



LED ELEVATED RUNWAY EDGE AND THRESHOLD/END LIGHT

LERE

INSTRUCTION MANUAL FOR USE, INSTALLATION AND MAINTENANCE

Compiled by: Luca Caleffi

Approved by: Matteo Mazzotti

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Supersedes edition 11/03/2019

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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.

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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



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.

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EDITIONS

Date

07/24/2013	First issue
10/31/2013	Corrected chapters “MONITORING” and “LIST OF THE RECOMMENDED SPARE PARTS”
03/28/2014	Deleted § “List of the recommended spare parts” and added relevant attachment
11/03/2014	New address of the Company
05/22/2017	Added ground wire specifications

REVISIONS

Index	Date	Description	Edited by	Approved by
01	10/02/2018	Added spare parts and version D for the breakable coupling	EBER	MMAZ
02	11/03/2019	Added the conformity to CASA Manual of Standard Part 139	EBER	MMAZ
03	16/04/2019	Added the Artic Kit option for FAA version. Updated the P/N identification and Spare Parts.	LCAL	MMAZ

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1 GENERAL

LERE elevated LED runway edge light is high intensity, bidirectional or unidirectional steady burning type.

These fixtures are intended for use as runway edge and threshold/end light, in order to provide a visual aid to the moving aircrafts.

LERE lights are in compliance with ICAO Annex 14 Vol.1, EASA CS-ADR DSN.M.745, FAA AC 150/5345-46, IEC TS 61827, CASA Manual of Standard Part 139 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 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 150/5340-30.

2 MAIN FEATURES

The fixture consists of:

heat resistant transparent glass lens; it is mechanically secured to the body by metal ring with gasket

aluminum body mounted on the pole using four screws. These screws also allow the levelling of equipment

the power supply/control PCB and the LED circuit are mounted inside the aluminum body

steel 1-inch-tube (FAA), available in different length, connecting the main body and fragile joint; to lock the tube, the breakable coupling is equipped with one screw

aluminum breakable coupling provided with a breakable groove with a lower 2" GAS (IEC) male thread. Meeting FAA Specs the breakable coupling is provided with 1"1/2 - 12 UNF or 2"-11 1/2 NPS.

two, single-pole neoprene cable leads, size 2.5 mm², with plug meeting FAA Specs L-823; a wire, XHHW, 600V, AWG12 type is provided for grounding purpose

two LED assemblies, consisting of seven LED, mounted on a PCB complete with a dedicated optic to collect the LED luminous flux so to maximize the light output

All hardware is made of stainless steel.

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

Power consumption is 40 VA (bidirectional) and 20 VA (unidirectional).

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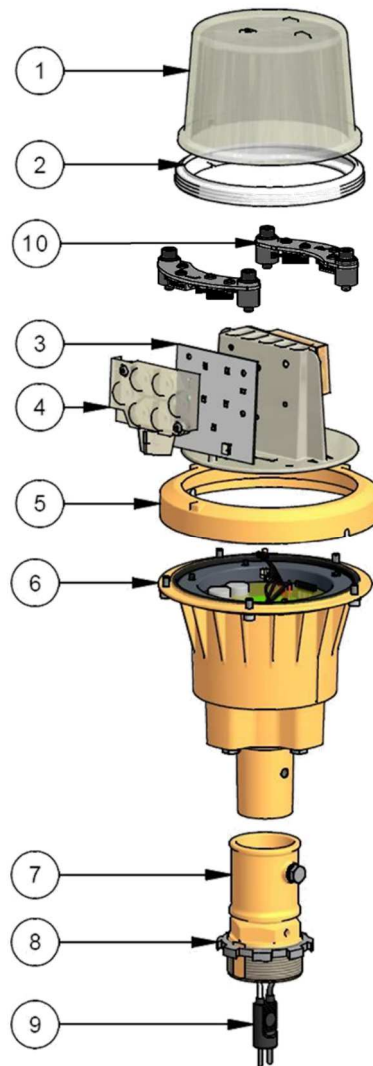


Fig 1 – Exploded view

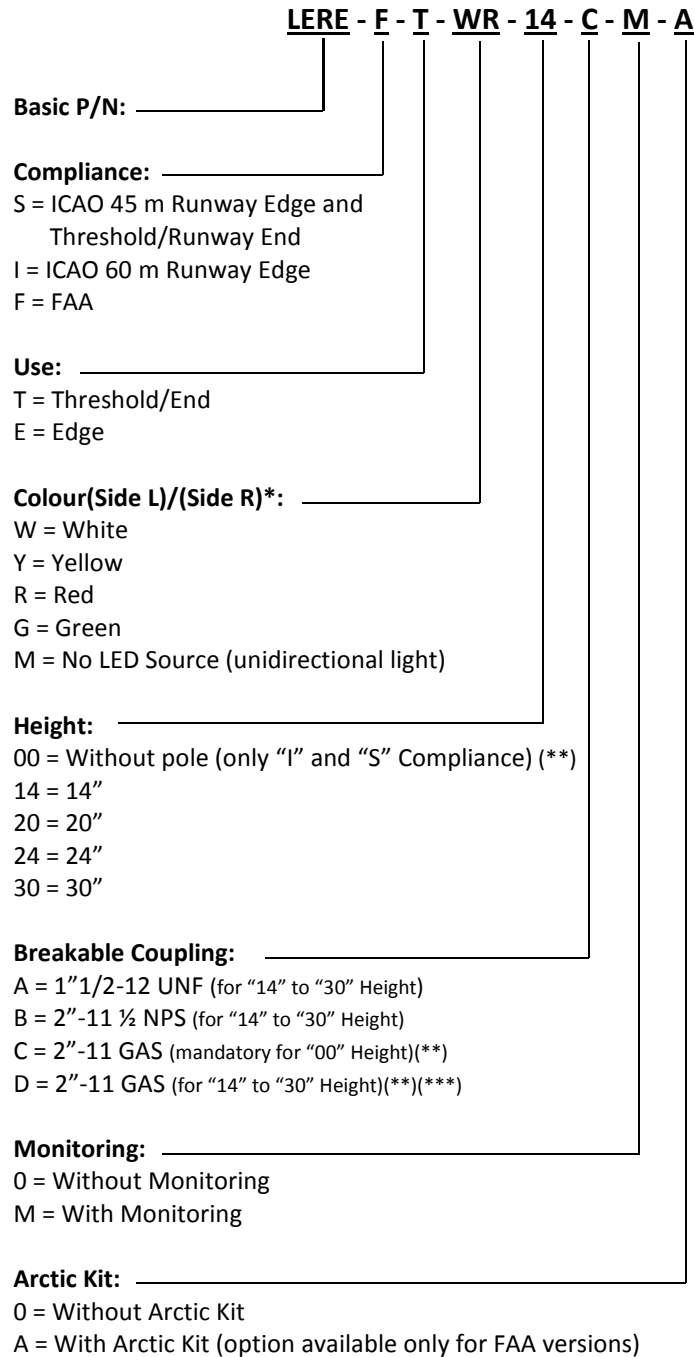
No.	Description	Qty
1	Clear outer glass cover	1
2	Gasket for glass cover	1
3	LED module	1-2
4	Lens array	1-2
5	Glass cover locking ring.....	1
6	Body with electronic and plug	1
7	Breakable coupling.....	1
8	Ring nut (ICAO versions)	1
9	FAA L-823 plug	1
10	Artic kit heater (option available only for version FAA)	1-2

Figure 1 – Part List

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* The beams aiming is not field adjustable
** Not defined by FAA.
*** For snow areas, with EMT 1" pole.

Figure 2 – Complete P/N identification

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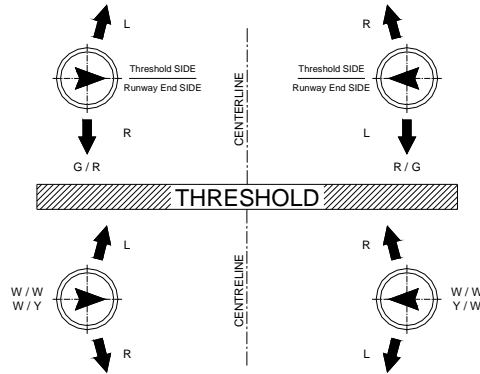


Figure 3 – Beams aiming on field

2.1 ELECTRONIC SECTION

The electronic section consists of the following circuits:

Current / current conversion circuit

LED command circuit

Control circuit

2.1.1 Current / current conversion circuit (patented)

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

This conversion, performed in one transformation only, allows to achieve several benefits:

minimize the power losses

significant increase of efficiency

high input power factor

independent form the CCR topology: the CCR may have any output current waveform

no percentage of load dependent: the CCR can feed without any problem also few lights in the series circuit

isolation transformers of smaller size can be used, respect to those used with the equivalent fixtures equipped with halogen lamps

To meet the previous features, the conversion circuit is based on the 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

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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 selectors

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

2.1.2 LED command circuit

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

2.1.3 Control circuit

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

To perform this features, the circuit is provided with 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 give a good accuracy 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 serial connection: this features allows to calibrate the brightness depending on the current, to modify the emission curve, to read the events occurred during the operating time

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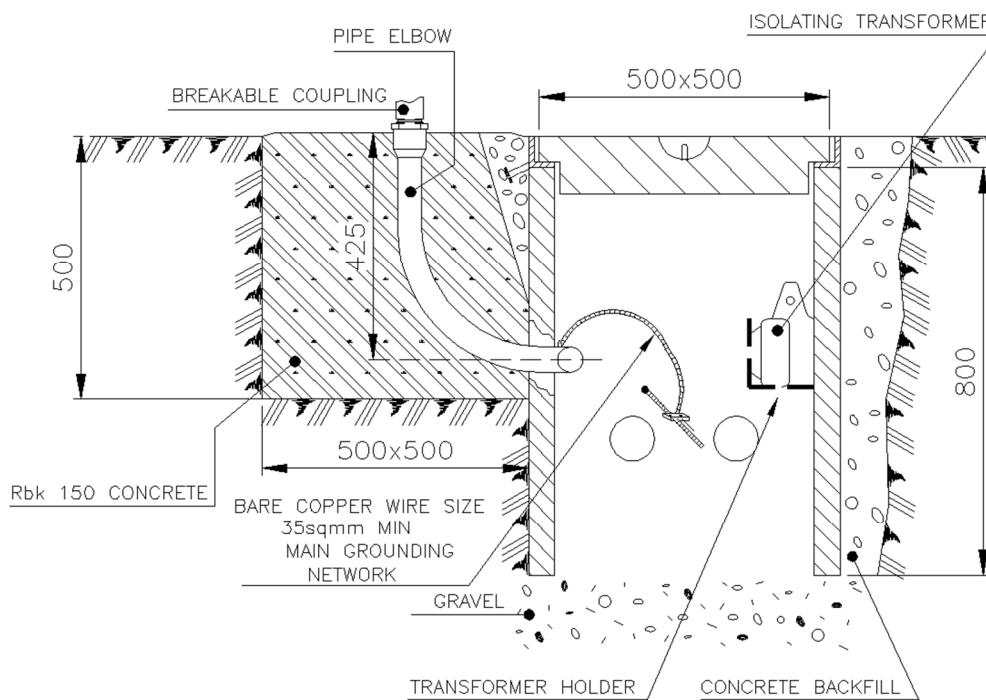
3 INSTALLATION

3.1 CIVIL WORKS

Each light is usually installed on a suitable concrete block, into which a pipe elbow 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.



IMPORTANT: MAKE SURE THE UPPER END OF THE PIPE ELBOW IS VE

Figure 4 – Civil Works

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3.2 INSTALLING THE LIGH UNIT

The light is shipped completely assembled including the LED module, except the 1-inch tube and the breakable coupling which are delivered separately inside the same carton.

Note: if the fixture has been ordered with an extra height option, the tubing may be packaged separately.

For the installation of the light 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)

slide one end of the 1-inch tube over the fixture cable assembly (cable leads with plug plus yellow-green wire) and into the fixture body until the body bottoms against the tube

approach, without tighten, the set screws on the side of the body to the 1-inch tube

slide the frangible coupling over the cable assembly (cable leads with plug plus yellow-green wire) and onto the other end of the 1-inch tube until it bottoms against the tube

connect the fixture grounding wire to the grounding wire coming from the pit (or from the base): splice both the wires and connect them together by using a crimping connector

connect the light plug to the secondary receptacle inside the pipe elbow

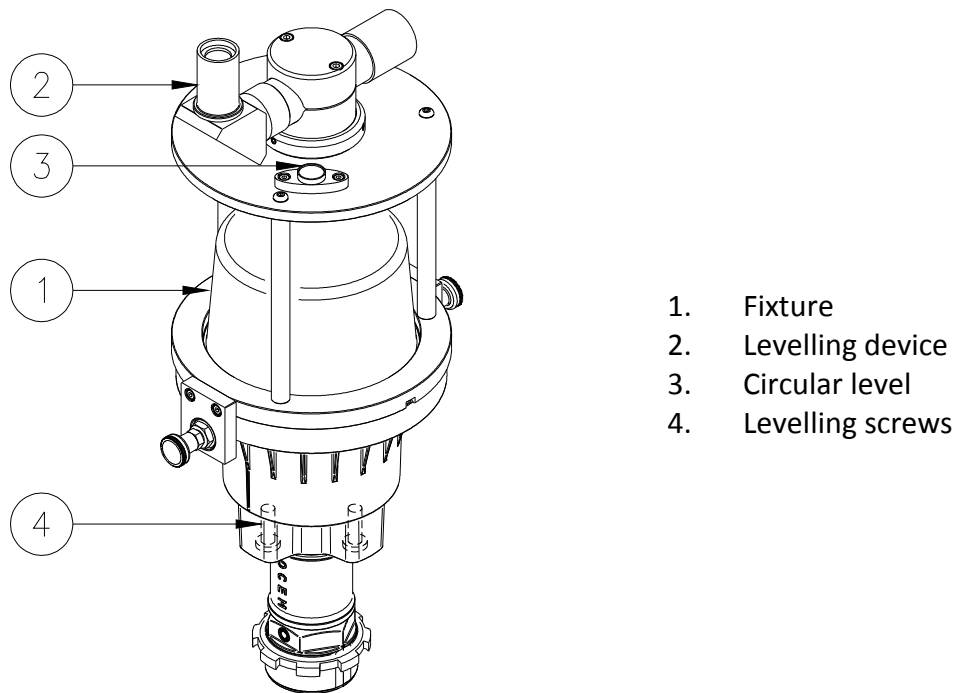
slide the frangible coupling down over the plug and tighten it into pipe elbow (or the base plate) until coupling bottoms out. Push any extra cable length into the 1-inch tube. Tighten the tube to the coupling with the setscrew on the coupling

Place on the lens locking ring the levelling device (P/N 332.4556 available on request) as shown in Figure 5. Levelling the light body by operating the four levelling screws until the bubble is centered

remove the levelling device

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INSTRUCTION MANUAL FOR USE, INSTALLATION AND MAINTENANCE*Figure 5 – Levelling Device*

3.3 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.

It is possible to connect in series more fixtures on the secondary side of a single isolation transformer: please contact ENERGY TECHNOLOGY technical department for additional information about this electrical solution.

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4 MAINTENANCE

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

LED lighting fixtures do not require frequent maintenance. With well-run installations and handling fixture carefully, avoiding excessive falls or collisions, the only maintenance work to be carried out on the field is to clean 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 luminous source
	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 luminous sources
Unscheduled	Condition of all the gaskets
	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.

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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

4.2.1 Removing the fixture

Remove the fixture from base plate or pipe elbow following steps are suggested:

unscrew the frangible coupling screw

hold the fixture and unscrew the frangible coupling

lay the fixture and disconnect plug to the secondary receptacle inside the pipe elbow

disconnect the fixture grounding wire to the grounding wire coming from the pit (or from the base).

4.3 LENS 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 lens surface with non abrasive glass product.

4.4 LENS REPLACEMENT

Unscrew the lens locking ring and remove the broken lens with the relevant gasket from the fixture.

Place a new gasket on the lens.

Set the new lens on the body.

Tighten the locking ring screws.

4.5 LED MODULE REPLACEMENT

Remove the lens with gasket as above described and proceed as follow:

disconnect the LED assembly from the PCB

remove the LED assembly unscrewing the relevant screws

provide a new LED assembly and reassembly the unit with reverse procedure

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

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4.6 ELECTRONIC REPLACEMENT

Remove the lens with gasket as above described and proceed as follow:

disconnect the LED assembly from the PCB assembly

remove the PCB assembly from the breakable coupling unscrewing the four levelling screws

provide a new PCB assembly and reassembly the unit with reverse procedure

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

4.7 ARTIC KIT REPLACEMENT

Remove the lens with gasket as above described and proceed as follow:

disconnect the LED assembly from the PCB assembly

unscrew the Artic Kit fixture, lift up the optical module in order to disconnect the supply fastons of the Artic Kit

provide a new Artic Kit and reassembly the unit with reverse procedure

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

4.8 BREAKABLE COUPLING REPLACEMENT

Unscrew the lower threaded section of broken breakable coupling from the pipe elbow (or base plate), cut the grounding wire, disconnect the light plug from the secondary receptacle and remove the threaded section.

Remove the upper section of the broken breakable coupling from the 1-inch pipe by releasing the setscrew.

If damaged, replace the 1-inch tube too. To make free the tube, release the setscrew on the main body.

Provide a new breakable coupling and, if required, a new 1-inch tube.

Reassembly the unit by following the installation steps.

4.9 CABLE LEAD WITH PLUG

4.9.1 Removing the cable lead with plug

Remove the fixture from the breakable coupling

Remove the cable lead from the fixture body by cutting it at least 30 mm from the bottom of the fixture body.

4.9.2 Installing the new cable lead with plug

Take a new cable leads with plug and join the wires through cylindrical butt connectors.

Reassembly with reverse procedure.

4.10 MONITORING

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

When the fixture has a bad operation, the internal monitoring device disconnects definitively the fixture from the series circuit; after this operation 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*"

replace the LED module following instructions of "*LED Module Replacement*"

INSERT THE JM1 JUMPER, see

Figure 6

make sure that the LED modules are connected

feed the electronics through a CCR set at 4.1 A (3rd step)

wait for the switch off of the D13 LED, see

Figure 6

turn off the CCR

REMOVE THE JM1 JUMPER, see

Figure 6

turn on the CCR and verify the proper functioning of the fixture

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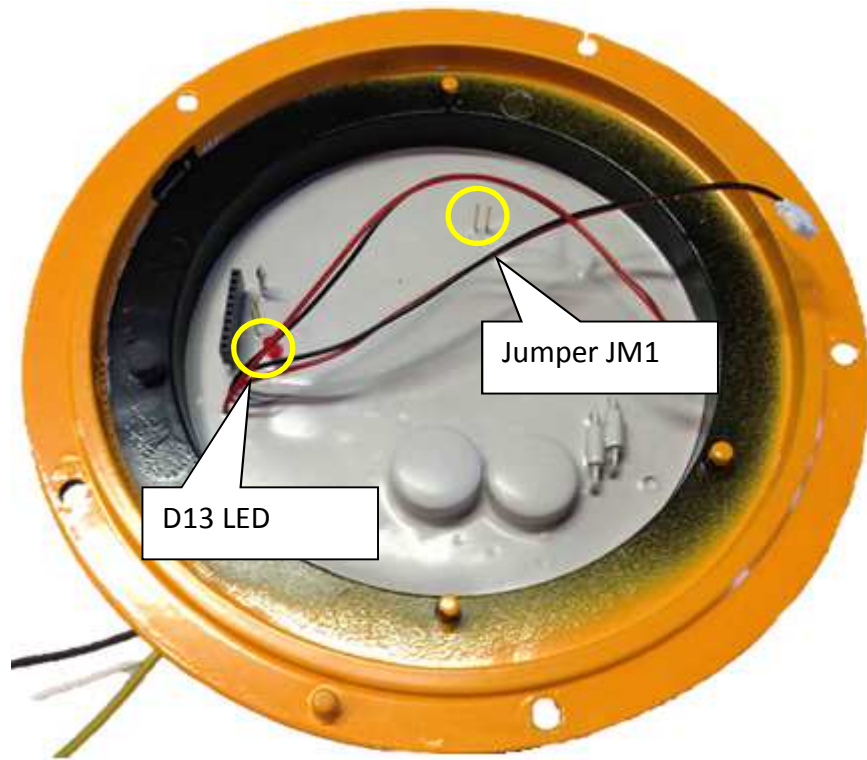


Figure 6 - Restoring the Monitoring Device

5 TROUBLESHOOTING

Problem	Possible cause	Solution
Distorted light beam output	Broken or damaged lens	Replace lens
Weak light output	Primary loop with partial short circuit	Check cable assembly
	Defect in the isolation transformer	Replace transformer
	Dirty lens	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
	Monitoring device locked (only if this option)	Unlocked monitoring device
Water or moisture inside the fixture	Lens gasket	Replace the gasket
	Pinched fixture power cables	Replace fixture leads

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6 SPARE PARTS

CODE	DESCRIPTION
RISL30001	Kit lens with locking ring and gaskets
RISL30002	LED module F240, 7 LED WHITE, versions S and F
RISL30003	LED module F240, 7 LED WHITE, version I
RISL30004	LED module F240, 7 LED YELLOW
RISL30005	LED module F240, 7 LED RED
RISL30006	LED module F240, 7 LED GREEN, version F
RISL30007	LED module F240, 7 LED GREEN, version S
RISL30008	Optical system at 7 lenses
RISL30009	Electronic 1I/2O-ICAO with monitoring, vers. S-E
RISL30010	Electronic 1I/2O-ICAO without monitoring, vers. S-E
RISL30011	Electronic 1I/1O-ICAO with monitoring, vers. S-E
RISL30012	Electronic 1I/1O-ICAO without monitoring, vers. S-E
RISL30013	Electronic 1I/2O-ICAO with monitoring, vers. S-T e I-E
RISL30014	Electronic 1I/2O-ICAO without monitoring, vers. S-T e I-E
RISL30015	Electronic 1I/1O-ICAO with monitoring, vers. S-T e I-E
RISL30016	Electronic 1I/1O-ICAO without monitoring, vers. S-T e I-E
RISL30017	Electronic 1I/2O-FAA with monitoring, vers. F-T (Plug style 3)
RISL30018	Electronic 1I/2O-FAA without monitoring, vers. F-T (Plug style 3)
RISL30019	Electronic 1I/1O-FAA with monitoring, vers. F-T (Plug style 3)
RISL30020	Electronic 1I/1O-FAA without monitoring, vers. F-T (Plug style 3)
RISL30021	Electronic 1I/2O-FAA with monitoring, vers. F-E (Plug style 3)
RISL30022	Electronic 1I/2O-FAA without monitoring, vers. F-E (Plug style 3)
RISL30023	Electronic 1I/1O-FAA with monitoring, vers. F-E (Plug style 3)
RISL30024	Electronic 1I/1O-FAA without monitoring, vers. F-E (Plug style 3)
RISL30025	Electronic 1I/2O-FAA with monitoring, vers. F-E (Plug style 7)
RISL30026	Electronic 1I/2O-FAA without monitoring, vers. F-E (Plug style 7)
RISL30027	Electronic 1I/1O-FAA with monitoring, vers. F-E (Plug style 7)
RISL30028	Electronic 1I/1O-FAA without monitoring, vers. F-E (Plug style 7)
RISL30029	Electronic 1I/1O-FAA without monitoring, vers. F, Plug style 7, 0.4 A
RISL30030	Kit Breakable coupling 1" ½-12 UNF (version A)
RISL30031	Kit Breakable coupling 2"-11 ½ NPS (version B)

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INSTRUCTION MANUAL FOR USE, INSTALLATION AND MAINTENANCE

RISL30032	Kit Breakable coupling 2" - 12 GAS (version C)
RISL50005	Kit Breakable coupling 2" - 12 GAS (version D)
RISL30033	Kit 1-inch tube H=14"
RISL30034	Kit 1-inch tube H=20"
RISL30035	Kit 1-inch tube H=24"
RISL30036	Kit 1-inch tube H=30"
RISL30037	Arctic Kit (only for FAA versions manufactured after May 2019)