Runway Edge High Intensity Bidirectional Elevated Light

User Manual

AM.03.11e, Rev. 2.5, 2023/01/23

ADB SAFEGATE

A.0 Disclaimer / Standard Warranty

CE certification

The equipment listed as CE certified means that the product complies with the essential requirements concerning safety and hygiene. The European directives that have been taken into consideration in the design are available on written request to ADB SAFEGATE.

ETL certification

The equipment listed as ETL certified means that the product complies with the essential requirements concerning safety and FAA Airfield regulations. The FAA directives that have been taken into consideration in the design are available on written request to ADB SAFEGATE.

All Products Guarantee

ADB SAFEGATE will correct by repair or replacement per the applicable guarantee above, at its option, equipment or parts which fail because of mechanical, electrical or physical defects, provided that the goods have been properly handled and stored prior to installation, properly installed and properly operated after installation, and provided further that Buyer gives ADB SAFEGATE written notice of such defects after delivery of the goods to Buyer. Refer to the Safety section for more information on Material Handling Precautions and Storage precautions that must be followed.

ADB SAFEGATE reserves the right to examine goods upon which a claim is made. Said goods must be presented in the same condition as when the defect therein was discovered. ADB SAFEGATE furthers reserves the right to require the return of such goods to establish any claim.

ADB SAFEGATE's obligation under this guarantee is limited to making repair or replacement within a reasonable time after receipt of such written notice and does not include any other costs such as the cost of removal of defective part, installation of repaired product, labor or consequential damages of any kind, the exclusive remedy being to require such new parts to be furnished.

ADB SAFEGATE's liability under no circumstances will exceed the contract price of goods claimed to be defective. Any returns under this guarantee are to be on a transportation charges prepaid basis. For products not manufactured by, but sold by ADB SAFEGATE, warranty is limited to that extended by the original manufacturer. This is ADB SAFEGATE's sole guarantee and warranty with respect to the goods; there are no express warranties or warranties of fitness for any particular purpose or any implied warranties of fitness for any particular purpose or any implied warranties other than those made expressly herein. All such warranties being expressly disclaimed.

Standard Products Guarantee

Products manufactured by ADB SAFEGATE are guaranteed against mechanical, electrical, and physical defects (excluding lamps) which may occur during proper and normal use for a period of two years from the date of ex-works delivery, and are guaranteed to be merchantable and fit for the ordinary purposes for which such products are made.

Note

See your applicable sales agreement for a complete warranty description.

Replaced or repaired equipment under warranty falls into the warranty of the original delivery. No new warranty period is started for these replaced or repaired products.

FAA Certified products manufactured by ADB SAFEGATE

ADB SAFEGATE L858 Airfield Guidance Signs are warranted against mechanical and physical defects in design or manufacture for a period of 2 years from date of installation, per FAA AC 150/5345-44 (applicable edition).

ADB SAFEGATE LED products (with the exception of obstruction lighting) are warranted against electrical defects in design or manufacture of the LED or LED specific circuitry for a period of 4 years from date of installation, per FAA EB67 (applicable edition). These FAA certified constant current (series) powered LED products must be installed, interfaced and powered with and through products certified under the FAA Airfield Lighting Equipment Program (ALECP) to be included in this 4 (four) year warranty. This includes, but is not limited to, interface with products such as Base Cans, Isolation Transformers, Connectors, Wiring, and Constant Current Regulators.

Note

See your sales order contract for a complete warranty description.

Replaced or repaired equipment under warranty falls into the warranty of the original delivery. No new warranty period is started for these replaced or repaired products.

Liability

WARNING

Use of the equipment in ways other than described in the catalog leaflet and the manual may result in personal injury, death, or property and equipment damage. Use this equipment only as described in the manual.

ADB SAFEGATE cannot be held responsible for injuries or damages resulting from non-standard, unintended uses of its equipment. The equipment is designed and intended only for the purpose described in the manual. Uses not described in the manual are considered unintended uses and may result in serious personal injury, death or property damage.

Unintended uses, includes the following actions:

- Making changes to equipment that have not been recommended or described in this manual or using parts that are not genuine ADB SAFEGATE replacement parts or accessories.
- Failing to make sure that auxiliary equipment complies with approval agency requirements, local codes, and all applicable safety standards if not in contradiction with the general rules.
- Using materials or auxiliary equipment that are inappropriate or incompatible with your ADB SAFEGATE equipment.
- Allowing unskilled personnel to perform any task on or with the equipment.

TABLE OF CONTENTS

1.0 Safety

Introduction to Safety

This section contains general safety instructions for installing and using ADB SAFEGATE equipment. Some safety instructions may not apply to the equipment in this manual. Task- and equipment-specific warnings are included in other sections of this manual where appropriate.

1.1 Safety Messages

HAZARD Icons used in the manual

For all HAZARD symbols in use, see the Safety section. All symbols must comply with ISO and ANSI standards.

Carefully read and observe all safety instructions in this manual, which alert you to safety hazards and conditions that may result in personal injury, death or property and equipment damage and are accompanied by the symbol shown below.

	WARNING Failure to observe a warning may result in personal injury, death or equipment damage.
	DANGER - Risk of electrical shock or ARC FLASH Disconnect equipment from line voltage. Failure to observe this warning may result in personal injury, death, or equipment damage. ARC Flash may cause blindness, severe burns or death.
	WARNING - Wear personal protective equipment Failure to observe may result in serious injury.
	WARNING - Do not touch Failure to observe this warning may result in personal injury, death, or equipment damage.
	CAUTION Failure to observe a caution may result in equipment damage.
	ELECTROSTATIC SENSITIVE DEVICES This equipment may contain electrostatic devices.

Qualified Personnel

	Important Information The term **qualified personnel** is defined here as individuals who thoroughly understand the equipment and its safe operation, maintenance and repair. Qualified personnel are physically capable of performing the required tasks, familiar with all relevant safety rules and regulations and have been trained to safely install, operate, maintain and repair the equipment. It is the responsibility of the company operating this equipment to ensure that its personnel meet these requirements. Always use required personal protective equipment (PPE) and follow safe electrical work practice.

1.1.1 Introduction to Safety

CAUTION

Unsafe Equipment Use
This equipment may contain electrostatic devices, hazardous voltages and sharp edges on components

- Read installation instructions in their entirety before starting installation.
- Become familiar with the general safety instructions in this section of the manual before installing, operating, maintaining or repairing this equipment.
- Read and carefully follow the instructions throughout this manual for performing specific tasks and working with specific equipment.
- Make this manual available to personnel installing, operating, maintaining or repairing this equipment.
- Follow all applicable safety procedures required by your company, industry standards and government or other regulatory agencies.
- Install all electrical connections to local code.
- Use only electrical wire of sufficient gauge and insulation to handle the rated current demand. All wiring must meet local codes.
- Route electrical wiring along a protected path. Make sure they will not be damaged by moving equipment.
- Protect components from damage, wear, and harsh environment conditions.
- Allow ample room for maintenance, panel accessibility, and cover removal.
- Protect equipment with safety devices as specified by applicable safety regulations
- If safety devices must be removed for installation, install them immediately after the work is completed and check them for proper functioning prior to returning power to the circuit.

Failure to follow this instruction can result in serious injury or equipment damage

Additional Reference Materials

Important Information

- IEC - International Standards and Conformity Assessment for all electrical, electronic and related technologies.
- IEC 60364 - Electrical Installations in Buildings.
- FAA Advisory: AC 150/5340-26 (current edition), Maintenance of Airport Visual Aid Facilities.
- Maintenance personnel must refer to the maintenance procedure described in the ICAO Airport Services Manual, Part 9.
- ANSI/NFPA 79, Electrical Standards for Metalworking Machine Tools.
- National and local electrical codes and standards.

1.1.2 Intended Use

CAUTION

Use this equipment as intended by the manufacturer
This equipment is designed to perform a specific function, do not use this equipment for other purposes

- Using this equipment in ways other than described in this manual may result in personal injury, death or property and equipment damage. Use this equipment only as described in this manual.

Failure to follow this instruction can result in serious injury or equipment damage

1.1.3 Material Handling Precautions: Storage

CAUTION

Improper Storage
Store this equipment properly

- If equipment is to be stored prior to installation, it must be protected from the weather and kept free of condensation and dust.

Failure to follow this instruction can result in equipment damage

1.1.4 Material Handling Precautions: Fasteners

DANGER

Foreign Object Damage - FOD
This equipment may contain fasteners that may come loose - torque properly.

- Only use fasteners of the same type as the one originally supplied with the equipment.
- Use of incorrect combination of gaskets, bolts and nuts can create severe damages to the product installation and create safety risk .
- You need to know what base the light fixture will be installed in, in order to chose the correct gasket, bolts and nuts.
- Bolt type, length, and torque value are determined by type of base, height of spacers used, and clamp force required in FAA Engineering Brief No 83 (latest revision).
- Due to the risk of bolts vibrating loose, do not use any type of washer with the fixing bolts (such as split lock washers) other than an anti-vibration washer. Anti-vibration washers as defined in FAA EB 83 (latest edition) must be used. For installations other than FAA, use the base can manufacturer's recommendations.
- Always tighten the fasteners to the recommended torque. Use a calibrated torque wrench and apply the recommended adhesive type.
- Obey the instructions of the adhesives necessary for the fasteners.

Failure to follow these warnings may cause the fasteners to loosen, damage the equipment, potentially to loosen the equipment. This can lead to a highly dangerous situation of FOD, with potential lethal consequences.

Note

To minimize the risk of errors, the ADB SAFEGATE Sales Representative will have information on which gasket goes with which base. This information is also provided in the product Data sheets, the User Manuals and the Spare Part Lists.

CAUTION

Use of incorrect combination of gaskets, bolts and nuts can create severe damages to the product installation and create multiple safety risks.

To obtain a safe and watertight installation the O-ring and retaining bolt stated in the document must be used.

You need to know what base the light fixture will be installed in, in order to choose the correct gasket, bolts and nuts.

Failure to follow these cautions can result in equipment damage or aircraft FOD.

1.1.5 Maintenance Safety

DANGER

Electric Shock Hazard
This equipment may contain electrostatic devices

- Do not operate a system that contains malfunctioning components. If a component malfunctions, turn the system OFF immediately.
- Disconnect and lock out electrical power.
- Allow only qualified personnel to make repairs. Repair or replace the malfunctioning component according to instructions provided in its manual.

Failure to follow these instructions can result in death or equipment damage

1.1.6 Material Handling Precautions, ESD

CAUTION

Electrostatic Sensitive Devices
This equipment may contain electrostatic devices

- Protect from electrostatic discharge.
- Electronic modules and components should be touched only when this is unavoidable e.g. soldering, replacement.
- Before touching any component of the cabinet you shall bring your body to the same potential as the cabinet by touching a conductive earthed part of the cabinet.
- Electronic modules or components must not be brought in contact with highly insulating materials such as plastic sheets, synthetic fiber clothing. They must be laid down on conductive surfaces.
- The tip of the soldering iron must be grounded.
- Electronic modules and components must be stored and transported in conductive packing.

Failure to follow this instruction can result in equipment damage

1.1.7 Arc Flash and Electric Shock Hazard

DANGER

Series Circuits have Hazardous Voltages
This equipment produces high voltages to maintain the specified current - Do NOT Disconnect while energized.

- Allow only qualified personnel to perform maintenance, troubleshooting, and repair tasks.
- Only persons who are properly trained and familiar with ADB SAFEGATE equipment are permitted to service this equipment.
- An open airfield current circuit is capable of generating >5000 Vac and may appear OFF to a meter.
- Never unplug a device from a constant current circuit while it is operating; Arc flash may result.
- Disconnect and lock out electrical power.
- Always use safety devices when working on this equipment.
- Follow the recommended maintenance procedures in the product manuals.
- Do not service or adjust any equipment unless another person trained in first aid and CPR is present.
- Connect all disconnected equipment ground cables and wires after servicing equipment. Ground all conductive equipment.
- Use only approved ADB SAFEGATE replacement parts. Using unapproved parts or making unapproved modifications to equipment may void agency approvals and create safety hazards.
- Check the interlock systems periodically to ensure their effectiveness.
- Do not attempt to service electrical equipment if standing water is present. Use caution when servicing electrical equipment in a high-humidity environment.
- Use tools with insulated handles when working with airfield electrical equipment.

Failure to follow these instructions can result in death or equipment damage

2.0 GENERAL INFORMATON AND REQUIREMENTS

Figure 1: BPE-2-150

2.1 INTRODUCTION

The BPE-2-150 high intensity bidirectional elevated light is used for the lighting of runway and stop way edges in Category I, II and III conditions.

It is also possible to use it for medium intensity threshold/runway-end lighting.

The light features also an omni-directional component for circling guidance.

The light is manufactured in full compliance with ICAO requirements Annex 14, table 5-1, for use as runway edge light in Category I, II and III conditions up to a 60 meters wide runway.

It also complies with FAA L-862 specification as high intensity runway-edge light according to the Advisory Circular AC 150/5345-46A and AC 150/5340-24 for use in HIRL systems.

2.1.1 Purpose

This manual provides general, operation, trouble- shooting, maintenance, installation information and parts list.

Refer to the table of contents (pages 5 - 7) to locate the information you need.

2.1.2 Scope

This manual covers the ADB type BPE-2-150 runway edge light manufactured in accordance with ICAO Annex 14 table 5-1 for use in cat. I, II and III for runways 45 m or 60 m wide and in compliance with FAA AC 150/5345-46A.

2.2 DESCRIPTION. Fig 1 and 11.

The frame of the BPE-2-150 consists of a cast aluminium alloy frangible stem (20) fitted with a 2" - 11 TPI thread on its base, on which a ball joint device (18 & 19) enable the seating and leveling of the optical system. The optical system is composed of a upper and lower body (1A and 15), the upper body (1A) consists of a cast aluminium support (6) surmounted by the inner left and right lenses (3) through colored or not or equipped with one blanking screen depending on its use. They are maintained on the support by means of a maintaining ring (2) and protected by means of an externally smooth outer clear dome (1). The whole is fastened to the support (6) by means of the clamping ring (5), the water tightness of the assembly is ensured by an O-ring seal (4).

Two lateral thumbscrews (14) secure the upper body on the lower body.

The lower body, on its top part is fitted with a lamp fastener and positioning pin which allow for the fixation of a PK 30 d lamp. A lead assembly for connection of the lamp holder to the two-pole plug (21) is secured on the lower body by a strain relief bushing (17) to avoid pulling on the connection to the socket, and to help disconnecting the plug in case of impact.

The lower part of the lower body (15) is half spherical shaped adapted to the polyester ball joint (18) sticked on the frangible stem. This knuckle-joint is locked on the lower body, thanks to three screws (10) and a clamp (19) below the split ball. This genuine knuckle-joint avoids the counter clockwise wires twisting problem during installation.

A weakening groove is provided at the lower part of the frangible stem to eliminate the need of a separate breakable coupling. Between the groove and the thread, an hexagonal shaped part is provided to tighten or loosen the light unit from the ground mounting device (base, conduit elbow, anchor stake).

The support, the lower body and the stem are aluminium die castings; phosphated and baked polyester, aviation yellow, electrostatic powder coated. The lower body is fitted with a flag-holder to locate the light with a flag in countries with heavy snowfalls.

2.3 USE

The ADB BPE-2-150 elevated light is designed for the lighting of Runway Edges serving Runways of all categories.

Fig. 2 and 3 shows typical layouts of the Runway Edge lights.

2.4 EQUIPMENT SPECIFICATION DATA

2.4.1 Title Not Available in the Source

The ADB ordering code is given in Table 1 for the BPE-2-150. Reference data pertinent to the equipment is listed in Table 2 . Information on items not supplied which might be required for installation is given in Table 3 .

Color coding is given in para. 1.4.3.

Figure 2:

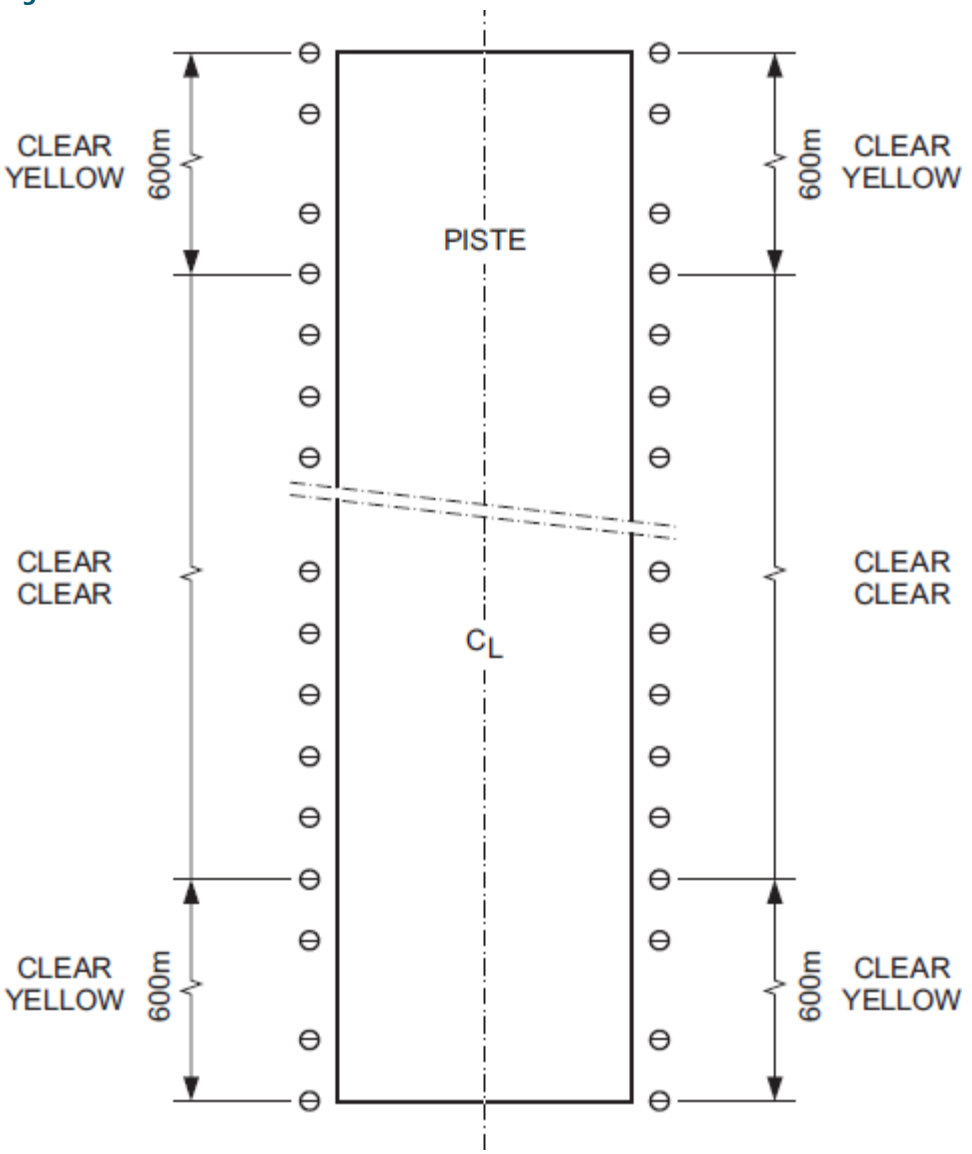
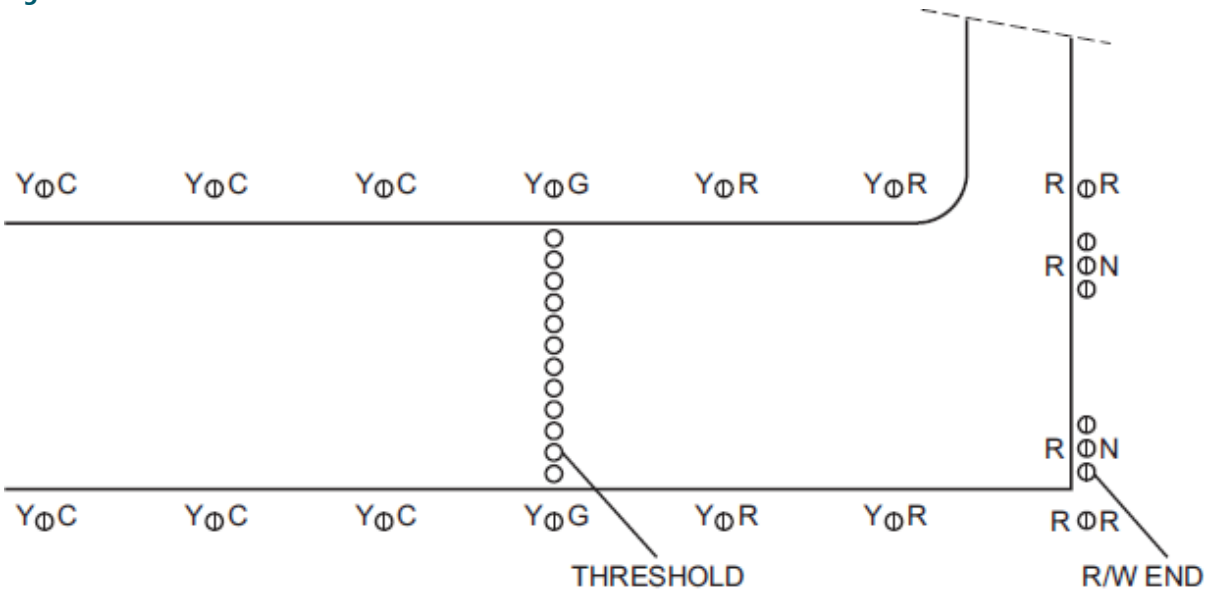
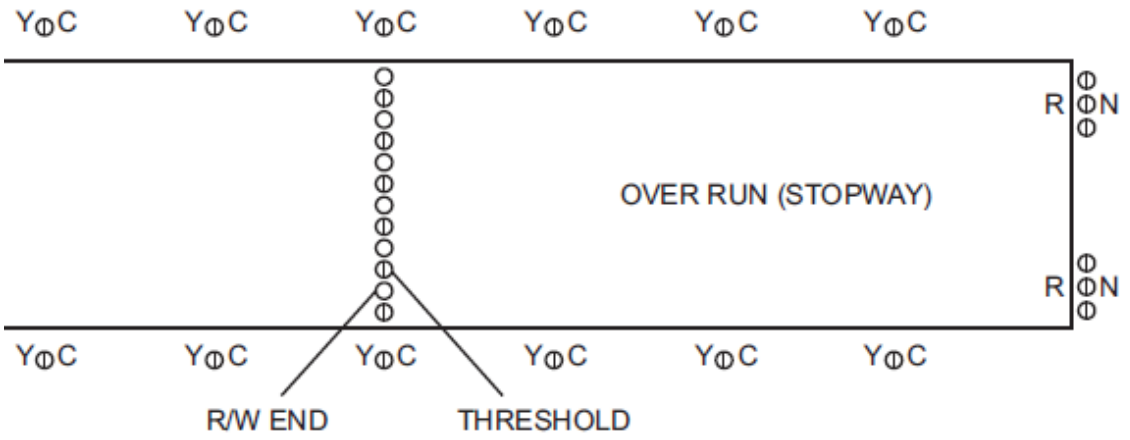


Figure 3:



R: Red
Y: Yellow
C: Clear
G: Green
N: Blank

DISPLACED THRESHOLD APPLICATION



OVER RUN APPLICATION

Figure 4: Outline dimensions

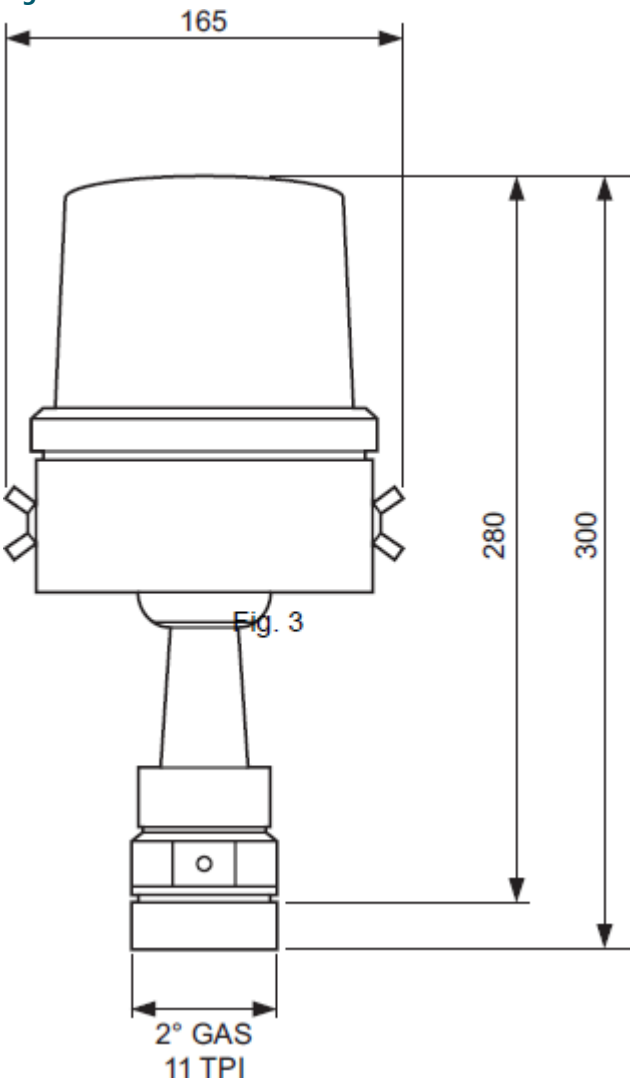


Table 1: Equipment data

Type:	**BPE-2-150**
– Input:	6.6A
– Lamp:	150W/6.6A - Pk30d, quartz (100W or 200W on request)
– Rated lamp life:	1000 hours
– Temperature range of installation:	-55°C (-67°F) to +55°C (131°F)
– Humidity:	Up to 100%
– Altitude:	sea level to 3000 m
– Wind:	Velocities up to 560 Km/h
– Dimensions:	See figure 1-4
– Net weight:	approx. 2,5 kg

Figure 5: Photometric curve with white inner lenses

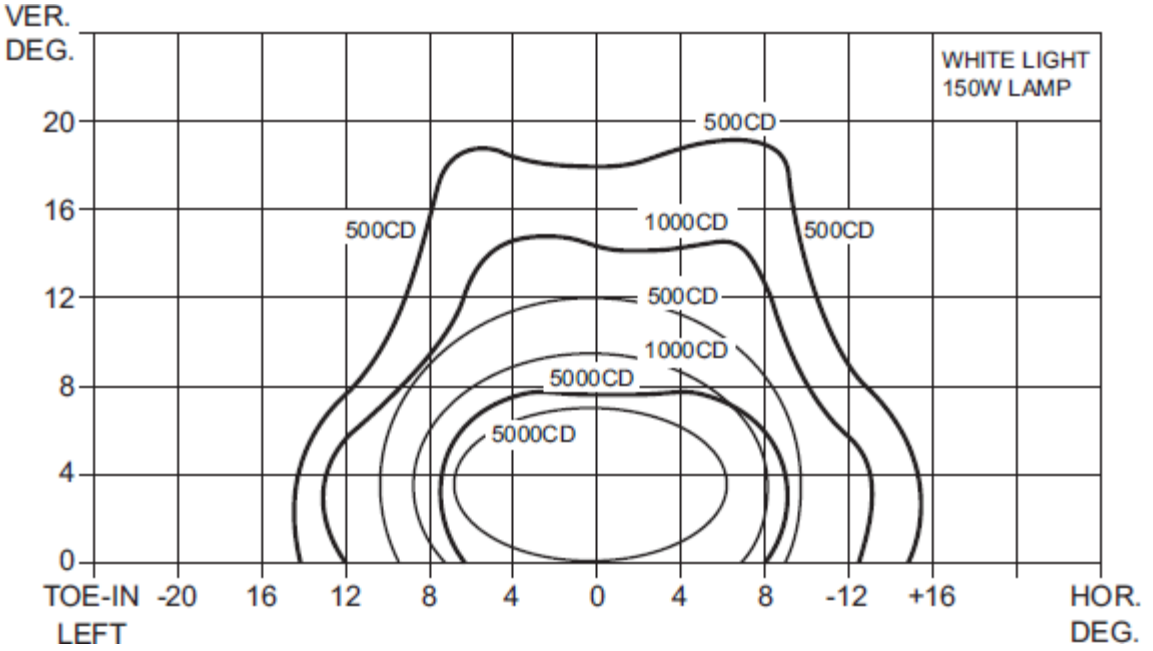


Table 2: Equipment required but not supplied

Quantity - Description
1 Spanner 2" open ended
1 Ratchet, lever reversible (3/8") nbr 435
1 Torque wrench (5-50Nm) nbr 730/5 with
1 Square drive insert tool (3/8") nbr 734/5
1 Socket nbr 45a - 9/16 (3/8")
1 Setting device with alignment telescope
A/R Loctite Grade AV or equivalent
1 T300/2 base plate assembly gasket and mounting screws (if base mounted)
1 L-867 base (if base mounted)
1 Anchor stake PA2 (if stake mounted)
1 Conduit elbow (if conduit mounted)
1 Set of standard screw drivers

2.4.2 Performances

The photometric performances with a 150W lamp are given in figure 5 and in table 4 .

Table 5 gives the transmission factors to use to calculate the performances with through colored lenses.

Table 4 : Photometric performances

BPE-2-150 fitted with :

One 150 W - PK30d - Prefocus halogen lamp (1000 hours rated life at full intensity).

Use	Color	Beam Spread (deg)		Average Intensity (cd)	
		Hor.	Vert.	Measured	Required
ICAO Runway edge width 45m	White	-2 to 9	0.2 to 7	14.505	10.000
ICAO Runway edge width 60m	White	-2 to 11	0.2 to 7	12.449	10.000
FAA Runway edge (FAA L-862)	White	-2 to 9	0.2 to 7	14.505	10.000
(1) ICAO Runway end (M.I.)	Red	± 6	0.25 to 4.75	1.365	-
(2) ICAO Threshold (H.I.)	Green	-2 to +9	1 to 10	1.711	-

Note

Outside the main beam, the intensity in white light never falls below 50 cd from 0 to 15° vertical. This meets ICAO and FAA requirements for circling guidance purposes.

Table 5: Transmission factor

The transmission factors are given for color filters at working temperature

Colour	Min.	Average	Max.
Green	0,2	0,25	0,3
Yellow	0,4	0,5	0,7
Red	0,15	0,17	0,2

2.4.3 Coding of colored lights

The different functions of the light are determined by the glassware :

- the two 180° prismatic inner domes are available in different colors; clear, yellow, red, green.
- when required a blanking screen can be installed instead of a color lens.

The function of the light as a runway edge light depends of its location on the layout as shown on figures 2 and 3.

According to its location the glassware must be adapted, the coding below enables an obvious identification of the necessary glassware.

The light is identified by the following code :

BPE-2-200- XX

Light beam color

-	C =	clear	
-	Y =	yellow	Left hand side
-	R =	red	
-	G =	green	Right hand side (Refer to fig. 6)
-	N =	blank	

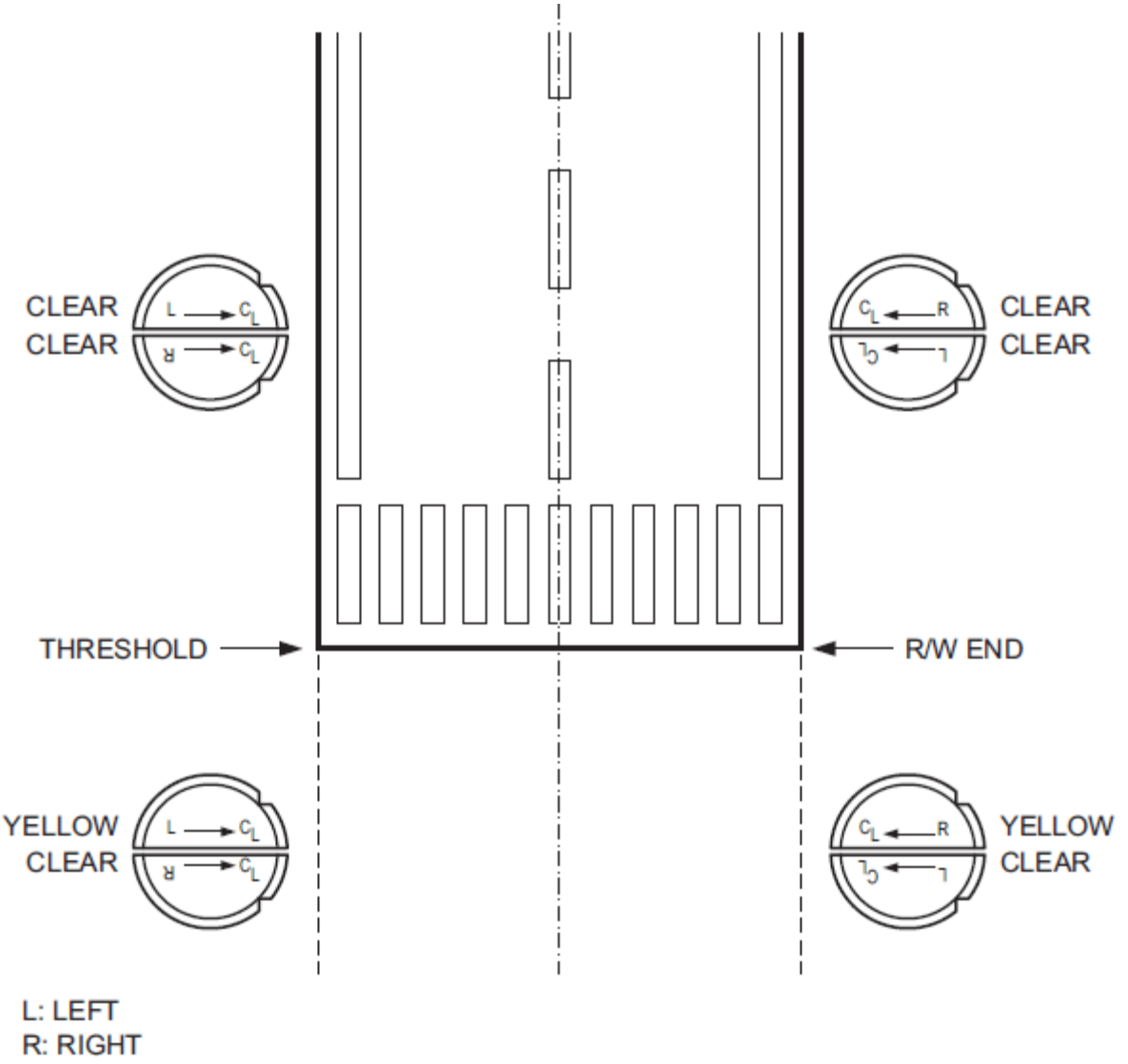
Note

The two 180-degree inner domes (left and right) are different and not interchangeable.
The same remark applies for half opaqued outer domes.
The respective position of the two letters in the code is therefore very important.

The code is based on the principle of an observer standing in the place of the light on the runway edge or on the threshold and looking perpendicularly towards and in the direction of the runway centerline. The two main light beams are then identified as "Left" or "Right" by the observer. The first letter indicates the color on "Left" side, the second letter the color on the "Right" side.

Refer to fig. 6.

Figure 6: Identification code for bi-coloured lights (Note location of indents in half inner domes)



3.0 MAINTENANCE

3.1 INTRODUCTION

Maintenance personnel should refer to the maintenance procedure described in the ICAO Airport Services Manual, Part 9, Airport maintenance practices and in FAA Advisory Circular N AC150/5340-26, chapter 4 , section 4.

The method of maintaining the BPE-2-150 Runway Edge Elevated Light consists only of a light assembly servicing in the field, limited to cleaning of outer glassware and to lamp and broken glassware replacement. If any lamp is out, the location of the fixture should be recorded and the lamp replaced at a time when the circuit is de-energized.

3.2 LAMP REPLACEMENT

De-energize circuit and lockout circuit.

Remove dome from fixture by loosening the two thumbscrews on the side of the fixture.

Pull out lamp.

Wearing clean, white, lint free gloves insert a new lamp into lamp socket and remove protective sleeving. Reinstall dome and tighten the two thumbscrews.

3.3 MAINTENANCE HINTS AND TIPS

3.3.1 Relamping

1. Make sure you are using the proper lamp.
   Check P/N, watts and current as printed on lamp base.

CAUTION

Several aviation lamps of different ratings have the same outside appearance.

2. Never touch the quartz bulb with bare fingers.
   Oil or grease may contaminate the surface of the bulb and in operation cause reduced performance and premature failure. If the quartz is accidentally handled, clean before operation with a cloth moistened with alcohol or methylated spirit.
3. It is a good precaution to check systematically the condition of the lamp holder and the wiring at each lamp replacement. Signs of overheating are the result of poor electrical contacts. The degradation process is fast if no remedial action is taken in time.
4. Premature oxidation of lamp holder contacts in highly corrosive or salt-laden atmospheres.
   In some cases the problem has been cured successfully by coating the lamp pins and lamp holder contacts with a silicone jelly such as DOW CORNING # 4 COMPOUND or similar.

CAUTION

Touching the lamp with bare fingers may seriously shorten the lamp life. If the lamp has been touched, clean with tissue moistened with isopropyl alcohol or methylated spirit.

3.3.2 Water

Build-up of condensation water in an elevated light is a normal process resulting from the temperature and pressure differentials during the ON and OFF cycles of operation. However the lights are so designed that condensation water will drain away through the mounting stem and will be evacuated through one or two purpose-made holes located near the shearing groove.

IT IS ESSENTIAL TO MAKE SURE THAT THESE DRAINAGE HOLES REMAIN UNOBSTRUCTED

3.4 PREVENTIVE MAINTENANCE

Service life depends essentially on the respect of the preventive maintenance procedures.

Table 6 List the maintenance task to perform to maintain the BPE-2-150 light operational at a maximum efficiency.

3.5 CORRECTIVE MAINTENANCE

Table 6 list the maintenance tasks.

3.5.1 Removal of a broken frangible stem

Use a 2" spanner applied on the hexagonal part of the stem above the thread to unscrew from the ground mounting device.

Dispose of the broken parts of the frangible base.

3.5.2 Replacement of a BPE-2-150

Use a 2" spanner applied on the hexagonal part of the base above the thread to unscrew from the ground mounting device.

Disconnect the plug from the receptacle.

Proceed as indicated in section 5 for installing a new BPE-2-150.

3.5.3 Dome maintenance

Remove the upper body losing the two thumb-screws.

Clean the blue dome with a liquid glass cleaner or a detergent solution.

Rinse thoroughly.

Replace by a new one if it shows signs of degradation.

3.6 SNOW REMOVAL

Snow-plough operators should exercise extra care not to strike the light fixture with snow-plough blades.

In regions where heavy snow falls can be expected it is recommended to mark the position of the BPE-2-150 lights by means of a small flag mounted on the fixture, in the dedicated hole.

Table 3: Preventive and corrective maintenance tasks

Interval	Maintenance Task	Action
Daily	Lamp burned-out	Replace when system deactivated See Section 2.2 and 2.3.1 .
	Dimly burning lamp	Same as above
	Broken dome	Replace dome assembly

Interval	Maintenance Task	Action
Weekly	Obscuration	Remove - use weed vegetation killer.
	Dirty outer dome	Clean with glass cleaner
Monthly	Misaligned fixture	Straighten, level and align
	Dirty frangible	Clean coupling weep holes(stake-mounted fixtures only)
	Water drain holes	Clean for dirt

Interval	Maintenance Task	Action
Semi- Annually	Improper ground elevation	Grade, so frangible point is approximately one inch above ground elevation
	Improper light elevation	Maintain elevation of all lights at same height
	Moisture present in light housing or L-867 base	Check drain holes & clamps. Check dome base for cracks. Replace if damaged. Use water pump to remove water from base.
	Paint flaking off	Paint anew after cleaning
Annually	Cracks, corrosion, shorts	Repair or replace
	Dirty contacts	Clean when system deactivated.
	Loose connections	Tighten or repair connections
Unscheduled	Prediction of heavy snowfall	Mark location of fixtures (use red flags or sticks) to facilitate snow removal and lessen the chance of damage to fixtures by snow removal equipment.

4.0 TROUBLESHOOTING

4.1 TROUBLESHOOTING GUIDE

The troubleshooting guide for the BPE-2-150 Runway Edge Light is given in Table 7.

CAUTION

De-energize circuit and lockout circuit or regulator so that the circuit can not be energized by remote means before attempting to service fixture.

Table 4: Troubleshooting Guide

Problem :	Possible cause	Solution
Lamp will not energize	Defective lamp Loose connections Deteriorated wire insulation Moisture present in fixture	Replace lamp Tighten or repair Replace wires Open up & dry. Inspect lens for cracks. Replace lamp and any damaged part s

5.0 PARTS LIST

5.1 BPE Parts

Table 5: List parts used in the BPE-2-150 lights

Item Nbr	Part Number	Qty/	Description(See Fig. 12)
	14 00. 33. 000		High Intensity
			Bidirectional
			Elevated light type
			BPE-2-150 comprising :
6	4071.22.610	1	cast aluminium support
1	1408.14.000	1	outer dome, clear
2	4071.22.690	1	maintaining ring for inner lenses
4	7080.90.290	1	O-ring seal
5	4071.22.863	1	clamping ring
15	1400.33.020	1	Lower body , consisting of :
			cast aluminium body fitted with :
20	4070.84.991	1	Breakable stem threaded: 2IN - 11 TPI
19	4070.85.490	1	clamp for ball joint
18	4070.84.980	1	ball joint
14	7131.44.700	2	thumb screw 1/4"200UNC x 7/8"
16	6126.83.590	1	cable retainer
17	7283.05.053	1	retaining washer • lamp fastener • lamp positioning pin
21	14 0 8 . 16. 0 10	1	2 - pole plug moulded on two AWG12, 260mm long Teflon wires fitted with fast-on. Without : • Lamp • Inner prismatic lenses • Blanking screen

Table 6: MANDATORY ADDITIONAL PARTS

Item Nbr	Part Number	Qty/	Description
3	1408.14.101 1408.14.111 1408.14.121 1408.14.131	1	- 180 deg. left inner prismatic lens clear yellow red green
3	1408.14.201 1408.14.211 1408.14.221 1408.14.231	1	- 180 deg. right inner prismatic lens clear yellow red green
3	4071.25.480	1	- Blanking screen 180 deg.
7	2990.48.340	1	- Halogen lamp - 150W - 6,6A Pk30d - 1000 h

Table 7: OPTIONAL/ALTERNATIVE PART

Item Nbr	Part Number	Qty/	Description
7	2990.48.325	1	- Halogen lamp - 100W - 6,6A - Pk30d - 1000 h
7	2990.48.310	1	- Halogen lamp - 200W - 6,6A Pk30d - 1000 h
	4072.37.620	1	- Snow flag adapter
	9102-SFR-R24-NONE	1	- Snow Flags

6.0 INSTALLATION

6.1 INTRODUCTION

This section provides instructions for the installation of the BPE-2-150 light. Refer to the airport project plans and specifications for the specific installation instructions.

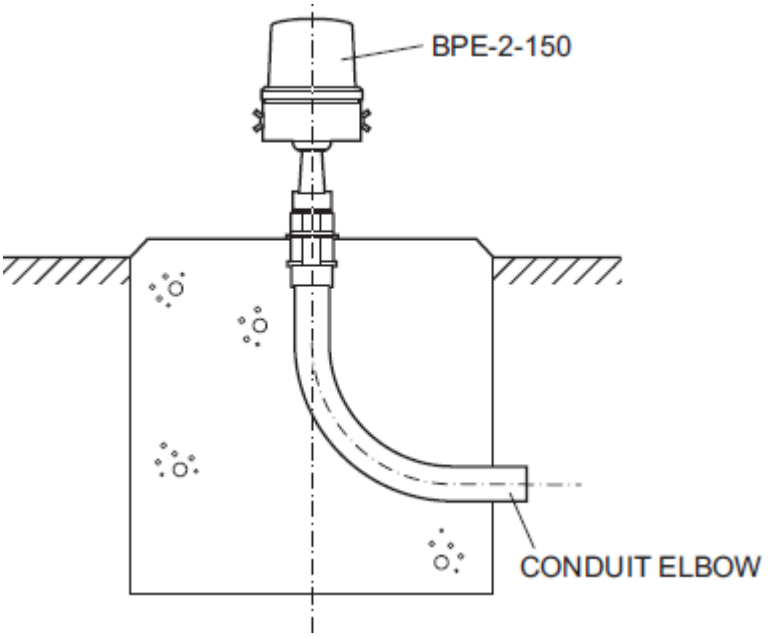
6.2 UNPACKING

The equipment must be handled carefully to prevent component damage. Unpack carton upon receipt and check the contents and their condition. Note any exterior damage to carton which might lead to detection of equipment damage.

6.2.1 Damage

If damage to any equipment is noted, a claim form should be filled with the carrier immediately. Inspection of equipment by the carrier may be necessary.

Figure 7: Mounting on a TC/2 conduit elbow



6.3 INSTALLATION CRITERIA

6.3.1 Title Not Available in the Source

Applicable documents for location details and tolerances.

6.3.1.1 Title Not Available in the Source

ICAO : Annex 14 Para 5.3.10 for runway edge lights.

6.3.1.2 Title Not Available in the Source

FAA : - Advisory Circular AC N 150/5340-24

6.3.2 Title Not Available in the Source

Location and tolerances : refer to fig. 1-2 and 1-3.

6.3.2.1 ICAO requirements

Location : in two parallel rows equidistant from the centre line and placed along the edges of the area declared for use as the runway or outside the edges at a distance of not more than 3 m.

The light shall be uniformly spaced in rows at intervals of not more than 60 m for an instrument runway.

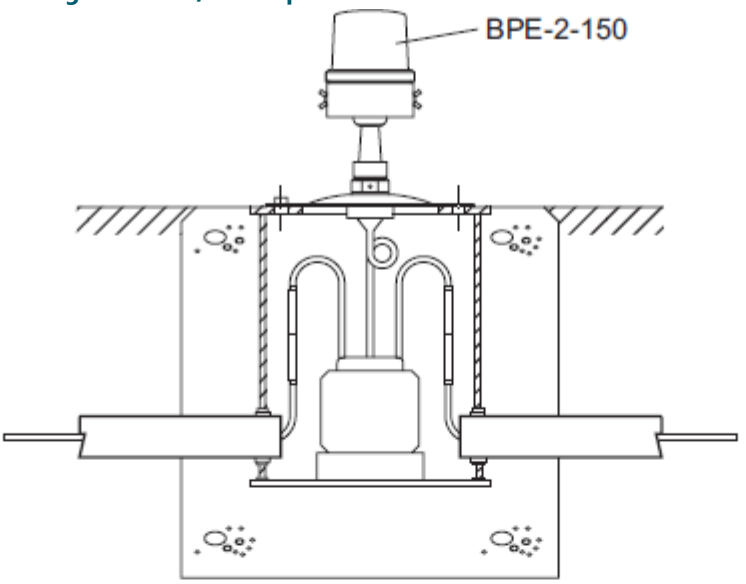
Inset lights are installed at taxiways intersections to avoid a gap in the information. A gap of max. 120 m is authorized but in any case the information given to the pilot must be sufficient.

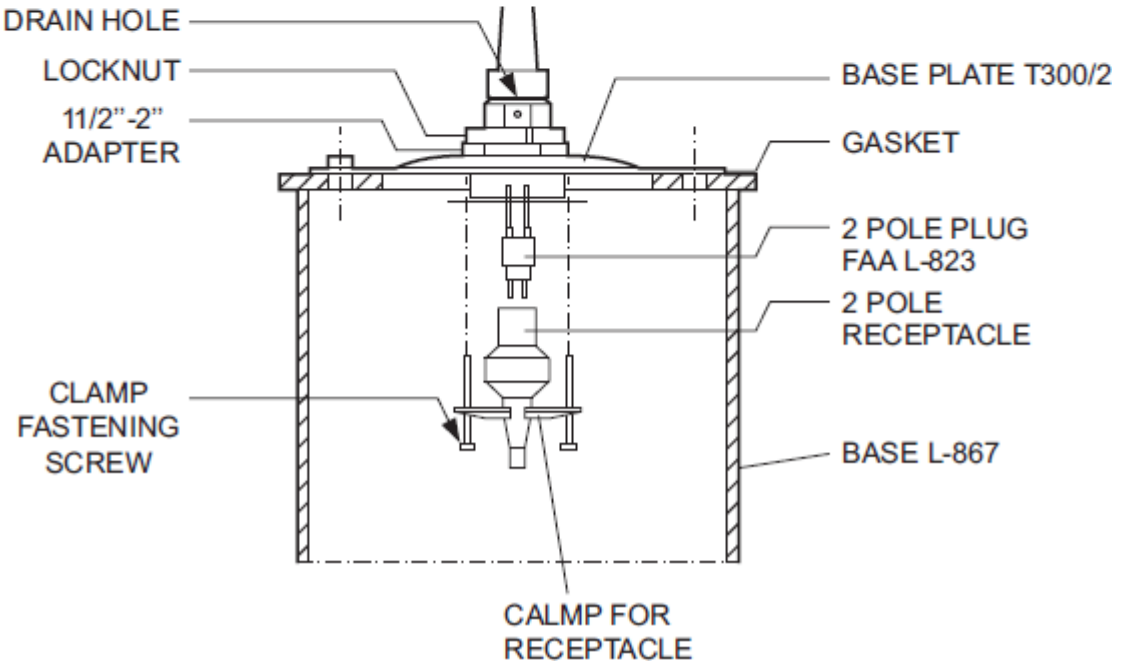
Tolerances : ICAO accepts ± 0,5 degree misalignment in azimuth and level.

6.3.2.2 FAA requirements

Location : same as above.

Figure 8: Mounting on a T300/2 base plate with steel base L-867





6.4 INSTALLATION METHOD

The BPE-2-150 light is ground-mounted. The lower breakable part has to be screwed into a mounting device such as :

- a conduit elbow TC/2 (see fig. 8), or,
- a deep base with base plate T300/2(see fig. 9) or,
- an anchor stake PA2 (see fig. 10).

6.5 INSTALLATION ON A CONDUIT ELBOW TC-2 (fig. 8)

The conduit elbow is sealed in a cubical or cylindrical concrete block, precast or poured in the excavation. The cast iron coupling must be vertical with a tolerance of ± 1 degree and will project 10 mm above the upper surface of the concrete block.

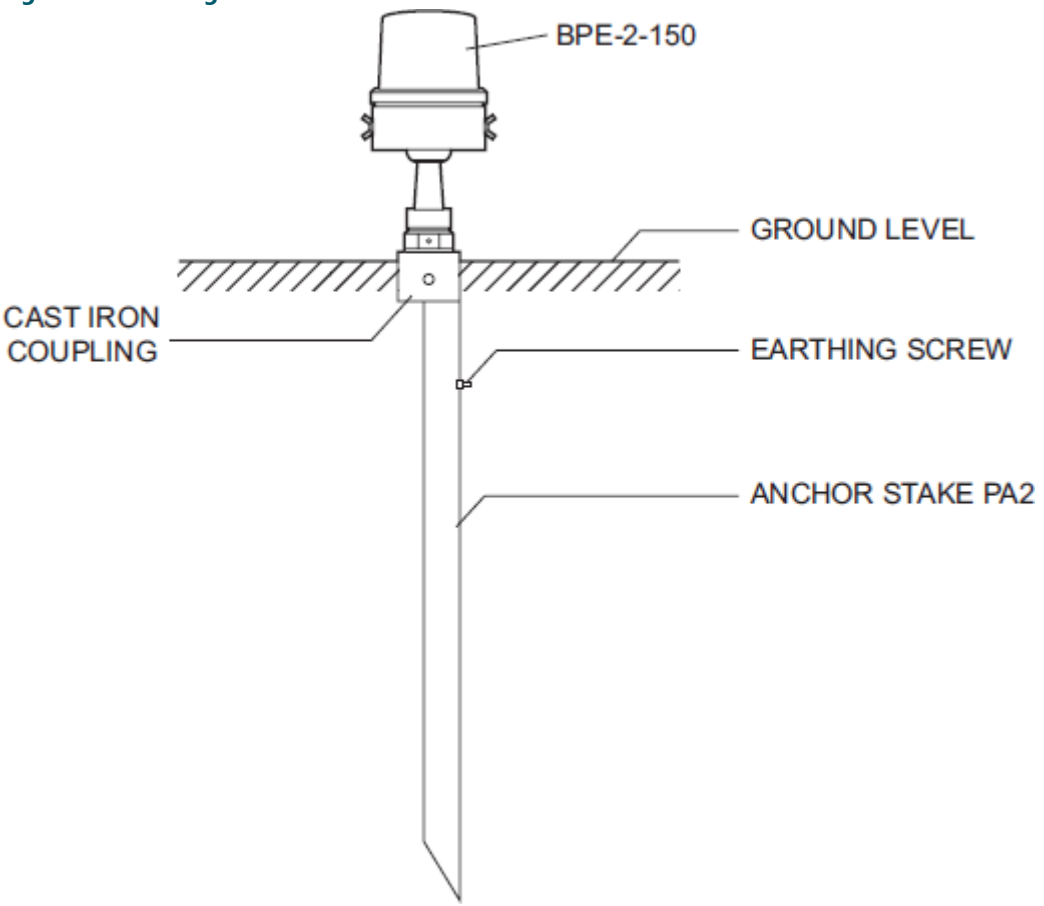
6.5.1 Installation procedure.

1. Before to start with the installation of the BPE-2-150 light, proceed with the installation of the isolating transformer. The primary cables are directly pulled into the ducts.
2. Check for continuity of the series loop after the isolating transformer has been connected.
3. Wrap the connector joints in the primary circuit with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape one-half lapped, extending at least 4 cm on each side of the joint.
4. The secondary plug is fixed in the conduit elbow and is maintained on the threaded sleeve by means of the receptacle seat.

6.5.2 Title Not Available in the Source

- Light installation : see para 5.8.
- Light setting : see para 5.9 .

Figure 9: Mounting on a PA2 anchor stake



6.6 INSTALLATION ON A FAA L-867 BASE (Fig. 9)

6.6.1 Title Not Available in the Source

Base installation and setting should be performed as described in manual AM.05.120e. With this installation method the light is mounted on a base plate type T300/2.

6.6.2 Installation procedure

1. Prior to start BPE-2-150 installation, check if isolation transformer is connected to primary series loop. The primary cables being pulled into the ducts.

   The isolating transformer should be installed on a spacer (e.g. a brik) to avoid direct contact with water remaining into the base.
2. Check for series loop continuity after transformer connection.
3. Apply two layers of an adhesive plastic tape type Scotch 33 or similar to the connections with an overlay of 4 cm at each side of the junction.
4. Install the secondary receptacle of the transformer at the base plate. Maintain it by means of the receptacle seat fitter with the base plate.
5. Install the base plate on the base, place the six hex head screws 3/8" - 16 UNC supplied with the base plate. Apply one drop of Loctite Grade AV or similar and torque at 10 Nm.

6.6.3 Title Not Available in the Source

Light installation: see 5.8.

6.6.4 Title Not Available in the Source

Light alignment: see 5.9.

6.7 INSTALLATION ON AN ANCHOR STAKE PA2

The BPE-2-150 light is secured to the ground by means of a 760 mm long stake fitted at the top with a 2IN = 11TPI coupling in which the frangible stem of the light is screwed. With this installation method, the transformers, cables and connectors are direct burried into the ground or in a trench.

1. The stake is placed in a 15 cm dia. hole, 76 cm deep as shown on fig. 10.
2. Proceed to electrical connection as indicated in para 5.6.2.1. through 5.6.2.3.
3. The upper part of the stake should be installed at 15 mm above the ground level with the stake installed vertically with at least one degree rake. Fill with compacted sand.

Note

In regions with continuous frost risk or when the ground is moveable, it is preferable to fill the hole with concrete or stabilized sand.

In regions with continuous frost risk, the electrical components directly buried in the ground should be recovered with sand and recovered with a water repellent material to reduce the moisture penetration.

6.8 BPE-2-150 INSTALLATION

The light is supplied complete with its feeder cable and outer dome. The lamp and half-inner lenses are packed separately.

Inner lenses mounting: can best be done in workshop to ease final installation and leveling.

Operate with steps as indicated on fig. 12 and hereafter.

a. Remove the upper body (1A), open the clamping ring (5), remove the outer dome (1) and the inner lenses maintaining ring (2) install the two half-inner lenses or blanking screen (when required) (3) taking into account of left and right hand side lenses position, as given in para. 1.4.3. and fig. 6 . The lenses receptacle is fitted with a positioning pin to avoid wrong installation of lenses.

   Place lenses retaining ring (2), the dome (1), look if the O-ring seal is correctly positioned in its groove and secure with the clamping ring (5).

   The dome assembly as well as the lamp will be installed on the light body after setting.

b. Screw the lower body of the lamp (including breakable stem) and screw it to the dedicated mounting device after connection of the feeder wires and plug into the receptacle.

   To avoid wires twisting, loosen the three clamps fastening screws, and holding the lower body with one hand, screw the breakable stem into its mounting device.

6.9 LEVELLING

As the toe-in is given by the glassware, the leveling to perform is reduced to horizontal leveling and light alignment in an axis parallel to runway axis.

6.9.1 Leveling system for BPE-2-150 lamp as per fig.11.

Precision level set for elevated light BPE, supplied with sighting telescope: 1408.35.051

Place and secure the dome assembly (1A) by means of the two thumbscrews as shown on fig. 11

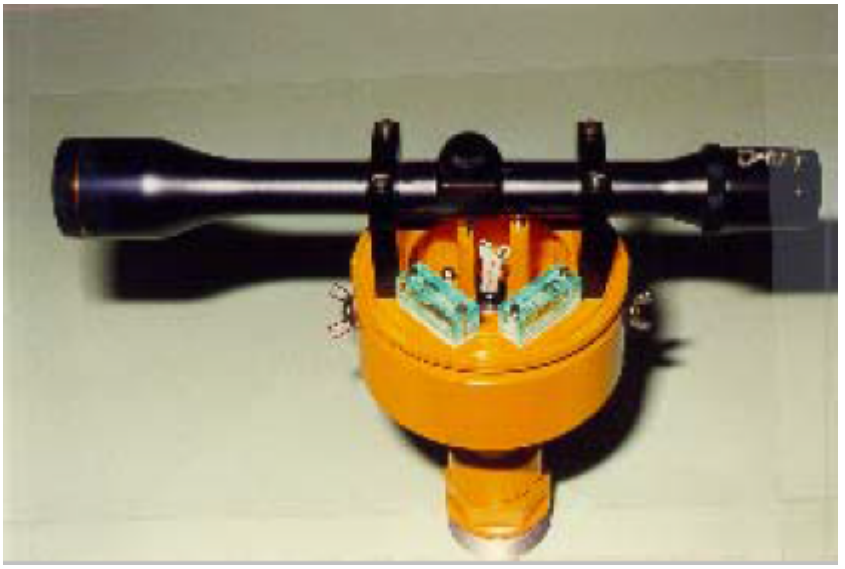
Set the light horizontally using the two water levels. The leveling is done by unscrewing slightly the three clamp fastening screws (10). Align the light with the other light, the first light being aligned with a correctly positioned target pole. Check again for correct leveling and tighten the three clamp fastening screws. Remove the leveling device.

Unpack the lamp taking care not to touch the quartz bulb with bare fingers.

Note

Touching the quartz bulb with bare fingers may seriously shorten the lamp life.
If the bulb has been touched, wipe it carefully with a piece of lens cleaning tissue or similar material moistened with alcohol or methylated spirit.

Figure 10: Leveling and sighting device



Put the PK30d lamp on the bracket fitted with one positioning pin and one spring for lamp retaining. Connect the lamp to the feeder wires with the insulated fast-on connectors. Install the dome assembly (1A) and screw it.

6.10 PRELIMINARY TESTS

6.10.1 Electrical tests

When making measurements on series loops, just make a complete safety check. Make sure that equipment to be tested is disconnected from all power sources, and control equipment locked out so that the equipment cannot be accidentally energized.

The insulation tester or megohmmeter is to be used for testing insulation series loop to ground these tests should be performed only by qualified persons who are familiar with high voltage electrical equipment.

Note

- Series loop with cable buried in earth should be tested before and after backfilling the cable trench.
- The series loop continuity test should be tested by ohmmeter.
- The high voltage insulation test should be performed when ground is thoroughly wet. The maximum acceptable leakage current, in microampere should not exceed the value calculated per series loop as follows : adding the following value in order to obtain the total allowable microamperes leakage per series loop
  - 1 microampere for each 100 meters of cable
  - 2 microamperes for each isolating transformer
- For the high intensity runway edge lights circuits having isolating transformer with 5000 Volt primary leads, the voltage tests to be applied for a period of 5 minutes between conductors and ground should be 9000 V DC for the first initial test and only 5000 V DC for all subsequent tests.

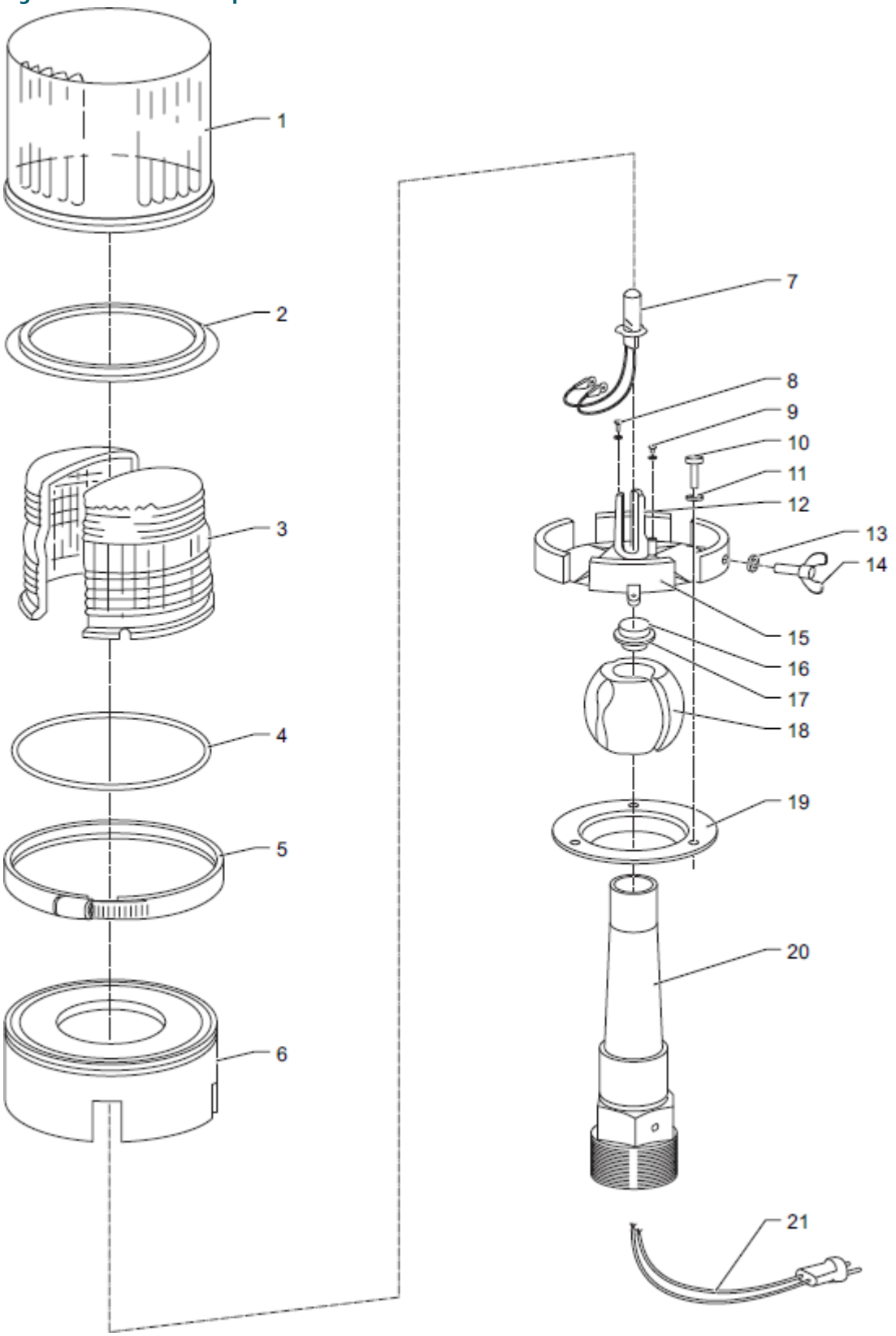
6.10.2 Visual check

Proceed to a visual inspection of each fixture, check if any part of the fixture is missing.

When the series loop of a circuit is completely closed energize the circuit on the lowest brightness step and make a visual inspection as per section

7.0 EXPLODED VIEW

Figure 11: BPE-2-150 : Exploded view



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