

Features

Electronic step relay and dimmer for control of lighting levels

- Suitable for incandescent and halogen lighting loads (with or without transformer or electronic supply)
- Version compatible with energy saving (CFL or LED) dimmable lamps and with all types of electromagnetic transformers, even in no-load condition (15.81)
- Version compatible with 230 V LED dimmable lamps (15.91)
- Use with 3 or 4 wire connection
- "Soft" On and Off transitions
- Two selectable operating modes: with or without previous light level memory
- Step (15.51 only) or linear dimming
- Thermal protection against overload
- Thermo-fuse for extreme protection (15.81)
- 230 V AC supply, 50 Hz (15.91), 50 or 60 Hz (15.51), 50/60 Hz with automatic recognition of frequency (15.81)

Screw terminal



For outline drawing see page 6



- For mounting within residential switch boxes
- Maximum lamp load 100 W
- Two operating modes
- Leading edge dimming method
- Compatible with LED dimmable lamps

- Box or panel mount
- Maximum lamp load 400 W
- Two operating modes
- Two different types for linear and step dimming
- Trailing edge dimming method

- 17.5 mm modular
- Maximum lamp load 500 W
- Multi-function
- Leading and trailing edge dimming methods (depending on the function)
- Compatible with energy saving dimmable lamps

Output data		15.91	15.51	15.81
Rated voltage	V AC	230	230	230
Power max.	W	100	400	500
Power min.	W	3	10	3
Nominal lamp rating: 230 V incandescent or halogen W		100	400	500 (1)
toroidal electromagnetic transformers for LV halogen W		—	300 (2)	500 (3)
Ecore electromagnetic transformers for LV halogen W		—	—	500 (3)
electronic transformers (ballasts) for LV halogen W		—	400 (4)	500 (1)
dimmable compact fluorescent (CFL) W		—	—	100 (5)
dimmable 230 V LED W		50	—	100 (5)
dimmable electronic transformers for LV LED W		50 (6)	—	100 (1)
Supply specifications				
Nominal voltage (U _N)	V AC (50/60 Hz)	230 (7)	230 (8)	230
Operating range		(0.8...1.1)U _N	(0.8...1.1)U _N	(0.8...1.1)U _N
Stand-by power consumption	W	0.4	0.7	0.5
Dimming operating mode		Leading edge	Trailing edge	Trailing edge (pos. ) Leading edge (pos. ) and ()
Technical data				
Ambient temperature range	°C	-10...+50 (9)	-10...+50 (9)	-10...+50 (10)
Protection category		IP 20	IP 20	IP 20
Approvals (according to type)		CE ENEC	CE ENEC 	

Note

- (1) Select "incandescent lamp" () position on the front selector.
 - (2) One transformer only. Power-up only with the lamp load connected.
 - (3) Select "transformer" () position on the front selector. Preferably, no more than 2 transformers.
 - (4) One transformer only.
 - (5) Select "CFL" () position on the front selector, and set the appropriate minimum dimming value (dependent on lamp type).
 - (6) Only if electronic transformers are compatible with leading edge method.
 - (7) Only 50 Hz version available.
 - (8) Specific 60 Hz version available (see ordering information).
 - (9) It is not recommended to mount more than one dimmer in the same wall box, unless an adequate ventilation is provided or the lamp load is less than 100 W (15.51) or 50 W (15.91).
 - (10) With lamp load > 300 W, adequate ventilation must be provided - a gap of 5 mm on both side of the dimmer is suggested.
- Not compatible with illuminated push-buttons.

Ordering information

Example: type 15.51, electronic step relay and dimmer, 230 V AC.



- Series** _____
- Type** _____
 - 5 = Panel or box mount
 - 8 = 35 mm rail (EN 60715) mount, 17.5 mm wide, for energy saving lamps
 - 9 = Switch box mount, for LED lamps
- No. of poles** _____
 - 1 = 1 output
- Supply voltage** _____
 - 230 = 230 V
- Supply version** _____
 - 8 = AC
- AC input frequency** _____
 - 0 = Standard
 - 4 = Only for 15.51 linear dimming
 - 0 = 50 Hz (15.51/15.91)
 - 50/60 Hz (15.81)
 - 6 = 60 Hz (15.51)
- Output power** _____
 - 0 = 100 W (15.91)
 - 4 = 400 W (15.51)
 - 5 = 500 W (15.81)

- Codes**
- 15.51.8.230.0400 step dimming, 50Hz
 - 15.51.8.230.0404 linear dimming, 50Hz
 - 15.51.8.230.0460 step dimming, 60Hz
 - 15.81.8.230.0500 linear dimming, 50/60Hz
 - 15.91.8.230.0000 linear dimming, 50Hz

Technical data

EMC specifications					
Type of test		Reference standard	15.51/15.91	15.81	
Electrostatic discharge	contact discharge	EN 61000-4-2	4 kV		
	air discharge	EN 61000-4-2	8 kV		
Radiated electromagnetic field	(80...1,000 MHz)	EN 61000-4-3	3 V/m	10 V/m	
Fast transients (burst)	on supply terminals	EN 61000-4-4	4 kV	4 kV	
	on pushbutton connection	EN 61000-4-4	4 kV	4 kV	
Voltage pulses on supply terminals (surge 1.2/50µs)					
	differential mode	EN 61000-4-5	2 kV	2 kV	
Radiofrequency common mode voltage (0.15...80 MHz)	on supply terminals	EN 61000-4-6	3 V	3 V	
	on pushbutton connection	EN 61000-4-6	3 V	3 V	
Voltage dips	70 % U _N , 40 % U _N	EN 61000-4-11	10 cycles		
Short interruptions		EN 61000-4-11	10 cycles		
Radiofrequency conducted emissions	0.15...30 MHz	EN 55014	class B		
Radiated emissions	30...1,000 MHz	EN 55014	class B		
Terminals		solid cable	stranded cable		
Max. wire size	mm ²	1 x 6 / 2 x 4	1 x 4 / 2 x 2.5		
	AWG	1 x 10 / 2 x 12	1 x 12 / 2 x 14		
Screw torque	Nm	0.8			
Wire strip length	mm	9			
Other data		15.91	15.51	15.81	
Power lost to the environment	without load	W	0.4	0.7	0.5
	with rated load	W	1.2	2.2	2.6
Max cable length for push-button connection	m	100	100	100	

Thermal protection and signaling

LED (15.81 type only)	Supply voltage	Thermal protection
	OFF	—
	ON	—
	ON	ALARM

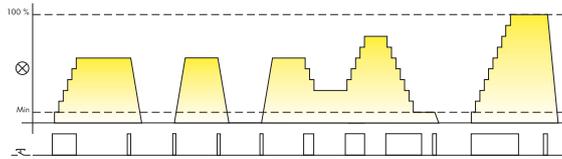
ALARM

The internal thermal protection (active on all dimmer types) will detect an unsafe temperature, due to overload or incorrect installation, and will turn the dimmer output off. It is possible to turn the dimmer on, by push button, only when the temperature reduces to a safe level (after 1 to 10 minutes, depending on installation conditions) and after removing the cause of the overload.

Functions (15.51/15.91 types)

Type Step dimming

Operating mode 1 (with memory): the previous light level is memorized.

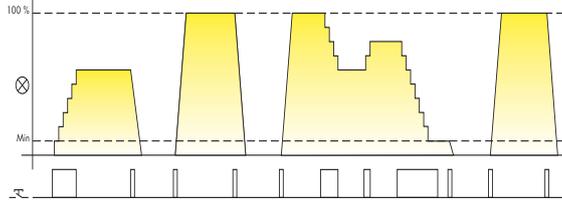


Long control pulse: The light level is progressively raised or lowered through a maximum of 10 incremental steps.

Short control pulse: Alternately switches between On and Off. When switching On, the light level assumes the value set during the previous On state.

15.51...0400

Operating mode 2 (without memory): on switch off, the light level is not memorized.

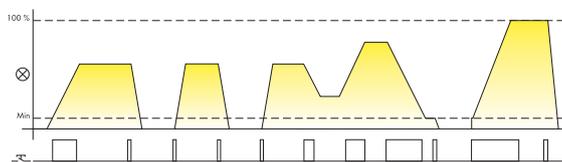


Long control pulse: The light level is progressively raised or lowered through a maximum of 10 incremental steps.

Short control pulse: Alternately switches On or Off between the maximum light level and the off state.

Type Linear dimming

Operating mode 3 (with memory): the previous light level is memorized.

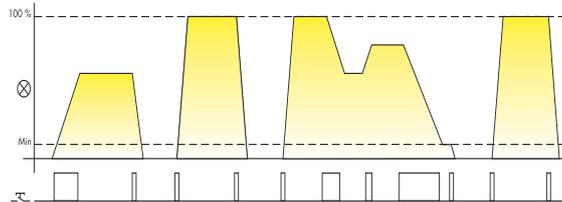


Long control pulse: The light level is progressively raised or lowered.

Short control pulse: Alternately switches between On and Off. When switching On, the light level assumes the value set during the previous On state.

15.51...0404
15.91...0000

Operating mode 4 (without memory): on switch off, the light level is not memorized.



Long control pulse: The light level is progressively raised or lowered.

Short control pulse: Alternately switches On or Off between the maximum light level and the off state.

Operating mode setup

Type 15.51

On 15.51 operating mode 1 or 3 (with memory) is preset, but it is possible to change it using the following sequence:

- remove the supply voltage;
- press the control button;
- apply the supply to the relay, keeping the button closed for 3 second;
- on button release, the light will flash twice to indicate the selection of operating mode 2 or 4, or flash once for operating mode 1 or 3. Repeating the above steps will alternately change between operating modes.

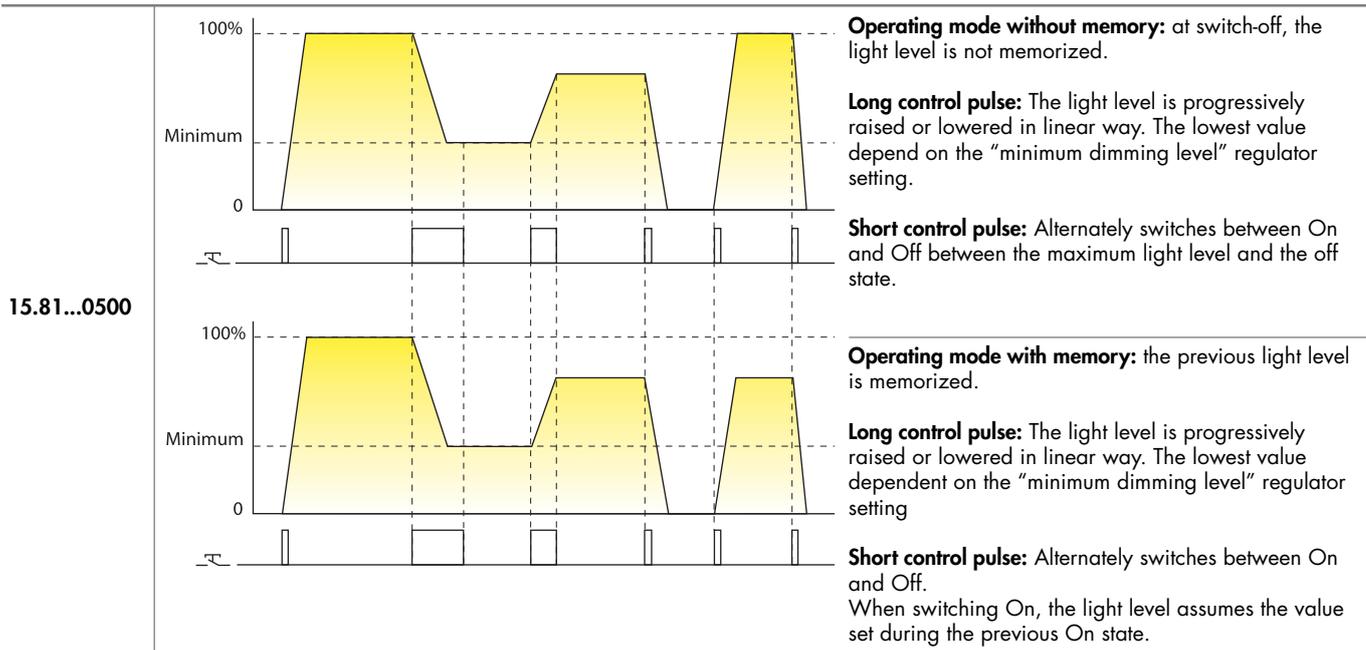
Type 15.91

On 15.91 operating mode 4 (without memory) is preset, but it is possible to change it using the following sequence:

- remove the supply voltage;
- press the control button;
- apply the supply to the relay, keeping the button closed for 3 second;
- on button release, the light will flash twice to indicate the selection of operating mode 3, or flash once for operating mode 4. Repeating the above steps will alternately change between operating modes.

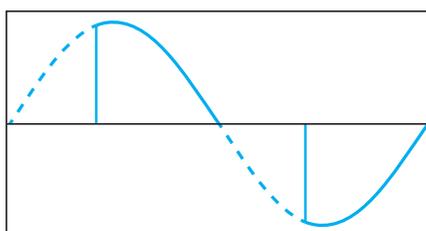
Functions (15.81 type)

Type Linear dimming

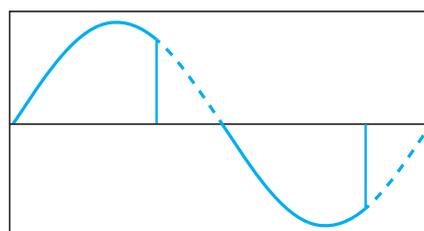


Type of load	Selector setting		Regulator setting
	With memory (M)	Without memory (M)	
<ul style="list-style-type: none"> Incandescent lamps 230 V halogen lamps 12/24 V halogen lamps with electronic transformer/ballast 			It is suggested to set the "minimum dimming level" at the lowest value, so that the complete dimming range is available. But if it is necessary to avoid too low a level of illumination, a higher value can be set.
<ul style="list-style-type: none"> Dimmable compact fluorescent lamps (CFL) Dimmable LED lamps 			It is suggested to initially set the "minimum dimming level" at an intermediate value and then if necessary, readjust for a level found to be compatible with the lamp being used.
<ul style="list-style-type: none"> 12/24 V halogen lamps with toroidal or E-core electromagnetic transformer 			It is suggested to set the "minimum dimming level" at the lowest value, so that the complete dimming range is available. But if it is necessary to avoid too low a level of illumination, a higher value can be set.

Leading edge dimming



Trailing edge dimming

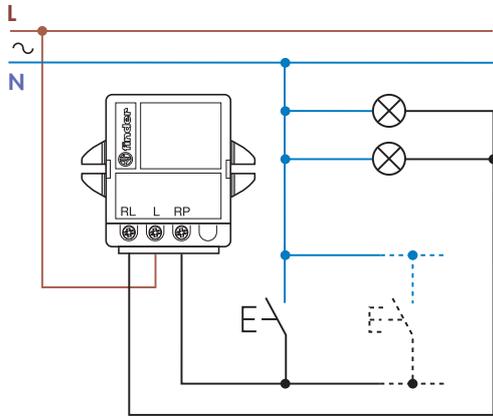


Light dimming is realized with "phase cutting technology", which works by "cutting off" part of the mains voltage waveform in order to reduce the RMS voltage fed to the lamp. If such "cutting off" is done at the beginning of the sine wave, the dimming method is called Leading Edge, if it is done towards the end it is called Trailing Edge. These 2 methods are suitable for dimming different lamp types: Trailing Edge is, in general, more suitable for electronic transformers for low voltage lamps (halogen or LED). Leading Edge is better suited for electromagnetic transformers for LV lamps, 230 V CFL and 230 V Led lamps. Both methods are, however, suitable for dimming 230 V halogen and incandescent lamps. In consideration of the different lamp types actually available on the market, it is suggested to refer to the technical specification indicated in page 1 and, if given, to the lamp manufacturer's recommendation.

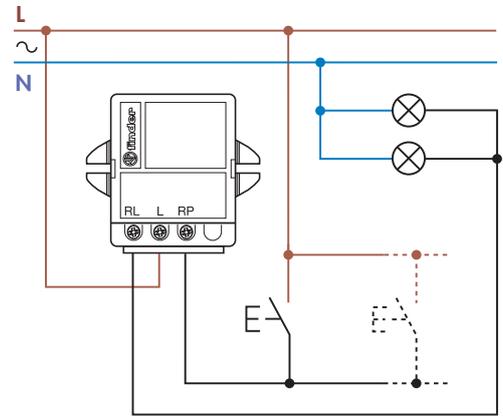
Wiring diagrams

Note: remember to maintain a ground/earth connection for class 1 lamps.

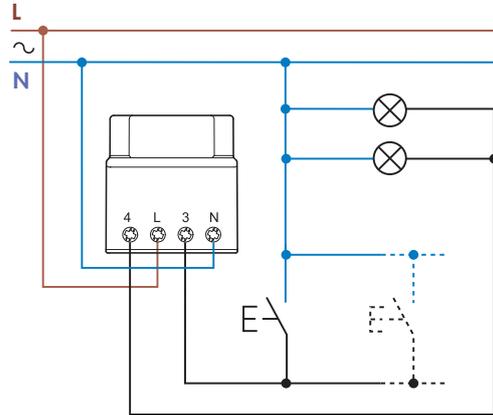
Type 15.51 - 3 wire connection



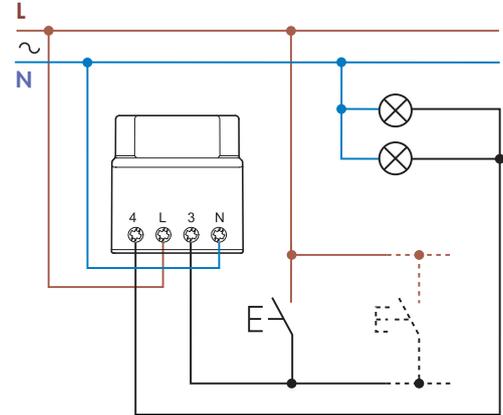
Type 15.51 - 4 wire connection



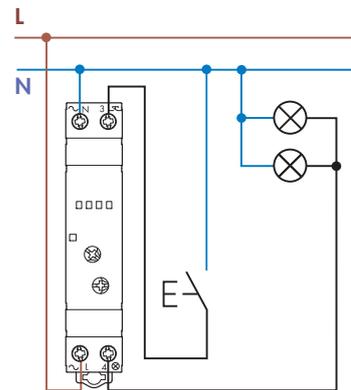
Type 15.91 - 3 wire connection



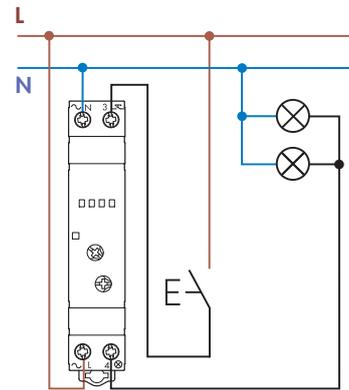
Type 15.91 - 4 wire connection



Type 15.81 - 3 wire connection

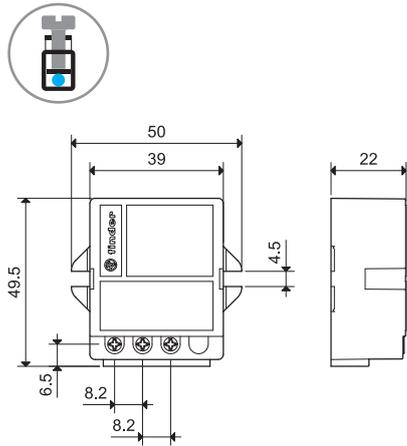


Type 15.81 - 4 wire connection

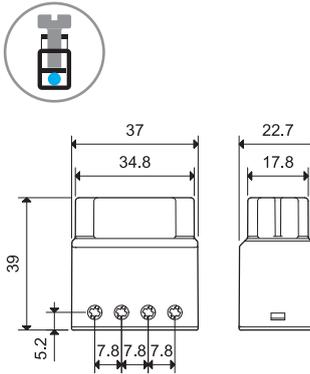


Outline drawings

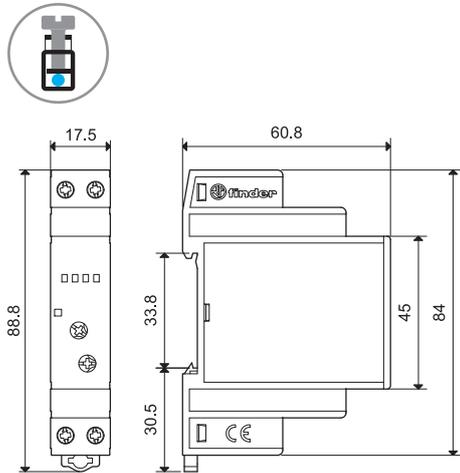
15.51
Screw terminal



15.91
Screw terminal



15.81
Screw terminal



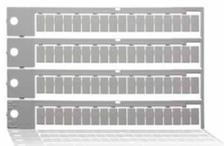
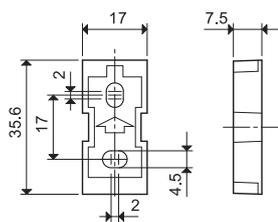
Accessories



020.01

Adaptor for panel mounting for type 15.81, plastic, 17.5 mm wide

020.01



060.72

Sheet of marker tags for type 15.81, plastic, 72 tags, 6x12 mm

060.72



020.03

Separator for panel mounting for type 15.81

020.03

