

# Miniature PCB Relays 10 - 16 A



Burners, boilers  
and furnaces



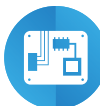
Film projectors



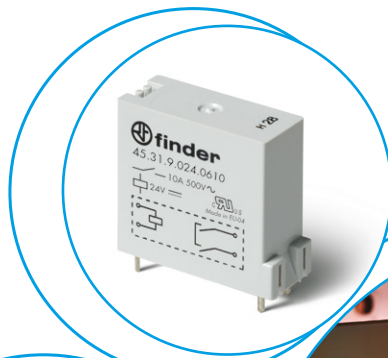
Infrared and  
microwave  
ovens



Jacuzzis and  
hot tubs



Electronic circuit  
boards





**Relay for +105 °C ambient use  
PCB mount - high contact gap**

- 45.31...x310, 1 Pole normally open (≥ 3 mm contact gap)
- 45.31...0610, 1 Pole normally open (≥ 3.6 mm contact gap)

- Contact gap ≥ 3 mm or ≥ 3.6 mm according to EN 60730-1
- Sensitive DC coil - 360 mW (45.31...x310 type)
- Cadmium Free contact material
- Reinforced insulation between coil and contacts according to EN 60335-1, EN 50178, EN 60204 with safe separation and 8 mm clearance and creepage distance
- 6 kV (1.2/50 μs) isolation, coil-contacts
- Flux proof: RT II

**45.31...x310**

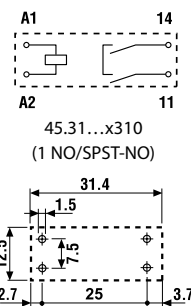


- 1 NO (SPST-NO), ≥ 3 mm gap
- Max ambient temperature +105 °C
- PCB mounting

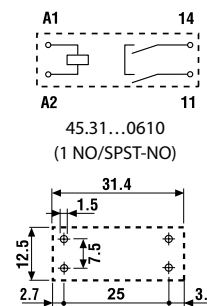
**45.31...0610**



- 1 NO (SPST-NO), ≥ 3.6 mm gap
- Max ambient temperature +105 °C
- PCB mounting



Copper side view



Copper side view

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

For outline drawing see page 7

**Contact specification**

Contact configuration		1NO (SPST-NO) ≥ 3 mm gap	1NO (SPST-NO) ≥ 3.6 mm gap
Rated current/Maximum peak current	A	16/30	10/30
Rated voltage/ Maximum switching voltage	V AC	250/400	500/500
Rated load AC1	VA	4000	5000
Rated load AC15 (230 V AC)	VA	750	750
Single phase motor rating (230 V AC)	kW	0.55	0.55
Breaking capacity DC1: 30/110/220 V	A	16/4/1	10/4/1
Minimum switching load	mW (V/mA)	500 (10/5)	500 (10/5)
Standard contact material		AgNi	AgNi

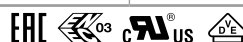
**Coil specification**

Nominal voltage (U <sub>N</sub> )	V AC (50/60 Hz)	—	—
	V DC	6 - 12 - 24 - 48 - 60	6 - 12 - 24 - 48 - 60
Rated power AC/DC	VA (50 Hz)/W	—/0.36	—/0.55
Operating range	AC	—	—
	DC	(0.7...1.2)U <sub>N</sub>	(0.8...1.2)U <sub>N</sub>
Holding voltage	AC/DC	—/0.4 U <sub>N</sub>	—/0.4 U <sub>N</sub>
Must drop-out voltage	AC/DC	—/0.1 U <sub>N</sub>	—/0.1 U <sub>N</sub>

**Technical data**

Mechanical life AC/DC	cycles	—/10 · 10 <sup>6</sup>	—/2 · 10 <sup>6</sup>
Electrical life at rated load AC1	cycles	30 · 10 <sup>3</sup>	10 · 10 <sup>3</sup>
Operate/release time	ms	12/2	12/2
Insulation between coil and contacts (1.2/50 μs)	kV	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts	V AC	2500	3000
Ambient temperature range	°C	−40...+105	−40...+105
Environmental protection		RT II	RT II

**Approvals** (according to type)



A

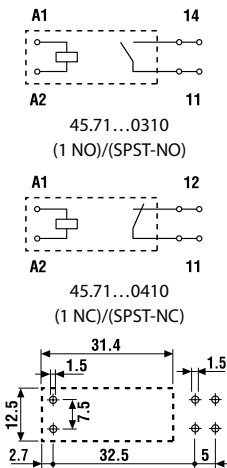
**Relays for +125 °C ambient use**  
**PCB mount - Faston 250 contact connections**  
 - 45.71, 1 Pole normally open or normally closed  
 - 45.91, 1 Pole normally open (≥ 3 mm contact gap)

- Contact gap ≥ 3 mm according to EN 60730-1 (45.91 type)
- Sensitive DC coil - 360 mW
- Cadmium Free option available
- Reinforced insulation between coil and contacts according to EN 60335-1, EN 50178, EN 60204 with safe separation and 8 mm clearance and creepage distance
- 6 kV (1.2/50 μs) isolation, coil-contacts
- Flux proof: RT II standard, (RT III option)

**45.71**



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

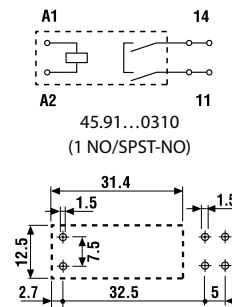


Copper side view

**45.91**



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



Copper side view

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

For outline drawing see page 7

<b>Contact specification</b>			
Contact configuration		1NO or 1NC (SPST-NO or SPST-NC)	1NO (SPST-NO) ≥ 3 mm gap
Rated current/Maximum peak current	A	16/30	16/30
Rated voltage/Maximum switching voltage	V AC	250/400	250/400
Rated load AC1	VA	4000	4000
Rated load AC15 (230 V AC)	VA	750	750
Single phase motor rating (230 V AC)	kW	0.55	0.55
Breaking capacity DC1: 30/110/220 V	A	16/0.3/0.13	16/4/1
Minimum switching load	mW (V/mA)	500 (10/5)	500 (10/5)
Standard contact material		AgCdO	AgNi
<b>Coil specification</b>			
Nominal voltage (U <sub>N</sub> )	V AC (50/60 Hz)	—	—
	V DC	6 - 12 - 24 - 48 - 60	6 - 12 - 24 - 48 - 60
Rated power AC/DC	VA (50 Hz)/W	—/0.36	—/0.36
Operating range	AC	—	—
	DC	(0.7...1.2)U <sub>N</sub>	(0.7...1.2)U <sub>N</sub>
Holding voltage	AC/DC	—/0.4 U <sub>N</sub>	—/0.4 U <sub>N</sub>
Must drop-out voltage	AC/DC	—/0.1 U <sub>N</sub>	—/0.1 U <sub>N</sub>
<b>Technical data</b>			
Mechanical life AC/DC	cycles	—/10 · 10 <sup>6</sup>	—/10 · 10 <sup>6</sup>
Electrical life at rated load AC1	cycles	100 · 10 <sup>3</sup>	30 · 10 <sup>3</sup>
Operate/release time	ms	10/2	12/2
Insulation between coil and contacts (1.2/50 μs)	kV	6 (8 mm)	6 (8 mm)
Dielectric strength between open contacts	V AC	1000	2500
Ambient temperature range	°C	−40...+125	−40...+125
Environmental protection		RT II	RT II
<b>Approvals</b> (according to type)			

## Ordering information

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

<b>4 5 . 7</b>	<b>1 . 7 .</b>	<b>0 1 2 .</b>	<b>A</b> <b>0</b>	<b>B</b> <b>3</b>	<b>C</b> <b>1</b>	<b>D</b> <b>0</b>		
<b>Series</b>	<b>Type</b>	<b>No. of poles</b>	<b>Coil version</b>	<b>Coil voltage</b>	<b>A: Contact material</b>	<b>B: Contact circuit</b>	<b>C: Options</b>	<b>D: Special versions</b>
	3 = PCB mount, ≥ 3 mm or ≥ 3.6 mm contact gap 7 = PCB + Faston 250 mount 9 = PCB + Faston 250 mount, ≥ 3 mm	1 = 1 pole, 16 A	7 = Sensitive DC 9 = Standard DC (45.31...0610 only)	See coil specifications	0 = Standard AgCdO for 45.71, Standard AgNi for 45.31 and 45.91 1 = AgNi 2 = AgCdO	3 = NO (SPST) 4 = NC (SPST) 45.71 only 6 = NO (SPST), ≥ 3.6 mm	1 = None	0 = Flux proof (RT II) 1 = Wash tight (RT III) 45.71 and 45.91 only

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

Type	Coil version	A	B	C	D
45.31	sensitive DC	0 - 2	3	1	0
	standard DC	0	6	1	0
45.71	sensitive DC	0 - 1	3 - 4	1	0 - 1
45.91	sensitive DC	0 - 2	3	1	0 - 1

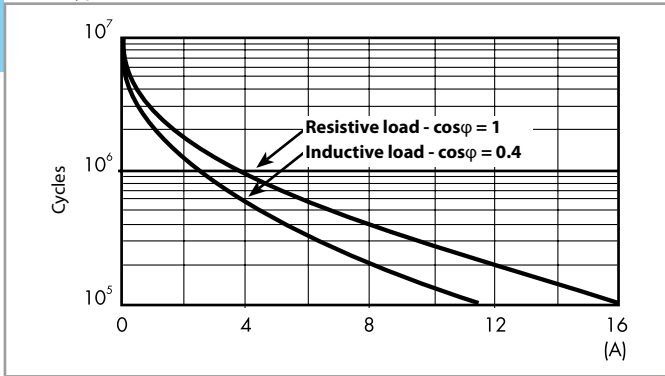
## Technical data

Insulation according to EN 61810-1		45.71		45.31 / 45.91	
Nominal voltage of supply system	V AC	230/400		230/400	
Rated insulation voltage	V AC	250	400	250	400
Pollution degree		3	2	3	2
<b>Insulation between coil and contact set</b>					
Type of insulation		Reinforced (8 mm)		Reinforced (8 mm)	
Overvoltage category		III		III	
Rated impulse voltage	kV (1.2/50 μs)	6		6	
Dielectric strength	V AC	4000		4000	
<b>Insulation between open contacts</b>					
Type of disconnection		Micro-disconnection		Full-disconnection	
Overvoltage category		—		III	
Rated impulse voltage	kV (1.2/50 μs)	—		4	
Dielectric strength	V AC/kV (1.2/50 μs)	1000/1.5		2500/4	
<b>Insulation between coil terminals</b>					
Rated impulse voltage (surge) differential mode (according to EN 61000-4-5)	kV (1.2/50 μs)	2			
<b>Other data</b>		45.71		45.31 / 45.91	
Bounce time: NO/NC	ms	3/3		2/—	
Vibration resistance (10...150)Hz: NO/NC	g	20/10		20/—	
Shock resistance	g	20			
Power lost to the environment	without contact current	W	0.4		
	with rated current	W	1.8		
Recommended distance between relays mounted on PCB	mm	≥ 5			

## Contact specification

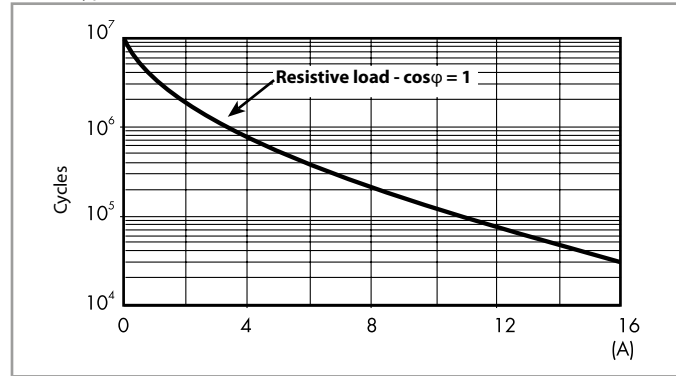
### F 45 - Electrical life (AC) v contact current

Type 45.71

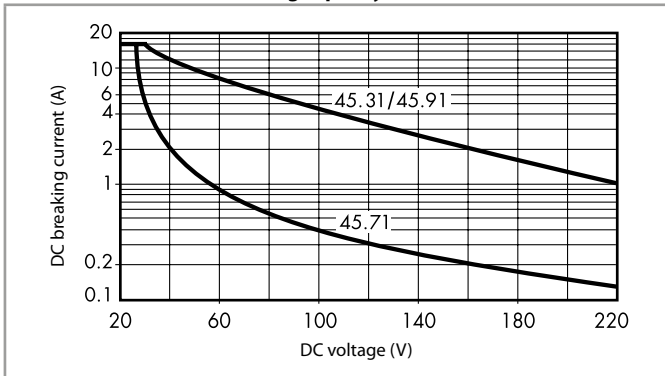


### F 45 - Electrical life (AC) v contact current

Type 45.31/45.91



### H 45 - Maximum DC1 breaking capacity



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

## Coil specifications

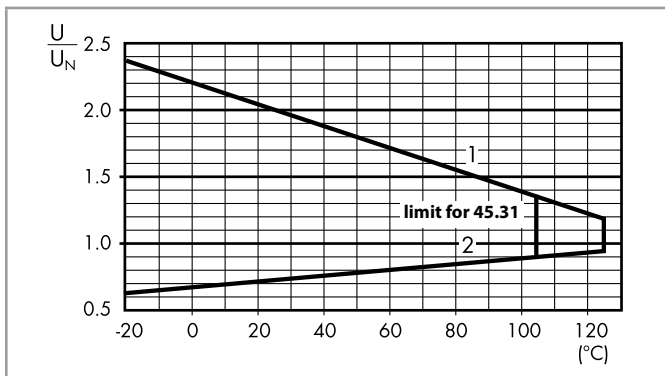
### DC coil data - 0.36 W sensitive

Nominal voltage $U_N$	Coil code	Operating range		Resistance $R$	Rated coil consumption $I$ at $U_N$
		$U_{min}$	$U_{max}$		
V		V	V	$\Omega$	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	1600	15
48	7.048	33.6	57.6	6400	7.5
60	7.060	42	72	10000	6

### DC coil data - 0.55 W standard

Nominal voltage $U_N$	Coil code	Operating range		Resistance $R$	Rated coil consumption $I$ at $U_N$
		$U_{min}$	$U_{max}$		
V		V	V	$\Omega$	mA
6	9.006	4.2	7.2	72	83
12	9.012	8.4	14.4	300	40
24	9.024	16.8	28.8	1150	21
48	9.048	33.6	57.6	4400	11
60	9.060	42	72	7200	8.3

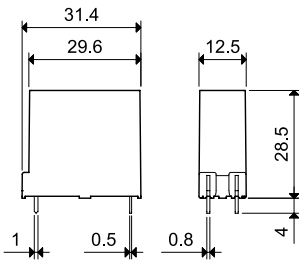
### R 45 - DC coil operating range v ambient temperature



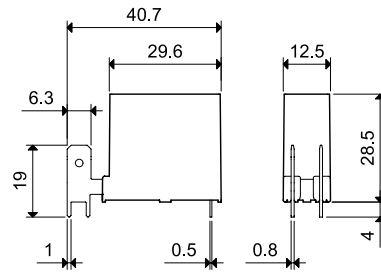
- 1 - Max. permitted coil voltage.
- 2 - Min. pick-up voltage with coil at ambient temperature.

### Outline drawings

Type 45.31



Types 45.71/91



A

