

smartLEDs

DELTA

OPTICAL DISTANCE / MOTION SENSOR

USER MANUAL

v0.2.3

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In accordance with the provisions of the Directive 2012/19/EU on waste electrical and electronic equipment (WEEE) it is forbidden to place with other waste any waste equipment marked with a crossed-out bin symbol.

The user, wanting to get rid of electronic equipment or services, is obliged to return it to a waste equipment collection point. Applicable restrictions have been introduced in order to restrict the amount of waste generated from waste electronic equipment.

This equipment does not contain any hazardous ingredients that may have a particularly negative impact on the environment and human health.

1 PURPOSE

DELTA is a one-piece microprocessor reflective optical sensor for detecting people and other objects. DELTA sensors are designed to work with devices controlled by OC (Open Collector) output, and in particular to work with intelligent stair LED lighting smartLEDs controllers. DELTA has a range adjustment of 30-200cm and is recommended for stairs or passages up to 2.4m wide. Installation is done in a 35mm diameter hole. DELTA sensors operate on the principle of infrared light emission and measurement of the light reflected by the detected object. Detection of an object forces low state at the sensor output OUT (NO type output). DELTA sensors can work in one of two modes: as a distance sensor (standard mode) or as a motion sensor (extra mode).

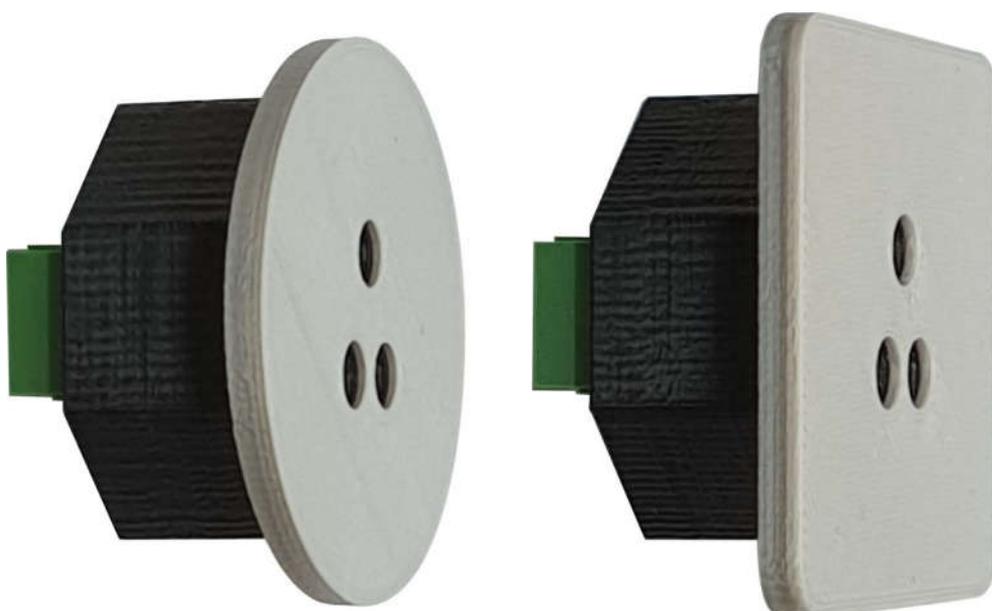
2 DESCRIPTION

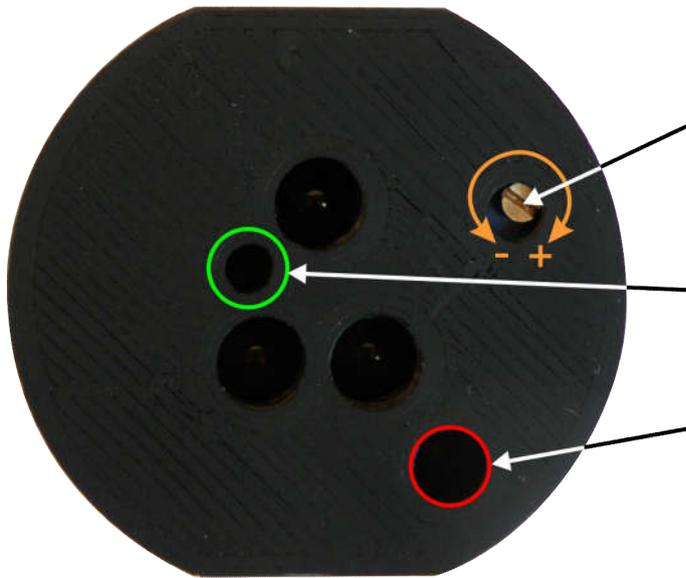


The sensor terminals are available on the terminal block at the back side of the device:

- +12V – power supply (plus, 8-24V DC)
- GND – ground (minus, 0V)
- OUT – digital OC (NPN) output

The sensor is equipped with a removable front cover, available in several colours and 2 shapes: round and square. To remove the cover, gently pry it from the top of the sensor.



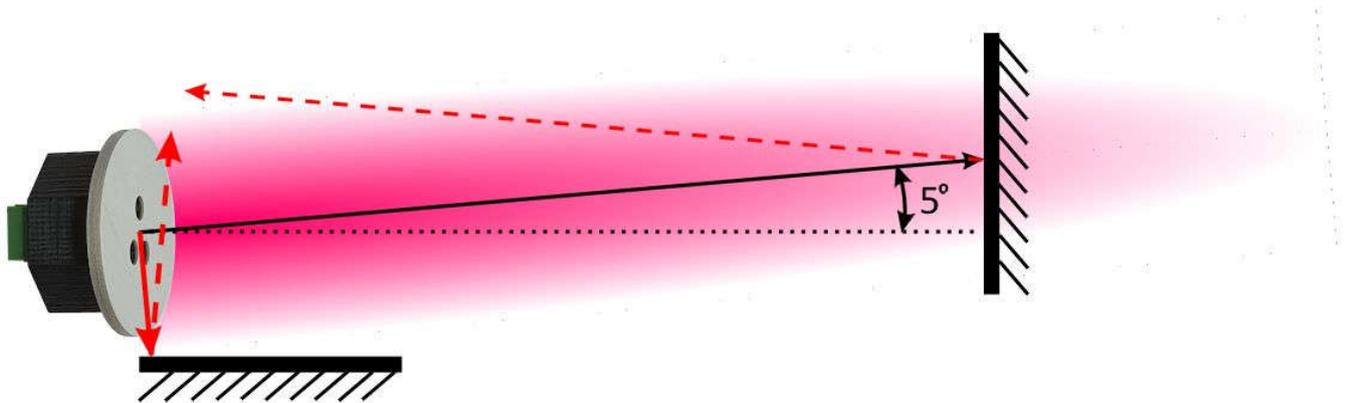


Under the cover there is a front panel on which located are:

- Range adjustment (as well as operating mode switching) knob
- Green LED - LED indicating detection of an object
- Red LED - LED for signalling the range and/or the sensor operating mode being set

In order to minimize the disturbing reflection from parallel and close perpendicular surfaces, the optical axis of the sensor is slightly deflected (5°) towards upper single front hole.

IMPORTANT! In case of locating of the sensor close to perpendicular surfaces, make sure to position the sensor as depicted below.



3 TERMINALS

IMPORTANT! All installation activities must be carried out with the power supply disconnected. The supply voltage can only be switched on after thorough checking of all connections.

IMPORTANT! Particular care should be taken when connecting the OUT output. The OUT output must not have a negative voltage (relative to the power supply ground) or more than + 30V, and the current consumption from the output may not be greater than 250mA, as this may damage the sensor.

3.1 Power supply

The sensor should be powered, like smartLEDs controllers, with SELV DC voltage from an external stabilized power supply with an output voltage of 8-24V DC (typically: 12V) and a minimum current load of 100mA. Sensor supply voltage should be applied between GND (supply minus) and + 12V (supply plus).

IMPORTANT! Use only power supplies marked with the CE sign, with galvanic separation of the output voltage from the power grid voltage.

3.2 Connecting the sensor to smartLEDs stair controller or time module

The sensor OUT output should be connected to the appropriate input of the stair controller (UP, MID, DOWN) or the time module (SENS).

IMPORTANT! If the sensor and the stair controller are powered from separate power supplies, connect the grounds (GND, 0V) of these power supplies.

4 INSTALLATION

It is recommended to mount DELTA sensors in vertical elements (wall, post, etc.) at a height of approx. 80 cm from the ground surface (stairs, floor).

IMPORTANT! The sensors should not be installed closer than 40 cm from the surface, such as stairs, floor, perpendicular wall, etc., as this may cause permanent blindness of the sensor.

The sensor mounting location should be chosen so that:

- detection of persons was certain
- there were no objects within the range of the sensor that should not be detected
- the sensor was not blinded by another sensor, sun or other light source
- nothing disturbed functioning of the sensor
- the sensor was not exposed to moisture

IMPORTANT! Before installing the sensor permanently, check the correctness of detection of persons (see section 5.2).

IMPORTANT! DELTA sensors are optical sensors, their range strongly depends on the conditions in which they work (and on the reflection ability of the object that is detected). Sunlight and light from other sources (bulbs, halogens, other sensors, etc.) falling on the sensor (as well as on a light wall opposite to the sensor or on the stair steps) can significantly shorten the range or cause permanent sensor activation. In this case, if possible, improve the working conditions of the sensor, e.g. change the position of the sensor so that the reflected stream of infrared light from the sensor does not fall back onto the sensor (e.g. move the sensor away from the stairs surface or set the sensor slightly at an angle), possibly reduce reflection of infrared light from the opposite wall (use a less reflective colour or structure of the wall surface). Eventually, reduce the range setting (see section 5.1) or change the distance sensor operating mode to motion sensor mode (see sections 6 and 7).

The sensor housing is designed for mounting in a 35mm diameter hole, e.g. special 35mm flush-mounted box. Sensor dimensions: width and height (diameter) of the cover - 42mm, length (depth) - 25mm.

IMPORTANT! During installation, pay attention not to damage the delicate sensor housing.

5 SENSOR OPERATING IN THE DISTANCE SENSOR MODE (basic mode)

Operation in the distance sensor mode is the basic operating mode of the sensor. In this mode, the sensor signals detection of an object after receiving light reflected from an object within the set range.

IMPORTANT! The sensor is delivered with the distance sensor mode set.

5.1 Setting the sensor range

The desired range of the sensor is set using the knob of the multi-turn potentiometer (adjustment knob), accessible from the front of the sensor after removing the cover. Turning the knob to the left (in the "-" direction, i.e. counter clockwise) reduces the range, and turning to the right (in the "+" direction) increases the range of the sensor. A pause in turning the adjustment knob (if the turn was high enough) displays the currently set range value with a single series of red LED flashes. The number of flashes in the series roughly corresponds to the range values in decimetres. The minimum adjustable value is 3 (3dm = 30cm) and the maximum is 20 (20dm = 200cm). If the number of flashes does not correspond to the desired range, continue to turn the control knob (left or right) until the number of flashes of the red LED corresponds to the desired range.

IMPORTANT! Permanent saving of the set range value takes place after a pause of approx. 2 seconds in turning of the adjustment knob and is signalled by a single, longer flash of the red LED.

5.2 Object detection correctness verification

After setting the range, check that the objects are correctly detected by the sensor. To do this, place the object within the range of the sensor. Detection of the object should be signalled by the green LED lighting up. If the green LED does not light up, increase the range of the sensor (see section 5.1), and then repeat the procedure of verification of the correctness of object detection by the sensor. The green LED should be lit until the object leaves the sensor's coverage area and then go out.

IMPORTANT! The minimum time of active state signalling is 0.5s.

IMPORTANT! If the green LED does not go out after the object leaves the coverage area (the sensor is still active), gently clean the optical elements of the sensor, check that the sensor cover is applied correctly (so that it does not obstruct the optical elements of the sensor), improve the working conditions of the sensor or change the position of the sensor (so as to reduce unwanted reflections towards the sensor of the infrared light emitted by the sensor).

If the green LED does not go out, reduce the sensor range by 1dm (see section 5.1) and then repeat the procedure to verify the correct detection of the object by the sensor.

Sometimes it can happen that the sensor starts to work properly only after a significant, unacceptable reduction in range. This happens when the correct operation of the sensor is disturbed due to specific operating conditions (e.g. white wall opposite the sensor, glare, etc.). In this case, switch the sensor to motion sensor mode.

6 SWITCHING TO MOTION SENSOR MODE

To put the sensor into motion sensor mode, turn the sensor adjustment knob to the left (in the "-" direction) below the sensor range adjustment scope. Switching the sensor into the motion sensor mode is signalled by a quick blinking of the red LED. Then turn the adjustment knob to the right (in the "+" direction) until the red LED goes out, which completes the procedure of changing the operating mode.

7 SENSOR OPERATING IN MOTION SENSOR MODE (extra mode)

In the motion sensor mode, the sensor signals the detection of motion causing rapid changes in the value of reflected infrared light. This mode can be used in situations where the basic distance sensor mode cannot be used (e.g. when the wall is opposite the sensor, the sensor is mounted close to stairs, the sensor may be blinded by other light sources, etc.).

IMPORTANT! *After switching to the motion sensor mode, set the sensor range in accordance with section 7.1.*

7.1 Setting the sensor range

The range of the sensor is adjusted by means of the adjustment knob. Turning the knob to the right increases the range, and turning it to the left decreases the range of the sensor. A pause in turning the adjustment knob (if the turn was sufficiently large) displays the currently set range value with a single series of red LED flashes. The number of flashes in the series (in the range from 3 to 20) shows approximate range values in decimetres. The minimum setting is 3 (3dm = 30cm) and the maximum is 20 (20dm = 200cm). If the number of flashes does not match the desired range, turn the control knob (left or right) until the number of flashes of the red LED corresponds to the desired range.

IMPORTANT! *Permanent saving of the set range value takes place after approx. 2s pause in turning the adjustment knob and is signalled by a single longer red LED flash.*

7.2 Object detection correctness verification

After setting the range, check that the objects are correctly detected by the sensor. To do this, move the object within the range of the sensor. In this mode, object movement is detected. Detection of object movement should be signalled by the green LED lighting up. If the LED does not light up, increase the range of the sensor. If the green LED lights up for no apparent reason, remove moving objects (e.g. curtains, curtains) from the field of view of the sensor or slightly reduce the range of the sensor, then re-verify the correctness of the object's motion detection by the sensor.

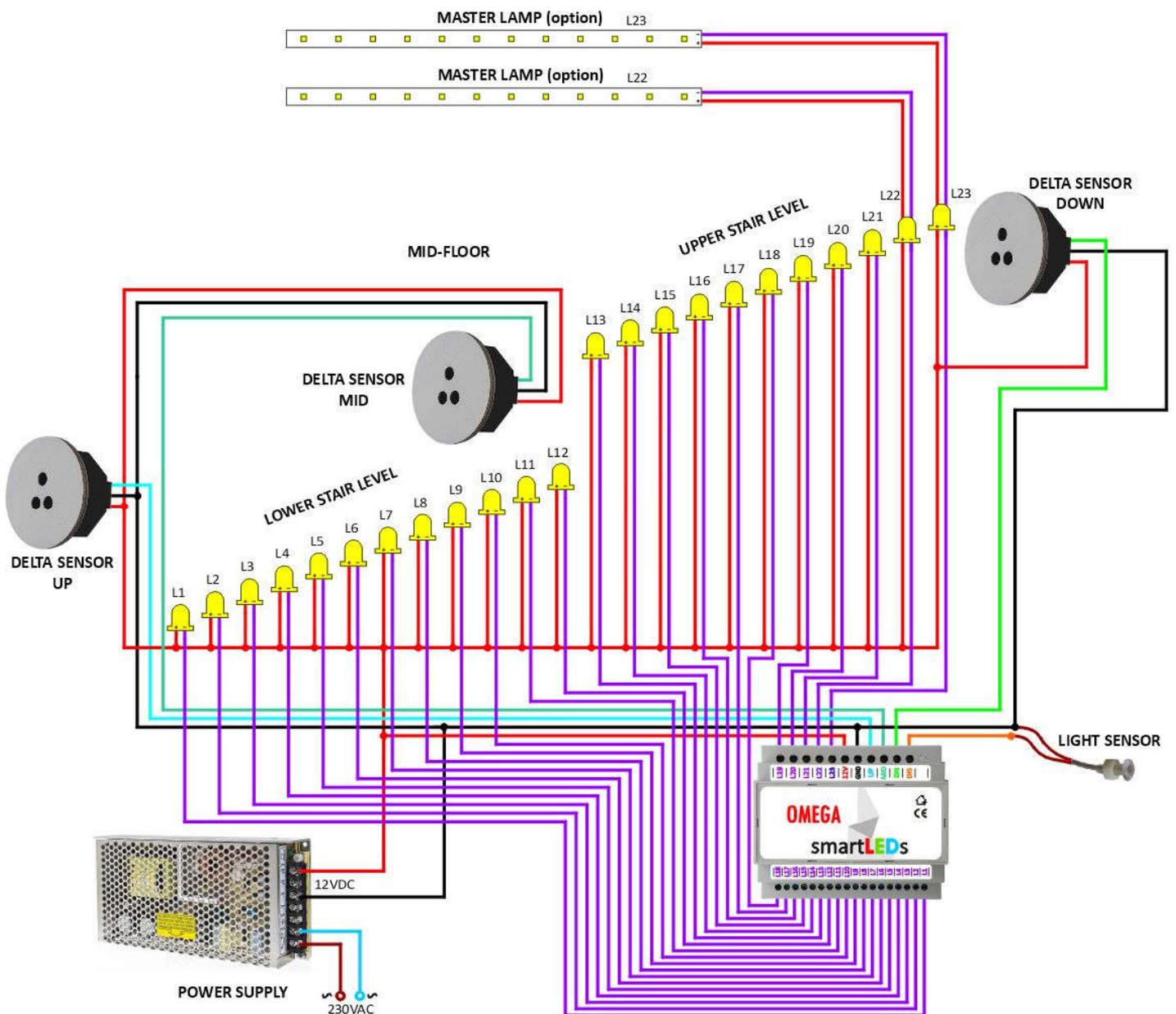
IMPORTANT! *The minimum time of active state signalling is 0.5s.*

8 SWITCHING TO DISTANCE SENSOR MODE

To put the sensor back into distance sensor mode, turn the control knob counter clockwise below the range / sensitivity adjustment scope. The transition to the distance sensor mode is signalled by a steady red LED lighting up. Then turn the adjustment knob clockwise until the red LED goes out, which completes the procedure for changing the operating mode. Then proceed in accordance with section 5.

IMPORTANT! After entering the distance sensor mode, set the sensor range according to section 5.1.

9 EXAMPLE DIAGRAM OF CONNECTING DELTA SENSORS TO A smartLEDs STAIR LED LIGHTING CONTROLLER



10 TECHNICAL DATA

Power supply:	8-24VDC (typ. 12VDC)
Power consumption (typ.):	120mW
Current consumption (typ.):	10mA
Detection angle:	15°
Sensor range:	adjustable: from 30 to 200 cm
Range adjustment:	multi-turn potentiometer
Range value signalling:	red LED
Output:	OC NPN NO (active low level), max. 30V 250mA
Object detection signalling:	green LED
Working temperature:	-10°C - +45°C
Dimensions:	cover height/width 40mm, install. diameter 35mm, depth 25mm
Protection index:	IP20
Protection class:	III
Operating conditions:	continuous, indoors
Compatible devices:	smartLEDs (stair controllers, dimmers, RGB), other (OC output controlled)

11 SENSOR DIMENSIONS

