8” Taxiway LED Inset Light

User Manual

AM.04.470e, Rev. 2.0, 2022/01/21

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 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.

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.

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This manual could contain technical inaccuracies or typographical errors. ADB SAFEGATE BV reserves the right to revise this manual from time to time in the contents thereof without obligation of ADB SAFEGATE BV to notify any person of such revision or change. Details and values given in this manual are average values and have been compiled with care. They are not binding, however, and ADB SAFEGATE BV disclaims any liability for damages or detriments suffered as a result of reliance on the information given herein or the use of products, processes or equipment to which this manual refers. No warranty is made that the use of the information or of the products, processes or equipment to which this manual refers will not infringe any third party's patents or rights. The information given does not release the buyer from making their own experiments and tests.

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.

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 Product Information

2.1 Overview

2.1.1 Introduction

In this chapter you will find all the general information and the identification of the ADB taxiway inset lights types LTO.

2.1.2 Contents

This chapter contains the following topics.

2.2 General information

2.2.1 LTO

The ADB taxiway inset lights type LTO are light fixtures which provide optimum visual guidance with minimal maintenance, extremely low life-cycle costs and maximum reliability. They are designed to withstand the roll-over loads imposed by today's wide body aircraft during taxiing operations while remaining waterproof and serviceable.

The LTO taxiway edge fixtures are usually shipped ready for installation on an ADB 8" HPI or Eurobase Shallow base. For installation on a 12" ADB or FAA shallow base or FAA deep bases (L-868 size B) an adapter ring is required.

The ADB taxiway inset lights types LTO are intended for use as omnidirectional light for Taxiway and Apron edge

2.2.2 Purpose of this manual

This manual describes procedures for the maintenance and troubleshooting of the inset light type LTO.

2.2.3 Scope of this manual

This manual covers the LTO taxiway edge light fixtures manufactured in accordance with FAA specification AC 150/5345-46 (except for photometry when it differs from ICAO Annex 14) and compliant to ICAO Annex 14.

2.3 Equipment data

2.3.1 Equipment supplied

Each unit is supplied completely assembled, tested and sealed, ready for installation. The electrical connection is made via one cable assembly with either FAA L-823 style 6 2-pole plug, 3-pole plug derived from FAA L-823 style 6 or flat 3- pole plug. A labyrinth gasket is included.

Each unit is individually packed in a durable, cushioned and corrugated cardboard box, labelled with ADB ordering number.

Upon customer request, the lights can also be palletised in a cardboard box in a number of layers, each fitting separated by cardboard.

At least one instruction manual is delivered per order.

Ordering codes and reference data pertinent to the light fixture and its components are listed in the tables on page Ordering code complete products

2.3.2 Equipment required for installation and maintenance

Beyond the light itself, some equipment is required for installation and maintenance. This equipment is not supplied with the light but can be obtained through ADB.

It is listed on page Tool case.

3.0 Mounting and connection

3.1 Overview

3.1.1 Introduction

This chapter instructs you how to connect and mount the LTO inset light on its base or adapter ring.

It includes important safety notifications regarding the choice and use of fixing hardware.

Note

It is supposed that the base supporting the LTO inset light, the adapter ring (if needed) and the secondary connector are already installed. All information pertinent to the installation of bases is available in the instruction manual Am.05.120, Edition 2.1 or subsequent.

3.1.2 Contents

This chapter contains the following topics.

3.2 Important safety notifications

3.2.1 Fixing hardware

Various types of fixing hardware can be used for the fixation of the light on its base or adapter ring (e.g. screws or studs and nuts). Moreover, bases and adapter rings may be supplied with threaded holes according either to ISO metric or UNC standards.

CAUTION

Only use fixing hardware of the same type as the one originally supplied with the base or adapter ring!

Always tighten the fixing hardware to the recommended torque, using a calibrated torque wrench and applying the recommended type of sealant!

Refer to the paragraph " How to mount the light assembly?", for the tool to use, the requirement for use of Loctite and the torque to apply.

It is possible to insert a 3/8"-16 UNC screw in a M10 threaded hole. However, such a combination damages the female thread and does not ensure a correct fastening so that the screw could become loose under repeated operation of rolling aircrafts. Using screws of incorrect standard might lead to either damage to the thread in the base or to an incorrect fixation of the lights.

Generally, using fixing hardware of a different type of the one originally supplied with the bases or adapter rings, or tightening it at an incorrect torque, may lead to a loosening of the fixing hardware, damage to the light and base, and potentially to the separation of the light fitting or parts thereof from its base. This can lead to a highly dangerous situation of Foreign Object Debris (FOD), with potential lethal consequences.

3.3 General recommendations

3.3.1 Receiving, storage and unpacking

1. Upon receipt of goods at the site store, check all packing for visible damage.

   Every damaged box should be opened and its contents inspected for damage.

Note

If equipment is damaged, a claim form shall be filed with the carrier immediately. It may then be necessary for the carrier to inspect the equipment.

2. Store the light assembly preferably in its original packing in a protected area.

   When stored unpacked (not recommended), please take care not to damage the cable insulation.

3. Unpack the light assembly at the installation site to avoid damage during transportation and handling.

3.3.2 Electrical connection

The light assemblies covered by this manual are designed for connection to 6.6 or 20A series circuits via one (or more) series transformer. (In case of use on a 20A series circuit, we consider that the series transformer is a 20A / 6.6A transformer). The current to the light should not exceed 6.6A + 3%.

Refer to ADB cat. leaflet A.06.112 or Instruction manual AM.06.112 for more information on series transformers.

The series transformer and associated connectors have to be ordered separately.

3.3.3 Base Earthing

Whatever the chosen installation method, it is strongly recommended to earth the base, especially in locations presenting a risk of lightning strikes.

CAUTION

This recommendation is extremely important in case of LED lights: this is the only way to guarantee a complete effectiveness of the protection system against voltage surges included in the light fitting.

Failure to earth correctly the base will void the warranty for all damages occurring as a result of voltage surges.

Note

Guidelines on how to realize the earthing of the base are given in instruction manual Am05.120

3.3.4 Location and tolerances

The applicable documents for location details and tolerances are the following:

Organisation	Applicable documents
ICAO	Annex 14
	Aerodrome Design Manual Part 4
FAA	Advisory Circular AC no. 150/5340-28

3.4 How to mount the light assembly?

3.4.1 Before you start

Make sure that the contact surfaces of the light assembly with base or adapter ring and the gaskets are absolutely clean and smooth.

3.4.2 Use the correct fixing hardware

Please refer to the paragraph " Important safety notifications": **only use fixing hardware of the same type as the one originally supplied with the base or adapter ring!**

In ADB shallow bases delivered since mid-2006, the type of thread is indicated on the bottom or the flange of the base: **METRIC M10** or **3/8"-16UNC**.

How to be sure of the type of fixing hardware you are using?

- M10 screws require the use of a 17mm socket.
- 3/8"-16UNC screws require a 9/16" socket, this is approximately 14.3mm.

CAUTION

On a base or adapter ring with metric M10 female thread, never use a screw that can be fastened with a socket smaller than 17mm: it would indicate that you are inserting a 3/8"-16UNC screw in a M10 female thread.

The opposite -inserting a M10 screw in a 3/8"-16UNC female thread- is impossible.

3.4.3 How to mount the light assembly?

To mount and connect the light assembly, proceed as follows:

1. In case a light has already been mounted on the base, remnants of Loctite are present in the fixation holes.

   Clean them using a cleaning tap for blind holes (preferably use a tap with a right spiral groove) and blow with dry, oil-free compressed air.

2. If the labyrinth gasket (D3) is not installed, put one in the dedicated groove at the cover periphery.

CAUTION

Never reuse an already used gasket.

3. Slightly moisten the gasket with soapy water, to lubricate.

CAUTION

Never lubricate the gasket with silicone or any other kind of grease. Avoid the use of soap containing silicone or glycerine.

4. Apply Loctite on the three first threads of the threaded holes in the base.

CAUTION

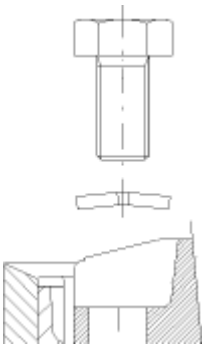
Always use Loctite 2701 to fasten the light fixture on its support.

5. Connect the light by inserting its plug into the receptacle of either the shallow base, the secondary cable or the transformer.
6. Gently install the light fixture in the adapter ring or base and press it home.

CAUTION
Make sure not to drop the light assembly or to pinch the wires.

Verify the light fixture is seating correctly onto the base or adapter ring

7. Make sure that the lock washers are mounted correctly - dents facing upwards - to avoid denting the cover..



8. Torque down gradually both screws (or self-locking nuts in case of a stud-equipped base).

CAUTION
Make sure the screws are tightened with a torque of 21 Nm/ 190 Lb.in.

3.5 Installation of adapter ring

3.5.1 Adapter ring Installation

To install the adapter ring, proceed as follow:

1. Clean the contact surfaces of the deep base and adapter ring.

   In case an adapter ring has already been mounted on the base, remnants of Loctite are present in the fixation holes. Clean them using a cleaning tap for blind holes (preferably use a tap with a right spiral groove) and blow with dry, oil-free compressed air.

2. Put onto the contact layer of the base a layer of RTV106 (ADB NC 7835.55.151 or equivalent.
3. Apply Loctite on the three first threads of the threaded holes in the base.

CAUTION
Always use Loctite 2701 to fasten the adapter ring on its support.

4. Mount the adapter ring onto the base and torque down the fixation screws.

CAUTION
Make sure the screws are tightened with a torque of 21 Nm/ 190 Lb.in.

5. Install the light as described above.

4.0 maintenance

4.1 Overview

4.1.1 Introduction

This chapter describes the general ideas on workshop maintenance and preventive maintenance and you will learn how to lift the unit out of the base or adapter ring. The servicing of the light assembly in the maintenance workshop will be described in detail in Servicing in the Maintenance Base.

4.1.2 Warranty limitation

The lights are delivered fully tested and sealed. In case of malfunctioning during the warranty period, the defective light shall be shipped back to ADB without opening it. Any attempt to open the light during the warranty period will void the warranty.

4.1.3 Contents

This chapter contains the following topics.

4.2 Workshop maintenance and preventive maintenance

4.2.1 Workshop maintenance

The light assemblies can be serviced in the field, but it is recommended to limit field maintenance to cleaning the prisms. It is recommended to replace the inset lights at regular intervals and to have them overhauled in the maintenance shop. The same applies to lights found unserviceable in the field.

No specific tools are required to remove or re-install the fittings, except for the lifting tool (see Lifting tool).

4.2.2 Preventive maintenance

The assembly's service life depends to a large extent on its waterproofness. All metal mating surfaces and seals must be clean, smooth, dry and free of all foreign particles if the light fixture is to operate for extended periods without requiring maintenance.

Greasing of O-ring seals may be required as indicated in this manual.

Preventive maintenance of the light fixtures should be performed as listed in the table on the next page.

Maintenance frequency depends on the conditions under which the runway is used (i.e. climate, traffic, etc.). The recommended practices for maintenance are described in the FAA advisory circular no. AC 150/5340-26 and in the ICAO Aerodrome Design Manual, Part 9 Airport Maintenance Practices.

Note

For components mentioned in this chapter, refer to LTO

4.2.3 Preventive maintenance tasks

In the table below you will find a checklist of preventive maintenance tasks. In case lights are found to be defective during the warranty period, do not open them as explained below, but replace them by new units, and send the defective ones, unopened, to ADB.

Interval	Check	Action
Daily	For low light output	1. Clean outer surface of lens if dirty. 2. Check for presence of moisture in fixture.
Monthly [1]	For presence of moisture or water (visual inspection for condensation on inner side of lens) For LED failure	1. Open up light assembly. 2. Clean, dry and inspect. 3. Replace cover/inner cover gasket and other parts found defective. 4. Replace LED assy
Bimonthly	Torque on hold-down screws or nuts	Refer to the paragraph " How to mount the light assembly?", page 18, for the tool to use, the requirement for use of Loctite and the torque to apply.
Semi-annually [1]	For presence of water in base	1. Pump water from the base. 2. Remove, dismantle and inspect light for water damage. 3. Cure the cause of water ingress.
After snow removal	For damaged light fixtures	1. Replace badly damaged fixtures. 2. Use a power broom for snow removal in the vicinity of the light fixture, if practical. 3. Follow recommended snow removal techniques described in FAA AC 150/5200-30 to avoid or at least to reduce damage to light fixtures.

Notes
[1] * More frequently during rainy seasons.

4.3 How to lift the light assembly out of the base or adapter ring

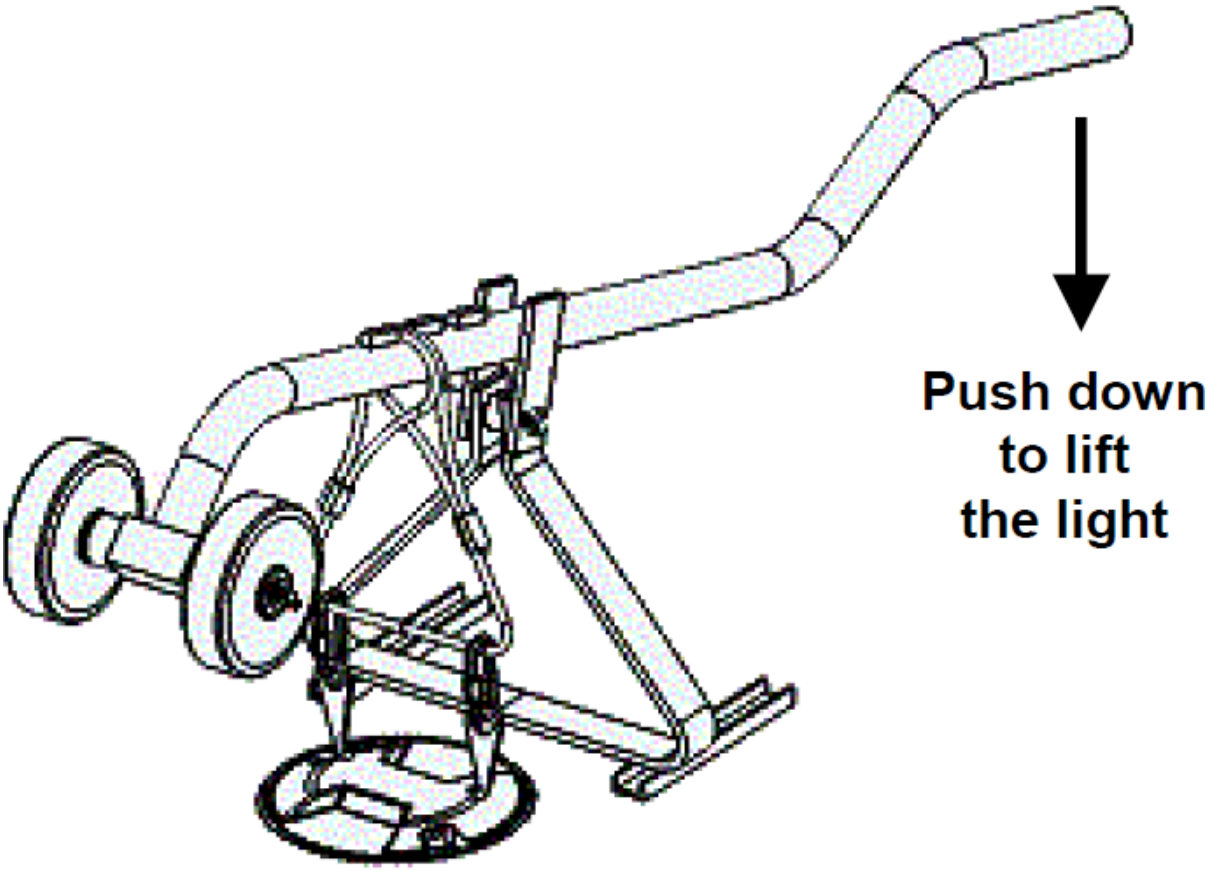
4.3.1 Lifting tool

Beside the simple jig delivered with the standard tool case, ADB has developed a more sturdy and efficient lifting tool (see illustration below). See Accessories for references.

4.3.2 Procedure

To lift the optical unit out of the base receptacle or adapter ring, proceed as follows:

1. Remove the fixing screws and washers (A1-A2) or self locking nuts and discard them.
2. Fit the appropriate lifting tool into both holes located (180° apart) in the cover (B1), lift the optical unit out of the base or adapter ring and place it next to it.



3. Disconnect the light fixture wires from the power wires coming from the transformer(s).
4. Remove the labyrinth gasket and discard it.
5. Mount a serviced or new fitting as described on page 18.
6. Take the optical unit back to the maintenance base where it can be serviced entirely.

CAUTION

Never hold the light fixture by the wires as this may damage the insulation, break the waterproof seal and cause insulation faults and water leakage.

5.0 Servicing in the Maintenance Base

5.1 Overview

5.1.1 Introduction

This chapter describes how to perform the various servicing tasks in the maintenance base.

5.1.2 Preliminary

All the screws used in this product are listed at the end of this manual.

Note

Refer to the table Screws Overview for the tool to use and the torque to apply.

5.1.3 Contents

This chapter contains the following topics.

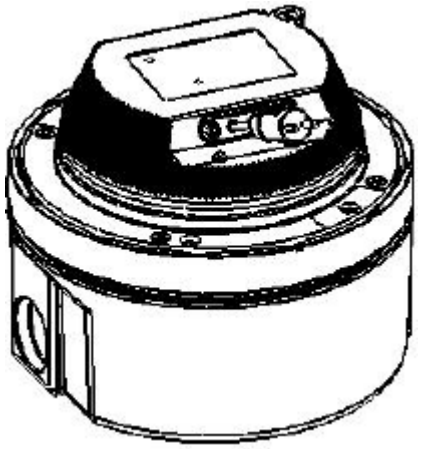
5.2 How to open the light assembly

5.2.1 Procedure

Note

To open the light assembly, proceed as follows (for the tools to use, refer to page 30, Screws Overview):

1. Turn the light unit upside-down. In order for the light to rest on a stable surface it is advised to lay it upside down on the top of a shallow base.

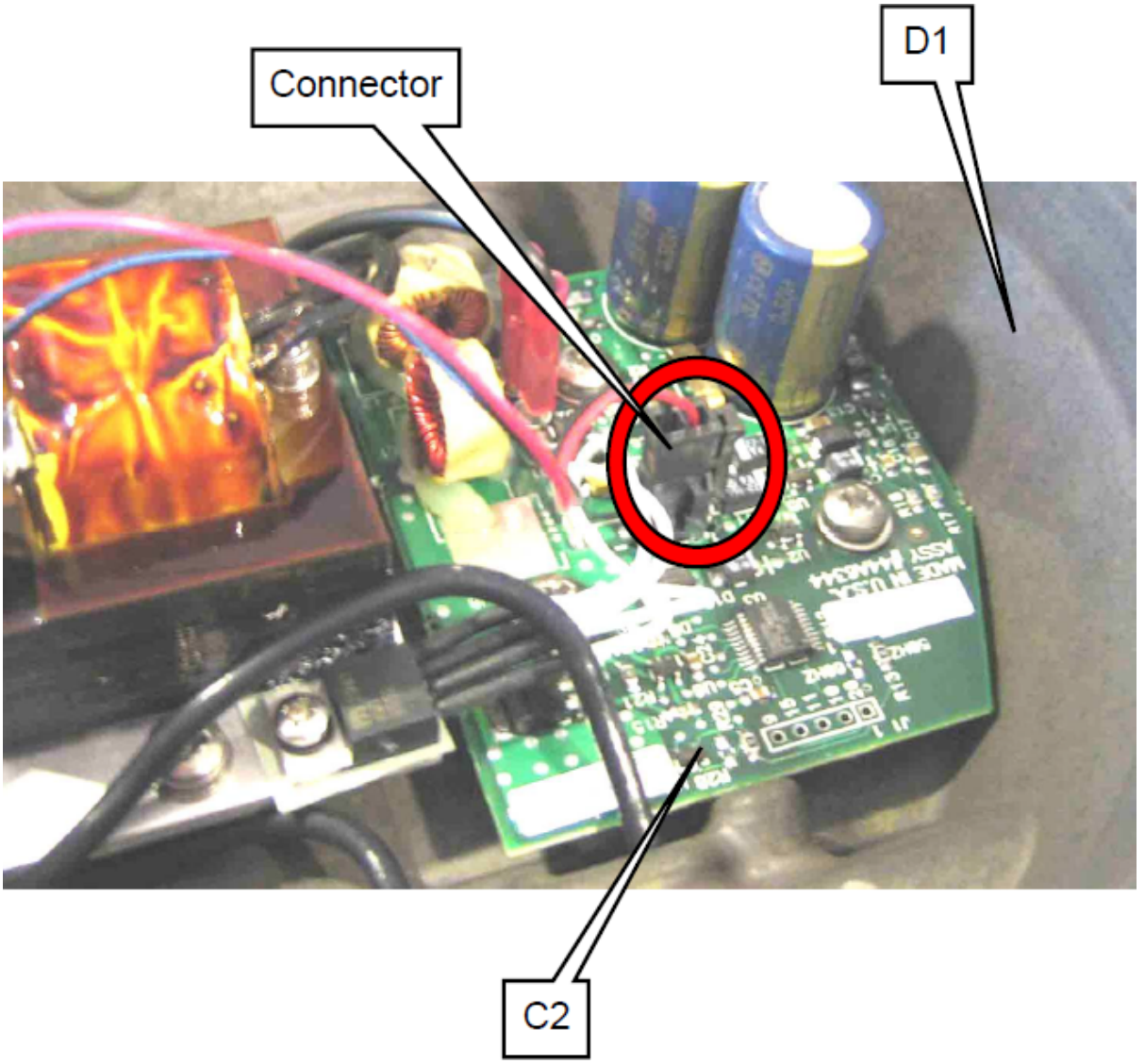


2. Remove the pressure release screw (D8).

3. Remove the four screws (D2). The use of an attack driver may be required to unlock the screws.
   - Always use a new bit for each light requiring the use of an attack driver.
   - Take care that the bit is well positioned on the screw head and that the driver is aligned with the axis of the screw.

4. Introduce the special opening tool (see page 46) or a flat screwdriver in the dedicated slot between cover and inner cover and rotate it to separate the inner cover from the cover.

Carefully lift-off the inner cover (D1) from the cover, taking care not to damage the connection between the PCB (C2) and the LED assembly.



CAUTION

Be careful, do not pull on the cable when you lift the inner cover, this might damage the connections!

Disconnect the LED assembly from the PCB by pulling out the connector.

CAUTION

Do not pull on the cable to disconnect as the cable might be pulled out of the connector.

Now you can take the inner cover away from the cover.

5. Remark:

CAUTION

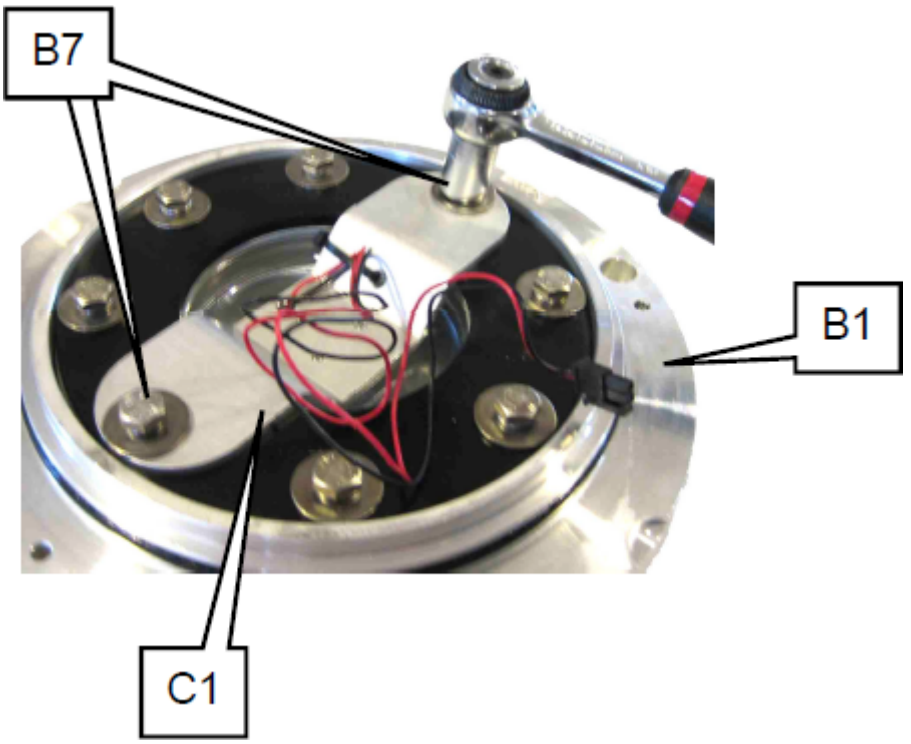
Always replace the cover / inner cover gasket (B2) and the 4 screws (D2) by new ones when a light is opened and closed again. This to guarantee fixture water tightness.

5.3 How to replace the LED assembly

5.3.1 Procedure

To replace a LED assembly, proceed as follows:

1. Open the light assembly (see page 26).
2. Remove the two hexagonal screws (B7) fastening the LED assembly (C1) to the cover (B1).



3. Remnants of Loctite are present in the fixation holes of the screws B7.

   Clean them using a cleaning tap for blind holes (preferably use a tap with a right spiral groove) and blow with dry, oil-free compressed air.
4. Replace the LED assembly by a new one.
5. Install new hexagonal head screws (B7) (do not forget the washers) and tighten them.

Note

Refer to the table Screws Overview for the tool to use and the torque to apply.

CAUTION

The two screws holding the LED assy are M6 x 20.

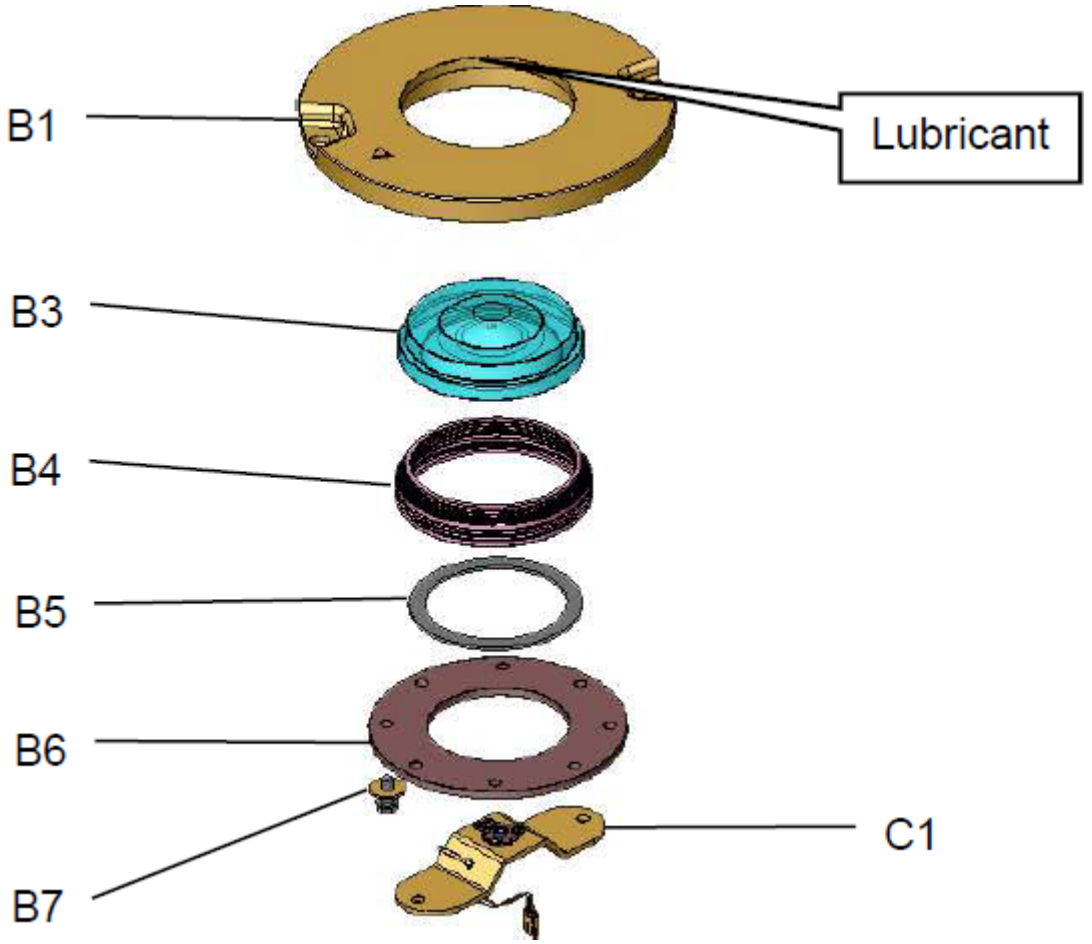
5.4 How to replace the lens

5.4.1 Procedure

To replace a lens, proceed as follows:

1. Open the light assembly (see Procedure).
2. Unscrew the 8 screws (B7).

   Remove the washers and lock-washers.



3. Remove the lens support plate (B6) and the lens gasket protection (B5)
4. Push the lens (B3) with the lens gasket (B4) towards the inside of the cover (B1)
5. Clean and degrease the lens chamber with any effective solvent.

CAUTION
Never use any abrasive substance.

Remnants of Loctite are present in the fixation holes of the screws B7. Clean them using a cleaning tap for blind holes (preferably use a tap with a right spiral groove) and blow with dry, oil-free compressed air.

6. Using a small brush, apply a thin layer of lubricant MOLYKOTE HP870 INERTA (ADB Part Number 7850.05.061) in the top section of the lens chamber of the cover (see in the figure above).
7. Bring a new lens gasket (B4) over the lens.

CAUTION
Always replace the lens gasket (B4) and the 8 screws, washers and lock-washers (B7) by new ones when a lens is replaced. This to guarantee fixture water tightness.

8. Push the lens/ gasket assembly in the lens chamber from the inside, put the lens gasket protection (B5) and clean the inner surface of the lens.
9. Secure it to the cover by means of the lens support plate (B6) and 8 new screws (B7).

   Don't forget the washers and lock washers.

CAUTION

The two screws holding the LED assy are M6 x 20 while the six other ones are M6 x 16.

Note

Refer to the table Screws Overview Page 30 for the tool to use and the torque to apply.

5.5 How to replace the cable set assembly

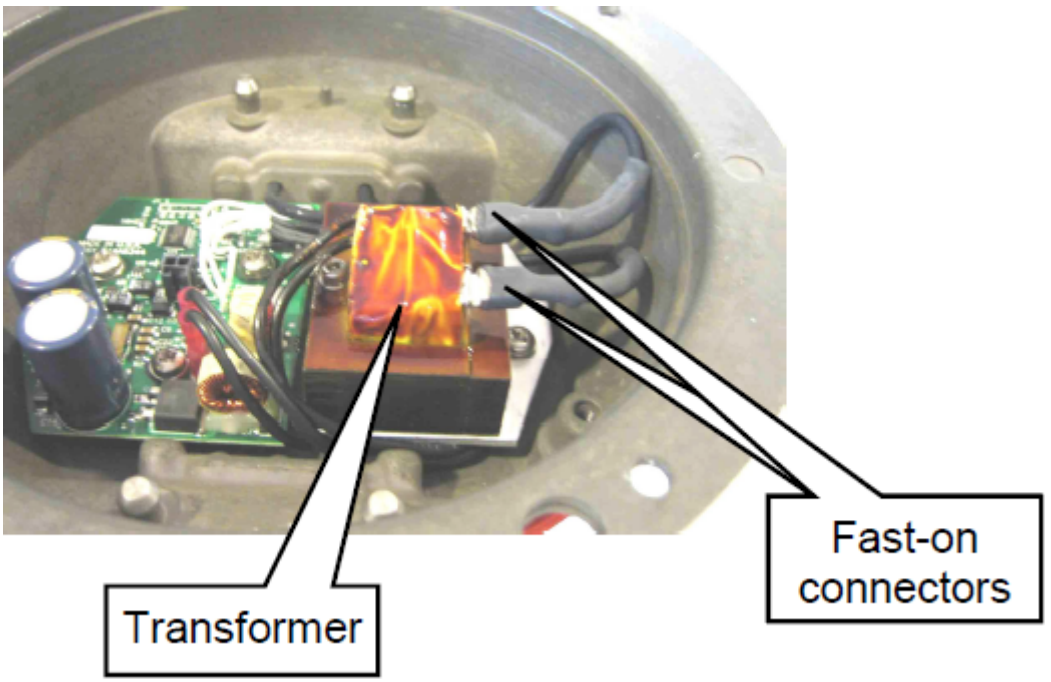
5.5.1 ADB cable sets

Only use ADB cable sets. Usage of substitutes voids the warranty.

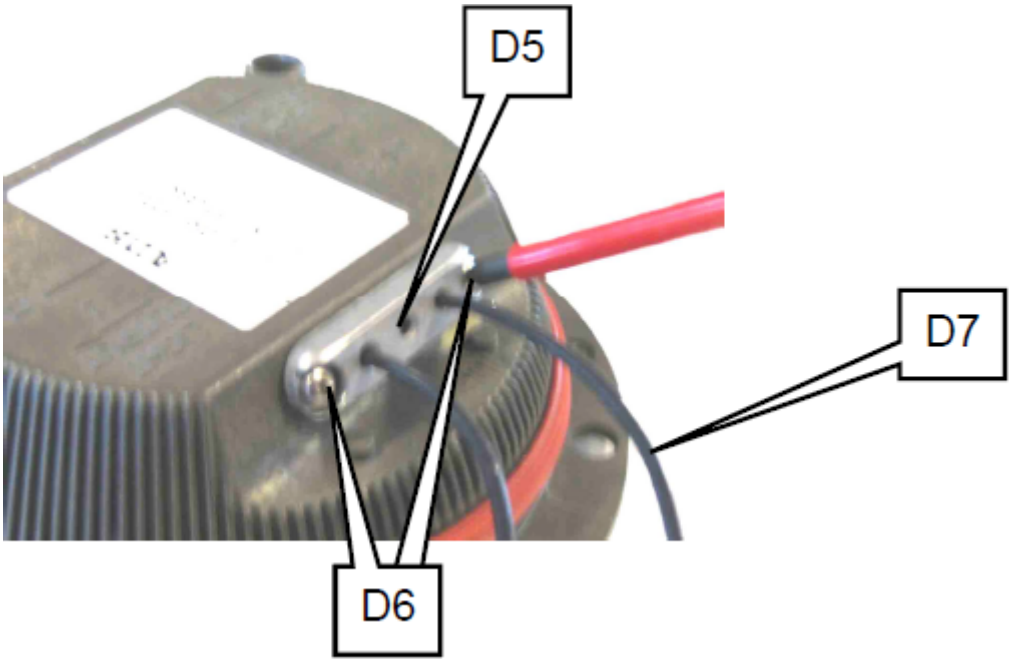
5.5.2 Procedure

To replace the cable set assembly, proceed as follows:

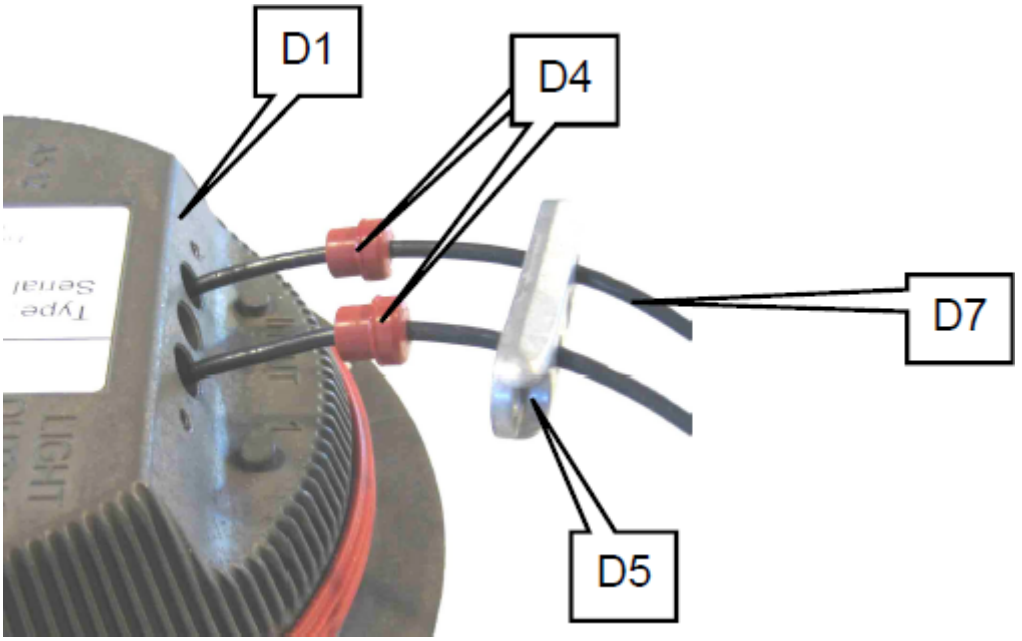
1. Open the light assembly (see Procedure).
2. Disconnect the fast-on connectors from the transformer.



3. Remove both screws (D6) and the wire clamp (D5).



4. Cut the fast-on connectors from the cable assembly (D7).
5. Pull the cable assembly (D7) out of the inner cover (D1) and discard the grommets (D4).



6. Bring the new ADB cable assembly through the wire clamp (D5)

CAUTION
One wire per hole.

7. Put a new wire grommet (D4) on each of the wires, taking care of the direction (the smaller diameter into the inner cover recesses).
8. Introduce the wires in the inner cover (D1).
9. Reinstall the wire clamp (D5) by means of both screws (D6).

   Do not torque down the screws entirely at this step.

10. Remove the insulation of the wires over about 5 mm.
11. Crimp on the fast-on connectors delivered with the cable assembly and connect to the terminals.

    Adjust the wires inside the inner cover.
12. Torque the screws (D6).

Note
Refer to the table Screws Overview page 30 for the tool to use and the torque to apply.

5.6 How to close and test the light assembly

5.6.1 Procedure

CAUTION
ALWAYS REPLACE COVER/INNER COVER GASKET AND FIXING SCREWS BY NEW ONES!

To close an optical unit, proceed as follows:

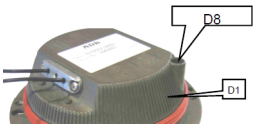
Note
Refer to the table Screws Overview for the tool to use and the torque to apply.

1. Turn the cover (B1) upside down.

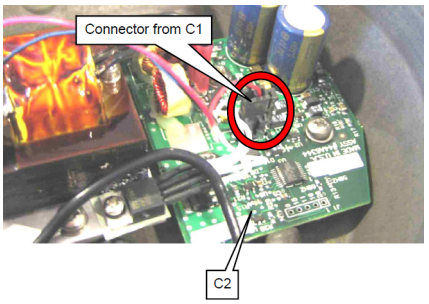
   In order for the cover to rest on a stable surface it is advised to lay it upside down on the top of a shallow base.

2. Make sure that the contact surfaces with the O-ring are clean.

   Remnants of Loctite may be present in the fixation holes of the screws D2. Clean them using a cleaning tap for blind holes (preferably use a tap with a right spiral groove) and blow with dry, oil-free compressed air.
3. Put a new O-ring gasket (B2) greased with high quality neutral silicone grease (ADB Part Number 7850.42.210) over the cover in the appropriate groove.
4. Make sure that the pressure release screw (D8) of the inner cover (D1) is removed.



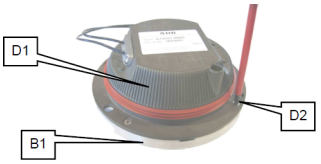
5. Connect the LED assy (C1) to the PCB (C2)



6. Gently put the inner cover (D1) on top of the cover, taking into account the keying pin between both parts.

Make sure that the wires do not get damaged between cover (B1) and inner cover (D1).

7. Press the inner cover (D1) on the cover (B1) and secure with new screws (D2).



Note

Refer to the table Screws Overview, page 30 For the tool to use and the torque to apply.

8. Check electrical insulation from two-pole plug to light body by means of a 500V insulation tester.

   Apply an AC current not exceeding 6.6 A on the two-pole plug and observe normal operation of the LED.

CAUTION

the electronic circuit is designed to be fed from a regulated AC current generator only (e.g. constant current regulator). Do not use a voltage generator as this might damage the electronic components or fail to energize the light.

9. Check waterproofness of the fitting by applying with dry air a pressure of 0.4 bar (40 kPa) above the atmospheric pressure via the pressure release hole.

   Whilst pressure is applied, immerse the light fixture for three minute in water and look carefully for NO stream of bubbles emanating from the light fixture.

   If no leakage occurs, dry the fixture and remove the air hose.

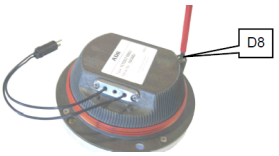
   Else, locate the leak source.

   Dry the fixture, remove the air hose. Replace the leaking gasket or part (check the contact surfaces for any scratches, corrosion or other damage) and repeat the test. For this purpose a water-tightness test adapter can be ordered from ADB (see Ordering code complete products). See Accessories for the part number of the valve to be used for that purpose.

10. Replace the O-ring seal of the pressure release screw (D8) and secure the pressure release screw..

Note

Refer to the table Screws Overview, page 30 For the tool to use and the torque to apply.



6.0 Ordering codes and exploded views

6.1 Overview

6.1.1 Introduction

References of the types of products described in this manual, of their spare parts and accessories are listed in this chapter, together with exploded views.

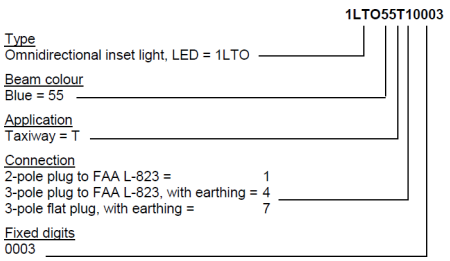
6.1.2 Contents

This chapter contains the following topics.

6.2 Complete products

6.2.1 Ordering code complete products

The illustration below clarifies the structure of the ordering code for the LTO light.



6.3 Spare parts

6.3.1 List of tables

Below you will find a list of all tables in this chapter:

6.3.2 Table 1

In the table below you will find all fixtures and main assemblies of the LTO inset lights:

Fixtures		*Main assemblies*	
Use	**Ordering code**	**Cover assembly**	**Inner cover assembly**
LTO taxiway edge	1LTO55T10003	4072.02.720	4072.09.130

Note

Complete lights are delivered **without fixing hardware**. This hardware is delivered together with the mounting system (base or adapter ring), or can be ordered separately (see Table 4) fixing hardware kit

6.3.3 Table 2

In the table below you will find the LTO cover and optical assembly parts and their availability as spare part or not; in the latter case, order the complete light (see Table 1):

Cover & Optical assembly LTO components			**Qty (per spare part)**
No.	**Spare part number**	**Description**	
B1 + B2 + B3 + B4 + B5 + B6 + B7	4072.02.720	LTO cover assy	1
B2	SP.7080.90.335	O-ring gasket between cover and inner cover	10
B3	SP.4072.02.700	LTO lens	10
B4	SP.4071.76.041	LTO lens gasket	20
B5	SP.4071.76.060	LTO lens gasket protection	20
B6	SP.4071.76.020	LTO lens support	10
B7	SP.7100.08.563	HEX SCREW M6x16 DIN 933-A2-LOCK 2045 (6 pcs)	100
	SP.7100.08.571	SCREW TH M6 20 DIN933-A2-LOCK 2045 (2 pcs)	100
	SP.7283.05.053	Flat washer M6 D20xD 6.5	100
	SP.7284.10.445	Lockwasher M6 Stainless steel - DIN 7980	100
C1	4072.09.190	LED assembly (incl. support)	10

6.3.4 Table 3

In the table below you will find the LTO inner cover assembly components and their availability as spare part or not; in the latter case, order the complete inner cover assembly (see Table 1):

Inner Cover assembly LTO components			**Qty (per spare part)**
No.	**Spare part number**	**Description**	
C2 + C3 + D1 + D4 + D5 + D6 + D7 + D8	4072.09.130	LTO inner cover assembly	1
D2	SP.7100.10.190	SCREW M5x10 DIN 965-T-A2-LOCK 2045	100
D3	4072.76.580	Red Labyrinth gasket	10
	4072.76.590	Red Labyrinth gasket	100
D4	SP.011231	Wire grommet	40
D5	SP.010762	Wire clamp	100
D6	SP.7110.08.360	SCREW M4x10 DIN 7500CE-T-A2	100
D7	4072.09.230	Secondary AWG 14 wires assembly with a FAA L-823 2-pole plug	10
D8	SP.010869	Pressure release plug including O-ring	10

6.3.5 Table 4

In the table below you will find the fixing hardware kits:

MATRIX HARDWARE FIXING KIT								
Fixing Hardware Kit			**Components**					
	Description	**ADB Part Number**	7100.08.759 St. Steel Screw M10 X25	7150.53.320 St. Steel nut M10	7150.53.330 St. St. selflocking nut M10	7284.10.470 St. Steel lock washer M10	7284.70.345 Nylon encap. washer M10	4071.50.240 Metric antirotation pin
For mounting 8" inset lights on to ADB SAFEGATE 8" shallow bases or adapter rings	Metric screw kit 8" (with anti-rotation pins)	1411.20.400	2			2		2
	Metric nut kit 8"	1411.20.420		2		2		
	Self-locking metric nut kit 8"	1411.20.430			2			
	Metric screw kit 8" (Germany)	1411.20.441	2				2	
	Metric screw kit 8" (w/o anti-rotation pins)	1411.20.522	2			2		
For mounting 12" inset lights or adapter rings on to ADB SAFEGATE 12" shallow or deep bases	Metric screw kit (France) 12"	1411.20.482	6			6		
	Metric screw kit 12" (Germany)	1411.20.492	6				6	
	Self-locking nut kit 12"	1411.20.500			6			

Note
1

Notes
1 (1): HPI bases only accept Metric hardware

Table 4, *continued*

MATRIX HARDWARE FIXING KIT					
Fixing Hardware Kit			**Components**		
	Description	**ADB Part Number**	71200.13.806 St. Screw 3/8"-16 UNC	7284.10.470 St. Steel lock washer M10	4071.50.120 UNC anti-rotation pin
For mounting 8" inset lights on to ADB SAFEGATE 8" shallow bases or adapter rings	UNC screw kit 8"	1411.20.411	2	2	2
For mounting 12" inset lights or adapter rings on to ADB SAFEGATE 12" shallow or deep bases	UNC screw kit 12"	1411.20.452	6	6	

6.4 Screws Overview

6.4.1 Important information

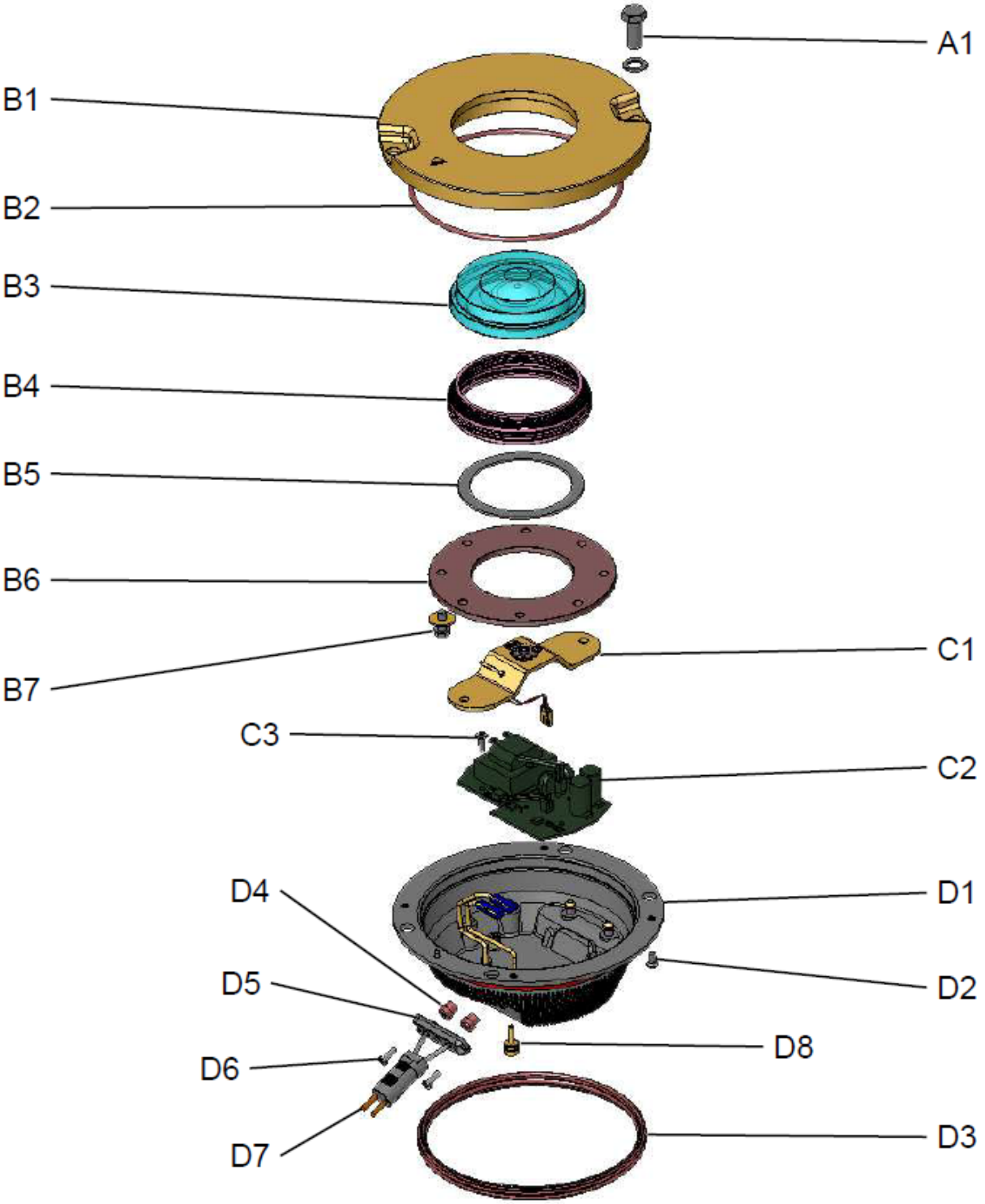
The table below gives for each screw used in this product, the reference on the exploded view, the type of screw, the tool to use and the torque.

Screw	Tool	Torque
B7- 7100.08.563 and 7100.08.571 - HEX SCREW M6x16 DIN 933-A2-LOCK 2045 and HEX SCREW M6x20 DIN 933-A2-LOCK 2045	Socket hex M10	3.5 Nm / 31 Lb.in
D2- 7100.10.190- SCREW M5x10 DIN 965-T-A2-LOCK 2045	Torx25	2.5 Nm / 23 Lb.in
D6- 7110.08.360 - SCREW M4x10 DIN 7500CE-T-A2	Torx20	3.5 Nm / 31 Lb.in
D8- 4070.77.150 - Pressure release screw	1.6 x 8 Flat	2.5 Nm/23 Lb.in
A1 (not supplied with the light) Screw FT.HEX M10 x 25, SST, Hex Head or Screw FT.HEX 3/8"-16UNC X7/8"	Socket hex 17mm or Socket hex 9/16"	21 Nm / 190 Lb.in
Self-locking nut (M10)	Socket hex 17mm	21 Nm / 190 Lbin
Screws delivered for installation of adapter ring on deep base	Socket hex 17mm or Socket hex 9/16"	21 Nm/190 Lb.in

6.5 Exploded views

6.5.1 LTO

The illustration below represents the exploded view of a LED Taxiway edge inset light LTO:



6.6 Accessories

6.6.1 Accessories

In the lists below you will find useful accessories for the installation, maintenance and repair of the LTO lights.

6.6.2 Tool case

ADB has designed a tool case (ADB part number **1411.19.421**) including the basic tools necessary for the maintenance of inset lights. It can also be used for the installation of the light fixture (please note this is a general tool case, some tools are of no use for LTO Lights). The table below lists the tools included in the case:

Description	ADB Part Number	Description	ADB Part Number
Tool case	6169.01.007	Screwdriver, flat blade AG. 8x150	8961.05.250
Torque wrench	8961.06.255	Screwdriver, Pozidriv AD.2x125	8961.05.220
Socket hex 3/8", screw 3/8", J 9/16LA	8961.06.008	Loctite 2701	7870.05.130
Socket hex 3/8", screw M10, J 17LA	8961.06.000	Loctite 222	7870.05.140
Socket, 1/4", 1.6x8 Flat, RS.8E	8961.05.050	Lubricant Molykote HP870 Inerta (100 gr) (to replace prism)	7850.05.061
Socket, 1/4", Pozidriv2, RD.2	8961.05.060	Natural hydraulic vacuum silicone grease (50 gr)	7850.42.220
Extension, 1/4", R.210	8961.06.220	Attack driver	8961.04.100
Adaptation, 1/4"-3/8", R.232	8961.06.010	Hammer 212A50	8961.04.110
Hinged handle - short	8961.06.110	Bit holder	8961.04.120
Plier	8981.10.110	Bits END202, Pozidriv2	8961.04.130
Opening tool	4071.53.220	Lifting tool assembly for inset lights	1411.19.550
Screwdriver ANX25x100 TX20	8961.05.300	Bit Torx 1/4" - TX20 EX.620 L=70mm	8961.06.020
Screwdriver ANX25x100 TX25	8961.05.290	Bit Torx 1/4" - TX20 EX.625 L=70mm	8961.06.025

6.6.3 Additional accessories

The following accessories can be purchased separately:

Description	ADB Part Number
Watertightness test adapter for inset lights	4060.84.570
Set of spare anchor hooks for lifting tool 1411.19.550	1411.19.560
Lifting tool on wheels (see Procedure)	1420.55.600

6.6.4 Fixing hardware

The fixing hardware for securing the fitting on to the mounting interface is generally not supplied with the fitting as it depends on the exact type of mounting interface. It can be purchased as kits or loose components, as listed on page 29, Table 4

7.0 Troubleshooting

7.1 Troubleshooting table

In the table below a number of problems are listed in the first column. In the second column, you will find the possible causes of the problem and in the third column the solution.

Problem	Possible cause	Solution
LED does not energize.	LED defective	Replace LED assembly
	PCB defective	Replace the complete inner cover
	Moisture inside assembly causing current leakage	1. Open light assembly. 2. Clean, dry, inspect or replace damaged components.
	No connection of primary loop. Defective isolation transformer or secondary wiring	Check transformer output current with A-meter. Check power line between the light fixture and the transformer, including connectors.
Weak light output	Partial short circuit in primary loop. Defective isolation transformer. Dirty lens.	1. Check cable assembly. 2. Replace transformer. 3. Clean lens.
Light beam distorted	Broken or damaged lens/cover	Replace lens or entire fixture.
Short LED life	Too high current	Check output current of isolating transformer at full brightness. Current should not exceed 6.7 A. Replace transformer if defective; if not, adjust CCR output current.
	Moisture in lighting fixture	1. Open light assembly. 2. Check for cause of leakage (Dirty or damaged seal mating surfaces, defective seals, cracked or broken prism, loose screws or damaged wire insulation). 3. Clean, dry, inspect or replace damaged components.

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