OBELUX
AVIATION LIGHTS

LIT Series

Low-Intensity Tower Light

ICAO Low-intensity Type A 10 cd
ICAO Low-Intensity Type B and Type E 32 cd
Low-Intensity 50/70 cd

User's Manual

Version 1.1

23.05.2022

CONTENTS:

1 CHANGELOG

Version:	Date:	Description:	Author:
0.1	23.10.2019	Document created	JSi
0.2	30.11.2020	Front page picture updated	JSi
1.0	10.03.2022	Added table of contents and numbered headers. Added device mounting chapters. Updated versions and order coding tables. Added grounding chapter. Added maintenance chapter. Various cosmetic changes.	INi
1.1	23.05.2022	Updated chapters 5.3, 6.1 and 6.2. Corrected some spelling mistakes.	INi

2 ABOUT THIS DOCUMENT

This document describes the installation and setup of the LIT series Obelux light head unit.

Table 1. Acronyms and abbreviations

1N	Single phase
cd	candela
DIP	Dual in line package
FPM	Flashes per minute
ICAO	International Civil Aviation Organization
IR	Infrared
LED	Light emitting diode
LH	Light head (Obelux light unit)
LI	Low intensity
LIT	Low intensity tower
NVG	Night vision goggle
SW	Software

3 SAFETY INSTRUCTIONS

In this section, you will find general safety instructions for the device. Please read the instructions carefully before installing or using the device to avoid any personal, environmental, or material damages.

3.1 Safety considerations

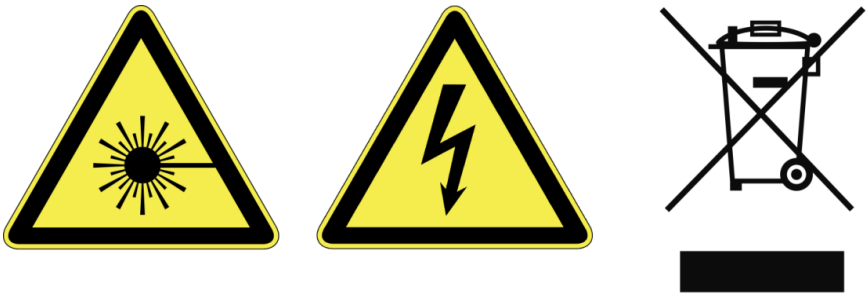
Obelux aviation obstruction lights are Class 2M LED devices. This class is safe for accidental viewing under all operating conditions. However, it may not be eye-safe for a person who deliberately stares into the LED beam by overcoming their natural aversion response to the very bright light.

3.2 Environmental considerations

The European Parliament and the Council of European Union issued directive 2012/19/EU to contribute to sustainable production and consumption by, as a priority, the prevention of WEEE and, in addition, by the re-use, recycling and other forms of recovery of such wastes to reduce the disposal of waste and to contribute to the efficient use of resources and the retrieval of valuable secondary raw materials.

Obelux aviation obstacle light products sold inside European Union can be returned to manufacturer if no local WEEE separate collection and re-use services are available. Please contact Obelux for details.

Obelux does not refurbish returned items but forwards them to authorized WEEE treatment facility.



4 ABOUT THIS PRODUCT

LIT series is designed to mark intermediary levels of wind turbines. The light is installed from inside the wind tower. All maintenance and replacement work can be done from inside the tower which allows savings in case of maintenance or repair is needed.

LIT series obstruction lights are microcontroller operated lights based on LED technology and provide 10cd, 32cd, 50cd or 70cd color aviation red light. Models are available which provide additionally Night Vision Goggle (NVG) compliant infrared (850 nm) light.

Alarm relay and fault monitoring are integrated into all models. Options for lights include an integrated photocell that can drive the transitions between day, twilight and night modes, external control voltage signal and Modbus communications.

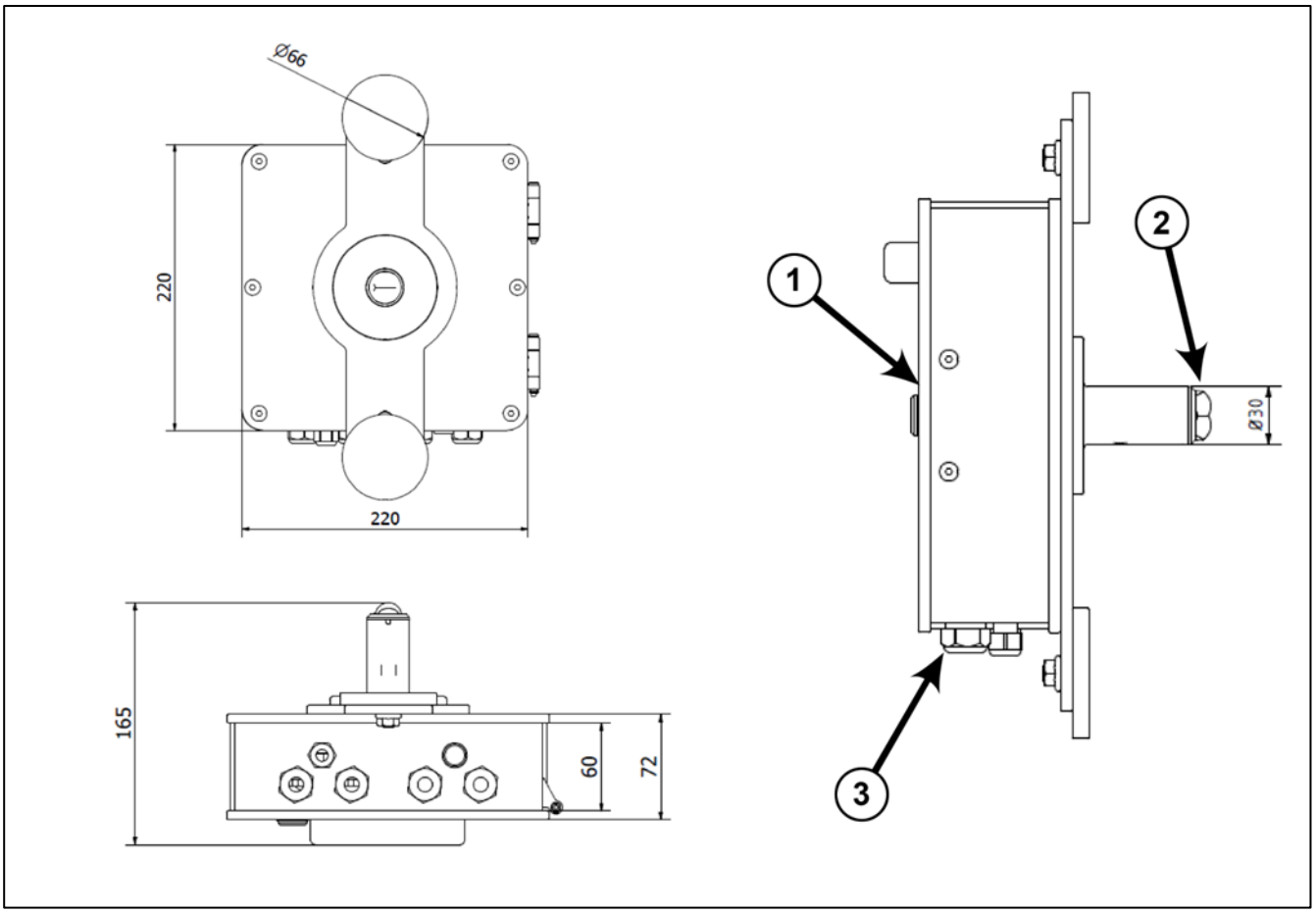


Figure 1. Main functional parts of the light head

1. Service access door
2. Photocell and LEDs
3. Cable glands (4) M25

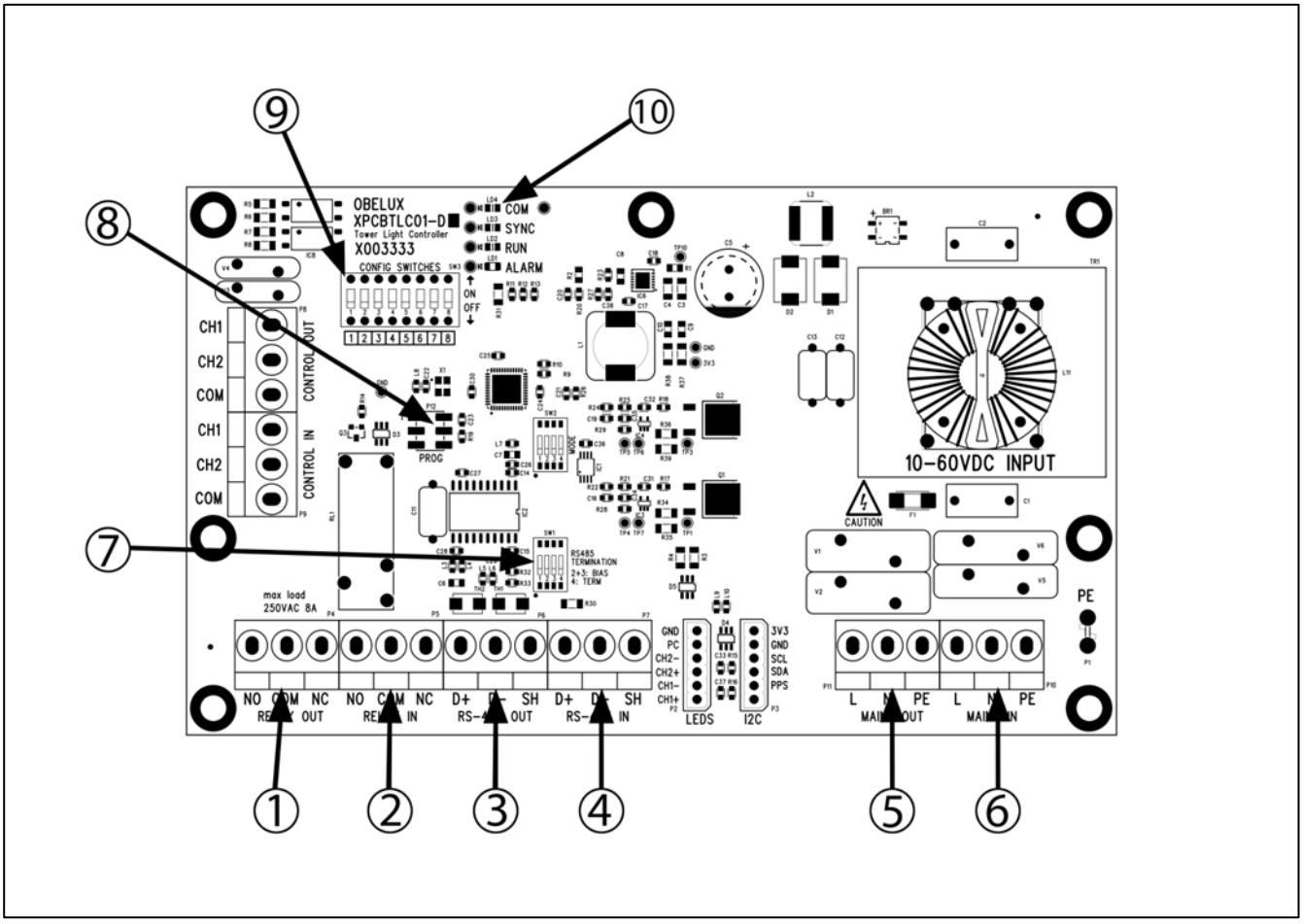


Figure 2. PCB of the light head

1. Alarm relay OUT
2. Alarm relay IN
3. RS-485 (Modbus) OUT
4. RS-485 (Modbus) IN
5. Mains OUT
6. Mains IN
7. RS-485 termination DIP switch (DIP4)
8. Programming terminal
9. Configuration DIP switches
10. Status LEDs

4.1 Versions

Obelux LIT series is available as the following models:

Order code	Output	ICAO	Operating voltage	Infrared	Tube diameter	Alarm Relay	RS-485 Modbus	Control Signal	Photocell
LIT10-AC115-xxC-y-z	10 cd	Type A	115 V_{AC}	No	Ø18 mm	Yes	Option	Option	Option
LIT10-AC115-xxD-y-z	10 cd	Type A	115 V_{AC}	No	Ø30 mm	Yes	Option	Option	Option
LIT10-AC115-IR-xxD-y-z	10 cd	Type A	115 V_{AC}	Yes	Ø30 mm	Yes	Option	Option	Option
LIT10-AC230-xxC-y-z	10 cd	Type A	230 V_{AC}	No	Ø18 mm	Yes	Option	Option	Option
LIT10-AC230-xxD-y-z	10 cd	Type A	230 V_{AC}	No	Ø30 mm	Yes	Option	Option	Option
LIT10-AC230-IR-xxD-y-z	10 cd	Type A	230 V_{AC}	Yes	Ø30 mm	Yes	Option	Option	Option
LIT10-DC-xxC-y-z	10 cd	Type A	10-60 V_{DC}	No	Ø18 mm	Yes	Option	Option	Option
LIT10-DC-xxD-y-z	10 cd	Type A	10-60 V_{DC}	No	Ø30 mm	Yes	Option	Option	Option
LIT10-DC-IR-xxD-y-z	10 cd	Type A	10-60 V_{DC}	Yes	Ø30 mm	Yes	Option	Option	Option
LIT32-AC115-xxC-y-z	32 cd	Type B/E	115 V_{AC}	No	Ø18 mm	Yes	Option	Option	Option
LIT32-AC115-xxD-y-z	32 cd	Type B/E	115 V_{AC}	No	Ø30 mm	Yes	Option	Option	Option
LIT32-AC115-IR-xxD-y-z	32 cd	Type B/E	115 V_{AC}	Yes	Ø30 mm	Yes	Option	Option	Option
LIT32-AC230-xxC-y-z	32 cd	Type B/E	230 V_{AC}	No	Ø18 mm	Yes	Option	Option	Option
LIT32-AC230-xxD-y-z	32 cd	Type B/E	230 V_{AC}	No	Ø30 mm	Yes	Option	Option	Option
LIT32-AC230-IR-xxD-y-z	32 cd	Type B/E	230 V_{AC}	Yes	Ø30 mm	Yes	Option	Option	Option
LIT32-DC-xxC-y-z	32 cd	Type B/E	10-60 V_{DC}	No	Ø18 mm	Yes	Option	Option	Option
LIT32-DC-xxD-y-z	32 cd	Type B/E	10-60 V_{DC}	No	Ø30 mm	Yes	Option	Option	Option
LIT32-DC-IR-xxD-y-z	32 cd	Type B/E	10-60 V_{DC}	Yes	Ø30 mm	Yes	Option	Option	Option
LIT50-AC115-xxC-y-z	50 cd	-	115 V_{AC}	No	Ø18 mm	Yes	Option	Option	Option
LIT50-AC115-xxD-y-z	50 cd	-	115 V_{AC}	No	Ø30 mm	Yes	Option	Option	Option
LIT50-AC115-IR-xxD-y-z	50 cd	-	115 V_{AC}	Yes	Ø30 mm	Yes	Option	Option	Option
LIT50-AC230-xxC-y-z	50 cd	-	230 V_{AC}	No	Ø18 mm	Yes	Option	Option	Option
LIT50-AC230-xxD-y-z	50 cd	-	230 V_{AC}	No	Ø30 mm	Yes	Option	Option	Option
LIT50-AC230-IR-xxD-y-z	50 cd	-	230 V_{AC}	Yes	Ø30 mm	Yes	Option	Option	Option
LIT50-DC-xxC-y-z	50 cd	-	10-60 V_{DC}	No	Ø18 mm	Yes	Option	Option	Option
LIT50-DC-xxD-y-z	50 cd	-	10-60 V_{DC}	No	Ø30 mm	Yes	Option	Option	Option
LIT50-DC-IR-xxD-y-z	50 cd	-	10-60 V_{DC}	Yes	Ø30 mm	Yes	Option	Option	Option
LIT70-AC115-xxD-y-z	70 cd	-	115 V_{AC}	No	Ø30 mm	Yes	Option	Option	Option
LIT70-AC115-IR-xxD-y-z	70 cd	-	115 V_{AC}	Yes	Ø30 mm	Yes	Option	Option	Option
LIT70-AC230-xxD-y-z	70 cd	-	230 V_{AC}	No	Ø30 mm	Yes	Option	Option	Option
LIT70-AC230-IR-xxD-y-z	70 cd	-	230 V_{AC}	Yes	Ø30 mm	Yes	Option	Option	Option
LIT70-DC-xxD-y-z	70 cd	-	10-60 V_{DC}	No	Ø30 mm	Yes	Option	Option	Option
LIT70-DC-IR-xxD-y-z	70 cd	-	10-60 V_{DC}	Yes	Ø30 mm	Yes	Option	Option	Option

ICAO:
Low-intensity Type A = 10cd RED fixed
Low-intensity Type B = 32cd RED fixed
Low-intensity Type E = 32cd RED flashing

xx = tube length
(standard lengths are 50 and 118 mm, other lengths available on request)

y = options
z = mounting variant

4.2 Order coding

LIT	10 32 50 70	–	AC115 AC230 DC	–	IR	–	50C 50D 118C 118D 330D	–	M	C	P	–	SG1	–	10
Series	Output [cd]		Operating voltage		Infrared (*)		Pin size (D x L) 50C = 18x50mm 50D = 30x50mm 118C = 18x118mm 118D = 30x118mm 330D = 30x330mm		Modbus / RS-485	Control voltage 5-55VDC for IR and / or RED	Photocell		Mounting set with adjustable installation depth		10-year warranty

***** If IR option is selected, the tube diameter must always be 30 mm (D)

Green = factory installed options
(If empty, no option in question is selected)

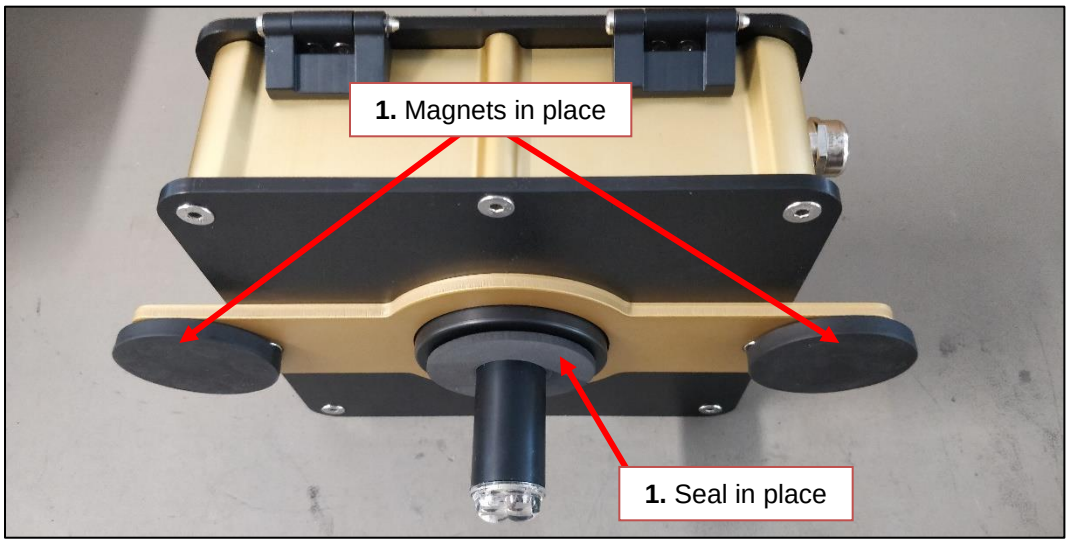
Ordering code examples: LIT10-AC230-IR-50D-MC-10
LIT32-DC-118C

5 INSTALLATION

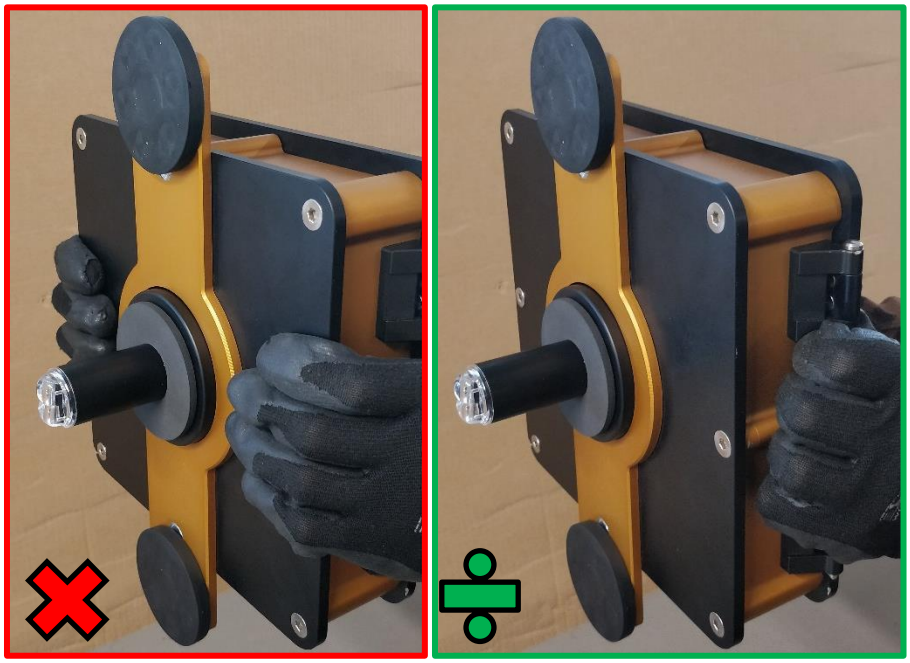
This chapter describes the installation procedure of the light unit.

5.1 Normal model mounting

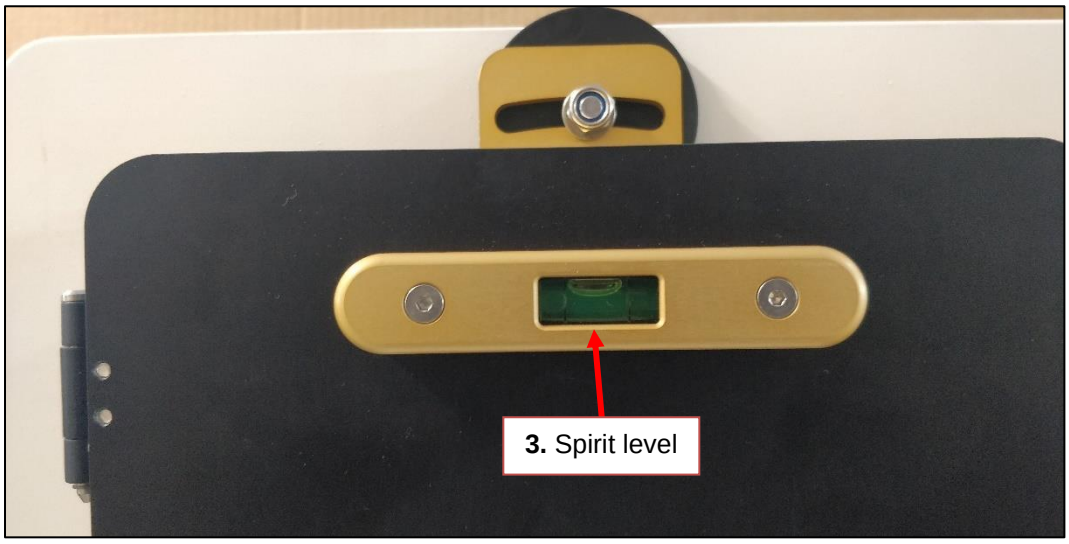
1. Before mounting the light to tower wall, make sure there is seal around the pin and the magnets are in place.

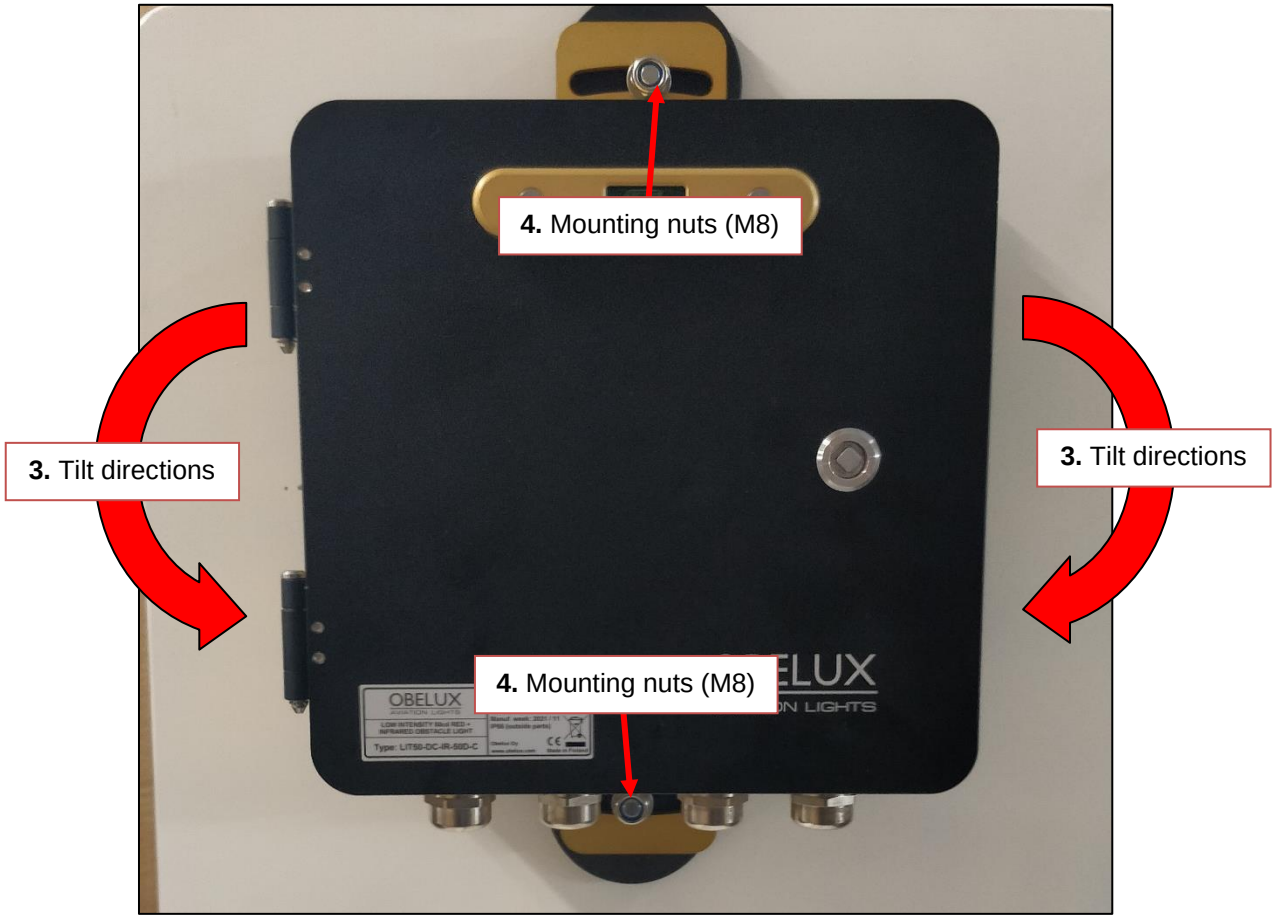


2. Mount the light carefully to the tower wall while guiding the pin inside the hole.
<u>Crushing hazard:</u> Beware of the magnets and make sure that there are no objects, fingers etc. between the magnets and tower wall!



3. Tilt the light until it is horizontally levelled. Use the spirit level as guidance.
4. Tighten the M8 mounting nuts.

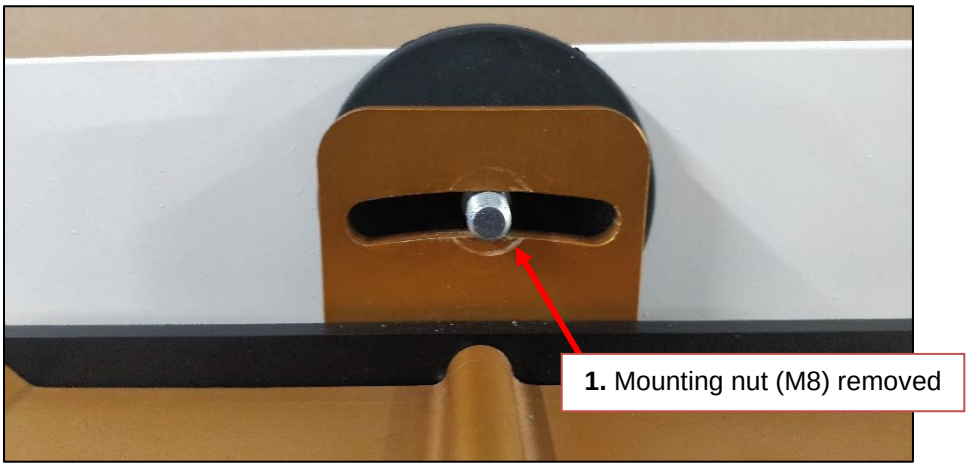




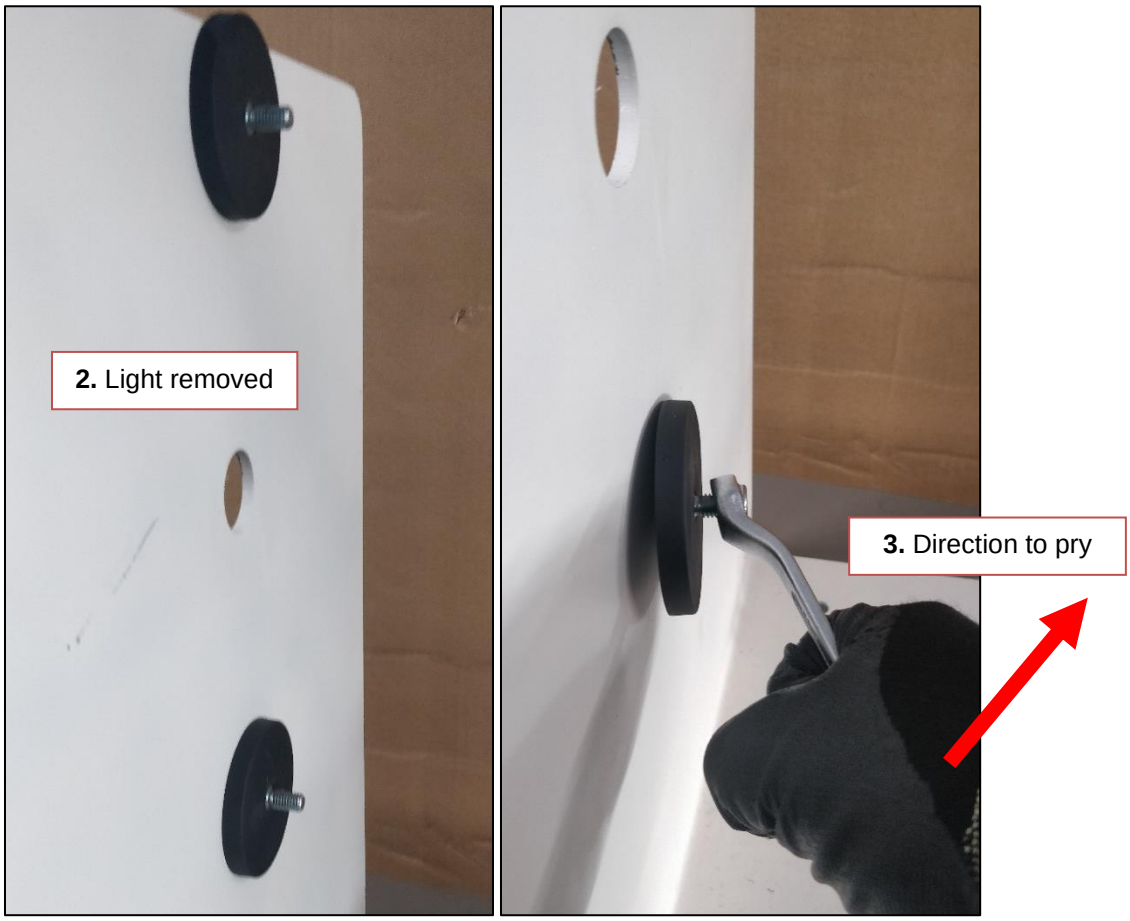
5.1.1 Light removal

In case the light needs to be removed from the tower wall:

1. Remove the M8 mounting nuts from both magnets.

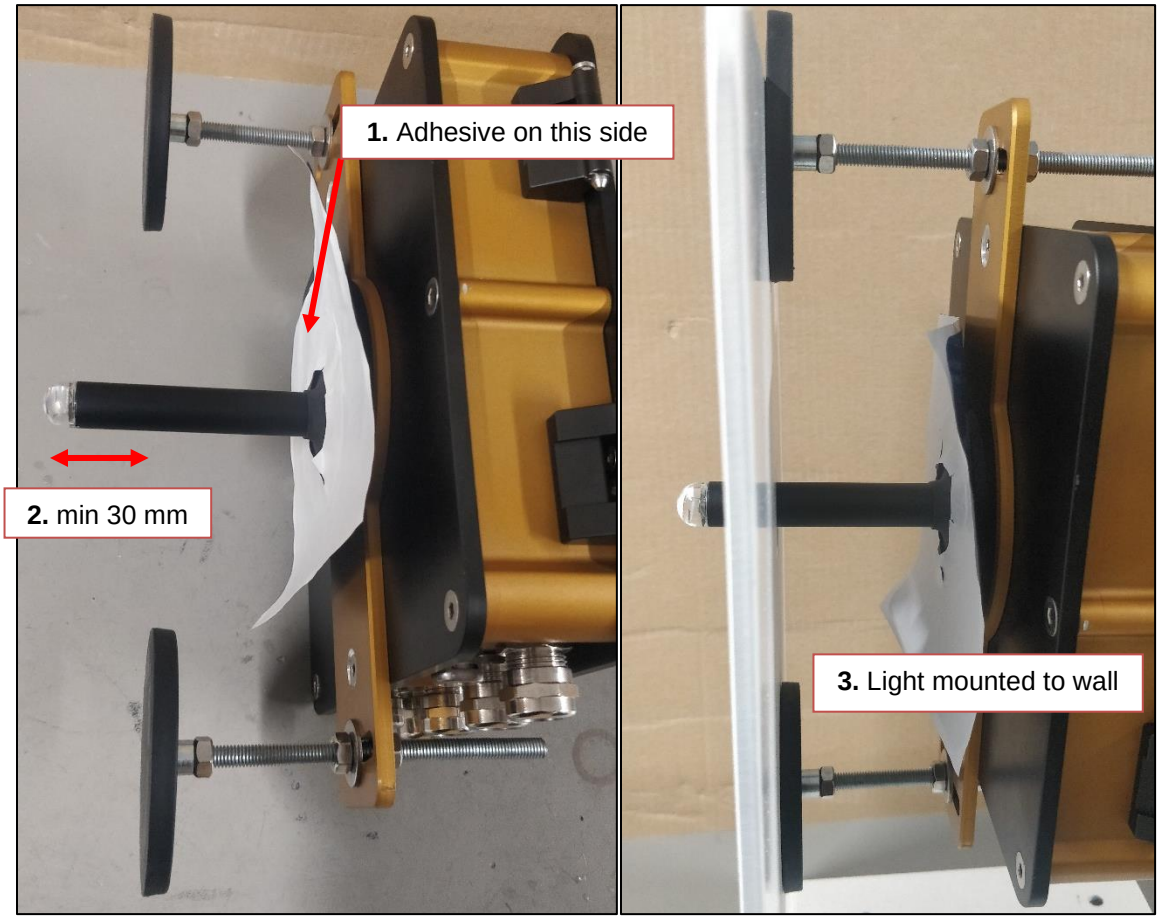


2. Pull the light backwards to get it out from the magnets.
3. Insert the M8 mounting nuts back to the magnets' threaded studs and use, for example, a spanner to pry the magnets from the wall.

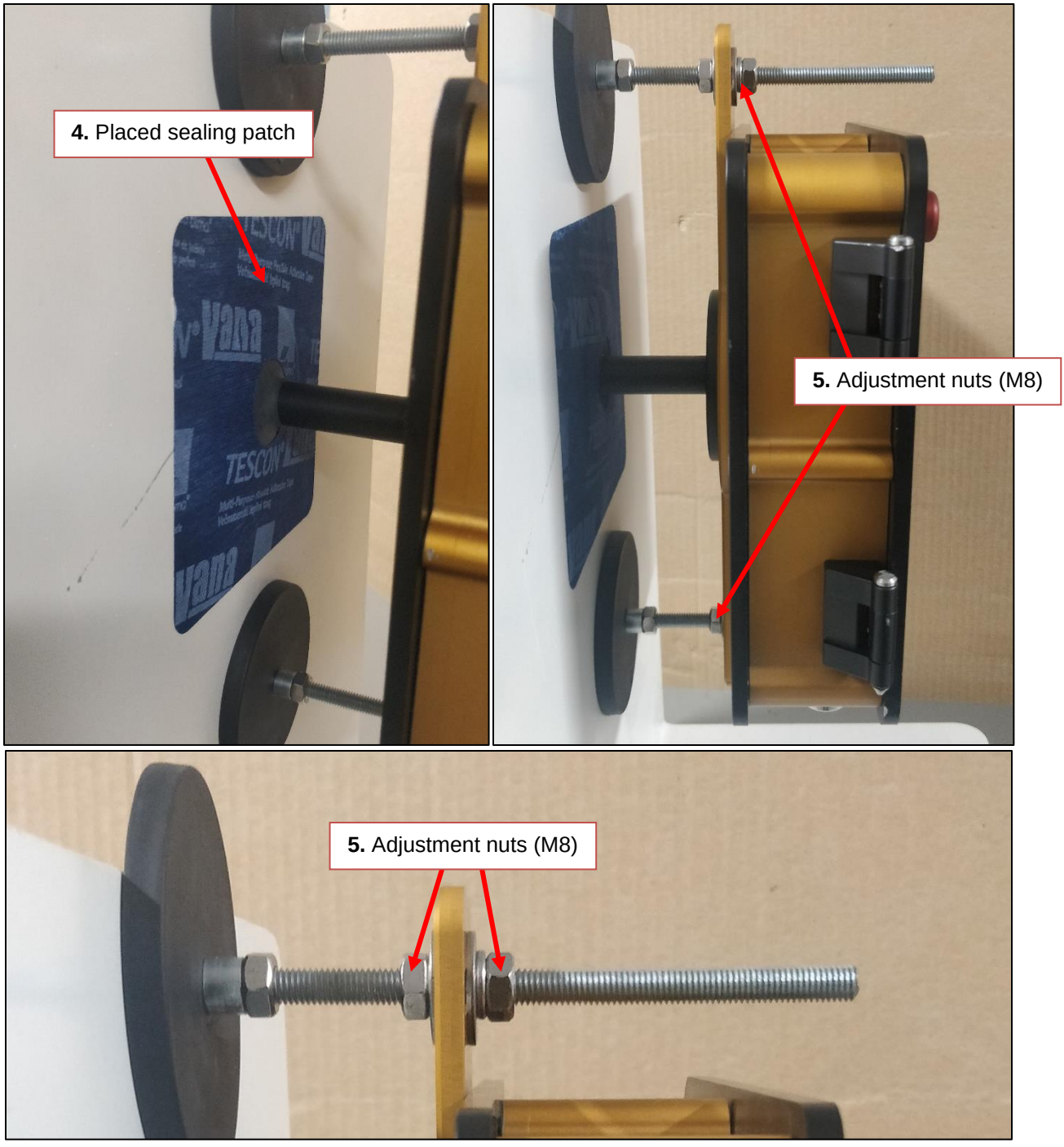


5.2 SG1 model mounting

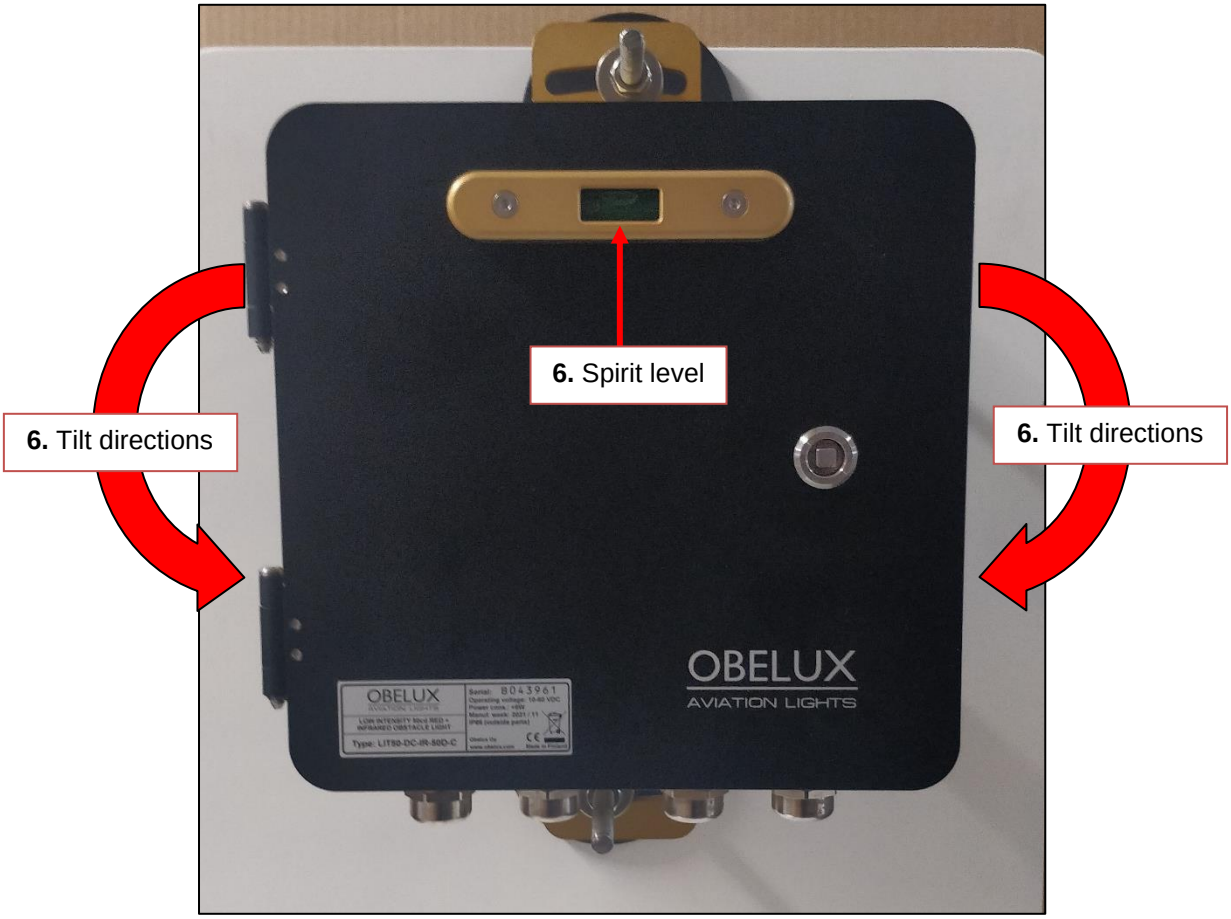
1. Before mounting the light to tower wall, make sure that there is a sealing patch fitted through the light's pin and the adhesive side is pointing towards the end of the pin.
2. Make sure that there is at least 30 mm of pin length beyond the magnets surface to ensure the pin goes inside the hole before magnets attach to the wall.
3. Mount the light carefully to the tower wall while guiding the pin inside the hole.
   Crushing hazard: Beware of the magnets and make sure that there are no objects, fingers etc. between the magnet and tower wall!



4. Remove the tape from the sealing patch and place it on the tower wall.
5. Adjust the installation depth to desired length by moving the M8 nuts on the threaded rods.

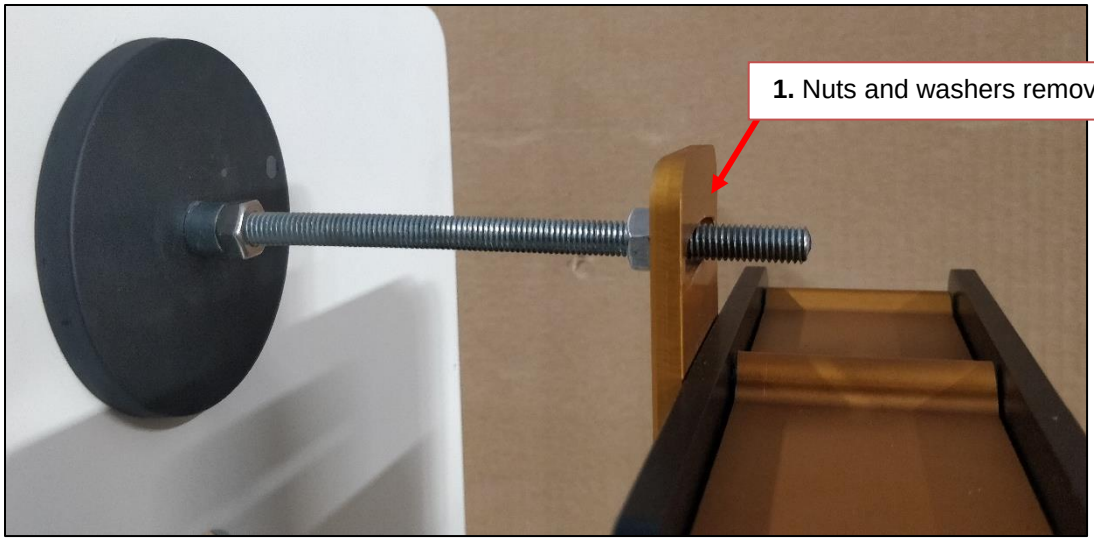


6. Tilt the light until it is horizontally levelled. Use the spirit level as guidance.
7. Tighten the M8 adjustment nuts.

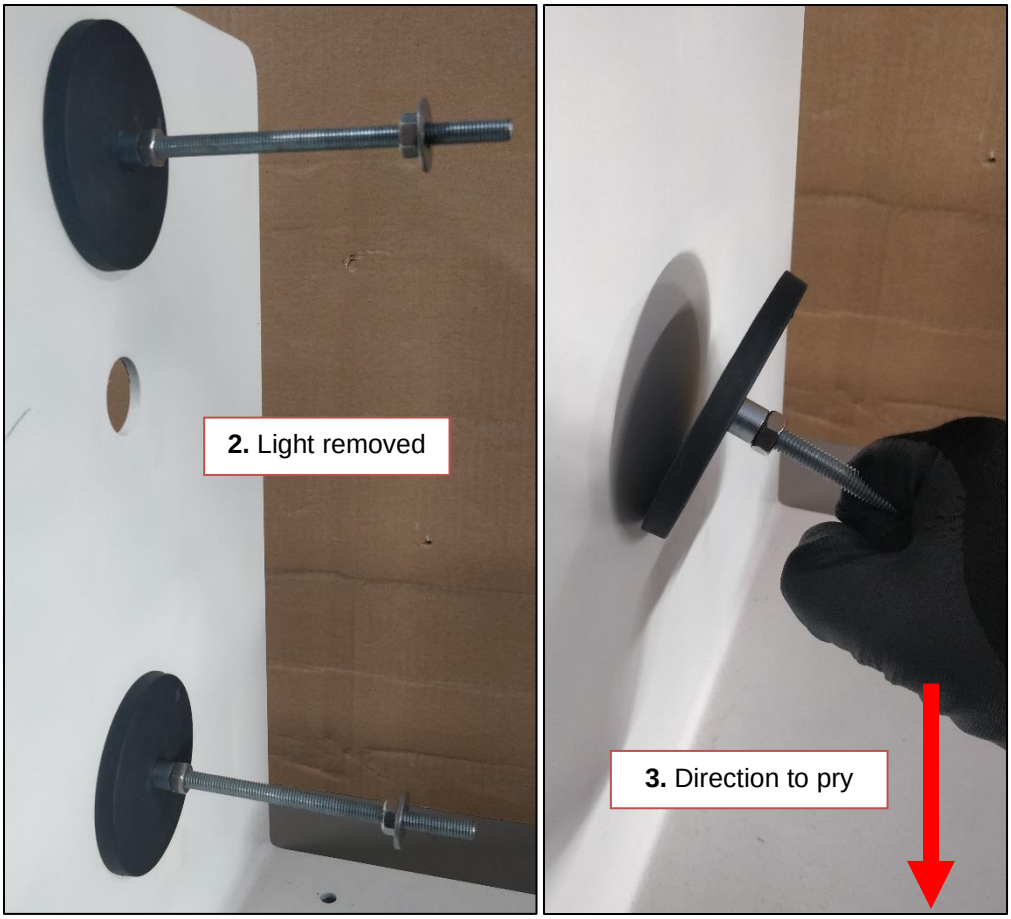


5.2.1 Light removal

1. Remove the M8 nuts and washers from both magnets.

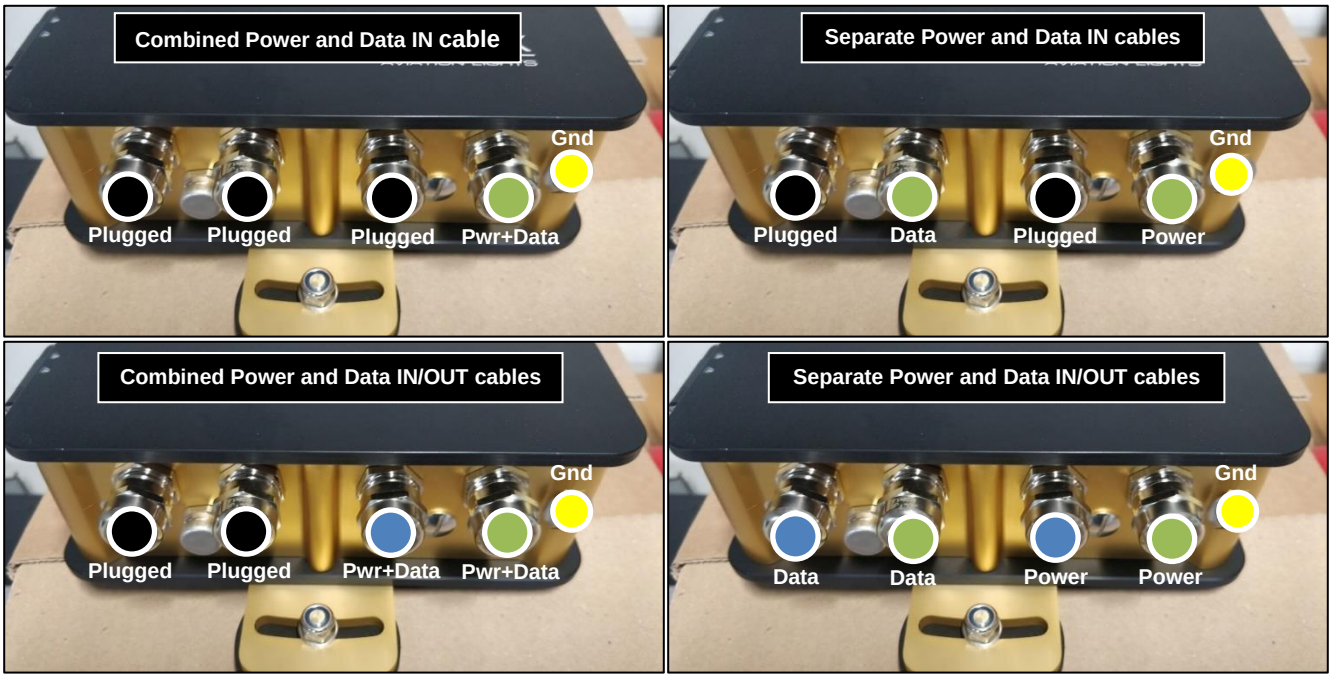


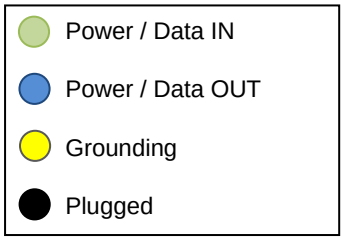
2. Pull the light backwards to get it out from the magnets.
3. Grab from the threaded rods and pry the magnets from the wall.



5.3 Wiring

Route power and data cables using cable gland(s) on the bottom of light unit. Lights can be daisy-chained (both power and data) if necessary. Below are the typical cable routing configurations.





Connect the cable wires securely to appropriate terminal block connectors. The light connectors are described in the following chapters. After configuring the unit, close the lid properly.

Make sure that all unused cable glands are sealed. Round sealing pieces that come with the packaging can be used for that purpose.

5.3.1 Mains In / Out (AC115 and AC230 versions, 1N)

Make sure the mains supply is disconnected before starting the wiring process.

Mark	Description	Information
L	Live terminal	Connect the mains supply Live (brown) wire into this connector
N	Neutral terminal	Connect the mains supply Neutral (blue) wire into this connector
PE	Protective earth	Connect the protective earth (yellow/green) wire into this connector

Conductor cross section: 0,2 mm^2 – 4 mm^2

From the “Out” connector, power can be distributed to the next light.

5.3.2 DC In / Out (DC versions)

Make sure the DC power supply is disconnected before starting the wiring process.

Mark	Description	Information
+	Positive	Connect the power supply output positive into this connector
-	Negative	Connect the power supply output negative into this connector
GND	Ground	Protective earth

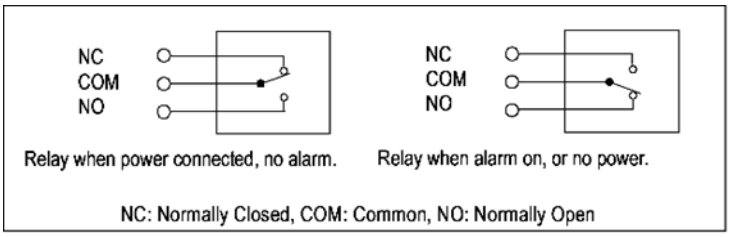
Conductor cross section: 0,2 mm^2 – 4 mm^2

From the “Out” connector, power can be distributed to the next light.

5.3.3 Alarm Relay In / Out

Mark	Description	Information
NO	Normally Open	Normally open / in alarm, connected with COM
COM	Common	Common relay contact
NC	Normally Connected	Normally connected with COM / in alarm, open

Conductor cross section: 0,2 mm^2 – 1,5 mm^2
Relay rating: Dry Contact 250 VAC (8 A) or 60 VDC (0,75 A)



Unused alarm relay connectors can be left floating, i.e., no wiring there is required.

5.3.4 Modbus (RS-485) In / Out

Mark	Description	Information
D+	Data +	RS-485 non-inverting pin
D-	Data -	RS-485 inverting pin
SH	Shield	Shield

Conductor cross section: 0,2 mm^2 – 1,5 mm^2

From the “Out” connector, data can be distributed to the next light.

5.3.5 Grounding

There is a designated M6 screw at the corner of the frame for device grounding.

6 CONFIGURATION AND OPERATION

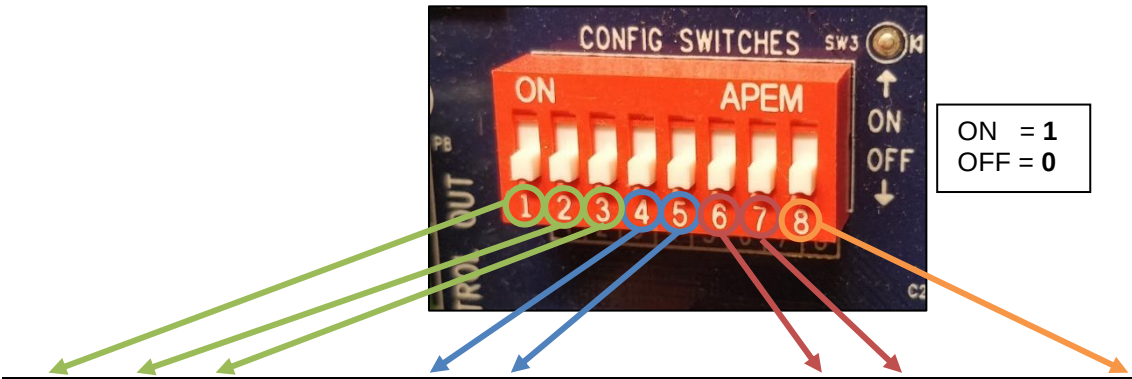
The LIT series lights support both Stand-alone and Modbus operation. In Stand-alone mode, the light is steady burning or flashing. In Modbus operation, the light is controlled with an Obelux controller as a part of an aviation light system. Power recycling / light reset is required when changing between Stand-alone and Modbus modes.

6.1 Stand-alone mode

In this mode, the light operation is configured with DIP switches. No additional controllers are needed.

Using the DIP switches, configure the desired parameters into the light. The DIP switches are numbered 1 - 8. Embedded software in the obstruction light reads configuration switches regularly. Configuration change becomes effective within few seconds.

The light is in Stand-alone mode when DIP 8 is OFF. Switches 1 - 3 control the FPM of the light and 4 - 5 control the photocell if the light has that option available. When photocell is disabled, the light is always on, and the lux value setting turns the light off when the ambient illuminance exceeds the selected value. Switches 6 and 7 are unused.



DIP1	DIP2	DIP3		DIP4	DIP5		DIP6	DIP7		DIP8	
0	0	0	Steady*	0	0	Photocell disabled*	0	0	Unused*	0	Stand-alone*
1	0	0	20 FPM	1	0	200 lux					
0	1	0	30 FPM	0	1	400 lux					
1	1	0	40 FPM	1	1	800 lux					
0	0	1	60 FPM								
1	0	1	Reserved								
0	1	1	Reserved								
1	1	1	Reserved								

** Factory default*

Note 1: If photocell option is not present it is recommended to set its DIP switches to 0.

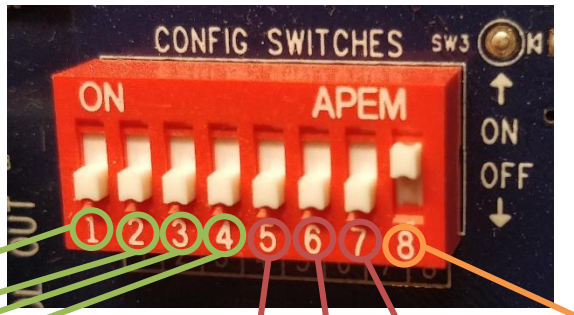
Note 2: DIP switches 6 - 7 are unused but it is recommended to set them to 0.

6.2 Modbus mode

In this mode, the light is being controlled by an external Obelux controller.

The lights time-of-day mode and FPM are set by the controller. In case of an alarm the light head will give an alarm to the Obelux controller. Details of the light head alarm can be read from the controller.

The light is in Modbus mode when DIP 8 is ON. Switches 1 - 4 are used to give the light a Modbus address. Duplicate addresses on the same bus are not allowed. Give lights connected to the same communication bus an address starting from Address 1. Switches 5 - 7 are unused.



ON = **1**
OFF = **0**

DIP1	DIP2	DIP3	DIP4		DIP5	DIP6	DIP7		DIP8	
0	0	0	0	Address 1*	0	0	0	Unused	1	Modbus
1	0	0	0	Address 1						
0	1	0	0	Address 2						
1	1	0	0	Address 3						
0	0	1	0	Address 4						
1	0	1	0	Address 5						
0	1	1	0	Address 6						
1	1	1	0	Address 7						
0	0	0	1	Address 8						
1	0	0	1	Address 9						
0	1	0	1	Address 10						
1	1	0	1	Address 11						
0	0	1	1	Address 12						
1	0	1	1	Address 13						
0	1	1	1	Address 14						
1	1	1	1	Address 15						

** Setting for "Address 0" is considered as Address 1 and is not a unique address!*
Note: DIP switches 5 - 7 are unused but it is recommended to set them to 0.

6.2.1 RS-485 termination

RS-485 bus should be terminated with on-board 120-ohm resistors on both ends of the communications bus. This can be done by turning DIP 4 from the termination DIP switches ON, if necessary. Only the last light on the bus should have the termination on. The location of termination DIP switch can be seen in Figure 2.

6.3 Onboard LEDs

Status indication LEDs are located on the controller board. Some of the status indicators can have three operating states (off, lit and blinking).

LED	Description
COM	**Communication (GREEN)** OFF: Waiting for external signals FLASHING: Master-slave communications occurring on the network
SYNC	**Light Head (LH) operation (GREEN)** OFF: LH LED is off FLASHING: LH LED flashing in sync with the LED ON: LH LED is steady on
RUN	**Power on indicator (GREEN)** OFF: Power off FLASHING: Unit SW is running normally
ALARM	**Alarm indicator (RED)** OFF: Normal operation, no alarms ON: Active alarm condition

6.4 Causes for ALARM

- Light source failure, including decreased intensity level below rated level of light. Contact Obelux or your reseller.
- Photocell failure. Contact Obelux or your reseller.
- Power failure. Contact Obelux or your reseller.

6.5 Troubleshooting

The light doesn´t start

- No power, check that the RUN LED is illuminated.
- Incorrect configuration, check DIP switches.
- Loose wires, check that all wires are properly seated in terminal block connectors.
- Wrong operating voltage. Do not exceed maximum operating voltage. Mains power supply input is protected with overvoltage protection circuit that is tuned to stated operating voltage range.

No Modbus data connection to Obelux controller

- Check DIP settings. Check that light has a correct Modbus address and that there are no conflicting addresses. Make sure light is configured to Modbus mode (DIP8).
- Too many RS-485 termination resistors (120 ohm) on the same RS-485 communication bus. Only the last light on the bus should have the termination resistor in use.
- Check Modbus data wiring.

7 MAINTENANCE

The product is maintenance free and does not need scheduled part replacements. It is recommended to visually check the seal between tower and light and inside the access door at least once per 5 years.

Things to check inside the access door:

- No water is collected on the circuit board and/or bottom of the light
- No corrosion has accumulated on the metallic parts

Things to check for outer parts:

- Normal mounting variant: the seal is intact
- SG1 mounting variant: the seal has no ruptures, and the adhesive part has not detached from the tower wall

7.1 Spare parts

For products with normal mounting variant and Ø18 mm tube (LITxx-x-xx**C**-x):

Item	Order code	Description
1	X003224	1 x EPDM seal between tower and light, for normal mounting (Ø18 mm tubes)
3	MS-MG	Normal magnet mounting set, incl. 2 x (magnet and nut)

For products with normal mounting variant and Ø30 mm tube (LITxx-x-xx**D**-x):

Item	Order code	Description
2	X003423	1 x EPDM seal between tower and light, for normal mounting (Ø30 mm tubes)
3	MS-MG	Normal magnet mounting set, incl. 2 x (magnet and nut)

For products with SG1 mounting variant and all tube diameters (LITxx-x-x-x-**SG1**):

Item	Order code	Description
4	X004061	1 x Roflex 20 sealing grommet, Ø15 - 30 mm, EPDM, blue, for SG1 mounting
5	MS-MG-01	SG1 magnet mounting set, incl. 2 x (magnet, threaded rod, all washers, and all nuts)

Pictures with item numbers below: