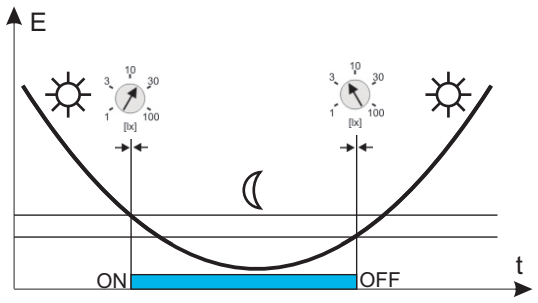

Fig. 3 .: Diagrams of the operation principles of the TS-42-4 TWILIGHT SWITCH.

V. Repair and maintenance

All repairs of the TWILIGHT SWITCH TS-42-4 are performed by the manufacturer. The device does not require any maintenance. When the sensor becomes contaminated, clean it with a clean, damp cloth. The device does not require any additional maintenance.

VI. Warranty Card

The manufacturer guarantees the correct operation of the TS-42-4 TWILIGHT SWITCH. The warranty period is 36 months from the date of sale. The warranty is extended by the time of repair. Warranty repairs are performed by the manufacturer free of charge after the AUTOMAT is delivered to the manufacturer. Improper use of the device or independent modifications to it will void the warranty.

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MART

www.mart-electronics.eu

Made in Europe

The TS-42-4 TWILIGHT SWITCH meets the requirements of the European Union Directives:
- Directive LVD 2014/35/EU - Low Voltage Directive of 26 February 2014
- Directive EMC 2014/30/EU - Eletromagnetic Compatibility Directive of 26 February 2014

In order to protect the environment, do not throw away used electrical appliances and electronics together with municipal waste. Used equipment should be delivered to collection points for recycling free of charge. Any information on this can be obtained at sellers, distributors, manufacturer or on the Internet. The product's packaging is made of ecological materials. The PVC packaging tape will be used while stocks last.

MART

MADE IN EUROPE

TWILIGHT SWITCH

TS-42-4 ECO

FIRST ECO

3-YEAR WARRANTY

User manual

I. Purpose

The TWILIGHT SWITCH TS-42-4 is designed to automatically switch the receiver on at the moment it is dusk and turned off at dawn, or vice versa (NO, NC contacts). Two independent knobs for setting the switch-on and switch-off thresholds allow for an optimal way to control the lighting. Independent adjustment of the activation thresholds corrects the location of the sensor (north, south, east, west) and eliminates the hysteresis that occurs in standard automatic units. Hysteresis causes switching off the lighting in the morning when the lighting intensity is higher (2 ÷ 3 times) than the set lighting intensity level at which the lighting was turned on. This causes an unfavourable extension of the lighting operation time in the morning, which results in an increased consumption of electricity. On the other hand, too little hysteresis means that on cloudy days the lamp may turn on and off with changing weather conditions, which is not advisable, and sometimes even unacceptable for some lamps.

The light intensity measurement sensor has a spectrum similar to that of the human eye, and the adjustment thresholds have logarithmic characteristics - also similar to the characteristics of the human eye.
Such an innovative design of the TS-42-4 TWILIGHT SWITCH makes the lighting control optimal, economic and ecological.
The TS-42-4 TWILIGHT SWITCH includes:
>> TS-42 CONTROLLER - mounted in a distribution box on a 35 mm rail (one 18 mm module)
>> OUTDOOR SENSOR (IP65) - surface-mounted box with a 5 mm rubber grommet on the rear wall, mounted vertically with two screws. Connection cable not longer than 100m (2x0.5mm2).

II. Properties of the TS-42-4 ECO TWILIGHT SWITCH

>> Independent regulation of activation and deactivation thresholds
>> precise logarithmic adjustment:
> activation - 1 ... 10 ... 100 lx
> shutdown - 1 ... 10 ... 100 lx
>> high switching power - 16A (4000 W) 250VAC, 16A (384 W) 24VDC
>> high inrush current - resistance to 100 A surge current
>> freedom of connections:
> executive relay contacts (one normally open contact - NO, one normally closed contact - NC) galvanically separated, which allows connections in various configurations
>> traffic light (LED):
> Green LED - indication of 230V AC supply voltage on LN terminals
> LED red:
- pulsating signalling (without delay) - the set (set) actuation threshold is exceeded
- continuous light - the level of the measured illuminance is between the settings on knobs
> Blue LED - changeover indication - switching on (contact 1-2), disconnection (contact 2-3)
>> 35mm rail mount - one 18mm module.

The TS-42-4 CONTROLLER uses a specialized OMRON G2RL-1-E-HR relay, designed to switch various types of lighting lamps. The special design of the relay enables effective switching of lamps with an inrush current up to 100 A.

III. Assembly

The TS-42-4 TWILIGHT SWITCH device may only be connected by a person authorized to operate electrical installations. Remember to choose the right protection.

On the front panel of the TS-42 CONTROLLER, there are three information LEDs: green, red, blue and two knobs for setting the activation thresholds in the ranges from 1 to 100 lux. There are connection diagrams and regulation characteristics on the side walls of the TS-42-4 CONTROLLER.

In order to connect the TS-42-4 TWILIGHT SWITCH:

1. Install the TS-42 CONTROLLER in the switchboard on a 35 mm rail
2. Fix the SENSOR on a vertical wall with two screws.

Insert the connection cable through the rubber grommet located on the back wall of the installation box.
Screw the wires to the terminal block.

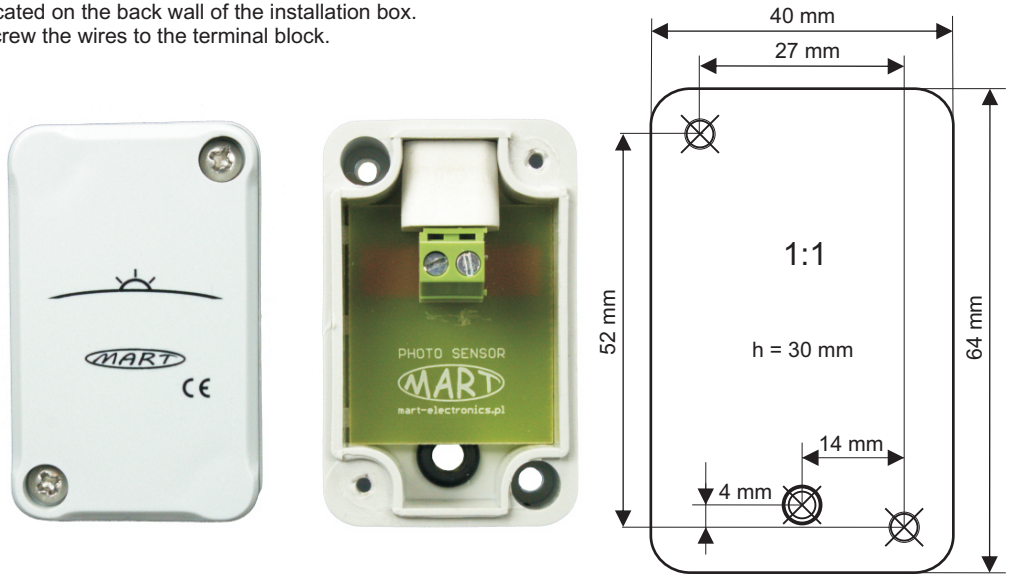

Fig 1. Photosensitive sensor - design, dimensions, template

3. Connect the wires in accordance with the diagram (fig. 2)
4. turn on the supply voltage - the green LED will light up and the red and blue LEDs will blink twice
5. set the activation thresholds.

When, during dimming, the level set on the ON knob is exceeded, the red LED will start to “blink” (without delay), and after approx. 60 seconds the operating relay will switch, which will be signalled by the blue LED. The activation delay of 60s should be counted from the moment of stable flashing of the red LED.

Using the control knobs, set the desired value of the switch-on threshold ON and switch-off OFF. Check operation of TWILIGHT SWITCH TS-42-4 and possibly correct the setting in real conditions (in the evening and in the morning). A red LED shining with a constant signal informs that the intensity of illumination falling on the sensor is in the range between the set positions of the knobs. In order for the TWITLIGHT SWITCH device to work properly, the measured illumination intensity must be lower at night from the lowest setting, the red LED will turn off.

It should be remembered that the optimal setting of the activation thresholds has an impact on the costs of electricity used and contributes to environmental protection.

In order to limit the impact of temporary large changes in lighting, for example, car lamps, lightning flash, etc. on the operation of the TWILIGHT SWITCH, an actuation delay (approx. 60s) has been applied.

When setting the activation thresholds ON, OFF, remember that on a sunny day, covering the sensor with a bare hand may not be sufficient. Then you should cover the SENSOR more effectively.

The pictorial diagram of the TS-42-4 TWILIGHT SWITCH operation principle is shown in Fig. 3.

NOTE: Avoid mounting the SENSOR directly in the light beam of the lamp being switched on, because lighting with the SENSOR lamp may interfere with operation - the lamp will be switched on periodically and turned off from evening until morning. This effect will not occur if the threshold on the OFF knob is set higher than the illuminance level of the lamp that illuminates the sensor.

IV. Technical data

Rated supply voltage LN	230V AC, + 10%, - 15%
Rated frequency	50Hz
Maximum load current (power):	
> resistive load	16A, AC1 (4 000 W)
> incandescent lamps	10A (2500 W)
> halogen lamps	8A (2000 W)
> fluorescent lamps	8A (2000 W)
> energy-saving lamps and LED	8A (2000 W)
Instantaneous inrush current	100A
Executive contacts	1 x NO, 1 x NC
Rated power consumption	0,7 W
Logarithmic control range ON	1...10...100 lx
Logarithmic control range OFF	1...10...100 lx
Switch-on and switch-off delay	60s (± 10%)
Switch-on and switch-off delay	100 000 operations
CONTROLLER protection level	IP 20
Installation of the CONTROLLER	One 18 mm field, 35 mm rail
CONTROLLER work position	Vertical
CONTROLLER working temperature	-25...+50 °C
CONTROLLER weight	50g
SENSOR protection class	IP 65
SENSOR dimensions	40mm x 30mm x 64mm
SENSOR assembly	Two screws
SENSOR working position	Vertical
Cable length to the SENSOR	Max 100 m (2 x 0,5 mm^2)
SENSOR working temperature	-25...+50 °C
SENSOR weight	50g

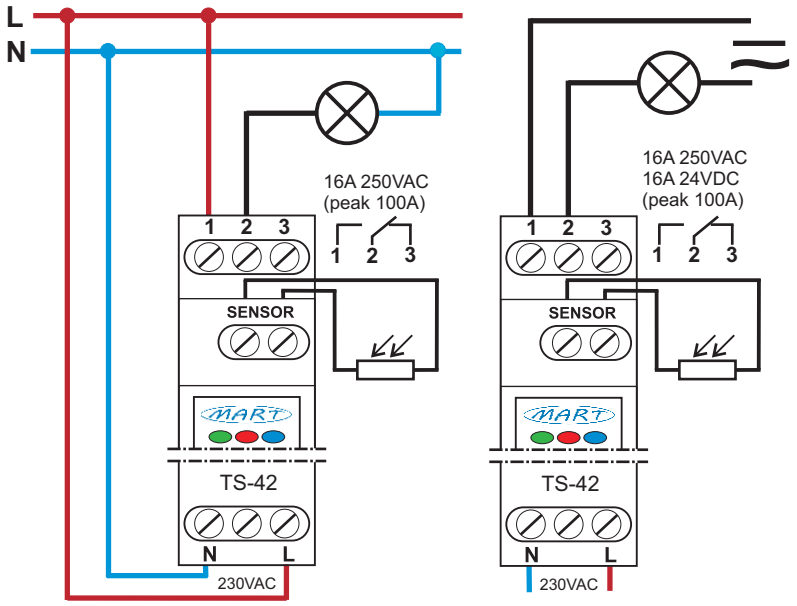

Fig. 2 .: Connection diagrams for the TS-42-4 TWILIGHT SWITCH automatic device.

Why is it worth using for ECOLOGICAL and ECONOMICAL lighting control TWILIGHT AUTOMATIC TS-42 series.

In general, lighting should be turned on optimally, that is, turned on when it is dark enough and turned off when it is bright enough. Seemingly simple, but not entirely.
The correct lighting control is influenced by:

- >> changeable weather conditions
- >> switch on threshold setting
- >> switch off threshold setting
- >> hysteresis
- >> characteristics of the illuminance measurement sensor
- >> regulatory characteristics

CHANGING ATMOSPHERIC CONDITIONS

The weather conditions at sunrise and sunset vary throughout the year. Sunrises and sunsets are slow-changing phenomena, and with cloudy twilight and sunrise, the intensity of lighting changes in a random and unpredictable manner. A TWILIGHT SWITCH should be designed to take this into account.

SENSOR POSITIONING

THE TWILIGHT SWITCH LIGHT SENSOR is usually mounted where there is a lamp or a convenient place for installation. Most often, we do not have much choice as to the direction of the sun's incidence on the sensor (north, south, east, west). Therefore, the possibility of independently set activation and deactivation thresholds corrects such a situation and enables the selection of optimal actuation parameters.

HYSTERESIS

Each typical TWILIGHT SWITCH has a hysteresis, which means that if we set the switch-on threshold (in the evening) 30 lux, the switch-off threshold (in the morning) will be at OFF = 2 x ON, i.e. 60 lux. Too little hysteresis will result in uncontrolled switching on and off of the lighting along with the change of weather conditions. This is an undesirable effect, and even unacceptable with some lamps.

SENSOR POSITIONING