



**finder**<sup>®</sup>

SWITCH TO THE FUTURE

**45**  
SERIES

# Miniature PCB Relays

## 10 - 16 A



Burners, boilers  
and furnaces



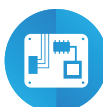
Film projectors



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

For outline drawing see page 7

For UL RATINGS SEE:

"General technical information" page V

#### 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/<br>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

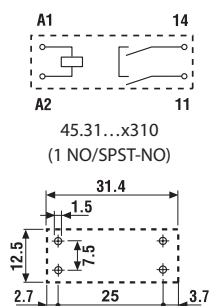
|                                                  |        |                        |                       |
|--------------------------------------------------|--------|------------------------|-----------------------|
| Mechanical life AC/DC                            | cycles | —/10 · 10 <sup>6</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)

### 45.31...x310



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

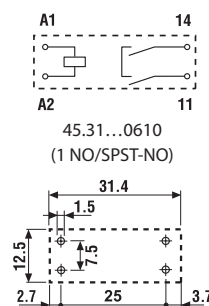


Copper side view

### 45.31...0610



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



Copper side view

## Relays for +125 °C ambient use

## PCB mount - Faston 250 contact connections

- 45.71, 1 Pole normally open or normally closed

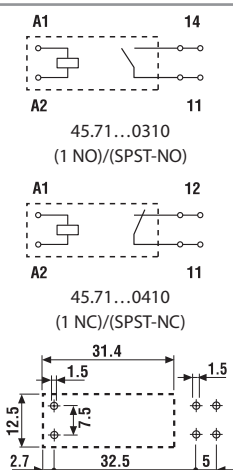
- 45.91, 1 Pole normally open  
(≥ 3 mm contact gap)

- 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

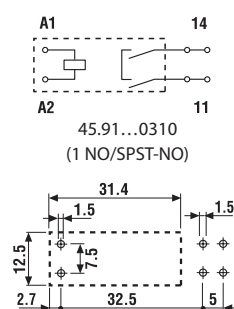


Copper side view

## 45.91



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



Copper side view

For outline drawing see page 7

FOR UL RATINGS SEE:

"General technical information" page V

## Contact specification

| Contact configuration                   |           | 1NO or 1NC (SPST-NO or SPST-NC) | 1NO (SPST-NO) ≥ 3 mm gap |
|-----------------------------------------|-----------|---------------------------------|--------------------------|
| Rated current/Maximum peak current      | A         | 16/30                           | 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                     |

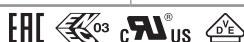
## Coil specification

|                                   |                 |                           |                           |
|-----------------------------------|-----------------|---------------------------|---------------------------|
| 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                    | —/0.36                    |
| 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>      |

## Technical data

|                                                  |        |                        |                        |
|--------------------------------------------------|--------|------------------------|------------------------|
| 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                  |

## Approvals (according to type)



## Ordering information

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

4

5

.

7

1

.

7

.

0

1

2

.

0

3

1

0

**Series**

**Type**  
3 = PCB mount,  $\geq 3$  mm or  $\geq 3.6$  mm contact gap  
7 = PCB + Faston 250 mount  
9 = PCB + Faston 250 mount,  $\geq 3$  mm

**No. of poles**  
1 = 1 pole, 16 A

**Coil version**  
7 = Sensitive DC  
9 = Standard DC (45.31...0610 only)

**Coil voltage**  
See coil specifications

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

**B: Contact circuit**  
3 = NO (SPST)  
4 = NC (SPST) 45.71 only  
6 = NO (SPST),  $\geq 3.6$  mm

**C: Options**  
1 = None

**D: Special versions**  
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 |

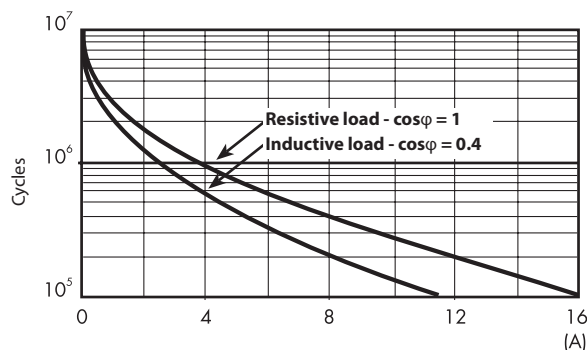
## Technical data

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

## Contact specification

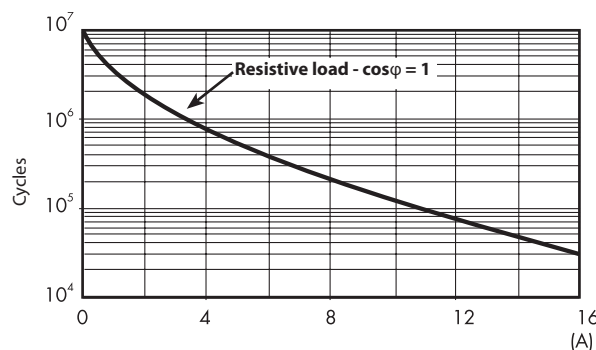
## F 45 - Electrical life (AC) v contact current

Type 45.71

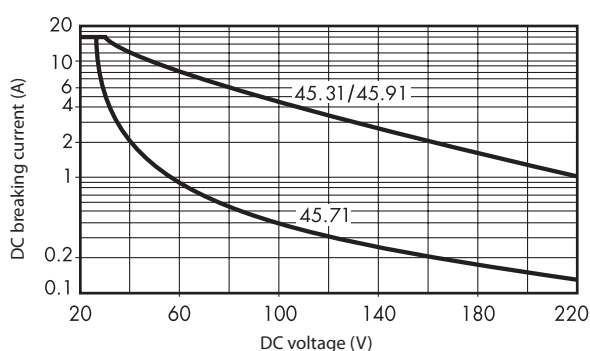


## F 45 - Electrical life (AC) v contact current

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

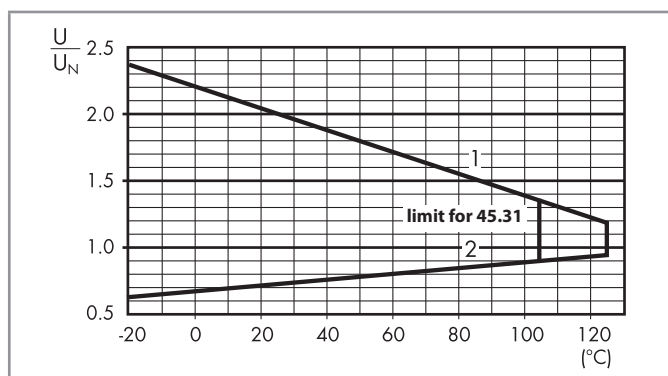
## DC coil data - 0.36 W sensitive

| Nominal voltage<br>$U_N$ | Coil code | Operating range |           | Resistance<br>$R$ | Rated coil consumption<br>$I$ 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<br>$U_N$ | Coil code | Operating range |           | Resistance<br>$R$ | Rated coil consumption<br>$I$ 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                                    |

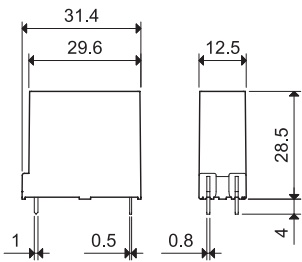
## R 45 - DC coil operating range v ambient temperature



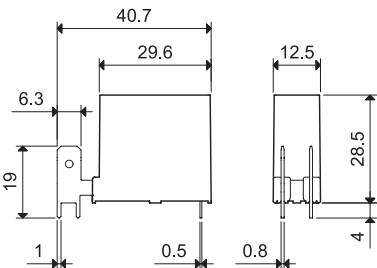
- 1 - Max. permitted coil voltage.  
2 - Min. pick-up voltage with coil at ambient temperature.

**Outline drawings**

Type 45.31



Types 45.71/91



A

