

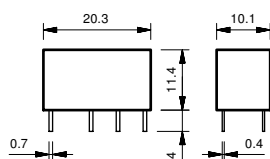
Features

30.22

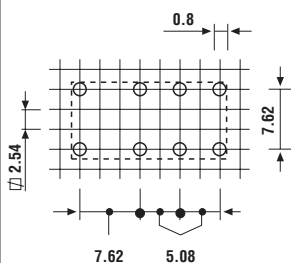
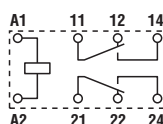
Printed circuit mount

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



- 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

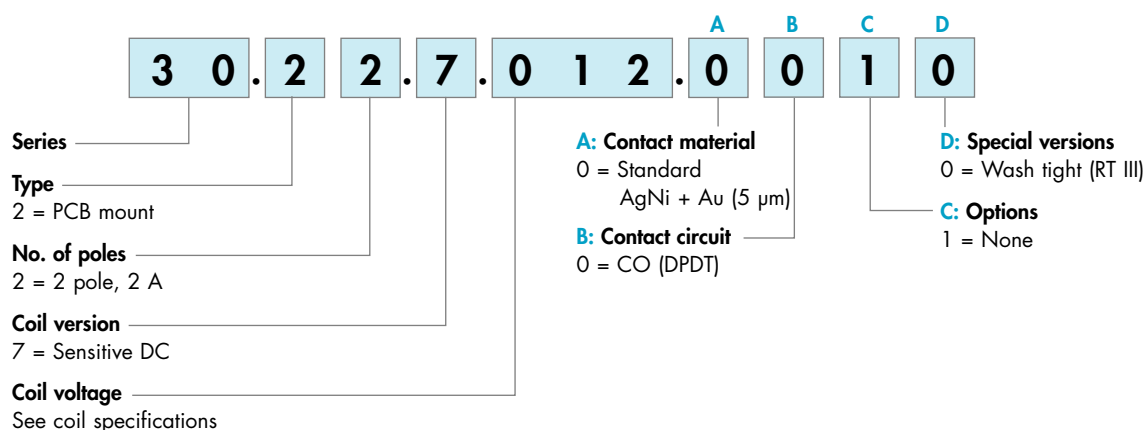
Mechanical life AC/DC	cycles	—/10 · 10 ⁶
Electrical life at rated load AC1	cycles	100 · 10 ³
Operate/release time	ms	6/2
Insulation between coil and contacts (1.2/50 μ s)	kV	1.5
Dielectric strength between open contacts	V AC	750
Ambient temperature range	°C	−40...+85
Environmental protection		RT III

Approvals (according to type)



Ordering information

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

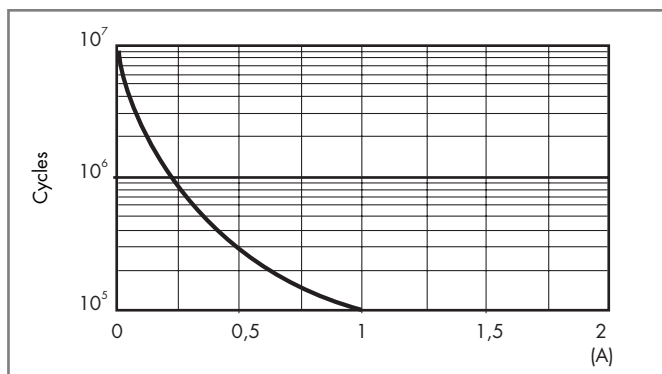


Technical data

Insulation according to EN 61810-1:2004			
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	

Contact specification

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



Note:

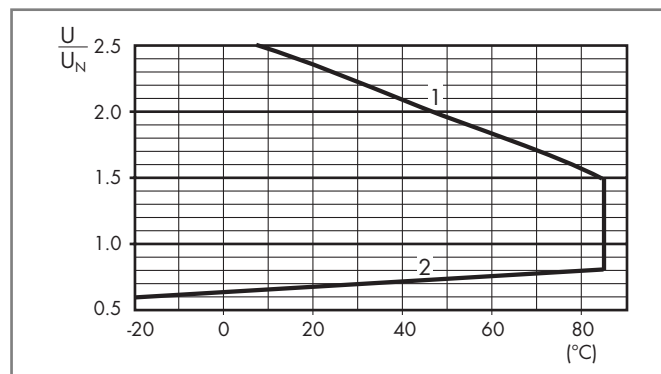
The rated current of 2 A corresponds to the limiting continuous current.

Coil specifications

DC coil data - 0.2 W sensitive

Nominal voltage U_N	Coil code	Operating range		Resistance R	Rated coil consumption I at U_N
		U_{min}	U_{max}		
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	11,520	4.1

R 30 - DC coil operating range v ambient temperature



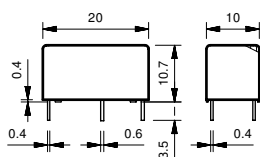
1 - Max. permitted coil voltage.

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

Features

Printed circuit mount 6 A relay

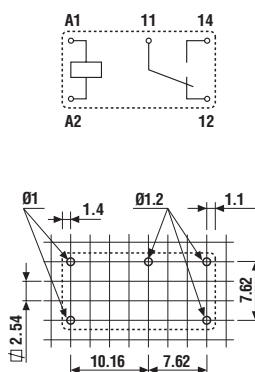
- 1 Pole changeover contacts or 1 Pole normally open contact
- Subminiature, low profile package
- Sensitive DC coil - 200 mW
- Wash tight: RT III
- Cadmium Free contact material option



32.21-x000



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

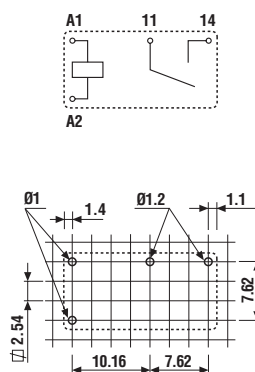


Copper side view

32.21-x300



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



Copper side view

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	AgCdO	AgCdO

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	100 · 10 ³	100 · 10 ³
Operate/release time ms	6/4	6/2
Insulation between coil and contacts (1.2/50 μ s) 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)



Ordering information

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

3	2	.	2	.	1	.	7	.	0	2	4	.	2	3	0	0
									A: Contact material		B: Contact circuit		C: Options		D: Special versions	
									2 = Standard AgCdO 4 = AgSnO ₂		0 = CO (SPDT) 3 = NO (SPST)		0 = None		0 = Wash tight (RT III)	

Series _____
Type _____
 2 = PCB mount
No. of poles _____
 1 = 1 pole, 6 A
Coil version _____
 7 = Sensitive DC
Coil voltage _____
 See coil specifications

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

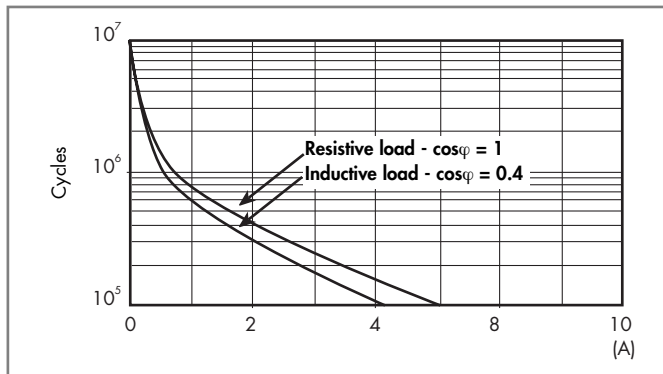
Type	Coil version	A	B	C	D
32.21	sens. DC	2 - 4	0 - 3	0	0

Technical data

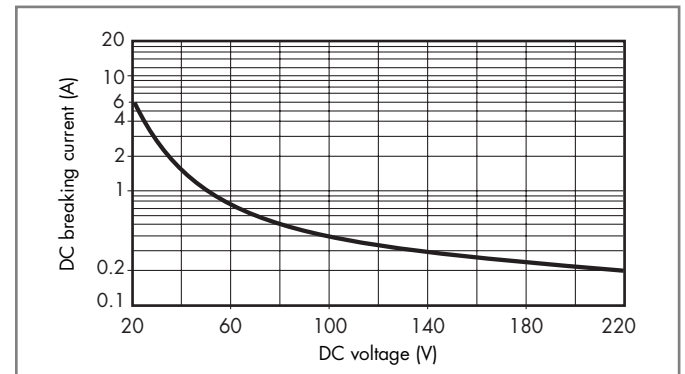
Insulation according to EN 61810-1:2004				
Nominal voltage of supply system		V AC	230/400	
Rated insulation voltage		V AC	250	
Pollution degree			2	
Insulation between coil and contact set				
Type of insulation		Basic		
Overvoltage category		III		
Rated impulse voltage		kV (1.2/50 µs)	4	
Dielectric 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



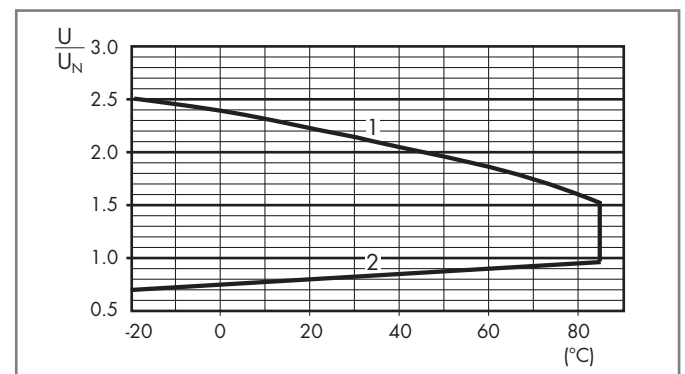
- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of $\geq 100 \cdot 10^3$ can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load.
Note: the release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

Coil specifications

DC coil data - 0.2 W sensitive

Nominal voltage U_N	Coil code	Operating range		Resistance	Rated coil consumption I at U_N
V		U_{min} V	U_{max} V	R 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

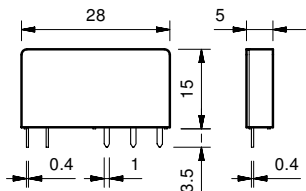
Printed circuit mount

- direct or via PCB socket

35 mm rail mount

- via screw or screwless 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 μ s) insulation, coil-contacts



FOR UL HORSEPOWER AND PILOT DUTY RATINGS
SEE "General technical information" page V

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 μ s)	kV	6 (8 mm)
Dielectric strength between open contacts V AC		1,000
Ambient temperature range	°C	−40...+85
Environmental protection		RT II

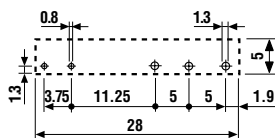
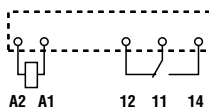
Approvals (according to type)



34.51



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



Copper side view

Features

Ultra-slim - Solid State Relays

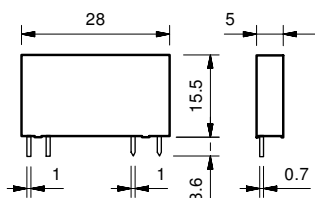
Printed circuit mount

- direct or via PCB socket

35 mm rail mount

- via screw or screwless sockets

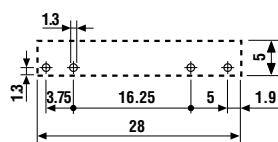
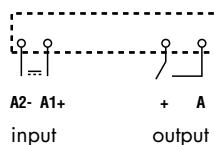
- Single circuit output switching options
 - 2 A 24 V DC
 - 0.1 A 48 V DC
 - 2 A 240 V AC
- Silent, high speed switching with long electrical life
- Ultra slim, 5 mm, package
- Sensitive DC Input circuits (Dual AC/DC input drive possible using 93 series sockets)
- UL Listing (certain relay/socket combinations)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

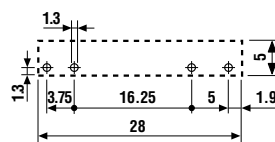
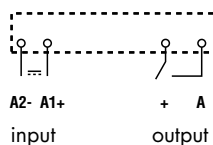


Copper side view

34.81-7048



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

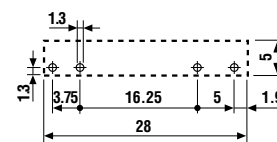
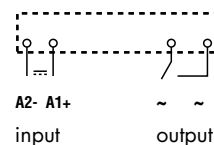


Copper side view

34.81-8240



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



Copper side view

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			(240/275)AC		
Switching voltage range V		(1.5...24)DC			(1.5...48)DC			(12...240)AC		
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										
Nominal voltage V DC		5	24	60	24	60		5	24	60
Operating range V DC		3.5...12	16...30	35...72	16...30	35...72		3.5...10	16...30	35...72
Control current mA		7	7	3	7	3		12	7	3
Release voltage V DC		1	10	20	10	20		1	10	20
Impedance Ω		715	3,200	21,300	3,200	21,300		416	3,200	21,300
Technical data										
Operate/release time ms		0.1/0.3*			0.02/0.1*			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 use with 35 mm rail socket types 93.01 or 93.51, refer to the technical data of 38 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
Series												A: Contact material		D: Special versions	
												0 = Standard AgNi		0 = Flux proof (RT II)	
Type												4 = AgSnO ₂		9 = Flat version	
5 = Electromechanical type												5 = AgNi + Au (5 µm)			
No. of poles												B: Contact circuit		C: Options	
1 = 1 pole, 6 A												0 = CO (SPDT)		1 = None	
Coil version												3 = NO (SPST)			
7 = Sensitive DC															
Coil voltage															
See coil specifications															

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)

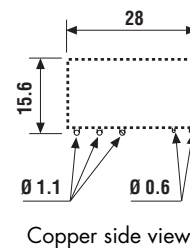
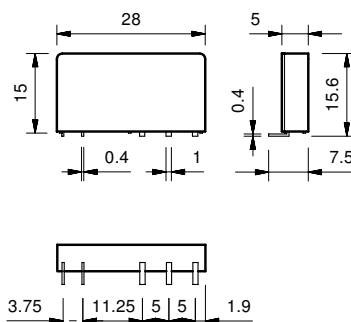
Example: 34 series SSR relay, 2 A output, 24 V DC supply.

3	4	.	8	1	.	7	.	0	2	4	.	9	0	2	4
Series												Output circuit			
												9024 = 2 A - 24 V DC			
Type												7048 = 0.1 A - 48 V DC			
8 = SSR type												8240 = 2 A - 240 V AC			
Output															
1 = 1 NO (SPST-NO)															
Input circuit															
See input specifications															

Flat pack version



Option = 34.51.7xxx.x019



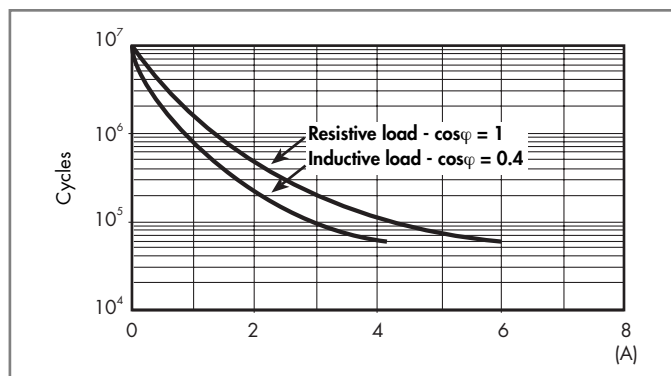
Electromechanical relay

Technical data

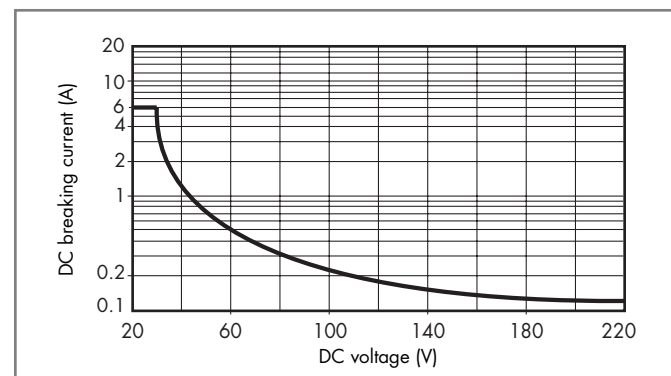
Insulation according to EN 61810-1:2004					
Nominal voltage of supply system	V AC	230/400			
Rated insulation voltage	V AC	250		400	
Pollution degree		3		2	
Insulation between coil and contact set					
Type of insulation		Reinforced			
Overvoltage category		III			
Rated impulse voltage	kV (1.2/50 μ s)	6			
Dielectric strength	V AC	4,000			
Insulation between open contacts					
Type of disconnection		Micro-disconnection			
Dielectric strength	V AC/kV (1.2/50 μ s)	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 μ s) 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



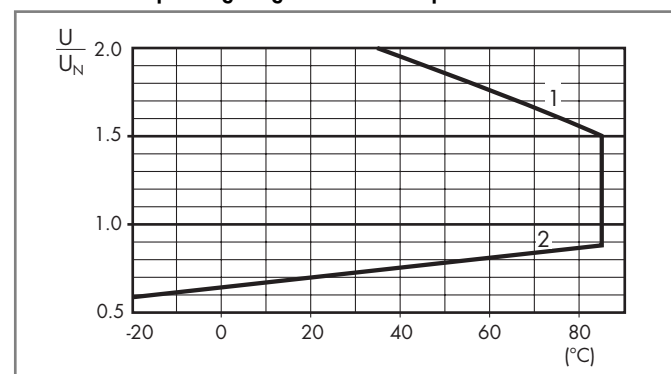
- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of $\geq 60 \cdot 10^3$ can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load.
Note: the release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

Coil specifications

DC coil data

Nominal voltage U_N	Coil code	Operating range		Resistance	Rated coil consumption
V		U_{min} V	U_{max} V	R Ω	I at U_N 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.

Solid state relay

Technical data

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

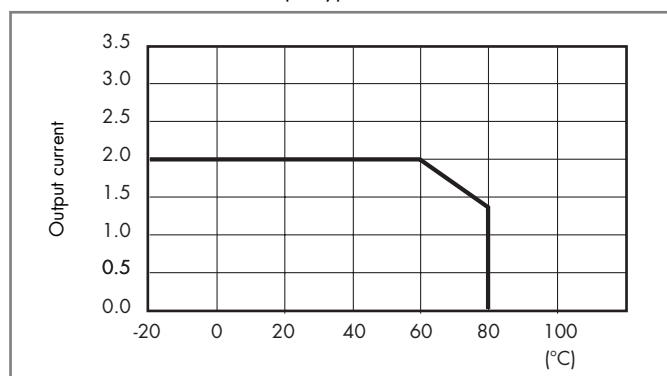
Nominal voltage U_N	Input code	Operating range		Release voltage V	Impedance Ω	Control current I at U_N mA
		U_{min} V	U_{max} V			
5	7.005	3.5	12 (10*)	1	715 (416*)	7 (12*)
24	7.024	16	30	10	3,200	7
60	7.060	35	72	20	21,300	3

* AC Output version.

Output specification

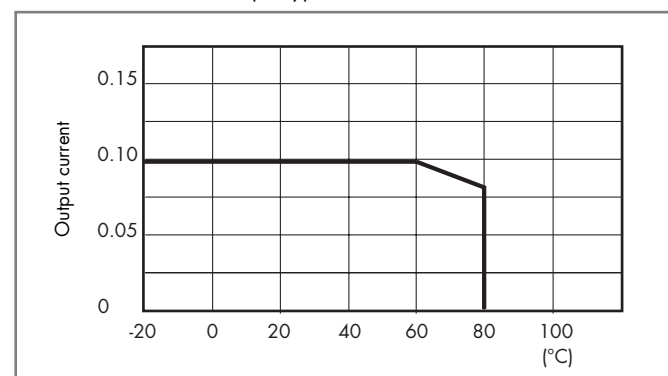
L 34 - Output current v ambient temperature

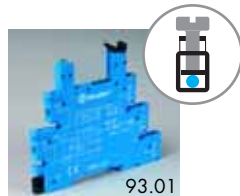
SSR - 2 A DC & AC output types



L 34 - Output current v ambient temperature

SSR - 0.1 A DC output types





93.01

Approvals
(according to type):



cUL[®] US

Certain relay/socket combinations

Screw terminal socket 35 mm (EN 50022) mounting

Supply voltage	Relay type	Socket type
12 V AC/DC	34.51.7.012.xx10	93.01.0.024
24 V AC/DC	34.51.7.024.xx10	93.01.0.024
48 V AC/DC	34.51.7.048.xx10	93.01.0.060
60 V AC/DC	34.51.7.060.xx10	93.01.0.060
(110...125)V AC/DC	34.51.7.060.xx10 or 34.81.7.060.xxxx	93.01.0.125
(220...240)V AC/DC	34.51.7.060.xx10 or 34.81.7.060.xxxx	93.01.0.240
(110...125)V AC/DC*	34.51.7.060.xx10 or 34.81.7.060.xxxx	93.01.3.125*
(220...240)V AC*	34.51.7.060.xx10 or 34.81.7.060.xxxx	93.01.3.240*
(220...240)V AC	34.51.7.060.xx10 or 34.81.7.060.xxxx	93.01.8.240
6 V DC	34.51.7.005.xx10 or 34.81.7.005.xxxx	93.01.7.024
12 V DC	34.51.7.012.xx10	93.01.7.024
24 V DC	34.51.7.024.xx10 or 34.81.7.024.xxxx	93.01.7.024
48 V DC	34.51.7.048.xx10	93.01.7.060
60 V DC	34.51.7.060.xx10 or 34.81.7.060.xxxx	93.01.7.060

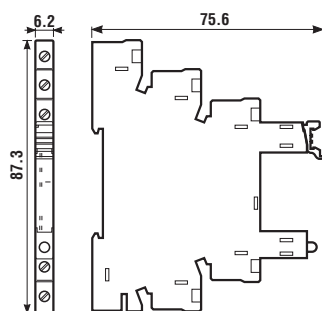
Accessories

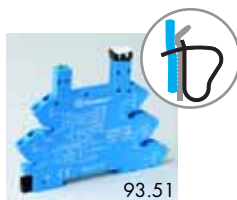
20-way jumper link	093.20 (see specification next page)
Plastic separator	093.01 (see specification next page)
Sheet of marker tags	093.64 (see specification next page)

Technical data

Rated values	6A - 250 V	
Dielectric strength	6 kV (1.2/50 μ s) between coil and contacts	
Protection category	IP 20	
Ambient temperature	(-40...+70)°C ($U_N \leq 60$ V), (-40...+55)°C ($U_N \geq 60$ V)	
Screw torque	Nm	0.5
Wire strip length	mm	10
Max. wire size for 93.01 socket	solid wire	stranded wire
	mm ²	1x2.5 / 2x1.5
	AWG	1x14 / 2x16

* Leakage current suppression.

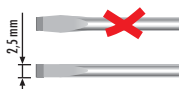




Approvals
(according to type):



cULUS Certain relay/socket combinations



Screwless terminal socket 35 mm (EN 50022) mounting

Supply voltage	Relay type	Socket type
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 or 34.81.7.060.xxxx	93.51.0.125
(220...240)V AC/DC	34.51.7.060.xx10 or 34.81.7.060.xxxx	93.51.0.240
(110...125)V AC/DC*	34.51.7.060.xx10 or 34.81.7.060.xxxx	93.51.3.125*
(220...240)V AC*	34.51.7.060.xx10 or 34.81.7.060.xxxx	93.51.3.240*
(220...240)V AC	34.51.7.060.xx10 or 34.81.7.060.xxxx	93.51.8.240
12 V DC	34.51.7.012.xx10	93.51.7.024
24 V DC	34.51.7.024.xx10 or 34.81.7.024.xxxx	93.51.7.024
60 V DC	34.51.7.060.xx10 or 34.81.7.060.xxxx	93.51.7.060

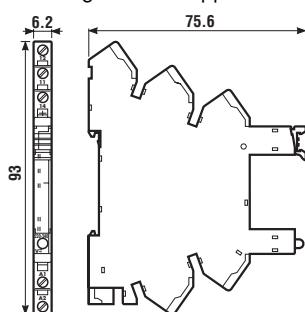
Accessories

20-way jumper link	093.20 (see table below)
Plastic separator	093.01 (see table below)
Sheet of marker tags	093.64 (see table below)

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	(-40...+70)°C ($U_N \leq 60$ V), (-40...+55)°C ($U_N \geq 60$ V)	
Wire strip length	mm	10
Max. wire size for 93.51 socket	solid wire	stranded wire
	mm ²	1x2.5
	AWG	1x14

* Leakage current suppression.



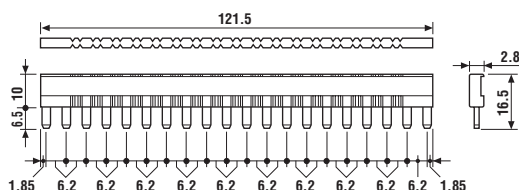
Accessories



Approvals
(according to type):



20-way jumper link for 93.01 and 93.51 sockets	093.20 (blue)	093.20.0 (black)
Rated values	36 A - 250 V	

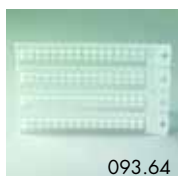


Plastic separator for 93.01 and 93.51 sockets	093.01
--	--------

Thickness 2 mm, required at the start and the end of a group of interfaces.

Can be used for visual separation of groups. Must be used for:

- protective separation of different voltages of neighbouring PLC interfaces according to VDE 0106-101
- protection of cut jumper links



Sheet of marker tags , plastic, 64 tags, 6x10 mm for 93.01 and 93.51 sockets	093.64
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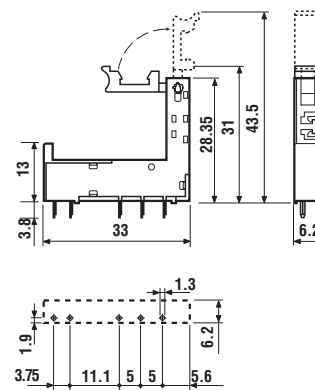
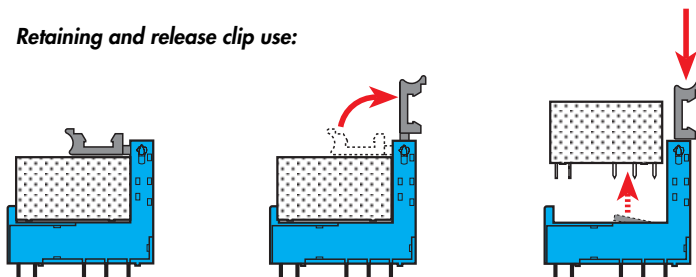
93.11

Approvals
(according to type):

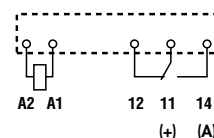


PCB socket with retaining and release clip	93.11 (blue)
For relay type	34.51, 34.81
Technical data	
Rated values	6 A - 250 V
Dielectric strength	≥ 6 kV (1.2/50 μ s) between coil and contacts
Protection category	IP 20
Ambient temperature	$^{\circ}\text{C}$ -40...+70

Retaining and release clip use:



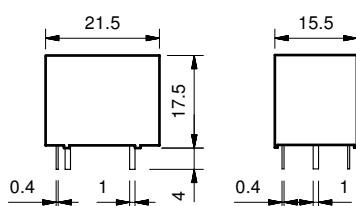
Copper side view



Features

Printed circuit mount 10 A relay

- 1 Pole changeover contacts or 1 Pole normally open contact
- Miniature - "Sugar cube" package
- DC coil - 360 mW
- Wash tight: RT III
- Cadmium Free contact material option



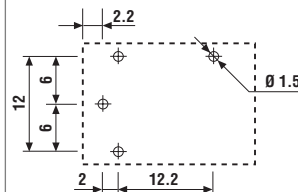
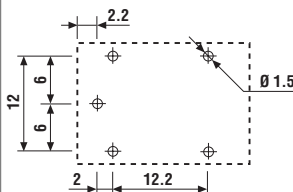
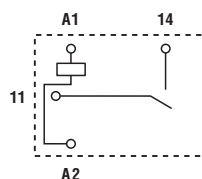
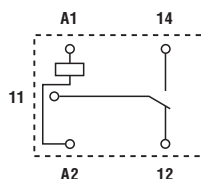
36.11

36.11-0300



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

- 1 NO (SPST-NO), 10 A
- Sugar cube size
- PCB mount



Copper side view

Copper side view

Contact specification

Contact configuration	1 CO (SPDT)	1 NO (SPST-NO)
Rated current/Maximum peak current	A	10/15
Rated voltage/Maximum switching voltage V AC	250/250	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	AgCdO	AgCdO

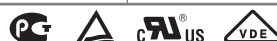
Coil specification

Nominal voltage (U_N)	V AC (50/60 Hz)	—	—
	V DC	3 - 5 - 6 - 9 - 12 - 24 - 48	3 - 5 - 6 - 9 - 12 - 24 - 48
Rated power AC/DC	VA (50 Hz)/W	—/0.36	—/0.36
Operating range	AC	—	—
	DC	(0.75...1.5) U_N	(0.75...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	—/10 · 10 ⁶	—/10 · 10 ⁶
Electrical life at rated load AC1	cycles	100 · 10 ³	100 · 10 ³
Operate/release time	ms	7/3	7/2
Insulation between coil and contacts (1.2/50 μ s)	kV	4	4
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)



Ordering information

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

3	6	.	1	.	1	.	9	.	0	1	2	.	0	0	0	0	
Series		Type		No. of poles		Coil version		Coil voltage		A: Contact material		B: Contact circuit		C: Options		D: Special versions	
1 = PCB mount		1 = 1 pole, 10 A		9 = DC		See coil specifications		0 = Standard AgCdO 4 = AgSnO ₂		0 = CO (SPDT) 3 = NO (SPST)		0 = None		0 = Wash tight (RT III)			

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

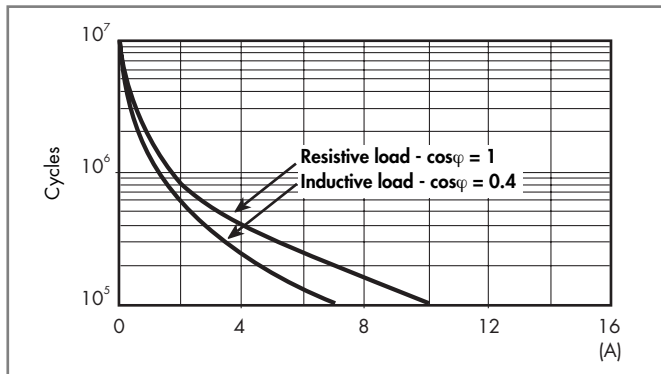
Type	Coil version	A	B	C	D
36.11	DC	0 - 4	0 - 3	0	0

Technical data

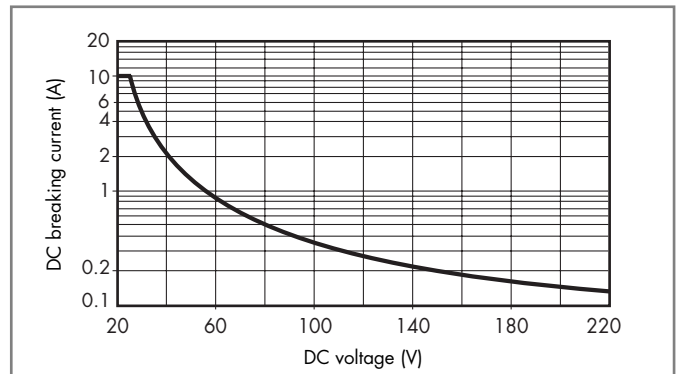
Insulation according to EN 61810-1:2004				
Nominal voltage of supply system		V AC	230/400	
Rated insulation voltage		V AC	250	
Pollution degree			2	
Insulation between coil and contact set				
Type of insulation			Basic	
Overvoltage category			II	
Rated impulse voltage		kV (1.2/50 μs)	2.5	
Dielectric 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	
Other data				
Bounce time: NO/NC		ms	1/6 (changeover)	1/— (normally open)
Vibration resistance (5...55)Hz: NO/NC		g	15/15 (changeover)	15/— (normally open)
Shock resistance		g	16	
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	

Contact specification

F 36 - Electrical life (AC) v contact current



H 36 - Maximum DC1 breaking capacity



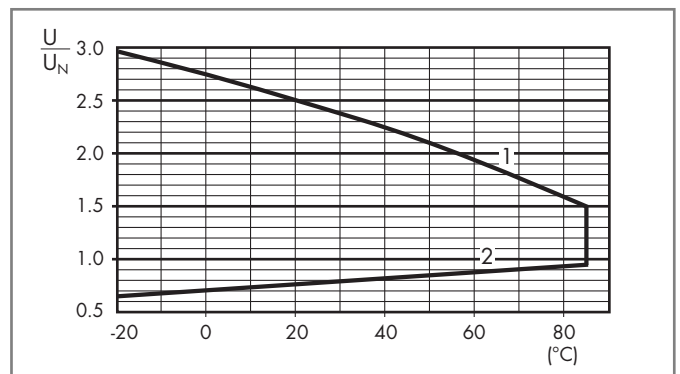
- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of $\geq 100 \cdot 10^3$ can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load.
Note: the release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

Coil specifications

DC coil data

Nominal voltage U_N	Coil code	Operating range		Resistance	Rated coil consumption I at U_N
V		U_{min} V	U_{max} V	R Ω	mA
3	9.003	2.2	4.5	25	120
5	9.005	3.7	7.5	70	72
6	9.006	4.5	9	100	60
9	9.009	6.7	13.5	225	40
12	9.012	9	18	400	30
24	9.024	18	36	1,600	15
48	9.048	36	72	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)

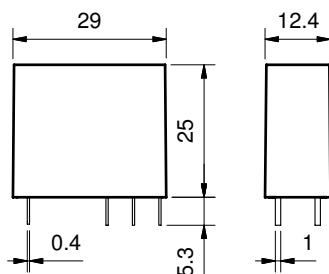
PCB mount

- 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 μ s) 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

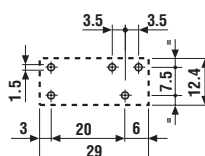
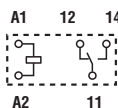


FOR UL HORSEPOWER AND PILOT DUTY RATINGS
 SEE "General technical information" page V

40.31



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

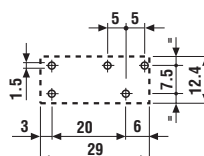
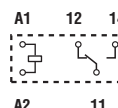


Copper side view

40.51



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

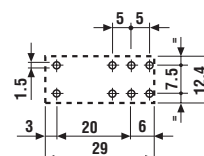
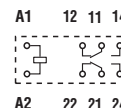


Copper side view

40.52



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



Copper side view

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...1.75) U_N	(0.73...1.5) U_N /(0.73...1.75) U_N	(0.73...1.5) U_N /(0.73...1.75) 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 AC/DC cycles	10 · 10 ⁶ /20 · 10 ⁶	10 · 10 ⁶ /20 · 10 ⁶	10 · 10 ⁶ /20 · 10 ⁶
Electrical life at rated load AC1 cycles	200 · 10 ³	200 · 10 ³	100 · 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 μ s) 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)



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

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

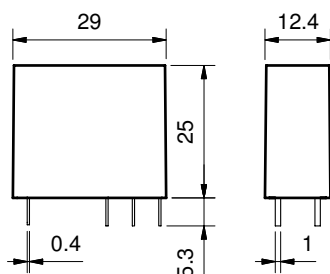
PCB mount

- 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 μ s) 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

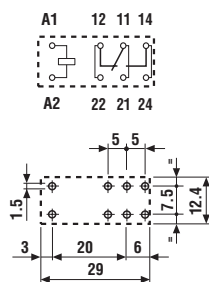


FOR UL HORSEPOWER AND PILOT DUTY RATINGS
 SEE "General technical information" page V

40.61



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



Copper side view

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 8

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

Coil specification

Nominal voltage (U_N)	V AC (50/60 Hz)	6-12-24-48-60-110-120-230-240
	V DC	***See table
Rated power AC/DC/sens. DC	VA (50 Hz)/W/W	1.2/0.65/0.5
Operating range	AC	(0.8...1.1) U_N
	DC/sens. DC	(0.73...1.5) U_N /(0.8...1.5) 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 AC/DC	cycles	10 · 10 ⁶ / 20 · 10 ⁶
Electrical life at rated load AC1	cycles	100 · 10 ³
Operate/release time	ms	7/3 - (12/4 sensitive)
Insulation between coil and contacts (1.2/50 μ s)	kV	6 (8 mm)
Dielectric strength between open contacts V AC		1,000
Ambient temperature range	°C	-40...+85
Environmental protection		RT II**

See relays
 40.31
 40.51
 40.52
 40.61

* With the AgSnO₂ 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

See relays
 40.31
 40.51
 40.52
 40.61
 Min. impulse duration
 ≥ 20 ms

Approvals (according to type)



Features

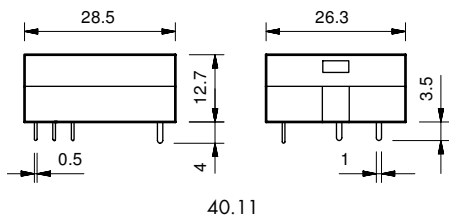
1 Pole relay range

- 40.11 - 1 Pole 10 A (Flat pack)
- 40.11-2016 - 1 Pole 16 A (Flat pack)
- 40.41 - 1 Pole 10 A (Vertical)

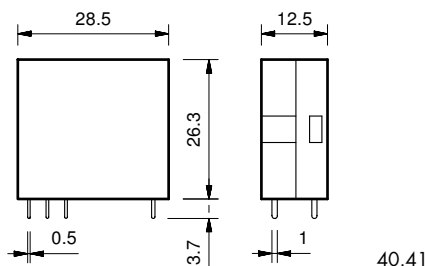
PCB mount

- direct or via PCB socket (40.41 version)

- DC coils
- Cadmium Free option available
- 8 mm, 6 kV (1.2/50 μ s) isolation, coil-contacts
- 40.41 - NO version available



40.11



40.41

FOR UL HORSEPOWER AND PILOT DUTY RATINGS
SEE "General technical information" page V

Contact specification

Contact configuration	1 CO (SPDT)	1 CO (SPDT)	1 CO (SPDT)
Rated current/Maximum peak current A	10/20	16/30	10/20
Rated voltage/Maximum switching voltage V AC	250/400	250/400	250/400
Rated load AC1 VA	2,500	4,000	2,500
Rated load AC15 (230 V AC) VA	500	750	500
Single phase motor rating (230 V AC) kW	0.37	0.55	0.37
Breaking capacity DC1: 30/110/220 V A	10/0.3/0.12	16/0.3/0.12	10/0.3/0.12
Minimum switching load mW (V/mA)	300 (5/5)	500 (10/5)	300 (5/5)
Standard contact material	AgCdO	AgCdO	AgCdO

Coil specification

Nominal voltage (U_N) V AC (50/60 Hz)	—	—	—
V DC	6 - 12 - 24 - 48 - 60	6 - 12 - 24 - 48	6 - 12 - 24 - 48 - 60
Rated power AC/DC/sens. DC VA (50 Hz)/W/W	—/—/0.5	—/—/0.5	—/—/0.5
Operating range AC	—	—	—
DC/sens. DC	—/(0.73...1.75) U_N	—/(0.73...1.5) U_N	—/(0.73...1.75) 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	—/20 · 10 ⁶	—/20 · 10 ⁶	—/20 · 10 ⁶
Electrical life at rated load AC1 cycles	200 · 10 ³	50 · 10 ³	200 · 10 ³
Operate/release time ms	12/4	12/4	12/4
Insulation between coil and contacts (1.2/50 μ s) 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	−40...+70	−40...+70
Environmental protection	RT I	RT I	RT I

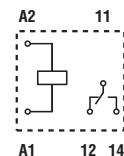
Approvals (according to type)



40.11



- 1 Pole 10 A
- Flat pack
- PCB mount

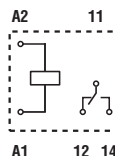


Copper side view

40.11-2016

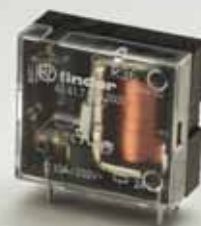


- 1 Pole 16 A
- Flat pack
- PCB mount

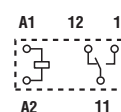


Copper side view

40.41



- 1 Pole 10 A
- Vertical
- PCB or 95 series socket



Copper side view

Ordering information

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

4

0

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5

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2

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8

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2

3

0

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0

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0

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0

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0

Series _____

Type _____

1 = PCB - 3.5 mm pinning, flat

3 = PCB - 3.5 mm pinning

4 = PCB - 3.5 mm pinning

5 = PCB - 5 mm pinning

6 = PCB - 5 mm pinning

No. of poles _____

1 = 1 pole
for: 40.11, 10 A/16 A

40.31, 10 A

40.41, 10 A

40.51, 10 A

40.61, 16 A

2 = 2 pole
for: 40.52, 8 A

Coil version _____

6 = AC/DC bistable

7 = Sensitive DC

8 = AC (50/60 Hz)

9 = DC

Coil voltage _____

See coil specifications

A: Contact material

0 = Standard AgNi
for 40.31/51/52,
AgCdO for 40.61

2 = AgCdO (standard
for 40.11/41)

4 = AgSnO₂

5 = AgNi + Au (5 µm)

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 = None

16 = With rated current 16 A (for 40.11)

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

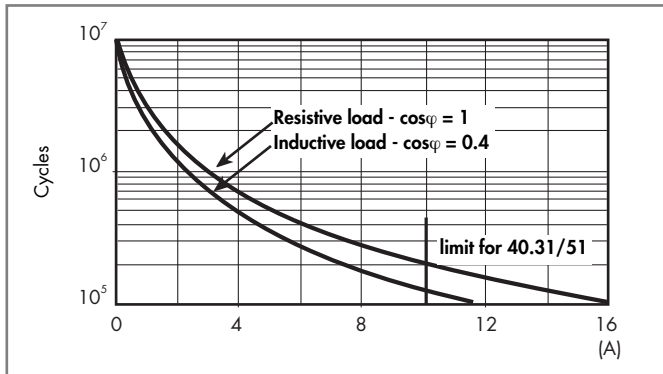
Type	Coil version	A	B	C	D
40.11	sensitive DC	2 - 4	0	0	0
40.11	sensitive DC	2 - 4	0	16	/
40.41	sensitive DC	0 - 2	0 - 3	0	0
40.31/51	AC-sens. DC	0 - 2 - 5	0 - 3	0	0 - 1
40.31/51	DC	0 - 2 - 5	0 - 3	0	0 - 1 - 3
40.52	AC-sens. DC	0 - 2 - 5	0 - 3	0	0 - 1
40.52	DC	0 - 2 - 5	0 - 3	0	0 - 1 - 3
40.61	AC-sens. DC	0 - 4	0 - 3	0	0 - 1
40.61	DC	0 - 4	0 - 3	0	0 - 1 - 3
40.31/51/ 52/61	bistable	0	0	0	0

Technical data

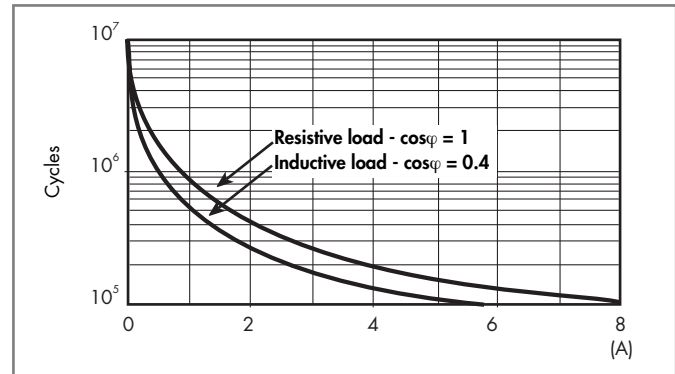
Insulation according to EN 61810-1:2004						
			1 pole		2 pole	
Nominal voltage of supply system		V AC	230/400		230/400	
Rated insulation voltage		V AC	250	400	250	400
Pollution degree			3	2	3	2
Insulation between coil and contact set						
Type of insulation			Reinforced (8 mm)		Reinforced (8 mm)	
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 (5...55)Hz: NO/NC		g	10/4 (1 changeover)		15/3 (2 changeover)	
Shock resistance		g	13			
Power lost to the environment						
	without contact current	W	0.6			
	with rated current	W	1.2 (40.11/31/41/51)		2 (40.61/52/40.11-2016)	
Recommended distance between relays mounted on PCB		mm	≥ 5			

Contact specification

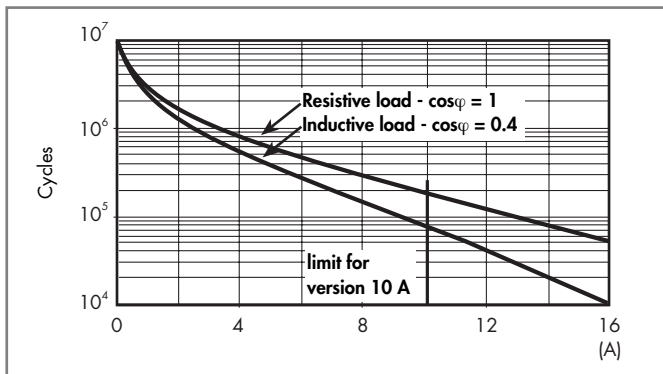
F 40 - Electrical life (AC) v contact current
Types 40.31/51/61



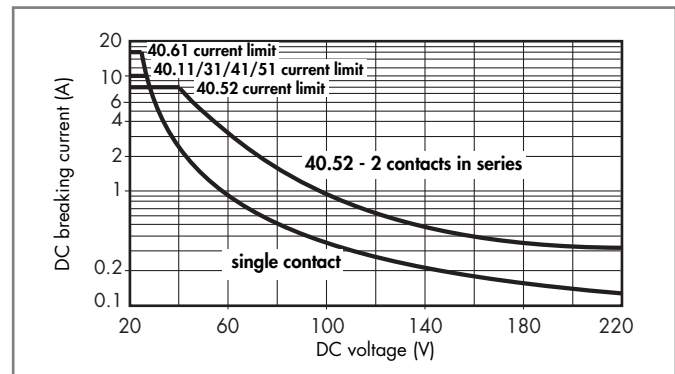
F 40 - Electrical life (AC) v contact current
Type 40.52



F 40 - Electrical life (AC) v contact current
Types 40.11/41



H 40 - Maximum DC1 breaking capacity



- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of $\geq 100 \cdot 10^3$ 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 (types 40.31/51/52/61)

Nominal voltage U_N	Coil code	Operating range		Resistance R	Rated coil consumption I at U_N
		U_{min}	U_{max}		
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	187.5	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		Resistance R	Rated coil consumption I at U_N
		U_{min}^*	U_{max}^{**}		
V		V	V	Ω	mA
5	7.005	3.7	8.8	50	100
6	7.006	4.4	10.5	75	80
7	7.007	5.1	12.2	100	70
9	7.009	6.6	15.8	160	56
12	7.012	8.8	21	300	40
14	7.014	10.2	24.5	400	35
18	7.018	13.2	31.5	650	27.7
21	7.021	15.4	36.9	900	23.4
24	7.024	17.5	42	1,200	20
28	7.028	20.5	49	1,600	17.5
36	7.036	26.3	63	2,600	13.8
48	7.048	35	84	4,800	10
60	7.060	43.8	105	7,200	8.4
90	7.090	65.7	157	16,200	5.6
110	7.110	80.3	192	23,500	4.7
125	7.125	91.2	218.7	32,000	3.9

* $U_{min} = 0.8 U_N$ for 40.61

** $U_{max} = 1.5 U_N$ for 40.61

DC coil data - 0.5 W sensitive (types 40.11/41)

Nominal voltage U_N	Coil code	Operating range		Resistance R	Rated coil consumption I at U_N
		U_{min}	U_{max}^*		
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

* $U_{max} = 1.5 U_N$ for 40.11-2016

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

Nominal voltage U_N	Coil code	Operating range		Resistance R	Rated coil consumption I at U_N (50Hz)
		U_{min}	U_{max}		
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

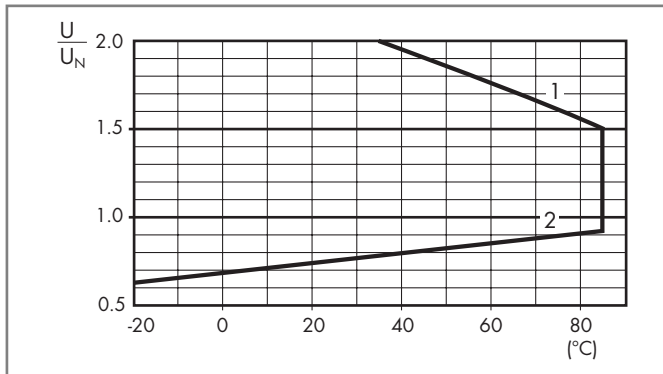
AC/DC coil data - bistable (types 40.31/51/52/61)

Nominal voltage U_N	Coil code	Operating range		Resistance R	Rated coil consumption I at U_N	DC: Release resistance** R_{DC}
		U_{min}	U_{max}			
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

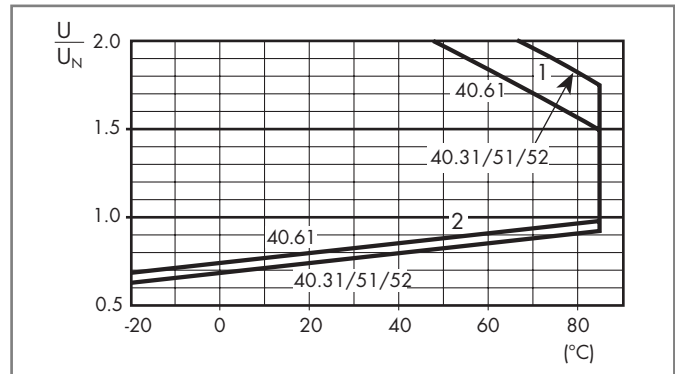
** R_{DC} = Resistance in DC, $R_{AC} = 1.3 \times R_{DC}$ 1W

Coil specifications

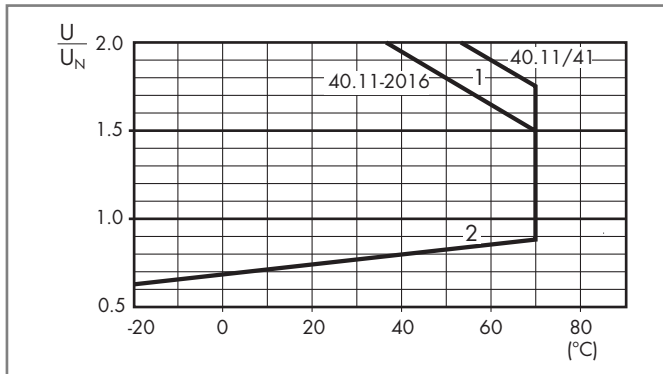
R 40 - DC coil operating range v ambient temperature
Standard coil



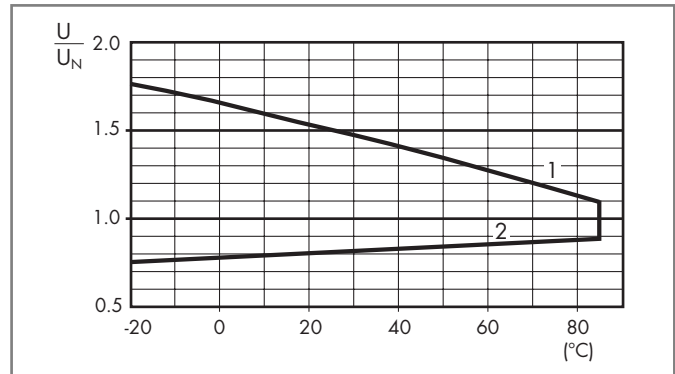
R 40 - DC coil operating range v ambient temperature
Sensitive coil, types 40.31/51/52/61



R 40 - DC coil operating range v ambient temperature
Sensitive coil, types 40.11/41



R 40 - AC coil operating range v ambient temperature

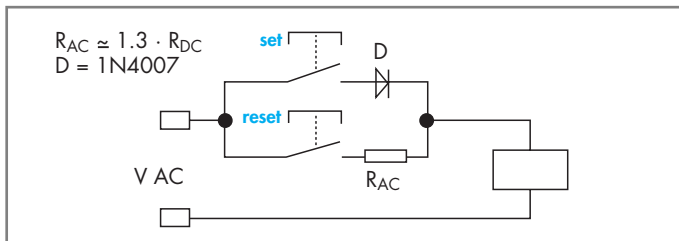


1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

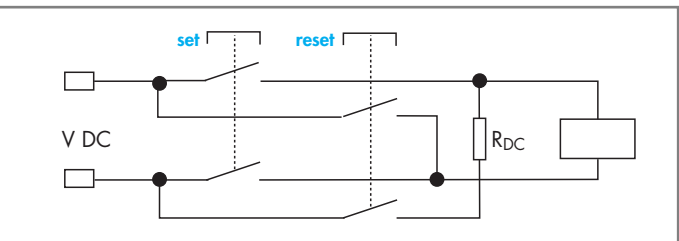
1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

Wiring diagram for 40 series bistable coil version

AC Operation



DC 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.

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.



95.05

See page 10



Module	Socket	Relay	Description	Mounting	Accessories
99.02	95.03	40.31	Screw terminal (Box clamp) socket	Panel or 35 mm rail (EN 50022) mount	<ul style="list-style-type: none"> - Coil indication and EMC suppression modules - Jumper link - Timer modules - Plastic retaining and release clip
	95.05	40.51	- Top terminals - Contacts		
		40.52	- Bottom terminals - Coil		
		40.61			



95.85.3

See page 11



Module	Socket	Relay	Description	Mounting	Accessories
99.80	95.83.3	40.31	Screw terminal (Box clamp) socket	Panel or 35 mm rail (EN 50022) mount	<ul style="list-style-type: none"> - Coil indication and EMC suppression modules - Jumper link - Plastic retaining and release clip
	95.85.3	40.51	95.83.3 wiring:		
		40.52	- Top terminals - Contacts		
		40.61	- Bottom terminals - Coil		



95.95.3

See page 12



Module	Socket	Relay	Description	Mounting	Accessories
99.80	95.93.3	40.31	Screw terminal (Box clamp) socket	Panel or 35 mm rail (EN 50022) mount	<ul style="list-style-type: none"> - Coil indication and EMC suppression modules - Jumper link - Plastic retaining and release clip
	95.95.3	40.51	- Top terminals - Contacts		
		40.52	- Bottom terminals - Coil		
		40.61			



95.55

See page 13



Module	Socket	Relay	Description	Mounting	Accessories
99.02	95.55	40.51	Screwless terminal socket	Panel or 35 mm rail (EN 50022) mount	<ul style="list-style-type: none"> - Coil indication and EMC suppression modules - Timer modules - Plastic retaining and release clip
		40.52	- For fast cable connections		
		40.61	- Top terminals - Contacts		
			- Bottom terminals - Coil		



95.55.3

See page 14



Module	Socket	Relay	Description	Mounting	Accessories
99.80	95.55.3	40.51	Screwless terminal socket	Panel or 35 mm rail (EN 50022) mount	<ul style="list-style-type: none"> - Coil indication and EMC suppression modules - Plastic retaining and release clip
		40.52	For fast cable connections		
		40.61	- Top terminals - Contacts		
			- Bottom terminals - Coil		

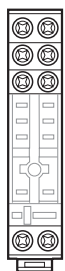


95.13.2

See page 15

Module	Socket	Relay	Description	Mounting	Accessories
—	95.13.2	40.31	PCB socket	PCB mounting	<ul style="list-style-type: none"> - Metal retaining clip - Plastic retaining clip
		40.41			
—	95.15.2	40.51			
		40.52			
		40.61			

Top terminals

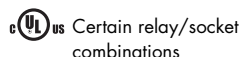


Bottom terminals



95.05

Approvals
(according to type):



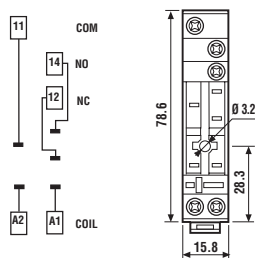
095.01



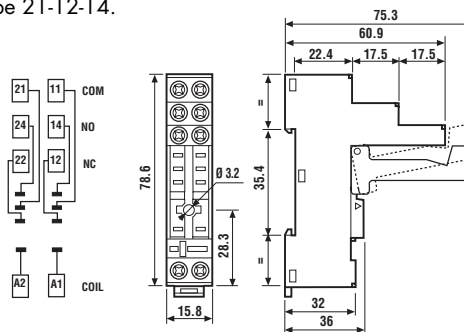
060.72

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			
⊕ 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.



95.03

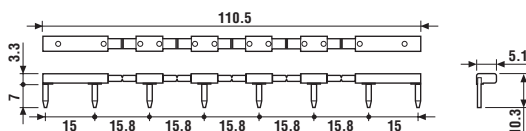


95.05



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
(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



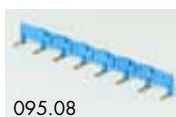
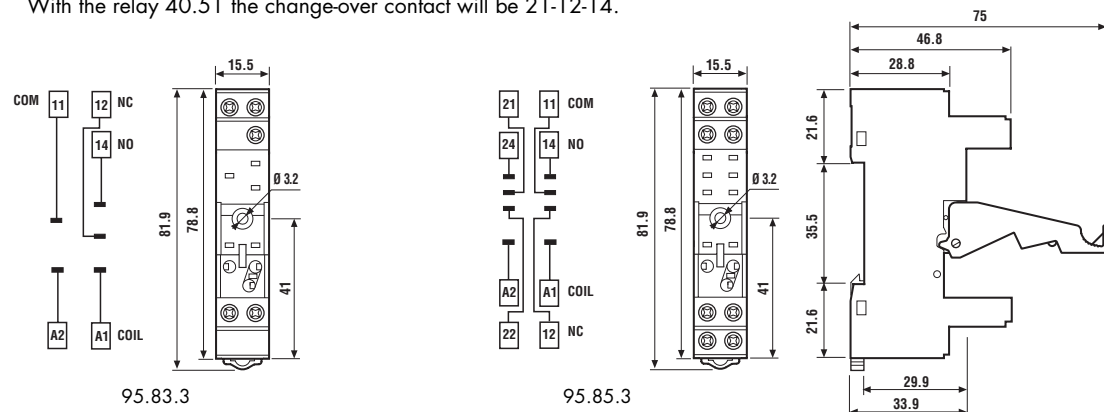
060.72

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			

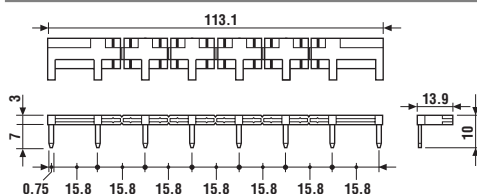
Technical data				
Rated values	10 A - 250 V *			
Dielectric strength	6 kV (1.2/50 µs) between coil and contacts (95.83.3 only)			
Protection category	IP 20			
Ambient temperature	°C -40...+70			
⊕ Screw torque	Nm 0.5			
Wire strip length	mm 7			
Max. wire size for 95.83.3 and 95.85.3 sockets	solid wire		stranded wire	
	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.



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

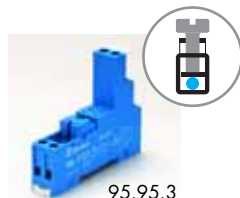
Approvals
(according to type):



* 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 95.83.3 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



95.95.3

Approvals
(according to type):



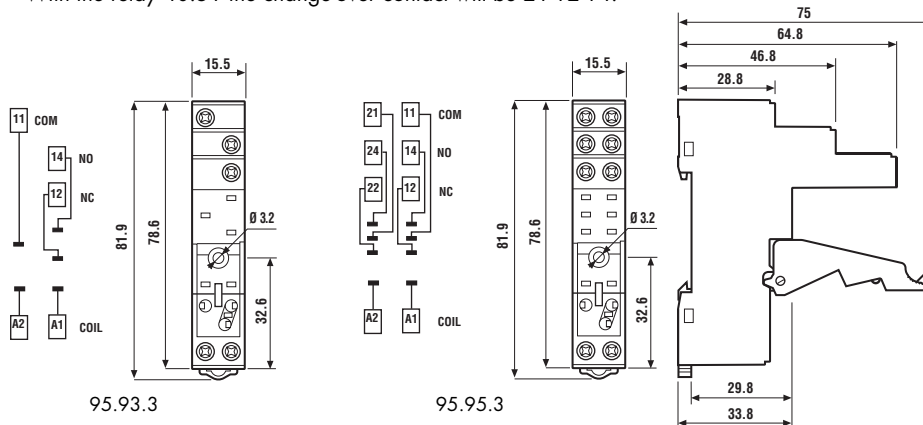
095.91.3



060.72

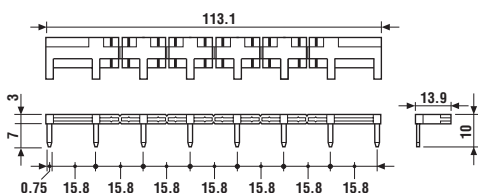
Screw (Box clamp) terminal socket panel or 35 mm rail mount	95.93.3 (blue)	95.93.30 (black)	95.95.3 (blue)	95.95.30 (black)
For relay type	40.31		40.51, 40.52, 40.61	
Accessories				
Metal retaining clip	095.71			
Plastic retaining and release clip	095.91.3	095.91.30	095.91.3	095.91.30
8-way jumper link	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			
⊕ 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
	m²	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.



095.08

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

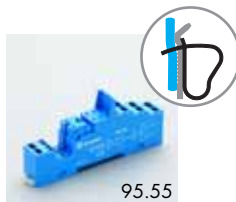
Approvals
(according to type):



* 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):



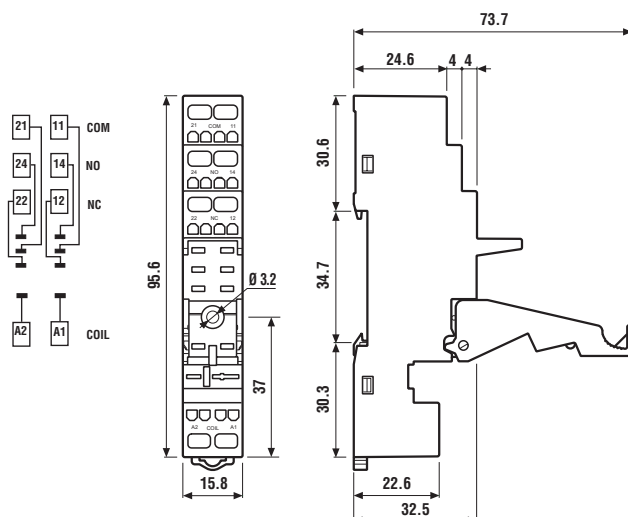
095.91.3



060.72

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	
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.



86.30

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

Approvals

(according to type):



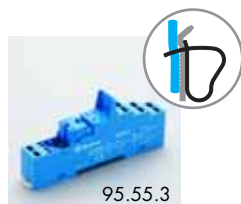
99.02

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

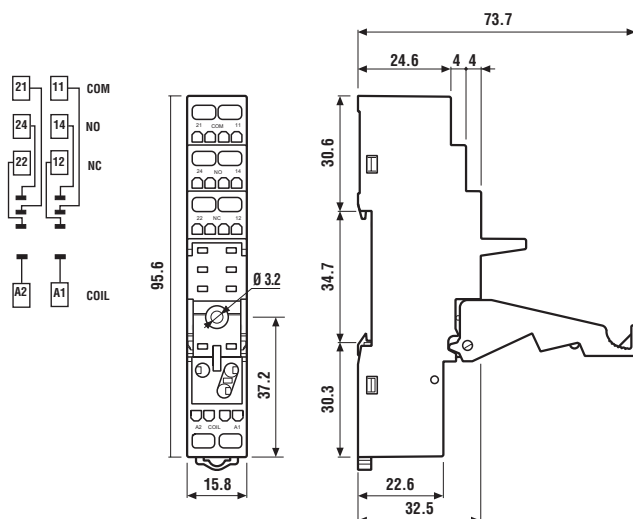


Approvals
(according to type):



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	
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.



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

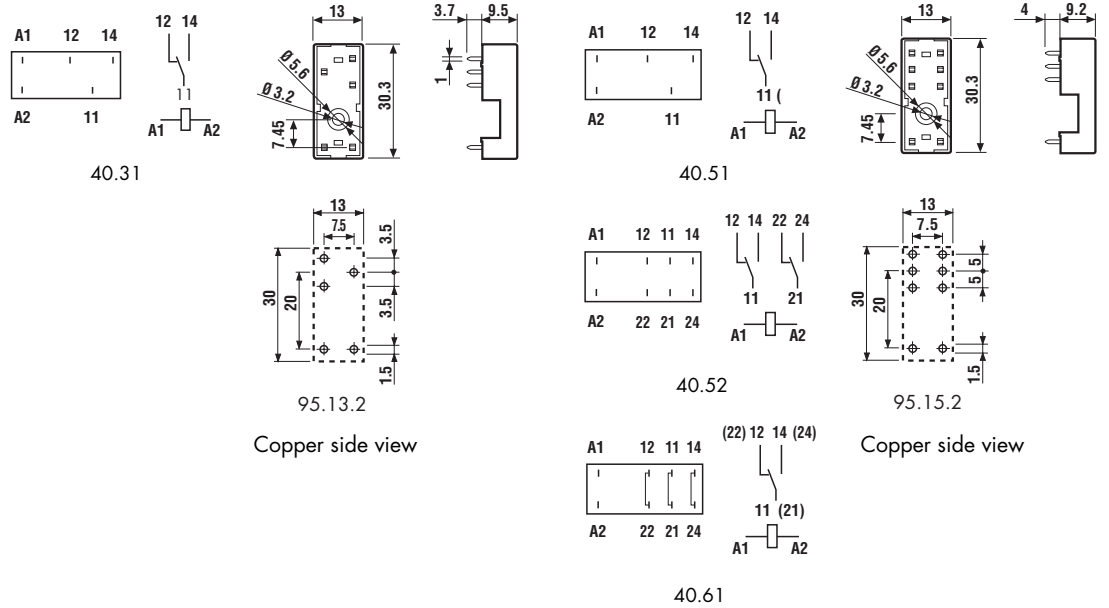


Approvals
(according to type):



PCB socket	95.13.2 (blue)	95.13.20 (black)	95.15.2 (blue)	95.15.20 (black)
For relay type	40.31, 40.41		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	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.



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

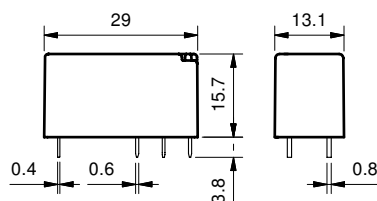
Without retaining clip

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

- DC coils - 400 mW
- 8 mm, 6 kV (1.2/50 μ s) isolation, coil-contacts
- Cadmium Free contact materials
- Flux proof: RT II standard, (RT III option)



FOR UL HORSEPOWER AND PILOT DUTY RATINGS
 SEE "General technical information" page V

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)	—	—	—
V DC	12 - 24 - 48 - 60 - 110	12 - 24 - 48 - 60 - 110	12 - 24 - 48 - 60 - 110
Rated power AC/DC VA (50 Hz)/W	—/0.4	—/0.4	—/0.4
Operating range AC	—	—	—
DC	$(0.7 \dots 1.5)U_N$	$(0.7 \dots 1.5)U_N$	$(0.7 \dots 1.5)U_N$
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	—/30 · 10 ⁶	—/30 · 10 ⁶	—/30 · 10 ⁶
Electrical life at rated load AC1 cycles	150 · 10 ³	80 · 10 ³	70 · 10 ³
Operate/release time ms	5/4	5/4	5/4
Insulation between coil and contacts (1.2/50 μ s) 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)

Ordering information

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

	4	1	.	5	2	.	9	.	0	2	4	.	0	0	.	1	0			
													A		B		C		D	
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																				
9 = DC																				
Coil voltage																				
See coil specifications																				
A: Contact material																				
0 = Standard AgNi																				
4 = AgSnO ₂																				
5 = AgNi + Au (5 µm)																				
B: Contact circuit																				
0 = CO (nPDT)																				
3 = NO (nPST)																				
D: Special versions																				
0 = Flux proof (RT II)																				
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**.

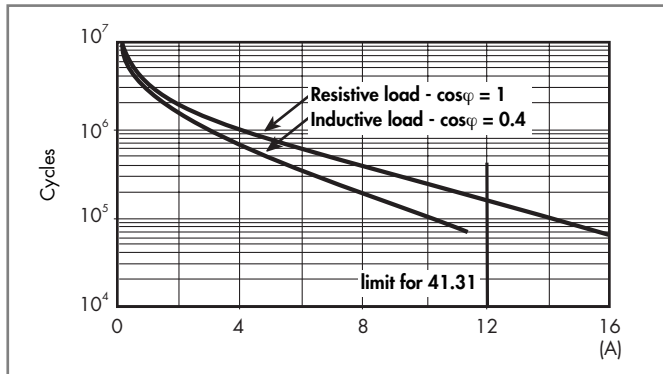
Type	Coil version	A	B	C	D
41.31	DC	0 - 4 - 5	0 - 3	1	0 - 1
41.52	DC	0 - 5	0 - 3	1	0 - 1
41.61	DC	0 - 4	0 - 3	1	0 - 1

Technical data

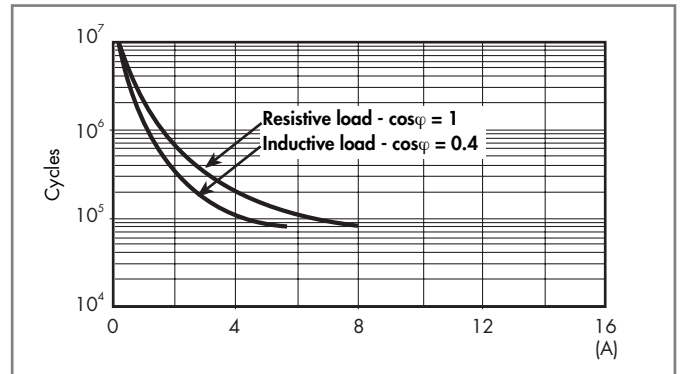
Insulation according to EN 61810-1:2004						
			1 pole		2 pole	
Nominal voltage of supply system		V AC	230/400		230/400	
Rated insulation voltage		V AC	250	400	250	400
Pollution degree			3	2	3	2
Insulation between coil and contact set						
Type of insulation			Reinforced (8 mm)		Reinforced (8 mm)	
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						
Bounce time: NO/NC		ms	2/5			
Vibration resistance (5...55)Hz: NO/NC		g	15/2			
Shock resistance		g	16			
Power lost to the environment		without contact current	W	0.4		
		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

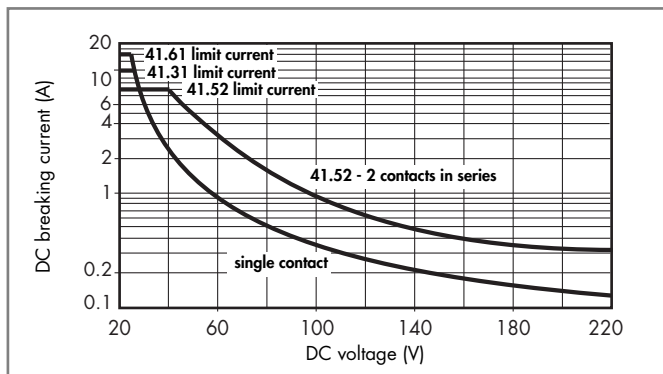
F 41 - Electrical life (AC) v contact current
Types 41.31/61



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



H 41- Maximum DC1 breaking capacity



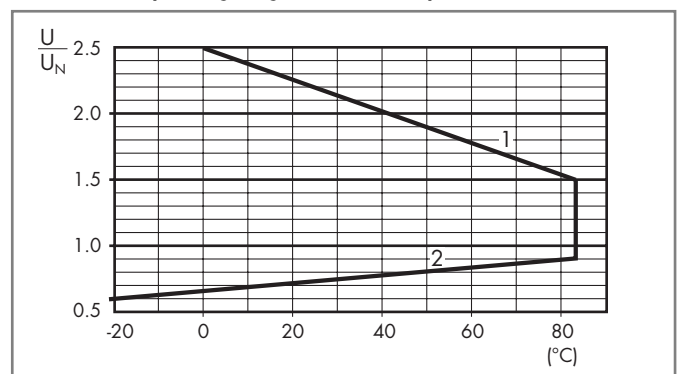
- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of $\geq 100 \cdot 10^3$ can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical life as for a DC1 load.
Note: the release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

Coil specifications

DC coil data

Nominal voltage U_N	Coil code	Operating range		Resistance	Rated coil consumption I at U_N
V		U_{min} V	U_{max} V	R Ω	mA
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.



Approvals
(according to type):



Screw terminal socket 35 mm (EN 50022) mounting

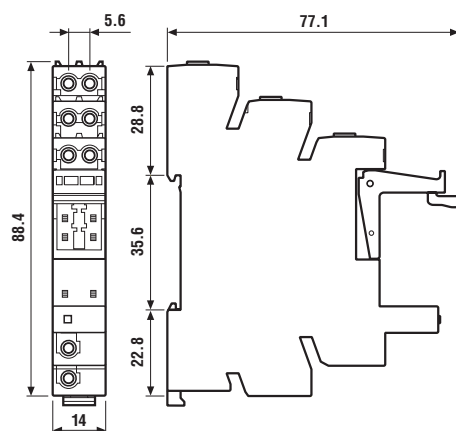
Supply voltage	Relay type	Socket type
6 V AC/DC	41.52.9.005.0010	93.02.0.024
12 V AC/DC	41.52.9.012.0010	93.02.0.024
24 V AC/DC	41.52.9.024.0010	93.02.0.024
60 V AC/DC	41.52.9.060.0010	93.02.0.060
(110...125)V AC/DC	41.52.9.110.0010	93.02.0.125
(220...240)V AC/DC	41.52.9.110.0010	93.02.0.240
6 V DC	41.52.9.005.0010	93.02.7.024
12 V DC	41.52.9.012.0010	93.02.7.024
24 V DC	41.52.9.024.0010	93.02.7.024
48 V DC	41.52.9.048.0010	93.02.7.060
60 V DC	41.52.9.060.0010	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	090.72 (see specification next page)

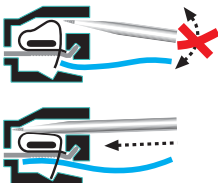
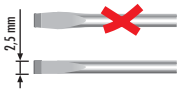
Technical data

Rated values	10 A - 250 V	
Insulation	6 kV (1.2/50 μ s) between coil and contacts	
Protection category	IP 20	
Ambient temperature	°C (-40...+70)°C - ($U_N \leq 60$ V DC), (-40...+55)°C - ($U_N > 60$ V DC)	
⊕ Screw torque	Nm	0.5
Wire strip length	mm	8
Max. wire size for 93.02 socket	solid wire	stranded wire
	mm ²	1x6 / 2x2.5
	AWG	1x12 / 2x14





Approvals
(according to type):



Screwless terminal socket 35 mm (EN 50022) mounting

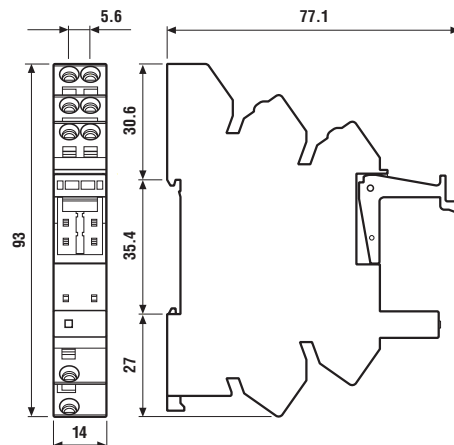
Supply voltage	Relay type	Socket type
6 V AC/DC	41.52.9.005.0010	93.52.0.024
12 V AC/DC	41.52.9.012.0010	93.52.0.024
24 V AC/DC	41.52.9.024.0010	93.52.0.024
60 V AC/DC	41.52.9.060.0010	93.52.0.060
(110...125)V AC/DC	41.52.9.110.0010	93.52.0.125
(220...240)V AC/DC	41.52.9.110.0010	93.52.0.240
6 V DC	41.52.9.005.0010	93.52.7.024
12 V DC	41.52.9.012.0010	93.52.7.024
24 V DC	41.52.9.024.0010	93.52.7.024
48 V DC	41.52.9.048.0010	93.52.7.060
60 V DC	41.52.9.060.0010	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	090.72 (see table below)

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)°C - ($U_N \leq 60$ V DC), (-40...+55)°C - ($U_N > 60$ V DC)
Wire strip length	mm	8
Max. wire size for 93.52 socket	solid wire	stranded wire
	mm ²	1x2.5
	AWG	1x14



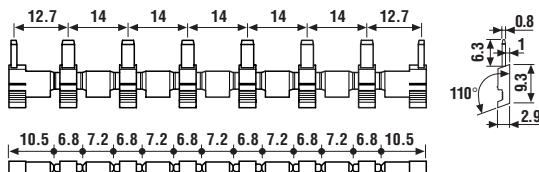
Accessories



Approvals
(according to type):



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



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



Sheet of marker tags for 38.x2, plastic, 72 tags, 6x12 mm	060.72
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95.13.2



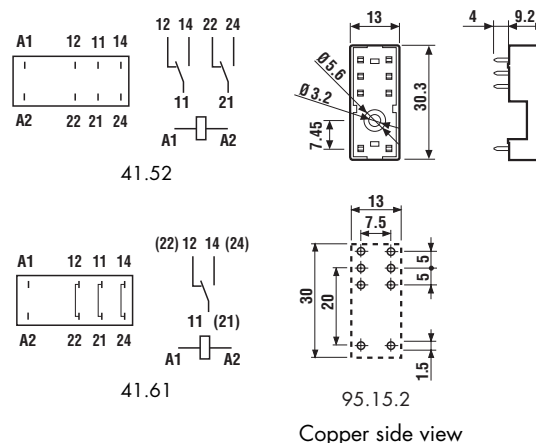
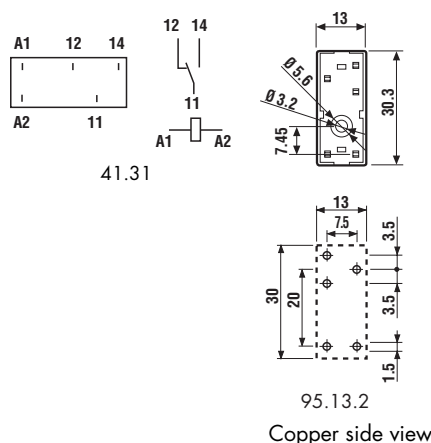
95.15.2

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	
Accessories				
Plastic retaining clip	095.42			
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			

* For currents >10 A, contact terminals must be connected in parallel (21 with 11, 24 with 14, 22 with 12).



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

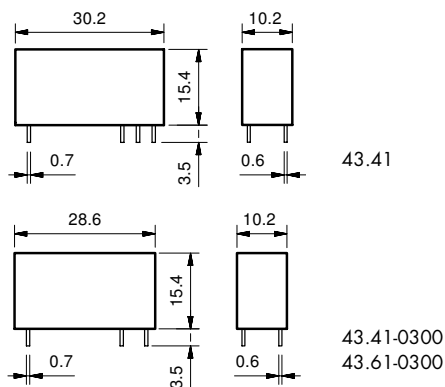
Without retaining clip

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)



FOR UL HORSEPOWER AND PILOT DUTY RATINGS
 SEE "General technical information" page V

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.

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 = AgSnO₂
5 = AgNi + Au (5 µm)

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 61810-1:2004

Nominal voltage of supply system	V AC	230/400
Rated insulation voltage	V AC	250
Pollution degree		3

Insulation between coil and contact set

Type of insulation	Reinforced (10 mm)
Overvoltage category	III
Rated impulse voltage	kV (1.2/50 µs)
Dielectric strength	V AC

Insulation between open contacts

Type of disconnection	Micro-disconnection
Dielectric strength	V AC/kV (1.2/50 µs)

Conducted disturbance immunity

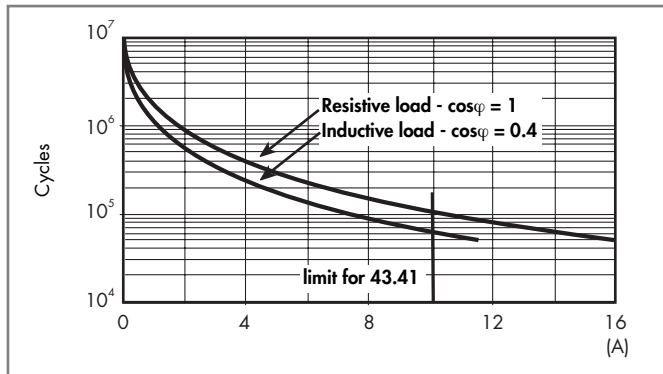
Burst (5...50)ns, 5 kHz, on A1 - A2	EN 61000-4-4	level 4 (4 kV)
Surge (1.2/50 µs) on A1 - A2 (differential mode)	EN 61000-4-5	level 3 (2 kV)

Other data

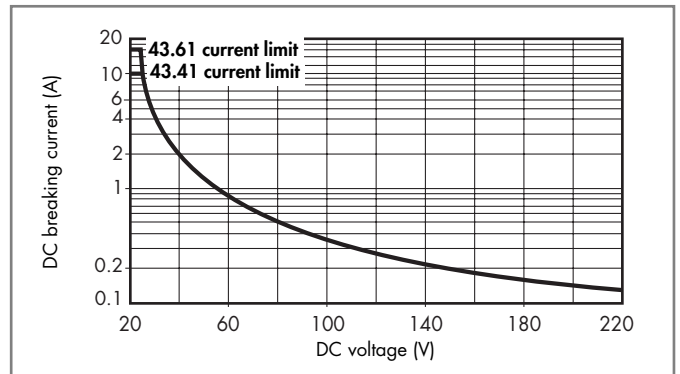
Bounce time: NO/NC	ms	3/6
Vibration resistance (5...55)Hz: NO/NC	g	15/3
Shock resistance	g	15
Power lost to the environment	without contact current	W
	with rated current	W
Recommended distance between relays mounted on PCB	mm	≥ 5

Contact specification

F 43 - Electrical life (AC) v contact current



H 43 - Maximum DC1 breaking capacity



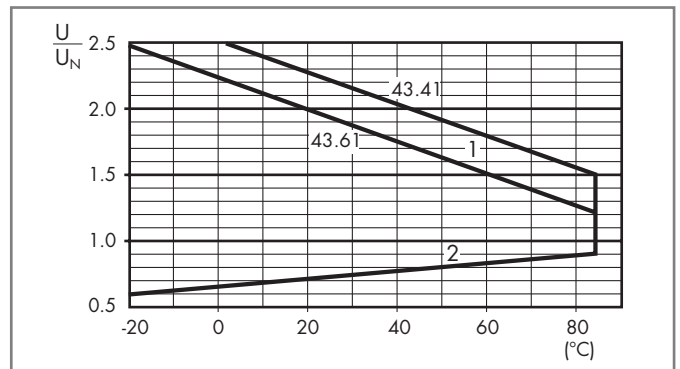
- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of $\geq 100 \cdot 10^3$ for 43.41 and $\geq 50 \cdot 10^3$ for 43.61 can be expected.
- In the case of DC13 loads, the connection of a diode in parallel with the load will permit a similar electrical 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 V	Coil code	Operating range		Resistance R Ω	Rated coil consumption I at U_N mA
		U_{min} V	U_{max} V		
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	1,296	13.8
24	7.024	16.8	36	2,200	10.9
36	7.036	25.2	54	5,184	6.9
48	7.048	33.6	72	9,200	5.2

R 43 - 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 - 0.4 W standard (type 43.61)

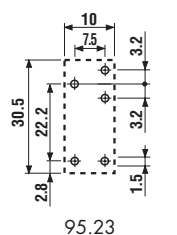
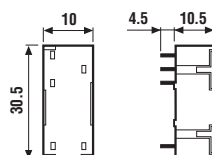
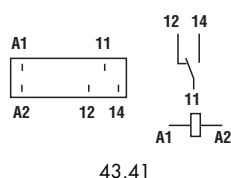
Nominal voltage U_N V	Coil code	Operating range		Resistance R Ω	Rated coil consumption I at U_N mA
		U_{min} V	U_{max} V		
12	9.012	8.4	14.4	360	33.3
24	9.024	16.8	28.8	1,400	17.1
48	9.048	33.6	57.6	5,760	8.3



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	



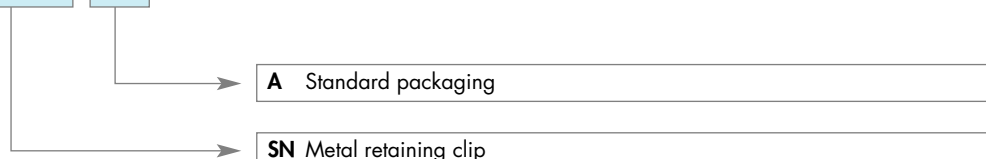
Copper side view

Packaging codes

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

Example:

9 5 . 2 3 S N A



9 5 . 2 3 [] []



Features

2 Pole relay range

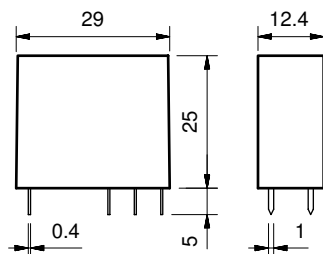
44.52 - 2 Pole 6 A (5 mm pin pitch)

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 μ s) isolation, coil-contacts
- UL Listing (certain relay/socket combinations)
- Flux proof: RT II
- 95 series sockets
- Coil EMC suppression
- Timer accessories 86 series



FOR UL HORSEPOWER AND PILOT DUTY RATINGS
SEE "General technical information" page V

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	—
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

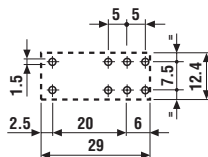
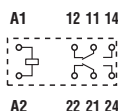
Mechanical life AC/DC cycles	—/20 · 10 ⁶	—/20 · 10 ⁶
Electrical life at rated load AC1 cycles	150 · 10 ³	100 · 10 ³
Operate/release time ms	8/5 - (12/5 sensitive)	8/5 - (12/5 sensitive)
Insulation between coil and contacts (1.2/50 μ s) kV	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts V AC	1,000	1,000
Ambient temperature range °C	−40...+85	−40...+85
Environmental protection	RT II	RT II

Approvals (according to type)

44.52

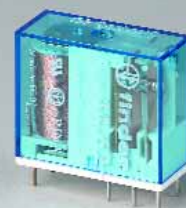


- 2 Pole, 6 A
- 5 mm contact pin pitch
- PCB or 95 series sockets

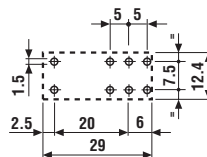
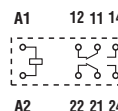


Copper side view

44.62



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



Copper side view

Ordering information

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

4	4	.	6	.	2	.	9	.	0	2	4	.	0	A	0	B	0	C	0	D	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 = AgSnO₂
 for 44.62 only
 5 = AgNi + Au (5 µm)
 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**.

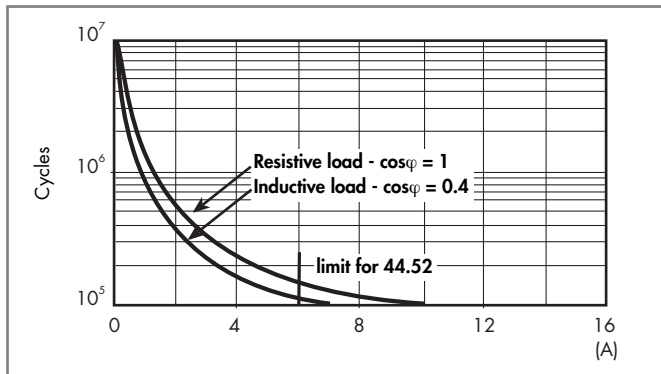
Type	Coil version	A	B	C	D
44.52	DC - sens. DC	0 - 5	0	0	0
44.62	DC - sens. DC	0 - 4	0	0	0

Technical data

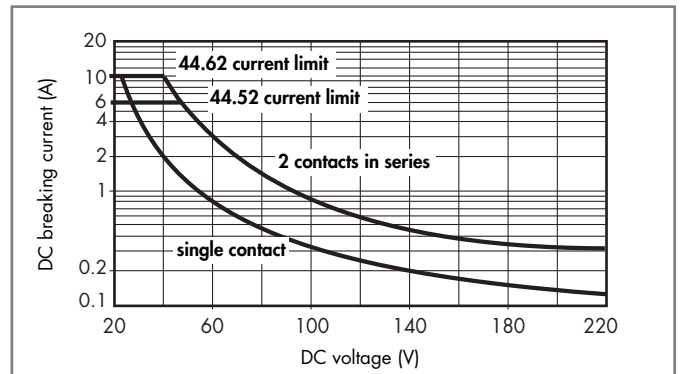
Insulation according to EN 61810-1:2004				
Nominal voltage of supply system		V AC	230/400	
Rated insulation voltage		V AC	250	400
Pollution degree			3	2
Insulation between coil and contact set				
Type of Insulation		Reinforced (8 mm)		
Overvoltage category		III		
Rated impulse voltage		kV (1.2/50 µs)	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 $\geq 100 \cdot 10^3$ 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

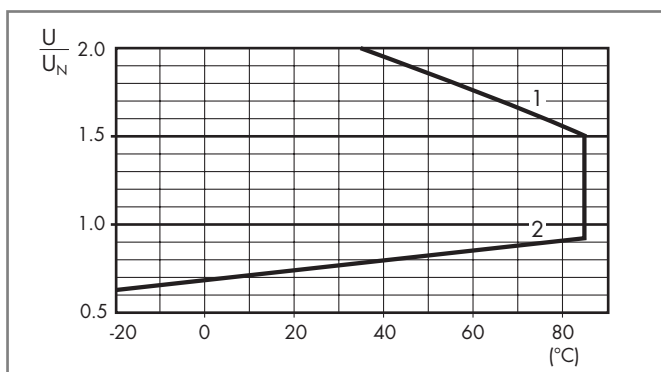
Nominal voltage U_N	Coil code	Operating range		Resistance	Rated coil consumption I at U_N
V		U_{min} V	U_{max} V	R Ω	mA
6	9.006	4.4	9	55	109
9	9.009	6.6	13.5	125	72
12	9.012	8.8	18	220	55
14	9.014	10.2	21	300	47
24	9.024	17.5	36	900	27
28	9.028	20.5	42	1,200	23
48	9.048	35	72	3,500	14
60	9.060	43.8	90	5,500	11
110	9.110	80.3	165	18,000	6.2
125	9.125	91.2	187.5	23,500	5.3

DC coil data - 0.5 W sensitive

Nominal voltage U_N	Coil code	Operating range		Resistance	Rated coil consumption I at U_N
V		U_{min}^* V	U_{max} V	R 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	218.7	32,000	3.9

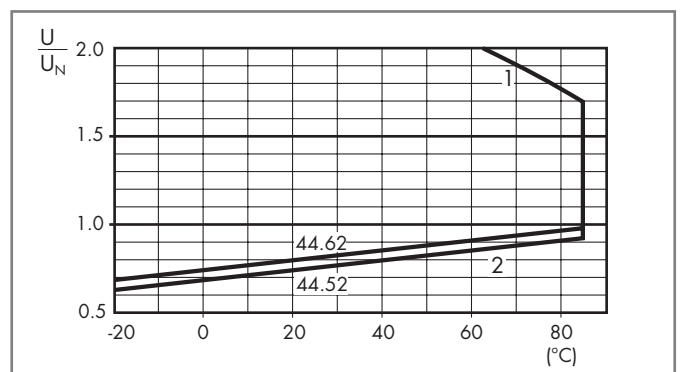
* $U_{min} = 0.8 U_N$ for 44.62

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.

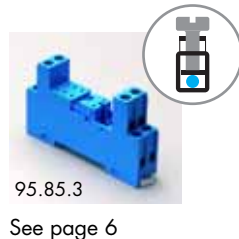
R 44 - DC coil operating range v ambient temperature
Sensitive coil



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



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 50022) mount	- Coil indication and EMC suppression modules - Jumper link - Timer modules - Plastic retaining and release clip



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 50022) mount	- Coil indication and EMC suppression modules - Plastic retaining and release clip



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 50022) mount	- Coil indication and EMC suppression modules - Plastic retaining and release clip



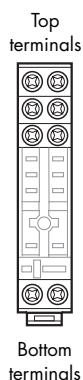
Module	Socket	Relay	Description	Mounting	Accessories
99.02	95.55	44.52 44.62	Screwless terminal socket - For fast cable connections - Top terminals - Contacts - Bottom terminals - Coil	Panel or 35 mm rail (EN 50022) mount	- Coil indication and EMC suppression modules - Timer modules - Plastic retaining and release clip

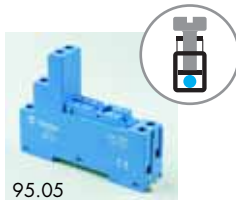


Module	Socket	Relay	Description	Mounting	Accessories
99.80	95.55.3	44.52 44.62	Screwless terminal socket - For fast cable connections - Top terminals - Contacts - Bottom terminals - Coil	Panel or 35 mm rail (EN 50022) mount	- Coil indication and EMC suppression modules - Plastic retaining and release clip



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





95.05

Approvals
(according to type):




cULUS Certain relay/socket combinations

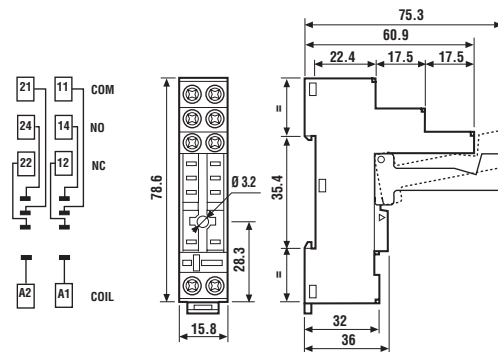


095.01



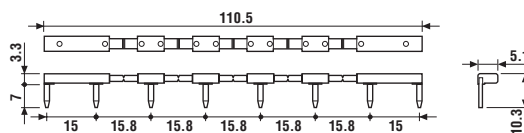
060.72

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	
 Screw torque		Nm 0.5	
Wire strip length		mm 8	
Max. wire size for 95.05 socket		solid wire	stranded wire
		mm² 1x6 / 2x2.5	1x4 / 2x2.5
		AWG 1x10 / 2x14	1x12 / 2x14



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	86.30.0.024.0000
(12...24)V AC/DC; Bi-function: AI, DI; (0.05s...100h)	

Approvals

(according to type):



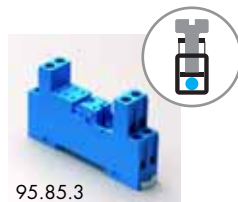
99.02

Approvals
(according to type):



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

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



95.85.3

Approvals
(according to type):

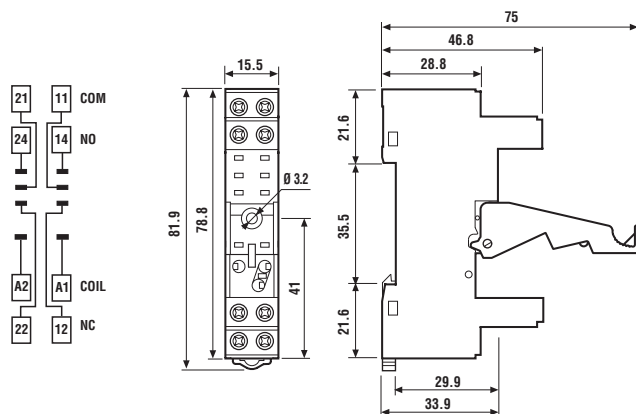


095.91.3

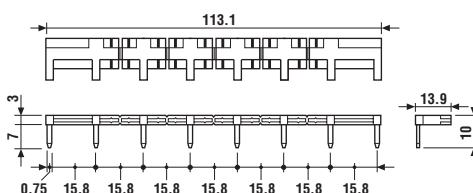


060.72

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	
Screw torque		Nm	0.5
Wire strip length		mm	7
Max. wire size for 95.85.3 sockets		solid wire	stranded wire
		mm ²	1x6 / 2x2.5
		AWG	1x10 / 2x14



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



095.08

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



99.80


Approvals
(according to type):

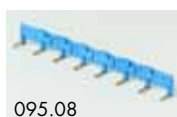
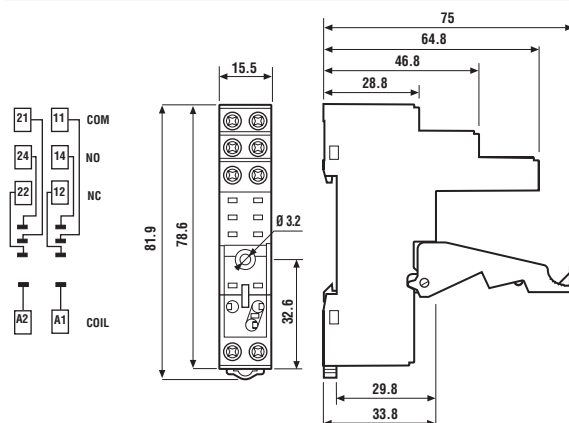


* Modules in Black
housing are
available on request.

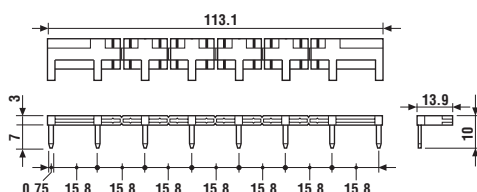
Green LED is standard.
Red LED available
on request.



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	
 Screw torque	Nm 0.5	
Wire strip length	mm 8	
Max. wire size for 95.95.3 sockets	solid wire	stranded wire
	mm² 1x6 / 2x2.5	1x4 / 2x2.5
	AWG 1x10 / 2x14	1x12 / 2x14

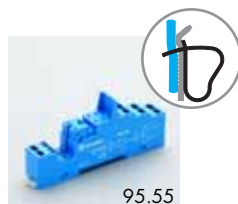


8-way jumper link for 95.95.3 socket	095.08 (blue)	095.08.0 (black)
Rated values	10 A - 250 V	



Green LED is standard.
Red LED available
on request.

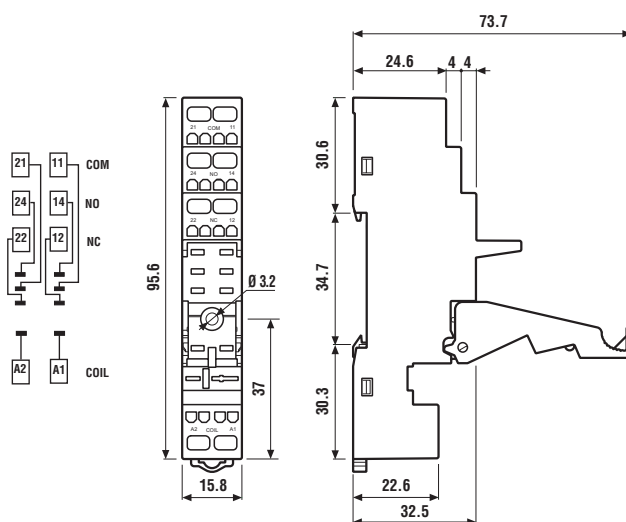
99.80 coil indication and EMC suppression modules for 95.95.3 socket		
		Blue*
Diode (+A1, standard polarity)	(6...220)V DC	99.80.3.000.00
LED	(6...24)V DC/AC	99.80.0.024.59
LED	(28...60)V DC/AC	99.80.0.060.59
LED	(110...240)V DC/AC	99.80.0.230.59
LED + Diode (+A1, standard polarity)	(6...24)V DC	99.80.9.024.99
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



Approvals
(according to type):



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	
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)



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):

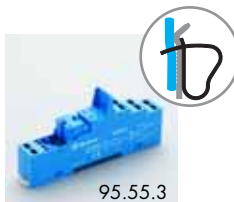


Approvals
(according to type):



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

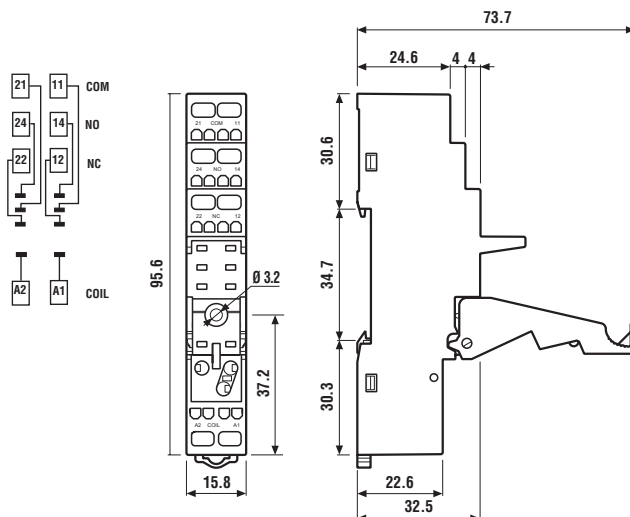
DC Modules with
non-standard polarity
(+A2) on request.



Approvals
(according to type):



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
Wire strip length	mm	8
Max. wire size for 95.55.3 socket	solid wire	stranded wire
	mm ²	2x(0.2...1.5)
	AWG	2x(24...18)



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

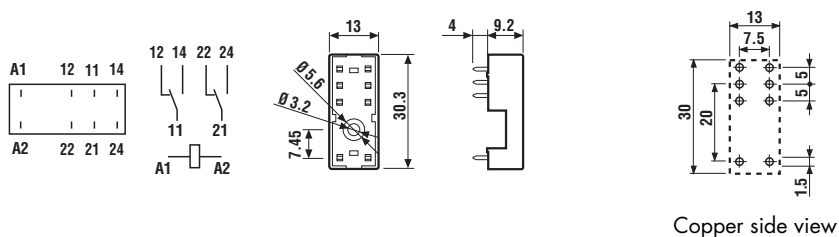


95.15.2

Approvals
(according to type):



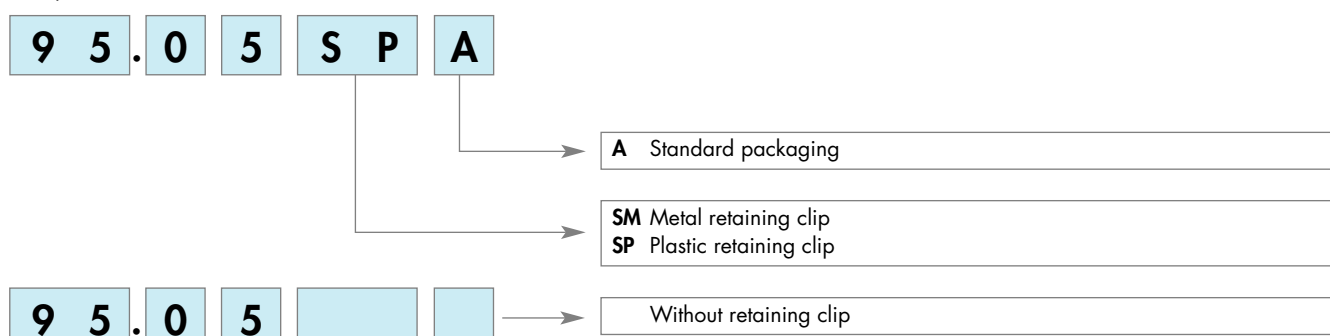
PCB socket	95.15.2 (blue)	95.15.20 (black)
For relay type	44.52, 44.62	
Accessories		
Metal retaining clip (supplied with socket - packaging code SMA)		095.51
Plastic retaining clip		095.52
Technical data		
Rated values	10 A - 250 V	
Dielectric strength	6 kV (1.2/50 µs) between coil and contacts	
Protection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



Packaging codes

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

Example:



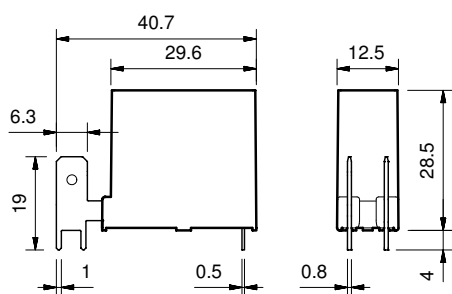
Features

- 1 Pole 16 A relays for 125 °C ambient use**
 - 45.71, 1 Pole normally open or normally closed
 - 45.91, 1 Pole normally open (≥ 3 mm contact gap)

PCB mount - coil connections

Faston 250 - contact connections

- Contact gap ≥ 3 mm according to EN 60730-1 (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 μ s) isolation, coil-contacts
- Flux proof: RT II standard, (RT III option)

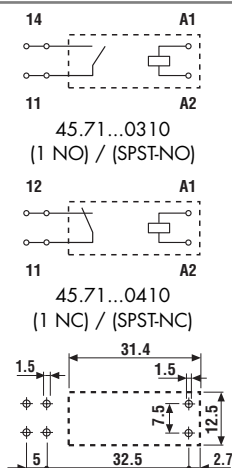


FOR UL HORSEPOWER AND PILOT DUTY RATINGS
 SEE "General technical information" page V

45.71



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

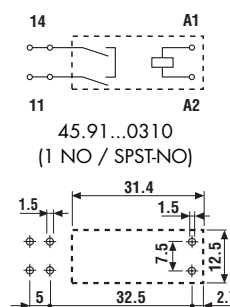


Copper side view

45.91



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



Copper side view

Contact specification

Contact configuration	1NO or 1NC (SPST-NO or SPST-NC)	1NO (SPST-NO) ≥ 3 mm gap
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	16/0.3/0.13
Minimum switching load	mW (V/mA)	500 (10/5)
Standard contact material	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
Rated power AC/DC	VA (50 Hz)/W	—/0.36	—/0.36
Operating range	AC	—	—
	DC	(0.7...1.2) U_N	(0.7...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	30 · 10 ³
Operate/release time	ms	10/2	12/2
Insulation between coil and contacts (1.2/50 μ s)	kV	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts	V AC	1,000	2,500
Ambient temperature range	°C	−40...+125	−40...+125
Environmental protection		RT II	RT II

Approvals (according to type)



Ordering information

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

	4	5	.	7	.	1	.	7	.	0	1	2	.	A	B	C	D
Series																	
Type																	
7 = PCB mount																	
9 = PCB 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 45.91																	
1 = AgNi																	
B: Contact circuit																	
3 = NO (SPST)																	
4 = NC (SPST)																	
D: Special versions																	
0 = Flux proof (RT II)																	
1 = Wash tight (RT III)																	
C: Options																	
1 = None																	

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

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

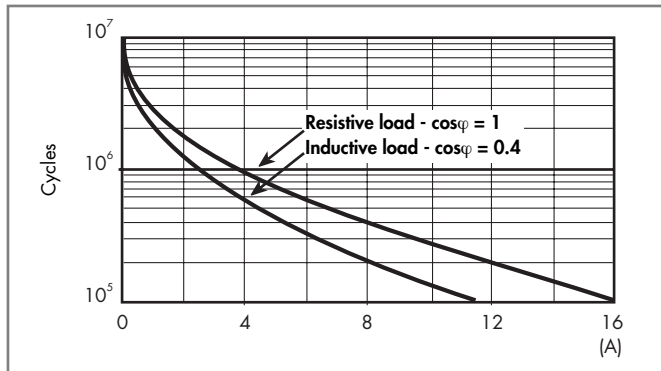
Technical data

Insulation according to EN 61810-1:2004

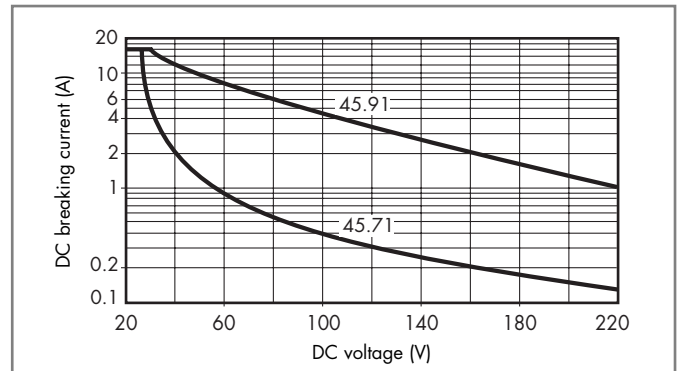
		45.71		45.91	
Nominal voltage of supply system	V AC	230/400		230/400	
Rated insulation voltage	V AC	250	400	250	400
Pollution degree		3	2	3	2
Insulation between coil and contact set					
Type of insulation		Reinforced (8 mm)		Reinforced (8 mm)	
Overvoltage category		III		III	
Rated impulse voltage	kV (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		45.91	
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		
	with rated current	W	1.8		
Recommended distance between relays mounted on PCB	mm	≥ 5			

Contact specification

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

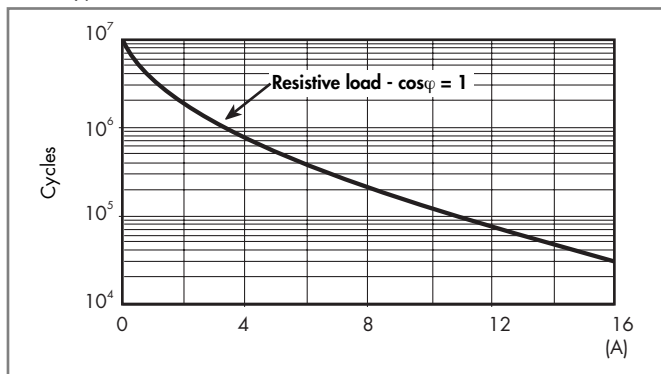


H 45 - Maximum DC1 breaking capacity



- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of $\geq 100 \cdot 10^3$ cycles (45.71) and $\geq 30 \cdot 10^3$ cycles (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.

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

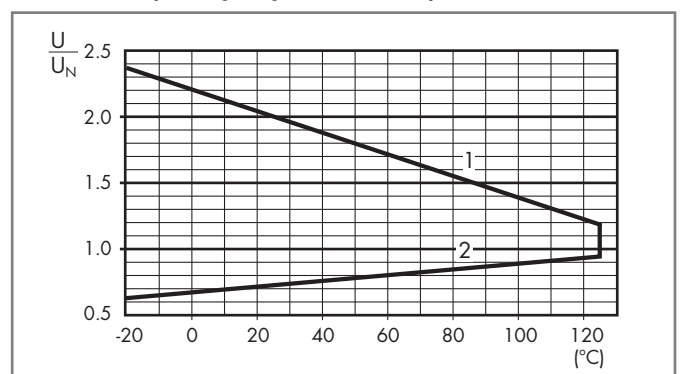


Coil specifications

DC coil data - 0.36 W sensitive

Nominal voltage U_N	Coil code	Operating range		Resistance	Rated coil consumption I at U_N
V		U_{min} V	U_{max} V	R 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

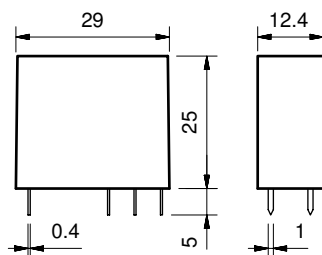


- 1 - Max. permitted coil voltage.
- 2 - Min. pick-up voltage with coil at ambient temperature.

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



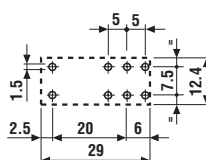
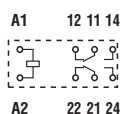
*According to EN 50205 only 1 NO and 1 NC (11-14 and 21-22 or 11-12 and 21-24) shall be used as forcibly guided contacts.

FOR UL HORSEPOWER AND PILOT DUTY RATINGS
 SEE "General technical information" page V

50.12



- 2 Pole 8 A
- 5 mm pinning
- PCB mounting



Copper side view

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: 30/110/220 V	A 8/0.65/0.2
Minimum switching load	mW (V/mA) 300 (5/5)
Standard contact material	AgNi

Coil specification

Nominal voltage (U _N)	V AC (50/60 Hz)	—
	V DC	5 - 6 - 12 - 24 - 48 - 60 - 110 - 125
Rated power AC/DC	VA (50 Hz)/W	—/0.7
Operating range	AC (50 Hz)	—
	DC	(0.75...1.2)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
Environmental protection		RT II

Approvals (according to type)



Ordering information

Example: 50 series safety relay, 2 CO (DPDT) 8 A contacts, 24 V DC coil.

<p>Series _____</p> <p>Type _____ 1 = PCB - 5 mm pinning</p> <p>No. of poles _____ 2 = 2 pole 8 A</p> <p>Coil version _____ 9 = DC</p> <p>Coil voltage _____ See coil specifications</p>	<p>A: Contact material 1 = Standard AgNi 4 = AgSnO₂ 5 = AgNi + Au (5 µm)</p> <p>B: Contact circuit 0 = CO (DPDT)</p>	<p>C: Options 0 = None</p> <p>D: Special versions 0 = Flux proof (RT II)</p>
---	---	--

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

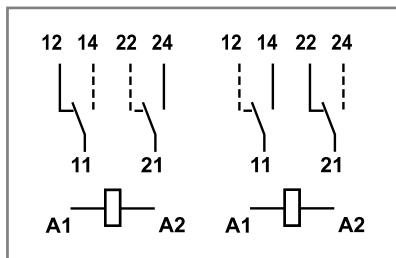
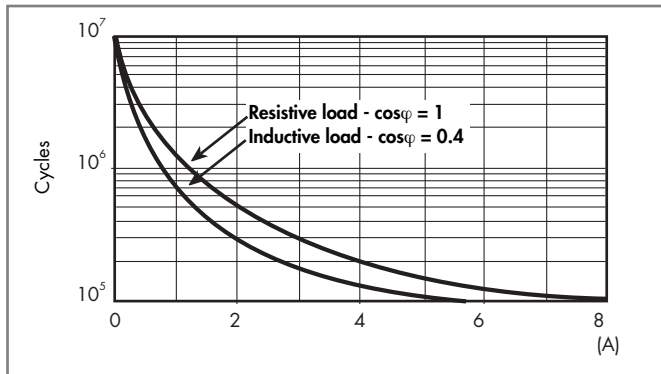
Type	Coil version	A	B	C	D
50.12	DC	1 - 4 - 5	0	0	0

Technical data

Insulation according to EN 61810-1:2004				
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)	1,500/2.5		
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		

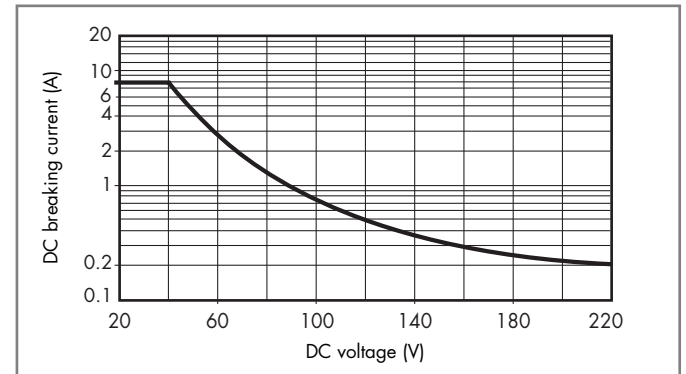
Contact specification

F 50 - Electrical life (AC) v contact current



Alternative selection of NO and NC contacts to provide Forcibly guided (mechanically linked) contacts, in accordance with EN 50205 (type B).

H 50 - Maximum DC1 breaking capacity



- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of $\geq 100 \cdot 10^3$ 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.

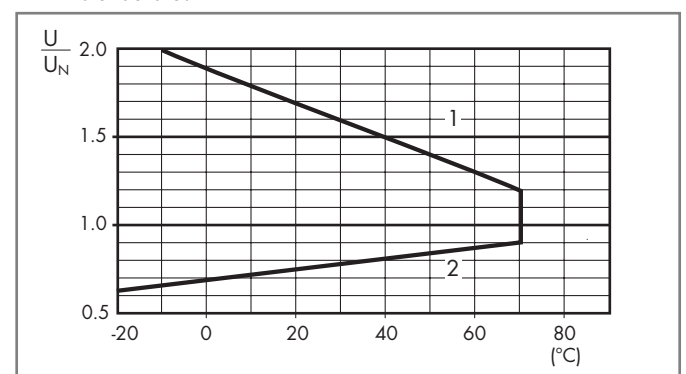
Coil specifications

DC coil data

Nominal voltage U_N V	Coil code	Operating range		Resistance R Ω	Rated coil consumption I at U_N mA
		U_{min} V	U_{max} V		
5	9.005	3.8	6.0	35	143
6	9.006	4.5	7.2	50	120
12	9.012	9.0	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	72.0	5,140	11.7
110	9.110	82.5	131.0	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.

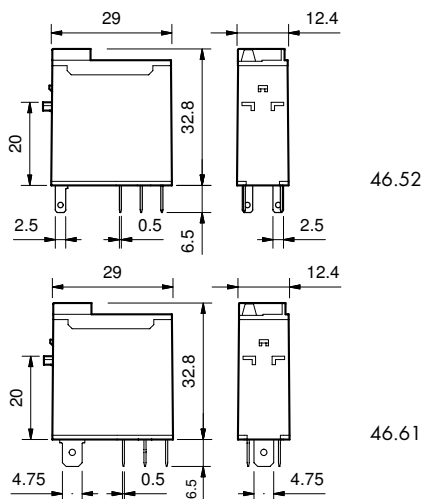
Features

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

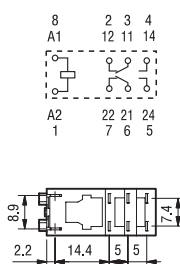


FOR UL HORSEPOWER AND PILOT DUTY RATINGS
SEE "General technical information" page V

46.52



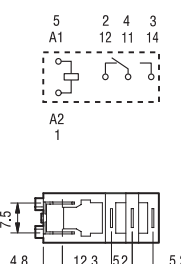
- 2 Pole CO, 8 A
- Plug-in/Solder terminals



46.61



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



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
Operating range AC	(0.8...1.1)U _N
DC	(0.73...1.1)U _N
Holding voltage AC/DC	0.8U _N / 0.4U _N
Must drop-out voltage AC/DC	0.2U _N / 0.1U _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	10/3
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 ... +70
Environmental protection	RT II

Approvals (according to type)



Ordering information

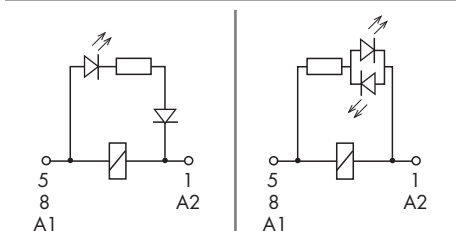
Example: 46 series Miniature industrial relay, 1 CO (SPDT), 24 V DC coil, lockable test button and mechanical indicator.

	4	6	.	6	.	1	.	9	.	0	2	4	.	0	A	0	B	0	C	4	D	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 (5 µm)																						
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**.

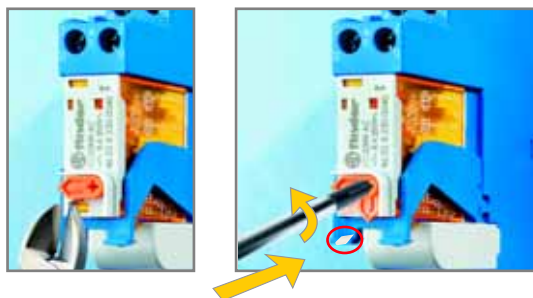
Type	Coil version	A	B	C	D
46.52	AC - DC	0 - 5	0	2 - 4	0
	AC	0 - 5	0	54	/
	DC	0 - 5	0	74	/
46.61	AC - DC	0 - 4 - 5	0	2 - 4	0
	AC	0 - 4 - 5	0	54	/
	DC	0 - 4 - 5	0	74	/

Descriptions: Options



C: Option 54
LED (AC)

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



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

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

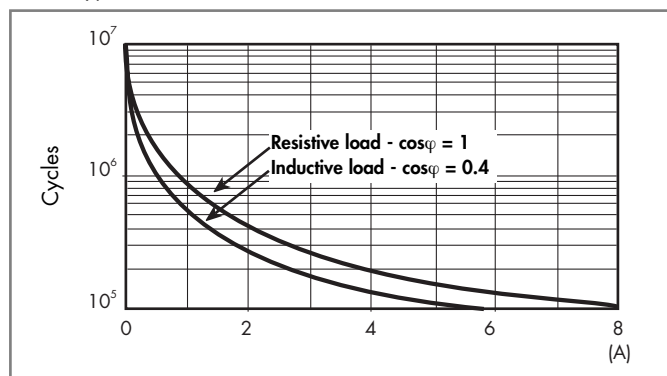
Insulation according to EN 61810-1:2004

Insulation according to EN 61010-1:2004

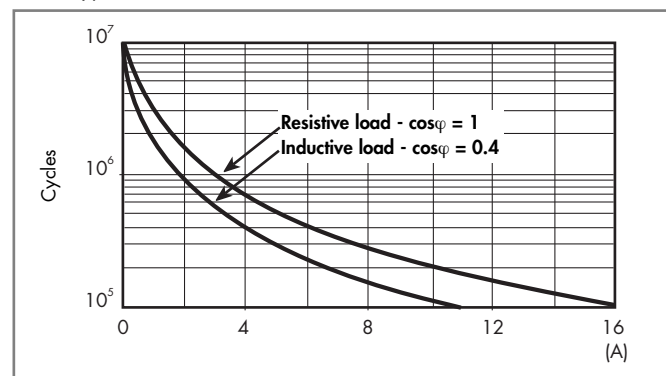
			1 pole		2 pole		
Nominal voltage of supply system			V AC	230/400		230/400	
Rated insulation voltage			V AC	250	400	250	400
Pollution degree				3	2	3	2
Insulation between coil and contact set							
Type of insulation				Reinforced (8 mm)		Reinforced (8 mm)	
Overvoltage category				III		III	
Rated impulse 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	
			with rated current	W	1.6	2	

Contact specification

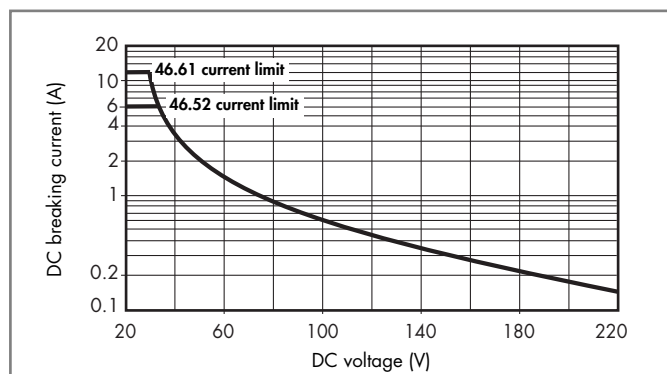
F 46 - Electrical life (AC) v contact current
Type 46.52



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 $\geq 100 \cdot 10^3$ 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

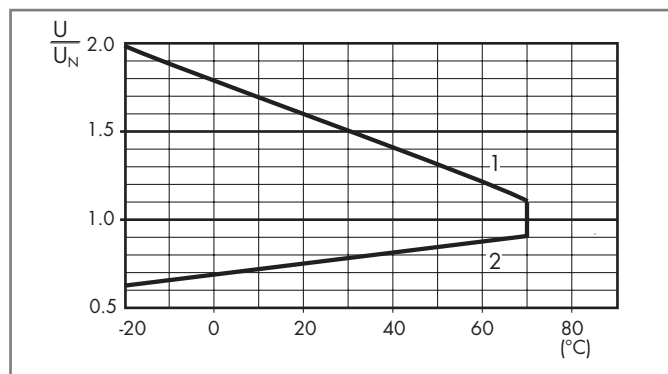
DC coil data

Nominal voltage U_N	Coil code	Operating range		Resistance R	Rated coil consumption I at U_N
V		U_{min} V	U_{max} 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	137.5	32,000	3.9

AC coil data

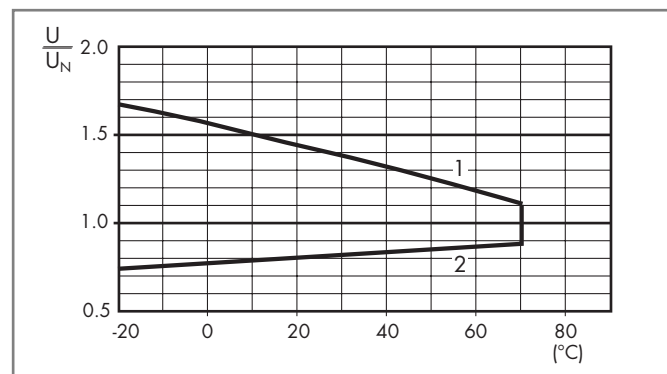
Nominal voltage U_N	Coil code	Operating range		Resistance R	Rated coil consumption I at U_N
V		U_{min} V	U_{max} V	Ω	mA
12	8.012	9.6	13.2	80	90
24	8.024	19.2	26.4	320	45
48	8.048	38.4	52.8	1,350	21
110	8.110	88	121	6,900	9.4
120	8.120	96	132	9,000	8.4
230	8.230	184	253	28,000	5
240	8.240	192	264	31,500	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



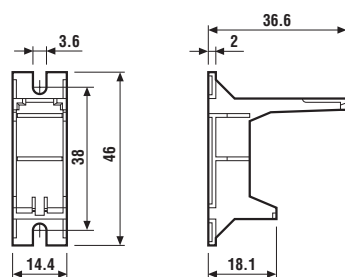
046.05



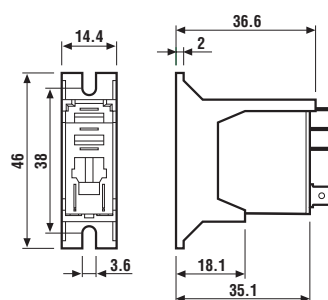
046.05 with relay

Flange mount adaptor for relays types 46.52 and 46.61

046.05



046.05



046.05 with relay



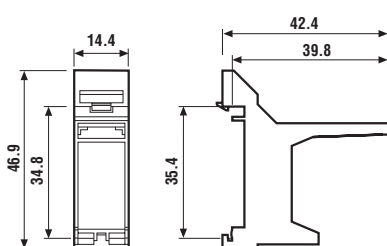
046.07



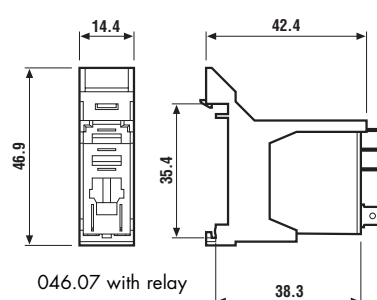
046.07 with relay

35 mm rail adaptor for relays types 46.52 and 46.61

046.07



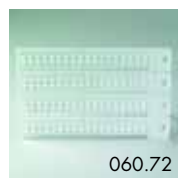
046.07



046.07 with relay

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

060.72



060.72

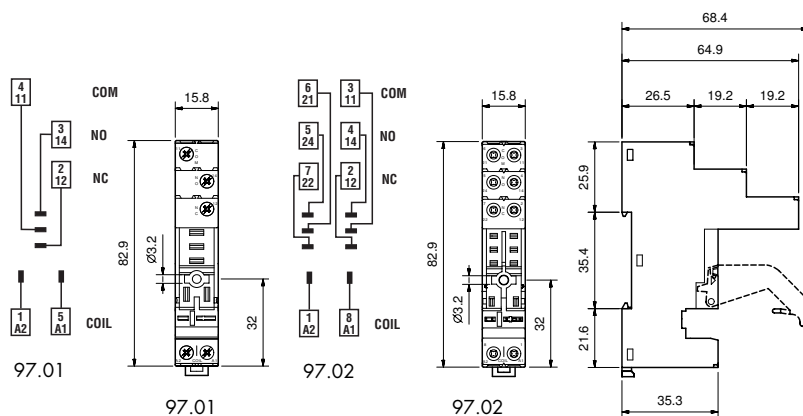
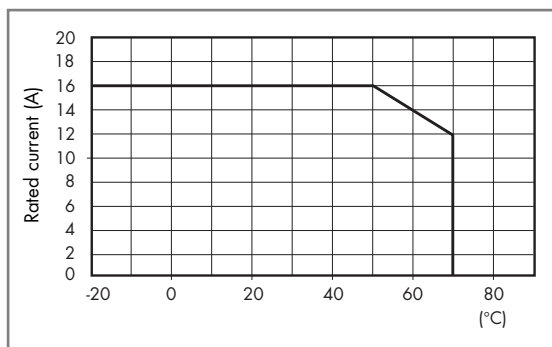


Approvals
(according to type):

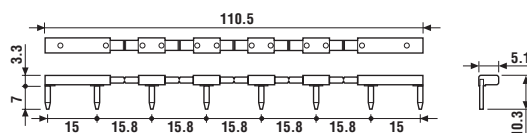


Screw terminal socket panel or 35 mm rail (EN 50022) mount	97.01 (blue)	97.01.0 (black)	97.02 (blue)	97.02.0 (black)
For relay type	46.61		46.52	
Accessories				
Plastic retain and release clip (supplied with socket - packaging code SPA)			097.01	
Identification tag			095.00.4	
8-way jumper link	095.18 (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	
	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)



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 timer module	
(12...24)V AC/DC; Bi-function: AI, DI; (0.05s...100h)	86.30.0.024.0000
(230...240)V AC; Bi-function: AI, DI; (0.05s...100h)	86.30.8.240.0000

Approvals
(according to type):

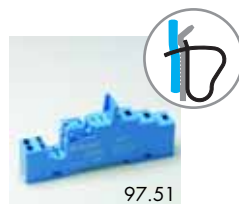


Approvals
(according to type):



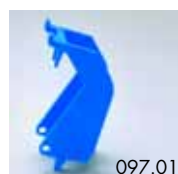
99.02 coil indication and EMC suppression modules for 97.01 and 97.02 sockets	
Diode (+A1, standard polarity)	(6...220)V DC 99.02.3.000.00
LED	(6...24)V DC/AC 99.02.0.024.59
LED	(28...60)V DC/AC 99.02.0.060.59
LED	(110...240)V DC/AC 99.02.0.230.59
LED + Diode (+A1, standard polarity)	(6...24)V DC 99.02.9.024.99
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

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



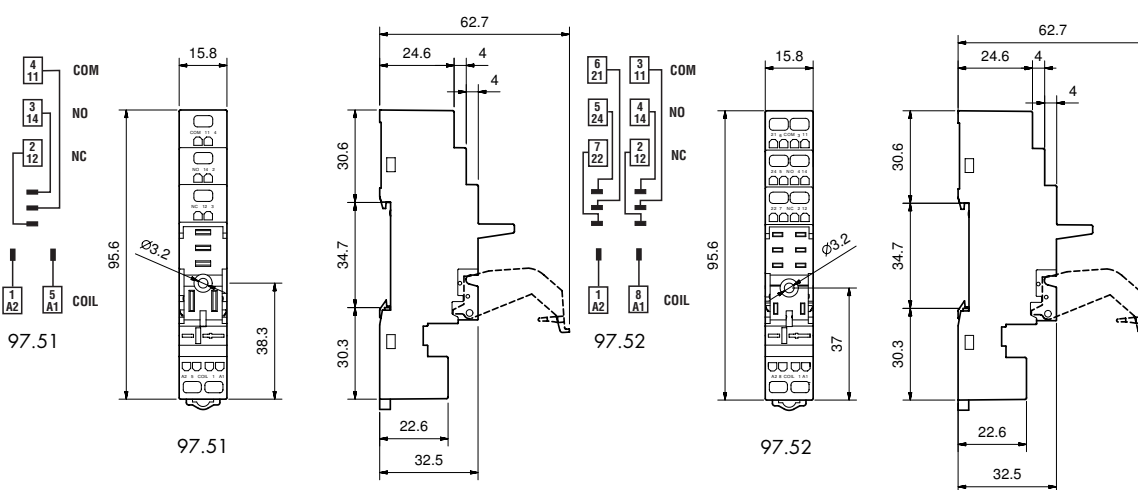
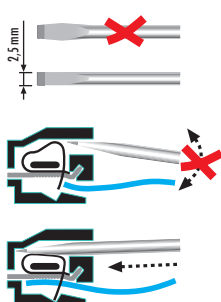
97.51

Approvals
(according to type):



097.01

Screwless terminal socket panel or 35 mm rail (EN 50022) 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			
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)	



86.30

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

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



Approvals
(according to type):

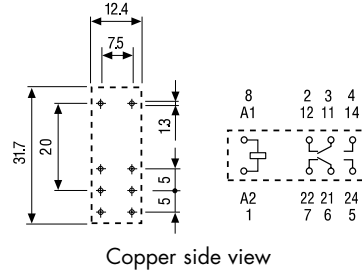
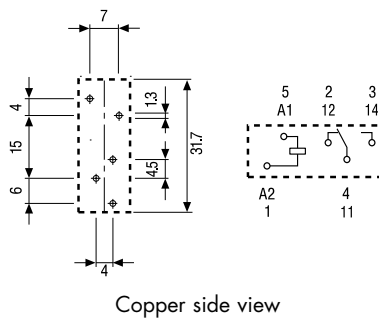
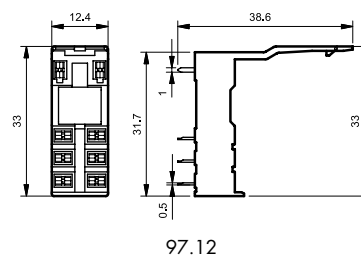
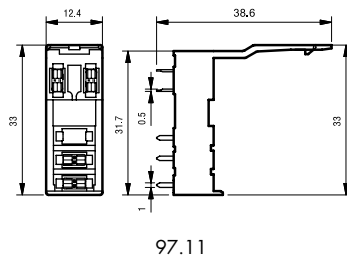
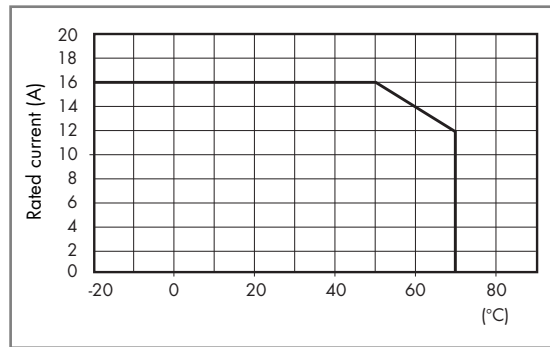


Approvals
(according to type):



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	

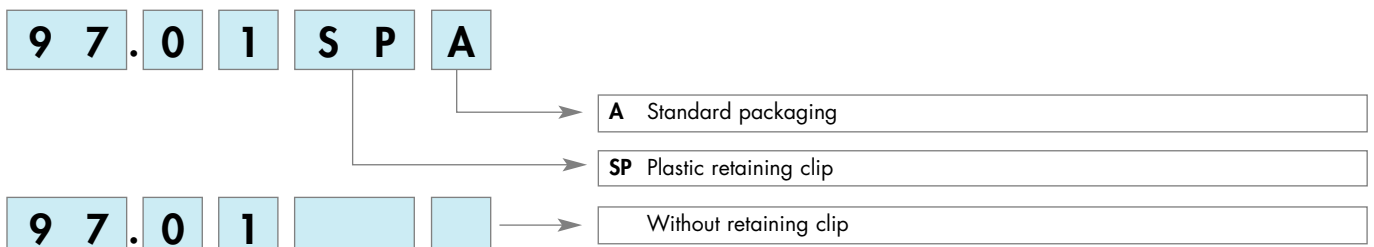
L 97 - Rated current vs ambient temperature
(for 46.61 relay / 97.11 socket combination)



Packaging codes

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

Example:



Features

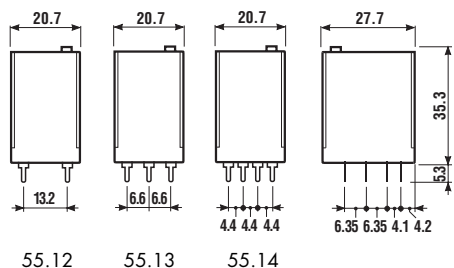
Printed circuit mount, general purpose
2, 3 & 4 Pole relays

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 (preferred version)
- Contact material options
- RT III (wash tight) option available



FOR UL HORSEPOWER AND PILOT DUTY RATINGS
SEE "General technical information" page V

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	9/3	9/3	9/3
Insulation between coil and contacts (1.2/50 μ s)	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

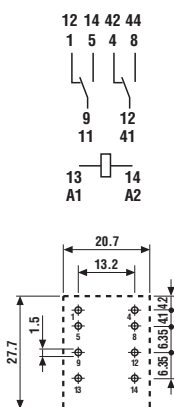
Approvals (according to type)



55.12



- 2 pole, 10 A
- PCB mount

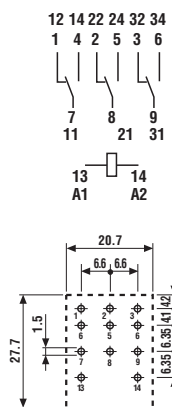


Copper side view

55.13



- 3 pole, 10 A
- PCB mount

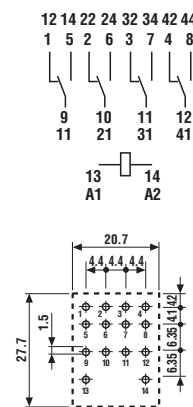


Copper side view

55.14



- 4 pole, 7 A
- PCB mount



Copper side view

Features

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

55.32 - 2 Pole 10 A

55.33 - 3 Pole 10 A

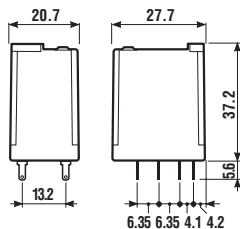
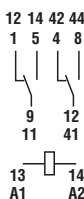
55.34 - 4 Pole 7 A

- 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 (preferred version)
- Contact material options
- 94 series sockets
- Coil EMC suppression
- Timer accessories 86 series

55.32



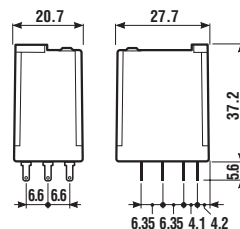
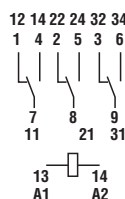
- 2 pole, 10 A
- Plug-in 94 series sockets



55.33



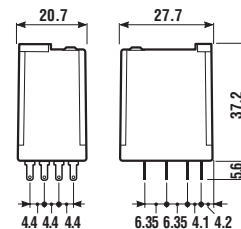
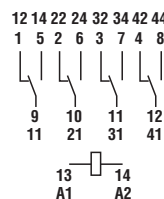
- 3 pole, 10 A
- Plug-in 94 series sockets



55.34



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



FOR UL HORSEPOWER AND PILOT DUTY RATINGS
SEE "General technical information" page V

Contact specification		55.32	55.33	55.34
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 · 10 ⁶ /50 · 10 ⁶	20 · 10 ⁶ /50 · 10 ⁶	20 · 10 ⁶ /50 · 10 ⁶
Electrical life at rated load AC1	cycles	200 · 10 ³	200 · 10 ³	150 · 10 ³
Operate/release time	ms	9/3	9/3	9/3
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)				

Ordering information

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

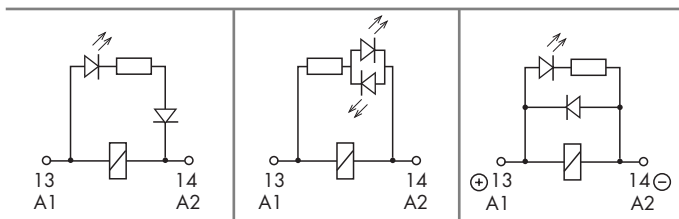
<p>Series ———</p> <p>Type ———</p> <p>1 = PCB 3 = Plug-in</p> <p>No. of poles ———</p> <p>2 = 2 pole, 10 A 3 = 3 pole, 10 A 4 = 4 pole, 7 A</p> <p>Coil version ———</p> <p>8 = AC (50/60 Hz) 9 = DC</p> <p>Coil voltage ———</p> <p>See coil specifications</p>	<p>A: Contact material</p> <p>0 = Standard AgNi 2 = AgCdO 5 = AgNi + Au (5 µm)</p> <p>B: Contact circuit</p> <p>0 = CO (nPDT)</p>	<p>C: Options</p> <p>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</p> <p>* Option not available for the 220 V DC version.</p>
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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 - 2 - 5	0	0	0
	AC	0 - 2 - 5	0	2 - 3 - 4 - 5	0
	AC	0 - 2 - 5	0	54	/
	DC	0 - 2 - 5	0	2 - 4 - 6 - 7 - 8 - 9	0
	DC	0 - 2 - 5	0	74 - 94	/
55.33	AC-DC	0 - 2 - 5	0	0	0
	AC	0 - 2 - 5	0	1 - 3 - 5	0
	DC	0 - 2 - 5	0	1 - 6 - 7 - 8 - 9	0
55.12/13/14	AC-DC	0 - 2 - 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)

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.

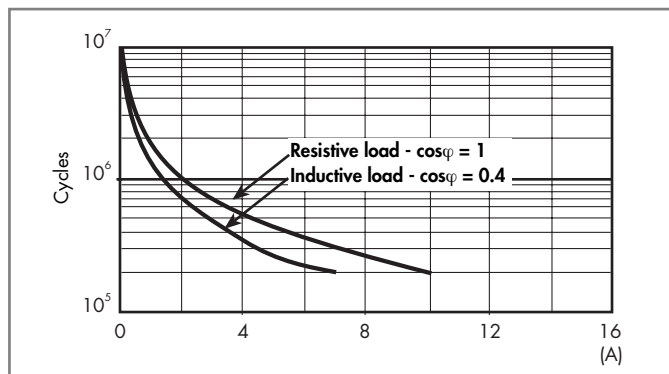
In both cases ensure that the test button actuation is swift and decisive.

Technical data

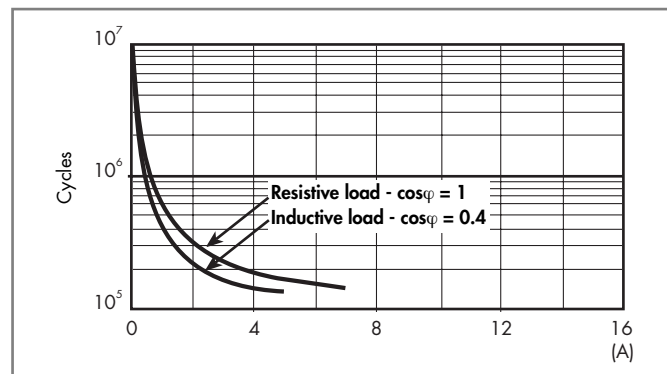
Insulation according to EN 61810-1:2004		2 pole - 3 pole	4 pole
Nominal voltage of supply system	V AC	230/400	230
Rated insulation voltage	V AC	400	250
Pollution degree		2	2
Insulation between coil and contact set			
Type of Insulation		Basic	Basic
Overvoltage category		III	III
Rated impulse voltage	kV (1.2/50 μ s)	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 μ s)	4	2.5
Dielectric strength	V AC	2,000	1,550
Insulation between open contacts			
Type of disconnection		Micro-disconnection	Micro-disconnection
Dielectric strength	V AC/kV (1.2/50 μ s)	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 μ s) 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	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

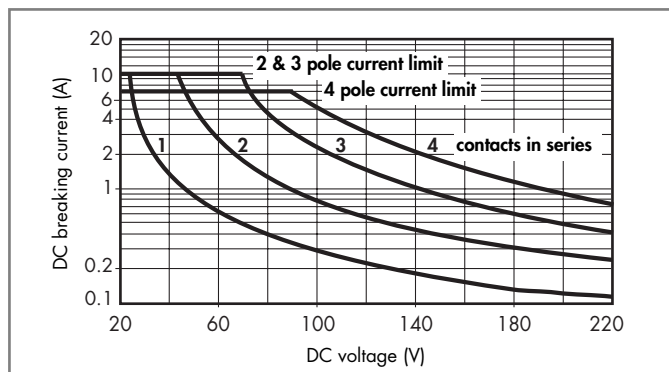
F 55 - Electrical life (AC) v contact current
2 and 3 pole relays



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 $\geq 100 \cdot 10^3$ 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

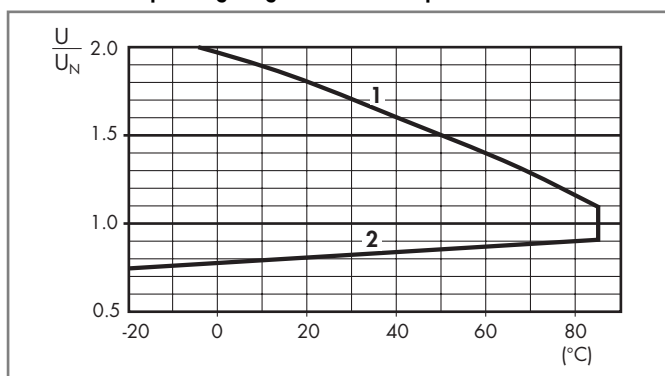
DC coil data

Nominal voltage U_N V	Coil code	Operating range		Resistance R Ω	Rated coil consumption I at U_N mA
		U_{min} V	U_{max} V		
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	137.5	17,300	7.2
220	9.220	176	242	54,000	4

AC coil data

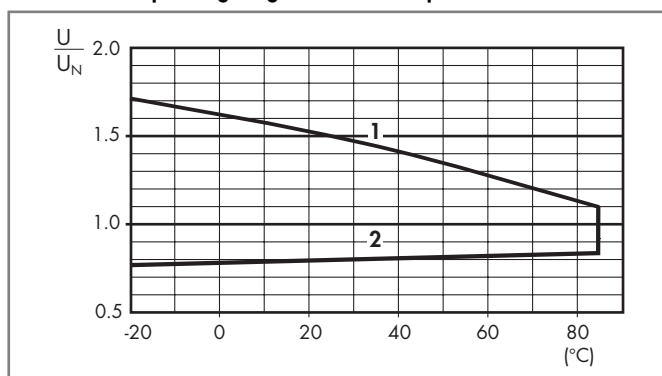
Nominal voltage U_N V	Coil code	Operating range		Resistance R Ω	Rated coil consumption I at U_N (50Hz) mA
		U_{min} V	U_{max} V		
6	8.006	4.8	6.6	12	200
12	8.012	9.6	13.2	50	97
24	8.024	19.2	26.4	190	53
48	8.048	38.4	52.8	770	25
60	8.060	48	66	1,200	21
110	8.110	88	121	4,000	12.5
120	8.120	96	132	4,700	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



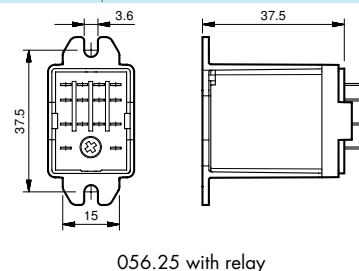
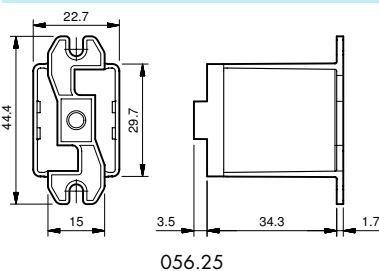
- 1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

Accessories



Top flange mount adaptor for 55.32, 55.33, 55.34

056.25

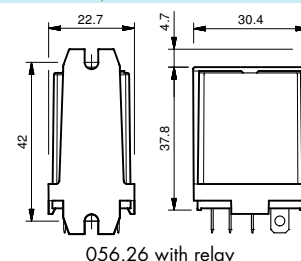
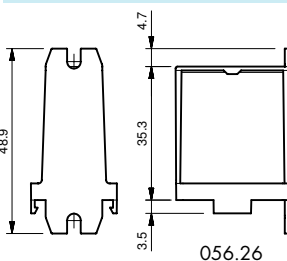


056.25 with relay

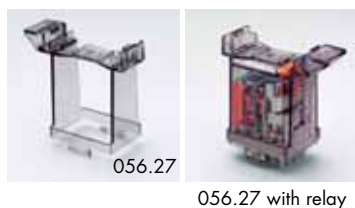


Rear flange mount adaptor for 55.32, 55.33, 55.34

056.26

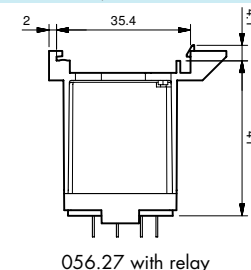
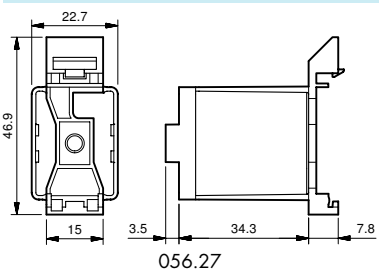


056.26 with relay



Top 35 mm rail (EN 50022) adaptor for 55.32, 55.33, 55.34

056.27



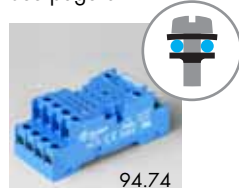
056.27 with relay



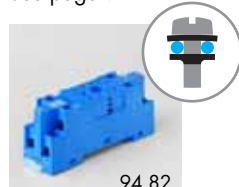
See page 7



See page 8



See page 9



See page 9



See page 10



See page 11



See page 12



See page 12



See page 13

Module	Socket	Relay	Description	Mounting	Accessories
99.02	94.02	55.32	Screw terminal (Box clamp) socket	Panel or 35 mm rail (EN 50022) mount	<ul style="list-style-type: none"> - Coil indication and EMC suppression modules - Jumper link - Timer modules - Plastic retaining and release clip
	94.03	55.33	- Top terminals - Contacts		
	94.04	55.32 55.34	- Bottom terminals - Coil		

Module	Socket	Relay	Description	Mounting	Accessories
99.80	94.54.1	55.32 55.34	Screwless terminal socket	35 mm rail (EN 50022) mount	<ul style="list-style-type: none"> - Coil indication and EMC suppression modules - Plastic retaining and release clip
			<ul style="list-style-type: none"> - For fast cable connections - Top terminals - Contacts - Bottom terminals - Coil 		

Module	Socket	Relay	Description	Mounting	Accessories
99.01	94.72	55.32	Screw terminal (Plate clamp) socket	Panel or 35 mm rail (EN 50022) mount	<ul style="list-style-type: none"> - Coil indication and EMC suppression modules - Metal retaining clip
	94.73	55.33			
	94.74	55.32 55.34			

Module	Socket	Relay	Description	Mounting	Accessories
99.01	94.82	55.32	Screw terminal (Plate clamp) socket	Panel or 35 mm rail (EN 50022) mount	<ul style="list-style-type: none"> - Coil indication and EMC suppression modules - Metal retaining clip
			- 23 mm wide for space saving		

Module	Socket	Relay	Description	Mounting	Accessories
99.80	94.84.2	55.32 55.34	Screw terminal (Box clamp) socket	Panel or 35 mm rail (EN 50022) mount	<ul style="list-style-type: none"> - Coil indication and EMC suppression modules - Jumper link - Plastic retaining and release clip
	94.82.3	55.32			
	94.84.3	55.32 55.34			

Module	Socket	Relay	Description	Mounting	Accessories
99.80	94.92.3	55.32	Screw terminal (Box clamp) socket	Panel or 35 mm rail (EN 50022) mount	<ul style="list-style-type: none"> - Coil indication and EMC suppression modules - Jumper link - Plastic retaining and release clip
	94.94.3	55.32	- Top terminals - Contacts		
		55.34	- Bottom terminals - Coil		

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			

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

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



94.04

Approvals
(according to type):



cULUS Certain relay/socket combinations

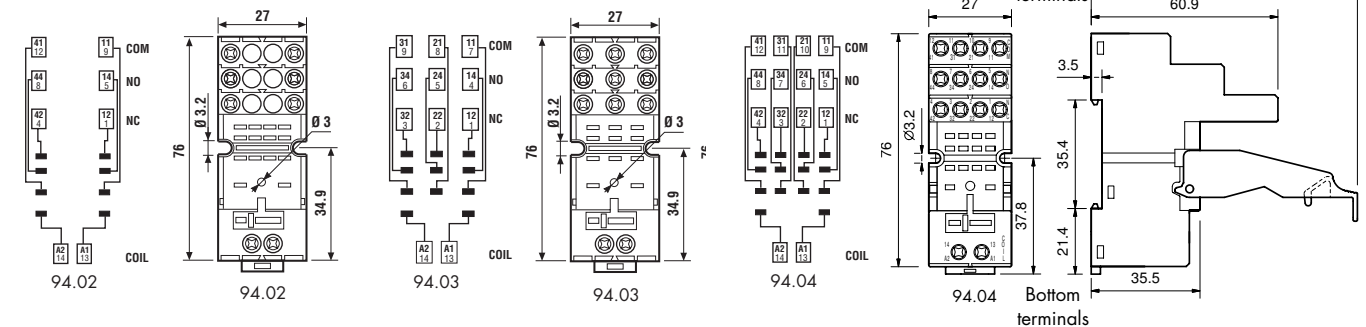


094.91.3



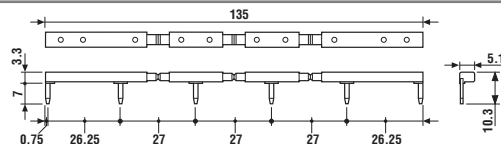
060.72

Screw terminal (Box clamp) socket panel or 35 mm 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		
	mm² 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	



86.30

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

Approvals
(according to type):



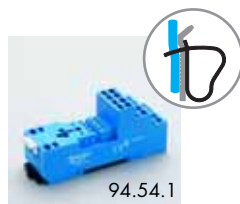
99.02

Approvals
(according to type):

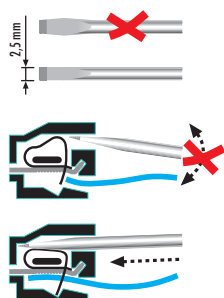
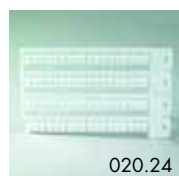


99.02 coil indication and EMC suppression modules for 94.02, 94.03 and 94.04 sockets		
Diode (+A1, standard polarity)	(6...220)V DC	99.02.3.000.00
LED	(6...24)V DC/AC	99.02.0.024.59
LED	(28...60)V DC/AC	99.02.0.060.59
LED	(110...240)V DC/AC	99.02.0.230.59
LED + Diode (+A1, standard polarity)	(6...24)V 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

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



Approvals
(according to type):



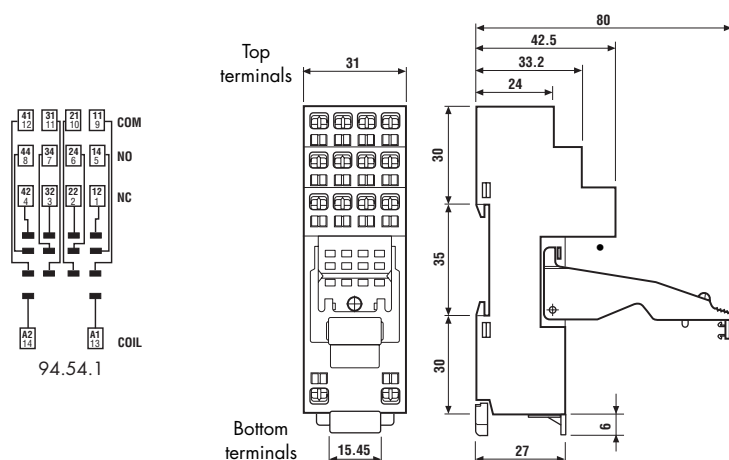
Approvals
(according to type):



* Modules in Black
housing are
available on request.

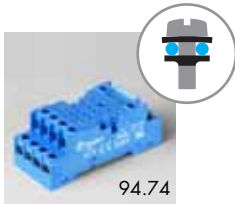
Green LED is standard.
Red LED available
on request.

Screwless terminal socket 35 mm rail (EN 50022) mount		94.54.1 (blue)	94.54.10 (black)
For relay type		55.32, 55.34	
Accessories			
Metal retaining clip			094.71
Plastic retaining and release clip			094.92
Modules (see table below)			99.80
Sheet of marker tags for retaining and release clip 094.92 plastic, 24 tags, 9x17 mm			020.24
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 7	
Max. wire size for 94.54.1 socket		solid wire	stranded wire
		mm ² 2x(0.2...1.5)	2x(0.2...1.5)
		AWG 2x(24...18)	2x(24...18)

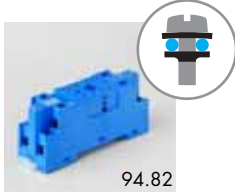


99.80 coil indication and EMC suppression modules for 94.54.1 socket

		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



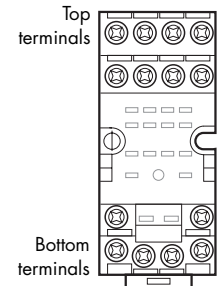
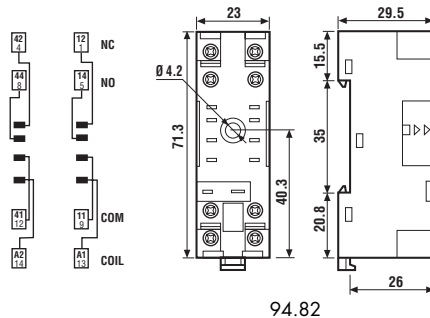
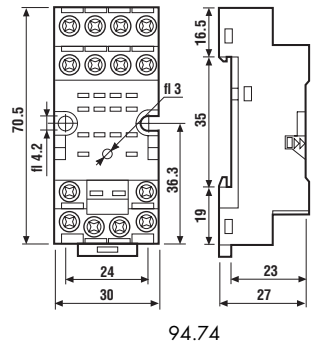
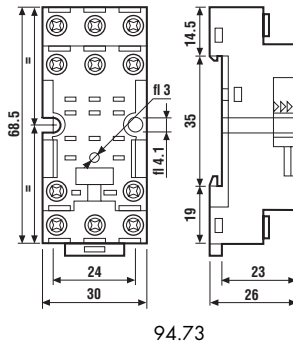
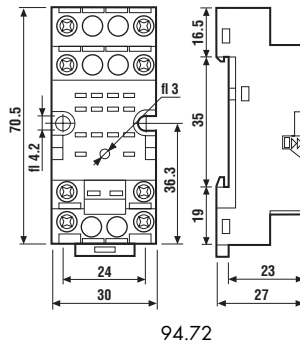
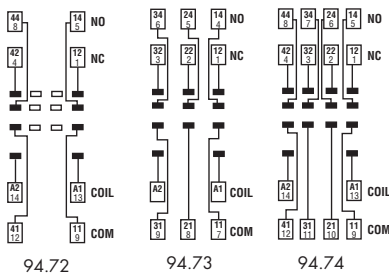
Approvals
(according to type):



Approvals
(according to type):



Screw terminal (Plate clamp) socket panel or 35 mm 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			



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	




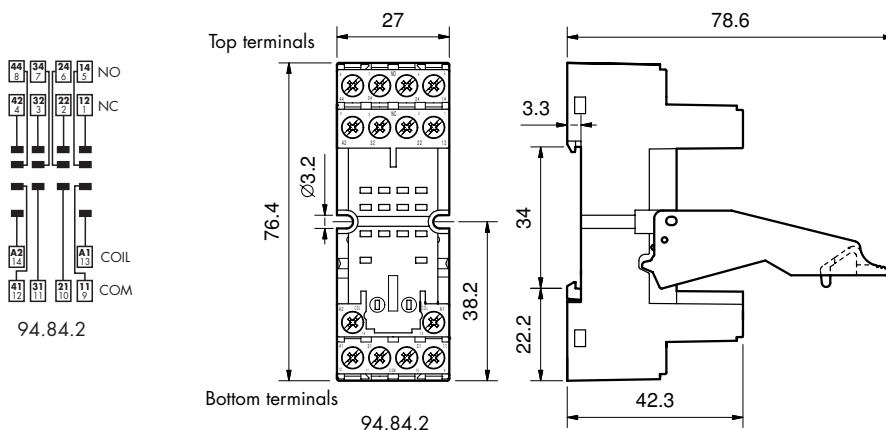
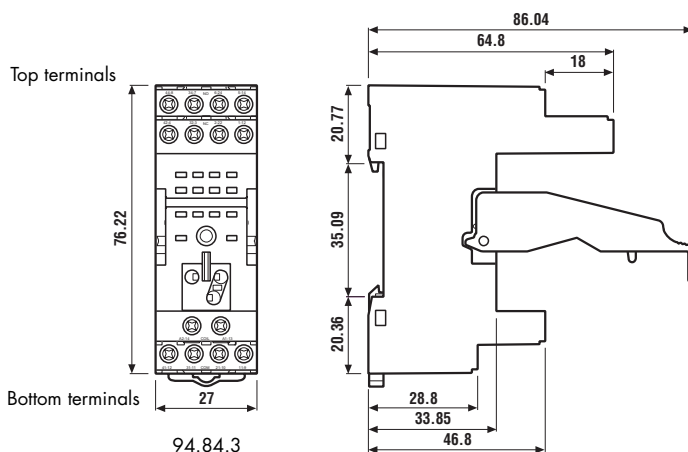
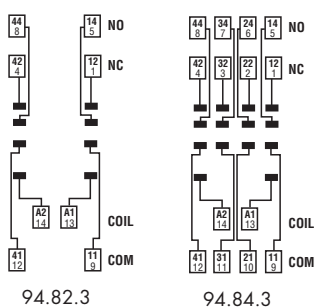
Approvals
(according to type):



Approvals
(according to type):




Screw terminal (Box clamp) socket panel or 35 mm 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			
Screw terminal (Box clamp) socket panel or 35 mm 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			
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

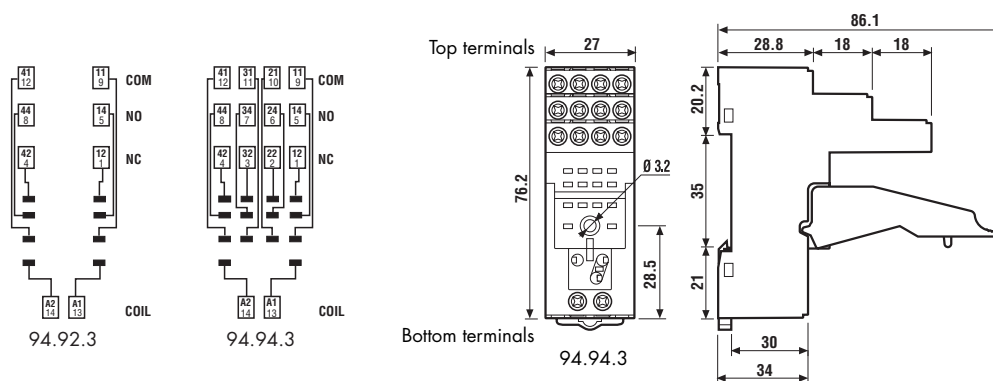




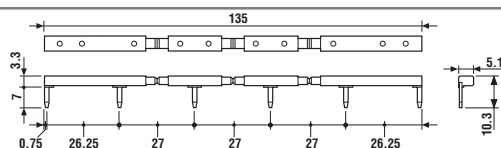
Approvals
(according to type):



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		
		mm²	1x6 / 2x2.5		1x4 / 2x2.5	
		AWG	1x10 / 2x14		1x12 / 2x14	



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	



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

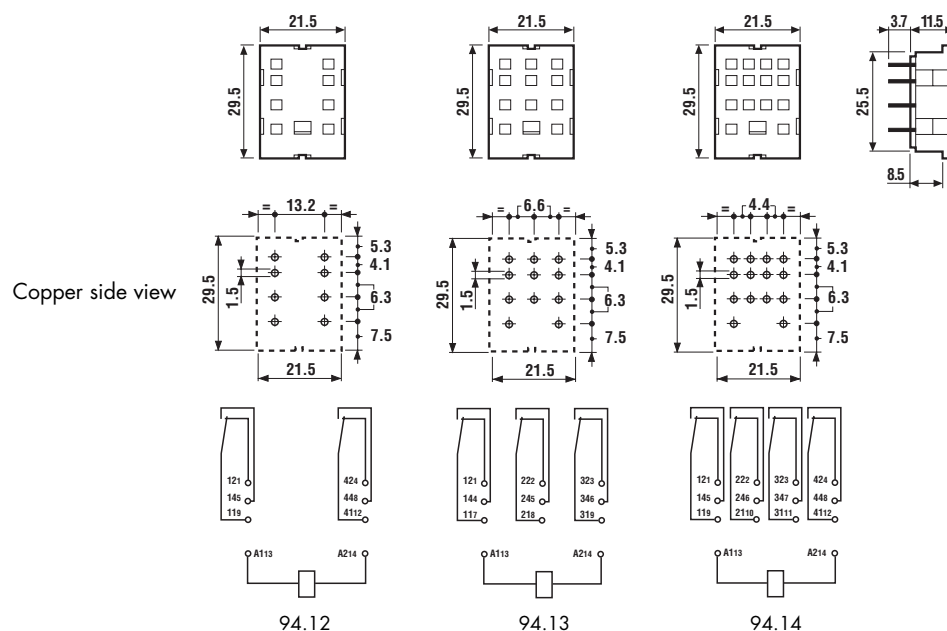


94.14

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					

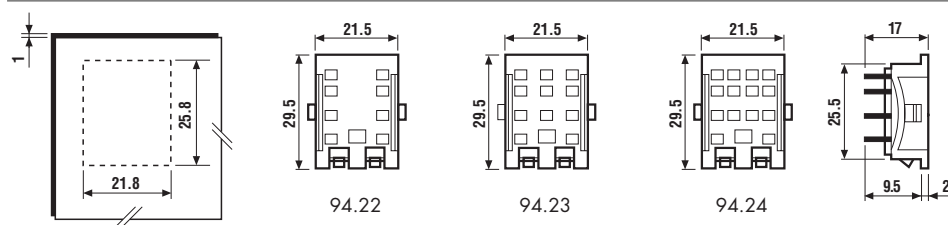


94.22

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					

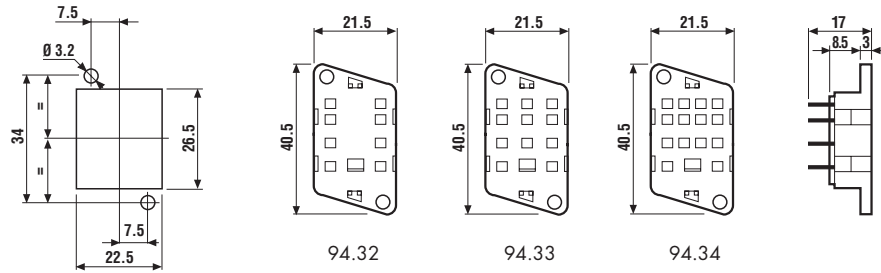




Approvals
(according to type):



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					



Packaging codes

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

Example:

9 4 . 0 4 S P A

A Standard packaging

SM Metal retaining clip
SP Plastic retaining clip

9 4 . 0 4

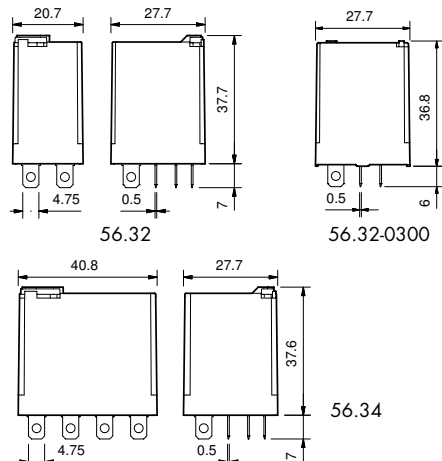
Without retaining clip

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



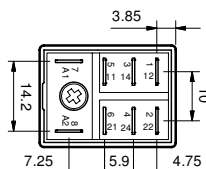
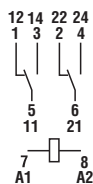
* For 4 CO (4PDT) only.

FOR UL HORSEPOWER AND PILOT DUTY RATINGS
SEE "General technical information" page V

56.32



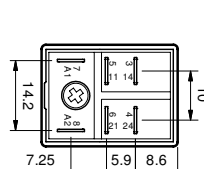
- 2 pole changeover contact
- Plug-in/Faston 187



56.32-0300



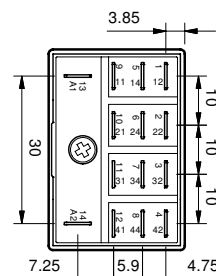
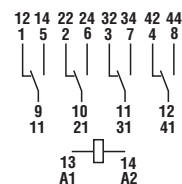
- 2 pole normally open contact (≥ 1.5 mm gap)
- Plug-in/Faston 187



56.34



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



Contact specification

Contact configuration	2 CO (DPDT)	2 NO (DPST-NO) ≥ 1.5 mm gap	4 CO (4PDT)
Rated current/Maximum peak current A	12/20	12/20	12/20
Rated voltage/Maximum switching voltage V AC	250/400	250/400	250/400
Rated load AC1 VA	3,000	3,000	3,000
Rated load AC15 (230 V AC) VA	700	700	700
Single phase motor rating (230 V AC) kW	0.55	0.55	0.55
Breaking capacity DC1: 30/110/220 V A	12/0.5/0.25	12/1/0.5	12/0.5/0.25
Minimum switching load mW (V/mA)	500 (10/5)	500 (10/5)	500 (10/5)
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 - 400*	
	V DC	6-12-24-48-60-110-125-220	6-12-24-48-60-110-125-220
Rated power AC/DC	VA (50 Hz)/W	1.5/1	2/1.3
Operating range	AC	$(0.8 \dots 1.1) U_N$	$(0.8 \dots 1.1) U_N$
	DC	$(0.8 \dots 1.1) U_N$	$(0.8 \dots 1.1) U_N$
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	$20 \cdot 10^6 / 50 \cdot 10^6$	$20 \cdot 10^6 / \text{—}$	$20 \cdot 10^6 / 50 \cdot 10^6$
Electrical life at rated load AC1	cycles	$200 \cdot 10^3$	$200 \cdot 10^3$	$150 \cdot 10^3$
Operate/release time	ms	8/8	8/8	8/8
Insulation between coil and contacts (1.2/50 μ s)	kV	4	4	5
Dielectric strength between open contacts	V AC	1,000	2,000	1,000
Ambient temperature range	°C	-40...+70	-40...+70	-40...+70
Environmental protection		RT I	RT I	RT I

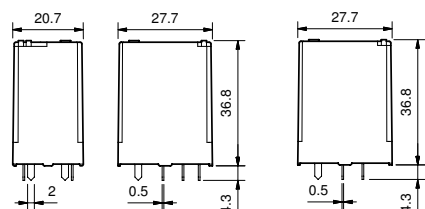
Approvals (according to type)



Features

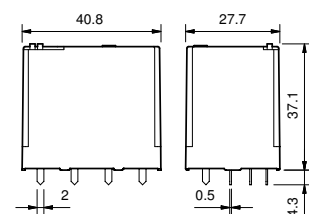
Printed circuit mount 12 A Power relay

- 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 HORSEPOWER AND PILOT DUTY RATINGS
SEE "General technical information" page V

Contact specification

Contact configuration	2 CO (DPDT)	2 NO (DPST-NO) - ≥ 1.5 mm gap	4 CO (4PDT)
Rated current/Maximum peak current A	12/20	12/20	12/20
Rated voltage/Maximum switching voltage V AC	250/400	250/400	250/400
Rated load AC1 VA	3,000	3,000	3,000
Rated load AC15 (230 V AC) VA	700	700	500
Single phase motor rating (230 V AC) kW	0.55	0.55	0.55
Breaking capacity DC1: 30/110/220 V A	12/0.5/0.25	12/1/0.5	12/0.25/0.12
Minimum switching load mW (V/mA)	500 (10/5)	500 (10/5)	500 (10/5)
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 - 400*		
	V DC	6-12-24-48-60-110-125-220	—	6-12-24-48-60-110-125-220
Rated power AC/DC	VA (50 Hz)/W	1.5/1	1.5/—	2/1.3
Operating range	AC	(0.8...1.1)U _N	(0.85...1.1)U _N	(0.8...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 /—	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 /—	0.2 U _N /0.1 U _N

Technical data

Mechanical life AC/DC	cycles	$20 \cdot 10^6 / 50 \cdot 10^6$	$20 \cdot 10^6 / —$	$20 \cdot 10^6 / 50 \cdot 10^6$
Electrical life at rated load AC1	cycles	$200 \cdot 10^3$	$200 \cdot 10^3$	$150 \cdot 10^3$
Operate/release time	ms	8/8	8/8	8/8
Insulation between coil and contacts (1.2/50 μ s)	kV	4	4	5
Dielectric strength between open contacts	V AC	1,000	2,000	1,000
Ambient temperature range	°C	-40...+70	-40...+70	-40...+70
Environmental protection		RT I	RT I	RT I

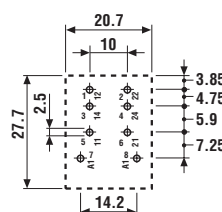
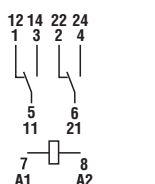
Approvals (according to type)



56.42



- 2 pole changeover contact
- PCB mount

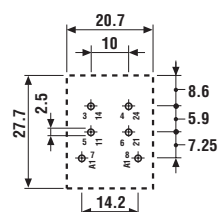


Copper side view

56.42-0300



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

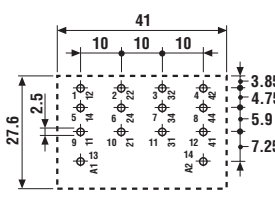
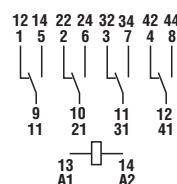


Copper side view

56.44



- 4 pole changeover contact
- PCB mount



Copper side view

Ordering information

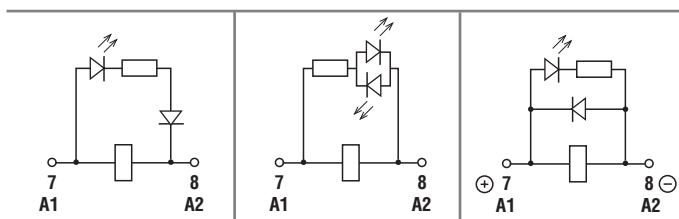
Example: 56 series plug-in relay, 2 CO (DPDT), 12 V DC coil, lockable test button and mechanical indicator.

<p>Series ———</p> <p>Type ——— 3 = Plug-in 4 = PCB</p> <p>No. of poles ——— 2 = 2 pole, 12 A 4 = 4 pole, 12 A</p> <p>Coil version ——— 8 = AC (50/60 Hz) 9 = DC</p> <p>Coil voltage ——— See coil specifications</p>	<p>A: Contact material 0 = Standard AgNi 2 = AgCdO 4 = AgSnO₂</p> <p>B: Contact circuit 0 = CO (nPDT) 3 = NO (nPST), ≥ 1.5 mm contact gap (2 pole only)</p>	<p>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</p> <p>* Options not available for 220 V DC and 400 V AC versions.</p>
---	--	--

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
	AC	0 - 2 - 4	0	54	/
	DC	0 - 2 - 4	0	0 - 2 - 4 - 6 - 7	0
	DC	0 - 2 - 4	0	74	/
56.42	AC-DC	0 - 2 - 4	0	0	0 - 1
	AC	0 - 2 - 4	3	0	0 - 1
56.44	AC-DC	0 - 2 - 4	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 7) - (56.32 only)



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.

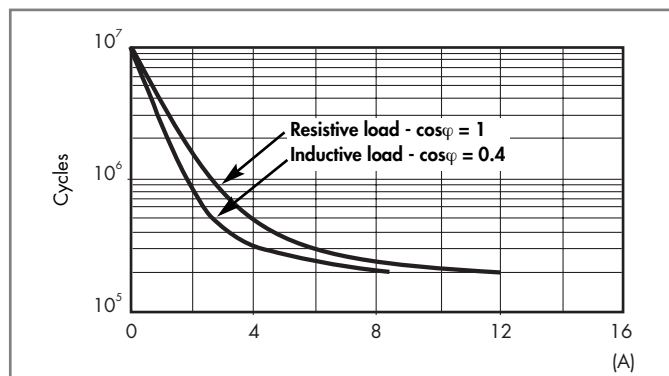
Technical data

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

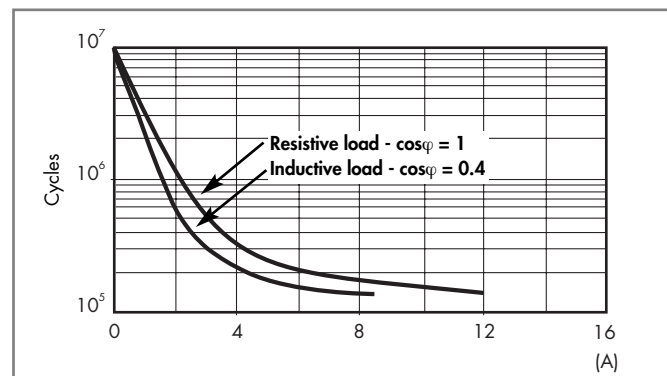
Insulation according to EN 61810-1:2004		2 CO - 4 CO		2 NO	
Nominal voltage of supply system	V AC	230/400		230/400	
Rated insulation voltage	V AC	250	400	250	400
Pollution degree		3	2	3	2
Insulation between coil and contact set					
Type of insulation		Basic		Basic	
Overvoltage category		III		III	
Rated impulse voltage	kV (1.2/50 μ s)	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 μ s)	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 μ s)	—		2.5	
Dielectric strength	V AC/(1.2/50 μ s)	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 μ s) on A1 - A2 (differential mode)		EN 61000-4-5		level 4 (4 kV)	
Other data					
Bounce time: NO/NC	ms	1/3 (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)
	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

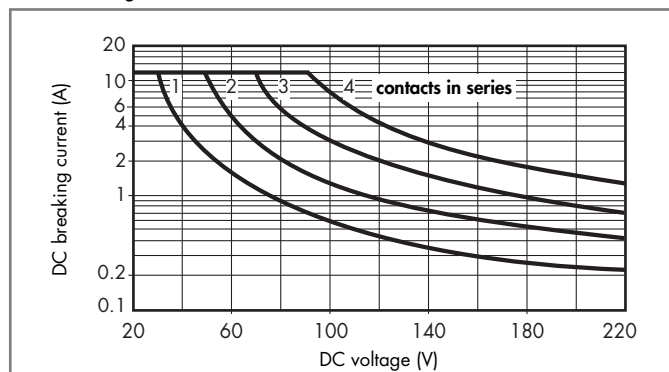
F 56 - Electrical life (AC) v contact current
2 pole relays



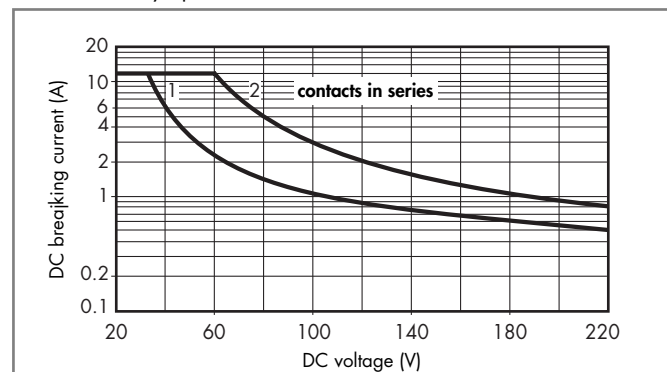
F 56 - Electrical life (AC) v contact current
4 pole relays



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 $\geq 100 \cdot 10^3$ 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 V	Coil code	Operating range		Resistance R Ω	Rated coil consumption I at U_N mA
		U_{min} V	U_{max} V		
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	137.5	17,300	7.2
220	9.220	176	242	54,000	4

AC coil data, 2 pole relay

Nominal voltage U_N V	Coil code	Operating range		Resistance R Ω	Rated coil consumption I at U_N [50Hz] mA
		U_{min}^* V	U_{max} V		
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.

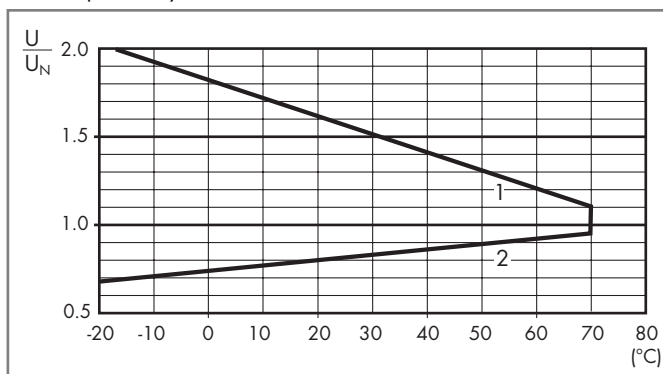
DC coil data, 4 pole relay

Nominal voltage U_N V	Coil code	Operating range		Resistance R Ω	Rated coil consumption I at U_N mA
		U_{min} V	U_{max} V		
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	137.5	14,200	8.8
220	9.220	187	242	44,000	5

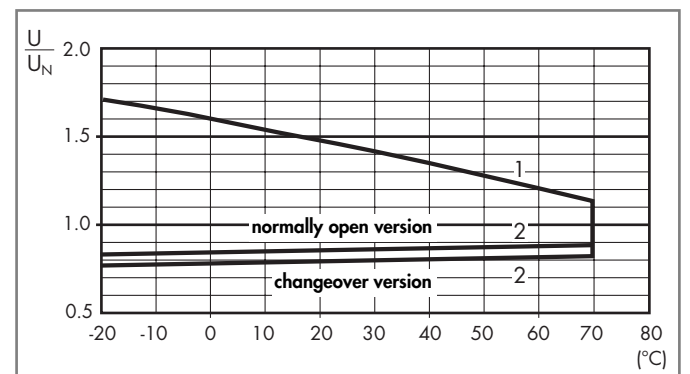
AC coil data, 4 pole relay

Nominal voltage U_N V	Coil code	Operating range		Resistance R Ω	Rated coil consumption I at U_N [50Hz] mA
		U_{min} V	U_{max} V		
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

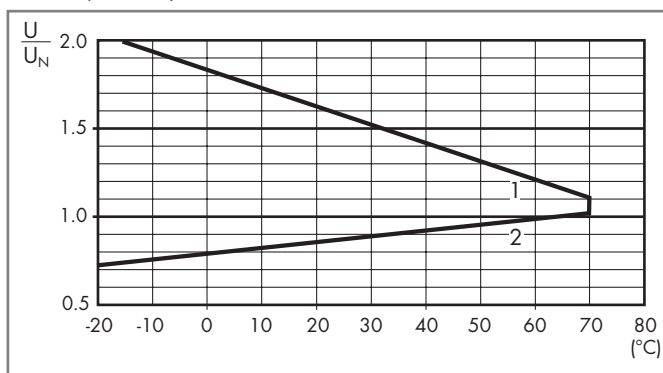
R 56 - DC coil operating range v ambient temperature 2 pole relay



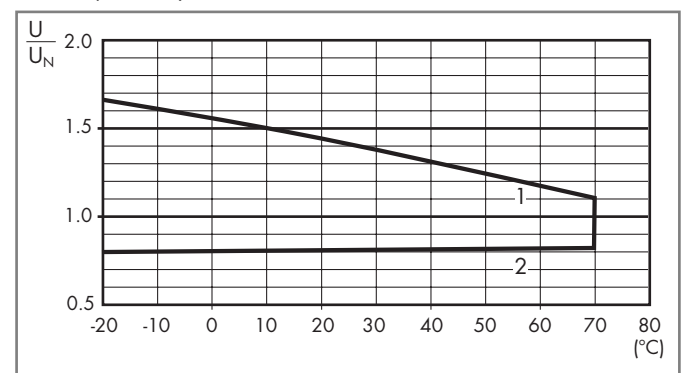
R 56 - AC coil operating range v ambient temperature 2 pole relay



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.

Accessories



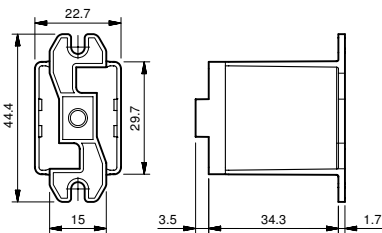
056.25



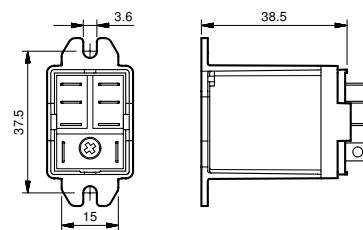
056.25 with relay

Top flange mount adaptor for 56.32

056.25



056.25



056.25 with relay



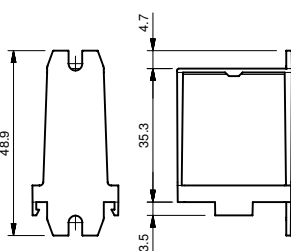
056.26



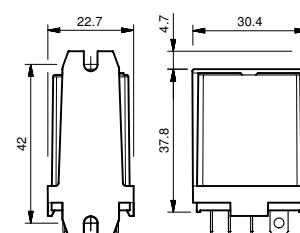
056.26 with relay

Rear flange mount adaptor for 56.32

056.26



056.26



056.26 with relay



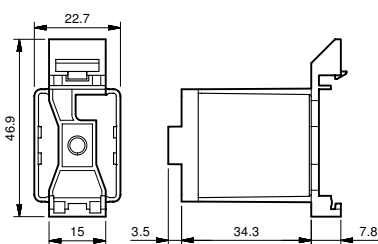
056.27



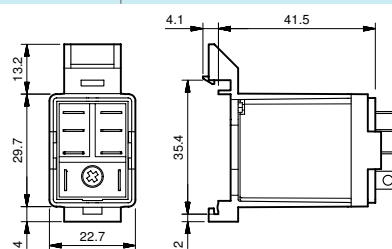
056.27 with relay

Top 35 mm rail (EN 50022) adaptor for 56.32

056.27



056.27



056.27 with relay



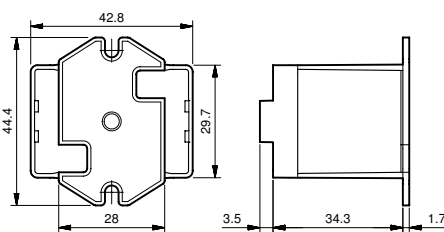
056.45



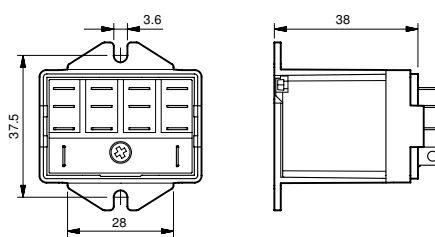
056.45 with relay

Top flange mount adaptor for 56.34

056.45



056.45



056.45 with relay



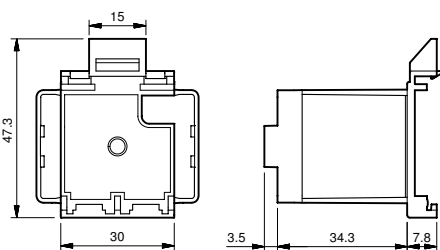
056.47



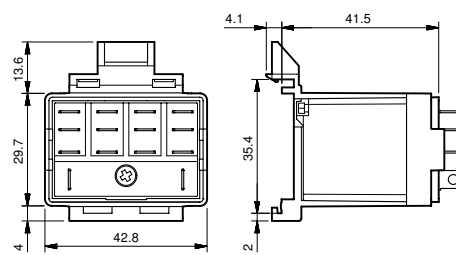
056.47 with relay

Top 35 mm rail (EN 50022) adaptor for 56.34

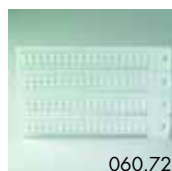
056.47



056.47



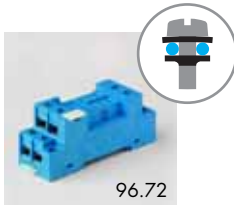
056.47 with relay



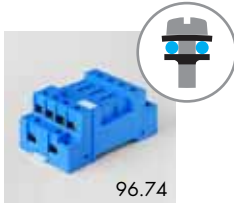
060.72

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

060.72




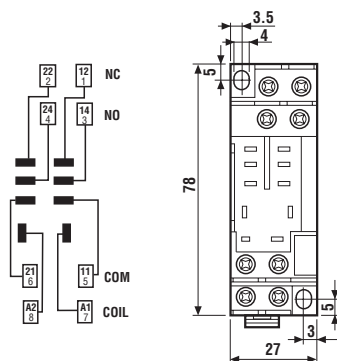
Approvals
(according to type):



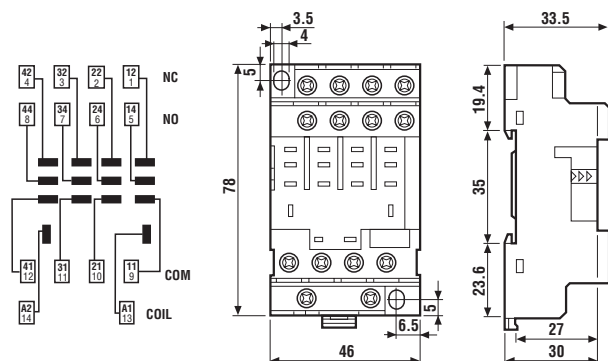
Approvals
(according to type):



Screw terminal (Plate clamp) socket		96.72	96.72.0	96.74	96.74.0	
panel or 35 mm rail (EN 50022) mount		Blue	Black	Blue	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		
		mm²	1x4 / 2x4		1x4 / 2x2.5	
		AWG	1x12 / 2x12		1x12 / 2x14	



96.72



96.74



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.

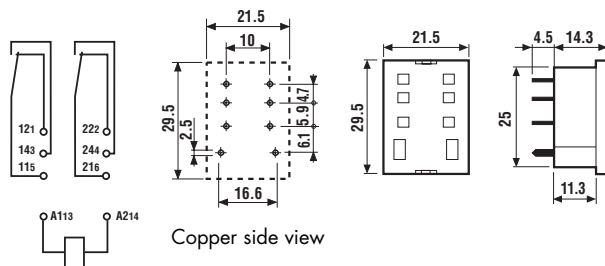


96.12

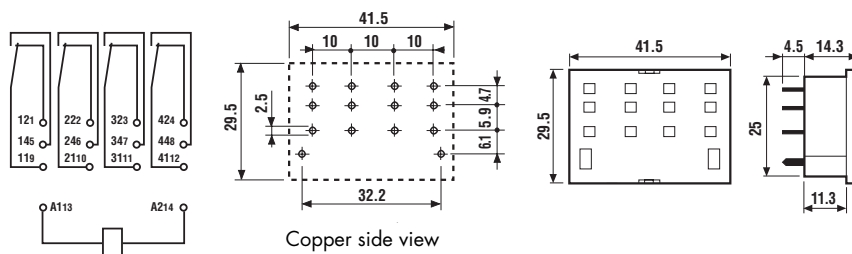
Approvals
(according to type):



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			



96.12



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

9 6 . 7 4

Without retaining clip

Features

Plug-in mount

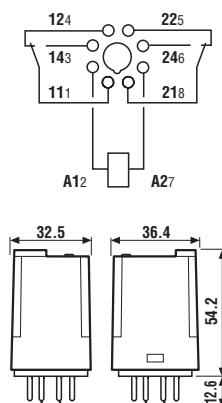
10 A General purpose relay

- 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

60.12



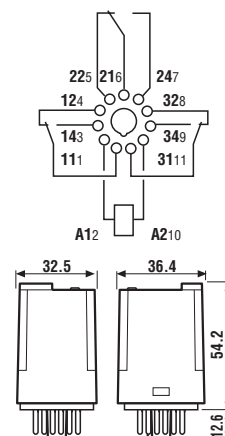
- 2 pole, 10 A power contacts
- 8 pin plug-in



60.13



- 3 pole, 10 A power contacts
- 11 pin plug-in



FOR UL HORSEPOWER AND PILOT DUTY RATINGS
SEE "General technical information" page V

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 · 10 ⁶ /50 · 10 ⁶	20 · 10 ⁶ /50 · 10 ⁶
Electrical life at rated load AC1 cycles	200 · 10 ³	200 · 10 ³
Operate/release time ms	9/9	9/9
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

Plug-in mount - 6 A

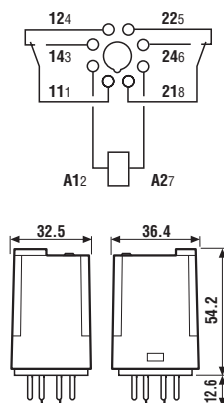
Bifurcated contacts for low level switching

- 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

60.12 - 5200



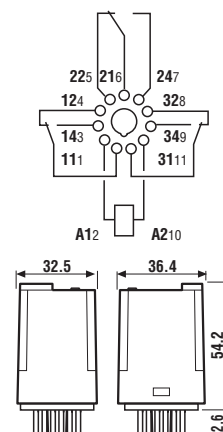
- 2 pole, 6 A bifurcated contacts
- 8 pin plug-in



60.13 - 5200



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



FOR UL HORSEPOWER AND PILOT DUTY RATINGS
SEE "General technical information" page V

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 (5 µm) bifurcated contacts	AgNi + Au (5 µm) 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 · 10 ⁶ /50 · 10 ⁶	20 · 10 ⁶ /50 · 10 ⁶
Electrical life at rated load AC1	cycles	250 · 10 ³	250 · 10 ³
Operate/release time	ms	9/9	9/9
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

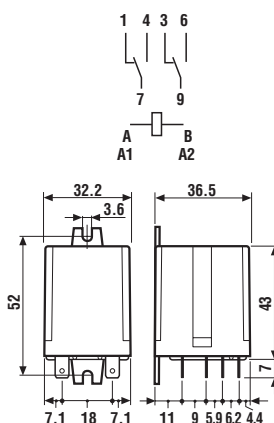
Flange mount - General purpose relay 10 A

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

60.62



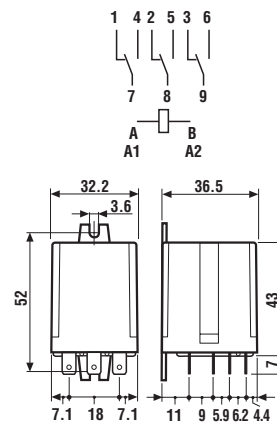
- 2 pole, 10 A power contacts
- Flange mount/Faston 187



60.63



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



FOR UL HORSEPOWER AND PILOT DUTY RATINGS
SEE "General technical information" page V

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
Operating range	AC	$(0.8 \dots 1.1) U_N$
	DC	$(0.8 \dots 1.1) U_N$
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	$200 \cdot 10^3$
Operate/release time	ms	9/9
Insulation between coil and contacts (1.2/50 μ s) kV		4
Dielectric strength between open contacts V AC		1,000
Ambient temperature range	°C	-40...+70
Environmental protection		RT I

Approvals (according to type)



Ordering information

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

6	0	.	1	.	3	.	9	.	0	1	2	.	0	A	0	B	0	C	4	D	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
 2 = AgCdO
 5 = AgNi + Au (5 µm)

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

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

D: Special versions
 0 = Standard

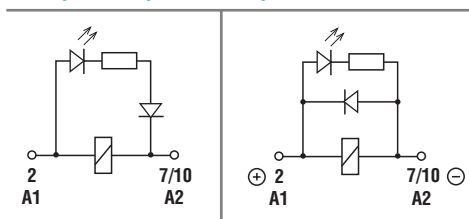
* Options not available for 220 V DC and 400 V AC versions.

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

Preferred selections for best availability are shown in **bold**.

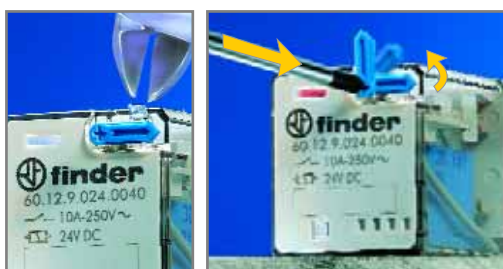
Type	Coil version	A	B	C	D
60.12/13	AC	0 - 2	0	0 - 2 - 3 - 4 - 5	0
	AC	0 - 2	0	54	/
	AC	5	0 - 2	0 - 2 - 3 - 4 - 5	0
	AC	5	0 - 2	54	/
	DC	0 - 2	0	0 - 2 - 4 - 6 - 7	0
	DC	0 - 2	0	74	/
	DC	5	0 - 2	0 - 2 - 4 - 6 - 7	0
	DC	5	0 - 2	74	/
	current sensing	0	0	4	0
60.62/63	AC-DC	0 - 2 - 5	0	0	0

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)

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.

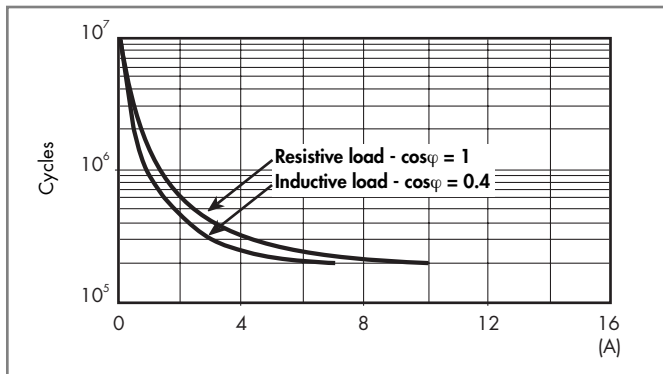
In both cases ensure that the test button actuation is swift and decisive.

Technical data

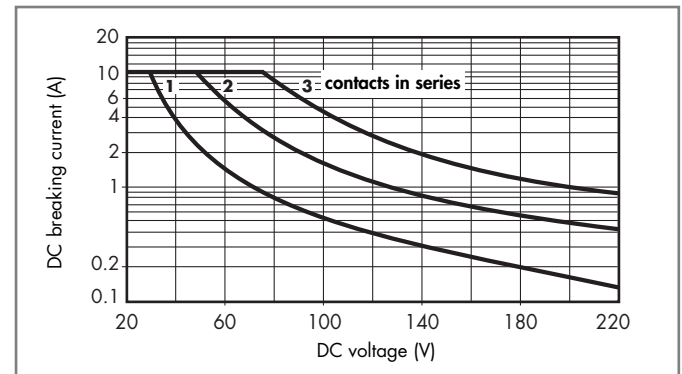
Insulation according to EN 61810-1:2004		2 pole		3 pole	
Nominal voltage of supply system	V AC	230/400		230/400	
Rated insulation voltage	V AC	250	400	250	400
Pollution degree		3	2	3	2
Insulation between coil and contact set					
Type of insulation		Basic		Basic	
Overvoltage category		III		III	
Rated impulse voltage	kV (1.2/50 μ s)	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 μ s)	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 μ s)	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 μ s) on A1 - A2 (differential mode)		EN 61000-4-5		level 4 (4 kV)	
Other data					
Bounce time: NO/NC	ms	2/4			
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	
	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 $\geq 100 \cdot 10^3$ 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

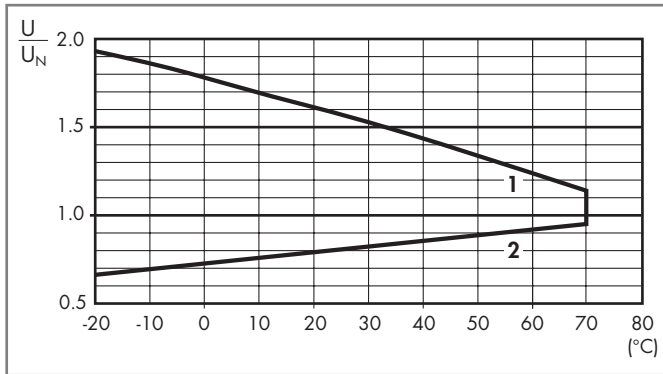
Nominal voltage U_N V	Coil code	Operating range		Resistance R Ω	Rated coil consumption I at U_N mA
		U_{min} V	U_{max} V		
6	9.006	4.8	6.6	28	214
12	9.012	9.6	13.2	110	109
24	9.024	19.2	26.4	445	53.9
48	9.048	38.4	52.8	1,770	27.1
60	9.060	48	66	2,760	21.7
110	9.110	88	121	9,420	11.7
125	9.125	100	137.5	12,000	10.4
220	9.220	176	242	37,300	5.8

AC coil data

Nominal voltage U_N V	Coil code	Operating range		Resistance R Ω	Rated coil consumption I at U_N (50Hz) mA
		U_{min} V	U_{max} V		
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

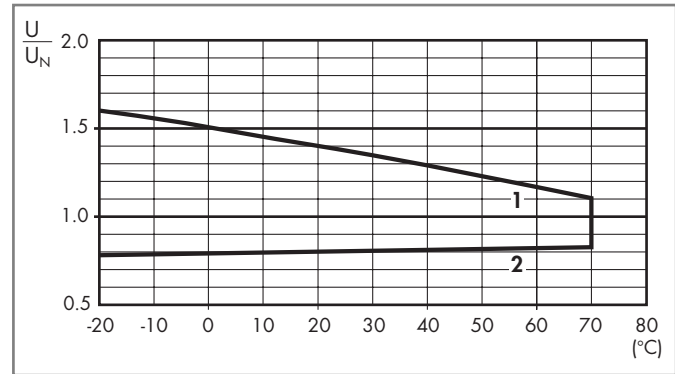
Coil specifications

R 60 - DC coil operating range v ambient temperature



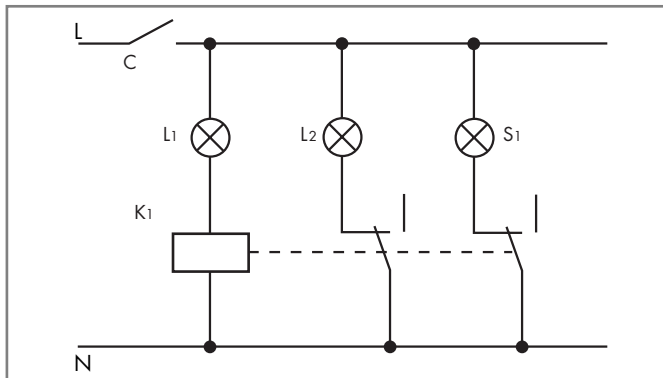
- 1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

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 filament 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



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 (EN 50022) mount	<ul style="list-style-type: none"> - Coil indication and EMC suppression modules - Jumper link - Timer modules - Metal retaining clip
	90.03	60.13	Double A1 terminal		



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 (EN 50022) mount	<ul style="list-style-type: none"> - Coil indication and EMC suppression modules - Metal retaining clip
	90.21	60.13			



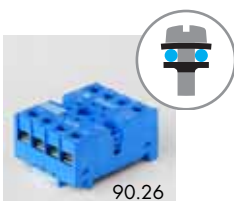
See page 10

Module	Socket	Relay	Description	Mounting	Accessories
—	90.82.3	60.12	Screw terminal (Box clamp) socket	Panel or 35 mm rail (EN 50022) mount	- Metal retaining clip
—	90.83.3	60.13			



See page 10

Module	Socket	Relay	Description	Mounting	Accessories
—	90.22	60.12	Screw terminal (Box clamp) socket	Panel or 35 mm rail (EN 50022) mount	- Metal retaining clip
—	90.23	60.13			



See page 11

Module	Socket	Relay	Description	Mounting	Accessories
—	90.26	60.12	Screw terminal (Plate clamp) socket	Panel or 35 mm rail (EN 50022) mount	- Metal retaining clip
—	90.27	60.13			



See page 11

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



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			

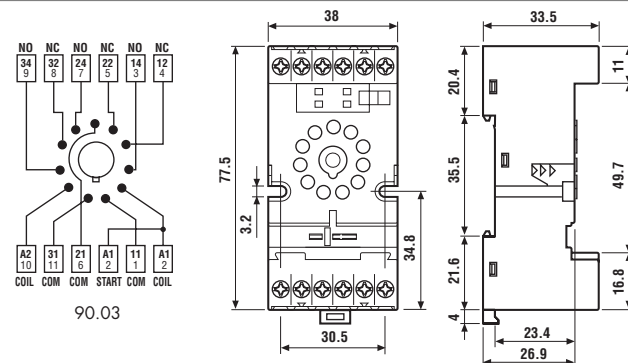
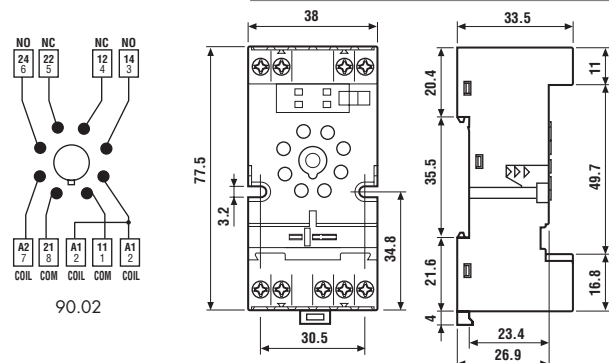


Approvals
(according to type):



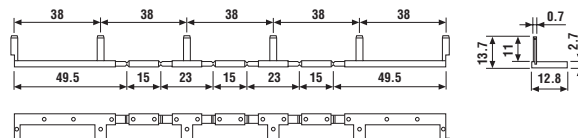
UL US Certain relay/socket combinations

Screw terminal (Box clamp) socket panel or 35 mm rail (EN 50022) mount For relay type	90.02 Blue	90.02.0 Black	90.03 Blue	90.03.0 Black
	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	



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

Approvals
(according to type):



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
(230...240)V AC; Bi-function: AI, DI; (0.05 s...100 h)	86.30.8.240.0000

Approvals (according to type):



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

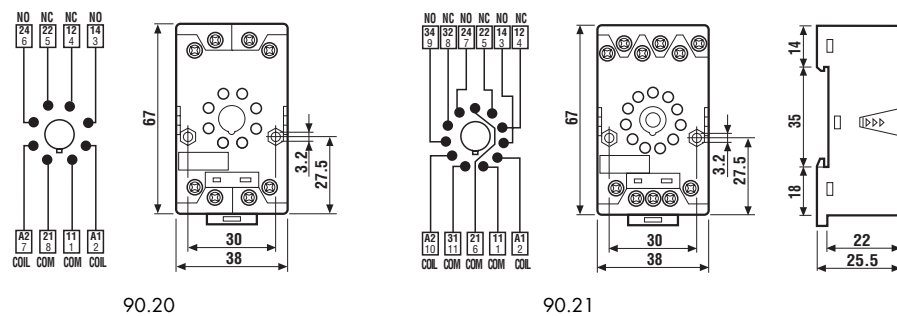
DC Modules with
non-standard polarity
(+A2) on request.



Approvals
(according to type):



Screw terminal (Box clamp) socket panel or 35 mm rail (EN 50022) 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	
	mm²	1x6 / 2x2.5		1x6 / 2x2.5
	AWG	1x10 / 2x14		1x10 / 2x14



Approvals
(according to type):



* Modules in Black
housing are
available on request.


Green LED is standard.
Red LED available on
request.

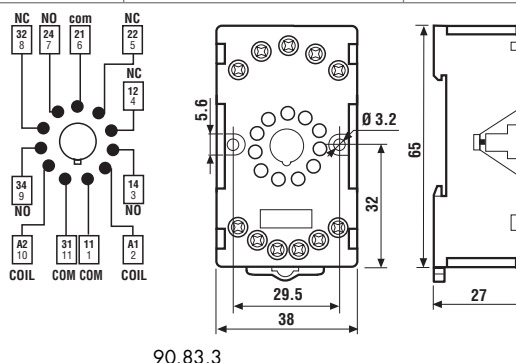
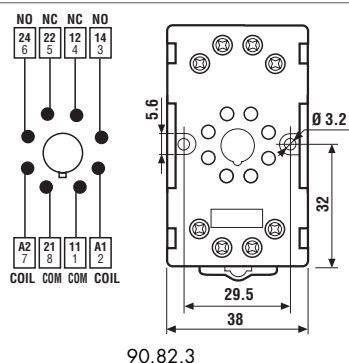
99.01 coil indication and EMC suppression modules for 90.20 and 90.21 sockets			Blue*
Diode (+A1, standard polarity)	(6...220)V DC	99.01.3.000.00	
Diode (+A2, non-standard polarity)	(6...220)V DC	99.01.2.000.00	
LED	(6...24)V DC/AC	99.01.0.024.59	
LED	(28...60)V DC/AC	99.01.0.060.59	
LED	(110...240)V 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	



Approvals
(according to type):




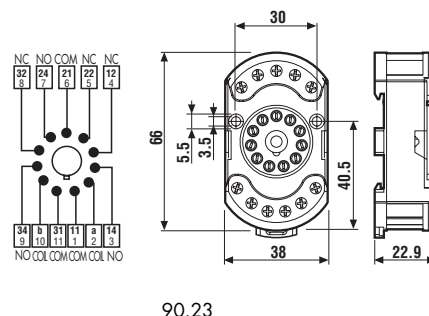
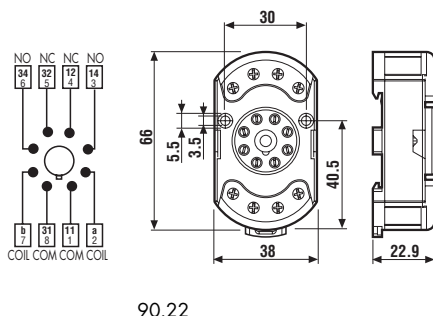
Screw terminal (Box clamp) socket panel or 35 mm rail (EN 50022) mount	90.82.3 Blue	90.82.30 Black	90.83.3 Blue	90.83.30 Black
For relay type	60.12		60.13	
Accessories				
Metal retaining clip	090.33			
Technical data				
Rated values	10 A - 250 V			
Dielectric strength	2 kV AC			
Protection category	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	

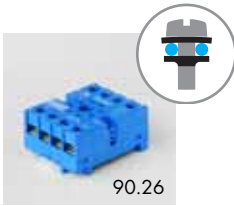


Approvals
(according to type):



Screw (Box clamp) terminal socket panel or 35 mm rail (EN 50022) 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




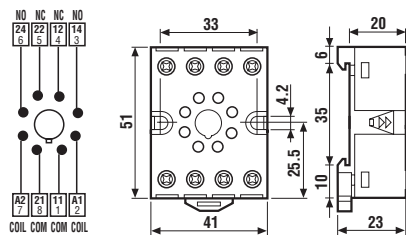


90.26

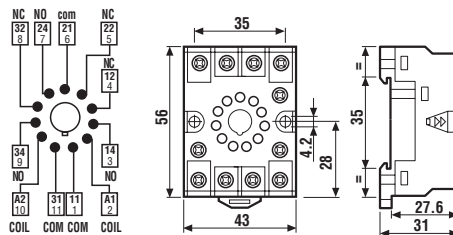
Approvals
(according to type):



Screw terminal (Plate clamp) socket	90.26	90.26.0	90.27	90.27.0
panel or 35 mm rail (EN 50022) mount	Blue	Black	Blue	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	
	mm² 1x4 / 2x2.5		1x4 / 2x2.5	
	AWG 1x12 / 2x14		1x12 / 2x14	



90.26



90.27

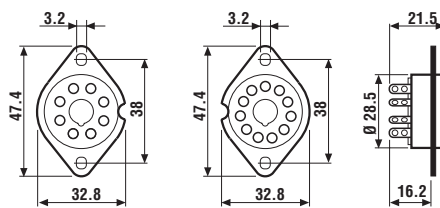


90.12

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

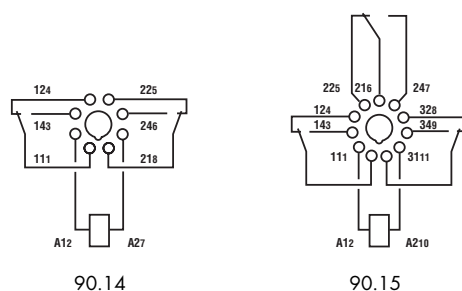
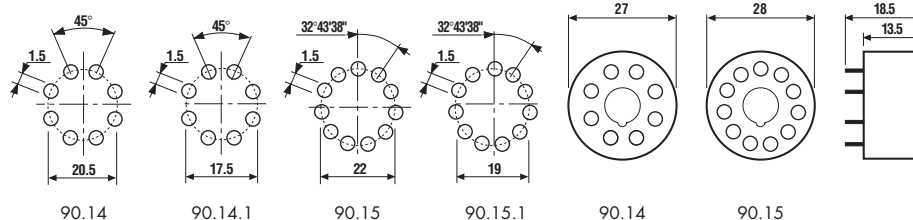


90.15

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	



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

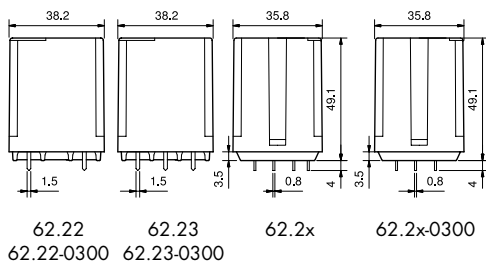
9 0 . 2 1

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



* 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 HORSEPOWER AND PILOT DUTY RATINGS
SEE "General technical information" page V

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/—	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	$(0.8 \dots 1.1) U_N$	
	DC	$(0.8 \dots 1.1) U_N$	
Holding voltage	AC/DC	$0.8 U_N / 0.6 U_N$	
Must drop-out voltage	AC/DC	$0.2 U_N / 0.1 U_N$	

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	10/10	20/4
Insulation between coil and contacts (1.2/50 μ s)	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

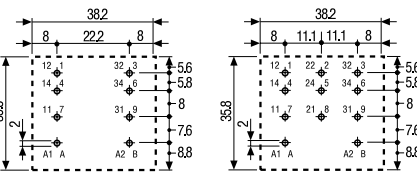
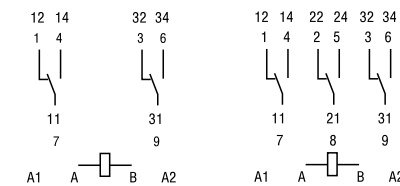
Approvals (according to type)



62.22 / 62.23



- 2 & 3 pole changeover contact
- PCB mount



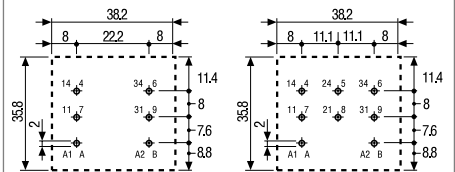
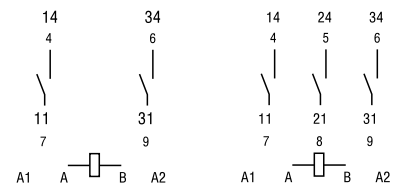
62.22
Copper side view

62.23
Copper side view

62.22-0300 / 62.23-0300



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



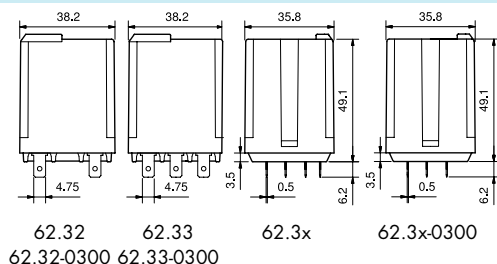
62.22 - 0300
Copper side view

62.23 - 0300
Copper side view

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



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

** With the AgSnO₂ material the maximum peak current is 120 A - 5 ms (NO contact).

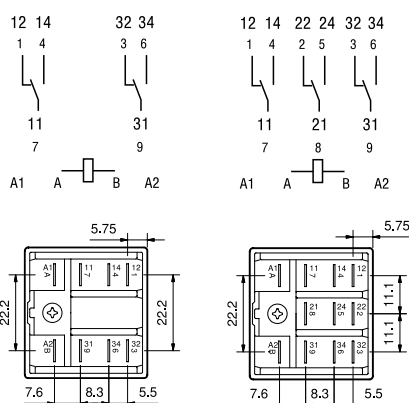
FOR UL HORSEPOWER AND PILOT DUTY RATINGS
SEE "General technical information" page V

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 · 10 ⁶ /30 · 10 ⁶		10 · 10 ⁶ /30 · 10 ⁶	
Electrical life at rated load AC1	cycles	100 · 10 ³		100 · 10 ³	
Operate/release time	ms	10/10		20/4	
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 SF PG   RINA   			

62.32 / 62.33



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



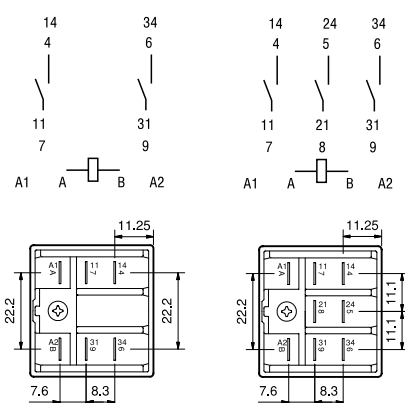
62.32

62.33

62.32-0300 / 62.33-0300



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



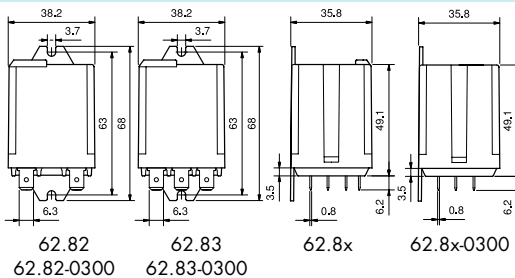
62.32-0300

62.33-0300

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



* 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 HORSEPOWER AND PILOT DUTY RATINGS
SEE "General technical information" page V

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 · 10 ⁶ /30 · 10 ⁶	10 · 10 ⁶ /30 · 10 ⁶
Electrical life at rated load AC1	cycles	100 · 10 ³	100 · 10 ³
Operate/release time	ms	10/10	20/4
Insulation between coil and contacts (1.2/50 μ s)	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

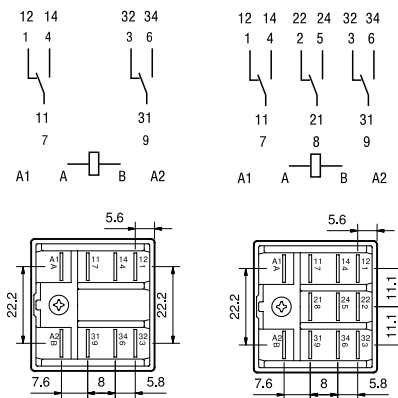
Approvals (according to type)



62.82 / 62.83



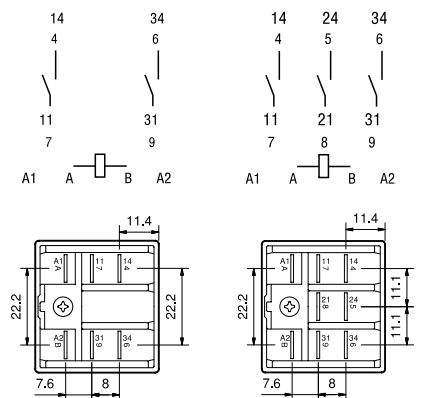
- 2 & 3 pole changeover contact
- Flange mount / Faston 250



62.82-0300 / 62.83-0300



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



Ordering information

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

<p>Series — 6 2 . 8 2 . 9 . 0 1 2 . 0 3 0 0</p> <p>Type — 2 = PCB 3 = Plug-in 8 = Faston 250 (6.3x0.8 mm) with rear flange mount</p> <p>No. of poles — 2 = 2 pole 3 = 3 pole</p> <p>Coil version — 8 = AC (50/60 Hz) 9 = DC</p> <p>Coil voltage — See coil specifications</p>	<p>A: Contact material 0 = Standard AgCdO 4 = AgSnO₂</p> <p>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)</p>	<p>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</p> <p>* Options not available for 220 V DC and 400 V AC versions.</p>	<p>D: Special versions 0 = Standard 5 = Top flange mount 6 = Rear flange mount 7 = Top 35 mm rail (EN 50022) mount 8 = Rear 35 mm rail (EN 50022) mount 9 = Type 62.82/83 without rear flange mount</p>
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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 - 5 - 6 - 7 - 8
	AC-DC	0 - 4	0 - 5	2 - 4	0 - 6 - 8
	AC	0 - 4	0	2 - 3 - 4 - 5	0 - 6 - 8
	AC	0 - 4	0 - 3	3	0 - 6 - 8
	AC	0 - 4	0	54	/
	DC	0 - 4	0	4 - 6 - 7	0 - 6 - 8
	DC	0 - 4	0 - 3	6	0 - 6 - 8
	DC	0 - 4	0	74	/
62.82/83	AC-DC	0 - 4	0 - 3 - 5 - 6	0	0 - 5 - 7 - 8 - 9
	AC-DC	0 - 4	0 - 5	2 - 4	0 - 8
	AC	0 - 4	0	2 - 3 - 4 - 5	0 - 8
	AC	0 - 4	0 - 3	3	0 - 8
	DC	0 - 4	0	4 - 6 - 7	0 - 8
	DC	0 - 4	0 - 3	6	0 - 8

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)	D: Special versions 5 Top flange mount	D: Special versions 7 Top 35 mm rail (EN 50022) mount	B: Contact circuit 5, 6 Additional physical separator between coil and contacts (for SELV applications)



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.

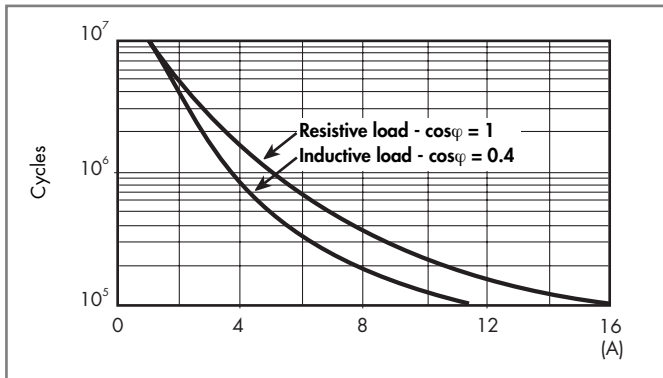
Technical data

Insulation according to EN 61810-1:2004

		2 CO - 3 CO		2 NO - 3 NO	
Nominal voltage of supply system	V AC	230/400		230/400	
Rated insulation voltage	V AC	400		400	
Pollution degree		3		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		6	
Dielectric strength	V AC	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	2,500		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	3/6 (changeover)		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)
	without contact current	W	1.3	3	3
	with rated current	W	3.3	5	6
Recommended distance between relays mounted on PCB	mm	≥ 5			

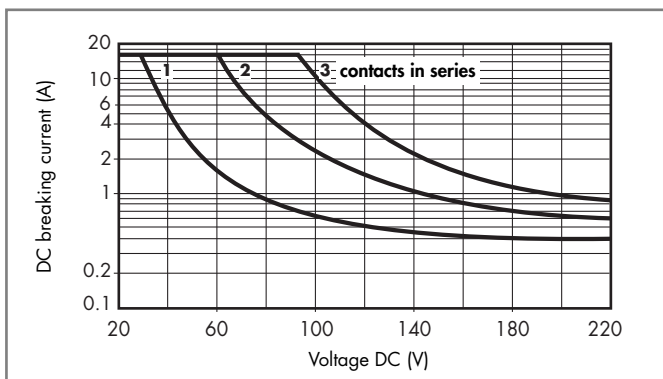
Contact specification

F 62 - Electrical life (AC) v contact current



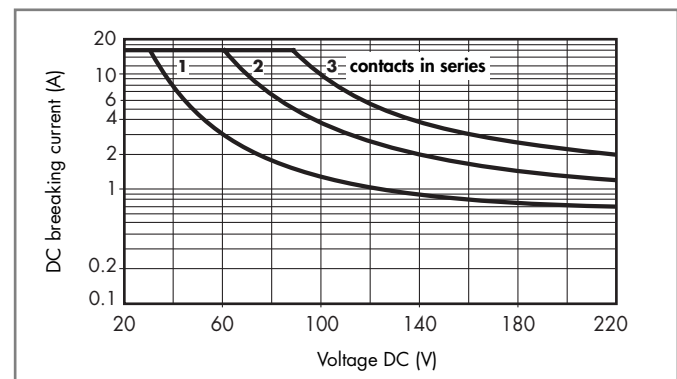
H 62 - Maximum DC1 breaking capacity

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 $\geq 100 \cdot 10^3$ 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 version data

Nominal voltage U_N	Coil code	Operating range		Resistance	Rated coil consumption I at U_N
V		U_{min} V	U_{max} V	R 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	137.5	12,000	10.4
220	9.220	176	242	37,300	5.8

AC version data

Nominal voltage U_N	Coil code	Operating range		Resistance	Rated coil consumption I at U_N (50Hz)
V		U_{min} V	U_{max} V	R 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

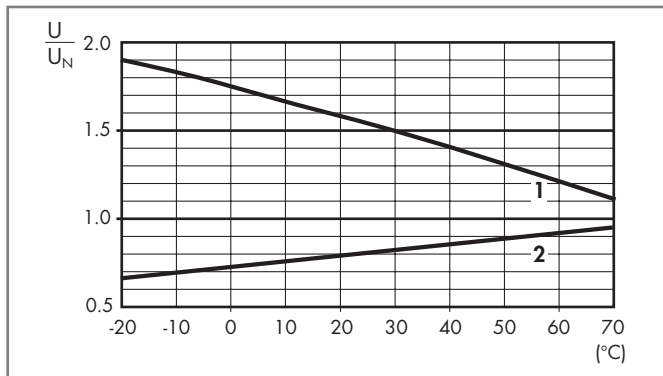
DC (NO/nPST-NO) version data - ≥ 3 mm

Nominal voltage U_N	Coil code	Operating range		Resistance	Rated coil consumption I at U_N
V		U_{min} V	U_{max} V	R 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	106.2	137.5	5,200	24
220	9.220	187	242	17,600	12.5

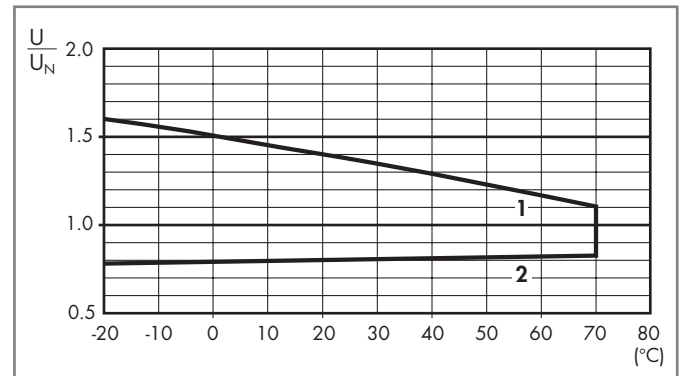
AC (NO/nPST-NO) version data - ≥ 3 mm

Nominal voltage U_N	Coil code	Operating range		Resistance	Rated coil consumption I at U_N (50Hz)
V		U_{min} V	U_{max} V	R 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

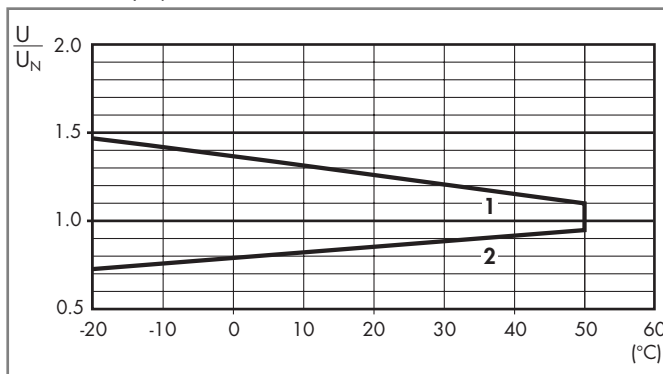
R 62 - DC coil operating range v ambient temperature Changeover contacts



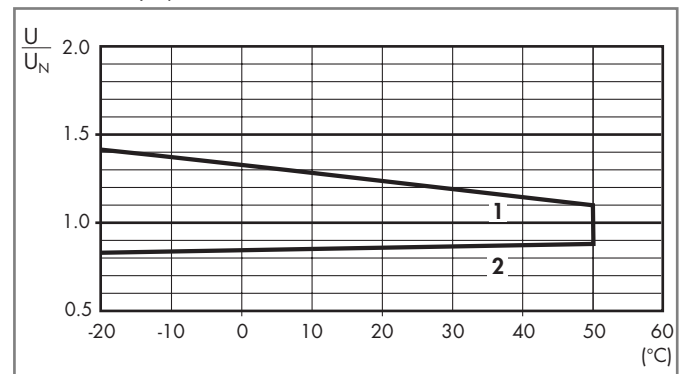
R 62 - AC coil operating range v ambient temperature Changeover contacts



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



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.

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

Accessories



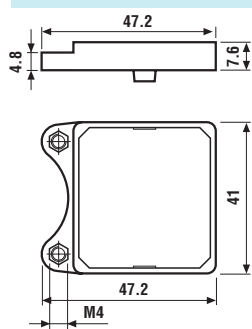
062.10



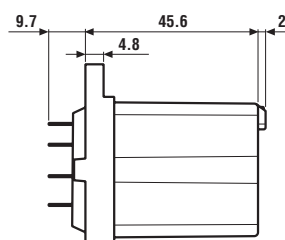
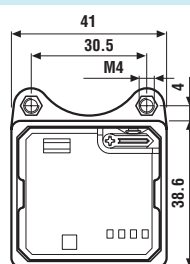
062.10 with relay

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

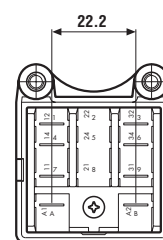
062.10



062.10



062.10 with relay



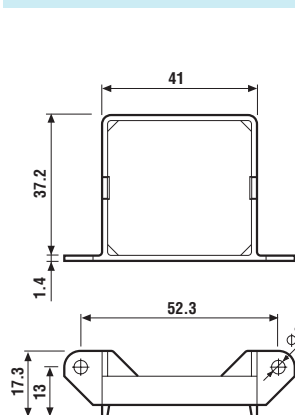
062.60



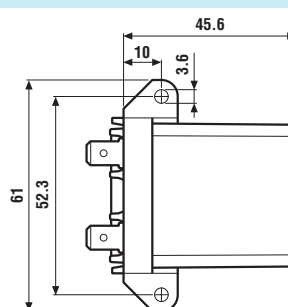
062.60 with relay

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

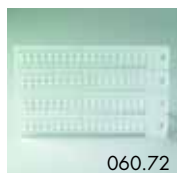
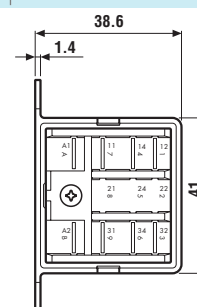
062.60



062.60



062.60 with relay



060.72

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


060.72

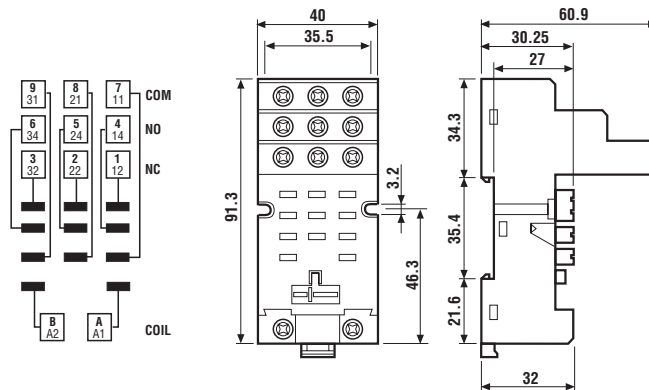


92.03

Approvals
(according to type):



Screw terminal (Box clamp) socket		92.03	92.03.0
panel or 35 mm rail (EN 50022) mount		Blue	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	
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	
 Screw torque		Nm	0.8
Wire strip length		mm	10
Max. wire size for 92.03 socket		solid wire	stranded wire
		mm²	1x10 / 2x4
		AWG	1x8 / 2x12



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
(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 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

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

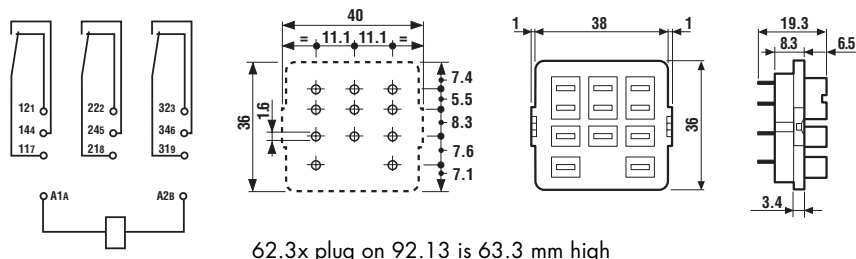


92.13

Approvals
(according to type):



PCB socket	92.13 (blue)	92.13.0 (black)
For relay type	62.32, 62.33	
Accessories		
Metal retaining clip (supplied with socket - packaging code SMA)		092.54
Technical data		
Rated values	16 A - 250 V (10 A max for each contact circuit)	
Dielectric strength	2.5 kV AC	
Ambient temperature	°C -40...+70	



62.3x plug on 92.13 is 63.3 mm high

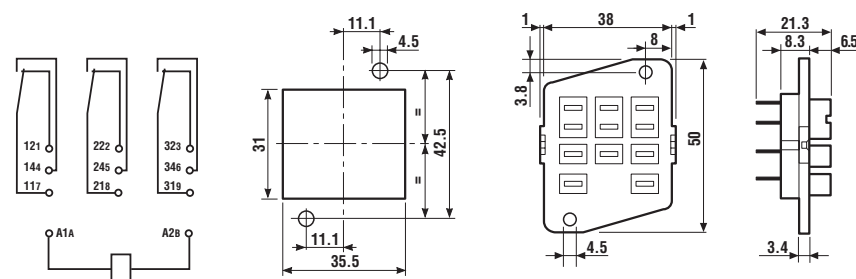


92.33

Approvals
(according to type):



Panel mount solder socket mounted with M3 screw	92.33 (blue)
For relay type	62.32, 62.33
Accessories	
Metal retaining clip (supplied with socket - packaging code SMA)	092.54
Technical data	
Rated values	16 A - 250 V (10 A max for each contact circuit)
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

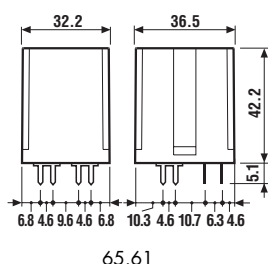
Features

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



65.61

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

FOR UL HORSEPOWER AND PILOT DUTY RATINGS
SEE "General technical information" page V

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
Operating range	AC	$(0.8 \dots 1.1) U_N$
	DC	$(0.85 \dots 1.1) U_N$
Holding voltage	AC/DC	$0.8 U_N / 0.6 U_N$
Must drop-out voltage	AC/DC	$0.2 U_N / 0.1 U_N$

Technical data

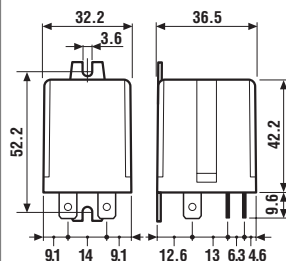
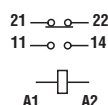
Mechanical life AC/DC	cycles	$10 \cdot 10^6 / 30 \cdot 10^6$
Electrical life at rated load AC1	cycles	$80 \cdot 10^3$
Operate/release time	ms	10/12
Insulation between coil and contacts (1.2/50 μs)	kV	4
Dielectric strength between open contacts	V AC	1,500
Ambient temperature range	$^{\circ}\text{C}$	-40...+75
Environmental protection		RT I

Approvals (according to type)

65.31



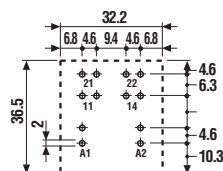
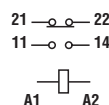
- 20 A rated contacts
- Flange mount/Faston 250 (6.3x0.8 mm) connection



65.61



- 20 A rated contacts
- PCB mount - bifurcated terminals



Copper side view

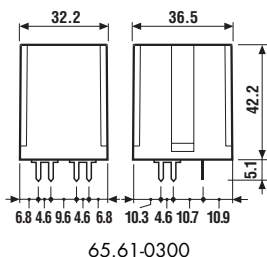


Features

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



* 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 HORSEPOWER AND PILOT DUTY RATINGS
SEE "General technical information" page V

Contact specification

Contact configuration	1 NO (SPST-NO), ≥ 3 mm*	1 NO (SPST-NO), ≥ 3 mm*
Rated current/Maximum peak current	A	30/50**
Rated voltage/Maximum switching voltage	V AC	250/400
Rated load AC1	VA	7,500
Rated load AC15 (230 V AC)	VA	1,250
Single phase motor rating (230 V AC)	kW	1.5
Breaking capacity DC1: 30/110/220 V	A	30/1.1/0.7
Minimum switching load	mW (V/mA)	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
Operating range	AC	$(0.8 \dots 1.1) U_N$
	DC	$(0.85 \dots 1.1) U_N$
Holding voltage	AC/DC	$0.8 U_N / 0.6 U_N$
Must drop-out voltage	AC/DC	$0.2 U_N / 0.1 U_N$

Technical data

Mechanical life AC/DC	cycles	$10 \cdot 10^6 / 30 \cdot 10^6$
Electrical life at rated load AC1	cycles	$50 \cdot 10^3$
Operate/release time	ms	15/4
Insulation between coil and contacts (1.2/50 μ s)	kV	4
Dielectric strength between open contacts	V AC	2,500
Ambient temperature range	$^{\circ}\text{C}$	-40...+75
Environmental protection		RT I

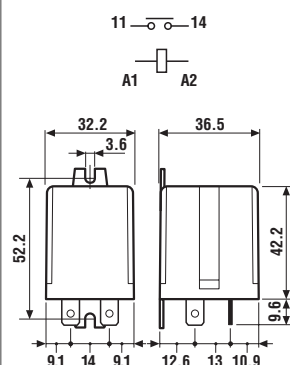
Approvals (according to type)



65.31-0300



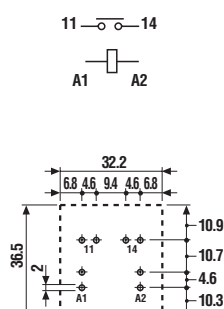
- 30 A rated contacts
- Flange mount/Faston 250 (6.3x0.8 mm) connection



65.61-0300



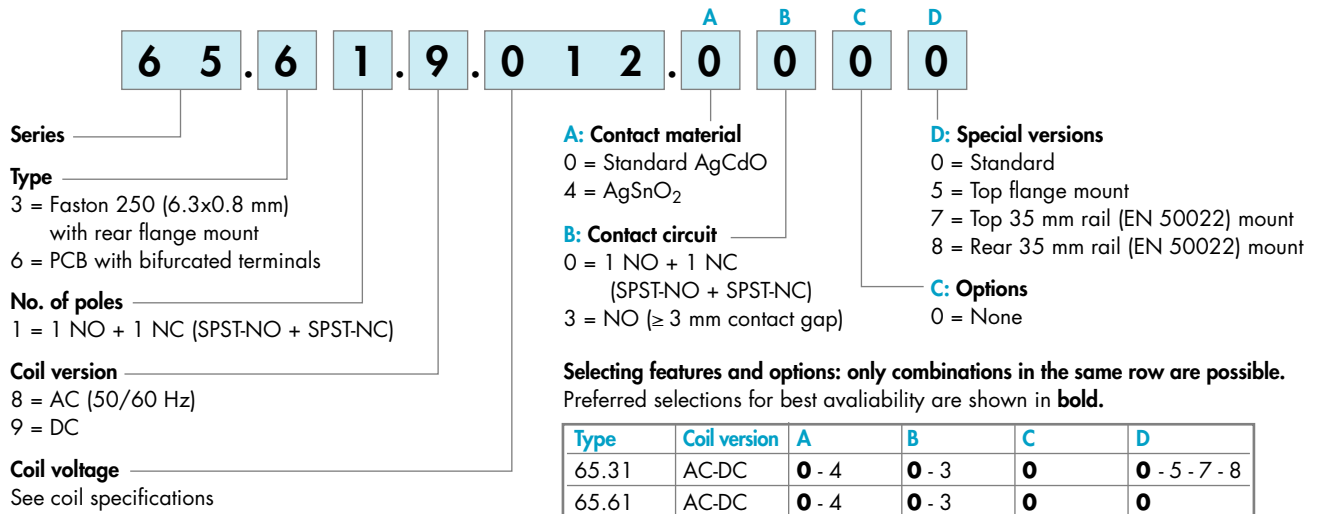
- 30 A rated contacts
- PCB mount - bifurcated terminals



Copper side view

Ordering information

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



Descriptions: Options and Special versions



D: Special version 5
Top flange mount

D: Special version 7
Top 35 mm rail
(EN 50022) mount

D: Special version 8
Rear 35 mm rail
(EN 50022) mount

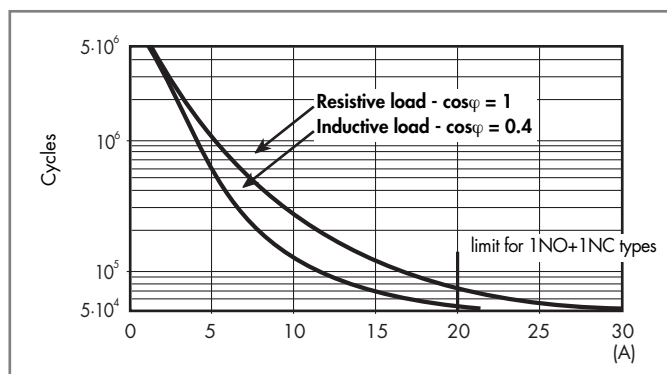
Technical data

Insulation according to EN 61810-1: 2004

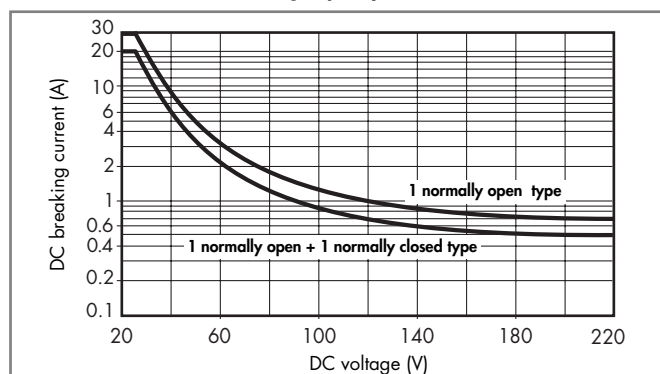
			1 NO + 1 NC		1 NO	
Nominal voltage supply system		V AC	230/400		230/400	
Rated insulation voltage		V AC	250	400	250	400
Pollution degree			3	2	3	2
Insulation between coil and contact set						
Type of insulation			Basic		Basic	
Overvoltage category			III		III	
Rated impulse voltage		kV (1.2/50 µs)	4		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	
		with rated current	W		2.1 (65.31, 65.61)	
Recommended distance between relays mounted on PCB		mm	≥ 5		3.1 (65.31/.61.0300)	

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 $\geq 80 \cdot 10^3$ 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

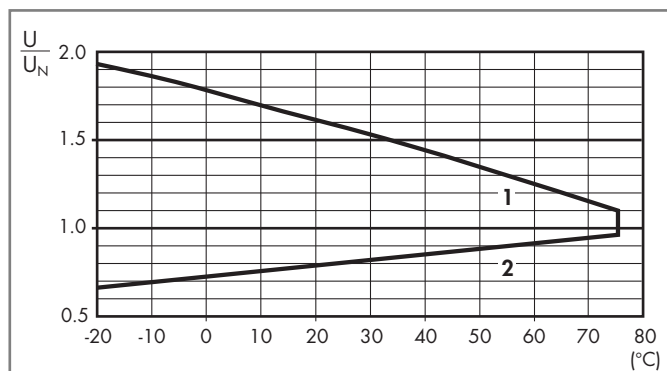
DC coil data

Nominal voltage U_N V	Coil code	Operating range		Resistance R Ω	Rated coil consumption I at U_N mA
		U_{min} V	U_{max} V		
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	106.2	137.5	12,000	10.4
220	9.220	187	242	37,300	5.8

AC coil data

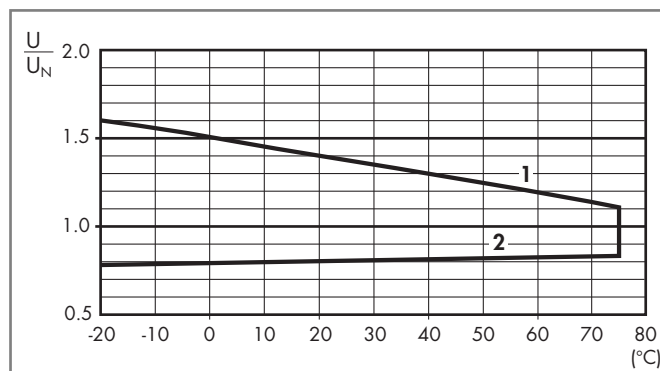
Nominal voltage U_N V	Coil code	Operating range		Resistance R Ω	Rated coil consumption I at U_N (50Hz) mA
		U_{min} V	U_{max} V		
6	8.006	4.8	6.6	4.6	367
12	8.012	9.6	13.2	19	183
24	8.024	19.2	26.4	74	90
48	8.048	38.4	52.8	290	47
60	8.060	48	66	450	37
110	8.110	88	121	1,600	20
120	8.120	96	132	1,940	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



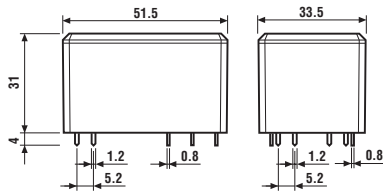
- 1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

Features

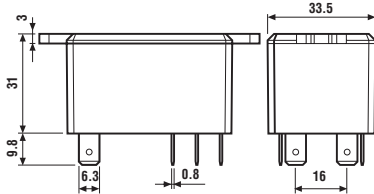
**2 Pole Changeover (DPDT)
30 A Power relay**

66.22 PCB connections & mount
66.82 Faston 250 connections
- Flange mount
66.82-xx07 Faston 250 connections
- 35 mm rail 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



66.22



66.82-xxxx

FOR UL HORSEPOWER AND PILOT DUTY RATINGS
SEE "General technical information" page V

Contact specification

Contact configuration	2 CO (DPDT)	2 CO (DPDT)	2 CO (DPDT)
Rated current/Maximum peak current A	30/50 (NO) - 10/20 (NC)	30/50 (NO) - 10/20 (NC)	30/50 (NO) - 10/20 (NC)
Rated voltage/Maximum switching voltage V AC	250/440	250/440	250/440
Rated load AC1 VA	7,500 (NO) - 2,500 (NC)	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)	1,200 (NO)
Single phase motor rating (230 V AC) kW	1.5 (NO)	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)	25/0.7/0.3 (NO)
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)	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	3.6/1.7
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	10 · 10 ⁶	10 · 10 ⁶	10 · 10 ⁶
Electrical life at rated load AC1 cycles	100 · 10 ³	100 · 10 ³	100 · 10 ³
Operate/release time ms	8/15	8/15	8/15
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	1,500	1,500	1,500
Ambient temperature range °C	-40...+70	-40...+70	-40...+70
Environmental protection	RT II	RT II	RT II

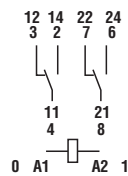
Approvals (according to type)



66.22



- 30 A rated contacts
- PCB mount - bifurcated terminals

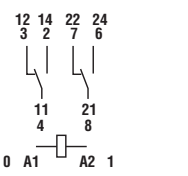


Copper side view

66.82



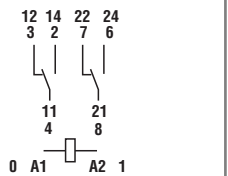
- 30 A rated contacts
- Flange mount
- Faston 250 connections



66.82-xx07



- 30 A rated contacts
- 35 mm rail mount
- Faston 250 connections



Features

2 Pole NO (DPST-NO)

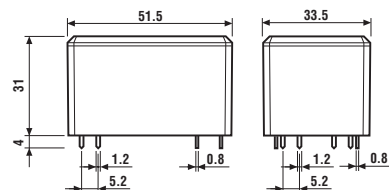
30 A Power relay

66.22-x300 PCB mount

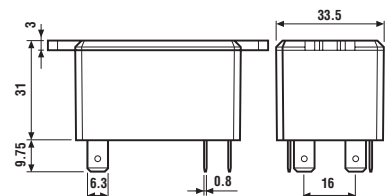
66.82-x300 Faston 250 connections
- Flange mount

66.82-x307 Faston 250 connections
- 35 mm rail 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



66.22-0300



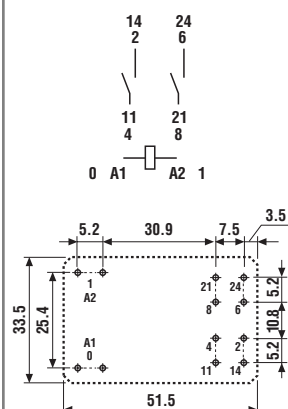
66.82-0300

FOR UL HORSEPOWER AND PILOT DUTY RATINGS
SEE "General technical information" page V

66.22-x300



- 30 A rated contacts
- PCB mount - bifurcated terminals

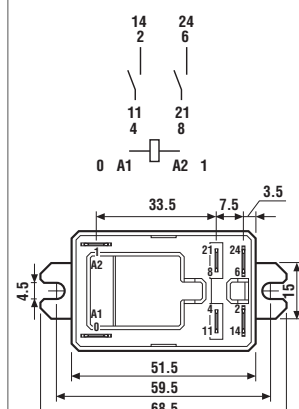


Copper side view

66.82-x300



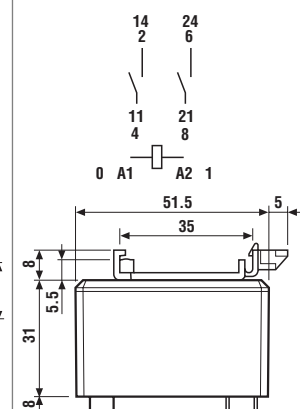
- 30 A rated contacts
- Flange mount
- Faston 250 connections



66.82-x307



- 30 A rated contacts
- 35 mm rail mount
- Faston 250 connections



Contact specification		66.22-x300	66.82-x300	66.82-x307
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	25/0.7/0.3	25/0.7/0.3	25/0.7/0.3
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)	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	3.6/1.7
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	10 · 10 ⁶	10 · 10 ⁶	10 · 10 ⁶
Electrical life at rated load AC1	cycles	100 · 10 ³	100 · 10 ³	100 · 10 ³
Operate/release time	ms	8/10	8/10	8/10
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	1,500	1,500	1,500
Ambient temperature range	°C	-40...+70	-40...+70	-40...+70
Environmental protection		RT II	RT II	RT II
Approvals (according to type)				

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.

	6	6	.	8	2	.	9	.	0	2	4	.	0	0	0	0
													A	B	C	D
Series	66															
Type	8															
	2 = PCB															
	8 = Faston 250 (6.3x0.8 mm) with top flange mount															
No. of poles	2															
	2 = 2 CO (DPDT) 30 A															
Coil version	9															
	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)			
D: Special versions																
													0 = Standard			
													1 = Wash tight (RT III) for 66.22 only			
													3 = Wash tight (RT III) + top 35 mm rail (EN 50022) mount for 66.82 only			
													7 = Top 35 mm rail (EN 50022) mount for 66.82 only			
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**.

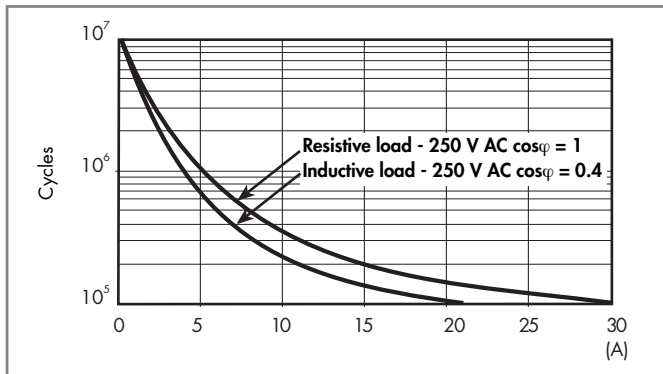
Type	Coil version	A	B	C	D
66.22	AC-DC	0 - 1	0 - 3	0	0 - 1
66.82	AC-DC	0 - 1	0 - 3	0	0 - 3 - 7

Technical data

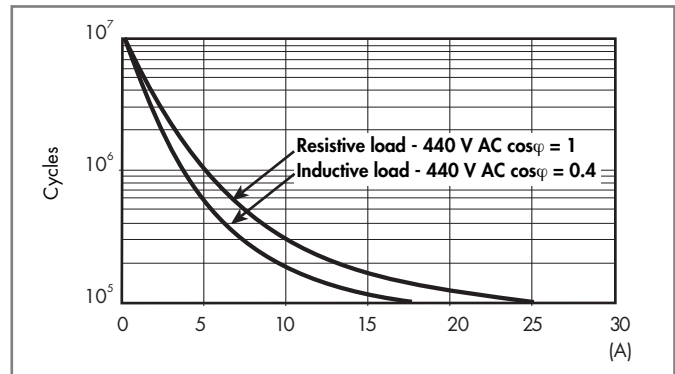
Insulation according to EN 61810-1:2004			
Nominal voltage of supply system		V AC	230/400
Rated insulation voltage		V AC	400
Pollution degree			3
Insulation between coil and contact set			
Type of insulation			Reinforced (8 mm)
Overvoltage category			III
Rated impulse voltage		kV (1.2/50 µs)	6
Dielectric 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			
Type of disconnection			Micro-disconnection
Dielectric strength		V AC/kV (1.2/50 µs)	1,500/2
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
	with rated current	W	5
Recommended distance between relays mounted on PCB		mm	≥ 10

Contact specification

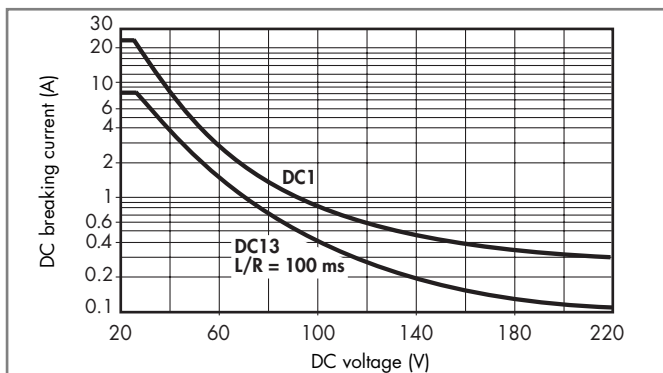
F 66 - Electrical life (AC) v contact current
250 V (normally open contact)



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



H 66 - Maximum DC1 breaking capacity



- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of $\geq 100 \cdot 10^3$ 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

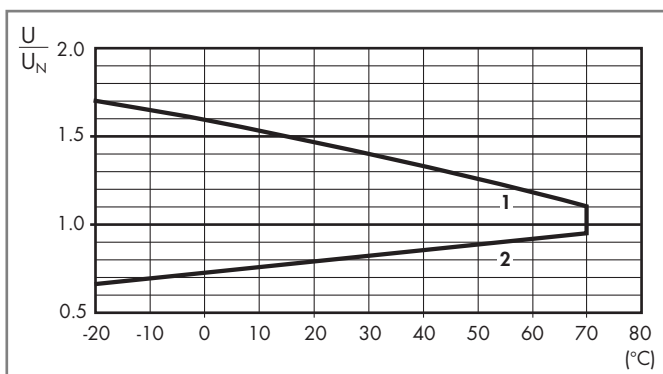
DC coil data

Nominal voltage U_N V	Coil code	Operating range		Resistance R Ω	Rated coil consumption I at U_N mA
		U_{min} V	U_{max} V		
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	137.5	9,200	13.6

AC coil data

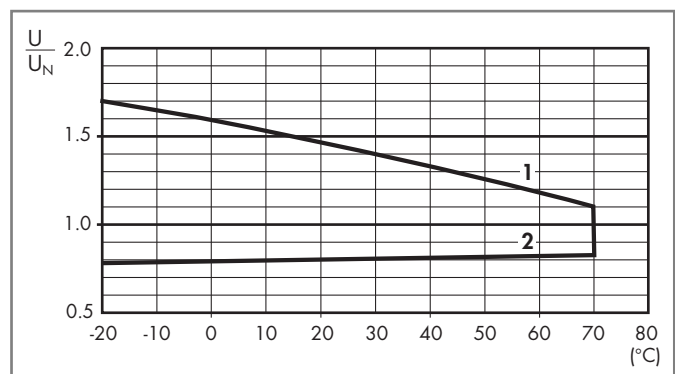
Nominal voltage U_N V	Coil code	Operating range		Resistance R Ω	Rated coil consumption I at U_N (50Hz) mA
		U_{min} V	U_{max} V		
6	8.006	4.8	6.6	3	600
12	8.012	9.6	13.2	11	300
24	8.024	19.2	26.4	50	150
110/115	8.110	88	126	930	32.6
120/125	8.120	96	137	1,050	30
230	8.230	184	253	4,000	15.7
240	8.240	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.

R 66 - AC coil operating range v ambient temperature



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

Features

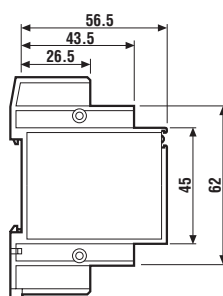
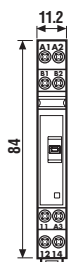
Auto-Off-On over-ride relay

- 3 function selector switch:
 - Auto (works as a monostable relay)
 - Off (relay permanently OFF)
 - On (relay permanently ON)
- AC/DC universal operation
- LED indicator
- Isolation between supply and contact terminals
- 35 mm rail (EN 50022) mount

19.21



- 11.2 mm wide
- 1 pole output contact
- Feedback contact



Contact specification

Contact configuration		1 CO (SPDT)
Rated current/Max. peak current	A	10/15
Rated voltage/Max. 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: 30/110/220 V	A	10/0.3/0.12
Minimum switching load	mW (V/mA)	300 (5/5)
Standard contact material		AgSnO ₂

Supply specification

Nominal voltage	V AC (50/60 Hz)	24
	V DC	24
Rated power AC/DC	VA (50 Hz)/W	0.6/0.4
Operating range	V AC	(0.8...1.1)U _N
	V DC	(0.8...1.1)U _N

Technical data

Mechanical life	cycles	10 · 10 ⁶
Electrical life at rated load in AC1	cycles	100 · 10 ³
Insulation between coil and contacts (1.2/50 μs)	kV	4
Dielectric strength between open contacts	V AC	1,000
Ambient temperature range	°C	-10...+50
Protection category		IP 20

Approvals (according to type)



Ordering information

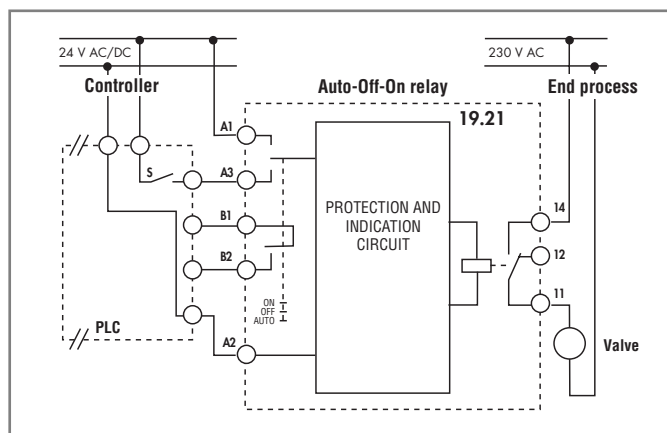
Example: 19 series relay modular Auto-Off-On, 1 CO (SPDT) 10 A contact, 24 V AC/DC supply.

Series	19	Supply voltage	024 = 24 V
Type	2	Supply version	0 = AC (50/60 Hz)/DC
2 = 35 mm rail (EN 50022) mount, 11.2 mm			
No. of poles	1		
1 = 1 pole			

Technical data

Insulation			
	insulation between coil and contacts (1.2/50 µs)	kV	4
Dielectric strength	between supply and contacts	V AC	3,000
	between open contacts	V AC	1,000
Other data			
Power lost to the environment	without contact current	W	0.4
	with rated current	W	1.8
Max. wire size		solid cable	stranded cable
		mm²	1x6 / 2x2.5
		AWG	1x10 / 2x14
Screw torque		Nm	0.5

Wiring diagram



Feedback contact (B₁ - B₂) is rated at 24 V AC/DC (300 mA) maximum.

Principle of operation

Many processes or systems rely on automatic control from a plc or dedicated electrical controller. However, should the controller fail it may be critically important to be able to by-pass certain controller outputs and establish manual control. Under such circumstances, interposing an Auto-Off-On relay between the output contact of the controller and the process may provide the appropriate override facility.

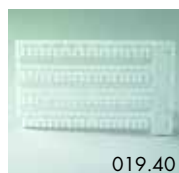
Selector position

Selector switch	Control switch (S)	Output relay	LED	Feedback contact (B ₁ - B ₂)
AUTO	Closed	ON	ON	Closed
	Open	OFF	OFF	Closed
ON	—	ON	ON	Open
OFF	—	OFF	OFF	Open

Feedback contact (B₁ - B₂) signals when the selector switch is in the Auto position.
The LED indicates the state of the output relay.

On failure of the controller the end process can be manually turned On or Off, as required, by the selector switch on the 19.21 facia. Under the healthy operation of the controller, the selector switch is set to Auto, in which case the process is controlled automatically through the normal functioning of the controller output contact(s). It may also be important to know when the process is under manual or automatic control, and a feedback contact within the 19.21 can be used to provide this information.

Accessories



019.40

Sheet of marker tags, 40 tags, plastic, 8x10 mm

019.40

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 50022) mounting

38.51 / 38.51.3
Screw terminal



38.61 / 38.61.3
Screwless terminal



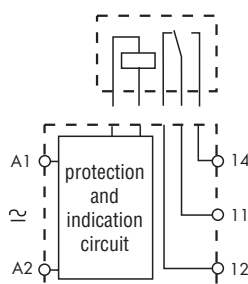
* Special version for max ambient temperature +70°C.

For outline drawing see page 8

38.51/61



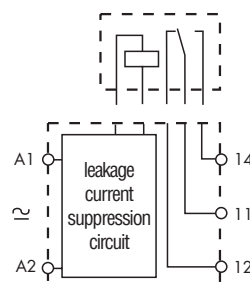
- 1 pole electromechanical relay
- Screw terminal and screwless terminal
- 35 mm rail (EN 50022) mounting



38.51.3 / 38.61.3



- 1 pole electromechanical relay
- Leakage current suppression
- Screw terminal and screwless terminal
- 35 mm rail (EN 50022) mounting



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	6/0.2/0.15	6/0.2/0.15
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 7	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 · 10 ⁶	10 · 10 ⁶
Electrical life at rated load AC1	cycles	60 · 10 ³	60 · 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 ≤ 60 V / >60V)	°C	−40...+70/−40...+55	−/−40...+55
Protection category		IP 20	IP 20

Approvals relay (according to type)



Features

2 Pole - 8 A electromechanical relay interface modules, 14 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 50022) mounting

38.52
Screw terminal



38.62
Screwless terminal



38.52

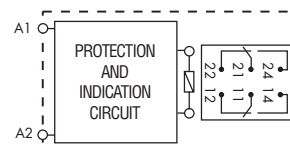
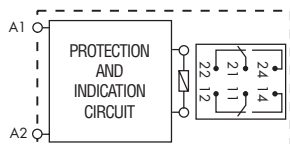


- 2 pole electromechanical relay
- Screw terminal
- 35 mm rail (EN 50022) mounting

38.62



- 2 pole electromechanical relay
- Screwless terminal
- 35 mm rail (EN 50022) mounting



For outline drawing see page 8

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

Coil specification

Nominal voltage (U_N)	V AC/DC	24 - 60 - (110...125) - (220...240)	
	V DC	12 - 24 - 60	12 - 24 - 60
Rated power AC/DC	VA (50 Hz)/W	See page 7	See page 7
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	30 · 10 ⁶	30 · 10 ⁶
Electrical life at rated load AC1	cycles	80 · 10 ³	80 · 10 ³
Operate/release time	ms	8 / 10	8 / 10
Insulation between coil and contacts (1.2/50 μ s)	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 / >60 V)	°C	-40...+70 / -40...+55	-40...+70 / -40...+55
Protection category		IP 20	IP 20

Approvals relay (according to type)



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 50022) mounting

38.81 / 38.81.3
Screw terminal



38.91 / 38.91.3
Screwless terminal

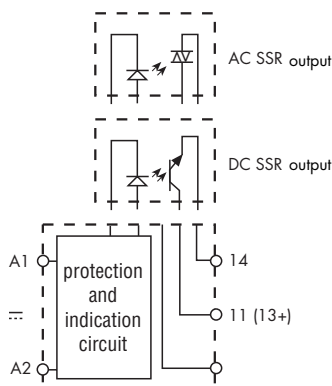


For outline drawing see page 8

38.81/38.91



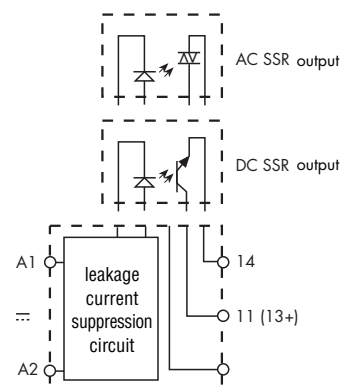
- AC or DC output switching
- SSR relay - DC input voltage
- Screw terminal and screwless terminal
- 35 mm rail (EN 50022) mounting



38.81.3/38.91.3



- AC or DC output - Leakage current suppression
- SSR relay - AC or AC/DC input voltage
- Screw terminal and screwless terminal
- 35 mm rail (EN 50022) mounting



Output circuit

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	240/275 AC	24/33 DC	48/60 DC	240/275 AC
Switching voltage range V	(1.5...24)DC	(1.5...48)DC	(12...240)AC	(1.5...24)DC	(1.5...48)DC	(12...240)AC
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 circuit

V AC	—	230...240
Nominal voltage (U_N) V DC	6 - 24 - 60	—
V AC/DC	(110...125) - (220...240)	110...125
Operating range V DC	See page 8	See page 8
Control current mA	See page 8	See page 8
Release voltage V DC	See page 8	See page 8

Technical data

Operate/release time: ON/OFF (DC input) ms	0.1/0.4	0.02/0.11	12/12	0.1/0.4	0.02/0.11	12/12
Dielectric strength between input/output V	2,500			2,500		
Ambient temperature range °C	-20...+55			-20...+55		
Environmental protection	IP20			IP20		

Approvals relay (according to type)

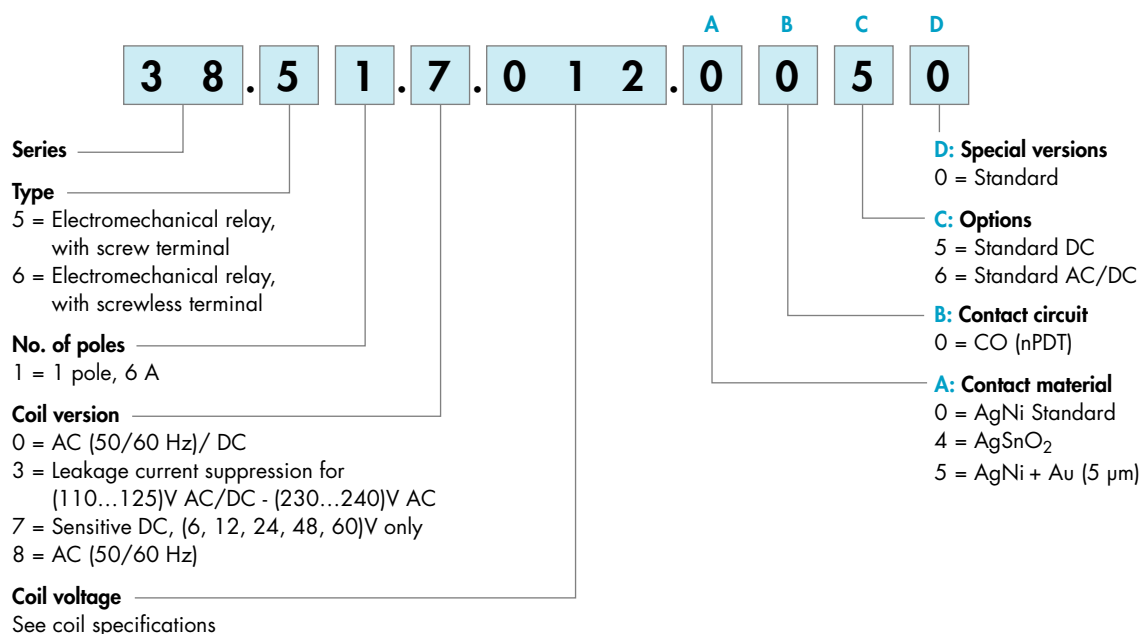


Electromechanical Relay

Ordering information

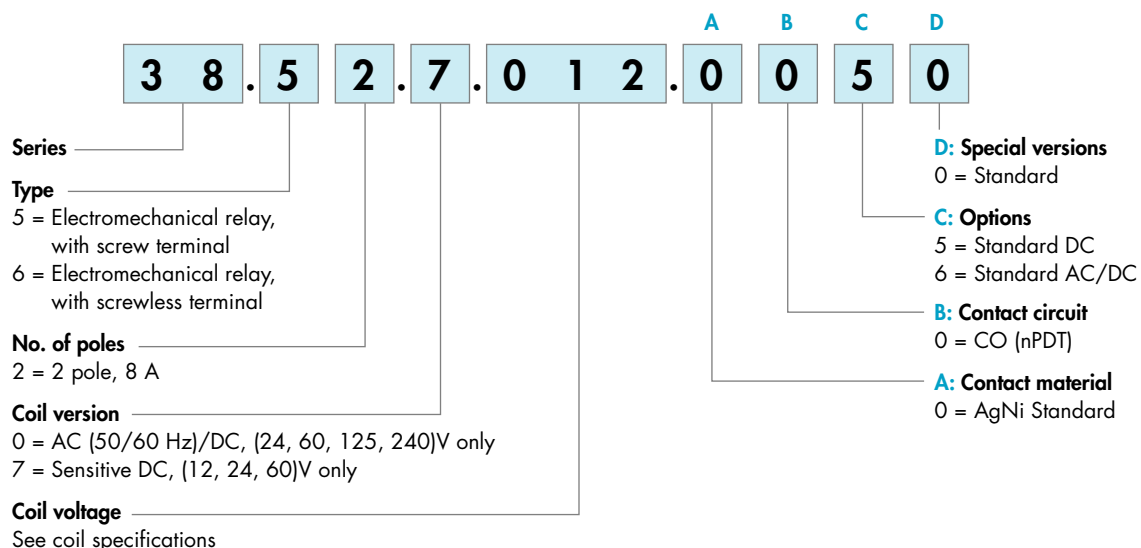
Electromechanical relay - 1 Pole

Example: 38 series screw terminal relay interface module, 1 CO (SPDT), sensitive 12 V DC coil.



Electromechanical relay - 2 Pole

Example: 38 series screw terminal relay interface module, 2 CO (DPDT), sensitive 12 V DC coil.

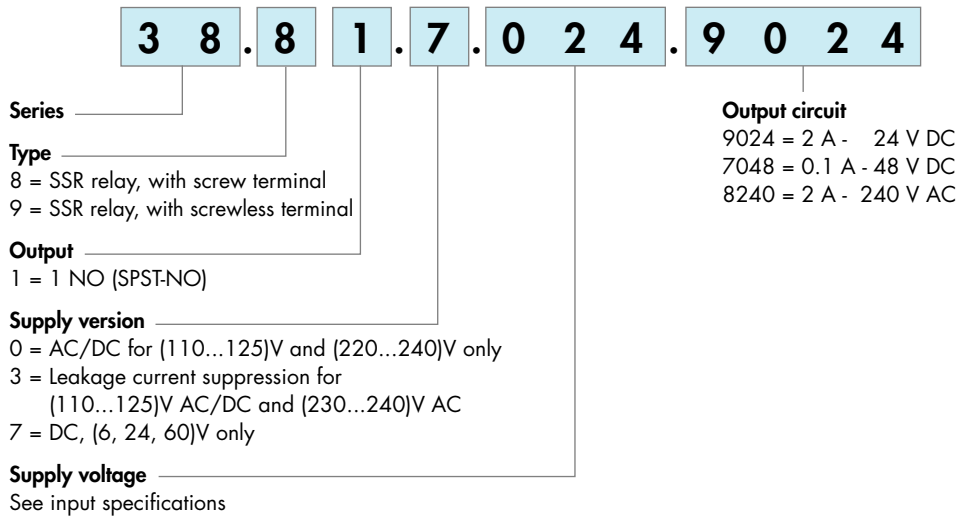


Solid State Relay

Ordering information

Solid state relay

Example: 38 series screw terminal SSR relay interface module, 2 A, 24 V DC supply.



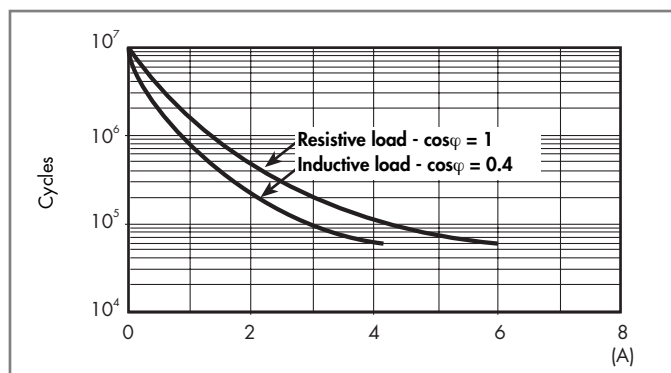
Electromechanical Relay

Technical data

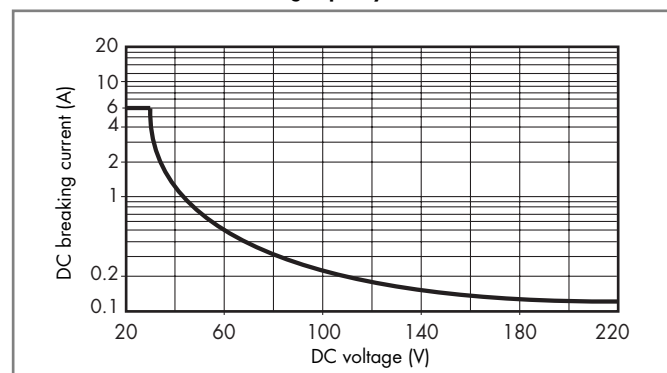
Insulation						
Insulation according to EN 61810-1	insulation rated voltage	V	250		400	
	rated impulse withstand voltage	kV	4		4	
	pollution degree		3		2	
	overvoltage category		III		III	
Insulation between coil and contacts (1.2/50 μs)		kV	6 (8 mm)			
Dielectric strength between open contacts		V AC	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		2 Pole	
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)	
			38.51/52		38.61/62	
Wire strip length		mm	10		10	
⊖ Screw torque		Nm	0.5		—	
Max. wire size			solid cable	stranded cable	solid cable	stranded cable
		mm²	1x2.5/2x1.5	1x2.5/2x1.5	1x2.5	1x2.5
		AWG	1x14/2x16	1x14/2x16	1x14	1x14

Contact specification

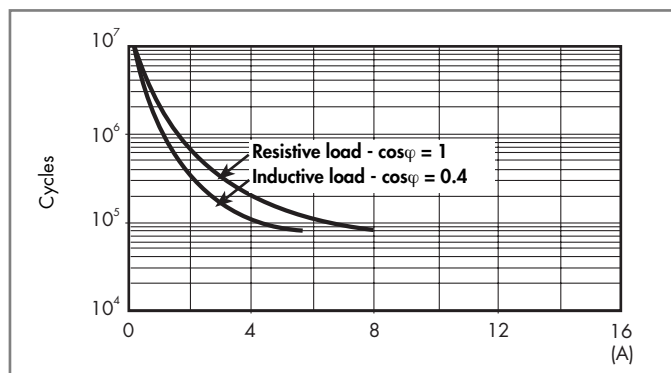
F 38 - Electrical life (AC) v contact current, 1 Pole



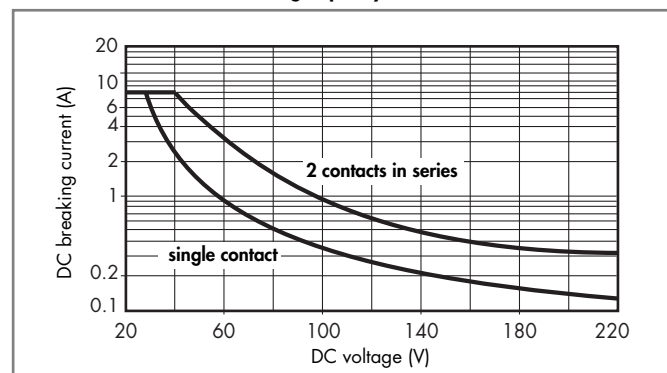
H 38 - Maximum DC1 breaking capacity, 1 Pole



F 38 - Electrical life (AC) v contact current, 2 Pole



H 38 - Maximum DC1 breaking capacity, 2 Pole



- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of $\geq 60 \cdot 10^3$ (1 Pole) or $\geq 80 \cdot 10^3$ (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.

Electromechanical Relay 1 Pole

Coil specifications

Coil data sensitive DC, 1 Pole

Nominal voltage U_N	Coil code	Operating range		Rated coil consumption I at U_N	Power consumption P at U_N
V		U_{min}	U_{max}	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		Rated coil consumption I at U_N	Power consumption P at U_N
V		U_{min}	U_{max}	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, indicated for max ambient temperature +70°C

Nominal voltage U_N	Coil code	Operating range		Rated coil consumption I at U_N	Power consumption P at U_N
V		U_{min}	U_{max}	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		Rated coil consumption I at U_N	Power consumption P at U_N
V		U_{min}	U_{max}	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.

Electromechanical Relay 2 Pole

Coil specifications

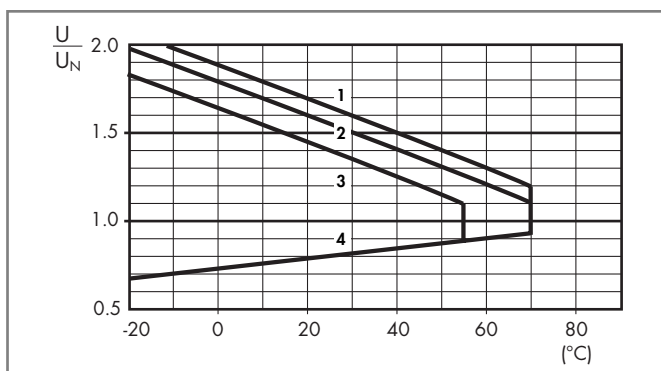
Coil data sensitive DC, 2 Pole

Nominal voltage U_N	Coil code	Operating range		Rated coil consumption I at U_N	Power consumption P at U_N
V		U_{min}	U_{max}	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

Nominal voltage U_N	Coil code	Operating range		Rated coil consumption I at U_N	Power consumption P at U_N
V		U_{min}	U_{max}	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

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 $U \leq 60$ 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.

Solid State Relay

Technical data

Other data				
Power lost to the environment	without output current	W	0.25 (24 V DC)	
	with rated current	W	0.4	
			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	1x2.5
	AWG	1x14 / 2x16	1x14	1x14

Input specification

Input data DC

Nominal voltage U_N	Supply code	Operating range		Release voltage U	Rated coil consumption I at U_N	Power consumption P
V		U_{min} V	U_{max} 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
V		U_{min} V	U_{max} 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

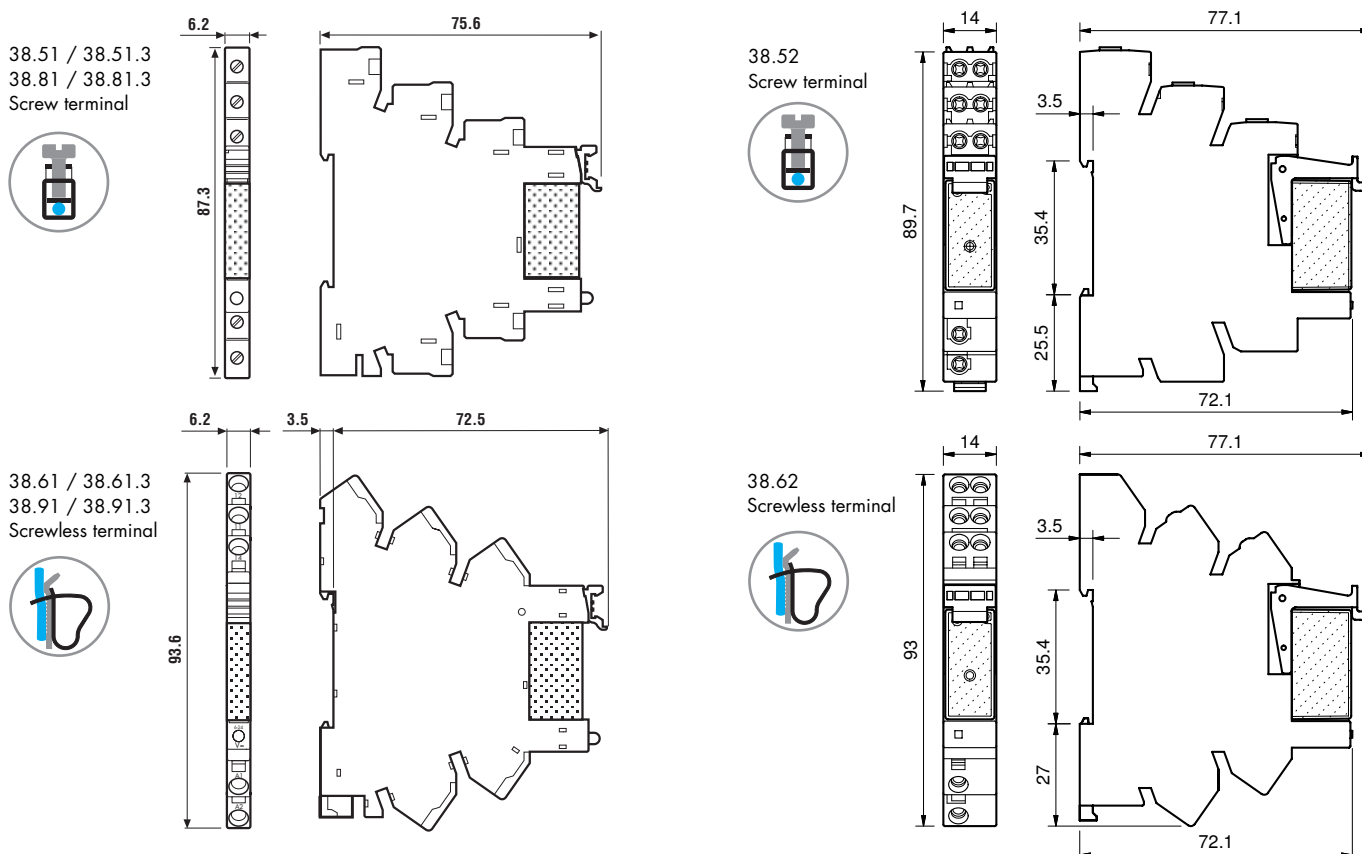
Nominal voltage U_N	Supply code	Operating range		Release voltage U	Rated coil consumption I at U_N	Power consumption P at U_N
V		U_{min} V	U_{max} V	V	mA	W
110...125 AC/DC	3.125	94	138	44	8(*)	1/1(*)
230...240 AC	3.240	184	264	72	6.5(*)	1.6/0.6(*)

(*) Rated coil consumption and power consumption values relate to $U_N = 125$ and 240 V.

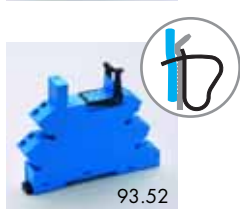
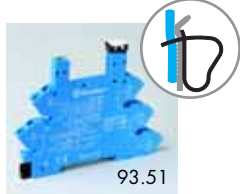
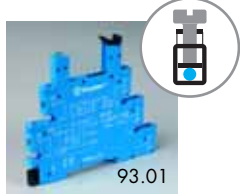
The 38 Series interface modules (supply version 3) have built-in leakage current suppression to address industry concerns of the contacts not dropping-out when there is residual current in the circuit; at (110...125)V AC and (230...240)V AC.

This problem can occur, for example, when connecting the interface modules to PLC,s with triac outputs or when connecting via relatively long cables.

Outline drawing



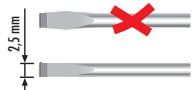
Combination for Electromechanical Relay



Approvals
(according to type):



Certain relay/socket combinations



Screw terminal - 1 Pole relay

Code	Supply voltage	Type of relay	Type of 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

Code	Supply voltage	Type of relay	Type of 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 - 2 Pole relay

Code	Supply voltage	Type of relay	Type of 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

Screwless terminal - 2 Pole relay

Code	Supply voltage	Type of relay	Type of 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

Combination for Solid State Relay

Screw terminal

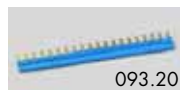
Code	Supply voltage	Type of relay	Type of socket
38.81.7.006.xxxx	6 V DC	34.81.7.005.xxxx	93.01.7.024
38.81.7.024.xxxx	24 V DC	34.81.7.024.xxxx	93.01.7.024
38.81.7.060.xxxx	60 V DC	34.81.7.060.xxxx	93.01.7.060
38.81.0.125.xxxx	(110...125)V AC/DC	34.81.7.060.xxxx	93.01.0.125
38.81.0.240.xxxx	(220...240)V 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

Code	Supply voltage	Type of relay	Type of 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

Accessories



093.20

Approvals
(according to type):

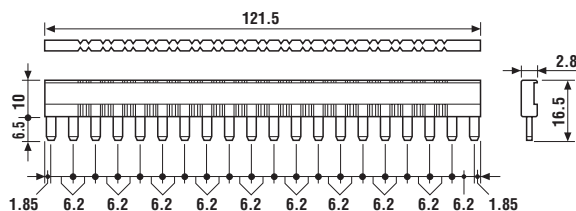


20-way jumper link for 38.x1

Rated values

093.20 (blue)

36 A - 250 V



093.08

Approvals
(according to type):

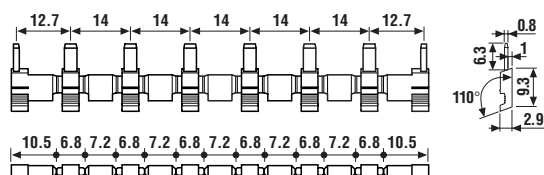


8-way jumper link for 38.x2

Rated values

093.08 (blue)

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.x1, plastic, 64 tags, 6x10 mm

093.64



060.72

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

060.72

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 50022) mounting

48.31 / 48.52
Screw terminal



48.72
Screwless terminal



For outline drawing see page 5

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	$(0.8 \dots 1.1) U_N$	$(0.8 \dots 1.1) U_N$
	sens. DC	$(0.73 \dots 1.75) U_N$	$(0.73 \dots 1.75) U_N$
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	$10 \cdot 10^6 / 20 \cdot 10^6$	$10 \cdot 10^6 / 20 \cdot 10^6$
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 μ s)	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

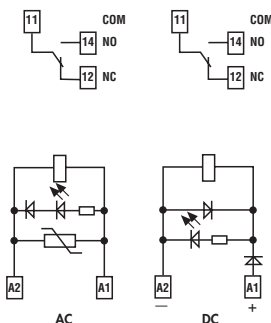
Approvals relay (according to type)

ABS RINA

48.31



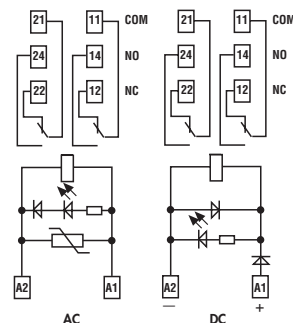
- 1 pole, 10 A
- Screw terminal
- 35 mm rail (EN 50022) mounting



48.52/72



- 2 pole, 8 A
- Screw terminal and screwless terminal
- 35 mm rail (EN 50022) mounting



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 50022) mounting

48.61 / 48.62
Screw terminal

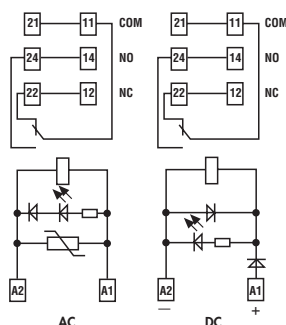
48.81 / 48.82
Screwless terminal



48.61/81



- 1 pole, 16 A
- Screw terminal and screwless terminal
- 35 mm rail (EN 50022) mounting

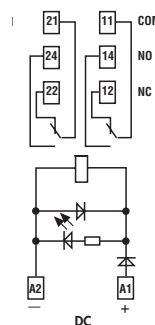


* For currents > 10 A, contact terminals must be connected in parallel (21 with 11, 24 with 14, 22 with 12).

48.62/82



- 2 pole, 10 A
- Screw terminal and screwless terminal
- 35 mm rail (EN 50022) mounting



For outline drawing see page 5

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	$(0.8 \dots 1.1) U_N$	—
	sens. DC	$(0.8 \dots 1.5) U_N$	$(0.8 \dots 1.5) U_N$
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 AC/DC	cycles	$10 \cdot 10^6 / 20 \cdot 10^6$	$—/20 \cdot 10^6$
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 μ s)	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)




Ordering information

Example: 48 series, 35 mm rail (EN 50022) mount, screw terminal relay interface module, 2 CO (DPDT) 8 A contacts, 24 V sensitive DC coil, green LED + diode, 99.02 coil indication.

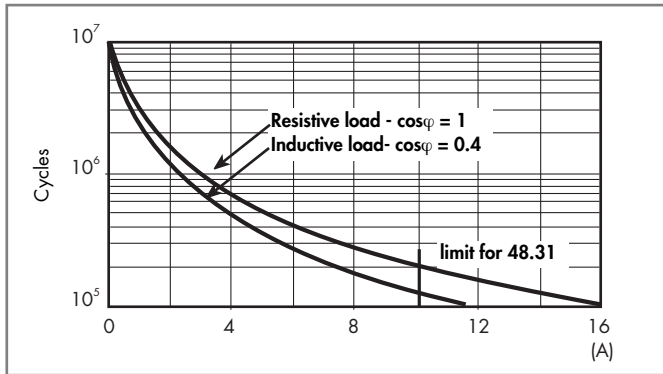
4	8	.	5	.	2	.	7	.	0	2	4	.	0	A	0	B	0	C	5	D	0
Series												A: Contact material		B: Contact circuit		C: Options		D: Special versions			
Type												0 = Standard		0 = CO (nPDT)		5 = Standard for DC: green LED + diode (polarity +A1)		0 = Standard			
Screw terminal																6 = Standard for AC: green LED + Varistor					
3 = 35 mm rail mount (EN 50022)																					
5 = 35 mm rail mount (EN 50022)																					
6 = 35 mm rail mount (EN 50022)																					
Screwless terminal																					
7 = 35 mm rail mount (EN50022)																					
8 = 35 mm rail mount (EN50022)																					
No. of poles																					
1 = 1 pole for 48.31, 10 A																					
48.61, 48.81, 16 A																					
2 = 2 pole for 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)																					
Coil voltage																					
See coil specifications																					

Technical data

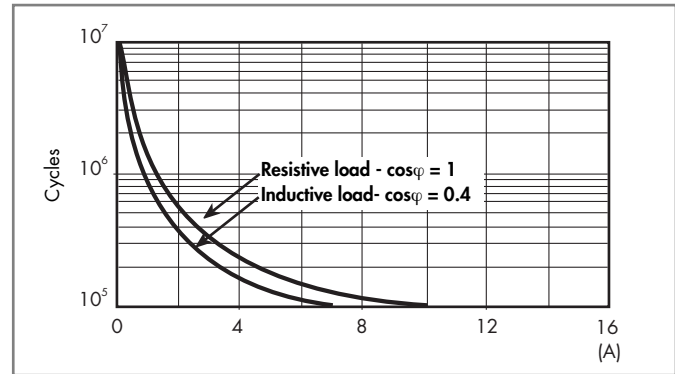
Insulation			48.31/61/62	48.52	48.31/61/62	
Insulation according to EN 61810-1	insulation rated voltage	V	250	250	400	
	rated impulse withstand voltage	kV	4	4	4	
	pollution degree		3	2	2	
	overvoltage category		III	III	III	
Insulation between coil and contacts (1.2/50 µs)		kV	6 (8 mm)			
Dielectric strength between open contacts		V AC	1,000			
Dielectric strength between adjacent contacts		V AC	2,000 (48.52); 2,500 (48.62)			
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			
Vibration resistance (5...55)Hz: NO/NC		g	10/4 (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 (48.31)	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
		mm²	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

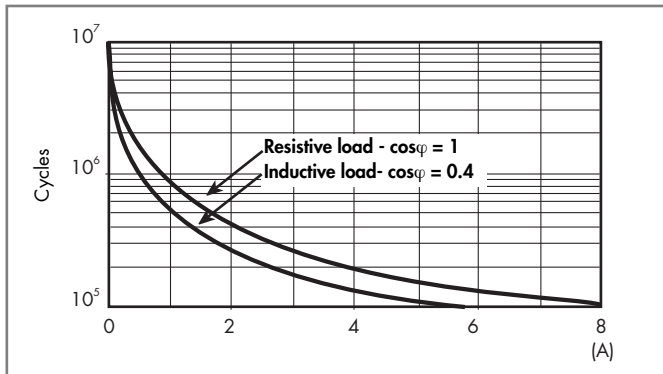
F 48 - Electrical life (AC) v contact current
Types 48.31/61/81



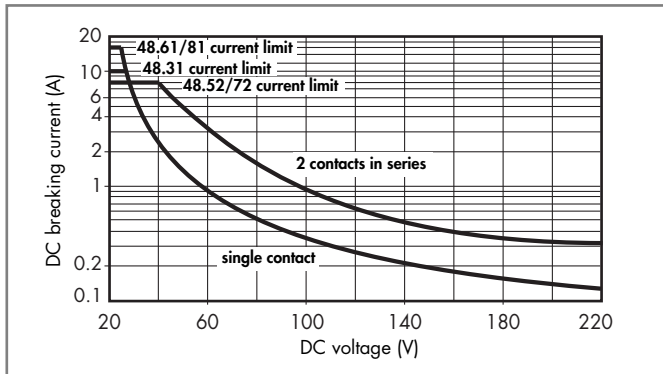
F 48 - Electrical life (AC) v contact current
Types 48.62/82



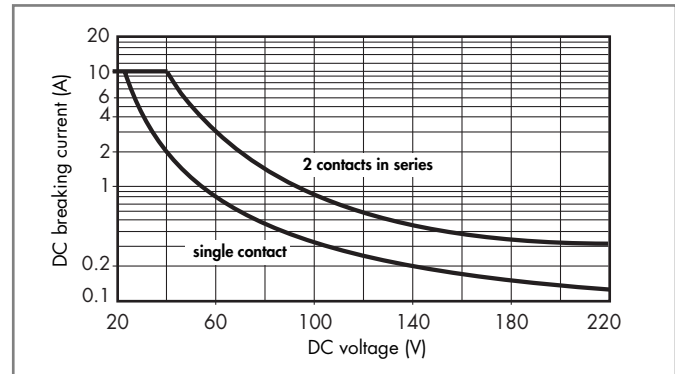
F 48 - Electrical life (AC) v contact current
Types 48.52/72



H 48 - Maximum DC1 breaking capacity
Types 48.31/52/61/72/81



H 48 - Maximum DC1 breaking capacity
Types 48.62/82



- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of $\geq 100 \cdot 10^3$ 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.

- When switching a resistive load (DC1) having voltage and current values under the curve, an electrical life of $\geq 100 \cdot 10^3$ 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 V	Coil code	Operating range		Rated coil consumption I at U_N mA
		U_{min}^* V	U_{max}^{**} V	
12	7.012	8.8	21	41
24	7.024	17.5	42	22.2
125	7.125	91	219	4

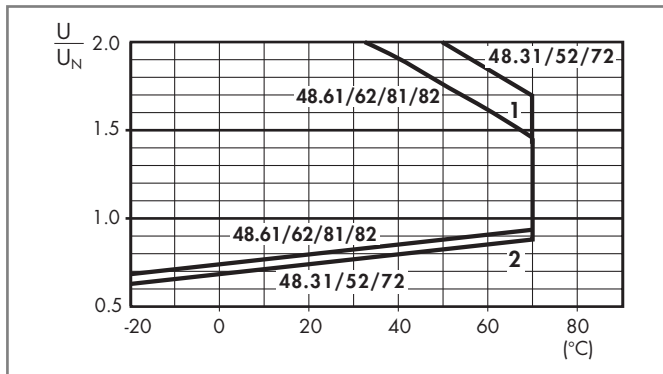
* $U_{min} = 0.8 U_N$ for 48.61, 48.62, 48.81 and 48.82

** $U_{max} = 1.5 U_N$ for 48.61, 48.62, 48.81 and 48.82

AC coil data

Nominal voltage U_N V	Coil code	Operating range		Rated coil consumption I at U_N (50Hz) mA
		U_{min} V	U_{max} V	
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

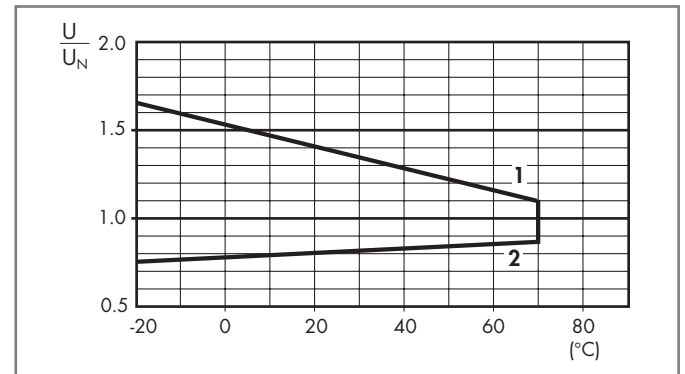
R 48 - DC coil operating range v ambient temperature



1 - Max. permitted coil voltage.

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

R 48 - DC coil operating range v ambient temperature



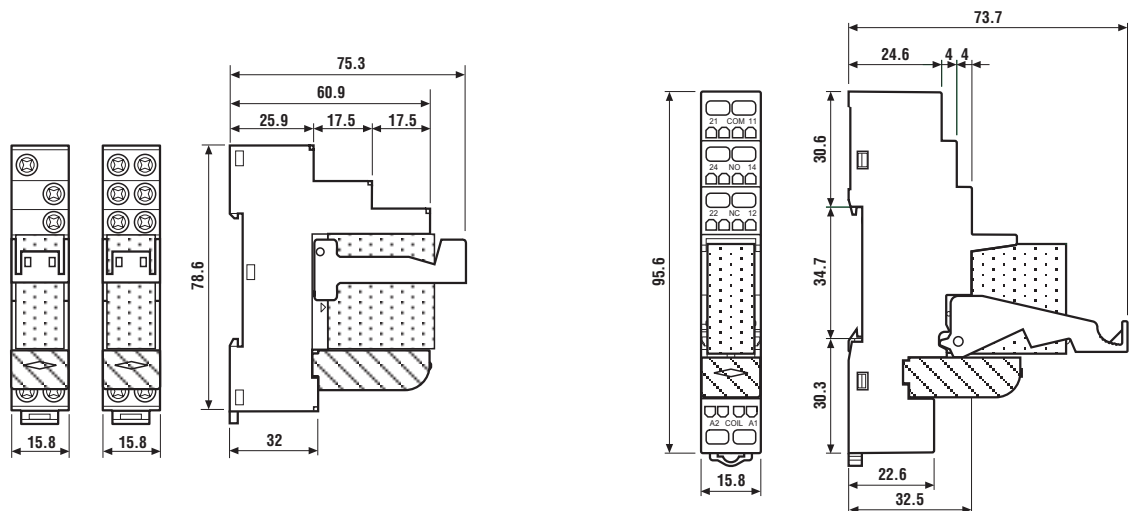
1 - Max. permitted coil voltage.

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

Combinations

Code	Type of socket	Type of relay	Module	Retaining clip
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

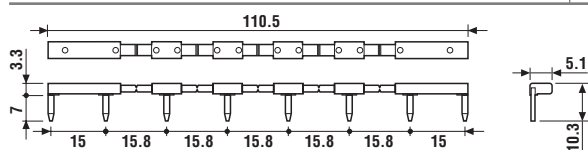


Accessories



095.18

8-way jumper link for screw terminal version	095.18 (blue)	095.18.0 (black)
Rated values	10 A - 250 V	



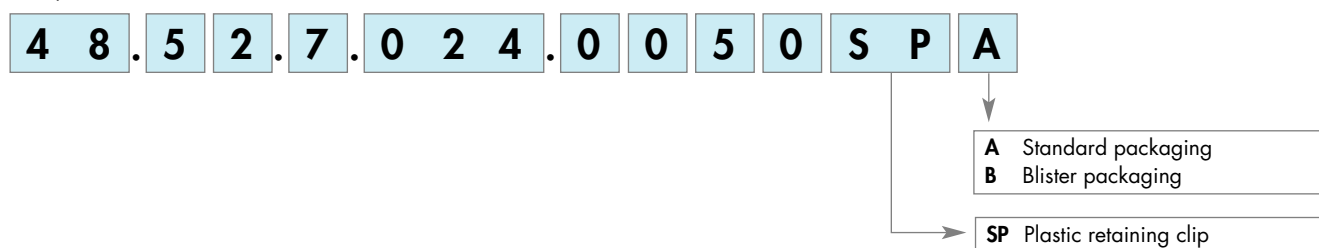
060.72

Sheet of marker tags , plastic, 72 tags, 6x12 mm	060.72
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Packaging codes

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

Example:



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 50022) mounting

49.31-50x0 / 49.52
Screw terminal



49.72-50x0
Screwless terminal

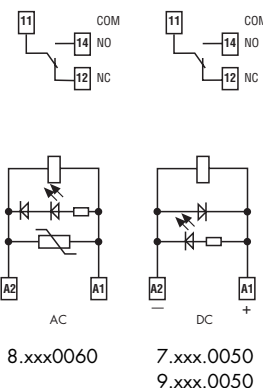


For outline drawing see page 8

49.31-50x0



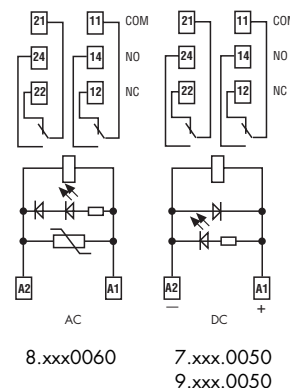
- 1 pole, 10 A
- AgNi + Au (5 µm) contact material
- Screw terminal
- 35 mm rail (EN 50022) mounting



49.52/72-50x0



- 2 pole, 8 A
- AgNi + Au (5 µm) contact material
- Screw terminal and screwless terminal
- 35 mm rail (EN 50022) mounting



** By external parallel connection of the contacts the values within [1 (0.1/1)] can be achieved.

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 (5 µm)	AgNi + Au (5 µm)

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...1.7)U _N	(0.73...1.5)U _N /(0.73...1.7)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 · 10 ⁶ /20 · 10 ⁶	10 · 10 ⁶ /20 · 10 ⁶
Electrical life at rated load AC1 cycles	150 · 10 ³	150 · 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)



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 50022) mounting

49.31-00x0 / 49.52
Screw terminal



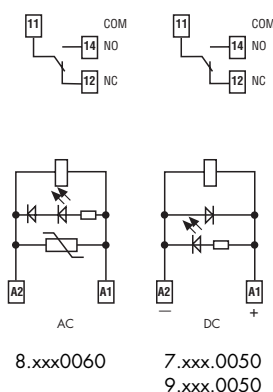
49.72-00x0
Screwless terminal



49.31-00x0



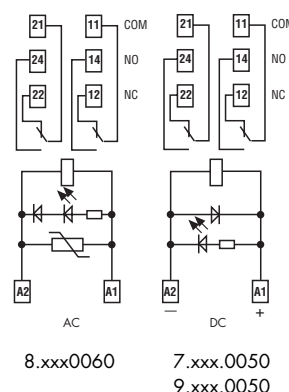
- 1 pole, 10 A
- AgNi contact material
- Screw terminal
- 35 mm rail (EN 50022) mounting



49.52/72-00x0



- 2 pole, 8 A
- AgNi contact material
- Screw terminal and screwless terminal
- 35 mm rail (EN 50022) mounting



For outline drawing see page 8

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...1.7)U _N	(0.73...1.5)U _N /(0.73...1.7)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 · 10 ⁶ /20 · 10 ⁶	10 · 10 ⁶ /20 · 10 ⁶
Electrical life at rated load AC1	cycles	200 · 10 ³	150 · 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)



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 50022) mounting

49.31-20x0 / 49.52
Screw terminal



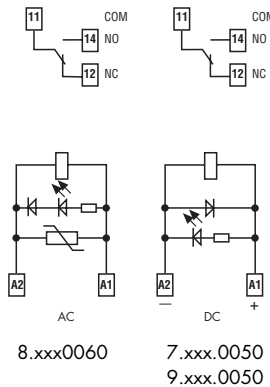
49.72-20x0
Screwless terminal



49.31-20x0



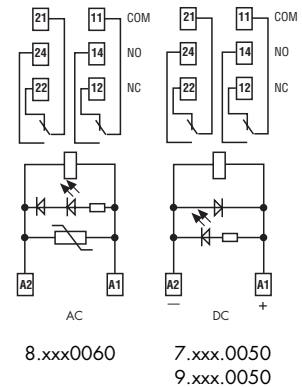
- 1 pole, 10 A
- AgCdO contact material
- Screw terminal
- 35 mm rail (EN 50022) mounting



49.52/72-20x0



- 2 pole, 8 A
- AgCdO contact material
- Screw terminal and screwless terminal
- 35 mm rail (EN 50022) mounting



For outline drawing see page 8

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...1.75)U _N	(0.73...1.5)U _N /(0.73...1.75)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 · 10 ⁶ / 20 · 10 ⁶	10 · 10 ⁶ / 20 · 10 ⁶
Electrical life at rated load AC1	cycles	200 · 10 ³	150 · 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)

Features

1 Pole relay interface module

AgCdO contacts for heavy duty switching

49.61-20x0 - 1 Pole 16 A (screw terminal)

49.81-20x0 - 1 Pole 16 A (screwless terminal)

AgSnO₂ 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 50022) mounting

49.61
Screw terminal



49.81-20x0/40x0
Screwless terminal



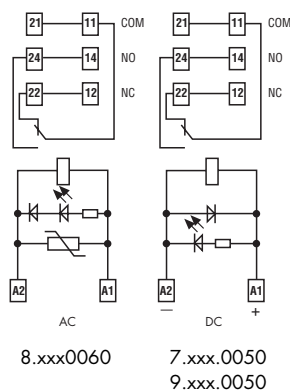
For outline drawing see page 8

Contact specification		49.61/81-20x0	49.61/81-40x0
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		49.61/81-20x0	49.61/81-40x0
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		49.61/81-20x0	49.61/81-40x0
Mechanical life AC/DC	cycles	10 · 10 ⁶ /20 · 10 ⁶	10 · 10 ⁶ /20 · 10 ⁶
Electrical life at rated load AC1	cycles	100 · 10 ³	100 · 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)		ABS RINA	

49.61/81-20x0



- 1 pole, 16 A
- AgCdO contact material
- Screw terminal and screwless terminal
- 35 mm rail (EN 50022) mounting

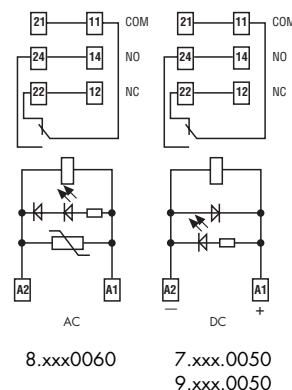


* For currents > 10 A, contact terminals must be connected in parallel (21 with 11, 24 with 14, 22 with 12).

49.61/81-40x0



- 1 pole, 16 A
- AgSnO₂ contact material
- Screw terminal and screwless terminal
- 35 mm rail (EN 50022) mounting



* For currents > 10 A, contact terminals must be connected in parallel (21 with 11, 24 with 14, 22 with 12).

Ordering information

Example: 49 series, 35 mm rail (EN 50022) 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

Series ———

Type ———

3, 5, 6 = 35 mm rail (EN 50022) mount, screw terminal

7, 8 = 35 mm rail (EN50022) 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 = AgSnO₂ for 49.61/81 only

5 = AgNi + Au (5 µm) 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**.

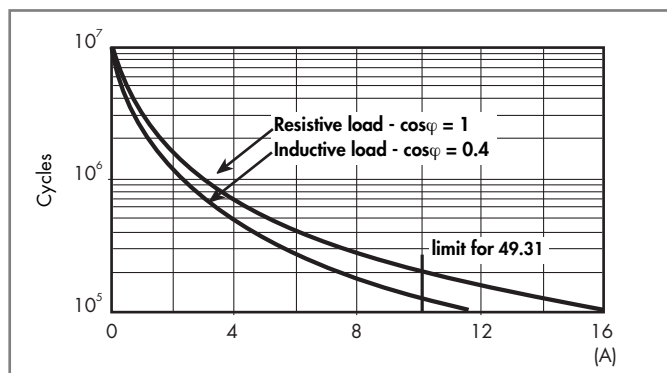
Type	Coil version	A	B	C	D
49.31/52/72	AC	0 - 2 - 5	0	6	0
49.31/52/72	DC	0 - 2 - 5	0	5	0
49.61/81	AC	0 - 4	0	6	0
49.61/81	DC	0 - 4	0	5	0

Technical data

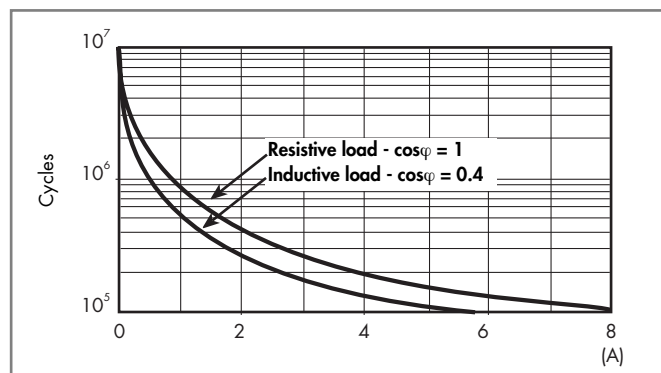
Insulation		49.31/61	49.52/72	49.31/61/81
Insulation according to EN 61810-1	insulation rated voltage	V	250	250
	rated impulse withstand voltage	kV	4	4
	pollution degree		3	2
	overvoltage category		III	III
Insulation between coil and contacts (1.2/50 µs)		kV	6 (8 mm)	
Dielectric strength between open contacts		V AC	1,000	
Dielectric strength between adjacent contacts		V AC	2,000 (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 (5...55)Hz: NO/NC		g	10/4 (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		solid cable	stranded cable
	mm ²		2x(0.2...1.5)	2x(0.2...1.5)
	AWG		2x(24...18)	2x(24...18)

Contact specification

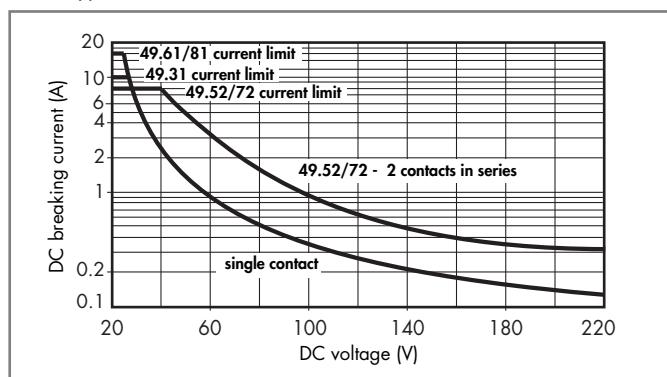
F 49 - Electrical life (AC) v contact current
Types 49.31/61/81



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 $\geq 100 \cdot 10^3$ 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		Rated coil consumption I at U_N
V		U_{min}^* V	U_{max}^{**} V	mA
12	7.012	8.8	21	41
24	7.024	17.5	42	22.2
125	7.125	91.2	212.5	4

* $U_{min} = 0.8 U_N$ for 49.61 and 49.81

** $U_{max} = 1.5 U_N$ for 49.61 and 49.81

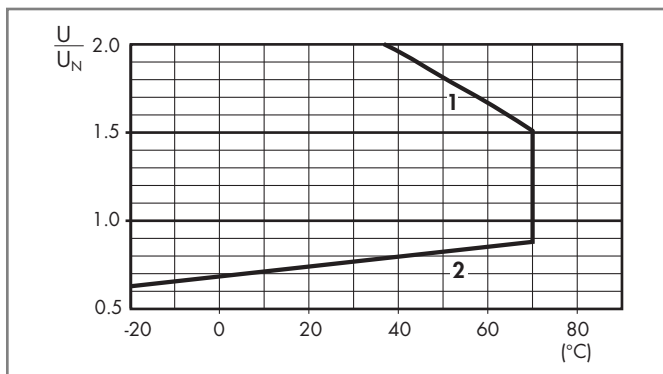
AC coil data

Nominal voltage U_N	Coil code	Operating range		Rated coil consumption I at U_N (50Hz)
V		U_{min} V	U_{max} 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 (0.65 W)

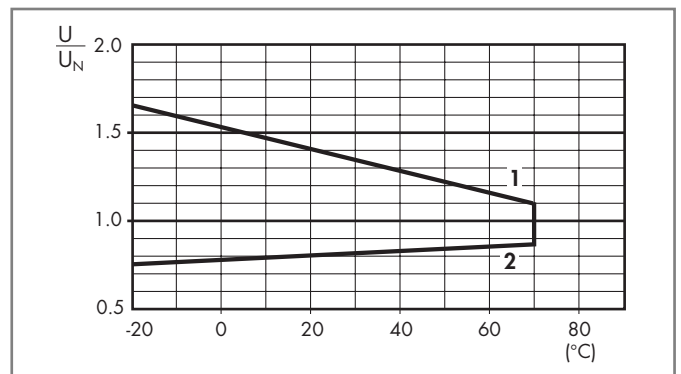
Nominal voltage U_N	Coil code	Operating range		Rated coil consumption I at U_N
V		U_{min} V	U_{max} V	mA
12	9.012	8.8	18	56
24	9.024	17.5	36	29
125	9.125	91.2	187.5	6

R 49 - DC coil operating range v ambient temperature Standard (650 mW)



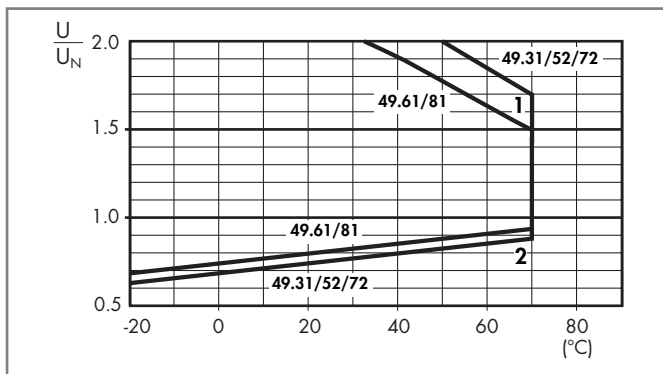
- 1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

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)

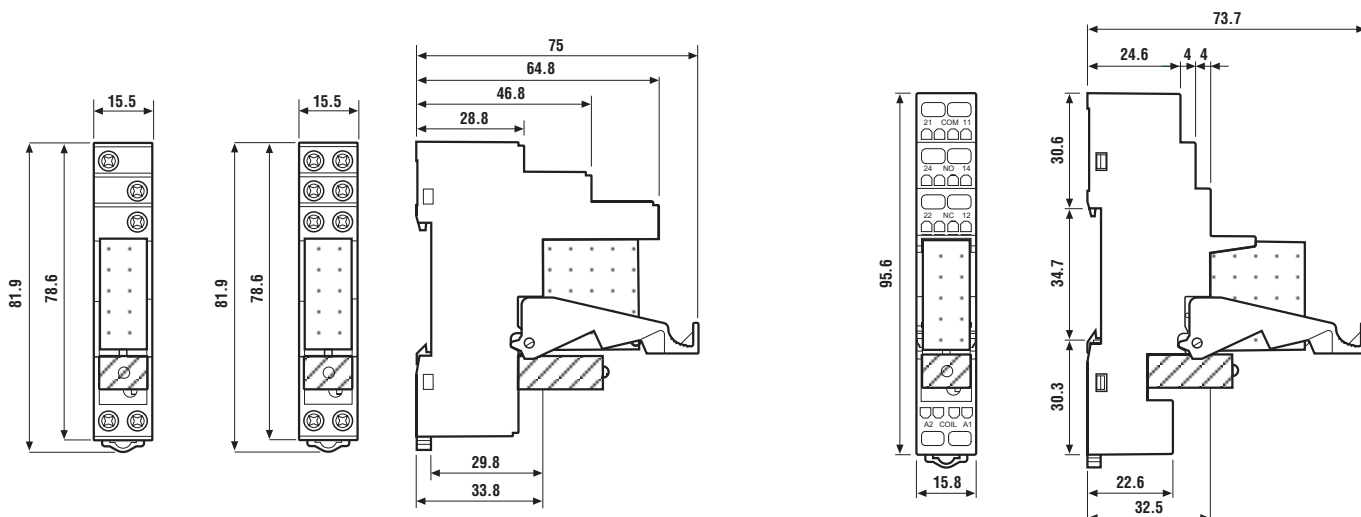


- 1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

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

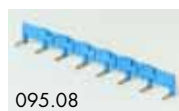


49.72
49.81

49.72-50x0 / 49.72-00x0 / 49.72-20x0
49.81-20x0 / 49.81-40x0
Screwless terminal

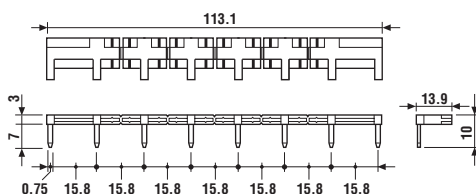


Accessories



095.08

8-way jumper link for screw terminal versions	095.08 (blue)	095.08.0 (black)
Rated values	10 A - 250 V	



Sheet of marker tags , plastic, 72 tags, 6x12 mm	060.72
---	--------



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

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 50022) mounting

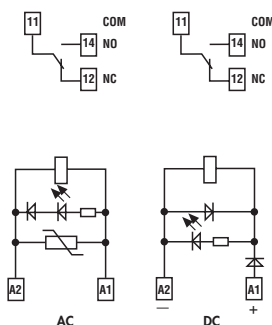
4C.01 / 4C.02
Screw terminal



4C.01



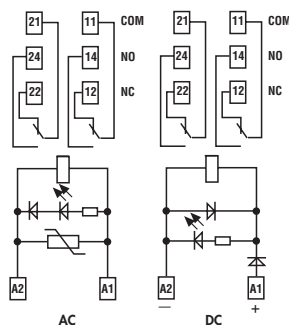
- 1 pole, 16 A
- Screw terminal connection
- 35 mm rail (EN 50022) mounting



4C.02



- 2 pole, 8 A
- Screw terminal connection
- 35 mm rail (EN 50022) mounting



For outline drawing of 4C.01/02 see page 5

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	4000	2000
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 μ s)	kV	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts	V AC	1000	1000
Ambient temperature range	°C	$\leq 12A: -40...+70 > 12A: -40...+50$	$-40...+70$
Protection category		IP 20	IP 20

Approvals - relay (according to type)



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 50022) mounting

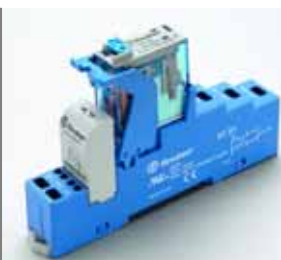
4C.51 / 4C.52
Screwless terminal



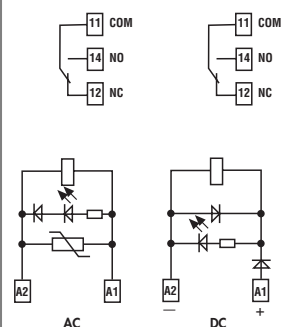
For outline drawing of 4C.51/52 see page 5

Contact specification		4C.51	4C.52
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	2500	2000
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		4C.51	4C.52
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	$(0.8 \dots 1.1) U_N$	$(0.8 \dots 1.1) U_N$
	DC	$(0.73 \dots 1.1) U_N$	$(0.73 \dots 1.1) U_N$
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		4C.51	4C.52
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 μ s)	kV	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts	V AC	1000	1000
Ambient temperature range	°C	-25...+70	-25...+70
Protection category		IP 20	IP 20
Approvals - relay (according to type)		CE SR PG Y CUL US VDE	

4C.51



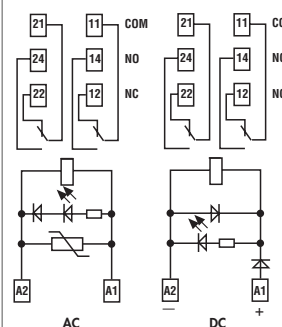
- 1 pole, 10 A
- Screwless terminal connections
- 35 mm rail (EN 50022) mounting



4C.52

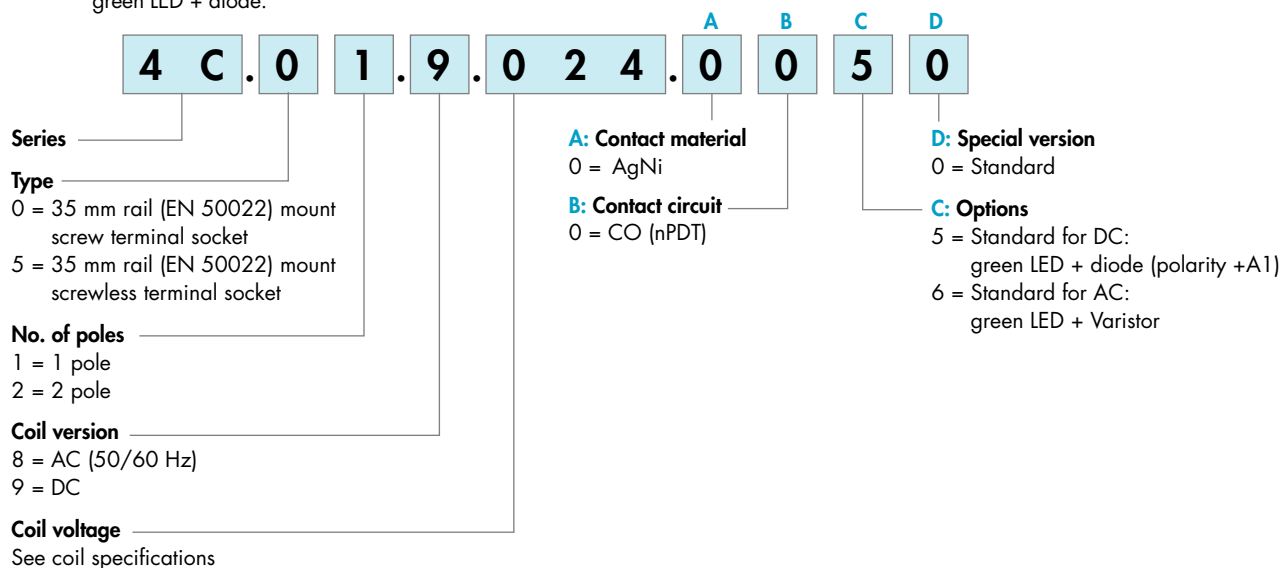


- 2 pole, 8 A
- Screwless terminal connections
- 35 mm rail (EN 50022) mounting



Ordering information

Example: 4C series, 35 mm rail (EN 50022) mount screw terminal relay interface module, 1 CO (SPDT) 16 A contacts, 24 V DC coil, green LED + diode.

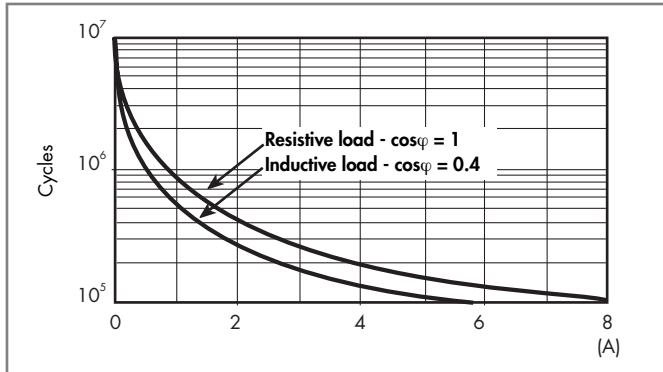


Technical data

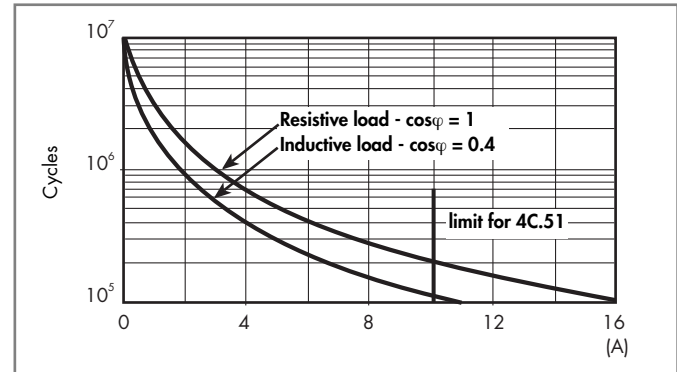
Insulation						
Insulation according to EN 61810-1	insulation rated voltage	V	250		440	
	rated impulse withstand voltage	kV	4		4	
	pollution degree		3		2	
	overvoltage category		III		III	
Insulation between coil and contacts (1.2/50 µs)		kV	6 (8 mm)			
Dielectric strength between open contacts		V AC	1000			
Dielectric strength between adjacent contacts		V AC	2000			
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)	
			4C.01/4C.02		4C.51/4C.52	
Wire strip length		mm	8		8	
⊕ 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...18)	2x(24...18)

Contact specification

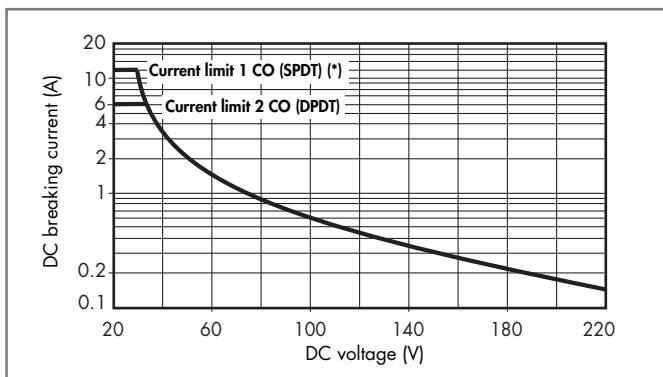
F 4C - Electrical life (AC) v contact current
Types 4C.02/52



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 $\geq 100 \cdot 10^3$ 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

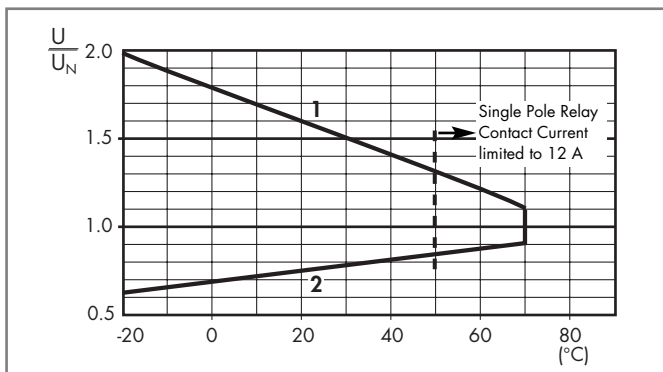
DC coil data

Nominal voltage U_N	Coil code	Operating range		Resistance	Rated coil consumption I at U_N
V		U_{min} V	U_{max} V	R Ω	mA
12	9.012	8.8	13.2	300	40
24	9.024	17.5	26.4	1200	20
125	9.125	91.2	137.5	32000	3.9

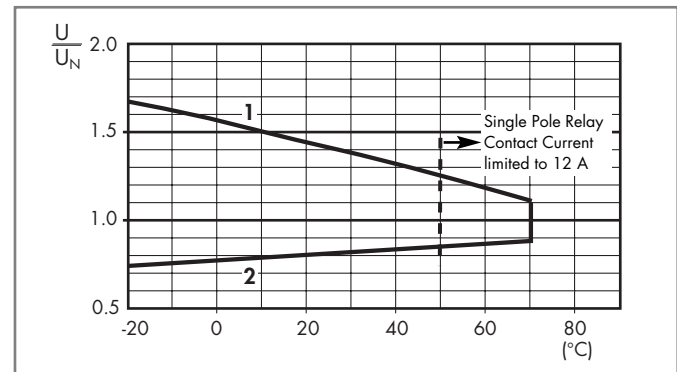
AC coil data

Nominal voltage U_N	Coil code	Operating range		Resistance	Rated coil consumption I at U_N
V		U_{min} V	U_{max} V	R 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	6900	9.4
120	8.120	96	132	9000	8.4
230	8.230	184	253	28000	5

R 4C - DC coil operating range v 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.

1 - Max. permitted coil voltage.

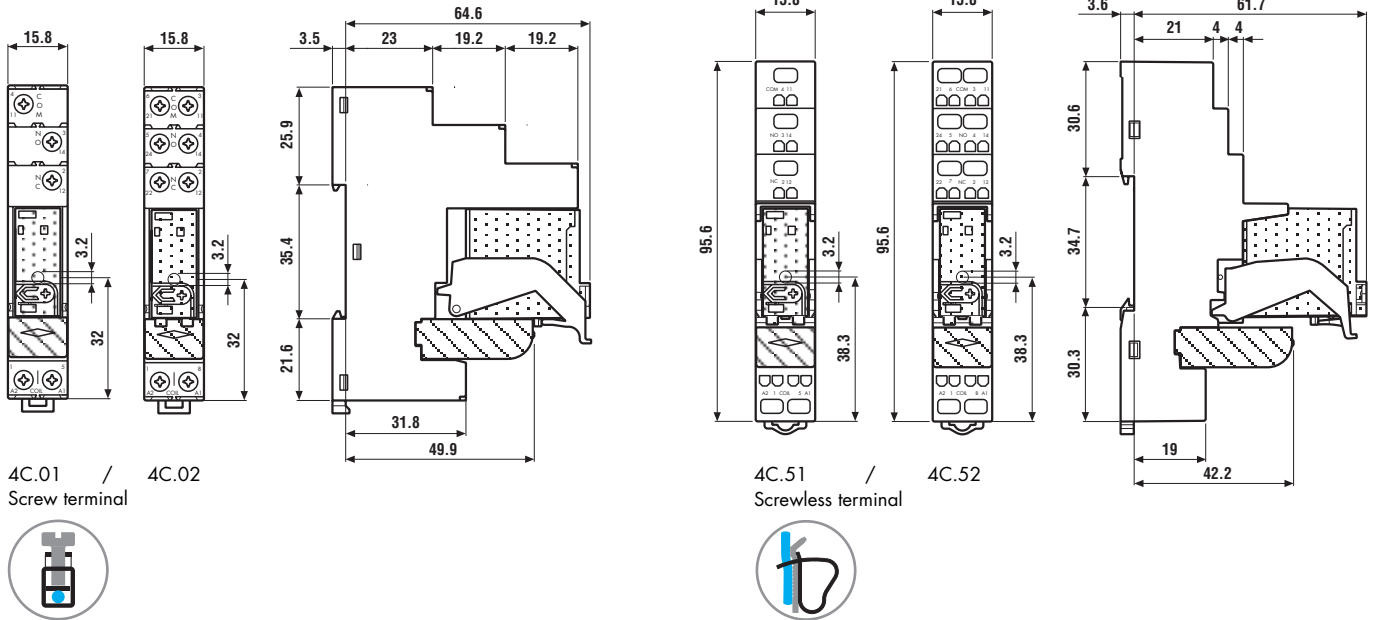
2 - Min. pick-up voltage with coil at ambient temperature.

Combinations

Certain relay/socket 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

Outline drawing



Accessories



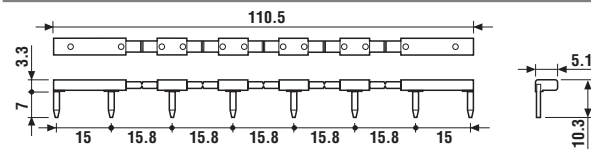
095.18

8-way jumper link for 4C.01 and 4C.02

Rated values

095.18 (blue)

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

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 50022) mounting

58.32 / 58.33 / 58.34

Screw terminals



For outline drawing see page 4

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

Single phase motor rating (230 V AC) kW

Breaking capacity DC1: 30/110/220V A

Minimum switching load mW (V/mA)

Standard contact material

Coil specification

Nominal voltage (U_N) V AC (50/60 Hz)

12 - 24 - 48 - 110 - 120 - 230

12 - 24 - 48 - 125

Rated power AC/DC VA (50 Hz)/W

1.5/1

Operating range AC

$(0.8 \dots 1.1) U_N$

Operating range DC

$(0.8 \dots 1.1) U_N$

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

$200 \cdot 10^3$

Operate/release time ms

9/3 (AC) - 9/15 (DC)

Insulation between coil and contacts (1.2/50 μ s) kV

3.6

Dielectric strength between open contacts V AC

1,000

Ambient temperature range °C

-40...+70

Protection category

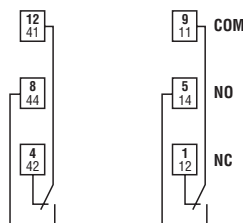
IP 20

Approvals relay (according to type)

58.32



- 2 pole, 10 A
- Screw terminals
- 35 mm rail (50022) mounting

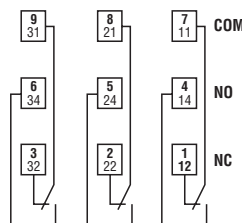


Example: AC

58.33



- 3 pole, 10 A
- Screw terminals
- 35 mm rail (50022) mounting

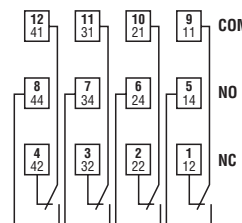


Example: DC

58.34



- 4 pole, 7 A
- Screw terminals
- 35 mm rail (50022) mounting



Example: AC

Ordering information

Example: 58 series 35 mm rail (EN 55022) mounting, screw terminals interface module, 4 CO (4PDT), 24 V DC coil, green LED + diode.

	5	8	.	3	.	4	.	9	.	0	2	4	.	0	A	B	C	D	
Series	58			3		4		9		0	2	4		0		0		5	0
Type				3		4		9		0	2	4		0		0		5	0
				3 = Screw terminals		4 = 35 mm rail (EN 55022) mount													
No. of poles						4													
						4 = 4 pole, 7 A													
Coil version								9											
								9 = DC											
Coil voltage																			

A: Contact material
0 = AgNi Standard

B: Contact circuit
0 = CO (nPDT)

D: Special versions
0 = Standard

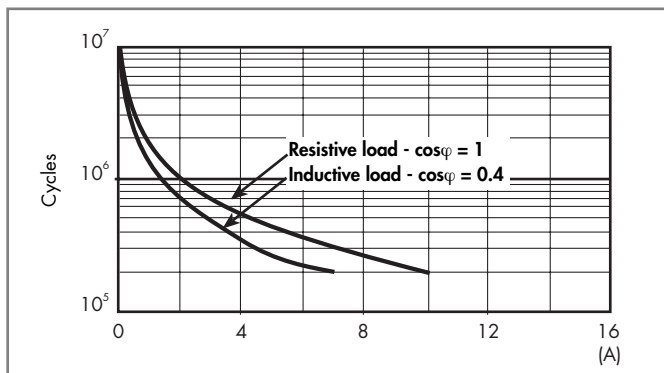
C: Options
5 = Standard DC: green LED + diode (polarity +A1)
6 = Standard AC: green LED + Varistor

Technical data

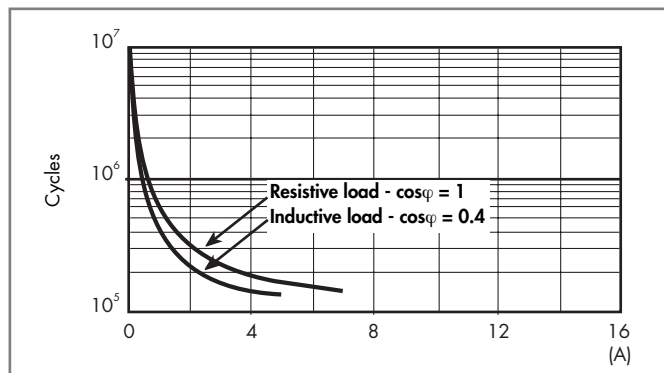
Insulation				
Insulation according to EN 61810-1	insulation rated voltage	V	400 (2-3 pole)	250 (4 pole)
	rated impulse withstand voltage	kV	3.6 (2-3 pole)	2.5 (4 pole)
	pollution degree		2	2
	overvoltage category		III	II
Insulation between coil and contacts (1.2/50 µs)		kV	3.6	
Dielectric strength between open contacts		V AC	1,000	
Dielectric strength between adjacent contacts		V AC	2,000 (58.32, 58.33)	1,550 (58.34)
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 (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)	4 (58.33)
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

Contact specification

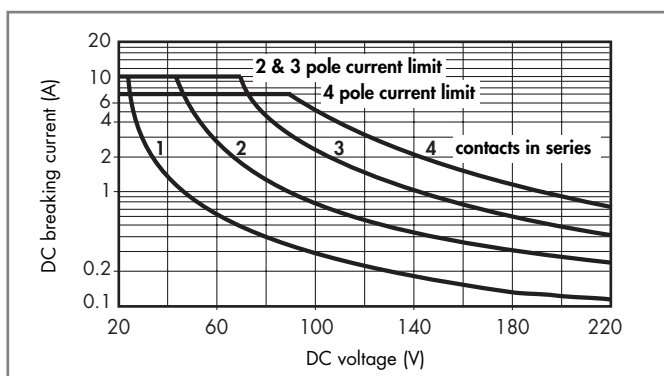
F 58 - Electrical life (AC) v contact current
2 & 3 pole relays



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 $\geq 100 \cdot 10^3$ 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

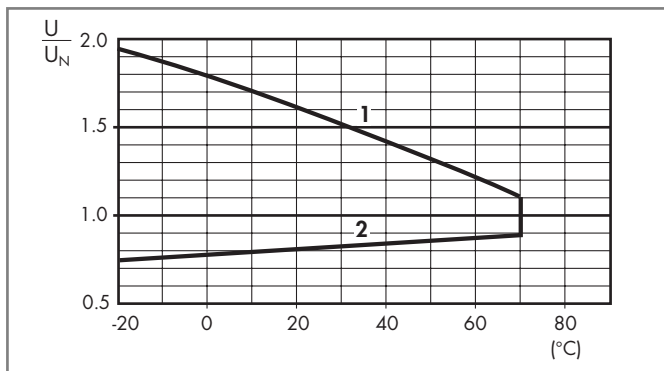
DC coil data

Nominal voltage U_N	Coil code	Operating range		Resistance	Rated coil absorption I at U_N
V		U_{min} V	U_{max} V	R 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	137.5	17,300	7.2

AC coil data

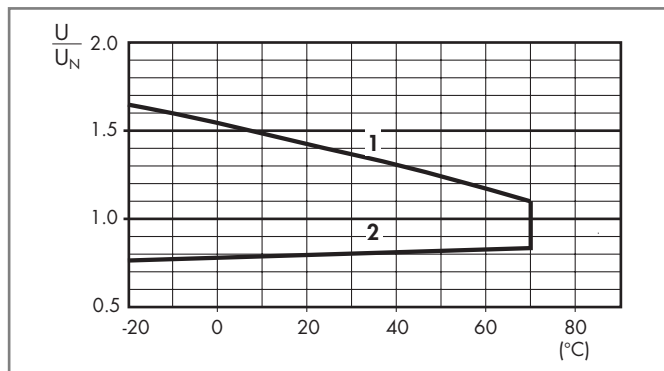
Nominal voltage U_N	Coil code	Operating range		Resistance	Rated coil absorption I at U_N (50Hz)
V		U_{min} V	U_{max} V	R Ω	mA
12	8.012	9.6	13.2	50	97
24	8.024	19.2	26.4	190	53
48	8.048	38.4	52.8	770	25
110	8.110	88	121	4,000	12.5
120	8.120	96	132	4,700	12
230	8.230	184	253	17,000	6

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



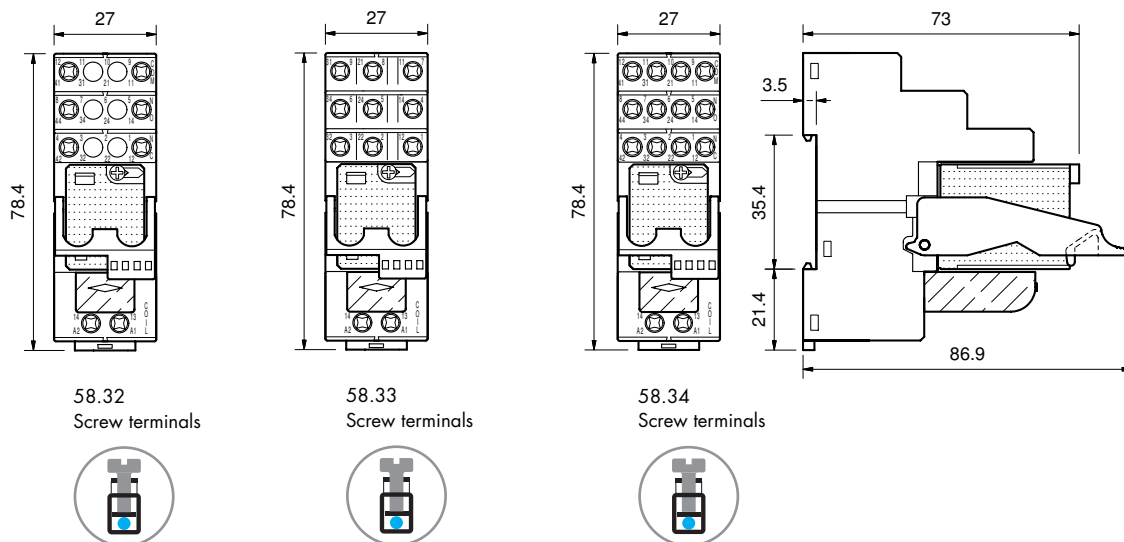
- 1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

Combinations

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

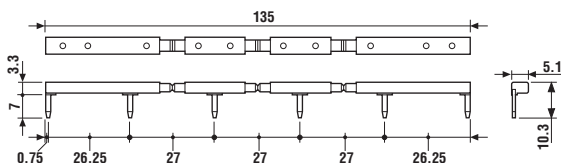
Outline drawing



Accessories



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



Sheet of marker tags, plastic, 72 tags, 6x12 mm	060.72
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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)

59.54 - 4 Pole 7 A (screwless 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 50022) mount

59.32 / 59.34
Screw terminals



59.54
Screwless terminals



For outline drawing see page 4

Contact specification

Contact configuration	2 CO (DPDT)	4 CO (4PDT)	4 CO (4PDT)
Rated current/Maximum peak current A	10/20	7/10	7/10
Rated voltage/Maximum switching voltage V AC	250/400	250/250	250/250
Rated load AC1 VA	2,500	1,750	1,750
Rated load AC15 (230 V AC) VA	500	350	350
Single phase motor rating (230 V AC) kW	0.37	0.125	0.125
Breaking capacity DC1: 30/110/220V A	10/0.25/0.12	7/0.25/0.12	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 - 230	12 - 24 - 230	12 - 24 - 230
	V DC	12 - 24	12 - 24	12 - 24
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 · 10 ⁶ /50 · 10 ⁶	20 · 10 ⁶ /50 · 10 ⁶	20 · 10 ⁶ /50 · 10 ⁶
Electrical life at rated load AC1	cycles	200 · 10 ³	150 · 10 ³	150 · 10 ³
Operate/release time	ms	9/3 (AC) - 9/15 (DC)	9/3 (AC) - 9/15 (DC)	9/3 (AC) - 9/15 (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)




59.32	59.34	59.54
<ul style="list-style-type: none"> • 2 pole, 10 A • Screw terminals • 35 mm rail (EN 50022) mount 	<ul style="list-style-type: none"> • 4 pole, 7 A • Screw terminals • 35 mm rail (EN 50022) mount 	<ul style="list-style-type: none"> • 4 pole, 7 A • Screwless terminals • 35 mm rail (EN 50022) mount
<p>Example: AC</p>	<p>Example: DC</p>	<p>Example: AC</p>

Ordering information

Example: 59 series 35 mm rail (EN 55022) mounting, screw terminal, interface module, 4 CO (4PDT), 24 V DC coil, green LED + diode.

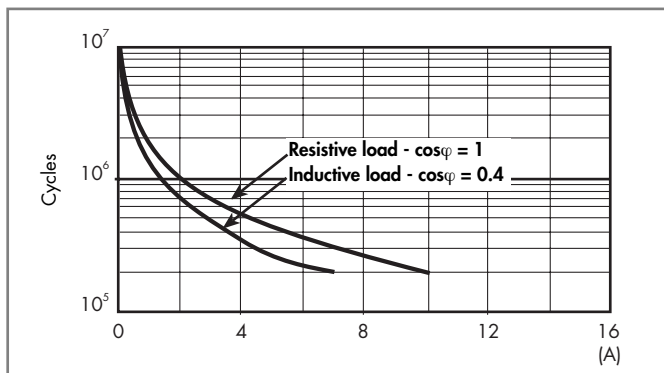
5	9	.	3	4	.	9	.	0	2	4	.	0	A	B	C	D	
Series												A: Contact material				D: Special versions	
Type												B: Contact circuit				C: Options	
3 = Screw terminals, 35 mm rail (EN 50022) mount		5 = Screwless terminals, 35 mm rail (EN 50022) mount										0 = AgNi Standard 2 = AgCdO 5 = AgNi + Au (5 µm)				0 = Standard 5 = Standard DC: green LED + diode (polarity +A1) 6 = Standard AC: green LED + Varistor	
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																	

Technical data

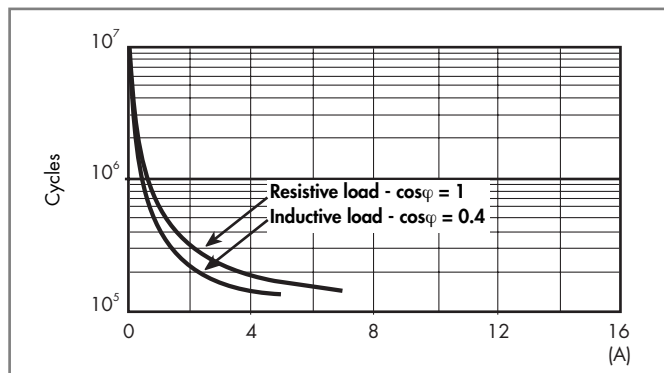
Insulation						
Insulation according to EN 61810-1	insulation rated voltage	V	400 (2 pole)		250 (4 pole)	
	rated impulse withstand voltage	kV	3.6 (2 pole)		2.5 (4 pole)	
	pollution degree		2		2	
	overvoltage category		III		II	
Insulation between coil and contacts (1.2/50 µs)		kV	3.6			
Dielectric strength between open contacts		V AC	1,000			
Dielectric strength between adjacent contacts		V AC	2,000 (59.32)		1,550 (59.34/54)	
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	1/4			
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)		59.54 (screwless terminals)	
Wire strip length		mm	8		8	
 Screw torque		Nm	0.5		—	
Max. wire size			solid cable	stranded cable	solid cable	stranded cable
	mm²		1x6 / 2x2.5	1x4 / 2x2.5	1x2.5	1x1.5
	AWG		1x10 / 2x14	1x12 / 2x14	1x14	1x16

Contact specification

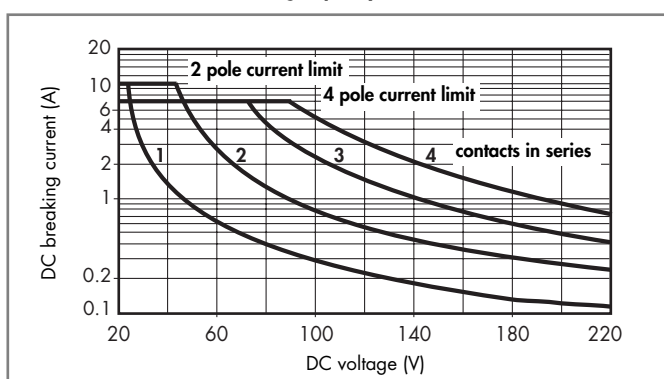
F 59 - Electrical life (AC) v contact current
2 pole relay



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 $\geq 100 \cdot 10^3$ 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

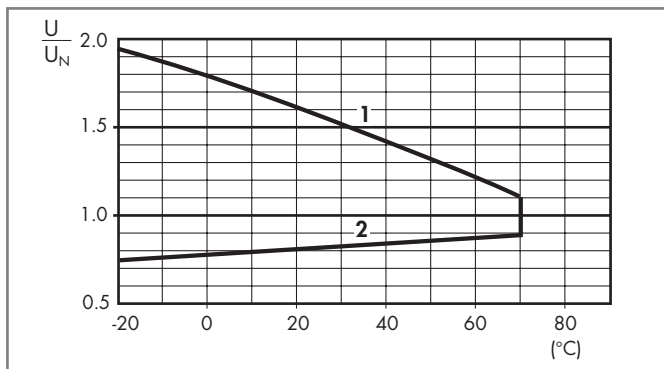
DC coil data

Nominal voltage U_N	Coil code	Operating range		Resistance	Rated coil absorption I at U_N
V		U_{min} V	U_{max} V	R Ω	mA
12	9.012	9.6	13.2	140	86
24	9.024	19.2	26.4	600	40

AC coil data

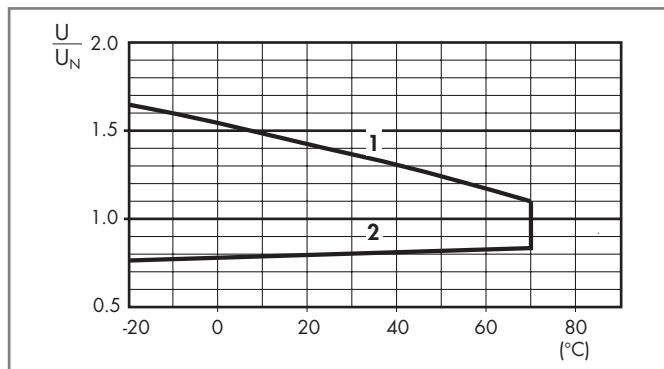
Nominal voltage U_N	Coil code	Operating range		Resistance	Rated coil absorption I at U_N (50Hz)
V		U_{min} V	U_{max} V	R Ω	mA
12	8.012	9.6	13.2	50	97
24	8.024	19.2	26.4	190	53
230	8.230	184	253	17,000	6

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

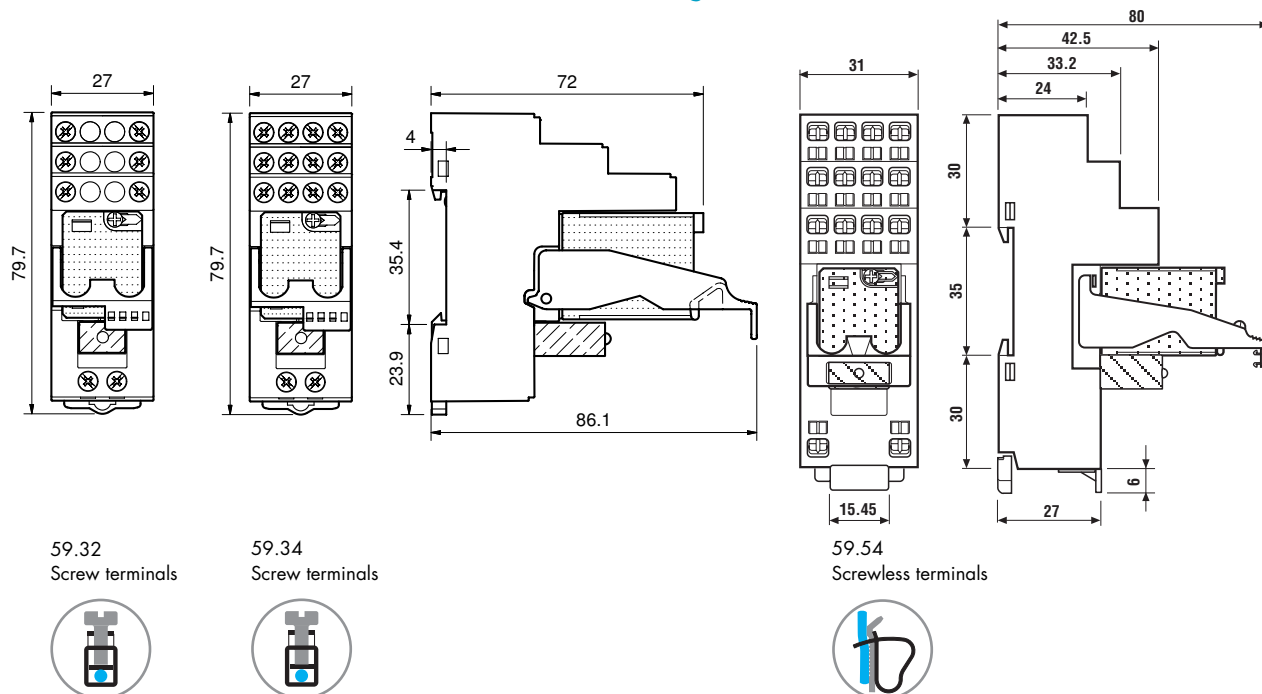


- 1 - Max. permitted coil voltage.
2 - Min. pick-up voltage with coil at ambient temperature.

Combinations

Code	Type of socket	Type of relay	Module	Retaining clip
59.32	94.94.3	55.32	99.80	094.91.3
59.34	94.94.3	55.34	99.80	094.91.3
59.54	94.54.1	55.34	99.80	094.91

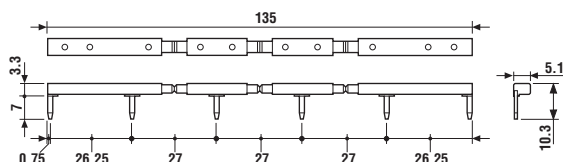
Outline drawing



Accessories



6-way jumper link for 59.32 and 59.34	094.06 (blue)	094.06.0 (black)
Rated values	10 A - 250 V	



Sheet of marker tags for retaining and release clip 094.91.3 plastic, 72 tags, 6x12 mm	060.72
--	--------



Sheet of marker tags for retaining and release clip 094.91.1 plastic, 24 tags, 9x17 mm	020.24
--	--------

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

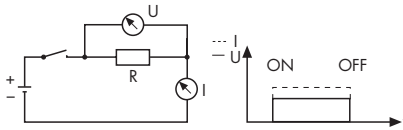
99.01

99.02

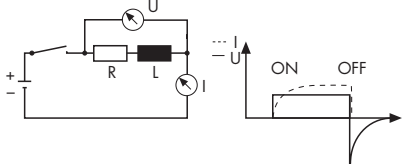
99.80

					
Sockets	Relays	Sockets	Relays	Sockets	Relays
90.20	60.12	90.02	60.12	94.54.1	55.32, 55.34
90.21	60.13	90.03	60.13	94.82.3	55.32
94.72	55.32	92.03	62.32, 62.33	94.84.3	55.32, 55.34
94.73	55.33	94.02	55.32	84.84.2	55.32, 55.34
94.74	55.32, 55.34	94.03	55.33	94.92.3	55.32
94.82	55.32	94.04	55.32, 55.34	94.94.3	55.32, 55.34
96.72	56.32	95.03	40.31	95.55.3	40.51/52/61
96.74	56.34	95.05	40.51/52/61		44.52, 44.62
			44.52, 44.62	95.83.3	40.31
		95.55	40.51/52/61	95.85.3	40.51/52/61
			44.52, 44.62		44.52/62
		97.01	46.61	95.93.3	40.31
		97.02	46.52	95.95.3	40.51/52/61
		97.51	46.61		44.52, 44.62
		97.52	46.52		
FUNCTION / OPERATING RANGE		CODE		CODE	
Green LED + diode module (standard polarity)					
6 - 24 V DC		99.01.9.024.99		99.80.9.024.99	
28 - 60 V DC		99.01.9.060.99		99.80.9.060.99	
110 - 220 V DC		99.01.9.220.99		99.80.9.220.99	
Green LED + diode module (non-standard polarity)					
6 - 24 V DC		99.01.9.024.79		99.80.9.024.79	
28 - 60 V DC		99.01.9.060.79		99.80.9.060.79	
110 - 220 V DC		99.01.9.220.79		99.80.9.220.79	
Green LED + Varistor					
6 - 24 V AC/DC		99.01.0.024.98		99.80.0.024.98	
28 - 60 V AC/DC		99.01.0.060.98		99.80.0.060.98	
110 - 240 V AC/DC		99.01.0.230.98		99.80.0.230.98	
Green LED					
6 - 24 V AC/DC		99.01.0.024.59		99.80.0.024.59	
28 - 60 V AC/DC		99.01.0.060.59		99.80.0.060.59	
110 - 240 V AC/DC		99.01.0.230.59		99.80.0.230.59	
Diode module (standard polarity)					
6 - 220 V DC		99.01.3.000.00		99.80.3.000.00	
Diode module (non-standard polarity)					
6 - 220 V DC		99.01.2.000.00		99.80.2.000.00	
RC module					
6 - 24 V AC/DC		99.01.0.024.09		99.80.0.024.09	
28 - 60 V AC/DC		99.01.0.060.09		99.80.0.060.09	
110 - 240 V AC/DC		99.01.0.230.09		99.80.0.230.09	
Residual current bypass module					
110 - 240 V AC		99.01.8.230.07		99.80.8.230.07	

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 energising 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 be taken into account when calculating the VA rating of the transformer.

Diagrams		Functions
<p>99.01.9.xxx.99 only 99.80.9.xxx.99 only</p>	<p>99.02.9.xxx.99 only</p>	<p>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.</p>
<p>99.01.9.xxx.79 only 99.80.9.xxx.79 only</p>	<p>99.02.9.xxx.79 only</p>	<p>Green LED + diode module (non-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 A2). 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.</p>
		<p>Green LED + Varistor 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.</p>
		<p>Green LED 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.</p>
<p>99.01.3.000.00 only 99.80.3.000.00 only</p>	<p>99.02.3.000.00 only</p>	<p>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.</p>
<p>99.01.2.000.00 only 99.80.2.000.00 only</p>	<p>99.02.2.000.00 only</p>	<p>Diode module (non-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 A2). 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.</p>
		<p>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.</p>
		<p>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.</p>

Features

1 - Phase 230 V

Over & Under voltage monitoring relays

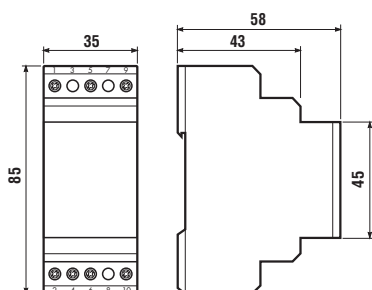
71.11.8.230.0010

- 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 50022) mounting
- LED indication
- Positive safety logic (healthy conditions - output relay energised)



71.11.8.230.0010



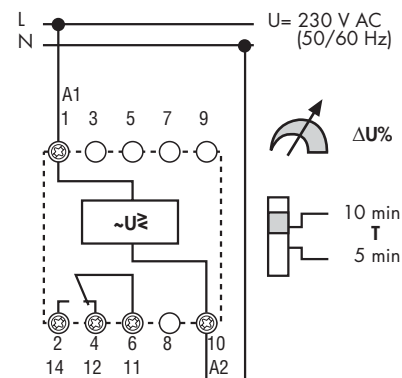
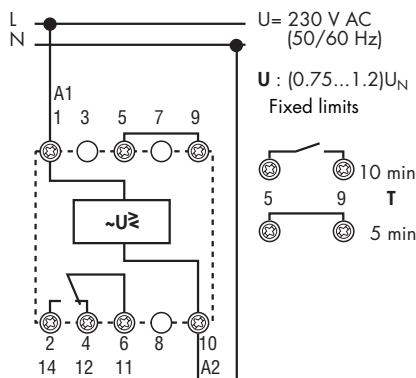
- Fixed - Over/Under voltage limits, $(0.75...1.2) U_N$ respectively
- Link selectable - 5 min or 10 min delay

71.11.8.230.1010



- Adjustable - symmetrical Over/Under voltage limits adjustable between $\pm 5\%$ to $\pm 20\% U_N$
- 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.



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

—

—

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 $(\pm 5... \pm 20)\% U_N$

Switch-on lock-out time/reaction time

$(5 \text{ or } 10) \text{ min} / < 0.5 \text{ s}$

$(5 \text{ or } 10) \text{ min} / < 0.5 \text{ s}$

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)



Features

71.31.8.400.1010

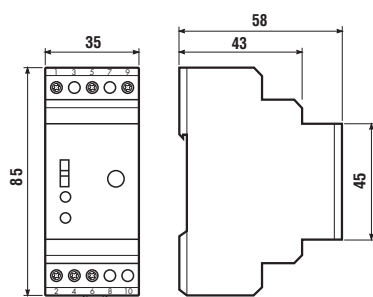
3 - Phase 400 V

Over & Under voltage monitoring relay

71.31.8.400.1010

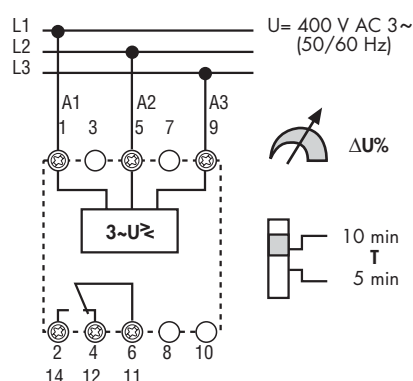
- Adjustable Over & Under voltage detection
- Switch selectable 5 or 10 minute lock-out delay

- 35 mm rail (EN 50022) mounting
- LED indication
- Positive safety logic (healthy conditions - output relay energised)



- Adjustable - symmetrical Over/Under voltage limits adjustable between $\pm 5\%$ to $\pm 20\%$ U_N
- Switch selectable - 5 min or 10 min delay

- Detects 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.



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 ($\pm 5 \dots \pm 20$)% 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 $-20 \dots +55$
Protection category	IP 20

Approvals (according to type)



Features

3 - Phase 400 V - Line monitoring relays

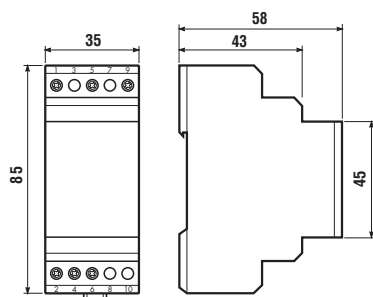
71.31.8.400.1021

- Over & Under voltage trip on-delay
- Fault memory

71.31.8.400.2000

- Phase asymmetry
- Phase rotation
- Phase loss

- 35 mm rail (EN 50022) mounting
- LED indication
- Positive safety logic (healthy conditions - output relay energised)

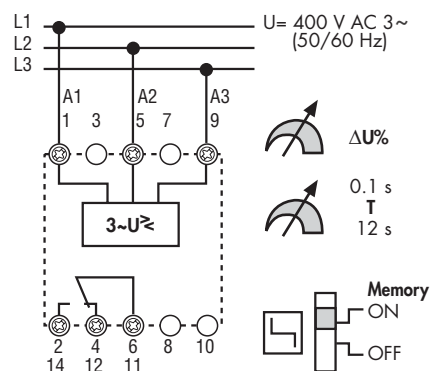


71.31.8.400.1021



- 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

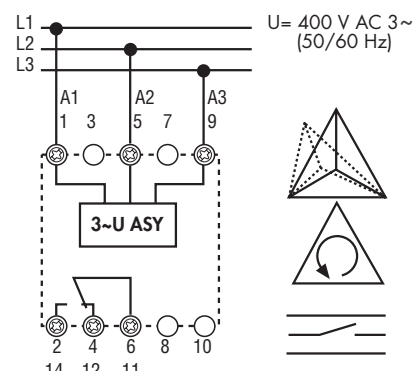


71.31.8.400.2000



- 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) $> 1.11 U_N$



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 $U_{min}/U_{max}/Asymmetry$

$(0.8...0.95)U_N / 1.15 U_N / —$

$0.7 U_N / 1.11 U_N / [-5...-20]\% U_N$

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)



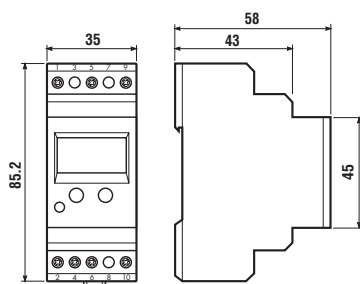
Features

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 50022) mounting

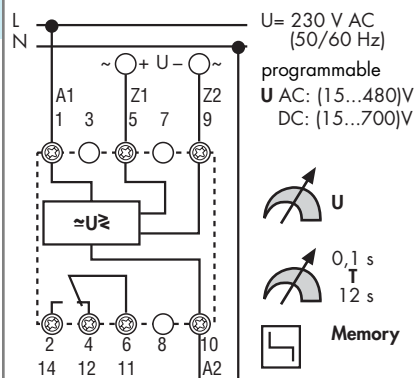


71.41.8.230.1021



- 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

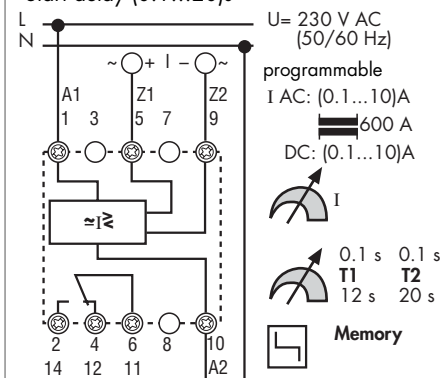


71.51.8.230.1021



- 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



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 · 10 ³	100 · 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)		CE	PG

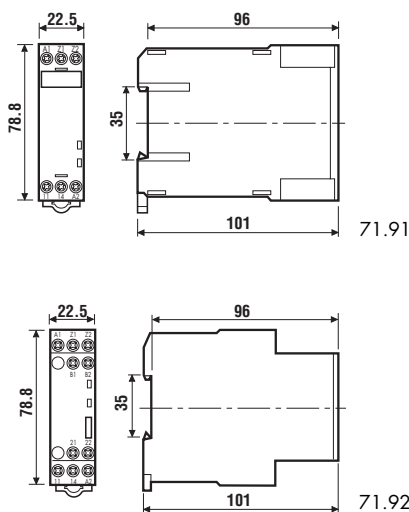
Features

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 50022) mounting

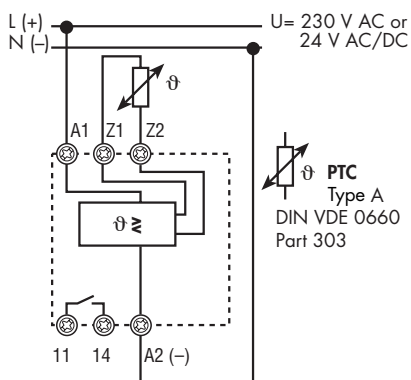


71.91.x.xxx.0300



- Thermistor relay
- 1 Pole normally open contact
- 24 V AC/DC, or 230 V AC supply

- Temperature detection with PTC
- PTC short circuit detection
- PTC wire breakage detection

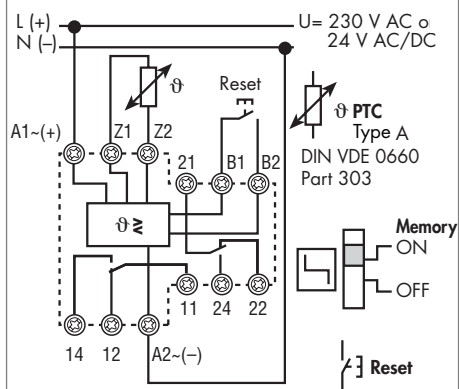


71.92.x.xxx.0001



- Thermistor relay with fault memory
- 2 Pole changeover contacts
- 24 V AC/DC, or 230 V AC supply

- Temperature detection with PTC
- Fault memory – switch selectable
- Reset by Reset button or supply interruption
- PTC short circuit detection
- PTC wire breakage detection



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	$<20 \Omega / >20 \Omega \dots <3 \text{ k}\Omega$	$<20 \Omega / >20 \Omega \dots <3 \text{ k}\Omega$
Reset/PTC break	$<1.3 \text{ k}\Omega / >3 \text{ k}\Omega$	$<1.3 \text{ k}\Omega / >3 \text{ k}\Omega$
Delay time/activation time	— / $<0.5 \text{ s}$	— / $<0.5 \text{ s}$
Fault memory - switch selectable	—	Yes
Electrical isolation: Supply to Measuring circuits	Yes	Yes
Ambient temperature range $^{\circ}\text{C}$	$-20...+55$	$-20...+55$
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 contact terminals (11, 12, 14) and terminals (Z1, Z2)			V AC	2,500		
			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, R1, R2) 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/ Measuring terminals			Type 71.11, 71.31	Contact bridge for time range	m	150 / —
			Type 71.41	Voltage measurement	m	150 / 50
(Wiring capacitance no greater than 10 nF/100 m)			Type 71.51	Current measurement	m	150 / 50
			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	VA	4	
			with rated current	VA	5	
Permitted storage temperature range			°C	−40...+85		
Protection category				IP 20		
 Screw torque			Nm	0.8		
Max. wire size				solid cable	standed cable	
			mm²	0.5...(2 x 2.5)	(2 x 1.5)	
			AWG	20...(2 x 14)	(2 x 16)	

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																				

Explanation of relay marking and LED/LCD display

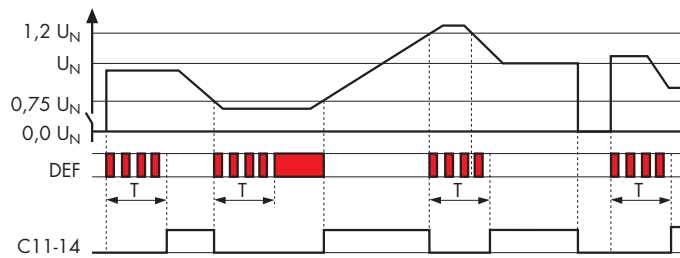
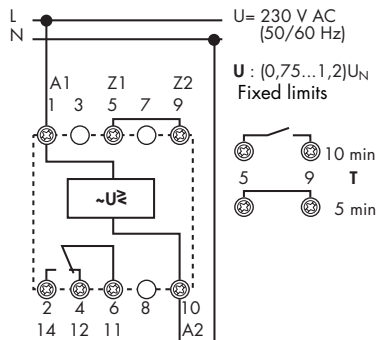
Monitoring relay without LCD-display			
ON	LED green steady light: supply voltage is on and measuring system is active.		
DEF	Default: the detected value is outside of the acceptable range (asymmetric is shown by the LED ASY). LED red flashing: delay time is running, see the function diagram. LED red steady light: output relay is off, contact 11-14 (6-2) is open.		
ASY	Phase asymmetry 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 occurrence 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 state of the output contacts will only remain in the “fault” condition –contact 11-14 (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.		
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 choice of “AC” or “DC”, and is confirmed with “SET/RESET”. Successively pressing the button “SELECT” brings up the choices of Up, or Up _{Lo} . The appropriate choice 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 3 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 		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 		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/or 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 		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

Functions

Type 71.11.8.230.0010



Switch off

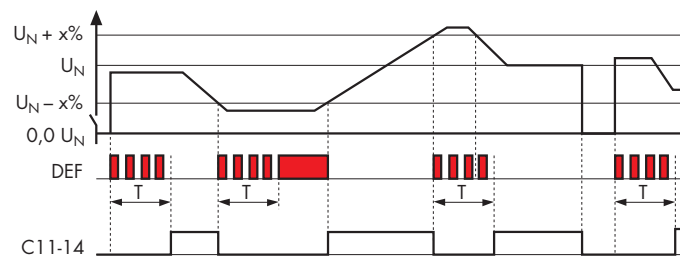
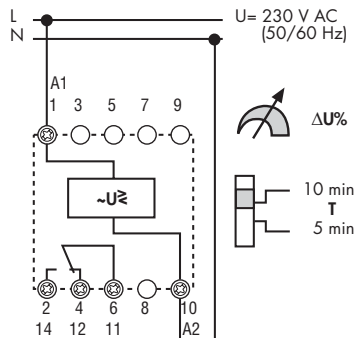
Immediately if monitored value is outside of the set points.

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

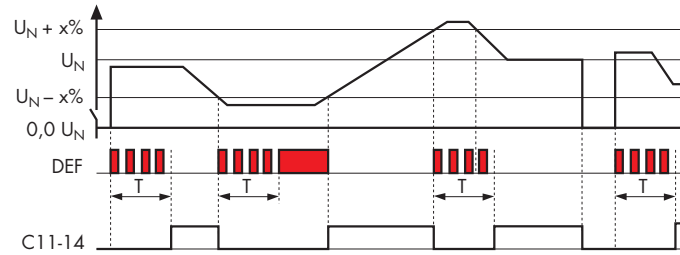
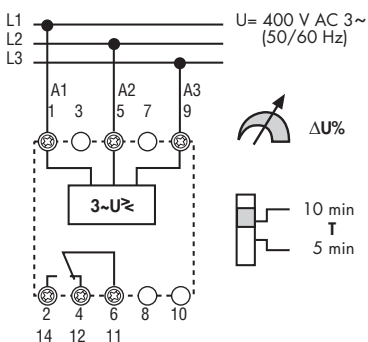
Immediately if monitored value is outside of the set points.

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

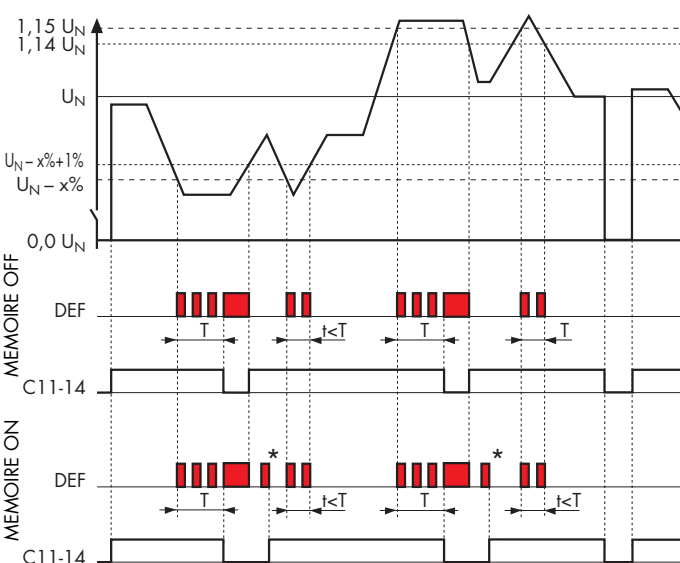
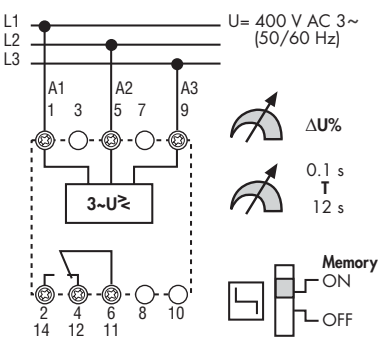
Immediately if monitored value is outside of the set points.

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



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).

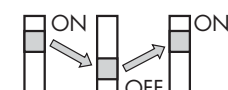
Switch on - MEMORY ON

As above, but subject to the RESET operation having been actioned.

RESET

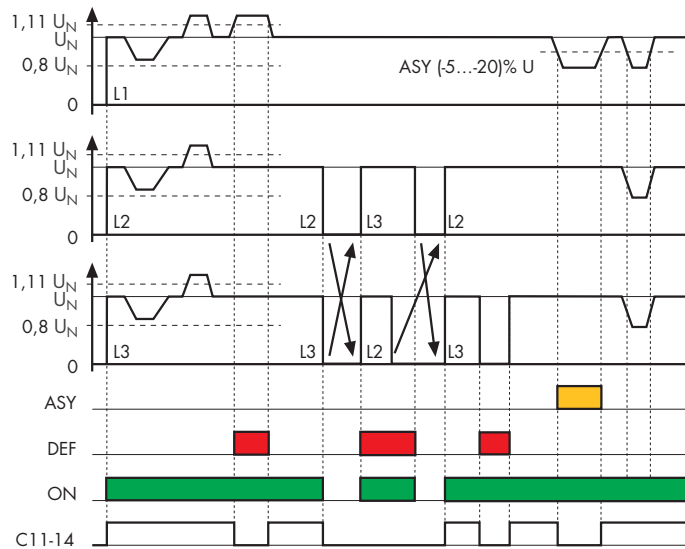
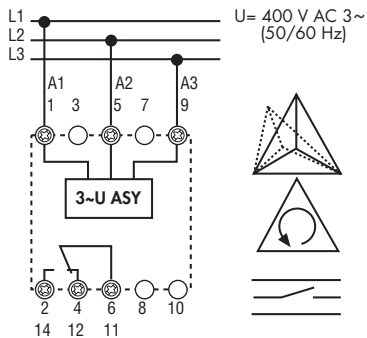
By Memory switch manipulation from ON to OFF and back to ON, or power down.

C = output contact
Normally open 11-14 (6-2) closed.

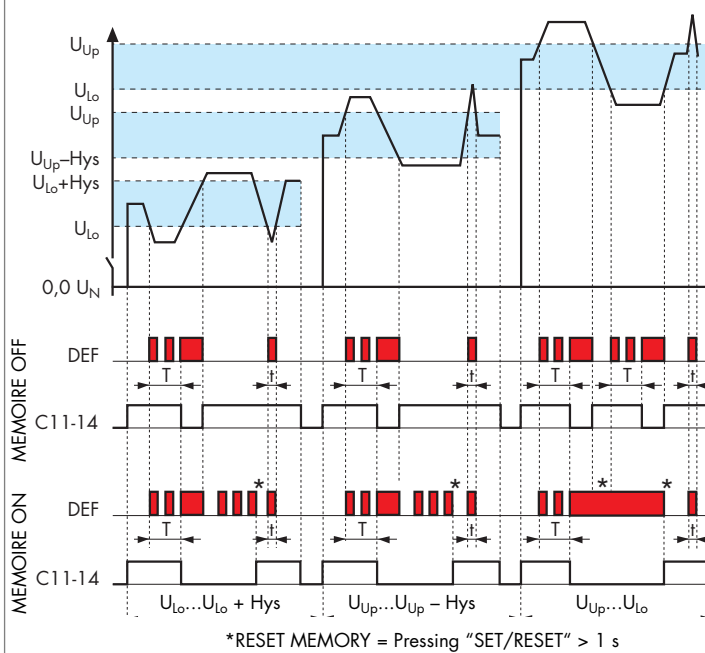
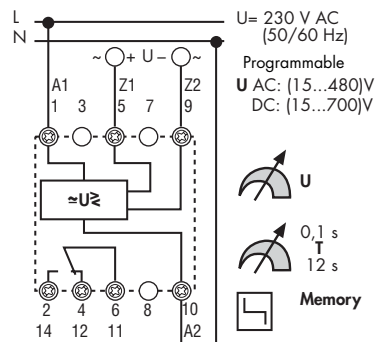


Functions

Type 71.31.8.400.2000

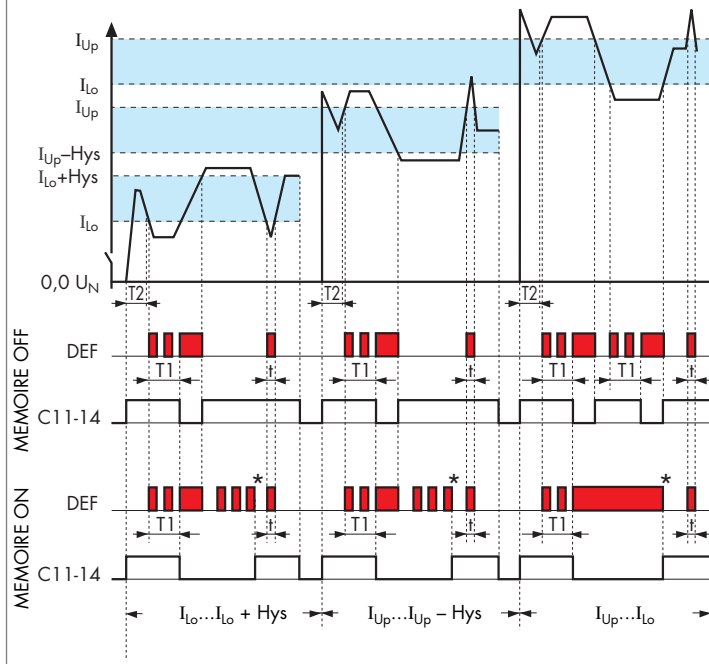
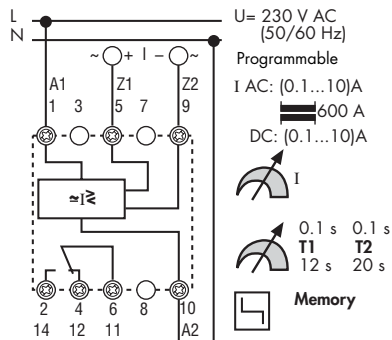


Type 71.41.8.230.1021



Functions

Type 71.51.8.230.1021



Switch off

ILo - mode
 If the monitored value is less than the lower-limit and, time T1 has expired.

IUp - mode
 If the monitored value is higher than the upper limit, and time T1 has expired.

IUp, ILo - 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.

*RESET MEMORY = Pressing "SET/RESET" > 1 s

Switch on

ILo or IUp - modes
 When passing the hysteresis value.

IUp, ILo - mode
 When passing the ILo or IUp value.

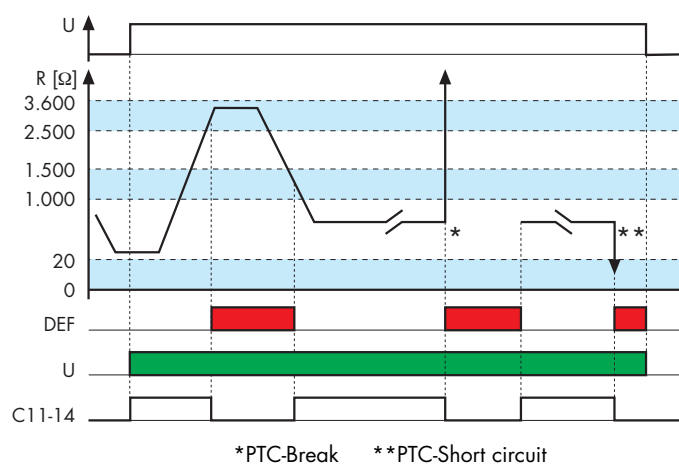
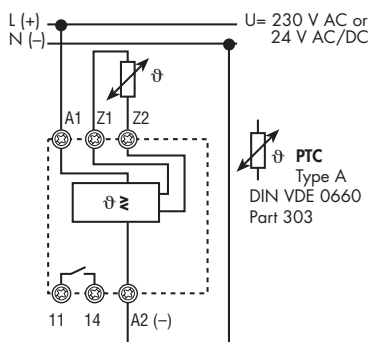
RESET MEMORY

Pushing "SET/RESET" > 1 sec.

C = output contact

Normally open 11-14 (6-2) closed.

Type 71.91.x.xxx.0300



Switch off

- Thermistor line break
- Over temperature $R_{PTC} > (2.5...3.6)k\Omega$
- Thermistor line short circuit ($R_{PTC} < 20\Omega$)
- Loss of supply

Switch on

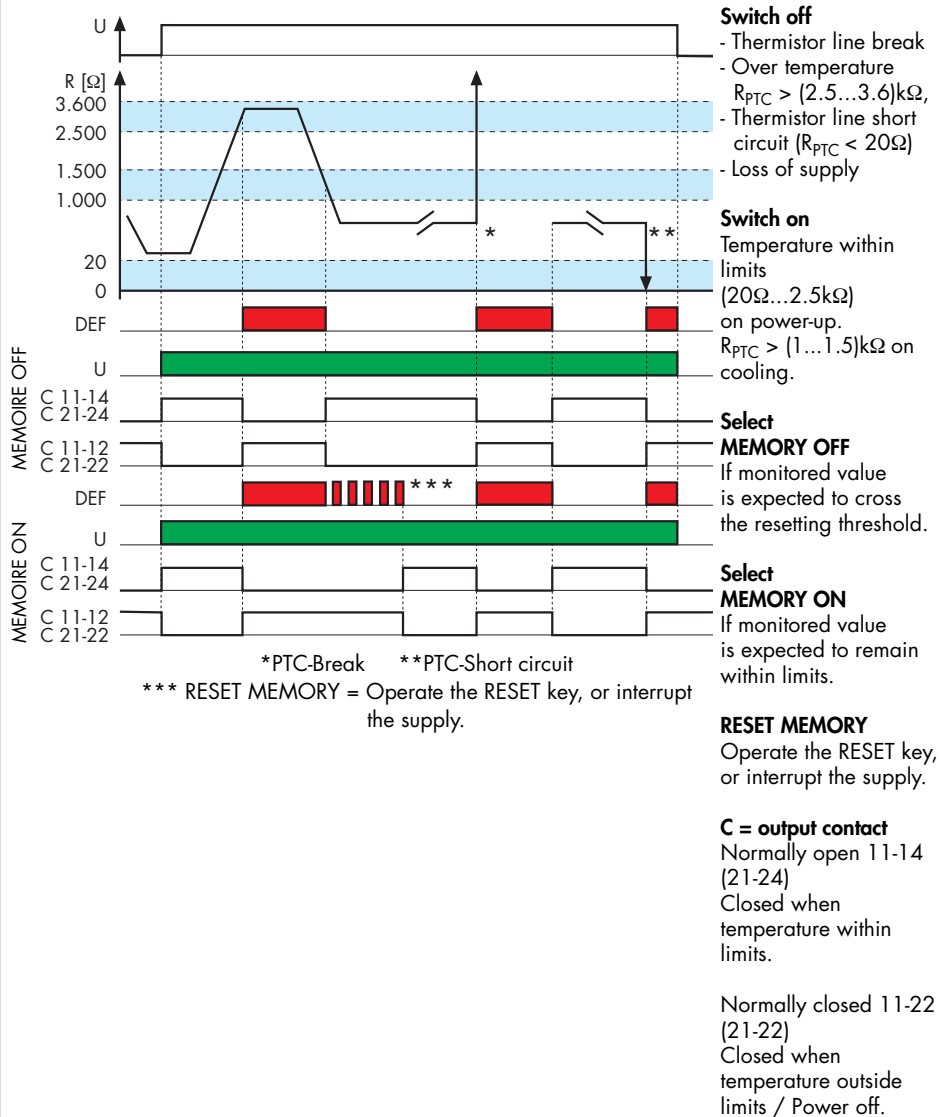
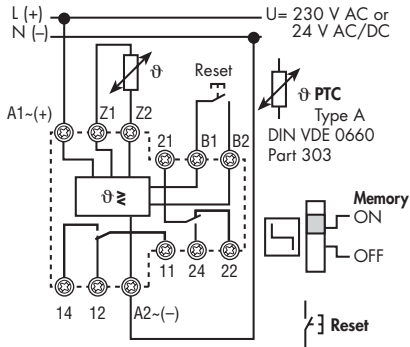
Temperature within limits
 $R_{PTC} > (1.0...1.5)k\Omega$ on power-up.
 (1...1.5)kΩ on cooling.

C = output contact

Normally open 11-14
 Closed when temperature within limits.

Functions

Type 71.92.x.xxx.0001



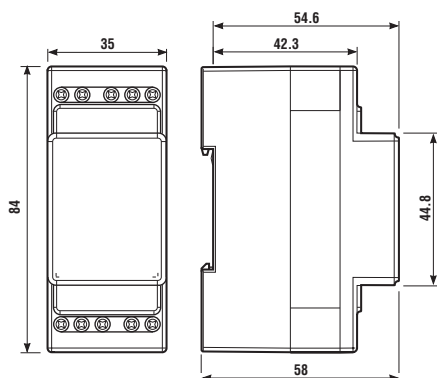
Features

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 μ s) between:
 - supply and contacts
 - electrodes and supply
 - contacts and electrodes
- 35 mm rail (EN 50022) mount
- Control about a single level or between Min./Max. limits
- 72.01 available also for supply 400 V

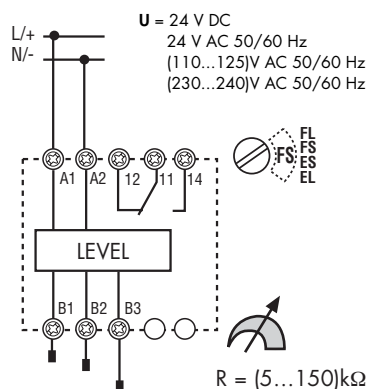


FOR UL HORSEPOWER AND PILOT DUTY RATINGS
SEE "General technical information" page V

72.01



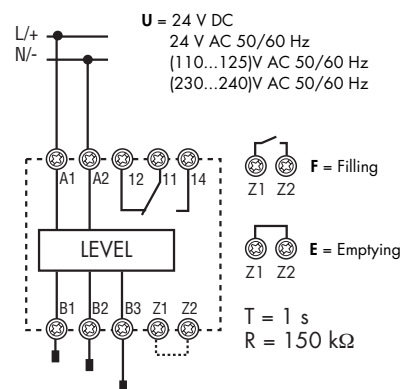
- Sensitivity range (5...150) k Ω adjustable
- Delay time (0.5s or 7s) switch selectable
- Emptying or filling functions switch selectable



72.11



- Sensitivity fixed 150 k Ω
- Delay time fixed: 1 s
- Emptying or filling functions link selectable



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	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	2.5/1.5
Operating range AC	(0.8...1.1)U _N	(0.9...1.15)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 AC1 cycles	100 · 10 ³	100 · 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 k Ω	5...150 (adjustable)	150 (fixed)
Insulation between supply/contacts/electrode (1.2/50 μ s) kV	6	6
Ambient temperature °C	-20...+60	-20...+60
Protection category	IP20	IP20

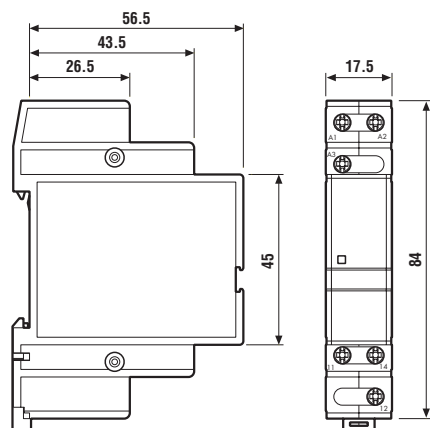
Approvals (according to type)



Features

3 Phase - Rotation and phase loss monitoring relay

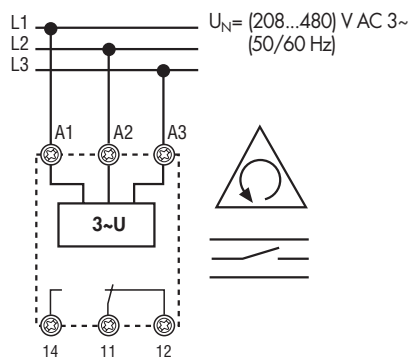
- Universal voltage monitoring (U_N from 208 V to 480 V, 50/60 Hz)
- Phase loss monitoring, under phase regeneration
- Positive safety logic - make contact opens if the relay detects an error
- Small size (17.5 mm wide)
- 35 mm rail (EN 50022) mount
- European patent pending for the fully innovative principle at the root of the 3 phase monitoring and error survey system



72.31



- Phase rotation monitoring
- Phase loss monitoring



Contact specification

Contact configuration	1 CO (SPDT)
Rated current/Maximum peak current	A 6/15
Rated voltage/Maximum switching voltage	V AC 250/400
Rated load AC1	VA 1,500
Rated load AC15 (230 V AC)	VA 250
Single phase motor rating (230 V AC)	kW 0.185
Breaking capacity DC1: 30/110/220 V	A 3/0.35/0.2
Minimum switching load	mW(V/mA) 500 (10/5)
Standard contact material	AgCdO

Supply specification

Nominal system voltage (U_N)	V AC 3 ~ 208...480
Frequency	Hz 50/60
Rated power	VA 50 Hz/ W 8/1
Operating range	V AC 3 ~ 170...500

Technical data

Electrical life at rated load AC1	cycles $100 \cdot 10^3$
Switch-off/reaction time	s $<0.5 / <0.5$
Ambient temperature	°C $-20 \dots +50$
Protection category	IP20

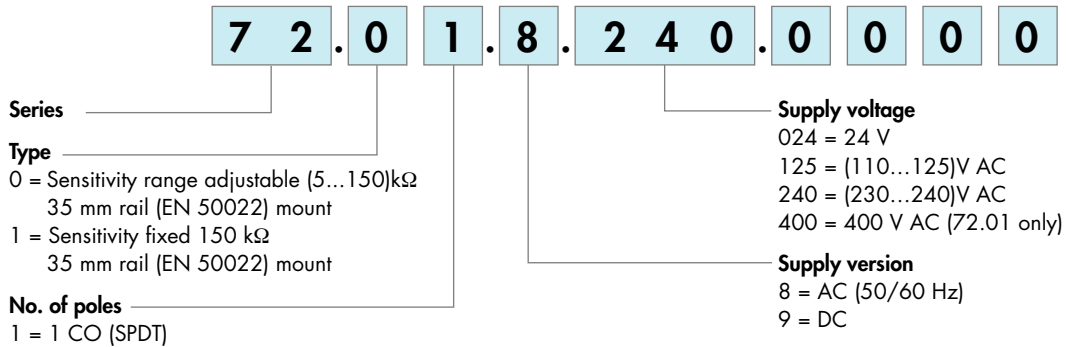
Approvals (according to type)



Ordering information

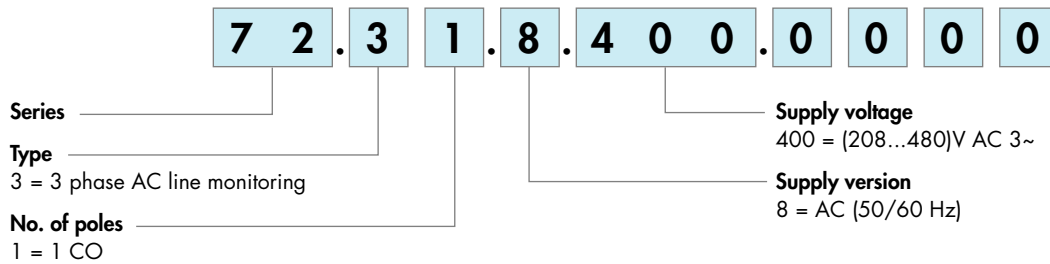
Level control relays

Example: 72 series level control relay, adjustable sensitivity range, (230...240)V AC supply voltage.



Monitoring relays

Example : 3 phase line monitoring relay, phase rotation and loss monitoring, supply voltage (208...480)V AC 3~.



Technical data for 72.01 and 72.11

Insulation			
Insulation		Dielectric strength	Impulse (1.2/50 µs)
	between supply and contacts	4,000 V AC	6 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
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 ÷ 1000 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		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			
Current absorption on Z1 and Z2		mA	< 1
Power lost to the environment	without contact current	W	1.5
	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
Max cable length between electrode and relay		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.

Technical data for 72.31

Insulation			
Insulation		Dielectric strength	Impulse (1.2/50 µs)
	between supply and contacts	3,000 V	5 kV
	between open contacts	1,000 V	1.5 kV
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
Fast transients (burst) (5-50ns, 5kHz) on A1, A2, A3		EN 61000-4-4	2 kV
Surge (1.2/50 µs)	differential mode	EN 61000-4-5	4 kV
Other data			
Start up time (NO contact closure after energising)		s	< 2
Regeneration level (Maximum)			≤ 80% of average of other 2 phase
Power lost to the environment	without contact current	W	1
	with rated current	W	1.4
Screw torque		Nm	0.8
Max. wire size		solid cable	stranded cable
	mm ²	1x6 / 2x4	1x4 / 2x2.5
	AWG	1x10 / 2x12	1x12 / 2x14

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	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

FL = Level control by Filling, Long (7sec) run-on delay.
FS = Level control by Filling, Short (0.5sec) run-on delay.
ES = Level control by Emptying, Short (0.5sec) run-on delay.
EL = Level control by Emptying, Long (7sec) run-on delay.

Type 72.11

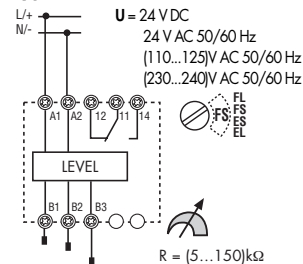
F = Level control by Filling, Z1-Z2 open. Run-on time fixed at 1sec.
E = Level control by Emptying, Z1-Z2 linked. Run-on time fixed at 1sec.

Filling functions

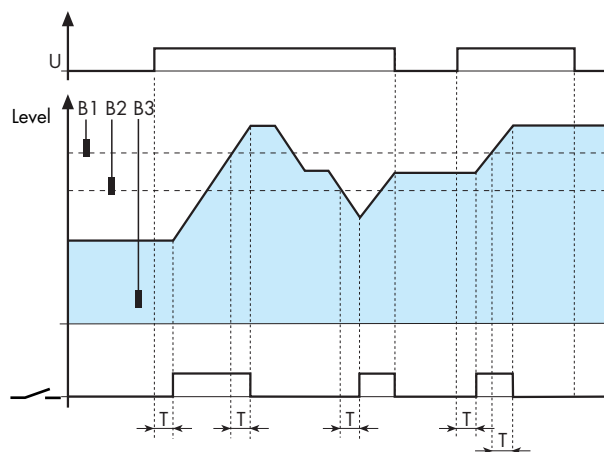
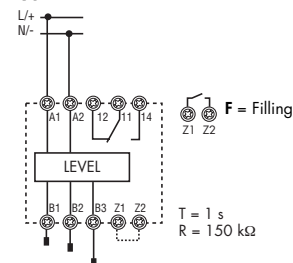
Wiring diagram

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.

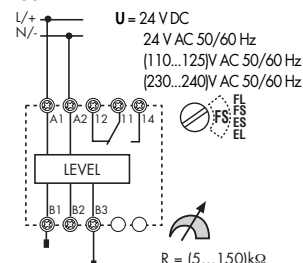
Switch Off:

- 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.

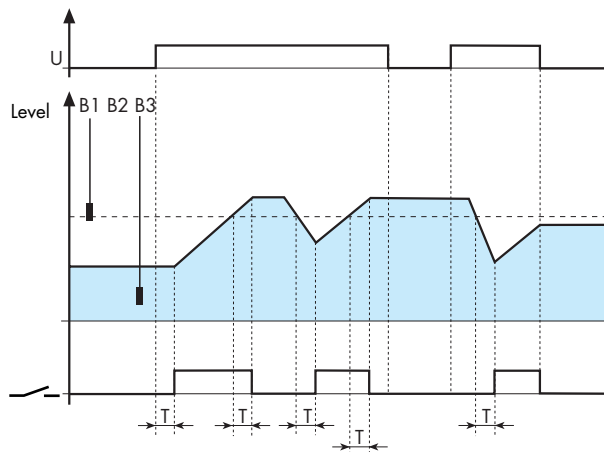
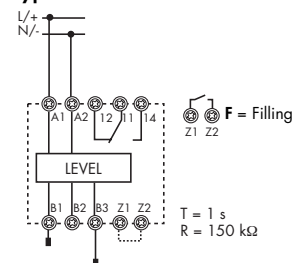
Wiring diagram

Examples with 2 electrodes

Type 72.01



Type 72.11



Filling Control – about a single level, B1.
 Under normal operation the liquid 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 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:

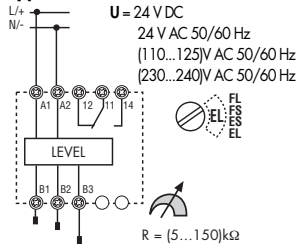
- On the liquid level reaching electrode B1, the output relay will de-energise after time T has expired.
- On "power-off", the output relay will immediately de-energise.

Emptying functions

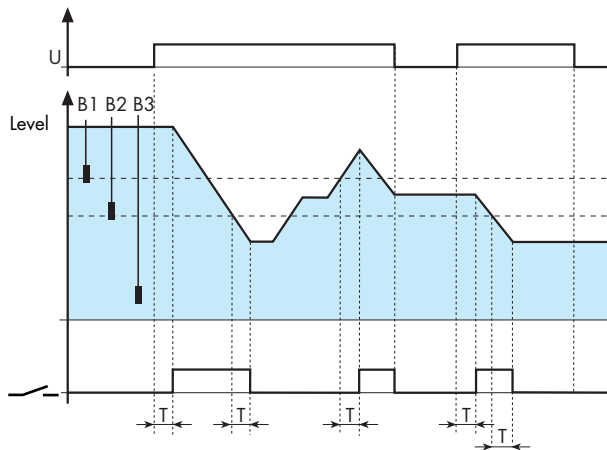
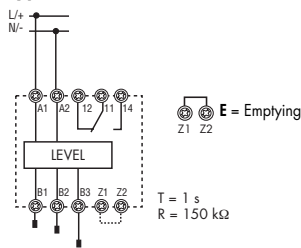
Wiring diagram

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.

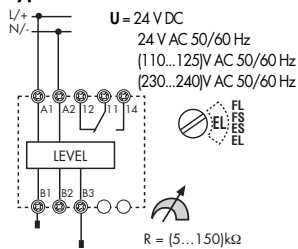
Switch Off:

- 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.

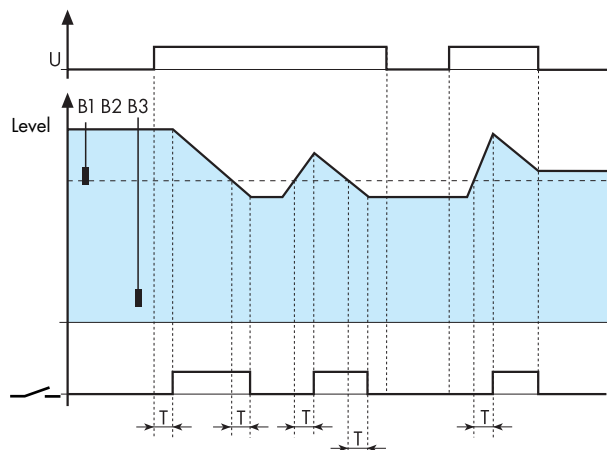
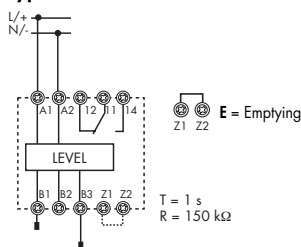
Wiring diagram

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.

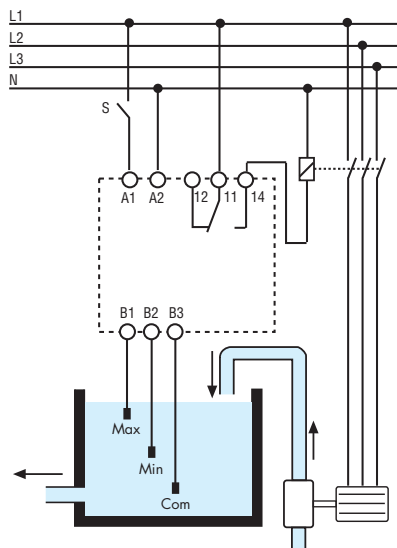
Switch Off:

- 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-energise.

Applications for 72.01 and 72.11

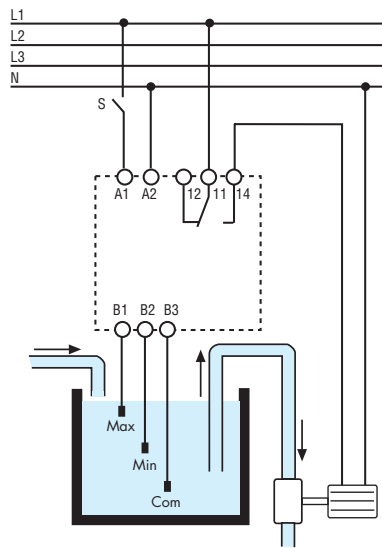
FILLING function:

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 metallic, 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

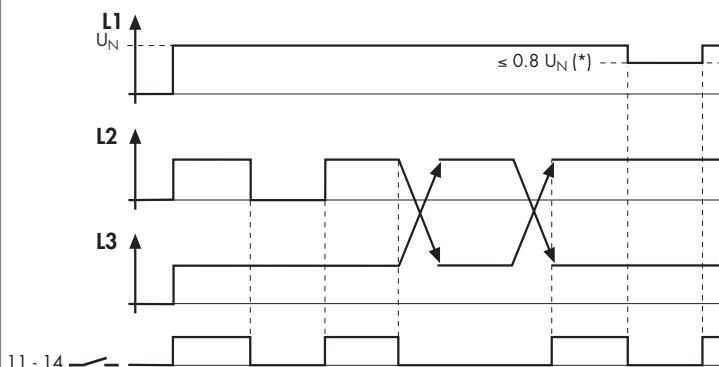
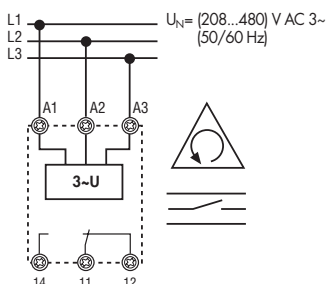
- Demineralised water
- Fuels
- Oil
- Liquids with high-percentage alcohol
- Liquid gas
- Paraffins
- Ethylene glycol
- Paint

Functions for 72.31

L1, L2, L3 = Supply voltage

= Contact 11-14

LED status		Supply voltage	NO output contact	Contacts	
				Open	Closed
Supply voltage OFF		OFF	Open	11 - 14	11 - 12
	- Incorrect phase rotation - Phase loss	ON			
	Normal operation	ON	Closed	11 - 12	11 - 14



Switch off

- Incorrect phase rotation
- Phase loss

Output contact (11 - 14)

- Closed, if monitored system healthy

(*) Phase loss monitoring possible under regeneration up to 80% of the average of the other 2 phases

Accessories for 72.01 and 72.11



072.01.06

Suspended electrode for conductive liquids, complete with cable. Suitable for level monitoring in wells and reservoirs not under pressure. All materials used are compatible with food processing applications (according to European Directive 2002/72 and cod. FDA title 21 part 177).
Order appropriate number of electrodes - additional to the relay.

Cable length: 6 m (1.5 mm²)

072.01.06

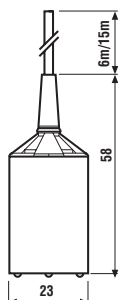
Cable length: 15 m (1.5 mm²)

072.01.15

Technical data

Max. liquid temperature

°C +100



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 included. Order appropriate number of electrodes holders - additional to the relay.

072.51

Technical data

Max liquid temperature

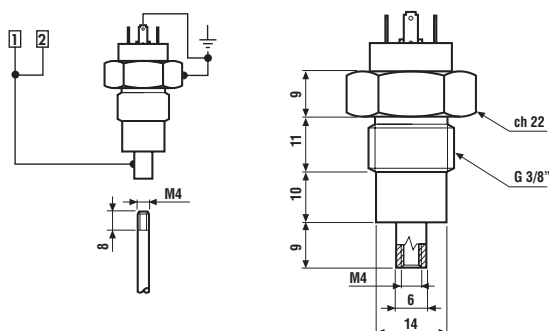
°C + 100

Max tank pressure

bar 12

Cable grip

mm Ø ≤ 6



072.53

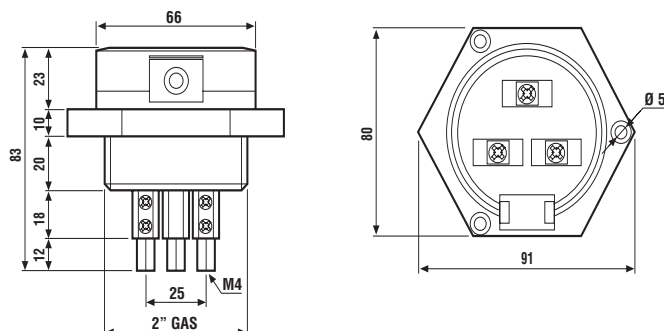
Electrode holder with three poles. Electrode not included.
Order appropriate number of electrodes holders - additional to the relay.

072.53

Technical data

Max liquid temperature

°C + 130



Accessories for 72.01 and 72.11



Electrode and electrode connector, multiple electrodes may be interconnected to provide required length

Technical data

Electrode - 500 mm long, M4 thread, stainless steel	072.500
Inter-electrode connector - M4 thread, stainless steel	072.501

Illustration of interconnection of electrodes.



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.

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 k Ω . 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 k Ω 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.

Features

kWh Energy meter - 1-phase

Type 7E.12 10(25)A - 2 module wide

Type 7E.13 5(32)A - 1 module wide

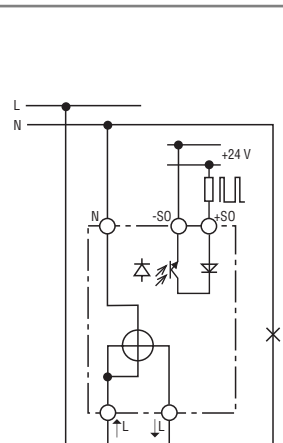
Type 7E.16 10(65)A - 2 module wide

- Complies with EN 62053-21 and prEN 50470
- Certified by PTB (Physikalisch - Technischen Bundesanstalt)
- Accuracy class 1
- Protection class II
- Pulse output for remote energy management; SO interface (open collector) according 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 50022) mount

7E.12.8.230.0002



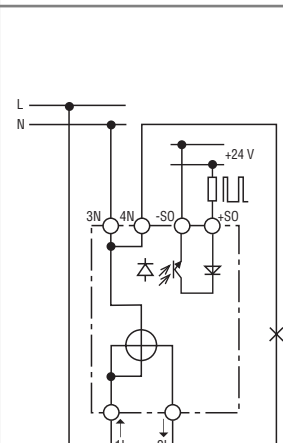
- Nominal current 10 A (25 A Maximum)
- 1-phase 230 V AC
- 35 mm wide



7E.13.8.230.0000



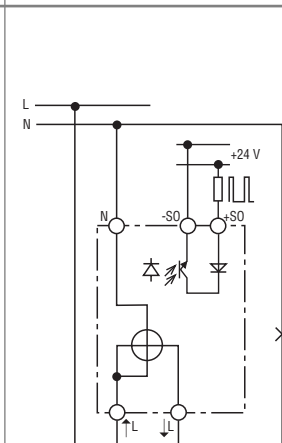
- Nominal current 5 A (32 A Maximum)
- 1-phase 230 V AC
- 17.5 mm wide



7E.16.8.230.0000



- Nominal current 10 A (65 A Maximum)
- 1-phase 230 V AC
- 35 mm wide



For outline drawing see page 5

Specification				
Nominal/Maximum current measuring	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	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	50/60	50/60	50/60
Rated power	W	< 0.5	< 0.4	< 0.5
Display, Reading (digit height 4 mm)		Six digit counter, red decimal digit	Seven digit counter, red decimal digit	
Max. totalising count/Min. totalising count 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	1	1
Ambient temperature (Within accuracy class)	°C	-10...+45	-10...+45	-10...+45
Ambient temperature (Outside accuracy class)	°C	-20...+55	-20...+55	-20...+55
Protective class		II	II	II
Protection category: Housing/terminal		IP 50/IP 20	IP 50/IP 20	IP 50/IP 20
Approvals (according to type)		CE	CE PTB	

Features

kWh Energy meter - 3-phase

Type 7E.36-0000 10(65)A - Single tariff

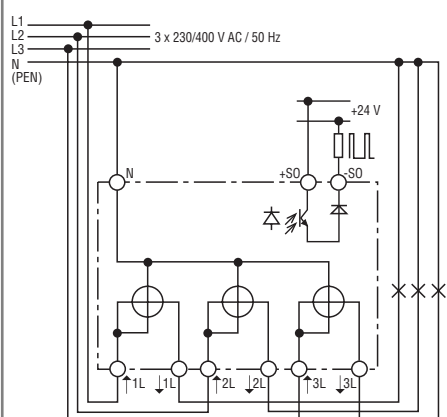
Type 7E.36-0002 10(65)A - Dual tariff

- Complies with EN 62053-21 and prEN 50470
- Certified by PTB (Physikalisch - Technischen Bundesanstalt)
- Accuracy class B
- Protection class II
- Pulse output for remote energy management; SO interface (open collector) according 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 50022) mount

7E.36.8.400.0000



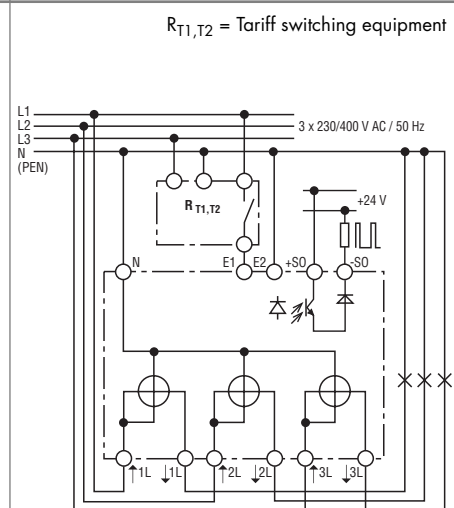
- Nominal current 10 A (65 A Maximum)
- 3-phase
- 70 mm wide



7E.36.8.400.0002



- Nominal current 10 A (65 A Maximum)
- 3-phase
- Dual tariff (Day and Night)
- 70 mm wide



For outline drawing see page 5

Specification			
Nominal/Maximum current measuring	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	V AC	3 x 230	3 x 230
Operating range		$(0.8...1.15)U_N$	$(0.8...1.15)U_N$
Frequency	Hz	50/60	50/60
Rated power per phase	W	< 1.5	< 1.5
Display, Reading, Indication		Seven digit counter, red decimal digit, digit height 4 mm	
Max. totalising count/Min. totalising count 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		B	B
Ambient temperature	°C	-25...+55	-25...+55
Protective class		II	II
Protection category: Housing/terminal		IP 50/IP 20	IP 50/IP 20
Approvals (according to type)		CE PTB	

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 50022) mounting.

7	E	.	1	.	3	.	8	.	2	3	0	.	0	0	0	0
----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------

Series _____

Function _____
 1 = 1-phase
 3 = 3-phase

Current _____
 2 = 25 A
 3 = 32 A
 6 = 65 A

Supply version _____
 8 = AC 50/60 Hz

Option _____
 0 = Standard
 2 = Standard (7E.12 only)
 2 = Dual tariff (7E.36 only)

Supply voltage _____
 230 = 230 V AC 50/60 Hz
 400 = 3 x 230/400 V AC 50/60 Hz

All versions/width
 7E.12.8.230.0002/35 mm
 7E.13.8.230.0000/17.5 mm
 7E.16.8.230.0000/35 mm
 7E.36.8.400.0000/70 mm
 7E.36.8.400.0002/70 mm

Technical data

Insulation EN 62053-21			7E.12, 7E.13, 7E.16	7E.36
Insulation rated voltage		V	250	250
Overvoltage category			IV	IV
Isolation	between active part SO+/SO- terminals	kV (1.2/50 µs)	6	6
	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
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	
Schock resistance		g/18 ms	30	
Schock resistance of the internal mechanical counter		g/18 ms	350	
Power lost to the environment			7E.12, 7E.13	7E.16
			7E.36	
	without current	W	0.4	0.4
	with maximum current	W	1	2
Supply terminals			7E.12, 7E.13	7E.16, 7E.36
	Max. wire size		solid cable	stranded cable
		mm ²	1...6	0.75...4
		AWG	18...10	18...12
Screw torque for I _{max}		Nm	0.8...1.2	1.5...2
	Screw		M4 Pozidrive No.1, Phillips No.1, Flat No.1	
SO+/SO- terminals			solid cable	stranded cable
	Max. wire size	mm ²	2.5	1.5
		AWG	14	16
Screw torque for I _{max}		Nm	0.5	0.8
	Screw		M3 Pozidrive No.1, Phillips No.1, Flat No.1	M4 Pozidrive No.1, Phillips No.1, Flat No.1

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	$kW = (\text{number of pulse per Minute}) / 33.3$
7E.16				1,000	100 ms	$kW = (\text{number of pulse per Minute}) / 16.7$
7E.36				100	150 ms	$kW = (\text{number of pulse per Minute}) / 1.7$

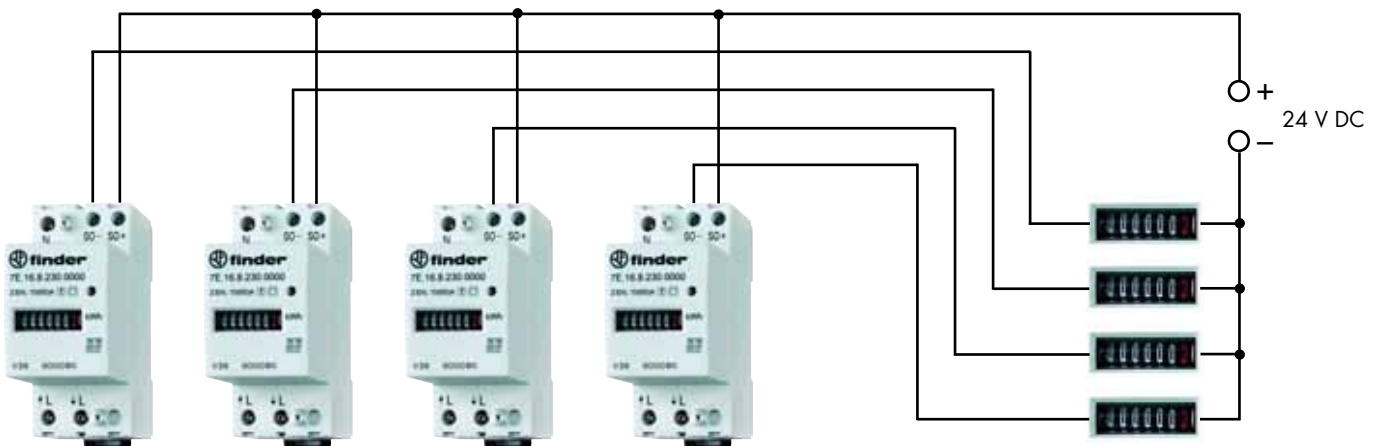
LED indication (Abnormal operation)

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 		
7E.36	Mark = 100 ms, Phase L1 ↑ L1 ↓ inverted or loss 	Phase L2 ↑ L2 ↓ inverted or loss 	Phase L3 ↑ L3 ↓ inverted or loss
	Phase L1 ↑ L1 ↓ and L2 ↑ L2 ↓ inverted or loss 	Phase L1 ↑ L1 ↓ and L3 ↑ L3 ↓ inverted or loss 	Phase L1 ↑ L1 ↓ and L2 ↑ L2 ↓ and L3 ↑ L3 ↓ inverted or loss

SO+/SO- Open collector output wiring diagram

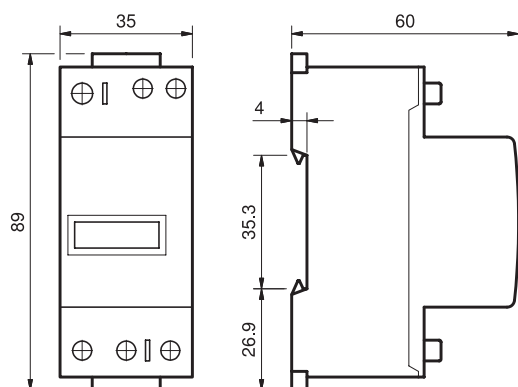
The pulsating open collector output available at terminals SO+ and SO- can be interfaced with the input of a computer, plc or other energy management equipment to allow the remote monitoring of energy consumed.



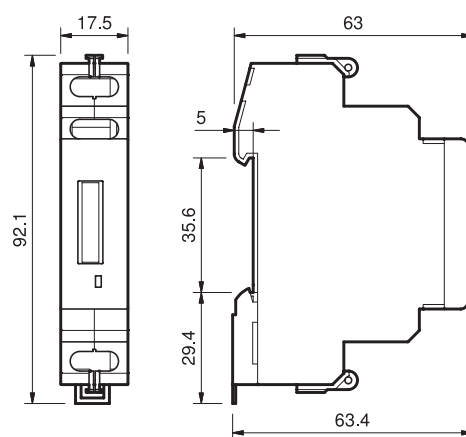
Energy meters – at difference locations
(Note: Both Single and Dual tariff meters provide only a single pulsating output)

Central monitoring/management system
(max. 20 mA for each input)

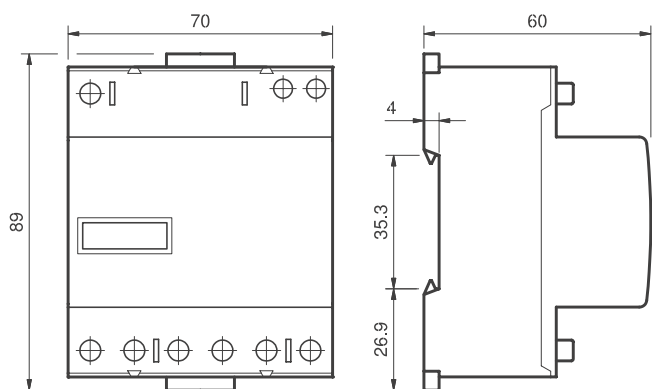
Outline drawing



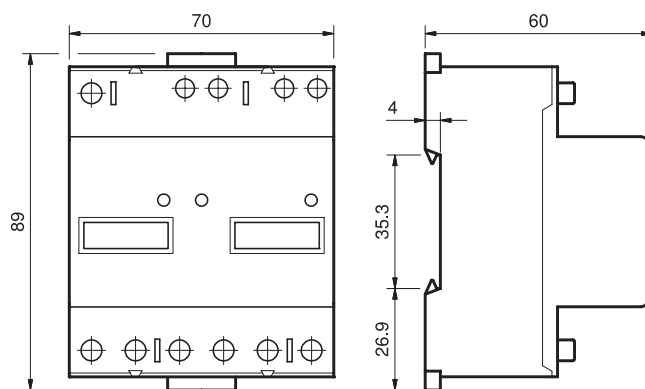
7E.12.8.230.0002 / 7E.16.8.230.0000



7E.13.8.230.0000



7E.36.8.400.0000



7E.36.8.400.0002

Accessories



07E.13

Terminal cover for type 7E.12 and 7E.13

For the tamper-proof lead seal use 2 terminal cover

07E.13



07E.16

Terminal cover for type 7E.16 and 7E.36

7E.16 - For the tamper-proof lead seal use 2 terminal covers

7E.36 - For the tamper-proof lead seal use 4 terminal covers

07E.16

Features

Multi-function and mono-function timer range

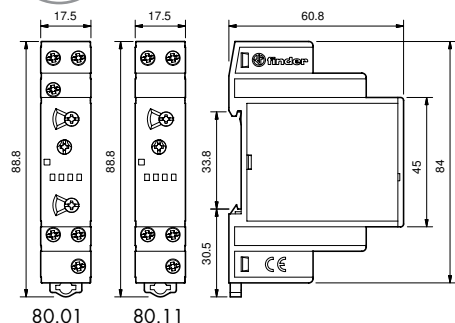
80.01 - Multi-function & multi-voltage

80.11 - ON delay, multi-voltage

- 17.5 mm wide
- Six time scales from 0.1 s to 20h
- High input/output isolation
- 35 mm rail (EN 50022) 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



FOR UL HORSEPOWER AND PILOT DUTY RATINGS
 SEE "General technical information" page V

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
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)
	V DC
Rated power AC/DC	VA (50 Hz)/W
Operating range	AC
	DC

Technical data

Specified time range	
Repeatability	%
Recovery time	ms
Minimum control impulse	ms
Setting accuracy-full range	%
Electrical life at rated load in AC1	cycles
Ambient temperature range	°C
Protection category	

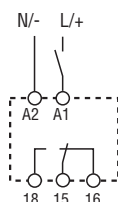
Approvals (according to type)

80.01

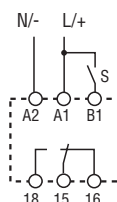


- Multi-voltage
- Multi-function

AI: ON delay
DI: ON pulse
SW: Symmetrical recycling: ON start
BE: Signal OFF delay
CE: Signal ON and OFF delay
DE: Signal ON pulse



Wiring diagram
(without signal START)



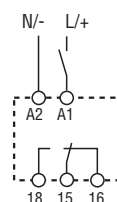
Wiring diagram
(with signal START)

80.11



- Multi-voltage
- Mono-function

AI: ON delay



Wiring diagram
(without signal START)

Features

Mono-function timer range

80.21 - ON pulse, multi-voltage

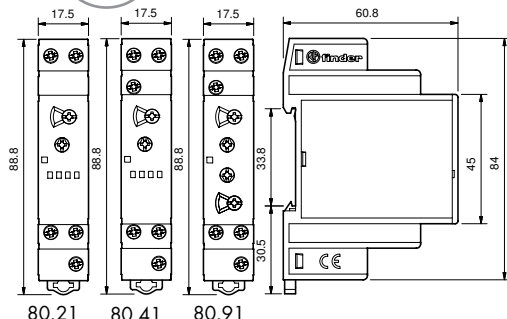
80.41 - Signal OFF delay, multi-voltage

80.91 - Asymmetrical recycling, multi-voltage

- 17.5 mm wide
- Six time scales from 0.1 s to 20 h
- High input/output isolation
- 35 mm rail (EN 50022) 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 HORSEPOWER AND PILOT DUTY RATINGS

SEE "General technical information" page V

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	4000	4000	4000
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	AC	(17...265)V	(17...265)V	(10.2...265)V
	DC	(17...265)V	(17...265)V	(10.2...265)V

Technical data

Specified time range		(0.1...2)s, (1...20)s, (0.1...2)min, (1...20)min, (0.1...2)h, (1...20)h		
Repeatability	%	± 1	± 1	± 1
Recovery time	ms	≤ 50	≤ 50	≤ 50
Minimum control impulse	ms	—	50	50
Setting accuracy-full range	%	± 5	± 5	± 5
Electrical life at rated load in AC1	cycles	100·10 ³	100·10 ³	100·10 ³
Ambient temperature range	°C	-10...+50	-10...+50	-10...+50
Protection category		IP 20	IP 20	IP 20

Approvals (according to type)



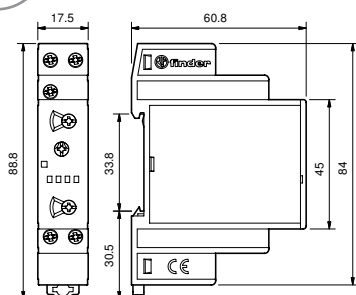
80.21	80.41	80.91
<ul style="list-style-type: none"> • Multi-voltage • Mono-function 	<ul style="list-style-type: none"> • Multi-voltage • Mono-function 	<ul style="list-style-type: none"> • Multi-voltage • Mono-function
DI: ON pulse 	BE: Signal OFF delay 	LI: Asymmetrical recycling (ON starting) LE: Signal asymmetrical recycling (ON starting)
Wiring diagram (without signal START)	Wiring diagram (with signal START)	Wiring diagram (without signal START) Wiring diagram (with signal START)

Features

Multi-function and multi-voltage solid-state output timer

- 17.5 mm wide
- Six time scales from 0.1 s to 24 h
- High input/output isolation
- 35 mm rail (EN 50022) 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
Screw terminal

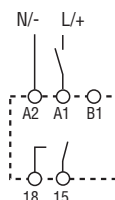


80.71

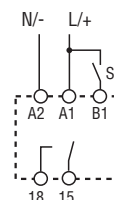


- Multi-voltage
- Multi-function

AI: ON delay
DI: ON pulse
SW: Symmetrical recycling: ON start
BE: Signal OFF delay
CE: Signal ON and OFF delay
DE: Signal ON pulse



Wiring diagram
(without signal START)



Wiring diagram
(with signal START)

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 AC

(19...265)V

DC

(19...265)V

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

≤ 50

Minimum control impulse ms

50

Setting accuracy-full range %

± 5

Electrical life cycles

100·10⁶

Ambient temperature range °C

-20...+50

Protection category

IP 20

Approvals (according to type)



Features

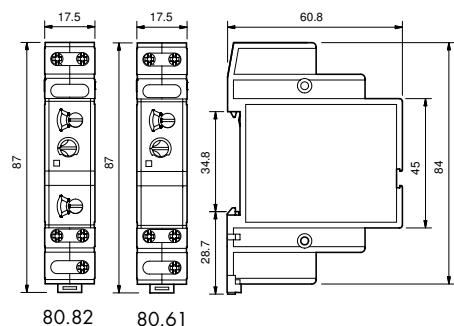
Mono-function timer range

80.61 - True OFF delay, multi-voltage

80.82 - Star-Delta timer, multi-voltage

- 17.5 mm wide
- Rotary range selector, and timing trimmer
- Four time scales from 0.1s to 20s (type 80.61)
- Six time scales from 0.1s to 20min (type 80.82)
- High input/output isolation
- 35 mm rail (EN 50022) mount

80.61 / 80.82
Screw terminal



FOR UL HORSEPOWER AND PILOT DUTY RATINGS
SEE "General technical information" page V

Contact specification		80.61	80.82
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	2000	1500
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		80.61	80.82
Nominal voltage (U_N)	V AC (50/60 Hz)	24...240	12...240
	V DC	24...240	12...240
Rated power AC/DC	VA (50 Hz)/W	< 0.6/ < 0.6	< 1.3/ < 0.8
Operating range	AC	(17...265)V	(10.2...265)V
	DC	(17...265)V	(10.2...265)V
Technical data		80.61	80.82
Specified time range		(0.1...1)s, (0.5...5)s, (1...10)s, (2...20)s	(0.1...2)s, (1...20)s, (0.1...2)min, (1...20)min
Repeatability	%	± 1	± 1
Recovery time	ms	≤ 50	≤ 50
Minimum control impulse	ms	300 (A1-A2)	—
Setting accuracy-full range	%	± 5	± 5
Electrical life at rated load in AC1	cycles	100·10 ³	60·10 ³
Ambient temperature range	°C	-10...+50	-10...+50
Protection category		IP 20	IP 20
Approvals (according to type)			

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 = ON pulse (DI)
- 4 = Signal OFF delay (BE)
- 6 = True OFF delay (BI)
- 7 = Multi-function with solid state output (AI, DI, SW, BE, CE, DE)
- 8 = Star-Delta (SD)
- 9 = Asymmetrical recycling ON starting (LI, LE)

Versions

- 0 = Standard
- 2 = Standard (for type 80.61 only)

Supply voltage

- 240 = (12 ... 240)V AC/DC (80.01, 80.82, 80.91)
- 240 = (24 ... 240)V AC/DC (80.11, 80.21, 80.41, 80.61, 80.71)

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
	between input and output circuit	V AC	4000
	between open contacts	V AC	1000
Insulation (1.2/50 µs) between input and output		kV	6
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 ÷ 1000 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
	on start terminal (B1) 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			
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 80.61/82, plastic, 24 tags, 9x17 mm

020.24



060.72

Sheet of marker tags, for types 80.01/11/21/41/71, plastic, 72 tags, 6x12 mm

060.72

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

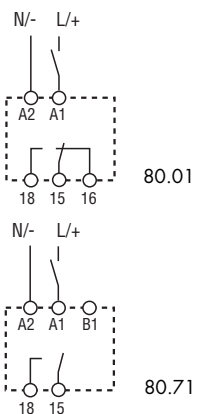
* The LED on type 80.61 is illuminated only when the supply voltage is applied to the timer; during the timing period the LED is not illuminated.

Wiring diagram

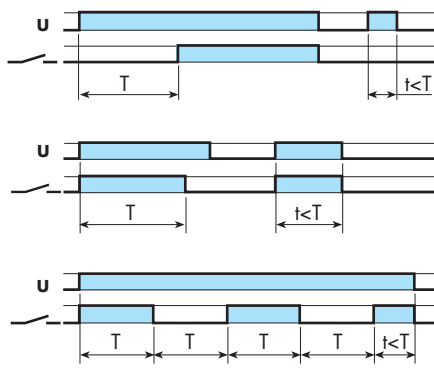
Without signal Start = Start via contact in supply line (A1).

With signal Start = Start via contact into control terminal (B1).

Without signal START



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.

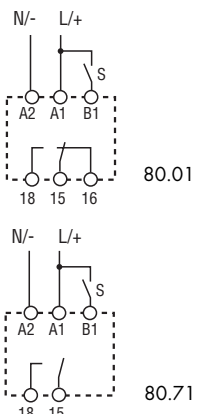
(DI) ON pulse.

Apply power to timer. Output contacts transfer immediately. After the preset time has elapsed, contacts reset.

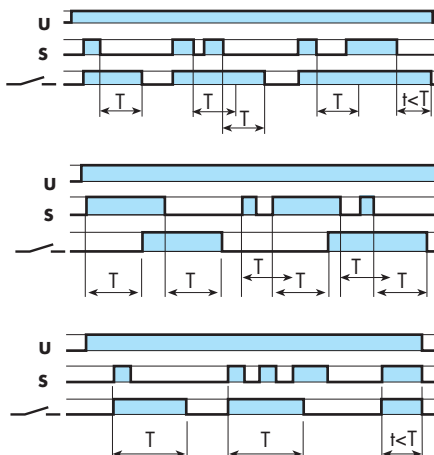
(SW) Symmetrical recycling: ON start.

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 signal START



80.01
80.71



(BE) Signal OFF delay.

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 time the output contacts reset.

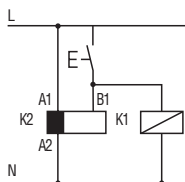
(CE) Signal ON and OFF delay.

Power is permanently 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.

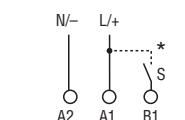
(DE) Signal ON pulse.

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.

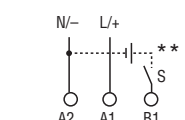
NOTE: The function must be set before energising the timer.



- Possible to control an external load, such as another relay coil or timer, connected to the signal start terminal B1.



- * With DC supply, positive polarity has to be connected to B1 terminal (according to EN 60204-1).



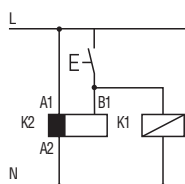
- ** A voltage other than the supply voltage can be applied to the command Start (B1), example:

A1 - A2 = 230 V AC
B1 - A2 = 12 V DC

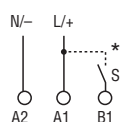
Functions

Wiring diagram

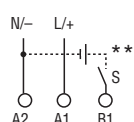
<p>Without signal START</p> <p>80.11/21/61</p> <p>80.82</p>	<p>Type</p> <p>80.11</p> <p>80.21</p> <p>80.61</p> <p>80.82</p>		<p>(AI) ON delay. Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs when power is removed.</p> <p>(DI) ON pulse. Apply power to timer. Output contacts transfer immediately. After the preset time has elapsed, contacts reset.</p> <p>(BI) True OFF delay (power OFF). Apply power to timer (minimum 300ms). Output contacts transfer immediately. Removal of power initiates the preset delay, after which time the output contacts reset.</p> <p>(SD) Star - delta. Apply power to timer. The star contact (Λ) closes immediately. After preset delay has elapsed the star contact (Λ) 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.</p>
<p>With signal START</p> <p>80.41</p>	<p>80.41</p>		<p>(BE) Signal OFF delay. 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 time the output contacts reset.</p>
<p>Without signal START</p> <p>80.91</p> <p>With signal START</p> <p>80.91</p>	<p>80.91</p>		<p>(LI) Asymmetrical recycling (ON start). 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.</p> <p>(LE) Signal asymmetrical recycling (ON start) Power is permanently 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.</p>



- Possible to control an external load, such as another relay coil or timer, connected to the signal start 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

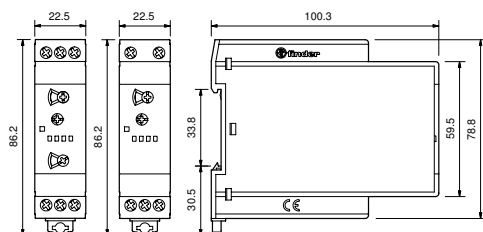
Multi-function and mono-function timer range

83.01 - Multi-function & multi-voltage

83.11 - ON delay, multi-voltage

- 22.5 mm wide
- Six time scales from 0.1 s to 20 h
- High input/output isolation
- 35 mm rail (EN 50022) 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

83.01 / 83.11
Screw terminal



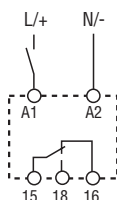
83.01 83.11

83.01

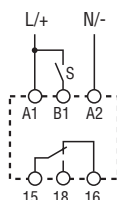


- Multi-voltage
- Multi-function

AI: ON delay
DI: ON pulse
SW: Symmetrical recycling: ON start
BE: Signal OFF delay
CE: Signal ON and OFF delay
DE: Signal ON pulse



Wiring diagram
(without signal START)



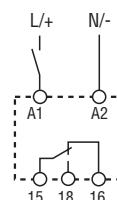
Wiring diagram
(with signal START)

83.11



- Multi-voltage
- Mono-function

AI: ON delay



Wiring diagram
(without signal START)

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 AC

(10.2...265)V

(17...265)V

DC

(10.2...265)V

(17...265)V

Technical data

Specified time range

(0.1...2)s, (1...20)s, (0.1...2)min, (1...20)min, (0.1...2)h, (1...20)h

Repeatability %

± 1

± 1

Recovery time ms

≤ 50

≤ 50

Minimum control impulse ms

50

—

Setting accuracy-full range %

± 5

± 5

Electrical life at rated load in AC1 cycles

100·10³

100·10³

Ambient temperature range °C

-10...+50

-10...+50

Protection category

IP 20

IP 20

Approvals (according to type)



Features

Mono-function timer range

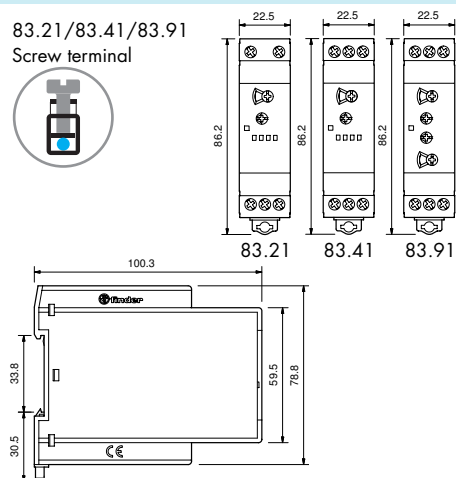
83.21 - ON pulse, multi-voltage

83.41 - Signal OFF delay, multi-voltage

83.91 - Asymmetrical recycling, multi-voltage

- 22.5 mm wide
- Six time scales from 0.1s to 20h
- High input/output isolation
- 35 mm rail (EN 50022) 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

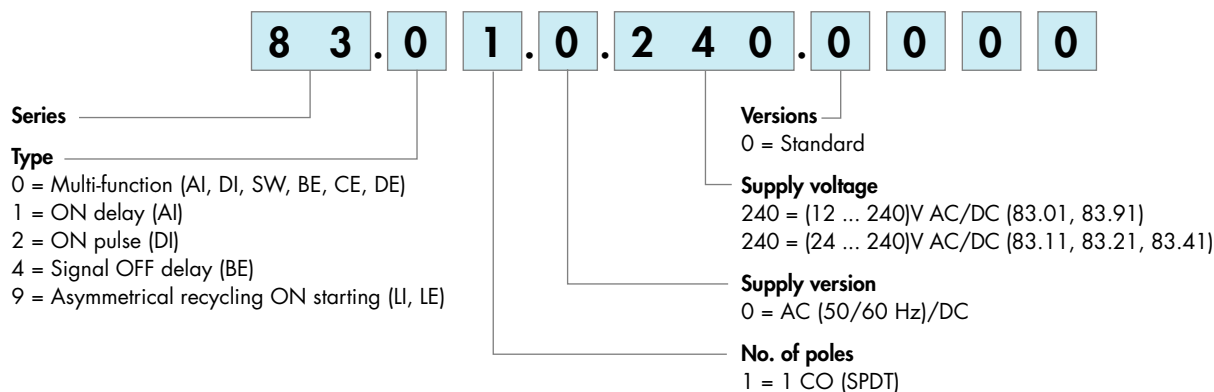
83.21/83.41/83.91
Screw terminal




	83.21	83.41	83.91
	<ul style="list-style-type: none"> • Multi-voltage • Mono-function 	<ul style="list-style-type: none"> • Multi-voltage • Mono-function 	<ul style="list-style-type: none"> • Multi-voltage • Mono-function
	DI: ON pulse	BE: Signal OFF delay	LI: Asymmetrical recycling (ON starting) LE: Signal asymmetrical recycling (ON starting)
	<p>Wiring diagram (without signal START)</p>	<p>Wiring diagram (with signal START)</p>	<p>Wiring diagram (without signal START)</p> <p>Wiring diagram (with signal START)</p>
Contact specification			
Contact configuration	1 CO (SPDT)	1 CO (SPDT)	1 CO (SPDT)
Rated current/Maximum peak current	A 16/30	A 16/30	A 16/30
Rated voltage/Maximum switching voltage	V AC 250/400	V AC 250/400	V AC 250/400
Rated load AC1	VA 4,000	VA 4,000	VA 4,000
Rated load AC15 (230 V AC)	VA 750	VA 750	VA 750
Single phase motor rating (230 V AC)	kW 0.55	kW 0.55	kW 0.55
Breaking capacity DC1: 30/110/220 V	A 16/0.3/0.12	A 16/0.3/0.12	A 16/0.3/0.12
Minimum switching load	mW (V/mA) 500 (10/5)	mW (V/mA) 500 (10/5)	mW (V/mA) 500 (10/5)
Standard contact material	AgCdO	AgCdO	AgCdO
Supply specification			
Nominal voltage (U _N)	V AC (50/60 Hz) 24...240	V AC (50/60 Hz) 24...240	V AC (50/60 Hz) 12...240
	V DC 24...240	V DC 24...240	V DC 12...240
Rated power AC/DC	VA (50 Hz)/W < 1.8 / < 1	VA (50 Hz)/W < 1.8 / < 1	VA (50 Hz)/W < 1.8 / < 1
Operating range	AC (17...265)V	AC (17...265)V	AC (10.2...265)V
	DC (17...265)V	DC (17...265)V	DC (10.2...265)V
Technical data			
Specified time range	(0.1...2)s, (1...20)s, (0.1...2)min, (1...20)min, (0.1...2)h, (1...20)h		
Repeatability	% ± 1	% ± 1	% ± 1
Recovery time	ms ≤ 50	ms ≤ 50	ms ≤ 50
Minimum control impulse	ms —	ms 50	ms 50
Setting accuracy-full range	% ± 5	% ± 5	% ± 5
Electrical life at rated load in AC1	cycles 100·10 ³	cycles 100·10 ³	cycles 100·10 ³
Ambient temperature range	°C -10...+50	°C -10...+50	°C -10...+50
Protection category	IP 20	IP 20	IP 20
Approvals (according to type)			

Ordering information

Example: 83 series, modular timers, 1 CO (SPDT) - 16 A, supply rated at (12...240)V AC/DC.



Technical data

Insulation					
Dielectric strength			83.01/11/21/41/91		
			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		
Electrostatic discharge		contact discharge	EN 61000-4-2	4 kV	
		air discharge	EN 61000-4-2	8 kV	
Radio-frequency electromagnetic field (80 ÷ 1000 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	
on start terminal (B1)		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					
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	
			mm²	1x6 / 2x4	1x4 / 2x2.5
			AWG	1x10 / 2x12	1x12 / 2x14

Accessories



060.72

Sheet of marker tags, for types 83.01/11/21/41, plastic, 72 tags, 6x12 mm

060.72

Functions

U = Supply voltage

S = Signal switch

= Output contact

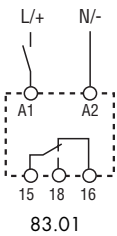
LED	Supply voltage	NO output contact	Contacts	
			Open	Closed
	OFF	Open	15 - 18	15 - 16
	ON	Open	15 - 18	15 - 16
	ON	Open (Timing in Progress)	15 - 18	15 - 16
	ON	Closed	15 - 16	15 - 18

Wiring diagram

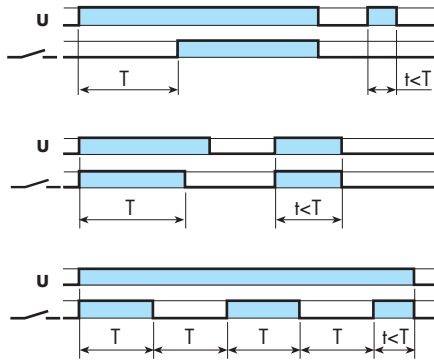
Without signal Start = Start via contact in supply line (A1).

With signal Start = Start via contact into control terminal (B1).

Without signal START



Type
83.01



(AI) ON delay.

Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs when power is removed.

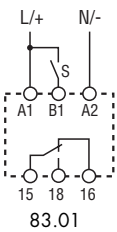
(DI) ON pulse.

Apply power to timer. Output contacts transfer immediately. After the preset time has elapsed, contacts reset.

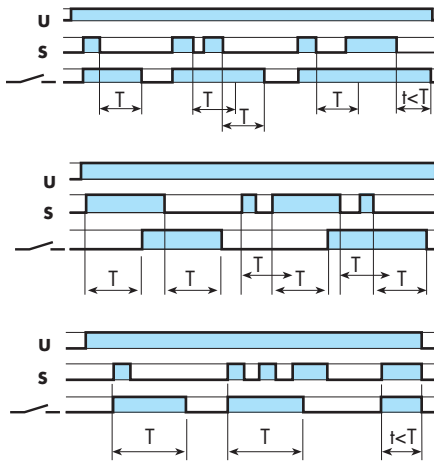
(SW) Symmetrical recycling: ON start.

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 signal START



83.01



(BE) Signal OFF delay.

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 time the output contacts reset.

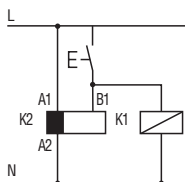
(CE) Signal ON and OFF delay.

Power is permanently 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.

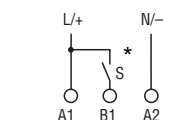
(DE) Signal ON pulse.

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.

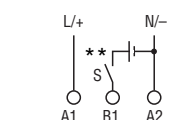
NOTE: The function must be set before energising the timer.



- Possible to control an external load, such as another relay coil or timer, connected to the signal start 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:

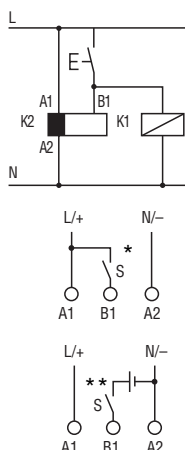
A1 - A2 = 230 V AC

B1 - A2 = 12 V DC

Functions

Wiring diagram

<p>Without signal START</p> <p>83.11/21</p>	<p>Type 83.11</p> <p>83.21</p>		<p>(AI) ON delay. Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs when power is removed.</p> <p>(DI) ON pulse. Apply power to timer. Output contacts transfer immediately. After the preset time has elapsed, contacts reset.</p>
<p>With signal START</p> <p>83.41</p>	<p>83.41</p>		<p>(BE) Signal OFF delay. 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 time the output contacts reset.</p>
<p>Without signal START</p> <p>83.91</p> <p>With signal START</p> <p>83.91</p>	<p>83.91</p>		<p>(LI) Asymmetrical recycling (ON start). 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.</p> <p>(LE) Signal asymmetrical recycling (ON start) Power is permanently 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.</p>



- Possible to control an external load, such as another relay coil or timer, connected to the signal start terminal B1.

- * With DC supply, positive polarity has to be connected to B1 terminal (according to EN 60204-1).

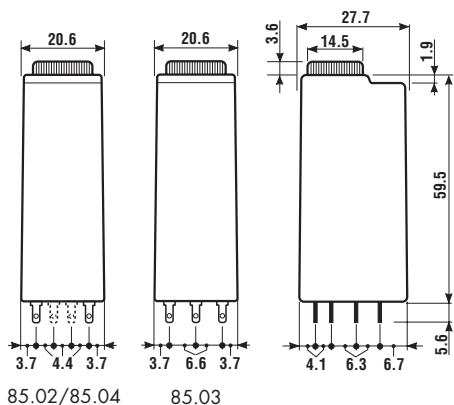
- ** A voltage other than the supply voltage can be applied to the command Start (B1), example:
A1 - A2 = 230 V AC
B1 - A2 = 12 V DC

Features

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



FOR UL HORSEPOWER AND PILOT DUTY RATINGS
SEE "General technical information" page V

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 = ON pulse

GI = Fixed pulse (0.5s) delayed

SW = Symmetrical recycling:ON start

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 ÷ 1000 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 Supply terminals	common mode	EN 61000-4-5	4 kV
	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

(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
1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3

NOTE: time scales and functions must be set before energising the timer.

Functions

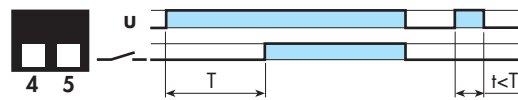
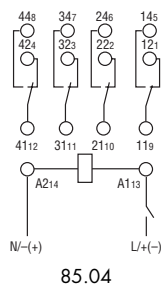
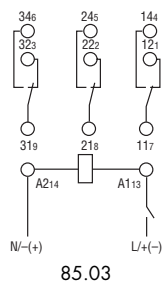
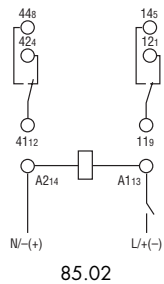
U = Supply voltage

= Output contact

LED	Supply voltage	NO (SPDT-NO) output contact	Contacts	
			Open	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

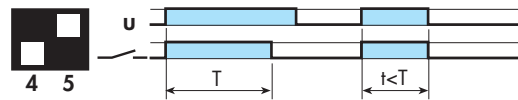
Wiring diagram

Type: 85.02, 85.03, 85.04



(AI) ON delay.

Apply power to timer.
Output contacts transfer after preset time has elapsed.
Reset occurs when power is removed.



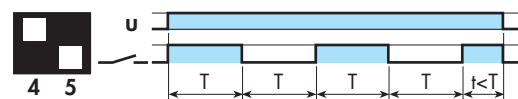
(DI) ON pulse.

Apply power to timer.
Output contacts transfer immediately.
After the preset time has elapsed, contacts reset.



(GI) Fixed 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 recycling: ON start.

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).

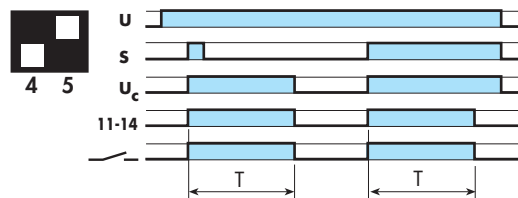
U = Supply voltage

S = Signal switch

U_c = Supply voltage to the timer

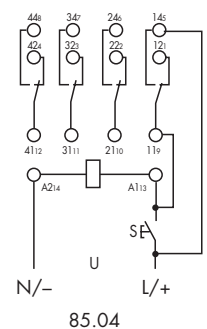
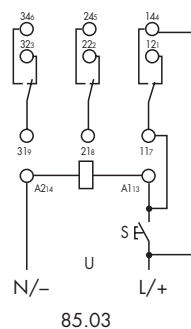
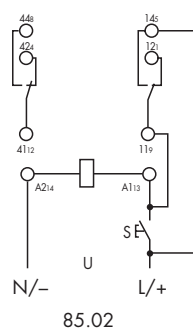
11-14 = Self-holding contact

= 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.




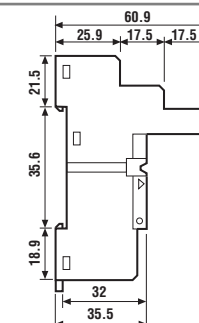
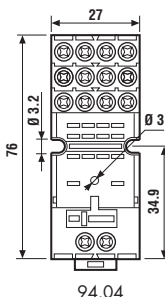
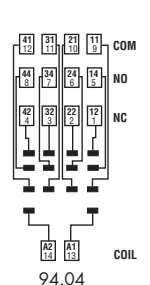
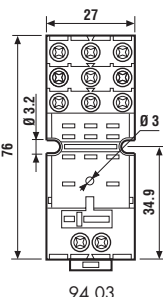
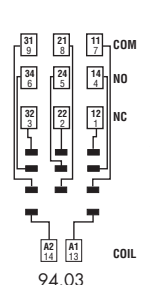
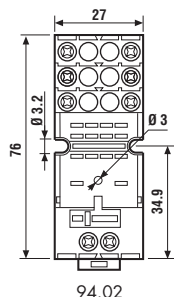
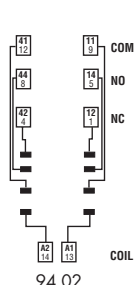


94.04

Approvals
(according to type):

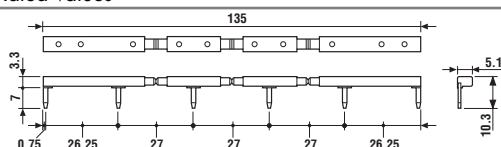


Screw terminal (Box clamp) socket	94.02	94.02.0	94.03	94.03.0	94.04	94.04.0
panel or 35 mm rail (EN 50022) mount	Blue	Black	Blue	Black	Blue	Black
For timer type	85.02		85.03		85.04	
Accessories						
Metal retaining clip (supplied with timer)	094.81					
6-way jumper link	094.06	094.06.0	094.06	094.06.0	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	
	mm²	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	

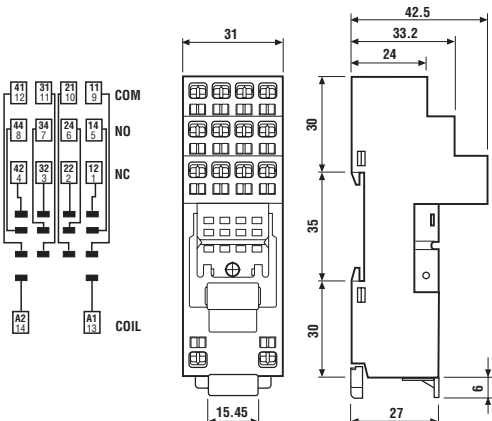
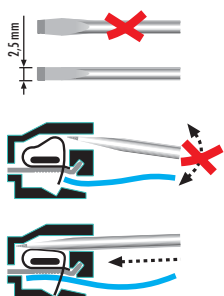


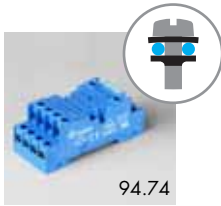
94.54.1

Approvals
(according to type):

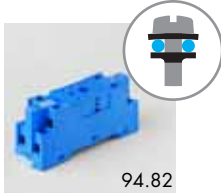


Screwless terminal socket 35 mm rail (EN 50022) mount		94.54.1 (blue)	94.54.10 (black)		
For timer type		85.02, 85.04			
Accessories					
Metal retaining clip		094.81			
Technical data					
Rated values		10 A - 250 V			
Dielectric strength		2 kV AC			
Protection category		IP 20			
Ambient temperature		°C −25...+70			
Wire strip length		mm 7			
Max. wire size for 94.54.1 socket		solid wire		stranded wire	
		mm² 2x(0.2...1.5)		2x(0.2...1.5)	
		AWG 2x(24...18)		2x(24...18)	





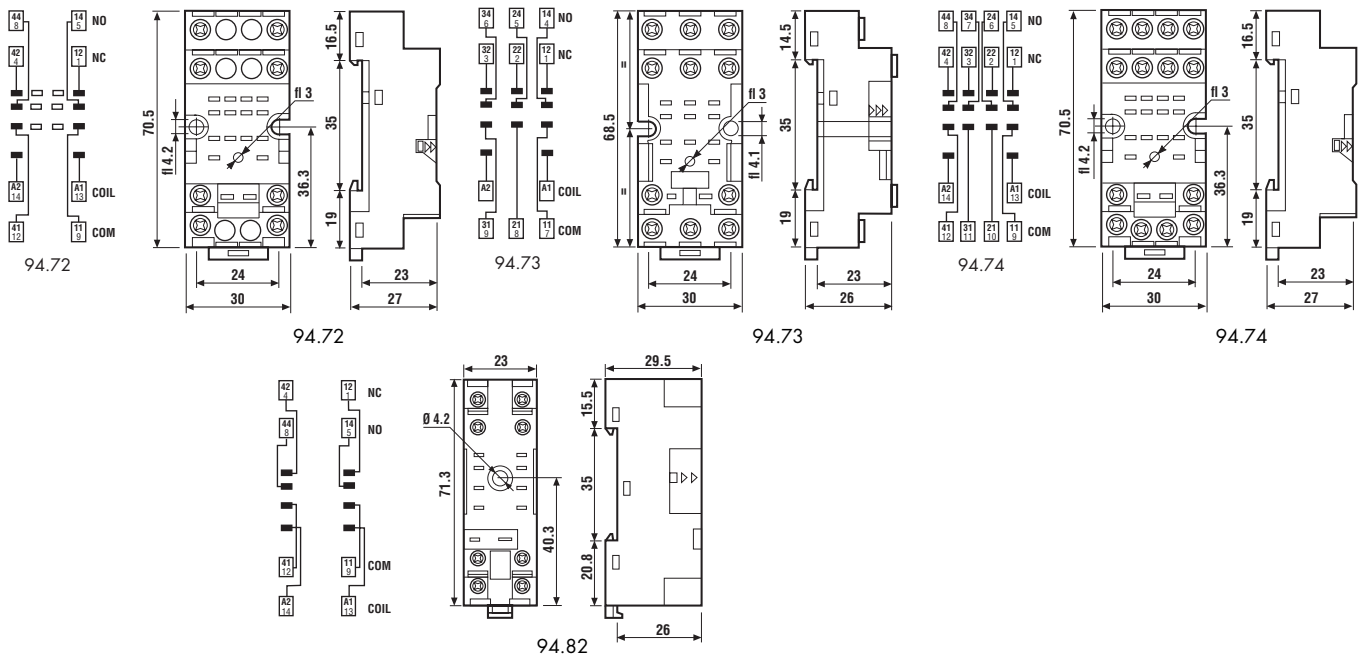
Approvals
(according to type):



Approvals
(according to type):

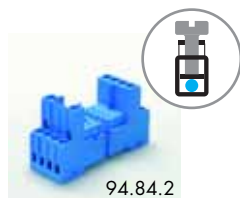


Screw terminal (Plate clamp) socket	94.72	94.72.0	94.73	94.73.0	94.74	94.74.0
panel or 35 mm rail (EN 50022) mount	Blue	Black	Blue	Black	Blue	Black
For timer type	85.02		85.03		85.02, 85.04	
Accessories						
Metal retaining clip (supplied with timer)	094.81					
Screw terminal socket	94.82			94.82.0		
panel or 35 mm rail (EN 50022) mount	Blue			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 and 94.82 sockets		solid wire			stranded wire	
	mm²	1x2.5 / 2x1.5			1x2.5 / 2x1.5	
	AWG	1x14 / 2x16			1x14 / 2x16	





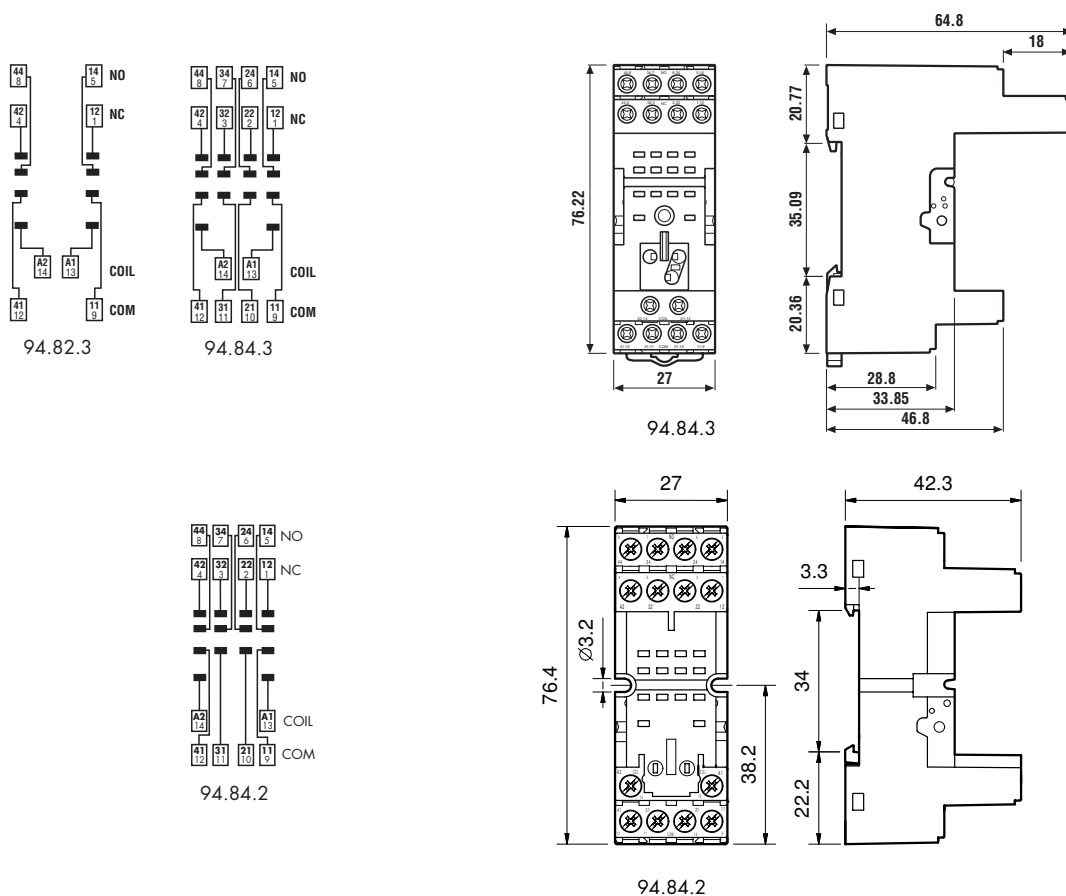
Approvals
(according to type):



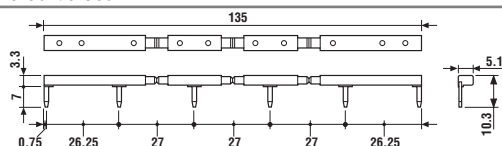
Approvals
(according to type):



Screw terminal (Box clamp) socket panel or 35 mm rail 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			
Screw terminal (Box clamp) socket panel or 35 mm rail 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




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	

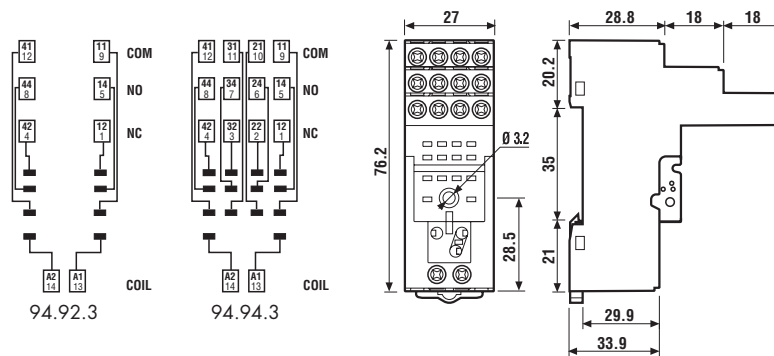




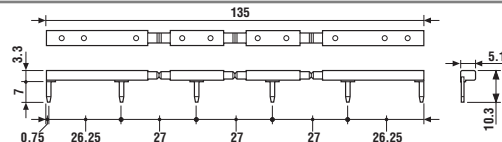
Approvals
(according to type):



Screw terminal (Box clamp) socket		94.92.3	94.92.30	94.94.3	94.94.30	
panel or 35 mm rail (EN 50022) 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		
		mm²	1x6 / 2x2.5		1x4 / 2x2.5	
		AWG	1x10 / 2x14		1x12 / 2x14	



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	



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 for 90, 92 series sockets for type 86.00 and 90, 92, 94, 95, 97 series sockets for type 86.30
- 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

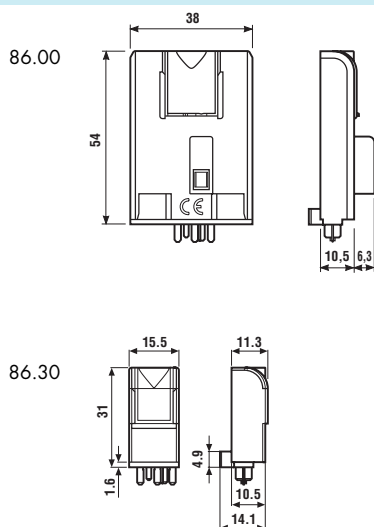


- Time scale: from 0.05s to 100h
- Multi-function
- Plug-in for use with 90.02, 90.03 and 92.03 sockets

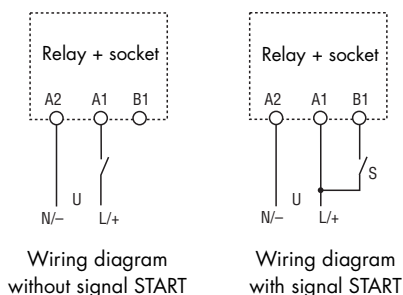
86.30



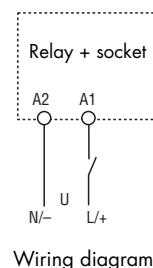
- Time scale: from 0.05s to 100h
- Bi-function
- Plug-in for use with 90.02, 90.03, 92.03, 94.02, 94.03, 94.04, 95.03, 95.05, 95.55, 97.01, 97.02, 97.51 and 97.52 sockets



AI: ON delay
DI: ON pulse
SW: Symmetrical recycling: ON start
BE: Signal OFF delay
CE: Signal ON & OFF delay
DE: Signal ON pulse
EE: Signal OFF pulse
FE: Signal ON delay + OFF pulse



AI: ON delay
DI: ON pulse



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

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)

12...240

12...240

Rated power AC/DC W

1.2

Operating range V AC (50/60 Hz)

10.2...265

10.2...265

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

Minimum control impulse ms

50

—

Setting accuracy full range %

± 5

± 5

Electrical life at rated load in AC1 cycles

See 60 and 62 series relays

See 40, 44, 46, 55, 60 and 62 series relays

Ambient temperature range °C

-20...+50

-20...+50

Protection category

IP 20

IP 20

Approvals (according to type)



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, 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)
 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	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	86.30

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 ÷ 1000 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	2 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 60 and 62 series relays	See 40, 44, 46, 55, 60, 62 series relays	

Time scales

1 2 3 [] [] [] (0.05...1)s	1 2 3 [] [] [] (0.5...10)s	1 2 3 [] [] [] (5...100)s	1 2 3 [] [] [] (0.5...10)min	1 2 3 [] [] [] (5...100)min	1 2 3 [] [] [] (0.5...10)h	1 2 3 [] [] [] (5...100)h
-------------------------------------	-------------------------------------	------------------------------------	---------------------------------------	--------------------------------------	-------------------------------------	------------------------------------

NOTE: time scales and functions must be set before energising the timer.

Functions

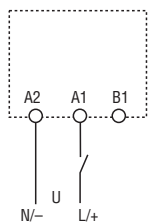
U = Supply voltage
S = Signal switch
 = Output contact

LED Type 86.00	LED Type 86.30	Supply voltage	NO output contact
		OFF	Open
		ON	Open
		ON	Open (timing in progress)
		ON	Closed

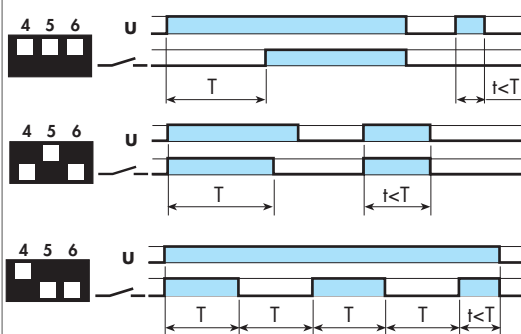
Without signal Start= Start via contact in supply line (A1).
 With signal Start = Start via contact into control terminal (B1).

Wiring diagram

Without signal START



Type 86.00



(AI) ON delay.

Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs when power is removed.

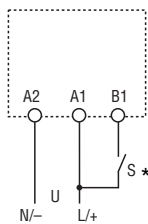
(DI) ON pulse.

Apply power to timer. Output contacts transfer immediately. After the preset time has elapsed, contacts reset.

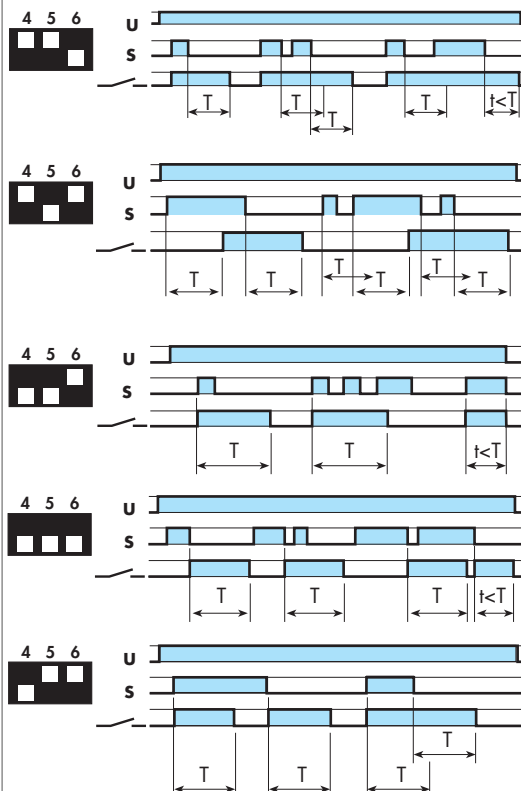
(SW) Symmetrical recycling: ON start.

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 signal START



* With DC supply, positive polarity has to be connected to B1 terminal (according to EN 60204-1).



(BE) Signal OFF delay.

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 time the output contacts reset.

(CE) Signal ON and OFF delay.

Power is permanently 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) Signal ON pulse.

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.

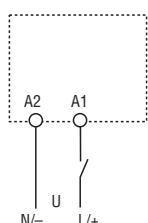
(EE) Signal OFF pulse.

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.

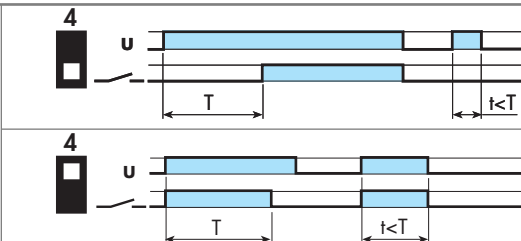
(FE) Signal ON pulse + OFF pulse.

Power is permanently 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

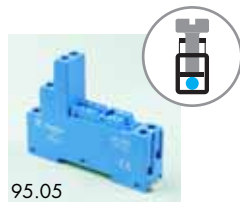


(AI) ON delay.

Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs when power is removed.

(DI) ON pulse.

Apply power to timer. Output contacts transfer immediately. After the preset time has elapsed, contacts reset.



95.05


Approvals
(according to type):



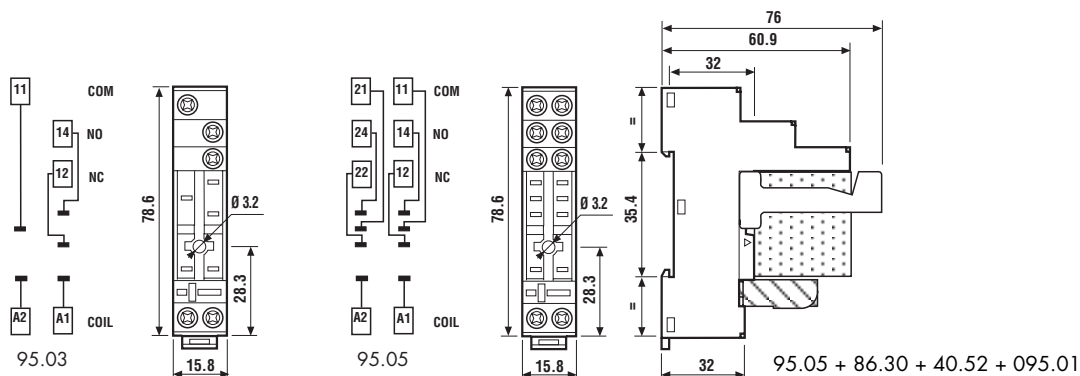
095.01



060.72

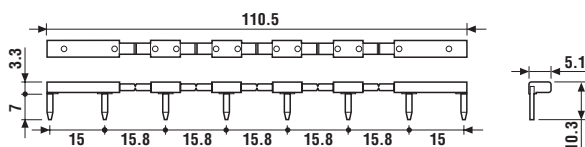
Screw terminal (Box clamp) socket	95.03	95.03.0	95.05	95.05.0
panel or 35 mm rail (EN 50022) mount	Blue	Black	Blue	Black
For relay type	40.31		40.51/ 52/ 61, 44.52/62	
Accessories				
Metal retaining clip	095.71			
Plastic retaining and release clip (supplied with socket - packaging code SPA)	095.01	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
	mm²	1x6 / 2x2.5		1x4 / 2x2.5
	AWG	1x10 / 2x14		1x12 / 2x14

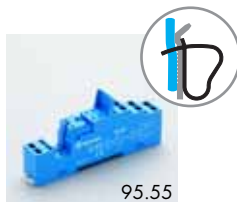
* For currents >10 A, contact terminals must be connected in parallel (21 with 11, 24 with 14, 22 with 12).



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	

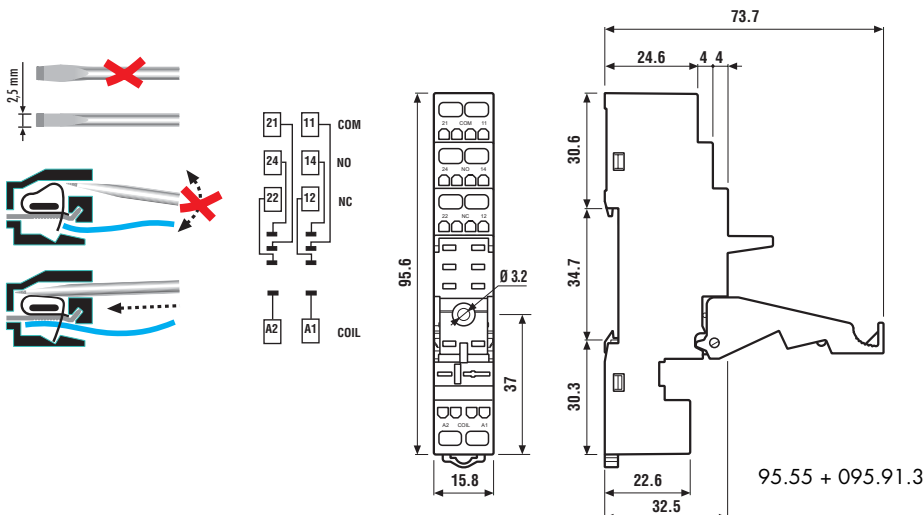




Approvals
(according to type):




Screwless terminal socket		95.55	95.55.0
panel or 35 mm rail (EN 50022) mount		Blue	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
		mm² 2x(0.2...1.5)	2x(0.2...1.5)
		AWG 2x(24...18)	2x(24...18)

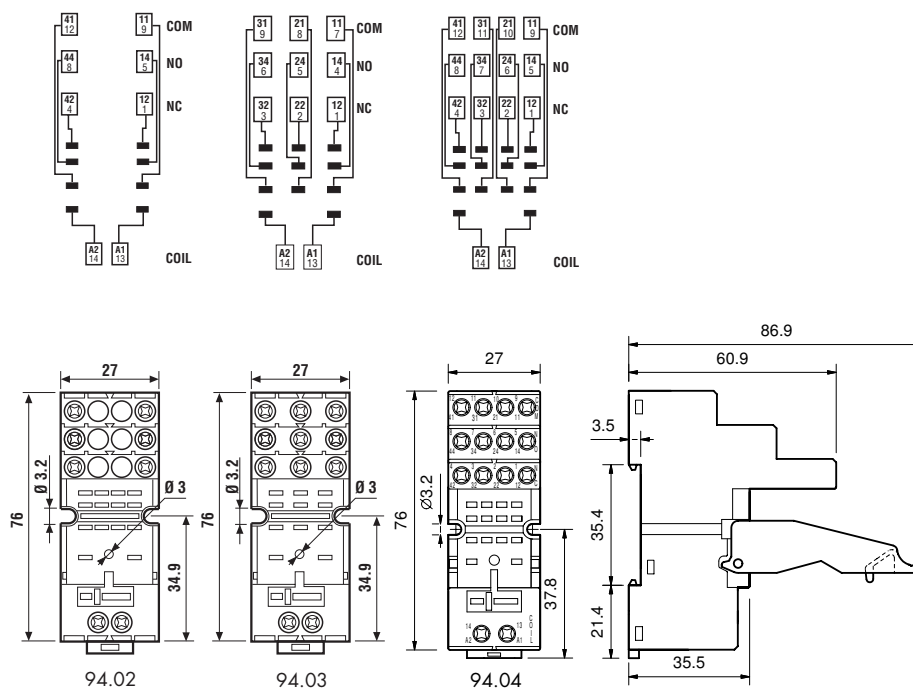




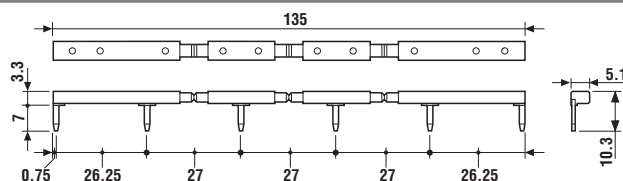
Approvals
(according to type):



Screw terminal (Box clamp) socket	94.02	94.02.0	94.03	94.03.0	94.04	94.04.0
panel or 35 mm rail (EN 50022) mount	Blue	Black	Blue	Black	Blue	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	



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	



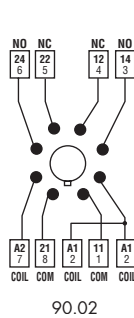


90.03

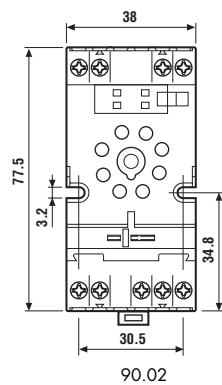
Approvals
(according to type):



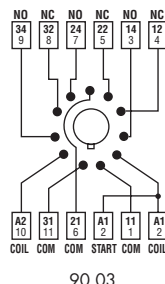
Screw terminal (Box clamp) socket	90.02	90.02.0	90.03	90.03.0
panel or 35 mm rail (EN 50022) mount	Blue	Black	Blue	Black
For relay type	60.12		60.13	
Accessories				
Metal retaining clip	090.33			
6-way jumper link	090.06			
Identification tag	090.00.2			
Timer module	86.00, 86.30			
Technical data				
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	



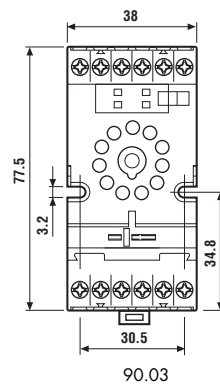
90.02



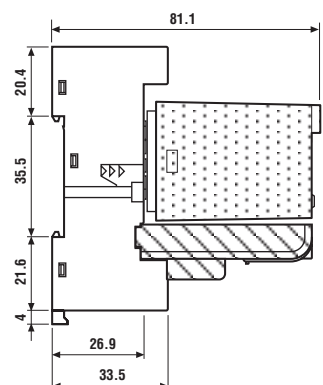
90.02



90.03



90.03



90.03 + 60.13 + 86.00



090.06

Approvals
(according to type):



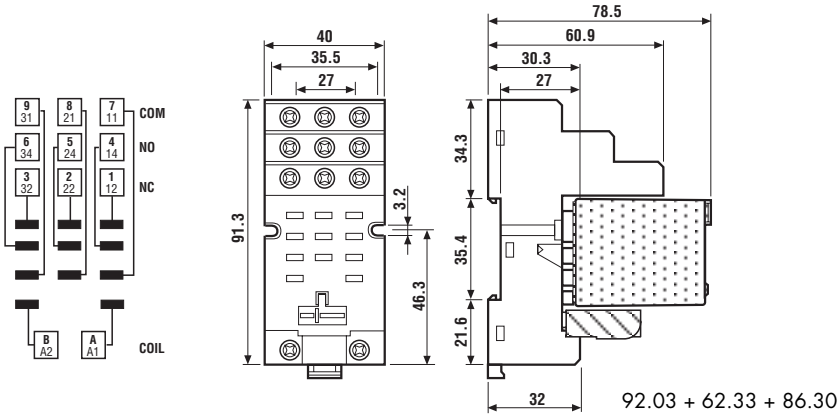
6-way jumper link for 90.02 and 90.03 sockets	090.06
Rated values	10 A - 250 V



Approvals
(according to type):



Screw terminal (Box clamp) socket		92.03	92.03.0
panel or 35 mm rail (EN 50022) mount		Blue	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	
⊕ 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
		AWG	1x8 / 2x12



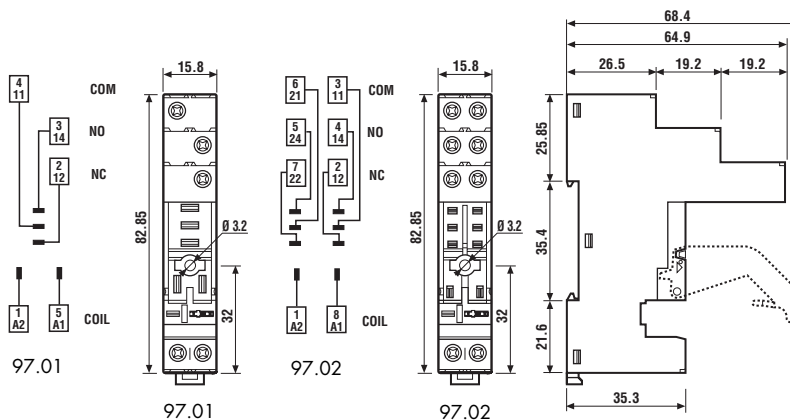
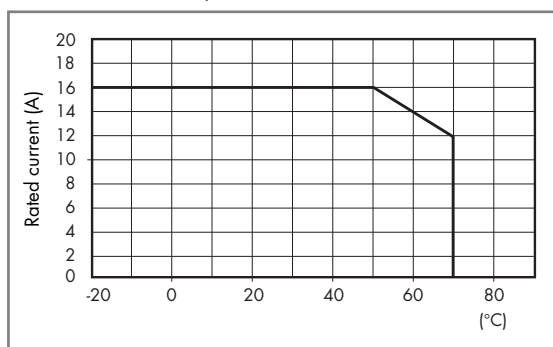


Approvals
(according to type):

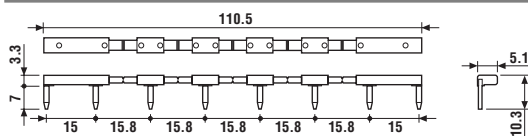


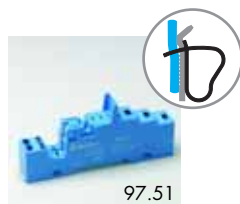
Screw terminal socket		97.01	97.02
panel or 35 mm rail (EN 50022) mount		Blue	Blue
For relay type		46.61	46.52
Accessories			
Plastic retain and eject clip (supplied with socket - packaging code SPA)		097.01	
8-way jumper link		095.18 (blue)	095.18.0 (black)
Identification tag		095.00.4	
Timer modules		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)



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

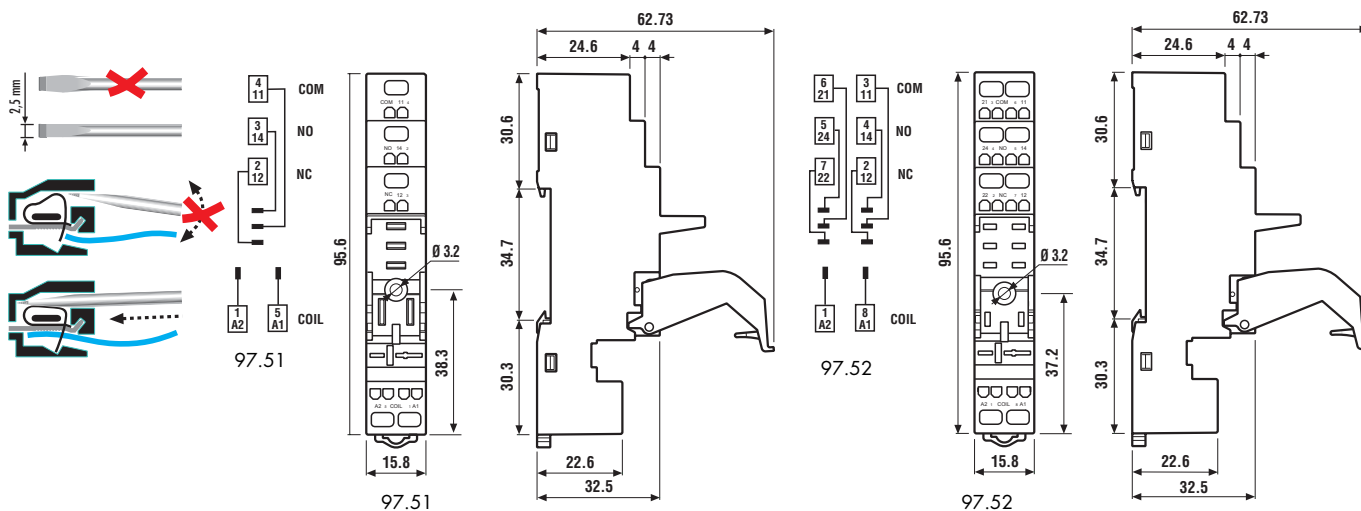




Approvals
(according to type):



Screwless terminal socket		97.51	97.52
panel or 35 mm rail (EN 50022) 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	12 A - 250 V AC	8 A - 250 V AC	
Dielectric strength	6 kV (1.2/50 μ s) 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)



Features

Mono-function and multi-function timer range
22.5 mm wide

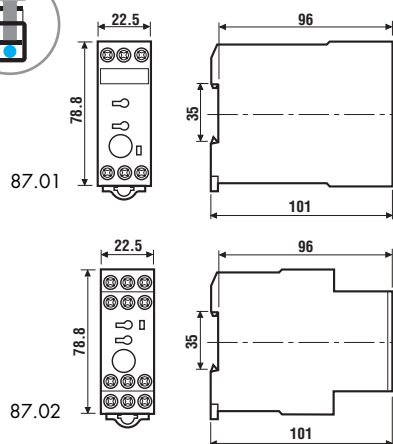
87.01 - 1 Pole - Multi-function and multi-voltage

87.02 - 2 Pole - Multi-function and multi-voltage,
(timed + instantaneous options)

External time setting potentiometer option

- Wide supply voltage range:
 (24...240)V AC / (24...48)V DC
- LED indicator
- Time setting from 0.05 seconds to 60 hours
- 35 mm rail (EN 50022) mounting

87.01 / 87.02
 Screw terminal

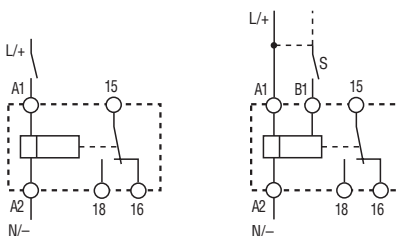


87.01



- Multi-function
- 1 pole
- 35 mm rail (EN 50022) mount

A1: ON delay
BE: Signal OFF delay
CE: Signal ON and OFF Delay
DE: Signal ON pulse
DI: ON pulse
EE α: Signal OFF pulse
GI: Fixed pulse delayed
SW: Symmetrical recycling: ON start



Wiring diagram
 (without signal START)

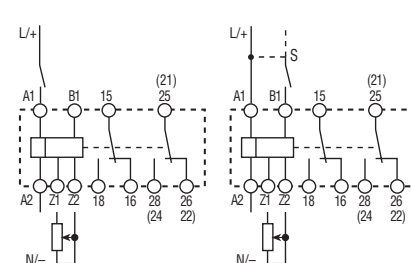
Wiring diagram
 (with signal START)

87.02



- Multi-function
- Timing can be regulated using ext. Potentiometer
- 2 timed contacts or 1 timed + 1 instantaneous contact
- 35 mm rail (EN 50022) mount

A1: ON delay
BE: Signal OFF delay
CE: Signal ON and OFF Delay
DE: Signal ON pulse
DI: ON pulse
EE α: Signal OFF pulse
GI: Fixed pulse delayed
SW: Symmetrical recycling: ON start



Wiring diagram
 (without signal START)

Wiring diagram
 (with signal START)

Contact specification

Contact configuration		1 CO (SPDT)	2 CO (DPDT)
Rated current/Maximum peak current	A	8/30	8/30
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	0.185	0.185
Breaking capacity DC1: 30/110/220 V	A	8/0.5/0.2	8/0.5/0.2
Minimum switching load	mW (V/mA)	300 (10/5)	300 (10/5)
Standard contact material		AgCdO	AgCdO

Supply specification

Nominal voltage (U _N)	V AC (50/60 Hz)	24...240	24...240
	V DC	24...48	24...48
Rated power AC/DC	VA (50 Hz)/W	5/0.5	5/0.5
Operating range	AC	(0.85...1.1)U _N	(0.85...1.1)U _N
	DC	(0.85...1.2)U _N	(0.85...1.2)U _N

Technical data

Specified time range		See page 6	See page 6
Repeatability	%	± 2	± 2
Recovery time	ms	50	50
Minimum control impulse	ms	50	50
Setting accuracy-full range	%	± 5	± 5
Electrical life at rated load in AC1	cycles	100·10 ³	100·10 ³
Ambient temperature range (Contact current)	°C	-20...+70	-20...+60 / -20...+70 (< 5 A)
Protection category		IP 20	IP 20

Approvals (according to type)



Features

Mono-function and multi-function timer range
22.5 mm wide

87.11 - ON delay, multi-voltage

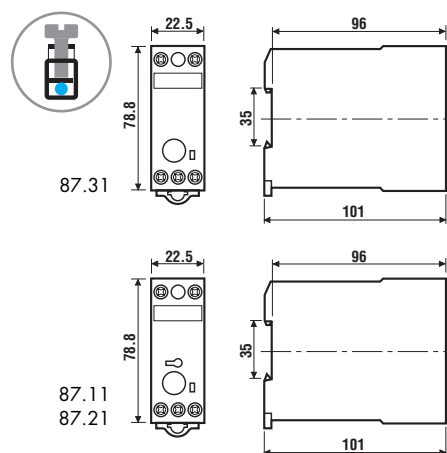
87.21 - ON pulse, multi-voltage

87.31 - Symmetrical recycling, multi-voltage

- 1 Pole output contact
- Wide supply voltage range:
(24...240)V AC / (24...48)V DC
- LED indicator
- Time setting:
Types 87.11/21 - 0.05 seconds to 60 hours
Type 87.31 - 0.5 seconds to 10 seconds
- 35 mm rail (EN 50022) mount

87.11 / 87.21 / 87.31

Screw terminal



	87.11	87.21	87.31
	<ul style="list-style-type: none"> • Mono-function • 35 mm rail (EN 50022) mount 	<ul style="list-style-type: none"> • Mono-function • 35 mm rail (EN 50022) mount 	<ul style="list-style-type: none"> • Mono-function • 35 mm rail (EN 50022) mount
	AI: ON delay	DI: ON pulse	SW: Symmetrical recycling: ON start
	Wiring diagram (without signal START)	Wiring diagram (without signal START)	Wiring diagram (without signal START)
Contact specification			
Contact configuration	1 CO (SPDT)	1 CO (SPDT)	1 CO (SPDT)
Rated current/Maximum peak current	A 8/30	A 8/30	A 8/30
Rated voltage/Maximum switching voltage	V AC 250/400	V AC 250/400	V AC 250/400
Rated load AC1	VA 2,000	VA 2,000	VA 2,000
Rated load AC15 (230 V AC)	VA 400	VA 400	VA 400
Single phase motor rating (230 V AC)	kW 0.185	kW 0.185	kW 0.185
Breaking capacity DC1: 30/110/220 V	A 8/0.5/0.2	A 8/0.5/0.2	A 8/0.5/0.2
Minimum switching load	mW (V/mA) 300 (10/5)	mW (V/mA) 300 (10/5)	mW (V/mA) 300 (10/5)
Standard contact material	AgCdO	AgCdO	AgCdO
Supply specification			
Nominal voltage (U _N)	V AC (50/60 Hz) 24...240	V AC (50/60 Hz) 24...240	V AC (50/60 Hz) 24...240
	V DC 24...48	V DC 24...48	V DC 24...48
Rated power AC/DC	VA (50 Hz)/W 5/0.5	VA (50 Hz)/W 5/0.5	VA (50 Hz)/W 5/0.5
Operating range	AC (0.85...1.1)U _N	AC (0.85...1.1)U _N	AC (0.85...1.1)U _N
	DC (0.85...1.2)U _N	DC (0.85...1.2)U _N	DC (0.85...1.2)U _N
Technical data			
Specified time range	See page 6	See page 6	See page 6
Repeatability	% ± 0.2	% ± 0.2	% ± 0.2
Recovery time	ms 50	ms 50	ms 50
Minimum control impulse	ms —	ms —	ms —
Setting accuracy-full range	% ± 5	% ± 5	% ± 5
Electrical life at rated load in AC1	cycles 100 · 10 ³	cycles 100 · 10 ³	cycles 100 · 10 ³
Ambient temperature range	°C -20...+70	°C -20...+70	°C -20...+70
Protection category	IP 20	IP 20	IP 20
Approvals (according to type)			

Features

Mono-function and multi-function timer range
22.5 mm wide

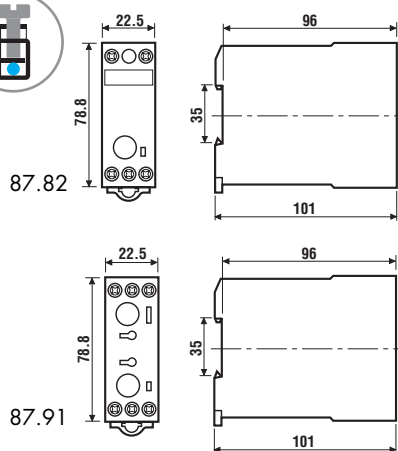
**87.82 - Star-Delta timer, multi-voltage,
star and delta output contacts**

87.91 - Multi-function Recycling timer, 1 Pole

- Wide supply range:
(24...240)V AC / (24...48)V DC
- LED indicator
- Time setting voltage range:
Type 87.82 - 0.05 minute to 1 minute
Type 87.91 - 0.05 seconds to 60 hours
- 35 mm rail (EN 50022) mount

87.82 / 87.91

Screw terminal

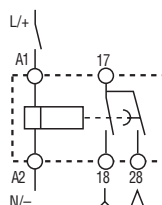


87.82



- Mono-function: Star - delta
- 2 pole
- 35 mm rail (EN 50022) mount

SD: Star - delta



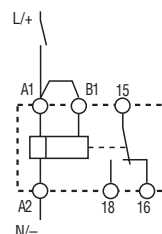
Wiring diagram
(without signal START)

87.91

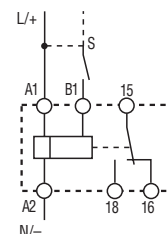


- Multi-function recycling
- 1 pole
- 35 mm rail (EN 50022) mount

LI: Asymmetrical recycling (ON starting)
LE: Signal asymmetrical recycling (ON starting)
PI: Asymmetrical recycling (OFF starting)
PE: Signal asymmetrical recycling (OFF starting)



Wiring diagram
(without signal START)



Wiring diagram
(with signal START)

Contact specification			
Contact configuration		2 NO (DPST-NO)	1 CO (SPDT)
Rated current/Maximum peak current	A	8/30	8/30
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	0.185	0.185
Breaking capacity DC1: 30/110/220 V	A	8/0.5/0.2	8/0.5/0.2
Minimum switching load	mW (V/mA)	300 (10/5)	300 (10/5)
Standard contact material		AgCdO	AgCdO
Supply specification			
Nominal voltage (U _N)	V AC (50/60 Hz)	24...240	24...240
	V DC	24...48	24...48
Rated power AC/DC	VA (50 Hz)/W	5/0.5	5/0.5
Operating range	AC	(0.85...1.1)U _N	(0.85...1.1)U _N
	DC	(0.85...1.2)U _N	(0.85...1.2)U _N
Technical data			
Specified time range		See page 6	See page 6
Repeatability	%	± 0.2	± 0.2
Recovery time	ms	50	50
Minimum control impulse	ms	—	50
Setting accuracy-full range	%	± 5	± 5
Electrical life at rated load in AC1	cycles	100 · 10 ³	100 · 10 ³
Ambient temperature range	°C	-20...+70	-20...+70
Protection category		IP 20	IP 20
Approvals (according to type)			

Ordering information

Example: 87 series multi-function timer 8 A, 1 CO (SPDT) contact, (24...240)V AC (50/60 Hz) and (24...48)V DC supply.

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

Series

Type

0 = Multi-function
(AI, BE, CE, DI, DE, EE α, GI, SW, ON, OFF)
1 = ON delay (AI)
2 = ON pulse (DI)
3 = Symmetrical recycling: ON start (SW)
4 = Signal OFF delay (BE)
6 = True OFF delay (power OFF) (BI)
8 = Star - delta (SD)
9 = Asymmetrical recycling (LI, LE, PI, PE)

Supply voltage

240 = { (24...48)V DC
(24...240)V AC
240 = (24...240)V AC/DC for 87.61 and 87.62

Supply version

0 = AC (50/60 Hz)/DC

No. of poles

1 = 1 pole
2 = 2 pole for 87.02/62
2 = 2 NO (DPST-NO) for 87.82

Technical data

Insulation			
Dielectric strength	between input and output circuit	V AC	4,000
	insulation (1.2/50 μs) between input and output	kV	6
	between open contacts	V AC	1,000
	between adjacent contacts	V AC	2,000 (Type 87.02, 87.62)
EMC specifications			
Type of test		Reference standard	
Electrostatic discharge	contact discharge	EN 61000-4-2	8 kV
	air discharge	EN 61000-4-2	8 kV
Radio-frequency electromagnetic field (80 ÷ 1000 MHz)		EN 61000-4-3	10 V/m
Fast transients (burst) (5-50 ns, 5 kHz) on Supply terminals		EN 61000-4-4	6 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	classe B
Other data			
Signal control (B1)			
		- current absorption	1 mA
		- max cable length (capacity of ≤ 10 nF / 100 m)	250 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 A1 and N to A2
Note: when applying a control signal to B1 it is recommended to attach a bypass resistance 56 kOhm/2 W across A1 - A2			
External potentiometer for 87.02		Use a 10 kΩ/ ≥ 0,25 W linear potentiometer. Maximum cable length 10 m. When using an external potentiometer, remove the bridge between Z1 and Z2, and set the timer's potentiometer to its minimum setting. Consider the voltage potential at the potentiometer to be the same as the timer supply voltage.	
Power lost to the environment		87.01/02/11/21/31/41/91	87.61/62
	without contact current	W	5
	with rated current	W	15
			7
Screw torque		Nm	1.2
Max. wire size		solid cable	stranded cable
		mm ²	1x4 / 2x2.5
		AWG	1x12 / 2x14
			1x4 / 2x1.5
			1x12 / 2x16

Time scales

Type	Function Code	Function	Time ranges - minimum to maximum span									
			s	s	s	min	min	min	h	h	h	h
			0,05	0,15	0,5	0,05	0,15	0,5	0,05	0,15	0,5	3
			1	3	10	1	3	10	1	3	10	60
87.01	AI	ON delay	•	•	•	•	•	•	•	•	•	•
87.02	BE	Signal OFF delay	•	•	•	•	•	•	•	•	•	•
	CE	Signal ON and OFF delay	•	•	•	•	•	•	•	•	•	•
	DI	ON pulse	•	•	•	•	•	•	•	•	•	•
	DE	Signal ON pulse	•	•	•	•	•	•	•	•	•	•
	EE a	Signal OFF pulse	•	•	•	•	•	•	•	•	•	•
	GI	Fixed pulse (0,5s) delayed	•	•	•	•	•	•	•	•	•	•
	SW	Symmetrical recycling: ON start	•	•	•	•	•	•	•	•	•	•
87.11	AI	ON delay	•	•	•	•	•	•	•	•	•	•
87.21	DI	ON pulse	•	•	•	•	•	•	•	•	•	•
87.31	SW	Symmetrical recycling: ON start			•							
87.41	BE	Signal OFF delay	•	•	•	•	•	•	•	•	•	•
87.61	BI	True OFF delay (power OFF)		0.15	•	0.07		•				
87.62				2.5		1.3						
87.82	SD	Star - delta ($T_U = \sim 60$ ms)				•						
87.91	LI	Asymmetrical recycling (ON start)	•	•	•	•	•	•	•	•	•	•
	LE	Signal asymmetrical recycling (ON start)	•	•	•	•	•	•	•	•	•	•
	PI	Asymmetrical recycling (OFF start)	•	•	•	•	•	•	•	•	•	•
	PE	Signal asymmetrical recycling (OFF start)	•	•	•	•	•	•	•	•	•	•

Functions

U = Supply Voltage

S = Signal switch

C = Output Contact

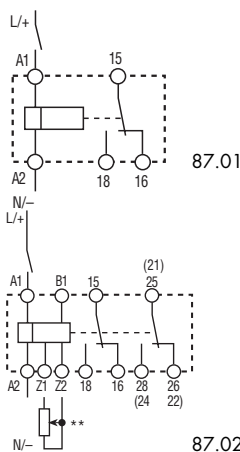
LED** Green	Timing	NO output contact	Contacts Timed		DIP switch	Contacts Instantaneous*	
			Open	Closed		Open	Closed
	None	Open	15 - 18 25 - 28*	15 - 16 25 - 26*	Up	21 - 24*	21 - 22*
	In progress	Open	15 - 18 25 - 28*	15 - 16 25 - 26*		21 - 22*	21 - 24*
	In progress	Closed	15 - 16 25 - 26*	15 - 18 25 - 28*		21 - 22*	21 - 24*
	None	Closed	15 - 16 25 - 26*	15 - 18 25 - 28*	Down	21 - 22*	21 - 24*

* 25-26-28 only for type 87.02 with 2 timed contacts. 21-22-24 only for type 87.02 with 1 instantaneous contact + 1 timed positioning the front DIP switch.

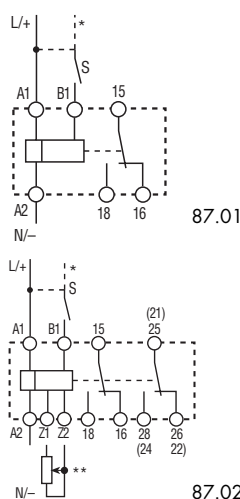
** The LED on types 87.61 and 87.62 is illuminated when supply voltage is supplied to timer.

Wiring diagram

Multi-function without signal START



with signal START



* A voltage other than the supply voltage can be applied to the command START (B1).
Example:
A1 - A2 = 230 V AC
B1 - A2 = 24 V AC

** Type 87.02: regulated using an external potentiometer (10 kΩ - 0.25 W).

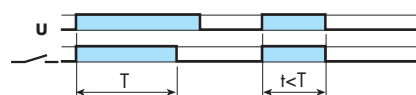
NB.: remove link between Z1-Z2 and position the Timer potentiometer on "zero".

Type 87.01 87.02



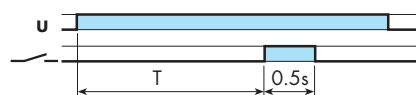
(AI) ON delay.

Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs when power is removed.



(DI) ON pulse.

Apply power to timer. Output contacts transfer immediately. After the preset time has elapsed, contacts reset.



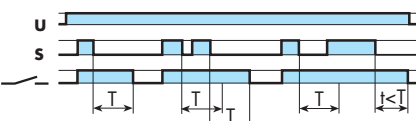
(GI) Fixed pulse (0.5s) delayed.

Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs after a fixed time of 0.5s.



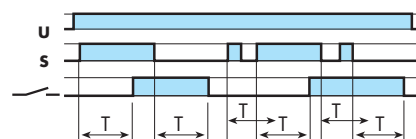
(SW) Symmetrical recycling: ON start.

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).



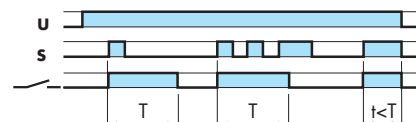
(BE) Signal OFF delay.

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 time the output contacts reset.



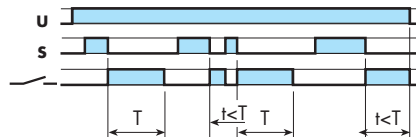
(CE) Signal ON and OFF delay.

Power is permanently 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.



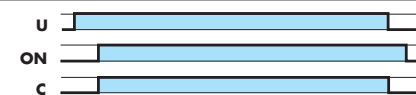
(DE) Signal ON pulse.

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.



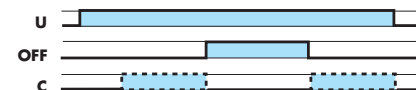
(EE a) Signal OFF pulse.

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.



Permanently ON.

Selecting the function ON when power is applied to the relay the first contact transfers immediately and remains in that position.



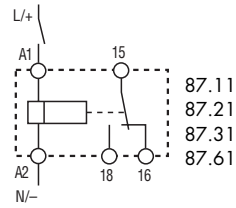
Permanently OFF.

The contact returns to the original position when the OFF function is selected.

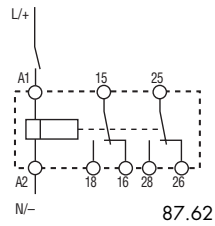
Functions

Wiring diagram

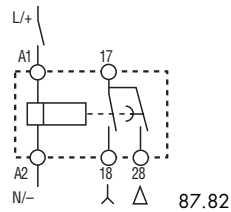
Mono-function without signal START



87.11
87.21
87.31
87.61

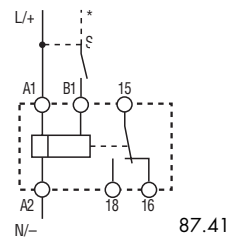


87.62



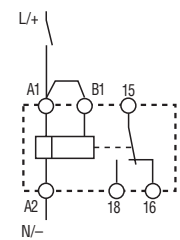
87.82

with signal START (S)



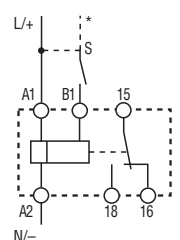
87.41

Asymmetrical recycler without signal START



87.91

with signal START (S)



87.91

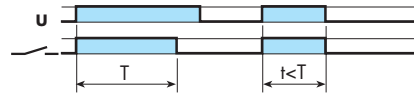
Type
87.11



(AI) ON delay.

Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs when power is removed.

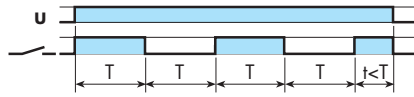
87.21



(DI) ON pulse.

Apply power to timer. Output contacts transfer immediately. After the preset time has elapsed, contacts reset.

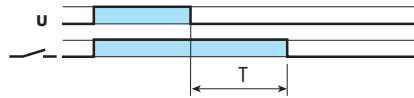
87.31



(SW) Symmetrical recycling: ON start.

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).

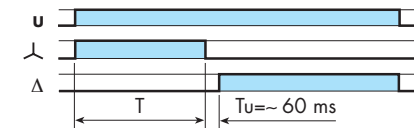
87.61
87.62



(BI) True OFF delay (power OFF).

Apply power to timer (minimum 300 ms). Output contacts transfer immediately. Removal of power initiates the preset delay, after which time the output contacts reset.

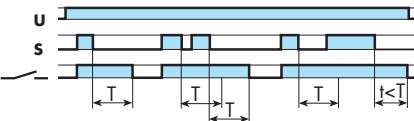
87.82



(SD) Star - delta.

Apply power to timer. The star contact (Λ) closes immediately. After preset delay has elapsed the star contact (Λ) resets. After a further fixed time of ~60 ms the delta contact (Δ) closes and remains in that position, until reset on power off.

87.41



(BE) Signal OFF delay.

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 time the output contacts reset.

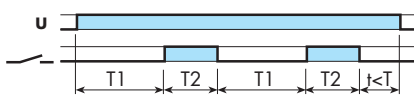
87.91
switch position



(LI) Asymmetrical recycling (ON start).

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.

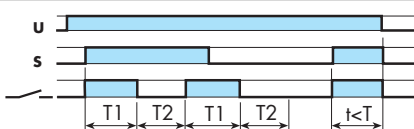
switch position



(PI) Asymmetrical recycling (OFF start).

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.

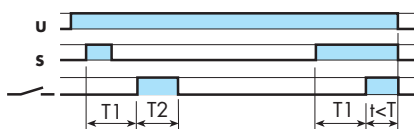
switch position



(LE) Signal asymmetrical recycling (ON start)

Power is permanently applied to the timer. Closing Signal Switch (S) causes the output contacts to transfer immediately and cycle between ON and OFF, until opened.

switch position



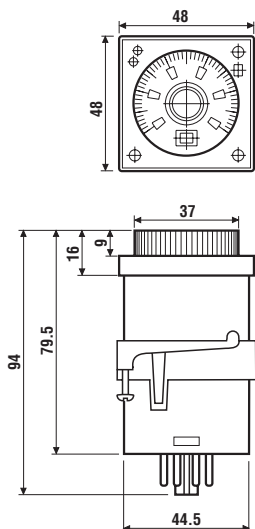
(PE) Signal asymmetrical recycling (OFF start).

Power is permanently applied to the timer. Closing the Signal Switch (S) initiates delay T1 after which the output contacts transfer and continue to cycle between OFF and ON, until the Signal Switch is opened.

Features

Multi-voltage and multi-function timer range Front panel or socket mount

- 8 - 11 pin plug-in version 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

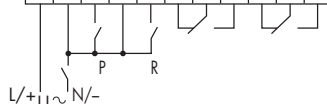
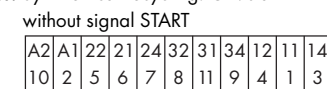


88.02

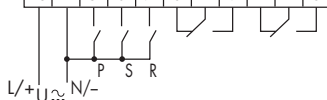
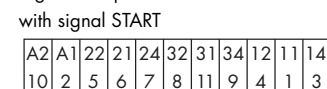


- Multi-function
- 11 pin
- Plug-in for use with 90 series sockets

AI: ON delay
DI: ON pulse
GI: Fixed pulse (0.5s) delayed
SW: Symmetrical recycling: ON start



BE: Signal OFF delay
CE: Signal ON and OFF delay
DE: Signal ON pulse



P = Pause
S = Start
R = Reset

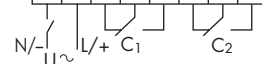
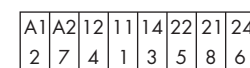
88.12



- 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: ON Pulse (2 timed contacts)
DI b: ON Pulse (1 timed + 1 instantaneous contact)
GI: Fixed pulse (0.5s) delayed
SW: Symmetrical recycling.

without signal START



Contact specification

Contact configuration

2 CO (DPDT)

2 CO (DPDT)

Rated current/Maximum peak current A

8/15

5/10

Rated voltage/Maximum switching voltage V AC

250/250

250/400

Rated load AC1 VA

2,000

1,250

Rated load AC15 (230 V AC) VA

400

250

Single phase motor rating (230 V AC) kW

0.3

0.125

Breaking capacity DC1: 30/110/220 V A

8/0.3/0.12

5/0.3/0.12

Minimum switching load mW (V/mA)

300 (5/5)

500 (5/5)

Standard contact material

AgNi

AgCdO

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 AC

20.4...264.5

20.4...264.5

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

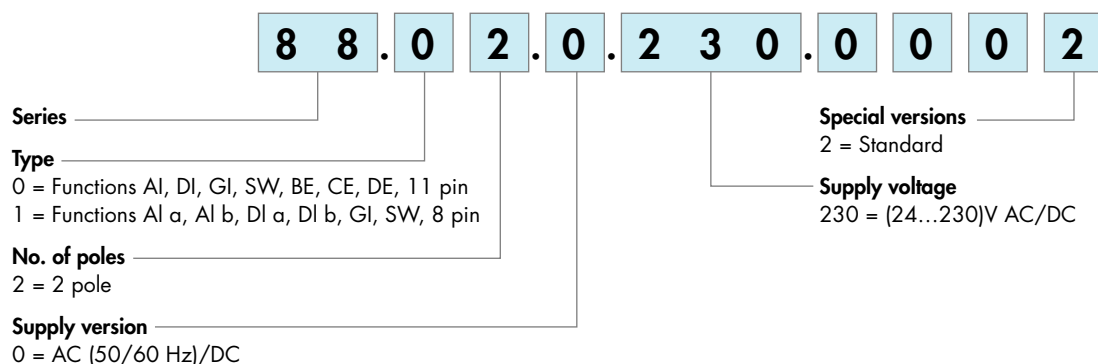
IP 40

Approvals (according to type)



Ordering information

Example: 88 series multi-function timer, 2 CO (DPDT) contact 8 A, (24...230)V AC (50/60 Hz) and (24...230)V DC supply.



Technical data

EMC specifications

Type of test	Reference standard
Electrostatic discharge	contact discharge
	air discharge
Radio-frequency electromagnetic field (80 ÷ 1000 MHz)	
Fast transients (burst) (5-50 ns, 5 kHz) on Supply terminals	
Surges (1.2/50 µs) on Supply terminals	common mode
	differential mode
Radio-frequency common mode (0.15 ÷ 80 MHz) on Supply terminals	

Selection of: function, time scale and units

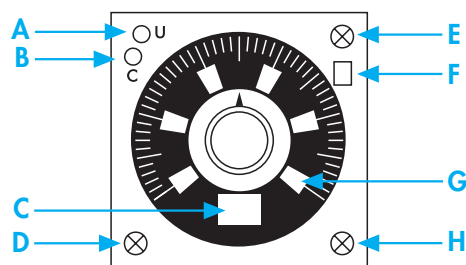
	88.02	88.12
E Function selector	AI, DI, GI, SW, BE, CE, DE	AI a, AI b, DI a, DI b, GI, SW
D Time scale selector	0.5, 1, 5, 10	
H Unit of time selector	s (second), min (minute), h (hour), 10h (10 hour)	

Time scales

Full scale value

D \ H	s	min	h	x10h
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

NOTE: time scales and functions must be set before energising the timer.



LED/visual indication

A	Yellow LED: power ON (U)
B	Red LED: timing in progress (C)
C	Unit of time selected
F	Function selected
G	Time selected

Functions

U = Supply Voltage

S = Signal switch

P = Pause

R = Reset

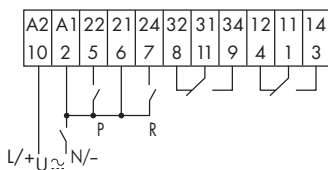
= Output Contact

LED (yellow)	LED (red)	Supply voltage	NO output contact	Contact	
Open	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

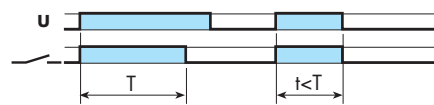
Type 88.02

without signal START



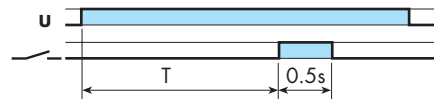
(AI) ON delay.

Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs when power is removed.



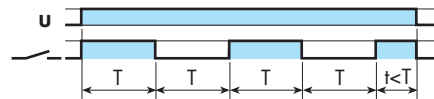
(DI) ON pulse.

Apply power to timer. Output contacts transfer immediately. After the preset time has elapsed, contacts reset.



(GI) Fixed pulse (0.5s) delayed.

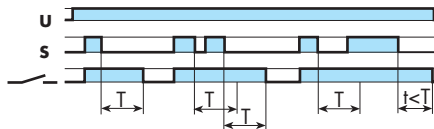
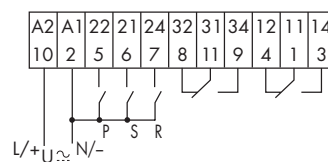
Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs after a fixed time of 0.5s.



(SW) Symmetrical recycling: ON start.

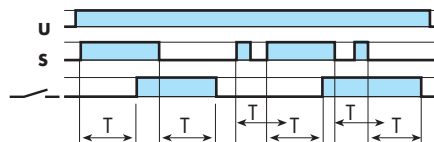
Apply power to timer. Output contacts transfer immediately and cycle between ON and OFF for as long as power is applied. The ratio is 1:1 (time on = time off).

with signal START



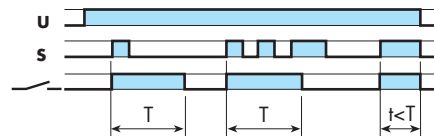
(BE) Signal OFF delay.

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 time the output contacts reset.



(CE) Signal ON and OFF delay.

Power is permanently 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) Signal ON pulse.

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.

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.

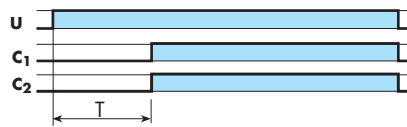
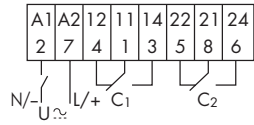
On opening of the pause switch, timing resumes from the retained value. This is applicable for all functions.

Functions

Wiring diagram

Type 88.12

without signal START

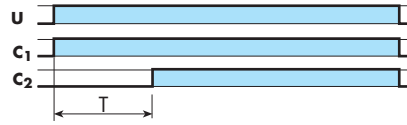


(AI a) ON Delay (2 timed contacts).

Apply power to timer.

Contacts (C₁ and C₂) transfer after preset time has elapsed.

Reset occurs when power is removed.

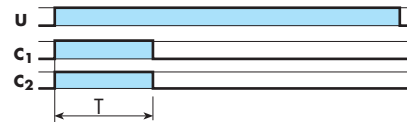


(AI b) ON Delay

(1 timed contact + 1 instantaneous contact).

Apply power to timer. Output contact (C₁) transfers immediately.

Contact (C₂) transfers after the preset time has elapsed. Reset occurs when power is removed.

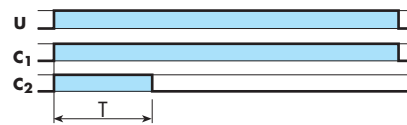


(DI a) ON pulse (2 timed contacts).

Apply power to timer.

Output contacts (C₁ and C₂) transfer immediately.

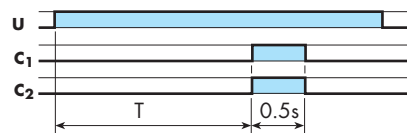
After preset time has elapsed, the contacts reset.



(DI b) ON pulse (1 timed contact + 1 instantaneous contact).

Apply power to timer. Output contacts (C₁ and C₂) transfer immediately.

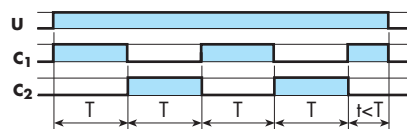
After preset time has elapsed, the contact (C₂) resets. Contact (C₁) resets when power is removed.



(GI) Fixed 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 recycling.

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).

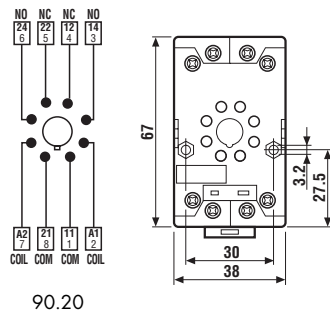


90.21

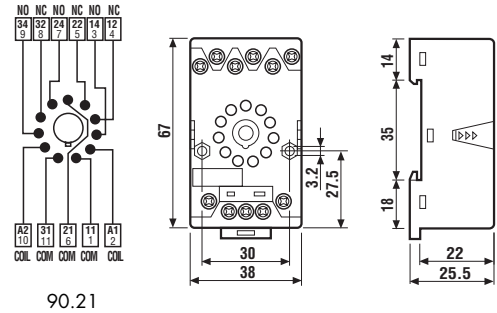
Approvals
(according to type):



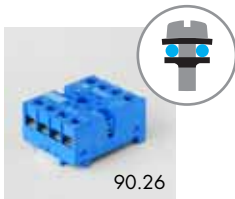
Screw terminal (Box clamp) socket	90.20	90.20.0	90.21	90.21.0
panel or 35 mm rail (EN 50022) mount	Blue	Black	Blue	Black
For timer type	88.12		88.02	
Technical data				
Rated values	10 A - 250 V			
Dielectric strength	2 kV AC			
Protection category	IP 20			
Ambient temperature	°C -40...+70			
⊕ Screw 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

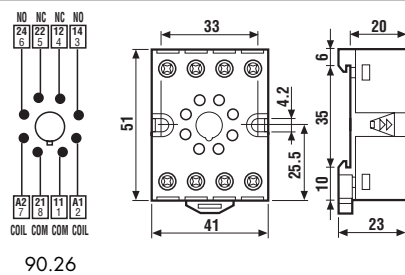


90.26

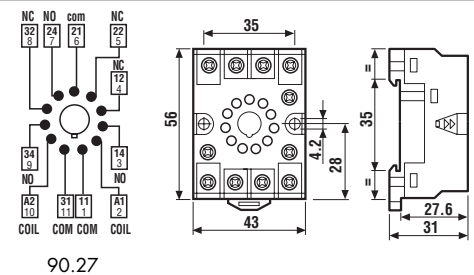
Approvals
(according to type):



Screw terminal (Plate clamp) socket	90.26	90.26.0	90.27	90.27.0
panel or 35 mm rail (EN 50022) mount	Blue	Black	Blue	Black
For timer type	88.12		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

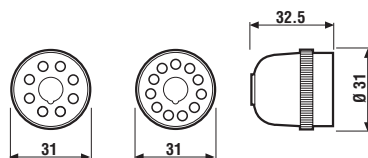


90.13.4

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	88.02
Technical data		
Rated values	10 A - 250 V	
Dielectric strength	2 kV AC	
Ambient temperature	°C -40...+70	



90.12.4

90.13.4

Features

Relays for automatic control of lighting according to the ambient light level

For pole or wall mounting

- A range of light sensitive relays with 1 or 2 NO (SPST-NO or DPST-NO) contacts
- Double break (phase + neutral) type available (type 10.32)
- Sensitivity adjustment from 1 to 150 lux
- Cadmium free contact material

10.32

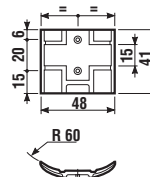
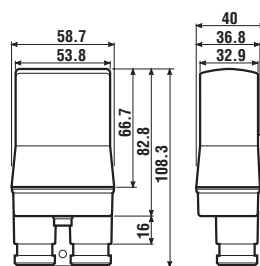
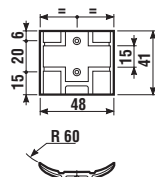
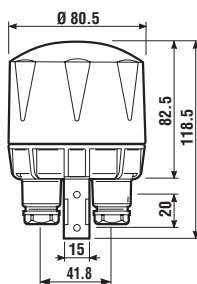


• 2 NO (DPST-NO), 16 A

10.41



• 1 NO (SPST-NO), 12 A



Contact specification

Contact configuration	2 NO (DPST-NO)	1 NO (SPST-NO)
Rated current/Maximum peak current A	16/30 (120 A - 5 ms)	12/25 (120 A - 5 ms)
Rated voltage/Maximum switching voltage V AC	230/—	230/—
Rated load AC1 VA	3,700	2,800
Rated load AC15 (230 V AC) VA	700	600
Nominal lamp rating: incandescent (230 V) W	2,000	1,200
compensated fluorescent (230 V) W	750	420
uncompensated fluorescent (230 V) W	1,000	600
halogen (230 V) W	2,000	1,200
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 AC/DC VA (50 Hz)/W	2.5/—	2/—
Operating range AC (50 Hz)	(0.85...1.1)U _N	(0.8...1.1)U _N
DC	—	—

Technical data

Electrical life at rated load in AC1 cycles	100 · 10 ³	100 · 10 ³
Threshold setting lx	1...80 (switching ON)	1...80 (switching ON)
lx	2...150 (switching OFF)	2...150 (switching OFF)
Delay time: switching ON/OFF s	6/25	15/25
Ambient temperature range °C	-30...+70	-30...+70
Protection category	IP 54	IP 54

Approvals (according to type)



Ordering information

Example: 10 series light dependent relay, 1 NO (SPST-NO) 12 A contact, screw terminal connections, 230 V AC supply.

1 0 . 4 1 . 8 . 2 3 0 . 0 0 0 0

Series

Type

3 = Pole/wall mount - 2 NO (DPST-NO)

4 = Pole/wall mount - 1 NO (SPST-NO)

No. of poles

1 = Single phase switch 1 NO (SPST-NO), 12 A

2 = Double phase switch 2 NO (DPST-NO), 16 A

Supply voltage

230 = 230 V

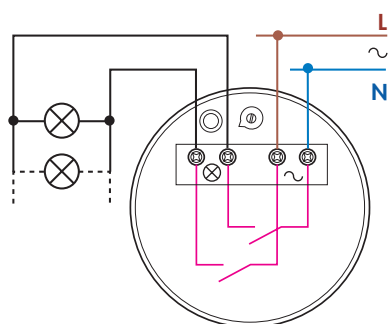
Supply version

8 = AC (50/60 Hz)

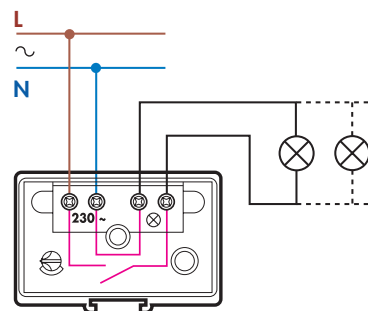
Technical data

Insulation		10.32		10.41	
Dielectric strength between open contacts V AC		1,000		1,000	
Other data		10.32		10.41	
Cable grip	Ø mm	(8.9...13)		(8.9...13)	
Preset threshold	Lux = lx	5 switch ON / 20 switch OFF		3 switch ON / 8 switch OFF	
Screw torque	Nm	1.2		1.2	
Max. wire size		solid cable	stranded cable	solid cable	stranded cable
	mm ²	1x6 / 2x4	1x6 / 2x2.5	1x6 / 2x4	1x6 / 2x2.5
	AWG	1x10 / 2x12	1x10 / 2x14	1x10 / 2x12	1x10 / 2x14

Wiring diagrams



Type 10.32



Type 10.41

Features

Relays for automatic control of lighting according to ambient light level

"Zero hysteresis" version for energy saving

- Type 11.01 is suitable for use on staircases and in entrance halls
- **Selector with 3 positions (type 11.01):**
 - **high range** (threshold setting 20...1000 lx)
 - **low range** (threshold setting 1...30 lx)
 - **continuous light** (helpful during installation and initial testing and for maintenance purposes)
- Type 11.71 available also with 12 and 24 V AC/DC voltage supply
- SELV separation between contact and supply circuit
- Supplied with separate sensitive photocell
- LED status indication
- 35 mm rail (EN 50022) mount
- Cadmium free contact material

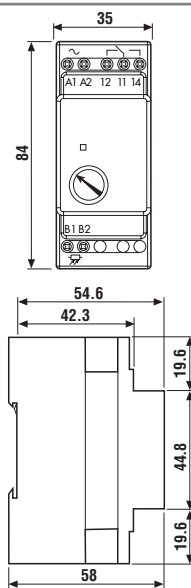
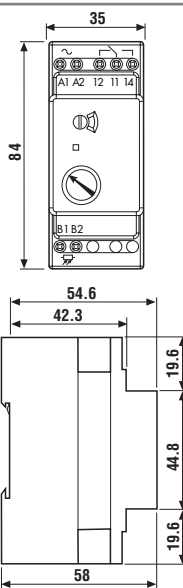
11.01

11.71



- 1 pole
- 35 mm rail (EN 50022) mount
- "zero hysteresis"

- 1 pole
- 35 mm rail (EN 50022) mount
- low voltage version available



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 (NO contact)	2,000 (NO contact)
compensated fluorescent (230 V) W	550 (NO contact)	550 (NO contact)
uncompensated fluorescent (230 V) W	1,000 (NO contact)	1,000 (NO contact)
halogen (230 V) W	2,000 (NO contact)	2,000 (NO contact)
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 DC/AC (50/60 Hz)	—	12	24
V AC (50/60 Hz)	230	110...125	230...240
Rated power AC/DC VA (50 Hz)/W	2/—	1.3/0.8	
Operating range DC/AC (50 Hz)	—	(9.6...13.2)V	(19.2...33.6)V
AC (50 Hz)	(0.8...1.1)U _N	(88...137)V	(184...264)V

Technical data

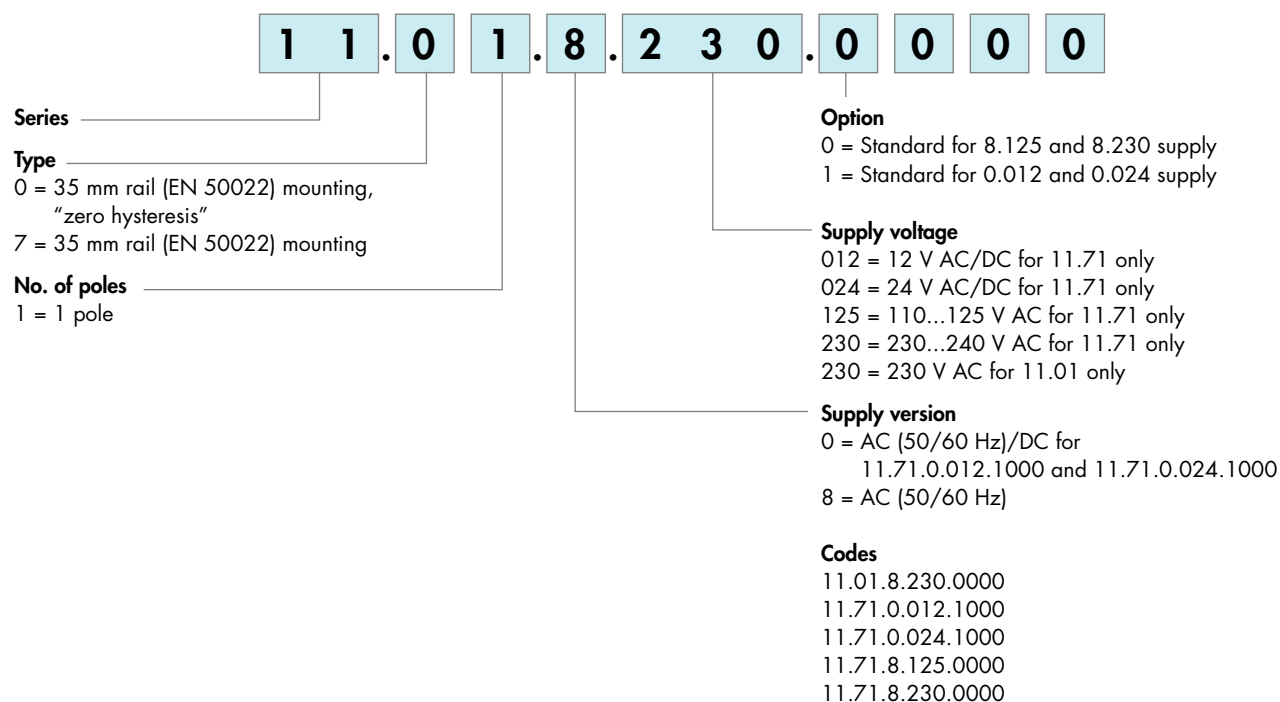
Electrical life at rated load in AC1 cycles	100 · 10 ³	100 · 10 ³
Threshold setting lx	1...30 (low range)	1...100 (switching ON)
lx	20...1,000 (high range)	2...150 (switching OFF)
Delay time: switching ON/OFF s	15/25	15/25
Ambient temperature range °C	-20...+50	-20...+60
Protection category: light dependent relay/photocell	IP 20/IP 54	IP 20/IP 54

Approvals (according to type)



Ordering information

Example: 11 series light dependent relay "zero hysteresis", 1 CO (SPDT) 16 A contact, 35 mm rail mounting, 230 V AC supply.



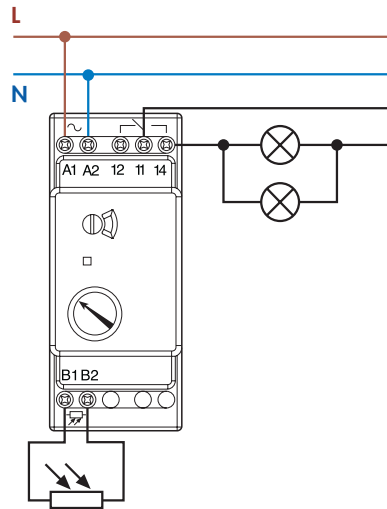
Technical data

Insulation		11.01		11.71	
Dielectric strength	between supply and contacts V AC	4,000		4,000	
	between open contacts V AC	1,000		1,000	
Other data		11.01		11.71	
Cable grip of sensitive photocell	Ø mm	(7.5...9)		(7.5...9)	
Maximum cable length relay to photocell	m	50 (2x1.5 mm ²)		50 (2x1.5 mm ²)	
Preset threshold	Lux = lx	10		100	
Power lost to the environment	without contact current W	1.3		0.8	
	with rated current W	3.1		2	
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	1x6 / 2x2.5
	AWG	1x10 / 2x12	1x10 / 2x14	1x10 / 2x12	1x10 / 2x14

Wiring diagrams

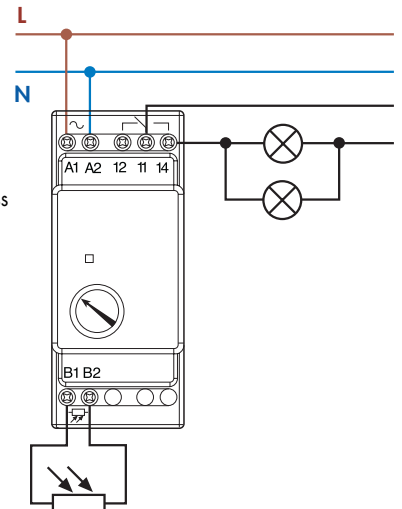
Type 11.01

RED LED indication:
Blinking = power ON,
relay OFF
Continuous = power ON,
relay ON

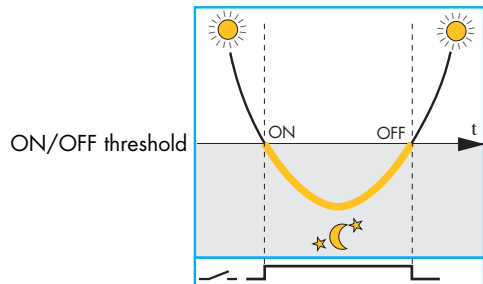


Type 11.71

RED LED indication:
Slow blinking =
power ON,
relay OFF
Fast blinking =
power ON,
timing in progress
Continuous =
power ON,
relay ON

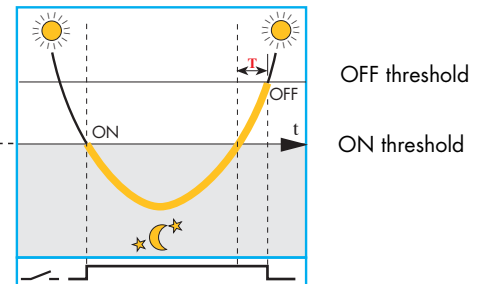


TYPE 11.01 "ZERO HYSTERESIS" LIGHT DEPENDENT RELAYS



Switch OFF level = Switch ON level.
Patented "Zero Hysteresis" circuitry
ensures reliable switching without
wasting energy.

TRADITIONAL LIGHT DEPENDENT RELAYS



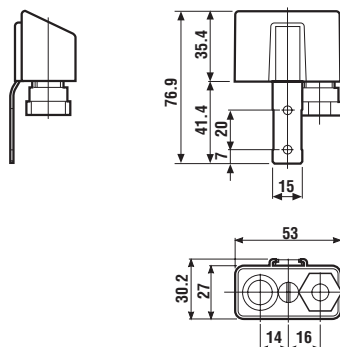
"Traditional" light dependent relays
incorporate switching hysteresis to
prevent malfunctioning or tripping.
This results in an unnecessary delay in
switching off, and a resulting waste of
energy (over period T).

Accessories



Sensitive photocell (supplied with light dependent relay)

011.00



Features

Mechanical time switches

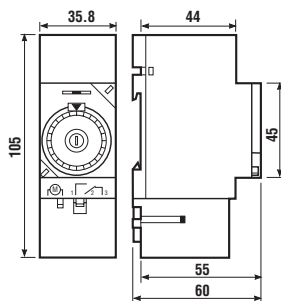
- daily time setting

- 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
- Minimum time interval setting:
30 min (12.01)
15 min (12.11)
- 35 mm rail (EN 50022) mount

12.01



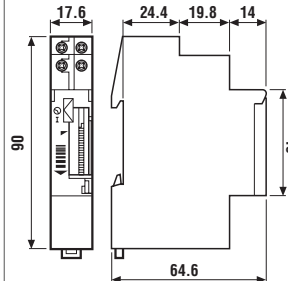
- Mechanical daily time switch
- 1 CO (SPDT)
- 35 mm rail (EN 50022) mount



12.11



- Mechanical daily time switch
- 1 NO (SPST-NO)
- 35 mm rail (EN 50022) mount



Contact specification

Contact configuration	1 CO (SPDT)	1 NO (SPST-NO)
Rated current/Maximum peak current A	16/—	16/30
Rated voltage/Maximum switching voltage V AC	250/—	250/—
Rated load AC1 VA	4,000	4,000
Rated load AC15 (230 V AC) VA	750	420
Nominal lamp rating: incandescent (230 V) W	2,000 (NO contact)	2,000
compensated fluorescent (230 V) W	750 (NO contact)	750
uncompensated fluorescent (230 V) W	1,000 (NO contact)	1,000
halogen (230 V) W	2,000 (NO contact)	2,000
Minimum switching load mW (V/mA)	1,000 (10/10)	1,000 (10/10)
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	2/—	2/—
Operating range AC (50 Hz)	$(0.85 \dots 1.1) U_N$	$(0.85 \dots 1.1) U_N$
DC	—	—

Technical data

Electrical life at rated load in AC1 cycles	$50 \cdot 10^3$	$50 \cdot 10^3$
Type of time switch	daily	daily
Programs	48 switching point	96 switching point
Minimum interval setting min	30	15
Accuracy s/day	1.5	1.5
Ambient temperature range °C	-5...+55	-5...+55
Protection category	IP 20	IP 20

Approvals (according to type)



Features

Electronic digital time switches

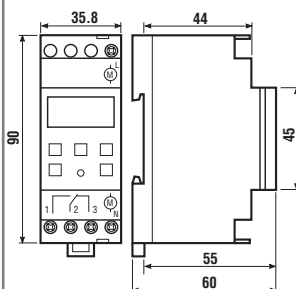
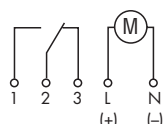
- weekly time setting

- 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 (1...59)s
- Automatic adjustment for daylight saving
- 35 mm rail (EN 50022) mount

12.21



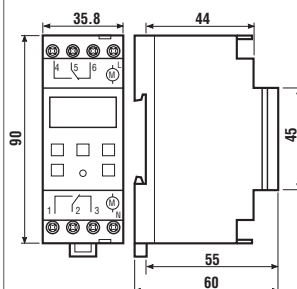
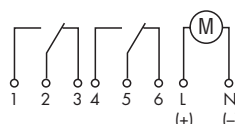
- Digital weekly time switch
- 1 CO (SPDT)
- 35 mm rail (EN 50022) mount



12.22



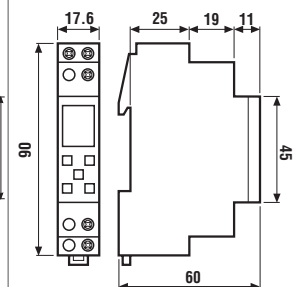
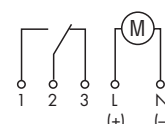
- Digital weekly time switch
- 2 CO (DPDT)
- 35 mm rail (EN 50022) mount



12.71



- Digital weekly time switch
- 1 CO (SPDT)
- 35 mm rail (EN 50022) mount



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)	750 (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	AgCdO

Supply specification

Nominal voltage (U _N)	V AC (50/60 Hz)	—	230	—	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 · 10 ³	50 · 10 ³	50 · 10 ³
Type of time switch		weekly	weekly	weekly
Programs		30	30	30
Minimum interval setting min		1	1	1
Accuracy s/day		1.5	1.5	1.5
Ambient temperature range °C		-5...+55	-5...+55	-10...+55
Protection category		IP 20	IP 20	IP 20

Approvals (according to type)



Ordering information

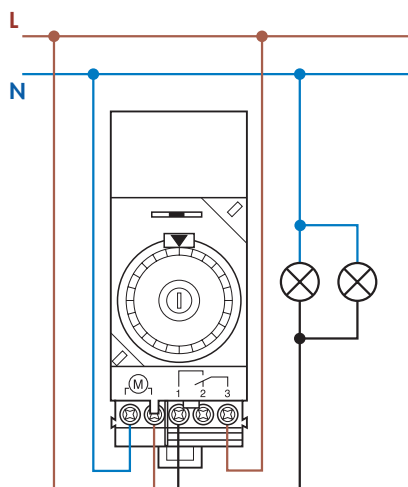
Example: 12 series, mechanical daily time switch, 1 CO (SPDT) 16 A, supply voltage 230 V AC.

1 2 . 0 1 . 8 . 2 3 0 . 0 0 0 0									
Series			Option						
Type			0 = With power back-up						
0 = Daily, 35.8 mm wide			1 = Without power back-up (type 12.11)						
1 = Daily, 17.5 mm wide			Supply voltage						
2 = Weekly, 35.8 mm wide			012 = 12 V AC/DC						
7 = Weekly, 17.5 mm wide			024 = 24 V AC/DC						
No. of poles			230 = 230 V						
1 = 1 CO (SPDT), 16 A			Supply version						
2 = 2 CO (DPDT), 16 A (type 12.22)			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)						

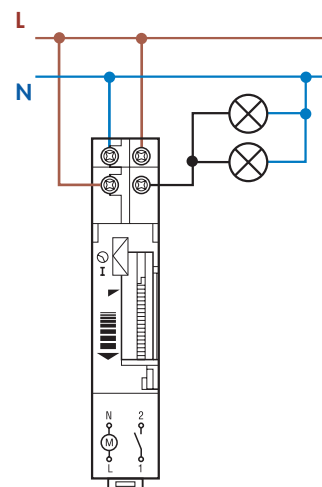
Technical data

Insulation		12.01, 12.11		12.21, 12.22, 12.71	
Dielectric strength between open contacts V AC		1,000		1,000	
Other data		12.01, 12.11		12.21, 12.22, 12.71	
Power back-up		70 h (following 80 h continuous energisation)		6 years after the first operation	
Power lost to the environment					
without contact current W		1.5		2	
with rated current W		2.5		3 (for 1 pole)	4 (for 2 pole)
Screw torque Nm		1.2		1.2	
Max. wire size		solid cable	stranded cable	solid cable	stranded cable
mm ²		1x6 / 2x4	1x6 / 2x2.5	1x6 / 2x4	1x6 / 2x2.5
AWG		1x10 / 2x12	1x10 / 2x14	1x10 / 2x12	1x10 / 2x14

Wiring diagrams

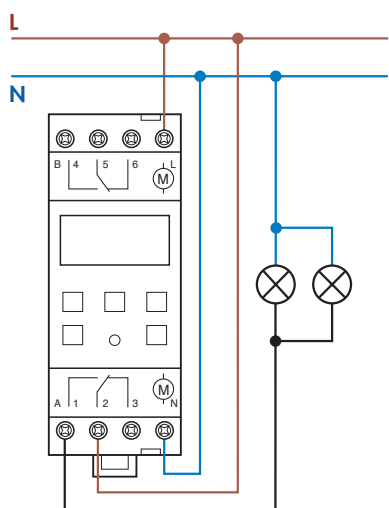


Type 12.01
Selector switch:
⏻ = Permanently OFF
AUTO = Automatic
I = Permanently ON

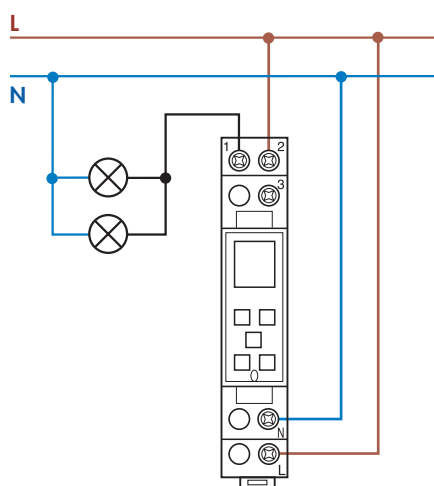


Type 12.11
Selector switch:
⏻ = Automatic
I = Permanently ON

Wiring diagrams



Type 12.21
12.22



Type 12.71

Accessories

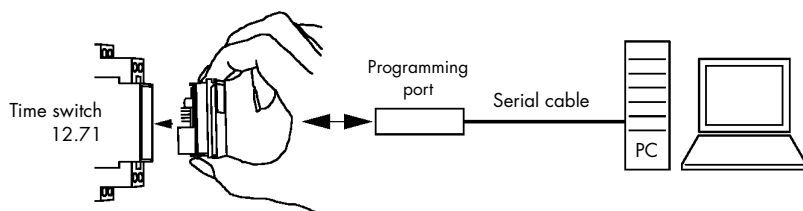
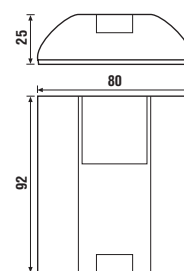


012.00

PC programming kit for type 12.71 contents:
programming port, serial cable and software

012.00

- Power supply: via PC-RS232 serial interface
- Power consumption: < 10 mA
- Ambient temperature: (-5...+35)°C
- Protection category: IP 00



INSTALLATION OF PC-SOFTWARE

- Place the CD in the CD-drive
- Installation should START
- Follow the on-screen instructions
- Choose your language and COM1...COM4 in "setting menu"

Features

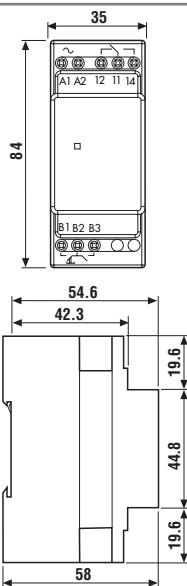
Quiet operation - electronic step relays 1 Pole output contact

- Selectable Step or Monostable operation (13.01)
- Control input can be continuously applied
- Longer mechanical and electrical life, and much quieter than electromechanical step relays
- Suitable for SELV applications (according to IEC 364), type 13.01
- Type 13.01 available also for supply 12 and 24 V AC/DC
- 35 mm rail (EN 50022) or flange mount
- Cadmium free contact material
- Use with 3 or 4 wire connection (13.71 and 13.81)

13.01



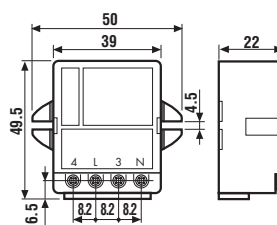
- Step or monostable relay
- 35 mm rail (EN 50022) mount



13.71



- 1 NO (SPST-NO)
- Panel mount
- Screw terminals

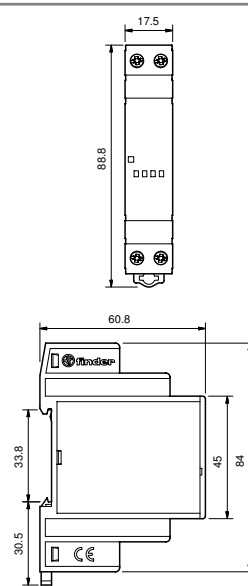


13.81

NEW



- 1 NO (SPST-NO)
- 35 mm rail (EN 50022) mount
- 17.5 mm wide



Contact specification

Contact configuration	1 CO (SPDT)	1 NO (SPST-NO)	1 NO (SPST-NO)
Rated current/Maximum peak current A	16/30 (120 A - 5 ms)	10/20 (120 A - 5 ms)	16/30 (120 A - 5 ms)
Rated voltage/Maximum switching voltage V AC	250/400	230/—	230/—
Rated load AC1 VA	4,000	2,300	3,700
Rated load AC15 (230 V AC) VA	750	450	750
Nominal lamp rating: incandescent (230 V) W	2,000	1,000	3,000
compensated fluorescent (230 V) W	750	350	1,000
uncompensated fluorescent (230 V) W	1,000	500	1,000
halogen (230 V) W	2,000	1,000	3,000
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)	12 - 24 - 110...125 - 230...240	230	230
V DC	12 - 24	—	—
Rated power AC/DC V AC (50 Hz)/W	2.5/2.5	1.5/—	3/1.2
Operating range AC (50 Hz)	(0.8...1.1)U _N	(0.85...1.15)U _N	(0.8...1.1)U _N
DC	(0.9...1.1)U _N	—	—

Technical data

Electrical life at rated load in AC1 cycles	100 · 10 ³	100 · 10 ³	100 · 10 ³
Maximum impulse duration	continuous	continuous	continuous
Dielectric strength between: open contacts V AC	1,000	1,000	1,000
supply - contacts V AC	4,000	—	—
Ambient temperature range °C	-10...+60	-10...+60	-10...+60
Protection category	IP 20	IP 20	IP 20

Approvals (according to type)



Features

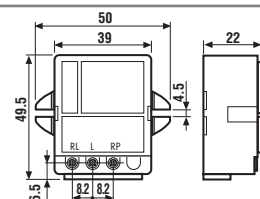
Electronic step relay and dimmer for control of lighting levels.

- Use with 3 or 4 wire connection
- "Soft" On and Off transitions
- Two selectable operating modes: with or without previous light level memory
- Suitable for incandescent and halogen lighting loads (with or without transformer or electronic supply)
- Panel mount or can be located inside junction

13.51



- Maximum lamp load 400 W
- Multi-function



Output data

Rated voltage	V AC	230
Power max.	(230 V) W	400
Power min.	(230 V) W	15
Nominal lamp rating: incandescent (230 V) W		400
halogen (230 V) W		400
transformers & electronic supplies for halogen lamps W		400

Supply specifications

Nominal voltage (U_N)	V AC (50 or 60Hz)	230
Operating range		$(0.8...1.1)U_N$
Power stand-by	W	<1

Technical data

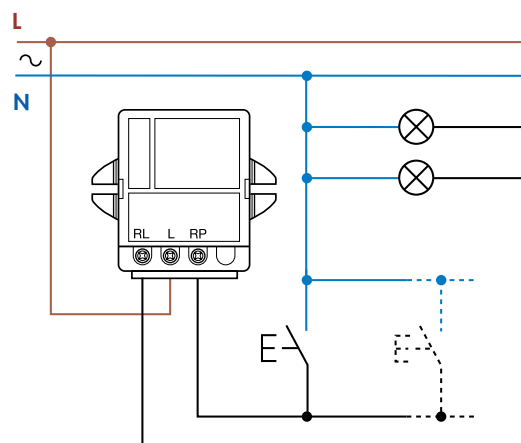
Ambient temperature range	°C	-10...+50
Protection category		IP 40

Approvals (according to type)

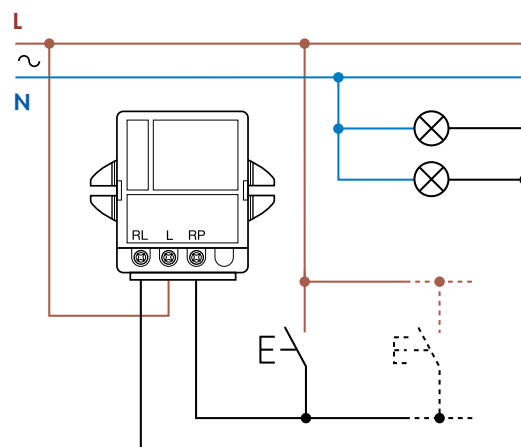


Wiring diagrams

3 wire connection



4 wire connection

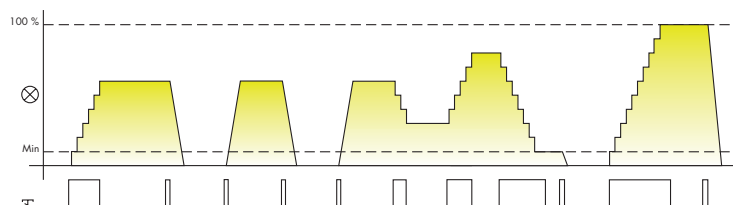


Note

- When controlling low voltage halogen lamps, powered either via conventional electromagnetic or electronic transformers, it is suggested to connect only one transformer to each dimmer.

Operating modes

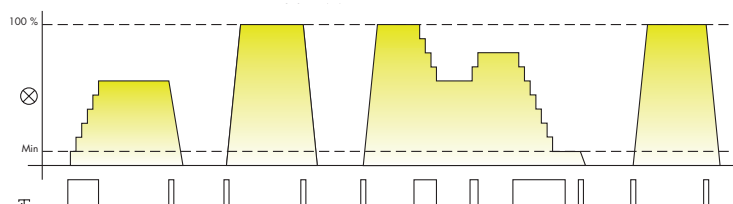
Operating mode 1 (with memory): the previous light level is memorized (default program).



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.

Operating mode setup:

It is possible to select the required operating mode using the follow steps:

- Remove the supply voltage;
 - Press the control button;
 - Apply the supply to the relay, keeping the button closed for 1 second;
 - On button release, the light will flash twice to indicate the selection of operating mode 2, or flash once for operating mode 1.
- Repeating the above steps will alternately change between operating modes.

Ordering information

Electronic step relays 13.01, 13.71 and 13.81

Example: 13 series, electronic step or monostable relay, 35 mm rail (EN 50022) mount, 1 CO (SPDT) 16 A contact, 230 V AC supply.

<p>Series _____</p> <p>Type _____</p> <p>0 = 35 mm rail (EN 50022) mount</p> <p>7 = Panel mount</p> <p>8 = 35 mm rail (EN 50022) mount, 17.5 mm wide</p> <p>No. of poles _____</p> <p>1 = 1 pole</p>	<p>Supply voltage</p> <p>012 = 12 V AC/DC (13.01 only)</p> <p>024 = 24 V AC/DC (13.01 only)</p> <p>125 = (110...125)V AC (13.01 only)</p> <p>230 = (230...240)V AC (13.01 only)</p> <p>230 = 230 V AC (13.71 and 13.81)</p> <p>Supply version</p> <p>0 = AC (50/60 Hz)/DC (for 13.01.0.012 and 13.01.0.024 only)</p> <p>8 = AC (50/60 Hz)</p>
---	---

Electronic step relay and dimmer 13.51

Example: type 13.51, electronic step relay and dimmer, 230 V AC.

<p>Serie _____</p> <p>Type _____</p> <p>5 = Panel mount or can be located inside junction box</p> <p>No. of poles _____</p> <p>1 = 1 output</p>	<p>Supply voltage</p> <p>230 = 230 V</p> <p>Supply version</p> <p>8 = AC (50Hz)</p>	<p>Options</p> <p>0 = Standard, 50Hz</p> <p>6 = 60Hz</p>
--	---	---

Technical data

Insulation		13.01.8	13.01.0	13.71 - 13.81
Dielectric strength				
between control circuit and supply	V AC	4,000	—	—
between control circuit and contacts	V AC	4,000	4,000	—
between supply and contacts	V AC	4,000	4,000	—
between open contacts	V AC	1,000	1,000	1,000
Other data		13.01	13.51 - 13.71	13.81
Power lost to the environment				
without contact current	W	2.2	0.5 (13.71)	1.2
without rated current	W	3.5	2.9 (13.71)	2
Max cable lenght for push-button connection	m	100	100	200
Max. no. of illuminated push-button (≤ 1 mA)		—	15 (13.71)	15
Screw torque	Nm	0.8	0.8	0.8
Max. wire size		solid cable	solid cable	solid cable
	mm ²	1x6 / 2x4	1x2.5 / 2x2.5	1x6 / 2x4
		stranded cable	stranded cable	stranded cable
	AWG	1x10 / 2x12	1x14 / 2x14	1x12 / 2x14

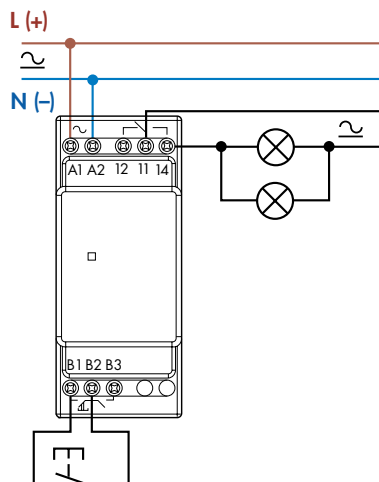
Type	Number of steps	Sequence	
		1	2
13.01	2		
13.71 13.81	2		

Wiring diagrams (13.01, 13.71 and 13.81)

Type 13.01

Bistable (step) wiring diagram

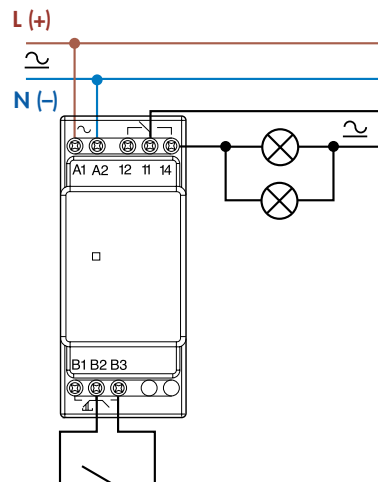
Red LED indication:
Continuous = relay ON



Type 13.01

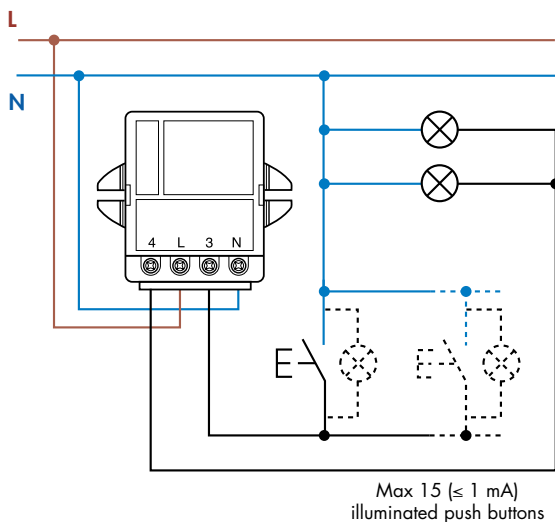
Monostable wiring diagram

Red LED indication:
Continuous = relay ON



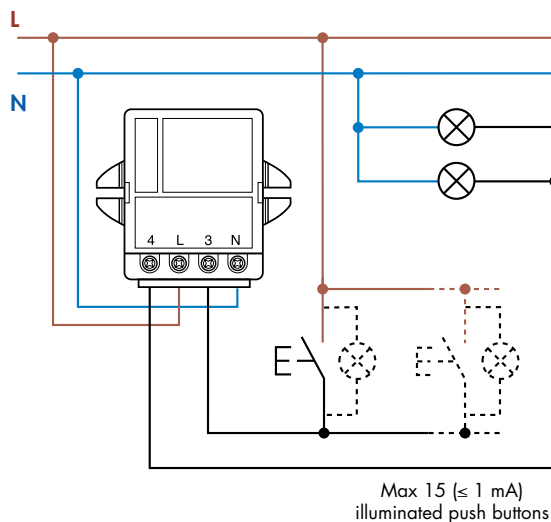
Type 13.71

3 wire connection



Type 13.71

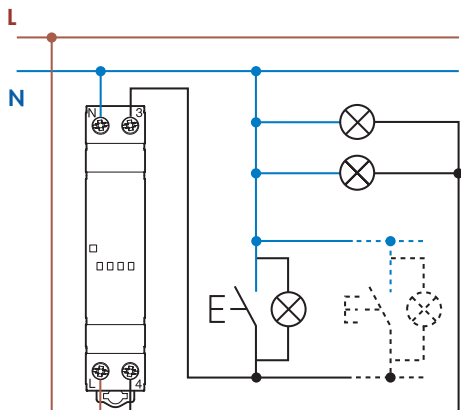
4 wire connection



Type 13.81

3 wire connection

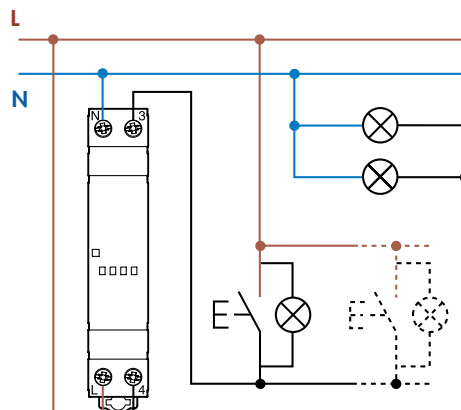
Red LED indication:
Continuous = relay ON
Blinking = relay OFF



Type 13.81

4 wire connection

Red LED indication:
Continuous = relay ON
Blinking = relay OFF



060.72

Sheet of marker tags for type 13.81, plastic, 72 tags, 6x12 mm

060.72

Features

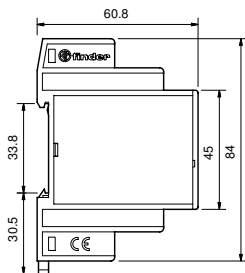
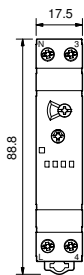
Range of electronic staircase timers

- 17.5 mm wide
- Time setting from 30 s to 20 min
- "Zero crossing" load switching
- "Switch-off early warning" - model 14.01
- Type 14.81: wiring compatible with mechanical versions
- Suitable for 3 or 4 wire systems, with automatic recognition
- 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 35mm rail mounting clip

14.01



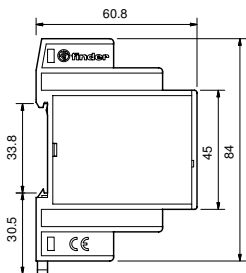
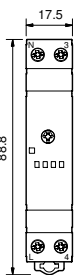
- Multi-function
- 1 NO (SPST-NO)
- 35 mm rail (EN 50022) mount



14.71



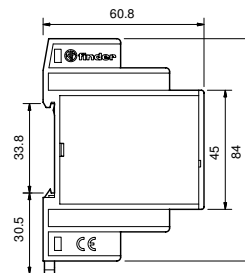
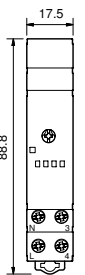
- Mono-function
- 1 NO (SPST-NO)
- 35 mm rail (EN 50022) mount



14.81



- Mono-function
- 1 NO (SPST-NO)
- 35 mm rail (EN 50022) mount
- All terminals on same side



Contact specification

Contact configuration		1 NO (SPST-NO)	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)	16/30 (120 A - 5 ms)
Rated voltage/Maximum switching voltage V AC		230/—	230/—	230/—
Rated load AC1	VA	3,700	3,700	3,700
Rated load AC15 (230 V AC)	VA	750	750	750
Nominal lamp rating: incandescent (230 V)	W	3,000	3,000	3,000
compensated fluorescent (230 V)	W	1,000	1,000	1,000
uncompensated fluorescent (230 V)	W	1,000	1,000	1,000
halogen (230 V)	W	3,000	3,000	3,000
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)	230	230	230
	V DC	—	—	—
Rated power AC/DC	VA (50 Hz)/W	3/1.2	3/1.2	3/1.2
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 · 10 ³	100 · 10 ³	100 · 10 ³
Delay setting	min	0.5...20	0.5...20	0.5...20
Max no. of illuminated push-button (≤ 1 mA)		30	30	15
Maximum impulse duration		continuous	continuous	continuous
Ambient temperature range	°C	-10...+60	-10...+60	-10...+60
Protection category		IP 20	IP 20	IP 20

Approvals (according to type)



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 50022) mount, multi-function

7 = 35 mm rail (EN 50022) mount, mono-function

8 = 35 mm rail (EN 50022) mount mono-function, all terminals on same side


No. of poles _____

1 = Single phase switch, 16 A

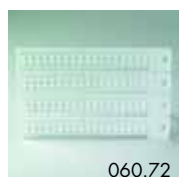
Supply voltage
230 = 230 V

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
		mm²	1x6 / 2x4 1x4 / 2x2.5
		AWG	1x10 / 2x12 1x12 / 2x14

Accessories



060.72

Sheet of marker tags, plastic, 72 tags, 6x12 mm

060.72

Wiring diagrams

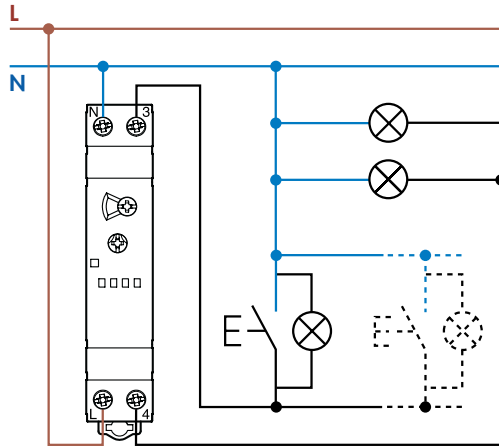
Type 14.01

14.71

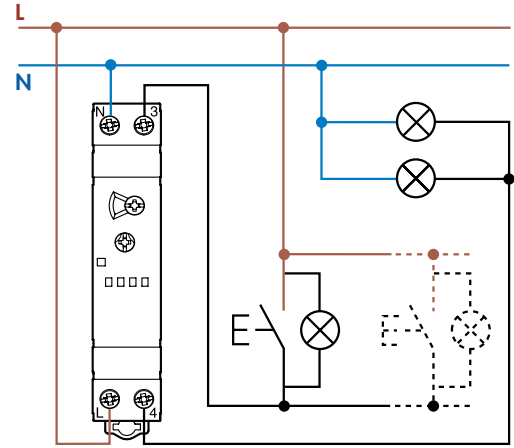
Red LED indication:

Continuous = relay ON

Blinking = relay OFF



3 wire connection



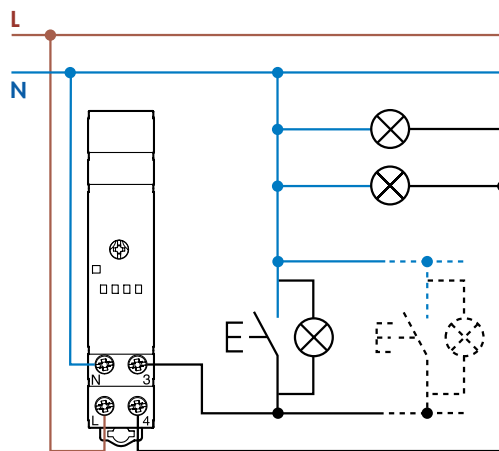
4 wire connection

Type 14.81

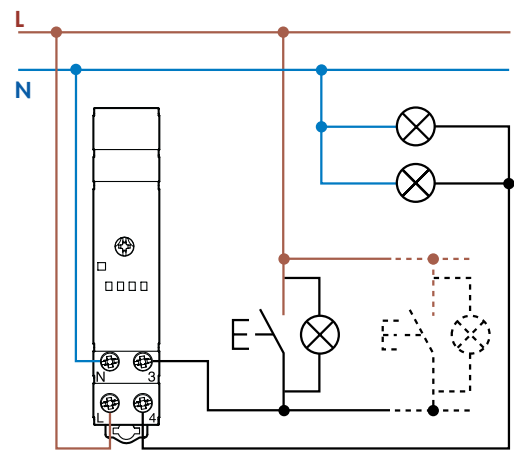
Red LED indication:

Continuous = relay ON

Blinking = relay OFF



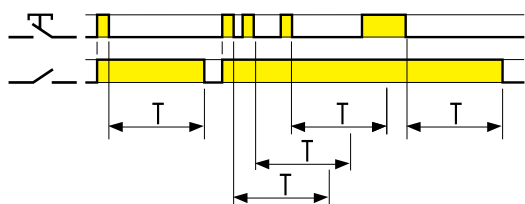
3 wire connection



4 wire connection

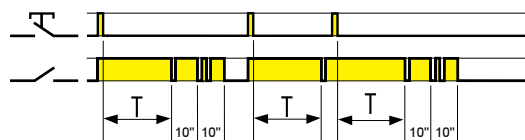
Functions

Type 14.01 Functions selectable with front rotary selector



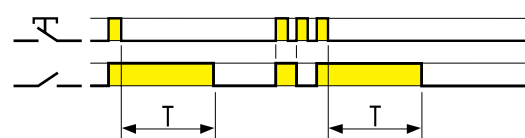
(BE) Staircase relay

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.



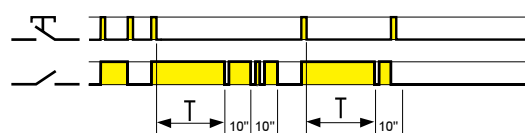
(BP) Staircase relay with early warning

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.



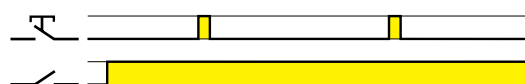
(IP) Timing step relay with early warning

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.

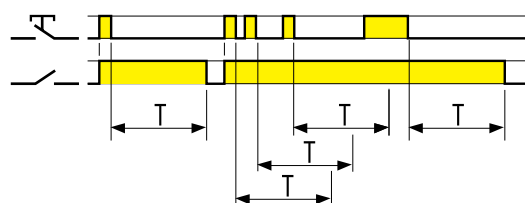


(ON) Light ON

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.

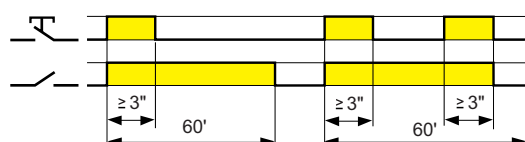
Type 14.71 and 14.81



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.

Type 14.01, 14.71 and 14.81 - "Staircase maintenance" function



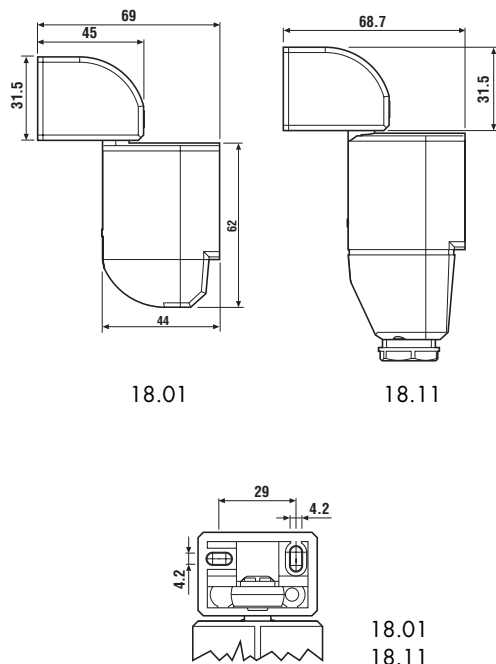
"Staircase maintenance" function

An impulse of ≥ 3 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 ≥ 3 seconds.

Features

PIR movement detector for internal or external installations - wall mounting

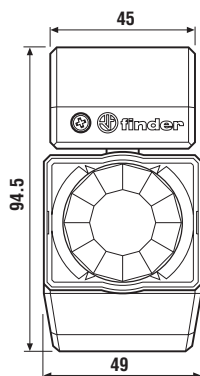
- Small size
- Adjustable ambient light intervention threshold
- Adjustable Light On Time
- Universal mounting position - permits the selection of any area for survey
- Wide angle of survey



18.01



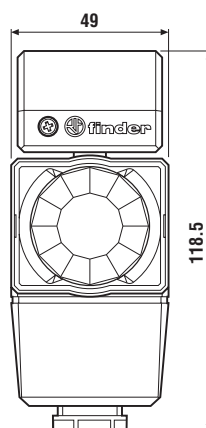
- 1 NO (SPST-NO) 10 A
- Internal installations
- Particularly suited for wall mounting



18.11



- 1 NO (SPST-NO) 10 A
- External installations
- Particularly suited for wall mounting



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 AC) VA	450	450
Nominal lamp rating: incandescent (230 V) W	1,000	1,000
compensated fluorescent (230 V) W	350	350
uncompensated fluorescent (230 V) W	500	500
halogen (230 V) W	1,000	1,000
Standard contact material	AgSnO ₂	AgSnO ₂

Coil specification

Nominal voltage V AC (50/60 Hz)	230	230
V DC	—	—
Rated power AC/DC VA (50 Hz)/W	2.5/—	2.5/—
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 AC1 cycles	100 · 10 ³	100 · 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
Angle of survey	110°	110°
Depth of field m	8	8
Ambient temperature range °C	-10...+50	-30...+50
Protection category	IP 40	IP 54

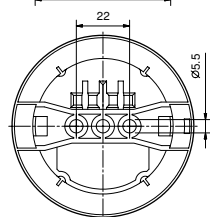
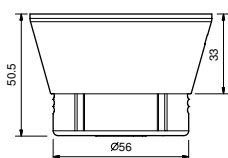
Approvals (according to type)



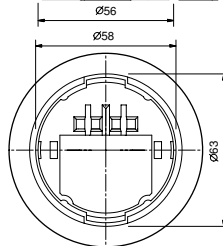
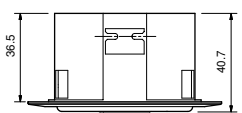
Features

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

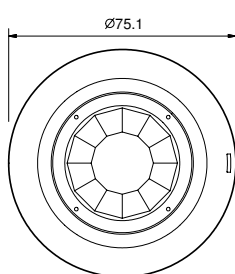


18.31

18.21



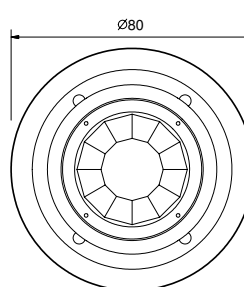
- 1 NO (SPST-NO) 10 A
- Internal ceiling installation
- Surface mounting



18.31



- 1 NO (SPST-NO) 10 A
- Internal ceiling installation
- Recessed mounting



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 AC)	VA	450	450
Nominal lamp rating: incandescent (230 V) W		1,000	1,000
compensated fluorescent (230 V) W		350	350
uncompensated fluorescent (230 V) W		500	500
halogen (230 V) W		1,000	1,000
Standard contact material		AgSnO ₂	AgSnO ₂

Coil specification

Nominal voltage	V AC (50/60 Hz)	230	230
	V DC	—	—
Rated power AC/DC	VA (50 Hz)/W	2.5/—	2.5/—
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 AC1	cycles	100 · 10 ³	100 · 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
Angle of survey		110°	110°
Sensing area diameter	m	8	8
Ambient temperature range	°C	-10...+50	-10...+50
Protection category		IP 40	IP 40

Approvals (according to type)



Ordering information

Example: 18 series, PIR movement detector for internal installations, wall mounting, 1 NO (SPST-NO) 10 A contact, 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

No. of poles _____

1 = Single phase switch 1 NO (SPST-NO), 10 A

Supply voltage
230 = 230 V

Supply version
8 = AC (50/60 Hz)

Technical data

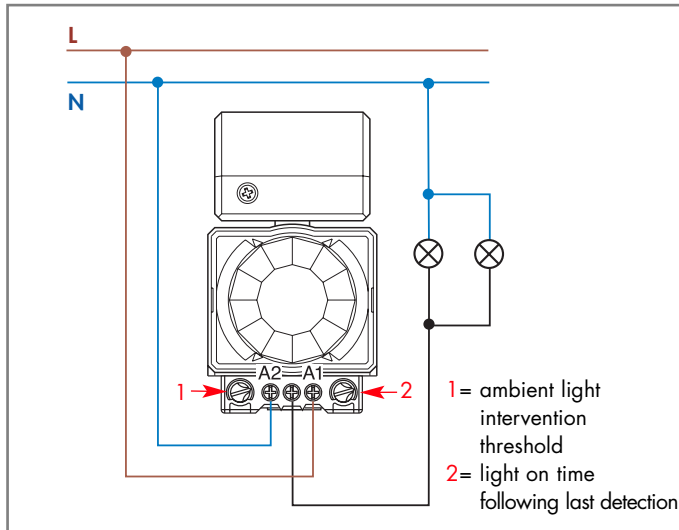
Insulation		
Dielectric strength between open contacts V AC		1,000
Other data		
⊕ Screw torque	Nm	0.5
Max. cable size	mm ²	1.5

Note

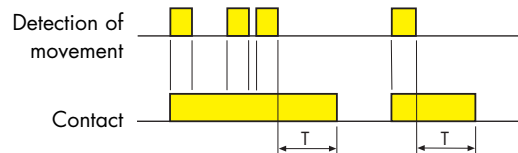
- Following the initial power-on, and following any subsequent power interruption, the detector makes a hardware-software initialization for approximately 30 seconds. However, if the detector was in the On state before the power interruption, and if the lighting level is below the pre-set threshold, the output contact immediately closes. Conversely, if it was in the Off state or if the ambient light is over the pre-set threshold, the detector will not switch until the end of the initialization phase.

Wiring diagram

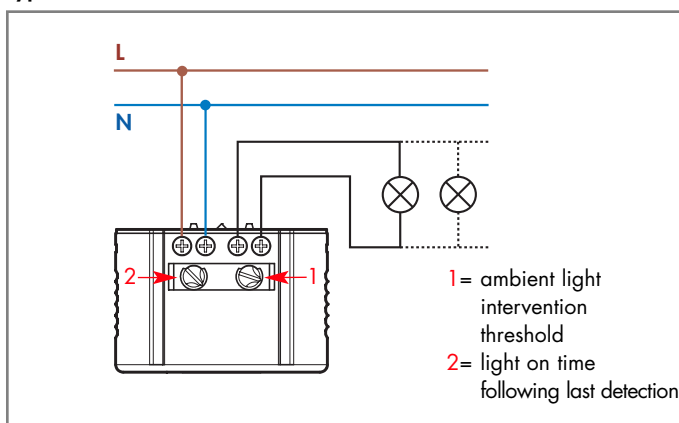
Type 18.01 / 18.11



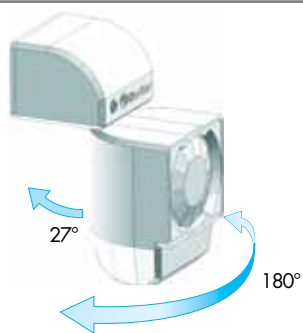
The output relay will remain On for the pre-set time, following the last detection of movement.



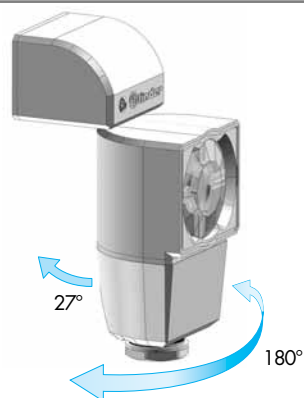
Type 18.21 / 18.31



Mounting and orientation



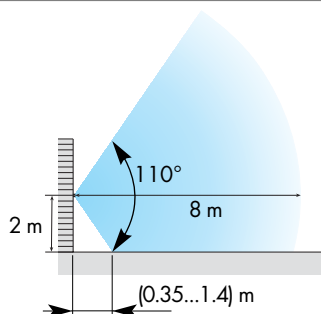
18.01



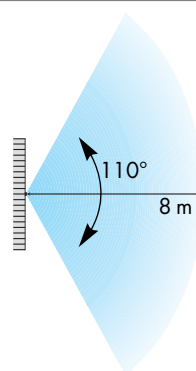
18.11

Sensing area

Wall mounting

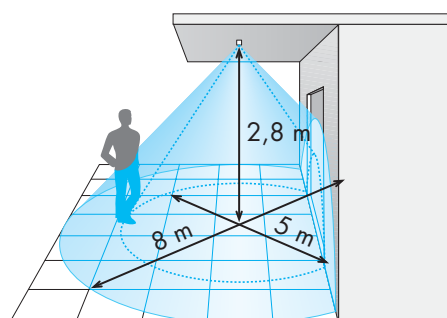
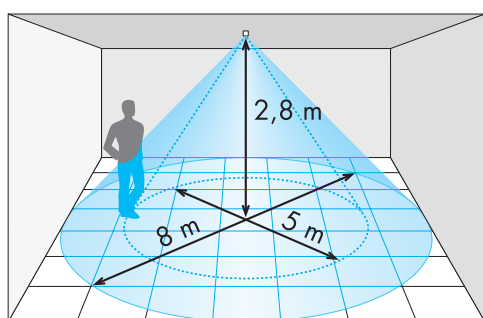


Side view



Plan view

Ceiling mounting



Features

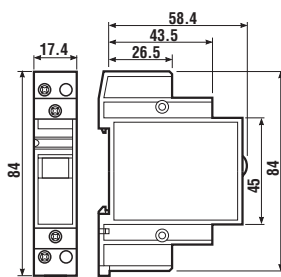
1 or 2 Pole 16 A Step relays for direct 35 mm rail (EN 50022) mounting

- 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 50022) mount
- Cadmium free contact material

20.21



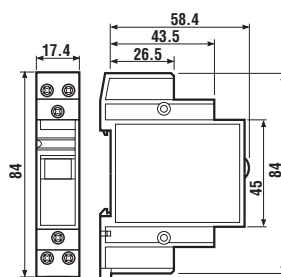
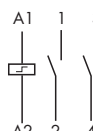
- Single phase switch 1 NO (SPST-NO)
- 35 mm rail (EN 50022) mount



20.22, 24, 26, 28



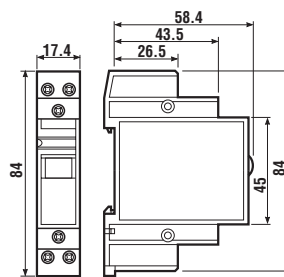
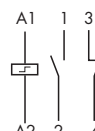
- Double phase switch
- 35 mm rail (EN 50022) mount



20.23



- Double phase switch 1 NO+1 NC (SPST-NO+SPST-NC)
- 35 mm rail (EN 50022) mount



FOR UL HORSEPOWER AND PILOT DUTY RATINGS
SEE "General technical information" page V

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...1.1)U _N (50 Hz)/(0.9...1.1)U _N (60 Hz)		
DC	(0.9...1.1)U _N	(0.9...1.1)U _N	(0.9...1.1)U _N

Technical data

Mechanical life cycles	300 · 10 ³	300 · 10 ³	300 · 10 ³
Electrical life at rated load in AC1 cycles	100 · 10 ³	100 · 10 ³	100 · 10 ³
Minimum/Maximum impulse duration	0.1s/1h (according to EN60669)	0.1s/1h (according to EN60669)	0.1s/1h (according to EN60669)
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)



Ordering information

Example: 20 series relay, 35 mm rail (EN 50022) mount, double phase switch, 2 NO (DPST-NO) 16 A contacts, coil rated at 12 V DC, AgSnO₂ contacts.

2 0 . 2 2 . 9 . 0 1 2 . 4 0 0 0

Series

Type

2 = 35 mm rail (EN 50022) 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 = AgSnO₂

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

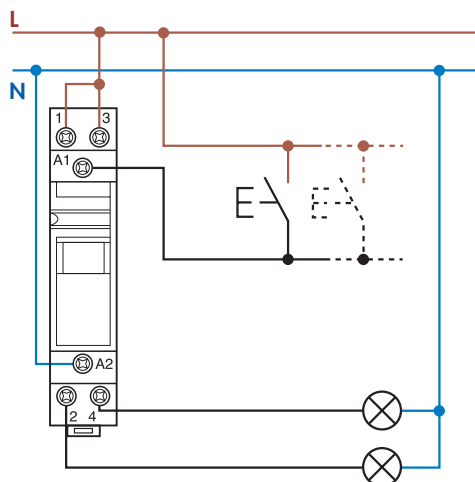
Nominal voltage U_N	Coil code	Operating range		Resistance R	Consumption I at U_N
V		U_{min} V	U_{max} V	Ω	mA
12	9.012	10.8	13.2	27	440
24	9.024	21.6	26.4	105	230
48	9.048	43.2	52.8	440	110
110	9.110	99	121	2,330	47

AC version data

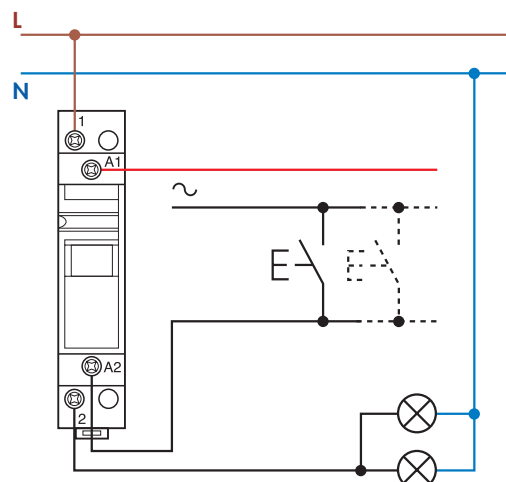
Nominal voltage U_N	Coil code	Operating range		Resistance R	Consumption I at U_N (50 Hz)
V		U_{min} V	U_{max} V	Ω	mA
8	8.008	6.8	8.8	4	800
12	8.012	10.2	13.2	7.5	550
24	8.024	20.4	26.4	27	275
48	8.048	40.8	52.8	106	150
110	8.110	93.5	121	590	64
120	8.120	102	132	680	54
230	8.230	195.5	253	2,500	28
240	8.240	204	264	2,700	27.5

Type	Number of steps	Sequence			
		1	2	3	4
20.21	2				
20.22	2				
20.23	2				
20.24	4				
20.26	3				
20.28	4				

Wiring diagrams



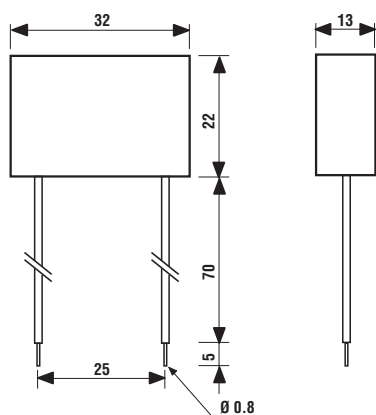
Example: 230 V AC supply voltage.



Example: 24 V AC supply voltage.

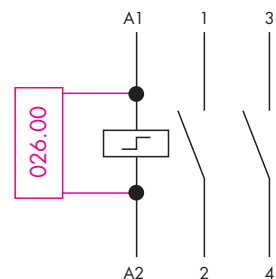
Accessories

Module for use with illuminated push-buttons



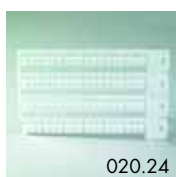
Type 026.00

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.



020.24

Sheet of marker tags, plastic, 24 tags, 9x17 mm

020.24

Features

1 or 2 pole, 20 A relay
for direct 35 mm rail (EN 50022) mounting

- 17.4 mm wide
- Test button
- Identification label
- AC coils and DC coils
- 35 mm rail (EN 50022) mount
- Cadmium free contact material

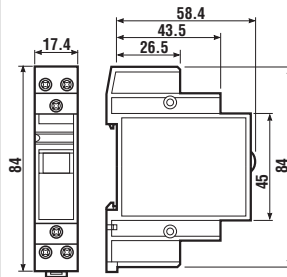
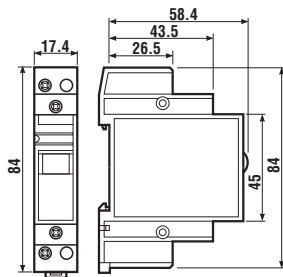
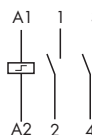
22.21

22.22



- Single phase switch 1 NO (SPST-NO)
- 35 mm rail (EN 50022) mount

- Double phase switch 2 NO (DPST-NO)
- 35 mm rail (EN 50022) mount



Contact specification

Contact configuration

1 NO (SPST-NO)

2 NO (DPST-NO)

Rated current/Maximum peak current A

20/30

20/30

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

—

—

Breaking capacity DC1: 30/110/220 V A

20/0.3/0.12

20/0.3/0.12

Minimum switching load mW (V/mA)

1,000 (10/10)

1,000 (10/10)

Standard contact material

AgSnO₂

AgSnO₂

Coil specification

Nominal voltage (U_N) V AC (50/60 Hz)

8 - 12 - 24 - 48 - 110 - 120 - 230 - 240

8 - 12 - 24 - 48 - 110 - 120 - 230 - 240

V DC

12 - 24 - 48 - 110

12 - 24 - 48 - 110

Rated power AC/DC VA (50 Hz)/W

3/1.25

3/1.25

Operating range AC (50 Hz)

(0.85...1.1)U_N

(0.85...1.1)U_N

DC

(0.9...1.1)U_N

(0.9...1.1)U_N

Technical data

Mechanical life cycles

500 · 10³

500 · 10³

Electrical life at rated load in AC1 cycles

50 · 10³

50 · 10³

Operate/release time ms

15/8

15/8

Maximum impulse duration

continuous

continuous

Insulation between coil and contacts (1.2/50 μs) kV

4

4

Ambient temperature range °C

−40...+40

−40...+40

Protection category

IP 20

IP 20

Approvals (according to type)



Features

1 or 2 pole, 20 A relay
for direct 35 mm rail (EN 50022) mounting

- 17.4 mm wide
- Test button
- Identification label
- AC coils and DC coils
- 35 mm rail (EN 50022) mount
- Cadmium free contact material

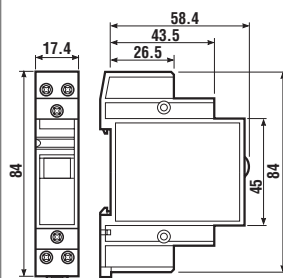
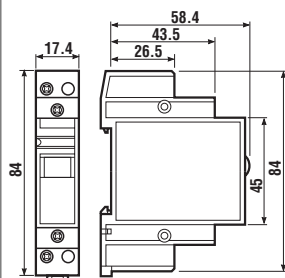
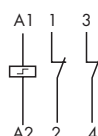
22.23

22.24



- Double phase switch
1NO+1NC (SPST-NO+SPST-NC)
- 35 mm rail (EN 50022) mount

- Double phase switch 2 NC
(DPST-NC)
- 35 mm rail (EN 50022) mount



Contact specification

Contact configuration	1NO+1NC (SPST-NO+SPST-NC)	2 NC (DPST-NC)
Rated current/Maximum peak current	A 20/30	20/30
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 —	—
Breaking capacity DC1: 30/110/220 V	A 20/0.3/0.12	20/0.3/0.12
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 AC (50/60 Hz)	8 - 12 - 24 - 48 - 110 - 120 - 230 - 240
	V DC	12 - 24 - 48 - 110
Rated power AC/DC	VA (50 Hz)/W	3/1.25
Operating range	AC (50 Hz)	(0.85...1.1)U _N
	DC	(0.9...1.1)U _N

Technical data

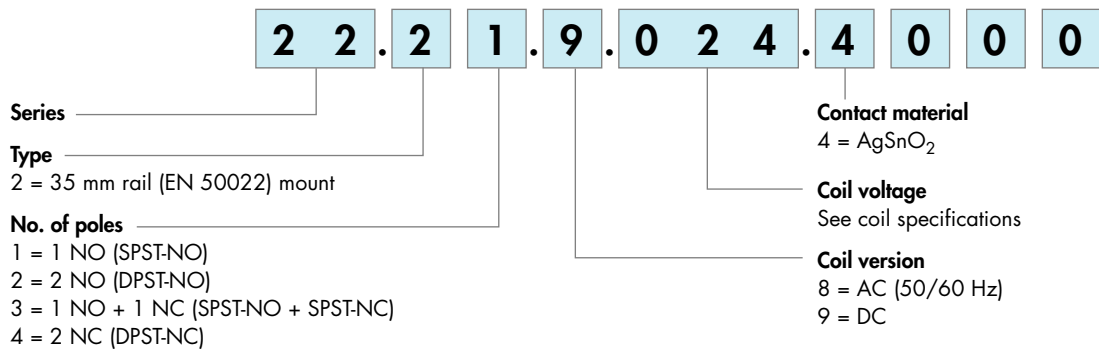
Mechanical life	cycles	500 · 10 ³	500 · 10 ³
Electrical life at rated load in AC1	cycles	50 · 10 ³	50 · 10 ³
Operate/release time	ms	15/8	15/8
Maximum impulse duration		continuous	continuous
Insulation between coil and contacts (1.2/50 μs)	kV	4	4
Ambient temperature range	°C	-40...+40	-40...+40
Protection category		IP 20	IP 20

Approvals (according to type)




Ordering information

Example: 22 series 35 mm rail mount relay, 1 NO (SPST-NO) 20 A contact, coil rated 24 V DC, contact material AgSnO₂.



Technical data

Contact specifications					
Nominal rate lamps					
incandescent (230V)	W	1,000			
compensated fluorescent (230V)	W	360			
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					
Bounce time: NO / NC	ms	5 / 10			
Power lost to the environment					
without contact current	W	1.2			
with rated current	W	3.2 (22.21, 22.23)	5.2 (22.22, 22.24)		
 Screw torque	Nm	0.8	0.8		
Max. wire size		Coil terminals		Contact terminals	
		solid cable	stranded cable	solid cable	stranded cable
	mm²	1x4 / 2x2.5	1x2.5 / 2x2.5	1x6 / 2x6	1x6 / 2x4
	AWG	1x12 / 2x14	1x14 / 2x14	1x10 / 2x10	1x10 / 2x12

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	Coil code	Operating range		Resistance	Consumption
U _N		U _{min}	U _{max}	R	I at U _N
V		V	V	Ω	mA
12	9.012	10.8	13.2	115	104.3
24	9.024	21.6	26.4	460	52.2
48	9.048	43.2	52.8	1,850	25.9
110	9.110	99	121	9,700	11.3

AC version data

Nominal voltage	Coil code	Operating range		Resistance	Consumption
U _N		U _{min}	U _{max}	R	I at U _N (50 Hz)
V		V	V	Ω	mA
8	8.008	6.8	8.8	6.5	360
12	8.012	10.2	13.2	13.5	245
24	8.024	20.4	26.4	41	135
48	8.048	40.8	52.8	186	68
110	8.110	93.5	121	970	26
120	8.120	102	132	1,380	24
230	8.230	195.5	253	4,200	12.5
240	8.240	204	264	4,400	12

Accessories



020.24

Sheet of marker tags, plastic, 24 tags, 9x17 mm

020.24

Features

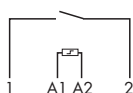
1 or 2 Pole electromechanical step relay with electrically separate coil and contact circuits

- Choice of 6 switching sequences
- Screw terminal connections
- AC coil
- Panel mount
- Cadmium free contact material

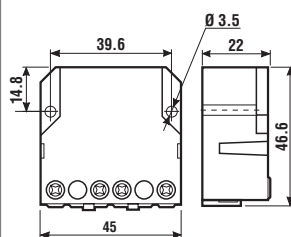
26.01



- Single phase switch 1 NO (SPST-NO)



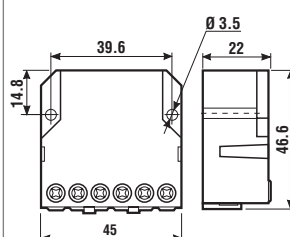
26.01



26.02, 04, 06, 08



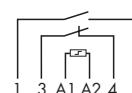
- Double phase switch 2 NO (DPST-NO)


26.02
26.04
26.06
26.08


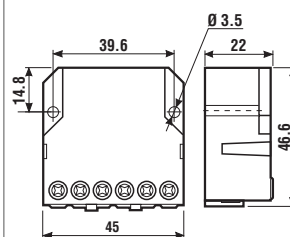
26.03



- 1 NO + 1 NC (SPST-NO + SPST-NC)



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)	$(0.8 \dots 1.1)U_N$	$(0.8 \dots 1.1)U_N$	$(0.8 \dots 1.1)U_N$
	DC	—	—	—

Technical data

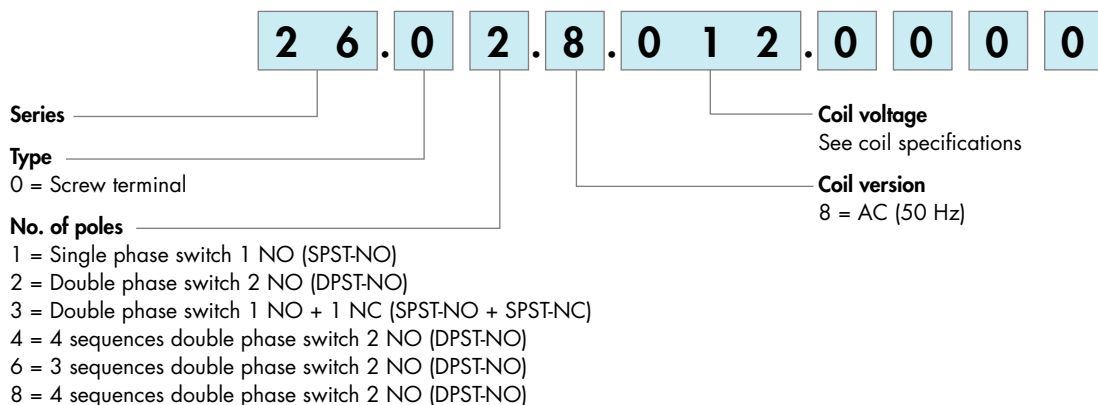
Mechanical life	cycles	$300 \cdot 10^3$	$300 \cdot 10^3$	$300 \cdot 10^3$
Electrical life at rated load in AC1	cycles	$100 \cdot 10^3$	$100 \cdot 10^3$	$100 \cdot 10^3$
Minimum/Maximum impulse duration		0.1s/1h (according to EN 60669)	0.1s/1h (according to EN 60669)	0.1s/1h (according to EN 60669)
Insulation between coil and contacts (1.2/50 μ s)	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)



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.



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
	mm ²	1x4 / 2x2.5	1x2.5 / 2x2.5
	AWG	1x12 / 2x14	1x14 / 2x14

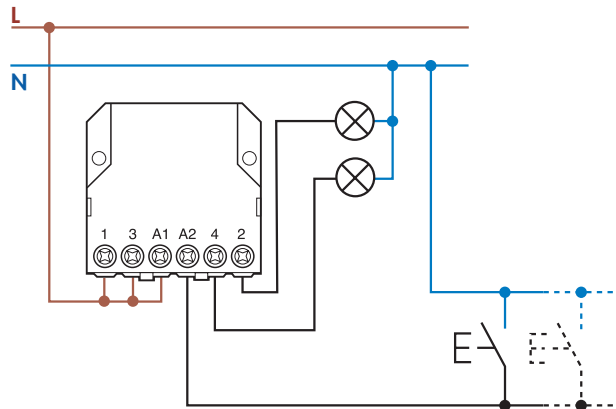
Coil specifications

AC version data

Nominal voltage	Coil code	Operating range		Resistance	Consumption
U_N		U_{min}	U_{max}	R	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

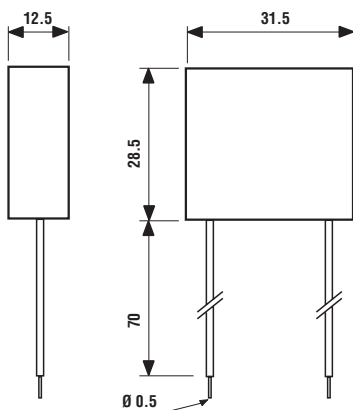
Type	Number of steps	Sequence			
		1	2	3	4
26.01	2				
26.02	2				
26.03	2				
26.04	4				
26.06	3				
26.08	4				

Wiring diagrams



Accessories

for 12 and 24 V DC control applications

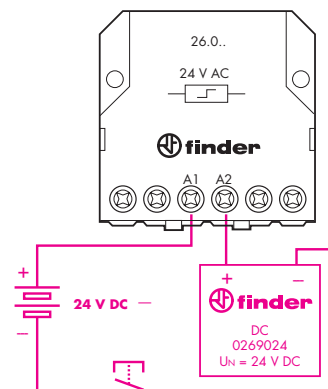


Type: 026.9.012

Nominal voltage: 12 V DC
Max temperature: + 40 °C
Operating range: (0.9...1.1)U_N

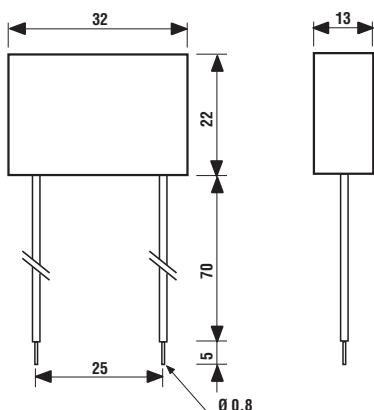
Type: 026.9.024

Nominal voltage: 24 V DC
Max temperature: + 40 °C
Operating range: (0.9...1.1)U_N



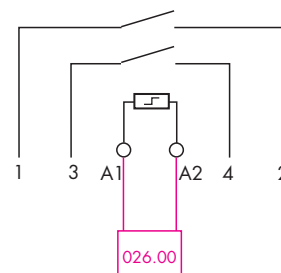
Example of wiring for 24 V DC control application.

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 1.5 mA max, 230 V AC). It must be connected in parallel to the coil of the relay (see diagram).

Features

1 or 2 Pole electromechanical step relay, for electrically common coil and contact circuits

- Choice of 3 switching sequences
- Screw terminal connections
- AC coil
- Panel mount
- Possible to connect illuminated push buttons with the additional part 027.00
- Cadmium free contact materials

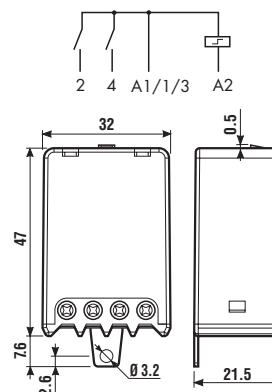
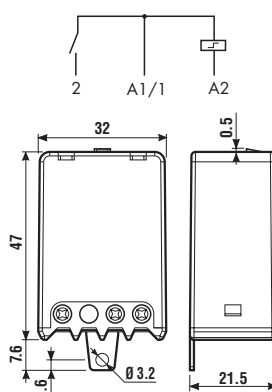
27.01

27.05/06



- Single phase switch
1 NO (SPST-NO)

- Double phase switch
2 NO (DPST-NO)



Contact specification

Number of contacts	1		2	
Rated current/Maximum peak current	A	10/20		10/20
Rated voltage/Maximum switching voltage V AC		110/110	230/230	110/110 230/230
Rated load AC1	VA	1,100	2,300	1,100 2,300
Rated load AC15	VA	250	500	250 500
Nominal lamp rating:				
incandescent	W	500	1,000	500 1,000
compensated fluorescent	W	180	360	180 360
uncompensated fluorescent	W	250	500	250 500
halogen	W	400	800	400 800
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	110 230
	V DC	—		—
Rated power AC/DC	VA (50 Hz)/W	4/—		4/—
Operating range	AC	$(0.8 \dots 1.1) U_N$		$(0.8 \dots 1.1) U_N$
	DC	—		—

Technical data

Mechanical life	cycles	$300 \cdot 10^3$		$300 \cdot 10^3$
Electrical life at rated load in AC1	cycles	$100 \cdot 10^3$		$100 \cdot 10^3$
Minimum/Maximum impulse duration		0.1s/1h (according to EN 60669)		0.1s/1h (according to EN 60669)
Insulation between coil and contacts (1.2/50 μ s)	kV	4		4
Ambient temperature range	°C	-40...+40		-40...+40
Protection category		IP 20		IP 20

Approvals (according to type)



Ordering information

Example: 27 series screw terminal, panel mount 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
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 Hz)

Technical data

Insulation

Dielectric strength between open contacts V AC 1,000

Other data

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
	mm²	2x2.5	1x4 / 2x2.5	2x2.5	1x4 / 2x2.5
	AWG	2x14	1x12 / 2x14	2x14	1x12 / 2x14

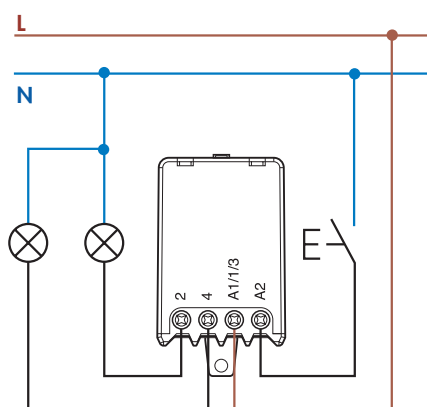
Coil specifications

AC version data

Nominal voltage U_N V	Coil code	Operating range U_{min} V	U_{max} V	Resistance R Ω	Consumption I at U_N (50 Hz) mA
110	8.110	88	121	1,400	42.0
230	8.230	184	253	6,500	17.5

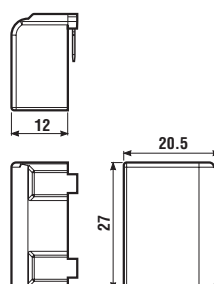
Type	Number of steps	Sequence			
		1	2	3	4
27.01	2				
27.05	4				
27.06	3				

Wiring diagram



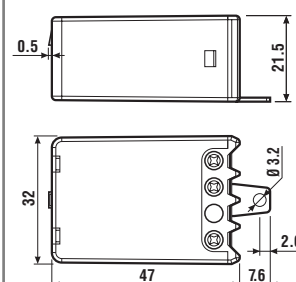
Accessories

Module for illuminated push-button (230 V AC applications)



Type 027.00

This module is necessary if using up to a maximum of 15 illuminated push-buttons (1 mA max, 230 V AC) in the switching input circuit. It must be plugged directly into the relay.



Relays 27 series

Terms	Page	col.		
Reference standard and values	II	1	Bounce time	IX 2
Operating & installation conditions	II	1	Ambient temperature	IX 2
Coil operating range	II	2	Ambient temperature range	IX 2
Excessive peak voltage limiting	II	1	Environmental protection	X 1
Residual current	II	1	Protection categories	X 1
Ambient temperature	II	1	Vibration resistance	X 1
Condensation	II	1	Shock resistance	X 1
Installed orientation	II	1	Installed orientation	X 1
RC contact suppression	II	1	Power lost to the environment	X 1
Guidelines for automatic flow solder Processes	II	2	Recommended distance between relays mounted on P.C.B.	X 1, 2
Relay mounting	II	2	Torque	X 2
Flux application	II	2	Minimum Wire size	X 2
Preheating	II	2	Max. wire size	X 2
Soldering	II	2	Terminating more than one wire	X 2
Cleaning	II	2	Box clamp	X 2
Terminology & definitions	III	1	Plate clamp	X 2
Terminal marking	III	1	Screwless terminal	X 2
Contact specification	III	1	SSR – Solid State Relay	X 2
Contact set	III	1	SSR Solid State Relay	X 2
Single contact	III	1	Opto-coupler	X 2
Twin/Bifurcated contact	III	1	Switching voltage range	X 2
Double break contact	III	1	Minimum switching current	X 2
Micro interruption	III	1	Control current	X 2
Micro disconnection	III	1	Maximum blocking voltage	X 2
Full disconnection	III	2	Relay with forcibly guided contacts, or safety relay	X, XI 2, 1
Rated current	III	2	Monitoring and Measuring relays	XI 1
Maximum peak current	III	2	Supply voltage monitoring	XI 1
Rated switching voltage	III	2	3-phase asymmetry monitoring	XI 1
Maximum switching voltage	III	2	Detection level	XI 1
Rated load AC1	III	2	Switch-on lock-out time	XI 1
Rated load AC15	III	2	Start delay (T2)	XI 1
Single-phase motor rating	III	2	Switch-off time	XI 1
Nominal lamp ratings	III	2	Trip on-delay	XI 1
Breaking capacity DC1	III	2	Run-on time	XI 1
Minimum switching load	III	2	Reaction time	XI 2
Electric life tests	IV	1	Fault memory	XI 2
Electrical life "F-chart"	IV	1	Switch-ON hysteresis	XI 2
Load reduction factor versus Cos φ	IV	1	Thermistor temperature sensing	XI 2
Capacitor start motors	V	1, 2	Level control relay	XI 2
Three-phase alternating current loads	VI	1	Electrode voltage	XI 2
Three-phase motors	VI	1	Electrode current	XI 2
Switching different voltage within a relay	VI	2	Max. sensitivity	XI 2
Contact resistance	VI	2	Sensitivity, fixed or adjustable	XI 2
Contact categories according to EN 61810-7	VI	2	Positive safety logic	XI 2
Coil specification	VII	1	Timers	XI 2
Nominal voltage	VII	1	Specified time range	XI 2
Rated power	VII	1	Repeatability	XI 2
Operating range	VII	1	Recovery time	XI 2
Non-operate voltage	VII	1	Minimum control impulse	XI 2
Minimum Pick-up voltage	VII	1	Setting accuracy	XI 2
Maximum permitted voltage	VII	1	Light dependent relays	XI 2
Holding voltage	VII	1	Threshold setting	XI 2
Must drop-out voltage	VII	1	Delay time	XII 2
Coil Resistance	VII	1	Time switches	XII 1
Rated coil consumption	VII	1	1 or 2 pole output types	XII 1
Thermal tests	VII	2	Type of time switch: Daily/ Weekly	XII 1
Monostable relay	VII	2	Programs	XII 1
Bistable relay	VII	2	Minimum interval setting	XII 1
Latching relay	VII	2	Power back-up	XII 1
Remanence relay	VII	2	Step relays and staircase timers	XII 1
Insulation	VII	2	Minimum/Maximum impulse duration	XII 1
EN/IEC 61810-1 relay standard	VII	2	Max. number of illuminated push-buttons	XII 1
Relay function and Isolation	VII	2	Glow wire conformity according to EN 60335-1	XII 1, 2
Specifying isolation levels	VIII	1	EMC (ElectroMagnetic Compatibility) Standards	XII 2
Insulation coordination	VIII	1	Burst	XII 2
Nominal voltage of supply system	VIII	1, 2	Surge	XII, XIII 2, 1
Rated Insulation Voltage	VIII	2	EMC rules	XIII 1
Dielectric strength	VIII	2	Reliability (MTTF & MTBF for equipment)	XIII 1
Insulation group	IX	1	MTTF	XIII 1
SELV, PELV and Safe separation	IX	1	MTBF	XIII 1
The SELV system	IX	1	B ₁₀ – Statistical 10% fractile of lifetime	XIII 1
The PELV system	IX	1	The RoHS & WEEE directives	XIII 1, 2
General technical data	IX	2	S I L and P L categories	XIII, XIV 2, 1
Cycle	IX	2	Tables	IV 2
Period	IX	2	Table 1: Contact load classifications	V —
Duty factor (DF)	IX	2	Table 2: UL Horsepower & Pilot duty ratings	VI 1
Continuous operation	IX	2	Table 3: Motor ratings v relay series	VI 2
Mechanical life	IX	2	Table 4: Contact categories	VI 2
Operate time	IX	2	Table 5: Contact material characteristics	VIII 2
Release time	IX	2	Table 6: Rated impulse	VIII 2
			Table 7: Pollution degree	VIII 2
			Quality approvals	XV —

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** ed. 2, **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**, **EN 60669-2-1** and **EN 60669-2-3** for light-dependent relays, electronic step relays, light dimmers, staircase switches and movement detectors.

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 $\pm 10\%$.

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.

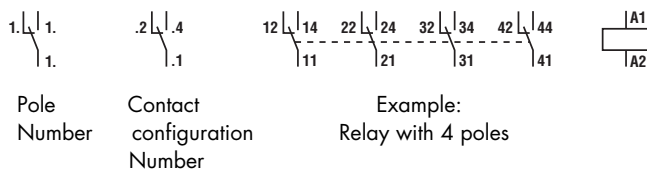
Terminology & definitions

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



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.x2 - 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).

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 $\cos \varphi \geq 0.9$ (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 B₁₀ 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 $\cos \varphi = 0.4$ (applicable for both the contact closing and opening).
In general, the reference load voltage applicable to these life expectancy charts is $U_n = 250$ 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 B₁₀ 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 $250/2U_n$ 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, or to the NC contacts (but not both during the same test).
- 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 $\cos \varphi$: 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 $\cos \varphi$). 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 $\cos \varphi$ 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.

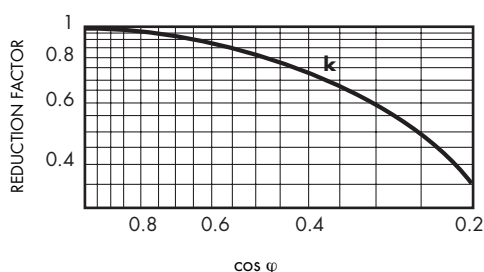


TABLE 1 Contact load classifications (related to the utilization categories defined in EN60947-4-1 and EN60947-5-1)

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 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”

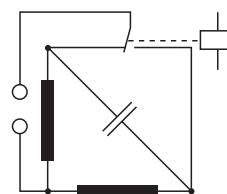
TABLE 2

UL Horsepower and Pilot duty ratings

Relays/Timers series	UL file No.	UL 508 approved ratings		
		Single phase AC horsepower		Pilot duty
		110-120 V	220-240 V	
34	E106390			B300 – R300
40.31 / 40.51	E81856	1/6 HP	1/3 HP (250 V)	R300
40.52			1/3 HP	
40.61			1/2 HP (250 V)	
40.11 / 40.41	E106390		1/2 HP (250 V)	
41.31 / 41.61	E106390	1/4 HP	1/2 HP	B300 – R300
41.52	E106390		1/2 HP (277 V)	
43.41	E81856	1/4 HP	1/2 HP	B300 – R300
43.61		1/4 HP (AgCdO contacts)	1/2 HP (AgCdO contacts)	B300 – R300 (AgCdO contacts)
		1/3 HP (AgNi contacts)	3/4 HP (AgNi contacts)	
44.52	E81856	1/8 HP	1/3 HP	
44.62		1/4 HP	3/4 HP	
45.71	E81856	1/2 HP		
45.91		1/6 HP	1/2 HP	
46.52	E81856	1/4 HP	1/2 HP	B300 – R300 (AgNi contacts)
46.61		1/3 HP	3/4 HP	
50	E81856	1/3 HP (NO contacts)	1/2 HP (NO contacts)	B300 (NO contacts)
55.x2 – 55.x3	E106390	1/3 HP	3/4 HP	R300
55.x4		1/8 HP	1/3 HP	
56	E81856	1/2 HP	1 HP	B300
60	E81856	1/3 HP	1 HP	B300 – R300 (AgNi contacts)
62	E81856	3/4 HP	2 HP	B300 (AgCdO contacts) – R300
			1 HP (480 V 3 ϕ – NO contacts)	
65	E81856	3/4 HP	2 HP	
66	E81856	1 HP (AgCdO, NO contacts)	2 HP (NO contacts)	
		1/2 HP (AgNi, NO contacts)		
20	E81856	1/2 HP		
72.01 - 72.11	E81856		1/2 HP (250 V)	
80.01-11-21-41-91	E81856		1/2 HP (250 V)	R300 B300 – R300
80.61			1/3 HP	
80.82				
85.02 – 85.03	E106390	1/3 HP	3/4 HP	R300
85.04		1/8 HP	1/3 HP	

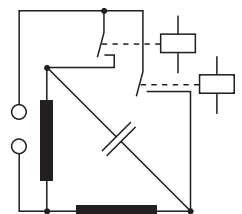
Capacitor start motors: Single phase 230V AC capacitor start motors have a starting current of about 120% of the rated current. However, damaging currents can result from an instantaneous reversal of the direction of rotation. In the first diagram, high circulating currents can cause severe arcing across 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.

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.

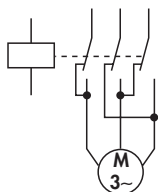
TABLE 3

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

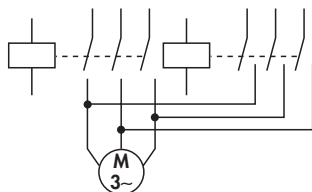
62 series relay is also capable to switch 1 hp 480 V 3 phase motors

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)	<ul style="list-style-type: none"> - Silver-nickel base with a galvanic hard gold plating of 5 µm typical thickness - Gold is not attacked by industrial atmospheres - With small loads, contact resistance is lower and more consistent compared to other materials <p>NOTE: 5 µm hard gold plating is completely different to 0.2µm gold flashing, which allows only protection in storing, but no better performance in use.</p>	<p>Wide range applications:</p> <ul style="list-style-type: none"> - <u>Small load range</u> (where gold plating erodes very little) from 50 mW (5 V - 2 mA) up to 1.5 W/24 V (resistive load). - <u>Middle load range</u> where gold plating erodes after several operations and the property of basic AgNi becomes dominant. <p>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.</p>
AgNi (Silver Nickel)	<ul style="list-style-type: none"> - Standard contact material for most relay applications - High wear resistance - Medium resistance to welding 	<ul style="list-style-type: none"> - Resistive and slightly inductive loads - Rated current up to 12 A - Inrush current up to 25 A
AgCdO (Silver Cadmium Oxide)	<ul style="list-style-type: none"> - High wear resistance with higher AC loads - Good resistance to welding 	<ul style="list-style-type: none"> - Inductive and motor loads - Rated current up to 30 A - Inrush current up to 50 A
AgSnO ₂ (Silver Tin Oxide)	<ul style="list-style-type: none"> - Excellent resistance to welding 	<ul style="list-style-type: none"> - 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.

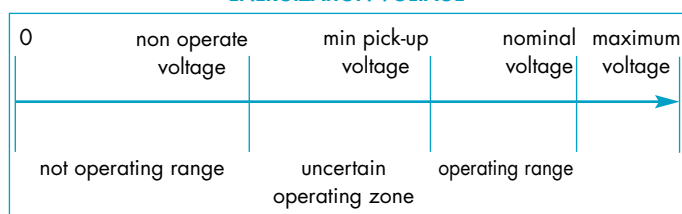
Rated power: The DC power value (W) or the apparent AC power value (VA with closed armature) which is absorbed by the coil at 23°C and at rated voltage.

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:

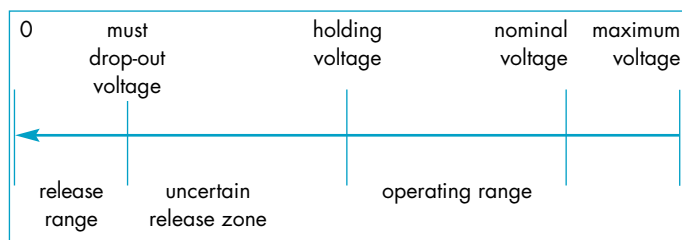
- class 1: $(0.8...1.1)U_N$
- class 2: $(0.85...1.1)U_N$

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 $\pm 10\%$.

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).

$$\text{That is: } \Delta T = (R_2 - R_1) / R_1 \times (234.5 + t_1) - (t_2 - t_1)$$

where:

R_1 = initial resistance

R_2 = final resistance

t_1 = initial temperature

t_2 = 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 safety-related and functional requirements 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"

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 ed. 2 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			
Three-phase systems	Single-phase systems		Overvoltage category			
			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 μ s), 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 time for the NO contact to close, from the point of coil energisation at rated voltage. It does not include the bounce time (see following pattern).

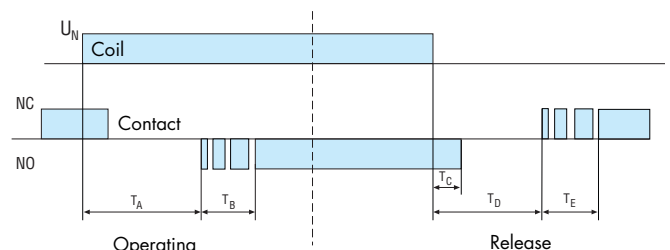
Release time

- For CO relays: The time for the NC contact to close, from the point of coil de-energisation. It does not include the bounce time.

- For NO relays: The time 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 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 ed. 2
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 sprayed 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, than 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 $g = 9.81 \text{ m/s}^2$). 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 mm² 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 mm², from 2.5 to 1.5 mm², from 1.5 to 1 mm²).

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.

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 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. A Safety Relay 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 signalling 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. And therefore, since there are also contacts other than safety contacts, the relay is categorised as "Type B".

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 (hysteresis) 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 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 < 1 mA @ 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

XII

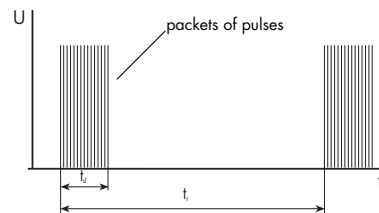
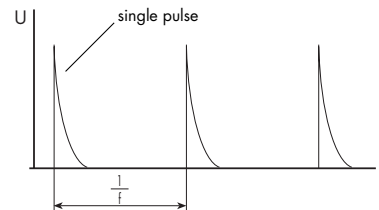
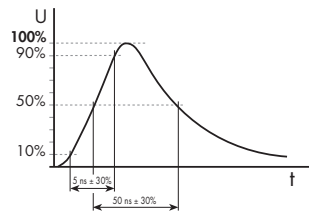
than 2 seconds) this can result in some limitation in the relay's mounting position. Finder products however, have no such limitations, since the materials used do not require the alternative test method to be performed.

EMC (ElectroMagnetic Compatibility) Standards

Type of test	Reference standard
Electrostatic discharge	EN 61000-4-2
Radio-frequency electromagnetic field (80 ÷ 1000 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

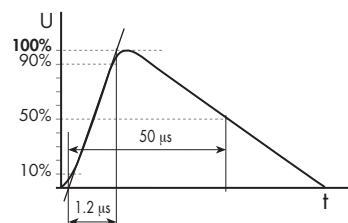
In panel installations, the most frequent and, particularly, more dangerous type of electrical disturbances are the following:

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 (5×10^{-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 (1.2×10^{-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 50082-2** (generic standard for immunity in the industrial environment) for other electronic products for industrial application;
- **EN 50082-1** (generic standard for immunity in the domestic environment) for other electronic products for domestic application.

Finder electronic products are in accordance with European EMC Directives **89/336/EEC** and **93/68/EEC** 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 50081-1 (generic standard for emission in the domestic environment) or 50081-2 (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.

B₁₀ - 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 B₁₀ 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 $MCTF = 1.4 \times B_{10}$. 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 compliant.

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 AgSnO₂). 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 AgSnO₂, 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).

SIL and PL categories

SIL and PL 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.

SIL 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.

The SIL (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.

PL Classes - according to EN 13849-1

EN 13849-1 is, at this time, a preliminary standard (prEN 13849-1) 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 prEN13849-1

The numeric values for the "statistical probability of a dangerous fault per hour" are to a large extent the same for EN 61508 and prEN13849-1. 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	$\geq 10^{-5} \dots < 10^{-4}$	A
1	$\geq 3 \times 10^{-6} \dots < 10^{-5}$	B
	$\geq 10^{-6} \dots < 3 \times 10^{-6}$	C
2	$\geq 10^{-7} \dots < 10^{-6}$	D
3	$\geq 10^{-8} \dots < 10^{-7}$	E

It is expected that PrEN13849 2006 may become fully effective as from 2009








































Summary

- SIL and PL 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.

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.

Quality Approvals

		CE	EU	
	American Bureau of Shipping	ABS	USA	
	Asociación de Normalización y Certificación, A.C.	ANCE	Mexico	
	Canadian Standards Association	CSA	Canada	
	UL International Demko	D	Denmark	
	SGS Fimko	FI	Finland	
	Germanischer Lloyd's	GL	Germany	
	Gost	Gost	Russia	
	Istituto Italiano del Marchio di Qualità	IMQ	Italy	
	Laboratoire Central des Industries Electriques	LCIE	France	
	Lloyd's Register of Shipping	Lloyd's Register	United Kingdom	
	Nemko	N	Norway	
RINA	Registro Italiano Navale	RINA	Italy	
	Intertek Testing Service ETL Semko	S	Sweden	
	Eidgenössisches Starkstrominspektorat	SEV	Switzerland	
	TÜV	TUV	Germany	
	Underwriters Laboratoires	UL	USA	
				
	Underwriters Laboratoires	UL	USA Canada	 
				
	VDE Prüf- und Zertifizierungsinstitut Zeichengenehmigung	VDE	Germany	