



OPERATING INSTRUCTION DEFENSOR

- TS
- TST

Version	Date	Comment
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1. Information about the document

1.1 Introduction

These operating instructions contain detailed information about the installation, commissioning and configuration of the specified devices. This document is available online on the relevant product web page at www.esylux.com and can be printed out in A4 format. Please read the operating instructions carefully and note all safety information and warnings.

Navigating on screen

When you are reading the document on screen, you can use the following functions:

- **Linked table of contents:** Clicking on the chapter title opens the corresponding chapter.
- **Linked references:** You can navigate to specified locations by clicking on the → *link* .
- **List of bookmarks:** All chapters can be accessed from the list of bookmarks  in the software you use to view PDF files.

1.2 Highlighted information within the text

Formatting

To make these operating instructions easier to read, certain information is highlighted by different means. The meaning of this formatting is explained below:

- indicates a call for action
- ✓ indicates results of actions
- < > indicates menu items of the app
- *indicates text links*



indicates important and useful information



warns of high voltage

1.3 Manufacturer address

ESYLUX GmbH
 An der Strusbek 40
 22926 Ahrensburg | Germany
 info@esylux.com
 www.esylux.com

1.4 Product identification

These instructions apply to the following products:

Item number	Product name
ED10025471	DEFENSOR TS IR 1C IP55 WH
ED10025464	DEFENSOR TS T IR 1C IP55 WH

You can find the item number and product name on the type plate of the products in chapter → ["3.5 Rating label" on page 12](#).

The product name contains important information about the product:

Elements	Meaning
DEFENSOR	Series
TS	Twilight switch
T	Time function
IR	Remote controllable (infrared)
1C	1 light channel
IP55	Protection type
WH	White (housing colour)

1.5 Warnings

Warnings are listed at the start of the relevant chapter if a hazardous situation is likely to occur.

The preceding signal words have the following meanings:

 **DANGER!**

This signal word denotes a hazard involving a high level of risk. Failure to observe the warning will lead to serious or fatal injury.

 **WARNING!**

This signal word denotes a hazard involving a moderate level of risk. Failure to observe the warning may lead to serious or fatal injury.

 **CAUTION!**

This signal word denotes a hazard involving a low level of risk. Failure to observe the warning may lead to minor or moderate injury.

NOTE!

This signal word warns against situations that could lead to instances of property damage if the information is not observed.

2. Basic safety information

2.1 Safety instructions

Specialist personnel

Electrical devices connected to a 230-V mains voltage must only be installed and commissioned by electrical installation technicians or trained electricians, taking country specific regulations into account.

**DANGER!****Risk of fatal injury from electric shock!**

- The following five safety rules must always be observed:
 1. Disconnect the power supply
 2. Secure the power supply from being switched on again
 3. Check that the relevant components have been de-energised
 4. Set up the earthing and short-circuiting mechanisms as required
 5. Cover or isolate neighbouring live parts
- Protect the device with a 10-A circuit breaker.
- Protect the circuit with a residual current device (RCD).
- Observe the contact opening width ($\mu = < 1.2 \text{ mm}$).

2.2 Intended use

Place of use

The twilight switches in the DEFENSOR series are designed for use in outdoor areas and automatically control the lighting based on ambient light conditions. They are suitable for use around the home, and in gardens, garages or carports.

The switches are designed for wall mounting. Surface mounting or mounting on inner / outer corners is possible with the appropriate accessories.

2.3 Liability and damages

The device must not be changed, modified or painted – doing so will void any warranty claims.

The manufacturer will not accept any liability for instances of personal injury or property damage caused by improper use.

Check the product for damage after unpacking. If the device is damaged in any way, return it to the relevant place of sale.

3. Product description

3.1 Introduction

The twilight switch automatically controls the lighting based on ambient light conditions. If the ambient lighting level falls below the configured brightness switching value, the twilight switch switches on the connected lighting; it switches the lighting off again when the ambient lighting level exceeds the threshold value.

Properties

Main product features:

- Automatic light control depending on the configured brightness switching value
- The twilight switch is supplied with the default settings

Overview of features

The following table shows an overview of the functions of the devices:

Functions	TS	TS T
Time-dependent operating modes		•
Integrated push button input	•	•
Zero-cross switching to protect the relay	•	•
Password-protected parameterisation	•	•

Functions	TS	TS T
High overvoltage protection	•	•
Configurable via the ESY Control app and ESY-Pen	•	•

3.2 Included in delivery

1 x twilight switch
1 x short instruction

Accessories

Optional accessories:
ESY-Pen (item no. EP10425356)
Spacer (item no. EM10025426)
Corner bracket (item no. EM10025419)

3.3 Settings – an overview

Operation via ESY Control app with ESY-Pen

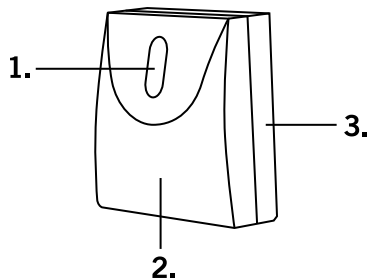
The twilight switch has no setting elements. All settings can only be modified using the ESY Control app and the ESY-Pen.

Setting options	Description
<i>Light on / off</i>	Used to manually switch lighting on or off regardless of ambient light conditions
<i>4 h / 12 h light on / off</i>	Used to manually switch lighting on or off for 4 hours or 12 hours regardless of ambient light conditions
<i>Reset to automatic mode</i>	Used to reset temporary settings
<i>Set time and date</i>	Used to set the date and time in order to use time-dependent functions
<i>Twilight switch operating mode</i>	Enables light control on the basis of the brightness switching value
<i>Light on / off operating mode</i>	Used to manually switch lighting on or off regardless of ambient light conditions

Setting options	Description
Brightness switching value	The lighting is automatically controlled on the basis of the configured brightness switching value
Reset to default settings	Used to reset the twilight switch to default settings
Test mode	Checks that the lighting switches on based on the brightness switching value
Password protection	Used to set a password to protect against unauthorised access

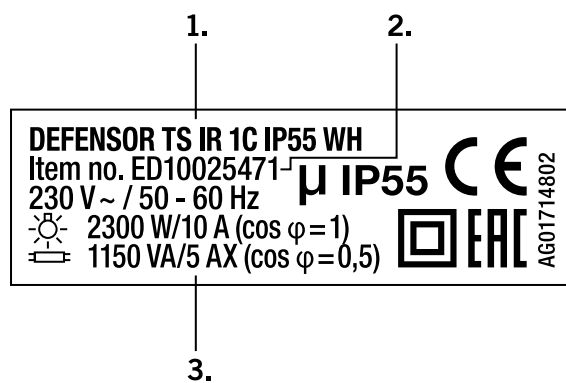
You can find a comprehensive description of the possible settings in chapter → ["7. Settings with the ESY Control app" on page 23](#).

3.4 Mechanical set-up



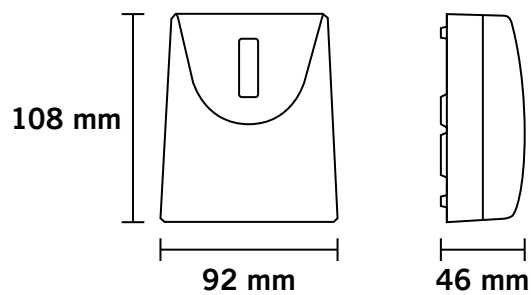
1. Sensor inspection window
2. Cover
3. Mounting base with sensor

3.5 Rating label



1. Product name
2. Item number
3. Technical data

3.6 Dimension drawing

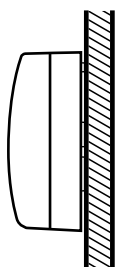


4. Installation and connection

4.1 Installation

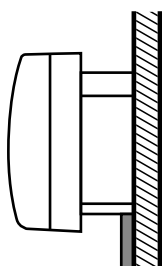
**Installation
type / location**

The twilight switch is intended for wall mounting. The twilight switch must be mounted on a solid, even surface. Surface mounting or mounting on inner / outer corners is possible with the appropriate accessories.

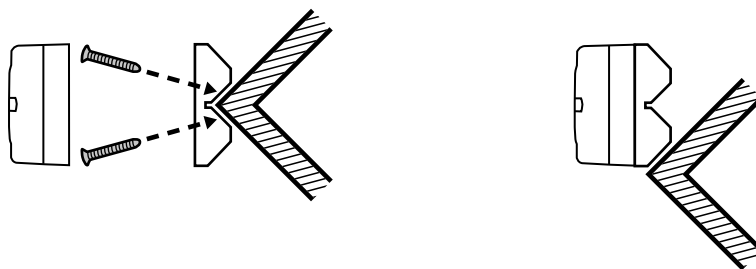


Wall mounting

The following installation types are possible with accessories:



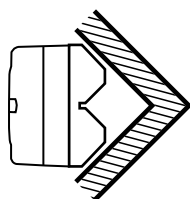
Wall mounting with spacers in the case of surface-mounted cabling



Mounting on outer corners with a corner bracket

NOTE!

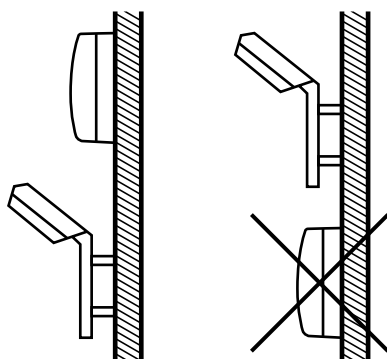
In order to prevent chipping due to bore holes that are at too much of an angle, observe the positioning of the screws.



Mounting on inner corners with a corner bracket

Installation instructions:

- Position the twilight switch in a location that is appropriate for the spatial conditions and requirements.
- Do not expose the twilight switch to direct sunlight.
- Ensure connected lighting is mounted with sufficient clearance from the twilight switch to avoid any interference with the light sensor.
- Do not point light sources directly at the twilight switch.

**DANGER!****Risk of fatal injury from electric shock!**

- Switch of the mains voltage before installing / removing the detector.
- Check that the mains voltage is de-energised.

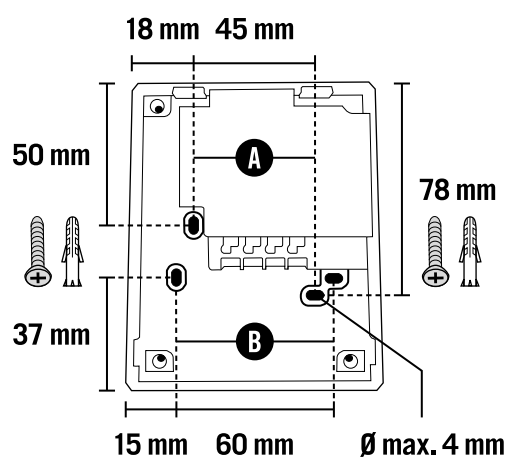
Installation steps:

- Remove the cover from the mounting base. These are connected via a plug-in connection.
- Feed the cable into the detector and install the mounting base in the required position.



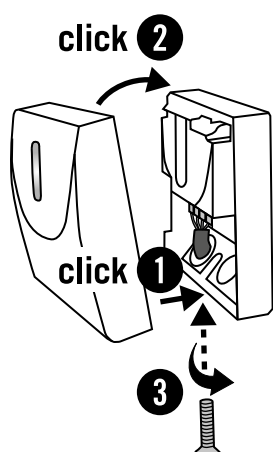
The distances between the screw holes **A** are compatible with those of the RC series of outdoor motion detectors from ESYLUX. The distances between the screw holes **B** are suitable for conventional recessed boxes (60 mm).

Installation and connection



After connecting the twilight switch, fit the cover on the mounting base as follows:

- Press the cover onto the mounting base.
- ✓ A "click" noise at the top and bottom confirms that they have been properly fixed together.
- Then tighten the screws.



4.2 Connection



DANGER!



Risk of fatal injury from electric shock!

- Switch of the mains voltage before connecting the product.
- Check that the mains voltage is de-energised.

Proceed as follows to connect the twilight switch:

- Observe the following circuit diagrams and terminal assignments.

**Terminal
assignment**

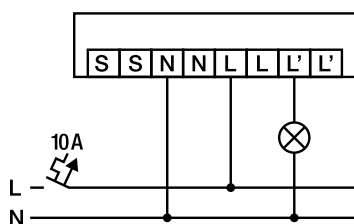
L	External conductor, 230 V~
L'	Switched external conductor 230 V~
N	Neutral conductor
S	Push button

A separate terminal is also available to loop through or fix the earth conductor.

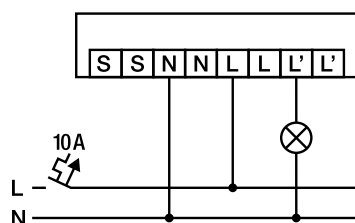


Earth conductor

4.2.1 Standard operation

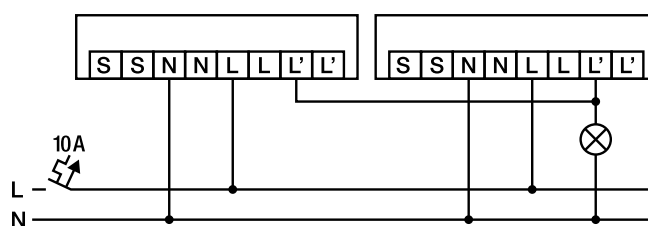


4.2.2 Standard operation with additional control using a push button



You can find a comprehensive description of this in chapter → ["8. Manual control via push button" on page 30.](#)

4.2.3 Parallel connection



Up to ten twilight switches can be connected in parallel.

5. Initial operation

5.1 Warm-up phase

The twilight switch initiates a warm-up phase each time the mains voltage is connected.

Warm-up phase

- Connect the mains voltage.
- ✓ A warm-up phase of approx. 45 seconds is initiated.
- ✓ During this time, the lighting is switched on.
- ✓ When the twilight switch is commissioned for the first time, the detector LED flashes blue – red – red alternately.
- ✓ The warm-up phase is over when the green detector LED briefly flashes three times after this and the lighting switches off again.



If individual settings have already been configured on the twilight switch, the detector LED flashes blue – red alternately during the warm-up phase.

5.2 Default settings

The twilight switch is equipped with default settings. It is ready for operation after the warm-up phase and operates in accordance with the default settings:

TS

Operating mode	Twilight switch
Brightness switching value	20 lx
Test mode	Off
Password	0000

TS T

Operating mode	Twilight switch
Brightness switching value	20 lx
Test mode	Off
Time and date	not defined
Adjustment of the clock to summer / winter time	On
Password	0000

The settings can be re-configured or customised at any time using the ESY Control app via the ESY-Pen; see chapter → ["7. Settings with the ESY Control app" on page 23](#).

All of the twilight switches from the DEFENSOR series are also equipped with overvoltage protection to prevent irreparable damage due to lightning strikes or temporary overloading of power supply systems (surge 2 kV, burst 4 kV).

6. ESY Control app and ESY-Pen

6.1 Operating principle

Parametrisation

Parameters can only be configured using the ESY Control app with the ESY-Pen (item no. EP10425356).

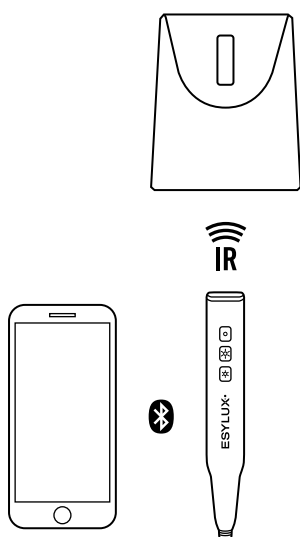
First, the parameters are changed in the ESY Control app. Then the ESY-Pen serves as a bridge to transmit the Bluetooth commands from the mobile device to the twilight switch using infrared technology.

As the infrared interface is located in the head of the ESY-Pen, the following must be taken into account with regards to communication between the ESY-Pen and the twilight switch:

- When programming, always direct the head of the ESY-Pen towards the twilight switch.



Direct sunlight can reduce the standard range of approx. 8 m. This is due to the effect of the sun's infrared radiation



Communication: smartphone – ESY-Pen – twilight switch



It is not possible to transfer parameters from the twilight switch into the ESY Control app. The communication between the ESY-Pen and the twilight switch is unidirectional.

6.2 ESY Control app

The free ESY Control app is available in the Google Play Store and Apple App Store for the following mobile devices:

- Apple devices with operating system iOS 11 or above
 - Android devices with Android version 6.0 or above
- Scan the QR code to download the ESY Control app.







Proceed as follows to add your product:

- Start the ESY Control app.
- Press the button **< Select products and configure >**.
- Press the button **< Add product >** and select your product using the search function or by scanning the bar code on your product.
- ✓ Your product appears in the product list.
- ✓ Parameters can now be configured.

You need the ESY-Pen to transfer the modified parameters to the product.

6.3 Connecting the ESY-Pen to the ESY Control app

1. Switch on the ESY-Pen.

- Press the **< On / Off button  >** for two seconds.
- ✓ The **< On / Off button  >** lights up red.
- ✓ Both **< function buttons  +  >** will light up white when the mobile device is switched on.

2. Activate Bluetooth® on your mobile device.

3. Start the ESY Control app.

- In the dashboard, press the **< No connection >** button at the bottom.
- Select your ESY-Pen **< ESY-Pen Vx.x xxxx >** from the list.
- Enter the security pin when requested.
- ✓ After it has been successfully connected, your **< ESY-Pen Vx.x xxxx >** will be listed at the bottom of the dashboard.
- ✓ The ESY-Pen is now ready for use.



If no ESY-Pen (ESY-Pen Vx.x xxxx) is listed, swipe down to update the list. You can find the name and security pin of your ESY-Pen on the identification label on the device.

7. Settings with the ESY Control app

7.1 Temporary settings

User You can configure temporary settings under the **< User >** menu item.

7.1.1 Light on / off

The lighting is switched on or off regardless of ambient light conditions.

The twilight switch switches the lighting **on** until ...

- the brightness level exceeds the set switching value

The twilight switch switches the lighting **off** until ...

- the brightness level falls below the set switching value

Once this time has elapsed, the twilight switch switches back to the configured operating mode. You can cancel this setting by activating the **< Reset to automatic mode >** setting.


Setting options: **< On >** **< Off >**

Acknowledgement: The lighting switches on or off. The violet detector LED flashes once to indicate that the infrared signal has been successfully received.

7.1.2 4 h / 12 h light on / off

The lighting is switched on or off for four hours or twelve hours regardless of ambient light conditions.

Once the four hours or twelve hours have elapsed, the twilight switch switches back to the configured operating mode.

 When this mode is activated, the twilight switch does not take the brightness switching value into account. Light measurement is deactivated.

You can cancel this setting by activating the **< Reset to automatic mode >** setting.

Setting options: **< 4 h light on >** **< 4 h light off >** **< 12 h light on >**
< 12 h light off >

Acknowledgement: The lighting switches on or off for four hours or twelve hours. The violet detector LED flashes once to indicate that the infrared signal has been successfully received.

7.1.3 Reset to automatic mode

This setting clears all temporary settings. The twilight switch returns to the configured operating mode.

Acknowledgement: The lighting switches on. After the changes have been completed, the violet detector LED flashes once to indicate that the infrared signal has been successfully received. The lighting then switches off.

7.2 Permanent settings

Advanced

You can configure permanent settings under the **< Advanced >** menu item. You can also compile a list of settings that have been made and send these in a single step.



In the event of a power failure, the password becomes invalid within approximately one minute. The other settings are saved for up to one week. After this, the twilight switch operates according to the default settings.

7.2.1 Set time and date

With the TS T models, you can either set the time and date or copy the time and date from your smartphone.

Setting options: < Time > < Date > < Copy time and date from smartphone >

The setting for automatic adjustment of the clock to summer / winter time can also be activated / deactivated.

Setting options: < On > < Off >

Acknowledgement: The lighting switches on. The detector LED provides various feedback signals during transmission. After the changes have been completed, the green detector LED flashes three times to confirm this. The lighting then switches off.

7.2.2 Operating mode

There is a choice of three different operating modes.

- Twilight switch
- Light on
- Light off

Setting options: < Twilight switch > < Light on > < Light off >

Acknowledgement: The lighting switches on. The detector LED provides various feedback signals during transmission. After the changes have been completed, the green detector LED flashes three times to confirm this. The lighting then switches off.

Twilight switch

When **< Twilight switch >** operating mode is active, the lighting is controlled based exclusively on the brightness switching value. You can find information on setting the brightness switching value and accepting the current light value in chapter → ["7.2.3 Brightness switching value" on page 28](#).

Switching on automatically

The twilight switch automatically switches **on** the lighting when ...

- The level of ambient light is below the configured brightness switching value

Switching off automatically

The twilight switch automatically switches **off** the lighting when ...

- The level of ambient light is above the configured brightness switching value

If the lighting is manually overridden via an external push button or via the **< Light on / off >** setting in the ESY Control app, the twilight switch returns to normal operation when the ambient light value exceeds or drops below the brightness switching value again.

Light on

When the **< Light on >** operating mode is active, the lighting is switched on regardless of ambient light conditions.

Light off

When the **< Light off >** operating mode is active, the lighting is switched off regardless of ambient light conditions.

The TS T model allows two time periods to be defined within the 24 hours of each day in which it is possible to deviate from the standard operating mode.

The following options are available:

- Twilight switch (light control on the basis of the brightness switching value)
- Light on (switches lighting on permanently regardless of ambient light conditions)
- Light off (switches lighting off permanently regardless of ambient light conditions)

i Ensure that the exception periods do not overlap.

Setting options: < Exception 1 > < Exception 2 >

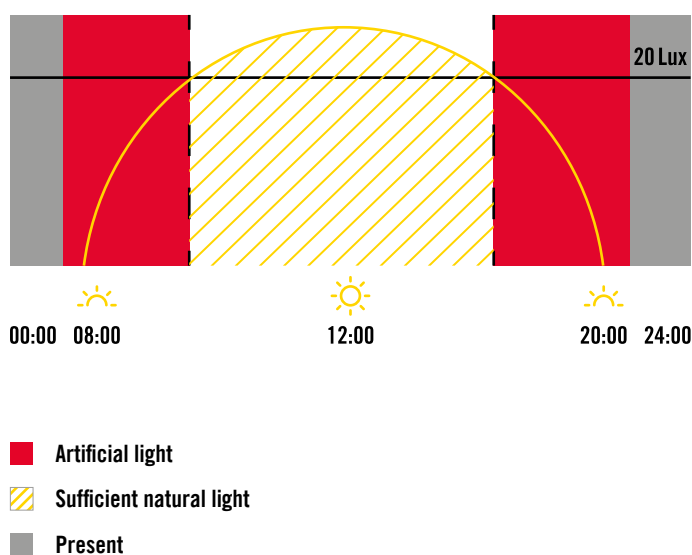
Acknowledgement: The lighting switches on. The detector LED provides various feedback signals during transmission. After the changes have been completed, the green detector LED flashes three times to confirm this. The lighting then switches off.

Example:

Setting in the ESY Control app:

- Standard operating mode – twilight switch
- Exception 1 – light off from 22:00 to 06:00

In the application example, the TS T switches on the lighting as usual during the early evening and early morning if there is insufficient daylight. By contrast, the lighting is intentionally deactivated between 22:00 and 06:00, in order to reduce energy consumption and also reduce night-time light pollution.



7.2.3 Brightness switching value

The < **brightness switching value** > is a threshold value for controlling the lighting.

The twilight switch automatically switches **on** the lighting when ...

- The level of ambient light is below the configured brightness switching value

The twilight switch automatically switches **off** the lighting when ...

- The level of ambient light is above the configured brightness switching value

Setting options: < 2 - 500 lx > < **Accept current light value** >

In the < **Accept current light value** > setting, you can read in the current light value as a brightness switching value. In this case, the twilight switch measures the current light value and adopts this as the new brightness switching value.

Acknowledgement: The lighting switches on. The detector LED provides various feedback signals during transmission. After the changes have been completed, the green detector LED flashes three times to confirm this. The lighting then switches off.

7.2.4 Reset to default settings

This setting is used to reset all settings to the default settings. You can find the default settings in chapter → ["5.2 Default settings" on page 19](#).

Acknowledgement: The lighting switches on. The detector LED provides various feedback signals during transmission. After the changes have been completed, the green detector LED flashes three times to confirm this. The lighting then switches off.

7.2.5 Test mode

In **< Test mode >**, you can test the twilight switch. The twilight switch switches on automatically when the level of ambient light is below the configured brightness switching value.

Setting options: **< On >** **< Off >**

Acknowledgement: The sensor LED flashes turquoise when test mode is active. If the level of ambient light is below the configured brightness switching value, the red sensor LED briefly flashes once and the lighting switches on. Once test mode is no longer active, the green detector LED flashes three times to confirm this.

7.2.6 Password protection

A personal password can be set to prevent unauthorised parties from configuring the twilight switch. The best way to use this setting is by configuring a "Project" in the ESY Control app. This is the only way to ensure that the new password is documented in a PDF report.

The twilight switch has the password 0000 by default and is unprotected. A new password must be set to activate password protection. You can unlock the twilight switch again by entering the selected password.

To remove **< password protection >** again, enter the current password and then set 0000 as the new password. Alternatively, you can completely disconnect the device from the mains voltage for one minute.

Acknowledgement: The lighting switches on. After the change has been completed, the violet detector LED flashes four times to indicate that the infrared signal has been successfully received. The lighting then switches off. If the password is entered incorrectly or there is a transmission fault, the detector LED flashes violet – red – violet – violet.

8. Manual control via push button

The twilight switch is equipped with a connection for an external push button (S terminal, for information on connection see chapter → ["4.2.2 Standard operation with additional control using a push button" on page 18](#)). This means that the twilight switch can be manually overridden at any time so that the lighting can be switched on or off individually.

The twilight switch switches the lighting **on** until ...

- the brightness level exceeds the set switching value
- or**
- Until an external push button is pressed again

The twilight switch switches the lighting **off** until ...

- the brightness level falls below the set switching value
- or**
- Until an external push button is pressed again

Switching on lighting manually

You can send the following temporary commands using the external push button:

- Briefly press (< 1 second) the push button once.
- ✓ The lighting is switched on or off.

- Briefly press (< 1 second) the push button twice within 4 seconds.
- ✓ The lighting is switched on or off for 4 hours continuously.

- Briefly press (< 1 second) the push button three times within 4 seconds.
- ✓ The lighting is switched on or off for 12 hours continuously.

To cancel a temporary command, briefly press the push button once or select the following setting in the ESY Control app → ["7.1.3 Reset to automatic mode" on page 24](#)).

Example 1:

The lighting is switched on and the user wants to switch it off for the next 12 hours.

- Briefly press the push button three times within 4 seconds.

Example 2:

The lighting is switched off and the user wants it to remain switched off for the next 12 hours.

- Briefly press the push button once to switch on the lighting.
- Wait for longer than 4 seconds.
- Briefly press the push button once to switch off the lighting and press it again twice within 4 seconds to switch the lighting off continuously for 12 hours.

9. Maintenance

The device is maintenance-free. In the event of damage the entire device must be replaced.

9.1 Cleaning

WARNING!

Using the wrong cleaning products will damage the device. Do not use corrosive cleaning agents or solvents for cleaning and care of the device.

- Use a lint-free cloth that is either dry or dampened with water.

9.2 Troubleshooting

Fault	Cause
The lighting does not switch on automatically	<ul style="list-style-type: none"> - The level of ambient light is above the configured brightness switching value - Lighting has been switched off manually - <i>Time-dependent operating modes</i> are set
The lighting does not switch off automatically	<ul style="list-style-type: none"> - <i>Time-dependent operating modes</i> are set
The lighting switches off when it gets dark	<ul style="list-style-type: none"> - The level of ambient light is above the configured brightness switching value - Lighting has been switched off manually - <i>Time-dependent operating modes</i> are set
Buttons do not work	<ul style="list-style-type: none"> - Device is still in the warm-up phase - The push button was used without the neutral conductor connected - The push button is not routed to the S terminal
Twilight switch does not respond	<ul style="list-style-type: none"> - No power supply; check the mains voltage.

10. Technical data

Attachment

Installation type	Layout
Installation position	Wall
Connection	NYM 3x1.5 mm ² ... NYY 5x2.5 mm ² Ø min. 2x 9 mm... Ø max. 2x 15 mm

Housing

Dimensions	92 mm x 108 mm x 46 mm	
Weight	TS 168 g	TS T 172 g

Technical data

Housing

Material	UV-resistant plastic
Protection type	IP55
Permissible ambient temperature	-25°C ... +50°C
Relative humidity	10 - 90 %, non-condensing
Impact resistance	IK07
Colour	White, similar to RAL 9003

Electrical design

Protection class	II
Nominal voltage	220 - 240 V~ / 50 - 60 Hz
Stand-by consumption	< 0.5 W
In-rush current	800 A / 200 µs

Sensor devices

Level of brightness	2 - 500 lx
Slave input	No
Number of parallel switchable twilight switches	10
Twilight switch	Yes
Light on	Yes
Light off	Yes
Switching delay from "dark to light" [s]	180 s
Switching delay from "light to dark" [s]	60 s

Controls

Channel 1	Lighting
Interface	Switching
Contact	Normally open contact / non-floating

Disposal

Controls

Switching capacity channel 1	230 V / 50 - 60 Hz 2300 W / 10 A ($\cos \varphi = 1$), 1150 VA / 5 AX ($\cos \varphi = 0,5$)
Zero-cross switching	Yes
Push button input channel 1	1

11. Disposal



This device must not be disposed of as unsorted residual waste. Used devices must be disposed of correctly. Contact your local town council for more information.

12. EU Declaration of Conformity

CE declaration

The product complies with the following directives:

EMC 2014 / 30 / EU
LVD 2014 / 35 / EU
RoHS 2011 / 65 / EU
Reach 1907 / 2006 / EC
Ecodesign 2009 / 125 / EC

13. ESYLUX manufacturer's guarantee

The ESYLUX manufacturer's guarantee can be found on the relevant product page at www.esylux.com.