INSTRUCTION MANUAL FOR USE, INSTALLATION AND MAINTENANCE

LTDZ

LED INSET RUNWAY TOUCHDOWN ZONE AND MEDIUM INTENSITY APPROACH LIGHT L-850 B

Manufactured By:

Multi Electric Mfg., Inc.

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LIMITED PRODUCT WARRANTY

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

Multi Electric Mfg., Inc. (the company) warrants the LED based products manufactured by the company, to be free of defects in materials and workmanship, for a period of (5) year from the date of installation. The company's sole liability is limited to either repair or replacement of the defective material at the manufacturer's sole discretion. The manufacture reserves the right to inspect or test at its facility, any products claimed to be defective during normal business hours.

The Purchaser making claims against this warranty are responsible for the full costs associated with removal and replacement of defective materials, transportation of all materials along with all other permits, fees and costs associated with the disruption of serve, restoration, replacement or repair of the product and facilities.

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Failures caused by improper handling, storage and transportation, Acts of God, Civil and Political conflict, accident, incursion with moving vehicles, tampering, or unauthorized modification are specifically excluded from coverage under this warranty agreement.

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. Do not remove protections and the safety devices for any reason.

MAINTENENCE ON THE EQUIPMENT - SKILLS

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

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.

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1 GENERAL

LTDZ inset LED touchdown zone and medium intensity approach light is high intensity, unidirectional, 12" steady burning fixture. These fixtures are intended for use as touchdown zone and approach lights in order to provide a visual aid to the moving aircraft. LTDZ 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, replacing those equipped with incandescent lamps, fed through standard isolation transformers connected to a 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 AC 150/5340-30.

2 MAIN FEATURES

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

The beam toe-in is obtained inside the light unit through positioning of the light source. In this way all lights are mechanically identical on the exterior and the shallow base installation becomes very easy because no precise toe-in is required during civil works.

Power consumption 20 VA.

2.1 REMOVABLE LIGHT UNIT

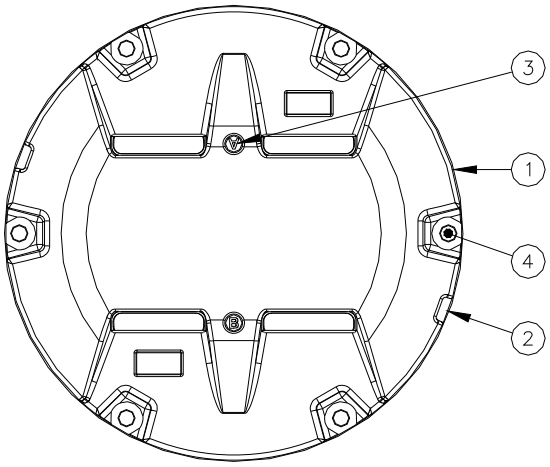
The removable fixture mainly consists of a dome, an optical assembly, a power supply/control board, and a lower cover.

2.1.1 Dome

The dome is made of treated drop-forged aluminum and includes one window to seat the prism, complete with gasket, kept in the proper position by means of a mounting plate fixed with HSCS M5x12 screws. The window in the dome is marked with the letter "A". The dome is provided with six through holes for fastening the light unit to the base.

Two lifting slots are provided to make it easy to remove the fixture by using two suitable lifting tools (available on request, P/N 332.4140 or 332.4230). As an alternative, two screwdrivers can be used.

A silicone O-Ring (supplied separately) has to be mounted around the outside of 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

Figure 1 – 12” Dome outside view

2.1.2 Optical Assembly

The optical assembly consists of one prism (Figure 5 - n°13) with fitted gasket (Figure 5 - n°12) kept into the proper position by mounting plate (Figure 5 - n°15) and one LED module (Figure 5 - n°7) with reflector (Figure 5 - n°6).

Three optical assemblies, with or without toe-in, are available for this fixture:

- Straight “ST”
- Left “RI”
- Right “LI”

LED module consists of six LEDs mounted on a metal core PCB, coupled with the support through thermo conductive material; the reflector is fixed to the support assembly.

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

2.1.3 Power Supply/Control Board

The power supply/control board is encapsulated into waterproof and heat conductive silicon resin.

The PCB powers and controls the LEDs so that the light output provided at every current step from 2.8 A to 6.6 A is comparable to a traditional halogen lamp, according to the requirements of FAA “Engineering Brief N°67”.

2.1.4 Lower Cover

The lower cover consists of a treated aluminum casting; it is fastened to the dome by means of six HSFH M5x10 screws. Two O-Ring are provided between dome and lower cover. The dome is equipped with a reference pin for its proper positioning.

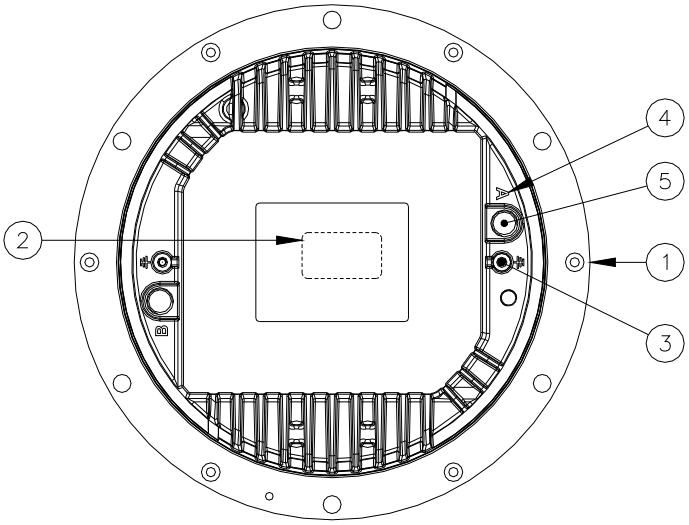
The cover is provided with one threaded hole for cable entry and external grounding screw. An air pressure valve is mounted for leakage testing.

Water tightness between fixture and shallow base is ensured by means of an O-Ring (supplied separately) to be placed in the shallow base groove.

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 or transformer secondary.

The fixture is 12" (304 mm) in diameter and 4 ¼" (107 mm) + 3/4" (18.5 mm) for plugs high; the protrusion above the ground is less than ¼" (6.35 mm).

An identification data label is applied to the lower cover (Figure 2 – n°2). Moreover, to identify quickly the beam color, the letter "A" of the dome in front of the window is painted in the same color of the light beam.

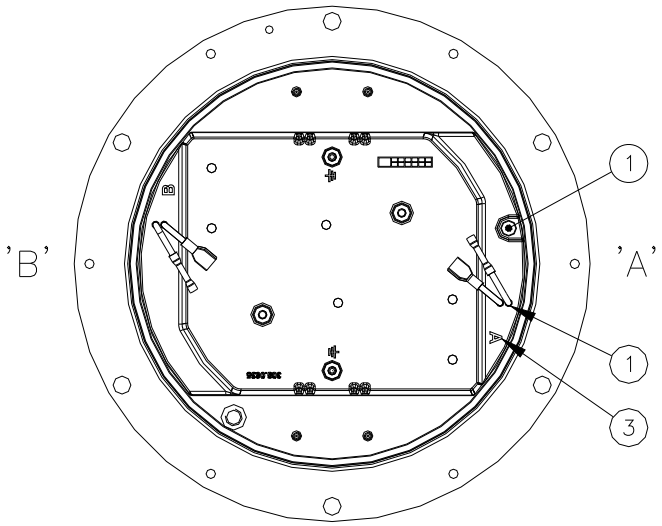


1. Lower cover
2. Identification label
3. Grounding cable hole
4. Letter "A" cable lead identification
5. Cable lead entry

Figure 2 – Lower Cover Outside View

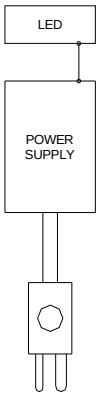
See *"Complete P/N identification"* figure for P/N information.

All hardware is made of stainless steel.



1. Cable lead with plug
2. Leak test valve
3. Letter “A” and “B” for cable lead identification

Figure 3 – Lower Cover Inside View



1 In 1 Out

Figure 4 – Wiring Diagram

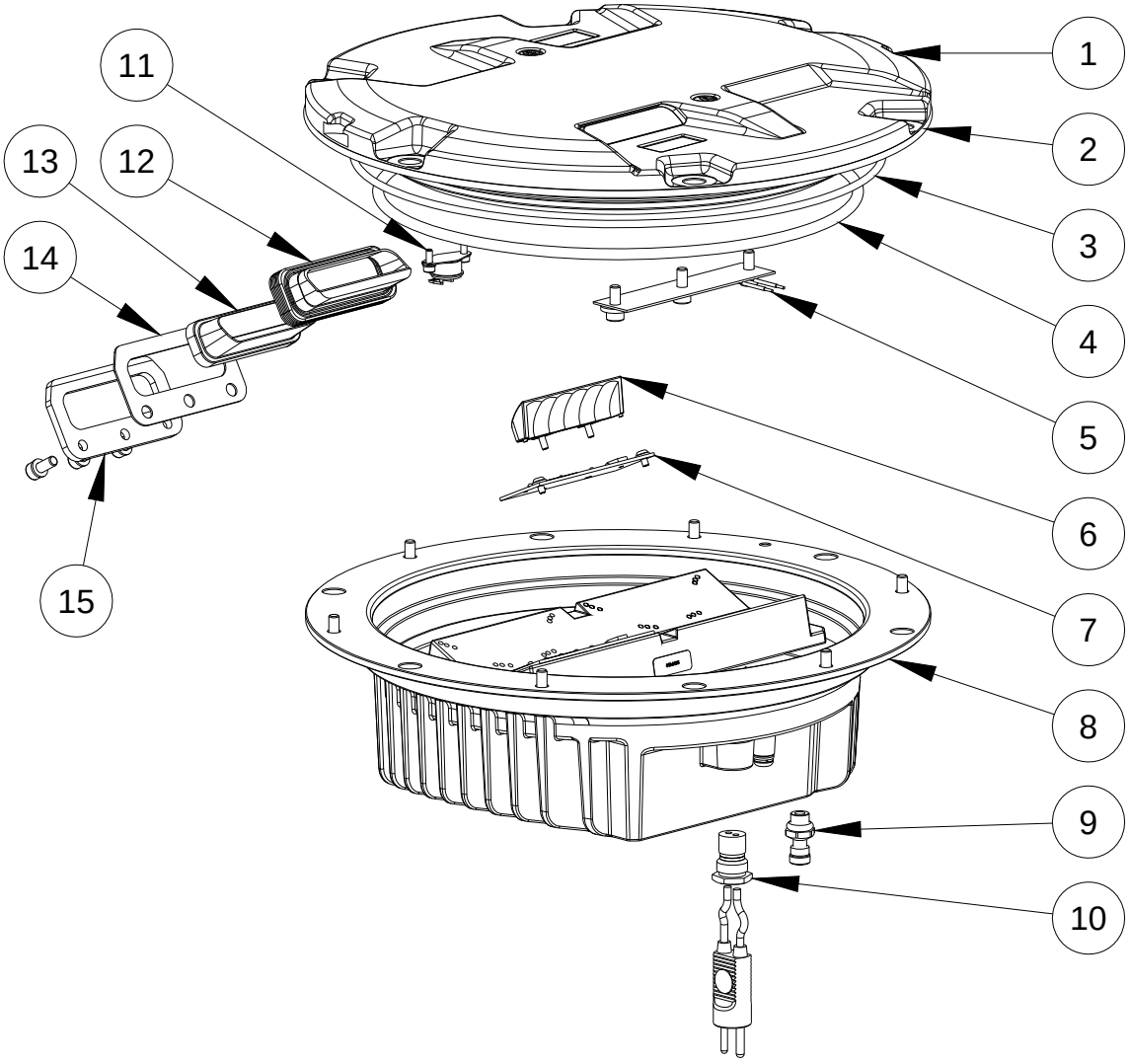


Figure 5 – Exploded View

No.	Description	Qty
1	Dome	1
2	O-Ring for dome (external)	1
3	O-Ring for dome (internal)	1
4	O-Ring for lower cover	1
5	Arctic kit heater	1
6	Reflector with hardware	1
7	LED module with accessories	1
8	Lower cover	1
9	Valve for Leakage test	1
10	FAA L-823 plug	1
11	Arctic kit thermostat	1
12	Prism gasket	1
13	Prism	1
14	Prism holder gasket	1
15	Mounting plate	1

Figure 6 – Part List

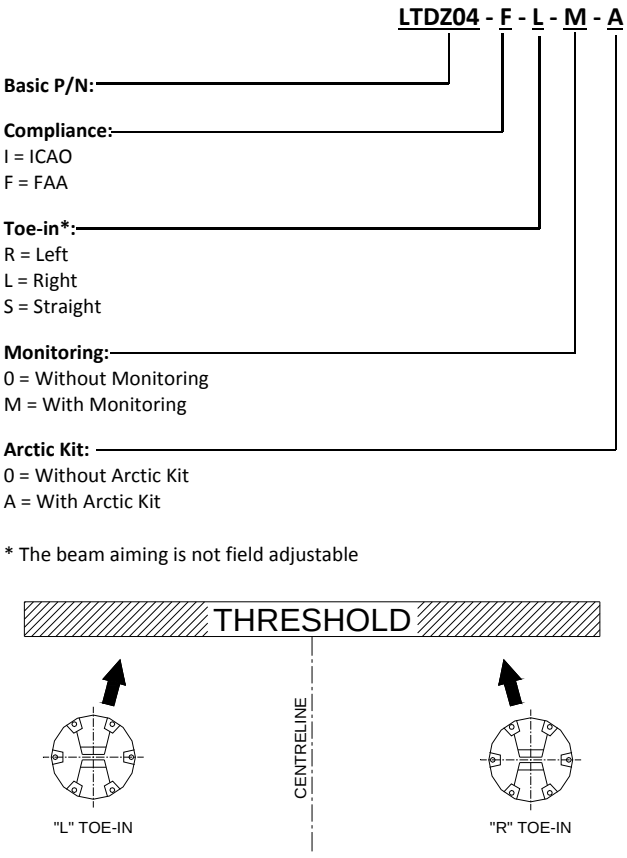


Figure 7 - Complete P/N identification

2.2 SHALLOW BASE

The shallow base (Figure 8) consists of a treated aluminium casting containing an electrical feed-thru system to connect the power cables, consisting of one cable lead with receptacle coming inside the base through one cable gland. The cable lead with receptacle consists of two single-pole leads, size 14AWG (2.5 mm^2), 40” (1 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 14AWG (2.5 mm^2, 0.250 m long), with female terminal for quick connection to a corresponding lead on the fixture. An additional external grounding screw is provided close to the cable entry.

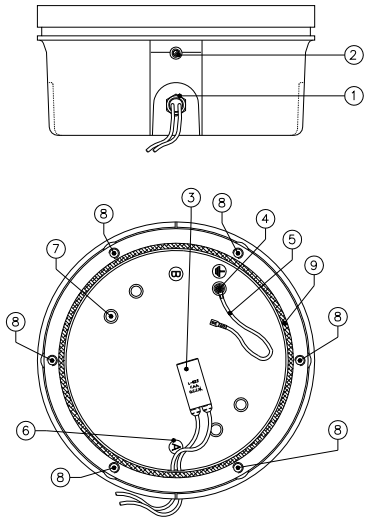
The shallow base is designed for cementing in place by means of epoxy-resin in a hole drilled in the pavement.

The fixture has to be fastened to the base by means of six hex cap screws, complete with external silicon-coated lock-washer. A gasket (supplied separately) must be placed between base and fixture for water tightness (Figure 8 - n°9) placed in the relevant shallow base groove.

The 12” shallow base is 320 mm in diameter and 150 mm high.

On request, special bases provided with holes for conduit connections can be supplied.

Inside the base two holders are provided to properly restrain the secondary power cable, in case the cable is coming through a conduit.



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 inserts for fixture fastening by bolts
9. O-Ring between fixture and base

Figure 8 – Standard 12” shallow base

2.3 ELECTRONIC SECTION

The electronic section consists of the following circuits:

- Current / current conversion circuit
- LED command circuit
- Control circuit

2.3.1 Current / current conversion circuit (patented)

This electronic section preforms a conversion from the input current (within range a from 2.8 A to 6.6 A) to the specified LED current value.

This conversion, performed in one transformation only, achieves several benefits:

- minimize the power losses
- significant increase of efficiency
- high input power factor
- the CCR may generate any output current waveform
- no constant current loop load dependency
- smaller isolation transformers can be used, compared to those used with the equivalent fixtures equipped with halogen lamps

To meet these features, the conversion circuit is based on MOSFET technology. This circuit has been designed to withstand the several field stresses (like withstand at elevated current peak) determinate by:

- defective connections along the series circuit
- sudden variations of the CCR power supply voltage; in many cases the CCRs don't provide suitable response time in order to compensate these variations
- use of circuit selector switches

The input circuit is protected against over-voltage, and tested in accordance with the requirements in FAA "Engineering Brief N°67".

2.3.2 LED command circuit

A PWM technique is used to control the LEDs. LEDs need to be supplied with a constant current; therefore in order to vary the luminous emission with proper linearity is necessary the supply current be applied at impulses. In other words, the LED luminous output depends on the time of application (duty-cycle) of constant current impulses.

2.3.3 Control circuit

The main task of the control circuit is to assure the correct LED light emission for the series circuit current.

To perform this, the circuit has a current sensor that generate a signal proportional to the series circuit current.

This signal is analyzed by a DSP which perform a RMS conversion of the input current.

The RMS conversion gives a good accurate value with any input current waveform.

Other functions:

- diagnostic, auxiliary voltage control and LED status control. In case of any LED failure or relative power supply circuit failure, the electronic control circuit commands the intervention of the monitoring device so that the secondary side of the isolation transformer becomes open, like in the case of an incandescent lamp failure. This features is essential when the monitoring option is required
- events recording (not-volatile memory) for diagnostic purposes
- PC operator interface through a serial connection: this features allows calibration of the brightness depending on the current, modification of the emission curve, and read back of the events occurred during the operating time

2.4 ARCTIC KIT

The optional arctic kit is in compliance with FAA “Engineering Brief N°67” and it prevents forming ice over the prisms area. The arctic kit is connected in series with the PCB and it consists of a thermostat and heater. It starts when the dome temperature is less than about 30°F (-1°C) and turns-off when the dome temperature reaches about 50°F (10°C).

Arctic kit consumption is less than 40 VA per plug.

3 INSTALLATION

3.1 Pavement Boring and Sawcutting

Drill each recess in pavement following the instruction in Figure 9.

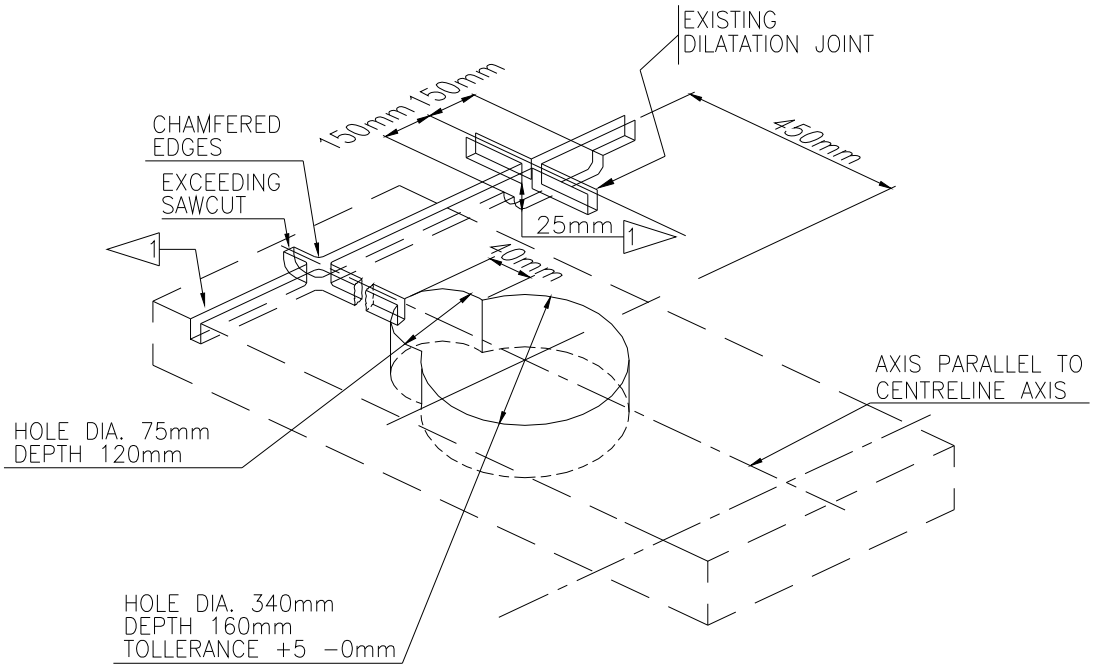


Figure 9 – Pavement Boring, Sawcutting and Joint Intersection Details

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 are damp, it is desirable that it be dried and blown clean with a compressed air. 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

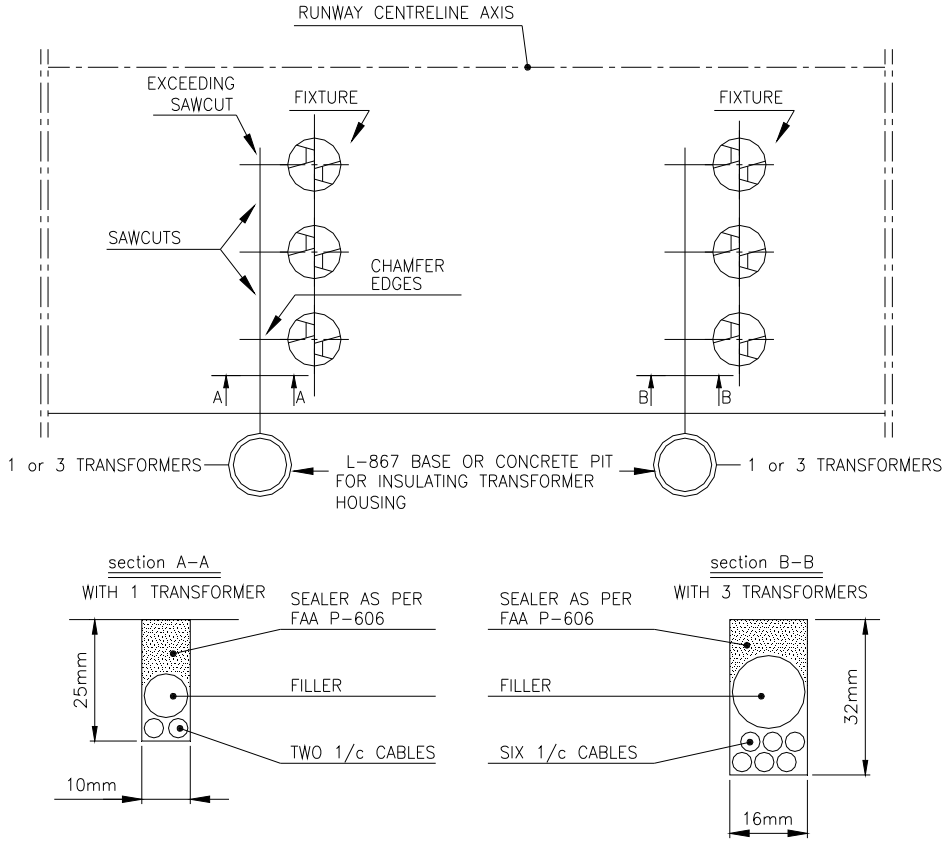


Figure 10 – Example of Light Unit Configuration

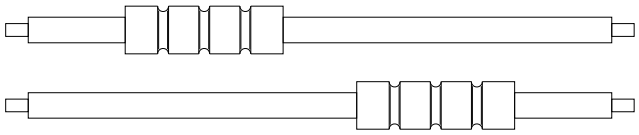
3.2 INSTALLING THE SHALLOW BASE

Two different installations are possible:

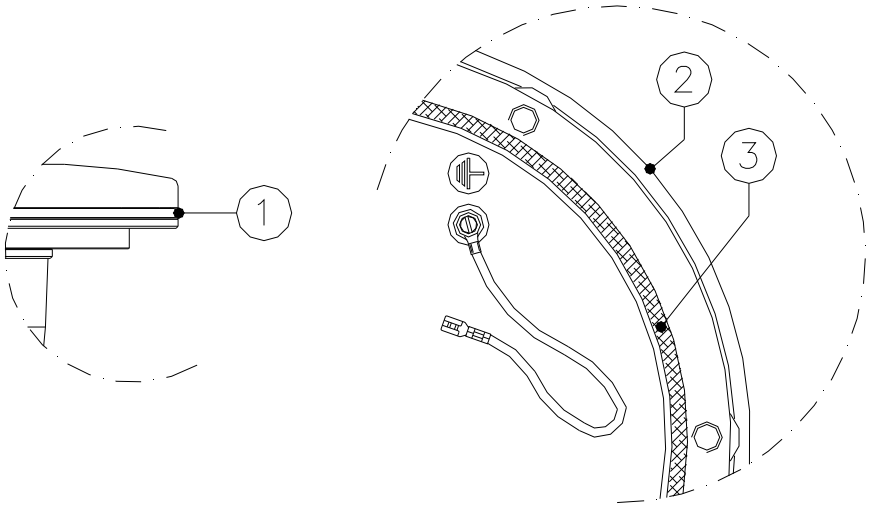
- Method "A" – cable leads to be laid in wireways
- ☐ Method "B" – cable leads to be laid in cable ducts (Figure 2)

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.

STEP	A	B	ACTIVITY DESCRIPTION
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 3. **An optical device for proper fixture orientation is available (P/N 332.4351** Figure 4**).**
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 (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.

STEP	A	B	ACTIVITY DESCRIPTION
9	•	/	Observing the circular level fixed on the jig, level the jig by operating the three leveling lobe knobs (Figure 13). 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 13). 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 2). 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.
12	•	☐	To install the fixture place the O-Ring around the dome (Figure 11- n°1) and between fixture and base (Figure 11- n°2). 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 locking screws complete with washer, one drop of screw paste (e.g. Dow Corning Molycote 1000) should be applied to the screws before installation. 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. 12” shallow base
3. O-Ring between fixture and base

Figure 11 – Gaskets for 12” shallow base

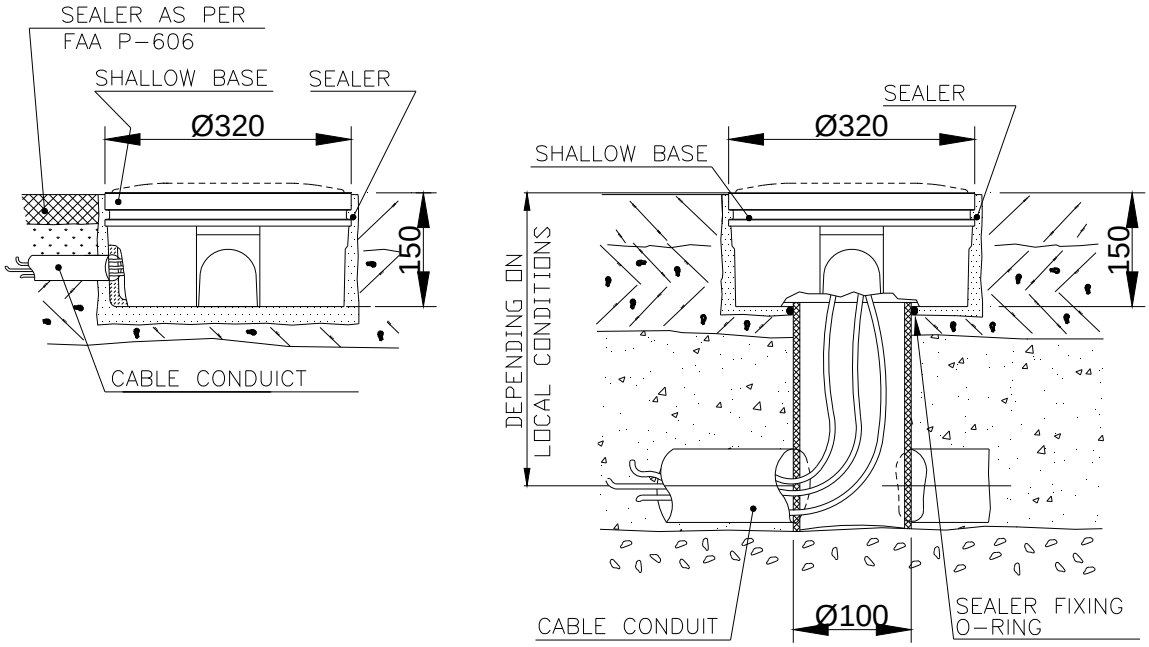
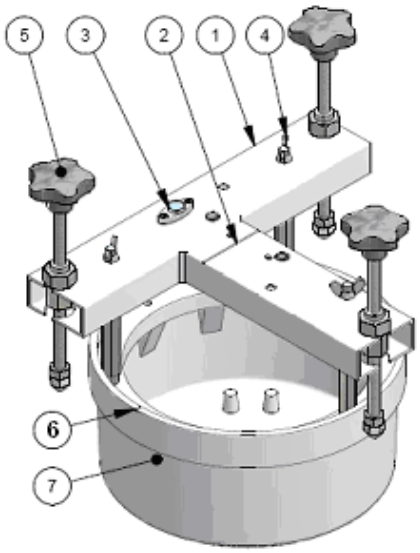
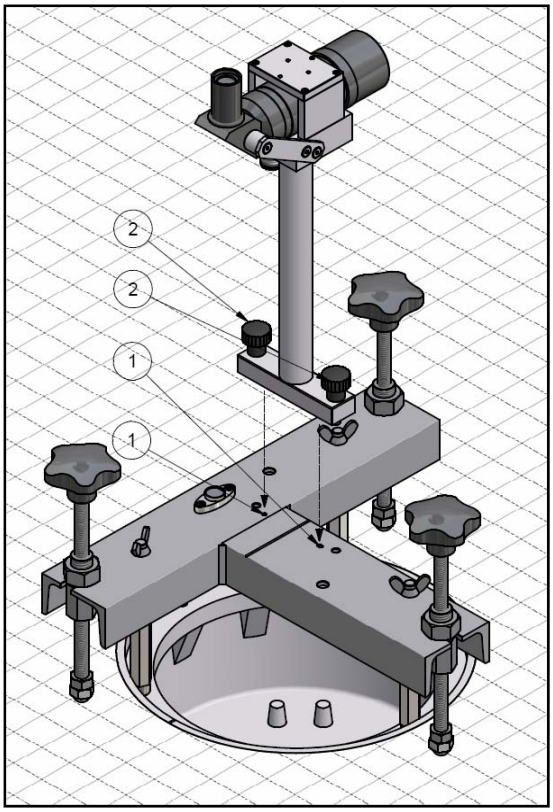


Figure 12 – 12” shallow base for side or bottom ducts (method “B”)



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. 12” shallow base
7. Shallow base notches aligned with the notch on the jig

Figure 13 – Shallow base installation details



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

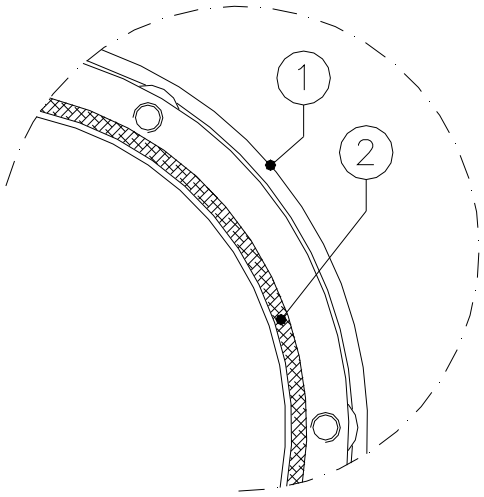
Figure 14 – Optical device (refer to the manual UT-MT-0485 for further information)

3.3 INSTALLING THE LIGHT UNIT ON L-868 BASE

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. Be sure the flange on the transformer housing is clean and the O-Ring (Figure 15 – 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 a grounding wire on the fixture to a grounding wire on the deep base (if required). 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 18.5 ft-lbs (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 15 – Gaskets for L-868 base

3.4 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 color 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, MAKE SURE THE POWER SUPPLY IS SWITCHED OFF.
DO NOT OPERATE ON LIVE PARTS!!!

LED lighting fixtures do not require frequent maintenance. With well-run installations and handling fixtures carefully by avoiding excessive falls or collisions, the only maintenance work to be carried out on the field should be 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 a 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 led
	Check for moisture inside the fixture
	CONDITION of the civil works of runway
Unscheduled	Check for water in base
	ELECTRICAL CONNECTIONS AND INSULATION
	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 six locking screws complete with washers.
- Raise the fixture by using the two lifting tools (P/N 332.4140 or 332.4230) inserted in the slots provided on the dome. As an alternative, two screwdrivers can be used.
- Disconnect the fixture and grounding cable from those inside the shallow base.

4.2.2 Opening the fixture

- Unscrew the air 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 six locking HSFH M5x10 screws (Figure 16 - n°1).

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

- prism, for dirt or damaged
- prism gasket, check the integrity
- cable lead and plug

4.2.3 Closing the fixture

Every time the fixture is opened **replace** the following items:

- six locking HSFH M5x10 screws (Figure 16 - n°1);
- O-Rings between dome and lower cover (Figure 18 – n°2 and 3);

Verify the correct position of the two O-Ring between dome and lower cover (Figure 18 – n°2 and 3); mount the lower cover on the dome and fasten it by means the six HSFH M5x10 screws (Figure 16 - 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 18 in-lbs (2.5 Nm).

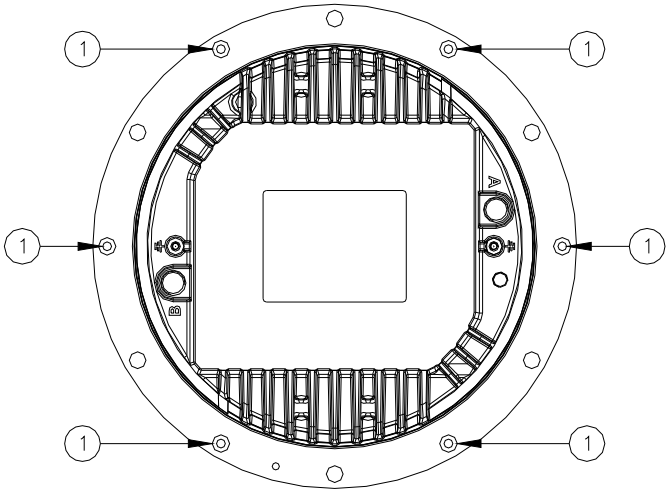


Figure 16 - Lower Cover Fixing Screws

4.2.4 Leakage test

The assembly should be given a 20 psi (138 kPa) air pressure test. This can be done by connecting an external airline to the valve (Figure 17– n°2) provided on the lower cover. Immerse the assembly under water, so air loss will be easily viewed if some part is damaged or assembled incorrectly.

If there is no air loss then test is passed successfully. Light unit is ready to be field installed.

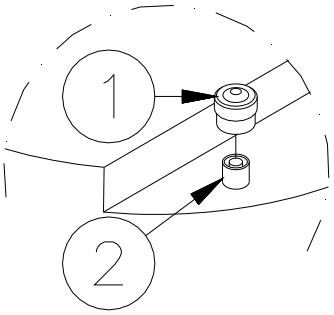
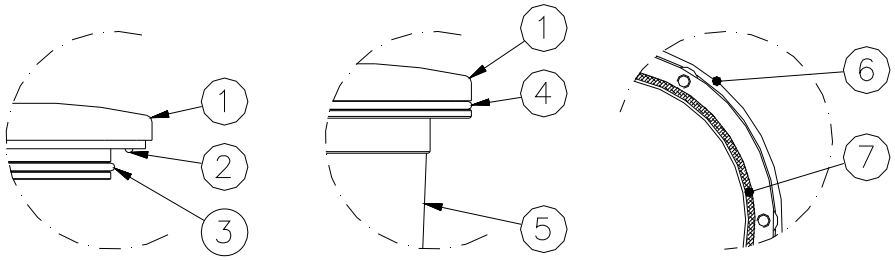


Figure 17 - Lower Cover with Pressure Valve

4.2.5 Reinstalling the fixture

Every time the fixture is removed from the base **replace** the following items making sure that all are placed correctly in the relevant groove:

- the six special seal lock washers;
- O-Ring around the dome (Figure 18 – n°4);
- O-Ring between fixture and shallow base (Figure 18 – n°7);
- The fixture is ready to be field installed.



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

Figure 18 – Fixture Gaskets

4.3 PRIMS CLEANING

4.3.1 Prism cleaning external

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

4.3.2 Prism cleaning interior

Normally the cleaning of the prism inside surfaces is not necessary because fixture is sealed. 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:

- clean the prisms surfaces (Figure 19 - n°1) with non-abrasive glass cleaning product
- dry them carefully
- reassemble the light unit following instructions of paragraph *“Closing the Fixture”, “Leakage Test”* and *“Reinstalling the fixture”*.

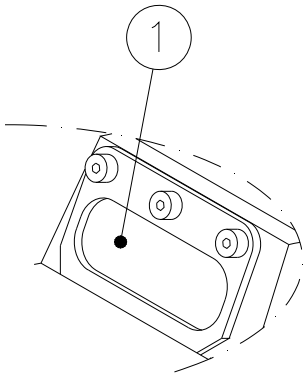


Figure 19 - Prism Cleaning

4.4 PRISM REPLACEMENT

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

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"*.

Clean out any pieces of the old prism and all accumulated debris from the inside. Unscrew the two HSCS M5x12 screws (Figure 20- n°6) and remove the mounting plate (Figure 20 - n°5). Then remove the old prism and the gasket, carefully clean the prism seat by scraping and taking care not to damage the walls.

4.4.2 Installing the New Prism

Place a new gasket (Figure 20 - n°2) in the prism cavity on the dome, then position and press by hand the prism (Figure 20 - n°3) in the relevant seat and place a new gasket in the back side of the prism (Figure 20 - n°4).

Then fasten the mounting plate (Figure 20 – n°5) with the two HSCS M5x12 screws (Figure 20 - n°6); tightening torque is 18 in-lbs (2.5 Nm). Inspect all components inside the fixture for damages or signs of corrosion. Replace all necessary components.

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

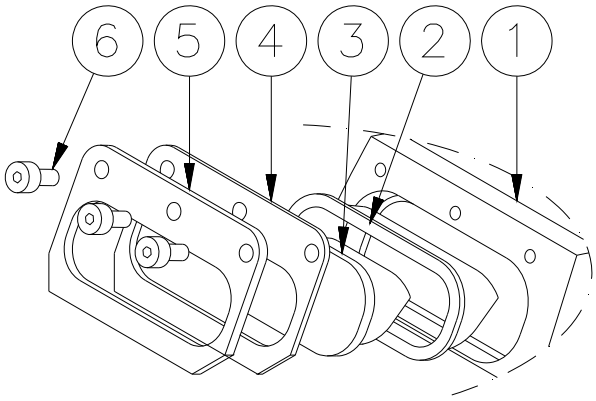


Figure 20 - Prism Replacement

4.5 LED MODULE REPLACEMENT

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

- disconnect the power supply connector from the LED module (Figure 21 – n°4)
- remove the LED module (Figure 21 – n°3) and reflector (Figure 21 – n°1) from the mounting plate unscrewing the two HSCS M3x12 screw
- replace the LED module

- check that the thermal interface (Figure 21 – n°5) is placed under the LED module and positioned properly
- check that the Kapton insulating sheet (Figure 21 – n°2) is placed over the LED board and is lying down and right-positioned
- fasten the LED module and the relevant reflector with a tightening torque of 5 in-lbs (0.6 Nm)
- reconnect the power supply connector (Figure 21 – n°4) to the LED module

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

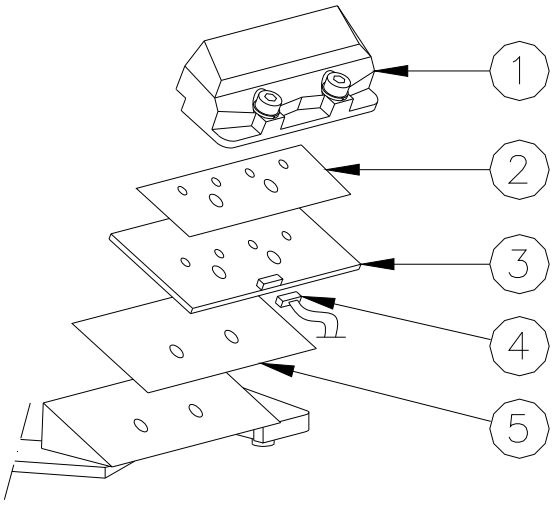


Figure 21 – LED Module Replacement

4.6 ELECTRONICS REPLACEMENT

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

- disconnect the power supply connector(s) from the LED module(s)
- replace the entire lower cover with a new one complete with electronic section
- reconnect the power supply connector(s) to the LED module(s)

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

4.7 ARCTIC KIT REPLACEMENT

4.7.1 Thermostat

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

- ddisconnect the thermostat from the cable lead with plug and from the PCB

- unscrew the two HSCS M3x8 screws
- unsolder the heater cable from the thermostat
- take a new thermostat and solder the heater cable on the new thermostat terminals
- protect the soldered joint from moisture with a piece of heat shrink tubing
- tighten the two screws with tightening torque 5 in-lbs (0.6 Nm)

4.7.2 Heater

- unsolder the heater cable from the thermostat
- unscrew the three HSCS M3x8 screws which fasten the heater
- solder the new heater cable on the thermostat terminals
- protect the soldered joint from moisture with a piece of heat shrink tubing
- clean the heater dome area
- apply silicon thermal paste (like Wacker P12) under the new heater
- position the heater on the dome and tighten the three screws with plastic washer; tightening torque 5 in-lbs (0.6 Nm)

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

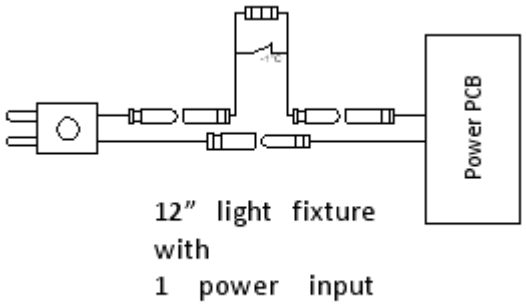


Figure 22 – Wiring diagrams for the heaters

4.8 GASKETS

4.8.1 Gasket examination

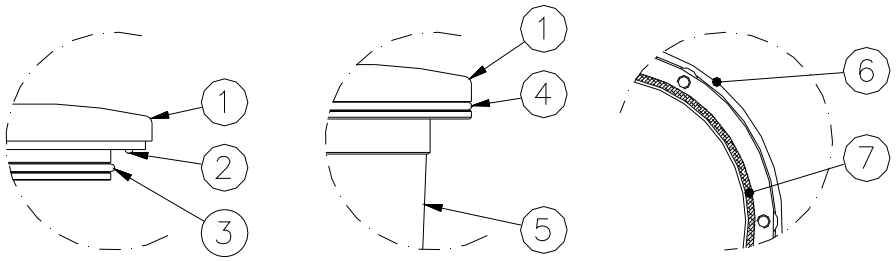
Every time a fixture is opened each O-Ring must be examined as described below and replaced if necessary.

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:

- two O-Ring between dome and lower cover (Figure 23 - n°2 and 3);
- O-Ring around the dome (Figure 23 - n°3);
- O-Ring between fixture and 12" shallow base (Figure 23 - n°7);
- prism gasket mounted between prism and dome (Figure 24- n°2).



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

Figure 23– Fixture Gaskets

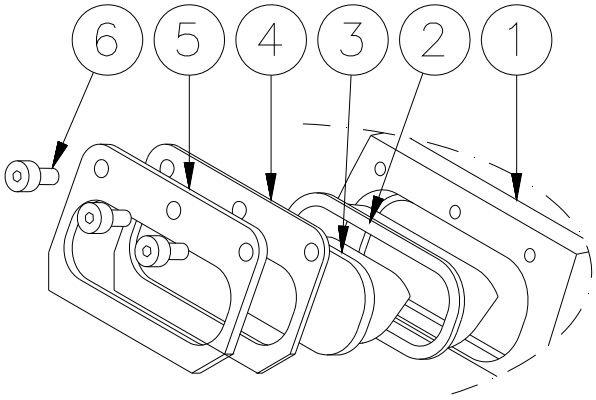


Figure 24 – Prism Gasket

4.8.2 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 the new O-Ring in its groove.

NOTE 1: Make sure that the proper O-Ring is 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 must be properly tightened to obtaining a complete seal.

TIGHTENING TORQUE	
lower cover HSCS M5x16	20 in-lbs (2.5 Nm)
fixture locking screw	26 ft-lbs (35 Nm) for shallow base 18.5 ft-lbs (25 Nm) for L-868 base

4.9 CABLE LEAD WITH PLUG

4.9.1 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 from the electronics by cutting the cables, unscrew the gland and pull out the cable lead with gland gasket.

4.9.2 Installing the new cable lead with plug

Insert on the new power supply cable lead with plug (Figure 25 – n° 1) the new gland nut (Figure 25 – n° 2) with Teflon washer (Figure 25 – n° 3), metal washer (Figure 25 – n° 4) and then the new gland gasket (Figure 25 – n° 5) so that the available length of cables outside the fixture is approx. 20 inches (50 cm) when re-assembled. Pull both cables through the holes provided in the bottom of the lower cover; then strip each cable for a length of approx. ¼" (7 mm) and clamp the female terminal to the cable (Figure 25 – n° 6) and the male ones to the electronics wires.

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

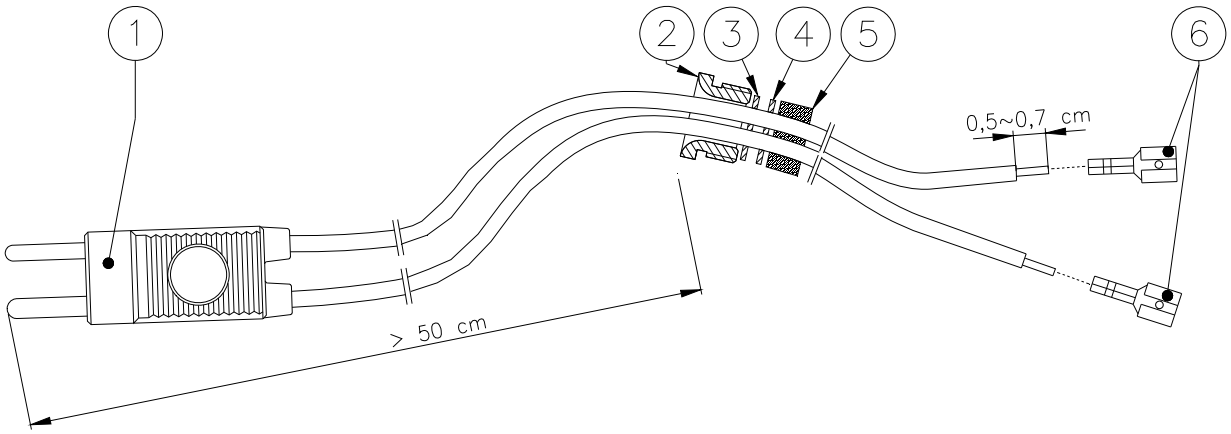


Figure 25 - Cable Lead With Plug

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

4.10 PRESSURE VALVE

If a leakage is found near the pressure valve during an air pressure test, check carefully where the leakage occurs. If the leakage is between the valve (Figure 26 - n°2) and the lower cover (Figure 26 - n°1), tighten the valve body to the lower cover from the outside 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"*. Unscrew the valve body with gasket from the outside of the lower cover (Figure 26 - n°1) by clamping the hexagonal end section of the valve body. Screw the new valve on the lower cover; tightening torque is 3 in-lbs (0.35 Nm). Check the valve core (Figure 26 - °4) is tightened to the valve body (Figure 26 - n°2) and then screw its cap (Figure 26 - n°3).

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

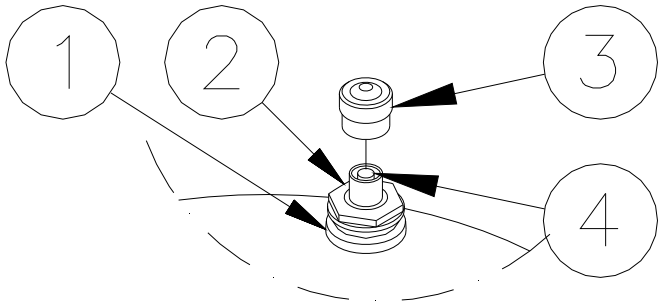


Figure 26 - Lower Cover with Pressure Valve

4.11 CLEANING

Service life depends upon the entire assembly being sealed. 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.

4.12 MONITORING

The fixtures can be provided with the option of monitoring. This device allows the constant current regulator to detect an open circuit as if the fixture was a Halogen Lamp when a LED burns out. The fixture thus acts as a traditional lamp fixture.

When the fixture has a failed operation, the internal monitoring device disconnects definitively the fixture from the series circuit; to restore the normal operation of the fixture it's necessary to replace the LED board and unlock the monitoring device. For this operation it is necessary to follow these steps:

- remove the fixture from the base and open it following instructions of *"Removing and Opening the Light Unit From the Base"*
- replace the LED module following instructions of *"LED Module Replacement"*

- restore the condition of proper functioning of the monitoring device as shown in Figure 1

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

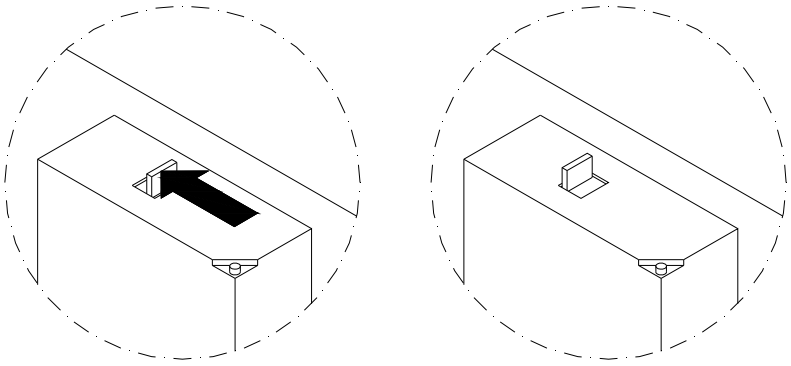


Figure 27 - Restoring the Monitoring Device

5 TROUBLESHOOTING

Problem	Possible cause	Solution
Distorted light beam output	Broken or damaged prism	Replace prism
	Wrong prism installed	CHECK PARTS LIST AND INSTALL THE CORRECT PRISM
Weak light output	Primary loop with partial short circuit	Check cable assembly
	Defect in the isolation transformer	Replace transformer
	Dirty prism or dome	Clean the light fixture
	One LED of the luminous source damaged in short circuit (only without the monitoring option)	Replace the LEDs board
	Wrong power PCB installed	Check parts list and install the correct PCB
Luminous source not working	LEDS DEFECTIVE	Replace the LEDs board
	POWER PCB DEFECTIVE	Replace the Power PCB
	Moisture inside the fixture	Execute leakage test and replace damaged components. Clean and dry the inside area of the fixture
	No connection of primary circuit	Check transformer output current with A-meter
	Defective isolation transformer or secondary wiring	Check power line between the light fixture and the transformer, including connectors

Problem	Possible cause	Solution
	Monitoring device locked (only if this option)	Unlocked monitoring device
Water or moisture inside the fixture	Prism gasket, O-rings between dome and lower cover	Replace all gasket and execute leakage test
	Pinched fixture power cables	Replace fixture leads

6 RENEWAL PARTS

(Refer to Figure 5 *Exploded View*)

Item	Description	Part Number
1a	Unidirectional dome with prism and gasket	152.7257
1b	Unidirectional dome with prism and gasket with arctic kit	152.7258
2	O-Ring for dome (external)	758.2016
3	O-Ring for dome (internal)	758.2150
4	O-Ring for lower cover	758.2140
5	Arctic kit with one heater and screws, for 12" fixture	152.5525
6	Reflector with screws	152.7259
7	LED module (WHITE)	150.3980
8a	Lower cover with monitoring	151.0009
8b	Lower cover w/out monitoring	151.0035
9	Pressure valve	786.7047
10	FAA L-823 plug with gland nut and gasket	152.6147
11	Arctic kit thermostat with screws, cables and terminal	152.5500
12	Prism gasket	325.0445
13	Prism	318.1311
14	Prism holder gasket	325.0450
15	Mounting plate	341.1250
--	O-Ring for base, 12" dia	325.2000
--	Cable lead with receptacle L-823 for shallow base	011.3020
--	Lower anaerobic adhesive, 50 cc	712.0025
--	Grease for O-Ring, 400 gr	752.1014
--	Hardware kit for adaptor ring fastening to shallow base, 12" Dia	152.8065