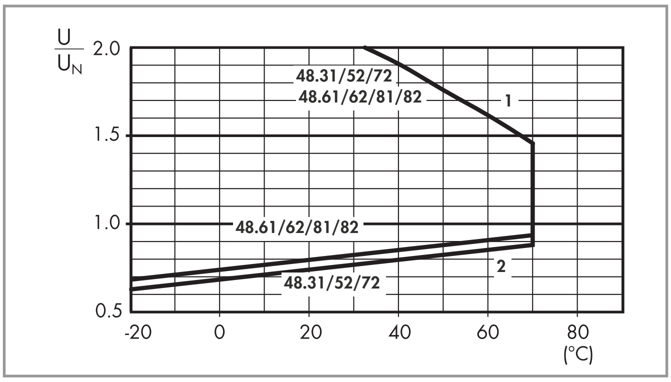
AC coil data

Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Rated coil consumption I at U_N (50Hz)
V		V	V	mA
12	**8**.012	9.6	13.2	90.5
24	**8**.024	19.2	26.4	46
110	**8**.110	88	121	10.1
120	**8**.120	96	132	11.8
230	**8**.230	184	253	7.0

DC coil data, 2 pole relay - Type 48.12

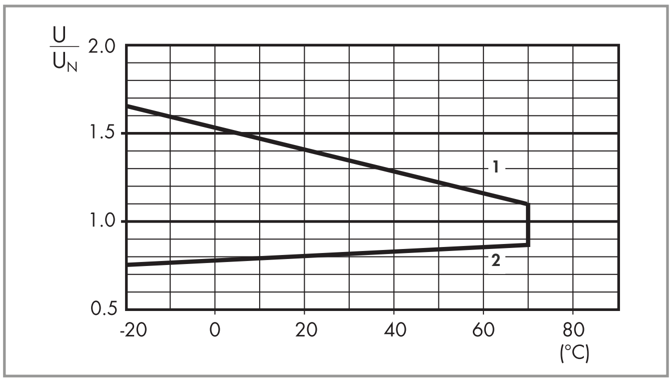
Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
12	**9**.012	9	14.4	205	58.5
24	**9**.024	18	28.8	820	29.3

R 48 - DC coil operating range v ambient temperature



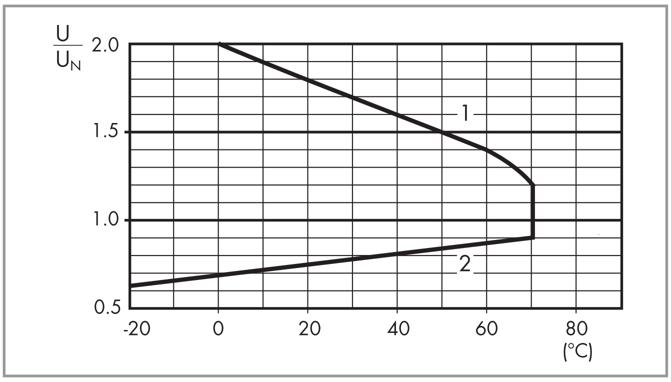
1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

R 48 - AC coil operating range v ambient temperature



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

R 48 - DC coil operating range v ambient temperature
Type 48.12

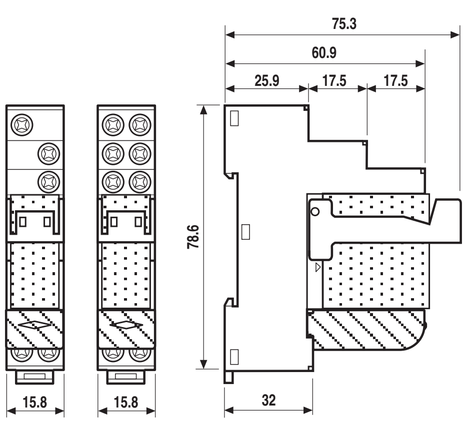


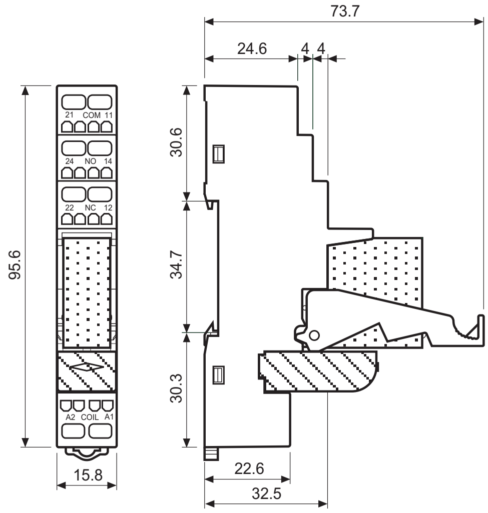
1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

Combinations

Code	Type of socket	Type of relay	Module	Retaining clip
48.12	95.05.0	50.12	—	095.71
48.31	95.03	40.31	99.02	095.01
48.52	95.05	40.52	99.02	095.01
48.61	95.05	40.61	99.02	095.01
48.62	95.05	44.62	99.02	095.01
48.72	95.55	40.52	99.02	095.91.3
48.81	95.55	40.61	99.02	095.91.3
48.82	95.55	44.62	99.02	095.91.3

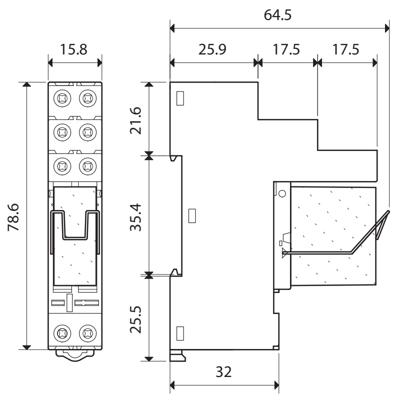
Outline drawing



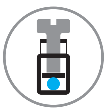


48.31 48.52 / 48.61 / 48.62
Screw terminal

48.72 / 48.81 / 48.82
Screwless terminal



48.12
Screw terminal



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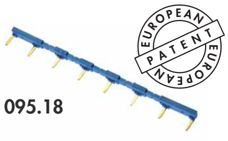
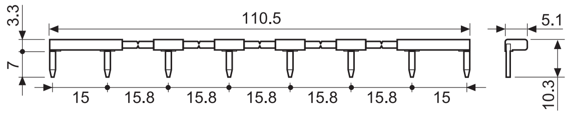
B

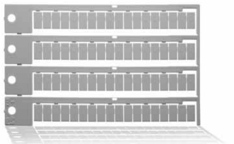
Accessories



095.18

8-way jumper link for screw terminal version	095.18 (blue)	095.18.0 (black)
Rated values	10 A - 250 V	





060.72

Sheet of marker tags, plastic, 72 tags, 6x12 mm	060.72

Packaging codes

How to code and identify retaining clip and packaging options for sockets.

Example:

4 8 . 5 2 . 7 . 0 2 4 . 0 0 5 0 S P A

A	Standard packaging
B	Blister packaging

SP	Plastic retaining clip

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Features

1 & 2 Pole relay interface modules

5 μm Gold plate contacts for low level switching capability

49.31-50x0 - 1 Pole 10 A (screw terminal)
49.52-50x0 - 2 Pole 8 A (screw terminal)
49.72-50x0 - 2 Pole 8 A (screwless terminal)

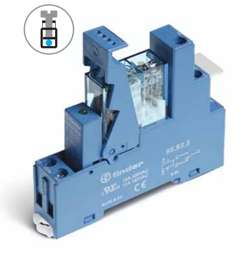
- 15.5 mm wide
- Ideal interface for PLC and electronic systems
- AC coils & DC coils
- Instant ejection of relay using plastic retaining clip
- Supply status indication and coil suppression module
- Identification labels
- 35 mm rail (EN 60715) mounting

49.31-50x0 / 49.52
Screw terminal

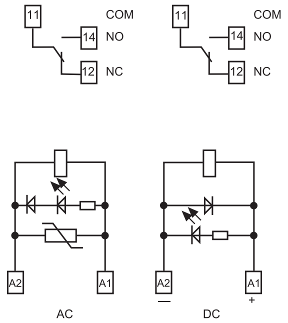
49.72-50x0
Screwless terminal

For outline drawing see page 8

49.31-50x0



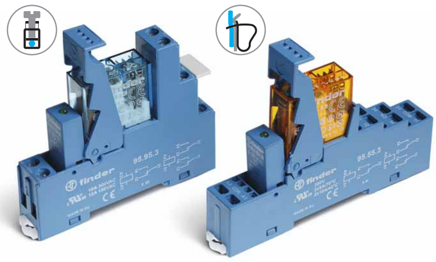
- 1 pole, 10 A
- AgNi + Au contact material
- Screw terminal
- 35 mm rail (EN 60715) mounting



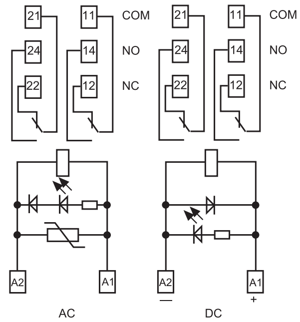
8.xxx.5060

7.xxx.5050
9.xxx.5050

49.52/72-50x0



- 2 pole, 8 A
- AgNi + Au contact material
- Screw terminal and screwless terminal
- 35 mm rail (EN 60715) mounting



8.xxx.5060

7.xxx.5050
9.xxx.5050

* By external parallel connection of the contacts the values within [1 (0.1/1)] can be acheived.

B

		49.31-50x0	49.52/72-50x0
Contact specification			
Contact configuration		1 CO (SPDT)	2 CO (DPDT)
Rated current/Maximum peak current	A	10/20	8/15
Rated voltage/Maximum switching voltage	V AC	250/400	250/250
Rated load AC1	VA	2,500	2,000
Rated load AC15 (230 V AC)	VA	500	400
Single phase motor rating (230 V AC)	kW	0.37	0.3
Breaking capacity DC1: 30/110/220V	A	10/0.3/0.12	8/0.3/0.12
Minimum switching load	mW (V/mA)	50 (5/2)	50 (5/2) - [1 (0.1/1)]*
Standard contact material		AgNi + Au	AgNi + Au
Coil specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	12 - 24 - 110 - 120 - 230	12 - 24 - 110 - 120 - 230
	V DC	12 - 24 - 125	12 - 24 - 125
Rated power AC/DC/sens.DC	VA (50 Hz)/W/W	1.2/0.65/0.5	1.2/0.65/0.5
Operating range	AC	(0.8…1.1)U_N	(0.8…1.1)U_N
	DC/sensitiv DC	(0.73…1.5)U_N/(0.73…1.5)U_N	(0.73…1.5)U_N/(0.73…1.5)U_N
Holding voltage	AC/DC	0.8 U_N /0.4 U_N	0.8 U_N /0.4 U_N
Must drop-out voltage	AC/DC	0.2 U_N /0.1 U_N	0.2 U_N /0.1 U_N
Technical data			
Mechanical life	cycles	$10 \cdot 10^6$	$10 \cdot 10^6$
Electrical life at rated load AC1	cycles	$200 \cdot 10^3$	$100 \cdot 10^3$
Operate/release time	ms	7/4 (AC) - 12/12 (DC)	7/4 (AC) - 12/12 (DC)
Insulation between coil and contacts (1.2/50 μs)	kV	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts	V AC	1,000	1,000
Ambient temperature range	°C	–40…+70	–40…+70
Protection category		IP 20	IP 20
Approvals relay (according to type)		CE, Lloyds Register, RINA, c UL us	

49 Series - Relay interface modules 8 - 10 - 16 A

finder

B

Features

1 & 2 Pole relay interface modules

AgNi contacts for medium duty switching

49.31-00x0 - 1 Pole 10 A (screw terminal)
49.52-00x0 - 2 Pole 8 A (screw terminal)
49.72-00x0 - 2 Pole 8 A (screwless terminal)

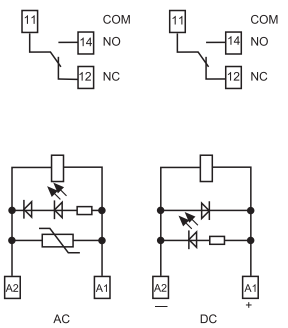
- 15.5 mm wide
- Ideal interface for PLC and electronic systems
- AC coils & DC coils
- Instant ejection of relay using plastic retaining clip
- Supply status indication and coil suppression module
- Identification labels
- 35 mm rail (EN 60715) mounting

49.31-00x0 / 49.52
Screw terminal

49.72-00x0
Screwless terminal

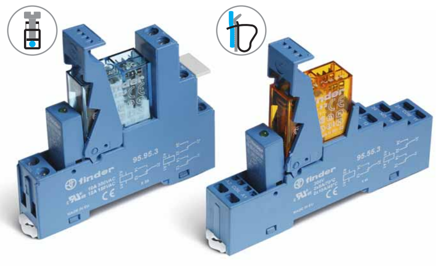
49.31-00x0

- 1 pole, 10 A
- AgNi contact material
- Screw terminal
- 35 mm rail (EN 60715) mounting

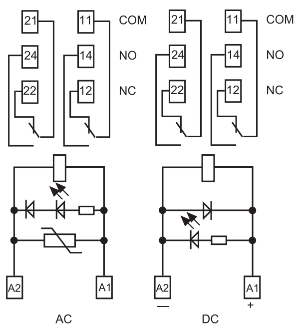


8.xxx.0060 | 7.xxx.0050 9.xxx.0050

49.52/72-00x0



- 2 pole, 8 A
- AgNi contact material
- Screw terminal and screwless terminal
- 35 mm rail (EN 60715) mounting



8.xxx.0060 | 7.xxx.0050 9.xxx.0050

For outline drawing see page 8

		49.31-00x0	49.52/72-00x0
Contact specification			
Contact configuration		1 CO (SPDT)	2 CO (DPDT)
Rated current/Maximum peak current	A	10/20	8/15
Rated voltage/Maximum switching voltage	V AC	250/400	250/250
Rated load AC1	VA	2,500	2,000
Rated load AC15 (230 V AC)	VA	500	400
Single phase motor rating (230 V AC)	kW	0.37	0,3
Breaking capacity DC1: 30/110/220V	A	10/0.3/0.12	8/0.3/0.12
Minimum switching load	mW (V/mA)	300 (5/5)	300 (5/5)
Standard contact material		AgNi	AgNi
Coil specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	12 - 24 - 110 - 120 - 230	12 - 24 - 110 - 120 - 230
	V DC	12 - 24 - 125	12 - 24 - 125
Rated power AC/DC/sens.DC	VA (50 Hz)/W/W	1.2/0.65/0.5	1.2/0.65/0.5
Operating range	AC	$(0.8…1.1)U_N$	$(0.8…1.1)U_N$
	DC/sensitiv DC	$(0.73…1.5)U_N$/$(0.73…1.5)U_N$	$(0.73…1.5)U_N$/$(0.73…1.5)U_N$
Holding voltage	AC/DC	$0.8\ U_N$ /$0.4\ U_N$	$0.8\ U_N$ /$0.4\ U_N$
Must drop-out voltage	AC/DC	$0.2\ U_N$ /$0.1\ U_N$	$0.2\ U_N$ /$0.1\ U_N$
Technical data			
Mechanical life	cycles	$10 \cdot 10^6$	$10 \cdot 10^6$
Electrical life at rated load AC1	cycles	$200 \cdot 10^3$	$100 \cdot 10^3$
Operate/release time	ms	7/4 (AC) - 12/12 (DC)	7/4 (AC) - 12/12 (DC)
Insulation between coil and contacts (1.2/50 μs)	kV	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts	V AC	1,000	1,000
Ambient temperature range	°C	–40…+70	–40…+70
Protection category		IP 20	IP 20
Approvals relay (according to type)			

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Features

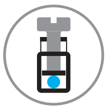
1 & 2 Pole relay interface modules

AgCdO contacts for heavy duty switching

49.31-20x0 - 1 Pole 10 A (screw terminal)
49.52-20x0 - 2 Pole 8 A (screw terminal)
49.72-20x0 - 2 Pole 8 A (screwless terminal)

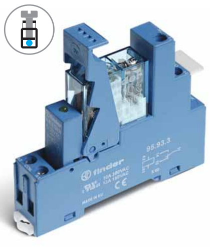
- 15.5 mm wide
- Ideal interface for PLC and electronic systems
- AC coils & DC coils
- Instant ejection of relay using plastic retaining clip
- Supply status indication and coil suppression module
- Identification labels
- 35 mm rail (EN 60715) mounting

49.31-20x0 / 49.52
Screw terminal

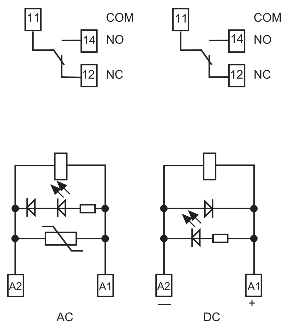


49.72-20x0
Screwless terminal

49.31-20x0



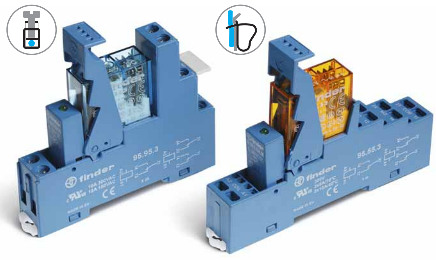
- 1 pole, 10 A
- AgCdO contact material
- Screw terminal
- 35 mm rail (EN 60715) mounting



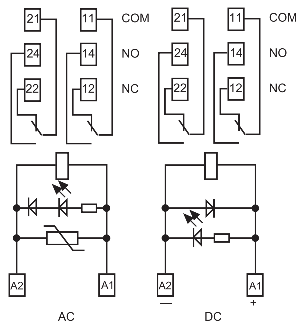
8.xxx.2060

7.xxx.2050
9.xxx.2050

49.52/72-20x0



- 2 pole, 8 A
- AgCdO contact material
- Screw terminal and screwless terminal
- 35 mm rail (EN 60715) mounting



8.xxx.2060

7.xxx.2050
9.xxx.2050

For outline drawing see page 8

		49.31-20x0	49.52/72-20x0
Contact specification			
Contact configuration		1 CO (SPDT)	2 CO (DPDT)
Rated current/Maximum peak current	A	10/20	8/15
Rated voltage/Maximum switching voltage	V AC	250/400	250/250
Rated load AC1	VA	2,500	2,000
Rated load AC15 (230 V AC)	VA	500	400
Single phase motor rating (230 V AC)	kW	0.37	0.3
Breaking capacity DC1: 30/110/220V	A	10/0.3/0.12	8/0.3/0.12
Minimum switching load	mW (V/mA)	500 (10/5)	500 (10/5)
Standard contact material		AgCdO	AgCdO
Coil specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	12 - 24 - 110 - 120 - 230	12 - 24 - 110 - 120 - 230
	V DC	12 - 24 - 125	12 - 24 - 125
Rated power AC/DC/sens.DC	VA (50 Hz)/W/W	1.2/0.65/0.5	1.2/0.65/0.5
Operating range	AC	$(0.8…1.1)U_N$	$(0.8…1.1)U_N$
	DC/sensitiv DC	$(0.73…1.5)U_N/(0.73…1.5)U_N$	$(0.73…1.5)U_N/(0.73…1.5)U_N$
Holding voltage	AC/DC	$0.8\ U_N$ /$0.4\ U_N$	$0.8\ U_N$ /$0.4\ U_N$
Must drop-out voltage	AC/DC	$0.2\ U_N$ /$0.1\ U_N$	$0.2\ U_N$ /$0.1\ U_N$
Technical data			
Mechanical life	cycles	$10 \cdot 10^6$	$10 \cdot 10^6$
Electrical life at rated load AC1	cycles	$200 \cdot 10^3$	$100 \cdot 10^3$
Operate/release time	ms	7/4 (AC) - 12/12 (DC)	7/4 (AC) - 12/12 (DC)
Insulation between coil and contacts (1.2/50 μs)	kV	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts	V AC	1,000	1,000
Ambient temperature range	°C	–40…+70	–40…+70
Protection category		IP 20	IP 20
Approvals relay (according to type)			

B

49 Series - Relay interface modules 8 - 10 - 16 A

Features

1 Pole relay interface module

AgCdO contacts for heavy duty switching

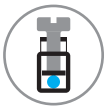
49.61-00x0 - 1 Pole 16 A (screw terminal)
49.81-00x0 - 1 Pole 16 A (screwless terminal)

AgSnO$_2$ contacts for heavy duty, high current inrush switching

49.61-40x0 - 1 Pole 16 A (screw terminal)
49.81-40x0 - 1 Pole 16 A (screwless terminal)

- 15.5 mm wide
- Ideal interface for PLC and electronic systems
- AC coils & DC coils
- Instant ejection of relay using plastic retaining clip
- Supply status indication and coil suppression module
- Identification labels
- 35 mm rail (EN 60715) mounting

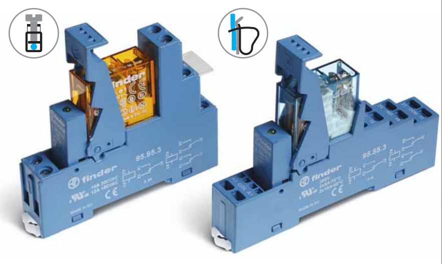
49.61
Screw terminal



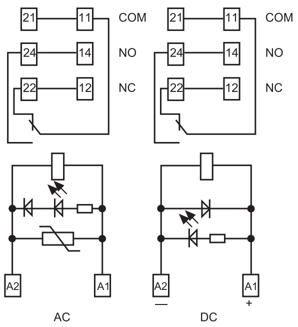
49.81-00x0/40x0
Screwless terminal

For outline drawing see page 8

49.61/81-00x0



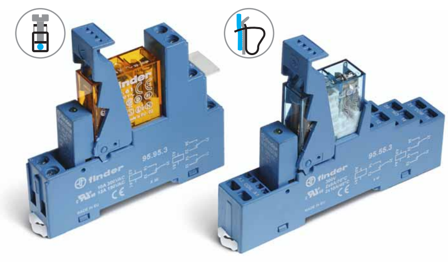
- 1 pole, 16 A*
- AgCdO contact material
- Screw terminal and screwless terminal
- 35 mm rail (EN 60715) mounting



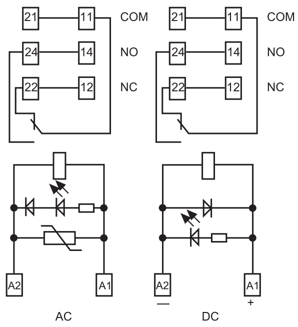
8.xxx.0060　7.xxx.0050
9.xxx.0050

* For currents >10 A, contact terminals must be connected in parallel (21 with 11, 24 with 14, 22 with 12).

49.61/81-40x0



- 1 pole, 16 A*
- AgSnO$_2$ contact material
- Screw terminal and screwless terminal
- 35 mm rail (EN 60715) mounting



8.xxx.4060　7.xxx.4050
9.xxx.4050

* For currents >10 A, contact terminals must be connected in parallel (21 with 11, 24 with 14, 22 with 12).

		49.61/81-00x0	49.61/81-40x0
Contact specification			
Contact configuration		1 CO (SPDT)	1 CO (SPDT)
Rated current/Maximum peak current	A	16*/30	16*/100 (5 ms)
Rated voltage/Maximum switching voltage	V AC	250/400	250/400
Rated load AC1	VA	4,000	4,000
Rated load AC15 (230 V AC)	VA	750	750
Single phase motor rating (230 V AC)	kW	0.55	0.55
Breaking capacity DC1: 30/110/220V	A	16/0.3/0.12	16/0.3/0.12
Minimum switching load	mW (V/mA)	500 (5/5)	1,000 (10/10)
Standard contact material		AgCdO	AgSnO$_2$
Coil specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	12 - 24 - 110 - 120 - 230	12 - 24 - 110 - 120 - 230
	V DC	12 - 24 - 125	12 - 24 - 125
Rated power AC/DC/sens.DC	VA (50 Hz)/W/W	1.2/0.65/0.5	1.2/0.65/0.5
Operating range	AC	$(0.8...1.1)U_N$	$(0.8...1.1)U_N$
	DC/sensitiv DC	$(0.73...1.5)U_N/(0.8...1.5)U_N$	$(0.73...1.5)U_N/(0.8...1.5)U_N$
Holding voltage	AC/DC	$0.8\ U_N\ /0.4\ U_N$	$0.8\ U_N\ /0.4\ U_N$
Must drop-out voltage	AC/DC	$0.2\ U_N\ /0.1\ U_N$	$0.2\ U_N\ /0.1\ U_N$
Technical data			
Mechanical life	cycles	$10 \cdot 10^6$	$10 \cdot 10^6$
Electrical life at rated load AC1	cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Operate/release time	ms	7/4 (AC) - 12/12 (DC)	7/4 (AC) - 12/12 (DC)
Insulation between coil and contacts (1.2/50 μs)	kV	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts	V AC	1,000	1,000
Ambient temperature range	°C	–40…+70	–40…+70
Protection category		IP 20	IP 20
Approvals relay (according to type)			

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B

Ordering information

Example: 49 series, 35 mm rail (EN 60715) mount screw terminal relay interface module, 2 CO (DPDT) 8 A contacts, 24 V sensitive DC coil, green LED + diode (polarity +A1), 99.80 coil indication.

4 9 . 5 2 . 7 . 0 2 4 . 0 0 5 0 (A = 0, B = 0, C = 5, D = 0)

Series

Type
3, 5, 6 = 35 mm rail (EN 60715) mount, screw terminal
7, 8 = 35 mm rail (EN 60715) mount, screwless terminal

No. of poles
1 = 1 pole for 49.31, 10 A
49.61, 49.81, 16 A
2 = 2 pole for 49.52, 49.72, 8 A

Coil version
7 = Sensitive DC (500 mW)
8 = AC (50/60 Hz)
9 = DC (650 mW)

Coil voltage
See coil specifications

A: Contact material
0 = Standard AgNi for 49.31/52/72, AgCdO for 49.61/81
2 = AgCdO for 49.31/52/72
4 = $AgSnO_2$ for 49.61/81 only
5 = AgNi + Au not for 49.61/81

B: Contact circuit
0 = CO (nPDT)

D: Special versions
0 = Standard

C: Options
5 = Standard for DC: green LED + diode (polarity +A1)
6 = Standard for AC: green LED + Varistor

Selecting features and options: only combinations in the same row are possible.
Preferred selections for best availability are shown in **bold.**

Type	Coil version	A	B	C	D
49.31/52/72	AC	**0** - 2 - 5	0	**6**	0
49.31/52/72	DC - sens. DC	**0** - 2 - 5	0	**5**	0
49.61/81	AC	**0** - 4	0	**6**	0
49.61/81	DC - sens. DC	**0** - 4	0	**5**	0

Technical data

Insulation			**49.31/61**	**49.52/72**	**49.31/61/81**	
Insulation according to EN 61810-1	insulation rated voltage	V	250	250	400	
	rated impulse withstand voltage	kV	4	4	4	
	pollution degree		3	2	2	
	overvoltage category		III	III	III	
Insulation between coil and contacts (1.2/50 μs)		kV	6 (8 mm)			
Dielectric strength between open contacts		V AC	1,000			
Dielectric strength between adjacent contacts		V AC	2,000 (49.52/72)			
Conducted disturbance immunity						
Burst (5…50)ns, 5 kHz, on A1 - A2			EN 61000-4-4		level 4 (4 kV)	
Surge (1.2/50 μs) on A1 - A2 (differential mode)			EN 61000-4-5		level 3 (2 kV)	
Other data						
Bounce time: NO/NC		ms	2/5			
Vibration resistance (10…200)Hz: NO/NC		g	20/5 (for 1 pole)		15/3 (for 2 pole)	
Power lost to the environment	without contact current	W	0.7			
	with rated current	W	1.2 (49.31/61/81)		1.3 (49.52/72)	
Wire strip length		mm	8			
Screw torque		Nm	0.5			
Max. wire size			**Screw terminal**		**Screwless terminal**	
			solid cable	stranded cable	solid cable	stranded cable
		mm^2	1x6 / 2x2.5	1x4 / 2x2.5	2x(0.2…1.5)	2x(0.2…1.5)
		AWG	1x10 / 2x14	1x12 / 2x14	2x(24…18)	2x(24…18)

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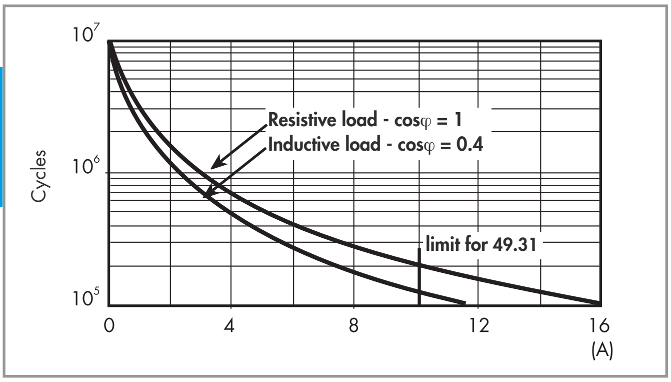
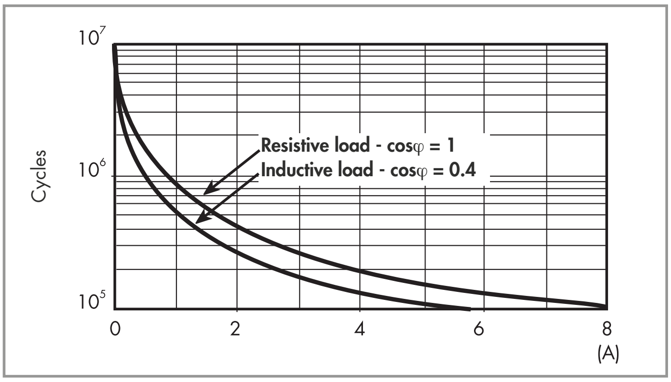
B

Contact specification

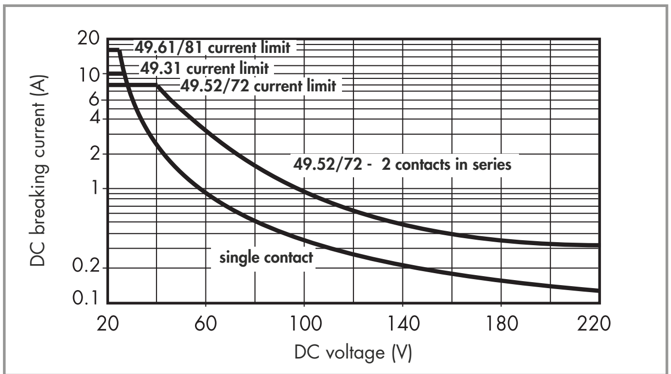
F 49 - Electrical life (AC) v contact current
Types 49.31/61/81



F 49 - Electrical life (AC) v contact current
Types 49.52/72



H 49 - Maximum DC1 breaking capacity
Types 49.31/52/61/72/81



- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of ≥ $100 \cdot 10^3$ can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load.
  Note: the release time for the load will be increased.

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Coil specifications

DC coil data (0.5 W sensitive)

Nominal voltage U_N	Coil code	Operating range U_{min}*	U_{max}	Rated coil consumption I at U_N
V		V	V	mA
12	**7**.012	8.8	18	41
24	**7**.024	17.5	36	22.2
125	**7**.125	91.2	188	4

*U_{min} = 0.8 U_N for 49.61 and 49.81

AC coil data

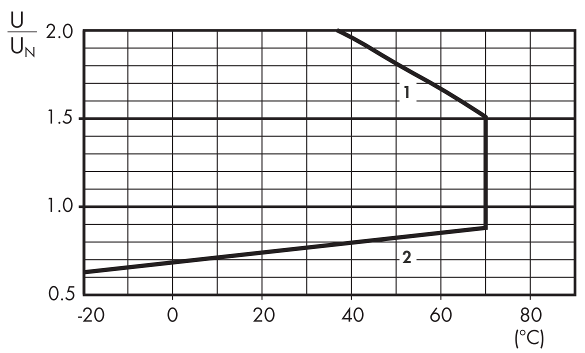
Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Rated coil consumption I at U_N (50Hz)
V		V	V	mA
12	**8**.012	9.6	13.2	90.5
24	**8**.024	19.2	26.4	46
110	**8**.110	88	121	10.1
120	**8**.120	96	132	11.8
230	**8**.230	184	253	7.0

B

DC coil data (0.65 W)

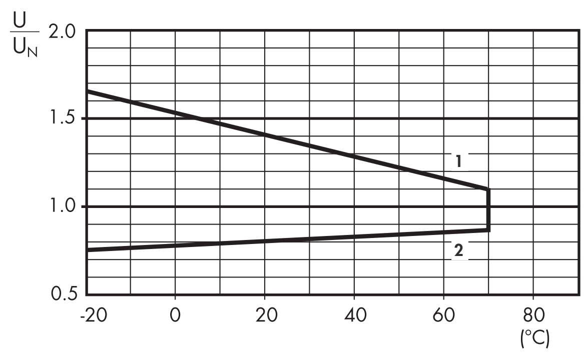
Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Rated coil consumption I at U_N
V		V	V	mA
12	**9**.012	8.8	18	56
24	**9**.024	17.5	36	29
125	**9**.125	91.2	188	6

R 49 - DC coil operating range v ambient temperature
Standard (650 mW)



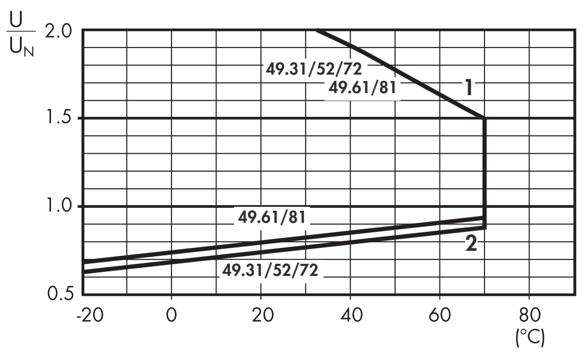
1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

R 49 - AC coil operating range v ambient temperature



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

R 49 - DC coil operating range v ambient temperature
Sensitive coil (500 mW)



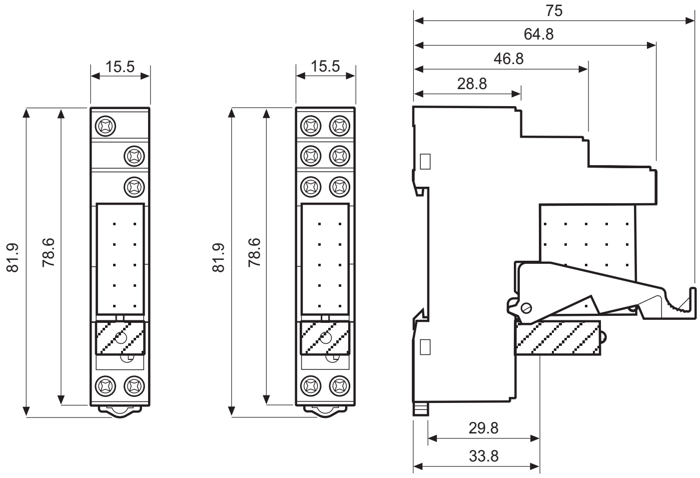
1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

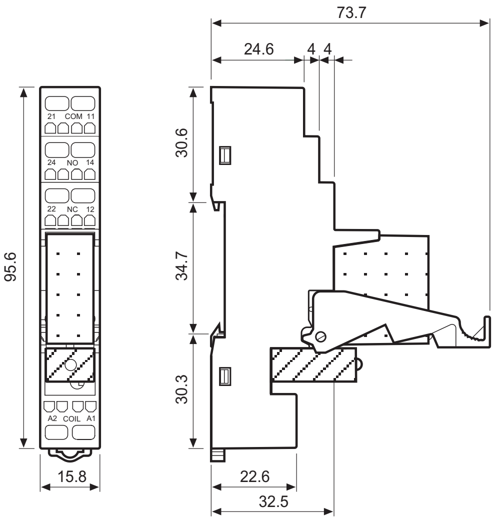
B

Combinations

Code	Type of socket	Type of relay	Module	Retaining clip
49.31	95.93.3	40.31	99.80	095.91.3
49.52	95.95.3	40.52	99.80	095.91.3
49.61	95.95.3	40.61	99.80	095.91.3
49.72	95.55.3	40.52	99.80	095.91.3
49.81	95.55.3	40.61	99.80	095.91.3

Outline drawing





49.31

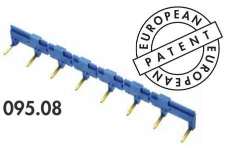
49.52
49.61

49.31-50x0 / 49.31-00x0 /
49.31-20x0 / 49.52 / 49.61
Screw terminal

49.72
49.81

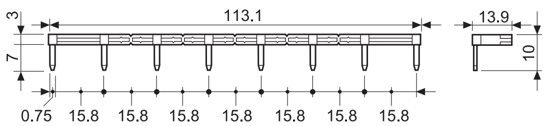
49.72-50x0 / 49.72-00x0 / 49.72-20x0
49.81-00x0 / 49.81-40x0
Screwless terminal

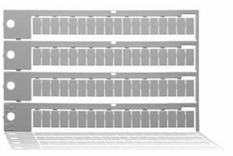
Accessories



095.08

8-way jumper link for screw terminal versions	095.08 (blue)	095.08.0 (black)
Rated values	10 A - 250 V	





060.72

Sheet of marker tags, plastic, retaining clip 095.91.3, 72 tags, 6x12 mm	060.72

Packaging codes

How to code and identify retaining clip and packaging options for sockets.

Example:

4	9	.	5	2	.	7	.	0	2	4	.	0	0	5	0	S	P	A

A Standard packaging
B Blister packaging

SP Plastic retaining clip

II-2014, www.findernet.com

Features

1 & 2 pole relay interface modules, screw terminal socket, 15.8 mm wide.

Ideal interface for PLC and electronic systems
4C.01 - 1 Pole 16 A
4C.02 - 2 Pole 8 A

- AC coils or DC coils
- Instant ejection of relay using plastic retaining clip
- Supply status indication and coil suppression module as standard
- Identification label
- UL Listing (certain relay/socket combinations)
- 35 mm rail (EN 60715) mounting

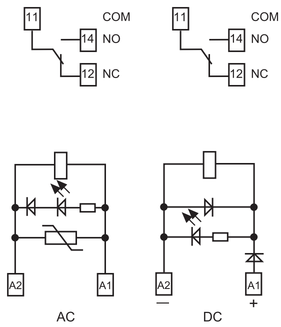
4C.01

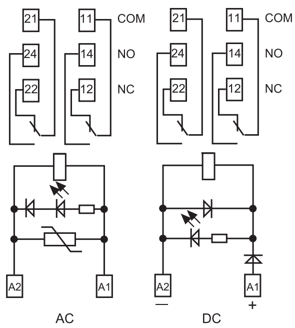
- 1 pole, 16 A
- Screw terminal connection
- 35 mm rail (EN 60715) mounting

4C.02

- 2 pole, 8 A
- Screw terminal connection
- 35 mm rail (EN 60715) mounting

4C.01 / 4C.02
Screw terminal





For outline drawing of 4C.01/02 see page 5

	4C.01	4C.02
Contact specification		
Contact configuration	1 CO (SPDT)	2 CO (DPDT)
Rated current/Maximum peak current A	16/25	8/15
Rated voltage/Maximum switching voltage V AC	250/440	250/440
Rated load AC1 VA	4,000	2,000
Rated load AC15 (230 V AC) VA	750	350
Single phase motor rating (230 V AC) kW	0.55	0.37
Breaking capacity DC1: 30/110/220V A	16/0.5/0.15	6/0.5/0.15
Minimum switching load mW (V/mA)	300 (5/5)	300 (5/5)
Standard contact material	AgNi	AgNi
Coil specification		
Nominal voltage (U_N) V AC (50/60 Hz)	12 - 24 - 110 - 120 - 230	12 - 24 - 110 - 120 - 230
V DC	12 - 24 - 125	12 - 24 - 125
Rated power AC/DC VA (50 Hz)/W	1.2/0.5	1.2/0.5
Operating range AC	$(0.8…1.1)U_N$	$(0.8…1.1)U_N$
DC	$(0.73…1.1)U_N$	$(0.73…1.1)U_N$
Holding voltage AC/DC	$0.8\ U_N$ /$0.4\ U_N$	$0.8\ U_N$ /$0.4\ U_N$
Must drop-out voltage AC/DC	$0.2\ U_N$ /$0.1\ U_N$	$0.2\ U_N$ /$0.1\ U_N$
Technical data		
Mechanical life AC/DC cycles	$10 \cdot 10^6$	$10 \cdot 10^6$
Electrical life at rated load AC1 cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Operate/release time ms	15/5 (AC) - 15/12 (DC)	10/3 (AC) - 10/10 (DC)
Insulation between coil and contacts (1.2/50 μs) kV	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts V AC	1,000	1,000
Ambient temperature range °C	≤ 12A: –40…+70/>12A: –40…+50	–40…+70
Protection category	IP 20	IP 20
Approvals - relay (according to type)		

X-2013, www.findernet.com

4C Series - Relay interface modules 8 - 10 - 16 A

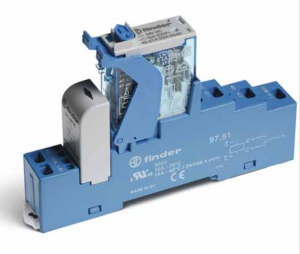
Features

1 & 2 pole relay interface modules, screwless terminal socket, 15.8 mm wide.

Ideal interface for PLC and electronic systems
4C.51 - 1 Pole 10 A
4C.52 - 2 Pole 8 A

- AC coils or DC coils
- Instant ejection of relay using plastic retaining clip
- Supply status indication and coil suppression module as standard
- Identification label
- UL Listing (certain relay/socket combinations)
- 35 mm rail (EN 60715) mounting

4C.51

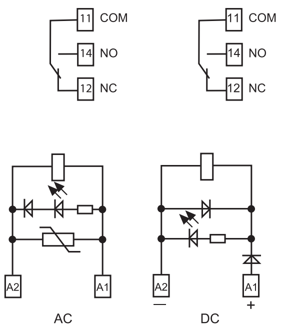


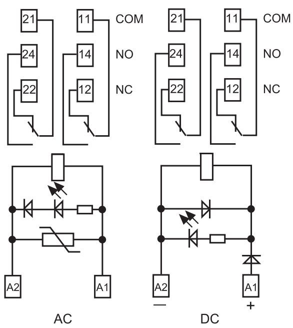
- 1 pole, 10 A
- Screwless terminal connections
- 35 mm rail (EN 60715) mounting

4C.52

- 2 pole, 8 A
- Screwless terminal connections
- 35 mm rail (EN 60715) mounting

4C.51 / 4C.52
Screwless terminal





For outline drawing of 4C.51/52 see page 5

		4C.51	4C.52
Contact specification			
Contact configuration		1 CO (SPDT)	2 CO (DPDT)
Rated current/Maximum peak current	A	10/20	8/15
Rated voltage/Maximum switching voltage	V AC	250/440	250/440
Rated load AC1	VA	2,500	2,000
Rated load AC15 (230 V AC)	VA	750	350
Single phase motor rating (230 V AC)	kW	0.55	0.37
Breaking capacity DC1: 30/110/220V	A	10/0.5/0.15	6/0.5/0.15
Minimum switching load	mW (V/mA)	300 (5/5)	300 (5/5)
Standard contact material		AgNi	AgNi
Coil specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	12 - 24 - 110 - 120 - 230	12 - 24 - 110 - 120 - 230
	V DC	12 - 24 - 125	12 - 24 - 125
Rated power AC/DC	VA (50 Hz)/W	1.2/0.5	1.2/0.5
Operating range	AC	(0.8…1.1)U_N	(0.8…1.1)U_N
	DC	(0.73…1.1)U_N	(0.73…1.1)U_N
Holding voltage	AC/DC	0.8 U_N /0.4 U_N	0.8 U_N /0.4 U_N
Must drop-out voltage	AC/DC	0.2 U_N /0.1 U_N	0.2 U_N /0.1 U_N
Technical data			
Mechanical life AC/DC	cycles	$10 \cdot 10^6$	$10 \cdot 10^6$
Electrical life at rated load AC1	cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Operate/release time	ms	15/5 (AC) - 15/12 (DC)	10/3 (AC) - 10/10 (DC)
Insulation between coil and contacts (1.2/50 μs)	kV	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts	V AC	1,000	1,000
Ambient temperature range	°C	–25…+70	–25…+70
Protection category		IP 20	IP 20
Approvals - relay (according to type)			

X-2013, www.findernet.com

Ordering information

Example: 4C series, 35 mm rail (EN 60715) mount screw terminal relay interface module, 1 CO (SPDT) 16 A contacts, 24 V DC coil, green LED + diode.

4 C	.	0	1	.	9	.	0 2 4	.	0 (A)	0 (B)	5 (C)	0 (D)

Series

Type
0 = 35 mm rail (EN 60715) mount screw terminal socket
5 = 35 mm rail (EN 60715) mount screwless terminal socket

No. of poles
1 = 1 pole
2 = 2 pole

Coil version
8 = AC (50/60 Hz)
9 = DC

Coil voltage
See coil specifications

A: Contact material
0 = AgNi
4 = $AgSnO_2$
5 = AgNi + Au

B: Contact circuit
0 = CO (nPDT)

D: Special version
0 = Standard

C: Options
5 = Standard for DC: green LED + diode (polarity +A1)
6 = Standard for AC: green LED + Varistor

Selecting features and options: only combinations in the same row are possible.
Preferred selections for best availability are shown in **bold**.

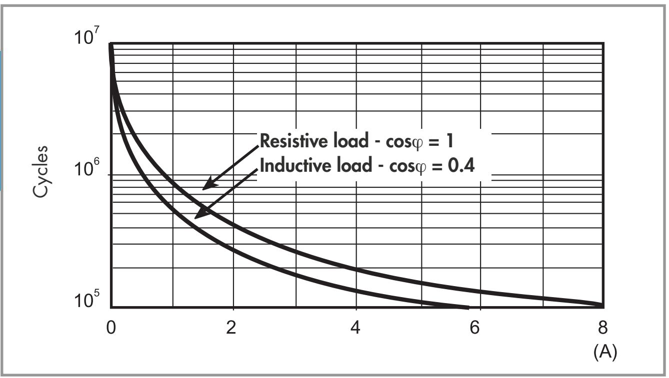
Type	Coil version	A	B	C	D
4C.02	AC	**0** - 5	**0**	**6**	**0**
4C.52	DC	**0** - 5	**0**	**5**	**0**
4C.01	AC	**0** - 4 - 5	**0**	**6**	**0**
4C.51	DC	**0** - 4 - 5	**0**	**5**	**0**

Technical data

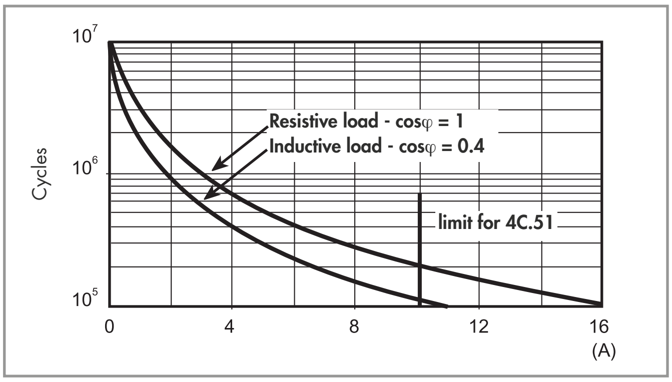
Insulation						
Insulation according to EN 61810-1	insulation rated voltage	V	250		440	
	rated impulse withstand voltage	kV	4		4	
	pollution degree		3		2	
	overvoltage category		III		III	
Insulation between coil and contacts (1.2/50 μs)		kV	6 (8 mm)			
Dielectric strength between open contacts		V AC	1,000			
Dielectric strength between adjacent contacts		V AC	2,000			
Conducted disturbance immunity						
Burst (5…50)ns, 5 kHz, on A1 - A2			EN 61000-4-4		level 4 (4 kV)	
Surge (1.2/50 μs) on A1 - A2 (differential mode)			EN 61000-4-5		level 3 (2 kV)	
Other data						
Bounce time: NO/NC		ms	2/6 (4C.01/51)		1/4 (4C.02/52)	
Vibration resistance (10…150)Hz: NO/NC		g	20/12			
Power lost to the environment	without contact current	W	0.6			
	with rated current	W	1.6 (4C.01/51)		2 (4C.02/52)	
Terminals			**4C.01/4C.02**		**4C.51/4C.52**	
Wire strip length		mm	8		8	
Screw torque		Nm	0.8		—	
Max. wire size			solid cable	stranded cable	solid cable	stranded cable
		mm^2	1x6/2x2.5	1x4/2x2.5	2x(0.2…1.5)	2x(0.2…1.5)
		AWG	1x10/2x14	1x12/2x14	2x(24…18)	2x(24…18)

Contact specification

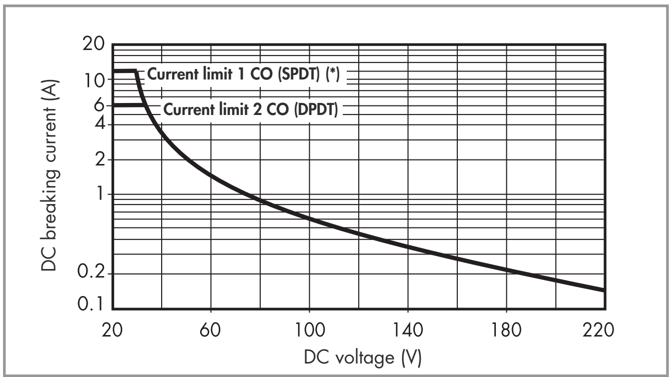
F 4C - Electrical life (AC) v contact current
Types 4C.02/52



F 4C - Electrical life (AC) v contact current
Types 4C.01/51



H 4C - Maximum DC1 breaking capacity



(*) Type 4C.01= 12 A, Type 4C.51= 10 A

- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of ≥ $100 \cdot 10^3$ can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load. Note: the release time for the load will be increased.

Coil specifications

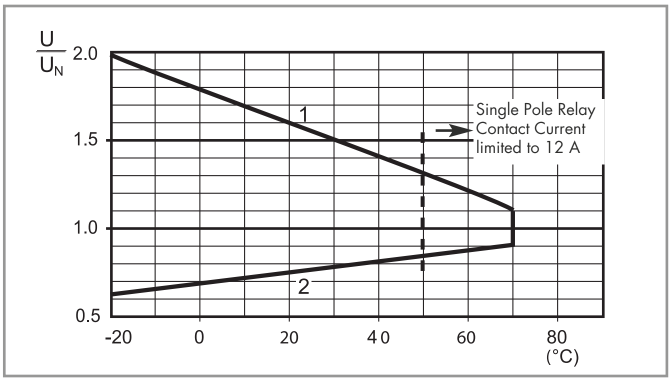
DC coil data

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
12	**9**.012	8.8	13.2	300	40
24	**9**.024	17.5	26.4	1,200	20
125	**9**.125	91.2	138	32,000	3.9

AC coil data

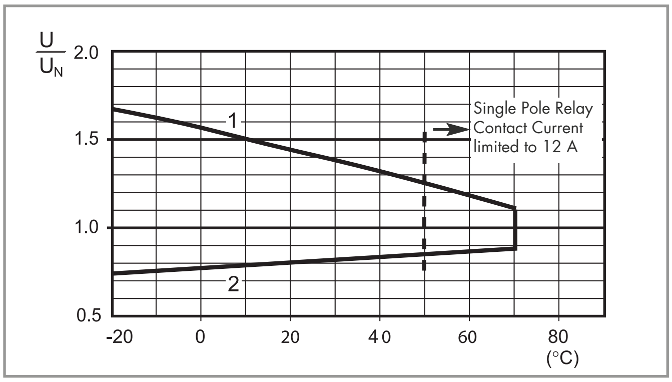
Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
12	**8**.012	9.6	13.2	80	90
24	**8**.024	19.2	26.4	320	45
110	**8**.110	88	121	6,900	9.4
120	**8**.120	96	132	9,000	8.4
230	**8**.230	184	253	28,000	5

R 4C - DC coil operating range v ambient temperature



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

R 4C - AC coil operating range v ambient temperature



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

------ Temperature limit for the single pole version under full 16 A contact current.

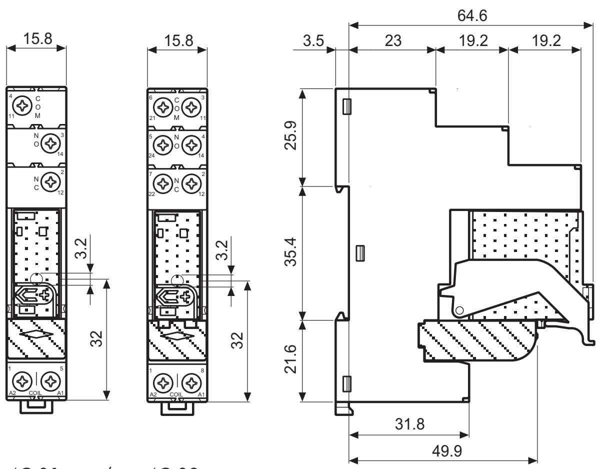
Combinations

Code	Type of socket	Type of relay	Module	Retaining clip
4C.01	97.01	46.61	99.02	097.01
4C.02	97.02	46.52	99.02	097.01
4C.51	97.51	46.61	99.02	097.01
4C.52	97.52	46.52	99.02	097.01

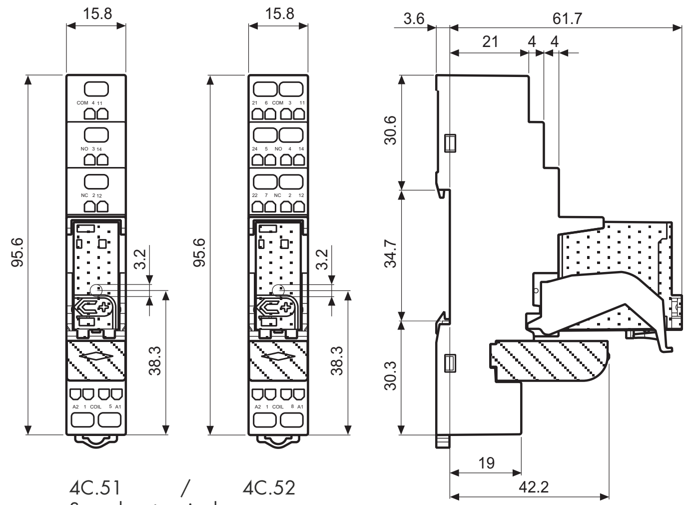
c UL us Certain relay/socket combinations

B

Outline drawing

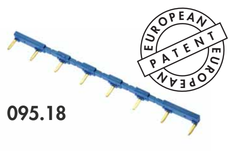


4C.01 / 4C.02
Screw terminal



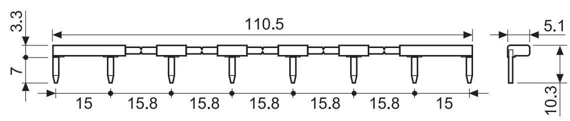
4C.51 / 4C.52
Screwless terminal

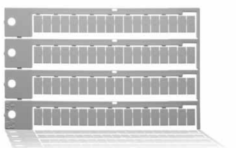
Accessories



095.18

8-way jumper link for 4C.01 and 4C.02	095.18 (blue)
Rated values	10 A - 250 V





060.72

Sheet of marker tags, plastic, 72 tags, 6x12 mm	060.72

Packaging code

How to code and identify retaining clip and packaging options for relay interface module.

Example:

4 C . 0 1 . 9 . 0 2 4 . 0 0 5 0 S P A

A	Standard packaging
B	Blister packaging

SP	Plastic retaining clip

X-2013, www.findernet.com

Features

2, 3 & 4 Pole relay interface modules, 27 mm wide.

Ideal interface for PLC and electronic systems

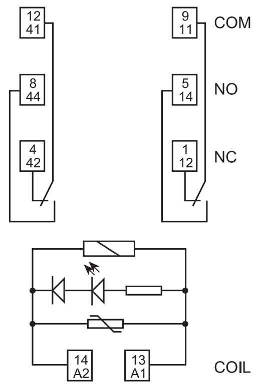
58.32 - 2 Pole 10 A (screw terminals)
58.33 - 3 Pole 10 A (screw terminals)
58.34 - 4 Pole 7 A (screw terminals)

- AC coils and DC coils
- Supply status indication and coil suppression module as standard
- Identification label
- Cadmium Free contacts
- UL Listing (certain relay/socket combinations)
- 35 mm rail (EN 60715) mounting

58.32 / 58.33 / 58.34
Screw terminals

58.32

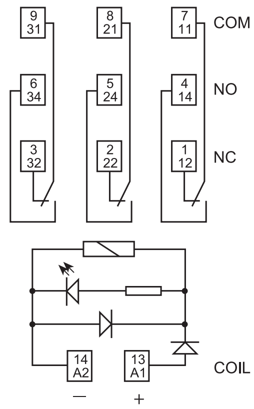
- 2 pole, 10 A
- Screw terminals
- 35 mm rail (EN 60715) mounting



Example: AC

58.33

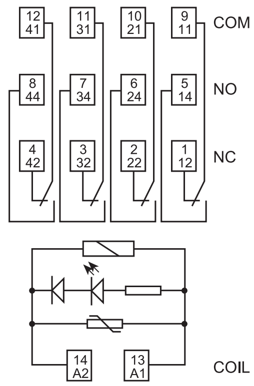
- 3 pole, 10 A
- Screw terminals
- 35 mm rail (EN 60715) mounting



Example: DC

58.34

- 4 pole, 7 A
- Screw terminals
- 35 mm rail (EN 60715) mounting



Example: AC

For outline drawing see page 5

		58.32	58.33	58.34
Contact specification				
Contact configuration		2 CO (DPDT)	3 CO (3PDT)	4 CO (4PDT)
Rated current/Maximum peak current	A	10/20	10/20	7/15
Rated voltage/Maximum switching voltage	V AC	250/400	250/400	250/250
Rated load AC1	VA	2,500	2,500	1,750
Rated load AC15 (230 V AC)	VA	500	500	350
Single phase motor rating (230 V AC)	kW	0.37	0.37	0.125
Breaking capacity DC1: 30/110/220V	A	10/0.25/0.12	10/0.25/0.12	7/0.25/0.12
Minimum switching load	mW (V/mA)	300 (5/5)	300 (5/5)	300 (5/5)
Standard contact material		AgNi	AgNi	AgNi
Coil specification				
Nominal voltage (U_N)	V AC (50/60 Hz)	12 - 24 - 48 - 110 - 120 - 230	12 - 24 - 48 - 110 - 120 - 230	12 - 24 - 48 - 110 - 120 - 230
	V DC	12 - 24 - 48 - 125	12 - 24 - 48 - 125	12 - 24 - 48 - 125
Rated power AC/DC	VA (50 Hz)/W	1.5/1	1.5/1	1.5/1
Operating range	AC	$(0.8...1.1)U_N$	$(0.8...1.1)U_N$	$(0.8...1.1)U_N$
	DC	$(0.8...1.1)U_N$	$(0.8...1.1)U_N$	$(0.8...1.1)U_N$
Holding voltage	AC/DC	$0.8\ U_N/0.5\ U_N$	$0.8\ U_N/0.5\ U_N$	$0.8\ U_N/0.5\ U_N$
Must drop-out voltage	AC/DC	$0.2\ U_N/0.1\ U_N$	$0.2\ U_N/0.1\ U_N$	$0.2\ U_N/0.1\ U_N$
Technical data				
Mechanical life AC/DC	cycles	$20 \cdot 10^6/50 \cdot 10^6$	$20 \cdot 10^6/50 \cdot 10^6$	$20 \cdot 10^6/50 \cdot 10^6$
Electrical life at rated load AC1	cycles	$200 \cdot 10^3$	$200 \cdot 10^3$	$150 \cdot 10^3$
Operate/release time	ms	10/5 (AC) - 10/15 (DC)	10/5 (AC) - 10/15 (DC)	11/3 (AC) - 11/15 (DC)
Insulation between coil and contacts (1.2/50 μs)	kV	3.6	3.6	3.6
Dielectric strength between open contacts	V AC	1,000	1,000	1,000
Ambient temperature range	°C	–40…+70	–40…+70	–40…+70
Protection category		IP 20	IP 20	IP 20
Approvals relay (according to type)		RINA		

58 Series - Relay interface modules 7 - 10 A

Features

4 Pole relay interface modules, 31 mm wide.

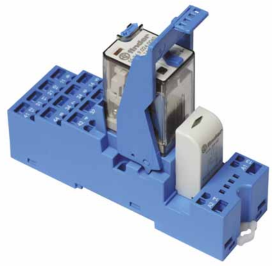
Ideal interface for PLC and electronic systems

58.54 - 4 Pole 7 A (screwless terminals)

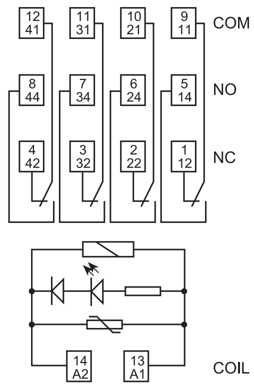
- AC coils and DC coils
- Supply status indication and coil suppression module as standard
- Identification label
- Cadmium Free contacts
- 35 mm rail (EN 60715) mounting

58.54
Screwless terminal

58.54



- 4 pole, 7 A
- Screwless terminals
- 35 mm rail (EN 60715) mounting



For outline drawing see page 5

Example: AC

Contact specification		
Contact configuration		4 CO (4PDT)
Rated current/Maximum peak current	A	7/15
Rated voltage/Maximum switching voltage	V AC	250/250
Rated load AC1	VA	1,750
Rated load AC15 (230 V AC)	VA	350
Single phase motor rating (230 V AC)	kW	0.125
Breaking capacity DC1: 30/110/220V	A	7/0.25/0.12
Minimum switching load	mW (V/mA)	300 (5/5)
Standard contact material		AgNi
Coil specification		
Nominal voltage (U_N)	V AC (50/60 Hz)	12 - 24 - 48 - 110 - 120 - 230
	V DC	12 - 24 - 48 - 125
Rated power AC/DC	VA (50 Hz)/W	1.5/1
Operating range	AC	$(0.8\ldots1.1)U_N$
	DC	$(0.8\ldots1.1)U_N$
Holding voltage	AC/DC	$0.8\ U_N/0.5\ U_N$
Must drop-out voltage	AC/DC	$0.2\ U_N/0.1\ U_N$
Technical data		
Mechanical life AC/DC	cycles	$20 \cdot 10^6/50 \cdot 10^6$
Electrical life at rated load AC1	cycles	$150 \cdot 10^3$
Operate/release time	ms	11/3 (AC) - 11/15 (DC)
Insulation between coil and contacts (1.2/50 μs)	kV	3.6
Dielectric strength between open contacts	V AC	1,000
Ambient temperature range	°C	–25…+70
Protection category		IP 20
Approvals relay (according to type)		

B

Ordering information

Example: 58 series 35 mm rail (EN 60715) mounting, screw terminals interface module, 4 CO (4PDT), 24 V DC coil, green LED + diode.

										A	B	C	D
5	8	.	3	4	.	9	.	0	2	4	.	0	0	5	0

Series

Type
3 = Screw terminals
35 mm rail (EN 60715) mount
5 = Screwless terminals
35 mm rail (EN 60715) mount

No. of poles
2 = 2 pole, 10 A
3 = 3 pole, 10 A
4 = 4 pole, 7 A

Coil version
8 = AC (50/60 Hz)
9 = DC

Coil voltage
See coil specifications

A: Contact material
0 = AgNi Standard
5 = AgNi + Au

B: Contact circuit
0 = CO (nPDT)

D: Special versions
0 = Standard

C: Options
5 = Standard DC: green LED + diode (polarity +A1)
6 = Standard AC: green LED + Varistor

Selecting features and options: only combinations in the same row are possible.
Preferred selections for best availability are shown in **bold**.

Type	Coil version	A	B	C	D
58.32/33/34/54	AC	**0** - 5	0	**6**	0
58.32/33/34/54	DC	**0** - 5	0	**5**	0

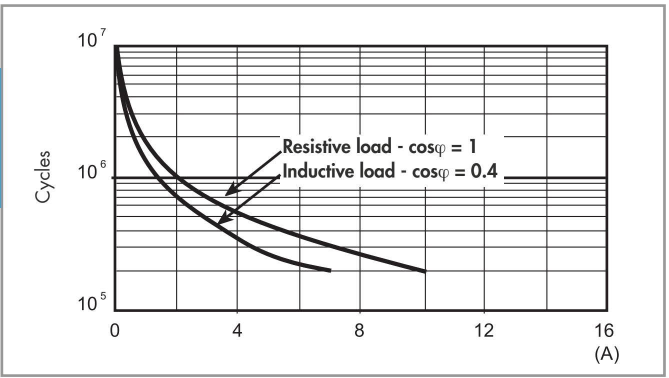
Technical data

Insulation						
Insulation according to EN 61810-1	insulation rated voltage	V	400 (2-3 pole)		250 (4 pole)	
	rated impulse withstand voltage	kV	3.6 (2-3 pole)		2.5 (4 pole)	
	pollution degree		2		2	
	overvoltage category		III		II	
Insulation between coil and contacts (1.2/50 µs)		kV	3.6			
Dielectric strength between open contacts		V AC	1,000			
Dielectric strength between adjacent contacts		V AC	2,000 (58.32,58.33)		1,550 (58.34, 58.54)	
Conducted disturbance immunity						
Burst (5…50)ns, 5 kHz, on A1 - A2			EN 61000-4-4		level 4 (4 kV)	
Surge (1.2/50 µs) on A1 - A2 (differential mode)			EN 61000-4-5		level 4 (4 kV)	
Other data						
Bounce time: NO/NC		ms	1/3			
Vibration resistance (10…55)Hz: NO/NC		g	6/6			
Power lost to the environment	without contact current	W	1			
	with rated current	W	3 (58.32, 58.34, 58.54)		4 (58.33)	
			58.32/33/34 (screw terminals)		**58.54 (screwless terminals)**	
Wire strip length		mm	8		10	
Screw torque		Nm	0.5		—	
Max. wire size			solid cable	stranded cable	solid cable	stranded cable
		mm²	1x6 / 2x2.5	1x4 / 2x2.5	2x(0.2…1.5)	2x(0.2…1.5)
		AWG	1x10 / 2x14	1x12 / 2x14	2x(24…14)	2x(24…14)

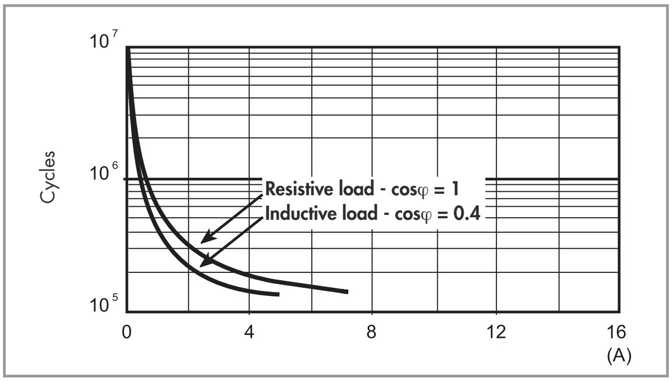
B

Contact specification

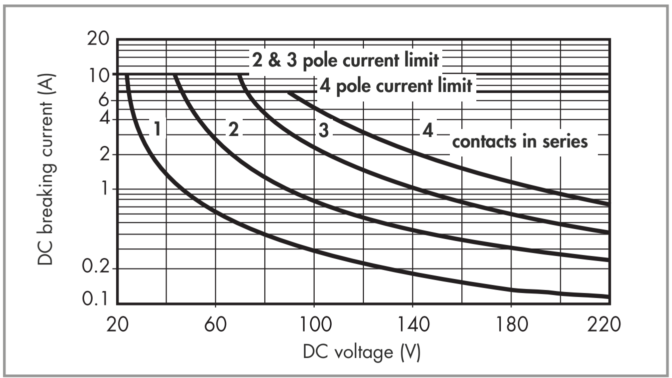
F 58 - Electrical life (AC) v contact current
2 & 3 pole relays



F 58 - Electrical life (AC) v contact current
4 pole relay



H 58 - Maximum DC1 breaking capacity



- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of ≥ $100 \cdot 10^3$ can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load.
  Note: the release time for the load will be increased.

Coil specifications

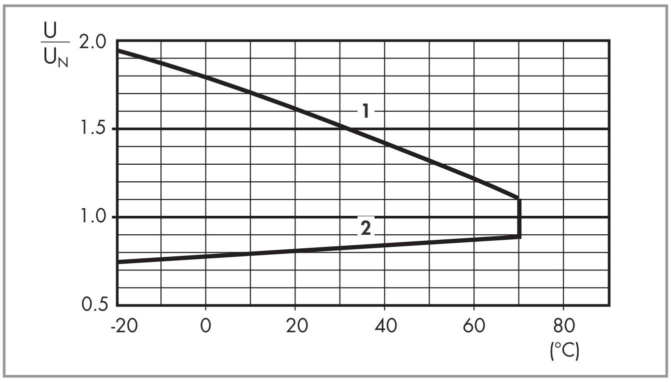
DC coil data

Nominal voltage U_N	Coil code	Operating range		Resistance	Rated coil absorption
		U_{min}	U_{max}	R	I at U_N
V		V	V	Ω	mA
12	**9**.012	9.6	13.2	140	86
24	**9**.024	19.2	26.4	600	40
48	**9**.048	38.4	52.8	2,400	20
125	**9**.125	100	138	17,300	7.2

AC coil data

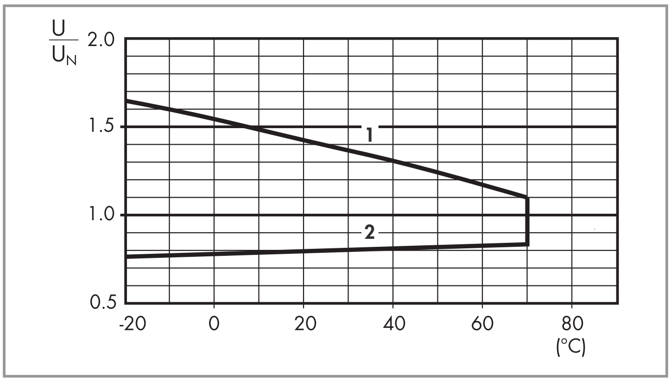
Nominal voltage U_N	Coil code	Operating range		Resistance	Rated coil absorption
		U_{min}	U_{max}	R	I at U_N (50Hz)
V		V	V	Ω	mA
12	**8**.012	9.6	13.2	50	97
24	**8**.024	19.2	26.4	190	53
48	**8**.048	38.4	52.8	770	25
110	**8**.110	88	121	4,000	12.5
120	**8**.120	96	132	4,700	12
230	**8**.230	184	253	17,000	6

R 58 - DC coil operating range v ambient temperature



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

R 58 - AC coil operating range v ambient temperature



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

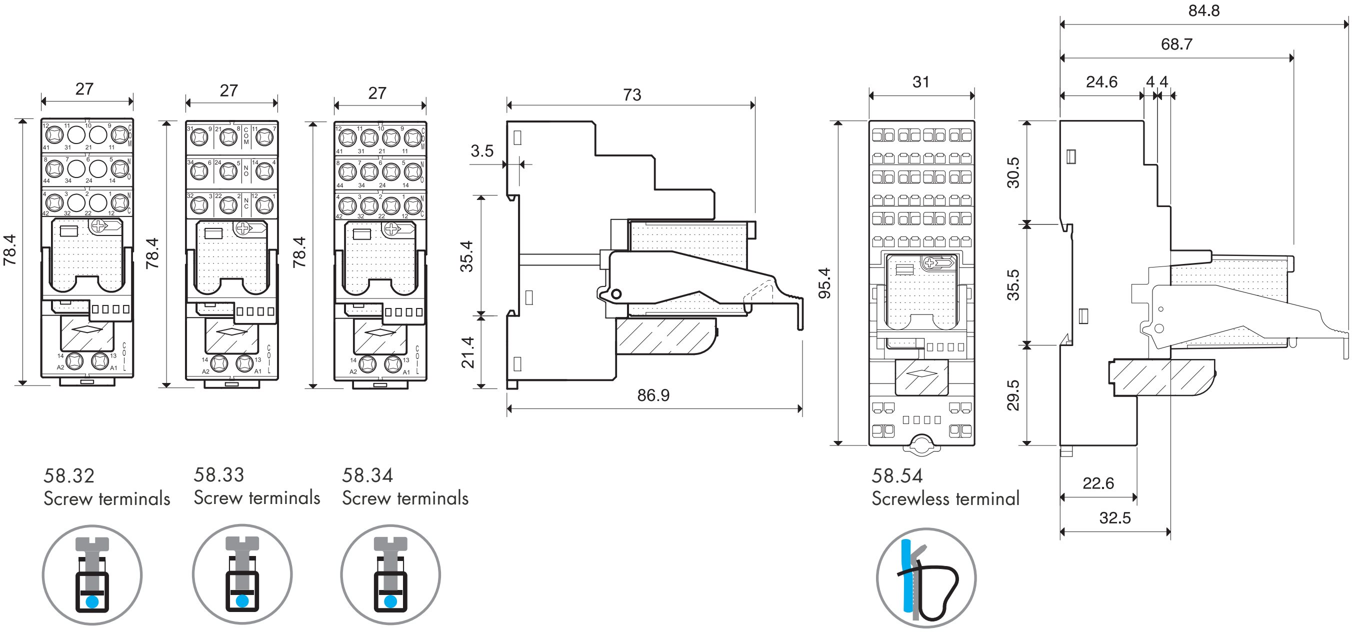
Combinations

cULus Certain relay/socket combinations

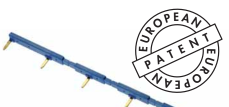
Code	Type of socket	Type of relay	Module	Retaining clip
58.32	94.02	55.32	99.02	094.91.3
58.33	94.03	55.33	99.02	094.91.3
58.34	94.04	55.34	99.02	094.91.3
58.54	94.54	55.34	99.02	094.91.3

B

Outline drawing

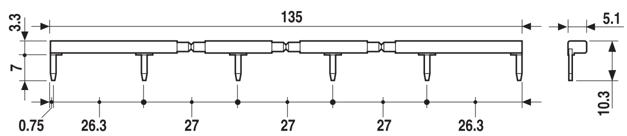


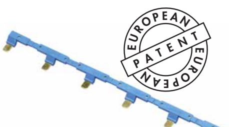
Accessories



094.06

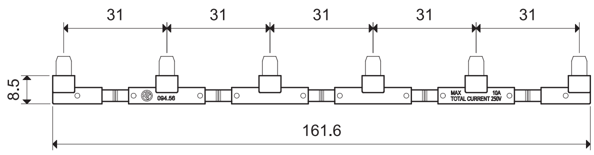
6-way jumper link for type 58.32, 58.33, 58.34	094.06 (blue)	094.06.0 (black)
Rated values	10 A - 250 V	

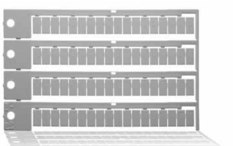




094.56

6-way jumper link for type 58.54	094.56 (blue)
Rated values	10 A - 250 V





060.72

Sheet of marker tags, plastic, 72 tags, 6x12 mm	060.72

Packaging codes

How to code and identify retaining clip and packaging options for sockets.

Example:

5 8 . 3 4 . 9 . 0 2 4 . 0 0 5 0 S P A

A	Standard packaging
B	Blister packaging

SP	Plastic retaining clip

Features

2 & 4 Pole relay interface modules, 27 mm wide.

Ideal interface for PLC and electronic systems

59.32 - 2 Pole 10 A (screw terminals)
59.34 - 4 Pole 7 A (screw terminals)

- AC coils and DC coils
- Supply status indication and coil suppression module as standard
- Identification labels
- Cadmium Free contact material options
- 35 mm rail (EN 60715) mount

59.32

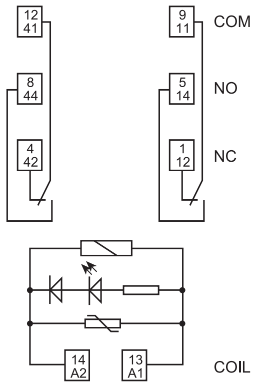
- 2 pole, 10 A
- Screw terminals
- 35 mm rail (EN 60715) mount

59.34

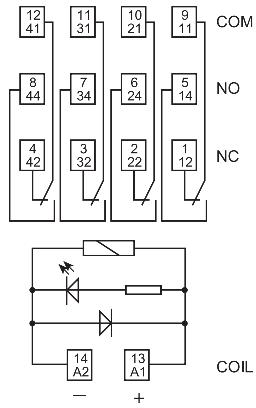
- 4 pole, 7 A
- Screw terminals
- 35 mm rail (EN 60715) mount

B

59.32 / 59.34
Screw terminals



Example: AC



Example: DC

For outline drawing see page 4

		59.32	59.34
Contact specification			
Contact configuration		2 CO (DPDT)	4 CO (4PDT)
Rated current/Maximum peak current	A	10/20	7/10
Rated voltage/Maximum switching voltage	V AC	250/400	250/250
Rated load AC1	VA	2,500	1,750
Rated load AC15 (230 V AC)	VA	500	350
Single phase motor rating (230 V AC)	kW	0.37	0.125
Breaking capacity DC1: 30/110/220V	A	10/0.25/0.12	7/0.25/0.12
Minimum switching load	mW (V/mA)	300 (5/5)	300 (5/5)
Standard contact material		AgNi	AgNi
Coil specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	12 - 24 - 230	12 - 24 - 230
	V DC	12 - 24	12 - 24
Rated power AC/DC	VA (50 Hz)/W	1.5/1	1.5/1
Operating range	AC	(0.8…1.1)U_N	(0.8…1.1)U_N
	DC	(0.8…1.1)U_N	(0.8…1.1)U_N
Holding voltage	AC/DC	0.8 U_N/0.5 U_N	0.8 U_N/0.5 U_N
Must drop-out voltage	AC/DC	0.2 U_N/0.1 U_N	0.2 U_N/0.1 U_N
Technical data			
Mechanical life AC/DC	cycles	$20 \cdot 10^6/50 \cdot 10^6$	$20 \cdot 10^6/50 \cdot 10^6$
Electrical life at rated load AC1	cycles	$200 \cdot 10^3$	$150 \cdot 10^3$
Operate/release time	ms	10/5 (AC) - 9/15 (DC)	10/5 (AC) - 9/15 (DC)
Insulation between coil and contacts (1.2/50 μs)	kV	3.6	3.6
Dielectric strength between open contacts	V AC	1,000	1,000
Ambient temperature range	°C	–25…+70	–25…+70
Protection category		IP 20	IP 20
Approvals relay (according to type)			

RINA

B

Ordering information

Example: 59 series 35 mm rail (EN 60715) mounting, screw terminal, interface module, 4 CO (4PDT), 24 V DC coil, green LED + diode.

						A	B	C	D
5	9	. 3	4	. 9	. 0 2 4	. 0	0	5	0

Series

Type
3 = Screw terminals,
35 mm rail (EN 60715) mount

No. of poles
2 = 2 pole, 10 A
4 = 4 pole, 7 A

Coil version
8 = AC (50/60 Hz)
9 = DC

Coil voltage
See coil specifications

A: Contact material
0 = AgNi Standard
5 = AgNi + Au

B: Contact circuit
0 = CO (nPDT)

D: Special versions
0 = Standard

C: Options
5 = Standard DC: green LED + diode (polarity +A1)
6 = Standard AC: green LED + Varistor

Selecting features and options: only combinations in the same row are possible.
Preferred selections for best availability are shown in **bold**.

Type	Coil version	A	B	C	D
59.32/34	AC	**0** - 5	0	**6**	0
59.32/34	DC	**0** - 5	0	**5**	0

Technical data

Insulation				
Insulation according to EN 61810-1	insulation rated voltage	V	400 (2 pole)	250 (4 pole)
	rated impulse withstand voltage	kV	3.6 (2 pole)	2.5 (4 pole)
	pollution degree		2	2
	overvoltage category		III	II
Insulation between coil and contacts (1.2/50 μs)		kV	3.6	
Dielectric strength between open contacts		V AC	1,000	
Dielectric strength between adjacent contacts		V AC	2,000 (59.32)	1,550 (59.34)
Conducted disturbance immunity				
Burst (5…50)ns, 5 kHz, on A1 - A2			EN 61000-4-4	level 4 (4 kV)
Surge (1.2/50 μs) on A1 - A2 (differential mode)			EN 61000-4-5	level 4 (4 kV)
Other data				
Bounce time: NO/NC		ms	1/3	
Vibration resistance (10…55)Hz: NO/NC		g	6/6	
Power lost to the environment	without contact current	W	1	
	with rated current	W	3	
			59.32/34 (screw terminals)	
Wire strip length		mm	8	
Screw torque		Nm	0.5	
Max. wire size			solid cable	stranded cable
		mm^2	1x6 / 2x2.5	1x4 / 2x2.5
		AWG	1x10 / 2x14	1x12 / 2x14

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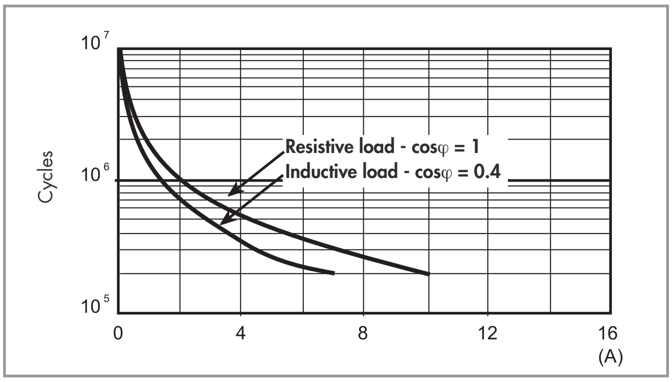
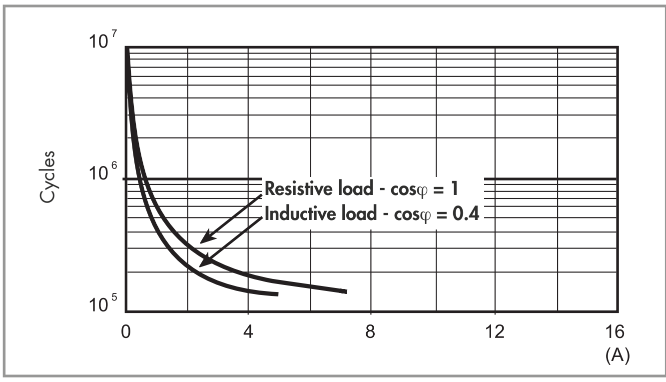
B

Contact specification

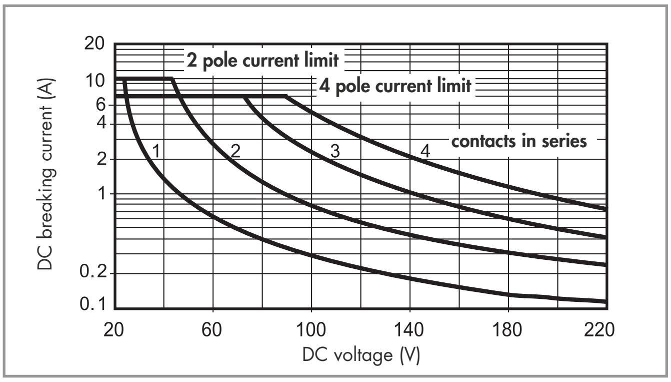
F 59 - Electrical life (AC) v contact current
2 pole relay



F 59 - Electrical life (AC) v contact current
4 pole relay



H 59 - Maximum DC1 breaking capacity



- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of ≥ $100 \cdot 10^3$ can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load. Note: the release time for the load will be increased.

Coil specifications

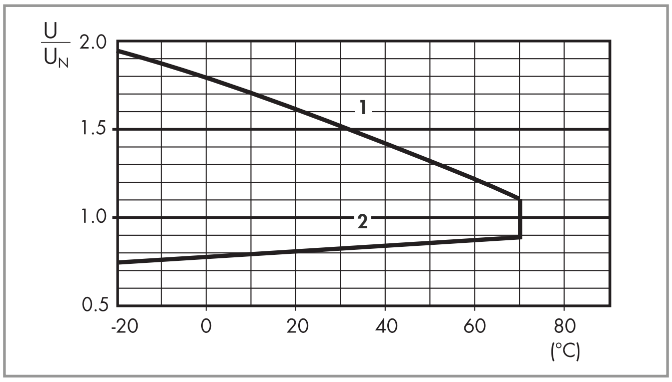
DC coil data

Nominal voltage U_N	Coil code	Operating range		Resistance	Rated coil absorption
		U_{min}	U_{max}	R	I at U_N
V		V	V	Ω	mA
12	**9**.012	9.6	13.2	140	86
24	**9**.024	19.2	26.4	600	40

AC coil data

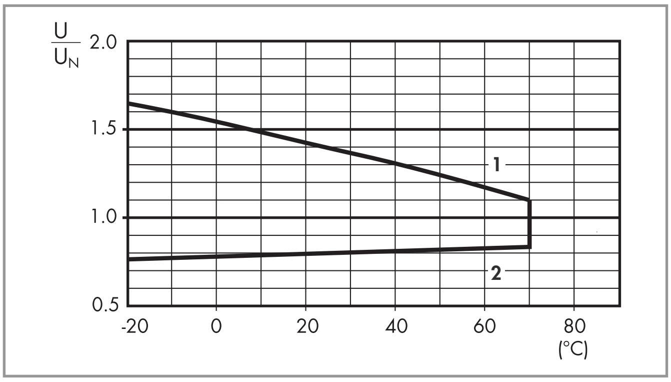
Nominal voltage U_N	Coil code	Operating range		Resistance	Rated coil absorption
		U_{min}	U_{max}	R	I at U_N (50Hz)
V		V	V	Ω	mA
12	**8**.012	9.6	13.2	50	97
24	**8**.024	19.2	26.4	190	53
230	**8**.230	184	253	17,000	6

R 59 - DC coil operating range v ambient temperature



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

R 59 - AC coil operating range v ambient temperature

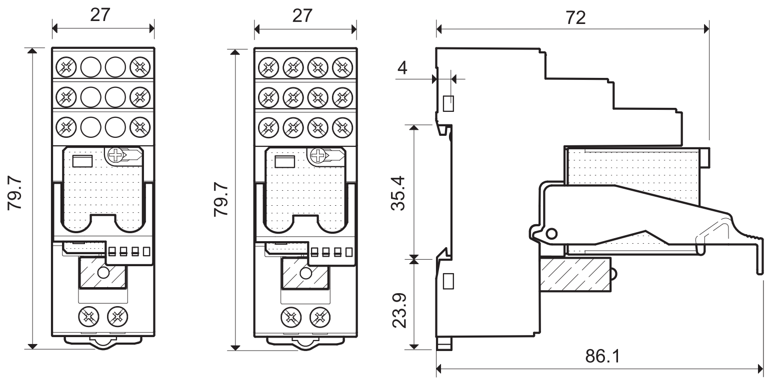


1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

Combinations

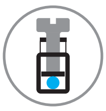
Code	Type of socket	Type of relay	Module	Retaining clip
59.32	94.92.3	55.32	99.80	094.91.3
59.34	94.94.3	55.34	99.80	094.91.3

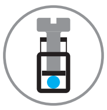
Outline drawing



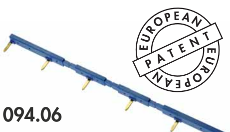
59.32
Screw terminals

59.34
Screw terminals



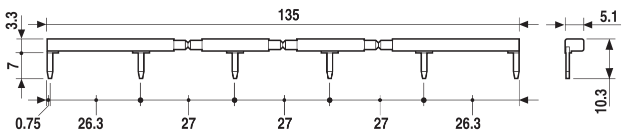


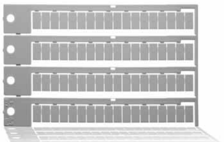
Accessories



094.06

6-way jumper link for 59.32 and 59.34	094.06 (blue)	094.06.0 (black)
Rated values	10 A - 250 V	





060.72

Sheet of marker tags for retaining and release clip 094.91.3 plastic, 72 tags, 6x12 mm	060.72

Packaging codes

How to code and identify retaining clip and packaging options for sockets.

Example:

5	9	.	3	4	.	9	.	0	2	4	.	0	0	5	0	S	P	A

A Standard packaging
B Blister packaging

SP Plastic retaining clip

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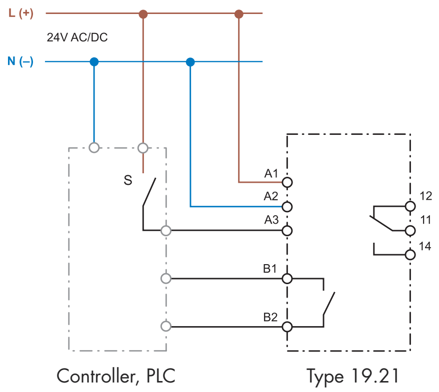
Features

Auto/Off/On output module 10 A

- Auto/Off/On output module intended to permit the automatic control of pumps, blowers or motor groups. Or, in the case of installation, maintenance or failure, to permit the load equipment to be turned "Off" or controlled under "On" control
- Ideal interface for PLC and electronic systems
- Only 11.2 mm wide
- 3 function selector switch:
  - Auto: works as a monostable relay (following A3 input)
  - Off: relay permanently OFF
  - On: relay permanently ON
- 24V AC/DC supply and module input
- 35 mm rail (EN 60715) mounting

Application examples:
- control of pumps, blowers or motor groups
- primarily suited to Industrial control systems

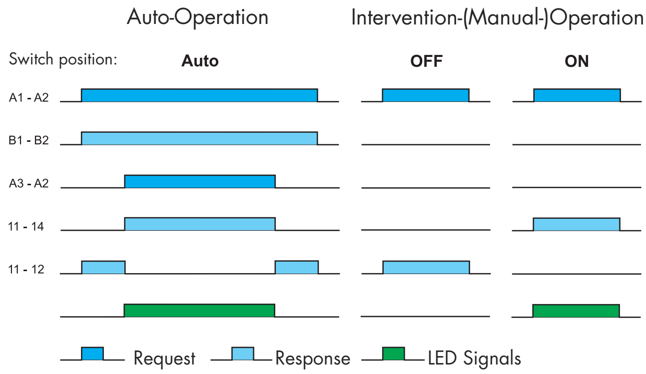
Wiring diagram



For outline drawing see page 8

19.21.0.024.0000

- 1 CO output contact
- 11.2 mm wide
- Feedback contact



B1-B2 feed back information to the controller for Auto-operation
A3-A2 From the controller requested operation

Contact specification		
Contact configuration		1 CO (SPDT)
Rated current/Maximum peak current	A	10/15
Rated voltage/Maximum switching voltage	V AC	250/400
Rated load AC1	VA	2,500
Rated load AC15 (230 V AC)	VA	500
Single phase motor rating (230 V AC)	kW	0.44
Breaking capacity DC1 (24/110/220 V)	A	10/0.3/0.12
Minimum switching load	mW (V/mA)	300 (5/5)
Standard contact material		$AgSnO_2$
Feedback contact specification (terminals B1-B2)		
Contact configuration		1 NO (SPST-NO)
Maximum current	mA	300
Rated voltage	V AC/DC	24
Supply & Input specification		
Nominal voltage (U_N)	V AC (50/60 Hz)	24
	V DC	24
Rated power	VA (50 Hz)/W	0.6 (50 Hz)/0.4
Operating range	AC	(0.8…1.1) U_N
	DC	(0.8…1.1) U_N
Technical data		
Ambient temperature range	°C	–20…+50
Protection category		IP 20
Approvals (according to type)		

B

Features

Override module - Auto/Off/Hand

- Auto/Off/Hand override module intended to permit the automatic control of pumps, blowers or motor groups. Or, in the case of installation, maintenance or failure, to permit the load equipment to be turned "Off" or controlled under "Hand" control
- 3 function selector switch:
  - Auto: work as a monostable relay relay (following A3 input)
  - Off: relay output permanently Off
  - Hand: relay output permanently On
- 24V AC/DC supply & input
- 35 mm rail (EN 60715) mounting

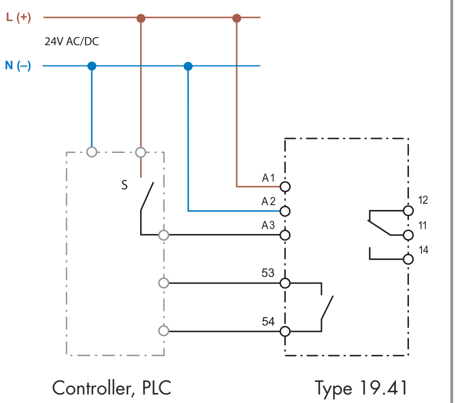
Application examples:

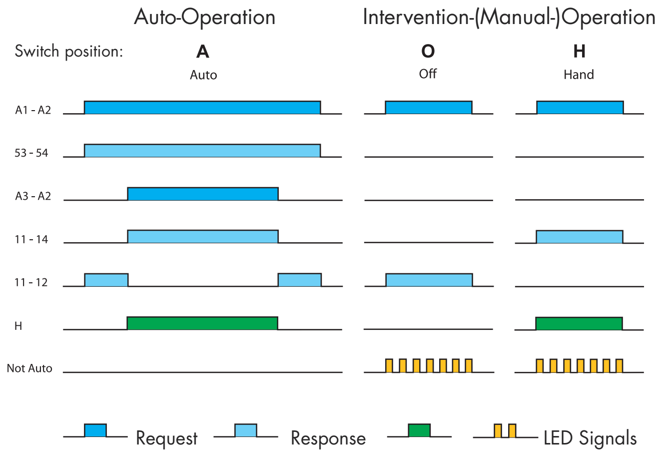
- control of pumps, blowers or motor groups commonly associated with building management systems

NEW **19.41.0.024.0000**

- 1 CO output contact
- 1 feedback output contact
- 17.5 mm wide
- LED indicator

Wiring diagram





53-54 feed back information to the controller for Auto-operation
A3-A2 Requested operation

For outline drawing see page 8

Output specification (terminals 12-11-14)		
Contact configuration		1 CO (SPDT)
Rated current/Maximum peak current	A	5/15
Rated voltage/Maximum switching voltage	V AC	250/400
Rated load AC1	VA	1,250
Rated load AC15 (230 V AC)	VA	250
Single phase motor rating (230 V AC)	kW	0.185
Breaking capacity DC1 (24/110/220 V)	A	3/0.35/0.2
Minimum switching load	mW (V/mA)	500 (10/5)
Standard contact material		AgCdO
Feedback output specification (terminals 53-54)		
Contact configuration		1 NO (SPST-NO)
Maximum / Minimum current	mA AC/DC	100/10
Rated voltage	V AC/DC	24
Supply & Input specification		
Nominal voltage (U_N)	V AC (50/60 Hz)	24
	V DC	24
Rated power	VA (50 Hz)/W	1 (50 Hz)/0.6
Operating range	AC	(0.8…1.1) U_N
	DC	(0.8…1.1) U_N
Technical data		
Ambient temperature range		–20…+50
Protection category		IP20
Approvals (according to type)		CE EAC PCT

Features

Override module - Auto/Off/Low/High

- Override output module intended to permit the automatic control of two-speed pumps, blowers or motor groups. Or, in the case of installation, maintenance or failure, to permit the load equipment to be turned "Off" or to run in "Low speed" or "High speed" under "Hand" control
- 4 function selector switch:
  - Auto: directly controlled by the BMS or PLC
  - Off: relays permanently Off
  - Hand Low: Low speed relay output permanently On
  - Hand High: High speed relay output permanently On
- 24V AC/DC supply and module inputs
- 35 mm rail (EN 60715) mounting

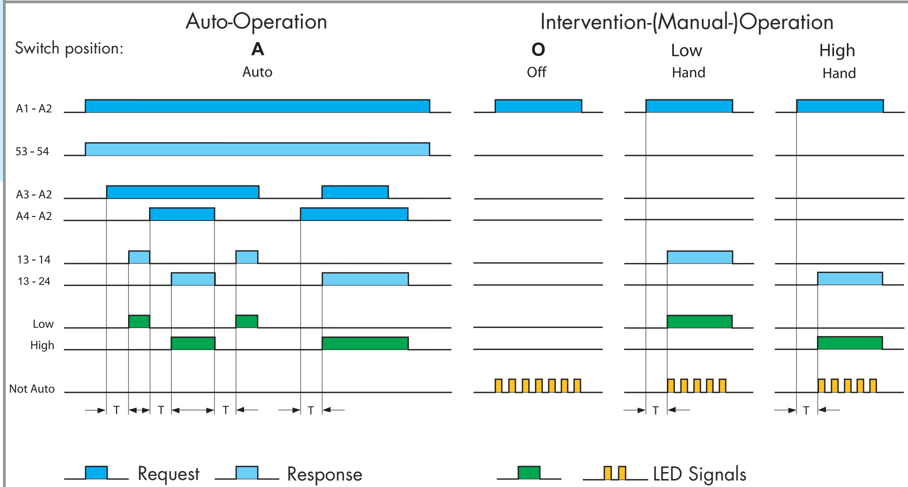
Application examples:

- control of two-speed pumps, blowers or motor groups commonly associated with building management systems

NEW **19.42.0.024.0000**

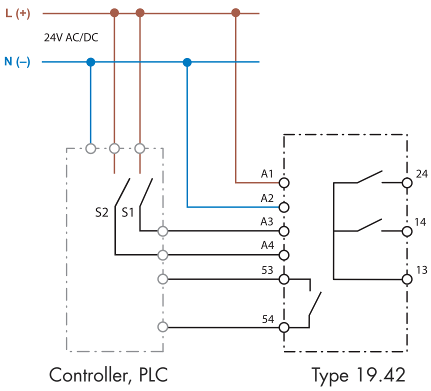
- Low and High output contacts
- 1 feedback output contact
- 35 mm wide
- LED indicator

B



53-54 feed back information to the controller for Auto-operation
A3-A2 Low speed or power operation
A4-A2 High speed or power operation (dominating again low speed or low power operation)
T = ON delay for 13-14 and 13-24 is approx. 100 ms as pause for the speed shift.
By reserving motors with big moments of inertia (inertia force) from high speed to low speed an additional ON delay of approx. 20 s is recommended.

Wiring diagram



For outline drawing see page 8

Output specification (terminals 13-14-24)		
Contact configuration		2 NO (DPST-NO)
Rated current/Maximum peak current	A	5/15
Rated voltage/Maximum switching voltage	V AC	250/400
Rated load AC1	VA	1,250
Rated load AC15 (230 V AC)	VA	250
Single phase motor rating (230 V AC)	kW	0.185
Breaking capacity DC1 (24/110/220 V)	A	3/0.35/0.2
Minimum switching load	mW (V/mA)	500 (10/5)
Standard contact material		AgCdO
Feedback output specification (terminals 53-54)		
Contact configuration		1 NO (SPST-NO)
Maximum / Minimum current	mA	100/10
Rated voltage	V AC/DC	24
Supply & Input specification		
Nominal voltage (U_N)	V AC (50/60 Hz)	24
	V DC	24
Rated power	VA (50 Hz)/W	1.6 (50 Hz)/0.8
Operating range	AC	(0.8…1.1) U_N
	DC	(0.8…1.1) U_N
Technical data		
Ambient temperature range	°C	–20…+50
Protection category		IP20
Approvals (according to type)		CE EAC PCT

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19 Series - Override & Status indicating modules

Features

Analogue override module - Auto/Hand (0…10)V

- Analogue output module intended to provide, by the selection switch on the front panel, a (0…10) V output, automatically or by hand. With the selector switch in position "A" (Automatic) the (0…10) V signal is derived from the controller.
  In position "H" (Hand) the controller signal is ignored and the (0…10) V signal is derived directly from the potentiometer setting on the facia of the module
- The level of the (0…10) V output signal is displayed by 3 green LEDs, set at >25%, >50% and >75%.
- 24V AC/DC supply
- 35 mm rail (EN 60715) mounting

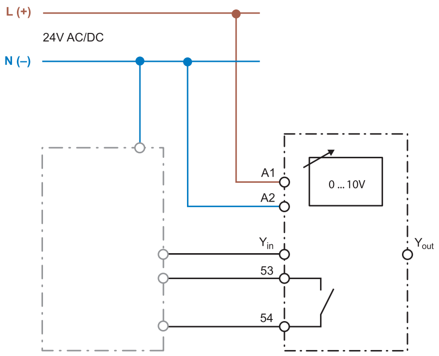
Application examples:

- permits the direct control of proportional valves under exceptional circumstances or where the automatic controller has failed

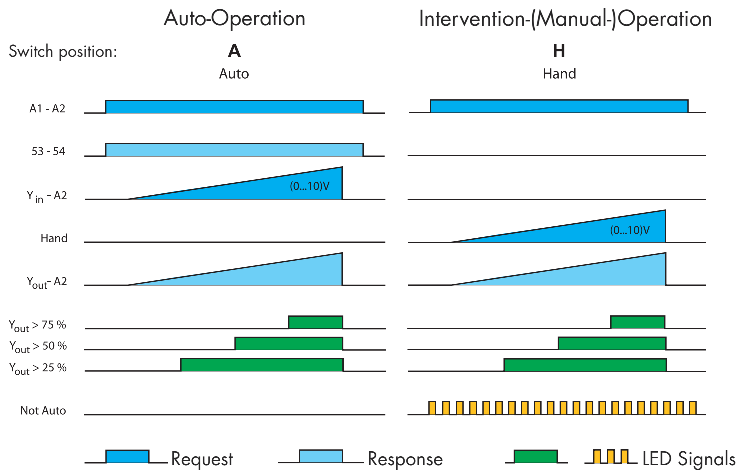
NEW **19.50.0.024.0000**

- Analogue output (0…10)V, plus 1 feedback output contact
- 17.5 mm wide
- LED indicator

Wiring diagram



Controller, PLC Type 19.50



53-54 feed back information to the controller for Auto-operation
Y_{in}-A2 / Hand = Set point (set value) (0…10) V DC;
requested by the controller or manual

For outline drawing see page 8

(0…10)V Signal specification (terminal Y-in)		
Input control signal	V DC	0…10 (Imax 20mA - short-circuit protected)
Green LED 25%		>2.5 V
Green LED 50%		> 5 V
Green LED 75%		>7.5 V
Feedback output specification (terminals 53-54)		
Output configuration		1 NO (SPST-NO)
Maximum / Minimum current	mA	100 /10
Rated voltage	V AC/DC	24
Supply & Input specification		
Nominal voltage (U_N)	V AC (50/60 Hz)	24
	V DC	24
Rated power AC/DC	VA (50 Hz)/W	0.9 / 0.7
Operating range	AC	(0.8…1.1) U_N
	DC	(0.8…1.1) U_N
Technical data		
Ambient temperature range		–20…+50 °C
Protection category		IP20
Approvals (according to type)		CE EAC

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Features

Power relay module 16 A

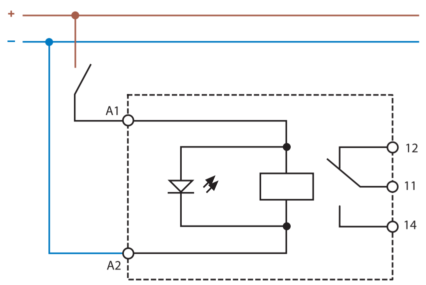
- Suitable for Lamps load
- $AgSnO_2$ contacts for heavy duty, high inrush current loads
- DC supply (12 or 24 V)
- LED indicator
- Reinforced insulation between supply and contacts
- Cadmium Free contacts
- 35 mm rail (EN 60715) mounting

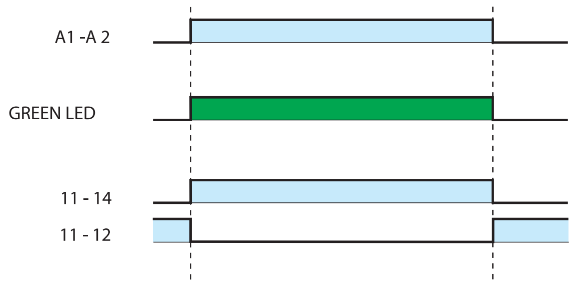
NEW **19.91.9.0xx.4000**

- 1 Pole changeover contact
- 17.5 mm

B

Wiring diagram





For outline drawing see page 8

Contact specification		
Contact configuration		1 CO (SPDT)
Rated current/Maximum peak current	A	16/30 (120 A – 5 ms)
Rated voltage/Maximum switching voltage	V AC	250/440
Rated load AC1	VA	4,000
Rated load AC15 (230 V AC)	VA	750
Nominal lamp rating (230 V): incandescent	W	2,000
compensated fluorescent	W	750
Minimum switching load	mW	300 (5 V/ 5 mA)
Standard contact material		$AgSnO_2$
Coil specification		
Nominal voltage (U_N)	V DC	12 - 24
Rated power AC/DC	VA (50 Hz)/W	1.2 / 0.5
Operating range		(0.8 ... 1.1) U_N
Technical data		
Mechanical life AC/DC	cycles	$10 \cdot 10^6$
Electrical life at rated load AC1	cycles	$80 \cdot 10^3$
Operate/release time	ms	12/8
Ambient temperature range	°C	–20…+50
Protection category		IP 20
Approvals (according to type)		

B

Ordering information

Example: 19 series Auto/Off/Hand override module, 1 CO (SPDT) 5 A contact, 24 V AC/DC supply.

1 9 . 4 1 . 0 . 0 2 4 . 0 0 0 0

Series

Type
21= Auto/Off/On output module, 11.2mm
41= Override module - Auto/Off/Hand
42= Override module - Auto/Off/Low/High
50= Analogue override module (0…10) V
91= Power relay module

Supply version
0 = AC (50/60 Hz) / DC
9 = DC

Supply voltage
012 = 12 V
024 = 24 V

Contact material
0= Standard for 19.21/41/42/50
4= Standard for 19.91

Codes / Module width
19.21.0.024.0000 / 11.2 mm
19.41.0.024.0000 / 17.5 mm
19.42.0.024.0000 / 35.0 mm
19.50.0.024.0000 / 17.5 mm
19.91.9.012.4000 / 17.5 mm
19.91.9.024.4000 / 17.5 mm

Technical data

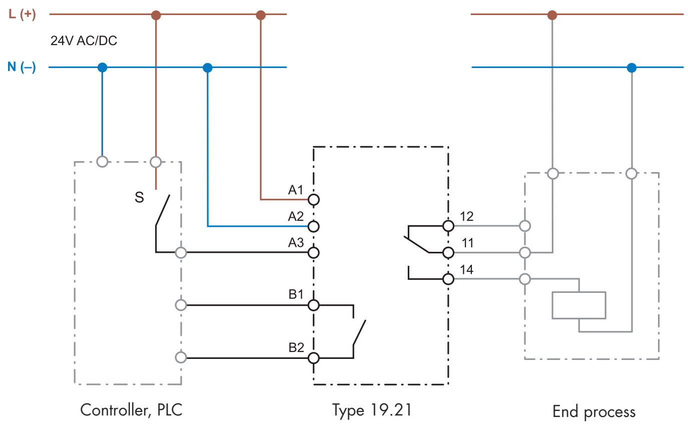
Insulation		**19.21**	**19.41/42**	**19.50**	**19.91**
Dielectric strength (V AC)	between supply and contacts	3,000	2,000	—	4,000
	between open contacts	1,000	1,000	—	1,000
	between supply and feedback output	2,000	1,500	1,500	—

EMC specifications				
Type of test		**Reference standard**	**19.21/42/91**	**19.41/50**
Electrostatic discharge	contact discharge	EN 61000-4-2	4 kV	
	air discharge	EN 61000-4-2	8 kV	
Radiated electromagnetic field (80 … 1,000 MHz)		EN 61000-4-3	30 V/m	
Fast transients (burst) (5-50 ns, 5 kHz)		EN 61000-4-4	4 kV	
Voltage pulses (1.2/50 μs)	common mode	EN 61000-4-5	2 kV	1 kV
on supply terminals	differential mode	EN 61000-4-5	1 kV	0.5 kV

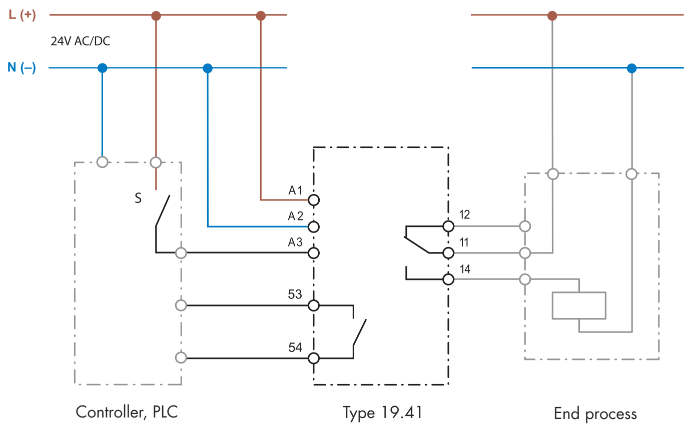
Terminals		**19.21**		**19.41/42/91**	
Screw torque		0.5 Nm		0.8 Nm	
Max. wire size	solid cable	1x6/2x2.5 mm²	1x10/2x14 AWG	1x6/2 x 4 mm²	1x10/2x12 AWG
	stranded cable	1x4/2x1.5 mm²	1x12/2x16 AWG	1x4/2x2.5 mm²	1x12/2x14 AWG
Wire strip length		7 mm		9 mm	

Wiring diagrams - *Application examples*

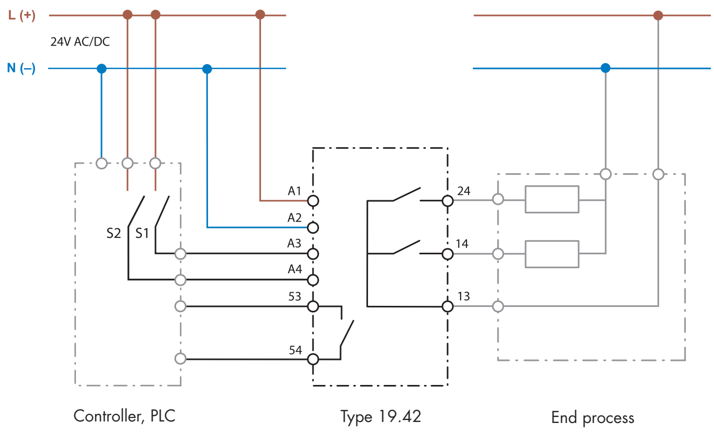
Type 19.21



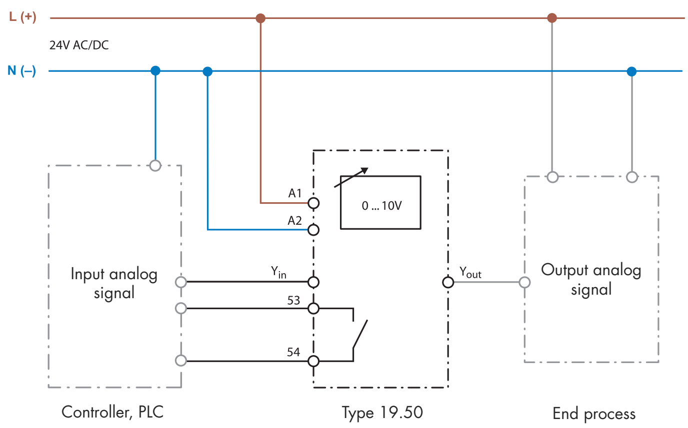
Type 19.41



Type 19.42



Type 19.50

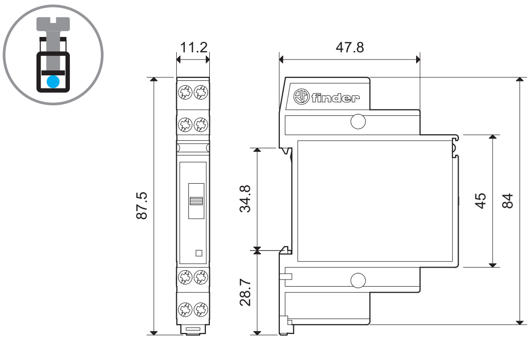


In the selector position A (Automatic) the 0...10 V set point of Yin - A2 is leaded, through Yout, to the end process;
in the selector position H (Hand) the 0...10 V value set with the regulator is leaded, through Yout, to the end process.

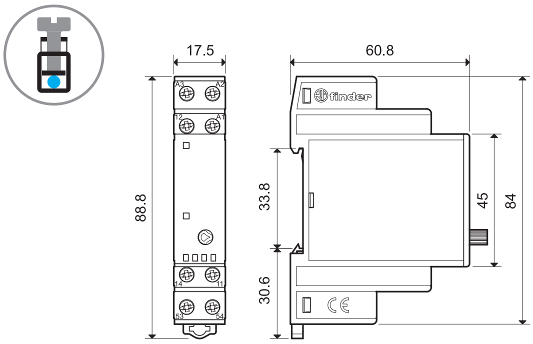
B

Outline drawings

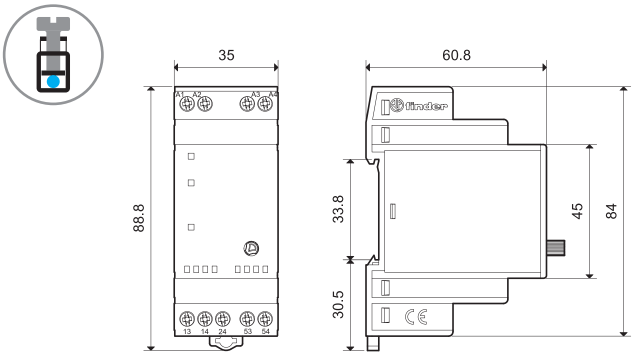
Type 19.21
Screw terminal



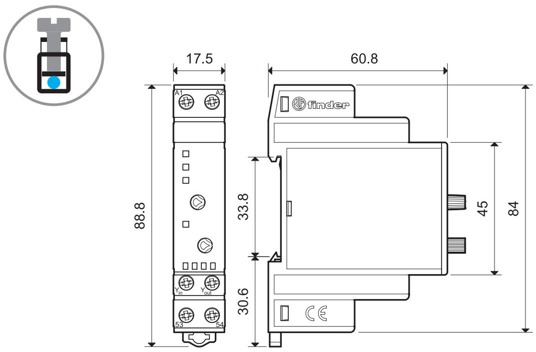
Type 19.41
Screw terminal



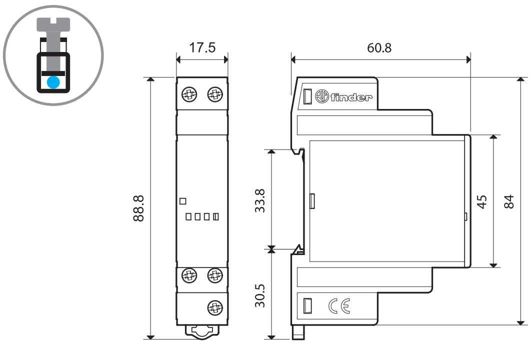
Type 19.42
Screw terminal



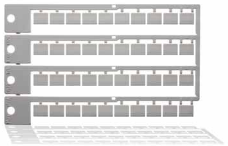
Type 19.50
Screw terminal



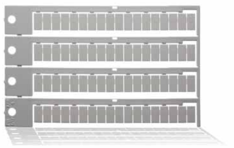
Type 19.91
Screw terminal



Accessories


019.40

Sheet of marker tags, for 19.21 type, plastic, 40 tags, 8x10 mm	019.40


060.72

Sheet of marker tags, for 19.41/42/50/91 types, plastic, 72 tags, 6x12 mm	060.72


019.01

Identification tag, for 19.41/42/50 types, plastic, 1 tag, 17x25.5 mm	019.01


020.01

Adaptor for panel mounting, for 19.41/50/91 types, plastic, 17.5 mm wide	020.01


011.01

Adaptor for panel mounting, for 19.42 type, plastic, 35 mm wide	011.01

Application notes

B

Intervention Modules
The demand for security apparatus, heating, air conditioning or efficient energy use in offices, hotels, and private homes or in industrial space is growing constantly, leading to the installation of increasingly complex electronic systems. But what happens if these systems malfunction and a qualified service technician will only be available in a few hours, or even days?

With the use of carefully installed intervention modules, a trained caretaker or security guard can be in a position to recognize interruptions in service, and by manual intervention perform the necessary override actions to maintain system operation until a repair can be effected.

Digital Override control module
Auto-Off-On output module (Type 19.21)
Many processes or systems are automatically controlled by an electronic control system or by a Programmable Logic Controller. In the event of an electronic system malfunction it is important, in order to avoid damage or downtime, to plan for the possibility of controlling the process manually. An Auto-Off-On Module can provide this, located between the output of the electronic system (Controller) and the process to be controlled (End Process) - bypassing the malfunctioning control unit in a planned way. For malfunctioning electronic systems, the process to be controlled can be manually switched On or Off, as needed, using the switch on the front of the unit. Under healthy functioning of the electronic system, the switch is left in the Auto position. In this configuration the process is controlled by the normal functioning of the electronic system and its output. It may be important to know (remotely) if the process is being controlled manually or automatically, in which case the feedback contact on the Auto–Off–On module 19.21 can provide this.

Override Control Modules (Type 19.41 and 19.42) may be installed if, in the event of a electronic system malfunction, emergency working has to be restored by means of manual intervention. On notice of a malfunctioning system, perhaps through a feedback contact from a Status Indicating Module, the caretaker on-site can then go to control panel housing the appropriate Override module and respond to the malfunction by manipulation of the Auto-Off-Hand switch. The 19.41 module has a three-position switch marked A-O-H. A= Automatic operation, O=OFF and H=Hand (or Manual operation).
Moving away for the Auto position means that the module’s output relay is no longer under the control of the defective electronic Control System. Turning the switch to “H” energizes the output relay, whilst selecting the “O” position ensures the relay is de-energized.
For example: a defective heating control system can be manually overridden to be On in the “H” position or Off in the “O” position. In this way heating can be maintained until the faulty controller can be replaced.
The module’s green LED will indicate that the Heating is On, whilst the flashing Yellow LED is a reminder that the task is under manual control, and that on the replacement of the defective electronic control system the Auto-Off-Hand switch should be returned to the “A” position.

The 19.42 override module is similar in principle to the 19.41 module except that it is intended for use with two-stage operations as associated with star-delta motor starting, two-speed fan motors, or forward/reverse motor switching. In these applications it is usually necessary to incorporate a “dead” time of > 50ms between the two On states. Consequently, when manually switching with the 19.42, between the “Low” and “High” state and vice versa, a “dead” time of > 80ms is provided for, within the module.

Note of caution: Where the reversal of motor direction is achieved by dual motor windings and a switched capacitor, an interval of approximately 300 ms should be provided. This will need to be provided by the inclusion of a separate timer in the control circuitry. To protect motors with a high moment of inertia (such as large fans and flywheels); when switching from high speed to lower speed, the lower speed should only be switched on when the motor has come nearly to a complete halt.

Analogue Override control module
Analogue output module (0…10)V (Type 19.50)
This module can be installed where there is need to give a manually adjustable analog signal (0…10)V priority over an analog signal from a electronic control unit or PLC, or to override and replace a malfunctioning signal.
The Analogue override module provides, by the selection switch on the front panel, a (0…10)V output signal either generated automatically or by hand. With the selector switch in position “A” (Automatic) the (0…10)V signal at Yout-A2 is derived from the controller signal applied to terminals Yin-A2. In position “H” (Hand) the controller signal is ignored and the (0…10) V signal is derived directly from the potentiometer setting on the module front panel.
Operation in switch position H is indicated by a blinking yellow LED, and by the opening of contact 51-52 – which could be used to report the override condition to the central control room.
The level of the (0…10) V output signal is displayed by 3 green LEDs, set at >25%, >50% and >75%.

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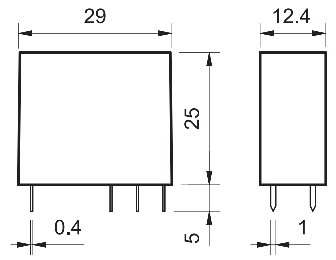
Features

PCB Relay with forcibly guided contacts according to EN 50205 type B
2 CO contacts *

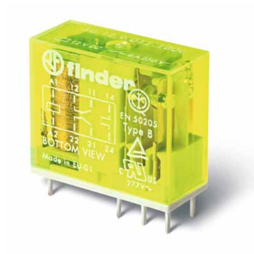
- High physical separation between adjacent contacts
- Cadmium Free contact materials
- 8 mm, 6 kV (1.2/50 μs) isolation, coil-contacts
- Flux proof: RT II



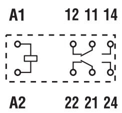
*According to EN 50205 only 1 NO and 1 NC (11-14 and 21-22 or 11-12 and 21-24) shall be used as forcibly guided contacts.

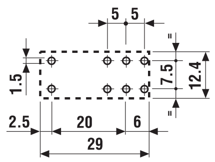
For UL ratings see:
"General technical information" page V

50.12...1000



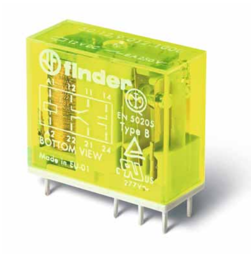
- For medium duty switching, suggested for DC loads
- 2 Pole 8 A
- 5 mm pinning
- PCB mounting



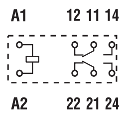


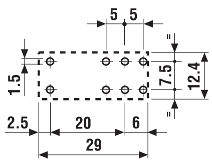
Copper side view

50.12...5000



- For safety applications
- Gold plate contacts for low level switching capability
- 5 mm pinning
- PCB mounting





Copper side view

		50.12...1000	50.12...5000
Contact specification			
Contact configuration		2 CO (DPDT)	2 CO (DPDT)
Rated current/Maximum peak current	A	8/15	8/15
Rated voltage/Maximum switching voltage	V AC	250/400	250/400
Rated load AC1	VA	2,000	2,000
Rated load AC15 (230 V AC)	VA	500	500
Single phase motor rating (230 V AC)	kW	0.37	0.37
Breaking capacity DC1: 30/110/220 V	A	8/0.65/0.2	8/0.65/0.2
Minimum switching load	mW (V/mA)	500 (10/10)	50 (5/5)
Standard contact material		AgNi	AgNi + Au
Coil specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	—	—
	V DC	5 - 6 - 12 - 24 - 48 - 60 - 110 - 125	5 - 6 - 12 - 24 - 48 - 60 - 110 - 125
Rated power AC/DC	VA (50 Hz)/W	—/0.7	—/0.7
Operating range	AC (50 Hz)	—	—
	DC	(0.75…1.2)U_N	(0.75…1.2)U_N
Holding voltage	AC/DC	—/0.4 U_N	—/0.4 U_N
Must drop-out voltage	AC/DC	—/0.1 U_N	—/0.1 U_N
Technical data			
Mechanical life AC/DC	cycles	—/10 · 10^6	—/10 · 10^6
Electrical life at rated load AC1	cycles	100 · 10^3	100 · 10^3
Operate/release time	ms	10/4	10/4
Insulation between coil and contacts (1.2/50 μs)	kV	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts	V AC	1,500	1,500
Ambient temperature range	°C	–40…+70	–40…+70
Environmental protection		RT II	RT II
Approvals (according to type)			

C

Ordering information

Example: 50 series forcibly guided contacts, 2 CO (DPDT) 8 A contacts, 24 V DC coil.

						A	B	C	D
5 0	. 1	2	. 9	. 0 2 4	.	5	0	0	0

Series

Type
1 = PCB - 5 mm pinning

No. of poles
2 = 2 pole 8 A

Coil version
9 = DC

Coil voltage
See coil specifications

A: Contact material
1 = Standard AgNi
5 = AgNi + Au

B: Contact circuit
0 = CO (DPDT)

D: Special versions
0 = Flux proof (RT II)

C: Options
0 = None

C

Selecting features and options: only combinations in the same row are possible.
Preferred selections for best availability are shown in **bold.**

Type	Coil version	A	B	C	D
50.12	DC	**1** - 5	**0**	**0**	**0**

Technical data

Insulation according to EN 61810-1			
Nominal voltage of supply system	V AC	230/400	
Rated insulation voltage	V AC	250	400
Pollution degree		3	2
Insulation between coil and contact set			
Type of insulation		Reinforced (8 mm)	
Overvoltage category		III	
Rated impulse voltage	kV (1.2/50 μs)	6	
Dielectric strength	V AC	4,000	
Insulation between adjacent contacts			
Type of insulation		Basic	
Overvoltage category		III	
Rated impulse voltage	kV (1.2/50 μs)	4	
Dielectric strength	V AC	3,000	
Insulation between open contacts			
Type of disconnection		Micro-disconnection	
Dielectric strength	V AC/kV (1.2/50 μs)	1,500/2.5	
Conducted disturbance immunity			
Burst (5…50)ns, 5 kHz, on A1 - A2		EN 61000-4-4	level 4 (4 kV)
Surge (1.2/50 μs) on A1 - A2 (differential mode)		EN 61000-4-5	level 3 (2 kV)
Other data			
Bounce time: NO/NC	ms	2/10	
Vibration resistance (10…200)Hz: NO/NC	g	20/6	
Shock resistance NO/NC	g	20/5	
Power lost to the environment without contact current	W	0.7	
with rated current	W	1.2	
Recommended distance between relays mounted on PCB	mm	≥ 5	

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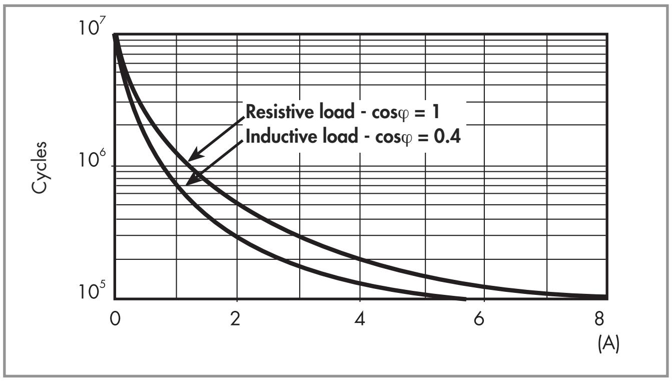
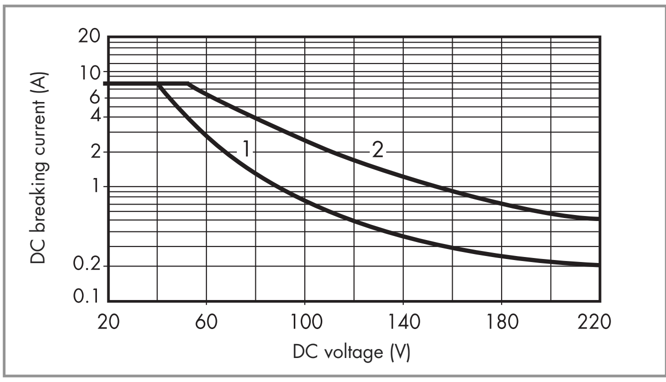
Contact specification

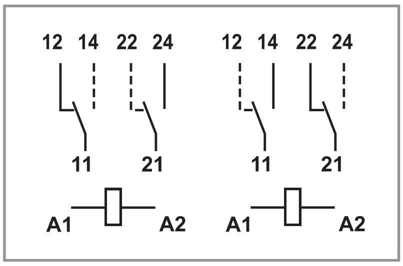
F 50 - Electrical life (AC) v contact current



H 50 - Maximum DC1 breaking capacity



- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of ≥ $100 \cdot 10^3$ can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load.
  Note: the release time for the load will be increased.



Alternative selection of NO and NC contacts to provide Forcibly guided (mechanically linked) contacts, in accordance with EN 50205 (type B).

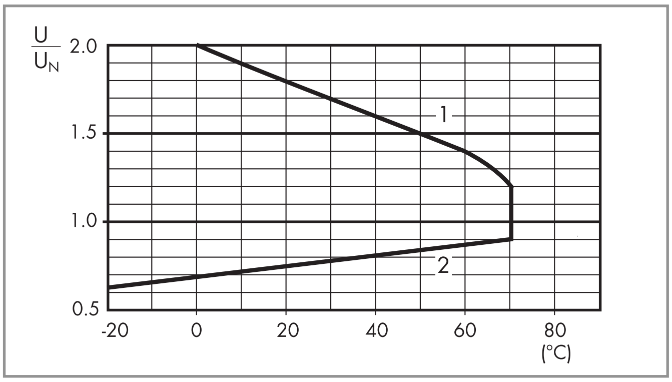
C

Coil specifications

DC coil data

Nominal voltage U_N	Coil code	Operating range		Resistance	Rated coil consumption
		U_{min}	U_{max}	R	I at U_N
V		V	V	Ω	mA
5	**9**.005	3.8	6	35	143
6	**9**.006	4.5	7.2	50	120
12	**9**.012	9	14.4	205	58.5
24	**9**.024	18	28.8	820	29.3
48	**9**.048	36	57.6	3,280	14.4
60	**9**.060	45	72	5,140	11.7
110	**9**.110	82.5	131	17,250	6.4
125	**9**.125	93.7	150	22,300	5.6

R 50 - DC coil operating range v ambient temperature
Standard coil



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

Features

Relay module with forcibly guided contacts

7S.12 with 2 pole (1NO + 1 NC)
7S.14 with 4 pole (2 NO + 2 NC and 3 NO + 1 NC)
7S.16 with 6 pole (4 NO + 2 NC)

- For safety applications, with class A forcibly guided contact relays (EN 50205)
- For functional reliability in machinery and plant engineering according to EN 13849-1
- For railway applications; materials compliant with fire and smoke characteristics (UNI 11170-3); mechanical and climatic characteristics compliant with EN 61373 and EN 50155
- DC and AC supply versions
- 24 and 110 V DC versions with extended operating range (0.7....1.25) U_N
- Coil status visual indication with LED
- 35 mm rail (EN 60715) mount

Screwless terminal

* Single contact current ≤ 6 A, total NO contacts current ≤ 12 A

For outline drawing see page 6

NEW **7S.12.....5110**

- 2 pole (1 NO + 1 NC)

NEW **7S.14.....0220/0310**

- 4 pole (2 NO + 2 NC and 3 NO + 1 NC)

NEW **7S.16.....0420**

- 6 pole (4 NO + 2 NC)

C

	7S.12.....5110	7S.14.....0220/0310	7S.16.....0420
Contact specification			
Contact configuration	1 NO + 1 NC	2 NO + 2 NC, 3 NO + 1 NC	4 NO + 2 NC
Rated current / Max. peak current A	6/15	6*/12	6*/12
Rated switching voltage V AC (50/60 Hz)	250	250	250
Rated load AC1 VA	1,500	1,500	1,500
Rated load AC15 (230 V AC) VA	700	500	500
Breaking capacity DC1: 30/110/220 V A	6/0.6/0.2	6/0.6/0.3	6/0.6/0.3
Breaking capacity DC13: 24 V A	1	1	1
Minimum switching load mW (V/mA)	60 (5/5)	60 (5/5)	60 (5/5)
Standard contact material	AgNi + Au	AgNi with notched crown	AgNi with notched crown
Coil specification			
Nominal voltage (U_N) V AC (50/60 Hz)	110...125 - 230...240	110...125 - 230...240	110...125 - 230...240
V DC	12 - 24	12 - 24 - 110	12 - 24 - 110
Rated power VA (50 Hz) / W	2.3/1	2.3/1	2.3/1
Operating range AC	(0.85...1.1) U_N	(0.85...1.1) U_N	(0.85...1.1) U_N
DC	(0.8...1.2) U_N	(0.8...1.2) U_N	(0.8...1.2) U_N
DC extended range (24 and 110 V only)	(0.7....1.25) U_N	(0.7....1.25) U_N	(0.7....1.25) U_N
Holding voltage AC/DC	0.45 U_N/0.45 U_N	0.55 U_N/0.55 U_N	0.55 U_N/0.55 U_N
Must drop-out voltage AC/DC	0.1 U_N/0.1 U_N	0.1 U_N/0.1 U_N	0.1 U_N/0.1 U_N
Technical data			
Mechanical life cycles	$10 \cdot 10^6$	$10 \cdot 10^6$	$10 \cdot 10^6$
Electrical life at rated load AC1 cycles	$100 \cdot 10^3$	$100 \cdot 10^3$	$100 \cdot 10^3$
Operate / release time ms	7/11	12/10	12/10
Insulation between coil and contacts (1.2/50 μs) kV	6	6 (4 against 13-14)	6 (4 against 13-14)
Dielectric strength between open contacts V AC	1,500	1,500	1,500
Ambient temperature °C	–40....+70	–40....+70	–40....+70
Protection category	IP 20	IP 20	IP 20
Approvals (according to type)			

Ordering information

Example: 7S series Relay module with forcibly guided contacts, 6 contact (4 NO + 2 NC) 6 A, supply voltage 24 V DC.

7	S	.	1	6	.	9	.	0	2	4	.	0	4	2	0

Series

Type
1 = 22.5 mm wide, cage-clamp terminals

Output
2 = 2 contacts
4 = 4 contacts
6 = 6 contacts

Supply version
8 = AC (50 /60 Hz)
9 = DC

Supply voltage
See page 5

Special versions
0 = Standard

NO and NC contatcs
11 = 1 NO + 1 NC
22 = 2 NO + 2 NC
31 = 3 NO + 1 NC
42 = 4 NO + 2 NC

Contact material
0 = AgNi
5 = AgNi + Au

Codes, Preferred selections for best availability are shown in **bold.**

7S.12.9.012.5110	7S.14.9.012.0220	7S.16.9.012.0420
7S.12.9.024.5110	7S.14.9.012.0310	**7S.16.9.024.0420**
7S.12.8.120.5110	**7S.14.9.024.0220**	7S.16.9.110.0420
7S.12.8.230.5110	**7S.14.9.024.0310**	7S.16.8.120.0420
	7S.14.9.110.0220	7S.16.8.230.0420
	7S.14.9.110.0310	
	7S.14.8.120.0220	
	7S.14.8.120.0310	
	7S.14.8.230.0220	
	7S.14.8.230.0310	

Technical data

Insulation according to EN 61810-1				
Nominal voltage of supply system	V AC	230/400		
Rated insulation voltage	V AC	250		
Pollution degree		2		
Insulation between coil and contact set				
Type of Insulation		Reinforced *	Basic *	Reinforced *
Overvoltage category		III	III	II
Rated impulse voltage	kV (1.2/50 μs)	6	4	4
Dielectric strength	V AC	4,000	2,500	2,500
Insulation between adjacent contacts				
Type of Insulation		Reinforced *	Basic*	Reinforced *
Overvoltage category		III	III	II
Rated impulse voltage	kV (1.2/50 μs)	6	4	4
Dielectric strength	V AC	4,000	2,500	2,500
Insulation between open contacts				
Type of disconnection		Micro-disconnection		
Dielectric strength	V AC / kV (1.2/50 μs)	1,500 / 2.5		

* Tables below indicate, for each 7S type, those contacts (R) meeting Reinforced Insulation Overvoltage category III, those contacts (R2) meeting Reinforced Insulation Overvoltage category II, and those contacts (B) meeting Basic Insulation Overvoltage category III.

EMC specifications			Reference standard	
Burst (5/50 ns)	on supply terminals		EN 61000-4-4	4 kV
Surge (1.2/50 μs) on supply terminals	differential mode		EN 61000-4-5	1.5 kV
Terminals			**solid cable**	**stranded cable**
Max. wire size		mm²	1 x 1.5	1 x 1.5
		AWG	1 x 14	1 x 16
Wire strip length		mm	9	

Other data			7S.12	7S.14	7S.16
Bounce time: NO/NC		ms	2/8	1/20	1/20
Vibration resistance (10…200) Hz: NO/NC		g	10/5	15/4	15/4
Shock resistance: NO/NC		g	20/6	25/13	25/13
Power lost to the environment	without contact current	W	0.8	0.8	0.8
	with rated current	W	1.4	2.3	2.8

Type of insulation between coil and contacts and between adjacent contacts

Code		
Type of Insulation		Overvoltage category
R	Reinforced	III
B	Basic	III
R2	Reinforced	II

7S.12....5110	Coil	13-14	21-22
Coil	—	R	R
13-14		—	B/R2
21-22			—

7S.14....0310	Coil	13-14	21-22	33-34	43-44
Coil	—	B	R	R	R
13-14		—	B	R	R
21-22			—	R	R
33-34				—	B/R2
43-44					—

7S.16....0420	Coil	13-14	21-22	31-32	43-44	53-54	63-64
Coil	—	B	R	R	R	R	R
13-14		—	B	R	R	R	R
21-22			—	R	R	R	R
31-32				—	B/R2	R	R
43-44					—	B/R2	R
53-54						—	B/R2
63-64							—

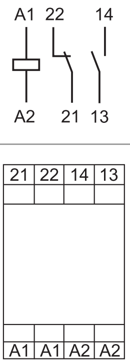
7S.14....0220	Coil	11-12	21-22	33-34	43-44
Coil	—	R	R	R	R
11-12		—	R	R	R
21-22			—	R	R
33-34				—	B/R2
43-44					—

C

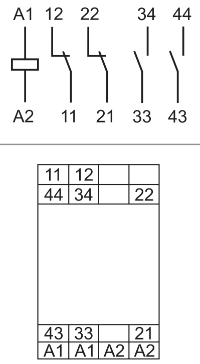
Contact specifications

Contact diagrams

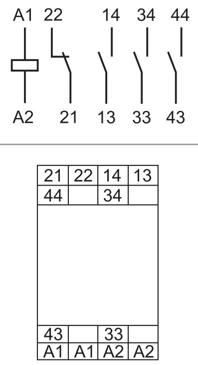
7S.12



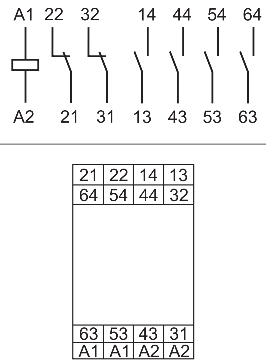
7S.14...0220



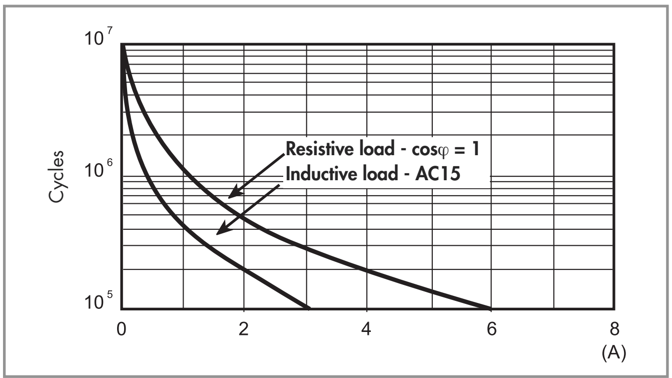
7S.14...0310



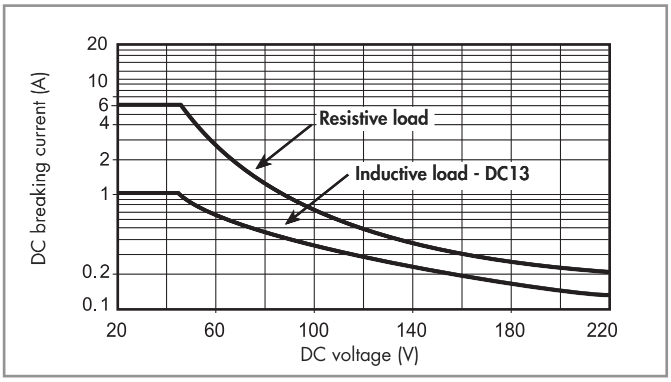
7S.16



F 7S12 - Electrical life (AC) v contact current - 7S.12

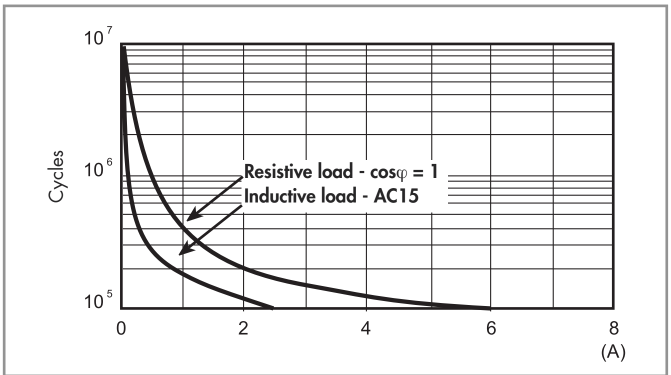


H 7S12 - Maximum DC breaking capacity - 7S.12

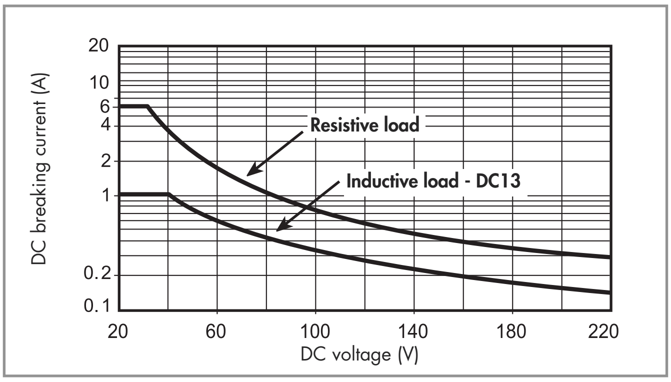


• When switching a load having voltage and current values under the curve, an electrical life of ≥ $100 \cdot 10^3$ can be expected.

F 7S16 - Electrical life (AC) v contact current - 7S.14 / 7S.16



H 7S16 - Maximum DC breaking capacity - 7S.14 / 7S.16



• When switching a load having voltage and current values under the curve, an electrical life of ≥ $100 \cdot 10^3$ can be expected.

Coil specifications

DC coil data - type 7S.12

Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Rated input current at U_N I_N	Rated power at U_N
V		V	V	mA	W
12	**9**.012	9.6	14.4	55	0.7
24	**9**.024	16.8	30	38.2	0.9

AC coil data - type 7S.12

Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Rated input current at U_N I_N	Rated power at U_N
V		V	V	mA	VA/W
110…125	**8**.120	93	138	9.5	1.1/1
230…240	**8**.230	195	264	9	2/0.8

DC coil data - type 7S.14 / 7S.16

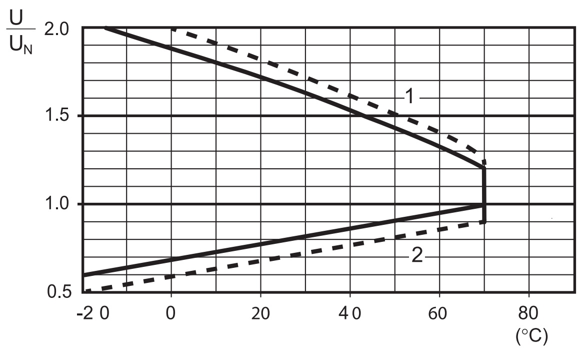
Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Rated input current at U_N I_N	Rated power at U_N
V		V	V	mA	W
12	**9**.012	9.6	14.4	56	0.7
24	**9**.024	16.8	30	28	0.7
110	**9**.110	77	138	9.2	0.7

AC coil data - type 7S.14 / 7S.16

Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Rated input current at U_N I_N	Rated power at U_N
V		V	V	mA	VA/W
110…125	**8**.120	93	138	8.9	1.1/0.9
230…240	**8**.230	195	264	8.5	2/0.8

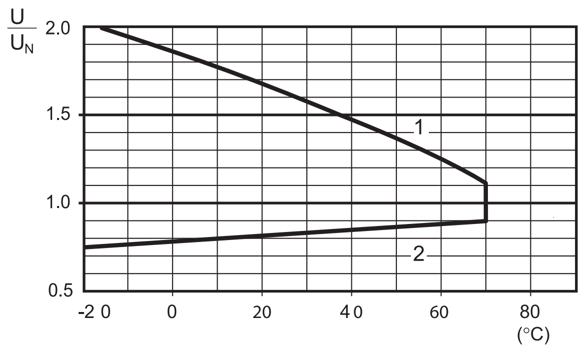
C

R 7S - DC coil operating range v ambient temperature - 7S.12 / 7S.14 / 7S.16



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.
- - - - - 24 and 110 V DC coils only (extended range)

R 7S - AC coil operating range v ambient temperature - 7S.12 / 7S.14 / 7S.16

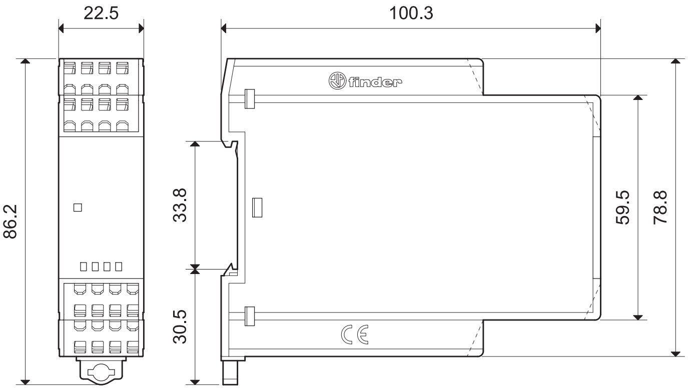


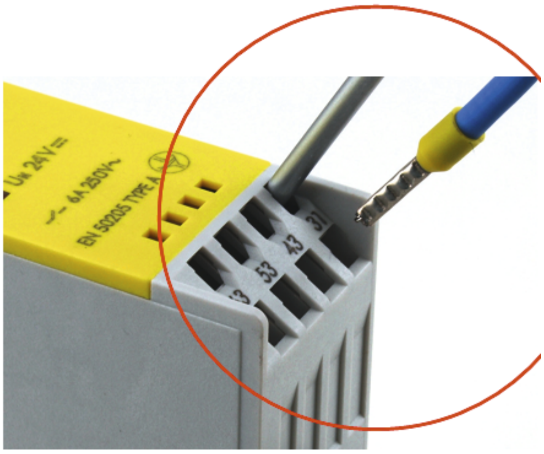
1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

C

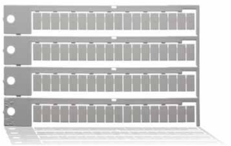
Outline drawings

7S
Screwless terminal





Accessories



060.72

Sheet of marker tags, plastic, 72 tags, 6x12 mm	060.72

Features

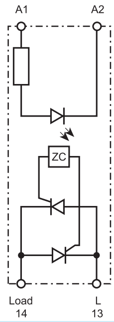
5 A modular SSR, 1 NO output

- 17.5 mm housing
- 60 to 240 V AC output (with back to back SCR)
- 5 kV (1.2/50 μs) insulation between Input and Output
- Zero-crossing and random switch-on versions available
- High switching speed
- High endurance
- Silent switching
- Spark and bounce-free switching
- Low control power
- 35 mm rail (EN 60715) mount

77.01
Screw terminal

77.01.x.xxx.8050

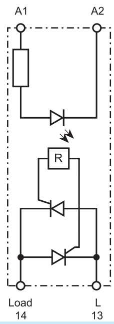
Zero-crossing switch-on
Suggested applications:
- Lamp inrush current reduction (CFL - Compact Fluorescent energy-saving Lamps and similar)
- Heater control
- Solenoid, contactor driver



Simplified circuit diagram

77.01.x.xxx.8051

Random switch-on
Suggested applications:
- Finer control requiring short operate time (specially motor control)
- AC Input phase different from AC Output phase
- 3-phase general purpose



Simplified circuit diagram

* See L77-3 diagram page 10
** See L77-1 and L77-2 diagrams page 9

For outline drawing see page 12

Output specification	77.01.x.xxx.8050	77.01.x.xxx.8051
Output configuration	1 NO (SPST-NO)	1 NO (SPST-NO)
Rated current I_N / Max. peak current* (10 ms) A	5 / 300 *	5 / 300 *
Rated voltage V AC (50/60 Hz)	230	230
Rated voltage range V AC (50/60 Hz)	60…240	60…240
Switching voltage range V AC (50/60 Hz)	48…265	48…265
Repetitive peak off-state voltage Vpk	800	800
Rated load AC7a (cos φ = 0.8) A	5	5
Rated load AC15 A	5	3
Single phase motor rating (230 V AC) kW	—	0.37
230 V lamps rating: incandescent/halogen W	1,000	800
compact fluorescent (CFL)/Led W	800	400
electronic ballast fluorescent tubes W	1,000	800
electromagnetic ballast compensated fluorescent tubes W	500	250
Minimum switching current @ 230 V mA	100	100
Typical "OFF-state" leakage current @ 230 V mA	1	1
Max "ON-state" voltage drop @ 25 °C and 5A/100mA V	0.85 / 1.5	0.85 / 1.5
Power loss @ 5 A W	4	4

Input specification	8050		8051	
Nominal voltage (U_N) V AC (50/60 Hz)	24	230	24	230
V DC	12 … 24	—	12 … 24	—
Rated power VA (50 Hz)/W	0.6 / 0.5	3.6 / 0.3	0.6 / 0.5	3.6 / 0.3
Operating range V AC (50/60 Hz)	16…32	90…265	16…32	90…265
V DC	9.8…32	—	9.8…32	—
Must drop-out voltage V AC (50/60 Hz)/DC	2.4	24	2.4	24

Technical data	77.01.x.xxx.8050	77.01.x.xxx.8051
Electrical life cycles	$10 \cdot 10^6$	$10 \cdot 10^6$
Operate / release time ms	20 / 12	9 / 8
Insulation between input and output (1.2/50μs) kV	5	5
Ambient temperature °C	–20…+70 **	–20…+70 **
Protection category	IP20	IP20
Approvals (according to type)		

D

77 Series - Modular Solid State Relay 15 A

Features

15 A modular SSR, 1 NO output

- 22.5 mm housing, heat-sink + plastic cover
- 24 to 277 V AC output (with triac)
- 6 kV (1.2/50 μs) insulation between Input and Output
- Zero-crossing and random switch-on versions available
- High switching speed
- High endurance
- Silent switching
- Spark and bounce-free switching
- Low control power
- "Relay-style" terminal arrangement (input and output terminals on opposite sides)
- 35 mm rail (EN 60715) mount

D

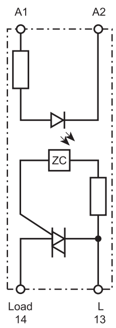
77.11
Screw terminal

* See L77-7 diagram page 10
** See L77-6 diagrams page 9

For outline drawing see page 12

77.11.x.xxx.8250

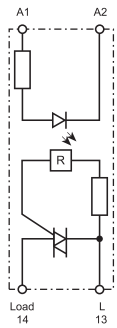
Zero-crossing switch-on
Suggested applications:
- Lamp inrush current reduction (CFL - Compact Fluorescent energy-saving Lamps and similar)
- Heater control
- Solenoid, contactor driver



Simplified circuit diagram

77.11.x.xxx.8251

Random switch-on
Suggested applications:
- Fine controls involving shorter time (specially motor control)



Simplified circuit diagram

	77.11.x.xxx.8250		77.11.x.xxx.8251	
Output specification				
Output configuration	1 NO (SPST-NO)		1 NO (SPST-NO)	
Rated current I_N / Max. peak current* (10 ms) A	15 / 400 *		15 / 400 *	
Rated voltage V AC (50/60 Hz)	230		230	
Rated voltage range V AC (50/60 Hz)	24…277		24…277	
Switching voltage range V AC (50/60 Hz)	19…305		19…305	
Repetitive peak off-state voltage V_{pk}	800		800	
Rated load AC7a (cos φ = 0.8, @ 25 °C) A	20		20	
Rated load AC15 A	15		15	
Single phase motor rating (230 V AC) kW	—		1.2	
230 V lamps rating: incandescent/halogen W	4,000		2,500	
compact fluorescent (CFL)/Led W	3,000		1,500	
electronic ballast fluorescent tubes W	4,000		2,500	
electromagnetic ballast compensated fluorescent tubes W	2,000		1,000	
Minimum switching current @ 250 V mA	100		100	
Typical "OFF-state" leakage current @ 250 V mA	1		1	
Max "ON-state" voltage drop @ 25 °C and 15 A V	1.55		1.55	
Power loss @ 15 A W	14		14	
Input specification				
Nominal voltage (U_N) V AC (50/60 Hz)	—	230	—	230
V DC	24	—	24	—
Rated power @ UMAX VA (50 Hz)/W	0.4	7.5 / 0.9	0.4	7.5 / 0.9
Operating range V AC (50/60 Hz)	—	40…305	—	40…305
V DC	4…32	—	4…32	—
Must drop-out voltage V AC (50/60 Hz)/DC	— / 2	6 / —	— / 2	6 / —
Technical data				
Electrical life cycles	$10 \cdot 10^6$		$10 \cdot 10^6$	
Operate / release time ms	< 10 / <10	< 10 / < 30	< 1 / <10	< 2 / < 25
Insulation between input and output (1.2/50μs) kV	6		6	
Ambient temperature °C	–20…+80 **		–20…+80 **	
Protection category	IP20		IP20	
Approvals (according to type)				

X-2014, www.findernet.com

Features

30 A modular SSR, 1 NO output

- 22.5 mm housing, heat-sink + plastic cover
- 60 to 440 V AC output (with back to back SCR)
- 6 kV (1.2/50 μs) insulation between Input and Output
- Zero-crossing and random switch-on versions available
- High switching speed
- High endurance
- Silent switching
- Spark and bounce-free switching
- Low control power
- “Relay-style” terminal arrangement (input and output terminals on opposite sides)
- 35 mm rail (EN 60715) mount

77.31
Screw terminal

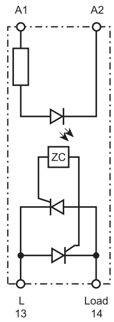
* See L77-5 diagram page 10
** See L77-4 diagrams page 9

For outline drawing see page 12

77.31.x.xxx.8050

Zero-crossing switch-on
Suggested applications:
- Lamp inrush current reduction (CFL - Compact Fluorescent energy-saving Lamps and similar)
- Heater control
- Solenoid, contactor driver

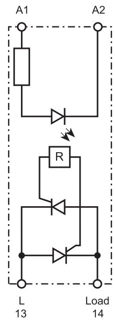
Simplified circuit diagram



77.31.x.xxx.8051

Random switch-on
Suggested applications:
- Fine controls involving shorter time (specially motor control)

Simplified circuit diagram



	77.31.x.xxx.8050		77.31.x.xxx.8051	
Output specification				
Output configuration	1 NO (SPST-NO)		1 NO (SPST-NO)	
Rated current I_N / Max. peak current* (10 ms) A	30 / 520 *		30 / 520 *	
Rated voltage V AC (50/60 Hz)	400		400	
Rated voltage range V AC (50/60 Hz)	60…440		60…440	
Switching voltage range V AC (50/60 Hz)	48…480		48…480	
Repetitive peak off-state voltage V_{pk}	1,100		1,100	
Rated load AC7a (cos φ = 0.8) A	30		30	
Rated load AC15 A	20		20	
Single phase motor rating (230 V AC) kW	—		2.5	
230 V lamps rating: incandescent/halogen W	6,000		4,500	
compact fluorescent (CFL)/Led W	4,000		2,500	
electronic ballast fluorescent tubes W	6,000		4,000	
electromagnetic ballast compensated fluorescent tubes W	3,000		1,800	
Minimum switching current @ 400 V mA	300		300	
Typical “OFF-state” leakage current @ 400 V mA	1		1	
Max “ON-state” voltage drop @ 25 °C and 30 A V	0.85		0.85	
Power loss @ 30 A W	16		16	
Input specification				
Nominal voltage (U_N) V AC (50/60 Hz)	—	230	—	230
V DC	24	—	24	—
Rated power @ UMAX VA (50 Hz)/W	0.4	7.5 / 0.9	0.4	7.5 / 0.9
Operating range V AC (50/60 Hz)	—	40…280	—	40…280
V DC	4…32	—	4…32	—
Must drop-out voltage V AC (50/60 Hz)/DC	— / 2	6 / —	— / 2	6 / —
Technical data				
Electrical life cycles	$10 \cdot 10^6$		$10 \cdot 10^6$	
Operate / release time ms	< 10 / <10	< 10 / < 30	< 1 / <10	< 2 / < 25
Insulation between input and output (1.2/50μs) kV	6		6	
Ambient temperature °C	–20…+80 **		–20…+80 **	
Protection category	IP20		IP20	
Approvals (according to type)				

D

X-2014, www.findernet.com

77 Series - Modular Solid State Relay 30 A

Features

30 A modular SSR, 1 NO output

- 22.5 mm housing, heat-sink + plastic cover
- 60 to 440 V AC output (with back to back SCR)
- 6 kV (1.2/50 μs) insulation between Input and Output
- Zero-crossing and random switch-on versions available
- High switching speed
- High endurance
- Silent switching
- Spark and bounce-free switching
- Low control power
- "Contactor-style" terminal arrangement (input and output terminals on adjacent sides)
- 35 mm rail (EN 60715) mount

77.31
Screw terminal

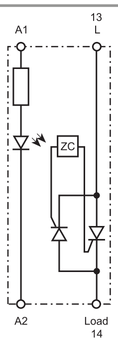
* See L77-5 diagram page 10
** See L77-4 diagrams page 9

For outline drawing see page 12

77.31.x.xxx.8070

Zero-crossing switch-on
Suggested applications:
- Lamp inrush current reduction (CFL - Compact Fluorescent energy-saving Lamps and similar)
- Heater control
- Solenoid, contactor driver

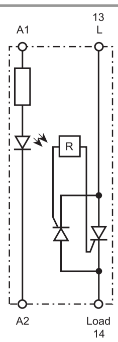
Simplified circuit diagram



77.31.x.xxx.8071

Random switch-on
Suggested applications:
- Fine controls involving shorter time (specially motor control)

Simplified circuit diagram



	77.31.x.xxx.8070		77.31.x.xxx.8071	
Output specification				
Output configuration	1 NO (SPST-NO)		1 NO (SPST-NO)	
Rated current I_N / Max. peak current* (10 ms) A	30 / 520 *		30 / 520 *	
Rated voltage V AC (50/60 Hz)	400		400	
Rated voltage range V AC (50/60 Hz)	60…440		60…440	
Switching voltage range V AC (50/60 Hz)	48…480		48…480	
Repetitive peak off-state voltage V_{pk}	1,100		1,100	
Rated load AC7a (cos φ = 0.8) A	30		30	
Rated load AC15 A	20		20	
Single phase motor rating (230 V AC) kW	—		2.5	
230 V lamps rating: incandescent/halogen W	6,000		4,500	
compact fluorescent (CFL)/Led W	4,000		2,500	
electronic ballast fluorescent tubes W	6,000		4,000	
electromagnetic ballast compensated fluorescent tubes W	3,000		1,800	
Minimum switching current @ 400 V mA	300		300	
Typical "OFF-state" leakage current @ 400 V mA	1		1	
Max "ON-state" voltage drop @ 25 °C and 30 A V	0.85		0.85	
Power loss @ 30 A W	16		16	
Input specification				
Nominal voltage (U_N) V AC (50/60 Hz)	—	230	—	230
V DC	24	—	24	—
Rated power @ UMAX VA (50 Hz)/W	0.4	7.5 / 0.9	0.4	7.5 / 0.9
Operating range V AC (50/60 Hz)	—	40…280	—	40…280
V DC	4…32	—	4…32	—
Must drop-out voltage V AC (50/60 Hz)/DC	— / 2	6 / —	— / 2	6 / —
Technical data				
Electrical life cycles	$10 \cdot 10^6$		$10 \cdot 10^6$	
Operate / release time ms	< 10 / <10	< 10 / < 30	< 1 / <10	< 2 / < 25
Insulation between input and output (1.2/50μs) kV	6		6	
Ambient temperature °C	–20…+80 **		–20…+80 **	
Protection category	IP20		IP20	
Approvals (according to type)				

X-2014, www.findernet.com

Features

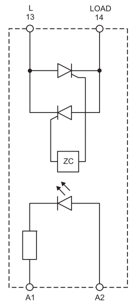
25, 40 and 50 A panel SSR, "hockey puck" style

- "hockey puck" housing with cover
- 24 to 240 V AC output
- Zero-crossing version
- High switching speed
- High endurance
- Silent switching
- Spark and bounce-free switching
- Low control power
- "Relay-style" terminal arrangement (input and output terminals on opposite sides)
- Mounting to heatsink with screws

77.x5
Screw terminal (plate clamp)

NEW 77.25.x.xxx.8250

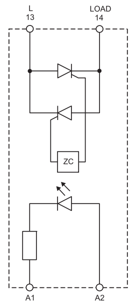
Zero-crossing switch-on
- Output: 25 A / 230 V AC
- Suggested applications: heater control



Simplified circuit diagram

NEW 77.45.x.xxx.8250

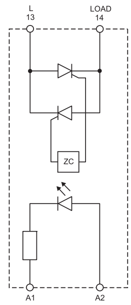
Zero-crossing switch-on
- Output: 40 A / 230 V AC
- Suggested applications: heater control



Simplified circuit diagram

NEW 77.55.x.xxx.8250

Zero-crossing switch-on
- Output: 50 A / 230 V AC
- Suggested applications: heater control



Simplified circuit diagram

* See L77-11 diagrams page 10
** See L77-8, L77-9 and L77-10 diagrams page 9

For outline drawing see page 12

		77.25.x.xxx.8250		77.45.x.xxx.8250		77.55.x.xxx.8250	
Output specification							
Output configuration		1 NO (SPST-NO)		1 NO (SPST-NO)		1 NO (SPST-NO)	
Rated current I_N / Max. peak current* (10 ms)	A	25/300 *		40/500 *		50/520 *	
Rated voltage	V AC (50/60 Hz)	230		230		230	
Rated voltage range	V AC (50/60 Hz)	24…240		24…240		24…240	
Switching voltage range	V AC (50/60 Hz)	21.6…280		21.6…280		21.6…280	
Repetitive peak off-state voltage	Vpk	600		600		600	
Minimum switching current @ 250 V	mA	120		250		250	
Typical "OFF-state" leakage current @ 250 V	mA	10		10		10	
Max "ON-state" voltage drop @ 25 °C and I_N	V	1.6		1.6		1.6	
Power loss @ I_N	W	40		64		80	
Input specification							
Nominal voltage (U_N)	V AC (50/60 Hz)	—	230	—	230	—	230
	V DC	24	—	24	—	24	—
Rated power @ UMAX	VA (50 Hz)/W	— / 0.6	4.8 / —	— / 0.6	4.8 / —	— / 0.6	4.8 / —
Operating range	V AC (50/60 Hz)	—	90…280	—	90…280	—	90…280
	V DC	3…32	—	3…32	—	3…32	—
Must drop-out voltage	V AC (50/60 Hz)/DC	— / 1	10 / —	— / 1	10 / —	— / 1	10 / —
Technical data							
Electrical life	cycles	$10 \cdot 10^6$		$10 \cdot 10^6$		$10 \cdot 10^6$	
Operate / release time	ms	10 / 10	40 / 80	10 / 10	40 / 80	10 / 10	40 / 80
Insulation between input and output (1.2/50μs)	kV	5.6		5.6		5.6	
Ambient temperature	°C	–30…+80 **		–30…+80 **		–30…+80 **	
Protection category		IP20		IP20		IP20	
Approvals (according to type)		CE EAC cURus					

D

77 Series - Hockey puck Solid State Relay, 25 - 40 - 50 A

Features

25, 40 and 50 A panel SSR, "hockey puck" style

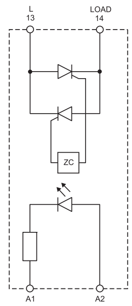
- "hockey puck" housing with cover
- 48 to 600 V AC output
- Zero-crossing version
- High switching speed
- High endurance
- Silent switching
- Spark and bounce-free switching
- Low control power
- "Relay-style" terminal arrangement (input and output terminals on opposite sides)
- Mounting on heatsink with screws

77.x5
Screw terminal (plate clamp)

D

NEW **77.25.x.xxx.8650**

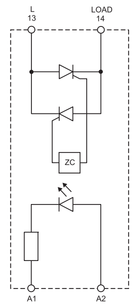
Zero-crossing switch-on
- Output: 25 A / 600 V AC
- Suggested applications: heater control



Simplified circuit diagram

NEW **77.45.x.xxx.8650**

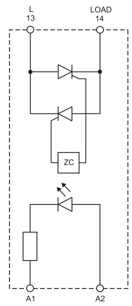
Zero-crossing switch-on
- Output: 40 A / 600 V AC
- Suggested applications: heater control



Simplified circuit diagram

NEW **77.55.x.xxx.8650**

Zero-crossing switch-on
- Output: 50 A / 600 V AC
- Suggested applications: heater control



Simplified circuit diagram

* See L77-11 diagrams page 10
** See L77-8, L77-9 and L77-10 diagrams page 9

For outline drawing see page 12

		77.25.x.xxx.8650		77.45.x.xxx.8650		77.55.x.xxx.8650	
Output specification							
Output configuration		1 NO (SPST-NO)		1 NO (SPST-NO)		1 NO (SPST-NO)	
Rated current I_N/ Max. peak current* (10 ms)	A	25/300 *		40/500 *		50/520 *	
Rated voltage	V AC (50/60 Hz)	600		600		600	
Rated voltage range	V AC (50/60 Hz)	48…600		48…600		48…600	
Switching voltage range	V AC (50/60 Hz)	43.2…660		43.2…660		43.2…660	
Repetitive peak off-state voltage	V_{pk}	1,200		1,200		1,200	
Minimum switching current @ 250 V	mA	120		250		250	
Typical "OFF-state" leakage current @ 250 V	mA	10		10		10	
Max "ON-state" voltage drop @ 25 °C and I_N	V	1.6		1.6		1.6	
Power loss @ I_N	W	40		64		80	
Input specification							
Nominal voltage (U_N)	V AC (50/60 Hz)	—	230	—	230	—	230
	V DC	24	—	24	—	24	—
Rated power @ U_{MAX}	VA (50 Hz)/W	— / 0.6	2.4 / —	— / 0.6	2.4 / —	— / 0.6	2.4 / —
Operating range	V AC (50/60 Hz)	—	90…280	—	90…280	—	90…280
	V DC	4…32	—	4…32	—	4…32	—
Must drop-out voltage	V AC (50/60 Hz)/DC	— / 1	10 / —	— / 1	10 / —	— / 1	10 / —
Technical data							
Electrical life	cycles	$10 \cdot 10^6$		$10 \cdot 10^6$		$10 \cdot 10^6$	
Operate / release time	ms	10 / 10	40 / 80	10 / 10	40 / 80	10 / 10	40 / 80
Insulation between input and output (1.2/50μs)	kV	5.6		5.6		5.6	
Ambient temperature	°C	–30…+80 **		–30…+80 **		–30…+80 **	
Protection category		IP20		IP20		IP20	
Approvals (according to type)		CE EAC cURus					

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Ordering information

Example: 77 series modular SSR, 1 output 30 A AC, input voltage 230 V AC, relay style terminals arrangement, zero-crossing switch-on.

7 7	.	3	1	.	8	.	2 3 0	.	8 (A)	0 (B)	5 (C)	0 (D)

Series

Type/rated current
0 = 5 A output (77.01)
1 = 15 A output (77.11)
2 = 25 A output (77.25)
3 = 30 A output (77.31)
4 = 40 A output (77.45)
5 = 50 A output (77.55)

No. of poles/mounting
1 = 1 pole, modular housing (plastic or heat sink/plastic), DIN rail mounting
5 = 1 pole, heat-sink or directly panel mounting ("hockey puck")

Input version
0 = DC/AC (50/60 Hz)
8 = AC (50/60 Hz)
9 = DC

Supply voltage
See "input specification"

D: Switch-on mode
0 = Zero-crossing
1 = Random

C: Terminals arrangement
5 = "Relay style" (input and output on opposite sides)
7 = "Contactor style" (input and output on adjacent sides)

AB: Output circuit (rated voltage range)
80 = 60...240 V AC (77.01), 60...440 V AC (77.31)
82 = 24...277 V AC (77.11), 24...240 V AC (77.x5)
86 = 48...600 V AC (77.x5)

Codes / Module width

77.01.8.230.8050 / 17.5 mm 5 A
77.01.0.024.8050 / 17.5 mm 5 A
77.01.8.230.8051 / 17.5 mm 5 A
77.01.0.024.8051 / 17.5 mm 5 A

77.11.8.230.8250 / 22.5 mm 15 A
77.11.9.024.8250 / 22.5 mm 15 A
77.11.8.230.8251 / 22.5 mm 15 A
77.11.9.024.8251 / 22.5 mm 15 A

77.31.8.230.8050 / 22.5 mm 30 A
77.31.9.024.8050 / 22.5 mm 30 A
77.31.8.230.8051 / 22.5 mm 30 A
77.31.9.024.8051 / 22.5 mm 30 A
77.31.8.230.8070 / 22.5 mm 30 A
77.31.9.024.8070 / 22.5 mm 30 A
77.31.8.230.8071 / 22.5 mm 30 A
77.31.9.024.8071 / 22.5 mm 30 A

77.25.8.230.8250 / hockey puck 25 A
77.25.9.024.8250 / hockey puck 25 A
77.25.8.230.8650 / hockey puck 25 A
77.25.9.024.8650 / hockey puck 25 A
77.45.8.230.8250 / hockey puck 40 A
77.45.9.024.8250 / hockey puck 40 A
77.45.8.230.8650 / hockey puck 40 A
77.45.9.024.8650 / hockey puck 40 A
77.55.8.230.8250 / hockey puck 50 A
77.55.9.024.8250 / hockey puck 50 A
77.55.8.230.8650 / hockey puck 50 A
77.55.9.024.8650 / hockey puck 50 A

D

Technical data

Insulation			**77.01**		**77.11**		**77.31**		**77.25/45/55**	
			Dielectric strength	Impulse (1.2/50 μs)	Dielectric strength	Impulse (1.2/50 μs)	Dielectric strength	Impulse (1.2/50 μs)	Dielectric strength	Impulse (1.2/50 μs)
Between input and output			2,500 V AC	5 kV	3,000 V AC	6 kV	3,000 V AC	6 kV	4,000 V AC	5.6 kV
Between input and ground (heat-sink)			—	—	3,000 V AC	6 kV	3,000 V AC	6 kV	4,000 V AC	5.6 kV
Between output and ground (heat-sink)			—	—	2,500 V AC	4 kV	4,000 V AC	6 kV	4,000 V AC	5.6 kV
EMC specifications		**Reference standard**	**77.01**		**77.11**		**77.31**		**72.25/45/55**	
			24 V AC/DC	230 V AC	24 V DC	230 V AC	24 V DC	230 V AC	24 V DC - 230 V AC	
Electrostatic discharge	contact discharge	EN 61000-4-2	4 kV		4 kV		4 kV		4 kV	
	air discharge	EN 61000-4-2	8 kV		8 kV		8 kV		8 kV	
Radiated electromagnetic field	(80 … 1,000 MHz)	EN 61000-4-3	30 V/m		20 V/m		30 V/m		—	
Fast transients on supply terminals (burst 5/50 ns, 5 and 100 kHz)		EN 61000-4-4	1 kV	4 kV	1 kV	3 kV	1 kV	3 kV	2 kV	
Voltage pulses on supply terminals (surge 1.2/50 μs)	common mode	EN 61000-4-5	2 kV	4 kV	3 kV	3 kV	3 kV	3 kV	2 kV	
	differential mode	EN 61000-4-5	1 kV	4 kV	0.5 kV	1.5 kV	0.5 kV	1.5 kV	1 kV	
Radio-frequency common mode voltage (0.15…230 MHz)	on supply terminals	EN 61000-4-6	—		10 V		10 V		—	
Terminals			**77.01**		**77.11**		**77.31**		**72.25/45/55**	
									Input	**Output**
Screw torque		Nm	0.8		0.8		0.8		0.5	1.2
Max. wire size			solid cable	stranded cable	solid cable	stranded cable	solid cable	stranded cable	solid and stranded cable	
		mm^2	1x6/2x4	1x4/2x2.5	1x6/2x4	1x6 / 2x4	1x6/2x4	1x6 / 2x4	1 (with ferrule)	4 (with ferrule) 10 (with fork tip)
		AWG	1x10/2x12	1x12/2x14	1x10/2x12	1x10/2x12	1x10/2x12	1x10/2x12	18 (with ferrule)	12 (with ferrule) 8 (with fork tip)
Wire strip length		mm	9		9		9		10	10
Other data										
Power lost to the environment	without output current	W	0.5		0.9		0.9		0.6	
	with rated current	W	4.0		14		16		40/64/80	

Input specification

77.01

Nominal voltage	Input code	Operating range				Must drop-out voltage (AC/DC)	Input current
		AC		DC			
U_N		U_{min}	U_{max}	U_{min}	U_{max}		I_N at U_N
V		V	V	V	V	V	mA
24	**0**.024	16	32	9.8	32	2.4	25
230	**8**.230	90	265	—	—	24	15

77.11

Nominal voltage	Input code	Operating range				Must drop-out voltage (AC/DC)	Input current
		AC		DC			
U_N		U_{min}	U_{max}	U_{min}	U_{max}		I_N at U_N
V		V	V	V	V	V	mA
24	**9**.024	—	—	4	32	2	11
230	**8**.230	40	305	—	—	6	25

77.31

Nominal voltage	Input code	Operating range				Must drop-out voltage (AC/DC)	Input current
		AC		DC			
U_N		U_{min}	U_{max}	U_{min}	U_{max}		I_N at U_N
V		V	V	V	V	V	mA
24	**9**.024	—	—	4	32	2	11
230	**8**.230	40	280	—	—	6	25

77.x5.x.xxx.8250

Nominal voltage	Input code	Operating range				Must drop-out voltage (AC/DC)	Input current
		AC		DC			
U_N		U_{min}	U_{max}	U_{min}	U_{max}		I_N at U_N
V		V	V	V	V	V	mA
24	**9**.024	—	—	3	32	1	22
230	**8**.230	90	280	—	—	10	20

77.x5.x.xxx.8650

Nominal voltage	Input code	Operating range				Must drop-out voltage (AC/DC)	Input current
		AC		DC			
U_N		U_{min}	U_{max}	U_{min}	U_{max}		I_N at U_N
V		V	V	V	V	V	mA
24	**9**.024	—	—	4	32	1	25
230	**8**.230	90	280	—	—	10	10

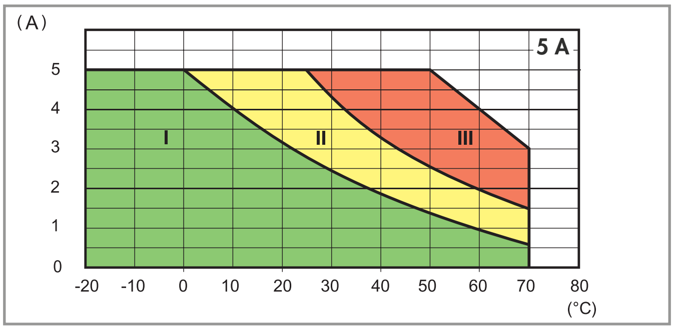
Led indication

LED	Supply voltage
	OFF
	ON

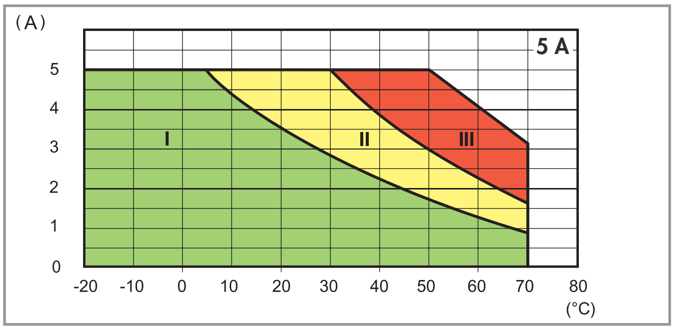
D

Output specification

L77-1 Output RMS current v ambient temperature
77.01.0.024.805x @ 32 V DC



L77-2 Output RMS current v ambient temperature
77.01.8.230.805x @ 265 V AC

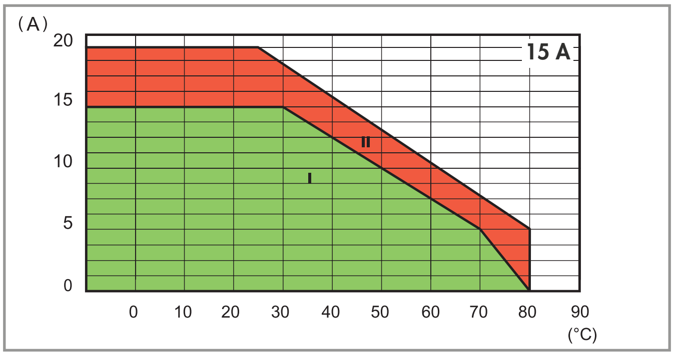


I - Modular SSR installed as a group (without gap)

II - Modular SSR installed as a group (9 mm gap between each SSR)

III - Modular SSR installed individually in free air (without a significant influence from nearby components)

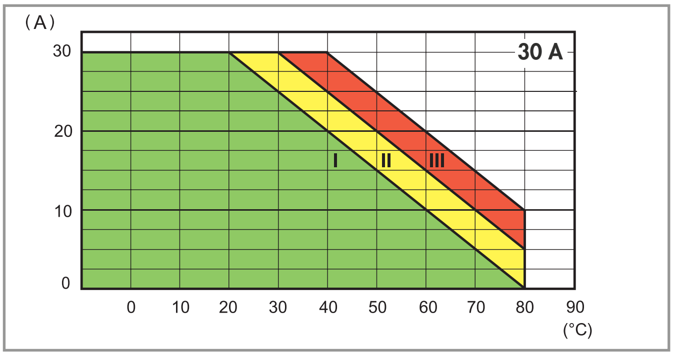
L77-6 Output RMS current v ambient temperature
77.11.x.xxx.82xx



I - Modular SSR installed as a group (without gap)

II - Modular SSR installed individually in free air , or with a gap ≥ 20 mm, which implies a not significant influence from nearby components

L77-4 Output RMS current v ambient temperature
77.31.x.xxx.80xx

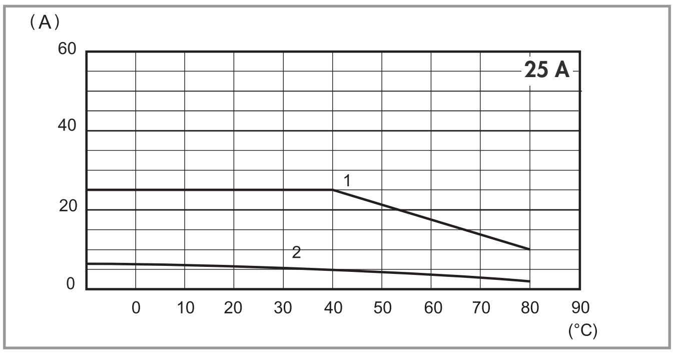


I - Modular SSR installed as a group (without gap)

II - Modular SSR installed as a group (20 mm gap between each SSR)

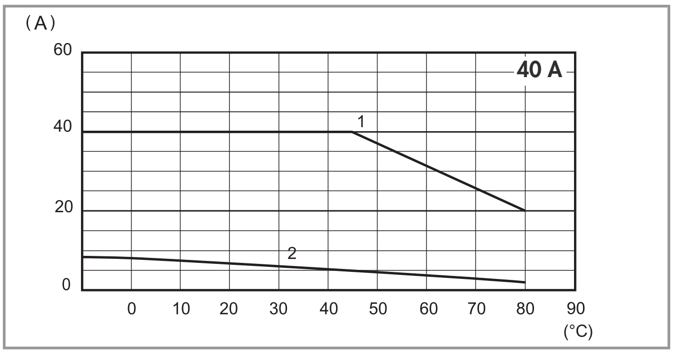
III - Modular SSR installed individually in free air , or with a gap ≥ 40 mm, which implies a not significant influence from nearby components

L77-10 Output RMS current v ambient temperature
77.25.x.xxx.8x50



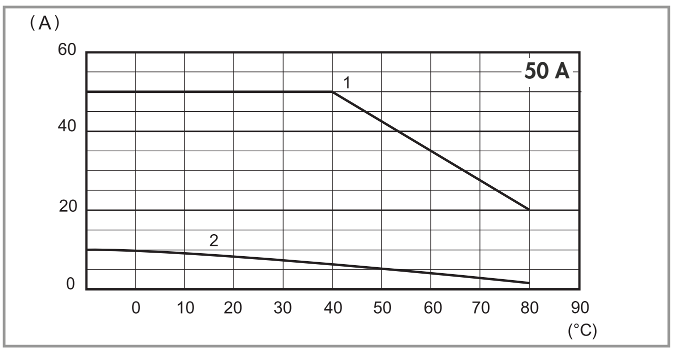
1 - Installation on 0.77.25 heat-sink (2 K/W)
2 -Installation individually in free-air

L77-9 Output RMS current v ambient temperature
77.45.x.xxx.8x50



1 - Installation on 0.77.55 heat-sink (0.9 K/W)
2 - Installation individually in free-air

L77-8 Output RMS current v ambient temperature
77.55.x.xxx.8x50

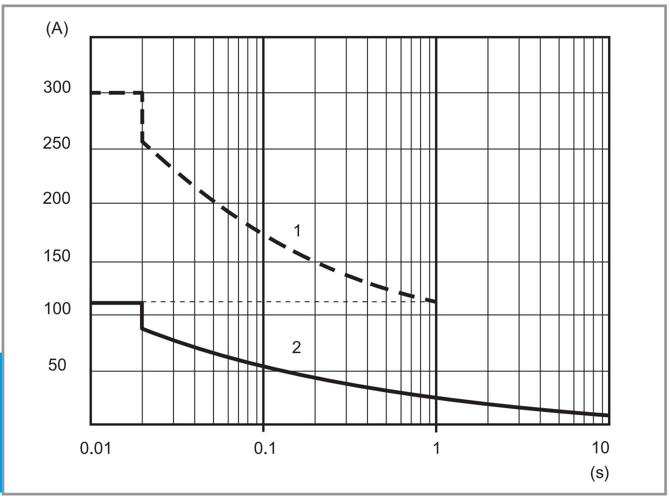


1 - Installation on 0.77.55 heat-sink (0.9 K/W)
2 - Installation individually in free-air

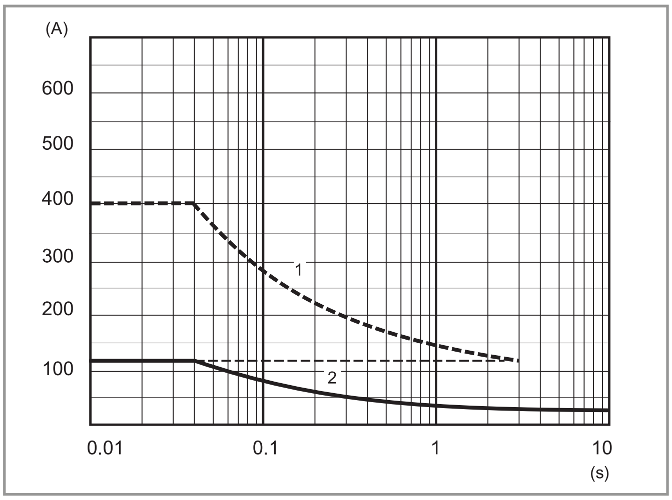
D

Output specification

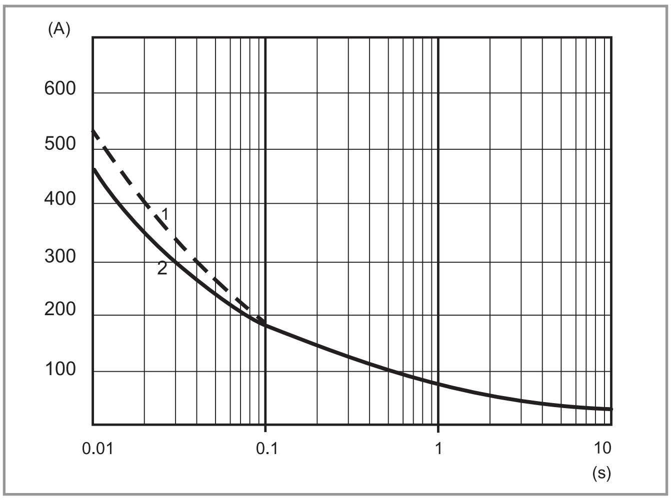
L77-3 Inrush peak current (AC) v inrush time
77.01.x.xxx.80xx



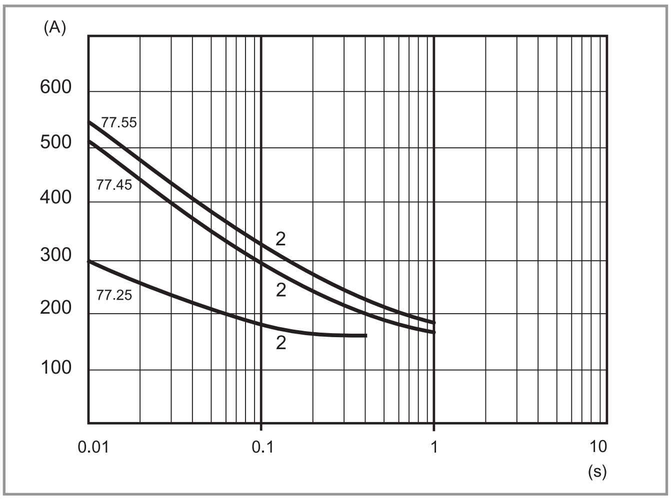
L77-7 Inrush peak current (AC) v inrush time
77.11.x.xxx.82xx



L77-5 Inrush peak current (AC) v inrush time
77.31.x.xxx.80xx



L77-11 Inrush peak current (AC) v inrush time
77x5.x.xxx.8x50



1 - "Cold" conditions (ambient temperature = 23 °C, no output current during the last 15 minutes)
2 - "Hot" conditions (ambient temperature = 50 °C, rated output current)

Max recommended switching frequency (Cycles/Hour, with 50 % Duty-cycle)

Load	77.01	77.11	77.31	77.25	77.45	77.55
5 A 230 V (AC1)	5,000	—	—	—	—	—
1A (AC15)	10,000	—	—	—	—	—
0.5 A (AC15)	20,000	—	—	—	—	—
15 A 305 V cos φ = 0.8	—	1,800	—	—	—	—
15 A 305 V cos φ = 0.5	—	1,200	—	—	—	—
30 A 480 V cos φ = 0.8	—	—	1,800	—	—	—
30 A 480 V cos φ = 0.5	—	—	1,200	—	—	—
25 A 230 V cos φ = 0.7	—	—	—	1,800	—	—
40 A 230 V cos φ = 0.7	—	—	—	—	1,800	—
50 A 230 V cos φ = 0.7	—	—	—	—	—	1,800

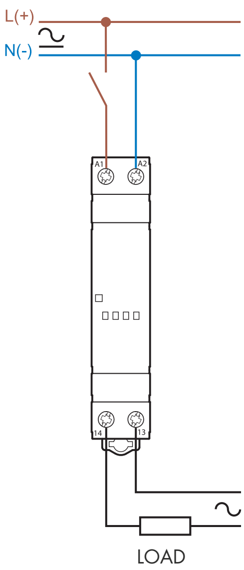
Other data

	77.01	77.11	77.31	77.25	77.45	77.55
Critical rising voltage dv/dt without input control (gate open) @ T_j =125 °C	> 1,000 V/μs	> 500 V/μs > 10 V/μs (with di/dt = 20 A/ms)	> 1,000 V/μs	300 V/μs (..8250) 500 V/μs (..8650)	500 V/μs (..8250) 1,000 V/μs (..8650)	1,000 V/μs (..8250) 1,000 V/μs (..8650)
Critical rising current di/dt @ T_j =125 °C	> 50 A/μs	> 50 A/μs	> 150 A/μs	—	—	–
I^2t for fusing @ t_p =10 ms	450 A^2s	1,000 A^2s*	1,350 A^2s**	450 A^2s	1,250 A^2s	1,350 A^2s

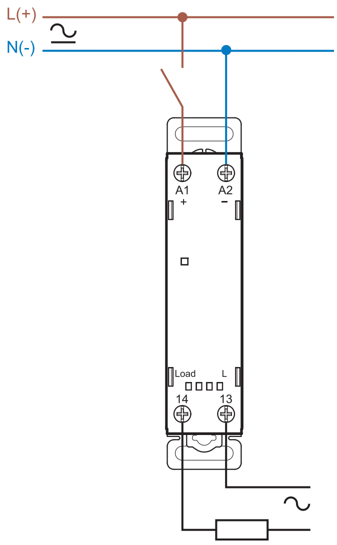
Suggested fuse (depending on application) for short-circuit protection (Ultra-Fast acting types for semiconductors):
 * 20 A, 660 V AC, 10x38 mm, 200 kA, 360 A^2s.
** 30 A, 660 V AC, 10x38 mm, 200 kA, 1,000 A^2s.

Wiring diagrams

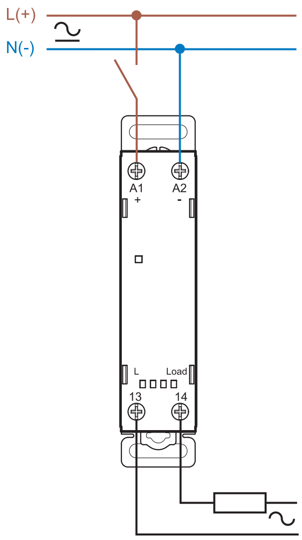
Single-phase connection (77.01)



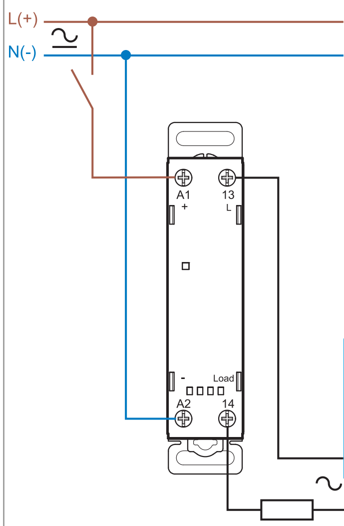
Single-phase connection (77.11)



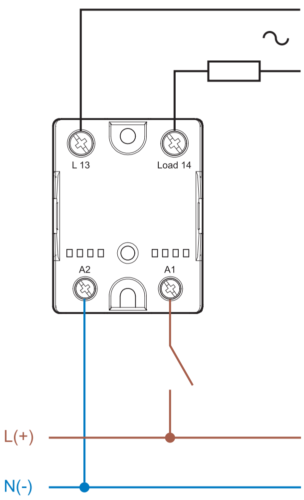
Single-phase connection (77.31.....5x)



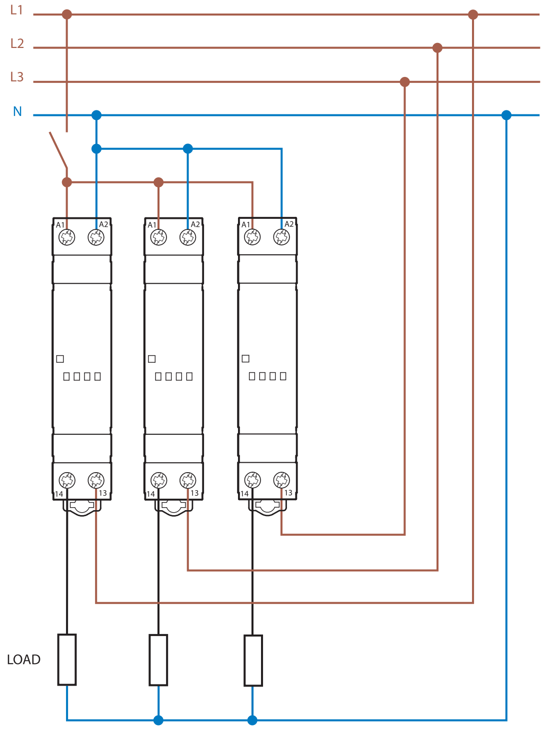
Single-phase connection (77.31.....7x)



Single-phase connection (77.x5)



Example of three-phase connection (with 3 x 77.01.8.230.8051)



Note: this connection can be used with all 77 series types, with the exception of 77.01.8.230.8050.

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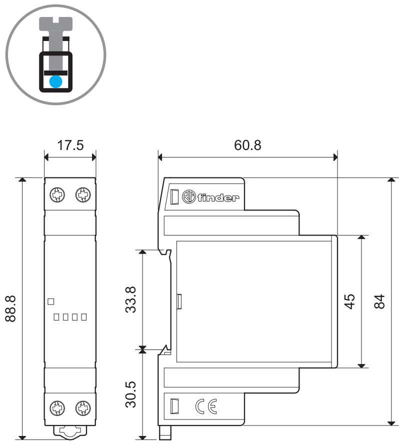
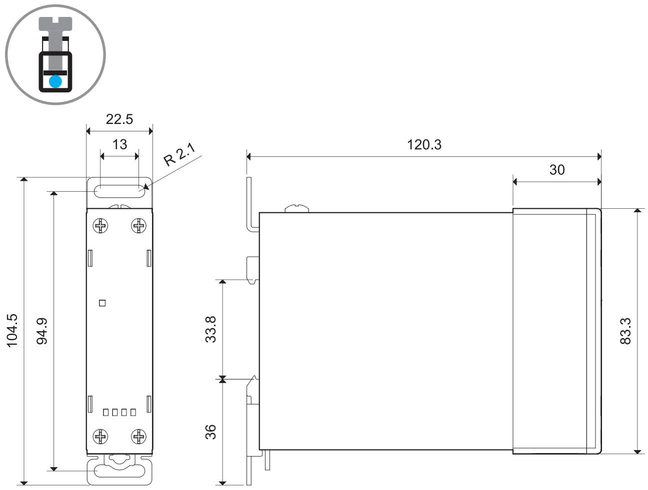
D

Outline drawings

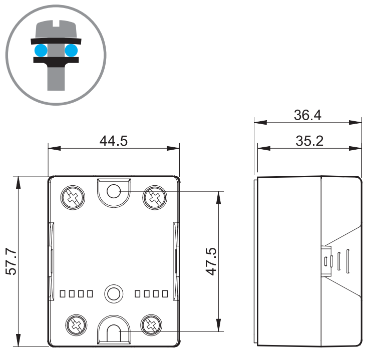
77.01
Screw terminal



77.11/31
Screw terminal



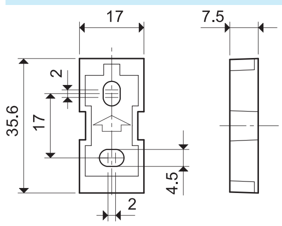
77.x5
Screw terminal (plate clamp)



Accessories

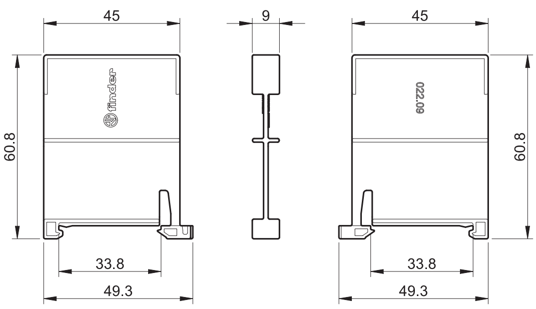
020.01

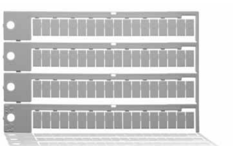
Adaptor for panel mounting, plastic, 17.5 mm wide for 77.01 only	020.01



022.09

Separator for rail mounting, plastic, 9 mm wide	022.09





060.72

Sheet of marker tags, plastic, 72 tags, 6x12 mm	060.72

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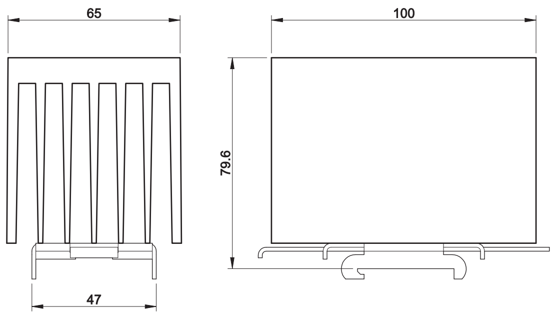
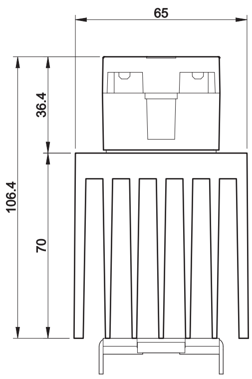
Accessories

077.25

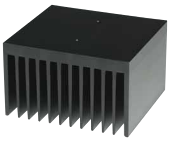
Heat-sink, anodized aluminium, 2 K/W, 65 x 100 mm, for 77.25 only	077.25

- Both the SSR and 35 mm rail clip mount to the heat-sink using M4 screws (supplied with heat-sink)
- Before assembling to the heat-sink, it is necessary to apply a thin and even layer of thermal conductive paste (not supplied) to the lower metal surface of the SSR





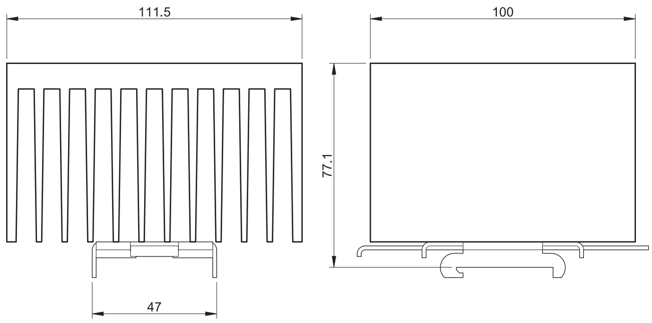
077.25 with 77.25

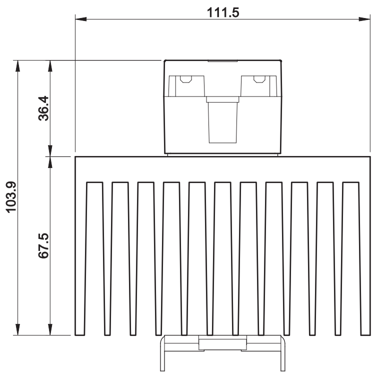


077.55

Heat-sink, anodized aluminium, 0.9 K/W, 111 x 100 mm, for 77.45 and 77.55	077.55

- Both the SSR and 35 mm rail clip mount to the heat-sink using M4 screws (supplied with heat-sink)
- Before assembling to the heat-sink, it is necessary to apply a thin and even layer of thermal conductive paste (not supplied) to the lower metal surface of the SSR





077.55 with 77.45/55

D

Features

Electronic voltage monitoring relays for single and three-phase applications

- Multifunctional types, providing the flexibility of monitoring Undervoltage, Overvoltage, Window Mode, Phase rotation, Phase loss
- Positive safety logic - Make output contact opens if the relay detects an error
- All functions and values can be easily adjusted by the selector and trimmer on front face
- “Blade + cross” – both flat blade and cross head screw drivers can be used to adjust the regulators and the function selector
- Colored LEDs for clear & immediate visual indication
- 1 CO relay output, 6 or 10 A
- Modular housing, 17.5 or 35 mm wide
- 35 mm rail (EN 60715) mount
- Cd-free contact material

Screw terminal

For outline drawing see page 10

70.11

Single-phase (220...240 V) voltage monitoring:

- Undervoltage
- Overvoltage
- Window mode (overvoltage + undervoltage)
- Voltage fault memory selectable

70.31

Three-phase (380...415 V) voltage monitoring:

- Undervoltage
- Overvoltage
- Window mode (overvoltage + undervoltage)
- Voltage fault memory selectable
- Phase loss
- Phase rotation

		70.11	70.31
Contact specification			
Contact configuration		1 CO (SPDT)	1 CO (SPDT)
Rated current/Maximum peak current	A	10 / 30	6 / 10
Rated voltage/Max. switching voltage	V AC	250 / 400	250 / 400
Rated load AC1	VA	2,500	1,500
Rated load AC15	VA	750	500
Single phase motor rating (230 V AC)	kW	0.5	0.185
Breaking capacity DC1: 30/110/220 V	A	10 / 0.3 / 0.12	6 / 0.2 / 0.12
Minimum switching load	mW (V/mA)	300 (5 / 5)	500 (12 / 10)
Standard contact material		AgNi	AgNi
Supply specification			
Nominal system voltage (U_N)	V AC (50/60 Hz)	220…240	380…415
Rated power	VA (50 Hz) / W	2.6 / 0.8	11 / 0.9
Operating range	V AC (50/60 Hz)	130…280	220…510
Technical data			
Electrical life at rated load AC1	cycles	$80 \cdot 10^3$	$60 \cdot 10^3$
Voltage detection level range	V	170…270	300…480
Asymmetry detection level range	%	—	—
Switch-off delay time (T on function diagrams)	s	0.5…60	0.5…60
Switch-on lock-out time	s	0.5	1
Switch-on hysteresis (H on function diagrams)	V	5 (L-N)	10 (L-L)
Power-on activation time	s	≈ 1	≈ 1
Insulation between supply and contacts (1.2/50 µs)	kV	4	4
Dielectric strength between open contacts	V AC	1,000	1,000
Ambient temperature	°C	–20…+60	–20…+60
Protection category		IP20	IP20
Approvals (according to type)			

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E

Features

Electronic voltage monitoring relays for three-phase applications

- Multifunctional types, providing the flexibility of monitoring Undervoltage, Overvoltage, Window Mode, Phase rotation, Phase loss, Asymmetry and Neutral loss
- Positive safety logic - Make output contact opens if the relay detects an error
- All functions and values can be easily adjusted by the selector and trimmer on front face
- "Blade + cross" – both flat blade and cross head screw drivers can be used to adjust the regulators and the function selector
- Colored LEDs for clear & immediate visual indication
- 1 or 2 CO relay output, 6 or 8 A
- Modular housing, 35 mm wide
- 35 mm rail (EN 60715) mount
- Cd-free contact material

E

Screw terminal

70.41

Three-phase (380...415 V, with or without neutral) voltage monitoring:

- Window mode (overvoltage + undervoltage)
- Phase loss
- Phase rotation
- Asymmetry
- Neutral loss selectable

NEW 70.42

Three-phase (380...415 V, with neutral) voltage monitoring:

- Undervoltage
- Overvoltage
- Window mode (overvoltage + undervoltage)
- Voltage fault memory selectable
- Phase loss
- Phase rotation
- Asymmetry
- Neutral loss

For outline drawing see page 10

		70.41	70.42
Contact specification			
Contact configuration		1 CO (SPDT)	2 CO (DPDT)
Rated current/Maximum peak current	A	6 / 10	8 / 15
Rated voltage/Max. switching voltage	V AC	250 / 400	250 / 400
Rated load AC1	VA	1,500	2,000
Rated load AC15	VA	500	400
Single phase motor rating (230 V AC)	kW	0.185	0.3
Breaking capacity DC1: 30/110/220 V	A	6 / 0.2 / 0.12	8 / 0.3 / 0.12
Minimum switching load	mW (V/mA)	500 (12 / 10)	300 (5 / 5)
Standard contact material		AgNi	AgNi
Supply specification			
Nominal system voltage (U_N)	V AC (50/60 Hz)	380…415	380…415
Rated power	VA (50 Hz) / W	11 / 0.9	12.5/1
Operating range	V AC (50/60 Hz)	220…510	220…510
Technical data			
Electrical life at rated load AC1	cycles	$60 \cdot 10^3$	$60 \cdot 10^3$
Voltage detection level range	V	300…480	300…480
Asymmetry detection level range	%	4…25	5…25
Switch-off delay time (T on function diagrams)	s	0.5…60	0.5…60
Switch-on lock-out time	s	1	1
Switch-on hysteresis (H on function diagrams)	V	10 (L-L)	10 (L-L)
Power-on activation time	s	≈ 1	≈ 1
Insulation between supply and contacts (1.2/50 μs)	kV	4	4
Dielectric strength between open contacts	V AC	1,000	1,000
Ambient temperature	°C	–20…+60	–20…+60
Protection category		IP20	IP20
Approvals (according to type)			

Features

Electronic phase loss and rotation monitoring relays for three-phase applications

- Universal voltage monitoring (U_N from 208 V to 480 V, 50/60 Hz)
- Phase loss monitoring, even under phase regeneration
- Positive safety logic - Make contact opens if the relay detects an error
- 2 versions:
  1 CO relay output, 6 A (17.5 mm wide), and
  2 CO relay output, 8 A (22.5 mm wide)
- 35 mm rail (EN 60715) mount
- European patent pending for the innovative principle at the root of the 3 phase monitoring and error survey system (70.61)

Screw terminal

70.61

Three-phase (208…480 V) voltage monitoring:

- Phase loss
- Phase rotation

70.62

Three-phase (208…480 V) voltage monitoring:

- Phase loss
- Phase rotation

For outline drawing see page 10

		70.61	70.62
Contact specification			
Contact configuration		1 CO (SPDT)	2 CO (DPDT)
Rated current/Maximum peak current	A	6 / 15	8 / 15
Rated voltage/Max. switching voltage	V AC	250 / 400	250 / 400
Rated load AC1	VA	1,500	2,000
Rated load AC15	VA	250	400
Single phase motor rating (230 V AC)	kW	0.185	0.3
Breaking capacity DC1: 30/110/220 V	A	3 / 0.35 / 0.2	8 / 0.3 / 0.12
Minimum switching load	mW (V/mA)	500 (10 / 5)	300 (5 / 5)
Standard contact material		AgCdO	AgNi
Supply specification			
Nominal system voltage (U_N)	V AC (50/60 Hz)	208…480	208…480
Rated power	VA (50 Hz) / W	8 / 1	11 / 0.8
Operating range	V AC (50/60 Hz)	170…500	170…520
Technical data			
Electrical life at rated load AC1	cycles	$100 \cdot 10^3$	$60 \cdot 10^3$
Switch-off delay time	s	0.5	0.5
Switch-on lock-out time	s	0.5	0.5
Power-on activation time	s	< 2	< 2
Insulation between supply and contacts (1.2/50 μs)	kV	5	5
Dielectric strength between open contacts	V AC	1,000	1,000
Ambient temperature	°C	–20…+60	–20…+60
Protection category		IP20	IP20
Approvals (according to type)		CE EAC PCT cULus	CE EAC

Ordering information

Example: 70 series, three-phase voltage monitoring relay, 1 output, supply voltage 380…415 V AC.

									A	B	C	D
7	0	. 3	1	. 8	. 4	0	0	.	2	0	2	2

Series

Type
1 = 1 phase AC line monitoring
3 = 3 phase AC line monitoring
4 = 3 phase + neutral AC line monitoring
6 = 3 phase loss and rotation monitoring

No. of poles
1 = 1 pole
2 = 2 pole

Supply version
8 = AC (50/60 Hz)

Supply voltage
230 = 220…240 V (70.11)
400 = 380…415 V (70.31/41/42)
400 = 208…480 V (70.61/62)

D: Fault memory option
0 = No fault memory
2 = Fault memory function selectable

C: Time delay setting
0 = Fixed switch-off delay
2 = Adjustable switch-off delay
3 = Adjustable switch-off delay and asymmetry

B: Contact circuit
0 = CO

A: Detection values
0 = Non-adjustable detection values
2 = 2 adjustable detection values

Codes
70.11.8.230.2022 70.42.8.400.2032
70.31.8.400.2022 70.61.8.400.0000
70.41.8.400.2030 70.62.8.400.0000

E

Monitoring and function overview

		70.11	70.31	70.41	70.42	70.61/62
Supply system type		Single phase system	3-phase systems	3-phase systems	3-phase systems	3-phase systems
Nominal voltage 50/60 Hz	V	220…240	380…415	380…415	380…415	208…480
Undervoltage with/without memory (selectable)		•	•	—	•	—
Overvoltage with/without memory (selectable)		•	•	—	•	—
Window Mode with/without memory (selectable)		•	•	—	•	—
Window Mode without memory		—	—	•	—	—
Phase loss		—	•	•	•	•
Phase rotation		—	•	•	•	•
Phase asymmetry		—	—	•	•	—
Neutral loss (selectable)		—	—	•	• (fixed)	—

Technical data

Insulation			**70.11/31/41/42**	**70.61/62**
Between supply and contacts	dielectric strength	V AC	2,500	3,000
	impulse (1.2/50 μs)	kV	4	5
Between open contacts	dielectric strength	V AC	1,000	1,000
	impulse (1.2/50 μs)	kV	1.5	1.5
EMC specifications				
Type of test			**Reference standard**	
Electrostatic discharge	contact discharge		EN 61000-4-2	4 kV
	air discharge		EN 61000-4-2	8 kV
Radiated electromagnetic field	80 … 1,000 MHz		EN 61000-4-3	10 V/m
	1 … 2.8 GHz		EN 61000-4-3	5 V/m
Fast transients (burst 5/50 ns, 5 and 100 kHz)	on supply terminals		EN 61000-4-4	4 kV
Voltage pulses on supply terminals (surge 1.2/50 μs)	common mode		EN 61000-4-5	4 kV
	differential mode		EN 61000-4-5	4 kV
Radiofrequency common mode voltage (0.15…230 MHz)	on supply terminals		EN 61000-4-6	10 V
Voltage dips	70 % U_N		EN 61000-4-11	25 cycles
Short interruptions			EN 61000-4-11	1 cycle
Radiofrequency conducted emissions	0.15…30 MHz		CISPR 11	class B
Radiated emissions	30…1,000 MHz		CISPR 11	class B

Terminals		**solid cable**	**stranded cable**
Max. wire size	mm²	1 x 6 / 2 x 4	1 x 4 / 2 x 2.5
	AWG	1 x 10 / 2 x 12	1 x 12 / 2 x 14
Screw torque	Nm	0.8	
Wire strip length	mm	9	

Other data			**70.11**	**70.31/41**	**70.42/61/62**
Power lost to the environment	without output current	W	0.8	0.9	1
	with rated output current	W	2	1.2	1.4

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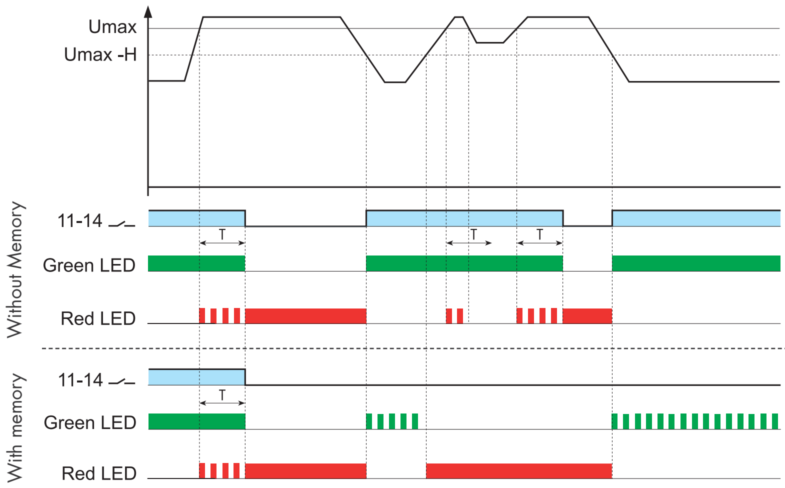
Functions

Output relay On (NO closed) when all OK: positive logic.

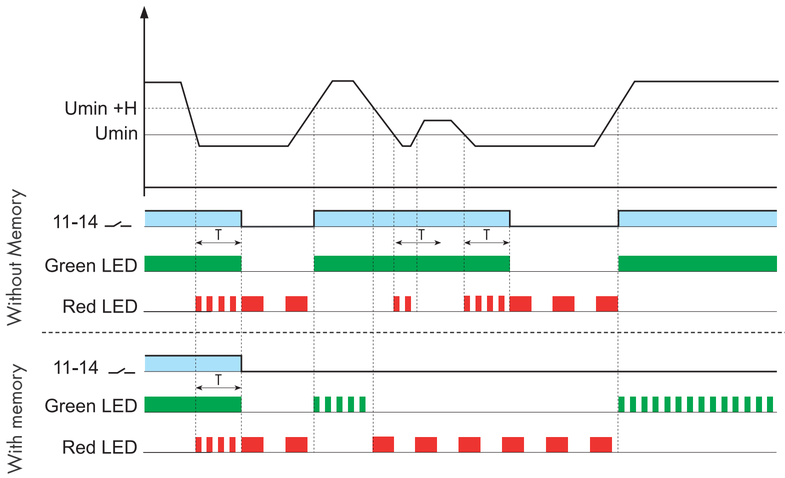
Type
70.11
70.31
70.42

Overvoltage (OV and OVm functions)



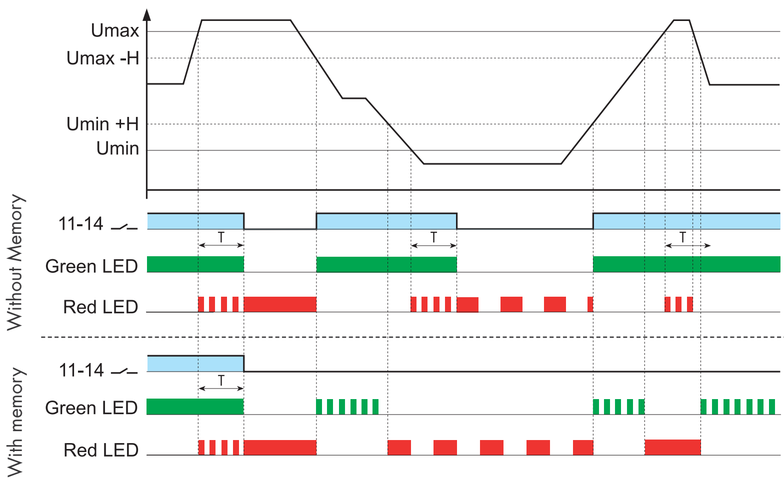
Type
70.11
70.31
70.42

Undervoltage (UV and UVm functions)



Type
70.11
70.31
70.41
(70.41 without memory)
70.42

Window mode (overvoltage + undervoltage, W and Wm functions)



Functions

= Output contact (11-14, 21-24 for 70.42 only)
OV = Overvoltage
OVm = Overvoltage with memory
UV = Undervoltage
UVm = Undervoltage with memory
W = Window mode (OV + UV)
Wm = Window mode (OV + UV) with memory
H = Hysteresis

If the voltage moves out of limits, following delay **T** the output relay turns Off.

When the voltage is again within limits (± the Switch-on hysteresis **H**):

- if set in the "without memory" position, the output relay "recovers", i.e. it turns On (after the Switch-on lock-out time) without any memory of the previous event.
- if set in the "with memory" position (70.11, 70.42 and 70.31 only), the output relay remains open. To reset, it is necessary to switch the supply Off and then On again, or to rotate the selector first to an adjacent position and then to the original position.

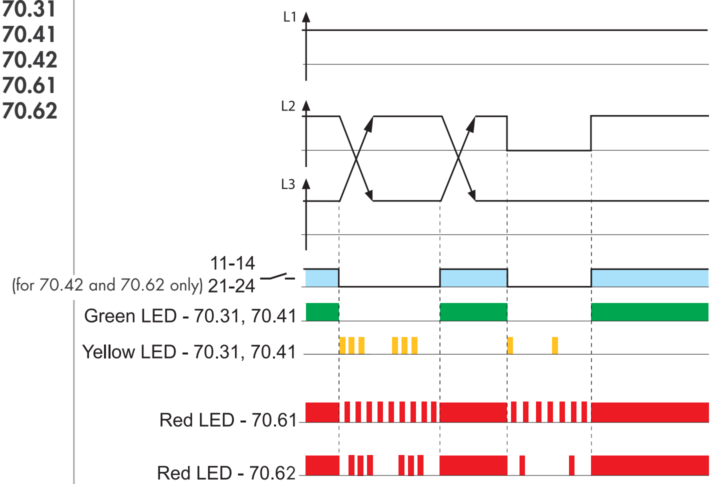
E

Functions

Output relay On (NO closed) when all OK: positive logic.

Type
70.31
70.41
70.42
70.61
70.62

Phase loss and phase rotation



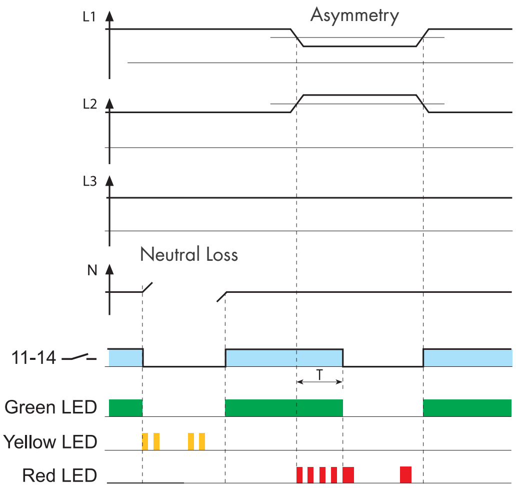
If the sequence (L1, L2, L3) is incorrect at power-on, the output relay will not turn-on.

If a phase is lost, the output relay turns off immediately. When the phase is again active, the output relay turns on immediately.

For types 70.61 and 70.62:
Phase loss monitoring possible even under regeneration up to 80% of the average of the other 2 phases.

Type
70.41
70.42

Neutral loss and asymmetry



If the neutral is lost (and the Neutral control function is set), the output relay turns off immediately.
When the neutral is again present, the output relay turns on immediately

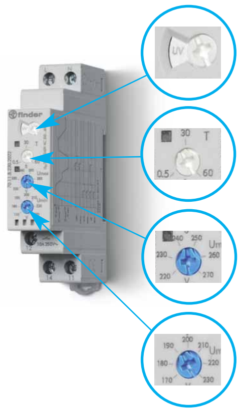
If the asymmetry (U_{max} - U_{min})/U_N is above the % set value, the output relay turns off after the set delay **T**.
When the asymmetry is again below the % set value (with a fixed hysteresis of approximately 2%), the output relay turns on after the Switch-on lock-out time.

E

III-2015, www.findernet.com

Front view: function selector and regulators

70.11



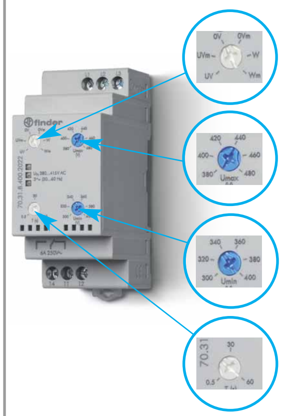
Functions:
OV, OVm, UV,
UVm, W, Wm

$T_{off\ delay}$:
(0.5…60) sec

U_{Max}:
(220…270) V

U_{Min}:
(170…230) V

70.31



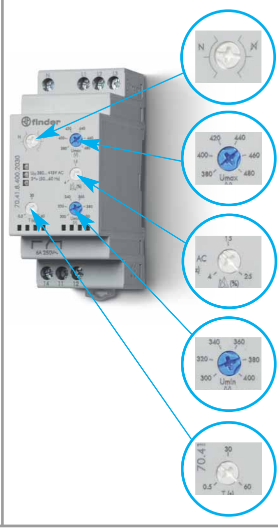
Functions:
OV, OVm, UV,
UVm, W, Wm

U_{Max}:
(380…480) V

U_{Min}:
(300…400) V

$T_{off\ delay}$:
(0.5…60) sec

70.41



N = With N-line monitoring
~~N~~ = Without N-line monitoring

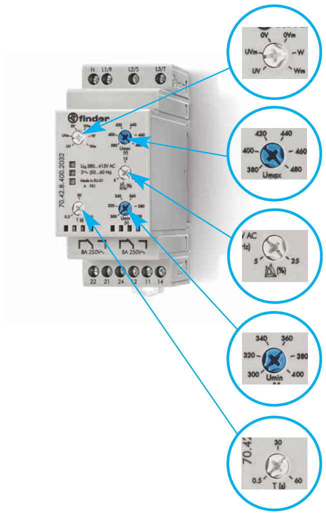
U_{Max}:
(380…480) V

(4…25) % U_N

U_{Min}:
(300…400) V

$T_{off\ delay}$:
(0.5…60) sec

70.42



Functions:
OV, OVm, UV,
UVm, W, Wm

U_{Max}:
(380…480) V

(5…25) % U_N

U_{Min}:
(300…400) V

$T_{off\ delay}$:
(0.5…60) sec

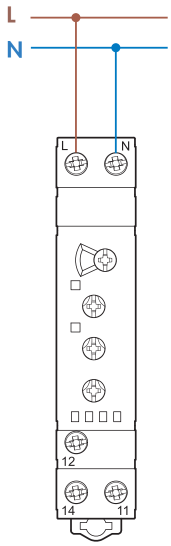
E

LED indication

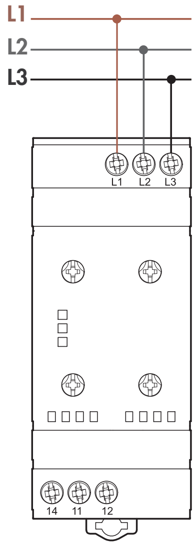
Monitoring relay Type	LED	Supply system normal	Supply system abnormal (Voltage out of limits, switch-off delay time T running)	Supply system abnormal (Reason for switch-off, RESET necessary when "with Memory"* is selected)	
		Contact 11 - 14 closed	Contact 11 - 14 closed	Contact 11-14 open	
70.11.8.230.2022					Overvoltage OV and OVm
					Undervoltage UV and UVm
					With Memory, following a failure a manual "RESET" ** is necessary
70.31.8.400.2022					Overvoltage OV and OVm
					Undervoltage UV and UVm
					Phase loss
					Phase rotation
					With Memory, following a failure a manual "RESET" ** is necessary
70.41.8.400.2030					Overvoltage OV
					Undervoltage UV
					Asymmetry
					Phase loss
					Neutral loss
					Phase rotation
70.42.8.400.2032					Overvoltage OV and OVm
					Undervoltage UV and UVm
					Asymmetry
					Phase loss
					Neutral loss
					Phase rotation
					With Memory, following a failure a manual "RESET" ** is necessary
70.61.8.400.0000					Phase rotation or Phase loss
70.62.8.400.0000					Phase loss
					Phase rotation

* The function "with Memory" is only available for type 70.11, 70.42 and 70.31.
**It is necessary to switch the supply OFF and then On again (U off U on) or to rotate the function selector first to an adjacent position and then to the original position.

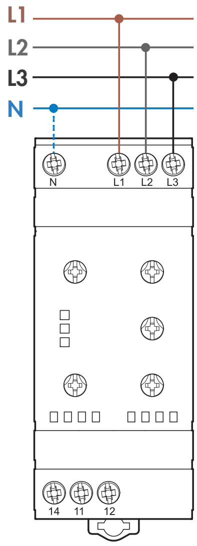
Wiring diagrams



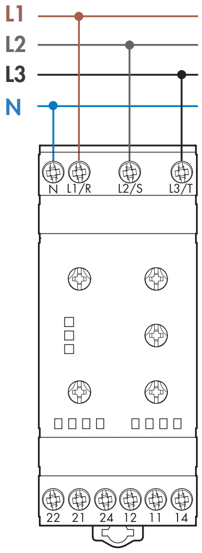
Type 70.11



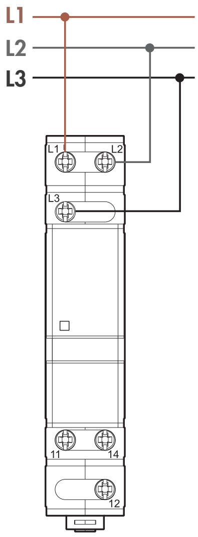
Type 70.31



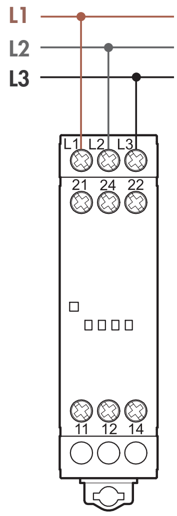
Type 70.41



Type 70.42



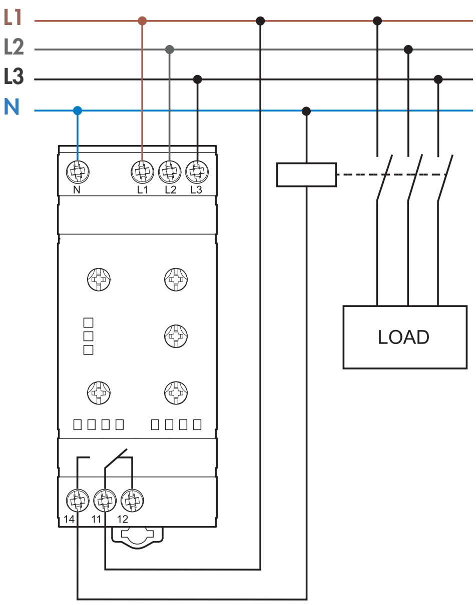
Type 70.61



Type 70.62

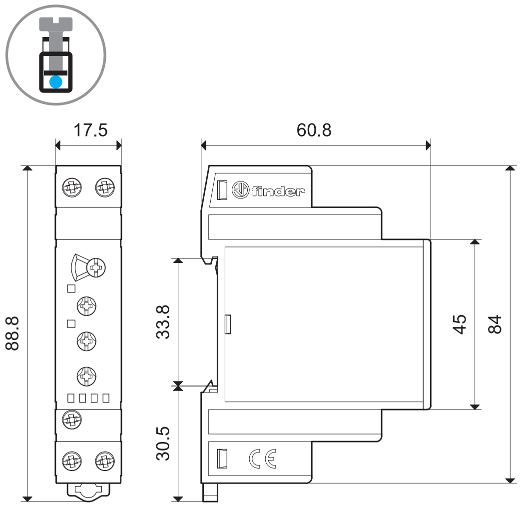
Application example

The output contact switches the coil of the line contactor.

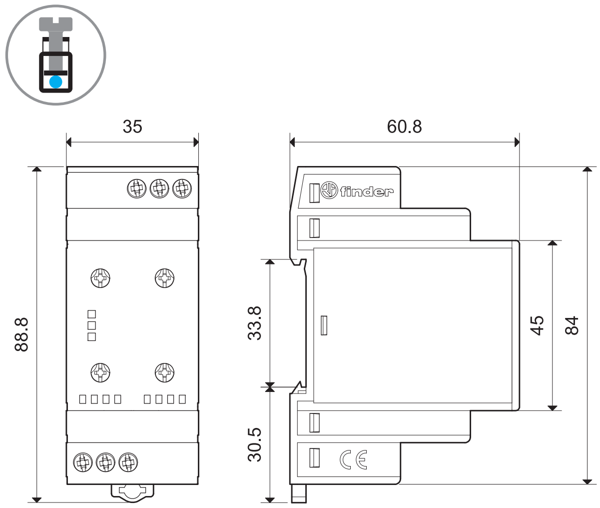


Outline drawings

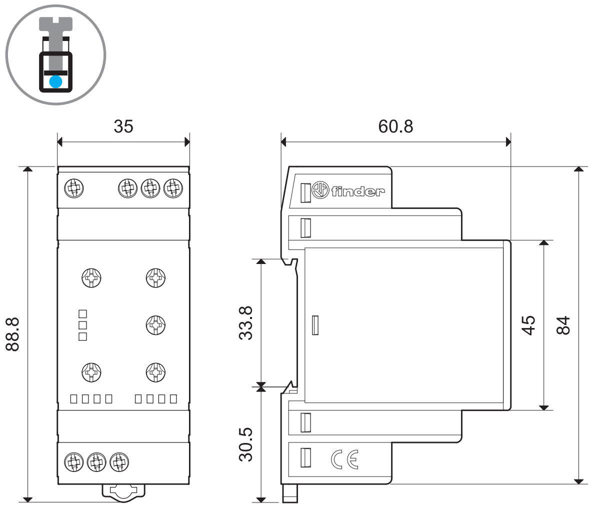
70.11
Screw terminal



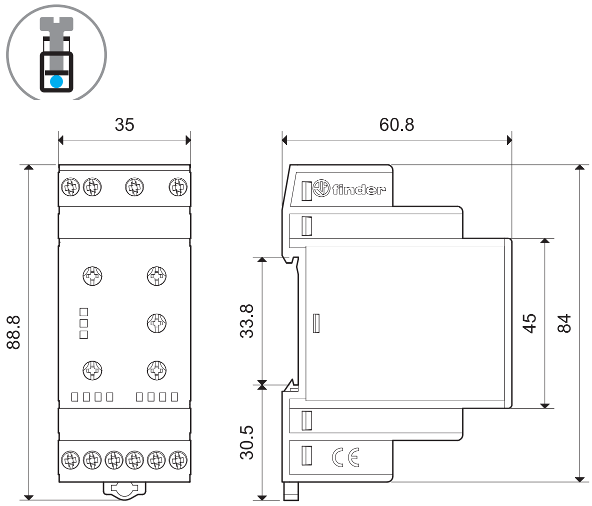
70.31
Screw terminal



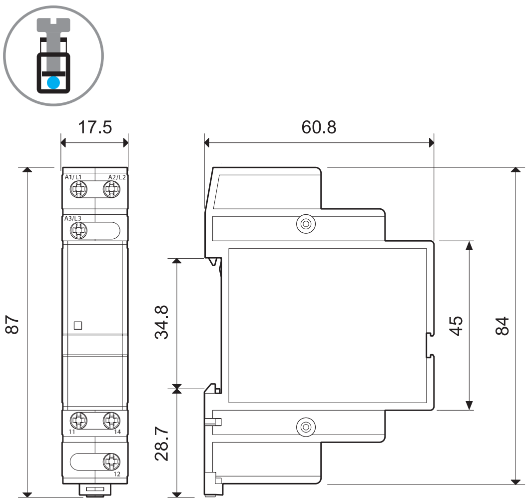
70.41
Screw terminal



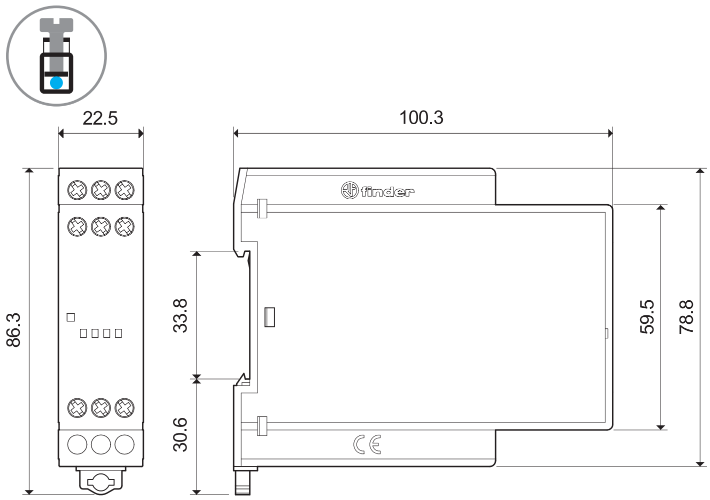
70.42
Screw terminal



70.61
Screw terminal



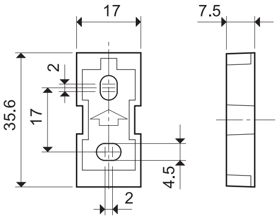
70.62
Screw terminal



Accessories

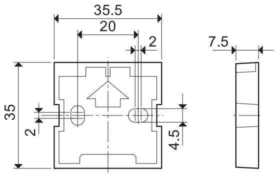
020.01

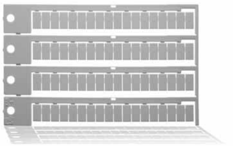
Adaptor for panel mounting, plastic, 17.5 mm wide for 70.11 and 70.61	020.01



011.01

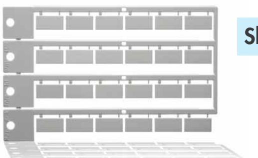
Adaptor for panel mounting, plastic, 35 mm wide for 70.31, 70.42 and 70.41	011.01





060.72

Sheet of marker tags, plastic, 72 tags, 6x12 mm for 70.11, 70.31, 70.41, 70.42 and 70.62	060.72

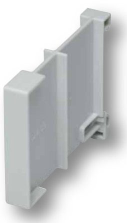


020.24

Sheet of marker tags, plastic, 24 tags, 9x17 mm for 70.61	020.24

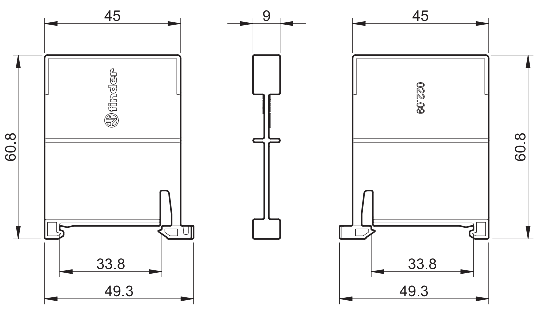
019.01

Identification tag, plastic, 1 tag, 17x25.5 mm for 70.11, 70.31, 70.42 and 70.41	019.01



022.09

Separator for rail mounting, plastic, 9 mm wide	022.09



E

Features

1 - Phase 230 V
Over & Under voltage monitoring relays

71.11.8.230.0010
- **Fixed Over & Under voltage detection**
- **Link selectable 5 or 10 minute lock-out delay**

71.11.8.230.1010
- **Adjustable Over & Under voltage detection**
- **Switch selectable 5 or 10 minute lock-out delay**

- 35 mm rail (EN 60715) mounting
- LED indication
- Positive safety logic (healthy conditions - output relay energised)

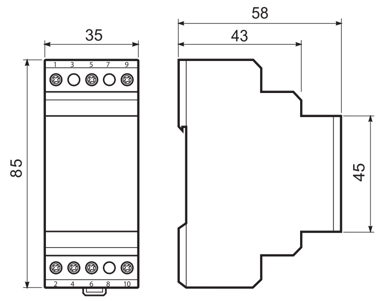
71.11.8.230.0010

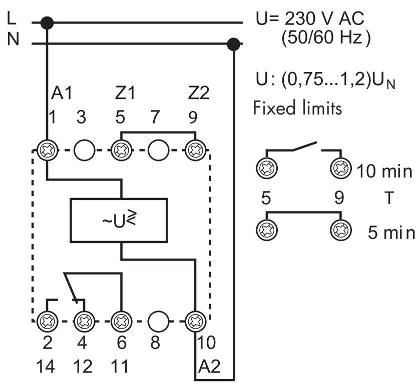
- Fixed - Over/Under voltage limits, (0.75...1.2) U_N respectivity
- Link selectable - 5 min or 10 min delay

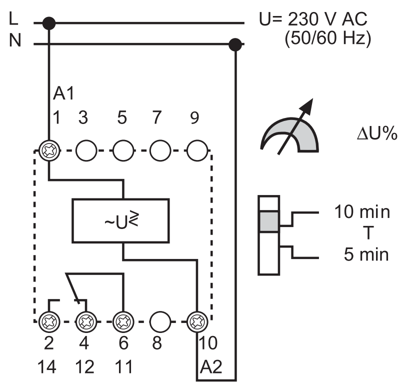
71.11.8.230.1010

- Adjustable - symmetrical Over/Under voltage limits adjustable between ±5% to ±20% U_N
- Switch selectable - 5 min or 10 min delay

- Detects and trips on out-of-limits L-N voltage, and protects against excessive "starts/hour" through "power-on" and "lock-out" time delays.
- Typical applications - protection of compressor motors and high pressure discharge lamp circuitry.







		71.11.8.230.0010	71.11.8.230.1010
Contact specification			
Contact configuration		1 CO (SPDT)	1 CO (SPDT)
Rated current/Maximum peak current	A	10/15	10/15
Rated voltage/Maximum switching voltage	V AC	250/400	250/400
Rated load AC1	VA	2,500	2,500
Rated load AC15 (230 V AC)	VA	500	500
Single phase motor rating (230 V AC)	kW	0.5	0.5
Breaking capacity DC1: 30/110/220 V	A	10/0.3/0.12	10/0.3/0.12
Minimum switching load	mW (V/mA)	300 (5/5)	300 (5/5)
Standard contact material		AgCdO	AgCdO
Supply specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	230	230
	V DC	—	—
Rated power AC/DC	VA (50 Hz)/W	4/—	4/—
Operating range	AC	(0.75...1.2)U_N	(0.8...1.2)U_N
	DC	—	—
Technical data			
Electrical life at rated load AC1	cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Detection levels		Fixed (0.75...1.2)U_N	Adjustable (±5...±20)% U_N
Switch-on lock-out time/reaction time		(5 or 10)min / < 0.5 s	(5 or 10)min / < 0.5 s
Fault memory		—	—
Electrical isolation: Supply to Measuring circuits		None – circuits are electrically common	None – circuits are electrically common
Ambient temperature range	°C	–20...+55	–20...+55
Protection category		IP 20	IP 20
Approvals (according to type)			

II-2014, www.findernet.com

Features

3 - Phase 400 V
Over & Under voltage monitoring relay

71.31.8.400.1010
- Adjustable Over & Under voltage detection
- Switch selectable 5 or 10 minute lock-out delay

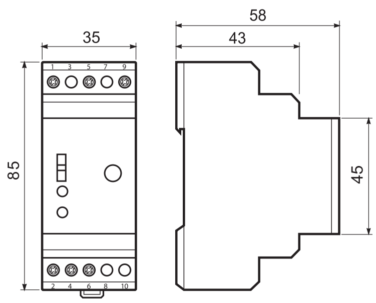
- 35 mm rail (EN 60715) mounting
- LED indication
- Positive safety logic (healthy conditions - output relay energised)

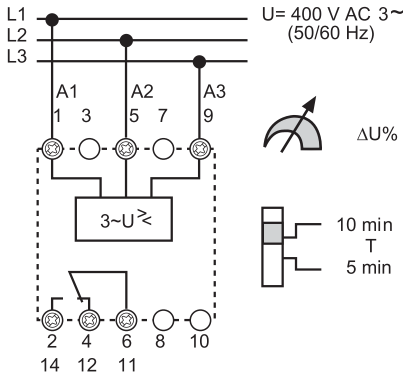
71.31.8.400.1010

- Adjustable - symmetrical Over/Under voltage limits adjustable between ±5% to ±20% U_N
- Switch selectable - 5 min or 10 min delay

- Delects and trips on out-of-limits L-L voltage, and protects against excessive "starts/hour" through "power-on" and "lock-out" time delays.
- Typical applications - protection of compressor motors and high pressure discharge lamp circuitry.

E





Contact specification		
Contact configuration		1 CO (SPDT)
Rated current/Maximum peak current	A	10/15
Rated voltage/Maximum switching voltage	V AC	250/400
Rated load AC1	VA	2,500
Rated load AC15 (230 V AC)	VA	500
Single phase motor rating (230 V AC)	kW	0.5
Breaking capacity DC1: 30/110/220 V	A	10/0.3/0.12
Minimum switching load	mW (V/mA)	300 (5/5)
Standard contact material		AgCdO
Supply specification		
Nominal voltage (U_N)	V AC (50/60 Hz)	400
	V DC	—
Rated power AC/DC	VA (50 Hz)/W	4/—
Operating range	AC	$(0.8...1.2)U_N$
	DC	—
Technical data		
Electrical life at rated load AC1	cycles	$100 \cdot 10^3$
Detection levels	V (50/60 Hz)	Adjustable (±5...±20)% U_N
Switch-on lock-out time/reaction time		(5 or 10)min / < 0.5 s
Fault memory		—
Electrical isolation: Supply to Measuring circuits		None – circuits are electrically common
Ambient temperature range	°C	–20...+55
Protection category		IP 20
Approvals (according to type)		CE EAC

II-2014, www.findernet.com

Features

3 - Phase 400 V - Line monitoring relays

71.31.8.400.1021
- **Over & Under voltage trip on-delay**
- **Fault memory**

71.31.8.400.2000
- **Phase asymmetry**
- **Phase rotation**
- **Phase loss**

- 35 mm rail (EN 60715) mounting
- LED indication
- Positive safety logic (healthy conditions - output relay energised)

71.31.8.400.1021

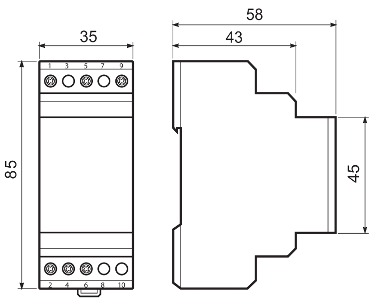
- 3 phase 400 V - line voltage monitoring
- Detects over and under voltage
- Adjustable trip on-delay
- Switch selectable fault memory

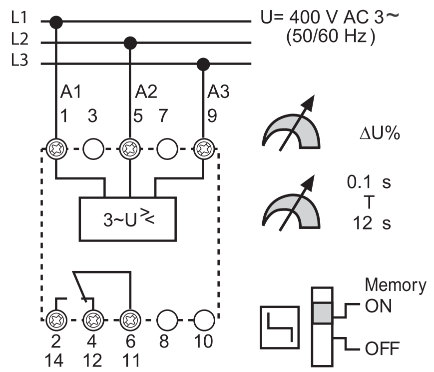
- Under voltage trip level $(0.8...0.95)U_N$ - Adjustable
- Over voltage trip level 1.15 U_N - Fixed
- Trip delay time (0.1…12)s adjustable
- Fault memory, switch selectable
- Fault acknowledgement by switch manipulation from ON to OFF and back to ON or power down

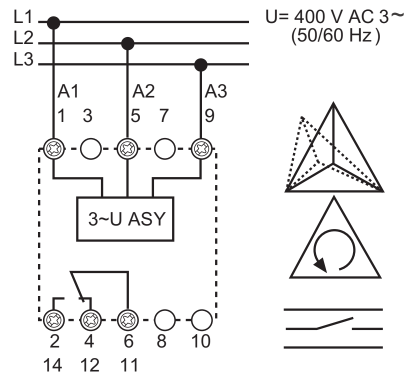
71.31.8.400.2000

- 3 phase asymmetry monitoring
- Phase rotation monitoring
- Phase loss monitoring

- Asymmetry between phases (–5… –20)% U_N adjustable
- Detection of the supply voltage U to A1 (1) and/or A2 (5) > 1.11 U_N







	71.31.8.400.1021	71.31.8.400.2000
Contact specification		
Contact configuration	1 CO (SPDT)	1 CO (SPDT)
Rated current/Maximum peak current A	10/15	10/15
Rated voltage/Maximum switching voltage V AC	250/400	250/400
Rated load AC1 VA	2,500	2,500
Rated load AC15 (230 V AC) VA	500	500
Single phase motor rating (230 V AC) kW	0.5	0.5
Breaking capacity DC1: 30/110/220 V A	10/0.3/0.12	10/0.3/0.12
Minimum switching load mW (V/mA)	300 (5/5)	300 (5/5)
Standard contact material	AgCdO	AgCdO
Supply specification		
Nominal voltage (U_N) V AC (50/60 Hz)	400	400
V DC	—	—
Rated power AC/DC VA (50 Hz)/W	4/ —	4/—
Operating range AC	$(0.8...1.15)U_N$	$(0.8...1.15)U_N$
DC	—	—
Technical data		
Electrical life at rated load AC1 cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Detection level U_{min}/U_{max}/Asymmetry	$(0.8...0.95)U_N$ / 1.15 U_N /—	0.8 U_N / 1.11 U_N /(–5...–20)% U_N
Trip on-delay/reaction time	(0.1…12)s / < 0.5 s	— / < 0.5 s
Fault memory - selectable	Yes	—
Electrical isolation: Supply to Measuring circuits	None – circuits are electrically common	None – circuits are electrically common
Ambient temperature range °C	–20…+55	–20…+55
Protection category	IP 20	IP 20
Approvals (according to type)	CE EAC	

Features

Universal voltage or current detecting and monitoring relay

71.41.8.230.1021 - Voltage monitoring

71.51.8.230.1021 - Current monitoring

- Zero voltage memory according to EN 60204-7-5
- Programmable for DC or AC detection level:
  - range detecting: upper and lower value
  - upper set point minus hysteresis range (5...50)% for switch on
  - lower set point plus hysteresis range (5...50)% for switch on
- Fault memory
- Electrical isolation between measuring and supply circuits
- Immune to supply interruptions of < 200 ms
- Wide detecting range:
  - voltage: DC (15...700)V, AC (15...480)V
- 35 mm rail (EN 60715) mounting

E

71.41.8.230.1021

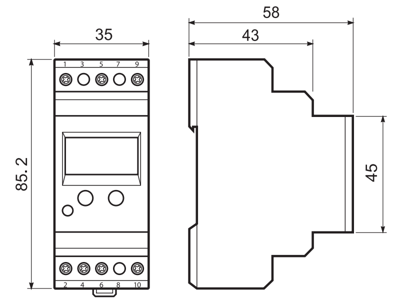
- Programmable universal voltage monitoring relay

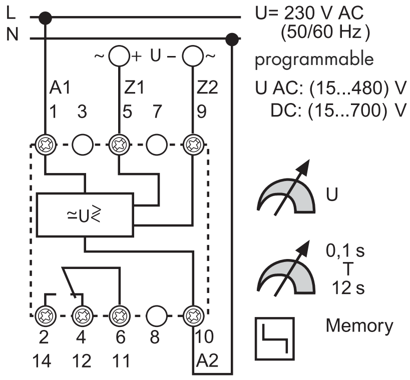
- AC/DC voltage detection - adjustable
- AC (50/60 Hz) (15...480)V
- DC (15...700)V
- Switch-on hysteresis (5...50)%
- Switch-off delay (0.1...12)s

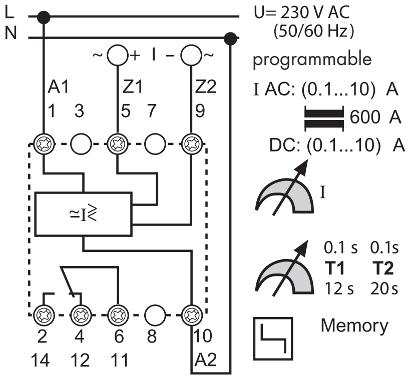
71.51.8.230.1021

- Programmable universal current monitoring relay
- Usable with current transformer 50/5, 100/5, 150/5, 250/5, 300/5, 400/5 or 600/5

- AC/DC current detection - adjustable
- AC(50/60Hz) (0.1...10)A with current transformer to 600A
- DC (0.1...10)A
- Switch-on hysteresis (5...50)%
- Switch-off delay (0.1...12)s
- Start delay (0.1...20)s







		71.41.8.230.1021	71.51.8.230.1021
Contact specification			
Contact configuration		1 CO (SPDT)	1 CO (SPDT)
Rated current/Maximum peak current	A	10/15	10/15
Rated voltage/Maximum switching voltage	V AC	250/400	250/400
Rated load AC1	VA	2,500	2,500
Rated load AC15 (230 V AC)	VA	500	500
Single phase motor rating (230 V AC)	kW	0.5	0.5
Breaking capacity DC1: 30/110/220 V	A	10/0.3/0.12	10/0.3/0.12
Minimum switching load	mW (V/mA)	300 (5/5)	300 (5/5)
Standard contact material		AgCdO	AgCdO
Supply specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	230	230
	V DC	—	—
Rated power AC/DC	VA (50 Hz)/W	4 / —	4 / —
Operating range	AC	(0.85...1.15)U_N	(0.85...1.15)U_N
	DC	—	—
Technical data			
Electrical life at rated load AC1	cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Detection levels	AC(50/60 Hz)/DC	(15...480)V/(15...700)V	(0.1...10)A at transducer to 600A / (0.1...10)A
Switch-off/reaction/Start delay		(0.1...12)s / < 0.35 s / < 0.5 s	(0.1...12)s / < 0.35 s / (0.1...20)s
Switch-on level of the detecting level	%	5...50	5...50
Fault memory - programmable		Yes	Yes
Electrical isolation: Supply to Measuring circuits		Yes	Yes
Ambient temperature range	°C	–20...+55	–20...+55
Protection category		IP 20	IP 20
Approvals (according to type)			

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Features

Thermistor temperature sensing relays for industrial applications

71.91 - 1 Pole, without fault memory

71.92 - 2 Pole, with fault memory

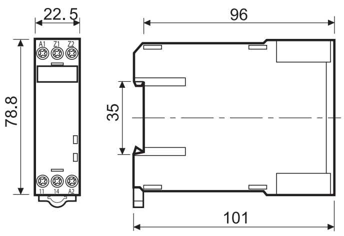
- Overload protection according EN 60204-7-3
- Positive safety logic - make contact opens if the measured value is outside of the acceptable range
- Industry standard module
- LED status indication
- 35 mm rail (EN 60715) mounting

71.91.x.xxx.0300

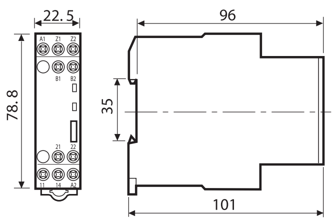
- Thermistor relay
- 1 Pole normally open contact
- 24 V AC/DC, or 230 V AC supply

71.92.x.xxx.0001

- Thermistor relay with fault memory
- 2 Pole changeover contacts
- 24 V AC/DC, or 230 V AC supply

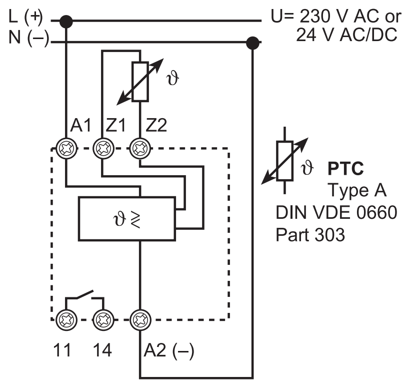


71.91

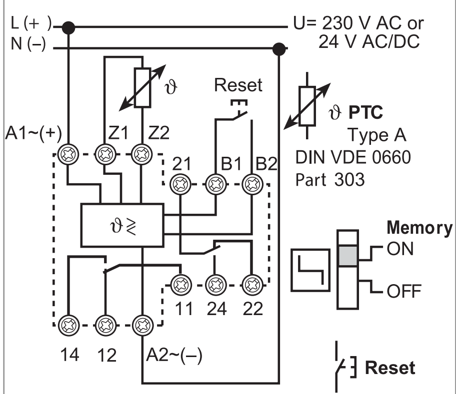


71.92

- Temperature detection with PTC
- PTC short circuit detection
- PTC wire breakage detection



- Temperature detection with PTC
- Fault memory – switch selectable
- Reset by Reset button or supply interruption
- PTC short circuit detection
- PTC wire breakage detection



		71.91.x.xxx.0300	71.92.x.xxx.0001
Contact specification			
Contact configuration		1 NO (SPST-NO)	2 CO (DPDT)
Rated current/Maximum peak current	A	10/15	10/15
Rated voltage/Maximum switching voltage	V AC	250/400	250/400
Rated load AC1	VA	2,500	2,500
Rated load AC15 (230 V AC)	VA	500	500
Single phase motor rating (230 V AC)	kW	0.5	0.5
Breaking capacity DC1: 30/110/220 V	A	10/0.3/0.12	10/0.3/0.12
Minimum switching load	mW (V/mA)	300 (5/5)	300 (5/5)
Standard contact material		AgCdO	AgCdO
Supply specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	230	230
	V AC/DC	24	24
Rated power AC/DC	VA (50 Hz)/W	1/0.5	1/0.5
Operating range	AC	$(0.85...1.15)U_N$	$(0.85...1.15)U_N$
	DC	—	—
Technical data			
Electrical life at rated load AC1	cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
PTC detecting: Short circuit/Temperature OK		<20 Ω / >20 Ω ... <3 kΩ	<20 Ω / >20 Ω ... <3 kΩ
Reset/PTC break		<1.3 kΩ / >3 kΩ	<1.3 kΩ / >3 kΩ
Delay time/activaction time		— / < 0.5 s	— / < 0.5 s
Fault memory - switch selectable		—	Yes
Electrical isolation: Supply to Measuring circuits		Yes	Yes
Ambient temperature range	°C	–20…+55	–20…+55
Protection category		IP 20	IP 20
Approvals (according to type)			

Ordering information

Example: Universal voltage monitoring relay with LCD display for AC/DC voltage detection, 1 CO (SPDT) contact rated 10 A 250, supply voltage 230 V, programmable delay time and fault memory.

7 1 . 4 1 . 8 . 2 3 0 . 1 0 2 1

Series

Type
1 = 1 phase AC line monitoring
3 = 3 phase AC line monitoring
4 = AC/DC universal- Voltage detection
5 = AC/DC universal- Current detection
9 = Thermistor relay (temperature monitoring with PTC thermistor)

No. of poles
1 = 1 CO (SPDT) types 71.11, 31, 41, 51
1 = 1 NO (SPST-NO) type 71.91
2 = 2 CO (DPDT) type 71.92

Supply version
0 = AC(50/60Hz)/DC
8 = AC (50/60 Hz)

Supply voltage
024 = 24 V AC/DC
230 = 230 V
400 = 400 V

Additional functions
0 = Basic function
1 = Adjustable detection value
2 = Adjustable: Asymmetry, phase loss, phase rotation

Special versions
0 = No fault memory
1 = Fault memory

Options
0 = No delay time
1 = Two selectable delay times
2 = Adjustable delay times

Contact circuit
0 = CO (nPDT)
3 = NO (nPST-NO)

Technical data

Insulation				
Insulation according to EN 61810-1		insulation rated voltage	V	250
		rated impulse withstand voltage	kV	4
		pollution degree		3
		over-voltage category		III
Dielectric strength (A1, A2, A3, B1, B2), and	V AC	2,500		
contact terminals (11, 12, 14) and terminals (Z1, Z2)	kV (1.2/50 μs)	6		
Dielectric strength at open contact	V AC	1,000		
EMC specifications				
Type of test		**Reference Standard**		
Electrostatic discharge	contact discharge	EN 610004-2		8 kV
	air discharge	EN 610004-2		8 kV
Radio-frequency electromagnetic field (80…1,000)MHz		EN 610004-3		3 V/m
Fast transients (burst) (5-50 ns, 5 kHz) on (A1, A2, A3, B1, B2) and (Z1, Z2)		EN 610004-4		2 kV
Surges (1.2/50 μs) on (A1, A2, A3, B1, B2) and (Z1, Z2)	common mode	EN 610004-5		4 kV
	differential mode	EN 610004-5		4 kV
Radio-frequency common mode (0.15 ÷ 80 MHz) to A1 - A2		EN 610004-6		10 V
Radiated and conducted emission		EN 55022		class B
Other data				
Voltage and current values at terminals Z1 Z2	Type 71.11	Link for time range	V / mA	230 V / —
	Type 71.91, 71.92	PTC temperature measurement	V / mA	24 V / 2.4
Maximum length of wiring to the Supply terminals/	Type 71.11, 71.31	Contact bridge for time range	m	150 / —
Measuring terminals	Type 71.41	Voltage measurement	m	150 / 50
	Type 71.51	Current measurement	m	150 / 50
(Wiring capacitance no greater than 10 nF/100 m)	Type 71.91, 71.92	PTC temperature measurement	m	50 / 50
Measuring principle	Type 71.11, 71.31, 71.41, 71.51, 71.91, 71.92	The measured value is the arithmetical average of 500 individual measurements taken over a 100 ms period. Interruptions less than <200 ms are ignored.		
Safety logic	Type 71.11, 71.31, 71.41, 71.51, 71.91, 71.92	Positive safety logic - When the value being monitored lies within the acceptable area, the make contact is closed.		
Reaction time (following the application of the supply voltage)	Type 71.11, 71.31, 71.41, 71.51, 71.91, 71.92	≤ 0.5 s		
Power lost to the environment	without contact load W	4		
	with rated current W	5		
Permitted storage temperature range	°C	–40…+85		
Protection category		IP 20		
Screw torque	Nm	0.8		
Max. wire size		solid cable		standed cable
	mm^2	0.5…(2 x 2.5)		(2 x 1.5)
	AWG	20…(2 x 14)		(2 x 16)

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Functions

Monitoring relay	Types												Times			Supply voltage			Module width		Contact conf.
	1-phase 230 V, Under/Overvoltage	3-phase 400 V, Under/Overvoltage	3-phase 400 V, Phase/Symmetry	3-phase 400 V, Phase loss	3-phase 400 V, Phase	DC voltage (15…700)V Under and Over voltage monitoring	AC voltage (15…484)V Under and Over voltage monitoring	DC current (0.1…10)A Under and Over current monitoring	AC current (0.1…10)A (for to 600 A with current transformers) Under and Over current monitoring	Thermistor relay (PTC)	Adjustable	Fault memory for 71.41 and 71.51	Delay time 5/10 min	Delay time (0.1…12)s adjustable	Power-up activation time delay (0.1…20)s — starting inrush current suppression	24 V AC/DC	230 V AC	400 V AC	35 mm wide	22.5 mm wide	Relay contact, 250 V AC/10A
71.11.8.230.0010	•												•				•		•		1 CO SPDT
71.11.8.230.1010	•										•		•				•		•		1 CO SPDT
71.31.8.400.1010		•									•		•					•	•		1 CO SPDT
71.31.8.400.1021		•									•	•		•				•	•		1 CO SPDT
71.31.8.400.2000			•	•	•						•							•	•		1 CO SPDT
71.41.8.230.1021	•					•	•				•	•		•			•		•		1 CO SPDT
71.51.8.230.1021								•	•		•	•		•	•		•		•		1 CO SPDT
71.91.0.024.0300										•	•					•				•	1 NO SPST-NO
71.91.8.230.0300										•	•						•			•	1 NO SPST-NO
71.92.0.024.0001										•	•	•				•				•	2 CO DPDT
71.92.8.230.0001										•	•	•					•			•	2 CO DPDT
Current transformer	Source as required																				

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Explanation of relay marking and LED/LCD display

Monitoring relay without LCD-display	
ON	LED green steady light: supply voltage is on and measuring system is active.
DEF	Default: the detected value is outside of the acceptable range (asymmetric is shown by the LED ASY). LED red flashing: delay time is running, see the function diagram. LED red steady light: output relay is off, contact 11-14 (6-2) is open.
ASY	Phase asymmtery is outside of the predefined range. LED steady light: output relay is turned off, contact 11-14 (6-2) is open.
LEVEL	Selected range as % value.
TIME	Delay time min (minutes) or s (seconds).
MEMORY ON	Fault memory switched on: the state of the output relay after the accurrence of a fault –contact 11-14 (6-2) open– will be maintained, monitored value returns to within acceptable limits. Fault reset is made by switch manipulation from ON to OFF to ON, or by power down (71.31.8.400.1021 & 71.92.x.xxx.0001), or by operating of the “RESET” (71.92.x.xxx.0001).
MEMORY OFF	Fault memory turned off: the sate of the output contatcts will only remain in the “fault” condition –contact 11-41 (6-2) open– while the monitored value is outside of the acceptable limits. When the monitored value returns within the acceptable limits the contact will revert to the energised state. Monitored equipment will start again automatically.

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Monitoring relay with LCD-display			
SET/RESET	Relay 71.41 and 71.51. Sets and resets the programmable values - see operating in the packing.		
SELECT	Relay 71.41 and 71.51. Selects the desired parameter for programming - see operating instructions.		
DEF	Default, LED red steady or flashing.		
PROG Modus	Enter the programming mode by simultaneously pressing the buttons “SET/RESET” and “SELECT” for 3 seconds. The word “prog” is shown for 1 second. “SELECT” allows the choise of “AC” or “DC”, and is confirmed with “SET/RESET”. Successively pressing the button “SELECT” brings up the choises of Up, or Up_{Lo}. The appropriate choise is made by pressing the “SET/RESET” button. The next step will program the appropriate values and the selection of the fault memory function (which is selected with a “YES” or “NO”). If all programming steps are completed the display will read “end”.		
Short programmin instruction	After repeatedly pressing the “SET/RESET” button the measured value will be displayed, or “0” appears if nothing is connected to Z1 and Z2 (5 and 9). If the programming is brocken off before “end” is shown in the display the previous program will remain unchanged after an interruption of the supply voltage.		
Program query	Pushing the “SELECT” button for at least 1 second, enters the “program inquiry mode”. The programmed mode and the values are shown on the repeated pressing of the “SELECT” button.		
Flashing M (memory)	Fault memory has had effect (fault acknowledgement and reset is made by a 1 second press of the “SET/RESET” button).		
LCD-display	V = volt A = amp Up = upper limit (with hysteresis in down direction) Lo = lower limit (with hysteresis in up direction) Up_{Lo} = upper and lower limit - range detecting	Level= value Hys = hysteresis M = memory (fault) Yes = yes - with memory no = no - without memory	t_1 = T_1 - time during which short-time fulctuations are not taken into account t_2 = T_2 - (monitoring relay 71.51) the time during which inrush currents are not taken into a account

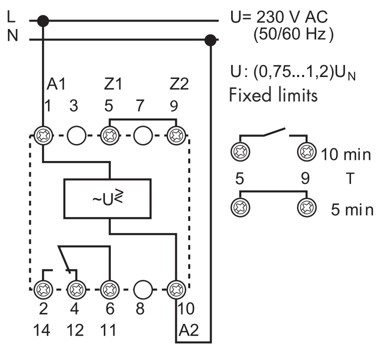
LED/LCD status announcement/advice

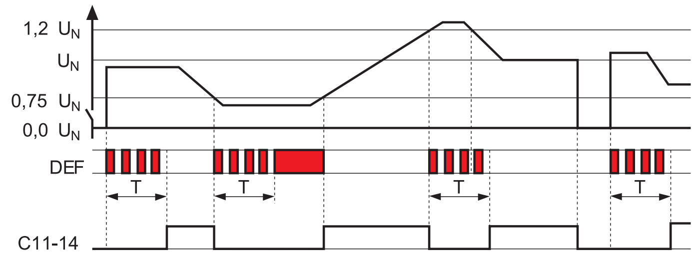
Type	Starting mode	Normal operation	Abnormal mode		Reset
71.11.8.230.0010 71.11.8.230.1010 71.31.8.400.1010	After connecting T = 5 or 10 min 11-14 open	Normal operation Set point is OK 11-14 is closed	Time T runs Set point is immaterial 11-14 is open **Will close after T, if set point is OK**	After expiry of T Set point is not OK 11-14 is open **Will close, if set point is OK**	
71.31.8.400.1021 **Memory OFF** ON OFF		Normal operation Set point is OK 11-14 is closed	Time T runs, Set point is not OK 11-14 is closed	After expiry of T Set point is not OK 11-14 is open **Will close, if set point is OK**	
71.31.8.400.1021 **Memory ON** ON OFF		Normal operation Set point is OK 11-14 is closed	Time T runs, Set point is not OK 11-14 is closed	After expiry of T Set point is not OK 11-14 is open **Will not close at RESET**	After expiry of T Set point is OK 11-14 is open **Will close at RESET**
71.31.8.400.2000		Normal operation Set point is OK 11-14 is closed	Supply voltage to A1(1) and / or A2(5) is missing 11-14 is open, **Will close if supply voltage restored and set point OK** Incorrect phase rotation or phase failure or voltage A1(1) and/ot A2(5) is > 1.11 U_N 11-14 is open **Will close, if set point is OK**	Phase asymmetry 11-14 is open **Will close, if set point is OK**	
71.41.8.230.1021 **Memory OFF**		**Measured value displayed** Normal operation Set point is OK 11-14 is closed	**Measured value displayed** Time T runs, Set point is not OK 11-14 is closed	**Measured value displayed** After expiry of T Set point is not OK 11-14 is open **Will close, if set point is OK**	
71.41.8.230.1021 **Memory ON**		**Measured value displayed** Normal operation Set point is OK 11-14 is closed	**Measured value displayed** Time T runs, Set point is not OK 11-14 is closed	**M in the display flashes** **Measured value displayed** After expiry of T Set point is not OK 11-14 is open **Will not close at RESET**	**M in the display - static** **Measured value displayed** After expiry of T Set point is OK 11-14 is open **Will close at RESET**
71.51.8.230.1021 **Memory OFF**	**Measured value displayed** Time T2 runs, Set point immaterial 11-14 is closed	**Measured value displayed** Normal operation Set point is OK 11-14 is closed	**Measured value displayed** Time T runs, Set point is not OK 11-14 is closed	**Measured value displayed** After expiry of T Set point is not OK 11-14 is open **Will close, if set point is OK**	
71.51.8.230.1021 **Memory ON**	**Measured value displayed** Time T2 runs, Set point immaterial 11-14 is closed	**Measured value displayed** Normal operation Set point is OK 11-14 is closed	**Measured value displayed** Time T runs, Set point is not OK 11-14 is closed	**M in the display flashes** **Measured value displayed** After expiry of T Set point is not OK 11-14 is open **Will not close at RESET**	**M in the display - static** **Measured value displayed** After expiry of T Set point is OK 11-14 is open **Will close at RESET**
71.91.x.xxx.0300		Normal operation Set point is OK 11-14 is closed	Temperature to high or PTC line break or PTC short circuit 11-14 is open **Will close, if set point is OK**		
71.92.x.xxx.0001 **Memory OFF**		Normal operation Set point is OK 11-14 is closed	Temperature to high or PTC line break or PTC short circuit 11-14 is open **Will close, if set point is OK**		
71.92.x.xxx.0001 **Memory ON** ON OFF ON OFF		Normal operation Set point is OK 11-14 is closed	Temperature to high or PTC line break or PTC short circuit 11-14 is open		Temperature is OK 11-14 is open **Will close at RESET**

E

Functions

Type 71.11.8.230.0010



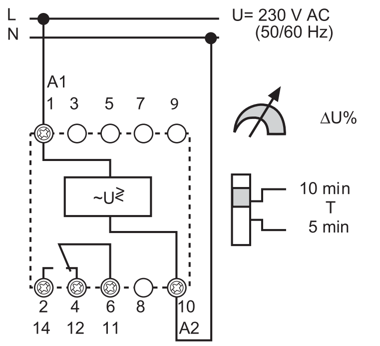


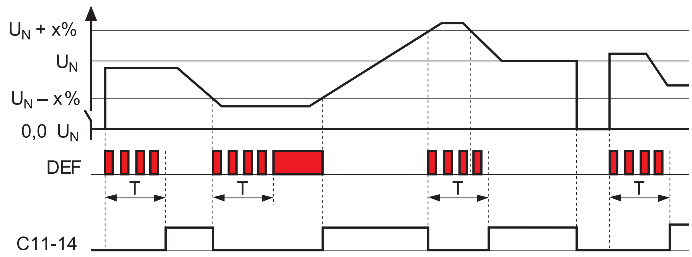
Switch off
Immediately if monitored value is outside of the set points.

Switch on
After expiry of the time T and if monitored value is within the set points.

C = output contact
Normally open 11-14 (6-2) closed.

Type 71.11.8.230.1010



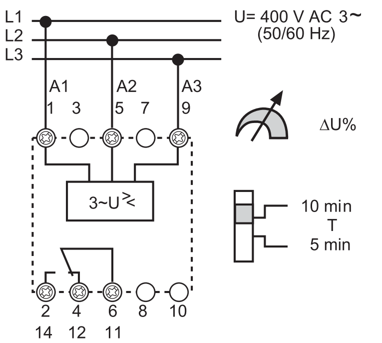


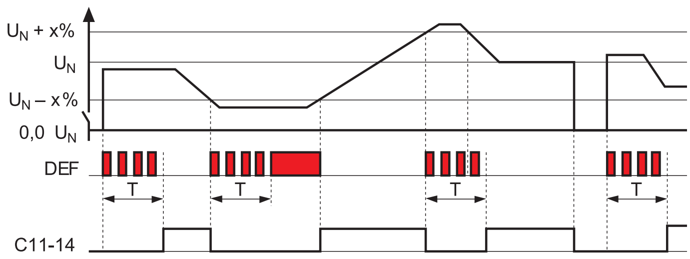
Switch OFF
Immediately if monitored value is outside of the set points.

Switch on
After expiry of the time T and if monitored value is within the set points.

C = output contact
Normally open 11-14 (6-2) closed, all values within the set points.

Type 71.31.8.400.1010



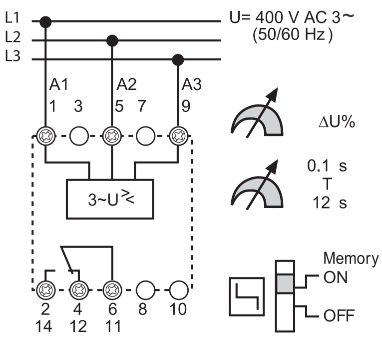


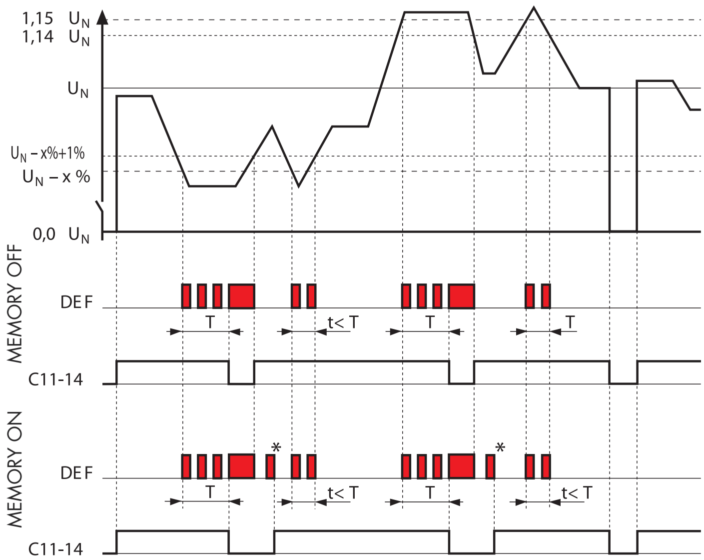
Switch off
Immediately if monitored value is outside of the set points.

Switch on
After expiry of the time T and if monitored value is within the set points.

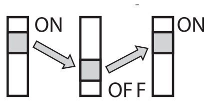
C = output contact
Normally open 11-14 (6-2) closed.

Type 71.31.8.400.1021





*RESET MEMORY = By power-down or switch manipulation from ON to OFF to ON



Switch off
If monitored value is outside of the set points and time T has elapsed.

Switch on - MEMORY OFF
Immediately monitored value returns within limits (off-set by 1% hysteresis).

Switch on - MEMORY ON
As above, but subject to the RESET operation having been actioned.

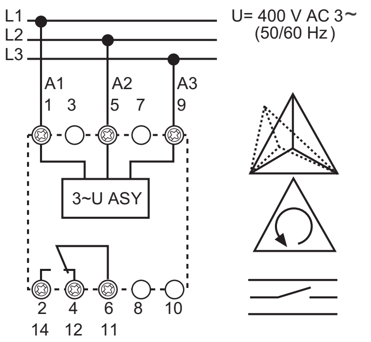
RESET
By Memory switch manipulation from ON to OFF and back to ON, or power down.

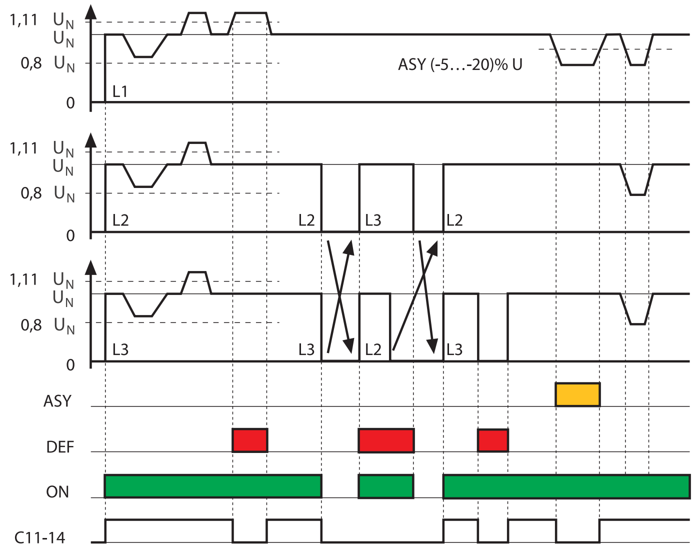
C = output contact
Normally open 11-14 (6-2) closed.

E

Functions

Type 71.31.8.400.2000





Switch off
Phase asymmetry
Incorrect phase rotation
Phase loss

LED • ASY yellow
Phase asymmetry

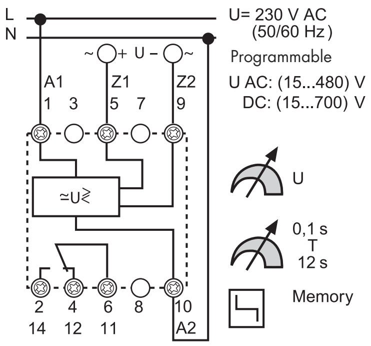
LED • DEF red
Voltage to A1 (1) and/or A2 (5) > 1.11 U_N

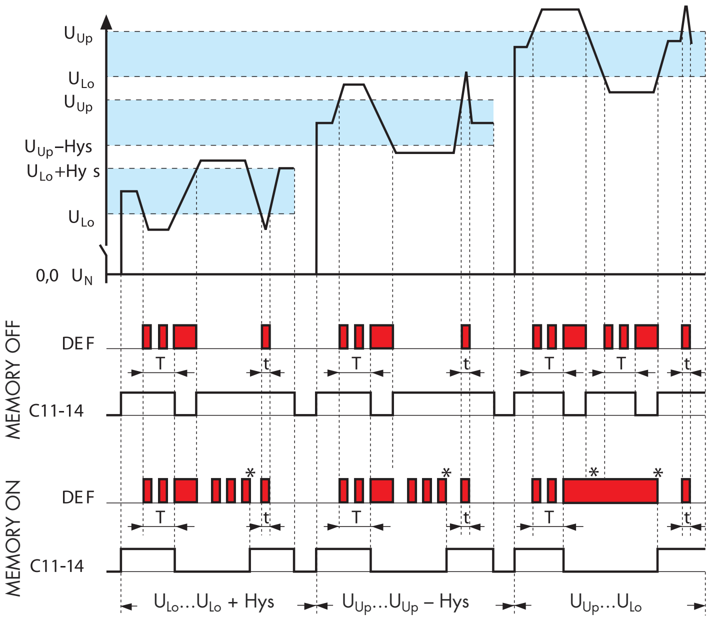
LED • ON green
Monitoring system is active and 400 V supply voltage is connected to 1-5 or A1-A2.

C = output contact
Normally open 11-14 (6-2) closed.

E

Type 71.41.8.230.1021





*RESET MEMORY = Pressing "SET/RESET" > 1 s

Switch off
U_{Lo} – mode
If the monitored value is less than the lower-limit and, time T has expired.

U_{Up} – mode
If the monitored value is higher than the upper limit, and time T has expired.

U_{Lo} U_{Up} – mode
If the monitored value of voltage is outside of the upper or lower voltage limits, and time T has expired.

Voltage dips < T do not result in output relay switching off.

Switch on
U_{Lo} or U_{Up} – modes
When passing the hysteresis value.

U_{Lo} U_{Up} – mode
When passing the U_{Lo} or U_{Up} value.

RESET MEMORY
Pressing "SET/RESET" > 1 sec.

C = output contact
Normally open 11-14 (6-2) closed.

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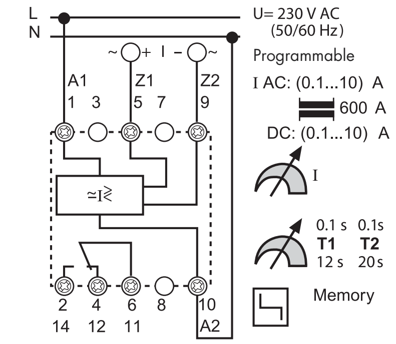
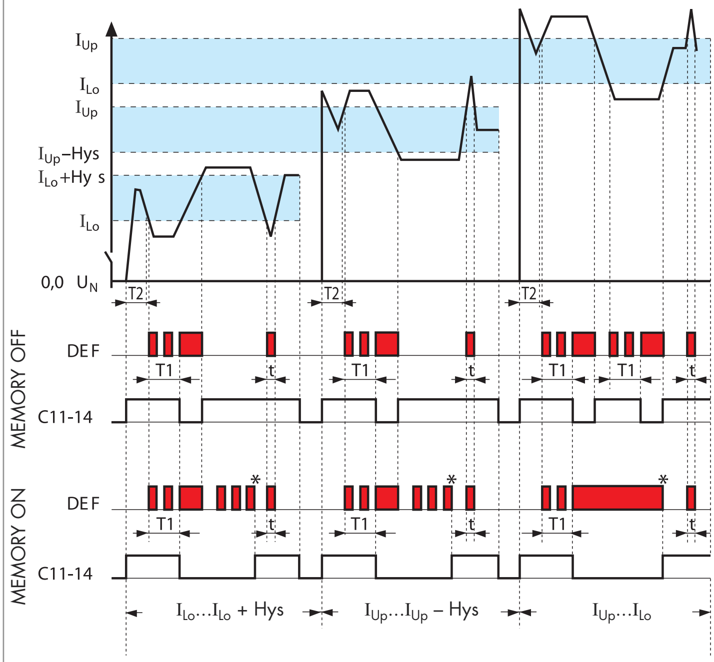
Functions

Type 71.51.8.230.1021





*RESET MEMORY = Pressing “SET/RESET” > 1 s

Switch off
I_{Lo} – mode
If the monitored value is less than the lower-limit and, time T1 has expired.

I_{Up} – mode
If the monitored value is higher than the upper limit, and time T1 has expired.

I_{Lo} I_{Up} – mode
If the monitored value of voltage is outside of the upper or lower limits, and time T1 has expired.

Inrush current < T2 is ignored

Current dips < T1 do not result in output relay switching off.

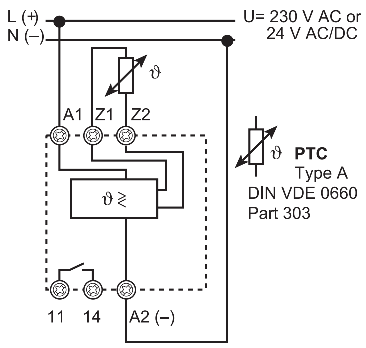
Switch on
I_{Lo} or I_{Up} – modes
When passing the hysteresis value.

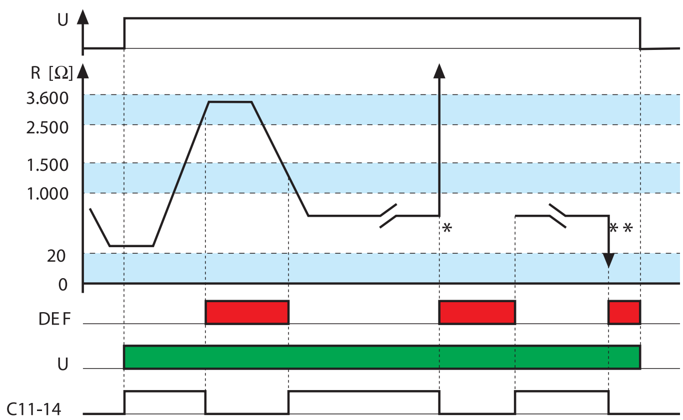
I_{Lo} I_{Up} – mode
When passing the I_{Lo} or I_{Up} value.

RESET MEMORY
Pushing “SET/RESET” > 1 sec.

C = output contact
Normally open 11-14 (6-2) closed.

Type 71.91.x.xxx.0300





*PTC-Break **PTC-Short circuit

Switch off
- Thermistor line break
- Over temperature R_{PTC} > (2.5...3.6)kΩ,
- Thermistor line short circuit (R_{PTC} < 20Ω)
- Loss of supply

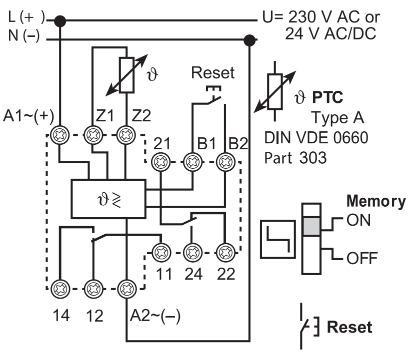
Switch on
Temperature within limits
R_{PTC} > (1.0...1.5)kΩ on power-up.
(1...1.5)kΩ on cooling.

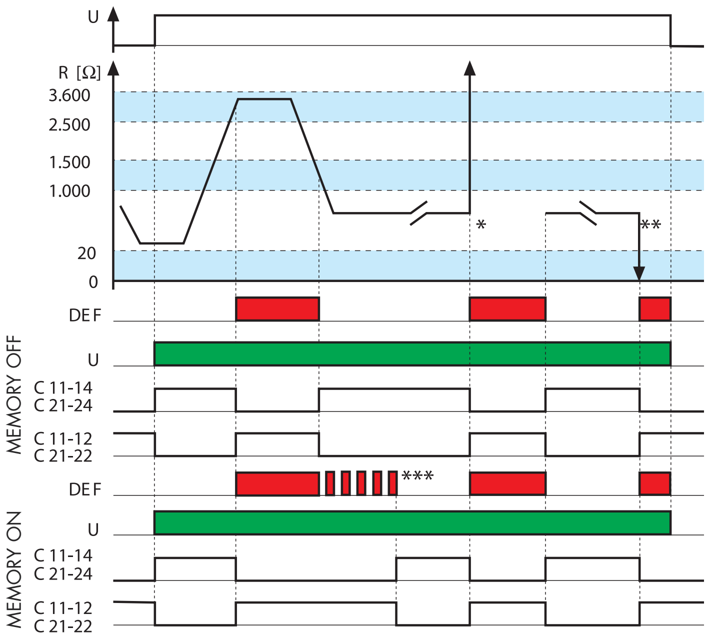
C = output contact
Normally open 11-14
Closed when temperature within limits.

E

Functions

Type 71.92.x.xxx.0001





*PTC-Break **PTC-Short circuit
*** RESET MEMORY = Operate the RESET key, or interrupt the supply.

Switch off
- Thermistor line break
- Over temperature R_{PTC} > (2.5...3.6)kΩ,
- Thermistor line short circuit (R_{PTC} < 20Ω)
- Loss of supply

Switch on
Temperature within limits (20Ω...2.5kΩ) on power-up.
R_{PTC} > (1...1.5)kΩ on cooling.

Select MEMORY OFF
If monitored value is expected to cross the resetting threshold.

Select MEMORY ON
If monitored value is expected to remain within limits.

RESET MEMORY
Operate the RESET key, or interrupt the supply.

C = output contact
Normally open 11-14 (21-24)
Closed when temperature within limits.

Normally closed 11-22 (21-22)
Closed when temperature outside limits / Power off.

E

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Features

Level control relays for conductive liquids

72.01 - Adjustable sensitivity
72.11 - Fixed sensitivity

- Emptying or filling functions
- LED indicator
- Reinforced insulation (6 kV - 1.2/50 μs) between:
  - supply and contacts
  - electrodes and supply
  - contacts and electrodes
- 35 mm rail (EN 60715) mount
- Control about a single level or between Min./Max. limits
- 72.01 available also for supply 400 V
- 72.01 available also with sensitivity range (5…450) kΩ adjustable
- 72.01 available also for contact loads down to 5 V 1 mA

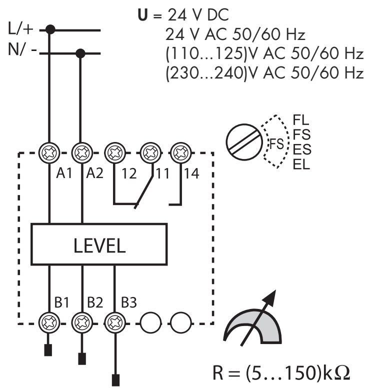
72.01/11
Screw terminal

For UL ratings see:
"General technical information" page V

For outline drawing see page 8

72.01

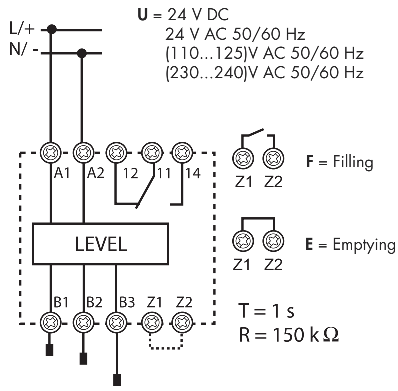
- Sensitivity range (5…150) kΩ adjustable
- Delay time (0.5s or 7s) switch selectable
- Emptying or filling functions switch selectable



FL = Filing – 7s delay
FS = Filling – 0.5s delay
ES = Emptying – 0.5s delay
EL = Emptying – 7s delay

72.11

- Sensitivity fixed 150 kΩ
- Delay time fixed: 1s
- Emptying or filling functions link selectable



		72.01				72.11		
Contact specification								
Contact configuration		1 CO (SPDT)				1 CO (SPDT)		
Rated current/Maximum peak current	A	16/30				16/30		
Rated voltage/Maximum switching voltage	V AC	250/400				250/400		
Rated load AC1	VA	4,000				4,000		
Rated load AC15 (230 V AC)	VA	750				750		
Single phase motor rating (230 V AC)	kW	0.55				0.55		
Breaking capacity DC1: 30/110/220 V	A	16/0.3/0.12				16/0.3/0.12		
Minimum switching load	mW (V/mA)	500 (10/5)				500 (10/5)		
Standard contact material		AgCdO				AgCdO		
Supply specification								
Nominal voltage (U_N)	V AC (50/60 Hz)	24	110…125	230…240	400	24	110…125	230…240
	V DC	24	—	—	—	24	—	—
Rated power AC/DC	VA (50 Hz)/W	2.5/1.5				2.5/1.5		
Operating range	V AC (50/60 Hz)	19.2...26.4	90…130	184…253	360…460	19.2…26.4	90…130	184…253
	V DC	20.4...26.4	—	—	—	20.4…26.4	—	—
Technical data								
Electrical life at rated load AC1	cycles	$100 \cdot 10^3$				$100 \cdot 10^3$		
Electrode voltage	V AC	4				4		
Electrode current	mA	0.2				0.2		
Run-on time	s	0.5 - 7 (selectable)				1		
Max sensitivity range	kΩ	5…150 (adjustable)				150 (fixed)		
Insulation between supply/contacts/electrode (1.2/50 μs)	kV	6				6		
Ambient temperature	°C	–20…+60				–20…+60		
Protection category		IP20				IP20		
Approvals (according to type)								

72 Series - Monitoring relays

Features

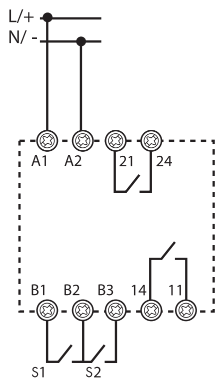
Priority change relay
Special relay for alternating loads, for applications with pumps, compressors, air conditioning or refrigeration units

- 2 independent NO output, 12 A
- 4 functions
- 2 independent control signals, insulated from supply
- 110...240 V and 24 V AC/DC supply versions
- Modular housing, 35 mm wide
- 35 mm rail (EN 60715) mount
- Cd-free contact material

NEW **72.42**

- Multi-function (MI, ME, M2, M1)

72.42
Screw terminal



For outline drawing see page 8

Contact specification		
Contact configuration	2 NO (2 DPST-NO)	
Rated current / Max. peak current A	12 / 20	
Rated voltage / Max. switching voltage V AC	250 / 400	
Rated load AC1 VA	3,000	
Rated load AC15 VA	1,000	
Single phase motor rating (230 V AC) kW	0.55	
Breaking capacity DC1: 30/110/220 V A	12 / 0.3 / 0.12	
Minimum switching load mW (V/mA)	300 (5 / 5)	
Standard contact material	AgNi	
Supply specification		
Nominal voltage (U_N) V AC (50/60 Hz) / DC	24	110 ... 240
Rated power in stand-by W	0.12	0.18
with 2 active relays W/VA(50 Hz)	1.1 / 1.7	1.5 / 3.9
Operating range V AC (50/60 Hz)	16.8…28.8	90…264
V DC	16.8…32	90…264
Technical data		
Electrical life at rated load AC1 cycles	100 x 10^3	
Output delay time (T on function diagrams) s	0.2…20	
Power-on activation time s	≤ 0.7	
Minimum impulse duration ms	50	
Insulation between supply and contacts (1.2/50 μs) kV	6	
Dielectric strength between open contacts V AC	1,000	
Ambient temperature °C	–20…+50	
Protection category	IP20	
Approvals (according to type)	CE EAC	

E

Ordering information

Example: 72 series level control relay, adjustable sensitivity range, (230…240)V AC supply voltage.

7	2	.	0	1	.	8	.	2	4	0	.	0	0	0	0

Series

Type
0 = Level control relay,
sensitivity range adjustable (5…150)kΩ
1 = Level control relay, sensitivity fixed 150 kΩ
4 = Priority change relay

No. of poles
1 = 1 CO (SPDT)
2 = 2 NO (DPST-NO)

Contact material
0 = Standard AgCdO
for 72.01/72.11,
AgNi for 72.42
5 = AgNi + Au**

Supply voltage
024 = 24 V
125 = (110…125)V AC
230 = (110 … 240) V
240 = (230…240)V AC
400 = 400 V AC (72.01 only)

Supply version
0 = DC / AC (50/60 Hz)
8 = AC (50/60 Hz)
9 = DC

Option
0 = Max. 150 kΩ
2 = Sensitivity range
adjustable (5…450) kΩ
types 72.01.8.024.0002*
72.01.8.240.0002*
72.01.8.240.5002**

All versions
72.01.8.024.0000
72.01.8.024.0002*
72.01.8.125.0000
72.01.8.240.0000
72.01.8.240.0002*
72.01.8.240.5002**
72.01.8.400.0000
72.01.9.024.0000
72.11.8.024.0000
72.11.8.125.0000
72.11.8.240.0000
72.11.9.024.0000
72.42.0.230.0000
72.42.0.024.0000

* For liquids conductivity up to 2 μSiemens or a Resistance of 450 kΩ
** For applications with output contact loading down to 5 V 1 mA

E

Technical data

Insulation			72.01/72.11	72.42
Insulation		Dielectric strength	Impulse (1.2/50 μs)	
	between supply and contacts	4,000 V AC	6 kV	6 kV
	between supply and control (for 110…240 V version only)	2,500 V AC	—	4 kV
	between electrodes, Z1-Z2 and supply*	4,000 V AC	6 kV	—
	between contacts and electrodes	4,000 V AC	6 kV	—
	between open contacts	1,000 V AC	1.5 kV	1.5 kV

EMC specifications				
Type of test		**Reference standard**	**72.01/72.11**	**72.42**
Electrostatic discharge	contact discharge	EN 61000-4-2	4 kV	4 kV
	air discharge	EN 61000-4-2	8 kV	8 kV
Radio-frequency electromagnetic field	(80…1,000 MHz)	EN 61000-4-3	10 V/m	10 V/m
	(1…2.8 GHz)	EN 61000-4-3	—	5 V/m
Fast transients	on supply terminals	EN 61000-4-4	4 kV	4 kV
(burst 5/50 ns, 5 and 100 kHz)	on control terminals	EN 61000-4-4	—	4 kV
Voltage pulses on supply terminals	common mode	EN 61000-4-5	4 kV	4 kV
(surge 1.2/50 μs)	differential mode	EN 61000-4-5	4 kV	4 kV
Radiofrequency common mode	on supply terminals	EN 61000-4-6	10 V	10 V (0.15...230 MHz)
voltage (0.15…280 MHz)	on control terminals	EN 61000-4-6	—	10 V
Voltage dips	70 % U_N	EN 61000-4-11	—	25 cycles
Short interruptions		EN 61000-4-11	—	1 cycles
Radiofrequency conducted emissions	(0.15…30 MHz)	CISPR 11	class B	class B
Radiated emissions	(30…1,000 MHz)	CISPR 11	class B	class B

Terminals			
Screw torque	Nm	0.8	
Wire strip length	mm	9	
Max. wire size		solid cable	stranded cable
	mm^2	1x6 / 2x4	1x4 / 2x2.5
	AWG	1x10 / 2x12	1x12 / 2x14

Other data				
Current absorption on Z1 and Z2 (type 72.11)		mA	< 1	
Current absorption on control signal (B1-B3 and B2-B3)			5 mA, 5 V	
Power lost to the environment			**72.01/72.11**	**72.42**
	without contact current	W	1.5	0.9 (1 relay ON)
	with rated current	W	3.2	3.0 (2 relays ON)
Max cable length between electrode and relay (types 72.01/72.11)		m	200 (max. capacitance of 100 nF/km)	

* There is no electrical isolation between electrodes and supply voltage for the 24 V DC types (72.x1.9.024.0000). Therefore, for SELV applications it would be necessary to use a SELV (non-grounded) power supply. In the case of a PELV (grounded) power supply take care to protect the level control relay against harmful circulating currents by ensuring that no electrodes are grounded.
However, there is no such problem for the 24 V AC types (72.x1.8.024.0000) which, by virtue of an internal isolating transformer, assure reinforced isolation between electrodes and supply.

E

Functions for 72.01 and 72.11

U = Supply voltage
B1 = Max level electrode
B2 = Min level electrode
B3 = Common
= Contact 11-14
Z1-Z2 = Link to select emptying (Type 72.11)

LED	Supply voltage	NO output contact	Contacts Open	Contacts Closed
	OFF	Open	11 - 14	11 - 12
	ON	Open	11 - 14	11 - 12
	ON	Open (Timing in Progress)	11 - 14	11 - 12
	ON	Closed	11 - 12	11 - 14

Function and Run-on time

Type 72.01	Type 72.11
FL = Level control by Filling, Long (7sec) run-on delay.	**F** = Level control by Filling, Z1–Z2 open. Run-on time fixed at 1sec.
FS = Level control by Filling, Short (0.5sec) run-on delay.	**E** = Level control by Emptying, Z1–Z2 linked. Run-on time fixed at 1sec.
ES = Level control by Emptying, Short (0.5sec) run-on delay.	
EL = Level control by Emptying, Long (7sec) run-on delay.	

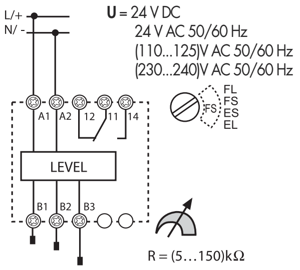
E

Filling functions

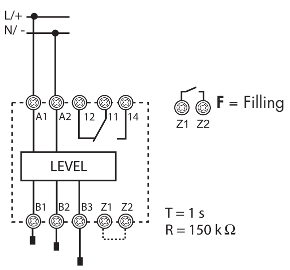
Wiring diagram

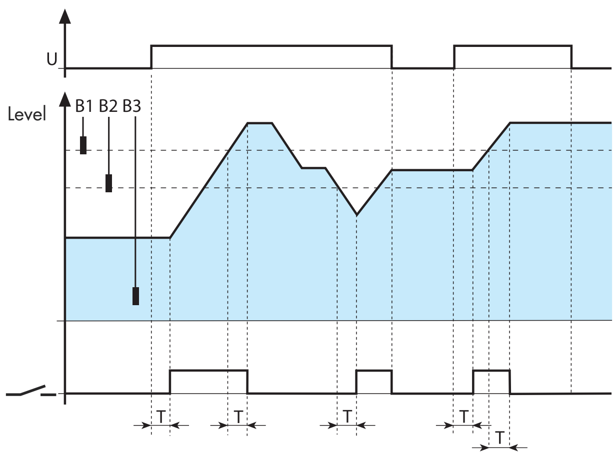
Examples with **3 electrodes**

Type 72.01



Type 72.11





Filling Control – between Min. and Max. levels.
Under normal operation the liquid level can be expected to cycle between the Minimum and the Maximum electrodes, B2 and B1 (plus a degree of over and under-shoot).

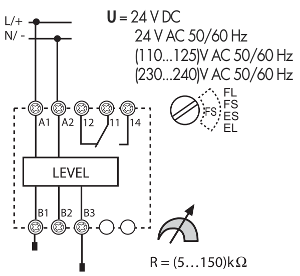
Switch On:
- On "power-up", if the liquid is below B1 the output relay will operate after time T has expired.
- On the liquid level falling below B2, the output relay will operate after time T has expired.

Switch Off:
- On the liquid level reaching electrode B1, the output relay will de-energise after time T has expired.
- On "power-off", the output relay will immediately de-energise.

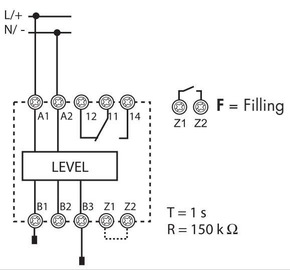
Wiring diagram

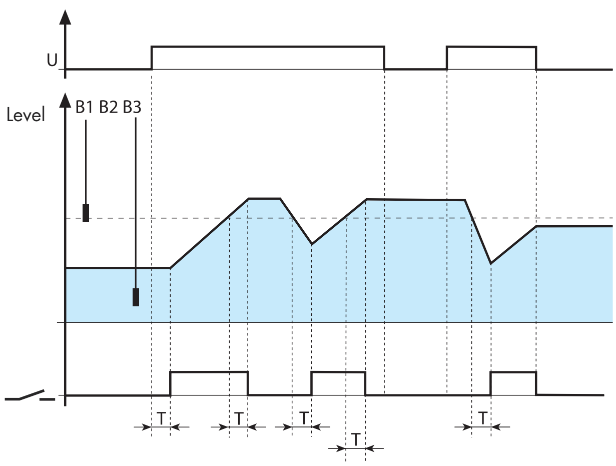
Examples with **2 electrodes**

Type 72.01



Type 72.11





Filling Control – about a single level, B1.
Under normal operation the liquid evel can be expected to cycle about the level set by electrode B1 with a degree of over and under-shoot.

Switch On:
- On "power-up", if the liquid is below B1 the output relay will operate after time T has expired.
- On the liquid level falling below B1, the output relay will operate after time T has expired.

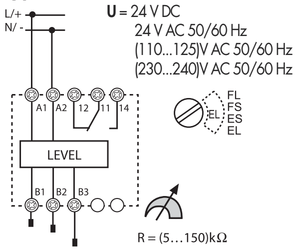
Switch Off:
- On the liquid level reaching electrode B1, the output relay will de-energise after time T has expired.
- On "power-off", the output relay will immediately de-energise.

Emptying functions

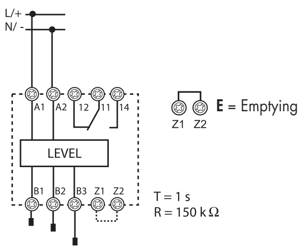
Wiring diagram

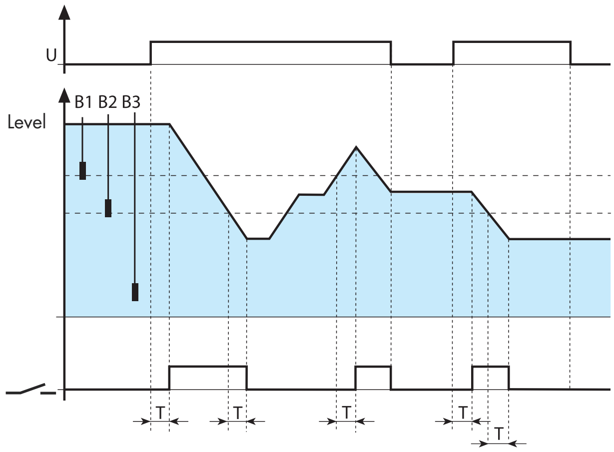
Examples with **3 electrodes**

Type 72.01



Type 72.11





Emptying Control – between Max. and Min. levels.
Under normal operation the liquid level can be expected to cycle between the Maximum and the Minimum electrodes, B1 and B2 (plus a degree of over and under-shoot).

Switch On:
- On "power-up", if the liquid level is above B2 the output relay will operate after time T has expired.
- On the liquid level rising to B1, the output relay will operate after time T has expired.

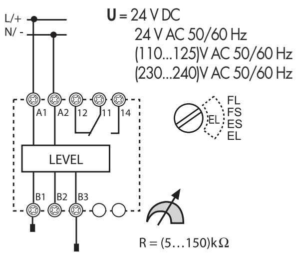
Switch Off:
- On the liquid level falling below electrode B2, the output relay will de-energise after time T has expired.
- On "power-off", the output relay will immediately de-energise.

E

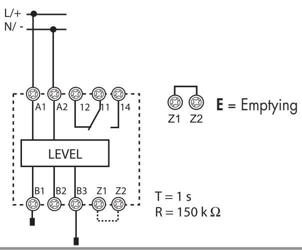
Wiring diagram

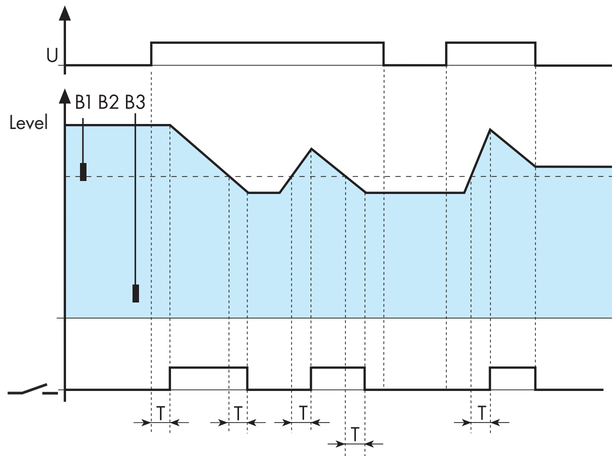
Examples with **2 electrodes**

Type 72.01



Type 72.11





Emptying Control about a single level, B1.
Under normal operation the liquid level can be expected to cycle about the level set by electrode B1 with a degree of over and under-shoot.

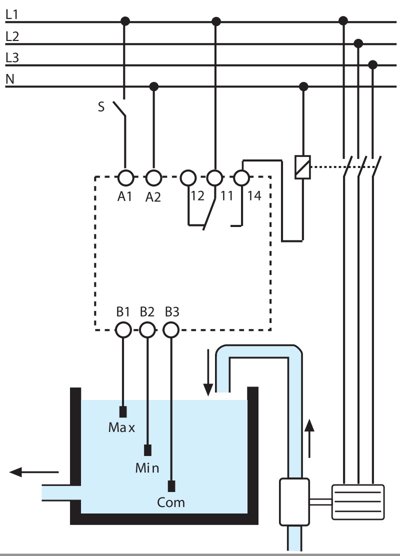
Switch On:
- On "power-up", if the liquid is above B1 the output relay will operate after time T has expired.
- On the liquid level rising to B1, the output relay will operate after time T has expired.

Switch Off:
- On the liquid level falling below electrode B1, the output relay will de-energise after time T has expired.
- On "power-off", the output relay will immediately de-energ

Applications for 72.01 and 72.11

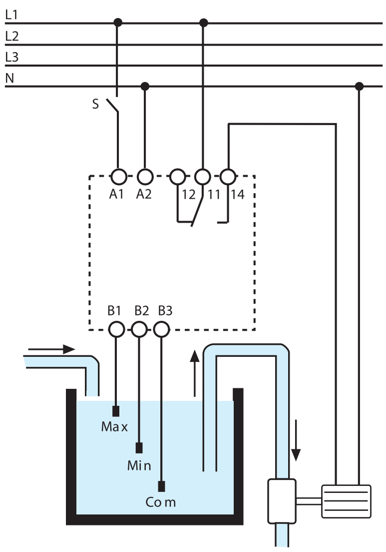
FILLING function:

Examples with 3 electrodes and with a contactor connected to the contact.



EMPTYING function:

Examples with 3 electrodes and with a motor pump connected directly to the contact.



The 72 series level control relays work by measuring the resistance through the liquid, between the common (B3) electrode and Min. and Max. electrodes (B2 and B1). If the tank is metalic, then this can be substituted as the B3 electrode.

Take care to ensure that the liquid has a suitable resistivity – see below:

SUITABLE LIQUIDS
- City water
- Well water
- Rainwater
- Sea water
- Liquids with low-percentage alcohol
- Wine
- Milk, Beer, Coffee
- Sewage
- Liquids fertilizer

UN-SUITABLE LIQUIDS
- Demineralised water
- Fuels
- Oil
- Liquids with high-percentage alcohol
- Liquid gas
- Paraffins
- Ethylene glycol
- Paint

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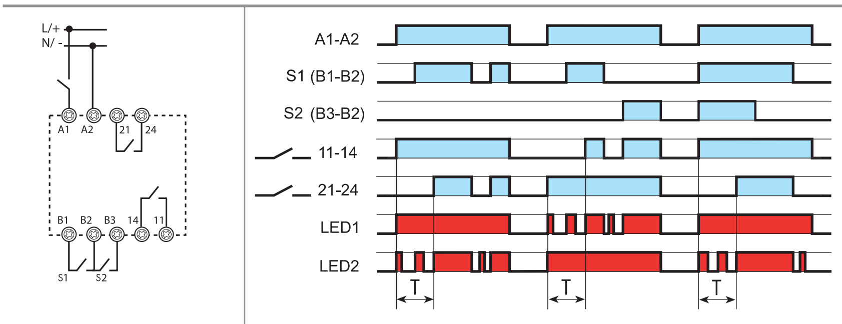
Functions for 72.42

A1-A2 = Supply voltage
S1 (B1-B2) = Control signal 1
S2 (B3-B2) = Control signal 2
= Contact 1 (11-14) and Contact 2 (21-24)
LED 1 = Output 1
LED 2 = Output 2

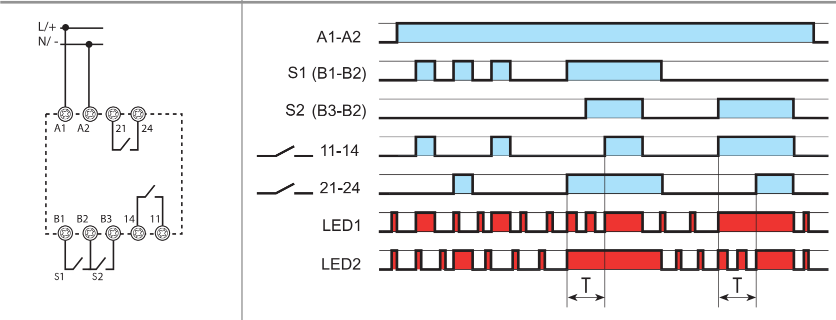
LED	
	Device in stand-by, output not activated
	Output not activated, timing in progress
	Output not activated (only functions M1/M2)
	Output activated

Wiring diagram



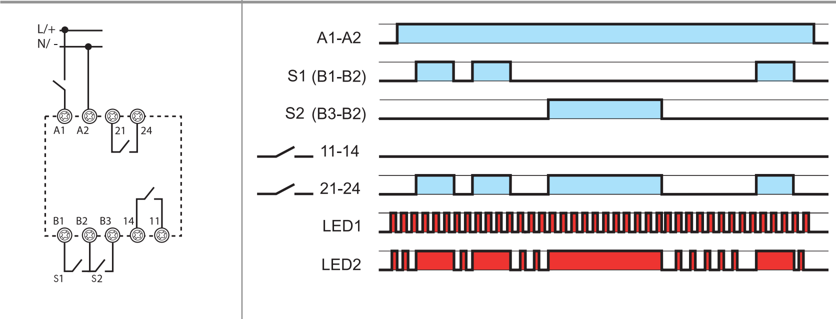
(MI) Outputs alternate on successive applications of supply voltage

- Application of the supply voltage to A1-A2 forces just one output contact to close, but the contact that closes will alternate between 11-14 and 21-24 on each successive application of the supply – ensuring even wear across both motors.
- The other output contact can be forced closed by the closure of either S1 or S2 - but to limit high current surges the other motor cannot start within T seconds of the first motor.



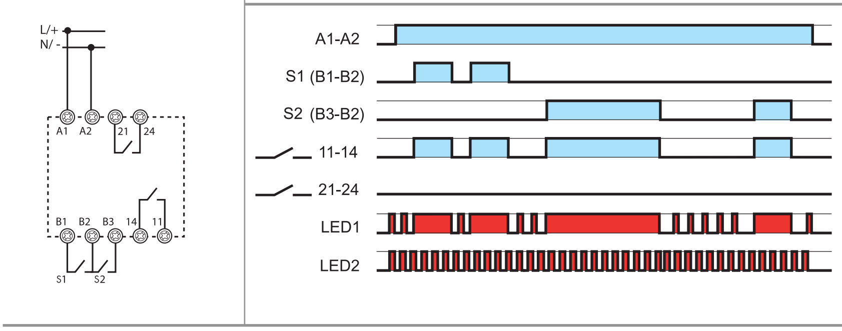
(ME) Outputs alternate according to control signal

- The supply voltage is permanently applied to A1-A2. When closed, S1 forces just one output contact to close. The contact that closes will alternate between 11-14 and 21-24 on each successive S1 closure - ensuring even wear across both motors.
- If closed, S2 forces both output contacts to close (irrespective of S1). However, to limit high current surges, both motors cannot start within T seconds of each other.



(M2) Output 2 (21-24) only

- Supply permanently applied to A1-A2.
- Closure of either S1 or S2 will close output contact 2 (21-24). Use when load 1 (11-14) is out of service.

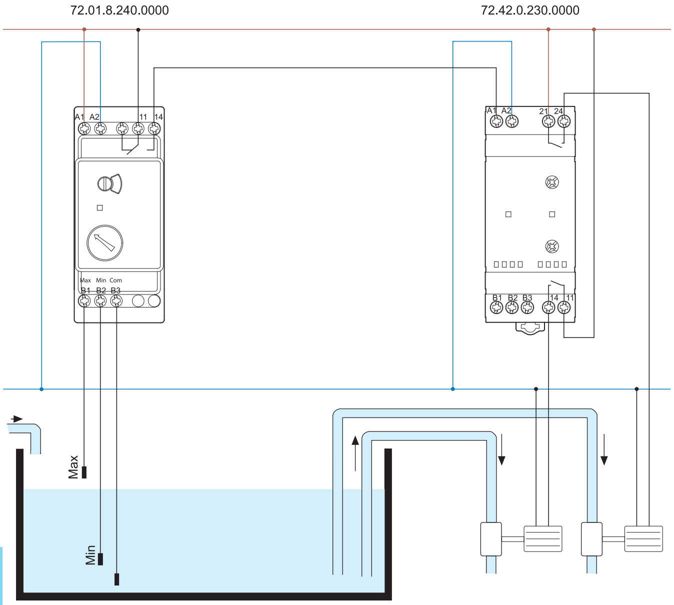


(M1) Output 1 (11-14) only

- Supply permanently applied to A1-A2.
- Closure of either S1 or S2 will close output contact 1 (11-14). Use when load 2 (21-24) is out of service.

E

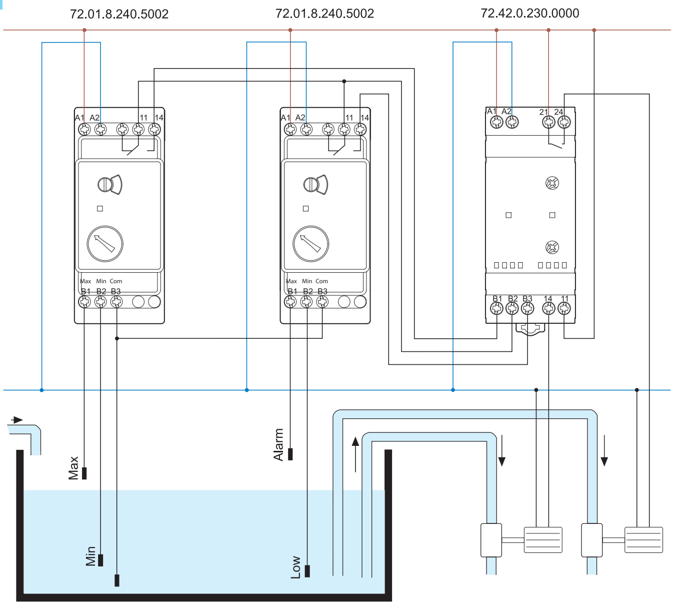
MI function example



This shows the 72.42 Priority change relay working in conjunction with a single 72.01 level controller. Under normal conditions the liquid level is expected to remain within the range shown as Min to Max. In this case the function of the 72.42 will be to alternate the duty between both pumps, to even wear across both pumps. There is no provision to run both pumps simultaneously.

E

ME function example

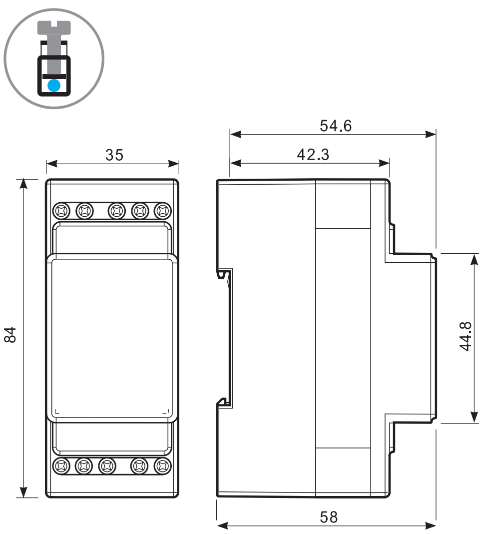


This shows the 72.42 Priority change relay working in conjunction with two 72.01 level controllers. Under normal conditions the liquid level is expected to remain within the range shown as Min to Max. In this case the function of the 72.42 will be to alternate the duty between both pumps, to even wear across both pumps. Should the liquid level rise above the Alarm level then the function of the 72.42 will call for the simultaneous operation of both pumps, by virtue of the signal to terminal B3 from the Alarm/Low level controller.

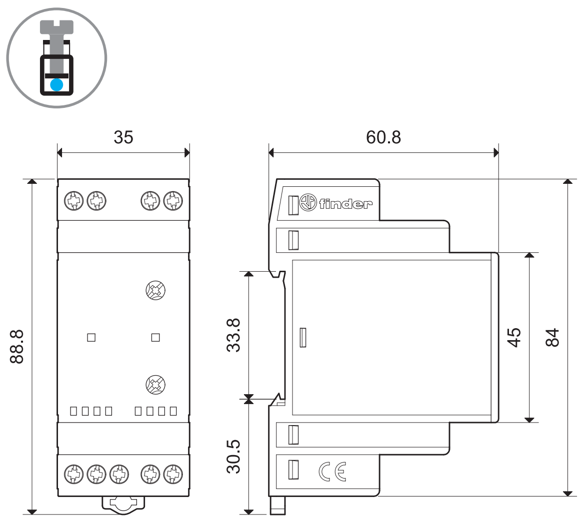
Note: due to the low level of 72.42 control signals, it is suggested to use level controller 72.01.8.240.5002 because of its superior low load switching capability.

Outline drawings

72.01/11
Screw terminal



72.42
Screw terminal



III-2014, www.findernet.com

Accessories for 72.01 and 72.11

072.01.06

072.02.06

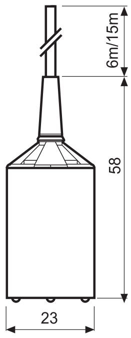
Suspended electrode for conductive liquids, complete with cable. Suitable for level monitoring in wells and reservoirs not under pressure.
Order appropriate number of electrodes - additional to the relay.

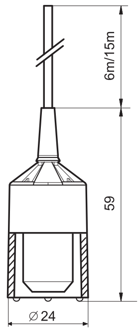
•Electrode compatible with food processing applications (according to European Directive 2002/72 and cod. FDA title 21 part 177):

Cable length: 6 m (1.5 mm²)		072.01.06
Cable length: 15 m (1.5 mm²)		072.01.15

• Electrode for swimming pools with high levels of chlorine, or in salt-water pools with high levels of salinity:

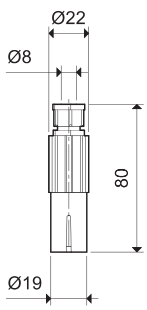
Cable length: 6 m (1.5 mm²)		072.02.06
Technical data		
Max. liquid temperature	°C	+100
Electrode material		stainless steel (AISI 316L)





072.31

Suspended electrode		
Order appropriate number of electrodes additional to the relay.		072.31
Technical data		
Max liquid temperature	°C	+ 80
Cable grip	mm	Ø ≤ 3...6
Electrode material		stainless steel (AISI 316L)
Max screw torque	Nm	0.7
Max. wire size	mm^2	1 x 2.5
	AWG	1 x 14
Wire strip length	mm	9

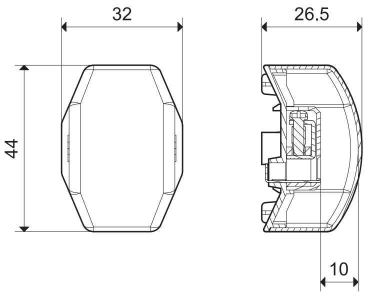


E

Accessories for 72.01 and 72.11

072.11

Floor water sensor, designed for the detection and reporting of the presence of floor surface water.			072.11
Technical data			
Electrode material		stainless steel (AISI 301)	
Wire capability of terminals			
Max screw torque	Nm	0.8	
Max. wire size		solid cable	stranded cable
	mm²	1 x 6 / 2 x 6	1 x 6 / 2 x 4
	AWG	1 x 10 / 2 x 10	1 x 10 / 2 x 12
Wire strip length	mm	9	
Other data			
Distance between electrodes and floor	mm	1	
Floor fixing screw diameter		Maximum M5	
Maximum cable diameter	mm	10	
Maximum length of cable connecting sensor to relay	m	200 (with capacitance of 100 nF/km)	
Max. liquid temperature	°C	+100	

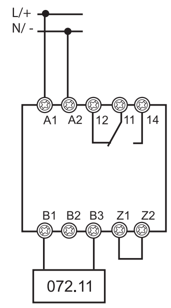


REGISTERED COMMUNITY DESIGN

Floor surface water sensor for connection to electrode terminals (B1 and B3) of 72.01 or 72.11 level control relay, set in Emptying function (ES or E respectively).

For ice bank control in refrigeration systems it is suggested to use the high sensitivity (5...450kOhm) types - 72.01.8.024.0002 or 72.01.8.230.0002.

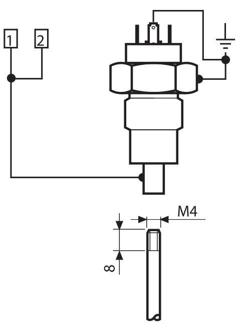
Function

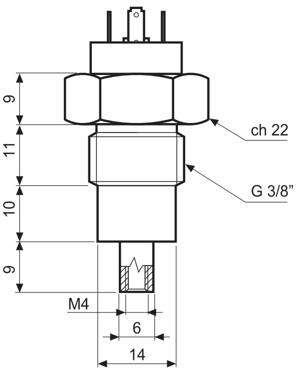


Z1, Z2 only for types 72.11

072.51

Electrode holder with two pole connector, one connected directly to the electrode and the second connected to the grounded installation thread. Suitable for metal tank with G3/8" linkage. Electrode not incuded. Order appropriate number of electrodes holders - additional to the relay.		072.51
Technical data		
Max liquid temperature	°C	+ 100
Max tank pressure	bar	12
Cable grip	mm	Ø ≤ 6
Electrode material		stainless steel (AISI 304)

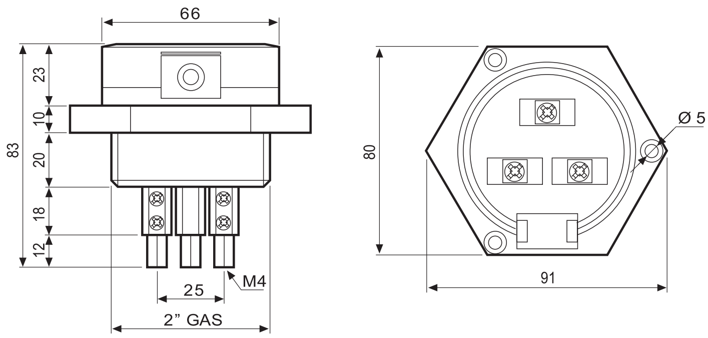




Accessories for 72.01 and 72.11

072.53

Electrode holder with three poles. Electrode not incuded. Order appropriate number of electrodes holders - additional to the relay.	072.53
Technical data	
Max liquid temperature °C	+ 130
Electrode material	stainless steel (AISI 303)



072.500

Electrode and electrode connector, multiple electrodes may be interconneced to provide required length	
Technical data	
Electrode - 500 mm long, M4 thread, stainless steel (AISI 303)	072.500
Inter-electrode connector - M4 thread, stainless steel (AISI 303)	072.501

E

Illustration of interconnection of electrodes.

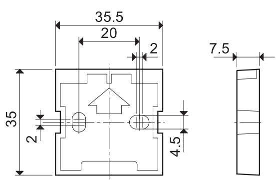
072.501

072.503

Electrode separator	072.503

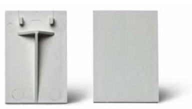
011.01

Adaptor for panel mounting, plastic, 35 mm wide	011.01



060.72

Sheet of marker tags, plastic, 72 tags, 6 x 12 mm (for 72.42 only)	060.72



019.01

Identification tag, plastic, 1 tag, 17 x 25.5 mm (for 72.42 only)	019.01

Application notes for 72.01 and 72.11

Applications
The main application for these relays is for the sensing and control of the level of conductive liquids.
Selectable options allow for this control to be achieved either through a filling operation or through an emptying operation, and in either case "positive logic" is used.
Level control can be achieved around a single level – using 2 electrodes, or between Minimum and Maximum levels – using 3 electrodes.
Additionally, the 72.01, with its adjustable sensitivity setting, can be ideal for monitoring the conductivity of liquids.

Positive safety logic
These relays work according to the principle that it is the closure of a normally open output contact that will be used to control the pump, both in filling and emptying applications. Consequently, in the event of a failure of the supply local to the relay, the filling or emptying will cease. This is generally considered to be the safest option.

Overrunning of tank on filling
Care must be exercised to ensure that the tank cannot overrun. Factors that have to be considered are the pump performance, the rate of discharge from the tank, the position of the single level electrode (or maximum electrode), and the run-on time delay. Keeping the time delay to a minimum will minimise the possibility of tank overrun, but will increase the installed switching rate.

Prevent dry running of pump on emptying
Care must be exercised to ensure that the pump cannot run dry. Similar considerations must be given as outlined above. In particular, keeping the run-on time delay to a minimum will minimise the risk, but again, it will increase the installed switching rate.

Run-on time
In commercial and light industrial applications the use of a short Run-on time delay is more appropriate, due to the relatively small size of tanks and the consequential need to react quickly to the change in level. Larger scale industrial applications involving larger tanks and powerful pumps must avoid a frequent switching cycle, and the use of the 72.01 set for the longer Run-on time of 7 seconds is suggested.
Note that the short run-on time will always achieve closer control to the desired level(s), but at the cost of more frequent switching.

Electrical life of the output contact
The electrical life of the output contact will be enhanced where a larger distance between the Max. and Min. electrodes (3-electrode control) can be realised. A smaller distance, or level control to a single level (2-electrode control), will result in more frequent switching and therefore a shorter electrical life for the contacts. Similarly, the long run-on time will enhance, and the short time will reduce, electrical life.

Pump control
Small single-phase pumps within the kW (0.55 kW - 230 V AC) rating stated may be driven directly by the level relay output contact. However, where very frequent switching is envisaged, it is better to "slave" a higher power relay or contactor to drive the pump motor. Large pumps (single-phase and three-phase) will of course require an interposing contactor.

Water leakage and condensation in oil lubrication systems
To detect condensed water vapour or water leakage within lubricating systems, monitor by sensors connected to B1 - B3 (Function E or ES, Z1 - Z2 linked). Condensed water vapour has low conductivity, therefore choose monitoring relay type 72.01.8.240.0002 with sensitivity range of (5...450) kOhm and sensor type 072.11.

Floor flooding control
To detect floor water due to spills or flooding, monitor using sensors connected to B1 - B3 (Function E or ES, Z1 - Z2 linked).
Choose monitoring relay type 72.01.8.240.0000 or 72.11.8.240.0000, together with floor water sensor type 072.11.

Electrodes and cable lengths
Normally 2 electrodes or 3 electrodes will be required for control about a single level, or control between Min. and Max. levels, respectively. However, if the tank is made of conductive material it is possible to use this as the common electrode, B3, if electrical connection can be made to it.
The maximum permitted length of cable between the electrode and the relays is 200m, for a cable not exceeding 100nF/km.
A maximum of 2 relays and associated electrodes can be employed in the same tank – if two different levels need monitoring.
Note: It is permitted to make direct electrical connection between terminals B1-B3, and B2-B3, (without using electrodes/liquid), but in this case it is not possible to set up the sensitivity.

Electrode choice
The choice of electrodes may depend on the liquid being monitored. Standard electrodes 072.01.06 and 072.51 are suitable for many applications but some liquids may be corrosive for example, and may therefore require custom made electrodes - but these can usually be used with the 72.01 and 72.11 relays.

On site commissioning
To confirm the suitability of the relay sensitivity to the resistance between electrodes it is suggested that the following checks are made. For convenience it is suggested that the fill function and the shortest run-on time are selected.

Commissioning
Follow these setting-up instructions to achieve correct operation:
72.01
Select the function "FS" (Filling and Short delay of 0.5 s), and set the sensitivity control to 5 kΩ. Ensure that all electrodes are immersed in the liquid - expect the output relay to be ON. Then, slowly rotate the sensitivity control in the 150 kΩ direction until the level relay switches OFF (internal output relay will switch OFF and red LED will switch slowly flash).
(If the level relay does not switch OFF then, either the electrodes are not immersed, or the liquid has too high impedance or the distance between electrodes is too long).
Finally, select the filling or emptying function as required, run in real time and confirm that the level relay works as required.
72.11
Select the Filling function "F", (Z1 – Z2 open). Ensure that all electrodes are immersed in the liquid, but leave electrode B3 disconnected – output relay should be ON. Connect electrode B3, and the level relay should switch OFF
(internal output relay will switch OFF and red LED will switch slowly flash).
(If the level relay does not switch OFF then, either the electrodes are not immersed, or the liquid has too high impedance or the distance between electrodes is too long.)
Finally, select the filling or emptying function as required, run in real time and confirm that the level relay works as required.

E

72 Series - Float switch

Features

Float switch suitable for level regulation in grey or black water systems, drainage plants and pump systems

- 1 CO 20 A (8 A) 250 V AC
- 2 or 3 watertight chambers
- Cable length 5m, 10m, 15m or 20m
- Suitable for emptying and filling

NEW 72.A1.0000.xxxx

- Float switch with 2 watertight chambers, for plumbing pumps and grey water systems
- Counterweight (300gr) with cable grip, included

NEW 72.B1.0000.xxxx

- Float switch with 3 watertight chambers, for dirty water systems, drainage plants and pumping stations
- Supplied with fixing kit

* H07 RN F cable approved TÜV

For outline drawing see page 4

Technical data		72.A1.0000.xxxx	72.B1.0000.xxxx
Contact configuration		1 CO	1 CO
Rated current	A	20 A (8 A)	20 A (8 A)
Rated voltage	V AC	250	250
Breaking capacity DC1		6 A - 30 V DC	6 A - 30 V DC
Protection degree		IP 68	IP 68
Max liquid temperature	°C	+60	+60
Max depth	m	40	20
Cable material		PVC – H07 RN F*	PVC – H07 RN F*
Body material		Polypropylene	Polypropylene
Approvals (according to type)		CE EAC	

E

I-2015, www.findernet.com

Ordering information

Example: 72 Series, float switch, 1 CO.

7 2	.	A	1	.	0 0 0 0	.	0 5	0 0

Series

Type
A = Float switch for grey water systems
B = Float switch for black water systems

No. of pole
1 = 1 CO

Cable
00 = PVC
01 = H07 RN F

Cable length
05 = 5 meters
10 = 10 meters
15 = 15 meters
20 = 20 meters

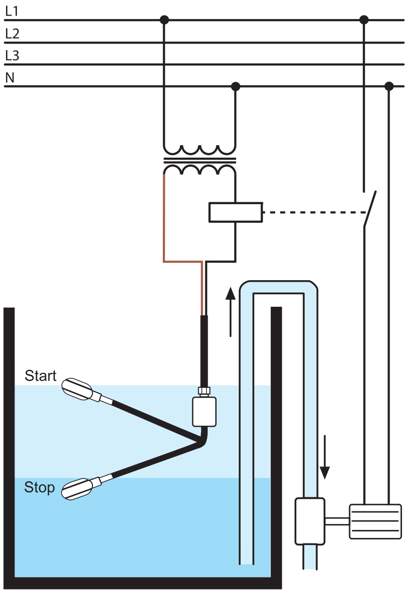
Codes
72.A1.0.000.0500
72.A1.0.000.0501
72.A1.0.000.1000
72.B1.0.000.1000
72.B1.0.000.1001
72.B1.0.000.1500
72.B1.0.000.1501
72.B1.0.000.2001

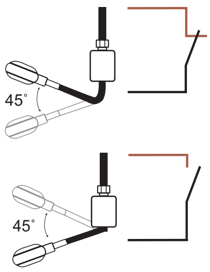
E

Applications

Type 72.A1

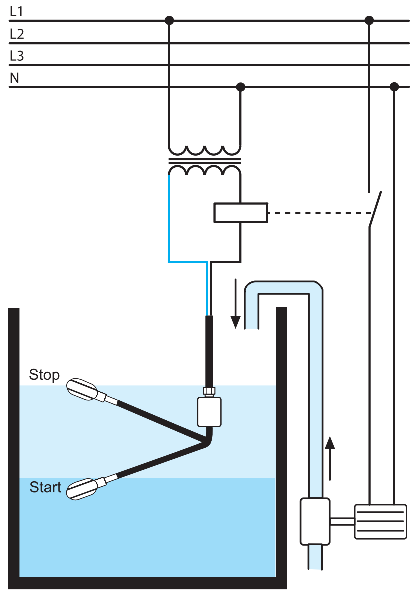
Emptying function

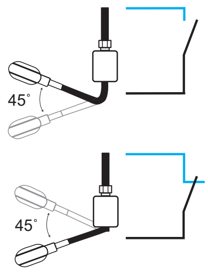




When black and brown wires are used, the circuit opens when the float is down and closes when the float in up.
In this case the blue/grey wire must be insulated.

Filling function

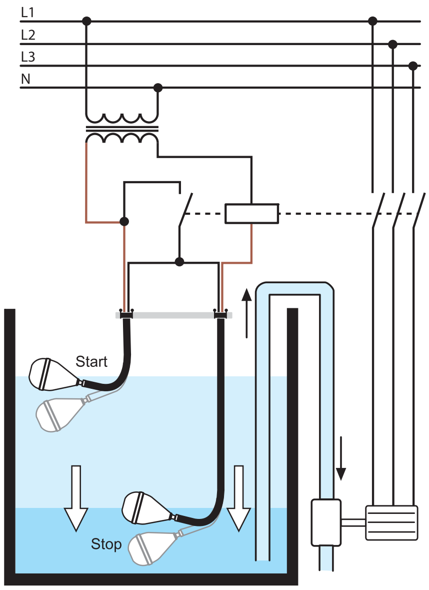


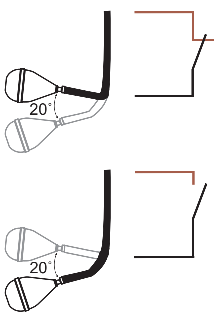


When black and blue/grey wires are used, the circuit opens when the float is up and closes when the float in down.
In this case the brown wire must be insulated.

Type 72.B1

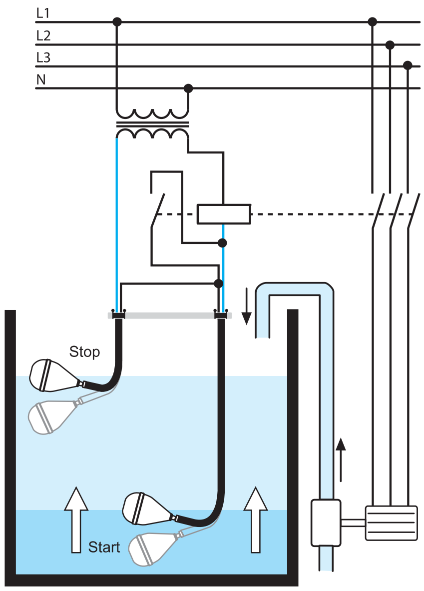
Emptying function

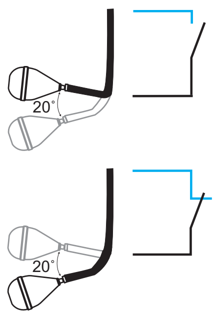




When black and brown wires are used, the circuit opens when the float is down and closes when the float in up.
In this case the blue/grey wire must be insulated.

Filling function



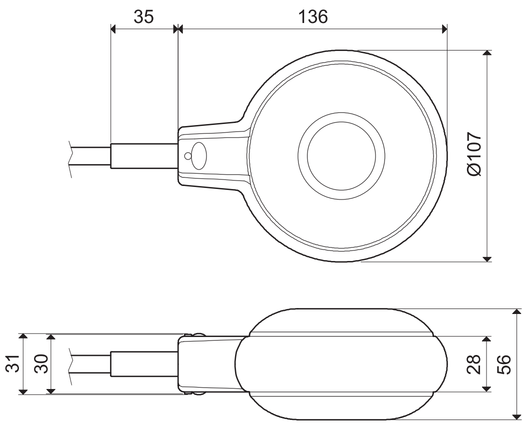


When black and blue/grey wires are used, the circuit opens when the float is up and closes when the float in down.
In this case the brown wire must be insulated.

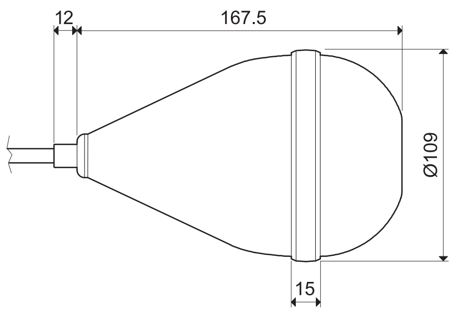
E

Outline drawings

Type 72.A1



Type 72.B1



Features

kWh Energy meter
1-phase with multi-functional LCD display

Type 7E.23 5(32)A - 1 module wide

- Complies with EN 62053-21 and EN 50470
- Display indicates total energy consumption, partial energy consumption (this value is resettable), instantaneous: power, voltage and current
- Seven digit counter, LCD with backlight
- Accuracy class: 1/B
- Easy to operate by one control key
- Protection class II
- Pulse output for remote energy management; SO interface (open collector) according to DIN 43864 to link the energy meter to a centrally located monitoring/management system
- Tamper-proof cover with lead seal facility available as an accessory
- Space saving small size
- 35 mm rail (EN 60715) mount
- MID compliant version (50 Hz only) available

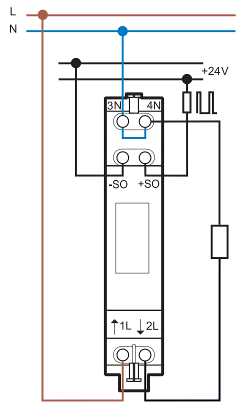
* 0.01 kWh for readings ≤ 99,999.99 kWh and 0.1 kWh for readings ≥ 100,000.0 kWh

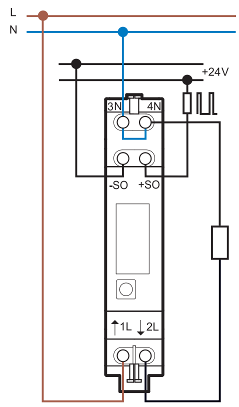
NEW **7E.23.8.230.0001**

- Nominal current 5 A (32 A Maximum)
- 1-phase 230 V AC
- kWh only
- 17.5 mm wide

7E.23.8.230.00x0

- Nominal current 5 A (32 A Maximum)
- 1-phase 230 V AC
- kWh + instantaneous W, V & A
- 17.5 mm wide





For outline drawing see page 17

		7E.23.8.230.0001	7E.23.8.230.00x0
Specification			
Nominal/Maximum current	A	5/32	5/32
Minimum measured current	A	0.02	0.02
Current range (within accuracy class)	A	0.25...32	0.25...32
Maximum peak current	A	960 (10 ms)	960 (10 ms)
Supply (& monitored) voltage (U_N)	V AC	230	230
Operating range		(0.8...1.15)U_N	(0.8...1.15)U_N
Frequency	Hz	50	50
Power consumption	W	< 0.4	< 0.4
Display (digit height 5 mm)		Seven digit counter, LCD without backlight	Seven digit counter, LCD with backlight
Max. totalising count/Min. increment	kWh	999,999.9/0.01 *	999,999.9/0.01 *
LCD-segment pulses per kWh		2,000	2,000
Open collector- output specification (SO+/SO–)			
Voltage (external supply)	V DC	5...30	5...30
Maximum current	mA	20	20
Maximum leakage current @30 V/25 °C	μA	10	10
Pulses per kWh		1,000	1,000
Pulse length	ms	30	30
Internal series resistance	Ω	100	100
Maximum Cable length @30 V/20 mA	m	1,000	1,000
Technical data			
Accuracy class		1 / B	1 / B
Ambient temperature (Within accuracy class)	°C	–10...+55	–25...+55
Protective class		II	II
Protection category: Housing/terminals		IP 50/IP 20	IP 50/IP 20
Approvals (according to type)		CE	

Features

kWh Energy meter
3-phase with multi-functional LCD display

Type 7E.46-0002 10(65)A - Single and Dual tariff
Type 7E.56-0000 5 (6)A - for current transformers up to 1,500 A

- Complies with EN 62053-21 and EN 50470
- Display indicates total energy consumption, partial energy consumption (this value is resettable), instantaneous power per phase or all phases, voltage per phase, current per phase
- ERROR-Display, in case of missing phase or reverse current flow
- Seven digit counter, LCD with backlight
- Accuracy class: 1/B
- Easy to operate by two control keys
- LCD display can be read twice within a period of 10 days following the loss of supply voltage
- Protection class II
- Pulse output for remote energy management; SO interface (open collector) according to DIN 43864 to link the energy meter to a centrally located monitoring/management system
- Tamper-proof cover with lead seal facility available as an accessory
- 35 mm rail (EN 60715) mount
- MID compliant version (50 Hz only) available

E

* Current transformer ratios: 5:5, 50:5, 100:5, 150:5, 200:5, 250:5, 300:5, 400:5, 500:5, 600:5, 750:5, 1,000:5, 1,250:5, 1,500:5.

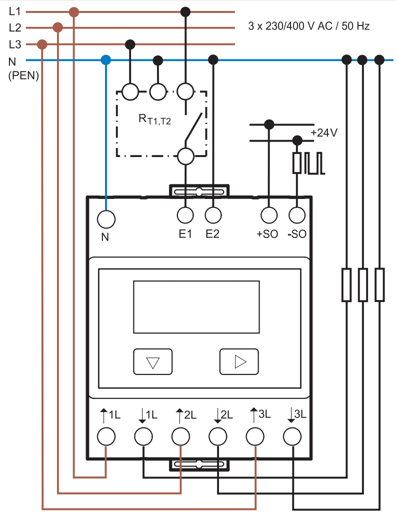
** 0.01 kWh for readings ≤ 99,999.99 kWh and 0.1 kWh for readings ≥ 100,000.0 kWh

*** 0.1 kWh for readings ≤ 999,999.9 kWh and 1 kWh for readings ≥ 1,000,000 kWh

For outline drawing see page 17

7E.46.8.400.00x2

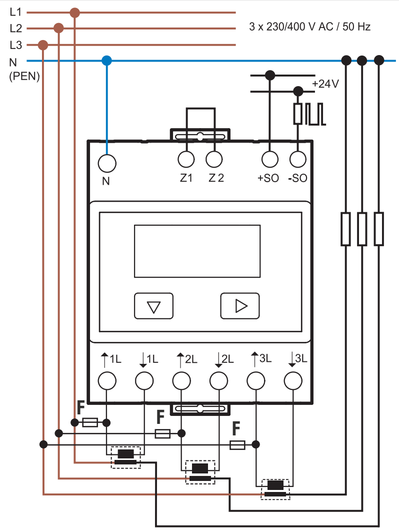
- Nominal current 10 A (65 A Maximum)
- 3-phase
- Single and Dual tariff (Day and Night)
- 70 mm wide



$R_{T1,T2}$ = Tariff switching equipment

7E.56.8.400.00x0

- Nominal current 5 A (6 A Maximum)
- 3-phase
- Usable with current transformer up to 1,500 A
- 14 selectable Current Transformer ratios*
- 70 mm wide



* Current transformer ratios / **F** = 250 mA T

		7E.46.8.400.00x2	7E.56.8.400.00x0
Specification			
Nominal/Maximum current	A	10/65	5/6
Minimum measured current	A	0.04	0.01
Current range (within accuracy class)	A	0.5…65	0.05…6
Maximum peak current	A	1,950 (10 ms)	180 (10 ms)
Supply (& monitored) voltage (U_N)	V AC	3 x 230	3 x 230
Operating range		$(0.8…1.15)U_N$	$(0.8…1.15)U_N$
Frequency	Hz	50	50
Power consumption per phase	W	< 1.5	< 1.5
Display (digit height 6 mm)		Seven digit counter, LCD with backlight	
Max. totalising count/Min. increment	kWh	999,999.9/0.01 **	9,999,999/0.1 ***
LCD-segment pulses per kWh		100	10
Open collector- output specification (SO+/SO–)			
Voltage (external supply)	V DC	5…30	5…30
Maximum current	mA	20	20
Maximum leakage current @30 V/25 °C	μA	10	10
Pulses per kWh		1,000	10
Pulse length	ms	30	30
Internal series resistance	Ω	100	100
Maximum Cable length @30 V/20 mA	m	1,000	1,000
Technical data			
Accuracy class		1 / B	1 / B
Ambient temperature	°C	–25…+55 °C	–25…+55 °C
Protective class		II	II
Protection category: Housing/terminals		IP 50/IP 20	IP 50/IP 20
Approvals (according to type)		CE	

Features

kWh Energy meter
1-phase with electro-mechanical display

Type 7E.12 10(25)A - 2 module wide
Type 7E.13 5(32)A - 1 module wide
Type 7E.16 10(65)A - 2 module wide

- Complies with EN 62053-21 and prEN 50470
- Certified by PTB (Physikalisch - Technischen Bundesanstalt)
- Accuracy class 1 / B
- Protection class II
- Pulse output for remote energy management; SO interface (open collector) according to DIN 43864 to link the energy meter to a centrally located monitoring/management system
- Tamper-proof cover with lead seal facility available as an accessory
- Space saving small size
- 35 mm rail (EN 60715) mount
- MID compliant version (50 Hz only) available

7E.12.8.230.0002

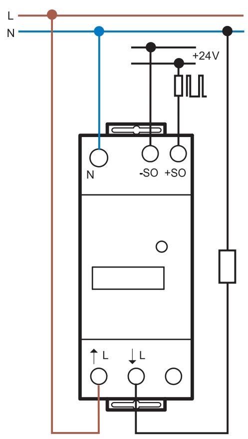
- Nominal current 10 A (25 A Maximum)
- 1-phase 230 V AC
- 35 mm wide

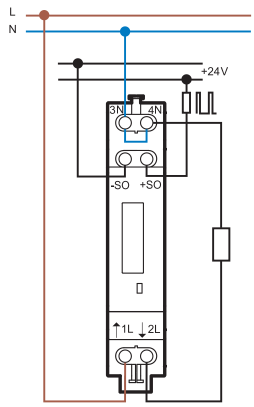
7E.13.8.230.00x0

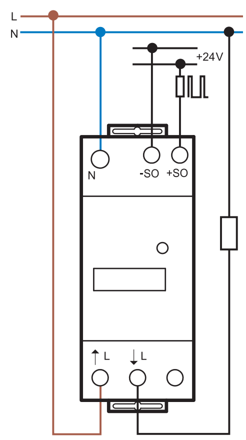
- Nominal current 5 A (32 A Maximum)
- 1-phase 230 V AC
- 17.5 mm wide

7E.16.8.230.00x0

- Nominal current 10 A (65 A Maximum)
- 1-phase 230 V AC
- 35 mm wide







For outline drawing see page 17

Specification		7E.12.8.230.0002	7E.13.8.230.00x0	7E.16.8.230.00x0
Nominal/Maximum current	A	10/25	5/32	10/65
Minimum measured current	A	0.04	0.02	0.04
Current range (within accuracy class)	A	0.5…25	0.25…32	0.5…65
Maximum peak current	A	750 (10 ms)	960 (10 ms)	1,950 (10 ms)
Supply (& monitored) voltage (U_N)	V AC	230	230	230
Operating range		$(0.8…1.15)U_N$	$(0.8…1.15)U_N$	$(0.8…1.15)U_N$
Frequency	Hz	50	50	50
Power consumption	W	< 0.5	< 0.4	< 0.5
Display (digit height 4 mm)		Six digit counter, red decimal digit	Seven digit counter, red decimal digit	
Max. totalising count/Min. increment	kWh	99,999.9/0.1	999,999.9/0.1	999,999.9/0.1
LED-Pulses per kWh		2,000	2,000	1,000
Open collector- output specification (SO+/SO–)				
Voltage (external supply)	V DC	5…30	5…30	5…30
Maximum current	mA	20	20	20
Maximum leakage current @30 V/25 °C	μA	10	10	10
Pulses per kWh		1,000	1,000	1,000
Pulse length	ms	50	50	50
Internal series resistance	Ω	100	100	100
Maximum Cable length @30 V/20 mA	m	1,000	1,000	1,000
Technical data				
Accuracy class		1 / B	1 / B	1 / B
Ambient temperature (Within accuracy class)	°C	–10…+55	–10…+55	–10…+55
Protective class		II	II	II
Protection category: Housing/terminals		IP 50/IP 20	IP 50/IP 20	IP 50/IP 20
Approvals (according to type)		CE	CE PTB	

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Features

kWh Energy meter
3-phase with electro-mechanical display

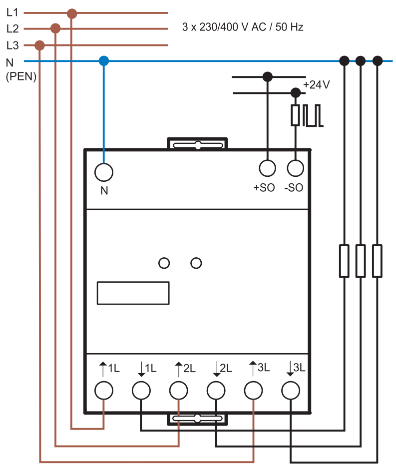
Type 7E.36-0000 10(65)A - Single tariff
Type 7E.36-0002 10(65)A - Dual tariff

- Complies with EN 62053-21 and prEN 50470
- Certified by PTB (Physikalisch - Technischen Bundesanstalt)
- Accuracy class 1 / B
- Protection class II
- Pulse output for remote energy management; SO interface (open collector) according to DIN 43864 to link the energy meter to a centrally located monitoring/management system
- Tamper-proof cover with lead seal facility available as an accessory
- 35 mm rail (EN 60715) mount
- MID compliant version (50 Hz only) available

E

7E.36.8.400.00x0

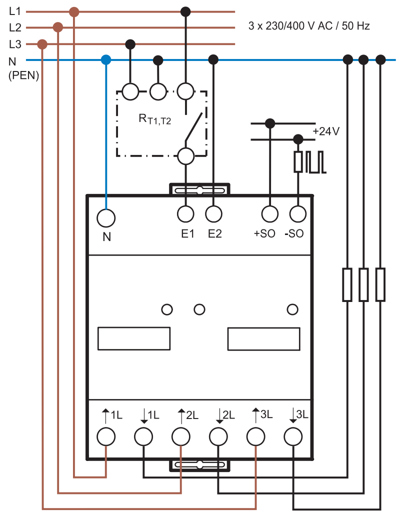
- Nominal current 10 A (65 A Maximum)
- 3-phase
- 70 mm wide



7E.36.8.400.00x2

- Nominal current 10 A (65 A Maximum)
- 3-phase
- Dual tariff (Day and Night)
- 70 mm wide

$R_{T1,T2}$ = Tariff switching equipment



For outline drawing see page 17

		7E.36.8.400.00x0	7E.36.8.400.00x2
Specification			
Nominal/Maximum current	A	10/65	10/65
Minimum measured current	A	0.04	0.04
Current range (within accuracy class)	A	0.5…65	0.5…65
Maximum peak current	A	1,950 (10 ms)	1,950 (10 ms)
Supply (& monitored) voltage (U_N)	V AC	3 x 230	3 x 230
Operating range		(0.8…1.15)U_N	(0.8…1.15)U_N
Frequency	Hz	50	50
Power consumption per phase	W	< 1.5	< 1.5
Display (digit height 4 mm)		Seven digit counter, red decimal digit	
Max. totalising count/Min. increment	kWh	999,999.9/0.1	999,999.9/0.1
LED-Pulses per kWh		100	100
Open collector- output specification (SO+/SO–)			
Voltage (external supply)	V DC	5…30	5…30
Maximum current	mA	20	20
Maximum leakage current @30 V/25 °C	µA	10	10
Pulses per kWh		100	100
Pulse length	ms	50	50
Internal series resistance	Ω	100	100
Maximum Cable length @30 V/20 mA	m	1,000	1,000
Technical data			
Accuracy class		1 / B	1 / B
Ambient temperature	°C	–10…+55	–10…+55
Protective class		II	II
Protection category: Housing/terminals		IP 50/IP 20	IP 50/IP 20
Approvals (according to type)		CE PTB	

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Features

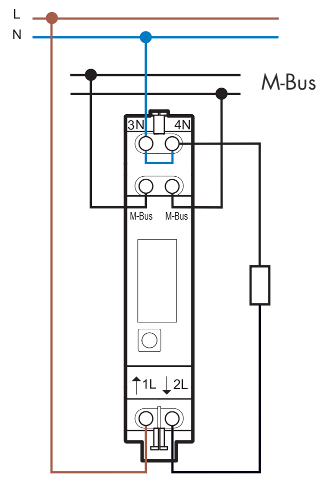
Multifunction energy meter MID certified with M-Bus integrated interface and backlit display for single-phase AC systems

- Complies with EN 62053-21 and EN 50470-3
- Display indicates total energy consumption, partial energy consumption (this value is resettable); active power, instantaneous voltage and current and reactive power via M-bus interface
- Seven digit counter, LCD with backlight
- Consumption data stored on internal EEprom
- Data transfer speed detected automatically
- Parallel connection of up to 250 energy meters
- Accuracy: Class 1 according to IEC 62053-21
  Class B according to EN 50470-3
- Reading data via a dedicated control button
- Protection class II
- Accessories: Tamper-proof cover with lead seal facility
- Space saving small size
- 35 mm rail (EN 60715) mount

* 0.01 kWh for readings ≤ 99,999.99 kWh and 0.1 kWh for readings ≥ 100,000.0 kWh
**The baud rate is recognized automatically

NEW **7E.23.8.230.0030**

- Nominal current 5 A (32 A Maximum)
- M-Bus integrated interface
- 1-phase 230 V 50 Hz
- 17.5 mm wide



For outline drawing see page 17

Specification		
Nominal/Maximum current	A	5/32
Minimum measured current	A	0.02
Current range (within accuracy class)	A	0.25…32
Maximum peak current	A	960 (10 ms)
Supply (& monitored) voltage (U_N)	V AC	230
Operating range		(0.8…1.15)U_N
Frequency	Hz	50
Power consumption per phase	W	< 0.4
Display (digit height 5 mm)		Seven digit counter, LCD with backlight
Max. totalising count/Min. increment	kWh	999,999.9/0,01 *
LED-Pulses per kWh		2,000
M-bus technical data		
Bus System		M-Bus
Bus Protocol		Conforms to M-bus standard
Max. M-Bus energy meters connectable		250
Baud rate**	Baud	300 - 2400 - 9600
Max reaction time (writing)	ms	60
Max reaction write (reading)	ms	60
Technical data		
Accuracy class		1 / B
Ambient temperature	°C	–25…+55
Protective class		II
Protection category: Housing/terminals		IP 50/IP 20
Approvals (according to type)		CE

Features

Multifunction energy meter MID certified with M-Bus integrated interface and backlit display for three-phase AC systems

Type 7E.46-0032 10(65)A - Dual tariff
Type 7E.56-0030 5 (6)A - for current transformers up to 1,500 A

- Complies with EN 62053-21 and EN 50470-3
- Display indicates total energy consumption, partial energy consumption (this value is resettable); active power, instantaneous voltage and current and reactive power via M-bus interface (total or for each phase)
- ERROR-Display, in case of missing phase or reverse current flow
- Seven digit counter, LCD with backlight
- Consumption data stored on internal EEprom
- Data transfer speed detected automatically
- Parallel connection of up to 250 energy meters
- Accuracy: Class 1 according to IEC 62053-21
  Class B according to EN 50470-3
- Reading data via a dedicated control button
- Protection class II
- Accessories: Tamper-proof cover with lead seal facility
- 35 mm rail (EN 60715) mount

E

* Current transformer ratios: 5:5, 50:5, 100:5, 150:5, 200:5, 250:5, 300:5, 400:5, 500:5, 600:5, 750:5, 1.000:5, 1.250:5, 1.500:5; preset at the factory: 5:5

** 0.01 kWh for readings ≤ 99,999.99 kWh and 0.1 kWh for readings ≥ 100,000.0 kWh

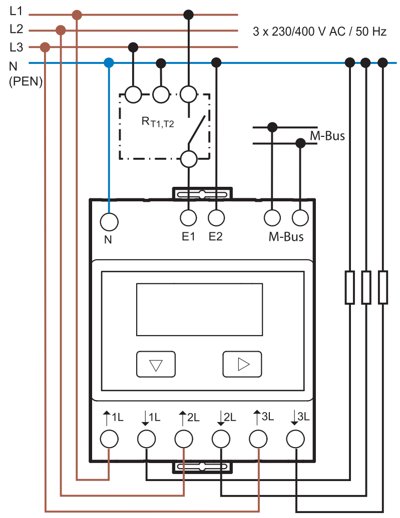
*** 0.1 kWh for readings ≤ 999,999.9 kWh and 1 kWh for readings ≥ 1,000,000 kWh

**** The baud rate is recognized automatically

For outline drawing see page 17

NEW 7E.46.8.400.0032

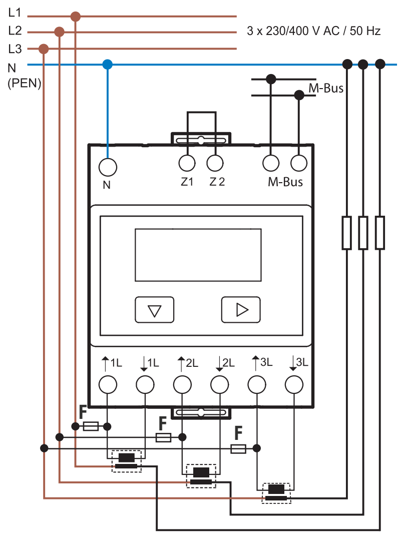
- Nominal current 10 A (65 A Maximum)
- M-Bus integrated interface
- 3-phase
- Dual tariff (Day and Night)
- 70 mm wide



$R_{T1,T2}$ = Tariff switching equipment

NEW 7E.56.8.400.0030

- Nominal current 5 A (6 A Maximum)
- M-Bus integrated interface
- 3-phase
- Usable with current transformer up to 1,500 A
- 14 selectable Current Transformer ratios*
- 70 mm wide



* Current transformer ratios / **F** = 250 mA T

		7E.46.8.400.0032	7E.56.8.400.0030
Specification			
Nominal/Maximum current	A	10/65	5/6
Minimum measured current	A	0.04	0.01
Current range (within accuracy class)	A	0.5…65	0.05…6
Maximum peak current	A	1,950 (10 ms)	180 (10 ms)
Supply (& monitored) voltage (U_N)	V AC	3 x 230	3 x 230
Operating range		(0.8…1.15)U_N	(0.8…1.15)U_N
Frequency	Hz	50	50
Power consumption per phase	W	< 1.5	< 1.5
Display (digit height 5 mm)		Seven digit counter, LCD with backlight	
Max. totalising count/Min. increment	kWh	999,999.9/0,01 **	9,999.999/0,1 ***
LED- Pulses per kWh		1,000	10
Bus System			
Bus System		M-Bus	M-Bus
Bus Protocol		Conforms to M-bus standard	Conforms to M-bus standard
Max. M-Bus energy meters connectable		250	250
Baud rate****	Baud	300 - 2,400 - 9,600	300 - 2,400 - 9,600
Max reaction time (writing)	ms	60	60
Max reaction write (reading)	ms	60	60
Technical data			
Accuracy class		1 / B	1 / B
Ambient temperature	°C	–25…+55	–25…+55
Protective class		II	II
Protection category: Housing/terminals		IP 50/IP 20	IP 50/IP 20
Approvals (according to type)		CE	

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Features

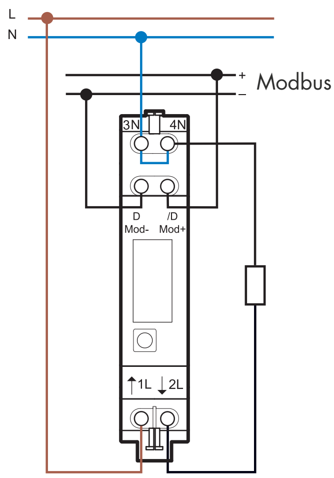
Multifunction energy meter MID certified with Modbus RS-485 integrated interface and backlit display for single phase AC systems

- Complies with EN 62053-21 and EN 50470-3
- Display indicates total energy consumption, partial energy consumption (this value is resettable); active power, instantaneous voltage and current. Via Modbus interface reactive power and cosφ measurement
- Seven digit counter, LCD with backlight
- Consumption data stored on internal EEprom
- Data transfer speed detected automatically
- Parallel connection of up to 247 energy meters
- Accuracy: Class 1 according to IEC 62053-21
  Class B according to EN 50470-3
- Reading data via a dedicated control button
- Protection class II
- Accessories: Tamper-proof cover with lead seal facility
- Space saving small size
- 35 mm rail (EN 60715) mount

* 0.01 kWh for readings ≤ 99,999.99 kWh and 0.1 kWh for readings ≥ 100,000.0 kWh
** The baud rate is recognized automatically

NEW **7E.23.8.230.0210**

- Nominal current 5 A (32 A Maximum)
- Modbus RS-485 integrated interface
- 1-phase 230 V 50 Hz
- 17.5 mm wide



For outline drawing see page 17

Specification		
Nominal/Maximum current	A	5/32
Minimum measured current	A	0.02
Current range (within accuracy class)	A	0.25...32
Maximum peak current	A	960 (10 ms)
Supply (& monitored) voltage (U_N)	V AC	230
Operating range		$(0.8...1.15)U_N$
Frequency	Hz	50
Power consumption per phase	W	< 0.4
Display (digit height 5 mm)		Seven digit counter, LCD with backlight
Max. totalising count/Min. increment	kWh	999,999.9/0.01 *
LED- Pulses per kWh		2,000
Modbus technical data		
Bus System		RS-485 serial interface
Max. bus length	m	1,200
Max. Modbus energy meters connectable		247
Baud rate**	Baud	2,400 - 4,800 - 9,600 - 19,200 38,400 - 57,600 - 115,200
Max reation time (writing/reading)	ms	60 / 60
Technical data		
Accuracy class		1 / B
Ambient temperature	°C	–25…+55
Protective class		II
Protection category: Housing/terminals		IP 50/IP 20
Approvals (according to type)		CE

E

finder

Features

Multifunction energy meter MID certified with Modbus RS-485 integrated interface and backlit display for three-phase AC systems

Type 7E.46-0212 10(65)A - Dual tariff
Type 7E.56-0210 5 (6)A - for current transformers up to 1,500 A

- Complies with EN 62053-21 and EN 50470-3
- Display indicates total energy consumption, partial energy consumption (this value is resettable); active power, instantaneous voltage and current. Via Modbus interface reactive power measurement (total or for each phase)
- Seven digit counter, LCD with backlight
- Consumption data stored on internal EEprom
- Data transfer speed detected automatically
- Parallel connection of up to 247 energy meters
- Accuracy: Class 1 according to IEC 62053-21
  Class B according to EN 50470-3
- Reading data via a dedicated control buttons
- Protection class II
- Accessories: Tamper-proof cover with lead seal facility
- 35 mm rail (EN 60715) mount

E

* Current transformer ratios: 5:5, 50:5, 100:5, 150:5, 200:5, 250:5, 300:5, 400:5, 500:5, 600:5, 750:5, 1.000:5, 1.250:5, 1.500:5; preset at the factory: 5:5

** 0.01 kWh for readings ≤ 99,999.99 kWh and 0.1 kWh for readings ≥ 100,000.0 kWh

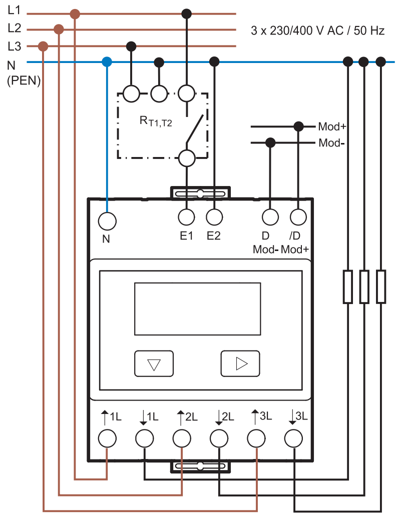
*** 0.1 kWh for readings ≤ 999,999.9 kWh and 1 kWh for readings ≥ 1,000,000 kWh

**** The baud rate is recognized automatically

For outline drawing see page 17

NEW **7E.46.8.400.0212**

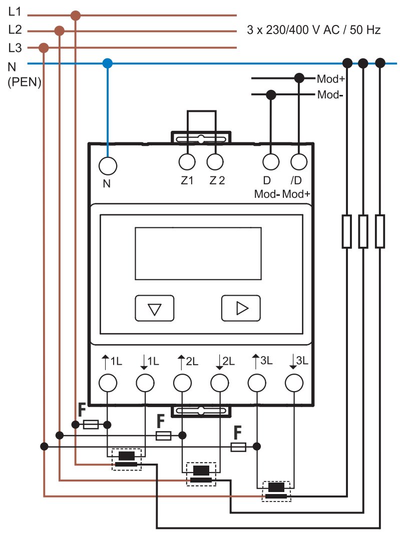
- Nominal current 10 A (65 A Maximum)
- Modbus RS-485 integrated interface
- 3-phase
- Dual tariff (Day and Night)
- 70 mm wide



$R_{T1,T2}$ = Tariff switching equipment

NEW **7E.56.8.400.0210**

- Nominal current 5 A (6 A Maximum)
- Modbus RS-485 integrated interface
- 3-phase
- Usable with current transformer up to 1,500 A
- 14 selectable Current Transformer ratios*
- 70 mm wide



* Current transformer ratios / **F** = 250 mA T

		7E.46.8.400.0212	7E.56.8.400.0210
Specification			
Nominal/Maximum current	A	10/65	5/6
Minimum measured current	A	0.04	0.01
Current range (within accuracy class)	A	0.5…65	0.05…6
Maximum peak current	A	1950 (10 ms)	180 (10 ms)
Supply (& monitored) voltage (U_N)	V AC	3 x 230	3 x 230
Operating range		$(0.8…1.15)U_N$	$(0.8…1.15)U_N$
Frequency	Hz	50	50
Power consumption per phase	W	< 1.5	< 1.5
Display (digit height 5 mm)		Seven digit counter, LCD with backlight	
Max. totalising count/Min. increment	kWh	999,999.9/0.01 **	9,999.999/0.1 ***
LED- Pulses per kWh		1,000	10
Modbus technical data			
Bus System		RS-485 serial interface	RS-485 serial interface
Max. bus length	m	1,200	1,200
Max. Modbus energy meters connectable		247	247
Baud rate****	Baud	1,200 - 2,400 - 4,800 - 9,600 - 19,200 38,400 - 57,600 - 115,200	1,200 - 2,400 - 4,800 - 9,600 - 19,200 38,400 - 57,600 - 115,200
Max reaction time (writing/reading)	ms	60 / 60	60 / 60
Technical data			
Accuracy class		1 / B	1 / B
Ambient temperature	°C	–25…+55	–25…+55
Protective class		II	II
Protection category: Housing/terminals		IP 50/IP 20	IP 50/IP 20
Approvals (according to type)		CE	

Ordering information

Example: Energy meter 32 A/230 V AC, with PTB certified, accuracy class 1, available with Tamper-proof lead sealed cover as accessory, for 35 mm rail (EN 60715) mounting.

7 E . 1 3 . 8 . 2 3 0 . 0 0 0 0

Series

Function
1 = 1-phase
2 = 1-phase with LCD display
3 = 3-phase
4 = 3-phase with LCD display
5 = 3-phase with LCD display for current transformer operation

Current
2 = 25 A
3 = 32 A
6 = 65 A (up to 1,500 A, type 7E.56)

Supply version
8 = AC 50 Hz

Special version
0 = Standard
1 = MID compliant versions

Option
0 = Standard
1 = kWh only (7E.23)
2 = Standard (7E.12)
2 = Dual tariff (7E.36, 7E.46)

Supply voltage
230 = 230 V AC 50 Hz
400 = 3 x 230/400 V AC 50 Hz

All versions/width

7E.12.8.230.0002/35 mm	7E.36.8.400.0000/70 mm
7E.13.8.230.0000/17.5 mm	7E.36.8.400.0010/70 mm
7E.13.8.230.0010/17.5 mm	7E.36.8.400.0002/70 mm
7E.16.8.230.0000/35 mm	7E.36.8.400.0012/70 mm
7E.16.8.230.0010/35 mm	7E.46.8.400.0002/70 mm
7E.23.8.230.0000/17.5 mm	7E.46.8.400.0012/70 mm
7E.23.8.230.0001/17.5 mm	7E.56.8.400.0000/70 mm
7E.23.8.230.0010/17.5 mm	7E.56.8.400.0010/70 mm

E

Technical data

Insulation EN 62053-21			**7E.12, 7E.13, 7E.16, 7E.23**	**7E.36, 7E.46, 7E.56**
Insulation rated voltage		V	250	250
Overvoltage category			IV	IV
Insulation	between active parts and SO+/SO– terminals	kV (1.2/50 μs)	6	6
	between adjacent phases	kV (1.2/50 μs)	—	6
Insulation	between supply and SO+/SO–	V AC	4,000	4,000
	between adjacent phases	V AC	—	4,000
Protection class			II	II

EMC Specification		**Reference standard**	
Electrostatic discharge	contact discharge	EN 61000-4-2	8 kV
	air discharge	EN 61000-4-2	15 kV (13 kV type 7E.23)
Radio-Frequency Electromagnetic Field (80…1,000)MHz		EN 61000-4-3	10 V/m
Fast Transients (Burst) (5-50 ns, 5 kHz)	on Supply Terminals	EN 61000-4-4	Class 4 (4 kV)
	on SO+/SO– Terminals	EN 61000-4-4	Class 4 (2 kV)
Surge (1.2/50 μs)	on Supply Terminals	EN 61000-4-5	Class 4 (4 kV)
	on SO+/SO– Terminals	EN 61000-4-5	Class 3 (1 kV)
Radio-Frequency Common Mode (0.15…80)MHz on Supply terminals		EN 61000-4-6	10 V
Radiated and Conducted Emission		EN 55022	Class B

Other data					
Pollution degree			2		
Vibration resistance	(10…60)Hz	mm	0.075		
	(60…150)Hz	g	1		
Vibration resistance of the internal mechanical counter (10…500)Hz		g	2		
Shock resistance		g/18 ms	30		
Shock resistance of the internal mechanical counter		g/18 ms	350		
Power lost to the environment			**7E.12, 7E.13, 7E.23**	**7E.16**	**7E.36, 7E.46, 7E.56**
	without current	W	0.4	0.4	1.5
	with maximum current	W	1	2	6

Supply terminals			**7E.12, 7E.13, 7E.23**		**7E.16, 7E.36, 7E.46, 7E.56**	
	Max. wire size		solid cable	stranded cable	solid cable	stranded cable
		mm^2	1…6	0.75…4	1.5…16	1.5…16
		AWG	18…10	18…12	16…6	16…6
	Screw torque for I_{max}	Nm	0.8…1.2		1.5…2	
	Screw		Pozidriv No.1, Flat No.1, 2			
SO+/SO– terminals	Max. wire size		solid cable	stranded cable	solid cable	stranded cable
		mm^2	2.5	1.5	2.5	1.5
		AWG	14	16	14	16
	Screw torque for I_{max}	Nm	0.5		0.8	
	Screw		Pozidriv No.0, Flat No.1		Pozidriv No.0, Flat No.2	

Ordering information M-Bus/Modbus versions

Example: Energy meter 32 A/230 V AC, with PTB certified, accuracy class 1, available with Tamper-proof lead sealed cover as accessory, for 35 mm rail (EN 60715) mounting.

7 E . 2 3 . 8 . 2 3 0 . 0 0 3 0

Series

Function
2 = 1-phase with LCD display with backlight
4 = 3-phase with LCD display with backlight
5 = 3-phase with LCD display with backlight for current transformer operation

Current
3 = 32 A
6 = 65 A (up to 1,500 A, type 7E.56)

Supply version
8 = AC 50 Hz

Special version
0 = Standard
2 = MID compliance with Modbus RS-485 integrated interface

Option
1 = MID compliance
3 = MID compliance with M-Bus integrated interface

Option
0 = Standard
2 = Dual tariff (7E.46)

Supply voltage
230 = 230 V AC 50 Hz
400 = 3 x 230/400 V AC 50 Hz

All versions/width

M-Bus
7E.23.8.230.0030/17.5 mm
7E.46.8.400.0032/70 mm
7E.56.8.400.0030/70 mm

Modbus
7E.23.8.230.0210/17.5 mm
7E.46.8.400.0212/70 mm
7E.56.8.400.0210/70 mm

E

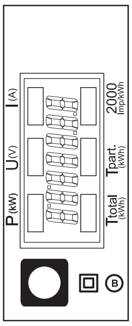
Technical data M-Bus/Modbus

Insulation EN 62053-21			**7E.23**	**7E.46, 7E.56**
Insulation rated voltage according to EN 62052-21		V	250	250
Overvoltage category according to EN 62052-21			IV	IV
Insulation according to EN 62052-21	between supply terminals and M-Bus/Modbus terminals	kV (1.2/50 µs)	6	6
	between adjacent phases	kV (1.2/50 µs)	—	6
Insulation	between supply terminals and M-Bus/Modbus terminals	V AC	2,000	2,000
	between adjacent phases	V AC	—	4,000
Protection class		II	II	
EMC Specification – EN 62052-11				
Electrostatic discharge	contact discharge		EN 61000-4-2	8 kV
	air discharge		EN 61000-4-2	15 kV (13 kV type 7E.23)
Radio-Frequency Electromagnetic Field (80...1,000)MHz			EN 61000-4-3	10 V/m
Fast Transients (Burst) (5-50 ns, 5 kHz)	on Supply Terminals		EN 61000-4-4	Class 4 (4 kV)
	M-Bus/Modbus terminals		EN 61000-4-4	Class 3 (1 kV)
Surge (1.2/50 µs) an	on Supply Terminals		EN 61000-4-5	Class 4 (4 kV)
	M-Bus/Modbus terminals		EN 61000-4-5	Class 3 (1 kV)
Radio-Frequency Common Mode (0.15...80)MHz on Supply terminals			EN 61000-4-6	10 V
EMC – Radiated and Conducted Emission			EN 55022	Class B
Other data				
Pollution degree			2	
Vibration resistance according to IEC 68-2-6	(10...60)Hz	mm	0.075	
	(60...150)Hz	g	1	
Shock resistance according to IEC 68-2-27		g/18 ms	30	
Power lost to the environment			**7E.23**	**7E.46, 7E.56**
	without current	W	0.4	1.5
	with maximum current	W	1	6

			7E.23		**7E.46, 7E.56**	
Supply terminals	Max. wire size		solid cable	stranded cable	solid cable	stranded cable
		mm^2	1...6	0.75...4	1.5...16	1.5...16
		AWG	18...10	18...12	16...6	16...6
	Screw torque for I_{max}	Nm	0.8...1.2		1.5...2	
	Screw		Pozidriv No.1, Flat No.1, 2			
M-Bus/Modbus terminals	Max. wire size		solid cable	stranded cable	solid cable	stranded cable
		mm^2	2.5	1.5	2.5	1.5
		AWG	14	16	14	16
	Screw torque for I_{max}	Nm	0.5		0.8	
	Screw		Pozidriv No.0, Flat No.1		Pozidriv No.0, Flat No.2	

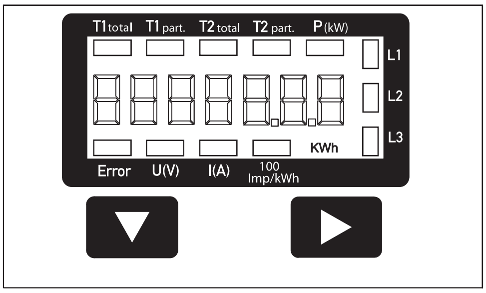
LC-Display Type 7E.23, 7E.46, 7E.56

Indication elements

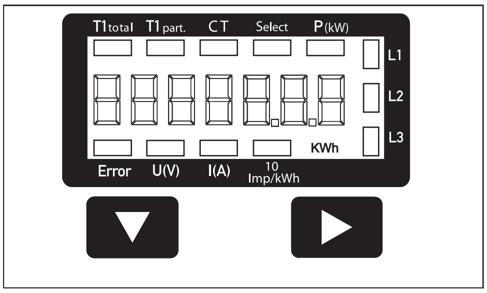


Type 7E.23		
Ttotal	kWh	Indicates total consumption
Tpart.	kWh	Indicates partial consumption, this value is resettable
P	kW	Indicates the instantaneous power
U	V	Indicates the voltage
I	A	Indicates the current
2,000 Imp/kWh		Pulses according to power consumption Error indication (line L1/L2 reversed) with pulsating 600/600 ms

Note: for 7E.23.8.230.0001 only total energy consumption is displayed.



Type 7E.46		
T1total	kWh	Indicates total consumption Tariff 1
T1part.	kWh	Indicates partial consumption for Tariff 1, this value is resettable
T2total	kWh	Indicates total consumption Tariff 2
T2part.	kWh	Indicates partial consumption for Tariff 2, this value is resettable
P	kW	Indicates the instantaneous power per phase or all phases
U	V	Indicates the voltage per phase
I	A	Indicates the current per phase
100 Imp/kWh		Pulsed according to drawn power
kWh		Indicates the unit kWh when the consumption is displayed
L1/L2/L3		For P-, U-, I- or Error display, the corresponding phase is displayed
Error		Indicates a missing phase or reverse current flow - the appropriate phase is also displayed



Type 7E.56		
T1total	kWh	Indicates total consumption
T1part.	kWh	Indicates partial consumption, this value is resettable
CT		Indicates the set current transformer ratio, factory setting is 5:5
Select		The transformer ratio can be selected in the menu item Select *
P	kW	Indicates the instantaneous power per phase or all phases
U	V	Indicates the voltage per phase
I	A	Indicates the current per phase
10 Imp/kWh		Pulsed according to drawn power
kWh		Indicates the unit kWh when the consumption is displayed
L1/L2/L3		For P-, U-, I- or Error display, the corresponding phase is displayed
Error		Indicates a missing phase or reverse current flow - the appropriate phase is also displayed

* To adjust the current transformer ratio remove the bridge Z1 - Z2 and reset the energy meter according to the operating instructions. Then lock it again with the bridge. For a tamper proof lead seal use four terminal covers (07E.16).

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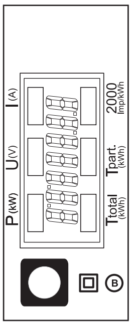
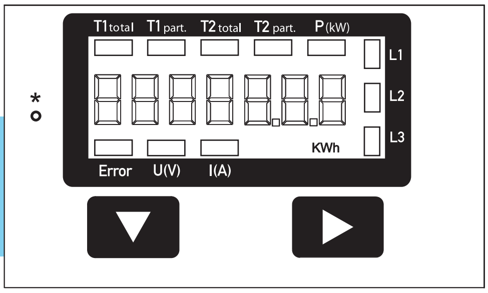
LC-Display with backlight Type 7E.23, 7E.46, 7E.56 with M-Bus/modbus integrated interface

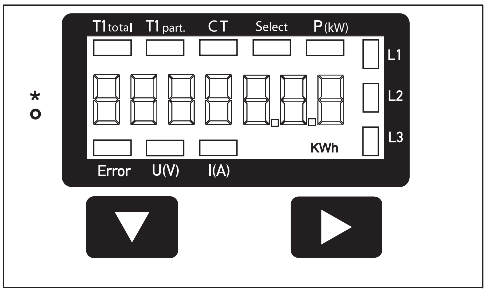


Type 7E.23 (direct measurement up to 32 A)		
Total	kWh	Indicates total consumption
Tpart.	kWh	Indicates partial consumption. This value is resettable
P	kW	Indicates the instantaneous power
U	V	Indicates the voltage
I	A	Indicates the current
Flashing display indicator (LCD)		2000 Imp/kWh Flashing rate varies with the instantaneous power. Indication of incorrect connection (Lines L1/L2 reversed) by 600/600 ms flashing



Display 7E.46.8.400.0032/0212

Type 7E.46 (direct measurement up to 65 A)		
T1total	kWh	Indicates total consumption Tariff 1
T1part.	kWh	Indicates partial consumption for Tariff 1. This value is resettable
T2total	kWh	Indicates total consumption Tariff 2
T2part.	kWh	Indicates partial consumption for Tariff 2. This value is resettable
P	kW	Indicates the instantaneous power per phase or all phases
U	V	Indicates the phase voltage
I	A	Indicates the line current
kWh		Indicates the unit kWh when the consumption is displayed
L1/L2/L3		For P-, U-, I- or Error display, the corresponding phase is displayed
Error		In case of Loss of Phase or reverse current flow the corresponding phase will be indicated and "Error" is displayed
Flashing LED*		1000 Imp/kWh Flashing rate varies with the instantaneous power



Display 7E.56.8.400.0030/0210

Type 7E.56 (with CT measurement up to 1500 A)		
T1total	kWh	Indicates total consumption
T1part.	kWh	Indicates partial consumption. This value is resettable
CT		Indicates the current transformer ratio; factory setting is 5:5
Select		When the jumper Z1-Z2 is open, the transformation ratio can be set under the menu item: Select **
P	kW	Indicates the instantaneous power per phase or all phases
U	V	Indicates the phase voltage
I	A	Indicates the line current
kWh		Indicates the unit kWh when the consumption is displayed
L1/L2/L3		For P-, U-, I- or Error display, the corresponding phase is displayed
Error		In case of Loss of Phase or reverse current flow the corresponding phase will be indicated and "Error" is displayed
Flashing LED *		10 Imp/kWh Flashing rate varies with the instantaneous power

** To adjust the current transformer ratio remove the bridge Z1 - Z2 and reset the energy meter according to the operating instructions. Then lock it again with the bridge. For a tamper proof lead seal use four terminal covers (07E.16).

Mechanical Display Type 7E.12, 7E.13, 7E.16, 7E.36

LED indication (Normal operation)

Type	Energy consumption			Pulses per kWh	Pulse space	The LED Pulse rate represents the instantaneous power being consumed, according to the following
	None	Low	High			
7E.12 7E.13				2,000	100 ms	kW = (number of pulse per Minute) / 33.3
7E.16				1,000	100 ms	kW = (number of pulse per Minute) / 16.7
7E.36				100	150 ms	kW = (number of pulse per Minute) / 1.7

LED indication (Abnormal operation)

Status indicates errors of installation, as below

Type 7E.12, 7E.13, 7E.16

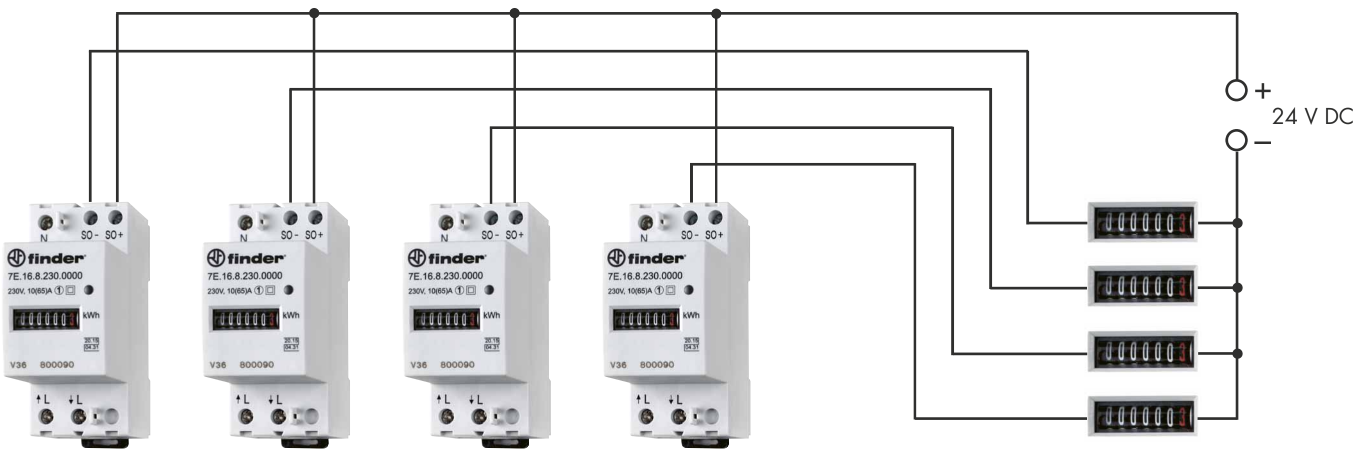
Device ON, incorrect connection (L-N inverted).
Mark = 600 ms, Space = 600 ms

Type 7E.36

Mark = 100 ms, Phase L1↑ L1↓ inverted or loss	3 s 3 s 3 s 3 s 3 s	Phase L1↑ L1↓ and L2↑ L2↓ inverted or loss	3 s 3 s 3 s 3 s 3 s
Phase L2↑ L2↓ inverted or loss	3 s 3 s 3 s 3 s 3 s	Phase L1↑ L1↓ and L3↑ L3↓ inverted or loss	3 s 3 s 3 s 3 s 3 s
Phase L3↑ L3↓ inverted or loss	3 s 3 s 3 s 3 s 3 s	Phase L2↑L2↓ and L3↑L3↓ inverted or loss	3 s 3 s 3 s 3 s 3 s
		Phase L1↑ L1↓ and L2↑L2↓ and L3↑L3↓ inverted or loss	3 s 3 s 3 s 3 s 3 s

SO+/SO– Open collector output wiring diagram Type 7E.12, 7E.13, 7E.23, 7E.16, 7E.36, 7E.46, 7E.56

The pulsating open collector output available at terminals SO+ and SO– can be interfaced with the input of a computer, plc or other energy management equipment to allow the remote monitoring of energy consumed.

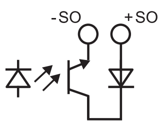


Energy meters – at difference locations
(Note: Both Single and Dual tariff meters provide only a single pulsating output)

Central monitoring/management system
(max. 20 mA for each input)

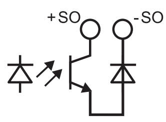
SO-Output Type 7E.12, 7E.13, 7E.16, 7E.23

SO+/SO– Open collector output



SO-Output Type 7E.36, 7E.46, 7E.56

SO+/SO– Open collector output



Overview of LCD display values M-Bus/Modbus - Type 7E.23

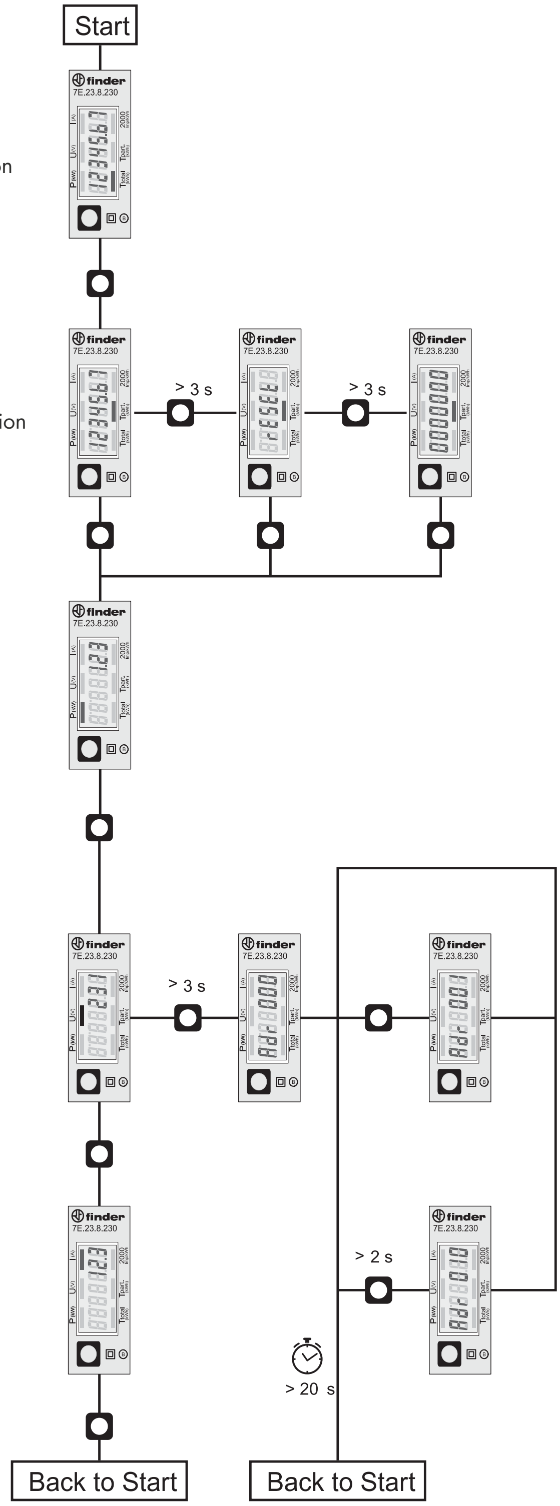
T total
Total energy consumption

T part
Partial energy consumption

P
Instantaneous power

U
Voltage

I
Current



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Overview of LCD display values M-Bus/Modbus - Type 7E.46

T1 total
T1 total energy consumption

T1 part
T1 partial energy consumption

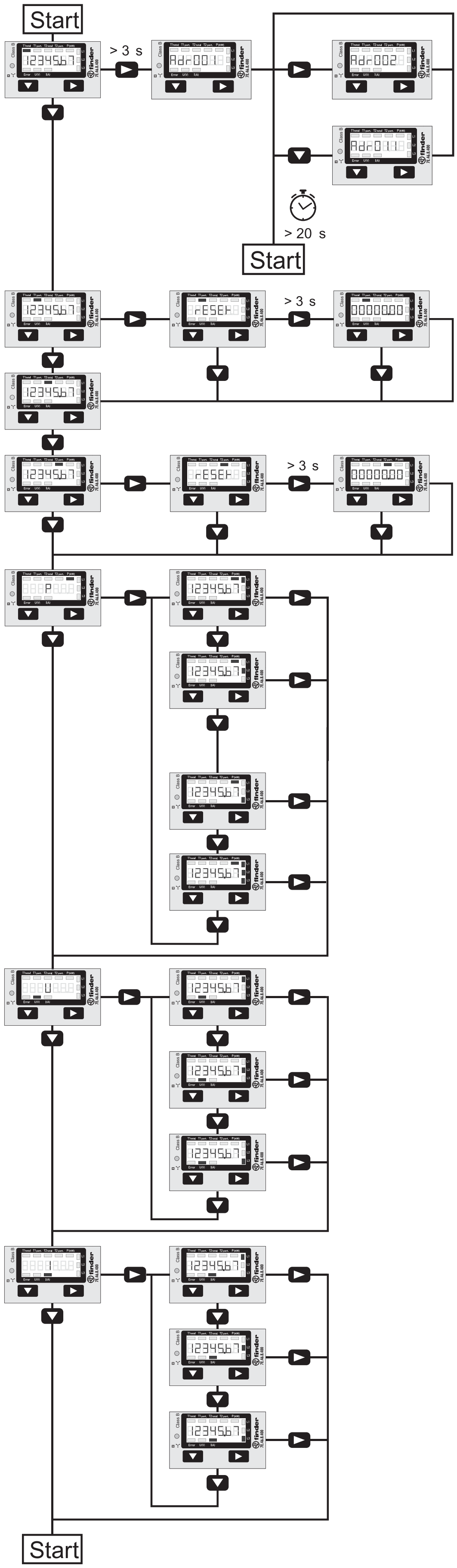
T2 total
T2 total energy consumption

T2 part
T2 partial energy consumption

P
Instantaneous Power

U
Voltage

I
Current



Overview of LCD display values M-Bus/Modbus - Type 7E.56

T1 total
T1 total energy consumption

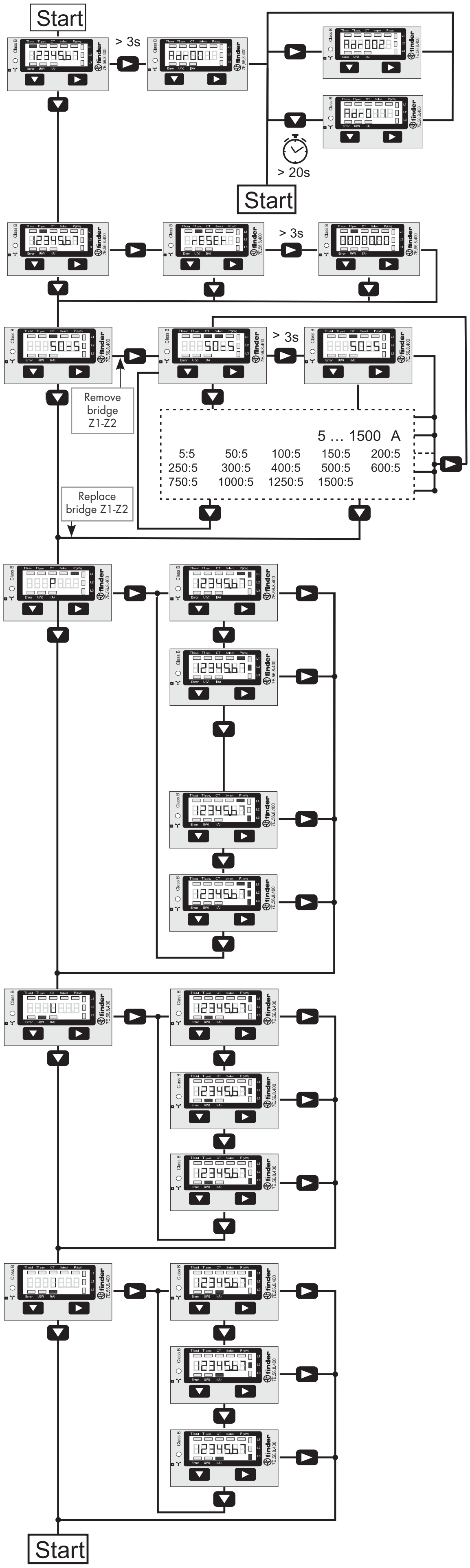
T1 part
T1 partial energy consumption

CT
Current transformer ratio

P
Instantaneous Power

U
Voltage

I
Current



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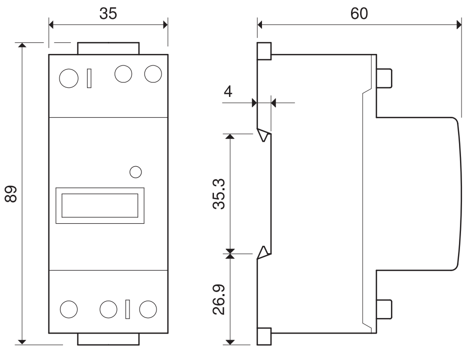
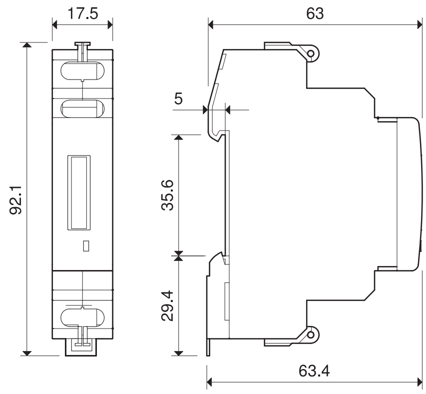
VI-2014, www.findernet.com

Outline drawing

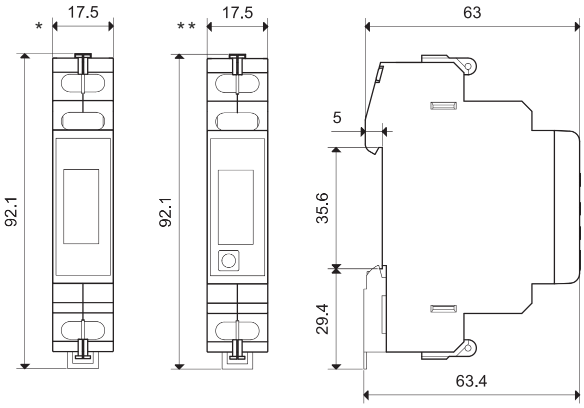
Type 7E.12.8.230.0002 / 7E.16.8.230.0000/10



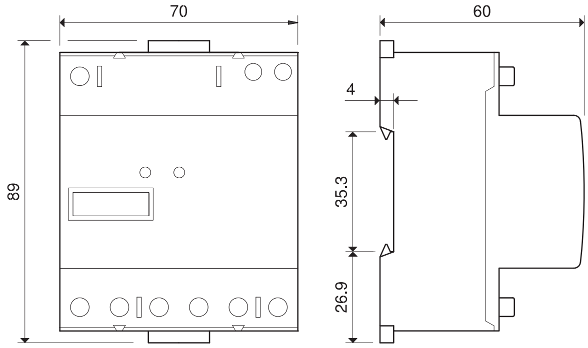
Type 7E.13.8.230.0000/10



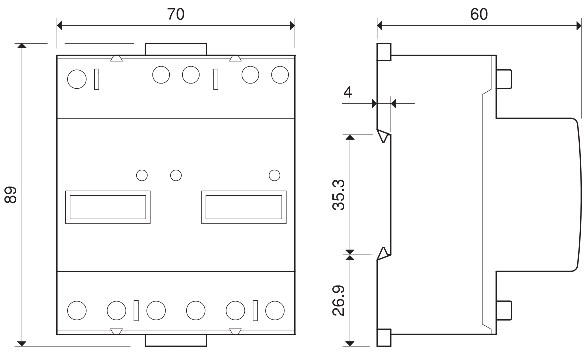
Type 7E.23.8.230.0001* / 7E.23**



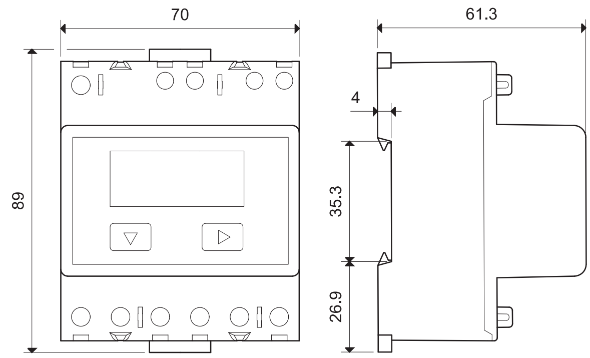
Type 7E.36.8.400.0000/10



Type 7E.36.8.400.0002/12



Type 7E.46 - 7E.56



Accessories

07E.13

Terminal cover for type 7E.13, 7E.23	07E.13

For the tamper-proof lead seal use two terminal covers

07E.16

Terminal cover for type 7E.12, 7E.16, 7E.36, 7E.46 and 7E.56	07E.16

7E.12, 7E.16 - For the tamper-proof lead seal use two terminal covers
7E.36, 7E.46, 7E.56 - For the tamper-proof lead seal use four terminal covers

Detailed structure of the protocol is available on line

Features

SPD Type 1+2 Surge arrester range high discharge capability with no following current - single / three phase systems

- Surge arresters, suitable for low-voltage applications, to protect equipment against overvoltage by direct lightning strike, induced overvoltage and switching overvoltage
- To be installed at the boundary of LPZ 0 - LPZ 1 zones or higher
- Versions with combination of varistor and high-performance gas discharge tube (GDT) ensures high discharge currents and eliminates leakage currents
- No follow current
- Very low residual voltage
- Low U_p voltage
- Replaceable modules
- Upside down mounting possible (thanks to dual terminal markings and new restraint system for the replaceable module that permits its inversion)
- Visual fault signalling: Healty/Replace
- Double screw terminal
- Remote status signalling contact: Healty/Replace/Presence. Connector 07P.01 included
- According to EN 61 643-11
- 35 mm rail EN 60715 mounting, 36mm each pole

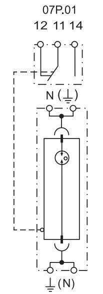
7P.09.1.255.0100 SPD Type 1, GDT protection for N-PE application only, for 3+1 configuration

7P.01.8.260.1025 SPD Type 1+2, varistor + GDT unipolar protection suitable to realize single phase or three phase systems (230/400 V) with the GDT protection module (7P.09)

7P.02.8.260.1025 SPD Type 1+2 for single phase system. Varistor + GDT protection L-N + GDT protection N-PE

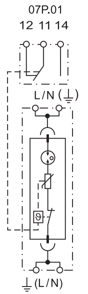
7P.09.1.255.0100

- SPD Type 1
- Spark gap module for N-PE application in three phase system, 3+1 configuration
- Remote contact signalling of GDT presence
- Upside down mounting possible
- Replaceable modules



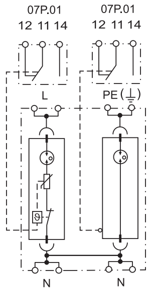
7P.01.8.260.1025

- SPD Type 1+2
- Combination of varistor and encapsulated spark gap (for single or three phase systems)
- Visual fault and remote contact fault signalling varistor/GDT status
- Upside down mounting possible
- Replaceable modules



7P.02.8.260.1025

- SPD Type 1+2
- Combination of varistor and encapsulated spark gap (for single phase systems)
- Visual fault and remote contact fault signalling varistor/GDT status, N-PE GDT presence
- Upside down mounting possible
- Replaceable modules



For outline drawing see page 13

SPD specification		7P.09.1.255.0100 N-PE	7P.01.8.260.1025	7P.02.8.260.1025 L-N	7P.02.8.260.1025 N-PE
Nominal voltage (U_N)	V AC	—	230	230	—
Maximum operating voltage (U_C)	V AC	255	260	260	255
Lightning impulse current (10/350 μs) (I_{imp})	kA	100	25	25	50
Nominal discharge current (8/20 μs) (I_n)	kA	100	30	30	50
Maximum discharge current (8/20 μs) (I_{max})	kA	100	60	60	100
Voltage protection level (U_P)	kV	1.5	1.5	1.5	1.5
Temporary overvoltage - 120 min (TOV)	AC	—	440	440	—
Ability to independently switch off the following current (I_{fi})	A	100	No following current	No following current	100
Response time (t_a)	ns	100	100	100	100
Short-circuit proof at maximum overcurrent protection	kA_{rms}	—	50	50	—
Maximum overcurrent protection (fuse rating gL/gG)		—	250 A	250 A	—
Maximum overcurrent protection for serial connection		—	125 A gL/gG	125 A gL/gG	—
Replacement module code		7P.00.1.000.0100	7P.00.8.260.0025	7P.00.8.260.0025	7P.00.1.000.0050

Other technical data			
Ambient temperature range	°C	–40…+80	
Protection degree		IP20	
Wire size		solid cable	stranded cable
	mm²	1x2.5…1x50	1x2.5…1x35
	AWG	1x13…1x1	1x13…1x2
Wire strip length	mm	11	
Screw torque	Nm	4	

Remote status signalling contact specification		7P.09.1.255.0100		7P.01.8.260.1025		7P.02.8.260.1025	
Contact configuration		1 CO (SPDT)		1 CO (SPDT)		1 CO (SPDT)	
Rated current	A AC/DC	0.5/0.1		0.5/0.1		0.5/0.1	
Rated voltage	V AC/DC	250/30		250/30		250/30	
Wire size (07P.01)		solid cable	stranded cable	solid cable	stranded cable	solid cable	stranded cable
	mm²	1.5	1.5	1.5	1.5	1.5	1.5
	AWG	16	16	16	16	16	16

Approvals (according to type)

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finder

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Features

SPD Type 1+2 Surge arrester range - three phase high discharge capability with no following current - system (230/400 V)

- Surge arresters, suitable for low-voltage applications, to protect equipment against overvoltage by direct lightning strike, induced overvoltage and switching overvoltage
- To be installed at the boundary of LPZ 0 - LPZ 1 zones or higher
- Combined high energy varistor block and heavy duty encapsulated spark gap (GDT) ensures high discharge current and eliminates leakage current
- No follow current
- Very low residual voltage
- Low U_P voltage
- Replaceable modules
- Upside down mounting possible (thanks to dual terminal markings and new restraint system for the replaceable module that permits its inversion)
- Visual fault signalling: Healty/Replace
- Double screw terminal
- Remote status signalling contact: Healty/Replace/Presence. Connector 07P.01 included
- According to EN 61 643-11
- 35 mm rail EN 60715 mounting, 36mm each pole

7P.03.8.260.1025 SPD Type 1+2 for three phase system without Neutral (PEN conductor). Varistor + GDT protection L1, L2, L3-PEN

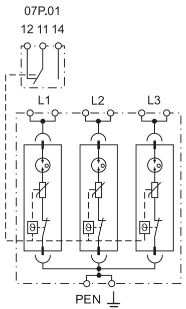
7P.04.8.260.1025 SPD Type 1+2 for three phase system with Neutral. Varistor + GDT protection L1, L2, L3-N + spark gap protection N-PE

7P.05.8.260.1025 SPD Type 1+2 for three phase system with Neutral. Varistor + GDT protection L1, L2, L3-N + varistor + GDT protection N-PE

For outline drawing see page 13, 14

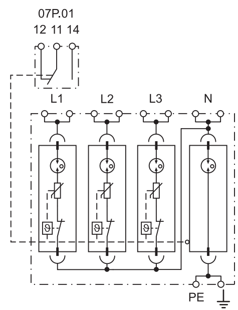
7P.03.8.260.1025

- SPD Type 1+2
- 3 x combined varistor and encapsulated spark gap
- Visual fault and remote contact fault signalling varistor/GDT status
- Upside down mounting position
- Replaceable modules



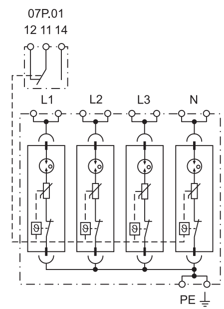
7P.04.8.260.1025

- SPD Type 1+2
- 3 x combined varistor and encapsulated spark gap + 1 encapsulated spark gap
- Visual fault and remote contact fault signalling varistor/GDT status, N-PE GDT presence
- Upside down mounting position
- Replaceable modules



7P.05.8.260.1025

- SPD Type 1+2
- 4 x combined varistor and encapsulated spark gap
- Visual fault and remote contact fault signalling varistor/GDT status
- Upside down mounting position
- Replaceable modules



SPD specification		7P.03.8.260.1025 L-PEN	7P.04.8.260.1025 L-N	7P.04.8.260.1025 N-PE	7P.05.8.260.1025 L, N-PE
Nominal voltage (U_N)	V AC	230	230	—	230
Maximum operating voltage (U_C)	V AC	260	260	255	260
Lightning impulse current (10/350 μs) (I_{imp})	kA	25	25	100	25
Nominal discharge current (8/20 μs) (I_n)	kA	30	30	100	30
Maximum discharge current (8/20 μs) (I_{max})	kA	60	60	100	60
Voltage protection level (U_P)	kV	1.5	1.5	1.5	1.5
Temporary overvoltage - 120 min (TOV)	AC	440	440	—	440
Ability to independently switch off the following current (I_{fi})	A	No following current	No following current	100	No following current
Response time (t_a)	ns	100	100	100	100
Short-circuit proof at maximum overcurrent protection	kA_{rms}	50	50	—	50
Maximum overcurrent protection (fuse rating gL/gG)		250 A	250 A	—	250 A
Maximum overcurrent protection for serial connection		125 A gL/gG	125 A gL/gG	—	125 A gL/gG
Replacement module code		7P.00.8.260.0025	7P.00.8.260.0025	7P.00.1.000.0100	7P.00.8.260.0025

Other technical data			
Ambient temperature range	°C	–40…+80	
Protection degree		IP20	
Wire size		solid cable	stranded cable
	mm²	1x2.5…1x50	1x2.5…1x35
	AWG	1x13…1x1	1x13…1x2
Wire strip length	mm	11	
Screw torque	Nm	4	

Remote status signalling contact specification		7P.03.8.260.1025		7P.04.8.260.1025		7P.05.8.260.1025	
Contact configuration		1 CO (SPDT)		1 CO (SPDT)		1 CO (SPDT)	
Rated current	A AC/DC	0.5/0.1		0.5/0.1		0.5/0.1	
Rated voltage	V AC/DC	250/30		250/30		250/30	
Wire size (07P.01)		solid cable	stranded cable	solid cable	stranded cable	solid cable	stranded cable
	mm²	1.5	1.5	1.5	1.5	1.5	1.5
	AWG	16	16	16	16	16	16

Approvals (according to type)

Features

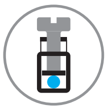
SPD Type 1+2 Surge arrester range with high performance "Low U_p" - Single phase / three phase system

- Surge arrester suitable for 230/400 V system applications to prevent overvoltage effects caused by direct or indirect lightning strikes
- To be installed at the boundary of LPZ 0 and LPZ 1 zones
- Low U_p to protect senstive equipment
- Visual indication of varistor status - Healthy/Replace
- Contact for remote signalling of varistor status. Connector 07P.01 included
- Replaceable varistor and Spark Gap modules
- Complies with EN 61 643-11
- 17.5 mm rail EN 60715 mounting for each module

7P.12.8.275.1012 SPD Type 1+2 for single phase system with Neutral.
- Varistor protection L-N + spark gap protection N-PE for single phase systems
- Replaceable Spark Gap and varistor modules

7P.13.8.275.1012 SPD Type 1+2 for three phase system without Neutral (PEN conductor).
- Varistor protection L1, L2, L3-PEN for three phase systems
- Replaceable varistor modules

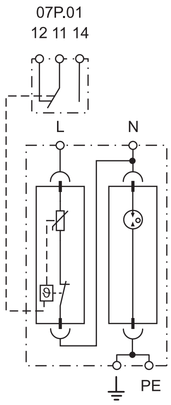
7P.12 / 7P.13
Screw terminal



For outline drawing see page 14

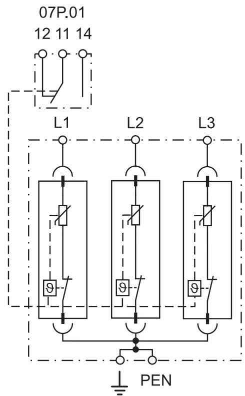
7P.12.8.275.1012

- SPD Type 1+2
- Replaceble Spark Gap and varistor modules (for single phase systems)
- Visual and remote signalling of varistor status



7P.13.8.275.1012

- SPD Type 1+2
- Replaceble varistor modules (for three phase systems)
- Visual and remote signalling of varistor status



SPD specification		L-N	N-PE	L-PEN
Nominal voltage (U_N)	V AC	230	—	230
Maximum continous operating voltage (U_C)	V AC/DC	275/350	255/—	275/350
Lightning impulse current (10/350 μs) (I_{imp})	kA	12.5	25	12.5
Nominal discharge current (8/20 μs) (I_n)	kA	30	40	30
Maximum discharge current (8/20 μs) (I_{max})	kA	60	60	60
Voltage protection level (U_P)	kV	1.2	1.5	1.2
Ability to independently switch off the following current (I_{fi})	A	No following current	100	No following current
Response time (t_a)	ns	25	100	25
Short-circuit proof at maximum overcurrent protection	kA_{rms}	50	—	50
Maximum overcurrent protection (fuse rating gL/gG)		160 A	—	160 A
Replacement module code		7P.10.8.275.0012	7P.10.1.000.0025	7P.10.8.275.0012
Other technical data				
Ambient temperature range	°C	–40…+80		
Protection degree		IP20		
Wire size		solid cable		stranded cable
	mm²	1x1…1x35		1x1…1x25
	AWG	1x 17…1x2		1x 17…1x4
Wire strip length	mm	12		
Screw torque	Nm	3		
Remote status signalling contact specification				
Contact configuration		1 CO (SPDT)	—	1 CO (SPDT)
Rated current	A AC/DC	0.5/0.1	—	0.5/0.1
Rated voltage	V AC/DC	250/30	—	250/30

Wire size (07P.01)		L-N solid cable	L-N stranded cable	N-PE	L-PEN solid cable	L-PEN stranded cable
	mm²	1.5	1.5	—	1.5	1.5
	AWG	16	16	—	16	16

Approvals (according to type)	CE EAC PCT

II-2015, www.findernet.com

7P Series - Surge Protection Device (SPD)

Features

SPD Type 1+2 Surge arrester range with high performance "Low U_p" - three phase system

- Surge arrester suitable for 230/400 V system applications to prevent overvoltage effects caused by direct or indirect lightning strikes
- To be installed at the boundary of LPZ 0 and LPZ 1 zones
- Low U_p to protect senstive equipment
- Visual indication of varistor status - Healthy/Replace
- Contact for remote signalling of varistor status. Connector 07P.01 included
- Replaceable varistor modules
- Complies with EN 61 643-11
- 17.5 mm rail EN 60715 mounting for each module

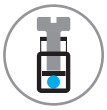
7P.14.8.275.1012 SPD Type 1+2 for three phase system with Neutral.

- Varistor protection L1, L2, L3-N+Spark Gap protection N-PE
- Replaceable varistor modules
- Non replaceable high discharge current spark gap

7P.15.8.275.1012 SPD Type 1+2 for three phase system with Neutral.

- Varistor protection L1, L2, L3,N-PE
- Replaceable varistor modules

7P.14 / 7P.15
Screw terminal

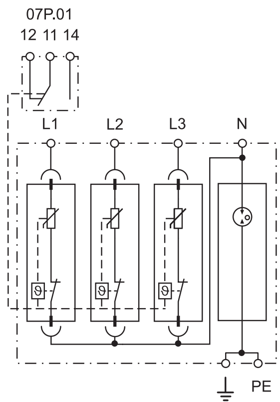


For outline drawing see page 14

E

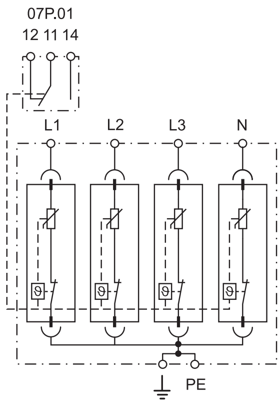
7P.14.8.275.1012

- SPD Type 1+2
- Replaceable varistor module
- Visual and remote signalling of varistor status



7P.15.8.275.1012

- SPD Type 1+2
- Replaceable varistor module
- Visual and remote signalling of varistor status



SPD specification		**L-N**	**N-PE**	**L, N-PE**
Nominal voltage (U_N)	V AC	230	—	230
Maximum continous operating voltage (U_C)	V AC/DC	275/350	255/—	275/350
Lightning impulse current (10/350 μs) (I_{imp})	kA	12.5	50	12.5
Nominal discharge current (8/20 μs) (I_n)	kA	30	50	30
Maximum discharge current (8/20 μs) (I_{max})	kA	60	100	60
Voltage protection level (U_P)	kV	1.2	1.5	1.2
Ability to independently switch off the following current (I_{fi})	A	No following current	100	No following current
Response time (t_a)	ns	25	100	25
Short-circuit proof at maximum overcurrent protection	kA_{rms}	50	—	50
Maximum overcurrent protection (fuse rating gL/gG)		160 A	—	160 A
Replacement module code		7P.10.8.275.0012	—	7P.10.8.275.0012
Other technical data				
Ambient temperature range	°C	–40...+80		
Protection degree		IP20		
Wire size		solid cable		stranded cable
	mm²	1x1...1x35		1x1...1x25
	AWG	1x 17...1x2		1x 17...1x4
Wire strip length	mm	12		
Screw torque	Nm	3		

Remote status signalling contact specification					
Contact configuration		1 CO (SPDT)	—	1 CO (SPDT)	
Rated current	A AC/DC	0.5/0.1	—	0.5/0.1	
Rated voltage	V AC/DC	250/30	—	250/30	
Wire size (07P.01)		solid cable / stranded cable		solid cable	stranded cable
	mm²	1.5 / 1.5	—	1.5	1.5
	AWG	16 / 16	—	16	16
Approvals (according to type)					

II-2015, www.findernet.com

7P Series - Surge Protection Device (SPD)

Features

SPD Type 2 Surge arrester range for single / three phase AC systems and for DC systems

- Surge arrester suitable for AC and DC systems to protect equipment against induced overvoltage or switching transients
- To be installed at the boundary of LPZ 1-LPZ 2 zones or higher
- Visual indication of varistor status - Healthy/Replace
- Contact for remote signalling of varistor status. Connector (07P.01) included (depending on the version)
- Replaceable varistor and spark gap modules
- Complies with EN 61643-11:2012
- 17.5 mm rail EN 60715 mounting for each module

7P.21.8.075.1015 SPD Type 2, unipolar protection suitable for DC applications or low voltage AC single phase systems
- Varistor protection +/– or L/N (GND); –/+ or GND (L/N)
- Replaceable module

7P.21.8.130.1015 SPD Type 2, unipolar protection suitable for DC application or low voltage AC single phase systems
- Varistor protection +/– or L/N (GND); –/+ or GND (L/N)
- Replaceable module

7P.21.8.275.x020 SPD Type 2, unipolar protection suitable to realize single phase or three phase systems (230/400 V)
- Varistor protection L/N(GND)-GND/(L/N)
- Replaceable module

7P.21.8.440.x020 SPD Type 2, unipolar protection suitable for three phase systems (400 V AC)
- Varistor protection L/N(GND)-GND/(L/N)
- Replaceable module

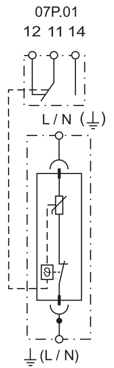
7P.22.8.275.x020 SPD Type 2 for single phase system with Neutral
- Varistor protection L-N + spark gap protection N-PE
- Replaceable varistor and spark gap modules

7P.27.8.275.x020 SPD Type 2 for single phase system with Neutral
- Varistor protection L, N-PE
- Replaceable varistor modules

For outline drawing see page 14

7P.21.8.xxx.x0xx

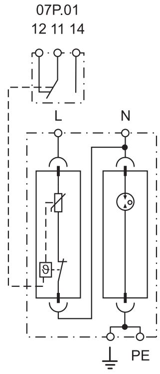
- SPD Type 2 (1 varistor)
- Replaceable varistor module
- Visual and optional remote connector for signalling of the varistor status



* 7P.20.8.075.0015
** 7P.20.8.130.0015
*** 7P.20.8.275.0020
**** 7P.20.8.440.0020

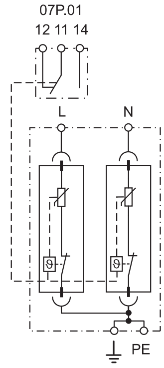
7P.22.8.275.x020

- SPD Type 2 (1 varistor + 1 spark-gap)
- Combination of replaceable varistor and encapsulated spark gap modules
- Visual and optional remote connector for signalling of the varistor status



7P.27.8.275.x020

- SPD Type 2 (2 varistors)
- Replaceable varistor modules
- Visual and optional remote connector for signalling of the varistor status



SPD specification		075.1015	130.1015	275.1020	440.1020	L-N	N-PE	L, N-PE
Nominal voltage (U_N)	V AC/DC	60/60	110/125	230/—	400/—	230/—	—	230/—
Maximum continous operating voltage (U_C)	V AC/DC	75/100	130/170	275/350	440/585	275/—	255/—	275/—
Nominal discharge current (8/20 µs) (I_n)	kA	15	15	20	20	20	20	20
Maximum discharge current (8/20 µs) (I_{max})	kA	40	40	40	40	40	40	40
Voltage protection level at 5kA (U_{P5})	kV	0.3	0.45	0.9	1.5	0.9	—	0.9
Voltage protection level at I_n(U_P)	kV	0.4	0.6	1.2	1.9	1.2	1.5	1.2
Response time (t_a)	ns	25				25	100	25
Short-circuit proof at maximum overcurrent protection	kA_{rms}	50			25	50	—	50
Maximum overcurrent protection (fuse rating gL/gG)		160 A			125 A	160 A	—	160 A
Replacement module code		*	**	***	****	7P.20.8.275.0020	7P.20.1.000.0020	7P.20.8.275.0020
Other technical data								
Ambient temperature range	°C	–40…+80						
Protection degree		IP20						
Wire size		solid cable					stranded cable	
	mm^2	1x1...1x35					1x1...1x25	
	AWG	1x17...1x2					1x17...1x4	
Wire strip length	mm	12						
Screw torque	Nm	3						
Remote status signalling contact specification								
Contact configuration		1 CO (SPDT)					1 CO (SPDT)	
Rated current	A AC/DC	0.5/0.1					0.5/0.1	
Rated voltage	V AC/DC	250/30					250/30	
Wire size (07P.01)		solid cable		stranded cable		solid cable	stranded cable	
	mm^2	1.5		1.5		1.5	1.5	
	AWG	16		16		16	16	
Approvals (according to type)		CE EAC						

Features

SPD Type 2 Surge arrester range - three phase systems

- Surge arrester suitable for 230/400 V system applications to protect equipments against induced overvoltage or switching transients
- To be installed at the boundary of LPZ 1-LPZ 2 zones or higher
- Visual indication of varistor status - Healthy/Replace
- Contact for remote signalling of varistor status. Connector (07P.01) included (depending on the version)
- Replaceable varistor and spark gap modules
- Complies with EN 61643-11:2012
- 35 mm rail (EN 60715) mounting

7P.23.8.275.1020 SPD Type 2 for three phase system without Neutral (PEN conductor).
- Varistor protection L1, L2, L3-PEN
- Replaceable varistor module

7P.24.8.275.x020 SPD Type 2 for three phase system with Neutral.
- Varistor protection L1, L2, L3 + Spark gap protection N-PE
- Replaceable varistor and spark gap modules

7P.25.8.275.x020 SPD Type 2 for three phase system with Neutral.
- Varistor protection L1, L2, L3, N-PE
- Replaceable varistor module

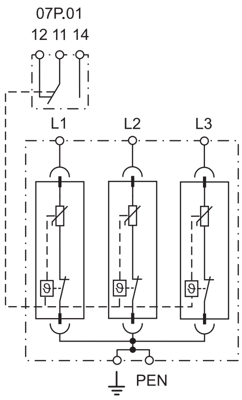
E

7P.23.8 / 7P.24 / 7P.25
Screw terminal

For outline drawing see page 15

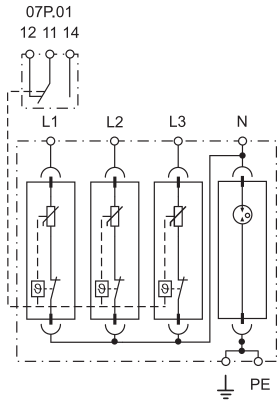
7P.23.8.275.1020

- SPD Type 2 (3 varistors)
- Replaceable varistor module, 3 pole
- Visual and remote signalling of varistor status



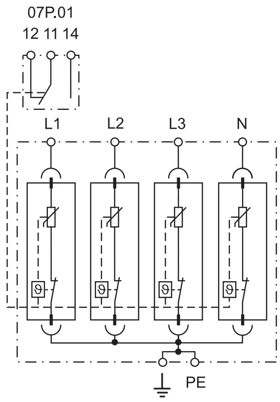
7P.24.8.275.x020

- SPD Type 2 (3 varistors + 1 spark-gap)
- Combination of replaceable varistor and encapsulated spark gap modules
- Visual and optional remote connector for signalling of the varistor status



7P.25.8.275.x020

- SPD Type 2 (4 varistors)
- Replaceable varistor module, 4 pole
- Visual and optional remote connector for signalling of the varistor status



SPD specification		7P.23.8.275.1020: L - PEN	7P.24.8.275.x020: L-N	7P.24.8.275.x020: N-PE	7P.25.8.275.x020: L, N-PE
Nominal voltage (U_N)	V AC	230	230	—	230
Maximum continous operating voltage (U_C)	V AC/DC	275/350	275/—	255/—	275/350
Nominal discharge current (8/20 μs) (I_n)	kA	20	20	20	20
Maximum discharge current (8/20 μs) (I_{max})	kA	40	40	40	40
Voltage protection level at 5kA (U_{P5})	kV	0.9	0.9	—	0.9
Voltage protection level at I_n (U_P)	kV	1.2	1.2	1.5	1.2
Response time (t_a)	ns	25	25	100	25
Short-circuit proof at maximum overcurrent protection	kA_{rms}	50	50	—	50
Maximum overcurrent protection (fuse rating gL/gG)		160 A	160 A	—	160 A
Replacement module code		7P.20.8.275.0020	7P.20.8.275.0020	7P.20.1.000.0020	7P.20.8.275.0020

Other technical data			
Ambient temperature range	°C	–40...+80	
Protection degree		IP20	
Wire size		solid cable	stranded cable
	mm²	1x1...1x35	1x1...1x25
	AWG	1x 17...1x2	1x 17...1x4
Wire strip length	mm	12	
Screw torque	Nm	3	

Remote status signalling contact specification		7P.23.8.275.1020		7P.24.8.275.x020		7P.25.8.275.x020	
Contact configuration		1 CO (SPDT)		1 CO (SPDT)		1 CO (SPDT)	
Rated current	A AC/DC	0.5/0.1		0.5/0.1		0.5/0.1	
Rated voltage	V AC/DC	250/30		250/30		250/30	
Wire size (07P.01)		solid cable	stranded cable	solid cable	stranded cable	solid cable	stranded cable
	mm²	1.5	1.5	1.5	1.5	1.5	1.5
	AWG	16	16	16	16	16	16

Approvals (according to type)

II-2015, www.findernet.com

Features

SPD Type 2 Surge arrester range for Photovoltaic applications

- Surge arrester for protection of DC side (420 V to 1,200 V) of systems in photovoltaic applications
- Protects equipment against inducedovervoltage caused by lightning strikes or switching transients

7P.26.9.420.1020, U_{CPV} = 420 V DC
7P.23.9.750.x020, U_{CPV} = 750 V DC
7P.23.9.200.1015, U_{CPV} =1,200 V DC

- Visual indication of varistor status - Healthy/Replace
- Contact for remote signalling of varistor status. Connector (07P.01) included (depending on the version)
- Replaceable modules
- Complies with prEN 50539-11:2010
- 35 mm rail (EN 60715) mounting

7P.26.9.420.1020

- SPD Type 2 (2 varistors + 1 spark-gap) for 420 V DC photovoltaic systems
- Combination of replaceable varistor and encapsulated spark gap modules
- Visual and remote signalling of varistor status

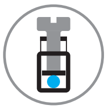
7P.23.9.750.x020

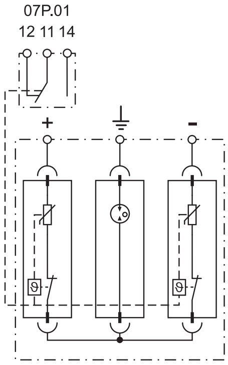
- SPD Type 2 (3 varistors) for 750 V DC photovoltaic systems
- Replaceable varistor modules
- Visual and optional remote connector for signalling of the varistor status

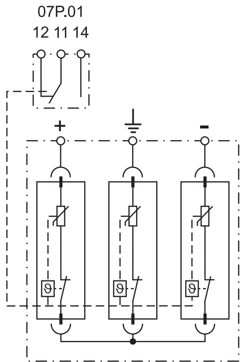
7P.23.9.200.1015

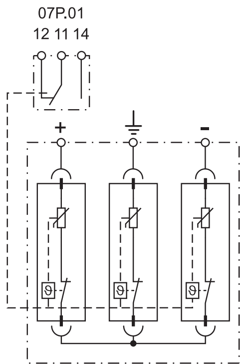
- SPD Type 2 (3 varistors) for 1200 V DC photovoltaic systems
- Replaceable varistor modules
- Visual and remote signalling of varistor status

7P.23.9 / 7P.26
Screw terminal









For outline drawing see page 15

SPD specification		7P.26.9.420.1020 Varistor module	7P.26.9.420.1020 Spark-gap module	7P.23.9.750.x020 Varistor module	7P.23.9.200.1015 Varistor module
Maximum operating voltage (U_{CPV})	V DC	420		750	1200
Maximum operating voltage /per module (U_{CPV})	V DC	375	420	375	600
Nominal discharge current (8/20 μs) /per module (I_n)	kA	20	20	20	15
Maximum discharge current (8/20 μs) /per module (I_{max})	kA	40	40	40	30
Voltage protection level per module (U_P)	kV	1.8	1.5	1.8	2.1
Voltage protection level of the system U_P (+ → –)/(+/– → PE)	kV	3.6/1.5		3.6/3.6	4.2/4.2
Response time (t_a)	ns	25	100	25	25
Short circuit current withstand I_{SCPV}	A	63	—	63	125
Replacement module code		7P.20.9.375.0020	—	7P.20.9.375.0020	7P.20.9.600.0015
Other technical data					
Ambient temperature range	°C	–40…+80			
Protection degree		IP20			
Wire size		solid cable		stranded cable	
	mm²	1x1…1x35		1x1…1x25	
	AWG	1x 17…1x2		1x 17…1x4	
Wire strip length	mm	14			
Screw torque	Nm	3			

Remote status signalling contact specification		7P.26.9.420.1020		7P.23.9.750.x020		7P.23.9.200.1015	
Contact configuration		1 CO (SPDT)		1 CO (SPDT)		1 CO (SPDT)	
Rated current	A AC/DC	0.5/0.1		0.5/0.1		0.5/0.1	
Rated voltage	V AC/DC	250/30		250/30		250/30	
Wire size (07P.01)		solid cable	stranded cable	solid cable	stranded cable	solid cable	stranded cable
	mm²	1.5	1.5	1.5	1.5	1.5	1.5
	AWG	16	16	16	16	16	16
Approvals (according to type)		CE EAC					

7P Series - Surge Protection Device (SPD)

finder

Features

SPD Type 1+2 and Type 2 Surge arrester range for Photovoltaic applications

- Surge arrester for protection of DC side (1,020 V) of systems in photovoltaic applications
- Protects equipment against overvoltage caused by direct lightning strike (Type 1+2 only) and induced overvoltages (Type 1+2 and Type 2)

7P.26.9.000.x015, U_{CPV} = 1,020 V DC (Type 2)
7P.23.9.000.x015, U_{CPV} = 1,020 V DC (Type 2)
7P.03.9.000.1012, U_{CPV} = 1,000 V DC (Type 1+2)

- Visual indication of varistor status - Healthy/Replace
- Contact for remote signalling of varistor status. Connector (07P.01) included (depending on the version)
- Replaceable modules
- Complies with prEN 50539-11:2010
- 35 mm rail (EN 60715) mounting

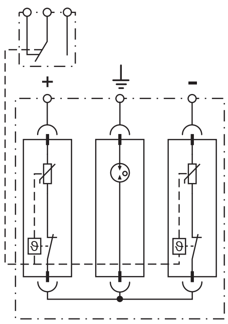
7P.23.9 / 7P.26 / 7P.03
Screw terminal

For outline drawing see page 15

E

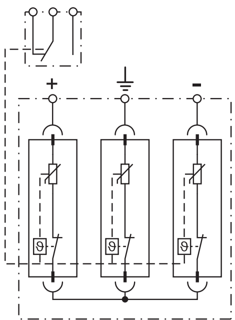
7P.26.9.000.x015

- SPD Type 2 (2 varistors + 1 spark-gap) for 1,020 V DC photovoltaic systems
- Combination of replaceable varistor and encapsulated spark gap modules
- Visual and optional remote connector for signalling of the varistor status



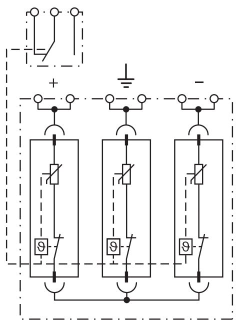
7P.23.9.000.x015

- SPD Type 2 (3 varistors) for 1,020 V DC photovoltaic systems
- Replaceable varistor modules
- Visual and optional remote connector for signalling of the varistor status



7P.03.9.000.1012

- SPD Type 1+2 (3 varistors) for 1,000 V DC photovoltaic systems
- Replaceable varistor modules
- Visual and remote signalling of varistor status



SPD specification		7P.26.9.000.x015 Varistor module	7P.26.9.000.x015 Spark-gap module	7P.23.9.000.x015 Varistor module		7P.03.9.000.1012 Varistor module	
Maximum operating voltage (U_{CPV})	V DC	1,020		1,020		1,000	
Maximum operating voltage /per module (U_{CPV})	V DC	510	1020	510		500	
Lightning impulse current (10/350 μs) /per module (I_{imp})	kA	—	—	—		12.5	
Nominal discharge current (8/20 μs) /per module (I_n)	kA	15	15	15		30	
Maximum discharge current (8/20 μs) /per module (I_{max})	kA	30	30	30		60	
Voltage protection level /per module (U_P)	kV	2	2.5	2		1.8	
Voltage protection level of the system U_P (+ → –)/(+/– → PE)	kV	4/2.5		4/4		3.6/3.6	
Response time (t_a)	ns	25	100	25		25	
Short circuit current withstand I_{SCPV}	A	125	—	125		125	
Replacement module code		7P.20.9.500.0015	7P.20.1.000.9015	7P.20.9.500.0015		7P.00.9.500.0012	
Other technical data							
Ambient temperature range	°C	–40...+80					
Protection degree		IP20					
Wire size		solid cable		stranded cable		solid cable	stranded cable
	mm²	1x1...1x35		1x1...1x25		1x2.5...1x50	1x2.5...1x35
	AWG	1x17...1x2		1x17...1x4		1x13...1x1	1x13...1x2
Wire strip length	mm	14				9	
Screw torque	Nm	3				4	
Remote status signalling contact specification							
Contact configuration		1 CO (SPDT)		1 CO (SPDT)		1 CO (SPDT)	
Rated current	A AC/DC	0.5/0.1		0.5/0.1		0.5/0.1	
Rated voltage	V AC/DC	250/30		250/30		250/30	
Wire size (07P.01)		solid cable	stranded cable	solid cable	stranded cable	solid cable	stranded cable
	mm²	1.5	1.5	1.5	1.5	1.5	1.5
	AWG	16	16	16	16	16	16
Approvals (according to type)							

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Features

SPD Type 3, Surge arrester for TT and TN-S system (with Neutral)
Single phase applications within socket outlets and 35 mm rail mounting

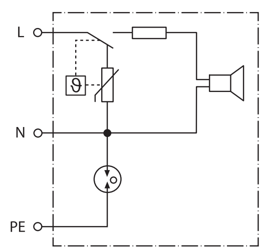
- Protects electrical and electronic equipment sensitive to impulse overvoltage
- "1+1" configuration: varistor + spark gap protection (avoiding earth leakage current)
- Conforms to EN 61643-11

7P.32.8.275.2003
- Provides easy additional surge protection for 230 V sockets
- Acoustic indication of need to replace varistor
- 3-wires, 150 mm long, for connection to socket terminals

7P.37.8.275.1003
- Permits serial connection for optimized load protection up to 16 A
- Integrated remote signalling contact of varistor status
- Relay with gold change-over contact for reliable low level switching
- 17.5 mm L-N/N-PE protection
- Mounting on 35mm DIN rail (EN60715)

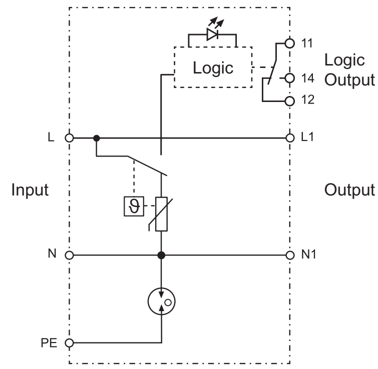
7P.32.8.275.2003

- SPD Type 3
- Acoustic (buzzing) signalling of varistor fault



7P.37.8.275.1003

- SPD Type 3
- Series connection for protection of loads up to 16 A
- Remote signalling of varistor status by integral change-over relay contact



* see diagram L7P page 21
For outline drawing see page 15, 16

		7P.32.8.275.2003	7P.37.8.275.1003	
SPD specification				
Nominal voltage (U_N)	V AC	230	230	
Maximum continuous operating voltage (U_C)	V AC	275	275	
Rated load current I_L	A	–	16	
Nominal discharge current (8/20 μs) L-N, L(N)-PE (I_n)	kA	3/3	3/3	
Test voltage of the combined generator L-N, L(N)-PE (U_{OC})	kV	6/6	6/6	
Voltage protection level L-N, L(N)-PE (U_P)	kV	1/1.5	1/1.5	
Response time L-N, L(N)-PE (t_a)	ns	25/100	25/100	
Short-circuit proof at maximum overcurrent protection	kA_{rms}	6	5	
Maximum overcurrent protection		16A gL/gG, C16 A	16A gL/gG, B16A, C16A	
Other technical data				
Ambient temperature range	°C	–25…+80	–25…+70*	
Protection degree		IP 20	IP 20	
Wire size		–	solid cable	stranded cable
	mm^2	–	0.5…6	0.5…4
	AWG	–	20…10	20…12
Wire strip length	mm	–	9	
Screw torque	Nm	–	0.8	
Remote status signalling contact specification				
Contact configuration		–	1 CO (SPDT)	
Rated current	A AC	–	0.5	
Rated voltage	V AC	–	230	
Breaking capacity DC1: 30/110	A	–	2/0.3	
Minimum switching load	mW (V/mA)	–	10 (5/5)	
Contact material		–	AgNi + Au	
Approvals (according to type)		CE EAC	CE EAC	

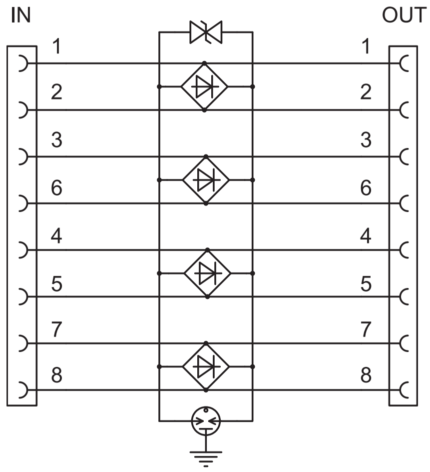
Features

Data line SPD for Ethernet Cat. 6

- Suitable for Ethernet, POE (Power over Ethernet) and dataline transmission system up to 250 MHz
- Protection of all pairs of conductors with minimum attenuation
- Aluminum chassis and RJ45 in metal screens
- Included accessories for simple installation near the equipment to be protected, LPZ boundary 2-3 (Type 3)
- Complies to EN 61643-21
- Mounting on 35mm DIN rail

7P.68.9.060.0600

- Ethernet Cat 6 - 60 V
- Shielded RJ45 connectors



For outline drawing see page 16

SPD specification		
Nominal voltage of system (U_N)	V DC	48
Maximum operating voltage (U_C)	V DC	60
Nominal current I_L	mA	500
C2 total nominal discharge current (8/20 μs) line - PG (I_n)	kA	1.6
C2 nominal discharge current (8/20 μs) line-line (I_n)	A	200
Voltage protection level line-line @ In (C2) - (Up)	V	40
Voltage protection level line-PG @ In (C2) - (Up)	V	350
Voltage protection level line-line @ 1kV/μs (C3) - (Up)	V	65
Insertion attenuation @ 250 MHz	dB	<2
Response time	ns	1
Other technical data		
Ambient temperature	°C	–40…+80
Degree of protection		IP 20
Input-Output connection		RJ45/RJ45 shielded
Approvals (according to type)		CE

Ordering information

Example: 7P series, surge protection device, Type 2, single phase (Uc = 275 V), 1 varistor + 1 encapsulated spark gap, with remote status signalling contact, In = 20 kA

7 P . 2 2 . 8 . 2 7 5 . 1 0 2 0

Series

Type
0 = Combined type 1 + 2 arresters high discharge capability
1 = Type 1+2 high performance “Low U_p” surge arresters
2 = Type 2 surge arresters
3 = Type 3 surge arresters
6 = Data line SPD

Circuit
1 = Single phase (1 varistor)
2 = Single phase (1 varistor + 1 spark-gap)
3 = Three-phase (3 varistors)
4 = Three-phase (3 varistors + 1 spark-gap)
5 = Three-phase (4 varistors)
6 = 2 varistors + 1 spark-gap
7 = Single phase (2 varistors) Type 2 (7P.27)
7 = Single phase (1 varistor + 1 spark gap) Type 3, DIN rail mounting (7P.37)
8 = Protected poles (Data line SPD)
9 = N-PE spark-gap for three phase system
0 = Spare module

Supply version
1 = N+PE connection (only for single spark gap replaceable module and 7P.09)
8 = AC (50/60 Hz)
9 = DC (PV application and Data line SPD)

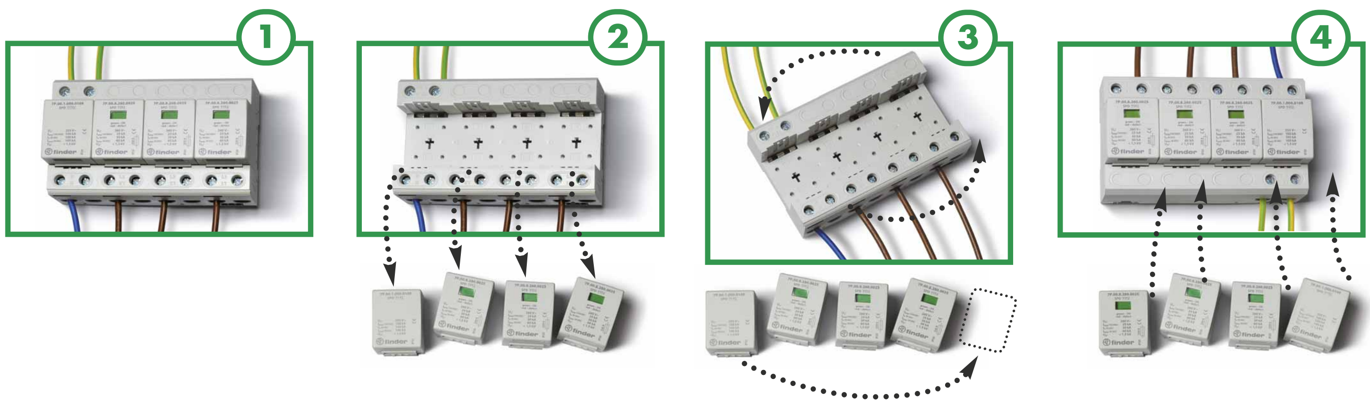
Supply voltage
000 = 1,000 V DC Max PV SPD T1+2 (7P.03.9), 1,020 V DC Max PV SPD T2 (7P.23.9, 7P.26.9) or N+PE connection for spark gap modules
060 = 60 V DC Max (Uc) and Data line SPD
075 = 75 V AC
130 = 130 V AC
200 = 1,200 V DC Max
420 = 420 V DC Max
750 = 750 V DC Max
440 = 440 V Max (Uc) for SPD Type 2 (for U_N = 400 V AC)
275 = 275 V Max for SPD Type 1+2 “Low U_p”, Type 2 (U_c) (for U_N = 230-240 V AC) and Type 3
260 = 260 V Max (U_c) for SPD Type 1+ 2 (for U_N = 230-240 V AC)
255 = 255 V Max (U_c) for SPD Type 1, N+PE (7P.09)

Nominal discharge current
100 = 100 kA (I_{imp} Type 1) only for 7P.09, N-PE GDT for 7P.04
050 = 50 kA (I_{imp} Type 1 N-PE GDT for 7P.02)
025 = 25 kA (I_{imp} Type 1+2)
020 = 20 kA (I_n Type 2)
015 = 15 kA (I_n Type 2)
012 = 12.5 kA (I_{imp} Type 1+2)
003 = 3 kA (In @ U_{oc} only for 7P.32 and 7P.37)
600 = Ethernet Cat 6 (Data line SPD)

Remote status signalling contact
0 = Without remote status signalling contact (only some Type 2 SPD and Data line)
1 = Built-in remote status signalling contact
2 = Acoustic fault signalling
6 = Upside down screw position

E

Upside down mounting



Replaceable modules

Replacement varistor and Spark-Gap modules	7P.00.8.260.0025	7P.00.9.500.0012	7P.00.1.000.0050	7P.00.1.000.0100
	Varistor	Varistor	Spark-Gap	Spark-Gap
Maximum operating voltage (U_C/U_{CPV}) V AC/DC	260 / —	— / 500	255 / —	255 / —
Lightning Impulse current (10/350 μs) (I_{imp}) kA	25	12.5	50	100
Nominal discharge current (8/20 μs) (I_n) kA	30	30	100	100
Maximum discharge current (8/20 μs) (I_{max}) kA	60	60	100	100
Voltage protection level (U_P) kV	1.5	1.8	1.5	1.5
Response time (t_a) ns	25	25	100	100
Maximum overcurrent protection	250 A gL/gG	—	—	—

Replacement varistor and Spark-Gap modules	7P.10.8.275.0012	7P.10.1.000.0025
	Varistor	Spark-Gap
Maximum operating voltage (U_C) V AC	275	255
Lightning Impulse current (10/350 μs) (I_{imp}) kA	12.5	25
Nominal discharge current (8/20 μs) (I_n) kA	30	30
Maximum discharge current (8/20 μs) (I_{max}) kA	60	60
Voltage protection level (U_P) kV	1.2	1.5
Response time (t_a) ns	25	100
Maximum overcurrent protection	160 A gL/gG	—

Replacement varistor modules	7P.20.8.075.0015	7P.20.8.130.0015	7P.20.8.275.0020	7P.20.8.440.0020
	Varistor	Varistor	Varistor	Varistor
Maximum operating voltage (U_C) V AC/DC	75/100	130/170	275 /350	440/585
Nominal discharge current (8/20 μs) (I_n) kA	15	15	20	20
Maximum discharge current (8/20 μs) (I_{max}) kA	40	40	40	40
Voltage protection level (U_P) kV	0.4	0.6	1.2	1.5
Response time (t_a) ns	25	25	25	25
Maximum overcurrent protection	160 A gL/gG	160 gL/gG	160 gL/gG	125 gL/gG

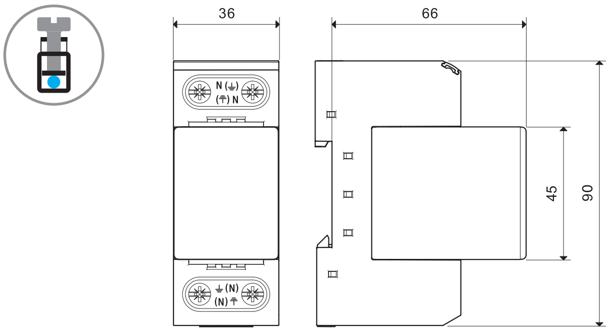
Replacement varistor modules	7P.20.9.375.0020	7P.20.9.500.0015	7P.20.9.600.0015
	Varistor	Varistor	Varistor
Maximum operating voltage (U_C/U_{CPV}) V AC/DC	— / 375	— / 510	— / 600
Nominal discharge current (8/20 μs) (I_n) kA	20	15	15
Maximum discharge current (8/20 μs) (I_{max}) kA	40	30	30
Voltage protection level (U_P) kV	1.8	2	2.1
Response time (t_a) ns	25	25	25
Maximum overcurrent protection	125 A gL/gG	—	—

Replacement Spark-Gap modules	7P.20.1.000.0020	7P.20.1.000.9015
	Spark-Gap	Spark-Gap
Maximum operating voltage (U_C/U_{CPV}) V AC/DC	255 /—	— / 1,020
Nominal discharge current (8/20 μs) (I_n) kA	20	15
Maximum discharge current (8/20 μs) (I_{max}) kA	40	30
Voltage protection level (U_P) kV	1.5	2.5
Response time (t_a) ns	100	100
Maximum overcurrent protection	—	—

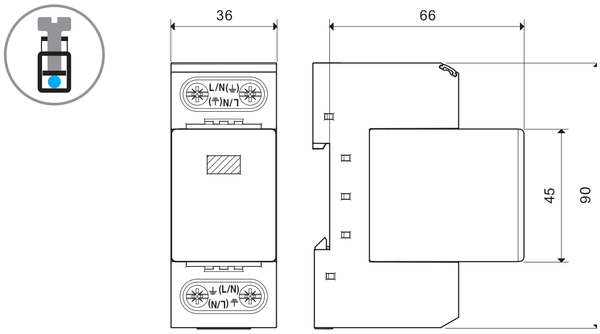
Temporary Overvoltage (TOV)	7P.32.8.275.2003	7P.37.8.275.1003
Transient OverVoltage 5s L-N (U_{TOV}) V	335	335
Transient OverVoltage 5s L-PE (U_{TOV}) V	400	400
Transient OverVoltage 200 ms L-PE (U_{TOV}) V	1,430	1,430

Outline drawings

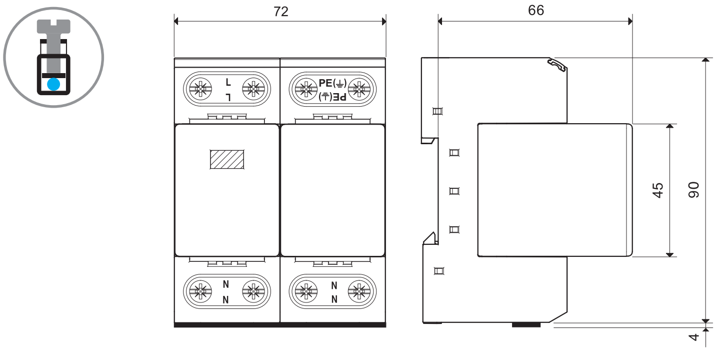
Type 7P.09
Screw terminal



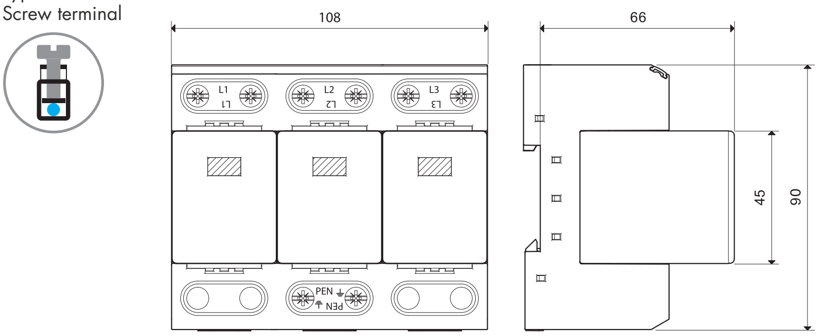
Type 7P.01
Screw terminal



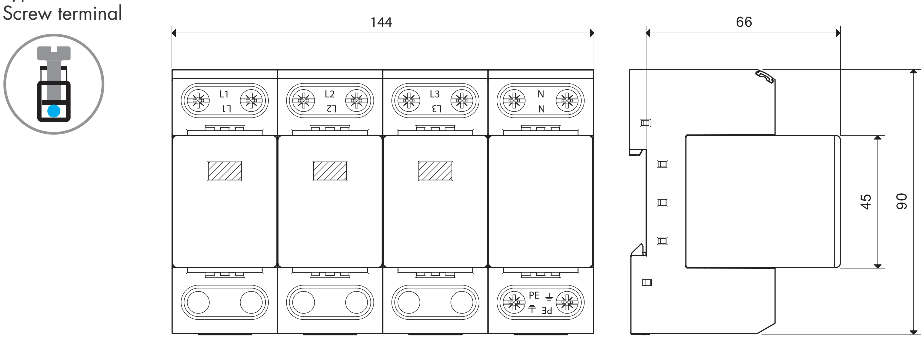
Type 7P.02
Screw terminal



Type 7P.03
Screw terminal

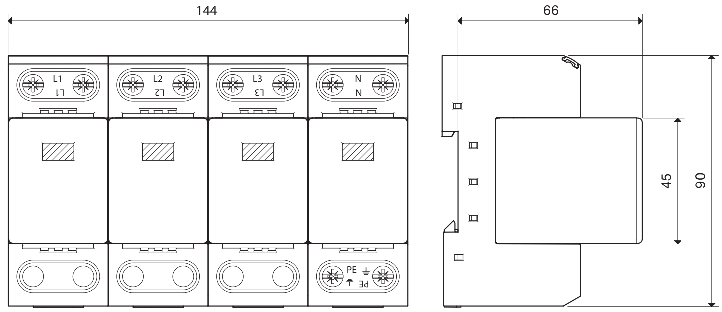


Type 7P.04
Screw terminal

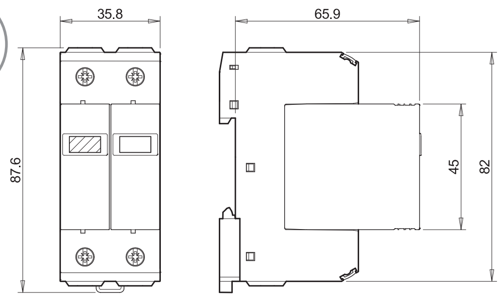


Outline drawings

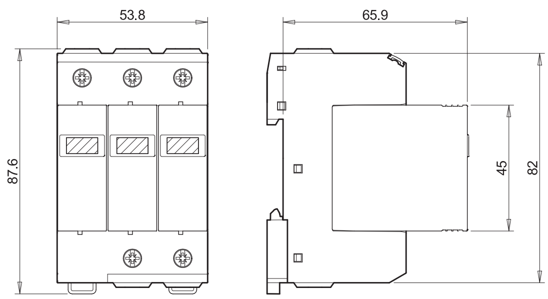
Type 7P.05
Screw terminal



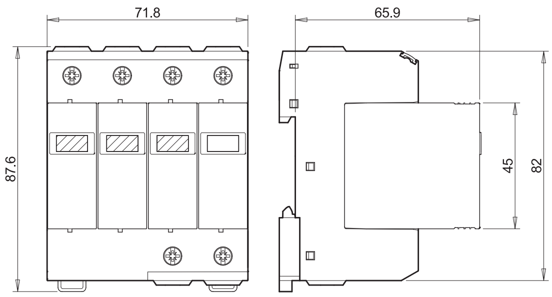
Type 7P.12
Screw terminal



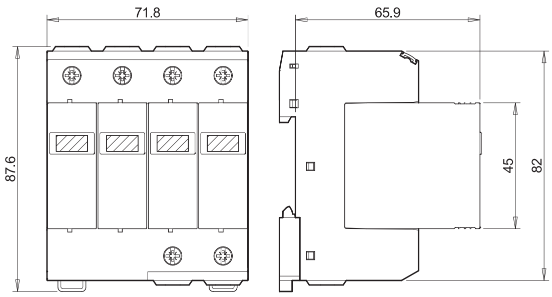
Type 7P.13
Screw terminal



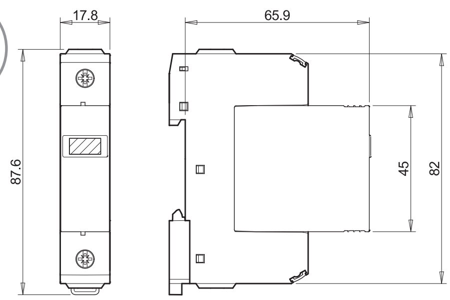
Type 7P.14
Screw terminal



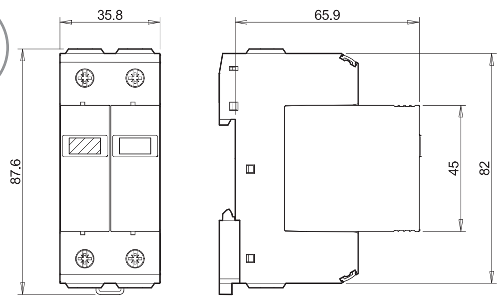
Type 7P.15
Screw terminal



Type 7P.21
Screw terminal

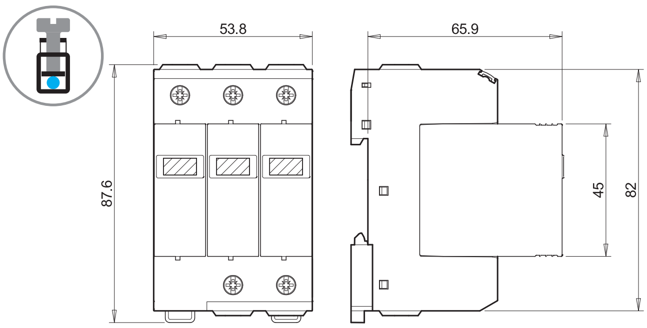


Type 7P.22 / 7P.27
Screw terminal

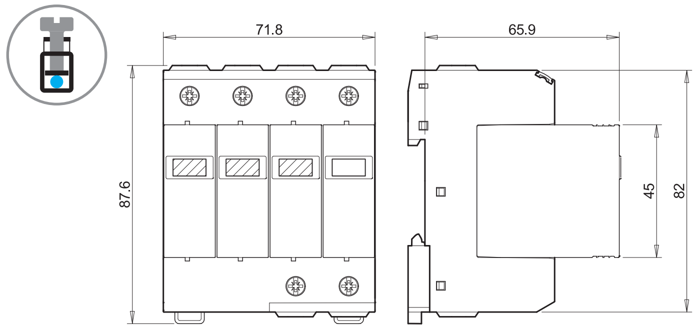


Outline drawings

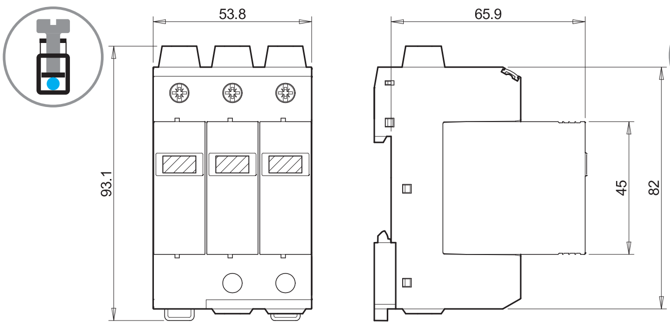
Type 7P.23.8
Screw terminal



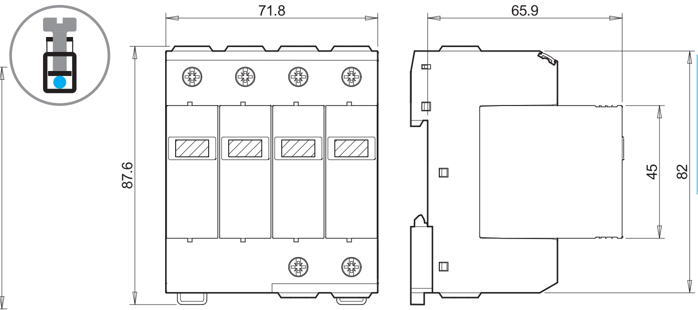
Type 7P.24
Screw terminal



Type 7P.23.9
Screw terminal

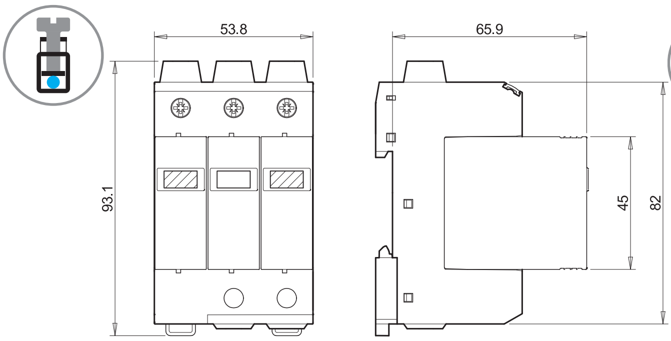


Type 7P.25
Screw terminal

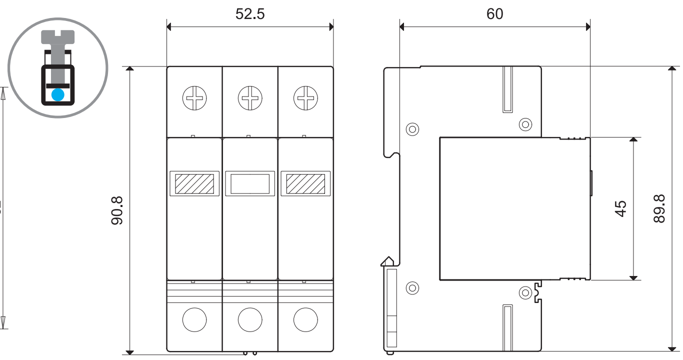


E

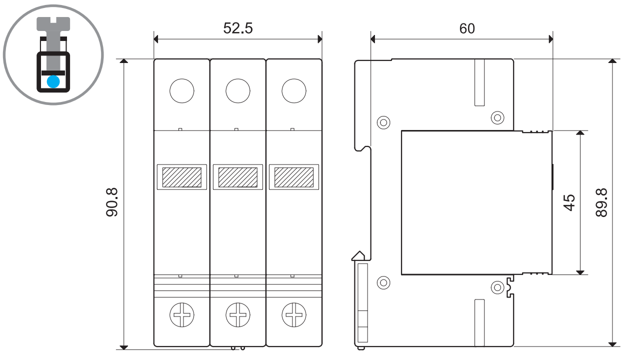
Type 7P.26.9.000.1015
Screw terminal



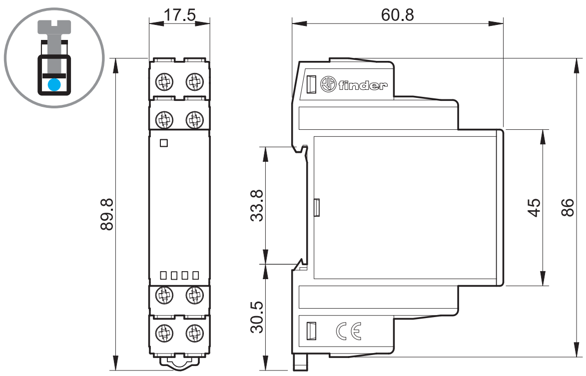
Type 7P.26.9.420.1020
Screw terminal



Type 7P.23.9.000.6020
Screw terminal

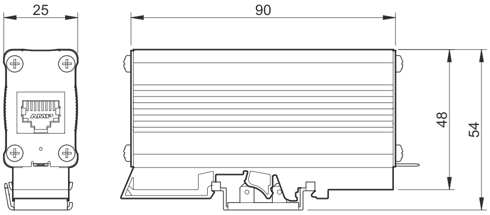


Tipo 7P.37.8.275.1003
Screw terminal

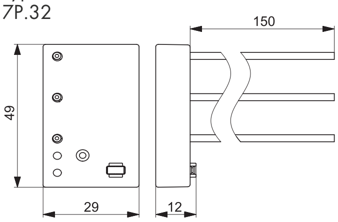


Outline drawings

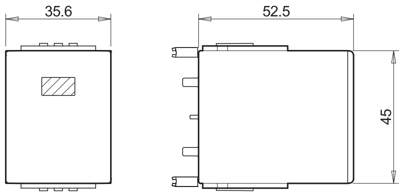
Type 7P.68.9.060.0600
Screw terminal



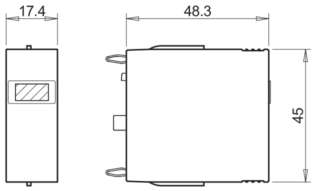
Type
7P.32



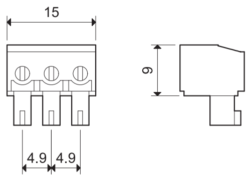
Type 7P.00
Replaceable module



Type 7P.10/20
Replaceable module

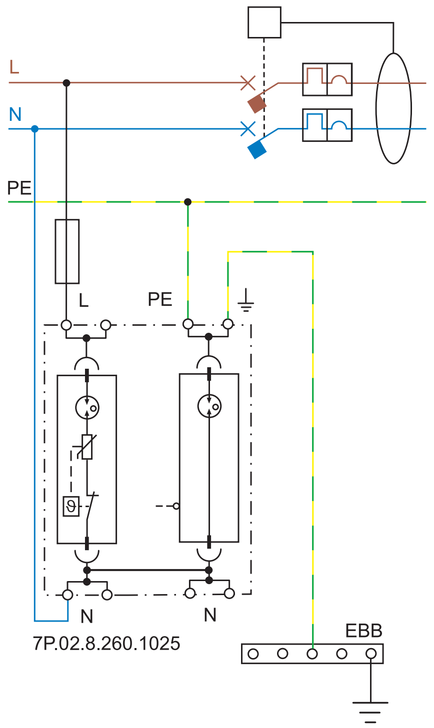


07P.01
Connector

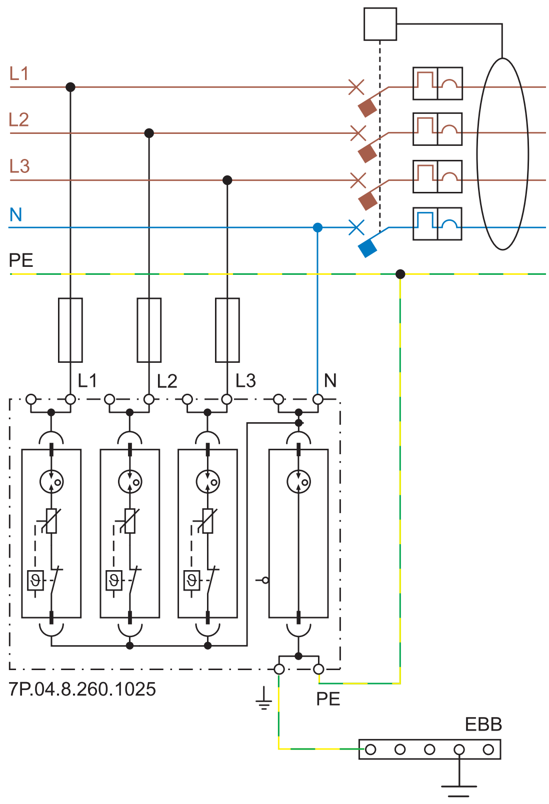


Installation example - SPD Type 1 + 2

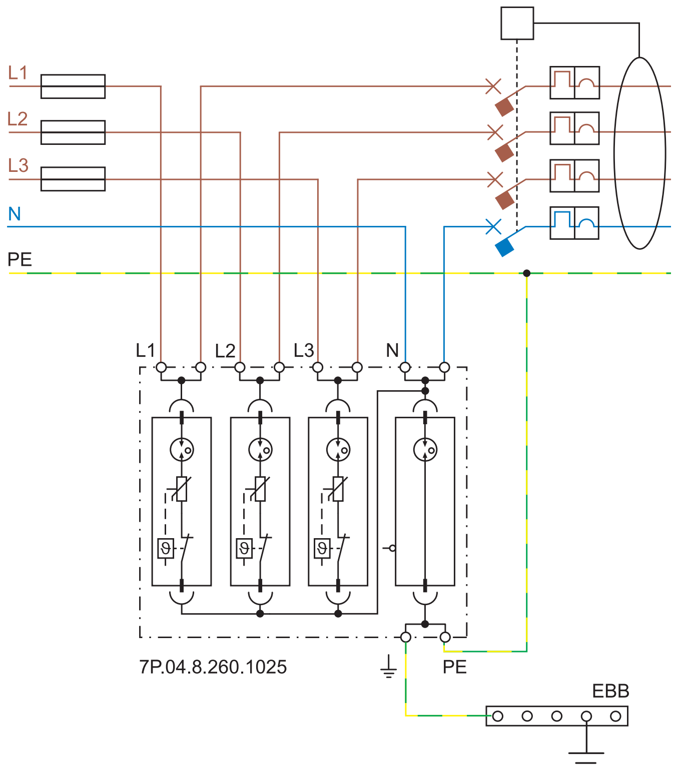
TT-SINGLE PHASE SYSTEM - SPD UP-STREAM OF RCD



TT-THREE PHASE SYSTEM - SPD UP-STREAM OF RCD

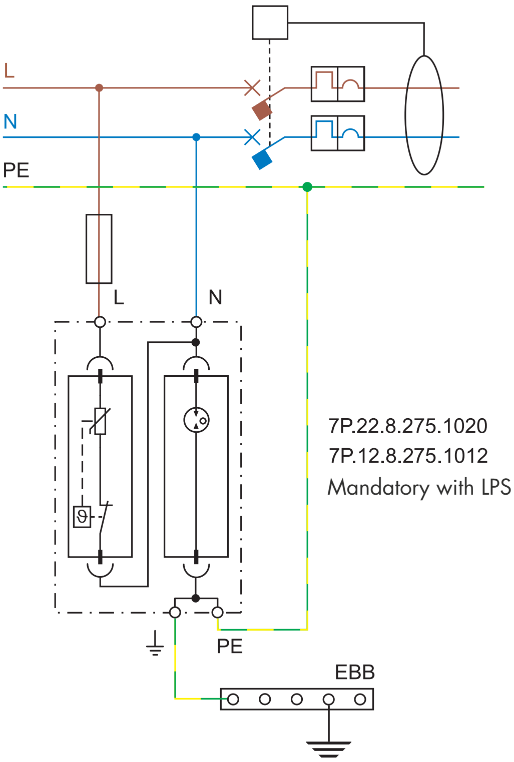


Wiring diagrams "V-shape" (fuse max = 125 A)

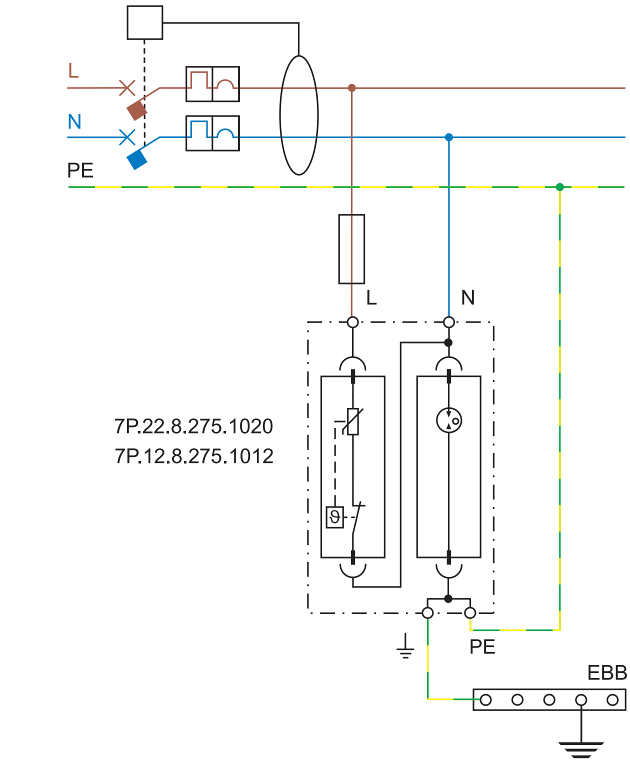


Installation example for SPD Type 1 + 2 and Type 2 - Single phase

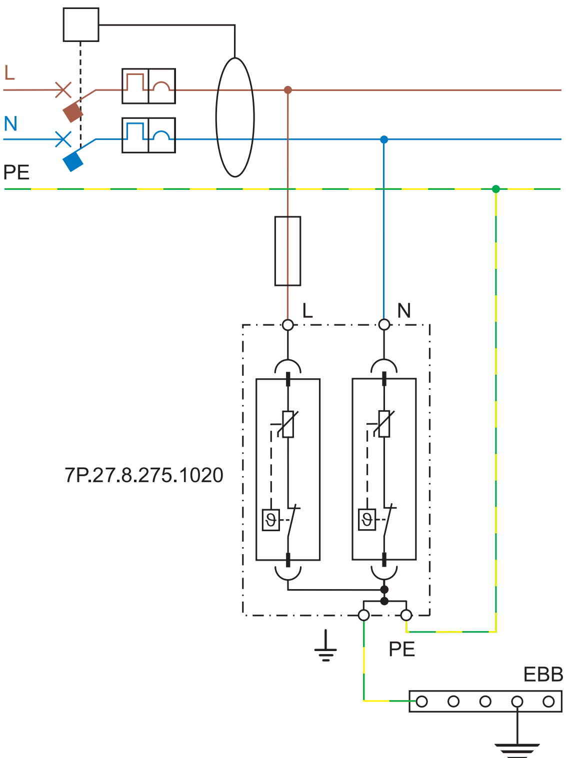
TT-SINGLE PHASE SYSTEM - SPD UP-STREAM OF RCD



TT or TN-S SINGLE PHASE SYSTEM - SPD DOWN-STREAM OF RCD

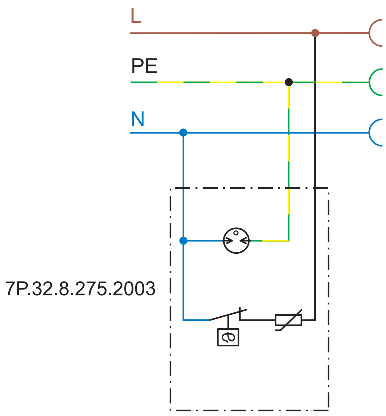


TN-S SINGLE PHASE SYSTEM - SPD DOWN-STREAM OF RCD



Installation example for SPD Type 3

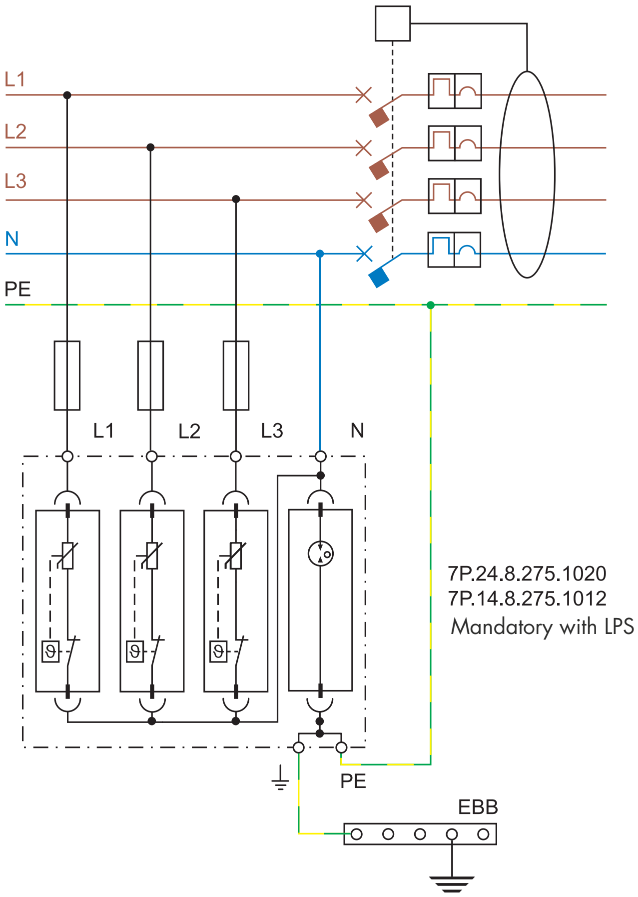
TT or TN-S SINGLE PHASE SYSTEM - INCORPORATED IN SOCKET OUTLET



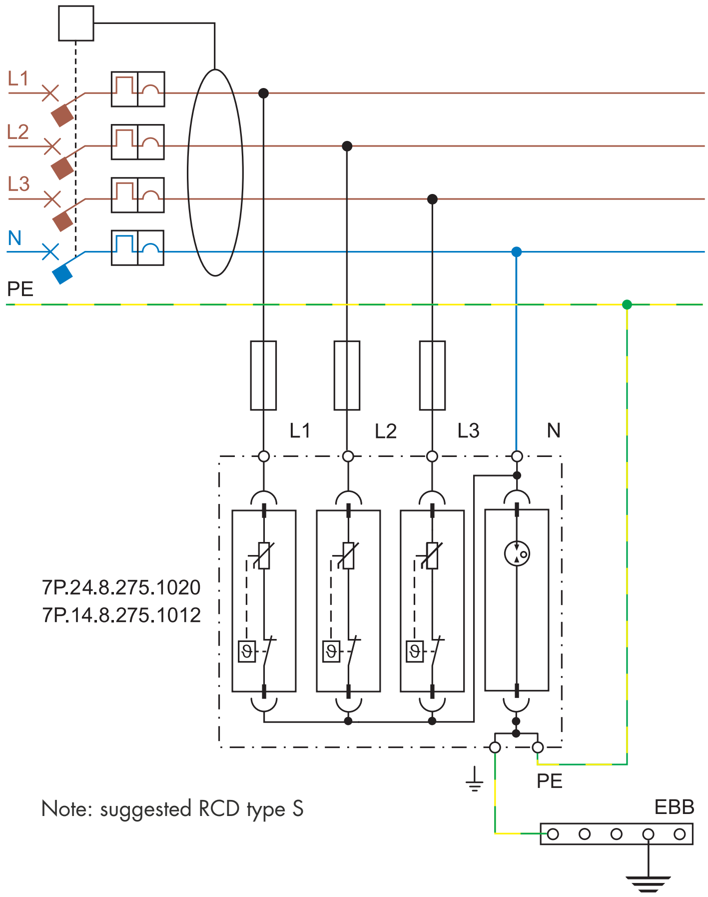
Note: suggested RCD type S

Installation example for SPD Type 1 + 2 and Type 2 - Three phase

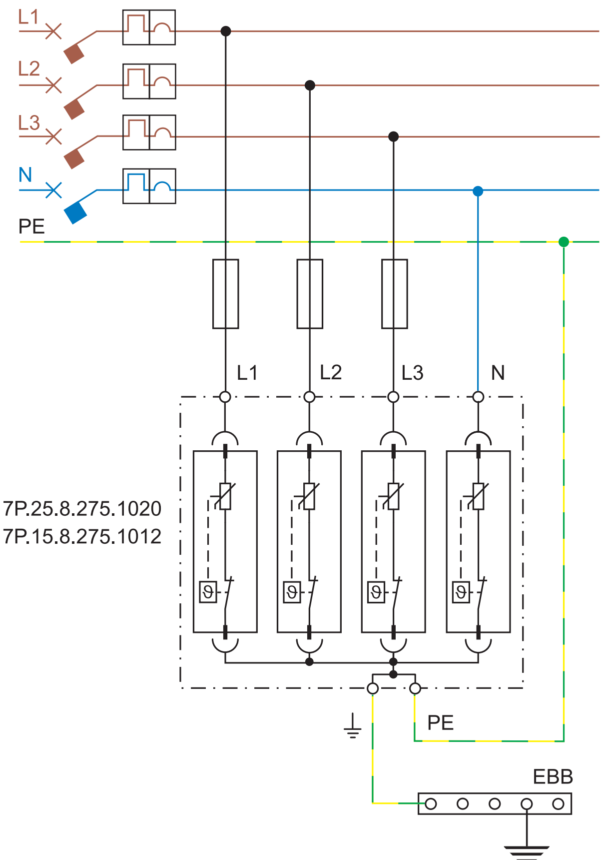
TT-THREE PHASE SYSTEM - SPD UP-STREAM OF RCD



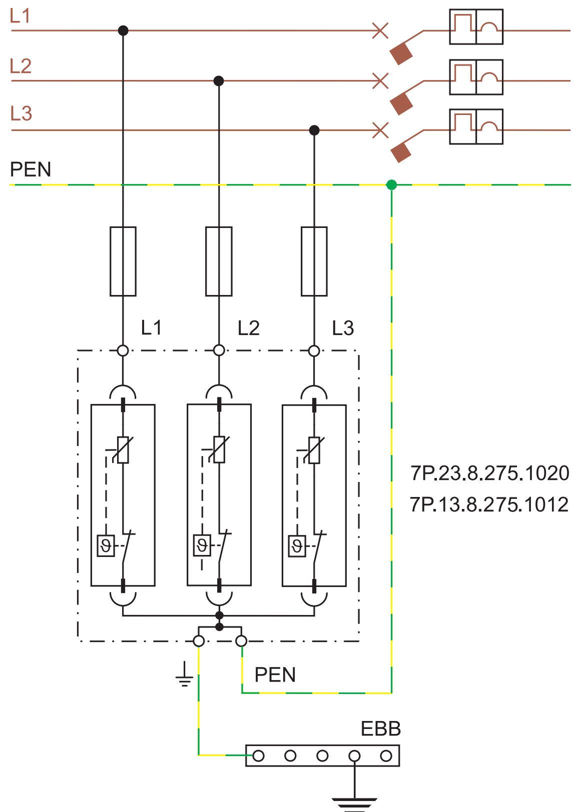
TT or TN-S THREE PHASE SYSTEM - SPD DOWN-STREAM OF RCD



TN-S THREE PHASE SYSTEM - SPD DOWN-STREAM OF OVERCURRENT PROTECTION



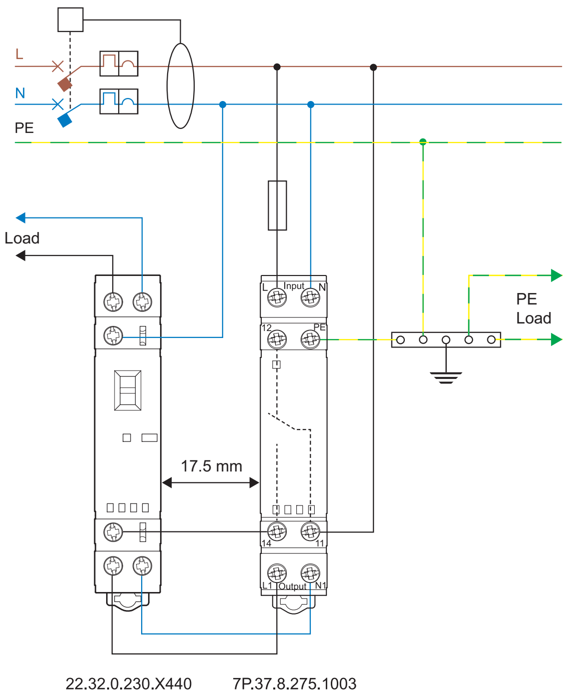
TN-C THREE PHASE SYSTEM - SPD UP-STREAM OF OVERCURRENT PROTECTION



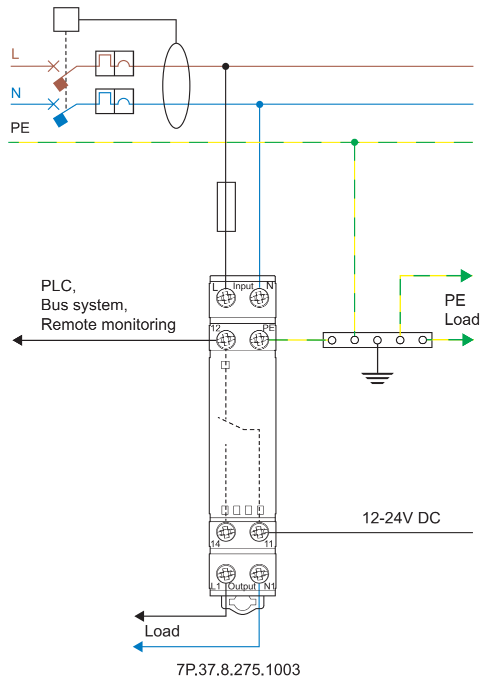
7P Series - Surge Protection Device (SPD)

Installation example for SPD Type 3 - Single phase

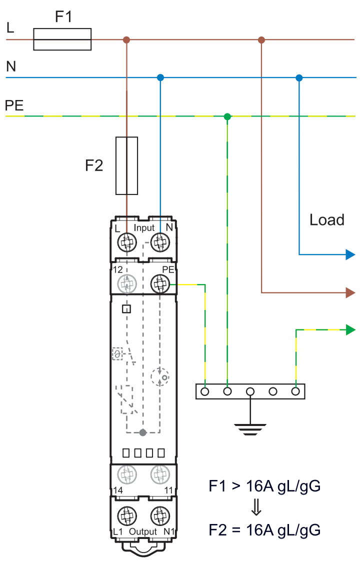
TT or TN-S SINGLE PHASE SYSTEM - SPD DOWN-STREAM OF RCD
Serial connection



TT or TN-S SINGLE PHASE SYSTEM - SPD DOWN-STREAM OF RCD
Serial connection + BUS line

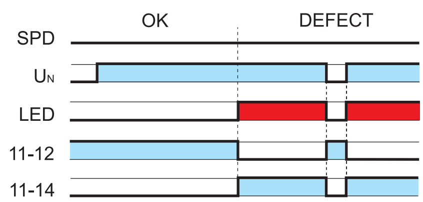


TT, TN-S SINGLE PHASE: parallel connection



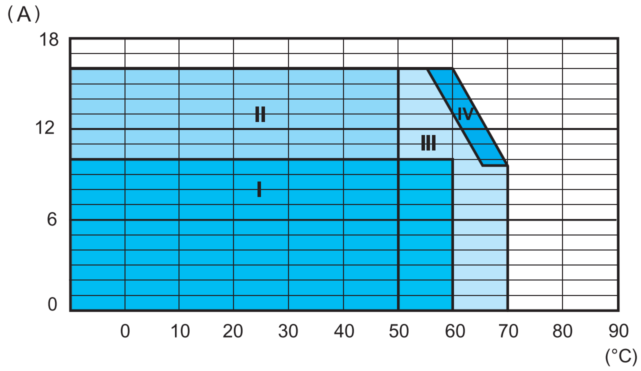
Function

Visual local LED signalling and remote signalling of varistor status

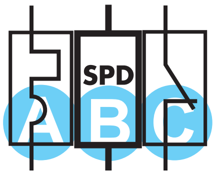


E

L7P Temperature/Current diagram for model 7P.37

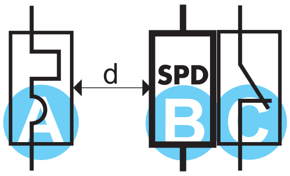


Zone I: SPD and other devices installed as a group (without gap)

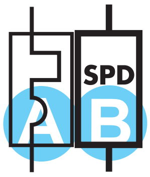


A MCB = B10A, C10A
B 7P.37.8.275.1003
C 22.32.0.xxx.x4x0

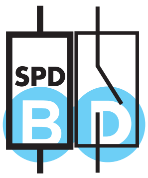
Zone II: SPD spaced, at least from one side, from components that generate heat during their operation (17.5 mm gap)



A MCB = B16A, C16A
B 7P.37.8.275.1003
C 22.32.0.xxx.x4x0
d 17.5 mm

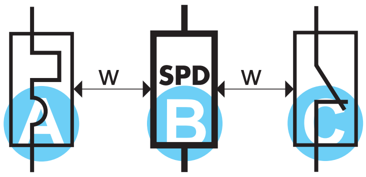


A MCB = B16A, C16A
B 7P.37.8.275.1003



B 7P.37.8.275.1003
D 22.32.0.xxx.x3x0
22.32.0.xxx.x4x0

Zone III: SPD spaced, on both side, from components that generate heat during their operation (20 mm gap)

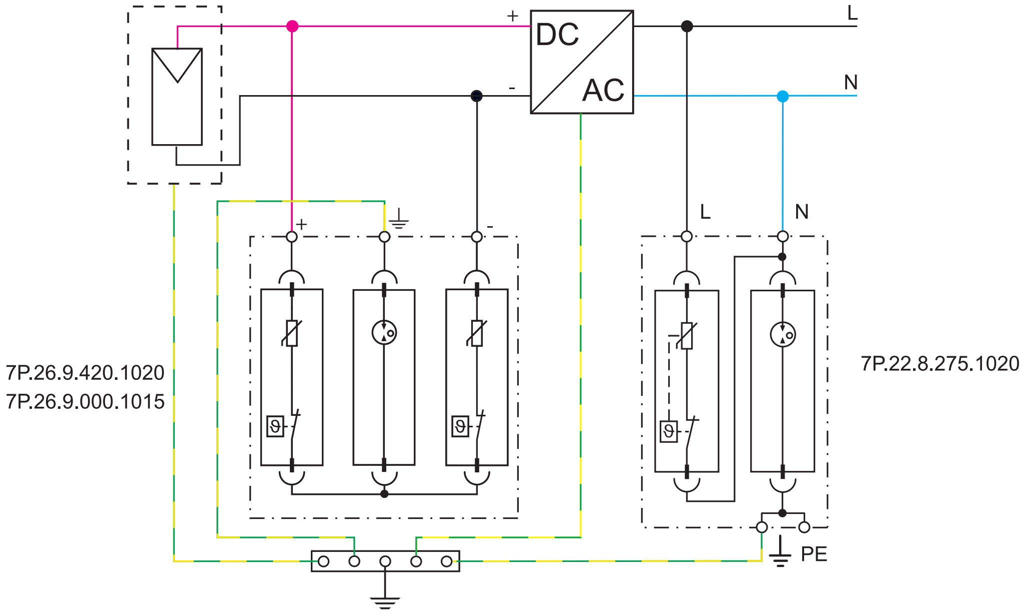


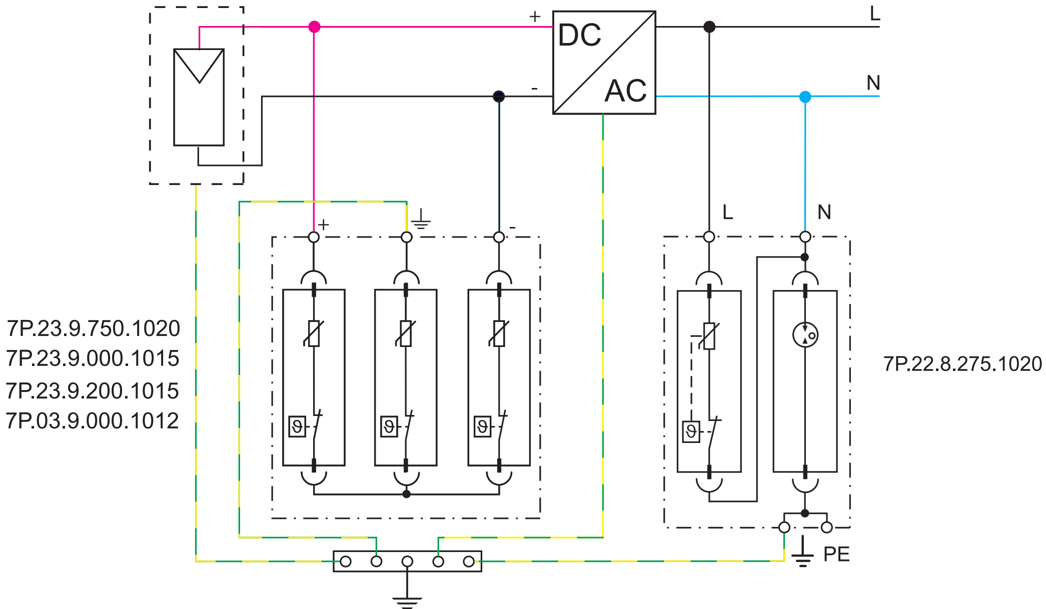
A MCB = B16A, C16A
B 7P.37.8.275.1003
C 22.32.0.xxx.x4x0
W 20 mm

Zone IV: SPD installed individually in free air (without significant influence from nearby components)

B 7P.37.8.275.1003

Installation examples - photovoltaic





SURGE VOLTAGE PROTECTORS

Surge voltage protectors (such as Finder's Surge Protection Devices, SPD) are intended to be installed in electrical systems, to protect people and machines from surge voltages that can occur on the electrical supply line and which would otherwise have disastrous consequences. These surge voltages can be atmospheric (lightning) or can originate on the electrical system due to, for example: the opening and closing of large loads, short circuits, or the switching of large power factor correction capacitors. The SPD can be described as a switch that is in parallel with the electrical system's supply line - which it is protecting. At the nominal network voltage (e.g. 230 V) the SPD appears as an open switch, having a very high impedance (almost infinite). But, under an overvoltage condition its impedance rapidly falls to near 0 Ω. This effectively applies a short circuit across the supply lines and immediately "drains" the overvoltage to earth. In this way the supply line is protected wherever an SPD is installed. When the overvoltage has passed, the SPD impedance rises rapidly and resumes the state of an open switch again.

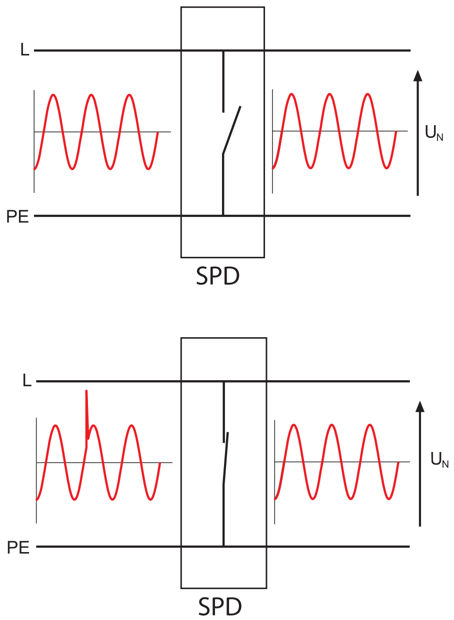


Figure 1: Ideal operation of an SPD

SPD technologies

Finder surge voltage protectors use either varistors or spark gaps.

Varistor: This can be considered as a variable resistance that at nominal voltage has a very high ohmic value. But the resistance rapidly falls to near zero as the voltage surges. In this way the varistor applies a near short circuit which clamps the surge voltage. The varistor is however subject to progressive degradation due to the small leakage current that occurs at the nominal voltage, and with the number of interventions. With every overvoltage that occurs the leakage current rises and accelerates the end of life for the device - which is ultimately indicated by the change from green to red in the signal-window.

Spark gap: This comprises two electrodes separated by air, or a gas. When a surge voltage occurs an electrical arc bridges the gap and a surge current flows to limit the surge voltage to a low and constant level. The arc extinguishes only when the surge current falls below about 10 ampere. The gas guarantees a constant level of breakdown voltage since the arc is struck in a protected environment; not exposed to pressure or humidity variations or impurities as would happen if it had occurred in air. There is however, a delay before the device arcs and the surge current is diverted, and this is dependent on the magnitude of the original voltage surge and on its rate of rise. Therefore, the voltage protection level can vary, although it is guaranteed to be less than U_p.

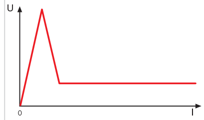
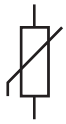
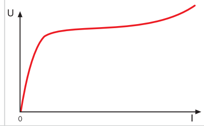
Component	Symbol	Leakage current	Energy dissipated	Response time	Voltage/Current characteristic
Ideal		0	High	Fast	
Spark gap		0	High	Medium	
Varistor		Very Low	Medium	Fast	

Figure 2: SPD component characteristics.

Installation (Overvoltage) categories

Choosing the SPD requires matching the Rated Impulse Voltage of the SPD with that of the equipment to be protected. This in turn relates to the Installation category (Overvoltage category). Installation categories are described within IEC 60664-1, which for a 230/400 V installation prescribes as follows:

- **Installation category I:** 1.5 kV for "particularly sensitive" equipment (e.g. electronic devices like PC or TV set);
- **Installation category II:** 2.5 kV for "user" equipment subject to "normal" impulse voltages (e.g. household electrical appliances, mobile items);
- **Installation category III:** 4 kV for equipment that are part of a fixed installation (e.g. switchboards, switches)
- **Installation category IV:** 6 kV for equipment installed at or near the origin of main incoming supply mains (e.g. energy meters).

Lightning Protection Zones and installation considerations

International standards refer to the various Lightning Protection Zones by the letters LPZ followed by an appropriate number.

LPZ 0A: An external area, where a direct lightning strike is possible and where there is total exposure to the electromagnetic field induced by the lightning.

LPZ 0B: An external area, but below a lightning conductor providing direct lightening strike protection. There remains total exposure to the electromagnetic field.

LPZ 1: Area within a building – therefore protected from direct lightning strike. The electromagnetic field will be attenuated, depending on the degree of shielding. This zone has to be protected by SPD type 1 device(s) at its boundary with the LPZ 0A or 0B zone.

LPZ 2: An area, typically a room, where the lightning current has been limited by preceding surge protectors. This zone has to be protected by SPD type 2 device(s) at its boundary with the LPZ 1 zone.

LPZ 3: An area within a room where the lightning current has been limited by preceding surge protectors (typically the wiring after a socket or an area within a metal enclosure). This zone has to be protected by SPD type 3 device(s) at its boundary with the LPZ 2 zone.

On the following picture (Figure 3, representation is not binding) it is shown that the transition from a protection zone to the next is through the installtion of SPD. SPD Type 1 must be connected upstream the system, at the point of delivery connection. As an alternative it is possible to use SPD Type 1+2. The grounding conductor must have a minimum section of 6 mm² for SPD Type 1, of 4 mm² for SPD Type 2, and 1.5 mm² for SPD Type 3 (If the building has an LPS, reference should be made to CEI 81-10/4 for the correct dimension of the cable).

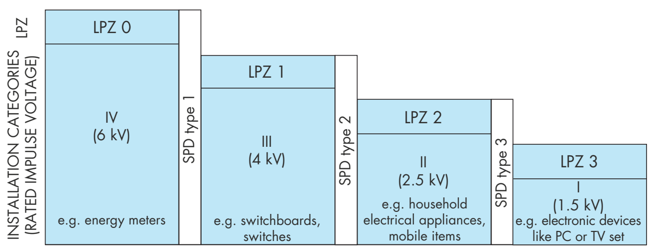


Figure 3: Typical relationship between Lightning Protection Zones, Installation Categories and SPD types

Rated values and marking common to all SPD

[U_c] Maximum continuous operating voltage: Under this voltage the SPD is guaranteed to appear as an “open switch”. This voltage is normally at least equal to the nominal supply voltage (U_N) + 10%. For the Finder SPD, U_C is specified as 275 V.

[U_p] Voltage protection level: This is the highest voltage level seen across the SPD during its intervention. For example, for Finder SPD Type 2, this means that a 4kV overvoltage would be limited by the SPD to a maximum 1.2 kV. Consequently, electronic devices such as PC, TV, stereo, etc. are protected - as their own internal protection will handle overvoltages U_p to 1.5 kV.
To better understand this concept; imagine that the SPD is a switch in series a low resistance. In the case of an overvoltage the switch closes and all the current goes through the resistance. According to Ohm’s law the voltage developed across the resistance will be this resistance x the current (V = R x I), and will be limited to < U_p.

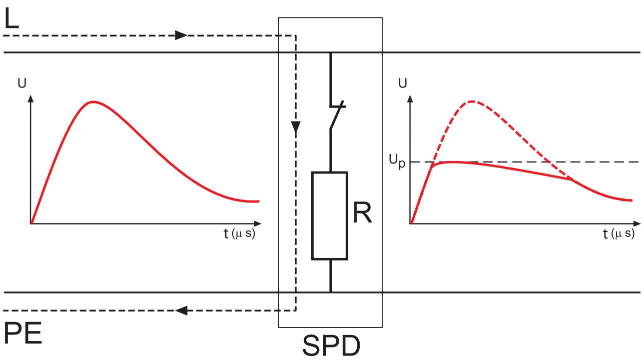


Figure 4: Overvoltage limiting

Short circuit proof: A further characteristic, not normally marked on the product but important for its correct installation, is the Short circuit proof at maximum overcurrent protection. This is the maximum short-circuit current that the SPD is able to withstand when it is installed with additional maximum overcurrent protection - such as a fuse rated in accordance with the value stated under the SPD specification. Consequently the maximum prospective short-circuit current of the system at the point of installation of the SPD must not exceed this value.

Rated vaules and marking of SPD Type 1

SPD Type 1 must be connected upstream the system, at the point of delivery of power energy. SPD protects building and people from the risk of direct lightning (fire and death) and are characterized by:

[I_{imp}10/350] Impulse current: I_{imp} corresponds to the peak value of a 10/350 μs current impulse waveform. This waveform represents a direct lightning strike and is used in tests to prove the performance of SPD type 1 devices.

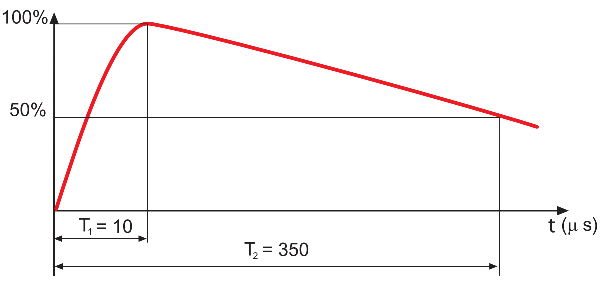


Figure 5: 10/350 μs current waveform

Comparison of the waveforms in figures 5 and 6 shows the much higher energy content controlled by the type 1 SPD.

[I_n8/20] Nominal discharge current: The peak current (and waveform shape) through the SPD under conditions prescribed by EN 62305 to represent the surge current as a consequence of a lightning strike to the electric supply line.

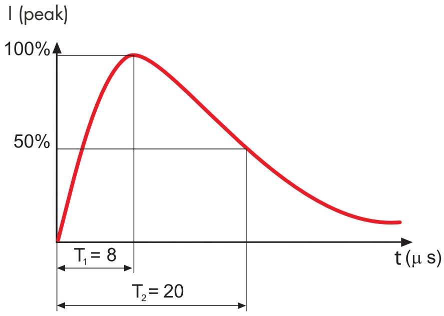


Figure 6: 8/20 μs current waveform

Rated values and marking of SPD Type 2

SPD Type 2 devices are designed to remove all the overvoltage from supply circuits that are not likely to be directly hit by lightning. SPD Type 2 are connected downstream SPD Type 1 or SPD Type 1+2, (minimum distance 1 m) and they protect machine and tools connected to the ground and reduce the risk of economic loss.
SPD Type 2 are characterized by:

[I_n8/20] Nominal discharge current: The peak current (and waveform shape) through the SPD under conditions prescribed by EN 62305 to represent the surge current as a consequence of a lightning strike to the electric supply line.

[I_{max}8/20] Maximum discharge current: Peak value of the highest current of a 8/20μs waveform that an SPD can discharge at least once without breaking.

Rated values and marking of SPD Type 3

SPD type 3 devices are used to protect the end user from overvoltage. They may be installed in supply networks where SDP types 1 and/or 2 already exist. They can be installed in fixed or mobile sockets and have the following characteristic parameters.

U_{oc}: test voltage. This is the peak value of the no load voltage of the combined test-generator; this has a waveform of 1.2/50 μs (figure 7) and can supply at the same time current with waveform 8/20 μs (figure 6).

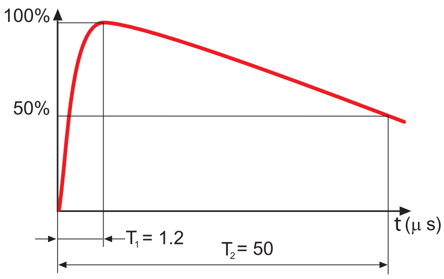
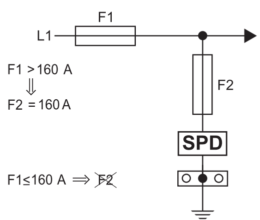


Figure 7: 1.2/50 μs voltage waveform

Suggestion for the connection

The correct connection of SPD requires a shortest as possible connection to the local equipotential bar, to which are connected PE cables of the equipment to be protected. From the local equipotential bar there is a connection to the EBB. The phase wiring remains appropriate to the load.



E

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Short-circuit protection for the SPD is provided by the overcurrent protective devices (fuses type gL/gG) recomended.

If the overcurrent protective devices F1 (which are part of the installation) have a rating smaller than or equal to the maximum recommended rating for the overcurrent protective devices for the SPD, then F2 (back up fuse), can be omitted.

7P.0X:

If F1 > 250 A, then F2 = 250 A

If F1<= 250 A, F2 can be omitted

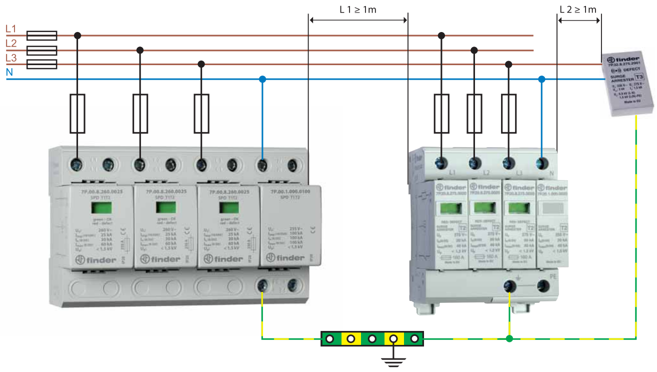
7P.1X, 7P.2X:

If F1 > 160 A, then F2 = 160 A

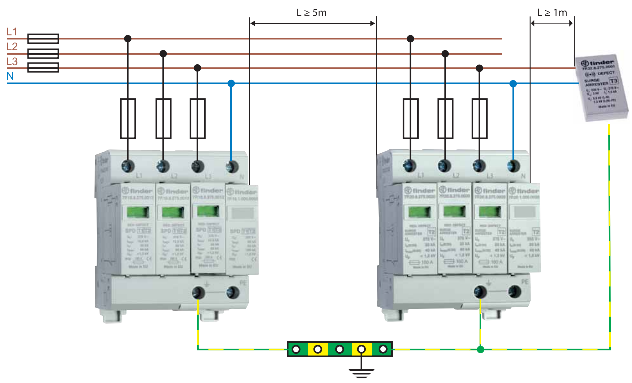
If F1<= 160 A, F2 can be omitted

Coordination of SPD

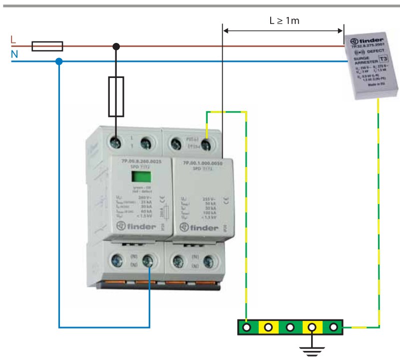
Optimal protection from surges requires cascaded coordinated SPDs. Coordination has the purpose of splitting the energy associated with voltage across the SPDs and it is achieved by introducing an impedance between the SPDs, or alternatively, by connecting them using wires having the minimum length indicated in the figures below, in order to use the cable's own impedance.



7P.0X 7P.2X 7P.32



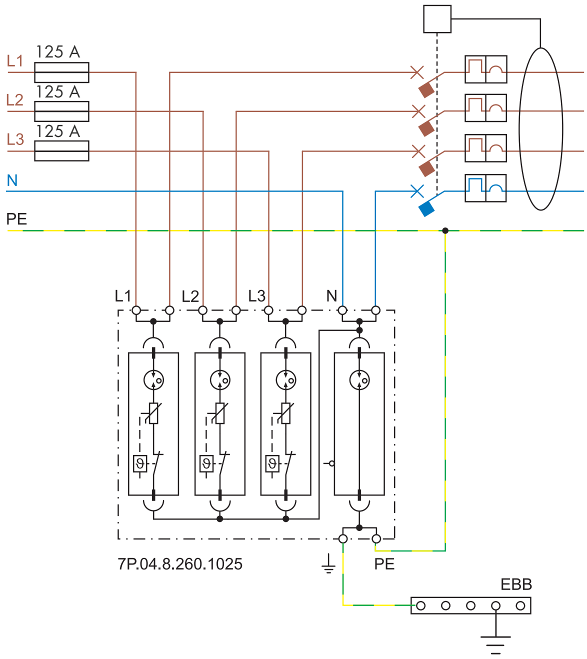
7P.1X 7P.2X 7P.32



7P.02 7P.32

V-shape connection

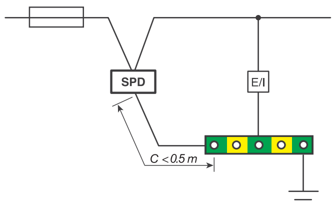
Using a V-shaped connection eliminates transferring downstream the inductive voltage generated by the surge current in the connecting wire to the SPD. This increases the protection to the system and equipment downstream. A limitation of this connection is that the nominal current for the downstream system is limited to 125A, which is the maximum current permitted through the double SPD terminals.

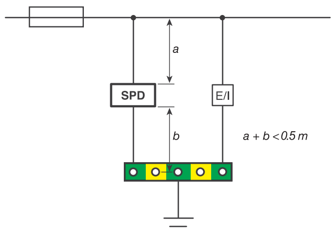


For systems where the rated current is greater than 125 A, it is necessary to connect the SPD in parallel with the equipment (E/I).

Connecting cable

Depending on the type of connection, serial (V-shape) or parallel (T-shape), ensure that both the maximum cable lengths and minimum cross section of the connecting wires are respected in accordance with the information below (IEC 60634-5-534):





The section of the connecting wires (copper) must not be less than:
SPD Tipo 1: 16 mm^2 if it is subject to discharge a significant lightning current, 6 mm^2 otherwise
SPD Type 2: 6 mm^2
SPD Type 3: 1.5 mm^2

PROTECTING PHOTOVOLTAIC (PV) SYSTEMS AGAINST LIGHTNING

Installation characteristics

[U_{OCSTC}] PV voltage: Open circuit voltage, measured under standardized test conditions, of the PV module, panel, array, or the DC side of the photovoltaic inverter. prEN50539-12.

[I_{SCSTC}]: Short-circuit current: Short-circuit current, measured under standardized test conditions, of the PV module, panel, array, or photovoltaic inverter. prEN50539-12.

[U_{CPV}] SPD Maximum continuous operating voltage: Must be equal or greater than to 1.2 times Uocstc in all conditions of radiation and temperature. prEN50539-11, prEN50539-12.

[I_{SCPV}]: Maximum prospective short-circuit current from the power system for which the SPD, in conjunction with the disconnectors specified, is rated. EN50539-11.

System installation

E

Photovoltaic systems are generally located external to a building and can be subjected to the direct or indirect effects of lightning.
Whilst the installation of photovoltaic panels on the roof does not, in itself, increase the risk of direct lightning, the only practical way to protect against the effects of a direct lightning strike would be the use of a lightning protection system (LPS).
The indirect effects of lightning can however, be mitigated by the appropriate use of Surge Protection Devices (SPD). These indirect effects occur when lightning strikes in proximity to the structure and where magnetic induction creates an overvoltage in the conductors – a
danger to both people and equipment. In particular, the DC cables of a PV system would be exposed to the high conducted and radiated disturbances caused as a result of the lightning currents. In addition, overvoltages in PV systems are not only of atmospheric origin. It is also necessary to consider overvoltages due to switching on electrical networks connected to them. These overvoltages can also damage both the inverter and the PV panels, and this explains the need to protect the inverter on both DC and AC sides.

Photovoltaic system on a building without a lightning protection system (LPS)

As an example, Figure 10 represents a simplified photovoltaic system placed on a building without lightning rod. In such a system, the protection against lightning must be considered at the following points of installation:

- DC input of the inverter
- AC output of the inverter
- Low voltage supply network

At the DC input to the inverter SPDs specific for photovoltaic systems must be installed, according to the PV system voltage. At the inverter AC output, type 2 surge arresters must be installed suitable for the type of system. At the point of connection to the LV supply network, install type 2 surge arresters suitable to the type of system (TT, TN). In more complex systems, it might be necessary to introduce additional SPDs. DC side: if the distance between the inverter and PV modules exceeds 10 m, it is necessary to replicate and install the SPD as close as possible to the PV modules.

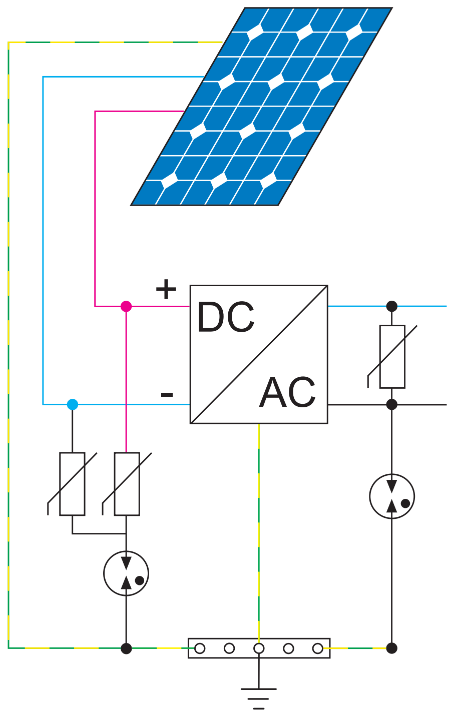


Figure 10: example of a photovoltaic system located on a building without LPS, protected on the DC side by an SPD with U_{OCSTC} = 420 V, and on the AC side by a 7P.22, specific for TT systems.

Photovoltaic system on a building with a lightning protection system (LPS)

Where an LPS exists it is good practice to install the photovoltaic panels in the area protected by the lightning rod.
In addition it is necessary to realize a good equipotential bonding system, which must be positioned as close as possible to the entry point of LV supply into the structure. The LPS, the SPD and all metal parts have to be connected to this equipotential system.
SPD protection on the DC depends on the safety distance (referred in EN50539-12:12-2012).
Note that under EN 62305 installation of a Type 1 SPD is mandatory at the point of delivery of the AC electricity supply, whether or not the building has LPS (with or without solar panels).

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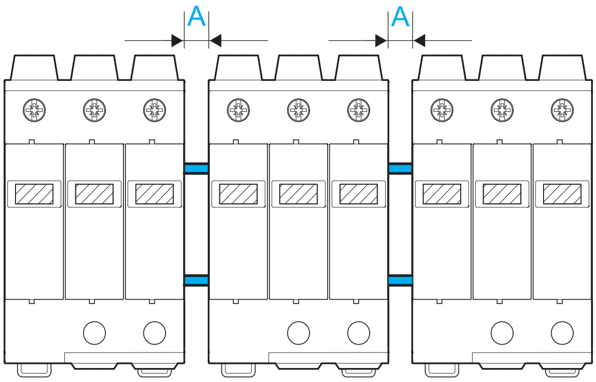
SPD fuse protection

Conforming to prEN50539-11: 2010, Finder SPDs are equipped with a thermal disconnector able to safely disconnect a worn or damaged varistor up to a value of short-circuit current equal to the short-circuit current withstand value (I_{scpv}), as specified in the technical data. Ensure that the PV short circuit current I_{sc}<I_{scpv}.
Ensure that the PV short circuit current Isc<Iscpv or increase the number of the strings.

Insulation distances and wiring

To conform with prEN50539-11 insulation distances and minimum wiring cross section must be respected.



Insulation distances		Minimum Wiring [mm^2]	
U_{CPV}(SPD)≥ 1.2xU_{OCSTC}	A [mm]	+/– Poles	Ground
750 V DC	5	4	6
1,000 V DC	5	4	6
1,200 V DC	7	4	6

E

78 Series - Switch mode power supplies

Features

Range of modular DC power supplies

- Low (< 0.4 W) stand-by power absorption
- Thermal protection: internal, with V_{out} shutdown
- Short circuit protection: hiccup (auto-recovery) mode
- Input protection: replaceable internal fuse plus spare (78.36)
- Overvoltage protection: varistor
- Flyback topology
- Compliant to EN 60950-1 and EN 61204-3
- Parallel working for automatic redundancy: with OR-IN diode
- Dual and series connection permissible
- Small dimensions: 17.5 mm (1 module) or 70 mm (4-modules) wide, 60 mm deep
- 35 mm rail (EN 60715) mount

78.12....2400

- 24 V DC, 12 W output

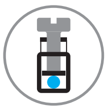
78.12....1200

- 12 V DC, 12 W output

78.36

- 24 V DC, 36 W output

Screw terminal



For outline drawing see page 12

Output specification		78.12....2400	78.12....1200	78.36
Output current (–20...+40°C, 230 V AC input)	A	0.63	1.25	1.7
Rated current I_N (50°C, full input operating range)	A	0.50	1	1.5
Rated voltage	V	24	12	24
Rated power	W	12	12	36
Output power (–20...+40°C, 230 V AC input)	W	15	15	40
Peak current capability for 3 ms *	A	2	3	8
Output voltage adjust	V	—	—	—
Voltage variation (from no-load to full-load)		< 1 %	< 1 %	< 1 %
Voltage ripple @ full load **	mV	< 200	< 200	< 200
Hold-up time@full load: with 100 V AC input	ms	< 10	< 10	< 20
with 260 V AC input	ms	< 90	< 90	< 100
Input specification				
Nominal voltage (U_N)	V AC (50/60 Hz)	110...240	110...240	110...240
	V DC (not polarized)	220	220	220
Operating range	V AC (50/60 Hz)	100...265***	100...265***	100...265***
	V DC	140...370	140...370	140...370
Max power absorption	VA	28.2	32	57.5
(@ 100 V AC, 50 Hz)	W	14.2	17.2	43
Stand-by power absorption	W	< 0.4	< 0.4	< 0.4
Power factor		0.50	0.53	0.74
Max current absorption (@ 88 V AC)	A	0.25	0.30	0.6
Max. inrush current (peak @ 265 V) for 3 ms	A	10	10	12
Replaceable protection fuse		—	—	1 A - T
Technical data				
Efficiency (@ 230 V AC)	%	85	87	86
MTTF	H	> 400.000	> 400.000	> 600.000
Start-up delay	s	< 1	< 1	< 1
Dielectric strength between input/output	V AC	2,500 (class II)	2,500 (class II)	3,000 (class II)
Dielectric strength between input/PE	V AC	—	—	—
Ambient temperature range ****	°C	–20...+60	–20...+60	–20...+70
Protection category		IP 20	IP 20	IP 20
Approvals (according to type)		CE EAC		

* (see diagrams P78)
** peak to peak, 100 Hz component, with 100 V AC input
*** 88...100 V AC with output current limited to 80 % I_N
**** (see derating diagrams L78)

F

78 Series - Switch mode power supplies

Features

Range of modular DC power supplies

- High efficiency (up to 91%)
- Low (< 0.4 W) stand-by power absorption
- Thermal protection: internal, with V_{out} shutdown
- Short circuit protection: hiccup (auto-recovery) mode
- Overload protection: fold-back mode (78.50 only)
- Input protection: replaceable internal fuse plus spare
- Overvoltage protection: varistor
- Flyback topology
- ZVS (Zero-voltage-switching), quasi-resonant mode technology
- Compliant to EN 60950-1 and EN 61204-3
- Parallel working for automatic redundancy: with OR-IN diode
- Dual and series connection permissible
- Small dimensions: 70 mm (4-modules) wide, 60 mm deep
- 35 mm rail (EN 60715) mount

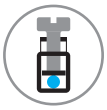
78.60

- 24 V DC, 60 W output
- Voltage regulation 24-28V
- ZVS technology

78.50

- 12 V DC, 50 W output
- Voltage regulation 12-15V
- ZVS technology
- Suitable for battery charging

Screw terminal



For outline drawing see page 12

* (see diagrams P78)
** peak to peak, 100 Hz component, with 100 V AC input
*** (see derating diagrams L78)

F

		78.60	78.50
Output specification			
Output current (–20...+40°C, 230 V AC input)	A	2.8	4.6
Rated current I_N (50°C, full input operating range)	A	2.5	4.2
Rated voltage	V	24	12
Rated power	W	60	50
Output power (–20...+40°C, 230 V AC input)	W	68	55
Peak current capability for 3 ms *	A	10	12
Output voltage adjust	V	24...28	12...15
Voltage variation (from no-load to full-load)		< 1 %	< 1 %
Voltage ripple @ full load **	mV	< 200	< 200
Hold-up time@full load: with 100 V AC input	ms	< 20	< 30
with 260 V AC input	ms	< 130	< 150
Input specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	110...240	110...240
	V DC (not polarized)	220	220
Operating range	V AC (50/60 Hz)	88...265	88...265
	V DC	140...370	140...370
Max power absorption	VA	90	89
(@ 100 V AC, 50 Hz)	W	67.5	58.3
Stand-by power absorption	W	< 0.4	< 0.4
Power factor		0.75	0.65
Max current absorption (@ 88 V AC)	A	0.9	0.85
Max. inrush current (peak @ 265 V) for 3 ms	A	30	30
Replaceable protection fuse		1.6 A - T	1.6 A - T
Technical data			
Efficiency (@ 230 V AC)	%	91	90
MTTF	H	> 500.000	> 400.000
Start-up delay	s	< 1	< 1
Dielectric strength between input/output	V AC	3,000 (class II)	3,000 (class II)
Dielectric strength between input/PE	V AC	1,500 (class I)	1,500 (class I)
Ambient temperature range ***	°C	–20...+70	–20...+70
Protection category		IP 20	IP 20
Approvals (according to type)		CE EAC	

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Features

Industrial DC Power Supply Switching

- High efficiency (up to 90%)
- Low stand-by power absorption
- Forward topology
- Thermal protection: internal with pre-alert alarm via LED and auxiliary contact, and with Vout shutdown for safety
- Overload indication: pre-alert alarm via LED and auxiliary contact indication
- Boost current: without time limit, with LED and auxiliary contact indication
- Overload protection: fold back mode
- Short circuit protection: hiccup (auto recovery) mode
- Input protection: replaceable internal fuse plus spare
- Overvoltage protection: varistor
- Compliant to EN 60950-1 and 61204-3
- Parallel working also for redundancy: with OR-IN diode
- Dual and series connection permissible
- 35 mm rail (EN 60715) mount

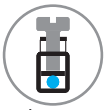
NEW 78.1C

- 24 V DC, 120 W output
- Voltage regulation 24-28V

NEW 78.1D

- 24 V DC, 130 W output
- Voltage regulation 24-28V
- Double stage with active PFC (Power Factor Correction)

Screw terminal



For outline drawing see page 12

Replaceable fuse

Thermal protection signalization with LED

* (see diagrams P78)
** peak to peak, 100 Hz component, with 110 V AC input
*** (see derating diagrams L78)

			78.1C	78.1D
Output specification				
Output current (–20...+40°C, 230 V AC input)		A	5.4	5.4
Rated current I_N (50°C, full input operating range)		A	5	5.4
Rated voltage		V	24	24
Rated power		W	120	130
Output power (–20...+40°C, 230 V AC input)		W	130	130
Peak current capability for 5 ms *		A	15	10
Output voltage adjust		V DC	24...28	24...28
Voltage variation (from no-load to full-load)			< 1 %	< 1 %
Voltage ripple @ full load **		mV	< 100	< 100
Hold-up time@full load:	with 110 V AC input	ms	> 10	> 20
	with 260 V AC input	ms	> 80	> 20
Input specification				
Nominal voltage (U_N)		V AC (50/60 Hz)	120...240	110...240
		V DC	220	110...240
Operating range		V AC (50/60 Hz)	110...265	88...265
		V DC	155...275 (polarized)	95...275 (not polarized)
Drop out DC Voltage		V	140 (with I_{output}= 2.5 A)	80
Max power absorption		VA	195 (@60Hz)	145 (@50 Hz)
(@ minimum V AC operating range)		W	137 (@60Hz)	145 (@50Hz)
Stand-by power absorption		W	< 2.1	< 3.3
Power factor			0.7	0.998
Max current absorption		A	1.7 (@ 110 V AC)	1.6 (@ 88 V AC)
Max. inrush current (peak @ 265 V) for 3 ms		A	10	12
Replaceable protection fuse			2.5 A - T	2.5 A - T
Technical data				
Efficiency (@ 230 V AC)		%	90	89
MTTF		H	> 500.000	> 400.000
Start-up delay		s	< 1	< 1
Dielectric strength between input/output		V AC	2,500 (class II)	2,500 (class II)
Dielectric strength between input/PE		V AC	1,500 (class I)	1,500 (class I)
Ambient temperature range ***		°C	–20...+70	–20...+70
Protection category			IP 20	IP 20
Approvals (according to type)			CE UL pending	CE cULus

F

Ordering information

Example: 78 series switching power supply, 36 W 24 V DC output, supply voltage 110...240 V AC, replaceable fuse.

					A	B	C	D
7 8	.	3 6	.	1	.	2 3 0	.	2 4	0	1

Series

Power
12 = 12 W output
36 = 36 W output
50 = 50 W output
60 = 60 W output
1C = 120 W output
1D = 130 W output

Voltage conversion
1 = AC input, DC output

Input voltage
230 = 110...240 VAC

D:
0 = Standard
1 = Replaceable fuse
3 = Replaceable fuse + output voltage regulator
4 = Fuse + regulator + feedback relay

C:
0 = Standard
1 = Double stage, with PFC (Power Factor Correction)

AB:
12 = 12 V output
24 = 24 V output

Codes
78.12.1.230.1200
78.12.1.230.2400
78.36.1.230.2401
78.60.1.230.2403
78.50.1.230.1203
78.1C.1.230.2404
78.1D.1.230.2414

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Technical data

EMC specifications (according to EN 61204-3)		Reference standard	78.12, 78.36	78.60, 78.50	78.1C, 78.1D
Electrostatic discharge	contact discharge	EN 61000-4-2	4 kV	4 kV	4 kV
	air discharge	EN 61000-4-2	8 kV	8 kV	8 kV
Radiated electromagnetic field	80…1,000 MHz	EN 61000-4-3	6 V/m	10 V/m	10 V/m
	1…2.8 GHz	EN 61000-4-3	3 V/m	3 V/m	3 V/m
Fast transients (burst 5/50 ns, 5 and 100 kHz)	on supply terminals	EN 61000-4-4	2 kV	3 kV	3 kV
Voltage pulses on supply terminals	common mode	EN 61000-4-5	2 kV	2 kV	3 kV
(surge 1.2/50 μs)	differential mode	EN 61000-4-5	2 kV (78.12), 4 kV* (78.36)	4 kV *	4 kV**
Radio-frequency common mode voltage (0.15…230 MHz)	on supply terminals	EN 61000-4-6	6 V	10 V	10 V
Short interruptions		EN 61000-4-11	5 cycles	6 cycles	6 cycles
Radio-frequency conducted emissions	0.15…30 MHz	EN 55022	class B	class B	class B
Radiated emissions	30…1,000 MHz	EN 55022	class B	class B	class A

Terminals		Max	Max...Min
Wire size (Solid cable, stranded cable)	mm^2	1 x 4 / 2 x 2.5	1 x 4...1 x 0.5
	AWG	1 x 12 / 2 x 14	1 x 12...1 x 20
Screw torque	Nm	0.8	0.5
Wire strip length	mm	9	9

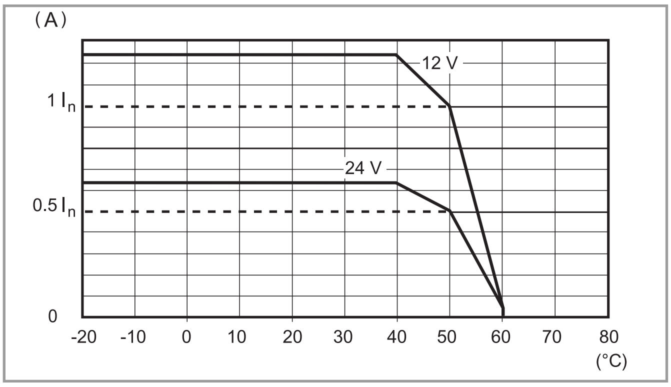
Other data		
Power lost to the environment with rated output current	W	2 (78.12), 5 (78.36, 78.50), 5.4 (78.60)
	W	12 (78.1C), 13.2 (78.1D)

* input fuse may blow for surges higher than 1.5 kV
** input fuse may blow for surges higher than 2 kV

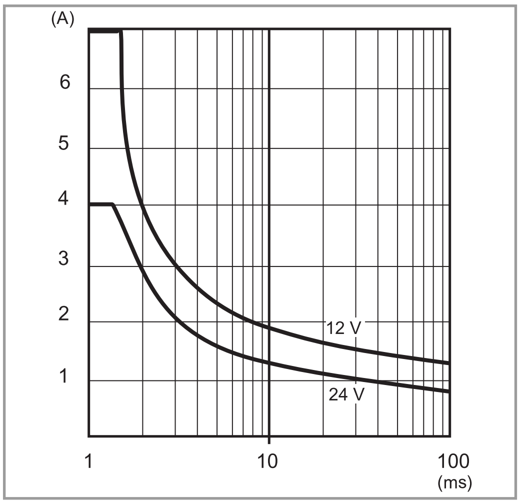
F

Output specification

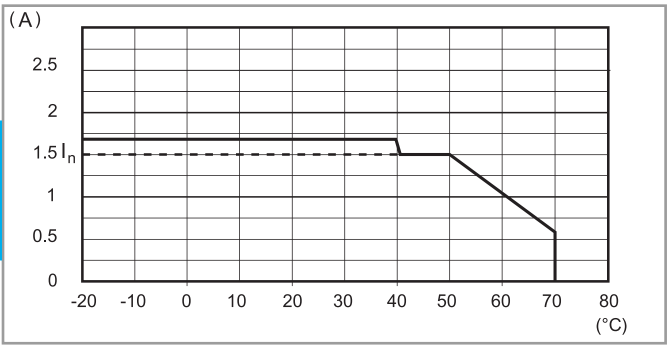
L78-1 Output current v ambient temperature (78.12)



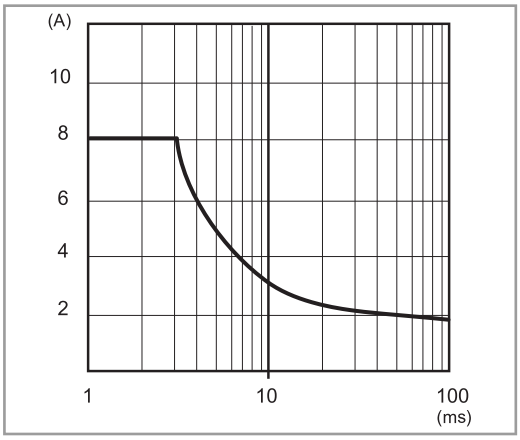
P78-1 Output peak current v time (78.12)



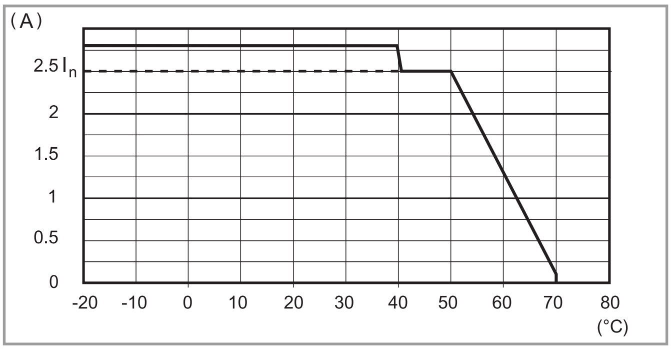
L78-2 Output current v ambient temperature (78.36)



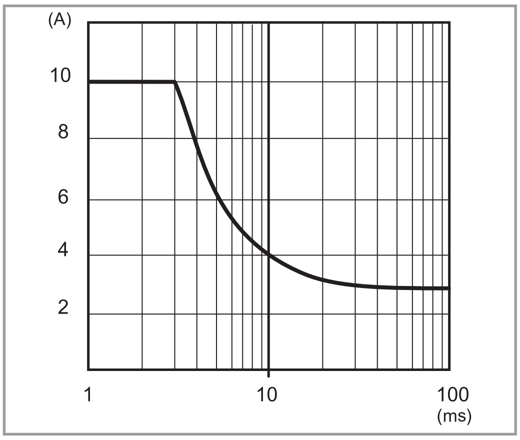
P78-2 Output peak current v time (78.36)



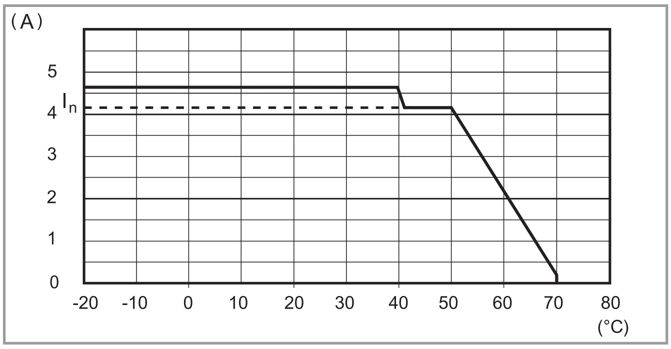
L78-3 Output current v ambient temperature (78.60)



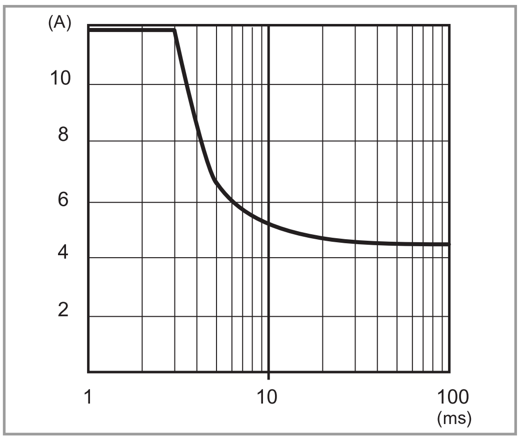
P78-3 Output peak current v time (78.60)



L78-4 Output current v ambient temperature (78.50)



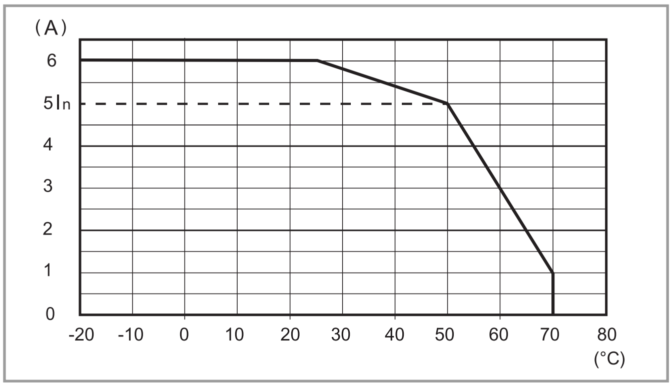
P78-4 Output peak current v time (78.50)



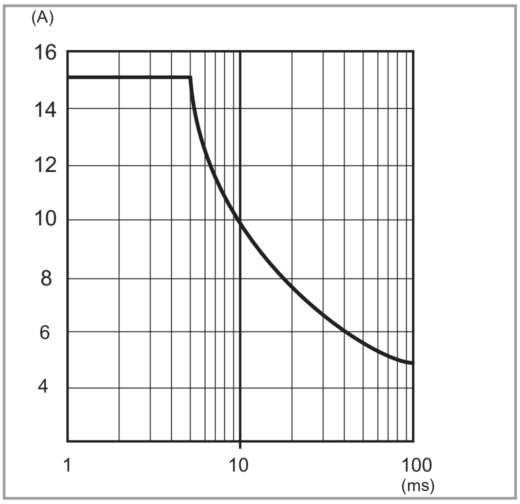
F

Output specification

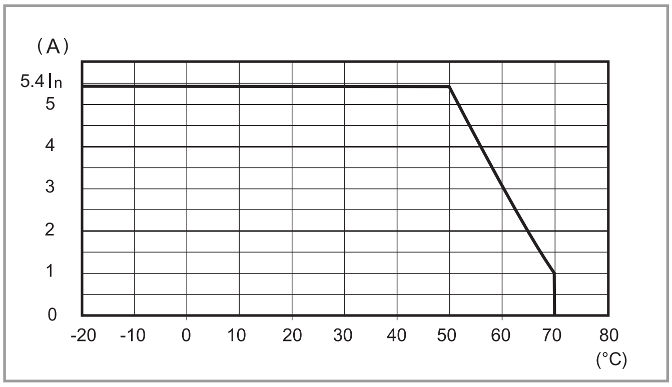
L78-5 Output current v ambient temperature (78.1C)



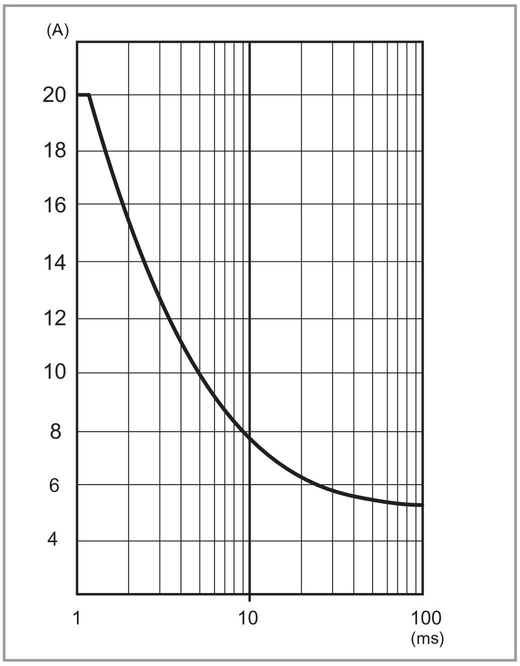
P78-5 Output peak current v time (78.1C)



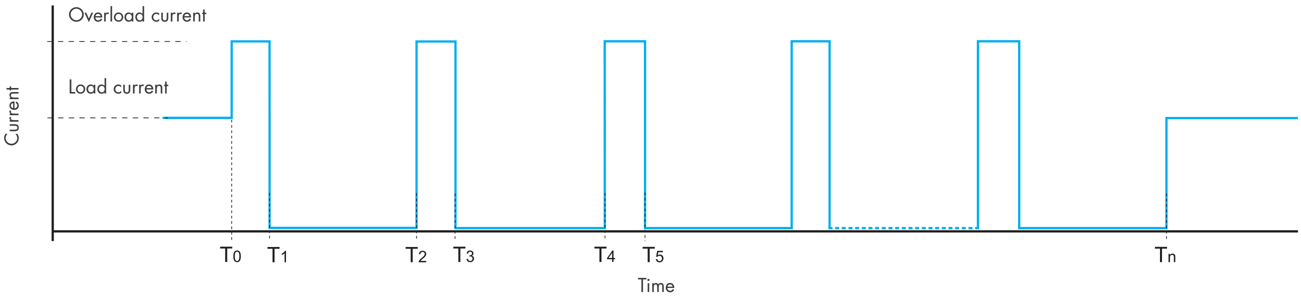
L78-6 Output current v ambient temperature (78.1D)



P78-6 Output peak current v time (78.1D)



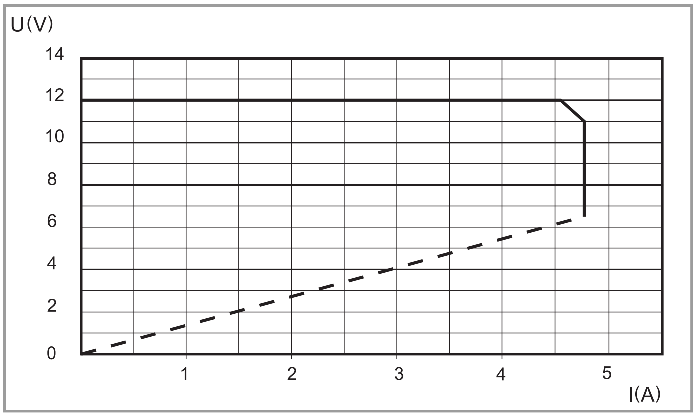
Hiccup mode



Under normal conditions, the 78 Series Power Supply supplies the current required by the load.
However, under abnormal conditions such as a short circuit or heavy overload (T_0) the output voltage will be rapidly reduced to zero - followed by the current (T_1). After approximately 2 seconds (T_1 to T_2), the power supply checks for the persistence of the anomaly over the time period T_2 to T_3 (30 to 100ms - dependent on the type of anomaly). If the anomaly persists, as shown above, the current is again reset to 0 A for a further 2 s (T_3 to T_4). This "hiccup" process is repeated until the anomaly is removed (T_n), whereon the power supply then returns to normal working.

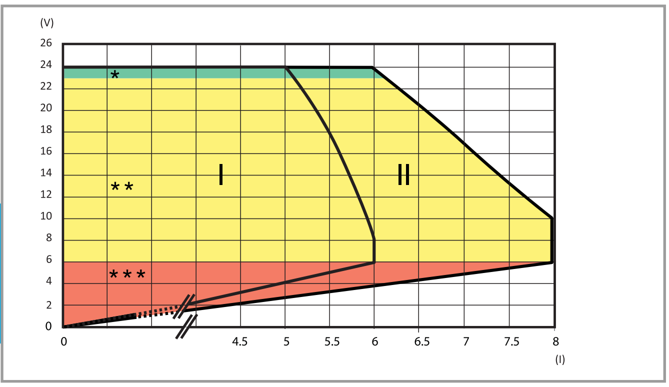
Output specification

FB78-1 Output voltage vs output current (78.50)



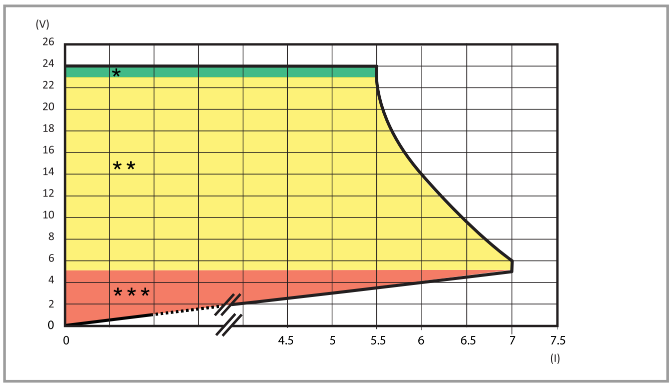
Fold-back technology permits to supply the load also in heavy condition. In case of heavy overload, the fold-back circuit will provide the output current and the output voltage, in accordance to the diagram "FB" of each model. In practice, when overcurrent is drawn by the load, the fold-back circuit reduces the output voltage supplying the current up to the maximal value, then it starts to work in hiccup mode. Also in case of short circuit, the power supply will work in hiccup mode. Both these conditions ends when the anomaly is removed, and the power supply returns to normal working. The fold-back mode allows to use the power supply as a battery charger, in particular 78.50 for charging lead batteries rated 15...20 Ah. It is suggested to insert a diode in series between the + output and the + input of the battery (if not already installed in the battery unit)

FB78-2 Output voltage vs output current (78.1C)



I: fold-back characteristic for temperature up to 50°C
II: fold-back characteristic for temperature up to 25°C
* / ** / ***: See LED table below

FB78-3 Output voltage vs output current (78.1D)



Fold-back characteristic for ambient temperature up to 50°C
* / ** / ***: See LED table below

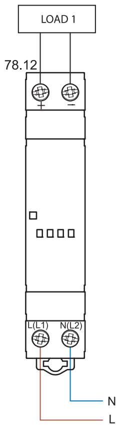
78.1C, 78.1D LED table

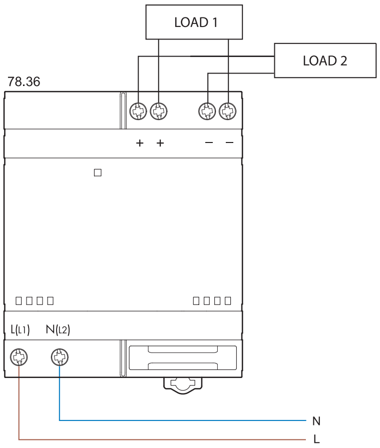
Type	Area	State	LED		Contact 11-14
78.1C.1.230.2404 78.1D.1.230.2414	*	OK		OFF	
	**	Overload		OFF	
	***	Short circuit		OFF	
		Thermal limit			
		Thermal protection		OFF	

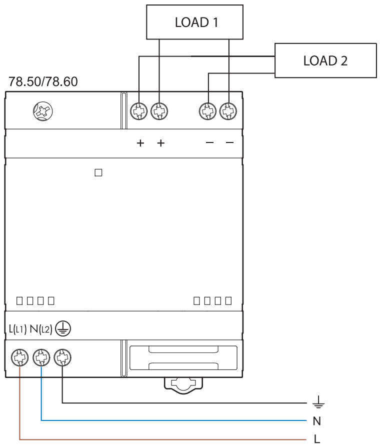
78.12, 78.36, 78.50, 78.60 LED table

Type	State	LED	
78.12.1.230.xx00 78.36.1.230.2401 78.50.1.230.1203 78.60.1.230.2403	OK		
	Short circuit		
	Thermal limit		OFF

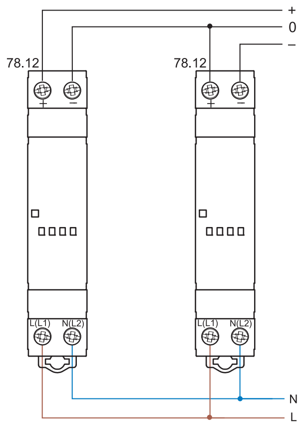
Wiring diagrams



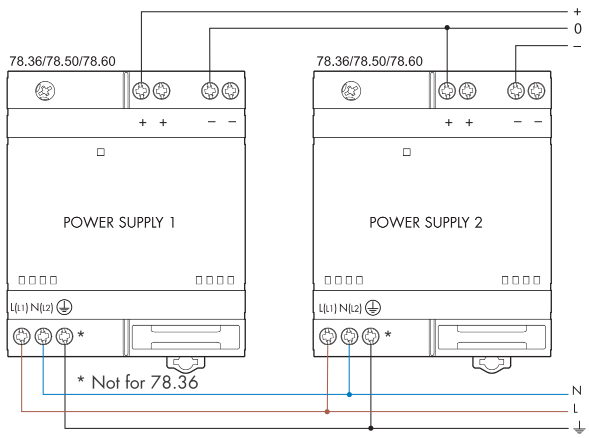




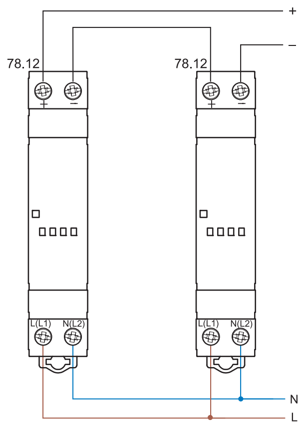
Dual connection



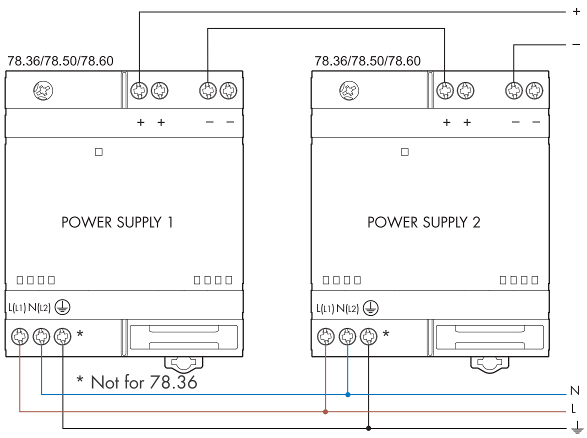
Dual connection



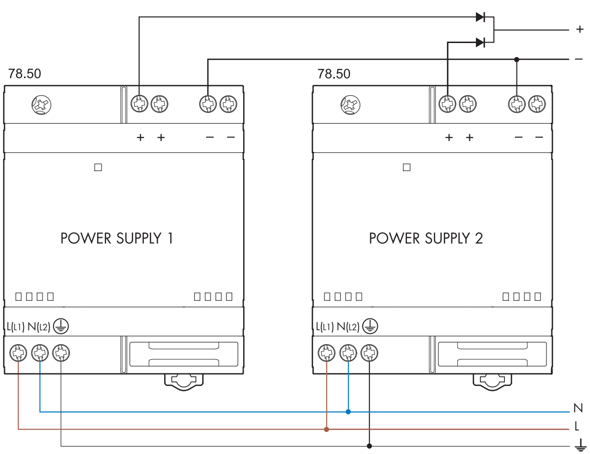
Series connection



Series connection

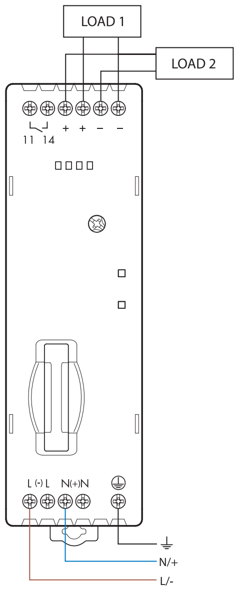


Parallel connection (78.50 only)

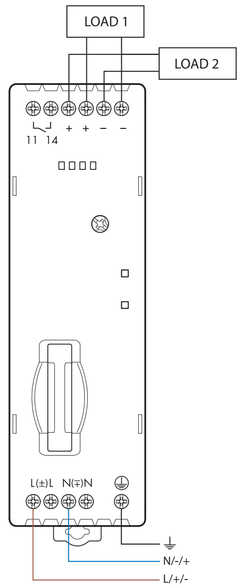


Wiring diagrams for 78.1C / 78.1D

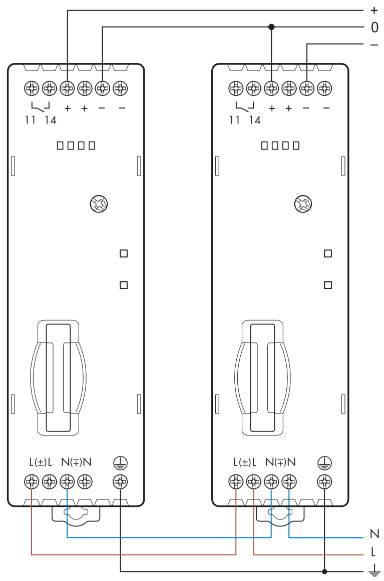
78.1C - Power supply connection



78.1D - Power supply connection

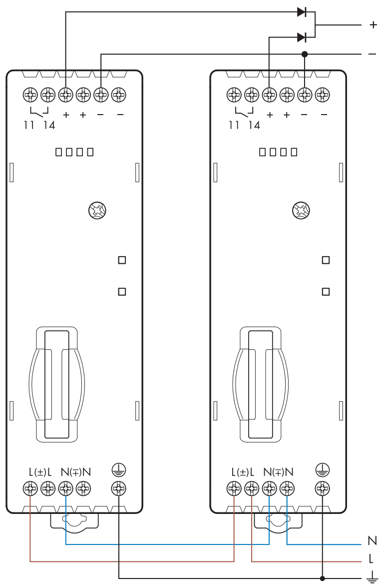


Dual connection

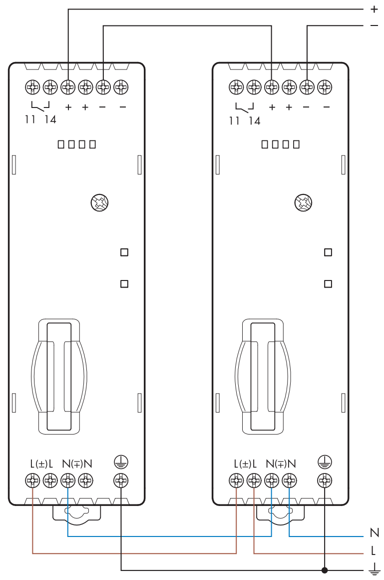


F

Parallel connection

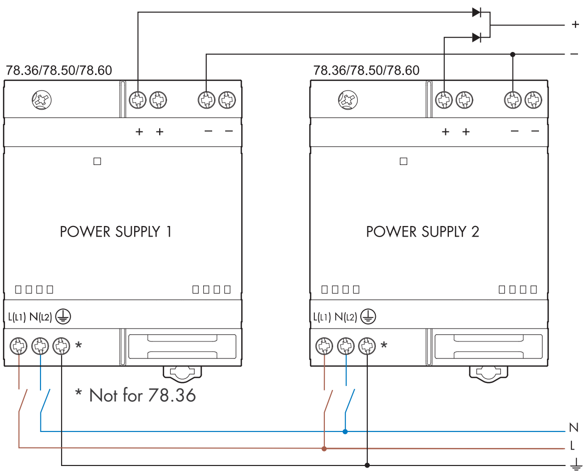


Series connection

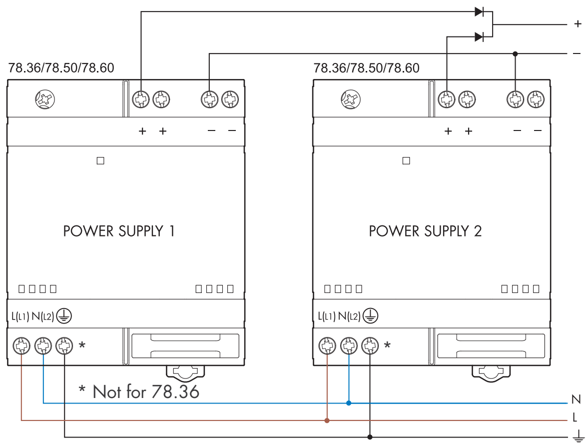


Application example: redundancy connection

Manual

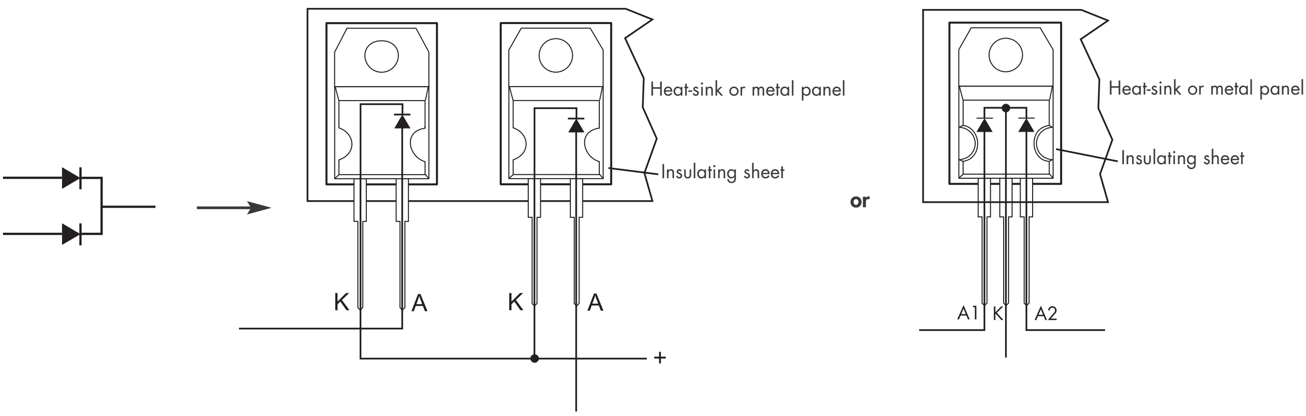


Automatic (with parallel connection)

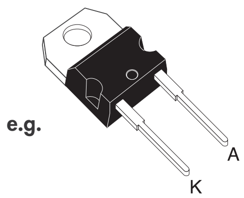


Note: Since parallel working is intended to provide automatic redundancy, rate the load current at no more than In.

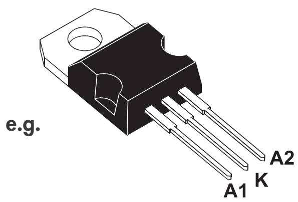
Diode(s)



Diode for type 78.12, 78.36, 78.50, 78.60



TO-220AC
STPS1545D



TO-220AB
STPS30L40CT

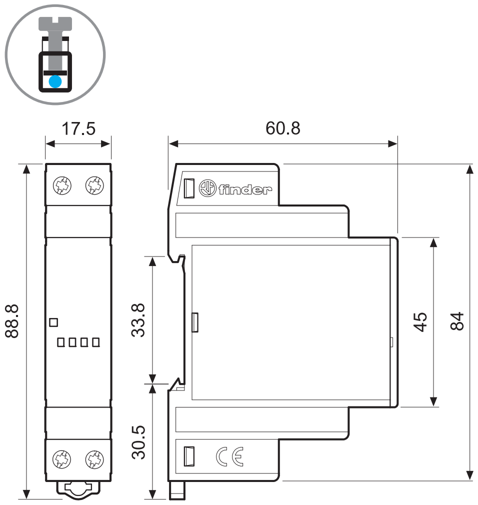
Diode for type 78.1C, 78.1D

TO-247AD
MBR 4060PT

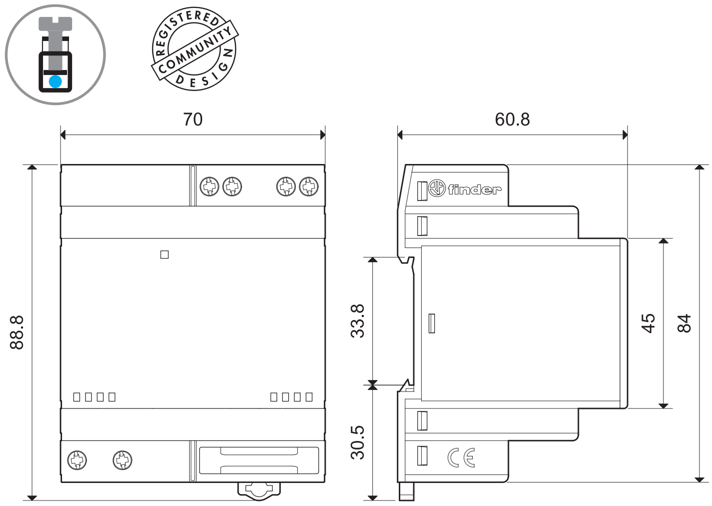
F

Outline drawings

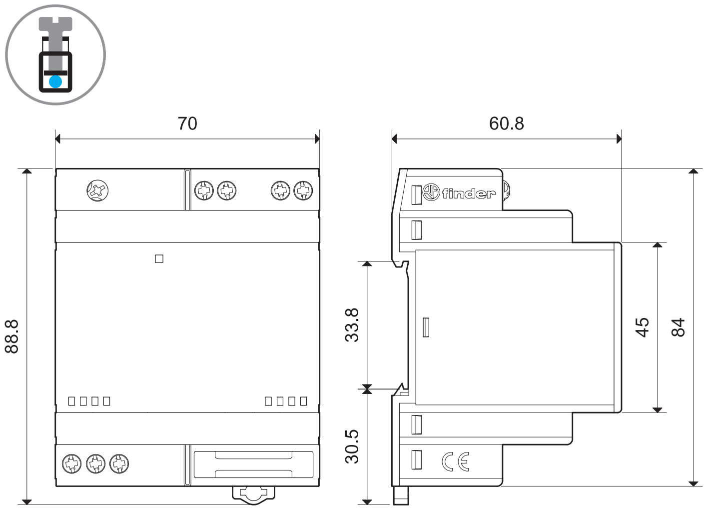
78.12
Screw terminal



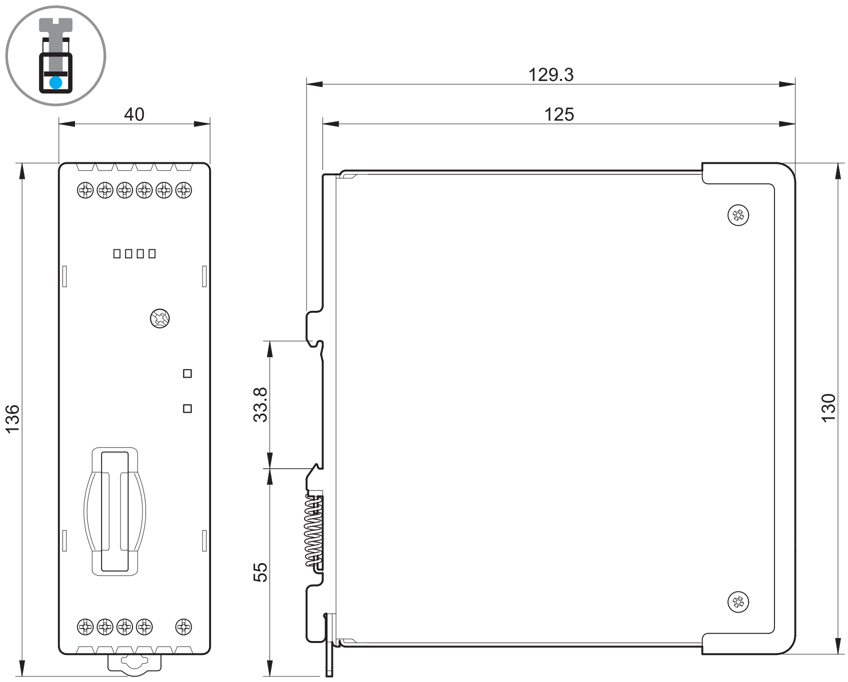
78.36
Screw terminal



78.50 / 78.60
Screw terminal



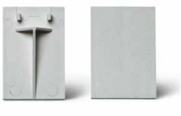
78.1C / 78.1D
Screw terminal



Accessories


060.72

Sheet of marker tags, plastic, 72 tags, 6x12 mm	060.72


019.01

Identification tag, plastic, 1 tag, 17x25.5 mm (for 78.12/36/50/60)	019.01

F

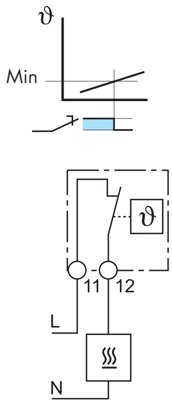
Features

Panel thermostat

- Small, compact size (17.5 mm wide)
- Snap action themostatic Bimetal sensor
- Wide temperature setting range
- Long electrical life
- 35 mm rail (EN 60715) mount

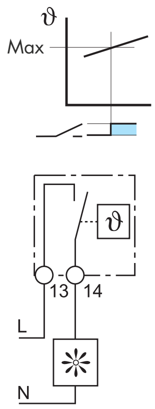
7T.81.0.000.240x

• Heating control



7T.81.0.000.230x

• Ventilation control



Heating control - Should the panel temperature fall below the (minimum) set temperature the contact will close to call for heat. The contact will open when this set temperature is exceeded.
Ventilation control - Should the panel temperature exceed the (maximum) set temperature then the contact will close to call for cooling.
The contact will open when the temperature falls below this set temperature.

For outline drawing see page 2

		7T.81.0.000.240x		7T.81.0.000.230x	
Contact specification					
Contact configuration		1 NC		1 NO	
Rated current/Maximum peak current	A	10/20		10/20	
Rated voltage/Maximum switching voltage	V AC	250/250		250/250	
Rated load AC1	VA	2,500		2,500	
Rated load AC15 (230 V AC)	VA	250		250	
Single phase motor rating AC3 (230 V AC)	kW	0.125		0.125	
Breaking capacity DC1: 30/110/220V	A	1/0.3/0.15		1/0.3/0.15	
Minimum switching load	mW (V/mA)	500 (12/10)		500 (12/10)	
Standard contact material		AgNi		AgNi	
Temperature setting range					
Setting range (ventilation)	°C	—		–20…+40	+0…+60
Switch temperature differential	K	—		7 ± 4	
Setting range (heating)	°C	–20…+40	+0…+60	—	
Switch temperature differential	K	7 ± 4		—	
Technical data					
Electrical life at rated load AC1	cycles	$100 \cdot 10^3$		$100 \cdot 10^3$	
Ambient temperature range	°C	–45…+80		–45…+80	
Protection category		IP 20		IP 20	
Approvals (according to type)		CE EAC c UL us			

G

Ordering information

Example: 7T Series, thermostat for ventilation control, contact activates ventilation should the panel temperature exceed the set value (max+60°C), 35 mm rail (EN 60715) mount.

7 T . 8 1 . 0 . 0 0 0 . 2 3 0 3

Series

Type
8 = 35 mm rail (EN 60715) mount

No. of contacts
1 = 1 contact

Voltage type
0 = No operating voltage required

Rated operating voltage
000 = No operating voltage required

Control function
(Temperature only)
1 = (–20...+40)°C
3 = (0...+60)°C

Contact configuration
3 = 1 NO contact
4 = 1 NC contact

Monitoring function
2 = Temperature, adjustable

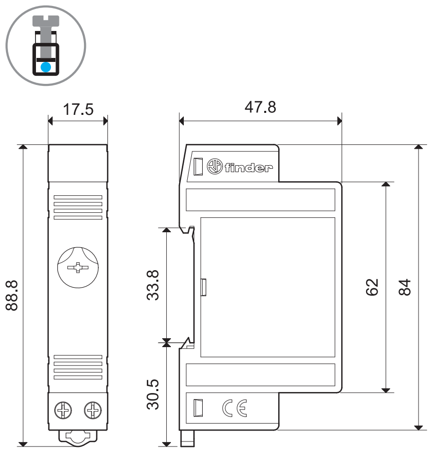
Technical data

Insulation			
Dielectric strength between open contacts	V AC	500	
Other data			
Screw torque	Nm	0.5	0.5
Max. wire size		solid cable	stranded cable
	mm^2	1x2.5	1x1.5
	AWG	1x12	1x16

G

Outline drawings

7T.81
Screw terminal



Features

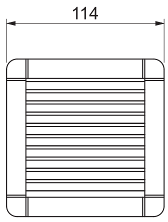
Filter Fan for electrical cabinets and enclosures
120 V or 230 V AC versions

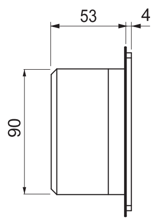
- Very low acoustic noise
- Minimal depth within enclosure
- Air volume (14…470) m³/h
  (with Exhaust Filter installed in cabinet)
- Air volume (24…630) m³/h (free flow)
- Power consumption (4…130) W
- Operating voltage: 120 or 230 V AC (50/60Hz)
- Time-saving installation and maintenance
- Further available versions*:
  - EMC Filter Fan (7F.70) and EMC Exhaust Filter (7F.07)
  - Filter Fan supplied in Reverse flow mode (7F.80)

* Product codes, see pages 6 & 9

7F.50.8.xxx.1020

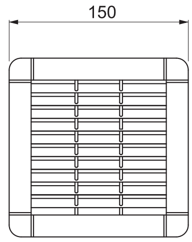
- Operating voltage (120 or 230) V AC
- Air volume 24 m³/h
- Rated power 13 W
- Size 1

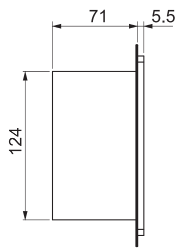




7F.50.8.xxx.2055

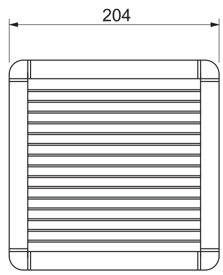
- Operating voltage (120 or 230) V AC
- Air volume 55 m³/h
- Rated power 22 W
- Size 2

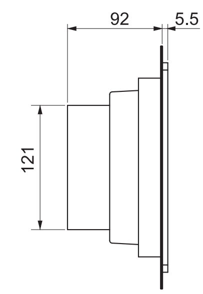




7F.50.8.xxx.3100

- Operating voltage (120 or 230) V AC
- Air volume 100 m³/h
- Rated power 22 W
- Size 3





Note:
By reversing the fan motor, the air direction can be changed from "Inlet" Filter Fan mode to "Exhaust" Filter Fan mode ** (except for the types 7F.50.8.xxx.4370, 7F.50.8.xxx.5500 and 7F.50.8.xxx.5630).

** Supplied in "Inlet" Filter Fan mode (Standard).

		7F.50.8.xxx.1020		7F.50.8.xxx.2055		7F.50.8.xxx.3100	
Fan data							
Air volume (free flow)	m³/h	24		55		100	
Air volume (with exhaust filter installed)	m³/h	14		40		75	
Noise level	dB (A)	30		43		43	
Life time at 40°C	h	50 000		50 000		50 000	
Electrical data							
Operating voltage	V AC (50/60 Hz)	120	230	120	230	120	230
Current consumption	A	0.14	0.1	0.26	0.14	0.26	0.14
Rated power	W	13	13	22	22	22	22
Other data							
Housing, cover		Plastics according to UL94 V-0, light gray (RAL 7035)					
Filter mat (included)		EU3 according to DIN 24185, filtering degree (80…90) %					
Filter material		Synthetic fibre with progressive construction, temperature resistant to +100°C, self extinguishing, Class F1 (DIN 53438)					
Electrical connections / wire size		3-pole screw terminals / max. 2.5 mm²					
Screw torque	Nm	0.8					
Ambient temperature range	°C	–10…+70					
Protection class		I					
Protection category according to EN 60529		IP54					
Approvals (according to type)		CE EAC cULus					

G

7F Series - Filter Fan (24...630) m³/h

Features

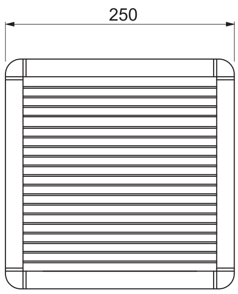
Filter Fan for electrical cabinets and enclosures
120 V or 230 V AC versions

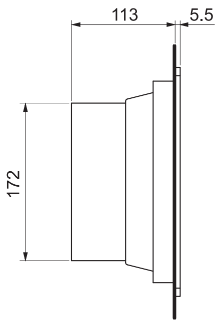
- Very low acoustic noise
- Minimal depth within enclosure
- Air volume (14...470) m³/h (with Exhaust Filter installed in cabinet)
- Air volume (24...630) m³/h (free flow)
- Power consumption (4...130) W
- Operating voltage: 120 or 230 V AC (50/60Hz)
- Time-saving installation and maintenance
- Further available versions*:
  - EMC Filter Fan (7F.70) and EMC Exhaust Filter (7F.07)
  - Filter Fan supplied in Reverse flow mode (7F.80)

* Product codes, see pages 6 & 9

7F.50.8.xxx.4230

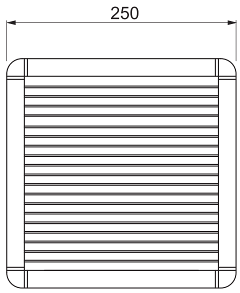
- Operating voltage (120 or 230) V AC
- Air volume 230 m³/h
- Rated power 40 W
- Size 4

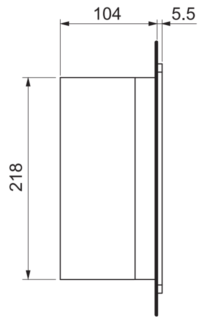




7F.50.8.xxx.4370

- Operating voltage (120 or 230) V AC
- Air volume 370 m³/h
- Rated power 70 W
- Size 4





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Note:
By reversing the fan motor, the air direction can be changed from "Inlet" Filter Fan mode to "Exhaust" Filter Fan mode ** (except for the types 7F.50.8.xxx.4370, 7F.50.8.xxx.5500 and 7F.50.8.xxx.5630).

** Supplied in "Inlet" Filter Fan mode (Standard).

		7F.50.8.xxx.4230		7F.50.8.xxx.4370	
Fan data					
Air volume (free flow)	m³/h	230		370	
Air volume (with exhaust filter installed)	m³/h	180		250	
Noise level	dB (A)	53		65	
Life time at 40°C	h	50.000		50.000	
Electrical data					
Operating voltage	V AC (50/60 Hz)	120	230	120	230
Current consumption	A	0.34	0.17	0.8	0.4
Rated power	W	40	40	70	70
Other data					
Housing, cover		Plastics according to UL94 V-0, light gray (RAL 7035)			
Filter mat (included)		EU3 according to DIN 24185, filtering degree (80...90) %			
Filter material		Synthetic fibre with progressive construction, temperature resistant to +100°C, self extinguishing, Class F1 (DIN 53438)			
Electrical connections / wire size		3-pole screw terminals / max. 2.5 mm²			
Screw torque	Nm	0.8			
Ambient temperature range	°C	–10...+70			
Protection class		I			
Protection category according to EN 60529		IP54			
Approvals (according to type)		CE EAC cURus			

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Features

Filter Fan for electrical cabinets and enclosures
120 V or 230 V AC versions

- Very low acoustic noise
- Minimal depth within enclosure
- Air volume (14…470) m³/h (with Exhaust Filter installed in cabinet)
- Air volume (24…630) m³/h (free flow)
- Power consumption (4…130) W
- Operating voltage: 120 or 230 V AC (50/60Hz)
- Time-saving installation and maintenance
- Further available versions*:
  - EMC Filter Fan (7F.70) and EMC Exhaust Filter (7F.07)
  - Filter Fan supplied in Reverse flow mode (7F.80)

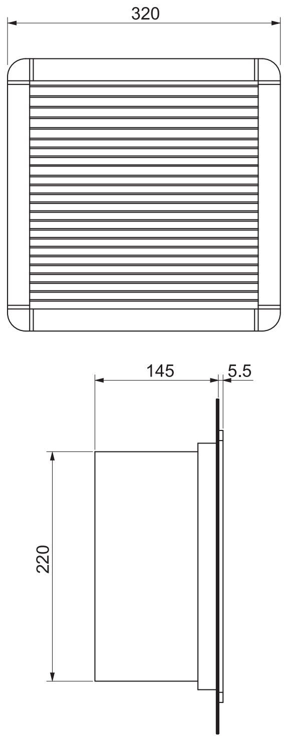
* Product codes, see pages 6 & 9

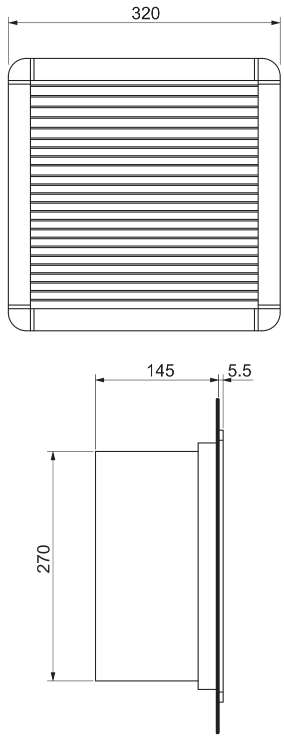
7F.50.8.xxx.5500

- Operating voltage (120 or 230) V AC
- Air volume 500 m³/h
- Rated power 70 W
- Size 5

7F.50.8.xxx.5630

- Operating voltage (120 or 230) V AC
- Air volume 630 m³/h
- Rated power 130 W
- Size 5





Note:
By reversing the fan motor, the air direction can be changed from "Inlet" Filter Fan mode to "Exhaust" Filter Fan mode ** (except for the types 7F.50.8.xxx.4370, 7F.50.8.xxx.5500 and 7F.50.8.xxx.5630).

** Supplied in "Inlet" Filter Fan mode (Standard).

		7F.50.8.xxx.5500		7F.50.8.xxx.5630	
Fan data					
Air volume (free flow)	m³/h	500		630	
Air volume (with exhaust filter installed)	m³/h	370		470	
Noise level	dB (A)	65		72	
Life time at 40°C	h	50.000		50.000	
Electrical data					
Operating voltage	V AC (50/60 Hz)	120	230	120	230
Current consumption	A	0.8	0.4	1.10	0.55
Rated power	W	70	70	130	130
Other data					
Housing, cover		Plastics according to UL94 V-0, light gray (RAL 7035)			
Filter mat (included)		EU3 according to DIN 24185, filtering degree (80…90) %			
Filter material		Synthetic fibre with progressive construction, temperature resistant to +100°C, self extinguishing, Class F1 (DIN 53438)			
Electrical connections / wire size		3-pole screw terminals / max. 2.5 mm²		4-pole screw terminals / max. 2.5 mm²	
Screw torque	Nm	0.8			
Ambient temperature range	°C	–10…+70			
Protection class		I			
Protection category according to EN 60529		IP54			
Approvals (according to type)		CE EAC cULus			

7F.50.8.120.5630 has no UL approval

G

7F Series - Filter Fan (24…630) m³/h

Features

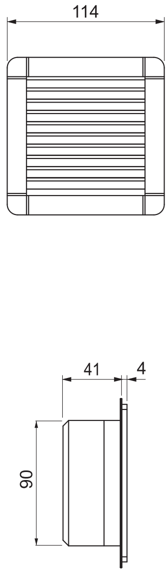
Filter Fan for electrical cabinets and enclosures 24 V DC versions

- Very low acoustic noise
- Minimal depth within enclosure
- Air volume (14…470) m³/h (with Exhaust Filter installed in cabinet)
- Air volume (24…630) m³/h (free flow)
- Power consumption (4…130) W
- Operating voltage: 24 V DC
- Time-saving installation and maintenance
- Further available versions*:
  - EMC Filter Fan (7F.70) and EMC Exhaust Filter (7F.07)
  - Filter Fan supplied in Reverse flow mode (7F.80)

* Product codes, see pages 6 & 9

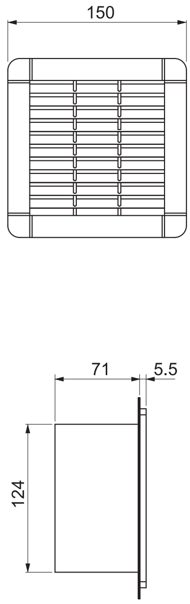
7F.50.9.024.1020

- Operating voltage 24 V DC
- Air volume 24 m³/h
- Rated power 4 W
- Size 1



7F.50.9.024.2055

- Operating voltage 24 V DC
- Air volume 55 m³/h
- Rated power 9 W
- Size 2



G

Note:
By reversing the fan motor, the air direction can be changed from "Inlet" Filter Fan mode to "Exhaust" Filter Fan mode ** (except for the types 7F.50.8.xxx.4370, 7F.50.8.xxx.5500 and 7F.50.8.xxx.5630).

** Supplied in "Inlet" Filter Fan mode (Standard).

		7F.50.9.024.1020	7F.50.9.024.2055
Fan data			
Air volume (free flow)	m³/h	24	55
Air volume (with exhaust filter installed)	m³/h	14	40
Noise level	dB (A)	35	45
Life time at 40°C	h	50 000	50 000
Electrical data			
Operating voltage	V DC	24	24
Current consumption	A	0.16	0.37
Rated power	W	4	9
Other data			
Housing, cover		Plastics according to UL94 V-0, light gray (RAL 7035)	
Filter mat (included)		EU3 according to DIN 24185, filtering degree (80…90) %	
Filter material		Synthetic fibre with progressive construction, temperature resistant to 100°C, self extinguishing, Class F1 (DIN 53438)	
Electrical connections / wire size		2-pole screw terminals / max. 2.5 mm²	
Screw torque	Nm	0.8	
Ambient temperature range	°C	–10…+70	
Protection class		I	
Protection category according to EN 60529		IP54	
Approvals (according to type)		CE EAC cURus	

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Features

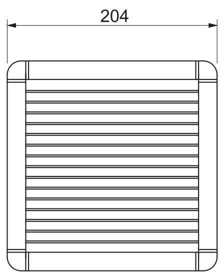
Filter Fan for electrical cabinets and enclosures 24 V DC versions

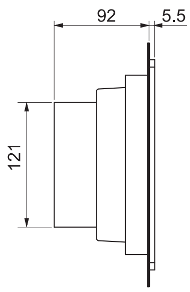
- Very low acoustic noise
- Minimal depth within enclosure
- Air volume (14…470) m³/h (with Exhaust Filter installed in cabinet)
- Air volume (24…630) m³/h (free flow)
- Power consumption (4…130) W
- Operating voltage: 24 V DC
- Time-saving installation and maintenance
- Further available versions*:
  - EMC Filter Fan (7F.70) and EMC Exhaust Filter (7F.07)
  - Filter Fan supplied in Reverse flow mode (7F.80)

* Product codes, see pages 6 & 9

7F.50.9.024.3100

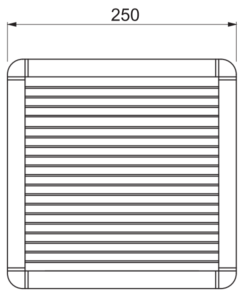
- Operating voltage 24 V DC
- Air volume 100 m³/h
- Rated power 9 W
- Size 3

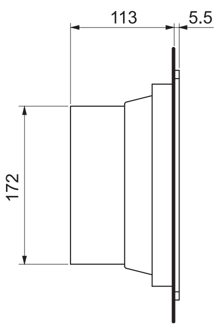




7F.50.9.024.4230

- Operating voltage 24 V DC
- Air volume 230 m³/h
- Rated power 26 W
- Size 4





Note:
By reversing the fan motor, the air direction can be changed from "Inlet" Filter Fan mode to "Exhaust" Filter Fan mode ** (except for the types 7F.50.8.xxx.4370, 7F.50.8.xxx.5500 and 7F.50.8.xxx.5630).

** Supplied in "Inlet" Filter Fan mode (Standard).

		7F.50.9.024.3100	7F.50.9.024.4230
Fan data			
Air volume (free flow)	m³/h	100	230
Air volume (with exhaust filter installed)	m³/h	75	180
Noise level	dB (A)	45	61
Life time at 40°C	h	50 000	50 000
Electrical data			
Operating voltage	V DC	24	24
Current consumption	A	0.37	1.08
Rated power	W	9	26
Other data			
Housing, cover		Plastics according to UL94 V-0, light gray (RAL 7035)	
Filter mat (included)		EU3 according to DIN 24185, filtering degree (80...90) %	
Filter material		Synthetic fibre with progressive construction, temperature resistant to 100°C, self extinguishing, Class F1 (DIN 53438)	
Electrical connections / wire size		2-pole screw terminals / max. 2.5 mm²	
Screw torque	Nm	0.8	
Ambient temperature range	°C	–10...+70	
Protection class		I	
Protection category according to EN 60529		IP54	
Approvals (according to type)		CE EAC cULus	

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Ordering information

Example: Series 7F, Filter Fan for mounting in sidewalls, operating voltage 230 V AC, size 1, air volume 24 m^3/h.

7 F . 5 0 . 8 . 2 3 0 . 1 0 2 0

Series

Type
50 = Filter Fan - for indoor use
70 = EMC Filter Fan - for indoor use
80 = Reverse flow Filter Fan - for indoor use

Supply version
8 = AC (50/60 Hz)
9 = DC

Operating voltage
024 = 24 V DC
120 = 120 V AC
230 = 230 V AC

Enclosure cut-out
1 = Size 1 ($92^{+0.5}$ x $92^{+0.5}$) mm
2 = Size 2 ($125^{+1.0}$ x $125^{+1.0}$) mm
3 = Size 3 ($177^{+1.0}$ x $177^{+1.0}$) mm
4 = Size 4 ($224^{+1.0}$ x $224^{+1.0}$) mm
5 = Size 5 ($291^{+1.0}$ x $291^{+1.0}$) mm

Air volume (free flow)
020 = 24 m^3/h
055 = 55 m^3/h
100 = 100 m^3/h
230 = 230 m^3/h
370 = 370 m^3/h
500 = 500 m^3/h
630 = 630 m^3/h

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Filter Fans - All versions

Standard versions	EMC versions	Reverse flow versions	
7F.50.8.120.1020	—	7F.80.8.120.1020	Filter Fan, Size 1
7F.50.8.120.2055	—	7F.80.8.120.2055	Filter Fan, Size 2
7F.50.8.120.3100	—	7F.80.8.120.3100	Filter Fan, Size 3
7F.50.8.120.4230	—	7F.80.8.120.4230	Filter Fan, Size 4
7F.50.8.120.4370	—	7F.80.8.120.4370	Filter Fan, Size 4
7F.50.8.120.5500	—	7F.80.8.120.5500	Filter Fan, Size 5
7F.50.8.120.5630	—	—	Filter Fan, Size 5
7F.50.8.230.1020	7F.70.8.230.1020	7F.80.8.230.1020	Filter Fan, Size 1
7F.50.8.230.2055	7F.70.8.230.2055	7F.80.8.230.2055	Filter Fan, Size 2
7F.50.8.230.3100	7F.70.8.230.3100	7F.80.8.230.3100	Filter Fan, Size 3
7F.50.8.230.4230	7F.70.8.230.4230	7F.80.8.230.4230	Filter Fan, Size 4
7F.50.8.230.4370	7F.70.8.230.4370	7F.80.8.230.4370	Filter Fan, Size 4
7F.50.8.230.5500	7F.70.8.230.5500	7F.80.8.230.5500	Filter Fan, Size 5
7F.50.8.230.5630	7F.70.8.230.5630	—	Filter Fan, Size 5
7F.50.9.024.1020	7F.70.9.024.1020	7F.80.9.024.1020	Filter Fan, Size 1
7F.50.9.024.2055	7F.70.9.024.2055	7F.80.9.024.2055	Filter Fan, Size 2
7F.50.9.024.3100	7F.70.9.024.3100	7F.80.9.024.3100	Filter Fan, Size 3
7F.50.9.024.4230	7F.70.9.024.4230	7F.80.9.024.4230	Filter Fan, Size 4

Note:
The technical features (air volume, dimensions and electrical parameters) for the Standard Filter Fans (7F.50), the EMC Filter Fans (7F.70) and the Reverse flow versions (7F.80) - are exactly the same.
7F.50.8.120.5630 has no UL approval. Other versions on request.

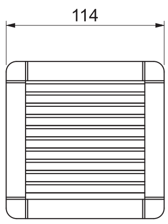
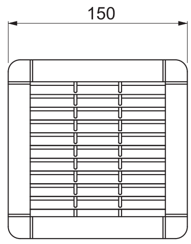
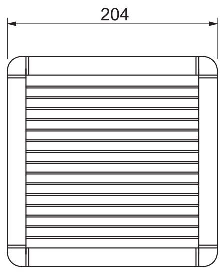
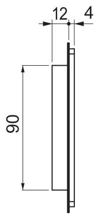
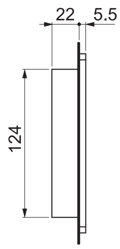
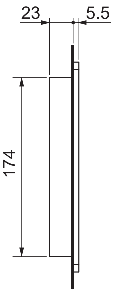
Features

Exhaust Filter

The size of the Exhaust Filter should match the size of the Filter Fan to achieve the best ventilation within the cabinet

- Minimum depth within enclosure
- Time-saving installation and maintenance
- Further available versions*:
  - EMC Exhaust Filters (7F.07)

* Product codes, see page 9

7F.05.0.000.1000	7F.05.0.000.2000	7F.05.0.000.3000
		
• For Filter Fans 7F.50.x.xxx.1020 • Size 1	• For Filter Fans 7F.50.x.xxx.2055 • Size 2	• For Filter Fans 7F.50.x.xxx.3100 • Size 3
		
		

Other data	
Housing, Cover	Plastics according to UL94 V-0, light gray (RAL 7035)
Filter mat (included)	EU3 according to DIN 24185, filtering degree (80...90) %
Filter material	Synthetic fibre with progressive construction, temperature resistant to +100°C, self extingiushing, Class F1 (DIN 53438)
Protection category according to EN 60529	IP54
Approvals (according to type)	CE EAC cULus

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7F Series - Exhaust Filter

Features

Exhaust Filter

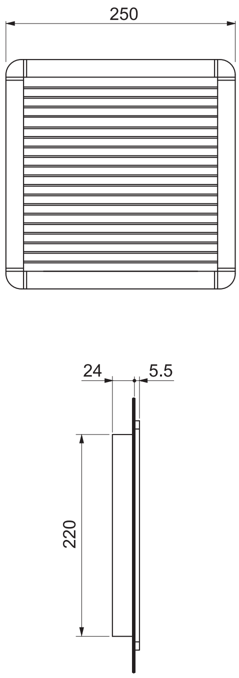
The size of the Exhaust Filter should match the size of the Filter Fan to achieve the best ventilation within the cabinet

- Minimum depth within enclosure
- Time-saving installation and maintenance
- Further available versions*:
  - EMC Exhaust Filters (7F.07)

* Product codes, see page 9

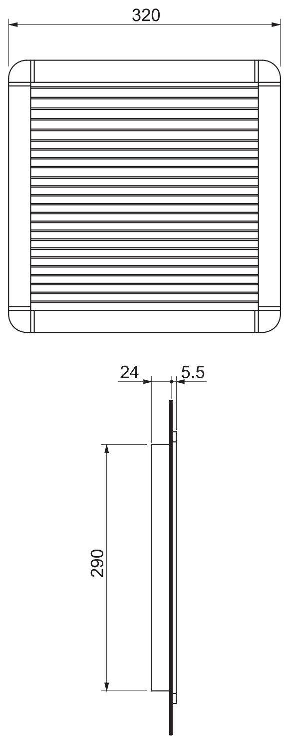
7F.05.0.000.4000

- For Filter Fans 7F.50.x.xxx.4230 or 7F.50.8.xxx.4370
- Size 4



7F.05.0.000.5000

- For Filter Fans 7F.50.8.xxx.5500 or 7F.50.8.xxx.5630
- Size 5



Other data	
Housing, Cover	Plastics according to UL94 V-0, light gray (RAL 7035)
Filter mat (included)	EU3 according to DIN 24185, filtering degree (80...90) %
Filter material	Synthetic fibre with progressive construction, temperature resistant to +100°C, self extingiushing, Class F1 (DIN 53438)
Protection category according to EN 60529	IP54
Approvals (according to type)	CE EAC cURus

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X-2013, www.findernet.com

Ordering information

Example: Series 7F, Exhaust Filter for mounting in sidewalls, size 1.

7 F . 0 5 . 0 . 0 0 0 . 1 0 0 0

Series

Type
05 = Exhaust Filter - for indoor use
07 = EMC Exhaust Filter - for indoor use

Supply version
0 = Not applicable for Exhaust Filter

Operating voltage
000 = Not applicable for Exhaust Filter

Enclosure cut-out
1000 = Size 1 ($92^{+0.5}$ x $92^{+0.5}$) mm
2000 = Size 2 ($125^{+1.0}$ x $125^{+1.0}$) mm
3000 = Size 3 ($177^{+1.0}$ x $177^{+1.0}$) mm
4000 = Size 4 ($224^{+1.0}$ x $224^{+1.0}$) mm
5000 = Size 5 ($291^{+1.0}$ x $291^{+1.0}$) mm

Exhaust Filter - All versions

Standard-versions	EMC - versions	
7F.05.0.000.1000	7F.07.0.000.1000	Exhaust Filter, Size 1
7F.05.0.000.2000	7F.07.0.000.2000	Exhaust Filter, Size 2
7F.05.0.000.3000	7F.07.0.000.3000	Exhaust Filter, Size 3
7F.05.0.000.4000	7F.07.0.000.4000	Exhaust Filter, Size 4
7F.05.0.000.5000	7F.07.0.000.5000	Exhaust Filter, Size 5

Components

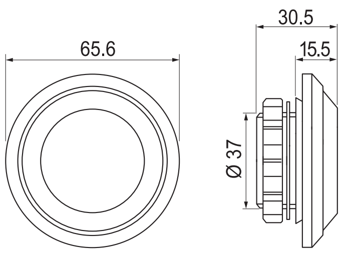
Standard-Filter Fan	Standard-Exhaust Filter	EMC-Filter Fan	EMC-Exhaust Filter	Filter mat	Size
7F.50.8.xxx.1020	7F.05.0.000.1000	7F.70.8.230.1020	7F.07.0.000.1000	07F.15	1
7F.50.8.xxx.2055	7F.05.0.000.2000	7F.70.8.230.2055	7F.07.0.000.2000	07F.25	2
7F.50.8.xxx.3100	7F.05.0.000.3000	7F.70.8.230.3100	7F.07.0.000.3000	07F.35	3
7F.50.8.xxx.4230	7F.05.0.000.4000	7F.70.8.230.4230	7F.07.0.000.4000	07F.45	4
7F.50.8.xxx.4370	7F.05.0.000.4000	7F.70.8.230.4370	7F.07.0.000.4000	07F.45	4
7F.50.8.xxx.5500	7F.05.0.000.5000	7F.70.8.230.5500	7F.07.0.000.5000	07F.55	5
7F.50.8.xxx.5630	7F.05.0.000.5000	7F.70.8.230.5630	7F.07.0.000.5000	07F.55	5
7F.50.9.024.1020	7F.05.0.000.1000	7F.70.9.024.1020	7F.07.0.000.1000	07F.15	1
7F.50.9.024.2055	7F.05.0.000.2000	7F.70.9.024.2055	7F.07.0.000.2000	07F.25	2
7F.50.9.024.3100	7F.05.0.000.3000	7F.70.9.024.3100	7F.07.0.000.3000	07F.35	3
7F.50.9.024.4230	7F.05.0.000.4000	7F.70.9.024.4230	7F.07.0.000.4000	07F.45	4

Spare Filter mats	07F.15	07F.25	07F.35	07F.45	07F.55
Protection category	IP54				

Accessories

07F.80

Pressure compensation device, for pressure compensation in closed cabinets or enclosures		**07F.80**
Air interface area	cm²	7
Mounting		PG 29 thread with union nut
Torque	Nm	5 (max. 10)
Material		plastic according to UL94-V0
Dimensions (diameter / depth)	mm	65.5 / 30.5
Mounting position		upper part of cabinet sidewalls
Ambient temperature	°C	–45…+70
Protection category		IP55



Unit package contains 2 pressure compensation devices

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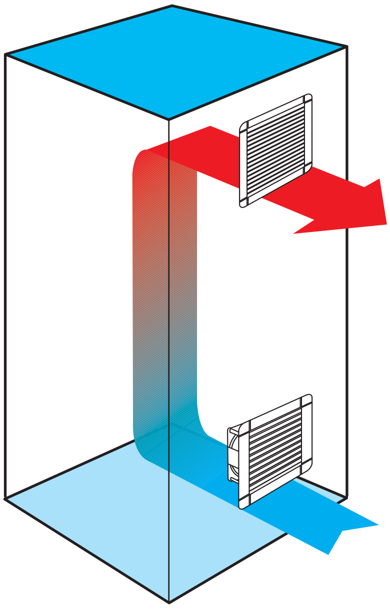
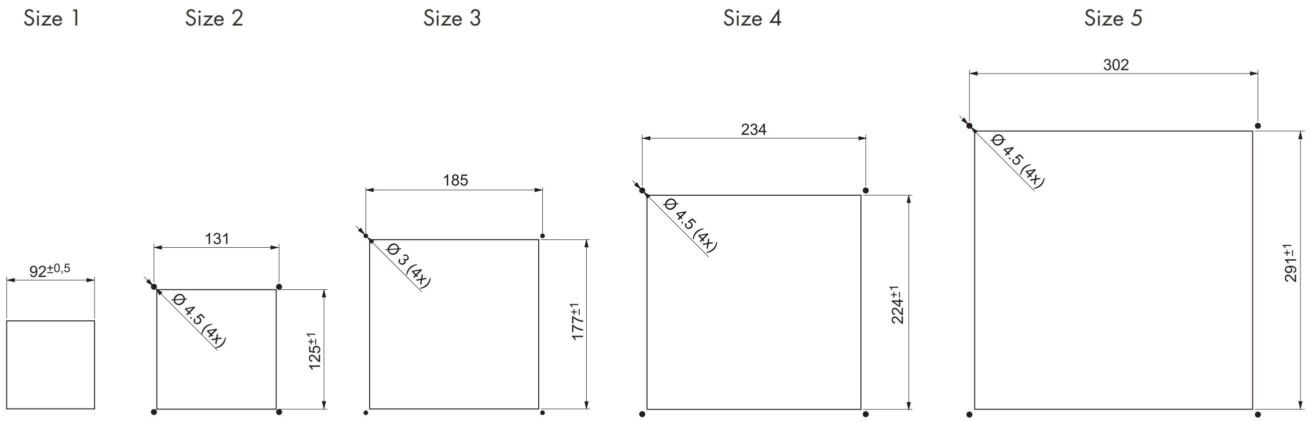
Mounting instructions for Filter Fans and Exhaust Filters

Mounting arrangement of Filter Fans and Exhaust Filters



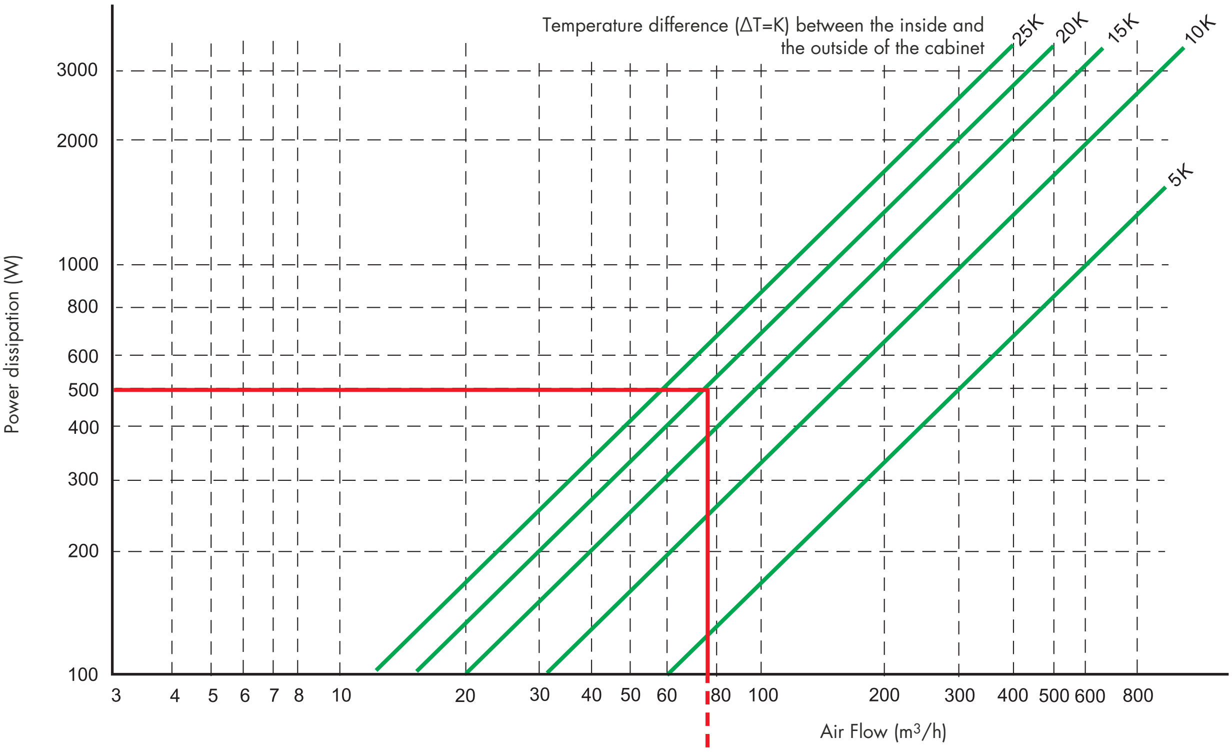
Drilling template and mounting cut-outs for Filter Fans and Exhaust Filter

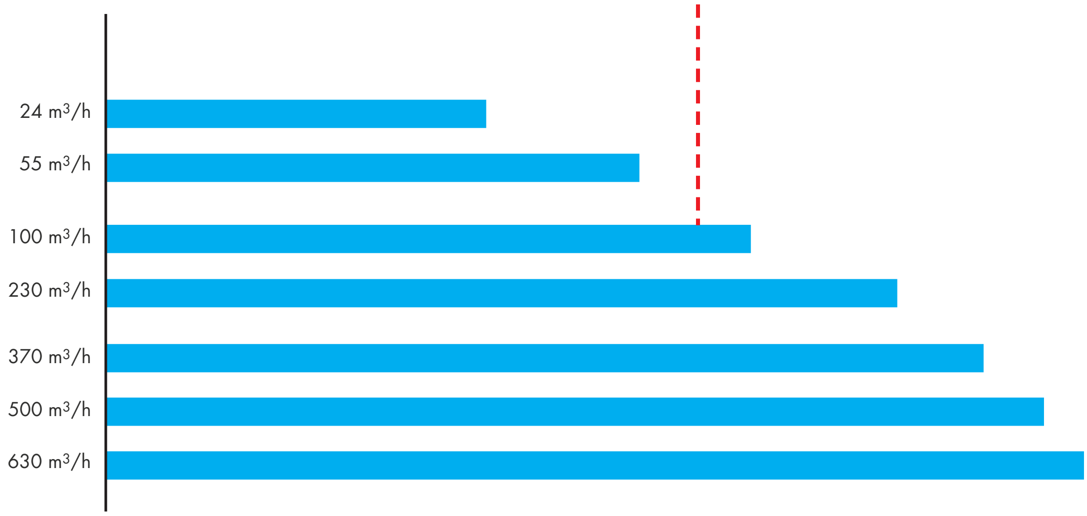


Mounting and maintenance

1. Make the panel cut-out according to the size of the Filter Fan or Exhaust Filter in the sidewall of the cabinet as appropriate.
   A template of the panel cut-out is included in the packaging of the Filter Fan or Exhaust Filter.
2. Make the electrical connection.
3. Mount by simply snapping the side-located lugs on the Filter Fan or Exhaust Filter into the panel cut-out (without using screws for sidewall thickness of 1,2...2,4 mm).
   At other thickness it is recommended to mount the Filter Fan by the screws supplied (for size 1, the template shows the mounting cut-out only).
4. When screws are needed for the mounting, remove the plastic cover and fix the Filter Fan with the 4 screws supplied.
   Then insert the filter mat and snap the plastic cover to the mounting frame.
5. During maintenance or when replacing the filter mat remove the plastic cover, replace the filter mat and snap on the plastic cover.

Fan selection





Example

First, estimate the power dissipated within the cabinet. Then calculate the maximum difference between the internal and external temperature (green lines) by considering the difference between the maximum permitted internal temperature (as dictated by the temperature rating of the enclosed components, or specification) and the maximum temperature expected outside the cabinet.

The projection onto the X axis, of the intersection between the power (watts) and the appropriate green line, corresponds to the air flow rate in m^3/h required to meet the maximum internal temperature limit. Extending this line vertically to intersect with the blue horizontal lines, indicates the most appropriate model of 7F fan to be fitted to the cabinet to provide the requisite air flow.

The example above considers a cabinet with an internal thermal power dissipation of 500 W, and assumes the maximum temperature difference between the inside and the outside of the cabinet to be 20K. The required air flow can be seen to be a little less than 80 m^3/h.

It is suggested that this is increased by 10% to allow for the affects of a dirty filter.

And so, it can be seen that models of the 7F with100 m^3/h flow rate will provide the proper dissipation of heat under these circumstances.

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Application notes

Filter Fan
The ball-bearing axial fan housing is made of aluminium and the rotor is made of plastic or metal (depending on the type).

Filter classes
Within DIN 24185 are specified 9 filter classes, categorised into 4 coarse dust filters und 5 fine dust filters.
The coarse dust filters (EU1 – EU4) are able to filter particles > 10 μm and the fine dust filters (EU5 – EU9) are able to filter particles from (1…10) μm.

Filter classes	Example of particle	Particle size
EU1 – EU4	Textile fibers, hair, sand, pollen, spores, insects, cement dust	> 10 μm
EU5 – EU9	Pollen, spores, cement dust, tobacco smoke, oil smoke, soot	(1…10) μm

Filtering degree (Am)
The degree of filtering (Am) is the percentages of dust, by weight, that is caught and retained by the filter.

Filter mats
The quality of these filters mats has been independently tested, according DIN 24185 and branded after passing the test. The filter mats are to filter class EU3 and have an average filtering degree of (80…90) %.

Filter material
The filter material consists of a synthetic fiber with progressive construction which is moisture-resistant to 100 % RH and temperature resistant to +100°C.
According to the strict requirements of fire class F1, DIN 53438, these filter mats are self extinguishing.

Progressive construction at filter mats
The individual fibers of these filter mats are bonded by a special process to provide a progressive construction where the fiber size and spacing varies through the thickness of the filter mat.
This means that coarse dust particles are caught early and fine dust later through the thickness of the mat. In this way the entire depth of the filter mat is used.

Flammability class of the housing and the cover
The plastic materials used comply with flammability class V-0, according UL94.

EMC Filter Fans and EMC Exhaust Filters
The plastic mounting frame of the EMC Filter Fans (7F.70) and EMC Exhaust Filters (7F.07) are sprayed with a conductive (metallic) paint.
The gasket located on the mounting frame, for sealing the Filter Fan or Exhaust Filter in the cabinet is also metalised.
In addition; located at the EMC Filter Fan between the metalized mounting frame and the filter mat, is a metal grid.
Therefore, between the metal parts of the Filter Fan and the metal cabinet, there is a conductive connection.

Filter Fan in "reverse flow" version
As supplied, the standard Filter Fan is in "Draw-In"- mode, which means that cool air is filtered and drawn into the cabinet. In some cases it may be required that the warm air is blown out of the cabinet. In which case it is possible to get Filter Fans in "Exhaust Filter" mode version (7F.80).

Mounting of the pressure compensation device
In sealed cabinets and enclosures the internal pressure can vary due to changes in temperature. The pressure compensation device (07F.80) will relieve this internal/external pressure differential whilst maintaining a high level of protection - preventing the ingress of dust and moisture into the cabinet or the enclosure. The pressure compensation device is approved for use in cabinets and enclosures according to DIN EN 62208.

Drill a hole Ø $37^{+1.0}$ mm in the housing wall and fix the pressure compensation device with the accompanying nut. It is important to ensure that the sealing ring is located on the outside. To ensure optimum pressure balance, it is recommended to fit 2 pressure compansation device at the upper sides of the cabinet or enclosure.

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Features

Multi-function and mono-function timer range

80.01 - Multi-function & multi-voltage
80.11 - On-delay, multi-voltage

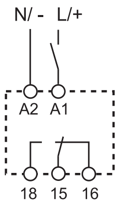
- 17.5 mm wide
- Six time scales from 0.1s to 24h
- High input/output isolation
- 35 mm rail (EN 60715) mount
- "Blade + cross" - both flat blade and cross head screw drivers can be used to adjust the range and function selectors, the timing trimmer, and to disengage the rail mounting clip
- New multi-voltage versions with "PWM clever" technology

80.01 / 80.11
Screw terminal

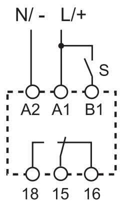
80.01

- Multi-voltage
- Multi-function

AI: On-delay
DI: Interval
SW: Symmetrical flasher (starting pulse on)
BE: Off-delay with control signal
CE: On- and off-delay with control signal
DE: Interval with control signal on



Wiring diagram (without control signal)

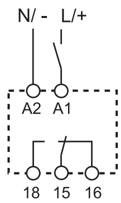


Wiring diagram (with control signal)

80.11

- Multi-voltage
- Mono-function

AI: On-delay



Wiring diagram (without control signal)

For UL ratings see:
"General technical information" page V

For outline drawing see page 6

	80.01	80.11
Contact specification		
Contact configuration	1 CO (SPDT)	1 CO (SPDT)
Rated current/Maximum peak current A	16/30	16/30
Rated voltage/Maximum switching voltage V AC	250/400	250/400
Rated load AC1 VA	4,000	4,000
Rated load AC15 (230 V AC) VA	750	750
Single phase motor rating (230 V AC) kW	0.55	0.55
Breaking capacity DC1: 30/110/220 V A	16/0.3/0.12	16/0.3/0.12
Minimum switching load mW (V/mA)	500 (10/5)	500 (10/5)
Standard contact material	AgCdO	AgCdO
Supply specification		
Nominal voltage (U_N) V AC (50/60 Hz)	12…240	24…240
V DC	12…240	24…240
Rated power AC/DC VA (50 Hz)/W	< 1.8 / < 1	< 1.8 / < 1
Operating range V AC	10.8…265	16.8…265
V DC	10.8…265	16.8…265
Technical data		
Specified time range	(0.1…2)s, (1…20)s, (0.1…2)min, (1…20)min, (0.1…2)h, (1…24)h	
Repeatability %	± 1	± 1
Recovery time ms	100	100
Minimum control impulse ms	50	—
Setting accuracy-full range %	± 5	± 5
Electrical life at rated load in AC1 cycles	$50 \cdot 10^3$	$50 \cdot 10^3$
Ambient temperature range °C	–10…+50	–10…+50
Protection category	IP 20	IP 20
Approvals (according to type)	CE EAC RINA Lloyd's Register cULus	

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Features

Mono-function timer range

80.21 - Interval, multi-voltage
80.41 - Off-delay with control signal, multi-voltage
80.91 - Asymmetrical flasher, multi-voltage

- 17.5 mm wide
- Six time scales from 0.1s to 24h
- High input/output isolation
- 35 mm rail (EN 60715) mount
- "Blade + cross" - both flat blade and cross head screw drivers can be used to adjust the range and function selectors, the timing trimmer, and to disengage the rail mounting clip
- New multi-voltage versions with "PWM clever" technology

80.21 / 80.41 / 80.91
Screw terminal

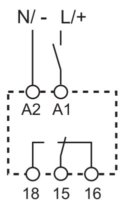
For UL ratings see:
"General technical information" page V

For outline drawing see page 6

80.21

- Multi-voltage
- Mono-function

DI: Interval

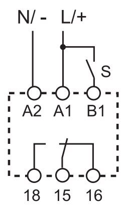


Wiring diagram
(without control signal)

80.41

- Multi-voltage
- Mono-function

BE: Off-delay with control signal

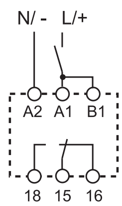


Wiring diagram
(with control signal)

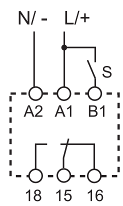
80.91

- Multi-voltage
- Mono-function

LI: Asymmetrical flasher (starting pulse on)
LE: Asymmetrical flasher (starting pulse on) with control signal



Wiring diagram
(without control signal)



Wiring diagram
(with control signal)

H

		80.21	80.41	80.91
Contact specification				
Contact configuration		1 CO (SPDT)	1 CO (SPDT)	1 CO (SPDT)
Rated current/Maximum peak current	A	16/30	16/30	16/30
Rated voltage/Maximum switching voltage	V AC	250/400	250/400	250/400
Rated load AC1	VA	4,000	4,000	4,000
Rated load AC15 (230 V AC)	VA	750	750	750
Single phase motor rating (230 V AC)	kW	0.55	0.55	0.55
Breaking capacity DC1: 30/110/220 V	A	16/0.3/0.12	16/0.3/0.12	16/0.3/0.12
Minimum switching load	mW (V/mA)	500 (10/5)	500 (10/5)	500 (10/5)
Standard contact material		AgCdO	AgCdO	AgCdO
Supply specification				
Nominal voltage (U_N)	V AC (50/60 Hz)	24…240	24…240	12…240
	V DC	24…240	24…240	12…240
Rated power AC/DC	VA (50 Hz)/W	< 1.8 / < 1	< 1.8 / < 1	< 1.8 / < 1
Operating range	V AC	16.8…265	16.8…265	10.8…265
	V DC	16.8…265	16.8…265	10.8…265
Technical data				
Specified time range		(0.1…2)s, (1…20)s, (0.1…2)min, (1…20)min, (0.1…2)h, (1…24)h		
Repeatability	%	± 1	± 1	± 1
Recovery time	ms	100	100	100
Minimum control impulse	ms	—	50	50
Setting accuracy-full range	%	± 5	± 5	± 5
Electrical life at rated load in AC1	cycles	$50 \cdot 10^3$	$50 \cdot 10^3$	$50 \cdot 10^3$
Ambient temperature range	°C	–10…+50	–10…+50	–10…+50
Protection category		IP 20	IP 20	IP 20
Approvals (according to type)		CE EAC Lloyds Register RINA c UL us		

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Features

Multi-function and multi-voltage solid-state output timer

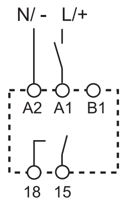
- 17.5 mm wide
- Six time scales from 0.1s to 24h
- High input/output isolation
- 35 mm rail (EN 60715) mount
- Multi-voltage output (24...240 V AC/DC), independent from the input voltage
- "Blade + cross" - both flat blade and cross head screw drivers can be used to adjust the range and function selectors, the timing trimmer, and to disengage the rail mounting clip
- Multi-voltage input with "PWM clever" technology

80.71

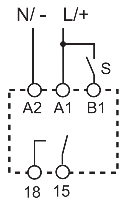
- Multi-voltage
- Multi-function

80.71
Screw terminal

AI: On-delay
DI: Interval
SW: Symmetrical flasher (starting pulse on)
BE: Off-delay with control signal
CE: On- and off-delay with control signal
DE: Interval with control signal on



Wiring diagram
(without control signal)



Wiring diagram
(with control signal)

For outline drawing see page 6

Output circuit		
Contact configuration		1 NO (SPST-NO)
Rated current	A	1
Rated voltage	V AC/DC	24...240
Switching voltage range	V AC/DC	19...265
Rated load AC15	A	1
Rated load DC1	A	1
Minimum switching current	mA	0.5
Max. "OFF-state" leakage current	mA	0.05
Max. "ON-state" voltage drop	V	2.8
Input circuit		
Nominal voltage (U_N)	V AC (50/60 Hz)	24...240
	V DC	24...240
Rated power	VA (50 Hz)/W	1.3/1.3
Operating range	V AC	19...265
	V DC	19...265
Technical data		
Specified time range		(0.1...2)s, (1...20)s, (0.1...2)min, (1...20)min, (0.1...2)h, (1...24)h
Repeatability	%	± 1
Recovery time	ms	100
Minimum control impulse	ms	50
Setting accuracy-full range	%	± 5
Electrical life	cycles	$100 \cdot 10^6$
Ambient temperature range	°C	–20...+50
Protection category		IP 20
Approvals (according to type)		CE EAC Lloyd's Register RINA

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80 Series - Modular timers 6 - 8 A

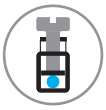
Features

Mono-function timer range

80.61 - Power off-delay (True off-delay), multi-voltage
80.82 - Star-delta, multi-voltage

- 17.5 mm wide
- Rotary range selector, and timing trimmer
- Four time scales from 0.05s to 3 min (type 80.61)
- Six time scales from 0.1s to 20min (type 80.82)
- High input/output isolation
- 35 mm rail (EN 60715) mount

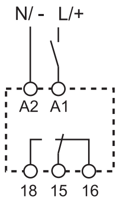
80.61 / 80.82
Screw terminal



80.61

- Multi-voltage
- Mono-function

BI: Power off-delay (True off-delay)

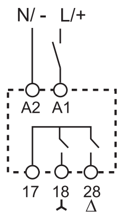


Wiring diagram
(without control signal)

80.82

- Multi-voltage
- Mono-function
- Transfer time can be regulated (0.05…1)s

SD: Star-delta



Wiring diagram
(without control signal)

For UL ratings see:
"General technical information" page V

For outline drawing see page 6

		80.61	80.82
Contact specification			
Contact configuration		1 CO (SPDT)	2 NO (DPST-NO)
Rated current/Maximum peak current	A	8/15	6/10
Rated voltage/Maximum switching voltage	V AC	250/400	250/400
Rated load AC1	VA	2,000	1,500
Rated load AC15 (230 V AC)	VA	400	300
Single phase motor rating (230 V AC)	kW	0.3	—
Breaking capacity DC1: 30/110/220 V	A	8/0.3/0.12	6/0.2/0.12
Minimum switching load	mW (V/mA)	300 (5/5)	500 (12/10)
Standard contact material		AgNi	AgNi
Supply specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	24…240	24…240
	V DC	24…220	24…240
Rated power AC/DC	VA (50 Hz)/W	< 0.6/ < 0.6	< 1.3/ < 0.8
Operating range	V AC	16.8…265	16.8…265
	V DC	16.8…242	16.8…265
Technical data			
Specified time range		(0.05…2)s, (1…16)s, (8…70)s, (50…180)s	(0.1…2)s, (1…20)s, (0.1…2)min, (1…20)min
Repeatability	%	± 1	± 1
Recovery time	ms	—	100
Minimum control impulse	ms	500 (A1-A2)	—
Setting accuracy-full range	%	± 5	± 5
Electrical life at rated load in AC1	cycles	$100 \cdot 10^3$	$60 \cdot 10^3$
Ambient temperature range	°C	–10…+50	–10…+50
Protection category		IP 20	IP 20
Approvals (according to type)			

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Ordering information

Example: 80 series, modular timers, 1 CO (SPDT) - 16 A, supply rated at (12…240)V AC/DC.

8 0 . 0 1 . 0 . 2 4 0 . 0 0 0 0

Series

Type
0 = Multi-function (AI, DI, SW, BE, CE, DE)
1 = On-delay (AI)
2 = Interval (DI)
4 = Off-delay with control signal (BE)
6 = Power off-delay (True off-delay) (BI)
7 = Multi-function with solid state output (AI, DI, SW, BE, CE, DE)
8 = Star-delta (SD)
9 = Asymmetrical flasher (LI, LE)

Versions
0 = Standard

Supply voltage
240 = (12 ... 240)V AC/DC (80.01, 80.91)
240 = (24 ... 240)V AC/DC (80.11, 80.21, 80.41, 80.71, 80.82)
240 = (24...240)V AC, (24...220)V DC (80.61)

Supply version
0 = AC (50/60 Hz)/DC

No. of poles
1 = 1 CO (SPDT)
1 = 1 NO (SPST-NO), type 80.71 only
2 = 2 NO (DPST-NO), type 80.82 only

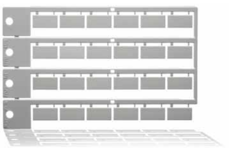
Technical data

Insulation					
Dielectric strength			**80.01/11/21/41/82/91**	**80.61**	**80.71**
	between input and output circuit	V AC	4,000	2,500	2,500
	between open contacts	V AC	1,000	1,000	—
Insulation (1.2/50 μs) between input and output		kV	6	4	4

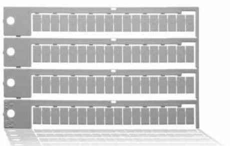
EMC specifications				
Type of test		**Reference standard**	**80.01/11/21/41/61/71/91**	**80.82**
Electrostatic discharge	contact discharge	EN 61000-4-2	4 kV	4 kV
	air discharge	EN 61000-4-2	8 kV	8 kV
Radio-frequency electromagnetic field (80 ÷ 1,000 MHz)		EN 61000-4-3	10 V/m	10 V/m
Fast transients (burst) (5-50 ns, 5 kHz) on Supply terminals		EN 61000-4-4	4 kV	4 kV
Surges (1.2/50 μs) on Supply terminals	common mode	EN 61000-4-5	4 kV	4 kV
	differential mode	EN 61000-4-5	4 kV	4 kV
on start terminal (B1)	common mode	EN 61000-4-5	4 kV	4 kV
	differential mode	EN 61000-4-5	4 kV	4 kV
Radio-frequency common mode (0.15 ÷ 80 MHz) on Supply terminals		EN 61000-4-6	10 V	10 V
Radiated and conducted emission		EN 55022	class B	class A

Other data				
Current absorption on signal control (B1)			< 1 mA	
Power lost to the environment	without contact current	W	1.4	
	with rated current	W	3.2	
Screw torque		Nm	0.8	
Max. wire size			solid cable	stranded cable
		mm^2	1x6 / 2x4	1x4 / 2x2.5
		AWG	1x10 / 2x12	1x12 / 2x14

Accessories


020.24

Sheet of marker tags, for types 80.82, plastic, 24 tags, 9x17 mm	020.24


060.72

Sheet of marker tags, for types 80.01/11/21/41/61/71, plastic, 72 tags, 6x12 mm	060.72

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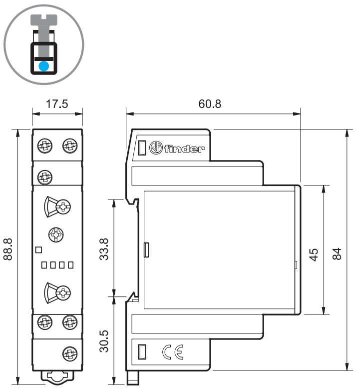
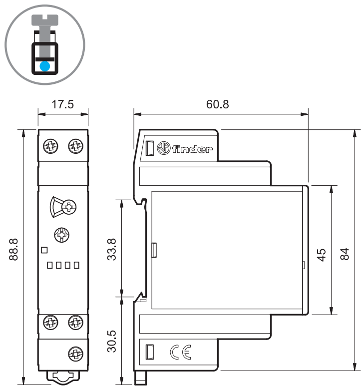
Outline drawings

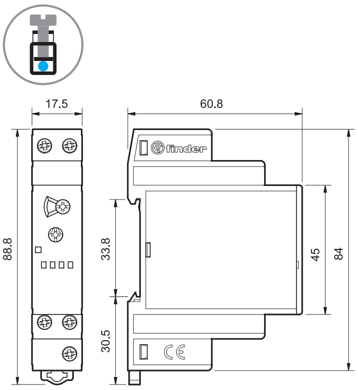
80.01
Screw terminal



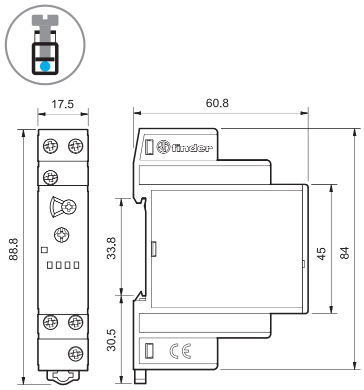
80.11
Screw terminal



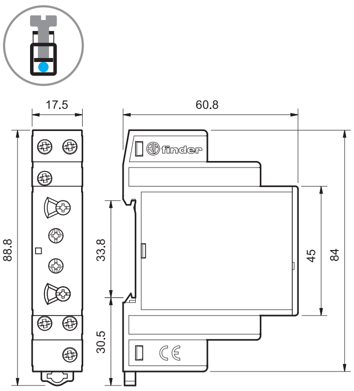
80.21
Screw terminal



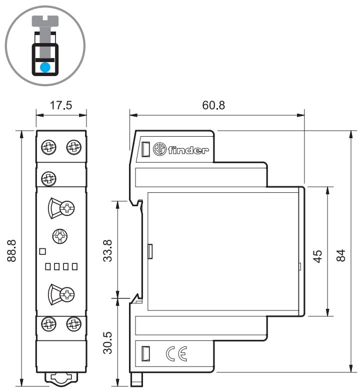
80.41
Screw terminal



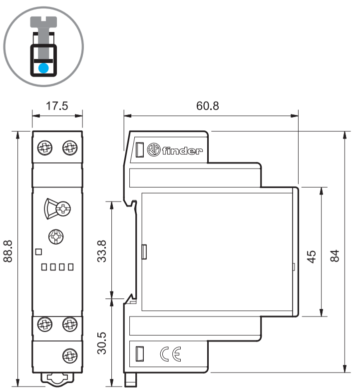
80.91
Screw terminal



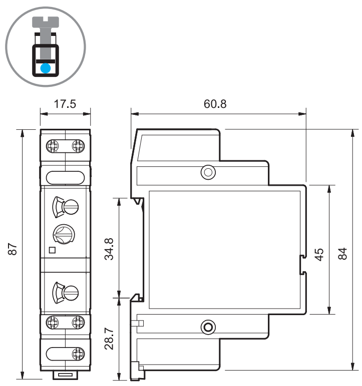
80.71
Screw terminal



80.61
Screw terminal



80.82
Screw terminal



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Functions

U = Supply voltage

S = Signal switch

= Output contact

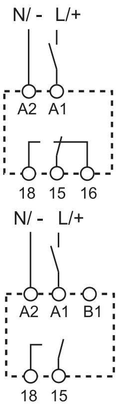
LED*	Supply voltage	NO output contact	Contacts	
			Open	Closed
	OFF	Open	15 - 18	15 - 16
	ON	Open	15 - 18	15 - 16
	ON	Open (Timing in Progress)	15 - 18	15 - 16
	ON	Closed	15 - 16	15 - 18

* The LED on type 80.61 is illuminated only when the supply voltage is applied to the timer; during the timing period the LED is not illuminated.

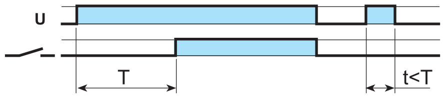
Without control signal = Start via contact in supply line (A1).
With control signal = Start via contact into control terminal (B1).

Wiring diagram

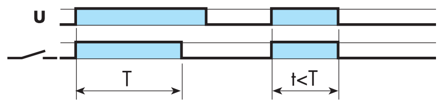
Without control signal



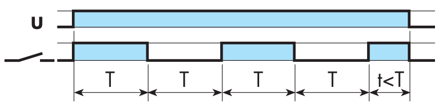
Type
80.01
80.71



(AI) **On-delay.**
Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs when power is removed.

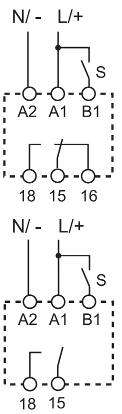


(DI) **Interval.**
Apply power to timer. Output contacts transfer immediately. After the preset time has elapsed, contacts reset.

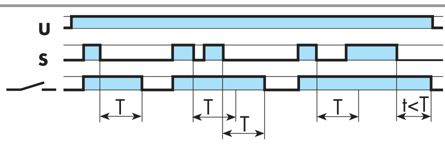


(SW) **Symmetrical flasher (starting pulse on).**
Apply power to timer. Output contacts transfer immediately and cycle between ON and OFF for as long as power is applied. The ratio is 1:1 (time on = time off).

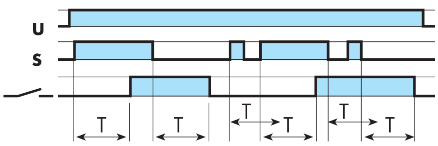
With control signal



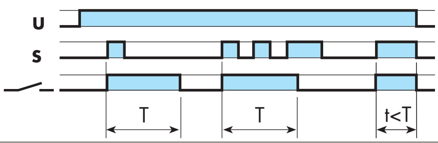
80.01
80.71



(BE) **Off-delay with control signal.**
Power is permenently applied to the timer. The output contacts transfer immediately on closure of the Signal Switch (S). Opening the Signal Switch initiates the preset delay, after which time the output contacts reset.

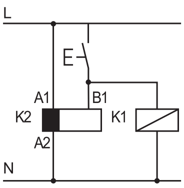


(CE) **On- and off-delay with control signal.**
Power is permenently applied to the timer. Closing the Signal Switch (S) initiates the preset delay, after which time the output contacts transfer. Opening the Signal switch initiates the same preset delay, after which time the output contacts reset.

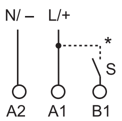


(DE) **Interval with control signal on.**
Power is permenently applied to the timer.
On momentary or maintained closure of Signal Switch (S), the output contacts transfer, and remain so for the duration of the preset delay, after which they reset.

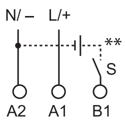
NOTE: The function must be set before energising the timer.



• Possible to control an external load, such as another relay coil or timer, connected to the control signal terminal B1.



* With DC supply, positive polarity has to be connected to B1 terminal (according to EN 60204-1).

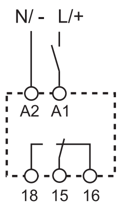


** A voltage other than the supply voltage can be applied to the command Start (B1), example:
A1 - A2 = 230 V AC
B1 - A2 = 12 V DC

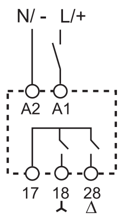
Functions

Wiring diagram

Without control signal

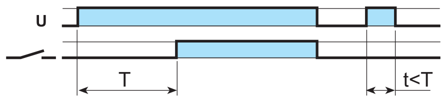


80.11/21/61



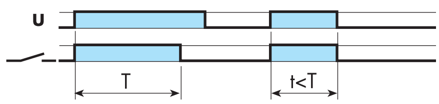
80.82

Type 80.11



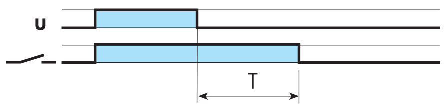
(AI) On-delay.
Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs when power is removed.

80.21



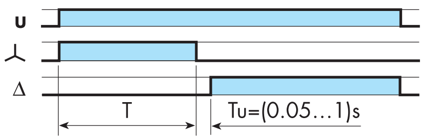
(DI) Interval.
Apply power to timer. Output contacts transfer immediately. After the preset time has elapsed, contacts reset.

80.61



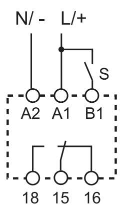
(BI) Power off-delay (True off-delay).
Apply power to timer (minimum 500ms). Output contacts transfer immediately. Removal of power initiates the preset delay, after which time the output contacts reset.

80.82



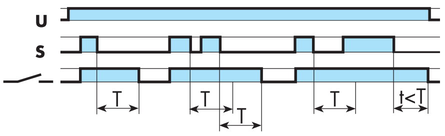
(SD) Star-delta.
Apply power to timer. The star contact (⅄) closes immediately. After preset delay has elapsed the star contact (⅄) resets. After a further transfer time variable from (0.05…1)s the delta contact (Δ) closes and remains in that position, until reset on power off.

With control signal



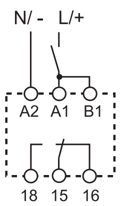
80.41

80.41



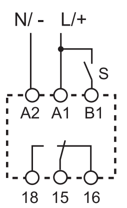
(BE) Off-delay with control signal.
Power is permenently applied to the timer.
The output contacts transfer immediately on closure of the Signal Switch (S). Opening the Signal Switch initiates the preset delay, after which time the output contacts reset.

Without control signal



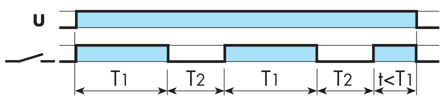
80.91

With control signal

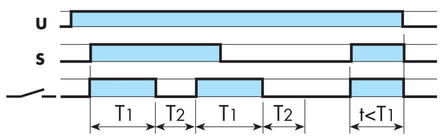


80.91

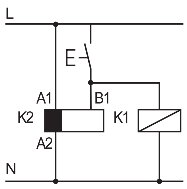
80.91



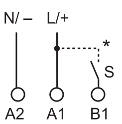
(LI) Asymmetrical flasher (starting pulse on).
Apply power to timer. Output contacts transfer immediately and cycle between ON and OFF for as long as power is applied. The ON (T1) and OFF (T2) times are independently adjustable.



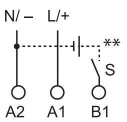
(LE) Asymmetrical flasher (starting pulse on) with control signal
Power is permenently applied to the timer.
Closing Signal Switch (S) causes the output contacts to transfer immediately and cycle between ON (T1) and OFF (T2), until opened.



• Possible to control an external load, such as another relay coil or timer, connected to the control signal terminal B1.



* With DC supply, positive polarity has to be connected to B1 terminal (according to EN 60204-1).



** A voltage other than the supply voltage can be applied to the command Start (B1), example:
A1 - A2 = 230 V AC
B1 - A2 = 12 V DC

Features

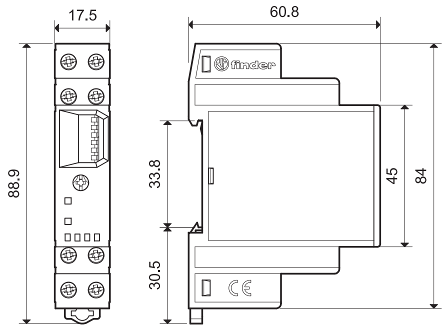
Multi-function and multi-voltage timer

- One module 17.5 mm wide housing
- Seven functions (4 with supply start and 3 with control signal)
- Additional Reset function
- Six time ranges from 0.1s to 10h
- 35 mm rail (EN 60715) mounting

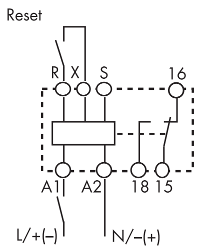
NEW **81.01**

- Multi-voltage (DC non polarized)
- Multi-function
- 35 mm rail (EN 60715) mounting

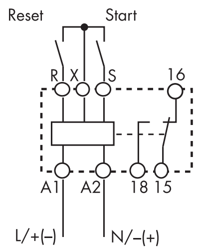
81.01
Screw terminal



AI: On-delay
DI: Interval
SW: Symmetrical flasher (starting pulse on)
SP: Symmetrical flasher (starting pulse off)
BE: Off-delay with control signal
DE: Interval with control signal on
EEb: Interval with control signal off



Wiring diagram
(supply START)



Wiring diagram
(control signal)

Contact specification		
Contact configuration		1 CO (SPDT)
Rated current/Maximum peak current	A	16/30
Rated voltage/Maximum switching voltage	V AC	250/400
Rated load AC1	VA	4,000
Rated load AC15 (230 V AC)	VA	750
Single phase motor rating (230 V AC)	kW	0.55
Breaking capacity DC1: 30/110/220 V	A	16/0.3/0.12
Minimum switching load	mW (V/mA)	500 (10/5)
Standard contact material		AgCdO
Supply specification		
Nominal voltage (U_N)	V AC (50/60 Hz)	12…230
	V DC	12…230 (non polarized)
Rated power AC/DC	VA (50 Hz)/W	< 2 / < 2
Operating range	V AC	10.8…250
	V DC	10.8…250
Technical data		
Specified time range		(0.1…1)s, (1…10)s, (10…60)s, (1…10)min, (10…60)min, (1…10)h
Repeatability	%	± 1
Recovery time	ms	≤ 50
Minimum control impulse	ms	50
Setting accuracy-full range	%	± 5
Electrical life at rated load in AC1	cycles	$100 \cdot 10^3$
Ambient temperature range	°C	–10…+50
Protection category		IP 20
Approvals (according to type)		

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Ordering information

Example: 81 series, modular timer multi-voltage, 1 CO (SPDT) - 16 A, supply rated at (12…230)V AC/DC.

8 1 . 0 1 . 0 . 2 3 0 . 0 0 0 0

Series

Type
0 = Multi-function (AI, DI, SW, SP, BE, DE, EEb)

No. of poles
1 = 1 CO (SPDT)

Supply voltage
230 = (12 ... 230)V AC/DC

Supply version
0 = AC (50/60 Hz)/DC

Technical data

EMC specifications			
Type of test		**Reference standard**	
Electrostatic discharge	contact discharge	EN 61000-4-2	4 kV
	air discharge	EN 61000-4-2	8 kV
Radio-frequency electromagnetic field (80 ÷ 1,000 MHz)		EN 61000-4-3	10 V/m
Fast transients (burst) (5-50 ns, 5 kHz) on Supply terminals		EN 61000-4-4	4 kV
Surges (1.2/50 µs) on Supply terminals	common mode	EN 61000-4-5	4 kV
	differential mode	EN 61000-4-5	4 kV
Radio-frequency common mode (0.15 ÷ 80 MHz) on Supply terminals		EN 61000-4-6	10 V
Radiated and conducted emission		EN 55022	class A
Other data			
Current absorption on signal control (B1)		< 1 mA (S-X)	< 1 mA (R-X)
Voltage potential on the input terminal R - X and S -X		Not galvanic separation from the supply voltage on A1 - A2	
Power lost to the environment	without contact current W	1.3	
	with rated current W	3.2	
Screw torque	Nm	0.8	
Max. wire size		solid cable	stranded cable
	mm²	1x6 / 2x4	1x4 / 2x2.5
	AWG	1x10 / 2x12	1x12 / 2x14

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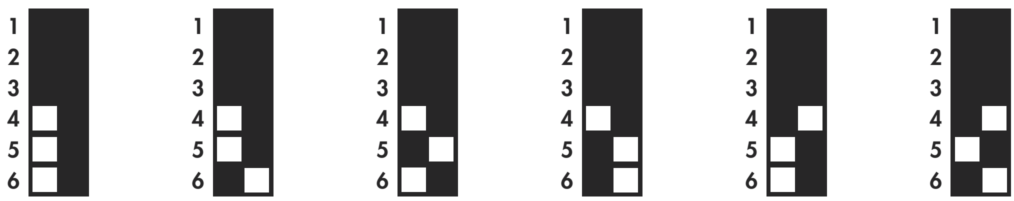
Time range setting

(0.1…1)s (1…10)s (10…60)s (1…10)min (10…60)min (1…10)h



NOTE: time range and function must be set before energising the timer.

Functions

U = Supply voltage

S = Signal switch

R = Reset

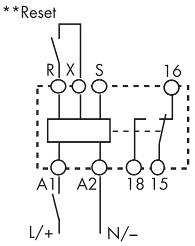
= Output contact

LED (green)	LED (red)	Supply voltage	NO output contact	Contacts Open	Contacts Closed
		OFF	Open	15 - 18	15 - 16
		ON	Open	15 - 18	15 - 16
		ON	Closed	15 - 16	15 - 18

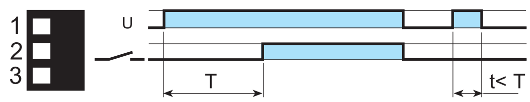
Supply Start = Start via contact in supply line (A1).
Control signal = Start via contact into control terminal (X-S).

Wiring diagram

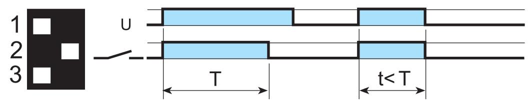
Supply START



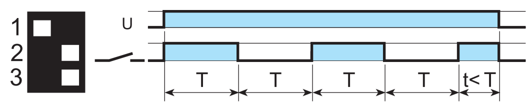
**Connection of the Reset (R-X) is optional



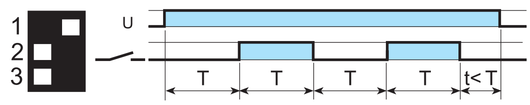
(AI) On-delay.
Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs when power is removed.



(DI) Interval.
Apply power to timer. Output contacts transfer immediately. After the preset time has elapsed, contacts reset.

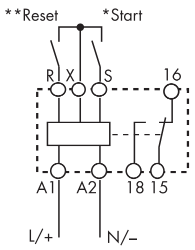


(SW) Symmetrical flasher (starting pulse on).
Apply power to timer. Output contacts transfer immediately and cycle between ON and OFF for as long as power is applied. The ratio is 1:1 (time on = time off).



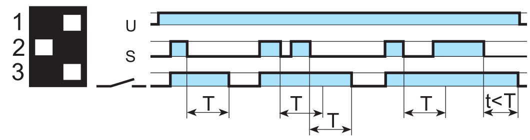
(SP) Symmetrical flasher (starting pulse off).
Apply power to timer. First transfer of contact occurs after preset time has elapsed. The timer now cycles between OFF and ON as long as power is applied. The ratio is 1:1 (time on = time off).

Control signal

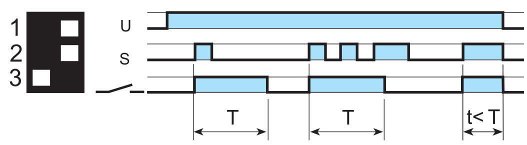


*Terminals R, S & X must not be directly connected to the timer supply voltage, but they should be considered to be at supply voltage potential for the purposes of insulation.

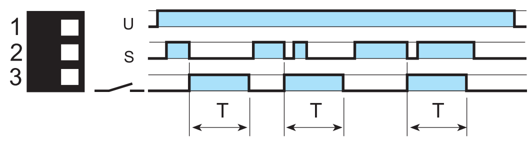
**Connection of the Reset (R-X) is optional



(BE) Off-delay with control signal.
Power is permenently applied to the timer. The output contacts transfer immediately on closure of the Signal Switch (S). Opening the Signal Switch initiates the preset delay, after which time the output contacts reset.



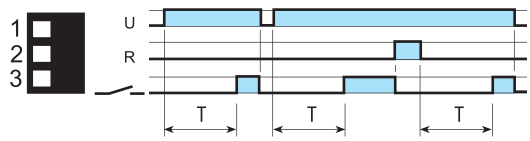
(DE) Interval with control signal on.
Power is permenently applied to the timer.
On momentary or maintained closure of Signal Switch (S), the output contacts transfer, and remain so for the duration of the preset delay, after which they reset.



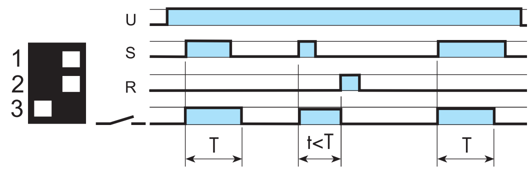
(EEb) Interval with control signal off.
Power is permenently applied to the timer.
On opening of the Signal Switch (S) the output contacts transfer, and remain so for the duration of the preset delay, after which they reset.

RESET function (R)

For each and every function and time range, the timer is immediately reset when the reset switch is closed.



Example:
Supply START; ON delay function
Closing the external reset switch immediately resets the timer. Opening the reset switch re-initiates the timing function.



Example:
Control signal; ON pulse function.
Closing the external reset switch terminates the interval time and resets the timer. To re-start, it is necessary to open the reset switch, before closing the control signal contact.

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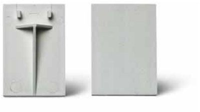
Accessories



019.01

Identification tag, for type 81.01, plastic, 1 tag, 17x25.5 mm	019.01

060.72

Sheet of marker tags, for type 81.01, plastic, 72 tags, 6x12 mm	060.72

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II-2014, www.findernet.com

Features

Multi-function timer range

83.01 - Multi-function & multi-voltage, 1 Pole
83.02 - Multi-function & multi-voltage, 2 Pole (timed + instantaneous options), external time setting potentiometer option
83.52 - Multi-function & multi-voltage, 2 Pole (timed + instantaneous options), external time setting potentiometer option, pause function option

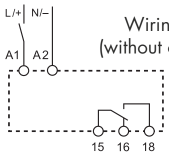
- 22.5 mm wide
- Eight time scales from 0.05s to 10 days
- High input/output isolation
- Wide supply range (24...240)V AC/DC
- 35 mm rail (EN 60715) mount
- "Blade + cross" - both flat blade and cross head screw drivers can be used to adjust the range and function selectors, the timing trimmer, and to disengage the rail mounting clip
- Multi-voltage versions with "PWM clever" technology

For outline drawing see page 5

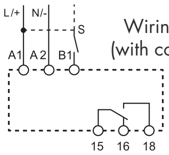
83.01

- Multi-voltage
- Multi-function

AI: On-delay
DI: Interval
GI: Pulse delayed
SW: Symmetrical flasher (starting pulse on)
BE: Off-delay with control signal
CE: On- and off-delay with control signal
DE: Interval with control signal on
WD: Watchdog (Retriggerable interval with control signal on)



Wiring diagram (without control signal)

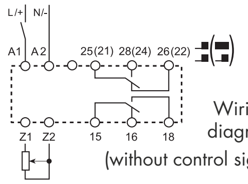


Wiring diagram (with control signal)

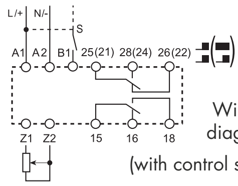
83.02

- Multi-voltage
- Multi-function
- Timing can be regulated using ext. Potentiometer
- 2 timed contacts or 1 timed + 1 instantaneous contact

AI: On-delay
DI: Interval
GI: Pulse delayed
SW: Symmetrical flasher (starting pulse on)
BE: Off-delay with control signal
CE: On- and off-delay with control signal
DE: Interval with control signal on
WD: Watchdog (Retriggerable interval with control signal on)



Wiring diagram (without control signal)

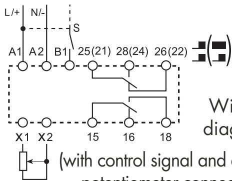


Wiring diagram (with control signal)

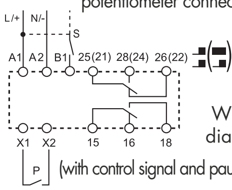
83.52

- Multi-voltage
- Multi-function
- Timing can be regulated using ext. Potentiometer
- 2 timed contacts or 1 timed + 1 instantaneous contact
- 3 functions with pause option

AE: On-delay with control signal
EEa: Interval with control signal off (retriggerable)
FE: Interval with control signal on and off
GE: Pulse delayed with control signal on
IT: Timing step
BEp: Off-delay with control signal and pause signal
DEp: Interval with control signal on and pause signal
SHp: "Shower" function



Wiring diagram (with control signal and external potentiometer connection)



Wiring diagram (with control signal and pause signal)

		83.01	83.02	83.52
Contact specification				
Contact configuration		1 CO (SPDT)	2 CO (DPDT)	2 CO (DPDT)
Rated current/Maximum peak current	A	16/30	12/30	12/30
Rated voltage/Maximum switching voltage	V AC	250/400	250/400	250/400
Rated load AC1	VA	4,000	3,000	3,000
Rated load AC15 (230 V AC)	VA	750	750	750
Single phase motor rating (230 V AC)	kW	0.5	0.5	0.5
Breaking capacity DC1: 30/110/220 V	A	16/0.3/0.12	12/0.3/0.12	12/0.3/0.12
Minimum switching load	mW (V/mA)	300 (5/5)	300 (5/5)	300 (5/5)
Standard contact material		AgNi	AgNi	AgNi
Supply specification				
Nominal voltage (U_N)	V AC (50/60 Hz)	24…240	24…240	24…240
	V DC	24…240	24…240	24…240
Rated power AC/DC	VA (50 Hz)/W	< 1.5 / < 2	< 2 / < 2	< 2 / < 2
Operating range	V AC	16.8…265	16.8…265	16.8…265
	V DC	16.8…265	16.8…265	16.8…265
Technical data				
Specified time range		(0.05…1)s, (0.5…10)s, (0.05…1)min, (0.5...10)min, (0.05…1)h, (0.5...10)h, (0.05…1)d, (0.5...10)d		
Repeatability	%	± 1	± 1	± 1
Recovery time	ms	200	200	200
Minimum control impulse	ms	50	50	50
Setting accuracy-full range	%	± 5	± 5	± 5
Electrical life at rated load in AC1	cycles	$50 \cdot 10^3$	$60 \cdot 10^3$	$60 \cdot 10^3$
Ambient temperature range	°C	–20…+60	–20…+60	–20…+60
Protection category		IP 20	IP 20	IP 20
Approvals (according to type)		CE EAC Lloyd's Register RINA cULus		

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83 Series - Modular timers 16 A

Features

Mono-function timer range

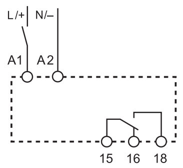
83.11 - ON-delay, multi-voltage
83.21 - Interval, multi-voltage
83.41 - Off-delay with control signal, multi-voltage

- 1 Pole
- 22.5 mm wide
- Eight time scales from 0.05s to 10 days
- High input/output isolation
- Wide supply range (24...240)V AC/DC
- 35 mm rail (EN 60715) mount
- "Blade + cross" - both flat blade and cross head screw drivers can be used to adjust the range and function selectors, the timing trimmer, and to disengage the rail mounting clip
- Multi-voltage versions with "PWM clever" technology

83.11

- Multi-voltage
- Mono-function

AI: On-delay

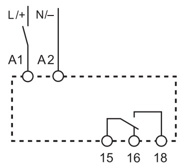


Wiring diagram
(without control signal)

83.21

- Multi-voltage
- Mono-function

DI: Interval

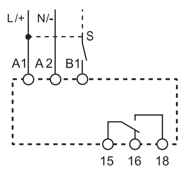


Wiring diagram
(without control signal)

83.41

- Multi-voltage
- Mono-function

BE: Off-delay with control signal



Wiring diagram
(with control signal)

For outline drawing see page 5

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		83.11	83.21	83.41
Contact specification				
Contact configuration		1 CO (SPDT)	1 CO (SPDT)	1 CO (SPDT)
Rated current/Maximum peak current	A	16/30	16/30	16/30
Rated voltage/Maximum switching voltage	V AC	250/400	250/400	250/400
Rated load AC1	VA	4,000	4,000	4,000
Rated load AC15 (230 V AC)	VA	750	750	750
Single phase motor rating (230 V AC)	kW	0.5	0.5	0.5
Breaking capacity DC1: 30/110/220 V	A	16/0.3/0.12	16/0.3/0.12	16/0.3/0.12
Minimum switching load	mW (V/mA)	300 (5/5)	300 (5/5)	300 (5/5)
Standard contact material		AgNi	AgNi	AgNi
Supply specification				
Nominal voltage (U_N)	V AC (50/60 Hz)	24...240	24...240	24...240
	V DC	24...240	24...240	24...240
Rated power AC/DC	VA (50 Hz)/W	< 1.5 / < 2	< 1.5 / < 2	< 1.5 / < 2
Operating range	V AC	16.8...265	16.8...265	16.8...265
	V DC	16.8...265	16.8...265	16.8...265
Technical data				
Specified time range		(0.05…1)s, (0.5…10)s, (0.05…1)min, (0.5...10)min, (0.05...1)h, (0.5...10)h, (0.05...1)d, (0.5...10)d		
Repeatability	%	± 1	± 1	± 1
Recovery time	ms	200	200	200
Minimum control impulse	ms	—	—	50
Setting accuracy-full range	%	± 5	± 5	± 5
Electrical life at rated load in AC1	cycles	$50 \cdot 10^3$	$50 \cdot 10^3$	$50 \cdot 10^3$
Ambient temperature range	°C	–20…+60	–20…+60	–20…+60
Protection category		IP 20	IP 20	IP 20
Approvals (according to type)				

Features

Mono-function and multi-function timer range

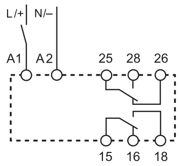
83.62 - Power off-delay, multi-voltage, 2 Pole
83.82 - Star-Delta, multi-voltage, star and delta output contacts
83.91 - Asymmetrical flasher, multi-voltage, 1 Pole

- 22.5 mm wide
- Time scales:
  Type 83.62 - 0.05s to 3 minutes
  Type 83.82 / 83.91 - 0.05 s to 10 days
- Wide supply range (24…240)V AC / DC
- 35 mm rail (EN 60715) mount

83.62

- Multi-voltage
- Mono-function
- 2 pole

BI: Power off-delay (True off-delay)

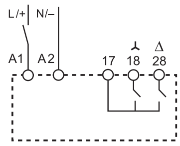


Wiring diagram
(without control signal)

83.82

- Multi-voltage
- Mono-function
- 2 pole
- Transfer time can be regulated (0.05…1)s ***

SD: Star-delta

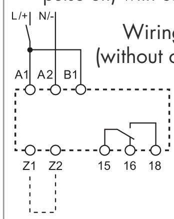


Wiring diagram
(without control signal)

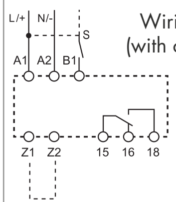
83.91

- Multi-voltage
- Multi-function

LI: Asymmetrical flasher (starting pulse on)
LE: Asymmetrical flasher (starting pulse on) with control signal
PI: Asymmetrical flasher (starting pulse off)
PE: Asymmetrical flasher (starting pulse off) with control signal



Wiring diagram
(without control signal)



Wiring diagram
(with control signal)

* (0.05…2)s, (1…16)s, (8…70)s, (50…180)s
** (0.05…1)s, (0.5…10)s, (0.05…1)min, (0.5…10)min, (0.05…1)h, (0.5…10)h, (0.05…1)d, (0.5…10)d
*** 0.05 s, 0.2 s, 0.3 s, 0.45 s, 0.6 s, 0.75 s, 0.85 s, 1 s

For outline drawing see page 5

		83.62	83.82	83.91
Contact specification				
Contact configuration		2 CO (DPDT)	2 NO (DPST-NO)	1 CO (SPDT)
Rated current/Maximum peak current	A	8/15	16/30	16/30
Rated voltage/Maximum switching voltage	V AC	250/400	250/400	250/400
Rated load AC1	VA	2,000	4,000	4,000
Rated load AC15 (230 V AC)	VA	400	750	750
Single phase motor rating (230 V AC)	kW	0.3	0.5	0.5
Breaking capacity DC1: 30/110/220 V	A	8/0.3/0.12	16/0.3/0.12	16/0.3/0.12
Minimum switching load	mW (V/mA)	300 (5/5)	300 (5/5)	300 (5/5)
Standard contact material		AgNi	AgNi	AgNi
Supply specification				
Nominal voltage (U_N)	V AC (50/60 Hz)	24…240	24…240	24…240
	V DC	24…220	24…240	24…240
Rated power AC/DC	VA (50 Hz)/W	< 1.5 / < 2	< 1.5 / < 2	< 1.5 / < 2
Operating range	V AC	16.8…265	16.8…265	16.8…265
	V DC	16.8…242	16.8…265	16.8…265
Technical data				
Specified time range		*	**	
Repeatability	%	± 1	± 1	± 1
Recovery time	ms	—	200	200
Minimum control impulse	ms	500 ms (A1 - A2)	—	50
Setting accuracy-full range	%	± 5	± 5	± 5
Electrical life at rated load in AC1	cycles	$100 \cdot 10^3$	$50 \cdot 10^3$	$50 \cdot 10^3$
Ambient temperature range	°C	–20…+60	–20…+60	–20…+60
Protection category		IP 20	IP 20	IP 20
Approvals (according to type)		CE EAC Lloyd's Register RINA c UL us		

H

Ordering information

Example: 83 series, modular timers, 1 CO (SPDT) - 16 A, supply rated at (24...240)V AC/DC.

8	3	.	0	1	.	0	.	2	4	0	.	0	0	0	0

Series

Type
0 = Multi-function (AI, DI, GI, SW, BE, CE, DE, WD)
1 = On-delay (AI)
2 = Interval (DI)
4 = Off-delay with control signal (BE)
5 = Multi-function (AE, EEa, FE, GE, IT, BEp, DEp, SHp)
6 = Power off-delay (True off-delay) (BI)
8 = Star-delta (SD)
9 = Asymmetrical flasher (LI, LE, PI, PE)

Versions
0000 = Standard

Supply voltage
240 = (24 ... 240)V AC/DC

Supply version
0 = AC (50/60 Hz)/DC

No. of poles
1 = 1 CO (SPDT)
2 = 2 CO (DPDT) for 83.02, 83.52 and 83.62
2 = 2 NO (DPST-NO) for 83.82

Technical data

Insulation				
Dielectric strength	between input and output circuit	V AC	4,000	
	between open contacts	V AC	1,000	
Insulation (1.2/50 μs) between input and output		kV	6	

EMC specifications				
Type of test		**Reference standard**	**83.01/02/52/11/21/41/82/91**	**83.62**
Electrostatic discharge	contact discharge	EN 61000-4-2	4 kV	4 kV
	air discharge	EN 61000-4-2	8 kV	8 kV
Radio-frequency electromagnetic field	(80 ÷ 1,000 MHz)	EN 61000-4-3	10 V/m	10 V/m
	(1,000 ÷ 2,700 MHz)	EN 61000-4-3	3 V/m	3 V/m
Fast transients (burst) (5-50 ns, 5 and 100 kHz)	on Supply terminals	EN 61000-4-4	7 kV	6 kV
	on control signal terminal (B1)	EN 61000-4-4	7 kV	6 kV
Surges (1.2/50 μs) on Supply terminals	common mode	EN 61000-4-5	6 kV	6 kV
	differential mode	EN 61000-4-5	6 kV	4 kV
on control signal terminal (B1)	common mode	EN 61000-4-5	6 kV	6 kV
	differential mode	EN 61000-4-5	4 kV	4 kV
Radio-frequency common mode	(0.15 ÷ 80 MHz)	EN 61000-4-6	10 V	10 V
on Supply terminals	(80 ÷ 230 MHz)	EN 61000-4-6	10 V	10 V
Radiated and conducted emission		EN 55022	class A	class A

Other data				
Current absorption on control signal (B1)			< 1 mA	
- max cable length (capacity of ≤ 10 nF / 100 m)			150 m	
- when applying a control signal to B1, which is different from the supply voltage at A1/A2			B1 is isolated from A1 and A2 by an opto-coupler, and can therefore be operated at a voltage other than the supply voltage. If using a control signal of between (24... 48)V DC and a supply voltage of (24...240)V AC, ensure that the signal – is connected to A2 and the + is applied to B1, and that L is applied to B1 and N to A2.	
External potentiometer for 83.02/52			Use a 10 kΩ/ ≥ 0,25 W linear potentiometer. Maximum cable length 10 m. When using an external potentiometer, the timer automatically use its setting in place of the internal setting. Consider the voltage potential at the potentiometer to be the same as the timer supply voltage.	
Power lost to the environment	without contact current	W	1.4	
	with rated current	W	3.2	
Screw torque		Nm	0.8	
Max. wire size			solid cable	stranded cable
		mm²	1x6 / 2x4	1x4 / 2x2.5
		AWG	1x10 / 2x12	1x12 / 2x14

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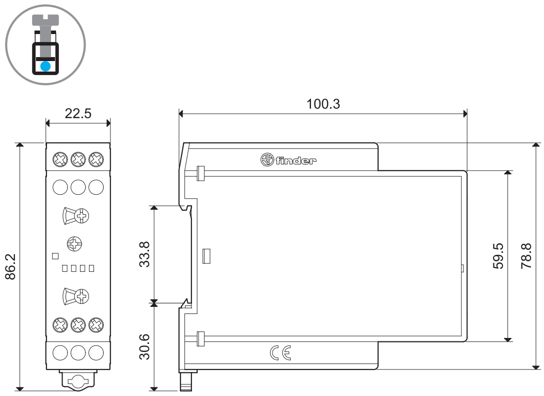
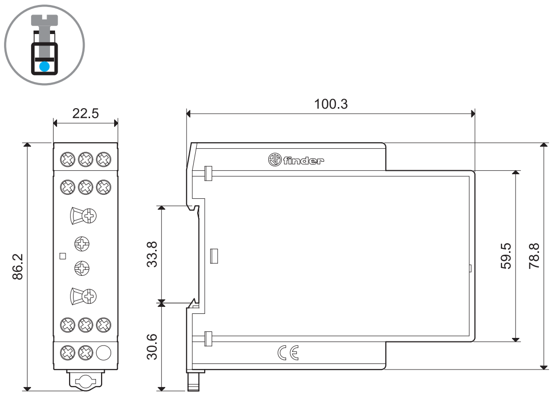
Outline drawings

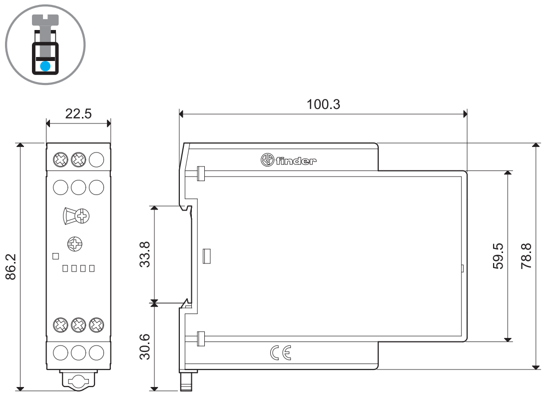
83.01
Screw terminal



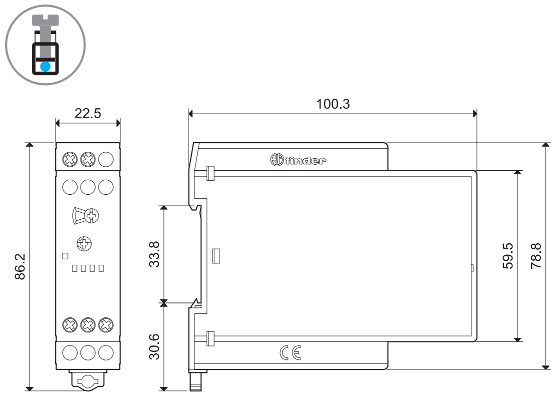
83.02/52
Screw terminal



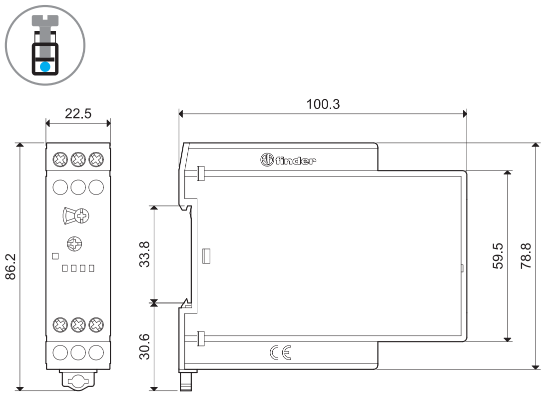
83.11
Screw terminal



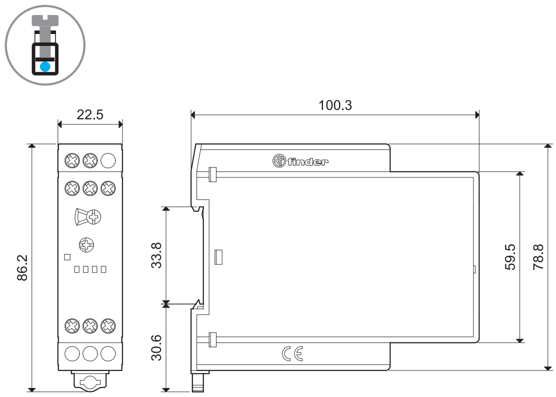
83.21
Screw terminal



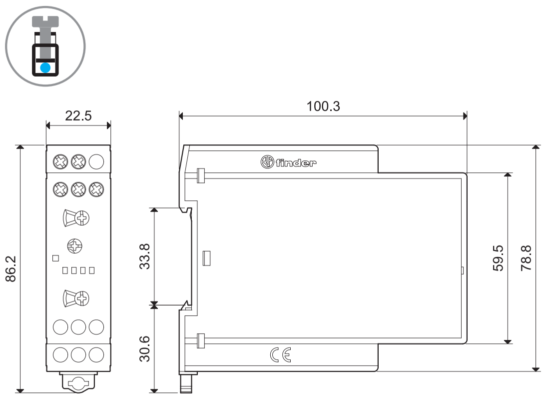
83.41
Screw terminal



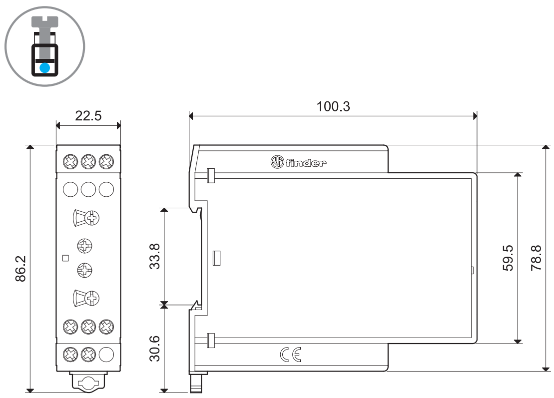
83.62
Screw terminal



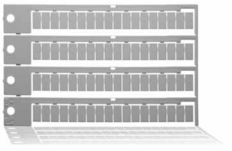
83.82
Screw terminal



83.91
Screw terminal



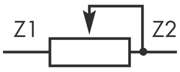
Accessories



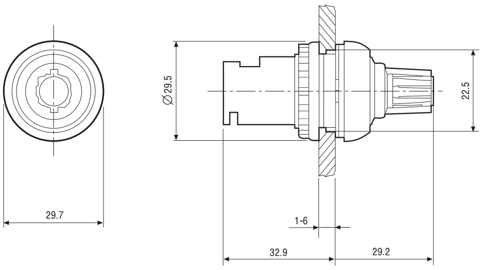
060.72

Sheet of marker tags, for types 83.01/11/21/41/62/82, plastic, 72 tags, 6x12 mm	060.72

087.02.2



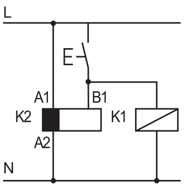
Potentiometer usable as external potentiometer for type 83.02/52 10 kΩ / 0.25 W linear, IP66	087.02.2



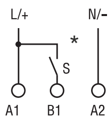
Functions

LED*	Supply voltage	NO output contact	Contacts Open	Contacts Closed
	OFF	Open	15 - 18 25 - 28	15 - 16 25 - 26
	ON	Open	15 - 18 25 - 28	15 - 16 25 - 26
	ON	Open (Timing in Progress)	15 - 18 25 - 28	15 - 16 25 - 26
	ON	Closed	15 - 16 25 - 26	15 - 18 25 - 28

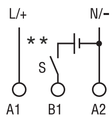
* The LED on type 83.62 is illuminated when supply voltage is supplied to timer.



• Possible to control an external load, such as another relay coil or timer, connected to the control signal terminal B1.



*   With DC supply, positive polarity has to be connected to B1 terminal (according to EN 60204-1).



** A voltage other than the supply voltage can be applied to the control signal (B1), example:
A1 - A2 = 230 V AC
B1 - A2 = 12 V DC

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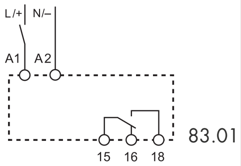
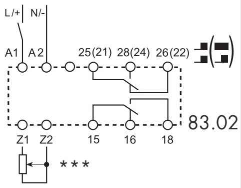
Functions

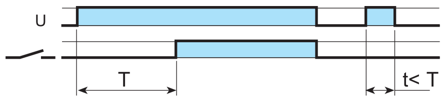
Wiring diagram — **U** = Supply voltage — **S** = Signal switch — (output contact symbol) = Output contact

Multi-function without control signal

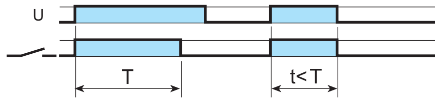
Type 83.01 83.02



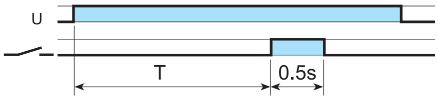




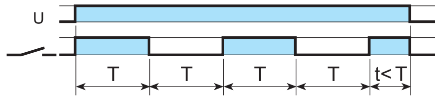
(AI) On-delay.
Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs when power is removed.



(DI) Interval.
Apply power to timer. Output contacts transfer immediately. After the preset time has elapsed, contacts reset.

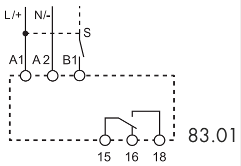


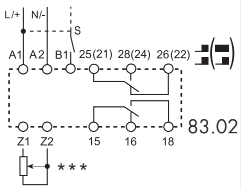
(GI) Pulse delayed.
Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs after a fixed time of 0.5s.



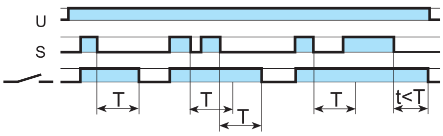
(SW) Symmetrical flasher (starting pulse on).
Apply power to timer. Output contacts transfer immediately and cycle between ON and OFF for as long as power is applied. The ratio is 1:1 (time on = time off).

with control signal

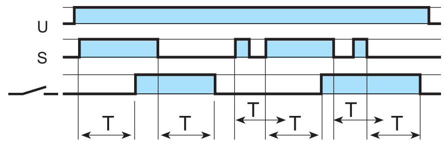




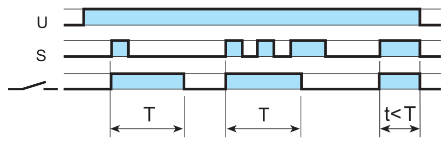
*** Type 83.02: regulated using an external potentiometer (10 kΩ - 0.25 W).



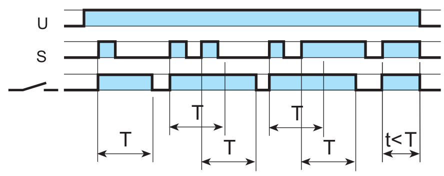
(BE) Off-delay with control signal.
Power is permenently applied to the timer. The output contacts transfer immediately on closure of the control signal (S). Opening the control signal initiates the preset delay, after which time the output contacts reset.



(CE) On- and off-delay with control signal.
Power is permenently applied to the timer.
Closing the control signal (S) initiates the preset delay, after which time the output contacts transfer. Opening the control signal initiates the same preset delay, after which time the output contacts reset.



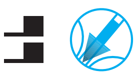
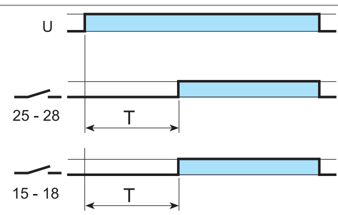
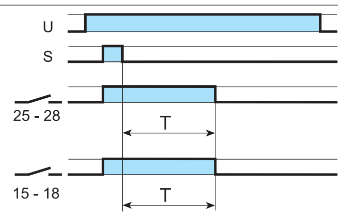
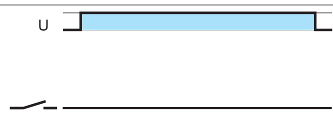
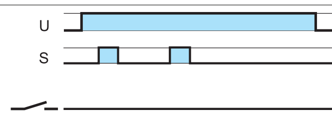
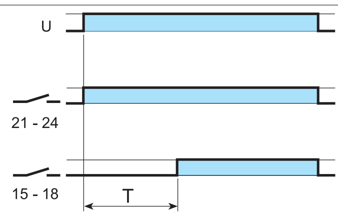
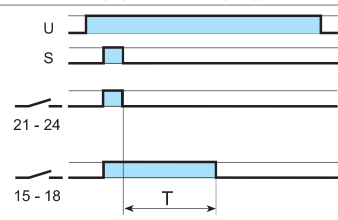
(DE) Interval with control signal on.
Power is permenently applied to the timer.
On momentary or maintained closure of control signal (S), the output contacts transfer, and remain so for the duration of the preset delay, after which they reset.



(WD) Watchdog (Retriggerable interval with control signal on).
Power is permanently applied to the timer.
On momentary or maintained closure of control signal (S), the output contacts transfer, and remain so for the duration of the preset delay, after which they reset; subsequent closures of control signal during the delay will extend the time. If the closure of the control signal (S) is longer than the preset time (T) then the output contacts reset.

NOTE: The timing function must be set when the timer is de-energised. Or for the 83.02/52, when the contact mode selector is in the OFF position.

83.02 type

Contact mode selector	Functions without control signal (example: AI)	Functions with control signal (example: BE)
2 timed contacts 	 Both output contacts (15-18 and 25-28) follow the timing function	 Both output contacts (15-18 and 25-28) follow the timing function
OFF 	 Both output contacts [15-18 and 25(21)-28(24)] stay permanently open	 Both output contacts [15-18 and 25(21)-28(24)] stay permanently open
1 timed + 1 instantaneous contact 	 The output contact 15-18 follows the timing function The output contact 21-24 follows the power supply (U)	 The output contact 15-18 follows the timing function The output contact 21-24 follows the control signal (S)

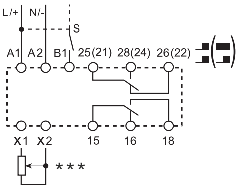
H

Functions

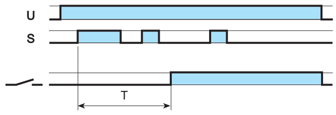
Wiring diagram

U = Supply voltage **S** = Signal switch **P** = Pause switch = Output contact

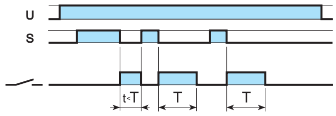
Multi-function with control signal — Type 83.52



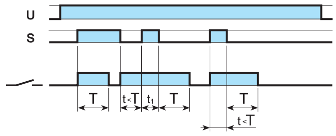
*** Regulated using an external potentiometer (10 kΩ - 0.25 W).



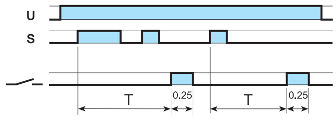
(AE) On-delay with control signal.
Power is permanently applied to the timer.
Closing the Signal Switch (S) initiates the preset delay, after which times the output contacts transfer and remain so until the power is removed.



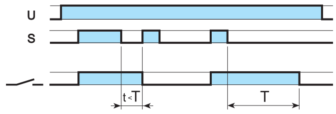
(EEa) Interval with control signal off (retriggerable).
Power is permanently applied to the timer.
On opening of the Signal Switch (S) the output contacts transfer, and remain so for the duration of the preset delay, after which they reset.



(FE) Interval with control signal on and off.
Power is permanently applied to the timer.
Both the opening and the closing of the Signal Switch (S) initiates the transfer of the output contacts. In both instances the contacts reset after the preset delay has elapsed.

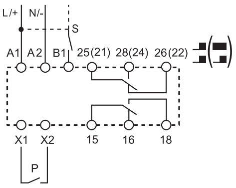


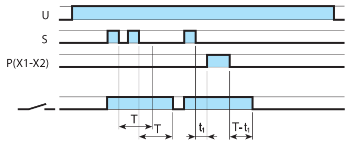
(GE) Pulse delayed with control signal on.
Power is permanently applied to the timer.
Closing the Signal Switch (S) initiates the preset delay, after which the output contacts transfer. Reset occurs after a fixed time of 0.25s.



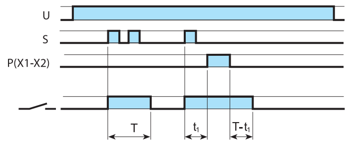
(IT) Timing step.
Closing the Signal Switch (S) the output contacts transfer and remain so, after S opening, for the duration of the preset delay, after which they reset. During the timing period it is possible to immediate open the contact with a further impulse on S.

with control signal and pause signal

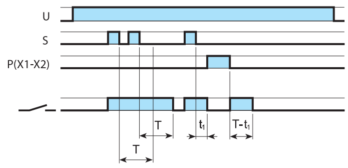




(BEp) Off-delay with control signal and pause signal.
Power is permanently applied to the timer. The output contacts transfer immediately on closure of the Signal Switch (S). Opening the signal switch initiates the preset delay, after which the output contacts reset. Closure of the pause switch (X1-X2) will immediately halt the timing process, but the elapsed time will be retained. The current state of the output contacts will be maintained. On opening of the pause switch, timing resumes from the retained value.

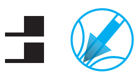
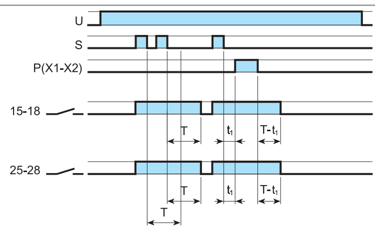
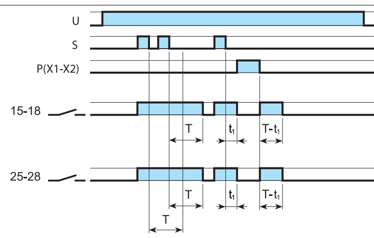
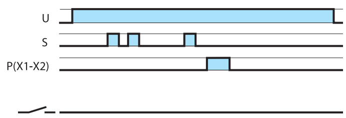
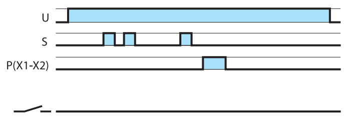
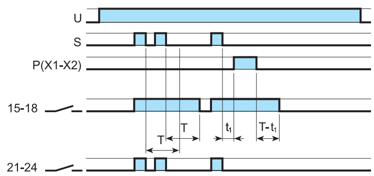
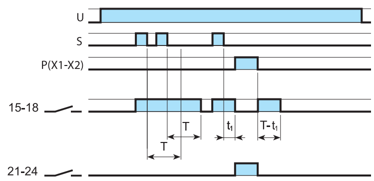


(DEp) Interval with control signal on and pause signal.
Power is permanently applied to the timer. On momentary or maintained closure of Signal Switch (S), the output contacts transfer, and remain so for the duration of the preset delay, after which they reset. Closure of the pause switch (X1-X2) will immediately halt the timing process, but the elapsed time will be retained. The current state of the output contacts will be maintained. On opening of the pause switch, timing resumes from the retained value.



(SHp) "Shower" function (Off-delay with control signal and pause signal).
Power is permanently applied to the timer. The output contacts transfer immediately on closure of the Signal Switch (S). Opening the signal switch initiates the preset delay, after which the output contacts reset. Closure of the pause switch (X1-X2) will immediately halt the timing process, but the elapsed time will be retained. During the pause, the output contacts 15-18 and 25-28 will be open. On opening of the pause switch, timing resumes from the retained value and the output contacts will take the previous condition.

83.52 type

Contact mode selector	Functions with control signal and pause signal (example: BEp)	Function SHp
2 timed contacts 	 Both output contacts (15-18 and 25-28) follow the timing function	 Both output contacts (15-18 and 25-28) follow the timing function
OFF 	 Both output contacts [15-18 and 25(21)-28(24)] stay permanently open	 Both output contacts [15-18 and 25(21)-28(24)] stay permanently open
1 timed + 1 instantaneous contact 	 The output contact 15-18 follows the timing function The output contact 21-24 follows the control signal (S)	 The output contact 15-18 follows the timing function. The output contact 21-24 is always open, unless during the pause, when is closed

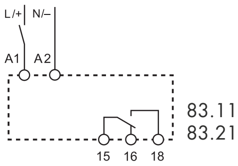
H

Functions

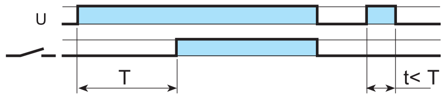
Wiring diagram | **U** = Supply voltage | **S** = Signal switch | = Output contact

Mono-function
without control signal

Type

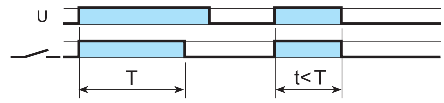


83.11

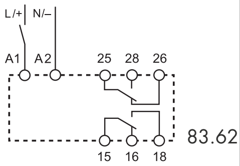


(AI) On-delay.
Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs when power is removed.

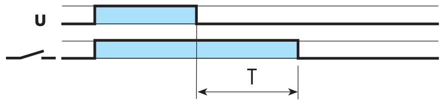
83.21



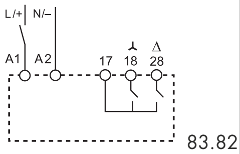
(DI) Interval.
Apply power to timer. Output contacts transfer immediately. After the preset time has elapsed, contacts reset.



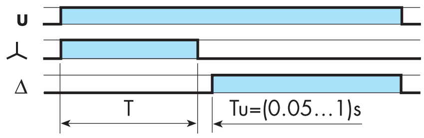
83.62



(BI) Power off-delay (True off-delay).
Apply power to timer (minimum 500 ms). Output contacts transfer immediately. Removal of power initiates the preset delay, after which time the output contacts reset.

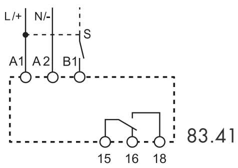


83.82

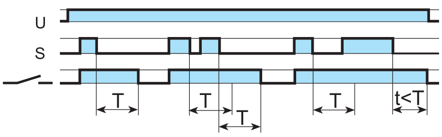


(SD) Star-delta.
Apply power to timer. The star contact (⅄) closes immediately. After preset delay has elapsed the star contact (⅄) resets. After a further time (settable from 0.05s to 1s) the delta contact (Δ) closes and remains in that position, until reset on power off.

with control signal (S)

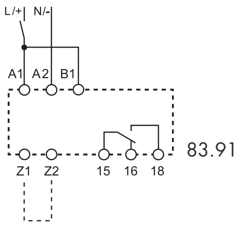


83.41



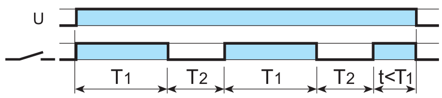
(BE) Off-delay with control signal.
Power is permenently applied to the timer.
The output contacts transfer immediately on closure of the control signal (S). Opening the control signal initiates the preset delay, after which time the output contacts reset.

Asymmetrical recycler
without control signal

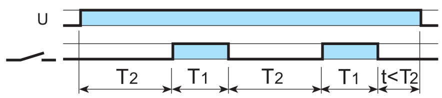


Z1-Z2 open: **(LI)** function
Z1-Z2 linked: **(PI)** function

83.91

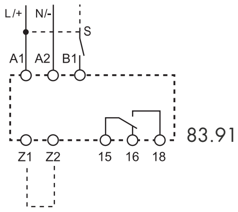


(LI) Asymmetrical flasher (starting pulse on)- (Z1-Z2 open).
Apply power to timer. Output contacts transfer immediately and cycle between ON and OFF for as long as power is applied. The ON and OFF times are independently adjustable.

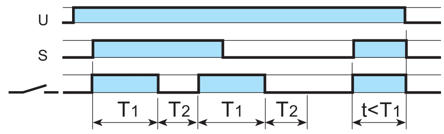


(PI) Asymmetrical flasher (starting pulse off) - (Z1-Z2 linked).
Apply power to timer. Output contacts transfer after time T1 has elapsed and cycle between OFF and ON for as long as power is applied. The ON and OFF times are independently adjustable.

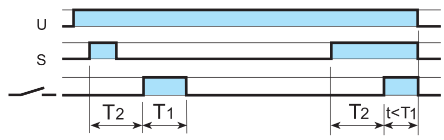
with control signal



Z1-Z2 open: **(LE)** function
Z1-Z2 linked: **(PE)** function



(LE) Asymmetrical flasher (starting pulse on) with control signal - (Z1-Z2 open).
Power is permenently applied to the timer.
Closing control signal (S) causes the output contacts to transfer immediately and cycle between ON and OFF, until opened.



(PE) Asymmetrical flasher (starting pulse off) with control signal - (Z1-Z2 linked).
Power is permenently applied to the timer.
Closing the control signal (S) initiates delay T1 after which the output contacts transfer and continue to cycle between OFF and ON, until the control signal is opened.

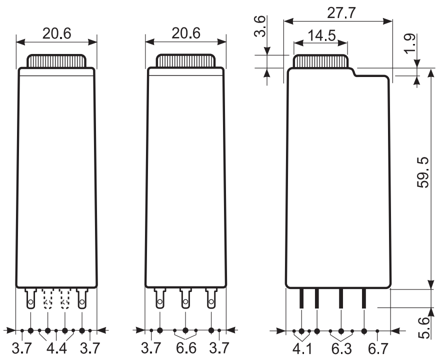
85 Series - Miniature plug-in timers 7 - 10 A

Features

Plug-in timer

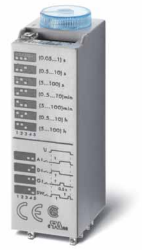
85.02 - 2 Pole 10 A
85.03 - 3 Pole 10 A
85.04 - 4 Pole 7 A

- Multifunctions
- Seven time scales, from 0.05s to 100h
- 94 series sockets



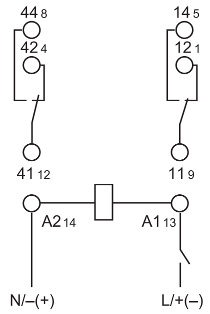
85.02/85.04 85.03

85.02



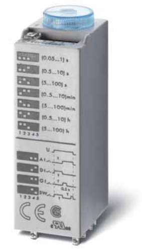
- 2 pole, 10 A
- AC/DC supply non polarized
- Plug-in for use with 94 series sockets

AI: On-delay
DI: Interval
SW: Symmetrical flasher (starting pulse on)
GI: Pulse delayed



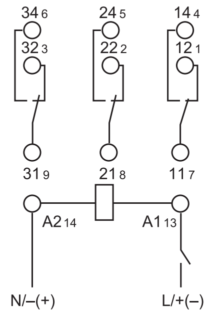
Wiring diagram
(without control signal)

85.03



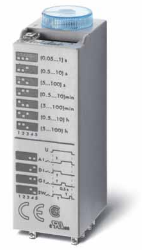
- 3 pole, 10 A
- AC/DC supply non polarized
- Plug-in for use with 94 series sockets

AI: On-delay
DI: Interval
SW: Symmetrical flasher (starting pulse on)
GI: Pulse delayed



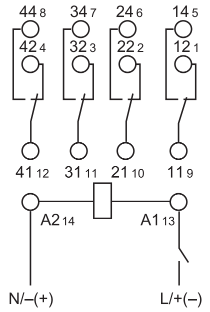
Wiring diagram
(without control signal)

85.04



- 4 pole, 7 A
- AC/DC supply non polarized
- Plug-in for use with 94 series sockets

AI: On-delay
DI: Interval
SW: Symmetrical flasher (starting pulse on)
GI: Pulse delayed



Wiring diagram
(without control signal)

For UL ratings see: "General technical information" page V

		85.02	85.03	85.04
Contact specification				
Contact configuration		2 CO (DPDT)	3 CO (3PDT)	4 CO (4PDT)
Rated current/Maximum peak current	A	10/20	10/20	7/15
Rated voltage/Maximum switching voltage	V AC	250/400	250/400	250/250
Rated load AC1	VA	2,500	2,500	1,750
Rated load AC15 (230 V AC)	VA	500	500	350
Single phase motor rating (230 V AC)	kW	0.37	0.37	0.125
Breaking capacity DC1: 30/110/220 V	A	10/0.25/0.12	10/0.25/0.12	7/0.25/0.12
Minimum switching load	mW (V/mA)	300 (5/5)	300 (5/5)	300 (5/5)
Standard contact material		AgNi	AgNi	AgNi
Supply specification				
Nominal voltage (U_N)	V AC (50/60 Hz)	230…240	230…240	230…240
	V AC/DC	12 - 24 - 48 - 110…125 (non polarized)		
Rated power AC/DC	V AC (50 Hz)/W	2/2	2/2	2/2
Operating range	AC	(0.85…1.1)U_N	(0.85…1.1)U_N	(0.85…1.1)U_N
	DC	(0.85…1.1)U_N	(0.85…1.1)U_N	(0.85…1.1)U_N
Technical data				
Specified time range		(0.05…1)s, (0.5…10)s, (5…100)s, (0.5…10)min, (5…100)min, (0.5…10)h, (5…100)h		
Repeatability	%	± 2	± 2	± 2
Recovery time	ms	≤ 20	≤ 20	≤ 20
Minimum control impulse	ms	—	—	—
Setting accuracy-full range	%	± 5	± 5	± 5
Electrical life at rated load in AC1	cycles	200 · 10^3	200 · 10^3	150 · 10^3
Ambient temperature range	°C	–20…+60	–20…+60	–20…+60
Protection category		IP 40	IP 40	IP 40
Approvals (according to type)				

Ordering information

Example: 85 series timer, 4 CO (4PDT), 24 V AC/DC supply voltage, AI, DI, GI, SW functions.

8 5 . 0 4 . 0 . 0 2 4 . 0 0 0 0

Series

Type
0 = Multifunction (AI, DI, GI, SW)*
* AI = On-delay
DI = Interval
GI = Pulse delayed
SW = Symmetrical flasher (starting pulse on)

No. of poles
2 = 2 pole - 10 A
3 = 3 pole - 10 A
4 = 4 pole - 7 A

Supply voltage
012 = 12 V AC/DC
024 = 24 V AC/DC
048 = 48 V AC/DC
125 = (110…125)V AC/DC
240 = (230…240)V AC

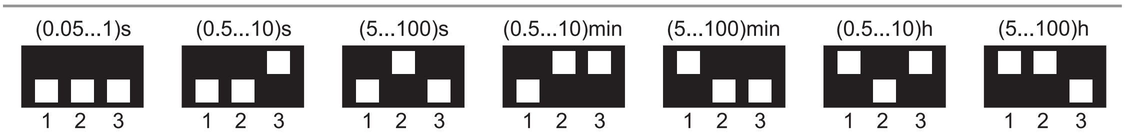
Supply version
0 = AC (50/60 Hz)/DC
8 = AC (50/60 Hz) for 240 V only

Technical data

Insulation				
Dielectric strength			**85.02, 85.03**	**85.04**
	between input and output circuit	V AC	2,000	2,000
	between open contacts	V AC	1,000	1,000
	between adjacent contacts	V AC	2,000	1,550
Insulation (1.2/50 μs) between input and output		kV	6	4
EMC specifications				
Type of test			**Reference standard**	
Electrostatic discharge	contact discharge		EN 61000-4-2	n.a.
	air discharge		EN 61000-4-2	8 kV
Radio-frequency electromagnetic field (80 ÷ 1,000 MHz)			EN 61000-4-3	15 V/m
Fast transients (burst) (5-50 ns, 5 kHz) on Supply terminals			EN 61000-4-4	4 kV
Surges (1.2/50 μs) on	common mode		EN 61000-4-5	4 kV
Supply terminals	differential mode		EN 61000-4-5	2 kV
Radio-frequency common mode (0.15 ÷ 80 MHz) on Supply terminals			EN 61000-4-6	10 V
Power-frequency (50 Hz)			EN 61000-4-8	30 A/m
Radiated and conducted emission			EN 55022	class B

Other data					
Power lost to the environment	without contact current	W	1.6		
	with rated current	W	3.7 (85.02)	4.7 (85.03)	3.6 (85.04)

Times scales



NOTE: time scales and functions must be set before energising the timer.

H

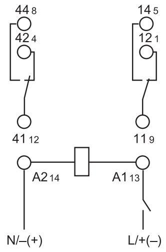
Functions

U = Supply voltage

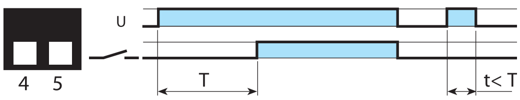
= Output contact

LED	Supply voltage	NO (SPDT-NO) output contact	Contacts Open	Contacts Closed
	OFF	Open	x1 - x4	x1 - x2
	ON	Open	x1 - x4	x1 - x2
	ON	Open (Timing in Progress)	x1 - x4	x1 - x2
	ON	Closed	x1 - x2	x1 - x4

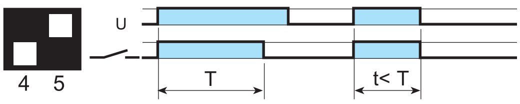
Wiring diagram **Type: 85.02, 85.03, 85.04**



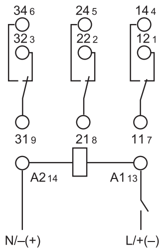
85.02



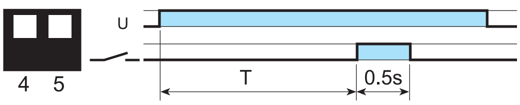
(AI) On-delay.
Apply power to timer.
Output contacts transfer after preset time has elapsed.
Reset occurs when power is removed.



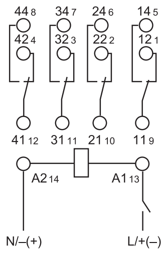
(DI) Interval.
Apply power to timer.
Output contacts transfer immediately.
After the preset time has elapsed, contacts reset.



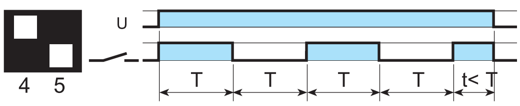
85.03



(GI) Pulse delayed.
Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs after a fixed time of 0.5s.



85.04



(SW) Symmetrical flasher (starting pulse on).
Apply power to timer.
Output contacts transfer immediately and cycle between ON and OFF for as long as power is applied.
The ratio is 1:1 (time on = time off).

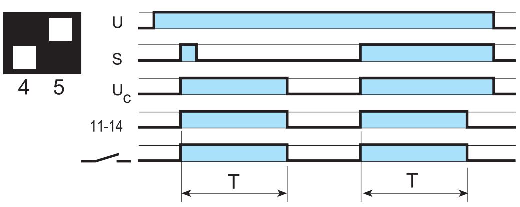
U = Supply voltage

S = Signal switch

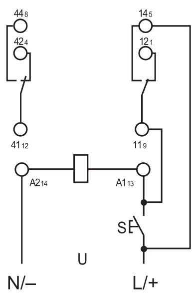
U_c = Supply voltage to the timer

11-14 = Self-holding contact

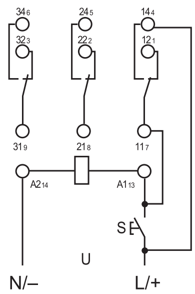
= Output contact



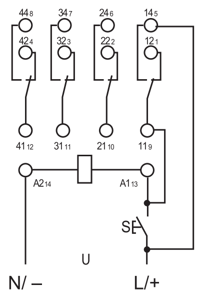
Signal ON Pulse
On momentary closure of Signal Switch (S) > 50 ms, the output contacts transfer and remain so (with self-holding on contact 11-14) for the duration of the preset delay, after which they reset.



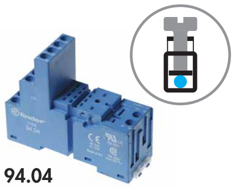
85.02



85.03



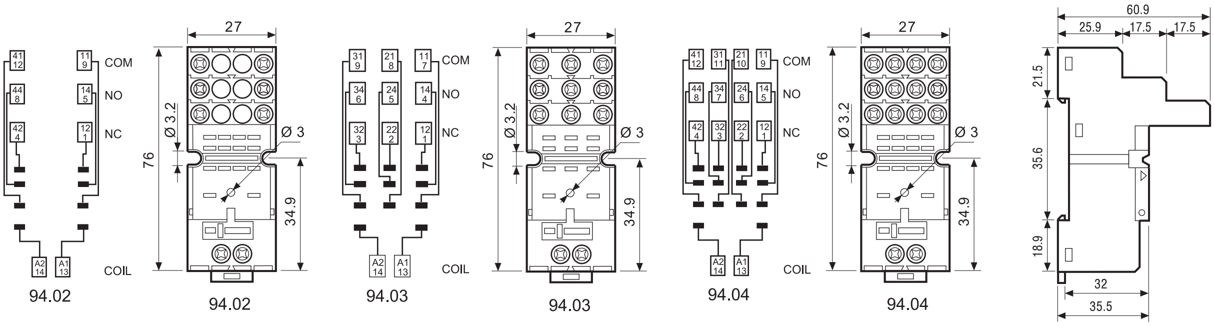
85.04

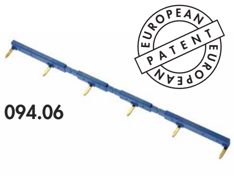


94.04

Approvals
(according to type):

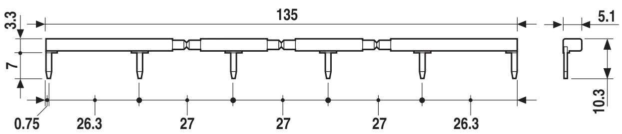
Screw terminal (Box clamp) socket panel or 35 mm rail (EN 60715) mount		94.02 Blue	94.02.0 Black	94.03 Blue	94.03.0 Black	94.04 Blue	94.04.0 Black
For timer type		85.02		85.03		85.04	
Accessories							
Metal retaining clip (supplied with timer)		094.81					
6-way jumper link		094.06	094.06.0	094.06	094.06.0	094.06	094.06.0
Identification tag		094.00.4					
Technical data							
Rated values		10 A - 250 V					
Dielectric strength		2 kV AC					
Protection category		IP 20					
Ambient temperature	°C	–40…+70					
Screw torque	Nm	0.5					
Wire strip length	mm	8					
Max. wire size for 94.02, 94.03 and 94.04 sockets		solid wire			stranded wire		
	mm^2	1x6 / 2x2.5			1x4 / 2x2.5		
	AWG	1x10 / 2x14			1x12 / 2x14		

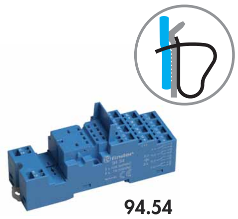




094.06

6-way jumper link for 94.02, 94.03 and 94.04 sockets	094.06 (blue)	094.06.0 (black)
Rated values	10 A - 250 V	

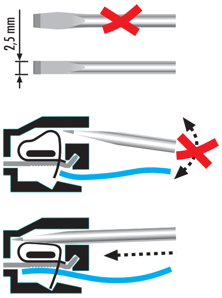


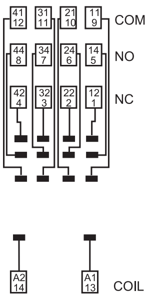


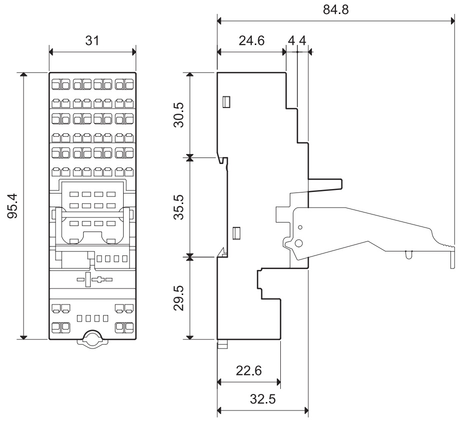
94.54

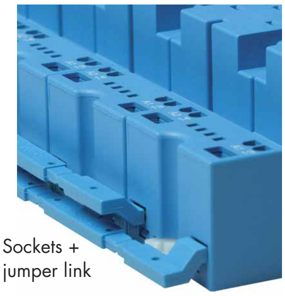
Approvals
(according to type):

Screwless terminal socket 35 mm rail (EN 60715) mount	**94.54 (blue)**	
For timer type	85.02, 85.04	
Accessories		
Metal retaining clip	094.81	
6-way jumper link	094.56	
Technical data		
Rated values	10 A - 250 V	
Dielectric strength	2 kV AC	
Protection category	IP 20	
Ambient temperature °C	–25…+70	
Wire strip length mm	10	
Max. wire size for 94.54 socket	solid wire	stranded wire
mm^2	2x(0.2…1.5)	2x(0.2…1.5)
AWG	2x(24…14)	2x(24…14)

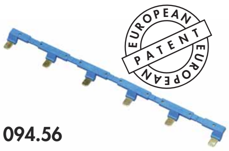






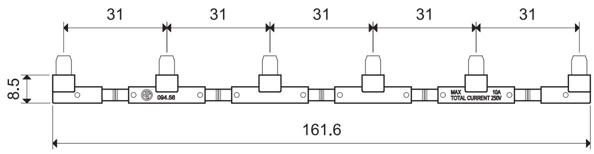


Sockets + jumper link

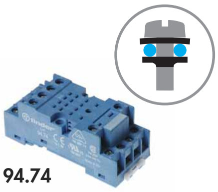


094.56

6-way jumper link	094.56 (blue)
Rated values	10 A - 250 V

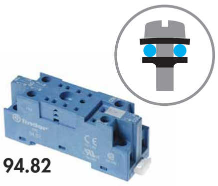


94 Series - Sockets and accessories for 85 series timers



94.74

Approvals
(according to type):



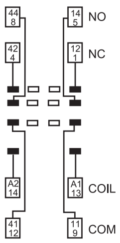
94.82

Approvals
(according to type):

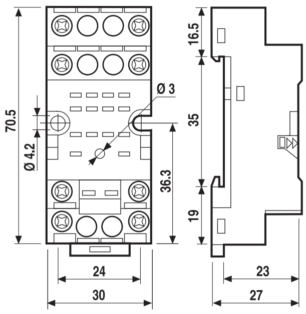
Screw terminal (Plate clamp) socket panel or 35 mm rail (EN 60715) mount	**94.72** Blue	**94.72.0** Black	**94.73** Blue	**94.73.0** Black	**94.74** Blue	**94.74.0** Black
For timer type	85.02		85.03		85.02, 85.04	
Accessories						
Metal retaining clip (supplied with timer)	094.81					

Screw terminal socket panel or 35 mm rail (EN 60715) mount	**94.82** Blue	**94.82.0** Black
For timer type	85.02	85.02
Accessories		
Metal retaining clip (supplied with timer)	094.81	

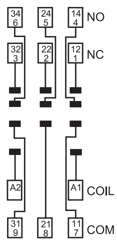
Technical data			
Rated values		10 A - 250 V	
Dielectric strength		2 kV AC	
Protection category		IP 20	
Ambient temperature	°C	–40…+70	
Screw torque	Nm	0.5	
Wire strip length	mm	8 (94.72, 94.73, 94.74)	9 (94.82)
Max. wire size for 94.72, 94.73, 94.74		solid wire	stranded wire
and 94.82 sockets	mm^2	1x2.5 / 2x1.5	1x2.5 / 2x1.5
	AWG	1x14 / 2x16	1x14 / 2x16



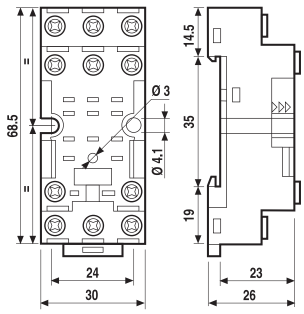
94.72



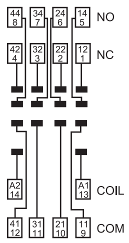
94.72



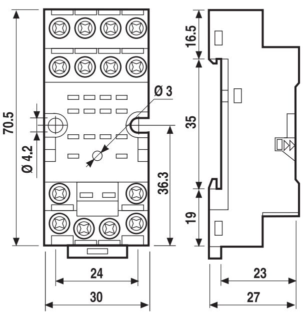
94.73



94.73



94.74



94.74

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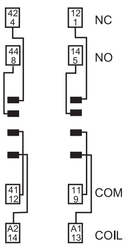
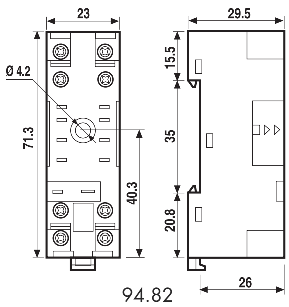
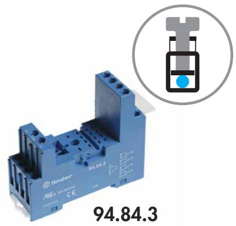


94.82



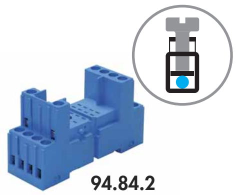
94.82



94.84.3

Approvals (according to type):

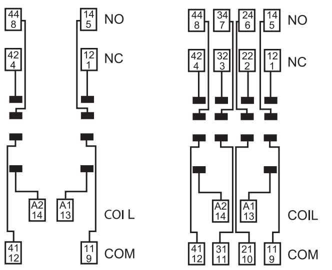
Screw terminal (Box clamp) socket panel or 35 mm rail (EN 60715) mount	94.82.3 Blue	94.82.30 Black	94.84.3 Blue	94.84.30 Black
For timer type	85.02		85.02, 85.04	
Accessories				
Metal retaining clip	094.81			
6-way jumper link	094.06	094.06.0	094.06	094.06.0
Identification tag	094.80.2			



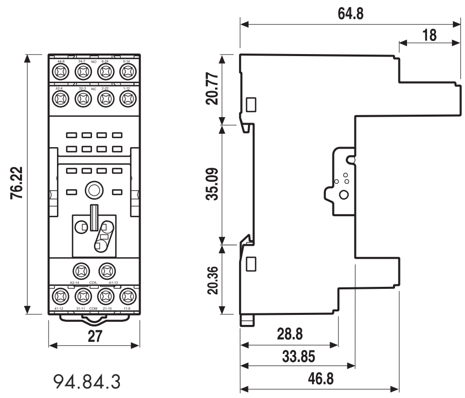
94.84.2

Approvals (according to type):

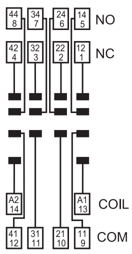
Screw terminal (Box clamp) socket panel or 35 mm rail (EN 60715) mount		94.84.2 Blue	94.84.20 Black
For timer type		85.02, 85.04	
Accessories			
Metal retaining clip		094.81	
6-way jumper link		094.06	094.06.0
Identification tag		094.80.2	
Technical data			
Rated values		10 A - 250 V	
Dielectric strength		2 kV AC	
Protection category		IP 20	
Ambient temperature	°C	–40…+70	
Screw torque	Nm	0.5	
Wire strip length	mm	7	
Max. wire size for 94.82.3, 94.84.3 and 94.84.2 sockets		solid wire	stranded wire
	mm²	1x6 / 2x2.5	1x4 / 2x2.5
	AWG	1x10 / 2x14	1x12 / 2x14



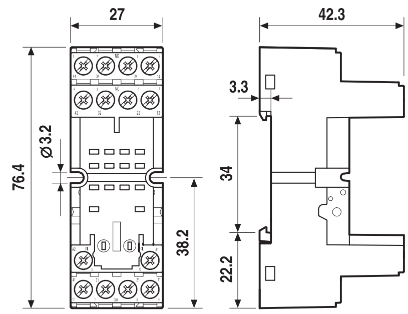
94.82.3 94.84.3



94.84.3



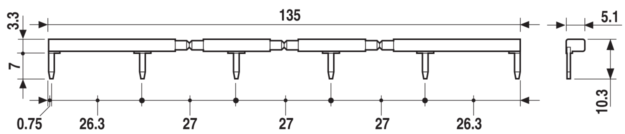
94.84.2



94.84.2

094.06

6-way jumper link for 94.82.3, 94.84.3 and 94.84.2 sockets	094.06 (blue)	094.06.0 (black)
Rated values	10 A - 250 V	



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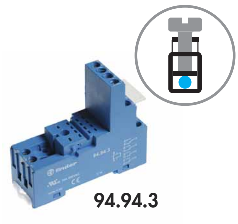
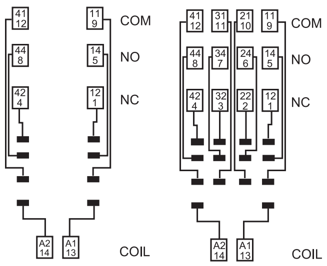


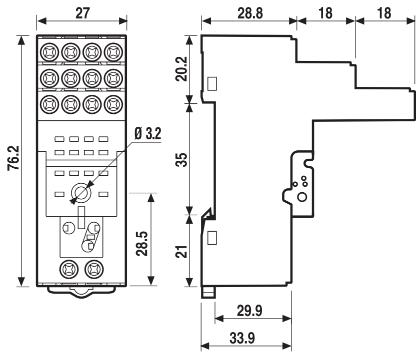
94.94.3

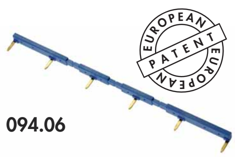
Approvals
(according to type):

Screw terminal (Box clamp) socket		**94.92.3**	**94.92.30**	**94.94.3**	**94.94.30**
panel or 35 mm rail (EN 60715) mount		**Blue**	**Black**	**Blue**	**Black**
For timer type		85.02		85.02, 85.04	
Accessories					
Metal retaining clip		094.81			
6-way jumper link		094.06	094.06.0	094.06	094.06.0
Identification tag		094.80.2			
Technical data					
Rated values		10 A - 250 V			
Dielectric strength		2 kV AC			
Protection category		IP 20			
Ambient temperature	°C	–25…+70			
Screw torque	Nm	0.5			
Wire strip length	mm	8			
Max. wire size for 94.92.3 and 94.94.3 sockets		solid wire		stranded wire	
	mm^2	1x6 / 2x2.5		1x4 / 2x2.5	
	AWG	1x10 / 2x14		1x12 / 2x14	



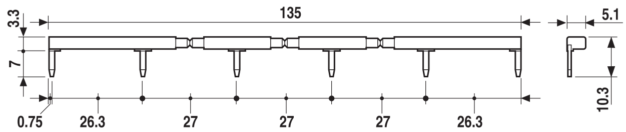
94.92.3 94.94.3





094.06

6-way jumper link for 94.92.3 and 94.94.3 sockets	094.06 (blue)	094.06.0 (black)
Rated values	10 A - 250 V	



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Features

Timer modules for use in conjunction with relay & socket.

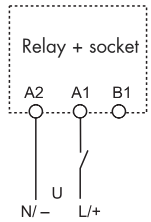
86.00 - Multi-function & multi-voltage timer module
86.30 - Bi-function & multi-voltage timer module

- Timer module type 86.00 for 90, 92, 96 series sockets and type 86.30 for 90, 92, 94, 95, 96, 97 series sockets
- Wide supply voltage range:
  12...240 V AC/DC (86.00)
  12...24 V AC/DC or 230...240 V AC (86.30)
- LED indicator

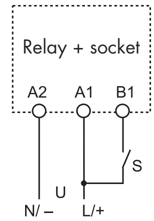
86.00

- Time scale: from 0.05s to 100h
- Multi-function
- Plug-in for use with 90.02, 90.03, 92.03 and 96.04 sockets

AI: On-delay
DI: Interval
SW: Symmetrical flasher (starting pulse on)
BE: Off-delay with control signal
CE: On- and off-delay with control signal
DE: Interval with control signal on
EE: Interval with control signal off
FE: Interval with control signal on and off



Wiring diagram
(without control signal)

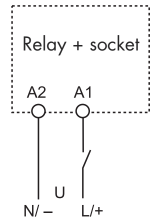


Wiring diagram
(with control signal)

86.30

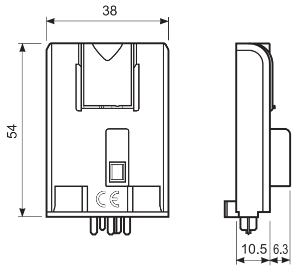
- Time scale: from 0.05s to 100h
- Bi-function
- Plug-in for use with 90.02, 90.03, 92.03, 94.02, 94.03, 94.04, 94.54, 95.03, 95.05, 95.55, 96.02, 96.04, 97.01, 97.02, 97.51 and 97.52 sockets

AI: On-delay
DI: Interval

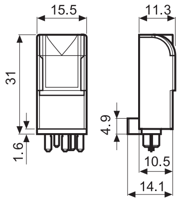


Wiring diagram

86.00



86.30



		86.00	86.30		
Contact specification					
Contact configuration					
Rated current/Maximum peak current	A				
Rated voltage/Maximum switching voltage	V AC				
Rated load AC1	VA				
Rated load AC15 (230 V AC)	VA	See 56, 60 and 62 series relays	See 40, 44, 46, 55, 56, 60 and		
Single phase motor rating (230 V AC)	kW	Note: Do not use with relays	62 series relays		
Breaking capacity DC1: 30/110/220 V	A	62.3x.x012.x300 and 62.3x.x012.x600			
Minimum switching load	mW (V/mA)				
Standard contact material					
Supply specification					
Nominal voltage (U_N)	V AC (50/60 Hz)	12…240	12…24	110…125	230…240
	V DC	12…240	12…24	—	—
Rated power AC/DC	W	1.2	0.15		
Operating range	V AC (50/60 Hz)	10.2…265	9.6…33.6	88…137	184…265
	DC	10.2…265	9.6…33.6	—	—
Technical data					
Specified time range		(0.05…1)s, (0.5…10)s, (5…100)s, (0.5…10)min, (5…100)min, (0.5…10)h, (5…100)h			
Repeatability	%	± 1	± 1		
Recovery time	ms	≤ 50	≤ 50		
Minimun control impulse	ms	50	—		
Setting accuracy full range	%	± 5	± 5		
Electrical life at rated load in AC1	cycles	See 56, 60 and 62 series relays	See 40, 44, 46, 55, 56, 60 and 62 series relays		
Ambient temperature range	°C	–20…+50	–20…+50		
Protection category		IP 20	IP 20		
Approvals (according to type)		CE EAC c UL us			

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Ordering information

Example: 86 series multi-function timer module, (12...240)V AC/DC supply voltage.

8 6 . 0 0 . 0 . 2 4 0 . 0 0 0 0

Series

Type
0 = Multi-function (AI, DI, SW, BE, CE, DE, EE, FE)
3 = Bi-function (AI, DI)

No. of poles
See 40, 44, 46, 55, 56, 60 and 62 series relays
Poles for chosen relay/socket combination - according to chart below

Supply voltage
024 = (12...24)V AC/DC (86.30 only)
120 = (110...125)V AC (86.30 only)
240 = (12...240)V AC/DC (86.00 only)
240 = (230...240)V AC (86.30 only)

Supply version
0 = AC (50/60 Hz)/DC
8 = AC (50/60 Hz)

Combinations

Number of poles	Relay type	Socket type	Timer module
1	40.31	95.03	86.30
1	40.61	95.05	86.30
1	46.61	97.01/97.51	86.30
2	40.52/44.52/44.62	95.05/95.55	86.30
2	46.52	97.02/97.52	86.30
2	55.32	94.02/94.54	86.30
2	56.32	96.02	86.30
2	60.12	90.02	86.00/86.30
2	62.32	92.03	86.00/86.30
3	55.33	94.03	86.30
3	60.13	90.03	86.00/86.30
3	62.33	92.03	86.00/86.30
4	55.34	94.04/94.54	86.30
4	56.34	96.04	86.00/86.30

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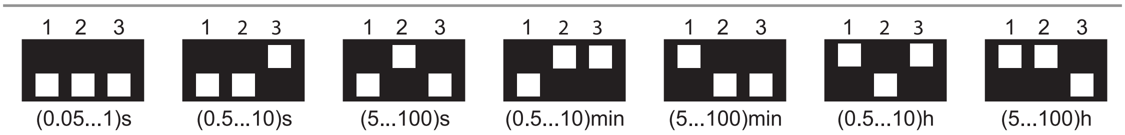
Technical data

EMC specifications					
Type of test			**Reference standard**	**86.00**	**86.30**
Electrostatic discharge	contact discharge		EN 61000-4-2	4 kV	n.a.
	air discharge		EN 61000-4-2	8 kV	8 kV
Radio-frequency electromagnetic field (80 ÷ 1,000 MHz)			EN 61000-4-3	10 V/m	10 V/m
Fast transients (burst) (5-50 ns, 5 kHz) on Supply terminals			EN 61000-4-4	4 kV	2 kV
Surges (1.2/50 μs) on Supply terminals	common mode		EN 61000-4-5	4 kV	2 kV
	differential mode		EN 61000-4-5	4 kV	1 kV
Radio-frequency common mode (0.15 ÷ 80 MHz) on Supply terminals			EN 61000-4-6	10 V	10 V
Radiated and conducted emission			EN 55022	class B	class B

Other data			86.00	86.30
Current absorption on signal control (B1)		mA	1	—
Power lost to the environment	without contact current	W	0.1 (12 V) - 1 (230 V)	0.2
	with rated current		See 56, 60 and 62 series relays	See 40, 44, 46, 55, 56, 60, 62 series relays

Time scales



NOTE: Time scales and functions must be set before energising the timer.
To achieve the minimum time setting of 0.05 seconds it is necessary to use one of the functions with control signal.
When setting very short times it may be necessary to take into account the operate time of the relay used.

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Functions

U = Supply voltage
S = Signal switch
= Output contact

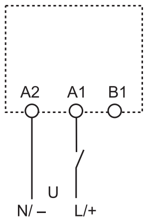
LED Type 86.00	LED Type 86.30	Supply voltage	NO output contact
		OFF	Open
		ON	Open
		ON	Open (timing in progress)
		ON	Closed

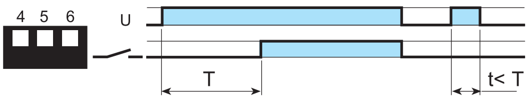
Without control signal = Start via contact in supply line (A1).
With control signal = Start via contact into control terminal (B1).

Wiring diagram

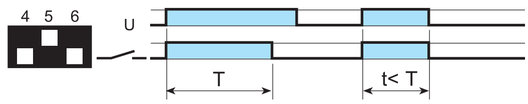
Type 86.00

Without control signal

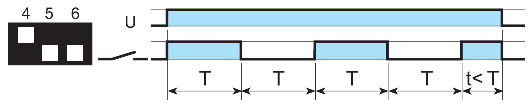




(AI) On-delay.
Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs when power is removed.

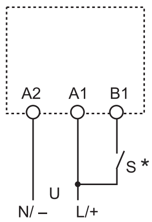


(DI) Interval.
Apply power to timer. Output contacts transfer immediately. After the preset time has elapsed, contacts reset.

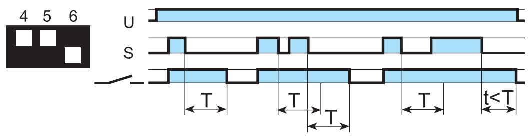


(SW) Symmetrical flasher (starting pulse on).
Apply power to timer. Output contacts transfer immediately and cycle between ON and OFF for as long as power is applied. The ratio is 1:1 (time on = time off).

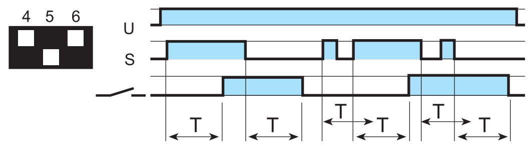
With control signal



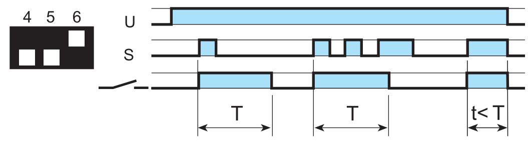
* With DC supply, positive polarity has to be conneted to B1 terminal (according to EN 60204-1). Switch S should be exclusively used to provide the control signal to terminal B1. (Do not connect any other load at this point).



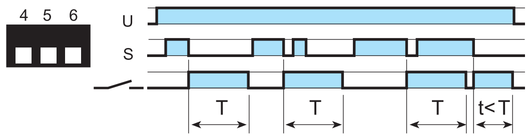
(BE) Off-delay with control signal.
Power is permenently applied to the timer.
The output contacts transfer immediately on closure of the Signal Switch (S). Opening the Signal Switch initiates the preset delay, after which time the output contacts reset.



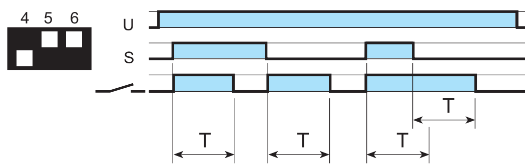
(CE) On- and off-delay with control signal.
Power is permenently applied to the timer.
Closing the Signal Switch (S) initiates the preset delay, after which time the output contacts transfer. Opening the Signal switch initiates the same preset delay, after which time the output contacts reset.



(DE) Interval with control signal on.
Power is permenently applied to the timer.
On momentary or maintained closure of Signal Switch (S), the output contacts transfer, and remain so for the duration of the preset delay, after which they reset.



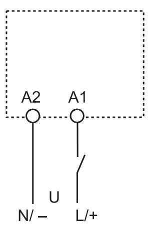
(EE) Interval with control signal off.
Power is permenently applied to the timer.
On opening of the Signal Switch (S) the output contacts transfer, and remain so for the duration of the preset delay, after which they reset.



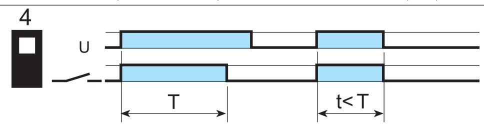
(FE) Interval with control signal on and off.
Power is permenently applied to the timer.
Both the opening and closing of the Signal Switch (S) initiates the transfer of the output contacts. In both instances the contacts reset after the delay period has elapsed.

Wiring diagram

Type 86.30



(AI) On-delay.
Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs when power is removed.



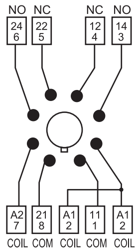
(DI) Interval.
Apply power to timer. Output contacts transfer immediately. After the preset time has elapsed, contacts reset.

H

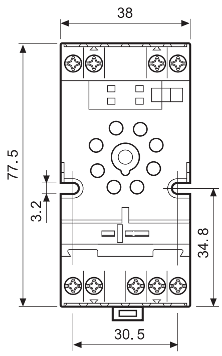
90.03

Approvals
(according to type):

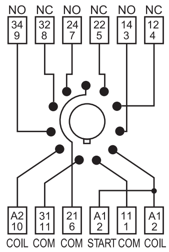
Screw terminal (Box clamp) socket panel or 35 mm rail (EN 60715) mount		**90.02** **Blue**	**90.02.0** **Black**	**90.03** **Blue**	**90.03.0** **Black**
For relay type		60.12		60.13	
Accessories					
Metal retaining clip		090.33			
6-way jumper link		090.06			
Identification tag		090.00.2			
Timer module		86.00, 86.30			
Technical data					
Double terminal A1 (for easy start connection)					
Rated values		10 A - 250 V			
Dielectric strength		2 kV AC			
Protection category		IP 20			
Ambient temperature	°C	–40…+70			
Screw torque	Nm	0.6			
Wire strip length	mm	10			
Max. wire size for 90.02 and 90.03 sockets		solid wire		stranded wire	
	mm^2	1x6 / 2x2.5		1x4 / 2x2.5	
	AWG	1x10 / 2x14		1x12 / 2x14	



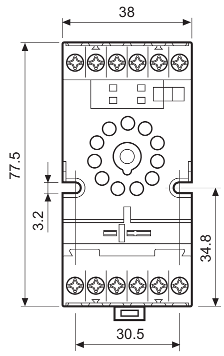
90.02



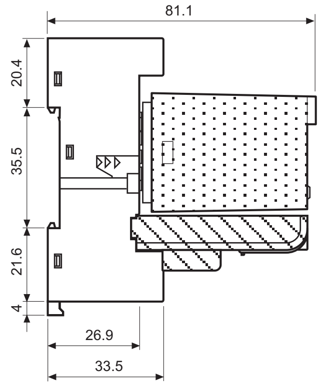
90.02



90.03

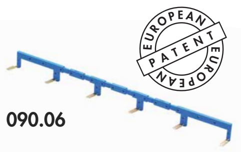


90.03



90.03 + 60.13 + 86.00

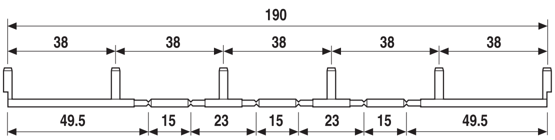
H

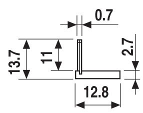


090.06

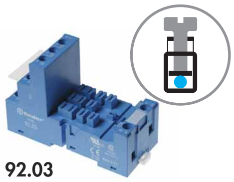
Approvals
(according to type):

6-way jumper link for 90.02 and 90.03 sockets	090.06
Rated values	10 A - 250 V





II-2014, www.findernet.com

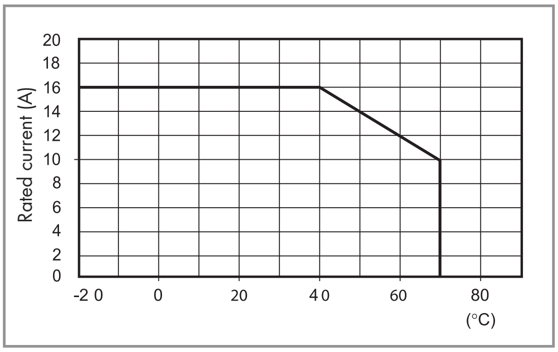


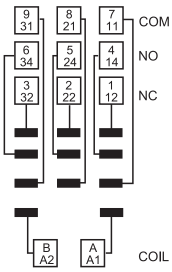
92.03

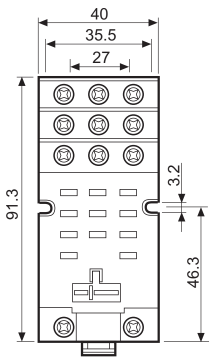
Approvals
(according to type):

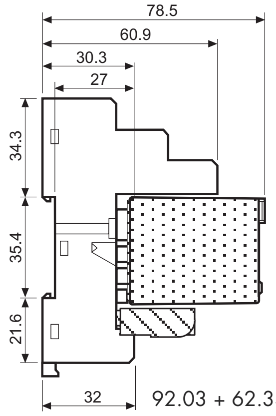
Screw terminal (Box clamp) socket panel or 35 mm rail (EN 60715) mount	**92.03** **Blue**	**92.03.0** **Black**
For relay type	62.32, 62.33	
Accessories		
Metal retaining clip (supplied with socket - packaging code SMA)	092.71	
Identification tag	092.00.2	
Timer modules	86.00, 86.30	
Technical data		
Rated values	16 A - 250 V	
Dielectric strength	6 kV (1.2/50 μs) between coil and contacts	
Protection category	IP 20	
Ambient temperature °C	–40…+70 (see diagram L92)	
Screw torque Nm	0.8	
Wire strip length mm	10	
Max. wire size for 92.03 socket	solid wire	stranded wire
mm²	1x10 / 2x4	1x6 / 2x4
AWG	1x8 / 2x12	1x10 / 2x12

L 92 - Rated current vs ambient temperature









92.03 + 62.33 + 86.30

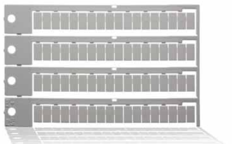
H

86 Series - Sockets and accessories

94.04

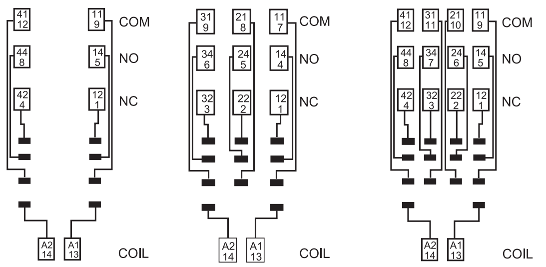
Approvals
(according to type):

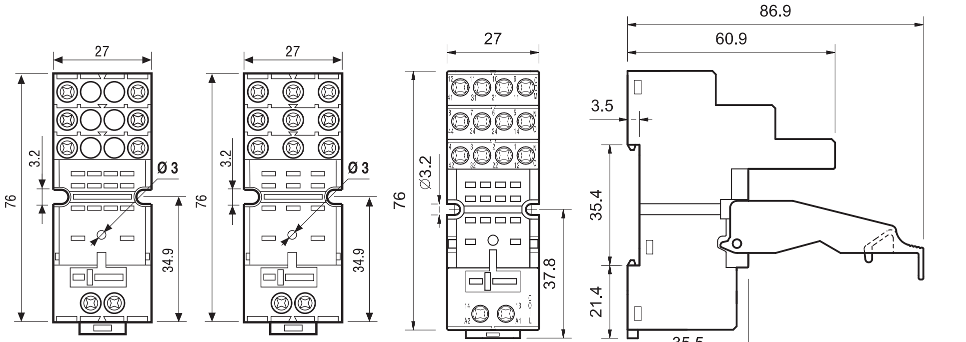
094.91.3



060.72

Screw terminal (Box clamp) socket panel or 35 mm rail (EN 60715) mount		94.02 Blue	94.02.0 Black	94.03 Blue	94.03.0 Black	94.04 Blue	94.04.0 Black
For relay type		55.32		55.33		55.32, 55.34	
Accessories							
Metal retaining clip		094.71					
Plastic retaining and release clip (supplied with socket - packaging code SPA)		094.91.3	094.91.30	094.91.3	094.91.30	094.91.3	094.91.30
6-way jumper link		094.06	094.06.0	094.06	094.06.0	094.06	094.06.0
Identification tag		094.00.4					
Timer modules		86.30					
Sheet of marker tags for retaining and release clip 094.01 plastic, 72 tags, 6x12 mm		060.72					
Technical data							
Rated values		10 A - 250 V					
Dielectric strength		2 kV AC					
Protection category		IP 20					
Ambient temperature	°C	–40…+70					
Screw torque	Nm	0.5					
Wire strip length	mm	8					
Max. wire size for 94.02/03/04 sockets		solid wire			stranded wire		
	mm²	1x6 / 2x2.5			1x4 / 2x2.5		
	AWG	1x10 / 2x14			1x12 / 2x14		

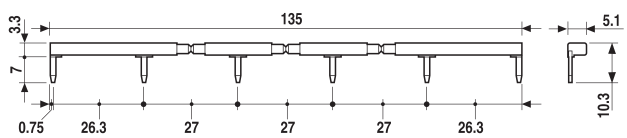




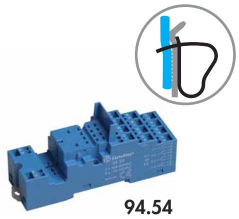
94.02 94.03 94.04 94.04 + 094.91.3

094.06

6-way jumper link for 94.02, 94.03 and 94.04 sockets	094.06 (blue)	094.06.0 (black)
Rated values	10 A - 250 V	



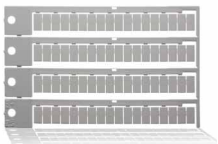
H



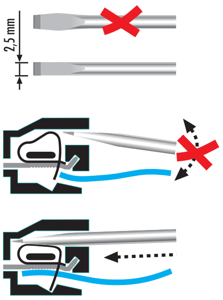
94.54

Approvals
(according to type):

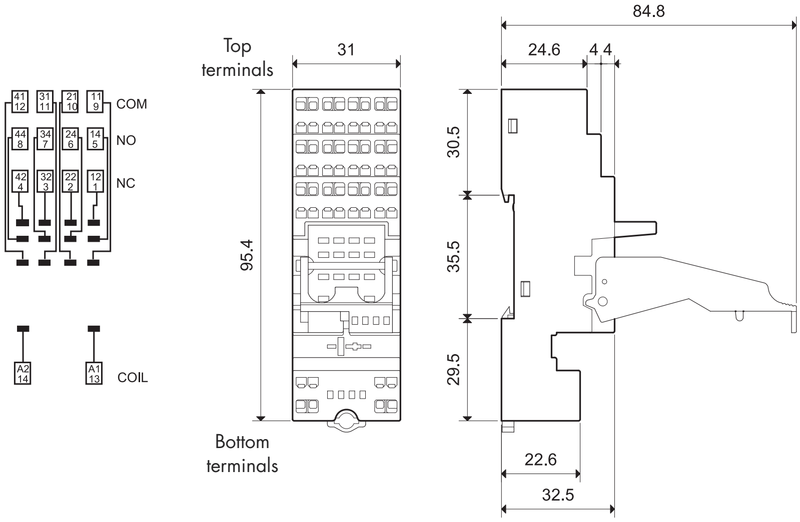
094.91.3

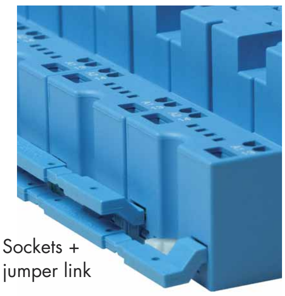


060.72



Screwless terminal socket 35 mm rail (EN 60715) mount		**94.54 (blue)**	
For relay type		55.32, 55.34	
Accessories			
Metal retaining clip		094.71	
Plastic retaining and release clip		094.91.3	
6-way jumper link		094.56	
Modules (see table below)		99.02, 86.30	
Sheet of marker tags, 72 tags, 6x12 mm		060.72	
Technical data			
Rated values		10 A - 250 V	
Dielectric strength		2 kV AC	
Protection category		IP 20	
Ambient temperature	°C	–25…+70	
Wire strip length	mm	10	
Max. wire size for 94.54 socket		solid wire	stranded wire
	mm²	2x(0.2…1.5)	2x(0.2…1.5)
	AWG	2x(24…14)	2x(24…14)

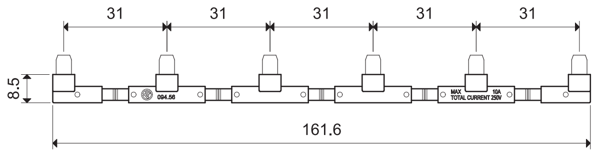


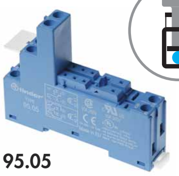


Sockets +
jumper link

094.56

6-way jumper link	094.56 (blue)
Rated values	10 A - 250 V

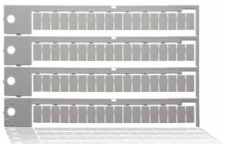




95.05

Approvals
(according to type):

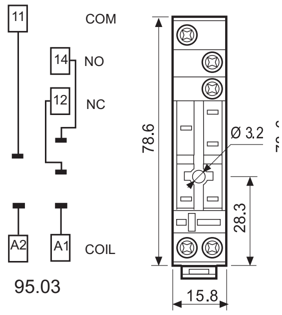
095.01



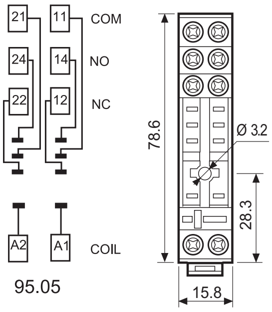
060.72

Screw terminal (Box clamp) socket panel or 35 mm rail (EN 60715) mount		**95.03** **Blue**	**95.03.0** **Black**	**95.05** **Blue**	**95.05.0** **Black**
For relay type		40.31		40.51/ 52/ 61, 44.52/62	
Accessories					
Metal retaining clip		095.71			
Plastic retaining and release clip (supplied with socket - packaging code SPA)		095.01	095.01.0	095.01	095.01.0
8-way jumper link		095.18	095.18.0	095.18	095.18.0
Identification tag		095.00.4			
Timer modules		86.30			
Sheet of marker tags for retaining and release clip 095.01 plastic, 72 tags, 6x12 mm		060.72			
Technical data					
Rated values		10 A - 250 V *			
Dielectric strength		6 kV (1.2/50 μs) between coil and contacts			
Protection category		IP 20			
Ambient temperature	°C	–40…+70			
Screw torque	Nm	0.5			
Wire strip length	mm	8			
Max. wire size for 95.03 and 95.05 sockets		solid wire		stranded wire	
	mm^2	1x6 / 2x2.5		1x4 / 2x2.5	
	AWG	1x10 / 2x14		1x12 / 2x14	

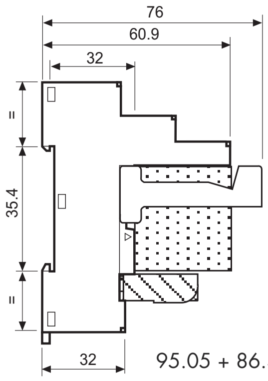
* For currents >10 A, contact terminals must be connected in parallel (21 with 11, 24 with 14, 22 with 12).



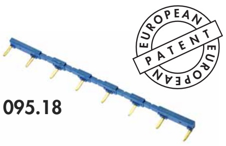
95.03



95.05

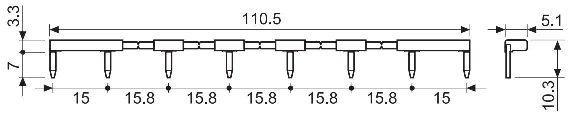


95.05 + 86.30 + 40.52 + 095.01

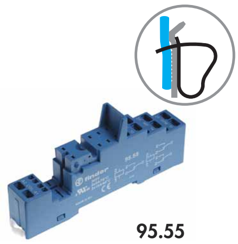


095.18

8-way jumper link for 95.03 and 95.05 sockets	095.18 (blue)	095.18.0 (black)
Rated values	10 A - 250 V	



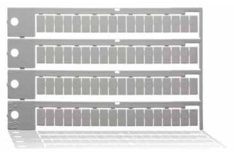
H



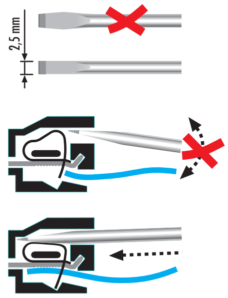
95.55

Approvals
(according to type):

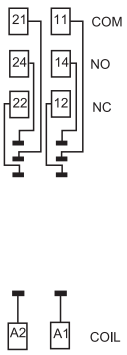
095.91.3

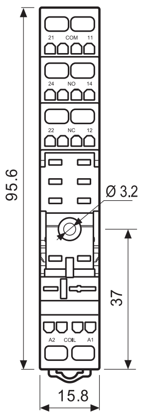


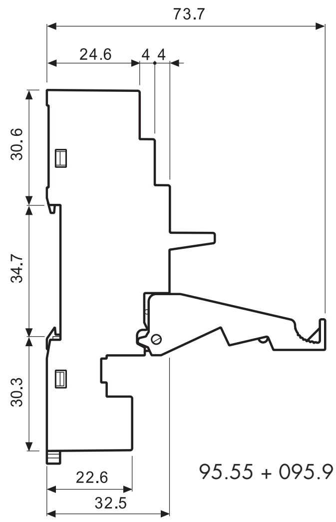
060.72



Screwless terminal socket panel or 35 mm rail (EN 60715) mount		95.55 Blue	95.55.0 Black
For relay type		40.51/52/61, 44.52/62	
Accessories			
Metal retaining clip		095.71	
Plastic retaining and release clip (supplied with socket - packaging code SPA)		095.91.3	095.91.30
Timer modules		86.30	
Sheet of marker tags for retaining and release clip 095.91.3 plastic, 72 tags, 6x12 mm		060.72	
Technical data			
Rated values		10 A - 250 V	
Dielectric strength		6 kV (1.2/50 μs) between coil and contacts	
Protection category		IP 20	
Ambient temperature	°C	–25…+70	
Wire strip length	mm	8	
Max. wire size for 95.55 socket		solid wire	stranded wire
	mm^2	2x(0.2...1.5)	2x(0.2...1.5)
	AWG	2x(24...18)	2x(24...18)

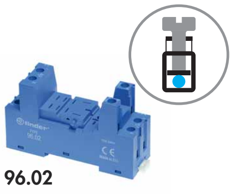




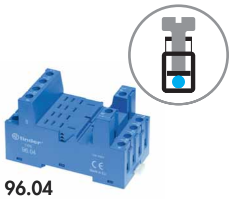


95.55 + 095.91.3

H

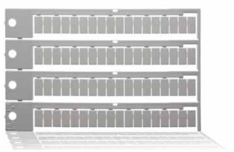


96.02
Approvals
(according to type):



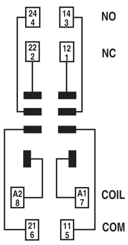
96.04
Approvals
(according to type):

094.91.3

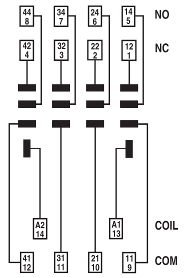


060.72

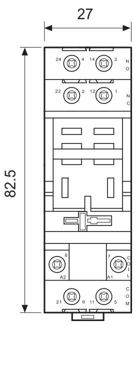
Screw terminal (Box clamp) socket panel or 35 mm rail (EN 60715) mount	**96.02** **Blue**	**96.02.0** **Black**	**96.04** **Blue**	**96.04.0** **Black**
For relay type	56.32		56.34	
Accessories				
Metal retaining clip (supplied with socket - packaging code SMA)	094.71		096.71	
Plastic retaining and release clip (supplied with socket - packaging code SPA)	094.91.3	094.91.30	—	—
6-way jumper link	094.06	094.06.0	—	—
Identification tag	095.00.4		090.00.2	
Timer modules	86.30		86.00, 86.30	
Sheet of marker tags for retaining and release clip 094.91.3 plastic, 72 tags, 6x12 mm	060.72		—	
Technical data				
Rated values	12 A - 250 V			
Dielectric strength	2 kV AC			
Protection category	IP 20			
Ambient temperature °C	–40…+70			
Screw torque Nm	0.8			
Wire strip length mm	8			
Max. wire size for 96.02/04 sockets	solid wire		stranded wire	
mm²	1x6 / 2x2.5		1x4 / 2x2.5	
AWG	1x10 / 2x14		1x12 / 2x14	



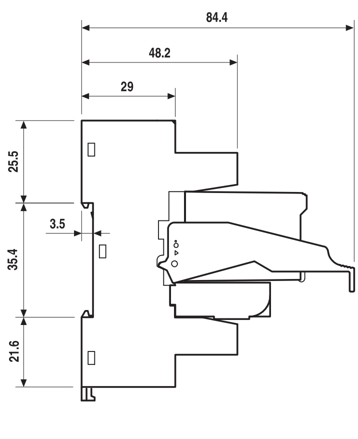
96.02



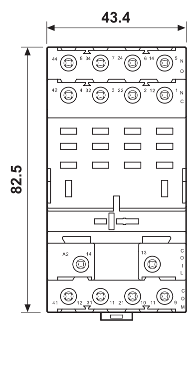
96.04



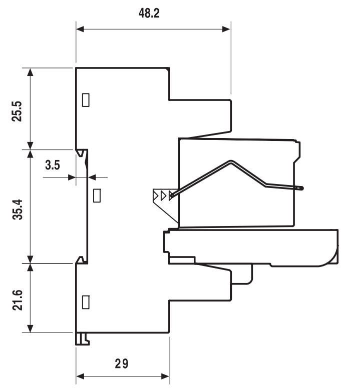
96.02



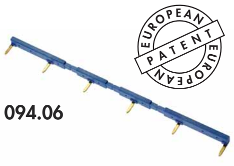
96.02 + 56.32 + 094.91.3 + 86.30



96.04

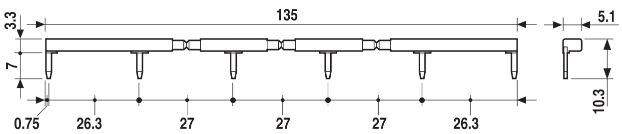


96.04 + 56.34 + 096.71 + 86.00



094.06

6-way jumper link for 96.02 socket	094.06 (blue)	094.06.0 (black)
Rated values	10 A - 250 V	



II-2014, www.findernet.com

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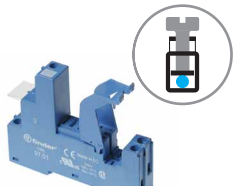
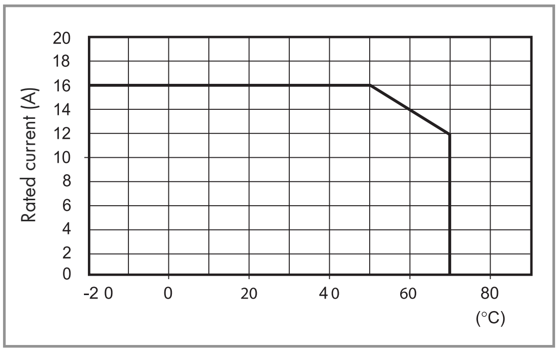


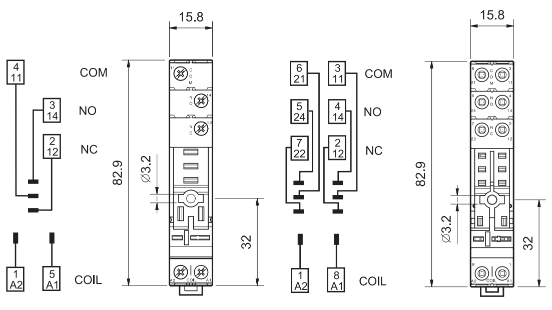
97.01
Approvals
(according to type):

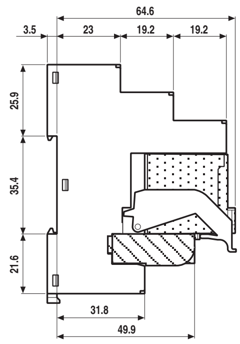
097.01

Screw terminal socket panel or 35 mm rail (EN 60715) mount		97.01 Blue	97.02 Blue
For relay type		46.61	46.52
Accessories			
Plastic retain and eject clip (supplied with socket - packaging code SPA)		097.01	
8-way jumper link		095.18 (blue)	095.18.0 (black)
Identification tag		095.00.4	
Timer modules		86.30	
Technical data			
Rated current		16 A - 250 V AC	8 A - 250 V AC
Dielectric strength		6 kV (1.2/50 μs) between coil and contacts	
Protection category		IP 20	
Ambient temperature	°C	–40…+70 (see diagram L97)	
Screw torque	Nm	0.8	
Wire strip length	mm	8	
Max. wire size for 97.01 and 97.02 sockets		solid wire	stranded wire
	mm^2	1x6 / 2x2.5	1x4 / 2x2.5
	AWG	1x10 / 2x14	1x12 / 2x14

L 97 - Rated current vs ambient temperature
(for 46.61 relay / 97.01 socket combination)





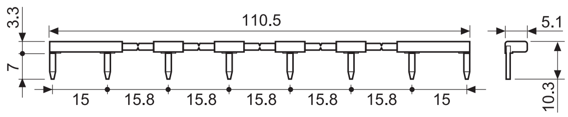


97.01 97.01 97.02 97.02

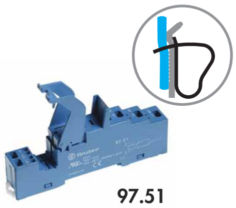
97.02 + 46.52 + 097.01
+ 86.30

095.18

8-way jumper link for 97.01 and 97.02 sockets	095.18 (blue)	095.18.0 (black)
Rated values	10 A - 250 V	



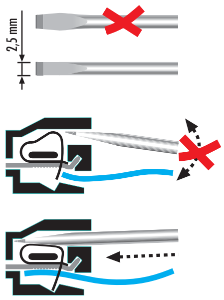
86 Series - Sockets and accessories



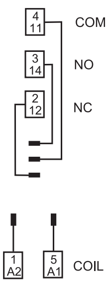
97.51

Approvals
(according to type):

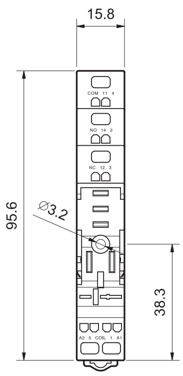
097.01



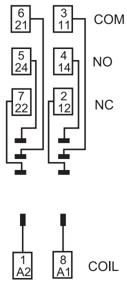
Screwless terminal socket		**97.51**	**97.52**
panel or 35 mm rail (EN 60715) mount		**Blue**	**Blue**
For relay type		46.61	46.52
Accessories			
Plastic retain and eject clip (supplied with socket - packaging code SPA)		097.01	
Timer modules		86.30	
Technical data			
Rated current		10 A - 250 V AC	8 A - 250 V AC
Dielectric strength		6 kV (1.2/50 μs) between coil and contacts	
Protection category		IP 20	
Ambient temperature	°C	–25…+70	
Wire strip length	mm	8	
Max. wire size for 97.51 and 97.52 sockets		solid wire	stranded wire
	mm^2	2x(0.2...1.5)	2x(0.2...1.5)
	AWG	2x(24...18)	2x(24...18)



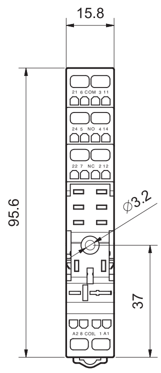
97.51



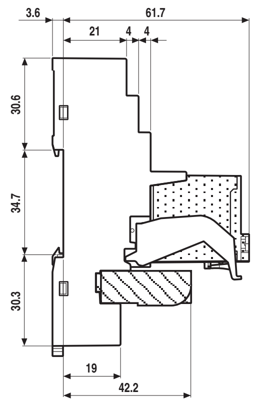
97.51



97.52



97.52



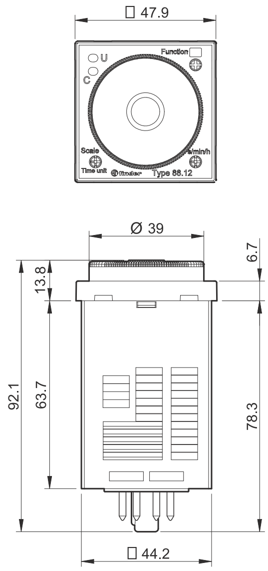
97.52 + 46.52 + 097.01 + 86.30

H

Features

Multi-voltage and multi-function timer range
Front panel or socket mount

- 8 and 11 pin plug-in versions available
- Time scales from 0.05s to 100h
- "1 delayed contact +1 instantaneous contact" version available (type 88.12)
- Front panel mounting fixing included
- 90 series sockets

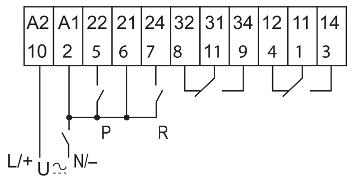


88.02

- Multi-function
- 11 pin
- Plug-in for use with 90 series sockets

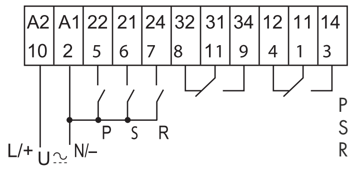
AI: On-delay
DI: Interval
GI: Pulse delayed
SW: Symmetrical flasher (starting pulse on)

without control signal



BE: Off-delay with control signal
CE: On- and off-delay with control signal
DE: Interval with control signal on

with control signal



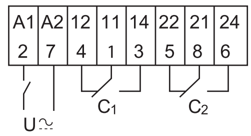
P = Pause
S = Start
R = Reset

88.12

- Multi-function
- 8 pin, 2 timed contacts or 1 timed + 1 instantaneous contact
- Plug-in for use with 90 series sockets

AI a: On-delay (2 timed contacts)
AI b: On-delay (1 timed + 1 instantaneous contact)
DI a: Interval (2 timed contacts)
DI b: Interval (1 timed + 1 instantaneous contact)
GI: Pulse delayed
SW: Symmetrical flasher (starting pulse on)

without control signal



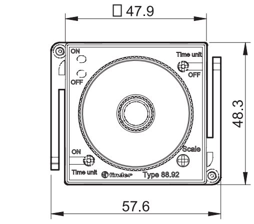
		88.02	88.12
Contact specification			
Contact configuration		2 CO (DPDT)	2 CO (DPDT)
Rated current/Maximum peak current	A	8/15	8/15
Rated voltage/Maximum switching voltage	V AC	250/400	250/400
Rated load AC1	VA	2,000	2,000
Rated load AC15 (230 V AC)	VA	400	400
Single phase motor rating (230 V AC)	kW	0.3	0.3
Breaking capacity DC1: 30/110/220 V	A	8/0.3/0.12	8/0.3/0.12
Minimum switching load	mW (V/mA)	300 (5/5)	300 (5/5)
Standard contact material		AgNi	AgNi
Supply specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	24…230	24…230
	V DC	24…230	24…230
Rated power AC/DC	VA (50 Hz)/W	2.5 (230 V)/1 (24 V)	2.5 (230 V)/1.5 (24 V)
Operating range	V AC	20.4…264.5	20.4…264.5
	V DC	20.4…264.5	20.4…264.5
Technical data			
Specified time range		(0.05 s…5 h) - (0.05 s…10 h) - (0.05 s…50 h) - (0.05 s…100 h)	
Repeatability	%	± 1	± 1
Recovery time	ms	300	200
Minimum control impulse	ms	50	—
Setting accuracy-full range	%	± 3	± 3
Electrical life at rated load AC1	cycles	100·10³	100·10³
Ambient temperature range	°C	–10…+55	–10…+55
Protection category		IP 40	IP 40
Approvals (according to type)			

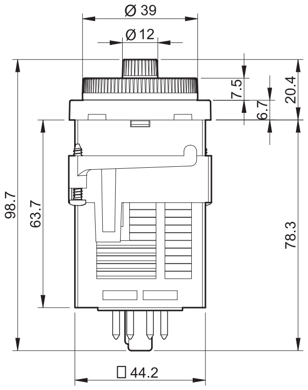
H

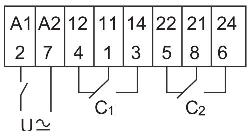
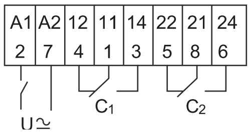
Features

Multi-voltage and mono-function timer range
Front panel or socket mount

- Asymmetrical flasher The ON and OFF time are independently adjustable
- 8 pin plug-in
- Time scales from 0.05s to 300h
- 2 contacts
- Front panel mounting fixing included
- 90 series sockets





88.92 - 0000	88.92 - 0001
	
• Mono-function • 8 pin, 2 timed contacts • Plug-in for use with 90 series sockets	• Mono-function • 8 pin, 2 timed contacts • Plug-in for use with 90 series sockets
PI: Asymmetrical flasher (starting pulse OFF)	**LI:** Asymmetrical flasher (starting pulse ON)
without control signal 	without control signal 

		88.92 - 0000	88.92 - 0001
Contact specification			
Contact configuration		2 CO (DPDT)	2 CO (DPDT)
Rated current/Maximum peak current	A	8/15	8/15
Rated voltage/Maximum switching voltage	V AC	250/400	250/400
Rated load AC1	VA	2,000	2,000
Rated load AC15 (230 V AC)	VA	400	400
Single phase motor rating (230 V AC)	kW	0.3	0.3
Breaking capacity DC1: 30/110/220 V	A	8/0.3/0.12	8/0.3/0.12
Minimum switching load	mW (V/mA)	300 (5/5)	300 (5/5)
Standard contact material		AgNi	AgNi
Supply specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	12…240	12…240
	V DC	12…240	12…240
Rated power AC/DC	VA (50 Hz)/W	2.5 (230 V)/1.5 (24 V)	2.5 (230 V)/1.5 (24 V)
Operating range	V AC	10.8…264.5	10.8…264.5
	V DC	10.8…264.5	10.8…264.5
Technical data			
Specified time range		See “Time Scale” page 3	See “Time Scale” page 3
Repeatability	%	± 1	± 1
Recovery time	ms	200	200
Minimum control impulse	ms	—	—
Setting accuracy-full range	%	± 1	± 1
Electrical life at rated load AC1	cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Ambient temperature range	°C	–10…+55	–10…+55
Protection category		IP 40	IP 40
Approvals (according to type)			

H

Ordering information

Example: 88 series multi-function timer, 2 CO (DPDT) 8 A contacts, (24…230)V AC (50/60 Hz) and (24…230)V DC supply.

8 8	.	0		2	.	0	.	2 3 0	.	0	0	0	2

Series

Type
0 = Functions AI, DI, GI, SW, BE, CE, DE, 11 pin
1 = Functions AI a, AI b, DI a, DI b, GI, SW, 8 pin
9 = Functions LI, PI, 8 pin

No. of poles
2 = 2 pole

Supply version
0 = AC (50/60 Hz)/DC

Special versions
0 = Functions PI (starting pulse OFF) for 88.92
1 = Functions LI (starting pulse ON) for 88.92
2 = Standard

Supply voltage
230 = (24…230)V AC/DC for 88.02, 88.12
240 = (12…240)V AC/DC for 88.92

Codes
88.02.0.230.0002
88.12.0.230.0002
88.92.0.240.0000
88.92.0.240.0001

Technical data

EMC specifications				
Type of test		**Reference standard**	**88.02/88.12**	**88.92**
Electrostatic discharge	contact discharge	EN 61000-4-2	4 kV	4 kV
	air discharge	EN 61000-4-2	8 kV	6 kV
Radio-frequency electromagnetic field (80 ÷ 1,000 MHz)		EN 61000-4-3	10 V/m	10 V/m
Fast transients (burst) (5-50 ns, 5 kHz) on Supply terminals		EN 61000-4-4	2 kV	—
Surges (1.2/50 μs) on Supply terminals	common mode	EN 61000-4-5	2 kV	—
	differential mode	EN 61000-4-5	1 kV	—
Radio-frequency common mode (0.15 ÷ 80 MHz) on Supply terminals		EN 61000-4-6	3 V	—

Selection of: function, time scale and units

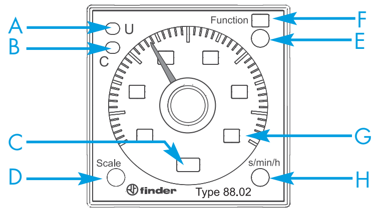
	88.02	88.12	88.92 - 0000	88.92 - 0001
Function	AI, DI, GI, SW, BE, CE, DE	AI a, AI b, DI a, DI b, GI, SW	PI	LI
Time scale	0.5, 1, 5, 10		1.2, 3, 12, 30	
Unit of time	s (second), min (minute), h (hour), 10h (10 hours)		s (second), 10s (second x 10), min (minute), 10 min (minute x 10), h (hour), 10h (hour x 10)	

Time scales

Full scale value for types 88.02, 88.12

D \ H	s	min	h	10h
0.5	0.5 second	0.5 minute	0.5 hour	5 hour
1	1 second	1 minute	1 hour	10 hour
5	5 second	5 minute	5 hour	50 hour
10	10 second	10 minute	10 hour	100 hour

Types 88.02, 88.12

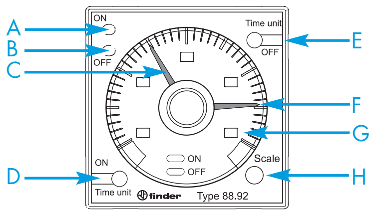


Full scale value for type 88.92

H \ D-E	s	10s	min	10min	h	10h
1.2	1.2 second	12 second	1.2 minute	12 minute	1.2 hour	12 hour
3	3 second	30 second	3 minute	30 minute	3 hour	30 hour
12	12 second	120 second	12 minute	120 minute	12 hour	120 hour
30	30 second	300 second	30 minute	300 minute	30 hour	300 hour

NOTE: time scales and functions must be set before energising the timer.

Type 88.92



LED/visual indication

Types 88.02, 88.12

A	Yellow LED: power ON (U)
B	Red LED: timing in progress (C)
C	Unit of time selected
D	Time scale selector
E	Function selector
F	Function selected
G	Time scale selected
H	Unit of time selector

Type 88.92

A	Red LED: pulse ON (T1)
B	Green LED: pulse OFF (T2)
C	Red timing regulator: T1 time setting
D	Unit of time selector: T1 (ON)
E	Unit of time selector: T2 (OFF)
F	Green timing regulator: T2 time setting
G	Time scale selected
H	Time scale selector

H

Functions for types 88.02, 88.12

U = Supply Voltage

S = Signal switch

P = Pause

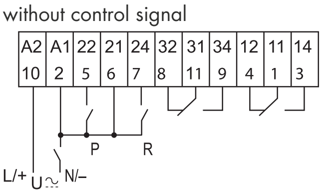
R = Reset

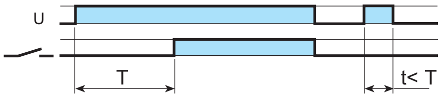
= Output Contact

LED (yellow)	LED (red)	Supply voltage	NO output contact	Contact Open	Contact Closed
		OFF	Open	x1 - x4	x1 - x2
		ON	Open	x1 - x4 x1 - x2	x1 - x2 x1 - x4
		ON	Open (timing in progress)	x1 - x4	x1 - x2
		ON	Closed	x1 - x2	x1 - x4

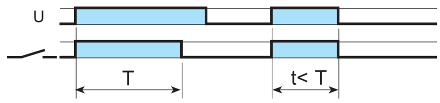
Wiring diagram **Type 88.02**

without control signal

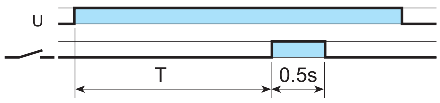




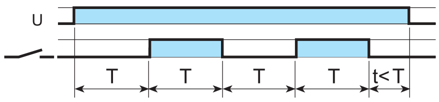
(AI) On-delay.
Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs when power is removed.



(DI) Interval.
Apply power to timer. Output contacts transfer immediately. After the preset time has elapsed, contacts reset.

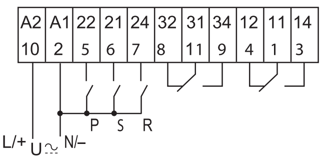


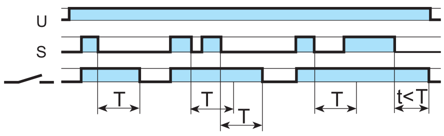
(GI) Pulse delayed.
Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs after a fixed time of 0.5s.



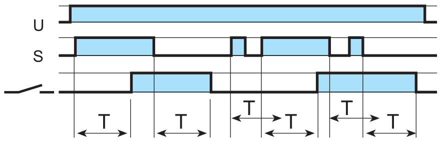
(SW) Symmetrical flasher (starting pulse on).
Apply power to timer. Output contacts transfer immediately and cycle between ON and OFF for as long as power is applied. The ratio is 1:1 (time on = time off).

with control signal

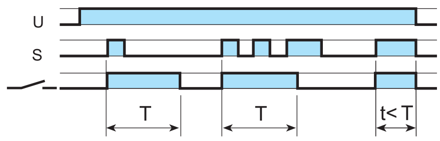




(BE) Off-delay with control signal.
Power is permenently applied to the timer.
The output contacts transfer immediately on closure of the Signal Switch (S). Opening the Signal Switch initiates the preset delay, after which time the output contacts reset.



(CE) On- and off-delay with control signal.
Power is permenently applied to the timer.
Closing the Signal Switch (S) initiates the preset delay, after which time the output contacts transfer. Opening the Signal switch initiates the same preset delay, after which time the output contacts reset.



(DE) Interval with control signal on.
Power is permenently applied to the timer.
On momentary or maintained closure of Signal Switch (S), the output contacts transfer, and remain so for the duration of the preset delay, after which they reset.

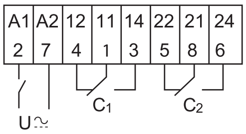
RESET (R)
A momentary closure of the reset switch (2-7) will reset the timer. Longer term closure of the reset switch will hold the timer in the reset state. This is applicable for all functions.

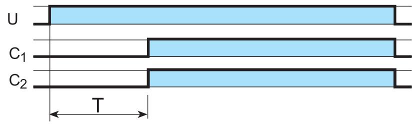
PAUSE (P)
Closure of the pause switch (2-5) will immediately halt the timing process, but the elapsed time will be retained, and the current state of the output contacts will be maintained.
On opening of the pause switch, timing resumes from the retained value. This is applicable for all functions.

Functions for type 88.12

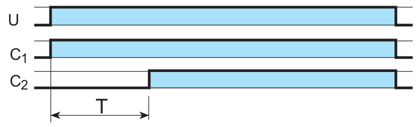
Wiring diagram **Type 88.12**

without control signal

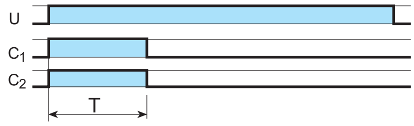




(AI a) On-delay (2 timed contacts).
Apply power to timer.
Contacts (C_1 and C_2) transfer after preset time has elasped.
Reset occurs when power is removed.

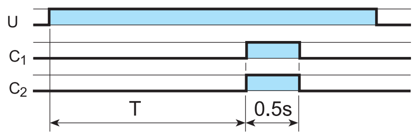


(AI b) On-delay
(1 timed contact + 1 instantaneous contact).
Apply power to timer. Output contact (C_1) transfers immediately. Contact (C_2) transfers after the preset time has elasped. Reset occurs when power is removed.

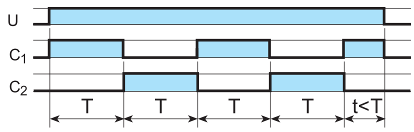


(DI a) Interval (2 timed contacts).
Apply power to timer.
Output contacts (C_1 and C_2) transfer immediately.
After preset time has elasped, the contacts reset.

(DI b) Interval (1 timed contact + 1 instantaneous contact).
Apply powert to timer. Output contacts (C_1 and C_2) transfer immediately. After preset time has elasped, the contact (C_2) resets. Contact (C_1) resets when power is removed.



(GI) Pulse delayed.
Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs after a fixed time of 0.5s.



(SW) Symmetrical flasher (starting pulse on).
Apply power to timer. Output contacts transfer immediately and cycle between ON and OFF for as long as power is applied. The ratio is 1:1 (time on = time off).

H

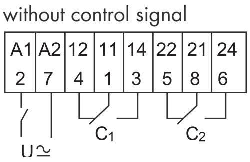
Functions for type 88.92

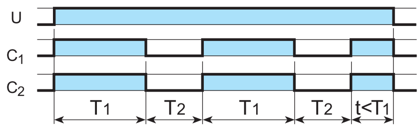
U = Supply Voltage

LED ON (red)	LED OFF (green)	Supply voltage	Contact Open	Contact Closed
		OFF	11 - 14 21 - 24	11 - 12 21 - 22
		ON	11 - 12 21 - 22	11 - 14 21 - 24
		ON	11 - 14 21 - 24	11 - 12 21 - 22

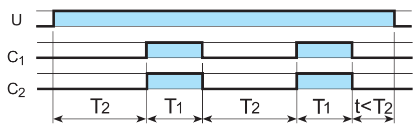
Wiring diagram **Type 88.92**

without control signal



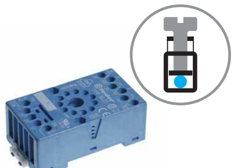


(LI) Asymmetrical flasher (starting pulse ON).
Apply power to timer. Output contacts transfer immediately and cycle between ON and OFF for as long as power is applied. The ON and OFF times are independently adjustable.



(PI) Asymmetrical flasher (starting pulse OFF).
Apply power to timer. Output contacts transfer after time T2 has elapsed and cycle between OFF and ON for as long as power is applied. The ON and OFF times are independently adjustable.

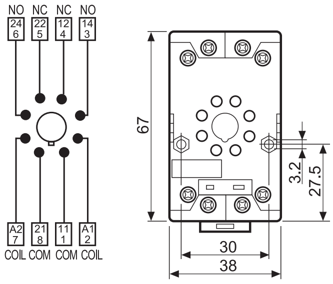
90 Series - Sockets and Accessories for 88 series Timers



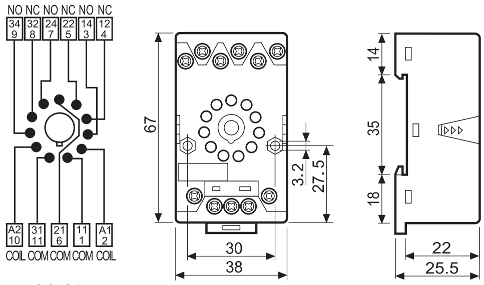
90.21

Approvals
(according to type):

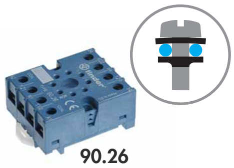
Screw terminal (Box clamp) socket panel or 35 mm rail (EN 60715) mount		90.20 Blue	90.20.0 Black	90.21 Blue	90.21.0 Black
For timer type		88.12, 88.92		88.02	
Technical data					
Rated values		10 A - 250 V			
Dielectric strength		2 kV AC			
Protection category		IP 20			
Ambient temperature	°C	–40…+70			
Screw torque	Nm	0.5			
Wire strip length	mm	10			
Max. wire size for 90.20 and 90.21 sockets		solid wire		stranded wire	
	mm^2	1x6 / 2x2.5		1x6 / 2x2.5	
	AWG	1x10 / 2x14		1x10 / 2x14	



90.20



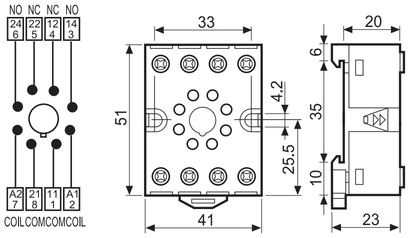
90.21



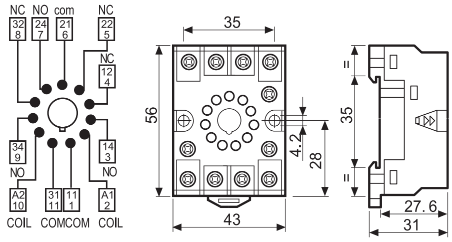
90.26

Approvals
(according to type):

Screw terminal (Plate clamp) socket panel or 35 mm rail (EN 60715) mount		90.26 Blue	90.26.0 Black	90.27 Blue	90.27.0 Black
For timer type		88.12, 88.92		88.02	
Technical data					
Rated values		10 A - 250 V			
Dielectric strength		2 kV AC			
Protection category		IP 20			
Ambient temperature	°C	–40…+70			
Screw torque	Nm	0.8			
Wire strip length	mm	10			
Max. wire size for 90.26 and 90.27 sockets		solid wire		stranded wire	
	mm^2	1x4 / 2x2.5		1x4 / 2x2.5	
	AWG	1x12 / 2x14		1x12 / 2x14	



90.26

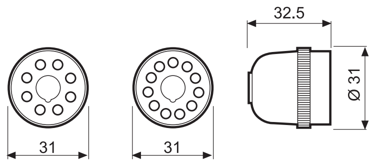


90.27

90.13.4

Approvals
(according to type):

Sockets 8-11 pin backwired with solder terminals		90.12.4 (black)	90.13.4 (black)
For timer type		88.12, 88.92	88.02
Technical data			
Rated values		10 A - 250 V	
Dielectric strength		2 kV AC	
Ambient temperature	°C	–40…+70	



90.12.4 90.13.4

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Features

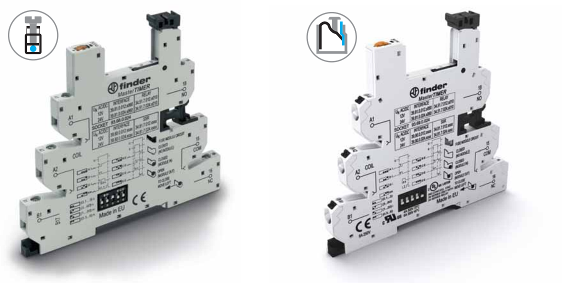
Slim timed sockets for 34 series, 6.2 mm wide

- Timer adjustment via top mounted rotary knob accessible after assembly
- Control signal terminal
- DIP-switch for selection of 4 time scales and 8 functions
- Output with fuse module option
- EMR and SSR: 12 to 24 V AC/DC supply
- Screw terminal and push-in terminal

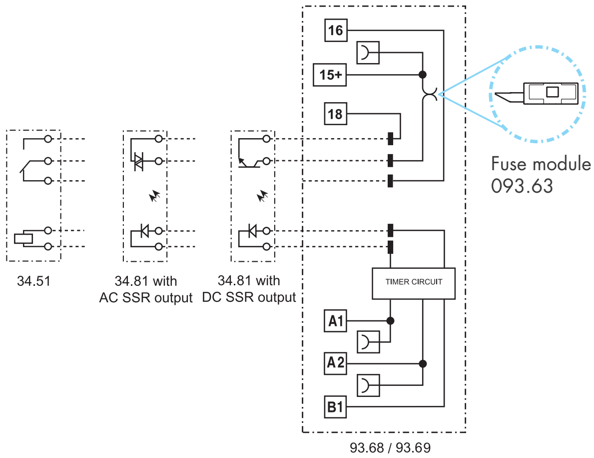
93.68
Screw terminal

93.69
Push-in terminal

NEW **93.68/93.69**



- Time scale: from 0.1s to 6h
- Multi-function
- For use with 34.51 (EMR) and 34.81 (SSR) relays
- Screw terminal and push-in terminal



AI: On-delay
DI: Interval
GI: Pulse (0.5 s) delayed
SW: Symmetrical flasher (starting pulse on)
BE: Off-delay with control signal
CE: On- and off-delay with control signal
DE: Interval with control signal on
EE: Interval with control signal off

For outline drawing see page 3

Contact specification	
Contact configuration	See 34.51 and 34.81 relays
Rated current/Maximum peak current A	
Rated voltage/Maximum switching voltage V AC	
Rated load AC1 VA	
Rated load AC15 (230 V AC) VA	
Single phase motor rating (230 V AC) kW	
Breaking capacity DC1: 30/110/220 V A	
Minimum switching load mW (V/mA)	
Standard contact material	
Supply specification	
Nominal voltage (U_N) V AC (50/60 Hz)/DC	12…24
Rated power AC/DC VA/W	See coils specifications page 2
Operating range V AC (50/60 Hz)/DC	9.6…26.4
Technical data	
Specified time range	(0.1…3)s, (3…60)s, (1…20)min, (0.3…6)h
Repeatability %	± 1
Recovery time ms	≤ 50
Setting accuracy – full range %	5
Electrical life at rated load in AC1 cycles	See 34.51 (EMR) and 34.81 (SSR) relays
Ambient temperature range °C	–20…+50
Protection category	IP 20
Approvals (according to type)	

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Ordering information

Example: type 93.68 multi-function timer module for 34 series relay, screw terminals, (12...24)V AC/DC supply voltage.

9	3	.	6	8	.	0	.	0	2	4

Series

Type
6 = Multi-function (AI, DI, GI, SW, BE, CE, DE, EE)

No. of poles
8 = 1 CO (EMR type 34.51), screw terminals
8 = 1 NO (SSR type 34.81), screw terminals
9 = 1 CO (EMR type 34.51), push-in terminals
9 = 1 NO (SSR type 34.81), push-in terminals

Supply voltage
024 = (12...24)V AC/DC

Supply version
0 = AC (50/60 Hz)/DC

Combinations

Output	Supply voltage	Type of relay	Type of socket, screw terminals
1 pole 6 A, electromechanical relay	12 V AC/DC	34.51.7.012.0010	93.68.0.024
1 pole 6 A, electromechanical relay	24 V AC/DC	34.51.7.024.0010	93.68.0.024
1 output 2 A 24 V DC, solid state relay	12 V AC/DC	34.81.7.012.9024	93.68.0.024
1 output 2 A 240 V AC, solid state relay	12 V AC/DC	34.81.7.012.8240	93.68.0.024
1 output 2 A 24 V DC, solid state relay	24 V AC/DC	34.81.7.024.9024	93.68.0.024
1 output 2 A 240 V AC, solid state relay	24 V AC/DC	34.81.7.024.8240	93.68.0.024
Output	**Supply voltage**	**Type of relay**	**Type of socket, push-in terminals**
1 pole 6 A, electromechanical relay	12 V AC/DC	34.51.7.012.0010	93.69.0.024
1 pole 6 A, electromechanical relay	24 V AC/DC	34.51.7.024.0010	93.69.0.024
1 output 2 A 24 V DC, solid state relay	12 V AC/DC	34.81.7.012.9024	93.69.0.024
1 output 2 A 240 V AC, solid state relay	12 V AC/DC	34.81.7.012.8240	93.69.0.024
1 output 2 A 24 V DC, solid state relay	24 V AC/DC	34.81.7.024.9024	93.69.0.024
1 output 2 A 240 V AC, solid state relay	24 V AC/DC	34.81.7.024.8240	93.69.0.024

Note: Although the timer socket covers both 12 and 24 volt supplies, it must be combined with the appropriate 12 V or 24 V relay; resulting in a combination suitable for just a single supply voltage.

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Technical data

EMC specifications			
Type of test		**Reference standard**	
Electrostatic discharge	contact discharge	EN 61000-4-2	4 kV
	air discharge	EN 61000-4-2	8 kV
Radio-frequency electromagnetic field	(80 ÷ 1,000 MHz)	EN 61000-4-3	10 V/m
	(1,400 ÷ 2,700 MHz)	EN 61000-4-3	10 V/m
Fast transients (burst) (5-50 ns, 5 and 100 kHz)	on Supply terminals	EN 61000-4-4	4 kV
	on control signal terminals	EN 61000-4-4	4 kV
Surges (1.2/50 μs) on supply and control signal terminals	common mode	EN 61000-4-5	2 kV
	differential mode	EN 61000-4-5	0.8 kV
Radio-frequency common mode (0.15 ÷ 80 MHz)	on Supply terminals	EN 61000-4-6	10 V
	on control signal terminals	EN 61000-4-6	3 V
Radiated and conducted emission		EN 55022	class B

Other data			
Current absorption on signal control (B1)		mA	<1.7 (12V) - <3.5 (24V)
Bounce time (EMR) : NO/NC		ms	1/6
Vibration resistance (EMR,10..55 Hz): NO/NC		g	10/5
Power lost to the environment	without contact current	W	0.3
	with rated current	W	0.8

Terminals		**Solid and stranded cable**	
		Screw terminals	**Push-in terminals**
Wire strip length	mm	10	8
Screw torque	Nm	0.5	—
Max. wire size	mm^2	1 x 2.5 / 2 x 1.5	1 x 2.5
	AWG	1 x 14 / 2 x 16	1 x 14
Min. wire size	mm^2	1 x 0.2	1 x 0.2
	AWG	1 x 24	1 x 24

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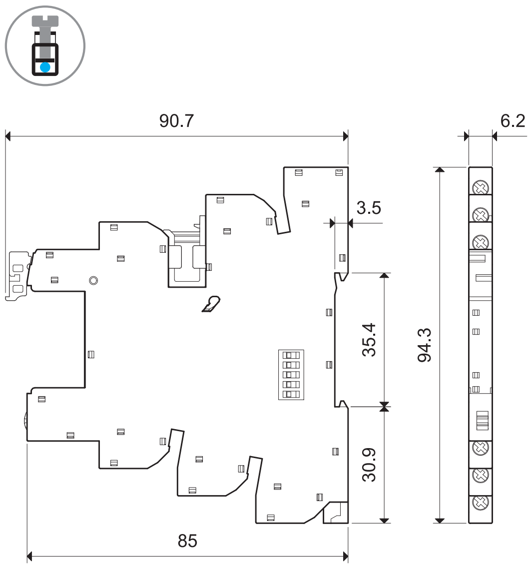
Input specifications

Input data AC/DC timer

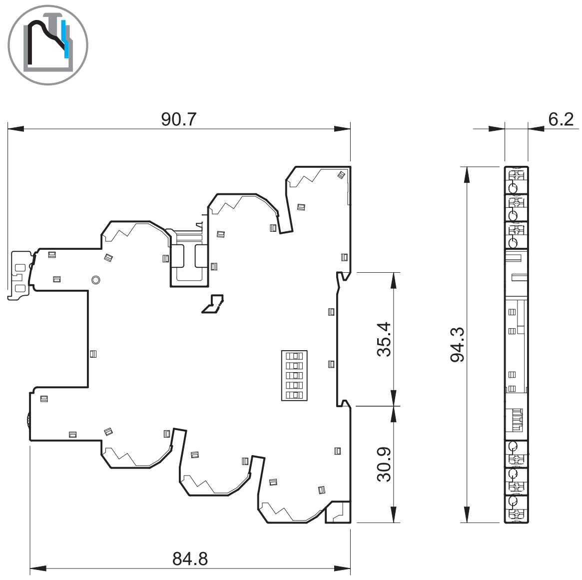
Nominal voltage	Operating range (AC/DC)		Must drop-out voltage	Rated input current at U_N		Rated power at U_N	
U_N	U_{min}	U_{max}	U_r	DC	AC	DC	AC
V	V	V	V	mA	mA	W	VA / W
12	9.6	13.2	1.2	15	23	0.2	0.3 / 0.2
24	19.2	26.4	2.4	11	19	0.25	0.4 / 0.3

Outline drawings

93.68
Screw terminal



93.69
Push-in terminal



Times scales

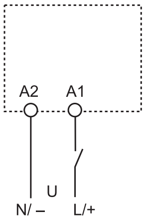
(0.1…3)s (3…60)s (1…20)min (0.3…6)h

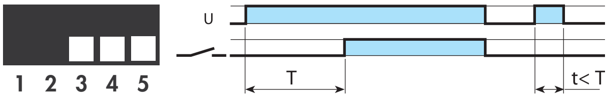
Functions

LED	Supply voltage	NO contact/output
	OFF	Open
	ON	Open
	ON	Open (timing to close in progress)
	ON	Closed

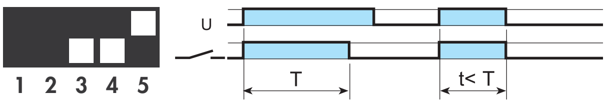
Wiring diagram

U = Supply voltage **S** = Signal switch = Output contact

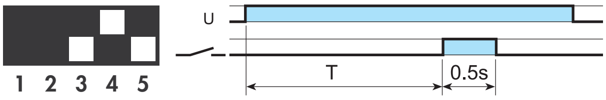




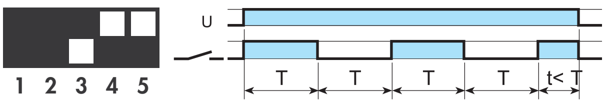
(AI) On-delay
Apply power to timer.
Output contacts transfer after preset time has elapsed. Reset occurs when power is removed.



(DI) Interval
Apply power to timer.
Output contacts transfer immediately.
After the preset time has elapsed, contacts reset.

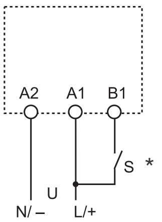


(GI) Pulse (0.5s) delayed
Apply power to timer.
Output contacts transfer after preset time has elapsed. Reset occurs after a fixed time of 0.5s.

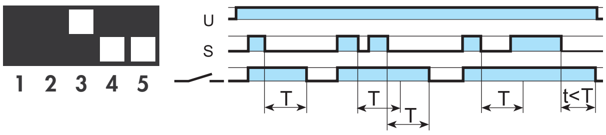


(SW) Symmetrical flasher (starting pulse on)
Apply power to timer.
Output contacts transfer immediately and cycle between ON and OFF for as long as power is applied. The ratio is 1:1 (time on = time off).

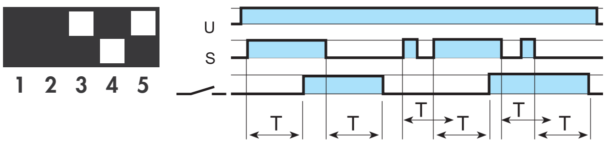
With control signal



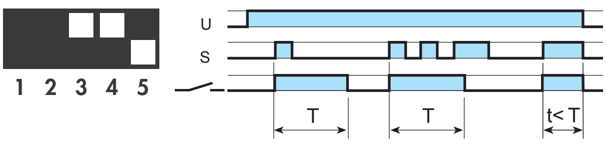
* With DC supply, positive polarity has to be conneted to B1 terminal (according to EN 60204-1).



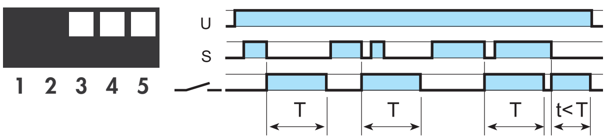
(BE) Off-delay with control signal
Power is permenently applied to the timer. The output contacts transfer immediately on closure of the Signal Switch (S). Opening the Signal Switch initiates the preset delay, after which time the output contacts reset.



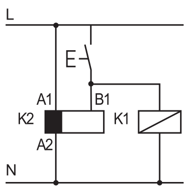
(CE) On- and off-delay with control signal
Power is permenently applied to the timer. Closing the Signal Switch (S) initiates the preset delay, after which time the output contacts transfer. Opening the Signal switch initiates the same preset delay, after which time the output contacts reset.



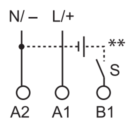
(DE) Interval with control signal on
Power is permenently applied to the timer. On momentary or maintained closure of Signal Switch (S), the output contacts transfer, and remain so for the duration of the preset delay, after which they reset.



(EE) Interval with control signal off
Power is permenently applied to the timer. On opening of the Signal Switch (S) the output contacts transfer, and remain so for the duration of the preset delay, after which they reset.

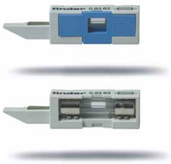


- Possible to control an external load, such as another relay coil or timer, connected to the control signal terminal B1.



** A voltage other than the supply voltage can be applied to the command Start (B1), example:
A1 - A2 = 24 V AC
B1 - A2 = 12 V DC

Accessories



093.63

Approvals
(according to type):

CE EAC cULus

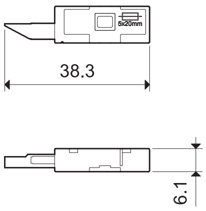
Output fuse module	093.63

- For 5 x 20 mm fuses up to 6 A, 250 V
- Easy visibility of the fuse condition through the window
- Quick connection to socket

Notes

Safety: Because the output circuit can be reinstated, even with the fuse removed, it is important not to consider the removal of the fuse as a "safety disconnect". Always isolate elsewhere before working on the circuit.

UL: According to UL508A, the fuse module cannot be installed in power circuits (in which it is mandatory that a fuse certified according to UL category JDDZ be fitted). However, where the MasterInterface is connected as an output interface to a PLC no such restrictions apply, and the fuse module can be usefully employed.



093.16

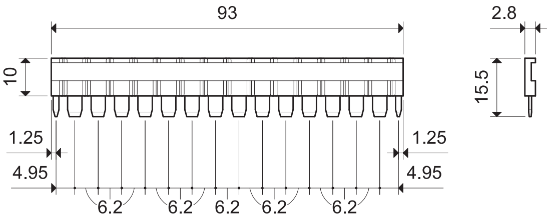
093.16.0

093.16.1

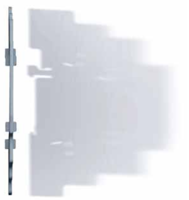
Approvals
(according to type):

CE EAC cULus

16-way jumper link	093.16 (blue)	093.16.0 (black)	093.16.1 (red)
Rated values	6 A - 250 V		
Possibility of multiple connection, side by side			



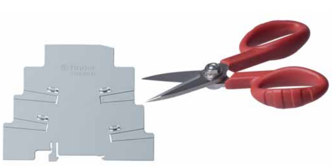
093.60

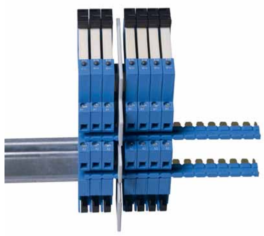


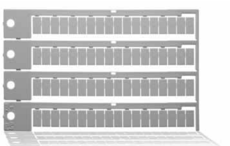
Dual-purpose plastic separator (1.8 mm or 6.2 mm separation)	093.60

1. By breaking off the protruding ribs (by hand), the separator becomes only 1.8 mm thick; useful for the visual separation of different groups of interfaces, or necessary for the protective separation of different voltages of neighbouring interfaces, or for the protection of cut ends of jumper links.

2. Leaving the ribs in place provides 6.2mm separation. Simply cutting (with scissors) the relevant segment(s) permits the interconnection across the separator of 2 different groups of interface relays, using the standard jumper link.







060.72

Sheet of marker tags, plastic, 72 tags, 6x12 mm	060.72

H

Accessories

093.62

Terminal doubler (for socket Push-in only)		093.62
Total load		6 A - 300 V
		Solid and stranded cable
Max. wire size	mm²	2 x 1.5
	AWG	2 x 16

093.68.14.1
Approvals
(according to type):

Connected *Master**ADAPTER***

*Master**ADAPTER***		093.68.14.1

The *Master**ADAPTER*** permits the easy connection of A1/A2 terminals of up to *Master**INTERFACE*** modules to PLC outputs via a 14-Pole ribbon cable, plus simple 2-wire power supply connection.

Technical data		
Rated current (per signal path)	A	1
Minimum required supply power	W	3
Nominal voltage (U_N)	V DC	24
Operating range		(0.8…1.1) U_N
Control logic		Positive switching (to A1)
Power supply status indication		Green LED
Ambient temperature range	°C	–40…+70
Terminals for 24 V control logic		
Type of connector		14 pole, according to IEC 60603-13
Terminals for 24 V power supply		
Wire strip length	mm	9.5
Screw torque	Nm	0.5
Max. wire size		
solid wire	mm²	1 x 4/2 x 1.5
	AWG	1 x 12/2 x 16
stranded wire	mm²	1 x 2.5/2 x 1.5
	AWG	1 x 14/2 x 16

H

10 Series - Light dependent relays 12 - 16 A

Features

Relays for automatic control of lighting according to the ambient light level

Integral light sensor

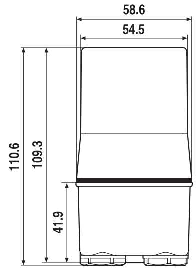
For pole or wall mounting

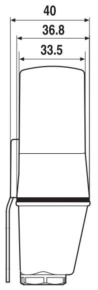
10.32 - 2 NO 16A output contacts
10.41 - 1 NO 16A output contact

- Double pole Live and Neutral switching possible with the 10.32
- Sensitivity adjustment from 1 to 80 lux
- Cadmium free contact material
- Cadmium free light sensor (IC photo diode)
- Electronic circuit - transformer isolated
- Italian Patent "light feedback compensation" innovative principle
  Compatible with slow starting gas discharge lamps (up to 10 minutes)
- For the first 3 working cycles the delay time (On and Off) is reduced to zero in order to aid installation
- Available for supply 230 and 120 V AC (50/60 Hz)

10.32

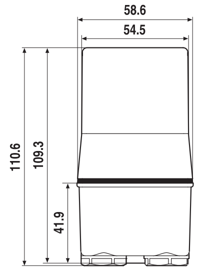
- Double pole switching - 2 NO 16A for Live and Neutral switching

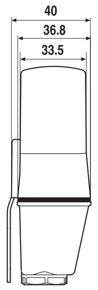




10.41

- Single pole switching - 1 NO 16A for Live switching





		10.32		10.41	
Contact specification					
Contact configuration		2 NO (DPST-NO)		1 NO (SPST-NO)	
Rated current/Maximum peak current	A	16/30 (120 A - 5 ms)		16/30 (120 A - 5 ms)	
Rated voltage/Maximum switching voltage	V AC	120/—	230/—	120/—	230/—
Rated load AC1	VA	1,900	3,700	1,900	3,700
Rated load AC15	VA	400	750	400	750
Rated current AC5a	A	—	5	—	5
Nominal lamp rating: incandescent	W	1,200	2,300	1,000	2,000
compensated fluorescent	W	450	850	400	750
uncompensated fluorescent	W	500	1,000	500	1,000
halogen	W	1,200	2,300	1,000	2,000
Minimum switching load	mW (V/mA)	1,000 (10/10)		1,000 (10/10)	
Standard contact material		$AgSnO_2$		$AgSnO_2$	
Supply specification					
Nominal voltage (U_N)	V AC (50/60 Hz)	120	230	120	230
	V DC	—		—	
Rated power AC/DC	VA (50 Hz)/W	2/—		2/—	
Operating range	AC (50 Hz)	$(0.8…1.1)U_N$		$(0.8…1.1)U_N$	
	DC	—		—	
Technical data					
Electrical life at rated load in AC1	cycles	$100 \cdot 10^3$		$100 \cdot 10^3$	
Threshold setting	lx	1…80		1…80	
Preset threshold	lx	10		10	
Delay time: switching ON/OFF	s	15/30		15/30	
Ambient temperature range	°C	–30…+70		–30…+70	
Protection category		IP 54		IP 54	
Approvals (according to type)					

10 Series - Light dependent relays 12 - 16 A

finder

Features

Relays for automatic control of lighting according to the ambient light level

Integral light sensor

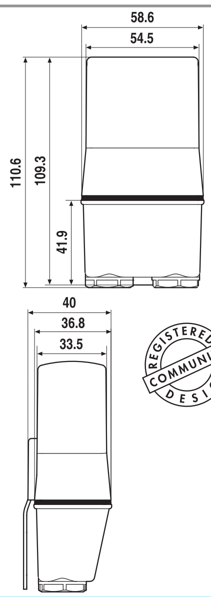
For pole or wall mounting

10.42 - Two independent 16A outputs with individual lux setting
10.51 - Miniature single 12A NO output
10.61 - Mounting on street light body

- Sensitivity adjustment from 1 to 80 lux
- Fixed sensivity 10 lux (± 20%) - (10.61 type)
- Cadmium free contact material
- Cadmium free light sensor (IC photo diode)
- Electronic circuit - transformer isolated (10.42 type)
- Italian Patent "light feedback compensation" innovative principle (10.51 type)
- For the first 3 working cycles the delay time (On and Off) is reduced to zero in order to aid installation
- Available for supply 230 and 120 V AC (50/60 Hz)
- Prewired with silicone wire, 500 mm length (10.61 type)

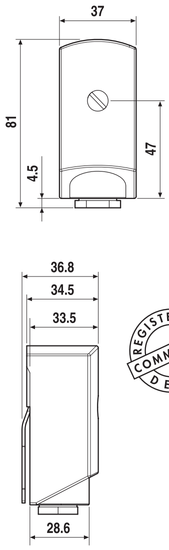
10.42

- Two independent outputs - 2 NO 16A



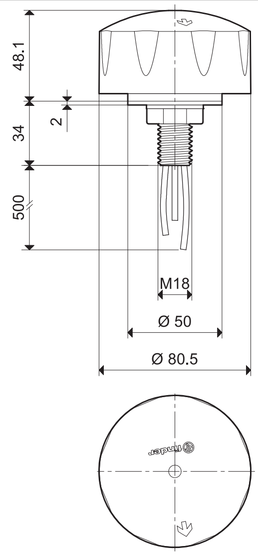
10.51

- Single pole switching - 1 NO 12A
- Miniature size



10.61

- Single pole switching - 1 NO 16 A



		10.42		10.51		10.61
Contact specification						
Contact configuration		2 NO (DPST-NO)		1 NO (SPST-NO)		1 NO (SPST-NO)
Rated current/Maximum peak current	A	16/30 (120 A – 5 ms)		12/25 (80 A – 5 ms)		16/30 (120 A – 5 ms)
Rated voltage/Maximum switching voltage	V AC	120/—	230/—	120/—	230/—	230/—
Rated load AC1	VA	1,900	3,700	1,400	2,760	3,700
Rated load AC15	VA	400	750	300	600	750
Rated current AC5a	A	—	5	—	—	5
Nominal lamp rating: incandescent	W	1,000	2,000	600	1,200	2,000
compensated fluorescent	W	400	750	200	400	750
uncompensated fluorescent	W	500	1,000	300	600	1,000
halogen	W	1,000	2,000	600	1,200	2,000
Minimum switching load	mW (V/mA)	1,000 (10/10)		1,000 (10/10)		1,000 (10/10)
Standard contact material		$AgSnO_2$		$AgSnO_2$		$AgSnO_2$
Supply specification						
Nominal voltage (U_N)	V AC (50/60 Hz)	120	230	120	230	230
	V DC	—		—		—
Rated power AC/DC	VA (50 Hz)/W	2/—		1.5/—		2.5/—
Operating range	AC (50 Hz)	$(0.8…1.1)U_N$		$(0.8…1.1)U_N$		$(0.8…1.1)U_N$
	DC	—		—		—
Technical data						
Electrical life at rated load in AC1	cycles	$100 \cdot 10^3$		$100 \cdot 10^3$		$100 \cdot 10^3$
Threshold setting	lx	1…80		1…80		10
Preset threshold	lx	10		10		10
Delay time: switching ON/OFF	s	15/30		15/30		15/30
Ambient temperature range	°C	–30…+70		–30…+70		–30…+70
Protection category		IP 54		IP 54		IP 54
Approvals (according to type)						

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Ordering information

Example: 10 series light dependent relay, 2 NO (DPST-NO) 16 A contact, screw terminal connections, 230 V AC supply.

1 0 . 3 2 . 8 . 2 3 0 . 0 0 0 0

Series

Type
32 = Double output - 2 NO 16 A
41 = Single output - 1 NO 16 A
42 = Two independent outputs - 2 NO 16A
51 = Single output - 1 NO 12A
61 = Mounting on street light body - 1 NO 16 A

Supply voltage
120 = 120 V
230 = 230 V

Supply version
8 = AC (50/60 Hz)

Technical data

Insulation		**10.32 / 41 / 42**		**10.51**		**10.61**
Dielectric strength between open contacts	V AC	1,000		1,000		1,000
Conducted disturbance immunity						
Surge (1.2/50 μs) on L and N (differential mode)	kV	4		4		6
Other data						
Cable grip	Ø mm	(8.9…12)		(7.5…9)		—
Screw torque	Nm	0.8		0.8		—
Max. wire size		solid cable	stranded cable	solid cable	stranded cable	—
	mm^2	1x6 / 2x4	1x6 / 2x2.5	1x6 / 2x4	1x4 / 2x2.5	—
	AWG	1x10 / 2x12	1x10 / 2x14	1x10 / 2x12	1x12 / 2x14	—
Output wires						
Material		—		—		Silicone rubber UV resistant
Size	mm^2	—		—		1.5
Length	mm	—		—		500, ends-ferruled
Rated insulation voltage	kV	—		—		0.6 / 1
Max temperature	°C	—		—		120

Functions

LED*	10.32 / 10.41 / 10.42		10.51	
	Supply voltage	NO output contact	Supply voltage	NO output contact
	OFF	Open	OFF or ON	Open
	ON	Open	ON	Closed
	ON	Open (Timing in Progress)	ON	Open (Timing in Progress)
	ON	Closed	—	—

* The LED is located under the terminal cover, close to the Lux adjustment knob. It indicates the contact status and assists in the test and setting of the correct light threshold level.

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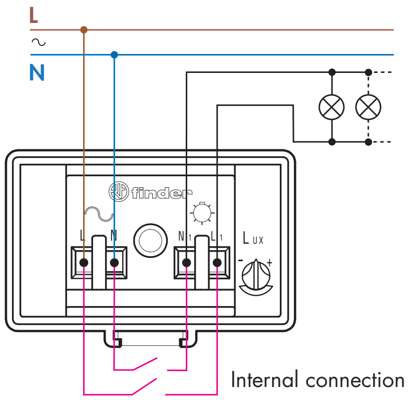
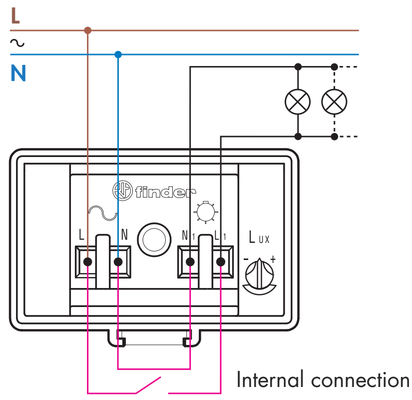
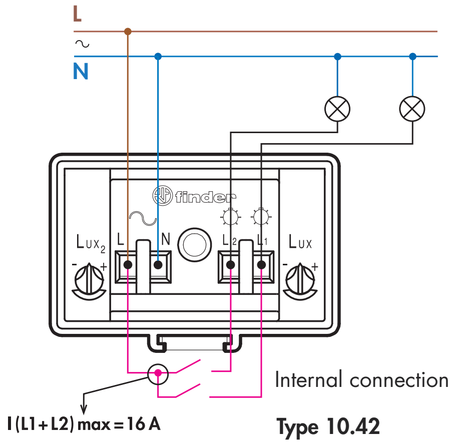
Wiring diagrams



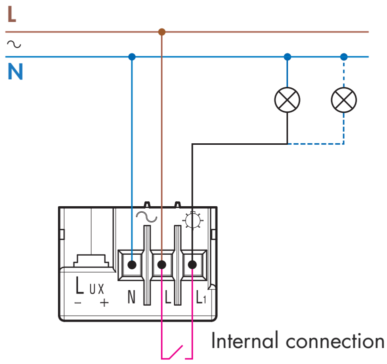
Type 10.32



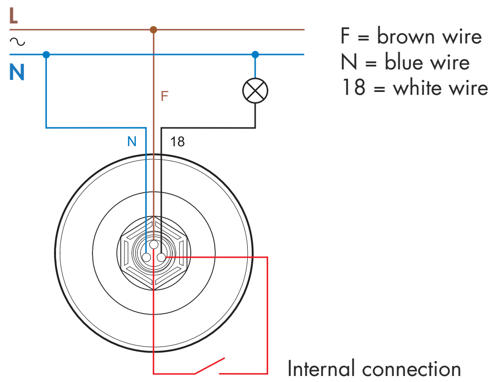
Type 10.41



Type 10.42



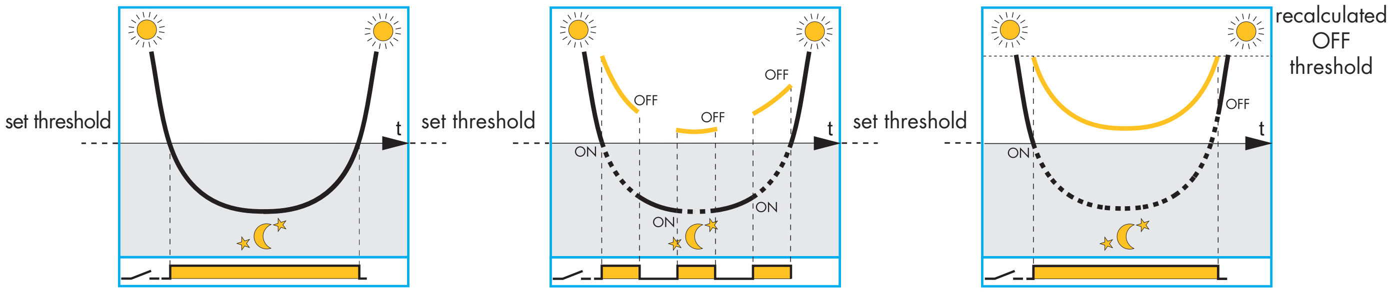
Type 10.51



Type 10.61

Advantage of the “light feedback compensation” principle

Light dependent relay where the lighting being controlled does not influence the light level seen by the light sensor	Traditional light dependent relay where the lighting being controlled influences the light level seen by the light sensor	Type 10.32, 10.41 and 10.51 light dependent relay with “light feedback compensation”



Correct functioning - provided the sensor can be shielded from the effects of the controlled lighting switching On and Off	Incorrect functioning where the lamps cycle between On and Off, because their effect is being detected by the light sensor	The innovative principle of “light feedback compensation” avoids the annoying and damaging effects of the lamps repeatedly “hunting” between On and Off, due to poor installation

Ambient light level as measured by the light dependent relay's integral light sensor.

Ambient light + controlled light level as measured by the light dependent relay's integral light sensor.

Notes
1. It is good practice to try to achieve a correct installation where the light emitted from the lamp(s) does not influence the light level seen by the sensor, although the “light feedback compensation” principle will help when this is not fully achievable. In this case it should be appreciated that the “light feedback compensation” principle may delay slightly the time of Switch Off - beyond the ideal.
2. The compensation principle is not effective where the combined effect of the ambient light and the controlled lighting exceeds 120 lux.
3. The 10.32 and 10.41 types are compatible with gas discharge lamps that attain full output within 10 minutes, since the electronic circuit monitors lamps' light output over a 10 minutes period to achieve a true assessment of its contribution to the overall lighting level.

Features

Relays for automatic control of lighting according to ambient light level - with separate light sensor

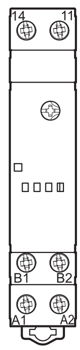
11.31 - 1 NO 16 A output contact
- Sensitivity adjustment from 1 to 100 lux
- One module, 17.5 mm wide
- Low energy consumption
- 24 V DC/AC supply version available

11.41 - 1 CO 16 A output contact
- European patent “Zero hysteresis” for energy saving;
- Italian patent “Light feedback compensation” principle
- Selector with 4 positions:
  - Standard range (threshold setting 1…80 lx)
  - High range (threshold setting 30…1000 lx)
  - continuous light (helpful during installation and initial testing and for maintenance purposes)
  - light off (useful for vacations)

- For the first 3 working cycles the delay time (On and Off) is reduced to zero in order to aid installation
- LED status indication
- SELV separation between contact and supply circuit
- Double insulation between supply and light sensor
- 35 mm rail (EN 60715) mount
- Cadmium free contact material
- Cadmium free light sensor (IC photo diode)

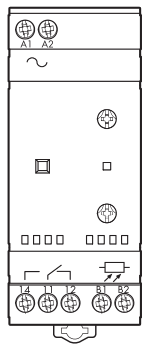
11.31

- 1 pole
- 17.5 mm wide



11.41

- 1 pole
- “zero hysteresis”
- 4 position selector



For outline drawing see page 8

		11.31		11.41
Contact specification				
Contact configuration		1 NO (SPST-NO)		1 CO (SPDT)
Rated current/Maximum peak current	A	16 / 30 (120 – 5 ms)		16 / 30 (120 – 5 ms)
Rated voltage/Maximum switching voltage	V AC	250 / 400		250 / 400
Rated load AC1	VA	4,000		4,000
Rated load AC15 (230 V AC)	VA	750		750
Nominal lamp rating (230 V): incandescent	W	2,000		2,000
compensated fluorescent	W	750		750
uncompensated fluorescent	W	1,000		1,000
halogen	W	2,000		2,000
Minimum switching load	mW (V/mA)	1,000 (10 / 10)		1,000 (10 / 10)
Standard contact material		$AgSnO_2$		$AgSnO_2$
Supply specification				
Nominal voltage (U_N)	V AC (50/60 Hz)	24	110…230	230
	DC	24	—	—
Rated power	VA (50 Hz)/W	2.5 / 0.9		5.2 / 2
Operating range	V AC (50 Hz)	16.8…28.8	90…265	(0.8 …1.1) U_N
	DC	16.8…32	—	—
Technical data				
Electrical life at rated load in AC1	cycles	$100 \cdot 10^3$		$100 \cdot 10^3$
Threshold setting:	Standard range lx	1…100		1…80
	High range lx	—		30…1,000
Hysteresis (switching Off/On ratio)		1.25		1
Delay time: switching On / Off	s	15 / 30		15 / 30
Ambient temperature range	°C	–20…+50		–20…+50
Protection category: light dependent relay/light sensor		IP 20 / IP 54		IP 20 / IP 54
Approvals (according to type)				

11 Series - Light Dependent Relay 12 - 16 A

Features

Relays for automatic control of lighting according to ambient light level - with separate light sensor

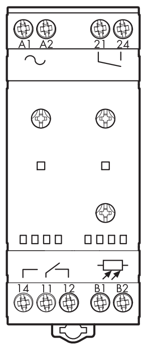
11.42 - 1 CO + 1 NO 12 A output contacts
- Two independent outputs with individual lux setting
- Selector with 4 positions:
  - Standard range (threshold setting 1…80 lx)
  - High range (threshold setting 20…1000 lx)
  - continuous light (helpful during installation and initial testing and for maintenance purposes)
  - light off (useful for vacations)
- For the first 6 working cycles (in total for channels 1 & 2) the delay time (On and Off) is reduced to zero in order to aid installation
- LED status indication

11.91 - 1 CO 16 A output contact (+ auxiliary output for Power Module)
- Daily time switch function - programmable to inhibit main output (for energy saving)
- Auxiliary output - directly driven by the photosensor
- Italian patent "Light feedback compensation" principle
- Sensitivity adjustment from 2 to 150 lux
- LCD status indication, set-up and programming
- Internal battery for set-up/programming without supply and for time/program back-up in case of power failure (5 years)

- SELV separation between contact and supply circuit
- Double insulation between supply and light sensor
- 35 mm rail (EN 60715) mount
- Cadmium free contact material
- Cadmium free light sensor (IC photo diode)

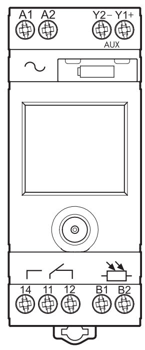
11.42

- 2 independent outputs
- 2 individual lux settings
- 4 position selector



11.91

- Light dependent relay + time switch
- Auxiliary output (light dependent) with 19.91 power module available



* 11.91 auxiliary output: 12 V DC, 1 W max
For outline drawing see page 8

		11.42	11.91
Contact specification			
Contact configuration		1 CO (SPDT) + 1 NO (SPST-NO)	1 CO (SPDT) + 1 aux output*
Rated current/Maximum peak current	A	12 / 24 (120 – 5 ms)	16 / 30 (120 – 5 ms)
Rated voltage/Maximum switching voltage	V AC	250 / 400	250 / 400
Rated load AC1	VA	3,000	4,000
Rated load AC15 (230 V AC)	VA	750	750
Nominal lamp rating (230 V): incandescent	W	2,000	2,000
compensated fluorescent	W	750	750
uncompensated fluorescent	W	1,000	1,000
halogen	W	2,000	2,000
Minimum switching load	mW (V/mA)	1,000 (10 / 10)	1,000 (10 / 10)
Standard contact material		$AgSnO_2$	$AgSnO_2$
Supply specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	230	230
	DC	—	—
Rated power	VA (50 Hz)/W	7.4 / 2.8	6.6 / 2.9
Operating range	V AC (50 Hz)	(0.8 …1.1) U_N	(0.8 …1.1) U_N
	DC	—	—
Technical data			
Electrical life at rated load in AC1	cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Threshold setting:	Standard range lx	1…80	2…150
	High range lx	20…1,000	—
Hysteresis (switching Off/On ratio)		1.25	Δ = 3 lx
Delay time: switching On / Off	s	15 / 30	25 / 50
Ambient temperature range	°C	–20…+50	–20 … + 50
Protection category: light dependent relay/light sensor		IP 20 / IP 54	IP 20 / IP 54
Approvals (according to type)			

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III-2015, www.findernet.com

Ordering information

Example: 11 series light dependent relay with time switch, 1 CO (SPDT) 16 A contact, 230 V AC supply.

1	1	.	9	1	.	8	.	2	3	0	.	0	0	0	0

Series

Type
3 = 17.5 mm wide
4 = 35 mm wide
9 = 35 mm wide, with time switch

No. of poles
1 = 1 pole, 16 A
2 = 2 pole, 12 A

Options
0000 = standard

Supply voltage
024 = 24 V (11.31 only)
230 = 230 V
110…230 V (11.31 only)

Supply version
0 = AC/DC (11.31 only)
8 = AC (50 / 60 Hz)

Codes
11.31.0.024.0000
11.31.8.230.0000
11.41.8.230.0000
11.42.8.230.0000
11.91.8.230.0000
19.91.9.012.4000 (power module for 11.91 type)

Technical data

Insulation		**Dielectric strength**	**Impulse (1.2/50 μs)**	
	between supply and contacts	4,000 V AC	6 kV	
	between supply and light sensor	2,000 V AC	4 kV	
	between open contacts	1,000 V AC	1.5 kV	
EMC specifications				
Type of test		**Reference standard**	**11.31**	**11.41 / 42 / 91**
Electrostatic discharge	contact discharge	EN 61000-4-2	4 kV	
	air discharge	EN 61000-4-2	8 kV	
Radiated electromagnetic field (80…1,000 MHz)		EN 61000-4-3	10 V/m	
Fast transients	on supply terminals	EN 61000-4-4	3 kV	4 kV
(burst 5/50 ns, 5 and 100 kHz)	on light sensor connection	EN 61000-4-4	3 kV	4 kV
Voltage pulses on supply terminals	common mode	EN 61000-4-5	4 kV	
(surge 1.2/50 μs)	differential mode	EN 61000-4-5	3 kV	4 kV
Radiofrequency common mode voltage	on supply terminals	EN 61000-4-6	10 V	
(0.15…80 MHz)	on light sensor	EN 61000-4-6	3 V	
Voltage dips	70 % U_N , 40 % U_N	EN 61000-4-11	10 cycles	
Short interruptions		EN 61000-4-11	10 cycles	
Radio frequency conducted emissions	0.15…30 MHz	EN 55014	class B	
Radiated emissions	30…1,000 MHz	EN 55014	class B	

Terminals			
Screw torque	Nm	0.8	
Max. wire size	solid cable	1 x 6 / 2 x 4 mm²	1 x 10 / 2 x 12 AWG
	stranded cable	1 x 4 / 2 x 2.5 mm²	1 x 12 / 2 x 14 AWG
Wire strip lenght	mm	9	

Other data					
Cable grip of light sensor	mm	7.5 …9			
Maximum cable length relay to light sensor	m	50 (2 x 1.5 mm²)			
Preset threshold	lx	10			
Power lost to the environment		**11.31**	**11.41**	**11.42**	**11.91**
	in stand-by W	0.3	1.3	1.4	1.4
	without contact current W	0.9	2.0	2.8	2.9
	with rated current W	1.7	2.6	3.8	3.5

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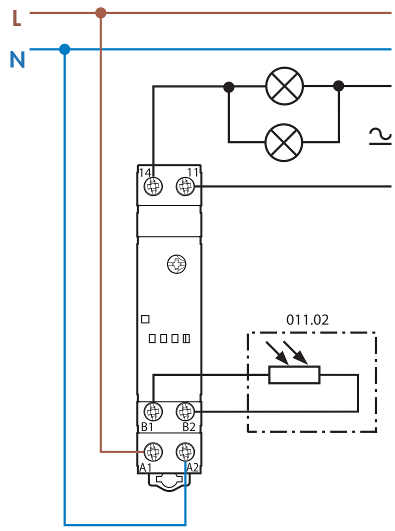
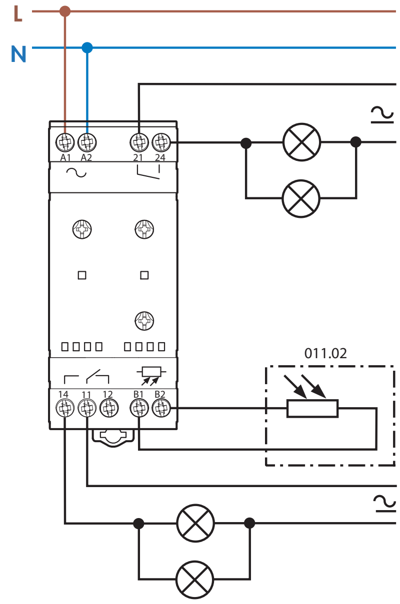
Wiring diagrams

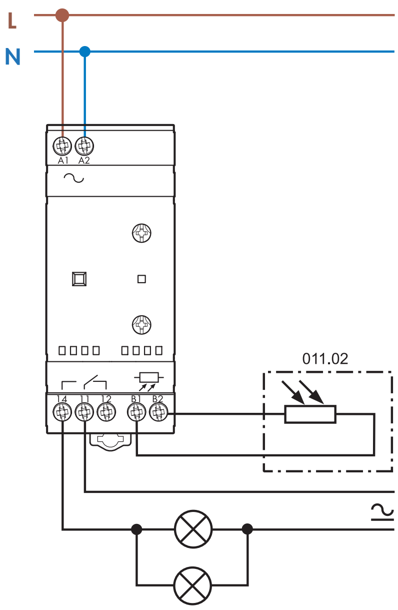
Type 11.31



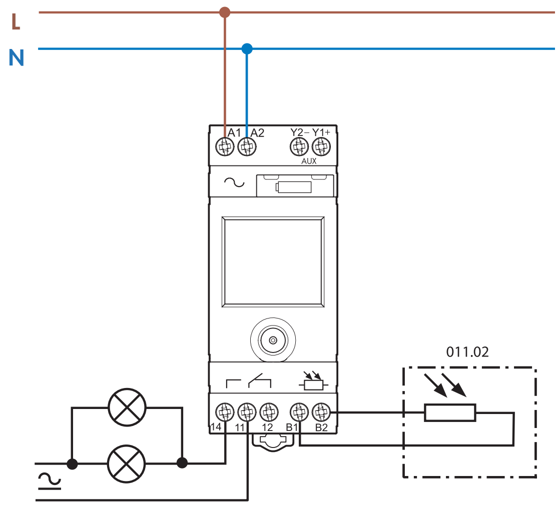
Type 11.42



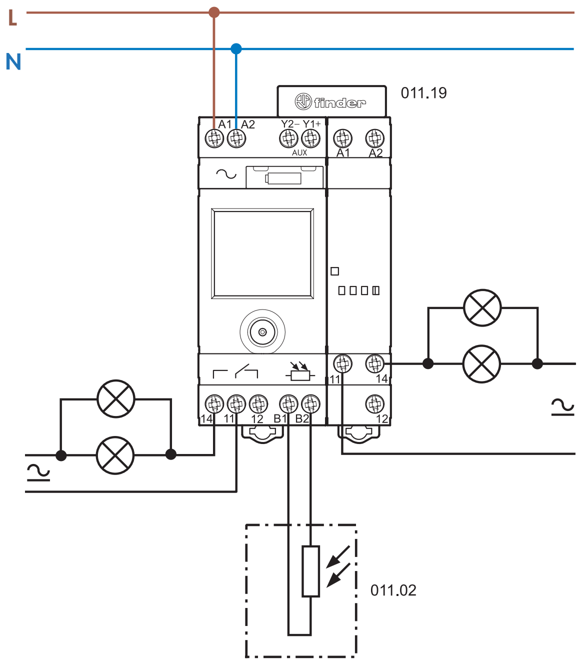
Type 11.41



Type 11.91



Type 11.91 + 19.91

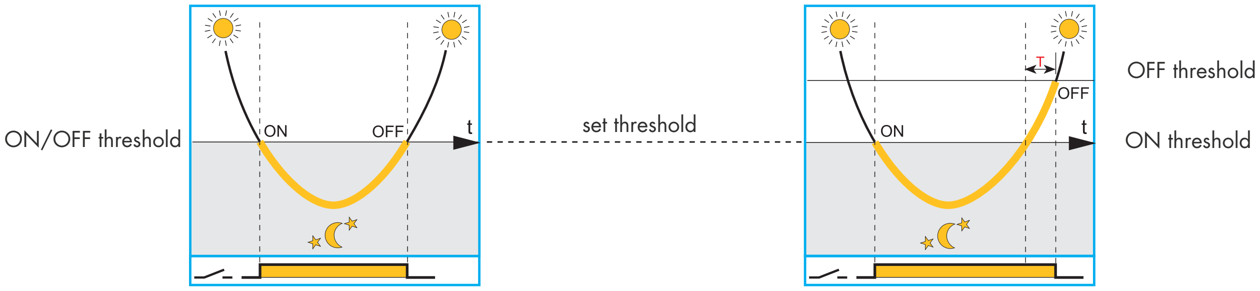


Advantage of the "Zero hysteresis" patented circuit:

ensures reliable switching without wasting energy

TYPE 11.41 "ZERO HYSTERESIS"
LIGHT DEPENDENT RELAYS

TRADITIONAL
LIGHT DEPENDENT RELAYS



Switch OFF level = Switch ON level. Patented "Zero Hyseresis" circuitry ensures reliable switching without wasting energy.

"Traditional" light dependent relays incorporate switching hysteresis to prevent malfunctioning or tripping. This results in an unnecessary delay in switching off, and a resulting waste of energy (over period T).

Brightness of the natural light

The NO of the light dependent relay is closed (light is switched on)

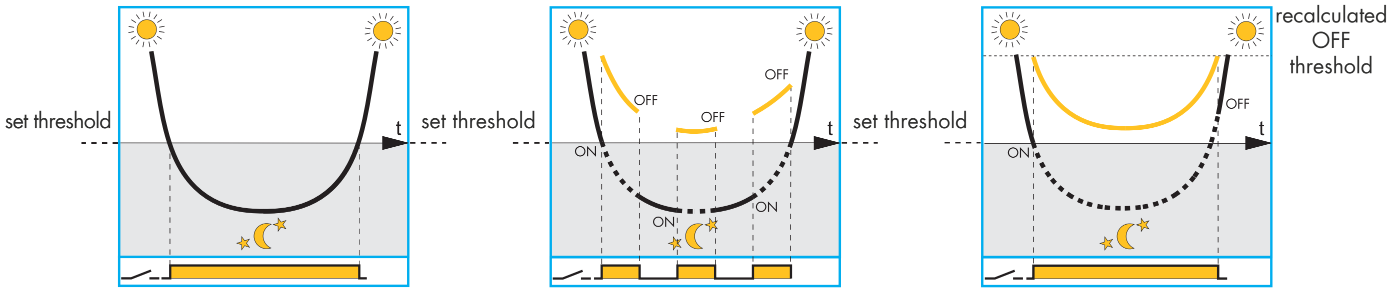
Advantage of the "light feedback compensation" principle:

avoids the effect of the lamps repeatedly "hunting" between On and Off, due to poor installation

Light dependent relay where the lighting being controlled does not influence the light level seen by the light sensor

Traditional light dependent relay where the lighting being controlled influences the light level seen by the light sensor

Type 11.41 and 11.91 light dependent relay with "light feedback compensation"



Correct functioning - provided the light sensor can be shielded from the effects of the controlled lighting switching On and Off

Incorrect functioning where the lamps cycle between On and Off, because their effect is being detected by the light sensor

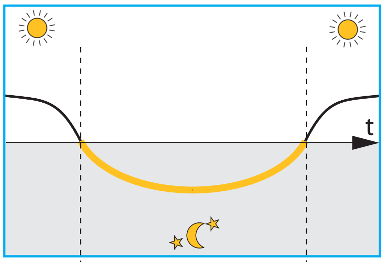
The innovative principle of "light feedback compensation" avoids the annoying and damaging effects of the lamps repeatedly "hunting" between On and Off, due to poor installation

Ambient light level as measured by the light dependent relay's light sensor.

Ambient light + controlled light level as measured by the light dependent relay's light sensor.

Notes
1. It is good practice to try to achieve a correct installation where the light emitted from the lamp(s) does not influence the light level seen by the light sensor, although the "light feedback compensation" principle will help when this is not fully achievable. In this case it should be appreciated that the "light feedback compensation" principle may delay slightly the time of Switch Off - beyond the ideal.
2. The compensation principle is not effective where the combined effect of the ambient light and the controlled lighting exceeds a maximum value (200 lux for the 11.91, 160/2,000 lux for standard/high range of the 11.41).
3. The 11.41 and 11.91 types are compatible with gas discharge lamps that attain full output within 10 minutes, since the electronic circuit monitors lamps' light output over a 10 minute period to achieve a true assessment of its contribution to the overall lighting level.

Functions 11.91



	Switch-OFF time	Switch-ON time		Application examples
11 14	NO	NO		Working as a standard light-dependent relay
	YES	NO	OFF	Working where lighting is not required from 10 PM onwards
	YES	YES	OFF ON	Working where lighting is not required between 1 AM and 5 AM
AUX Y1 Y2				Additional output - light dependent without time switch intervention

All the functions and the values can be set through the front joystick and are displayed on the front LCD.

Display mode

During normal operation, with AC supply connected, the following is displayed:
- the current time
- the current lux level (upper bars)
- the set lux threshold (lower bars)
- the status (open/closed) of the 11-14 output contact
- the "moon" symbol (only if the current lux level is lower than the set threshold). It also indicates that the Auxiliary output is On, although the main output contact 11-14 may be On, depending on the chrono program.
- the "chrono" symbol (only if a switch-off time is enabled).

From **Display mode** it is possible to enter **Program mode** or **Set-up mode** with a short or long (> 2s) press respectively, to the joystick centre. From **Display mode** it is also possible to enter **Hand mode**, where (independently of the lux level and the Chrono program) the 11-14 output contact is forced into the On or Off position with a long (> 2s) press of the joystick upper or lower quadrants, respectively. The "hand" symbol is then displayed. A long press to the opposite quadrant will reset the hand mode.

Program mode

In this mode it is possible to set the lux threshold level, to enable and to set the switch-off time, to enable and to set the switch-on time. With a short press to the joystick right or left quadrant it is possible to progress from one program step to another (accepting the values set). At any program step it is possible to modify the set values with a short press to the joystick upper or lower quadrant. A long (> 1s) press allows the fast increment (or decrement) of values. A short press to the joystick centre will resume the display mode.

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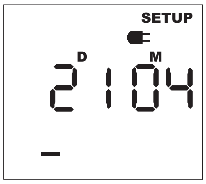


Set-up mode

In this mode it is possible to set the current year, month, day, hour and minute (in this order) and to enable european "Daylight saving".
With a short press to the joystick right or left quadrant it is possible to progress from one set-up step to another (accepting the values set); in any step it is possible to modify the set values with a short press to the joystick upper or lower quadrant. A long (> 1s) press allows the fast increment (or decrement) of values.
A short press to the joystick centre will resume the display mode.
Note: the product is supplied with central european time factory set and "Daylight saving" enabled.

Power-off mode

If the 230 V AC supply is not connected, the relay enters power-off mode and to ensure the long life of the built-in back-up battery only the clock is maintained active. The display turns off and no other operation (including light measurement) is performed.
With a press to the joystick during power-off mode it is possible to "awaken" the device and to enter program or set-up mode (the"electrical plug" symbol is displayed); after about 1 minute inactivity the power-off mode is resumed. Note: with the supply not connected, the program or set-up modes absorb a higher current than the power-off mode, thus influencing the battery life.

Auxiliary output

A solid state output at terminals Y1-Y2 is provided (rated 12 V DC, 80 mA 1 W max.): this can be used with the power module **19.91.9.012.4000** connected by the dedicated **011.19** connector. Or, it is possible to connect a suitable relay (for example, 38-48-49-4C-58-59 interface module) provided the coil is within the rating, and the wiring does not exceed 40 cm length. The auxiliary output is driven exclusively by the light sensor of the device, and is consequently independent of the time switch. With the main contact, this permits a flexible lighting system controlled by the ambient light, both with and without the influence of the time switch function.

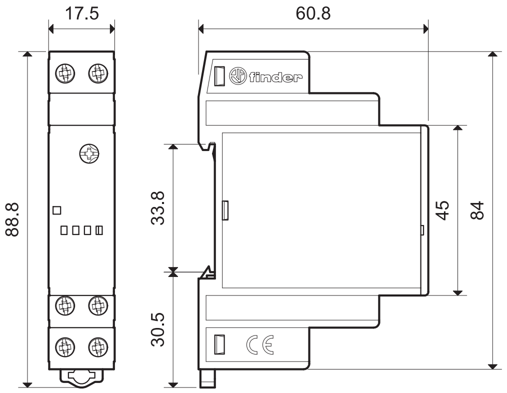
19.91 power module specification		
Contact configuration		1 CO (SPDT)
Rated current/Maximum peak current (I_N/I_{max})	A	16 / 30 (120 A – 5 ms)
Rated voltage/Maximum switching voltage (U_N/U_{max})	V AC	250 / 400
Rated load AC15 (230 VAC)	VA	750
Nominal lamp rating (230 V):	incandescent W	2,000
	compensated fluorescent W	750
Nominal supply voltage (U_N)	V DC	12
Ambient temperature range	°C	–20…+50
Protection category		IP 20

11.31/41/42

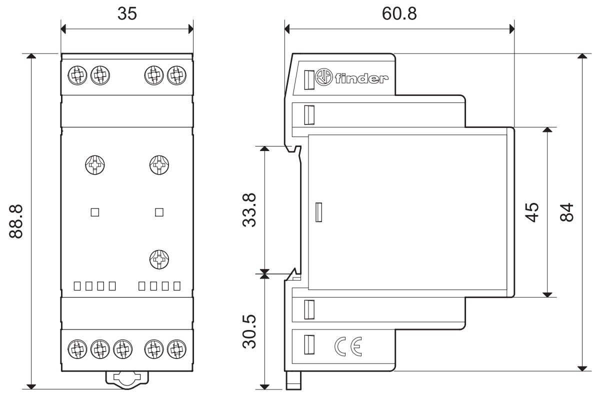
LED	Supply voltage	NO output contact 11.41 / 11.42	NO output contact 11.31
	OFF	Open	Open
	ON	Open	Open
	ON	Open (timing to close in progress)	Open (timing to close in progress)
	ON	Closed	Closed
	ON	Closed (timing to open in progress)	Closed (timing to open in progress)
	ON	Fixed position (On or Off on selector)	–

Outline drawings

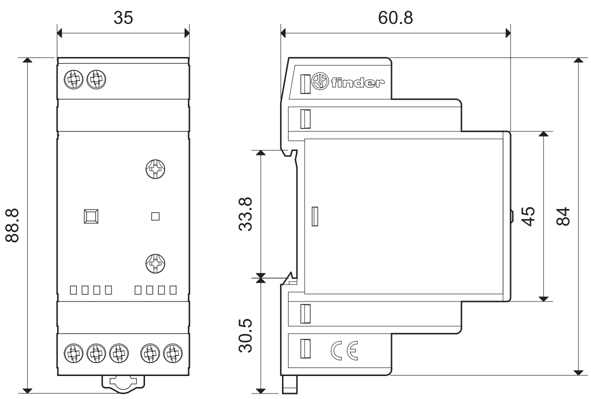
11.31
Screw terminal



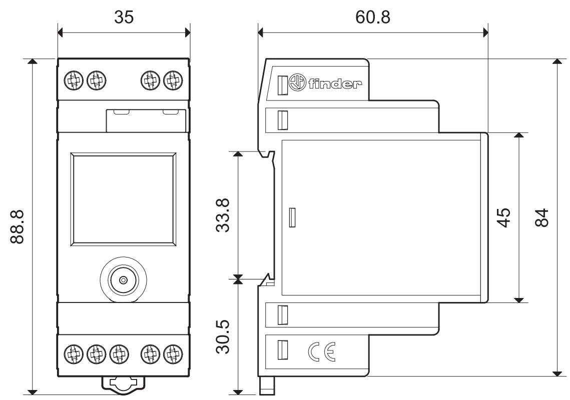
11.42
Screw terminal



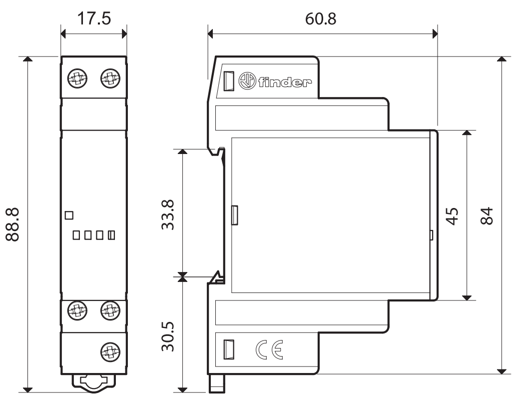
11.41
Screw terminal



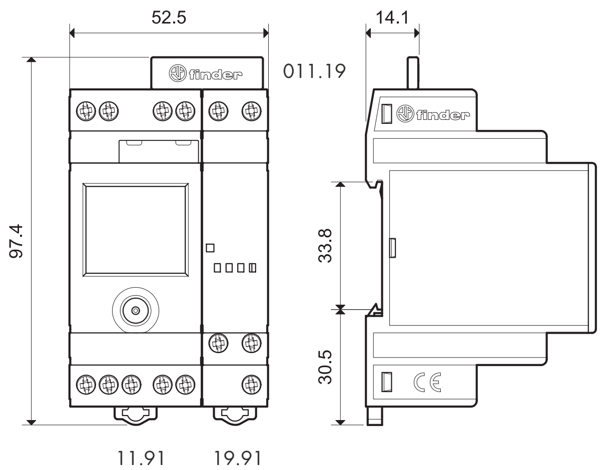
11.91
Screw terminal



19.91 (power module for 11.91)
Screw terminal



11.91 + 19.91 power module
Screw terminal



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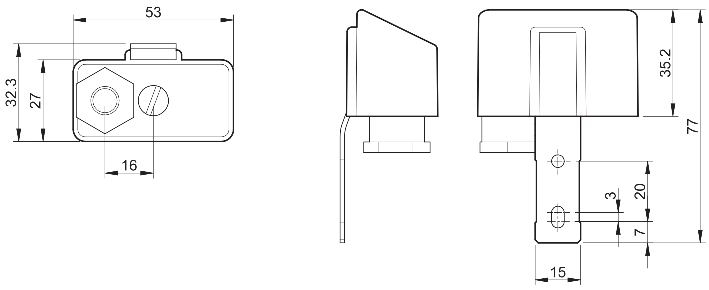
Accessories

011.02

Light sensor (supplied with light dependent relay)	011.02

- Ambient temperature range: –40...+70 °C
- Cadmium free
- Non polarized
- Double insulated with respect to light dependent relay supply
- Not compatible with old 11.01 and 11.71 light dependent relay (to be used with 011.00 photosensor)

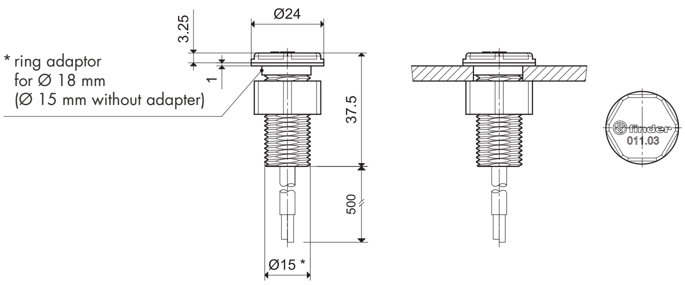


011.03

Flush-mounted light sensor (protection category: IP66/67)	011.03

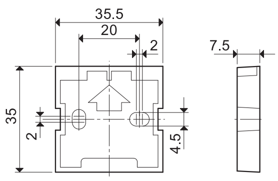
- Ambient temperature range: –40...+70 °C
- Cadmium free
- Non polarized
- Double insulated with respect to light dependent relay supply
- Not compatible with old 11.01 and 11.71 light dependent relay
- Supplied with light dependent relay (packaging code POA)

Connection cable		
Material		PVC, flame retardant
Conductor size	mm^2	0.5
Cable length	mm	500
Cable diameter	mm	5.0
Working voltage	V	300/500
Test voltage, cable	kV	2.5
Max. temperature	°C	+90



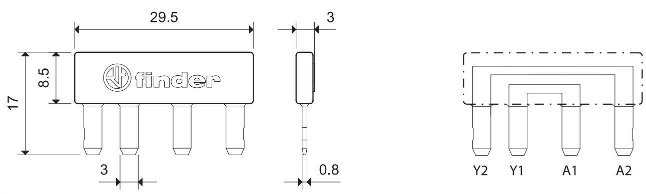
011.01

Adaptor for panel mounting (supplied with light dependent relay), 35 mm wide	011.01



011.19

2-pole connector (for type 11.91 and 19.91 power module)	011.19



For direct connection of 11.91 auxiliary output (Y1-Y2) to 19.91 supply (A1-A2)

060.72

Sheet of marker tags, for types 11.31, 11.41, 11.42, 19.91, plastic, 72 tags, 6x12 mm	060.72

019.01

Identification tag, for types 11.41 and 11.42, plastic, 1 tag, 17x25.5 mm	019.01

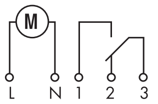
Features

Mechanical time switches
- **Daily time setting** *
- **Weekly time setting** **

- **Type 12.01** - 1 Pole 16 A CO (SPDT) 35.8 mm width
- **Type 12.11** - 1 Pole 16 A NO (SPST-NO) 17.6 mm width
- **Type 12.31-0000** daily - 1 Pole 16 A CO (SPDT)
- **Type 12.31-0007** weekly - 1 Pole 16 A CO (SPDT)
- Minimum time interval setting:
  1h (12.31-0007)
  30 min (12.01)
  15 min (12.11 - 12.31-0000)

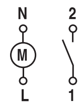
12.01

- Mechanical daily time switch
- 1 CO (SPDT)
- 35 mm rail (EN 60715) mount



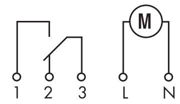
12.11

- Mechanical daily time switch
- 1 NO (SPST-NO)
- 35 mm rail (EN 60715) mount



12.31

- Mechanical daily or weekly
- 1 CO (SPDT)
- Front panel mounting



* Same program every day

**Different program possible for each of the 7 days of the week

For outline drawing see page 10

		12.01	12.11	12.31	
Contact specification					
Contact configuration		1 CO (SPDT)	1 NO (SPST-NO)	1 CO (SPDT)	
Rated current/Maximum peak current	A	16/—	16/30	16/—	
Rated voltage/Maximum switching voltage	V AC	250/—	250/—	250/—	
Rated load AC1	VA	4,000	4,000	4,000	
Rated load AC15 (230 V AC)	VA	750	420	420	
Nominal lamp rating: incandescent (230 V)	W	2,000 (NO contact)	2,000	2,000	
compensated fluorescent (230 V)	W	750 (NO contact)	750	750	
uncompensated fluorescent (230 V)	W	1,000 (NO contact)	1,000	1,000	
halogen (230 V)	W	2,000 (NO contact)	2,000	2,000	
Minimum switching load	mW (V/mA)	1,000 (10/10)	1,000 (10/10)	1,000 (10/10)	
Standard contact material		AgCdO	AgCdO	AgCdO	
Supply specification					
Nominal voltage (U_N)	V AC (50/60 Hz)	230	230	120 - 230	
	V DC	—	—	—	
Rated power AC/DC	VA (50 Hz)/W	2/—	2/—	2/—	
Operating range	AC (50 Hz)	$(0.85...1.1)U_N$	$(0.85...1.1)U_N$	$(0.85...1.1)U_N$	
	DC	—	—	—	
Technical data					
Electrical life at rated load in AC1	cycles	$50 \cdot 10^3$	$50 \cdot 10^3$	$50 \cdot 10^3$	
Type of time switch		daily	daily	daily	weekly
Switching intervals /day		48	96	96	24 (168/week)
Minimum switching interval	min	30	15	15	60
Accuracy	s/day	1.5	1.5	1.5	
Ambient temperature range	°C	–5…+50	–5…+50	–10…+50	
Protection category		IP 20	IP 20	IP 20	
Approvals (according to type)					

12 Series - Time/Astro-Switch 16 A

Features

12.51 - Digital (analogue-style) time switch, daily/weekly programming

- 30 minutes interval setting
- Easily configurable for daily or weekly programming

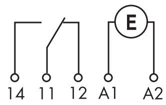
12.81 - Digital astro-switch

- Astro program: calculation of sunrise and sunset times through date, time and location coordinates
- Option for Astro ON period override, by timeswitch
- Location coordinates easily settable for most European countries through post codes
- Offset function: allows programming of switching times offset from the astronomic time (by up to 90 min, in 10 min steps)

- Summer/winter European time
- 1 CO 16 A output contact
- LCD status indication, set-up and programming
- Back-light display
- Internal battery for set-up and programming without supply, easily replaceable from the front
- Protective separation between supply and contacts
- 35 mm rail (EN 60715) mount
- Cadmium free contact material

NEW **12.51**

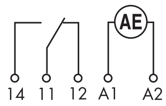
- Digital time switch
- 1 CO (SPDT)
- 35 mm rail (EN 60715) mount



NEW **12.81**

REGISTERED COMMUNITY DESIGN

- Astro- time switch
- 1 CO (SPDT)
- 35 mm rail (EN 60715) mount



For outline drawing see page 10

		12.51	12.81
Contact specification			
Contact configuration		1 CO (SPDT)	1 CO (SPDT)
Rated current/Maximum peak current	A	16 / 30 (120 A – 5 ms)	16 / 30 (120 A – 5 ms)
Rated voltage/Maximum switching voltage	V AC	250/400	250/400
Rated load AC1	VA	4,000	4,000
Rated load AC15 (230 V AC)	VA	750	750
Nominal lamp rating: incandescent (230 V)	W	2,000	2,000
compensated fluorescent (230 V)	W	750	750
energy saving (CFL, LED) (230 V)	W	200	200
halogen (230 V)	W	2,000	2,000
Minimum switching load	mW (V/mA)	1,000 (10/10)	1,000 (10/10)
Standard contact material		$AgSnO_2$	$AgSnO_2$
Supply specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	120 - 230	230
	V DC	—	—
Rated power	VA (50 Hz)/W	6.6/2.9	6.6/2.9
Operating range	AC (50 Hz)	(0.8…1.1)U_N	(0.8…1.1)U_N
	DC	—	—
Technical data			
Electrical life at rated load in AC1	cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Switching intervals		48	—
Minimum switching interval	min	30	—
Accuracy	s/day	1	1
Ambient temperature range	°C	–20…+50	–20…+50
Protection category		IP 20	IP 20
Approvals (according to type)		CE EAC	

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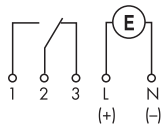
Features

Electronic digital time switches
- Weekly time setting

- **Type 12.21** - 1 Pole 16 A CO (SPDT)
  35.8 mm width
- **Type 12.22** - 2 Pole 16 A CO (DPDT)
  35.8 mm width
- **Type 12.71** - 1 Pole 16 A CO (SPDT)
  17.6 mm width
- Available for 230 V AC or 12, 24 V AC/DC supply
- Minimum time interval setting - 1 minute
- Internal battery for set-up without supply
- Impulse output function:
  - 1s... 59: 59(mm:ss)
- Automatic adjustment for daylight saving
- 35 mm rail (EN 60715) mount

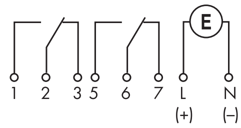
12.21

- Digital weekly time switch
- 1 CO (SPDT)
- 35 mm rail (EN 60715) mount



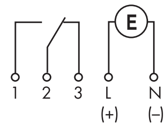
12.22

- Digital weekly time switch
- 2 CO (DPDT)
- 35 mm rail (EN 60715) mount



12.71

- Digital weekly time switch
- 1 CO (SPDT)
- 35 mm rail (EN 60715) mount



For outline drawing see page 10, 11

		12.21		12.22		12.71	
Contact specification							
Contact configuration		1 CO (SPDT)		2 CO (DPDT)		1 CO (SPDT)	
Rated current/Maximum peak current	A	16/30		16/30		16/30	
Rated voltage/Maximum switching voltage	V AC	250/—		250/—		250/—	
Rated load AC1	VA	4,000		4,000		4,000	
Rated load AC15 (230 V AC)	VA	750		750		420	
Nominal lamp rating: incandescent (230 V)	W	2,000 (NO contact)		2,000 (NO contact)		2,000 (NO contact)	
compensated fluorescent (230 V)	W	420 (NO contact)		420 (NO contact)		420 (NO contact)	
uncompensated fluorescent (230 V)	W	1,000 (NO contact)		1,000 (NO contact)		1,000 (NO contact)	
halogen (230 V)	W	2,000 (NO contact)		2,000 (NO contact)		2,000 (NO contact)	
Minimum switching load	mW (V/mA)	1,000 (10/10)		1,000 (10/10)		1,000 (10/10)	
Standard contact material		AgCdO		AgCdO		AgNi	
Supply specification							
Nominal voltage (U_N)	V AC (50/60 Hz)	—	120 - 230	—	120 - 230	—	230
	V AC/DC	12 - 24	—	24	—	24	—
Rated power AC/DC	VA (50 Hz)/W	1.4/1.4	2/—	1.4/1.4	2/—	1.4/1.4	2/—
Operating range	AC (50 Hz)	(0.9…1.1)U_N	(0.85…1.1)U_N	(0.9…1.1)U_N	(0.85…1.1)U_N	(0.9…1.1)U_N	(0.85…1.1)U_N
	DC	(0.9…1.1)U_N	—	(0.9…1.1)U_N	—	(0.9…1.1)U_N	—
Technical data							
Electrical life at rated load in AC1	cycles	$50 \cdot 10^3$		$50 \cdot 10^3$		$50 \cdot 10^3$	
Type of time switch		weekly		weekly		weekly	
Memory locations for switching times *		30		30		30	
Minimum interval setting	min	1		1		1	
Accuracy	s/day	0.5		0.5		0.5	
Ambient temperature range	°C	–30…+55		–30…+55		–30…+55	
Protection category		IP 20		IP 20		IP 20	
Approvals (according to type)							

* Switching times in memory may be used more than once i.e. when selected for different days.

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X-2014, www.findernet.com

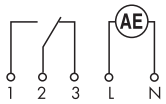
Features

Electronic digital time switches
- weekly time setting

- **Type 12.91...0000 "ZENITH"**
  1 pole 16 A CO (SPDT)
  35.8 mm width
- **Type 12.91...0090 "ZENITH"**
  1 pole 16 A CO (SPDT)
  35.8 mm width
  version for programming via PC by a special Key Memory (included)
- **Type 12.92...0090 "ZENITH"**
  2 pole 16 A CO (DPDT)
  35.8 mm width
  version for programming via PC by a special Key Memory (included)
- **Type 12.92 "ZENITH"**
  2 Pole 16 A CO (DPDT)
  35.8 mm width
- Astro program:
  calculation of sunrise and sunset times through date, time and location coordinates (longitude and latitude)
- Offset function: allows programming of switching times offset (+ or -) from the astronomic time
- Minimum time interval setting - 1 minute
- Internal battery for set-up without supply
- Automatic adjustment for daylight saving
- 35 mm rail (EN 60715) mount

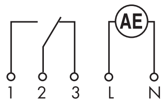
12.91...0000

- Digital weekly time switch
- 1 CO (SPDT)
- 35 mm rail (EN 60715) mount

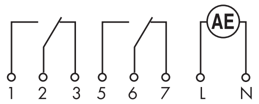


12.91...0090/12.92...0090

- Digital weekly time switch
- Type 12.91: 1 CO (SPDT)
- Type 12.92: 2 CO (DPDT)
- Version for programming via PC by a special key memory
- 35 mm rail (EN 60715) mount



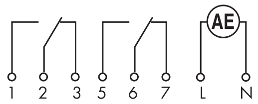
12.91...0090



12.92...0090

12.92

- Digital weekly time switch
- 2 CO (DPDT)
- 35 mm rail (EN 60715) mount



For outline drawing see page 11

		12.91...0000	12.91...0090/12.92...0090	12.92
Contact specification				
Contact configuration		1 CO (SPDT)	1 CO (SPDT) / 2 CO (DPDT)	2 CO (DPDT)
Rated current/Maximum peak current	A	16/30	16/30	16/30
Rated voltage/Maximum switching voltage	V AC	250/—	250/—	250/—
Rated load AC1	VA	4,000	4,000	4,000
Rated load AC15 (230 V AC)	VA	750	750	750
Nominal lamp rating: incandescent (230 V)	W	2,000 (NO contact)	2,000 (NO contact)	2,000 (NO contact)
compensated fluorescent (230 V)	W	420 (NO contact)	420 (NO contact)	420 (NO contact)
uncompensated fluorescent (230 V)	W	1,000 (NO contact)	1,000 (NO contact)	1,000 (NO contact)
halogen (230 V)	W	2,000 (NO contact)	2,000 (NO contact)	2,000 (NO contact)
Minimum switching load	mW (V/mA)	1,000 (10/10)	1,000 (10/10)	1,000 (10/10)
Standard contact material		$AgSnO_2$	$AgSnO_2$	$AgSnO_2$
Supply specification				
Nominal voltage (U_N)	V AC (50/60 Hz)	230	230	230
Rated power AC/DC	VA (50 Hz)/W	2/—	2/—	2/—
Operating range	AC (50 Hz)	$(0.85...1.1)U_N$	$(0.85...1.1)U_N$	$(0.85...1.1)U_N$
Technical data				
Electrical life at rated load in AC1	cycles	$50 \cdot 10^3$	$50 \cdot 10^3$	$50 \cdot 10^3$
Type of time switch		weekly	weekly	weekly
Memory locations for switching times *		60	60	60
Minimum interval setting	min	1	1	1
Accuracy	s/day	0.5	0.5	0.5
Ambient temperature range	°C	–30...+55	–30...+55	–30...+55
Protection category		IP 20	IP 20	IP 20
Approvals (according to type)		CE EAC		

* Switching times in memory may be used more than once i.e. when selected for different days.

Ordering information

Example: 12 series digital/analogue time switch, 1 CO 16 A contact, 230 V AC supply

1	2	.	5	1	.	8	.	2	3	0	.	0	0	0	0

Series

Type
0 = Daily, 35.8 mm wide
1 = Daily, 17.5 mm wide
3 = Daily or Weekly, 72x72 mm
5 = Digital/analogue time switch, 35 mm wide
2 = Weekly, 35.8 mm wide
7 = Weekly, 17.5 mm wide
8 = Astro-switch, 35 mm wide
9 = Weekly "Astro", 35.8 mm wide

No. of poles
1 = 1 CO (SPDT), 16 A
2 = 2 CO (DPDT), 16 A (type 12.22 and 12.92)

Option
0 = With power back-up
1 = Without power back-up (type 12.11)

Supply voltage
012 = 12 V AC/DC
024 = 24 V AC/DC
120 = 120 V AC
230 = 230 V AC

Supply version
0 = AC (50/60 Hz)/DC (types 12.21.0.012, 12.21.0.024, 12.22.0.024, 12.71.0.024)
8 = AC (50/60 Hz)

Option
0 = Standard
0 = Daily only for 12.31
7 = Weekly only for 12.31

Special version
0 = Standard
9 = Programming via PC type 12.91.8.230.0090 type 12.92.8.230.0090

Technical data

Insulation		12.51, 12.81	12.01, 12.11, 12.31	12.21, 12.22, 12.71, 12.91, 12.92
Dielectric strength between supply and contacts	VAC	4,000	4,000	4,000
Dielectric strength between open contacts	VAC	1,000	1,000	1,000
Rated impulse voltage (between supply and contacts)	kV/(1.2/50) μs	6	6	6
Rated impulse voltage (between open contacts)	kV/(1.2/50) μs	1.5	1.5	1.5

EMC specifications				
Type of test		**Reference standard**		
Electrostatic discharge	contact discharge	EN 61000-4-2	4 kV	6 kV
	air discharge	EN 61000-4-2	8 kV	8 kV
Radiated electromagnetic field (80…1,000 MHz)		EN 61000-4-3	10 V/m	10 V/m
Fast transients (burst 5/50 ns, 5 and 100 kHz)		EN 61000-4-4	4 kV	4 kV
Voltage pulses on supply terminals	common mode	EN 61000-4-5	4 kV	2 kV
(surge 1.2/50 μs)	differential mode	EN 61000-4-5	4 kV	2 kV
Radiofrequency common mode voltage (0.15…80 MHz)		EN 61000-4-6	10 V	10 V
Voltage dips	70 % U_N , 40 % U_N	EN 61000-4-11	10 cycles	10 cycles
Short interruptions		EN 61000-4-11	10 cycles	10 cycles
Radio frequency conducted emissions	0.15…30 MHz	EN 55014	class B	class B
Radiated emissions	30…1,000 MHz	EN 55014	class B	class B

Terminals					
Screw torque	Nm	0.8	1.2		
		12.51, 12.81		**12.01, 12.11, 12.31**	
Max. wire size		mm^2	AWG	mm^2	AWG
	solid cable	1 x 6 / 2 x 4	1 x 10 / 2 x 12	1 x 6 / 2 x 4	1 x 10 / 2 x 12
	stranded cable	1 x 4 / 2 x 2.5	1 x 12 / 2 x 14	1 x 6 / 2 x 2.5	1 x 10 / 2 x 14

		12.21, 12.22, 12.71, 12.91, 12.92	
Max. wire size		mm^2	AWG
	solid cable	1 x 6 / 2 x 4	1 x 10 / 2 x 12
	stranded cable	1 x 6 / 2 x 2.5	1 x 10 / 2 x 14
Wire strip length	mm	9	

Other data				
Power back-up (Battery life)		6 years (12.51, 12.81, 12.21, 12.22, 12.71, 12.91, 12.92)		
Battery type		CR 2032, 3V, 230 mAh		
Power back-up		100 h (12.01, 12.11, 12.31 - following 80 h continuous energisation)		
Power lost to the environment		**12.51, 12.81**	**12.01, 12.11, 12.31**	**12.21, 12.22, 12.71, 12.91, 12.92**
	in stand-by W	1.4	—	—
	without contact current W	2.9	1.5	2
	with rated current W	3.5	2.5	3 (for 1 pole)/4 (for 2 pole)

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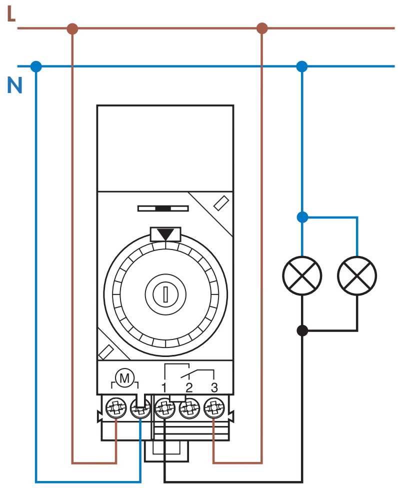
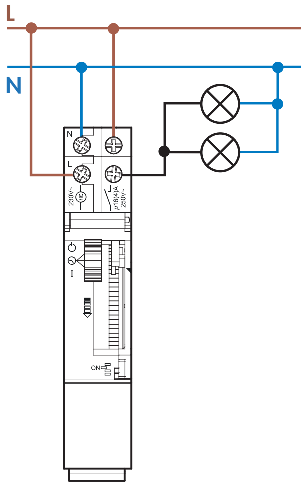
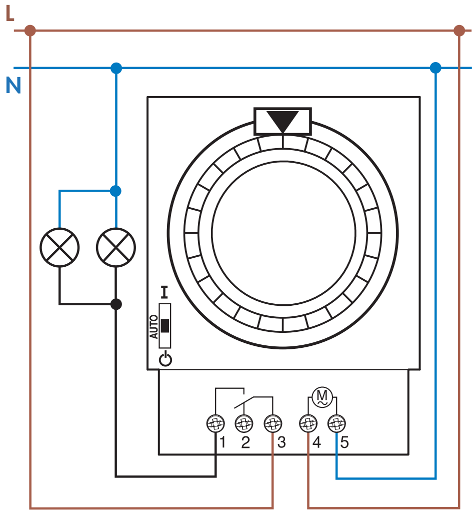
Wiring diagrams



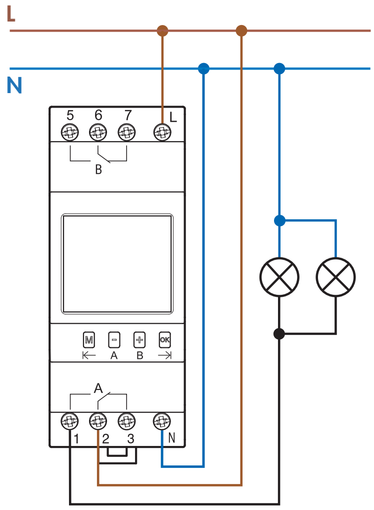
Type 12.01
Selector switch:
⏻ = Permanently OFF
AUTO = Automatic
I = Permanently ON



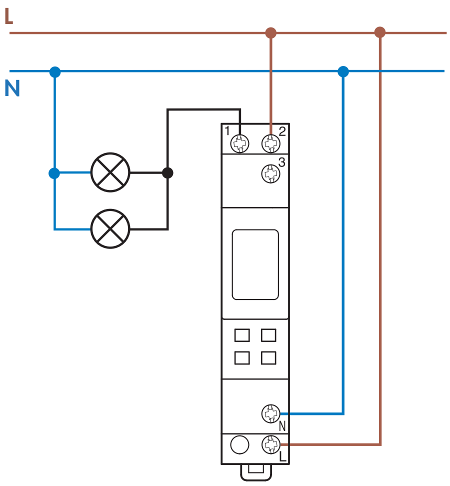
Type 12.11
Selector switch:
⏻ = Permanently OFF
⏲ = Automatic
I = Permanently ON



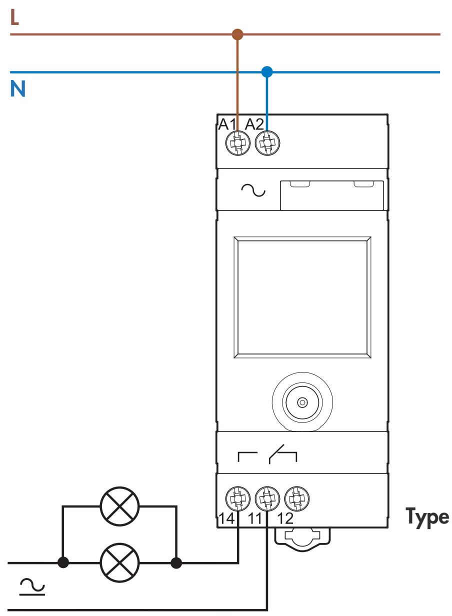
Type 12.31



Type 12.21
12.22
12.91
12.92



Type 12.71



Type 12.51
12.81

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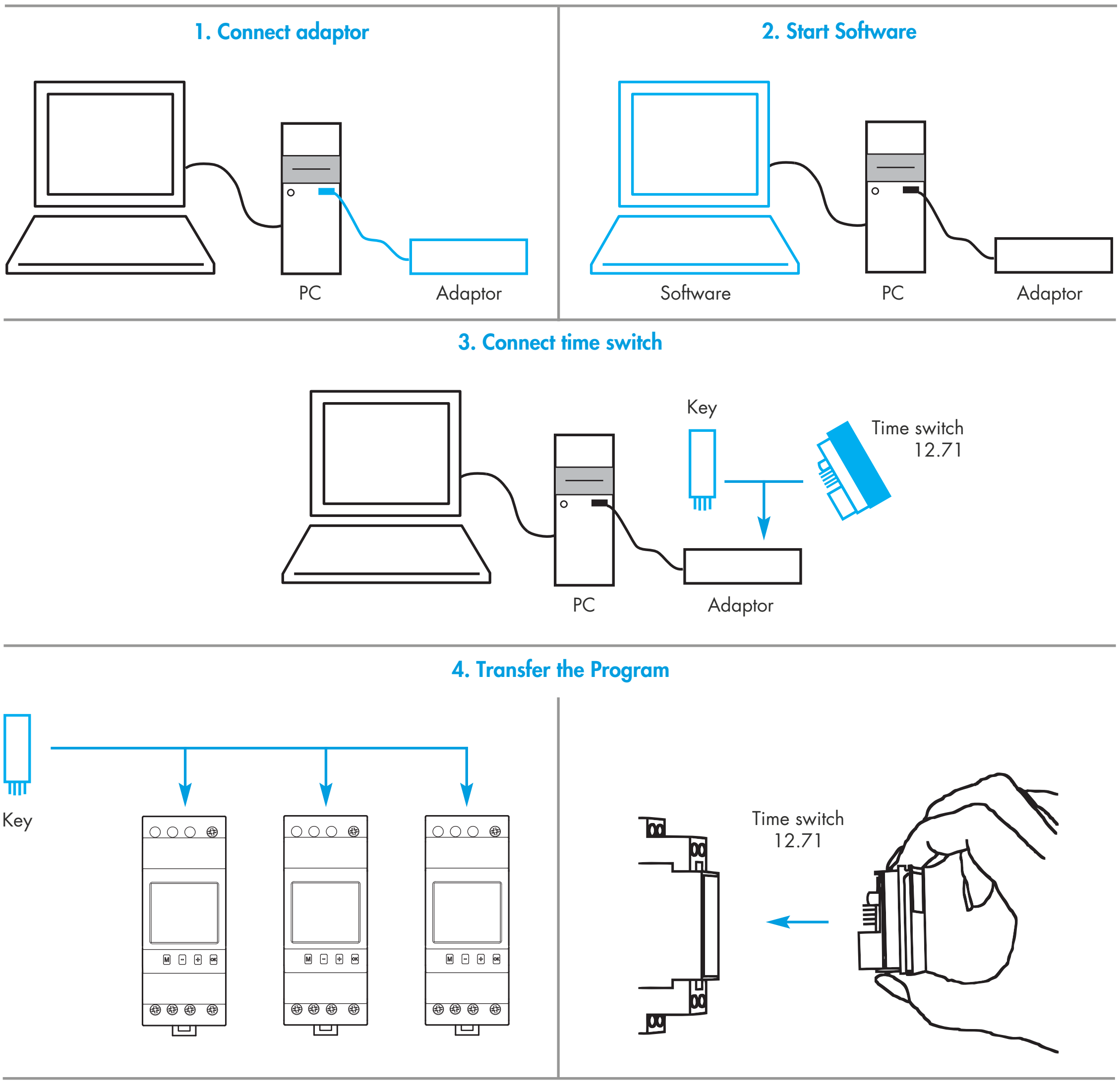
Accessories for type 12.71 and 12.91

012.90

PC programming kit for type 12.71, 12.91.8.230.0090, 12.92.8.230.0090	012.90

This special PC programming kit, permits fast and easy programming of the Time Switch with a PC or Laptop.
The program transfer can be done by the special Key Memory (supplied with the 12.91.8.230.0090, 12.92.8.230.0090) or directly by the Time switch 12.71.
Contents: Programming adaptor, USB cable (1.8 meter length), Software.



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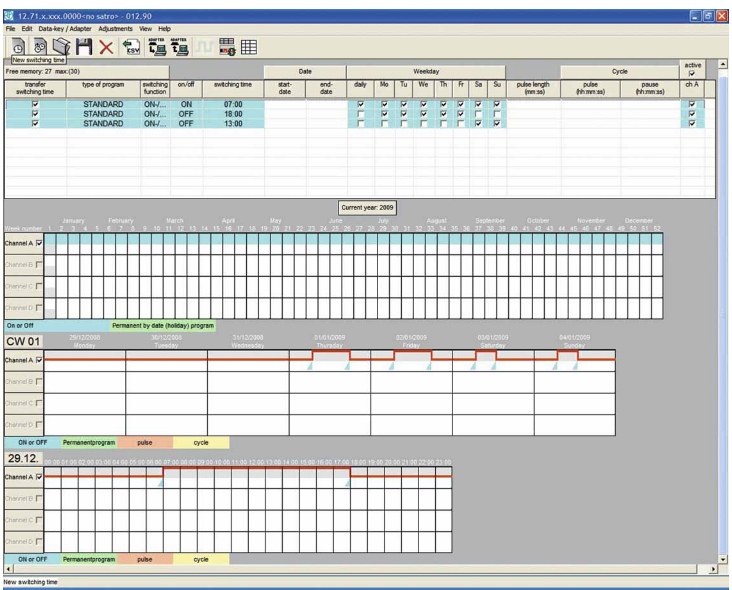
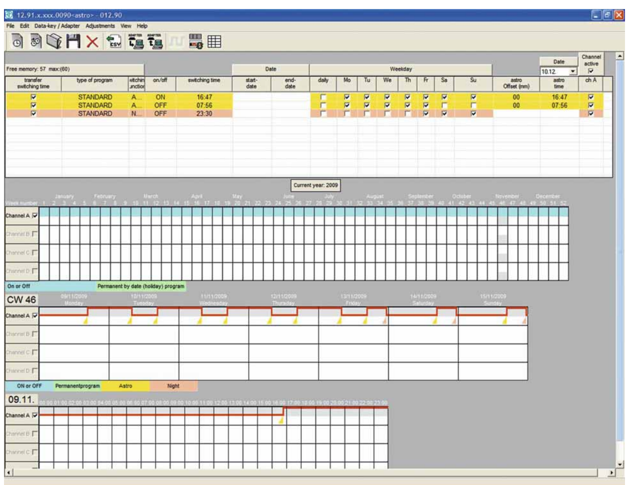
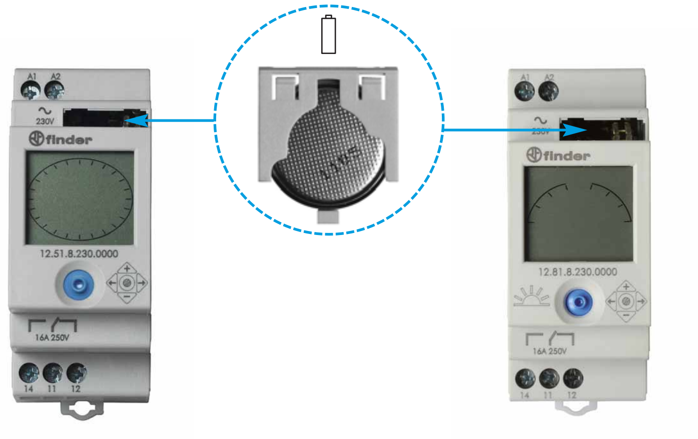
PC Programming software

Easy and intuitive software to create programs for the Time Switch, in a few fast steps. For Windows 7, 8, 2000/XP/Vista.





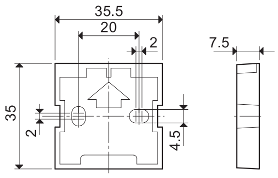
Battery replacement type 12.51 and 12.81



Accessories type 12.51 and 12.81

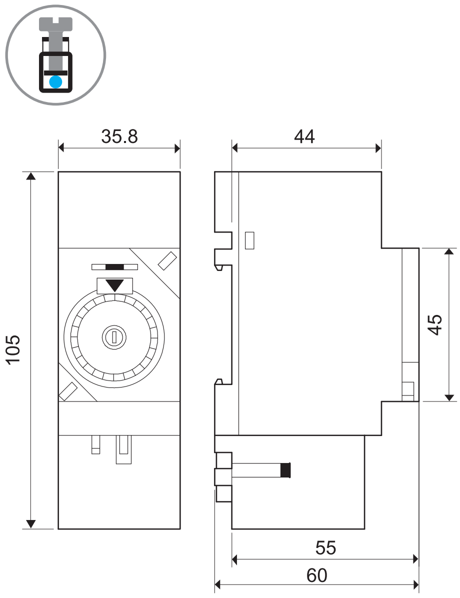
011.01

Adaptor for panel mounting, 35 mm wide	011.01

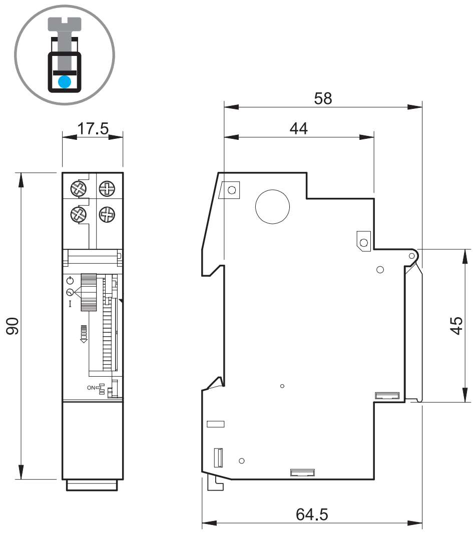


Outline drawings

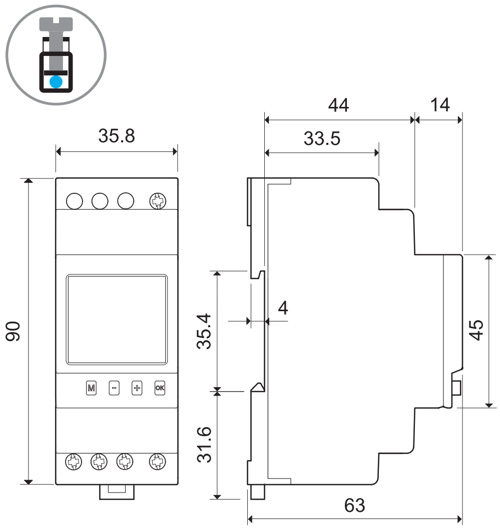
12.01
Screw terminal



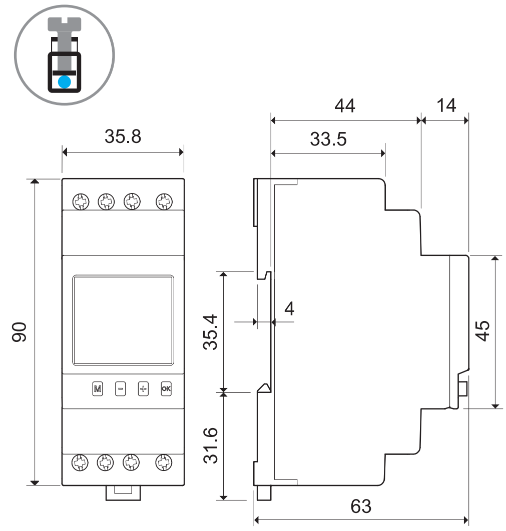
12.11
Screw terminal



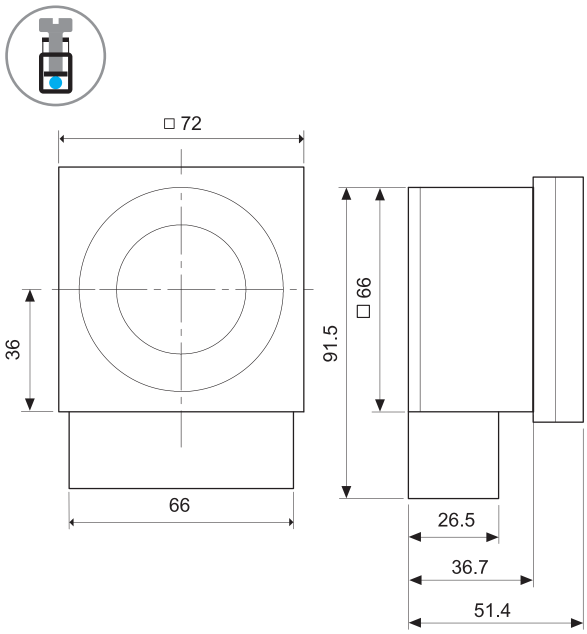
12.21
Screw terminal



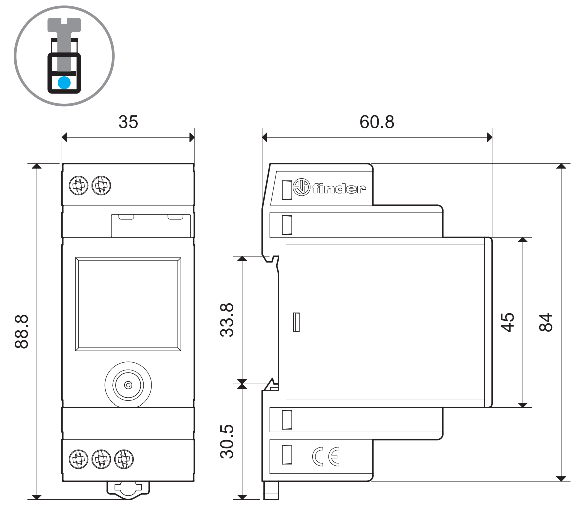
12.22
Screw terminal



12.31
Screw terminal

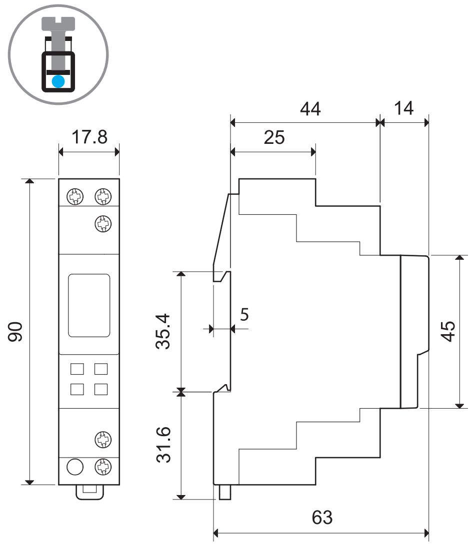


12.51/12.81
Screw terminal

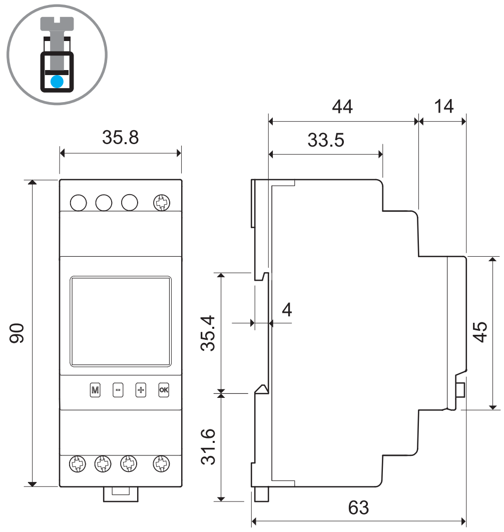


Outline drawings

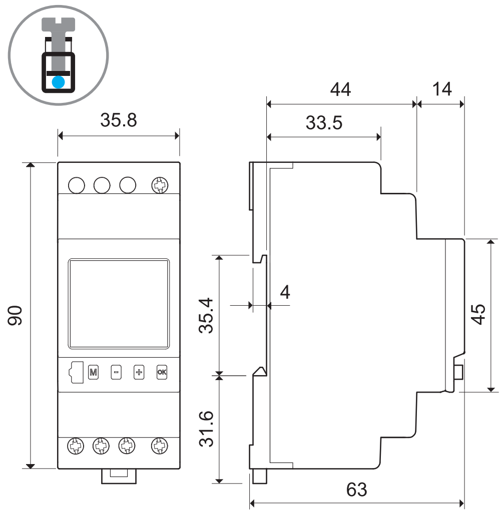
12.71
Screw terminal



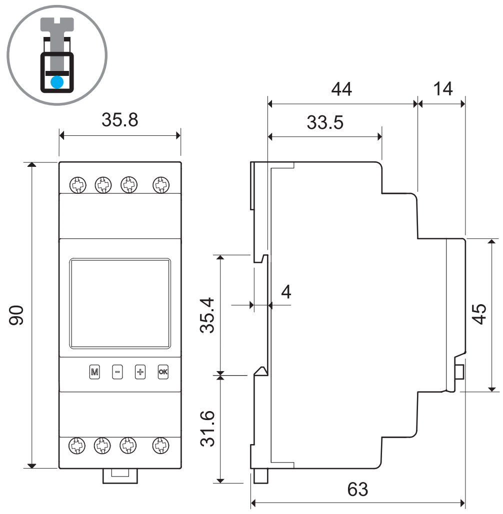
12.91...0000
Screw terminal



12.91...0090 / 12.92...0090
Screw terminal



12.92
Screw terminal



Functions type 12.51

All the functions and the values can be set through the joystick and are displayed on the LCD.

Display mode

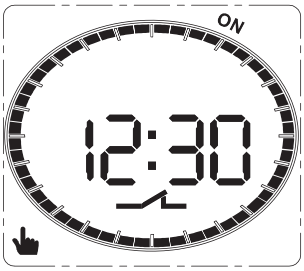
During normal operation, with AC supply connected, the following is displayed:

- the current time (hours and minutes)
- the status (ON/OFF and symbol of contact open/closed) of the 11-14 output contact
- the program for the current day (each solid segment represents an half-hour interval set to ON)

From **Display mode** it is possible to enter in **Program mode** or **Setup mode** respectively with a short or long (> 2s) press to the joystick centre.

Manual mode

From **Display mode** it is also possible to enter in **Manual mode**, where (independently from the program) the 11-14 output contact can be forced into the ON or OFF position with a long (> 2s) press to the joystick + or − directions, respectively. The "hand" symbol is then displayed.
A long press in the opposite direction will exit the manual mode.



Setup mode

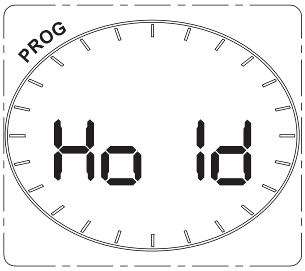
In this mode it is possible to set (in the following order):

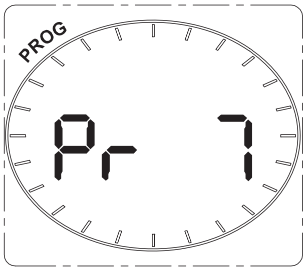
- daily/weekly function
- current year
- current day
- current month
- current hour
- current minute
- enable/disable european summer time.

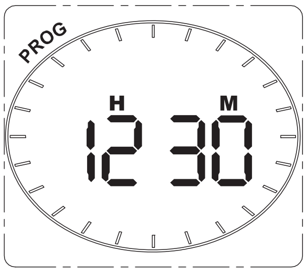
With a short press of the joystick → or ←, it is possible to pass from one setup step to another (confirming the set values); in any step it is possible to modify the set values with a short press to the joystick + or −. A sustained (> 1s) press results in the fast increasing (or decreasing) of values.

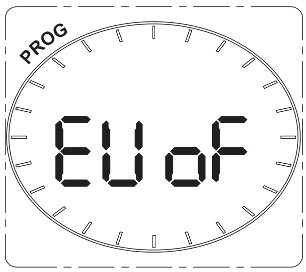
A short press to the joystick centre will restore the Display mode.

Note: the product is supplied factory set to Central Europe time with european summer time enabled.



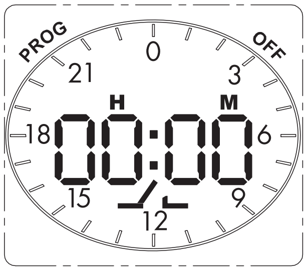


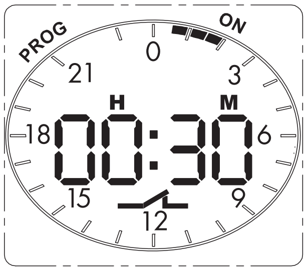




Functions type 12.51

Program mode (daily)





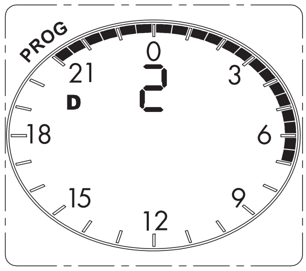
In this mode it is possible to set the "pattern" of time segments, which define the ON time of the 11-14 output contact. This "pattern" will be the same for all days of the week (daily).

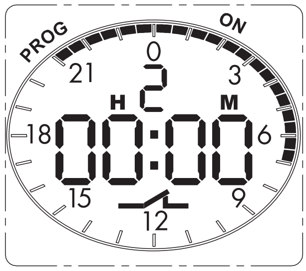
Entering Programming mode (from Display mode) with a short press to takes the digital time to 00:00 (and any previously programmed segment pattern is displayed). Stepping backwards or forwards in time displays the appropriate segment time and the appropriate open or closed contact status for that time segment.

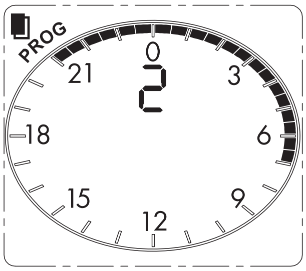
At any step it is possible to change the segment status with a short press to the joystick (for ON) or (for OFF) as appropriate, and this also automatically advances the time to the next segment, and always in a clockwise direction. If the joystick is pressed several times in, say, the direction then each successive segment will assume the ON status. If it is then pressed several times in the direction then each successive segment will assume the OFF status. This allows the rapid setting of many consecutive segments with the same status.

A short press to the joystick centre will restore the display to the Display mode.

Program mode (weekly)







In this mode it is possible to set a different "pattern" of time segments for each day of the week (weekly).

Entering Programming mode (from Display mode) with a short press to takes the display to the programming mode, for the current day. With a subsequent short press to or it is possible to pass from one day to another (Monday is day 1).

With the desired day selected it is possible to enter the programming mode for that day by pressing .

Program the segments for that day by following the same procedure as described above for daily mode. When all 48 segments have been set, accept with a short press to . Then progress to the next day by pressing the joystick in the or direction. Repeat programming for the next day, and then repeat for other remaining days.

At any time return to the Display mode with a short press to the joystick centre .

COPY FUNCTION

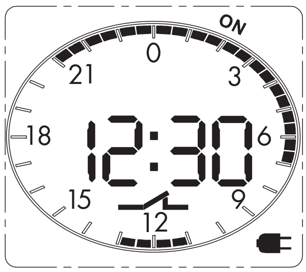
View the particular day to be copied (using or as described above) and copy with a short press to (the "copy icon" will then appear).

Then select another day, using or , and paste the copied program with a short press to .

This can be repeated for other days.

A short press to the joystick centre , or , will exit the copy function.

Power-save mode



If the 230 V AC supply is not connected, the time switch enters power-save mode: only the clock is maintained active whilst the display turns off so as to guarantee a long life for the built-in back-up battery.

With a press to the joystick it is possible to "awake" the device and enter Display mode (with the "plug" symbol displayed). A further press to will enter the program or set-up mode as explained in the Display mode section above.

After about 1 minute of inactivity the power-save mode will start again. During program or set-up the current absorption is higher than in power-save mode, thus influencing the battery life.

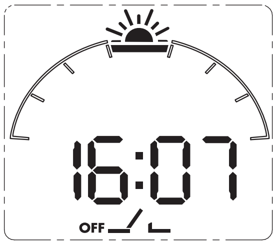
In this mode the display back-light is not active. It is activated following a press to the joystick only with the 230 V AC supply connected, but after about 1 minute of inactivity the display back-light will turn off, and to activate it again it is necessary to press the joystick again.

Functions type 12.81

All the functions and the values can be set through the joystick and are displayed on the LCD.

Display mode

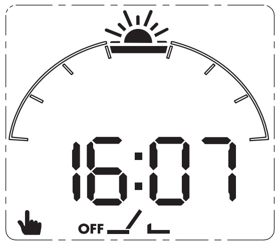
During normal operation, with AC supply connected, the following is displayed:
- the current time (hours and minutes)
- the status (ON/OFF and symbol of contact open/closed) of the 11-14 output contact



From **Display mode** it is possible to enter in **Program mode** or **Setup mode** respectively with a short or long (> 2s) press to the joystick centre ◉.

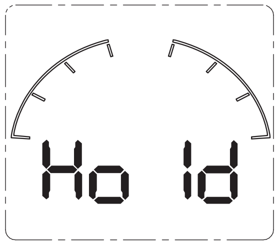
Manual mode

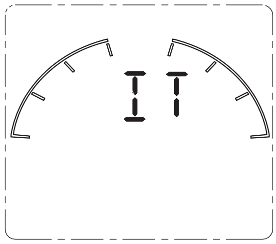
From **Display mode** it is also possible to enter in **Manual mode**, where (independently from the program) the 11-14 output contact can be forced into the ON or OFF position with a long (> 2s) press to the joystick + or − directions, respectively. The "hand" symbol is then displayed.
A long press in the opposite direction will exit the manual mode.



Setup mode

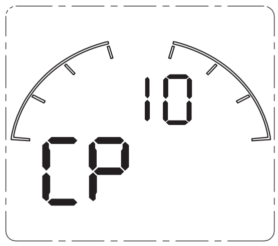
In this mode it is possible to set (in the following order):
- country (using Internet websites extension, e.g. IT, DE, FR..)
- post-code (CP, setting only the first 2 digits, 00 to 99 - or letters for UK)
- current year
- current day
- current month
- current hour
- current minute
- enable/disable european summer time.



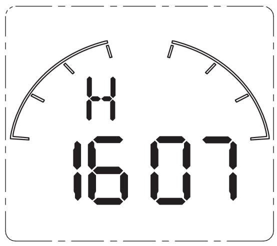


From the Display mode - Enter the Setup mode with a long press (> 2 s) to ◉.
With a short press to → or ←, it is then possible to pass from one setup step to another (confirming the set values). In any step it is possible to modify the set values with a short press to + or −. A sustained (> 1s) press results in the fast increment (or decrement) of values.

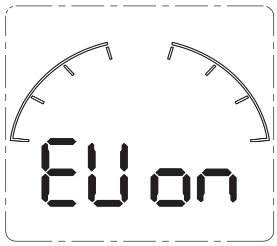
A short press to the joystick centre ◉ will restore the Display mode.



If the "country" is set to "Coor" (between IT and HU) or if the "postal code" is set to "Coor" (between 99 and 00*), press → to view the coordinates of latitude and use + or − to set between 30 and 64 ° North.
Press → again to view the coordinates of longitude and use + or − to set between 15 ° West and 50 ° East). Proceed in a similar way to set the time zone "Gmt" (00 corresponds to Greenwich Mean Time, 01 Central Europe, 02 Eastern Europe, and 03 European Russia), and then continue with setting year, day, month etc..
*or between ZE and AB for UK post codes.



Note: the product is supplied with the following factory settings:
- Central Europe time,
- european summer time enabled,
- country Italy,
- post-code 00 (the capital city Rome).



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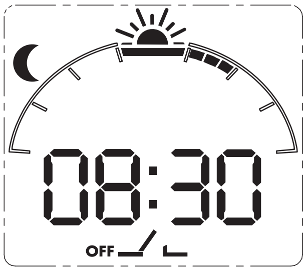
Functions type 12.81

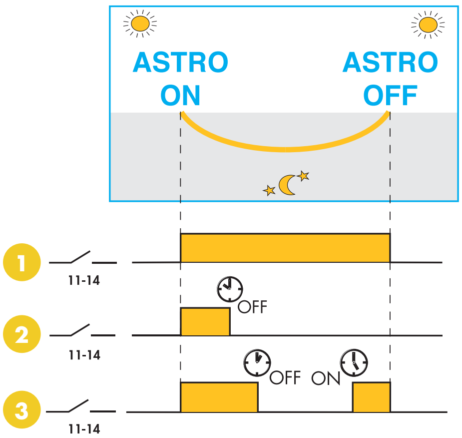
Program mode (advance/retard setting)



In this mode it is possible to set independently:
- the advance (or the retard) of the light turn-on time in the evening with respect to the "astronomic" sunset time.
- the advance (or the retard) of the light turn-off time in the morning with respect to the "astronomic" sunrise time;

From the Display mode - A short press of the joystick will display the "astronomic" sunset time, indicated by the (clockwise) transition from to ("ON" and closed contact symbols displayed).
A short press to or will retard or advance the switch ON time about the astronomic time in 10 minute steps (up to a maximum of 90 min.).
Press to display the "astronomic" sunrise time, indicated by the (clockwise) transition from to ("OFF" and open contact symbols displayed). Again, a short press to or will retard or advance the switch OFF time about the "astronomic" time, in 10 minute steps.
At this point, either exit (to Display mode) with a short press to , or continue to set the **Astro ON period override time(s)** with a short press to .
Set the OFF time using or . A further short press to will display the ON time which again can be set using or .
Note: setting "–:–" for either OFF or ON means the function is inoperative.
Continuing to press will cycle through the "sunset" / "sunrise" / "OFF" / "ON" settings in turn.
A short press to at any time will return the display to Display mode.

Note 1: The effect of the retard/advance settings is valid for all days. That is; lights will, for example, always turn-on every day for 30 minutes before the "astronomic" sunset time.
Note 2: The effect of the On period override settings is also valid for all days - but also see Note 3 by the function diagrams.

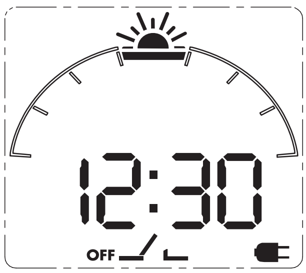


*Note 3: Depending on the time of year (summer specifically) it may be that the override ON time will fall after the AstroOFF time. In this case, the output switches off at the Astro OFF time and the override ON time is ignored.

The Override feature permits the 12.81 three different ways of functioning:

1. Classic function where the **AstroON** and **AstroOFF** times are determined by the geographic coordinates. These times vary every day.
2. Functions such that the output turns on according to the **AstroON** time and turns off according to the clock off-time OFF . Application example: shop window lighting on by **AstroON** at sunset and off OFF at 00:30 .
3. Functions such that the output turns on according to the **AstroON** time and turns off according to the clock off-time OFF, and then turns back on at the clock on-time ON (for the remainder of the ASTRO time period). Application example: company car park lighting, on by **AstroON** at sunset, off end of the evening shift at 23:00 OFF. On again at the beginning of the morning shift at 5:00 ON and off automatically by AstroOFF*.

Power-save mode



If the 230 V AC supply is not connected, the time switch enters power-save mode: only the clock is maintained active whilst the display turns off so as to guarantee a long life for the built-in back-up battery.
With a press to the joystick it is possible to "awake" the device and enter Display mode (with the "plug" symbol displayed). A further press to will enter the program or set-up mode as explained in the Display mode section above.
After about 1 minute of inactivity the power-save mode will start again. During program or set-up the current absorption is higher than in power-save mode, thus influencing the battery life.
In this mode the display back-light is not active. It is activated following a press to the joystick only with the 230 V AC supply connected, but after about 1 minute of inactivity the display back-light will turn off, and to activate it again it is necessary to press the joystick again.
Note: the output relay only functions if the power supply is connected.

14 Series - Electronic staircase timer 16 A

Features

Range of electronic staircase timers

- 17.5 mm wide
- Time setting from 30 seconds to 20 minutes
- “Zero crossing” load switching
- “Switch-off early warning” - model 14.01
- Suitable for 3 or 4 wire systems, with automatic recognition
- Compatible with movement detectors (18 series)
- LED status indicators
- Cadmium free contact material
- Can be used with illuminated push - buttons
- “Blade + cross” - both flat blade and cross head screw drivers can be used to adjust the function selector, the timing trimmer, and to disengage the 35 mm rail mounting clip
- European Patent

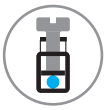
14.01

- 6 functions
- 1 NO (SPST-NO)
- 35 mm rail (EN 60715) mount

14.71

- 3 functions
- 1 NO (SPST-NO)
- 35 mm rail (EN 60715) mount

14.01/71
Screw terminal



For outline drawing see page 7

		14.01	14.71
Contact specification			
Contact configuration		1 NO (SPST-NO)	1 NO (SPST-NO)
Rated current/Maximum peak current	A	16/30 (120 A - 5 ms)	16/30 (120 A - 5 ms)
Rated voltage/Maximum switching voltage	V AC	230/—	230/—
Rated load AC1	VA	3,700	3,700
Rated load AC15 (230 V AC)	VA	750	750
Nominal lamp rating: 230V incandescent/halogen	W	3,000	3,000
fluorescent tubes with electronic ballast	W	1,500	1,500
fluorescent tubes with electromechanical ballast	W	1,000	1,000
CFL	W	600	600
230V LED	W	600	600
LV halogen or LED with electronic ballast	W	600	600
LV halogen or LED with electromechanical ballast	W	1,500	1,500
Minimum switching load	mW (V/mA)	1,000 (10/10)	1,000 (10/10)
Standard contact material		$AgSnO_2$	$AgSnO_2$
Supply specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	230	230
	V DC	—	—
Rated power	VA (50 Hz)/W	3/1.2	3/1.2
Operating range	AC (50 Hz)	$(0.8…1.1)U_N$	$(0.8…1.1)U_N$
	DC	—	—
Technical data			
Electrical life at rated load in AC1	cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Delay setting	min	0.5…20	0.5…20
Max no. of illuminated push-button (≤ 1 mA)		30	30
Maximum impulse duration		continuous	continuous
Ambient temperature range	°C	–10…+60	–10…+60
Protection category		IP 20	IP 20
Approvals (according to type)			

14 Series - Electronic staircase timer 16 A

Features

Range of electronic staircase timers

- 17.5 mm wide
- Time setting from 30 seconds to 20 minutes
- "Zero crossing" load switching
- Wiring compatible with mechanical versions and with old type (low emission) illuminated pushbuttons
- Suitable for 3 or 4 wire systems, via "pushbutton configuration"
- 110...125 V AC supply version available (14.81)
- Cadmium free contact material
- Can be used with illuminated push - buttons
- "Blade + cross" - both flat blade and cross head screw drivers can be used to adjust the function selector, the timing trimmer, and to disengage the 35 mm rail mounting clip

14.81

- Mono-function
- 1 NO (SPST-NO)
- 35 mm rail (EN 60715) mount
- All terminals on same side

14.91

- Mono-function
- 1 NO (SPST-NO)
- 35 mm rail (EN 60715) mount
- 3 terminals, on same side

14.81/91
Screw terminal

For outline drawing see page 7

		14.81	14.91
Contact specification			
Contact configuration		1 NO (SPST-NO)	1 NO (SPST-NO)
Rated current/Maximum peak current	A	16/30 (120 A - 5 ms)	16/30 (120 A - 5 ms)
Rated voltage/Maximum switching voltage	V AC	230/—	230/—
Rated load AC1	VA	3,700	3,700
Rated load AC15 (230 V AC)	VA	750	750
Nominal lamp rating: 230V incandescent/halogen	W	3,000	3,000
fluorescent tubes with electronic ballast	W	1,500	1,500
fluorescent tubes with electromechanical ballast	W	1,000	1,000
CFL	W	600	600
230V LED	W	600	600
LV halogen or LED with electronic ballast	W	600	600
LV halogen or LED with electromechanical ballast	W	1,500	1,500
Minimum switching load	mW (V/mA)	1,000 (10/10)	1,000 (10/10)
Standard contact material		$AgSnO_2$	$AgSnO_2$
Supply specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	110...125/230	230
	V DC	—	—
Rated power	VA (50 Hz)/W	3/1.2	3/1.2
Operating range	AC (50 Hz)	$(0.8...1.1)U_N$	$(0.8...1.1)U_N$
	DC	—	—
Technical data			
Electrical life at rated load in AC1	cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Delay setting	min	0.5...20	0.5...20
Max no. of illuminated push-button (≤ 1 mA)		25	25
Maximum impulse duration		continuous	continuous
Ambient temperature range	°C	–10...+60	–10...+60
Protection category		IP 20	IP 20
Approvals (according to type)			

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Ordering information

Example: 14 series multi-function relay, single phase switch 1 NO (SPDT-NO) 16 A contact, supply rated at 230 V AC.

1 4 . 0 1 . 8 . 2 3 0 . 0 0 0 0

Series

Type
0 = 35 mm rail (EN 60715) mount,
6 functions
7 = 35 mm rail (EN 60715) mount,
3 functions
8 = 35 mm rail (EN 60715) mount
mono-function, all terminals on same side
9 = 35 mm rail (EN 60715) mount,
mono-function, 3 terminals

No. of poles
1 = Single phase switch, 16 A

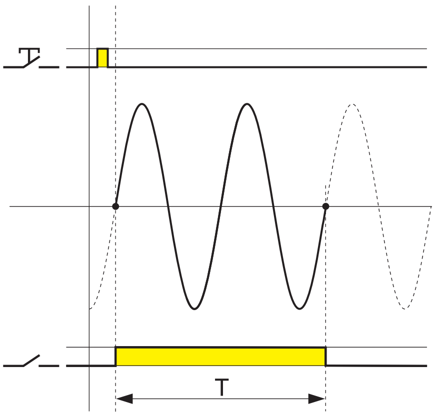
Supply voltage
120 = 110...125 V AC (14.81 only)
230 = 230 V

Supply version
8 = AC (50/60 Hz)

Technical data

Insulation			
Dielectric strength between open contacts	V AC	1,000	
Other data			
Power lost to the environment			
without contact current	W	1.2	
with rated current	W	2	
Maximum cable length for push-button connection	m	200	
Screw torque	Nm	0.8	
Max. wire size		solid cable	stranded cable
	mm^2	1x6 / 2x4	1x4 / 2x2.5
	AWG	1x10 / 2x12	1x12 / 2x14

Zero crossing switching



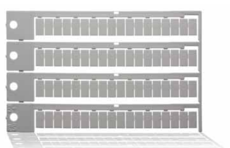
1. Lower inrush current protects and increases lamp life
2. Lower inrush current reduces the possibility of contact welding
3. The current at switch-off is also lower, reducing stress and wear on the contacts

Note
Using the type 14.91, the lamps are switched on directly by the pushbutton

Accessories

020.01

Adaptor for panel mounting, 17.5 mm wide	020.01

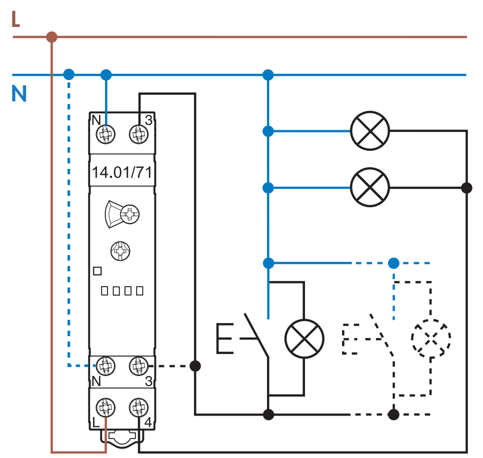


060.72

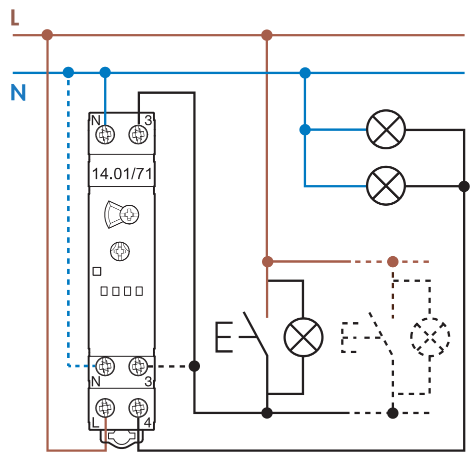
Sheet of marker tags, plastic, 72 tags, 6x12 mm	060.72

Wiring diagrams

Type 14.01
14.71
Red LED indication:
Continuous = relay ON
Blinking = relay OFF

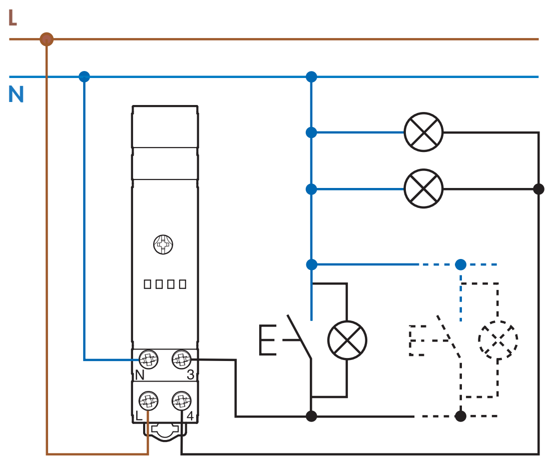


3 wire connection

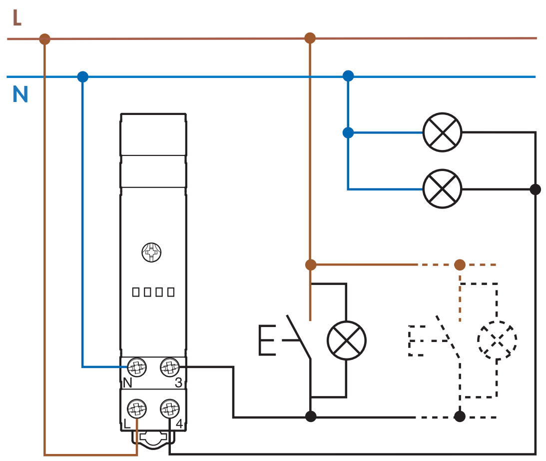


4 wire connection

Type 14.81 (pushbutton configuration procedure, as per the Installation manual)

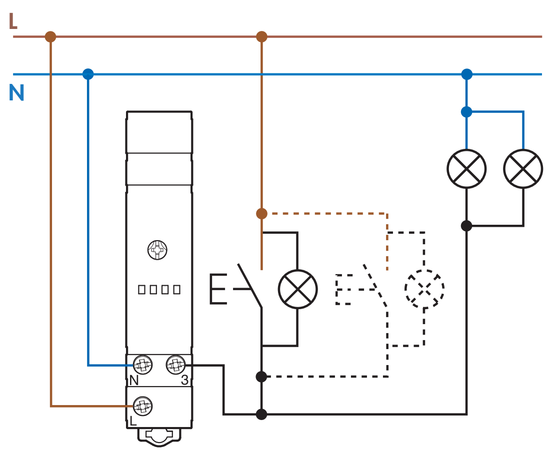


3 wire connection



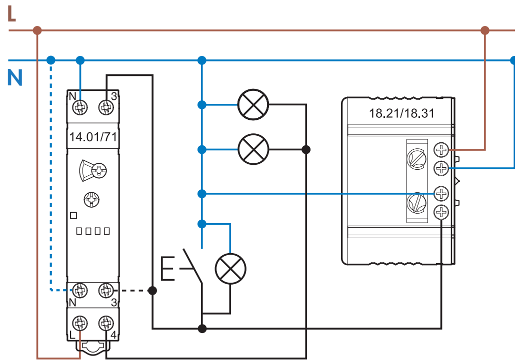
4 wire connection

Type 14.91 (the push-buttons must be rated for the load current)

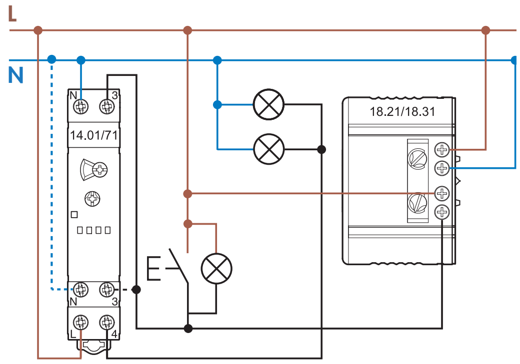


Wiring diagrams - 14.01 or 14.71 without Staircase maintenance function, triggered by PIR movement detector (18 series).

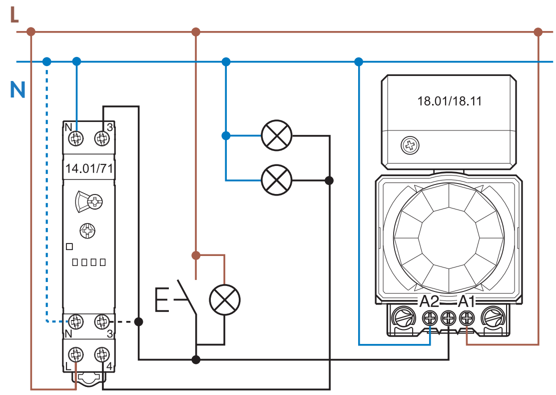
3 wire connection (with 18.21.8.230.0300 or 18.31.8.230.0300 only)



4 wire connection (with 18.21.8.230.0300 or 18.31.8.230.0300 only)

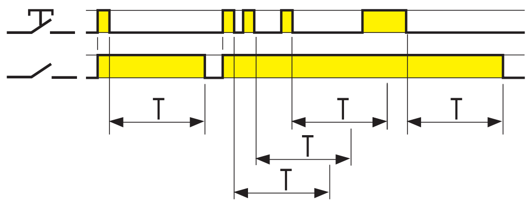


4 wire connection (with 18.01.8.230.0000 or 18.11.8.230.0000 only)

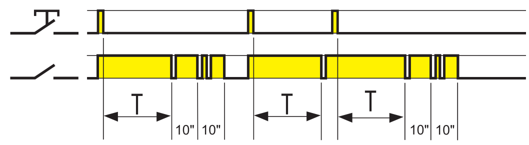


Functions

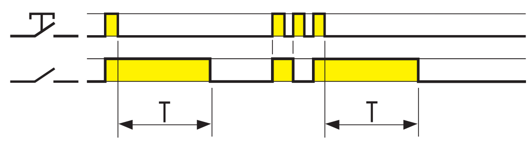
Type 14.01 Functions selectable with front rotary selector



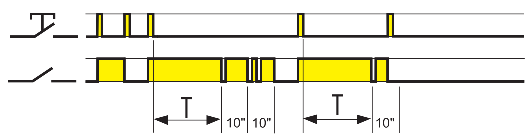
(BE) Staircase relay
On initial impulse the output contact closes and timing starts for the pre-set duration; subsequent impulses during the timing period will extend the timing period by the full pre-set value.
On expiry of the time delay, the output contact opens.



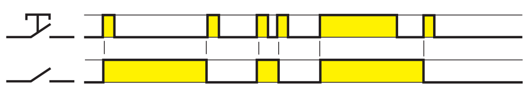
(BP) Staircase relay with early warning
On initial impulse the output contact closes and the timing starts for the pre-set duration.
After the timing period, the output contact blinks off once; 10secs later the contact blinks off twice, and after a further 10secs the contact opens.
During the pre-set and 20 second warning time, it is possible, by a further impulse, to extend the time by the full pre-set value.



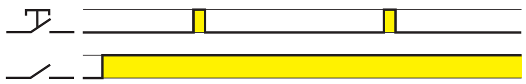
(IT) Timing step relay
On initial impulse the output contact closes and timing starts for the pre-set duration; On expiry of the time delay, the output contact opens.
During the timing period it is possible to immediately open the contact with a further impulse.



(IP) Timing step relay with early warning
On initial impulse the output contact closes and timing starts for the pre-set duration; After the timing period, the output contact blinks off once; 10 secs later the contact blinks off twice, and after a further 10 secs the contact opens.
During the pre-set and 20 second warning time, it is possible to immediately open the output contact by a further impulse.



(RI) Step relay
After every impulse, the output contact changes state - alternately switching from open to closed and vice versa.



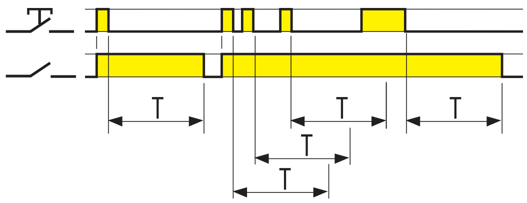
Light ON
With this function set - the output contact stays permanently closed.

NOTE: The blinking within the Early Warning functions (BP and IP) could cause re-start problems for fluorescent lamps with electromagnetic chokes (both conventional and compact types); We consequently suggest not to use such lamps with these functions.

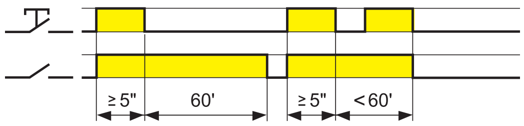
Functions

Type 14.71 Functions selectable with front selector

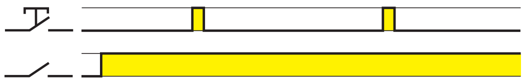
3-function front selector	
	Staircase relay + Staircase maintenance
	Light ON
	Staircase relay (compatible with 18 series movement detectors)



Staircase relay
On initial impulse the output contact closes and timing starts for the pre-set duration; subsequent impulses during the timing period will extend the timing period by the full pre-set value.
On expiry of the time delay, the output contact opens.

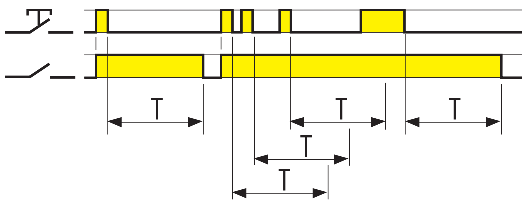


Staircase maintenance
An impulse of ≥ 5 seconds will close the output contact for 60 minutes, after which time the contact will open. Ideal for maintenance or cleaning activities. The 60' timing can be interrupted by a further impulse of ≥ 5 seconds, the output contact opens.

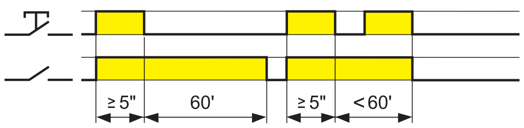


Light ON
With this function set - the output contact stays permanently closed.

Type 14.81

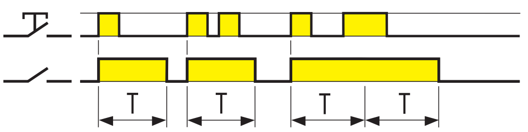


Staircase relay
On initial impulse the output contact closes and timing starts for the pre-set duration; subsequent impulses during the timing period will extend the timing period by the full pre-set value.
On expiry of the time delay, the output contact opens.



"Staircase maintenance" function
An impulse of ≥ 5 seconds will close the output contact for 60 minutes, after which time the contact will open. Ideal for maintenance or cleaning activities. The 60' timing can be interrupted by a further impulse of ≥ 5 seconds, which will re-establish the staircase timer function; so on expiry of the staircase time delay, the output contact opens.

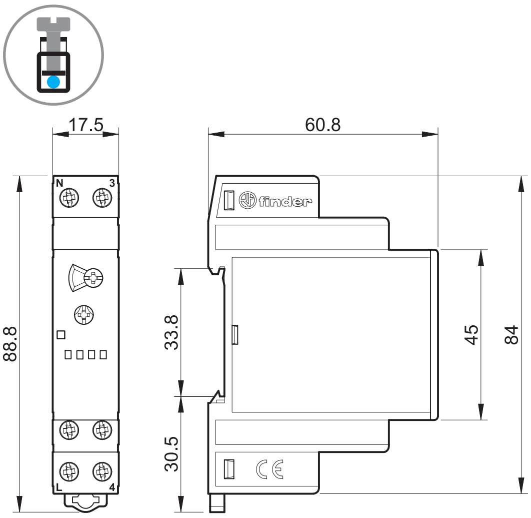
Type 14.91



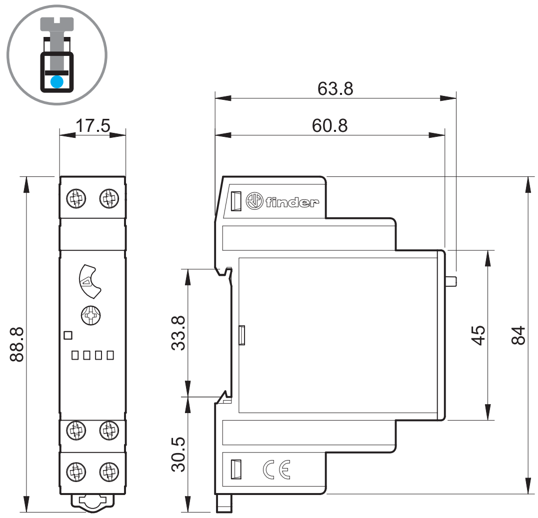
Signal ON pulse
On initial impulse the output contact closes, and remain so for the duration of the preset delay. On expiry of the time delay, the output contact opens.

Outline drawings

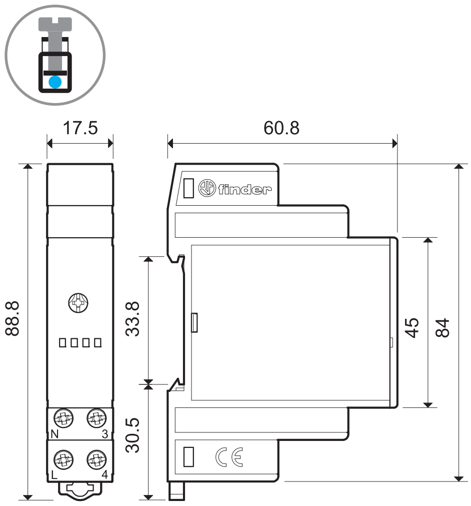
14.01
Screw terminal



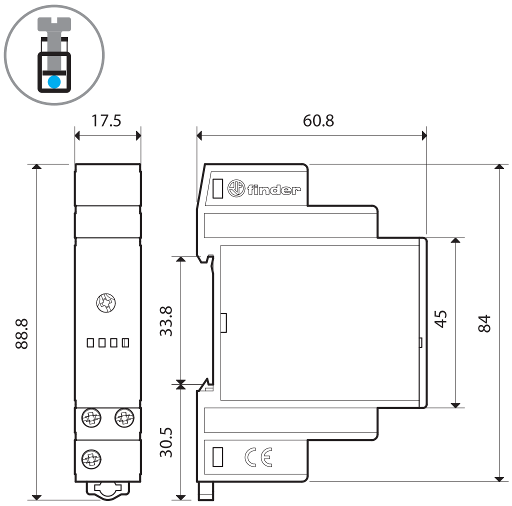
14.71
Screw terminal



14.81
Screw terminal



14.91
Screw terminal



Features

"Master + slave" system for multiple load dimming

- Suitable for incandescent and halogen lighting loads (with or without transformer or electronic supply)
- Compatible with energy saving (CFL or LED) dimmable lamps and with all types of electromagnetic transformers
- 0-10 V driving. Master Dimmer Type 15.10 is able to drive up to 32 Slaves Dimmer Type 15.11
- Use with 4 wire connection
- "Soft" On and Off transitions
- Selectable operating modes with or without previous light level memory (15.10)
- Staircase timer function, with "switch-off early warning" signalled by lamps dimming (15.10)
- Linear dimming
- Thermal protection against overload, thermo-fuse for extreme protection and short-circuit protection (15.11)
- 230 V AC supply, 50/60 Hz with automatic recognition of frequency

Screw terminal

* When the total load exceeds 6 A, it is necessary to switch it through an external contactor

For outline drawing see page 9

NEW 15.10

- "Master" dimmer
- 0-10 V/1-10 V output, usable both for driving one or more 15.11, or for directly controlling Drivers and luminaires with 0-10 V /1-10 V inputs
- Multi-function (with or without memory, including specific "memory for CFL" function)
- Dimming speed setting
- Staircase timer function, with "switch-off early warning" signalled by lamps dimming
- 6 A output relay contact*
- 17.5 mm wide, modular

NEW 15.11

- "Slave" dimmer
- 1-10 V input, driven by 15.10 or by other 0-10 V/1-10 V output devices
- Maximum lamp load 400 W
- 100 W load with energy saving dimmable lamps (LED and CFL)
- Leading and trailing edge dimming methods
- "Transformer" function (for use with electromechanical transformers)
- Minimum dimming level setting
- 17.5 mm wide, modular

	15.10	15.11
"Master Dimmer" output specifications		
Driving signal (Output mode automatically configures	0-10 V, +35 mA max (Active current sourcing mode)	—
to match input mode of the connected Driver)	1-10 V, –35 mA max (Passive current sinking mode)	—
Contact configuration A	1 NO (6 A/230 V AC)*	—
"Slave Dimmer" output specifications		
Power max. W	—	400
Power min. W	—	3
Nominal lamp ratings:		
230 V incandescent or halogen W	—	400 (1)
Toroidal electromagnetic transformers for LV halogen W	—	400 (2)
E-core electromagnetic transformers for LV halogen W	—	400 (2)
Electronic transformers (ballasts) for LV halogen W	—	400 (1)
Dimmable compact fluorescent (CFL) W	—	100 (3)
Dimmable 230 V LED W	—	100 (3) or (1)
Dimmable electronic transformers for LV LED W	—	100 (1)
Supply specifications		
Nominal voltage (U_N) V AC (50/60 Hz)	110…230	230
Operating range	(0.8…1.1) U_N	(0.8…1.1) U_N
Stand-by power consumption W	0.5	0.5
Dimming operating modes	—	Trailing edge ( ) Leading edge ( ) and ( )
Technical data		
Dimming speed (total dimming time) s	1.5…10	—
Delay setting (staircase function) min	0.5…20	—
Max no. of illuminated push-button (≤ 1 mA)	15	—
Ambient temperature range °C	–10…+50	–10…+50 (4)
Protection category	IP 20	IP 20
Approvals (according to type)	CE	CE

Note (1) Select "trailing edge" ( ) position on the front selector.
(2) Select "transformer" ( ) position on the front selector. Preferably, no more than 2 transformers.
(3) Select "leading edge" ( ) position on the front selector, and set the appropriate minimum dimming value (dependent on lamp type).
(4) With lamp load > 300 W (> 75 W for CFL or LED lamps), adequate ventilation must be provided - a gap of 9 mm on both side of the dimmer is suggested. Use the plastic separator type 022.09.

Features

Electronic step relay and dimmer for control of lighting levels

- Suitable for incandescent and halogen lighting loads (with or without transformer or electronic supply)
- Version compatible with energy saving (CFL or LED) dimmable lamps and with all types of electromagnetic transformers (15.81)
- Version compatible with 230 V LED dimmable lamps (15.51/15.91)
- Use with 3 or 4 wire connection
- "Soft" On and Off transitions
- Two selectable operating modes: with or without previous light level memory
- Step (15.51 only) or linear dimming
- Thermal protection against overload
- Thermo-fuse for extreme protection (15.81)
- 230 V AC supply, 50 or 60 Hz (15.51), 50/60 Hz with automatic recognition of frequency (15.81, 15.91)

Screw terminal

For outline drawing see page 9

15.91

REGISTERED COMMUNITY DESIGN

- For mounting within residential wall boxes
- Maximum lamp load 100 W
- Two operating modes
- Leading edge dimming method
- Compatible with LED dimmable lamps

15.51

- Box or panel mount
- Maximum lamp load 400 W
- Two operating modes
- Two different types for linear and step dimming
- Trailing edge dimming method

15.81

- 17.5 mm modular
- Maximum lamp load 500 W
- Multi-function
- Leading and trailing edge dimming methods (depending on the function)
- Compatible with energy saving dimmable lamps

		15.91	15.51	15.81
Output data				
Rated voltage	V AC	230	230	230
Power max.	W	100	400	500
Power min.	W	3	10	3
Nominal lamp ratings:				
230 V incandescent or halogen	W	100	400	500 (1)
Toroidal electromagnetic transformers for LV halogen	W	—	300 (2)	500 (3)
E-core electromagnetic transformers for LV halogen	W	—	—	500 (3)
Electronic transformers (ballasts) for LV halogen	W	—	400 (4)	500 (1)
Dimmable compact fluorescent (CFL)	W	—	—	100 (5)
Dimmable 230 V LED	W	50 (6)	50 (7)	100 (5)
Dimmable electronic transformers for LV LED	W	50 (6)	50 (7)	100 (1)
Supply specifications				
Nominal voltage (U_N)	V AC (50/60 Hz)	230	230 (8)	230
Operating range		$(0.8…1.1)U_N$	$(0.8…1.1)U_N$	$(0.8…1.1)U_N$
Stand-by power consumption	W	0.4	0.7	0.5
Dimming operating mode		Leading edge	Trailing edge	Trailing edge ( ) Leading edge ( ) and ( )
Technical data				
Ambient temperature range	°C	–10…+50 (9)	–10…+50 (9)	–10…+50 (10)
Protection category		IP 20	IP 20	IP 20
Approvals (according to type)		CE EAC	CE EAC	

Note

(1) Select "incandescent lamp" ( ) position on the front selector.
(2) One transformer only. Power-up only with the lamp load connected.
(3) Select "transformer" ( ) position on the front selector. Preferably, no more than 2 transformers.
(4) One transformer only.
(5) Select "CFL" ( ) position on the front selector, and set the appropriate minimum dimming value (dependent on lamp type).
(6) Only if lamps or electronic transformers are compatible with leading edge method.
(7) Only if lamps or electronic transformers are compatible with trailing edge method.
(8) Specific 60 Hz version available (see ordering information).
(9) It is not recommended to mount more than one dimmer in the same wall box, unless adequate ventilation is provided or the lamp load is less than 100 W (15.51) or 50 W (15.91).
(10) With lamp load > 300 W (> 75 W for CFL or LED lamps), adequate ventilation must be provided - a gap of 9 mm on both side of the dimmer is suggested. Use the plastic separator type 022.09.

Not compatible with illuminated push-buttons.

Ordering information

Example: type 15.91, Dimmer, 230 V AC.

1	5	.	9	1	.	8	.	2	3	0	.	0	0	0	0

Series

Type
1 = Master / slave, 35 mm rail (EN 60715) mount, 17.5 mm wide
5 = Panel or wall box mount
8 = 35 mm rail (EN 60715) mount, 17.5 mm wide, for energy saving lamps
9 = Wall box mount, for LED lamps

No. of poles
0 = 0-10 V output (only for 15.10)
1 = 1 output

Supply voltage
230 = 230 V
230 = 110...230 V (only for 15.10)

Supply version
8 = AC

0 = Standard
4 = Only for 15.51 linear dimming

AC input frequency
0 = 50 Hz (15.51)
50/60 Hz (15.11/81/91)
1 = 50/60 Hz (15.10)
6 = 60 Hz (15.51)

Output power
0 = 100 W (15.91)
4 = 400 W (15.51,15.11)
5 = 500 W (15.81)

Codes
15.10.8.230.0010 master dimmer, 50/60 Hz
15.11.8.230.0400 slave dimmer, 50/60 Hz
15.51.8.230.0400 step dimming, 50Hz
15.51.8.230.0404 linear dimming, 50Hz
15.51.8.230.0460 step dimming, 60Hz
15.81.8.230.0500 linear dimming, 50/60Hz
15.91.8.230.0000 linear dimming, 50/60Hz

Technical data

EMC specifications				
Type of test		**Reference standard**	**15.51/15.91**	**15.10/11/81**
Electrostatic discharge	contact discharge	EN 61000-4-2	4 kV	
	air discharge	EN 61000-4-2	8 kV	
Radiated electromagnetic field	(80…1,000 MHz)	EN 61000-4-3	3 V/m	10 V/m
Fast transients (burst)	on supply terminals	EN 61000-4-4	4 kV	
(5-50 ns, 5 and 100 kHz)	on pushbutton connection	EN 61000-4-4	4 kV	
Voltage pulses on supply terminals (surge 1.2/50μs)	differential mode	EN 61000-4-5	2 kV	
Radiofrequency common mode voltage	on supply terminals	EN 61000-4-6	3 V	
(0.15…80 MHz)	on pushbutton connection	EN 61000-4-6	3 V	
Voltage dips	70 % U_N,40 % U_N	EN 61000-4-11	10 cycles	
Short interruptions		EN 61000-4-11	10 cycles	
Radiofrequency conducted emissions	0.15…30 MHz	EN 55014	class B	
Radiated emissions	30…1,000 MHz	EN 55014	class B	

Terminals		**solid cable**	**stranded cable**
Max. wire size	mm²	1 x 6 / 2 x 4	1 x 4 / 2 x 2.5
	AWG	1 x 10 / 2 x 12	1 x 12 / 2 x 14
Screw torque	Nm	0.8	
Wire strip length	mm	9	

Other data			**15.10**	**15.11**	**15.51**	**15.81**	**15.91**
Power lost to the environment	without load	W	0.5	0.5	0.7	0.5	0.4
	with rated load	W	1.7	2.5	2.2	2.6	1.2
Max cable length for push-button connection		m	100	100	100	100	100
Max cable length for Master and Slaves connection		m	100 (keep separate from power cables)				

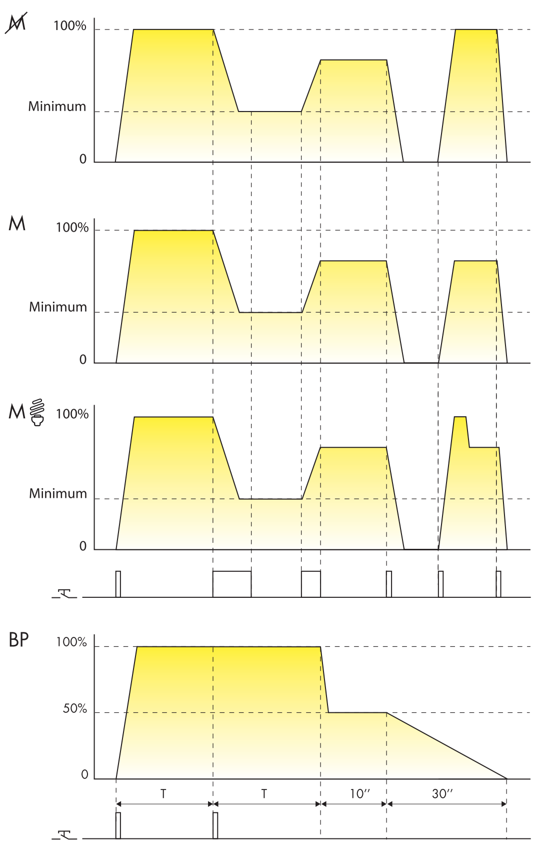
Signaling

LED (15.10 only)	Condition	LED (15.11 only)	Condition
	Stand-by, output voltage <1V		Stand-by, input voltage <1V
	Active, output voltage ≥1V		Active, input voltage ≥1V
	Short circuit or overload, output disabled		Short circuit or overload, output disabled
	Timing, staircase function		Overtemperature, output disabled

Functions - Type 15.10 and 15.11

Type | **Linear dimming**

15.10



Operating mode without memory: at switch-off, the light level is not memorized.

Long control pulse: The light level is progressively raised or lowered in linear way. The lowest value depending on the "minimum dimming level" regulator setting (on 15.11).

Short control pulse: Alternately switches between On and Off (maximum light level and the off state).

Operating mode with memory: the previous light level is memorized.

Long control pulse: The light level is progressively raised or lowered in linear way. The lowest value dependent on the "minimum dimming level" regulator setting (on 15.11).

Short control pulse: Alternately switches between On and Off. When switching On, the light level assumes the value set during the previous On state.

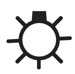
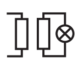
Operating mode with memory: the previous light level is memorized, specific for CFL Lamp.

Long control pulse: The light level is progressively raised or lowered in linear way. The lowest value dependent on the "minimum dimming level" regulator setting (on 15.11).

Short control pulse: Alternately switches between On and Off. When switching On, the light level reach the full value for a very short time (in order to guarantee the correct lamp turn-on), then immediately assumes the value set during the previous On state.

Staircase relay with early warning
On initial impulse the output closes and the timing starts for the pre-set duration. After the timing period (T), the output power is reduced to 50% for 10 seconds; then in the last 30 seconds it will be further reduced to the final shutdown.
During the pre-set and 40 second warning time, it is possible, by a further impulse, to extend the time by the full pre-set value.

Type of load - Type 15.11

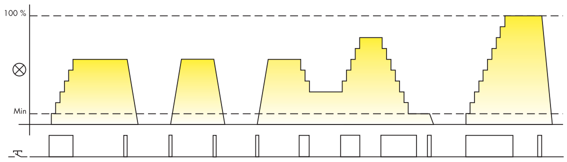
Type of load	Selector setting	Regulator setting	
• Incandescent lamps • 230 V halogen lamps • 12/24 V halogen and LED lamps with electronic transformer/ballast	 (Trailing Edge)	It is suggested to set the "minimum dimming level" at the lowest value, so that the complete dimming range is available. But if it is necessary to avoid too low a level of illumination, a higher value can be set.	
• Dimmable compact fluorescent lamps (CFL) • Dimmable LED lamps	 (Leading Edge)	It is suggested to initially set the "minimum dimming level" at an intermediate value and then if necessary, readjust for a level found to be compatible with the lamp being used.	
• 12/24 V halogen lamps with toroidal or E-core electromagnetic transformer	 (Leading Edge)	It is suggested to set the "minimum dimming level" at the lowest value, so that the complete dimming range is available. But if it is necessary to avoid too low a level of illumination, a higher value can be set.	

Functions - Types 15.51 and 15.91

Type — **Step dimming**

15.51...0400

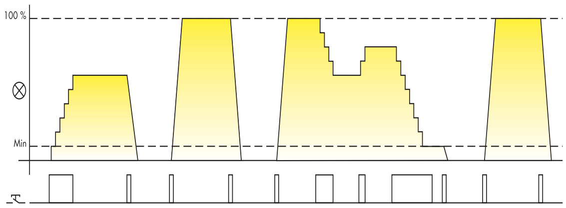
Operating mode 1 (with memory): the previous light level is memorized.



Long control pulse: The light level is progressively raised or lowered through a maximum of 10 incremental steps.

Short control pulse: Alternately switches between On and Off. When switching On, the light level assumes the value set during the previous On state.

Operating mode 2 (without memory): on switch off, the light level is not memorized.



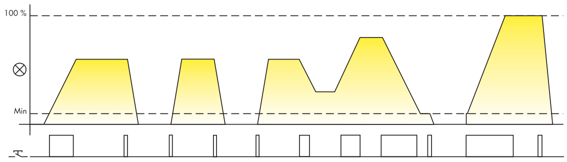
Long control pulse: The light level is progressively raised or lowered through a maximum of 10 incremental steps.

Short control pulse: Alternately switches On or Off between the maximum light level and the off state.

Type — **Linear dimming**

15.51...0404
15.91...0000

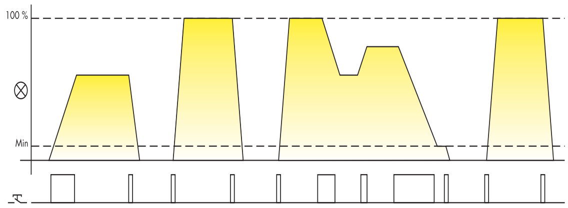
Operating mode 3 (with memory): the previous light level is memorized.



Long control pulse: The light level is progressively raised or lowered.

Short control pulse: Alternately switches between On and Off. When switching On, the light level assumes the value set during the previous On state.

Operating mode 4 (without memory): on switch off, the light level is not memorized.



Long control pulse: The light level is progressively raised or Lowered.

Short control pulse: Alternately switches On or Off between the maximum light level and the off state.

Operating mode setup

Type 15.51

On **15.51** operating mode 1 or 3 (with memory) is preset, but it is possible to change it using the following sequence:
a) remove the supply voltage;
b) press the control button;
c) apply the supply to the relay, keeping the button closed for 3 second;
d) on button release, the light will flash twice to indicate the selection of operating mode 2 or 4, or flash once for operating mode 1 or 3.
Repeating the above steps will alternately change between operating modes.

Type 15.91

On **15.91** operating mode 4 (without memory) is preset, but it is possible to change it using the following sequence:
a) remove the supply voltage;
b) press the control button;
c) apply the supply to the relay, keeping the button closed for 3 second;
d) on button release, the light will flash twice to indicate the selection of operating mode 3, or flash once for operating mode 4.
Repeating the above steps will alternately change between operating modes.

Thermal protection and signaling

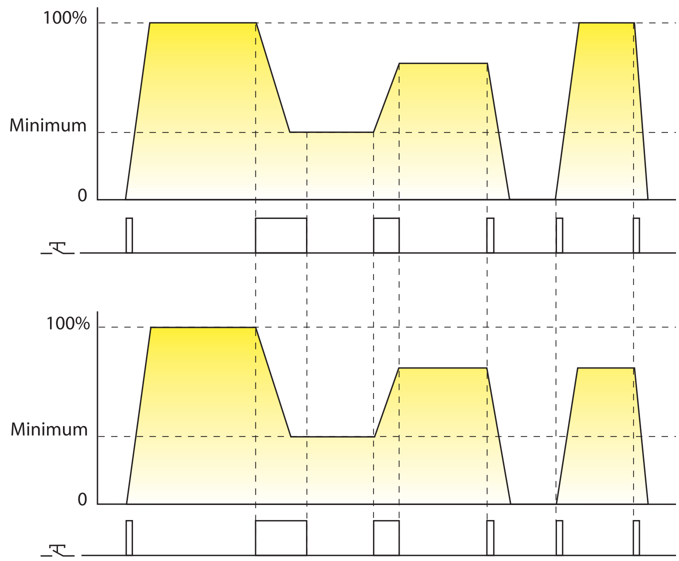
LED (15.81 type only)	Supply voltage	Thermal protection
	OFF	–
	ON	–
	ON	ALARM

ALARM
The internal thermal protection (active on all dimmer types) will detect an unsafe temperature, due to overload or incorrect installation, and will turn the dimmer output off.
It is possible to turn the dimmer on, by push button, only when the temperature reduces to a safe level (after 1 to 10 minutes, depending on installation conditions) and after removing the cause of the overload.

Functions - Type 15.81

Type **Linear dimming**

15.81...0500



Operating mode without memory: at switch-off, the light level is not memorized.

Long control pulse: The light level is progressively raised or lowered in linear way. The lowest value depend on the "minimum dimming level" regulator setting.

Short control pulse: Alternately switches between On and Off between the maximum light level and the off state.

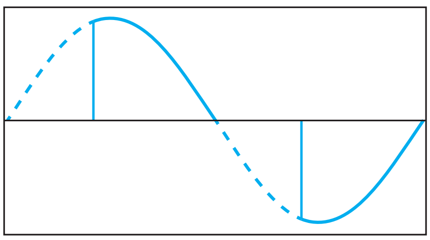
Operating mode with memory: the previous light level is memorized.

Long control pulse: The light level is progressively raised or lowered in linear way. The lowest value dependent on the "minimum dimming level" regulator setting.

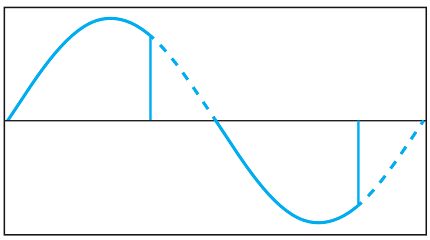
Short control pulse: Alternately switches between On and Off. When switching On, the light level assumes the value set during the previous On state.

Type of load	Selector setting: With memory (M)	Selector setting: Without memory (~~M~~)	Regulator setting
• Incandescent lamps • 230 V halogen lamps • 12/24 V halogen lamps with electronic transformer/ballast	M	~~M~~	It is suggested to set the "minimum dimming level" at the lowest value, so that the complete dimming range is available. But if it is necessary to avoid too low a level of illumination, a higher value can be set. – +
• Dimmable compact fluorescent lamps (CFL) • Dimmable LED lamps	M	~~M~~	It is suggested to initially set the "minimum dimming level" at an intermediate value and then if necessary, readjust for a level found to be compatible with the lamp being used. – +
• 12/24 V halogen lamps with toroidal or E-core electromagnetic transformer	M	~~M~~	It is suggested to set the "minimum dimming level" at the lowest value, so that the complete dimming range is available. But if it is necessary to avoid too low a level of illumination, a higher value can be set. – +

Leading edge dimming

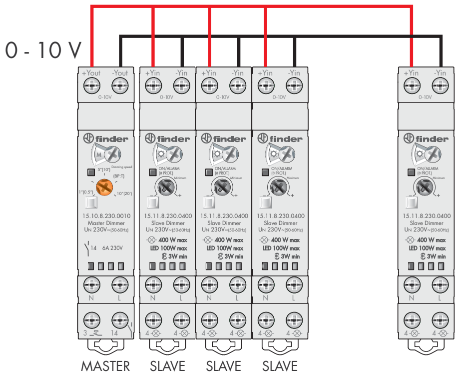


Trailing edge dimming



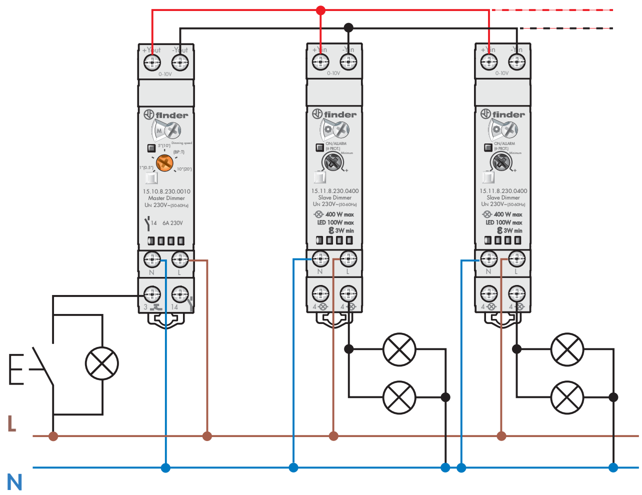
Light dimming is realized with "phase cutting technology", which works by "cutting off" part of the mains voltage waveform in order to reduce the RMS voltage fed to the lamp. When the "cut off" part is at the beginning of each half cycle the dimming method is called Leading Edge. When it is towards the end of each half cycle, it is called Trailing Edge. These 2 methods are suitable for dimming different lamp types: Trailing Edge is, in general, more suitable for electronic transformers for low voltage lamps (halogen or LED). Leading Edge is better suited for electromagnetic transformers for LV lamps, 230 V CFL and 230 V LED lamps. Both methods are, however, suitable for dimming 230 V halogen and incandescent lamps.
In consideration of the different lamp types actually available on the market, it is suggested to refer to the technical specification indicated in page 1 and, if given, to the lamp manufacturer's recommendation.

Wiring diagrams - Types 15.10 and 15.11

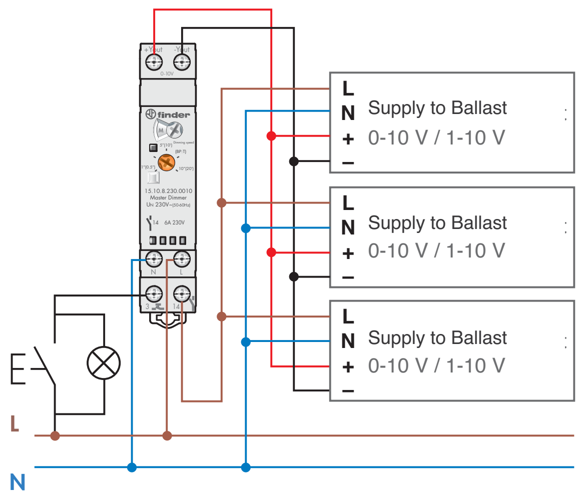


This new system is modular, adaptable to every need and allows control of multiple lamps through a single control device called the "Master Dimmer" Type 15.10.8.230.0010.
The Master Dimmer, produces a 0 - 10 V signal proportional to the dimming value needed:
0 V corresponds to 0% (light off); 5V equals 50%, 10 V corresponds to the maximum brightness (100% on).
The 0 - 10 V output signal terminals Yout + / Yout of the "Master Dimmer" must be connected to terminals + Yin / Yin of one or more 15.11.8.230.0400, called the "Slave Dimmers", which have the task of changing the voltage applied to the lamps and therefore their brightness.

The result is a flexible system that offers a range of solutions from the minimum configuration of a Master Dimmer and a Slave Dimmer, up to the maximum configuration of a Master Dimmer and 32 Slave Dimmers.
Each slave can drive a different lamp type, depending on the appropriate methodology, "Leading Edge" or "Trailing Edge". It can regulate halogen lamps, dimmable LED lamps, dimmable CFL lamps, electronic transformers,and electromagnetic transformers.
For example, one Master Dimmer can control a Slave Dimmer with LED lamps and at the same time a second Slave Dimmer with halogen lamps, and a third with electronic transformers.

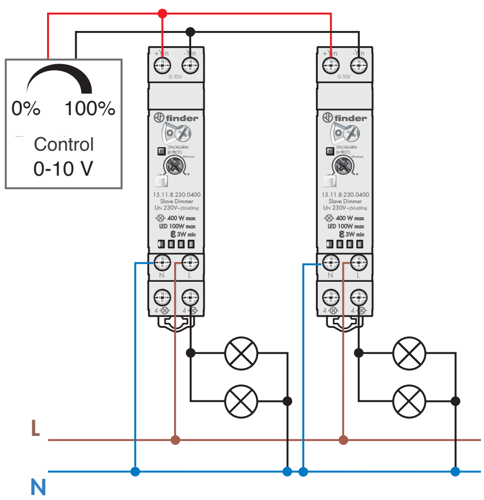


MASTER DIMMER TYPE 15.10 AND SLAVE DIMMER TYPE 15.11
It is recommended that the Master controls from one to a maximum of 32 Slave units.
The push-buttons (including illuminated push-buttons Max. 15) serve as the ON / OFF (momentary push), or when pressed for a longer time they adjust the brightness level.
Each Slave can drive a different load type.



MASTER DIMMER + 0 - 10 V ELECTRONIC TRANSFORMER OR BALLAST
Using only the Master Dimmer it is possible to control electronic transformers or ballasts with a 0 - 10 V / 1 - 10 V input (observing correct polarity).
For 1 - 10 V applications it is suggested to supply the Ballast Live from terminal 14. This will ensure that the supply to the Ballast is cut-off for a signal < 1 V.
Note: Check that the rated current of the Ballast does not exceed the 6 A 230 V AC rating of terminal 14.

I

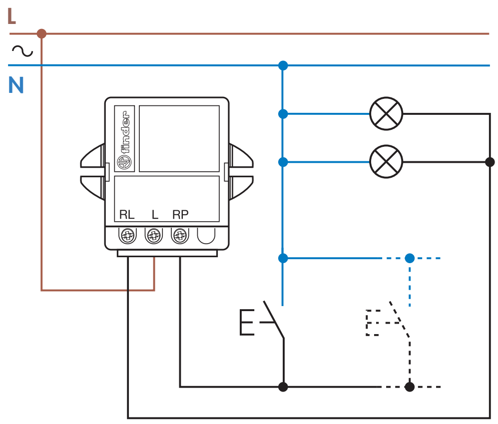


BMS 0 - 10 V OUTPUTS + SLAVE DIMMERS
In the case of Home Automation or Building Automation systems you can use just the Slave Dimmer Type 15.11 directly controlled by the 0 - 10 V output of the building management system (BMS), or by 0 - 10 V rotary regulators.

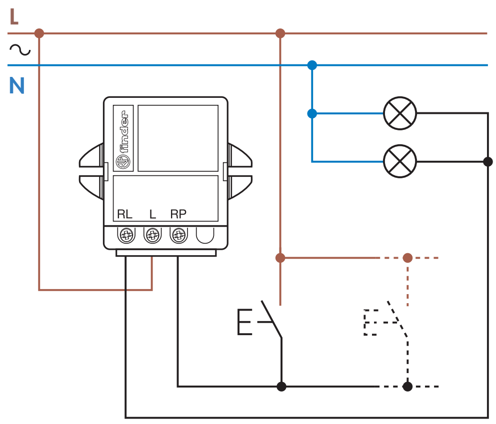
Wiring diagrams - Types 15.51, 15.81 and 15.91

Note: remember to maintain a ground/earth connection for class 1 light fittings.

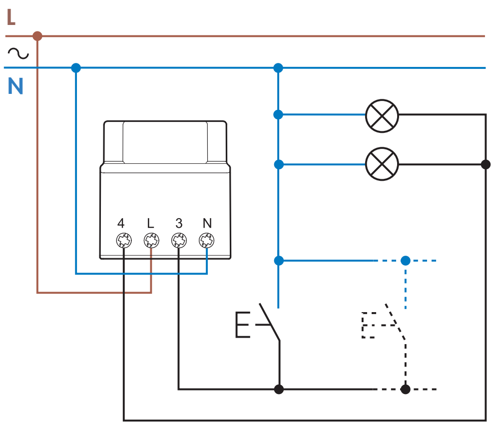
Type 15.51 - 3 wire connection



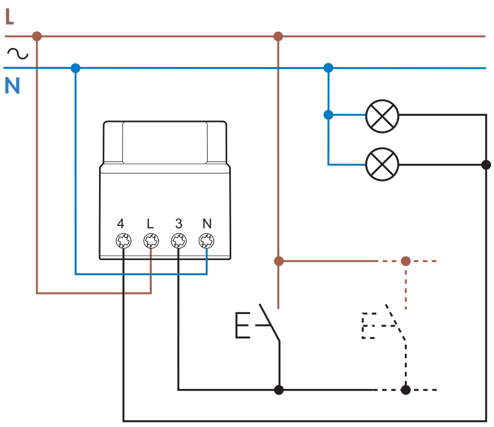
Type 15.51 - 4 wire connection



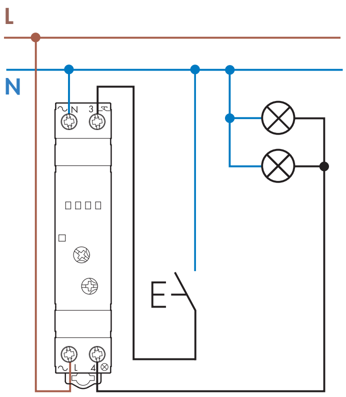
Type 15.91 - 3 wire connection



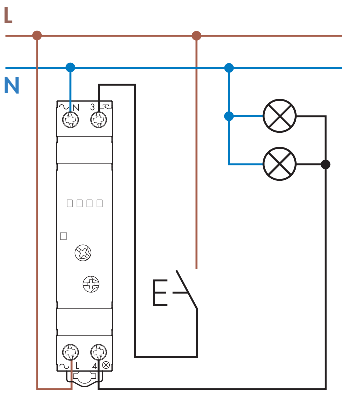
Type 15.91 - 4 wire connection



Type 15.81 - 3 wire connection

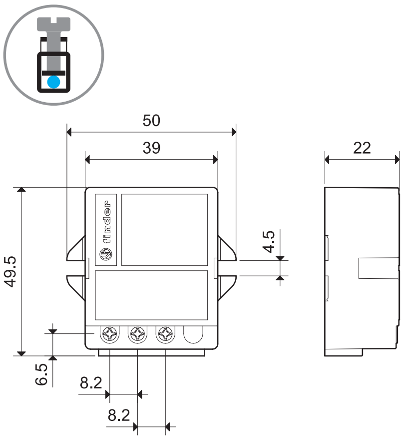


Type 15.81 - 4 wire connection

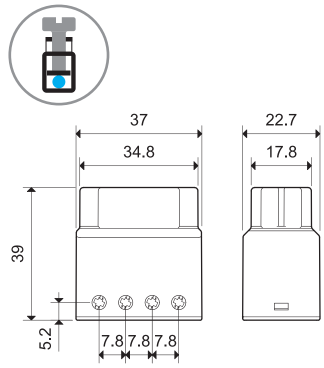


Outline drawings

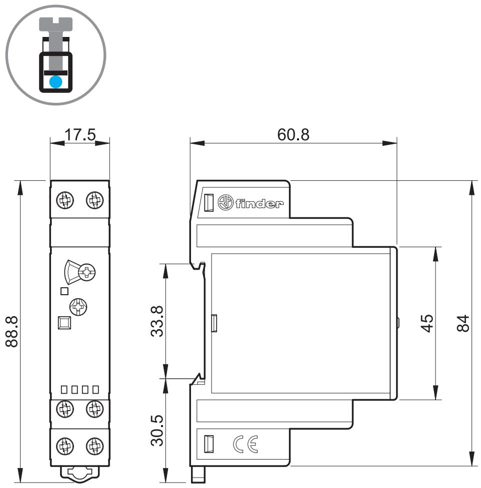
15.51
Screw terminal



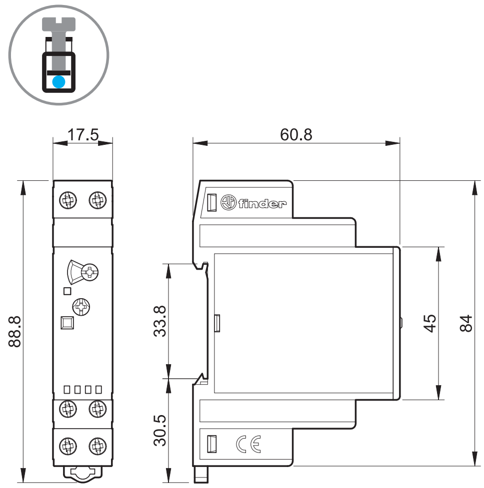
15.91
Screw terminal



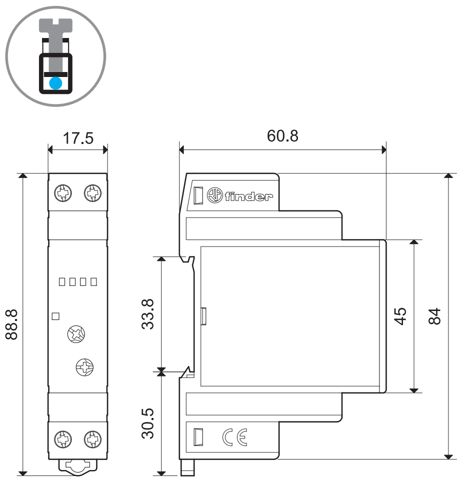
15.10
Screw terminal



15.11
Screw terminal



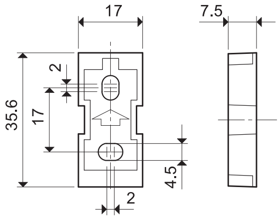
15.81
Screw terminal



Accessories

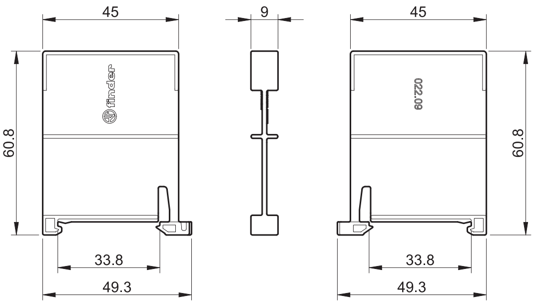
020.01

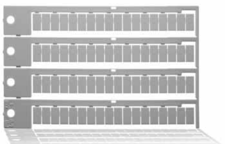
Adaptor for panel mounting for types 15.10, 15.11 and 15.81, plastic, 17.5 mm wide	020.01



022.09

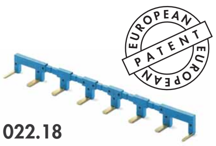
Separator for rail mounting, plastic, 9 mm wide for types 15.10, 15.11 and 15.81	022.09





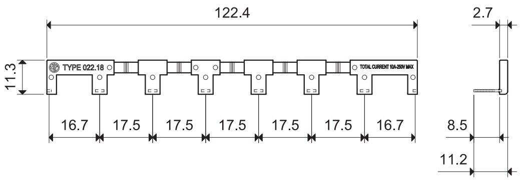
060.72

Sheet of marker tags for types 15.10, 15.11 and 15.81, plastic, 72 tags, 6x12 mm	060.72



022.18

8-way jumper link for type 15.10 and 15.11 connection, 17.5 mm wide	022.18 (blue)
Rated values	10 A - 250 V



Features

PIR movement detector for internal or external installations - wall mounting

- Small size
- Adjustable ambient light intervention threshold
- Adjustable Light On Time
- Universal mounting position - permits the selection of any area for survey
- Wide angle of survey

18.01/18.11
Screw terminal

18.01

- 1 NO (SPST-NO) 10 A
- Internal installations
- Particularly suited for wall mounting

18.11

- 1 NO (SPST-NO) 10 A
- External installations
- Particularly suited for wall mounting

NOTE: with 110...125 V AC supply, the Ratings (AC1, AC15 and lamp loads) specified in pages 1 to 4 must be reduced by 50 % (e.g. 500 W instead of 1,000 W)

For outline drawings see page 8

	18.01	18.11
Contact specification		
Number of contacts	1 NO (SPST-NO)	1 NO (SPST-NO)
Rated current/Maximum peak current A	10/20 (100 A - 5 ms)	10/20 (100 A - 5 ms)
Rated voltage/Maximum switching voltage V AC	230/230	230/230
Rated load AC1 VA	2,300	2,300
Rated load AC15 (230 V) VA	450	450
Nominal lamp rating 230 V: incandescent/halogen W	1,000	1,000
Fluorescent lamp with Electronic ballast W	500	500
Fluorescent lamp with Electromecanical ballast W	350	350
CFL W	300	300
LED 230 V W	300	300
halogen or LV LED with electronic ballast W	300	300
halogen or LV LED with electromechanical ballast W	500	500
Standard contact material	$AgSnO_2$	$AgSnO_2$
Supply specification		
Coil specification V AC (50/60 Hz)	120...230	120...230
DC	—	—
Rated power AC/DC VA (50 Hz)/W	2.5/—	2.5/—
Operating range V AC (50/60 Hz)	96...253	96...253
DC	—	—
Technical data		
Electrical life at rated load AC1 cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Ambient light intervention threshold lx	5...350	5...350
Light on time after last detection	10 s...12 min	10 s...12 min
Sensing area diameter	See diagram pag. 7	See diagram pag. 7
Ambient temperature range °C	–10...+50	–30...+50
Protection category	IP 40	IP 54
Approvals (according to type)		

18 Series - PIR movement detector 10 A

Features

PIR movement detector for internal installations

- Ceiling mounting
- Small size
- Adjustable ambient light intervention threshold
- Adjustable Light On Time
- Wide angle of survey

18.21/18.31/18.31...0031
Screw terminal

18.21	18.31	18.31...0031
		
• 1 NO (SPST-NO) 10 A • Internal ceiling installation • Surface mounting • Output connected to supply voltage	• 1 NO (SPST-NO) 10 A • Internal ceiling installation • Recessed mounting • Output connected to supply voltage	• 1 NO 10 A • Internal ceiling installation • Recommended for applications with high ceilings (up to 6 meters) • Light ON time after last detection (30 s...35 min)

NOTE: with 110...125 V AC supply, the Ratings (AC1, AC15 and lamp loads) specified in pages 1 to 4 must be reduced by 50 % (e.g. 500 W instead of 1,000 W)

For outline drawings see page 8

	18.21	18.31	18.31...0031
Contact specification			
Number of contacts	1 NO (SPST-NO)	1 NO (SPST-NO)	1 NO (SPST-NO)
Rated current/Maximum peak current A	10/20 (100 A - 5 ms)	10/20 (100 A - 5 ms)	10/20 (100 A - 5 ms)
Rated voltage/Maximum switching voltage V AC	230/230	230/230	230/230
Rated load AC1 VA	2,300	2,300	2,300
Rated load AC15 (230 V) VA	450	450	450
Nominal lamp rating 230 V: incandescent/halogen W	1,000	1,000	1,000
Fluorescent lamp with Electronic ballast W	500	500	500
Fluorescent lamp with Electromecanical ballast W	350	350	350
CFL W	300	300	300
LED 230 V W	300	300	300
halogen or LV LED with electronic ballast W	300	300	300
halogen or LV LED with electromechanical ballast W	500	500	500
Standard contact material	$AgSnO_2$	$AgSnO_2$	$AgSnO_2$
Supply specification			
Coil specification V AC (50/60 Hz)	120...230	120...230	120...230
DC	—	—	—
Rated power AC/DC VA (50 Hz)/W	2/1	2/1	2/1
Operating range V AC (50/60 Hz)	96...253	96...253	96...253
DC	—	—	—
Technical data			
Electrical life at rated load AC1 cycles	$100 \cdot 10^3$	$100 \cdot 10^3$	$100 \cdot 10^3$
Ambient light intervention threshold lx	5...350	5...350	5...350
Light on time after last detection	10 s...12 min	10 s...12 min	30 s...35 min
Sensing area diameter	See diagram page 7	See diagram page 7	See diagram page 7
Ambient temperature range °C	–10...+50	–10...+50	–10...+50
Protection category	IP 40	IP 40	IP 40
Approvals (according to type)			

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Features

PIR movement detector for internal installations, with potential free contact

- Applications where interface to PLC or BMS is required
- Ceiling mounting
- Small size
- Adjustable ambient light intervention threshold
- Adjustable Light On Time
- Wide angle of survey

18.21...0300/18.31...0300
Screw terminal

NOTE: with 110...125 V AC supply, the Ratings (AC1, AC15 and lamp loads) specified in pages 1 to 4 must be reduced by 50 % (e.g. 500 W instead of 1,000 W)

For outline drawings see page 8

18.21-0300

- 1 NO (SPST-NO) 10 A
- Internal ceiling installation
- Surface mounting
- Output with potential free contact

18.31-0300

- 1 NO (SPST-NO) 10 A
- Internal ceiling installation
- Recessed mounting
- Output with potential free contact

	18.21-0300	18.31-0300
Contact specification		
Number of contacts	1 NO (SPST-NO)	1 NO (SPST-NO)
Rated current/Maximum peak current A	10/20 (100 A - 5 ms)	10/20 (100 A - 5 ms)
Rated voltage/Maximum switching voltage V AC	250/400	250/400
Rated load AC1 VA	2,500	2,500
Rated load AC15 (230 V) VA	450	450
Nominal lamp rating 230 V: incandescent/halogen W	1,000	1,000
Fluorescent lamp with Electronic ballast W	500	500
Fluorescent lamp with Electromecanical ballast W	350	350
CFL W	300	300
LED 230 V W	300	300
halogen or LV LED with electronic ballast W	300	300
halogen or LV LED with electromechanical ballast W	500	500
Standard contact material	$AgSnO_2$	$AgSnO_2$
Supply specification		
Coil specification V AC (50/60 Hz)	120...230	120...230
V AC (50/60 Hz)/DC	24	24
Rated power AC/DC VA (50 Hz)/W	2/1	2/1
Operating range V AC (50/60 Hz)	96...253	96...253
V AC (50/60 Hz)/DC	19.2...26.4	19.2...26.4
Technical data		
Electrical life at rated load AC1 cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Ambient light intervention threshold lx	5...350	5...350
Light on time after last detection	10 s...12 min	10 s...12 min
Sensing area diameter	See diagram page 7	See diagram page 7
Ambient temperature range °C	–10...+50	–10...+50
Protection category	IP 40	IP 40
Approvals (according to type)		

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Features

Movement detector

- Extensive sensing area up to 120m^2
- Two sensing areas (type 18.51): "presence" suitable for zones of low activity, and "movement" suitable for transit areas or zones of high activity
- Modern design
- Quick installation thanks to push-in terminals
- 1 NO contact 10 A, with "zero crossing" switching
- Wall mounting compatible with 60 mm box and 3 module box

18.41/18.51/18.61
Push-in terminal

NEW 18.41

- Applications: hotel and offices corridors, transit areas
- Sensing area 30 meters length and 4 meters width

NEW 18.51

- Applications: offices, schools, zones of low activity
- Two sensing areas: "presence" and "movement"
- Sensing area 360°

NEW 18.61

- Specific product for wall mountig
- Wide angle: 180°
- Wall mounting compatible with 60 mm box

NOTE: with 110...125 V AC supply, the Ratings (AC1, AC15 and lamp loads) specified in pages 1 to 4 must be reduced by 50 % (e.g. 500 W instead of 1,000 W)

For outline drawings see page 8

		18.41	18.51	18.61
Contact specification				
Number of contacts		1 NO (SPST-NO)	1 NO (SPST-NO)	1 NO (SPST-NO)
Rated current/Maximum peak current	A	10 / 20 (100 A 5 ms)	10 / 20 (100 A 5 ms)	10 / 20 (100 A 5 ms)
Rated voltage/Maximum switching voltage	V AC	250 / 400	250 / 400	250 / 400
Rated load AC1	VA	2,500	2,500	2,500
Rated load AC15	VA	450	450	450
Nominal lamp rating 230 V: incandescent/halogen	W	1,000	1,000	1,000
Fluorescent lamp with Electronic ballast	W	500	500	500
Fluorescent lamp with Electromecanical ballast	W	350	350	350
CFL	W	300	300	300
LED 230 V	W	300	300	300
halogen or LV LED with electronic ballast	W	300	300	300
halogen or LV LED with electromechanical ballast	W	500	500	500
Standard contact material		$AgSnO_2$	$AgSnO_2$	$AgSnO_2$
Supply specification				
Coil specification	V AC (50/60 Hz)	110…230	110…230	110…230
Rated power	VA (50 Hz)/ W	1.5 / 1	1.5 / 1	1.5 / 1
Operating range	V AC (50/60 Hz)	96…253	96…253	96…253
Technical data				
Electrical life at rated load AC1	cycles	$100 \cdot 10^3$	$100 \cdot 10^3$	$100 \cdot 10^3$
Ambient light intervention threshold	lx	1…500	1…500	1…500
Light on time after last detection		12 s…35 min	12 s…35 min	12 s…35 min
Sensing area diameter		See diagram page 7	See diagram page 7	See diagram page 7
Ambient temperature range	°C	–10…+50	–10…+50	–10…+50
Protection category		IP 40	IP 40	IP 40
Approvals (according to type)		CE EAC		

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Ordering information

Example: 18 series, PIR movement detector for internal installations, wall mounting, 1 NO (SPST-NO) 10 A contact, 120...230 V AC supply.

1 8 . 0 1 . 8 . 2 3 0 . 0 0 0 0

Series

Type
0 = Internal installation - wall mounting
1 = External installations
2 = Internal ceiling installation - surface mounting
3 = Internal ceiling installation - recessed mounting
4 = PIR movement detector for corridors
5 = PIR Movement and presence detector
6 = PIR movement detector wall mounting

Contact circuit
0 = Voltage output
3 = Volt-free output contact

Special version
31 = High ceilings, (30 s...35 min)

Supply voltage
024 = 24 V AC/DC for types 18.21/31-0300 only
230 = 120...230 V for types 18.01, 18.11, 18.21, 18.31
230 = 110...230 V for type 18.41, 18.51, 18.61

Supply version
0 = AC (50/60 Hz)/DC (24 V only)
8 = AC (50/60 Hz)

No. of poles
1 = Single pole switching 1 NO (SPST-NO), 10 A

Codes
18.01.8.230.0000
18.11.8.230.0000
18.21.0.024.0300
18.21.8.230.0000
18.21.8.230.0300
18.31.0.024.0300
18.31.8.230.0000
18.31.8.230.0300
18.31.8.230.0031
18.41.8.230.0300
18.51.8.230.0300
18.61.8.230.0300

Technical data

Insulation			
Type		**18.01...18.31**	**18.41...18.61**
Dielectric strength between open contacts	V AC	1,000	1,000
Between supply and contact	V AC	1,500 (types 18.21...0300, 18.31...0300)	1,500

EMC specifications			
Type of test		**Reference standard**	
Electrostatic discharge	contact discharge	EN 61000-4-2	4 kV
	air discharge	EN 61000-4-2	8 kV
Radiated electromagnetic field (80 … 2,000 MHz)		EN 61000-4-3	3 V/m
Fast transients (burst 5/50 ns, 5 and 100 kHz)	on supply terminals	EN 61000-4-4	1 kV
Voltage pulses on supply terminals	common mode	EN 61000-4-5	4 kV
(surge 1.2/50 μs)	differential mode	EN 61000-4-5	4 kV (2.5 kV for 18.01/11)
Radiofrequency common mode voltage (0.15…230 MHz)	on supply terminals	EN 61000-4-6	3 V
Voltage dips	70 % U_N , 40 % U_N	EN 61000-4-11	10 cycles
Short interruptions		EN 61000-4-11	10 cycles
Radiofrequency conducted emissions	(0.15…30) MHz	EN 55014	class B
Radiated emissions	(30…1,000) MHz	EN 55014	class B

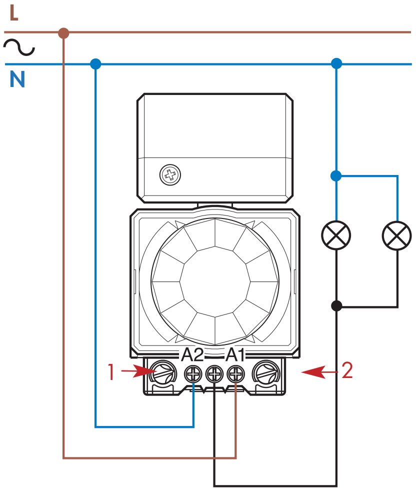
Terminals					
Type		Screw terminal		Push-in (see pag. 9)	
Screw torque	Nm	0.5		—	
Max. wire size		solid cable	stranded cable	solid cable	stranded cable
	mm^2	1x6/2x4	1x4/2x2.5	2.5	2.5
	AWG	1x10/2x12	1x12/2x14	14	14
Wire strip length	mm	9	9	8	8

Other data			
Power lost to the environment	without output current	W	0.3
	with rated output current	W	1.4

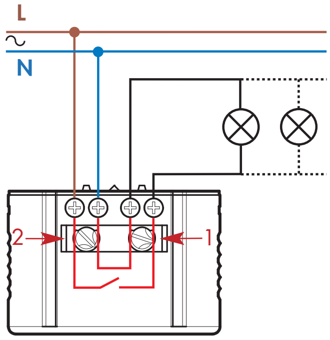
- Following the initial power-on, and power-on following a power interruption, the detector makes a hardware-software initialisation for approximately 30 seconds. However, the behavior of the output during this 30 seconds will depend on certain circumstances:
  - If the detector was in the On state before the power interruption, and if the lighting level is (currently) below the pre-set threshold, then the output contact will immediately close when the power is re-applied, for the time delay set by the potentiometer (irrespective of whether movement is being detected).
  - If the detector was in the Off state before the power interruption, or if the ambient light is currently over the pre-set threshold, then the detector will not switch-on until the end of the initialisation phase (assuming movement is then detected).

Wiring diagram

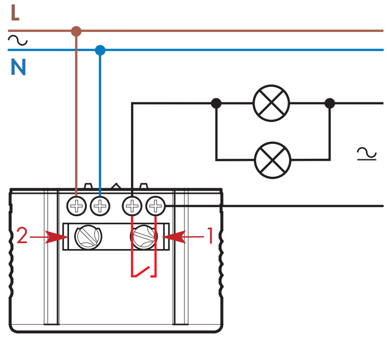
Type 18.01/18.11



Type 18.21/18.31/18.31...0031

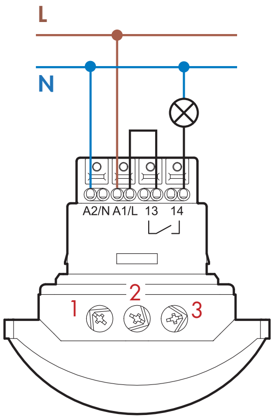


Type 18.21-0300/18.31-0300

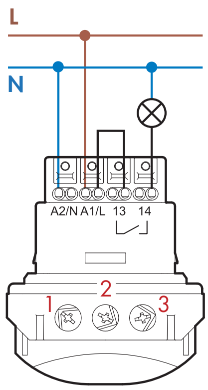


1= ambient light intervention threshold
2= light on time following last detection

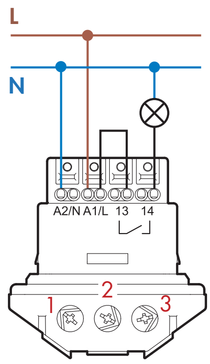
Type 18.41



Type 18.51



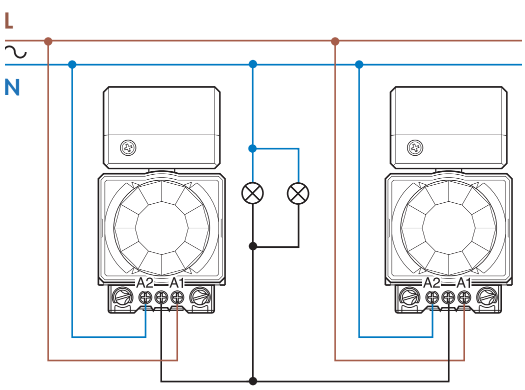
Type 18.61



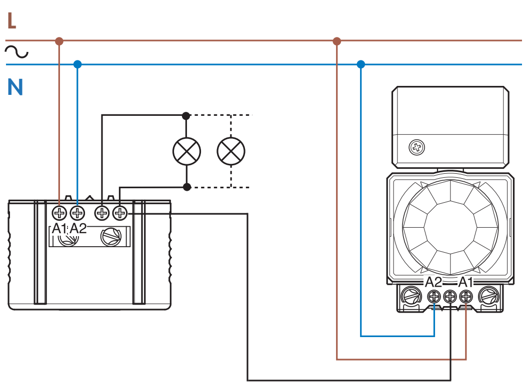
1= light on time following last detection
2 = sensitivity setting
3= ambient light intervention threshold

The nominal lamp rating as stated in the contact specification applies when wiring is realized in accordance with the diagrams above.
If the load is powered from a phase different to that powering the Movement detector, then a 50 % reduction in the lamp rating must be considered.

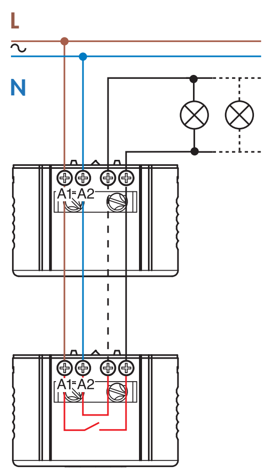
Type 18.01/18.11



Type 18.01/18.21



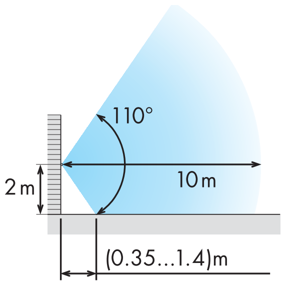
Type 18.21/18.31/18.31...0031



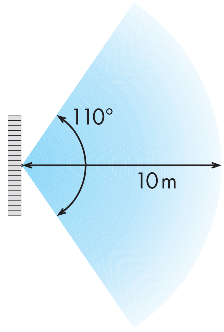
Note: keep the polarity indicated for Phase and Neutral

Sensing area

18.01, 18.11 - Wall mounting

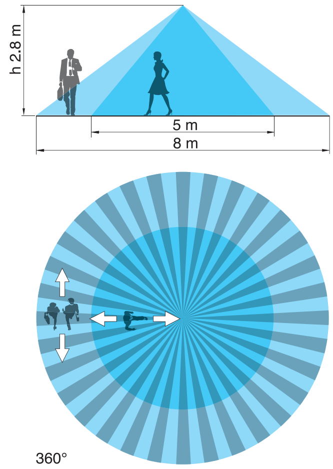


Side view

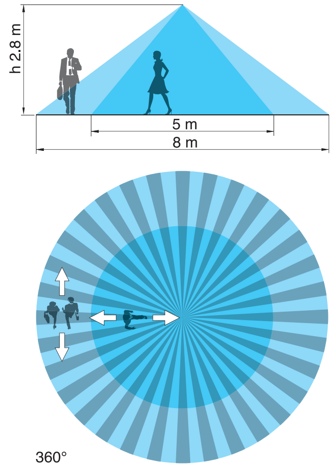


Plan view

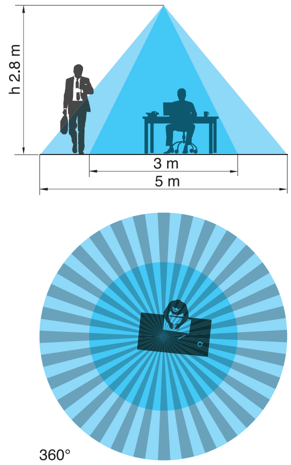
18.01, 18.11 - Ceiling mounting



18.21, 18.31 - Ceiling mounting

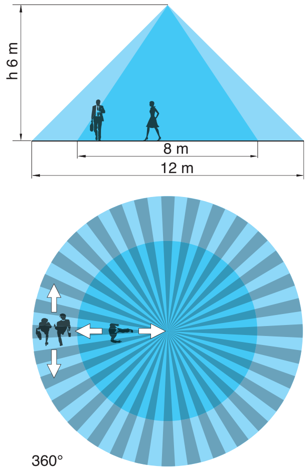


18.31...0031 - Internal ceiling installation, surface mounting



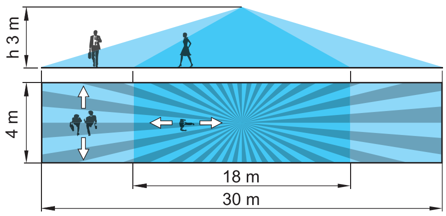
Movement and presence detector

18.31...0031 - High ceilings installations

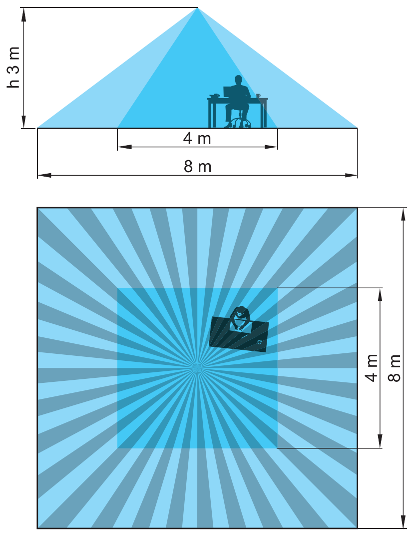


For applications with high ceilings (up to 6 meters)

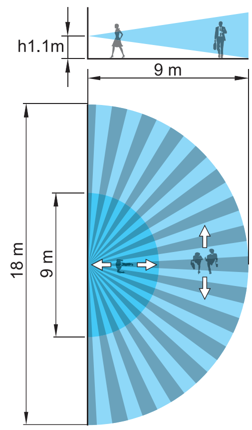
18.41



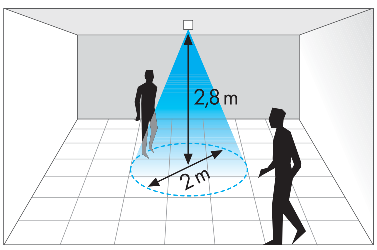
18.51



18.61



Accessories

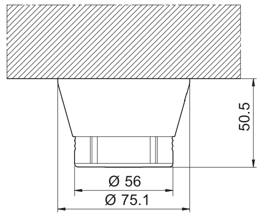
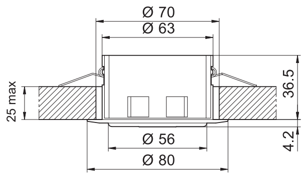
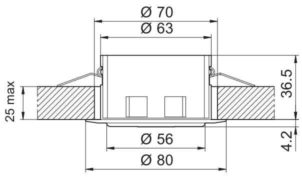
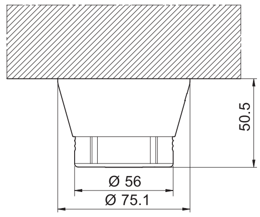
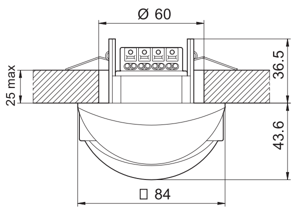
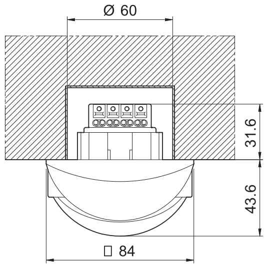
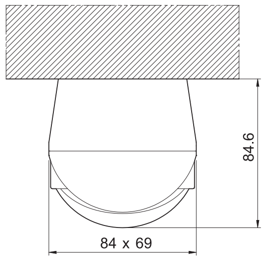
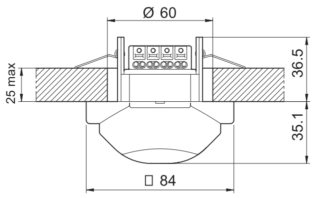
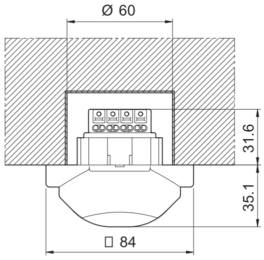
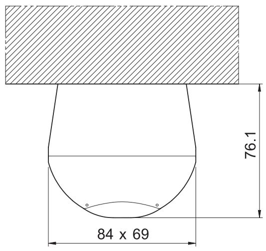
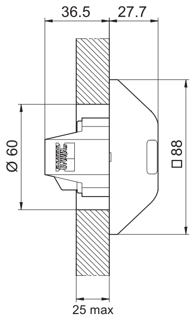
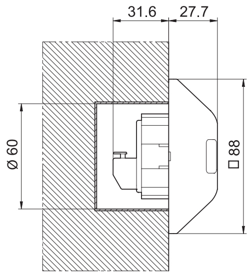


Beam limiter for 18.21 and 18.31 PIR movement detectors

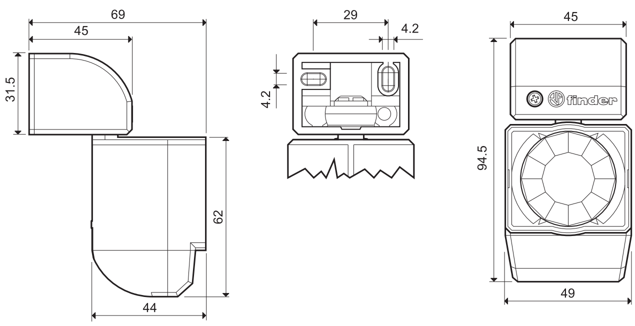
Reduces the area of survey to 2 meters diameter (versus 8m) at an installation height of 2.8 meters.
(Note: with the beam limiter the ambient light intervention threshold feature will be increased significantly)

II-2014, www.findernet.com

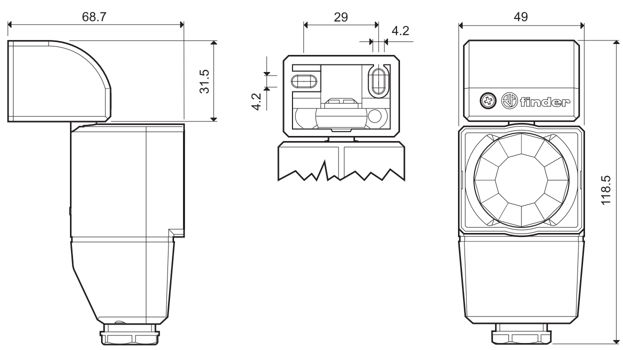
Outline drawings

Type	Suspended ceiling mounting	Recess mounting	Surface mounting
18.21			
18.31			
18.31...0031			
18.41			
18.51			
18.61			

Type 18.01



Type 18.11

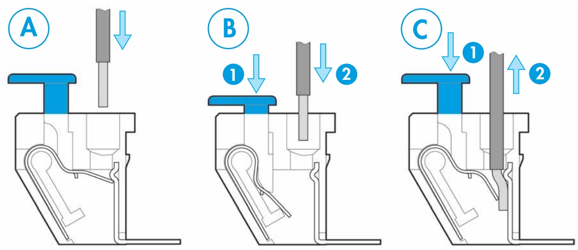


J

Main features for 18.41, 18.51 and 18.61

Push-in terminals

The push-in terminals permit the quick connection of solid wires or ferrules by their simple insertion into the terminal (A).
It is possible to open the terminal to extract the wire by first pushing down on the push-button using a screwdriver or fingers (C).
For stranded cable it is necessary first to open the terminal using the push button, both for the extraction (C) and insertion (B).



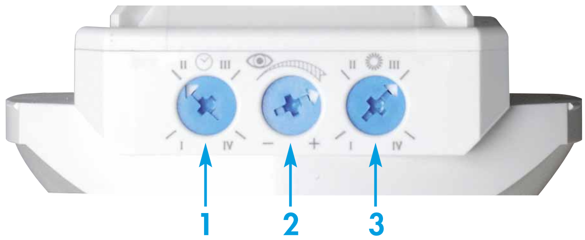
Double terminals for the easy "looping" between multiple 18 Series.
The Max. wire size for each terminal is 2.5 mm^2.

The terminals are equipped with a test hole to take a test probe.

Settings

The **ambient light intervention threshold** can be set from the lowest value (about 1 lx) to the optimal value for offices and working area (about 500lx), with the possibility to exclude totally the intervention of the light sensor (set to ∞ lx).
To optimize energy saving, it is suggested to set the intervention threshold after consideration of the minimum natural light levels appropriate to the safety and comfort of the application.

Lux (3):
I. Min. level (about 1 lx)
II. Transit area (> 10 lux)
III. Offices – work area (about 500 lx)
IV. Always ON (∞ lx)



The **sensitivity control (2)** is pre-set at maximum sensitivity, and this will be suitable for most applications. Setting a lower level of sensitivity will have the effect of reducing the sensing area and ignoring smaller movements - which might be necessary depending on the application.

The light on time (1) following last detection can be regulated between 12 seconds to 35 minutes.
Time:
I. 12 seconds
II. 3 minutes
III. 15 minutes
IV. 35 minutes

Features

13.81 - Electronic step relay - Rail mount - 1 Pole

13.91 - Electronic step relay and timing step relay Switch box mount - 1 Pole

- Fixed time (10 minutes) timing function selectable (13.91)
- Use with 3 or 4 wire connection, with automatic recognition by the relay
- Control input can be continuously applied
- Longer mechanical and electrical life, and much quieter than electromechanical step relays
- "Zero crossing" load switching
- Can be mounted behind blanking plates, as widely used in residential wiring systems such as; BTicino: Axolute, Matix, Living and Magic, Gewiss: GW24, Vimar: Plana and Idea ... (13.91)
- 35 mm rail (EN 60715) mount (13.81)
- Cadmium free contact material

13.81

- 1 NO (SPST-NO)
- 35 mm rail (EN 60715) mount
- 17.5 mm wide

NEW GENERATION **13.91**

- 1 NO (SPST-NO)
- Step relay and timing step relay (10 minutes)
- For mounting within residential switch boxes

13.81/91
Screw terminal

For outline drawing see page 9

		13.81	13.91
Contact specification			
Contact configuration		1 NO (SPST-NO)	1 NO (SPST-NO)
Rated current/Maximum peak current	A	16/30 (120 A - 5 ms)	10/20 (80 A - 5 ms)
Rated voltage/Maximum switching voltage	V AC	230/—	230/—
Rated load AC1	VA	3,700	2,300
Rated load AC15 (230 V AC)	VA	750	450
Nominal lamp rating: 230V incandescent/halogen	W	3,000	1,000
fluorescent tubes with electronic ballast	W	1,500	500
fluorescent tubes with electromechanical ballast	W	1,000	350
CFL	W	600	300
230V LED	W	600	300
LV halogen or LED with electronic ballast	W	600	300
LV halogen or LED with electromechanical ballast	W	1,500	500
Minimum switching load	mW (V/mA)	1,000 (10/10)	1,000 (10/10)
Standard contact material		$AgSnO_2$	$AgSnO_2$
Supply specification			
Nominal voltage (U_N)	V AC (50/60 Hz)	230	230
	V DC	—	—
Rated power	V A (50 Hz)/W	3/1.2	2/1
Operating range	AC (50 Hz)	$(0.8...1.1)U_N$	$(0.8...1.1)U_N$
	DC	—	—
Technical data			
Electrical life at rated load in AC1	cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Maximum impulse duration		continuous	continuous
Dielectric strength between: open contacts	V AC	1,000	1,000
supply - contacts	V AC	—	—
Ambient temperature range	°C	–10…+60	–10…+50
Protection category		IP 20	IP 20
Approvals (according to type)			

K

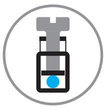
Features

13.01 - Electronic step/monostable relay Rail mount - 1 Pole

13.61 - Multifunction step/monostable relay with reset command - Rail mount 1 Pole

- Selectable Step or Monostable operation (13.01)
- Multifunction (Step, Timing step, Monostable, Light ON) (13.61)
- Reset feature, for centralized off command (13.61)
- Set feature, for centralized on command (13.61.0.024)
- Control input can be continuously applied
- Longer mechanical and electrical life, and much quieter than electromechanical step relays
- 12...24 V AC/DC and 110...240 V AC supply versions (13.61)
- Suitable for SELV applications and available also for supply 12 and 24 V AC/DC (13.01)
- "Zero-crossing" load switching (13.61)
- 35 mm rail (EN 60715) mount
- Cadmium free contact material

13.01/61
Screw terminal



For outline drawing see page 9

13.01

- 1 CO (SPDT)
- Step or monostable relay
- 35 mm rail (EN 60715) mount
- 35 mm wide

NEW 13.61

- 1 NO (SPST-NO)
- Multifunction:
  - step relay
  - timing step relay
  - monostable relay
  - light on
- Reset feature, for centralized off command
- Set feature, for centralized on command (0.024 version)
- 35 mm rail (EN 60715) mount
- 17.5 mm wide

		13.01	13.01	13.61
Contact specification				
Contact configuration		1 CO (SPDT)		1 NO (8.230), 1 CO (0.024)
Rated current/Maximum peak current	A	16/30 (120 A - 5 ms)		16/30 (120 A - 5 ms)
Rated voltage/Maximum switching voltage	V AC	250/400		250/400
Rated load AC1	VA	4,000		4,000
Rated load AC15 (230 V AC)	VA	750		750
Nominal lamp rating: 230V incandescent/halogen	W	2,000		3,000
fluorescent tubes with electronic ballast	W	1,000		1,500
fluorescent tubes with electromechanical ballast	W	750		1,000
CFL	W	400		600
230V LED	W	400		600
LV halogen or LED with electronic ballast	W	400		600
LV halogen or LED with electromechanical ballast	W	800		1,500
Minimum switching load	mW (V/mA)	1,000 (10/10)		1,000 (10/10)
Standard contact material		$AgSnO_2$		$AgSnO_2$
Supply specification				
Nominal voltage (U_N)	V AC (50/60 Hz)	110...125	230...240	110...240
	V DC/AC (50/60 Hz)	12	24	12...24
Rated power AC/DC	V A (50/60 Hz)/W	2.5/2.5		3.2/1 (8.230), 1/0.5 (0.024)
Operating range	V AC (50 Hz)	90...130	184...253	90...264
	V DC/AC (50 Hz)	10.8...13.2	20.6...33.6	10.2...26.4
Technical data				
Electrical life at rated load in AC1	cycles	$100 \cdot 10^3$		$100 \cdot 10^3$
Maximum impulse duration		continuous		continuous
Dielectric strength between: open contacts	V AC	1,000		1,000
supply - contacts	V AC	4,000		2,000
Ambient temperature range	°C	–10...+60		–10...+60
Protection category		IP 20		IP 20
Approvals (according to type)				

Features

13.11 - Call & Reset Relay - Rail mount - 1 Pole

13.12 - Call & Reset Relay - Rail mount - 2 Pole

13.31 - Electromechanical monostable relay Switch box mount - 1 Pole

- Call relay with reset command suitable for residential and commercial applications: public bathroom, hospital, hotel (type 13.11/13.12)
- Can be mounted behind blanking plates, as widely used in residential wiring systems such as; BTicino: Axolute, Matix, Living e Magic, Gewiss: GW24, Vimar: Plana e Idea ... (13.31)
- 35 mm rail (EN 60715) or flange mount (13.11 and 13.12)
- Cadmium free contact material (13.31)

13.11

- 1 CO (SPDT)
- Call relay with reset command
- 35 mm rail (EN 60715) mount
- 17.5 mm wide

13.12

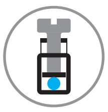
- 1 CO (SPDT) + 1 NO (SPST-NO)
- Call relay with reset command
- 35 mm rail (EN 60715) mount
- 17.5 mm wide

13.31

NEW GENERATION

- 1 NO (SPST-NO)
- Interposing monostable relay
- For mounting within residential switch boxes

13.11/12/31
Screw terminal



* During impulse only.
For outline drawing see page 9

		13.11	13.12	13.31
Contact specification				
Contact configuration		1 CO (SPDT)	1 CO (SPDT) + 1 NO (SPST-NO)	1 NO (SPST-NO)
Rated current/Maximum peak current	A	12/30	8/15	12/20 (80 A - 5 ms)
Rated voltage/Maximum switching voltage	V AC	250/400	250/400	250/400
Rated load AC1	VA	3,000	2,000	3,000
Rated load AC15 (230 V AC)	VA	750	400	450
Nominal lamp rating: 230V incandescent/halogen	W	1,200	800	800
fluorescent tubes with electronic ballast	W	500	300	400
fluorescent tubes with electromechanical ballast	W	400	250	300
CFL	W	300	150	200
230V LED	W	300	150	200
LV halogen or LED with electronic ballast	W	300	150	200
LV halogen or LED with electromechanical ballast	W	500	300	400
Minimum switching load	mW (V/mA)	500 (5/5)	300 (5/5)	1,000 (10/10)
Standard contact material		AgCdO	AgCdO	$AgSnO_2$
Supply specification				
Nominal voltage (U_N)	V AC (50/60 Hz)	230...240	12 - 24	12 - 230
	V DC	—	12 - 24	24
Rated power AC/DC	V A (50 Hz)/W	1.7/0.7 *	3/2.5 *	1/0.4
Operating range	AC (50 Hz)	(0.8...1.1)U_N	(0.8...1.1)U_N	(0.8...1.1)U_N
	DC	—	(0.8...1.1)U_N	(0.8...1.1)U_N
Technical data				
Electrical life at rated load in AC1	cycles	$100 \cdot 10^3$	$100 \cdot 10^3$	$70 \cdot 10^3$
Maximum impulse duration		10 s (100 ms minimum)	10 s (100 ms minimum)	continuous
Dielectric strength between: open contacts	V AC	1,000	1,000	1,000
supply - contacts	V AC	2,000	2,000	2,000
Ambient temperature range	°C	–10...+60	–10...+60	–10...+60
Protection category		IP 20	IP 20	IP 20
Approvals (according to type)		CE EAC PCT		CE EAC

K

Ordering information

Example: 13 series, electronic step/monostable relay, 35 mm rail (EN 60715) mount, 1 CO (SPDT) 16 A contact, 230 V AC supply.

1 3	. 0	1	. 8	. 2 3 0	. 0 (A)	0 (B)	0 (C)	0 (D)

Series

Type
0 = Step/Monostable, 35 mm rail (EN 60715) mount, 35 mm wide
1 = Call & Reset relay, 35 mm rail (EN 60715) mount, 17.5 mm wide
3 = Monostable relay, switch box mounting
6 = Multifunction relay, 35 mm rail (EN 60715) mount, 17.5 mm wide
8 = Modular step relay, 35 mm rail (EN 60715) mount, 17.5 mm wide
9 = Step relay and timing step relay, switch box mounting

No. of poles
1 = 1 pole
2 = 1 pole CO (SPDT) + 1 NO (SPST-NO)

Supply version
0 = AC (50/60 Hz)/DC
8 = AC (50/60 Hz)
9 = DC

Supply voltage
012 = 12 V AC/DC (13.01 and 13.12 only)
012 = 12 V AC (13.31 only)
024 = 24 V AC/DC (13.01 and 13.12 only)
024 = 24 V DC (13.31 only)
024 = 12...24 V AC/DC (13.61 only)
125 = (110...125)V AC (13.01 only)
230 = (230...240)V AC (13.01 and 13.11)
230 = 110...240 V AC (13.61 only)
230 = 230 V AC (13.31, 13.81 and 13.91)

A: Contact material
0 = Standard
4 = Standard $AgSnO_2$ (only for 13.31)

B: Contact circuit
0 = Standard
3 = Standard NO (only for 13.31)

Codes / Supply voltage
13.01.0.012.0000 12 V AC/DC
13.01.0.024.0000 24 V AC/DC
13.01.8.125.0000 110...125 V AC
13.01.8.230.0000 230...240 V AC
13.11.8.230.0000 230...240 V AC
13.12.0.012.0000 12 V AC/DC
13.12.0.024.0000 24 V AC/DC
13.31.8.012.4300 12 V AC
13.31.9.024.4300 24 V DC
13.31.8.230.4300 230 V AC
13.61.8.230.0000 110...240 V AC
13.61.0.024.0000 12...24 V AC/DC
13.81.8.230.0000 230 V AC
13.91.8.230.0000 230 V AC

Technical data

Insulation		**13.01.8**	**13.01.0**	**13.11 - 13.12**	**13.31 - 13.61**	**13.81 - 13.91**
Dielectric strength						
between control circuit and supply	V AC	4,000	—	—	—	—
between control circuit and contacts	V AC	4,000	4,000	—	—	—
between R-S-A2 and contacts	V AC	—	—	2,000	—	—
between supply and contacts	V AC	4,000	4,000	—	2,000	—
between open contacts	V AC	1,000	1,000	1,000	1,000	1,000

Other data		**13.01**	**13.11 - 13.12**	**13.31**	**13.61**	**13.81**	**13.91**
Power lost to the environment							
without contact current	W	2.2	—	0.4	1	1.2	0.7
with rated current	W	3.5	1.5	1.6	1.8	2	1.8
Max cable lenght for push-button connection	m	100	100	—	200	200	100
Max. no. of illuminated push-button	(≤ 1mA)	—	—	—	10*	15	12

Terminals		**13.01**		**13.11 - 13.12 - 13.31 - 13.61 - 13.81 - 13.91**	
Max. wire size		solid cable	stranded cable	solid cable	stranded cable
	mm^2	1x6 / 2x4	1x6 / 2x2.5	1x6 / 2x4	1x4 / 2x2.5
	AWG	1x10 / 2x12	1x10 / 2x14	1x10 / 2x12	1x12 / 2x14
Screw torque	Nm	0.8		0.8	

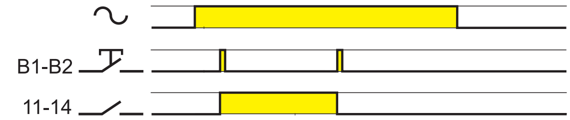
* For 8.230 version.

Functions

Type **Functions**

13.01

Monostable
On closure of a switch between terminals (B2-B3) the output contact will close, and remain so, until the switch opens.

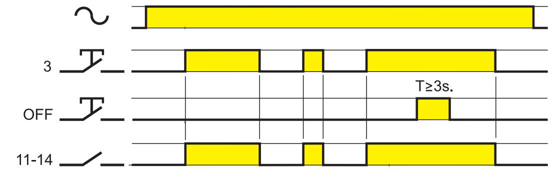


Step relay (bistable)
After every impulse (B1-B2), the output contact changes state - alternately switching from open to closed and vice versa.

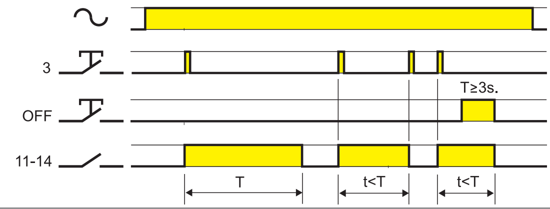
13.11
13.12

Call and Reset relay
On momentary closure of the Set switch (S), the output contact closes. Only a momentary closure of the Reset switch (R) will open the output contact.

13.61

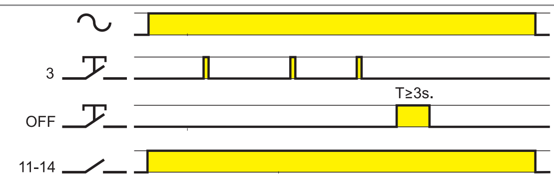


(RM) **Monostable**
On closure of a switch between terminal 3 and Line (or Neutral, in case of 3-wire connection) the output contact will close, and remain so, until the switch opens.



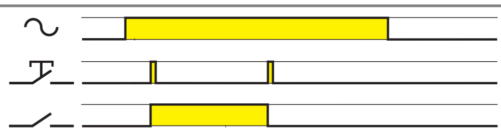
(IT) **Timing step relay**
On initial impulse the output contact closes and timing starts for the pre-set duration T; On expiry of the time delay, the output contact opens.
During the timing period it is possible to immediately open the contact with a further impulse.

(RI) **Step relay**
After every impulse, the output contact changes state - alternately switching from open to closed and vice versa.



Light ON
With this function set - the output contact stays permanently closed.

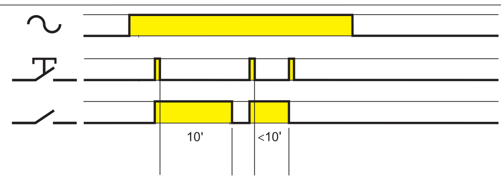
13.81



(RI) **Step relay**
After every impulse, the output contact changes state - alternately switching from open to closed and vice versa.

13.91

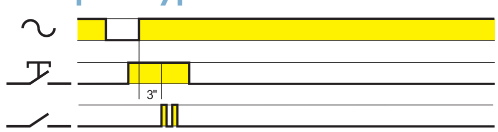
(RI) **Step relay**
After every impulse, the output contact changes state - alternately switching from open to closed and vice versa.



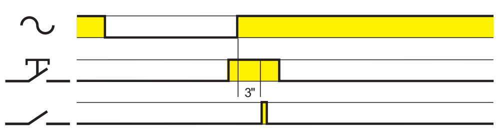
(IT) **Timing step relay**
On initial impulse the output contact closes and timing starts for the pre-set duration (fixed 10 min); On expiry of the time delay, the output contact opens.
During the timing period it is possible to immediately open the contact with a further impulse.

Operating mode setup for type 13.91

RI → IT



IT → RI



a) Remove the supply voltage
b) Press the control button
c) Apply the supply to the relay, keeping the button closed.
After 3 second, the light will flash twice to indicate the selection of the "IT" function, or flash once for "RI" function.

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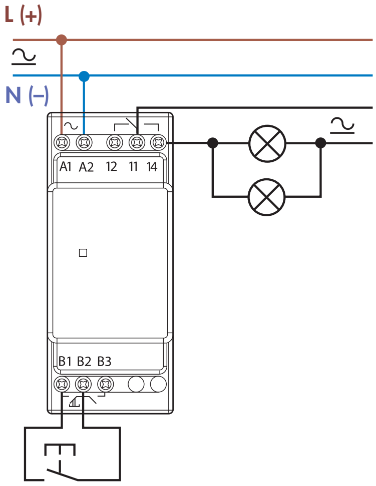
Wiring diagrams (13.01, 13.11, 13.12 and 13.31)

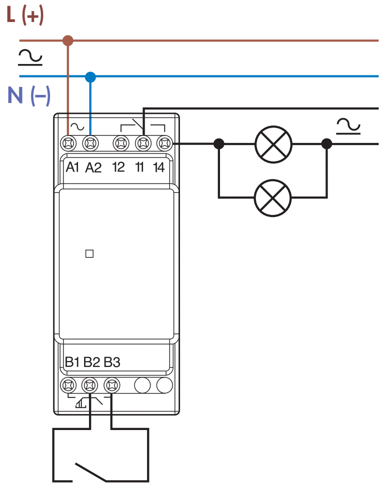
Type 13.01
Step wiring diagram

Red LED indication:
Continuous = relay ON

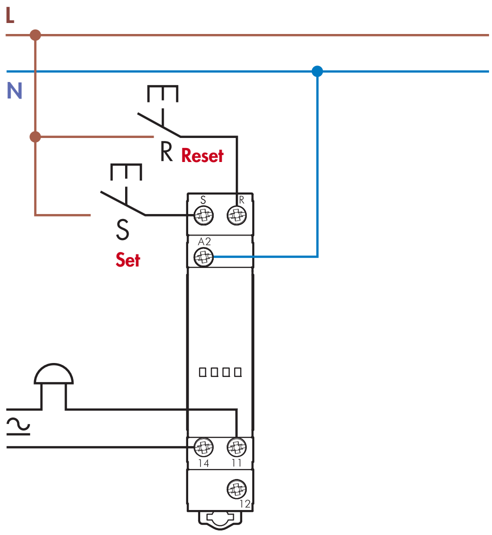


Type 13.01
Monostable wiring diagram

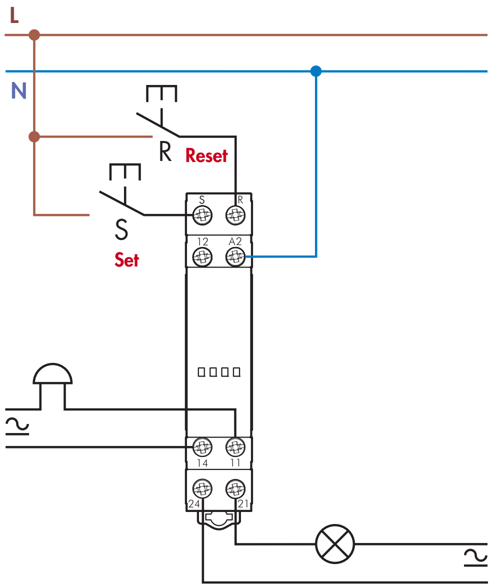
Red LED indication:
Continuous = relay ON



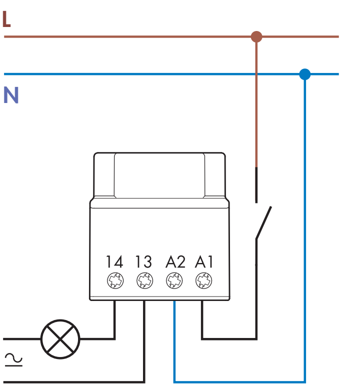
Type 13.11
Call & reset relay



Type 13.12
Call & reset relay



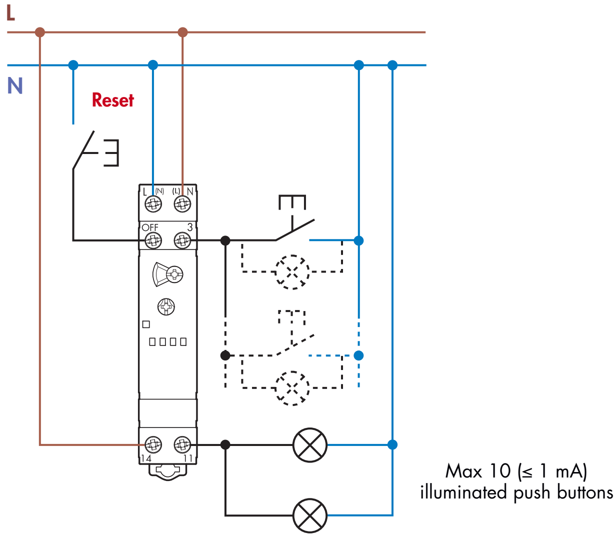
Type 13.31
Connection



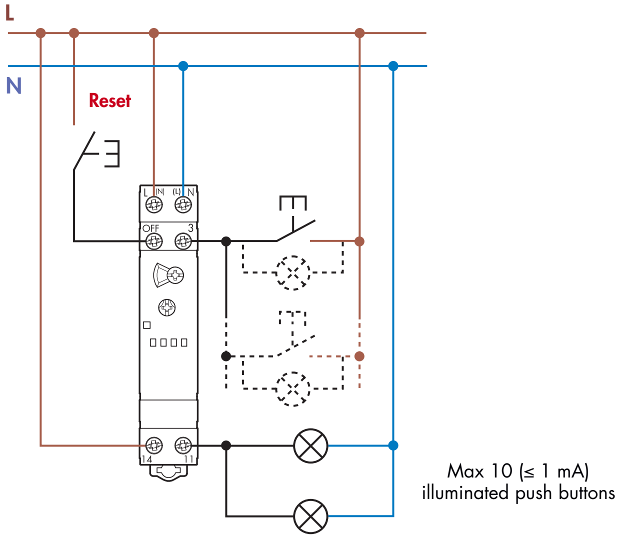
K

Wiring diagrams (13.61)

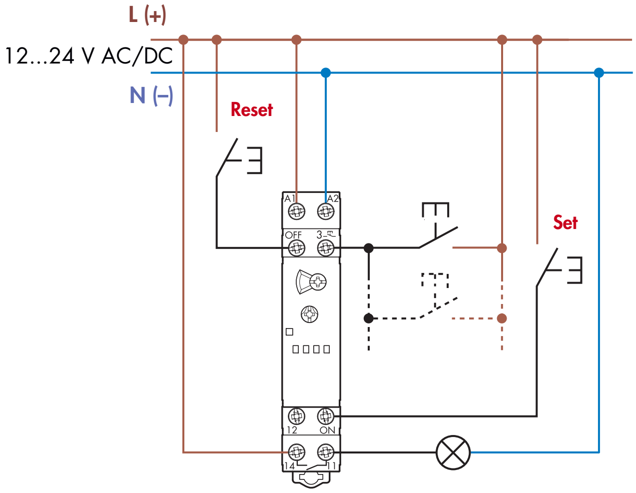
Type 13.61.8.230
3 wire connection
Red LED indication:
Continuous = relay ON
Blinking = relay OFF



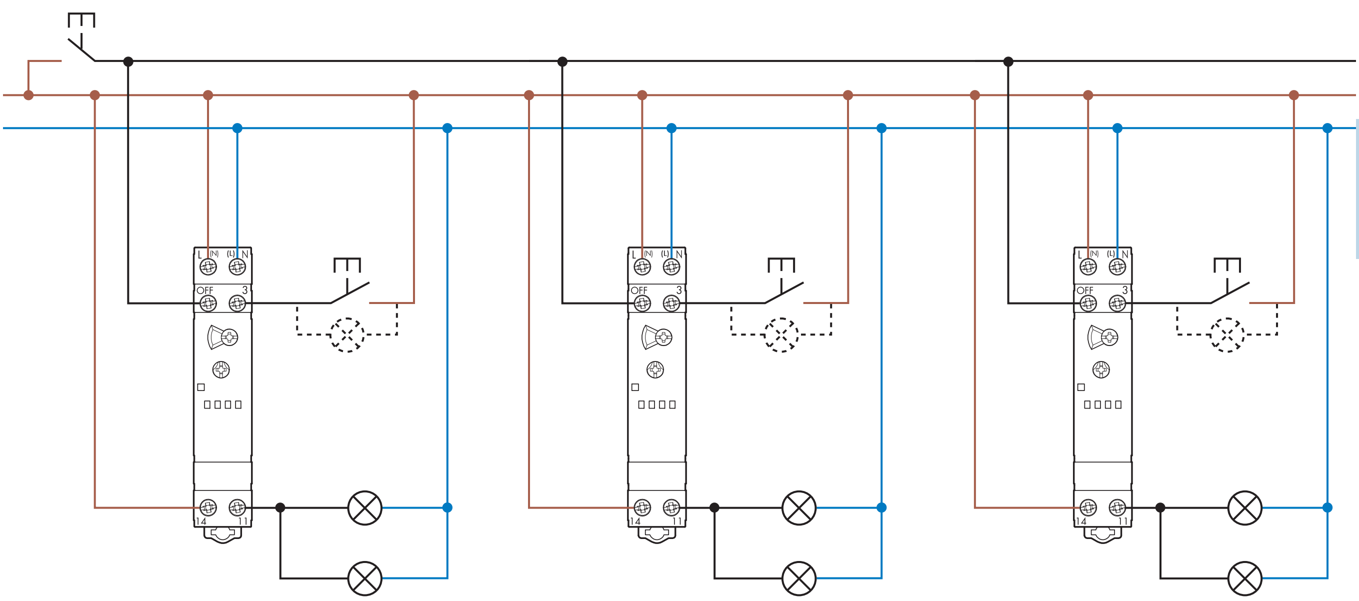
Type 13.61.8.230
4 wire connection
Red LED indication:
Continuous = relay ON
Blinking = relay OFF



Type 13.61.0.024
4 wire connection
Red LED indication:
Continuous = relay ON
Blinking = relay OFF

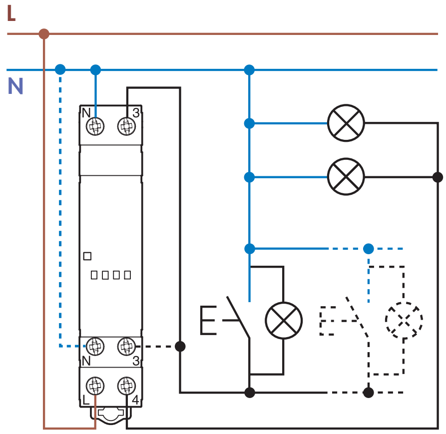


Type 13.61.8.230 - Examples of multiple 4 wire connection with centralized reset pushbutton



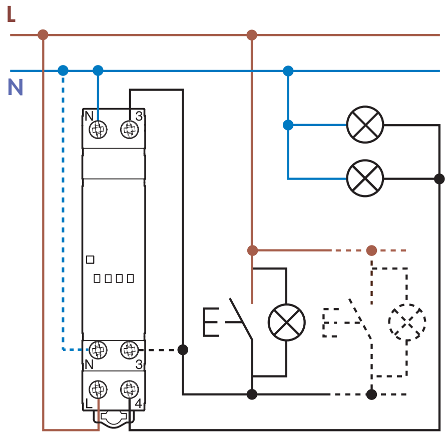
Wiring diagrams (13.81 and 13.91)

Type 13.81
3 wire connection
Red LED indication:
Continuous = relay ON
Blinking = relay OFF



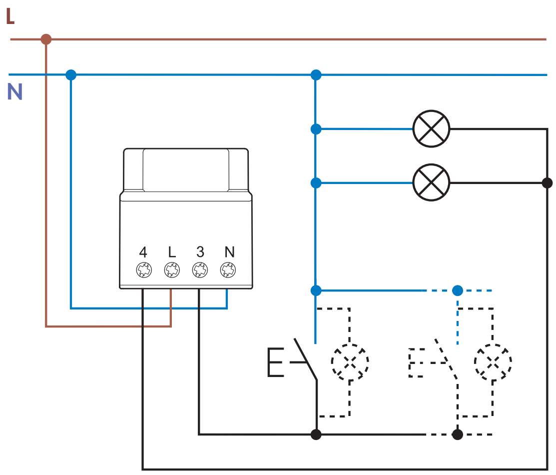
Max 15 (≤ 1 mA)
illuminated push buttons

Type 13.81
4 wire connection
Red LED indication:
Continuous = relay ON
Blinking = relay OFF



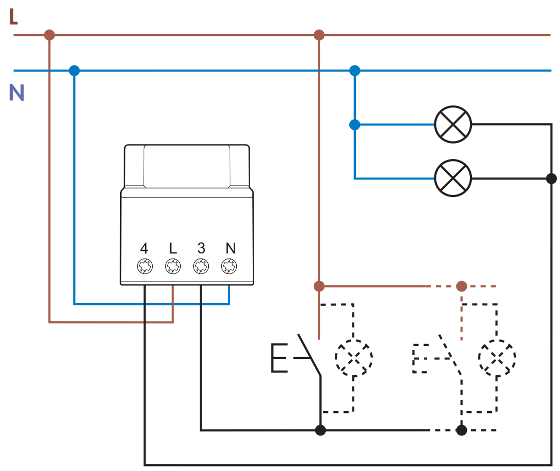
Max 15 (≤ 1 mA)
illuminated push buttons

Type 13.91
3 wire connection



Max 12 (≤ 1 mA)
illuminated push buttons

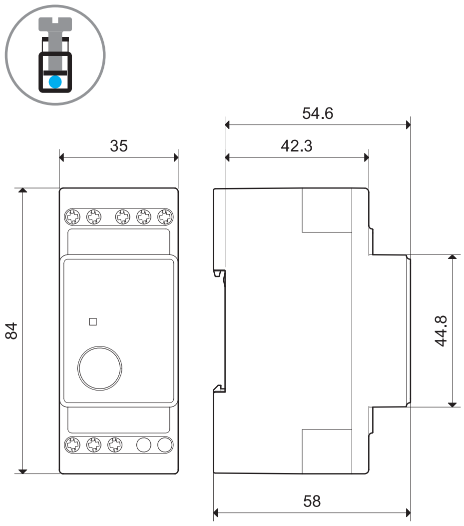
Type 13.91
4 wire connection



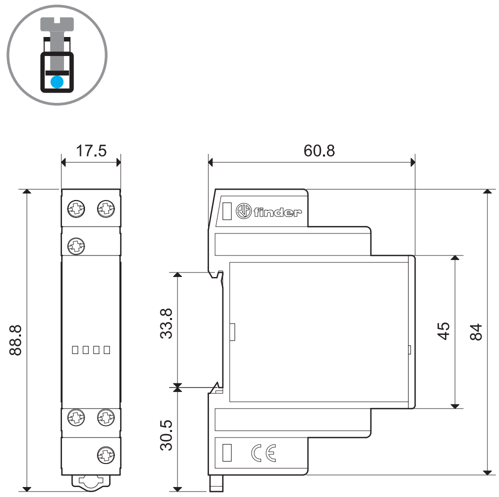
Max 12 (≤ 1 mA)
illuminated push buttons

Outline drawings

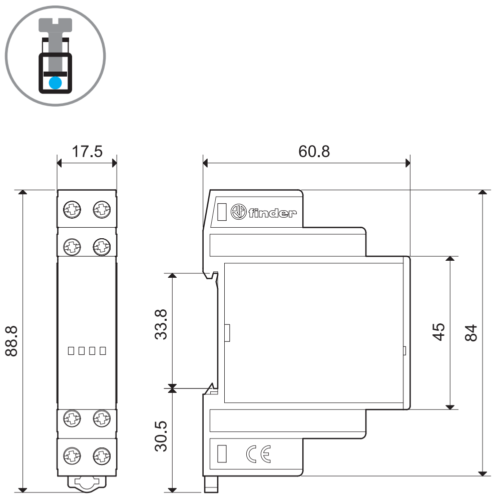
13.01
Screw terminal



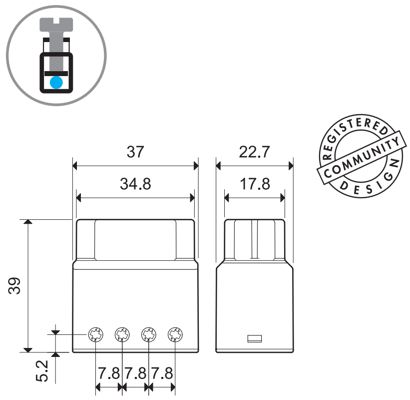
13.11
Screw terminal



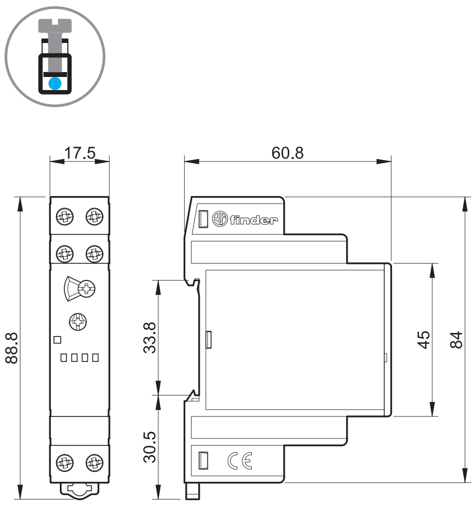
13.12
Screw terminal



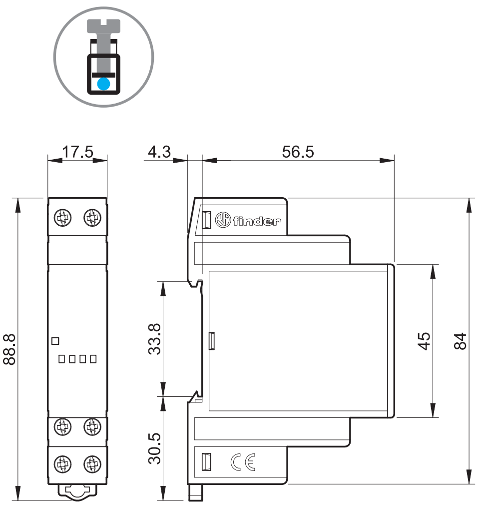
13.31/13.91
Screw terminal



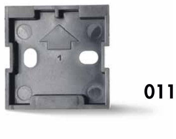
13.61
Screw terminal



13.81
Screw terminal



Accessories

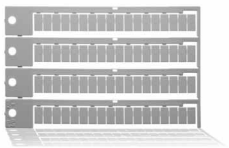


011.01

Adaptor for panel mounting, for type 13.01, 35 mm wide	011.01

020.01

Adaptor for panel mounting, for type 13.11, 13.12, 13.61 and 13.81, 17.5 mm wide	020.01



060.72

Sheet of marker tags for type 13.11, 13.12, 13.61 and 13.81, plastic, 72 tags, 6x12 mm	060.72

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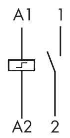
Features

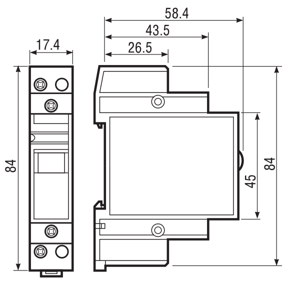
1 or 2 Pole 16 A Step relays for direct 35 mm rail (EN 60715) mounting

- 17.4 mm wide
- Test button with mechanical indicators
- Choice of 6 switching sequences
- AC coils and DC coils
- Identification label
- Possible to connect illuminated push buttons with the additional part 026.00
- 35 mm rail (EN 60715) mount
- Cadmium free contact material

20.21

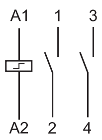
- Single phase switch 1 NO (SPST-NO)
- 35 mm rail (EN 60715) mount

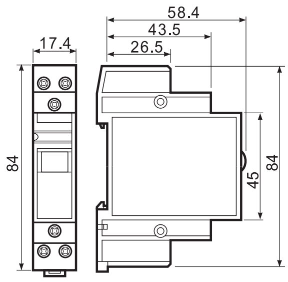




20.22, 24, 26, 28

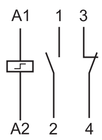
- Double phase switch
- 35 mm rail (EN 60715) mount

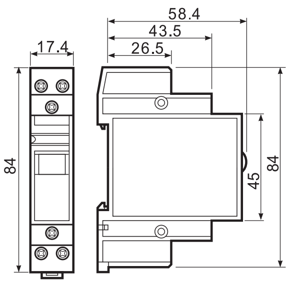




20.23

- Double phase switch 1NO+1NC (SPST-NO+SPST-NC)
- 35 mm rail (EN 60715) mount





For UL ratings see:
"General technical information" page V

	20.21	20.22, 24, 26, 28	20.23
Contact specification			
Contact configuration	1 NO (SPST-NO)	2 NO (DPST-NO)	1NO+1NC (SPST-NO+SPST-NC)
Rated current/Maximum peak current A	16/30	16/30	16/30
Rated voltage/Maximum switching voltage V AC	250/400	250/400	250/400
Rated load AC1 VA	4,000	4,000	4,000
Rated load AC15 (230 V AC) VA	750	750	750
Nominal lamp rating: incandescent (230 V) W	2,000	2,000	2,000
compensated fluorescent (230 V) W	750	750	750
uncompensated fluorescent (230 V) W	1,000	1,000	1,000
halogen (230 V) W	2,000	2,000	2,000
Minimum switching load mW (V/mA)	1,000 (10/10)	1,000 (10/10)	1,000 (10/10)
Standard contact material	AgNi	AgNi	AgNi
Coil specification			
Nominal voltage (U_N) V AC (50/60 Hz)	8 - 12 - 24 - 48 - 110 - 120 - 230 - 240		
V DC	12 - 24 - 48 - 110	12 - 24 - 48 - 110	12 - 24 - 48 - 110
Rated power AC/DC VA (50 Hz)/W	6.5/5	6.5/5	6.5/5
Operating range AC	$(0.85\ldots1.1)U_N$ (50 Hz)/$(0.9\ldots1.1)U_N$ (60 Hz)		
DC	$(0.9\ldots1.1)U_N$	$(0.9\ldots1.1)U_N$	$(0.9\ldots1.1)U_N$
Technical data			
Mechanical life AC/DC cycles	$300 \cdot 10^3$	$300 \cdot 10^3$	$300 \cdot 10^3$
Electrical life at rated load in AC1 cycles	$100 \cdot 10^3$	$100 \cdot 10^3$	$100 \cdot 10^3$
Minimum/Maximum impulse duration	0.1s/1h (according to EN 60669)	0.1s/1h (according to EN 60669)	0.1s/1h (according to EN 60669)
Insulation between coil and contacts (1.2/50 μs) kV	4	4	4
Ambient temperature range °C	–40…+40	–40…+40	–40…+40
Protection category	IP 20	IP 20	IP 20
Approvals (according to type)			

K

Ordering information

Example: 20 series relay, 35 mm rail (EN 60715) mount, double phase switch, 2 NO (DPST-NO) 16 A contacts, coil rated at 12 V DC, $AgSnO_2$ contacts.

2 0 . 2 2 . 9 . 0 1 2 . 4 0 0 0

Series

Type
2 = 35 mm rail (EN 60715) mount

No. of poles
1 = Single phase switch 1 NO (SPST-NO)
2 = Double phase switch 2 NO (DPST-NO)
3 = Double phase switch 1 NC+1 NO (SPST-NO+SPST-NC)
4 = 4 sequence double phase switch 2 NO (DPST-NO)
6 = 3 sequence double phase switch 2 NO (DPST-NO)
8 = 4 sequence double phase switch 2 NO (DPST-NO)

Contact material
0 = AgNi standard
4 = $AgSnO_2$

Coil voltage
See coil specifications

Coil version
8 = AC (50/60 Hz)
9 = DC

Technical data

Insulation					
Dielectric strength					
between supply and contacts	V AC	3,500			
between open contacts	V AC	2,000			
between adjacent contacts	V AC	2,000			
Other data					
Power lost to the environment					
with rated current and coil deenergised	W	1.3 (20.21, 20.23, 20.28)		2.6 (20.22, 20.24, 20.26)	
Screw torque	Nm	0.8		0.8	
Max. wire size		**Coil terminals**		**Contact terminals**	
		solid cable	stranded cable	solid cable	stranded cable
	mm^2	1x4 / 2x2.5	1x2.5 / 2x2.5	1x6 / 2x4	1x4 / 2x2.5
	AWG	1x12 / 2x14	1x14 / 2x14	1x10 / 2x12	1x12 / 2x14

If the coil is operated for a prolonged period of time, adequate ventilation of the relays must be provided - suggested gap of 9 mm between adjacent relays.

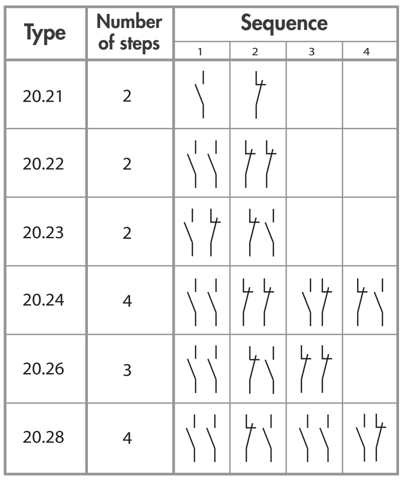
Coil specifications

DC version data

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Consumption I at U_N
V		V	V	Ω	mA
12	**9**.012	10.8	13.2	27	440
24	**9**.024	21.6	26.4	105	230
48	**9**.048	43.2	52.8	440	110
110	**9**.110	99	121	2,330	47

AC version data

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Consumption I at U_N (50 Hz)
V		V	V	Ω	mA
8	**8**.008	6.8	8.8	4	800
12	**8**.012	10.2	13.2	7.5	550
24	**8**.024	20.4	26.4	27	275
48	**8**.048	40.8	52.8	106	150
110	**8**.110	93.5	121	590	64
120	**8**.120	102	132	680	54
230	**8**.230	196	253	2,500	28
240	**8**.240	204	264	2,700	27.5



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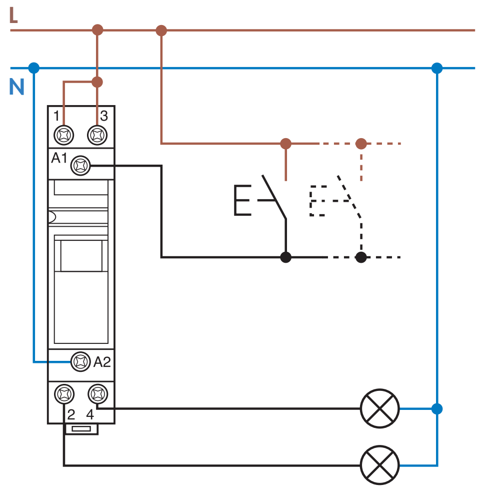
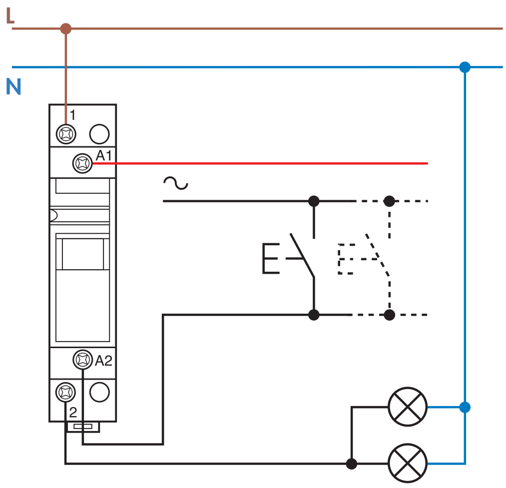
II-2015, www.findernet.com

Wiring diagrams



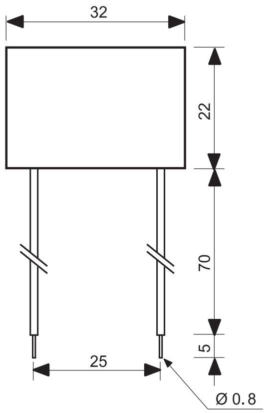
Example: 230 V AC supply voltage.



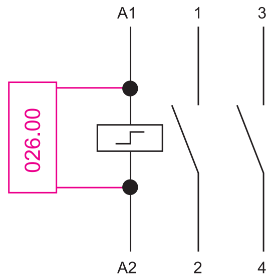
Example: 24 V AC supply voltage.

Accessories

Module for use with illuminated push-buttons



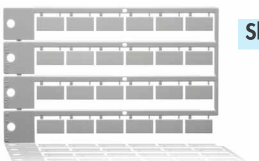
Type 026.00
Sealed construction, 7.5 cm insulated flexible wire termination.



Example of wiring diagram of type 026.00
This module is necessary when using between 1 and a maximum of 15 illuminated push buttons in the coil circuit (Each 1.5 mA max, 230 V AC). It must be connected in parallel to the coil of the relay.

020.01

Adaptor for panel mounting, 17.5 mm wide	020.01

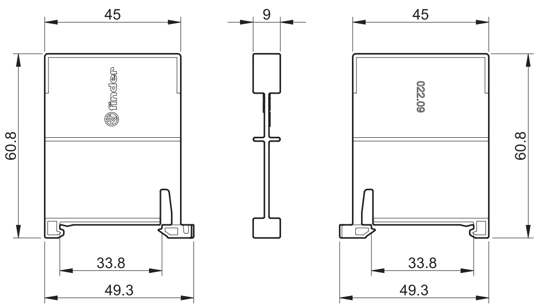


020.24

Sheet of marker tags, plastic, 24 tags, 9x17 mm	020.24

022.09

Separator for rail mounting, plastic, 9 mm wide	022.09



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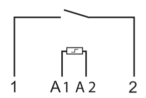
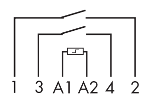
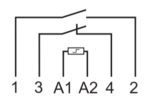
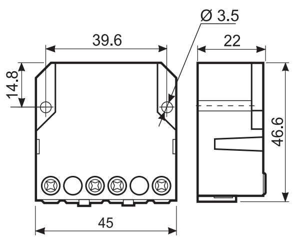
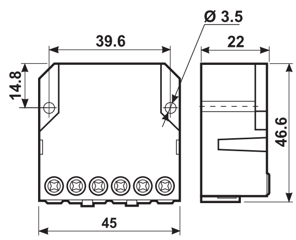
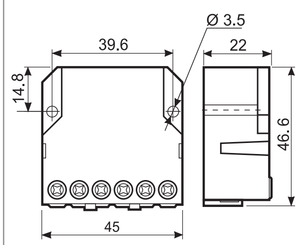
II-2015, www.findernet.com

26 Series - Step relays 10 A

Features

1 or 2 Pole electromechanical step relay with electrically separate coil and contact circuits

- Choice of 6 switching sequences
- Screw terminal connections
- AC coil
- Panel mount
- Cadmium free contact material

26.01	26.02, 04, 06, 08	26.03
		
• Single phase switch 1 NO (SPST-NO)	• Double phase switch 2 NO (DPST-NO)	• 1 NO + 1 NC (SPST-NO + SPST-NC)
 26.01	 26.02 26.04 26.06 26.08	 26.03
		

		26.01	26.02, 04, 06, 08	26.03
Contact specification				
Number of contacts		1 NO (SPST-NO)	2 NO (DPST-NO)	1NO+1NC (SPST-NO+SPST-NC)
Rated current/Maximum peak current	A	10/20	10/20	10/20
Rated voltage/Maximum switching voltage	V AC	250/400	250/400	250/400
Rated load AC1	VA	2,500	2,500	2,500
Rated load AC15 (230 V AC)	VA	500	500	500
Nominal lamp rating: incandescent (230 V)	W	800	800	800
compensated fluorescent (230 V)	W	360	360	360
uncompensated fluorescent (230 V)	W	500	500	500
halogen (230 V)	W	800	800	800
Minimum switching load	mW (V/mA)	1,000 (10/10)	1,000 (10/10)	1,000 (10/10)
Standard contact material		AgNi	AgNi	AgNi
Coil specification				
Nominal voltage (U_N)	V AC (50 Hz)	12 - 24 - 48 - 110 - 230	12 - 24 - 48 - 110 - 230	12 - 24 - 48 - 110 - 230
	V DC	—	—	—
Rated power AC/DC	VA (50 Hz)/W	4.5/—	4.5/—	4.5/—
Operating range	AC (50 Hz)	$(0.8\ldots1.1)U_N$	$(0.8\ldots1.1)U_N$	$(0.8\ldots1.1)U_N$
	DC	—	—	—
Technical data				
Mechanical life AC/DC	cycles	$300 \cdot 10^3$	$300 \cdot 10^3$	$300 \cdot 10^3$
Electrical life at rated load in AC1	cycles	$100 \cdot 10^3$	$100 \cdot 10^3$	$100 \cdot 10^3$
Minimum/Maximum impulse duration		0.1s/1h (according to EN 60669)	0.1s/1h (according to EN 60669)	0.1s/1h (according to EN 60669)
Insulation between coil and contacts (1.2/50 μs)	kV	4	4	4
Ambient temperature range	°C	–40…+40	–40…+40	–40…+40
Protection category		IP 20	IP 20	IP 20
Approvals (according to type)				

K

Ordering information

Example: 26 series screw terminal, panel mount relay, double phase switch 2 NO (DPST-NO) 10 A contacts, coil rated 12 V AC.

2 6 . 0 2 . 8 . 0 1 2 . 0 0 0 0

Series

Type
0 = Screw terminal

No. of poles
1 = Single phase switch 1 NO (SPST-NO)
2 = Double phase switch 2 NO (DPST-NO)
3 = Double phase switch 1 NO + 1 NC (SPST-NO + SPST-NC)
4 = 4 sequences double phase switch 2 NO (DPST-NO)
6 = 3 sequences double phase switch 2 NO (DPST-NO)
8 = 4 sequences double phase switch 2 NO (DPST-NO)

Coil voltage
See coil specifications

Coil version
8 = AC (50 Hz)

Technical data

Insulation					
Dielectric strength					
between supply and contacts	V AC	3,500			
between open contacts	V AC	2,000			
between adjacent contacts	V AC	2,000			
Other data		**26.01, 26.03, 26.08**		**26.02, 26.04, 26.06**	
Power lost to the environment					
with rated current and coil de-energised	W	0.9		1.8	
Screw torque	Nm	0.8		0.8	
Max. wire size		solid cable	stranded cable	solid cable	stranded cable
	mm^2	1x4 / 2x2.5	1x2.5 / 2x2.5	1x4 / 2x2.5	1x2.5 / 2x2.5
	AWG	1x12 / 2x14	1x14 / 2x14	1x12 / 2x14	1x14 / 2x14

Coil specifications

AC version data

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Consumption I at U_N (50 Hz)
V		V	V	Ω	mA
12	**8**.012	9.6	13.2	17	370
24	**8**.024	19.2	26.4	70	180
48	**8**.048	38.4	52.8	290	90
110	**8**.110	88	121	1,500	40
230	**8**.230	184	253	6,250	20

Type	Number of steps	Sequence 1	2	3	4
26.01	2				
26.02	2				
26.03	2				
26.04	4				
26.06	3				
26.08	4				

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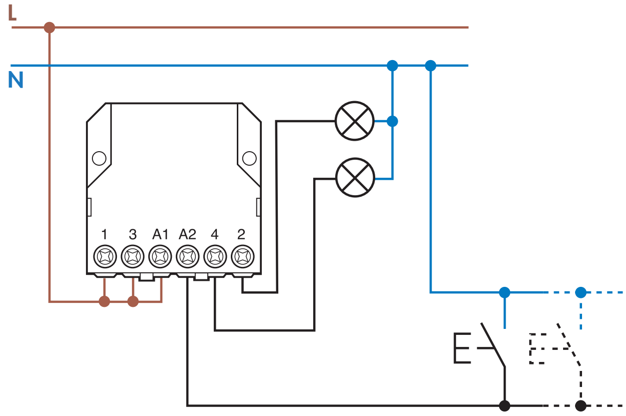
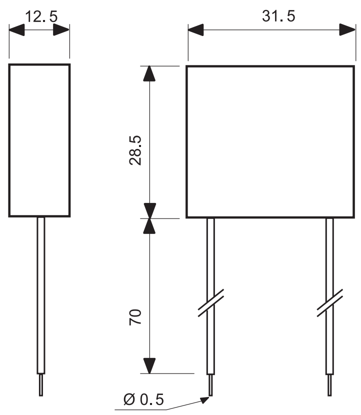
Wiring diagrams

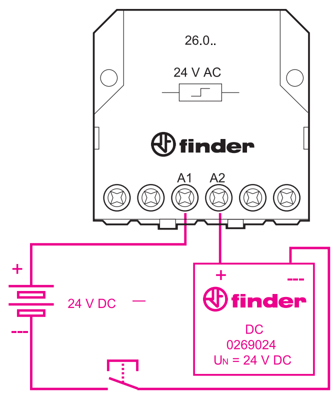


Accessories

for 12 and 24 V DC control applications

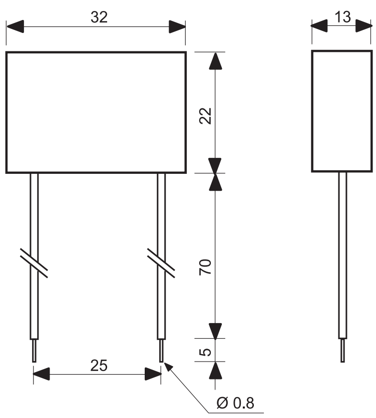


Type: 026.9.012
Nominal voltage: 12 V DC
Max temperature: + 40 °C
Operating range: (0.9…1.1)U_N
Type: 026.9.024
Nominal voltage: 24 V DC
Max temperature: + 40 °C
Operating range: (0.9…1.1)U_N

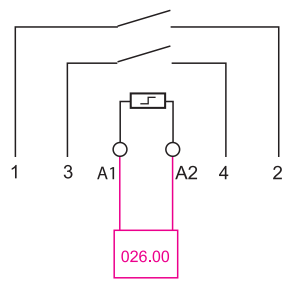


Example of wiring for 24 V DC control application.

Module for use with illuminated push buttons (230 V AC applications)



Type 026.00
Sealed construction, 7.5 cm insulated flexible wire termination.



Example of wiring diagram of type 026.00
This module is necessary when using between 1 and a maximum of 15 illuminated push buttons in the coil circuit (Each 1 mA max, 230 V AC). It must be connected in parallel to the coil of the relay (see diagram).

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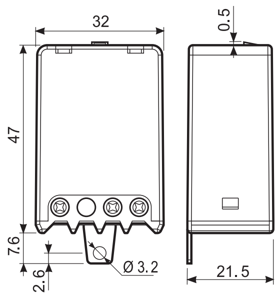
Features

1 or 2 Pole electromechanical step relay, for electrically common coil and contact circuits

27.0x - Connect up to 24 illuminated push buttons with the addition of module 027.00

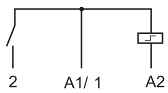
27.2x - Connect up to 15 illuminated push buttons (without additional module)
- incorporates coil power limiter to permit continuous coil energisation

- Choice of 3 switching sequences
- Screw terminal connections
- AC coil
- Panel mount
- Cadmium free contact material
- Italian Patent

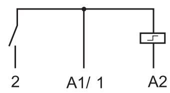


27.0x	27.2x EVO
	
• Single or 2 double phase switch 1 NO (SPST-NO) or 2 NO (DPST-NO)	• Single or 2 double phase switch 1 NO (SPST-NO) or 2 NO (DPST-NO) with coil power limiter

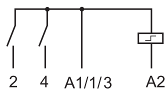
27.01



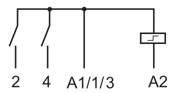
27.21



27.05 - 27.06



27.25 - 27.26



		27.0x		27.2x
Contact specification				
Number of contacts		1 or 2		1 or 2
Rated current/Maximum peak current	A	10/20		10/20
Rated voltage/Maximum switching voltage	V AC	110/—	230/—	230/—
Rated load AC1	VA	1100	2300	2300
Rated load AC15	VA	250	500	500
Nominal lamp rating: incandescent	W	500	1000	1000
compensated fluorescent	W	180	360	360
uncompensated fluorescent	W	250	500	500
halogen	W	400	800	800
Minimum switching current	mW (V/mA)	10		10
Standard contact material		AgNi		AgNi
Coil specification				
Nominal voltage (U_N)	V AC (50/60 Hz)	110	230	230
	V DC	—		—
Pickup/continuous power	VA (50 Hz)	4/4		25/1
Operating range	AC 50Hz/AC 60Hz	(0.8 ... 1.1)U_N/(0.85 ... 1.1)U_N		(0.8 ... 1.1)U_N/(0.85 ... 1.1)U_N
	DC	—		—
Technical data				
Mechanical life AC/DC	cycles	$300 \cdot 10^3$		$300 \cdot 10^3$
Electrical life at rated load in AC1	cycles	$100 \cdot 10^3$		$100 \cdot 10^3$
Max no. of illuminated push-button	(≤1mA)	4 (24 with module 027.00)		15
Minimum/Maximum impulse duration		0.1s/1h (according to EN 60669)		0.1s/continuous
Ambient temperature range	°C	–40…+40		–40…+40
Protection category		IP 20		IP 20
Approvals (according to type)				

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Ordering information

Example: 27 series screw terminal, panel mount step relay, single phase switch 1 NO (SPST-NO) 10 A contact, coil rated 230 V AC.

2	7	.	0	1	.	8	.	2	3	0	.	0	0	0	0

Series

Type
0 = Clamp terminal
2 = Clamp terminal, with coil power limiter

No. of poles
1 = Single phase switch 1 NO (SPST-NO)
5 = 4 sequences double phase switch 2 NO (DPST-NO)
6 = 3 sequences double phase switch 2 NO (DPST-NO)

Coil voltage
See coil specifications

Coil version
8 = AC (50/60 Hz)

Technical data

Other data		**27.01, 27.21**		**27.05, 27.06, 27.25, 27.26**	
Power lost to the environment with rated current and coil de-energised	W	0.9		1.8	
Screw torque	Nm	0.8		0.8	
Max. wire size		solid cable	stranded cable	solid cable	stranded cable
	mm^2	2x2.5	1x4 / 2x2.5	2x2.5	1x4 / 2x2.5
	AWG	2x14	1x12 / 2x14	2x14	1x12 / 2x14

Coil specifications

Types 27.01, 27.05, 27.06

Nominal voltage U_N	Coil code	Operating range (50 Hz) U_{min}	U_{max}	Resistance R	Consumption I at U_N (50 Hz)
V		V	V	Ω	mA
110	**8**.110	88	121	1,400	42.0
230	**8**.230	184	253	6,500	17.5

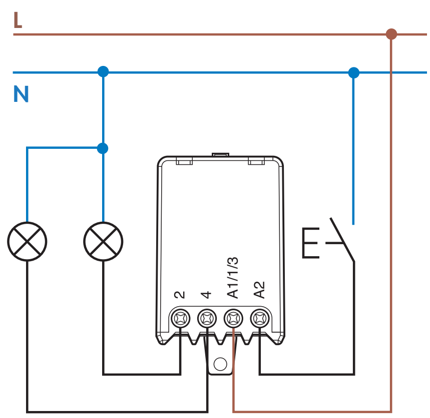
Types 27.21, 27.25, 27.26

Nominal voltage U_N	Coil code	Operating range (50 Hz) U_{min}	U_{max}	Resistance R	Consumption pick up I at U_N (50 Hz)	Consumption continuous I at U_N (50 Hz)
V		V	V	Ω	mA	mA
230	**8**.230	184	253	1,250	100	4

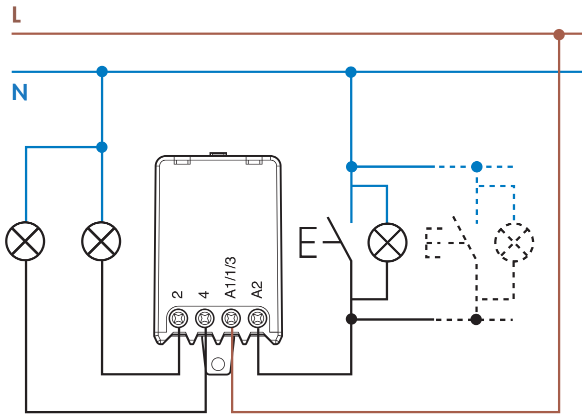
Type	**Number of steps**	**Sequence** 1	2	3	4
27.01/21	2				
27.05/25	4				
27.06/26	3				

Wiring diagram

Type 27.01/05/06

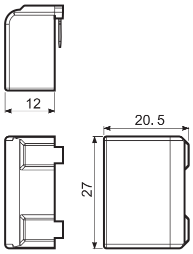


Type 27.21/25/26

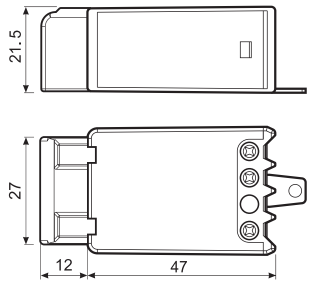


Accessories for types 27.01, 27.05, 27.06

Module for illuminated push-button (230 V AC applications)



Type 027.00
This module is necessary if using up to a maximum of 24 illuminated push-buttons (1 mA max, 230 V AC) in the switching input circuit. It must be plugged directly into the relay.



Type 27.0x + 027.00

Features

25 A modular contactor - 2 pole

- 17.5 mm wide
- NO contact gap ≥ 3 mm, double break
- Continuous duty for the coil and contacts
- AC/DC silent coil (with varistor protection)
- Protective separation (reinforced insulation) between coil and contacts
- Mechanical and LED indicators as standard
- Auto-On-Off selector version available
- AgNi and $AgSnO_2$ contact versions available
- Compliant with EN 61095: 2009
- Auxiliary contact module available, quick-assembly with the main contactor (1 NO + 1 NC and 2 NO versions)
- 35 mm rail (EN 60715) mount

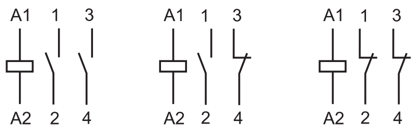
22.32.0.xxx.1xx0

- AgNi contacts, specifically intended for resistive and slightly inductive loads as well as for motor loads

22.32.0.xxx.4xx0

- $AgSnO_2$ contacts, specifically intended for lamp loads and for high inrush current loads

22.32...1xx0 / 22.32...4xx0
Screw terminal



2 NO (x3x0) | 1 NO + 1 NC (x5x0) | 2 NC (x4x0)

* Contact gap ≥ 3 mm for NO contacts only; NC contacts ≥ 1.5 mm
For outline drawings see page 8

		22.32.0.xxx.1xx0	22.32.0.xxx.4xx0
Contact specification			
Contact configuration		2 NO, 3 mm * (or 1 NO + 1 NC or 2 NC)	
Rated current/Maximum peak current	A	25 / 80	25 / 120
Rated voltage	V AC	250 / 440	250 / 440
Rated load AC1 / AC-7a (per pole @ 250 V)	VA	6,250	6,250
Rated current AC3 / AC-7b	A	10	10
Rated load AC15 (per pole @ 230 V)	VA	1,800	1,800
Single-phase motor rating (230 V AC)	kW	1	1
Rated load AC5a (per pole @ 250 V)	A	15	15
Rated current AC-7c	A	—	10
230 V lamps rating: incandescent or halogen	W	—	2,000
compact fluorescent (CFL) or LED	W	—	200
electronic ballast fluorescent tubes	W	—	800
electromagnetic ballast compens. fluorescent tubes	W	—	500
Breaking capacity DC1: 30/110/220 V	A	25/5/1	25/5/1
Minimum switching load	mW (V/mA)	1,000 (10/10)	1,000 (10/10)
Contact material		AgNi	$AgSnO_2$
Coil specification			
Nominal voltage (U_N)	V DC/AC (50/60 Hz)	12 - 24 - 48 - 60 - 120 - 230	12 - 24 - 48 - 60 - 120 - 230
Rated power AC/DC	VA (50 Hz)/W	2 /2.2	2 / 2.2
Operating range	DC/AC (50/60 Hz)	(0.8...1.1) U_N	(0.8...1.1) U_N
Holding voltage	DC/AC (50/60 Hz)	0.4 U_N	0.4 U_N
Must drop-out voltage	DC/AC (50/60 Hz)	0.1 U_N	0.1 U_N
Technical data			
Mechanical life AC/DC	cycles	$2 \cdot 10^6$	$2 \cdot 10^6$
Electrical life at rated load AC-7a	cycles	$70 \cdot 10^3$	$30 \cdot 10^3$
Operate/release time	ms	30 / 20	30 / 20
Insulation between coil and contacts (1.2/50 μs)	kV	6	6
Ambient temperature range	°C	–20...+50	–20...+50
Protection category		IP20	IP20
Approvals (according to type)		CE EAC Lloyds Register RINA c UL us	

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22 Series - Modular contactors 25 - 40 - 63 A

Features

25 A modular contactor - 4 pole

- 35 mm wide
- NO contact gap ≥ 3 mm, double break
- Continuous duty for the coil and contacts
- AC/DC silent coil (with varistor protection)
- Protective separation (reinforced insulation) between coil and contacts
- Mechanical and LED indicators as standard
- Auto-On-Off selector version available
- AgNi and $AgSnO_2$ contact versions available
- Compliant with EN 61095: 2009
- Auxiliary contact module available, quick-assembly with the main contactor (1 NO + 1 NC and 2 NO versions)
- 35 mm rail (EN 60715) mount

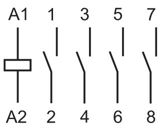
22.34...1xx0 / 22.34...4xx0
Screw terminal

22.34.0.xxx.1xx0

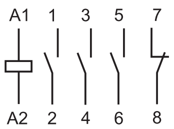
- AgNi contacts, specifically intended for resistive and slightly inductive loads as well as for motor loads

22.34.0.xxx.4xx0

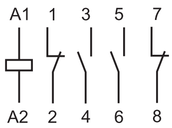
- $AgSnO_2$ contacts, specifically intended for lamp loads and for high inrush current loads



4 NO
(x3x0)



3 NO + 1 NC
(x7x0)



2 NO + 2 NC
(x6x0)

* Contact gap ≥ 3 mm for NO contacts only; NC contacts ≥ 1.5 mm
For outline drawings see page 8

	22.34.0.xxx.1xx0	22.34.0.xxx.4xx0
Contact specification		
Contact configuration	4 NO, 3 mm * (or 3NO + 1NC or 2NO + 2NC)	
Rated current/Maximum peak current A	25 / 80	25 / 120
Rated voltage V AC	250 / 440	250 / 440
Rated load AC1 / AC-7a (per pole @ 250 V) VA	6,250	6,250
Rated current AC3 / AC-7b A	10	10
Rated load AC15 (per pole @ 230 V) VA	1,800	1,800
Three-phase motor rating (400 - 440 V AC) kW	4	4
Rated load AC5a (per pole @ 250 V) A	15	15
Rated current AC-7c A	—	10
230 V lamps rating: incandescent or halogen W	—	2,000
compact fluorescent (CFL) or LED W	—	200
electronic ballast fluorescent tubes W	—	800
electromagnetic ballast compens. fluorescent tubes W	—	500
Breaking capacity DC1: 30/110/220 V A	25/5/1	25/5/1
Minimum switching load mW (V/mA)	1,000 (10/10)	1,000 (10/10)
Contact material	AgNi	$AgSnO_2$
Coil specification		
Nominal voltage (U_N) V DC/AC (50/60 Hz)	12 - 24 - 48 - 60 - 120 - 230	12 - 24 - 48 - 60 - 120 - 230
Rated power AC/DC VA (50 Hz)/W	2 / 2.2	2 / 2.2
Operating range DC/AC (50/60 Hz)	(0.8…1.1) U_N	(0.8…1.1) U_N
Holding voltage DC/AC (50/60 Hz)	0.4 U_N	0.4 U_N
Must drop-out voltage DC/AC (50/60 Hz)	0.1 U_N	0.1 U_N
Technical data		
Mechanical life AC/DC cycles	$2 \cdot 10^6$	$2 \cdot 10^6$
Electrical life at rated load AC-7a cycles	$150 \cdot 10^3$	$30 \cdot 10^3$
Operate/release time ms	18 / 40	18 / 40
Insulation between coil and contacts (1.2/50 μs) kV	6	6
Ambient temperature range °C	–20…+50	–20…+50
Protection category	IP20	IP20
Approvals (according to type)	Lloyds Register RINA	

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III-2015, www.findernet.com

Features

40 - 63 A modular contactor - 4 pole

- NO and NC contact gap ≥ 3 mm, double break
- Continuous duty for the coil and contacts
- AC/DC silent coil (with varistor protection)
- Protective separation (reinforced insulation) between coil and contacts
- Mechanical indicator as standard
- $AgSnO_2$ contacts
- Compliant with EN 61095: 2009 and with EN 60947-4-1: 2009
- 35 mm rail (EN 60715) mount

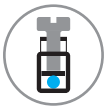
NEW **22.44.0.xxx.4xx0**

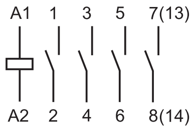
- For high inrush current loads 176 A
- Contact material $AgSnO_2$

NEW **22.64.0.xxx.4xx0**

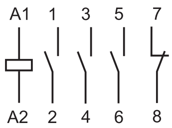
- Specifically intended: for high inrush current loads 240 A
- Contact material $AgSnO_2$

22.44.../22.64...
Screw terminal

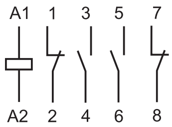




4 NO
(4310)



3 NO + 1 NC
(4710)



2 NO + 2 NC
(4610)

For outline drawings see page 8

	22.44.0.xxx.4xx0	22.64.0.xxx.4xx0
Contact specification		
Contact configuration	4 NO, (or 3NO + 1NC or 2NO + 2NC) ≥ 3 mm	
Rated current/Maximum peak current A	40 / 176	63 / 240
Rated voltage V AC	400 / 440	400 / 440
Rated load AC1 / AC-7a (per pole @ 400 V) VA	16,000	24,000
Rated current AC3 / AC-7b (400 V) A	22	30
Rated load AC15 (per pole @ 230 V) VA	—	—
Three-phase motor rating (400 - 440 V AC) kW	11	15
Rated load AC5a (per pole @ 250 V) A	20	32
Rated current AC-7c A	—	—
230 V lamps rating: incandescent or halogen W	4,000	5,000
compact fluorescent (CFL) or LED W	1,000	1,500
electronic ballast fluorescent tubes W	1,500	2,000
electromagnetic ballast compens. fluorescent tubes W	1,500	2,000
Breaking capacity DC1: 30/110/220 V A	40/4/1.2	63/4/1.2
Minimum switching load mW (V/mA)	1,000 (17/50)	1,000 (17/50)
Contact material	$AgSnO_2$	$AgSnO_2$
Coil specification		
Nominal voltage (U_N) V DC/AC (50/60 Hz)	12 - 24 - 110...120 (110 V DC) - 230...240 (220 V DC)	
Rated power AC/DC VA (50 Hz)/W	5	5
Operating range DC/AC (50/60 Hz)	(0.85...1.1) U_N	(0.85...1.1) U_N
Holding voltage DC/AC (50/60 Hz)	0.85 U_N	0.85 U_N
Must drop-out voltage DC/AC (50/60 Hz)	0.2 U_N	0.2 U_N
Technical data		
Mechanical life AC/DC cycles	$3 \cdot 10^6$	$3 \cdot 10^6$
Electrical life at rated load AC-7a cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Operate/release time ms	20 / 45	20 / 45
Insulation between coil and contacts (1.2/50 μs) kV	6	6
Ambient temperature range °C	–5…+55	–5…+55
Protection category	IP20	IP20
Approvals (according to type)	CE EAC PCT cULus	

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Ordering information

Exemple: 22 series, modular contactor 25 A, 4 NO contacts, coil 230 V AC/DC, $AgSnO_2$ contacts, Auto-On-Off selector + mechanical indicator + LED.

									A	B	C	D
2	2	.	3	4	.	0	.	2 3 0	. 4	3	4	0

Series

Type
3 = 25 A modular contactor range
4 = 40 A modular contactor range
6 = 63 A modular contactor range

Number of contacts
2 = 2 pole
4 = 4 pole

Coil version
0 = AC (50/60 Hz)/DC

Coil rated voltage
See coil specifications

D: Special versions
0 = Standard

C: Options
1 = Mechanical indicator
2 = Mechanical indicator + LED
4 = Auto-On-Off selector + mechanical indicator + LED

B: Contact circuit
3 = All NO contacts
4 = All NC contacts (22.32 only)
5 = 1 NO + 1 NC
6 = 2 NO + 2 NC
7 = 3 NO + 1 NC

A: Contact material
1 = AgNi
4 = $AgSnO_2$

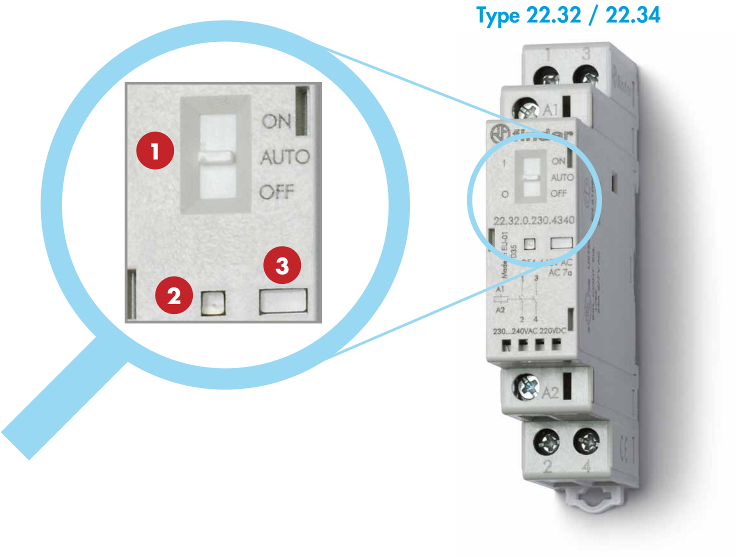
Selecting features and options: only combinations in the same row are possible.
Preferred selections for best availability are shown in **bold**.

Type	Coil version	A	B	C	D
22.32	AC/DC	**1 - 4**	**3** - 4 - 5	**2 - 4**	0
22.34	AC/DC	**1 - 4**	**3** - 6 - 7	**2 - 4**	0
22.44	AC/DC	**4**	**3** - 6 - 7	**1**	0
22.64	AC/DC	**4**	**3** - 6 - 7	**1**	0

Options

Auto-On-Off selector + mechanical indicator + LED (xx40 option)

Type 22.32 / 22.34



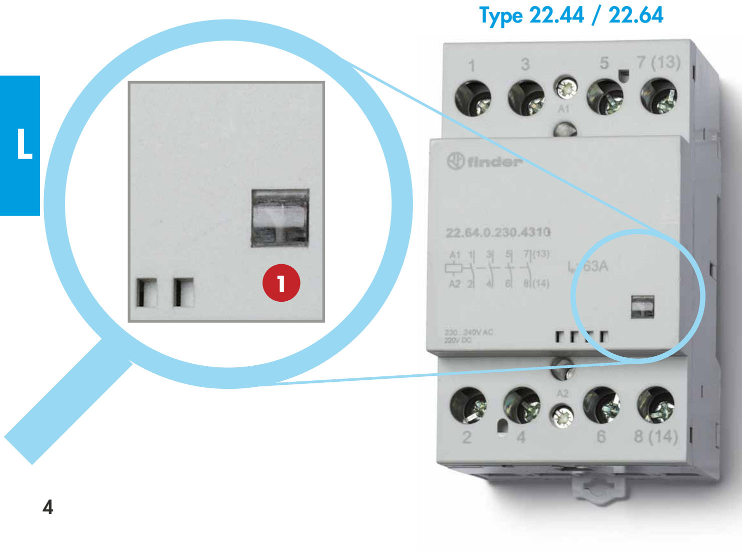
Options

1 **Selector**
The three-position manual selector has the following functions:
- **ON position** - the contacts are latched in the operated state (NO contacts - closed and NC contacts - open), the mechanical indicator is visible in its window, the LED is not illuminated.
- **AUTO position** - the state of contacts, mechanical indicator and LED follow the coil supply voltage.
- **OFF position** - even if terminals A1 - A2 are supplied with rated voltage, the coil is not energized, and so the contacts remain in the non-operated state, the mechanical indicator is not visible and the LED is not illuminated.

2 **LED**

3 **Mechanical indicator**

Type 22.44 / 22.64



Options

Mechanical indicator

III-2015, www.findernet.com

Technical data

Insulation		22.32 / 22.34		22.44 / 22.64
Rated insulation voltage	V AC	250	440	440
Pollution degree		3 *	2	3
Insulation between coil and contact set				
Type of insulation		Reinforced		Reinforced
Overvoltage category		III		III
Rated impulse voltage	kV (1.2/50 μs)	6		4
Dielectric strength	V AC	4,000		2,000
Insulation between adjacent contacts				
Type of insulation		Basic		Basic
Overvoltage category		III		III
Rated impulse voltage	kV (1.2/50 μs)	4		4
Dielectric strength	V AC	2,500		2,000
Insulation between open contacts		**NO contact**	**NC contact**	**NO/NC contacts**
Contact gap	mm	3	1.5	3
Overvoltage category		III	II	III
Rated impulse voltage	kV (1.2/50 μs)	4	2.5	4
Dielectric strength	V AC/kV (1.2/50 μs)	2,500/4	2,000/3	2,000/3

* Only for versions without Auto-On-Off selector. For versions with Auto-On-Off selector pollution degree 2 applies.

Conducted disturbance immunity	Reference standard		
Fast transients (burst 5/50 ns, 5 kHz) at coil terminals	EN 61000-4-4	Level 4 (4 kV)	Level 2 (2 kV)
Voltage pulses (surge 1.2/50 μs) at supply terminals (differential mode)	EN 61000-4-5	Level 4 (4 kV)	Level 2 (2 kV)

Short circuit protection		22.32 / 22.34	22.44	22.64
Rated conditional short circuit current	kA	3	3	3
Back-up fuse	A	32 (gL/gG type)	63	80

Terminals		Solid and stranded cable	
		22.32 / 22.34	**22.44 / 22.64**
Max. wire size – contact terminals	mm^2	1 x 6 / 2 x 4	1x25 (solid) - 1x16 (stranded)
	AWG	1 x 10 / 2 x 12	1x4 (solid) - 1x6 (stranded)
Max. wire size – coil terminals	mm^2	1 x 4 / 2 x 2.5	1x2.5
	AWG	1 x 12 / 2 x 14	1x14
Min. wire size – contact and coil terminals	mm^2	1 x 0.2	1x1 (coil) - 1x1.5 (contacts)
	AWG	1 x 24	1x18 (coil) - 1x16 (contacts)
Screw torque	Nm	0.8	1.2 (coil terminals) - 3.5 (contact terminals)
Wire strip length	mm	9	10

Other data			22.32	22.34	22.44	22.64
Vibration resistance (10...150)Hz		g	4	4	3	3
Shock resistance		g	10	10	15	15
Power lost to the environment	without contact current	W	2	2	5	5
	with rated current	W	4.8	6.3	17	37

NOTE

22.32/22.34: It is suggested an air gap of 9 mm between adjacent relays for installations and working conditions close to the limit (that is, ambient temperature > 40 °C, coil operated for a prolonged period of time, all contacts loaded with current > 20 A).

22.44/22.64: The maximum ambient temperature with 3 adjacent contactors is + 40 °C; when more than 3 contactors are installed, it is necessary an air gap of 9 mm.
With 2 adjacent contactors the maximum ambient temperature is + 55 °C; when more than 2 contactors are installed, it is necessary an air gap of 9 mm.

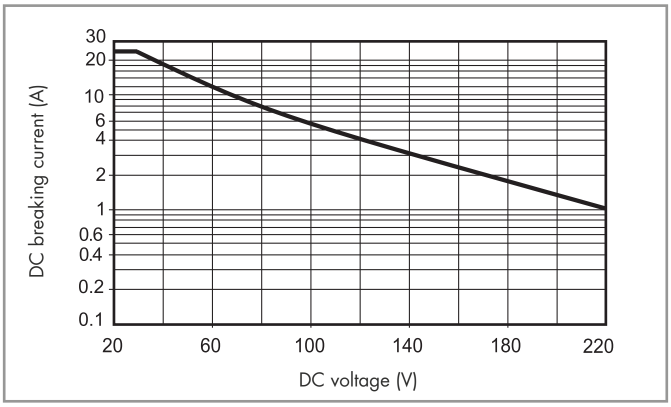
Contact specification

Ratings and utilization categories according to EN 61095: 2009

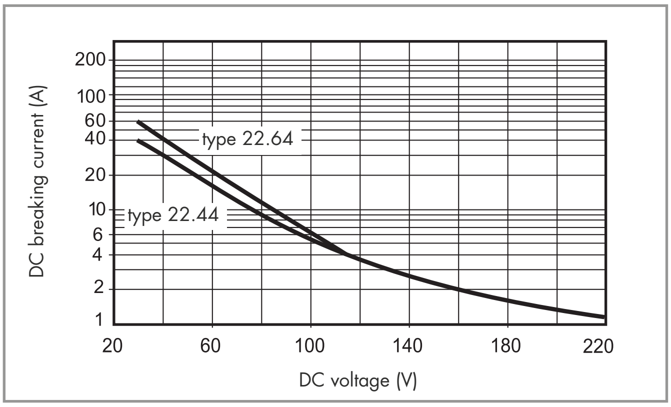
Type	Utilization category					
	AC-7a		AC-7b		AC-7c	
	Rated current (A)	Rated electrical life (Cycles)	Rated current (A)	Rated electrical life (Cycles)	Rated current (A)	Rated electrical life (Cycles)
22.32....1xx0 (AgNi contacts)	25	$70 \cdot 10^3$ (NO) $30 \cdot 10^3$ (NC)	10	$30 \cdot 10^3$	—	—
22.32....4xx0 ($AgSnO_2$ contacts)	25	$30 \cdot 10^3$	10	$30 \cdot 10^3$	10	$30 \cdot 10^3$
22.34....1xx0 (AgNi contacts)	25	$150 \cdot 10^3$ (NO) $100 \cdot 10^3$ (NC)	10	$30 \cdot 10^3$	—	—
22.34....4xx0 ($AgSnO_2$ contacts)	25	$30 \cdot 10^3$	10	$30 \cdot 10^3$	10	$30 \cdot 10^3$
22.44....4xx0	40	$100 \cdot 10^3$	22	$150 \cdot 10^3$	—	—
22.64....4xx0	63	$100 \cdot 10^3$	30	$150 \cdot 10^3$	—	—

Utilization category: **AC-7a** = Slightly inductive loads (cosφ=0.8)
AC-7b = Motor loads; (cosφ=0.45, I_{making}= 6x$I_{breaking}$)
AC-7c = Compensated electric discharge lamps (cosφ=0.9, C= 10 mF/A)

H 22 - Maximum DC1 breaking capacity - Type 22.32 / 22.34



H 22 - Maximum DC1 breaking capacity - Type 22.44 / 22.64



- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of ≥ $100 \cdot 10^3$ can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load.
  Note: the release time for the load will be increased.

Coil specifications

AC/DC version data (type 22.32)

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Rated coil consumption I_N at U_N (AC)
V		V	V	mA
12	**0**.012	9.6	13.2	165
24	**0**.024	19.2	26.4	83
48	**0**.048	38.4	52.8	42
60	**0**.060	48	66	33
120 (110...125)	**0**.120	88	138	16.5
230 (230...240 AC) (220 DC)	**0**.230	184 (AC) 176 (DC)	264 (AC) 242 (DC)	8.7

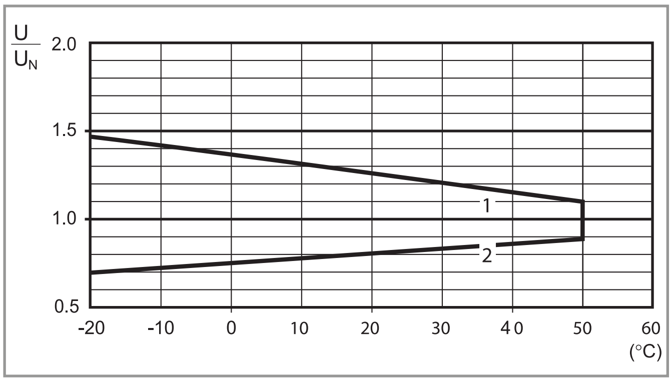
AC/DC version data (type 22.34)

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Rated coil consumption I_N at U_N (AC)
V		V	V	mA
12	**0**.012	9.6	13.2	165
24	**0**.024	19.2	26.4	83
48	**0**.048	38.4	52.8	42
60	**0**.060	48	66	33
120 (110...125)	**0**.120	88	138	16.5
230 (230...240 AC) (220 DC)	**0**.230	184 (AC) 176 (DC)	264 (AC) 242 (DC)	8.7

AC/DC version data (type 22.44 / 22.64)

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Rated coil consumption I_N at U_N (AC)
V		V	V	mA
12	**0**.012	10.2	13.2	417
24	**0**.024	20.4	26.4	208
120 (110...125)	**0**.120	102	138	41
230 (230...240 AC) (220 DC)	**0**.230	196	264 (AC) 242 (DC)	21

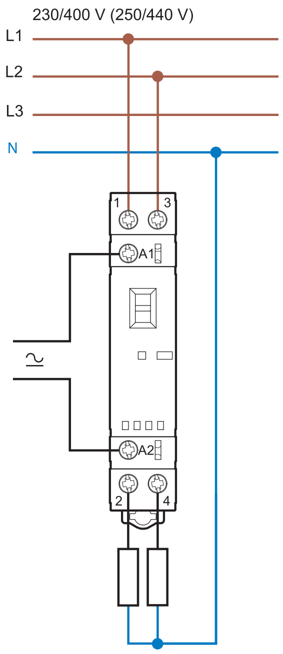
R 22 - Coil operating range v ambient temperature



1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

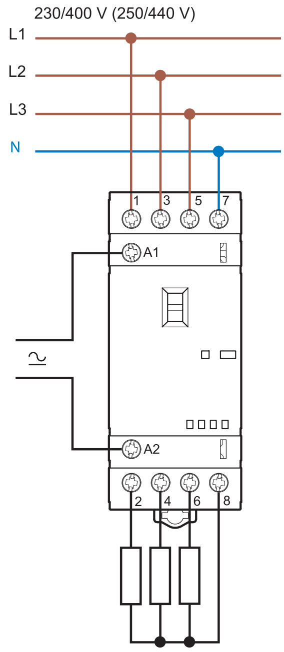
L

Wiring diagrams



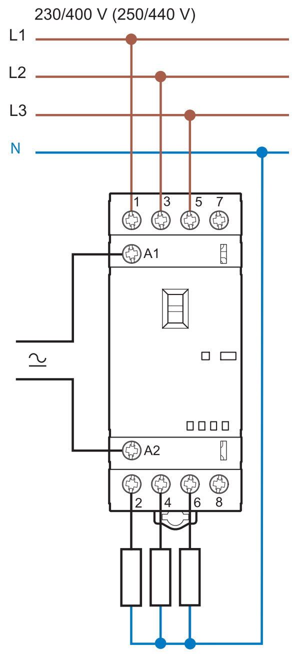
Type 22.32

Line and neutral switched



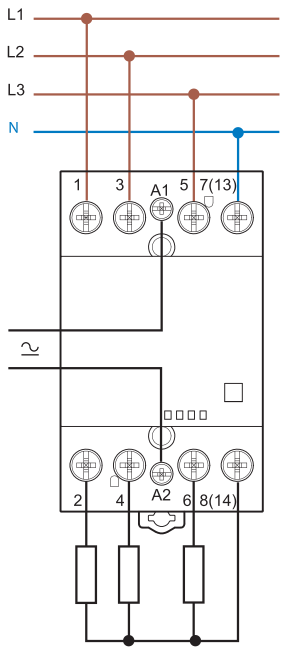
Type 22.34

Line only switched



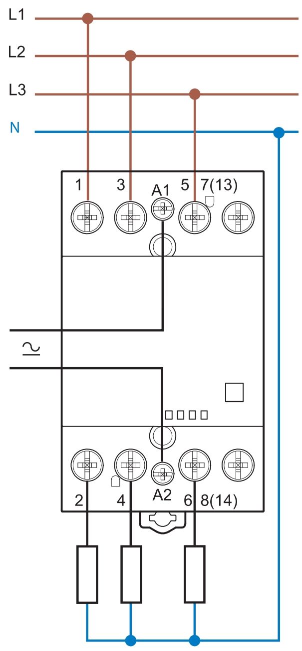
Type 22.34

Line and neutral switched



Type 22.44 / 22.64

Line only switched



Type 22.44 / 22.64

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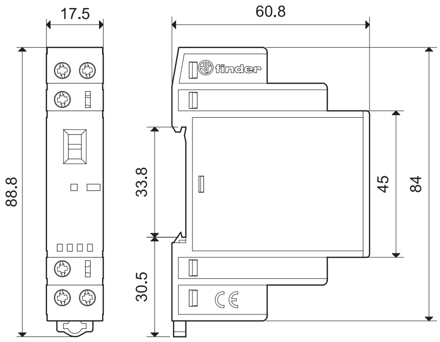
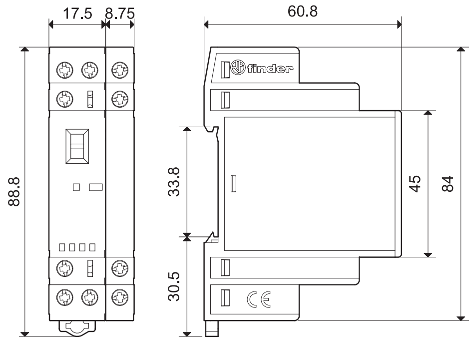
Outline drawings

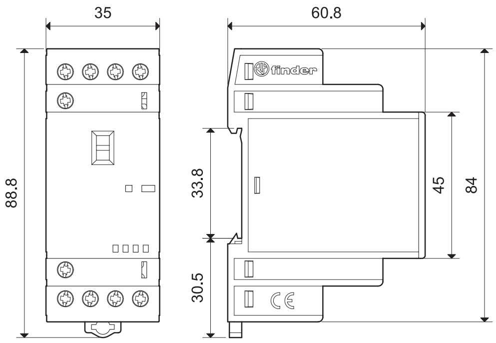
Type 22.32
Screw terminal



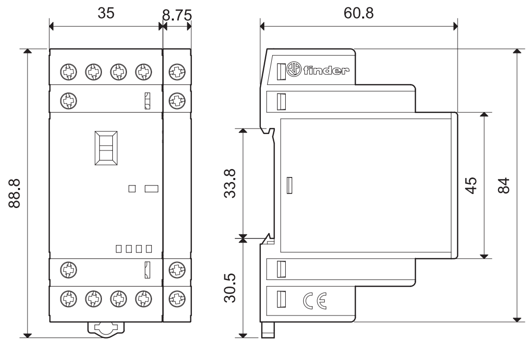
Type 22.32 + 022.33 / 022.35
Screw terminal



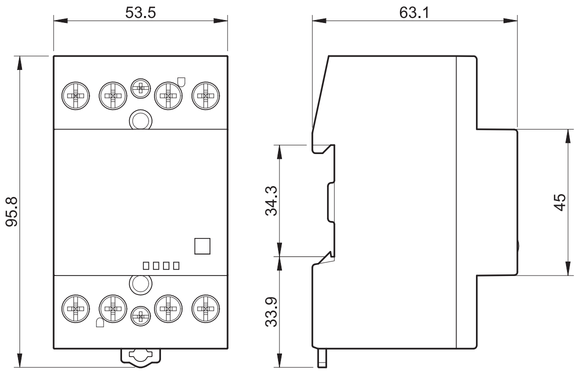
Type 22.34
Screw terminal



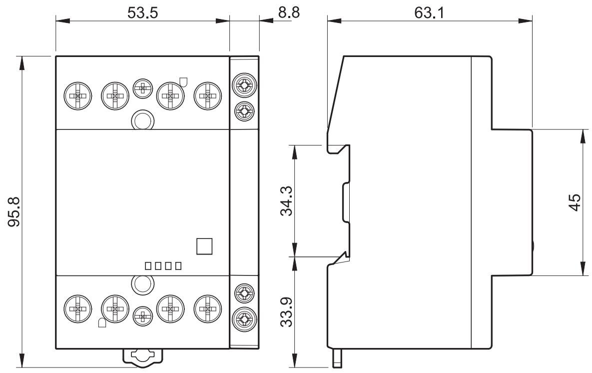
Type 22.34 + 022.33 / 022.35
Screw terminal



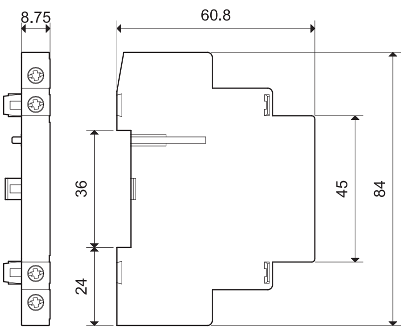
Type 22.44 / 22.64
Screw terminal



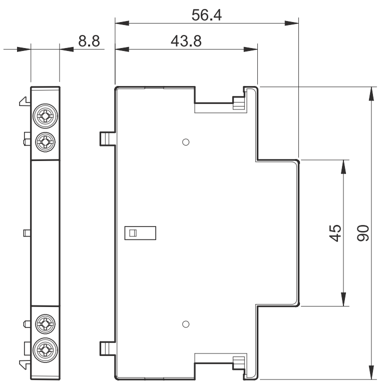
Type 22.44 / 22.64 + 022.63 / 022.65
Screw terminal



Type 022.33 / 022.35
Screw terminal



Type 022.63 / 022.65
Screw terminal



L

Auxiliary modules

Mechanically linked contacts according to Annex L of EN 60947-5-1

	022.33	022.35	022.63	022.65
				
				
Type of contactor	Type 22.32 Type 22.34		Type 22.44 Type 22.64	
Contact specification				
Contact configuration	2 NO	1 NO + 1 NC	2 NO	1 NO + 1 NC
Conventional free air thermal current I_{th} A	6		6	
Rated power AC15 (230 V) VA	700		700	
Electrical life at rated load cycles	30 x 10^3		30 x 10^3	
Contact material	AgNi		AgNi	
Short circuit protection				
Rated conditional short circuit current kA	1		1	
Back-up fuse A	6 (gL/gG type)		6 (gL/gG type)	
Terminals	**Solid and stranded cable**		**Solid and stranded cable**	
Max. wire size mm²	1 x 4 / 2 x 2.5		1 x 2.5	
AWG	1 x 12 / 2 x 14		1 x 14	
Min. wire size mm²	1 x 0.2		1 x 1	
AWG	1 x 24		1 x 18	
Screw torque Nm	0.8		0.6	
Wire strip length mm	9		9	
Power lost to the environment				
without contact current W	—		—	
with rated current W	0.5		0.5	
Approvals (according to type)	CE EAC RINA cULus		CE EAC cULus	

NOTE: it is not possible to assembly the auxiliary module on 22.32.0.xxx.x4x0 (2 NC versions).

22.32 + 022.33/022.35

22.44 + 022.63/022.65

22.34 + 022.33/022.35

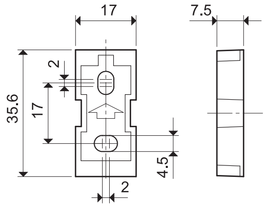
22.64 + 022.63/022.65

L

Accessories

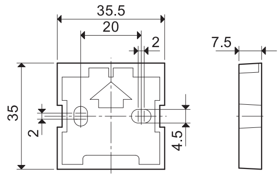
020.01

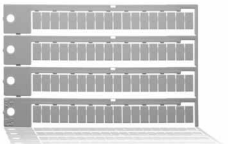
Adaptor for panel mounting (for 22.32 type), plastic, 17.5 mm wide	020.01



011.01

Adaptor for panel mounting (for 22.34 type), plastic, 35 mm wide	011.01





060.72

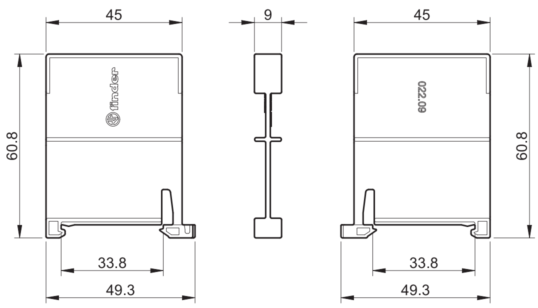
Sheet of marker tags, plastic, 72 tags, 6x12 mm	060.72

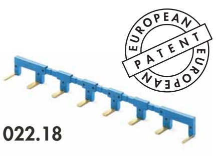
019.01

Identification tag, plastic, 1 tag, 17x25.5 mm	019.01

022.09

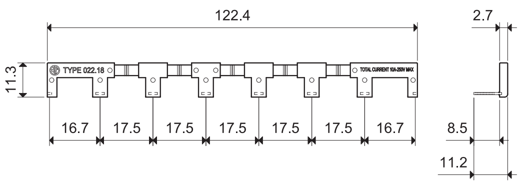
Separator for rail mounting, plastic, 9 mm wide	022.09

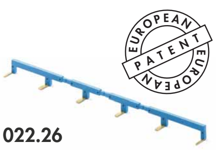




022.18

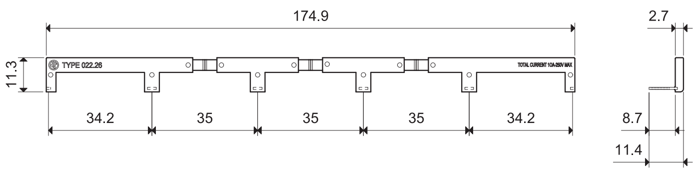
8-way jumper link for type 22.32, 17.5 mm wide	022.18 (blue)
Rated values	10 A - 250 V





022.26

6-way jumper link for type 22.34, 35 mm wide	022.26 (blue)
Rated values	10 A - 250 V

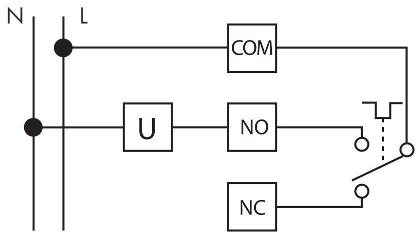


L

Features

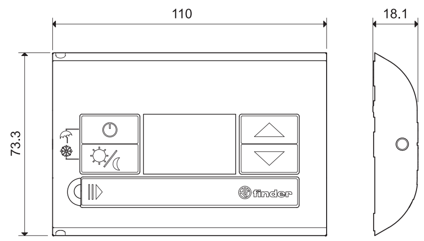
Digital room thermostat

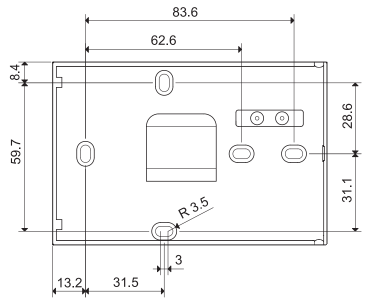
- Independently set temperatures for Day and Night
- Temperature range (+5…+37)°C
- Supply voltage: 3V DC
  (2 batteries 1.5V DC AAA)
- Thermostat lock
- Functions: OFF (with Frost protection)/ Summer/Winter
- Frost protection range (+2…+8)°C
- 1 change over 5 A 250V AC output
- On/Off hysteresis selectable (0.2 - 0.5)°C



Wiring diagram

1T.31





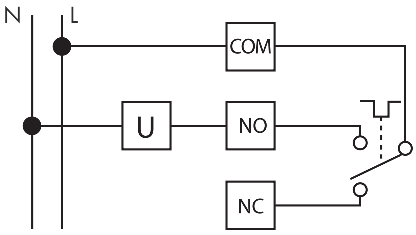
Colour	
White basic	1T.31.9.003.0000
Black basic	1T.31.9.003.2000
White	1T.31.9.003.0100
White, pearl effect	1T.31.9.003.0200
Metallic Grey	1T.31.9.003.1100
Metallic Silver	1T.31.9.003.1200
Metallic Anthracite	1T.31.9.003.2100
Titanium	1T.31.9.003.2200
Technical features	
Sensing element	NTC
Supply	2 batteries 1.5V AAA
Contact configuration	1 CO (SPDT)
Contact rating	5A 250V AC
Display range	0…+50°C
Temperature setting range	+5…+37°C
Temperature differential	0.2 - 0.5
Temperature rate of change	—
Nighttime set-back	YES
Thermostat lock	Buttons
Protection category	IP20
Mounting	Surface
Display resolution	0.1°C
Accuracy at +20°C	+/–0.5°C
Frost Protection	+2…+8°C
Approvals (according to type)	CE EAC

1T Series - Digital thermostat

Features

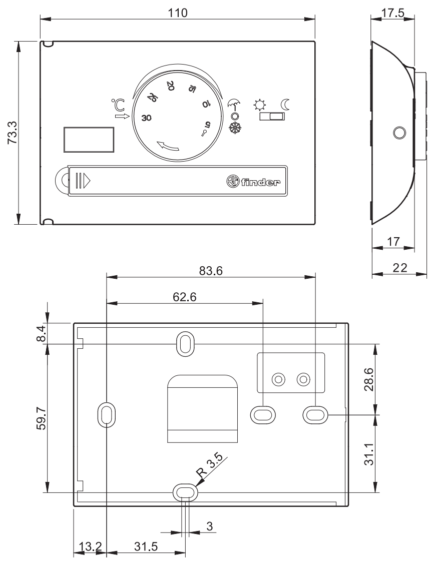
Digital room thermostat

- Temperature regulation from 5 to 33°C
- Supply voltage: 3V DC
  (2 batteries 1.5V DC AAA)
- Functions: OFF (with Frost protection)/ Summer/Winter
- Programming: Day/Night (set-back by –3°C)
- 1 change over 5A 250V AC output
- Temperature setting range can be restricted, by internal mechanical blocking
- Display with:
  - Set temperature, actual temperature
  - low battery
  - SUMME/WINTER setting active
  - Heater/Air-conditioning ON



Wiring diagram

1T.41



Colour	
White basic	1T.41.9.003.0000
Black basic	1T.41.9.003.2000
Technical features	
Sensing element	NTC
Supply	2 batteries 1.5V AAA
Contact configuration	1 CO (SPDT)
Contact rating	5A 250V AC
Display range	0...+50°C
Temperature setting range	+8...+30°C (reducing night: **Winter** +5...+27°C/**Summer** +11...+33°C)
Temperature differential	0.3
Temperature rate of change	—
Nighttime set-back	YES
Thermostat lock	Mechanical
Protection category	IP20
Mounting	Surface
Display resolution	0.1°C
Accuracy at +20°C	+/–0.5°C
Frost Protection	5°C
Approvals (according to type)	CE EAC

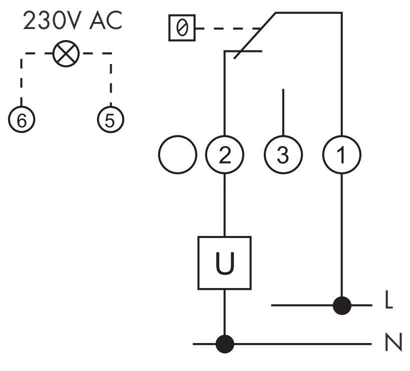
M

X-2014, www.findernet.com

Features

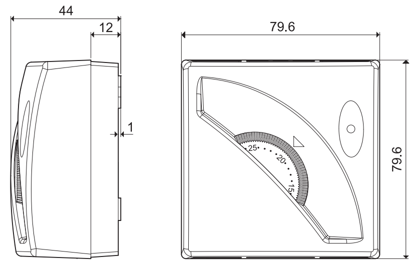
Room thermostat

- Temperature regulation (+7…+30)°C
- System operating - indicator light



Wiring diagram

1T.01.0



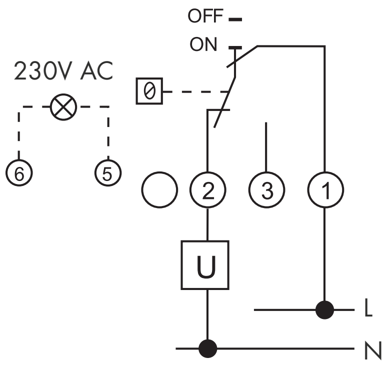
Colour	
White	1T.01.0
Technical features	
Sensing element	Gas bulb
Supply	—
Contact configuration	1 CO (SPDT)
Contact rating	16A 250 V AC
Display range	—
Temperature setting range	+7…+30°C
Temperature differential	0.4 - 0.8°C
Temperature rate of change	1°C/15 min
Nighttime set-back	—
Thermostat lock	Mechanical
Protection category	IP20
Mounting	Surface
Display resolution	—
Accuracy at +20°C	—
Frost Protection	—
Approvals (according to type)	CE EAC

X-2014, www.findernet.com

Features

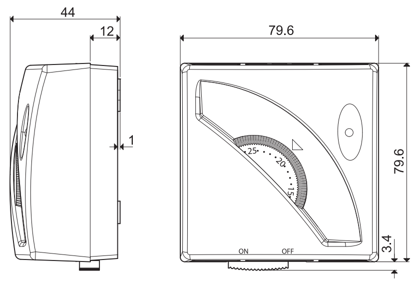
Room thermostat ON/OFF

- Switch ON/OFF
- Temperature regulation (+7...+30)°C
- System operating - indicator light



Wiring diagram

1T.01.1

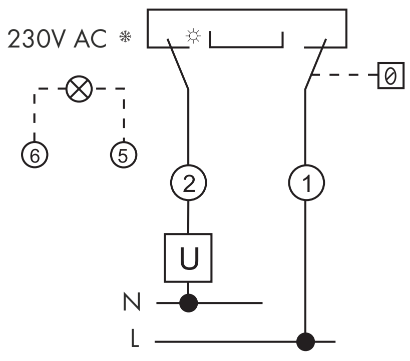


Colour	
White	1T.01.1
Technical features	
Sensing element	Gas bulb
Supply	—
Contact configuration	1 CO (SPDT)
Contact rating	16A 250 V AC
Display range	—
Temperature setting range	+7...+30°C
Temperature differential	0.4 - 0.8°C
Temperature rate of change	1°C/15 min
Nighttime set-back	—
Thermostat lock	Mechanical
Protection category	IP20
Mounting	Surface
Display resolution	—
Accuracy at +20°C	—
Frost Protection	—
Approvals (according to type)	CE EAC

Features

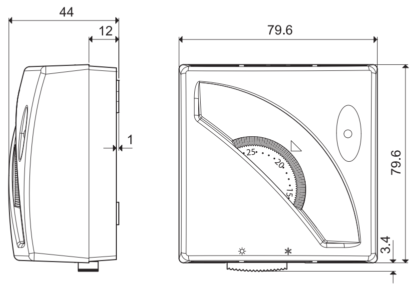
Room thermostat SUMMER/WINTER

- Switch SUMMER/WINTER
- Temperature regulation (+7...+30)°C
- System operating - indicator light



Wiring diagram

1T.01.2



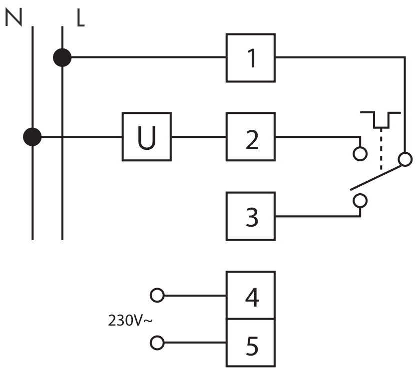
Colour	
White	1T.01.2
Technical features	
Sensing element	Gas bulb
Supply	—
Contact configuration	1 CO (SPDT)
Contact rating	16A 250 V AC
Display range	—
Temperature setting range	+7...+30°C
Temperature differential	0.4 - 0.8°C
Temperature rate of change	1°C/15 min
Nighttime set-back	—
Thermostat lock	Mechanical
Protection category	IP20
Mounting	Surface
Display resolution	—
Accuracy at +20°C	—
Frost Protection	—
Approvals (according to type)	CE EAC

1T Series - Thermostat

Features

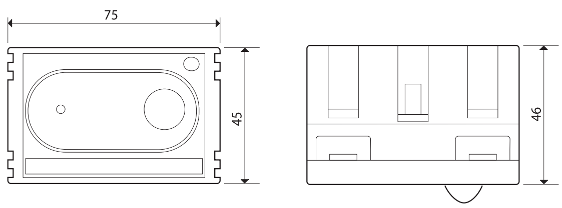
Thermostat for recess mounting

- Compatible with 3 module box
- Temperature regulation (+5...+30)°C
- System operating - indicator light
- Complete with adaptor for following frames:
  - BTicino (series Living International)
  - Gewiss (series Playbus and Playbus Young)
  - Vimar (series Idea and Idea Rondò)



Wiring diagram

1T.51



Colour	
Black basic	1T.51.8.230
Technical features	
Sensing element	NTC
Supply	230V AC
Contact configuration	1 CO (SPDT)
Contact rating	5A 250V AC
Display range	–
Temperature setting range	+5...+30°C
Temperature differential	0.2...0.4°C
Temperature rate of change	1°C/15 min
Nighttime set-back	NO
Thermostat lock	NO
Protection category	IP20
Mounting	Recess (3 module box)
Display resolution	–
Accuracy at +20°C	–
Frost Protection	–
Approvals (according to type)	CE EAC

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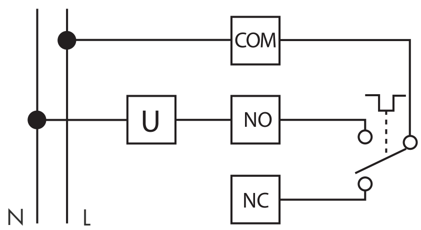
Features

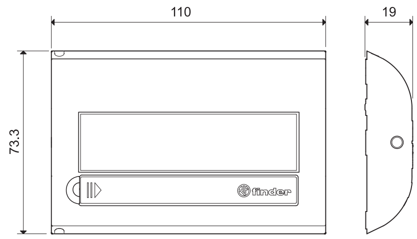
Digital room chronothermostat

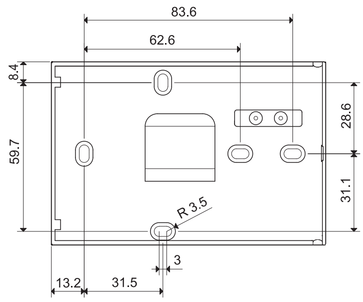
- TOUCH SCREEN Programmable Room Thermostat weekly programmable version
- Calendar with automatic leap year & daylight-saving updates
- Summer/Winter switch
- 3 programmable temperature thresholds
- Functions: frost protection, automatic control, manual control, holiday program, pump anti-seizure function
- 2 level security - simple touch screen blocking or full 4-digit PIN lock
- Visual and audible confirmation of key and function entry
- Compatible with 3 module housing
- 1 contact output 5 A 250 V AC



Wiring diagram

1C.71





Colour	**Weekly Program**
White	1C.71.9.003.0107
White, pearl effect	1C.71.9.003.0207
Metallic Grey	1C.71.9.003.1107
Metallic Silver	1C.71.9.003.1207
Metallic Anthracite	1C.71.9.003.2107
Titanium	1C.71.9.003.2207
Technical features	
Sensing element	NTC
Supply	2 batteries 1.5V AAA
Contact configuration	1 CO (SPDT)
Contact rating	5A 250V AC
Display range	0...+50°C
Temperature setting range	+5...+37°C
Temperature differential	0.1 - 0.9°C
Minimum programming interval	1h - weekly
Buttons	Touch sceen
Back-light display	NO
Thermostat lock	Code
Protection category	IP20
Mounting	Surface
Display resolution	0.1°C
Accuracy at +20°C	+/–0.5°C
Frost Protection	+2...+8°C
Approvals (according to type)	CE EAC

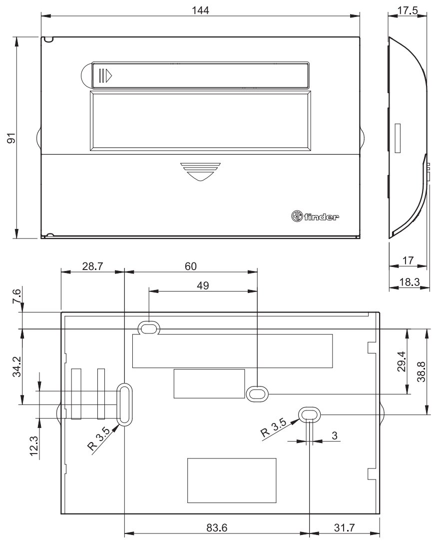
1C Series - Digital chronothermostat

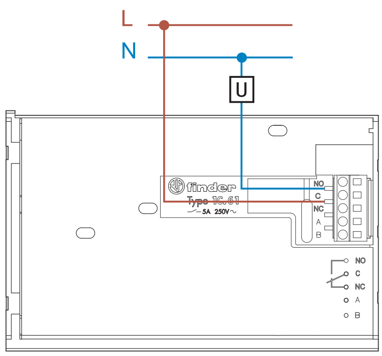
Features

Digital "touch slide" chronothermostat

- Chronothermostat "touch slide" ultrathin 17mm only with wide display
- Easy to use
- Summer/Winter switch
- 24 point for temperature setting
- Basic display lock or advanced with PIN, with storage of all settings
- Visual and acoustic signal for confirmation
- Minimum interval setting 15 minutes
- The weekly function allows each day to be set to, automatic mode, hand mode, or OFF
- Calibration function
- The thermostat can display, or be controlled by the external temperature using an external sensor (optional accessory)
- Input for remote control
- Dynamic icons
- Compatible with 3 module housing

1C.61





Wiring diagram

Colour	Daily Program
White	1C.61.9.003.0101
Metallic Anthracite	1C.61.9.003.2101
Technical features	
Sensing element	NTC
Supply	2 batteries 1.5V AAA
Contact configuration	1 CO (SPDT)
Contact rating	5A 250V AC
Display range	0...+50°C
Temperature setting range	+5...+37°C (with sliders: winter +6...+24°C/summer +18...+30°C)/–20...+90°C (with external sensor)
Temperature differential	0.1 - 0.9°C
Minimum programming interval	1h or 15 minutes - daily/weekly (weekly: only Auto, Manual and OFF mode)
Buttons	Touch screen
Back-light display	YES
Thermostat lock	Code
Protection category	IP20
Mounting	Surface
Display resolution	0.1°C
Accuracy at +20°C	+/–0.5°C
Frost Protection	+2...+8°C
Approvals (according to type)	CE EAC

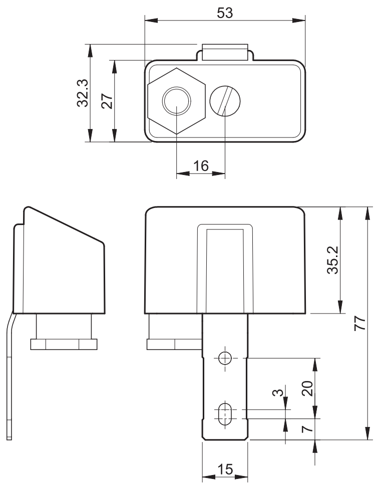
Accessories

01C.61

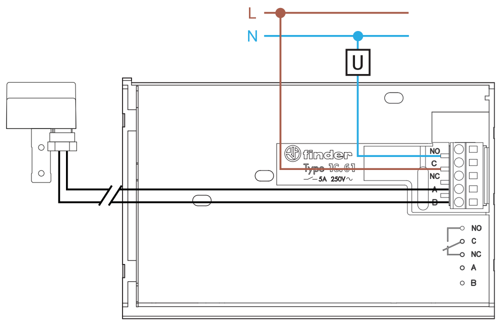
External temperature sensor		01C.61
Sensing range		(–20...+90)°C
Resolution		0.1°C (–9.9...+90)°C
		1°C (–10...-20)°C
Maximum cable length	m	20
Degree of protection		IP54

The 01C.61 is used to sense the temperature at a location external to the 1C.61 chronothermostat. The 1C.61 can either; display the external temperature (and regulate to its internal sensor), or display & regulate to the external sensor temperature. The 01C.61 sensor communicates with the 1C.61 chronothermostat through a dedicated digital system.
This is the only sensor that can be used.

Outline drawings



Wiring diagrams

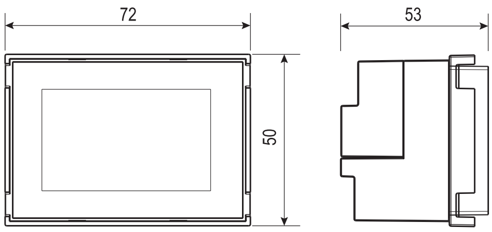


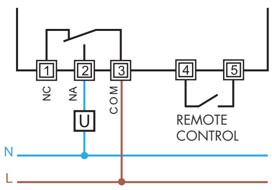
Features

Digital "touch" chronothermostat

- Easy to use
- TOUCH SCREEN Programmable Room Thermostat weekly programmable version
- Calendar with automatic leap year & daylight-saving updates
- Summer/Winter switch
- 3 programmable temperature thresholds
- Functions: frost protection, automatic control, manual control, holiday program, pump anti-seizure function
- 2 level security - simple touch screen blocking or full 3-digit PIN lock
  - remote control
- Compatible with 3 module housing
- 1 contact output 5 A 250 V AC
- Complete with adaptor for following frames:
  - ABB series Chiara
  - ABB series Mylos
  - Ave series S44
  - Bticino series Axolute
  - Bticino series Light
  - Bticino series Light tech
  - Bticino series Living
  - Bticino series Livinglight
  - Bticino series Matix
  - Gewiss series Chorus
  - Vimar series Eikon
  - Vimar series Eikon Evo
  - Vimar series Idea
  - Vimar series Plana
  - Vimar series Arkè
  - Adapter type 01C.51 for Bticino Air cover plates

1C.51





Wiring diagram

Colour	
White	1C.51.9.003.0007
Black	1C.51.9.003.2007
Technical features	
Sensing element	NTC
Supply	2 batteries 1.5V AAA
Contact configuration	1 CO (SPDT)
Contact rating	5A 250V AC
Display range	0...+50°C
Temperature setting range	+5...+37°C
Temperature differential	0.1 - 0.9°C
Minimum programming interval	1h - weekly
Buttons	Touch sceen
Back-light display	YES
Thermostat lock	Code
Protection category	IP20
Mounting	Recess (3 module box)
Display resolution	0.1°C
Accuracy at +20°C	+/–0.5°C
Frost Protection	+2...+8°C
Approvals (according to type)	CE EAC

Index - General technical information

i

Reference standards and values

Unless expressly indicated otherwise, the products shown in this catalogue are designed and manufactured according to the requirements of the following European and International Standards:

- **EN 61810-1**, **EN 61810-2**, **EN 61810-7** for electromechanical elementary relays
- **EN 50205** for relays with forcibly guided contacts
- **EN 61812-1** for timers
- **EN 60669-1** and **EN 60669-2-2** for electromechanical step relays
- **EN 60669-1** and **EN 60669-2-1** for light-dependent relays, electronic step relays, light dimmers, staircase switches, movement detectors and monitoring relays.

Other important standards, often used as reference for specific applications, are:

- **EN 60335-1** and **EN 60730-1** for domestic appliances
- **EN 50178** for industrial electronic equipments

According to EN 61810-1, all technical data is specified under standard conditions of 23°C ambient temperature, 96 kPa pressure, 50% humidity, clean air and 50 Hz frequency. The tolerance for coil resistance, nominal absorption and rated power values is ± 10%.
Unless expressly indicated otherwise, the standard tolerances for mechanical drawings are ± 0.1 mm.

Operating & installation conditions

Coil operating range: In general, Finder relays will operate over the full specified temperature range, according to:
- Class 1 – 80% to 110% of nominal coil voltage, or
- Class 2 – 85% to 110% of nominal coil voltage.

Outside the above Classes, coil operation is permitted according to the limits shown in the appropriate "R" chart.
Unless expressly indicated otherwise, all relays are suitable for 100% Duty Cycle (continuous energisation) and all AC coil relays are suitable for 50 and 60 Hz frequency.

Excessive peak voltage limiting: Overvoltage protection (varistor for AC, diode for DC) is recommended in parallel with the coil for nominal voltages ≥ 110 V for the relays of 40, 41, 44, 46 series.

Residual current: When AC relay coils are controlled via a proximity switch, or via cables having length > 10 m, the use of a "residual current bypass" module is recommended, or alternatively, fit a resistor of 62kOhm/1 watt in parallel with the coil.

Ambient temperature: The Ambient temperature as specified in the relevant specification and "R" chart relates to the immediate environment in which the component is situated, as this may be greater than the ambient temperature in which the equipment is located. Refer to page IX for more detail.

Condensation: Environmental conditions causing condensation or ice formation in the relay are not permitted.

Installed orientation: The component's specification is unaffected (unless expressly stated otherwise) by its orientation, (provided it is properly retained, eg by a retaining clip in the case of socket mounted relays).

RC contact suppression: If a resistor/capacitor network is placed across a contact to suppress arcing, it should be ensured that when the contact is open, the leakage current through the RC network does not give rise to a residual voltage across the load (typically the coil of another relay or solenoid) any greater than 10% of the load's nominal voltage - otherwise, the load may hum or vibrate, and reliability can be affected. Also, the use of an RC network across the contact will destroy the isolation normally afforded by the contact (in the open position).

Guidelines for automatic flow solder processes

In general, an automatic flow solder process consists of the following stages:

Relay mounting: Ensure that the relay terminals are straight and enter the PC board perpendicular to the PC board. For each relay, the catalogue illustrates the necessary PC board hole pattern (copper side view). Because of the weight of the relay, a plated through hole printed circuit board is recommended to ensure a secure fixation.

Flux application: This is a particularly delicate process. If the relay is not sealed, flux may penetrate the relay due to capillary forces, changing its performance and functionality.
Whether using foam or spray fluxing methods, ensure that flux is applied sparingly and evenly and does not flood through to the component side of the PC board.
By following the above precautions, and assuming the use of alcohol or water based fluxes, it is possible to satisfactorily use relays with protection category RT II.

Preheating: Set the preheat time and heat to just achieve the effective evaporation of the flux, taking care not to exceed a component side temperature of 100°C (212°F).

Soldering: Set the height of the molten solder wave such that the PC board is not flooded with solder. Ensure the solder temperature and time are kept to 260°C (500°F) and 3 seconds maximum.

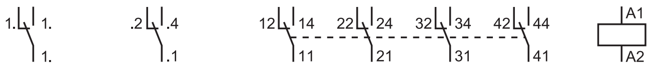
Cleaning: The use of modern "no-clean" flux avoids the necessity of washing the PC board. In special cases where the PC board must be washed the use of wash-tight relays (option xxx1 - RT III) is strongly recommended. After cleaning it is suggested to break the pin on the relay cover. This is necessary to guarantee the electrical life at maximum load as quoted in the catalogue; otherwise ozone generated inside the relay (dependent on the switching load and frequency) will reduce the electrical life. Even so, avoid washing the relay itself, particularly with aggressive solvents or in washing cycles using low temperature water, as this may cause thermal shock to the PC board components. The user should establish compatibility between his cleaning fluid and the relay plastics.

Terminology & definitions

All the following terms used in the catalogue are commonly used in technical language. However, occasionally, National, European or International Standards may prescribe the use of different terms, in which case these will be mentioned in the appropriate descriptions that follow.

Terminal marking

European Standard EN 50005 recommends the following numbering for the marking of relay terminals:
- .1 for common contact terminals (e.g. 11, 21, 31…)
- .2 for NC contact terminals (e.g. 12, 22, 32…)
- .4 for NO contact terminals (e.g. 14, 24, 34…)
- A1 and A2 for coil terminals
- B1, B2, B3 etc. for Signal inputs
- Z1 & Z2 for potentiometer or sensor connection



Pole Number | Contact configuration Number | Example: Relay with 4 poles

For delayed contacts of timers the numbering will be:
- .5 for common contact terminals (e.g. 15, 25,…)
- .6 for NC contact terminals (e.g. 16, 26, …)
- .8 for NO contact terminals (e.g. 18, 28,…)

IEC 67 and American standards prescribe:
progressive numbering for terminals (1,2,3,….13,14,..) and sometimes A and B for coil terminals.

Contact specification

Symbol	Configuration	EU	D	GB	USA
	Make contact (Normally Open)	NO	S	A	SPST-NO DPST-NO nPST-NO
	Break contact (Normally Closed)	NC	Ö	B	SPST-NC DPST-NC nPST-NC
	Changeover	CO	W	C	SPDT DPDT nPDT

n = number of poles (3,4,…), S = 1 and D = 2

Contact Set: The contact set comprises all the contacts within a relay.

Single contact: A contact with only one point of contact.

Twin/Bifurcated contact: A contact with two points of contact, which are effectively in parallel with each other. Very effective for switching small contact loads such as analogue, transducer, low signal or PLC input circuits.

Double break contact: A contact comprising two points of contact in series with each other. Particularly effective for switching DC loads. The same effect can be achieved by wiring two single contacts in series.

Micro interruption: Interruption of a circuit, without any specific requirements for distance or dielectric strength across the contact gap. All Finder relays comply or exceed this.

Micro disconnection: Adequate contact separation in at least one contact so as to provide functional safety. A dielectric strength requirement must be achieved across the contact gap. All Finder relays comply with this class of disconnection.

Full disconnection: Contact separation for the disconnection of conductors so as to provide the equivalent of basic insulation between those parts intended to be disconnected. There are requirements for both the dielectric strength and the dimensioning of the contact gap.
Finder relays types 45.91, 56.xx - 0300, 62.xx - 0300 and 65.x1 - 0300 comply with this category of disconnection.

Rated current: This coincides with the *Limiting continuous current* - the highest current that a contact can continuously carry within the prescribed temperature limits. It also coincides with the *Limiting cycling capacity*, i.e. the maximum current that a contact is capable of making and breaking under specified conditions. In virtually all cases the Rated current is also the current that, when associated with the Rated switching voltage, gives rise to the Rated load (AC1). (The exception being the 30 series relay).

Maximum peak current: The highest value of inrush current (≤ 0.5 seconds) that a contact can make and cycle (duty cycle ≤ 0.1) without undergoing any permanent degradation of its characteristics due to generated heat. It also coincides with the *limiting making capacity*.

Rated switching voltage: This is the switching voltage that when associated with the Rated current gives rise to the Rated load (AC1). The Rated load is used as the reference load for electrical life tests.

Maximum switching voltage: This represents the maximum nominal voltage that the contacts are able to switch and for the relay to meet the insulation and design requirements called for by the insulation coordination standards.

Rated load AC1: The maximum AC resistive load (in VA) that a contact can make, carry and break repeatedly, according to classification AC1 (see Table 1). It is the product of rated current and rated voltage, and is used as the reference load for electrical life tests.

Rated load AC15: The maximum AC inductive load (in VA) that a contact can make, carry and break repeatedly, according to classification AC15 (see Table 1), called "AC inductive load" in EN 61810-1:2008, Annex B.

Single-phase motor rating: The nominal value of motor power that a relay can switch.
(The figures are given in kW; the horsepower rating can be calculated by multiplying the kW value by 1.34 i.e. 0.37 kW = 0.5 HP).
Note: "inching" or "plugging" is not permitted.
If reversing motor direction, always allow an intermediate break of > 300 ms, otherwise an excessive inrush peak current (caused from change of polarity of motor capacitor) may occur, causing contact welding.

Nominal lamp ratings: Lamp ratings for 230V AC supply for:
- Incandescent (tungsten filament) lamps
- Standard and halogen filled types
- Fluorescent lamps without power factor compensation
- Fluorescent lamps compensated to Cos φ ≥ 0.9 (using conventional power factor correction capacitors)

For other lamp types, such as HID, or Electronic Ballast driven fluorescent lamp loads – please enquire.

Breaking capacity DC1: The maximum value of DC resistive current that a contact can make, carry and break repeatedly, according to classification DC1 (see Table 1).

Minimum switching load: The minimum values of power, voltage and current that a contact can reliably switch. For example, if minimum values are 300 mW, 5 V / 5 mA:
- with 5 V the current must be at least 60 mA;
- with 24 V the current must be at least 12.5 mA;
- with 5 mA the voltage must be at least 60 V.

For gold contact variants, loads no less than 50 mW, 5 V / 2 mA are suggested.
With 2 gold contacts in parallel, it is possible to switch 1 mW, 0.1 V / 1 mA.

Electric life tests: The Electrical life at rated load AC1; as specified in the Technical data, represents the life expectancy for an AC resistive load at rated current and 250 V.
(This value can be used as the relay B_{10} value; see "Electrical life "F-chart" and "Reliability" sections).

Electrical life "F-chart": The "Electrical life (AC) v contact current" chart indicates the life expectancy for an AC resistive load for different values of contact current. Some charts also indicate the results of electrical life tests for Inductive AC loads with a power factor of Cos φ = 0.4 (applicable for both the contact closing and opening).
In general, the reference load voltage applicable to these life expectancy charts is Un= 250 V AC. However, the life indicated can also be assumed to be approximately valid for voltages between 125 V to 277 V. Where the life expectancy chart shows a curve for 440 V, the life indicated can also be assumed to be approximately valid for voltages up to 480 V.

Note: Life, or number of cycles, from these charts can be taken as indicating the B_{10} statistical value for the purposes of reliability calculations. And, this value multiplied by 1.4 could be taken as an approximation to the related MCTF (Mean Cycles To Failure) figure. (Failure, in this case, refers to the contact "wear-out" mechanism that occurs at relatively high contact loads.)

Predicting life expectancy at voltages lower than 125 V:
For load voltages < 125 V (i.e.110 or 24 V AC), the electrical life will rise significantly with decreasing voltage. (A rough estimate can be made using a multiplying factor of 250/2Un and applying it to the life expectancy appropriate to the 250 V load voltage).
Estimating switching current at voltages greater than 250 V: For load voltages higher than 250 V (but less than the maximum switching voltage specified for the relay), the maximum contact current should be limited to the Rated load AC1 divided by the voltage being considered. For example, a relay with rated current and rated load AC1 of 16 A and 4000 VA respectively, is able to switch a maximum current of 10 A at 400 V AC: the corresponding electrical life will be approximately the same as that at 16 A 250 V.

Unless otherwise specified, the following test conditions apply:
- Tests performed at the maximum ambient temperature.
- Relay coil (AC or DC) energised at rated voltage.
- Load test applied to the NO contacts.
- Switching frequency for elementary relays: 900 cycles/h with 50% duty cycle (25 % for relays with rated current > 16 A and for 45.91 and 43.61 types).
- Switching frequency for step relays: 900 cycles/h for the coil, 450 cycles/h for the contact, 50% duty cycle.
- Electrical life expectancy values are valid for relays with standard contact material; data for optional materials are available on request.

Load reduction factor versus Cos φ: The load current for AC loads which comprise both an inductive and resistive component can be estimated by applying a reduction factor (k) to the resistive contact current (according to the load's Cos φ). Such loads should not be taken as appropriate for electric motors or fluorescent lamps, where specific ratings are quoted. They are however, appropriate for inductive loads where the current and Cos φ are substantially the same at "make" and "break", and are also widely specified by international relay standards as reference loads for performance verification and comparison.

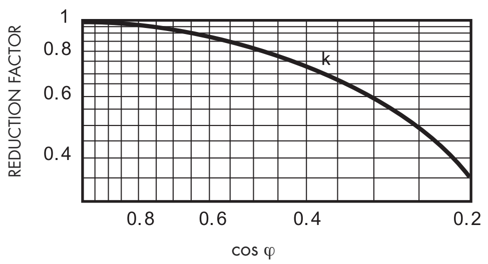


TABLE 1 ***Contact load classifications*** *(related to the utilization categories defined in EN60947-4-1 and EN60947-5-1)*

Load classification	Supply type	Application	Switching with relay
AC1	AC single-phase AC three-phase	Resistive or slightly Inductive AC loads.	Work within the relay data.
AC3	AC single-phase AC three-phase	Starting and stopping of Squirrel cage motors. Reversing direction of rotation only after motor has stopped rotating. Three-phase: Motor reversal is only permitted if there is a guaranteed break of 50ms between energisation in one direction and energisation in the other. Single-phase: Provision of 300ms "dead break" time when neither relay contacts are closed - during which time the capacitor discharges harmlessly through the motor windings.	For single-phase: keep to the relay data. For three-phase: see "Three-phase motors" section.
AC4	AC three-phase	Starting, Stopping and Reversing direction of rotation of Squirrel cage motors. Jogging (Inching). Regenerative braking (Plugging).	Not possible using relays. Since, when reversing a phase connection, severe contact arcing will occur.
AC14	AC single-phase	Control of small electromagnetic loads (<72 VA), power contactors, magnetic solenoid valves, and electromagnets.	Assume a peak inrush current of approx. 6-times rated current, and keep this within the the specified "Maximum peak current" for the relay.
AC15	AC single-phase	Control of small electromagnetic loads (>72 VA), power contactors, magnetic solenoid valves, and electromagnets.	Assume a peak inrush current of approx. 10-times rated current, and keep this within the specified "Maximum peak current" for the relay.
DC1	DC	Resistive loads or slightly inductive DC loads. (The switching voltage at the same current can be doubled by wiring 2 contacts in series).	Work within relay data (see the diagram "Maximum DC1 breaking capacity").
DC13	DC	Control of electromagnetic loads, power contactors, magnetic solenoid valves, and electromagnets.	This assumes no inrush current, although the switch off over-voltage can be up to 15 times the rated voltage. An approximation of the relay rating on a DC inductive load with 40 ms L/R can be made using 50 % of the DC1 rating. If a freewheeling diode is wired in parallel to the load, it can be considered the same value as DC1. See the diagram "Maximum DC1 breaking capacity"

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TABLE 2.1 cULus *Certified products ratings*

R = Resistive / GP = General Purpose / GU = General Use / I = Inductive (cosφ 0.4) / B = Ballast / NO = NO type

Product Type	UL file No.	Ratings AC/DC	"Motor Load" Single phase 110-120	"Motor Load" Single phase 220-240	Pilot Duty	Open Type Devices	Pollution degree	Max Surrounding Air Temperature
34.51	E106390	6 A – 250 Vac (GP)			B300 – R300	Yes	2	40 °C
40.31 – 40.51	E81856	10 A – 250 Vac (R)		1/3 Hp (250 V)	R300	Yes	/	85 °C
40.52	E81856	8 A – 250 Vac (R) 8 A – 277 Vac (GP) 8 A – 30 Vdc (GP)	1/6 Hp (4.4 FLA)	1/3 Hp (3.6 FLA)	R300	Yes	/	85 °C
40.61	E81856	15 A – 250 Vac (R)		½ Hp (250 V)	R300	Yes	/	85 °C
40.31 NEW	E81856	12 A – 277 Vac (GU) 12 A – 30 Vdc (GU)	1/3 Hp (7.2 FLA)	¾ Hp (6.9 FLA)	B300	Yes	2 or 3	85 °C
40.61 NEW	E81856	16 A – 277 Vac (GU) 16 A 30 Vdc (GU) (AgCdO) 12 A – 30 Vdc (GU) (AgNi)	1/3 Hp (7.2 FLA)	¾ Hp (6.9 FLA)	B300	Yes	2 or 3	85 °C
40.11 – 40.41	E81856	10 A – 240 Vac (R) 5 A – 240 Vac (I) 10 A – 250 Vac (GP) 8 A – 24 Vdc 0,5 A – 60 Vdc 0,2 A – 110 Vdc 0,12 A – 250 Vdc	/	½ Hp (250 V)	/	Yes	/	70 °C
41.31	E81856	12 A – 277 Vac (GU) 12 A – 277 Vac (R)	1/4 Hp (5.8 FLA)	½ Hp (4.9 FLA)	B300 – R300	Yes	2 or 3	40 or 70 °C with a minimum distance among relay of 5 mm
41.61	E81856	16 A – 277 Vac (GU-R) 8 A – 277 Vac (B)	¼ Hp (5.8 FLA)	½ Hp (4.9 FLA)	B300 – R300	Yes	2 or 3	40 or 70 °C with a minimum distance among relay of 5 mm
41.52	E81856	8 A – 277 Vac (GU-R) 8 A – 30 Vdc (GU; NO)		½ Hp (277 V) (4.1 FLA)	B300	Yes	2 or 3	40 or 70 °C with a minimum distance among relay of 5 mm
43.41	E81856	10 A – 250 Vac (GU-R) 4 A – 30 Vdc (R)	¼ Hp (5,8 FLA)	½ Hp (4.9 FLA)	B300 – R300	Yes	2 or 3	40 or 85 °C
43.61	E81856	10 A – 250 Vac (GU-R) (AgCdO) 16 A – 250 Vac (GU) (AgNi) 16 A – 250 Vac (R) (AgCdO)	¼ Hp (5.8 FLA) (AgCdO) 1/3 Hp (7.2 FLA) (AgNi)	½ Hp (4.9 FLA) (AgCdO) ¾ Hp (6.9 FLA) (AgNi)	B300 – R300	Yes	2 or 3	40 or 85 °C
44.52	E81856	6 A – 277 Vac (R)	1/8 Hp (3.8 FLA)	1/3 Hp (3.6 FLA)	/	Yes	/	85°C
44.62	E81856	10 A – 277 Vac (R)	¼ Hp (5.8 FLA)	¾ Hp (6.9 FLA)	/	Yes	/	85°C
45.31	E81856	16 A – 277 Vac (GU)(Agni) 16 A – 30 Vdc (GU)(AgNi)16 A – 30 Vdc (GU)(AgNi)16 A – 30 Vdc (GU)(AgNi)16 A – 30 Vdc (GU)(AgNi)16 A – 30 Vdc (GU)(AgNi)	1/3 Hp (7.2 FLA) (AgNi; NO)1/3 Hp (7.2 FLA) (AgNi; NO)1/3 Hp (7.2 FLA) (AgNi; NO)1/3 Hp (7.2 FLA) (AgNi; NO)1/3 Hp (7.2 FLA) (AgNi; NO)	1 Hp (8 FLA) (AgNi)1 Hp (8 FLA) (AgNi)1 Hp (8 FLA) (AgNi)1 Hp (8 FLA) (AgNi)1 Hp (8 FLA) (AgNi)	/	Yes	2 or 3	105 or 125 °C with a minimum distance among relay of 10 mm
45.71	E81856	16 A – 240 Vac (GU) 16 A – 30 Vdc (GU) (AgCdO) 16 A – 277 Vac (GU) 16 A – 30 Vdc (NO-GU) 12 A – 30 Vdc (NC-GU) (AgNi)	½ Hp (9.8 FLA) (AgCdO) 1/3 Hp (7.2 FLA) (AgNi; NO)	1 Hp (8 FLA) (AgNi)	/	Yes	2 or 3	105 or 125 °C with a minimum distance among relay of 10 mm
45.91	E81856	16 A – 277 Vac (GU)(AgNi) 16 A – 30 Vdc (GU)(AgNi)	1/6 Hp (4.4 FLA)1/6 Hp (4.4 FLA)1/6 Hp (4.4 FLA)1/6 Hp (4.4 FLA)	½ Hp (4.9 FLA)½ Hp (4.9 FLA)½ Hp (4.9 FLA)½ Hp (4.9 FLA)	/	Yes	2 or 3	105 or 125 °C with a minimum distance among relay of 10 mm
46.52	E81856	8 A – 277 Vac (GU) 6 A – 30 Vdc (R)	¼ Hp (5.8 FLA)	½ Hp (4.9 FLA)	B300 – R300	Yes	2 or 3	70 °C

TABLE 2.1 cULus *Certified products ratings*

R = Resistive / GP = General Purpose / GU = General Use / I = Inductive (cosφ 0.4) / B = Ballast / NO = NO type

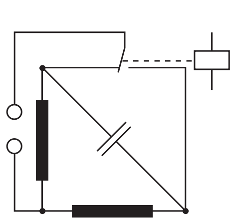
Product Type	UL file No.	Ratings AC/DC	"Motor Load" Single phase 110-120	"Motor Load" Single phase 220-240	Pilot Duty	Open Type Devices	Pollution degree	Max Surrounding Air Temperature
46.61	E81856	16 A – 277 Vac 12 A(NO)-10 A (NC) 30 Vdc (AgNi) 10 A(NO)-8 A(NC) 30 Vdc ($AgSnO_2$)30 Vdc ($AgSnO_2$) 30 Vdc ($AgSnO_2$)30 Vdc ($AgSnO_2$)	1/3 Hp (7.23 FLA)	¾ Hp (6.9 FLA) A300 – R300 ($AgSnO_2$)($AgSnO_2$) ($AgSnO_2$)($AgSnO_2$)	B300 – R300 (AgNi)	Yes	2 or 3	70 °C
50	E81856	8 A – 277 Vac (GU) 8 A – 30 Vdc (GU)	1/3 Hp (7.2 FLA) (Only NO)	½ Hp (4.9 FLA) (Only NO)	B300 (NO)	Yes	2 or 3	70 °C with a minimum distance among relay of 5 mm
55.X2 – 55.X3	E106390	10 A – 277 Vac (R) 10 A – 24 Vdc (R) (55.X2) 5 A – 24 Vdc (R) (55.X3)	1/3 Hp (7.2 FLA)	¾ Hp (6.9 FLA)	R300	Yes	/	40 °C
55.X4	E106390	7 A – 277 Vac (GP) 7 A – 30 Vdc (GP) (Std/Au contact) 5 A – 277 Vac (R) 5 A – 24 Vdc (R) (AgCdO contact)	1/8 Hp (3.8 FLA)	1/3 Hp (3.6 FLA)	R300	Yes	/	55°C
56	E81856	12 A – 277 Vac (GU) 12 A – 30 Vdc (GU) (AgNi; NO) 8 A – 30 Vdc (GU) (AgNi; NC) 12 A – 30 Vdc (GU) (AgCdO) 10 A – 30 Vdc (GU) ($AgSnO_2$; NO)($AgSnO_2$; NO) 8 A – 30 Vdc (GU) ($AgSnO_2$; NC)($AgSnO_2$; NC)	½ Hp (9.8 FLA)	1 Hp (8 FLA)	B300	Yes	2 o 3	40 or 70 °C
60	E81856	10 A – 277 Vac (R) 10 A – 30 Vdc (GU)	1/3 Hp (7.2 FLA)	1 Hp (8 FLA)	B300 (AgNi only) R300	Yes	/	40 °C
62	E81856	15 A – 277 Vac (GU) 10 A – 400 Vac (GU) 8 A – 480 Vac (GU) 15 A – 30 Vdc (GU)	¾ Hp (13.8 FLA)	2 Hp (12 FLA) 1 Hp (480 Vac - 3 f); (480 Vac - 3 f) (2.1 FLA) (NO)	B300 (AgCdO) R300	Yes	2 or 3	40 or 70 °C
65.31 65.61	E81856	20 A – 277 Vac (GU)	3/4 Hp (13.6 FLA)	2 Hp (12.0 FLA)	/	Yes	/	70 °C
65.31 NO 65.61 NO		30 A – 277 Vac (GU)						
65.31-S 65.61-S (DC coil, NO only)		35 A – 277 Vac (GU)	/	/				85 °C
66	E81856	30 A – 277 Vac (GU) (NO) 10 A – 277 Vac (GU) (NC) 24 A – 30 Vdc (GU) (NO) 30 A – 30 Vdc (GU) (X6XX type only)	1 Hp (16.0 FLA) (AgCdO, NO) ½ Hp (9.8 FLA) (AgNi)	2 Hp (12.0 FLA) (NO)	/	Yes	2 or 3	70 °C with a minimum distance among relay of 20 mm
67	E81856	50 A – 277 Vac (GU) 50 A – 480 Vac (GU) (three phases)	/	/	/	Yes	3	85 °C (60 °C - PCB)
70.61	E106390	6 A – 250 Vac (R) 6 A – 24 Vdc (R)	/	/	/	Yes	2	50 °C
20	E81856	16 A – 277 Vac (R) 1,000 W Tung. 120 V 2,000 W Tung. 277 V	½ Hp (9.8 FLA)	/	/	Yes	/	40 °C
85.02 – 85.03	E106390	10 A – 277 Vac (R) 10 A – 24 Vdc (R) (85.X2) 5 A – 24 Vdc (R) (85.X3)	1/3 Hp (7.2 FLA)	¾ Hp (6.9 FLA)	/	Yes	/	40 °C
85.04	E106390	7 A – 277 Vac (GP) 7 A – 30 Vdc (GP)	1/8 Hp (3.8 FLA)	1/3 Hp (3.6 FLA)	/	Yes	/	55 °C
7T.81…2301 7T.81…2401	E337851	10 A – 250 Vac (R)		1 ½ Hp (250 Vac) (10 FLA)	/	Yes	2	-20 / +40 °C
7T.81…2303 7T.81…2403	E337851	10 A – 250 Vac (R)		1 ½ Hp (250 Vac) (10 FLA)	/	Yes	2	0 / +60 °C
86	E106390	/	/	/	/	Yes	2	35 or 50 °C
99	E106390	/	/	/	/	Yes	2 or 3	50 °C

TABLE 2.2 cULus *Certified products ratings*

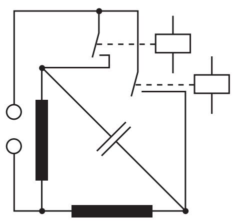
R = Resistive / GP = General Purpose / GU = General Use / I = Inductive (cosφ 0.4) / B = Ballast / NO = NO type

Product Type	UL file No.	Ratings AC/DC	"Motor Load" Single phase 110-120	"Motor Load" Single phase 220-240	Pilot Duty	Open Type Devices	Pollution degree	Max Surrounding Air Temperature
22.32 – 22.34	E81856	25 – 277 Vac (GU) 25 A – 30 Vdc (GU) 20 A – 277 Vac (B)	3/4 Hp (13.8 FLA / 82.8 LRA) (AgNi ; NO) 1/2 Hp (9.8 FLA / 5.8 LRA) (AgSnO2 ; NO)	2 Hp (12 FLA / 72 LRA) (AgNi ; NO) 1.5 Hp (10 FLA / 60 LRA) (AgSnO2 ; NO) **Three phase** (22.34 NO only) 3 Hp (9.6 FLA / 64 LRA)	A300	Yes	2	50 °C
0.22.33 – 0.22.35	E81856	5 A – 277 Vac (GU)			B300	Yes	2	50 °C
72.01 – 72.11	E81856	15 A – 250 Vac (R)		½ Hp (250 Vac) (4.9 FLA)	/	Yes	2 or 3	50 °C
77.11	E359047	15 A – 277 Vac (GU-B)	¾ Hp	1 Hp	/	Yes	2	45 °C
77.31	E359047	30 A – 400 Vac (GU) 30 A – 277 Vac (B)	¾ Hp	1 Hp ½ Hp (480 Vac)	/	Yes	2	40 °C
80.01-11-21-41-91	E81856	8 A – 250 (R)		½ Hp (250 Vac) (4.9 FLA)	/	Yes	2	40 °C
80.61	E81856	8 A – 250 (GU;R)	/	1/3 Hp (250 Vac) (3.6 FLA)	R300	Yes	2	40 °C
80.82	E81856	6 A – 250 Vac (GU;R)	/	/	B300 – R300	Yes	2	40 °C
83.X1 – 83.X2	E81856	12 A – 250 Vac (GU)	/	/	/	Yes	2	50 °C
83.62	E81856	8 A – 250 Vac (GU)	/	/	/	Yes	2	50 °C
7S	E172124	6 A – 250 Vac (GU same polarity) 6 A – 24 Vdc (GU)		/	B300 (NO)	Yes	/	70 °C

Capacitor start motors: Single phase 230V AC capacitor start motors have a starting current of about 120% of the rated current. However, damaging currents can result from an instantaneous reversal of the direction of rotation. In the first diagram, high circulating currents can cause severe arcing across the contact gap, as the changeover contacts make an almost instantaneous reversal of polarity to the capacitor. Measurements have shown a peak current of 250A for a 50 Watt motor, and up to 900A for a 500 Watt motor. This inevitably leads to welding of the contacts. Reversing the direction of such motors should therefore use two relays, as the second diagram shows, whereby in the control to the relay coils a "dead break" of approximately 300 ms is provided. The delay can either be provided by another control component such as a Timer, or through the Microprocessor etc., or by connecting a suitable NTC resistance in series with each relay coil. Cross interlocking the coil circuits of both relays will not produce the required delay! Moreover, the use of anti-weld contact material will not solve the problem.



Incorrect AC motor reversal:
Contact is in the intermediate state for less than 10ms – insufficient time to allow the energy in the capacitor to dissipate before the electrical connection is remade to the opposite polarity.



Correct AC motor reversal:
Provision of 300 ms "dead break" time when neither relay contacts are closed - during which time the capacitor discharges harmlessly through the motor windings.

TABLE 2.3 *Certified sockets ratings*

Socket type	UL ratings	CSA ratings	Open Type Devices	Pollution degree (Installation environment)	Max Surrounding Air Temperature	System Overvoltage Category (max peak Voltage impulse)	Conductors to be used	Wire size (AWG)	Terminal tightening torque
90.02/03	10A 300V	10A 300V (max 20A Total Load)			70°C				
90.14/15	10A 300V	10A 250V							
90.20/21/26/27	10A 300V	10A 250V							
90.82.3	10A 300V	10A 300V			70 °C			14-20 stranded and solid	7.08 lb.in. (0.8 Nm)
90.83.3	10A 300V	10A 300V			65 °C			14-20 stranded and solid	7.08 lb.in. (0.8 Nm)
92.03	16A 300V	10A 250V (max 20A Total Load)			70°C		75°C Cu only	10-24, stranded or solid	7.08 lb.in. (0.8 Nm)
92.13/33	16A 300V	10A 250V							
93.01/51	6A 300V	6A 250V			60°C		75°C Cu only	14-24, stranded or solid	
93.02/52	2x10A 300V (60°C) 2x8A 300V (70°C)	2x10A 300V (60°C) 2x8A 300V (70°C)	Yes	2	60 or 70°C	II (2.5 kV)	75°C Cu only (CSA)		
93.11	6A 300V	6A 300V			70°C				
93.21	6A 300V	/	Yes	2	70°C				
93.60/65/66/67/68	6A 300V (40°C) 4A 300V (70°C)	6A 300V (40°C) 4A 300V (70°C)			40 or 70°C		75°C Cu only	14-24, stranded or solid	
93.61/62/63/64/68	6A 300V (40°C) 4A 300V (70°C)	6A 300V (40°C) 4A 300V (70°C)			40 or 70°C		75°C Cu only	14-24, stranded or solid	4.43 lb.in. (0.5 Nm)
09368141	100mA 24V	100mA 24V			70°C				
94.02/03/04	10A 300V	10A 250V (max 20A Total Load)			70°C		75°C Cu only	10-24 stranded, 12-24 solid	4.43 lb.in. (0.5 Nm)
94.12/13/14	10A 300V (4 pole: 5A 300V)	10A 250V							
94.22/23/24	10A 300V	10A 250V							
94.33/34	10A 300V (4 pole: 5A 300V)	10A 250V							
94.54	10A 300V		Yes		70 °C		Copper only	14-18-24 stranded and solid	
94.62/64	10A 300V	10A 250V							
94.72/73/74	10A 300V	10A 250V (94.74: max 20A Total Load)							
94.82	10A 300V	10A 250V							
94.82.3/92.3	10A 300V		Yes		70 °C				
94.84.3/94.3	10A 300V		Yes		55 °C				
94.82.2	10A 300V		Yes		50 °C				
94.84.2	7 A 300 V		Yes		50 °C				
95.03/05	10A 300V	10A 250V (max 20A Total Load)			70°C		75°C Cu only	10-24 stranded, 12-24 solid	4.43 lb.in. (0.5 Nm)
95.13.2/15.2	12A 300V	10A 300V (max 20A Total Load)	Yes		70 °C with a minimum distance of 5 mm				
95.55/55.3	10A 300V (40°C) 8A 300V (70°C)	10A 300V (40 °C) 8A 300V (70 °C)	Yes		40 or 70°C			14-24 stranded and solid	
95.23	10A 300V	10A 250V							
95.63/65/75	10A 300V	10A 250V							
95.83.3/85.3/ 93.3/95.3	12A 300V		Yes		85 °C			14-18, stranded or solid	7.08 lb. in. (0.8 Nm)
96.02/04	12A 300V (50°C) 10A 300V (70°C)	12A 300V (50°C) 10A 300V (70°C)	Yes		50 or 70°C	III (4.0 kV)	60/75°C Cu only 75°C Cu only (CSA)	10-14, stranded or solid	7.08 lb.in. (0.8 Nm)
96.12/14	12A 300V	15A 250V							
96.72/74	15A 300V	10A 250V (max 20A Total Load)							
97.01	16A 300V (50°C) 12A 300V (70°C)	16A 300V (50°C) 12A 300V (70°C)	Yes		50 or 70°C		75°C Cu only (CSA)		
97.02	2x8A 300V	2x8A 300V	Yes		70°C		75°C Cu only (CSA)		
97.11	16A 300V (50°C) 12A 300V (70°C)	/	Yes		50 or 70 °C with a minimum distance of 5 mm				
97.12	2x8A 300V	/	Yes		70 °C with a minimum distance of 5 mm				
97.51 - 97.51.3	15A 300V (40°C) (2-wires/per pole) 10A 300V (70°C)	15A 300V (40 °C) 10A 300V (70 °C)	Yes		40 or 70°C			14-24 stranded and solid	
97.52 - 97.52.3	10A 300V (40°C) 8A 300V (70°C)	8A 300V	Yes		70°C			14-24 stranded and solid	

Three-phase alternating current loads: Larger three-phase alternating current loads should preferably be switched with contactors according to EN 60947-4-1 Electromechanical contactors and motor starters. Contactors are similar to relays but they have their own characteristics; typically compared to relays:

· They can normally switch different phases at the same time.
· They are physically much larger.
· Their design and construction usually features double break contacts.
· They can withstand certain short-circuit conditions.

There is nevertheless, some overlap between relays and contactors regarding switching characteristics and applications.
However, when switching three-phase alternating current with relays, consider and take into account:

- The isolation co-ordination, i.e. the voltage stress and the degree of pollution between the contacts according to the insulation rated voltage.
- And, avoid the use of the NO relay versions with 3mm contact gaps, unless the isolation afforded by the contact gap is specifically required.

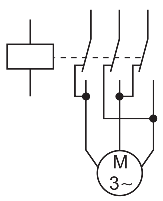
Three-phase motors: Higher power three-phase motors are often switched by a 3-pole contactor, where there is high isolation/separation between phases. However, for space, size and other reasons, relays are also called upon to switch 3-phase motors.

TABLE 3
Motor ratings v relay series

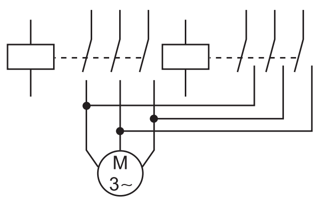
Relay series	Motor Power (400 V 3 phase)		Permissible degree of pollution	Impulse voltage
	kW	PS(hp)		
55.33, 55.13	0.37	0.50	2	4
56.34, 56.44	0.80	1.10	2	4
60.13, 60.63	0.80	1.10	2	3.6
62.23, 62.33, 62.83	1.50	2.00	3	4

62 series relay is also capable to switch 1 hp 480 V 3 phase motors

Reversing the motor: Take particular care if it is required to change the motor direction by reversing two of the supply phases applied to the motor terminals, as this will result in severe damage unless there is a “dead time” between the changeover. Therefore, use one relay for the forward direction and another for the reverse direction (as the following diagram). And, most importantly, ensure that there is a “dead time” of no less than 50ms - when neither relay coil is energised. Simple cross interlocking of the relay coils will not produce a Time delay! However, choosing a tougher, anti-weld contact material may further improve the reliability and performance, and is advised.



Incorrect three-phase motor reversal:
The electrical stress of opposing phase voltages across the contact gap, together with contact arcing can result in a phase to phase short-circuit.



Correct three-phase motor reversal:
“Dead break” time of >50 ms, during which time neither the Forward nor the Reverse relay contacts are closed.

Notes:
1. For AC3 category (starting and switching off) - motor reversal is only permitted if there is a guaranteed break of 50ms between energisation in one direction and energisation in the other. Observe the maximum starts per hour, according to the motor manufacturer’s recommendation.
2. AC4 category (starting, plugging, reversing and inching/jogging) is not possible with relays or small contactors. In particular, the direct reversing of phase connections for “plugging” will result in severe contact arcing leading to a short-circuit within the relay or contactor.
3. Under certain circumstances it may be preferable to use three single pole relays to control each phase individually, and so achieve greater separation between the phases. (Any relatively small time difference between the operation times of the three relays is insignificant compared to the much slower operation of contactors.)

Switching different voltages within a relay: Switching different voltages in a relay e.g. 230 V AC with one contact and 24 V DC with a neighboring contact is possible -provided that the Insulation type between adjacent contacts is at least of Basic level. However, note that the equipment standard might demand a higher level that is not possible using adjacent contacts on the same relay. The possibility of using more than one relay could be considered.

Contact resistance: Measured, according to Application Category (Table 4), at the external terminals of the relay. It is a final test value, not necessarily reproducible subsequently. It has little effect on relay reliability for most applications since a typical value would be < 50 mΩ (measured with 24 V 100 mA).

Contact categories according to EN 61810-7: The effectiveness with which a relay contact can make an electrical circuit depends on several factors, such as the material used for the contact, its exposure to environmental pollution and its design etc.. Therefore, for reliable operation, it is necessary to specify a Contact Category, which is defined in terms of the characteristics of the load. The appropriate Contact Category will also define the voltage and current levels used to measure the contact resistance. All Finder relays are category CC2.

TABLE 4 *Contact categories*

Contact category	Load characteristic	Contact Resistance Measurement	
CC0	Dry circuit	30 mV	10 mA
CC1	Low load without arcing	10 V	100 mA
CC2	High load with arcing	30 V	1 A

TABLE 5 *Contact materials characteristics*

Material	Property	Typical application
AgNi + Au (Silver Nickel Gold plated)	- Silver-nickel base with a galvanic hard gold plating - Gold is not attacked by industrial atmospheres - With small loads, contact resistance is lower and more consistent compared to other materials **NOTE:** hard gold plating is completely different to 0.2μm gold flashing, which allows only protection in storing, but no better performance in use.	Wide range applications: - Small load range (where gold plating erodes very little) from 50 mW (5 V - 2 mA) up to 1.5 W/24 V (resistive load). - Middle load range where gold plating erodes after several operations and the property of basic AgNi becomes dominant. **NOTE:** for switching lower load, typically 1mW (0.1 V - 1 mA), (for example in measuring instruments), it is recommended to connect 2 contacts in parallel.
AgNi (Silver Nickel)	- Standard contact material for most relay applications - High wear resistance - Medium resistance to welding	- Resistive and slightly inductive loads - Rated current up to 12 A - Inrush current up to 25 A
AgCdO (Silver Cadmium Oxide)	- High wear resistance with higher AC loads - Good resistance to welding	- Inductive and motor loads - Rated current up to 30 A - Inrush current up to 50 A
$AgSnO_2$ (Silver Tin Oxide)	- Excellent resistance to welding	- Lamp and capacitive loads - Very high Inrush current (up to 120 A) loads

Coil specification

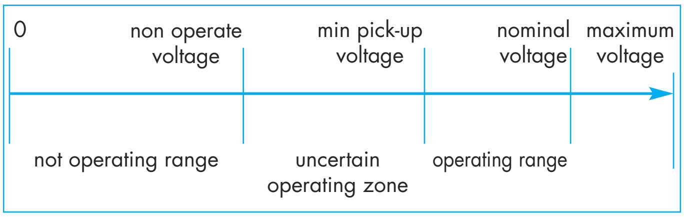
Nominal voltage: The nominal value of coil voltage for which the relay has been designed, and for which operation is intended. The operating and performance characteristics are with respect to the coil at nominal voltage.

Rated power: The DC power value (W) or the apparent AC power value (VA with closed armature) which is absorbed by the coil at 23°C and at rated voltage.

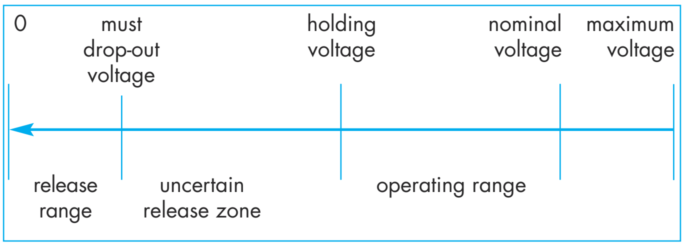
Operating range: The range of input voltage, in nominal voltage applications, in which the relay works in the whole range of ambient temperatures, according to operating class:
- class 1: $(0.8...1.1)U_N$
- class 2: $(0.85...1.1)U_N$

In application where the coil voltage doesn’t meet the tolerances of nominal voltage, the diagrams “R” shows the relation of maximum coil voltage permitted and pick-up voltage (without pre-energisation) versus ambient temperature.

ENERGIZATION VOLTAGE



DE-ENERGIZATION VOLTAGE



Non-operate voltage: The highest value of input voltage at which the relay will not operate (not specified in the catalogue).

Minimum Pick-up voltage (Operate voltage): The lowest value of applied voltage at which the relay will operate.

Maximum permitted voltage: The highest applied coil voltage that the relay can continuously withstand, dependent on ambient temperature (see “R” diagrams).

Holding voltage (Non-release voltage): The lowest value of coil voltage at which the relay (which has previously been energised with a voltage within the operating range) will not drop-out.

Must drop-out voltage (Must release voltage): The highest value of coil voltage at which the relay (having previously been energised with a voltage within the operating range) will definitely drop-out.
The same “per unit” value can be applied to the nominal coil current value to give an indication of the maximum leakage current that may be permitted in the coil circuit, before problems with relay release might be expected.

Coil Resistance: The nominal value of the coil resistance under the standard prescribed condition of 23°C ambient. Tolerance is ± 10%.

Rated coil consumption: The nominal value of coil current, when energized at nominal voltage (and at 50Hz for AC coils).

Thermal tests: Calculation of the coil temperature rise (ΔT) is made by measuring the coil resistance in a temperature controlled oven (not ventilated) until a stable value is reached (no less than 0.5 K variation in 10 minutes).
That is: $\Delta T = (R2 - R1)/R1 \times (234.5 + t1) - (t2 - t1)$
where:
R1 = initial resistance
R2 = final resistance
t1 = initial temperature
t2 = final temperature

Monostable relay: An electrical relay which, having responded to coil energisation by changing contact state, returns to the previous contact state when the coil energisation is removed.

Bistable relay: An electrical relay, which, having responded to coil energisation by changing contact state, retains that contact state after the coil energisation has been removed. A further energisation of the coil is necessary to cause the contact state to revert.

Latching relay: A bistable relay, where the contacts retain their state due to a mechanical latching mechanism. Subsequent applications of coil energisation causes the contacts to “toggle” open and closed.

Remanence relay: A bistable relay, where the contacts retain their operated (or Set) state due to remanent magnetism in the relay iron circuit caused by the application of a DC current through the coil.
Resetting the contact state is achieved by passing a smaller DC current through the coil in the opposite direction.
For AC excitation, magnetization takes place via a diode to produce a DC set current, and demagnetising is achieved by applying an AC coil current of lower magnitude.

Insulation

EN/IEC 61810-1 Relay standard:
The “Scope” of the relay standard says of itself “… IEC 61810-1 applies to electromechanical elementary relays (non-specified time all-or-nothing relays) for incorporation into equipment. It defines the basic functional requirements and safety-aspects for applications in all areas of electrical engineering or electronics, such as:
- general industrial equipment,
- electrical facilities,
- electrical machines,
- electrical appliances for household and similar use,
- information technology and business equipment,
- building automation equipment,
- automation equipment,
- electrical installation equipment,
- medical equipment,
- control equipment,
- telecommunications,
- vehicles,
- transportation (e.g. railways)…”

Relay function and Isolation: One of the main functions of a relay is to connect and disconnect different electric circuits, and usually, to maintain a high level of electrical separation between the various circuits.
It is therefore necessary to consider the level of isolation appropriate to the application and the task to be performed - and to relate this to the relay’s specification.
In the case of electromechanical relays the areas of isolation generally considered are:
- Isolation between coil and all contacts (the “contact set”). Catalogue data - "Insulation between coil and contact set"
- Isolation between physically adjacent, but electrically separate, contacts of a multi-pole relay. Catalogue data – “Insulation between adjacent contacts”.
- Isolation between the open contacts (applies to the NO contact, and the NC contact when the coil is energised). Catalogue data - “Insulation between open contacts”.

Specifying isolation levels
There are several ways of specifying or describing the level of isolation offered by, or demanded of, a relay. These include:

Insulation coordination, which focuses on the levels of impulse voltage likely to be seen on the supply lines of the application equipment and the cleanliness of the immediate surroundings of the relay in the equipment. And, as a consequence, it demands appropriate levels of separation between circuits, in terms of isolating distances and quality of insulating material used etc. (see additional information under "Insulation coordination")

Type of insulation; For both equipment and components such as a relay, there are several types (or levels) of insulation that might be demanded between the various circuits. The appropriate type will depend on the specific function being performed, the voltage levels involved, and the associated safety consequences. The various types of insulation are listed below, and those appropriate to each relay series are stated within the relay data; Specifically, within the table under the section entitled Technical data, sub-heading; Insulation.

Functional insulation; Insulation between conductive parts, which is necessary only for the proper functioning of the relay.
Basic insulation; Insulation applied to live parts to provide basic protection against electric shock.
Supplementary insulation; Independent insulation applied in addition to basic insulation, in order to provide protection against electric shock in the event of a failure of basic insulation.
Double insulation; Insulation comprising both basic insulation and supplementary insulation.
Reinforced insulation; A single insulation system applied to live parts, which provides a degree of protection against electric shock equivalent to double insulation.

(Usually, the decision as to the appropriate type of insulation will have already been made by the equipment standard.)

Dielectric strength, and high voltage impulse tests; These are either, final inspection or Type tests, which prove the level of isolation in terms of the minimum voltage stress that can be withstood, between the various specified electrical circuits. As the *only* method of specifying and checking for adequate isolation, this tends to be the more historical approach. However, there are still some dielectric strength requirements to be found within both the Insulation coordination approach and the Level of Insulation approach.

Insulation coordination: In accordance with EN 61810-1 and IEC 60664-1:2003, the Insulation characteristics offered by a relay can be described by just two characteristic parameters – the Rated Impulse Voltage and the Pollution Degree.
To ensure the correct Insulation Coordination between the relay and the application, the equipment designer (relay user) should establish the Rated Impulse Voltage appropriate to his application, and the Pollution Degree for the microenvironment in which the relay is situated. He should then match (or coordinate) these two figures with the corresponding values given in the appropriate relay data, under the section entitled Technical data, sub-heading; Insulation.
Rated Impulse Voltage; To establish the appropriate Rated Impulse Voltage refer to the appropriate Equipment Standard which may specify mandatory values for equipment being designed. Alternatively, using the Rated Impulse Voltage table (Table 6) with knowledge of the Nominal Voltage of the Supply System and knowledge of the Overvoltage Category, determine the appropriate Rated Impulse Voltage.
Overvoltage Category; this is described in IEC 60664-1, but is also summarised in the footnotes to Rated Impulse Voltage table. Alternatively, it may be specified in the equipment standard.
Pollution Degree; determine this by considering the immediate surroundings of the relay (refer to Pollution Degree table 7). Then check that the relay specification offers the appropriate (or better) Rated Impulse Voltage and Rated Insulation Voltage, for that Pollution Degree.

Nominal voltage of supply system: This effectively describes the source of the power supply system, so 230/400 V AC indicates that this would be (or is likely to be) a three-phase sub-station transformer with a Neutral connection. Being aware of the source of the supply system is important since (in conjunction with the Overvoltage category) it determines the typical levels of impulse voltage likely to be seen on the supply lines, and this has to be taken into account in the designing of the relay. However, it does not necessarily follow that the relay will be rated by the manufacturer for use at the highest voltage of the supply system. It is the declared Rated Insulation Voltage that confirms this aspect.

Rated Insulation Voltage: This is a notional value of voltage that indicates the relay's insulation as being suitable for handling voltages up to this level. Note that this notional Rated Insulation Voltage is selected from a list of preferred values. For Finder relays, 250 V and 400 V are two such preferred values, and of course they will cover respectively, the 230 V L-N and 400 V L-L voltages commonly encountered in practice.

TABLE 6 *Rated impulse voltage*

Nominal voltage of the supply system[1] V		Rated insulation voltage V	Rated impulse voltage kV			
			Overvoltage category			
Three-phase systems	Single-phase systems		I	II	III	IV
	120 to 240	125 to 250	0.8	1.5	2.5	4
230/400		250/400	1.5	2.5	4	6
277/480		320/500	1.5	2.5	4	6

(1) In accordance with IEC 60038.

Remark: The descriptions of overvoltage categories below are for information. The actual overvoltage category to be considered has to be taken from the product standard defining the application of the relay.
Overvoltage category I Applies to equipment intended for connection to fixed installations of buildings, but where measures have been taken (either in the fixed installation or in the equipment) to limit transient overvoltages to the level indicated.
Overvoltage category II Applies to equipment intended for connection to fixed installations of buildings.
Overvoltage category III Applies to equipment in fixed installations, and for cases where a higher degree of availability of the equipment is expected.
Overvoltage category IV Applies to equipment intended for use at or near the origin of the installation, from the main distributor towards the supply mains.

TABLE 7 *Pollution degree*

Pollution degree	Immediate surroundings of relay
1	No pollution or only dry, non-conductive pollution occurs. The pollution has no influence.
2	Only non-conductive pollution occurs, except that occasionally a temporary conductivity caused by condensation is to be expected.
3	Conductive pollution occurs or dry, non-conductive pollution occurs which becomes conductive due to condensation, which is to be expected.

Dependent on the product standard, pollution degree 2 and 3 are commonly prescribed for equipment. For example, EN 50178 (electronics for use in power installations) prescribes, under normal circumstances, contamination level 2.

Dielectric strength: This can be described in terms of an AC voltage test, or in terms of an Impulse (1.2/50 μs) voltage test. (The correspondence between the AC test and Impulse voltage test is listed in IEC 60664-1 Annex A, Table A.1).
All Finder relays receive a 100 % final inspection AC (50Hz) dielectric strength test; applied between all contacts and coil, between adjacent contacts, and across open contacts. The leakage current must be less than 3 mA.
For Type testing, both AC and Impulse voltage dielectric strength tests are applied.

Insulation Group: This was the older Insulation Group classification (such as C 250), which was according to the VDE 0110 standard. They have largely been replaced with the more recent way of specifying insulation properties, according to Insulation Coordination.

SELV, PELV and Safe separation: Insulation Coordination as described earlier ensures the isolation of hazardous voltages from other circuits to a safe engineering level, but may not be adequate on its own if the design of the equipment permits the LV circuit to be accessible and therefore able to be touched directly or, where the nature and location of the electrics presents extra dangers.
Therefore, for these extra dangerous applications (such as swimming pool lighting or bathroom electrics) there can be a need for a special low voltage supply system (SELV or PELV), that is inherently safe and highly secure, working at low voltage and with much higher levels of physical isolation and integrity between it and other hazardous circuits.

The SELV (Separated Extra Low Voltage) system is achieved by designing with double or reinforced insulation and by ensuring "safe separation" from hazardous circuits in accordance with regulations for SELV circuits. The SELV voltage (which is isolated from Ground) must be derived via a safety transformer meeting double or reinforced isolation between the windings, as well as other safety requirements demanded by the appropriate standard.
Note: The value for the "safe voltage" can differ slightly dependent upon the particular application or end product regulation.
There are specific requirements for keeping SELV circuits and wiring separate from other hazardous circuits, and it is this aspect concerning the separation of the coil to contacts that is met by several Finder relays as standard, and as a special version of the 62 series of relays - where an additional barrier is a special option.

The PELV system (Protected Extra Low Voltage), like the SELV system, requires a design that guarantees a low risk of accidental contact with a high voltage, but in contrast, it has a protective earth (ground) connection. Like SELV, the transformer can have windings separated by double or reinforced isolation, or by a conductive shield with a protected earth connection.

Consider a common situation, where the mains voltage of 230 V and a low voltage circuit both appear within a relay; all the following requirements must be met by the relay - and also applied to the connections/wiring to it.
- The low voltage and the 230 V must be separated by double or reinforced insulation. This means that between the two electrical circuits there must be guaranteed a dielectric strength of 6 kV (1.2/50 μs), an air distance of 5.5 mm and, depending on the pollution degree and on material used, an appropriate tracking distance.
- The electrical circuits within the relay must be protected against any possibility of bridging, caused for instance by a loose metal part. This is achieved by the physical separation of circuits into isolated chambers within the relay.
- The different voltage wiring connected to the relay must also be physically separated from each other. This is normally achieved by using separate cable channels.
- For relays mounted on printed circuit boards the appropriate distance between the tracks connected to low voltage and the tracks connected to other voltages must be achieved. Alternatively, earth barriers can be interposed between hazardous and safe parts of the circuitry.

Although this appears quite complex, with the SELV capability/options offered by some Finder relays, the user only needs to address the two last points. And, when using a socket where the coil and contact connections are on opposite sides, the separation of wiring into different cable channels is greatly facilitated.

General technical data

Cycle: The operate and subsequent release of a relay. Over a cycle, the coil is energised and de-energised, and a (NO) contact will have progressed through a cycle of making circuit, through to breaking the circuit, back to the point at which it is just about to re-make the circuit.

Period: The time taken by one cycle.

Duty factor (DF): During cyclic operation, the Duty Factor is the ratio between the time the relay is energized, to the time taken for one cycle (ie the Period). For continuous duty, the DF =1.

Continuous operation: This would represent the condition where the coil is permanently energized, or is energized for at least sufficient time for the relay to reach thermal equilibrium.

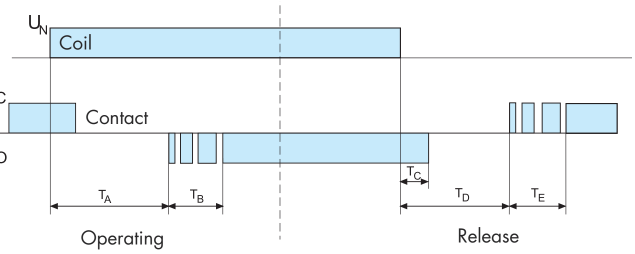
Mechanical life: This is derived from a test performed by energising the coils of several relays at 5 to 10 cycles per second without any load applied to the contacts. It establishes the ultimate durability of the relay where electrical wear of the contacts is not an issue. The maximum Electrical Life may therefore approach the Mechanical Life where the electrical loading of the contacts is very small.

Operate time: The typical time (average of values measured supplying the relay coil with the nominal DC voltage) for the NO contact to close, from the point of coil energisation. It does not include the bounce time (see following pattern).

Release time
- For CO relays: The typical time (average of values measured removing from the coil the DC voltage) for the NC contact to close, from the point of coil de-energisation. It does not include the bounce time.
- For NO relays: The typical time (average of values measured removing from the coil the DC voltage) for the NO contact to open, from the point of coil de-energisation. It does not include the bounce time.

Note: The release time will increase if a suppression diode in parallel with the coil is employed (either in the form of; a coil protection module; integrated option within the relay; or mounted directly on the pcb).

Bounce time: The typical time duration (average of values measured) while closing contacts bounce, before attaining a stable closed state. Different values generally apply to NO and NC contacts.



T_A Operate time
T_B Bounce time for NO contact
T_C Release Time (NO relays)
T_D Release Time (CO relays)
T_E Bounce time for NC contact

Ambient temperature: The temperature of the immediate area where the relay is located. It will not necessarily correspond to the ambient temperature either within, or external to, the enclosure in which the relay is located.
To accurately measure the ambient temperature with respect to the relay, remove the relay from its location whilst maintaining the worst-case energisation of all the other relays and components within the enclosure or panel. Measuring the temperature at the position vacated by the relay will give the true ambient temperature in which the relay is working.

Ambient temperature range: The temperature range over which, operation of the relay is guaranteed (under prescribed conditions).

Storage temperature range: This can be taken as the ambient temperature range, with the upper and lower limits extended by 10 °C.

Environmental protection: according to EN 61810-1
The RT categories describe the degree of sealing of the relay case:

Environmental protection category	Protection
RT 0 Unenclosed relay	Relay not provided with a protective case.
RT I Dust protected relay	Relay provided with a case, which protects its mechanism from dust.
RT II Flux proof relay	Relay capable of being automatically soldered without allowing the migration of solder fluxes beyond the intended.
RT III Wash tight relay	Relay capable of being automatically soldered and subsequently undergoing a washing process to remove flux residues without allowing the ingress of flux or washing solvents.
Special application categories	
RT IV Sealed relay	Relay provided with a case which has no venting to the outside atmosphere.
RT V Hermetically sealed relay	Sealed relay having an enhanced level of sealing.

Protection category: according to EN 60529.
The first digit is related to the protection against the intrusion of solid foreign objects into the relay, and also against access to hazardous parts. The second digit relates to the protection against ingress of water.
The IP category relates to the relay, when used normally in relay sockets or PC boards.
For sockets, IP20 signifies that the socket is "finger-safe" (VDE0106).
IP Examples:
IP 00 = Not protected.
IP 20 = Protected against solid foreign objects of 12.5 mm Ø and greater. Not protected against water.
IP 40 = Protected against solid foreign objects of 1 mm Ø and greater. Not protected against water.
IP 50 = Protected against powder (ingress of dust is not totally prevented, but dust shall not penetrate in a quantity to interfere with satisfactory operation of the relay). Not protected against water.
IP 51 = As IP 50, but with protection against vertically falling drops of water.
IP 54 = As IP 50, but with protection against spayed from all directions – limited ingress permitted.
IP 67 = Totally protected against powder (dust-tight) and protected against the effects of temporary immersion in water.

Vibration resistance: The maximum level of sinusoidal vibration, over the specified frequency range, which can be applied to the relay in the X-axis without the opening (for more than 10 μs) of the NO contact (if the coil is energised) or NC contact (if the coil is not energised). (The X-axis is the axis through the plane of the relay face containing the relay terminals). The vibration resistance is usually higher in the energised state, then in the non-energised state. Data for other axes and frequency ranges, on request. The level of vibration is given in terms of the maximum acceleration of the sinusoidal vibration,"g" (where g = 9.81 m/s^2). But note: the normal testing procedure according to IEC 60068-2-6 prescribes to limit the maximum peak-to-peak displacement in the lower range of frequencies.

Shock resistance: The maximum mechanical shock (half-sine 11ms waveform) permitted in the X-axis without contact opening > 10 μs. Data for other axes on request.

Installed orientation: The component's specification is unaffected (unless expressly stated otherwise) by its orientation, (provided it is properly retained, eg by a retaining clip in the case of socket mounted relays.)

Power lost to the environment: The value of the power lost from the relay with the coil energised (without contact current, or with full rated current through all NO contacts). This may be used in the thermal design and regulation of the control panel.

Recommended distance between relays mounted on printed circuit boards: This is the minimum mounting distance suggested when several relays are mounted on the same PC board. Care and consideration shall be given to ensure that other components mounted on the PC board do not heat the relay and raise its microenvironment beyond the permitted maximum ambient temperature.

Torque: The maximum value of torque that can be used for tightening terminal screws, according to EN 60999, is 0.4 Nm for M2.5 screws, 0.5 Nm for M3 screws, 0.8 Nm for M3.5 screws, 1.2 Nm for M4 screws. The test torque is indicated in the catalogue. Normally a 20% increase of this value is acceptable.
Both slot-head and cross-head screwdrivers can be used.

Minimum Wire size: For all types of terminal, a minimum cross-section of 0.2 mm^2 is permitted.

Max. wire size: Maximum cross-section of cables (solid or stranded wire, without ferrules) that can be connected to each terminal. For use with ferrules, the wire cross-section has to be reduced (e.g. from 4 to 2.5 mm^2, from 2.5 to 1.5 mm^2, from 1.5 to 1 mm^2).

Terminating more than one wire: EN 60204-1 permits 2 or more wires to be terminated in the same terminal. All Finder products are designed in such a way that each terminal can accept 2 or more wires, except screwless terminals.

Box clamp: wires are terminated within a box shaped clamp. Effective retention of solid, stranded and "bootlace" wires, but not suitable for wires terminated with "fork" style terminations.

Plate clamp: wires are terminated under the pressure of a clamp plate. Effective for "fork" terminated wires and solid wire, but less so for stranded wire.

Screwless terminal (Spring clamp): wires are terminated under the pressure of a spring clamp. The clamp being temporarily held open by the insertion of a tool, while the wire is inserted.

Push-in terminal: similarly to spring clamp terminals, wires are terminated under the pressure of a spring clamp. Solid wires or ferrules can be quickly connected by their simple insertion into the terminal. For stranded wires insertion, and for each wire type extraction, it is necessary first to open the terminal by pushing down on the push-button.

SSR – Solid State Relay

SSR Solid State Relay: A relay utilising semiconductor technology, rather than electromechanical. In particular, the load is switched by a semiconductor and consequently these relays are not subject to burning of contacts and there is no migration of contact material.
SSRs are capable of very high speed switching and virtual unlimited life.
However, SSRs for switching DC are polarity sensitive and consideration must given to the maximum permitted blocking voltage.

Opto-coupler: For all SSR relays in the catalogue, the electrical isolation between Input and Output circuits is provided by the use of an opto-coupler.

Switching voltage range: The minimum to maximum (nominal) range for the load voltage. (The maximum value can be extended to cover the normal upper tolerance expected for the load voltage supply.)

Minimum switching current: The minimum value of load current necessary to ensure correct switch-on and switch-off action.

Control current: The nominal value of input current, at 23 °C and with rated voltage applied.

Maximum blocking voltage: The maximum level of output (load) voltage that the SSR can withstand.

Relay with forcibly guided (mechanically linked) contacts, or safety relay

A relay with forcibly guided contacts is a special type of relay which must satisfy the requirements of a very specific safety EN standard.
Such relays are used within safety systems to guarantee their operational safety and reliability, contributing to a safe working environment.
Such relays must have at least one NO and one NC forcibly guided contact. These contacts must be mechanically linked, such that if one of the contacts fails to open, the other is prevented from closing (and vice versa).
This requirement is fundamental in order to identify with certainty the non-correct operation of a circuit. For example, a failure of a NO contact to open (for example, by welding closed) is identified by the failure of the NC from closing, thereby signaling an operational anomaly. Under such circumstances, the standard requires a guaranteed contact gap of 0.5 mm to be maintained.

EN 50205 is the standard that establishes the requirements for relays with forcibly guided contacts, and it describes two types:
- Type A: where all the contacts are forcibly guided
- Type B: where only some contacts are forcibly guided

According to EN50205, in a relay with changeover contacts, only the NO of one pole and the NC of the other pole can be considered as forcibly guided contacts. In the case of the 50 series relay this means the remaining poles cannot be considered as forcibly guided and therefore this relay is categorised as “Type B”.
However, since the 7S relay series offer only NO and NC contacts they can be categorized as “Type A”.

Monitoring and Measuring relays

Supply voltage monitoring: The supply voltage being monitored also provides the operating power for the unit, so an auxiliary supply is not necessary. (Not applicable to the Universal voltage monitoring relay 71.41)

3-phase asymmetry monitoring: In a 3-phase system, asymmetry is present if at least one of the three L - L voltage vectors fails to be at 120° with respect to the other L - L voltage vectors.

Detection level: For monitoring relays, this represents, either fixed or adjustable level(s) of voltage, current or phase asymmetry, which define the acceptable limits of operation. Values outside acceptable limits will cause the output relay NO contact to open (after any intentional delay).

Switch-on lock-out time: for over and under voltage monitoring relays this is a selectable time delay to ensure that the output relay cannot re-energise too quickly (following a trip and the re-establishment of healthy conditions). Protects equipment where a quick succession of restarts might cause overheating and damage. Same delay applies immediately following “power-on”.

Start delay (T2): Current monitoring relay 71.51; immediately on the detection of current flow (following a period of no current flow) “out of limits” current detection is inhibited for time period T2. Useful for ignoring inrush currents that commonly occur at switch-on of sodium lamps or motors etc.

Switch-off time: This refers to the time taken for the output relay to de-energise, following the detection of conditions requiring this. Depending on the particular monitoring relay, a short time may be demanded (ie. <0.5 secs – 72.31), or in the case of the 71.41 a longer delay may be preferred (ie, variable 0.1 to 12 secs). In the case of the latter, this delay is useful for ignoring momentary or short-term excursions of the measured/monitored value outside of limits.

Trip on-delay: Similar in effect to the switch-off delay, this delays the “trip” signal that would result in the output relay switching off. The term is used primarily for monitoring relays which monitor and act according to several parameters. But the effect is the same, and momentary or short-term excursions of the measured/monitored values outside of limits are ignored.

Run-on time: With liquid level control relays the pump motor can be turned on (or off) within 0.5 to 1 second of the liquid reaching or departing the level of the electrode. Depending on model, this delay can be increased up to 7 seconds, which will have the effect of the liquid level running past the electrode level. This can help prevent “hunting” of the motor, which might otherwise have happened due to ripples, or foam, on the surface of the liquid.

Reaction time: For monitoring relays, this is the maximum time taken by the electronics to respond to changes in the monitored value.

Fault memory: For monitoring relays; selecting this function will inhibit the automatic reset following clearing of fault condition. Reset can only be made by positive intervention.

Fault memory - status retained on power down: As above but the fault memory status will be retained during power down.

Switch-ON hysteresis: For monitoring relays type 71.41 and 71.51, the switch-on level can be off-set from the set level by a (hystereis) percentage. The desired percentage can be selected during relay set-up.

Thermistor temperature sensing: Over-temperature monitoring via a PTC resistance sensor, with in-built checking for sensor open or short circuit faults.

Level control relay: Detects the level of conductive liquids by measuring and evaluating the resistance between either 2 or 3 level electrodes.

Electrode voltage: For level control relays, this is the nominal voltage between electrodes. Note: this voltage is an alternating voltage, so as to avoid the effects of electrolytic corrosion.

Electrode current: For level control relays, this is the nominal (AC) electrode current.

Max. sensitivity: For level control relays: the maximum sensitivity is the maximum resistance between the electrodes that will be recognised as indicating the presence of liquid. This may be fixed, or adjustable over a range - according to type.

Sensitivity, fixed or adjustable: The resistance value between the electrodes B1-B3 and B2-B3 is used to determine if there is a conductive liquid between the electrodes. The sensitivity is either a fixed level (type 72.11) or an adjustable value (type 72.01). The latter is useful for “tuning out” any false detection of the fluid level arising from detecting surface foam (or head), rather than the liquid itself.

Positive safety logic: Positive logic means that the make contact is closed, if the level or parameter which is being monitored lies within the target range. The make contact opens, after a delay if appropriate, if the level falls outside of the target range, or level.

Timers

Specified time range: the minimum and maximum limits of, one or more time ranges, over which it is possible to set the desired time.

Repeatability: The difference between the upper and lower limits of a range of values taken from several time measurements of a specified time relay under identical stated conditions. Usually repeatability is indicated as a percentage of the mean value of all measured values.

Recovery time: The minimum time necessary before re-starting the timer function - in order to maintain the defined timing accuracy.

Minimum control impulse: The minimum duration of a control impulse (Terminal B1) necessary to ensure the complete and proper time function.

Setting accuracy: The difference between the measured value of the specified time and the reference value set on the scale.

Light dependent relays

Threshold setting: The ambient light level setting, measured in lux (lx), at which the output relay switches on (following the elapse of the ON Delay time). This is adjustable over the range specified in the specification.
The relay will switch off, dependent upon the type of Light dependent relay used, at either the same or a higher brightness value (following the elapse of the OFF Delay time).

Delay time: switching ON/OFF For light-dependent relays this is an intentional delay in the response of the output relay, following a change of state within the electronic light sensitive circuit (usually indicated by change of state of an LED).
This is to eliminate the possibility of the output relay unnecessarily responding to a momentary change in ambient light level.

Time switches

1 or 2 pole output types: The 2 pole output type (12.22) can have both contacts programmed independently of each other.

Type of time switch:
Daily The programmed operational sequence of the time switch repeats itself daily.
Weekly The programmed operational sequence of the time switch repeats itself weekly.

Programs: For electronic digital time switches, this is the maximum number of switching times that can be stored in memory. A switching time can be used for more than one day (ie. It could apply to Mon, Tues, Wed, Thurs and Friday), but will only use one memory location.
For mechanical daily time switches, this is the maximum number of switching points during the day that can be set.

Minimum interval setting: For time switches, this it is the minimum time interval that can be programmed.

Power back-up: The time, following a power failure, over which the time switch will retain the stored programs and the elapsed time information.

Step relays and staircase timers

Minimum/Maximum impulse duration: For step relays there is a minimum and a maximum time period for coil energisation. The former is necessary to ensure a full and complete mechanical step action, while exceeding the latter would result in coil overheating and damage.
With the electronic staircase timer, there is no limit to the maximum time for impulse duration.

Max. number of illuminated push-buttons: For step relays and staircase switches, this is the maximum number of illuminated push-buttons (having current absorption < 1mA @ 230 V AC) that can be connected without causing problems. If the push-button consumption is higher than 1 mA, the maximum number of push-buttons allowed is proportionally reduced. (ie. 15 push-buttons x 1 mA is equivalent to 10 push-buttons x 1.5 mA).

Glow wire conformity according to EN 60335-1

European standard EN 60335-1:2002, "Household and similar electrical appliances - Safety - Part 1: General requirements"; Paragraph 30.2.3 prescribes that insulated parts supporting connections that carry current exceeding 0.2 A (and the insulated parts within a distance of 3 mm from them), must comply with the following 2 requirements with respect to resistance to fire:

1. GWFI (Glow Wire Flammability Index) of 850 °C - Compliance with glow wire flammability test at 850 °C (according to EN 60695-2-12: 2001).

2. GWIT (Glow Wire Ignition Temperature) of 775 °C according to EN 60695-2-13:2001 - This requirement can be verified with a GWT (Glow Wire Test according to EN 60695-2-11: 2001) at a value of 750 °C with a flame extinction within 2 seconds.

The following Finder products comply with the above mentioned requirements;
- electromechanical relays of series **34, 40, 41, 43, 44, 45, 46, 50, 55, 56, 60, 62, 65, 66**
- PCB socket types **93.11, 95.13.2, 95.15.2, 95.23.**

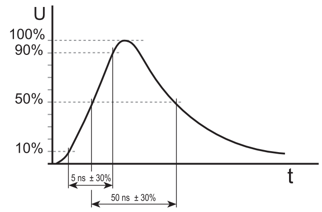
Important note: Whilst EN 60335-1 permits the application of an alternative needle flame test (if the flame during test no. 2 burns longer than 2 seconds) this can result in some limitation in the relay's mounting position. Finder products however, have no such limitations, since the materials used do not require the alternative test method to be performed.

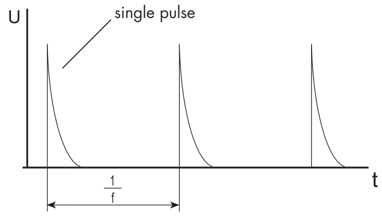
EMC (ElectroMagnetic Compatibility) Standards

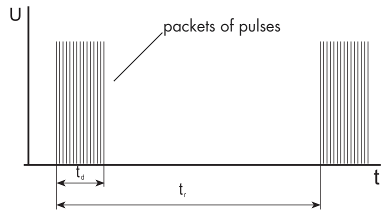
Type of test	Reference standard
Electrostatic discharge	EN 61000-4-2
Radio-frequency electromagnetic field (80 ÷ 1,000 MHz)	EN 61000-4-3
Fast transients (burst) (5-50 ns, 5 kHz)	EN 61000-4-4
Surges (1.2/50 µs)	EN 61000-4-5
Radio-frequency common mode disturbances (0.15 ÷ 80 MHz)	EN 61000-4-6
Power-frequency magnetic field (50 Hz)	EN 61000-4-8
Radiated and conducted emission	EN 55011 / 55014 / 55022

In panel installations, the most frequent and, particularly, more dangerous type of electrical disturbances are the following:

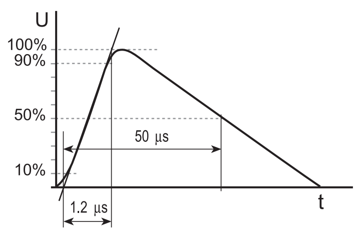
1. **Burst** (fast transients). These are packets of **5/50 ns** pulses, having high peak voltage level but low energy since individual pulses are very short - 5 ns rise time (5 x 10^{-9} seconds) and 50 ns fall time.
They simulate the disturbances that can spread along the cables as a consequence of commutation transients from relays, contactors or motors. Usually they are not destructive, but they can affect the correct working of electronic devices.







2. **Surge** (voltage pulses). These are single **1.2/50 µs** pulses, with energy much higher than bursts since the duration is considerably longer - 1.2 µs rise time (1.2 x 10^{-6} seconds) and 50 µs fall time.
For this reason they are very often destructive. The Surge test typically simulates disturbances caused by the propagation of atmospheric electrical storm discharges along electrical lines, but often the switching of power contacts (such as the opening of highly inductive loads) can cause disturbances that are very similar, and equally destructive. The test levels **V** (peak values of the single pulses) are prescribed in appropriate product standards:
- **EN 61812-1** for electronic timers;
- **EN 60669-2-1** for electronic relays and switches;



- **EN 61000-6-2** (generic standard for immunity in the industrial environment) for other electronic products for industrial application;
- **EN 61000-6-1** (generic standard for immunity in the domestic environment) for other electronic products for domestic application.

Finder electronic products are in accordance with European EMC Directive **2004/108/EC** and indeed, have immunity capabilities often higher than the levels prescribed in the above mentioned standards. Nevertheless, it is not impossible that some working environments may impose levels of disturbances far in excess of the guaranteed levels, such that the product could be immediately destroyed!

It is therefore necessary to consider Finder products as not being indestructible under all circumstances. The user should pay attention to the disturbances in electrical systems and reduce as much as possible these disturbances. For example, employ arc suppression circuits on the contacts of switches, relays or contactors which otherwise might produce over-voltages when opening electrical circuits (particularly highly inductive or DC loads). Attention should also be paid to the placement of components and cables in such a way as to limit disturbances and their propagation.

EMC rules: Require that it is the equipment designer who must ensure that the emissions from panels or equipment does not exceed the limits stated in EN 61000-6-3 (generic standard for emission in the domestic environment) or 61000-6-4 (generic standard for emission in the industrial environment) or any product specific harmonised EMC standard.

Reliability (MTTF & MTBF for equipment)

MTTF - Mean Time To Failure: The predominant failure mode for elementary relays is attributable to the wear-out mechanism affecting the relay's contacts. This can be expressed in terms of MCTF (Mean Cycles To Failure).

With knowledge of the frequency of operation (cycling rate) of the relay within the equipment, the number of cycles can be simply transformed into a respective time, giving the effective MTTF value for the relay in that application. See B10 description below for information on how to estimate the MCTF for Finder relays.

MTBF - Mean Time Between Failures Relays are generally considered to be non-repairable items and consequently would require replacement following failure. Consequently, if a worn relay within equipment were replaced, its MTTF value would be appropriate in calculating the MTBF (Mean Time Between Failure) for the equipment.

B_{10} - Statistical 10% fractile of lifetime: The electrical contact life for a Finder relay, as indicated by its associated "F" chart, can be taken as the relay's B_{10} statistical life figure. This being the expected time at which 10% of the population will fail. There is a relationship between it and the MCTF value, and generally for a Finder relay this is approximately MCTF = 1.4 x B_{10}. See Electrical life "F-chart" section for more information.

The RoHS & WEEE directives

Recent directives approved by the European Union aim to reduce potentially hazardous substances contained in electrical and electronic equipment - minimising risks to health and the environment, and guaranteeing the safe reuse, recycling or ultimate disposal of equipment.

RoHS Directive

As of 1 July, 2006, European directive 2002/95/CE dated 27 January 2003 (known as the RoHS directive - "Restriction of Hazardous Substances") and its amendments 2005/618/EC, 2005/717/EC, 2005/747/EC limits the use of substances, considered potentially damaging to human health if contained in electrical and electronic equipment. Restricted materials:

- **Lead**
- **Mercury**
- **Hexavalent chromium**
- **PBB** (Polybromide biphenyl)
- **PBDE** (Polybromide diphenyl ether)
- **Cadmium** (With certain exceptions, including contact materials)

Scope of applications subject to the RoHS & WEEE directives

Categories of electrical and electronic equipment covered by the directives

- Large household appliances
- Small household appliances
- IT and telecommunications equipment
- Consumer equipment
- Lighting equipment
- Electrical and electronic tools
  (with the exception of large-scale stationary industrial tools)
- Toys, leisure and sports equipment
- Automatic dispensers
- (WEEE only) Medical devices
  (with the exception of all implanted and infected products)
- (WEEE only) Monitoring and control instruments
  (for example control panels)

Conformance of Finder products to the RoHS directive

Following a transitional period from December 2004 to June 2006, all Finder products manufactured since the latter date are fully RoHS complaint.

CADMIUM

Following the European Commission decision 2005/747/EC dated 21st October 2005, cadmium and its compounds are now permitted in electrical contacts. Consequently, relays with AgCdO contacts are acceptable in all applications. However, if required, the majority of Finder relays are currently available in "Cadmium-free" versions (for example, AgNi or $AgSnO_2$). But, it should be noted that AgCdO achieves a particularly good balance between the electrical life and the switching capacity of, for example, solenoids and inductive loads in general (particularly DC loads), motor loads and higher power resistive loads. Alternative materials such as AgNi and $AgSnO_2$, do not always offer the same performance for electrical life as AgCdO, although this depends on both the type of load and application (see Table 5 under Contact specification section).

WEEE directive

European directive 2002/96/CE dated 27 January 2003 (known as the WEEE directive - "Waste Electrical and Electronic Equipment") contains measures and strategies for the safe and environmentally sound disposal of waste derived from electrical equipment. (This directive is not directly applicable to Finder products as it applies to equipment, rather than components).

S I L and P L categories

S I L and P L categories relate to the statistical reliability of Safety Related Electrical Control Systems (SRECS), and not directly to components, such as relays, used in such systems.

It is therefore not possible, or appropriate, to quote a PL or SIL class against a relay. SIL and PL categories relate only to the SRECS and can only be calculated by the system designer.

However, the following section may be useful for those engineers incorporating Finder relays into SRECS systems.

S I L Classes - according to EN 61508

EN 61508:2 describes the requirements for security of Safety Related Electrical/electronic/programmable Control Systems (SRECS). It is a "sector independent" wide ranging standard - describing some 350 aspects that need to be considered in order to define the safety and performance required from such as system.

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The S I L (Safety Integrity Level) classifies, as one of 4 classes (SIL 0 to SIL 3), the dangers and risks that would be consequential to a particular application malfunctioning. This in turn generates the need for any associated SRECS to perform with an appropriate level of reliability. Applications, where the consequences of a failure of the control system are assessed as low (SIL 0) can tolerate a relatively high statistical probability of a control system failure occurring.
Conversely, applications where the dangerous consequences of a failure of the control system are assessed as very high (SIL 3) cannot tolerate anything other than a control system with the highest (statistically assured) reliability.
The reliability of the (overall) control system is specified in terms of the „Statistical probability of a dangerous system failure per hour".
Note: EN61508 is not a prescribed standard under the EU Machinery Directive because it is primarily intended for complex systems such as chemical plants and power stations, or for use as a generic standard for other applications.

P L Classes - according to EN 13849-1

EN 13849-1 is specifically intended to cover machines and process plant.
Similar to EN 61508, this standard, classifies the danger and risks into one of five PL (Performance Level) classes. Described against each class is the required reliability for the (overall) control system, defined in terms of "statistical probability of a dangerous system failure per hour".

Points of commonality between EN 61508 and EN13849-1

The numeric values for the "statistical probability of a dangerous fault per hour" are to a large extent the same for EN 61508 and EN13849-1. SIL 1 corresponds to PL B & C, SIL 2 corresponds to PL D and SIL 3 corresponds to PL E.
Both EU standards define the statistical probability of a SERCS failure, and not the failure of a component. It is the responsibility of the system designer to ensure that a failure of a component does not compromise the required safety integrity of the system.

IEC EN 61508 (Safety Integrity Level)	"Statistical probability of a dangerous system failure per hour"	**EN 13849-1** (Performance Level)
No special safety requirements	$\geq 10^{-5} \ldots < 10^{-4}$	A
1	$\geq 3 \times 10^{-6} \ldots < 10^{-5}$	B
	$\geq 10^{-6} \ldots < 3 \times 10^{-6}$	C
2	$\geq 10^{-7} \ldots < 10^{-6}$	D
3	$\geq 10^{-8} \ldots < 10^{-7}$	E

Component reliability

The safety control system designer needs to take into account the reliability of components. Accordingly, the most predictable failure for a relay is contact wear-out at moderate to high contact loading. But, as relay reliability standard EN 61810-2:2005 emphasises, relays are not repairable, and this in particular needs to be taken into account when estimating the "statistical probability of a dangerous system failure per hour". See Reliability section.

Summary

- S I L and P L categorisation applies to systems and not to components.
- PL classes apply to machines and process plant, while SIL classes relate to more complex systems.
- EN 13849, with PL classifications, is expected to take effect from 2009 and will be mandatory, and as a consequence, component manufacturers will need to provide reliability data.
- For relays, the number of switching cycles before failure is predominantly determined by the life of the contacts, and consequently is dependent upon contact loading. The F-diagrams in the Finder catalogue can be regarded as indicating the B_{10} value of a Weibull type distribution of electrical life (for a 230 V AC1 load); from which the MCTF can be derived and used ultimately in calculating the "statistical probability of a dangerous system failure per hour" for the safety control system.

Certifications and Quality Approvals

CE		CE	EU
Ex		ATEX	EU
ANCE	Asociación de Normalización y Certificación, A.C.	ANCE	Mexico
CCC	China quality Certification Centre	CCC	China
SP	Canadian Standards Association	CSA	Canada
D	UL International Demko	D	Denmark
EAC	EurAsian Certification	EAC	Russia, Belarus and Kazakhstan
ENEC	European Norms Electrical Certification	ENEC	Europe
EZU	Electrotechnical Testing Institute	EZU	Czech Republic
FI	SGS Fimko	FI	Finland
GL	Germanischer Lloyd's	GL	Germany
PCT	Gost	GOST	Russia
IMQ	Istituto Italiano del Marchio di Qualità	IMQ	Italy
NF	Laboratoire Central des Industries Electriques	LCIE	France
Lloyd's Register TYPE APPROVED	Lloyd's Register of Shipping	Lloyd's Register	United Kingdom
N	Nemko	N	Norway
RINA	Registro Italiano Navale	RINA	Italy
S	Intertek Testing Service ETL Semko	S	Sweden
	TÜV Rheinland	TUV	Germany
UL	Underwriters Laboratoires	UL	USA
c UL us	Underwriters Laboratoires	UL	USA Canada
DVE	VDE Prüf- und Zertifizierungsinstitut Zeichengenehmigung	VDE	Germany