

## Use and Maintenance Manual

## Flash LED Lighting System



LED FLASHING  
SYSTEM: SEQUENTIAL  
APPROACH  
THRESHOLD IDENTIFICATION  
CIRCLING GUIDANCE



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| Editions |            |                          |
|----------|------------|--------------------------|
| Revision | Date       | Notes                    |
| 2.0      | 24-02-2023 | Revision of the document |
|          |            |                          |

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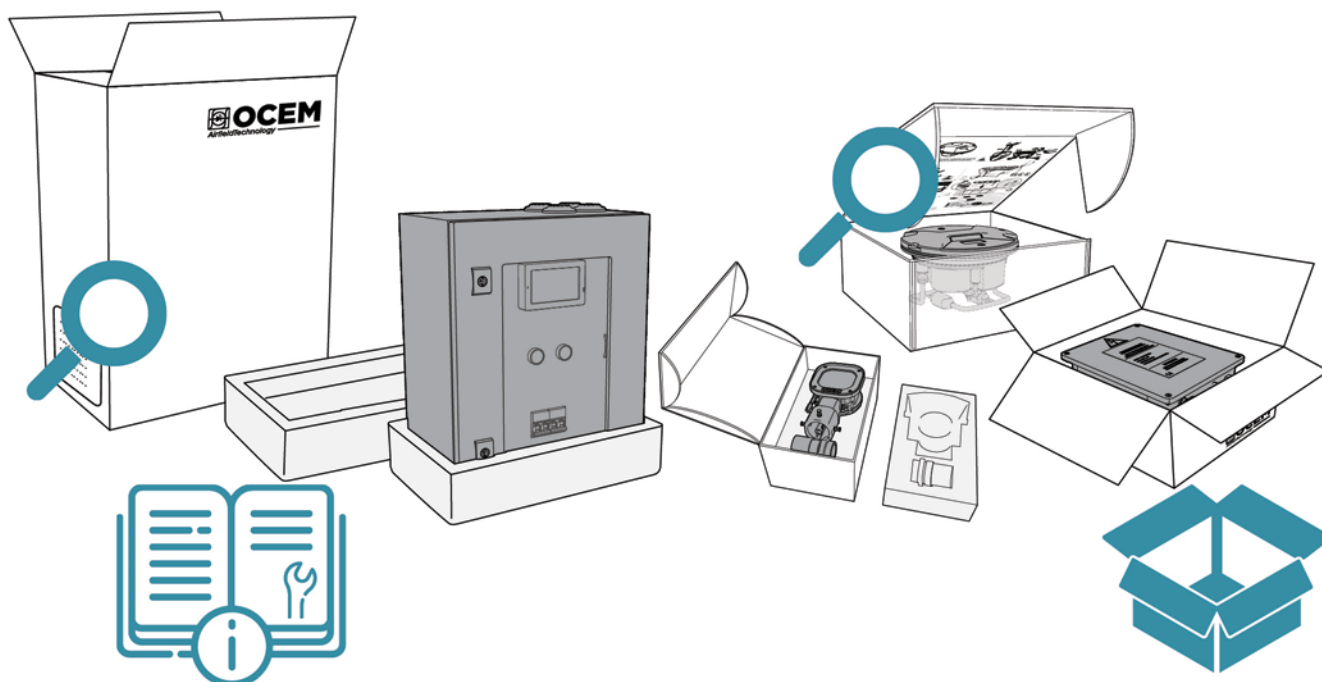
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## 1 GENERAL INFORMATION

### 1.1 Package content



The OCEM Airfield Technology LED FLASH SYSTEM consists of new-generation high intensity LED fixtures (elevated LEFL or inset LIFL), for unidirectional emissions (with 360° guidance system), with adjustable height, and with flashing light designed to provide a visual guidance to landing and take-off aircrafts:

- SFL: approach sequential flash light;
- RTIL: threshold identification light;
- CGL: circling guiding light.

Immediately check for visible damages of the containing box. Carefully remove the device and check for visible damages. Before proceeding read all warnings on the packaging.



**Store the device in its original packaging until the time of installation.**  
Do not lift the device from the supply cables to avoid damaging the cables or the watertightness of the device.



**The LEFL and LIFL fixtures described in this manual are designed to be supplied only with series circuits, supplied by a specific FMCU control unit, through FFU programmed field units. Always check the proper configuration of the system and the compatibility of the devices with the relevant system design.**

## 1.2 Manual reference guide

This document contains all the information related to the lighting system and describes the procedures to follow during the installation of the products and the main ordinary maintenance procedures. The document is intended for all operators that must intervene on the equipment.

**This document does not replace in any manner applicable laws, rules or regulations, included the standards FAA and ICAO.**

The precautions provided in the manual are always preceded by a symbol as illustrated below:



Indicates the warnings, the notes, the suggestions and other points on which is intended to draw the attention of the reader.



Indicates the operations to be carried out mandatorily or the information which should be carefully read to avoid possible risks.



Indicates particular risks connected with the power supply. It reports the operations to be carried out mandatorily or the information which should be carefully read to avoid possible risks.

These precautions safeguard the personal security of everyone who work on and/or are in proximity of the single equipment and of the relative supply circuits.

**The failure to comply with the instructions (in particular those preceded by danger, warning, caution precautions) can cause serious injury or death.**

## 1.3 Safety instructions



### CAREFULLY READ THIS DOCUMENT.

The improper use of the lighting system and of the equipments or the failure to comply all the precautions indicated implies life danger and serious injury to persons and damages to things.



### HAZARD OF ELECTRICAL SHOCK, EXPLOSION OR ELECTRIC ARC

Carefully read the enclosed documentation before installing or starting to use the lighting system.

Do not install the equipment until the completion of all construction works required to carry out the work.



### DO NOT OPERATE ON POWERED CIRCUITS

**Do not carry out any operation on powered circuits.**

Before every access, inspection or intervention on the equipment, ensure to have switched off the system by opening the main power switch and by removing the supply from the unit (open the power switch at the beginning of the line or switch off the constant current regulator).

**The failure to comply all the precautions indicated implies life danger and serious injury to persons.**

## 1.4 Safety symbols

The symbols illustrated in the following table are used in the user and maintenance manual and on the device. These symbols indicate the existence of any dangerous situations, to indicate obligations and prohibitions in relation to the situations that may represent an hazard for the operator or indicate the behaviour to adopt to minimize the risk for the operator.

| Warning signs                                                                      |                               | Prohibition and obligation signs                                                   |                                                             |
|------------------------------------------------------------------------------------|-------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------|
|   | W001   General warning sign   |   | P001   General prohibition sign                             |
|   | W004   Laser beam             |   | M001   General mandatory sign                               |
|   | W005   Non-ionizing radiation |   | M002   Refer to instruction manual/booklet                  |
|   | W006   Magnetic field         |   | M005   Connect an earth terminal to the ground              |
|   | W012   Electricity            |   | M009   Wear protective gloves                               |
|   | W017   Hot surface            |   | M015   Wear high visibility clothing                        |
|  | W027   Optical radiation      |  | M021   Disconnect before carrying out maintenance or repair |

## 1.5 Definition of operator

All operations on devices and on its internal parts must be performed by professional staff, properly formed and aware of the risks connected with the power supply and to the use of low and high voltage circuits.



**Take all the precautions in compliance with the safety standards for the work carried out on electrical installations and however for the works carried out using electrical installations or in buffer zones of the installations and of the electrical devices.**

All operations on equipments and on its internal parts must be performed by professional staff, properly trained for Cardio Pulmonary Resuscitation (CPR) techniques.



**Never operate on devices if there is not at least another operator properly trained for CPR techniques.**

Check that Operators do not operate outside their own specific fields of competence and responsibility. OCEM Airfield Technology declines any and all liability arising from wrong operations carried out by untrained personnel in the use of the devices, or deriving from the non compliance of general safety standards.

## 1.6 Limited warranty

OCEM Airfield Technology assures that all the FLASH LED products marketed are free of manufacturing defects at the time of shipment. This limited warranty will be valid for the period indicated in the sales agreement. **THIS LIMITED WARRANTY IMMEDIATELY DECAYS IF THE PRODUCT IS USED FOR PURPOSES OTHER THAN ORIGINALLY INTENDED.**

This limited warranty is provided by OCEM Airfield Technology to the original purchaser of FLASH LED products as identified by the documents issued at the time of purchase. This limited warranty can be transferred to the subsequent purchasers of the Product, only on condition that this Product is resold as NEW and with the original packaging.



**Each change and/or tampering made to the product immediately terminates the warranty. OCEM Airfield Technology cannot be held responsible for any damage to items or persons deriving from the failure to comply with instructions relating to installation, use and maintenance of the product, and to the installation and storage environmental conditions stipulated by the Manufacturer or by applicable rules regarding electrical devices and systems.**

In case of potential defects or non-usability of the Goods supplied, the applicable warranty that excludes any other legal warranty and agreement - applies to the defects of materials, in the design, and/or in the installation of the Goods supplied. The warranty consists, depending on the Supplier, in the repair or replacement, at the expense of the Supplier, of each faulty component or malfunctioning component from the beginning, but is not extended to damages arising from negligence or wear.

This warranty lasts for at least 12 months after the date on which the received Goods are put into service, but will not in any case exceed 24 months from the shipping date.

**FAA**

**For FAA certified products this warranty lasts for at least 4 years after the date on which the received Goods are put into service, but will not in any case exceed 5 years from the shipping date.**

The Supplier undertakes to repair or replace the components in the shortest possible time without prejudice to the fact that for the so called commercial components and more generally for the components supplied by third-party manufacturers, will only be applied the terms of the respective original manufacturer's warranties.

The warranty absolves from all liability the Supplier and does not apply to the damage of any kind, caused by: improper use by the Customer or by the Customer's staff, use of inadequate materials, or incorrect or insufficient treatments; installation of equipments or spare parts not approved by the Supplier; installation and operating working of the Goods received without following the indications and the instructions provided by the Supplier's Technical staff; improper or excessive use, insufficient maintenance, and/or works not carried out in compliance with the information provided in the use and maintenance instructions; any other reason not attributable to the Supplier. The Customer must shoulder, at its own cost and employing its own staff, without involving the Supplier, those repairs that on the base of the Supplier's opinion are considered compliant at a moderate level of technical know-how.

The Customer must, under penalty of expiration, communicate the complaint concerning the defect or the non-compliance to the Supplier **within 8 days from the date of discovery of the defect**, and must send a written request to activate the intervention under warranty. The intervention request under warranty must be sent to:

**OCEM Airfield Technology | via della Solidarietà, 2/1 | 40056 Valsamoggia BO (Italia)  
info@ocem.com**

The Customer must bear the travel and accommodation costs borne by the technical staff of the Supplier that must complete on the installation site any intervention associated with the guarantee.

The warranty excludes any other damage, included those resulting from economic loss and from low production capacity; direct, indirect or consequential damages; and the Contract termination.

The Supplier is not in any manner responsible for any other compensation or indemnity, including damage derived from missed or reduced production, from the loss of chance, from the missed or reduced profit, from the loss of contracts, impossibility of use or in general the partial use, in addition to indirect and/or consequential damages.

## 1.7 CE marking



This equipment complies with the requirements of European legislation for the CE marking. The user should carefully read this document and respect all the requirements quoted.

This equipment meet the requirements in relation to health and safety of the main EC directives, and in particular of the EMC Directive on electromagnetic compatibility (2014/30/EU) and of the LV Directive relating to electrical equipment designed for use within certain voltage limits (2014/35/EU).

## 1.8 Confidentiality, industrial property rights

The Customer needs to adopt the maximum confidentiality with respect to all the information of technical nature (including, by way of example and not exhaustively, plans, programmes, documentation, formulas, recipes, setting and correspondence) received by the Supplier or in any case assimilated or gained during the conclusion of the Contract of sale.

Any right regarding intellectual and industrial property connected to equipment and to any other element included in the supplied Goods as indicated in the Contract remain exclusive property of the Supplier.

## 1.9 Disposal



At the end of use, the user must confer all the waste in suitable differentiated waste collection centres. It is the responsibility of the user the correct disposal of the equipment in accordance with the WEEE Directive and with the respective national laws in force at the time of disposal. These equipments must never be disposed of in the household waste.

## 1.10 Article identification

On each equipment there is an identification plate of the article, where the article code is reported; on the plate there are additional data: the name of the model, employments or use, power supply features, any trademarks and/or marks that attest the agreement of the equipment to specific regulations or legislations.

### 1.11 Photo-biological risk

The fixtures LIFL and LEFL are designed and manufactured in compliance with current regulations, but if used unsafely or without precautions, the light emitted by the fixture, reaching even high levels of intensity, can be harmful not only to those who use the light fixture locally, but for anyone within the light beam range.

The optical radiation issued by the equipment does not present any particular photo-biological risks, however can be harmful.



**Don't look directly inside the light source during high intensity operation. Wear appropriate personal protective equipment (goggles or similar protections).**

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## 2 DESCRIPTION OF THE DEVICES

### 2.1 FMCU

#### 2.1.1 General characteristics

The FMCU control unit is designed to supply power and to communicate with the FFU field units that manage FLASH LED fixtures (inset or elevated). The control unit is connected (3P circuit with 230 Vac supply voltage with FFU units connected in parallel) to all OCEM blinkers of a single approach head for the purpose of providing visual guidance to aircraft approaching and landing on ICAO CAT I, II and III, FAA (IFR precision instrument) and military runways in the following applications:

- Approach Sequential Light (SFL).
- Runway Threshold Identification Light (RTIL).
- Circling Guidance Lights (CGL).

The FMCU is compliant with the rules:

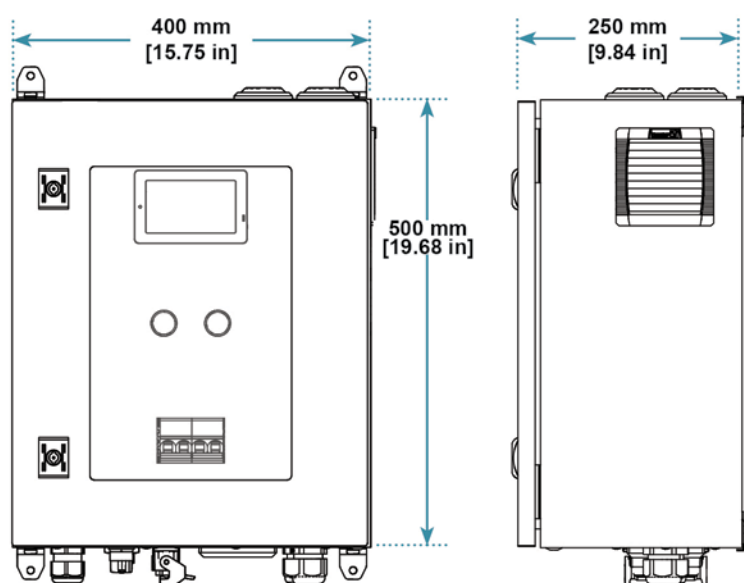
IEC (TS 61827)



The FMCU control units described in this manual have been designed to be supplied by a single-phase line 230 Vac ( $\pm 10\%$ ) / 50-60 Hz adequately protected.



The supply circuits for the field units (and the relevant fixtures) can be positioned within plastic or metallic pipes permanently laid in the ground, equipped with appropriate coupling devices.



OPERATING  
TEMPERATURE



INGRESS  
PROTECTION

## 2.1.2 Use

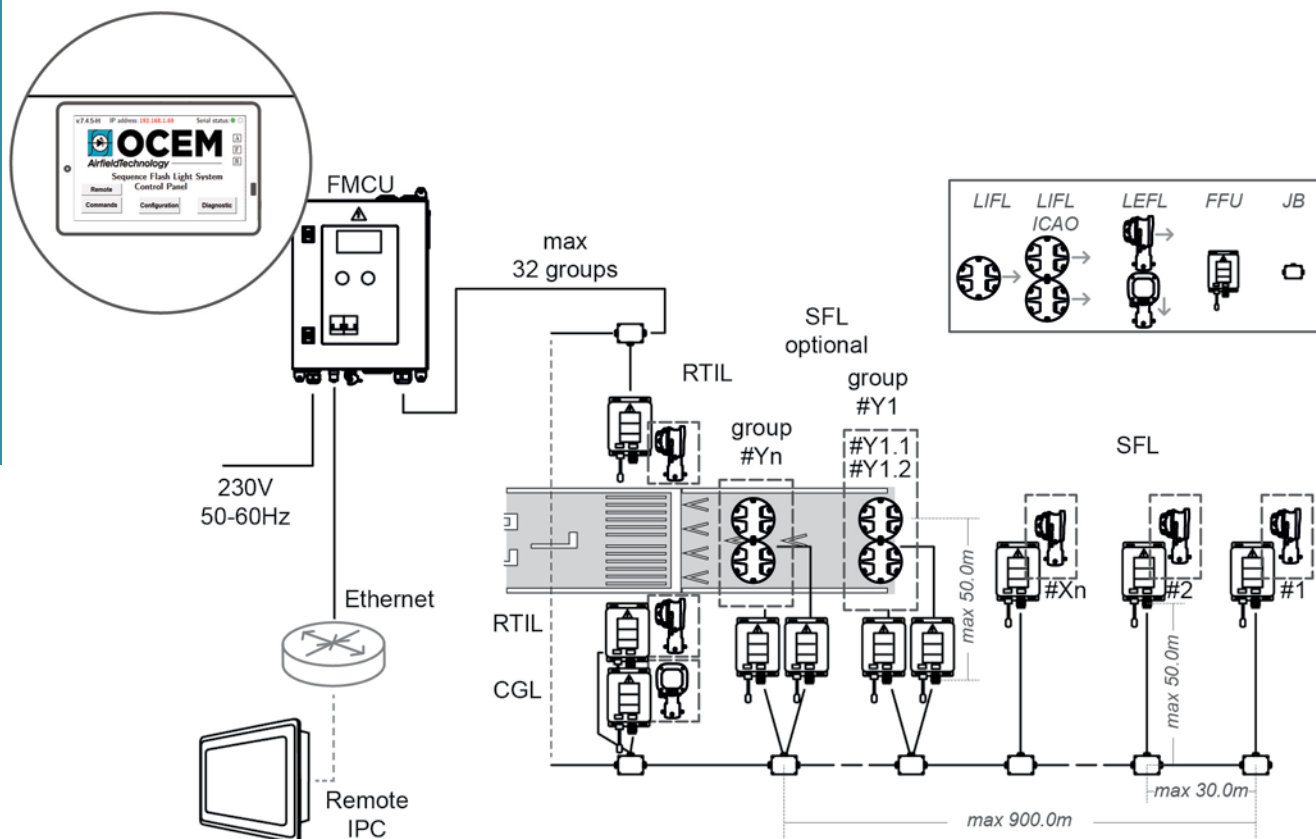
The FMCU control unit is equipped with specific remote control and monitoring interfaces:

- Modbus TCP Interface (standard)
- Integrated electromechanical interface (optional)

The FMCU control unit can be supplied already programmed to meet the requirements of the regulations depending on the use:

- Approach SFL segment
- RTIL threshold identifier segment
- Circling Guidance CGL

If necessary, the unit can be supplied unconfigured.



## 2.1.3 Touch-pad

The touch-pad panel allows local configuration and control of the system and of the flashing units on the field.



Via touch-pad it is possible:

- configure the ID of each connected device
- install or remove an FFU from the configuration

2.1.4 Article number

| example: FMCU 0 - 1              |                                   |
|----------------------------------|-----------------------------------|
| Remote control                   | <div><div></div><div></div></div> |
| 0 = Modbus TCP                   |                                   |
| 1 = Integrated electromechanical |                                   |
| Local interface                  | <div><div></div><div></div></div> |
| 1 = Touch-pad                    |                                   |

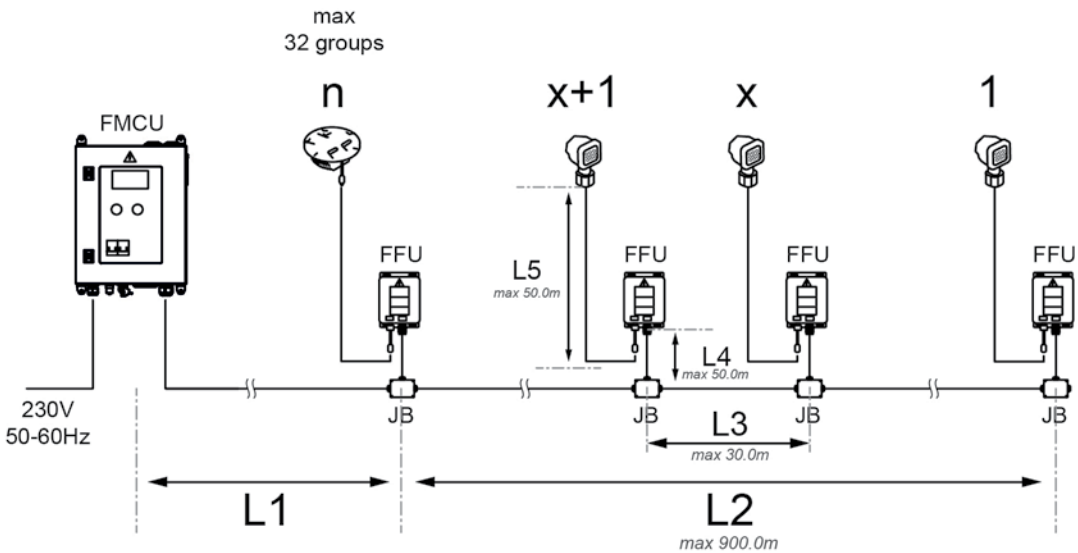
In the example **FMCU - 0 - 1**: control unit for OCEM FLASH system, FMCU model. Local control panel with touch-pad device. Equipped with Modbus TCP Interface for the remote control.

2.1.5 Wiring

The FMCU control unit, unique to the system, is supplied fully assembled and must be supplied by a single-phase line 230 Vac (± 10%) / 50-60 Hz adequately protected.



The FMCU unit is not equipped with differential protection devices.  
It is the Customer's responsibility to provide adequate protection of the supply line.



The FMCU unit is designed to operate in conjunction with the supplied FFU field unit that make up the system, which must receive power and configuration parameters from the dedicated FMCU control unit.  
The connection cables and the connection boxes (JB) are not included in the supply.

| Type of approach |      |        |        | TRIPULAR CABLE LENGTH (in m) SECTION L1 (between FMCU and the first FFU) |     |     |     |     |     |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------------------|------|--------|--------|--------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Ref.             | LEFL | LIFL-I | LIFL-L | 100                                                                      | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 |
| A0*              | 2    |        |        |                                                                          |     |     |     |     |     |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| A1               | 20   |        |        | 3 x 6                                                                    |     |     |     |     |     |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| A2               | 21   |        |        | 3 x 6                                                                    |     |     |     |     |     |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|                  |      |        |        |                                                                          |     |     |     |     |     |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| D1               | 30   |        |        | 3 x 10                                                                   |     |     |     |     |     |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| E1               | 29   | 1      |        | 3 x 16                                                                   |     |     |     |     |     |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| F1               | 28   | 2      |        | 3 x 16                                                                   |     |     |     |     |     |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| G1               | 27   | 3      |        | 3 x 10                                                                   |     |     |     |     |     |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| H1               | 26   | 4      |        | 3 x 10                                                                   |     |     |     |     |     |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |

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## 2.2 LEFL

### 2.2.1 General characteristics

LEFL signals are elevated new generation high intensity LED fixtures designed to provide visual guidance to aircraft approaching and landing on ICAO CAT I, II and III, FAA (precision IFR instrument) and military runways in the following applications:

- Approach Sequential Light (SFL).
- Runway Threshold Identification Light (RTIL).
- Circling Guidance Lights (CGL).

The LEFL is compliant with the rules:

**ICAO** (Annex 14 - Volume I [Figg. A-5, A-6])

**FAA** (AC150/5345-51, AC150/5340-30, EB67)

**ICAO** (Doc 9157 | Part 4 - Visual aids, Part 5 - Electrical system, Part 6 - Frangibility))

**NATO** (Stanag 3316)

**IEC** (TS 61827)

**CASA** (Manual of Standards Part 139)

**ENAC** (Airport Construction Regulation)

**EASA** (CS-ADR-DSN - [figure M-1, M-2])

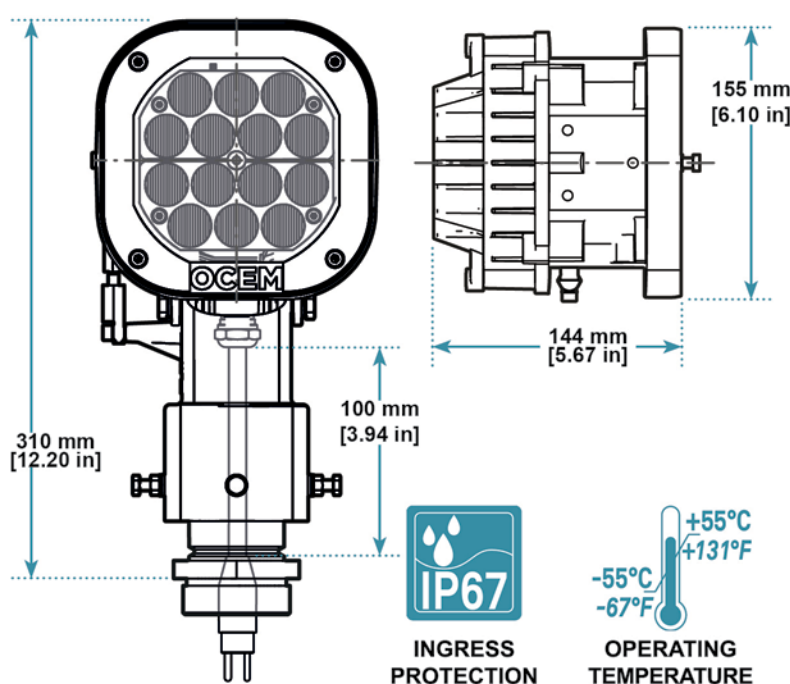


The LEFL fixtures described in this manual have been designed to be supplied only by the FFU field unit included in the supply.

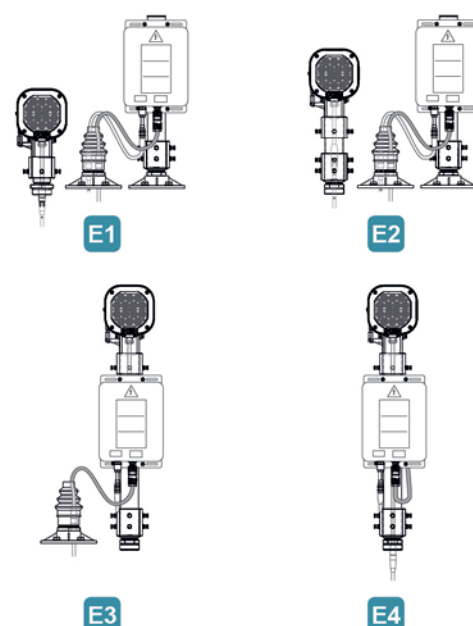
The installation kit E1, E2, E3 and E4 can be used to obtain different configurations of the LEFL-FFU unit (and relevant connections). With the installation kit it is possible to fasten the elements on the pipes (with threaded entrance) placed in the concrete base or on flanges firmly anchored to the concrete base.



The supply circuits for the LEFL fixtures (and relevant field units) can be positioned within plastic or metallic pipes permanently laid in the ground, equipped with appropriate coupling devices.



#### INSTALLATION EXAMPLE



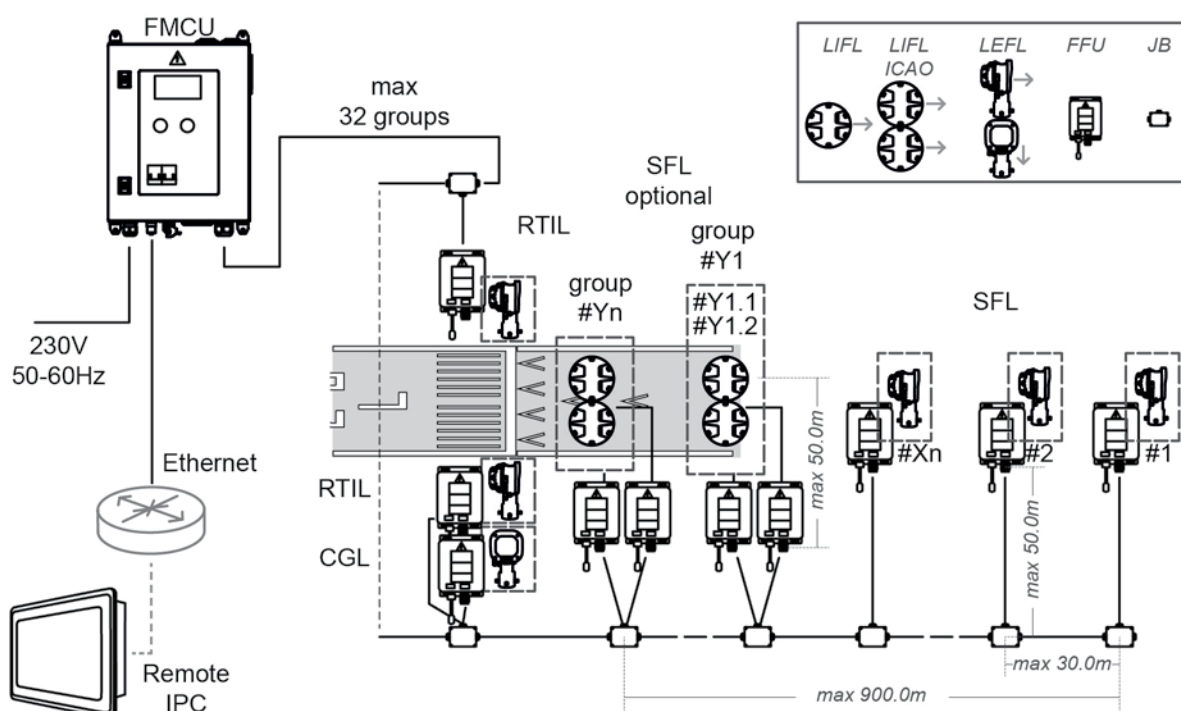
## 2.2.2 Use

The LEFL fixtures are realised in a single version, but can be supplied already programmed to meet the requirements of the regulations depending on the use:

- Approach SFL segment
- RTIL threshold identifier segment
- Circling Guidance CGL

If necessary, the unit can be supplied unconfigured.

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## 2.2.3 Arctic Kit

**A** The arctic kit option meets the FAA specifications (Engineering Brief N.67) preventing the formation of ice on the protective transparent glass by heating the body of the fixture near the glass. The heater automatically activates when the temperature falls below -1 °C and is turned off when the detected temperature is higher than +10 °C.

## 2.2.4 Configuration and assembling



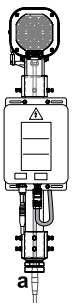
**Always respect the project quotas. Before proceeding with the installation and commissioning of the device, check the ground and elevation position.**

The LEFL fixtures are supplied fully assembled with supply cable (L = 500 mm) and bipolar plug FAA L-823 Style 5 (and bipolar mobile socket FAA L-823 Style 12).

The optional installation kit can be used to simplify the installation of the components in different configurations of the LEFL-FFU unit (and relevant connections):

| KIT       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>E1</b> | <p>a. The fixture body is installed directly on the coupling to be fastened to the anchor point (flange anchored to the base, not supplied, or pipe with 2" GAS threading, not supplied, or on base plate for L-867 base with 2" GAS threading, not supplied) within which the supply line is placed. Connector kits for LEFL fixture supply (L-823 Style 12 + Style 5) are included.</p> <p>b. The coupling of plugs and sockets is realised by means of a locking system of no. 2 connections complete with a frangible coupling for double sockets to be fixed to the flange (<math>\varnothing = 155</math> mm) which must be firmly anchored to the concrete base (or on pipes with 2" GAS threading, not supplied). Connector kits for field unit power supply (3P socket + 3P plug) and LEFL fixture supply (L-823 Style 12 + Style 5) are included.</p> <p>c. The FFU unit is installed on a separate pole (<math>\varnothing = 60</math> mm, H = 500 mm) which is mounted on a frangible coupling to be fixed to the flange (<math>\varnothing = 155</math> mm) which must be firmly anchored to the concrete base (or on piping with 2" GAS threading, not supplied).</p>                                                           |
| <b>E2</b> | <p>a. The fixture body is installed on a pole (<math>\varnothing = 60</math> mm, not supplied) with frangible coupling to be fastened to the anchor point (flange anchored to the base, not supplied, or pipe with 2" GAS threading, not supplied, or on base plate for L-867 base with 2" GAS threading, not supplied) within which the supply line is placed. Connector kits for LEFL fixture supply (L-823 Style 12 + Style 5) are included.</p> <p>b. The coupling of plugs and sockets is realised by means of a locking system of no. 2 connections complete with a frangible coupling for double sockets to be fixed to the flange (<math>\varnothing = 155</math> mm) which must be firmly anchored to the concrete base (or on pipes with 2" GAS threading, not supplied). Connector kits for field unit power supply (3P socket + 3P plug) and LEFL fixture supply (L-823 Style 12 + Style 5) are included.</p> <p>c. The FFU unit is installed on a separate pole (<math>\varnothing = 60</math> mm, H = 500 mm) which is mounted on a frangible coupling to be fixed to the flange (<math>\varnothing = 155</math> mm) which must be firmly anchored to the concrete base (or on piping with 2" GAS threading, not supplied).</p> |
| <b>E3</b> | <p>a. The fixture body and the relevant FFU unit are installed on a pole (<math>\varnothing = 60</math> mm, not supplied, minimum height 600 mm) with frangible coupling to be fastened to the anchor point (flange anchored to the base, not supplied, or pipe with 2" GAS threading, not supplied, or on base plate for L-867 base with 2" GAS threading, not supplied). Connector kits for LEFL fixture supply (L-823 Style 12 + Style 5) are included.</p> <p>b. The coupling of plugs and sockets is realised by means of a locking system of no. 2 connections complete with a frangible coupling for double sockets to be fixed to the flange (<math>\varnothing = 155</math> mm) which must be firmly anchored to the concrete base (or on pipes with 2" GAS threading, not supplied). Connector kits for field unit power supply (3P socket + 3P plug) and LEFL fixture supply (L-823 Style 12 + Style 5) are included.</p>                                                                                                                                                                                                                                                                                                          |



| KIT                                                                                            | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div>E4</div> | <p>a. The fixture body and the relevant FFU unit are installed on a pole (<math>\varnothing = 60</math> mm, not supplied, minimum height 600 mm) with frangible coupling to be fastened to the anchor point (flange anchored to the base, not supplied, or pipe with 2" GAS threading, not supplied, or on base plate for L-867 base with 2" GAS threading, not supplied). Connector kits for LEFL fixture supply (L-823 Style 12 + Style 5) are included.</p> |

2.2.5 Article number

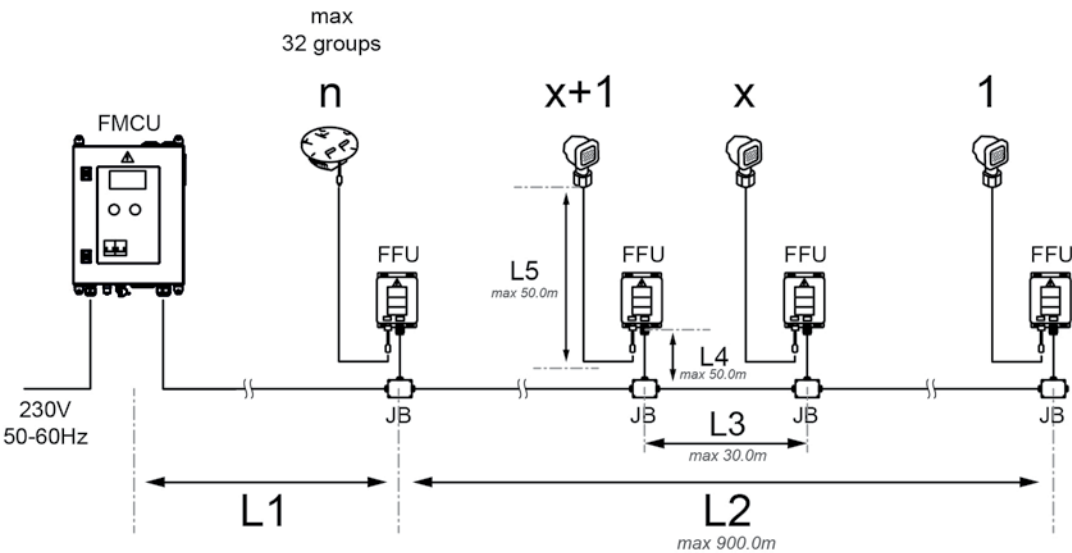
| example: LEFL SF -                                                                                                                                                                                                                                            |                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <div>Use [Colour]</div> <div>SF = Approach SFL segment [White]<br/>RL = RTIL threshold identifier segment [White]<br/>CG = Circling Guidance CGL [White]<br/>00 = Unscheduled unit [White]</div> <div>Arctic kit option</div> <div>A = With Arctic kit*</div> |  |

\* Version with separate 48 V power supply (to be supplied with dedicated line).

In the example **LEFL - SF**: overhead light LED unit for OCEM FLASH system, LEFL model configured for SFL approach use. Unidirectional fixture with white colour lamps. System equipped with special support and cable with bipolar plug (L-823), complete with associated FFU power unit. Arctic kit not present.

2.2.6 Wiring

The LEFL fixtures are supplied fully assembled with supply cable (L = 500 mm) and bipolar plug FAA L-823 Style 5.





The LEFL fixture must be connected to the FFU field unit supplied. Power supply cable section 2x2.5mm<sup>2</sup>. LEFL unit power supply very low voltage (ELV).



**The LEFL fixture is designed to operate in conjunction with the supplied FFU field unit, which must receive power and configuration parameters from the dedicated FMCU control unit. The LEFL fixture cannot be supplied by means of standard isolation transformers. The LEFL fixture cannot be connected to series circuits (CCR). The connection cables and the connection boxes (JB) are not included in the supply.**

The FFU field unit must be supplied by the dedicated FMCU control unit. Power supply cable section L1/L2 (FMCU-FFU) 3x6.0-35mm<sup>2</sup> (please refer to OCEM's technical support).

All signals are supplied without cables and connectors for the wiring of the system. Installation kits include the necessary connectors. Any auxiliary connector kits must be ordered separately.

| Code     | Description             | Features                                                                                                                                                                           |
|----------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 011.3523 | Secondary connector kit | Secondary connector kit socket (F) for cable 1.5-2.5 mm <sup>2</sup> [16-14 AWG]. Note: the outer diameter of the cable must be within the range 8.5-13.0 mm [0.334-0.531 inch].   |
| 011.3520 | Secondary connector kit | Secondary connector kit plug (M) for cable 1.5-2.5 mm <sup>2</sup> [16-14 AWG]. Note: the outer diameter of the cable must be within the range 8.5-13.0 mm [0.334-0.531 inch].     |
| 013.0008 | 3P connector kit        | Tripolar connector kit socket (F) for cable 4.0-6.0 mm <sup>2</sup> [12-10/8 AWG]. Note: the outer diameter of the cable must be within the range 11.5-18.0 mm [0.157-0.708 inch]. |
| 013.0010 | 3P connector kit        | Secondary connector kit plug (M) for cable 1.5-2.5 mm <sup>2</sup> [12-10/8 AWG]. Note: the outer diameter of the cable must be within the range 8.5-13.0 mm [0.157-0.708 inch].   |



**OCEM supplies all devices already configured and ready to be installed (unless otherwise requested).**

**In order to configure the system correctly, a number of parameters must be communicated to OCEM when ordering:**

- **L1 section length:** evaluate the length of the connection between the FMCU and the first JB.
- **L2 section length:** to be defined according to the configuration of the approach type (L2 = 600m or L2 = 900m).
- **L3 section length:** if a step other than the standard section (30.0 m) is used, communicate the actual length value.
- **L4 section length:** (tripolar cable 3x6.0mm<sup>2</sup>): if a length other than the standard section (2.0 m) is used, communicate the actual length value (max 50.0 m).
- **L5 section length:** (tripolar cable 3x2.5mm<sup>2</sup>): if a length other than the standard section (5.0 m) is used, communicate the actual length value (max 50.0 m).

## 2.2.7 Mounting accessories



**Always respect the project quotas. Before proceeding with the installation and commissioning of the device, check the ground and elevation position.**

All the fixtures installed directly on the anchor point are supplied without the frangible coupling. Installation elements must be ordered separately.

All fixtures installed on the pole are supplied without pole and without any frangible coupling. Installation elements must be ordered separately.

The aluminium pole (Ø 60 mm) is available in standard length versions from 1.0 to 2.0 m. The pole can be cut to size according to the installation project (minimum height for combined installation: 600 mm).

| Code     | Description               | Features                                                                                                                                                                                    |
|----------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 315.3712 | Support pole 1000 mm      | Support pole Ø 60 mm H = 1000 mm                                                                                                                                                            |
| 315.3713 | Support pole 1500 mm      | Support pole Ø 60 mm H = 1500 mm                                                                                                                                                            |
| 315.3714 | Support pole 2000 mm      | Support pole Ø 60 mm H = 2000 mm                                                                                                                                                            |
| 315.3714 | Frangible coupling        | Frangible coupling for direct assembly                                                                                                                                                      |
| 155.7200 | Frangible coupling        | Frangible coupling for pole Ø 60 mm                                                                                                                                                         |
| 303.7350 | Base flange               | Aluminium base flange Ø 155 mm (threading 2" GAS)                                                                                                                                           |
| 315.1062 | Base plate (L-867)        | Plate Ø 305 mm for inset base (L-867) with 2" GAS threading, complete with gasket and cable gland. Note: Use of the plate results in a vertical shift of the optical axis of 18 mm upwards. |
| 013.0008 | Curve with 1 threaded end | Elbow curve (90°) in zinc-coated steel pipe with threading (2" GAS) on the upper end                                                                                                        |
| 013.0010 | Ryton ring                | Set of no. 2 ryton rings to support the socket inside the threaded pipe (2" GAS)                                                                                                            |

## 2.3 LIFL

### 2.3.1 General characteristics

LIFL signals are inset new generation high intensity LED fixtures designed to provide visual guidance to aircraft approaching and landing on ICAO CAT I, II and III, FAA (precision IFR instrument) and military runways in the following applications:

- Approach Sequential Light (SFL).
- Runway Threshold Identification Light (RTIL).
- Circling Guidance Lights (CGL).

The LIFL is compliant with the rules:

**ICAO** (Annex 14 - Volume I [Figg. A-5, A-6])

**FAA** (AC150/5345-51, AC150/5340-30, EB67)

**ICAO** (Doc 9157 | Part 4 - Visual aids, Part 5 - Electrical system, Part 6 - Frangibility))

**NATO** (Stanag 3316)

**CASA** (Manual of Standards Part 139)

**ENAC** (Airport Construction Regulation)

**EASA** (CS-ADR-DSN - [figure M-1, M-2])

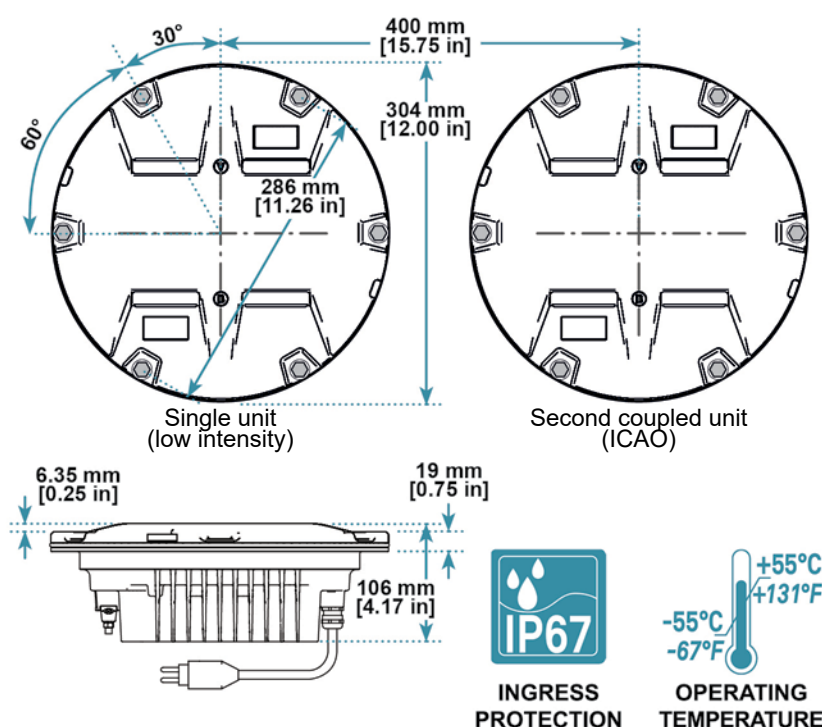


The LIFL fixtures described in this manual have been designed to be supplied only by the FFU field unit included in the supply.

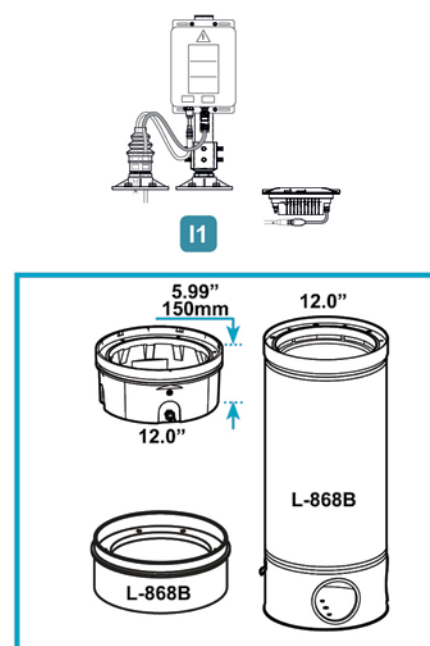
The I1 installation kit can be used to make the LIFL-FFU connection. With the installation kit it is possible to fasten the elements on the pipes (with threaded entrance) placed in the concrete base or on flanges firmly anchored to the concrete base.



The supply circuits for the LIFL fixtures (and relevant field units) can be positioned within plastic or metallic pipes permanently laid in the ground, equipped with appropriate coupling devices.



### INSTALLATION EXAMPLE



## 2.3.2 Use

The LIFL fixtures are realised in different versions, to meet the requirements of the regulations depending on the use:

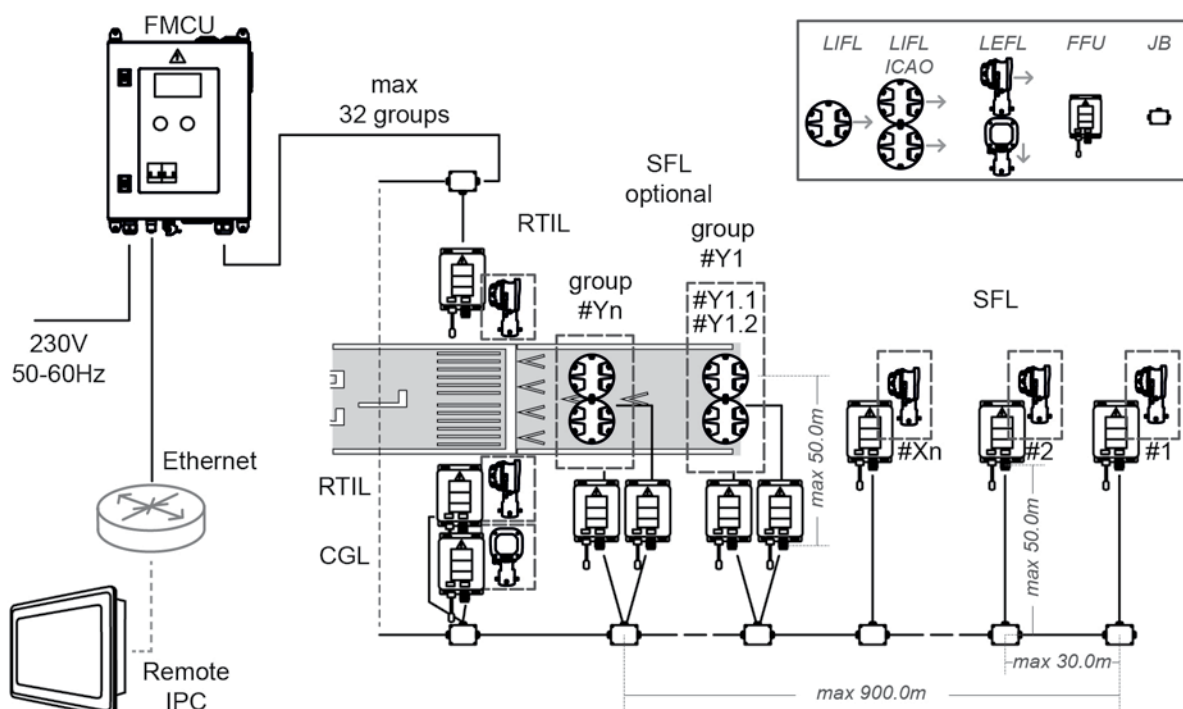
- Single unit (low intensity)
- Two coupled units (ICAO)

All the units can be supplied already programmed to meet the requirements of the regulations depending on the use:

- Approach SFL segment
- RTIL threshold identifier segment
- Circling Guidance CGL

If necessary, the unit can be supplied unconfigured.

13584-005-Rev1-4517-002-7-2023-05/09



### 2.3.3 Configuration and assembling



**Always respect the project quotas. Before proceeding with the installation and commissioning of the device, check the ground and elevation position.**

The LIFL fixtures are supplied fully assembled with supply cable (L = 500 mm) and bipolar plug FAA L-823 Style 5.

The optional installation kit can be used to simplify the installation of the components in different configurations of the LIFL -FFU unit (and relevant connections):

| KIT | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | <p>b. The coupling of plugs and sockets is realised by means of a locking system of no. 2 connections complete with a frangible coupling for double sockets to be fixed to the flange (<math>\varnothing = 155</math> mm) which must be firmly anchored to the concrete base (or on pipes with 2" GAS threading, not supplied). Connector kits for field unit power supply (3P socket + 3P plug) and LEFL fixture supply (L-823 Style 12 + Style 5) are included.</p> <p>c. The FFU unit is installed on a pole (<math>\varnothing = 60</math> mm, H = 500 mm) which is mounted on a frangible coupling to be fixed to the flange (<math>\varnothing = 155</math> mm) which must be firmly anchored to the concrete base (or on piping with 2" GAS threading, not supplied).</p> |

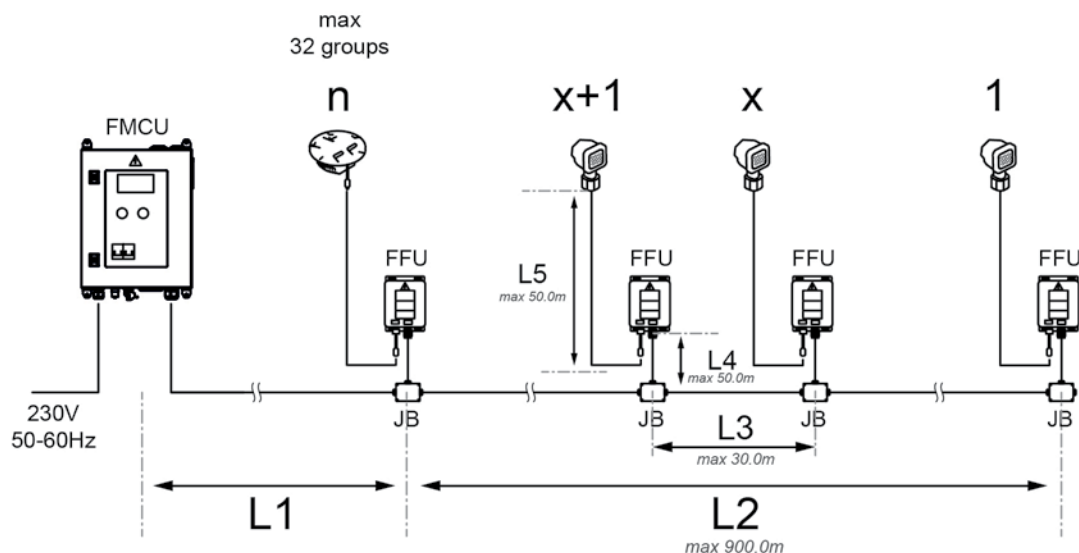
### 2.3.4 Article number

| example: LIFL I - SF                                                                                                                                                                                     |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <p><b>Use [Colour]</b></p> <p>I = ICAO (2 coupled units)</p> <p>L = Low intensity (single unit)</p>                                                                                                      |  |
| <p><b>Use [Colour]</b></p> <p>SF = Approach SFL segment [White]</p> <p>RL = RTIL threshold identifier segment [White]</p> <p>CG = Circling Guidance CGL [White]</p> <p>00 = Unscheduled unit [White]</p> |  |

In the example **LIFL - I - SF**: inset light LED unit for OCEM FLASH system, LIFL model configured for low intensity SFL approach use. Unidirectional single fixture with white colour lamps. System equipped with cable with bipolar plug (L-823), complete with associated FFU power unit. Arctic kit not present.

### 2.3.5 Wiring

The LIFL fixtures are supplied fully assembled with supply cable (L = 500 mm) and bipolar plug FAA L-823 Style 5.



The LIFL fixture must be connected to the FFU field unit supplied. Power supply cable section 2x2.5mm<sup>2</sup>. LEFL unit power supply very low voltage (ELV).



**The LIFL fixture is designed to operate in conjunction with the supplied FFU field unit, which must receive power and configuration parameters from the dedicated FMCU control unit. The LIFL fixture cannot be supplied by means of standard isolation transformers. The LIFL fixture cannot be connected to series circuits (CCR). The connection cables and the connection boxes (JB) are not included in the supply.**

The FFU field unit must be supplied by the dedicated FMCU control unit. Power supply cable section L1/L2 (FMCU-FFU) 3x6.0-35mm<sup>2</sup> (please refer to OCEM's technical support).

All signals are supplied without cables and connectors for the wiring of the system. Installation kits include the necessary connectors. Any auxiliary connector kits must be ordered separately.

| Code     | Description             | Features                                                                                                                                                                           |
|----------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 011.3523 | Secondary connector kit | Secondary connector kit socket (F) for cable 1.5-2.5 mm <sup>2</sup> [16-14 AWG]. Note: the outer diameter of the cable must be within the range 8.5-13.0 mm [0.334-0.531 inch].   |
| 011.3520 | Secondary connector kit | Secondary connector kit plug (M) for cable 1.5-2.5 mm <sup>2</sup> [16-14 AWG]. Note: the outer diameter of the cable must be within the range 8.5-13.0 mm [0.334-0.531 inch].     |
| 013.0008 | 3P connector kit        | Tripolar connector kit socket (F) for cable 4.0-6.0 mm <sup>2</sup> [12-10/8 AWG]. Note: the outer diameter of the cable must be within the range 11.5-18.0 mm [0.157-0.708 inch]. |
| 013.0010 | 3P connector kit        | Secondary connector kit plug (M) for cable 1.5-2.5 mm <sup>2</sup> [12-10/8 AWG]. Note: the outer diameter of the cable must be within the range 8.5-13.0 mm [0.157-0.708 inch].   |



OCEM supplies all devices already configured and ready to be installed (unless otherwise requested).

In order to configure the system correctly, a number of parameters must be communicated to OCEM when ordering:

- L1 section length: evaluate the length of the connection between the FMCU and the first JB.
- L2 section length: to be defined according to the configuration of the approach type (L2 = 600m or L2 = 900m).
- L3 section length: if a step other than the standard section (30.0 m) is used, communicate the actual length value.
- L4 section length: (tripolar cable 3x6.0mm<sup>2</sup>): if a length other than the standard section (2.0 m) is used, communicate the actual length value (max 50.0 m).
- L5 section length: (tripolar cable 3x2.5mm<sup>2</sup>): if a length other than the standard section (5.0 m) is used, communicate the actual length value (max 50.0 m).

### 2.3.6 Mounting accessories



**Always respect the project quotas. Before proceeding with the installation and commissioning of the device, check the ground and the orientation of the base.**

The LIFL fixture must be installed on a compatible base (L-867B L-868B). Installation elements must be ordered separately.



**Inset bases (high or low), cables and other accessories are not included in the supply of the fixture.**

**The choice of compatible accessories is the responsibility of the installer.**

| Code      | Description      | Features                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 332.4140  | Lifting tool     | Lifting tool for inset light fixture. The kit consists of a pair of levers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| PABAJ0003 | Base 12"         | <p>Aluminium low base (h = 150 mm) for inset light fixture (Ø 12"). Complete with:</p> <ul style="list-style-type: none"> <li>• cable gland (M 25) for supply cable entry (Ø 10-18 mm).</li> <li>• Secondary connector kit socket (F) for cable 1.5-2.5 mm<sup>2</sup> [16-14 AWG]. Note: the outer diameter of the cable must be within the range 8.5-13.0 mm [0.334-0.531 inch].</li> <li>• Ground cable with faston terminal for the connection to the fixture body.</li> <li>• Screw set for light fastenings 6 x M 10 and special OCEM washers (siliconised, sealed with external tothing and external EDPM material).</li> <li>• O-ring gasket</li> </ul> <p>The base comes with an external (plywood) L-868B cover, which is required during installation.</p> <p>Note: the low base is designed to be cemented into a hole made in the floor with epoxy resin.</p> |
| 332.4301  | Positioning mask | Positioning mask for low base (art. PABAJ0003).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 332.4351  | Pointing device  | Optical pointing device for positioning mask (art. 332.4301).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

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### 3 INSTALLATION

#### 3.1 Fixture placement

The signalling devices, in combination with horizontal and vertical fixtures, provide information to the pilots and therefore represent a fundamental driving aid.

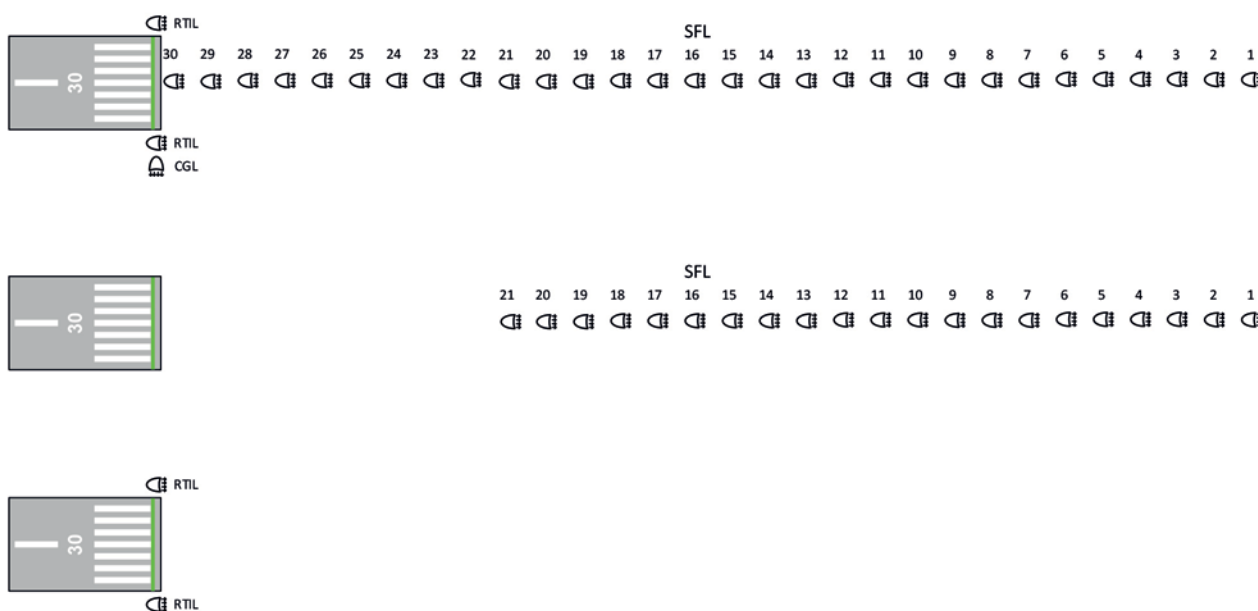
These devices must always be in operating condition and must be clean, maintained and, if necessary, replaced as soon as their visibility is affected.

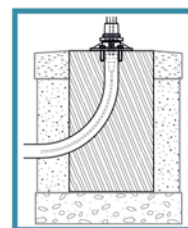
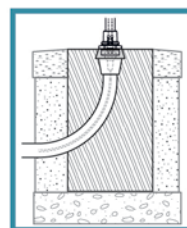
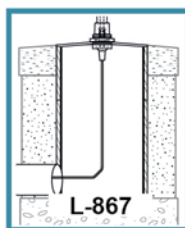
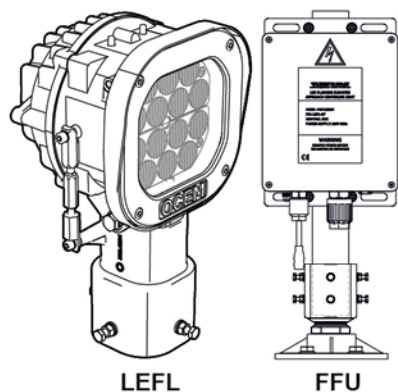
The chromatic features of signalling optical devices must be compliant with the dispositions of competent bodies and with the regulations in force.



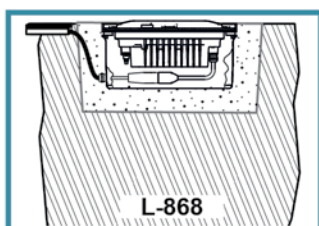
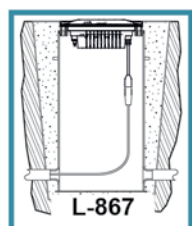
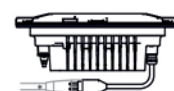
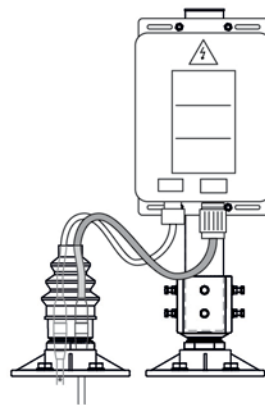
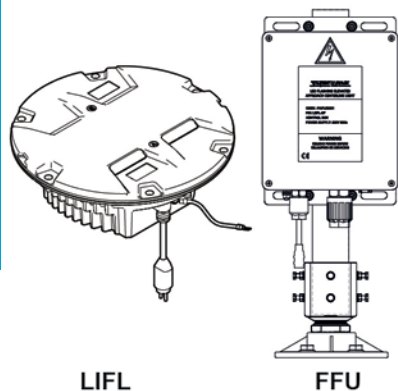
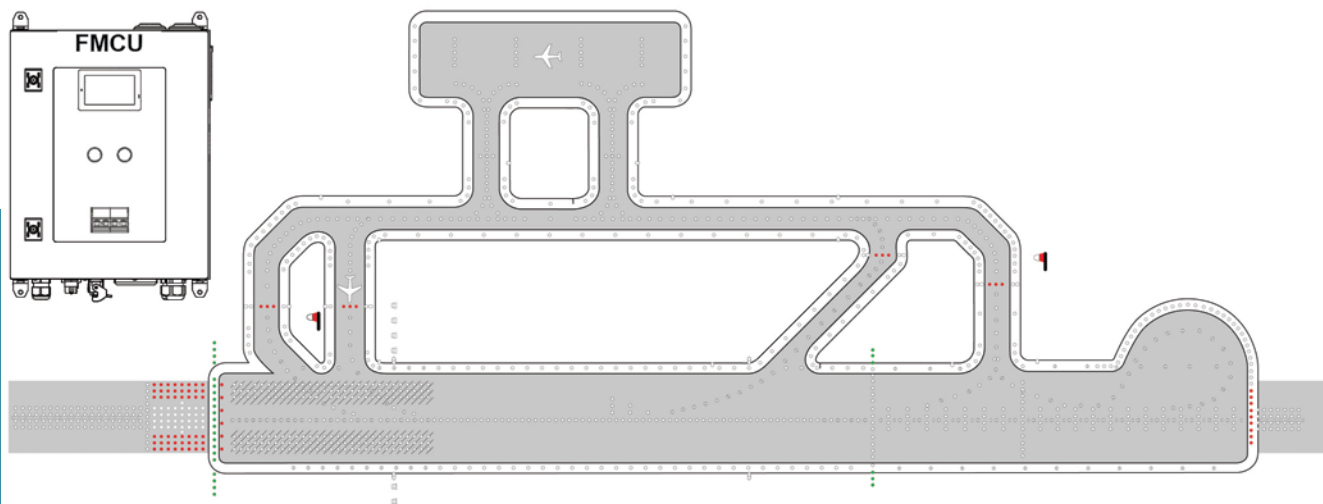
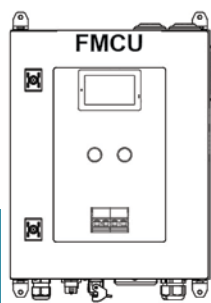
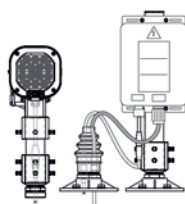
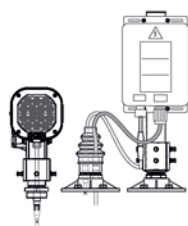
**For the positioning of the fixtures always refer to the requirements of the relevant Standards:**

- ICAO Annex 14 Volume I
- FAA 150/5345-46 for the construction and operation of airports;
- CASA MOS Civil Aviation Safety Authority Manual of Standards (Part 139);
- TCAA TP-312 (Aerodrome Standards and Recommended Practices).
- ENAC Airport Construction Regulation
- NATO Stanag 3316





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INSTALLATION

### 3.2 Installation of the FMCU control unit



Store the device in its original packaging until the time of installation.  
Check the supply features before installing the device.  
Leave a clear space around the unit to facilitate maintenance and inspection operations.  
Observe the minimum distances indicated in the figure.

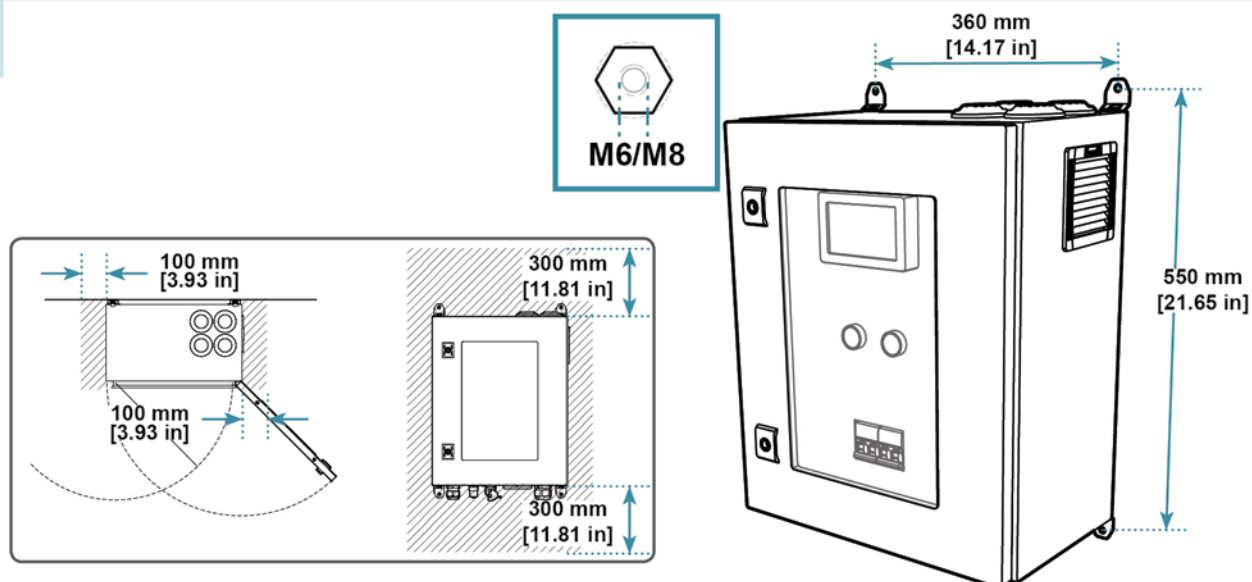
Use the device only in conjunction with OCEM's FLASH devices (inset or elevated), which are equipped with FFU field units. The FMCU supplies power to all FFUs of the flashing system (maximum 32 units). The master unit can supply a maximum of 64 flashing fixtures (in the LIFL-I version 30 x SFL + 2 x RTIL).



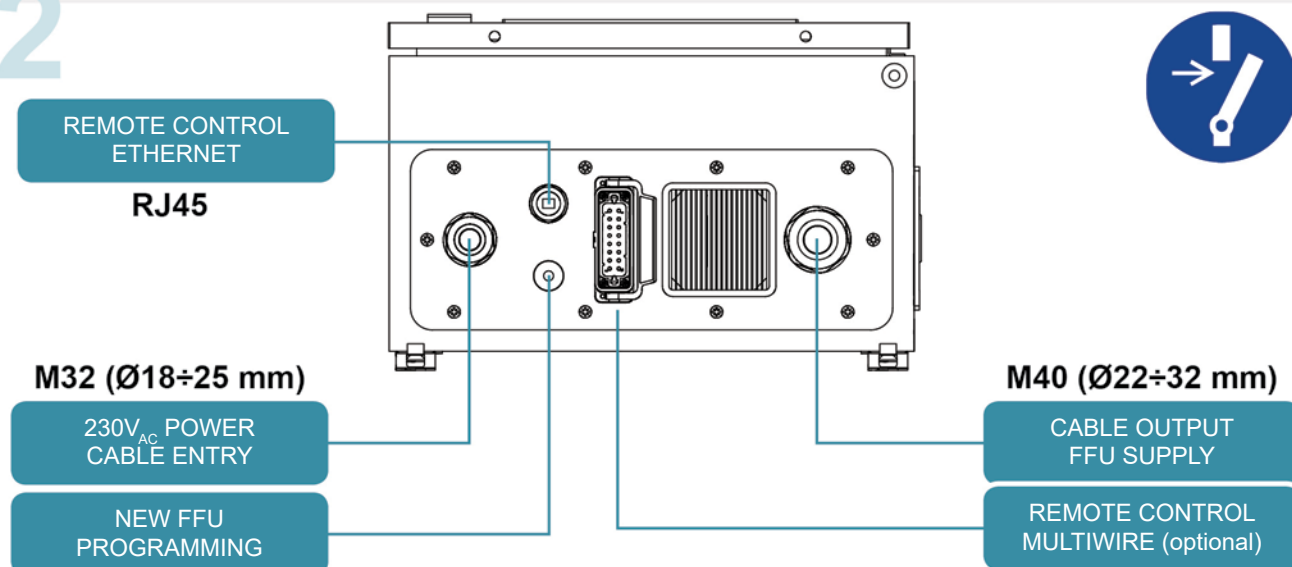
Before proceeding with the operation, check the conditions of the device:

- check that the mechanical fixing of the components are steady;
- check that the internal connections are properly configured;
- check that the internal equipotential connections are all realized.

1



2





Before carrying out any intervention on the device, cut off all external power sources and place appropriate work-in-progress warnings on the systems.



Before proceeding, check that the system is correctly configured:

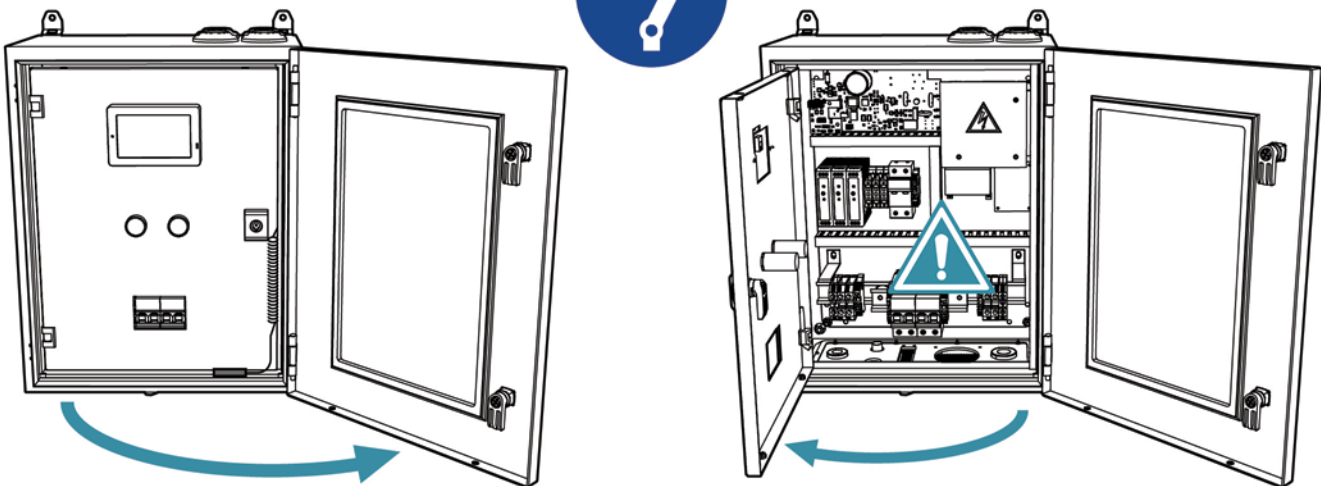
- check that the light fixtures have been correctly positioned;
- check that the fixture and field unit supply lines are properly dimensioned.

Open the electrical panel and access the internal connections.

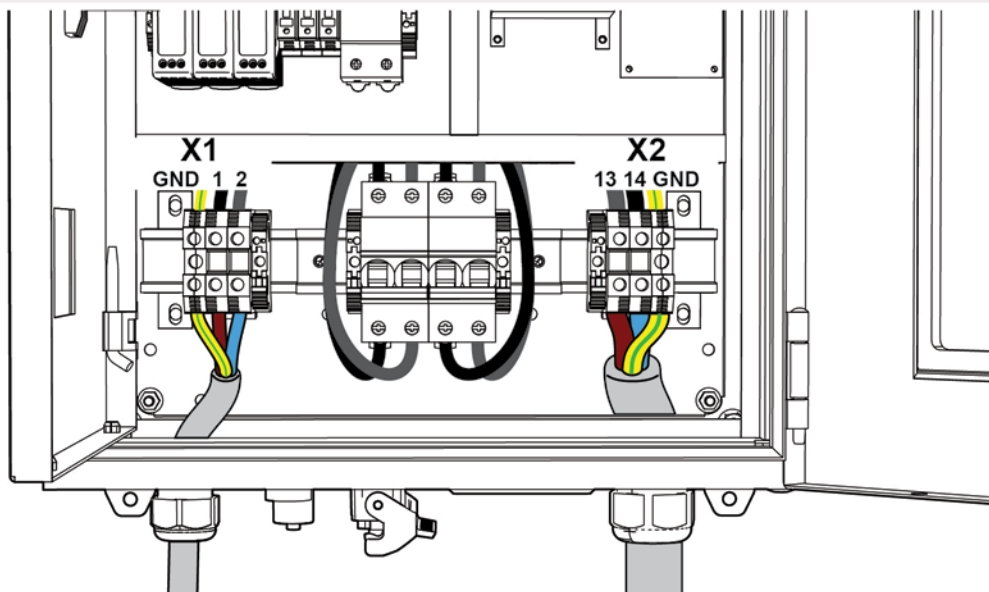
Connect the 230 Vac ( $\pm 10\%$ ) 50-60 Hz input power supply. Insert the tripolar cable into the cable gland at the bottom of the panel (LINE IN). Connect the cables (L+N+PE) to terminal board X1.

Connect the FFU field unit output power supply line. Insert the tripolar cable into the cable gland at the bottom of the panel (LINE OUT). Connect the cables (L+N+PE) to terminal board X2.

3



4





Always protect the incoming supply line to the FMCU unit:

- rated voltage: 230 V 50/60 Hz
- rated current: 32 A
- intervention curve: C or B (comply with the electrical system design)
- breaking capacity: not lower than 10kA

The unit is not equipped with differential protection: provide adequate differential protection to the power supply line entering the FMCU.

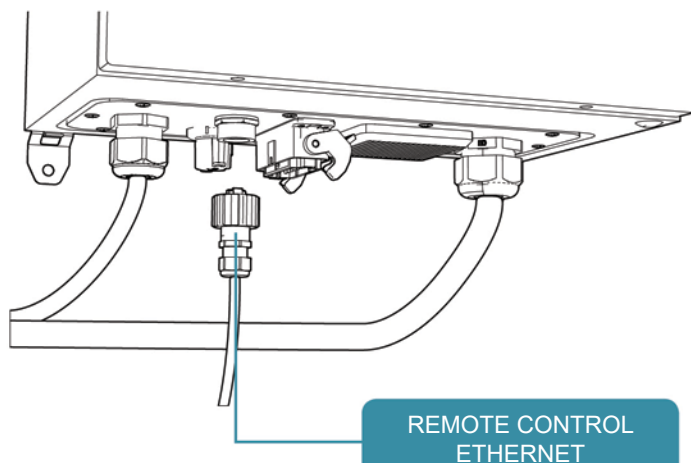
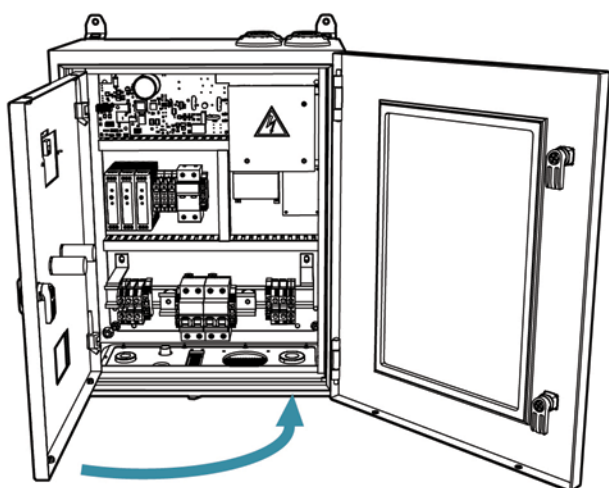
Close the internal panel of the cabinet.

If required by the system configuration, connect the ethernet cable to the RJ45 door at the bottom of the cabinet (J2).

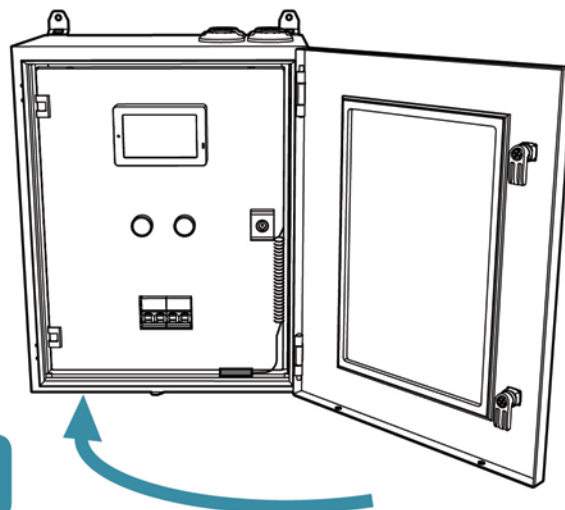
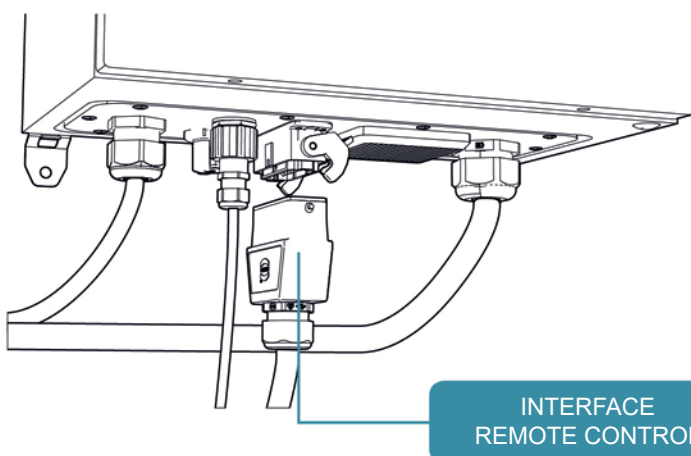
If required by the system configuration, connect the multipolar connector of the integrated electromechanical interface (J3).

Close the external panel door.

5



6



## 3.2.1 Ethernet connection

The FMCU unit can interface directly with the network structure.



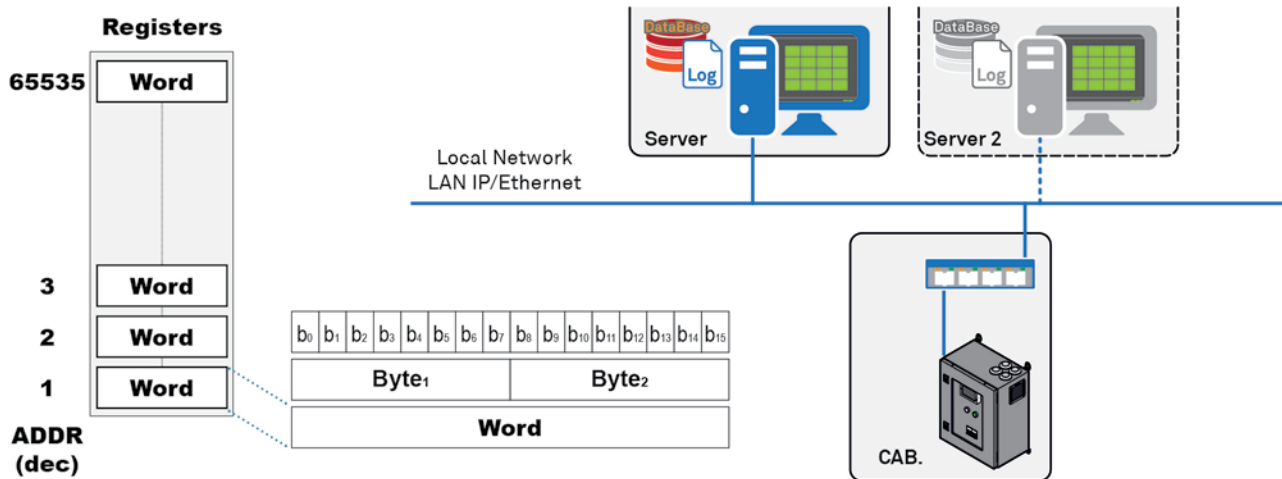
The FMCU is equipped with **ETHERNET** network interface and may be configured with an own IP address to be easily reached on the existing LAN data network.

The supervision server of the whole system directly reach the devices and can collect data and log from the unit.



Using the modbus/jbus protocol, it is possible to interface the FMCU panel with a night light control system.

Modbus and jbus are in fact synonymous; nevertheless the address table has starting address 0, as strictly defined in jbus.



The described interface:

- is operationally oriented, for general control and monitoring activities;
- does not support configuration sessions: OCEM FLASH LED equipments must be configured by a local operator using the front panel dedicated to the “configuration and maintenance”.

The FLASH LED can be accessed via modbus TCP protocol using the following two modbus function codes:

- read multiple registers, decimal value 3
- write multiple registers, decimal value 16

No ‘coils-oriented’ registers are supported.



**LED FLASH system is a modbus slave waiting for requests, so TCP connection is handled as listener.**



In general, the following elements must be taken into account in order to correctly interface the ALCMS to the LED FLASH system:

- The control system is a master for modbus and a client for TCP connection.
- If the communication link falls, the control system has to re-connect the TCP link
- A maintenance operator can locally perform some checks using the front touch pad TPD panel. During these operations, the LED FLASH interface enters in a "local maintenance/diagnostic" mode during which
  - modbus tcp requests/commands are not served
  - the TCP link persistence is not guaranteed, therefore the ALCMS has to check periodically the TCP link connection and, if the link is down, try to reconnect.

### 3.2.1.1 Jbus table (reading)



**The register structure may be different depending on the different version of the FLASH LED system installed.**  
**Not all features are available in all versions (N/A = not available).**  
**Before proceeding, always check the installed version from the panel (HOME page).**



**General information on the current operating status can be read in the register at address 2.**  
**This word is the main status request a control system should periodically poll, with period not lower than 1s.**

|                            | DESCRIPTION                                                                                                                                          | ADDR.<br>(dec) | R/W | Field/Value/bit |        |        |        |       |       |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----|-----------------|--------|--------|--------|-------|-------|
|                            |                                                                                                                                                      |                |     | -> 6.3          | 7.0 -> | 7.3 -> | 7.4 -> | 7.4.4 | 7.4.5 |
| General status information | FLASH LED version:                                                                                                                                   |                |     |                 |        |        |        |       |       |
|                            | Current flash step:<br>00 = 100% (HIGH)   01 = 30% (MED)   10 = 10% (LOW)                                                                            | 2              | R   | b0-b1           |        |        |        |       |       |
|                            | Current intensity mode:<br>1 = standard ICAO mode                                                                                                    |                |     | b2              |        |        |        |       |       |
|                            | Current period:<br>00 = 0.5 s (2 Hz)                                                                                                                 |                |     | b3-b4           |        |        |        |       |       |
|                            | General on/off SFL state:<br>1 = SFL light and/or RTIL/REIL in operation<br>0 = SFL light and/or RTIL/REIL off                                       |                |     | b5              |        |        |        |       |       |
|                            | General alarm status:<br>1 = (at least) one FFU unit is alarmed<br>0 = no FFU unit is alarmed                                                        |                |     | b6              | b7     | b6     |        |       |       |
|                            | General Warning status:<br>1 = (at least) one FFU unit is warned<br>0 = no FFU unit is warned                                                        |                |     | b7              | b8     | b7     |        |       |       |
|                            | Last unsuccessful control:<br>1 = the last command sent to master unit was rejected (or invalid)<br>0 = the last command has been received correctly |                |     | b8              | b9     | b8     |        |       |       |
|                            | on/off SFL state<br>1 = SFL light in operation<br>0 = SFL light off                                                                                  |                |     | N/A             | N/A    | b9     |        |       |       |
|                            | on/off RTIL/REIL state:<br>1 = RTIL/REIL light in operation<br>0 = RTIL/REIL light off                                                               |                |     | N/A             | b6     | b10    |        |       |       |
|                            | Reserved bit - test mode                                                                                                                             |                |     | N/A             | N/A    | b11    |        |       |       |
|                            | Reserved bit - test mode                                                                                                                             |                |     | N/A             | N/A    | b12    |        |       |       |
|                            | RTIL/REIL alarm status:<br>1 = RTIL/REIL light is alarmed<br>0 = no alarm detected in the RTIL/REIL light                                            |                |     | N/A             | N/A    | N/A    | N/A    | b13   |       |
|                            | LFD lamp fault detection L1 (Warning):<br>1 = (at least) one FFU unit is warned LFD (L1)<br>0 = no warning LFD (L1) detected                         |                |     | N/A             | N/A    | N/A    | N/A    | N/A   | b14   |
|                            | LFD lamp fault detection L2 (Alarm):<br>1 = (at least) one FFU unit is alarmed LFD (L2)<br>0 = no alarm LFD (L2) detected                            |                |     | N/A             | N/A    | N/A    | N/A    | N/A   | b15   |

|                 | DESCRIPTION                                                                                                                                                                        | ADDR.<br>(dec) | R/W | Field/Value/bit                           |        |        |        |       |        |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----|-------------------------------------------|--------|--------|--------|-------|--------|
|                 | FLASH LED version:                                                                                                                                                                 |                |     | -> 6.3                                    | 7.0 -> | 7.3 -> | 7.4 -> | 7.4.4 | 7.4.5  |
| General config. | Max number of configured FFU                                                                                                                                                       | 4              | R   | b0-b15                                    |        |        |        |       |        |
|                 | Max number of configured units                                                                                                                                                     | 5              | R   | b0-b15                                    |        |        |        |       |        |
|                 | Input frequency:<br>0 = 50 Hz   1 = 60 Hz                                                                                                                                          | 6              | R   | b0                                        |        |        |        |       |        |
| Units           | Unit configuration<br>(32 total registers, 2 FFUs for each register)<br>Byte = number (int) of the configured unit for the FFU                                                     | 8              | R   | b0-b7: FFU 1   b8-b15: FFU 2              |        |        |        |       |        |
|                 |                                                                                                                                                                                    | 9              |     | b0-b7: FFU 3   b8-b15: FFU 4              |        |        |        |       |        |
|                 |                                                                                                                                                                                    | 10             |     | b0-b7: FFU 5   b8-b15: FFU 6              |        |        |        |       |        |
|                 |                                                                                                                                                                                    | ...            |     | ...                                       |        |        |        |       |        |
|                 |                                                                                                                                                                                    | 39             |     | b0-b7: FFU 63   b8-b15: FFU 64            |        |        |        |       |        |
| FFU alarm       | FFU Alarm Status<br>(4 total registers, 16 FFUs for each register):<br>1 = FFU unit is alarmed<br>0 = no alarm detected                                                            | 40             | R   | b0: FFU 1   b1: FFU 2   ... b15: FFU 16   |        |        |        |       |        |
|                 |                                                                                                                                                                                    | 41             |     | b0: FFU 17   b1: FFU 18   ... b15: FFU 32 |        |        |        |       |        |
|                 |                                                                                                                                                                                    | 42             |     | b0: FFU 33   b1: FFU 34   ... b15: FFU 48 |        |        |        |       |        |
|                 |                                                                                                                                                                                    | 43             |     | b0: FFU 49   b1: FFU 50   ... b15: FFU 64 |        |        |        |       |        |
| Warning FFU     | FFU Warning Status<br>(4 total registers, 16 FFUs for each register):<br>1 = FFU unit is warned<br>0 = no warning detected                                                         | 44             | R   | b0: FFU 1   b1: FFU 2   ... b15: FFU 16   |        |        |        |       |        |
|                 |                                                                                                                                                                                    | 45             |     | b0: FFU 17   b1: FFU 18   ... b15: FFU 32 |        |        |        |       |        |
|                 |                                                                                                                                                                                    | 46             |     | b0: FFU 33   b1: FFU 34   ... b15: FFU 48 |        |        |        |       |        |
|                 |                                                                                                                                                                                    | 47             |     | b0: FFU 49   b1: FFU 50   ... b15: FFU 64 |        |        |        |       |        |
| Config. FFU     | FFU Configuration status<br>(4 total registers, 16 FFUs for each register):<br>1 = FFU configured<br>0 = FFU not configured                                                        | 48             | R   | b0: FFU 1   b1: FFU 2   ... b15: FFU 16   |        |        |        |       |        |
|                 |                                                                                                                                                                                    | 49             |     | b0: FFU 17   b1: FFU 18   ... b15: FFU 32 |        |        |        |       |        |
|                 |                                                                                                                                                                                    | 50             |     | b0: FFU 33   b1: FFU 34   ... b15: FFU 48 |        |        |        |       |        |
|                 |                                                                                                                                                                                    | 51             |     | b0: FFU 49   b1: FFU 50   ... b15: FFU 64 |        |        |        |       |        |
| Active FFU      | FFU activation status<br>(4 total registers, 16 FFUs for each register):<br>1 = FFU active and in communication with FMCU<br>0 = FFU not active and not in communication with FMCU | 52             | R   | b0: FFU 1   b1: FFU 2   ... b15: FFU 16   |        |        |        |       |        |
|                 |                                                                                                                                                                                    | 53             |     | b0: FFU 17   b1: FFU 18   ... b15: FFU 32 |        |        |        |       |        |
|                 |                                                                                                                                                                                    | 54             |     | b0: FFU 33   b1: FFU 34   ... b15: FFU 48 |        |        |        |       |        |
|                 |                                                                                                                                                                                    | 55             |     | b0: FFU 49   b1: FFU 50   ... b15: FFU 64 |        |        |        |       |        |
| LFD             | LFD actual value:<br>number (int) of lamps currently faulted                                                                                                                       | 86             | R   | N/A                                       | N/A    | N/A    | N/A    | N/A   | b0-b15 |

The active generic alarm status indicates the presence of at least one of the possible conditions:

- (at least) one unit has detected an internal electrical issue: LED failure, voltage/current anomaly,...
- (at least) one FFU is currently not responding to the FMCU



**When the alarm status indication bit is set to 1, the ALCMS system is authorised to check the detail of individual FFUs units (activation status, at registers 52-55; alarm status, at registers 40-43).**

The active RTIL/REIL alarm status (if RTIL/REIL light has been configured) informs that (at least) one RTIL/REIL unit is alarmed.



**In the event of an RTIL/REIL system alarm, the respective lights are automatically switched off.**

The status of the lamp failure detection system LFD (if detection has been activated, at registers 84-85) informs of the exceeding of the relevant warning (L2) and alarm (L1) thresholds due to a number of units alarmed (see registers 40-43 and 52-55).



**In the event of an LFD alarm signalling (L2), the LFD warning signalling variable (L1) is also active.**



The configuration of several FFUs in the same unit (see registers 8-39) allows the respective signals to flash synchronously.



**Max FFU number configurable in the system is 64.**

**If the unit value associated to the FFU is 0xEF (hex) it means that the unit itself is not configured, therefore it will be ignored by the system.**

### 3.2.1.2 Jbus table (reading)



**The FLASH LED system cannot be configured via ALCMS, except for certain threshold values. The operator must configure the system using only the local panel.**



**The register structure may be different depending on the different version of the FLASH LED system installed.**

**Not all features are available in all versions (N/A = not available).**

**Before proceeding, always check the installed version from the panel (HOME page).**



**The main command of the unit requires the use of two different registers:**

- the register at address 0 contains the command indication

- the register at address 1 contains any details needed to execute the command

**ATTENTION: only some options are currently available and some details must necessarily be set to the values indicated in the table (mandatory: force the value indicated).**



**Only use the values given in this documentation. All values not described are reserved and available for future use.**

**Improper use of the registers can generate unexpected or dangerous results.**

**OCEM Airfield Technology cannot be held responsible in case of incorrect configuration of the devices.**

|              | DESCRIPTION                                                    | ADDR.<br>(dec) | R/W | Field/Value/bit                   |        |                                           |          |
|--------------|----------------------------------------------------------------|----------------|-----|-----------------------------------|--------|-------------------------------------------|----------|
|              | FLASH LED version:                                             |                |     | -> 6.3                            | 7.0 -> | 7.4 ->                                    | 7.4.5 -> |
| MAIN COMMAND | Activate SFL light (->On)<br>See Intensity detail              | 0              | W   | N/A                               |        | b0-b8: 1 (int)<br>b9-b15: 0 (int)         |          |
|              | Deactivate SFL light (->Off)                                   |                |     | N/A                               |        | b0-b8: 2 (int)<br>b9-b15: 0 (int)         |          |
|              | Activate RTIL/REIL light (->On)<br>See Intensity detail        |                |     | N/A                               |        | b0-b8: 5 (int)<br>b9-b15: 0 (int)         |          |
|              | Deactivate RTIL/REIL light (->Off)                             |                |     | N/A                               |        | b0-b8: 6 (int)<br>b9-b15: 0 (int)         |          |
|              | Deactivate all lights (->Off)                                  |                |     | b0-b8: 1 (int)<br>b9-b15: 0 (int) | N/A    | b0-b8: 20 (int) [0x14]<br>b9-b15: 0 (int) |          |
|              | Activate all lights (->On)<br>See Intensity detail             |                |     | b0-b8: 2 (int)<br>b9-b15: 0 (int) | N/A    | b0-b8: 21 (int) [0x15]<br>b9-b15: 0 (int) |          |
| DETAIL       | Intensity = 100% (HIGH)                                        | 1              | W   |                                   |        | b0-b1: 00                                 |          |
|              | Intensity = 30% (MEDIUM)                                       |                |     |                                   |        | b0-b1: 01                                 |          |
|              | Intensity = 10% (LOW)                                          |                |     |                                   |        | b0-b1: 10                                 |          |
|              | ICAO mode (mandatory)                                          |                |     |                                   |        | b2: 1                                     |          |
|              | period 0,5 s (2 Hz) (mandatory)                                |                |     |                                   |        | b3-b4: 00                                 |          |
|              |                                                                |                |     |                                   |        |                                           |          |
| CAT          | Enable CAT I (all SFL lights are activated)                    | 73             | W   | N/A                               |        | 1 (int)                                   |          |
|              | Enable CAT II/III (only the first 20 SFL lights are activated) |                |     | N/A                               |        | 2 (int)                                   |          |
|              | Disable CAT                                                    |                |     | N/A                               |        | 255 (int) [0xFF]                          |          |

|     | DESCRIPTION                                                                                                     | ADDR.<br>(dec) | R/W | Field/Value/bit |        |        |          |
|-----|-----------------------------------------------------------------------------------------------------------------|----------------|-----|-----------------|--------|--------|----------|
|     | FLASH LED version:                                                                                              |                |     | -> 6.3          | 7.0 -> | 7.4 -> | 7.4.5 -> |
| LFD | LFD (L1) warning level<br>maximum number (int) of faulted lamps before activation of<br>warning status LFD (L1) | 84             | R/W | N/A             | N/A    | N/A    |          |
|     | LFD (L2) alarm level<br>maximum number (int) of faulted lamps before activation of<br>alarmed LFD (L2)          | 85             | R/W | N/A             | N/A    | N/A    |          |



**It is good practice for an ALCMS system to set a command retransmission policy on the field units, usually for operations that are not executed in a given time interval, based on specific considerations on control system.**

**WARNING:** In order to avoid possible retransmission overlap scenarios, please note that the OCEM FLASH LED system implements its retransmission policy independently.

**Avoid continuous retransmissions of commands and set a limit of a few retransmissions (e.g. spaced a few seconds apart)**

From version 7.0 onwards, it is possible to control SFL and RTIL/REIL lights separately.



**If the system is configured with only RTIL light, compatibility with earlier models is guaranteed (the system is controlled using (int) 1 and 2 values for the register at address 0 (b0-b8)).**

From version 7.0 onwards, CAT operations can be controlled when more than 20 SFL fixtures are present on the system.



**If the system is configured with RTIL light as well, the operation of these devices is not involved in CAT functionalities.**

**In order to carry out the desired CAT adjustment, the SFL light must be switched off before the CAT command is launched.**

## 3.2.1.3 Examples of modbus messages

### SFL only switch on command and subsequent state request

CMD : ledFlashCmd : \_\_\_\_ raw pkt: len 17  
 byte index    0   1   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16  
                  00 00 00 00 00 0b 01 10 00 00 00 02 04 00 01 00 04

Note:

- byte 13-14    valore 0x01 [00000001] Comando per l'attivazione della sola segnalazione SFL
- byte 16        value 0x04 [00000100] 100%, standard ICAO mode, period 0.5 s

REQ : status polling req : \_\_\_\_ raw pkt: len 12  
 byte index    0   1   2   3   4   5   6   7   8   9   10   11  
                  00 00 00 00 00 06 01 03 00 02 00 01

Notes:

- byte 7        value 0x03 [code 3] Read multiple register (even if only one is required)
- byte 8-9        starting address 2 (general status information)
- byte 10-11     Request: 1 Word (2 Byte)

RXD : status polling resp : \_\_\_\_ raw pkt: len 11

|            |    |    |    |    |    |    |    |    |    |    |    |
|------------|----|----|----|----|----|----|----|----|----|----|----|
| byte index | 0  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |
|            | 00 | 00 | 00 | 00 | 00 | 05 | 01 | 03 | 02 | 02 | 24 |

Notes:

- byte 9 value 0x02 [b9=1] ON state for SFL only
- byte 10 value 0x24 [b0-b1=00;b5=1] 100%, ON state (general)

RTIL only switch on command and subsequent state request

CMD : ledFlashCmd : \_\_\_\_ raw pkt: len 17

|            |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| byte index | 0  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|            | 00 | 00 | 00 | 00 | 00 | 0b | 01 | 10 | 00 | 00 | 00 | 02 | 04 | 00 | 05 | 00 | 04 |

Notes:

- byte 13-14 value 0x05 [00000101] Command is for RTIL only
- byte 16 value 0x04 [00000100] 100%, standard ICAO mode, period 0.5 s

REQ : status polling req : \_\_\_\_ raw pkt: len 12

|            |    |    |    |    |    |    |    |    |    |    |    |    |
|------------|----|----|----|----|----|----|----|----|----|----|----|----|
| byte index | 0  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 |
|            | 00 | 00 | 00 | 00 | 00 | 06 | 01 | 03 | 00 | 02 | 00 | 01 |

Notes:

- byte 7 value 0x03 [code 3] Read multiple register (even if only one is required)
- byte 8-9 starting address 2 (general status information)
- byte 10-11 Request: 1 Word (2 Byte)

RXD : status polling resp : \_\_\_\_ raw pkt: len 11

|            |    |    |    |    |    |    |    |    |    |    |    |
|------------|----|----|----|----|----|----|----|----|----|----|----|
| byte index | 0  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |
|            | 00 | 00 | 00 | 00 | 00 | 05 | 01 | 03 | 02 | 04 | 24 |

Note:

- byte 9 value 0x04 [b10=1] ON state for RTIL/REIL only
- byte 10 value 0x24 [b0-b1=00;b5=1] 100%, ON state (general)

SFL and RTIL switch on command and subsequent state request

CMD : ledFlashCmd : \_\_\_\_ raw pkt: len 17

|            |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| byte index | 0  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|            | 00 | 00 | 00 | 00 | 00 | 0b | 01 | 10 | 00 | 00 | 00 | 02 | 04 | 00 | 15 | 00 | 05 |

Note:

- byte 7 value 0x10 [code 16] Write multiple register
- bytes 8-9 starting reading at address 0 (main command)
- byte 10-11 To write: 1 Word (2 Byte)
- byte 13-14 value 0x15 Command for the activation of all lights
- byte 15-16 value 0x05 [00000101] 30%, standard ICAO mode, period 0.5 s

REQ : status polling req : \_\_\_\_ raw pkt: len 12

|            |    |    |    |    |    |    |    |    |    |    |    |    |
|------------|----|----|----|----|----|----|----|----|----|----|----|----|
| byte index | 0  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 |
|            | 00 | 00 | 00 | 00 | 00 | 06 | 01 | 03 | 00 | 02 | 00 | 01 |

Notes:

- byte 7 code 0x3 [code 3] Read multiple register (even if only one is required)
- byte 8-9 starting address 2 (general status information)
- byte 10-11 Request: 1 Word (2 Byte)

RXD : status polling resp : \_\_\_\_ raw pkt: len 11  
 byte index    0   1   2   3   4   5   6   7   8   9   10  
                  00 00 00 00 00 05 01 03 02 06 25

Note:

- byte 9        value 0x06 [b9=1;b10=1] ON state for SFL and RTIL/REIL
- byte 10      value 0x25 [b0-b1=01;b5=1] 30%, ON state (general)

Should RTIL light occur alarmed, the response would be different.

RXD : status polling resp : \_\_\_\_ raw pkt: len 11  
 byte index    0   1   2   3   4   5   6   7   8   9   10  
                  00 00 00 00 00 05 01 03 02 22 E5

Notes:

- byte 9        value 0x22 [b9=1;b10=0;b13=1] ON state for SFL, OFF state for RTIL/REIL, alarm condition for RTIL/REIL
- byte 10      value 0xE5 [b0-b1=01;b5=1;b6=1;b7=1] 30%, ON state (general), (General) alarm status, (General) warning status.



**To be highlighted:**

- the (general) alarm status [byte10: b6=1] is always present when RTIL/REIL alarm status is active [byte9: b13=1].
- the (general) warning status [byte10: b7=1] means that the functioning unit of the RTIL light was switched off due to the RTIL/REIL alarm on the coupled unit.



**Concerning the general alarm status:**

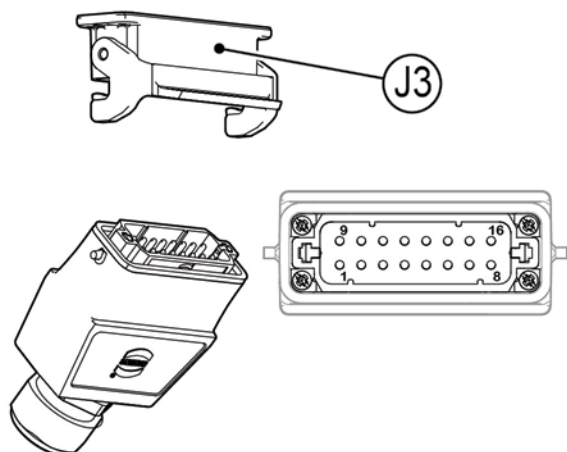
- the byte10 could contains value 0xA5 for a certain number of status responses without indicating the (general) alarm status, that will be notified subsequently.
- temporary “filtering” of the alarm status (generic) is necessary to avoid any fluctuations of its value
- in the example, the RTIL/REIL alarm status is referred to the FLASH LED version 7.4.4 and later.

## 3.2.2 Multi-wire remote connection

The FMCU unit can be equipped with a multiwire optional interface.



**The FMCU unit configured with multiwire interface J3 is equipped with special connector (16 poles) to be wired according to the diagram.**



| PIN   | DESCRIPTION                |
|-------|----------------------------|
|       | Controls                   |
| 1     | Common (GND)               |
| 2     | Low intensity selection    |
| 3     | Medium intensity selection |
| 4     | High intensity selection   |
|       | Feedback (dry contacts)    |
| 5-6   | Not Responding             |
| 7-8   | Alarm                      |
| 9-10  | Warning                    |
| 11-12 | System On                  |
|       | Reserved                   |
| 13-14 | --- (do not connect)       |
| 15-16 | --- (do not connect)       |

### 3.3 Installation of the fixtures - Preliminary operations

The fixture is supplied with the FFU field unit. Use the components only in combination with compatible supports. The devices are normally installed on a concrete block.

Ensure the verticality of the upper part of the support.

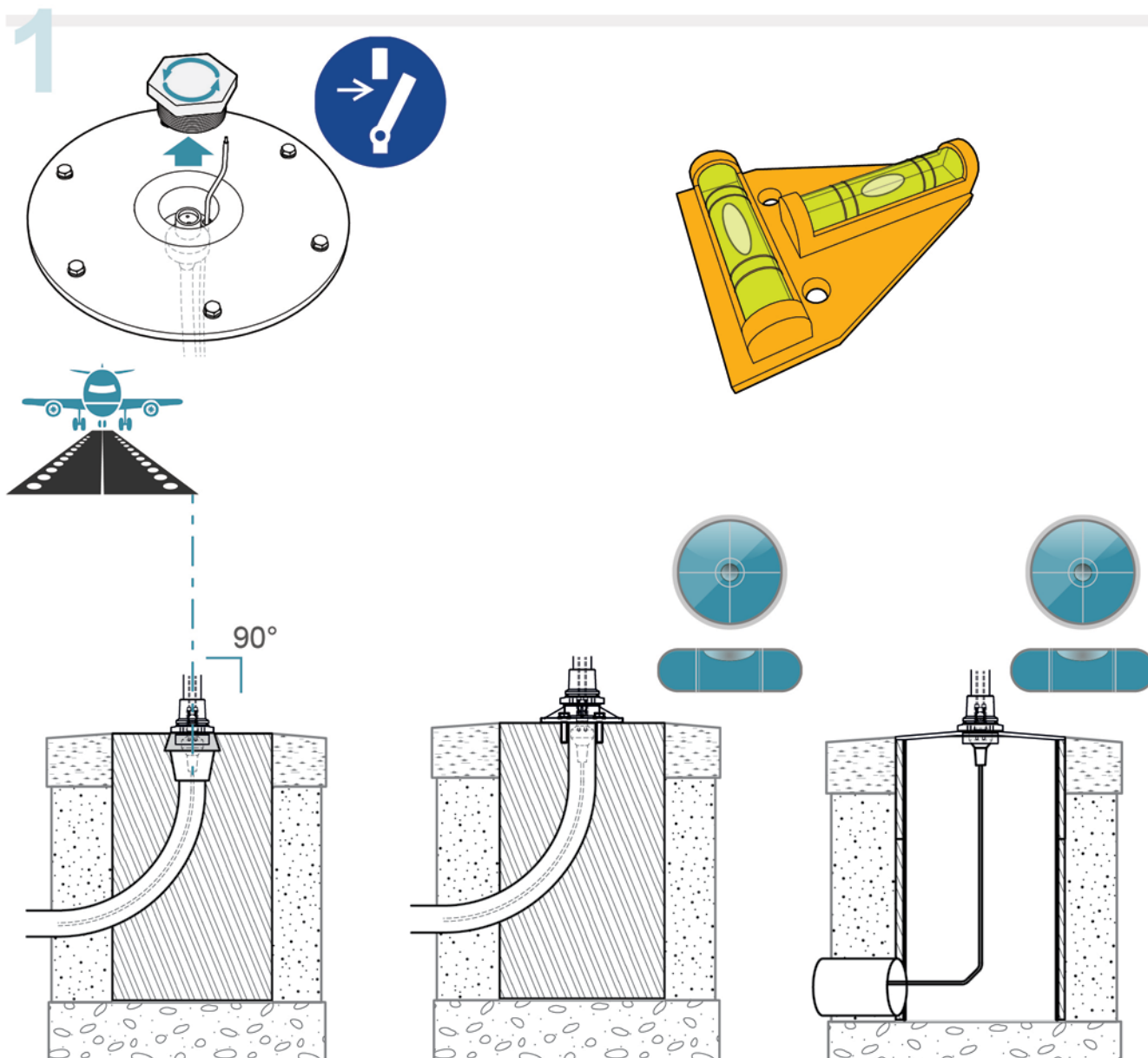


**Using a bubble level check that the fastening surface of the flange (on the concrete or on the base plate) is perfectly at level.**

In the case of an elbow pipe, ensure the verticality of the upper part of the pipe.



**Do not proceed with installation if the supports are damaged or not aligned.**



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Use the inset fixture only in combination with compatible supports L-867B or L-868B.

Ensure the correct pointing of the base.



**In case of incorrect positioning of the base optical misalignments of light beams or mechanical damages may occur.**



**The positioning of the light elements varies depending on the use. Ensure that the device is used correctly for its intended purpose, in accordance with the installation project and the regulations in force.**

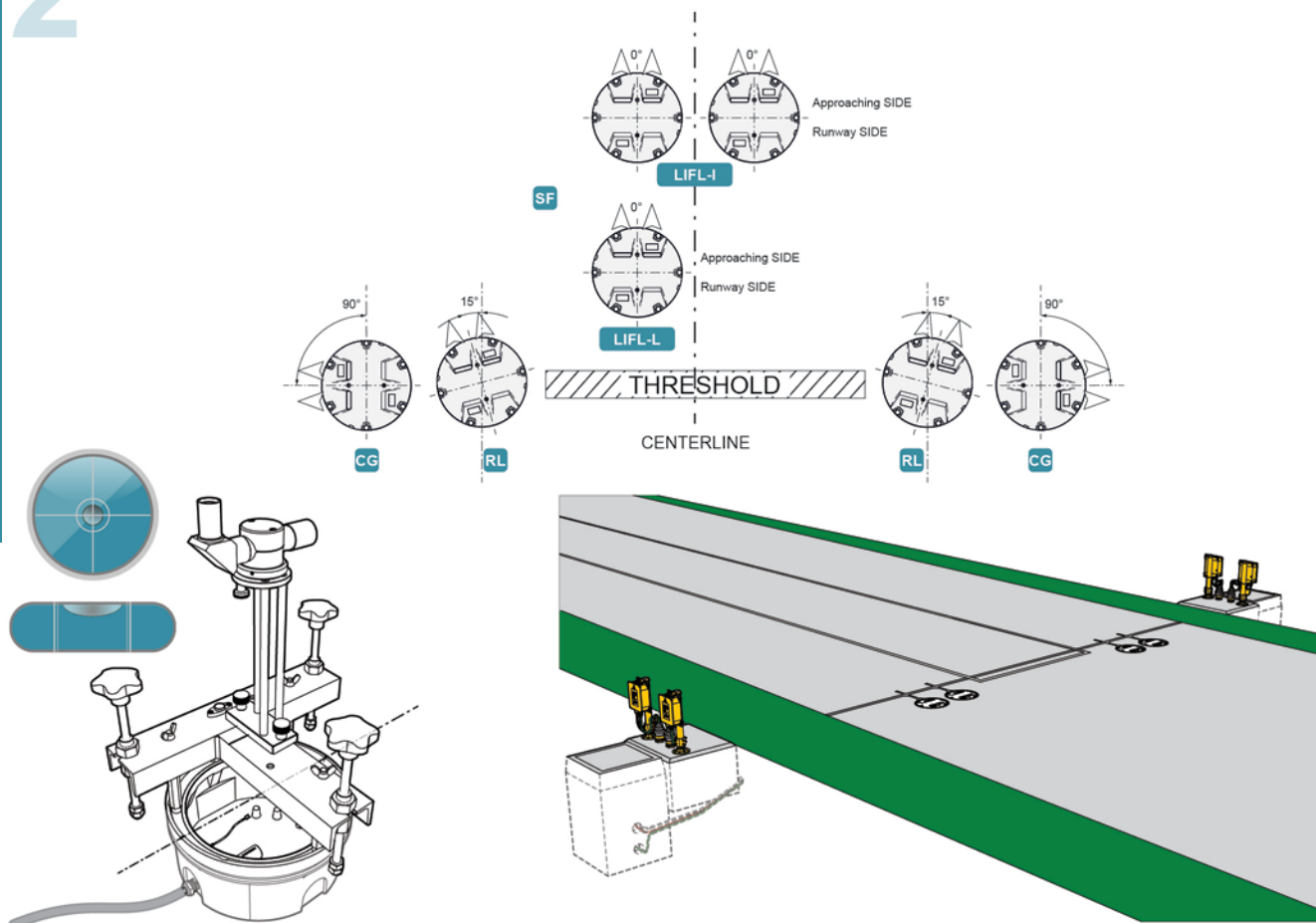
Install the pointing tool on the base and check the pointing of the light beam.



**Use pointing references placed frontally or laterally, and adjust the pointing tool accordingly.**

## 2

### INSTALLATION





### 3.4 Wiring of the secondary connector kit



**Keep the components in their original packaging until installation.**  
**Before starting the wiring, provide yourself with a cloth and alcohol (or equivalent detergent) for preliminary cable cleaning.**

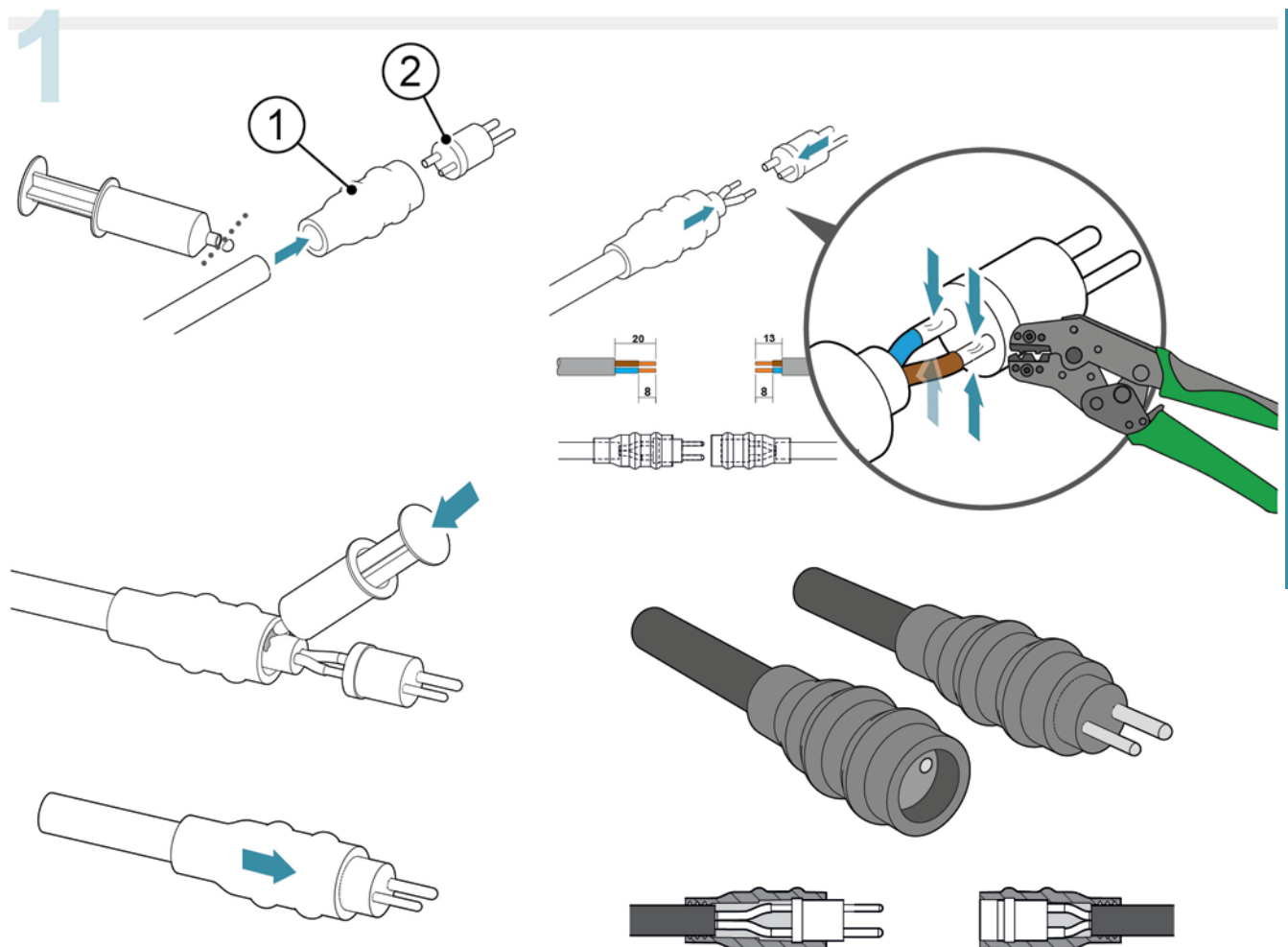
Clean the end of the cable on which you intend to install the connector to a length of at least 20 cm with alcohol (or equivalent detergent) and allow to dry completely. If necessary, make a header cut to remove damaged parts and remove the sharp edge of the external insulation layer to facilitate the subsequent operational steps.

Cut the spout of the tube/syringe with silicone grease and sprinkle the end of the cable. Insert the cable in the housing (1).

Clean the end of the cable with alcohol (or equivalent detergent). Remove the insulating material from the cable and the conductors, as shown in the figure.

Crimp the conductors to the pins of the contact holder body (2) using a suitable tool (not supplied), to fasten the brown cable to the small pin and the blue cable to the large pin.

Fill the housing with silicone grease, taking care to completely empty the tube/syringe. Slide the housing along the cable until the contact holder body is in position.



## 3.5 Installation of the FFU field unit



Store the device in its original packaging until the time of installation. Proceed assembling the fixture and check the supply features before installing the fixture. Pay particular attention to the proper positioning of the fixture on the base.



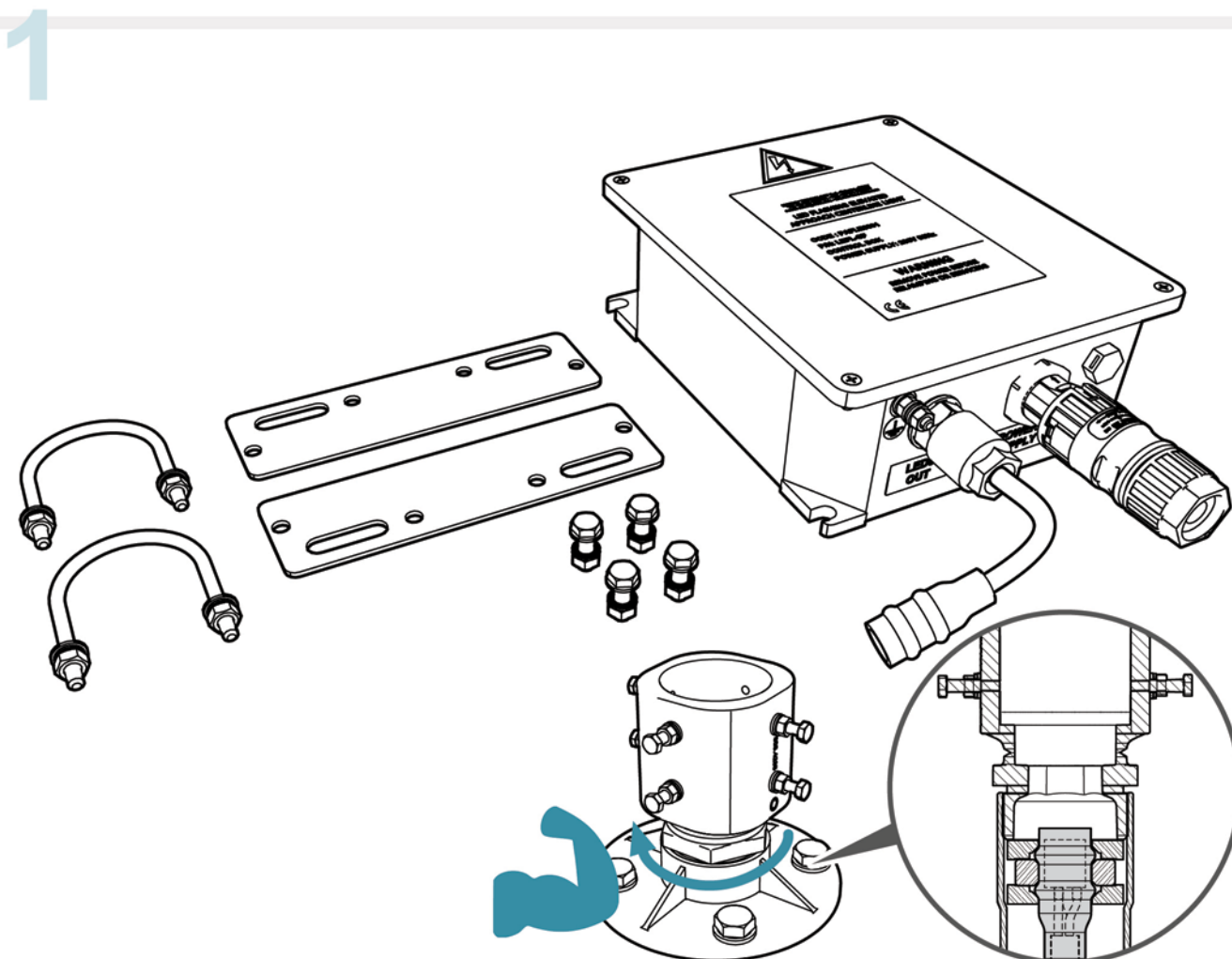
The FFU unit has technical specifications (dimensions: 22x25x12 cm; degree of mechanical protection: IP 67) suitable for installation within a dry hole or within a deep base L-867. OCEM suggests installing the FFU on a pole (equipped with a frangible coupling) to ensure easy access to the device for periodic maintenance operations.

The unit is supplied without pole and without any frangible coupling. Use the devices only in combination with optional installation kits or compatible supports.



Before carrying out any intervention on the device, cut off all external power sources and place appropriate work-in-progress warnings on the systems. Wait for the discharging time (at least 5 min) and check using appropriate instruments that there are no residual energies before accessing the electrical equipment.

If foreseen, anchor the flange to the concrete block or position the socket locking ring, if any. Screw and tighten the frangible coupling to the anchor point.







**Before proceeding, if required by the configuration, prepare the necessary openings on the pipe for the passage of cables.**

Use a suitable tool, make an opening on the pipe to allow the cable passage. Clean the hole by removing dirt and processing residues, both outside and inside the pipe.



**Make a circular hole with a diameter sufficient to allow the cable passage, but not exceeding 25 mm.**

**Remove edges or burrs from the hole, which could damage the cable.**

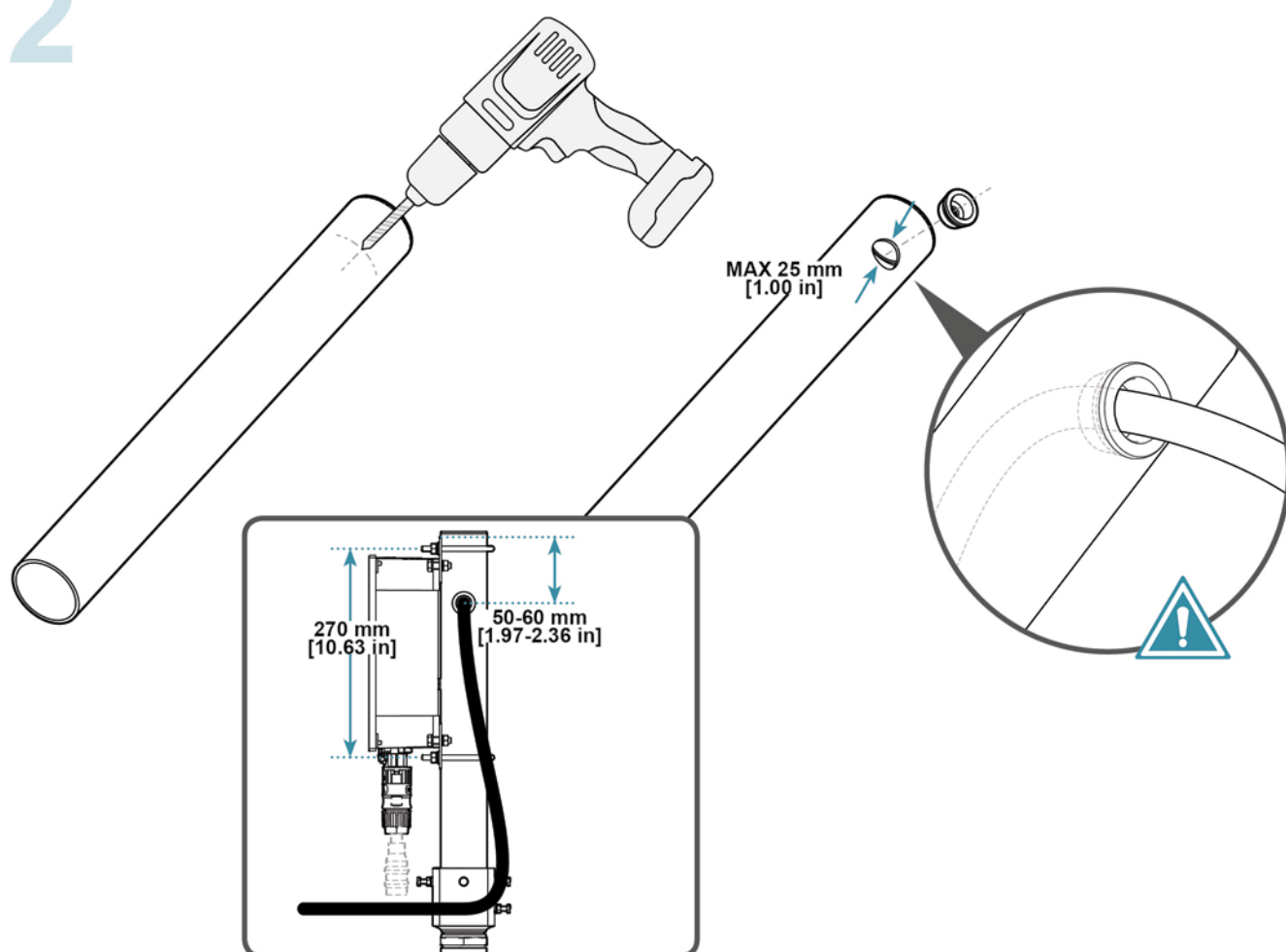
**Use suitable protection to prevent damage to the cable and the entrance of dust or water inside the pole in correspondence of the hole.**



**The works required to arrange the passage of cables are at the installer's complete charge. Always observe the dimensions given in the diagram: incorrect positioning of the holes could compromise the stability of the device.**

**The accessories required to arrange the passage of cables are not supplied. Components can be ordered separately.**

# 2





**If required by the configuration, insert inside the coupling the supply cable of the FFU unit.**

Insert the supply cable into the pole ( $\varnothing$  60 mm) of a height compliant with the project, providing an adequate supply of cable for connecting the field unit.

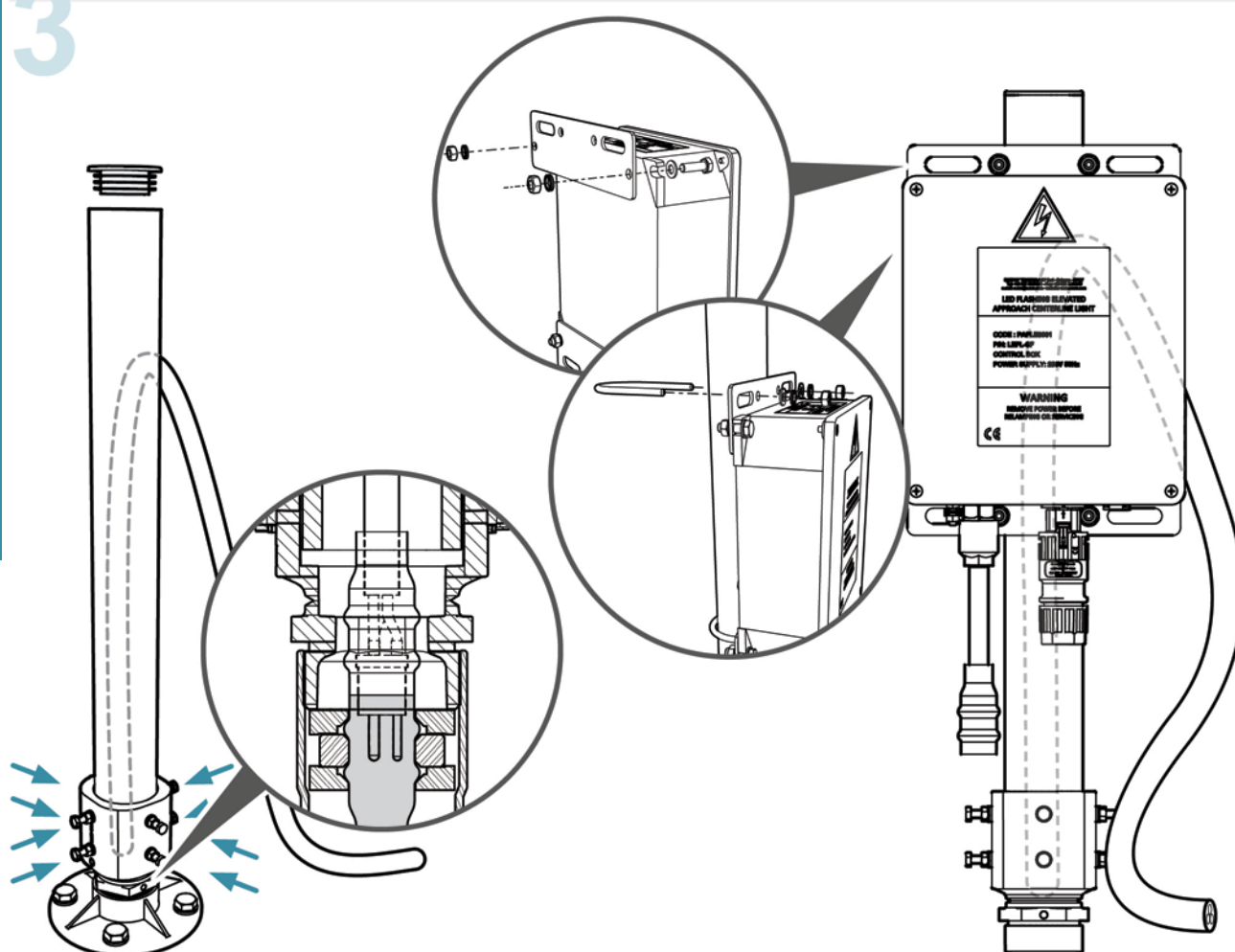
Insert the pole on the coupling and tighten the locking screws (respecting the verticality of the pole). If required by the configuration, install the upper closing plug of the support pole.

Install the support plates with the screws provided. Position the FFU unit (with the connections facing downwards) at the installation level and secure it to the pole with the brackets supplied.



**If required by the configuration, install the ground connection system for connecting the field unit to the power supply line coming from the FMCU and/or the corresponding fixture supply line.**

# 3





To make connections with the FFU field unit, it is not necessary to open the box. The field unit is equipped with quick-connect connections on the lower side. The kit includes plug connectors (M) to be installed on the supply cable (not supplied) of the indicated section.



Before connecting/disconnecting the connector, check that the line is not powered.

Insert the cable through the screw connection (1), the gasket (2) and the case (3). Remove the insulating material from the cable and the conductors, as shown in the figure.

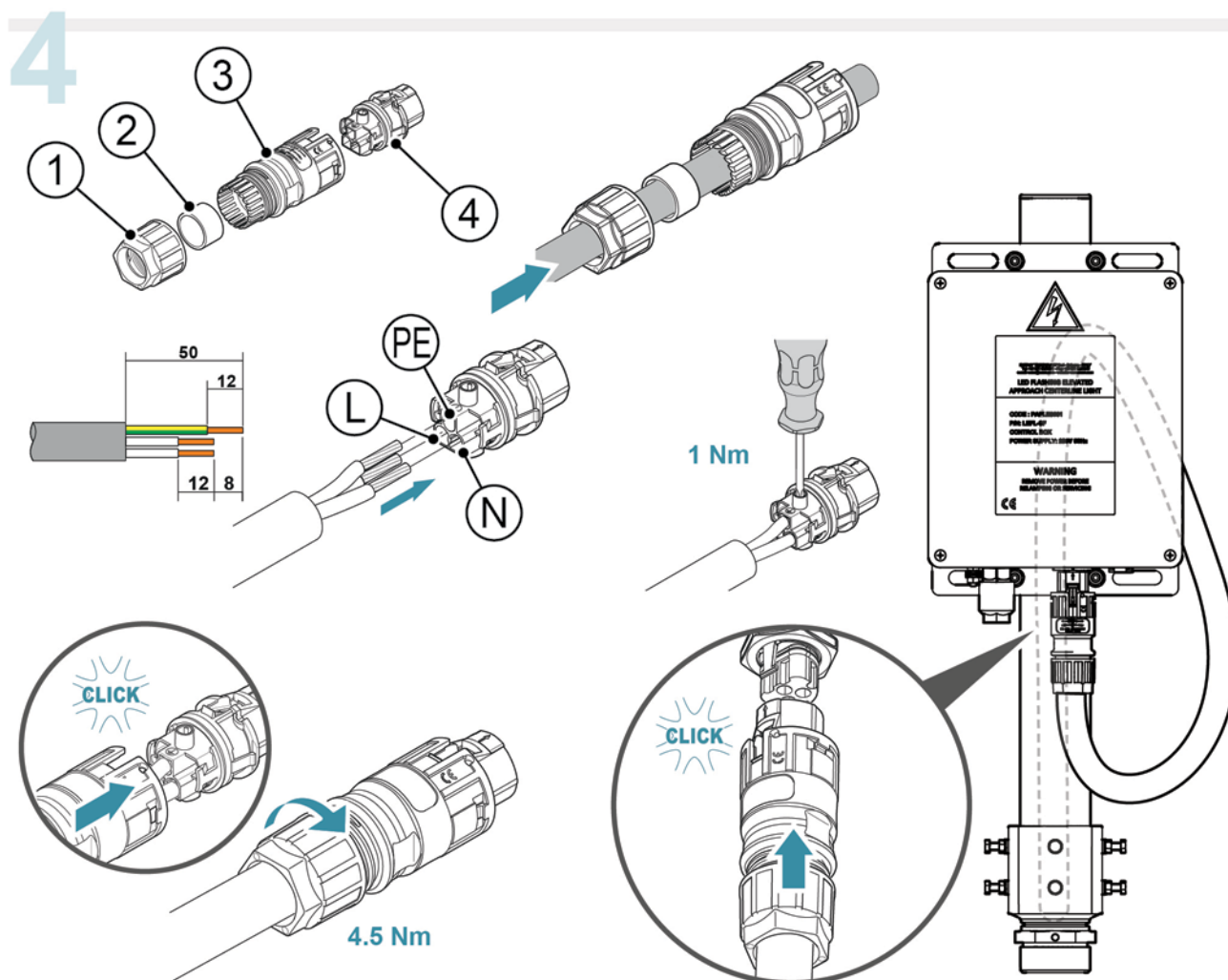
Insert the individual conductors into the contact holder terminals (4) and tighten the screws with the torque values shown in the figure.

Push the case onto the contact holder until it clicks into position. Tighten the screw connections with the indicated torque values indicated in figure.



Ensure that the gasket fits properly in the housing before tightening the screw connection.

Connect the plug (M) installed on the cable with the socket connector (F) on the field unit. Insert the plug until it clicks into position.



## 3.6 Installation of the elevated light fixture (LEFL)

### 3.6.1 Installation of the light fixture directly on the coupling



Store the device in its original packaging until the time of installation. Proceed assembling the fixture and check the supply features before installing the fixture. Pay particular attention to the proper positioning of the fixture on the base.

If foreseen, fixtures can be installed directly on the frangible coupling. Use the fixture only in combination with optional installation kits or compatible supports.



Before carrying out any intervention on the device, cut off all external power sources and place appropriate work-in-progress warnings on the systems. Wait for the discharging time (at least 5 min) and check using appropriate instruments that there are no residual energies before accessing the electrical equipment.

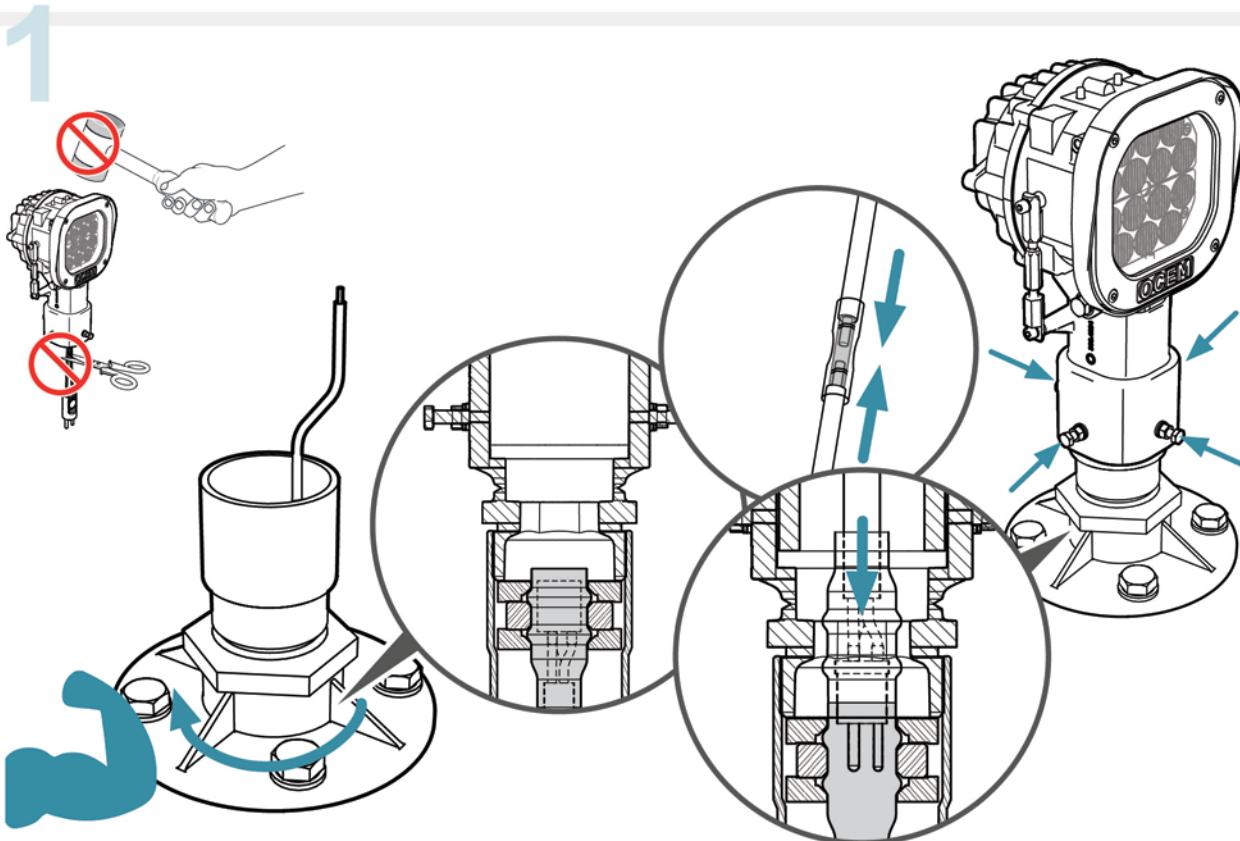
Screw and tighten the frangible coupling to the base.



Insert inside the coupling the power cable of the fixture (with socket) coming from the FFU field unit and the ground cable (ground connected at its nearest point).

Make the electrical connections: insert the plug of the fixture in the socket coming from the field unit and joint the ground cable with the protective conductor.

Tighten uniformly the screws present on the body of the fixture until stopping the fixture on the pole (without tightening).



### 3.6.2 Installation of the light fixture directly on the pole



**Store the device in its original packaging until the time of installation. Proceed assembling the fixture and check the supply features before installing the fixture. Pay particular attention to the proper positioning of the fixture on the base.**

The fixture is supplied without pole and without any frangible coupling. Use the fixture only in combination with optional installation kits or compatible supports.

The fixtures installed on the pole require a supply cable (not supplied) of suitable length to connect the fixture to the FFU field unit.



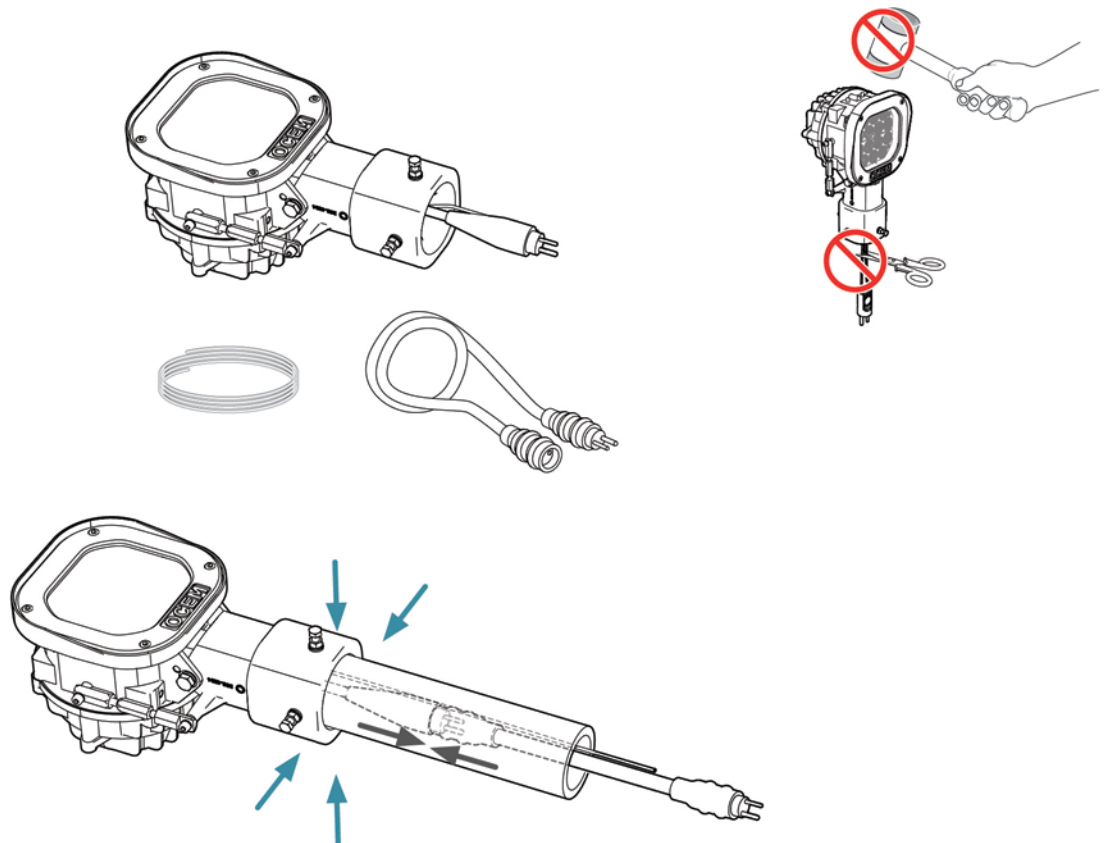
**Before carrying out any intervention on the device, cut off all external power sources and place appropriate work-in-progress warnings on the systems. Wait for the discharging time (at least 5 min) and check using appropriate instruments that there are no residual energies before accessing the electrical equipment.**

Make the electrical connections: insert the plug of the fixture in the socket and joint the ground cable with the protective conductor. Insert inside the pole.

Insert the fixture on the pole (Ø 60 mm) of height in accordance with the project: the focus of the fixture is positioned 143 mm above the support system.

Tighten uniformly the screws present on the body of the fixture until stopping the fixture on the pole (without tightening) Install an adequate support system.

# 1



INSTALLATION



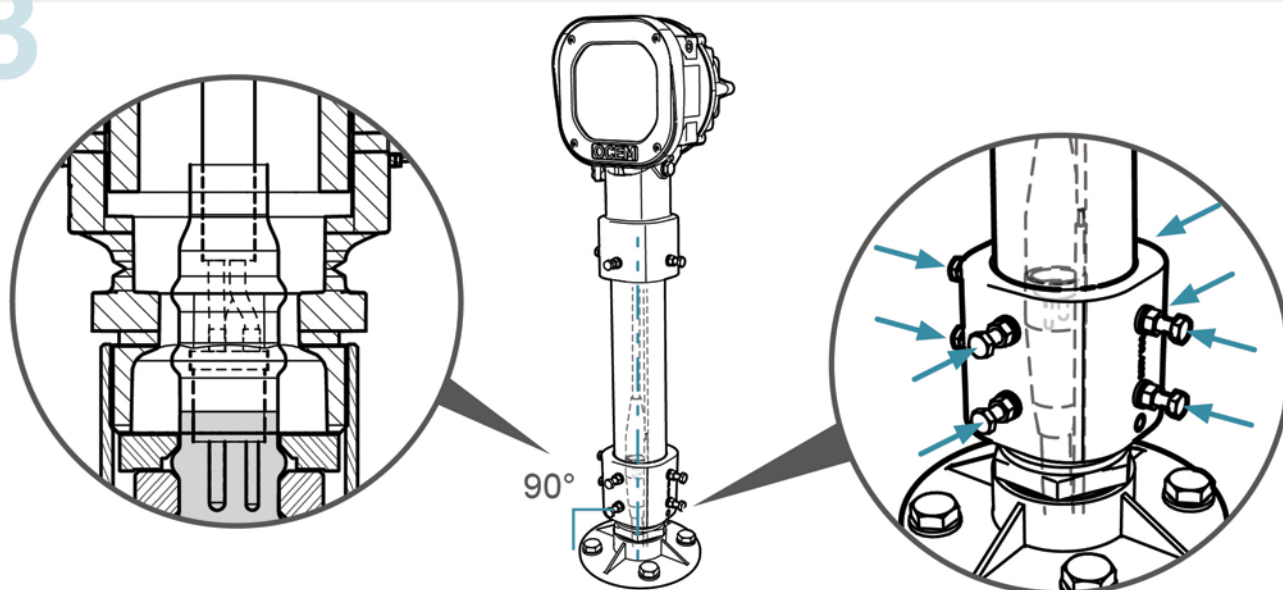
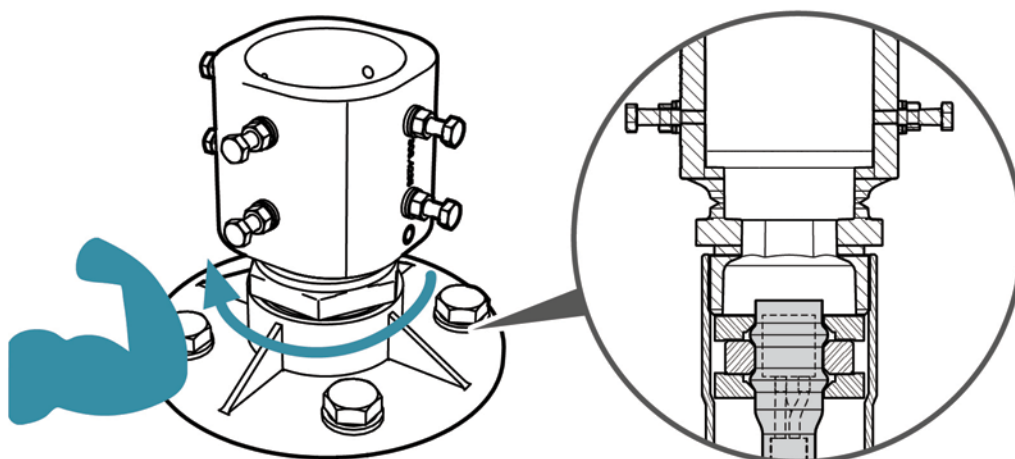
If foreseen, screw and tighten the frangible coupling to the base.



**Insert inside the coupling the power cable of the fixture (with socket) coming from the FFU field unit and the ground cable (ground connected at its nearest point).**

Make the electrical connections: insert the plug of the fixture in the socket coming from the transformer and joint the ground cable with the protective conductor coming from the base.

Insert the pole on the coupling and tighten the locking screws (respecting the verticality of the pole).



### 3.6.3 Installation of the light fixture on the folding pole



**Store the device in its original packaging until the time of installation. Proceed assembling the fixture and check the supply features before installing the fixture. Pay particular attention to the proper positioning of the fixture on the base.**

The fixture is supplied without pole. Use the fixture only in combination with compatible supports (pipe Ø 60 mm). The fixtures installed on the pole require a supply cable (not supplied) of suitable length to connect the fixture to the FFU field unit.

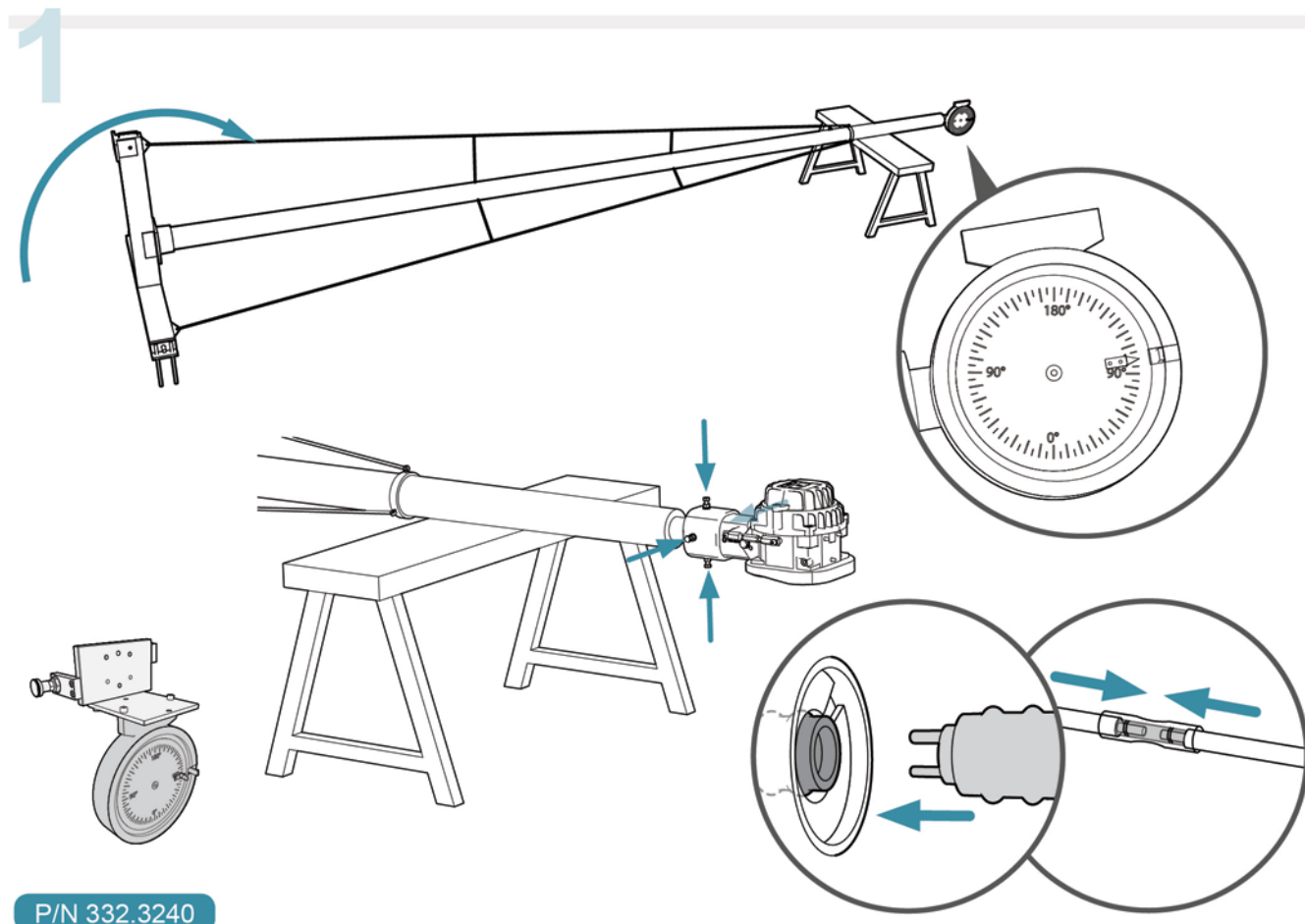


**Before carrying out any intervention on the device, cut off all external power sources and place appropriate work-in-progress warnings on the systems. Wait for the discharging time (at least 5 min) and check using appropriate instruments that there are no residual energies before accessing the electrical equipment.**

The frangible pole must be prepared for installation operations: following the manufacturer's instructions, lower the pole, by placing it on a perfectly level support if provided. Apply the pendulum goniometer to the upper part of the pole and detect the angle of repose of the pole and take note (in the example 10°).

Make the electrical connections: insert the plug of the fixture in the socket coming from the field unit and joint the ground cable with the protective conductor.

Tighten uniformly the screws present on the body of the fixture until stopping the fixture on the support (without tightening).



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## 3.6.4 Fixture pointing on fixed support

Make an initial pointing of the fixture by hand. Rotate the body of the fixture until orienting the fixture in the desired direction.



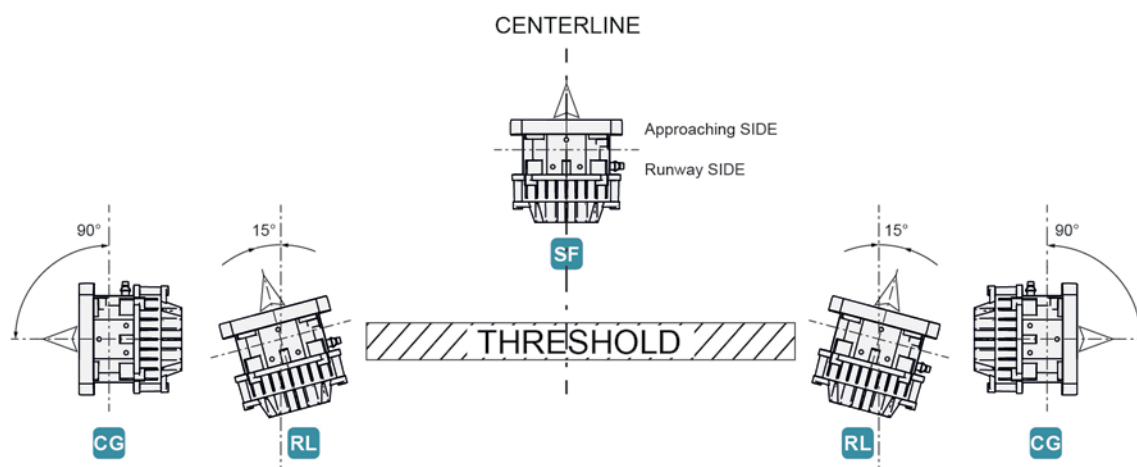
The positioning of the light elements varies depending on the use. Ensure that the device is used correctly for its intended purpose, in accordance with the installation project and the regulations in force.

Install the pointing tool on the body of the fixture and proceed to adjust the light beam.

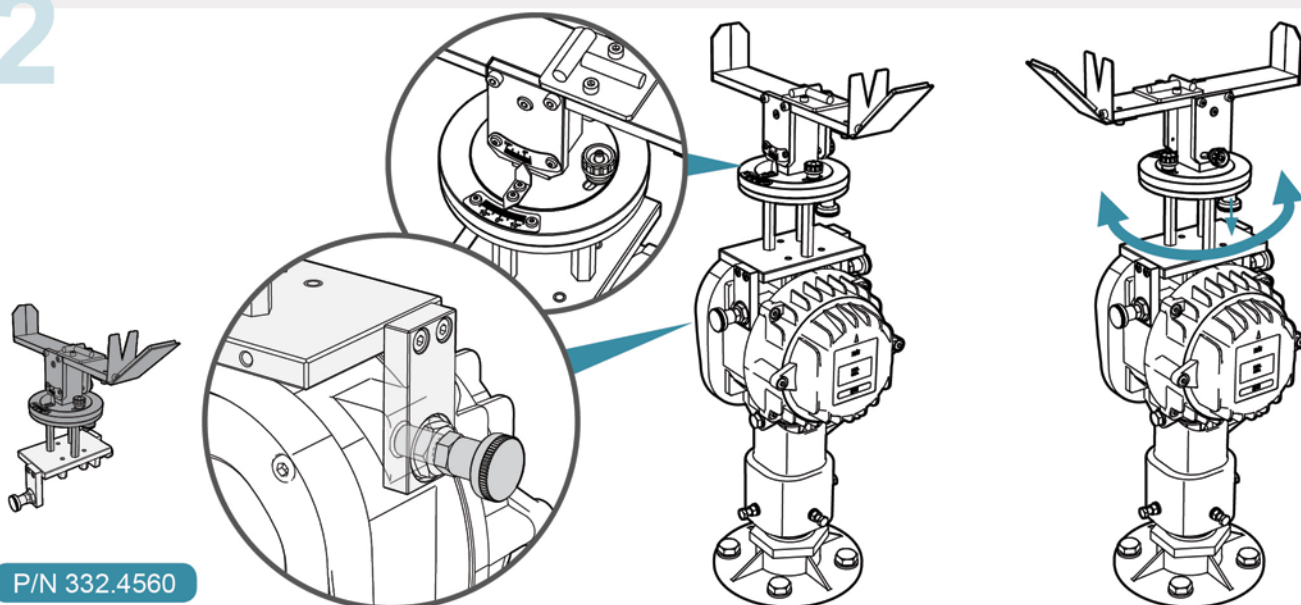


Before proceeding, make sure that both angle settings are reset. Use pointing references placed frontally or laterally, and adjust the pointing tool accordingly. The pointing tool can rotate 360° in 90° steps.

# 1



# 2



P/N 332.4560

Align the fixture.



Place a post as a pointing reference.

Rotate the knob to unlock the azimuthal convergence adjuster of the optical pointer and set the angle defined by the standards. Turn the knob to lock the pointer in position.



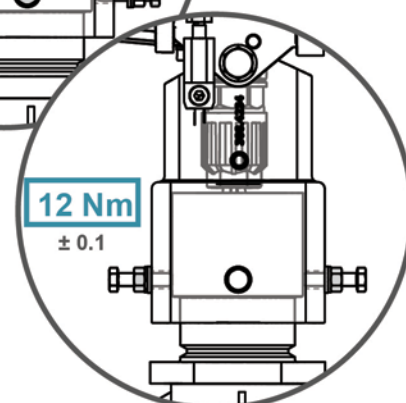
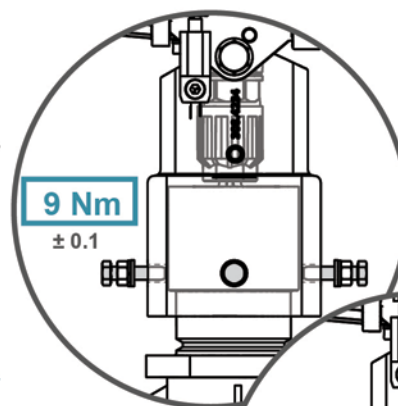
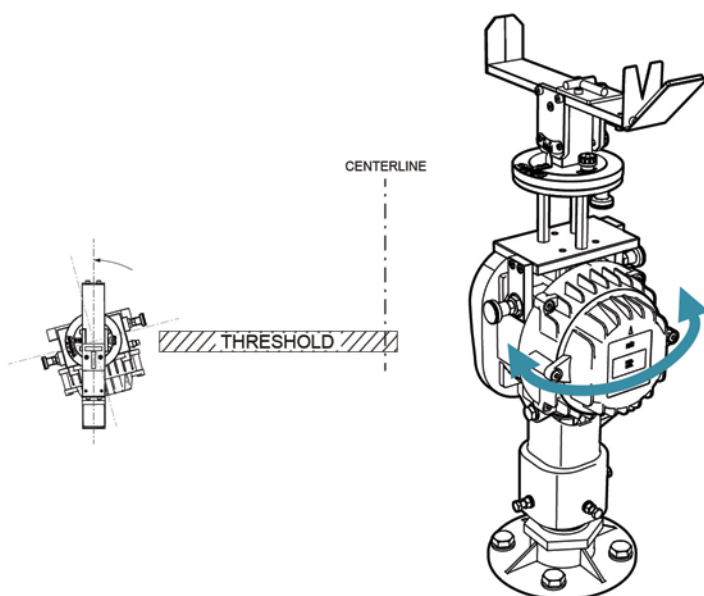
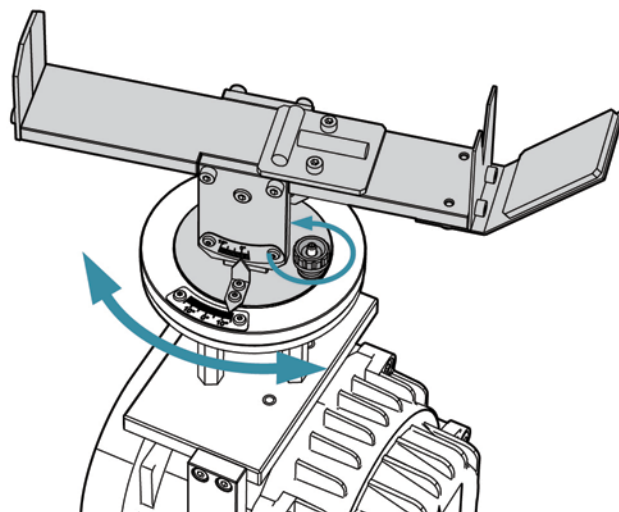
Use the optical pointer to correctly align the light beams.  
Make small movements until reaching the right position.

Keeping the alignment fixed, tighten the screws present on the coupling to the indicated torque paying attention not to send the locking nut to stroke on the coupling. Therefore tighten the nuts to the indicated torque.

# 3

|                                | HORIZONTAL POINTING* |
|--------------------------------|----------------------|
| Approach<br><i>runway edge</i> |                      |
| Threshold up to 315 m          | 0°                   |
| from 316 to 475 m              | 0°                   |
| from 476 to 640 m              | 0°                   |
| from 641 m to 900 m            | 0°                   |
| Threshold identifier           | -15.0°               |
| Circling guidance              | 0°                   |

\* horizontal pointing is positive when facing the central axis.



## Level the fixture.

Rotate the knob to unlock the zenith adjuster of the optical pointer and set the angle defined by the standards. Turn the knob to lock the pointer in position.

Loosen the locking screws of the fixture. Act on the adjustment tie rod and proceed to fine adjustments of the zenith pointing. After adjustment, tighten the screws present on the support to the indicated torque.

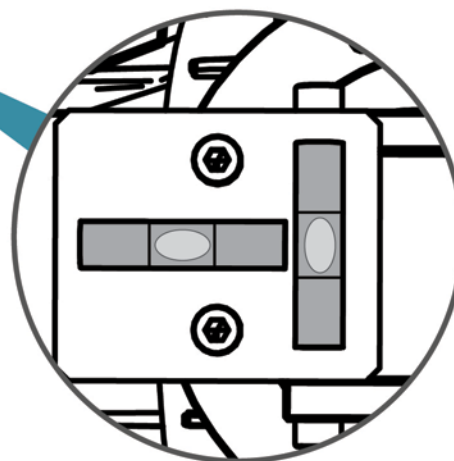
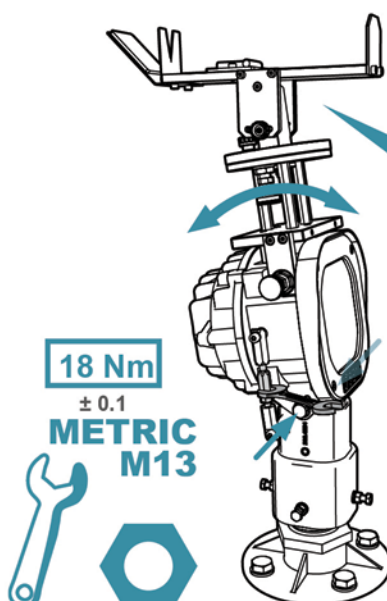
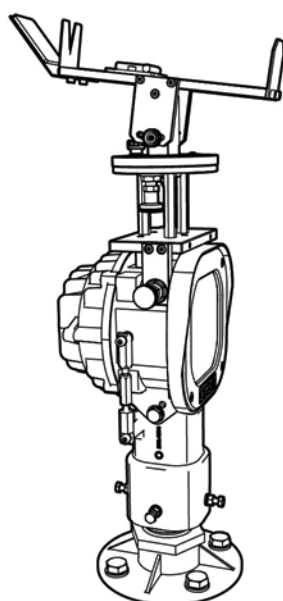
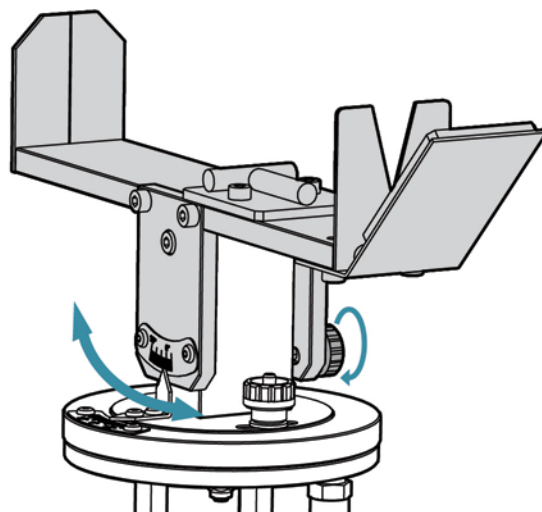


**Use the level present on the pointing tool to correctly align the fixture.  
Make small movements until reaching the right position.**

At the end of the operations remove the tool and complete the installation.

# 4

|                       | VERTICAL POINTING |
|-----------------------|-------------------|
| Approach runway edge  |                   |
| Threshold up to 315 m | +5.5°             |
| from 316 to 475 m     | +6.0°             |
| from 476 to 640 m     | +7.0°             |
| from 641 m to 900 m   | +8.0°             |
| Threshold identifier  | +5.5°             |



### 3.6.5 Pointing and alignment on folding pole



The positioning of the light elements varies depending on the use. Ensure that the device is used correctly for its intended purpose, in accordance with the installation project and the regulations in force. For correct evaluation of angles, take into account the orientation of the support pole.

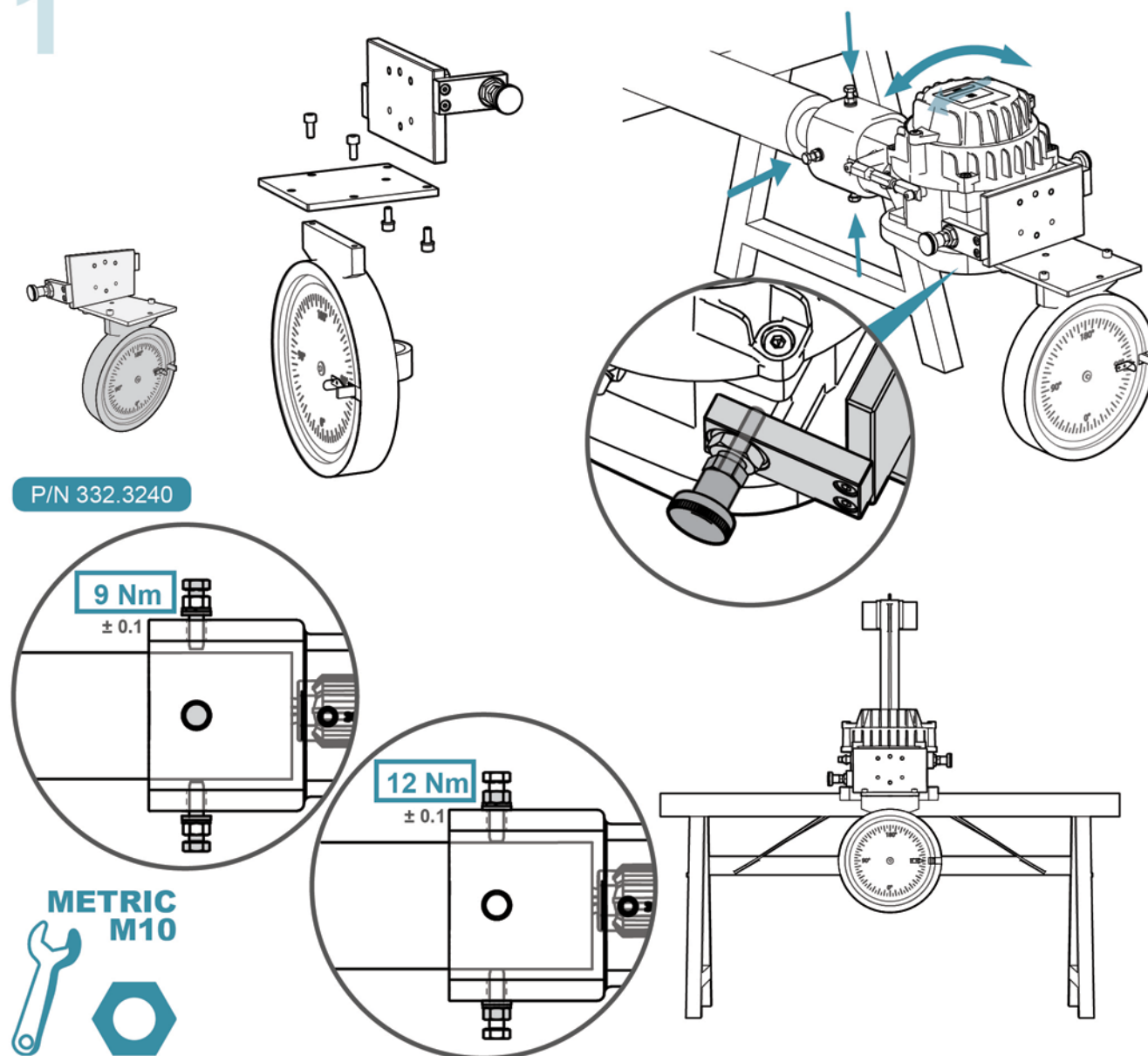
Install the pointing tool on the body of the fixture and proceed to adjust the light beam.



Use the pendulum goniometer to correctly align the fixture. Make small movements until reaching the right position.

Keeping the alignment fixed, tighten the screws present on the coupling to the indicated torque paying attention not to send the locking nut to stroke on the coupling. Therefore tighten the nuts to the indicated torque.

# 1





## FLASH LED

Position the goniometer to detect the zenith orientation and adjust the light beam.

Loosen the locking screws of the fixture. Act on the adjustment tie rod and proceed to fine adjustments of the zenith pointing. After adjustment, tighten the screws present on the support to the indicated torque.



**Use the level present on the pointing tool to correctly align the fixture.  
Make small movements until reaching the right position.**

carry out the verification of the pointing (see following paragraph).



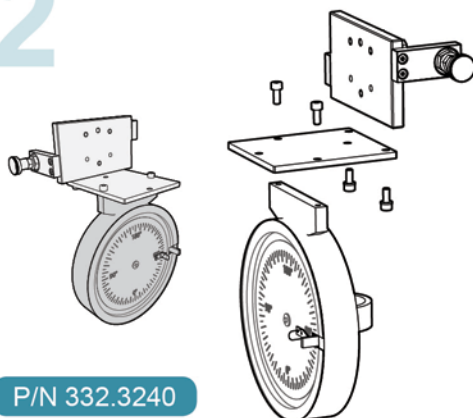
**Example:**

**angle of repose detected: 10°; elevation angle: 8°.**

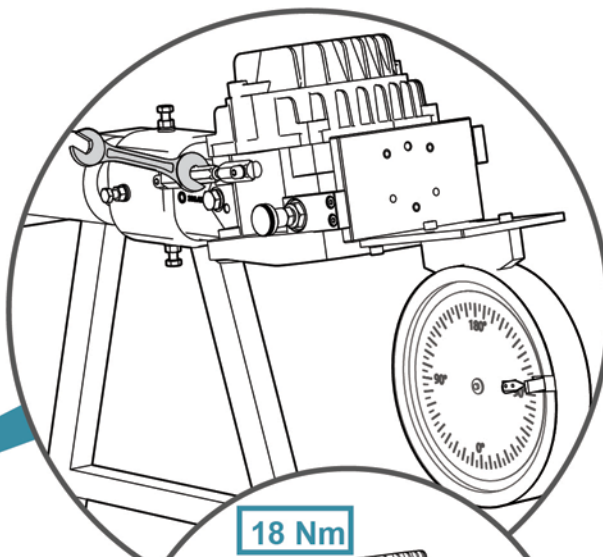
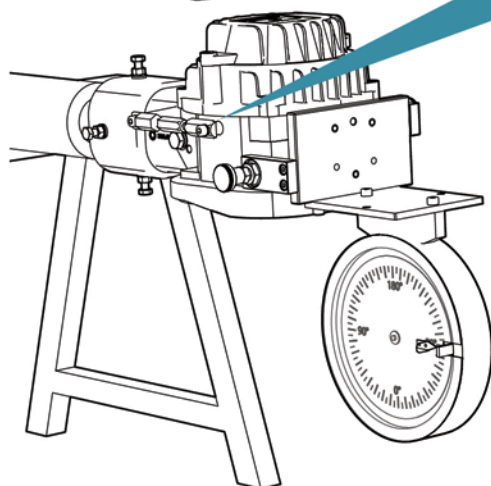
**Pointing angle (to be read on the goniometer when locking):  $90^\circ - 10^\circ - 8^\circ = 72^\circ$**

At the end of the operations remove the tool and complete the installation.

## 2

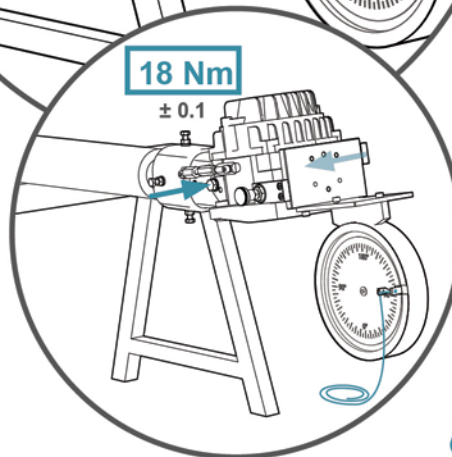


P/N 332.3240



**18 Nm**

$\pm 0.1$



**METRIC  
M13**



### Verification of the pointing of the fixture on pole head

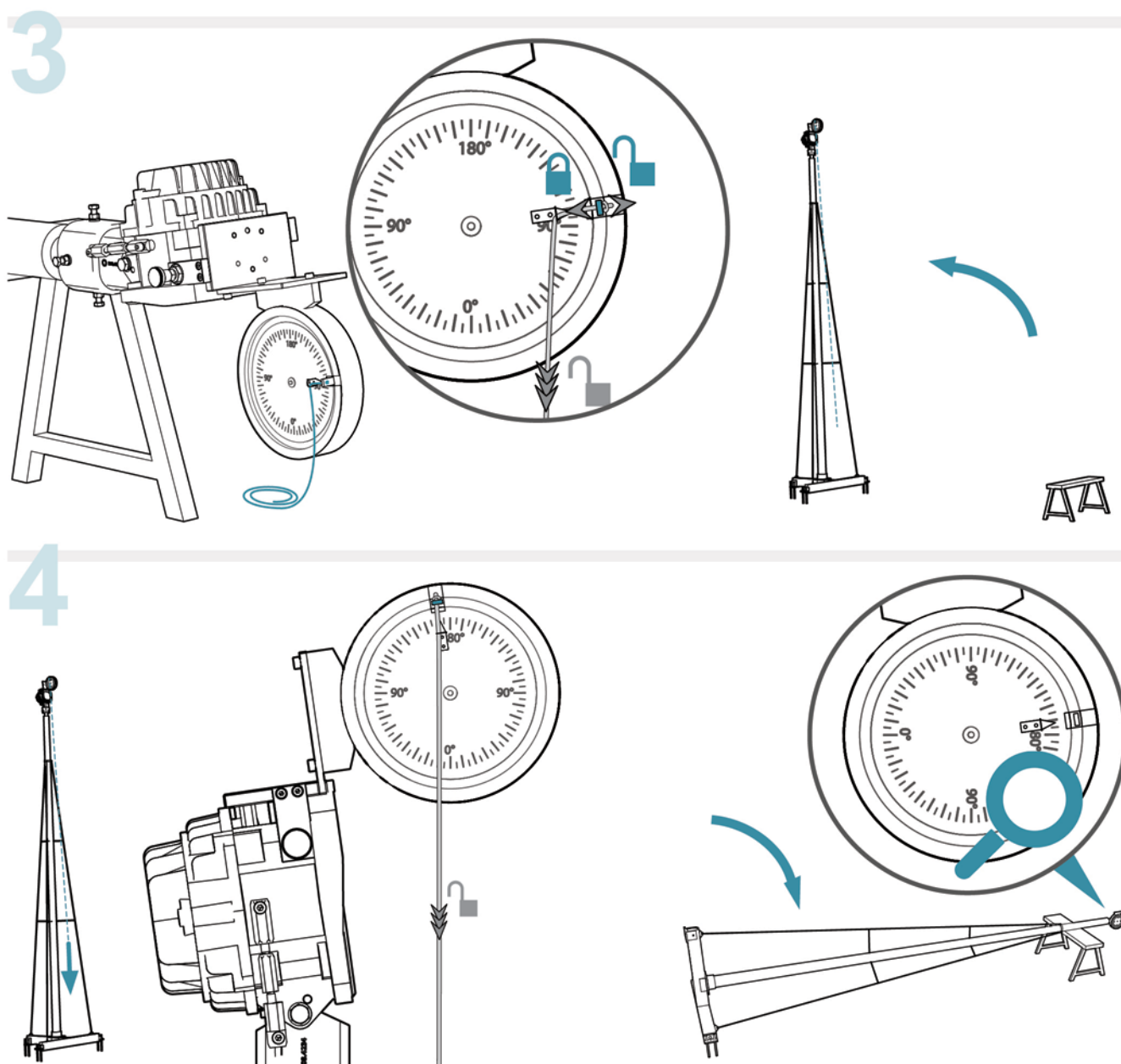


**After each pointing operation, check that the fixture setting is correct.**

Act on the lever to lock the rotation of the goniometer and connect the nylon string. Lift the pole to the working position.

When the pole is in position, act on the string to temporarily unlock the goniometer and detect the actual angle. Wait for the goniometer to settle then release the string to lock the goniometer again.

Proceed to lower the pole. Read the measured value and check that it corresponds to the project angle. If necessary, make required adjustments and repeat the verification.



## 3.7 Installation of the inset light fixture (LIFL)



Store the device in its original packaging until the time of installation. Proceed assembling the fixture and check the supply features before installing the fixture. Pay particular attention to the proper positioning of the fixture on the base.



Before carrying out any intervention on the device, cut off all external power sources and place appropriate work-in-progress warnings on the systems. Wait for the discharging time (at least 5 min) and check using appropriate instruments that there are no residual energies before accessing the electrical equipment.

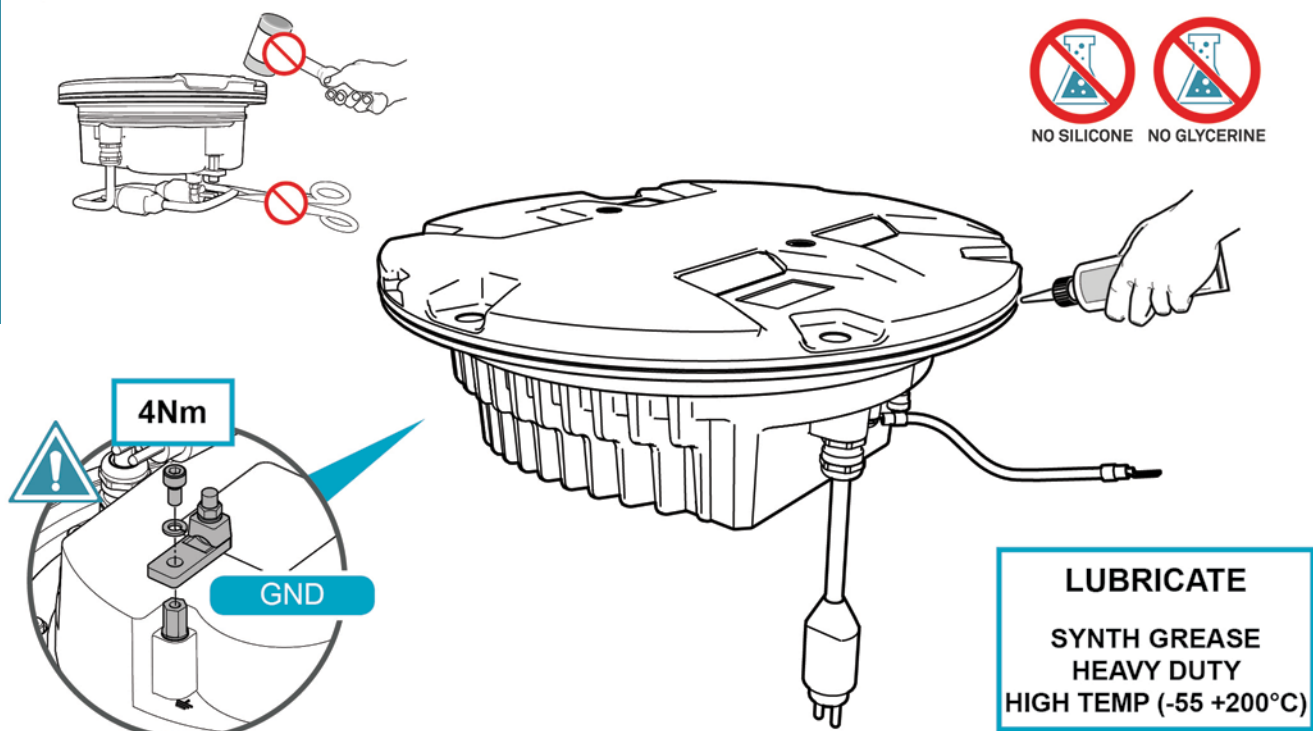
Check that the device to be installed matches the FFU field unit that supply it. Prepare the fixture by lubricating the external gasket.



Use only high-performance, high-temperature-resistant synthetic grease (-55 - +200 °C). Do not use silicone or glycerine.

If necessary, prepare the ground terminal for subsequent connections.

1





Make the electrical connections: insert the plug of the fixture in the socket and joint the ground cable with the protective conductor. Insert the fixture into the base, taking care not to damage the cables.



**Check that the orientation of the fixture (A-side/B-side) matches the project specifications. Use only the screws**

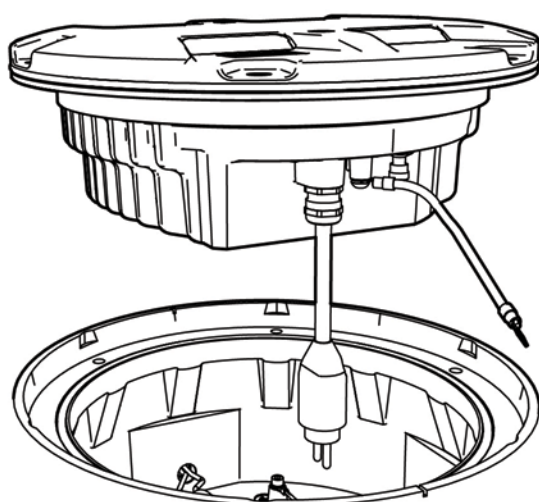
Prepare the fastening screws: degrease and clean the threaded surface and apply a quantity of threadlocker to the affected area. Tighten uniformly the screws without tightening.



**Use only threadlocker adhesives suitable for all metals (not supplied). If the installation conditions can cause the polymerization speed to be too slow (e.g. outside temperature below +5.0 °C) use specific additives or activators. Always refer to the technical data sheets of the products used.**

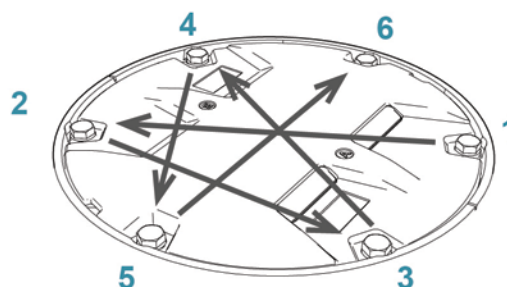
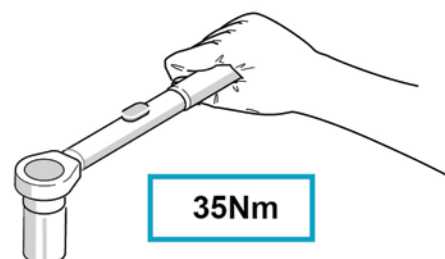
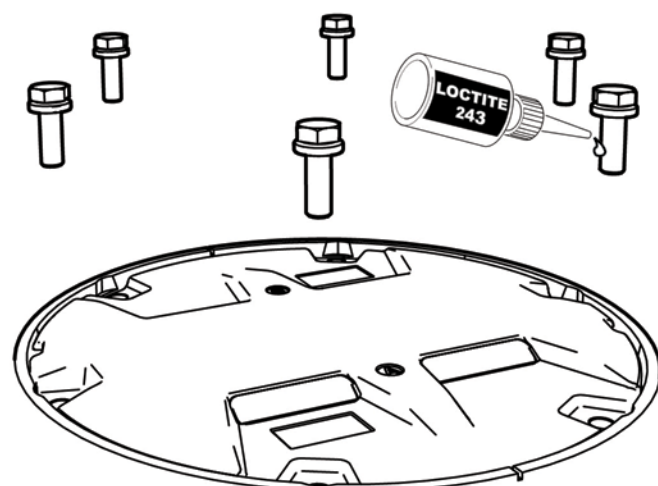
Tighten the screws in the order shown in the figure.

2



3

**LOCTITE 243**



## 3.8 Removal of the elevated light fixture (LEFL)



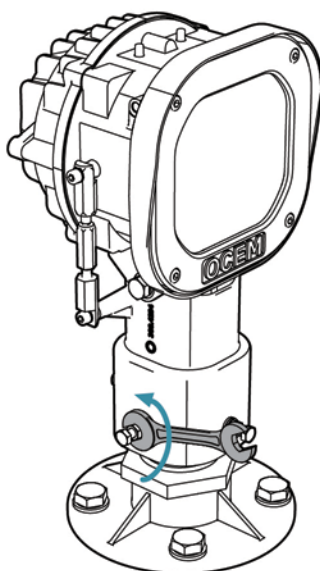
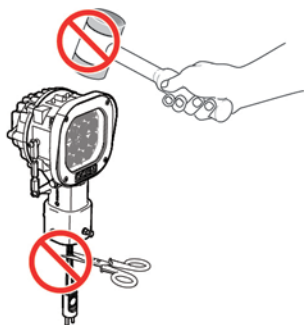
Ensure that the energy sources are cut before proceeding.

Do not try to remove the fixture from the base by using different tools of the extraction equipments indicated by OCEM Airfield Technology.

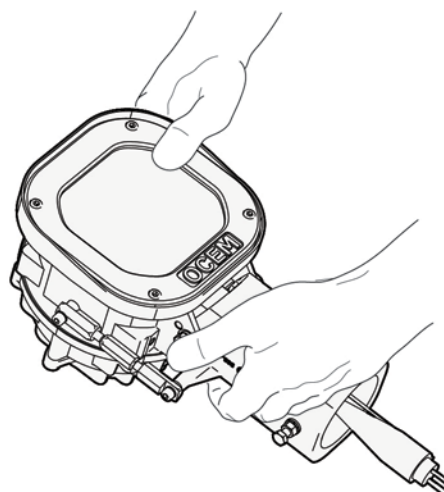
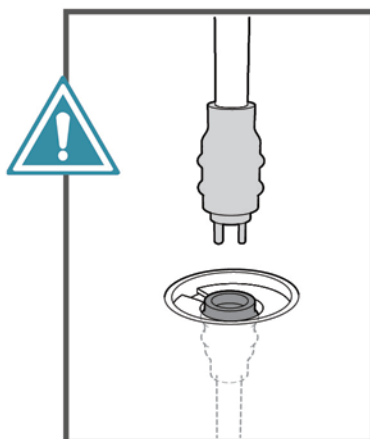
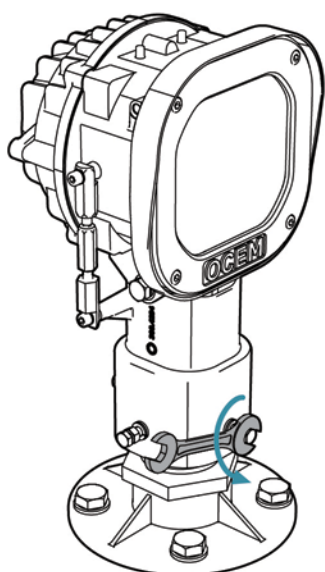


Before carrying out any intervention on the device, cut off all external power sources and place appropriate work-in-progress warnings on the systems. Wait for the discharging time (at least 5 min) and check using appropriate instruments that there are no residual energies before accessing the electrical equipment.

1



2

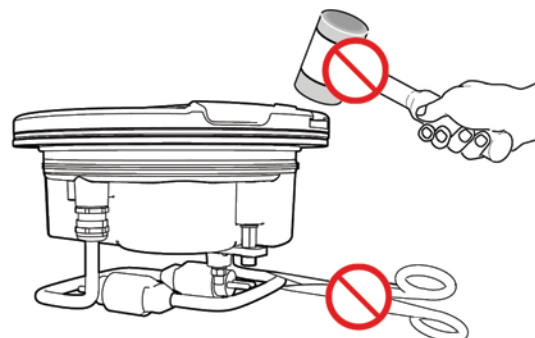


### 3.9 Removal of the inset light Fixture (LIFL)

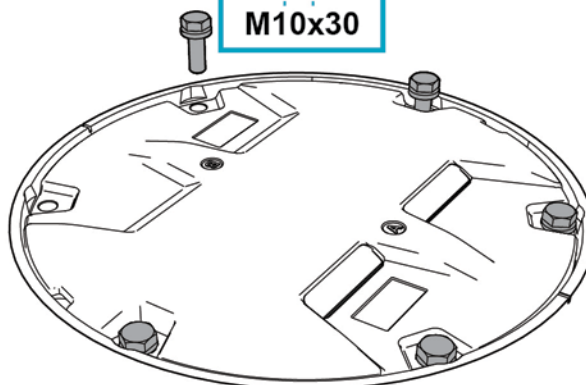


Ensure that the energy sources are cut before proceeding.

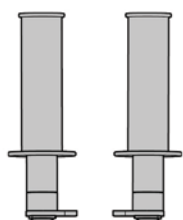
Do not try to remove the fixture from the base by using different tools of the extraction equipments OCEM Airfield Technology.



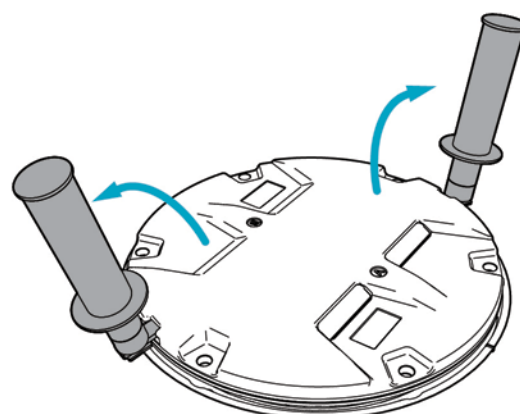
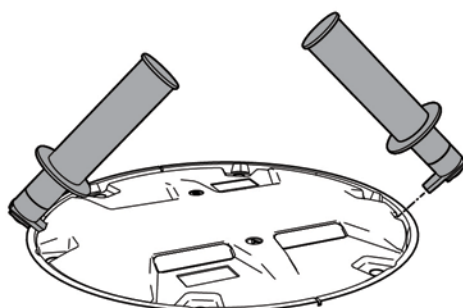
# 1



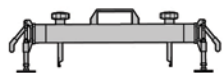
# 2a



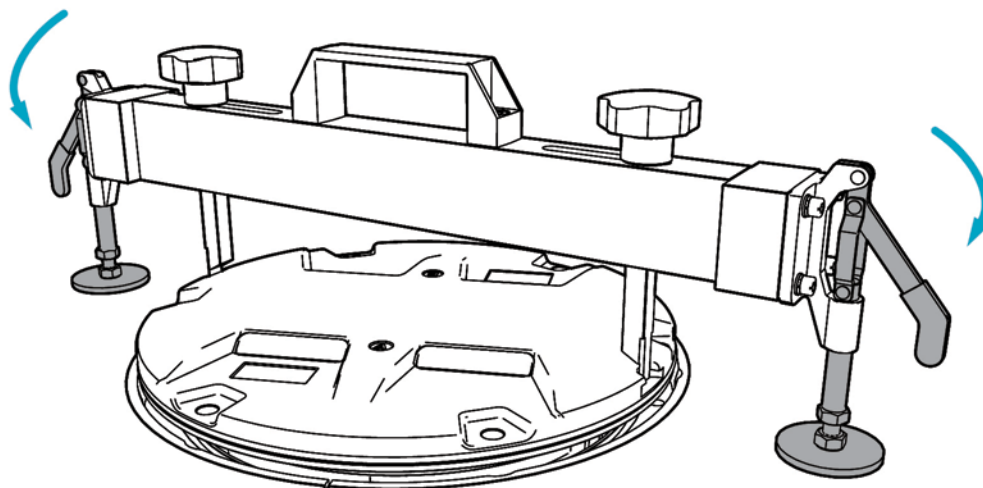
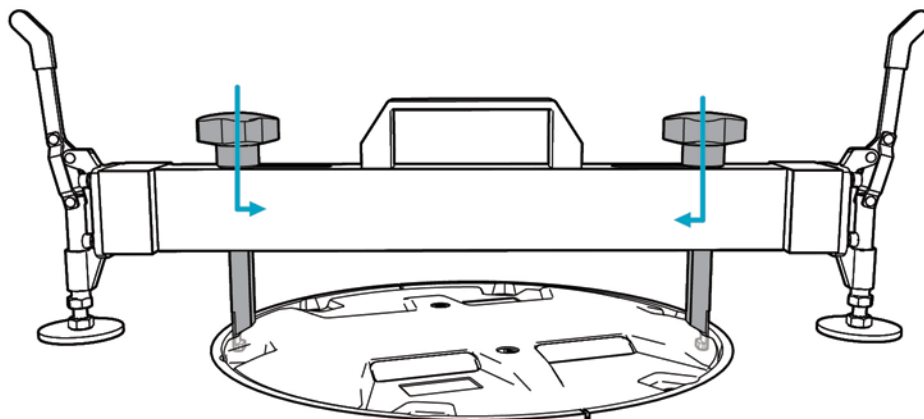
P/N 332.4140



2b



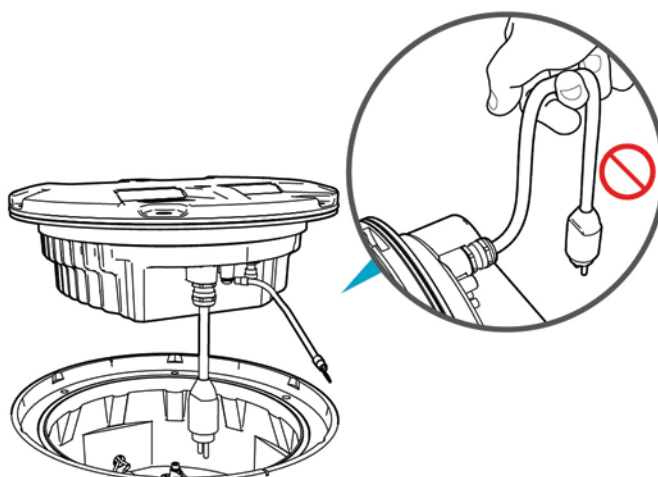
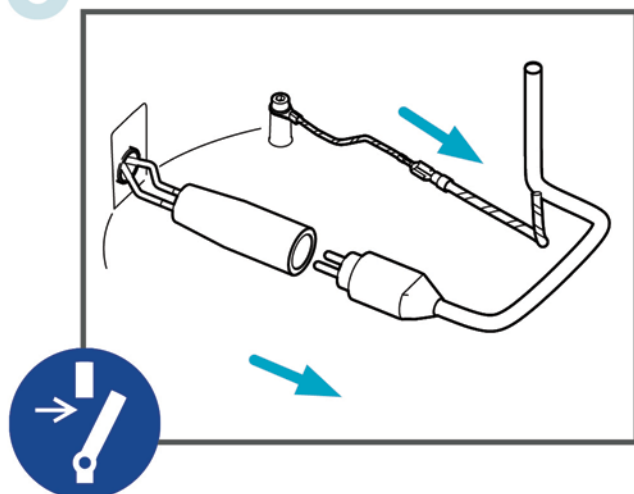
P/N 332.4230



E51005441-42004-42004-42004-42004

INSTALLATION

3



## 4 ADJUSTMENTS AND MAINTENANCE

To minimize operations, always pay the greatest attention to handling and storage of devices and carry out installation procedures with extreme precision.

### 4.1 Adjustments of the system



After completing the installation, perform all the required checks:

- check the mechanical fixing of the component
- check the electrical connections
- wiring inspection
- check the electronic board connections
- visual inspection of general conditions
- check the ground connections

Only now is possible to close the upstream cut-out to supply the device.

#### 4.1.1 Preliminary operations

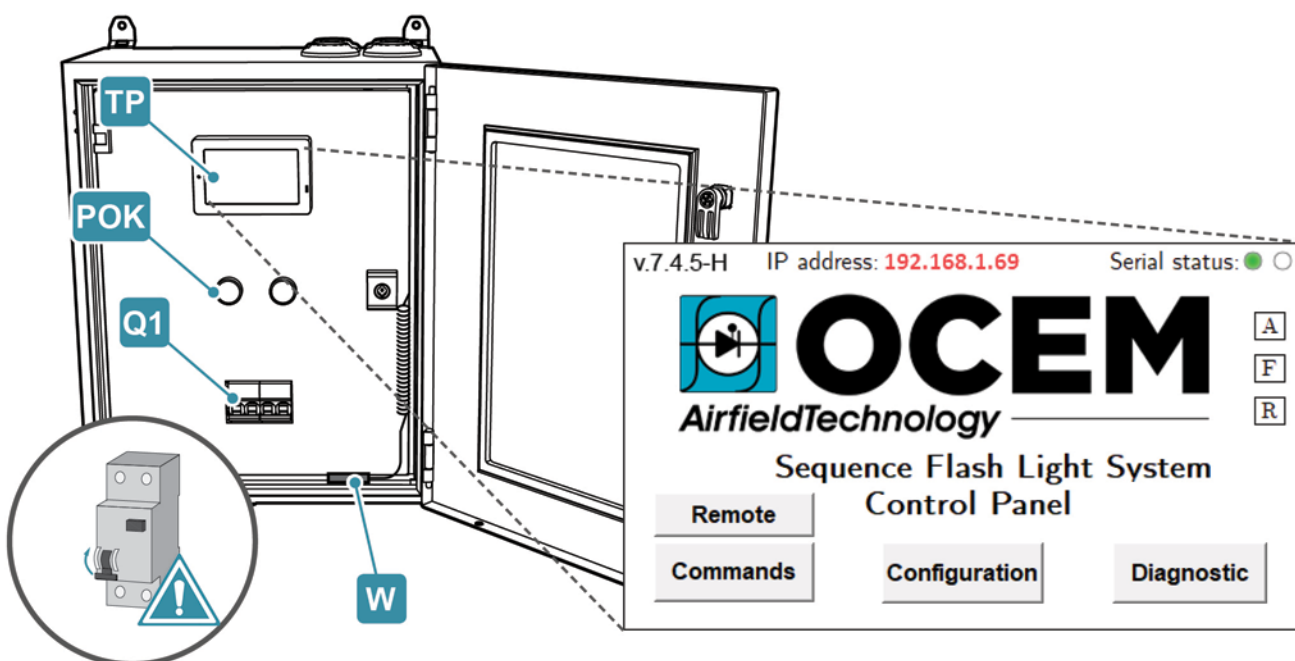
Open the electrical panel and act on the main switch (Q1). If the power supply line is active, the LED (POK) lights up (white). The touch-pad (TP) lights up and remains in standby after initialisation is completed.



Before interacting with the system via the touch-pad, take care to wear the wrist strap against electric discharges (W) available inside the panel.



Normally the device is supplied set with values appropriate to the system configuration communicated by the customer during purchasing. All the parameters can be freely customised on the basis of the customer needs.





## 4.1.2 System local supervision

From the HOME page, you can supervise the system:

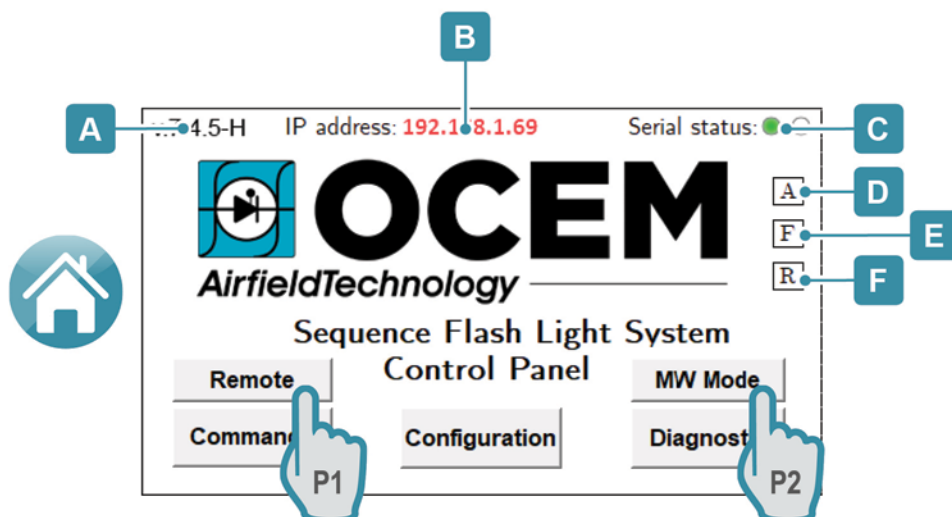
- A) version of the software installed.
- B) IP address (customised) to communicate via Ethernet with Modbus/TCP protocol.
- C) indication of the status of the serial connection between the TP panel and the FMCU control (RS-485 link): GREEN led ON indicates that internal communication is established; RED led ON indicates the presence of a problem.
- D) Quick alarm condition check: when an alarm signalling is active, the background lights up RED.
- E) Fast sequential flash light control (SFL): when the lights are ON the background lights up GREEN; when an alarmed SFL unit is detected the background lights up RED.
- F) Fast RTIL/REIL light control: when the lights are ON the background lights up GREEN; when an alarmed RTIL/REIL unit is detected the background lights up RED.



The buttons on the HOME page may vary depending on the configuration.

If the system is interfaced to a remote control/ALCMS system via Modbus/TCP protocol, the button (P1) enables the remote control.

If the system is equipped with a multi-wire control interface via which it is interfaced to a remote control/ALCMS system, the button (P2) enables remote control.





### 4.1.3 Configuration of the system parameters



Parameter configuration must be completed before adding FFU field units to the system. Normally these operations are completed at the factory and the system is delivered already configured for use in the field.

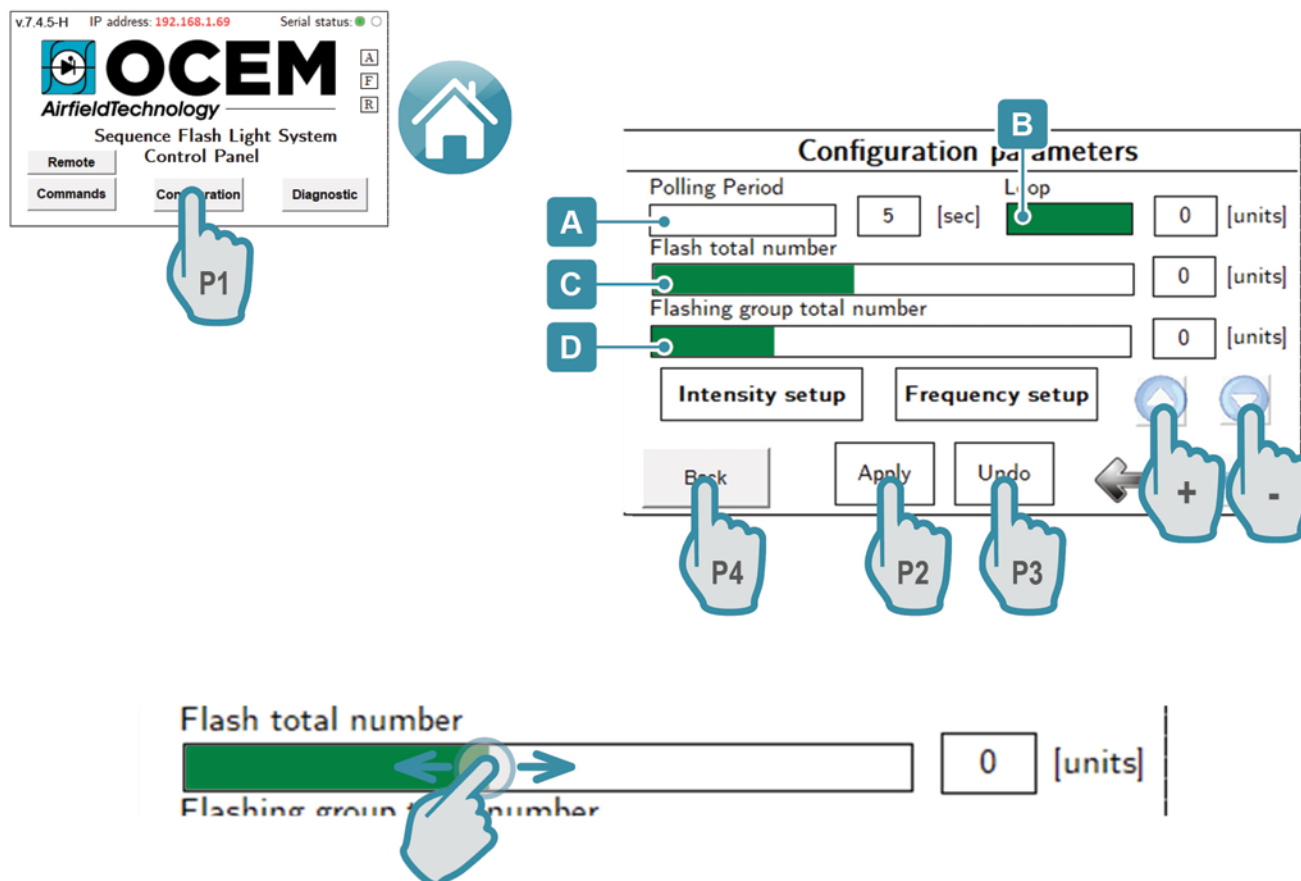
From the HOME page, press the button (P1) to access the parameter configuration page.

- A) evaluation period: time interval (expressed in seconds) between two consecutive flash system status queries between TP panel and FMCU control. Do not change the factory set value.
- B) loop id: flashing system identifier (value between 1 and 4).
- C) number of total blinkers: total number of FFUs in the system (maximum value: 64)
- D) number of total blinkers units: total number of FFUs flashing at the same time (note: the number of units cannot exceed the number of total blinkers)



To change the value, simply act on the bar and slide your finger in the desired direction to increase or decrease the relative value.  
To change the value precisely, you can use the increase (+) and decrease (-) buttons.  
To confirm the operation, press the button (P2). To delete the change and restore the previously set values, press the button (P3).

At the end of configuration, press the return button to the HOME page (P4)





#### 4.1.5 Management of new blinking units

From the PARAMETERS CONFIGURATION page, press the button (P1) to access the management page for new flashing units.



To configure a new FFU unit, all FFUs already connected to the system must be correctly configured and in communication.  
Only one new FFU (unscheduled field unit) can be configured at a time.



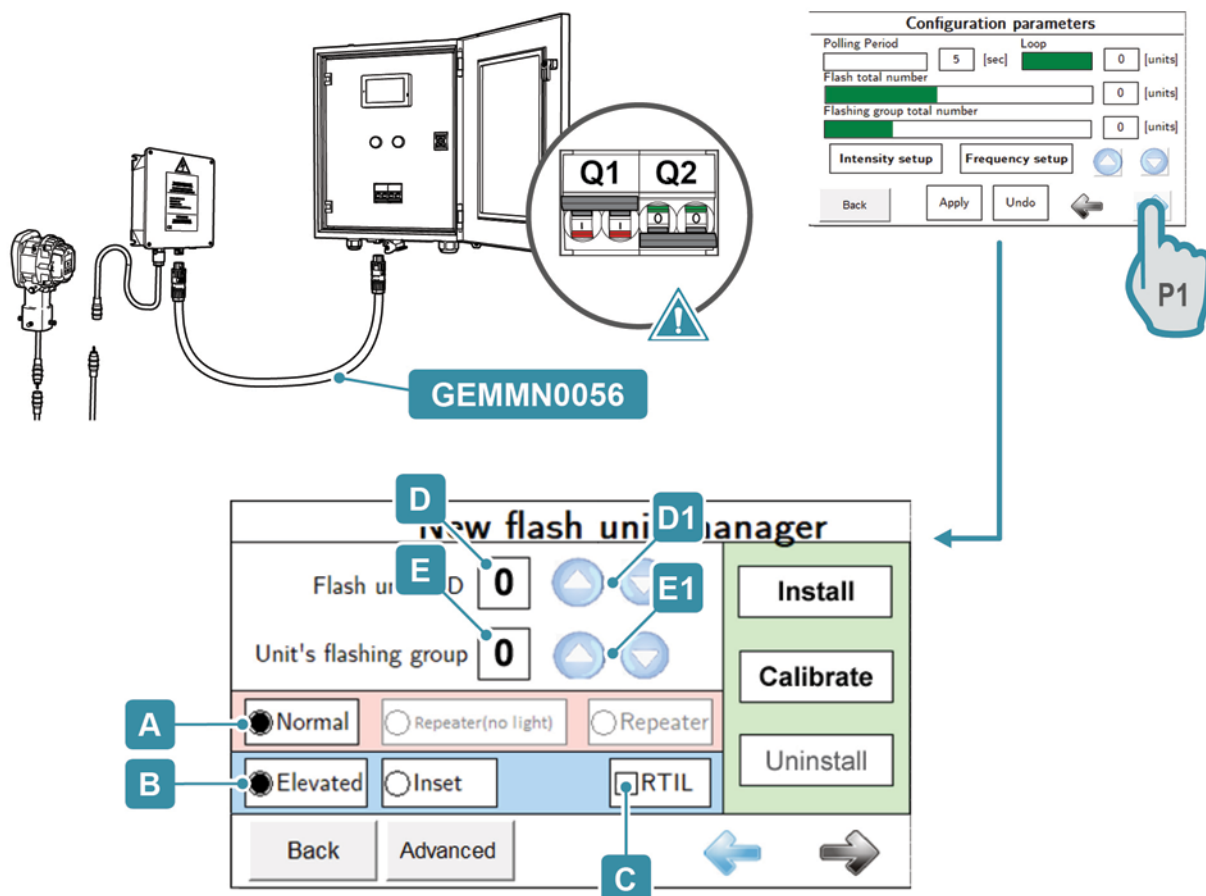
To simplify programming procedures, the new FFU unit can be connected directly to the FMCU panel.

Open the switch (Q2) to disconnect the output line. Use the suitable cable (GEMMN0056) to connect the new (unscheduled) FFU unit to the socket (J1) available at the bottom of the panel.

Proceed with the identification of the blinker:

- A) if necessary configure the FFU unit type: Normal.
- B) configure the type of fixture combined with the FFU: Elevated or Inset.
- C) if necessary, enable the tick to identify a fixture for RTIL use.
- D) FFU unit selection: use the buttons (D1) to set the FFU unit identifier.
- E) unit selection: use the buttons (E1) to set the flashing unit identifier.

Via the buttons on the interface unit configuration operations can be completed.



## 4.1.6 Installation of a flashing unit

Use the buttons (P1) to select the FFU identifier to be installed by the system.



If the FFU is connected and the parameters entered are valid, the button (P2) turns GREEN: communication with the FFU has been successful.

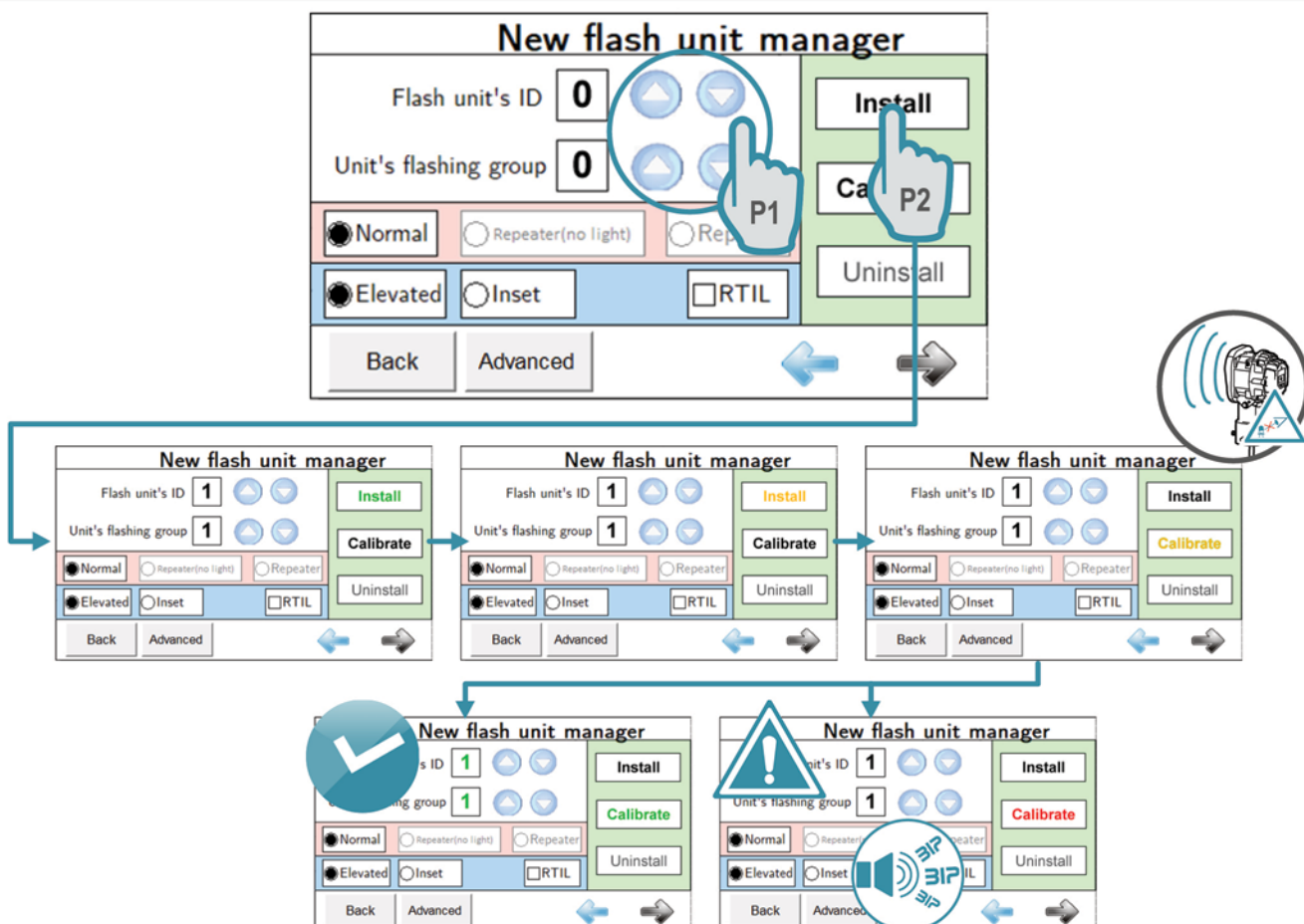
Press the button (P2) to initiate synchronisation with the FFU in programming.

The button (P2) turns ORANGE and an acoustic fixture confirms the start of synchronisation. The data are transmitted to the field unit and, at the end, the button (P3) turns ORANGE.

The fixture flashes for a few seconds and, at the end, the button (P3) turns GREEN.



If the FFU field unit does not communicate correctly with the FMCU unit, or if the flashing units of the system are not connected correctly, the calibration process is interrupted. If the calibration fails, the button (P3) turns RED and an acoustic fixture warns the operator.



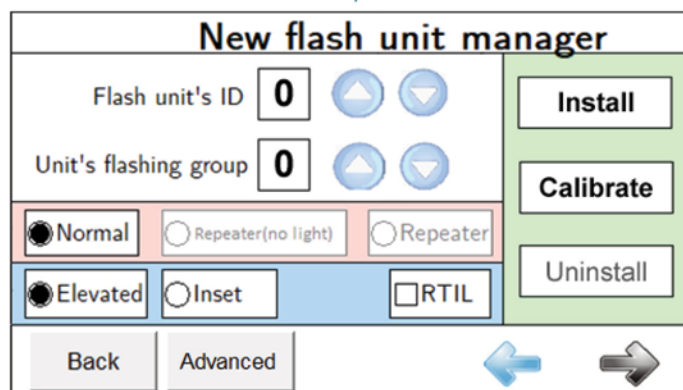
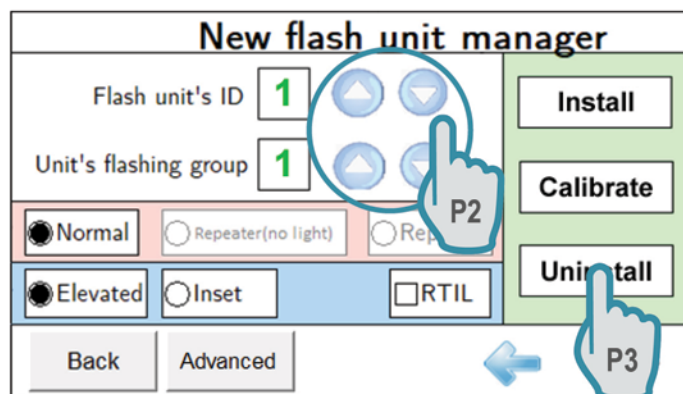
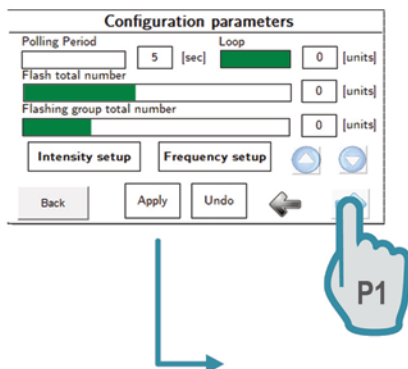
#### 4.1.7 Uninstallation of a flashing unit

From the PARAMETERS CONFIGURATION page, press the button (P1) to access the management page for new flashing units.



**To delete the configuration of a new FFU unit, all FFUs already connected to the system must be correctly configured.  
Can be deleted the configuration of only one new FFU (unscheduled field unit) at a time.**

Use the buttons (P2) to select the FFU identifier to be uninstalled by the system. Press the button (P3) to delete the configuration of the selected FFU field unit.



## 4.1.8 Advanced configuration functions

From the PARAMETERS CONFIGURATION page, press the button (P1) to access the management page for new flashing units. Press the button (P2) to access the advanced configuration page.



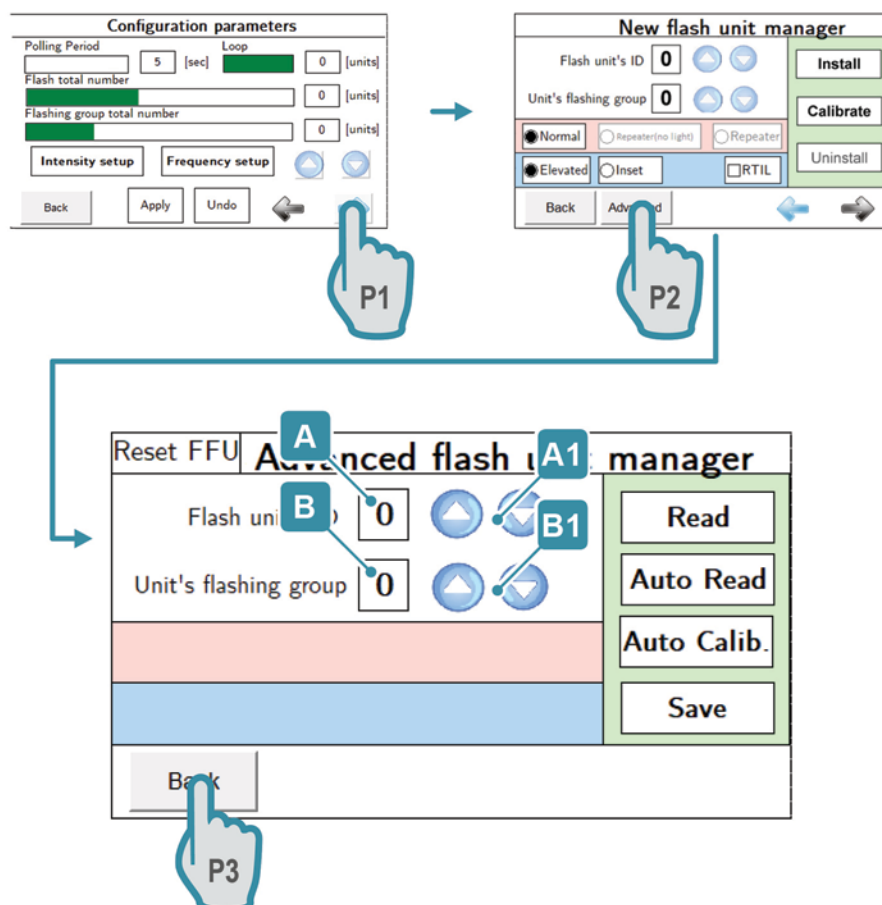
**Advanced configuration functions allow to manage the configuration of the devices. Using the advanced functions, it is possible to read the configuration of each device and save the individual configurations to the permanent memory of the FMCU to allow easy recovery in case of fault or error.**

Proceed with the selection of the blinker:

- A)** FFU unit selection: use the buttons (A1) to set the FFU unit identifier.
- B)** unit selection: use the buttons (B1) to set the flashing unit identifier.

Using the buttons on the interface, it is possible to complete reading and saving configuration of the individual units.

At the end of configuration, press the return button to the source page (P3)





#### 4.1.9 Reading the individual unit configuration

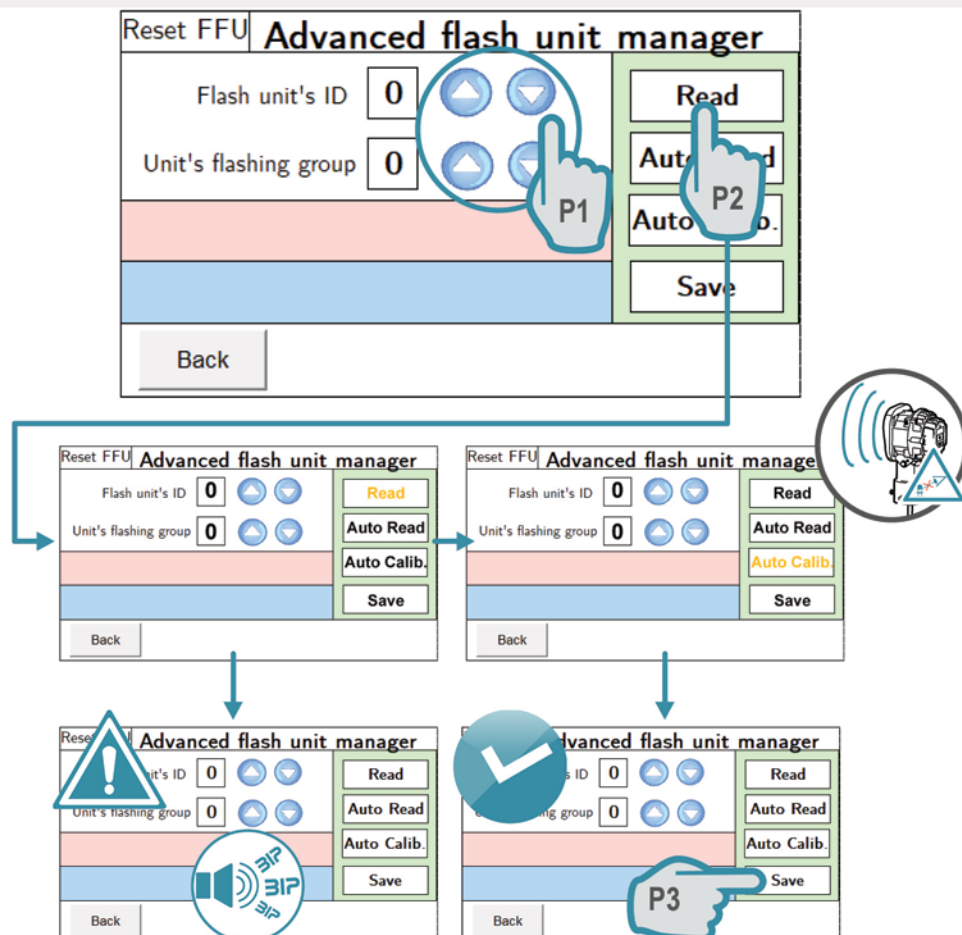
Use the buttons (P1) to select the FFU identifier to be uninstalled by the system. Press the button (P2) to read the configuration of the selected FFU field unit.

If the configuration data are read correctly, the self-calibration of the blinker is started.



**If the FFU field unit does not communicate correctly with the FMCU unit, or if the flashing units of the system are not connected correctly, the reading process is interrupted. If the reading procedure fails, an acoustic fixture alerts the operator.**

Press the button (P3) to save the configuration of the selected FFU unit on the FMCU unit. In the event of an error, the procedure is interrupted and an acoustic fixture alerts the operator.



## 4.1.10 Automatic reading of the configuration of all the units

From the PARAMETERS CONFIGURATION page, press the button (P1) to access the management page for new flashing units. Press the button (P2) to access the advanced configuration page.



If necessary, the configuration of all the FFU units can be read automatically.

The procedure should only be activated when the connected units are all already correctly configured and the on-board configuration data of the FMCU must be updated/aligned with the actual field parameters.

Before starting the operations, check that the parameter (A), which indicates the total number of connected units, is correctly set.

Press the button (P3) to read the configuration of the selected FFU field unit. Reading will occur sequentially on all (A) the connected units, starting with the FFU with identifier 0. At the end of each reading operation, if the configuration data are read correctly, the self-calibration of the single blinker is started.

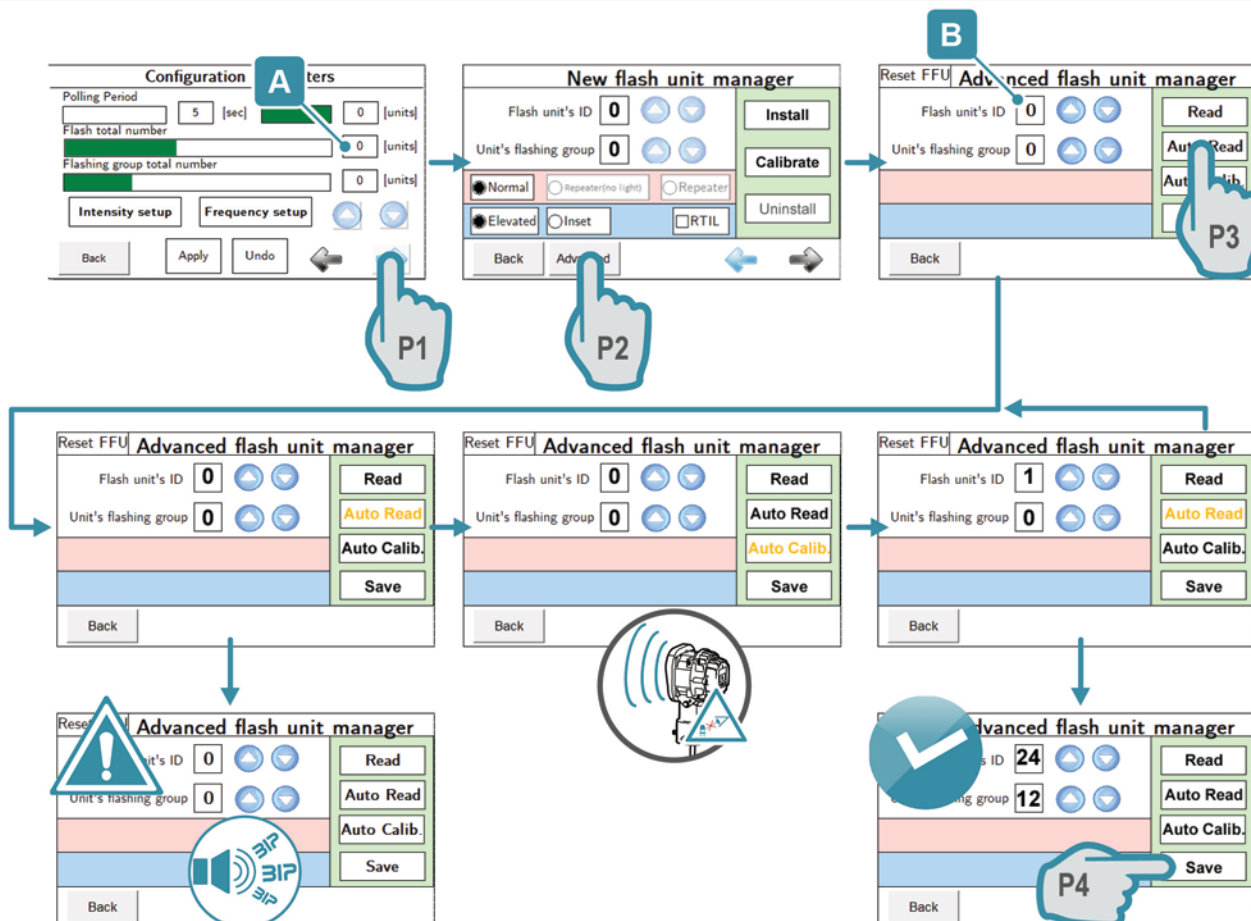


The procedure requires the exchange of information with the units installed in the field.

If the FFU field unit does not communicate correctly with the FMCU unit, or if the flashing units of the system are not connected correctly, the reading process is interrupted.

If the reading procedure fails, an acoustic fixture alerts the operator.

At the end of the calibration, the system automatically starts the reading of the following field unit. After reading the configuration of the last blinker, the procedure ends. Press the button (P4) to save the configuration of the selected FFU unit on the FMCU unit. In the event of an error, the procedure is interrupted and an acoustic fixture alerts the operator.



#### 4.1.11 Automatic configuration of the FMCU unit



If necessary, the system configuration on board the FMCU can be created/changed/updated. The procedure only needs to be activated when the FMCU needs to be configured offline, e.g. to set up a spare FMCU before connecting field units that are already all correctly configured. Before starting the operations, open the switch (Q2) to disconnect the output line.

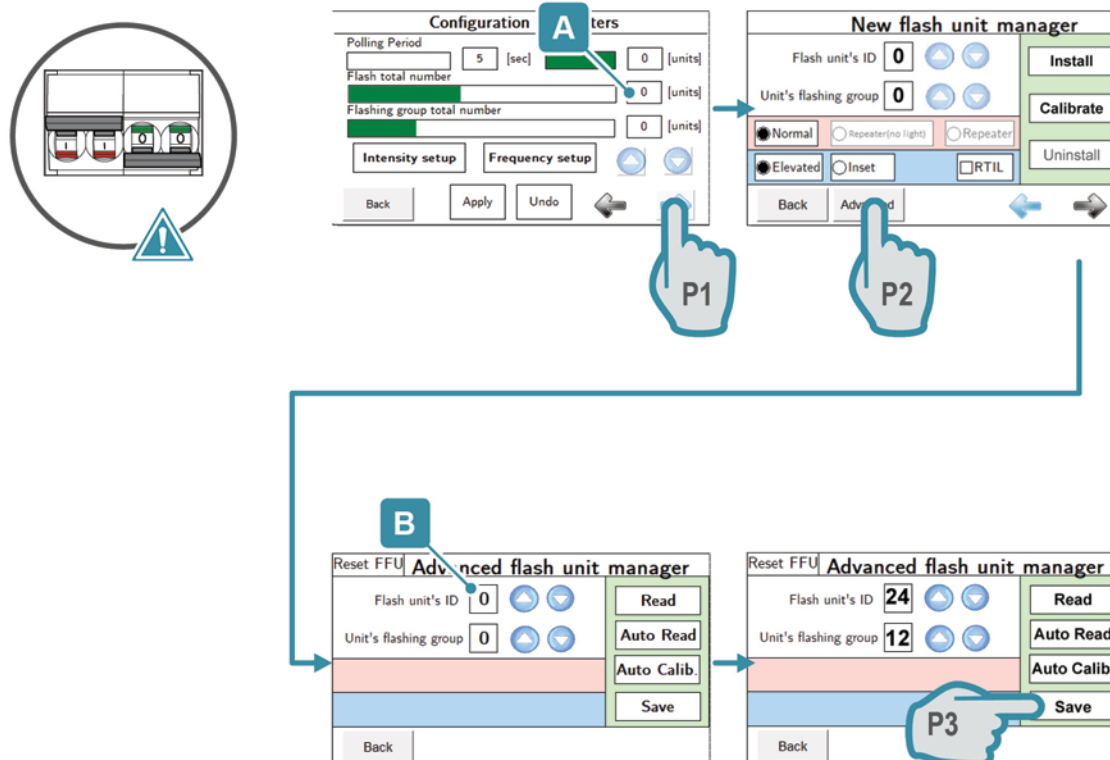
From the PARAMETERS CONFIGURATION page, press the button (P1) to access the management page for the flashing units. Press the button (P2) to access the advanced configuration page.



Before starting the operations, check that the parameter (A), which indicates the total number of connected units, is correctly set.

Set the configuration values for each unit installed in the field by selecting the correct identifier (B), starting with the FFU unit with identifier 0.

At the end of configuration of each device, press the button (P3) to save the configuration of the selected FFU unit on the FMCU unit.



## 4.1.12 Resetting the configuration



To reset the configuration of a unit, the new FFU unit can be connected directly to the FMCU panel.

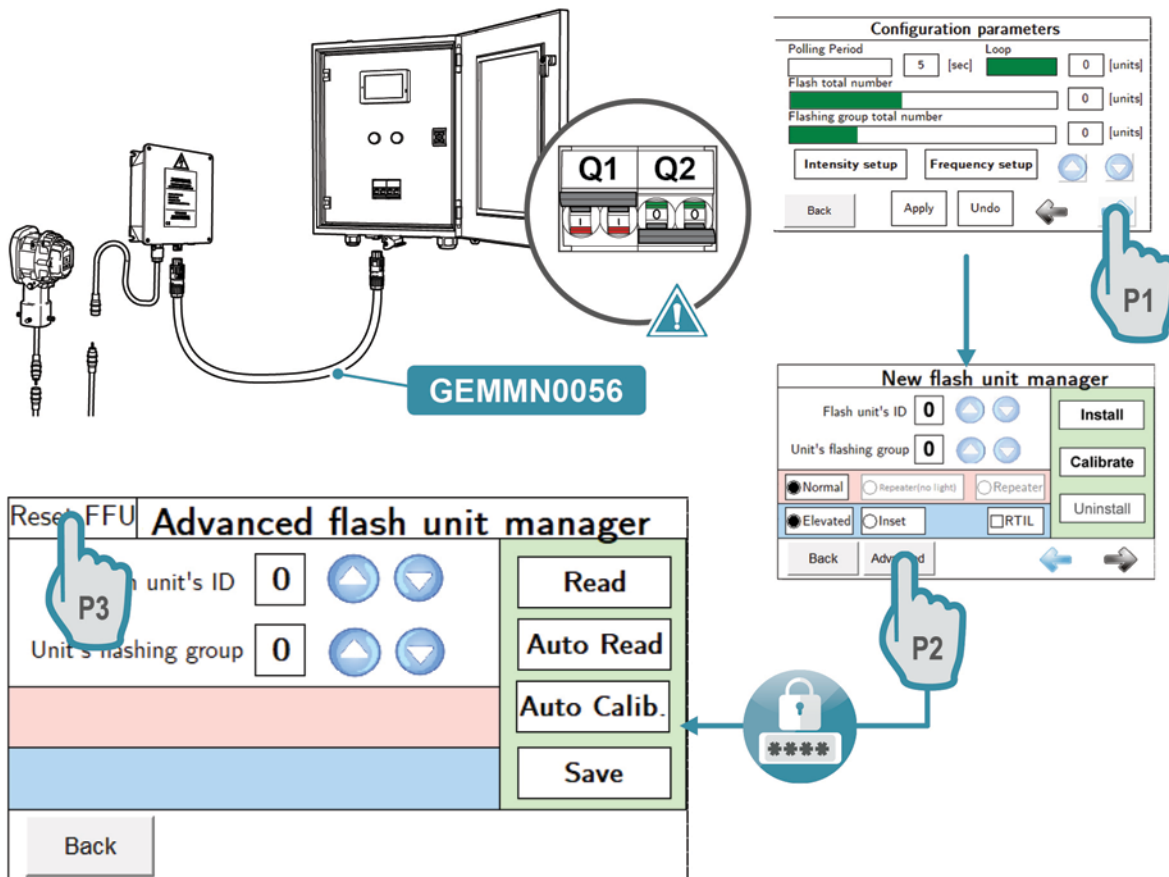
Open the switch (Q2) to disconnect the output line. Use the suitable cable (GEMMN0056) to connect the (to be reset) FFU unit to the socket (J1) available at the bottom of the panel.

From the PARAMETERS CONFIGURATION page, press the button (P1) to access the management page for new flashing units. Press the button (P2) to access the advanced configuration page.



Check that the FFU field unit is correctly connected to the FMCU unit.

When required, enter the system configuration password. If authentication is successful, the button (P3) appears to reset the configuration.



## 4.1.13 IP address configuration



**Correct configuration of the connection parameters allows remote control of the flashing system.**  
**Communication is based on the Modbus/TCP protocol.**

Press on the address bar (IP) to access the connection parameter configuration page.

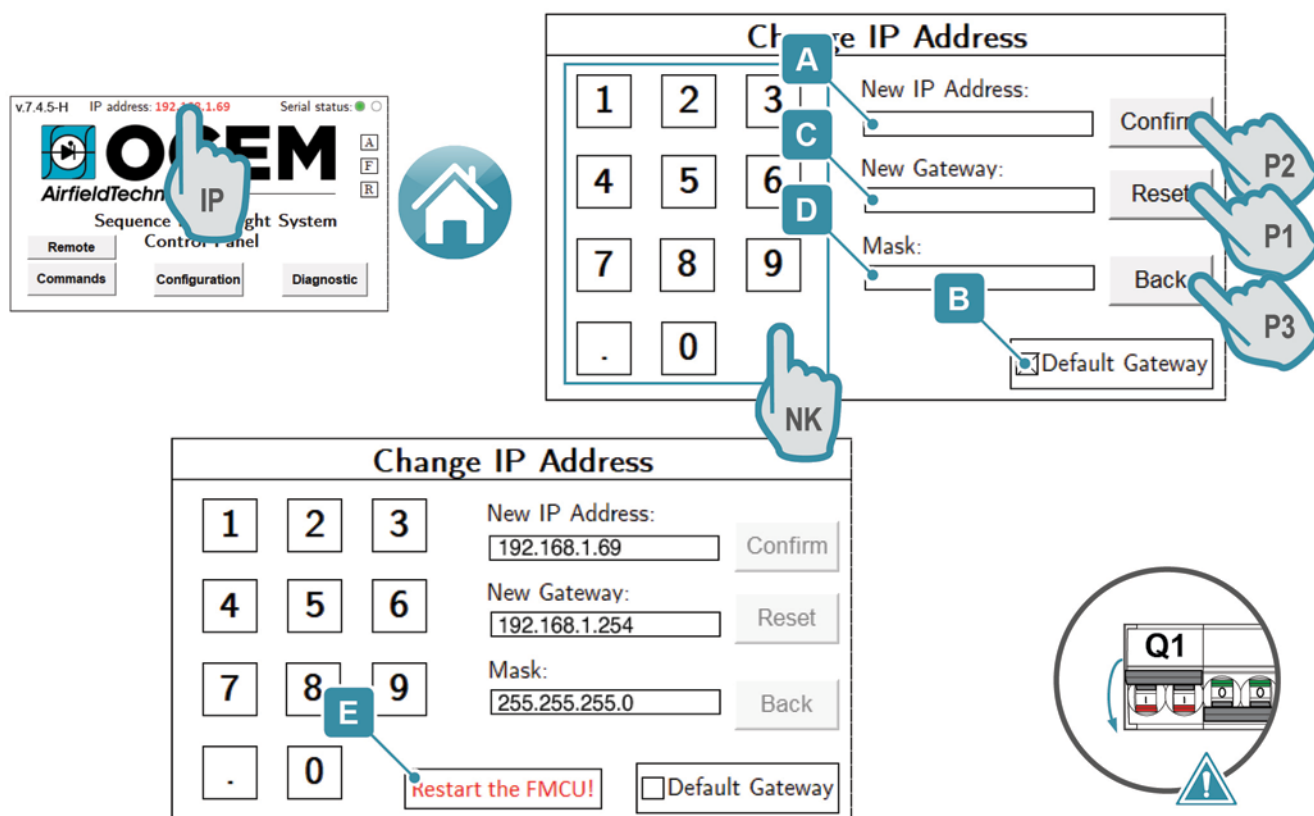
Proceed with the insertion of the connection parameters:

- A)** new IP address: select the field and to set the desired IP address to be assigned to the control unit, using the numeric keypad (NK).
- B)** default gateway selection: clear the check box to set a customised IP address for the gateway.
- C)** new gateway address: select the field and to set the IP address of the gateway to be configured in the control unit, using the numeric keypad (NK).
- D)** new subnet address: select the field and to set the subnet mask to be configured in the control unit, using the numeric keypad (NK).

Using the buttons on the interface it is possible to restore the parameters to previous values (P1) or to confirm the inserted values (P2). At the end of configuration, press the return button to the source page (P3).



**After confirming the entry (P2), a message appears on the screen (E) and the system waits for a reboot.**



## 4.1.14 Enabling/Disabling of the remote control through IP



Correct configuration of the connection parameters allows remote control of the flashing system.  
Communication is based on the Modbus/TCP protocol.

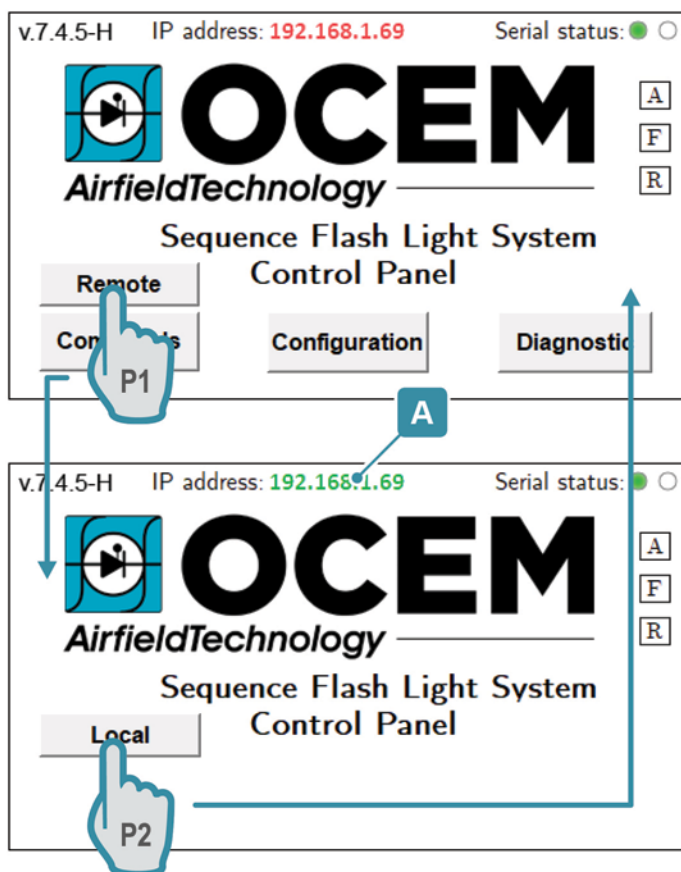
If the configuration of the connection parameters is correct, it is possible to enable the remote control of the FMCU unit.

Use the button (P1) to enable the remote control (IP).



After enabling the remote control, the buttons for local control are disabled.  
If the connection is established, the IP address (A) turns GREEN.

Use the button (P2) to disable the remote control (IP) and reactivate the local commands.





#### 4.1.15 Enabling the multiwire interface (MW)



If the device is equipped with an optional electromechanical interface, the flashing system can be controlled via a series of wired switches. A set of dry contacts provides feedback fixtures for the system supervision.

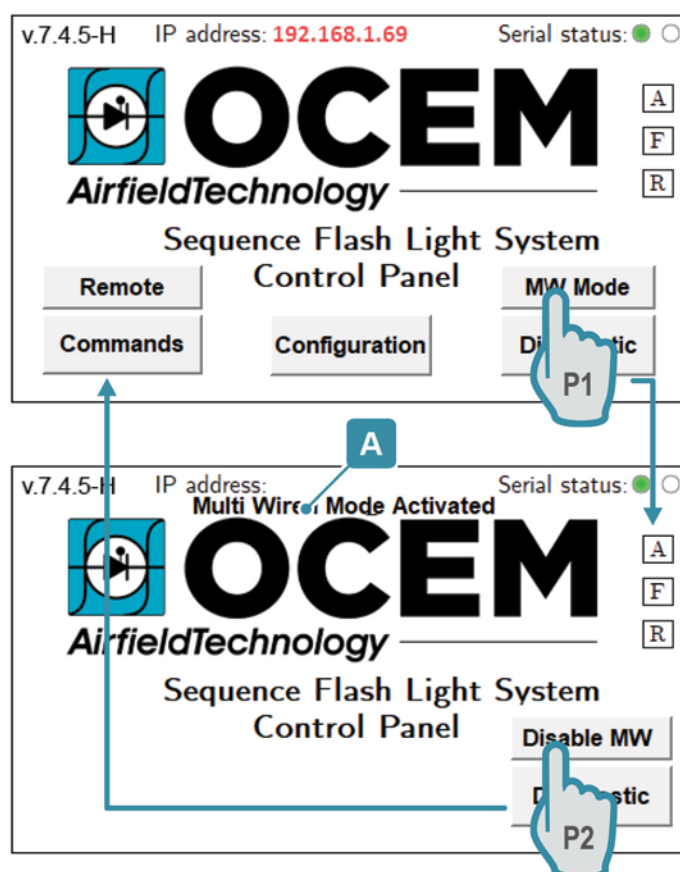
If the connection of the multi-wire interface has been carried out correctly, it is possible to enable the remote control of the FMCU unit.

Use the button (P1) to enable the remote control (MW).



After enabling the remote control, the buttons for local control are disabled. If the connection is enabled, the information message (A) appears.

Use the button (P2) to disable the remote control (MW) and reactivate the local commands.



## 4.1.16 Local control panel



The installation and configuration of parameters must be completed and verified before starting to control the system.

From the HOME page, press the button (P1) to access the system control page.

- A) flashing period: selection of flashing frequency (1 sec = 30 fpm; 1/2 sec = 60 fpm).
- B) flashing intensity: selection of flashing intensity level (ICAO = high brightness; Normal = standard brightness).
- C) flashing category: reference selection (CAT I, CAT II/III).
- D) flashing level: selecting the brightness level of the emitted light beam (High, Medium or Low).
- E) operating status: independent switching on/switching off of the SFL lights and of the RTIL/REIL lights. The presence of the buttons depends on the actual configuration of the device.

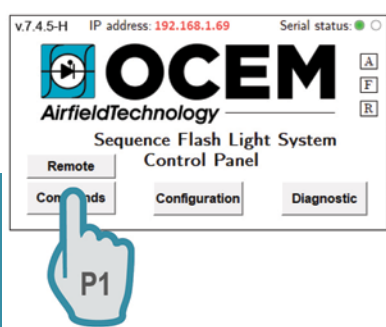
Using the buttons on the interface it is possible to select the desired value.



After changing any of the values, the system waits for confirmation. The button (P2) turns YELLOW. Use the button (P2) to confirm the operation.

To exit from the page, press the return button to the source page (P3).

ADJUSTMENTS AND MAINTENANCE





**Flash system control panel**

|   |                 |       |            |                                              |
|---|-----------------|-------|------------|----------------------------------------------|
| A | Flash Period    | 1 sec | 1/2 sec    | SYNC<br><input type="checkbox"/> V Hole Sync |
| B | Flash Intensity | ICAO  | Normal     |                                              |
| C | Flash CAT       | CAT I | CAT II/III |                                              |
| D | Flash Level     | High  | Med        | Low                                          |
|   |                 | SF On | SF Off     | Confirm                                      |
|   |                 | RL On | RL Off     |                                              |

Back

E

**Flash system control panel**

|                 |       |            |                                              |
|-----------------|-------|------------|----------------------------------------------|
| Flash Period    | 1 sec | 1/2 sec    | SYNC<br><input type="checkbox"/> V Hole Sync |
| Flash Intensity | ICAO  | Normal     |                                              |
| Flash CAT       | CAT I | CAT II/III |                                              |
| Flash Level     | High  | Med        | Low                                          |
|                 | SF On | SF Off     | Confirm                                      |
|                 | RL On | RL Off     |                                              |

Back

P2

#### 4.1.17 Switching on/switching off of the flashing system

From the HOME page, press the button (P1) to access the system control page.

Using the buttons on the interface it is possible to select the desired value.



**When the flashing system is switched on, it is not possible to change the value of the flashing period.**

**To change the flashing period, switch the system off, change the operating parameter and switch the flashing system on again.**

If the flashing system is off, use the button (P2) to command the independent switching on of the SFL lights and of the RTIL/REIL lights of the flashing system.



**After changing the values and switching on, the system waits for confirmation. The button (P3) turns YELLOW.**

**Use the button (P3) to confirm the operation.**

If the system is commanded to switch on without first selecting the flashing level, the system cannot proceed and an acoustic fixture warns the operator.

If the flashing system is switched on, use the button (P4) to command the flashing system to switch off and confirm the operation by acting on button (P3).

**Flash system control panel**

Flash Period: 1 sec | 1/2 sec

Flash Intensity: ICAO | Normal

Flash CAT: CAT I | CAT II/III

Flash Level: High | Med | Low

SF On | SF Off | Confirm

RL On | RL Off

Back

**Flash system control panel**

Flash Period: 1 sec | 1/2 sec

Flash Intensity: ICAO | Normal

Flash CAT: CAT I | CAT II/III

Flash Level: High | Med | Low

SF On | SF Off | Confirm

RL On | RL Off

Back

**Flash system control panel**

Flash Period: 1 sec | 1/2 sec

Flash Intensity: ICAO | Normal

Flash CAT: CAT I | CAT II/III

Flash Level: High | Med | Low

SF On | SF Off | Confirm

RL On | RL Off

Back

**Flash system control panel**

Flash Period: 1 sec | 1/2 sec

Flash Intensity: ICAO | Normal

Flash CAT: CAT I | CAT II/III

Flash Level: High | Med | Low

SF On | SF Off | Confirm

RL On | RL Off

Back

**Flash system control panel**

Flash Period: 1 sec | 1/2 sec

Flash Intensity: ICAO | Normal

Flash CAT: CAT I | CAT II/III

Flash Level: High | Med | Low

SF On | SF Off | Confirm

RL On | RL Off

Back

## 4.1.18 Reset of the synchronism



If the lights are not correctly synchronised or if the system is not able to reset the correct synchronism by itself, proceed immediately to manually reset the system synchronism.

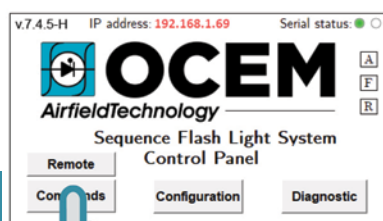
From the HOME page, press the button (P1) to access the system control page.

Use the button (P2) to command the reset of synchronism.



At the end of the synchronisation cycle, check that the problem is resolved.

To exit from the page, press the return button to the source page (P3).



### Flash system control panel

|                 |       |            |                                                                             |
|-----------------|-------|------------|-----------------------------------------------------------------------------|
| Flash Period    | 1 sec | 1/2 sec    | <input type="button" value="SYNC"/><br><input type="checkbox"/> V Hole Sync |
| Flash Intensity | ICAO  | Normal     |                                                                             |
| Flash CAT       | CAT I | CAT II/III | <input type="button" value="P2"/>                                           |
| Flash Level     | High  | Med        |                                                                             |
| Back            | SF On | SF Off     | <input type="button" value="Confirm"/>                                      |
|                 | RL On | RL Off     |                                                                             |

### Flash system control panel

|                 |       |            |                                                                             |
|-----------------|-------|------------|-----------------------------------------------------------------------------|
| Flash Period    | 1 sec | 1/2 sec    | <input type="button" value="SYNC"/><br><input type="checkbox"/> V Hole Sync |
| Flash Intensity | ICAO  | Normal     |                                                                             |
| Flash CAT       | CAT I | CAT II/III | <input type="button" value="P3"/>                                           |
| Flash Level     | High  | Med        |                                                                             |
| Back            | SF On | SF Off     | <input type="button" value="Confirm"/>                                      |
|                 | RL On | RL Off     |                                                                             |

#### 4.1.19 Diagnostics

From the HOME page, press the button (P1) to access the diagnostics page.

The synoptic presents the current system configuration. Each LED represents an FFU field unit (and relevant fixture).

|                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>Each LED represents a device connected to the system. Depending on the position, it is possible to obtain the identifier of the FFU unit.</p> <p>At the bottom right corner a number appears representing the identifier of the unit.</p> <p>Auxiliary indications may appear at the top right to identify the type of fixture installed, if it is different from the elevated fixture (IN = inset fixture).</p> |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

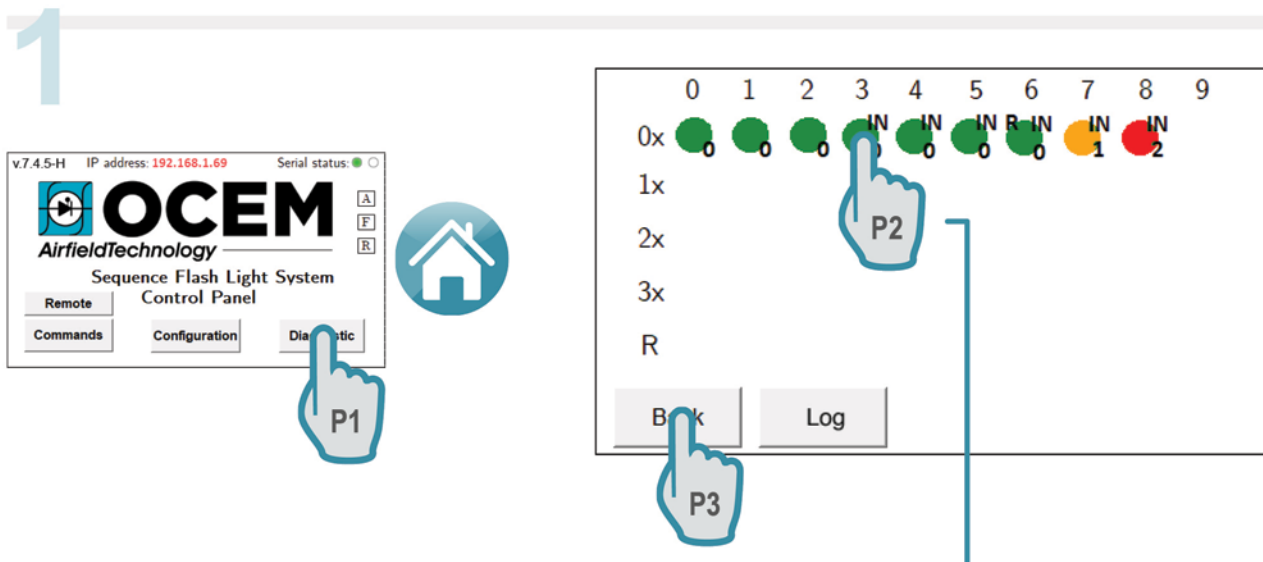
The colour of the LED provides information on the current status of the field unit.

|                                                                                            |                                                                  |
|--------------------------------------------------------------------------------------------|------------------------------------------------------------------|
|  (BLUE)   | The field unit is ready for operation (waiting state)            |
|  (GREEN)  | The field unit is working properly.                              |
|  (YELLOW) | The field unit is alarmed.                                       |
|  (RED)    | The field unit is not responding.<br>The field unit is in error. |

Act on the LED (P2) to access the individual unit status detail page. After an initialisation phase (acquisition of the values), the page updates with the data read from the unit.

To exit from the page, press the return button to the source page (P3).

**1**



The synoptic display shows a row of LEDs numbered 0 to 9. Above the LEDs, the letters 0x, 1x, 2x, 3x, and R are listed. The LEDs are colored: 0 (blue), 1 (green), 2 (green), 3 (green), 4 (green), 5 (green), 6 (green), 7 (yellow), 8 (red), 9 (red). Above LEDs 3, 4, 5, 6, 7, 8, and 9, the letters IN, IN, IN, R, IN, IN, and IN are displayed respectively.

The 'Status of the flash unit' page shows the following data:

| Status of the flash unit |         |               |     |
|--------------------------|---------|---------------|-----|
| Flash ID:                | 0       | Group ID:     | 0   |
| FVVer (unit, PIC)        | -       | VDC Link      | - V |
| Status                   | WORKING | Aux voltage   | - V |
| Led current              | - A     | Forw. voltage | - V |
| Temperature              | - °C    |               |     |

Value acquisition...

Buttons: Back, Log, Reset Alarm

The detail page shows the main operating information of the flashing unit.

- A) Identifier of the field unit.
- B) Identifier of the unit.
- C) Firmware version installed in the PIC control on board of the field units.
- D) Firmware version installed in the processor on board of the field units.
- E) Information message on current operating status.
- F) Actual value of current absorbed by the LED (expressed in A).
- G) Temperature of the fixture (expressed in °C).
- H) Voltage value present on the DC link (expressed in V).
- I) Auxiliary voltage value (expressed in V).
- J) Direct voltage value present (expressed in V).

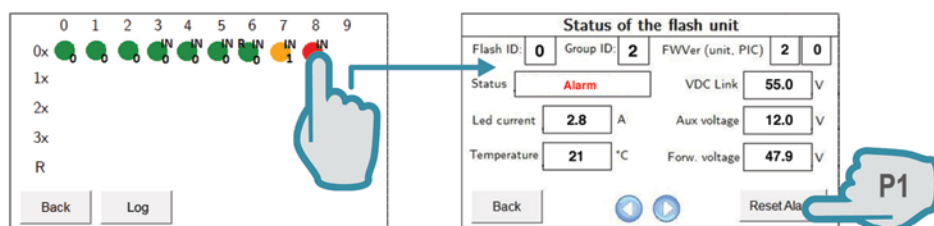
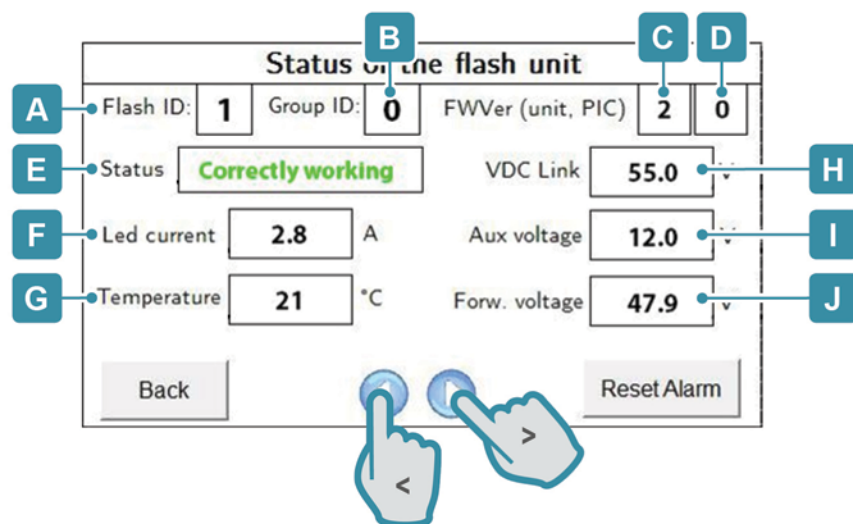
Act on the buttons (<) or (>) to access the previous or next individual unit status detail page. After an initialisation phase (acquisition of the values), the page updates with the data read from the unit.



**Acting on the LED of the synoptic it is possible to access directly the detail page of a specific unit.**

In the event of an error, after resolving the causes that generated the signalling and checking that there are no further problems, press the button (P1) to reset the alarm signalling.

# 2





#### 4.1.20 Consultation of the alarm history

From the diagnostics page, press the button (P1) to access the alarm history.



The main data are displayed for each alarm condition:

- Error message identifier (progressive number)
- Identifier of the field unit
- Alarm message: an abbreviation allows to identify the problem that generated the alarm message (AL = the fixture is alarmed; NR = the FFU field unit is not responding; WR = one or two RTIL fixtures do not operate properly causing the error state on the second fixture)

If necessary, use the button (P2) to reset the list by eliminating all registered alarms.

To exit from the page, press the return button to the source page (P3).

The interface displays a list of alarms with columns for Counter, FFU, and Allarm. A hand icon labeled P2 points to the 'Log' button. Below the list, a table shows the details of the first three alarms.

| Counter | FFU | Allarm |
|---------|-----|--------|
| 0       | 1   | AL     |
| 1       | 15  | NR     |
| 2       | 7   | WR     |
| ---     | --- | --     |
| ---     | --- | --     |
| ---     | --- | --     |
| ---     | --- | --     |

Buttons: Back, Log, P2 (Reset), P3 (Back). A note indicates: Night Alarmed, NR = FFU Not Resp, RTIL Warning.

## 4.2 Scheduled maintenance - Generality



**Before carrying out any intervention on the device, cut off all external power sources and place appropriate work-in-progress warnings on the systems. Wait for the discharging time (at least 5 min) and check using appropriate instruments that there are no residual energies before accessing the electrical equipment.**

To minimize operations, always pay the greatest attention to handling and storage of devices and carry out installation procedures with extreme precision.

In accordance with the suggestions contained in the document FAA AC 150 5340-30, the LEFL/LIFL fixtures and relevant FFU field units must be subjected to regular maintenance.

In order to assure the proper functioning of the fixture and the maximum duration of the operating lifetime of the device all the checks and periodical audits must be carried out and, if necessary, the necessary corrective procedures must be activated to restore and ensure operative safety levels foreseen by the standards.



**Do not let running devices not properly maintained or fixtures presenting signs of damage or fault.**

Each maintenance operation carried out on the devices must be noted on the maintenance register.

| Frequency          | Description                                                                                                                                                                                                |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>every day</b>   | Check of the normal operation of the fixture.                                                                                                                                                              |
| <b>weekly</b>      | Replacement of fixtures presenting breakdowns or malfunctions.                                                                                                                                             |
| <b>monthly</b>     | External cleaning of the protective glass/lens.                                                                                                                                                            |
|                    | Installation check of the fixture.                                                                                                                                                                         |
| <b>every year</b>  | Check the stability of the civil works.                                                                                                                                                                    |
| <b>unscheduled</b> | After exceptional weather events, check the condition of the fixture and remove any objects interfering with the light beam.                                                                               |
|                    | Check for the presence of water inside the installation bases (to be carried out during intervention requiring the removal of the fixture).                                                                |
|                    | Check of the electrical connections and of the isolation degree of the system (to be carried out during intervention requiring the removal of the fixture).                                                |
|                    | Check of the mounting seals (to be carried out during intervention requiring the fixture opening).                                                                                                         |
|                    | Check of the integrity of the electric cables (to be carried out during intervention requiring the removal of the fixture from the base).                                                                  |
|                    | Removal of snow (when necessary). Techniques for snow removal are described in the manual: Airport Service Manual ICAO -Part 9- Airport Maintenance Practices on in the FAA AC 150/5200-30 specifications. |

### 4.3 FMCU maintenance



**Before carrying out any intervention on the device, cut off all external power sources and place appropriate work-in-progress warnings on the systems. Wait for the discharging time (at least 5 min) and check using appropriate instruments that there are no residual energies before accessing the electrical equipment.**

In accordance with the suggestions contained in the document ICAO Airport Service Manual - Part 9: Airport Maintenance Practices, or on the basis of what reported in the document FAAAC 150 5340-30, the devices FLASH LED must be subjected to regular maintenance.

In order to assure the proper functioning and the maximum duration of the operating lifetime of the device all the checks and periodical audits must be carried out and, if necessary, the necessary corrective procedures must be activated to restore and ensure operative safety levels foreseen by the standards.



**Do not let running devices not properly maintained or fixtures presenting signs of damage or fault.**

Each maintenance operation carried out on the devices must be noted on the maintenance register.

#### 4.3.1 Maintenance after the first month

After the first month of use, carry out the following checks:

- Status of the connections and of tightening of the terminals of the power terminals: input line (X1) and automatic switch (Q1);
- Status of the connections and of tightening of the power terminals: output line (X2) and automatic switch (Q2);
- Correct tightening of all internal terminal blocks.

#### 4.3.2 Semestral maintenance

At least once every 6 months of use, carry out the following activities:

- Check the status of the connections and of tightening of the main connections (X1, X2, Q1, Q2);
- Check the proper tightening of the magnetic components (L1);
- Check the operating condition of auxiliary fuses (F1-F5);
- Remove dust accumulated on internal components by means of compressed air;
- Clean the ventilation fans of the panel: replace the filter (if present) and remove the accumulated dust by means of compressed air.

#### 4.3.3 Annual maintenance

At least once every 12 months of use, carry out the following activities:

- Check the operation of the unit in LOCAL mode and in REMOTE mode.

#### 4.3.4 Three-year maintenance

At least once every 36 months of use, carry out an overall check of the condition of the unit. Carry out a visual inspection and perform the following activities:

- Check the proper tightening of all internal terminal blocks.

## 4.4 Elevated fixture (LEFL) maintenance

### 4.4.1 Fixture opening



Every time that the fixture body is opened, all the seals must be replaced: use only original spare parts by OCEM Airfield Technology.

Whenever the LEFL fixture is opened, it must be ensured that:

- the optical unit is undamaged and clean;
- there are no infiltration;
- the supply cables and the connectors are undamaged and do not have breakdowns or abrasions.

#### 4.4.1.1 Rear access

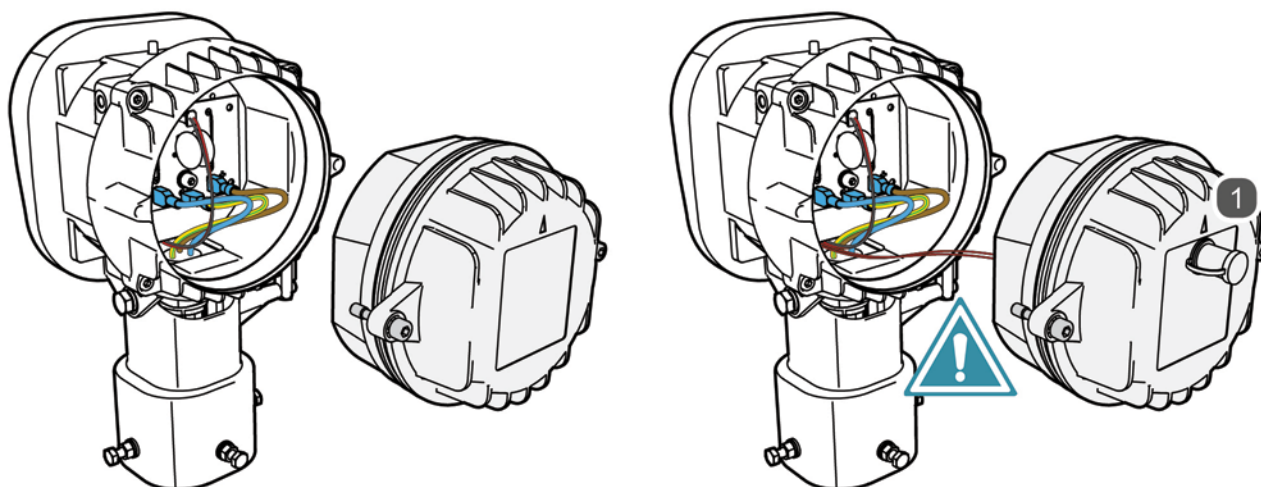
To access the electronic board, remove the rear cover.



The version equipped with arctic kit shows a connector on the rear part. Before proceeding to opening, disconnect the supply of the arctic kit.

Unscrew the two captive screws and open the fixture. If the fixture is equipped with the arctic kit (1), pay attention to the supply cables of the resistance.

Open the fixture.



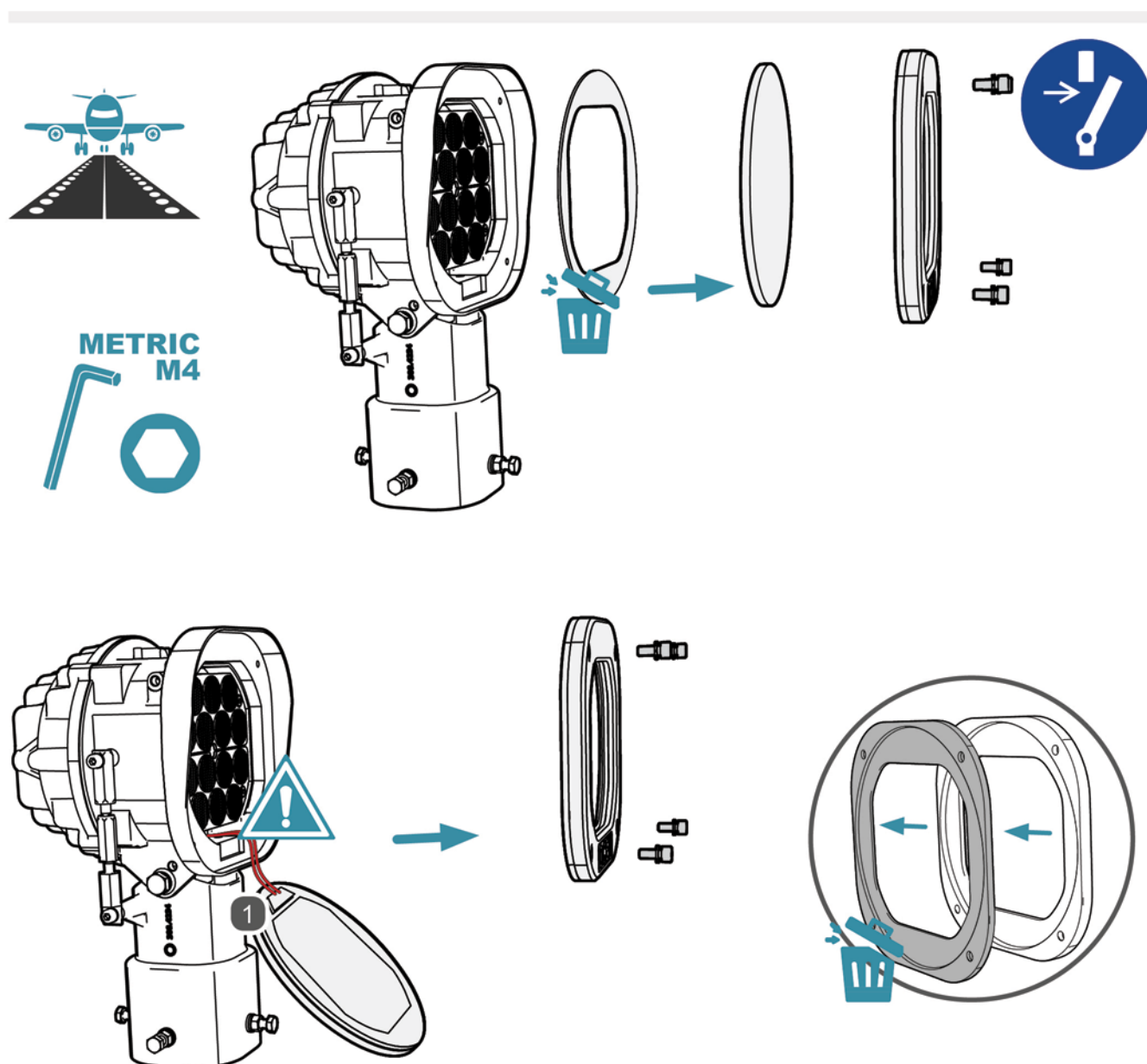
#### 4.4.1.2 Front access

To access the LED module, remove the front lens.



**The version equipped with the arctic kit has a heating element glued to the protective glass.**

Unscrew the four screws and remove the frame unit (complete with gasket). If the fixture is equipped with the arctic kit (1), pay attention to the supply cables of the resistance.



## 4.4.2 Fixture closing



Every time that the fixture body is opened, all the seals must be replaced: use only original spare parts by OCEM Airfield Technology.

Pay attention not to damage the cables.

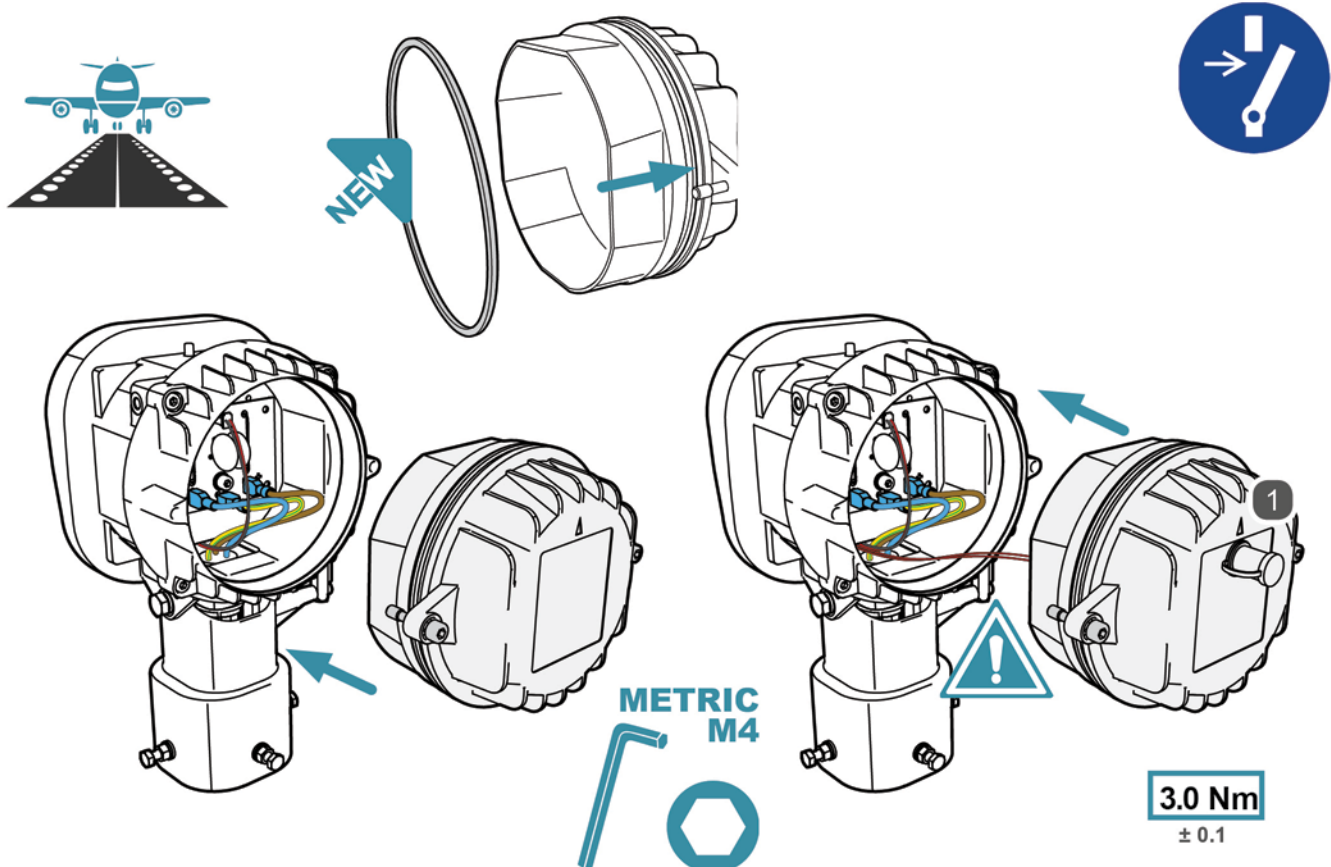
### 4.4.2.1 Rear cover closing

Replace the gasket. Clean the internal surface of the cover.



Do not use solvent or diluent products to avoid damaging the materials. Dry thoroughly the internal sides of the device.

Insert the cover on the body, paying attention not to crush the connection cables of the arctic kit (1), if present. Tighten the screws alternately to allow the gasket to insert linearly into the body, until the expected tightening torque is reached.





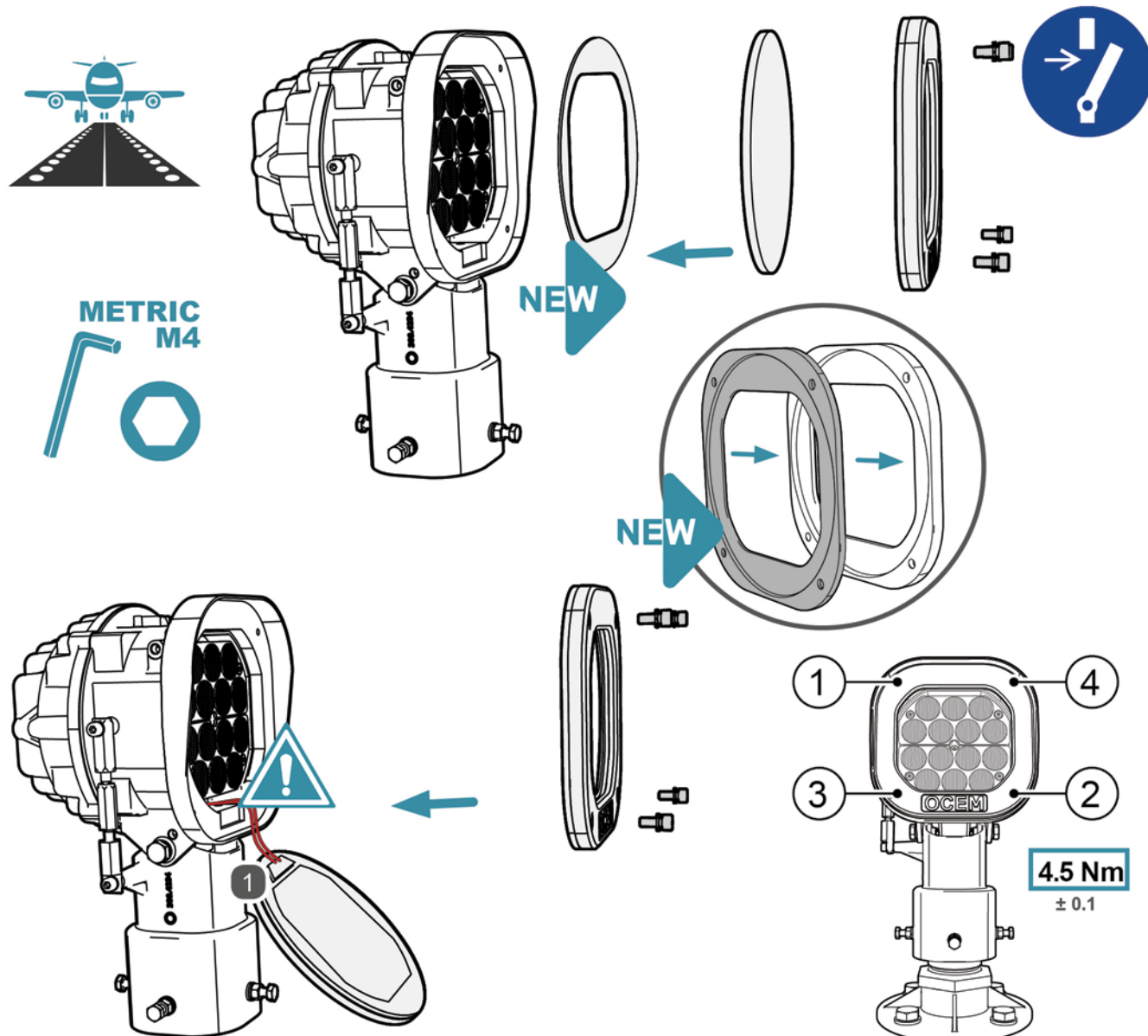
## 4.4.2.2 Front side closing

Replace the gaskets (lower -if any- and upper). Clean the internal surface of the protective glass.



**Do not use solvent or diluent products to avoid damaging the materials. Dry thoroughly the internal sides of the device.**

Position the frame unit (complete with gasket) on the body, paying attention not to crush the connection cables (1) of the arctic kit, if present. Screw the four screws alternately until the expected tightening torque is reached.



## 4.4.3 Cleaning the front glass



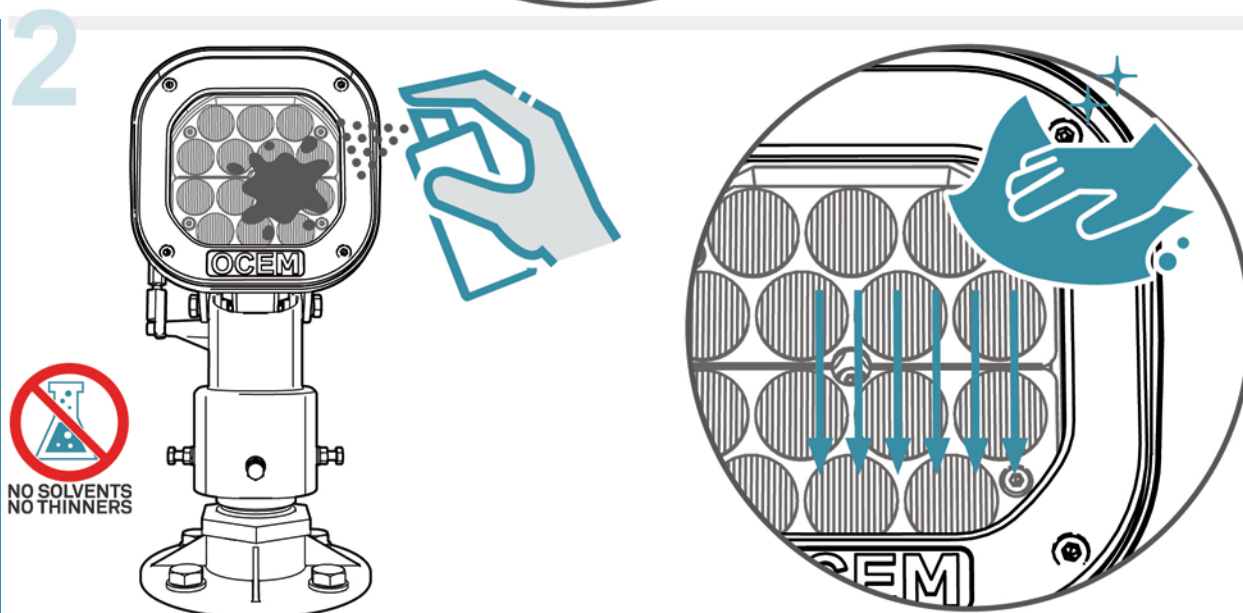
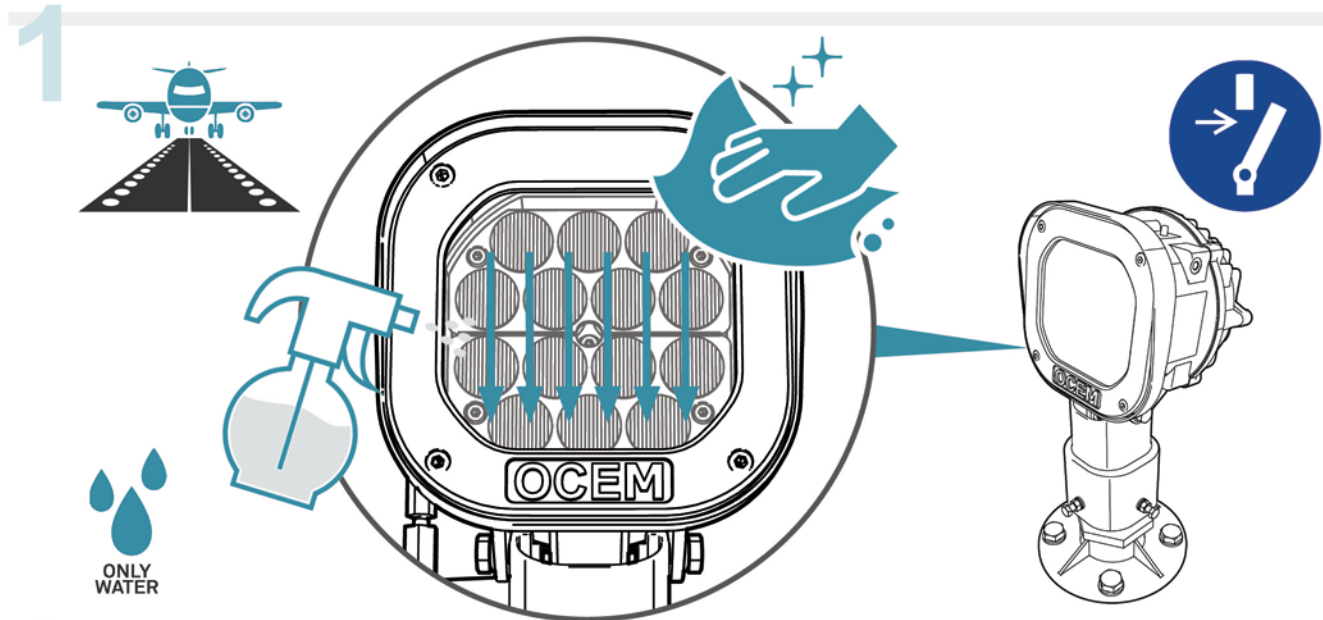
Before carrying out any intervention on the fixture, cut off all external power sources and place appropriate work-in-progress warnings on the systems.  
Wait for the discharging time (at least 5 minutes) and check using appropriate instruments that there are no residual energies before accessing the electrical equipment.

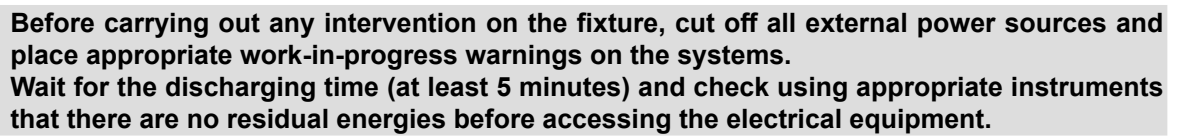
Clean the external surface of the front protective glass with neutral and non-abrasive products using clean clothes.

The external cleaning operation of the glass take place directly on the runway and do not require the removal or the opening of the fixture. In normal conditions of use it is not necessary to clean the protective glass or the lens internally.



Do not use solvent or diluent products to avoid damaging the glass elements.  
In case the glass or the lens are damaged, replace them.





Unscrew the four screws and remove the frame unit (complete with gasket). If the fixture is equipped with the arctic kit (1), pay attention to the supply cables of the resistance.



## FLASH LED

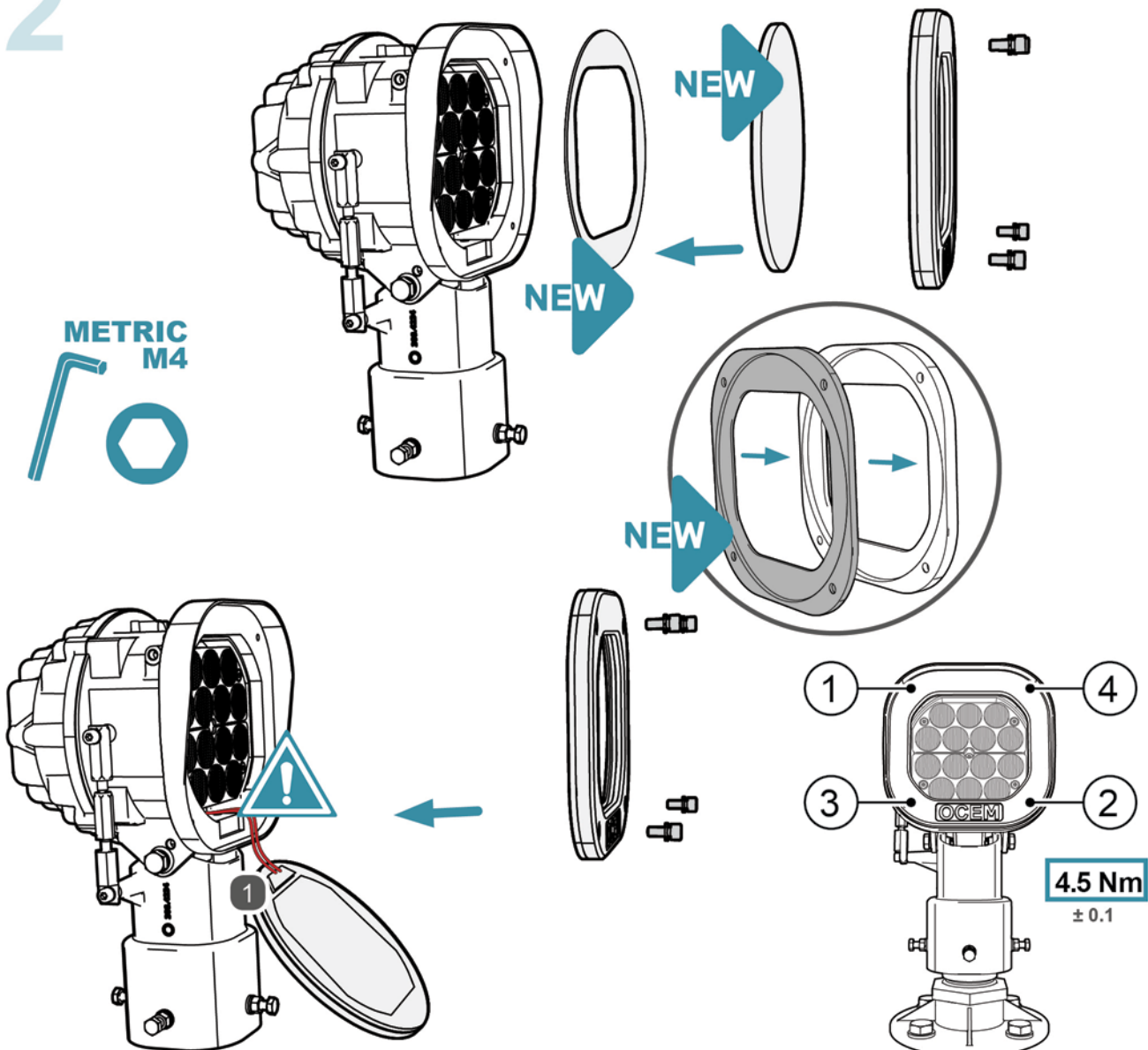
Replace the gaskets (lower -if any- and upper). Clean the internal surface of the protective glass. Position the new glass.



**Do not use solvent or diluent products to avoid damaging the materials. Dry thoroughly the internal sides of the device.**

Position the frame unit (complete with gasket) on the body, paying attention not to crush the connection cables (1) of the arctic kit, if present. Screw the four screws alternately until the expected tightening torque is reached.

# 2





#### 4.4.5 Replacement of the power cable

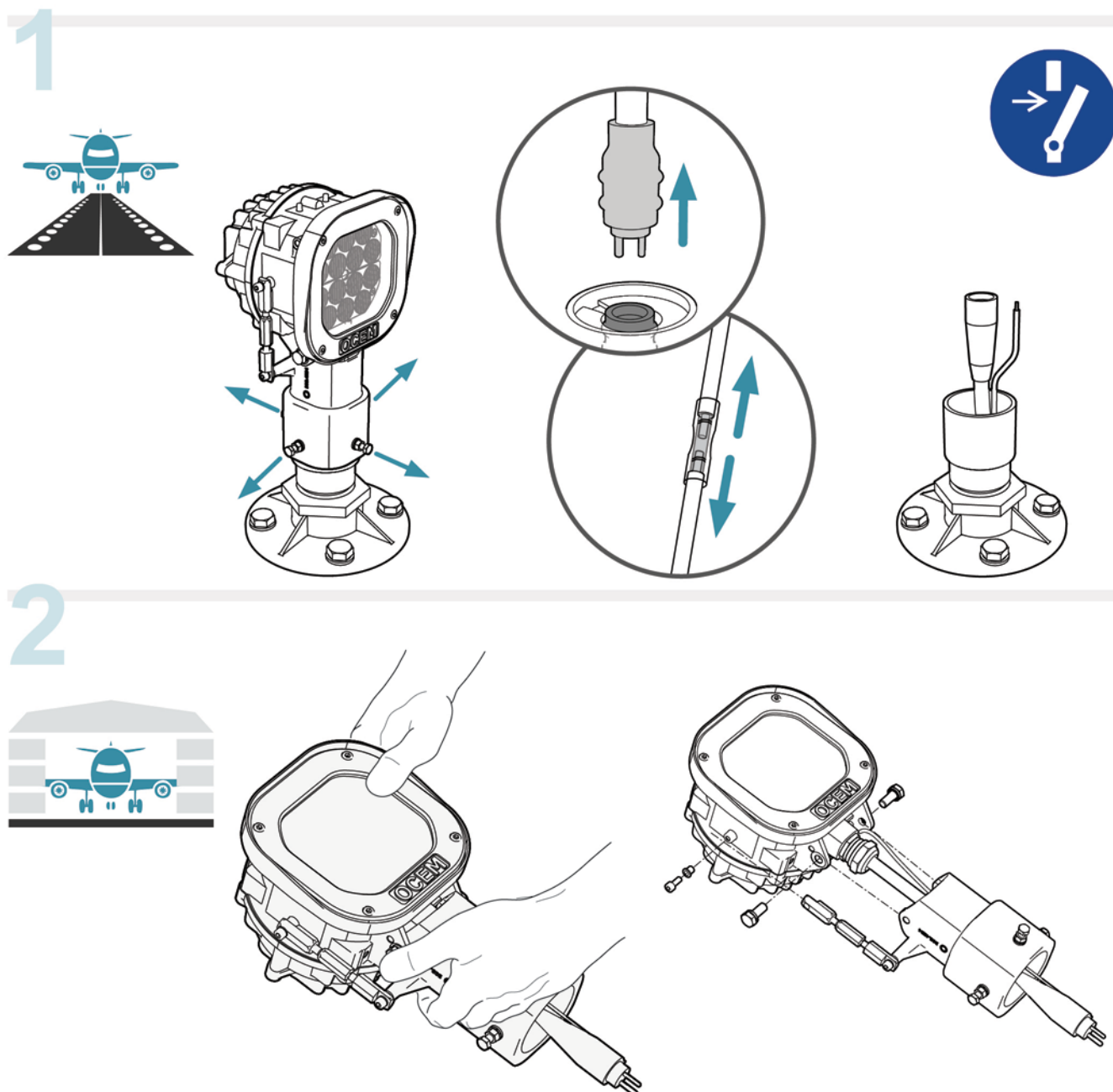


Before carrying out any intervention on the device, cut off all external power sources and place appropriate work-in-progress warnings on the systems. Wait for the discharging time (at least 5 minutes) and check using appropriate instruments that there are no residual energies before accessing the electrical equipment.

Unscrew the screws present on the fixture body until free the fixture from the anchorage.

Disconnect the electrical connections: disconnect the plug of the fixture from the socket coming from the transformer and separate the ground cable with the protective conductor coming from the base.

Remove the fixture from the base and bring it to the workshop to remove the support and to complete maintenance.





The assembly of the power supply cable must be performed only by professional staff, in compliance with all the safety requirements of the laws and regulations in force in the country of use.

Carry out operations on the bench, with all elements detached from energy sources. Never operate on potentially active components.

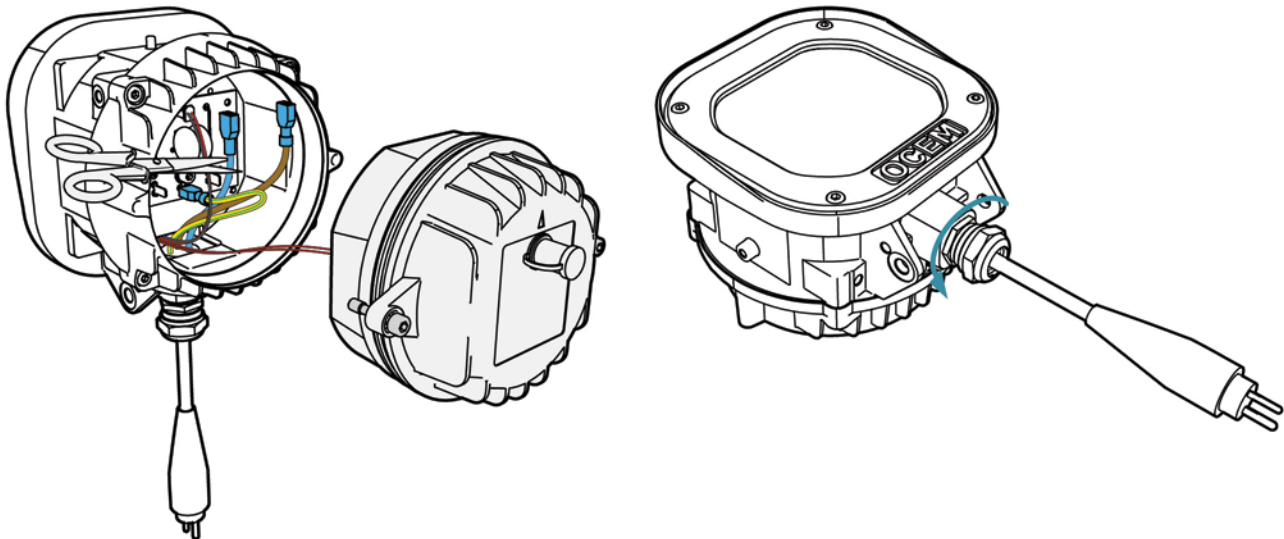
Proceed to remove the rear cover.

Disconnect the connectors from the board and cut the cables. Unscrew the cable clip nut of the bulkhead coupling and remove it from the fixture paying attention not to damage the gasket.

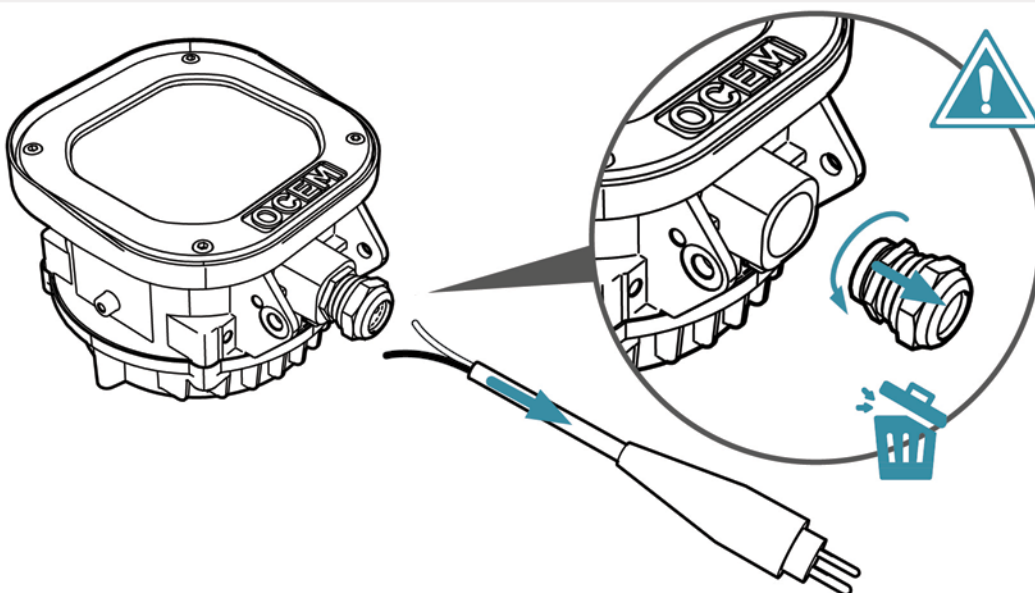


The cable gland be reused for a maximum of 10 times with connectors of same dimensions. If necessary, replace the bulkhead.

### 3



### 4





Cut the cable to the desired length: the cable length shall be sufficient to allow the connection of the device on the type of support envisaged in the installation project. The length L of the cable must be approximately 150 mm greater than the height H of the support.

If necessary, screw a new cable gland in the base body.

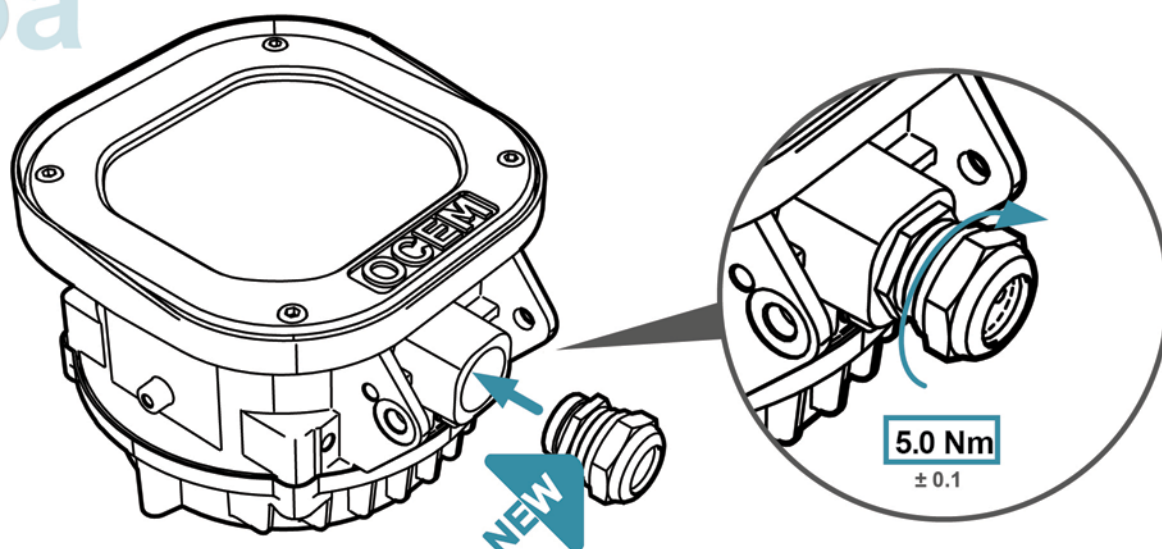
The power supply cable replacement kit is composed by an attested bipolar cable to a Style 1 plug and ground cable. Insert the cables in the cable gland gasket.

Tighten the cable clip nut to the end of the thread, and no further.

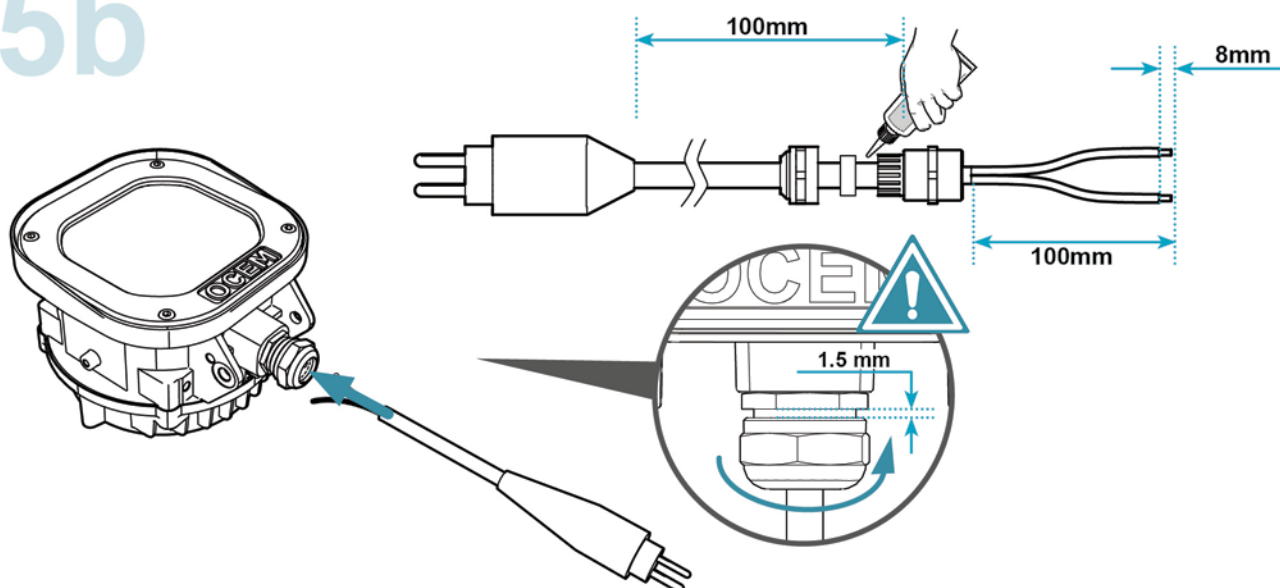


**When tightening the cable clip nut, use a 1.5-mm-thick template appropriately positioned.**

# 5a



# 5b



## FLASH LED

Connect the connectors faston to the cables. Connect the cables to the driver board, observing polarity.



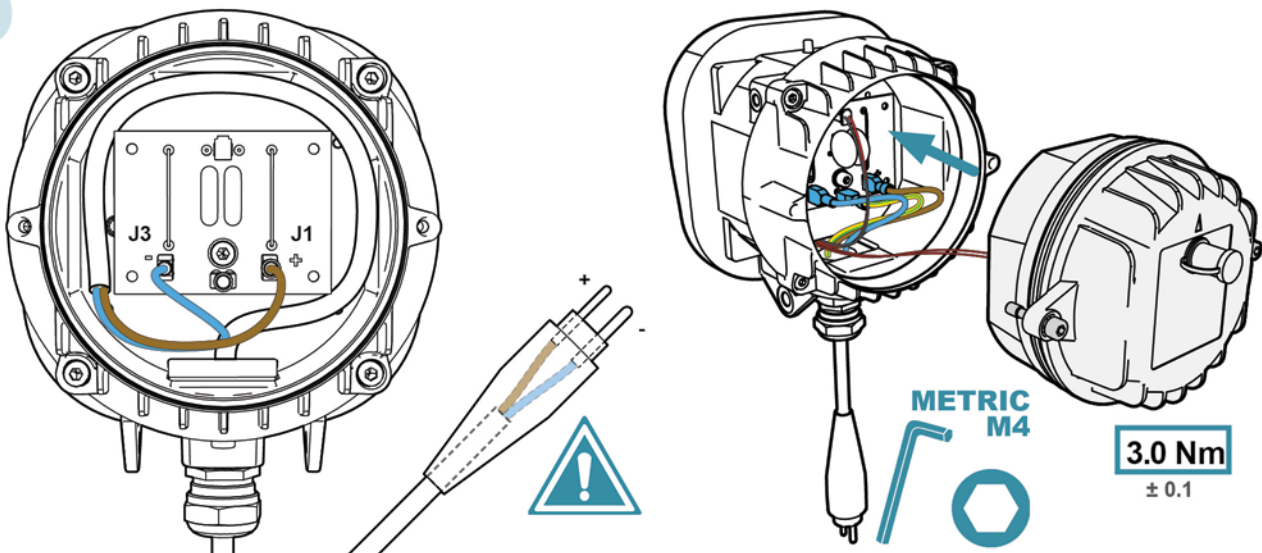
**Always check the correspondence between cable colour and polarity (small pin = positive pole; large pin = negative pole).  
Use a multimeter to check the continuity of the conductors.**

Insert the cover on the body, taking care not to crush the cables. Tighten the screws alternately to allow the gasket to insert linearly into the body, until the expected tightening torque is reached.

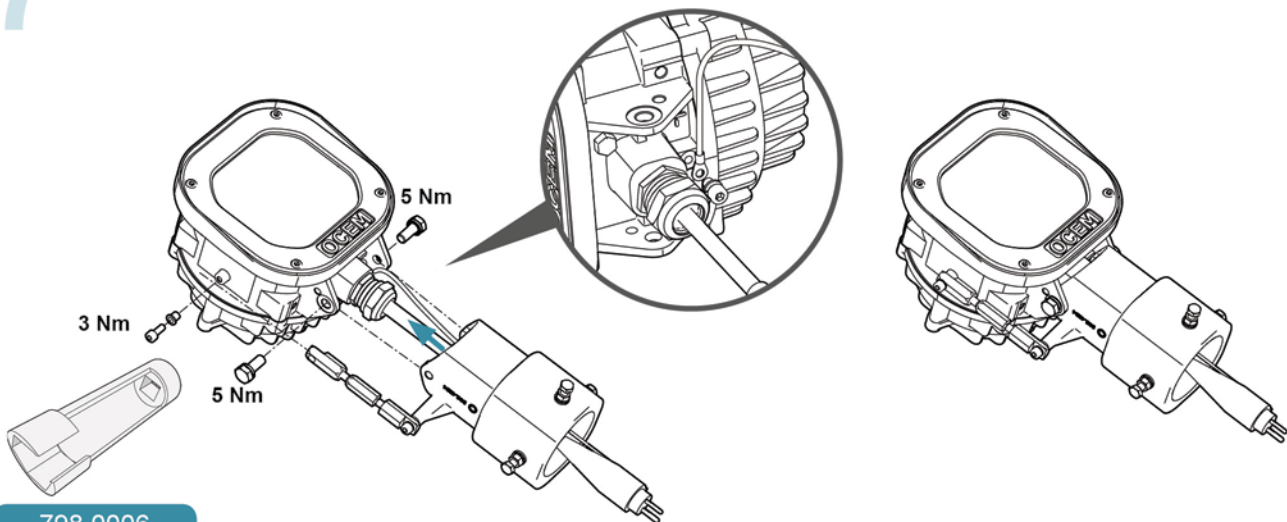
Make the earth connection: connect the conductor to the predisposed ground screw located on the lower part of the body.

Reassemble the support. Tighten the screws with the indicated tightening torque.

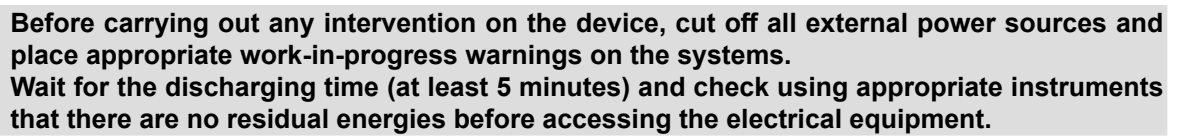
6



7



798.0006



Unscrew the four screws and remove the frame unit (complete with gasket). If the fixture is equipped with the arctic kit (1), pay attention to the supply cables of the resistance.



Remove the lenses. Disconnect the connector and remove the LED module to be replaced and the thermal pad. Check that the lens are not damaged.

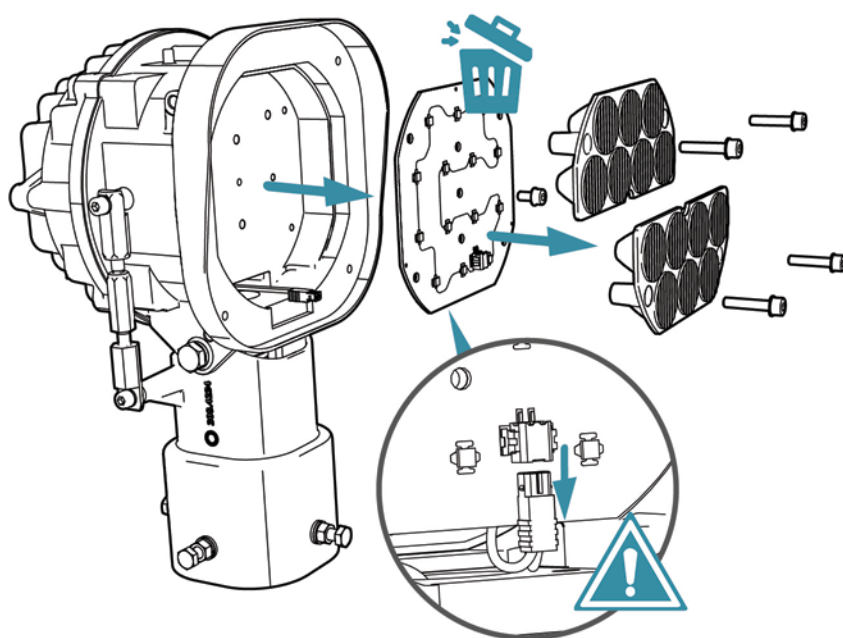


**If necessary, replace the lens with spare parts matching the original configuration.**

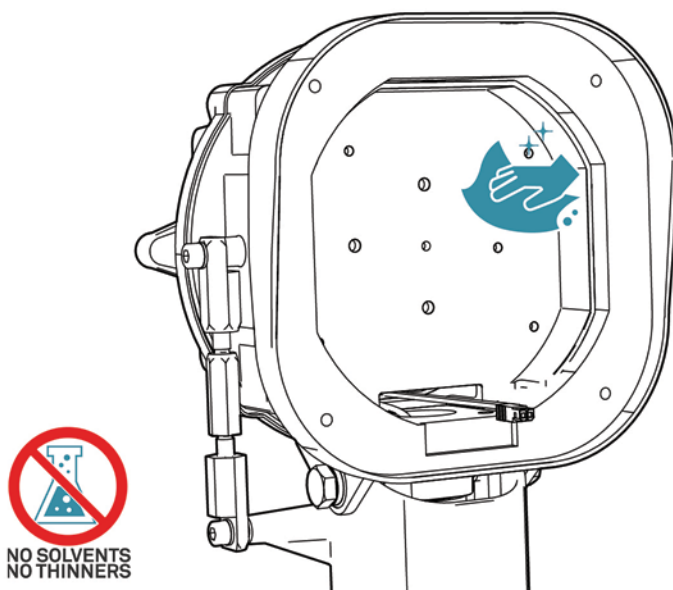
Clean the installation site of the LED module.



**Do not use solvent or diluent products to avoid damaging the materials.  
Dry thoroughly the internal sides of the device.**



**METRIC  
M4**







Check that the replacement LED module match the desired configuration.  
If necessary, replace the lens with spare parts matching the original configuration.

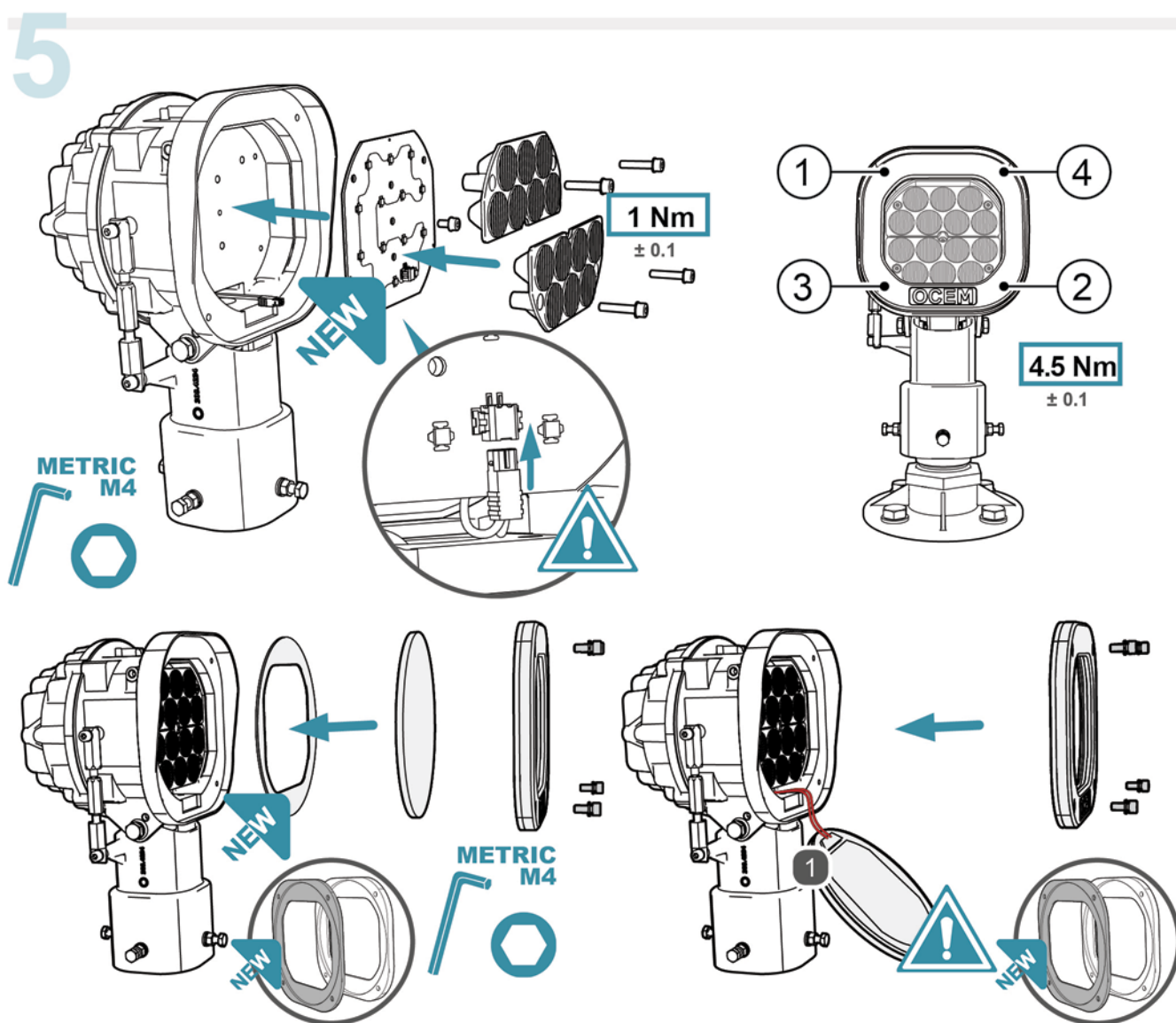
Position the LED module, complete with thermal pad, centring it on the predisposed holes. Position the lenses.



Check that the lens package is perfectly installed on the LED module.  
Tighten the screws with the indicated torque values.

Connect the connector.

Position the frame unit (complete with gasket) on the body, paying attention not to crush the connection cables (1) of the arctic kit, if present. Screw the four screws alternately until the expected tightening torque is reached.



## 4.4.7 Replacement of the Driver Board



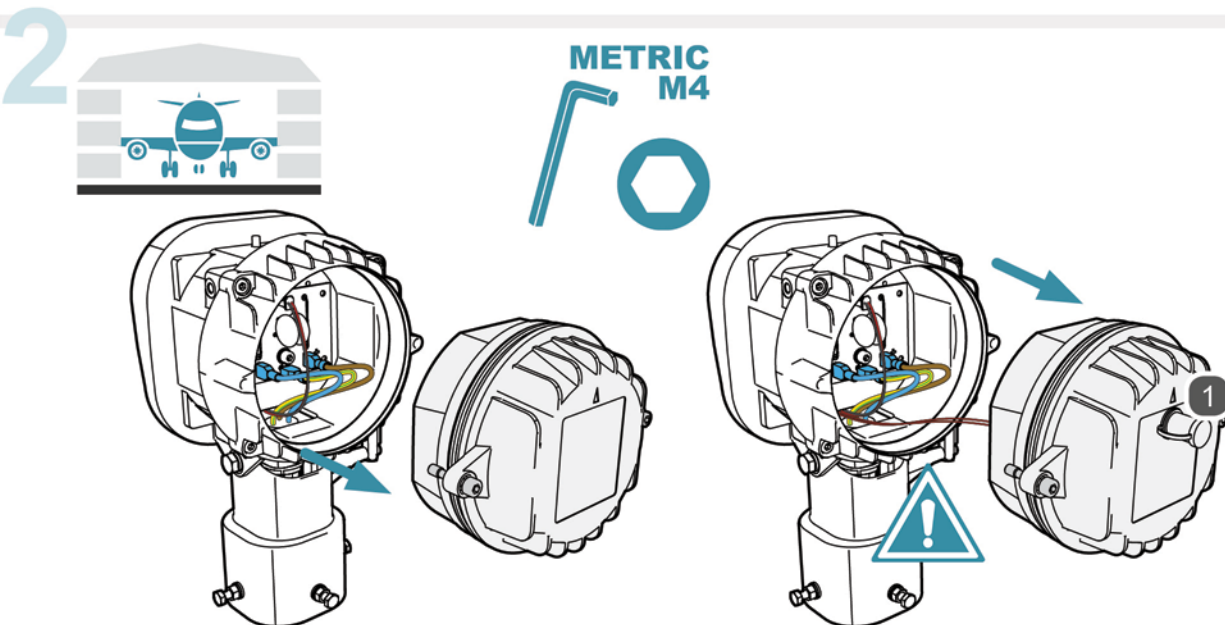
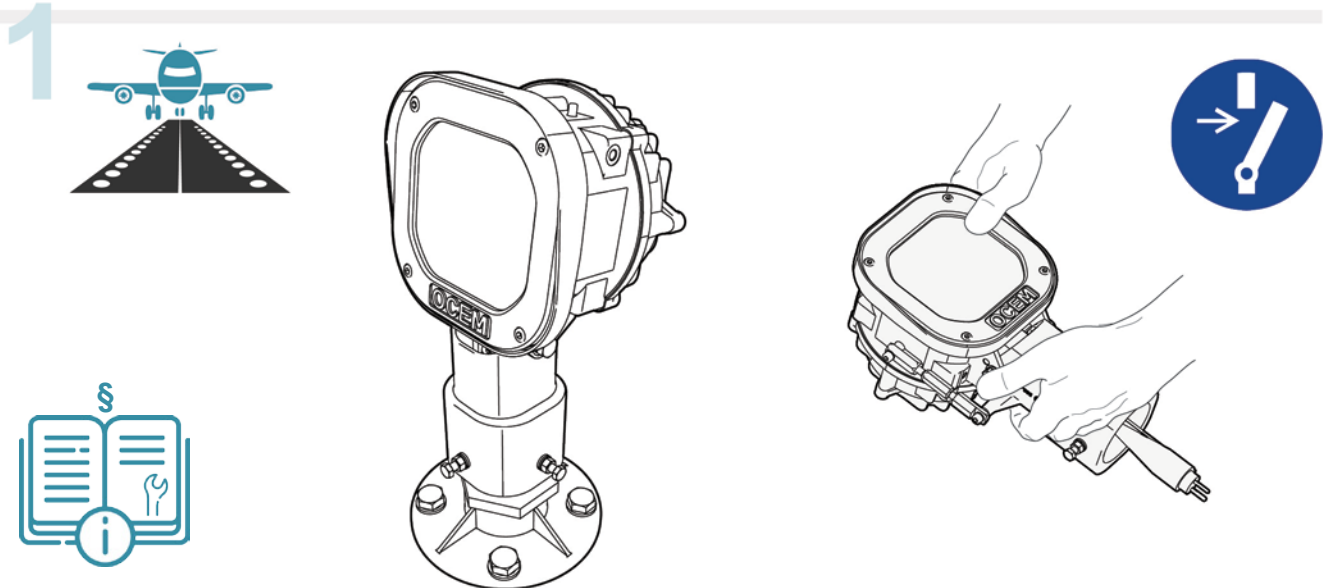
Before carrying out any intervention on the device, cut off all external power sources and place appropriate work-in-progress warnings on the systems. Wait for the discharging time (at least 5 minutes) and check using appropriate instruments that there are no residual energies before accessing the electrical equipment.

Remove the fixture from the support (see the related paragraph in the chapter "INSTALLATION") and bring it to the workshop to complete maintenance.



The version equipped with arctic kit shows a connector on the rear part. Before proceeding to opening, disconnect the supply of the arctic kit.

Unscrew the two captive screws and open the fixture. If the fixture is equipped with the arctic kit (1), pay attention to the supply cables of the resistance.





Pay particular attention to the disconnection phase of the power cable of the LED module (1).



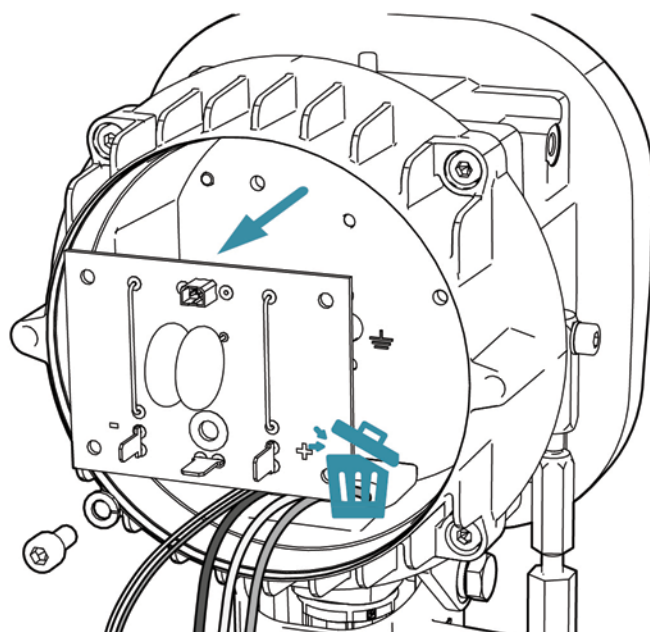
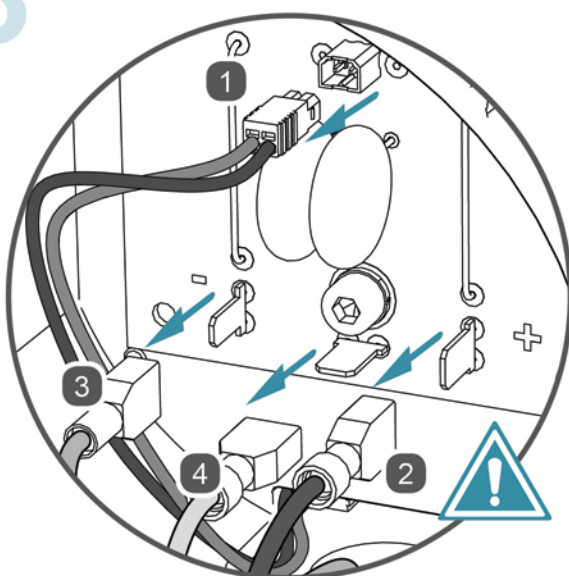
**In case of damage, replace the power cable of the LED module.  
Do not reconnect connectors or damaged cables.**

Disconnect the supply cables (2) and (3) from the electronic board. Disconnect the ground cable (4). Unscrew the screw and remove the Driver Board. Clean the installation site.

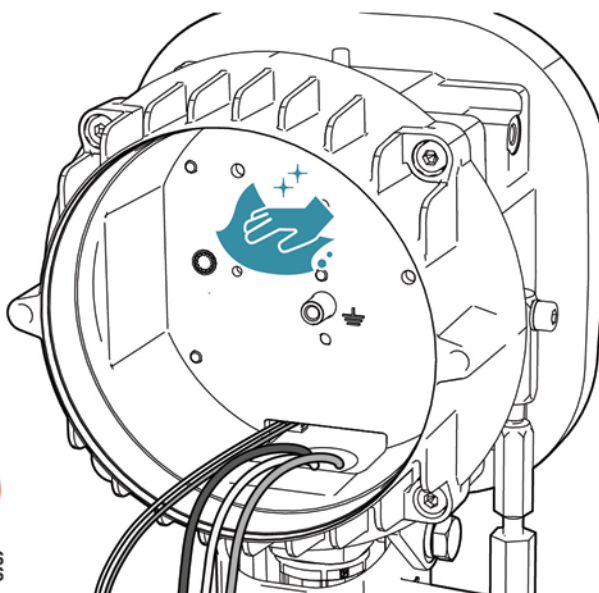


**Do not use solvent or diluent products to avoid damaging the materials.  
Dry thoroughly the internal sides of the device.**

3



4





Check that the Driver Board spare part matches the component installed on the fixture.  
**ATTENTION:** Check the product codes before reconnecting the component.

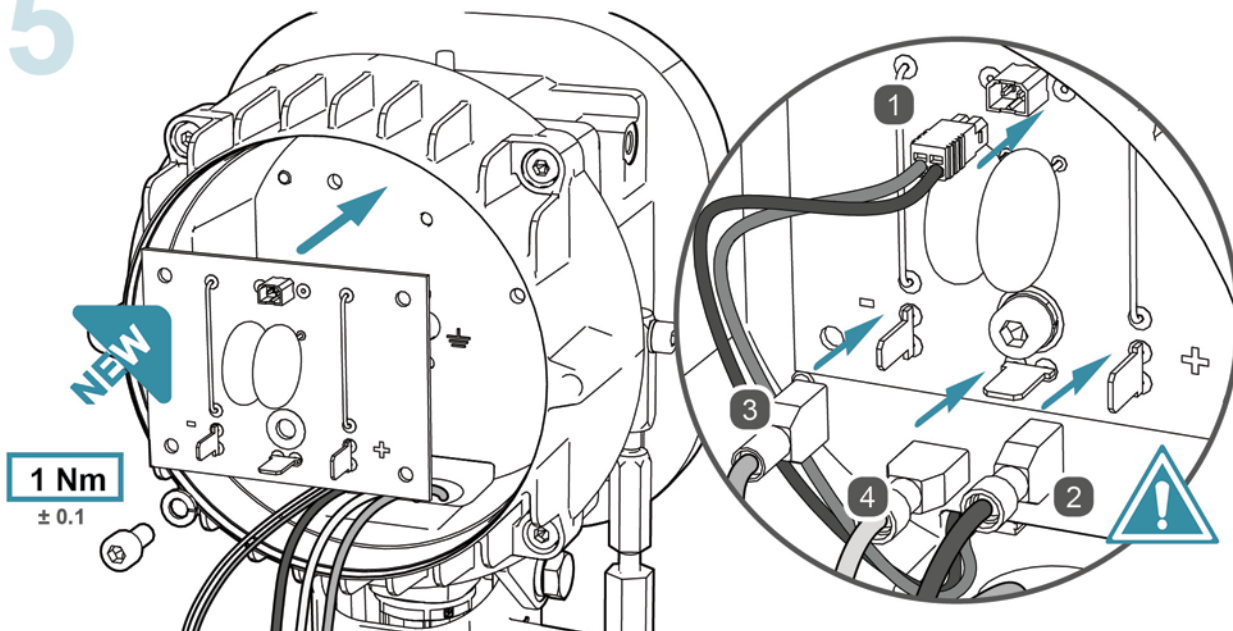
Position the driver board spare part and tighten the screw to the indicated torque values.  
Connect the power cable of the LED module (1). Connect the ground cable (4) and the supply cables (2) and (3).



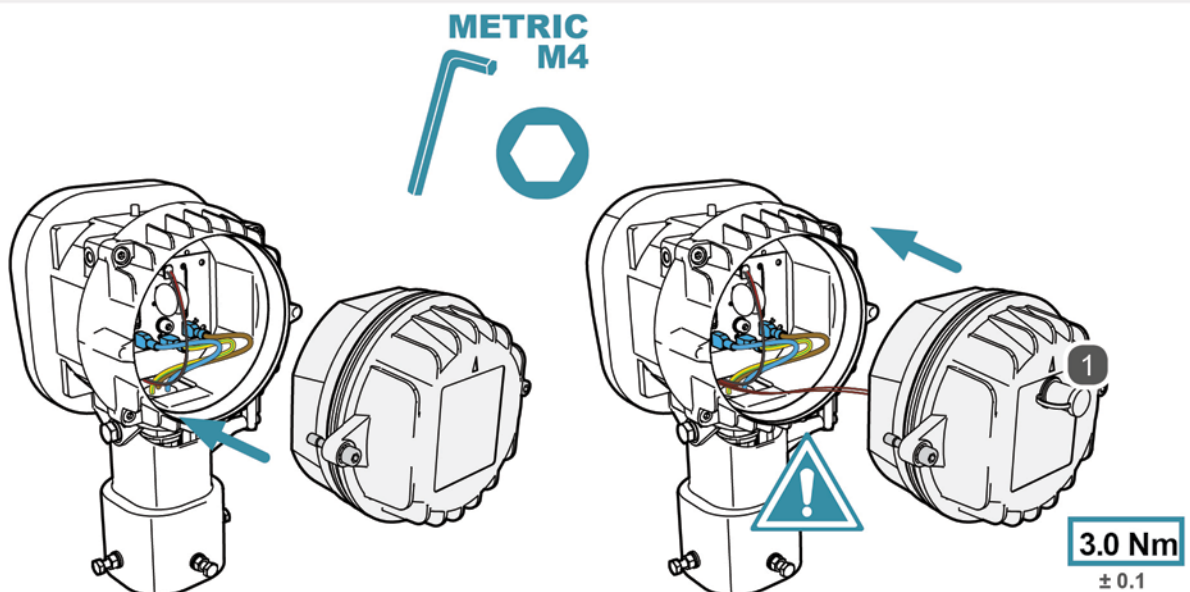
Respect the direction of the driver board during assembly phase. Please refer to the indications on the rear cover.

Check the proper functioning of the gasket. Close the light unit and screw the two captive screws.

5



6



#### 4.4.8 Replacement of the support

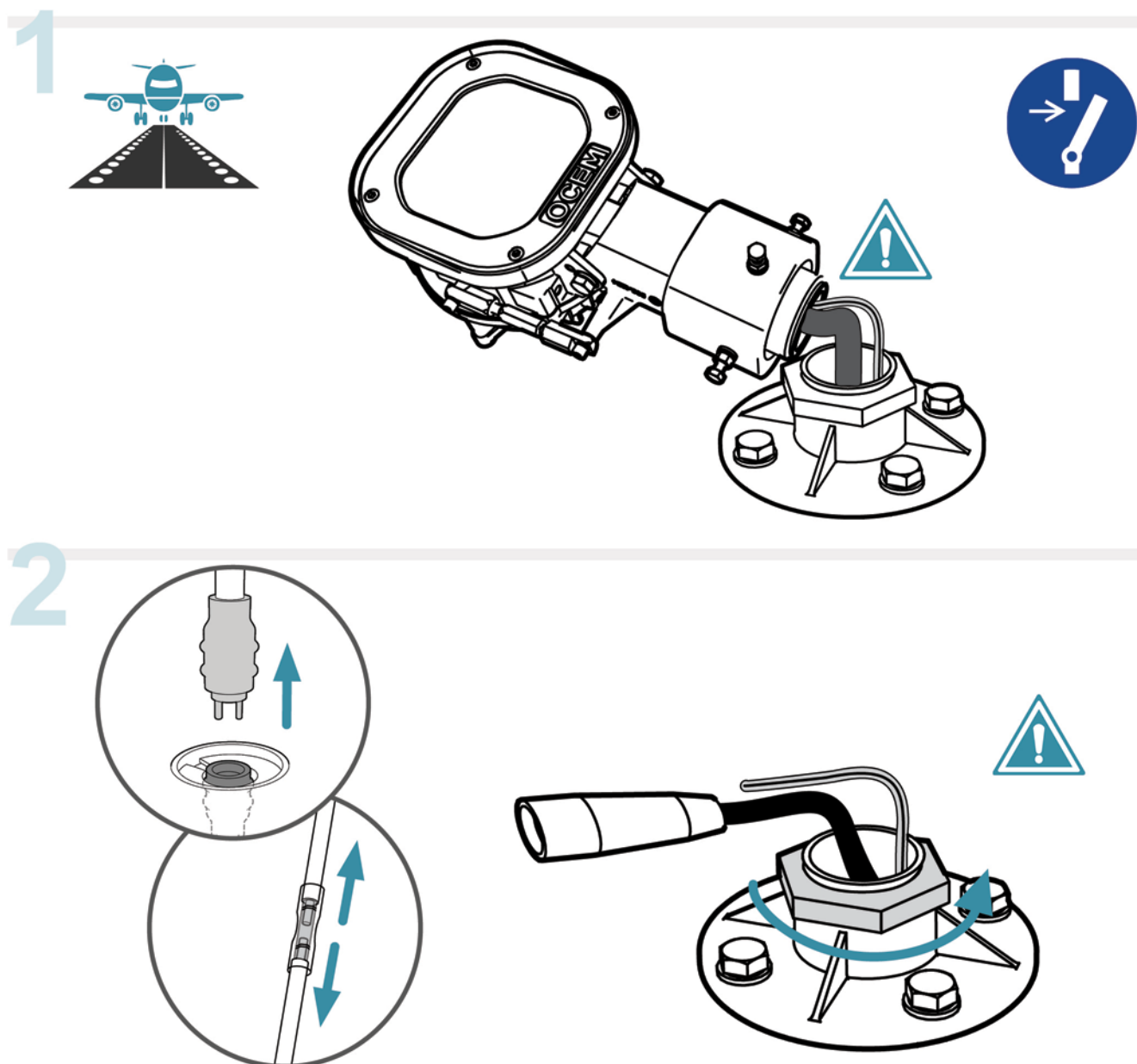


Before carrying out any intervention on the fixture, cut off all external power sources and place appropriate work-in-progress warnings on the systems. Wait for the discharging time (at least 5 minutes) and check using appropriate instruments that there are no residual energies before accessing the electrical equipment.

The frangible coupling and the relevant installation accessories are provided as spare parts.

Disconnect the supply cables of the unit.

Loosen and remove the ring nut. Grab the damaged support with an adjustable wrench in correspondence of the base of the breakable coupling element. Rotate counterclockwise and remove the support of the fastening flange.



Screw and tighten the frangible coupling to the base.



**Insert inside the coupling the power cable (with socket) and the ground cable (ground connected inside the base).**

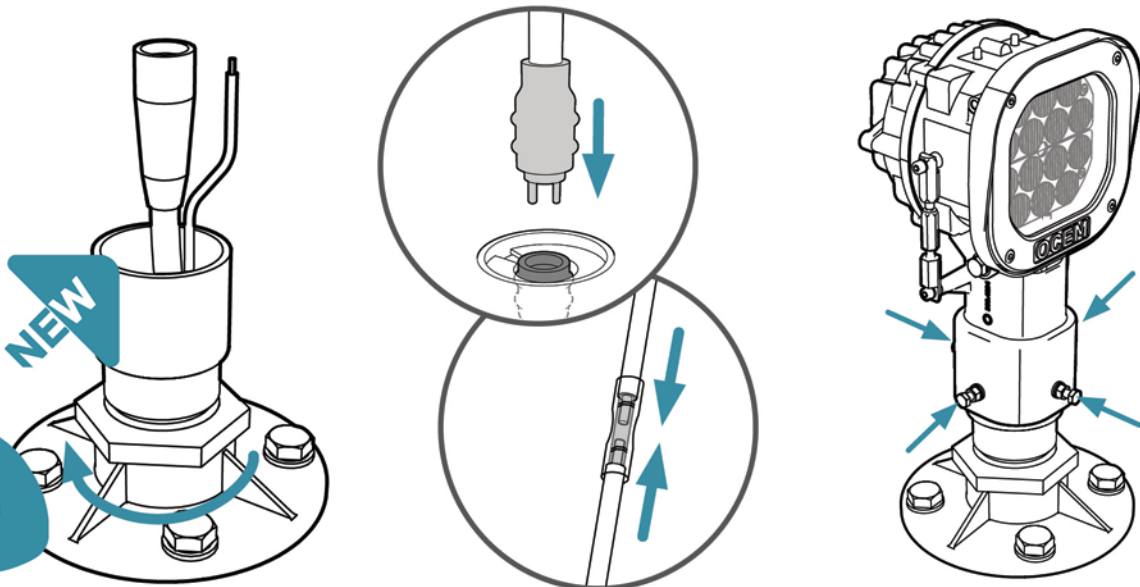
Make the electrical connections: insert the plug of the fixture in the socket coming from the field unit and joint the ground cable with the protective conductor coming from the base.

Tighten uniformly the screws present on the body of the fixture until stopping the fixture on the pole (without tightening).

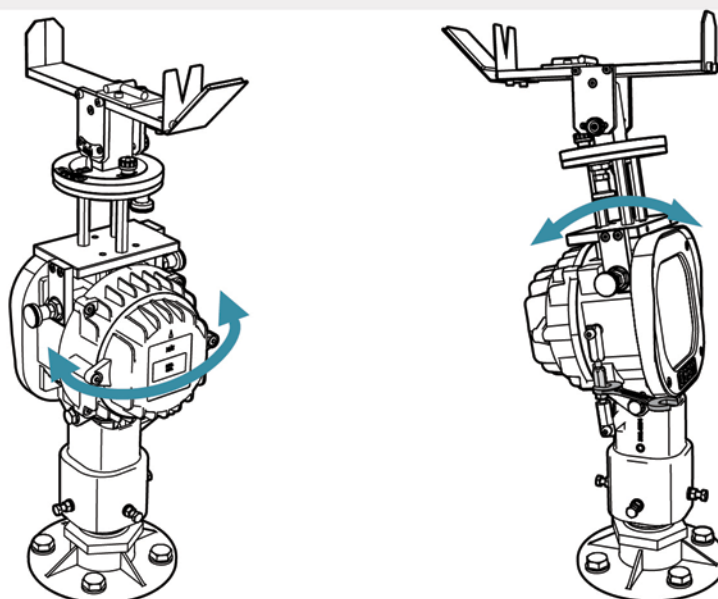
Check the proper alignment of the fixture (see the related paragraph in the chapter "INSTALLATION").

After completion of operations, check the operation of all light(s) fixtures.

3



4





## 4.5 Inset fixture (LIFL)

### 4.5.1 Fixture opening



Every time that the fixture body is opened, all the seals must be replaced: use only original spare parts by OCEM Airfield Technology.

Whenever the LIFL fixture is opened, it must be ensured that:

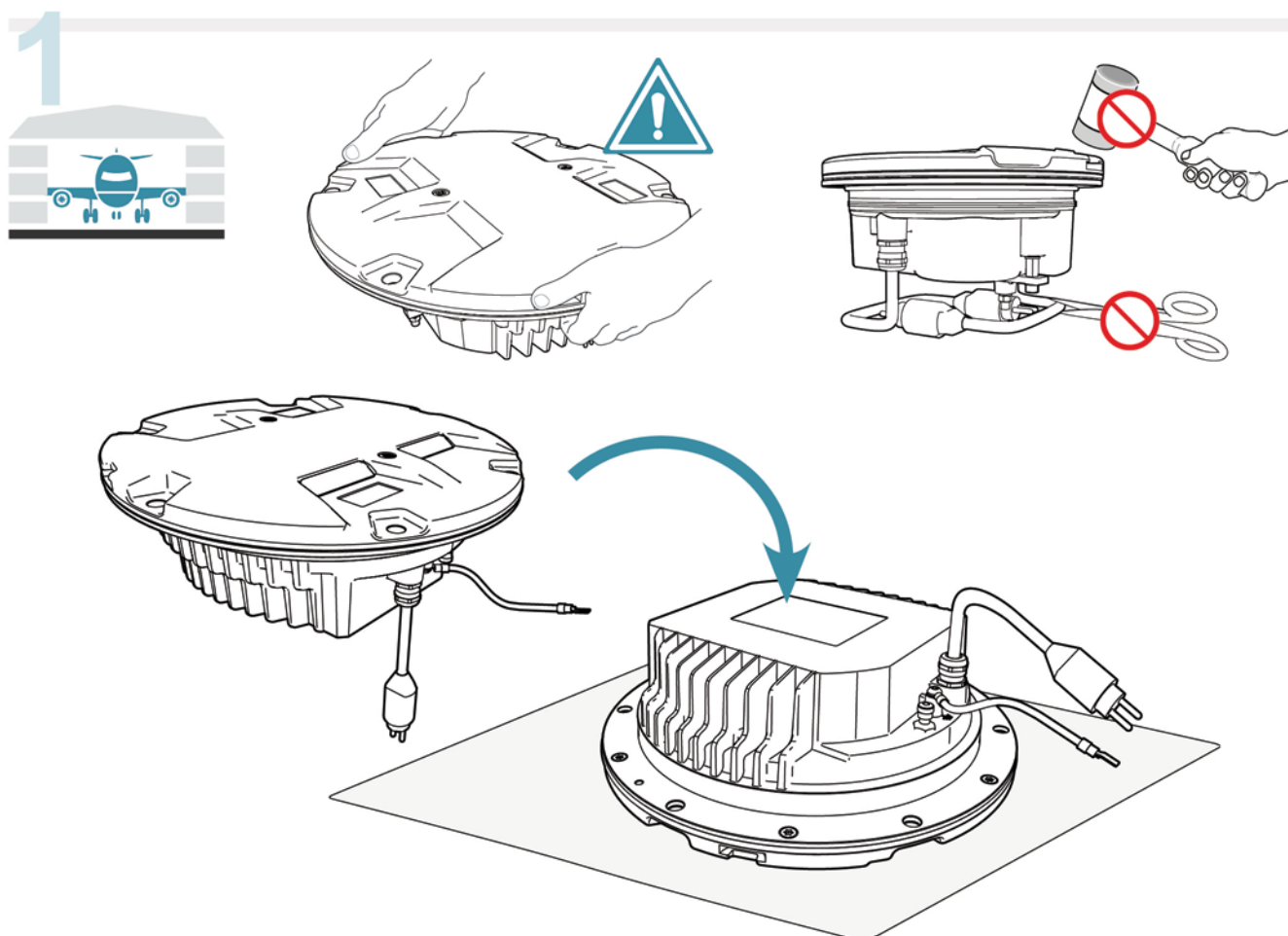
- the optical unit is undamaged and clean;
- there are no infiltration;
- the supply cables and the connectors are undamaged and do not have breakdowns or abrasions.



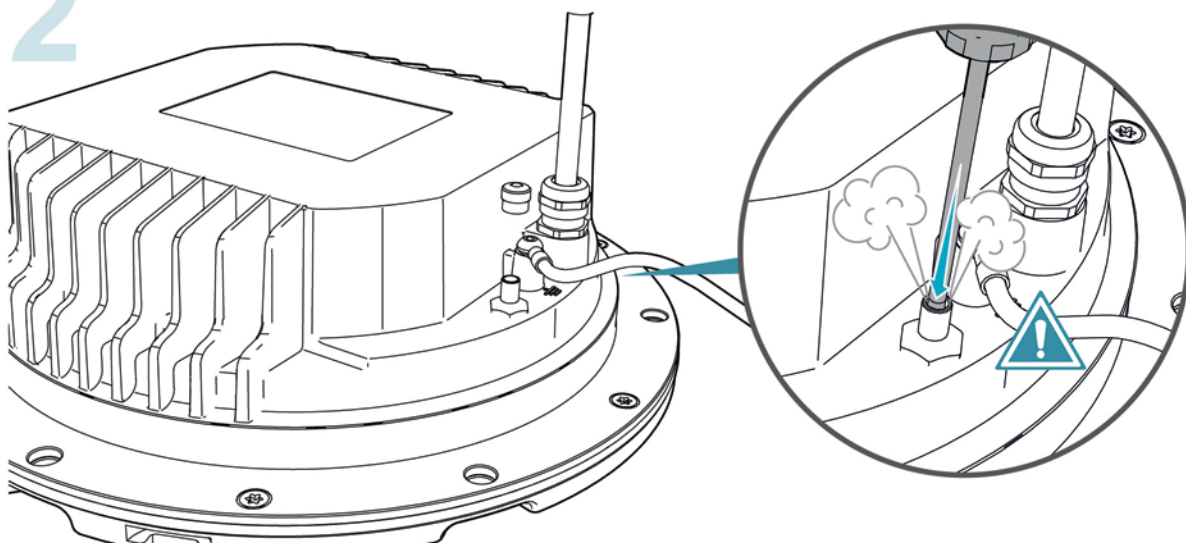
Place the fixture on a flat, adequately protected surface to avoid damaging the device.

Unscrew the plug and act on the valve to discharge the residual internal pressure. Unscrew the screws and open the fixture.

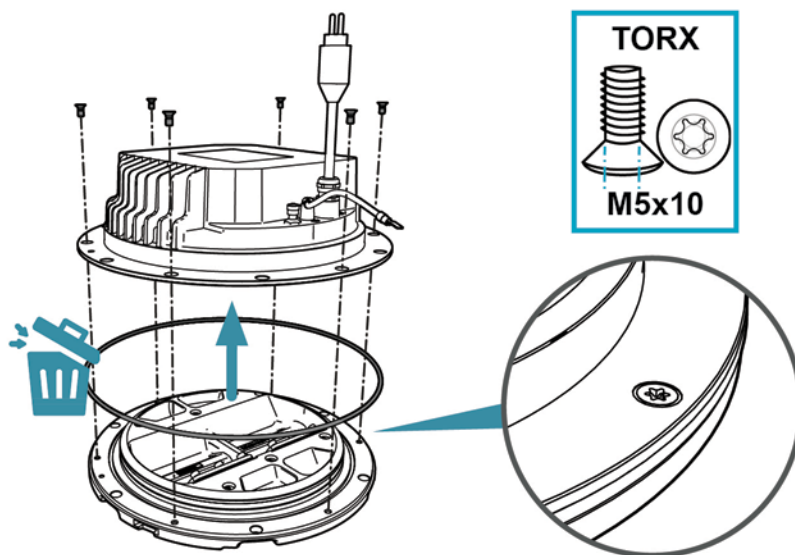
Remove used gaskets and clean the internal surfaces of the device.



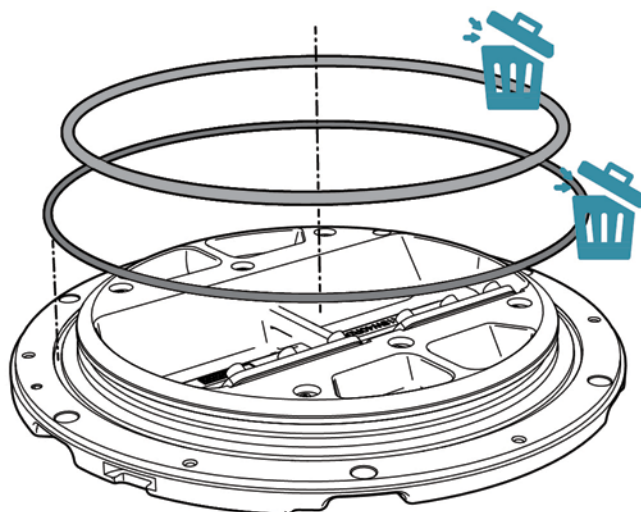
## 2



## 3



## 4





#### 4.5.2 Fixture opening



Every time that the fixture body is opened, all the seals must be replaced: use only original spare parts by OCEM Airfield Technology.

Whenever the FLASH LED fixture is opened, it must be ensured that:

- the optical unit is undamaged and clean;
- there are no infiltration;
- the supply cables and the connectors are undamaged and do not have breakdowns or abrasions.

Position the new gaskets. Close the fixture and alternately tighten the screws until the foreseen tightening torque is reached.

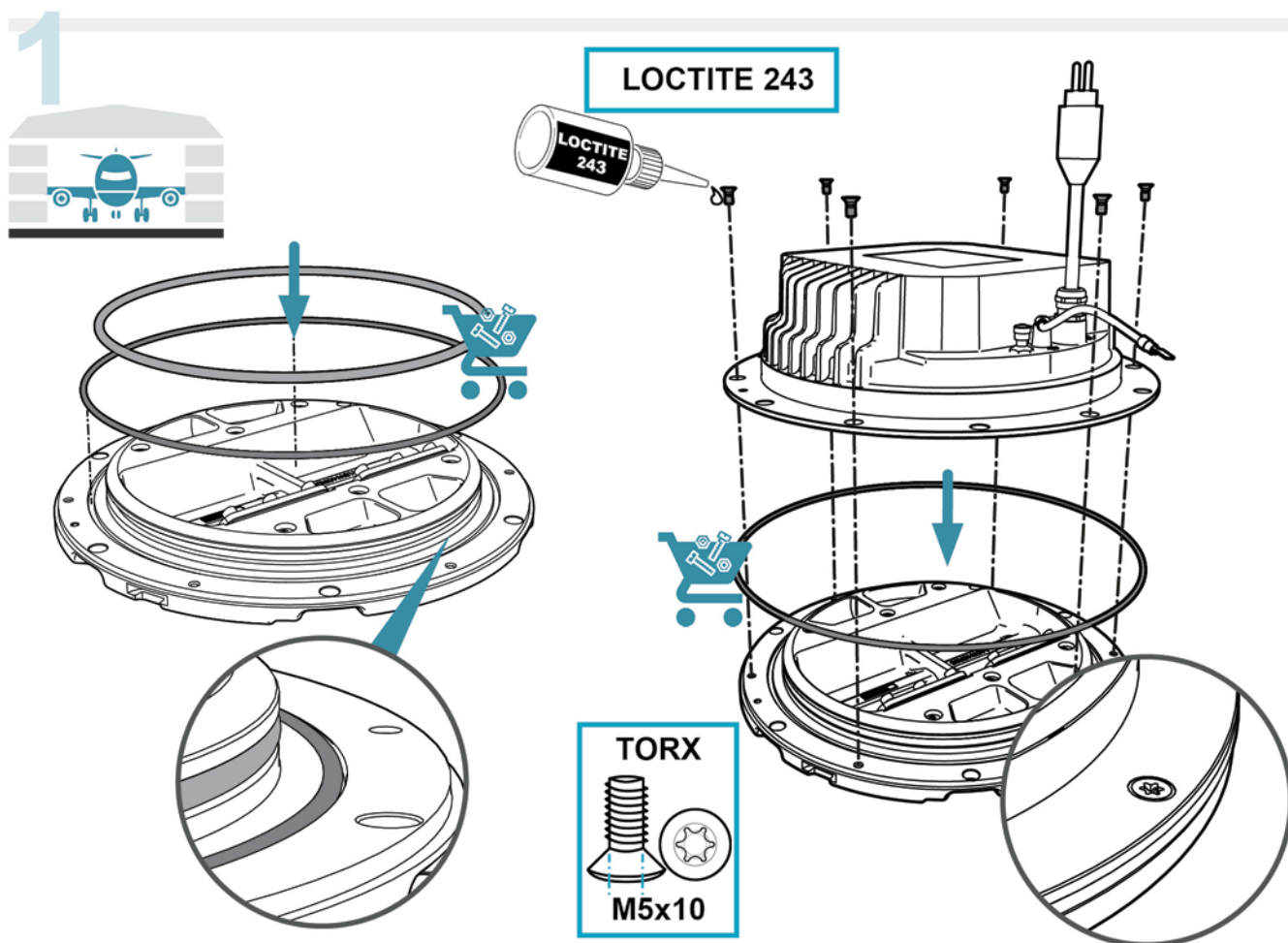
Unscrew the plug and restore the internal pressure level. Re-tighten the plug.



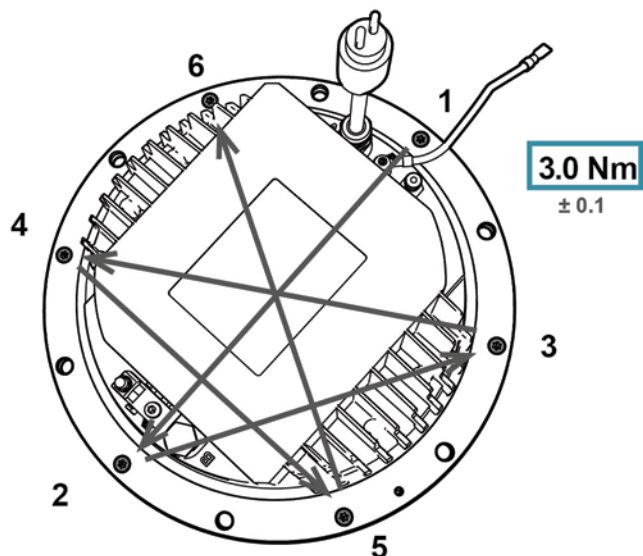
Before installing the fixture in the field, carry out a leak test.

If a leak is detected during the leak test, action must be taken to solve the problem.

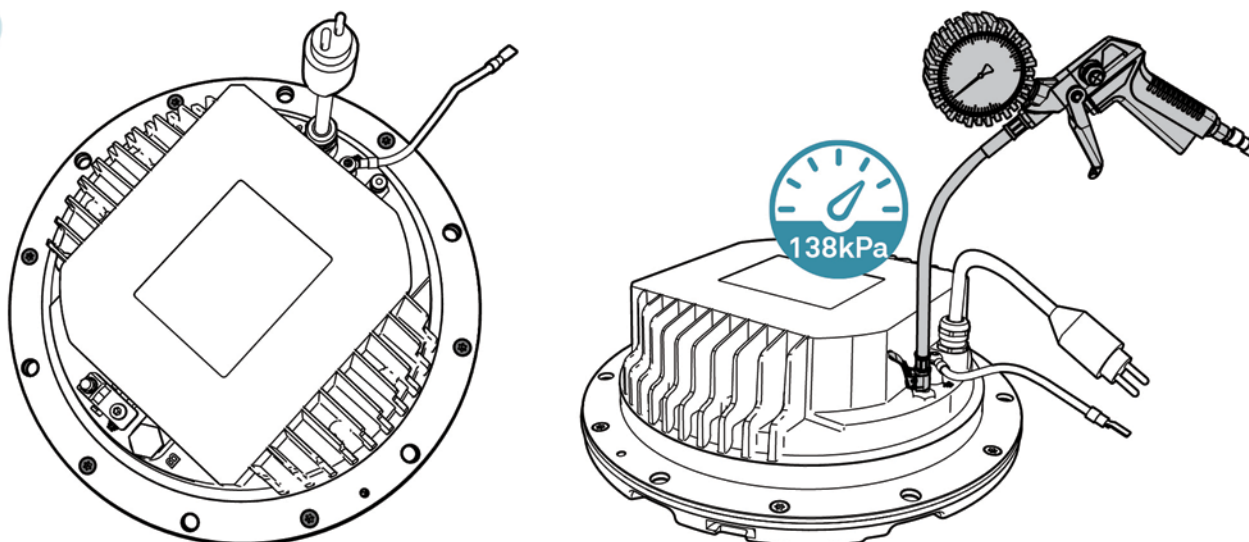
If the leakage is in correspondence of the profile, replace the gasket. If the leakage is in correspondence of the test valve, replace the valve assembly. If the leakage is in correspondence of the supply, replace the supply cable assembly.



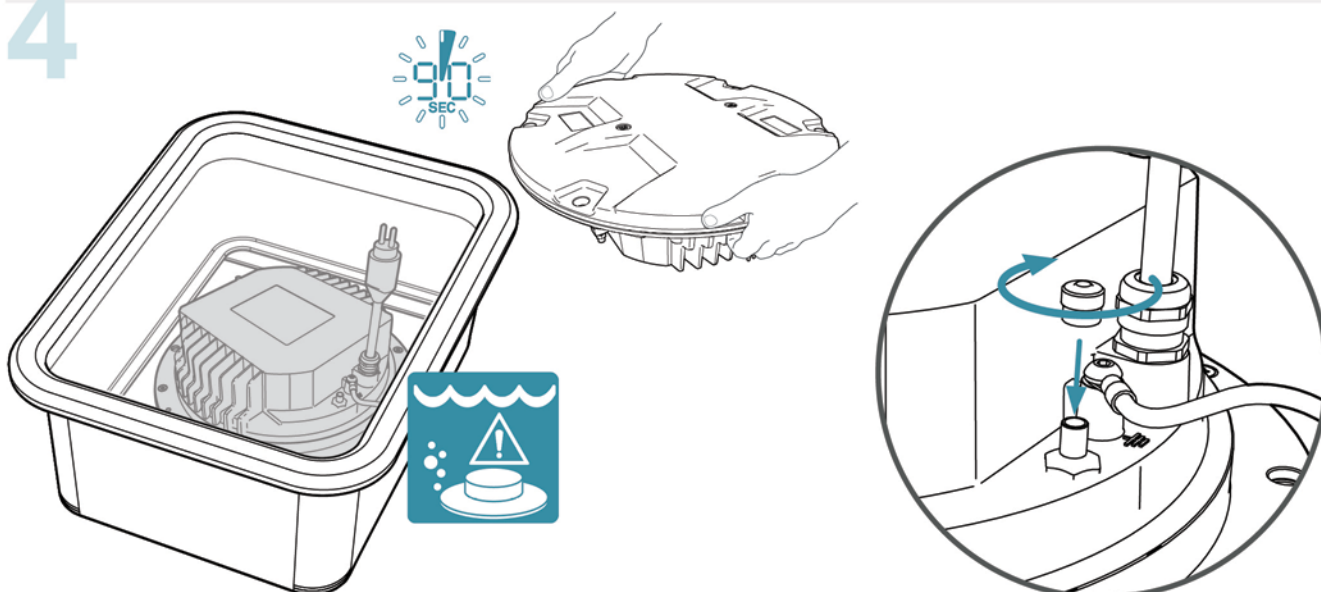
## 2



## 3



## 4



#### 4.5.3 External prism cleaning



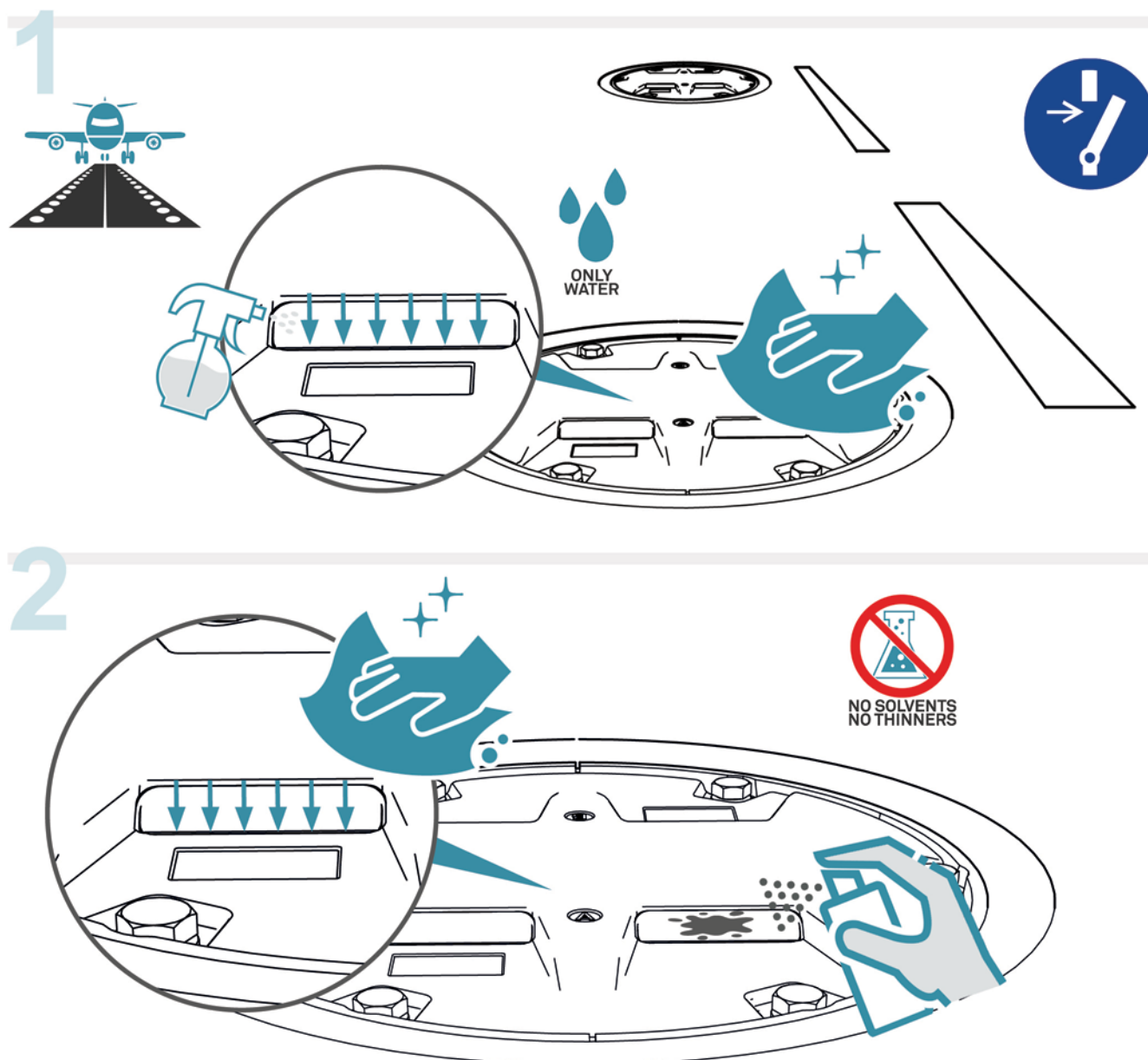
Before carrying out any intervention on the fixture, cut off all external power sources and place appropriate work-in-progress warnings on the systems. Wait for the discharging time (at least 5 minutes) and check using appropriate instruments that there are no residual energies before accessing the electrical equipment.

Clean the external surface of the prism with neutral and non-abrasive products using clean clothes.

The external cleaning operation of the glass take place directly on the runway and do not require the removal or the opening of the fixture. In normal conditions of use it is not necessary to clean the protective glass or the lens internally.



Do not use solvent or diluent products to avoid damaging the glass elements. In case the prism is damaged, replace it. If the prism shows signs of damage or breakdowns, proceed with replacement.



## 4.5.4 Maintenance of the prism

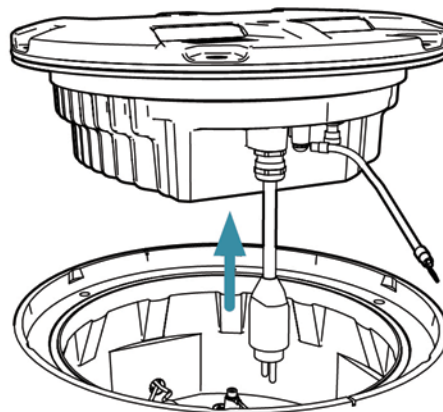
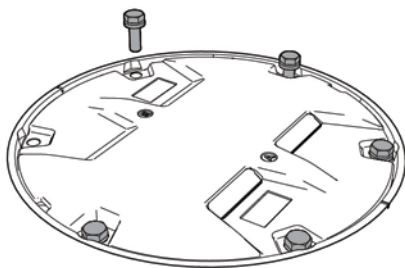


Before carrying out any intervention on the fixture, cut off all external power sources and place appropriate work-in-progress warnings on the systems. Wait for the discharging time (at least 5 minutes) and check using appropriate instruments that there are no residual energies before accessing the electrical equipment.

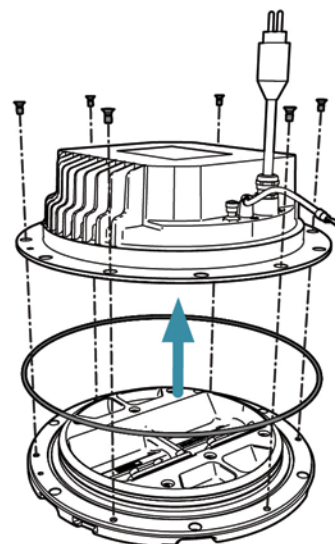
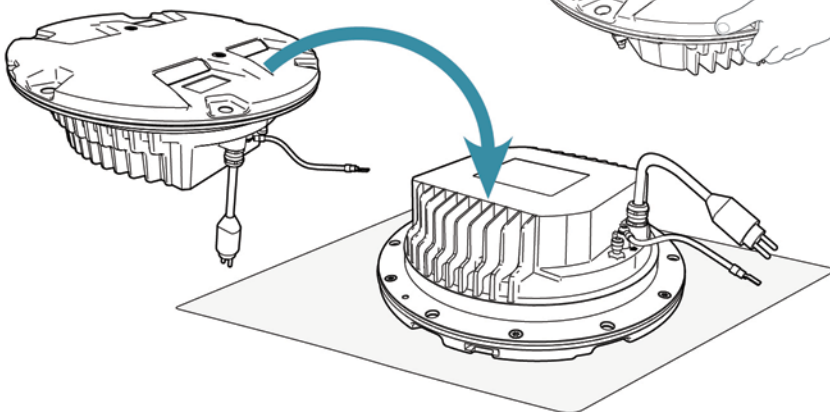
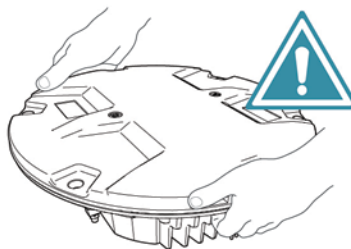
If the glass shows signs of damage or breakdowns, proceed with replacement.

Remove the fixture from the base (see the related paragraph in the chapter “INSTALLATION”) and bring it to the workshop to complete maintenance. Open the fixture (see the related paragraph in the chapter “ADJUSTMENTS AND MAINTENANCE”).

1



2





## 4.5.4.1 Internal prism cleaning



Every time that the fixture body is opened, all the seals must be replaced: use only original spare parts by OCEM Airfield Technology.

Whenever the FLASH LED fixture is opened, it must be ensured that:

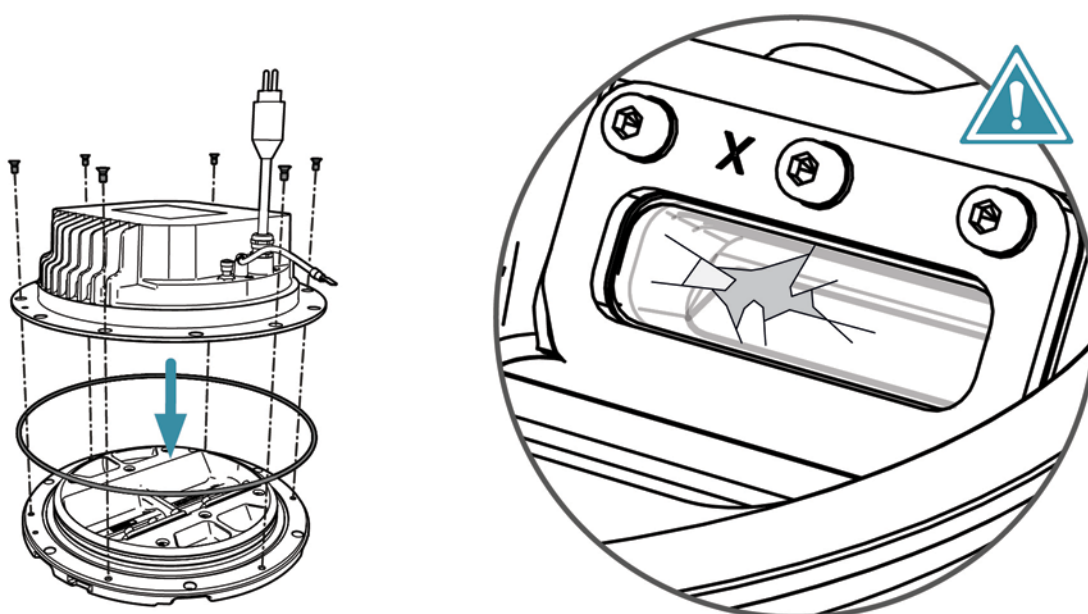
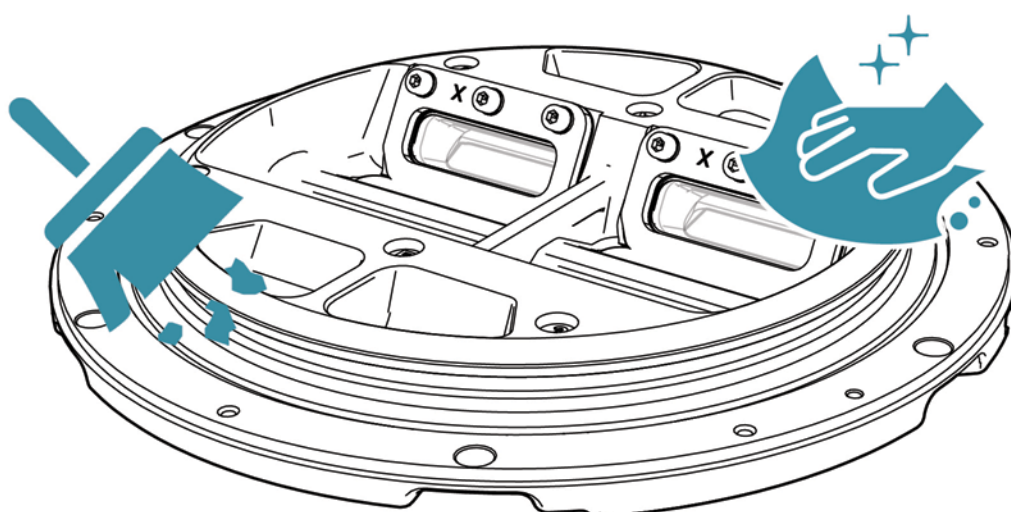
- the optical unit is undamaged and clean;
- there are no infiltration;
- the supply cables and the connectors are undamaged and do not have breakdowns or abrasions.

Clean the internal surface of the fixture.



Do not use solvent or diluent products to avoid damaging the glass elements.  
In case the prism is damaged, replace it.  
If the prism shows signs of damage or breakdowns, proceed with replacement.

3



## 4.5.4.2 Replacement of the prism



If necessary, replace the prism.  
Check that the replacement prism kit correspond to the desired code of use.

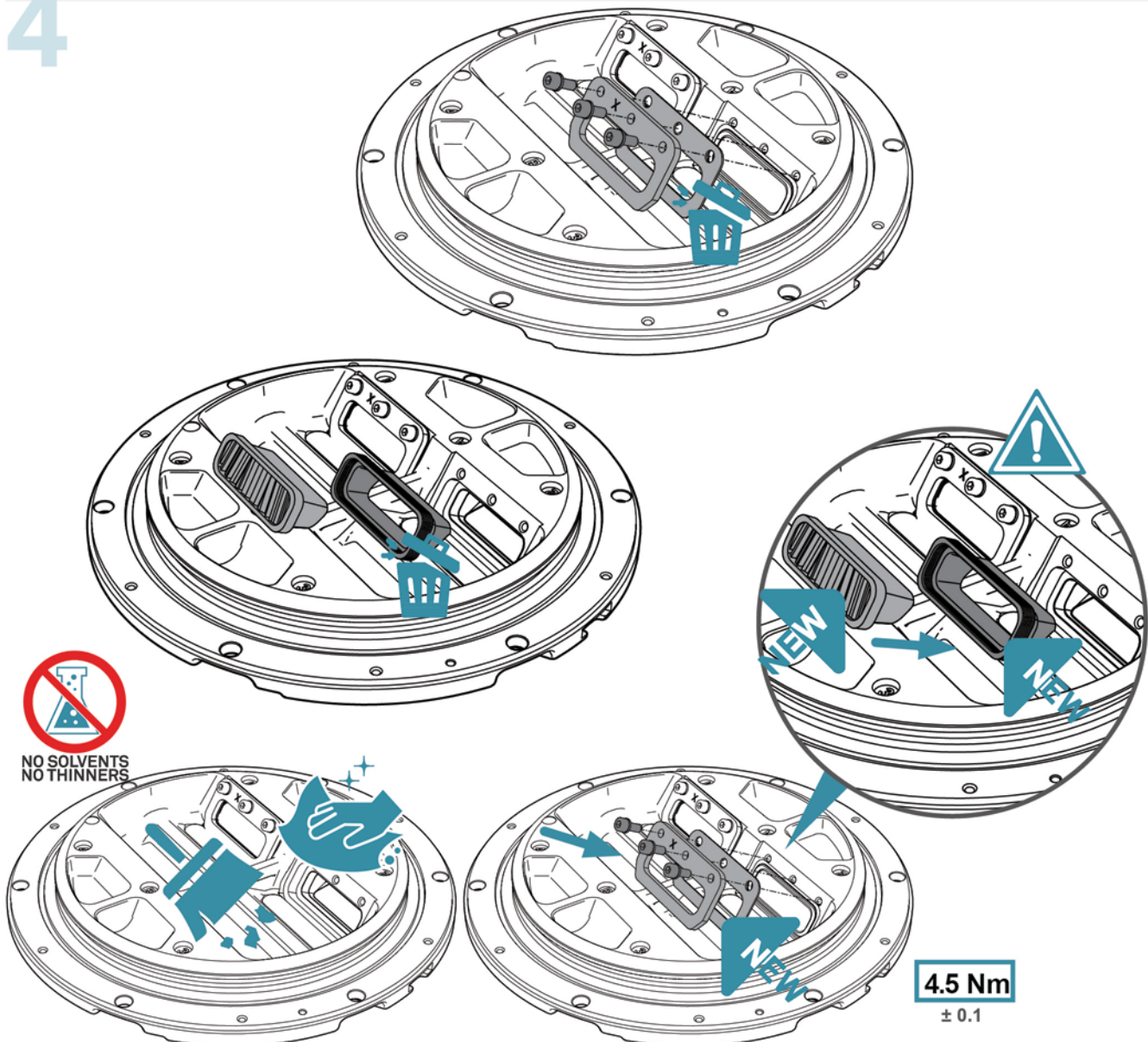
Unscrew the screw and remove the frame. Carefully extract the damaged prism and remove the gasket.



Clean the seat of the prism scraping with caution the walls without damaging them.  
Do not use solvent or diluent products to avoid damaging the prism.  
Dry thoroughly the internal sides of the device.

Position the new prism, complete with gasket. Position the contrast element complete with gasket and alternately tighten the screws until the foreseen tightening torque is reached.

# 4





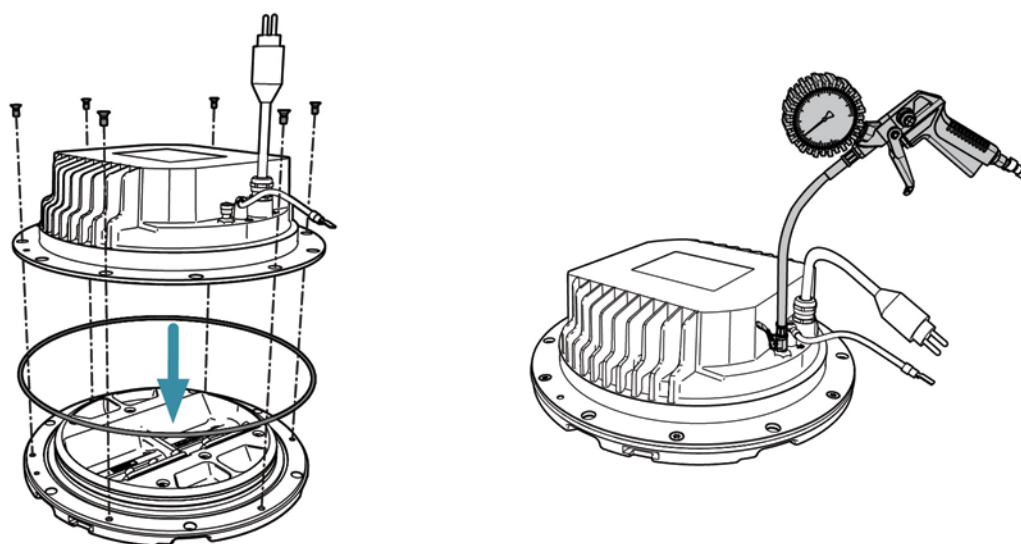
#### 4.5.4.3 Reassembling

Reassemble the unit (see the related paragraph in the chapter “ADJUSTMENTS AND MAINTENANCE”).



**Before installing the fixture in the field, carry out a leak test.  
If a leak is detected during the leak test, action must be taken to solve the problem.**

# 5



# 6



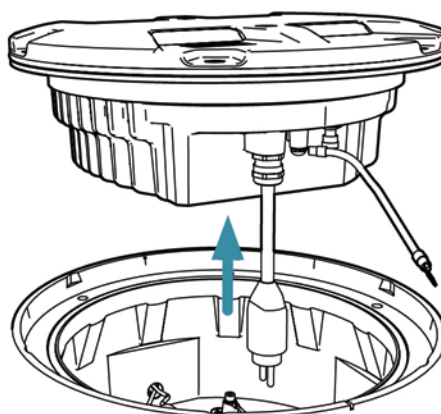
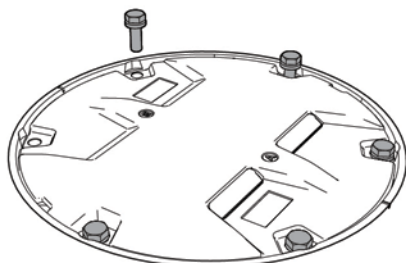
## 4.5.5 Replacement of the power cable



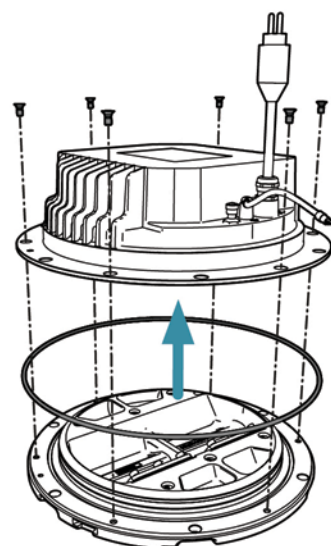
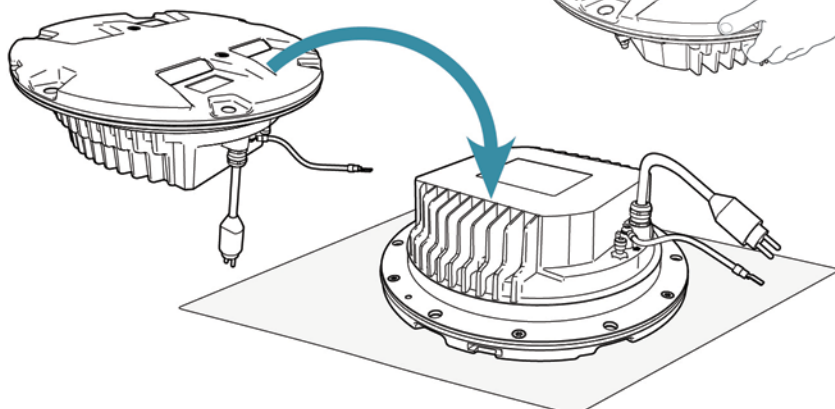
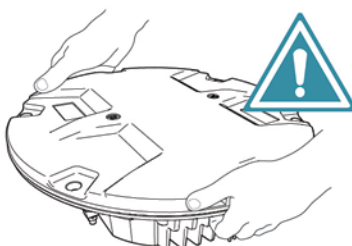
Before carrying out any intervention on the fixture, cut off all external power sources and place appropriate work-in-progress warnings on the systems. Wait for the discharging time (at least 5 minutes) and check using appropriate instruments that there are no residual energies before accessing the electrical equipment.

Remove the fixture from the base (see the related paragraph in the chapter “INSTALLATION”) and bring it to the workshop to complete maintenance. Open the fixture (see the related paragraph in the chapter “ADJUSTMENTS AND MAINTENANCE”).

1



2





The assembly of the power supply cable must be performed only by professional staff, in compliance with all the safety requirements of the laws and regulations in force in the country of use.

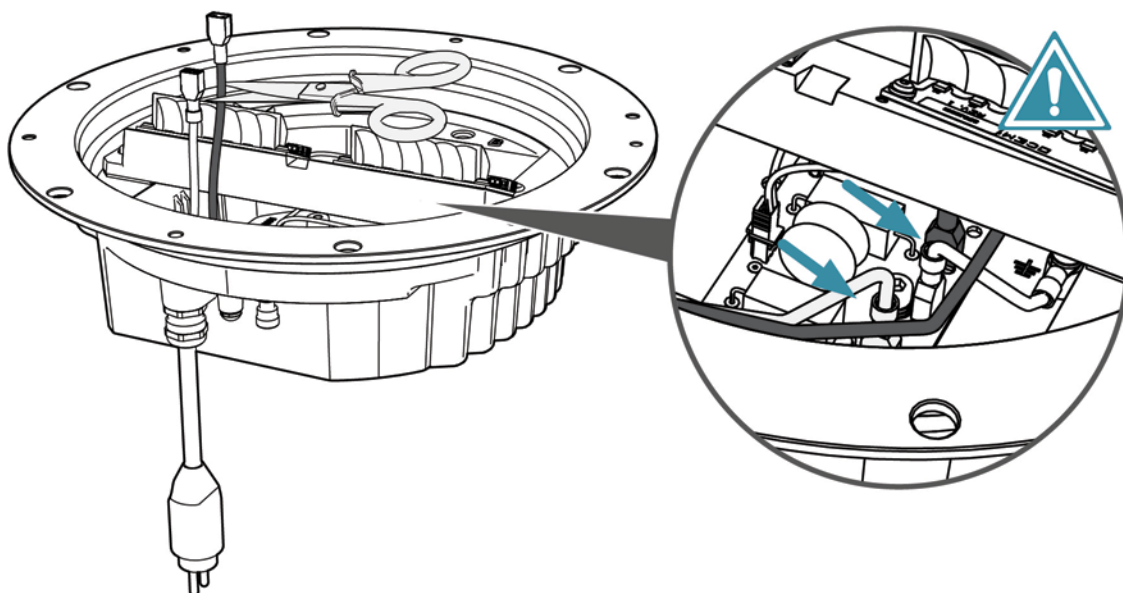
Carry out operations on the bench, with all elements detached from energy sources. Never operate on potentially active components.

Disconnect the connectors from the board and cut the cables. Unscrew the cable clip nut of the bulkhead coupling and remove it from the fixture.

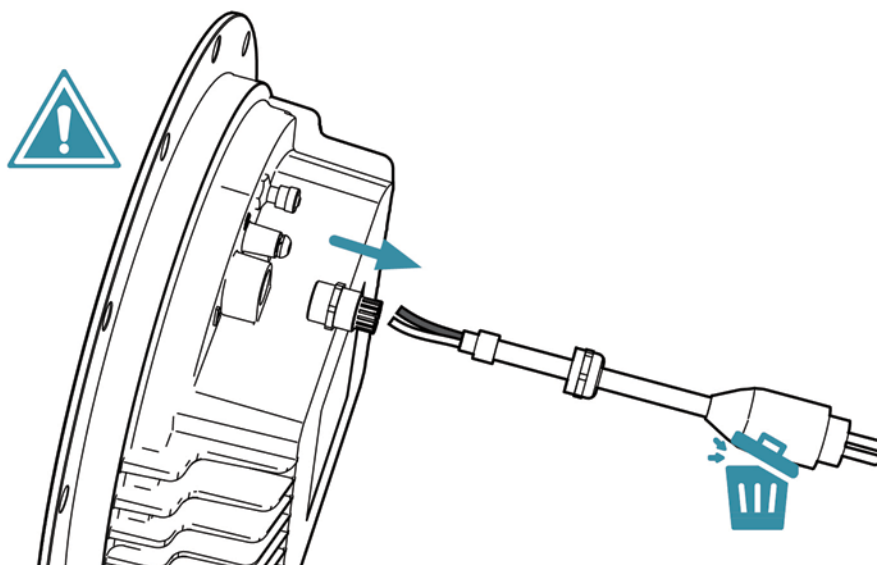


Take care not to damage electronic components and internal wiring.

# 3



# 4



Cut the cable to the desired length: the cable length shall be sufficient to allow the connection of the device on the type of support envisaged in the installation project.

If the power supply cable replacement kit is composed by attested unipolar cables to a Style 6 plug and ground cable, insert the cables in the cable gland gasket. Lubricate the cables with alcohol.

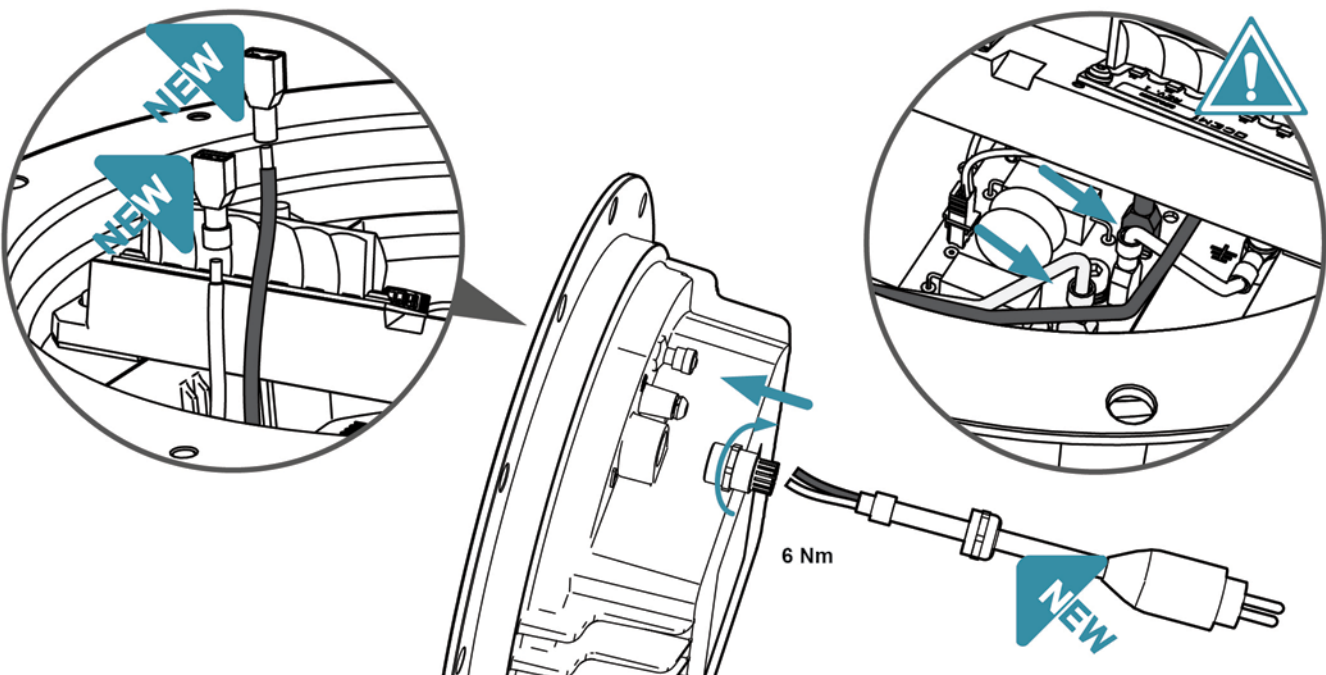
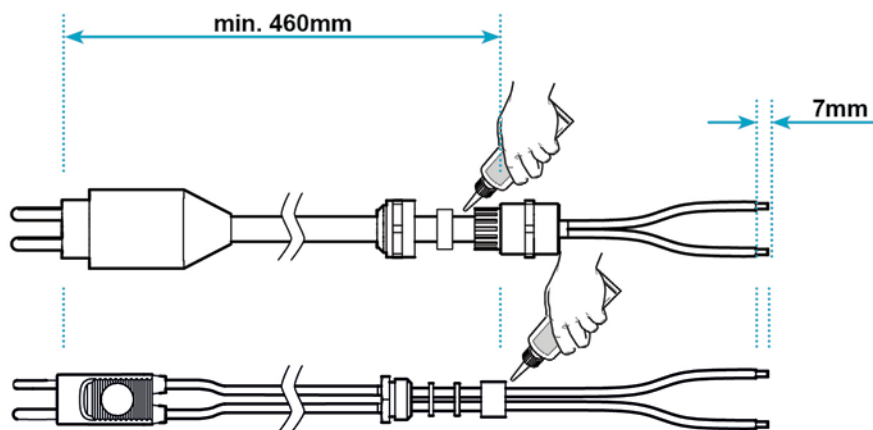
Insert the cables into the fixture and screw the cable clip nut lightly: perform a single turn to secure the cables in position. Crimp the terminals to the cables and restore the connections to the electronic board.

If the power supply cable replacement kit is composed by an attested bipolar cable to a Style 1 plug and ground cable, insert the cables in the cable gland gasket. Screw the bulkhead body to the fixture, tightening to the specified torque.

Tighten the cable clip nut slightly: make one turn to secure the cable in position. Crimp the terminals to the cables and restore the connections to the electronic board.

Tighten the cable clip nut with the specified tightening torque.

# 5

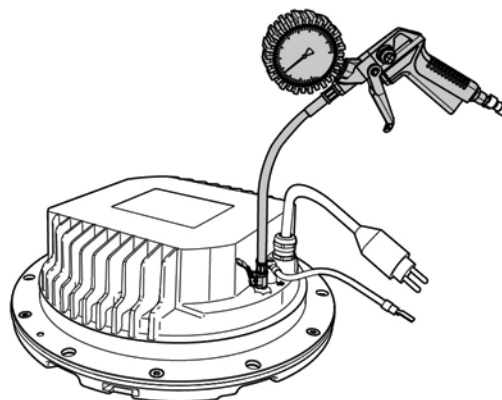
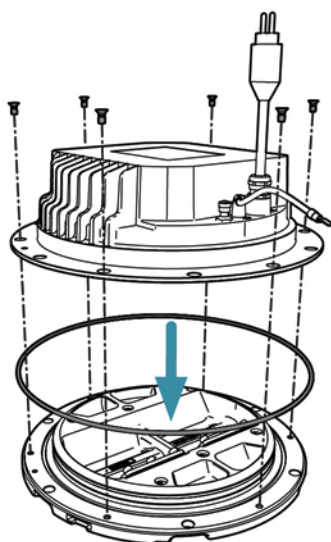


Reassemble the unit (see the related paragraph in the chapter “ADJUSTMENTS AND MAINTENANCE”).



**Before installing the fixture in the field, carry out a leak test.  
If a leak is detected during the leak test, action must be taken to solve the problem.**

6



7





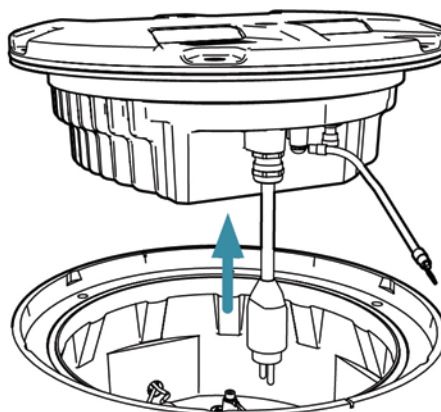
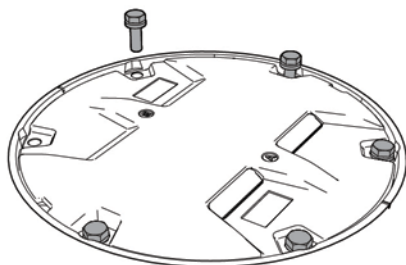
## 4.5.6 Replacement of the LED module



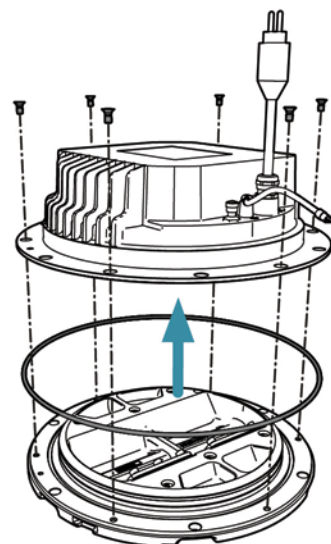
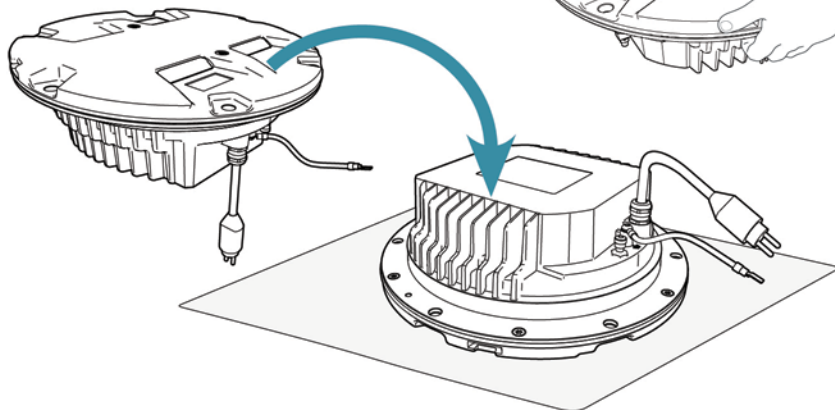
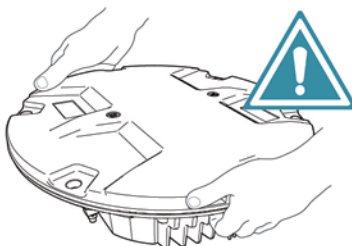
Before carrying out any intervention on the fixture, cut off all external power sources and place appropriate work-in-progress warnings on the systems. Wait for the discharging time (at least 5 minutes) and check using appropriate instruments that there are no residual energies before accessing the electrical equipment.

Remove the fixture from the base (see the related paragraph in the chapter “INSTALLATION”) and bring it to the workshop to complete maintenance. Open the fixture (see the related paragraph in the chapter “ADJUSTMENTS AND MAINTENANCE”).

1



2





Remove the reflector. Disconnect the connector and remove the LED module to be replaced and the thermal pad. Check that the reflector is not damaged.



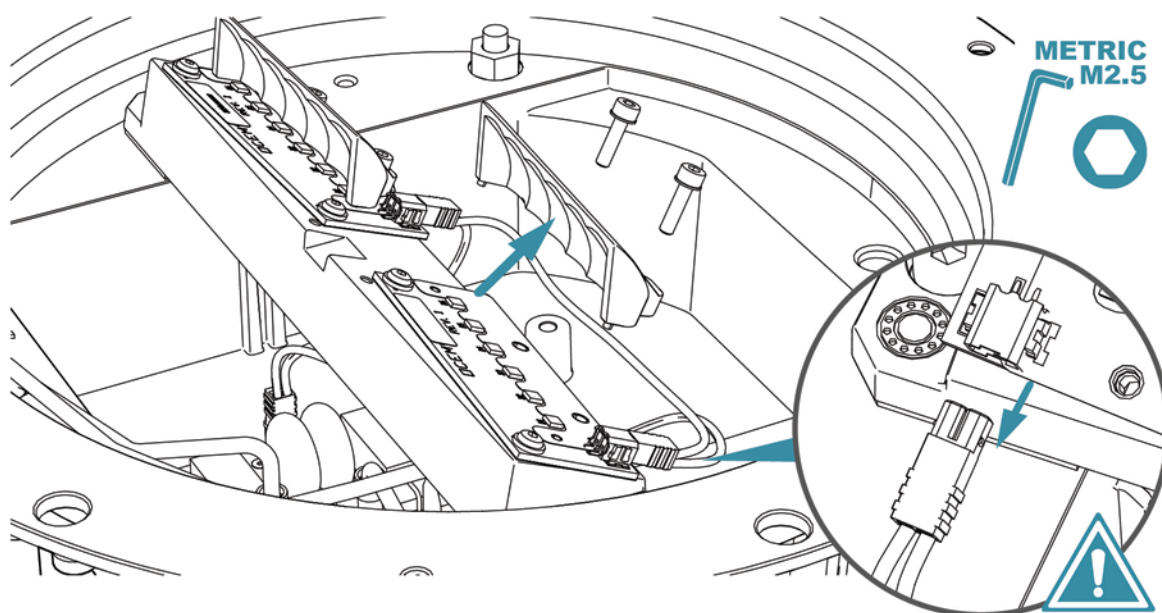
If necessary, replace the reflector with spare parts matching the original configuration.

Clean the installation site of the LED module.

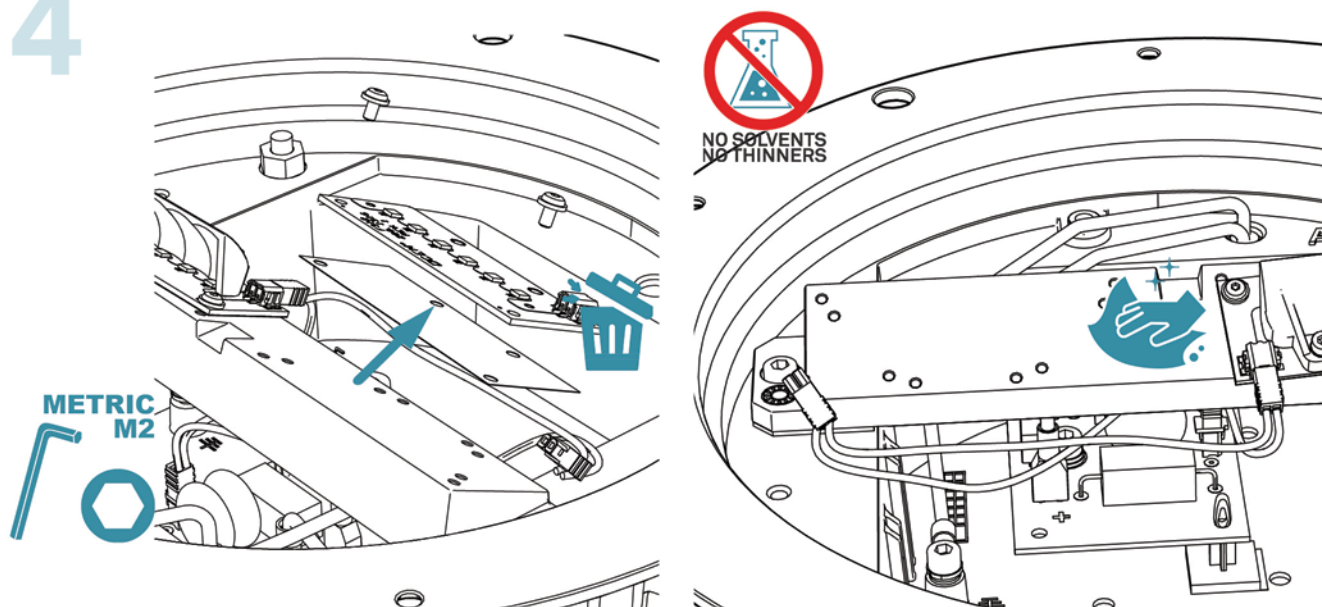


Do not use solvent or diluent products to avoid damaging the materials. Dry thoroughly the internal sides of the device.

3



4





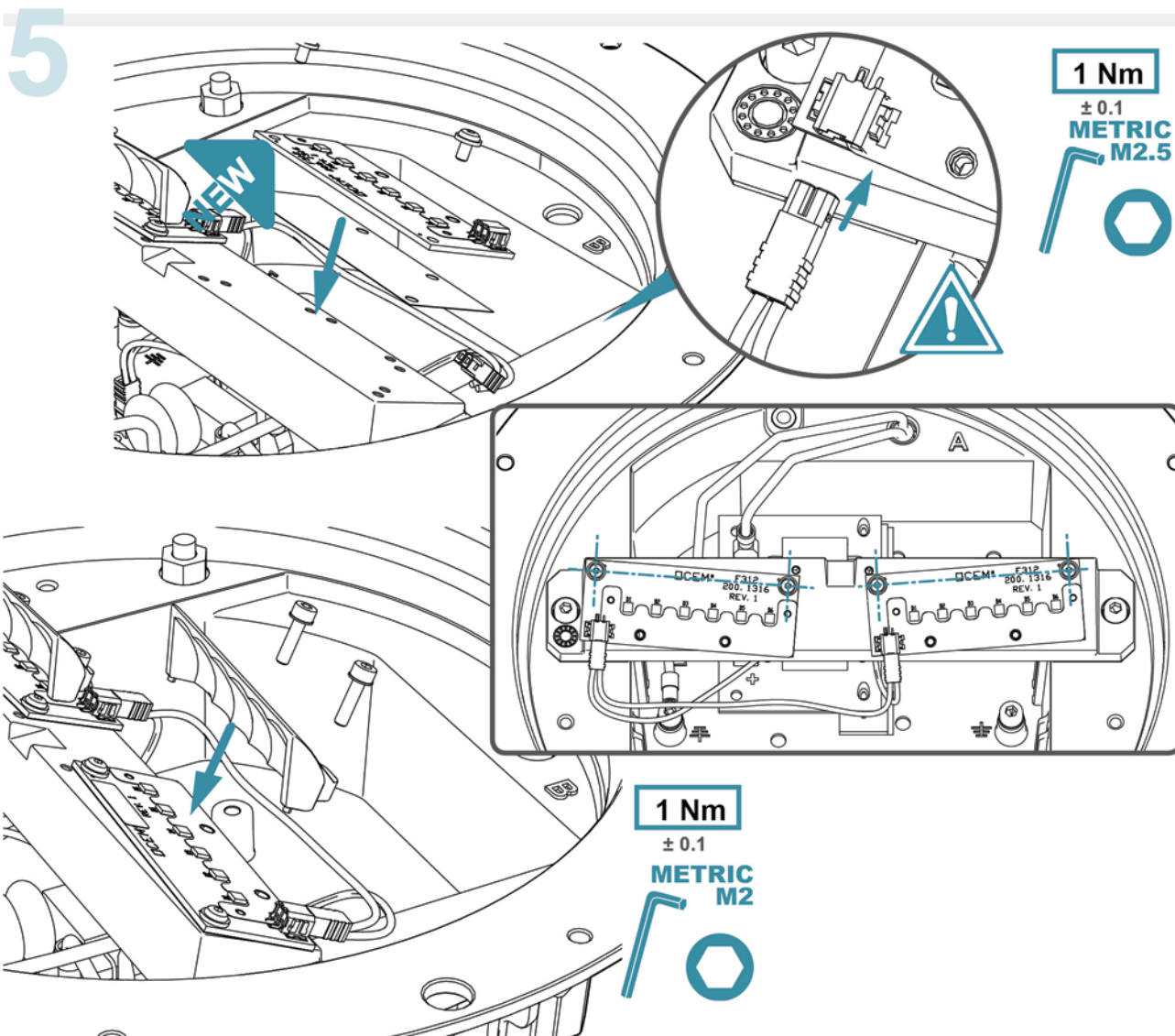
Check that the replacement LED module match the desired configuration.  
If necessary, replace the lens with spare parts matching the original configuration.  
Respect the mounting direction, using the correct predisposed hole.

Position the LED module, complete with thermal pad, centring it on the predisposed holes. Connect the connector.



Tighten the screws with the indicated torque values.

Position the reflector.

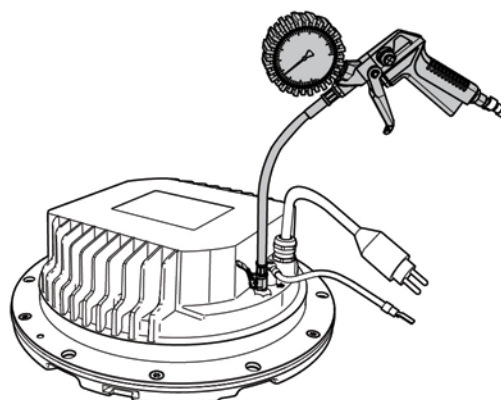
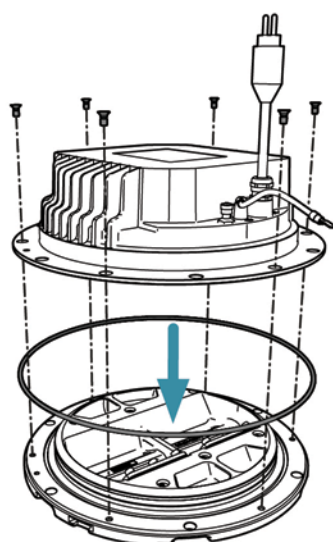


Reassemble the unit (see the related paragraph in the chapter “ADJUSTMENTS AND MAINTENANCE”).



**Before installing the fixture in the field, carry out a leak test.  
If a leak is detected during the leak test, action must be taken to solve the problem.**

6



7



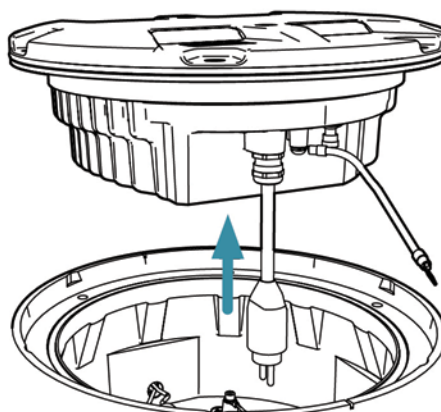
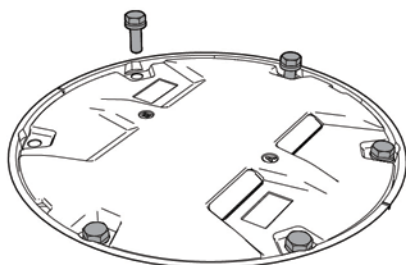
## 4.5.7 Replacement of the Driver Board



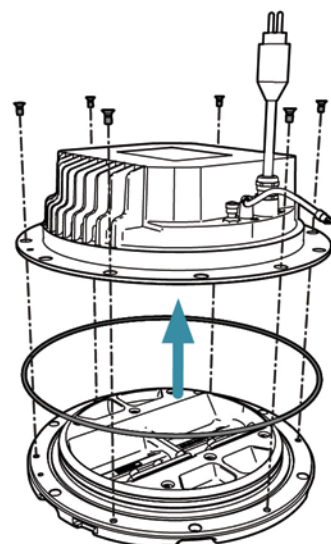
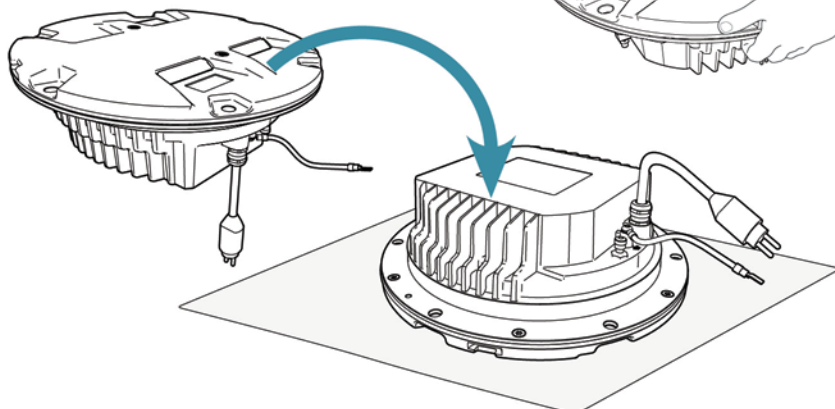
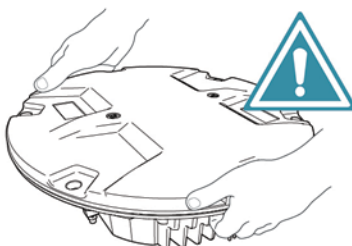
Before carrying out any intervention on the fixture, cut off all external power sources and place appropriate work-in-progress warnings on the systems. Wait for the discharging time (at least 5 minutes) and check using appropriate instruments that there are no residual energies before accessing the electrical equipment.

Remove the fixture from the base (see the related paragraph in the chapter “INSTALLATION”) and bring it to the workshop to complete maintenance. Open the fixture (see the related paragraph in the chapter “ADJUSTMENTS AND MAINTENANCE”).

1



2





Pay particular attention to the disconnection phase of the power cable of the LED module (1).



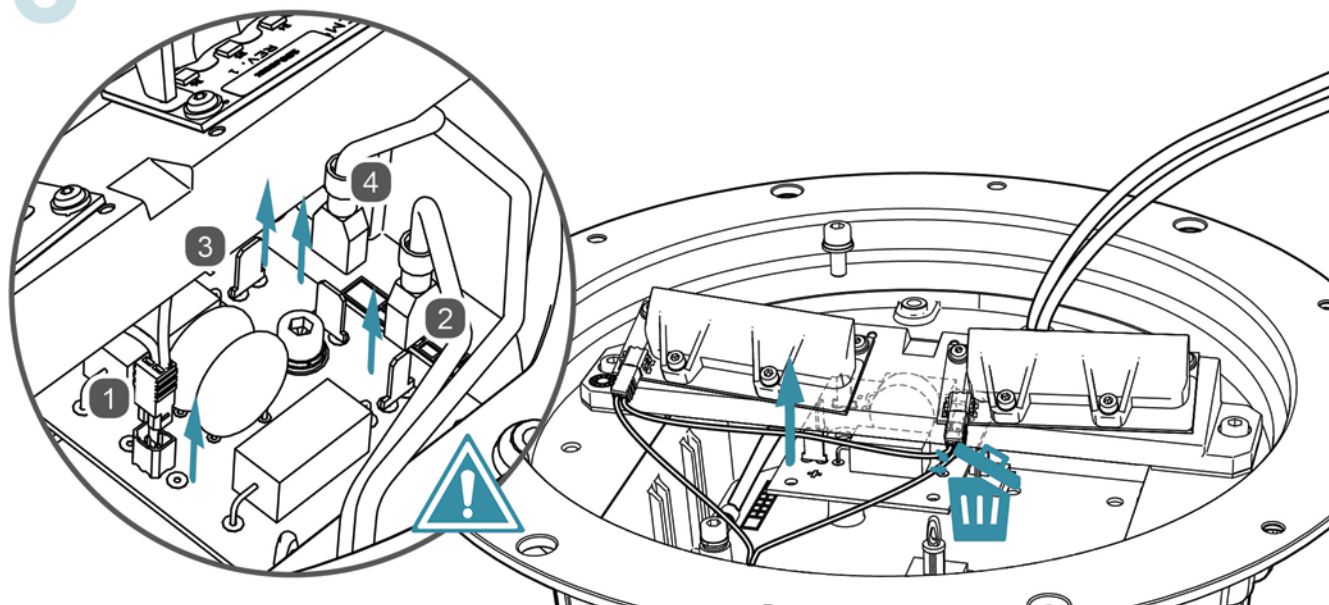
**In case of damage, replace the power cable of the LED module.  
Do not reconnect connectors or damaged cables.**

Disconnect the supply cables (2) and (3) from the electronic board. Disconnect the ground cable (4). Unscrew the screw and remove the Driver Board. Clean the installation site.

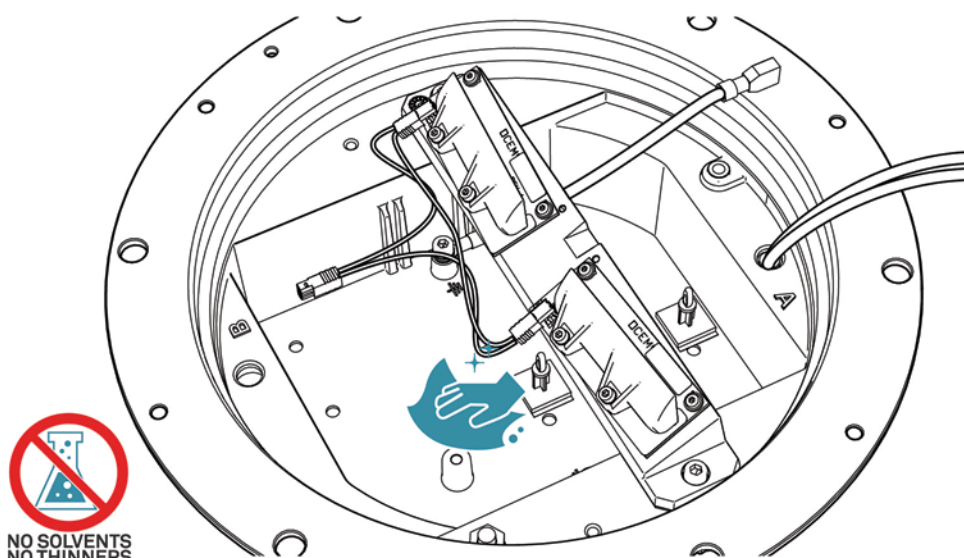


**Do not use solvent or diluent products to avoid damaging the materials.  
Dry thoroughly the internal sides of the device.**

3



4







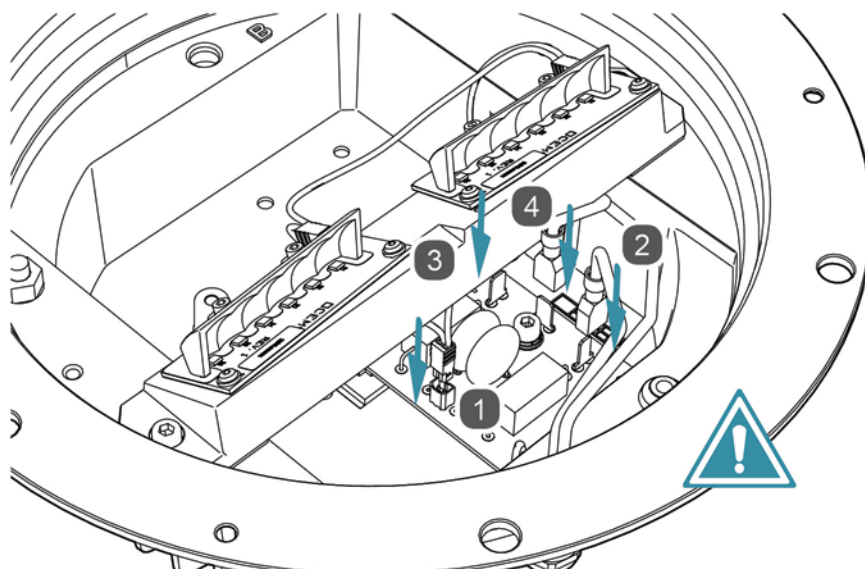
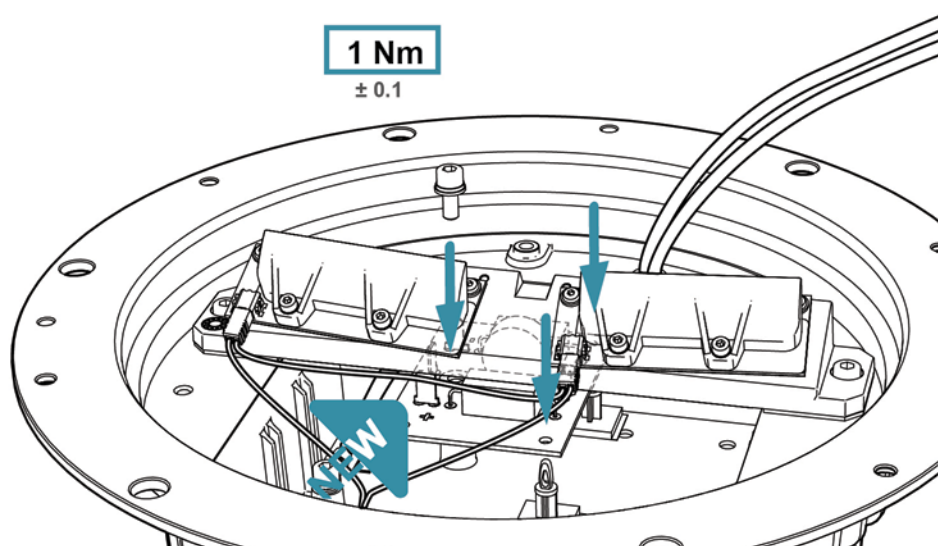
Check that the Driver Board spare part matches the component installed on the fixture.  
**ATTENTION:** Check the product codes before reconnecting the component.

Position the driver board spare part and tighten the screw to the indicated torque values.  
Connect the power cable of the LED module (1). Connect the ground cable (4) and the supply cables (2) and (3).



Respect the direction of the driver board during assembly phase. Please refer to the indications on the rear cover.

## 5



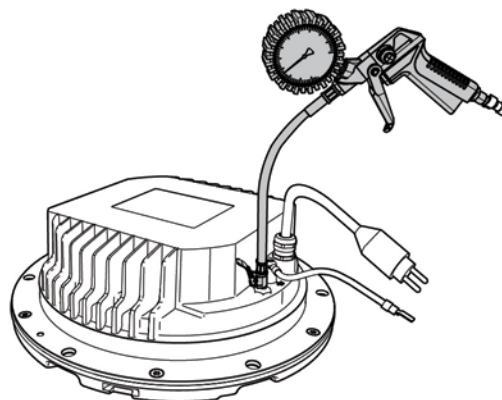
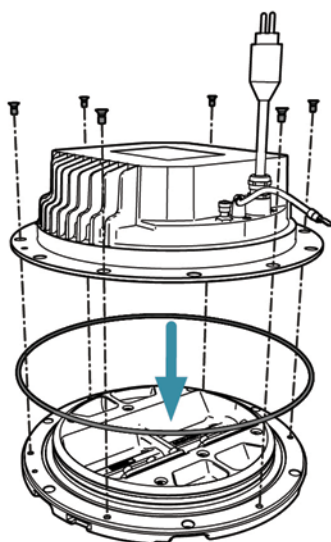
± 0.1

Reassemble the unit (see the related paragraph in the chapter “ADJUSTMENTS AND MAINTENANCE”).



**Before installing the fixture in the field, carry out a leak test.  
If a leak is detected during the leak test, action must be taken to solve the problem.**

6



7



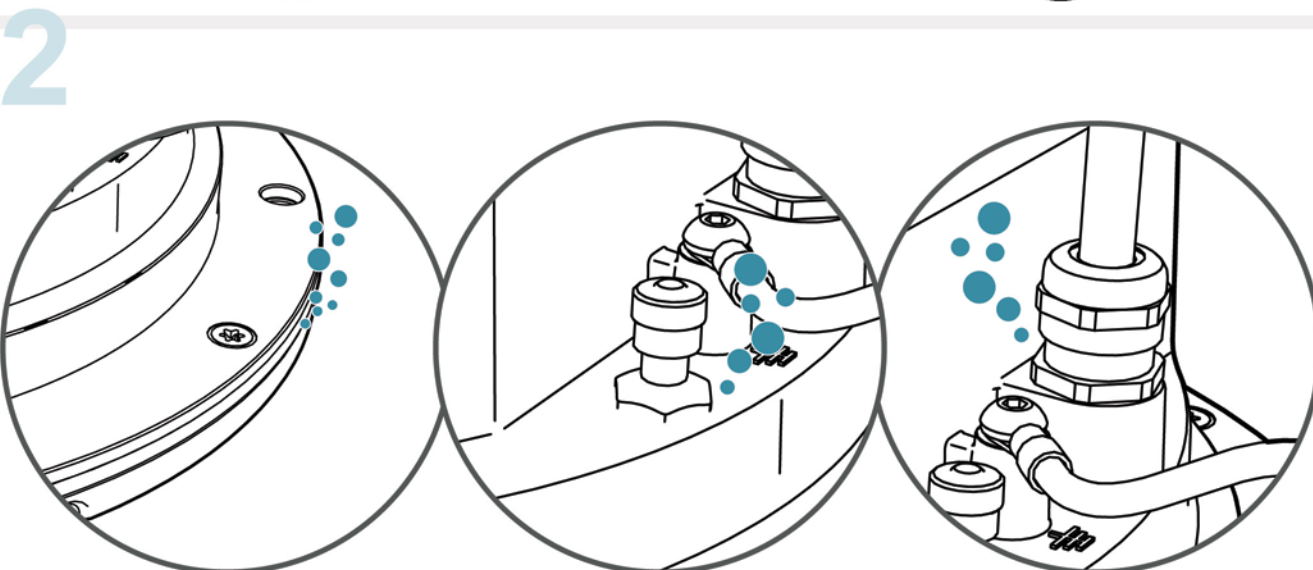
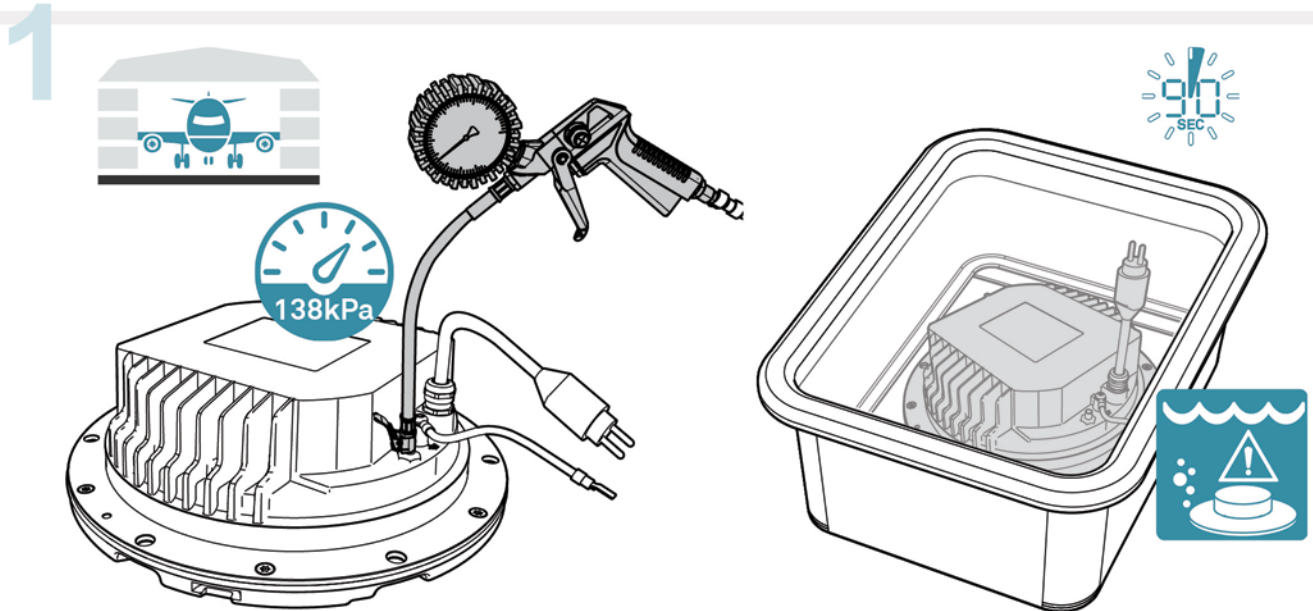
## 4.5.8 Leak test under pressure



Before carrying out any intervention on the fixture, cut off all external power sources and place appropriate work-in-progress warnings on the systems. Wait for the discharging time (at least 5 minutes) and check using appropriate instruments that there are no residual energies before accessing the electrical equipment.

If a leak is detected during a leak test under pressure, action must be taken to solve the problem. Depending on the type of leakage, several solutions are possible, as illustrated in the following paragraphs. Leakage may occur:

- in correspondence of the profile of the device;
- in correspondence of the test valve;
- in correspondence of the input cable gland of the power supply of the fixture.

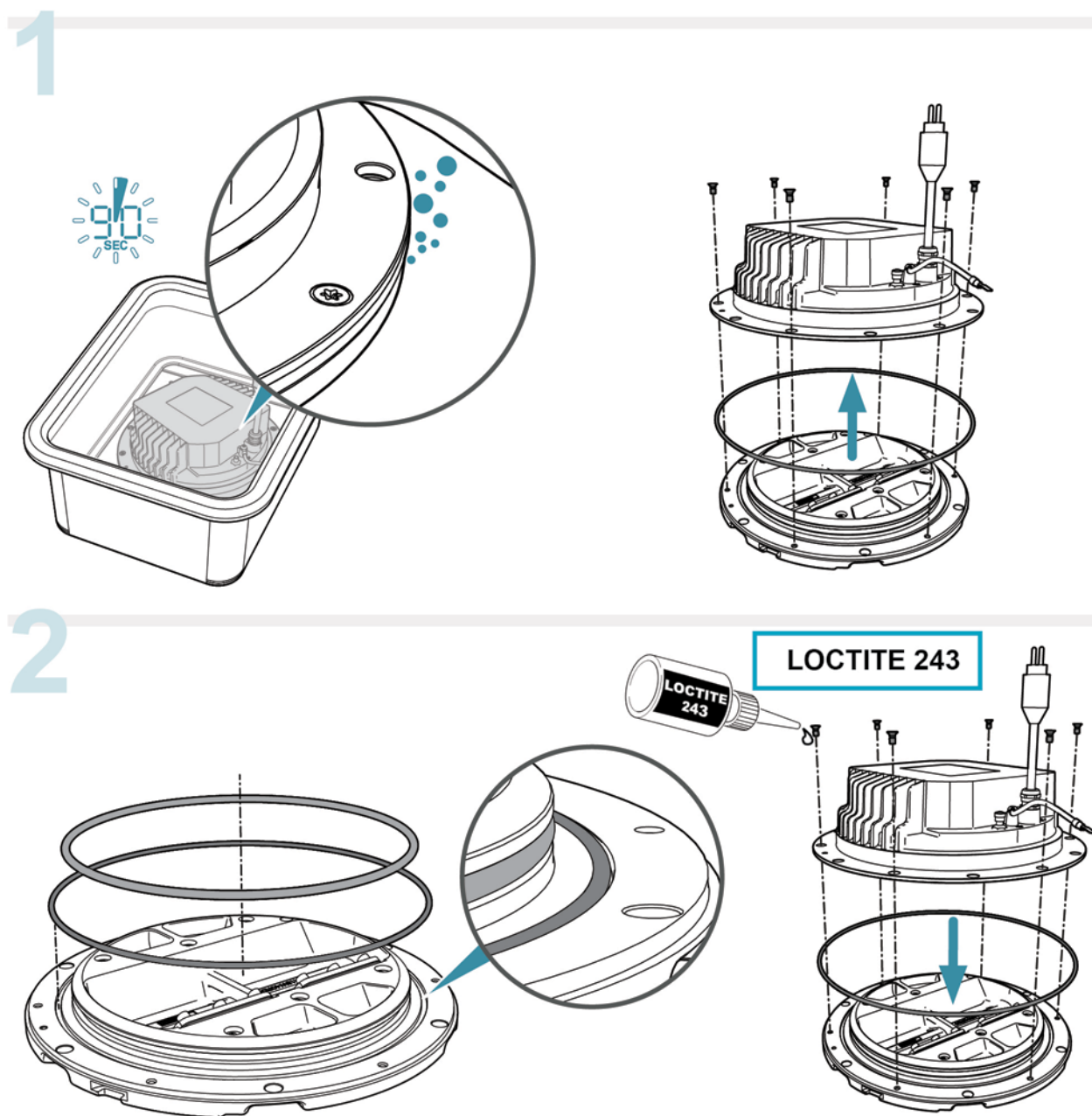


#### 4.5.8.1 Checking and replacing internal gasket

If the leakage occurs in correspondence of the profile of the device, open the fixture (see the relevant paragraph in the chapter “ADJUSTMENTS AND MAINTENANCE”) and check that the gasket is correctly positioned and that it does not have breakdowns or deteriorations and, if necessary, replace it.

Reassemble the unit (see the related paragraph in the chapter “ADJUSTMENTS AND MAINTENANCE”).

At the end of the operations on the gasket, repeat the leak test under pressure and check that you have solved the problem.





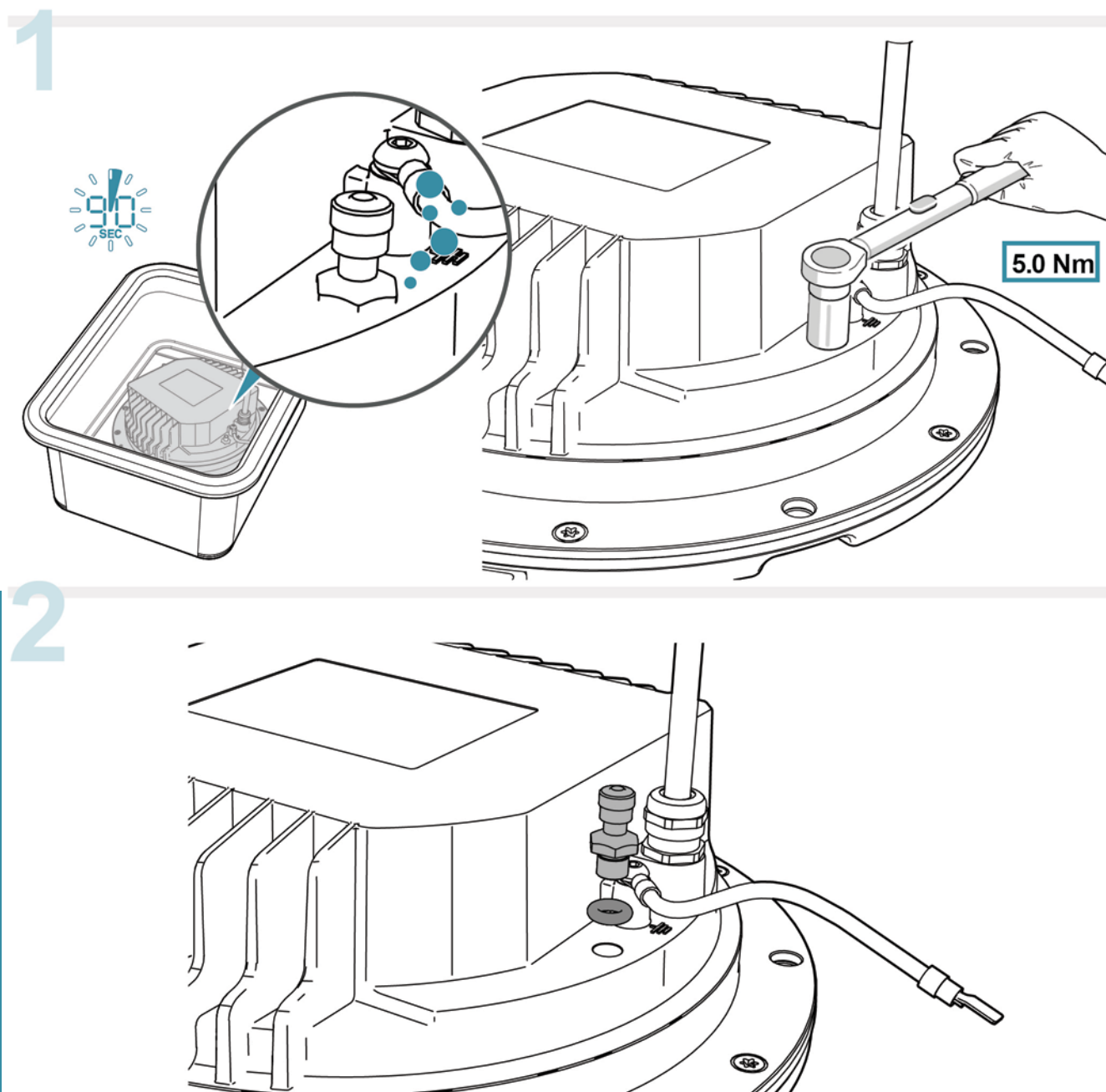
## 4.5.8.2 Checking and replacing test valve

If leakage occurs in correspondence of the test valve, check that it is properly tightened and replace it if necessary.



**Tighten the parts with the indicated torque values.**

At the end of the operations on the test valve, repeat the leak test under pressure and check that you have solved the problem.





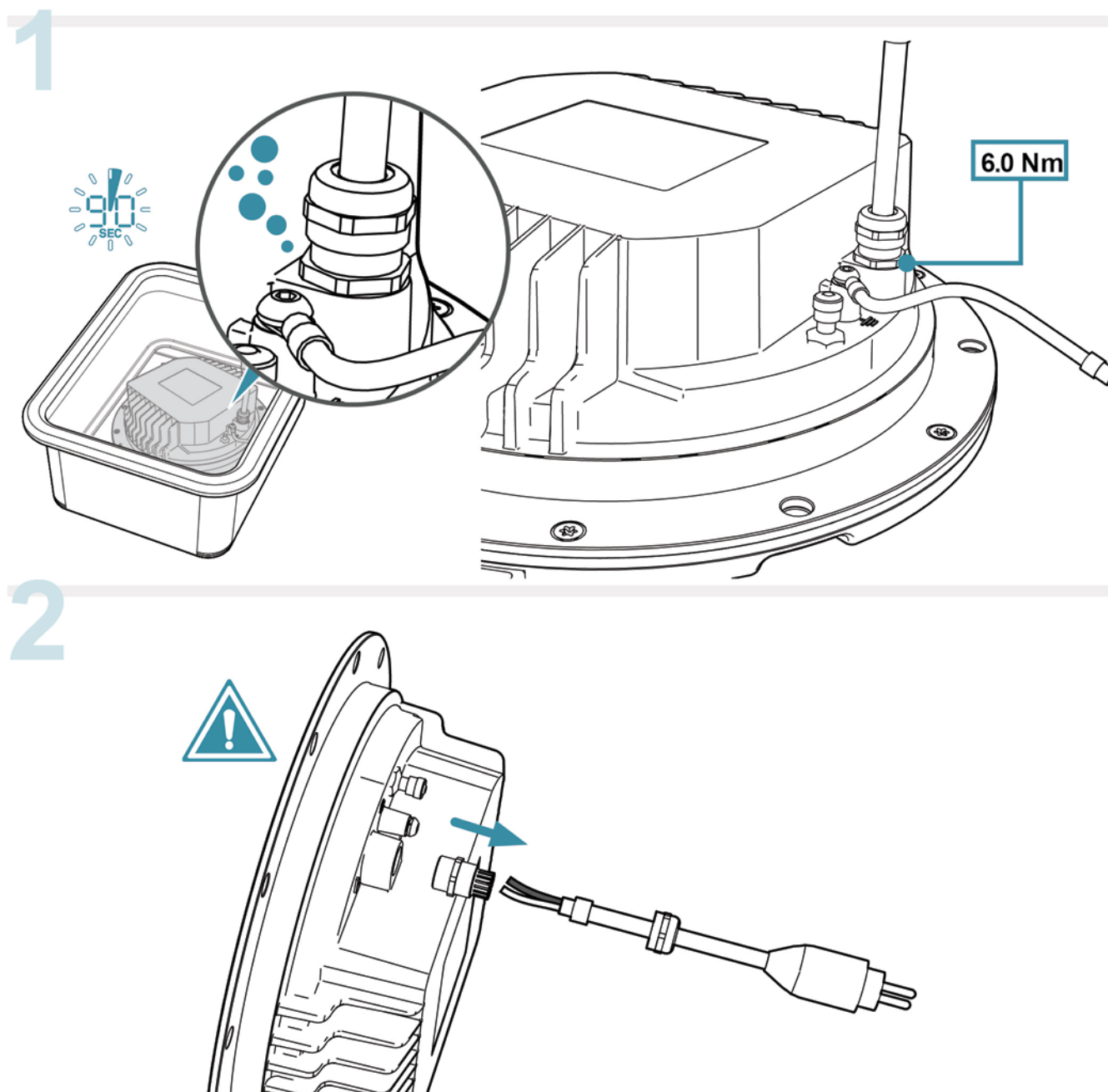
#### 4.5.8.3 Checking and replacing supply cable

If leakage occurs in correspondence of the input cable gland of the power supply of the fixture, check that it is properly tightened and, if necessary, replace the power cable (complete with cable gland and gasket).



**Tighten the parts with the indicated torque values.**

At the end of the operations on the test valve, repeat the leak test under pressure and check that you have solved the problem.



## 4.6 Troubleshooting

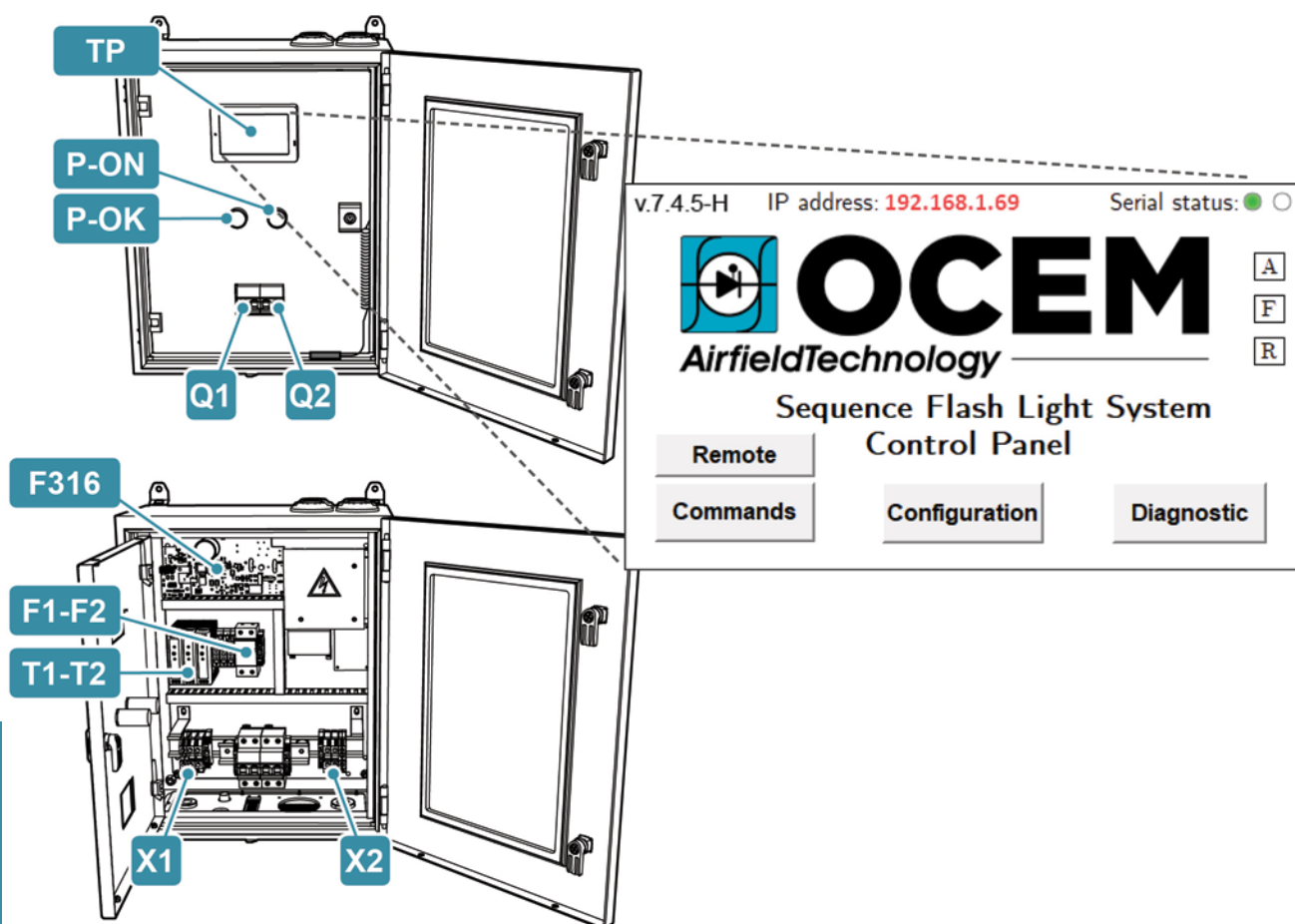
### 4.6.1 Control unit (FMCU)



Carefully read the manual, and in particular safety information, before proceeding with the resolution of common faults.



Before proceeding to delete the message, identify the cause of the fault and eliminate the problem.  
The unit preserves the memory of messages detected during operation even in the event of the supply voltage.



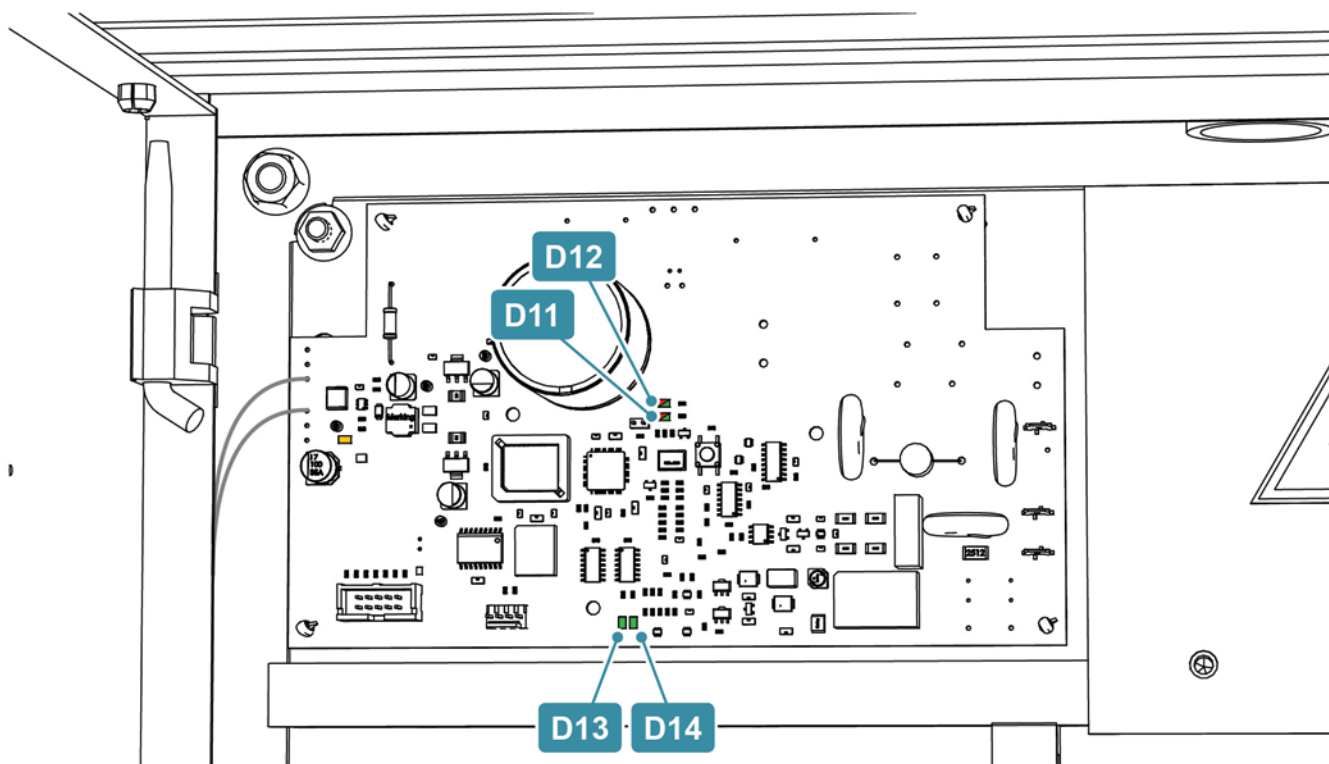
If the automatic switch (Q2) is opened, a number of alarms relating to the FFU field units may appear on the diagnostics page.  
Normally, these alarms are cleared as soon as the fixture supply line is reactivated by closing the automatic switch (Q2) again.



Before interacting with the system via the touch-pad, take care to wear the wrist strap against electric discharges (W) available inside the panel.



During the troubleshooting phase, it may be necessary to check the status of the diagnostic LEDs on the F316 board.



| LED | DESCRIPTION                              |
|-----|------------------------------------------|
|     | Memory chip                              |
| D11 | Off = operational                        |
| D12 | Yellow/Red = EEPROM in error             |
|     | Communication FMCU<->FFU                 |
| D13 | Green (flashing) = operational (link OK) |
| D14 |                                          |



If LEDs D11 and D12 flash continuously and alternately in **YELLOW**, the memory chip may not have been inserted correctly into the respective housing, or may not have been configured properly.

| Problems                                                                                |                                                                                                                                                  |                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Possible causes                                                                         |                                                                                                                                                  | Possible solution                                                                                                                                                                                                                                                           |
| The display is switched off and there are no active flash signalling (P-OK) and (P-ON). |                                                                                                                                                  |                                                                                                                                                                                                                                                                             |
|                                                                                         | A fault of the supply line has occurred.                                                                                                         | <ol style="list-style-type: none"> <li>1. Check the supply voltage value.</li> <li>2. Check that the main switch (Q1) is closed.</li> <li>3. Check that the fuses (F1), (F2) and (F3) are not burned.</li> <li>4. Check the connections to the signalling lamps.</li> </ol> |
| There are no active flash signalling on the auxiliary feeders (T1) and/or (T2).         |                                                                                                                                                  |                                                                                                                                                                                                                                                                             |
|                                                                                         | A fault of the supply line has occurred.                                                                                                         | <ol style="list-style-type: none"> <li>1. Check the supply voltage value.</li> <li>2. Check that the main switch (Q1) is closed.</li> <li>3. Check that the fuses (F1), (F2) and (F3) are not burned.</li> <li>4. Check the connections to the signalling lamps.</li> </ol> |
|                                                                                         | A failure of the feeder (T1) and/or (T2) has occurred.                                                                                           | Replace the faulty auxiliary feeder (refer to the enclosed wiring diagram).                                                                                                                                                                                                 |
| FFU field unit not responding (red LED in the diagnostic panel)                         |                                                                                                                                                  |                                                                                                                                                                                                                                                                             |
|                                                                                         | A problem with the supply cable of the FFU unit has occurred.                                                                                    | <ol style="list-style-type: none"> <li>1. Check the connection of the field unit.</li> <li>2. Check the value of the supply voltage of the electronic board inside the field unit.</li> </ol>                                                                               |
| FFU field unit is at fault (red LED in diagnostic panel)                                |                                                                                                                                                  |                                                                                                                                                                                                                                                                             |
|                                                                                         | A problem with the power cable of the fixture has occurred.                                                                                      | <ol style="list-style-type: none"> <li>1. Check the connection of the fixture.</li> <li>2. Check the polarity of the fixture connection.</li> </ol>                                                                                                                         |
|                                                                                         | A problem with the fixture has occurred.                                                                                                         | Check the fixture status. If it is damaged, replace it.                                                                                                                                                                                                                     |
| FFU field unit is alarmed (orange LED in diagnostic panel)                              |                                                                                                                                                  |                                                                                                                                                                                                                                                                             |
|                                                                                         | A problem with the RTIL system has occurred: the fixture remains switched off because the other associated RTIL fixture is not working properly. | <ol style="list-style-type: none"> <li>1. Check the status of the associated FFU RTIL field unit.</li> <li>2. Check the status of the fixture.</li> </ol>                                                                                                                   |
|                                                                                         | <b>If after trying the proposed solutions the problem persists, please contact OCEM Customer Service.</b>                                        |                                                                                                                                                                                                                                                                             |

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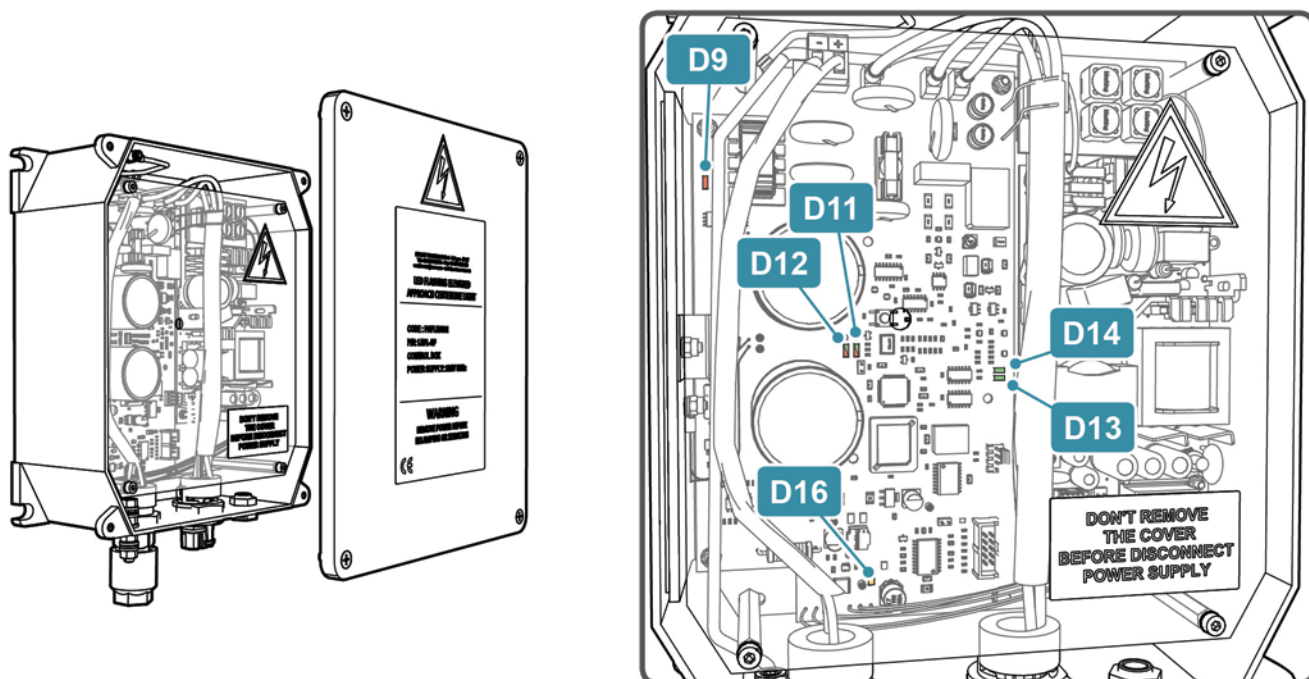
## 4.6.2 Control Unit (FFU)



Carefully read the manual, and in particular safety information, before proceeding with the resolution of common faults.



During the troubleshooting phase, it may be necessary to check the status of the diagnostic LEDs on the F316 board.



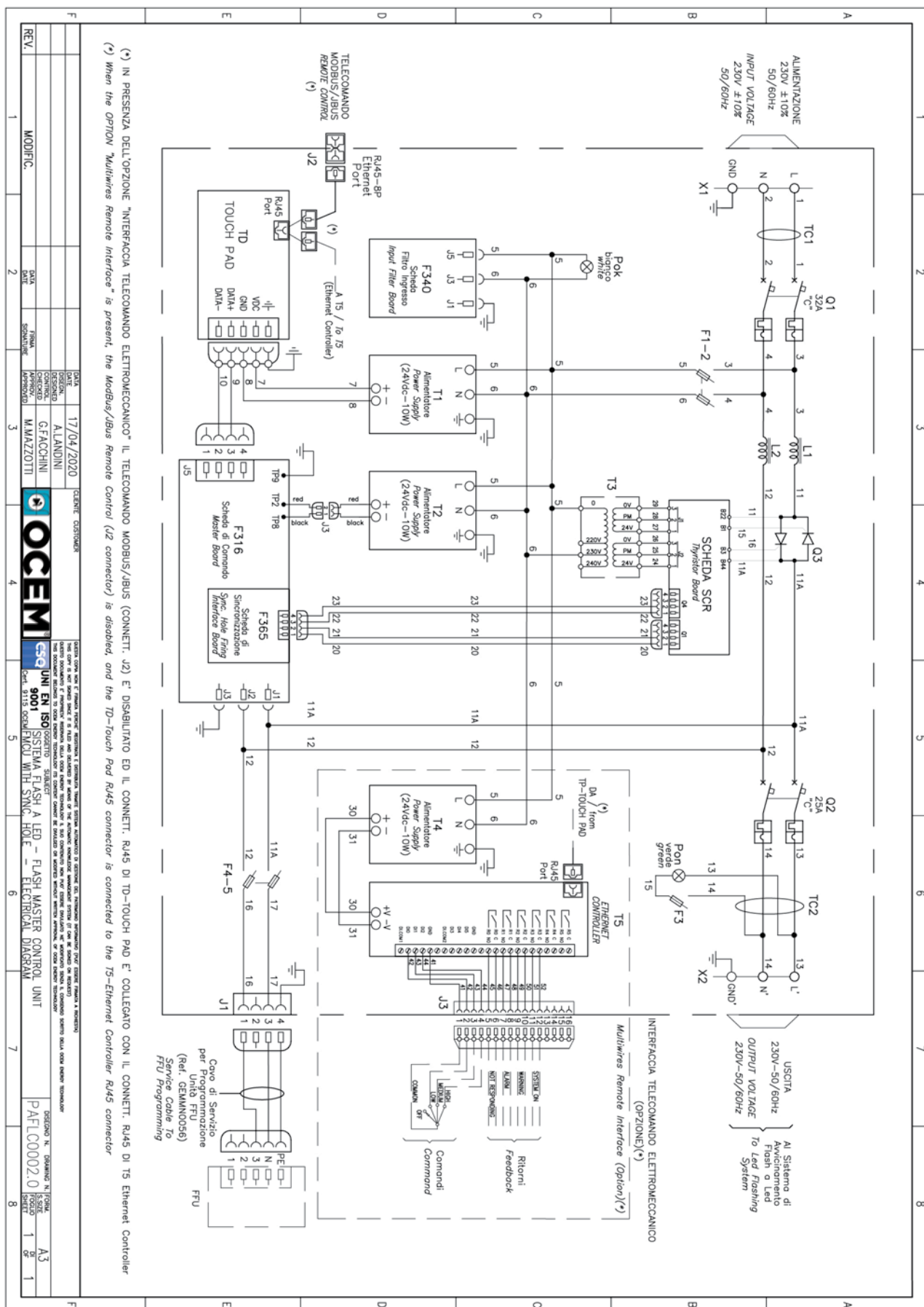
| LED | DESCRIPTION                              |
|-----|------------------------------------------|
|     | FFU Output state                         |
| D9  | Off = operational<br>Red = in error      |
|     | Memory chip                              |
| D11 | Off = operational                        |
| D12 | Yellow/Red = EEPROM in error             |
|     | Communication FMCU<->FFU                 |
| D13 | Green (flashing) = operational (link OK) |
| D14 |                                          |
|     | FFU Power supply                         |
| D16 | Off = operational<br>Yellow = in error   |



If LEDs D11 and D12 flash continuously and alternately in YELLOW, the memory chip may not have been inserted correctly into the respective housing, or may not have been configured properly.



### 4.6.3 Reference wiring diagram



## 4.6.4 Fixture (LEFL/LIFL)



Carefully read the manual, and in particular safety information, before proceeding with the resolution of common faults.

| Problem                                                        | Possible cause                                                                                           | Solution                                                                                                                                                                                                        |
|----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| When the fixture is powered, the light flow appears distorted. | The lens could be broken or damaged.                                                                     | Replace the damaged lens.                                                                                                                                                                                       |
| When the fixture is powered, the light flow appears weak.      | The power supply circuit of the fixture may have a partial short-circuit.                                | Check the status of the power cable and, if necessary, restore the connection.                                                                                                                                  |
|                                                                | The field unit may be faulty.                                                                            | Check the status of the field unit with appropriate instruments and, if necessary, replace the damaged component. For further details, please refer to the use and maintenance manual of the damaged component. |
|                                                                | The protective glass could be dirty or damaged.                                                          | Clean the protective glass.                                                                                                                                                                                     |
|                                                                | The light module may have more than 25% of the faulty or short-circuited LEDs.                           | Replace the damaged LED module.                                                                                                                                                                                 |
|                                                                | If the fixture has recently been under maintenance, the electronic board installed could not be correct. | Check that the original configuration of the device matches the one actually installed. When an error occurs replace the electronic board with the correct spare part.                                          |

| Problem                                                                                             | Possible cause                                                                                                                                                                    | Solution                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| When the fixture is powered, the LEDs do not light up.                                              | The LED module could be faulty or short-circuited.                                                                                                                                | Replace the damaged LED module.                                                                                                                                                                                 |
|                                                                                                     | The installed electronic board could be faulty.                                                                                                                                   | Replace the electronic board.                                                                                                                                                                                   |
|                                                                                                     | The power supply circuit may have a partial short-circuit.                                                                                                                        | Check the status of the power cable and, if necessary, restore the connection.                                                                                                                                  |
|                                                                                                     | The field unit may be faulty.                                                                                                                                                     | Check the status of the field unit with appropriate instruments and, if necessary, replace the damaged component. For further details, please refer to the use and maintenance manual of the damaged component. |
| During periodic inspection is detected the presence of humidity or condensation inside the fixture. | The gaskets could be damaged.                                                                                                                                                     | Clean and dry all internal parts inside the fixture. Check the status of the gaskets. If necessary replace the gaskets and reassemble the fixture.                                                              |
|                                                                                                     | The cables could be damaged: the presence of cracks or holes in the cable insulation and the breaking of the rubber of the cable gland could allow humidity to enter the fixture. | Clean and dry all internal parts inside the fixture. Check the status of the power cable and, if necessary, restore the connection.                                                                             |



If after trying the proposed solutions the problem persists, contact OCEM technical support. Do not let running fixtures presenting signs of damage or fault.

## 4.7 Spare parts

## 4.7.1 Elevated fixture (LEFL)



Always check the version of the fixture installed and the accessories present.

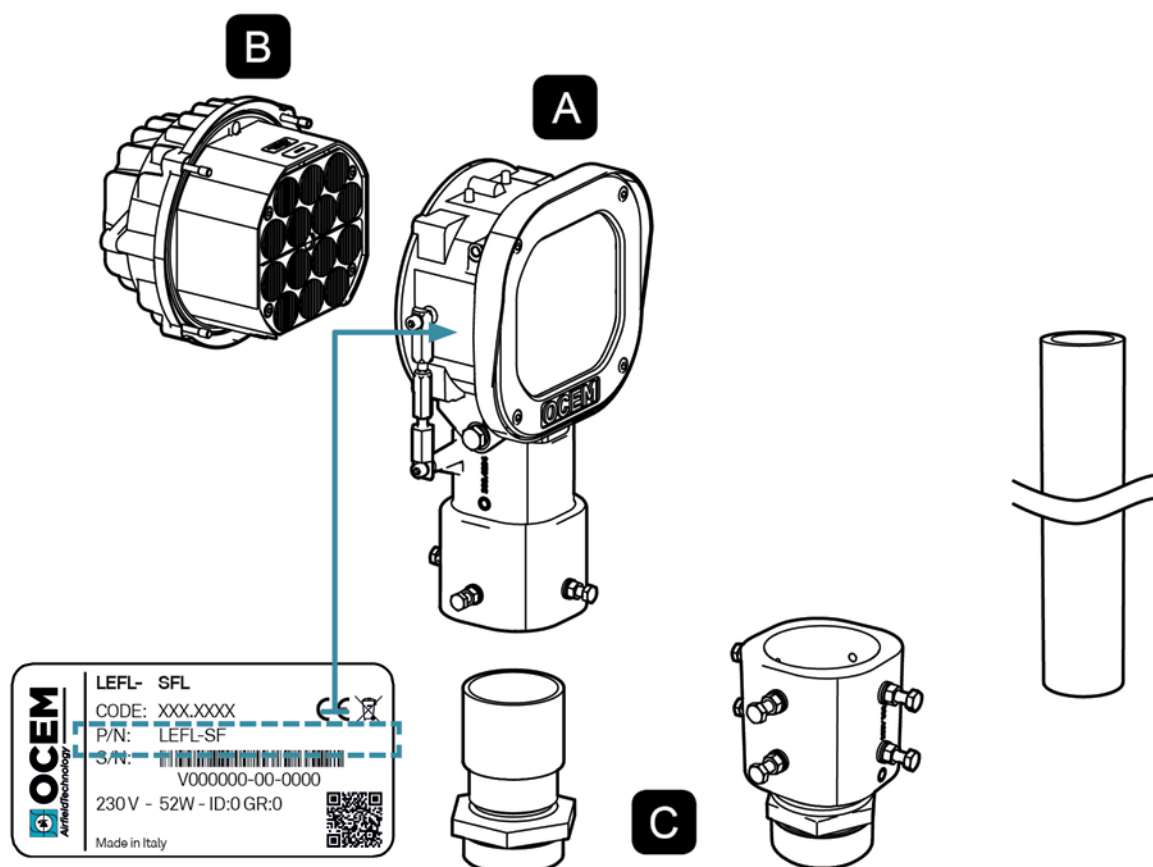
## FLASH LED fixture

|          |                    |
|----------|--------------------|
| <b>A</b> | Special support    |
| <b>B</b> | LED light assembly |
| <b>C</b> | Fastening System   |

## Accessories

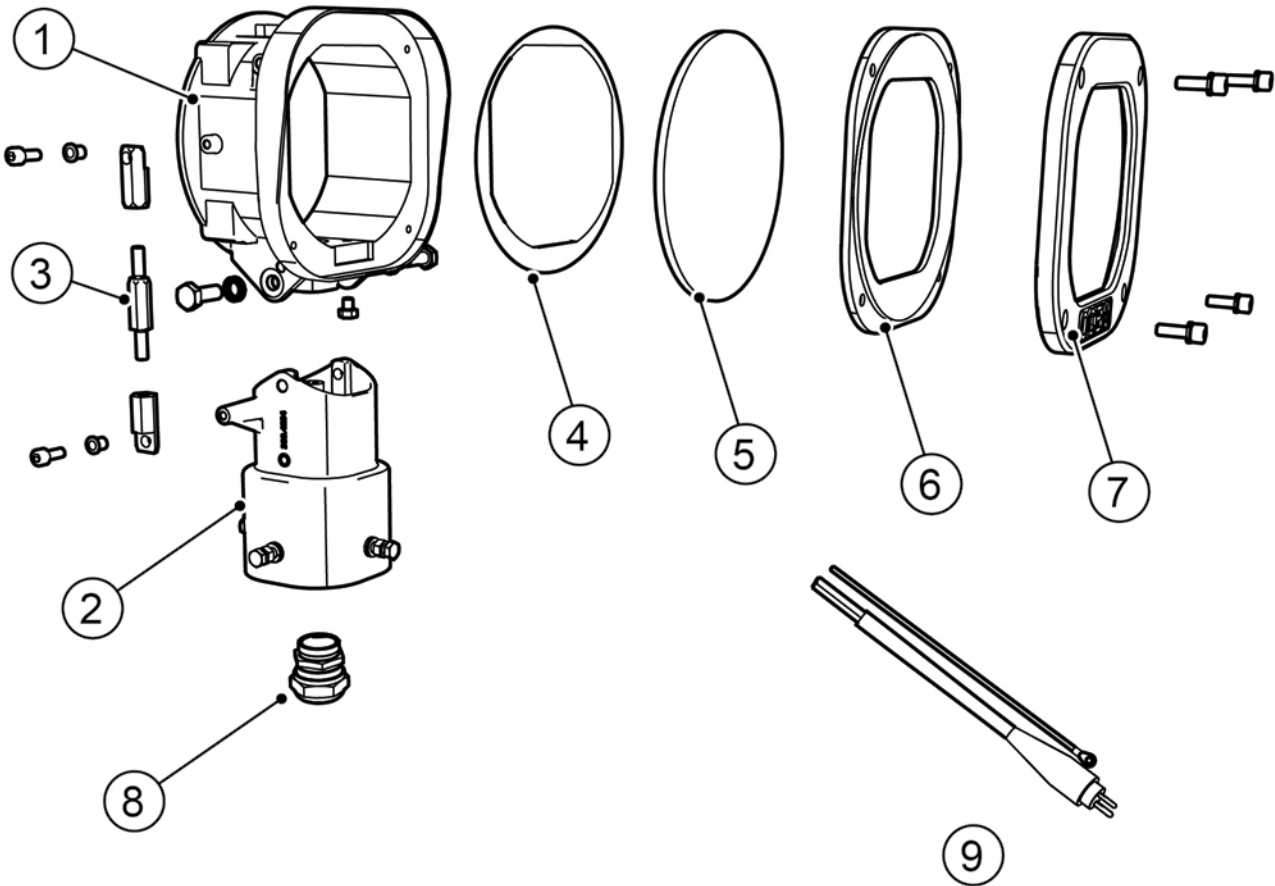
## Code Art.

|                    |          |
|--------------------|----------|
| Grease for gaskets | 752.1014 |
|--------------------|----------|



4.7.1.1 Special support

| Pos | Description                           | Fixture Code | Code Art. |
|-----|---------------------------------------|--------------|-----------|
| 1   | Support body                          | always valid | RISLF0092 |
| 2   | Support                               | always valid | RISLF0063 |
| 3   | Complete tie rod                      | always valid | RISLF0062 |
| 4   | Lower gasket (in gaskets kit)         | ■ ■ - 0      | RISLF0018 |
| 5   | Transparent front panel in plexiglass | always valid | RISLF0017 |
| 6   | Upper gasket (in gaskets kit)         | always valid | RISLF0018 |
| 7   | Closing frame (kit includes seals)    | always valid |           |
| 8   | Cable gland                           | always valid | 709.0941  |
| 9   | Power cable                           | always valid |           |



ADJUSTMENTS AND MAINTENANCE

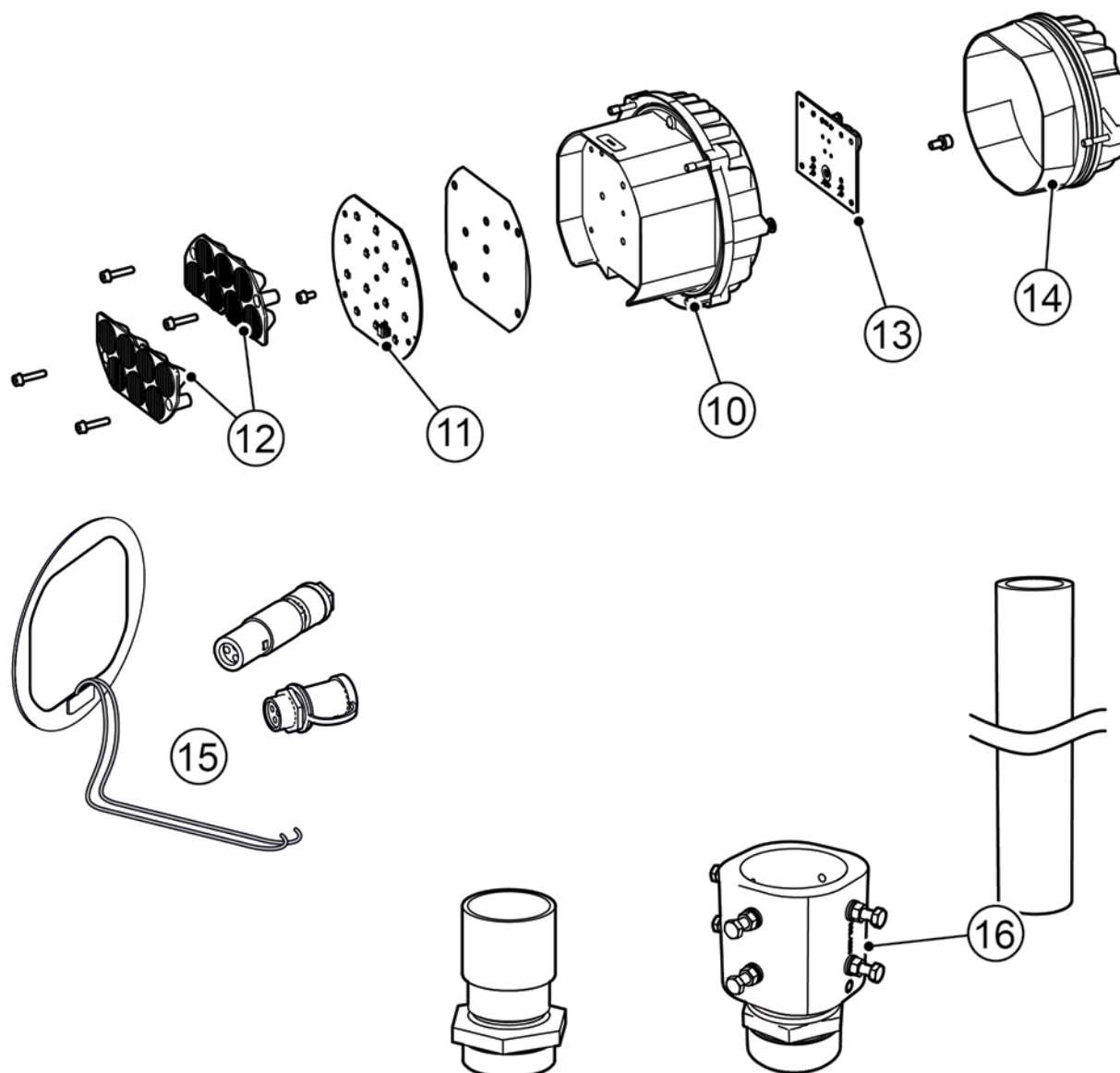


## 4.7.1.2 LED light assembly

| Pos | Description              | Fixture Code | Code Art. |
|-----|--------------------------|--------------|-----------|
| 10  | LED driver board support | always valid | RISLF0058 |
| 11  | LED module (F313)        | always valid | RISLF0015 |
| 12  | Lenses                   | always valid |           |
| 13  | Electronic board (F311)  | always valid | RISLF0016 |
| 14  | Body                     | always valid |           |
| 15  | Arctic Kit               | ■ - A        |           |

## 4.7.1.3 Fastening system

| Pos | Description                 | Fixture Code | Code Art. |
|-----|-----------------------------|--------------|-----------|
| 16  | Frangible coupling for pole | always valid | RISLF0091 |



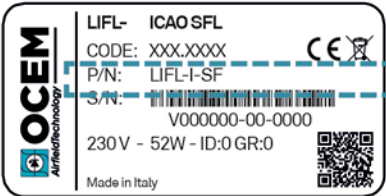
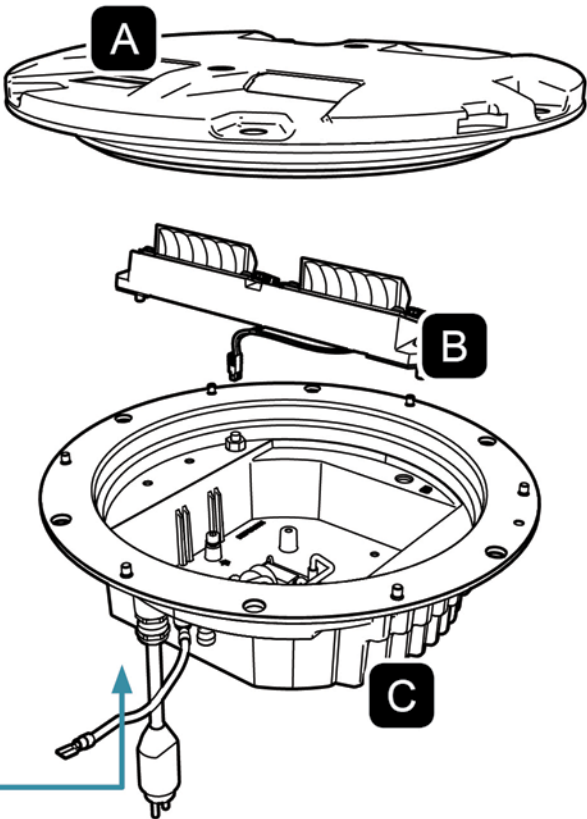
4.7.2 Inset fixture (LIFL)



Always check the version of the fixture installed and the accessories present.

| FLASH LED fixture |                    |
|-------------------|--------------------|
| A                 | Cap unit           |
| B                 | LED light assembly |
| C                 | Bottom unit        |

| Accessories |                                              | Code Art. |
|-------------|----------------------------------------------|-----------|
|             | Grease for gaskets                           | RILSX0003 |
|             | Anaerobic adhesive for threads (LOCTITE 243) | RILSX0007 |
|             |                                              |           |

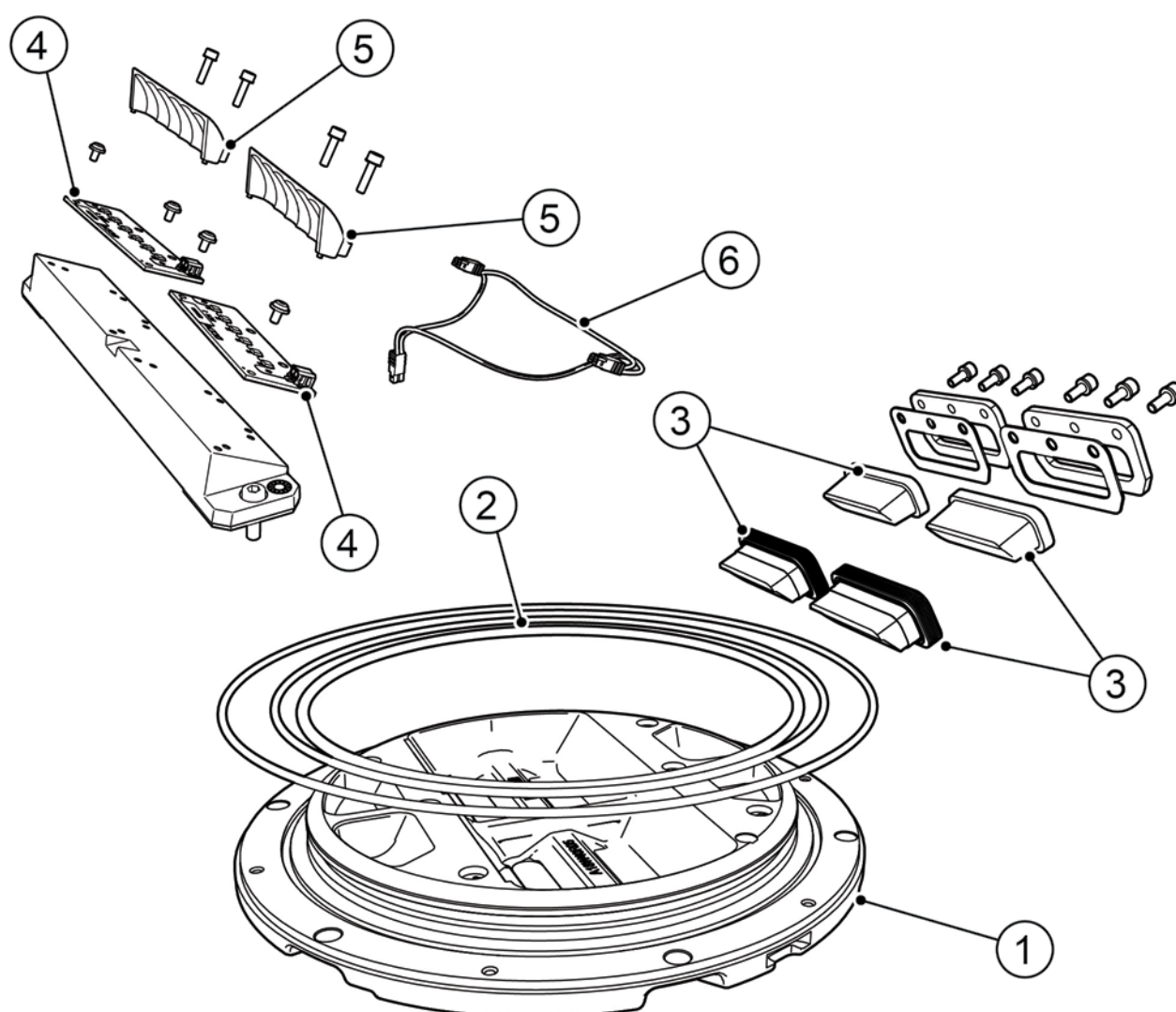


## 4.7.2.1 Cap unit

| Pos | Description         | Fixture Code | Code Art. |
|-----|---------------------|--------------|-----------|
| 1   | Unidirectional cap  | always valid | RISLF0009 |
| 2   | Mounting gasket kit | always valid | RISLF0010 |
| 3   | Prism assembly      | always valid | RISLF0011 |

## 4.7.2.2 LED light assembly

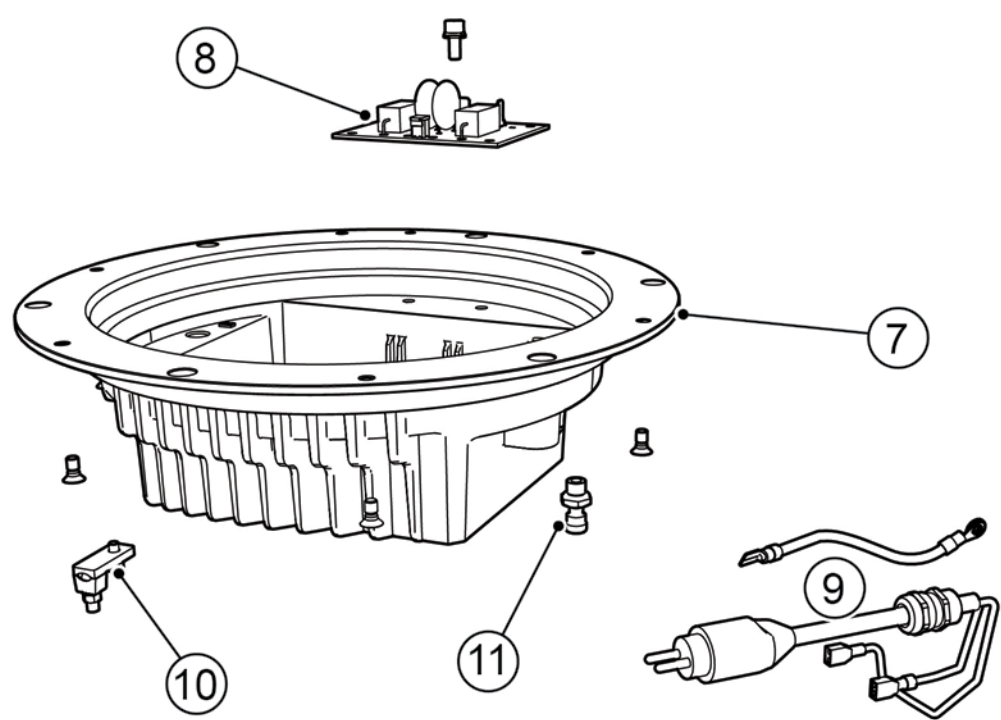
| Pos | Description                     | Fixture Code | Code Art. |
|-----|---------------------------------|--------------|-----------|
| 4   | LED module (F312)               | always valid | RISLF0012 |
| 5   | Reflector kit (screws included) | always valid |           |
| 6   | LED module power cable          | always valid |           |



4.7.2.3 Bottom unit

| Pos | Description              | Fixture Code | Code Art. |
|-----|--------------------------|--------------|-----------|
| 7   | Bottom                   | always valid |           |
| 8   | Electronic board (F311)  | always valid |           |
| 9   | Power supply cable kit   | always valid | RISLF0014 |
| 10  | Ground connector.kit FAA | always valid |           |
| 11  | Test valve               | always valid |           |

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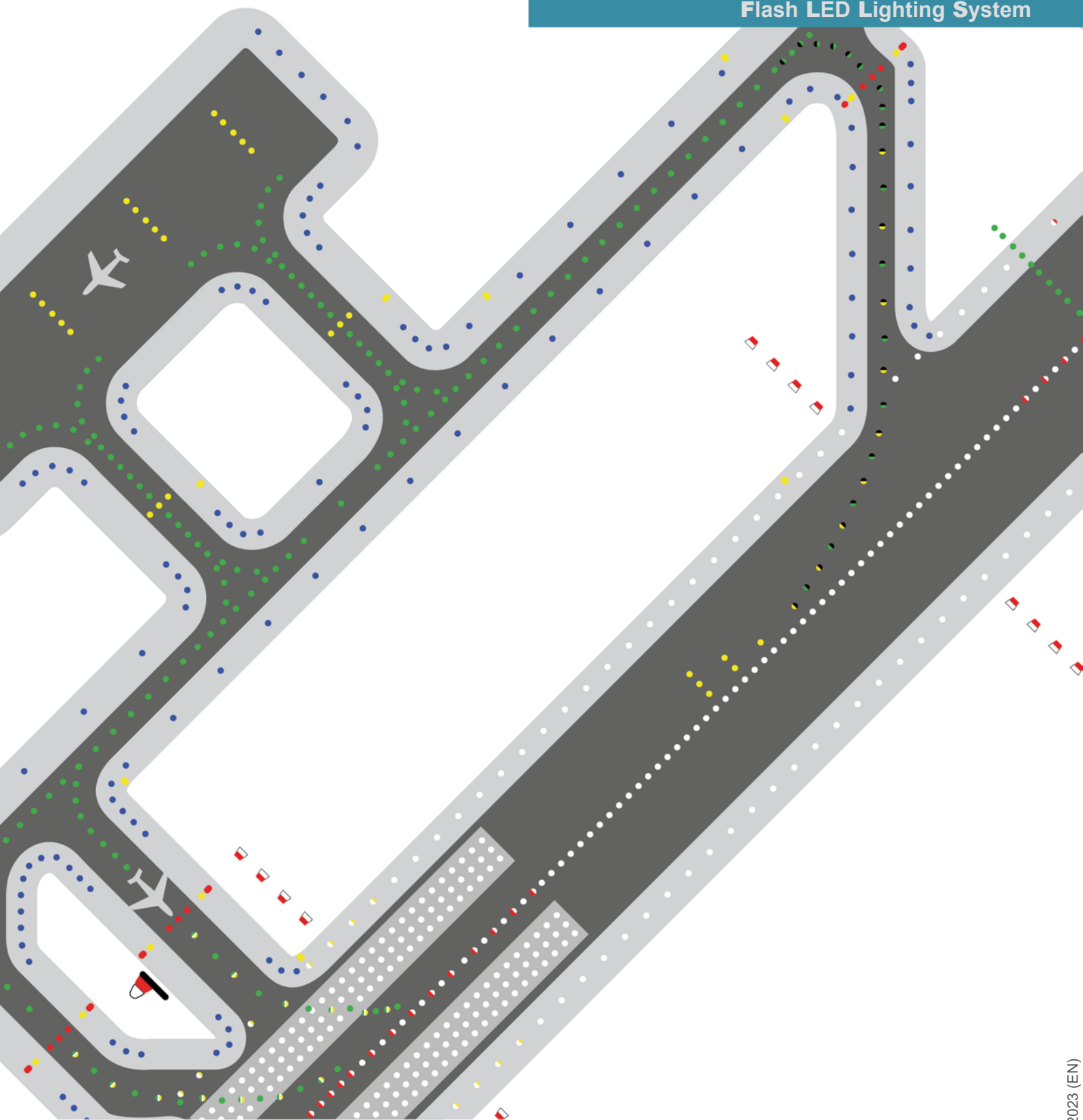
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## Flash LED Lighting System



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