

Light dependent relays 12 – 16 A



Garden and
night lighting



NEON

Shop displays



Lighting for
parks



Streetlights and
car park lighting



11
SERIES

Relays for automatic control of lighting according to ambient light level - with separate light sensor

11.31 - 1 NO 16 A output contact

- Sensitivity adjustment from 1 to 100 lux
- One module, 17.5 mm wide
- Low energy consumption
- 24 V DC/AC supply version available

11.41 - 1 CO 16 A output contact

- European patent "zero hysteresis" for energy saving
- Italian patent "Light feedback compensation" principle
- Selector with 4 positions:
 - Standard range (threshold setting 1...80 lx)
 - High range (threshold setting 30...1000 lx)
 - continuous light (helpful during installation and initial testing and for maintenance purposes)
 - light off (useful for vacations)
- For the first 3 working cycles the delay time (On and Off) is reduced to zero in order to aid installation
- LED status indication
- SELV separation between contact and supply circuit
- Double insulation between supply and light sensor
- 35 mm rail (EN 60715) mount
- Cadmium free contact material
- Cadmium free light sensor (IC photo diode)

For outline drawing see page 10

Contact specification

| | | | |
|--|-----------|----------------------|----------------------|
| Contact configuration | | 1 NO (SPST-NO) | 1 CO (SPDT) |
| Rated current/Maximum peak current | A | 16/30 (120 A - 5 ms) | 16/30 (120 A - 5 ms) |
| Rated voltage/Maximum switching voltage | V AC | 250/400 | 250/400 |
| Rated load AC1 | VA | 4000 | 4000 |
| Rated load AC15 (230 V AC) | VA | 750 | 750 |
| Nominal lamp rating: | | | |
| 230 V incandescent/halogen W | | 2000 | 2000 |
| fluorescent tubes with electronic ballast W | | 1000 | 1000 |
| fluorescent tubes with electromagnetic ballast W | | 750 | 750 |
| CFL W | | 400 | 400 |
| 230 V LED W | | 400 | 400 |
| LV halogen or LED with electronic ballast W | | 400 | 400 |
| LV halogen or LED with electromagnetic ballast W | | 800 | 800 |
| Minimum switching load | mW (V/mA) | 1000 (10/10) | 1000 (10/10) |
| Standard contact material | | AgSnO ₂ | AgSnO ₂ |

Supply specification

| | | | | |
|-----------------------------------|-----------------|-------------|-----------|---------------------------|
| Nominal voltage (U _N) | V AC (50/60 Hz) | 12...24 | 110...230 | 230 |
| | DC | 12...24 | — | — |
| Rated power | VA (50 Hz)/W | 2.5/0.9 | 5.2/2 | 5.2/2 |
| Operating range | V AC (50 Hz) | 10.2...28.8 | 90...265 | (0.8...1.1)U _N |
| | DC | 10.2...32 | — | — |

Technical data

| | | | |
|--------------------------------------|-------------------|-----------------------|-----------------------|
| Electrical life at rated load in AC1 | cycles | 100 · 10 ³ | 100 · 10 ³ |
| Threshold setting: | Standard range lx | 1...100 | 1...80 |
| | High range lx | — | 30...1000 |
| Hysteresis (switching Off/On ratio) | | 1.25 | 1 |
| Delay time: switching On/Off | s | 15/30 | 15/30 |
| Ambient temperature range | °C | -20...+50 | -20...+50 |
| Protection category: | | | |
| light dependent relay/light sensor | | IP 20/IP 54 | IP 20/IP 54 |

Approvals (according to type)



11.31



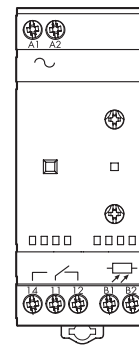
- 1 pole
- 17.5 mm wide



11.41



- 1 pole
- "zero hysteresis"
- 4 position selector



Relays for automatic control of lighting according to ambient light level - with separate light sensor
11.42 - 1 CO + 1 NO 12 A output contacts

- Two independent outputs with individual lux setting
- Selector with 4 positions:
 - Standard range (threshold setting 1...80 lx)
 - High range (threshold setting 20...1000 lx)
 - continuous light (helpful during installation and initial testing and for maintenance purposes)
 - light off (useful for vacations)
- For the first 6 working cycles (in total for channels 1 & 2) the delay time (On and Off) is reduced to zero in order to aid installation
- LED status indication

11.91 - 1 CO 16 A output contact
(+ auxiliary output for Power Module)

- Daily time switch function - programmable to inhibit main output (for energy saving)
- Auxiliary output - directly driven by the photosensor
- Italian patent "Light feedback compensation" principle
- Sensitivity adjustment from 1 to 150 lux
- LCD status indication, set-up and programming
- Internal battery for set-up/programming without supply and for time/program back-up in case of power failure (5 years)
- Low stand-by power consumption
- SELV separation between contact and supply circuit
- Double insulation between supply and light sensor
- 35 mm rail (EN 60715) mount
- Cadmium free contact material
- Cadmium free light sensor (IC photo diode)

For outline drawing see page 10

Contact specification

| Contact configuration | 1 CO (SPDT) + 1 NO (SPST-NO) | 1 CO (SPDT) + 1 aux output* |
|--|------------------------------|-----------------------------|
| Rated current/Maximum peak current | A 12/24 (120 A - 5 ms) | 16/30 (120 A - 5 ms) |
| Rated voltage/Maximum switching voltage | V AC 250/400 | 250/400 |
| Rated load AC1 | VA 3000 | 4000 |
| Rated load AC15 (230 V AC) | VA 750 | 750 |
| Nominal lamp rating: | | |
| 230 V incandescent/halogen W | 2000 | 2000 |
| fluorescent tubes with electronic ballast W | 1000 | 1000 |
| fluorescent tubes with electromagnetic ballast W | 750 | 750 |
| CFL W | 400 | 400 |
| 230 V LED W | 400 | 400 |
| LV halogen or LED with electronic ballast W | 400 | 400 |
| LV halogen or LED with electromagnetic ballast W | 800 | 800 |
| Minimum switching load | mW (V/mA) 1000 (10/10) | 1000 (10/10) |
| Standard contact material | AgSnO ₂ | AgSnO ₂ |

Supply specification

| | | | |
|-----------------------------------|-----------------|---------------------------|---------------------------|
| Nominal voltage (U _N) | V AC (50/60 Hz) | 230 | 110...230 |
| | DC | — | 110...230 |
| Rated power | VA (50 Hz)/W | 7.4/2.8 | 5/2.1 |
| Operating range | V AC (50 Hz) | (0.8...1.1)U _N | (0.8...1.1)U _N |
| | DC | — | (0.8...1.1)U _N |

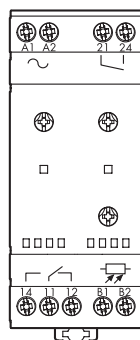
Technical data

| | | | |
|---|-------------------|-----------------------|-----------------------|
| Electrical life at rated load in AC1 | cycles | 100 · 10 ³ | 100 · 10 ³ |
| Threshold setting: | Standard range lx | 1...80 | 1...150 |
| | High range lx | 20...1000 | — |
| Hysteresis (switching Off/On ratio) | | 1.25 | Δ = 3 lx |
| Delay time: switching On / Off | s | 15/30 | 25/50 |
| Ambient temperature range | °C | -20...+50 | -20...+50 |
| Protection category: light dependent relay/light sensor | | IP 20/IP 54 | IP 20/IP 54 |

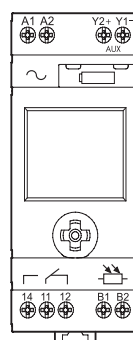
Approvals (according to type)

11.42


- 2 independent outputs
- 2 individual lux settings
- 4 position selector


11.91

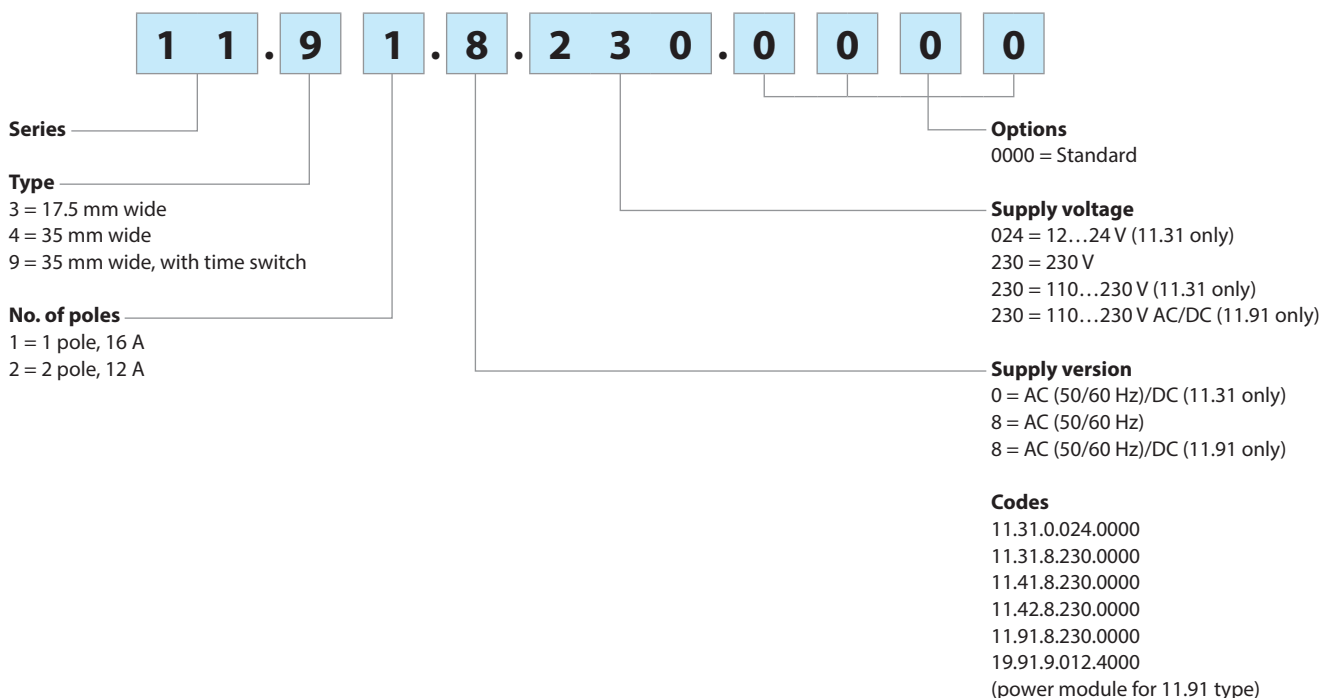

- Light dependent relay + time switch
- Auxiliary output (light dependent) with 19.91 power module available




* 11.91 auxiliary output:
12 V DC, 1 W max

Ordering information

Example: 11 series light dependent relay with time switch, 1 CO (SPDT) 16 A contact, 230 V AC supply.

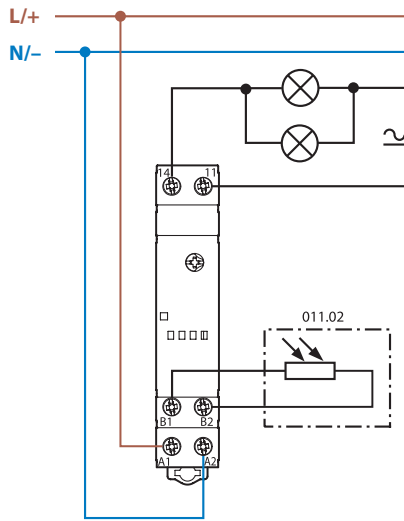


Technical data

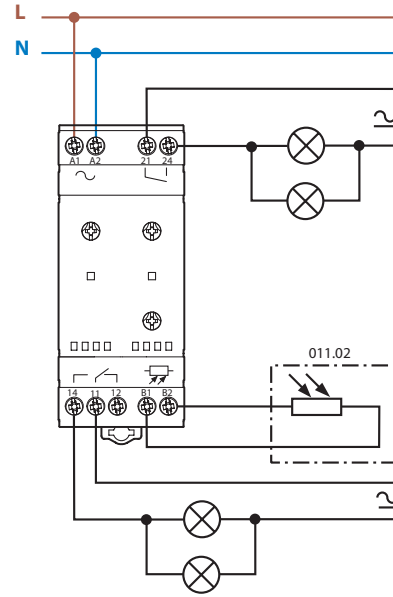
| Insulation | | Dielectric strength | | Impulse (1.2/50 μs) | |
|--|---|---------------------------------|-------|---------------------|-----------------|
| | between supply and contacts | 4000 V AC | | 6 kV | |
| | between supply and light sensor | 2000 V AC | | 4 kV | |
| | between open contacts | 1000 V AC | | 1.5 kV | |
| EMC specifications | | | | | |
| Type of test | | Reference standard | | 11.31 | 11.41 / 42 / 91 |
| Electrostatic discharge | contact discharge | EN 61000-4-2 | | 4 kV | |
| | air discharge | EN 61000-4-2 | | 8 kV | |
| Radiated electromagnetic field (80...1000 MHz) | | EN 61000-4-3 | | 10 V/m | |
| Fast transients | on supply terminals | EN 61000-4-4 | | 3 kV | 4 kV |
| (burst 5/50 ns, 5 and 100 kHz) | on light sensor connection | EN 61000-4-4 | | 3 kV | 4 kV |
| Voltage pulses on supply terminals | common mode | EN 61000-4-5 | | 4 kV | |
| (surge 1.2/50 μs) | differential mode | EN 61000-4-5 | | 3 kV | 4 kV |
| Radiofrequency common mode voltage | on supply terminals | EN 61000-4-6 | | 10 V | |
| (0.15...80 MHz) | on light sensor | EN 61000-4-6 | | 3 V | |
| Voltage dips | 70% U _N , 40% U _N | EN 61000-4-11 | | 10 cycles | |
| Short interruptions | | EN 61000-4-11 | | 10 cycles | |
| Radio frequency conducted emissions | 0.15...30 MHz | EN 55014 | | class B | |
| Radiated emissions | 30...1000 MHz | EN 55014 | | class B | |
| Terminals | | | | | |
|  Screw torque | Nm | 0.8 | | | |
| Max. wire size | solid cable | 1 x 6 / 2 x 4 mm ² | | 1 x 10 / 2 x 12 AWG | |
| | stranded cable | 1 x 4 / 2 x 2.5 mm ² | | 1 x 12 / 2 x 14 AWG | |
| Wire strip length | mm | 9 | | | |
| Other data | | | | | |
| Cable grip of light sensor | mm | 7.5...9 | | | |
| Maximum cable length relay to light sensor | m | 50 (2 x 1.5 mm ²) | | | |
| Preset threshold | lx | 10 | | | |
| Power lost to the environment | | 11.31 | 11.41 | 11.42 | 11.91 |
| | in stand-by W | 0.3 | 1.3 | 1.4 | 0.5 |
| | without contact current W | 0.9 | 2.0 | 2.8 | 2.1 |
| | with rated current W | 1.7 | 2.6 | 3.8 | 2.7 |

Wiring diagrams

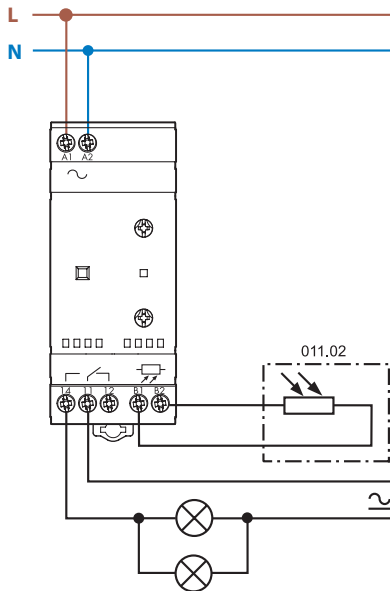
Type 11.31



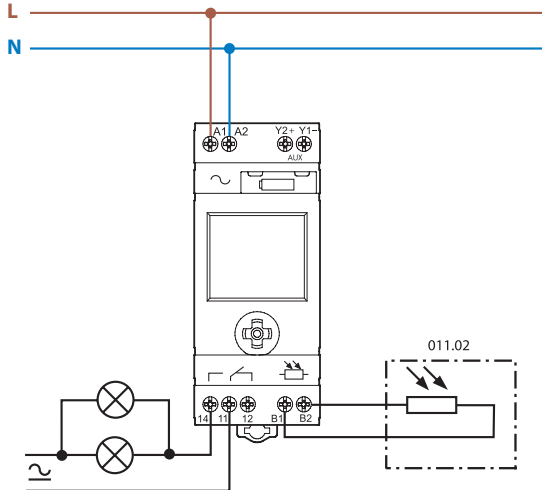
Type 11.42



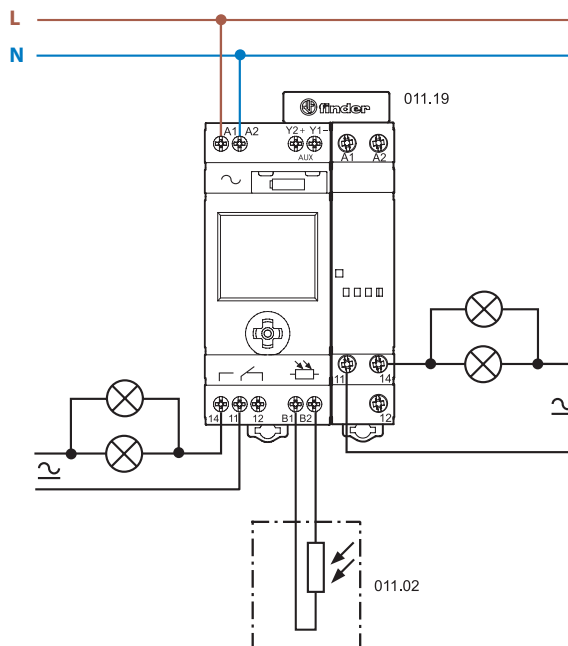
Type 11.41



Type 11.91



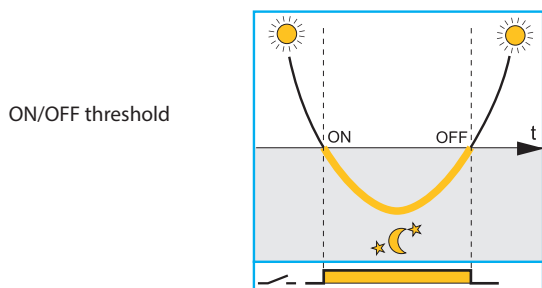
Type 11.91 + 19.91



Advantage of the “zero hysteresis” patented circuit:

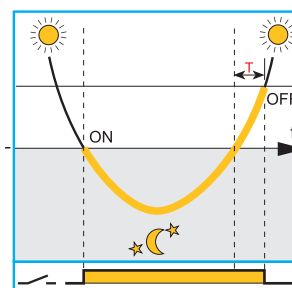
ensures reliable switching without wasting energy

TYPE 11.41 “ZERO HYSTERESIS”
LIGHT DEPENDENT RELAYS



Switch OFF level = Switch ON level.
Patented “zero hysteresis” circuitry
ensures reliable switching without
wasting energy.

TRADITIONAL
LIGHT DEPENDENT RELAYS



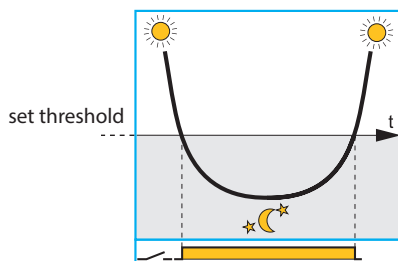
“Traditional” light dependent relays
incorporate switching hysteresis to
prevent malfunctioning or tripping.
This results in an unnecessary delay
in switching off, and a resulting
waste of energy (over period T).

— Brightness of the natural light
— The NO of the light dependent relay is closed (light is switched on)

Advantage of the “light feedback compensation” principle:

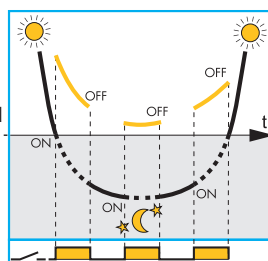
avoids the effect of the lamps repeatedly “hunting” between On and Off, due to poor installation

Light dependent relay where
the lighting being controlled
does not influence the light
level seen by the light sensor



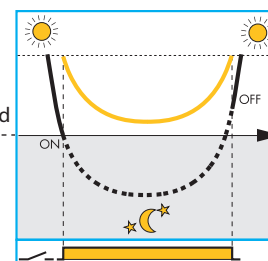
Correct functioning -
provided the light sensor
can be shielded from the
effects of the controlled
lighting switching
On and Off

Traditional light dependent
relay where the lighting
being controlled influences
the light level seen by the
light sensor



Incorrect functioning where
the lamps cycle between On
and Off, because their effect
is being detected by the
light sensor

Type 11.41 and 11.91 light
dependent relay with “light
feedback compensation”



The innovative principle
of “light feedback
compensation” avoids the
annoying and damaging
effects of the lamps
repeatedly “hunting”
between On and Off, due to
poor installation

— — — Ambient light level as measured by the light dependent relay's light sensor.
— Ambient light + controlled light level as measured by the light dependent relay's light sensor.

Notes

1. It is good practice to try to achieve a correct installation where the light emitted from the lamp(s) does not influence the light level seen by the light sensor, although the “light feedback compensation” principle will help when this is not fully achievable. In this case it should be appreciated that the “light feedback compensation” principle may delay slightly the time of Switch Off - beyond the ideal.
2. The compensation principle is not effective where the combined effect of the ambient light and the controlled lighting exceeds a maximum value (200 lux for the 11.91, 160/2000 lux for standard/high range of the 11.41).
3. The 11.41 and 11.91 types are compatible with gas discharge lamps that attain full output within 10 minutes, since the electronic circuit monitors lamps' light output over a 10 minute period to achieve a true assessment of its contribution to the overall lighting level.

Functions 11.91

| | Switch-OFF time | Switch-ON time | | Application examples |
|--------------|-----------------|----------------|--|--|
| | NO | NO | | Working as a standard light-dependent relay |
| | YES | NO | | Working where lighting is not required from 10 PM onwards |
| | YES | YES | | Working where lighting is not required between 1 AM and 5 AM |
| AUX Y1 Y2 | | | | Additional output - light dependent without time switch intervention |

All the functions and the values can be set through the front joystick and are displayed on the front LCD.

Display mode

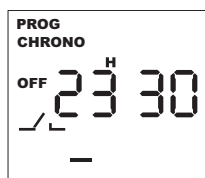
During normal operation, with AC supply connected, the following is displayed:

- the current time
- the current lux level (upper bars)
- the set lux threshold (lower bars)
- the status (open/closed) of the 11-14 output contact
- the "moon" symbol (only if the current lux level is lower than the set threshold). It also indicates that the Auxiliary output is On, although the main output contact 11-14 may be On, depending on the chrono program.
- the "chrono" symbol (only if a switch-off time is enabled).

From **Display mode** it is possible to enter **Program mode** or **Set-up mode** with a short or long (> 2 s) press respectively, to the joystick centre. From **Display mode** it is also possible to enter **Hand mode**, where (independently of the lux level and the Chrono program) the 11-14 output contact is forced into the On or Off position with a long (> 2 s) press of the joystick upper or lower quadrants, respectively. The "hand" symbol is then displayed. A long press to the opposite quadrant will reset the hand mode.

**Program mode**

In this mode it is possible to set the lux threshold level, to enable and to set the switch-off time, to enable and to set the switch-on time. With a short press to the joystick right or left quadrant it is possible to progress from one program step to another (accepting the values set). At any program step it is possible to modify the set values with a short press to the joystick upper or lower quadrant. A long (> 1 s) press allows the fast increment (or decrement) of values. A short press to the joystick centre will resume the display mode.

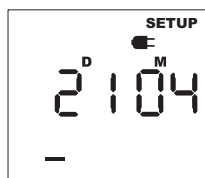
**Set-up mode**

In this mode it is possible to set the current year, month, day, hour and minute (in this order) and to enable european "Daylight saving".

With a short press to the joystick right or left quadrant it is possible to progress from one set-up step to another (accepting the values set); in any step it is possible to modify the set values with a short press to the joystick upper or lower quadrant. A long (> 1 s) press allows the fast increment (or decrement) of values.

A short press to the joystick centre will resume the display mode.

Note: the product is supplied with central european time factory set and "Daylight saving" enabled.

**Power-off mode**

If the 230 V AC supply is not connected, the relay enters power-off mode and to ensure the long life of the built-in back-up battery only the clock is maintained active. The display turns off and no other operation (including light measurement) is performed.

With a press to the joystick during power-off mode it is possible to "awaken" the device and to enter program or set-up mode (the "electrical plug" symbol is displayed); after about 1 minute inactivity the power-off mode is resumed.

Note: with the supply not connected, the program or set-up modes absorb a higher current than the power-off mode, thus influencing the battery life.

Auxiliary output

A solid state output at terminals Y1-Y2 is provided (rated 12 V DC, 80 mA/1 W max.): this can be used with the power module **19.91.9.012.4000** connected by the dedicated **011.19** connector. Or, it is possible to connect a suitable relay (for example, 38-48-49-4C-58-59 interface module) provided the coil is within the rating, and the wiring does not exceed 40 cm length. The auxiliary output is driven exclusively by the light sensor of the device, and is consequently independent of the time switch. With the main contact, this permits a flexible lighting system controlled by the ambient light, both with and without the influence of the time switch function.



19.91 power module specification

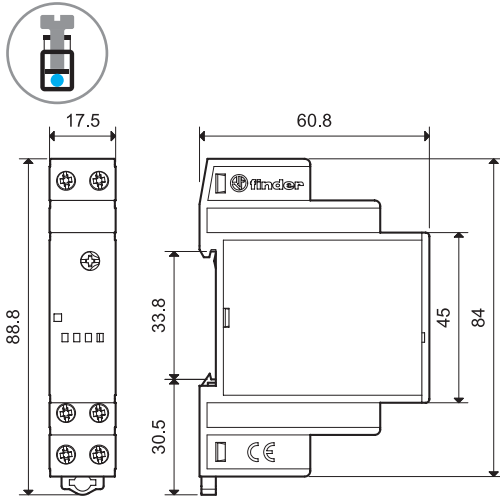
| | | |
|---|--|----------------------|
| Contact configuration | | 1 CO (SPDT) |
| Rated current/Maximum peak current (I_N/I_{max}) | A | 16/30 (120 A – 5 ms) |
| Rated voltage/Maximum switching voltage (U_N/U_{max}) | V AC | 250/400 |
| Rated load AC15 (230 V AC) | VA | 750 |
| Nominal lamp rating: | | |
| | 230 V incandescent/halogen W | 2000 |
| | fluorescent tubes with electronic ballast W | 1000 |
| | fluorescent tubes with electromagnetic ballast W | 750 |
| | CFL W | 400 |
| | 230 V LED W | 400 |
| | LV halogen or LED with electronic ballast W | 400 |
| | LV halogen or LED with electromagnetic ballast W | 800 |
| Nominal supply voltage (U_N) | V DC | 12 |
| Ambient temperature range | °C | -20...+50 |
| Protection category | | IP 20 |

Type 11.31/41/42

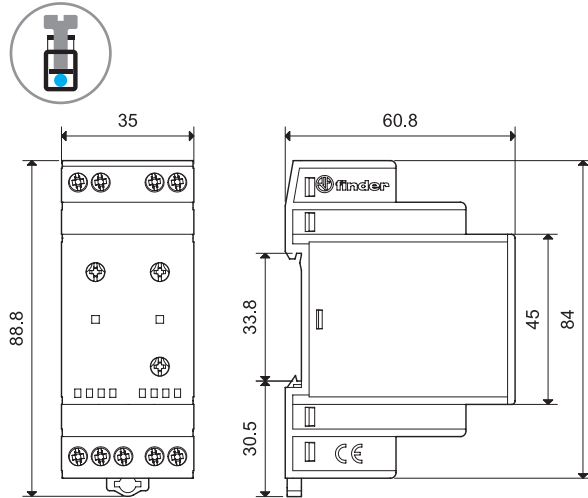
| LED | Supply voltage | NO output contact | |
|-----|----------------|--|-------------------------------------|
| | | 11.41/11.42 | 11.31 |
| | OFF | Open | Open |
| | ON | Open | Open |
| | ON | Open (timing to close in progress) | Open (timing to close in progress) |
| | ON | Closed | Closed |
| | ON | Closed (timing to open in progress) | Closed (timing to open in progress) |
| | ON | Fixed position (On or Off on selector) | — |

Outline drawings

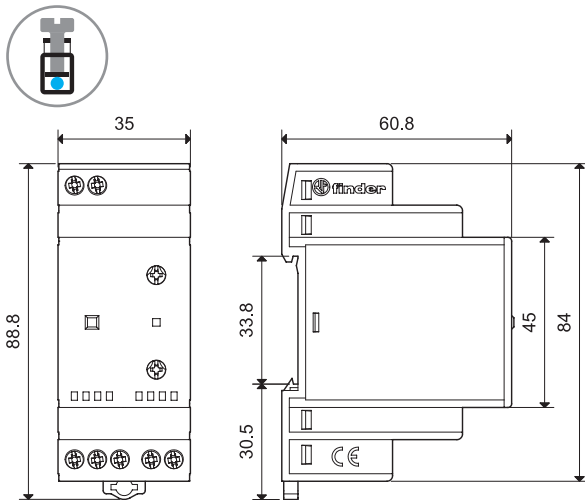
Type 11.31
Screw terminal



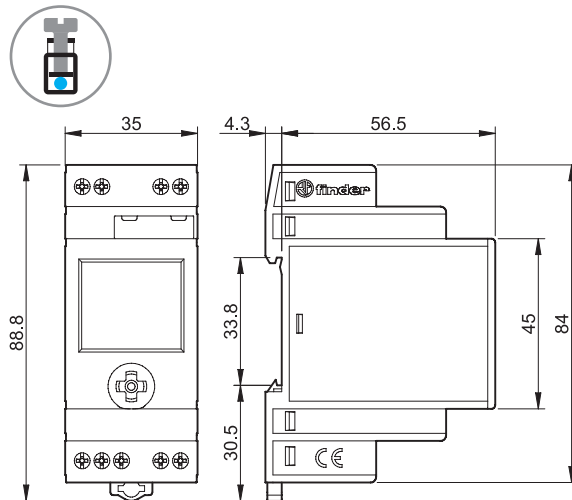
Type 11.42
Screw terminal



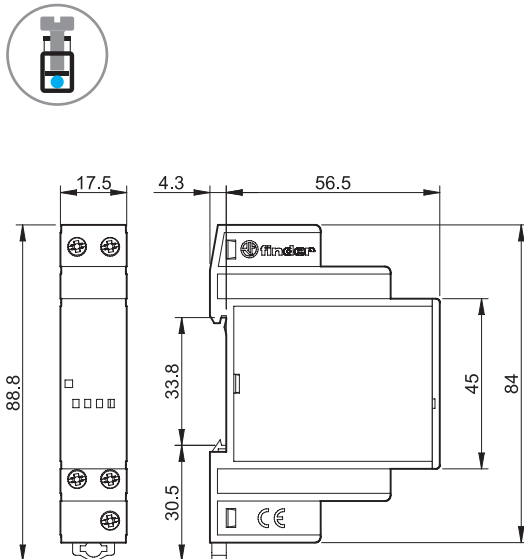
Type 11.41
Screw terminal



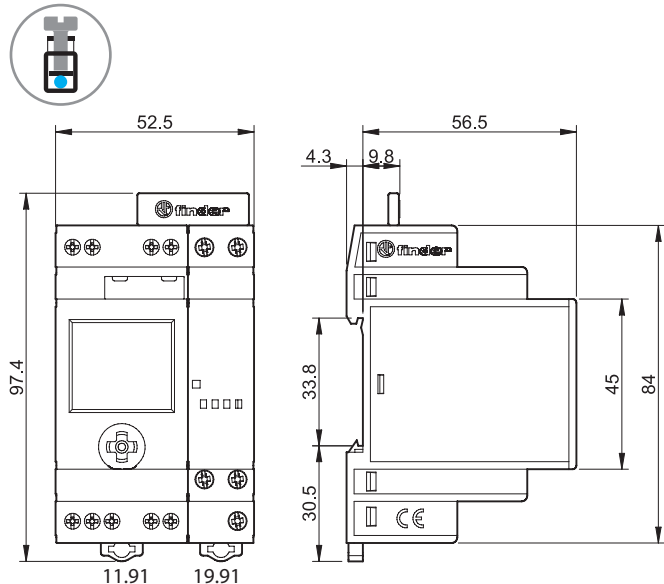
Type 11.91
Screw terminal



Type 19.91 (power module for 11.91)
Screw terminal



Types 11.91 + 19.91 power module
Screw terminal



Accessories

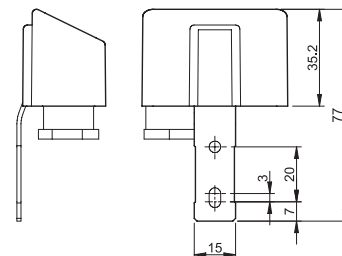
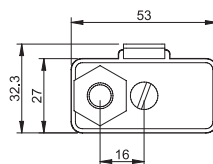


011.02

Light sensor (supplied with light dependent relay)

011.02

- Ambient temperature range: $-40 \dots +70$ °C
- Cadmium free
- Non polarized
- Double insulated with respect to light dependent relay supply
- Not compatible with old 11.01 and 11.71 light dependent relay (to be used with 011.00 photosensor)



011.03

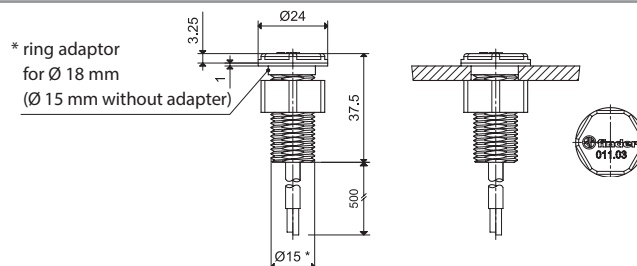
Flush-mounted light sensor (protection category: IP66/67)

011.03

- Ambient temperature range: $-40 \dots +70$ °C
- Cadmium free
- Non polarized
- Double insulated with respect to light dependent relay supply
- Not compatible with old 11.01 and 11.71 light dependent relay
- Supplied with light dependent relay (packaging code POA)

Connection cable

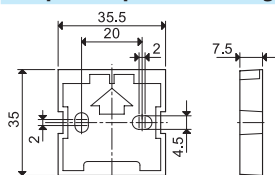
| | |
|---------------------|----------------------|
| Material | PVC, flame retardant |
| Conductor size | mm ² 0.5 |
| Cable length | mm 500 |
| Cable diameter | mm 5.0 |
| Working voltage | V 300/500 |
| Test voltage, cable | kV 2.5 |
| Max. temperature | °C +90 |



011.01

Adaptor for panel mounting (supplied with light dependent relay), 35 mm wide

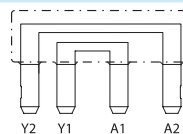
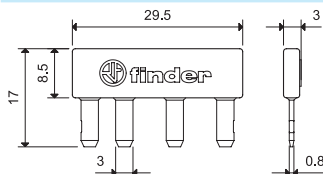
011.01



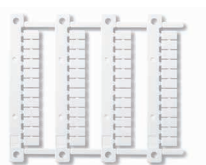
011.19

2-pole connector (for type 11.91 and 19.91 power module)

011.19



For direct connection of 11.91 auxiliary output (Y1-Y2) to 19.91 supply (A1-A2)



060.48

Sheet of marker tags, for types 11.31, 11.41, 11.42, 19.91, plastic, 48 tags, 6 x 12 mm, for CEMBRE thermal transfer printers

060.48



019.01

Identification tag, for types 11.41 and 11.42, plastic, 1 tag, 17 x 25.5 mm

019.01

