8-inch F-Range Inset Lights

User Manual

UM-5015, Rev. 1.5, 2023/01/31

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.

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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 About this Manual

This document includes information with focus on safety, installation and maintenance procedures.

For more information, see www.adbsafegate.com.

Note
It is very important to read this document before any work is started.

2.1 How to work with the manual

1. Become familiar with the structure and content.

2. Carry out the actions completely and in the given sequence.

2.2 Abbreviations and terms — AGL

Abbreviations and terms	Description
FAA	Federal Aviation Administration
ICAO	International Civil Aviation Organization
IEC	International Electrical Committee
ISO	International Standardization Organization
ANSI	American National Standards Institute
NFPA	National Fire Protection Association
AC	Advisory Circular (FAA)
ESD	Electro-Static Discharge; Electrostatic-Sensitive Devices
LED	Light Emitting Diode
PPE	Personal Protective Equipment
FOD	Foreign Object Debris
Mounting support	A piece of equipment, on which the fixture is installed.
Toe-in	The toe-in angle is the angle the beam of light makes with the longitudinal axis of the runway or taxiway.

3.0 Introduction to 8-inch F- Range inset lights

The ADB SAFEGATE 8-inch F-Range Inset Lights are light fixtures which provide optimum visual guidance with minimal maintenance, low life-cycle costs and maximum reliability. It is designed to withstand the high impact and roll-over loads imposed by today's widebody aircraft during landing and take-off operations while remaining waterproof and serviceable.

The FRC / FTZ / FTD fixture is shipped ready for installation on an ADB SAFEGATE 8-inch shallow base or on 12-inch shallow base or FAA deep bases (L-867 size B or L-868 size B) with an adapter ring .

The 8-inch F-Range family types FRC/ FTZ/ FTD are intended for the following uses:

- FRC: Runway centerline in Cat I, II and III,
- FTD: Taxiway centerline, on straight and curved sections and on rapid exit taxiway, taxiway stop bar and intersection, and apron,
- FTZ: Touch down zone in cat. II and III; rapid exit taxiway indicator light (RETIL).

Note

For more detailed information on interoperability, refer to the appendix, INTEROPERABILITY section.

3.1 Common properties 8-inch lights

Find below the common properties of all 8-inch F-Range lights:

Compliance with Standards (current Versions)

IEC	IEC 61827
FAA	AC 150 / 5345-46: for mechanical requirements
ICAO	Annex 14, Volume I
NATO	STANAG 3316

Features and Benefits

Efficiency

- Designed and built with simplicity and ease of maintenance in mind
- Extensive use of aluminum alloys limits fixture weight to less than 8 kg to ease handling in the field
- Many components are common to all F-range lights
- Outer prisms mechanically clamped to light cover through molded, replaceable seals: prism replacement by airport maintenance personnel is fast and easy and does not require any sealing compound or resin
- No optical adjustment required after replacement lamp, prism or reflector
- Specific tools have been developed to ease installation and subsequent maintenance
- Plug for pressure-testing of fixture after overhaul

Sustainability

- Lightweight, sturdy, low-energy and environment friendly lighting fixtures (no cadmium plating)
- Normal protrusion (12,7 mm) reduces vibrations induced in aircraft landing gear and in lighting fixture itself, thereby increasing lifetime, particularly for the lamps
- Smooth outer surface of light cover avoids tire damage and makes light less sensitive to snowplows
- Long life halogen lamps: 1500 hours at full intensity, in excess of 4000 hours in practical use
- Low temperature lights: temperature at center of top cover remains below 160 °C ICAO specified limit
- IP67 protected, finish: aluminum alloy cover, inner cover and optical support; plain stainless steel hardware

Safety

- Part of a comprehensive range of 8- and 12-inch diameter inset lights covering all aviation ground lighting requirements
- Shallow gully in front of prism windows maintains optimal light output under heavy rainfall

Power Supply

6.6 A through a secondary transformer rated between 45 W and 100 W installed under the light in the base can or in a separate housing.

Note

Refer to the appendix for a complete power table and the cable loss formula.

Dimensions and Weight

Outer diameter / depth	Approx. 210 x 210/ 100 mm
	8.3 x 8.3/ 3.9 in
Weight without packaging	Approx. 2.7 kg
	5.9 lb

Operating Conditions

Operating temperature	-58 to +122 °F / -50 to +50 °C
Storage temperature	-67 to +131 °F / -55 to +55 °C
Relative humidity	Up to 98 % at +77 °F / 25° C

Note

- Refer to the POWER TABLE appendix or to the data sheet annex for the applications' power table.
- Refer to Accessories the section for further info on the accessories.
- Refer to the Maintenance and Installation chapters for information on the maintenance and installation procedures.
- Refer to the data sheets for the ordering codes.

3.2 Specific properties of the FRC light

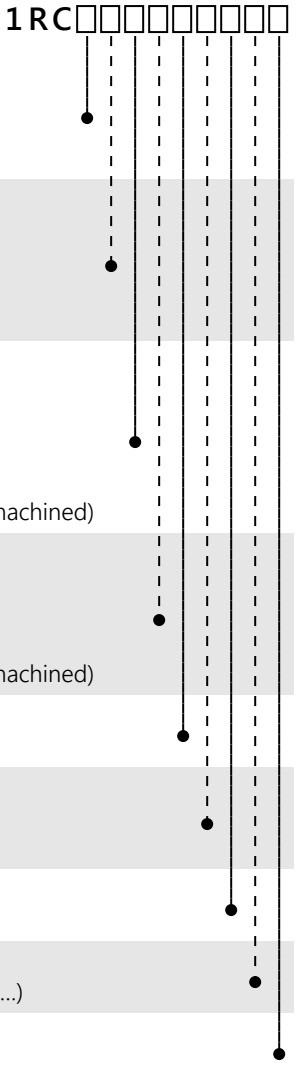
Uses

- Runway centerline

Find below the specific properties of each 8-inch F-Range FRC light:

Ordering Code FRC 8-inch

1 R C □ □ □ □ □ □ □ □ □



FITTING VERSION
A = ADB
F = French
G = German

LAMP POWER
1 = 1 X 48 W (without cut-out)
2 = 2 X 48 W (without cut-out)
4 = 1 X 48 W (with cut-out)
5 = 2 X 48 W (with cut-out)

COLOR LEFT
1 = White
2 = Red
4 = Yellow
8 = Blank (with blank filter)
9 = None (prism window in cover not machined)

COLOR RIGHT
1 = White
2 = Red
8 = Blank (with blank filter)
9 = None (prism window in cover not machined)

INSTALLATION
3 = Straight (No Toe-in)

SUPPLY
1 = 1 Plug
2 = 2 Plugs

BASE
1 = None

SPECIAL EXECUTIONS
0 = Standard (1RCA... 1RCE... 1RCF 1RCG...)

EXECUTIONS
3 = Without fixing hardware

Note

- Deep base and / or adapter rings to be ordered separately.
- Use of a cutout is not compatible with the *Lamp Fault Detection* (*LFD*) functionality of a regulator.

3.3 Specific properties of the FTD light

Uses

- Centerline taxiway, on straight and curved sections and on rapid exit taxiways
- Taxiway stop bar and intersection
- Apron lights, to assist aircraft docking maneuvers
- Because of their individually switchable light channels, their high light output and wide beam coverage, the lights are particularly well suited for use in SMGC and A-SMGC systems

Find below the specific properties of each 8-inch F-Range FTD light:

Ordering Code FTD 8-inch

1 T D □ □ □ □ □ □ □ □ □

FITTING VERSION
A = ADB
F = French
G = German

LAMP POWER
1 = 1 X 48 W (without cut-out)
2 = 2 X 48 W (without cut-out)
4 = 1 X 48 W (with cut-out)
5 = 2 X 48 W (with cut-out)

COLOR LEFT
2 = Red
3 = Green
4 = Yellow
8 = Blank (with blank filter)
9 = None (prism window in cover not machined)

COLOR RIGHT
2 = Red
3 = Green
4 = Yellow
8 = Blank (with blank filter)
9 = None (prism window in cover not machined)

LIGHT LOCATION
S = Straight
C = Curved

SUPPLY
1 = 1 Plug
2 = 2 Plugs

BASE
1 = None

SPECIAL EXECUTIONS
0 = Standard (1TDA... 1TDF... 1TDG...)

EXECUTIONS
3 = Without fixing hardware

Note

- Deep base and / or adapter rings to be ordered separately.
- Use of a cutout is not compatible with the *Lamp Fault Detection* (*LFD*) functionality of a regulator.

3.4 Specific properties of the FTZ light

Uses

- Touch down zone
- RETIL (Rapid Exit Taxiway Indicator Light)

Find below the specific properties of each 8-inch F-Range light:

Ordering Code FTZ 8-inch

1 T Z □□□□□□□□□

FITTING VERSION
A = ADB
F = French
G = German

LAMP POWER
1 = 1 X 48 W (without cut-out)
4 = 1 X 48 W (with cut-out)

COLOR LEFT
1 = White
2 = Red
3 = Green
4 = Yellow

COLOR RIGHT
9 = None

INSTALLATION
1 = Left of C / L (Toe-in right)
2 = Right of C / L (Toe-in left)
3 = Straight (No Toe-in)

SUPPLY
1 = 1 Plug

BASE
1 = None

SPECIAL EXECUTIONS
0 = Standard (1TZA... 1TZF... 1TZG...)

EXECUTIONS
3 = Without fixing hardware

Note

- Deep base and / or adapter rings to be ordered separately.
- Use of a cutout is not compatible with the *Lamp Fault Detection* (*LFD*) functionality of a regulator.

4.0 Installation

This chapter instructs you how to connect and mount the 8-inch F-Range inset lights, type FRC/FTZ/FTD, on their base or adapter ring.

It includes important safety instructions regarding the choice and use of fixing elements.

Parts identification symbols (e.g. A1, B4, ...) appearing in the text refer to the Exploded views section.

Note

It is assumed that the base supporting the 8" F-Range inset light, type FRC / FTZ / FTD, the secondary connector(s), and the adapter ring (if necessary) are already installed. All information pertinent to the installation of bases is available in the user manual UM-0106, RELIANCE Shallow Base, 8" Base and 12" Base for Ground Fixing of Inset Light Fixtures.

4.1 Safety instruction — Fixing elements

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.

WARNING

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 How to mount the light assembly? section for the tool to use, requirement description regarding the use of Loctite adhesives / sealants and the necessary torque to apply.

Do not insert a 3 / 8- to 16-inch UNC screw in a M10 threaded hole. Such a 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.

4.2 General recommendations regarding installation

4.2.1 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 content 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, 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.

4.2.2 Electrical connection

he light assemblies covered by this manual are designed for connection to 6.6 or 20-A series circuits via one (or more) L-830 or L-831 series transformer(s). The current to the light should not exceed 6.6A + 3%.

Note
In case of use on a 20 A series circuit, we consider that the series transformer is a 20 A / 6.6 A transformer.

The series transformers are to be ordered separately.

4.2.3 Base Earthing

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

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 user manual UM-0106.

4.3 How to mount the light assembly?

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

4.3.1 Use the correct fixing hardware

Please refer to Safety chapter.

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

In ADB SAFEGATE shallow bases delivered since mid-2006, the type of thread can be 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.

WARNING
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.

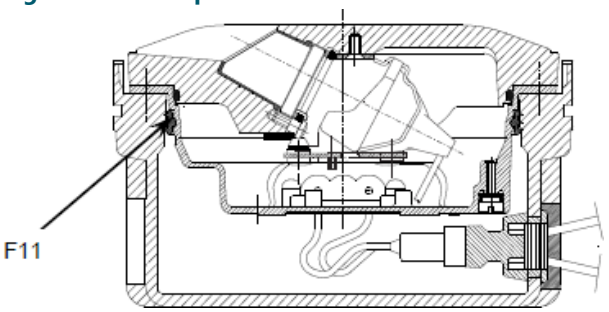
4.3.2 Installation procedure

NOTICE
Always take into account the information from the interoperability between light and base. Refer to appendix, INTEROPERABILITY section.

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 adhesives may be present in the fixation holes (depending on the type of base used). Always clean the fixation holes 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 (A2) is not installed, put a new, clean one in the dedicated groove at the cover periphery.

Figure 1: Fixture profile



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. Connect the light by inserting its plug into the receptacle of either the shallow base, the secondary cable or the transformer.
5. Apply Loctite on the three first threads of the threaded holes in the base, if necessary.

NOTICE

Refer to interoperability between light and base. Please find it in the appendix, INTEROPERABILITY section.

6. Gently install the light fixture; press it home in the adapter ring or base. Make sure not to drop the light assembly or to pinch the wires.

CAUTION

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.

Figure 2: Mounting procedure

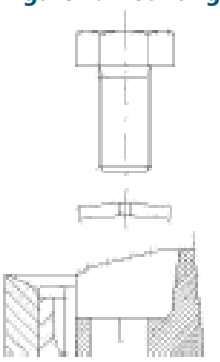
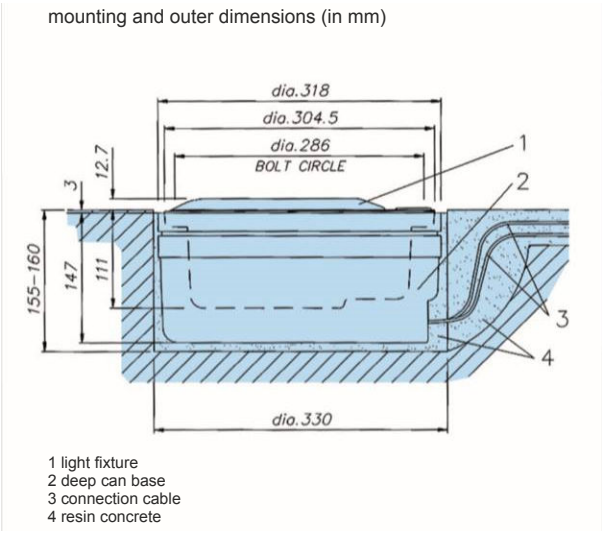


Figure 3: Installation drawing



8. Torque down gradually the 2 screws (or self-locking nuts in case of a stud-equipped base).

CAUTION
Make sure the screws are tightened with the correct torque.

NOTICE
Refer to interoperability between light and base. Please find it in the appendix, INTEROPERABILITY section.

4.4 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 adhesives 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 (NC 7835.55.151) or equivalent.
3. Apply Loctite adhesive on the three first threads of the threaded holes in the base, if necessary. Check the interoperability information in the appendix.

NOTICE
Refer to interoperability between light and base. Please find it in the appendix, INTEROPERABILITY section.

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

CAUTION
Make sure the screws are tightened with the correct torque.

5. Install the light as described above.

5.0 Maintenance

This chapter describes 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 is described in detail in Fixture and component related maintenance — detailed procedures section.

Parts identification symbols (e.g. A1, B4, ...) appearing in the text refer to the Exploded views section .

5.1 Overall maintenance — types and tasks

5.1.1 In the field 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 non-serviceable in the field.

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

5.1.2 Preventive maintenance — Part 1

The assembly's service life depends to a large extent on its watertightness. 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 the Exploded views section.

5.1.3 Preventive maintenance — Part 2

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 SAFEGATE .

Table 1: Preventive maintenance tasks

Interval	Check	Action
Daily	for lamp failure	Replace lamp and film disc cut-out (if any).
	for low light output	1. Clean outer surface of prism if dirty. 2. Check for misalignment or presence of moisture in fixture. 3. Check for lamp ageing or displacement
Weekly	for obstruction in light output channel	Clean channel and prism surface
Monthly	for presence of moisture or water (visual inspection on condensation inside of prisms)	1. Open up light assembly. 2. Clean, dry and inspect. 3. Replace O-ring and other parts found defective.

Table 1: Preventive maintenance tasks (Continued)

Interval	Check	Action
Bimonthly	torque on hold-down bolts	Refer to the section " How to mount the light assembly? ", for the tool to use. Please find the requirement for use of Loctite adhesives and the torque to apply in the appendix, INTEROPERABILITY section.
Semi-annually[1]	for presence of water in base	1. Pump water from base. 2. Remove, dismantle and inspect light for water damage. 3. Cure the cause of water ingress.
After 1200 hours of operation at 6.6 A	Replace lamps of complete subsystems (e.g. R/W centerline)	It is recommended to replace the lamps systematically when 80 % of the useful life has been reached. At full brightness (6.6 A), it represents 1200 hours, but, in practice, life spans of 3000 to 6000 hours can be expected.
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

5.2 Fixture and component related maintenance — detailed procedures

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

All the screws used in this product are listed at the spare parts section of this manual.

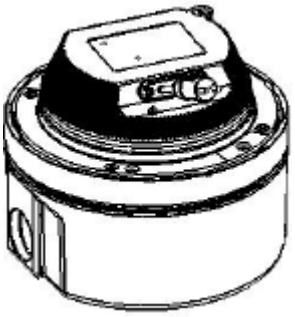
Note
Refer to the Screws used in F-Range 8-inch section for the tool to use and the torque to apply.

5.2.1 How to open the light assembly

To open the light assembly, proceed as follows (for the tools to use, refer to Screws used in F-Range 8-inch section):

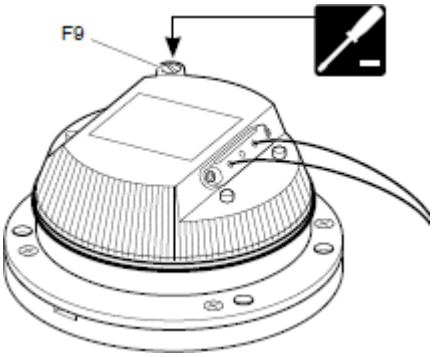
1. Turn the light unit upside-down. In order for the light to rest on a stable surface it is advised to lay it upside down on the top of a shallow base.

Figure 4: Light opening procedure 1



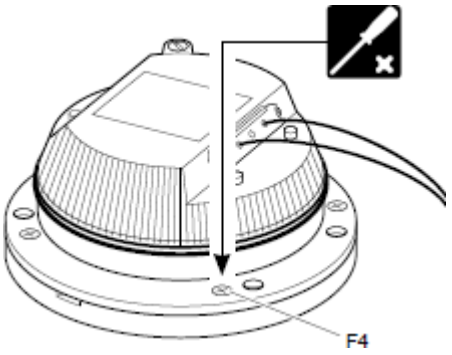
2. Remove the pressure release screw (F9).

Figure 5: Light opening procedure 2



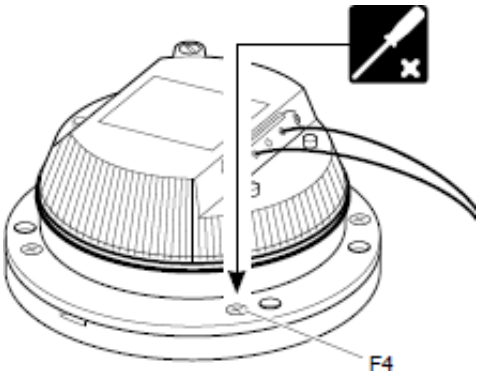
3. Remove the four cross recessed pan head screws (F4). The use of an attack driver may be required to unlock the screws.
   - Always use a new bit for each light requiring the use of an attack driver.
   - Take care that the bit is well positioned on the screw head and that the driver is aligned with the axis of the screw.

Figure 6: light opening procedure 3



4. Introduce the special opening tool in the dedicated slot between cover and inner cover and rotate it to separate the inner cover from the cover.

Figure 7: light opening procedure 4



5.2.2 How to lift the light fixture out of the base or adapter ring

5.2.2.1 Lifting tool

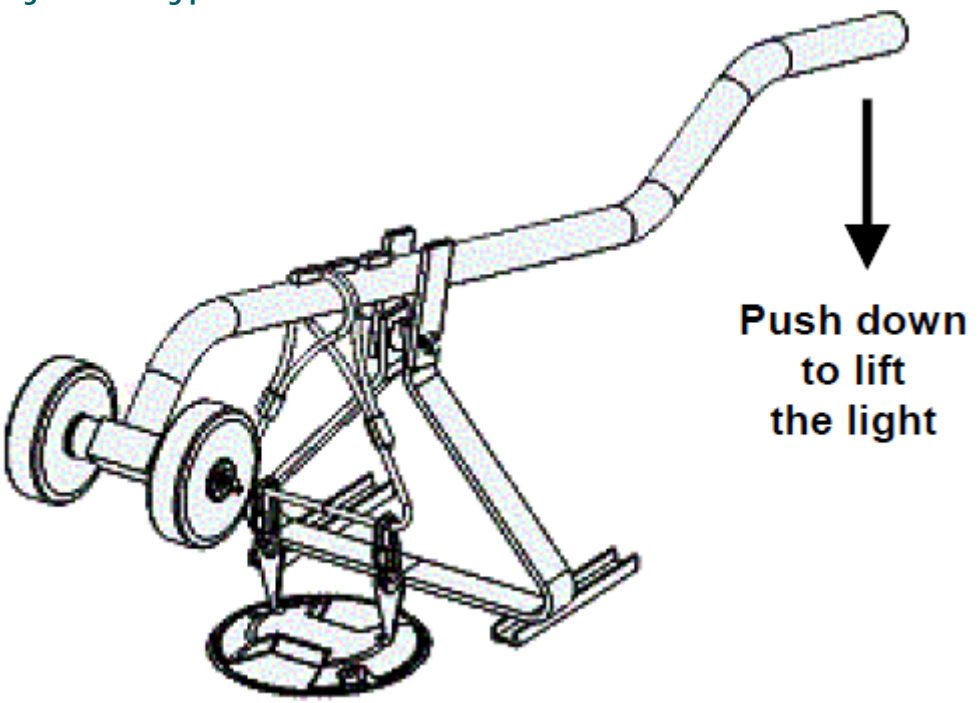
Beside the simple jig delivered with the standard tool case, ADB SAFEGATE has developed a more sturdy and efficient lifting tool (see illustration below). See Accessories section for references.

5.2.2.2 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.

Figure 8: Lifting procedure



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 How to mount the light assembly? section.
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.

5.2.3 How to replace a lamp

5.2.3.1 Film disc cut-out

Remember

When installed, always replace the film disc cut-out each time a lamp has to be replaced.

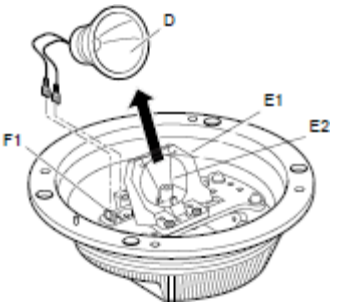
5.2.3.2 Procedure

To replace a lamp, proceed as follows (for the tools to use, refer to Screws used in F-Range 8-inch section):

1. Disconnect the fast-on connectors of the lamp from the terminal block (E1).
2. Release the lamp spring (E2).

3. Remove the lamp (D) from the lamp holder (E1), holding the reflector.

Figure 9: Lamp replacement procedure 1



4. If a cut-out is used, remove it by loosening the screw which secures the cut-out clip to the terminal block (F1) and rotate cut-out clip free.
5. If a cut-out is used, position a new disc (small button side up) in the terminal block. Rotate the cut-out clip on top of the cut-out and hold while tightening the screw. Make sure that the pressure applied by the clip on the film disc is sufficient to assure good contact. If loosened, remove the clip and bend it slightly to increase its pressure.
6. Install a new lamp.

   To optimise photometric output, make sure that the lamp is correctly positioned with the "arrow" pointing upside (up).

Figure 10: Lamp replacement procedure 2

CAUTION

Never touch the quartz bulb of the lamp with your bare fingers. It would reduce the lifetime of the lamp considerably. Should it happen, clean the bulb with methylated spirit.

7. Reassemble in reverse order.

NOTICE

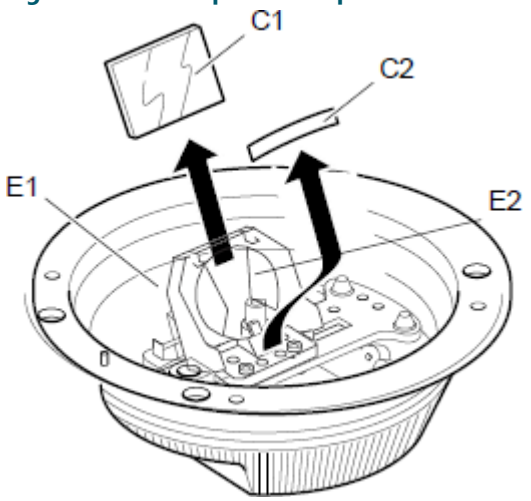
Make sure there is good contact between fast-on connectors and terminals.

5.2.4 How to replace a filter

To replace a filter, proceed as follows:

1. Release the lamp spring (E2).

Figure 11: Filter replacement procedure



2. Lift the filter (C) and the filter spring (C2) out of the lamp holder (E1).
3. Put a new filter in the lamp holder
4. Secure the springs (E2 and C2)

5.2.5 How to replace a prism

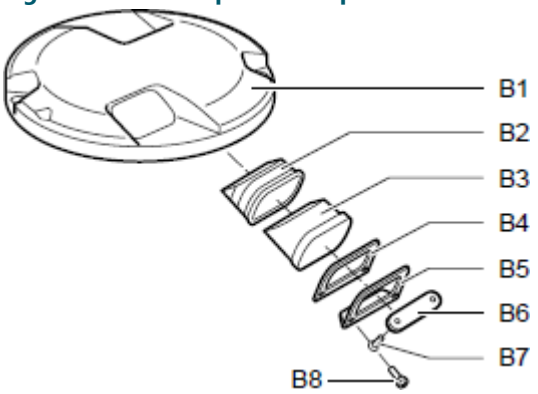
To replace a prism, proceed as follows:

The use of an attack driver may be required to unlock the screws fastening the prism.

- 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.

1. Remove the prism clamp plate (B6) secured in the cover.

Figure 12: Prism replacement procedure



2. Remove the prism keeper plate (B5) and the flat gasket (B4).
3. Push the prism (B3) with the sleeve gasket (B2) towards the inside of the cover.
4. Clean and degrease the prism chamber with any effective solvent.

CAUTION

Never use any abrasive substance.

Remnants of Loctite are present in the fixation holes of the screws B7 and B8. 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.

5. Apply a thin layer of lubricant MOLYKOTE HP870 INERTA (ADB PN 7850.05.061) in the prism chamber using a small brush.
6. Bring a new sleeve gasket over the new prism.
7. Push the prism/gasket assembly home in the prism chamber from the inside and clean the inner surface of the prism.
8. Mount a new flat gasket (B4) under the prism-keeper plate (B5).
9. Introduce new screws (B8) and turn them by a few turns only.
10. Fit the prism clamp plate (B6) in the appropriate recess in the cover.
11. Secure it to the cover by means of new screws (B7).
12. Torque down the 4 B7 and B8 screws.

Note
Refer to the Screws used in F-Range 8-inch section for the tool to use and the torque to apply.

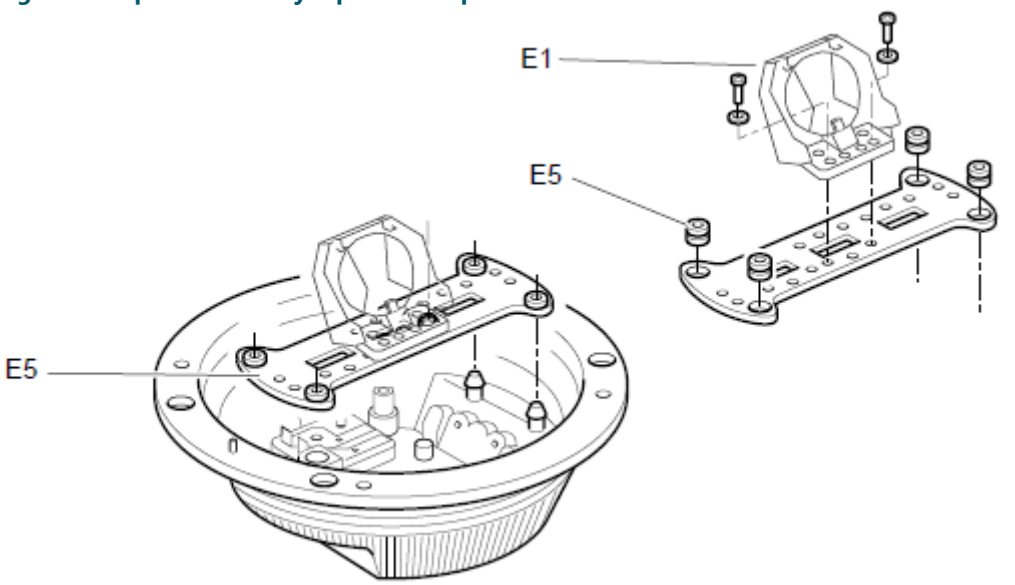
5.2.6 How to replace the optical assembly

5.2.6.1 Procedure

To replace the optical assembly, proceed as follows:

1. Remove the lamp (D) as explained in the Procedure section.
2. Remove the optical assembly (E1+E5) by lifting it up from the inner cover (F3) manually.

Figure 13: Optical assembly replacement procedure



3. Position the lamp holder (E1) on the optical support (E5) as described in the illustration the Positioning the lamp holder section.

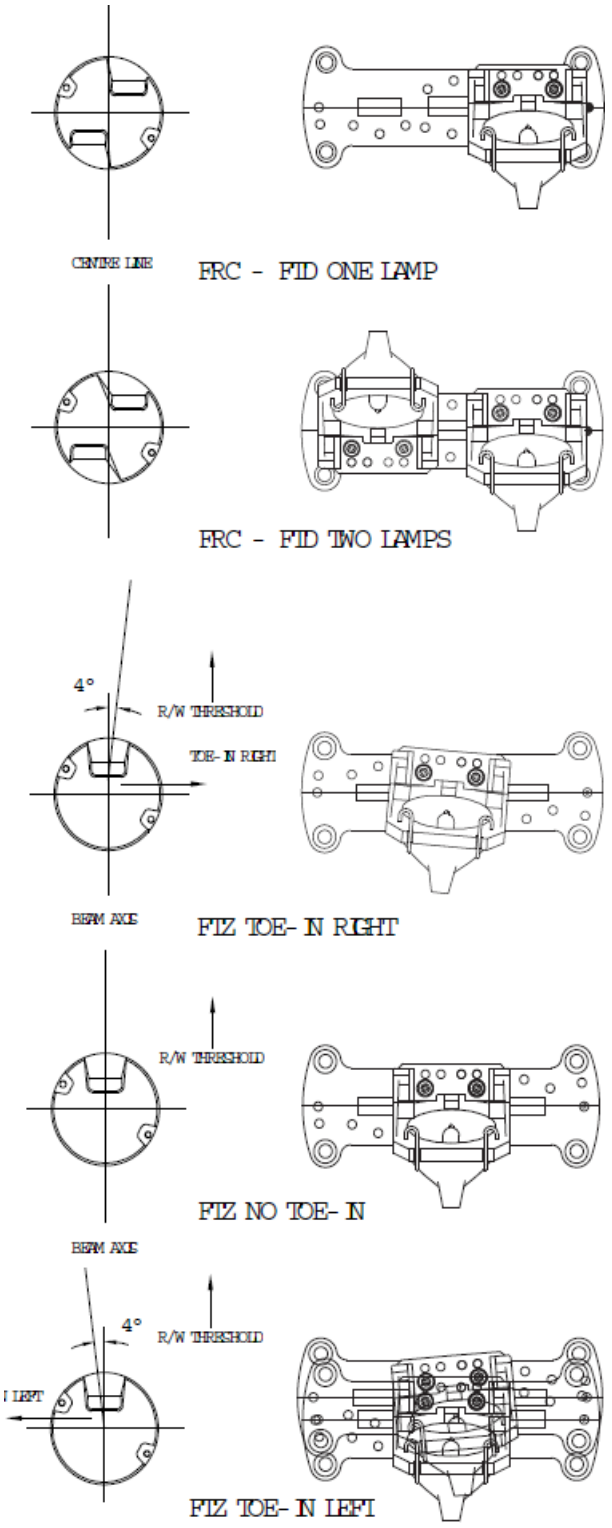
   Only if the optical assembly is assembled on site!
4. Install the new optical assembly with new dampers (grommet E6).
5. Clip the optical assembly to the studs on the inner cover.
6. Reinstall the lamp (D) as described in the Installation chapter.

Note

Refer to the table Screws used in F-Range 8-inch for the tool to use and the torque to apply.

5.2.6.2 Positioning the lamp holder

Figure 14: Lamp holder positioning procedure



5.2.7 How to replace the cable set assembly

5.2.7.1 Cable sets

Restriction

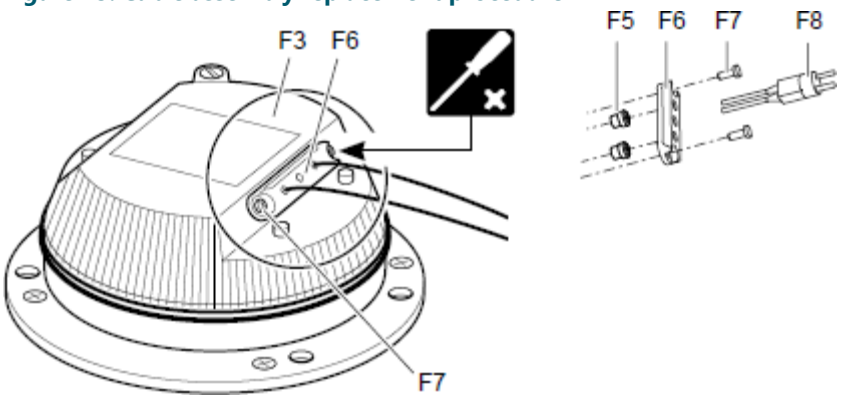
Only use ADB SAFEGATE cable sets. Usage of substitutes voids the warranty.

5.2.7.2 Procedure

To replace the cable set assembly, proceed as follows:

1. Remove the optical assembly as described How to replace the optical assembly section.
2. Remove both screws (F7) and the wire clamp (F6).

Figure 15: Cable assembly replacement procedure



3. Cut the fast-on connectors (F2) from the cable assembly (F8).
4. Pull the cable assembly out of the inner cover and discard the grommets (F5).
5. Bring the new ADB cable assembly through the wire clamp (F6)

CAUTION

Use only one wire per hole.

NOTICE

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

6. Put a new wire grommet (F5) on each of the wires, taking care of the direction (the smaller diameter into the inner cover recesses).
7. Introduce the wires in the inner cover (F3).
8. Reinstall the wire clamp (F6) by means of both screws (F7).
   Do not torque down the screws entirely at this step.
9. Remove the insulation of the wires over about 5 mm.
10. Crimp on new fast-on connectors (F2- ADB CN 6111.87.140) and connect to the terminals. Adjust the wires inside the inner cover.
11. Torque the screws (F7).

Note

Refer to the table Screws used in F-Range 8-inch for the tool to use and the torque to apply.

5.2.8 How to close and test the light fixture

Important

Always replace cover / inner cover gasket and fixing screws by new ones!

To close the light fixture, proceed as follows:

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.

   Figure 16: Closing procedure 1

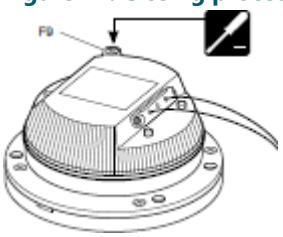
2. Make sure that the contact surfaces with the O-ring are clean.

   Remnants of Loctite may be present in the fixation holes of the screws E10. 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 (B9) greased with high quality neutral silicone grease (PN 7850.42.210) over the cover in the appropriate groove.

4. Remove the pressure release screw (F9).

   Figure 17: Closing procedure 2

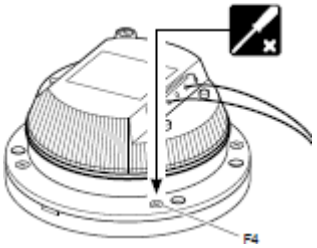
   

5. Gently put the inner cover (F3) on top of the cover, taking into account the keying pin between both parts. Make sure the optical assembly (E5) and the lamp (D) are correctly positioned and that the wires do not get damaged between both parts: cover (B1) and inner cover (F3).

6. Press the inner cover (F3) on the cover (B1)and secure it with the screws (F4).

   Note

   Refer to the table in the Screws used in F-Range 8-inch section for the tool to use and the torque to apply.

7. Check electrical insulation from two-pole plug to frame by means of a 500V insulation tester.

   Apply an AC or DC voltage not exceeding 6 V across the two-pole plug and observe normal operation of the lamp.

8. Check watertightness 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 SAFEGATE (see ordering code in Spare partschapter).

9. Replace the O-ring seal of the pressure release screw (F9) and secure the pressure release screw.

Note
Refer to the Screws used in F-Range 8-inch section for the tool to use and the torque to apply.

5.3 Product Troubleshooting

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.

Table 2: Troubleshooting

Problem	Possible cause	Solution
Lamp(s) do(es) not energize.	Lamp(s) defective	1. Replace lamp(s). 2. Replace film disc cut-out (when used)
	Loose or broken contact	Tighten or replace the contacts.
	Moisture inside assembly causing current leakage	1. Open light assembly. 2. Clean, dry, inspect or replace damaged components.
	Defective cable assembly or defective crimping	1. Open light assembly. 2. Replace cable assembly.
	Defective isolation transformer	Check transformer output current with Am meter. Check power line between the light fixture and the transformer, including connectors.
Lamp(s) do(es) not energize at normal level.	Resistance too high or partial short circuit. Dirty lens. Defective isolation transformer.	1. Replace cable assembly or inner cover assembly. 2. Replace lamp(s) and/or transformer(s). 3. Clean prisms and check orientation.
Light beam distorted	Broken or damaged prism/ cover	1. Replace prism or entire outer cover assembly. 2. Check lamp positioning.
Improper color	Wrong filter	Replace filter.
	Broken filter	1. Replace filter. 2. Check spring.
	Broken filter bracket	Replace filter and filter bracket.

Table 2: Troubleshooting (Continued)

Problem	Possible cause	Solution
Short lamp life	Too high current (lamp will have black burns)	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 assembly	1. Open light assembly. 2. Clean, dry, inspect or replace damaged components.
	Defective lamp or lamp bulb touched with bare hands (lamp interior will have a white powdery appearance if air has entered through a hole or crack)	1. Replace lamp. 2. If used, replace film disc cut-out.

5.4 Accessories

In the lists below you will find useful accessories for the installation, maintenance and repair of the F-RANGE 8-inch inset lights, type FRC / FTZ / FTD.

5.4.1 Tool case

ADB SAFEGATE 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 F-RANGE 8-inch lights, type FRC / FTZ / FTD). The table below lists the tools included in the case:

Table 3: Maintenance tools overview

Description	Part Number	Description	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

5.4.2 Additional accessories

The following accessories can be purchased separately:

Table 4: Additional accessories overview

Description	Part Number
Watertightness test adapter for inset lights	1411.17.100
Set of spare anchor hooks for lifting tool 1411.19.550	1411.19.560
Lifting tool on wheels (see illustration page 20)	1420.55.600

5.4.3 Fixing elements

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 in Fixing hardware kits section.

6.0 Spare parts

In this chapter you will find an overview of the main and sub-assemblies and the exploded views of the 8-inch F-RANGE inset lights.

Tip

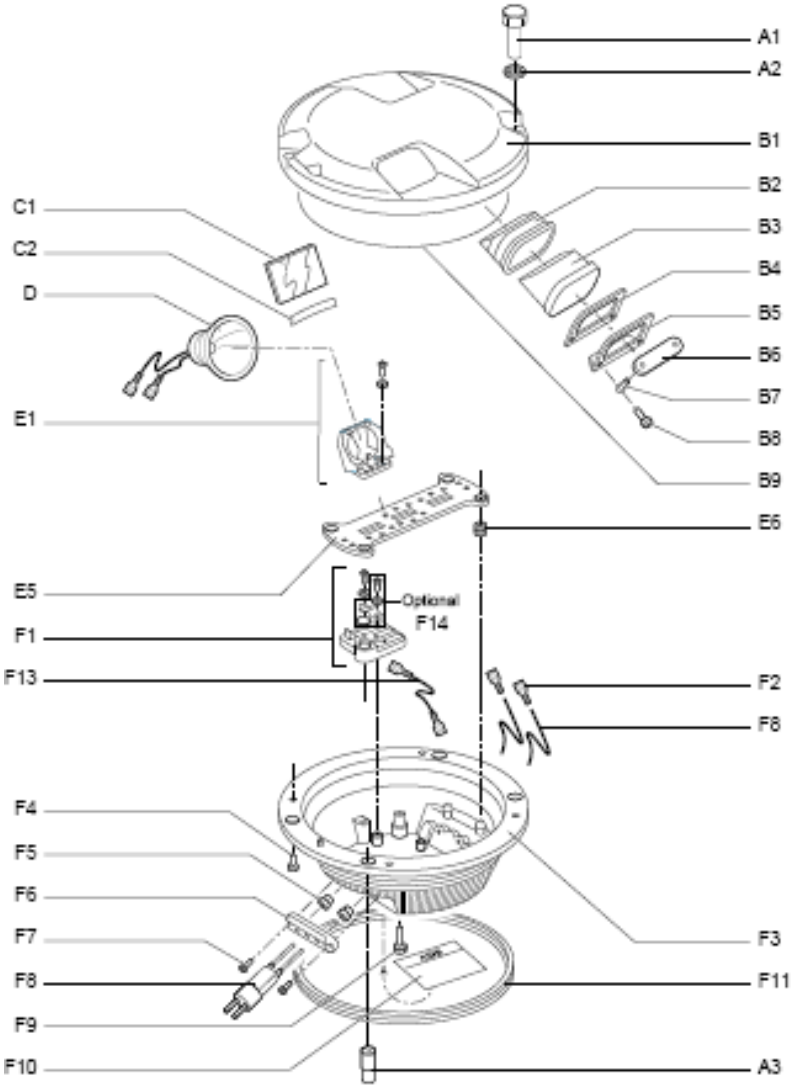
It is recommended to create a sufficiently large stock of spare parts to maintain the fittings. It will mainly consist of consumables like lamps, O-ring gaskets, film disc cut-outs, etc. Other components that may need replacement, such as prisms, prism gaskets, terminal blocks and hardware even as sub-assemblies should be stocked in smaller quantities. The stock should also contain some complete fittings of each type.

6.1 Exploded views

6.1.1 8-inch F-Range FRC and FTD

The illustration below represents the exploded view of an 8-inch F-Range inset light, type FRC and FTD [1]:

Figure 18: 8-inch F-Range inset light - Exploded View 1

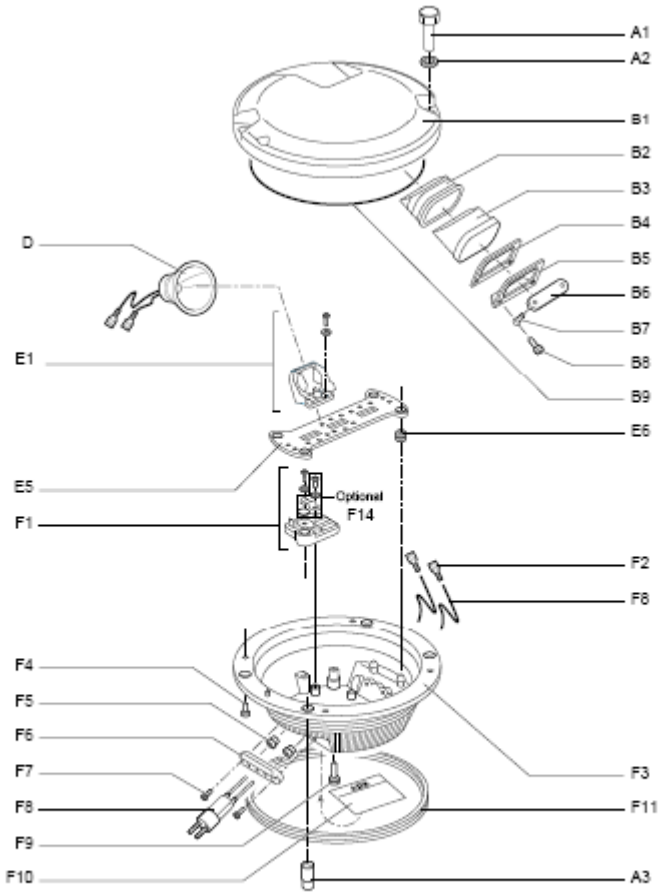


[1] Part references are those used throughout the text of this manual.

6.1.2 8-inch F-Range FTZ

The illustration below represents the exploded view of an 8-inch F-Range inset light type FTZ [2]:

Figure 19: 8-inch F-Range inset light - Exploded View 2



[2] Part references are those used throughout the text of this manual.

6.2 Complete Fixtures

6.2.1 Fixtures and main assemblies — part 1

In the table below you will find all fixtures and main assemblies of the 8" F-Range type FRC / FTZ / FTD inset lights (standard versions):

Table 5: Fixtures and main assemblies of 8" F-Range inset lights; standard versions

Fixtures				Main assemblies		
Category	**Description**	**Previous ordering code**	**Ordering code**	**Cover**	**Optical assy**	**Inner cover**
FRC	RWY C/L (1inlet)	FRC-2-090-CC-I-0	1RCA21131103	1411.20.021	1411.22.022	1411.24.121
		FRC-2-090-CR-I-0	1RCA21231103	1411.20.021	1411.22.022	1411.24.121
FTZ	Touch-down	FTZ-1-045-C-L-I-0	1TZA11911103	1411.20.111	1411.22.662	1411.24.011
		FTZ-1-045-C-R-I-0	1TZA11921103	1411.20.111	1411.22.672	1411.24.001
		FTZ-1-045-C-O-I-0	1TZA11931103	1411.20.111	1411.22.682	1411.24.011
FTD Taxi-ways (2 inlets)	straight	FTD-2-090-S-GG-II-0	1TDA233S2103	1411.20.151	1411.22.022	1411.24.201
		FTD-2-090-S-YY-II-0	1TDA244S2103	1411.20.151	1411.22.022	1411.24.201
		FTD-2-090-S-GY-II-0	1TDA234S2103	1411.20.151	1411.22.022	1411.24.201
	curved	FTD-2-090-C-GG-II-0	1TDA233C2103	1411.20.171	1411.22.022	1411.24.231
		FTD-2-090-C-YY-II-0	1TDA244C2103	1411.20.171	1411.22.022	1411.24.231
		FTD-2-090-C-GY-II-0	1TDA234C2103	1411.20.171	1411.22.022	1411.24.231
FTD Stop-Bars	Straight curved	FTD-1-045-S-RN-I-0	1TDA129S1103	1411.20.161	1411.22.012	1411.24.221
		FTD-1-045-C-RN-I-0	1TDA129C1103	1411.20.181	1411.22.012	1411.24.251
		FTD-1-045-C-NR-I-0	1TDA192C1103	1411.20.191	1411.22.012	1411.24.251

Note

Complete lights are delivered without fixing screws and nuts. This hardware is delivered together with the mounting system (base or adapter ring), or can be ordered separately (see Fixing hardware kits section).

6.2.2 Fixtures and main assemblies — part 2

In the table below you will find all fixtures and main assemblies of the 8" F-Range type FRC / FTZ / FTD inset lights (special versions):

Table 6: Fixtures and main assemblies of 8" F-Range inset lights; special versions

Fixtures				Main assemblies		
Category	**Description**	**Previous ordering code**	**Ordering code**	**Cover**	**Optical assy**	**Inner cover**
FRC	RWY C/L (2 inlets)	FRC-2-090-CC-II-0	1RCA21132103	1411.20.021	1411.22.022	1411.24.111
		FRC-2-090-CR-II-0	1RCA21232103	1411.20.021	1411.22.022	1411.24.111
	RWY C/L uni- directional	FRC-1-045-CN-I-0	1RCA11931103	1411.20.031	1411.22.012	1411.24.101
		FRC-1-045-RN-I-0	1RCA12931103	1411.20.031	1411.22.012	1411.24.101
FTD Taxi- ways (1 inlet)	straight	FTD-2-090-S-GG-I-0	1TDA233S1103	1411.20.151	1411.22.022	1411.24.211
		FTD-2-090-S-YY-I-0	1TDA244S1103	1411.20.151	1411.22.022	1411.24.211
		FTD-2-090-S-GY-I-0	1TDA234S1103	1411.20.151	1411.22.022	1411.24.211
	curved	FTD-2-090-C-GG-I-0	1TDA233C1103	1411.20.171	1411.22.022	1411.24.241
		FTD-2-090-C-YY-I-0	1TDA244C1103	1411.20.171	1411.22.022	1411.24.241
		FTD-2-090-C-GY-I-0	1TDA234C1103	1411.20.171	1411.22.022	1411.24.241

Note

Complete lights are delivered without fixing screws and nuts. This hardware is delivered together with the mounting system (base or adapter ring), or can be ordered separately (see Fixing hardware kits).

6.3 Fixing hardware kits

In the table below you will find the fixing kits of 8" and 12" F-Range inset lights: The choice for hardware kit depends on several criteria : the used thread in the base (metric of UNC), the use of screws or studs and the base itself (refer to interoperability matrix)

Table 7: Fixing hardware kits of F-Range inset lights

METRIC FIXING HARDWARE KITS								
Fixing hardware kit			**Components**					
Description	**Part Number**	**7100.08.759 St.Steel Screw M10 X25**	**7150.53.320 St. Steel Nut M10**	**7150.53.330 St.St.Steel Self-locking Nut M10 H100**	**7150.53.335 St.St. Self-locking Nut M10 H80**	**7284.10.470 St. Steel Lock Washer M10**	**7284.70.345 Nylon Encap. Washer M10**	**4071.50.240 Metric Anti-Rotation Pin**
For mounting 8" inset lights on to 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 (H100)"	1411.20.430			2				
Self - locking metric nut kit 8" (H80)	1411.20.435				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 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" (H100)	1411.20.500			6				
Self-locking metric nut kit 12" (H80)	1411.20.505				6			

Notes

1 **Note (1): HPI bases only accept Metric hardware**

UNC FIXING HARDWARE KITS							
Fixing hardware kit			**Components**				
Description	**Part Number**	**7200.13.806 St. St. Screw 3/8" - 16 UNC**	**7284.10.470 St.Steel Lock Washer M10**	**4027.50.120 UNC Anti-Rotation Pin**			
For mounting 8" inset lights on 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 12" shallow or deep bases							
UNC screw kit 12"	1411.20.452	6	6				

6.4 Components

6.4.1 FRC, FTZ, FTD cover components

In the table below you will find the components and main assemblies of the 8-inch F-Range covers, type FRC / FTZ / FTD:

Table 8: Components and main assemblies of the 8-inch F-Range covers

No.	Part Number	Description	1411.20.xxx							
			021	031	111	151	161	171	181	191
B1	SP.4071.50.012	machined FRC bidirectional cover	1							
B1	SP.4071.50.222	machined FRC unidirectional cover		1						
B1	SP.4071.50.312	machined FTZ cover			1					
B1	SP.4071.52.812	machined FTD bidirectional cover				1		1		
B1	SP.4071.56.902	machined FTD unidirectional cover straight and curved with right blank window					1			1
B1	SP.4071.56.922	machined FTD unidirectional cover curved with left blank window							1	
B2	SP.011935(10 pcs)	prism sleeve gasket	2	1	1	2	1	2	1	1
B3	SP.010559 (10 pcs)	FRC / FTZ prism	2	1	1					
B3	SP.010563 (10 pcs)	FTD straight section prism				2	1			
B3	SP.010564 (10 pcs)	FTD curved section prism						2	1	1
B4	SP.010759 (10 pcs)	flat prism gasket	2	1	1	2	1	2	1	1
B5	SP.010760 (10 pcs)	prism keeper plate	2	1	1	2	1	2	1	1
B6	SP.010767 (10 pcs)	prism clamp	2	1	1	2	1	2	1	1
B7	SP.7100.10.190 (100 pcs)	SCREW M5x10 DIN 965-T-A2-LOCK 2045	4	2	2	4	2	4	2	2
B8	SP.4071.53.703 (100 pcs)	SCREW M5x13 DIN 7985-T-A2-LOCK 2045	4	2	2	4	2	4	2	2
B9	SP.7080.90.335 (10 pcs)	O-ring gasket between cover and inner cover	1	1	1	1	1	1	1	1

6.4.2 8-inch F-Range optical assemblies and lamps

In the table below you will find the components of the 8-inch F-Range optical assemblies and lamps, type FRC / FTZ / FTD:

Table 9: Components of the 8-inch F-Range optical assemblies and lamps

No.	Part Number	Description	Filters				
			FRC	FTZ	FTD		
C1	SP.010583 (10 pcs)	green absorption filter		x	x		
C1	SP.010584 (10 pcs)	yellow absorption filter		x	x		
C1	SP.010585 (10 pcs)	red absorption filter	x		x		
C2	SP.4071.50.160 (10 pcs)	filter spring	x	x	x		
			Number of lamps				
D	SP.011851 (10 pcs)	cold mirror prefocus halogen lamp 48 W to 6.6 A to 1500 hrs	1/2	1	1/2		
			1411.22.xxx				
			012	022	662	672	682
E1	1411.22.002	Lamp support assembly	1	2	1	1	1
E5	SP.4071.50.141	optical support	1	1	1	1	1
E6	SP.010736 (100 pcs)	Vibration damper grommet	4	4	4	4	4

6.4.3 8-inch F-range inset lights inner covers

In the table below you will find the components of the 8-inch F-range inset lights inner covers, type FRC / FTZ / FTD:

Table 10: Components of the 8-inch F-range inset lights inner covers

No.	Part Number	Description	1411.20.xxx							
			001	011	101	111	121	201	211	221
F1	1411.21.000	terminal block assembly with fixing hardware and with cut-out	1	1	1	2	2	2	2	1
F1	1411.21.010	terminal block assembly with fixing hardware and w/o cut-out	1	1	1	2	2	2	2	1
F1	1411.21.200	cut-out kit to install on existing terminal block	1	1	1	2	2	2	2	1
F2	SP.013068 (100 pcs)	female fast-on connector	2	2	2	4	2	4	4	2
F3	SP.4071.50.083	inner cover machined for one cable inlet	1	1	1		1		1	1
F3	SP.4071.59.041	inner cover machined for two cable inlets				1		1		
F4	SP.7100.10.190 (100 pcs)	SCREW M5x10 DIN 965-T-A2-LOCK 2045	4	4	4	4	4	4	4	4
F6	SP.010762 (100 pcs)	wire clamp	1	1	1	2	1	2	2	1
F7	SP.7110.08.360 (100 pcs)	SCREW M4x10 DIN 7500CE-T-A2	2	2	2	4	2	4	4	2
F8	SP.013033 (5 pcs)	Kit FAA PLUG STYLE 6 400MM PTFE	1	1	1	2	1	2	2	1
F9	SP.010869 (10 pcs)	O-ring /Pres. Release Screw Assy	1	1	1	1	1	1	1	1

Table 10: Components of the 8-inch F-range inset lights inner covers (Continued)

No.	Part Number	Description	1411.20.xxx							
			001	011	101	111	121	201	211	221
F10		name plate	1	1	1	1	1	1	1	1
F11	Refer to the appendix, INTEROPERABILITY section.	labyrinth gasket	1	1	1	1	1	1	1	1
F13	SP.010411 (10 pcs)	Connecting wire					1		1	
F14	1420.22.410	film disc cut-out	opt.	opt.	opt.					

6.5 Screws used in F-Range 8-inch

The table below gives for each screw used in F-Range 8-inch type FRC-FTZ-FTD lights, the reference on the Exploded view, the type of screw, the tool to use and the torque:

Table 11: Screws and references

Screw	Tool	Torque
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"	Refer to the appendix, INTEROPERABILITY section.
B7 - 7100.10.190-SCREW M5x10 DIN 965-T-A2-LOCK 2045	Torx25	3.5 NM/ 31 LB.in
B8 - 4071.53.703 -SCREW M5x13 DIN 7985-T-A2-LOCK 2045	Torx25	3.5 NM/ 31 LB.in
E1, E3 – 7100.08.360 - SCREW M4x10 DIN 7500CE-T-A2	Torx20	3.3 NM/ 30 LB.in
F4 - 7100.10.190 -SCREW M5x10 DIN 965-T-A2-LOCK 2045	Torx25	2.5 NM/ 23 LB.in
F7 - 7100.08.360 -SCREW M4x10 DIN 7500CE-T-A2	Torx20	3.5 NM/ 31 LB.in
F9 - 4070.77.150 - pressure release screw	1.6x8 Flat	2.5 Nm/ 23 Lb.in
Self-locking nut (M10)	Socket hex 17mm	Refer to the appendix, INTEROPERABILITY section.
Screws delivered for installation of adapter ring on deep base	Socket hex 17mm or Socket hex 9/16"	Refer to the appendix, INTEROPERABILITY section.

Appendix A: INTEROPERABILITY

1

Note
Note that fixtures produced before 2019 are not suitable for all bases. See footnote.

ADB SAFEGATE Interoperability

Table 12: Interoperability matrix

Base type	Required O-ring	Bolt installation		Stud installation	
		Required dimension	Recommended torque	Required nut	Recommended torque
ADB 8" Eurobase; ADB 8" HPI; Adapter ring ADB 8" to 12"	White labyrinth gasket 4072.76.560 / 10 pc 4072.76.570 / 100 pc	1411.20.522 Metric screw kit 8" M10x25 mm	21 Nm+Loctite 2701	1411.20.430 Self-locking nut kit 8" M10xH100	21 Nm Do not use Loctite or washer with self-locking nut
Safegate 8"-135mm[1] RELIANCE base 8" 135 mm[1]	White labyrinth gasket 4072.76.560 / 10 pc 4072.76.570 / 100 pc	1411.20.522 Metric screw kit 8" M10x25 mm	40 Nm+locking washer (max height 2 mm)	1411.20.435 Self-locking nut kit 8" M10xH80	35 Nm
ERNI 8" EE08 150 mm[1] ERNI 8" ED08 133 mm	RED labyrinth gasket 4072.76.580 / 10 pc 4072.76.590 / 100 pc	1411.20.522 Metric screw kit 8" M10x25 mm	40 Nm+locking washer (max height 2 mm)	1411.20.435 Self-locking nut kit 8'' M10xH80	35 Nm
THORN 8" 100 mm[1]	Dep. On Installation Plugs Grey O-ring SGE.SP24522 / 10 pc SGE.SP24525 / 100 pc	Dep. On Installation Plugs 1411.20.522 Metric screw kit 8'' M10x25 mm	Dep. On Installation Plugs 40 Nm+locking washer (max height 2 mm)	Dep. On Installation Plugs 1411.20.435 Self-locking nut kit 8'' M10xH80	Dep. On installation plugs 35 Nm (No loctite)
THORN 8" 133 mm	Grey O-ring SGE.SP24522 / 10 pc SGE.SP24525 / 100 pc	1411.20.522 Metric screw kit 8'' M10x25 mm	40 Nm+locking washer (max height 2 mm)	1411.20.435[1] Self-locking nut kit 8''[1] M10xH80[1]	35 Nm[1]
THORN 8" MK2 133 mm	White labyrinth gasket 4072.76.560 / 10 pc 4072.76.570 / 100 pc	1411.20.522 Metric screw kit 8'' M10x25 mm	40 Nm+locking washer (max height 2 mm)	1411.20.435[1] Self-locking nut kit 8''[1] M10xH80[1]	35 Nm[1]
IDM 6494 120 mm[1] Adapter ring SG / Thorn / ID 8" to 12"[1]	White labyrinth gasket 4072.76.560 / 10 pc 4072.76.570 / 100 pc	1411.20.522 Metric screw kit 8'' M10x25 mm	40 Nm+locking washer (max height 2 mm)	1411.20.430 Self-locking nut kit 8'' M10xH100	35 Nm

Note
Contact your ADB SAFEGATE Sales representative for more information.

[1] Not for fixtures produced before 2019.

Appendix B: POWER TABLE

F-RANGE 8-inch inset Fixtures – Power Table

Fixture type	Fixture load	Isolation transformer			CCR load
		Rating	Loss	Efficiency	
FRC (unidirectional)	48 VA	45 W	9 VA	0.85	57 VA
FRC (bidirectional)	96 VA	100 W	11 VA	0.9	107 VA
FTD (unidirectional)	45 VA	45 W	9 VA	0.85	54 VA
FTD (bidirectional)	90 VA	100 W	10 VA	0.9	100 VA
FTZ (unidirectional)	48 VA	45 W	9 VA	0.85	57 VA

Note

- Extra losses in secondary cables or due to extra equipment (e.g. ILCMS remotes) are not included in above table; these extra losses will result in a higher required size of isolation transformers.
- Extra losses in primary cables are not included in above table; these extra losses will result in a higher required CCR load.
- Efficiency of the secondary transformer depends on the supplier of secondary transformers.

Appendix C: CABLE LOSS

The cable resistance R (Ohms) for 1 conductor is calculated with following formula:

- R (Ohms) = resistivity of material (Ohm m) * Length (m) / cross sectional area (m^2)
- for copper conductors the resistivity is 1.72 10-8 (m^2)

For example for 1km 2.5 mm^2 copper cond., the resistance R is calculated like this:

1.72 10-8 * 1000 / 2.5 10-6 m^2 = 6.88 Ohms

The loss (Watt) is then R * I^2 or 6.88 Ohms * 6.6^2 A^2 = 299.69 W / km or 0.299 W / m.

The loss (Watt) for a secondary cable with 2 conductors is thus 2 * 0.299 = 0,599 or 0,6 W / m.

As such we can calculate:

- for a 2.5 mm2 Cu-wire (2 conductors) : 0.6 W / m
- for a 4 mm2 Cu-wire (2 conductors) : 0.4 W / m
- for a 6 mm2 Cu-wire (1 conductor): 0,12 W/m

The cable between the isolation transformer and the lamp adds losses that cannot be ignored when dimensioning the circuits and selecting rating for secondary transformers and regulators.

NOTICE

Secondary cable lengths should not exceed 100 m.

For a secondary cable of e. g. 20 m of 2.5 mm^2 CU-wire, 20 m * 0.6 W / m = 12 W equals the additional loss to be taken into account.

For a primary cable of e. g. 100 m of 6mm^2 CU-wire, 100 m * 0,12 W / m = 12 W equals the additional loss to be taken into account.

Appendix D: SUPPORT

Our experienced engineers are available for support and service at all times, 24 hour/7 days a week. They are part of a dynamic organization making sure the entire ADB SAFEGATE is committed to minimal disturbance for airport operations.

ADB SAFEGATE Support

Live Technical Support - Americas
If at any time you have a question or concern about your product, just contact ADB SAFEGATE's technical service department. Trained in all areas of system issues, troubleshooting, quality control and technical assistance, our highly experienced Technical support specialists are available 24 hours a day, seven days a week to provide assistance over the phone.
ADB SAFEGATE **Americas Technical Service & Support (US & Canada): +1-800-545-4157**
ADB SAFEGATE Americas Technical Service & Support (International): +1-614-861-1304
During regular business hours, you can also Chat with a Service Technician. We look forward to working with you!

Before You Call
When you have an airfield lighting or system control system problem it is our goal to support airfield maintenance staff as quickly as possible. To support this effort we ask that you have the following information ready before calling.

- The *airport code*
- If not with an airport, then company name (prefer customer id number)
- Contact phone number and email address
- Product with part number preferable or product number
- Have you reviewed the product's manual and troubleshooting guide
- Do you have a *True RMS* meter available (and any other necessary tools)
- Be located with the product ready to troubleshoot

Note
For more information, see www.adbsafegate.com, or contact ADB SAFEGATE Support via email at support@adbsafegate.com or
Brussels: +32 2 722 17 11
Rest of Europe: +46 (0) 40 699 17 40
Americas: +1 614 861 1304. Press 3 for technical service or press 4 for sales support.
China: +86 (10) 8476 0106

D.1 Telephoning Customer Service

When you call for technical assistance, you should have the appropriate product documentation at hand. Be prepared to give the following information:

- To what product does the question relate?
- The exact wording of any messages that appeared on the Operator Interface screens (Computer System related assistance only).
- What happened, and what you were doing before and during when the problem occurred.
- How have you tried to solve the problem.

D.2 ADB SAFEGATE Website

The ADB SAFEGATE website, www.adbsafegate.com, offers information regarding our airport solutions, products, company, news, links, downloads, references, contacts and more.

D.3 Disposal

Tip

You can also contact the ADB SAFEGATE customer service team to get information on adequate disposal options or recycling of electrical devices delivered by ADB SAFEGATE.

NOTICE

Electrical equipment that is not in use or needed anymore, must be disposed according to the applicable legal environmental regulations. Electrical must not be disposed with household waste. Follow the applicable regulations established by the responsible local authorities. Contact the responsible local authorities for more information on local waste disposal sites or recycling centers.

D.4 Recycling

D.4.1 Local Authority Recycling

The disposal of ADB SAFEGATE products is to be made at an applicable collection point for the recycling of electrical and electronic equipment. The correct disposal of equipment prevents any potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling. The recycling of materials helps to conserve natural resources. For more detailed information about recycling of products, contact your local authority city office.

D.4.2 ADB SAFEGATE Recycling

ADB SAFEGATE is fully committed to environmentally-conscious manufacturing with strict monitoring of our own processes as well as supplier components and sub-contractor operations. ADB SAFEGATE offers a recycling program for our products to all customers worldwide, whether or not the products were sold within the EU.

ADB SAFEGATE products and/or specific electrical and electronic component parts which are fully removed/separated from any customer equipment and returned will be accepted for our recycling program.

All items returned must be clearly labeled as follows:

- For *ROHS/WEEE* Recycling
- Sender contact information (Name, Business Address, Phone number).
- Main Unit Serial Number.

ADB SAFEGATE will continue to monitor and update according for any future requirements for *EU directives* as and when *EU member states* implement new *regulations* and or *amendments*. It is our aim to maintain our *compliance plan* and assist our customers.

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