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BOLOGNA ITALY
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# ELEVATED APPROACH, THRESHOLD AND RUNWAY END LIGHT

# FAU

# INSTRUCTION MANUAL FOR USE, INSTALLATION AND MAINTENANCE

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N° Attachments: Copy n°:

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(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,

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*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.

*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 | |
|---|---|
| 02/27/2014 | Deleted § "List of the recommended spare parts" and added relevant attachment |
| 09/29/2000 | General review |
| 08/28/1995 | First issue |

## REVISIONS

| Index | Date | Description | Edited by | Approved by |
|---|---|---|---|---|
| 01 | 08/03/2019 | Updated Powers Table. TG version passed from 150W to 200W | M.Bacciglieri | M.Mazzotti |
| 02 | 19/09/2019 | Update installation chapter on breakable pole | M.Bacciglieri | M.Mazzotti |

## LIST OF EFFECTIVE PAGES

From page 1 to page 18

## INDEX



## INDEX OF FIGURES



## LIST OF ATTACHMENTS

## 1 GENERAL

**FAU** elevated LED runway edge light is high intensity, unidirectional steady burning type.

These fixtures are intended for use as approach centreline and crossbars, approach side row, threshold, threshold wing bar and runway end light, in order to provide a visual aid to the landing aircraft.

FAU lights are in compliance with ICAO Annex 14 Vol.1, FAA AC 150/5345-46, IEC TS 61827 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

The fixture consists of:

- front glass mechanically secured to the body by aluminium ring with gasket
- aluminium reflector equipped with lampholder
- aluminium body mounted on aluminium graduated support with graduated scales, to allow the horizontal (±30°) and vertical (±20°) aiming of the body
- aluminium breakable coupling (P-001 only)
- tungsten-halogen lamp, 6.6 A, PK 30/d base, with male faston cable leads
- two, single-pole neoprene cable leads, size 2.5 mm2, with plug meeting FAA Specs L-823

All hardware is made of stainless steel.

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

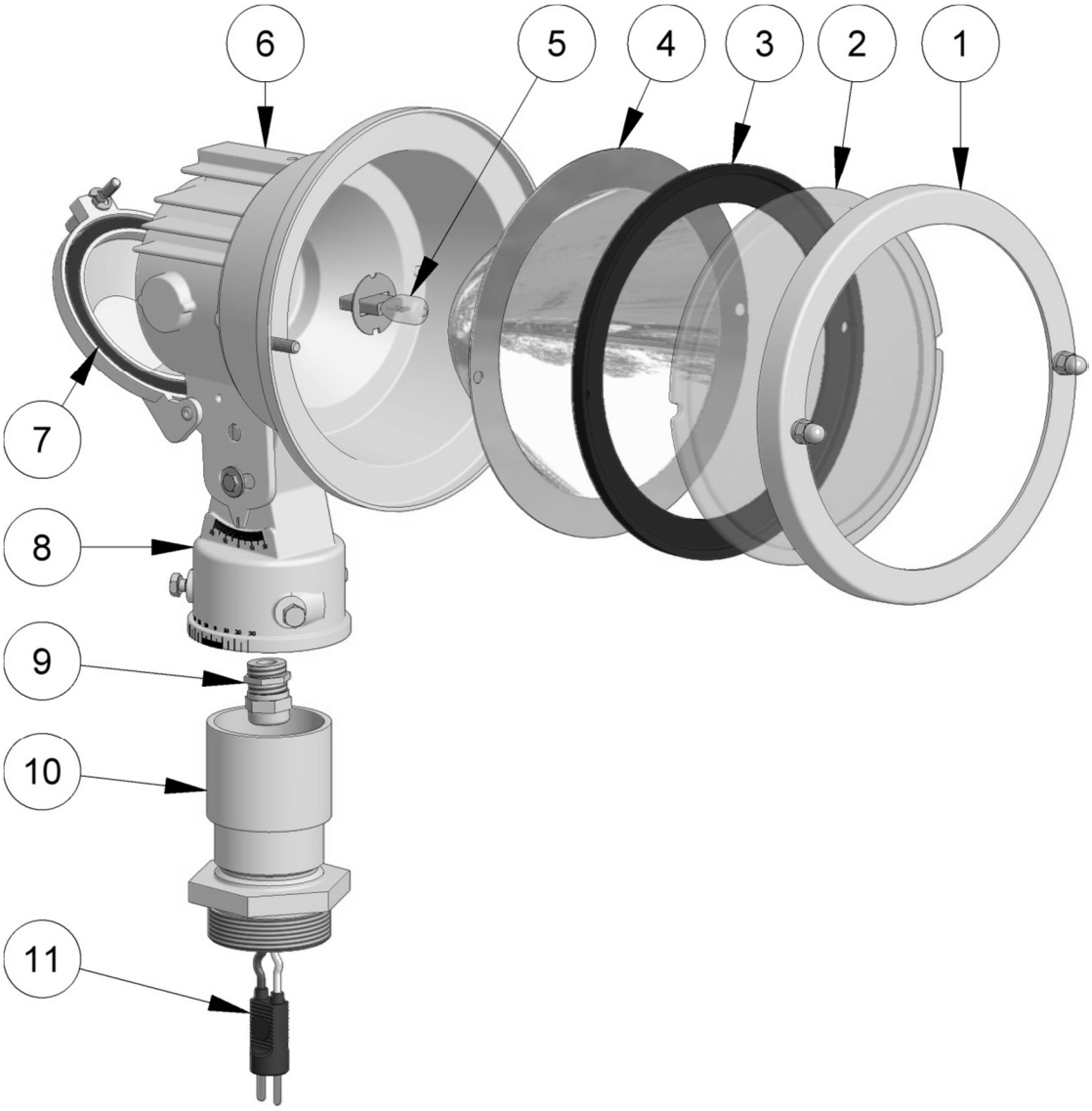



*Figure 1 – Exploded View (P-001 configuration)*

| No. | Description | Qty |
|---|---|---|
| 1 | Aluminium ring | 1 |
| 2 | Front glass | 1 |
| 3 | Front glass gasket | 1 |
| 4 | Aluminium reflector | 1 |
| 5 | Lamp | 1 |
| 6 | Rear door gasket | 1 |
| 7 | Graduated support with screws | 1 |
| 8 | Cable gland | 1 |
| 9 | Breakable coupling | 1 |
| 10 | FAA L-823 plug | 1 |

*Figure 2 – Part List*

**FAU - AC - 150 – P-001**

**Basic P/N:**

**Use Code:**
(Refer to TABLE A)

**Lamps:**
065 = 1x65W 6.6A PK30/d
100 = 1x100W 6.6A PK30/d
150 = 1x150W 6.6A PK30/d
200 = 1x200W 6.6A PK30/d

**Configuration:**
P-001 = Fixture complete with breakable coupling
C-050 = Fixture with graduated support and cable lead (L= 0.5 m)(*)
C-250 = Semi-assembled fixture (AC and AR only)(*) (**)

(*) Mounting pole and breakable coupling must be ordered separately
(**) This configuration is provided with graduated support and cable lead (L = 2.5 m) not assembled

**TABLE A**

| USE CODE | APPLICATION | COLOUR | LAMP | | |
|---|---|---|---|---|---|
| | | | ICAO | STANAG | FAA |
| AC | Approach centreline and crossbars | WHITE | 150W | 150W | / |
| AR | Approach side row | RED | 150W | 150W | / |
| TG | Threshold | GREEN | 200W | 200W | / |
| WG | Threshold Wing Bar | GREEN | 200W | 200 W | / |
| ER | Runway End | RED | 65W | 65W | / |
| SB | FAA Stop bar | RED | / | / | 100W |

*Figure 3 - Complete P/N identification*

# 3 INSTALLATION

## 3.1 CIVIL WORKS

Each light is usually installed on a suitable concrete block, into which a pipe elbows is cemented. The isolating transformer is housed into a separate concrete pit which is normally placed close the above concrete block (Figure 4).

The pit can be placed far from the concrete block too, but in this case a suitable cable duct has to be provided between the pit and the pipe elbow for passing the secondary cable.

As alternative the assembly pit-pipe elbow can be replaced by a steel sheet base, which can be used to house the isolating transformer, complete with an upper steel plate with a threaded sleeve.

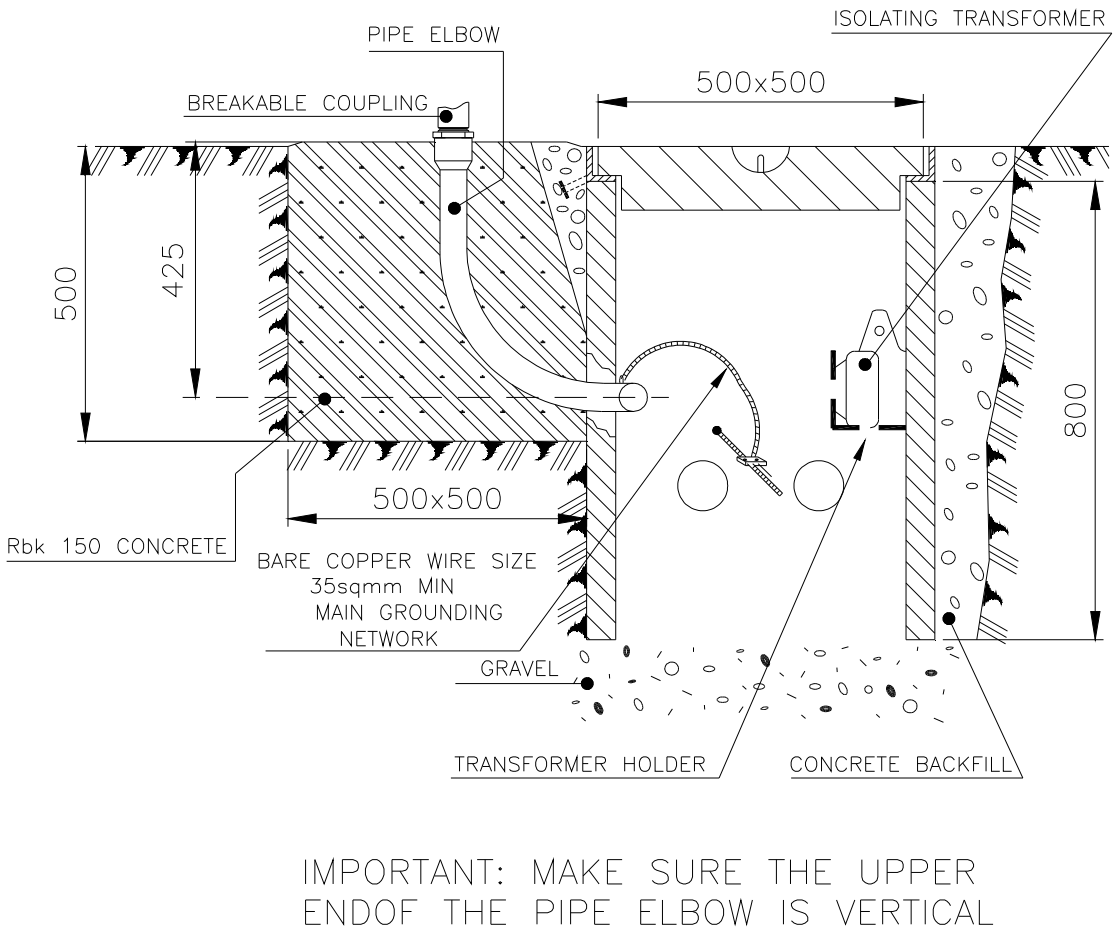


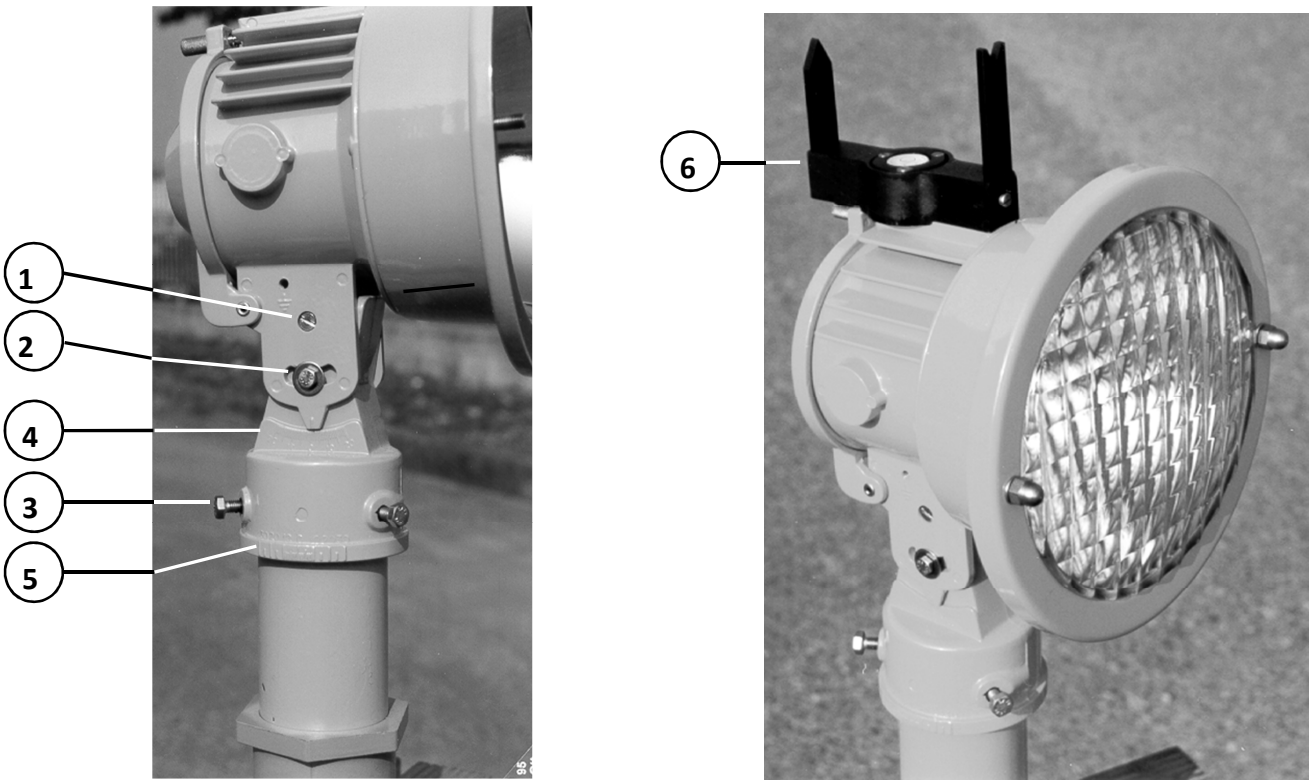

*Figure 4 – Civil Works*

## 3.2 INSTALLING THE LIGH UNIT ON 2" MOUNTING POLE/BREAKABLE COUPLING

For the installation of the light on 2" mounting pole with breakable coupling, or on breakable coupling directly, the following steps are suggested:

- pass together the secondary cable lead with receptacle and a suitable length of grounding wire (grounded inside the pit) through the pipe elbow
- place the receptacle into the upper threaded section of the pipe elbow, by holding it between the two plastic rings, and pass the grounding wire through the rings (in correspondence of break point provided on the rings)
- screw the mounting pole (if provided) into the breakable coupling
- pass the grounding wire through the breakable coupling and the mounting pole (if provided), through the graduated support and clamp a suitable eyelet terminal to the wire and connect it to the grounding hole provided on the right external side of the fixture
- connect the light plug to the secondary receptacle inside the pipe elbow, by passing it through the breakable coupling and the mounting pole (if provided)
- screw the breakable coupling to the pipe elbow, supporting by hand the body, in order to avoid the twisting of the grounding wire and the light cable leads
- mount the body on the breakable coupling (or on the mounting pole, if provided), by tightening the three HHCS screws on the graduated support
- before to tighten, take care of the light levelling and alignment in line with the runway centreline by using the levelling-alignment device (P/N 332.3270) placed on the light body in fixed position (see Fig. 5)
- mark a reference on the breakable coupling (or on the mounting pole if provided) in correspondence of the zero of the horizontal scale, to allow the eventual horizontal aiming
- provide the eventual horizontal aiming (see Fig. 6) loosen the three HHCS screws (see Fig. 5) which locks the graduated support to breakable coupling (or mounting pole, if provided), rotate the light at the required angle and tighten again the screws being sure the light be always in level. Tightening torque 5 Nm
- provide the eventual vertical aiming (see Fig. 6) loosen the two HH screws (see Fig. 5) locking the body to the graduated support, rotate the body at the required angle and tighten again the screws. Tightening torque 5 Nm

NOTE: for a more precise vertical aiming, use the light sight (P/N 332.3240) in free-wheeling mode and the light adapter (P/N 332.4580), mounted on the light unit as shown in Fig. 8 position "B". When the light sight reads the correct angle, tighten the body locking screws




1 - CH screw (pin for vertical aiming)
2 - HH screw (to lock the body to the graduated support)
3 - HH screw (to lock the graduated
4 - Scale for vertical aiming
5 - Scale for horizontal aiming
6.- Levelling alignment device displaced on the body

*Figure* 5 - *Light unit aiming on 2" mounting pole/breakable coupling*

| USE | HORIZONTAL AIMING | VERTICAL AIMING |
|---|---|---|
| **APPROACH (*)** | | |
| **(centreline and crossbars)** | | |
| threshold to 315 m | 0° | + 5.5° |
| 316 m to 475 m | 0° | + 6° |
| 476 m to 640 m | 0° | + 7° |
| 641 m to the end | 0° | + 8° |
| **APPROACH SIDE ROW** | | |
| threshold to 115 m | +2° | + 5.5° |
| 116 m to 215 m | +2° | + 6° |
| 216 m and beyond | +2° | + 6.5° |
| **THRESHOLD** | +3.5° | +5.5° |
| **THRESHOLD WING BAR** | +2° | +5.5° |
| **RUNWAY END** | 0° | +2.5° |

**(*)** LIGHTS IN CROSSBARS BEYOND 22.5 M FROM THE CENTRELINE SHOULD BE TOED-IN 2°.

NOTE: the horizontal aiming is positive when the light is rotate towards the runway centreline; the vertical angles are referred to the horizontal plane.

*Figure 6 - Aiming angles depending on FAU use*

## 3.3 INSTALLING LIGHT UNIT ON FRANGIBLE POLE

For the installation of the light on frangible lowering pole the following steps are suggested:

- place mast in down position (see Fig. 7)
- use the clamp adapter to mount the light sight (P/N 332.3240) on the upper part of the pole and determine the repose angle
- install the light unit on the top of the pole through the graduated support. Attach the light sight to the light body by mean of the adapter plate (P/N 332.4580) as shown in position "A" Fig. 8
- with the pole properly installed in parallel to the runway centreline (flight path), when the reading of the light sight is 90° the light unit will be in parallel to the fight path
- rotate light sight to position "B" Fig. 8 by means of the adapter plate. Set the elevation angle (taking into consideration the repose angle) by loosening the two body locking screws and rotate the light body to the required angle as shown by reading on light sight in free-wheeling mode. Example: elevation desired angle is 8°. Light sight in free-wheeling mode reads 80°. Angle of repose is 10°. To properly aim, rotate the light body until light sight reads 80° (90° - 10°) and then continue to rotate until it reads 72°. Tighten the body locking screws
- put the light sight in lock mode and attach a nylon cord. Raise the mast and tighten it.
- pull nylon cord and allow the light sight to come to rest. Release the cord and lower the mast. Read the angle direct from the light sight to make the final adjustment. Loosen the body locking screws slightly. With the light sight in free-wheeling mode and with the scale at rest, rotate the light body the necessary number of degrees from the original position. Lamp is now set to proper elevation. Tighten the body locking screws

NOTE: if the fall line of the mast is not parallel to the runway centreline, use light sight as shown in position "A" Fig. 8. Loosen the graduated support locking screws and rotate the light unit thy number of degrees equal to the displacement angle of the fall line to the flight path

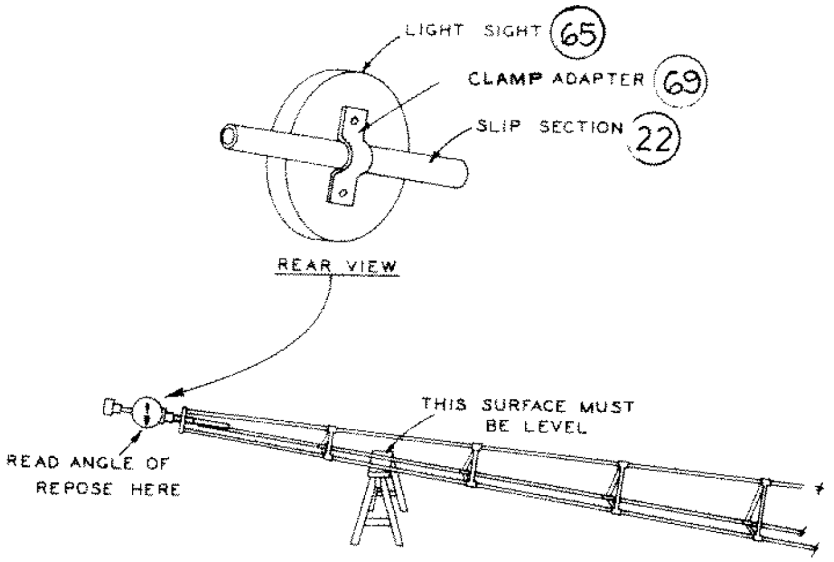



*Figure 7 - Frangible lowering pole in down position*

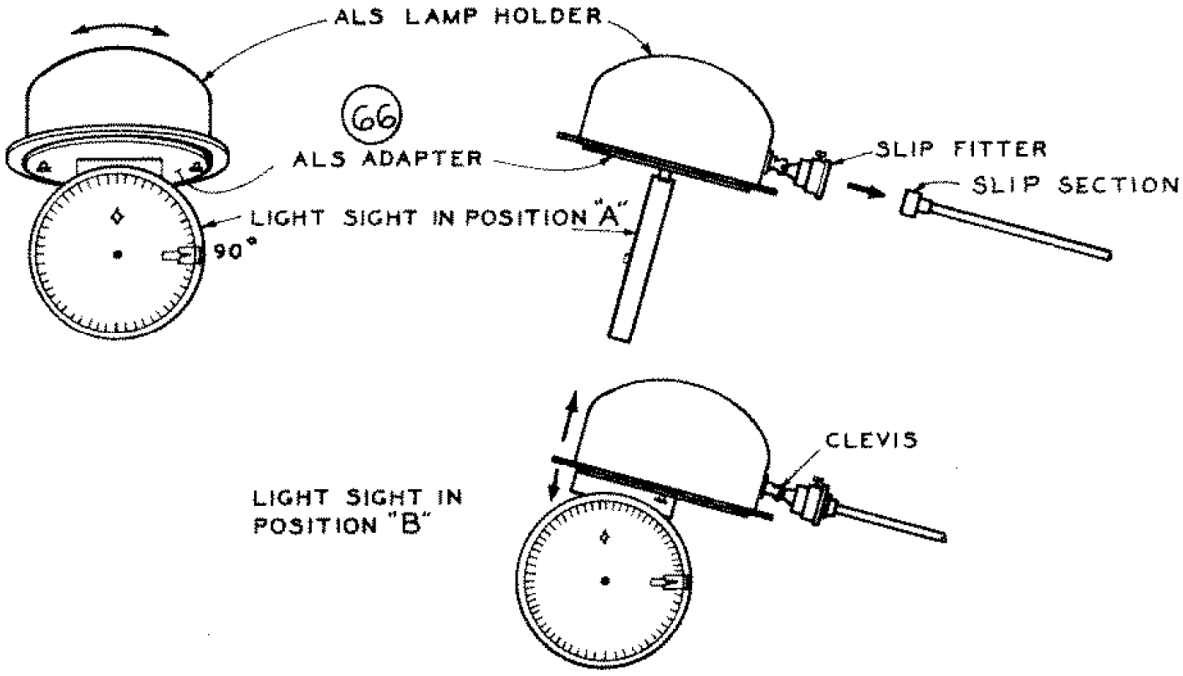



*Figure 8 - Light unit aiming by means of the light sight*

### 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 a fixture, installed in the taxiway/runway pavement on its concrete pit 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 concrete pit, the concrete pit 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*

| | |
|---|---|
| **Daily** | Burnt-out lamps |
| | Broken parts of lights |
| **Monthly** | Cleaning of the lenses |
| | Correct setting of the lights |
| **Semi-Annual** | Painting or replacement of rusted parts |
| **Annual** | Stability of the civil works |
| | Stability and assembly of lights |
| | Electrical connections and insulation degree |
| | Luminous efficiency of lamps |
| | Condition of all the gaskets |
| **Unscheduled** | After unusual atmospheric precipitation, check the light condition and remove any luminous beam obstructions |

#### *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.

Recommended snow removal techniques are described in Airport Service Manual ICAO - Part 9 - Airport Maintenance Practices or FAA AC 150/5200-30.

## 4.2 CLEANING OF THE FRONT GLASS

Clean the external surface of the front glass with a detergent solution.

## 4.3 RELAMPING

Open the rear door by unscrewing the relevant knob. Disconnect the faston connections between the light cable leads and the lamp cable leads. Remove the faulty lamp by releasing the two elastic mountings. Mount the new lamp in fixed position and reassembly by reversing the above procedure.

Take care the new lamp be identified by the same P/N of the old one.

**CAUTION: TOUCHING THE QUARTZ BULB WITH YOUR BARE FINGERS MAY SERIOUSLY SHORTEN THE LAMP LIFE. IF THE QUARTZ BULB HAS BEEN TOUCHED, WIPE IT CLEAN WITH A PIECE OF LENS CLEANING TISSUE OR SIMILAR MATERIAL MOISTENED WITH ISOPROPYL ALCOHOL.**

## 4.4 REPLACEMENT OF THE FRONT GLASS

Remove the aluminium ring, which locks the front glass, by unscrewing the two cap nuts with washer. Remove the damaged front glass and mount the new one in fixed position. Reassembly by reversing the above procedure.

If necessary, recheck the light aiming.

**IMPORTANT: IT IS SUGGESTED TO REPLACE THE GASKET TO NOT AFFECT WATERTIGHTNESS.**

## 4.5 REPLACEMENT OF THE REFLECTOR

Remove the aluminium ring, which locks the front glass, by unscrewing the two cap nuts with washer. Remove the front glass, the gasket and the damaged reflector. Mount the new reflector in fixed position and reassembly by reversing the above procedure.

If necessary, recheck the light aiming.

**IMPORTANT: IT IS SUGGESTED TO REPLACE THE GASKET TO NOT AFFECT WATERTIGHTNESS.**

## 4.6 REPLACEMENT OF THE BREAKABLE COUPLING

Loosen the three HHCS screws of the graduated support and raise the assembly body-graduated support; then unscrew the broken breakable coupling complete with mounting pole (if provided).

Disconnect the light plug from the secondary receptacle. Uscrew the mounting pole (if provided) from the broken breakable coupling.

Screw the mounting pole (if provided) on the new breakable coupling.

Complete the installation as per par. 3.2.

## 4.7 REPLACEMENT OF THE CABLE LEAD

Loosen the three HHCS screws of the graduated support and raise the assembly body-graduated support; then unscrew the breakable coupling complete with mounting pole (if provided).

Disconnect the light plug from the secondary receptacle.

Remove the two HSCH screws with washer, which lock the body to the graduated support, and the two HSCH screws, which permit the vertical rotation of the body. Disconnect the faston connections between the light cable leads and the lamp cable leads.

Open the rear door and cut the cable lead inside the body close to the cable gland and then pull them through the cable gland from the outside of the body. Loosen the cable gland from the outside by means of a suitable wrench.

Insert a new cable gland on the new light cable leads with plug and place it at approx 8 cm from the free extremity of the cables.

By using a suitable wrench screw the cable gland on the fixture body.

Make sure the cable gland be properly placed.

Then reassembly by reversing the procedure and complete the installation as per par. 3.2.