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INSET TAXIWAY CENTRELINE AND STOP BAR LIGHT

TWCS

INSTRUCTION MANUAL FOR USE, INSTALLATION AND MAINTENANCE

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N° Attachments: 1 Copy n°:

LIMITED PRODUCT WARRANTY

THE FOLLOWING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESS, IMPLIED OR STATUTORY, INCLUDING, BUT NOT BY WAY OF LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

OCEM - ENERGY TECHNOLOGY warrants to each original Buyer of Products manufactured by the Company that such Products are at the time of delivery to the Buyer, free of material and workmanship defects, provided that no warranty is made with respect to:

(a) any Product, which has been repaired or altered in such a way, in Company's judgement, as to affect the Product adversely;
(b) any Product which has, in Company's judgement, been subject to negligence, accident or improper storage;
(c) any Product which has not been operated and maintained in accordance with normal practice and in conformity with recommendations and published specification of Company;
(d) the breaking of the warranty seals, if present, determines the immediate termination of the warranty; and,

OCEM - ENERGY TECHNOLOGY's obligation under this warranty is limited to use reasonable efforts to repair or, at its option, replace, during normal working hours at the facility of the Company, any Product which in its judgement proved not to be as warranted within the applicable warranty period. All costs of transportation of Products claimed not to be warranted and of those repaired or replaced, to or from the facility of the Company shall be borne by Purchaser. Company may require the return of any Product claimed not to be as warranted to its facility, transportation prepaid by Purchaser, to establish a claim under this warranty. The cost of labour for the installation of a repaired or replaced Product shall be borne by Purchaser. Replacement parts provided under the terms of this warranty are warranted for the remainder of the warranty period of the Products upon which they are installed to the same extent as if such parts were original components thereof. Warranty services provided under the Agreement do not assure uninterrupted operations of Products; Company does not assume any liability for damages caused by any delays involving warranty service.

IMPORTANT: READ THIS DOCUMENT

Before proceeding to the operations of installation, commissioning, operation, maintenance or disposal, carefully read the entire document.

SAFETY INFORMATION

Extreme caution should be exercised when working with this equipment; it is normally used or connected to circuits that operate at dangerous voltages and can be fatal.
The following section contains important safety information that you must follow when installing and using the apparatus.
Misuse of the equipment or lack of care in applying safety procedures and prescriptions specified in this document, may result in a hazard.
Avoid contact with voltage or current sources.
For no reason the protections and the safety devices must be removed.

OPERATION ON THE EQUIPMENT - SKILLS

Operation on the equipment and access to its internal parts shall be done by experienced personnel, adequately trained and aware of the risks related to electricity and high voltages.
Safety rules shall be adopted when operating on the equipment, or on cables and other apparatus connected to the it

DO NOT OPERATE ON ENERGIZED CIRCUITS

Do not carry out any operation on the converter or on apparatus connected to it when the circuits are energized.

WHEN HANDLING AND SERVICING THIS EQUIPMENT, OBSERVE PRECAUTIONS FOR HIGH VOLTAGE EQUIPMENT.

Before any access, inspection or intervention, be sure to have switched-off the unit, opened the main circuit breaker and removed the supply to the unit (by opening the circuit breaker/switch on the distribution board at the beginning of the supply line).

Then wait discharge time (at least 5 minutes), ground carefully the system, and check for voltage presence before accessing..

REANIMATION

The maintenance staff must be aware of the risks related to electricity, criteria to prevent the risk of electric shock and resuscitation techniques

CE MARK

CE This equipment complies with the requirements of European regulations for the CE mark.The user has to respect all prescriptions reported in this document.
This equipment complies with the requirements of the EEC directives 2004/108/EEC and 2006/95/EEC with regard to “Electromagnetic Compatibility” and “Low Voltage Electrical Apparatus” respectively.

OUT OF SERVICE

In case of dismantling, decommissioning, destruction, disposal, the user shall follow all the required precautions for component and material elimination, according to local rules and applicable law.

EDITIONS

Date	
12/14/2012	General Revision
12/03/2013	Updated § "List of the recommended spare parts"
11/03/2014	New address of the Company Deleted § "List of the recommended spare parts" and added relevant attachment

REVISIONS

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UC-PU-0309 - LIST OF THE RECOMMENDED SPARE PARTS

1 GENERAL

TWCS semi-flush taxiway centreline light is medium intensity, bidirectional or unidirectional, inset, 8" steady burning type.

These fixtures are intended for use as taxiway centreline and stop bar (ICAO) light, in order to provide a visual aid to the moving aircraft.

TWCS lights are in compliance with ICAO Annex 14 Vol.1, FAA AC 150/5345-46 (Style 3), IEC TS 61827 (Style 4) and NATO-STANAG 3316.

The fixtures described in this manual are designed to be connected to series circuit, fed through standard isolation transformers connected to CCR with variable current from 2.8 A to 6.6 A.

Location of these fittings shall be in compliance with ICAO – Annex 14, STANAG 3316 and FAA

2 MAIN FEATURES

Each light assembly consists of a removable fixture and a shallow base receptacle. The fixture is waterproof and designed to withstand aircraft impact and roll-over loads without damage.

On request a suitable adaptor ring (base mounted, option R) is available to allow the installation on shallow base, 12" diameter, or on deep base, type L-868, size B, as per FAA AC 150/5345-42, thereby permitting replacement of any inset fixture without removing the deep base from the pavement.

The fixture can be bidirectional type (bidirectional dome provided with two optical windows) or unidirectional type (unidirectional dome provided with one optical window) both configurations are provided with always one lamp; otherwise in case of bidirectional fixture the light beam can be symmetric (two opposite beams) or asymmetric (toe-in beams for taxiway curved section in accordance with ICAO – Annex 14 and STANAG 3316 ed FAA).

It is also possible to obtain an unidirectional light from a bidirectional dome choosing the 'X – Screened' option.

2.1 REMOVABLE LIGHT UNIT

The removable fixture mainly consists of a dome, an optical assembly and a lower cover.

2.1.1 Dome

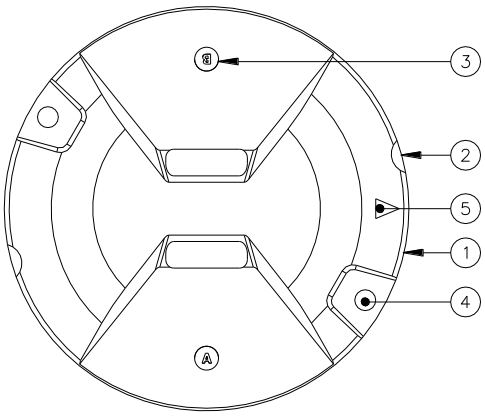
The dome is made of treated drop-forged aluminium and includes one or two windows to seat the prisms, complete with gaskets, kept in the proper position by

means of a mounting plate fixed with FHCS M5x12 screws. In correspondence of the windows, the dome is outside provided with identification letters “A” and “B”.

The dome is provided with two through holes for fastening the light unit to the base and two dead holes for matching two studs mounted on the base, so to prevent the rotation of the light unit due to aircraft wheel impact/roll over

It is also provided with two suitable slots, in opposite position, to make easy the fixture removal by using two suitable lifting tools (available on request, P/N 332.4140 or 332.4230). As alternative, two screwdrivers can be used.

A silicone O-Ring (separately supplied) has to be mounted outside around the dome, to avoid dirt deposits between dome and shallow base.



1. Dome
2. Slot for dome removal
3. Letter “A” to identify the beam
4. Through hole for light unit fastening
5. Reference arrow

Figure 1 – Dome outside view

2.1.2 Optical Assembly

The **optical assembly** consists of two prisms (Figure 5 - n°16) with relevant gaskets (Figure 5 - n°15), two filters with relevant holder (Figure 5 - n°10-11) and one lamp (Figure 5 - n°9). Unidirectional fixtures mount only one prism and one filter.

Fixtures can be provided with five kind of prisms in order to obtain five different configurations:

- Straight sections ICAO, STANAG 3316 and FAA L-852C
- Straight sections ICAO, STANAG 3316 and FAA L-852A
- Curved sections FAA L-852B/D
- Curved sections (right) ICAO, FAA type L-852J/K and STANAG 3316
- Curved sections (left) ICAO, FAA type L-852J/K and STANAG 3316

The lamp is of tungsten-halogen type, rated 30 or 48 W 6,6 A, 1500 hours average lamp life, with dicroic reflector and male faston plug wires. The lamp is locked into its

seat by a single elastic holder (stainless steel) in order to realize an easy and quick lamp replacement.

All the optical assembly parts are factory assembled; they may be field-replaced if necessary.

2.1.3 Lower Cover

The **lower cover** consists of a treated aluminium casting; it is fastened to the dome by means of three screws HSFH M5x10. An O-Ring is provided between dome and lower cover.

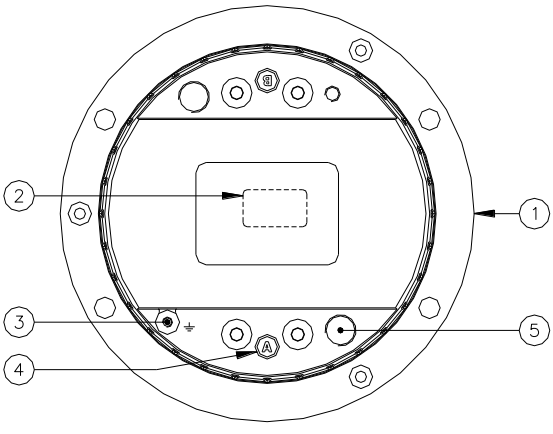
The cover is provided with one threaded hole for cable entry and external grounding screw with yellow-green cable lead, size 2.5 mm^2, 0.250 m long, with male faston terminal. A suitable valve is outside mounted for the leakage test.

Watertightness between fixture and shallow base is ensured by means of an O-Ring (separately supplied) to be placed on the relevant groove around the lower cover.

The fixture is supplied with one **cable lead with L-823 plug**; it consists of two single-pole teflon leads, size 2.1 mm^2 (#14 AWG), 0.700 m long. The plug is in compliance with FAA AC 150/5345-26 for very quick coupling with the receptacle mounted on the shallow base.

The fixture is 203 mm in diameter and 92 mm (+ 18.5 mm for plugs) high; the protrusion above the ground is less than 6.35 mm.

An identification data label is externally applied over the lower cover (Figure 2 – n°2). Moreover, to identify quickly the beam colour, the letters “A” of the dome in front of the window is painted in the same colour of the light beam.



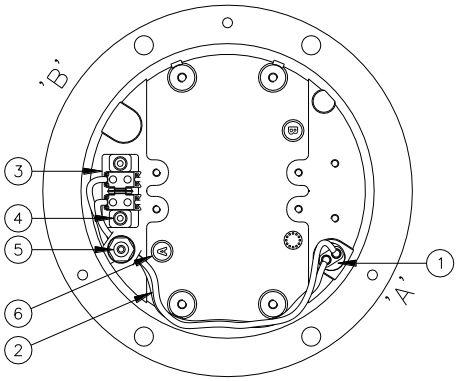
1. Lower cover
2. Identification label
3. Grounding cable hole
4. Letter “A” for cable lead identification
5. Cable lead entry

Figure 2 – Lower Cover Outside View

The same colour painting is provided outside on the lower cover.

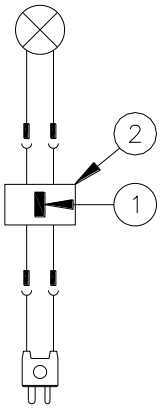
See *“Complete P/N identification”* figure for P/N information.

All hardware is made of stainless steel.



1. Cable lead with plug
2. Cable lead with plug wire
3. Insulating strip
4. Insulating strip screws
5. Leak test valve
6. Letter “A” and “B” for cable lead identification

Figure 3 – Lower Cover Inside View



1. Fuse cutout
2. Insulating strip

1 In 1 Lamp

Figure 4 – Wiring Diagram

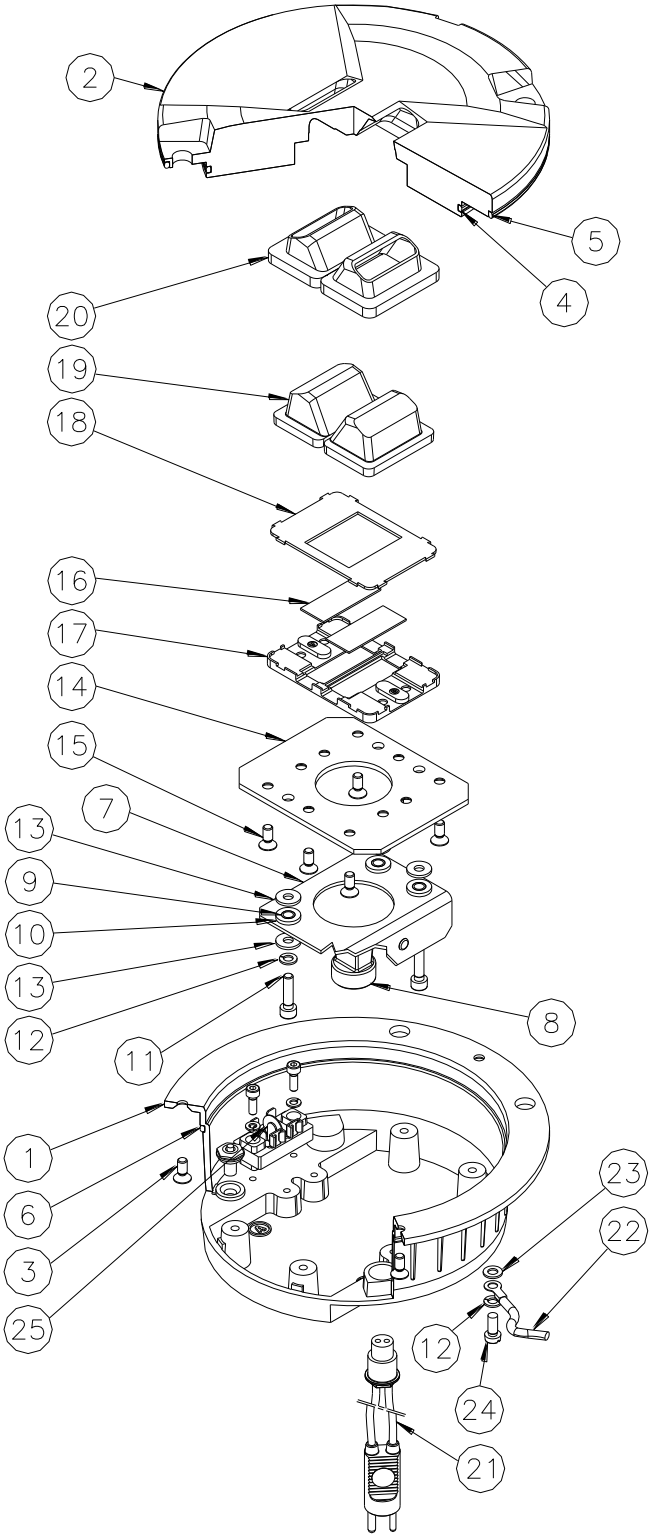


Figure 5 – Exploded View

No.	Description	Qty
1	Lower cover	1
2	Dome	1
3	HSFH M5x10 inox screw	3
4	O-Ring 4600 silicone	1
5	O-Ring 4775 silicone	1
6	O-Ring 4625 silicone	1
7	Lampholder	1
8	Lamp	1
9	Spacer	3
10	Vibration-damping block	3
11	HSCH M5x20 inox screw	3
12	Ø5 inox grower washer	3
13	Ø5x13x1,5 teflon washer	6
14	Mounting plate	1
15	HSFH M5x12 inox screw	6
16	Filter	1-2
17	Filter-holder box	1
18	Teflon filter-holder	1
19	Prism	1-2
20	Prism gasket	1-2
21	Cable lead with plug	1
22	Grounding cable L=250 mm	1
23	Ø5x10x1 inox washer	1
24	CH M5x10 inox screw	1
25	Fuse cutout	1

Figure 6 – Part List

TWCS – A – I – GG – 090 – O – F

Basic P/N:

Use Code:
(Refer to TABLE A)

Compliance:
I = ICAO CAT III
S = STANAG and ICAO CAT I - II
F = FAA

Colour(Side A)/(Side B):
G = Green
Y = Yellow
R = Red
C = Clear (L-852D only)
X = Screened
M = Blank (unidirectional dome)

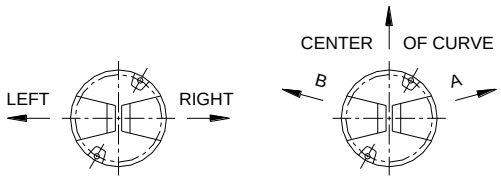
Lamp:
030 = 1x30W 6.6A with reflector
045 = 1x48W 6.6A with reflector

Mounting Assembly:
O = No Mounting Assembly
R = Adaptor Ring 8”-12” dia.

Options:
F = Fuse Cutouts

* For curved sections it's necessary to specify the colour of each side, "A" and "B", due to the fixture toe-in

** The not-finished "M" side, on straight sections, is always side "B"



Straight and Curved Section Orientation

Figure 7 – Complete P/N identification

Use	**I** = ICAO CAT. III	**S** = ICAO CAT. I - II	**F** = FAA
A	Fig. A2-12 straight before and after curves	Fig. A2-15 straight	L-852A
B			L-852B
C	Fig. A2-13 straight		L-852C
D			L-852D
W	Fig. A2-14 curved	Fig. A2-16 curved	
K			L-852K
J			L-852J

Table 1 - Use and compliance

2.2 SHALLOW BASE

The **shallow base** (Figure 9) consists of a treated aluminium casting containing an electrical feed-thru system to connect the power cables, consisting of one cable lead with receptacle incoming inside the base through one cable gland. The cable lead with receptacle consists of two single-pole leads, size 2.5 mm^2, 1.00 m long, with FAA L-823 receptacle.

The letters "A" and “B” are printed inside the base for cable leads identification.

The base is equipped with an internal grounding screw with yellow-green cable lead, size 2.5 mm^2, 0.250 m long, with female faston terminal for quick connection to the corresponding of the fixture. An additional external grounding screw is provided close to the cable entry.

The shallow base is designed for cementing in place by means of epoxy-resin in a hole drilled in the pavement.

The fixture has to be fastened to the base by means of two or six M10x30 stainless steel hex cap screws (8” or 12” shallow base resp.). If the base has American threaded holes, UNC 3/8-16 screws can be used. Each locking screw is complete with special sealed external silicon-coated lock-washer.

A gasket (separately supplied) must be placed between base and fixture for watertightness: for 8” fixtures (Figure 8 - n°1) around the lower cover, for 12” fixtures (Figure 9 - n°9) placed in the relevant shallow base groove.

The 12” shallow base is 320 mm in diameter and 150 mm high, while the 8” one is 214 mm in diameter and 125 mm high.

On request, special bases without cable leads can be supplied, provided with holes suitable for conduit connections.

Inside the base two suitable holders (Figure 9 - n°7) are provided to properly sustain the secondary power cable, in case of this cable is inside incoming through a conduit.

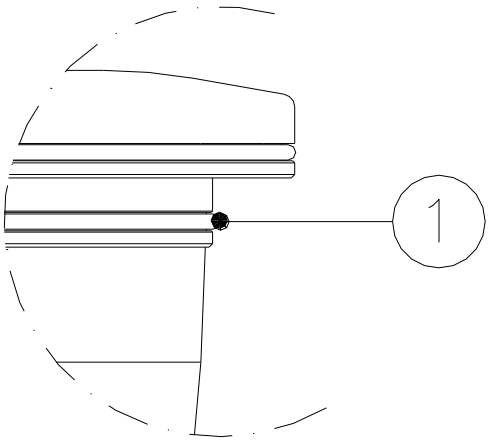
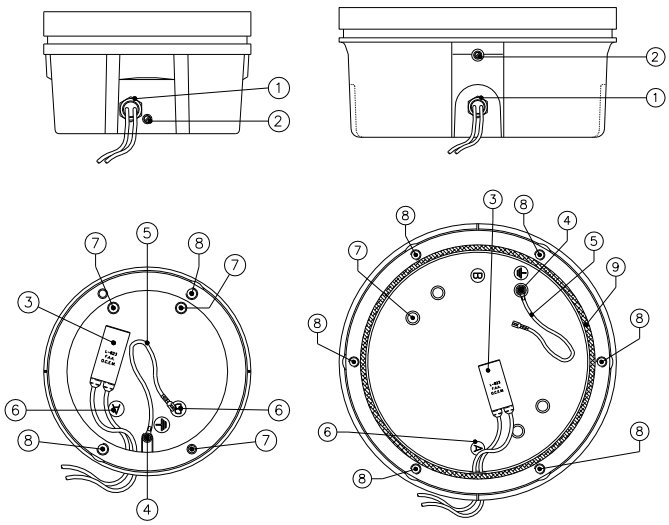


Figure 8 – Gasket of 8” fixture for 8” shallow base



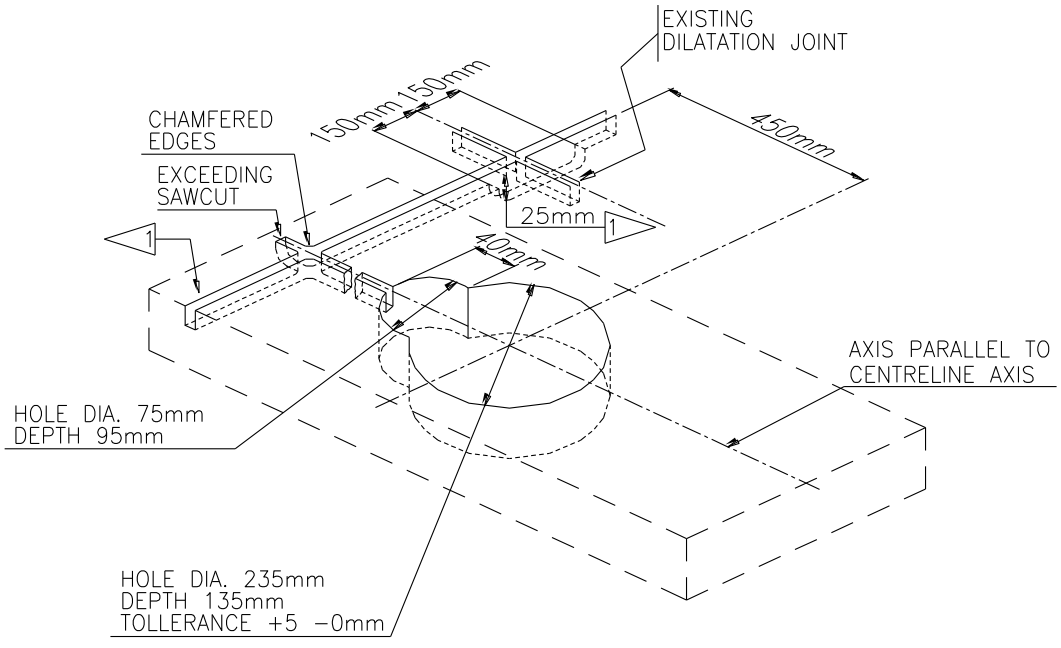
1. Cable gland for cable entry
2. External grounding screw
3. Cable leads with socket
4. Internal grounding screw
5. Grounding cable with female faston terminal
6. Letters “A” for cable lead identification
7. Power cable holders
8. Threaded holes for fixture fastening by bolts
9. O-Ring between fixture and base

Figure 9 – Standard 8“-12” shallow base

3 INSTALLATION

3.1 Pavement Boring and Sawcutting

Drill each recess in pavement following the instruction in Figure 10.



NOTE:

1 12” SHALLOW BASE :
BASE HOLE : DIA: 340mm – 160 mm DEEP (+5 ; −0)
CABLE GLAND HOLE : DIA: 75mm – 120 mm DEEP

Figure 10 – Pavement Boring, Sawcutting and Joint Intersection Details

Make sure the recess size and depth are maintained within the specified limits. All surfaces of the recess must be clean and dry. If any of these surfaces is damp, it is desirable that it be dried and blown clean with a compressed air blast. The recess side walls must be perpendicular to the pavement surface. The bottom surface must be flat or slightly concave to assure that the shallow base rest securely and in true position. The recess can best be drilled using a diamond-faced core drill in a sturdy, stable drill rig.

Mark on the pavement surface the aiming direction of the light by chalk, nails or other devices.

3.1.1 Scheme of Light Configurations

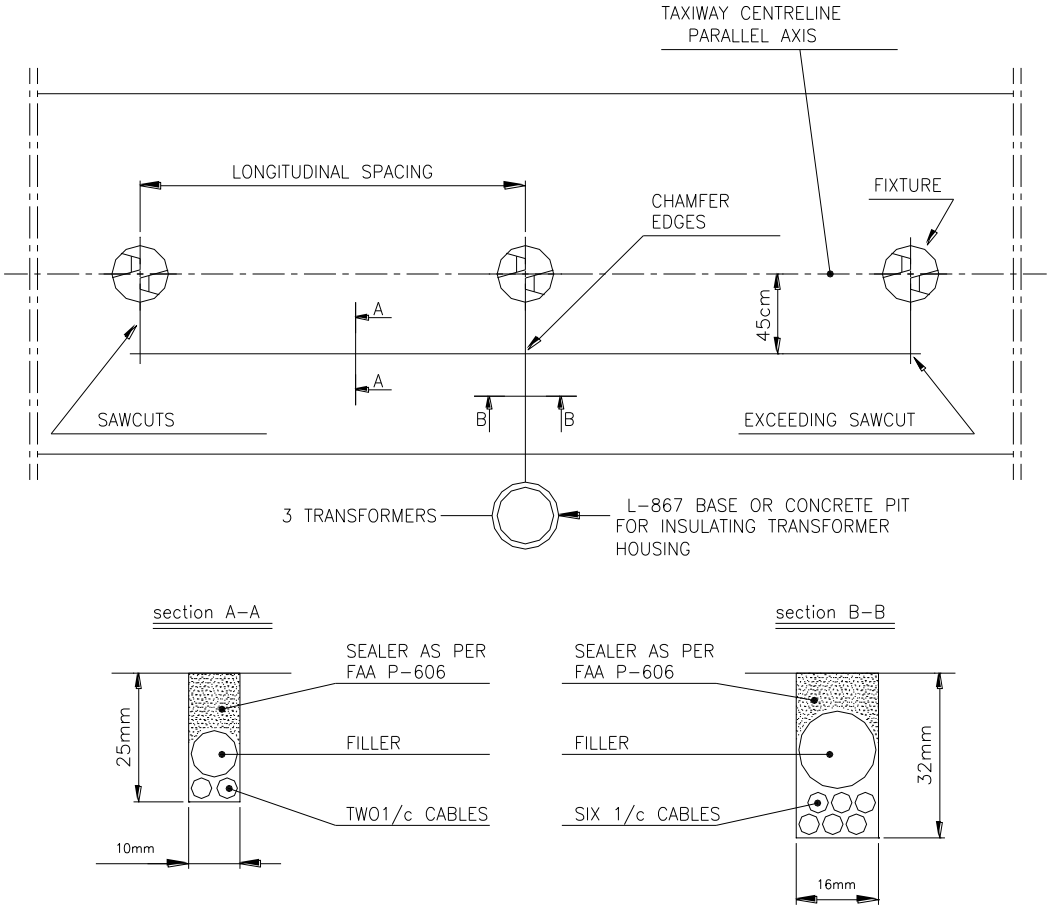


Figure 11 – Taxiway Centreline (ICAO) Scheme of Light Configurations

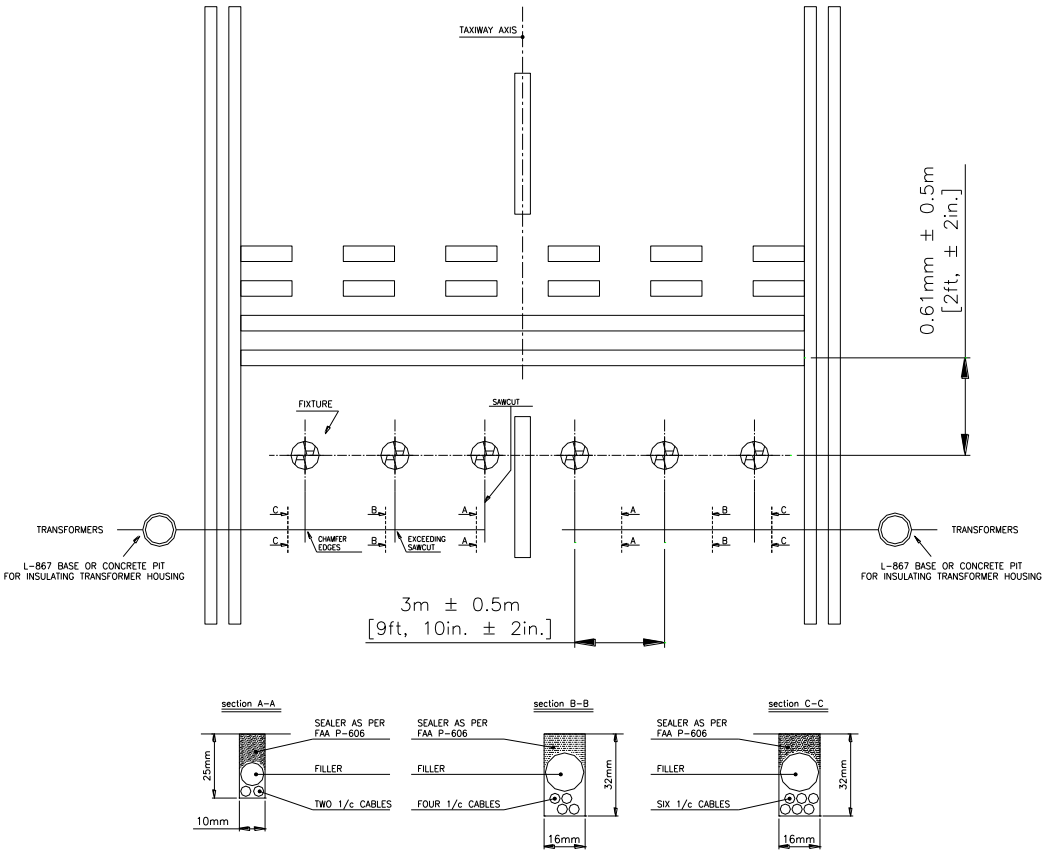


Figure 12 – Stop Bar (ICAO) Scheme of Light Configurations

3.2 CURVED SECTION LIGHT ALIGNMENT

1. Using the scheme in Figure 13 determine the radius (R) of the curve and mark the taxiway radius centre (C').
2. Determine longitudinal spacing (S) between lights. Table 2 is taken from FAA AC 150/5340-30 normative, Table 3 from ICAO Annex 14 – Volume 1.
3. Locate and mark the location of each light (C) on the taxiway centreline.
4. Mark on the taxiway surface a narrow line (at least 0.90 m or 3 units long) from the light location towards the taxiway radius centre and mark the 0.90 m point (or 3 units) (C'').
5. Using a string or other measuring device, mark an arc of 1.5 m radius (or 5 units) from this last point (C'') on either side of the light.
6. Mark two arcs of 1.2 m radius (or 4 units) from the centre of the light location (C) so as to intersect the first arc, and form a "X" in two places (X' - X'').
7. Draw a straight line between these intersection points (X' - X''): this is a line tangent to the taxiway centreline and can be used to align the taxiway light during positioning.

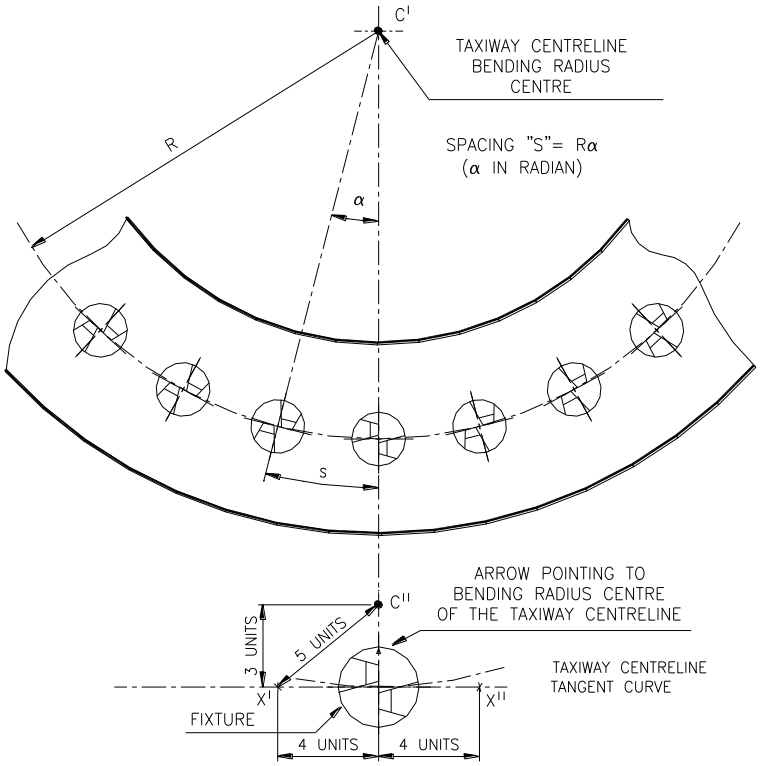


Figure 13 – Curved section light alignment

CURVE RADIUS (R)	LIGHT LONGITUDINAL SPACING (S) - FAA	
	365m RVR and above	Below 365 m RVR
From 23 m to 121 m	7 m	4 m
From 122 m to 364 m	15 m	7 m
364 m or greater	30 m	15 m

Table 2 - Taxiway centreline longitudinal spacing according to FAA

CURVE RADIUS (R)	LIGHT LONGITUDINAL SPACING (S) - ICAO	
	350m RVR and above	Below 350m RVR
Up to 400 m	7.5 m	7.5 m
From 401 m to 899 m	15 m	7.5 m
900 m or greater	30 m	15 m

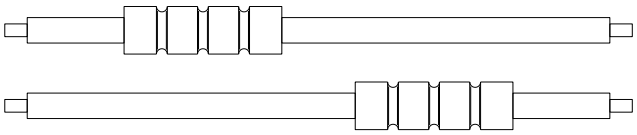
Table 3 - Taxiway centreline longitudinal spacing according to ICAO

3.3 INSTALLING THE SHALLOW BASE

Two different installations are possible:

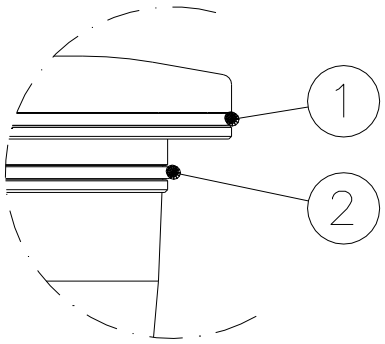
- Method "A" – cable leads to be laid in wireways
- ☐ Method "B" – cable leads to be laid in cable ducts (Figure 17)

Proceed as follow to realize a proper installation.

STEP	A	B	ACTIVITY DESCRIPTION
1	•	☐	Take the base from the shipping box.
2	•	☐	To assure an adequate bond between base and hole all external surfaces of the base should be sandblasted and must be cleaned with solvent. **TAKE CARE NOT TO DAMAGE THE ELECTRICAL SYSTEM.**
3	•	/	Connect an insulated G/Y grounding wire of suitable length to the grounding screw externally provided on the wall of the base.
4	•	/	Splice the light base leads to the power cables using solderless squeeze connectors, as shown in the figure, crimped with the proper tool. Connect also the grounding wire to the main grounding network by using a suitable clamping lug.  **ATTENTION: Insulate each splice carefully using either heat shrinkable insulating tubing properly applied or at least three layers of plastic electrical insulating tape applied with half overlap.**
5	•	☐	Mount the positioning jig (P/N 332.4301) on the base as shown in Figure 18. **An optical device for proper fixture orientation is available (P/N 332.4351** Figure 19**).**
6	•	/	Properly arrange the leads in the wireways using small pieces of insulating tape if necessary.
7	•	☐	Completely cover the bottom of the base with sealer material, apply a thin coat of sealer to the bottom of the drilled hole to assure a bond between the bottom of the light base and the drilled hole. It may be necessary to place temporary plugs so as to block the wireways entrances into the drilled hole

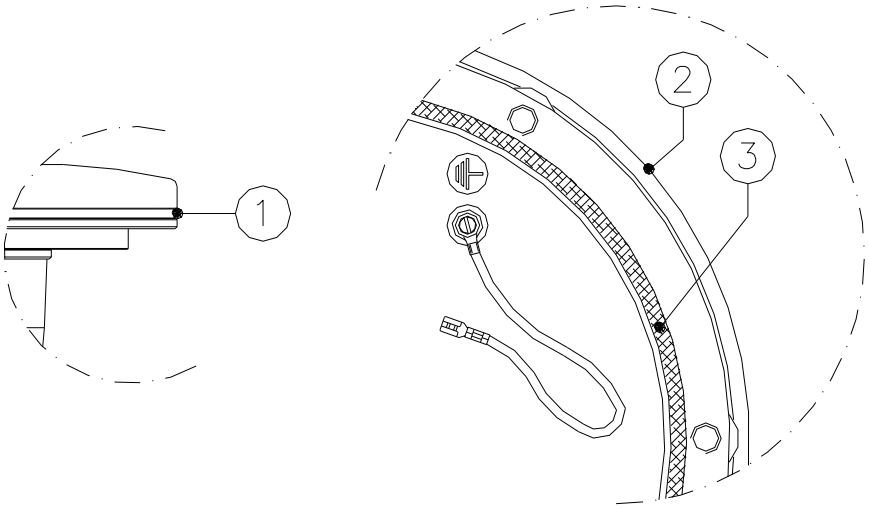
STEP	A	B	ACTIVITY DESCRIPTION
			(METHOD "A") or the cable ducts entrance (METHOD "B"). The plugs will retain the sealer while it begins to dry up. **ATTENTION: avoid starting the installation when the ambient temperature is below 10°C (86°F), unless the sealer used is designed to dry up at a lower temperature.**
8	●	☐	Push the base into the recess until its upper side is at the level of the pavement surface; take care no sealer flowing inside the base. Align the notch of the base with the markings on the pavement surface.
9	●	/	Observing the circular level fixed on the jig, level the jig by operating the three leveling lobe knobs (Figure 18). If necessary, a weight may be placed on the jig to hold the light base in position. The remainder of the space between the sides of the shallow base and the drilled hole should be filled with sealer up to approx 25 mm from the pavement, according to the local needs. Fill the remaining 25 mm with a suitable joint sealing filler.
10	/	☐	Observing the circular level fixed on the jig, level the jig by operating the three leveling lobe knobs (Figure 18). If necessary, a weight may be placed on the jig to hold the light base in position. When the shallow base is in its final position, the conduit(s) must be properly jointed to the hole(s) provided on the shallow base. This(these) hole(s) can be provided either on the wall either on the bottom, the number and the dimensions according to customer requirements (Figure 16 and Figure 17). The remainder of the space between the sides of the shallow base and the drilled hole should be filled with sealer up to approx 25 mm from the pavement, according to the local needs. Fill the remaining 25 mm with a suitable joint sealing filler.
11	/	☐	Lay the secondary power cable, equipped with a suitable two-pole receptacle kit, and the grounding wire inside the cable duct.

STEP	A	B	ACTIVITY DESCRIPTION
12	●	☐	To install a 8” fixture place the O-Ring around the dome (Figure 14- n°1) and between fixture and base (Figure 14- n°2), for 8” fixtures with adaptor ring place the O-Ring between fixture and base (Figure 15- n°3). To install a 12” fixture place the O-Ring around the dome (Figure 15- n°1) and between fixture and base (Figure 15- n°3). Connect the plug and the grounding wire of the fixture with the receptacle and the grounding wire of the base; press the fixture by hand onto the base and secure it using the six (12” base) locking screws complete with washer, one drop of screw paste (e.g. Dow Corning Molycote 1000) should be applied to the screws before installation; two screws are used for 8” base, one drop of anaerobic adhesive, medium type (e.g. Loctite 243) should be applied. Tightening torque is 35 Nm. **ATTENTION: The fixture is subject to mechanical damage and/or optical misalignment if not properly seated on the base flange.**



1. O-Ring around the dome
2. O-Ring between fixture and base

Figure 14 – Gaskets for 8” shallow base



1. O-Ring around the dome
2. 12” shallow base
3. O-Ring between fixture and base

Figure 15 – Gaskets for 12” shallow base

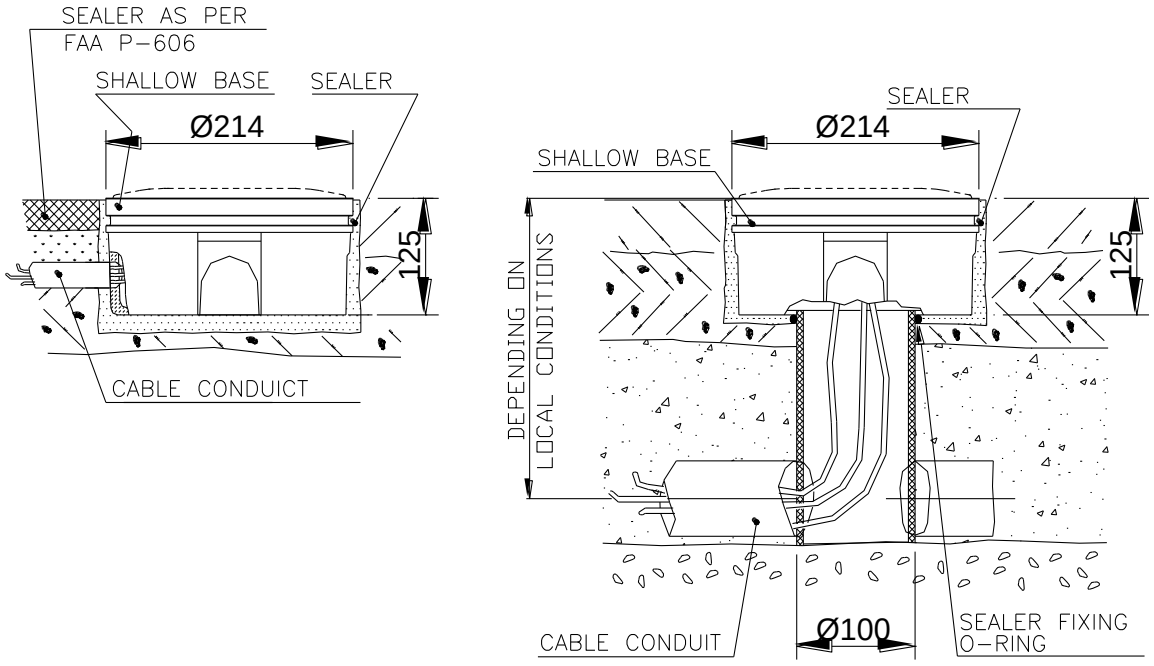


Figure 16 – 8” shallow base for side or bottom ducts (method “B”)

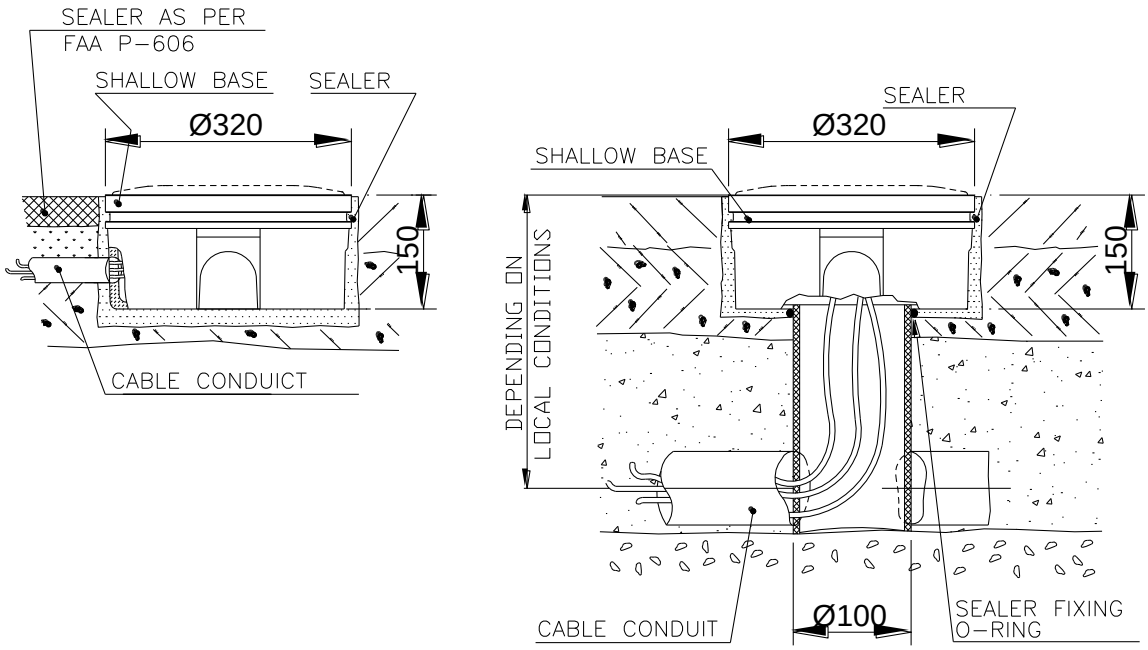
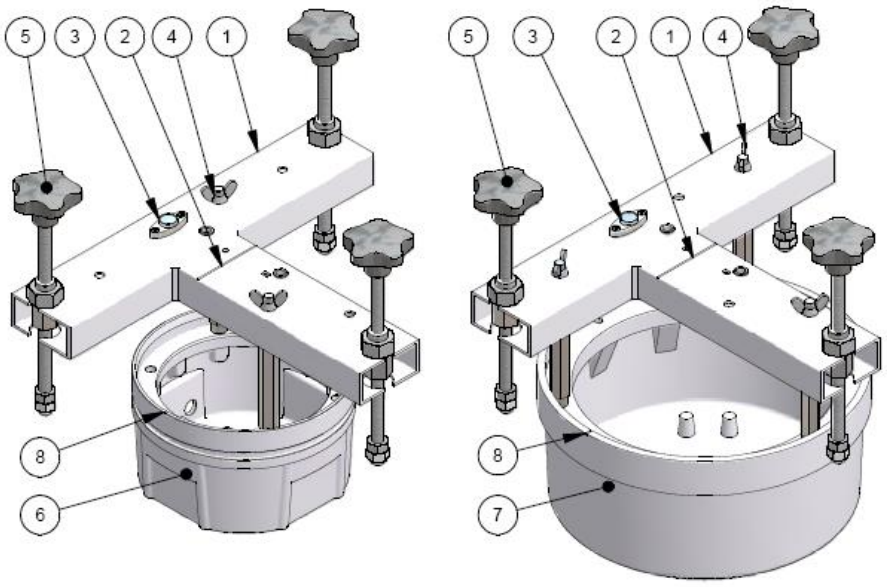
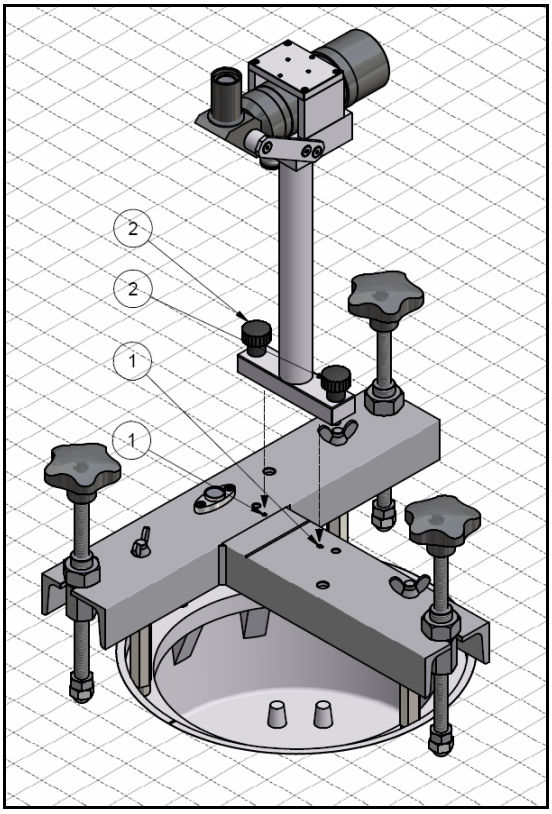


Figure 17 – 12" shallow base for side or bottom ducts (method "B")



1. Positioning jig
2. Align the jig notch with the mark on the pavement
3. Circular level
4. Screws and spacers for the jig mounting
5. Lobe knob for positioning jig levelling
6. 8" shallow base
7. 12" shallow base
8. Shallow base notches aligned with the notch on the jig

Figure 18 – Shallow base installation details



1. Positioning jig holes for optical device reference pins
2. Fixing knobs

Figure 19 – Optical device (refer to the manual UT-MT-0485 for further information)

3.4 INSTALLING THE LIGHT UNIT ON L-868 BASE, SIZE B

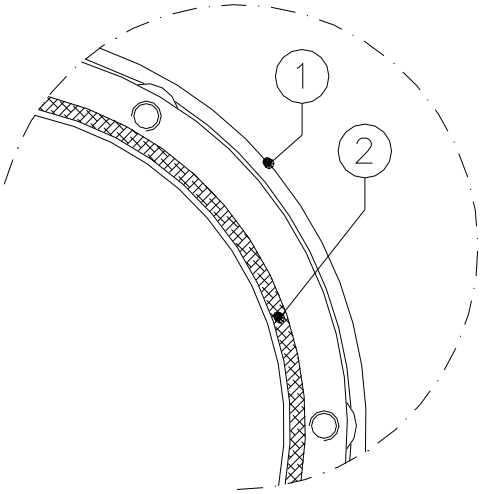
Install L-868 light base in compliance with FAA AC 150/5340-30.

The fixture is shipped complete (including the lamps) and is ready for installation as received, in case of 8" fixture it shall be complete of adaptor ring.

Be sure the flange on the transformer housing is clean and the O-Ring (Figure 20 – n°2), if used, is in place in the O-Ring groove.

Connect the plug of the fixture to the receptacle of the isolating transformer inside the deep base. Connect the grounding wire of the fixture to the grounding wire of the deep base (faston connection). Then press the fixture firmly and evenly by hand onto the base flange. Secure the fixture to the base by using the six locking screws complete with washers, supplied with the base. One drop of anaerobic adhesive, medium type (e.g. Loctite 243) should be applied to the screws before installation; tightening torque is 25 Nm.

The fixture is subject to optical misalignment and/or mechanical damage if not properly seated.



1. L-868 base
2. O-Ring between fixture and base

Figure 20 – Gaskets for L-868 base

3.5 SECONDARY WIRING

The IEC 61823 International Standard (AGL series transformers) states at para. 4.6 that "if an earthing connection is provided, it shall be connected to the larger socket of the transformer secondary connector."

This means that, when a fixture is directly connected to the relevant isolation transformer (provided with earthing connection), the fixture secondary side is wired to the grounding network through the larger pin of fixture plug.

In case of an inset fixture, installed in the taxiway/runway pavement on its shallow base far from the relevant isolation transformer, it is necessary to provide a secondary extension between fixture and transformer. To help the installer to identify the larger socket of the female connector inside the base (when installed), the base secondary cable leads are identified by a colour code: the grey wire is wired to the larger socket, the black wire to the other one. In this way it will be easy to assure the earthing wiring, above described, between the larger socket of the transformer secondary connector and the larger pin of the fixture plug.

4 MAINTENANCE

WARNING
BEFORE ANY MAINTENANCE INTERVENTION, MAKE SURE THE POWER SUPPLY BE SWITCHED OFF.
DO NOT OPERATE ON LIVE PARTS!!!

The preferred method of maintaining these lights is replacing each fixture periodically and systematically and return it to the maintenance shop for renovation.

Field servicing shall be limited to cleaning the prisms.

4.1 MAINTENANCE PROGRAM

In order to ensure maximum light fixture life, the installed units should be subject to a maintenance program in accordance with the following instructions and taking as reference the Airport Service Manual ICAO - Part 9 - Airport Maintenance Practices or FAA AC 150 5340-30.

4.1.1 Periodical Checks

Weekly	Cleaning of the prisms and the light output channel of runway fixtures
Bi-monthly	Cleaning of the prisms and the light output channel of taxiway fixtures
Annually	Check for burned-out lamps
	Check for moisture inside the fixture
	STABILITY OF THE CIVIL WORKS OF RUNWAY FIXTURES
Unscheduled	Check for water in base
	ELECTRICAL CONNECTIONS AND INSULATION DEGREE
	LEAKAGE TEST
	Condition of all gaskets
	Check torque of mounting bolts after a month of their first installation
	Remove snow from around fixtures
	Check wires in saw kerfs

4.1.2 Snowplow Operations

Snowplow operators should exercise extra care not to strike the light fixtures with snowplow blades. After snow removal operations, inspect all light fixtures to locate and replace, if necessary, any damaged light assemblies.

Passes over the light rows should be made with a power broom only if practical. Whenever snowplows must traverse in-pavement light fixtures, they should be either travelling at less than 10 km/h or have the blades lifted clear of the fixtures. Recommended snow removal techniques are described in Airport Service Manual ICAO - Part 9 - Airport Maintenance Practices or FAA AC 150/5200-30.

4.2 REMOVING AND OPENING THE LIGHT UNIT FROM THE BASE

4.2.1 Removing the fixture

- Remove the fixture from the base, after switching off, by unscrewing the two locking screws complete with washers.
- Raise the fixture by using the two lifting tools (P/N 332.4140 or 332.4230) inserted in the suitable slots provided on the dome. As an alternative, two screwdrivers can be used.
- Disconnect the fixture plug/s and grounding cable from those inside the shallow base.

4.2.2 Opening the fixture

- Unscrew the leak valve cap and push the valve central pin, in this way the light internal pressure is the same of the atmospheric pressure.
- Open the fixture by unscrewing the three locking screws HSFH M5x10 (Figure 23 - n°1).

  Every time the fixture is opened, inspect the following parts and replace them if necessary:

- prism, if it is dirty or damaged
- prism gasket, check the integrity
- cable lead with plug

4.2.3 How to Access the Filter and Prism Assembly

- slide out the lamp from its seat as shown in Figure 21
- unscrew the screws HSCH M5x20 (Figure 22- n° 2) and remove the supporting plate (Figure 22 - n° 1)

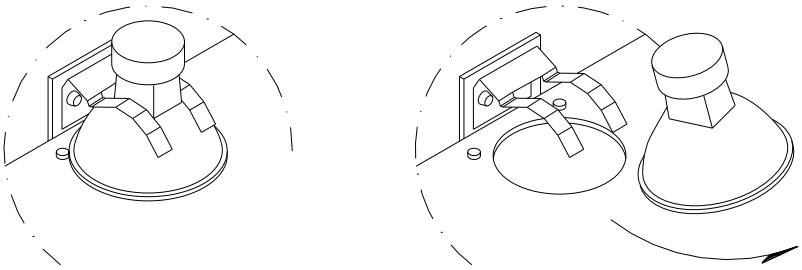


Figure 21 – Sliding out the Lamp

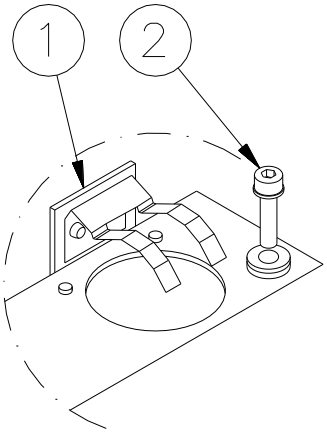


Figure 22 – Removing the Supporting Plate

4.2.4 Closing the fixture

Every time the fixture is opened **replace** the following items with a new ones:

- three locking screws HSFH M5x10 (Figure 23 - n°1);
- O-Rings between dome and lower cover (Figure 25 – n°2);

Verify the correct position of O-Ring between dome and lower cover (Figure 25 – n°2);, mount the lower cover on the dome and fasten it by means the three screws HSFH M5x10 (Figure 23 - n°1). One drop of anaerobic adhesive lower type (e.g. LOXEAL 24-18) should be applied to the screws before installation; tightening torque is 2.5 Nm.

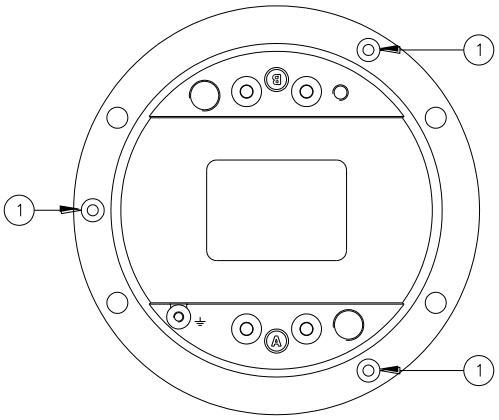


Figure 23 - Lower Cover Fixing Screws

4.2.5 Leakage test

The assembly should be given a 1.38 kPa air pressure test. This can be done by connecting an external air pressure line to the valve (Figure 24– n°2) provided on the lower cover. Immerge the assembly under water, so air loss will be easily viewed if some part is damaged or assembling is wrong.

If there is no air loss then test is passed successfully.

Light unit is ready to be field installed.

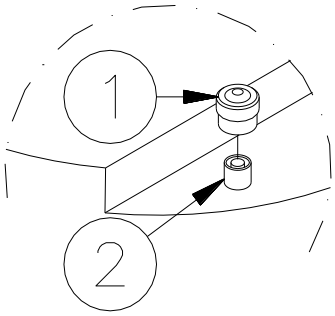


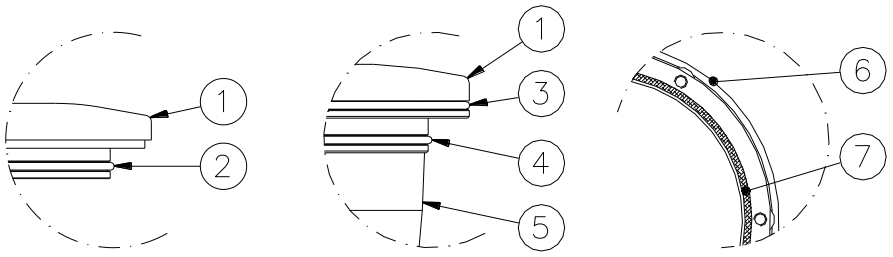
Figure 24 - Lower Cover with Pressure Valve

4.2.6 Reinstalling the fixture

Every time the fixture is removed from the base **replace** the following items with a new ones making sure that are right placed in the relevant groove:

- the two special seal lock washers;

- O-Ring around the dome (Figure 25 – n°3);
- O-Ring between fixture and 8" shallow base (Figure 25 – n°4);
- O-Ring between fixture and 12" shallow base (Figure 25 – n°7);
- The fixture is ready to be field installed.



1. Dome
2. O-Ring between dome and lower cover
3. O-Ring around the dome
4. O-Ring between fixture and shallow base
5. Lower Cover
6. 12" Shallow base
7. O-Ring between fixture and 12" Shallow base

Figure 25 – Fixture Gaskets

4.3 PRIMS CLEANING

4.3.1 Prism outside cleaning

- Removing the fixture is not necessary to clean the outer surface of the prisms, and if already removed is not necessary to open it. Clean the prisms surface with non abrasive glass product.

4.3.2 Prism inside cleaning

Normally the cleaning of the prism inside surfaces is not necessary because fixture is watertight. Whenever it is necessary, remember the following rules.

Remove the fixture from the base and open it following instructions of *"Removing and Opening the Light Unit From the Base"* and proceed as follows:

- remove the mounting plate (Figure 26 - n°3) unscrewing the relevant screws HSFH M5x12 (Figure 26 - n°4)
- remove the filter assembly (Figure 26 - n°2)
- clean the prism surface (Figure 26 - n°1) with non abrasive glass product
- dry them carefully
- reassembly the light unit taking care that the white teflon filter holder is facing the prism

Close the light fixture following instructions of paragraph *"Closing the Fixture", "Leakage Test"* and *"Reinstalling the fixture"*.

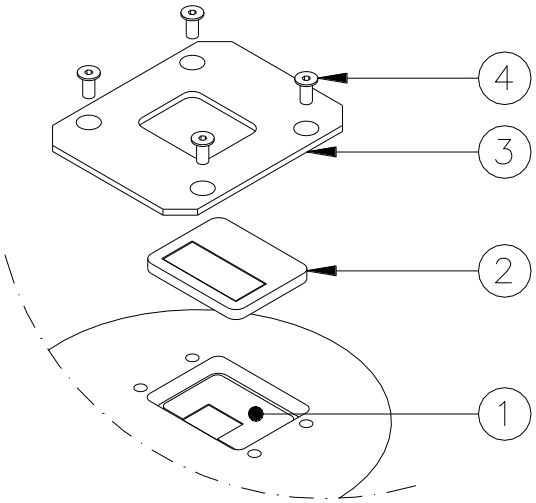


Figure 26 – Prism Surface to be Cleaned

4.4 PRISM REPLACEMENT

If the prism is damaged it must be replaced as described below.

It is highly recommended to do a complete overhaul of the fixture. Contact OCEM - ENERGY TECHNOLOGY for any suggestion.

4.4.1 Removing the Prism

Remove the fixture from the base and open it following instructions of *"Removing and Opening the Light Unit From the Base"* and proceed as follows:

- clean out possible pieces of the old prism and all accumulated debris from inside the fixture
- remove the mounting plate and filter holder (Figure 27 – n°4-5)
- remove the old prism and the gasket (Figure 27 – n°3-2)
- carefully clean the prism seat by scraping and taking care not to damage the relevant walls.

4.4.2 Installing the New Prism

- place a new gasket (Figure 27 – n°2) in the prism cavity on the dome (Figure 27 – n°1)
- position and press by hand the prism (Figure 27 – n°3) in the relevant seat
- position the filter holder and the mounting plate (Figure 27 – n°4-5) and fasten it with the relevant screws HSFH M5x12 (Figure 27 – n°6), tightening torque is 2.5 Nm

- inspect all components inside the light unit for damages or signs of corrosion and replace it if necessary.

  Close the light fixture following instructions of paragraph *"Closing the Fixture", "Leakage Test"* and *"Reinstalling the fixture"*.

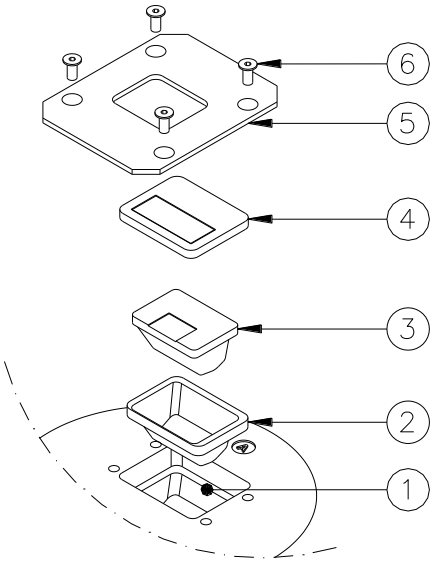


Figure 27 - Prism Replacement

4.5 FILTER REPLACEMENT

Remove the fixture from the base and open it following instructions of *"Removing and Opening the Light Unit From the Base"*.

It is highly recommended to do a complete overhaul of the fixture. Contact OCEM - ENERGY TECHNOLOGY for any suggestion.

4.5.1 Removing the filter

- Clean out possible pieces of the old filter and all accumulated debris from the inside
- remove the mounting plate (Figure 28- n°5) and the filter holder (Figure 28- n°2-3-4)
- open the filter holder and remove the possible pieces of the old filter

4.5.2 Istalling the new filter

- place a new filter (Figure 28- n°3) inside the filter holder (Figure 28- n°2-3-4)

- position the filter holder in the relevant seat (Figure 28- n°1)
- position the mounting plate (Figure 28 – n°5) and fasten it with the relevant screws HSFH M5x12 (Figure 28 – n°6), tightening torque is 2.5 Nm
- inspect all components inside the light unit for damages or signs of corrosion and replace it if necessary.

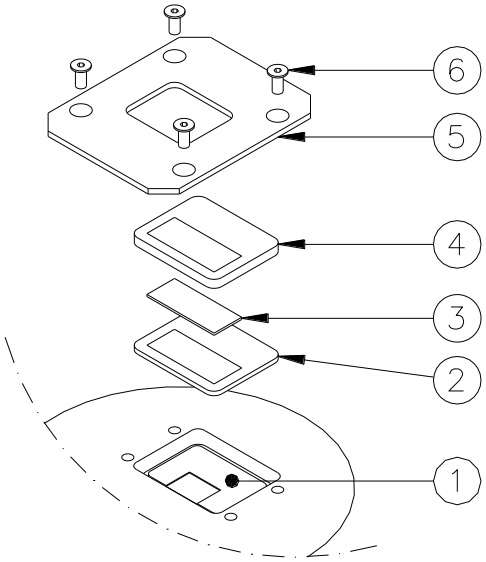


Figure 28 - Filter Replacement

Close the light fixture following instructions of paragraph *"Closing the Fixture", "Leakage Test"* and *"Reinstalling the fixture"*.

4.6 RELAMPING

Remove the fixture from the base and open it following instructions of *"Removing and Opening the Light Unit From the Base".*

Disconnect the male faston terminals of the lamp (Figure 29 - n°2) wires from the insulating strip (Figure 29 - n°1) and slide the lamp out from its lamp-holder seat (Figure 29 - n°3-4).

Connect the male faston terminals (Figure 29 - n°2) of the new lamp wires to the insulating strip (Figure 29 - n°1) and slide the lamp into its lamp-holder seat (Figure 29 - n°3-4).

CAUTION: touching the quartz bulb with bare fingers may seriously shorten the lamp life. If the quartz bulb has been touched, wipe it clean with a piece of fabric suitable for lens cleaning, or similar, moistened with isopropyl alcohol

Reassembly the fixture following instructions of paragraph *"Closing the Fixture", "Leakage Test"* and *"Reinstalling the fixture"*.

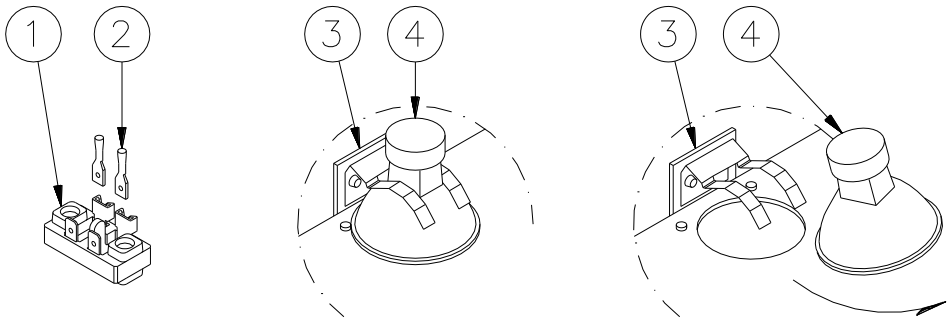


Figure 29 - Relamping

4.7 GASKETS

4.7.1 Gasket examination

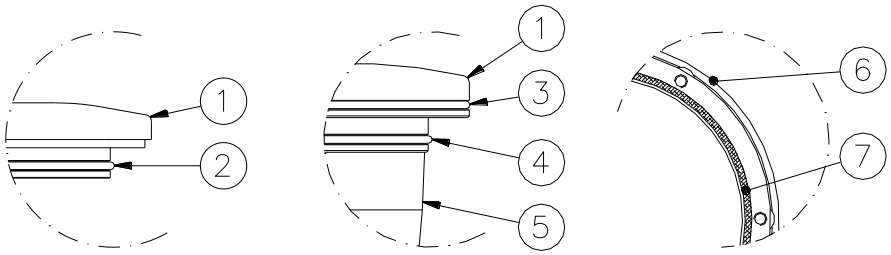
Every time a fixture is opened each O-Ring must be examined as described below and **replaced** if necessary.

Any O-Ring that is stretched, torn, has a permanent set or some other defect, which would prevent it from obtaining a water-tight seal **must be replaced with a new O-Ring**.

Remove the fixture from the base and open it following instructions of *"Removing and Opening the Light Unit From the Base"*.

Light assembly is equipped with the following gaskets:

- O-Ring between dome and lower cover (Figure 30 - n°2);
- O-Ring around the dome (Figure 30 - n°3);
- O-Ring between fixture and 8" shallow base (Figure 30 - n°4);
- O-Ring between fixture and 12" shallow base (Figure 30 - n°7);
- prism gasket mounted between prism and dome (Figure 31- n°2).



1. Dome
2. O-Ring between dome and lower cover
3. O-Ring around the dome
4. O-Ring between fixture and shallow base
5. Lower Cover
6. 12” Shallow base
7. O-Ring between fixture and 12” Shallow base

Figure 30– Fixture Gaskets

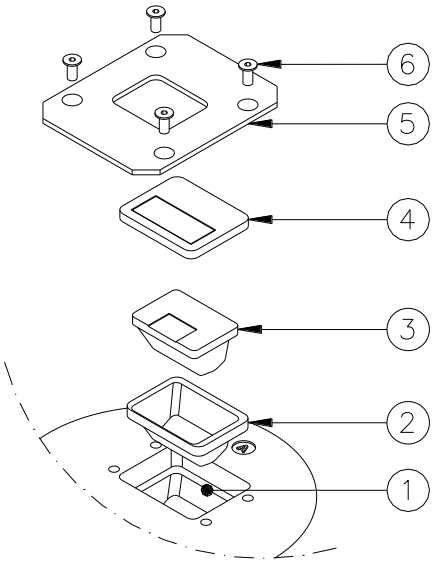


Figure 31 – Prism Gasket

4.7.2 O-Ring replacement

Remove the old O-Ring from the groove and clean the flange mating surfaces and the groove, scraping carefully. Take care not to damage the mating surface and the bottom and sides of the groove. Position it in the centre of its groove and push it inside.

NOTE 1: Make sure that the proper O-Ring is re-inserted into the groove.

NOTE 2: The seat of an O-Ring gasket is dimensioned to allow the proper positioning when compressed between the mating surfaces. Screws properly tightened are important in obtaining a complete seal.

TIGHTENING TORQUE	
lower cover HSCS M5x10	2.5 Nm
fixture locking screw	35 Nm (for shallow base) 25 Nm (for L-868 base, size B)

4.8 CABLE LEAD WITH PLUG

4.8.1 Removing the cable lead with plug

Remove the fixture from the base and open it following instructions of *"Removing and Opening the Light Unit From the Base"*.

Inside the lower cover, disconnect the pair of wires with faston terminals from the insulating strip of the damaged cable lead (Figure 32 – n° 1-2). Remove the faston terminals by cutting the cables, unscrew the gland and pull out the cable lead with gland gasket.

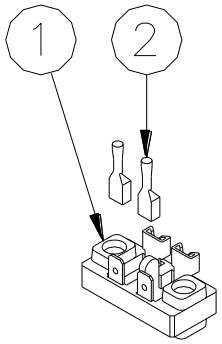


Figure 32 - Insulating Strip Female Faston

4.8.2 Installing the new cable lead with plug

Insert on the new power supply cable lead with plug (Figure 33 – n° 1) the new gland nut (Figure 33 – n° 2) with teflon washer (Figure 33 – n° 3), metal washer (Figure 33 – n° 4) and then the new gland gasket (Figure 33 – n° 5) so that the available length of cables outside the fixture is approx. 50 cm when re-assembled. Pull both cables through the suitable hole provided in the bottom of the lower cover; then splice each cable for a length of approx. 7 mm and clamp the female faston terminal to the cable (Figure 33 – n° 6).

Place the gland gasket inside its seat and tighten the gland nut. Restore internally the electrical connections.

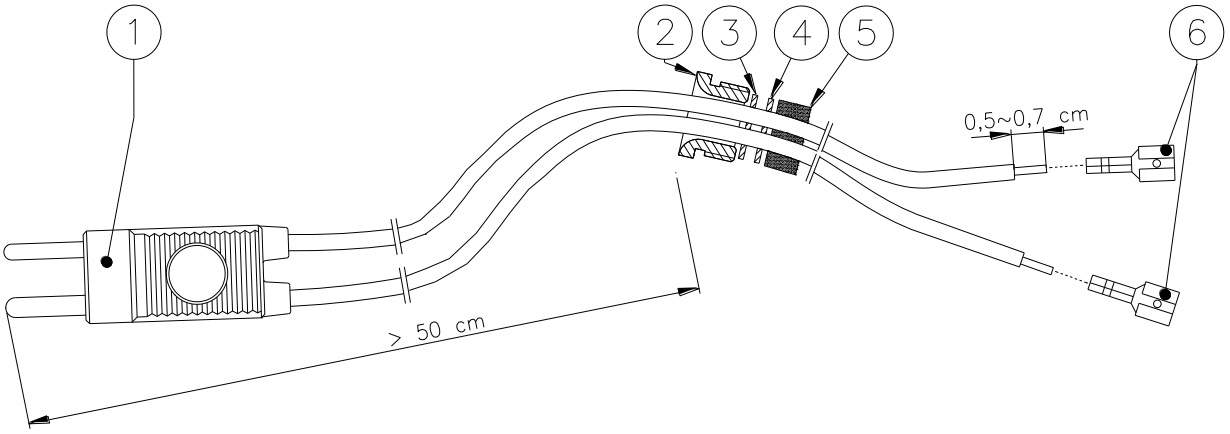


Figure 33 - Cable Lead With Plug

Close the light fixture following instructions of paragraph *"Closing the Fixture", "Leakage Test"* and *"Reinstalling the fixture"*.

4.9 PRESSURE VALVE

If a leakage is found through the pressure valve during an air pressure test, check carefully where the leakage happens. If the leakage is between the valve (Figure 34 - n°1) and the lower cover, check the tightening of the valve body to the lower cover from the inside of the fixture.

In case the pressure valve needs replacing, operate as follows, considering the fixture already opened following instructions of *"Removing and Opening the Light Unit From the Base"*. Remove the valve cap (Figure 34 - n°3). Unscrew the valve body with gasket from the inside of the lower cover (Figure 34 - n°2) by clamping the hexagonal end section of the valve body. Screw the new valve on the lower cover; tightening torque is 0.35 Nm. Check the valve core (Figure 34 - °4) is tightened to the valve body (Figure 34 - n°5) and then screw its cap (Figure 34 - n°3).

Reassembly the light unit following instructions of paragraph *"Closing the Fixture", "Leakage Test"* and *"Reinstalling the fixture"*.

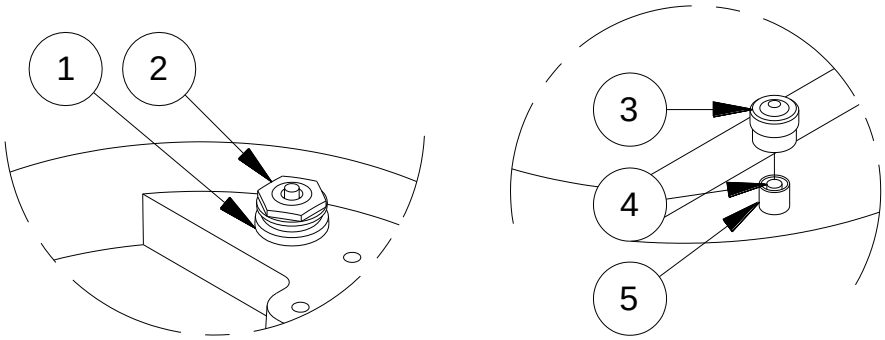


Figure 34 - Lower Cover with Pressure Valve

4.10 CLEANING

Service life depends upon the entire assembly being waterproof. All surfaces must be clean, dry and free of all foreign matter if the light fixture is to operate for an extended period without requiring maintenance.