

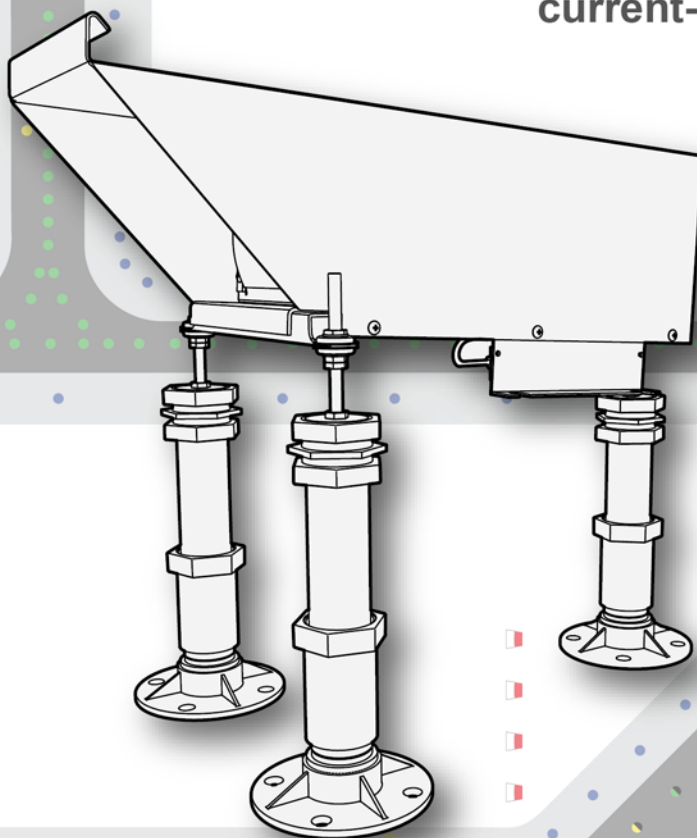
LED PAPI 66



Use and Maintenance Manual

LED Precision Approach Path Indicator

current-powered systems
(Style B) Series 3



UT-MT-0972_1.0_19-09-2022 (EN)

EN

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Editions

Revision	Date	Notes
1.0	19-09-2022	First edition

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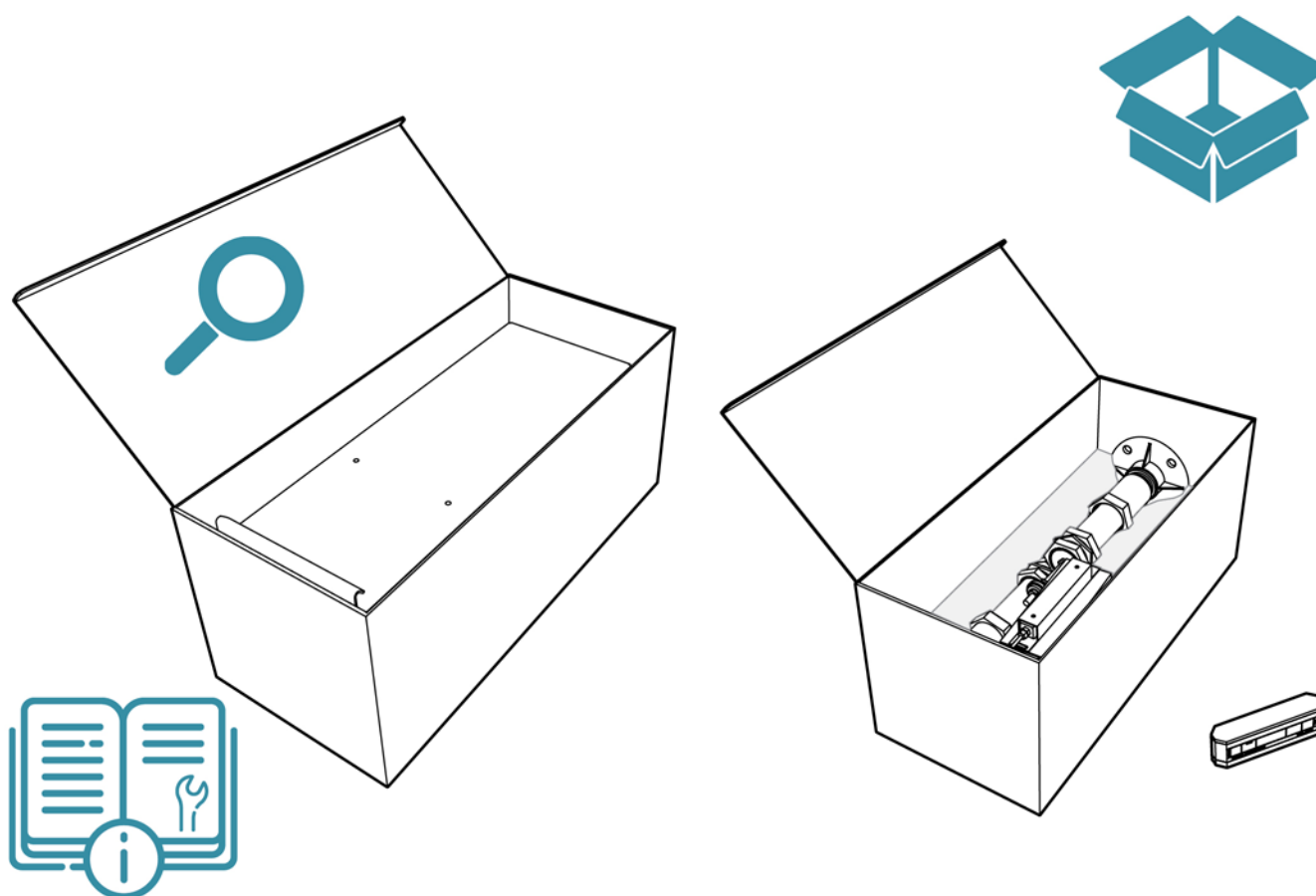
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1 GENERAL INFORMATION

1.1 Package content



The LED PAPI 66 of OCEM Airfield Technology is a signalling system composed of overhead light LED units PAPI Series 3 type current-powered (6.6A - Style B), with optical indicator function of the gradient approach (VASI | Visual Approach Slope Indicator). The system provides to flight crews informations concerning both the adopted approach angle and the trajectory to follow. The device is designed in compliance with:

- ICAO Annex 14 Volume 1 | EASA Certification Specifications and Guidance Material for Aerodrome Design (CS-ADR-DSN)
- FAAAC 150/5345-28 Precision Approach Path indicator (PAPI) Systems: L-880 - System composed of 4 light units; L-881 - System composed of 2 light units (Style B: system current-powered through series circuit; Class I: system operating from -31 degrees Fahrenheit (F) [-35 °C] to 131 degrees Fahrenheit (F) [+55 °C]).



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



Store all the components in the original packaging until the time of installation. Pay attention not to damage the cables, the pipes or the watertightness of the components.



The device described in this manual has been designed to be powered by series circuits, powered by constant current regulators (CCR) up to 6,6 A.

1.2 Manual reference guide

This document contains all the information related to the equipment and describes the procedures to follow during the installation of the product and during ordinary maintenance. 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 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 equipment 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 equipment. 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 equipment 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.

Always proceed with the utmost attention. Safe intervention procedures indicated aim to protect the operator against possible risks and to preserve the fixture from any damages.

SAFE INTERVENTION ON THE FIXTURE POWERED BY SERIES CIRCUIT

Operate in this way:

- Switch off the constant current regulator
- Disconnect the supply plug from the related socket of the secondary of the isolation transformer
- Disconnect the plug of the monitoring circuit (if present) from the related socket of the secondary of the dedicated isolation transformer



Carry out all the operations on the fixture and complete the intervention. At the end, proceed to restore the operating condition:

- Reconnect the supply plug to related socket of the secondary of the isolation transformer
- Reconnect the plug of the monitoring circuit (if present) to the related socket of the secondary of the dedicated isolation transformer
- Restart the constant current regulator

RESIDUAL ENERGIES

Always wait for the discharging time (at least 5 min) before operating on the equipments. Check the complete de-energization of the equipments before accessing the potentially active parts. The failure to comply all the precautions indicated implies life danger and serious injury to persons.



GROUND CONNECTION

The body/envelope of the fixture must be connected to the earth potential before the commissioning of the fixture.

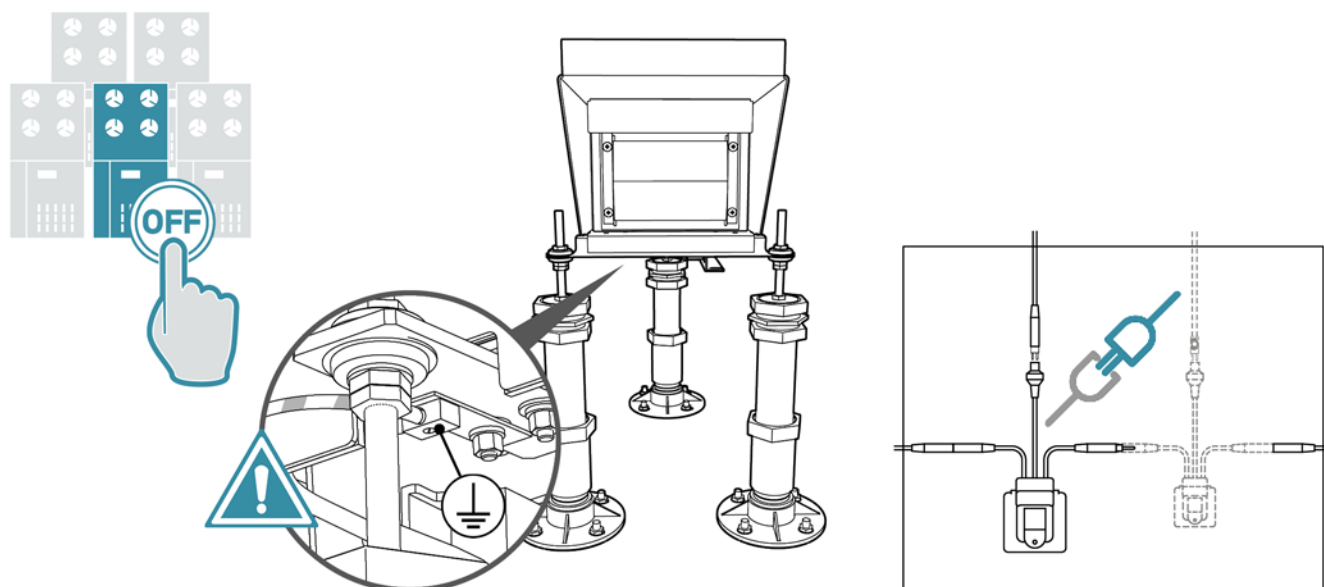
Check that the protective conductor yellow-green is connected to the terminal predisposed on the fixture.

In case of isolation transformer with secondary ground connected it is advisable to ground connect the fixture at the point where the secondary of the dedicated isolation transformer is connected to the ground.



IN CASE OF MULFUNCTION OF THE EQUIPMENTS

Do not leave the devices who have expressed evidence of deterioration or of malfunction. Disconnect the energy sources and proceed as soon as possible to repair/replacement of devices.



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 LED PAPI 66 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 LED PAPI 66 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.

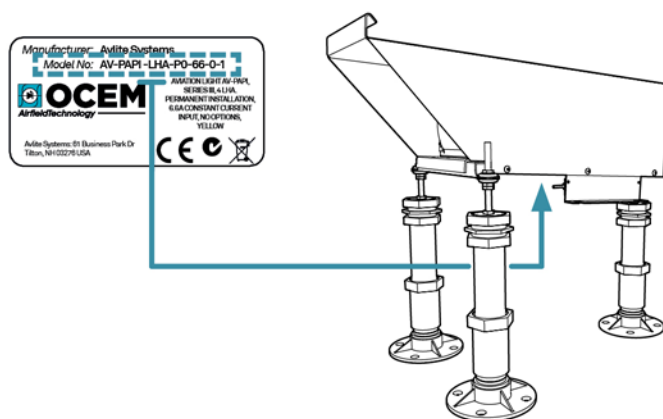
1.9 Disposal



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 LED PAPI 66 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 **FIXTURE DESCRIPTION**

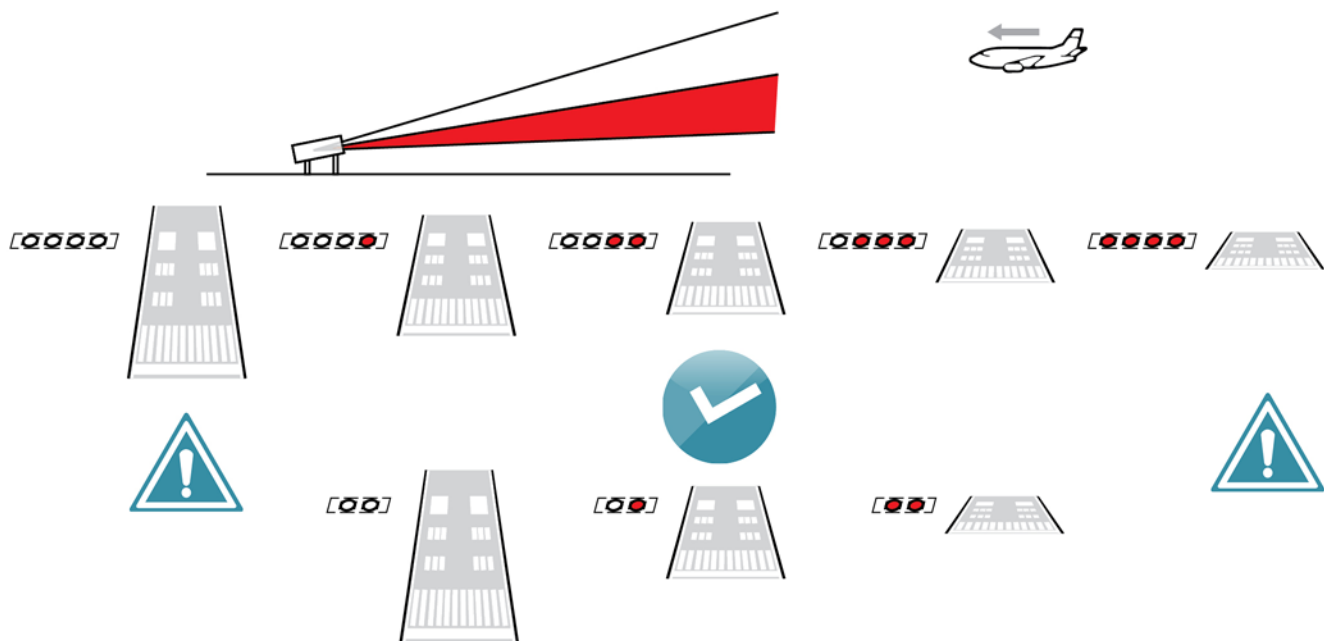
2.1 **General characteristics**

The LED PAPI 66 unit are designed for the purpose of providing visual guidance to aircrafts in the bichromatic approach flash signalling:

- Four-light PAPI the system consists of 4 LHA units (Light Head Assembly) current-powered in environments with temperatures between -35 °C [-31 °F] and +55 °C [+131 °F].
- Two-light PAPI (A-PAPI) the system consists of 2 LHA units (Light Head Assembly) current-powered in environments with temperatures between -35 °C [-31 °F] and +55 °C [+131 °F].

The innovative optics reach the lowest consumption levels of the sector, uniform intensity and red/white rapid transition to provide the pilot with an accurate reporting on the glideslope approaching the runway.

The LHA units use high power LED array to generate the light emission of the required colour: red for the lower section of the light beam, white for the upper section of the light beam.
The 4 or 2 lights fixture format displayed by the pilot is illustrated in the figure below.



The fixtures, positioned on the left of the landing area, project stable light beams and depending on the approach angle there can be different combinations:

PAPI	Glideslope
○ ○ ○ ○	Very high glideslope
○ ○ ○ ●	Slightly high glideslope
○ ○ ● ●	Appropriate approach glideslope
○ ● ● ●	Slightly low glideslope
● ● ● ●	Very low glideslope

A-PAPI	Glideslope
○ ○	High glideslope
○ ●	Appropriate approach glideslope
● ●	Low glideslope

Available with supports for fixed installation [P0] with frangible coupling, the LED PAPI 66 system is designed to be used in various scenarios.

The LED PAPI 66 is compliant with the rules:

ICAO (Annex 14 Volume 1)

EASA (CS-ADR-DSN)

FAA (AC150/5345-28)



The fixtures LED PAPI 66 described in this manual have been designed to be installed on the concrete basis.

Typical installation suggested by FAA: minimum depth of 914 mm [36"] or of 305 mm [12"] below the frost line, if greater; the base must extend at least 305 mm [12"] in all the directions, beyond the profile of the LHA unit.

The distance between the two front supports must be equal to 283 mm[11,13"].

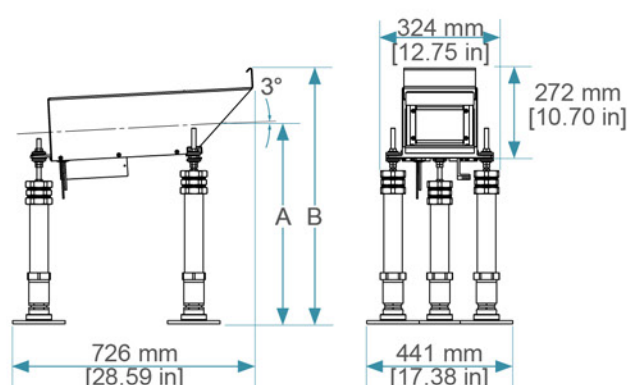


The supply circuits for the LHA modules can be positioned within plastic or metallic pipes permanently laid in the ground, equipped with appropriate coupling devices.

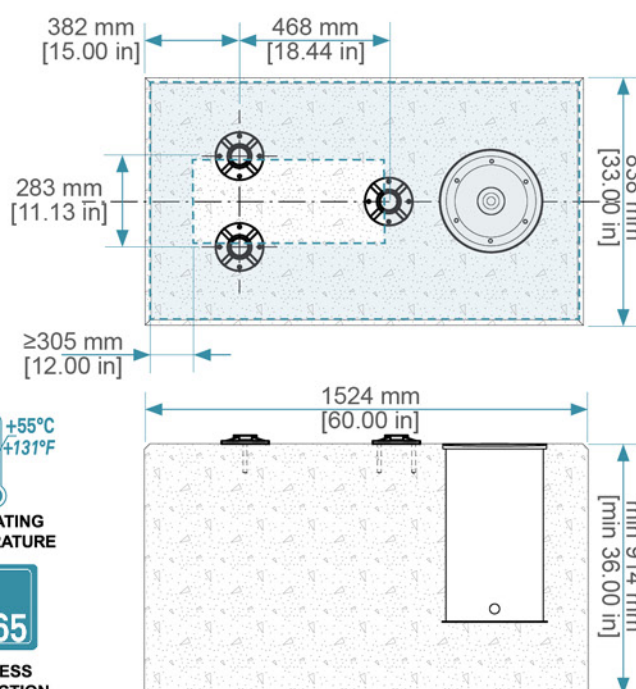
The LHA unit is designed to be inserted in a circuit airport series powered by constant current regulators (CCR, Constant Current Regulator) at 3 or 5 current step, in the range from 2.8 to 6.6 A effective. The intensity of the light emitted depends on the effective value (RMS) of the supply current.

Intensity level	CCR	ICAO
Intensity Level 5	6.6 A	100%
Intensity Level 4	5.2 A	24%
Intensity Level 3	4.1 A	6%
Intensity Level 2	3.4 A	0.8%
Intensity Level 1	2.8 A	0.16%

Intensity level	CCR	FAA
Intensity Level 3	6.6 A	100%
Intensity Level 2	5.5 A	34%
Intensity Level 1	4.8 A	15%



Height	A	B
Minimum	394 mm [15.52 in]	566 mm [22.27 in]
Provided	601 mm [23.67 in]	773 mm [30.42 in]
Extended	912 mm [35.92 in]	1083 mm [42.67 in]



The units communicate with each other by means of a CAN type communication bus (CAN BUS).

In the PAPI system is included a digital clinometer to perform the alignment and the adjustment of the LHA unit. For further information on the use of the clinometer, please refer to the manual included in the supply.



Calibrate the clinometer before each use.
Clinometer calibration can be easily performed by the maintenance personnel, carefully following the instrument's instructions.



Description

2.2 Content of delivery

	L-880 PAPI/4 LHA 4 LIGHTS	L-881 A-PAPI/2 LHA 2 LIGHTS
LHA - Light Head Assembly		
Pre-cabled unit with cables (power and control) 183 cm [6 ft] in length with overmolded connectors L-823	4	2
Flexible wrinkled tube 1" in length 15,24 m [50 ft]	15,24 m [50 ft]	15,24 m [50 ft]
Column LHA (with breakable coupling) 12-3/4"	4	2
Column LHA (with breakable coupling) 14"	8	4
Flange 2"	12	6
Digital Clinometer with assembly screws	1	1

The kits include also all the connection cables attested and pre-cabled.



The isolation transformers necessary for the functioning of the unit are not included in the supply. It is the customer's responsibility to arrange appropriate certified equipment to supply the units.

2.3 Article number

example: AV-PAPI 4 - P0 - 66 - 0 - 1 ***

Regulations/Dimension

- A = ICAO Abbreviated-PAPI 2-LHA (Light Head Assembly)
- 2 = FAA 2-LHA (Light Head Assembly)
- 4 = FAA/ICAO 4-LHA (Light Head Assembly)
- LHA = Replacement optical unit (only LHA - Light Head Assembly)

Installation

P0 = Fixed

Supply

66 = CCR 3 and 5 step from 2.8 A to 6.6 A (FAA Style B)

Options

- 0 = None
- 4 = Heated lens*
- 8 = Tilt switch
- 12 = Heated lens and tilt switch (version FAA std)**

Colour

- 0 = Orange FAA
- 1 = Yellow ICAO
- 2 = Marine grade orange
- 3 = Marine grade yellow
- 4 = Desert sand
- 5 = NATO green
- 6 = Marine grade desert sand
- 7 = Marine grade NATO green

Special version***

- SM00 = Monitoring
- S0MF = Tilt switch mercury free****
- SMMF = SM00 and S0FM

* The "Heated lens" option is mandatory for the systems installed in subzero and arctic conditions.

** The "Heated lens and tilt switch" is mandatory for the FAA certified systems.

*** For the special versions contact the technical office before ordering.

**** Special version for application in areas in which mercury is listed among the substances subject to restrictions (ex. European Community).

2.4 Lens heating optional device

The LHA unit of LED PAPI 66 system can be equipped with optional lens heaters. The heater is controlled by a microprocessor system to delete any problem caused by repeated and close on-off cycles and to optimise the relative consumption.

The heater is always activated at full power for 25 minutes after the unit is powered on. Subsequently it remains powered at low power to keep the lens warm at about 5 ° above ambient temperature.

In any case, if the lens temperature exceeds a certain threshold, the heater is deactivated.

2.5 Tilt switch optional device

The effectiveness of the LED PAPI 66 system is determined by the correct inclination of the light beams of the LHA units installed. If a LHA unit loses the alignment of the correct inclination, can provide incorrect indications to the pilot approaching.

Each LHA unit can be equipped with a tilt switch optional device of the LHA unit and, if this deviates by the correct inclination set during installation, the whole LHA units system is deactivated (with a delay of 10-30 seconds, to avoid detection mistakes due to temporary external conditions, such as wind or vibrations).

The PAPI system is designed to operate in fail-safe mode: when the LHA units are equipped with tilt switch device, the system becomes operational only if all LHA units are correctly inclined.

2.6 Tilt switch optional device (mercury-free)

The LED PAPI 66 system can be equipped with tilt switch optional device mercury-free type (for applications in areas in which mercury is listed among the substances subject to restrictions). The operation of these components is similar to the one already described in the paragraph related to the standard tilt.

2.7 Behaviour in case of fault

Below are listed the possible types of faults and the behaviour of the failed unit and of other units of the system in the various cases:

- Tilt error: the tilt switch device detects the misalignment of the LHA unit with respect to the inclination set during installation. All the LHA units in service of the PAPI system switch off after about 10-30 seconds.
- LED module fault. All the LHA units in service of the PAPI system switch off after a few seconds.
- Fault of the unit supply system: an internal fault occurs or the power supply is disconnected. The LHA failed unit switches off immediately (or does not switch on) and the remaining LHA units in service of the PAPI system switch off after a few seconds.

2.8 Optional monitoring device

The LED PAPI 66 LHA unit can be equipped with an optional device for monitoring its operating status remotely. It is an internal relay with contact normally open. The contact is externally made available through a cable with L-823 Style 6 plug.

The status of the contact reports the information on the operating status of the unit:

- Closed contact: LHA unit in operating condition.
- Open contact: LHA unit in fault condition or disconnected.

The relay opens the contact in case of fault, as described in the previous paragraph: tilt error, LED module fault, supply system fault.



Only the monitoring contact of the faulty (or not powered) unit is open, while the unit in operating condition switch off their own LEDs after a few seconds and keep the contact of the relay closed: in this way the faulty unit can be identified by an external monitoring system ILCMS (Individual Lamp Control and Monitoring System).

2.9 Wiring

To wire the LED PAPI 66 system properly use the cables supplied already attested to the equipment:

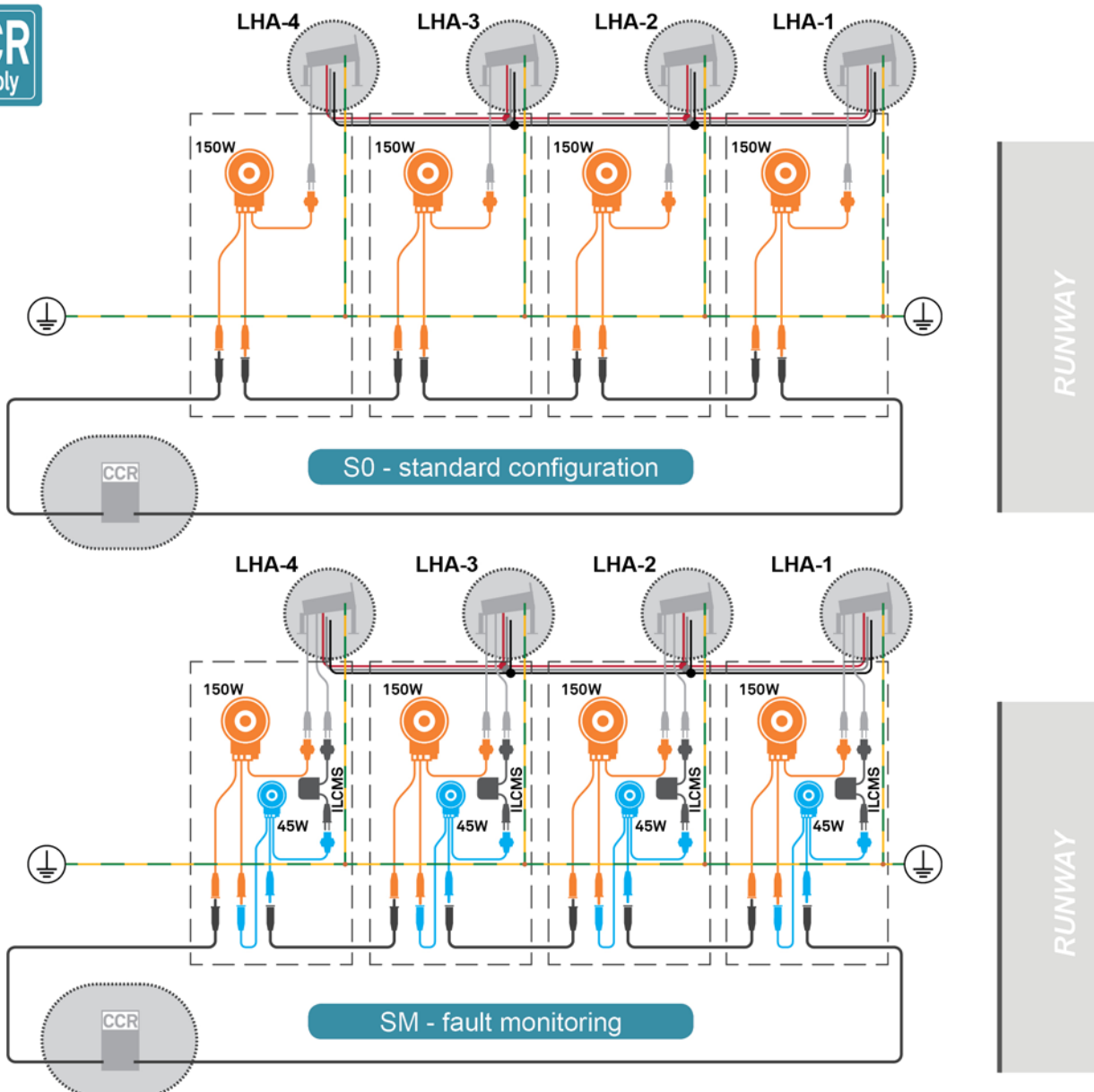
- Power cable equipped with overmolded connector L-823 Style 1 to connect to the secondary of the isolation transformer (L-830, L-831) 150 W.
- Monitoring cable (optional) equipped with overmolded connector L-823 Style 6 to connect to the secondary of the isolation transformer (L-830, L-831) 45 W.
- Communication cable (bus CAN).



The isolation transformers necessary for the functioning of the unit are not included in the supply. It is the customer's responsibility to arrange appropriate certified equipment to supply the units.



The LHA units communicate with each other by means of a CAN type communication bus. To work properly the CAN bus must be equipped with two termination resistors at the two ends of the bus. The termination resistors are installed in the units identified as LHA1 and LHA4 that must necessarily be installed respectively in the nearest and furthest position from the runway.



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 features of the fixtures always refer to the requirements of the relevant Standards:

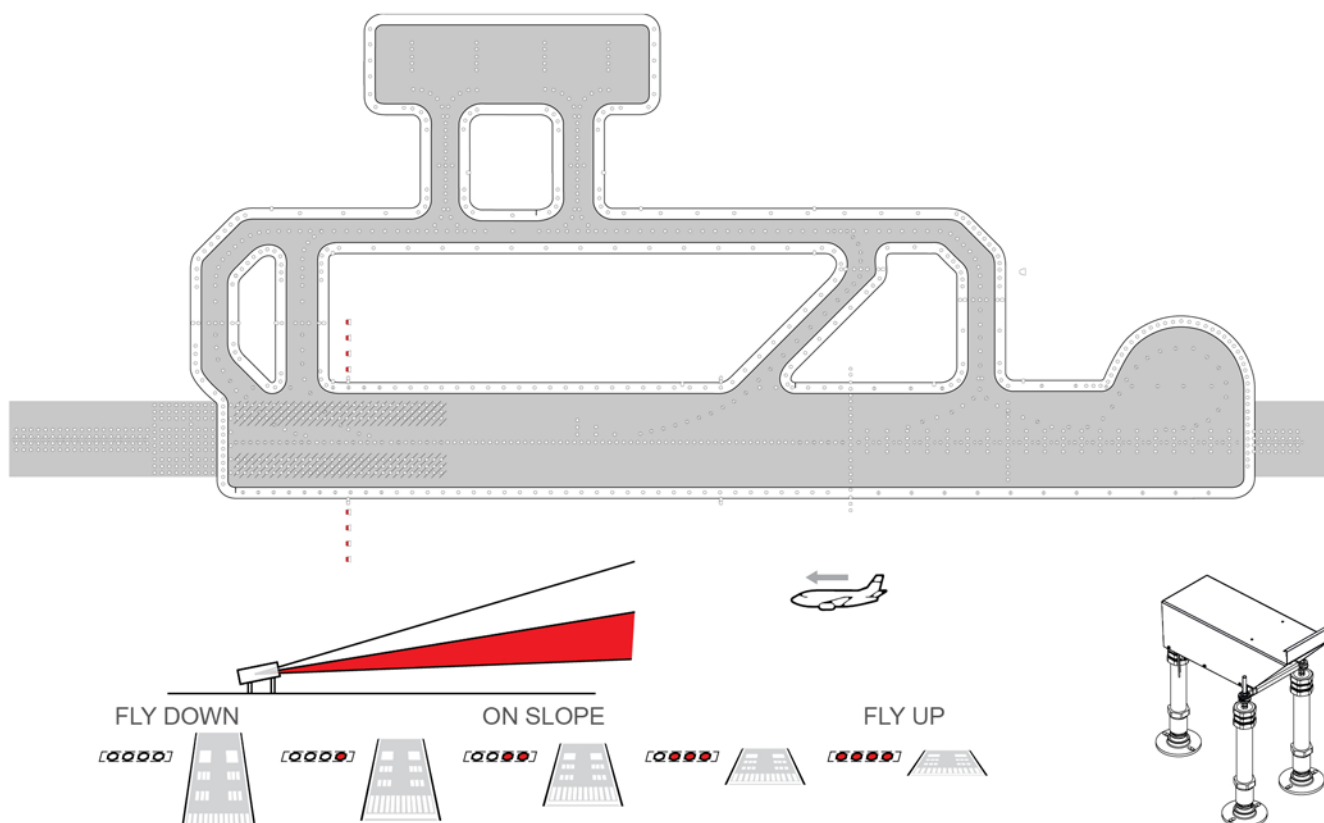
- FAA AC150/5345-28H Precision Approach Path indicator (PAPI) Systems: L-880 - System consisting of 4 light units; L-881 - System consisting of 2 light units
- ICAO Annex 14 Part 1 from 5.3.5.23 to 5.3.5.40 - PAPI and APAPI
- UFC 3-535-01 (§3-7 - PAPI 4 LHA)

The light sources must be positioned near the runway oriented towards the approach direction to the landing runway. The side walls of the LHA unit must be parallel to the runway edge. The positioning of the light units of the runway must be in compliance with current regulations.



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

- FAA 150/5340-30J for the design and the installation of the visual aids in the airports.
- ICAO Annex 14 Part 1 from 5.3.5.23 to 5.3.5.40 - PAPI and APAPI
- UFC 3-535-01 (§3-7 - PAPI 4 LHA)
- DGAC 20580/DNA/2A



3.2 Permanent installation



Store the device in its original packaging until the time of installation. Proceed assembling the device and check the supply features before proceeding with the installation.

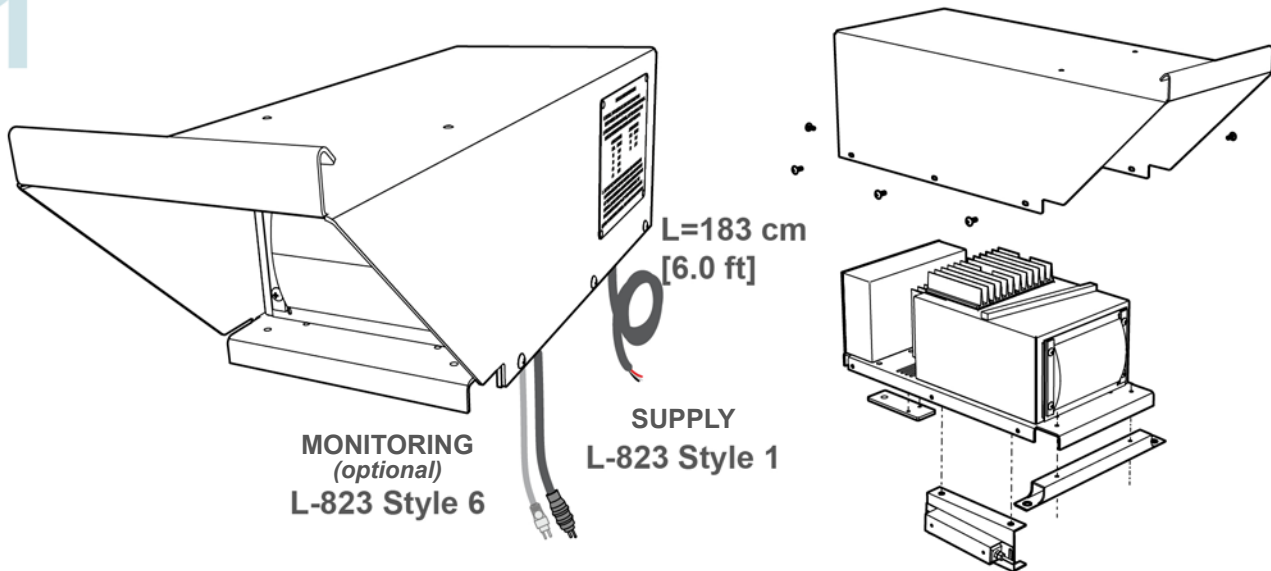
Use the fixture only in combination with concrete foundations with adequate characteristics (in accordance to specifications FAA and ICAO). At the end of installation check the proper alignment of the fixture. In case of incorrect positioning optical misalignments of light beams may occur.

The installer is the solely responsible of the proper positioning of the devices, in accordance to the specific regulation of the different regulatory agencies. For each LHA unit, the height depends on the valuation of the optical axis respect to the base (established quota in the project of the system).

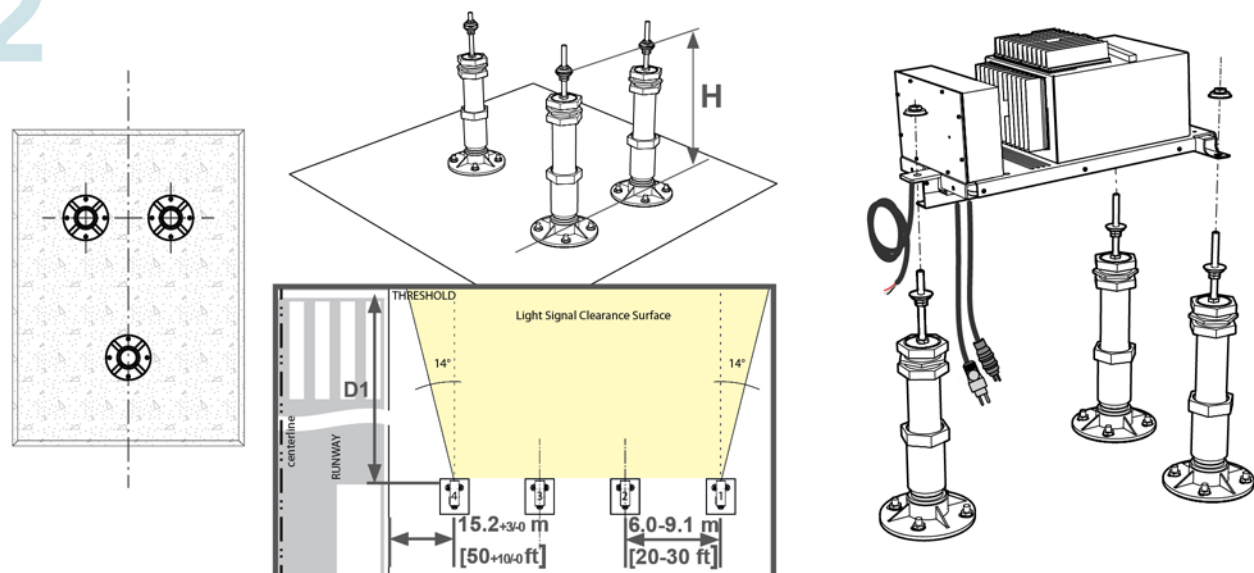


Before carrying out any intervention on the device, cut off all external power sources and place appropriate work-in-progress warnings on the systems. Wait for the discharging time (at least 5 min) and check using appropriate instruments that there are no residual energies before accessing the electrical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

1



2



Position the LHA unit on the supports suitably fixed to the ground and insert the alignment washer (3a) and the increased washer (3b). Screw, without tightening, the upper nut (3c).



If on the support surface of the tool there is dust or dirt, carefully clean the surface before proceeding.

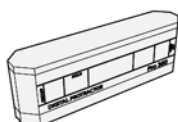
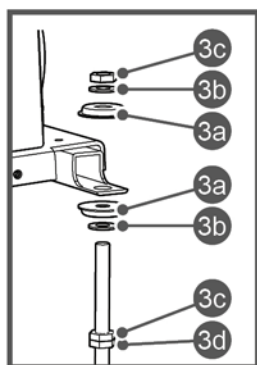
Position the clinometer on the front transverse tubular in centred position. Act on the lower nuts (3c) and (3d) of the front supports to adjust the alignment (0°) of the unit.

Position the clinometer on the rear support bracket, by fastening it with 2 knurled screws (supplied with the clinometer). Act on the lower nuts (3c) and (3d) of the rear support to adjust the tilt angle (i) of the unit.

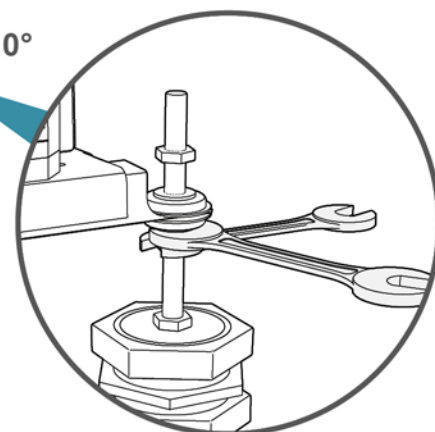
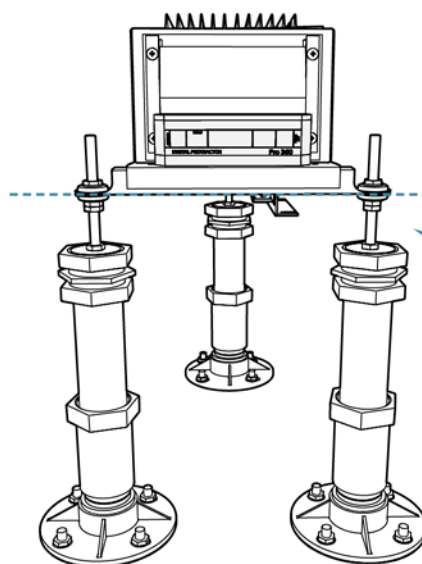


Adjust each unit according to the installation parameter provided (in compliance with the tolerance values indicated).

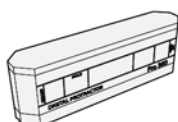
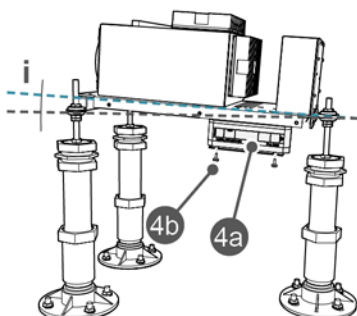
3



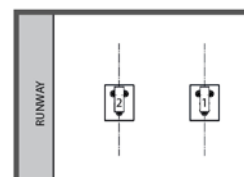
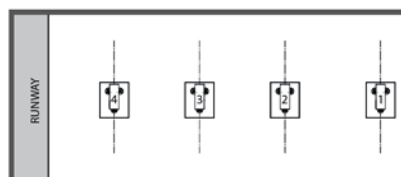
AV-INCL-KT



4



AV-INCL-KT



#	i [°]	
	standard runway	large runway with ILS
1	2° 30' (2,50°)	2° 25' (2,42°)
2	2° 50' (2,83°)	2° 45' (2,75°)
3	3° 10' (3,17°)	3° 15' (3,25°)
4	3° 30' (3,50°)	3° 35' (3,58°)

allowed tolerance:
+3' (+0,05°)/-0' (-0,00°)

#	i [°]	
	standard runway	
1	3° 45' (2,75°)	
2	3° 15' (3,25°)	

allowed tolerance:
+3' (+0,05°)/-0' (-0,00°)

Repeat the verification/adjustment operations of the alignment (0°) of the LHA unit.



If necessary, proceed to fine adjustments of the alignment by acting on both supports: move the lower nuts of the same amount in opposite directions until obtaining the alignment (0°).

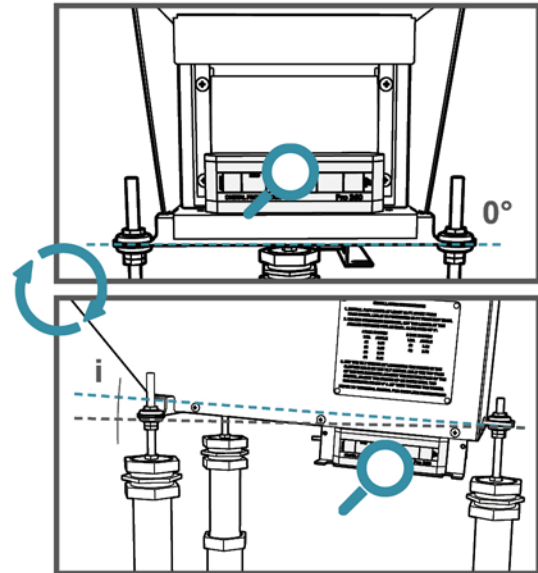
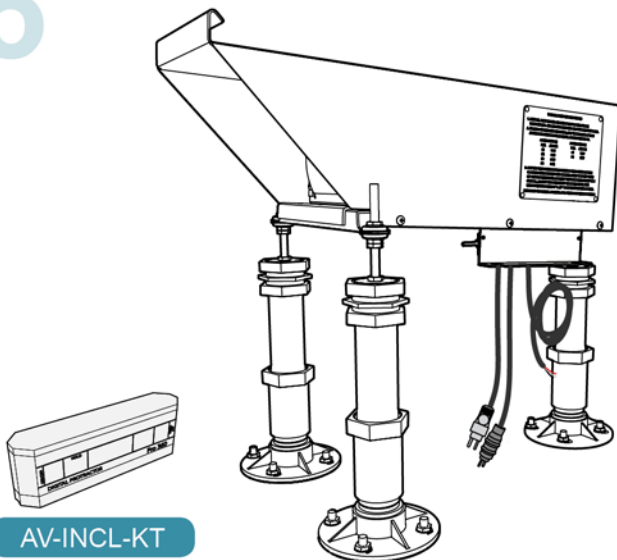
Repeat the verification/adjustment operations of the tilt (i) of the LHA unit.



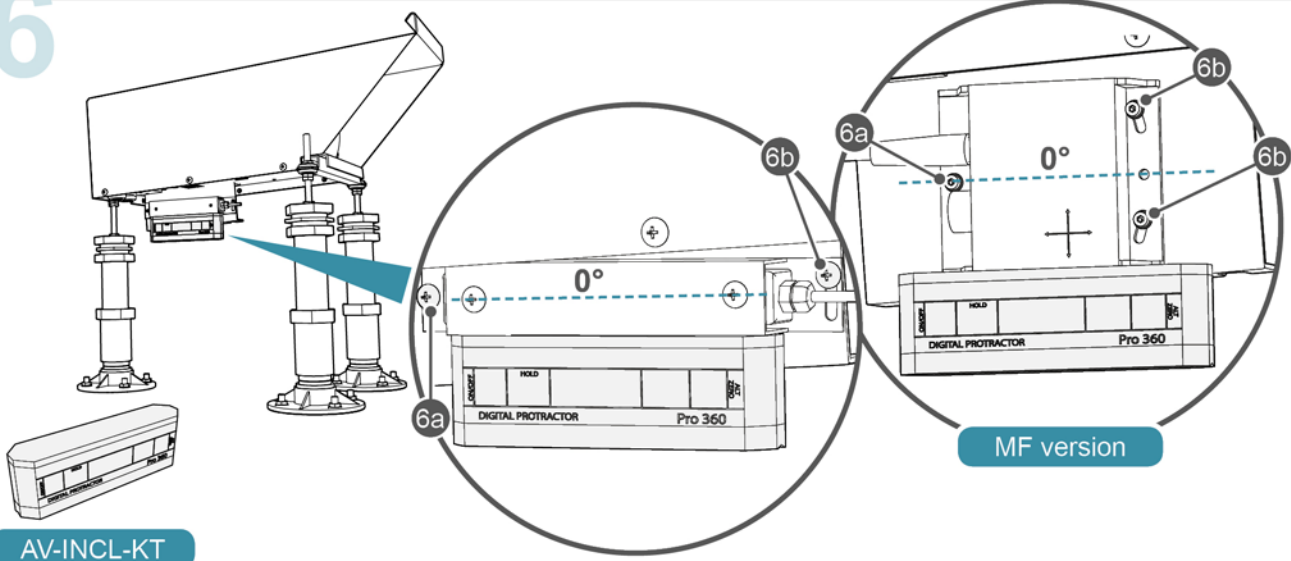
If necessary, proceed to fine adjustments of the tilt (i) and proceed to a further verification of the alignment (0°).

If the LHA unit is equipped with the tilt switch optional device, follow the resetting the device. Loosen the screws slightly (6a) and (6b) and use the clinometer to reset the tilt switch. When the value detected by the clinometer is equal to 0° ($\pm 0.02^\circ$) tighten the screws (6a) and (6b).

5



6





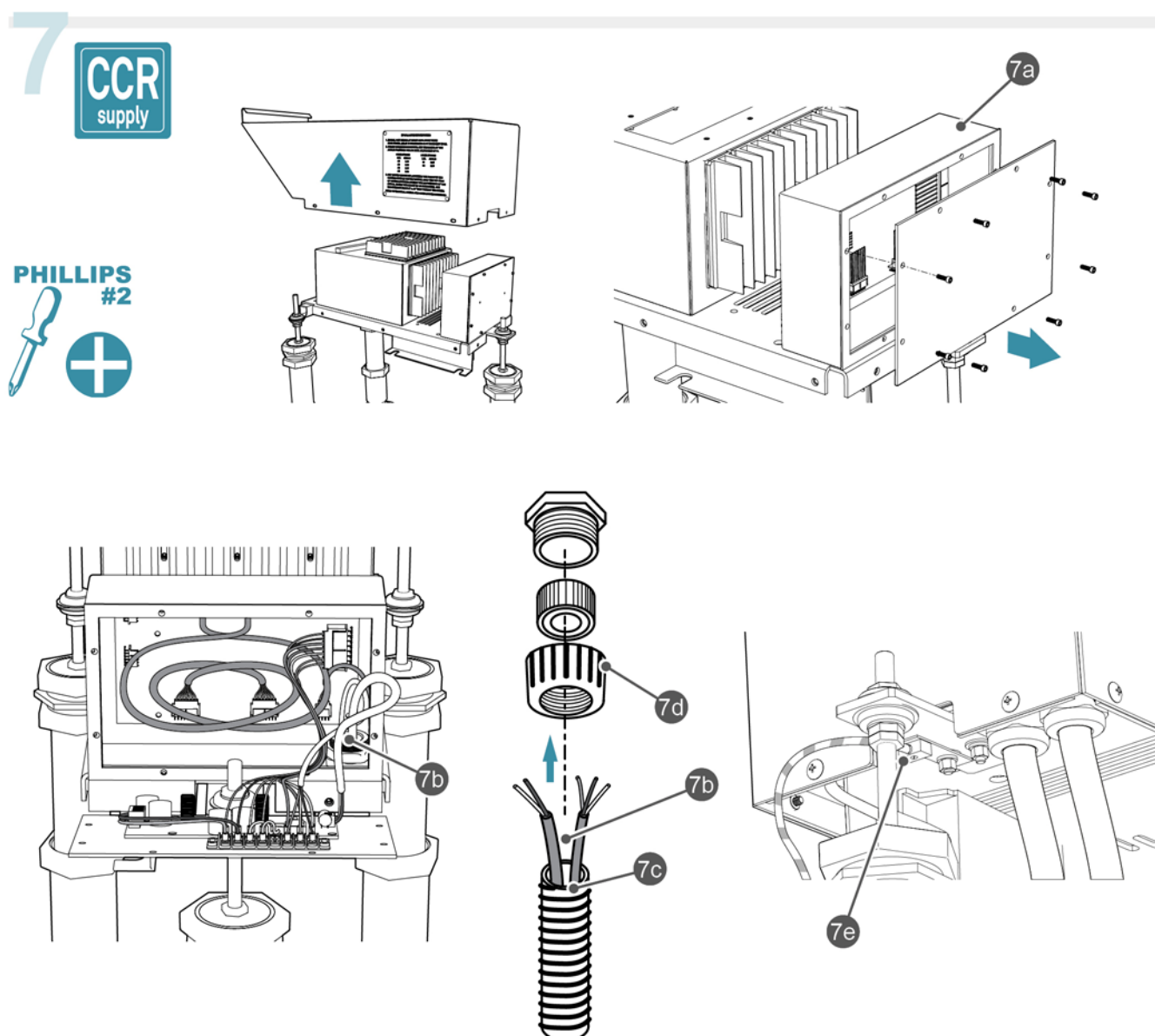
Pay attention not to damage the cables of the LHA units during installation operations. Before connecting, protect the cables of the LHA units by using the wrinkled tube supplied. The number and the type of input cables can change depending on the configuration.

Protect the input cables to each LHA unit proceeding as follows:

- Open the electronic box (7a) and make note of the connection diagram of the cables of the LHA unit;
- Disconnect the input cables (7b) from the relevant terminals;
- Put the cables (7b) in the wrinkled tube (7c), previously prepared;
- Pass the cables through the cable gland (7d) and enter them in the electronic box;
- Screw the tube in the cable gland;
- Reconnect the cables respecting the connection diagram and close the electronic box;
- Connect the protective conductor (7e).



Use the prepared works to contain the cables, the connections and all the devices necessary for the proper functioning of the system. The isolation transformers are not included in this supply.



Make the connections of each LHA unit proceeding as follows:

- The power cable (L-823 Style 1) to the secondary of the isolation transformer 150 W (not included in the supply) inserted on the series circuit;
- The communication cable CAN BUS in parallel with the cables CAN BUS of other LHA units of the system (connect together the wires of the same colour), extending them by means of the three-core cable supplied performing watertightness connections;
- The cable of the optional monitoring (L-823 Style 6) to the external monitoring device; in case of Power Line communication connect the external monitoring device to the primary circuit by means of isolation transformer from 45 W (not included in the supply).



At the end of installation, carry out a function test of each unit.

Position a screen (8a) in front of LHA units (ex. a panel of paper/cardboard) and check that the units work properly.

Don't look directly inside the light source during operation

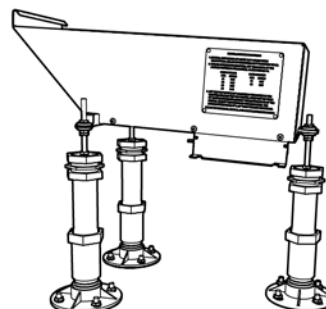
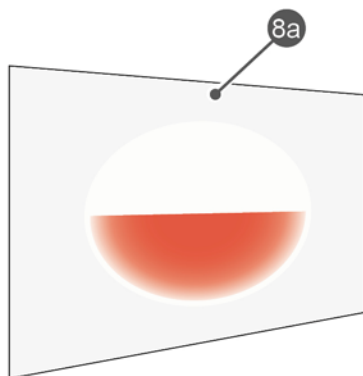
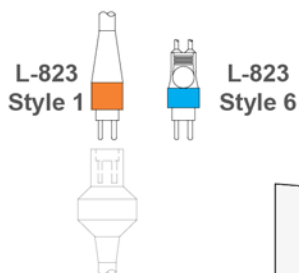
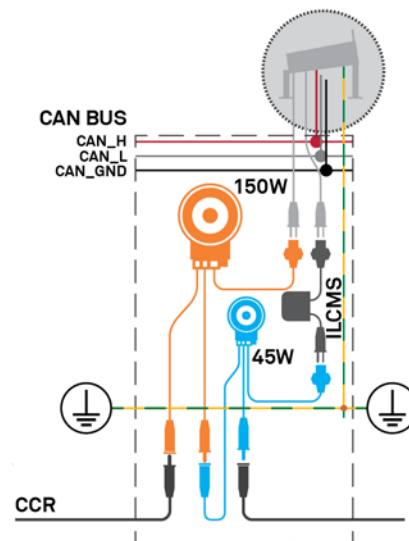
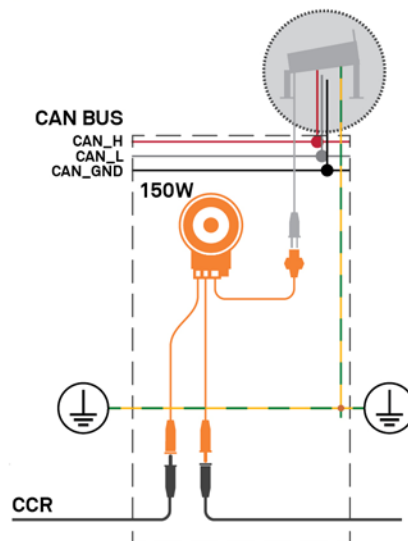
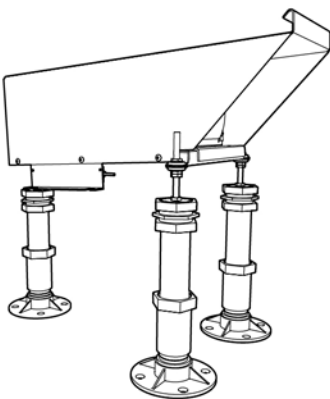
Check the proper light flow testing the power levels provided for by the model.

8

CCR
supply

S0 - standard configuration

SM - fault monitoring



4 ADJUSTMENTS AND 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.

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

4.1 Scheduled maintenance

In accordance with the suggestions contained in the document FAA AC 150 5340-28, LED PAPI 66 must be subjected to regular maintenance.

In order to assure the proper functioning of the fixtures 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
every day	Check of the normal operation of the fixture.
monthly	Command control.
	Check of the general conditions to identify any damages caused by service vehicles or aircrafts
	External cleaning of the lens and of the filters.
	Check of the mechanical parts to identify any damages.
	Check the status of the protective devices (dischargers) - if present.
	Search for any damage caused by seepage of water and by insect infestations
	Search for presence of rodents.
	Verification of the alignment and pointing of LHA modules.
	Verification of the adjustment and of the functioning of the tilt switch.
every 4 months	Integrity check of the OCS buffer zone (obstacle-free) in approach direction.
every 6 months	Verification of the insulation resistance of the underground cables.
	Verification of the earth resistance of the system.
every year	Check the stability of the civil works.
unscheduled	Replacement of fixtures presenting breakdowns or malfunctions.
	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 cover).
	Check of the mounting gaskets (to be carried out during intervention requiring the removal of the fixture cover).
	Check of the integrity of the electric cables (to be carried out during intervention requiring the removal of the fixture cover).
	Removal of snow (when necessary).

4.2 Removal of the cover



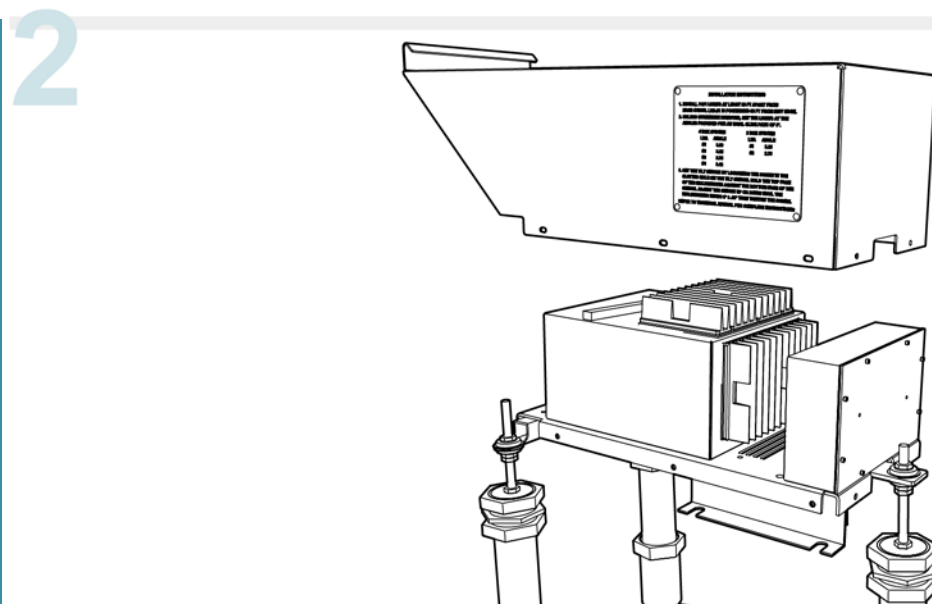
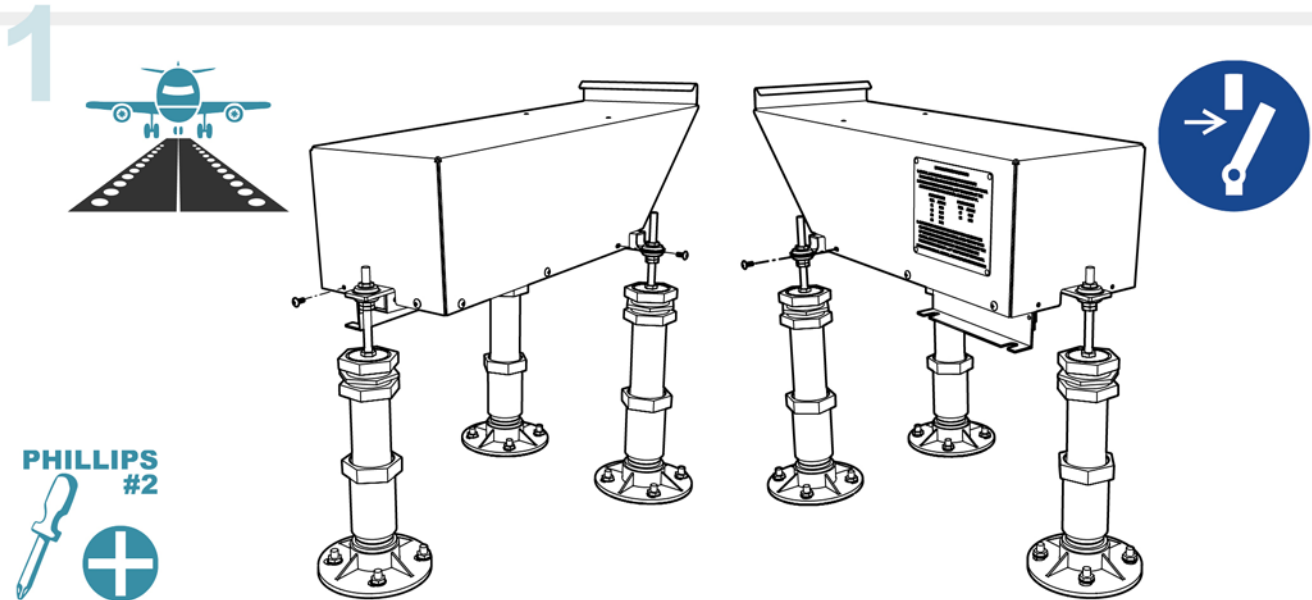
Before carrying out any intervention on the fixture, cut off all external power sources and place appropriate work-in-progress warnings on the systems. Wait for the discharging time (at least 5 minutes) and check using appropriate instruments that there are no residual energies before accessing the electrical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



Every time that the fixture body is opened, all cables must be checked. If necessary, use only original spare parts by OCEM Airfield Technology.

Whenever the LED PAPI 66 fixture is opened, it must be ensured that:

- the optical unit is undamaged and clean;
- the gaskets of the heat sinks does not have breakdowns;
- the supply cables and the connectors are undamaged and do not have breakdowns or abrasions.



4.3 Cleaning of the lens



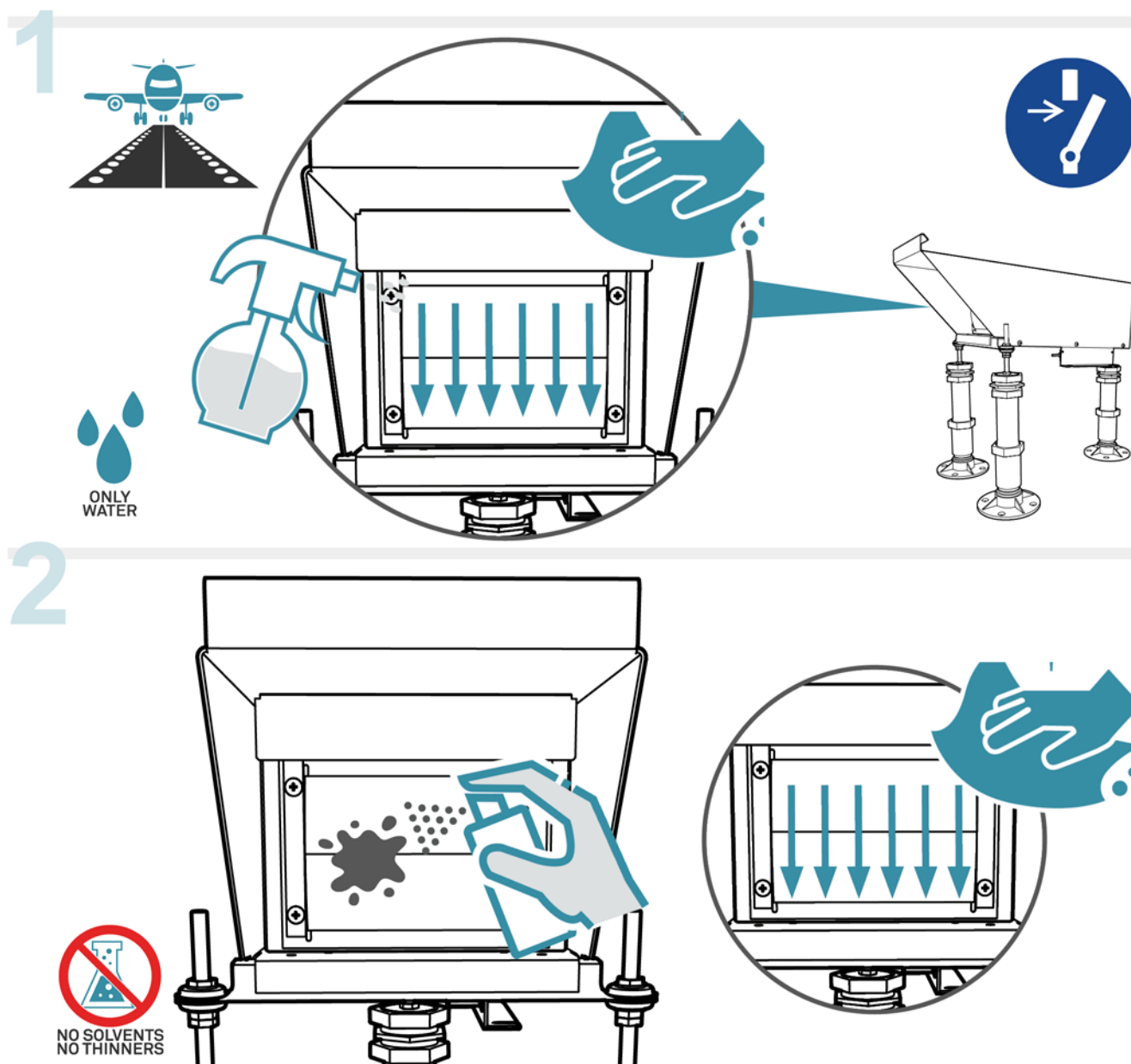
Before carrying out any intervention on the fixture, cut off all external power sources and place appropriate work-in-progress warnings on the systems. Wait for the discharging time (at least 5 minutes) and check using appropriate instruments that there are no residual energies before accessing the electrical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

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

The external cleaning operation of the lens 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 lens internally.



Do not use solvent or diluent products to avoid damaging the glass lens. In case the lens is damaged, replace it.



4.4 Replacement of the Led MODULE assembly



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.

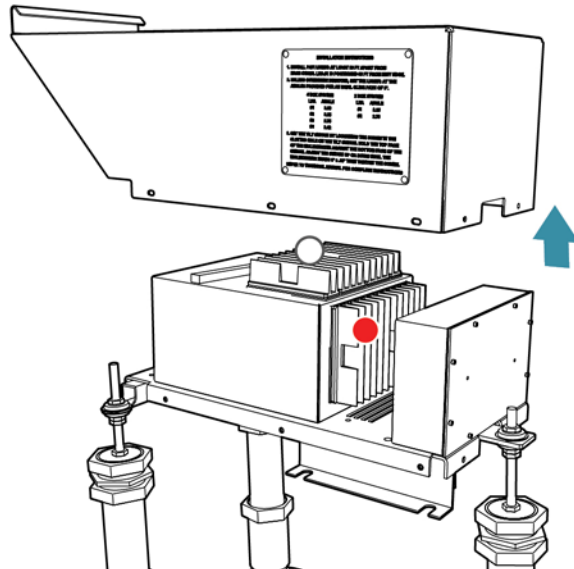
The replacement procedure of the LED module is valid for both the LED sources (rear RED/upper WHITE).

Remove the upper cover of the fixture and access the LED module (see related paragraph in the chapter "ADJUSTMENTS AND MAINTENANCE").



Before disconnecting and removing the LED module, mark the position of the 4 edges of the heat sink on the optical box, in order to fasten the replacement module in the same position, to avoid the risk of misalignment of the light beam.
If necessary, replace the gasket below the heat sink of the LED module.

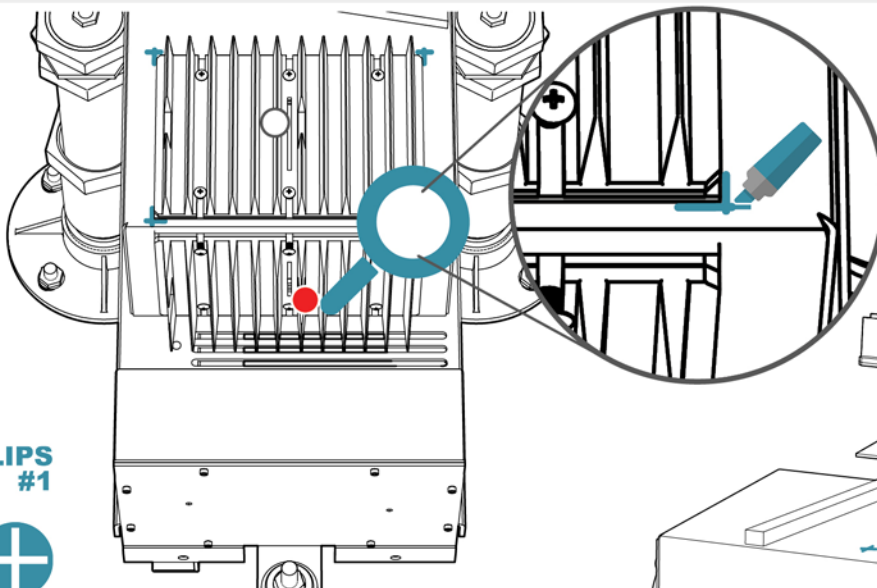
1



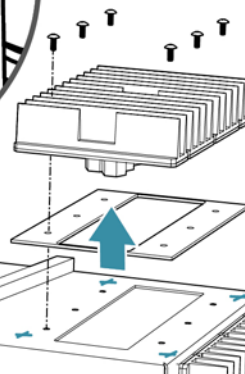
PHILLIPS
#2



2



PHILLIPS
#1





Check that the replacement LED module match the desired colour configuration. **ATTENTION:** Check the position references of the LED module before definitively fasten and connect the module.



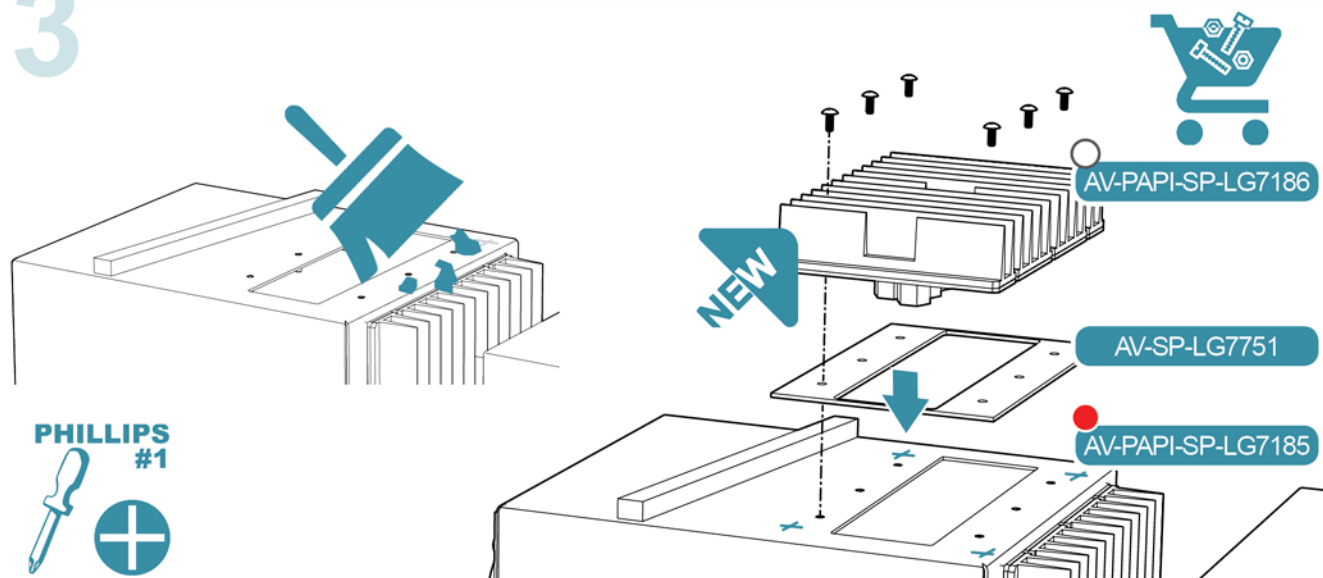
Do not use solvent or diluent products.
Remove any condensation accumulated during operations: if necessary, dry thoroughly the internal sides of the device.



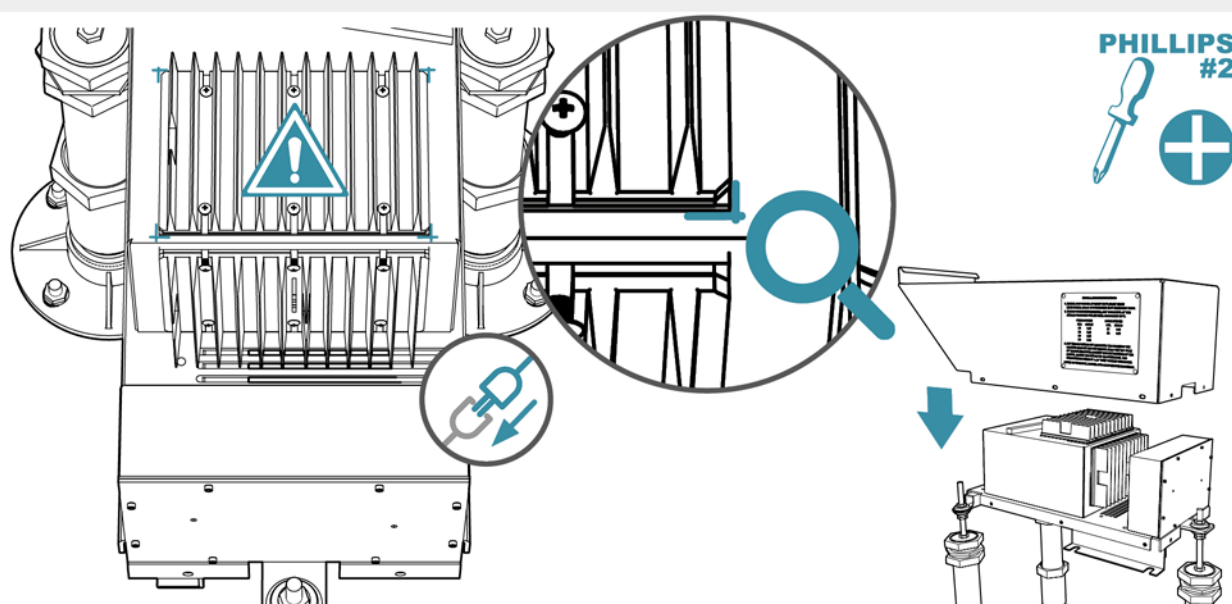
If necessary, replace the gasket.

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

3



4



4.5 Replacement of the PCBA LED Driver Board

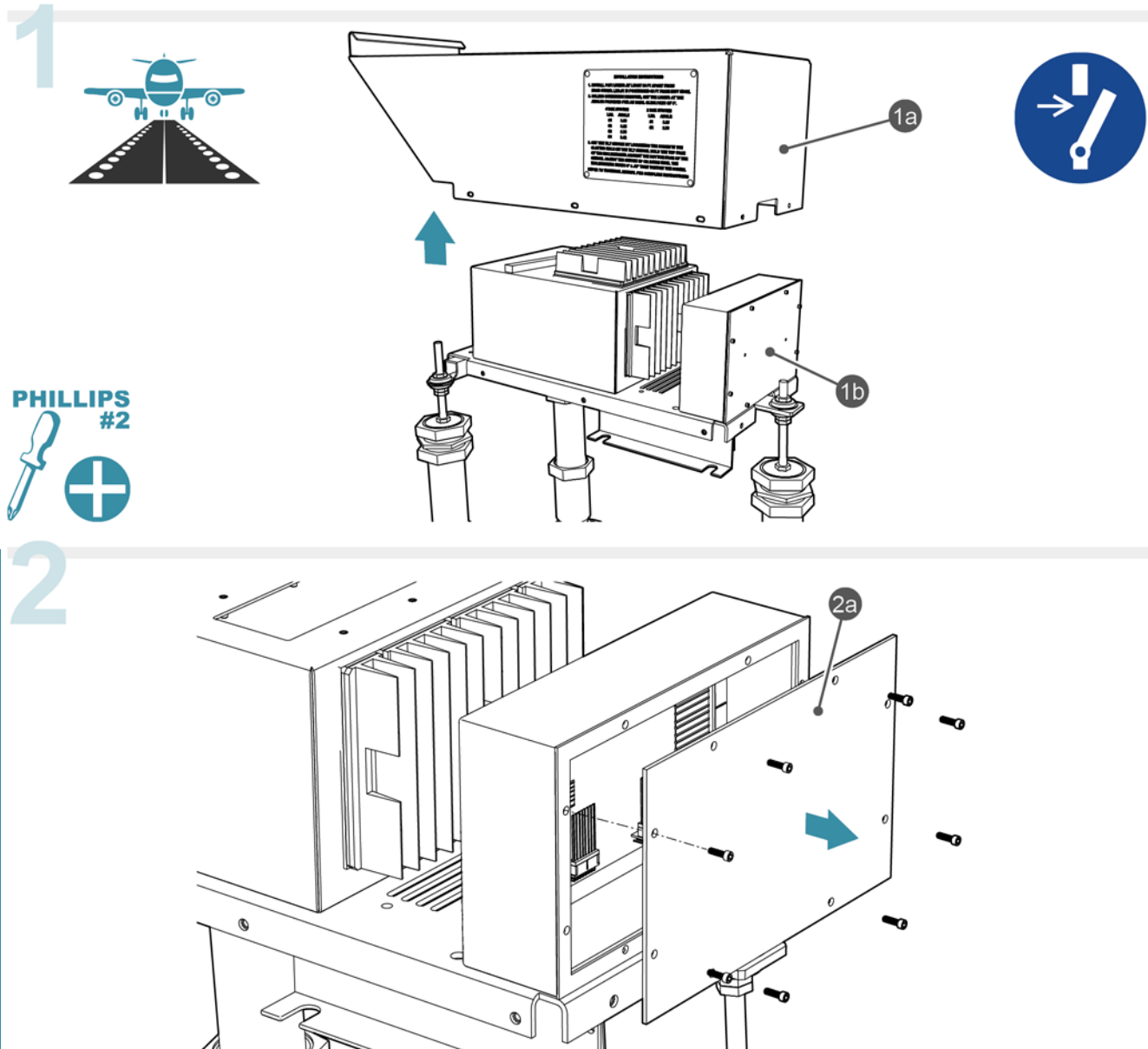


Before carrying out any intervention on the fixture, cut off all external power sources and place appropriate work-in-progress warnings on the systems. Wait for the discharging time (at least 5 minutes) and check using appropriate instruments that there are no residual energies before accessing the electrical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

The PCBA LED Driver Board is a complete spare part: when ordering always communicate the model and the options installed on the LHA device.

Disconnect the supply cables of the LHA unit. Remove the upper cover of the fixture (1a) and access the electronic box (1b) (see related paragraph in the chapter “ADJUSTMENTS AND MAINTENANCE”).

Unscrew the screws and remove the cover (2a) of the electronic box internal to the fixture.





Before disconnecting the board mark the position references in order to restore the exact configuration of the connection (position and orientation compared with the board).

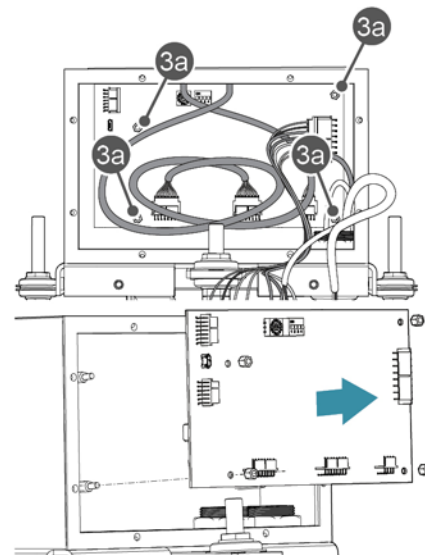
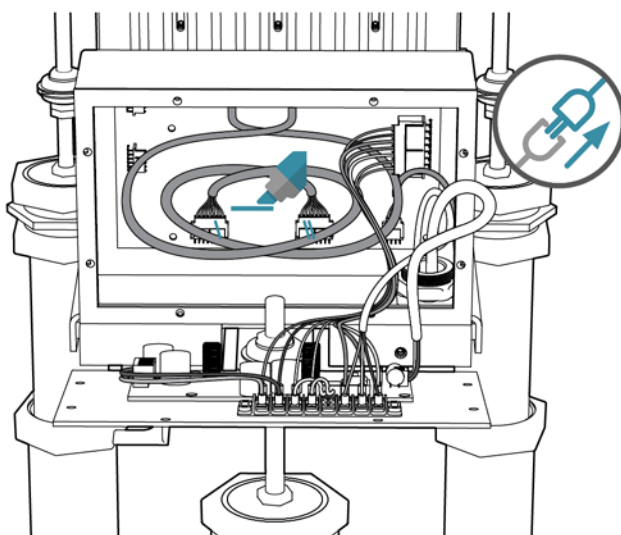
Unscrew the self-locking nuts (3a). Disconnect the connectors from the PCBA LED Driver Board and remove the board from its seat paying the utmost caution.

If necessary, carefully clean the connection box (4a).

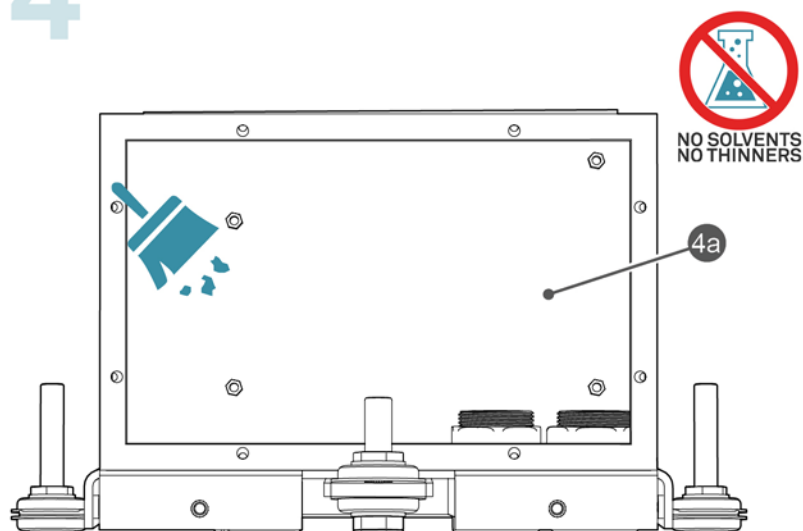
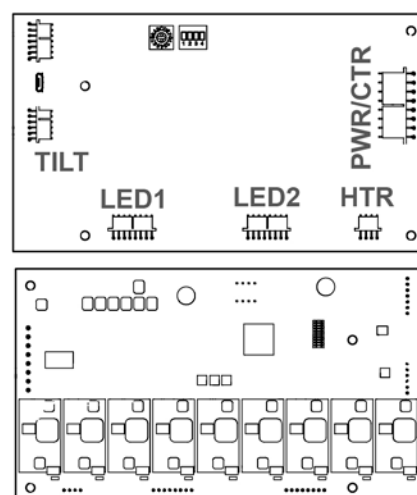


Do not use solvent or diluent products. Remove any condensation accumulated during operations: if necessary, dry thoroughly the internal sides of the device.

3

IMPERIAL
1/4

4

NO SOLVENTS
NO THINNERS

Fasten the PCB LED driver (5a) to its supports.



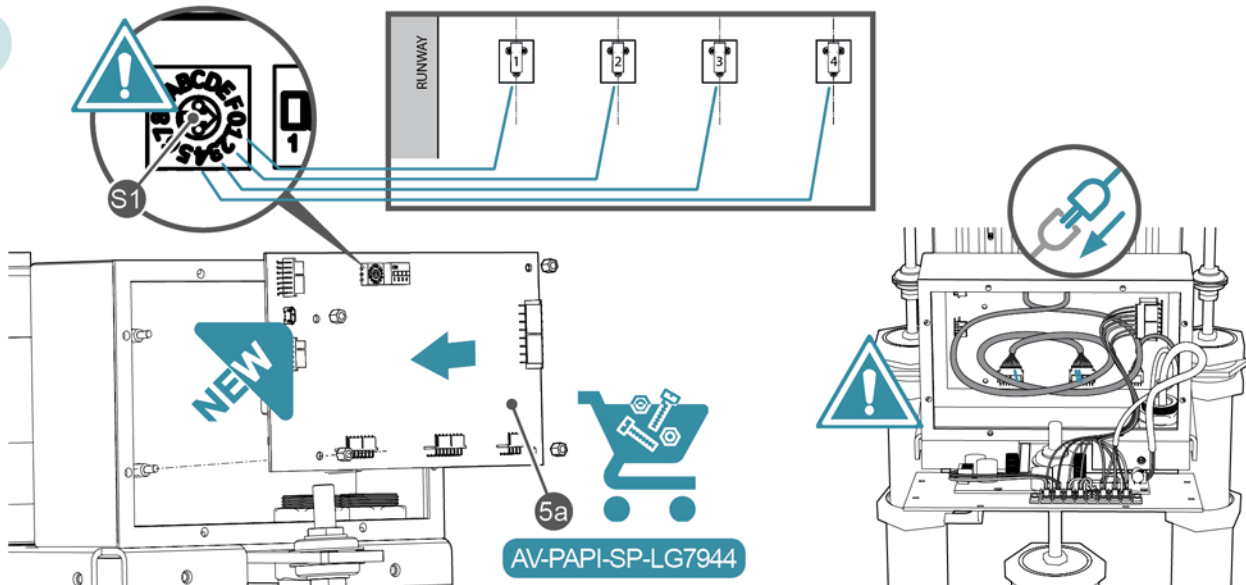
Before connecting the electronic board configure the component for use in the field: with an appropriate adjustment tool act on the selector (S1) and select the identifier of the LHA unit on which is intended to install the electronic board.

Reconnect the connectors to the PCBA LED Driver Board, respecting the configuration previously marked.

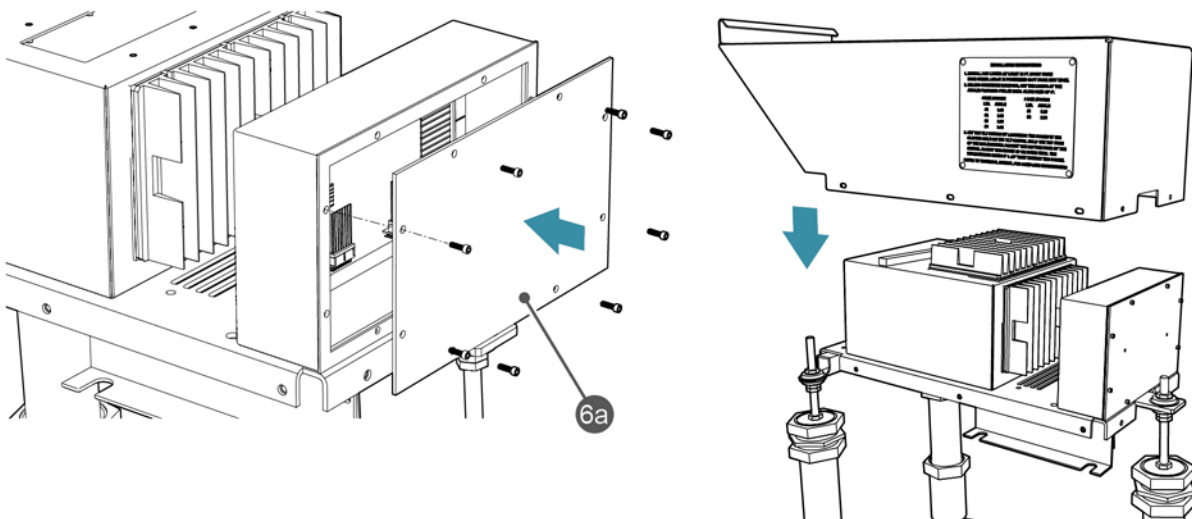
Position the cover (6a) of the electronic box and tighten the screws.

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

5



6



4.6 Replacement of the PCBA CCR Interface Board

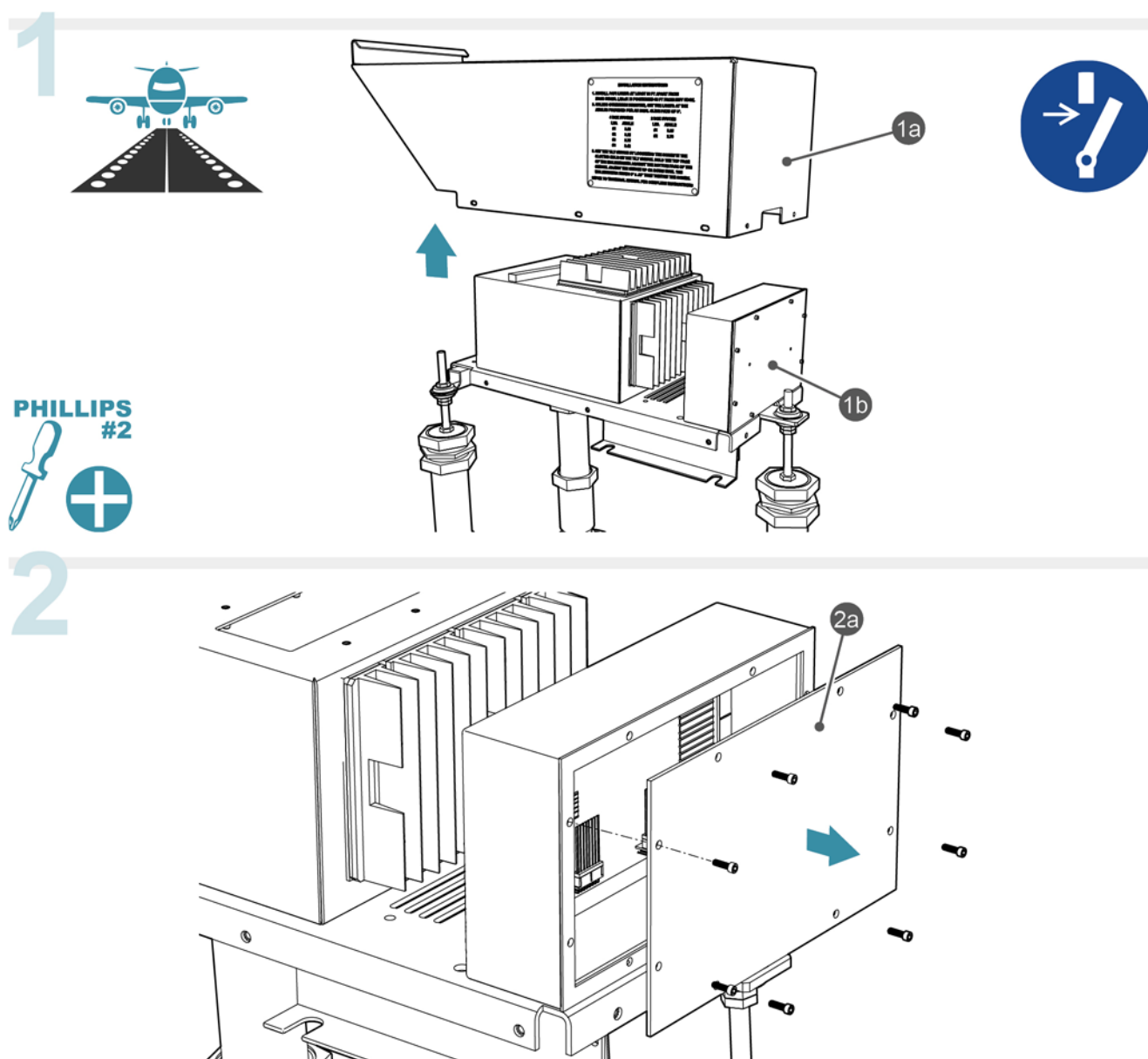


Before carrying out any intervention on the fixture, cut off all external power sources and place appropriate work-in-progress warnings on the systems. Wait for the discharging time (at least 5 minutes) and check using appropriate instruments that there are no residual energies before accessing the electrical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

The electronic board is provided in a kit including a cover, terminal board and cable. In the version for the monitored LHA unit, the replacement kit also includes the monitoring relay. When ordering always communicate the model and the options installed on the LHA device.

Disconnect the supply cables of the LHA unit. Remove the upper cover of the fixture (1a) and access the electronic box (1b) (see related paragraph in the chapter “ADJUSTMENTS AND MAINTENANCE”).

Unscrew the screws and remove the cover (2a) of the electronic box internal to the fixture.





Before disconnecting the board mark on the connectors the position references in order to restore the exact configuration of the connection (position and orientation compared with the board).

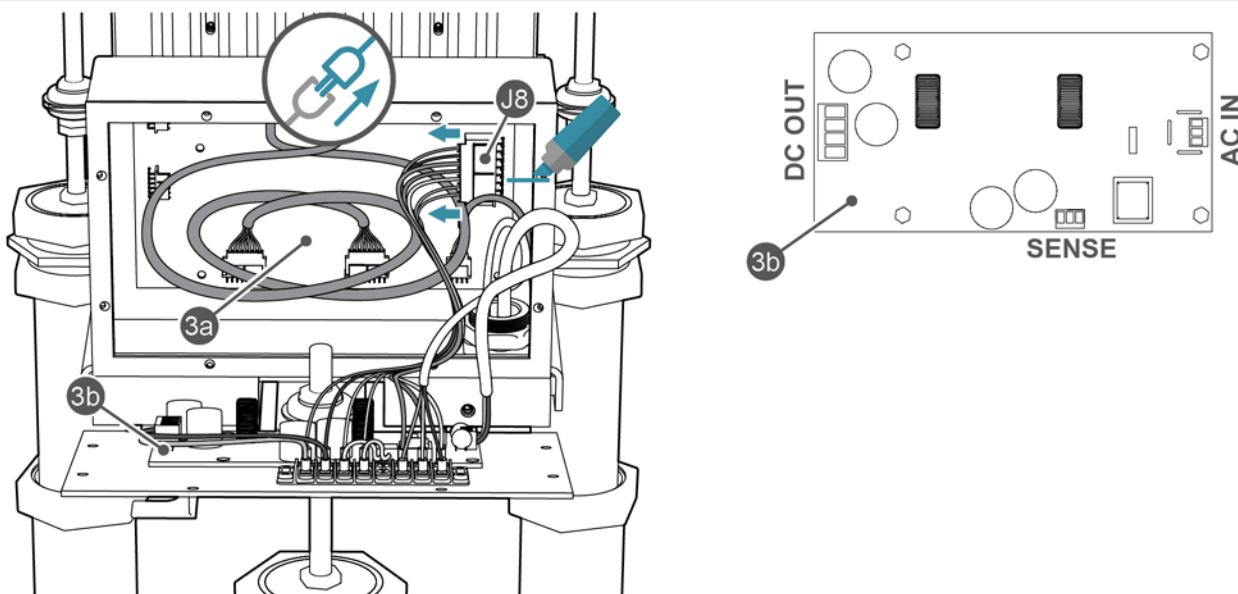
Disconnect the connector PWR/CTR (J8) of the electronic board (3a).
Disconnect the connectors from the PCBA CCR Interface Board (3b) paying the utmost caution not to damage the cables.

Remove the cover (4a) with the board on board and the related cables.

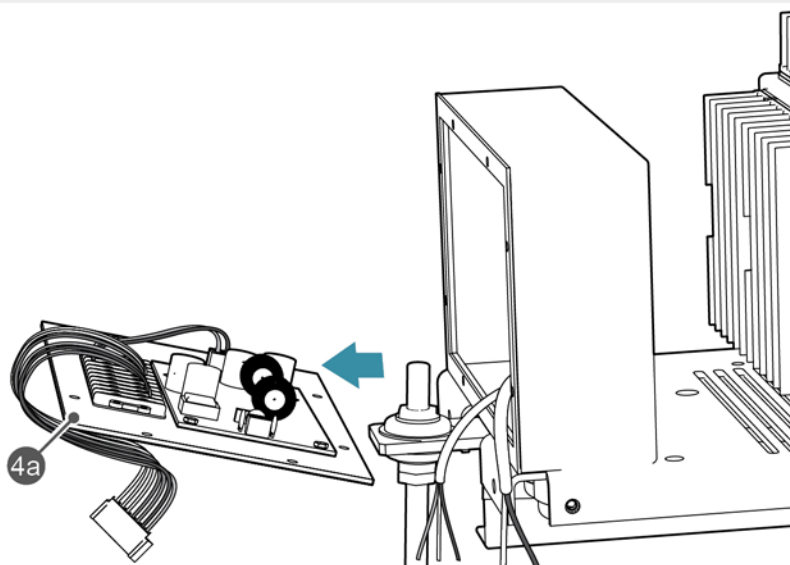


Remove any condensation accumulated during operations: if necessary, dry thoroughly the internal sides of the device.

3



4

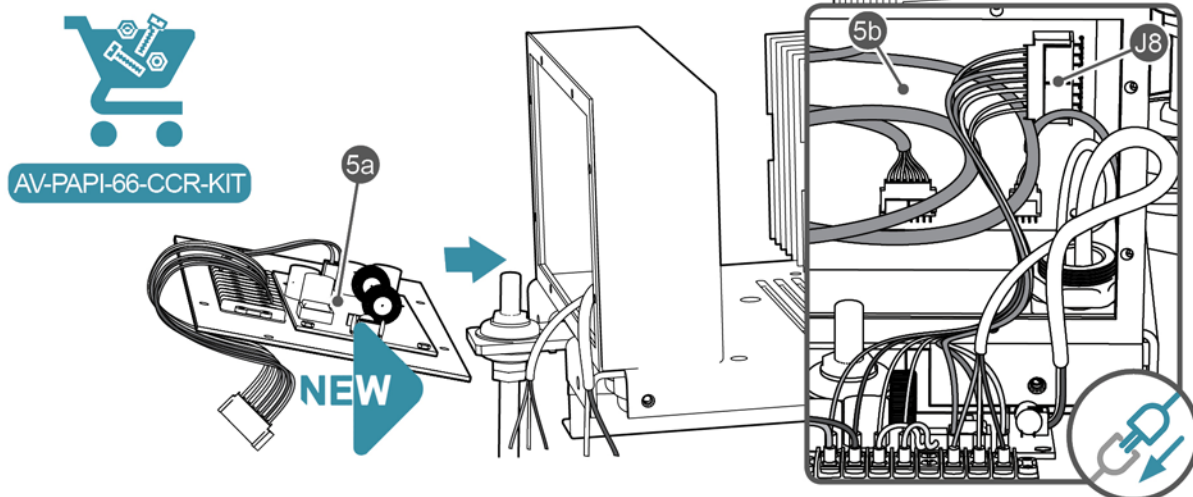


Reconnect the connectors of the PCBA CCR Interface Board (5a) respecting the configuration previously marked. Reconnect the connector PWR/CTR (J8) of the electronic board (5b).

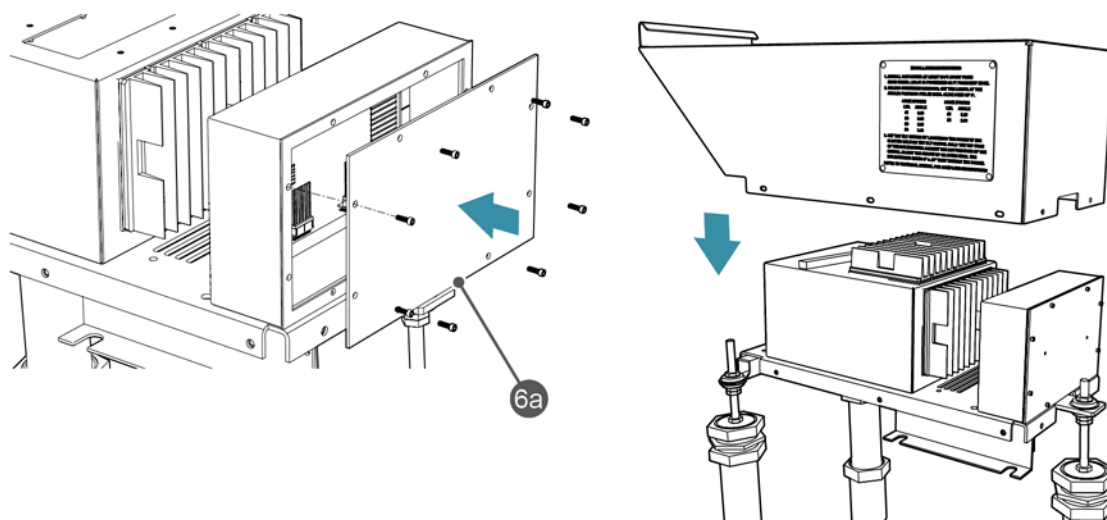
Position the cover (6a) of the electronic box and tighten the screws.

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

5



6



4.7 Replacement of the LHA support

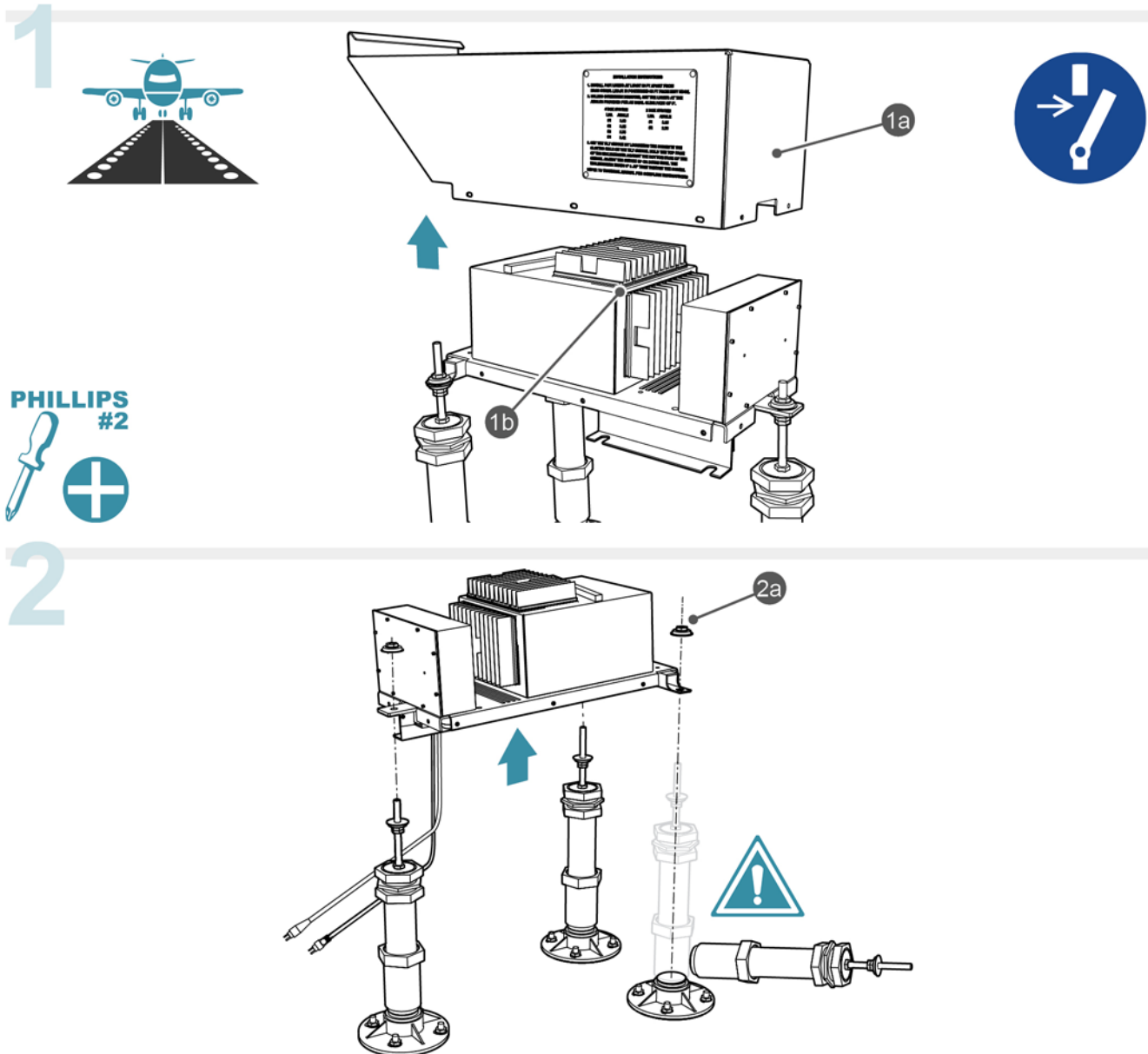


Before carrying out any intervention on the fixture, cut off all external power sources and place appropriate work-in-progress warnings on the systems. Wait for the discharging time (at least 5 minutes) and check using appropriate instruments that there are no residual energies before accessing the electrical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

The support is a complete spare part, diversified depending on the type and position (fixed installation or mobile installation, front or rear support).

Disconnect the supply cables of the LHA unit. Remove the upper cover (1a) of the fixture and access the LED module (1b) (see related paragraph in the chapter "ADJUSTMENTS AND MAINTENANCE").

Unscrew the three upper locking nuts (2a) and extract the spherical washers. Remove the LHA supports.



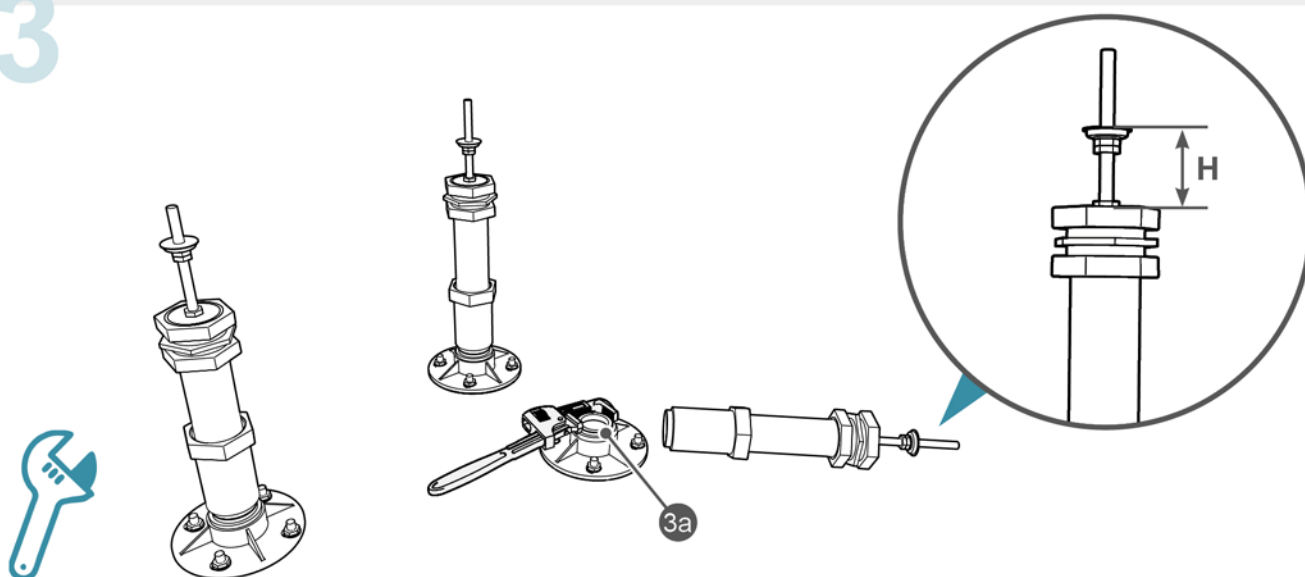


Before disconnecting, proceed with the operation, detect and record the position of the lower support nut to simplify the pointing operations.

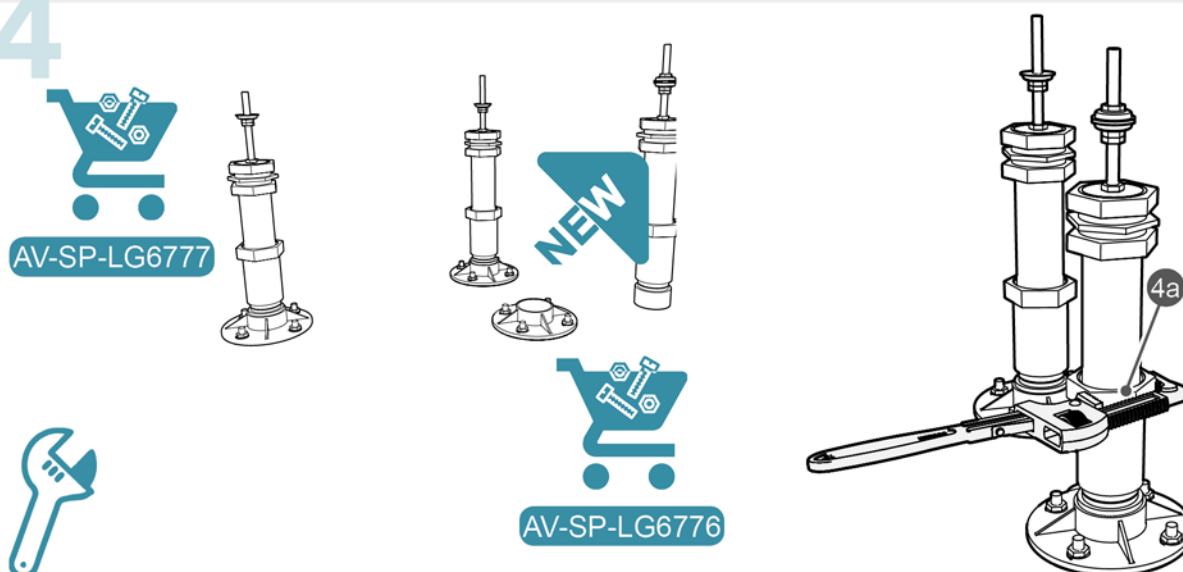
Grab the damaged support (3a) with an adjustable wrench in correspondence of the base of the breakable coupling element. Rotate counterclockwise and remove the support of the fastening flange.

Arrange the spare part for installation and start manually clockwise tighten the new support to the fastening flange anchored to the base. Grab the support (4a) with an adjustable wrench in correspondence of the base of the breakable coupling element. Rotate clockwise and completely tighten the support to the fastening flange.

3



4



ADJUSTMENTS AND MAINTENANCE

Unscrew the upper locking nut (5a) and adjust the lower nut to the correct height, previously detected.

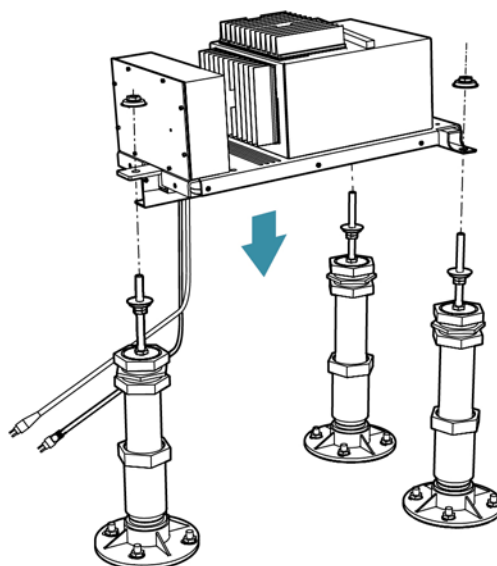
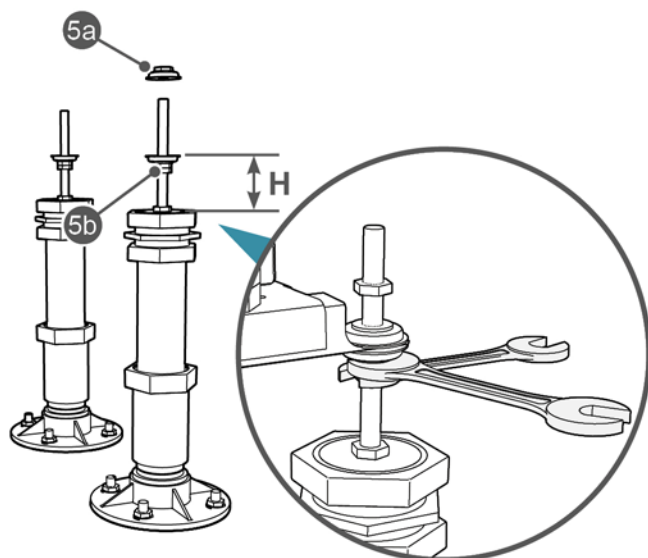
Position the LHA unit on the supports and spherical washers. Tighten the three upper locking nuts.

Check the proper alignment of the fixture (see the related paragraph in the chapter "ADJUSTMENTS AND MAINTENANCE").

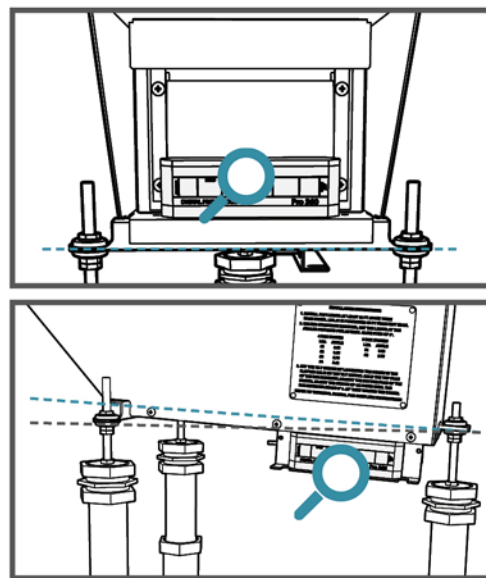
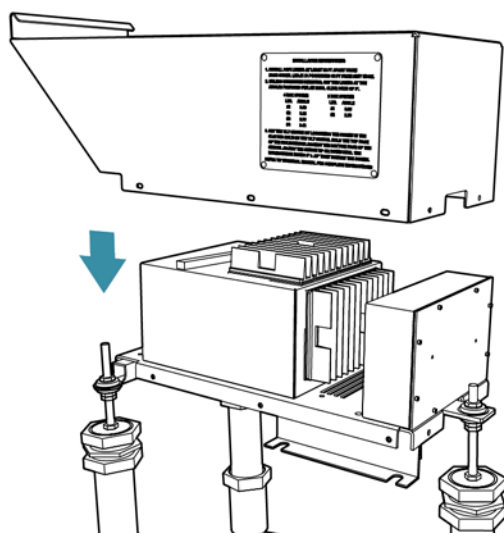


Tighten the screws with the indicated torque values.

5



6



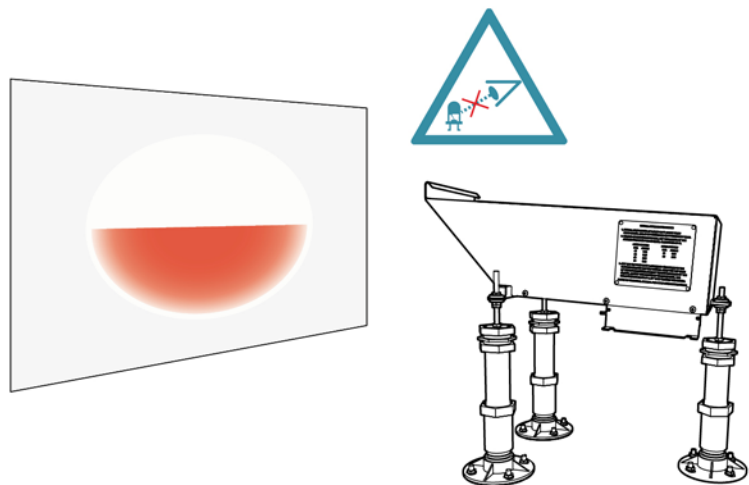
4.8 Troubleshooting



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



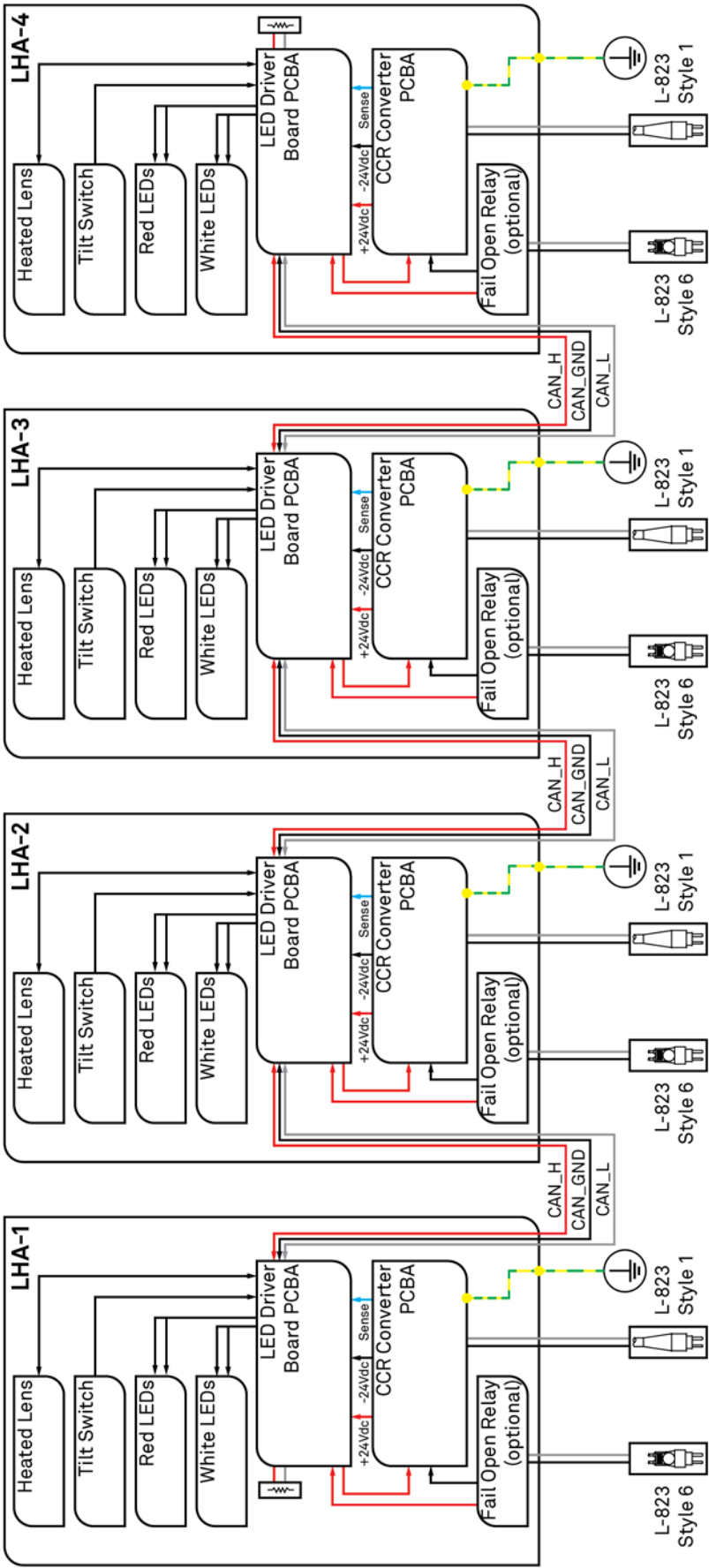
Don't look directly inside the light source during operation
At the end of maintenance, carry out a function test of each unit.
Position a screen in front of LHA units (ex. a panel of paper/cardboard) and check that the units work properly.
Check the proper light flow testing the power levels provided for by the model.



Problems		
	Possible causes	Possible solutions
When the bar is powered all the units light up, remain lit for 10-30 sec, then switch off.		
	Tilt error of one unit. (the system is designed to switch off all the units when a unit has an inclination going outside accessible limits)	1. Remove supply to the bar. 2. Remove the external cover and open the electronic box of any unit. 3. Supply the bar. 4. On the LED driver board there is a red LED (D22): if steady on it indicates that the fault is on the unit present, if it is flashing, the number of flashes indicates the number of the faulty unit. 5. On the unit that faces the problem, check the tilt angle according to the Paragraph 3.2 point 5, therefore restore the position of the tilt error detector (Paragraph 3.2 point 6).
	If after trying the proposed solutions the problem persists, contact OCEM Customer Service.	

Problems		
Possible causes	Possible solutions	
When the bar is powered all the units light up, remain lit for 1-5 sec then switch off.		
LED fault on a unit (the system is designed to switch off all the units when a unit has a number of faulty LEDs greater than a certain quantity)	1. Remove supply to the bar. 2. Remove the external cover and open the electronic box of any unit. 3. Supply the bar. 4. On the LED driver board there is a red LED (D22): if steady on it indicates that the fault is on the unit present, if it is flashing, the number of flashes indicates the number of the faulty unit 5. Remove supply to the bar. 6. On the unit that faces the problem, open the electronic box and check the internal connections. 7. Supply the bar. 8. If the problem persists, remove supply to the bar and replace the LED Driver Board. 9. Supply the bar. 10. If the problem persists, remove supply to the bar and replace the red LED module (according to the Paragraph 4.4). 11. Supply the bar. 12. If the problem persists, remove supply to the bar and replace the white LED module (Paragraph 4.4).  ATTENTION: don't look directly inside the light source during operation.	
	If after trying the proposed solutions the problem persists contact OCEM Customer Service.	
When the bar is powered, a unit remains completely switched off, while the others light up and then switch off.		
The CCR Interface Board is faulty	1. Remove supply to the bar. 2. Remove the external cover and open the electronic box. 3. Supply the bar. 4. Check that the green leds on the LED Driver Board are lit. 5. If they are off, disconnect the bar and replace the CCR Interface Board.	
The LED Driver Board is faulty	6. Supply the bar 7. If the problem persists, replace the LED Driver Board.	
Disconnected power supply cable	8. If the problem persists, check the power cable and the connection to the secondary of the isolation transformer.	
	If after trying the proposed solutions the problem persists, contact OCEM Customer Service.	
When the bar is powered, one or more units flashes.		
	Contact OCEM Customer Service.	
When the bar is powered, all units remain switched off		
	Contact OCEM Customer Service.	

4.9 Block diagram of the system



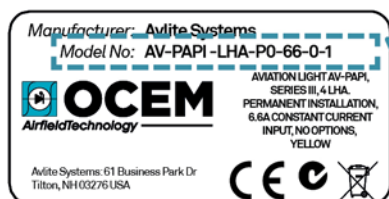
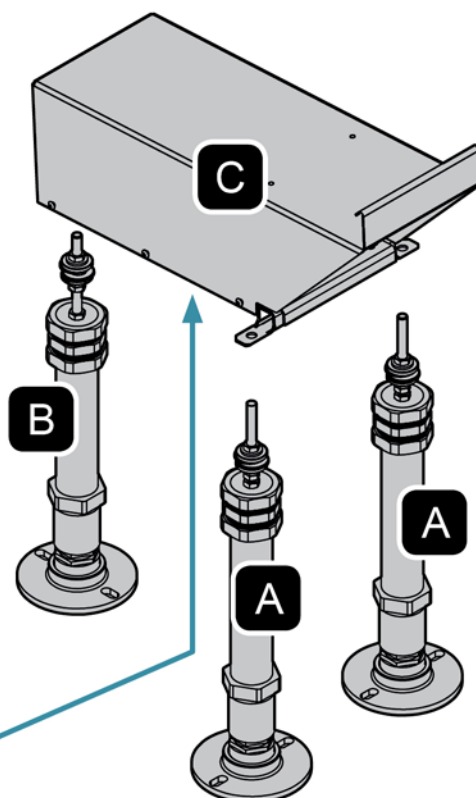
4.10 Spare parts



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

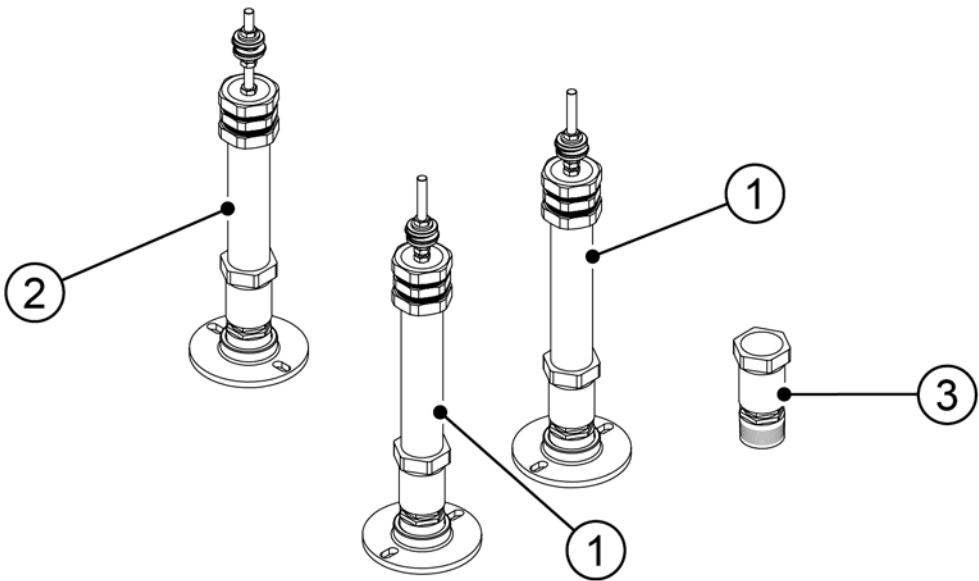
LED PAPI 66 fixture	
A	Front support
B	Rear support
C	Optical unit.

Accessories		Code Art.
D	Clinometer	



4.10.1 Support units

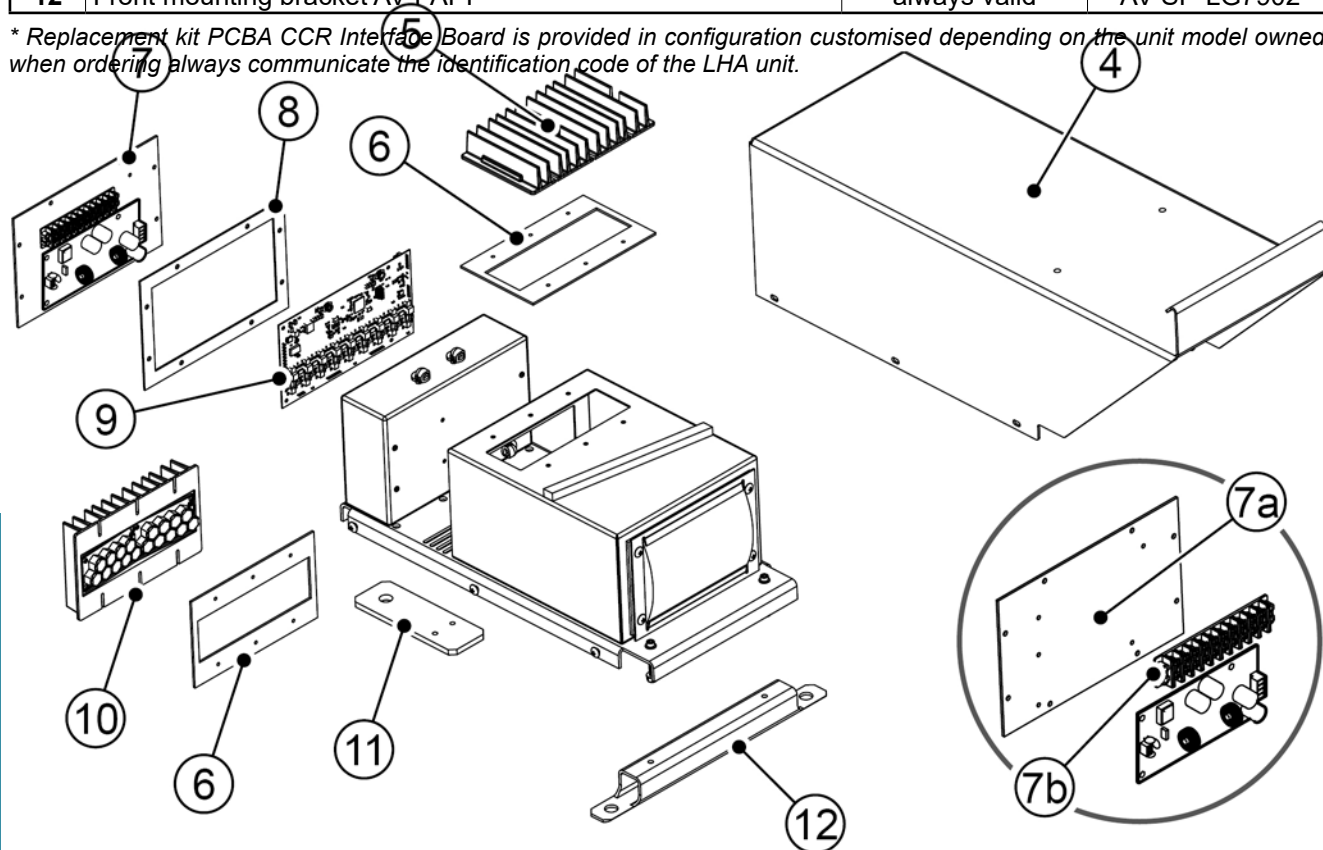
Pos	Description	Fixture Code	Code Art.
1	Front support assembly (fixed mounting) AV-PAPI	- P 0 - - - -	AV-SP-LG6776
2	Rear support assembly (fixed mounting) AV-PAPI	- P 0 - - - -	AV-SP-LG6777
3	Frangible couplings, thread 2" (per 2" EMT)	always valid	AV-MC-59-E



4.10.2 Optical unit

Pos	Description	Fixture Code	Code Art.
4	External fixture cover AV-PAPI (specify colour when ordering)	always valid	AV-SP-LG7179
5	White LED AV-PAPI module	always valid	AV-PAPI-SP-LG7186
6	Gasket for LED AV-PAPI module	always valid	AV-SP-LG7751
7	Replacement kit PCBA CCR Interface Board with rear cover of the AV-PAPI electronic box, terminal board and cable. With monitoring relay for versions equipped with option SM00/ SMMF*.	always valid*	AV-PAPI-66-CCR-KIT
7a	Back cover of the electronic box AV-PAPI	always valid	AV-SP-LG7183
7b	Terminal boxes 10 circuits (Marathon Special Product)	always valid	671 RZ 10
8	Gasket for electrical connections box AV-PAPI	always valid	AV-PAPI-SP-LG7184
9	PCBA LED Driver Board AV-PAPI	always valid	AV-PAPI-SP-LG7944
10	Red LED AV-PAPI module	always valid	AV-PAPI-SP-LG7185
11	Rear mounting bracket AV-PAPI	always valid	AV-SP-LG7191
12	Front mounting bracket AV-PAPI	always valid	AV-SP-LG7902

* Replacement kit PCBA CCR Interface Board is provided in configuration customised depending on the unit model owned: when ordering always communicate the identification code of the LHA unit.



Note: to order a complete replacement optical unit, use an article code of the unit to be replaced using the LHA code - ex: unit to be replaced AV-PAPI-**A**-P0-66-15-0; unit to be ordered AV-PAPI-**LHA**-P0-66-15-0.

Contact us

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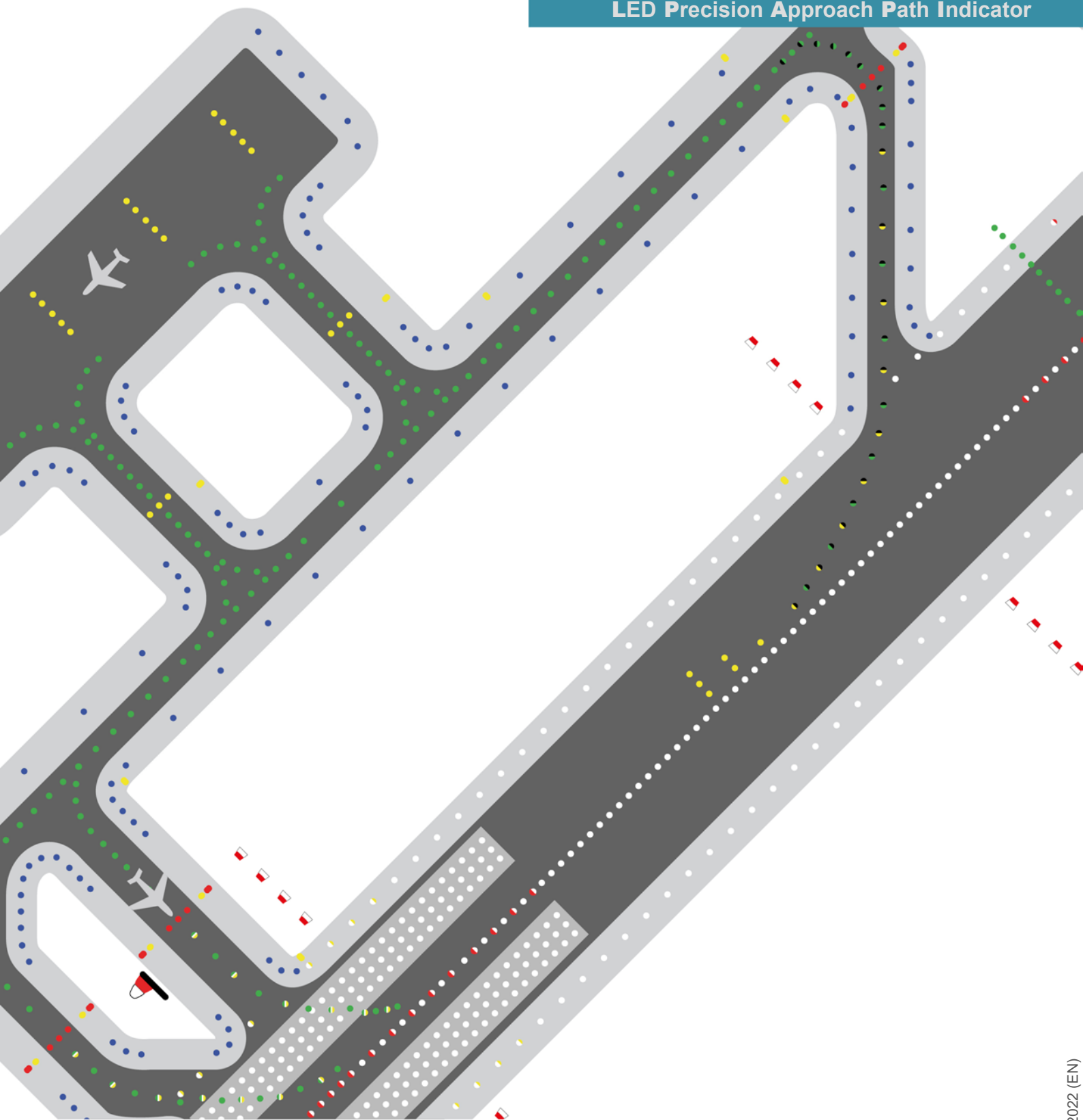


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LED Precision Approach Path Indicator



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