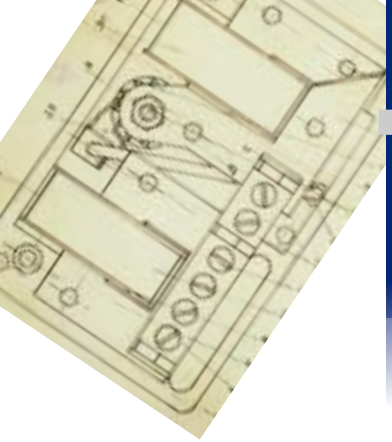
50 years

Relays, Interface Modules, Timers, Sockets and Accessories

Catalogue 2004-2005

finder®

The power in relays and timers since 1954



1954 - 2004

50 anni Finder - 50 years of Finder - 50 ans de Finder - 50 Jahre Finder - 50 años Finder - 50 anos de Finder - 50 anni Finder - 50 years of Finder - 50 ans de Finder - 50 Jahre Finder - 50 años Finder - 50 anos de Finder - 50 anni Finder - 50 years of Finder - 50 ans de Finder - 50 Jahre Finder - 50 años Finder - 50 anos de Finder - 50 anni Finder - 50 years Finder - 50 anni Finder - 50 years of Finder - 50 ans de Finder

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Fifty years ago, Piero Giordanino patented his first step relay and began the manufacture of electromechanical relays for use in home lighting installations. The move marked the very beginnings of his company - Finder - and in the 1960's the company started producing electro-mechanical relays for industrial applications.

- 1950 - 1960 - 1970 - 1980 - 1990 - 2000 -

Manufacturing Facilities

Our four factories produce over 220,000 relays every day, using machines which have been designed and built in-house by our own team of technicians, who are experts in their own right in production techniques and industrial automation.

Saint-Jean de Maurienne - F

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Almese - I

Finder has always followed a policy of constantly increasing quality. Its products have many quality approvals certified by the following international organizations: **ABS**, **BBJ**, **BEAB**, **CSA**, **DEMKO**, **FIMKO**, **GERMANISCHER LLOYD**, **GOST**, **IMQ**, **IRAM**, **LLOYD'S REGISTER**, **NEMKO**, **LCIE**, **RINA**, **SEV**, **SEMKO**, **TÜV**, **UL**, **VDE** as well as **CE** certification.

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ISO 9001 ISO 14001

finder

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finder®


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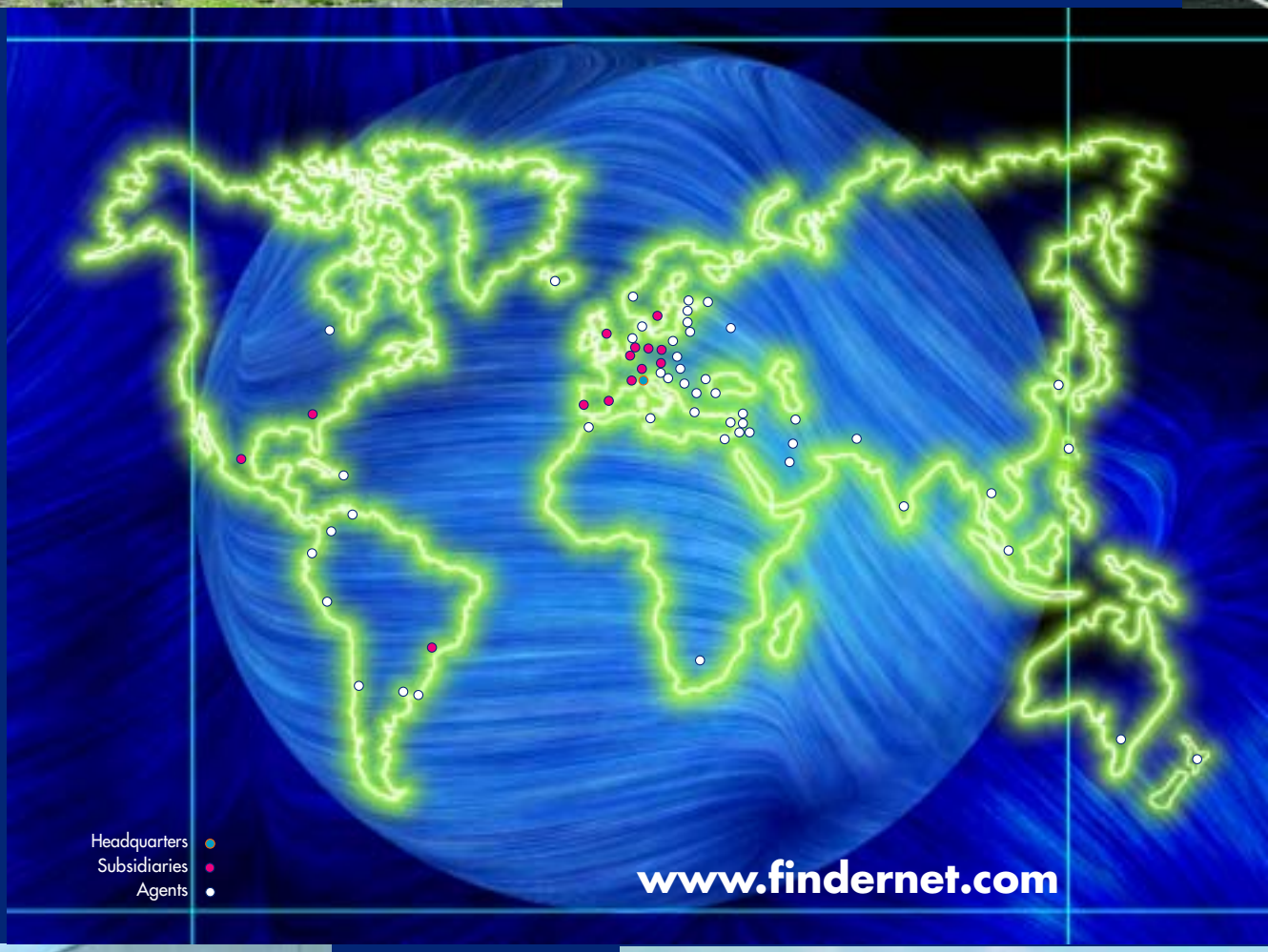


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finder

Contents

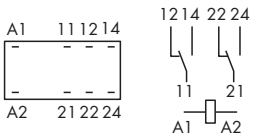
finder

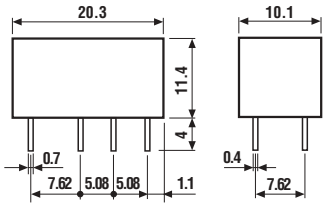
Contents

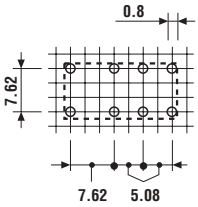
30.22

- *Sub miniature relay*
- *Low level switching capability*
- *Sensitive DC coil, 200mW*
- *Wash tight: RT III*

- Low consumption
- P.C.B. mounting







Copper side view

* For 250 V applications, where requirements for pollution degree 1 are met.

Contact specifications		
Contact configuration		2 CO (DPDT)
Rated current/Maximum peak current	A	2/3
Rated voltage/Maximum switching voltage	V AC	125/250*
Rated load in AC1	VA	125
Rated load in AC15 (230 V AC)	VA	25
Single phase motor rating (230 V AC)	kW	—
Breaking capacity in 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 specifications		
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 5
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 according to EN 61810-1 ed. 2		1.2 kV/2
Insulation between coil and contacts (1.2/50 µs)	kV	1.5
Dielectric strength between open contacts	V AC	750
Ambient temperature range	°C	–40...+85
Environmental protection		RT III
Approvals (according to type):		GOST cULus

ORDERING INFORMATION

Example: a 30 series P.C.B. relay with 2 CO (DPDT) contacts, with coil rated at 12 V sensitive DC.

30	.	2	2	.	7	.	0 12	.	A 0	B 0	C 1	D 0

Series

Type
2 = P.C.B.

No. of poles
2 = 2 pole, 2 A

Coil version
7 = Sensitive DC

Coil voltage
see coil specifications

A: Contact material
0 = Standard
AgNi + Au (5 µm)

B: Contact circuit
0 = CO (DPDT)

C: Options
1 = None

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

TECHNICAL DATA

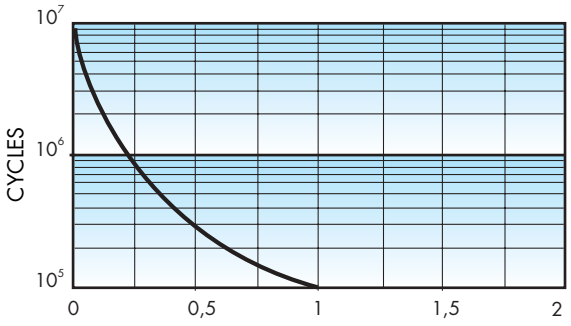
INSULATION

Insulation according to EN 61810-1 ed. 2		insulation rated voltage	V 125
		rated impulse withstand voltage	kV 1.2
		pollution degree	2
		overvoltage category	I
Dielectric strength between adjacent contacts	V AC	1,500	

OTHER DATA

Bounce time: NO/NC		ms	1/3
Vibration resistance (10...55)Hz, max. ± 1 mm: NO/NC		g/g	10/10
Power lost to the environment	without contact current	W	0.2
	with rated current	W	0.4
Recommended distance between relays mounted on P.C.B.s		mm	≥ 5

CONTACT SPECIFICATIONS



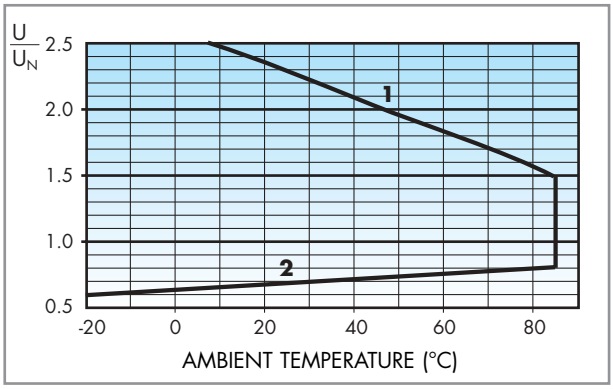
Cycling capacity.
Note: the rated current of 2 A coincides with the limiting continuous current.

COIL SPECIFICATIONS

DC VERSION DATA (0.2 W sensitive)

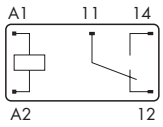
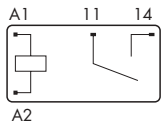
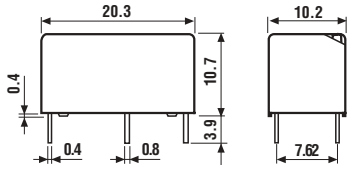
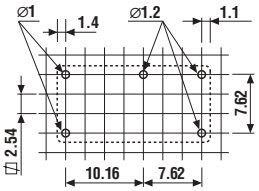
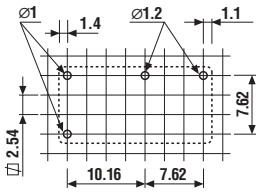
Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance consumption R	Rated coil I at U_N
V		V	V	Ω	mA
5	**7**.005	3.7	7.5	125	40
6	**7**.006	4.5	9	180	33
9	**7**.009	6.7	13.5	405	22
12	**7**.012	8.4	18	720	16
24	**7**.024	16.8	36	2,880	8.3
48	**7**.048	36	72	11,520	4.1

R 30 DC



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

- *Sensitive DC version*
- *Low profile*
- *NO (SPST-NO) version available*
- *Wash tight: RT III*

	32.21-x000	32.21-x300
		
	- 1 CO (SPDT), 6 A - P.C.B. mounting	- 1 NO (SPST-NO), 6 A - P.C.B. mounting
		
		
	Copper side view	Copper side view
Contact specifications		
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 in AC1 VA	1,500	1,500
Rated load in AC15 (230 V AC) VA	250	250
Single phase motor rating (230 V AC) kW	0.185	0.185
Breaking capacity in 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 specifications		
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/—
Insulation according to EN 61810-1 ed. 2	4 kV/2	4 kV/2
Insulation between coil and contacts (1.2/50 µs) kV	5	5
Dielectric strength between open contacts V AC	1,000	1,000
Ambient temperature range °C	–40...+85	–40...+85
Environmental protection	RT III	RT III
Approvals (according to type):	cULus VDE	

32

ORDERING INFORMATION

Example: a 32 series P.C.B. relay with 1 NO (SPDT-NO) contact 6 A, coil rated at 24 V sensitive DC.

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

Series

Type
2 = P.C.B. mounting

No. of poles
2 = 1 pole, 6 A

Coil version
7 = Sensitive DC

Coil voltage
see coil specifications

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

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

C: Options
0 = None

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

Only combinations in the same row are possible

Preferred versions

	coil version	A	B	C	D
32.21	sens. DC	2	0 - 3	0	0

All versions

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

TECHNICAL DATA

INSULATION

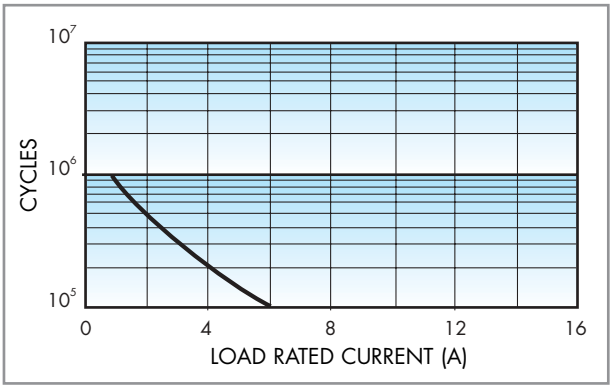
Insulation according to EN 61810-1 ed. 2	insulation rated voltage V	250
	rated impulse withstand voltage kV	4
	pollution degree	2
	overvoltage category	III

OTHER DATA

Bounce time: NO/NC		ms	2/10 (for CO or SPDT)	2/— (for NO or SPST-NO)
Vibration resistance (10...55)Hz, max. ± 1 mm: NO/NC		g/g	10/10 (for CO or SPDT)	10/— (for NO or SPST-NO)
Power lost to the environment	without contact current	W	0.2	
	with rated current	W	0.5	
Recommended distance between relays mounted on P.C.B.s		mm	≥ 5	

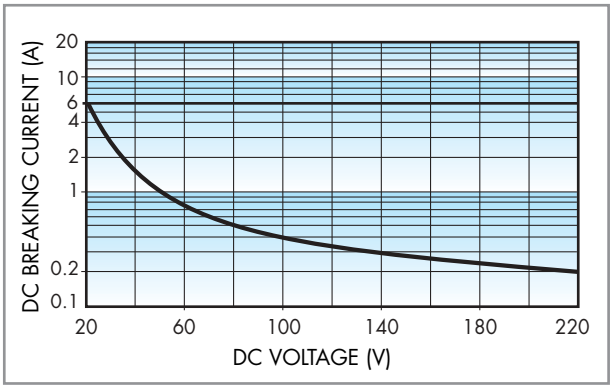
CONTACT SPECIFICATIONS

F 32



Contact life vs AC1 load.

H 32



Breaking capacity for DC1 load.

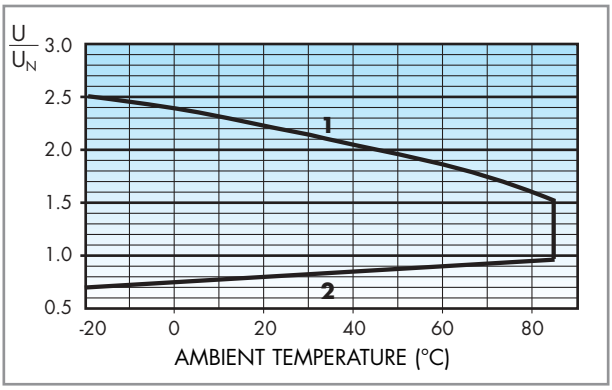
• When switching a resistive load (DC1) having voltage and current values under the curve the expected electrical life is ≥ $100 \cdot 10^3$ cycles.
• In case of DC13 loads the connection of a diode in parallel with the load will permit the same electrical life as for a DC1 load.
Note: the release time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

COIL SPECIFICATIONS

DC VERSION DATA (0.2 W sensitive)

Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
5	**7**.005	3.9	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

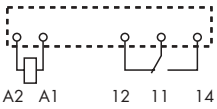


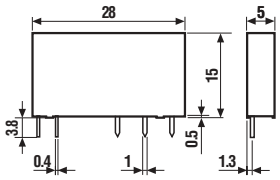
Operating range vs ambient temperature.
1 - Max coil voltage permitted.
2 - Min pick-up voltage with coil at ambient temperature.

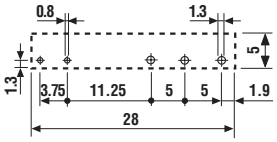
34.51

- *Ultra-slim, 5 mm wide*
- *Sensitive DC coil, 170 mW*
- *6/8 mm clearance/creepage distance*
- *6 kV (1.2/50 µs) between coil and contacts*

- 5 mm wide
- P.C.B./for use with 93 series sockets







* For 400 V applications, where requirements for pollution degree 2 are met.

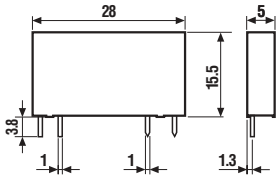
Copper side view

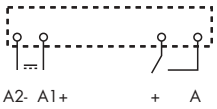
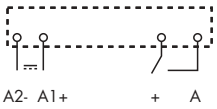
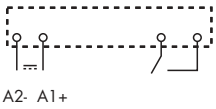
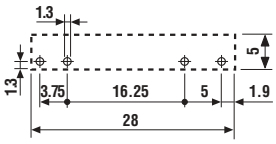
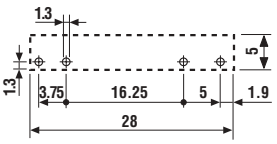
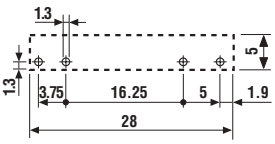
Contact specifications		
Contact configuration		1 CO (SPDT)
Rated current/Maximum peak current	A	6/10
Rated voltage/Maximum switching voltage	V AC	250/400*
Rated load in AC1	VA	1,500
Rated load in AC15 (230 V AC)	VA	300
Single phase motor rating (230 V AC)	kW	0.185
Breaking capacity in DC1: 30/110/220 V	A	6/0.2/0.12
Minimum switching load	mW (V/mA)	500 (12/10)
Standard contact material		AgNi
Coil specifications		
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 according to EN 61810-1 ed. 2		4 kV/3
Insulation between coil and contacts (1.2/50 µs)	kV	6
Dielectric strength between open contacts	V AC	1,000
Ambient temperature range	°C	–40...+85
Environmental protection		RT II
Approvals (according to type):		GOST cULus VDE

34 Series - Slim solid state P.C.B. relay (SSR) 0.1 - 2 A

- *Ultra-slim, 5 mm wide*
- *High switching speed and endurance*
- *Silent switching*

34



	34.81-9024	34.81-7048	34.81-8240
			
	- Switching current 2 A - 24 V DC - P.C.B. mounting	- Switching current 0.1 A - 48 V DC - P.C.B. mounting	- Switching current 2 A - 240 V AC - P.C.B. mounting
	 A2- A1+ + A input output	 A2- A1+ + A input output	 A2- A1+
	 Copper side view	 Copper side view	 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	24 / 60	24 / 60	24 / 60
Operating range V DC	16...30 / 35...72	16...30 / 35...72	16...30 / 35...72
Control current mA	7 / 3	7 / 3	7 / 3
Release voltage V DC	10 / 20	10 / 20	10 / 20
Impedance Ω	3,200 / 21,300	3,200 / 21,300	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):	cULus	cULus	—

* Operate/release time: if the relays are used with 35 mm rail sockets types 93.01 and 93.51, refer to the technical data of 38 Series, page 98.

ORDERING INFORMATION

ELECTROMECHANICAL RELAY

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

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

Series

Type
5 = Electromechanical type

No. of poles
1 = 1 pole, 6 A

Coil version
7 = Sensitive DC

Coil voltage
see coil specifications

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

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

C: Options
1 = None

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

Only combinations in the same row are possible

Preferred versions

	coil version	A	B	C	D
34.51	sens. DC	0	0	1	0

All versions

	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

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

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

Series

Type
8 = SSR type

Output
1 = 1 NO (SPST-NO)

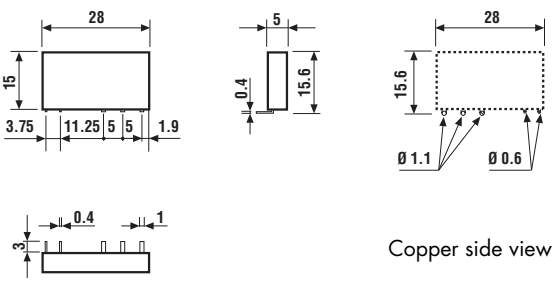
Input circuit
see input specifications

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

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, page 98.

POSSIBLE OPTIONS

Option = 34.51.7xxx.x019



Copper side view

ELECTROMECHANICAL RELAY

TECHNICAL DATA

INSULATION

Insulation according to EN 61810-1 ed. 2	insulation rated voltage	V	250
	rated impulse withstand voltage	kV	4
	pollution degree		3
	overvoltage category		III

CONDUCTED DISTURBANCE IMMUNITY

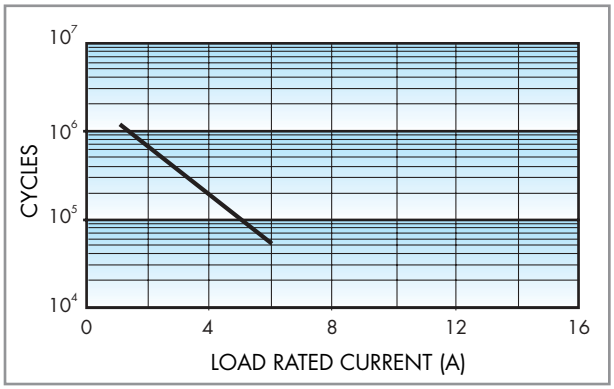
Burst (5...50)ns, 5 kHz, on A1 - A2	EN 61000-4-4	level 4 (4 kV)
Surge (1.2/50 µs) on A1 - A2 (differential mode)	EN 61000-4-5	level 3 (2 kV)

OTHER DATA

Bounce time: NO/NC		ms	1/6
Vibration resistance (10...55)Hz, max. ± 1 mm: NO/NC		g/g	10/5
Power lost to the environment	without contact current	W	0.2
	with rated current	W	0.5
Recommended distance between relays mounted on P.C.B.s		mm	≥ 5

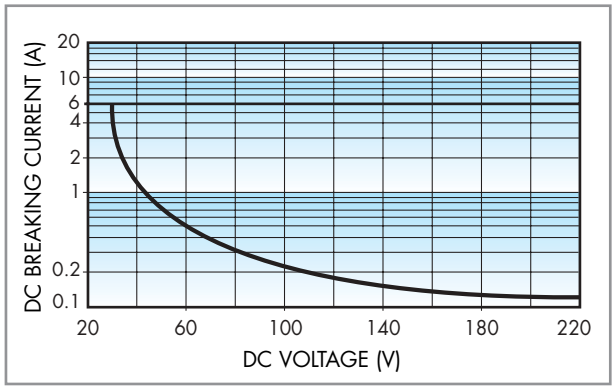
CONTACT SPECIFICATIONS

F 34



Electrical life vs AC1 load.

H 34



Breaking capacity in DC1 load.

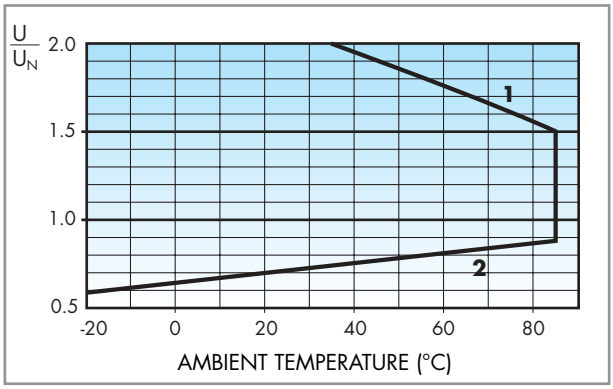
• When switching a resistive load (DC1) having voltage and current values under the curve the expected electrical life is ≥ $60 \cdot 10^3$ cycles.
• In case of DC13 loads the connection of a diode in parallel with the load will permit the same electrical life as for a DC1 load.
Note: the release time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

COIL SPECIFICATIONS

DC VERSION DATA

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



Operating range vs ambient temperature.
1 - Max coil voltage permitted.
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

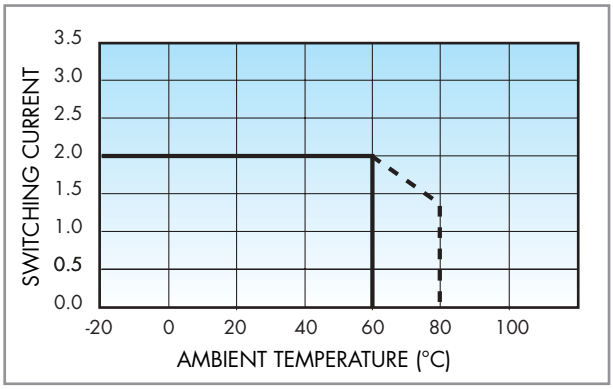
INPUT SPECIFICATION

DC VERSION DATA

Nominal voltage U_N	Input code	Operating range U_{min}	Operating range U_{max}	Release voltage	Control current I at U_N
V		V	V	V	mA
24	**7**.024	16	30	10	7.5
60	**7**.060	35	72	20	3

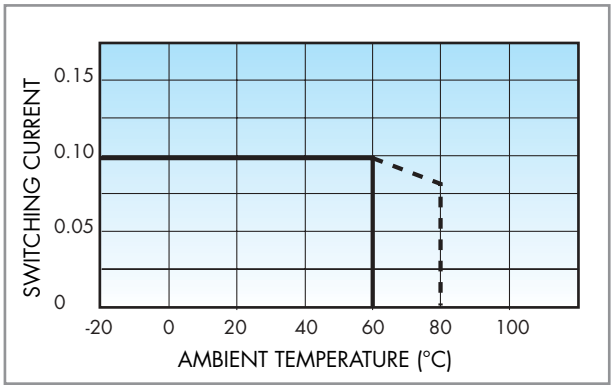
OUTPUT SPECIFICATION

L 34/2A



Type 34.81 (2 A - 24 V DC and 2 A - 240 V AC)
Switching current vs ambient temperature.

L 34/0.1A

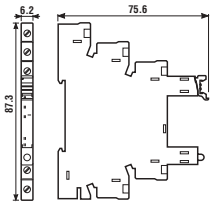


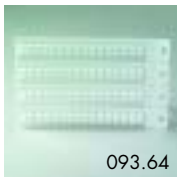
Type 34.81 (100 mA - 48 V DC)
Switching current vs ambient temperature.


93.01

Approvals (according to type):

CE GOST cULus




093.64

Relay type	34.51, 34.81	
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*
6 V DC	34.51.7.005.xx10	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
Sheet of marker tags (64 tags), 6x10 mm		093.64

* Leakage current suppression.

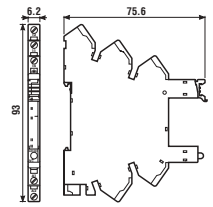
- Rated values: 6A - 250 V
- Insulation: ≥ 6 kV (1.2/50 µs) *between coil and contacts*
- Protection category: IP 20
- Ambient temperature: (–40...+70)°C (U_N ≤ 60 V), (–40...+55)°C (U_N ≥ 60 V)
- ⏀ Screw torque: 0.5 Nm
- Wire strip length: 10 mm
- Max wire size:

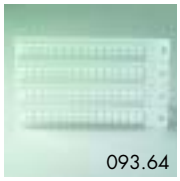
	solid wire	stranded wire
mm²	1x2.5 / 2x1.5	1x2.5 / 2x1.5
AWG	1x14 / 2x16	1x14 / 2x16


93.51

Approvals (according to type):

CE GOST cULus



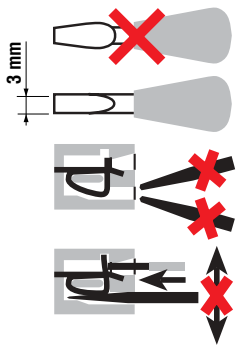

093.64

Relay type	34.51, 34.81	
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*
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
Sheet of marker tags (64 tags), 6x10 mm		093.64

* Leakage current suppression.

- Rated values: 6A - 250 V
- Insulation: ≥ 6 kV (1.2/50 µs) *between coil and contacts*
- Protection category: IP 20
- Ambient temperature: (–40...+70)°C (U_N ≤ 60 V), (–40...+55)°C (U_N ≥ 60 V)
- Wire strip length: 10 mm
- Max wire size:

	solid wire	stranded wire
mm²	1x2.5	1x2.5
AWG	1x14	1x14

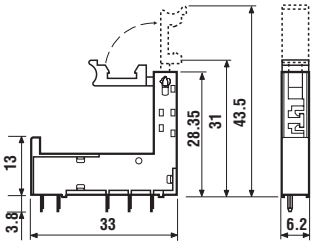


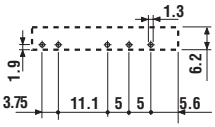

93.11

Approvals
(according to type):

Relay type	34.51/34.81
Colour	BLUE
P.C.B. sockets with retaining and release clip	93.11

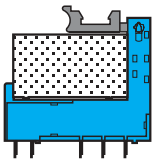
- Rated values: 6 A - 250 V
- Insulation: ≥ 6 kV (1.2/50 µs) *between coil and contacts*
- Protection category: IP 20
- Ambient temperature: (–40...+70)°C

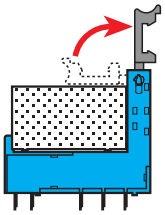


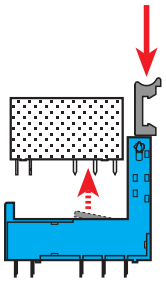


Copper side view

Retaining and release clip use:







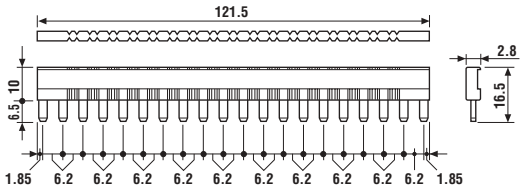
FOR 93.01 AND 93.51 SOCKETS:


093.20

Approvals
(according to type):

20-way jumper link	093.20

- Rated values: 36 A - 250 V

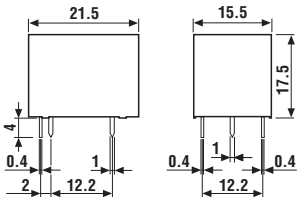


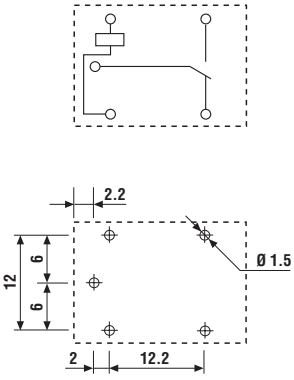
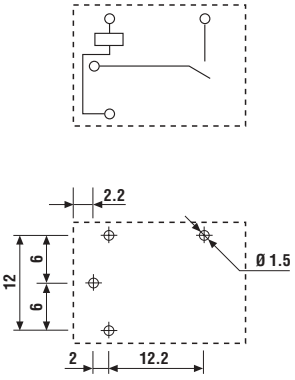

093.01

Plastic separator	093.01

Thickness 2mm, 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

- *Sensitive DC coil, 360 mW*
- *Wash tight: RT III*
- *Basic insulation VDE 0435*



	36.11	36.11-0300
		
	- Sugar cube - 1 CO (SPDT) - P.C.B. mounting	- Sugar cube - 1 NO (SPST-NO) - P.C.B. mounting
	 Copper side view	 Copper side view
Contact specifications		
Contact configuration	1 CO (SPDT)	1 NO (SPST-NO)
Rated current/Maximum peak current A	10/15	10/15
Rated voltage/Maximum switching voltage V AC	250/250	250/250
Rated load in AC1 VA	2,500	2,500
Rated load in AC15 (230 V AC) VA	500	500
Single phase motor rating (230 V AC) kW	0.37	0.37
Breaking capacity in DC1: 30/110/220 V A	10/0.3/0.12	10/0.3/0.12
Minimum switching load mW (V/mA)	500 (5/100)	500 (5/100)
Standard contact material	AgCdO	AgCdO
Coil specifications		
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/sens. 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 according to EN 61810-1 ed. 2	2.5 kV/2	2.5 kV/2
Insulation between coil and contacts (1.2/50 µs) kV	4	4
Dielectric strength between open contacts V AC	1,000	1,000
Ambient temperature range °C	–40...+85	–40...+85
Enviromental protection	RT III	RT III
Approvals (according to type):	GOST cULus VDE	cULus GOST

ORDERING INFORMATION

Example: a 36 series miniature P.C.B. relay, 1 CO (SPDT) 10 A contacts, with 12 V DC coil.

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

Series

Type
1 = P.C.B.

No. of poles
1 = 1 pole, 10 A

Coil version
9 = DC

Coil voltage
see coil specifications

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

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

C: Options
0 = None

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

Only combinations in the same row are possible

Preferred versions

	coil version	A	B	C	D
36.11	DC	0	0	0	0

All versions

	coil version	A	B	C	D
36.11	DC	0 - 4	0 - 3	0	0

TECHNICAL DATA

INSULATION

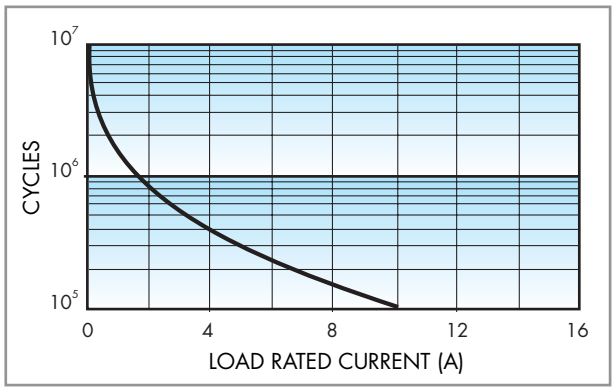
Insulation according to EN 61810-1 ed. 2	insulation rated voltage	V	250
	rated impulse withstand voltage	kV	2.5
	pollution degree		2
	overvoltage category		II

OTHER DATA

Bounce time: NO/NC	ms	1/6 (for CO or SPDT)	1/— (for NO or SPST-NO)

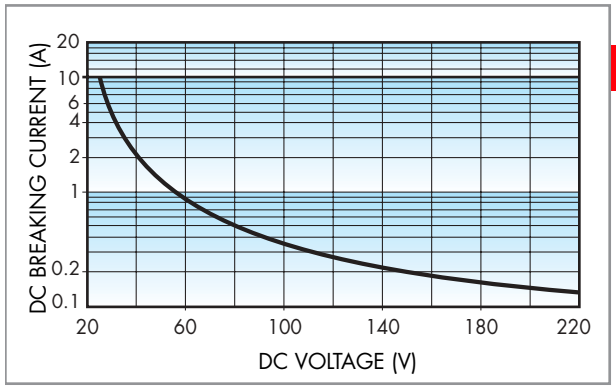
CONTACT SPECIFICATIONS

F 36



Electrical life vs AC1 load.

H 36



Breaking capacity in DC1 load.

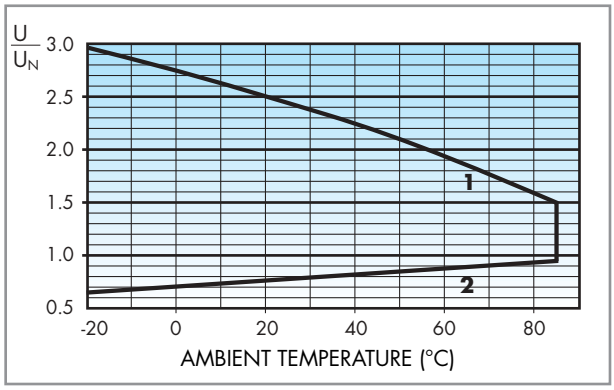
• When switching a resistive load (DC1) having voltage and current values under the curve the expected electrical life is ≥ $100 \cdot 10^3$ cycles.
• In case of DC13 loads the connection of a diode in parallel with the load will permit the same electrical life as for a DC1 load.
Note: the release time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

COIL SPECIFICATIONS

DC VERSION DATA

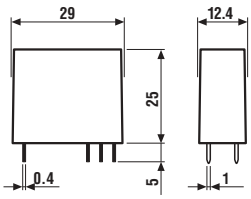
Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
3	**9**.003	2.2	4.5	25	120
5	**9**.005	3.7	7.5	70	72
6	**9**.006	4.5	9	100	60
9	**9**.009	6.7	13.5	225	40
12	**9**.012	9	18	400	30
24	**9**.024	18	36	1,600	15
48	**9**.048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

R 36

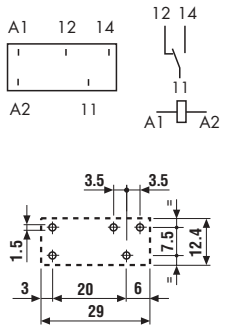
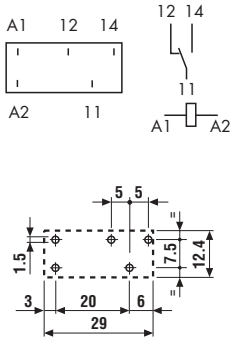
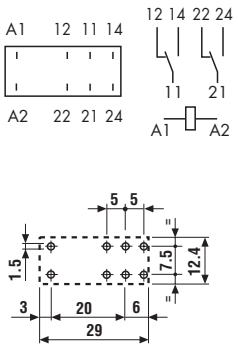


Operating range vs ambient temperature.
1 - Max coil voltage permitted.
2 - Min pick-up voltage with coil at ambient temperature.

- *P.C.B. or plug-in mount*
- *AC, DC, sensitive DC or single bistable coil versions available*
- *8 mm, 6 kV (1.2/50 µs) between coil and contacts*
- *Ambient temperature + 85 °C*
- *RT III (wash tight) version available*
- *Sockets and accessories: see 95, 99 and 86 series*



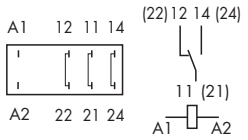
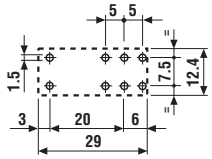
* For 400 V applications, where requirements for pollution degree 2 are met.

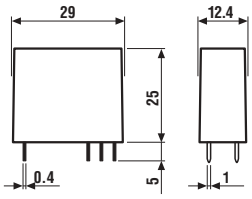
	40.31	40.51	40.52
			
	- 1 pole, 10 A - 3.5 mm pinning - P.C.B./for use with 95 series sockets	- 1 pole, 10 A - 5 mm pinning - P.C.B./for use with 95 series sockets	- 2 pole, 8 A - 5 mm pinning - P.C.B./for use with 95 series sockets
	 Copper side view	 Copper side view	 Copper side view
Contact specifications			
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*	250/250
Rated load in AC1 VA	2,500	2,500	2,000
Rated load in AC15 (230 V AC) VA	500	500	400
Single phase motor rating (230 V AC) kW	0.37	0.37	0.3
Breaking capacity in 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 specifications			
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 according to EN 61810-1 ed. 2	4 kV/3	4 kV/3	4 kV/2
Insulation between coil and contacts (1.2/50 µs) kV	6 (8 mm)	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts V AC	1,000	1,000	1,000
Ambient temperature range °C	–40...+85	–40...+85	–40...+85
Envirommental protection	RT II**	RT II**	RT II**
Approvals (according to type):	CE ABS BV BEAB SP DNV FI GOST KR IRAM LR RINA NK cULus NF VDE		

** See page 202 "Guidelines for automatic flow solder processes".

40

- *P.C.B. or plug-in mount*
- *AC, DC, sensitive DC or single bistable coil versions available*
- *8 mm, 6 kV (1.2/50 µs) between coil and contacts*
- *Ambient temperature + 85 °C*
- *RT III (wash tight) version available*
- *Sockets and accessories: see 95, 99 and 86 series*

	40.61	40.xx.6
		
	- 1 pole, 16 A - 5 mm pinning - P.C.B./for use with 95 series sockets	- Bistable version (1 coil) - P.C.B./for use with 95 series sockets
	  Copper side view	Bistable version (1 coil) types: 40.31.6... 40.51.6... 40.52.6... 40.61.6... For wiring diagrams see page 28
Contact specifications		
Contact configuration	1 CO (SPDT)	
Rated current/Maximum peak current A	16/30**	
Rated voltage/Maximum switching voltage V AC	250/400*	See relays
Rated load in AC1 VA	4,000	40.31
Rated load in AC15 (230 V AC) VA	750	40.51
Single phase motor rating (230 V AC) kW	0.55	40.52
Breaking capacity in DC1: 30/110/220 V A	16/0.3/0.12	40.61
Minimum switching load mW (V/mA)	500 (10/5)	
Standard contact material	AgCdO	
Coil specifications		
Nominal voltage (U_N) V AC (50/60 Hz)	6 - 12 - 24 - 48 - 60 - 110 - 120 - 230 - 240	5 - 6 - 12 - 24 - 48 - 110
V DC	***See below	5 - 6 - 12 - 24 - 48 - 110
Rated power AC/DC/sens. DC VA (50 Hz)/W/W	1.2/0.65/0.5	1.0/1.0/—
Operating range AC	(0.8...1.1)U_N	(0.8...1.1)U_N
DC/sens. DC	(0.73...1.5)U_N/(0.8...1.5)U_N	(0.8...1.1)U_N/—
Holding voltage AC/DC	0.8 U_N /0.4 U_N	—
Must drop-out voltage AC/DC	0.2 U_N /0.1 U_N	—
Technical data		
Mechanical life AC/DC cycles	10 · 10^6/20 · 10^6	See relays
Electrical life at rated load AC1 cycles	100 · 10^3	40.31
Operate/release time ms	7/3 - (12/4 sensitive)	40.51
Insulation according to EN 61810-1 ed. 2	4 kV/3	40.52
Insulation between coil and contacts (1.2/50 µs) kV	6 (8 mm)	40.61
Dielectric strength between open contacts V AC	1,000	
Ambient temperature range °C	–40...+85	Min. impulse duration
Enviromental protection	RT II**	≥ 20 ms
Approvals (according to type):	CE ABS BEAB SP DFI GOST IRAM Lloyd's Register N RINA S cULus NF VDE	



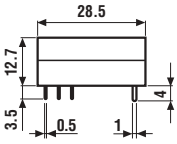
* For 400 V applications, where requirements for pollution degree 2 are met.

** With the $AgSnO_2$ material the maximum peak current is 100 A - 5 ms on NO (nPST-NO) contact.

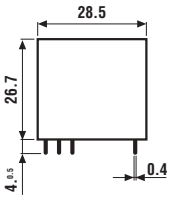
*** Nominal voltage (U_N): 5 - 6 - 7 - 9 - 12 - 14 - 18 - 21 - 24 - 28 - 36 - 48 - 60 - 90 - 110 - 125 V DC

** See page 202 "Guidelines for automatic flow solder processes".

- *Plug-in or P.C.B. versions*
- *Sensitive DC version available*
- *8 mm, 6 kV (1.2/50 µs) between coil and contacts*
- *Sockets and accessories: see 95 series*

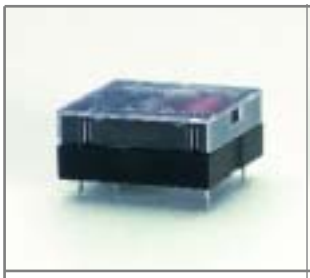
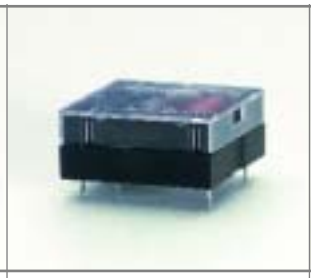
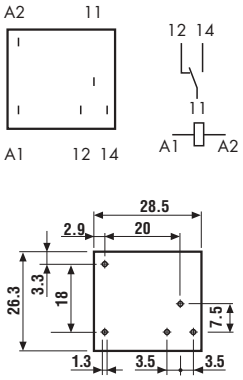
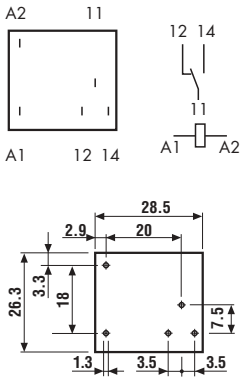
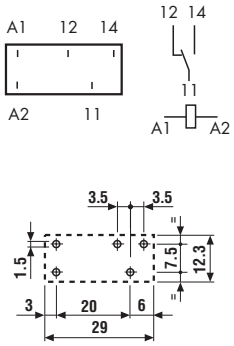


40.11



40.41

* For 400 V applications, where requirements for pollution degree 2 are met.

	40.11	40.11-2016	40.41
			
	- 1 pole, 10 A - 3.5 mm pinning - P.C.B. mounting	- 1 pole, 16 A - 3.5 mm pinning - P.C.B. mounting	- 1 pole, 10 A - 3.5 mm pinning - P.C.B./for use with 95 series sockets
	 Copper side view	 Copper side view	 Copper side view
Contact specifications			
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 in AC1 VA	2,500	4,000	2,500
Rated load in AC15 (230 V AC) VA	500	750	500
Single phase motor rating (230 V AC) kW	0.37	0.55	0.37
Breaking capacity in 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 specifications			
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...1.75)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 according to EN 61810-1 ed. 2	4 kV/3	4 kV/3	4 kV/3
Insulation between coil and contacts (1.2/50 µs) kV	6 (8 mm)	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts V AC	1,000	1,000	1,000
Ambient temperature range °C	–40...+70	–40...+70	–40...+70
Enviromental protection	RT I	RT I	RT I
Approvals (according to type):	GOST cULus VDE		

ORDERING INFORMATION

Example: a 40 series P.C.B. relay with 2 CO (SPDT) contacts, with coil rated at 230 V AC.

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

Series

Type
1 = P.C.B. - 3.5 mm pinning, flat
3 = P.C.B. - 3.5 mm pinning
4 = P.C.B. - 3.5 mm pinning
5 = P.C.B. - 5 mm pinning
6 = P.C.B. - 5 mm pinning

No. of poles
1 = 1 pole
for: 40.11, 10 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 = $AgSnO_2$
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)

Only combinations in the same row are possible

Preferred versions

	coil version	A	B	C	D
40.11/41	sens.DC	2	0	0	0
40.31/51	AC/DC/sens.DC	0	0	0	0
40.52	AC/DC/sens.DC	0	0	0	0
40.61	AC/DC/sens.DC	0	0	0	0

All versions

	coil version	A	B	C	D
40.11	sens. DC	2	0	0	0
40.11	sens. DC	2	0	16	/
40.41	sens. DC	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

Insulation according to EN 61810-1 ed. 2		insulation rated voltage	V	250
		rated impulse withstand voltage	kV	4
		pollution degree		3 (1 CO/SPDT) 2 (2 CO/DPDT)
		overvoltage category		III
Dielectric strength between adjacent contacts	V AC	2,000		

CONDUCTED DISTURBANCE IMMUNITY

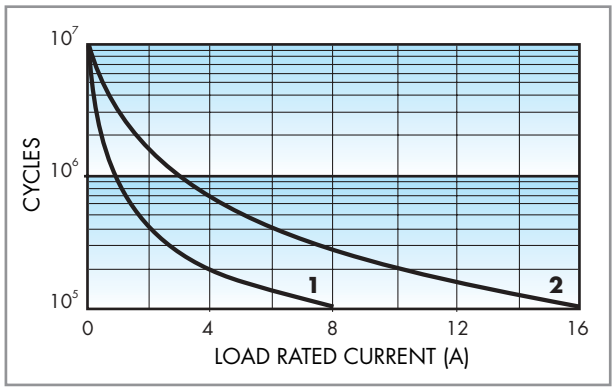
Burst (5...50)ns, 5 kHz, on A1 - A2	EN 61000-4-4	level 4 (4 kV)
Surge (1.2/50 µs) on A1 - A2 (differential mode)	EN 61000-4-5	level 3 (2 kV)

OTHER DATA

Bounce time: NO/NC		ms	2/5	
Vibration resistance (10...55)Hz, max. ± 1 mm: NO/NC		g/g	10/4 (for 1 CO or SPDT)	3/3 (for 2 CO or DPDT)
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 P.C.B.s		mm	≥ 5	

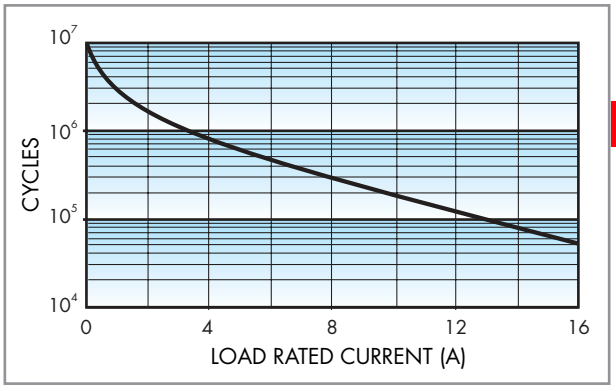
CONTACT SPECIFICATIONS

F 40 (Types 40.31/51/52/61)



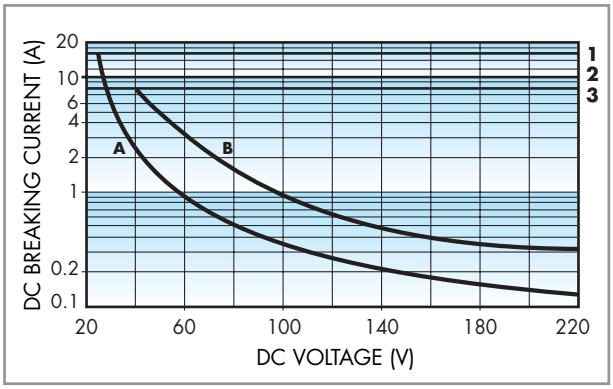
Electrical life vs AC1 load.
1 - Type 40.52 (8 A)
2 - Types 40.31, 40.51 (10 A)
Type 40.61 (16 A)

F 40 (Types 40.11/41)



Electrical life vs AC1 load.
Types 40.11, 40.41 (10 A)
Types 40.11-2016 (16 A)

H 40



Breaking capacity for DC1 load.
1 - Type 40.61
2 - Types 40.11, 40.31, 40.41, 40.51
3 - Type 40.52
A - Load applied to 1 contact
B - Load applied to 2 contacts in series

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

COIL SPECIFICATIONS

DC VERSION DATA (0.65 W standard - Types 40.31/51/52/61)

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
5	**9**.005	3.65	7.5	38	130
6	**9**.006	4.4	9	55	109
7	**9**.007	5.1	10.5	75	94
9	**9**.009	6.6	13.5	125	72
12	**9**.012	8.8	18	220	55
14	**9**.014	10.2	21	300	47
18	**9**.018	13.1	27	500	36
21	**9**.021	15.3	31.5	700	30
24	**9**.024	17.5	36	900	27
28	**9**.028	20.5	42	1,200	23
36	**9**.036	26.3	54	2,000	18
48	**9**.048	35	72	3,500	14
60	**9**.060	43.8	90	5,500	11
90	**9**.090	65.7	135	12,500	7.2
110	**9**.110	80.3	165	18,000	6.2
125	**9**.125	91.2	187.5	23,500	5.3

DC VERSION DATA (0.5 W sensitive - Types 40.31/51/52/61)

Nominal voltage U_N	Coil code	Operating range U_{min}*	U_{max}**	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
5	**7**.005	3.7	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 VERSION DATA (0.5 W sensitive - Types 40.11/41)

Nominal voltage U_N	Coil code	Operating range U_{min}	U_{max}*	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
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 VERSION DATA (Types 40.31/51/52/61)

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

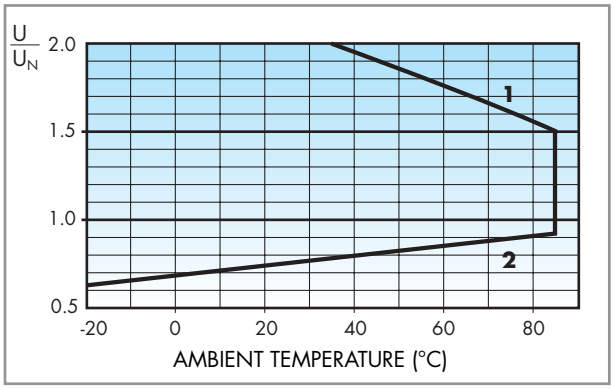
AC/DC VERSION DATA (bistable - Types 40.31/51/52/61)

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

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

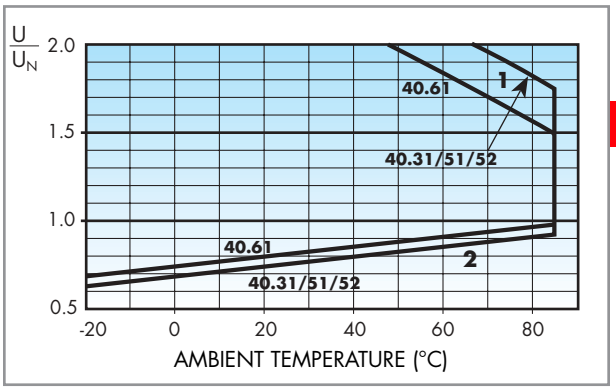
COIL SPECIFICATIONS

R 40 DC



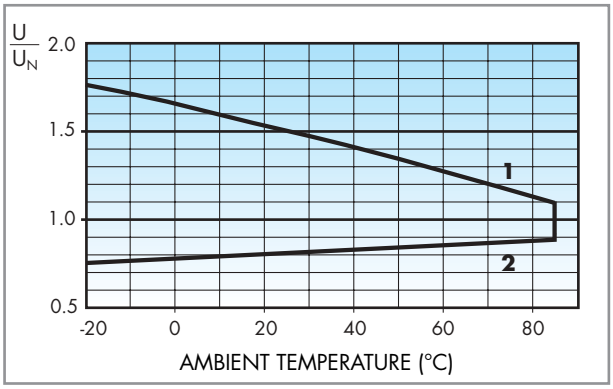
Operating range vs ambient temperature.
1 - Max coil voltage permitted.
2 - Min pick-up voltage with coil at ambient temperature.

R 40 sens. DC (Types 40.31/51/52/61)



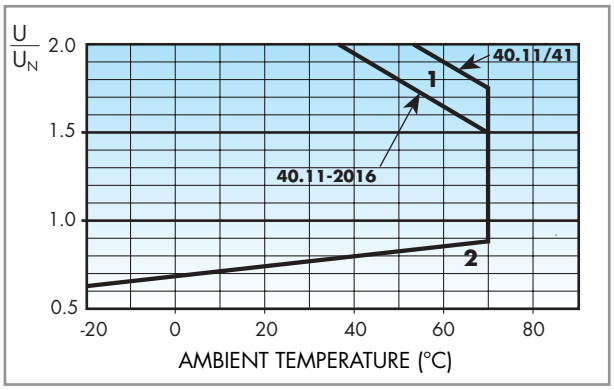
Operating range vs ambient temperature.
1 - Max coil voltage permitted.
2 - Min pick-up voltage with coil at ambient temperature.

R 40 AC



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

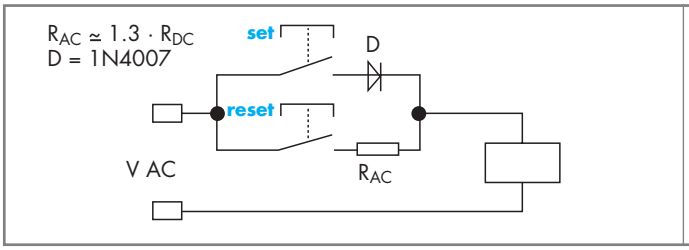
R 40 sens. DC (Types 40.11/41)



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

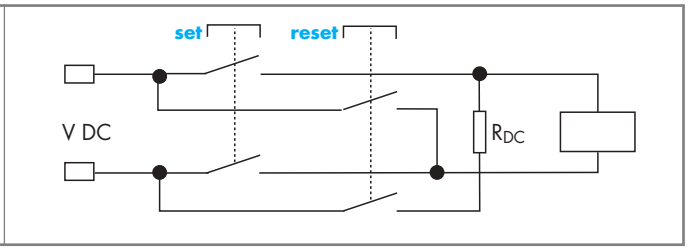
Wiring diagram for 40 series bistable coil version

AC Operation



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

DC Operation



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

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

95.05

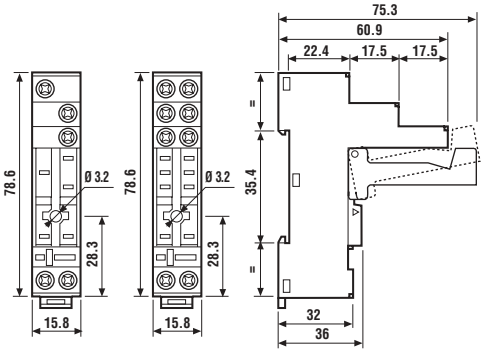
40

Approvals (according to type):

Relay type	40.31		40.51/ 52/ 61	
Colour	BLUE	BLACK	BLUE	BLACK
Clamp terminal socket: panel or 35 mm rail (EN 50022) mount, retaining clip 095.01 supplied with socket packaging code SPA	95.03	95.03.0	95.05	95.05.0
Plastic retaining and release clip	095.01	095.01.0	095.01	095.01.0
Metal retaining clip	095.71			
8-way jumper link for 95.03 and 95.05 sockets	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)	86.10, 86.20			
Sheet of marker tags for retaining and release clip 095.01	060.72			

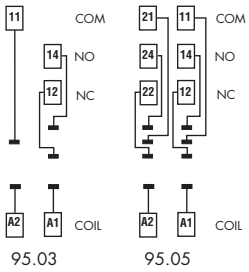
- Rated values: 10 A - 250 V
  with a current >10 A, the contact terminal must be connected in parallel (21 with 11, 24 with 14, 22 with 12)
- Insulation: ≥ 6 kV (1.2/50 µs) between coil and contacts
- Protection category: IP 20
- Ambient temperature: (–40...+70)°C
- Screw torque: 0.5 Nm
- Wire strip length: 8 mm
- Max wire size:

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



095.01

060.72

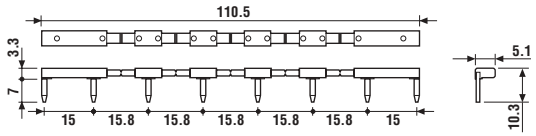


FOR 95.03 AND 95.05 SOCKETS:

095.18

8-way jumper link	095.18

- Rated values: 10 A - 250 V



86.10

86 series module timers (see technical data pages 151/156)	BLUE
Mono-function: (12...24)V AC/DC; function AI; (1.5s...60min)	86.10.0.024.0000
Mono-function: (12...24)V AC/DC; function DI; (1.5s...60min)	86.20.0.024.0000

Approvals (according to type): GOST

99.02

99.02 coil indication and EMC suppression modules (see technical data page 209)		BLUE*
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 (62 kΩ/1W)	(110...240)V AC	99.02.8.230.07

Approvals (according to type): GOST

* Modules in Black housing are available on request.

**For DC supply, apply the positive to terminal A1.

95.85.3

Approvals (according to type):

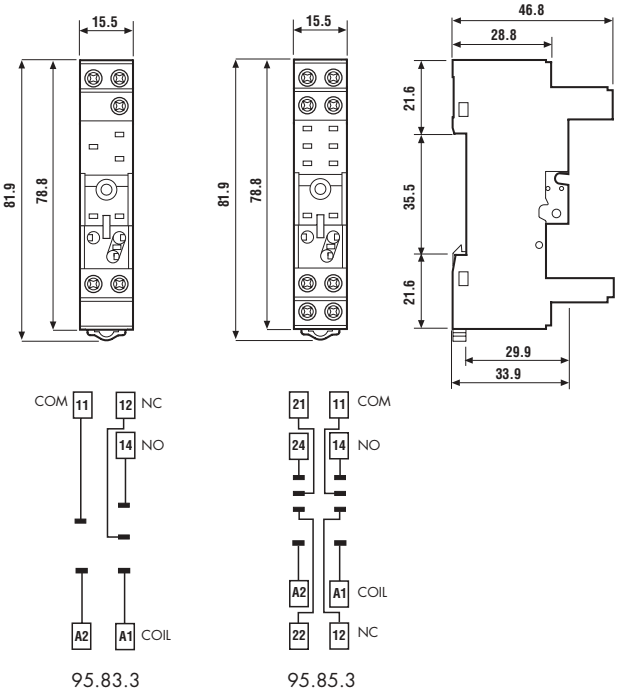
GOST

Relay type	40.31		40.51, 40.52, 40.61	
Colour	BLUE	BLACK	BLUE	BLACK
Clamp terminal socket: panel or 35 mm rail (EN 50022) mount retaining clip 095.91.3 supplied with socket packaging code SPA	95.83.3	95.83.30	95.85.3	95.85.30
Metal retaining clip	095.71			
Plastic retaining and release clip	095.91.3			
8-way jumper link for 95.83.3 and 95.85.3 sockets	095.08	095.08.0	095.08	095.08.0
Modules (see table below)	99.80			
Sheet of marker tags for retaining and release clip 095.91.3	060.72			

40

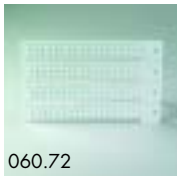
- Rated values: 10 A - 250 V
  with a current >10 A, the contact terminal must be connected in parallel (21 with 11, 24 with 14, 22 with 12)
- Insulation: ≥ 6 kV (1.2/50 µs) between coil and contacts (only for 95.83.3)
- Protection category: IP 20
- Ambient temperature: (–40...+70)°C
- Srew torque: 0.5 Nm
- Wire strip length: 7 mm
- Max wire size:

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



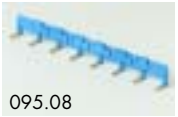
95.83.3 95.85.3

095.91.3



060.72

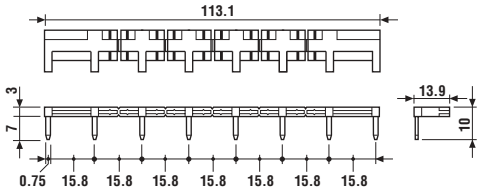
FOR 95.83.3 AND 95.85.3 SOCKETS:



095.08

8-way jumper link	095.08

- Rated values: 10 A - 250 V



99.80

Approvals (according to type):

GOST

* Modules in Black housing are available on request.

**For DC supply, apply the positive to terminal A1.

99.80 coil indication and EMC suppression modules (see technical data page 209)		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 (62 kΩ/1W)	(110...240)V AC	99.80.8.230.07

Green LED is standard.
Red LED available on request.

95.13.2

95.15.2

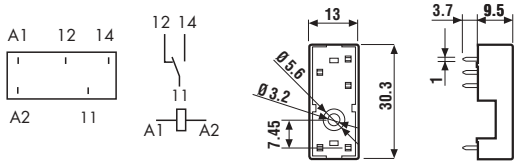
Relay type	40.31, 40.41		40.51, 40.52, 40.61	
Colour	BLUE	BLACK	BLUE	BLACK
P.C.B. socket retaining clip 095.51 supplied with socket packaging code SMA	95.13.2	95.13.20	95.15.2	95.15.20
Metal retaining clip	095.51			
Plastic retaining clip	095.52			

40

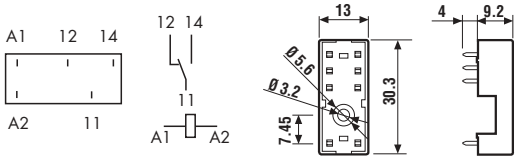
Approvals (according to type):

GOST

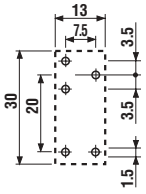
- Rated values: 10 A - 250 V
- Insulation: ≥ 6 kV (1.2/50 µs) *between coil and contacts*
- Protection category: IP 20
- Ambient temperature: (–40...+70)°C



40.31

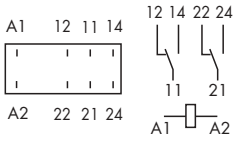


40.51

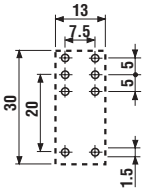


95.13.2

Copper side view

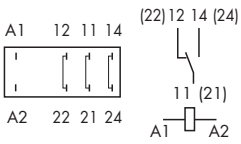


40.52



95.15.2

Copper side view



40.61

PACKAGING CODES

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

Code options according to the last three letters:

9 5 . 0 5	S P	A

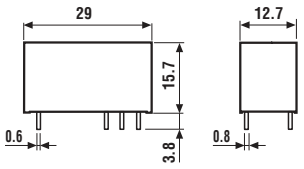
A Standard packaging

SM Metal retaining clip
SP Plastic retaining clip

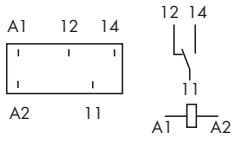
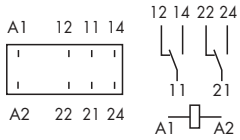
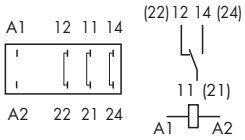
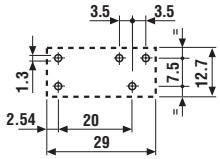
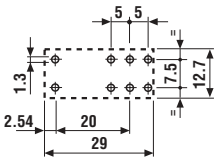
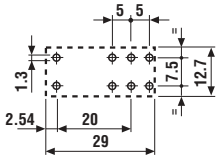
9 5 . 0 5		

Without retaining clip

- *Low-profile, only 15.7 mm high*
- *DC coil 400 mW*
- *8 mm, 6 kV (1.2/50 µs) between coil and contacts*
- *Ambient temperature + 85 °C*
- *Sockets and accessories: see 95 and 99 series*



* For 400 V applications, where requirements for pollution degree 2 are met.

	41.31	41.52	41.61
			
	- 1 pole, 12 A - Low profile, 3.5 mm pinning - P.C.B./for use with 95 series sockets	- 2 pole, 8 A - Low profile, 5 mm pinning - P.C.B./for use with 95 series sockets	- 1 pole, 16 A - Low profile, 5 mm pinning - P.C.B./for use with 95 series sockets
			
			
	Copper side view	Copper side view	Copper side view
Contact specifications			
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 in AC1 VA	3,000	2,000	4,000
Rated load in AC15 (230 V AC) VA	600	400	750
Single phase motor rating (230 V AC) kW	0.5	0.3	0.5
Breaking capacity in 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 specifications			
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...1.5)U_N	(0.7...1.5)U_N	(0.7...1.5)U_N
Holding voltage AC/DC	—/0.4U_N	—/0.4 U_N	—/0.4 U_N
Must drop-out voltage AC/DC	—/0.1U_N	—/0.1 U_N	—/0.1 U_N
Technical data			
Mechanical life AC/DC cycles	—/30·10⁶	—/30·10⁶	—/30·10⁶
Electrical life at rated load AC1 cycles	150 · 10³	80 · 10³	70 · 10³
Operate/release time ms	5/4	5/4	5/4
Insulation according to EN 61810-1 ed. 2	4 kV/3	4 kV/3	4 kV/3
Insulation between coil and contacts (1.2/50 µs) kV	6 (8 mm)	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts V AC	1,000	1,000	1,000
Ambient temperature range °C	–40...+85	–40...+85	–40...+85
Environmental protection	RT II	RT II	RT II
Approvals (according to type):	GOST cULus VDE		

ORDERING INFORMATION

Example: a 41 series low-profile P.C.B. relay with 2 CO (DPDT) contacts, with coil rated 24 V DC.

41	.	5	2	.	9	.	024	.	A: 0	B: 0	C: 1	D: 0

Series

Type
3 = P.C.B. - 3.5 mm pinning
5 = P.C.B. - 5 mm pinning
6 = P.C.B. - 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

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

C: Options
1 = None

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

Only combinations in the same row are possible

Preferred versions

	coil version	A	B	C	D
41.31/52/61	DC	0	0	1	0

All versions

	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

Insulation according to EN 61810-1 ed. 2	insulation rated voltage	V	250
	rated impulse withstand voltage	kV	4
	pollution degree		3
	overvoltage category		III
Dielectric strength between adjacent contacts		V AC	2,000

CONDUCTED DISTURBANCE IMMUNITY

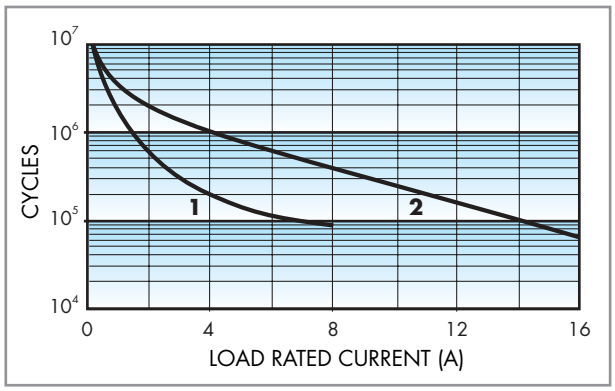
Burst (5...50)ns, 5 kHz, on A1 - A2	EN 61000-4-4	level 4 (4 kV)
Surge (1.2/50 µs) on A1 - A2 (differential mode)	EN 61000-4-5	level 3 (2 kV)

OTHER DATA

Bounce time: NO/NC		ms	2/5		
Vibration resistance (10...55)Hz, max. ± 1 mm: NO/NC		g/g	20/5		
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 P.C.B.s		mm	≥ 5		

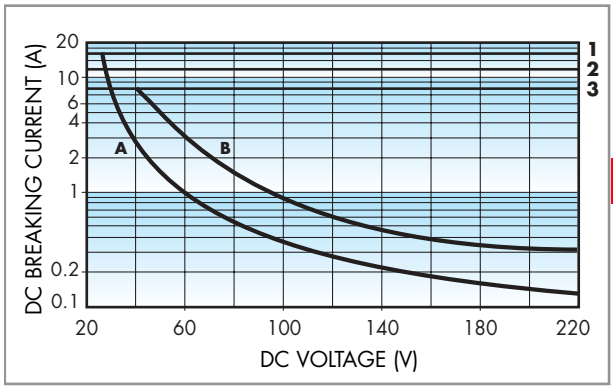
CONTACT SPECIFICATIONS

F 41



Contact life vs AC1 load.
1 - Type 41.52 (8 A) at 360 cycles/h
2 - Type 41.31 (12 A) at 360 cycles/h
Type 41.61 (16 A) at 360 cycles/h

H 41



Breaking capacity for DC1 load.
1 - Type 41.61
2 - Type 41.31
3 - Type 41.52
A - Load applied to 1 contact
B - Load applied to 2 contacts in series

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

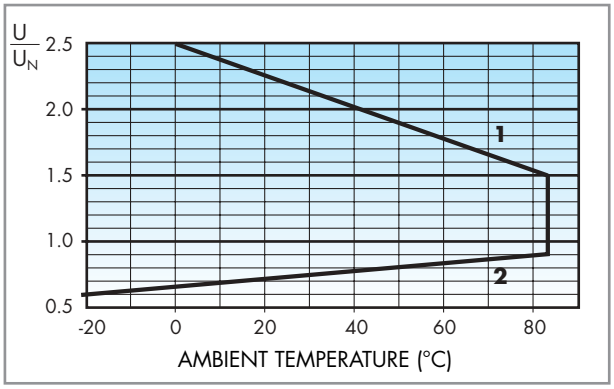
41

COIL SPECIFICATIONS

DC VERSION DATA

Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
12	**9**.012	8.4	18	360	33.3
24	**9**.024	16.8	36	1,440	19.7
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



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


95.13.2

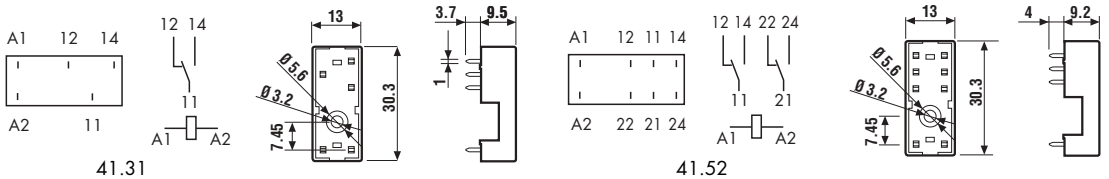

95.15.2

Relay type	41.31		41.52, 41.61	
Colour	BLUE	BLACK	BLUE	BLACK
P.C.B. socket retaining clip 095.41 supplied with socket packaging code SNA	95.13.2	95.13.20	95.15.2	95.15.20
Metal retaining clip	095.41			
Plastic retaining clip	095.42			

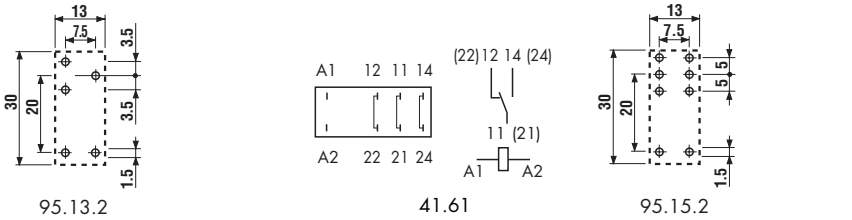
Approvals (according to type):

GOST

- Rated values: 10 A - 250 V
- Insulation: ≥ 6 kV (1.2/50 µs) *between coil and contacts*
- Protection category: IP 20
- Ambient temperature: (–40...+70)°C



41.31 41.52



95.13.2 41.61 95.15.2

Copper side view Copper side view

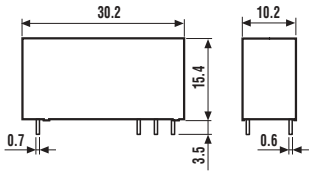
PACKAGING CODES

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

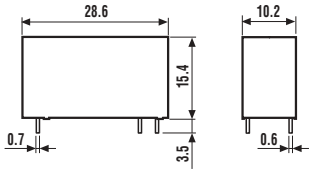
Code options according to the last three letters:

9 5 . 1 3	S N	A	
			A Standard packaging
			SN Metal retaining clip **SL** Plastic retaining clip
9 5 . 1 3			Without retaining clip

- *15.4 mm high*
- *Very low coil consumption, only 250 mW*
- *10 mm, 6 kV (1.2/50 µs) between coil and contacts*
- *Ambient temperature + 85 °C*
- *Sockets: see type 95.23*

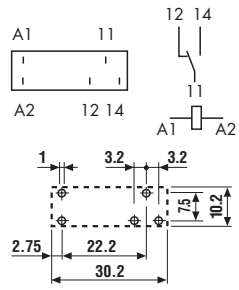
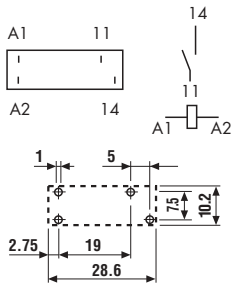
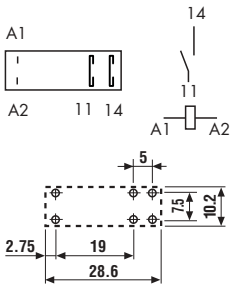


43.41



43.41-0300 / 43.61-0300

* For 400 V applications, where requirements for pollution degree 2 are met.

	43.41	43.41-0300	43.61-0300
			
	- 1 CO (SPDT), 10 A - 3.2 mm pinning - P.C.B. mounting or sockets 95 series	- 1 NO (SPST-NO), 10 A - 5 mm pinning - P.C.B. mounting	- 1 NO (SPST-NO), 16 A - 5 mm pinning - P.C.B. mounting
			
	Copper side view	Copper side view	Copper side view
Contact specifications			
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 in AC1 VA	2,500	2,500	4,000
Rated load in AC15 (230 V AC) VA	500	500	750
Single phase motor rating (230 V AC) kW	—	—	—
Breaking capacity in 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	AgCdO	AgCdO	AgCdO
Coil specifications			
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 according to EN 61810-1 ed. 2	4 kV/3	4 kV/3	4 kV/3
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):	GOST cULus VDE		

ORDERING INFORMATION

Example: a 43 series low-profile P.C.B. relay with 1 CO contact (SPDT), with coil rated 24 V DC.

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

Series

Type
4 = P.C.B. - 3.2 mm pinning (CO/SPDT)
P.C.B. - 5 mm pinning (NO/SPST-NO)
6 = P.C.B. - 5 mm pinning (16 A)

No. of poles
1 = 1 pole

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

Coil voltage
see coil specifications

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

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

C: Options
0 = None

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

Only combinations in the same row are possible

Preferred versions

	coil version	A	B	C	D
43.41	sens. DC	2	0	0	0
43.61	DC	2	3	0	0

All versions

	coil version	A	B	C	D
43.41	sens. DC	2 - 4 - 5	0 - 3	0	0 - 1
43.61	DC	2 - 4	3	0	0

TECHNICAL DATA

INSULATION

Insulation according to EN 61810-1 ed. 2	insulation rated voltage	V	250
	rated impulse withstand voltage	kV	4
	pollution degree		3
	overvoltage category		III

CONDUCTED DISTURBANCE IMMUNITY

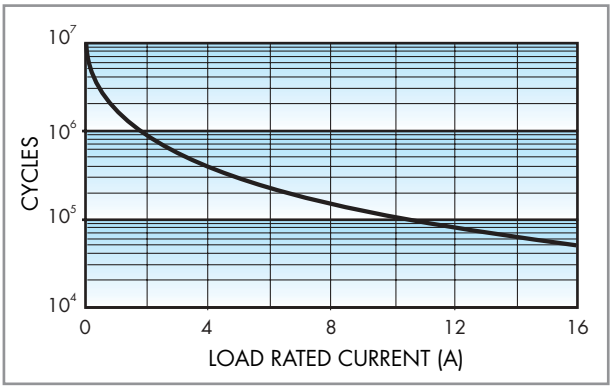
Burst (5...50)ns, 5 kHz, on A1 - A2	EN 61000-4-4	level 4 (4 kV)
Surge (1.2/50 µs) on A1 - A2 (differential mode)	EN 61000-4-5	level 3 (2 kV)

OTHER DATA

Bounce time: NO/NC		ms	3/6	
Vibration resistance (10...55)Hz, max. ± 1 mm: NO/NC		g/g	10/10	
Power lost to the environment	without contact current	W	0.25 (43.41)	0.4 (43.61)
	with rated current	W	1.3 (43.41)	2 (43.61)
Recommended distance between relays mounted on P.C.B.s		mm	≥ 5	

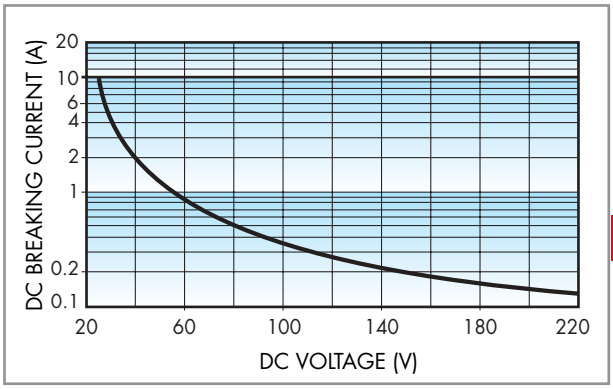
CONTACT SPECIFICATIONS

F 43



Electrical life vs AC1 load.

H 43



Breaking capacity in DC1 load.

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

COIL SPECIFICATIONS

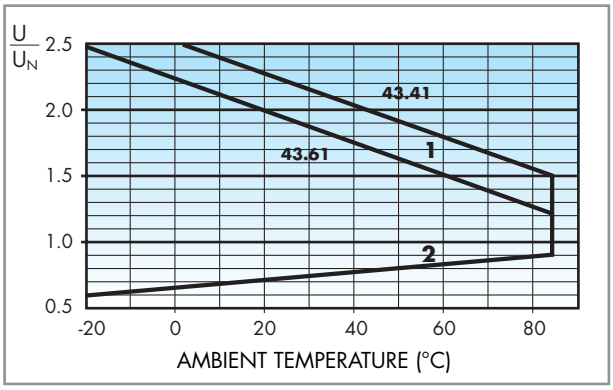
DC VERSION DATA (0.25 W sensitive - Type 43.41)

Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
3	**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

DC VERSION DATA (0.4 W standard - Type 43.61)

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

R 43 DC

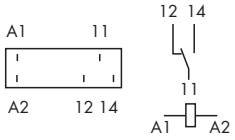


Operating range vs ambient temperature.
1 - Max coil voltage permitted.
2 - Min pick-up voltage with coil at ambient temperature.

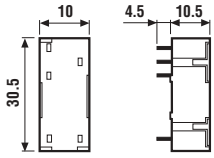
Relay type	43.41	
Colour	BLUE	BLACK
P.C.B. socket (CO/SPDT only) retaining clip 095.43 supplied with socket packaging code SNA	95.23	95.23.0
Metal retaining clip	095.43	

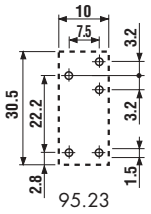
Approvals
(according to type):

- Rated values: 10 A - 250 V
- Insulation: ≥ 6 kV (1.2/50 µs) *between coil and contacts*
- Protection category: IP 20
- Ambient temperature: (–40...+70)°C



43.41





95.23

Copper side view

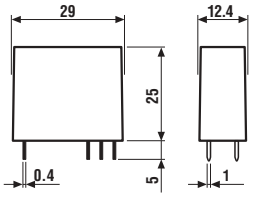
PACKAGING CODES

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

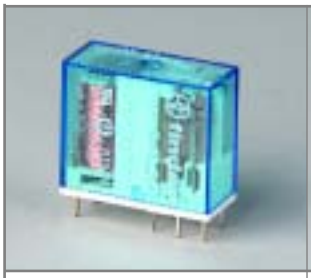
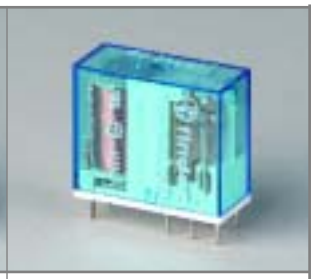
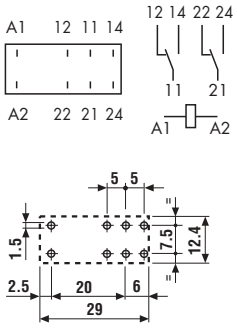
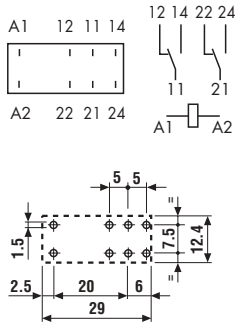
Code options according to the last three letters:

9 5 . 2 3	S N	A	
			A Standard packaging
	SN		Metal retaining clip
9 5 . 2 3			Without retaining clip

- *Plug-in or P.C.B. versions*
- *DC and sensitive DC available*
- *8 mm, 6 kV (1.2/50 µs) between coil and contacts*
- *Ambient temperature + 85 °C*
- *High physical separation between adjacent contacts*
- *Sockets and accessories: see 95, 99 and 86 series*



* For 400 V applications, where requirements for pollution degree 2 are met.

	44.52	44.62
		
	- 2 pole, 6 A - 5 mm pinning - P.C.B./ for use with 95 series sockets	- 2 pole, 10 A - 5 mm pinning - P.C.B./ for use with 95 series sockets
		
	Copper side view	Copper side view
Contact specifications		
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 in AC1 VA	1,500	2,500
Rated load in AC15 (230 V AC) VA	250	500
Single phase motor rating (230 V AC) kW	0.185	0.37
Breaking capacity in 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 specifications		
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 sens.)	8/5 - (12/5 sens.)
Insulation according to EN 61810-1 ed. 2	4 kV/3	4 kV/3
Insulation between coil and contacts (1.2/50 µs) kV	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts V AC	1,000	1,000
Ambient temperature range °C	–40…+85	–40…+85
Environmental protection	RT II	RT II
Approvals (according to type):	CE SP GOST IRAM RINA cULus VDE	

ORDERING INFORMATION

Example: a 44 series P.C.B. relay with 2 CO (DPDT) 10 A contacts, coil rated 24 V DC.

44	.	6	2	.	9	.	024	.	A: 0	B: 0	C: 0	D: 0

Series

Type
5 = P.C.B. - 5 mm pinning
6 = P.C.B. - 5 mm pinning

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

Coil version
7 = Sensitive DC
9 = DC

Coil voltage
see coil specifications

A: Contact material
0 = Standard AgNi
4 = $AgSnO_2$
for 44.62 only

B: Contact circuit
0 = CO (DPDT)

C: Options
0 = None

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

Only combinations in the same row are possible

Preferred versions

	coil version	A	B	C	D
44.52	DC - sens. DC	0	0	0	0
44.62	DC - sens. DC	0	0	0	0

All versions

	coil version	A	B	C	D
44.62	DC - sens. DC	0 - 4	0	0	0

TECHNICAL DATA

INSULATION

Insulation according to EN 61810-1 ed. 2		insulation rated voltage V	250
		rated impulse withstand voltage kV	4
		pollution degree	3
		overvoltage category	III
Dielectric strength between adjacent contacts	V AC	2,500	

CONDUCTED DISTURBANCE IMMUNITY

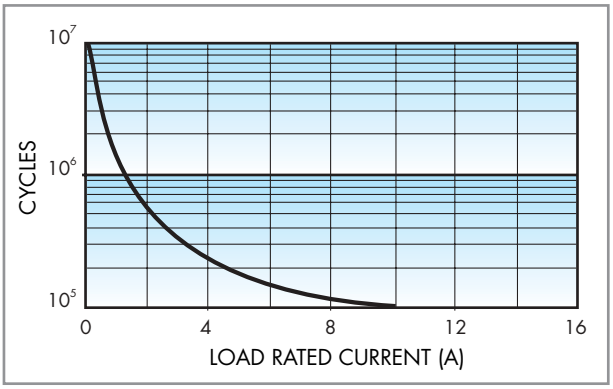
Burst (5...50)ns, 5 kHz, on A1 - A2	EN 61000-4-4	level 4 (4 kV)
Surge (1.2/50 µs) on A1 - A2 (differential mode)	EN 61000-4-5	level 3 (2 kV)

OTHER DATA

Bounce time: NO/NC		ms	4/4	
Vibration resistance (10...55)Hz, max. ± 1 mm: NO/NC		g/g	3/3	
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 P.C.B.s		mm	≥ 5	

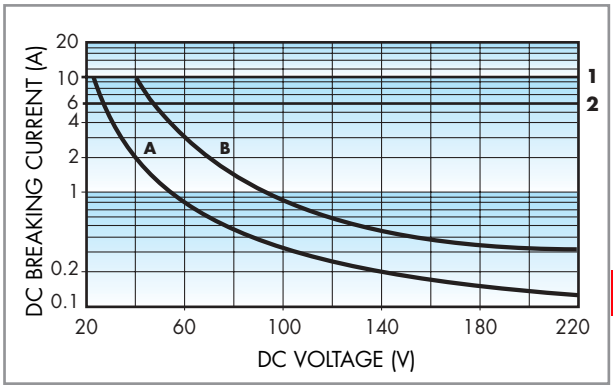
CONTACT SPECIFICATIONS

F 44



Electrical life vs AC1 load.
Type 44.52 (6 A).
Type 44.52 (10 A).

H 44



Breaking capacity for DC1 load.
1 - Type 44.62
2 - Type 44.52
A - Load applied to 1 contact
B - Load applied to 2 contacts in series

- When switching a resistive load (DC1) having voltage and current values under the curve the expected electrical life is ≥ $100 \cdot 10^3$ cycles.
- In case of DC13 loads the connection of a diode in parallel with the load will permit the same electrical life as for a DC1 load.

Note: the release time of load will be increase.

COIL SPECIFICATIONS

DC VERSION DATA (0.65 W standard)

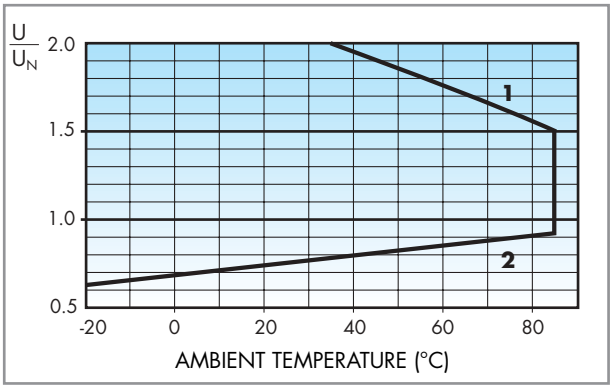
Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
6	**9**.006	4.4	9	55	109
9	**9**.009	6.6	13.5	125	72
12	**9**.012	8.8	18	220	55
14	**9**.014	10.2	21	300	47
24	**9**.024	17.5	36	900	27
28	**9**.028	20.5	42	1,200	23
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 VERSION DATA (0.5 W sensitive)

Nominal voltage U_N	Coil code	Operating range U_{min}*	Operating range U_{max}	Resistance consumption R	Rated coil I at U_N
V		V	V	Ω	mA
6	**7**.006	4.4	10.2	75	80
9	**7**.009	6.6	15.3	160	56
12	**7**.012	8.8	20.4	300	40
14	**7**.014	10.2	23.8	400	35
24	**7**.024	17.5	40.8	1,200	20
28	**7**.028	20.5	47.6	1,600	17.5
48	**7**.048	35	81.6	4,800	10
60	**7**.060	43.8	102	7,200	8.4
110	**7**.110	80.3	187	23,500	4.7
125	**7**.125	100	218.7	32,000	3.9

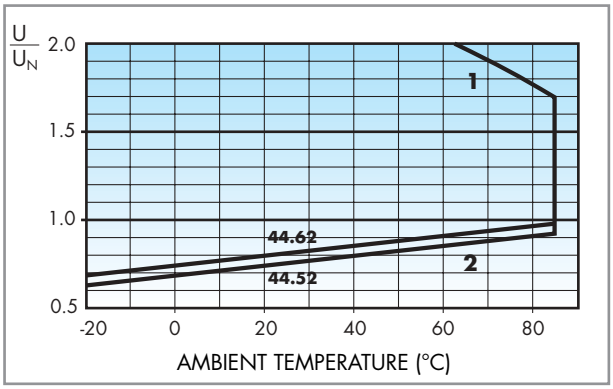
*U_{min} = 0.8 U_N for 44.62

R 44 DC



Operating range (DC version) vs ambient temperature.
1 - Max coil voltage permitted.
2 - Min pick-up voltage with coil at ambient temperature.

R 44 sens. DC



Operating range (DC version) vs ambient temperature.
1 - Max coil voltage permitted.
2 - Min pick-up voltage with coil at ambient temperature.

95.05

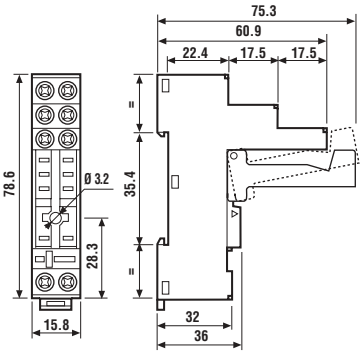
Approvals (according to type):

GOST

Relay type	44.52, 44.62	
Colour	BLUE	BLACK
Clamp terminal socket: panel or 35 mm rail (EN 50022) mount retaining clip 095.01 supplied with socket packaging code SPA	95.05	95.05.0
Plastic retaining and release clip	095.01	095.01.0
Metal retaining clip	095.71	
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)	86.10, 86.20	
Sheet of marker tags for retaining and release clip 095.01	060.72	

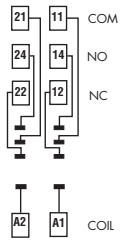
- Rated values: 10 A - 250 V
- Insulation: ≥ 6 kV (1.2/50 µs) *between coil and contacts*
- Protection category: IP 20
- Ambient temperature: (–40...+70)°C
- Screw torque: 0.5 Nm
- Wire strip length: 8 mm
- Max wire size:

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



095.01

060.72

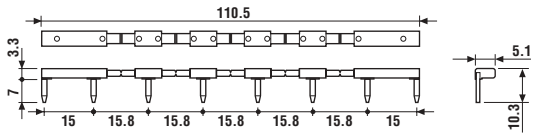


FOR 95.05 SOCKET:

095.18

8-way jumper link	095.18

- Rated values: 10 A - 250 V



86.10

86 series module timers (see technical data pages 151/156)	BLUE
Mono-function: (12...24)V AC/DC; function AI; (1.5s...60min)	86.10.0.024.0000
Mono-function: (12...24)V AC/DC; function DI; (1.5s...60min)	86.20.0.024.0000

Approvals (according to type): GOST

99.02

Approvals (according to type):

GOST

99.02 coil indication and EMC suppression modules (see technical data page 209)		BLUE*
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	(6...24)V DC/AC	99.02.0.024.09
RC	(28...60)V DC/AC	99.02.0.060.09
RC	(110...240)V DC/AC	99.02.0.230.09
Residual current by-pass (62 kΩ/1W)	(110...240)V AC	99.02.8.230.07

* Modules in Black housing are available on request.

**For DC supply, apply the positive to terminal A1.


95.85.3

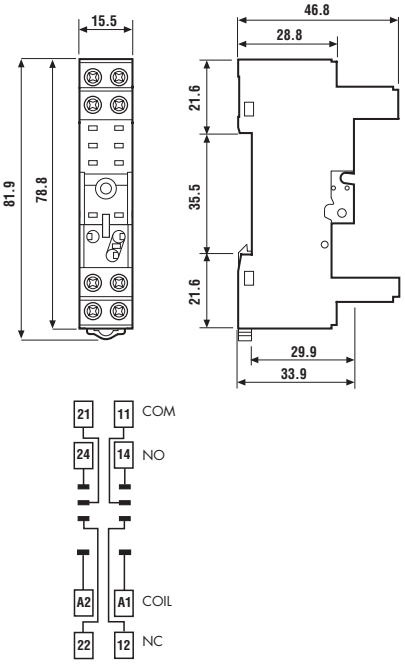
Approvals (according to type):

GOST

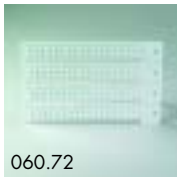
Relay type	44.52, 44.62	
Colour	BLUE	BLACK
Clamp terminal socket: panel or 35 mm rail (EN 50022) mount retaining clip 095.91.3 supplied with socket packaging code SPA	95.85.3	95.85.30
Metal retaining clip	095.71	
Plastic retaining and release clip	095.91.3	
8-way jumper link	095.08	095.08.0
Modules (see table below)	99.80	
Sheet of marker tags for retaining and release clip 095.91.3	060.72	

- Rated values: 10 A - 250 V
- Insulation: ≥ 6 kV (1.2/50 µs) *between coil and contacts*
- Protection category: IP 20
- Ambient temperature: (–40...+70)°C
- Screw torque: 0.5 Nm
- Wire strip length: 7 mm
- Max wire size:

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




095.91.3

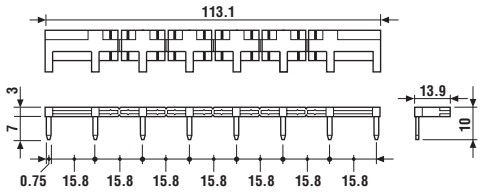

060.72

FOR 95.85.3 SOCKET:


095.08

8-way jumper link	095.08

- Rated values: 10 A - 250 V




99.80

Approvals (according to type):

GOST

* Modules in Black housing are available on request.

**For DC supply, apply the positive to terminal A1.

99.80 coil indication and EMC suppression modules (see technical data page 209)		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 (62 kΩ/1W)	(110...240)V AC	99.80.8.230.07

Green LED is standard.
Red LED available on request.

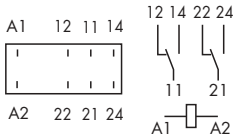

95.15.2

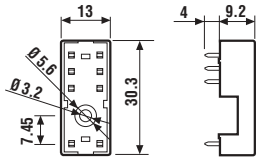
Relay type	44.52, 44.62	
Colour	BLUE	BLACK
P.C.B. socket retaining clip 095.51 supplied with socket with packagimg code SMA	95.15.2	95.15.20
Metal retaining clip	095.51	
Plastic retaining clip	095.52	

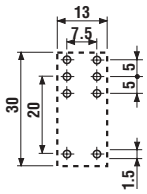
Approvals (according to type):

GOST

- Rated values: 10 A - 250 V
- Insulation: ≥ 6 kV (1.2/50 µs) *between coil and contacts*
- Protection category: IP 20
- Ambient temperature: (–40...+70)°C







Copper side view

PACKAGING CODES

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

Code options according to the last three letters:

95.05	SPA

A Standard packaging

SM Metal retaining clip
SP Plastic retaining clip

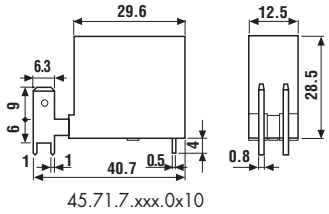
95.05		

Without retaining clip

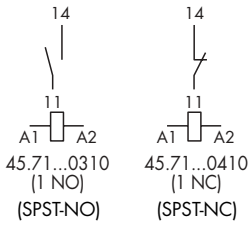
45.71

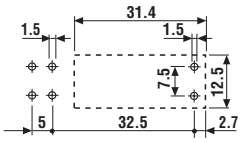
- *Miniature P.C.B. Faston 250 connect relay*
- *Sensitive DC coil*
- *8 mm, 6 kV (1.2/50 µs) between coil and contacts*
- *Ambient temperature + 125 °C*
- *NO (SPST-NO) contact or NC (SPST-NC) contact version*

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



45.71.7.xxx.0x10





Copper side view

* For 400 V applications, where requirements for pollution degree 2 are met.

Contact specifications		
Contact configuration		1NO or 1NC (SPST-NO or SPST-NC)
Rated current/Maximum peak current	A	16/30
Rated voltage/Maximum switching voltage	V AC	250/400*
Rated load in AC1	VA	4,000
Rated load in AC15 (230 V AC)	VA	750
Single phase motor rating (230 V AC)	kW	0.55
Breaking capacity in DC1: 30/110/220 V	A	16/0.3/0.13
Minimum switching load	mW (V/mA)	500 (10/5)
Standard contact material		AgCdO
Coil specifications		
Nominal voltage (U_N)	V AC (50/60 Hz)	—
	V DC	6 - 12 - 24 - 48 - 60
Rated power AC/DC	VA (50 Hz)/W	—/0.36
Operating range	AC	—
	DC	(0.7...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	—/30 · 10^6
Electrical life at rated load AC1	cycles	100 · 10^3
Operate/release time	ms	10/2
Insulation according to EN 61810-1 ed. 2		4 kV/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...+125
Environmental protection		RT II
Approvals (according to type):		GOST

ORDERING INFORMATION

Example: a 45 series for P.C.B. relay + Faston 250, 1 NO (SPST-NO) contact, coil rated 12 V DC.

45	.7	1	.7	.012	.0	3	1	0
Series	Type	No. of poles	Coil version	Coil voltage	A	B	C	D

Series

Type
7 = P.C.B.

No. of poles
1 = 1 pole, 16 A

Coil version
7 = Sensitive DC

Coil voltage
see coil specifications

A: Contact material
0 = Standard AgCdO

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

C: Options
1 = None

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

45

Only combinations in the same row are possible
All versions

	coil version	A	B	C	D
45.71	sens. DC	0	3 - 4	1	0

TECHNICAL DATA

INSULATION

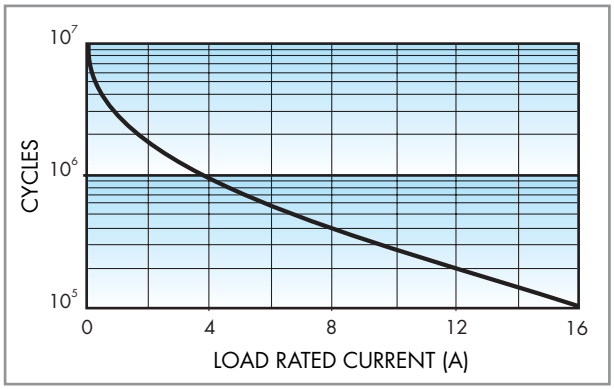
Insulation according to EN 61810-1 ed. 2	insulation rated voltage	V	250
	rated impulse withstand voltage	kV	4
	pollution degree		3
	overvoltage category		III

OTHER DATA

Bounce time: NO/NC		ms	3/— (for 1NO or SPST-NO)	—/3 (for 1NC or SPST-NC)
Vibration resistance (10...55)Hz, max. ± 1 mm: NO/NC		g/g	10/10	
Power lost to the environment	without contact current	W	0.4	
	with rated current	W	1.8	
Recommended distance between relays mounted on P.C.B.s		mm	≥ 5	

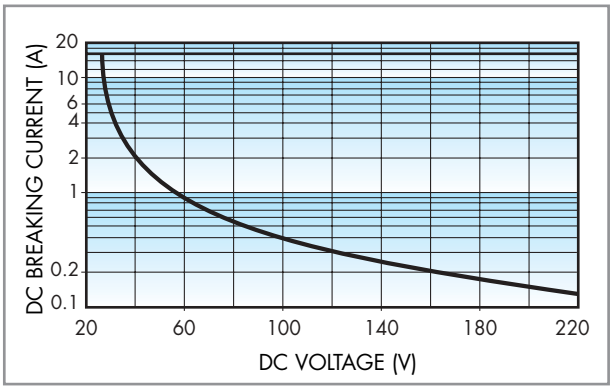
CONTACT SPECIFICATIONS

F 45



Electrical life AC1 load (+85°C).

H 45



Breaking capacity for DC1 load.

- When switching a resistive load (DC1) having voltage and current values under the curve the expected electrical life is ≥ $100 \cdot 10^3$ cycles.
- In case of DC13 loads the connection of a diode in parallel with the load will permit the same electrical life as for a DC1 load.

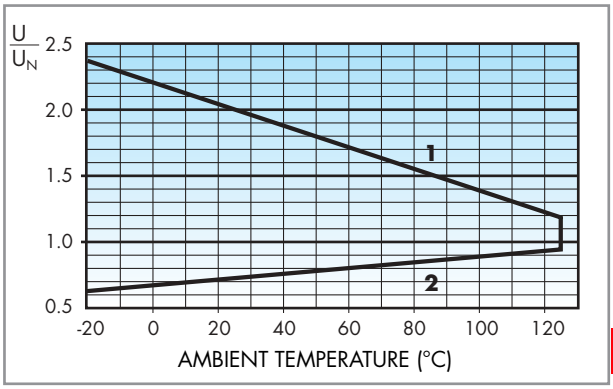
Note: the release time of load will be increase.

COIL SPECIFICATIONS

DC VERSION DATA (0.36 W sensitive)

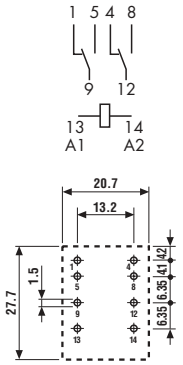
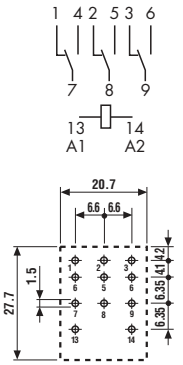
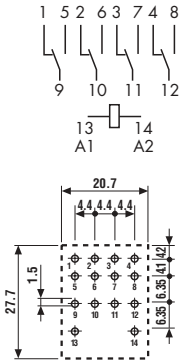
Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
6	**7**.006	4.2	7.2	100	60
12	**7**.012	8.4	14.4	400	30
24	**7**.024	16.8	28.8	1,600	15
48	**7**.048	33.6	57.6	6,400	7.5
60	**7**.060	42	72	10,000	6

R 45 DC



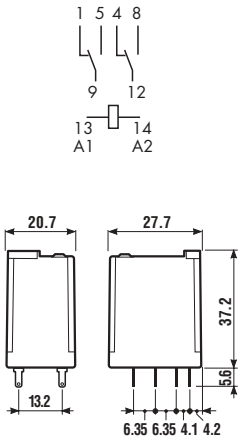
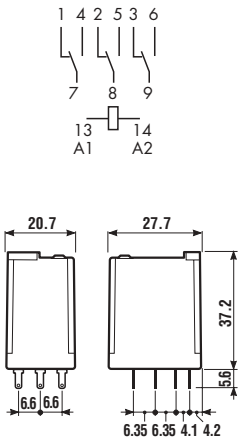
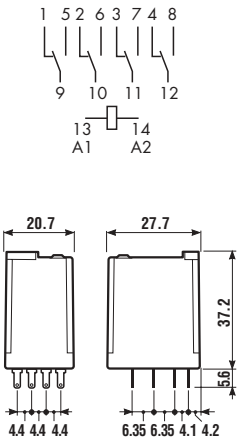
Operating range vs ambient temperature.
1 - Max coil voltage permitted.
2 - Min pick-up voltage with coil at ambient temperature.

- *P.C.B. versions*
- *AC or DC coils*
- *RT III (wash tight) version available*

	55.12	55.13	55.14
			
	- 2 pole, 10 A - P.C.B. mounting	- 3 pole, 10 A - P.C.B. mounting	- 4 pole, 7 A - P.C.B. mounting
	 Copper side view h = 35.8 mm	 Copper side view h = 35.8 mm	 Copper side view h = 35.8 mm
Contact specifications			
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 in AC1 VA	2,500	2,500	1,750
Rated load in AC15 (230 V AC) VA	500	500	350
Single phase motor rating (230 V AC) kW	0.37	0.37	0.125
Breaking capacity in 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 specifications			
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 according to EN 61810-1 ed. 2	3.6 kV/2	3.6 kV/2	2.5 kV/2
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...+85	–40...+85	–40...+85
Environmental protection	RT I	RT I	RT I
Approvals (according to type):	CE ABS GOST RINA cULus VDE		

55 Series - Miniature general purpose relays 7 - 10 A

- *Plug-in versions*
- *AC or DC coils*
- *Lockable test button and mechanical flag indicator as standard on 2 and 4 CO (DPDT and 4PDT) relays types*
- *Sockets and accessories: see 94, 99 and 86 series*

	55.32	55.33	55.34
			
	- 2 pole, 10 A - Plug-in for use with 94 series sockets	- 3 pole, 10 A - Plug-in for use with 94 series sockets	- 4 pole, 7 A - Plug-in for use with 94 series sockets
			
Contact specifications			
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 in AC1 VA	2,500	2,500	1,750
Rated load in AC15 (230 V AC) VA	500	500	350
Single phase motor rating (230 V AC) kW	0.37	0.37	0.125
Breaking capacity in 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 specifications			
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 according to EN 61810-1 ed. 2	3.6 kV/2	3.6 kV/2	2.5 kV/2
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...+85	–40...+85	–40...+85
Environmental protection	RT I	RT I	RT I
Approvals (according to type):	CE B ABS SP D FI GOST IRAM Lloyd's Register N RINA S cULus NF VDE		

ORDERING INFORMATION

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

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

Series

Type
1 = P.C.B.
3 = Plug-in

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

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

Coil voltage
see coil specifications

A: Contact material
0 = Standard AgNi
2 = AgCdO
5 = AgNi + Au (5 µm)

B: Contact circuit
0 = CO (nPDT)

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

C: Options
0 = None
1 = Lockable test button
2 = Mechanical indicator
3 = LED (AC)
4 = Lockable test button + mechanical indicator
5 = Lockable test button + LED (AC)
54 = Lockable test button + LED (AC) + mechanical indicator
6 = Double LED (DC not polarized)
7 = Lockable test button + double LED (DC not polarized)
74 = Lockable test button + double LED (DC not polarized) + mechanical indicator
8 = LED + diode (positive to pin A1/13, DC standard polarity)
9 = Lockable test button + LED + diode (positive to pin A1/13, DC standard polarity)
94 = Lockable test button + LED + diode (positive to pin A1/13, DC standard polarity) + mechanical indicator

Only combinations in the same row are possible

Preferred versions

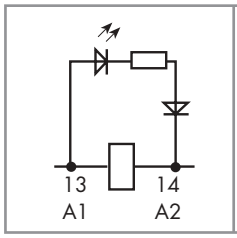
	coil version	A	B	C	D
55.32/34	AC/DC	0	0	4	0
55.12/13/14	AC/DC	0	0	0	0
55.33	AC/DC	0	0	0	0

All versions

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

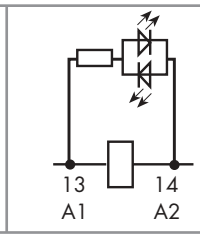
POSSIBLE OPTIONS

AC



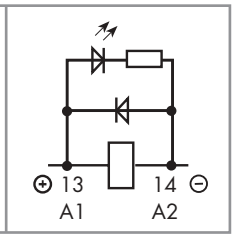
Option = 0030
0050
0054

DC - Not polarized

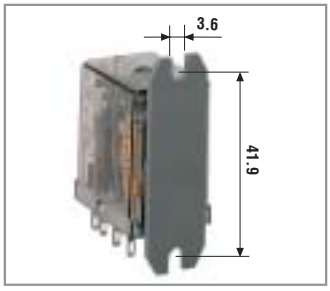


Option = 0060
0070
0074

DC - Standard polarity



Option = 0080
0090
0094



Option = 0006
REAR FLANGE MOUNT

LOCKABLE TEST BUTTON AND MECHANICAL FLAG INDICATOR (0040)

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.

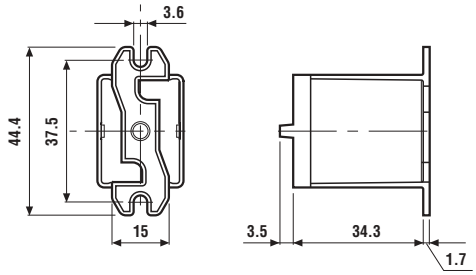
In both cases ensure that the test button actuation is swift and decisive.

ACCESSORIES


055.05


055.05 with relays

Adaptor with top mount flange for 55.32, 55.33, 55.34	055.05



55

TECHNICAL DATA

INSULATION

Insulation according to EN 61810-1 ed. 2		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	
		overvoltage category	III	
		2 CO (DPDT)	**3 CO (3PDT)**	**4 CO (4PDT)**
Dielectric strength between adjacent contact	V AC	2,000	2,000	1,550

CONDUCTED DISTURBANCE IMMUNITY

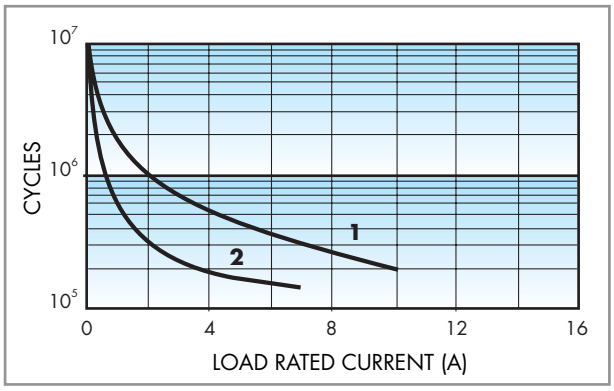
Burst (5...50)ns, 5 kHz, on A1 - A2	EN 61000-4-4	level 4 (4 kV)
Surge (1.2/50 µs) on A1 - A2 (differential mode)	EN 61000-4-5	level 4 (4 kV)

OTHER DATA

Bounce time: NO/NC	ms	1/4		
Vibration resistance (10...55)Hz, max. ± 1 mm: NO/NC	g/g	6/6		
Power lost to the environment		**2 CO (DPDT)**	**3 CO (3PDT)**	**4 CO (4PDT)**
without contact current	W	1	1	1
with rated current	W	3	4	3
Recommended distance between relays mounted on P.C.B.s	mm	≥ 5		

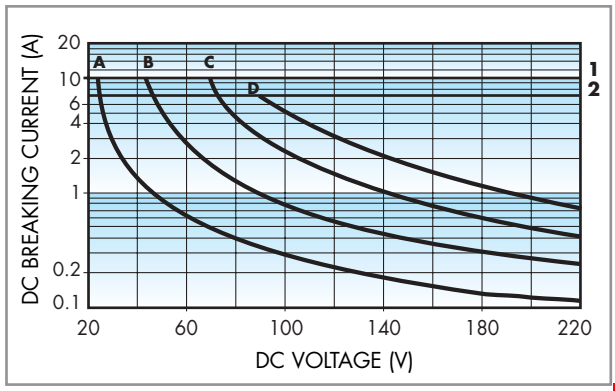
CONTACT SPECIFICATIONS

F 55



Electrical life vs AC1 load.
1 - 2 - 3 CO (DPDT - 3PDT) relay type (10 A)
2 - 4 CO (4PDT) relay type (7 A)

H 55



Breaking capacity for DC1 load.
1 - 2 - 3 CO (DPDT - 3PDT) type
2 - 4 CO (4PDT) type
A - Load applied to 1 contact
B - Load applied to 2 contacts in series
C - Load applied to 3 contacts in series
D - Load applied to 4 contacts in series

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

COIL SPECIFICATIONS

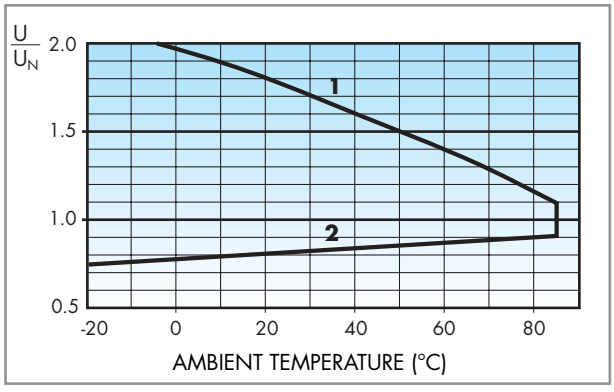
DC VERSION DATA

Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
6	**9**.006	4.8	6.6	40	150
12	**9**.012	9.6	13.2	140	86
24	**9**.024	19.2	26.4	600	40
48	**9**.048	38.4	52.8	2,400	20
60	**9**.060	48	66	4,000	15
110	**9**.110	88	121	12,500	8.8
125	**9**.125	100	137.5	17,300	7.2
220	**9**.220	176	242	54,000	4

AC VERSION DATA

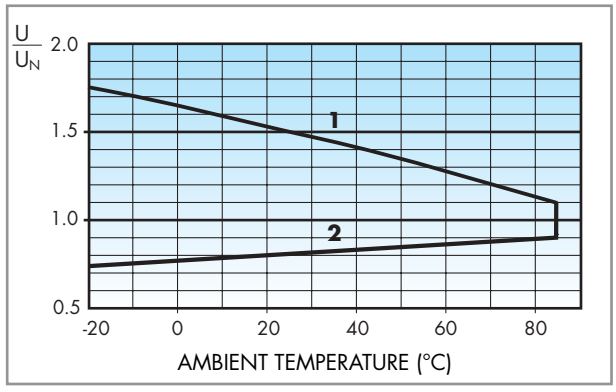
Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Rated coil consumption I at U_N (50Hz)
V		V	V	Ω	mA
6	**8**.006	4.8	6.6	12	200
12	**8**.012	9.6	13.2	50	97
24	**8**.024	19.2	26.4	190	53
48	**8**.048	38.4	52.8	770	25
60	**8**.060	48	66	1,200	21
110	**8**.110	88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

R 55 DC



Operating range (DC type) vs ambient temperature.
1 - Max coil voltage permitted.
2 - Min pick-up voltage with coil at ambient temperature.

R 55 AC



Operating range (AC type) vs ambient temperature.
1 - Max coil voltage permitted.
2 - Min pick-up voltage with coil at ambient temperature.


94.04

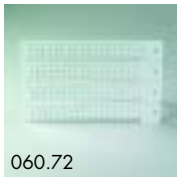
Approvals (according to type):

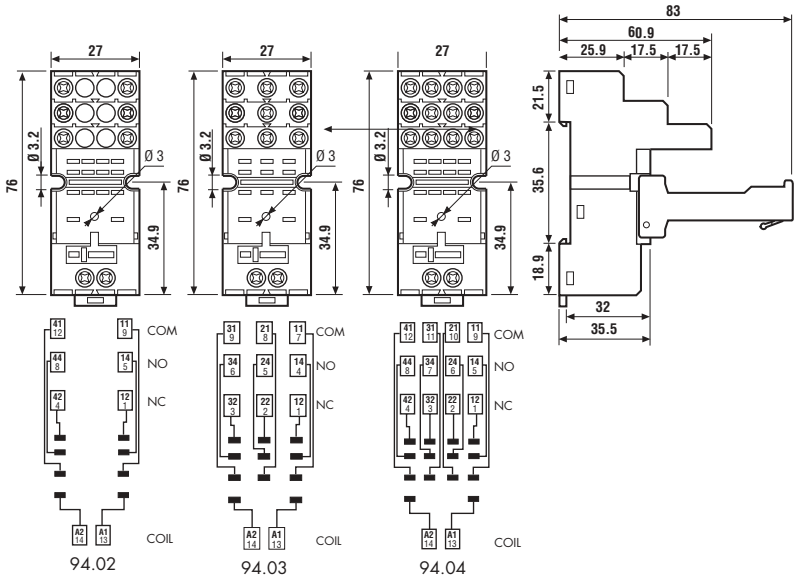
Relay type	55.32		55.33		55.32, 55.34	
Colour	BLUE	BLACK	BLUE	BLACK	BLUE	BLACK
Clamp terminal socket: panel or 35 mm rail (EN 50022) mount retaining clip 094.01 supplied with socket packaging code SPA	94.02	94.02.0	94.03	94.03.0	94.04	94.04.0
Metal retaining clip	094.71					
Plastic retaining and release clip	094.01					
6-way jumper link for 94.02, 94.03 and 94.04 sockets	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)	86.10, 86.20					
Sheet of marker tags for retaining and release clip 094.01	060.72					

- Rated values: 10 A - 250 V
- Dielectric strength: ≥ 2 kV AC
- Protection category: IP 20
- Ambient temperature: (–40…+70)°C
- Screw torque: 0.5 Nm
- Wire strip length: 8 mm
- Max wire size:

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


094.01


060.72

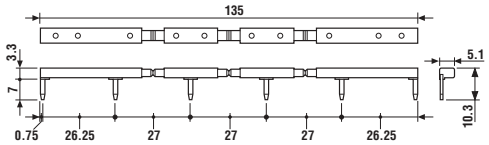


FOR 94.02, 94.03 AND 94.04 SOCKETS:


094.06

6-way jumper link	094.06

- Rated values: 10 A - 250 V




86.10

86 series module timers (see technical data pages 151/155)	BLUE
Mono-function: (12…24)V AC/DC; function AI; (1.5s…60min)	86.10.0.024.0000
Mono-function: (12…24)V AC/DC; function DI; (1.5s…60min)	86.20.0.024.0000

Approvals (according to type): GOST


99.02

Approvals (according to type): GOST

99.02 coil indication and EMC suppression modules (see technical data page 209)		BLUE*
Diode** (+A1, standard polarity)	(6...220)V DC	99.02.3.000.00
Diode (+A2, non standard polarity)	(6...220)V DC	99.02.2.000.00
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 + Diode (+A2, non standard polarity)	(6...24)V DC	99.02.9.024.79
LED + Diode (+A2, non standard polarity)	(28...60)V DC	99.02.9.060.79
LED + Diode (+A2, non standard polarity)	(110...220)V DC	99.02.9.220.79
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 (62 kΩ/1W)	(110...240)V AC	99.02.8.230.07

* Modules in Black housing are available on request.

**For DC supply, apply the positive to terminal A1.


94.74

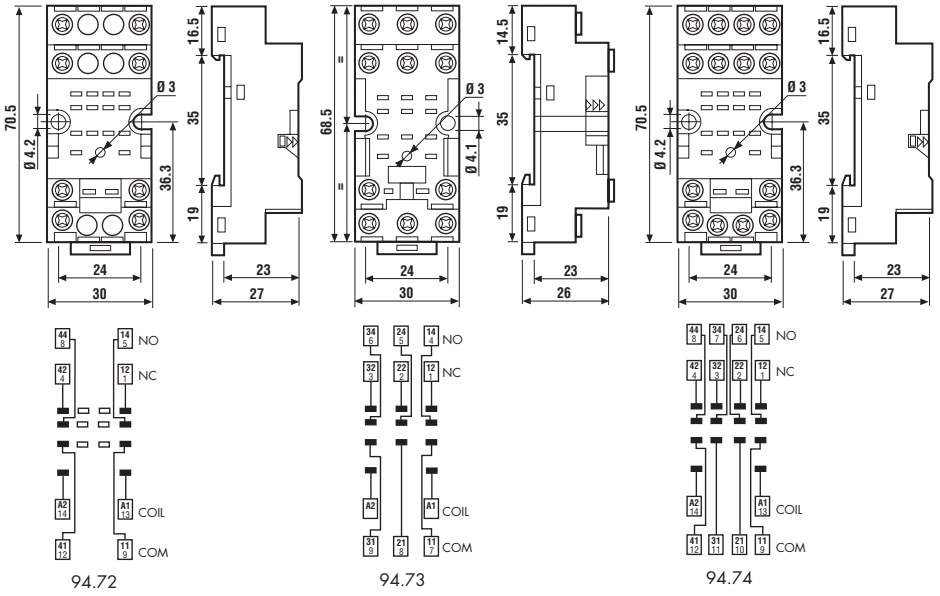
Approvals (according to type):

GOST

- Rated values: 10 A - 250 V
- Dielectric strength: ≥ 2 kV AC
- Protection category: IP 20
- Ambient temperature: (–40…+70)°C
- Screw torque: 0.5 Nm
- Wire strip length: 8 mm
- Max wire size:

	solid wire	stranded wire
mm²	1x2.5 / 2x1.5	1x2.5 / 2x1.5
AWG	1x14 / 2x16	1x14 / 2x16

Relay type	**55.32**		**55.33**		**55.32, 55.34**	
Colour	BLUE	BLACK	BLUE	BLACK	BLUE	BLACK
Screw terminal socket: panel or 35 mm rail (EN 50022) mount retaining clip 094.71 supplied with socket packaging code SMA	94.72	94.72.0	94.73	94.73.0	94.74	94.74.0
Metal retaining clip	094.71					
Modules (see table below)	99.01					



94.72 94.73 94.74


94.82

Approvals (according to type):

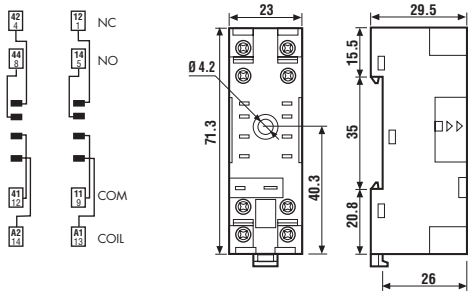
GOST

- Rated values: 10 A - 250 V
- Dielectric strength: ≥ 2 kV AC
- Protection category: IP 20
- Ambient temperature: (–40…+70)°C
- Screw torque: 0.5 Nm
- Wire strip length: 9 mm

- Max wire size:

	solid wire	stranded wire
mm²	1x2.5 / 2x1.5	1x2.5 / 2x1.5
AWG	1x14 / 2x16	1x14 / 2x16

Relay type	**55.32**	
Colour	BLUE	BLACK
Screw terminal socket: panel or 35 mm rail (EN 50022) mount, 23 mm wide retaining clip 094.71 supplied with socket packaging code SMA	94.82	94.82.0
Metal retaining clip	094.71	
Modules (see table below)	99.01	



FOR 94.72, 94.73, 94.74 AND 94.82 SOCKETS:


99.01

Approvals (according to type):

GOST

* Modules in Black housing are available on request.

**For DC supply, apply the positive to terminal A1.

Green LED is standard. Red LED available on request.

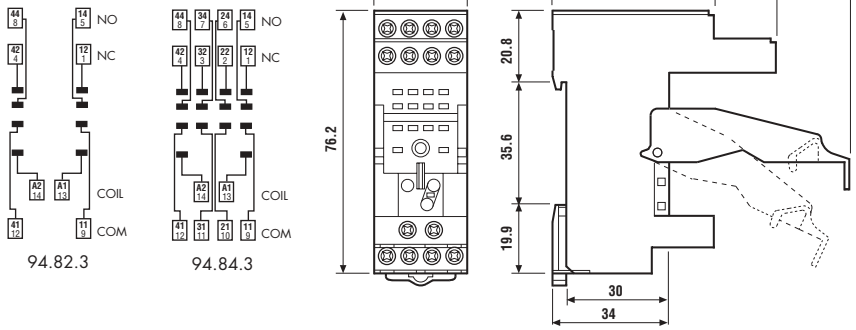
99.01 coil indication and EMC suppression modules (see technical data pag. 209)		BLUE*
Diode** (+A1, standard polarity)	(6...220)V DC	99.01.3.000.00
Diode (+A2, non standard polarity)	(6...220)V DC	99.01.2.000.00
LED	(6...24)V DC/AC	99.01.0.024.59
LED	(28...60)V DC/AC	99.01.0.060.59
LED	(110...240)V 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 (62 kΩ/1W)	(110...240)V AC	99.01.8.230.07

Relay type	55.32		55.32, 55.34	
Colour	BLUE	BLACK	BLUE	BLACK
Clamp terminal socket: panel or 35 mm rail (EN 50022) mount retaining clip 094.71 supplied with socket packaging code SMA	94.82.3	94.82.30	94.84.3	94.84.30
Metal retaining clip	094.71			
Plastic retaining and release clip	094.91.3			
Identification tag	094.80.2			
Modules (see table below)	99.80			

Approvals (according to type):

- Rated values: 10 A - 250 V
- Dielectric strength: ≥ 2 kV AC
- Protection category: IP 20
- Ambient temperature: (–40...+70)°C
- Screw torque: 0.5 Nm
- Wire strip length: 7 mm
- Max wire size:

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

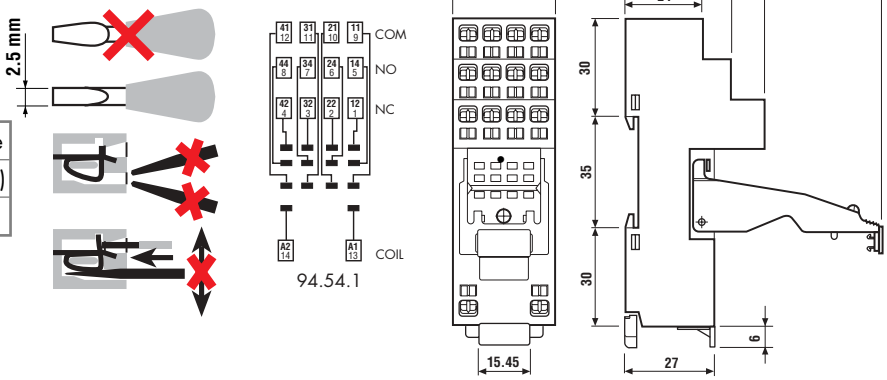


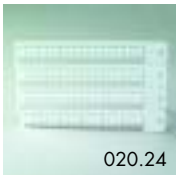
Relay type	55.32, 55.34	
Colour	BLUE	BLACK
Screwless terminal socket: 35 mm rail (EN 50022) mount	94.54.1	94.54.10
Metal retaining clip	094.71	
Plastic retaining and release clip	094.92	
Sheet of marker tags for retaining and release clip 094.92	020.24	
Modules (see table below)	99.80	

Approvals (according to type):

- Rated values: 10 A - 250 V
- Dielectric strength: ≥ 2 kV AC
- Protection category: IP 20
- Ambient temperature: (–25...+70)°C
- Wire strip length: 7 mm
- Max wire size:

	solid wire	stranded wire
mm²	2x(0.2...1.5)	2x(0.2...1.5)
AWG	2x(24...18)	2x(24...18)





FOR 94.82.3, 94.84.3 AND 94.54.1 SOCKETS:

99.80 coil indication and EMC suppression modules (see technical data page 209)		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 (62 kΩ/1W)	(110...240)V AC	99.80.8.230.07

Approvals (according to type):

GOST

* Modules in Black housing are available on request.

**For DC supply, apply the positive to terminal A1.

Green LED is standard. Red LED available on request.


94.14

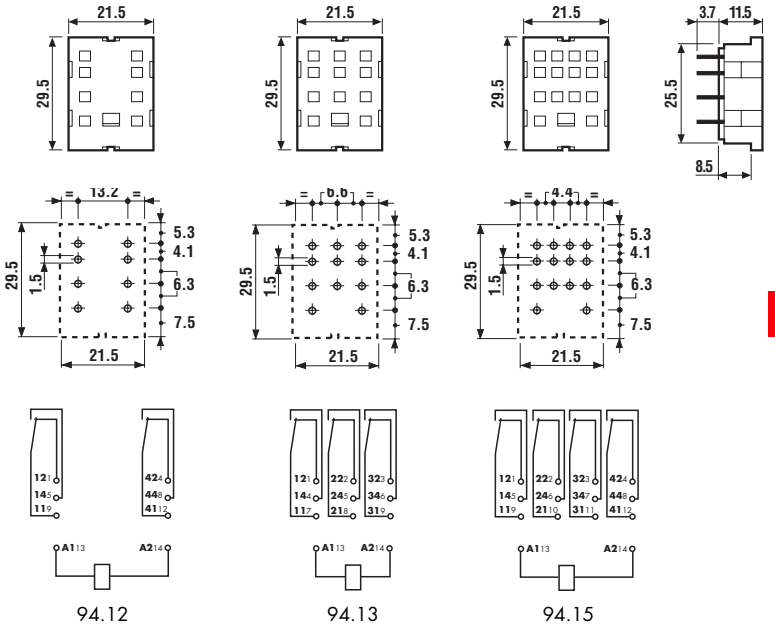
Relay type	55.32		55.33		55.32, 55.34	
Colour	BLUE	BLACK	BLUE	BLACK	BLUE	BLACK
P.C.B. socket retaining clip 094.51 supplied with socket packaging code SMA	94.12	94.12.0	94.13	94.13.0	94.14	94.14.0
Metal retaining clip	094.51					

Approvals (according to type):

GOST

- Rated values: 10 A - 250 V
- Dielectric strength: ≥ 2 kV AC
- Ambient temperature: (–40...+70)°C

Copper side view



94.12 94.13 94.15

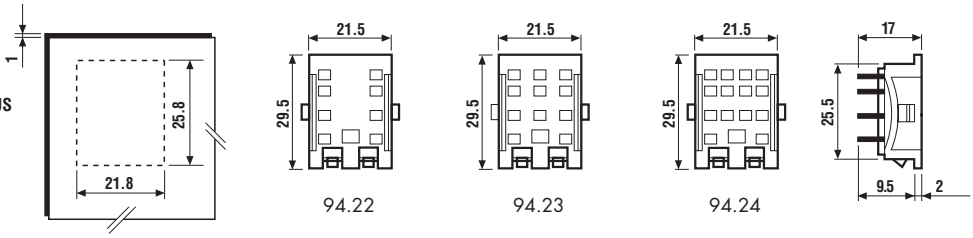

94.22

Relay type	55.32		55.33		55.32, 55.34	
Colour	BLUE	BLACK	BLUE	BLACK	BLUE	BLACK
Panel mount solder socket: 1 mm thick panel retaining clip 094.51 supplied with socket packaging code SMA	94.22	94.22.0	94.23	94.23.0	94.24	94.24.0
Metal retaining clip	094.51					

Approvals (according to type):

GOST

- Rated values: 10 A - 250 V
- Dielectric strength: ≥ 2 kV AC
- Ambient temperature: (–40...+70)°C



94.22 94.23 94.24

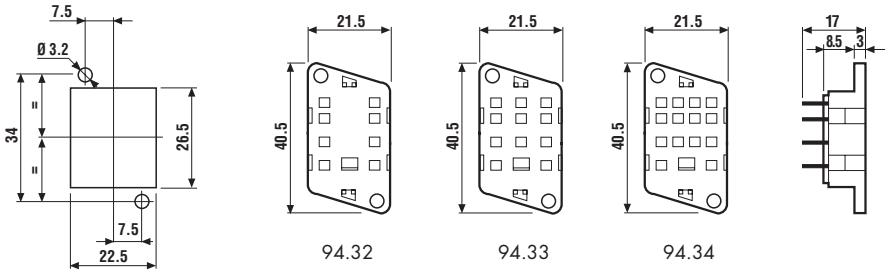

94.34

Relay type	55.32		55.33		55.32, 55.34	
Colour	BLUE	BLACK	BLUE	BLACK	BLUE	BLACK
Panel mount socket: M3 screw mount - solder connections retaining clip 094.51 supplied with socket packaging code SMA	94.32	94.32.0	94.33	94.33.0	94.34	94.34.0
Metal retaining clip	094.51					

Approvals (according to type):

GOST

- Rated values: 10 A - 250 V
- Dielectric strength: ≥ 2 kV AC
- Ambient temperature: (–40...+70)°C

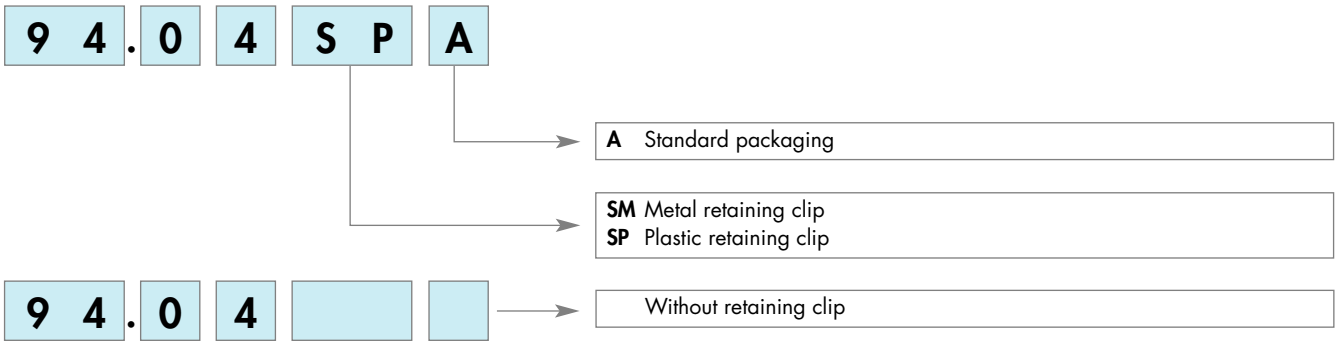


94.32 94.33 94.34

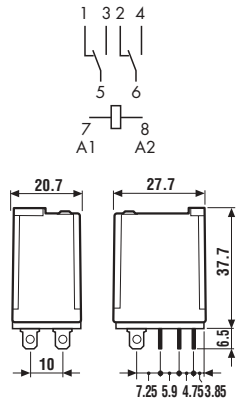
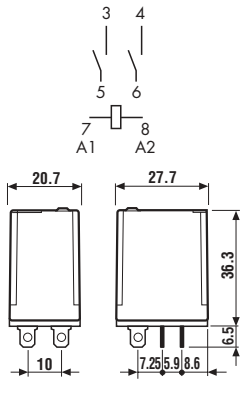
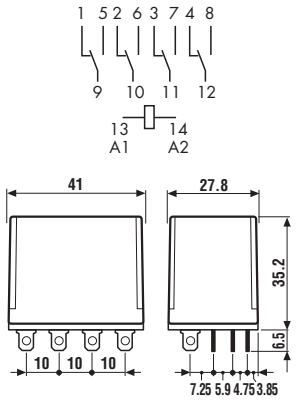
PACKAGING CODES

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

Code options according to the last three letters:



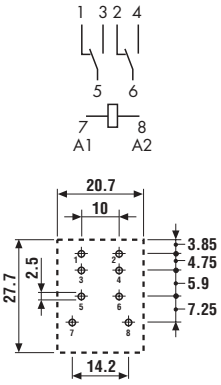
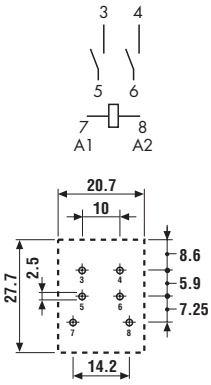
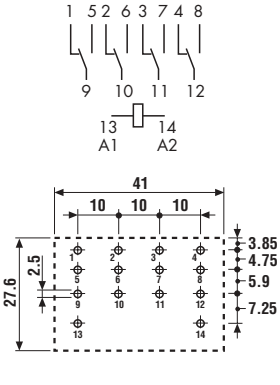
- *Plug-in version*
- *AC or DC coils*
- *Lockable test button and mechanical flag indicator as standard on 2 CO (DPDT) relay type*
- *Sockets and accessories: see 96 and 99 series*

	56.32	56.32-0300	56.34
			
	- 2 pole - Plug-in for use with 96 series sockets (Faston 187, 4.8x0.5 mm)	- 2 NO (DPST-NO), 1.5 mm gap - Plug-in for use with 96 series sockets (Faston 187, 4.8x0.5 mm)	- 4 pole - Plug-in for use with 96 series sockets (Faston 187, 4.8x0.5 mm)
			
Contact specifications			
Contact configuration	2 CO (DPDT)	2 NO (DPST-NO) - 1.5 mm	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 in AC1 VA	3,000	3,000	3,000
Rated load in AC15 (230 V AC) VA	500	500	500
Single phase motor rating (230 V AC) kW	0.55	0.55	0.55
Breaking capacity in DC1: 30/110/220 V A	12/0.25/0.12	12/0.6/0.3	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 specifications			
Nominal voltage (U_N) V AC (50/60 Hz)	6 - 12 - 24 - 48 - 60 - 110 - 120 - 230 - 240 - 400**		
V DC	6 - 12 - 24 - 48 - 60 - 110 - 125 - 220		
Rated power AC/DC VA (50 Hz)/W	1.5/1	1.5/1	2/1.3
Operating range AC	(0.8...1.1)U_N	(0.8...1.1)U_N	(0.8...1.1)U_N
DC	(0.85...1.1)U_N	(0.85...1.1)U_N	(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	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	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	8/8	8/8	8/8
Insulation according to EN 61810-1 ed. 2	4 kV/3	4 kV/3	4 kV/3
Insulation between coil and contacts (1.2/50 µs) kV	4	4	4
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):	CE B SP GOST		

* For 400 V applications, where requirements for pollution degree 2 are met.

**For 4 CO (4PDT) only

- *P.C.B. version*
- *AC or DC coils*

	56.42	56.42-0300	56.44
			
	- 2 pole - P.C.B. mounting	- 2 NO (DPST-NO), 1.5 mm gap - P.C.B. mounting	- 4 pole - P.C.B. mounting
			
	Copper side view h = 37.7 mm	Copper side view h = 36.3 mm	Copper side view h = 35.2 mm
Contact specifications			
Contact configuration	2 CO (DPDT)	2 NO (DPST-NO) 1.5 mm	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 in AC1 VA	3,000	3,000	3,000
Rated load in AC15 (230 V AC) VA	500	500	500
Single phase motor rating (230 V AC) kW	0.55	0.55	0.55
Breaking capacity in DC1: 30/110/220 V A	12/0.25/0.12	12/0.6/0.3	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 specifications			
Nominal voltage (U_N) V AC (50/60 Hz)	6 - 12 - 24 - 48 - 60 - 110 - 120 - 230 - 240 - 400**		
V DC	6 - 12 - 24 - 48 - 60 - 110 - 125 - 220		
Rated power AC/DC VA (50 Hz)/W	1.5/1	1.5/1	2/1.3
Operating range AC	(0.8...1.1)U_N	(0.8...1.1)U_N	(0.8...1.1)U_N
DC	(0.85...1.1)U_N	(0.85...1.1)U_N	(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	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	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	8/8	8/8	8/8
Insulation according to EN 61810-1 ed. 2	4 kV/3	4 kV/3	4 kV/3
Insulation between coil and contacts (1.2/50 µs) kV	4	4	4
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):	CE B SP GOST IQNet IRAM cULus NF VDE		

* For 400 V applications, requirements for pollution degree 2 are met.

**For 4 CO (4PDT) only

ORDERING INFORMATION

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

56	.	3	2	.	9	.	012	.	A: 0	B: 0	C: 4	D: 0

Series

Type
3 = Plug-in
4 = P.C.B.

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

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

Coil voltage
see coil specifications

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

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

D: Special versions
0 = Standard
5 = Top flange mount (56.34 only)
6 = Rear flange mount
7 = Top 35 mm rail mount (56.34 only)
8 = Rear 35 mm rail mount (56.34 only)

C: Options
0 = None
1 = Test button
2 = Mechanical indicator
3 = LED (AC only)
4 = Lockable test button + mechanical indicator
5 = Lockable test button + LED (AC only)
54 = Lockable test button + LED (AC only) + mechanical indicator
6 = Double LED (DC not polarized)
7 = Lockable test button + double LED (DC not polarized)
74 = Lockable test button + double LED (DC not polarized) + mechanical indicator
8 = LED + diode (polarity positive to pin 7, DC)
9 = Lockable test button + LED + diode (polarity positive to pin 7, DC)
94 = Lockable test button + LED + diode + mechanical indicator (polarity positive to pin 7, DC)

Only combinations in the same row are possible

Preferred versions

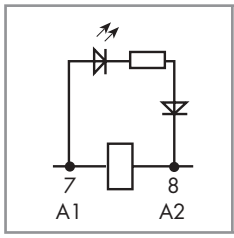
	coil version	A	B	C	D
56.32	AC/DC	0	0	4	0
56.34	AC/DC	0	0	0	0
56.42	AC/DC	0	0	0	0
56.44	AC/DC	0	0	0	0

All versions

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

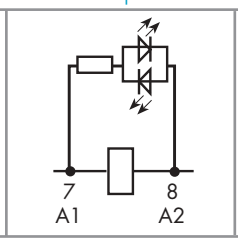
POSSIBLE OPTIONS

AC



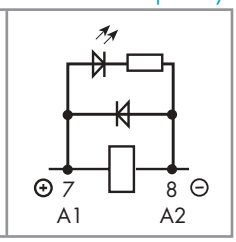
Option = 0030
0050

DC - Non polarized

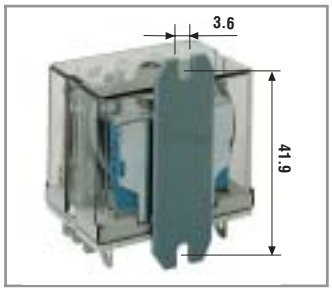


Option = 0060
0070
0074

DC - Standard polarity



Option = 0080
0090
0094



Option = 0006
REAR FLANGE MOUNT

LOCKABLE TEST BUTTON AND MECHANICAL FLAG INDICATOR (0040)

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.

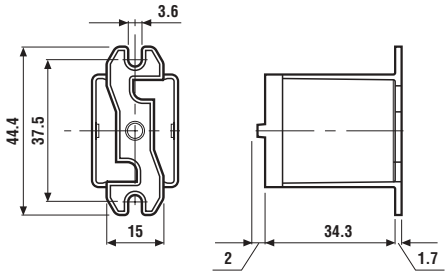
In both cases ensure that the test button actuation is swift and decisive.

ACCESSORIES


056.05


056.05 with relays

Adaptor with top mount flange for 56.32.x.xxx.xx00	056.05



TECHNICAL DATA

INSULATION

Insulation according to EN 61810-1 ed. 2		insulation rated voltage V	250
		rated impulse withstand voltage kV	4
		pollution degree	3
		overvoltage category	III
Dielectric strength between adjacent contacts	V AC	2,500	

CONDUCTED DISTURBANCE IMMUNITY

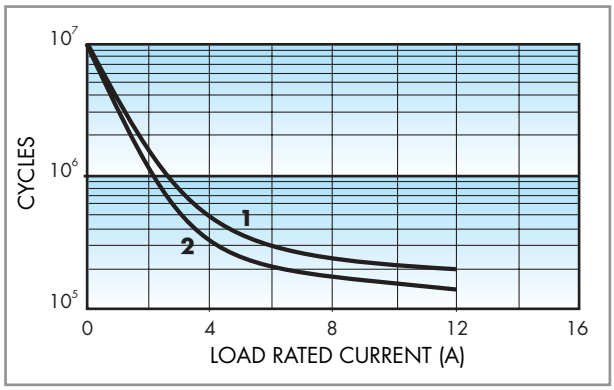
Burst (5...50)ns, 5 kHz, on A1 - A2	EN 61000-4-4	level 4 (4 kV)
Surge (1.2/50 µs) on A1 - A2 (differential mode)	EN 61000-4-5	level 4 (4 kV)

OTHER DATA

Bounce time: NO/NC	ms	3/— (for NO or nPST-NO)	1/3 (for CO or nPDT)	
Vibration resistance (10...55)Hz, max. ± 1 mm: NO/NC	g/g	8/8		
Power lost to the environment		**2 CO (DPDT) /2 NO (DPST-NO)**	**4 CO (4PDT)**	
without contact current	W	1	1.3	
with rated current	W	3.8	6.9	
Recommended distance between relays mounted on P.C.B.s	mm	≥ 5		

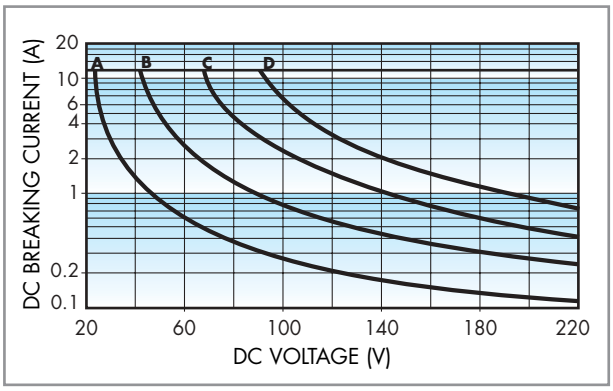
CONTACT SPECIFICATIONS

F 56



Electrical life vs AC1 load.
1 - Types 56.32/42
2 - Types 56.34/44

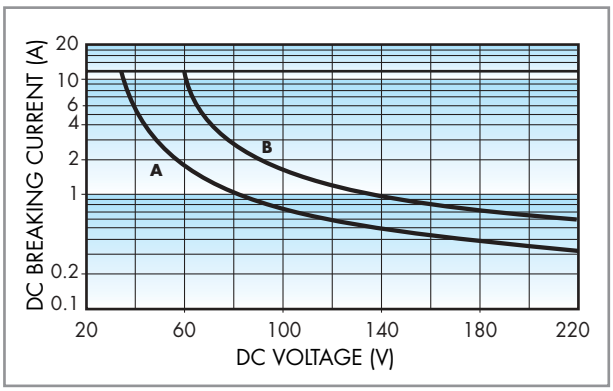
H 56 (CO/nPDT)



Breaking capacity for DC1 load.
A - Load applied to 1 contact
B - Load applied to 2 contacts in series
C - Load applied to 3 contacts in series
D - Load applied to 4 contacts in series

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

H 56 (NO/nPST-NO)



Breaking capacity for DC1 load.
A - Load applied to 1 contact
B - Load applied to 2 contacts in series

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

COIL SPECIFICATIONS

DC VERSION DATA (2 CO/DPDT, 2 NO/DPST-NO)

Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
6	**9**.006	5.1	6.6	40	150
12	**9**.012	10.2	13.2	140	86
24	**9**.024	20.4	26.4	600	40
48	**9**.048	40.8	52.8	2,400	20
60	**9**.060	51	66	4,000	15
110	**9**.110	93.5	121	12,500	8.8
125	**9**.125	100	137.5	17,300	7.2
220	**9**.220	176	242	54,000	4

AC VERSION DATA (2 CO/DPDT, 2 NO/DPST-NO)

Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Rated coil consumption I at U_N (50Hz)
V		V	V	Ω	mA
6	**8**.006	4.8	6.6	12	200
12	**8**.012	9.6	13.2	50	97
24	**8**.024	19.2	26.4	190	53
48	**8**.048	38.4	52.8	770	25
60	**8**.060	48	66	1,200	21
110	**8**.110	88	121	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

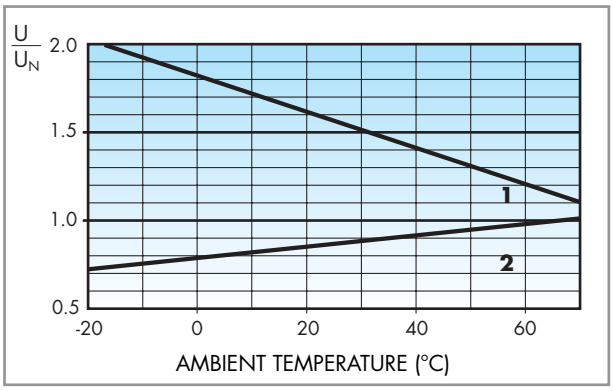
DC VERSION DATA (4 CO/4PDT)

Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
6	**9**.006	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	100	137.5	14,200	8.8
220	**9**.220	176	242	44,000	5

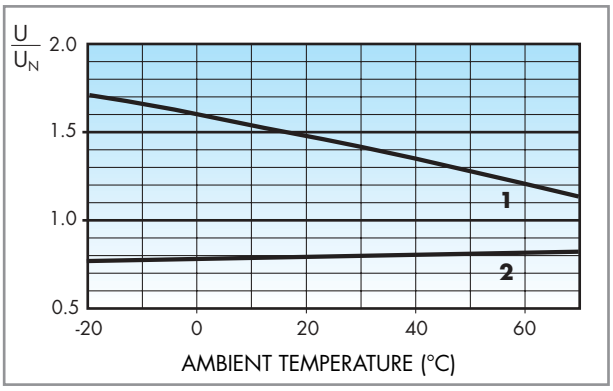
AC VERSION DATA (4 CO/4PDT)

Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Rated coil consumption I at U_N (50Hz)
V		V	V	Ω	mA
6	**8**.006	4.8	6.6	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

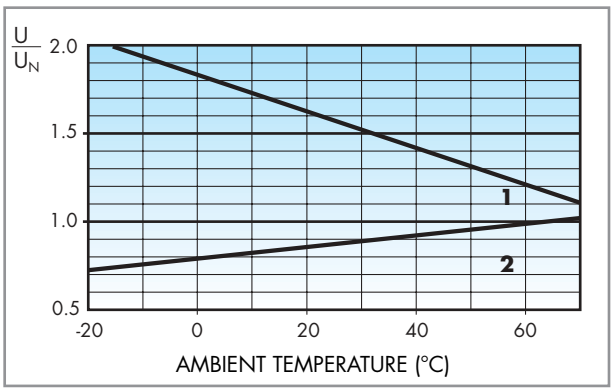
R 56 DC (2 CO/DPDT, 2 NO/DPST-NO)



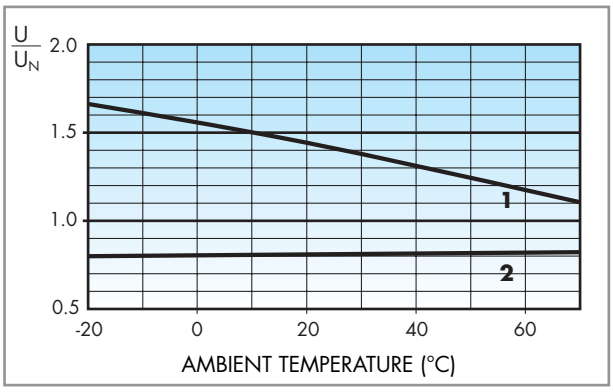
R 56 AC (2 CO/DPDT, 2 NO/DPST-NO)



R 56 DC (4 CO/4PDT)



R 56 AC (4 CO/4PDT)



Operating range (DC type) vs ambient temperature.
1 - Max coil voltage permitted.
2 - Min pick-up voltage with coil at ambient temperature.

Operating range (AC type) vs ambient temperature.
1 - Max coil voltage permitted.
2 - Min pick-up voltage with coil at ambient temperature.


96.72


96.74

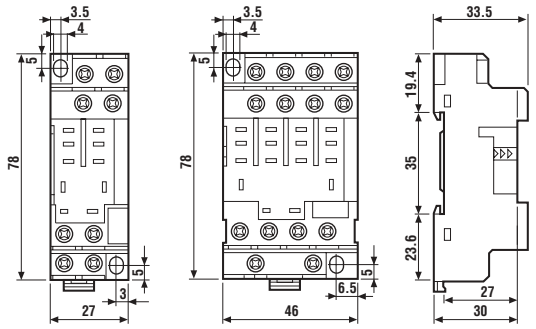
Relay type	56.32		56.34	
Colour	BLUE	BLACK	BLUE	BLACK
Screw terminal socket: panel or 35 mm rail (EN 50022) mount retaining clip 094.71/096.71 supplied with socket packaging code SMA	96.72	96.72.0	96.74	96.74.0
Metal retaining clip	094.71		096.71	
Modules (see table below)	99.01			

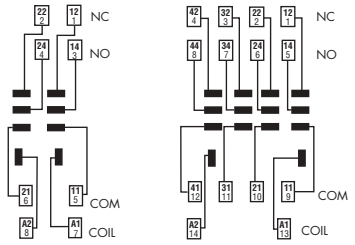
Approvals
(according to type):

CE B SP cULus GOST

- Rated values: 12 A - 250 V
- Dielectric strength: ≥ 2 kV AC
- Protection category: IP 20
- Ambient temperature: (–40...+70)°C
- Screw torque: 0.8 Nm
- Wire strip length: 10 mm
- Max wire size:

	solid wire	stranded wire
mm²	1x4 / 2x4	1x4 / 2x2.5
AWG	1x12 / 2x12	1x12 / 2x14





96.72 96.74

56

FOR 96.72 AND 96.74 SOCKETS:


99.01

Approvals
(according to type):

GOST

* Modules in Black housing are available on request.

**For DC supply, apply the positive to terminal A1.

Green LED is standard. Red LED available on request.

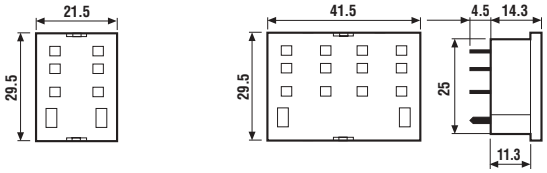
99.01 coil indication and EMC suppression modules (see technical data page 209)		BLUE*
Diode** (+A1, standard polarity)	(6...220)V DC	99.01.3.000.00
Diode (+A2, non standard polarity)	(6...220)V DC	99.01.2.000.00
LED	(6...24)V DC/AC	99.01.0.024.59
LED	(28...60)V DC/AC	99.01.0.060.59
LED	(110...240)V 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 (62 kΩ/1W)	(110...240)V AC	99.01.8.230.07


96.12

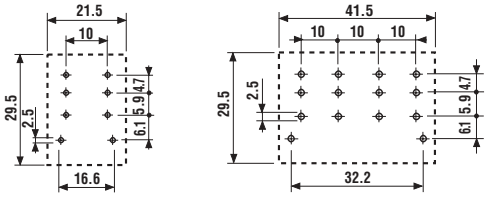
Relay type	56.32		56.34	
Colour	BLUE	BLACK	BLUE	BLACK
P.C.B. socket retaining clip 094.51 supplied with socket packaging code SMA	96.12	96.12.0	96.14	96.14.0
Metal retaining clip	094.51			

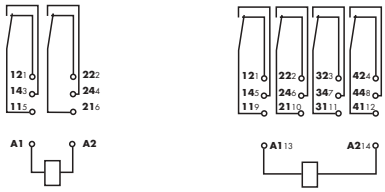
Approvals
(according to type):

- Rated values: 15 A - 250 V (10 A max for each contact circuit)
- Dielectric strength: ≥ 2 kV AC
- Ambient temperature: (–40...+70)°C



Copper side view





96.12 96.14

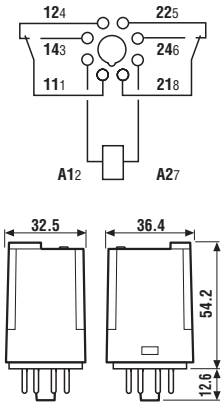
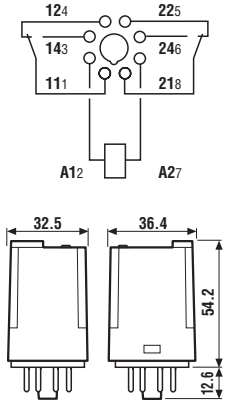
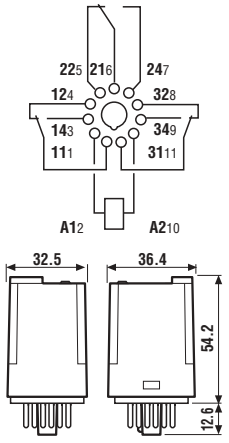
PACKAGING CODES

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

Code options according to the last three letters:

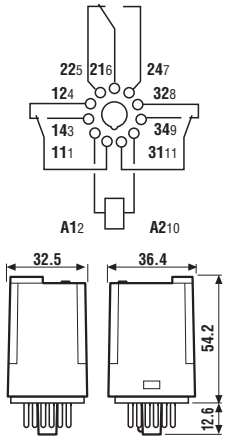
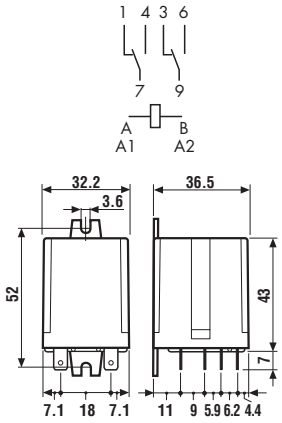
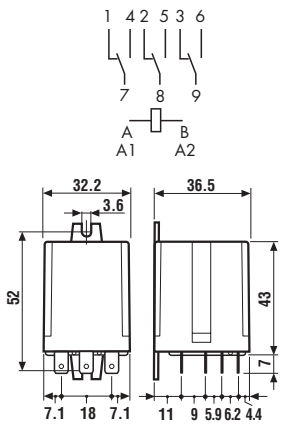
96.74	SMA	**A** Standard packaging
	SM	**SM** Metal retaining clip
96.74		Without retaining clip

- *8 - 11 pin plug-in*
- *AC or DC coils*
- *Lockable test button with mechanical flag indicator*
- *Bifurcated contact option*
- *Sockets and accessories: see 90, 99 and 86 series*

	60.12	60.12-0200	60.13
			
	- 2 pole - 8 pin - Plug-In for use with 90 series sockets	- 2 bifurcated contacts, for low level switching capability - 8 pin - Plug-In for use with 90 series sockets	- 3 pole - 11 pin - Plug-In for use with 90 series sockets
			
* For 400 V applications, where requirements for pollution degree 2 are met.			
Contact specifications			
Contact configuration	2 CO (DPDT)	2 CO (DPDT)	3 CO (3PDT)
Rated current/Maximum peak current A	10/20	6/10	10/20
Rated voltage/Maximum switching voltage V AC	250/400*	250/400*	250/400*
Rated load in AC1 VA	2,500	1,500	2,500
Rated load in AC15 (230 V AC) VA	500	250	500
Single phase motor rating (230 V AC) kW	0.37	0.185	0.37
Breaking capacity in DC1: 30/110/220 V A	10/0.4/0.15	6/0.3/0.12	10/0.4/0.15
Minimum switching load mW (V/mA)	500 (10/5)	50 (5/5)	500 (10/5)
Standard contact material	AgNi	AgNi+Au bifurcated contacts	AgNi
Coil specifications			
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	2.2/1.3
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	250 · 10^3	200 · 10^3
Operate/release time ms	9/9	9/9	9/9
Insulation according to EN 61810-1 ed. 2	4 kV/3	4 kV/3	3.6 kV/3
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
Environmental protection	RT I	RT I	RT I
Approvals (according to type):	CE ABS GOST IRAM RINA cULus VDE		

60

- *8 - 11 pin plug-in*
- *AC or DC coils*
- *Lockable test button with mechanical flag indicator*
- *Bifurcated contact option*
- *Sockets and accessories: see 90, 99 and 86 series*

	60.13-0200	60.62	60.63
			
	- 3 bifurcated contacts, for low level switching capability - 11 pin - Plug-In for use with 90 series sockets	- 2 pole - Faston 187 (4.8x0.8 mm) with flange mount	- 3 pole - Faston 187 (4.8x0.8 mm) with flange mount
			
Contact specifications			
Contact configuration	3 CO (3PDT)	2 CO (DPDT)	3 CO (3PDT)
Rated current/Maximum peak current A	6/10	10/20	10/20
Rated voltage/Maximum switching voltage V AC	250/400*	250/400*	250/400*
Rated load in AC1 VA	1,500	2,500	2,500
Rated load in AC15 (230 V AC) VA	250	500	500
Single phase motor rating (230 V AC) kW	0.185	0.37	0.37
Breaking capacity in DC1: 30/110/220 V A	6/0.3/0.12	10/0.4/0.15	10/0.4/0.15
Minimum switching load mW (V/mA)	50 (5/5)	500 (10/5)	500 (10/5)
Standard contact material	AgNi+Au bifurcated contacts	AgNi	AgNi
Coil specifications			
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	2.2/1.3
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	250 · 10^3	200·10^3	200·10^3
Operate/release time ms	9/9	9/9	9/9
Insulation according to EN 61810-1 ed. 2	3.6 kV/3	4 kV/3	3.6 kV/3
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
Environmental protection	RT I	RT I	RT I
Approvals (according to type):	CE ABS B SP GOST IRAM Lloyd's Register N RINA cULus VDE		

* For 400 V applications, where requirements for pollution degree 2 are met.

ORDERING INFORMATION

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

6	0	.	1	3	.	9	.	0	1	2	.	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
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

D: Special versions
0 = Standard

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

Only combinations in the same row are possible

Preferred versions

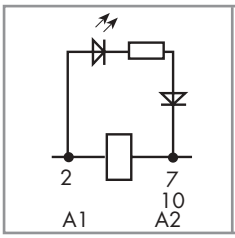
	coil version	A	B	C	D
60.12/13	AC/DC	0	0	4	0
60.62/63	AC/DC	0	0	0	0

All versions

	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

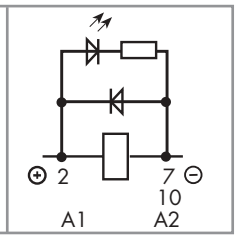
POSSIBLE OPTIONS

AC



Option = 0030
0050
0054

DC



Option = 0060
0070
0074

LOCKABLE TEST BUTTON AND MECHANICAL FLAG INDICATOR (0040)

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.

ACCESSORIES

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

TECHNICAL DATA

INSULATION

Insulation according to EN 61810-1 ed. 2		insulation rated voltage	V	250
		rated impulse withstand voltage	kV	4 (2 pole) / 3.6 (3 pole)
		pollution degree		3
		overvoltage category		III
Dielectric strength between adjacent contacts	V AC	2,000		

60

CONDUCTED DISTURBANCE IMMUNITY

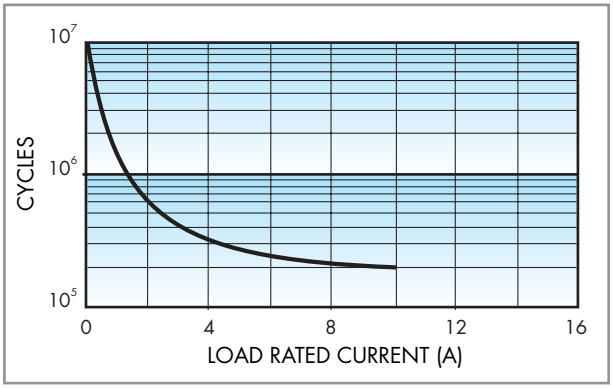
Burst (5...50)ns, 5 kHz, on A1 - A2	EN 61000-4-4	level 4 (4 kV)
Surge (1.2/50 µs) on A1 - A2 (differential mode)	EN 61000-4-5	level 4 (4 kV)

OTHER DATA

Bounce time: NO/NC	ms	2/4	
Vibration resistance (10...55)Hz, max. ± 1 mm: NO/NC	g/g	5/3	
Power lost to the environment		**2 CO (DPDT)**	**3 CO (3PDT)**
without contact current	W	1.3	1.3
with rated current	W	2.7	3.4

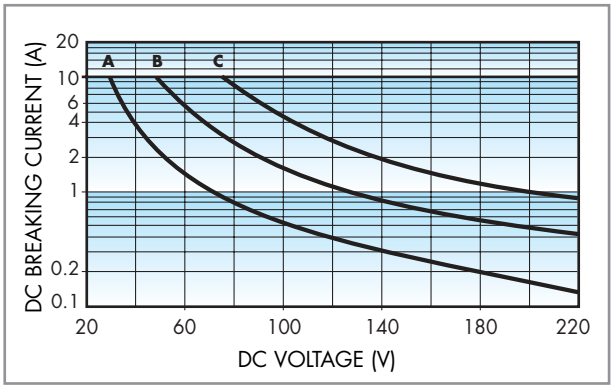
CONTACT SPECIFICATIONS

F 60



Electrical life vs AC1 load.

H 60



Breaking capacity for DC1 load.
A - Load applied to 1 contact
B - Load applied to 2 contacts in series
C - Load applied to 3 contacts in series

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

COIL SPECIFICATIONS

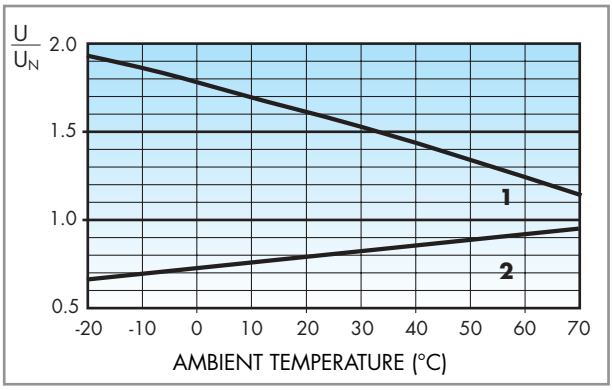
DC VERSION DATA

Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
6	**9**.006	4.8	6.6	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 VERSION DATA

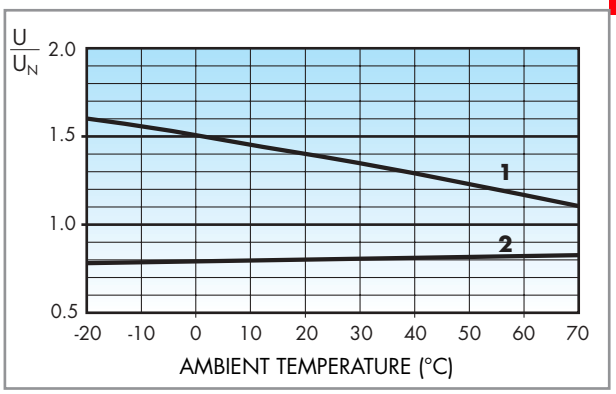
Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Rated coil consumption I at U_N (50Hz)
V		V	V	Ω	mA
6	**8**.006	4.8	6.6	4.6	367
12	**8**.012	9.6	13.2	19	183
24	**8**.024	19.2	26.4	74	90
48	**8**.048	38.4	52.8	290	47
60	**8**.060	48	66	450	37
110	**8**.110	88	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 60 DC



Operating range (DC version) vs ambient temperature.
1 - Max coil voltage permitted.
2 - Min pick-up voltage with coil at ambient temperature.

R 60 AC

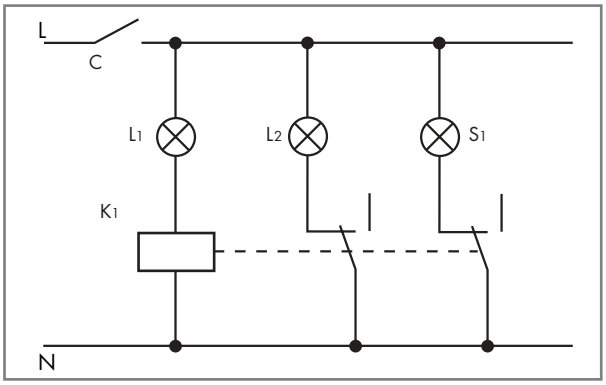


Operating range (AC version) vs ambient temperature.
1 - Max coil voltage permitted.
2 - Min pick-up voltage with coil at ambient temperature.

60

CURRENT SENSING VERSION

Wiring Diagram



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

CURRENT SENSING AC VERSION 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

CURRENT SENSING DC VERSION 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

Other types of current sensing relays are available on request.

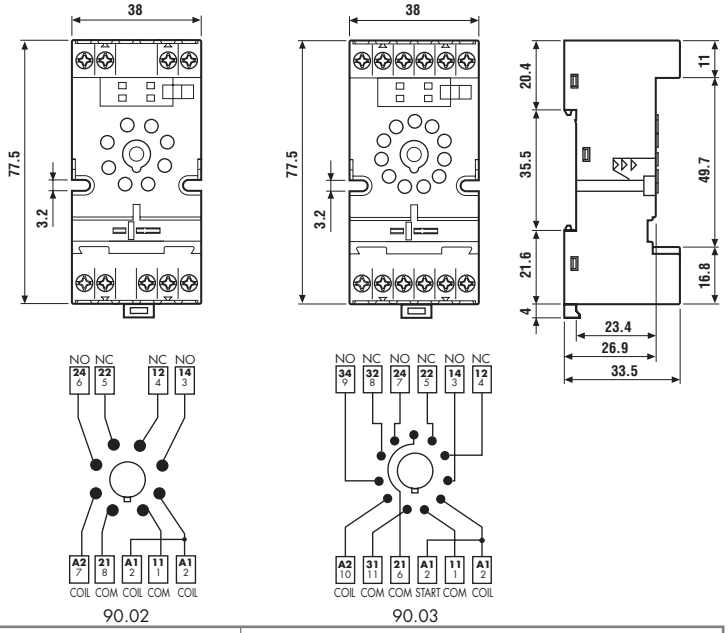

90.03

Approvals (according to type):

- Double terminal A1 (for easy start connection)
- Rated values: 10 A - 250 V
- Dielectric strength: ≥ 2 kV AC
- Protection category: IP 20
- Ambient temperature: (–40...+70)°C
- Screw torque: 0.6 Nm
- Wire strip length: 10 mm
- Max wire size:

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

Relay type	**60.12**		**60.13**	
Colour	BLUE	BLACK	BLUE	BLACK
Clamp terminal socket: panel or 35 mm rail (EN 50022) mount retaining clip 090.33 supplied with socket packaging code SMA	90.02	90.02.0	90.03	90.03.0
Metal retaining clip	090.33			
Identification tag	090.00.2			
Modules (see table below)	99.02			
Timer module (see table below)	86.00, 86.10, 86.20			
6-way jumper link for 90.02 and 90.03 sockets	090.06			



90.02 90.03

60

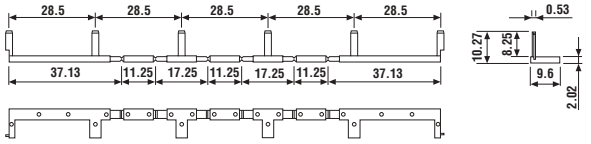
FOR 90.02 AND 90.03 SOCKETS:


090.06

6-way jumper link	090.06

- Rated values: 10 A - 250 V

Approvals (according to type):




86.00

86 Series Module Timers (see technical data pages 150/151/154)	
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
Mono-function: (12...24)V AC/DC; function AI; (1.5s...60min)	86.10.0.024.0000
Mono-function: (12...24)V AC/DC; function DI; (1.5s...60min)	86.20.0.024.0000

Approvals (according to type): GOST


99.02

Approvals (according to type): GOST

99.02 coil indication and EMC suppression modules (see technical data page 209)	BLUE*	
Diode** (+A1, standard polarity)	(6...220)V DC	99.02.3.000.00
Diode (+A2, non standard polarity)	(6...220)V DC	99.02.2.000.00
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 + Diode (+A2, non standard polarity)	(6...24)V DC	99.02.9.024.79
LED + Diode (+A2, non standard polarity)	(28...60)V DC	99.02.9.060.79
LED + Diode (+A2, non standard polarity)	(110...220)V DC	99.02.9.220.79
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 (62 kΩ/1W)	(110...240)V AC	99.02.8.230.07

* Modules in Black housing are available on request.

**For DC supply, apply the positive to terminal A1.


90.21

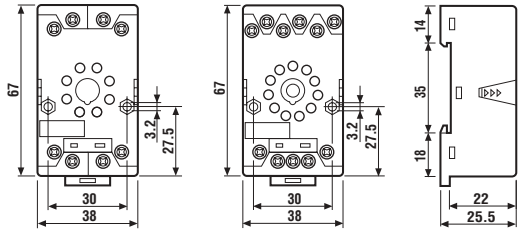
Approvals (according to type):

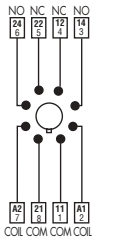
GOST

- Rated values: 10 A - 250 V
- Dielectric strength: ≥ 2 kV AC
- Protection category: IP 20
- Ambient temperature: (–40...+70)°C
- Screw torque: 0.5 Nm
- Wire strip length: 10 mm
- Max wire size:

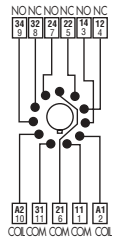
	solid wire	stranded wire
mm²	1x6 / 2x2.5	1x6 / 2x2.5
AWG	1x10 / 2x14	1x10 / 2x14

Relay type	**60.12**		**60.13**	
Colour	BLUE	BLACK	BLUE	BLACK
Clamp terminal socket: panel or 35 mm rail (EN 50022) mount retaining clip 090.33 supplied with socket packaging code SMA	90.20	90.20.0	90.21	90.21.0
Metal retaining clip	090.33			
Modules (see table below)	99.01			





90.20



90.21

60

FOR 90.20 AND 90.21 SOCKETS:


99.01

Approvals (according to type):

GOST

* Modules in Black housing are available on request.

**For DC supply, apply the positive to terminal A1.

Green LED is standard. Red LED available on request.

99.01 coil indication and EMC suppression modules (see technical data page 209)		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 (62 kΩ/1W)	(110...240)V AC	99.01.8.230.07

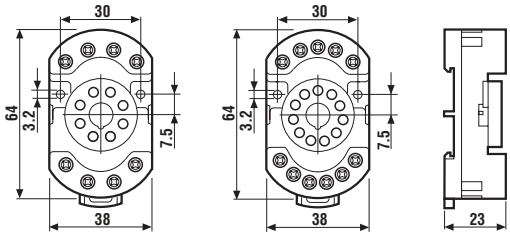

90.23

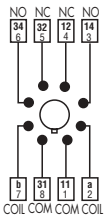
Relay type	60.12	60.13
Colour	BLUE	BLUE
Clamp terminal socket: panel or 35 mm rail (EN 50022) mount (retaining clip 090.33 supplied with socket packaging code SMA	90.22	90.23
Metal retaining clip	090.33	

Approvals
(according to type):

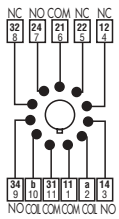
- Rated values: 10 A - 250 V
- Dielectric strength: ≥ 2 kV AC
- Protection category: IP 20
- Ambient temperature: (–40…+70)°C
- Screw torque: 0.5 Nm
- Wire strip length: 7 mm
- Max wire size:

	solid wire	stranded wire
mm²	1x6 / 2x2.5	1x6 / 2x2.5
AWG	1x10 / 2x14	1x10 / 2x14





90.22



90.23

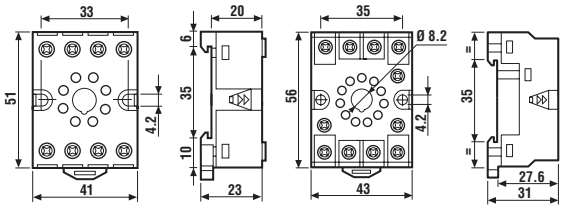

90.26

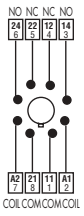
Relay type	60.12		60.13	
Colour	BLUE	BLACK	BLUE	BLACK
Screw terminal socket: panel or 35 mm rail (EN 50022) mount retaining clip 090.33 supplied with socket packaging code SMA	90.26	90.26.0	90.27	90.27.0
Metal retaining clip	090.33			

Approvals
(according to type):

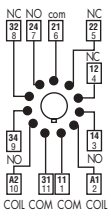
- Rated values: 10 A - 250 V
- Dielectric strength: ≥ 2 kV AC
- Protection category: IP 20
- Ambient temperature: (–40…+70)°C
- Screw torque: 0.8 Nm
- Wire strip length: 10 mm
- Max wire size:

	solid wire	stranded wire
mm²	1x4 / 2x2.5	1x4 / 2x2.5
AWG	1x12 / 2x14	1x12 / 2x14





90.26



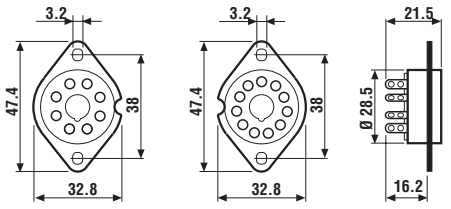
90.27


90.12

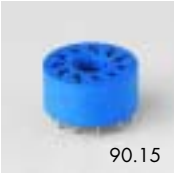
Relay type	60.12	60.13
Colour	BLACK	BLACK
Flange mount solder socket mount with M3 screw	90.12	90.13

Approvals
(according to type):

- Rated values: 10 A - 250 V
- Dielectric strength: ≥ 2 kV AC
- Ambient temperature: (–40…+70)°C



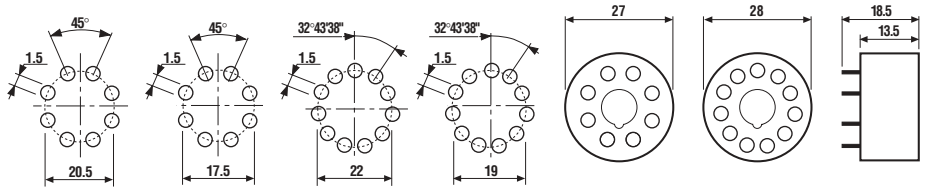
90.12 90.13


90.15

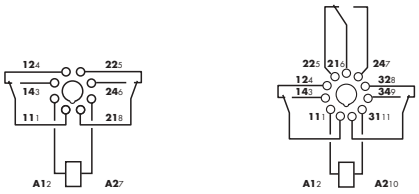
Relay type		60.12	60.13
P.C.B. socket	BLUE	90.14	90.15
	BLUE	90.14.1 (Ø 17.5mm)	90.15.1 (Ø 19mm)

Approvals
(according to type):

- Rated values: 10 A - 250 V
- Dielectric strength: ≥ 2 kV AC
- Ambient temperature: (–40...+70)°C



90.14 90.14.1 90.15 90.15.1 90.14 90.15



90.14 90.15

PACKAGING CODES

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

Code options according to the last three letters:

9	0	.	2	1	S	M	A

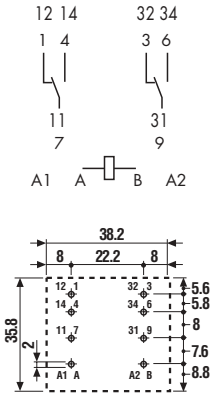
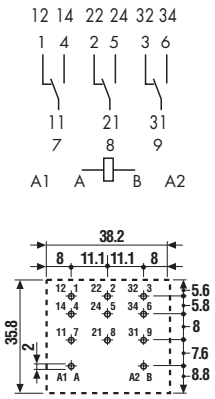
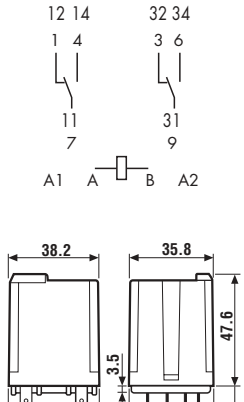
A Standard packaging

SM Metal retaining clip

9	0	.	2	1			

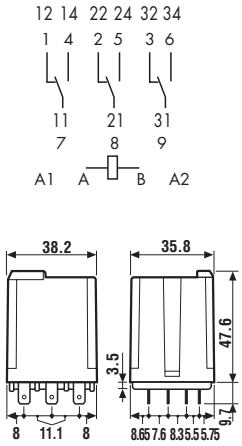
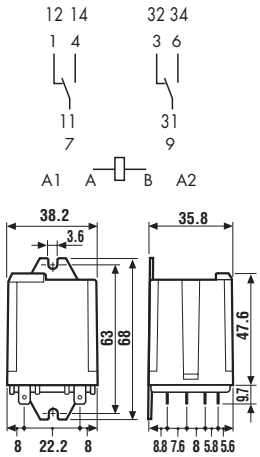
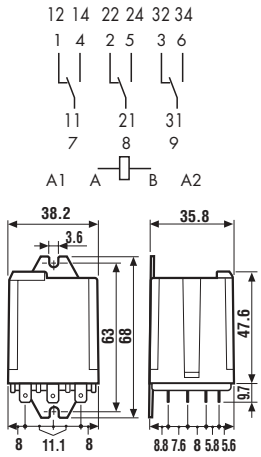
Without retaining clip

- *Plug-in or P.C.B. versions*
- *AC or DC coils*
- *3 mm gap between open contacts on NO (nPST-NO) option*
- *8 mm, 6 kV (1.2/50 µs) between coil and contacts (internal distance)*
- *Option with coil to contacts SELV insulation*
- *Sockets and accessories: see 92, 99 and 86 series*

	62.22	62.23	62.32
			
	- 2 pole - P.C.B. mounting	- 3 pole - P.C.B. mounting	- 2 pole - Faston 187 (4.8x0.5 mm) - Plug-in use 92 series socket
	 Copper side view h = 49.1 mm	 Copper side view h = 49.1 mm	
Contact specifications			
Contact configuration	2 CO (DPDT)	3 CO (3PDT)	2 CO (DPDT)
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 in AC1 VA	4,000	4,000	4,000
Rated load in AC15 (230 V AC) VA	750	750	750
Motor rating (230/400 V AC) kW	0.8/—	0.8/1.5	0.8/—
Breaking capacity in DC1: 30/110/220 V A	16/0.6/0.4	16/0.6/0.4	16/0.6/0.4
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 specifications			
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	2.2/1.3
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/0.6 U_N	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	0.2 U_N/0.1 U_N
Technical data			
Mechanical life AC/DC cycles	$10 \cdot 10^6/30 \cdot 10^6$	$10 \cdot 10^6/30 \cdot 10^6$	$10 \cdot 10^6/30 \cdot 10^6$
Electrical life at rated load AC1 cycles	$100 \cdot 10^3$	$100 \cdot 10^3$	$100 \cdot 10^3$
Operate/release time ms	10/10	10/10	10/10
Insulation according to EN 61810-1 ed. 2	4 kV/3	4 kV/3	4 kV/3
Insulation between coil and contacts (1.2/50 µs) kV	6	6	6
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 I	RT I	RT I
Approvals (according to type):	CE ABS GOST IRAM Lloyd's Register RINA cULus VDE		

* With the $AgSnO_2$ material the maximum peak current is 100 A - 5 ms on NO contact.

- *Plug-in or P.C.B. versions*
- *AC or DC coils*
- *3 mm gap between open contacts on NO (nPST-NO) option*
- *8 mm, 6 kV (1.2/50 µs) between coil and contacts (internal distance)*
- *Option with coil to contacts SELV insulation*
- *Sockets and accessories: see 92, 99 and 86 series*

	62.33	62.82	62.83
			
	- 3 pole - Faston 187 (4.8x0.5 mm) - Plug-in use 92 series socket	- 2 pole - Faston 250 (6.3x0.8 mm) with rear flange mount	- 3 pole - Faston 250 (6.3x0.8 mm) with rear flange mount
			

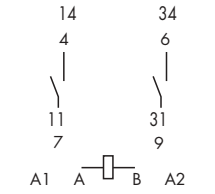
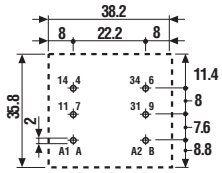
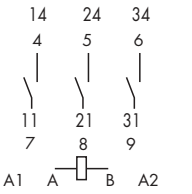
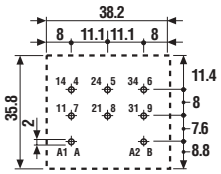
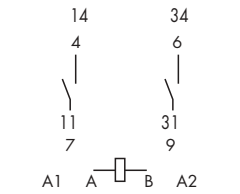
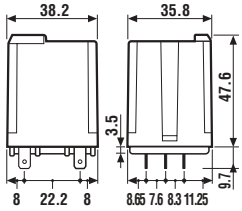
* With the $AgSnO_2$ material the maximum peak current is 100 A - 5 ms on NO contact.

Contact specifications				
Contact configuration		3 CO (3PDT)	2 CO (DPDT)	3 CO (3PDT)
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 in AC1	VA	4,000	4,000	4,000
Rated load in AC15 (230 V AC)	VA	750	750	750
Motor rating (230/400 V AC)	kW	0.8/1.5	0.8/—	0.8/1.5
Breaking capacity in DC1: 30/110/220 V	A	16/0.6/0.4	16/0.6/0.4	16/0.6/0.4
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 specifications				
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	2.2/1.3
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	$0.8\ U_N/0.6\ U_N$	$0.8\ U_N/0.6\ U_N$	$0.8\ U_N/0.6\ U_N$
Must drop-out voltage	AC/DC	$0.2\ U_N/0.1\ U_N$	$0.2\ U_N/0.1\ U_N$	$0.2\ U_N/0.1\ U_N$
Technical data				
Mechanical life AC/DC	cycles	$10 \cdot 10^6/30 \cdot 10^6$	$10 \cdot 10^6/30 \cdot 10^6$	$10 \cdot 10^6/30 \cdot 10^6$
Electrical life at rated load AC1	cycles	$100 \cdot 10^3$	$100 \cdot 10^3$	$100 \cdot 10^3$
Operate/release time	ms	10/10	10/10	10/10
Insulation according to EN 61810-1 ed. 2		4 kV/3	4 kV/3	4 kV/3
Insulation between coil and contacts (1.2/50 µs)	kV	6	6	6
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 I	RT I	RT I
Approvals (according to type):		CE ABS GOST RINA cULus VDE		

- *Plug-in or P.C.B. versions*
- *AC or DC coils*
- *3 mm gap between open contacts on NO (nPST-NO) option*
- *8 mm, 6 kV (1.2/50 µs) between coil and contacts (internal distance)*
- *Option with coil to contacts SELV insulation*
- *Sockets and accessories: see 92, 99 and 86 series*

*Distance between contacts ≥ 3 mm (EN 60335-1).

** With the $AgSnO_2$ material the maximum peak current is 100 A - 5 ms on NO contact.

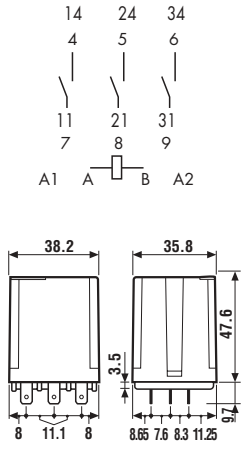
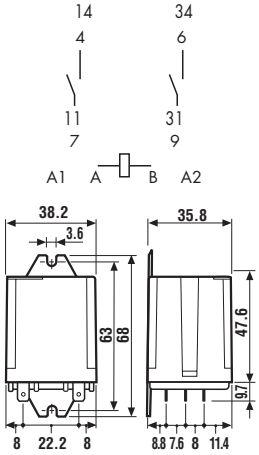
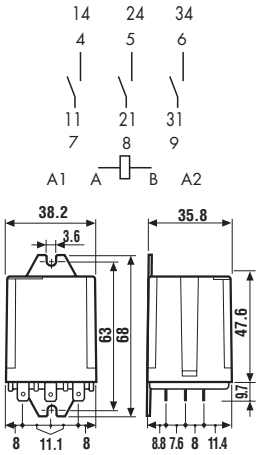
	62.22-0300	62.23-0300	62.32-0300
			
	- 2 NO (DPST-NO), 3 mm contact gap - P.C.B. mounting	- 3 NO (3PST-NO), 3 mm contact gap - P.C.B. mounting	- 2 NO (DPST-NO),3 mm contact gap - Faston 187 (4.8x0.5 mm) - Plug-in use 92 Series socket
	  Copper side view h = 51.1 mm	  Copper side view h = 51.1 mm	 
Contact specifications			
Contact configuration	2 NO (DPST-NO) 3 mm*	3 NO (3PST-NO) 3 mm*	2 NO (DPST-NO) 3 mm*
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 in AC1 VA	4,000	4,000	4,000
Rated load in AC15 (230 V AC) VA	750	750	750
Motor rating (230/400 V AC) kW	0.8/—	0.8/1.5	0.8/—
Breaking capacity in DC1: 30/110/220 V A	16/1.1/0.7	16/1.1/0.7	16/1.1/0.7
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 specifications			
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	3/3	3/3	3/3
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/0.6 U_N	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	0.2 U_N/0.1 U_N
Technical data			
Mechanical life AC/DC cycles	$10 \cdot 10^6/30 \cdot 10^6$	$10 \cdot 10^6/30 \cdot 10^6$	$10 \cdot 10^6/30 \cdot 10^6$
Electrical life at rated load AC1 cycles	$100 \cdot 10^3$	$100 \cdot 10^3$	$100 \cdot 10^3$
Operate/release time ms	20/4	20/4	20/4
Insulation according to EN 61810-1 ed. 2	4 kV/3	4 kV/3	4 kV/3
Insulation between coil and contacts (1.2/50 µs) kV	6	6	6
Dielectric strength between open contacts V AC	2,500	2,500	2,500
Ambient temperature range °C	–40...+50	–40...+50	–40...+50
Environmental protection	RT I	RT I	RT I
Approvals (according to type):	CE ABS BV SP GOST LR IRAM Lloyd's Register RINA S TÜV cULus VDE		

62

- *Plug-in or P.C.B. versions*
- *AC or DC coils*
- *3 mm gap between open contacts on NO (nPST-NO) option*
- *8 mm, 6 kV (1.2/50 µs) between coil and contacts (internal distance)*
- *Option with coil to contacts SELV insulation*
- *Sockets and accessories: see 92, 99 and 86 series*

*Distance between contacts ≥ 3 mm (EN 60335-1).

** With the $AgSnO_2$ material the maximum peak current is 100 A - 5 ms on NO contact.

	62.33-0300	62.82-0300	62.83-0300
			
	- 3NO (3PST-NO),3 mm contact gap - Faston 187 (4.8x0.5 mm) - Plug-in use 92 series socket	- 2 NO (DPST-NO),3 mm contact gap - Faston 250 (6.3x0.8 mm) with rear flange mount	- 3 NO (3PST-NO),3 mm contact gap - Faston 250 (6.3x0.8 mm) with rear flange mount
			
Contact specifications			
Contact configuration	3 NO (3PST-NO)3 mm*	2 NO (DPST-NO) 3 mm*	3 NO (3PST-NO) 3 mm*
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 in AC1 VA	4,000	4,000	4,000
Rated load in AC15 (230 V AC) VA	750	750	750
Motor rating (230/400 V AC) kW	0.8/1.5	0.8/—	0.8/1.5
Breaking capacity in DC1: 30/110/220 V A	16/1.1/0.7	16/1.1/0.7	16/1.1/0.7
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 specifications			
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	3/3	3/3	3/3
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/0.6 U_N	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	0.2 U_N/0.1 U_N
Technical data			
Mechanical life AC/DC cycles	$10 \cdot 10^6/30 \cdot 10^6$	$10 \cdot 10^6/30 \cdot 10^6$	$10 \cdot 10^6/30 \cdot 10^6$
Electrical life at rated load AC1 cycles	$100 \cdot 10^3$	$100 \cdot 10^3$	$100 \cdot 10^3$
Operate/release time ms	20/4	20/4	20/4
Insulation according to EN 61810-1 ed. 2	4 kV/3	4 kV/3	4 kV/3
Insulation between coil and contacts (1.2/50 µs) kV	6	6	6
Dielectric strength between open contacts V AC	2,500	2,500	2,500
Ambient temperature range °C	–40...+50	–40...+50	–40...+50
Environmental protection	RT I	RT I	RT I
Approvals (according to type):	CE ABS GOST RINA cULus VDE		

ORDERING INFORMATION

Example: a 62 series power relay + FASTON 250 (6.3x0.8 mm), rear flange mount with 2 NO (DPST-NO) contacts, coil rated at 12 V DC.

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

Series

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

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

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

Coil voltage
see coil specifications

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

B: Contact circuit
0 = CO (nPDT)
3 = NO (nPST), ≥ 3 mm contact gap
5 = CO (nPDT) version with coil to contacts SELV insulation
6 = NO (nPST), ≥ 3 mm contact gap, version with coil to contacts SELV insulation

D: Special versions
0 = Standard
5 = Top flange mount
6 = Rear flange mount
7 = Top 35 mm rail mount
8 = Rear 35 mm rail mount
9 = Type 62.82/83 without rear flange mount

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

Only combinations in the same row are possible

Preferred versions

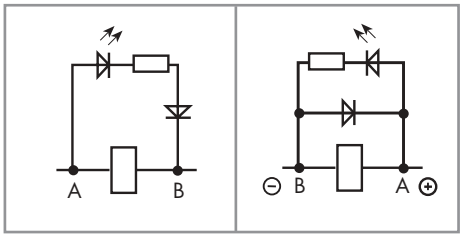
	coil version	A	B	C	D
62.22/23	AC-DC	0	0	0	0
62.32/33	AC-DC	0	0	4	0
62.82/83	AC-DC	0	0	0	0

All versions

	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	5	2 - 4	0 - 6 - 8
	AC	0 - 4	0	2 - 3 - 4 - 5	0 - 6 - 8
	AC	0 - 4	3	3	0 - 6 - 8
	AC	0 - 4	0	54	/
	DC	0 - 4	0	4 - 6 - 7	0 - 6 - 8
	DC	0 - 4	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	5	2 - 4	0 - 8
	AC	0 - 4	0	2 - 3 - 4 - 5	0 - 8
	AC	0 - 4	3	3	0 - 8
	DC	0 - 4	0	4 - 6 - 7	0 - 8
	DC	0 - 4	3	6	0 - 8

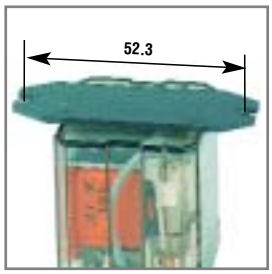
POSSIBLE OPTIONS

AC DC

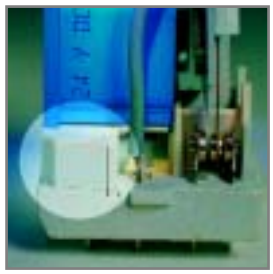


Option = 0030
0050

Option = 0060
0070



Option = 0005
TOP MOUNT FLANGE



Option = 0500 and 0600
COIL TO CONTACTS
PHYSICAL SEPARATOR FOR
SELV APPLICATIONS

Option = 0007
TOP 35mm RAIL MOUNT

LOCKABLE TEST BUTTON AND MECHANICAL FLAG INDICATOR (0040)

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.

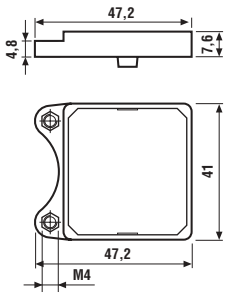
62

ACCESSORIES

062.10

062.10

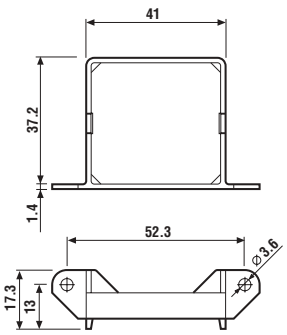
Mounting adaptor for types 62.3x and 62.8x.xxxx.xxx9 (M4)	062.10



062.60

062.60

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



060.72

Sheet of marker tags for 62 series relays (72 tags), 6x12mm	060.72

TECHNICAL DATA

INSULATION

Insulation according to EN 61810-1 ed. 2		insulation rated voltage V	400
		rated impulse withstand voltage kV	4
		pollution degree	3
		overvoltage category	III
Dielectric strength between adjacent contacts	V AC	2,500	

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 (for CO or nPDT)		3/— (for NO or nPST-NO)	
Vibration resistance (10...55)Hz, max. ± 1 mm: NO/NC	g/g	5/3			
Power lost to the environment		2 CO (DPDT)	3 CO (3PDT)	2 NO (DPST-NO)	3 NO (3PST-NO)
without contact current	W	1.3	1.3	3	3
with rated current	W	3.3	4.3	5	6
Recommended distance between relays mounted on P.C.B.s	mm	≥ 5			

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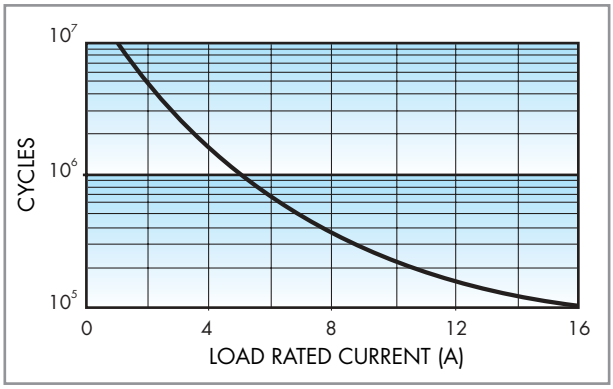
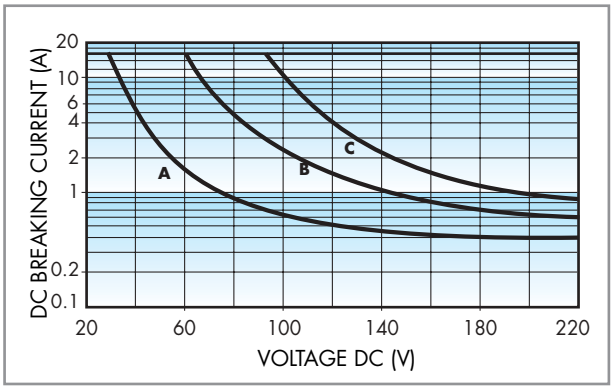
CONTACT SPECIFICATIONS

F 62



Electrical life vs AC1 load.

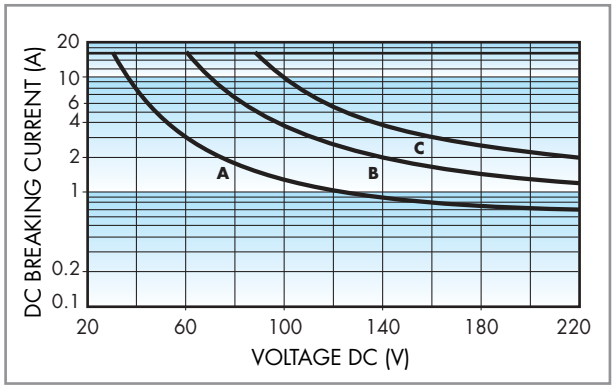
H 62 (CO/nPDT)



Breaking capacity for DC1 load.
A - Load applied to 1 contact
B - Load applied to 2 contacts in series
C - Load applied to 3 contacts in series

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

H 62 (NO/nPST-NO)



Breaking capacity for DC1 load.
A - Load applied to 1 contact
B - Load applied to 2 contacts in series
C - Load applied to 3 contacts in series

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

COIL SPECIFICATIONS

DC VERSION DATA

Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
6	**9**.006	4.8	6.6	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 U_{min}	Operating range U_{max}	Resistance R	Rated coil consumption I at U_N (50Hz)
V		V	V	Ω	mA
6	**8**.006	4.8	6.6	4.6	367
12	**8**.012	9.6	13.2	19	183
24	**8**.024	19.2	26.4	74	90
48	**8**.048	38.4	52.8	290	47
60	**8**.060	48	66	450	37
110	**8**.110	88	121	1,600	20
120	**8**.120	96	132	1,940	18.6
230	**8**.230	184	253	7,250	10.5
240	**8**.240	192	264	8,500	9.2
400	**8**.400	320	440	19,800	6

DC (NO/nPST-NO) VERSION DATA (≥ 3 mm)

Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
6	**9**.006	5.1	6.6	12	500
12	**9**.012	10.2	13.2	48	250
24	**9**.024	20.4	26.4	192	125
48	**9**.048	40.8	52.8	770	63
60	**9**.060	51	66	1,200	50
110	**9**.110	93.5	121	4,200	26
125	**9**.125	106.2	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 U_{min}	Operating range U_{max}	Resistance R	Rated coil consumption I at U_N (50Hz)
V		V	V	Ω	mA
6	**8**.006	5.1	6.6	4	540
12	**8**.012	10.2	13.2	14	275
24	**8**.024	20.4	26.4	62	130
48	**8**.048	40.8	52.8	220	70
60	**8**.060	51	66	348	55
110	**8**.110	93.5	121	1,200	30
120	**8**.120	106	137	1,350	24
230	**8**.230	196	253	5,000	14
240	**8**.240	204	264	6,300	12.5
400	**8**.400	340	440	14,700	7.8

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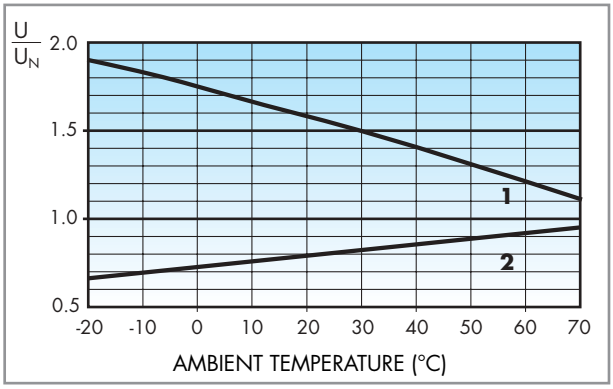
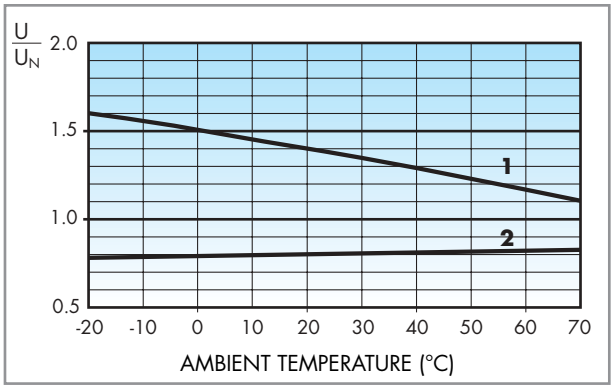
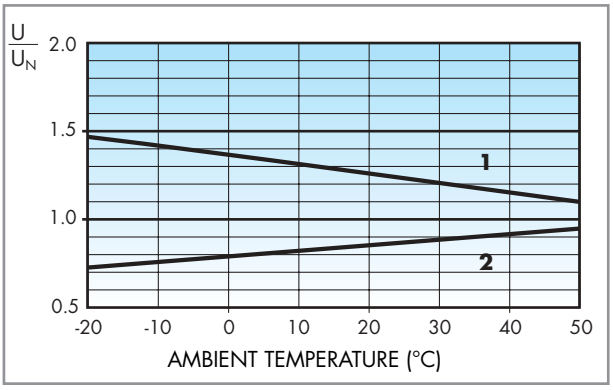
R 62 DC



R 62 AC

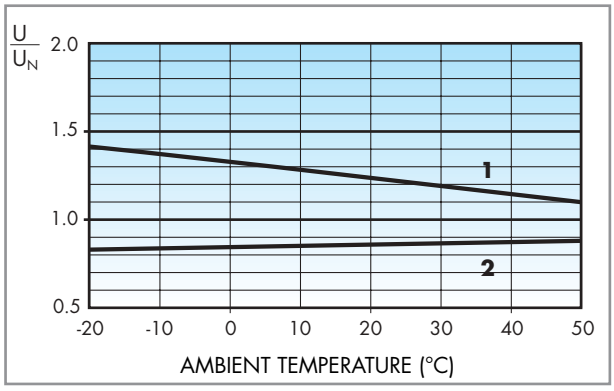


R 62 DC (NO/nPST-NO)



Operating range (DC type) vs ambient temperature.
1 - Max coil voltage permitted.
2 - Min pick-up voltage with coil at ambient temperature.

R 62 AC (NO/nPST-NO)



Operating range (AC type) vs ambient temperature.
1 - Max coil voltage permitted.
2 - Min pick-up voltage with coil at ambient temperature.


92.03

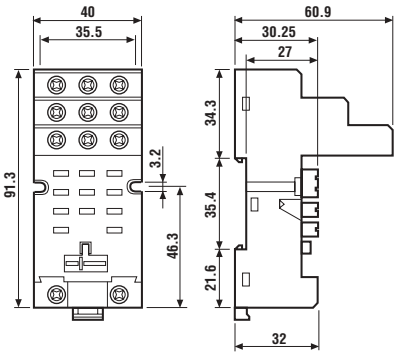
Approvals
(according to type):

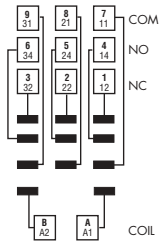
GOST

Relay type	62.32, 62.33	
Colour	BLUE	BLACK
Clamp terminal socket: panel or 35 mm rail (EN 50022) mount retaining clip 092.71 supplied with socket packaging code SMA	92.03	92.03.0
Metal retaining clip	092.71	
Identification tag	090.00.2	
Modules (see table below)	99.02	
Timer modules (see table below)	86.00, 86.10, 86.20	

- Rated values: 16 A - 250 V
- Insulation: ≥ 6 kV (1.2/50 µs) *between coil and contacts*
- Protection category: IP 20
- Ambient temperature: (–40...+70)°C
- Screw torque: 0.8 Nm
- Wire strip length: 10 mm
- Max wire size:

	solid wire	stranded wire
mm²	1x10 / 2x4	1x6 / 2x4
AWG	1x8 / 2x12	1x10 / 2x12





62

FOR 92.03 SOCKET:


86.00


86.10

86 Series Module Timers (see technical data pages 150/151/154)	
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
Mono-function: (12...24)V AC/DC; function AI; (1.5s...60min)	86.10.0.024.0000
Mono-function: (12...24)V AC/DC; function DI; (1.5s...60min)	86.20.0.024.0000

Approvals
(according to type): GOST


99.02

Approvals
(according to type):

GOST

99.02 coil indication and EMC suppression modules (see technical data page 209)		BLUE*
Diode** (+A1, standard polarity)	(6...220)V DC	99.02.3.000.00
Diode (+A2, non standard polarity)	(6...220)V DC	99.02.2.000.00
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 + Diode (+A2, non standard polarity)	(6...24)V DC	99.02.9.024.79
LED + Diode (+A2, non standard polarity)	(28...60)V DC	99.02.9.060.79
LED + Diode (+A2, non standard polarity)	(110...220)V DC	99.02.9.220.79
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 (62 kΩ/1W)	(110...240)V AC	99.02.8.230.07

* Modules in Black housing are available on request.

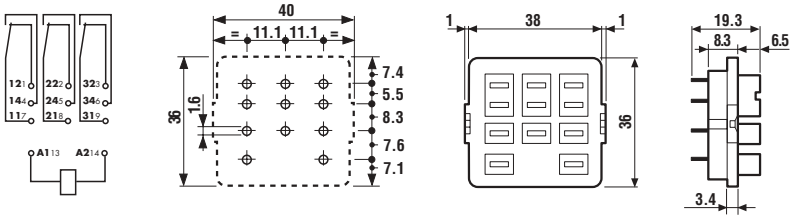
**For DC supply, apply the positive to terminal A1.


92.13

Relay type	62.32, 62.33	
Colour	BLUE	BLACK
P.C.B. socket retaining clip 092.54 supplied with socket packaging code SMA	92.13	92.13.0
Metal retaining clip	092.54	

Approvals (according to type):

- Rated values: 16 A - 250 V (10 A max for each contact circuit)
- Dielectric strength: ≥ 2.5 kV AC
- Ambient temperature: (–40…+70)°C



- 62.3X plug on 92.13 is 63.3 mm high

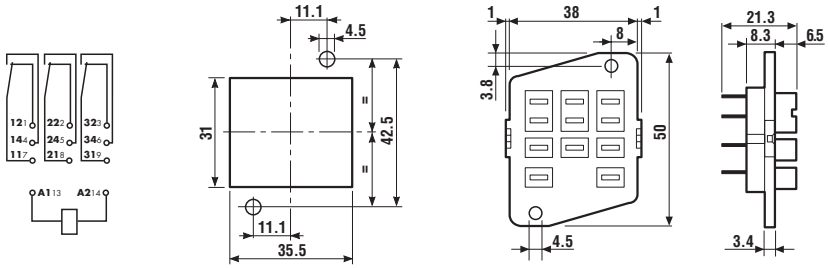
62


92.33

Relay type	62.32, 62.33
Colour	BLUE
Panel mount solder socket: mounted with M3 screw retaining clip 092.54 supplied with socket packaging code SMA	92.33
Metal retaining clip	092.54

Approvals (according to type):

- Rated values: 16 A - 250 V (10 A max for each contact circuit)
- Dielectric strength: ≥ 2.5 kV AC
- Ambient temperature: (–40…+70)°C



PACKAGING CODES

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

Code options according to the last three letters:

9 2 . 0 3	S M	A

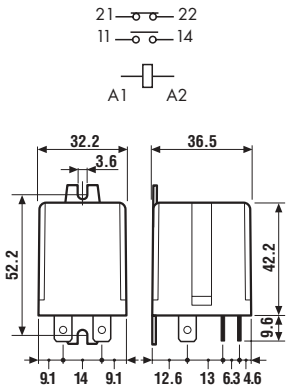
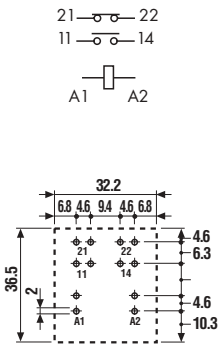
A Standard packaging

SM Metal retaining clip

9 2 . 0 3		

Without retaining clip

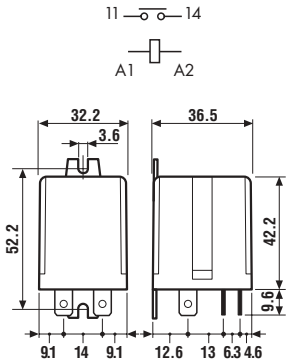
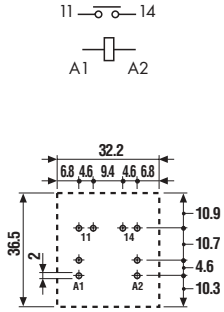
- *P.C.B. or flange mount*
- *AC or DC coils*

	65.31	65.61
		
	- 1NO+1NC (SPST-NO+SPST-NC) - Flange mount - Faston 250 (6.3x0.8 mm)	- 1NO+1NC (SPST-NO+SPST-NC) - P.C.B. mounting - Bifurcated terminals
		 Copper side view h = 46 mm

* With the $AgSnO_2$ material the maximum peak current is 100 A - 5 ms on NO contact.
** For 400 V applications, where requirements for pollution degree 2 are met.

Contact specifications			
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 in AC1	VA	5,000	5,000
Rated load in AC15 (230 V AC)	VA	1,000	1,000
Single phase motor rating (230 V AC)	kW	1.1	1.1
Breaking capacity in 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 specifications			
Nominal voltage (U_N)	V AC (50/60 Hz)	6 - 12 - 24 - 48 - 60 - 110 - 120 - 230 - 240 - 400	
	V DC	6 - 12 - 24 - 48 - 60 - 110 - 125 - 220	
Rated power AC/DC	VA (50 Hz)/W	2.2/1.3	2.2/1.3
Operating range	AC	$(0.8...1.1)U_N$	$(0.8...1.1)U_N$
	DC	$(0.85...1.1)U_N$	$(0.85...1.1)U_N$
Holding voltage	AC/DC	$0.8\ U_N/0.6\ U_N$	$0.8\ U_N/0.6\ U_N$
Must drop-out voltage	AC/DC	$0.2\ U_N/0.1\ U_N$	$0.2\ U_N/0.1\ U_N$
Technical data			
Mechanical life AC/DC	cycles	$10 \cdot 10^6/30 \cdot 10^6$	$10 \cdot 10^6/30 \cdot 10^6$
Electrical life at rated load AC1	cycles	$80 \cdot 10^3$	$80 \cdot 10^3$
Operate/release time	ms	10/12	10/12
Insulation according to EN 61810-1 ed. 2		4 kV/3	4 kV/3
Insulation between coil and contacts (1.2/50 µs)	kV	4	4
Dielectric strength between open contacts	V AC	1,500	1,500
Ambient temperature range	°C	–40...+75	–40...+75
Environmental protection		RT I	RT I
Approvals (according to type):		CE B SP GOST EAC cULus VDE	

- *P.C.B. or flange mount*
- *AC or DC coils*
- *3 mm gap between open contacts on NO (SPST-NO) version*

	65.31-0300	65.61-0300
		
	- 1NO (SPST-NO) 3mm contact gap - Flange mount - Faston 250 (6.3x0.8 mm)	- 1NO (SPST-NO) 3mm contact gap - P.C.B. mounting - Bifurcated terminals
		 Copper side view h = 42 mm

65

* Distance between contacts ≥ 3 mm (EN 60335-1).
** With the $AgSnO_2$ material the maximum peak current is 100 A - 5 ms on NO contact.
***For 400 V applications, where requirements for pollution degree 2 are met.

Contact specifications			
Contact configuration		1 NO 3 mm*	1 NO 3 mm*
Rated current/Maximum peak current	A	30/50**	30/50**
Rated voltage/Maximum switching voltage	V AC	250/400***	250/400***
Rated load in AC1	VA	7,500	7,500
Rated load in AC15 (230 V AC)	VA	1,250	1,250
Single phase motor rating (230 V AC)	kW	1.5	1.5
Breaking capacity in DC1: 30/110/220 V	A	30/1.1/0.7	30/1.1/0.7
Minimum switching load	mW (V/mA)	1,000 (10/10)	1,000 (10/10)
Standard contact material		AgCdO	AgCdO
Coil specifications			
Nominal voltage (U_N)	V AC (50/60 Hz)	6 - 12 - 24 - 48 - 60 - 110 - 120 - 230 - 240 - 400	
	V DC	6 - 12 - 24 - 48 - 60 - 110 -125 - 220	
Rated power AC/DC	VA (50 Hz)/W	2.2/1.3	2.2/1.3
Operating range	AC	$(0.8...1.1)U_N$	$(0.8...1.1)U_N$
	DC	$(0.85...1.1)U_N$	$(0.85...1.1)U_N$
Holding voltage	AC/DC	0.8 U_N/0.6 U_N	0.8 U_N/0.6 U_N
Must drop-out voltage	AC/DC	0.2 U_N/0.1 U_N	0.2 U_N/0.1 U_N
Technical data			
Mechanical life AC/DC	cycles	$10 \cdot 10^6/30 \cdot 10^6$	$10 \cdot 10^6/30 \cdot 10^6$
Electrical life at rated load AC1	cycles	$50 \cdot 10^3$	$50 \cdot 10^3$
Operate/release time	ms	15/4	15/4
Insulation according to EN 61810-1 ed. 2		4 kV/3	4 kV/3
Insulation between coil and contacts (1.2/50 µs)	kV	4	4
Dielectric strength between open contacts	V AC	2,500	2,500
Ambient temperature range	°C	–40...+75	–40...+75
Environmental protection		RT I	RT I
Approvals (according to type):		CE EAC GOST cULus VDE	

ORDERING INFORMATION

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

6	5	.	6		1	.	9	.	0	1	2	.	A: 0	B: 0	C: 0	D: 0

Series

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

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

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

Coil voltage
see coil specifications

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

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

C: Options
0 = None

D: Special versions
0 = Standard
5 = Top flange mount
7 = Top 35 mm rail (EN 50022) mount
8 = Rear 35 mm rail (EN 50022) mount

Only combinations in the same row are possible

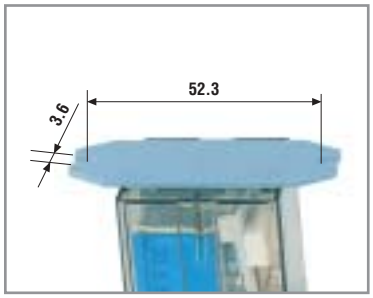
Preferred versions

	coil version	A	B	C	D
65.31	AC-DC	0	0	0	0
65.61	AC-DC	0	0	0	0

All versions

	coil version	A	B	C	D
65.31	AC-DC	0 - 4	0 - 3	0	0 - 5 - 7 - 8
65.61	AC-DC	0 - 4	0 - 3	0	0

POSSIBLE OPTIONS



Option = 0005
TOP FLANGE MOUNT

Option = 0008
REAR 35 mm RAIL MOUNT

TECHNICAL DATA

INSULATION

Insulation according to EN 61810-1 ed. 2	insulation rated voltage	V	250
	rated impulse withstand voltage	kV	4
	pollution degree		3
	overvoltage category		III

CONDUCTED DISTURBANCE IMMUNITY

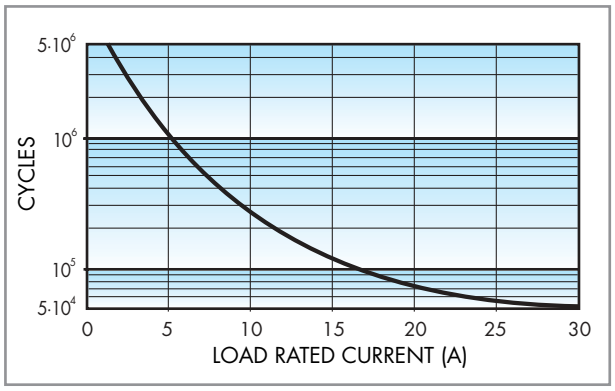
Burst (5...50)ns, 5 kHz, on A1 - A2	EN 61000-4-4	level 4 (4 kV)
Surge (1.2/50 µs) on A1 - A2 (differential mode)	EN 61000-4-5	level 4 (4 kV)

OTHER DATA

Bounce time: NO/NC		ms	5/6 (for 1NO+1NC or SPST-NO+SPST-NC)	7/– (for NO or SPST-NO)
Vibration resistance (10...55)Hz, max. ± 1 mm: NO/NC		g/g	10/4	
Power lost to the environment			1 NO + 1 NC (SPST-NO+SPST-NC)	1 NO (SPST-NO)
	without contact current	W	1.3	1.3
	with rated current	W	2.1	3.1
Recommended distance between relays mounted on P.C.B.s		mm	≥ 5	

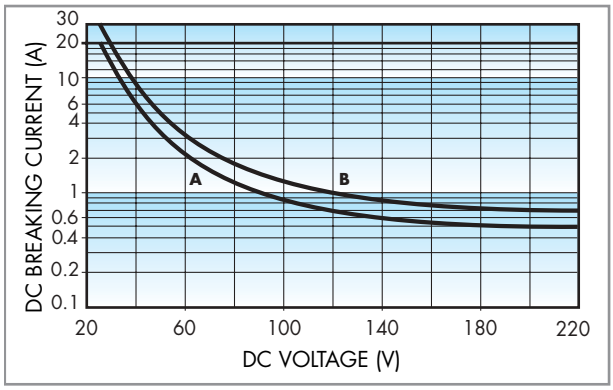
CONTACT SPECIFICATIONS

F 65



Electrical life vs AC1 load.

H 65



Breaking capacity for DC1 load.
Load applied to 1 contact
A - 1 NO + 1 NC type
B - 1 NO type

- When switching a resistive load (DC1) having voltage and current values under the curve the expected electrical life is ≥ 100·10³ cycles.
- In case of DC13 loads the connection of a diode in parallel with the load will permit the same electrical life as for a DC1 load.

Note: the release time of load will be increase.

COIL SPECIFICATIONS

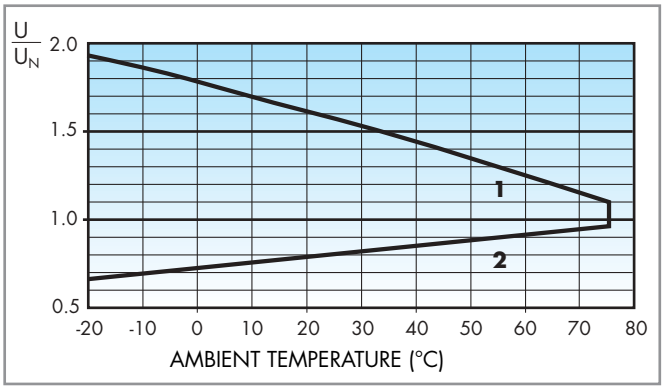
DC VERSION DATA

Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
6	**9**.006	5.1	6.6	28	214
12	**9**.012	10.2	13.2	110	109
24	**9**.024	8.8	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	100	137.5	12,000	10.4
220	**9**.220	176	242	37,300	5.8

AC VERSION DATA

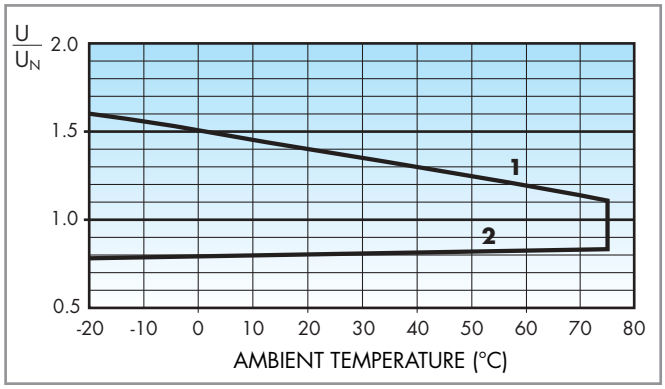
Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Rated coil consumption I at U_N (50Hz)
V		V	V	Ω	mA
6	**8**.006	4.8	6.6	4.6	367
12	**8**.012	9.6	13.2	19	183
24	**8**.024	19.2	26.4	74	90
48	**8**.048	38.4	52.8	290	47
60	**8**.060	48	66	450	37
110	**8**.110	88	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



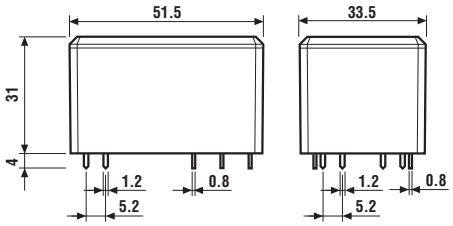
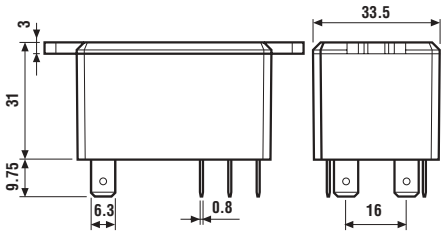
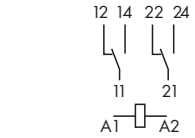
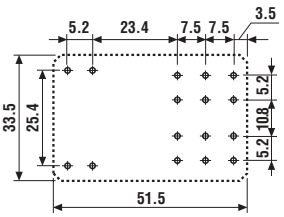
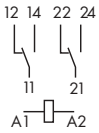
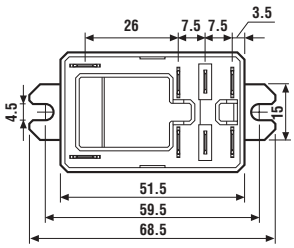
Operating range (DC type) vs ambient temperature.
1 - Max coil voltage permitted.
2 - Min pick-up voltage with coil at ambient temperature.

R 65 AC



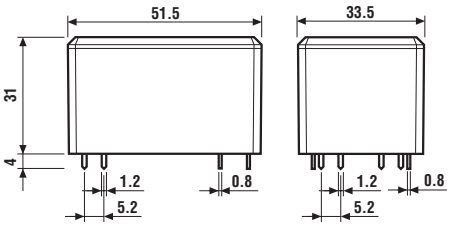
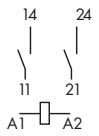
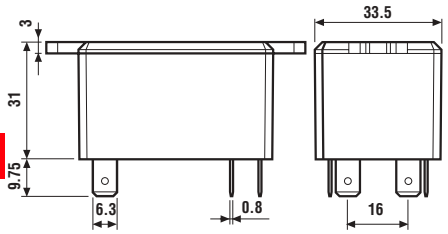
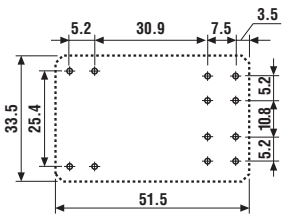
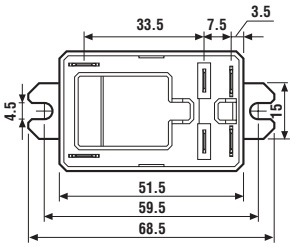
Operating range (AC type) vs ambient temperature.
1 - Max coil voltage permitted.
2 - Min pick-up voltage with coil at ambient temperature.

- *P.C.B. or top flange mount with Faston 250*
- *AC or DC coil versions*
- *Double insulation between coil and contacts according to EN 60335-1 (VDE 0700), with safe separation and 8 mm clearance and creepage distance*

	66.22	66.82
		
	- 2 pole - P.C.B. mounting with bifurcated terminals	- 2 pole - Faston 250 (6.3x0.8 mm) with top flange mount
	 66.22  66.82	  Copper side view
		 

Contact specifications			
Contact configuration		2 CO (DPDT)	2 CO (DPDT)
Rated current/Maximum peak current	A	30/50 (NO) - 10/20 (NC)	30/50 (NO) - 10/20 (NC)
Rated voltage/Maximum switching voltage	V AC	250/440	250/440
Rated load in AC1	VA	7,500 (NO) - 2,500 (NC)	7,500 (NO) - 2,500 (NC)
Rated load in AC15 (230 V AC)	VA	1,200 (NO)	1,200 (NO)
Single phase motor rating (230 V AC)	kW	1.5 (NO)	1.5 (NO)
Breaking capacity in DC1: 30/110/220 V	A	25/0.7/0.3 (NO)	25/0.7/0.3 (NO)
Minimum switching load	mW (V/mA)	1,000 (10/10)	1,000 (10/10)
Standard contact material		AgCdO	AgCdO
Coil specifications			
Nominal voltage (U_N)	V AC (50/60 Hz)	6 - 12 - 24 - 110/115 - 120/125 - 230 - 240	
	V DC	6 - 12 - 24 - 110 - 125	
Rated power AC/DC	VA (50 Hz)/W	3.6/1.7	3.6/1.7
Operating range	AC	$(0.8...1.1)U_N$	$(0.8...1.1)U_N$
	DC	$(0.8...1.1)U_N$	$(0.8...1.1)U_N$
Holding voltage	AC/DC	$0.8\ U_N/0.5\ U_N$	$0.8\ U_N/0.5\ U_N$
Must drop-out voltage	AC/DC	$0.2\ U_N/0.1\ U_N$	$0.2\ U_N/0.1\ U_N$
Technical data			
Mechanical life AC/DC	cycles	$10 \cdot 10^6$	$10 \cdot 10^6$
Electrical life at rated load AC1	cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Operate/release time	ms	8/15	8/15
Insulation according to EN 61810-1 ed. 2		6 - 4 kV/3	6 - 4 kV/3
Insulation between coil and contacts (1.2/50 µs)	kV	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts	V AC	1,500	1,500
Ambient temperature range	°C	–40...+70	–40...+70
Environmental protection		RT II	RT II
Approvals (according to type):		CE	

- *P.C.B. or top flange mount with Faston 250*
- *AC or DC coil versions*
- *Double insulation between coil and contacts according to EN 60335-1 (VDE 0700), with safe separation and 8 mm clearance and creepage distance*

	66.22-0300	66.82-0300
		
	- 2 NO (DPST-NO) - P.C.B. mounting with bifurcated terminals	- 2 NO (DPST-NO) - Faston 250 (6.3x0.8 mm) with top flange mount
	 66.22-0300	
	 66.82-0300	 Copper side view
		

Contact specifications			
Contact configuration		2 NO (DPST-NO)	2 NO (DPST-NO)
Rated current/Maximum peak current	A	30/50	30/50
Rated voltage/Maximum switching voltage	V AC	250/440	250/440
Rated load in AC1	VA	7,500	7,500
Rated load in AC15 (230 V AC)	VA	1,200	1,200
Single phase motor rating (230 V AC)	kW	1.5	1.5
Breaking capacity in DC1: 30/110/220 V	A	25/0.7/0.3	25/0.7/0.3
Minimum switching load	mW (V/mA)	1,000 (10/10)	1,000 (10/10)
Standard contact material		AgCdO	AgCdO
Coil specifications			
Nominal voltage (U_N)	V AC (50/60 Hz)	6 - 12 - 24 - 110/115 - 120/125 - 230 - 240	
	V DC	6 - 12 - 24 - 110 -125	
Rated power AC/DC	VA (50 Hz)/W	3.6/1.7	3.6/1.7
Operating range	AC	$(0.8...1.1)U_N$	$(0.8...1.1)U_N$
	DC	$(0.8...1.1)U_N$	$(0.8...1.1)U_N$
Holding voltage	AC/DC	0.8 U_N/0.5 U_N	0.8 U_N/0.5 U_N
Must drop-out voltage	AC/DC	0.2 U_N/0.1 U_N	0.2 U_N/0.1 U_N
Technical data			
Mechanical life AC/DC	cycles	$10 \cdot 10^6$	$10 \cdot 10^6$
Electrical life at rated load AC1	cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Operate/release time	ms	8/10	8/10
Insulation according to EN 61810-1 ed. 2		6 - 4 kV/3	6 - 4 kV/3
Insulation between coil and contacts (1.2/50 µs)	kV	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts	V AC	1,500	1,500
Ambient temperature range	°C	–40...+70	–40...+70
Environmental protection		RT II	RT II
Approvals (according to type):		CE	

ORDERING INFORMATION

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

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

Series

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

No. of poles
2 = 2 CO (DPDT) 30 A

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

Coil voltage
see coil specifications

A: Contact material
0 = Standard AgCdO

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

C: Options
0 = None

D: Special versions
0= Standard
1 = Wash tight (RT III)
7 = Top 35 mm rail (EN 50022) mount

Only combinations in the same row are possible

Preferred versions

	coil version	A	B	C	D
62.22	AC-DC	0	0	0	1
62.82	AC-DC	0	0	0	0

All versions

	coil version	A	B	C	D
62.22	AC-DC	0	0 - 3	0	1
62.82	AC-DC	0	0 - 3	0	0 - 7

TECHNICAL DATA

INSULATION

Insulation according to EN 61810-1 ed. 2		insulation rated voltage V	440
		rated impulse withstand voltage kV	4
		pollution degree	3
		overvoltage category	III
Dielectric strength between adjacent contacts	V AC	2,500	

CONDUCTED DISTURBANCE IMMUNITY

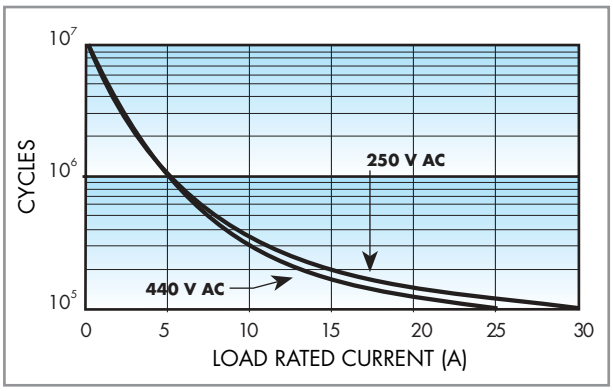
Burst (5...50)ns, 5 kHz, on A1 - A2	EN 61000-4-4	level 4 (4 kV)
Surge (1.2/50 µs) on A1 - A2 (differential mode)	EN 61000-4-5	level 4 (4 kV)

OTHER DATA

Bounce time: NO/NC		ms	7/10
Power lost to the environment	without contact current	W	2.3
	with rated current	W	5
Recommended distance between relays mounted on P.C.B.s		mm	20

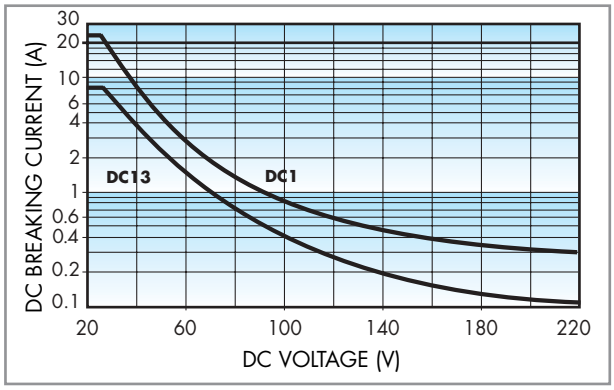
CONTACT SPECIFICATIONS

F 66



Electrical life vs AC1 load.

H 66



Breaking capacity for DC1 load and DC13 (L/R=100ms).

- When switching a resistive load (DC1) having voltage and current values under the curve the expected electrical life is ≥ $100 \cdot 10^3$ cycles.
- In case of DC13 loads the connection of a diode in parallel with the load will permit the same electrical life as for a DC1 load.

Note: the release time of load will be increase.

66

COIL SPECIFICATIONS

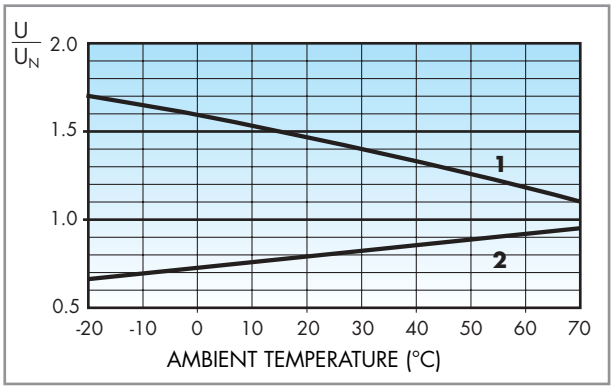
DC VERSION DATA

Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Rated coil consumption I at U_N
V		V	V	Ω	mA
6	**9**.006	4.8	6.6	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 VERSION DATA

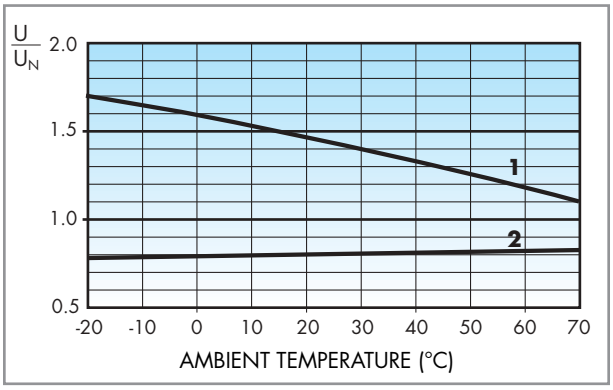
Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Rated coil consumption I at U_N (50Hz)
V		V	V	Ω	mA
6	**8**.006	4.8	6.6	3	600
12	**8**.012	9.6	13.2	11	300
24	**8**.024	19.2	26.4	50	150
110/115	**8**.110	88	126	930	32.6
120/125	**8**.120	96	137	1,050	30
230	**8**.230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

R 66 DC



Operating range (DC type) vs ambient temperature.
1 - Max coil voltage permitted.
2 - Min pick-up voltage with coil at ambient temperature.

R 66 AC

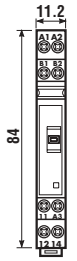


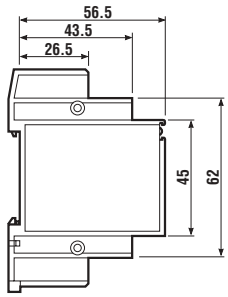
Operating range (AC type) vs ambient temperature.
1 - Max coil voltage permitted.
2 - Min pick-up voltage with coil at ambient temperature.

19.21

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

- One module (11.2 mm) wide
- 1 pole
- Feedback contact





Contact specifications		
Contact configuration		1 CO (SPDT)
Rated current/Max. peak current	A	10/15
Rated voltage/Max. switching voltage	V AC	250/400
Rated load in AC1	VA	2,500
Rated load in AC15 (230 V AC)	VA	500
Single phase motor rating (230 V AC)	kW	0.44
Breaking capacity in 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 specifications		
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	$10 \cdot 10^6$
Electrical life at rated load in AC1	cycles	$100 \cdot 10^3$
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):		CE GOST

ORDERING INFORMATION

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

1 9	.	2	1	.	0	.	0 2 4	.	0	0	0	0

Series

Type
2 = 35 mm rail (EN 50022) mount, 11.2 mm

No. of poles
1 = 1 pole

Supply voltage
024 = 24 V

Supply version
0 = AC (50/60 Hz)/DC

TECHNICAL DATA

CONTACT SPECIFICATIONS

Nominal rate lamps		
- incandescent (230 V)	W	1,000
- compensated fluorescent (230 V)	W	350
- uncompensated fluorescent (230 V)	W	500
- halogen (230 V)	W	1,000

INSULATION

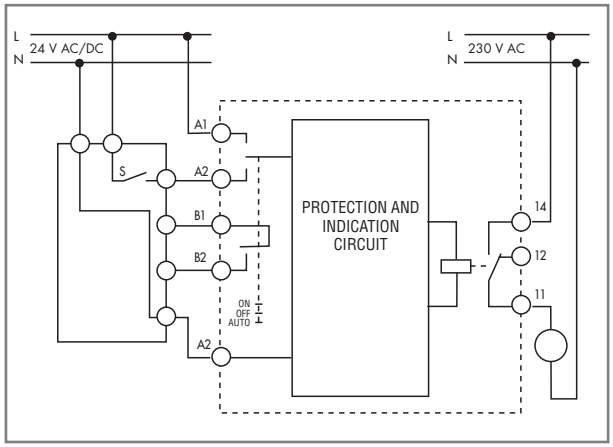
Dielectric strength		
- between supply and contacts	V AC	3,000
- between open contacts	V AC	1,000

19

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
	mm^2	1x6 / 2x2.5	1x4 / 2x1.5
	AWG	1x10 / 2x14	1x12 / 2x16
Screw torque	Nm	0.5	

WIRING DIAGRAM



The max switching voltage between B_1 and B_2 terminal is 24 V AC/DC (300 mA).

SELECTOR POSITION

Selector switch	Control switch (S)	Output relay	LED	B1–B2 contact
AUTO	**Closed**	**ON**	**ON**	**Closed**
	Open	**OFF**	**OFF**	**Closed**
ON	—	**ON**	**ON**	**Open**
OFF	—	**OFF**	**OFF**	**Open**

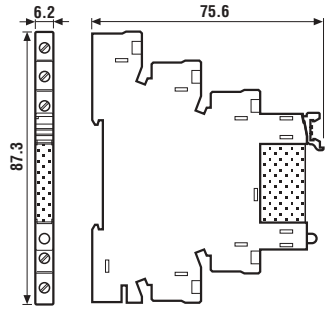
The B1 - B2 contact signals when the selector switch is in the Auto position.
The LED indicates the state of the Modular relay's output contacts.

ACCESSORIES

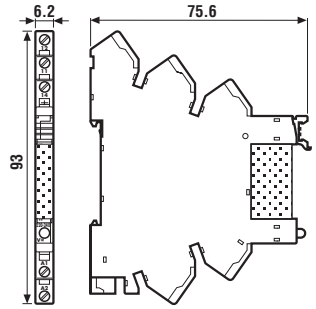
Sheet of marker tags (40 tags), 8x10 mm	019.40

- *Relay interface modules for use with PLC systems, 6.2 mm wide*
- *Sensitive DC coil or AC/DC coil version*
- *Supplied with integral coil indication and protection circuit*
- *Instant removal of relay using plastic retaining clip*
- *35 mm rail (EN 50022) mounting*

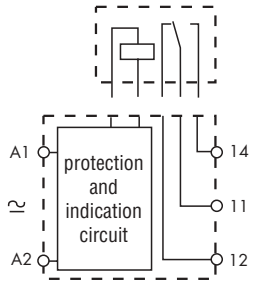
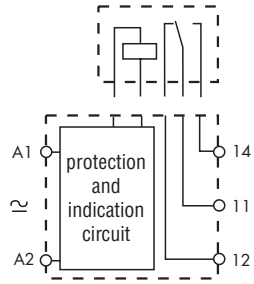
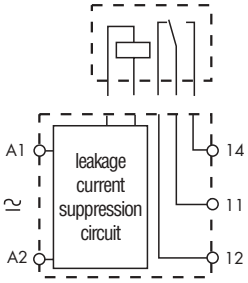
38.51



38.61



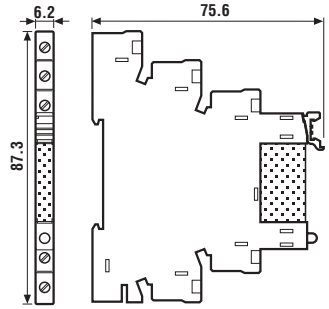
* for 400 V applications, requirements for pollution degree 2 are met.

		38.51	38.61	38.51.3 / 38.61.3
				
		- Screw terminal - Electromechanical relay - 35 mm rail mounting	- Screwless terminal - Electromechanical relay - 35 mm rail mounting	- Leakage current suppression - Electromechanical relay - 35 mm rail mounting
				
Contact specifications				
Contact configuration		1 CO (SPDT)	1 CO (SPDT)	1 CO (SPDT)
Rated current/Maximum peak current	A	6/10	6/10	6/10
Rated voltage/Maximum switching voltage	V AC	250/400*	250/400*	250/400*
Rated load in AC1	VA	1,500	1,500	1,500
Rated load in AC15 (230 V AC)	VA	300	300	300
Single phase motor rating (230 V AC)	kW	—	—	—
Breaking capacity in DC1: 30/110/220 V	A	6/0.2/0.15	6/0.2/0.15	6/0.2/0.15
Minimum switching load	mW (V/mA)	500 (12/10)	500 (12/10)	500 (12/10)
Standard contact material		AgNi	AgNi	AgNi
Coil specifications				
Nominal voltage (U_N)	V DC/AC	12 - 24 - 48 - 60 - (110...125) - (220...240)		(110...125) / (230...240)AC only
	V DC	6 - 12 - 24 - 48 - 60 (non polarized)		—
Rated power AC/DC	VA (50 Hz)/W	see page 102	see page 102	1/1 / 0.5/—
Operating range	AC/DC	(0.8...1.1)U_N	(0.8...1.1)U_N	(0.8...1.1)U_N / (0.8...1.1)U_N AC only
	DC	(0.8...1.2)U_N	(0.8...1.2)U_N	(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	0.6 U_N / 0.6 U_N
Must drop-out voltage	AC/DC	0.1 U_N / 0.05 U_N	0.1 U_N / 0.05 U_N	44 V / 92 V
Technical data				
Mechanical life AC/DC	cycles	—/10 · 10^6	—/10 · 10^6	—/10 · 10^6
Electrical life at rated load AC1	cycles	60 · 10^3	60 · 10^3	60 · 10^3
Operate/release time	ms	5/6	5/6	5/6
Insulation according to EN 61810-1 ed. 2		4 kV/3	4 kV/3	4 kV/3
Insulation between coil and contacts (1.2/50 µs)	kV	6 (8 mm)	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts	V AC	1,000	1,000	1,000
Ambient temperature range (≤ 60 V/≥ 60 V)	°C	–40...+70/–40...+55	–40...+70/–40...+55	—/–40...+55
Protection category		IP20	IP20	IP20
Approvals relay (according to type):		GOST cULus VDE		

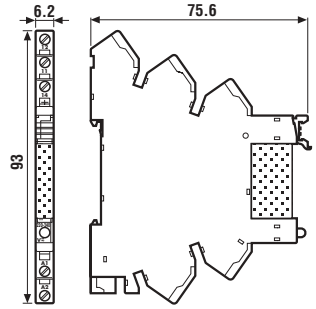
38

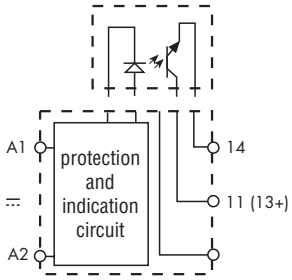
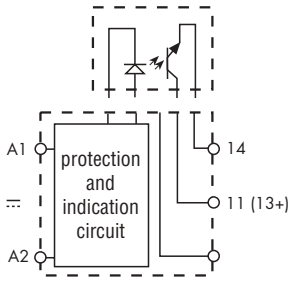
- *Relay interface modules for use with PLC systems, 6.2 mm wide*
- *Sensitive DC coil or AC/DC coil version*
- *Supplied with integral coil indication and protection circuit*
- *Instant removal of relay using plastic retaining clip*
- *35 mm rail (EN 50022) mounting*

38.81



38.91



	38.81/38.91	38.81.3/38.91.3
		
	- Screw terminal - SSR relay - 35 mm rail mounting	- Leakage current suppression - SSR relay - 35 mm rail 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	(24...240)AC
Minimum switching current	mA	1	0.05	22	1	0.05	22
Max "OFF-state" leakage current	µA	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							
Nominal voltage	V	24 - 60 DC			(120...125)AC/DC - (230...240)AC		
Operating range	V DC	24 V: (16.8...30)V	- 60V: (35.6...62)V		125 V: (94...138)V	- 240 V: (184...264)V	
Control current	mA	24 V: 7 mA	- 60V: 3 mA		125 V: 8 mA	- 240 V: 7 mA	
Release voltage	V DC	24 V: 10 V DC	- 60V: 20 V DC		125 V: 44 V AC	- 240 V: 72 V AC	
Impedance	Ω	24 V: 3.200	- 60V: 21,300		—		
Technical data							
Operate/release time	µs	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 (according to type):		cULus					

ORDERING INFORMATION

ELECTROMECHANICAL RELAY (EMR)

Example: a 38 series relay interface module with 1 CO (SPDT) contact, with coil rated at 12 V DC.

3 8	. 5	1	. 7	. 0 1 2	. 0	0	5	0
					A	B	C	D

Series

Type
5 = Electromechanical relay, with screw terminal
6 = Electromechanical relay, with screwless terminal

No. of poles
1 = 1 pole, 6 A

Coil version
0 = AC (50/60 Hz)/ DC
3 = Leakage current suppression for (110...125)V AC/DC - (230...240)V AC only
7 = Sensitive DC

Coil voltage
see coil specifications

D: Special versions
0 = Standard

C: Options
5 = Standard DC
6 = Standard AC/DC

B: Contact circuit
0 = CO (nPDT)

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

SOLID STATE RELAY (SSR)

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

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

Series

Type
8 = SSR relay, with screw terminal
9 = SSR relay, with screwless terminal

Output
1 = 1 NO (SPST-NO)

Supply version
3 = Leakage current suppression for (110...125)V AC/DC and (230...240)V AC only
7 = DC

Supply voltage
see input specifications

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

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

TECHNICAL DATA

INSULATION

Insulation according to EN 61810-1 ed. 2	insulation rated voltage	V	250
	rated impulse withstand voltage	kV	4
	pollution degree		3
	overvoltage category		III

CONDUCTED DISTURBANCE IMMUNITY

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

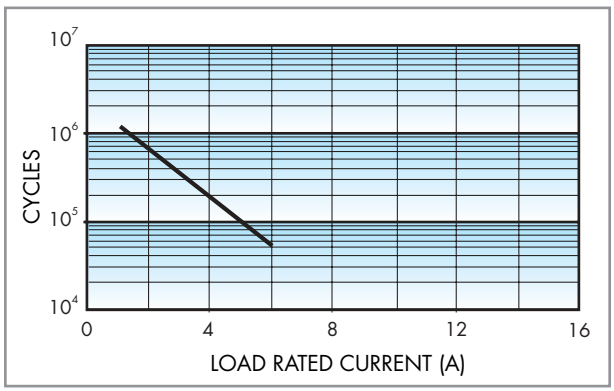
OTHER DATA

Bounce time: NO/NC		ms	1/6		
Vibration resistance (10...55)Hz, max. ± 1 mm: NO/NC		g/g	10/5		
Power lost to the environment	without contact current	W	0.2 (12 V) - 0.9 (240 V)		
	with rated current	W	0.5 (12 V) - 1.5 (240 V)		
Wire strip length		mm	10		
			38.51		38.61	
⏀ Screw torque		Nm	0.5		—	
Max wire size			solid cable	stranded cable	solid cable	stranded cable
		mm^2	1x2.5 / 2x1.5	1x2.5 / 2x1.5	1x2.5	1x2.5
		AWG	1x14 / 2x16	1x14 / 2x16	1x14	1x14

38

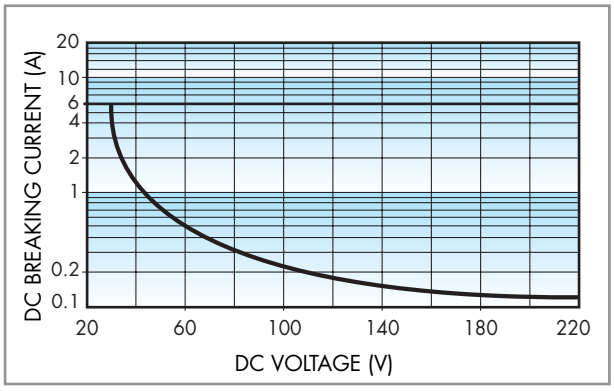
CONTACT SPECIFICATIONS

F 38



Electrical life vs AC1 load.

H 38



Breaking capacity in DC1 load.

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

ELECTROMECHANICAL RELAY

COIL SPECIFICATIONS

AC/DC VERSION DATA

Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Rated coil consumption I at U_N	Power consumption P at U_N
V		V	V	mA	W
12	**0**.012	9.8	13.2	16	0.2
24	**0**.024	19.2	26.4	12	0.2
48	**0**.048	38.4	52.8	6.9	0.3
60	**0**.060	48	66	7	0.5
110...125	**0**.125	88	138	5(*)	0.6(*)
220...240	**0**.240	184	264	4(*)	0.9(*)

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

DC VERSION DATA (sensitive)

Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Rated coil consumption I at U_N	Power consumption P at U_N
V		V	V	mA	W
6	**7**.006	5	7.2	35	0.2
12	**7**.012	9.8	14.4	15.2	0.2
24	**7**.024	18.2	28.8	10.4	0.3
48	**7**.048	35	57.6	6.3	0.3
60	**7**.060	43.5	72	7	0.4

TYPE 38.51.3/38.61.3 DATA

Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Must drop out U	Rated coil consumption I at U_N	Power consumption P at U_N
V		V	V		mA	W
(110...125) AC/DC	**3**.125	94	138	44	8(*)	1(*)
(230...240) AC	**3**.240	184	264	92	7(*)	0.5(*)

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

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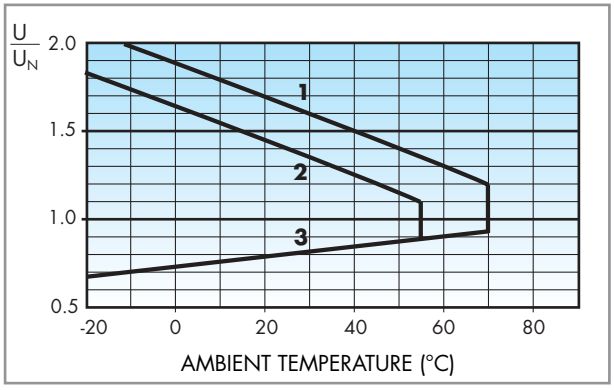
R 38



Operating range Vs ambient temperature.
1 - Max coil voltage permitted at nominal load (≤ 60 V versions).
2 - Max coil voltage permitted at nominal load (≥ 60 V versions).
3 - Min pick-up voltage with coil at ambient temperature.

SOLID STATE RELAY

TECHNICAL DATA

OTHER DATA

Power lost to the environment	without contact current	W	0.17			
	with rated current	W	0.4			
Wire strip length		mm	10			
			38.81		38.91	
⏀ Screw torque		Nm	0.5		—	
Max wire size			solid cable	stranded cable	solid cable	stranded cable
		mm^2	1x2.5 / 2x1.5	1x2.5 / 2x1.5	1x2.5	1x2.5
		AWG	1x14 / 2x16	1x14 / 2x16	1x14	1x14

INPUT SPECIFICATION

DC VERSION DATA

Nominal voltage U_N	Supply code	Operating range U_{min}	Operating range U_{max}	Release voltage	Control current I at U_N
V		V	V	V	mA
24	**7**.024	16.8	30	10	10.5
60	**7**.060	35.6	72	20	6.5

TYPE 38.81.3/38.91.3 DATA

Nominal voltage U_N	Supply code	Operating range U_{min}	Operating range U_{max}	Release voltage U	Rated coil consumption I at U_N	Power consumption P at U_N
V		V	V		mA	W
110...125 AC/DC	**3**.125	94	138	44	8(*)	1(*)
230...240 AC	**3**.240	184	264	72	5.6(*)	0.5(*)

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

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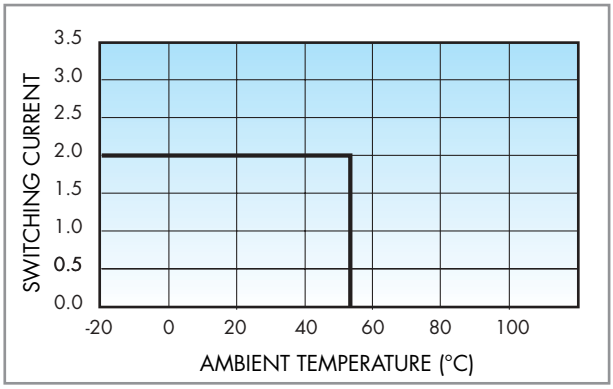
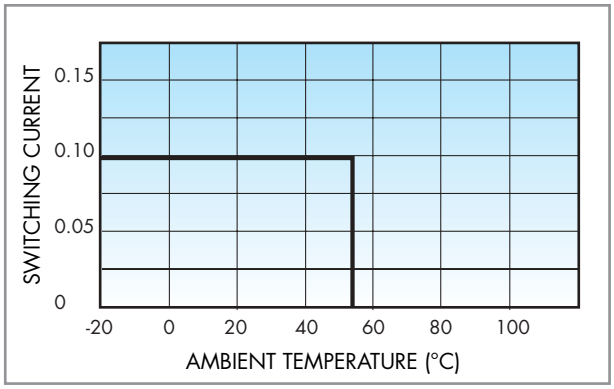
OUTPUT SPECIFICATION

L 38/2A



Type 38.81/91 (2 A - 24 V DC and 2 A - 240 V AC)
Switching current vs ambient temperature.

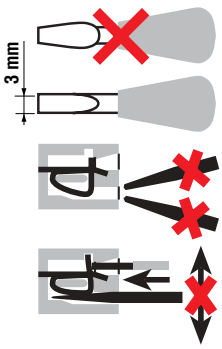
L 38/0.1A



Type 38.81/91 (100 mA - 48 V DC)
Switching current vs ambient temperature.

COMBINATIONS

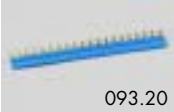
Approvals (according to type):



COMBINATION FOR ELECTROMECHANICAL 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
38.61.0.012.0060	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

COMBINATION FOR SSR RELAY			
Code	**Supply voltage**	**Type of relay**	**Type of socket**
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
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

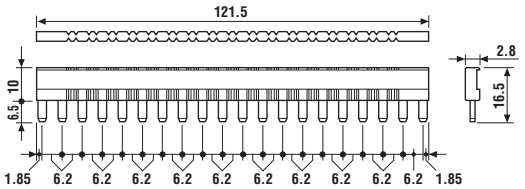
ACCESSORIES



Approvals (according to type):

20-way jumper link	093.20

- Rated values: 36 A - 250 V

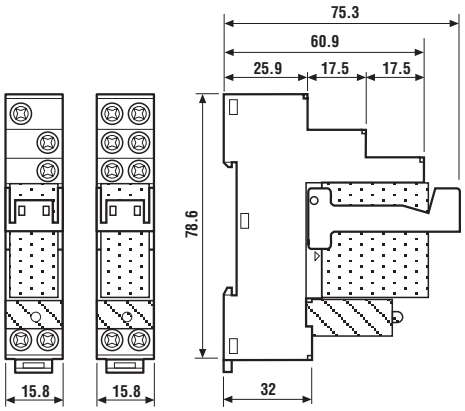


Plastic separator	093.01

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

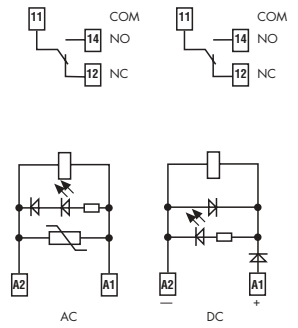
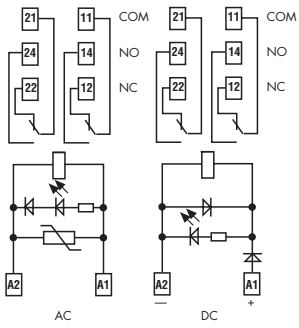
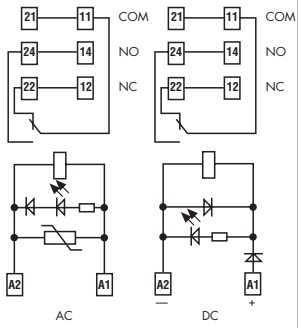
Sheet of marker tags (64 tags), 6x10 mm	093.64

- *Relay interface modules for use with PLC systems, 15.8 mm wide*
- *AC or sensitive DC coil versions available*
- *Instant removal of relay using plastic retaining clip*
- *Supply status indication or coil suppression module provided*
- *Identification label*
- *35 mm rail (EN 50022) mounting*



48.31 48.52/61

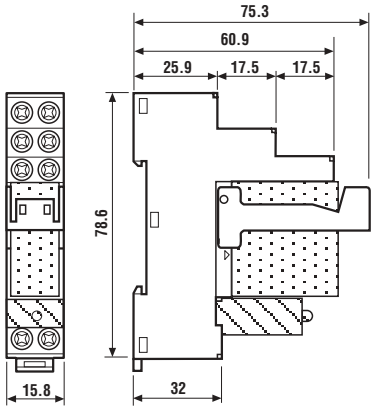
* For 400 V applications, where requirements for pollution degree 2 are met.

	48.31	48.52	48.61
			
	- 1 pole, 10 A - 35 mm rail mounting	- 2 pole, 8 A - 35 mm rail mounting	- 1 pole, 16 A - 35 mm rail mounting
			
Contact specifications			
Contact configuration	1 CO (SPDT)	2 CO (DPDT)	1 CO (SPDT)
Rated current/Maximum peak current A	10/20	8/15	16/30
Rated voltage/Maximum switching voltage V AC	250/400*	250/250	250/400*
Rated load in AC1 VA	2,500	2,000	4,000
Rated load in AC15 (230 V AC) VA	500	400	750
Single phase motor rating (230 V AC) kW	0.37	0.3	0.55
Breaking capacity in DC1: 30/110/220V A	10/0.3/0.12	8/0.3/0.12	16/0.3/0.12
Minimum switching load mW (V/mA)	300 (5/5)	300 (5/5)	500 (10/5)
Standard contact material	AgNi	AgNi	AgCdO
Coil specifications			
Nominal voltage (U_N) V AC (50/60 Hz)	12 - 24 - 110 - 120 - 230	12 - 24 - 110 - 120 - 230	12 - 24 - 110 - 120 - 230
V DC	12 - 24 - 125	12 - 24 - 125	12 - 24 - 125
Rated power AC/sens. DC VA (50 Hz)/W	1.2/0.5	1.2/0.5	1.2/0.5
Operating range AC	(0.8...1.1)U_N	(0.8...1.1)U_N	(0.8...1.1)U_N
sens. DC	(0.73...1.75)U_N	(0.73...1.75)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	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/—	10 · 10^6/20 · 10^6
Electrical life at rated load AC1 cycles	200 · 10^3	150 · 10^3	100 · 10^3
Operate/release time ms	7/4 (AC) - 12/12 (DC)	7/4 (AC) - 12/12 (DC)	7/4 (AC) - 12/12 (DC)
Insulation according to EN 61810-1 ed. 2	4 kV/3	4 kV/2	4 kV/3
Insulation between coil and contacts (1.2/50 µs) kV	6 (8 mm)	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts V AC	1,000	1,000	1,000
Ambient temperature range °C	–40...+70	–40...+70	–40...+70
Protection category	IP 20	IP 20	IP 20
Approvals relay (according to type):	ABS BEAB GOST RINA cULus NF VDE		

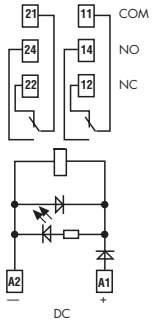
48.62

- *Relay interface modules for use with PLC systems, 15.8 mm wide*
- *AC or sensitive DC coil versions available*
- *Instant removal of relay using plastic retaining clip*
- *Supply status indication or coil suppression module provided*
- *Identification label*
- *35 mm rail (EN 50022) mounting*

- 2 pole, 10 A
- 35 mm rail mounting



48.62



* For 400 V applications, where requirements for pollution degree 2 are met.

48

Contact specifications		
Contact configuration		2 CO (DPDT)
Rated current/Maximum peak current	A	10/20
Rated voltage/Maximum switching voltage	V AC	250/400*
Rated load in AC1	VA	2,500
Rated load in AC15 (230 V AC)	VA	500
Single phase motor rating (230 V AC)	kW	0.37
Breaking capacity in DC1: 30/110/220V	A	10/0.3/0.12
Minimum switching load	mW (V/mA)	300 (5/5)
Standard contact material		AgNi
Coil specifications		
Nominal voltage (U_N)	V AC (50/60 Hz)	—
	V DC	12 - 24 - 125
Rated power AC/sens. DC	VA (50 Hz)/W	—/0.5
Operating range	AC	—
	sens. DC	(0.8...1.5)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	—/20 · 10^6
Electrical life at rated load AC1	cycles	100 · 10^3
Operate/release time	ms	12/12 (DC)
Insulation according to EN 61810-1 ed. 2		4 kV/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
Protection category		IP 20
Approvals relay (according to type):		GOST RINA

ORDERING INFORMATION

Example: a 48 series, 35 mm rail (EN 50022) mount relay interface module, with 2 CO (DPDT) - 8 A, coil rated 24 V sensitive DC, green LED + diode.

4 8	.	5	2	.	7	.	0 2 4	.	A 0	B 0	C 5	D 0

Series

Type
3 = 35 mm rail mount
5 = 35 mm rail mount
6 = 35 mm rail mount

No. of poles
1 = 1 pole for 48.31, 10 A
48.61, 16 A
2 = 2 pole for 48.52, 8 A
48.62, 10 A, DC only

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

Coil voltage
see coil specifications

A: Contact material
0 = Standard

B: Contact circuit
0 = CO (nPDT)

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

D: Special versions
0 = Standard

TECHNICAL DATA

INSULATION

Insulation according to EN 61810-1 ed. 2		insulation rated voltage	V	250
		rated impulse withstand voltage	kV	4
		pollution degree		3 (48.31/61/62) 2 (48.52)
		overvoltage category		III
Dielectric strength between adjacent contacts	V AC	2,000 (48.52)		2,500 (48.62)

CONDUCTED DISTURBANCE IMMUNITY

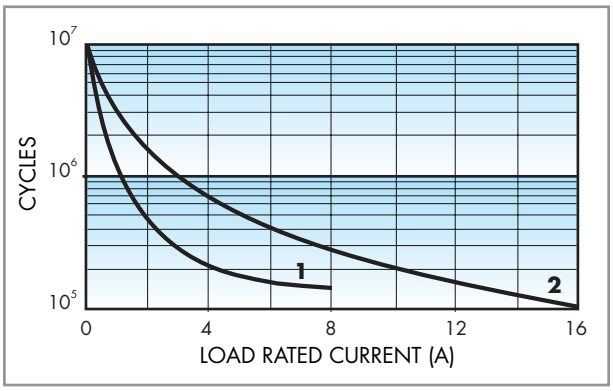
Burst (5...50)ns, 5 kHz, on A1 - A2	EN 61000-4-4	level 4 (4 kV)
Surge (1.2/50 µs) on A1 - A2 (differential mode)	EN 61000-4-5	level 3 (2 kV)

OTHER DATA

Bounce time: NO/NC		ms	2/5			
Vibration resistance (10...55)Hz, max. ± 1 mm: NO/NC		g/g	10/4 (for 1 CO or SPDT)		3/3 (for 2 CO or DPDT)	
Power lost to the environment	without contact current	W	0.7			
	with rated current	W	1.2 (48.31)	1.3 (48.52)	1.2 (48.61)	1.2 (48.62)
Wire strip length		mm	8			
Screw torque		Nm	0.5			
Max wire size			solid cable		stranded cable	
		mm²	1x6 / 2x2.5		1x4 / 2x2.5	
		AWG	1x10 / 2x14		1x12 / 2x14	

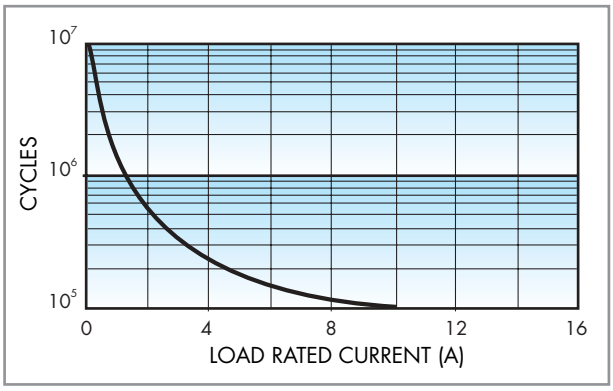
CONTACT SPECIFICATIONS

F 48/1



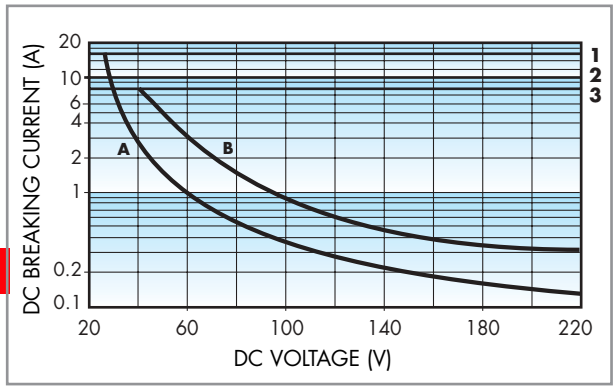
Electrical life vs AC1 load.
1 - Type 48.52 (8 A)
2 - Type 48.31 (10 A)
Type 48.61 (16 A)

F 48/2



Electrical life vs AC1 load.
Type 48.62 (10 A)

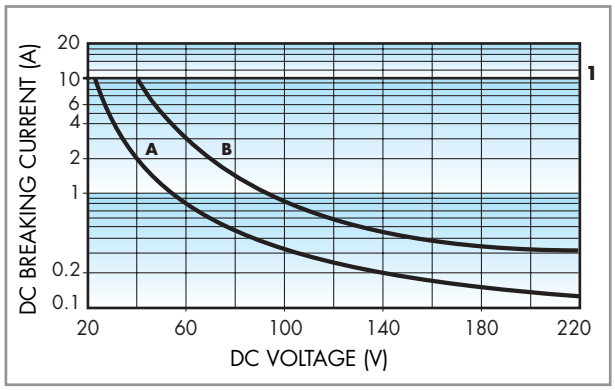
H 48/1



Breaking capacity for DC1 load.
1 - Type 48.61
2 - Type 48.31
3 - Type 48.52
A - Load applied to 1 contact
B - Load applied to 2 contacts in series

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

H 48/2



Breaking capacity for DC1 load.
1 - Type 48.62
A - Load applied to 1 contact
B - Load applied to 2 contacts in series

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

COIL SPECIFICATIONS

DC VERSION DATA (0.5 W sensitive)

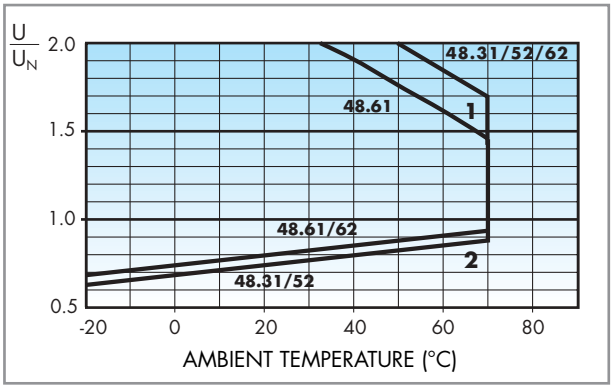
Nominal voltage U_N	Coil code	Operating range U_{min}*	Operating range U_{max}	Rated coil consumption I at U_N
V		V	V	mA
12	**7**.012	8.8	21	41
24	**7**.024	17.5	42	22.2
125	**7**.125	92	218	4

*U_{min} = 0.8 U_N for 48.61 and 48.62

AC VERSION DATA

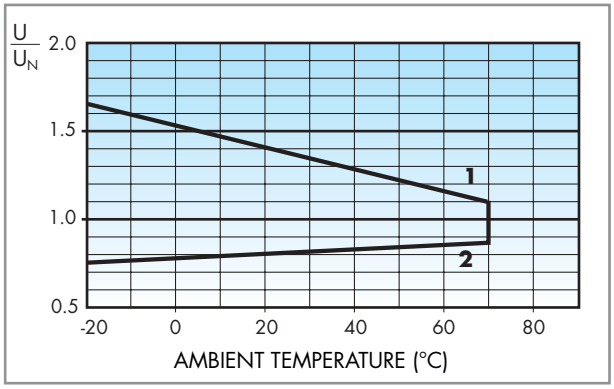
Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Rated coil consumption I at U_N (50Hz)
V		V	V	mA
12	**8**.012	9.6	13.2	90.5
24	**8**.024	19.2	26.4	46
110	**8**.110	88	121	10.1
120	**8**.120	96	132	11.8
230	**8**.230	184	253	7.0

R 48 sens. DC



Operating range (sensitive DC version) vs ambient temperature.
1 - Max coil voltage permitted.
2 - Min pick-up voltage with coil at ambient temperature.

R 48 AC



Operating range (AC version) vs ambient temperature.
1 - Max coil voltage permitted.
2 - Min pick-up voltage with coil at ambient temperature.

48

COMBINATIONS

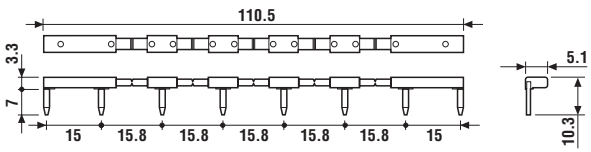
Code	Type of Socket	Type of Relay	Module	Retaining Clip
48.31	95.03	40.31	99.02	095.01
48.52	95.05	40.52	99.02	095.01
48.61	95.05	40.61	99.02	095.01
48.62	95.05	44.62	99.02	095.01

ACCESSORIES


095.18

8-way jumper link	095.18

- Rated values: 10 A - 250 V



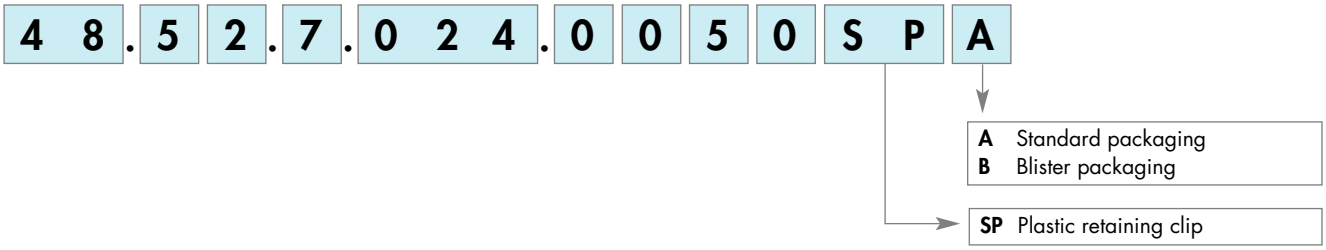

060.72

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

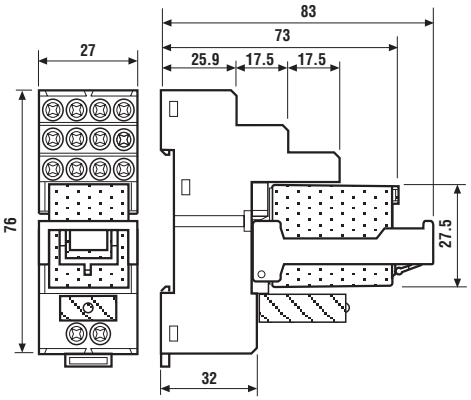
PACKAGING CODES

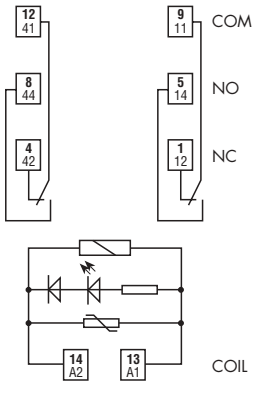
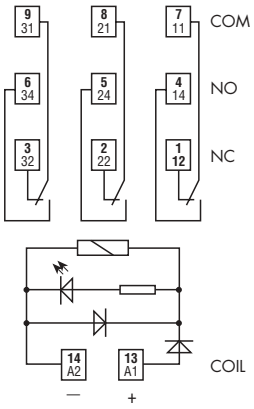
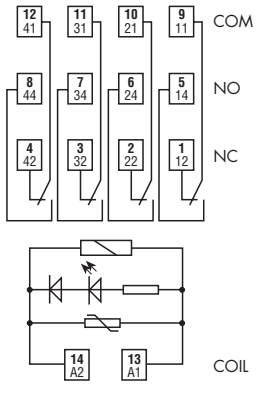
How to code and identify retaining clip and packaging options for relay interface module.

Code options according to the last three letters:



- *Relay interface modules for use with PLC systems, 27mm wide*
- *AC and DC versions available*
- *Supply status indication and coil suppression module provided*
- *Identification label*
- *35 mm rail (EN 50022) mounting*



	58.32	58.33	58.34
			
	- 2 pole, 10 A - 35 mm rail mounting	- 3 pole, 10 A - 35 mm rail mounting	- 4 pole, 7 A - 35 mm rail mounting
	 Example: AC	 Example: DC	 Example: AC
Contact specifications			
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 in AC1 VA	2,500	2,500	1,750
Rated load in AC15 (230 V AC) VA	500	500	350
Single phase motor rating (230 V AC) kW	0.37	0.37	0.125
Breaking capacity in 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 specifications			
Nominal voltage (U_N) V AC (50/60 Hz)	12 - 24 - 48 - 110 - 120 - 230		
V DC	12 - 24 - 48		
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 (AC) - 9/15 (DC)	9/3 (AC) - 9/15 (DC)	9/3 (AC) - 9/15 (DC)
Insulation according to EN 61810-1 ed. 2	3.6 kV/2	3.6 kV/2	2.5 kV/2
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):	CE ABS BV SP DNV FI GOST LR IRAM Lloyd's Register N RINA SEV cULus NF VDE		

ORDERING INFORMATION

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

5 8	. 3	4	. 9	. 0 2 4	. 0	0	5	0
					A	B	C	D

Series

Type
3 = 35 mm rail mount

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

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

Coil voltage
see coil specifications

A: Contact material
0 = AgNi Standard

B: Contact circuit
0 = CO (nPDT)

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

D: Special versions
0 = Standard

TECHNICAL DATA

58

INSULATION

Insulation according to EN 61810-1 ed. 2		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	
		overvoltage category	III	
Dielectric strength between adjacent contacts	V AC	2,000 (58.32,58.33)	1,550 (58.34)	

CONDUCTED DISTURBANCE IMMUNITY

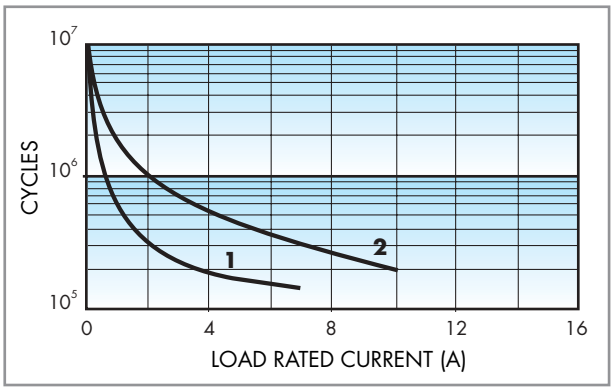
Burst (5...50)ns, 5 kHz, on A1 - A2	EN 61000-4-4	level 4 (4 kV)
Surge (1.2/50 µs) on A1 - A2 (differential mode)	EN 61000-4-5	level 4 (4 kV)

OTHER DATA

Bounce time: NO/NC		ms	1/4	
Vibration resistance (10...55)Hz, max. ± 1 mm: NO/NC		g/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

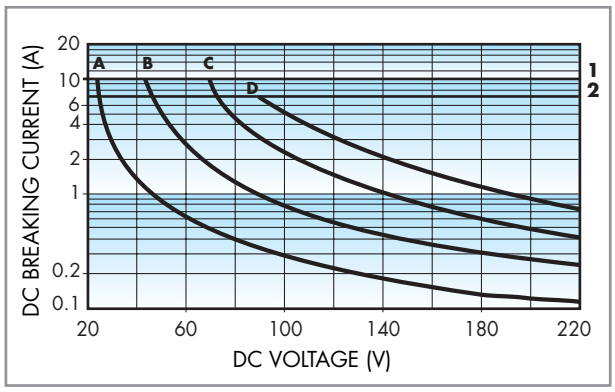
CONTACT SPECIFICATIONS

F 58



Electrical life vs AC1 load.
1 - 4 CO (4PDT) relay type (7 A)
2 - 2 - 3 CO (DPDT and 3PDT) relay type (10 A)

H 58



Breaking capacity for DC1 load.
1 - 2 - 3 CO (DPDT and 3PDT) type
2 - 4 CO (4PDT) type
A - Load applied to 1 contact
B - Load applied to 2 contacts in series
C - Load applied to 3 contacts in series
D - Load applied to 4 contacts in series

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

COIL SPECIFICATIONS

58

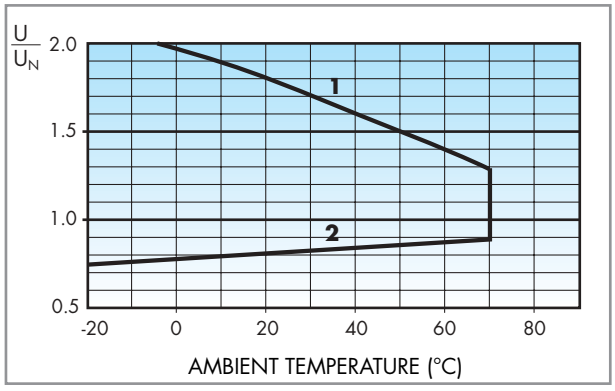
DC VERSION DATA

Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Rated coil absorption I at U_N
V		V	V	Ω	mA
12	**9**.012	9.6	13.2	140	86
24	**9**.024	19.2	26.4	600	40
48	**9**.048	38.4	52.8	2,400	20

AC VERSION DATA

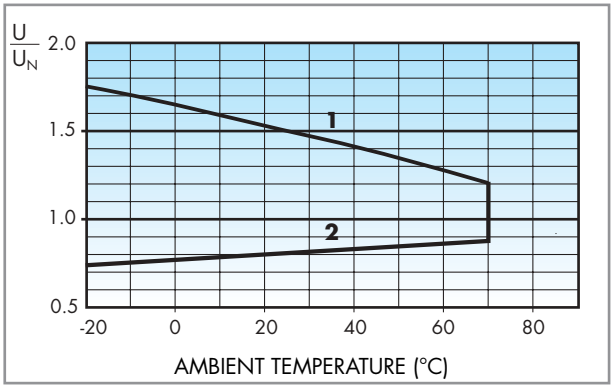
Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Rated coil absorption I at U_N (50Hz)
V		V	V	Ω	mA
12	**8**.012	9.6	13.2	50	97
24	**8**.024	19.2	26.4	190	53
48	**8**.048	38.4	52.8	770	25
110	**8**.110	88	121	4,000	12.5
120	**8**.120	96	132	4,700	12
230	**8**.230	184	253	17,000	6

R 58 DC



Operating range (DC type) vs ambient temperature.
1 - Max coil voltage permitted.
2 - Min pick-up voltage with coil at ambient temperature.

R 58 AC



Operating range (AC type) vs ambient temperature.
1 - Max coil voltage permitted.
2 - Min pick-up voltage with coil at ambient temperature.

COMBINATIONS

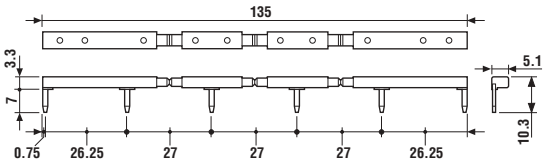
Code	Type of socket	Type of relay	Module	Retaining clip
58.32	94.02	55.32	99.02	094.01
58.33	94.03	55.33	99.02	094.01
58.34	94.04	55.34	99.02	094.01

ACCESSORIES


094.06

6-way jumper link	094.06

- Rated values: 10 A - 250 V




060.72

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

PACKAGING CODES

58

How to code and identify retaining clip and packaging options for relay interface module.

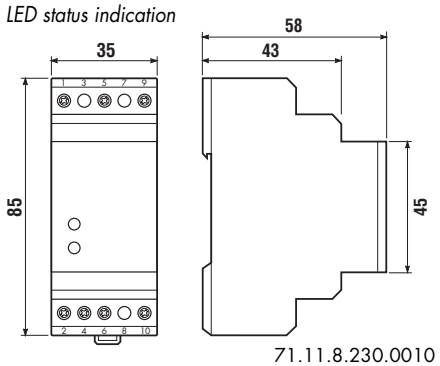
Code options according to the last three letters:

5	8	.	3	4	.	9	.	0	2	4	.	0	0	5	0	S	P	A

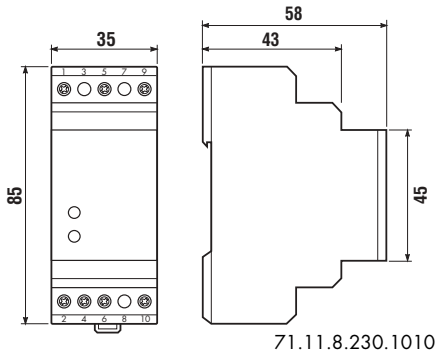
A Standard packaging
B Blister packaging

SP Plastic retaining clip

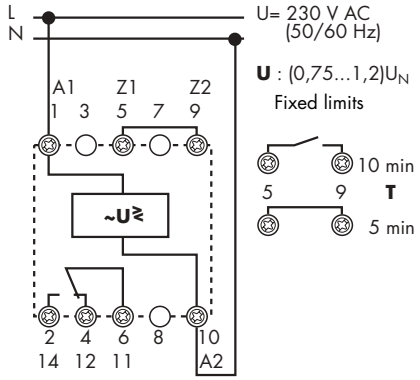
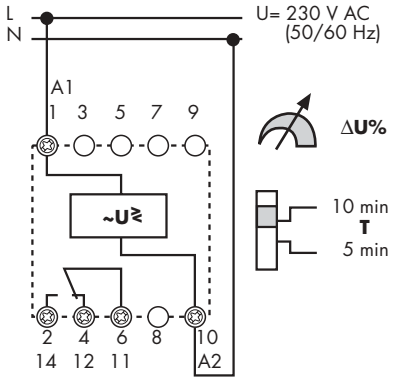
- *Designed for industrial applications*
- *Positive safety logic - make contact opens if the measured value is outside of the acceptable range*
- *High precision - measured value based on the average of 500 measurements over a 100 ms period*
- *Industry standard module*
- *35 mm rail (EN 50022) mounting*
- *Switch or link setting of the delay time*
- *LED status indication*



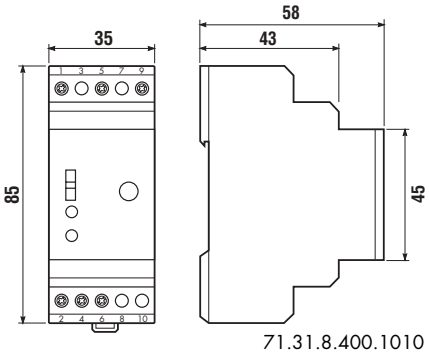
71.11.8.230.0010



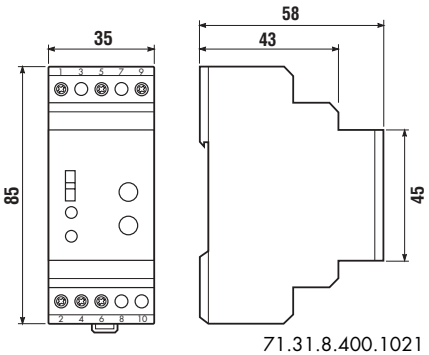
71.11.8.230.1010

	71.11.8.230.0010	71.11.8.230.1010
		
	- 1 phase 230 V – line voltage monitoring - Detects over/under voltage against fixed limits - Protects against excessive "starts/hour", typically for motor compressors and high-pressure discharge lamps	- 1 phase 230 V – line voltage monitoring - Detects over and under voltage against adjustable limits - Protects against excessive "starts/hour", typically for motor compressors and high-pressure discharge lamps
	- Line voltage detection 230 V AC (50/60 Hz) - Detection levels (0.75...1.2)U_N, fixed - Delay time 5 min or 10 min – link selectable	- Line voltage detection 230 V AC (50/60 Hz) - Detection levels (±5... ±20)% U_N, adjustable - Delay time 5 min or 10 min – switch selectable
		
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 in AC1 VA	2,500	2,500
Rated load in AC15 (230 V AC) VA	500	500
Single phase motor rating (230 V AC) kW	0.5	0.5
Breaking capacity in DC1: 30/110/220V A	10/0.3/0.12	10/0.3/0.12
Minimum switching load mW/(V/mA)	300 (5/5)	300 (5/5)
Standard contact material	AgCdO	AgCdO
Supply specification		
Nominal voltage U_N V AC (50/60 Hz)	230	230
V DC	—	—
Rated power AC/DC VA (50 Hz)/W	4/—	4/—
Operating range AC	(0.75...1.2)U_N	(0.8...1.2)U_N
DC	—	—
Technical data		
Electrical life at rated load AC1 cycles	100 · 10^3	100 · 10^3
Detection levels	(0.75...1.2)U_N	(±5...±20)% U_N
Switch-on delay time/reaction time	(5 - 10)min / < 0.5 s	(5 - 10)min / < 0.5 s
Fault memory	—	—
Electrical isolation: Supply to Measuring circuits	None – circuits are electrically common	None – circuits are electrically common
Insulation according to EN 61810-1 ed. 2	6 kV	6 kV
Ambient temperature range °C	–20...+55	–20...+55
Protection category	IP20	IP20
Approvals (according to type):	CE	

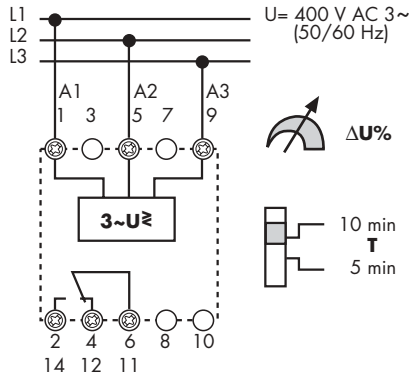
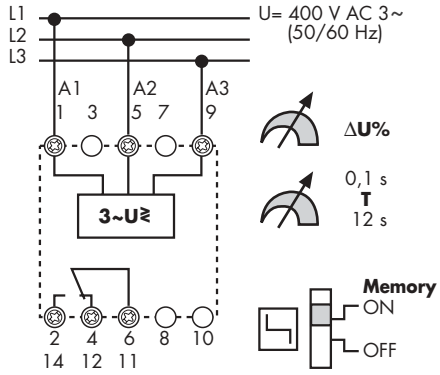
- *Designed for industrial applications*
- *Positive safety logic - make contact opens if the measured value is outside of the acceptable range*
- *High precision - measured value based on the average of 500 measurements over a 100 ms period*
- *Industry standard module*
- *35 mm rail (EN 50022) mounting*
- *Adjustable setting of the detecting levels*
- *LED status indication*



71.31.8.400.1010



71.31.8.400.1021

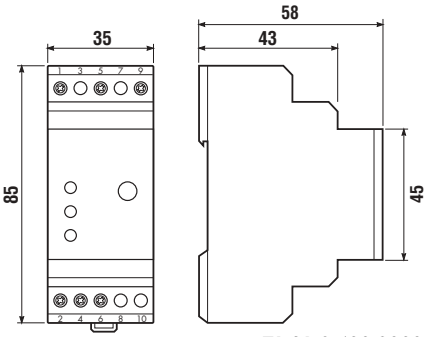
	71.31.8.400.1010	71.31.8.400.1021
		
	- 3 phase 400 V - line voltage monitoring - Detects over and under voltage against adjustable limits - Protects against excessive "starts/hour", typically for motor compressors and high-pressure discharge lamps	- 3 phase 400 V - line voltage monitoring - Detects over and under voltage against adjustable limits - Adjustable switch-on delay - Switch selectable fault memory
	- Line voltage detection 400 V AC (50/60 Hz) - Detecting levels (±5…±20)% U_N, adjustable - Delay time 5 min or 10 min – switch selectable	- Line voltage detection 400 V AC (50/60 Hz) - Detecting level (0.8…0.95)U_N > U > 1.15 U_N - 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
		
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 in AC1 VA	2,500	2,500
Rated load in AC15 (230 V AC) VA	500	500
Single phase motor rating (230 V AC) kW	0.5	0.5
Breaking capacity in DC1: 30/110/220V 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…1.2)U_N	(0.8…1.15)U_N
DC	—	—
Technical data		
Electrical life at rated load AC1 cycles	100 · 10^3	100 · 10^3
Detection level	(±5…±20)% U_N	(–5…–20)% U_N … (1.15)U_N fixed
Switch-on delay/Switch-off delay/reaction time	(5 - 10)min / < 0.5 s	(0.1…12)s / < 0.5 s
Fault memory - selectable	—	Yes
Electrical isolation: Supply to Measuring circuits	None – circuits are electrically common	None – circuits are electrically common
Insulation according to EN 61810-1 ed. 2	6 kV	6 kV
Ambient temperature range °C	–20…+55	–20…+55
Protection category	IP20	IP20
Approvals (according to type):	CE	

71.31.8.400.2000

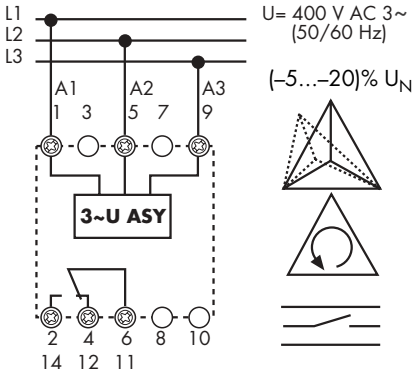
- *Designed for industrial applications*
- *Positive safety logic - make contact opens if the measured value is outside of the acceptable range*
- *High precision - measured value based on the average of 500 measurements over a 100 ms period*
- *Industry standard module*
- *35 mm rail (EN 50022) mounting*
- *Adjustable setting of the detecting levels*
- *LED status indication*

- 3 phase asymmetry monitoring
- Phase rotation monitoring
- Phase loss monitoring

- Line voltage detection 400 V AC (50/60 Hz)
- Asymmetry of one or two phases (–5... –20)% U_N adjustable
- Detection of the supply voltage U to A1 (1) and/or A2 (5) > 1.11 U_N

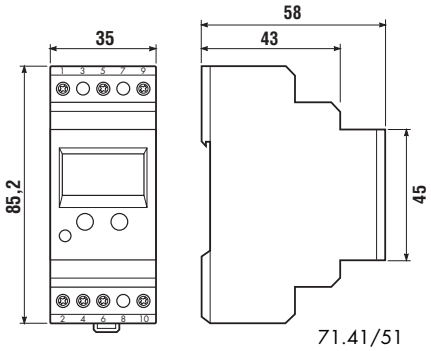


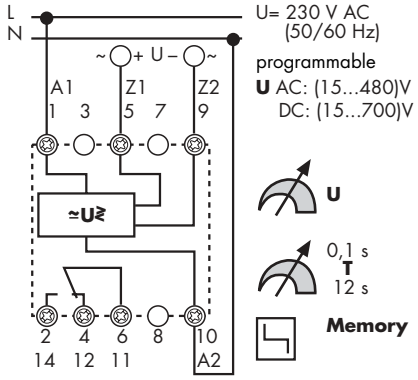
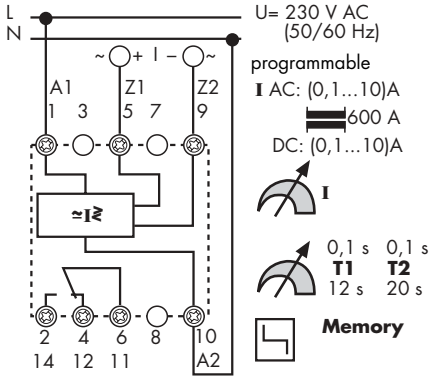
71.31.8.400.2000



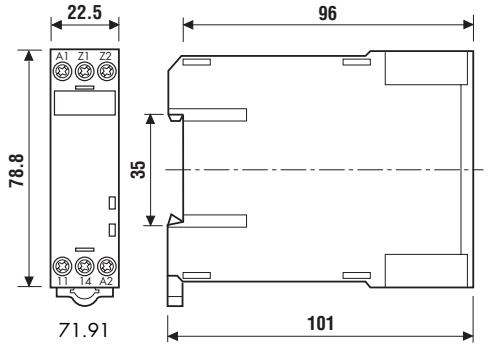
Contact specification		
Contact configuration		1 CO (SPDT)
Rated current/Maximum peak current	A	10/15
Rated voltage/Maximum switching voltage	V AC	250/400
Rated load in AC1	VA	2,500
Rated load in AC15 (230 V AC)	VA	500
Single phase motor rating (230 V AC)	kW	0.5
Breaking capacity in DC1: 30/110/220V	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...1.15)U_N
	DC	—
Technical data		
Electrical life at rated load AC1	cycles	100 · 10^3
Detection level: Phase asymmetry: Adjustable		(–5...–20)% U_N
Switch-off delay/activation time		— / < 0.5 s
Fault memory		—
Electrical isolation: Supply to Measuring circuits		None – circuits are electrically common
Insulation according to EN 61810-1 ed. 2		6 kV
Ambient temperature range	°C	–20...+55
Protection category		IP20
Approvals (according to type):		CE

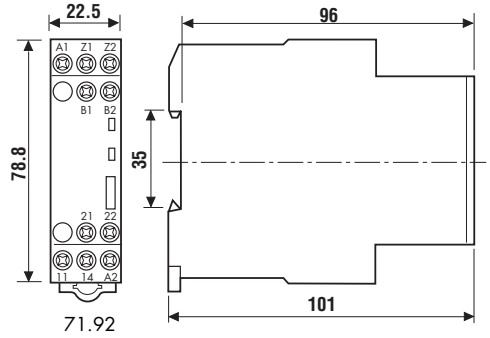
- *Universal voltage or current detecting and monitoring relay*
- *Zero voltage memory according to EN 60204-7-5*
- *Programmable for DC or AC detection level:*
  - *range detecting: upper and lower value*
  - *upper set point minus hysteresis range (5...50)% for switch on*
  - *lower set point plus 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*

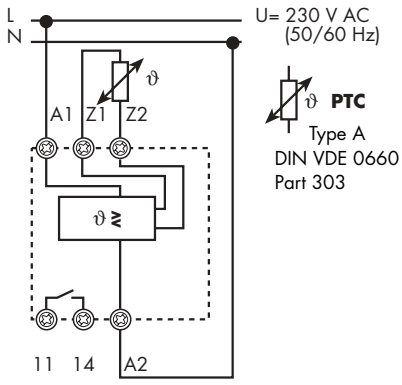
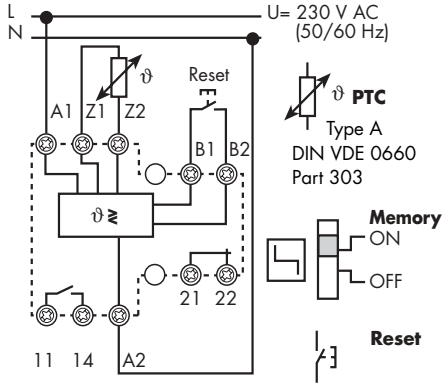


	71.41.8.230.1021	71.51.8.230.1021
		
	- Programmable universal voltage detecting module	- Programmable universal current detecting module, - Usable with current transformer 50/5, 100/5, 150/5, 250/5, 300/5, 400/5 or 600/5
	- AC/DC voltage detection - adjustable - AC (50/60 Hz) (15...480)V - DC (15...700)V - Switch-on hysteresis (5...50)% - Switch-off delay (0.1...12)s	- 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 - Switch-on 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 in AC1 VA	2,500	2,500
Rated load in AC15 (230 V AC) VA	500	500
Single phase motor rating (230 V AC) kW	0.5	0.5
Breaking capacity in DC1: 30/110/220V 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/Switch-on reaction time	(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
Insulation according to EN 61810-1 ed. 2	6 kV	6 kV
Ambient temperature range °C	–20...+55	–20...+55
Protection category	IP20	IP20
Approvals (according to type):	CE	

- *Designed for industrial applications*
- *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*
- *35 mm rail (EN 50022) mounting*
- *LED status indication*





	71.91.8.230.0300	71.92.8.230.0401
		
	- Thermistor relay	- Thermistor relay with fault memory
	- Temperature detection with PTC - PTC short circuit detection - PTC wire breakage detection - Supply voltage 230 V AC (50/60 Hz)	- Temperature detection with PTC - Fault memory – switch selectable - Reset by Reset button or supply interruption - PTC short circuit detection - PTC wire breakage detection - Supply voltage 230 V AC (50/60 Hz)
		
Contact specification		
Contact configuration	1 NO (SPST-NO)	1 NO + 1 NC (SPST-NO + SPST-NC)
Rated current/Maximum peak current A	10/15	10/15
Rated voltage/Maximum switching voltage V AC	250/400	250/400
Rated load in AC1 VA	2,500	2,500
Rated load in AC15 (230 V AC) VA	500	500
Single phase motor rating (230 V AC) kW	0.5	0.5
Breaking capacity in DC1: 30/110/220V 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	1/—	1/—
Operating range AC	(0.85...1.15)U_N	(0.85...1.15)U_N
DC	—	—
Technical data		
Electrical life at rated load AC1 cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
PTC detecting: Short circuit/Temperature OK	<20 Ω / >20 Ω ... <3 kΩ	<20 Ω / >20 Ω ... <3 kΩ
Reset/PTC break	<1.3 kΩ / >3 kΩ	<1.3 kΩ / >3 kΩ
Delay time/activaction time	— / < 0.5 s	— / < 0.5 s
Fault memory - switch selectable	—	Yes
Electrical isolation: Supply to Measuring circuits	Yes	Yes
Insulation according to EN 61810-1 ed. 2	6 kV	6 kV
Ambient temperature range °C	–20...+55	–20...+55
Protection category	IP20	IP20
Approvals (according to type):	CE	

ORDERING INFORMATION

Example: Universal measuring relay with LCD display for AC/DC voltage detection, with 1 CO (SPDT) contact for 10 A 250 and 230 V supply voltage, 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) at 71.11, 31, 41 51 81
1 = 1 NO (SPST-NO) at 71.91
2 = 1 NO + 1 NC (SPST-NO + SPST-NC) at 71.92

Supply version
8 = AC (50/60 Hz)

Supply voltage
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 = 1 CO (SPDT)
3 = 1 NO (SPST-NO)
4 = 1 NO + 1 NC (SPST-NO + SPST-NC)

Mounting width
71.11.8.230.0010 / 35 mm
71.11.8.230.1010 / 35 mm
71.31.8.400.1010 / 35 mm
71.31.8.400.1021 / 35 mm
71.31.8.400.2000 / 35 mm
71.41.8.230.1021 / 35 mm
71.51.8.230.1021 / 35 mm
71.91.8.230.0300 / 22.5 mm
71.92.8.230.0401 / 22.5 mm

TECHNICAL DATA

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

INSULATION

Insulation according to EN 61810-1 ed. 2		insulation rated voltage V	250
		rated impulse withstand voltage kV	4
		pollution degree	3
		over-voltage category	III
Dielectric strength (A1, A2, A3, B1, B2), and	V AC	2,500	
contact terminals (11, 12, 14) and terminals (Z1, Z2)	kV (1,2/50 µs)	6	
Dielectric strength at open contact	V AC	1,000	

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
	Type 71.51		Current measurement m	150 / 50
(Wiring capacitance no greater than 10 nF/100 m)	Type 71.91, 71.92		PTC temperature measurement m	50 / 50
Measuring principle	Type 71.11, 71.31, 71.41, 71.51, 71.91, 71.92		The measured value is the arithmetical average of 500 individual measurements taken over a 100 ms period. Interruptions less than 200 ms are ignored.	
Safety logic	Type 71.11, 71.31, 71.41, 71.51, 71.91, 71.92		Positive safety logic - When the value being monitored lies within the acceptable area, the make contact is closed.	
Reaction time (following the application of the supply voltage)	Type 71.11, 71.31, 71.41, 71.51, 71.91, 71.92		≤ 0,5 s	
Power lost to the environment	without contact load	VA	4	
	with rated current	VA	5	
Permitted storage temperature range		°C	–40...+85	
Protection category			IP 20	
Max. wire size			solid cable	standed cable
		mm^2	0.5...(2 x 2,5)	(2 x 1,5)
		AWG	20...(2 x 14)	(2 x 16)
Screw torque		Nm	0.8	

FUNCTIONS

Monitoring Relay - Type	Types													Times			Supply voltage		Module width		Contact conf.
	1-phase 230 V, Under/Over voltage	3-phase 400 V, Under/Over voltage	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(or 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	230 V AC	400 V AC	35 mm wide	22.5 mm wide	Relay contact, 250 V AC / 10 A
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**
71.91.8.230.0300										•		•					•			•	**1 NO SPST-NO**
71.92.8.230.0401										•		•	•				•			•	**1 NO SPST-NO 1 NC SPST-NO**
Current transformer	Source as required																				

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Explanation of relay marking and LED/LCD display

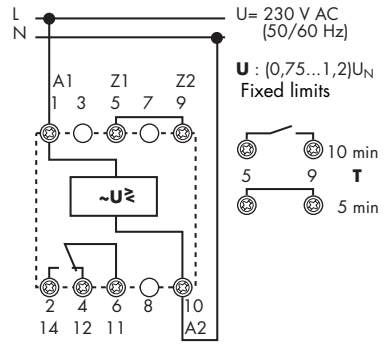
Monitoring relay without LCD-display			
ON	LED green steady light: Supply voltage is on and measuring system is active.		
DEF	Default: The detected value is outside of the acceptable range. (Asymmetric is shown by the LED ASY) LED red flashing: Delay time is running. See the function diagram. LED red steady light: Output relay is off. Contact 11-14 (6-2) is open.		
ASY	Phase 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), or 71.91.8.230.0401 by operating of the "RESET" button (71.91.8.230.0401).		
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 instructions 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 secs. The word "prog" is shown for 1 sec. "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, Lo, or UpLo. The appropriate choice is made by pressing the "SET/RESET" button. The next steps 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 programming 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 broken 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 sec, 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) UpLo = upper and lower limit - range detecting	Level = value Hys = hysteresis M = Memory (fault) Yes = yes - with memory no = no - without memory	t1 = T1 - time during which short-time fluctuations are not taken into account t2 = T2 - (monitoring relay 71.51) the time during which inrush currents are not taken into account.

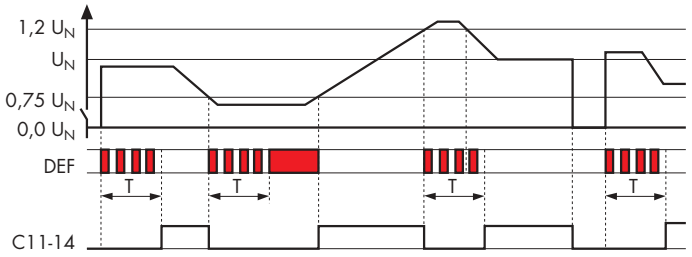
LED/LCD status announcement/advice

Type	Starting mode	Normal operation	Abnormal mode		Reset
71.11.8.230.0010 **71.11.8.230.1010** **71.31.8.400.1010**	After connecting T = 5 or 10 min 11-14 open	Normal operation Set point is OK 11-14 is closed	Time T runs Set point is immaterial 11-14 is open **Will close after T, if set point is OK**	After expiry of T Set point is not OK 11-14 is open **Will close, if set point is OK**	
71.31.8.400.1021 **Memory OFF** ON / OFF		Normal operation Set point is OK 11-14 is closed	Time T runs Set point is not OK 11-14 is closed	After expiry of T Set point is not OK 11-14 is open **Will close, if set point is OK**	
71.31.8.400.1021 **Memory ON** ON / OFF		Normal operation Set point is OK 11-14 is closed	Time T runs Set point is not OK 11-14 is closed	After expiry of T Set point is not OK 11-14 is open **Will not close at RESET**	After expiry of T Set point is OK 11-14 is open **Will close at RESET**
71.31.8.400.2000		Normal operation Set point is OK 11-14 is closed	Supply voltage to A1 (1) and / or A2 (5) is missing 11-14 is open **Will close if supply voltage re-stored and set point OK** Incorrect phase rotation or phase failure or voltage A1 (1) and/or A2 (5) is > 1.11 UN 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 T1 runs Set point is not OK 11-14 is closed	**Measured value displayed** After expiry of T1 Set point is not OK 11-14 is open **Will close if set point 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 T1 runs Set point is not OK 11-14 is closed	**M in the display flashes** **Measured value displayed** After expiry of T1 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 T1 Set point is OK 11-14 is open **Will close at RESET**
71.91.8.230.0300		Normal operation Set point is OK 11-14 is closed	Temperature too high or PTC line break or PTC short circuit 11-14 is open **Will close if set point OK**		
71.92.8.230.0401 **Memory OFF** ON / OFF		Normal operation Set point is OK 11-14 is closed	Temperature too high or PTC line break or PTC short circuit 11-14 is open **Will close if set point OK**		
71.92.8.230.0401 **Memory ON** ON / OFF		Normal operation Set point is OK 11-14 is closed	Temperature too 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



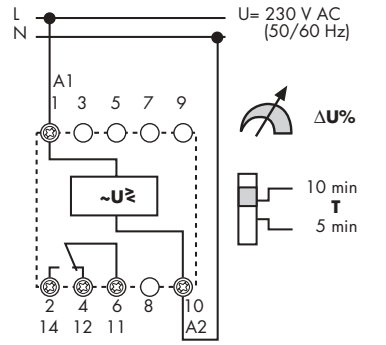


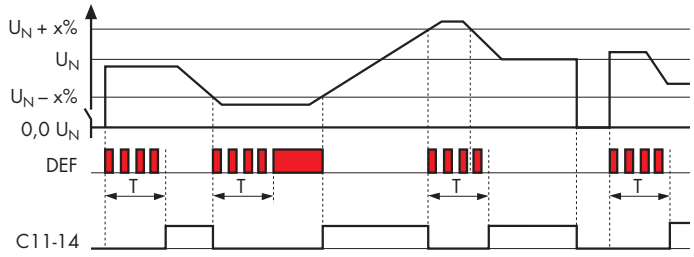
Switch off
Immediately if monitored value is outside of the set points.

Switch on
After expiry of the time T and if monitored value is within the set points.

C = output contact
NO 11-14 (6-2) closed.

Type 71.11.8.230.1010



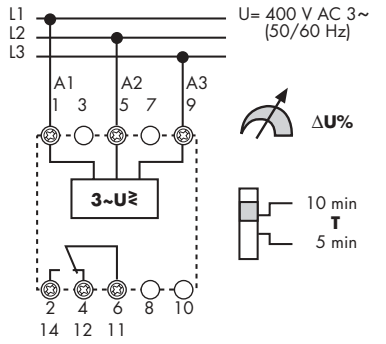


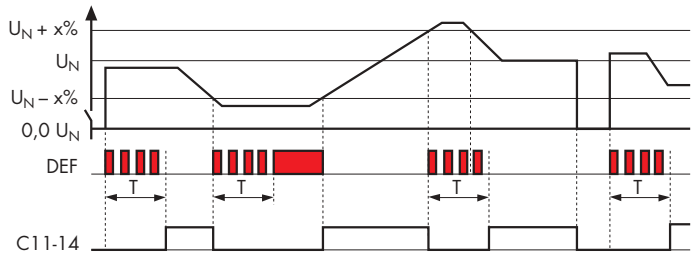
Switch off
Immediately if monitored value is outside of the set points.

Switch on
After expiry of the time T and if monitored value is within the set points.

C = output contact
NO 11-14 (6-2) closed, all values within the set points.

Type 71.31.8.400.1010



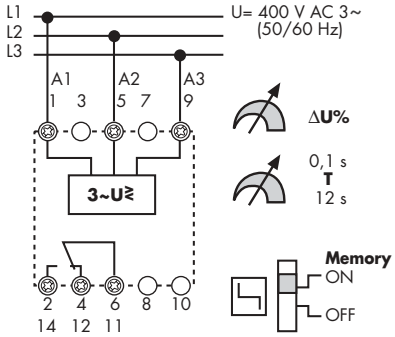


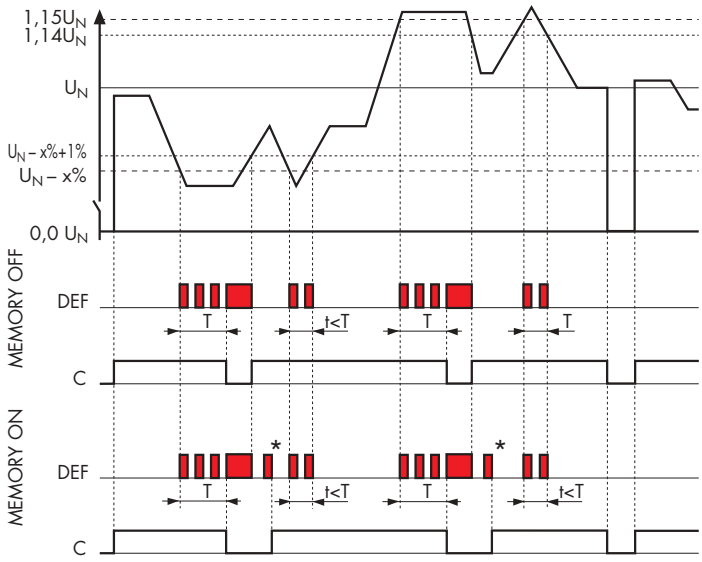
Switch off
Immediately if monitored value is outside of the set points.

Switch on
After expiry of the time T and if monitored value is within the set points.

C = output contact
NO 11-14 (6-2) closed.

Type 71.31.8.400.1021





*RESET MEMORY = By power-down or switch manipulation from ON to OFF to ON

Switch off
If monitored value is outside of the set points and time T has elapsed.

Switch on - MEMORY OFF
Immediately monitored value returns within limits (off-set by 1% hysteresis).

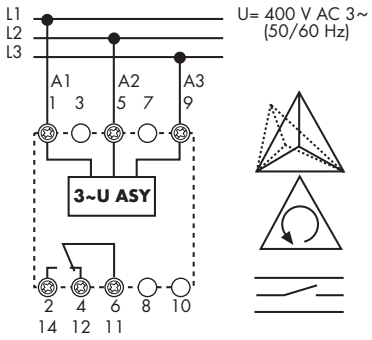
Switch on - MEMORY ON
As above, but subject to the RESET operation having been actioned.

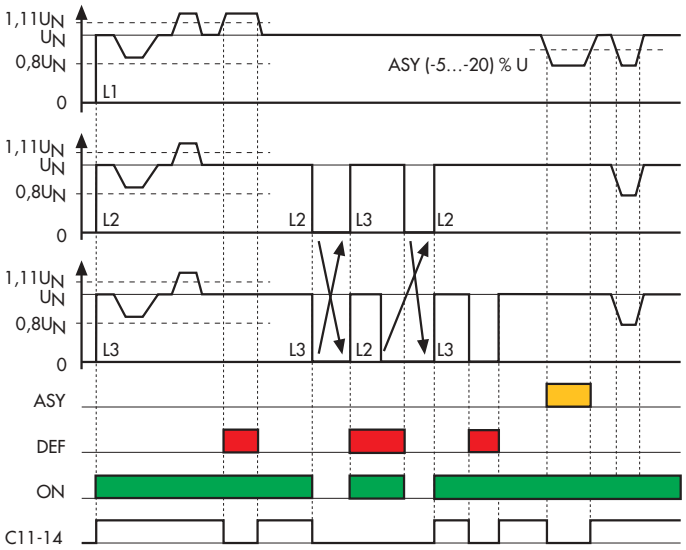
RESET
By Memory switch manipulation from ON to OFF and back to ON, or power down.

C = output contact
NO 11-14 (6-2) closed.

FUNCTIONS

Type 71.31.8.400.2000





Switch off:
Phase asymmetry
Incorrect phase rotation
Phase loss

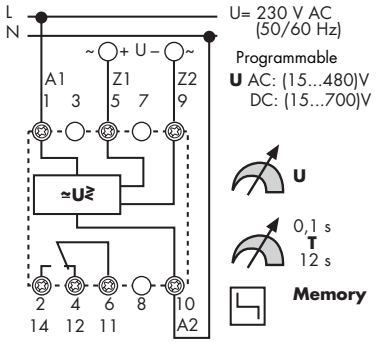
LED • ASY yellow
Phase asymmetry

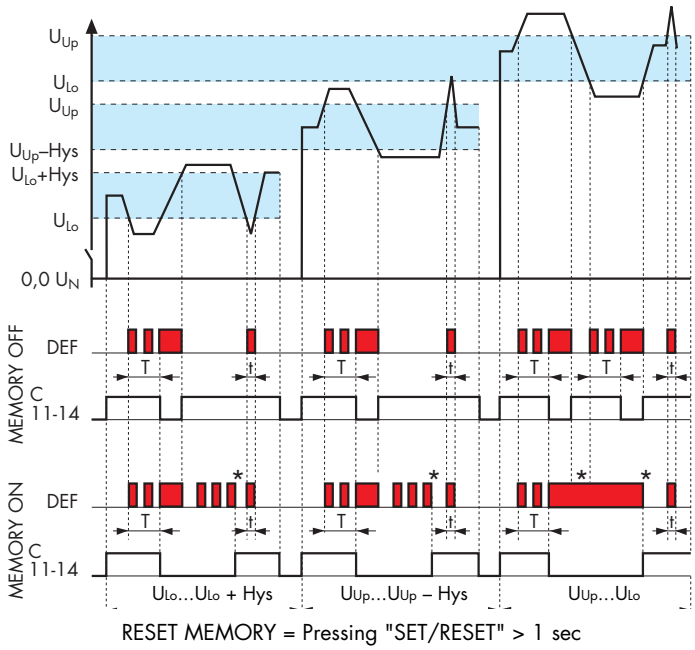
LED • DEF red
Voltage to A1 (1) and/or A2 (5) > 1.11 U_N
Incorrect phase rotation
Phase loss to A3 (9)

LED • ON green
Monitoring system is active and 400 V supply voltage is connected to 1-5 or A1– A2

C = output contact
NO 11-14 (6-2) closed

Type 71.41.8.230.1021





RESET MEMORY = Pressing "SET/RESET" > 1 sec

Switch off:
U_{Lo} – mode
If the monitored value is less than the lower-limit and, time T has expired

U_{Up} – mode
If the monitored value is higher than the upper limit, and time T has expired

U_{Lo} U_{Up} - mode
If the monitored value of voltage is outside of the upper or lower voltage limits, and time T has expired

Voltage dips < T do not result in output relay switching off

Switch on:
U_{Lo} or U_{Up} - modes
When passing the hysteresis value

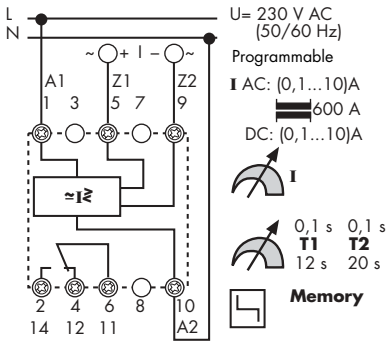
U_{Lo} U_{Up} mode -
When passing the U_{Lo} or U_{Up} value

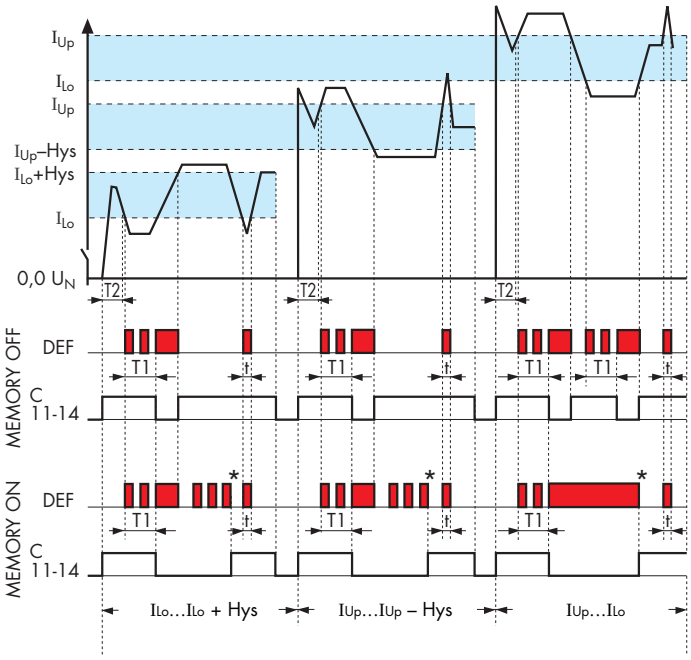
RESET MEMORY:
Pressing "SET/RESET" > 1 sec

C = output contact
NO 11-14 (6-2) closed

FUNCTIONS

Type 71.51.8.230.1021





*RESET MEMORY = pressing "SET/RESET" > 1 sec

Switch off:
I_{Lo} - mode
If the monitored value is less than the lower-limit and, time T has expired

I_{Up} – mode
If the monitored value is higher than the upper limit, and time T has expired

I_{Lo} I_{Up} - mode
If the monitored value of current is outside of the upper or lower limits, and time T has expired

Inrush current < T2 is ignored

Current dips < T1 do not result in output relay switching off

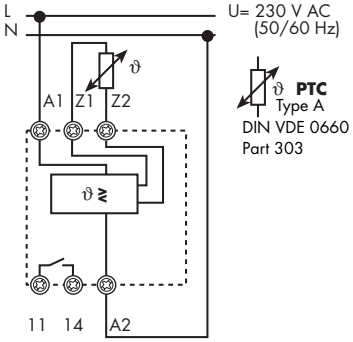
Switch on:
I_{Lo} or I_{Up} – mode
When passing the hysteresis value

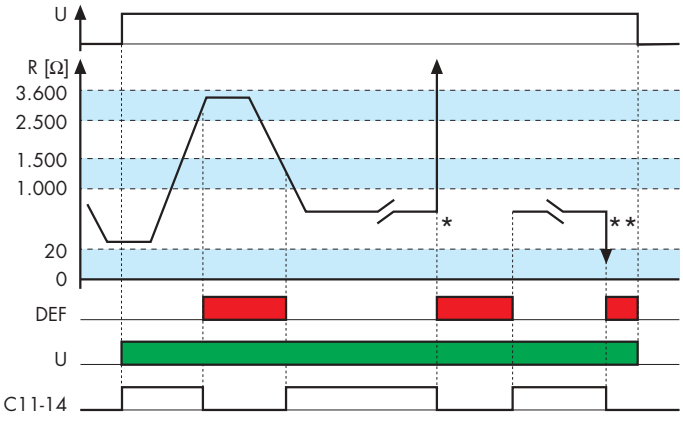
I_{Lo} I_{Up} – mode
When passing the I_{Lo} or Iup values

RESET MEMORY:
Pushing "SET/RESET" >1 sec

C = output contact
NO 11-14 (6-2) closed

Type 71.91.8.230.0300





*PTC-Break **PTC-Short circuit

Switch off:
- Thermistor line break
- Over temperature R_{PTC} >(2,5...3,6)kΩ,
- Thermistor line short circuit (R_{PTC} <20Ω)
- Loss of supply

Switch on:
Temperature within limits R_{PTC} >(1,0...1,5)kΩ on power-up. (1kΩ...1.5)kΩ on cooling

C = output contact
NO (11-14)
Closed when Temperature within limits

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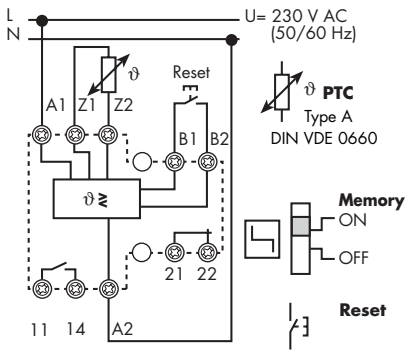
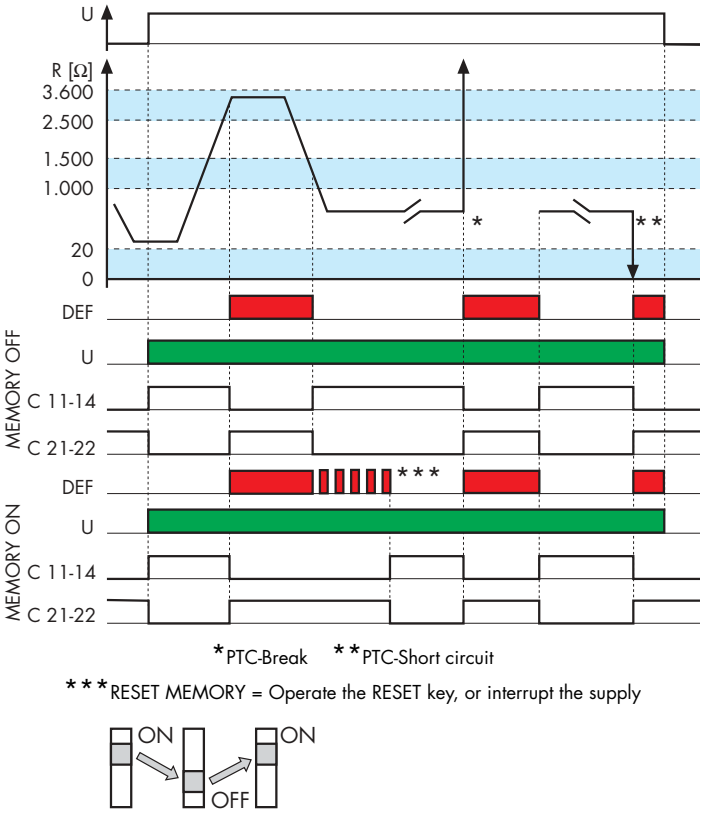
FUNCTIONS

Type 71.92.8.230.0401





*PTC-Break **PTC-Short circuit

***RESET MEMORY = Operate the RESET key, or interrupt the supply

Switch off:
- Thermistor line break
- Over temperature R_{PTC} >(2.5…3.6)kΩ
- Thermistor line short circuit R_{PTC} <20Ω
- Loss of supply

Switch on:
Temperature within limits (20Ω…2.5kΩ) on power-up.
R_{PTC} >(1.0…1.5)kΩ on cooling.

Select MEMORY OFF:
If monitored value is expected to cross the resetting threshold.

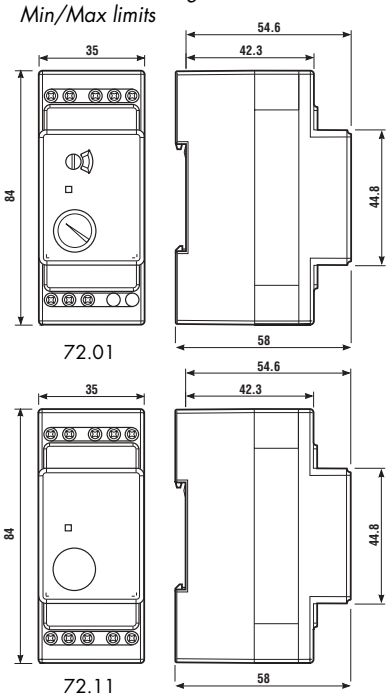
Select MEMORY ON:
If monitored value is expected to remain within limits.

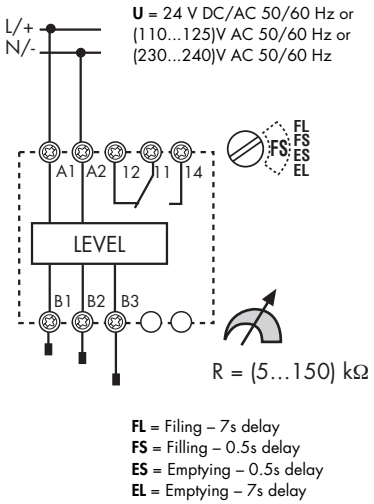
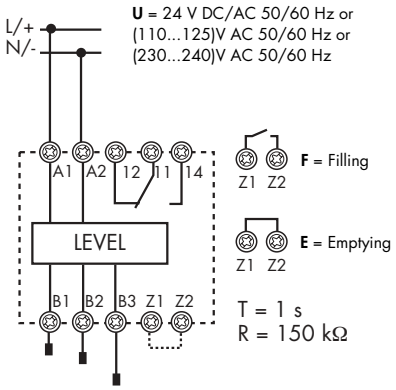
RESET MEMORY:
Operate the RESET key, or interrupt the supply.

C = output contacts
NO (11-14)
Closed when Temperature within limits

NC (21-22)
Closed when Temperature outside limits / Power off

- *Level control relays for conductive liquids*
- *Emptying or filling functions*
- *Sensitivity: adjustable (72.01) or fixed (72.11)*
- *LED indicator*
- *Double insulation (6 kV - 1.2/50 µs) between:*
  - *supply and contacts*
  - *electrodes and supply*
  - *contacts and electrodes*
- *35 mm rail mount*
- *Control about a single level or between Min/Max limits*



	72.01	72.11
		
	- Sensitivity range (5...150) kΩ adjustable - Delay time (0.5s or 7s) switch selectable - Emptying or filling functions switch selectable	- Sensitivity fixed 150 kΩ - Delay time fixed: 1s - Emptying or filling functions link selectable
	 **U** = 24 V DC/AC 50/60 Hz or (110...125)V AC 50/60 Hz or (230...240)V AC 50/60 Hz L/+ N/- A1 A2 12 11 14 FL FS ES EL LEVEL B1 B2 B3 R = (5...150) kΩ **FL** = Filing – 7s delay **FS** = Filling – 0.5s delay **ES** = Emptying – 0.5s delay **EL** = Emptying – 7s delay	 **U** = 24 V DC/AC 50/60 Hz or (110...125)V AC 50/60 Hz or (230...240)V AC 50/60 Hz L/+ N/- A1 A2 12 11 14 LEVEL B1 B2 B3 Z1 Z2 Z1 Z2 **F** = Filling Z1 Z2 **E** = Emptying T = 1 s R = 150 kΩ
Contact specifications		
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 in AC1 VA	4,000	4,000
Rated load in AC15 (230 V) VA	750	750
Single phase motor rating (230 V) kW	0.55	0.55
Breaking capacity in 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 specifications		
Nominal voltage (U_N) V AC (50/60 Hz)/DC	24	
V AC	110...125 – 230...240	
Rated power AC/DC VA (50 Hz)/W	2.5/1.5	2.5/1.5
Operating range AC	(0.8...1.1)U_N	(0.8...1.1)U_N
DC	(0.8...1.1)U_N	(0.8...1.1)U_N
Technical data		
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 kΩ	5...150 (adjustable)	150 (fixed)
Insulation between supply/contacts/electrode (1.2/50 µs) kV	6	6
Ambient temperature °C	–20...+60	–20...+60
Protection category	IP20	IP20
Approvals (according to type):	CE	

ORDERING INFORMATION

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

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

Series

Type
0 = Sensitivity range adjustable (1...150) kΩ
35 mm rail mount
1 = Sensitivity fixed 150 kΩ
35 mm rail mount

No. of poles
1 = 1 CO (SPDT)

Supply voltage
024 = 24 V AC/DC
125 = (110...125)V AC
240 = (230...240)V AC

Supply version
0 = AC (50/60 Hz)/DC
8 = AC (50/60 Hz)

TECHNICAL DATA

EMC SPECIFICATIONS

TYPE OF TEST		REFERENCE STANDARD	
Electrostatic discharge	- contact discharge	EN 61000-4-2	4 kV
	- air discharge	EN 61000-4-2	8 kV
Radio-frequency electromagnetic field (80 ÷ 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

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 contacts and electrodes	1,000 V AC	1.5 kV

*There is no insulation between electrode and supply for the type 72.x1.0.024.0000 at 24V AC/DC.

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	
Max wire size			solid cable	stranded cable
		mm^2	1x6 / 2x4	1x4 / 2x2.5
		AWG	1x10 / 2x12	1x12 / 2x14
Screw torque		Nm	0.8	
Max cable length between electrode and relay		m	200 (max. capacitance of 100 nF/km)	

FUNCTIONS

U	= Supply voltage
B1	= Max level electrode
B2	= Min level electrode
B3	= Common
	= Contact 11-14
Z1-Z2	= Link to select emptying (Type 72.11)

LED	Supply voltage	NO output contact	Contacts Open	Contacts Closed
	OFF	Open	11 - 14	11 - 12
	ON	Open	11 - 14	11 - 12
	ON	Open (Timing in Progress)	11 - 14	11 - 12
	ON	Closed	11 - 12	11 - 14

Function and Run-on time

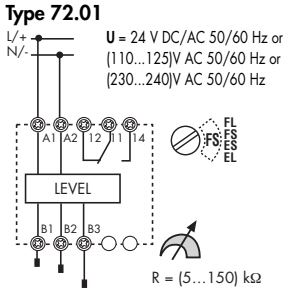
Type 72.01	**Type 72.11**
FL = Level control by Filling, Long (7sec) run-on delay.	**F** = Level control by Filling, Z1–Z2 open. Run-on time fixed at 1sec.
FS = Level control by Filling, Short (0.5sec) run-on delay.	**E** = Level control by Emptying, Z1–Z2 linked. Run-on time fixed at 1sec.
ES = Level control by Emptying, Short (0.5sec) run-on delay.	
EL = Level control by Emptying, Long (7sec) run-on delay.	

FILLING FUNCTIONS

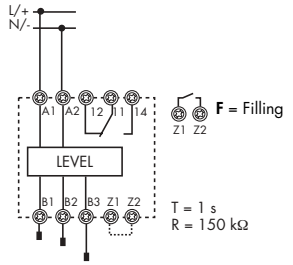
Wiring diagram

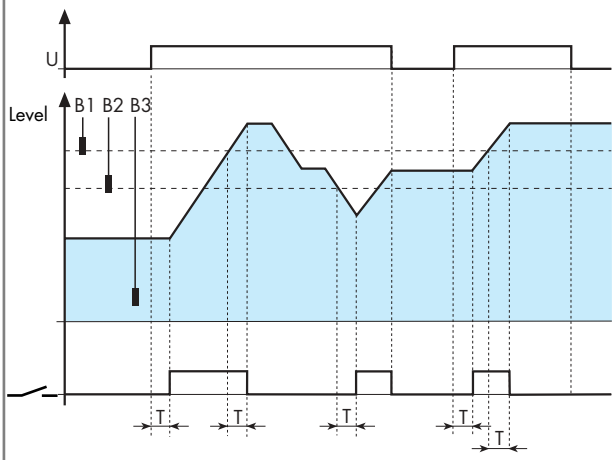
Examples with **3 electrodes**

Type 72.01



Type 72.11





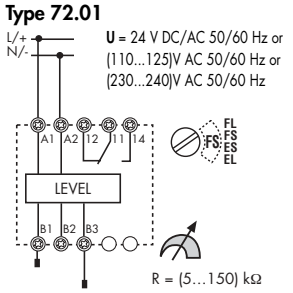
Filling Control – between Min. and Max. levels.
Under normal operation the liquid level can be expected to cycle between the Minimum and the Maximum electrodes, B2 and B1 (plus a degree of over and under-shoot).

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.

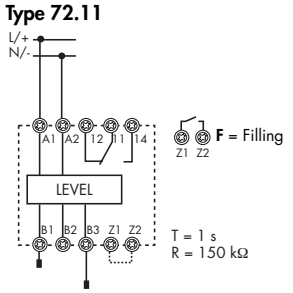
Switch Off:
• On the liquid level reaching electrode B1, the output relay will de-energise after time T has expired.
• On "power-off", the output relay will immediately de-energise.

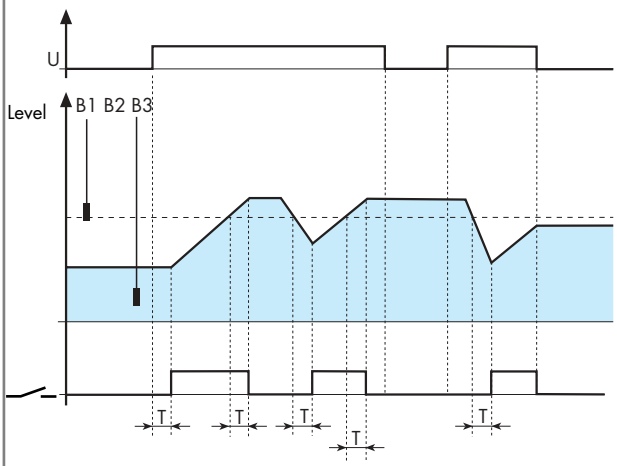
Examples with **2 electrodes**

Type 72.01



Type 72.11





Filling Control – about a single level, B1.
Under normal operation the liquid evel can be expected to cycle about the level set by electrode B1 with a degree of over and under-shoot.

Switch On:
• On "power-up", if the liquid is below B1 the output relay will operate after time T has expired.
• On the liquid level falling below B1, the output relay will operate after time T has expired.

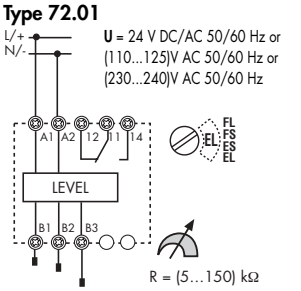
Switch Off:
• On the liquid level reaching electrode B1, the output relay will de-energise after time T has expired.
• On "power-off", the output relay will immediately de-energise.

EMPTYING FUNCTIONS

Wiring diagram

Examples with **3 electrodes**

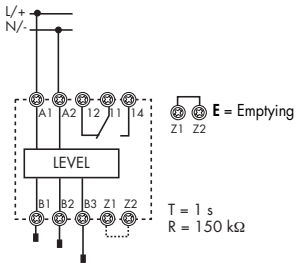
Type 72.01



U = 24 V DC/AC 50/60 Hz or
(110...125)V AC 50/60 Hz or
(230...240)V AC 50/60 Hz

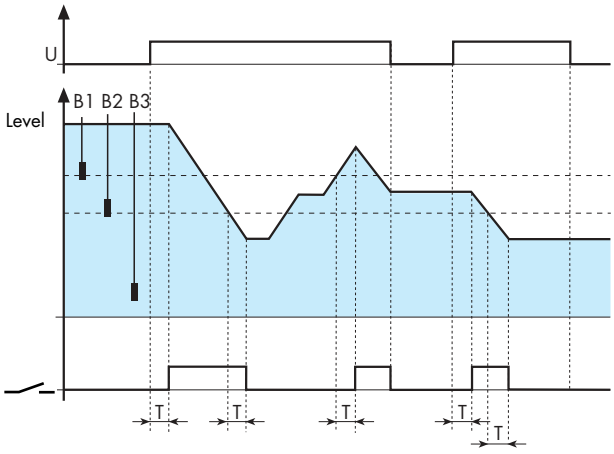
R = (5...150) kΩ

Type 72.11



E = Emptying

T = 1 s
R = 150 kΩ



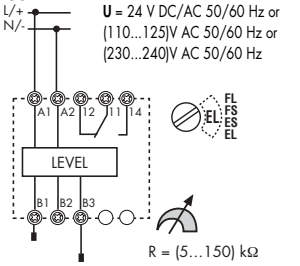
Emptying Control – between Max. and Min. levels.
Under normal operation the liquid level can be expected to cycle between the Maximum and the Minimum electrodes, B1 and B2 (plus a degree of over and under-shoot).

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.

Examples with **2 electrodes**

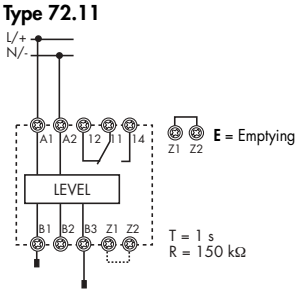
Type 72.01



U = 24 V DC/AC 50/60 Hz or
(110...125)V AC 50/60 Hz or
(230...240)V AC 50/60 Hz

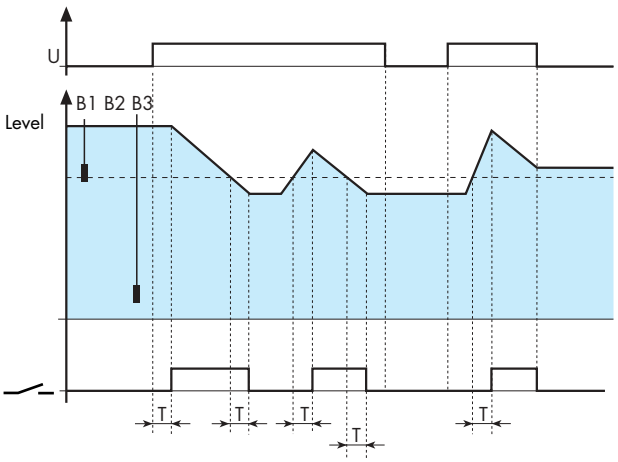
R = (5...150) kΩ

Type 72.11



E = Emptying

T = 1 s
R = 150 kΩ



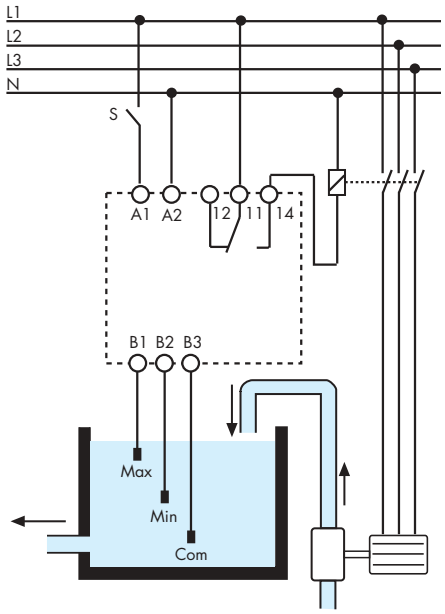
Emptying Control about a single level, B1.
Under normal operation the liquid level can be expected to cycle about the level set by electrode B1 with a degree of over and under-shoot.

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.

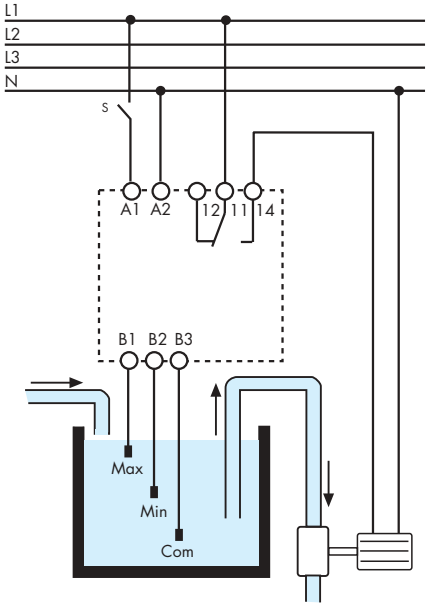
Switch Off:
• On the liquid level falling below electrode B1, the output relay will de-energise after time T has expired.
• On "power-off", the output relay will immediately de-energise.

APPLICATIONS

FILLING function:
Examples with 3 electrodes and with a contactor connected to the contact.



EMPTYING function:
Examples with 3 electrodes and with a motor pump connected directly to the contact.



The 72 series level control relays work by measuring the resistance through the liquid, between the common (B3) electrode and Min. and Max. electrodes (B2 and B1).
If the tank is metalic, then this can be substituted as the B3 electrode.

Take care to ensure that the liquid has a suitable resistivity – see below:

SUITABLE LIQUIDS
- City water
- Well water
- Rainwater
- Sea water
- Liquids with low-percentage alcohol
- Wine
- Milk, Beer, Coffee
- Sewage
- Liquids fertilizer

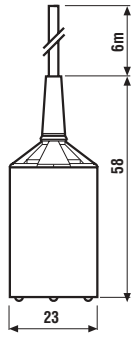
UN-SUITABLE LIQUIDS
- Demineralised water
- Fuels
- Oil
- Liquids with high-percentage alcohol
- Liquid gas
- Paraffins
- Ethylene glycol
- Paint

ACCESSORIES


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

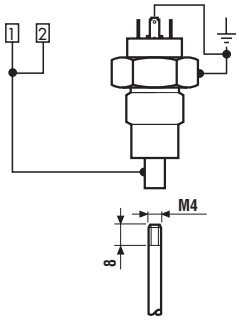
- Max. liquid temperature: + 100 °C

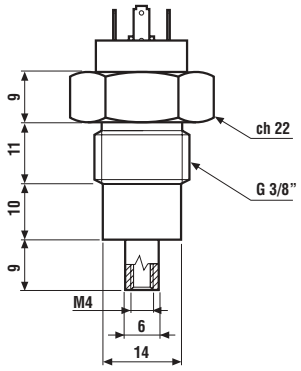



072.51

Electrode holder with two pole connector, one connected directly to the electrode and the second connected to the grounded installation thread. Suitable for metal tank with G3/8" linkage. Electrode not incuded. Order appropriate number of electrodes holders - additional to the relay.	072.51

- Max liquid temperature: + 100 °C
- Max tank pressure: 12 bar
- Cable grip: Ø ≥ 6 mm

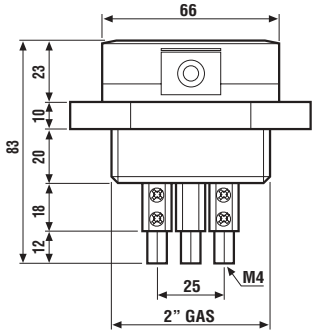


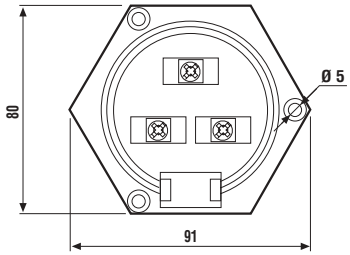



072.53

Electrode holder with three poles. Electrode not incuded. Order appropriate number of electrodes holders - additional to the relay.	072.53

- Max liquid temperature: + 130 °C





APPLICATION NOTES

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.

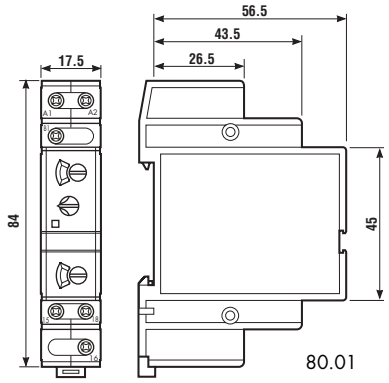
Electrodes and cable lengths
Normally 2 electrodes or 3 electrodes will be required for control about a single level, or control between Min. and Max. levels, respectively. However, if the tank is made of conductive material it is possible to use this as the common electrode, B3, if electrical connection 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 possible to make direct connection (using a contact) between B1-B3 and B2-B3 without using electrodes, but in this case it is not possible 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.

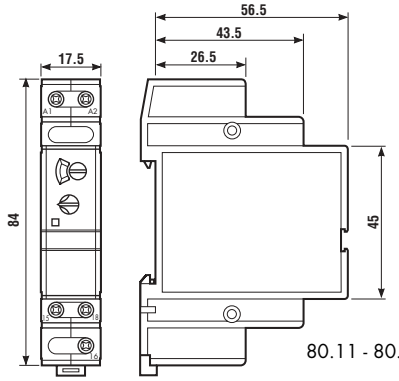
On site commissioning
To confirm the suitability of the relay sensitivity to the resistance between electrodes it is suggested that the following checks are made.
For convenience it is suggested that the fill function and the shortest run-on time are selected.

Commissioning
Follow these setting-up instructions to achieve correct operation:
72.01
Select the function "FS" (Filling and Short delay of 0.5s), and set the sensitivity control to 5 kΩ. Ensure that all electrodes are immersed in the liquid - expect the output relay to be ON. Then, slowly rotate the sensitivity control in the 150 kΩ direction until the level relay switches OFF (internal output relay will switch OFF and red LED will switch slowly flash). (If the level relay does not switch OFF then, either the electrodes are not immersed, or the liquid has too high impedance or the distance between electrodes is too long).
Finally, select the filling or emptying function as required, run in real time and confirm that the level relay works as required.
72.11
Select the Filling function "F", (Z1 – Z2 open). Ensure that all electrodes are immersed in the liquid, but leave electrode B3 disconnected – output relay should be ON. Connect electrode B3, and the level relay should switch OFF (internal output relay will switch OFF and red LED will switch slowly flash). (If the level relay does not switch OFF then, either the electrodes are not immersed, or the liquid has too high impedance or the distance between electrodes is too long.)
Finally, select the filling or emptying function as required, run in real time and confirm that the level relay works as required.

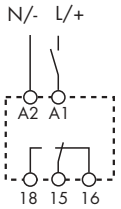
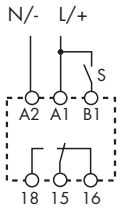
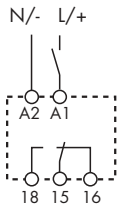
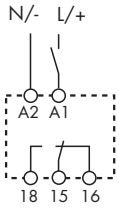
- *Mono-function and multi-function versions available*
- *Rotary selector*
- *7.5 mm wide*
- *Six time scales from 0.1s to 20h*
- *35 mm rail (EN 50022) mount*
- *High input/output insulation*



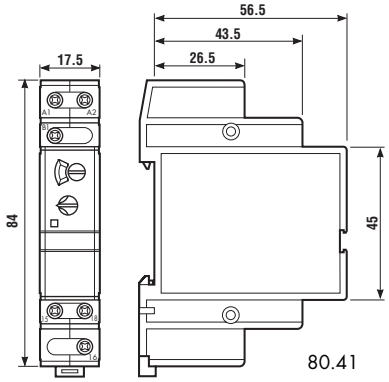
80.01



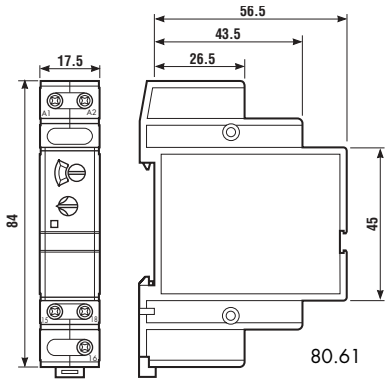
80.11 - 80.21

	80.01	80.11	80.21
			
	- Multi-voltage - Multi-function	- Mono-voltage - Mono-function	- Mono-voltage - Mono-function
	AI: ON delay **DI:** ON pulse **SW:** Symmetrical recycler: ON start **BE:** Signal OFF delay **CE:** Signal ON and OFF delay **DE:** Signal ON pulse	**AI:** ON delay	**DI:** ON pulse
	 wiring diagram (without signal START)	 wiring diagram (with signal START)	 wiring diagram (without signal START)	 wiring diagram (without signal START)
Contact specifications			
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 in AC1 VA	4,000	4,000	4,000
Rated load in AC15 (230 V AC) VA	750	750	750
Single phase motor rating (230 V AC) kW	0.55	0.55	0.55
Breaking capacity in 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 specifications			
Nominal voltage V AC (50/60 Hz)	12...240	24 - 110...125 - 230...240	24 - 110...125 - 230...240
V DC	12...240	24 - 110...125	24 - 110...125
Rated power AC/DC VA (50 Hz)/W	< 1.8 / < 1.4	< 1.8 / < 0.6	< 1.8 / < 0.6
Operating range AC	(10.2...265)V	(0.85...1.1)U_N	(0.85...1.1)U_N
DC	(10.2...265)V	(0.85...1.1)U_N	(0.85...1.1)U_N
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	—	—
Setting accuracy-full range %	± 5	± 5	± 5
Electrical life at rated load in AC1 cycles	$100 \cdot 10^3$	$100 \cdot 10^3$	$100 \cdot 10^3$
Ambient temperature range °C	–10...+50	–10...+50	–10...+50
Protection category	IP 20	IP 20	IP 20
Approvals (according to type):	CE GOST		

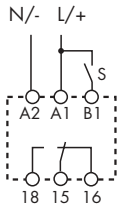
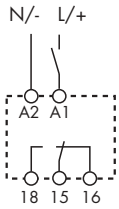
- *Mono-function and multi-function versions available*
- *Rotary selector*
- *17.5 mm wide*
- *Six time scales from 0.1s to 20h*
- *35 mm rail (EN 50022) mount*
- *High input/output insulation*



80.41



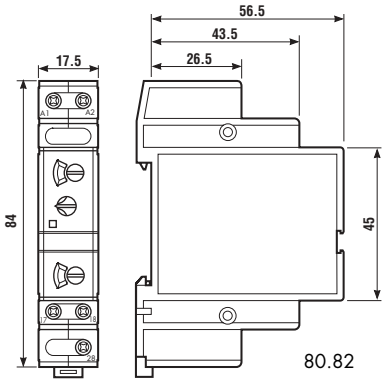
80.61

	80.41	80.61
		
	- Mono-voltage - Mono-function	- Multi-voltage - Mono-function
	BE: Signal OFF delay	**BI:** True Off Delay
		
	wiring diagram (with signal START)	wiring diagram (without signal START)
Contact specifications		
Contact configuration	1 CO (SPDT)	1 CO (SPDT)
Rated current/Maximum peak current A	16/30	8/15
Rated voltage/Maximum switching voltage V AC	250/400	250/400
Rated load in AC1 VA	4,000	2,000
Rated load in AC15 (230 V AC) VA	750	400
Single phase motor rating (230 V AC) kW	0.55	0.3
Breaking capacity in DC1: 30/110/220 V A	16/0.3/0.12	8/0.3/0.12
Minimum switching load mW(V/mA)	500 (10/5)	300 (5/5)
Standard contact material	AgCdO	AgNi
Supply specifications		
Nominal voltage V AC (50/60 Hz)	24 - 110...125 - 230...240	24...240
V DC	24 - 110...125	24...240
Rated power AC/DC VA (50 Hz)/W	< 1.8/ < 0.6	< 0.6/ < 0.6
Operating range AC	(0.85...1.1)U_N	(17...265)V
DC	(0.85...1.1)U_N	(17...265)V
Technical data		
Specified time range	See below*	See below**
Repeatability %	± 1	± 1
Recovery time ms	≤ 50	≤ 50
Minimum control impulse ms	50	300 (A1-A2)
Setting accuracy-full range %	± 5	± 5
Electrical life at rated load in AC1 cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Ambient temperature range °C	–10...+50	–10...+50
Protection category	IP 20	IP 20
Approvals (according to type):	CE	GOST

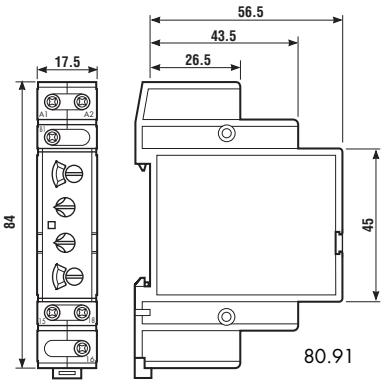
*Type 80.41:
(0.1...2)s, (1...20)s,
(0.1...2)min, (1...20)min,
(0.1...2)h, (1...20)h

**Type 80.61:
(0.1...1)s, (0.5...5)s,
(2...20)s, (0.2...2)min

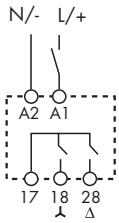
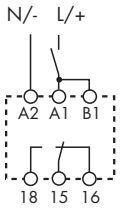
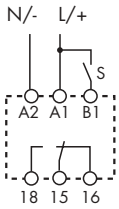
- *Mono-function and multi-function versions available*
- *Rotary selector*
- *17.5 mm wide*
- *Six time scales from 0.1s to 20h*
- *35 mm rail (EN 50022) mount*
- *High input/output insulation*



80.82



80.91

	80.82	80.91
		
	- Multi-voltage - Mono-function - Transfer time can be regulated (0.05…1)s	- Multi-voltage - Mono-function
	SD: Star-Delta	**LI:** Asymmetrical recycler (ON starting) **LE:** Signal asymmetrical recycler (ON starting)
		 
	wiring diagram (without signal START)	wiring diagram (without signal START) / wiring diagram (with signal START)
Contact specifications		
Contact configuration	2 NO (DPST-NO)	1 CO (SPDT)
Rated current/Maximum peak current A	6/10	16/30
Rated voltage/Maximum switching voltage V AC	250/400	250/400
Rated load in AC1 VA	1,500	4,000
Rated load in AC15 (230 V AC) VA	300	750
Single phase motor rating (230 V AC) kW	—	0.55
Breaking capacity in DC1: 30/110/220 V A	6/0.2/0.12	16/0.3/0.12
Minimum switching load mW(V/mA)	500 (12/10)	500 (10/5)
Standard contact material	AgNi	AgCdO
Supply specifications		
Nominal voltage V AC (50/60 Hz)	12...240	12...240
V DC	12...240	12...240
Rated power AC/DC VA (50 Hz)/W	< 1.3/ < 0.8	< 1.8/ < 1.4
Operating range AC	(10.2...265)V	(10.2...265)V
DC	(10.2...265)V	(10.2...265)V
Technical data		
Specified time range	See below*	See below**
Repeatability %	± 1	± 1
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	$60 \cdot 10^3$	$100 \cdot 10^3$
Ambient temperature range °C	–10…+50	–10…+50
Protection category	IP 20	IP 20
Approvals (according to type):	CE GOST	

*Type 80.82:
(0.1…2)s, (1…20)s,
(0.1…2)min, (1…20)min

**Type 80.91:
(0.1…2)s, (1…20)s,
(0.1…2)min, (1…20)min,
(0.1…2)h, (1…20)h

ORDERING INFORMATION

Example: a 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)
8 = Star-Delta (SD)
9 = Asymmetrical recycler ON starting (LI, LE)

No. of poles
1 = 1 CO (SPDT)
2 = 2 NO (DPST-NO), only 80.82 type

Supply voltage
024 = 24 V AC/DC
240 = (230...240)V AC (80.11, 80.21, 80.41)
240 = (12 ... 240)V AC/DC (80.01, 80.82, 80.91)
240 = (24 ... 240)V AC/DC (80.61)
125 = (110...125)V AC/DC (80.11, 80.21, 80.41)

Supply version
0 = AC (50/60 Hz)/DC (80.01, 80.61, 80.82, 80.91)
8 = AC (50/60 Hz) (80.11, 80.21, 80.41)

ACCESSORIES


020.24

Sheet of marker tags (24 tags), 9x17 mm, for types 80.01/11/21/41/61/82	020.24

TECHNICAL DATA

EMC SPECIFICATIONS

TYPE OF TEST		REFERENCE STANDARD	
Electrostatic discharge	- contact discharge	EN 61000-4-2	4 kV
	- air discharge	EN 61000-4-2	8 kV
Radio-frequency electromagnetic field (80 ÷ 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

INSULATION

			80.01/11/21/41/82/91	80.61
Dielectric strength				
	- between input and output circuit	V AC	4,000	2,500
	- between open contacts	V AC	1,000	1,000
Insulation (1.2/50 µs) between input and output		kV	6	4

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	
Max wire size			solid cable	stranded cable
		mm²	1x6 / 2x4	1x4 / 2x2.5
		AWG	1x10 / 2x12	1x12 / 2x14
Screw torque		Nm	0.8	

FUNCTIONS

U = Supply voltage

S = Signal switch

= Output contact

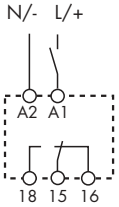
LED*	Supply voltage	NO output contact	Contacts Open	Contacts Closed
	OFF	Open	15 - 18	15 - 16
	ON	Open	15 - 18	15 - 16
	ON	Open (Timing in Progress)	15 - 18	15 - 16
	ON	Closed	15 - 16	15 - 18

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

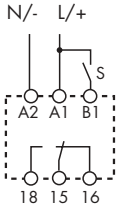
Without signal Start = Start via contact in supply line (A1).
With signal Start = Start via contact into control terminal (B1).

Wiring diagram

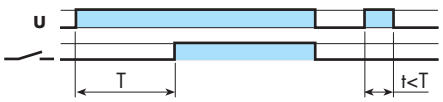
Without signal START



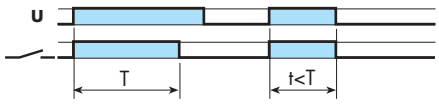
With signal START



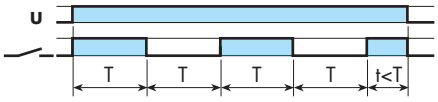
Type 80.01



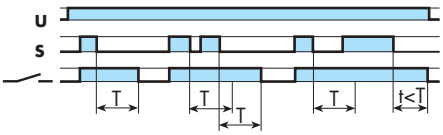
(AI) ON delay.
Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs when power is removed.



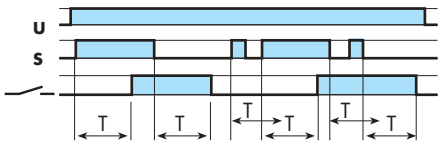
(DI) ON pulse.
Apply power to timer. Output contacts transfer immediately. After the preset time has elapsed, contacts reset.



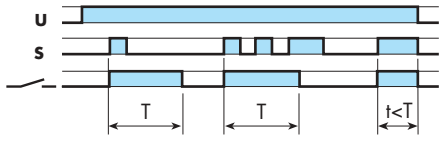
(SW) Symmetrical recycler: ON start.
Apply power to timer. Output contacts transfer immediately and cycle between ON and OFF for as long as power is applied. The ratio is 1:1 (time on = time off).



(BE) Signal OFF delay.
Power is permenently applied to the timer.
The output contacts transfer immediately on closure of the Signal Switch (S). Opening the Signal Switch initiates the preset delay, after which time the output contacts reset.

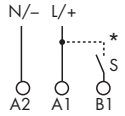


(CE) Signal ON and OFF delay.
Power is permenently applied to the timer.
Closing the Signal Switch (S) initiates the preset delay, after which time the output contacts transfer. Opening the Signal switch initiates the same preset delay, after which time the output contacts reset.



(DE) Signal ON pulse.
Power is permenently applied to the timer.
On momentary or maintained closure of Signal Switch (S), the output contacts transfer, and remain so for the duration of the preset delay, after which they reset.

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

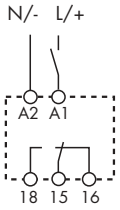


* - With DC supply, positive polarity has to be connected to B1 terminal (according to EN 60204-1).
- A voltage other than the supply voltage can be applied to the command Start (B1), example:
A1 - A2 = 230 V AC
B1 - A2 = 12 V DC

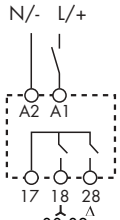
FUNCTIONS

Wiring diagram

Without signal START

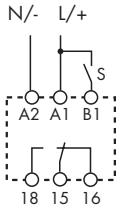


80.11/21/61

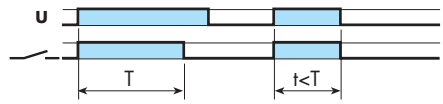
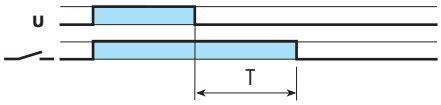
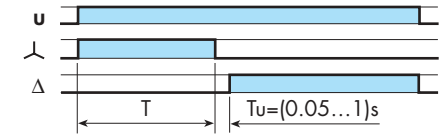
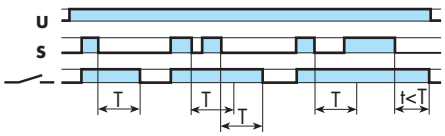


80.82

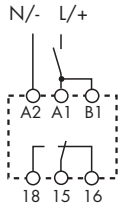
With signal START



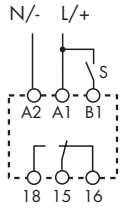
80.41

Type		
80.11		**(AI) ON delay.** Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs when power is removed.
80.21		**(DI) ON pulse.** Apply power to timer. Output contacts transfer immediately. After the preset time has elapsed, contacts reset.
80.61		**(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.
80.82		**(SD) Star - delta.** Apply power to timer. The star contact (⅄) closes immediately. After preset delay has elapsed the star contact (⅄) resets. After a further transfer time variable from (0.05…1)s the delta contact (Δ) closes and remains in that position, until reset on power off.
80.41		**(BE) Signal OFF delay.** Power is permenently applied to the timer. The output contacts transfer immediately on closure of the Signal Switch (S). Opening the Signal Switch initiates the preset delay, after which time the output contacts reset.

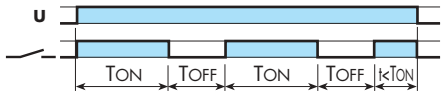
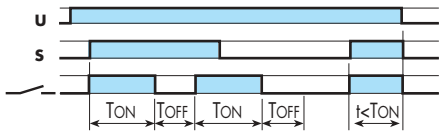
Without signal START



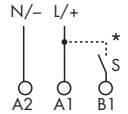
With signal START



80.91

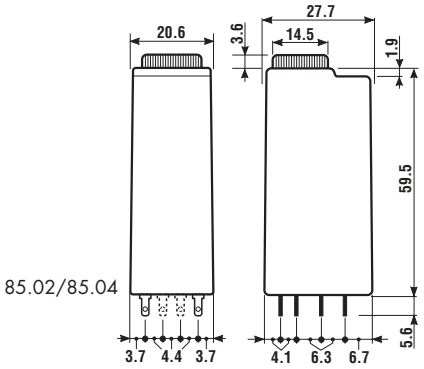
Type		
80.91		**(LI) Asymmetrical recycler (ON starting).** Apply power to timer. Output contacts transfer immediately and cycle between ON and OFF for as long as power is applied. The ON and OFF times are independently adjustable.
		**(LE) Signal asymmetrical recycler (ON starting)** Power is permenently applied to the timer. Closing Signal Switch (S) causes the output contacts to transfer immediately and cycle between ON and OFF, until opened.

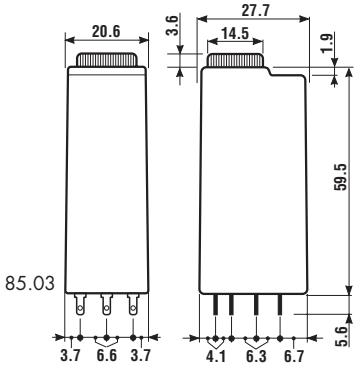
NOTE: time scales and functions must be set before energising the timer.

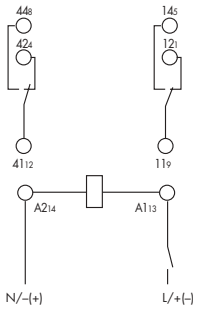
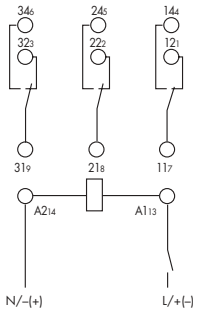
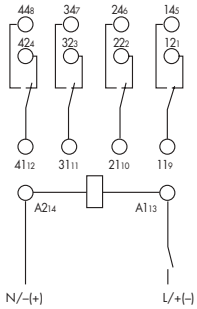


* - With DC supply, positive polarity has to be connected to B1 terminal (according to EN 60204-1).
- A voltage other than the supply voltage can be applied to the command Start (B1), example:
A1 - A2 = 230 V AC
B1 - A2 = 12 V DC

- *Plug-in timer relay*
- *2, 3 or 4 CO (DPDT, 3PDT or 4PDT) contact available*
- *Seven time scales, from 0.05s to 100h*
- *Multifunctions*
- *Sockets: see 94 series*





	85.02	85.03	85.04
			
	- 2 pole, 10 A - AC/DC supply non polarized - Plug-in for use with 94 series sockets	- 3 pole, 10 A - AC/DC supply non polarized - Plug-in for use with 94 series sockets	- 4 pole, 7 A - AC/DC supply non polarized - Plug-in for use with 94 series sockets
	AI: ON delay **DI:** ON pulse **SW:** Symmetrical recycler: ON start **GI:** Fixed pulse (0.5s) delayed	**AI:** ON delay **DI:** ON pulse **SW:** Symmetrical recycler: ON start **GI:** Fixed pulse (0.5s) delayed	**AI:** ON delay **DI:** ON pulse **SW:** Symmetrical recycler: ON start **GI:** Fixed pulse (0.5s) delayed
	 wiring diagram	 wiring diagram	 wiring diagram
Contact specifications			
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 in AC1 VA	2,500	2,500	1,750
Rated load in AC15 (230 V AC) VA	500	500	350
Single phase motor rating (230 V AC) kW	0.37	0.37	0.125
Breaking capacity in 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 specifications			
Nominal voltage 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 VA (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	$200 \cdot 10^3$	$200 \cdot 10^3$	$200 \cdot 10^3$
Ambient temperature range °C	–20...+60	–20...+60	–20...+60
Protection category	IP 40	IP 40	IP 40
Approvals (according to type):	CE EAC GOST cULus		

ORDERING INFORMATION

Example: 85 series timer, 4 CO (4PDT), 24 V AC/DC supply voltage with AI - DI functions.

8 5 . 0 4 . 0 . 0 2 4 . 0 0 0 0

Series

Type
0 = Multifunction (AI, DI, GI, SW)

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

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

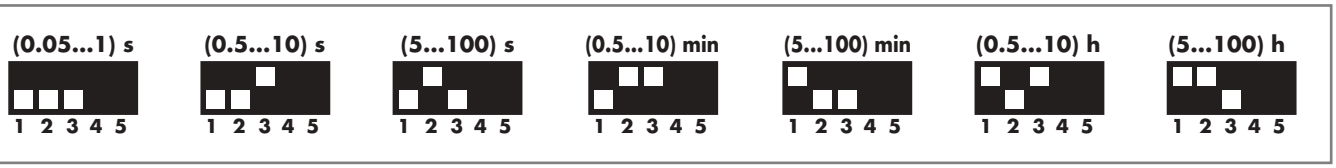
INSULATION

Dielectric strength		85.02/03	85.04
- between input and output circuit	V AC	2,000	2,000
- between open contacts	V AC	1,000	1,000
Insulation (1.2/50 µs) between input and output	kV	6	4

OTHER DATA

Power lost to the environment		2 pole	3 pole	4 pole
without contact current	W	1.6	1.6	1.6
with rated current	W	3.7	4.7	3.6

TIME SCALES

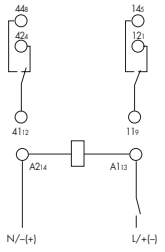


NOTE: time scales and functions must be set before energising the timer.

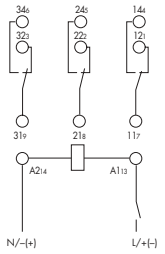
FUNCTIONS

	LED	Supply voltage	NO (SPDT-NO) output contact	Contacts Open	Contacts Closed
U = Supply voltage = Output contact		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

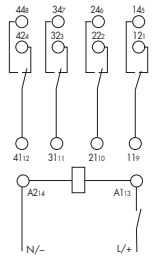
Wiring diagram



85.02

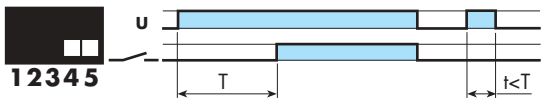


85.03

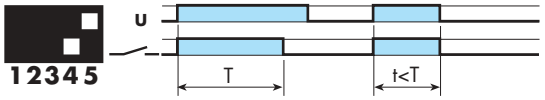


85.04

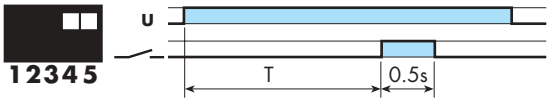
Types: 85.02, 85.03, 85.04



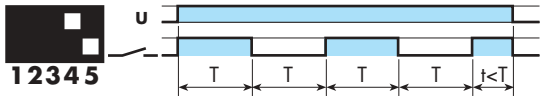
(AI) ON delay.
Apply power to timer.
Output contacts transfer after preset time has elapsed.
Reset occurs when power is removed.



(DI) ON pulse.
Apply power to timer.
Output contacts transfer immediately.
After the preset time has elapsed, contacts reset.

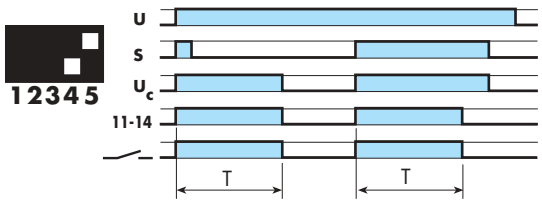


(GI) Fixed pulse (0.5s) delayed.
Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs after a fixed time of 0.5s. 0.5s.

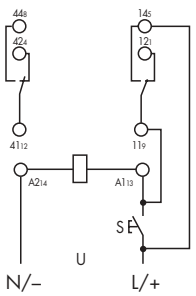


(SW) Symmetrical recycler: ON start.
Apply power to timer.
Output contacts transfer immediately and cycle between ON and OFF for as long as power is applied.
The ratio is 1:1 (time on = time off).

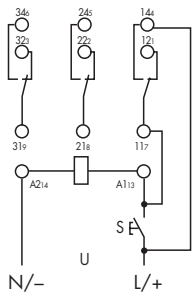
U = Supply voltage
S = Signal switch
Uc = Supply voltage to the timer
11-14 = Self-holding contact
= Output contact



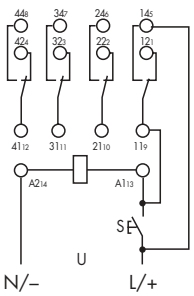
Signal ON Pulse
On mometary closure of Signal Switch (S) > 50 ms, the output contacts transfer and remain so (with self-holding on contact 11-14) for the duration of the preset delay, after which they reset.



85.02



85.03



85.04

94.04

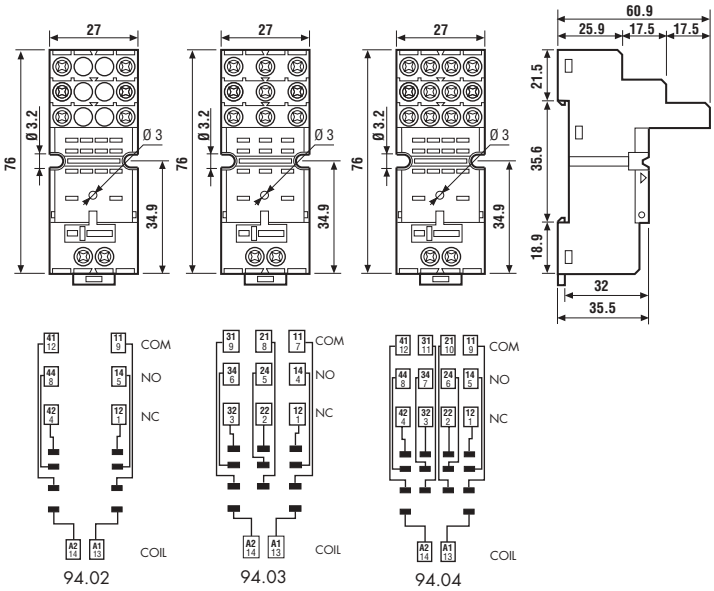
Timer type	85.02		85.03		85.04	
Colour	BLUE	BLACK	BLUE	BLACK	BLUE	BLACK
Clamp terminal socket: panel or 35 mm rail (EN 50022) mount	94.02	94.02.0	94.03	94.03.0	94.04	94.04.0
Metal retaining clip (supplied with timer)	094.81					
6-way jumper link for 94.02, 94.03 and 94.04 sockets	094.06	094.06.0	094.06	094.06.0	094.06	094.06.0
Identification tag	094.00.4					

Approvals (according to type):

GOST

- Rated values: 10 A - 250 V
- Dielectric strength: ≥ 2 kV AC
- Protection category: IP 20
- Ambient temperature: (–40...+70)°C
- Torque: 0.5 Nm
- Wire strip length: 8 mm
- Max wire size:

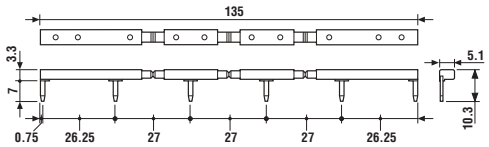
	solid wire	stranded wire
mm²	1x6 / 2x2.5	1x4 / 2x2.5
AWG	1x10 / 2x14	1x12 / 2x14



094.06

6-way jumper link	094.06

- Rated values: 10 A - 250 V



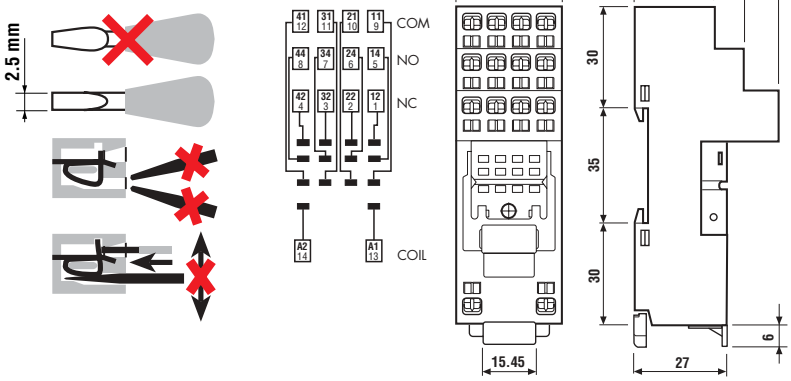
94.54.1

Relay type	85.02, 85.04	
Colour	BLUE	BLACK
Screwless terminal socket: 35 mm rail (EN 50022) mount	94.54.1	94.54.10
Metal retaining clip	094.81	

Approvals (according to type):

- Rated values: 10 A - 250 V
- Dielectric strength: ≥ 2 kV AC
- Protection category: IP 20
- Ambient temperature: (-25...+70)°C
- Wire strip length: 7 mm
- Max wire size:

	solid wire	stranded wire
mm²	2x(0.2...1.5)	2x(0.2...1.5)
AWG	2x(24...18)	2x(24...18)




94.74

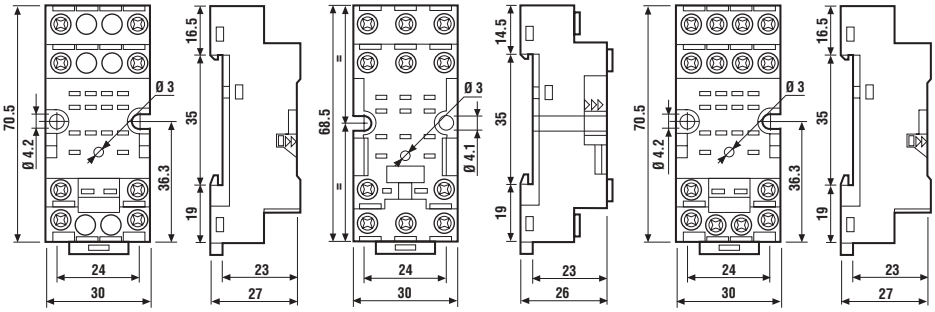
Timer type	85.02		85.03		85.04	
Colour	BLUE	BLACK	BLUE	BLACK	BLUE	BLACK
Screw terminal socket: panel or 35 mm rail (EN 50022) mount	94.72	94.72.0	94.73	94.73.0	94.74	94.74.0
Metal retaining clip (supplied with timer)	094.81					

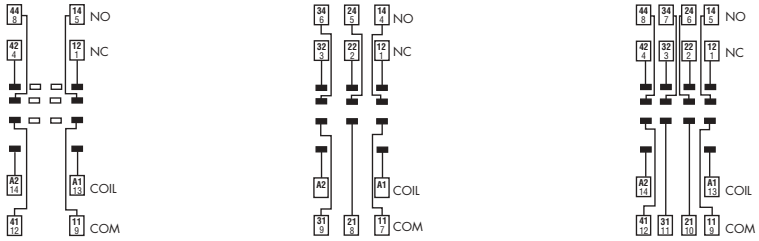
Approvals
(according to type):

GOST

- Rated values: 10 A - 250 V
- Dielectric strength: ≥ 2 kV AC
- Protection category: IP 20
- Ambient temperature: (–40...+70)°C
- Torque: 0.5 Nm
- Wire strip length: 8 mm
- Max wire size:

	solid wire	stranded wire
mm²	1x2.5 / 2x1.5	1x2.5 / 2x1.5
AWG	1x14 / 2x16	1x14 / 2x16





94.72 94.73 94.74


94.82

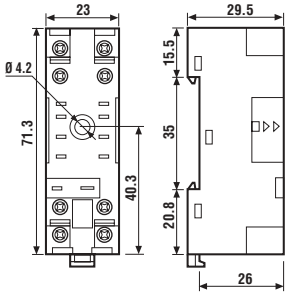
Timer type	85.02	
Colour	BLUE	BLACK
Screw terminal socket: panel or 35 mm rail (EN 50022) mount	94.82	94.82.0
Metal retaining clip (supplied with timer)	094.81	

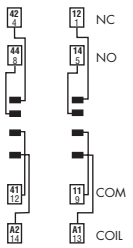
Approvals
(according to type):

GOST

- Rated values: 10 A - 250 V
- Dielectric strength: ≥ 2 kV AC
- Protection category: IP 20
- Ambient temperature: (–40...+70)°C
- Torque: 0.5 Nm
- Wire strip length: 9 mm
- Max wire size:

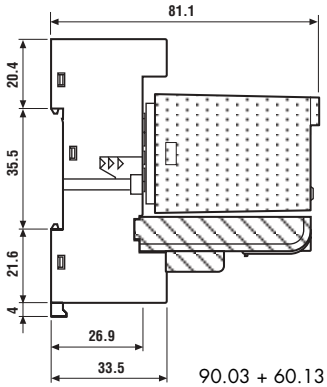
	solid wire	stranded wire
mm²	1x2.5 / 2x1.5	1x2.5 / 2x1.5
AWG	1x14 / 2x16	1x14 / 2x16



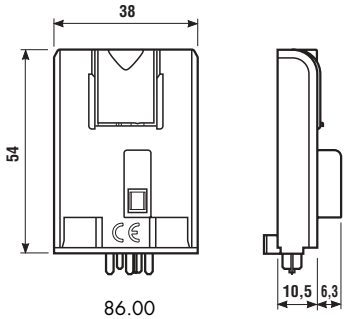


86.00

- *Multi-function timer modules*
- *Timer module for 90 and 92 series sockets*
- *LED indicator*



90.03 + 60.13 + 86.00

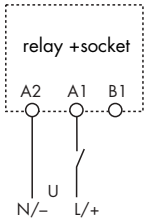


86.00

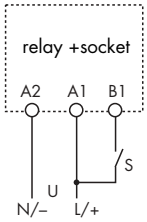
- Time scale: from 0.05s to 100 h
- Multi-function
- Plug-in for use with 90.02, 90.03 and 92.03 sockets

AI: ON delay
DI: ON pulse
SW: Symmetrical recycler: 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



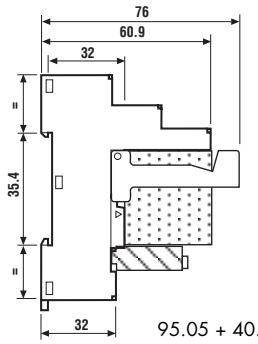
wiring diagram
without signal START



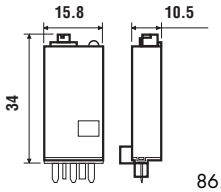
wiring diagram
with signal START

Contact specifications		
Contact configuration		
Rated current/Maximum peak current	A	
Rated voltage/Maximum switching voltage	V AC	
Rated load in AC1	VA	
Rated load in AC15 (230 V AC)	VA	see 60 and 62 series relays
Single phase motor rating (230 V AC)	kW	Note: don't use with relay 62.3x.x012.x300 and 62.3x.x012.x600
Breaking capacity in DC1:	30/110/220 V A	
Minimum switching load	mW (V/mA)	
Standard contact material		
Supply specifications		
Nominal voltage	V AC (50/60 Hz)	12...240
	V DC	12...240
Rated power AC/DC	W	1.2
Operating range	V AC (50/60 Hz)	10.2...265
	DC	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
Recovery time	ms	≤ 50
Minimun control impulse	ms	50
Setting accuracy full range	%	± 5
Electrical life at rated load in AC1	cycles	see 60 and 62 series relays
Ambient temperature range	°C	–20...+50
Protection category		IP 20
Approvals (according to type):		CE GOST cULus

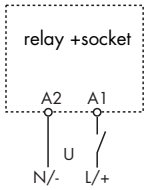
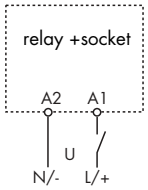
- *Mono-function timer modules*
- *Timer module for 90, 92, 94, 95 series sockets*
- *LED indicator*



95.05 + 40.52 + 86.10



86.10 , 86.20

	86.10	86.20
		
	- Mono-function - Plug-in for use with 90.02, 90.03, 92.03, 94.02, 94.03, 94.04, 95.03, 95.05 sockets	- Mono-function - Plug-in for use with 90.02, 90.03, 92.03, 94.02, 94.03, 94.04, 95.03, 95.05 sockets
	AI: ON delay  wiring diagram without signal START	**DI:** ON pulse  wiring diagram without signal START
Contact specifications		
Contact configuration	see 40, 44, 55, 60 and 62 series relays	see 40, 44, 55, 60 and 62 series relays
Rated current/Maximum peak current A		
Rated voltage/Maximum switching voltage V AC		
Rated load in AC1 VA		
Rated load in AC15 (230 V AC) VA		
Single phase motor rating (230 V AC) kW		
Breaking capacity in DC1: 30/110/220 V A		
Minimum switching load mW (V/mA)		
Standard contact material		
Supply specifications		
Nominal voltage V AC (50/60 Hz)	12...24	12...24
V DC	12...24 (non polarized)	12...24 (non polarized)
Rated power AC/DC mW	150	150
Operating range AC	$(0.8...1.1)U_N$	$(0.8...1.1)U_N$
DC	$(0.8...1.1)U_N$	$(0.8...1.1)U_N$
Technical data		
Specified time range	(1.5...15)s,(6...60)s,(0.8...8)min,(6.4...64)min	(1.5...15)s,(6...60)s,(0.8...8)min,(6.4...64)min
Repeatability %	± 1	± 1
Recovery time ms	≤ 150	≤ 150
Minimum control impulse ms	—	—
Setting accuracy-full range %	± 5	± 5
Electrical life at rated load in AC1 cycles	see 40, 44, 55, 60 and 62 series relays	see 40, 44, 55, 60 and 62 series relays
Ambient temperature range °C	0...+50	0...+50
Protection category	IP 20	IP 20
Approvals (according to type):	CE GOST cULus	

ORDERING INFORMATION

Example: a 86 series multi-function timer module with (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)
1 = Mono-function (AI)
2 = Mono-function (DI)

No. of poles
see 40, 44, 55, 60 and 62 series relays

Supply voltage
024 = (12...24)V AC/DC (86.10/20 only)
240 = (12...240)V AC/DC (86.00 only)

Supply version
0 = AC (50/60 Hz)/DC

COMBINATIONS

Number of poles	Relay type	Socket type	Timer module
1	40.31	95.03	86.10/86.20
1	40.61	95.05	86.10/86.20
2	40.52/44.52/44.62	95.05	86.10/86.20
2	55.32	94.02	86.10/86.20
2	60.12	90.02	86.00/86.10/86.20
2	62.32	92.03	86.00/86.10/86.20
3	55.33	94.03	86.10/86.20
3	60.13	90.03	86.00/86.10/86.20
3	62.33	92.03	86.00/86.10/86.20
4	55.34	94.04	86.10/86.20

TECHNICAL DATA

EMC SPECIFICATIONS

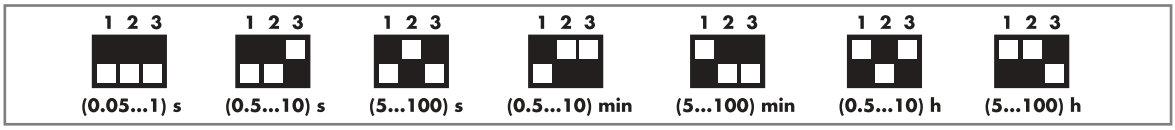
TYPE OF TEST		REFERENCE STANDARD	86.00	86.10/20
Electrostatic discharge	- contact discharge	EN 61000-4-2	4 kV	n.a.
	- air discharge	EN 61000-4-2	8 kV	8 kV
Radio-frequency electromagnetic field (80 ÷ 1000 MHz)		EN 61000-4-3	10 V/m	10 V/m
Fast transients (burst) (5-50 ns, 5 kHz) on Supply terminals		EN 61000-4-4	2 kV	2 kV
Surges (1.2/50 µs) on Supply terminals	- common mode	EN 61000-4-5	2 kV	2 kV
	- differential mode	EN 61000-4-5	1 kV	—
Radio-frequency common mode (0.15 ÷ 80 MHz) on Supply terminals		EN 61000-4-6	10 V	10 V
Radiated and conducted emission		EN 55022	class B	class B

OTHER DATA

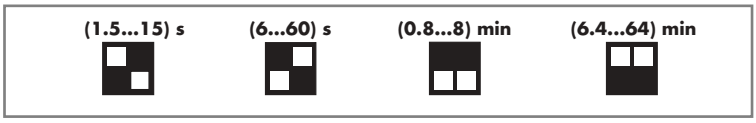
			86.00	86.10, 86.20
Current absorption on signal control (B1)		mA	1	—
Power lost to the environment	without contact current	W	0.1 (12 V) - 1 (230 V)	0.2
	with rated current		see 60 and 62 series relays	see 40, 44, 55, 60, 62 series relays

TIME SCALES

Type 86.00



Type 86.10
Type 86.20



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

FUNCTIONS

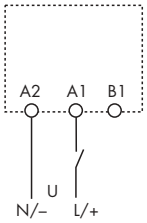
	LED Type 86.00	LED Type 86.10/20	Supply voltage	NO output contact
U = Supply Voltage **S** = Signal switch = Output Contact			OFF	Open
			ON	Open
			ON	Open (timing in progress)
			ON	Closed

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

Type 86.00

Wiring diagram

without signal START

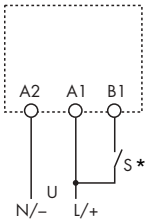


(AI) ON delay.
Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs when power is removed.

(DI) ON pulse.
Apply power to timer. Output contacts transfer immediately. After the preset time has elapsed, contacts reset.

(SW) Symmetrical recycler: 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 conneted to B1 terminal (according to EN 60204-1).

(BE) Signal OFF delay.
Power is permenently applied to the timer.
The output contacts transfer immediately on closure of the Signal Switch (S). Opening the Signal Switch initiates the preset delay, after which time the output contacts reset.

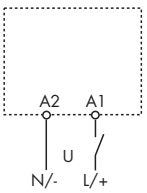
(CE) Signal ON and OFF delay.
Power is permenently applied to the timer.
Closing the Signal Switch (S) initiates the preset delay, after which time the output contacts transfer. Opening the Signal switch initiates the same preset delay, after which time the output contacts reset.

(DE) Signal ON pulse.
Power is permenently applied to the timer.
On momentary or maintained closure of Signal Switch (S), the output contacts transfer, and remain so for the duration of the preset delay, after which they reset.

(EE) Signal OFF pulse.
Power is permenently applied to the timer.
On opening of the Signal Switch (S) the output contacts transfer, and remain so for the duration of the preset delay, after which they reset.

(FE) Signal ON pulse + OFF pulse.
Power is permenently applied to the timer.
Both the opening and closing of the Signal Switch (S) initiates the transfer of the output contacts. In both instances the contacts reset after the delay period has elapsed.

Wiring diagram



Type 86.10

(AI) ON delay.
Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs when power is removed.

Type 86.20

(DI) ON pulse.
Apply power to timer. Output contacts transfer immediately. After the preset time has elapsed, contacts reset.

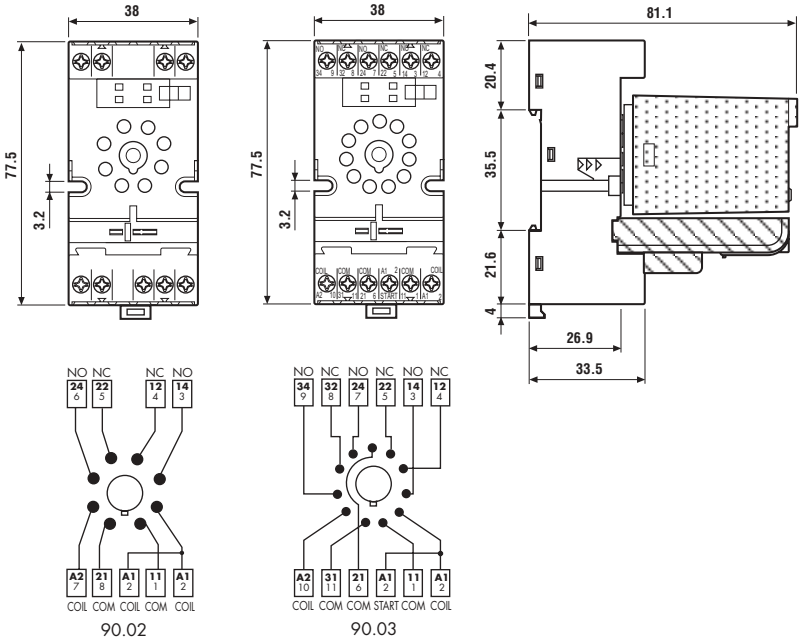

90.03

Relay type	60.12		60.13	
Colour	BLUE	BLACK	BLUE	BLACK
Clamp terminal socket: panel or 35 mm rail (EN 50022) mount retaining clip 090.33 supplied with socket packaging code SMA	90.02	90.02.0	90.03	90.03.0
Metal retaining clip	090.33			
Timer module	86.00, 86.10, 86.20			
6-way jumper link for 90.02 and 90.03 sockets	090.06			

Approvals (according to type):

- Double terminal A1 (for easy start connection)
- Rated values: 10 A - 250 V
- Dielectric strength: ≥ 2 kV AC
- Protection category: IP 20
- Ambient temperature: (–40...+70)°C
- Torque: 0.6 Nm
- Wire strip length: 10 mm
- Max wire size:

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



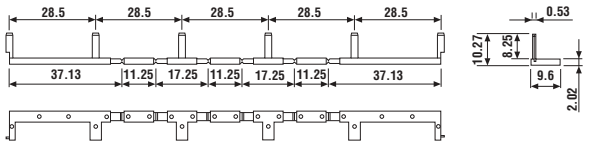
90.02 90.03


090.06

6-way jumper link	090.06

- Rated values: 10 A - 250 V

Approvals (according to type):



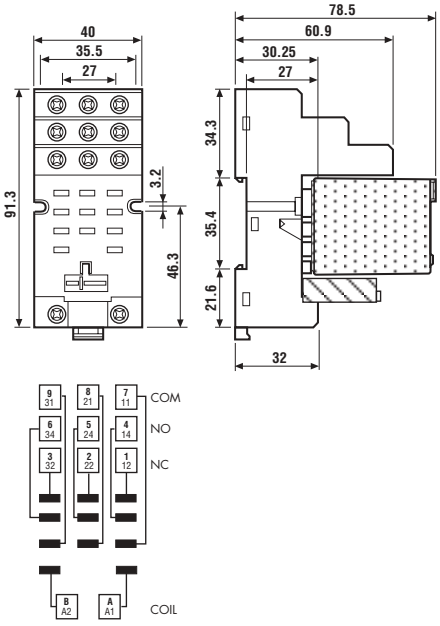

92.03

Relay type	62.32, 62.33	
Colour	BLUE	BLACK
Clamp terminal socket: panel or 35 mm rail (EN 50022) mount retaining clip 092.71 supplied with socket packaging code SMA	92.03	92.03.0
Metal retaining clip	092.71	
Timer modules	86.00, 86.10, 86.20	

Approvals (according to type):

- Rated values: 16 A - 250 V
- Insulation: ≥ 6 kV (1.2/50μs) between coil and contacts
- Protection category: IP 20
- Ambient temperature: (-40...+70)°C
- Screw torque: 0.8 Nm
- Wire strip length: 10 mm
- Max wire size:

	solid wire	stranded wire
mm²	1x10 / 2x4	1x6 / 2x4
AWG	1x8 / 2x12	1x10 / 2x12




94.04

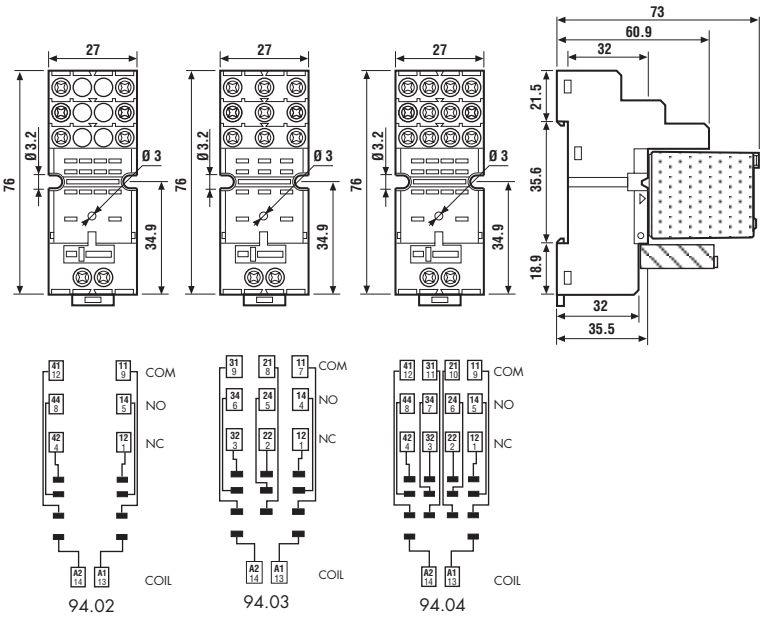
Approvals (according to type):

GOST

Relay type	55.32		55.33		55.32, 55.34	
Colour	BLUE	BLACK	BLUE	BLACK	BLUE	BLACK
Clamp terminal socket: panel or 35 mm rail (EN 50022) mount retaining clip 094.71 supplied with socket packaging code SMA	94.02	94.02.0	94.03	94.03.0	94.04	94.04.0
Metal retaining clip	094.71					
Plastic retaining and release clip	094.01					
6-way jumper link for 94.02, 94.03 and 94.04 sockets	094.06	094.06.0	094.06	094.06.0	094.06	094.06.0
Identification tag	094.00.4					
Timer modules	86.10, 86.20					
Sheet of marker tags for retaining and release clip 094.01	060.72					

- Rated values: 10 A - 250 V
- Dielectric strength: ≥ 2 kV AC
- Protection category: IP 20
- Ambient temperature: (–40...+70)°C
- Screw torque: 0.5 Nm
- Wire strip length: 8 mm
- Max wire size:

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



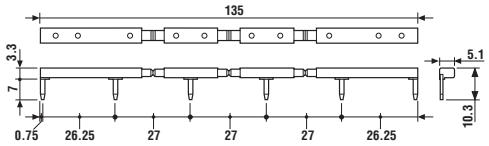

094.01


060.72


094.06

6-way jumper link	094.06

- Rated values: 10 A - 250 V



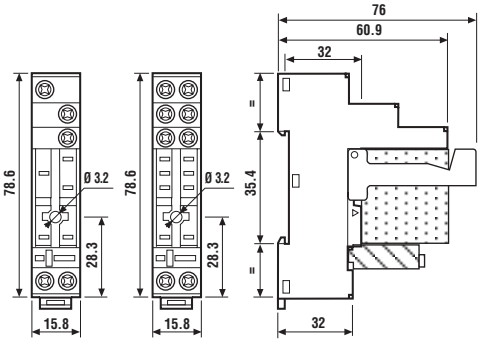

95.05

Approvals
(according to type):

Relay type	40.31		40.51, 40.52, 40.61	
Colour	BLUE	BLACK	BLUE	BLACK
Clamp terminal socket: panel or 35 mm rail (EN 50022) mount, retaining clip 095.01 supplied with socket packaging code SPA	95.03	95.03.0	95.05	95.05.0
Plastic retaining and release clip	095.01	095.01.0	095.01	095.01.0
Metal retaining clip	095.71			
8-way jumper link for 95.03 and 95.05 sockets	095.18	095.18.0	095.18	095.18.0
Identification tag	095.00.4			
Timer modules	86.10, 86.20			
Sheet of marker tags for retaining and release clip 095.01	060.72			

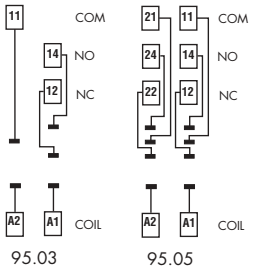
- Rated values: 10 A - 250 V
  with a current >10 A, the contact terminal must be connected in parallel (21 with 11, 24 with 14, 22 with 12)
- Insulation: ≥ 6 kV (1.2/50μs) between coil and contacts
- Protection category: IP 20
- Ambient temperature: (-40...+70) °C
- Screw torque: 0.5 Nm
- Wire strip length: 8 mm
- Max wire size:

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




095.01


060.72

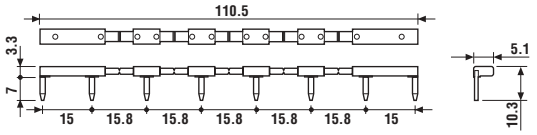


95.03 95.05

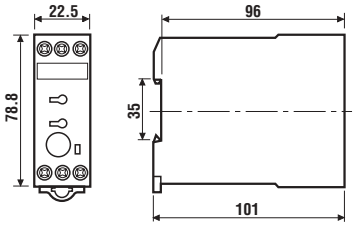

095.18

8-way jumper link	095.18

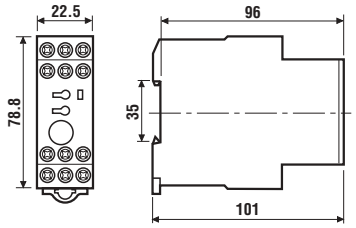
- Rated values: 10 A - 250 V



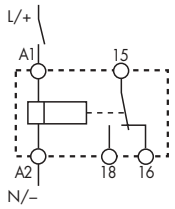
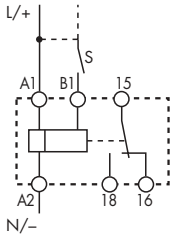
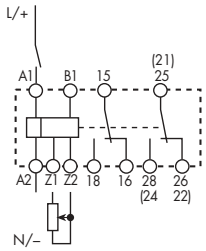
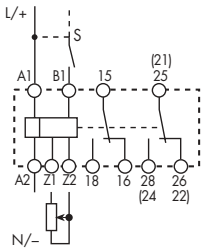
- *22.5 mm wide*
- *Mono-function and multi-function versions available*
- *Time scales from 0.05s to 60h*
- *"1 delayed contact +1 instantaneous contact" and remote potentiometer version available (type 87.02)*
- *True OFF delay version (type 87.61/62)*
- *LED indicator*
- *35 mm rail (EN 50022) mount*



87.01



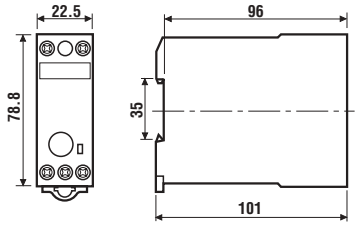
87.02

	87.01	87.02
		
	- Multi-function - 1 pole - 35 mm rail mounting	- Multi-function - Timing can be regulated using ext. Potentiometer - 2 timed contacts or 1 timed + 1 instantaneous contact - 35 mm rail mounting
	AI: ON delay **DI:** ON pulse **GI:** Fixed pulse delayed **SW:** Symmetrical recycler: ON start **BE:** Signal OFF delay **CE:** Signal ON and OFF Delay **DE:** Signal ON pulse **EE a:** Signal OFF pulse	**AI:** ON delay **DI:** ON pulse **GI:** Fixed pulse delayed **SW:** Symmetrical recycler: ON start **BE:** Signal OFF delay **CE:** Signal ON and OFF Delay **DE:** Signal ON pulse **EE a:** Signal OFF pulse
	 wiring diagram (without signal START)	 wiring diagram (with signal START)
	 wiring diagram (without signal START)	 wiring diagram (with signal START)

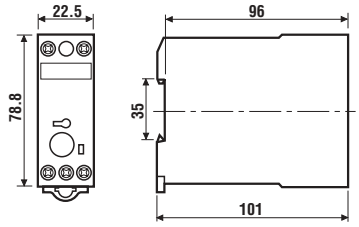
Contact specifications				
Contact configuration			1 CO (SPDT)	2 CO (DPDT)
Rated current/Maximum peak current		A	8/30	8/30
Rated voltage/Maximum switching voltage		V AC	250/400	250/400
Rated load in AC1		VA	2,000	2,000
Rated load in AC15 (230 V AC)		VA	400	400
Single phase motor rating (230 V AC)		kW	0.185	0.185
Breaking capacity in 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 specifications				
Nominal voltage	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 163	See page 163
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	$100 \cdot 10^3$	$100 \cdot 10^3$
Ambient temperature range		°C	–20...+60	–20...+60
Protection category			IP 20	IP 20
Approvals (according to type):			CE GL GOST cULus	

87

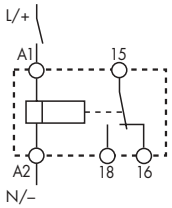
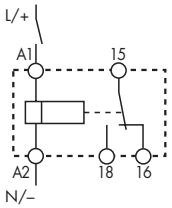
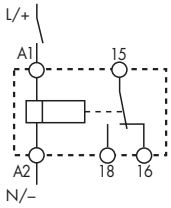
- *22.5 mm wide*
- *Mono-function and multi-function versions available*
- *Time scales from 0.05s to 60h*
- *"1 delayed contact +1 instantaneous contact" and remote potentiometer version available (type 87.02)*
- *True OFF delay version (type 87.61/62)*
- *LED indicator*
- *35 mm rail (EN 50022) mount*



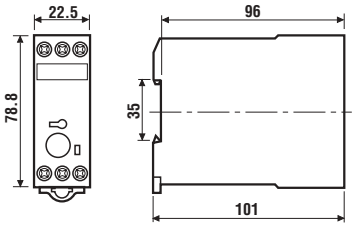
87.31



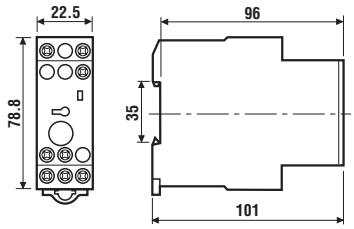
87.11
87.21

	87.11	87.21	87.31
			
	- Mono-function - 35 mm rail mounting	- Mono-function - 35 mm rail mounting	- Mono-function - 35 mm rail mounting
	AI: ON delay	**DI:** ON pulse	**SW:** Symmetrical recycler: ON start
			
	wiring diagram (without signal START)	wiring diagram (without signal START)	wiring diagram (without signal START)
Contact specifications			
Contact configuration	1 CO (SPDT)	1 CO (SPDT)	1 CO (SPDT)
Rated current/Maximum peak current A	8/30	8/30	8/30
Rated voltage/Maximum switching voltage V AC	250/400	250/400	250/400
Rated load in AC1 VA	2,000	2,000	2,000
Rated load in AC15 (230 V AC) VA	400	400	400
Single phase motor rating (230 V AC) kW	0.185	0.185	0.185
Breaking capacity in DC1: 30/110/220 V A	8/0.5/0.2	8/0.5/0.2	8/0.5/0.2
Minimum switching load mW(V/mA)	300 (10/5)	300 (10/5)	300 (10/5)
Standard contact material	AgCdO	AgCdO	AgCdO
Supply specifications			
Nominal voltage V AC (50/60 Hz)	24...240	24...240	24...240
V DC	24...48	24...48	24...48
Rated power AC/DC VA (50 Hz)/W	5/0.5	5/0.5	5/0.5
Operating range AC	$(0.85...1.1)U_N$	$(0.85...1.1)U_N$	$(0.85...1.1)U_N$
DC	$(0.85...1.2)U_N$	$(0.85...1.2)U_N$	$(0.85...1.2)U_N$
Technical data			
Specified time range	See page 163	See page 163	See page 163
Repeatability %	± 0.2	± 0.2	± 0.2
Recovery time ms	50	50	50
Minimum control impulse ms	—	—	—
Setting accuracy-full range %	± 5	± 5	± 5
Electrical life at rated load in AC1 cycles	$100 \cdot 10^3$	$100 \cdot 10^3$	$100 \cdot 10^3$
Ambient temperature range °C	–20...+60	–20...+60	–20...+60
Protection category	IP 20	IP 20	IP 20
Approvals (according to type):	CE GL GOST cULus		

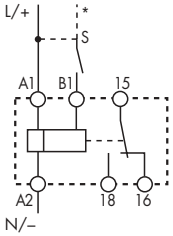
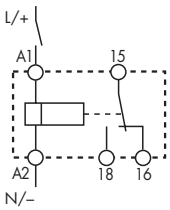
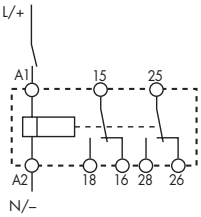
- *22.5 mm wide*
- *Mono-function and multi-function versions available*
- *Time scales from 0.05s to 60h*
- *"1 delayed contact +1 instantaneous contact" and remote potentiometer version available (type 87.02)*
- *True OFF delay version (type 87.61/62)*
- *LED indicator*
- *35 mm rail (EN 50022) mount*



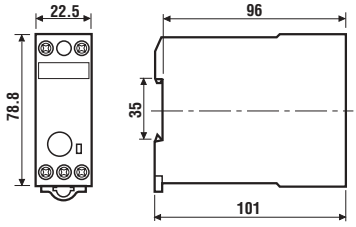
87.41



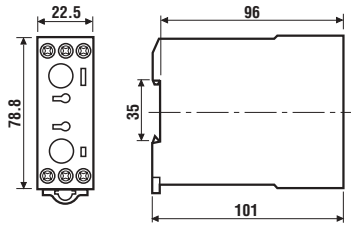
87.61
87.62

	87.41	87.61	87.62
			
	- Mono-function - 35 mm rail mounting	- Mono-function - 1 pole - 35 mm rail mounting	- Mono-function - 2 pole - 35 mm rail mounting
	BE: Signal OFF delay	**BI:** True OFF delay	**BI:** True OFF delay
			
	wiring diagram (with signal START)	wiring diagram (without signal START)	wiring diagram (without signal START)
Contact specifications			
Contact configuration	1 CO (SPDT)	1 CO (SPDT)	2 CO (DPDT)
Rated current/Maximum peak current A	8/30	5/10	5/10
Rated voltage/Maximum switching voltage V AC	250/400	250/400	250/400
Rated load in AC1 VA	2,000	1,250	1,250
Rated load in AC15 (230 V AC) VA	400	250	250
Single phase motor rating (230 V AC) kW	0.185	0.125	0.125
Breaking capacity in DC1: 30/110/220 V A	8/0.5/0.2	5/0.5/0.2	5/0.5/0.2
Minimum switching load mW(V/mA)	300 (10/5)	300 (10/5)	300 (10/5)
Standard contact material	AgCdO	AgCdO	AgCdO
Supply specifications			
Nominal voltage V AC (50/60 Hz)	24...240	24...240	24...240
V DC	24...48	24...240	24...240
Rated power AC/DC VA (50 Hz)/W	5/0.5	1.5/1.5	1.5/1.5
Operating range AC	$(0.85...1.1)U_N$	$(0.85...1.1)U_N$	$(0.85...1.1)U_N$
DC	$(0.85...1.2)U_N$	$(0.85...1.2)U_N$	$(0.85...1.2)U_N$
Technical data			
Specified time range	See page 163	See page 163	See page 163
Repeatability %	± 0.2	± 1	± 1
Recovery time ms	50	50	50
Minimum control impulse ms	50	300 ms (A1 - A2)	300 ms (A1 - A2)
Setting accuracy-full range %	± 5	± 5	± 5
Electrical life at rated load in AC1 cycles	$100 \cdot 10^3$	$100 \cdot 10^3$	$100 \cdot 10^3$
Ambient temperature range °C	–20...+60	–20...+60	–20...+60
Protection category	IP 20	IP 20	IP 20
Approvals (according to type):	CE GL GOST cULus		

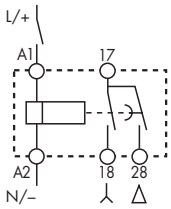
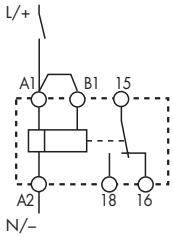
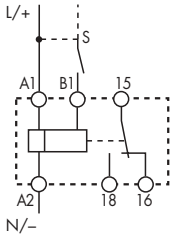
- *22.5 mm wide*
- *Mono-function and multi-function versions available*
- *Time scales from 0.05s to 60h*
- *"1 delayed contact +1 instantaneous contact" and remote potentiometer version available (type 87.02)*
- *True OFF delay version (type 87.61/62)*
- *LED indicator*
- *35 mm rail (EN 50022) mount*



87.82



87.91

	87.82	87.91
		
	- Mono-function: Star - delta - 2 pole - 35 mm rail mounting	- Multi-function - 35 mm rail mounting
	SD: Star - delta	**LI:** Asymmetrical recycler (ON starting) **PI:** Asymmetrical recycler (OFF starting) **LE:** Signal asymmetrical recycler (ON starting) **PE:** Signal asymmetrical recycler (OFF starting)
		 
	wiring diagram (without signal START)	wiring diagram (without signal START) / wiring diagram (with signal START)
Contact specifications		
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 in AC1 VA	2,000	2,000
Rated load in AC15 (230 V AC) VA	400	400
Single phase motor rating (230 V AC) kW	0.185	0.185
Breaking capacity in 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 specifications		
Nominal voltage 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 163	See page 163
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...+60	–20...+60
Protection category	IP 20	IP 20
Approvals (according to type):	CE GL GOST cULus	

ORDERING INFORMATION

Example: 87 series multi-function timer 8 A, 1 CO (SPDT) contact, with (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 a, GI, SW, ON, OFF)
1 = ON delay (AI)
2 = ON pulse (DI)
3 = Symmetrical recycler: ON start (SW)
4 = Signal OFF delay (BE)
6 = True OFF delay (power OFF) (BI)
8 = Star - delta (SD)
9 = Asymmetrical recycler (LI, LE, PI, PE)

No. of poles
1 = 1 pole
2 = 2 pole for 87.02/62
2 = 2 NO DPST-NO) for 87.82

Supply version
0 = AC (50/60 Hz)/DC

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

TECHNICAL DATA

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	—
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

Signal control (B1)				
- current absorption		1 mA		
- max cable lenght (capacity of ≤ 10 nF / 100 m)		≤ 250 m		
Power lost to the environment		87.01/02/11/21/31/41/91	87.61/62	87.82
- without contact current	W	5	1.5	8
- with rated current	W	15	7	18
Max wire size		solid cable	stranded cable	
	mm^2	1x4 / 2x2.5	1x4 / 2x1.5	
	AWG	1x12 / 2x14	1x12 / 2x16	
Screw torque	Nm	1.2		

TIME SCALES

Type	Function Code	Function	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/ 87.02	AI	ON delay	•	•	•	•	•	•	•	•	•	•
	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 recycler: ON start	•	•	•	•	•	•	•	•	•	•
87.11	AI	ON delay	•	•	•	•	•	•	•	•	•	•
87.21	DI	ON pulse	•	•	•	•	•	•	•	•	•	•
87.31	SW	Symmetrical recycler: ON start			•							
87.41	BE	Signal OFF delay	•	•	•	•	•	•	•	•	•	•
87.61/ 87.62	BI	True OFF delay (power OFF)		0.15 2.5	•	0.07 1.3		•				
87.82	SD	Star - delta (T_U = ~60 ms)				•						
87.91	LI	Asymmetrical recycler (ON starting)	•	•	•	•	•	•	•	•	•	•
	LE	Signal asymmetrical recycler (ON starting)	•	•	•	•	•	•	•	•	•	•
	PI	Asymmetrical recycler (OFF starting)	•	•	•	•	•	•	•	•	•	•
	PE	Signal asymmetrical recycler (OFF starting)	•	•	•	•	•	•	•	•	•	•

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

FUNCTIONS

U = Supply Voltage
S = Signal switch
C = Output Contact

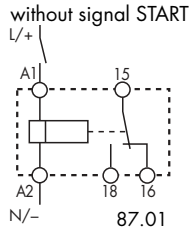
LED** Green	Timing	NO output contact	Contacts: Timed Open	Contacts: Timed Closed	Contacts: DIP switch	Contacts: Instantaneous* Open	Contacts: Instantaneous* Closed
	None	Open	15 - 18 25 -28*	15 - 16 25 - 26*	Up	21 - 24*	21 - 22*
	In progress	Open	15 - 18 25 - 28*	15 - 16 25 - 26*		21 - 22*	21 - 24*
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

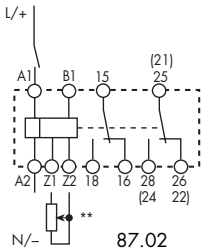
Without signal Start= Start via contact in supply line (A1). With signal Start = Start via contact into control terminal (B1).
With DC supply, positive polarity has to be connected to B1 terminal (according to EN 60204-1).

Wiring diagram

Multi-function
without signal START

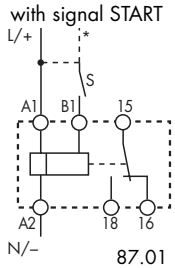


87.01

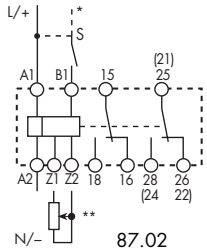


87.02

with signal START



87.01

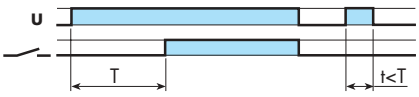


87.02

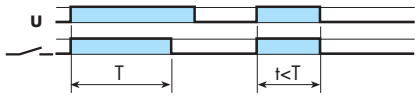
* A voltage other than the supply voltage can be applied to the command START (B1).
Example:
A1 - A2 = 230 V AC
B1 - A2 = 24 V AC

** 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".

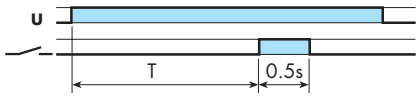
Type 87.01 87.02



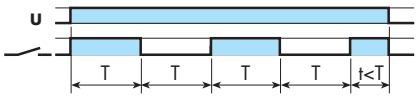
(AI) ON delay.
Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs when power is removed.



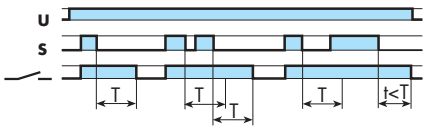
(DI) ON pulse.
Apply power to timer. Output contacts transfer immediately. After the preset time has elapsed, contacts reset.



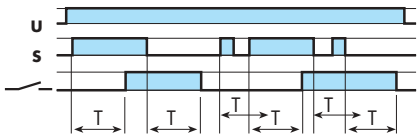
(GI) Fixed pulse (0.5s) delayed.
Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs after a fixed time of 0.5s. 0.5s.



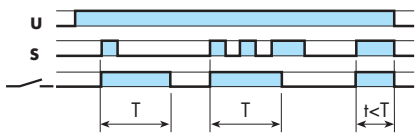
(SW) Symmetrical recycler: ON start.
Apply power to timer. Output contacts transfer immediately and cycle between ON and OFF for as long as power is applied. The ratio is 1:1 (time on = time off).



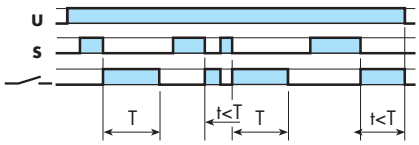
(BE) Signal OFF delay.
Power is permenently applied to the timer.
The output contacts transfer immediately on closure of the Signal Switch (S). Opening the Signal Switch initiates the preset delay, after which time the output contacts reset.



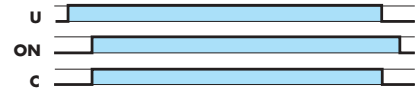
(CE) Signal ON and OFF delay.
Power is permenently applied to the timer.
Closing the Signal Switch (S) initiates the preset delay, after which time the output contacts transfer. Opening the Signal switch initiates the same preset delay, after which time the output contacts reset.



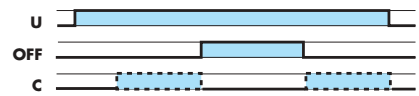
(DE) Signal ON pulse.
Power is permenently applied to the timer.
On momentary or maintained closure of Signal Switch (S), the output contacts transfer, and remain so for the duration of the preset delay, after which they reset.



(EE a) Signal OFF pulse.
Power is permenently applied to the timer.
On opening of the Signal Switch (S) the output contacts transfer, and remain so for the duration of the preset delay, after which they reset.



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



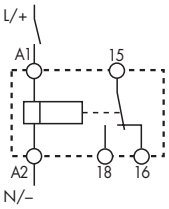
Permanently OFF.
The contact returns to the original position when the OFF function is selected.

FUNCTIONS

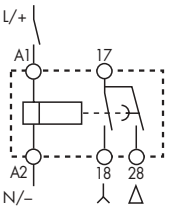
Wiring diagram

Monofunction

without signal START

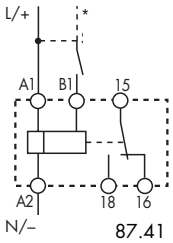


87.11
87.21
87.31
87.61



87.62

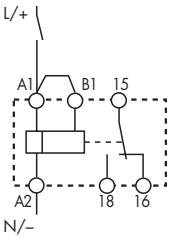
with signal START (S)



87.41

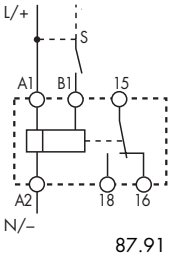
Asymmetrical recycler

without signal START

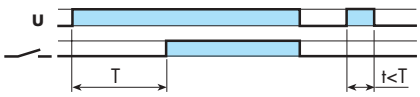
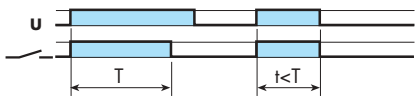
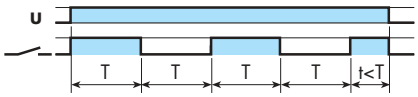
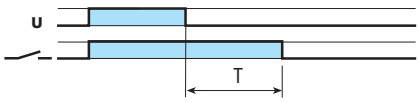
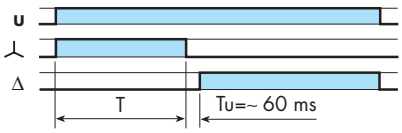
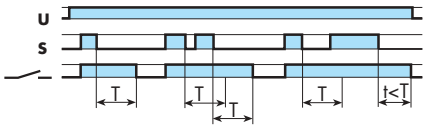


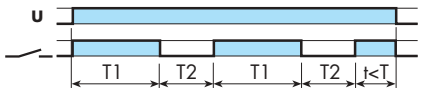
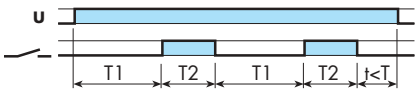
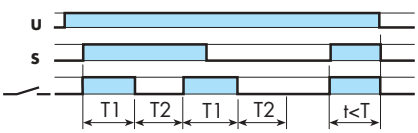
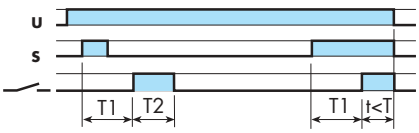
87.91

with signal START (S)

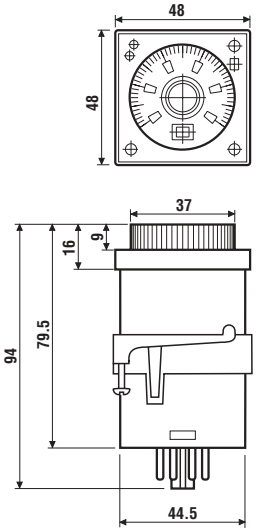


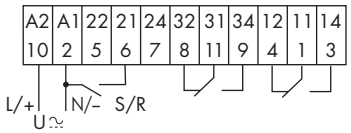
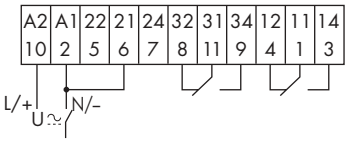
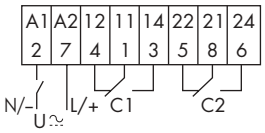
87.91

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 recycler: 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 300ms). 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 (人) closes immediately. After preset delay has elapsed the star contact (人) 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 permenently applied to the timer. The output contacts transfer immediately on closure of the Signal Switch (S). Opening the Signal Switch initiates the preset delay, after which time the output contacts reset.

Type		
87.91 switch position		**(LI) Asymmetrical recycler (ON starting).** 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 recycler (OFF starting).** 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 recycler (ON starting)** Power is permenently 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 recycler (OFF starting).** Power is permenently 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.

- *8 - 11 pin plug-in version available*
- *Multi-voltage and multi-function versions available*
- *Time scales from 0.05s to 100h*
- *"1 delayed contact +1 instantaneous contact" version available (type 88.12)*
- *Front panel mount*
- *Sockets: 90 series*



	88.02	88.12
		
	- Multi-function - 11 pin - Plug-in for use with 90 series sockets	- Multi-function - 8 pin, 2 timed contacts or 1 timed + 1 instantaneous contact - Plug-in for use with 90 series sockets
	AE: Signal ON delay **BE:** Signal OFF delay **DE:** Signal ON pulse with signal START  **AI:** ON delay **HI:** ON pulse **SW:** Symmetrical recycle: ON start without signal START 	**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) without signal START 
Contact specifications		
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 in AC1 VA	2,000	1,250
Rated load in AC15 (230 V AC) VA	400	250
Single phase motor rating (230 V AC) kW	0.3	0.125
Breaking capacity in 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 specifications		
Nominal voltage V AC (50/60 Hz)	24...230	24...230
V DC	24...230	24...48
Rated power AC/DC VA (50 Hz)/W	3.5 (230 V)/1 (24 V)	9 (230 V)/1 (24 V)
Operating range AC	20.4...264.5	20.4...264.5
DC	20.4...264.5	20.4...55.2
Technical data		
Specified time range	(0.05s...5h) - (0.05s...10h) - (0.05s...50h) - (0.05s...100h)	
Repeatability %	± 1	± 1
Recovery time ms	300	200
Minimum control impulse ms	50	—
Setting accuracy-full range %	± 3	± 3
Electrical life at rated load in AC1 cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Ambient temperature range °C	–10...+55	–10...+55
Protection category	IP 40	IP 40
Approvals (according to type):	CE GOST	

ORDERING INFORMATION

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

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

Series

Type
0 = Functions AI, SW, AE, BE, DE, HI
1 = Functions AI a, AI b, DI a, DI b

No. of poles
2 = 2 pole

Supply version
0 = AC (50/60 Hz)/DC

Special versions
0 = Standard for type 88.12
1 = Standard for type 88.02

Supply voltage
230 = { (24...230)V AC (for type 88.12)
(24...48)V DC
230 = (24...230)V AC/DC (for type 88.02)

TECHNICAL DATA

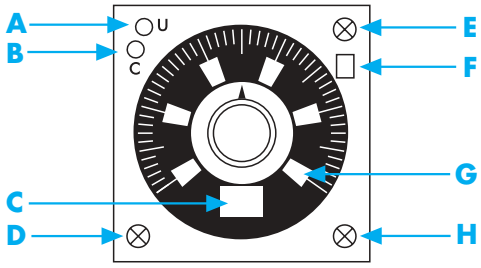
EMC SPECIFICATIONS

TYPE OF TEST		REFERENCE STANDARD	
Electrostatic discharge	- contact discharge	EN 61000-4-2	4 kV
	- air discharge	EN 61000-4-2	8 kV
Radio-frequency electromagnetic field (80 ÷ 1000 MHz)		EN 61000-4-3	10 V/m
Fast transients (burst) (5-50 ns, 5 kHz) on Supply terminals		EN 61000-4-4	2 kV/5 kV
Surges (1.2/50 µs) on Supply terminals	- common mode	EN 61000-4-5	2 kV
	- differential mode	EN 61000-4-5	1 kV
Radio-frequency common mode (0.15 ÷ 80 MHz) on Supply terminals		EN 61000-4-6	3 V

TIME SCALES AND FUNCTIONS SELECTION

		88.02	88.12
E	**Function selector**	AE, AI, BE, DE, HI, SW	AI a, AI b, DI a, DI b
D	**Time scale selector**	0.5, 1, 5, 10	0.5, 1, 5, 10
H	**Unit of time selector**	s, min, h, 10h	s, min, h, 10h

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



TIME SCALES

END SCALE

D \ H	s	min	h	x10 h
0.5	0.5 s	0.5 min	0.5 h	5 h
1	1 s	1 min	1 h	10 h
5	5 s	5 min	5 h	50 h
10	10 s	10 min	10 h	100 h

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

FUNCTIONS

U = Supply Voltage
S = Signal switch
= Output Contact

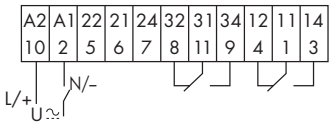
LED (yellow)	LED (red)	Supply voltage	NO output contact	Contact	
		OFF	Open	x1 - x4	x1 - x2
		ON	Open	x1 - x4 x1 - x2	x1 - x2 x1 - x4
		ON	Open (timing in progress)	x1 - x4	x1 - x2
		ON	Closed	x1 - x2	x1 - x4

Without signal Start= Start via contact in supply line (A1).
With signal Start = Start via contact into control terminal (6/21).

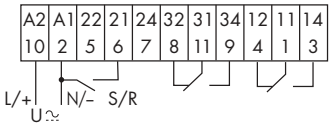
Wiring diagram

Type 88.02

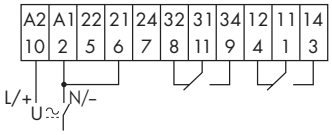
without signal START



with signal START

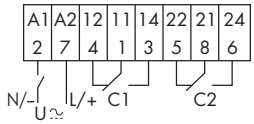


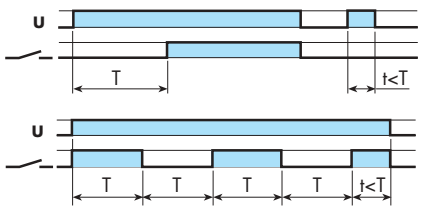
without signal START



Type 88.12

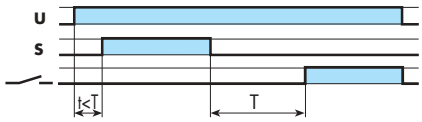
without signal START



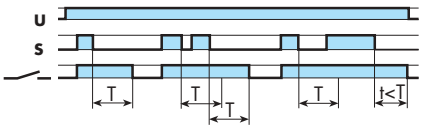


(AI) ON delay.
Apply power to timer. Output contacts transfer after preset time has elapsed. Reset occurs when power is removed.

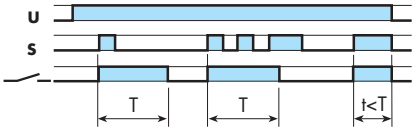
(SW) Symmetrical recycler: ON start.
Apply power to timer. Output contacts transfer immediately and cycle between ON and OFF for as long as power is applied. The ratio is 1:1 (time on = time off).



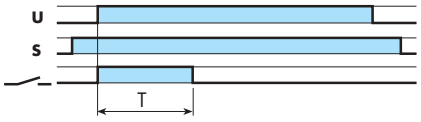
(AE) ON delay.
When power is applied, the timer will function as an ON delay except when the Signal Switch (S) is closed which will force the output and the timing process into the reset condition.



(BE) Signal OFF delay.
Power is permenently applied to the timer.
The output contacts transfer immediately on closure of the Signal Switch (S). Opening the Signal Switch initiates the preset delay, after which time the output contacts reset.

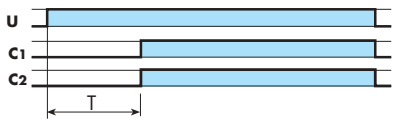


(DE) Signal ON pulse.
Power is permenently applied to the timer.
On momentary or maintained closure of Signal Switch (S), the output contacts transfer, and remain so for the duration of the preset delay, after which they reset.

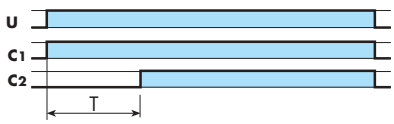


(HI) ON pulse.
Apply power to timer. Output contacts transfer immediately After preset time has elasped, contacts reset.

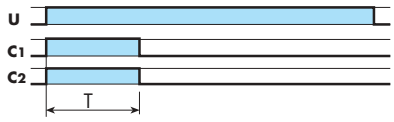
N.B. Ensure a fixed connection between Terminals 2 and 6.



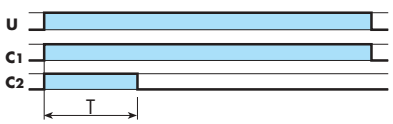
(AI a) ON Delay (2 timed contacts).
Apply power to timer.
Contacts (C_1 and C_2) transfer after preset time has elasped. Reset occurs when power is removed.



(AI b) ON Delay (1 timed contact + 1 instantaneous contact).
Apply power to timer. Output contact (C_1) transfers immediately. Contact (C_2) transfers after the preset time has elasped. Reset occurs when power is removed.



(DI a) ON pulse (2 timed contacts).
Apply power to timer.
Output contacts (C_1 and C_2) transfer immediately. After preset time has elasped, the contacts reset.



(DI b) ON pulse (1 timed contact + 1 instantaneous contact).
Apply powert to timer. Output contacts (C_1 and C_2) transfer immediately. After preset time has elasped, the contact (C_2) resets. Contact (C_1) resets when power is removed.

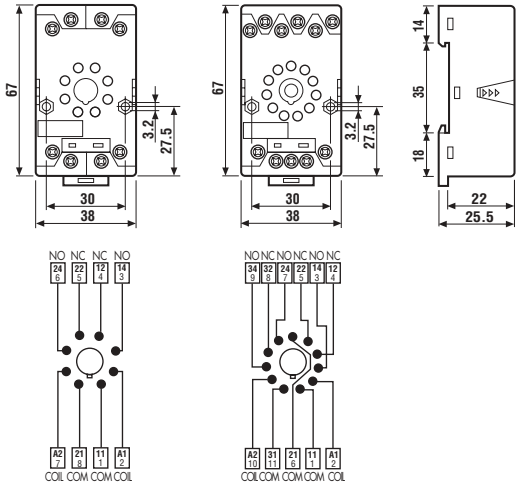

90.21

Timer type	88.12		88.02	
Colour	BLUE	BLACK	BLUE	BLACK
Clamp terminal socket: panel or 35 mm rail (EN 50022) mount	90.20	90.20.0	90.21	90.21.0

Approvals
(according to type):

- Rated values: 10 A - 250 V
- Dielectric strength: ≥ 2 kV AC
- Protection category: IP 20
- Ambient temperature: (–40…+70)°C
- Torque: 0.5 Nm
- Wire strip length: 10 mm
- Max wire size:

	solid wire	stranded wire
mm²	1x6 / 2x2.5	1x6 / 2x2.5
AWG	1x10 / 2x14	1x10 / 2x14



90.20 90.21

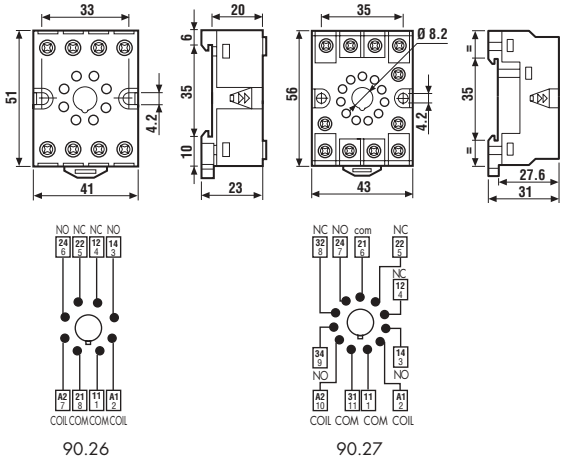

90.26

Timer type	88.12		88.02	
Colour	BLUE	BLACK	BLUE	BLACK
Screw terminal socket: panel or 35 mm rail (EN 50022) mount	90.26	90.26.0	90.27	90.27.0

Approvals
(according to type):

- Rated values: 10 A - 250 V
- Dielectric strength: ≥ 2 kV AC
- Protection category: IP 20
- Ambient temperature: (–40…+70)°C
- Torque: 0.8 Nm
- Wire strip length: 11 mm
- Max wire size:

	solid wire	stranded wire
mm²	1x4 / 2x2.5	1x4 / 2x2.5
AWG	1x12 / 2x14	1x12 / 2x14



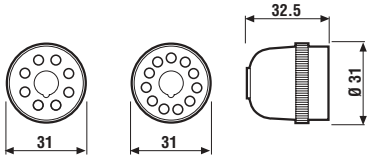
90.26 90.27


90.13.4

Timer type	88.12		88.02	
Colour	BLUE	BLACK	BLUE	BLACK
Sockets 8-11 pin backwired with solder terminals	—	90.12.4	—	90.13.4

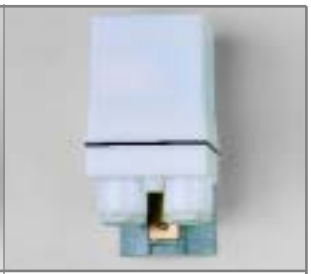
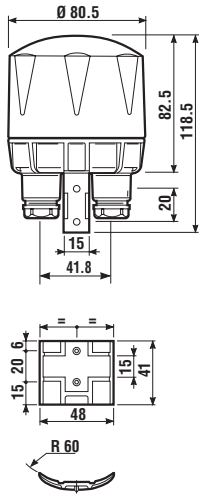
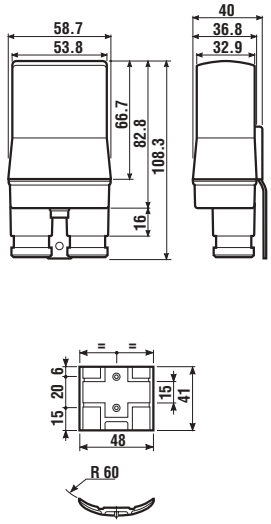
Approvals
(according to type):

- Rated values: 10 A - 250 V
- Dielectric strength: ≥ 2 kV AC
- Ambient temperature: (–40…+70)°C



90.12.4 90.13.4

- *A range of light dependent relays with 1 or 2 NO (SPST-NO or DPST-NO) contacts*
- *Pole or flange mounting*
- *Double break (phase + neutral) type available (type 10.32)*
- *Sensitivity adjustment from 1 to 150 lux*

	10.32	10.41
		
	- 2 NO (DPST-NO), 16 A - Pole mount	- 1 NO (SPST-NO), 12 A - Pole mount
		

Contact specifications			
Contact configuration		2 NO (DPST-NO)	1 NO (SPST-NO)
Rated current/Max. peak current	A	16/30 (100 A - 5 ms)	12/25 (100 A - 5 ms)
Rated voltage/Max. switching voltage	V AC	230/—	230/—
Rated load in AC1	VA	3,700	2,800
Rated load in 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 specifications			
Nominal voltage	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	$100 \cdot 10^3$	$100 \cdot 10^3$
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):		CE GOST	

ORDERING INFORMATION

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

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

Series

Type
3 = Pole mount - 2 NO (DPST-NO)
4 = Pole 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

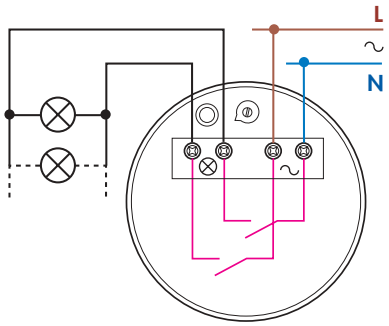
Supply version
8 = AC (50/60 Hz)

TECHNICAL DATA

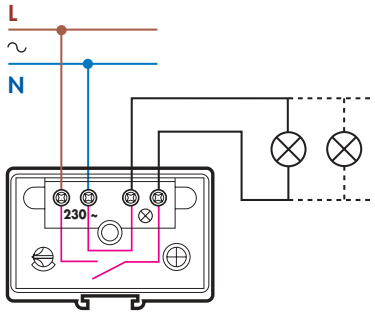
INSULATION		10.32	10.41
Dielectric strength - between open contacts	V AC	1,000	1,000

OTHER DATA		10.32		10.41	
Cable grip	Ø mm	(8.9...13)		(8.9...13)	
Preset threshold	lx	5 switch ON / 20 switch OFF		3 switch ON / 8 switch OFF	
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
Screw torque	Nm	1.2		1.2	

WIRING DIAGRAMS

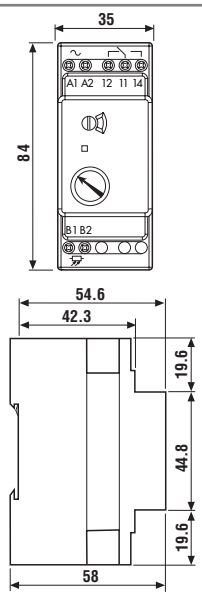
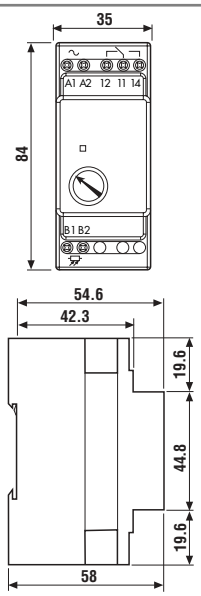


Type 10.32



Type 10.41

- *Type 11.01 is suitable for use on staircases and in entrance halls*
- ***Selector with 3 positions:***
  - ***high range*** *(threshold setting 20...1000 lx)*
  - ***low range*** *(threshold setting 1...30 lx)*
  - ***continuous light*** *(particularly interesting for the Test at the first installation)*
- *Type 11.71: with 1 CO (SPDT) contact and with (12...24)V AC/DC voltage supply*
- *SELV separation between contact and supply circuit*
- *Supplied with separate sensitive photocell*
- *LED indication*
- *35 mm rail (EN 50022) mount*

	11.01	11.71
		
	- 1 pole - 35 mm rail mount - "zero hysteresis"	- 1 pole - 35 mm rail mount - low voltage version available
		

Contact specifications				
Contact configuration			1 CO (SPDT)	1 CO (SPDT)
Rated current/Max. peak current		A	16/30 (100 A - 5 ms)	16/30 (100 A - 5 ms)
Rated voltage/Max. switching voltage		V AC	250/400	250/400
Rated load in AC1		VA	4,000	4,000
Rated load in 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 specifications				
Nominal voltage	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...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	$100 \cdot 10^3$	$100 \cdot 10^3$
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):			CE GOST	

ORDERING INFORMATION

Example: a 11 series light dependent relay "zero hysteresis" with 1 CO (SPDT) 16 A contact and 35 mm rail mounting, with 230 V AC supply.

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

Series

Type
0 = 35 mm rail (EN 50022) mounting, "zero hysteresis"
7 = 35 mm rail (EN 50022) mounting

No. of poles
1 = 1 pole

Supply voltage
024 = 12...24 V AC/DC for 11.71 only
125 = 110...125 V AC for 11.71 only
230 = 230...240 V AC for 11.71 only
230 = 230 V AC for 11.01 only

Supply version
0 = AC (50/60 Hz)/DC for 11.71.0.024 only
8 = AC (50/60 Hz)

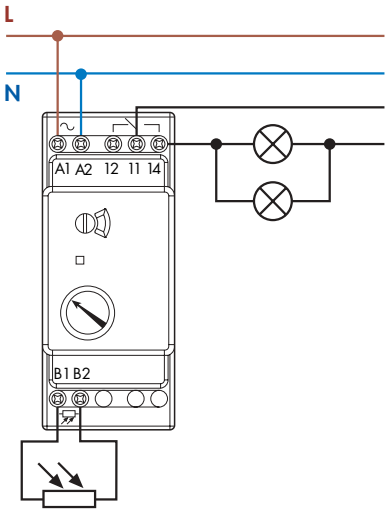
TECHNICAL DATA

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

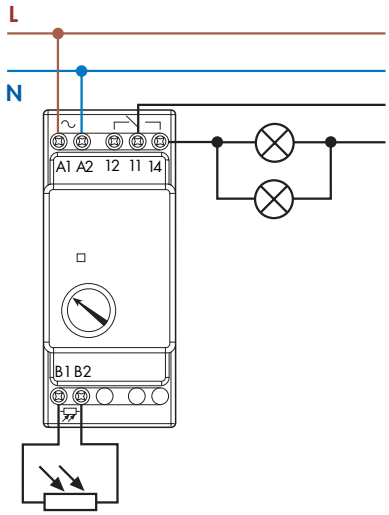
OTHER DATA		11.01		11.71	
Cable grip of sensitive photocell	Ø mm	7.5...9		7.5...9	
Cable length	m	50 (2x1.5mm²)			
Preset threshold	lx	10		100	
Power lost to the environment					
- without contact current	W	1.3		0.8	
- with rated current	W	3.1		2	
Max wire size		solid cable	stranded cable	solid cable	stranded cable
	mm²	1x6 / 2x4	1x6 / 2x2.5	1x6 / 2x4	1x6 / 2x2.5
	AWG	1x10 / 2x12	1x10 / 2x14	1x10 / 2x12	1x10 / 2x14
Screw torque	Nm	0.8		0.8	

WIRING DIAGRAMS

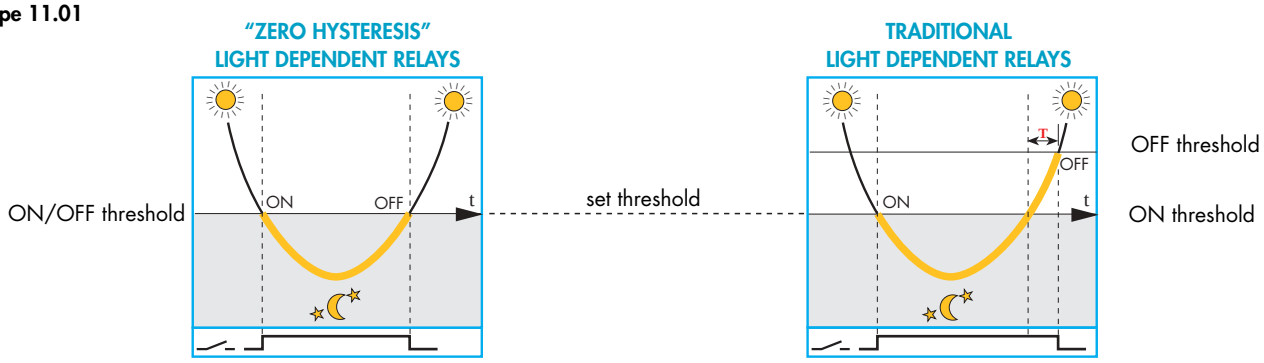
Type 11.01
RED LED indication:
Blinking = power ON, relay OFF
Continuous = power ON, relay ON



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

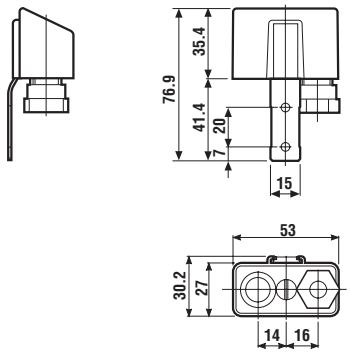


Switch OFF level = Switch ON level. Patented "Zero Hyseresis" circuitry ensures reliable switching without wasting energy.

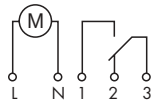
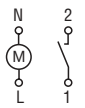
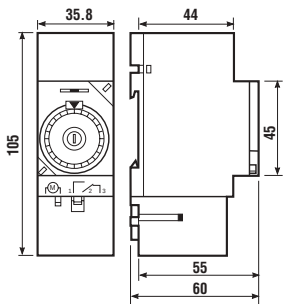
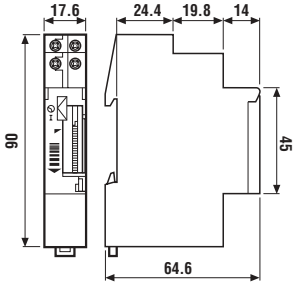
"Traditional" light dependent relays incorporate switching hysteresis to prevent malfunctioning or tripping. This results in an unnecessary delay in switching off,and a resulting waste of energy (over period T).

ACCESSORIES

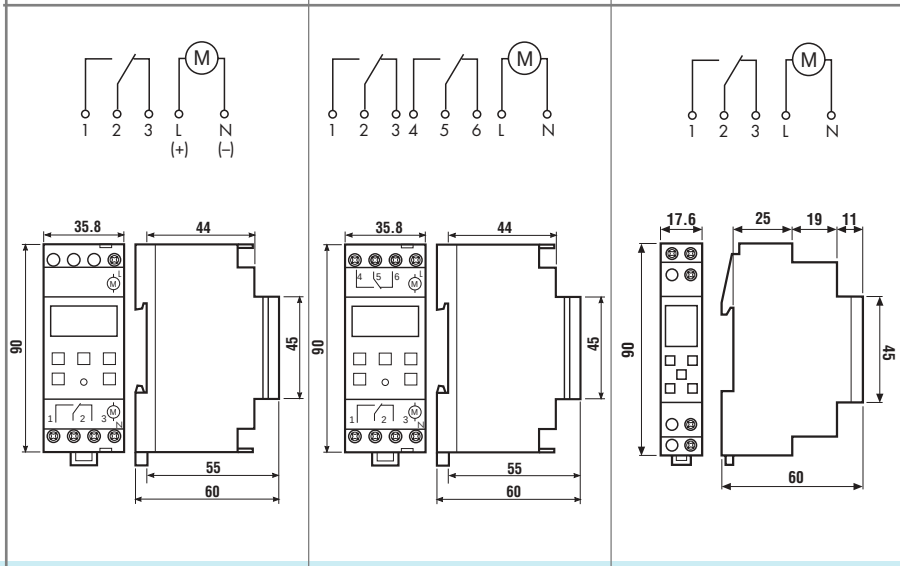
Sensitive photocell (supplied with light dependent relay)	011.00



- *Types available:*
  - *type 12.01/11 - mechanical daily time switch*
  - *type 12.21/22/71 - digital weekly time switch*
- *17.5 mm wide (type 12.11/71)*
- *35 mm rail (EN 50022) mount*
- *Internal battery for the set up without supply (types 12.21/22/71)*
- *Impulse function (1...59)s (types 12.21/22/71)*
- *Automatically adjusts for daylight saving (types 12.21/22/71)*

	12.01	12.11
		
	- Mechanical daily time switch - 1 CO (SPDT) - 35 mm rail mount	- Mechanical daily time switch - 1 NO (SPST-NO) - 35 mm rail mount
		
		
Contact specifications		
Contact configuration	1 CO (SPDT)	1 NO (SPST-NO)
Rated current/Max. peak current A	16/—	16/30
Rated voltage/Max. switching voltage V AC	250/—	250/—
Rated load in AC1 VA	4,000	4,000
Rated load in 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 specifications		
Nominal voltage V AC (50/60 Hz)	230	230
V DC	—	—
Rated power AC/DC VA (50 Hz)/W	2/—	2/—
Operating range AC (50 Hz)	$(0.85...1.1)U_N$	$(0.85...1.1)U_N$
DC	—	—
Technical data		
Electrical life at rated load in AC1 cycles	$50 \cdot 10^3$	$50 \cdot 10^3$
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):	CE GOST	

- *Types available:*
  - *· type 12.01/11 - mechanical daily time switch*
  - *· type 12.21/22/71 - digital weekly time switch*
- *17.5 mm wide (type 12.11/71)*
- *35 mm rail (EN 50022) mount*
- *Internal battery for the set up without supply (types 12.21/22/71)*
- *Impulse function (1...59)s (types 12.21/22/71)*
- *Automatically adjusts for daylight saving (types 12.21/22/71)*

	12.21	12.22	12.71
			
	- Digital weekly time switch - 1 CO (SPDT) - 35 mm rail mount	- Digital weekly time switch - 2 CO (DPDT) - 35 mm rail mount	- Digital weekly time switch - 1 CO (SPDT) - 35 mm rail mount
			
Contact specifications			
Contact configuration	1 CO (SPDT)	2 CO (DPDT)	1 CO (SPDT)
Rated current/Max. peak current A	16/30	16/30	16/30
Rated voltage/Max. switching voltage V AC	250/—	250/—	250/—
Rated load in AC1 VA	4,000	4,000	4,000
Rated load in 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 specifications			
Nominal voltage V AC (50/60 Hz)	24 | 230	230	230
V DC	24 | —	—	—
Rated power AC/DC VA (50 Hz)/W	1.4/1.4 | 2/—	2/—	2/—
Operating range AC (50 Hz)	(0.9...1.1)U_N | (0.85...1.1)U_N	(0.85...1.1)U_N	(0.85...1.1)U_N
DC	(0.9...1.1)U_N | —	—	—
Technical data			
Electrical life at rated load in AC1 cycles	$50 \cdot 10^3$	$50 \cdot 10^3$	$50 \cdot 10^3$
Type of time switch	weekly	weekly	weekly
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 | –10...+55	–5...+55	–10...+55
Protection category	IP 20	IP 20	IP 20
Approvals (according to type):	CE GOST		

ORDERING INFORMATION

Example: a 12 series, mechanical daily time switch, 1 CO (SPDT) 16 A, supply voltage 230 V AC.

12	.	0	1	.	8	.	230	.	0	000

Series

Type
0 = Daily, 35.8 mm wide
1 = Daily, 17.5 mm wide
2 = Weekly, 35.8 mm wide
7 = Weekly, 17.5 mm wide

No. of poles
1 = 1 CO (SPDT), 16 A
2 = 2 CO (DPDT), 16 A (for 12.22 only)

Option
0 = with power back-up
1 = without power back-up (for 12.11 only)

Supply voltage
024 = 24 V AC/DC
230 = 230 V

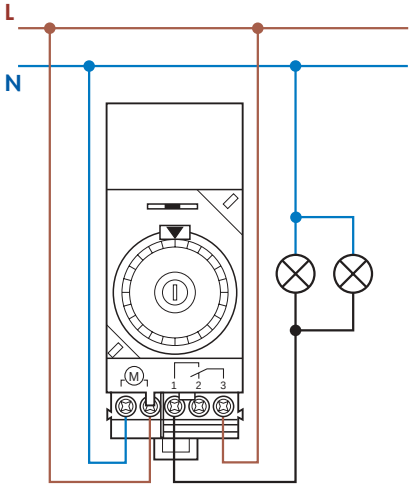
Supply version
0 = AC (50/60 Hz)/DC (for 12.21.0.024 only)
8 = AC (50/60 Hz)

TECHNICAL DATA

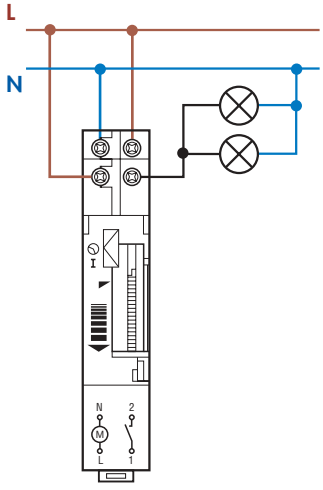
INSULATION		12.01, 12.11	12.21/12.22/12.71
Dielectric strength - between open contacts	V	1,000	1,000

OTHER DATA		12.01, 12.11		12.21/12.22/12.71	
Power back-up		70 h (following 80 h of 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 CO or SPDT)	4 (for 2 CO or DPDT)
Max wire size		solid cable	stranded cable	solid cable	stranded cable
	mm²	1x6 / 2x4	1x6 / 2x2.5	1x6 / 2x4	1x6 / 2x2.5
	AWG	1x10 / 2x12	1x10 / 2x14	1x10 / 2x12	1x10 / 2x14
Screw torque	Nm	1.2		1.2	

WIRING DIAGRAMS

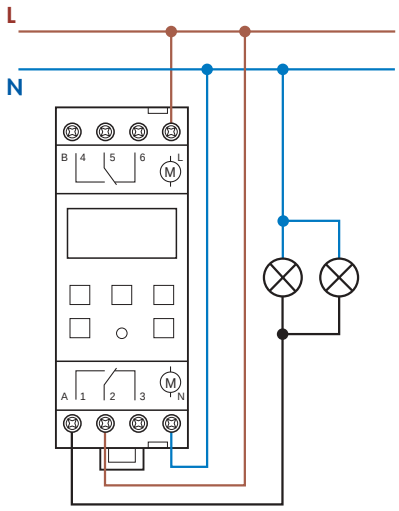


Type 12.01
SELECTOR SWITCH:
Permanently OFF (⏻)
Automatic (AUTO)
Permanently ON (I)

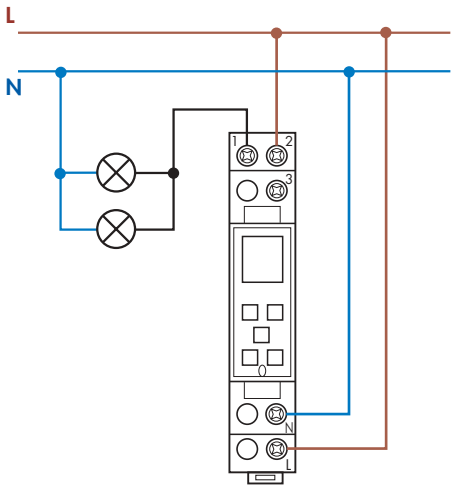


Type 12.11

WIRING DIAGRAMS



Type 12.21
12.22



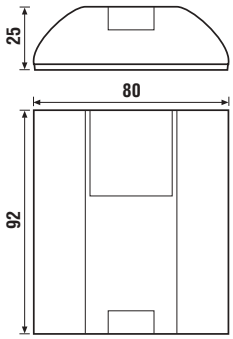
Type 12.71

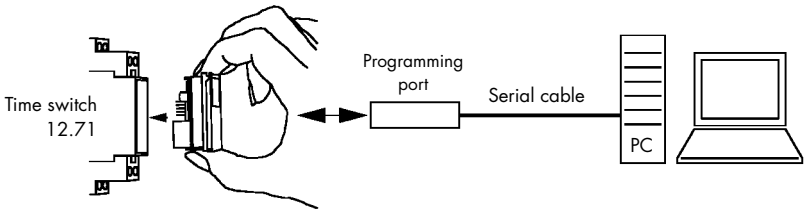
ACCESSORIES

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 consuption: < 10 mA
- Ambient temperature: (–5...+35)°C
- Protection category: IP 00

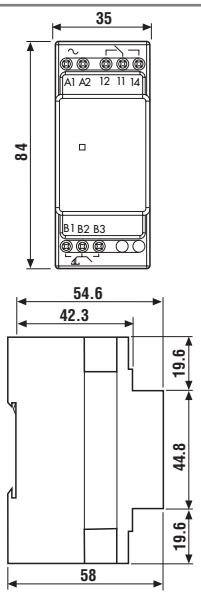
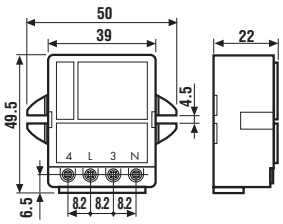




INSTALLATION OF PC-SOFTWARE

· Place the CD in the CD-drive
· Installation should START
· Follow the on-screen instructions
· Choose your language and COM1...COM4 in "setting menu"

- *Electronic step relays*
- *Control circuit can be used continuously*
- *Longer mechanical and electrical life, and much quieter than electromechanical step relays*
- *Suitable for SELV applications (according to IEC 364), type 13.01*
- *35 mm rail (EN 50022) or flange mount*
- *Low voltage supply 12-24 V, type 13.01*

	13.01	13.71
		
	- Low voltage supply 12-24 V - Step or monostable relay - 35 mm rail mount	- 1 NO (SPDT-NO) - Panel mount - Screw terminals
		
Contact specifications		
Contact configuration	1 NO (SPDT-NO)	1 NO (SPDT-NO)
Rated current/Max. peak current A	16/30 (100 A - 5 ms)	10/20 (100 A - 5 ms)
Rated voltage/Max. switching voltage V AC	250/400	230/—
Rated load in AC1 VA	4,000	2,300
Rated load in AC15 (230 V AC) VA	750	450
Nominal lamp rating: incandescent (230 V) W	2,000	1,000
compensated fluorescent (230 V) W	750	350
uncompensated fluorescent (230 V) W	1,000	500
halogen (230 V) W	2,000	1,000
Minimum switching load mW (V/mA)	1,000 (10/10)	1,000 (10/10)
Standard contact material	$AgSnO_2$	$AgSnO_2$
Supply specifications		
Nominal voltage V AC (50/60 Hz)	12 - 24 - 110...125 - 230...240	230
V DC	12 - 24	—
Rated power AC/DC V AC (50 Hz)/W	2.5/2.5	1.5/—
Operating range AC (50 Hz)	$(0.8...1.1)U_N$	$(0.85...1.15)U_N$
DC	$(0.9...1.1)U_N$	—
Technical data		
Electrical life at rated load in AC1 cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Maximum impulse duration	continuous	continuous
Dielectric strength between: open contacts V AC	1,000	1,000
supply - contacts V AC	4,000	—
Ambient temperature range °C	–10...+60	–10...+60
Protection category	IP 20	IP 20
Approvals (according to type):	CE GOST	CE GOST

ORDERING INFORMATION

Example: a 13 series, electronic step or monostable relay, 35 mm rail mount and 1 NO (SPDT-NO) 16 A contact, with 230 V AC supply.

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

Series

Type
0 = 35 mm rail (EN 50022) mount
7 = Panel mount

No. of poles
1 = Single phase switch 1 NO (SPDT-NO)

Supply voltage
012 = 12 V AC/DC
024 = 24 V AC/DC
125 = (110...125)V AC
230 = (230...240)V AC (13.71 only)
230 = 230 V AC (13.71 only)

Supply version
0 = AC (50/60 Hz)/DC (for 13.01.0.012 and 13.01.0.024 only)
8 = AC (50/60 Hz)

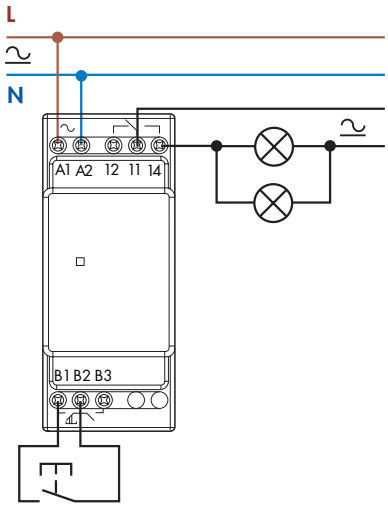
TECHNICAL DATA

INSULATION		13.01.8	13.01.0	13.71
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

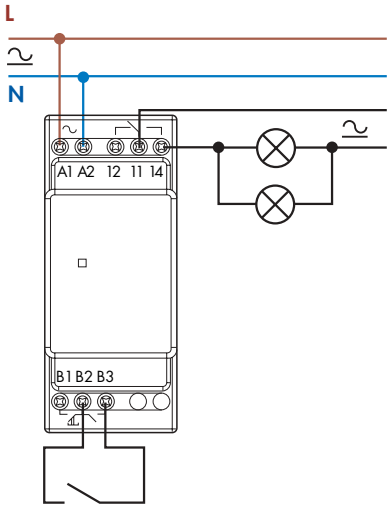
OTHER DATA		13.01		13.71	
Power lost to the environment					
- without contact current	W	2.2		0.5	
- with rated current	W	3.5		2.9	
Max wire size		solid cable	stranded cable	solid cable	stranded cable
	mm^2	1x6 / 2x4	1x6 / 2x2.5	1x4 / 2x2.5	1x2.5 / 2x2.5
	AWG	1x10 / 2x12	1x10 / 2x14	1x12 / 2x14	1x14 / 2x14
Screw torque	Nm	0.8		0.8	

TYPE	Number of steps	SEQUENCES	
		1	2
13.01 13.71	2		

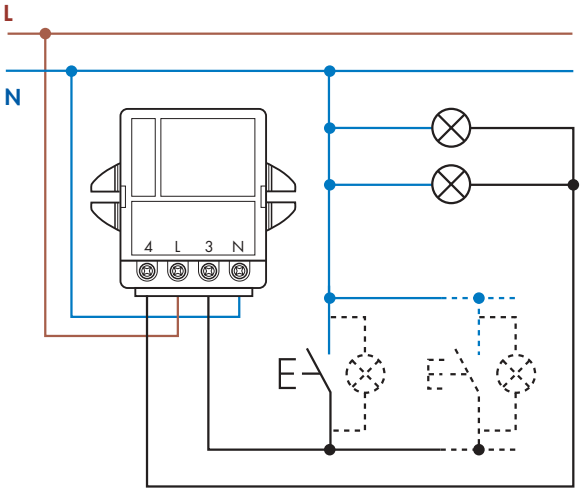
WIRING DIAGRAMS



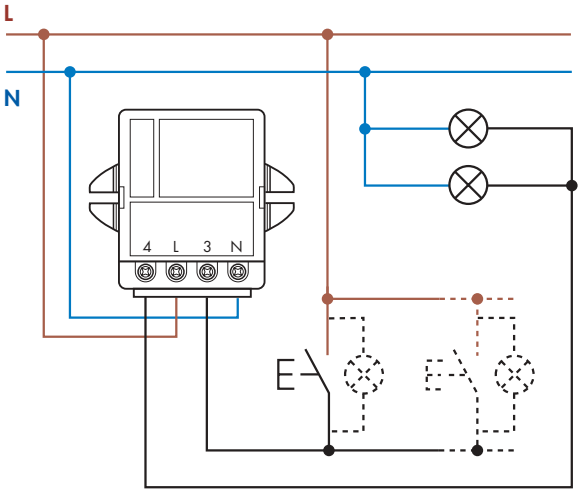
Type 13.01
Bistable (step) wiring diagram



Type 13.01
Monostable wiring diagram

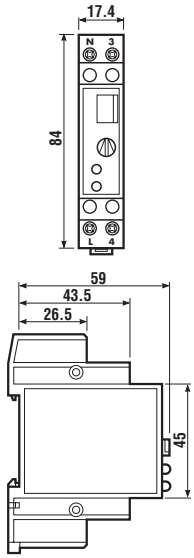
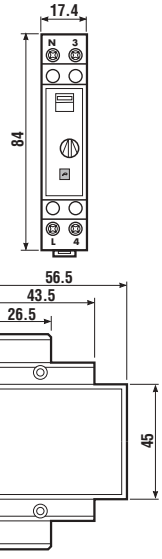


Type 13.71
3 wire connection



Type 13.71
4 wire connection

- *One module (17.4 mm) wide*
- *Time range from 30 s to 20 min*
- *Can be used with illuminated push - buttons*
- *Suitable for 3 or 4 wiring systems*
- *LED indicators*
- *35 mm rail (EN 50022) mount*

	14.01	14.71
		
	- Multi-function - 1 NO (SPDT-NO) - 35 mm rail mount	- For 3 or 4 wiring system - 1 NO (SPDT-NO) - 35 mm rail mount
		
Contact specifications		
Contact configuration	1 NO (SPDT-NO)	1 NO (SPDT-NO)
Rated current/Max. peak current A	16/30 (100 A - 5 ms)	16/30 (100 A - 5 ms)
Rated voltage/Max. switching voltage V AC	230/—	230/—
Rated load in AC1 VA	3,700	3,700
Rated load in AC15 (230 V AC) VA	750	750
Nominal lamp rating: incandescent (230 V) W	2,000	2,000
compensated fluorescent (230 V) W	750	750
uncompensated fluorescent (230 V) W	1,000	1,000
halogen (230 V) W	2,000	2,000
Minimum switching load mW (V/mA)	1,000 (10/10)	1,000 (10/10)
Standard contact material	$AgSnO_2$	$AgSnO_2$
Supply specifications		
Nominal voltage V AC (50/60 Hz)	230	230
V DC	—	—
Rated power AC/DC VA (50 Hz)/W	2/—	1.5/—
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 in AC1 cycles	$100 \cdot 10^3$	$100 \cdot 10^3$
Delay setting min	0.5...20	0.5...20
Max no. of illuminated push-button (≤ 1 mA)	15	30
Maximum impulse duration	continuous	continuous
Ambient temperature range °C	–10...+50	–10...+60
Protection category	IP 20	IP 20
Approvals (according to type):	CE GOST	

ORDERING INFORMATION

Example: a 14 series single module relay with a single phase switch 1 NO (SPDT-NO) 16 A contact, with 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

No. of poles
1 = Single phase switch, 16 A

Supply version
8 = AC (50/60 Hz)

Supply voltage
230 = 230 V

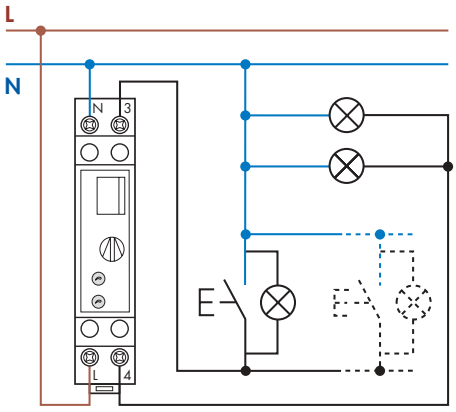
TECHNICAL DATA

INSULATION		14.01	14.71
Dielectric strength			
- between open contacts	V AC	1,000	1,000

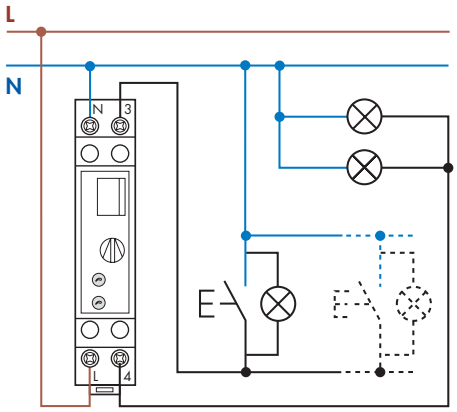
OTHER DATA		14.01		14.71	
Power lost to the environment					
- without contact current	W	1.3		1	
- with rated current	W	3.3		3.3	
Max wire size		solid cable	stranded cable	solid cable	stranded cable
	mm²	1x6 / 2x4	1x4 / 2x2.5	1x6 / 2x4	1x4 / 2x2.5
	AWG	1x10 / 2x12	1x12 / 2x14	1x10 / 2x12	1x12 / 2x14
Screw torque	Nm	0.8		0.8	

WIRING DIAGRAMS

Type14.01
LED indication:
red = relay ON
green = power ON

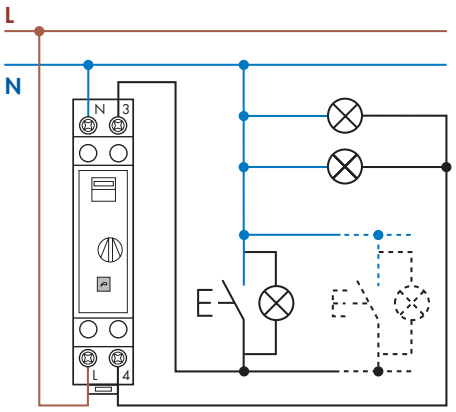


3 wire connection

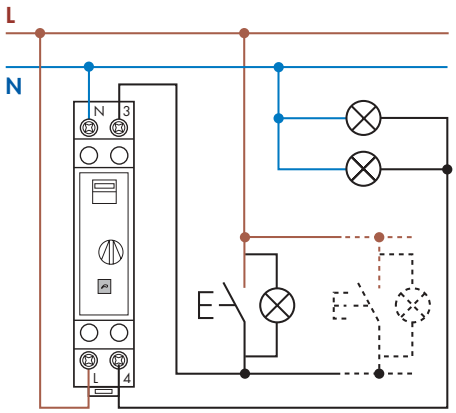


4 wire connection

Type 14.71
LED indication:
red = relay ON



3 wire connection

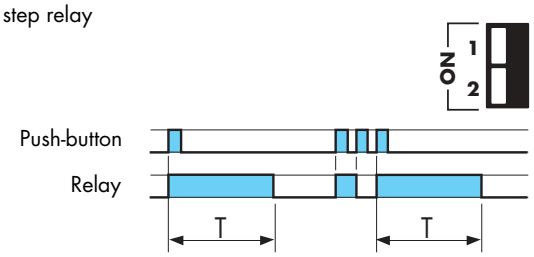


4 wire connection

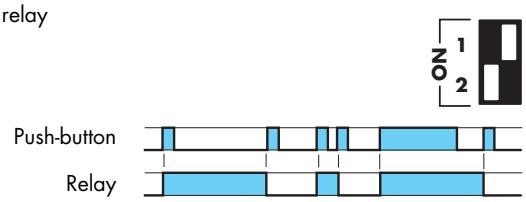
FUNCTIONS

Type 14.01.8.230 The following functions are selected by means of a DIP SWITCH:

Timing step relay

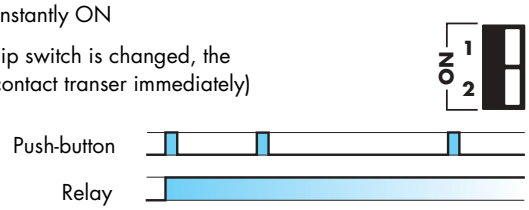


Step relay

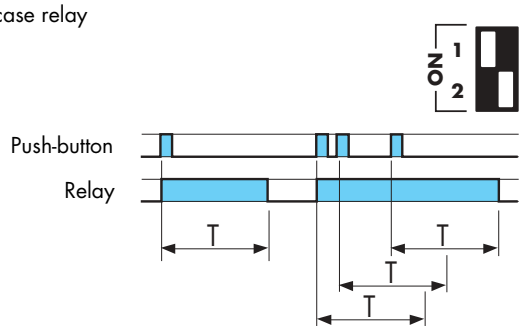


Light constantly ON

(If the Dip switch is changed, the output contact transer immediately)

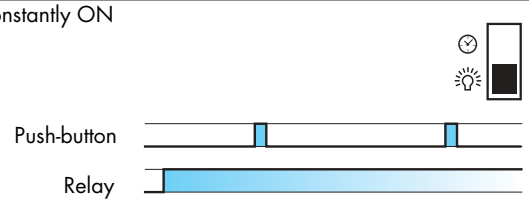


Staircase relay

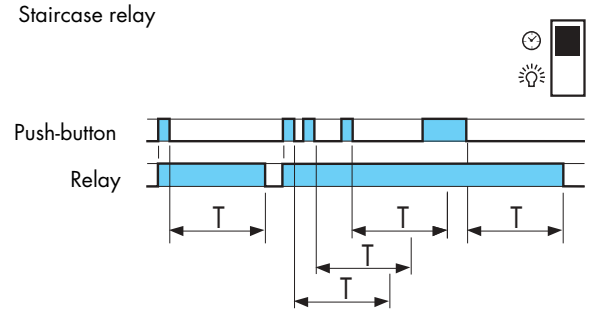


Type 14.71.8.230 The following functions are selected by means of a SELECTOR SWITCH:

Light constantly ON

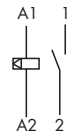
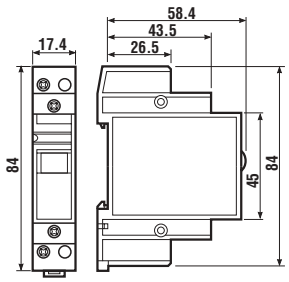
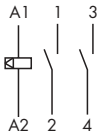
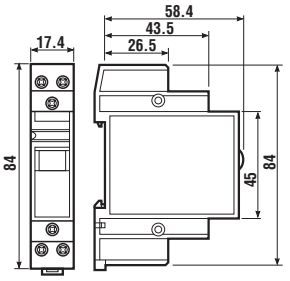
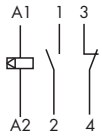
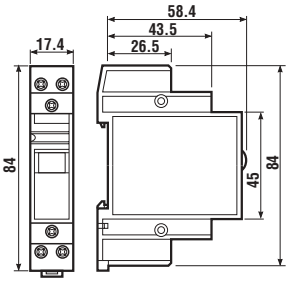


Staircase relay



1. When the DIP switch is changed from one position to another, the new function comes into effect immediately. It is not therefore necessary to operate the push button again.
2. The "light constantly ON" function can also be attained when the dip switch is set to the "staircase timer" setting. To do this, either keep the push-button pressed for the desired time or install a standard one-way switch in parallel to the push-button.

- *One module (17.4 mm) wide*
- *Test button with mechanical indicators*
- *6 functions available*
- *AC and DC coils*
- *Identification label*
- *Possible to connect illuminated push buttons*
- *35 mm rail (EN 50022) mount*

	20.21	20.22, 24, 26, 28	20.23
			
	- Single phase switch 1 NO (SPDT-NO) - 35 mm rail mount	- Double phase switch - 35 mm rail mount	- Double phase switch 1NC+1NO (SPST-NO+SPST-NC) - 35 mm rail mount
	 	 	 
Contact specifications			
Contact configuration	1 NO (SPST-NO)	2 NO (DPST-NO)	1NC+1NO (SPST-NO+SPST-NC)
Rated current/Max. peak current A	16/30	16/30	16/30
Rated voltage/Max. switching voltage V AC	250/400	250/400	250/400
Rated load in AC1 VA	4,000	4,000	4,000
Rated load in 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 specifications			
Nominal voltage 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)		
V DC	$(0.9...1.1)U_N$	$(0.9...1.1)U_N$	$(0.9...1.1)U_N$
Technical data			
Mechanical life cycles	$300 \cdot 10^3$	$300 \cdot 10^3$	$300 \cdot 10^3$
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 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):	CE GOST		RINA cULus

ORDERING INFORMATION

Example: a 20 series 35 mm rail (EN 50022) mount relay with double phase switch, 2 NO (DPST-NO) 16 A contacts, coil rated at 12 V DC and with $AgSnO_2$ 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 = $AgSnO_2$

Coil voltage
see coil specifications

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

TECHNICAL DATA

INSULATION

Dielectric strength		
- between supply and contacts	V AC	3,500
- between open contacts	V AC	2,000
- between adjacent contacts	V AC	2,000

OTHER DATA

		20.21, 20.23, 20.28		20.22, 20.24, 20.26	
Power lost to the environment					
- with rated current and coil deenergised	W	1.3		2.6	
		COIL CLAMPS		CONTACT CLAMPS	
Max wire size		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
Screw torque	Nm	0.8		0.8	

If the coil is operated for a prolonged period of time, adaquate ventilation of the relays must be provided, for example leaving a gap of about 9 mm between relays.

COIL SPECIFICATIONS

DC VERSION DATA

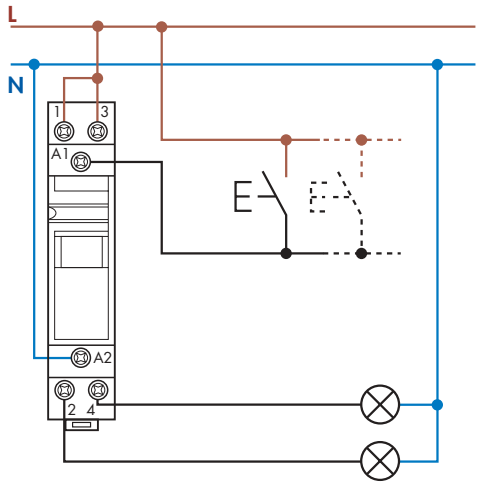
Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Consumption I at U_N
V		V	V	Ω	mA
12	**9**.012	10.8	13.2	27	440
24	**9**.024	21.6	26.4	105	230
48	**9**.048	43.2	52.8	440	110
110	**9**.110	99	121	2,330	47

AC VERSION DATA

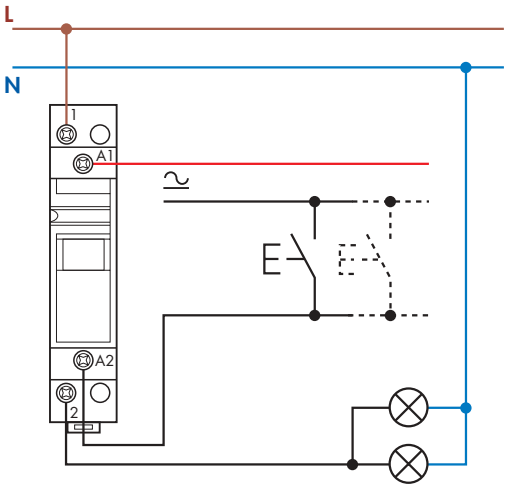
Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Consumption I at U_N (50 Hz)
V		V	V	Ω	mA
8	**8**.008	6.8	8.8	4	800
12	**8**.012	10.2	13.2	7.5	550
24	**8**.024	20.4	26.4	27	275
48	**8**.048	40.8	52.8	106	150
110	**8**.110	93.5	121	590	64
120	**8**.120	102	132	680	54
230	**8**.230	195.5	253	2,500	28
240	**8**.240	204	264	2,700	27.5

TYPE	Number of steps	SEQUENCES 1	2	3	4
20.21	2				
20.22	2				
20.23	2				
20.24	4				
20.26	3				
20.28	4				

WIRING DIAGRAMS



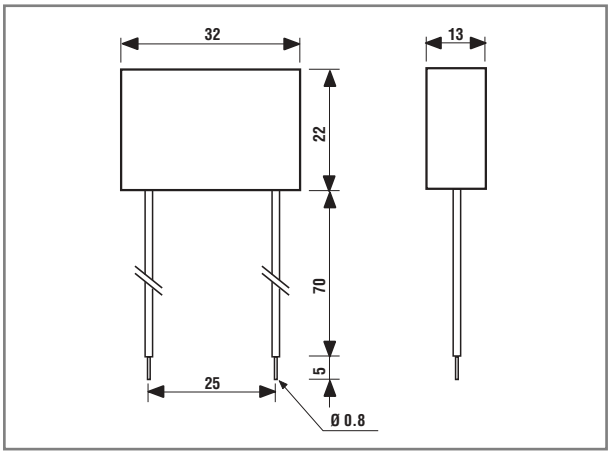
Example: 230 V AC supply voltage.



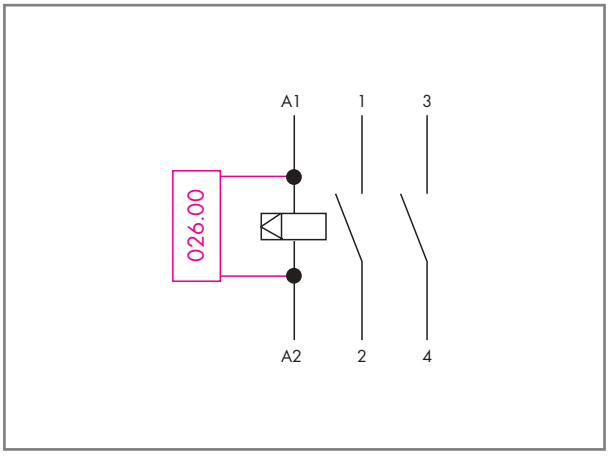
Example: 24 V AC supply voltage.

ACCESSORIES

MODULE FOR ILLUMINATED PUSH-BUTTONS



Type 026.00
Sealed version, 7.5 cm insulated and flexible terminals.

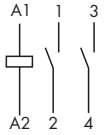
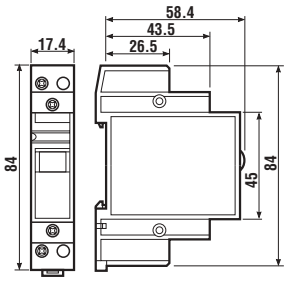
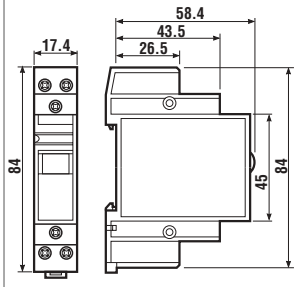


Example of wiring diagram of type 026.00
This module is necessary if using up to a maximum of 15 illuminated pushbuttons (1.5 mA max, 230 V AC) in the switching input circuit. It must be be connected in parallel to the coil of the relay (see diagram).


020.24

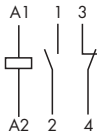
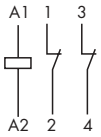
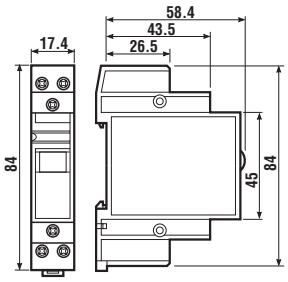
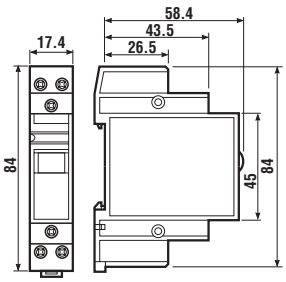
Sheet of marker tags (24 tags), 9x17 mm	020.24

- *One module (17.4 mm) wide*
- *Test button*
- *Identification label*
- *AC and DC coils*
- *35 mm rail (EN 50022) mount*

	22.21	22.22
		
	- Single phase switch 1 NO (SPDT-NO) - 35 mm rail mount	- Double phase switch 2 NO (DPST-NO) - 35 mm rail mount
		
		

Contact specifications				
Contact configuration			1 NO (SPST-NO)	2 NO (DPST-NO)
Rated current/Max. peak current		A	20/30	20/30
Rated voltage/Max. switching voltage		V AC	250/400	250/400
Rated load in AC1		VA	5,000	5,000
Rated load in 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 specifications				
Nominal voltage	V AC (50/60 Hz)		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	$500 \cdot 10^3$	$500 \cdot 10^3$
Electrical life at rated load in AC1		cycles	$50 \cdot 10^3$	$50 \cdot 10^3$
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):			CE GOST	

- *One module (17.4 mm) wide*
- *Test button*
- *Identification label*
- *AC and DC coils*
- *35 mm rail (EN 50022) mount*

	22.23	22.24
		
	- Double phase switch 1NO+1NC (SPST-NO+SPST-NC) - 35 mm rail mount	- Double phase switch 2 NC (DPST-NC) - 35 mm rail mount
		
		
Contact specifications		
Contact configuration	1NO+1NC (SPST-NO+SPST-NC)	2 NC (DPST-NC)
Rated current/Max. peak current A	20/30	20/30
Rated voltage/Max. switching voltage V AC	250/400	250/400
Rated load in AC1 VA	5,000	5,000
Rated load in 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 specifications		
Nominal voltage V AC (50/60 Hz)	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	$500 \cdot 10^3$	$500 \cdot 10^3$
Electrical life at rated load in AC1 cycles	$50 \cdot 10^3$	$50 \cdot 10^3$
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):	CE GOST	

ORDERING INFORMATION

Example: a 22 series 35 mm rail mount relay with 1 NO (SPST-NO) 20 A contacts, with coil rated at 24 V DC, contact material $AgSnO_2$.

2 2	.	2	1	.	9	.	0 2 4	.	4	0	0	0

Series

Type
2 = 35 mm rail (EN 50022) mount

No. of poles
1 = 1 NO (SPST-NO)
2 = 2 NO (DPST-NO)
3 = 1 NO + 1 NC (SPST-NO + SPST-NC)
4 = 2 NC (DPST-NC)

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

Coil voltage
see coil specifications

Contact material
4 = $AgSnO_2$

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

		22.21, 22.23		22.22, 22.24	
Bounce time: NO/NC	ms	5/10		5/10	
Power lost to the environment					
- without contact current	W	1.2		1.2	
- with rated current	W	3.2		5.2	
Max wire size		COIL CLAMPS		CONTACT CLAMPS	
		solid cable	stranded cable	solid cable	stranded cable
	mm^2	1x4 / 2x2.5	1x2.5 / 2x2.5	1x6 / 2x6	1x6 / 2x4
	AWG	1x12 / 2x14	1x14 / 2x14	1x10 / 2x10	1x10 / 2x12
Screw torque	Nm	0.8		0.8	

If the coil is operated for a prolonged period of time, adaquate ventilation of the relays must be provided, for example leaving a gap of about 9 mm between pairs of relays.

COIL SPECIFICATIONS

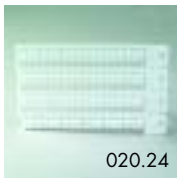
DC VERSION DATA

Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Consumption 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

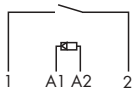
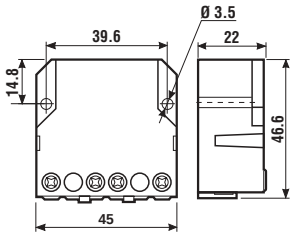
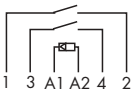
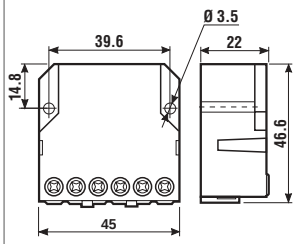
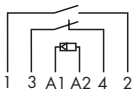
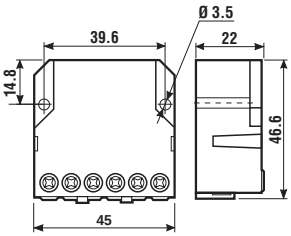
Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Consumption I at U_N (50 Hz)
V		V	V	Ω	mA
8	**8**.008	6.8	8.8	6.5	360
12	**8**.012	10.2	13.2	13.5	245
24	**8**.024	20.4	26.4	41	135
48	**8**.048	40.8	52.8	186	68
110	**8**.110	93.5	121	970	26
120	**8**.120	102	132	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 (24 tags), 9x17 mm	020.24

- *Screw terminal connections*
- *AC coil*
- *Panel mount*

	26.01	26.02, 04, 06, 08	26.03
			
	- Single phase switch 1 NO (SPST-NO)	- Double phase switch 2 NO (DPST-NO)	- 1 NO + 1 NC (SPST-NO + SPST-NC)
	 26.01 	 26.02 26.04 26.06 26.08 	 26.03 
Contact specifications			
Number of contacts	1 NO (SPST-NO)	2 NO (DPST-NO)	1NO+1NC (SPST-NO+SPST-NC)
Rated current/Max. peak current A	10/20	10/20	10/20
Rated voltage/Max. switching voltage V AC	250/400	250/400	250/400
Rated load in AC1 VA	2,500	2,500	2,500
Rated load in 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 specifications			
Nominal voltage 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)	$(0.8...1.1)U_N$	$(0.8...1.1)U_N$	$(0.8...1.1)U_N$
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 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):	CE GOST		

ORDERING INFORMATION

Example: a 26 series screw terminal mount relay with double phase switch 2 NO (DPST-NO) 10 A contacts, with coil rated at 12 V AC.

2 6	.	0	2	.	8	.	0 1 2	.	0	0	0	0
Series		Type	No. of poles		Coil version		Coil voltage					

Series

Type
0 = Screw terminal

No. of poles
1 = Single phase switch 1 NO (SPST-NO)
2 = Double phase switch 2 NO (DPST-NO)
3 = Double phase switch 1 NO + 1 NC (SPST-NO + SPST-NC)
4 = 4 sequences double phase switch 2 NO (DPST-NO)
6 = 3 sequences double phase switch 2 NO (DPST-NO)
8 = 4 sequences double phase switch 2 NO (DPST-NO)

Coil version
8 = AC (50 Hz)

Coil voltage
see coil specifications

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 deenergised	W	0.9		1.8	
Max wire size		solid cable	stranded cable	solid cable	stranded cable
	mm^2	1x4 / 2x2.5	1x2.5 / 2x2.5	1x4 / 2x2.5	1x2.5 / 2x2.5
	AWG	1x12 / 2x14	1x14 / 2x14	1x12 / 2x14	1x14 / 2x14
Screw torque	Nm	0.8		0.8	

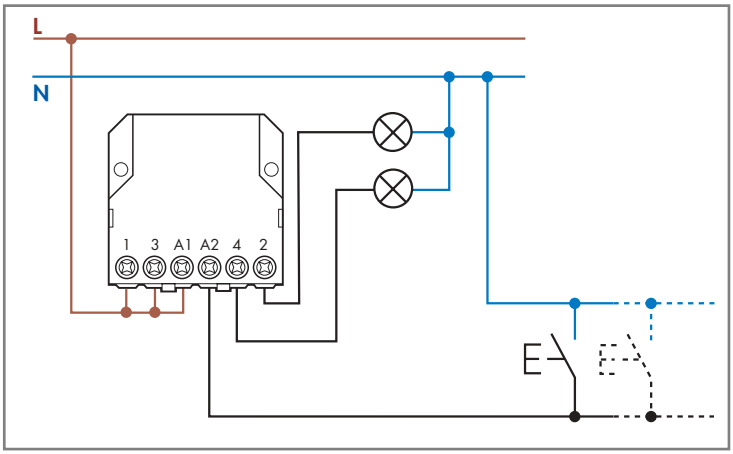
COIL SPECIFICATIONS

AC VERSION DATA

Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Consumption I at U_N (50 Hz)
V		V	V	Ω	mA
12	**8**.012	9.6	13.2	17	370
24	**8**.024	19.2	26.4	70	180
48	**8**.048	38.4	52.8	290	90
110	**8**.110	88	121	1,500	40
230	**8**.230	184	253	6,250	20

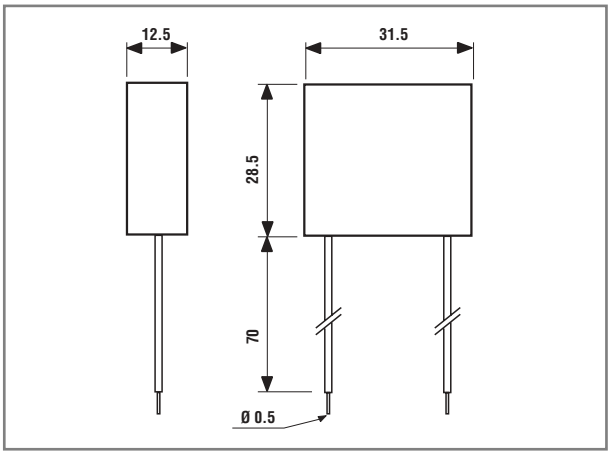
TYPE	Number of steps	SEQUENCES 1	2	3	4
26.01	2				
26.02	2				
26.03	2				
26.04	4				
26.06	3				
26.08	4				

WIRING DIAGRAMS



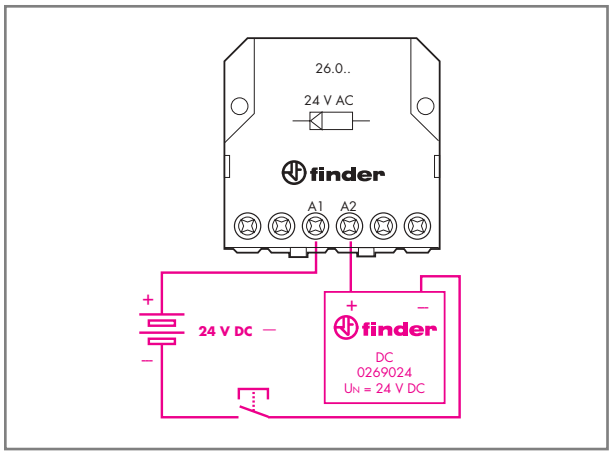
ACCESSORIES

12-24 V DC CONTROL APPLICATIONS



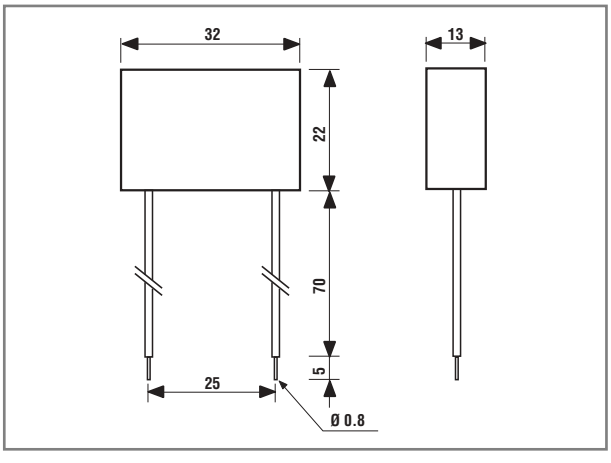
Type: 026.9.012
Nominal voltage: 12 V DC
Max temperature: + 40 °C
Operating range: (0.9...1.1)U_N

Type: 026.9.024
Nominal voltage: 24 V DC
Max temperature: + 40 °C
Operating range: (0.9...1.1)U_N

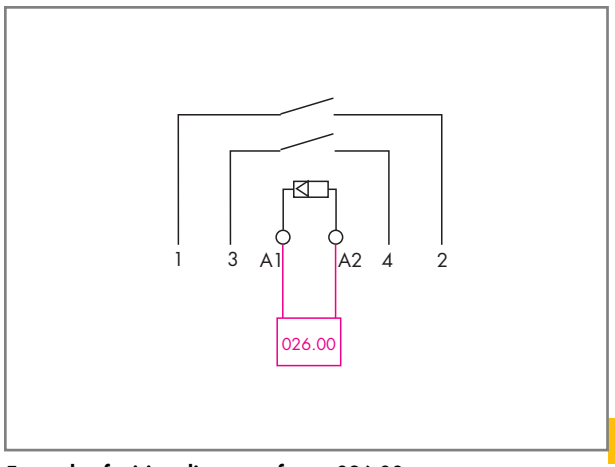


Example of wiring for 24 V DC control application.

MODULE FOR ILLUMINATED PUSH-BUTTONS

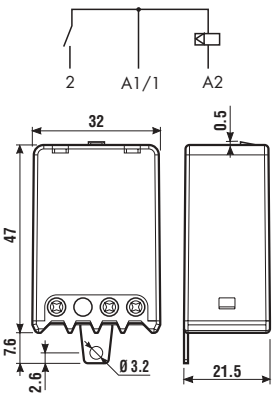
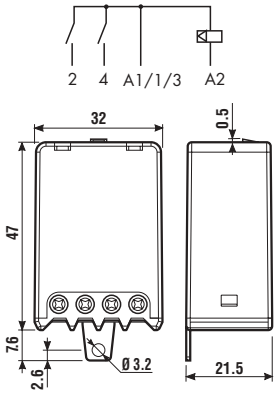


Type 026.00
Sealed version, 7.5 cm insulated and flexible terminals.



Example of wiring diagram of type 026.00
This module is necessary if using up to a maximum of 15 illuminated pushbuttons (1.5 mA max, 230 V AC) in the switching input circuit. It must be connected in parallel to the coil of the relay (see diagram).

- *Screw terminal connections*
- *AC coil*
- *Panel mount*

	27.01	27.05/06
		
	- Single phase switch 1 NO (SPST-NO)	- Double phase switch
		

Contact specifications					
Number of contacts		1		2	
Rated current/Max. peak current	A	10/20		10/20	
Rated voltage/Max. switching voltage	V AC	110/110	230/230	110/110	230/230
Rated load in AC1	VA	1,100	2,300	1,100	2,300
Rated load in AC15 (230 V AC)	VA	250	500	250	500
Nominal lamp rating:incandescent (230 V)	W	500	1,000	500	1,000
compensated fluorescent (230 V)	W	180	360	180	360
uncompensated fluorescent (230 V)	W	250	500	250	500
halogen (230 V)	W	400	800	400	800
Minimum switching current	mW (V/mA)	10		10	
Standard contact material		AgNi		AgNi	
Coil specifications					
Nominal voltage	V AC (50/60 Hz)	110	230	110	230
	V DC	—		—	
Rated power AC/DC	VA (50 Hz)/W	4/—		4/—	
Operating range	AC	$(0.8...1.1)U_N$		$(0.8...1.1)U_N$	
	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 µs)	kV	4		4	
Ambient temperature range	°C	–40...+40		–40...+40	
Protection category		IP 20		IP 20	
Approvals (according to type):		CE GOST			

ORDERING INFORMATION

Example: a 27 series clamp terminal mount relay with single phase switch 1 NO (SPST-NO) 10 A contacts, with coil rated at 230 V AC.

27	.	0	1	.	8	.	230	.	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

		27.01		27.05, 27.06	
Power lost to the environment with rated current and coil deenergised	W	0.9		1.8	
Max wire size		solid cable	stranded cable	solid cable	stranded cable
	mm^2	2x2.5	1x4 / 2x2.5	2x2.5	1x4 / 2x2.5
	AWG	2x14	1x12 / 2x14	2x14	1x12 / 2x14
Screw torque	Nm	0.8		0.8	

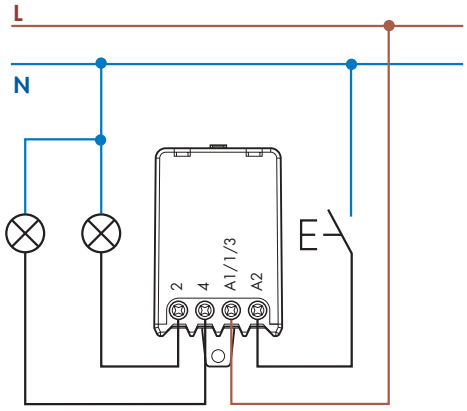
COIL SPECIFICATIONS

AC VERSION DATA

Nominal voltage U_N	Coil code	Operating range U_{min}	Operating range U_{max}	Resistance R	Consumption I at U_N (50 Hz)
V		V	V	Ω	mA
110	**8**.110	88	121	1,400	42.0
230	**8**.230	184	253	6,500	17.5

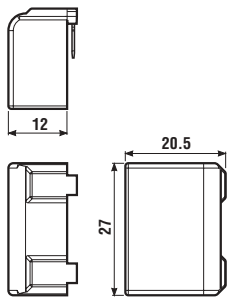
Type	Number of steps	Sequences 1	2	3	4
27.01	2				
27.05	4				
27.06	3				

WIRING DIAGRAMS

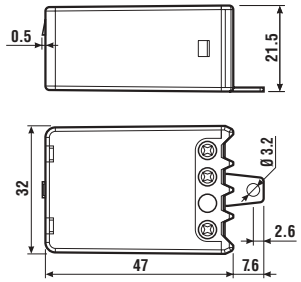


ACCESSORIES

MODULE FOR ILLUMINATED PUSH-BUTTONS



027.00 module



27 series relay

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.

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, IEC 61810-7, EN 60255-23 for all-or-nothing (elementary) relays
- 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 electronic step relays, staircase switches and light-dependent relays

Other standards, used as reference for double insulation, are:
- VDE 0106 as basic standard
- EN 60335 (VDE 0700) for domestic appliances, prescribing 8 mm creepage and clearance between coil and contacts
- EN 50178 (VDE 0160) for industrial appliances, prescribing 5.5 mm clearance and 6.4...8 mm creepage between coil and contacts

According to EN 61810-1, all technical data is specified under standard conditions of 23°C ambient temperature, 96 kPa pressure, 50% humidity, clean air and 50 Hz frequency. The tolerance for coil resistance, nominal absorption and rated power values is ± 10%.

WORKING CONDITIONS

- Unless expressly indicated otherwise, all relays are suitable for 100% Duty Cycle and all the AC coil relays are suitable for 50 and 60 Hz frequency.
- Environmental conditions causing condensation or ice formation in the relay are not permitted.
- 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 series.
- When relay coils are controlled via a proximity switch, or via cables having length > 10 m, the use of a "residual current bypass" module in parallel with the coil is recommended.

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 pattern (copper side view).

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 250°C (482°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 inside the relay will reduce the electrical life property to the switching frequency. Even so, avoid washing the relay itself, particularly with aggressive solvents or in cycles using low temperature water, as this may cause thermal shock to the PC board components.

TERMINOLOGY & DEFINITIONS

All the following terms indicated 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 this will be mentioned in the appropriate descriptions that follow.

CONTACT SPECIFICATIONS

CONTACT CONFIGURATION:

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,...)

TERMINAL MARKING

The 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

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,..)
- sometimes A and B for coil terminals.

RATED CURRENT - The limiting continuous current, is 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.

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.

MAXIMUM BLOCKING VOLTAGE (Solid State Relay) - The maximum level of output voltage at which the output circuit will not be destroyed.

RATED VOLTAGE - The line-to-neutral voltage (derived from nominal voltages of contact loads) used for insulation co-ordination.

MAXIMUM SWITCHING VOLTAGE - The highest voltage level (including tolerances) that the contacts are able to switch according to rated voltage.

RATED LOAD IN AC1 - The maximum AC resistive switching power (in VA) that a contact can make, carry and break repeatedly, according to utilisation category AC1, EN 60947-4-1 (see Table 1). It is the product of rated current and rated voltage. It is used as the reference load for electrical life tests.

RATED LOAD IN AC15 - The maximum AC inductive switching power (in VA) that a contact can make, carry and break repeatedly, according to utilisation category AC15, EN 60947-5-1 (see Table 1).

SINGLE PHASE MOTOR RATING - The nominal value of motor power that a relay can switch according to EN 60947-1, UL 508 and CSA 22.2 n. 14 * The figures are given in kW; the horsepower rating can be calculated by multiplying that value by 1.34 (ie. 0.37 kW = 0.5 HP). If reversing motor direction, always allow an intermediate break > 300 ms, otherwise an excessive inrush peak current (caused from change of polarity of motor capacitor) may occur, causing contact welding.

RATED LAMPS LOAD - Maximum incandescent and fluorescent lamp ratings for 230 V AC supply voltage. Fluorescent lamps compensated to cos φ ≥ 0.9.

BREAKING CAPACITY IN DC1 - The maximum value of DC resistive current that contacts can switch, depending on the value of the load voltage (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.

ELECTRICAL LIFE TEST - An AC resistive load test (AC1category) conducted with relay coil (both AC and DC) supplied at rated voltage. Load applied between all movable and NO contacts but without any load on the NC contacts, and vice-versa. These load life values are valid for relays with standard contact material.
Switching frequency:
All-or-nothing relays: coil 900 cycles/h - contact 900 cycles/h
(2s ON - 2s OFF, 1s ON - 3s OFF
for rated current >16 A)
Step relays: coil 900 cycles/h - contact 450 cycles/h (4s ON - 4s OFF).

LOAD REDUCTION FACTOR VERSUS COS φ - For AC inductive loads (such as solenoids, contactors coils, etc.) the reduction factor corresponding to cos φ shall be multiplied by the rated current in order to define the maximum allowed current It is not valid for electric motors or fluorescent lamps.

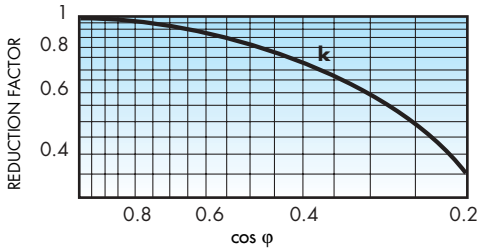


TABLE 1

Utilisation categories according to EN60947-4-1 and EN 60947-5-1

Load Category	Supply type	Application
AC 1	AC single-phase AC three-phase	Resistive or slightly Inductive AC loads.
AC 3	AC three-phase	Starting and stopping of Squirrel-cage motors. Reversing direction of rotation only after stopping motor.
AC 4	AC three-phase	Starting, Stopping and Reversing direction of rotation of Squirrel cage motors. Jogging (Inching). Regenerative braking (Plugging).
DC 1 **AC 14**	DC AC single-phase	Resistive loads or slightly inductive DC loads.* Control of small electromagnetic loads (<72 VA), power contactors, magnetic solenoid valves, and electromagnets.
AC 15	AC single-phase	Control of small electromagnetic loads (>72 VA), power contactors, magnetic solenoid valves, and electromagnets.
DC 13	DC	Control of electromagnetic loads, power contactors, magnetic solenoid valves, and electromagnets

*The switching voltage at the same current can be doubled by wiring 2 contacts in series.

CONTACT RESISTANCE - Measured, according to contact category (Table 2), at the external terminals of the relay. It is a statistical value, not reproducible. It hasn't any effect on relay reliability on most application. The typical value, measured with 24 V 100 mA, is 50 mΩ.

TABLE 2 - Contact categories according to EN60255-23

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 Application Category that will define a particular relay's switching capability in terms of maximum and minimum limits for contact voltage and current. The appropriate Application Category will also define the voltage and current levels used to measure the contact resistance. All Finder relays are category 3, with the exception of 30 series, which is category 2.

Application category	Voltage (V)	Current (A)	Contact Resistance Measurement (IEC 61810-7)	
0	U < 0.03	I < 0.01	> 30 mV	10 mA
1	0.03 < U < 60	0.01 < I < 0.1	100 mV	10 mA
2	5 < U < 250	0.1 < I <1	24 V	100 mA
3	**5 < U < 600**	**0.1 < I < 100**	**24 V**	**1000 mA**

TABLE 3 - Contact materials characteristics

Material	Property	Typical application*
AgNi + Au (Silver Nickel Gold plated)	- 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 **NOTE:** 5 µm hard gold plating is completely different from 0.2 µm gold flashing, which allows only protection in storing, but no better performance in use.	Wide range applications: - Small load range (where gold plating erodes very little) from up to 1.5 W/24 V (resistive load). - Middle load range where gold plating erodes after several operations and the property of basic AgNi becomes dominant. **NOTE:** for awitching lower load, typically 1 mW (0.1 V - 1 mA), (for example in measuring instruments), it is recommended to connect 2 contacts in parallel.
AgNi (Silver Nickel)	- Standard contact material for most relay applications - High wear resistance - Medium resistance to welding	- Resistive and slightly inductive loads - Rated current up to 12 A - Inrush current up to 25 A
AgCdO (Silver Cadmium Oxide)	- High wear resistance with higher AC loads - Good resistance to welding	- Inductive and motor loads - Rated current up to 30 A - Inrush current up to 50 A
$AgSnO_2$ (Silver Tin Oxide)	- Excellent resistance to welding - Low material transfer in DC loads	- Lamp and capacitive loads - Very high Inrush current (up to 120 A) loads

*It is necessary to refer to the maximum current values specified in the catalogue for each relay.

COIL (or INPUT or SUPPLY) SPECIFICATIONS

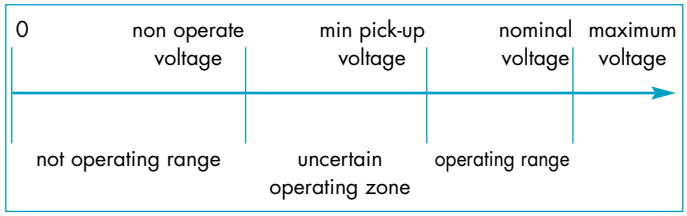
NOMINAL VOLTAGE - The nominal value of coil (or input or supply) voltage for which the relay has been designed, and for which operation is intended. The operating and use characteristics are referred to the rated voltage.

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. It is a short-time value (not steady-state).

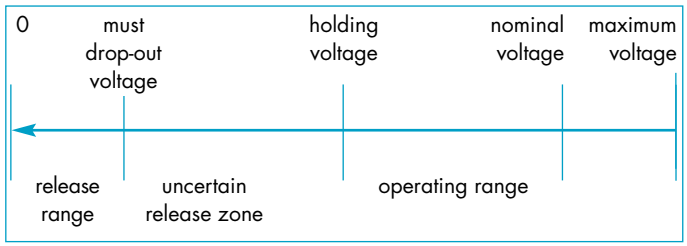
OPERATING RANGE - The range of input voltage, in nominal voltage applications, in which the relay works in the whole range of ambient temperatures, according to operating class:
- class 1: $(0.8...1.1)U_N$
- class 2: $(0.85...1.1)U_N$

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 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 VOLTAGE - The highest applied 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 (Release voltage) - The value of coil voltage at which the relay (which had previously been energised with a voltage within the operating range) will definitely drop-out.

RESISTANCE - The average value of the coil resistance under the standard prescribed condition of 23°C ambient.

RATED COIL CONSUMPTION - The average value of coil current, when energised at nominal voltage.

CONTROL CURRENT (Solid State Relays) - The nominal value of curent consumption of the input circuit, when supplied at nominal voltage.

THERMAL TESTS - Calculation of the coil temperature rise (ΔT) is made by measuring the coil resistance in a controlled temperature oven (not ventilated) until a stable value is reached (no less than 0.5 K variation in 10 minutes).
That is: $\Delta T = (R2 - R1)/R1 \times (234.5 + t1) - (t2 - t1)$

where: R1 = initial resistance R2 = final resistance
t1 = initial temperature t2 = final temperature

INSULATION DATA

INSULATION COORDINATION

(according to EN 61810-1 ed. 2 and IEC 60664-1)
In accordance with to EN 61810-1 ed. 2 , the Insulation characteristics achieved by the relay can be described by just two characteristic parameters – the Rated Impulse Voltage and the Degree of Pollution.

To ensure the correct Insulation Coordination between the relay and the application, the equipment designer (relay user) should establish the Rated Impulse Withstand Voltage appropriate to his application, and the Pollution level for the micro environment 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.

To establish the appropriate Pollution degree and Rated impulse withstand voltage refer either to an appropriate Product Standard (which may be mandatory for the particular type of equipment), or consider the tables below. Select the Rated impulse withstand voltage from a knowledge of the Nominal Voltage of the Supply and a knowledge of the Over Voltage Category (as described in IEC 60664-1).

Nominal voltage of the supply system (mains) according to IEC 600038		Voltage line-to neutral (derived from nominal voltages AC or DC, up to and including)	**Rated impulse withstand voltage**			
V		V	V			
			Overvoltage category			
Three-phase	Single-phase		I	II	III	IV
	120 to 240	150	**800**	**1500**	**2500**	**4000**
230/400*		250*	**1200***	**2200***	**3600***	**5500***
230/400	277/480	300	**1500**	**2500**	**4000**	**6000**

* For existing products the interpolated values apply.

Pollution degree	**Immediate surroundings conditions**
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.
4	The pollution generates persistent conductivity caused by conductive dust or by rain or snow.

Dependent on the product standard, pollution degree 2 and 3 are commonly prescribed for equipment. For example, EN 50178 (electronic for use in power installations) prescribes, under normal circumstances, contamination level 2.

Examples of specification of Rated Impulse Voltage and the Degree of Pollution :

4 kV/3 (This relay is designed to withstand a rated impulse voltage of 4 kV and pollution degree 3).
4 - 2.5 kV/3 (This relay is designed to withstand rated impulse voltages of 4 kV and 2.5 kV and pollution degree 3).

If only one rated impulse voltage is given, the value refers to all electrical circuits against each other and against the accessible surfaces. If two values are indicated for the rated impulse voltage, the first value refers to the contacts against each other and against the accessible surfaces as well as other electrical circuits. The second value refers to the coil against accessible surfaces and other electrical circuits.

DIELECTRIC STRENGTH - It can be described in terms of an alternating voltage or in terms of a surge (1.2/50 µs impulse) voltage. The correspondence between the alternating voltage and surge voltage is listed in IEC 60664-1 Annex A, Table A.1.
For all Finder relays a 100 % test is carried out with a 50 Hz, alternating voltage applied between all contacts and coil, between adjacent contacts and between open contacts. The leakage current must be less than 3 mA. Type tests are carried out with both alternating voltage and with impulse voltage.

DIELECTRIC STRENGTH BETWEEN OPEN CONTACTS - It far exceeds the maximum switching voltage. Typical contact gaps of 0.3 ~ 0.5 mm result in ultimate dielectric strength values of typically 1300 ~ 1550 V (1.2/50 µs impulse), but always refer to the relay specification.

INSULATION GROUP - The latest way of specifying insulation properties according to the Insulation Coordination replaces the insulation group classification, such as C 250 according to the older VDE 0110 standard.

SAFE SEPARATION / DOUBLE INSULATION - Isolation Co-ordination as described earlier ensures the isolation of hazardous voltages from other circuits to a safe engineering level. But importantly, not on the basis that there is any intentional direct personal access to the isolated circuits or, where failure of insulation would present a particularly high risk. (Telecoms and medical applications, are good examples).

For high risk / high integrity applications there is a need for a very special and higher level of physical isolation and integrity between circuits, and this is provided by safe separation and double insulation. The regulations for safe separation establish the conditions which must be met for PELV (protected extra low voltage) or SELV (safety extra low voltage) circuits.

Consider the common case, where the mains voltage of 230 V and a low voltage circuit both appear within a relay; all the following requirements for the relay, including its connections and wiring, must in consequentce be met.

- The low voltage and the 230 V must be separated by double or reinforced insulation. This means that between the two electrical circuits must be guaranteed a dielectric strength of 6 kV (1.2/50 µs), an air distance of 5.5 mm and, depending on the pollution degree and on material used, an appropriate tracking distance.
- The electrical circuits within the relay must be protected against any possibility of bridging caused, for instance, by a lose metal part. This is achieved by the physical separation of circuits into isolated chambers within the relay.
- The wires connected to the relay must also be physically separated from each other. This normally is achieved 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.

Although this appears quite complex, with the SELV insulation options offered on some Finder relays, the user only needs to address the two last points. And with the coil and contact connections on opposite sides of the relays and sockets, the separation of connections into different cable channels is greatly facilitated.

GENERAL TECHNICAL DATA

CYCLE - Operate and subsequent release of a relay. Over a cycle the coil is energised and de-energised and the contact will progress from the point at which it makes a circuit, through to breaking the circuit, to the point at which it re-makes the circuit.

PERIOD - The time covering one cycle.

DUTY FACTOR (DF) - During cyclic operation, DF is the ratio between the energised time and one period. For continuous duty, DF =1.

MECHANICAL LIFE - This test is performed by energising the coils of several relays at 8 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.

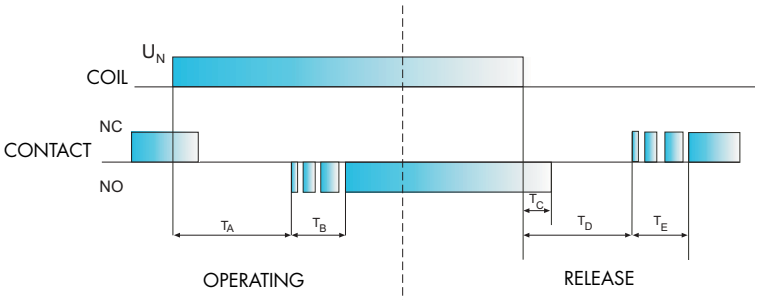
ELECTRICAL LIFE - See in CONTACT SPECIFICATIONS.

OPERATE TIME - The typical value of the NO contact closing time with the coil energised at rated voltage. It doesn't include the bounce time (see following pattern).

RELEASE TIME -
- For CO relays: the typical value of the NC contact closing time with the coil de-energized. It doesn't include the bounce time.
- For NO relays: the typical value of the NO contact opening time with the coil de-energized.

Note: It will increase if protection (diode or led+diode) modules are connected in parallel to the coil.

BOUNCE TIME - The typical value of duration of bounces, for NO or 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

INSULATION COORDINATION according to EN 61810-1 -
See in INSULATION DATA.

DIELECTRIC STRENGTH BETWEEN OPEN CONTACTS -
See in INSULATION DATA.

AMBIENT TEMPERATURE RANGE - The range of temperatures of the immediate area where the relay is located, and for which operation of the relay is guaranteed (under prescribed conditions).

ENVIRONMENTAL PROTECTION according to IEC 61810-7 - The relay technology categories describe the degree of sealing of the relay case:

Relay technology category		Condition
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 areas.
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.
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 OF ENCLOSURES - according to EN 60529. The first digit is related to the protection against ingress 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 grade is related to normal use, in relay sockets or PC boards. For sockets, IP20 means that the socket is "finger-safe" (VDE0106).
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 67 = Totally protected against powder (dust-tight) and protected against the effect of temporary immersion in water.

VIBRATION RESISTANCE - The maximum acceleration value (measured in g = 9.81 m/s^2) for frequencies in the range 10-55 Hz which can be applied to the relay in any of the 3 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). In the energised state, the resistance is usually higher than in non-energised state.

POWER LOST TO THE ENVIRONMENT - The value of the power lost from the relay in working conditions (without contact load or at full load) and may be used in the thermal design of panels.

MOUNTING POSITION - If not expressly indicated, any mounting position of the relay is permitted.

RECOMMENDED DISTANCE BETWEEN RELAYS MOUNTED ON PC.Boards - This is the minimum mounting distance suggested when several relays are mounted on the same PC board. Care shall also be taken that other components mounted on the PC board do not heat the relays.

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.

MAX WIRE SIZE - Maximum cross-section of cables (solid or stranded wire, without ferrules) that can be connected to each terminal. For use with ferrules, the wire cross-section has to be reduced (e.g. from 4 to 2.5 mm^2, from 2.5 to 1.5 mm^2, from 1.5 to 1 mm^2).
For any terminals, a minimum cross-section of 0.2 mm^2 is allowed. According to EN 60204-1, it is permitted to introduce 2 or more wires

into the same terminal. All Finder products are designed in such a way that each terminal can accept 2 or more wires.

SPECIFIED TIME RANGE - Range in which it is possible to set timing using the time scales.

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 time necessary to start the relay again with the defined accuracy after the input energising quantity has been removed.

MINIMUM CONTROL IMPULSE - The shortest duration of a control impulse to fulfil and complete the time function.

SETTING ACCURACY - The difference between the measured value of the specified time and the reference value set on the scale.

THRESHOLD SETTING - For light-dependent relays this is the illumination level (measured in Lux) at which the relay will switch on or off. Pre-set levels and the corresponding range of threshold that can be set using the regulator are indicated in the catalogue.

DELAY TIME - For light-dependent relays this is the delay between the change of state in the electronic circuit sensitive to light variation (usually indicated by change of state of an LED) and the switching of the output relay contact.

CABLE GRIP - Specifies the range of the external diameter of cables that can be reliably gripped.

TYPE - For time switches, this is the type of program (weekly or daily).

PROGRAMS - For time switches, this is the number of different types of programs that can be stored.

MINIMUM INTERVAL SETTING - For time switches, this it is the minimum time interval that can be programmed.

BACK-UP POWER - The time when the switch won't loose neither the programs nor the time.

MAXIMUM IMPULSE DURATION - For step relays and staircase switches, this is the maximum command pulse duration permitted.

MAX NO. OF ILLUMINATED PUSH-BUTTONS - For step relays and staircase switches, this is the maximum number of illuminated push-buttons (having current absorption < 1mA @ 230 V AC) that can be connected without causing problems. If the push-button consumption is higher than 1 mA, the maximum number of push-buttons allowed is proportionally reduced (ie. 15 push-buttons x 1 mA is equivalent to 10 push-buttons x 1.5 mA).

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 (OFF) DELAY: For monitoring relays, these are intetional (fixed or adjustable) times to either delay the re-energisation, or delay the de-energisation of the output relay.

REACTION TIME: For monitoring relays, this is the maximum time taken by the electronics to respond to changes in the monitored value.

FAULTY MEMORY: For monitoring relays - selecting this function will inhibit the automatic reset following fault detection. Reset can only be made by positive intervention.

SWITCH-ON HYSTERESIS: For monitoring relays type 71.41 and 71.51, switch-on and swtch-off about the detection level can be separated by a (Hystereis) percentage - selected during relay set-up. (see function diagram).

ELECTRODE VOLTAGE: For level control relays, this is the nominal voltage between. Note: this voltage in alternating in order to avoid the electrolysis effects.

ELECTRODE CURRENT: For level control relays, this is the nominal electrode current.

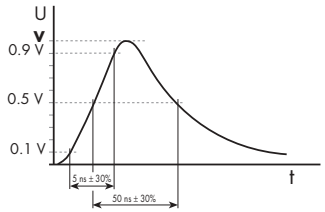
MAX SENSIVITY RANGE: For level control relays: the maximum sensitivity is the maximum resistance between the electrodes that will be recognised as indicating the presence of liquid. This may be fixed or adjustable over a range.

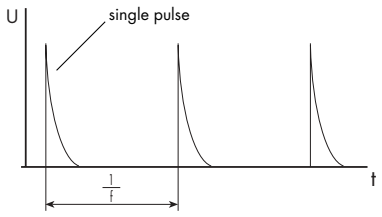
EMC (ElectroMagnetic Compatibility) SPECIFICATIONS

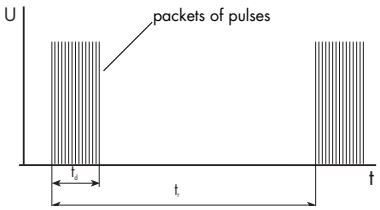
TYPE OF TEST	REFERENCE STANDARD
ELECTROSTATIC DISCHARGE	EN 61000-4-2
RADIO-FREQUENCY ELECTROMAGNETIC FIELD (80 ÷ 1000 MHz)	EN 61000-4-3
FAST TRANSIENTS (burst) (5-50 ns, 5 kHz)	EN 61000-4-4
SURGES (1.2/50 µs)	EN 61000-4-5
RADIO-FREQUENCY COMMON MODE DISTURBANCES (0.15 ÷ 80 MHz)	EN 61000-4-6
POWER-FREQUENCY 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:

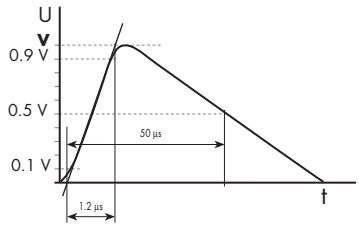
1. **Burst** (fast transients). These are packets of **5/50 ns** pulses, having high peak voltage level but low energy since individual pulses are very short - 5 ns rise time (5 x 10^{-9} seconds) and 50 ns fall time. They simulate the disturbances that can spread along the cables as a consequence of commutation transients from relays, contactors or motors. Usually they are not destructive, but they can affect the correct working of electronic devices.







2. **Surge** (voltage pulses). These are single **1.2/50 µs** pulses, with energy much higher than bursts since the duration is considerably longer - 1.2 µs rise time (1.2 x 10^{-6} seconds) and 50 µs fall time. For this reason they are very often destructive. The Surge test typically simulates disturbances caused by the propagation of atmospheric electrical storm discharges along electrical lines, but often the switching of power contacts (such as the opening of highly inductive loads) can cause disturbances that are very similar, and equally destructive.



The test levels **V** (peak values of the single pulses) are prescribed in appropriate product standards:

- **EN 61812-1** for electronic timers;
- **EN 60669-2-1** for electronic relays and switches;
- **EN 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.

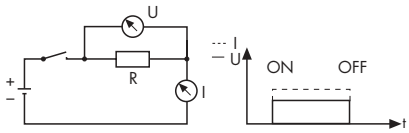
EMC rules - Require that it is the equipment designer who must ensure that the emissions from panels or equipment does no exceed the limits stated in EN 50081-1 (generic standard for emission in the domestic environment) or 50081-2 (generic standard for emission in the industrial environment) or any product specific harmonised EMC standard.

99 Series - Coil indication and EMC suppression modules

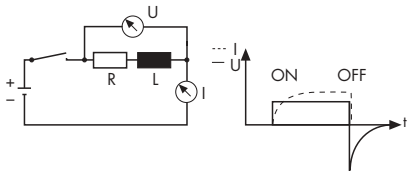
	99.01		99.02		99.80	
						
	Sockets	Relays	Sockets	Relays	Sockets	Relays
	90.20	60.12	90.02	60.12	94.54.1	55.32, 55.34
	90.21	60.13	90.03	60.13	94.82.3	55.32
	94.73	55.33	94.02	55.32	94.84.3	55.32, 55.34
	94.74	55.34	94.03	55.33	95.83.3	40.31
	94.82	55.32	94.04	55.32, 55.34	95.85.3	40.51/52/61
	96.72	56.32	95.03	40.31		44.52/62
	96.74	56.34	95.05	40.51/52/61		
				44.52, 44.62		
			92.03	62.32, 62.33		

FUNCTION/ OPERATING RANGE	CODE	CODE	CODE
GREEN LED + DIODE MODULE (STANDARD POLARITY)			
6 - 24 V DC 28 - 60 V DC 110 - 220 V DC	99.01.9.024.99 99.01.9.060.99 99.01.9.220.99	99.02.9.024.99 99.02.9.060.99 99.02.9.220.99	99.80.9.024.99 99.80.9.060.99 99.80.9.220.99
GREEN LED + DIODE MODULE (NON STANDARD POLARITY)			
6 - 24 V DC 28 - 60 V DC 110 - 220 V DC	99.01.9.024.79 99.01.9.060.79 99.01.9.220.79	99.02.9.024.79 99.02.9.060.79 99.02.9.220.79	
GREEN LED + VARISTOR			
6 - 24 V AC/DC 28 - 60 V AC/DC 110 - 240 V AC/DC	99.01.0.024.98 99.01.0.060.98 99.01.0.230.98	99.02.0.024.98 99.02.0.060.98 99.02.0.230.98	99.80.0.024.98 99.80.0.060.98 99.80.0.230.98
GREEN LED			
6 - 24 V AC/DC 28 - 60 V AC/DC 110 - 240 V AC/DC	99.01.0.024.59 99.01.0.060.59 99.01.0.230.59	99.02.0.024.59 99.02.0.060.59 99.02.0.230.59	99.80.0.024.59 99.80.0.060.59 99.80.0.230.59
DIODE MODULE (STANDARD POLARITY)			
6 - 220 V DC	99.01.3.000.00	99.02.3.000.00	99.80.3.000.00
DIODE MODULE (NON STANDARD POLARITY)			
6 - 220 V DC	99.01.2.000.00	99.02.2.000.00	99.80.2.000.00
RC MODULE			
6 - 24 V AC/DC 28 - 60 V AC/DC 110 - 240 V AC/DC	99.01.0.024.09 99.01.0.060.09 99.01.0.230.09	99.02.0.024.09 99.02.0.060.09 99.02.0.230.09	99.80.0.024.09 99.80.0.060.09 99.80.0.230.09
RESIDUAL CURRENT BYPASS MODULE			
110 - 240 V AC	99.01.8.230.07	99.02.8.230.07	99.80.8.230.07

Voltage-current characteristic when switching an ohmic load (fig. 1).



Voltage-current characteristic when switching a relay coil (fig. 2).



Switching Relay Coils.

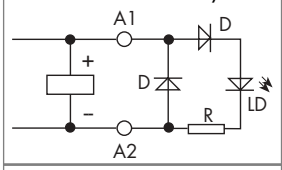
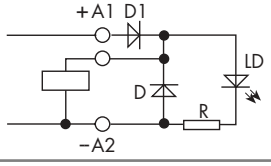
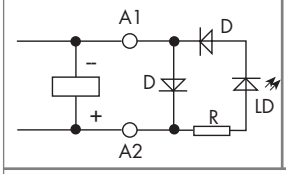
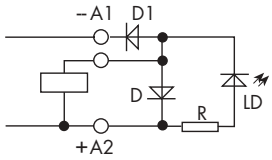
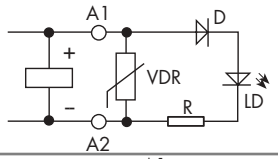
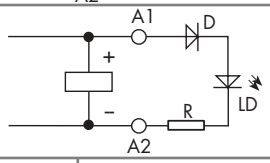
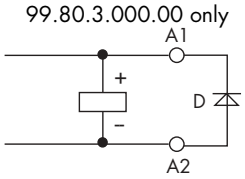
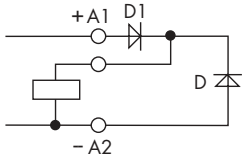
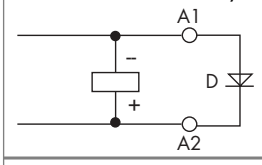
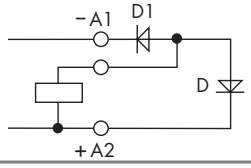
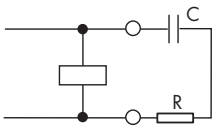
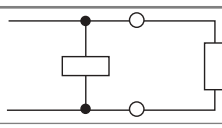
When switching a resistive load, the current follows the phase of the voltage directly (Fig 1).

When switching relay coils the current and voltage waveforms are different due to the inductive nature of the coil (Fig 2). A brief explanation of this mechanism is as follows.

On energisating the coil, the build up of the magnetic field gives rise to counter electromotive forces which in turn delay the rise in coil current. On de-energisation, the sudden interruption of the coil current causes a sudden collapse of the magnetic field, which in turn induces a high voltage of reverse polarity across the coil. This reverse polarity voltage peak can reach a value typically 15 times higher than the supply voltage, and as a consequence can disturb or destroy electronic devices.

To counteract this potentially damaging effect, relays coils can be suppressed with a Diode, a Varistor (voltage dependent resistor) or a RC (resistor/capacitor) module – dependent on the operating voltage. (See below for descriptions of the various Modules available.)

Whilst the above description is based on the working of a DC coil, the reverse polarity voltage peak on de-energisation applies similarly to AC coils. However, when energising AC coils there will also be a coil inrush current of 1.3 to 1.7 times the nominal coil current – dependent on coil size. If coils are fed via a transformer (and particularly if several are energised at the same time) then this may need to taken into account when calculating the VA rating of the transformer.

Diagrams	Functions
99.01.9.xxx.99 only 99.80.9.xxx.99 only  99.02.9.xxx.99 only 	**GREEN LED +DIODE MODULE (STANDARD POLARITY)** Recovery diode modules + LED are used for DC only. The reverse voltage peaks of the coil are short circuited by the recovery diode (positive to terminal A1). The release time increases by an approximate factor of 3. If an increase of the release time is undesirable use a Varistor or RC module. The LED indicator lights up when the coil is energized.
99.01.9.xxx.79 only  99.02.9.xxx.79 only 	**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.
	**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.
	**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.
99.01.3.000.00 only 99.80.3.000.00 only  99.02.3.000.00 only 	**DIODE MODULE (STANDARD POLARITY)** Recovery diode modules are used for DC only. The reverse voltage peaks of the coil are short circuited by the recovery diode (positive to terminal A1). The release time increases by an approximate factor of 3. If an increase of the release time is undesirable use a Varistor or RC module.
99.01.2.000.00 only 99.80.2.000.00 only  99.02.2.000.00 only 	**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.
	**RC MODULE** RC circuit modules are used for AC and DC coils. The reverse voltage peaks of the coil are limited by the RC module to approximately 2.5 times the nominal voltage of the supply. The relay release time increases insignificantly.
	**RESIDUAL CURRENT BYPASS MODULE** Bypass modules are advisable if 110 or 230v AC relays show any tendency to fail to release. Failure to release can be caused by residual currents from AC proximity switches or inductive coupling caused through long parallel lying AC control lines.

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