SIEMENS

Siemens Airfield Solutions L-850D/E F-Range Style 2 Inset Lights

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ETL Certified to FAA Specification
AC 150/5345-46B

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The innovative approach

Record of Changes

Revision	Description	Editor	Checked	Date
A	First edition. ECO 00511.	JY	WT	6/28/00
B	Changed to new title page. Changed ADB to Siemens Airfield Solutions.	JY	WT	5/16/01
C	Deleted information for L-850C Style 3 inset light and created a new manual for the L-850C. Changed the L-868B light base for 12-inch light fixture. ECO #00743.	JY	WT	10/22/01
D	ECO 00828. Changed part number for tool case on page 11 from 1411.19.420 to 1411.19.421. Deleted Section 3, Installation of Shallow Base, and all references to shallow base installation in the manual.	JY	WT	2/11/02

Safety Instructions

Safety precautions

Operating and maintenance personnel should refer to ICAO Airport Services Manual Part 9, “Airport Maintenance Practices” and to FAA Advisory Circular AC 150/5340-26 "Maintenance of Airport Visual Aid Facilities" for instructions on safety precautions. Personnel must always observe the safety regulations. The equipment has been designed and manufactured to allow safe and secure operation, however, the following rules must be strictly observed.

Keep away from live circuits

Operating and maintenance personnel must always observe all safety regulations.

Do not change lamps or components or make adjustments to equipment when the light circuit is switched on.

See FAA Advisory Circular AC 150/5340-26 concerning safety.

Resuscitation

Operating and maintenance personnel should get acquainted with the resuscitation techniques described in the First Aid Instruction Manual as issued by the Red Cross Organisation or similar.

Warranty

Products of Siemens Airfield Solutions manufacture are guaranteed against mechanical, electrical, and physical defects (excluding lamps) for a period of one year from the date of installation or a maximum of two years from the date of shipment and are guaranteed to be merchantable and fit for the ordinary purposes for which such products are made.

Siemens Airfield Solutions will correct by repair or replacement, 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 Siemens Airfield Solutions written notice of such defects after delivery of the goods to Buyer.

Siemens Airfield Solutions 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. Siemens Airfield Solutions furthers reserves the right to require the return of such goods to establish any claim.

Siemens Airfield Solutions'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.

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Details and values given in this manual are average values and have been compiled with care. They are not binding, however, and Siemens Airfield Solutions 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.

Information About this Manual

Chapter overview

Each chapter starts with an overview of the topics of that chapter.

Using icons

Icons are used to attract the attention of the reader to specific information. The meaning of each icon is described in the table below:

Icon	Type of information	Description
	Note	A 'note' provides information that is not indispensable, but may nevertheless be valuable to the reader, such as hints and tips.
	Caution	A 'caution' is used when there is danger that the reader, through incorrect manipulation, may damage equipment, get an unexpected result or has to restart (part of) a procedure.
	Reference	A 'reference' guides the reader to other places in this manual, where he/she will find additional information on a specific topic.

Parts Identification

Parts identification symbols (e.g. A1, B4, …) appearing in the text refer to the Exploded view page 44.

Comments and Proposals

This manual has been compiled with all possible care and in view of providing a valuable and practical tool to the Airport Maintenance personnel.

We encourage customers to address us their comments and proposals for improving further the contents of this manual.

Table of Contents

Chapter 1: General Information and Requirements Overview

Introduction

In this chapter you will find all the information about the shipment and the identification of the Siemens Airfield Solutions 12” F-Range inset light.

Contents

This chapter contains the following topics.

Light Assembly Part Numbers

Refer below for the assembly part numbers for the inset light fixtures referenced in this manual.

Light Assembly Part Number	Inset Light Fixture
1TEA-X32XX102	L-850D runway threshold & runway end light, Style 2
1TEA-X2931102	L-850D runway end light, Style 2
1THA-X39X1102	L-850E runway approach threshold light, Style 2

General information

Siemens Airfield Solutions 12" F-Range inset lights

The Siemens Airfield Solutions 12" F-Range Inset Lights are light fixtures which provide optimum visual guidance with minimal maintenance, low life-cycle costs and maximum reliability. They are 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 12" F-Range fixtures are shipped ready for installation on FAA L-868 deep bases with an adapter ring (see "Overview of FAA deep bases and Siemens Airfield Solutions adapter rings" page 13). An alternate approach to mounting the F-Range fixtures is to install them on L-868C or on LB1/4/4A bases using an adapter ring. Contact Siemens Airfield Solutions Sales Department for shallow base mounting options.

The 12" F-Range family types are intended for the following uses:

- L-850D: Combined Threshold and Runway End
- L-850E: Threshold and Threshold Wing Bars
- FEN: Runway End (not submitted for FAA certification)
- FAP: Approach Centreline and Side Row Barrettes (not submitted for FAA certification)

Purpose of this manual

This manual describes procedures for the installation, maintenance and troubleshooting of the 12" inset light family.

Scope of this manual

This manual covers the light fixtures manufactured in accordance with FAA specification AC 150/5345-46B and the photometric requirements of the latest edition of ICAO Annex 14. Operation beyond the design limitations of these specifications may result in degradation of performance, damage or failure of components or hazardous conditions.

Equipment data

Equipment supplied

Each unit is supplied completely assembled, tested and sealed, ready for installation. The electrical connection is made via 1, 2 or 3 cable assemblies with FAA L-823 style 2-pole plugs. The 6 mounting screws (A1) and lock washers (A2) or self locking nuts for holding the light on the base or adapter ring are included. They can be either M10 or 3/8" UNC, according to order. An o-ring gasket (E6) is also included.

Each unit is individually packed in a durable, cushioned and corrugated cardboard box, labelled with Siemens Airfield Solutions and ordering numbers.

At least one instruction manual is delivered per order.

Film disc cut-out

For some applications, optional film disc cut-outs are available. They form an electrical bypass over the lamp within 15 seconds after lamp failure. After a lamp failure, the film disc cut-out must be replaced.

References

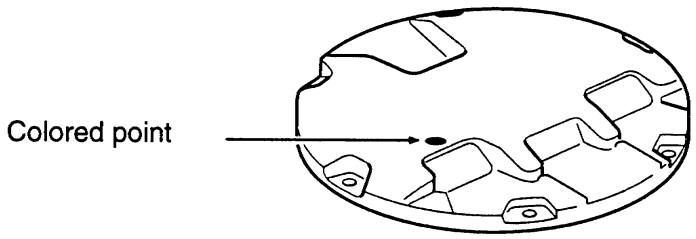
Ordering codes and reference data pertinent to the light fixture and its components are listed in the tables on pages 30 to 44.

Differences between versions

All the inset lights used for a particular function look externally identical. The differences between versions depend on the beam colour and the optical support inside. Make sure to use the correct version when installing the light onto its base.

Beam color

The colors of the light beams are identified by colored points on the top of the window. A red point, for example, refers to a corresponding red colored beam.



In the 12" F-Range inset lights, light beam coloration is obtained by a dichroïc coating applied on the inner face of the prism. Therefore, no separate color filters are required.

Equipment data, *continued*

Toe-in coding

For some applications, the inset lights are delivered with built-in toe-in. Refer to page 30 and following for detailed information.

According to this toe-in, those lights are to be installed to the left or to the right of the Runway/ Approach center line. The built-in toe-in is referenced with labels (black letters on yellow background):

Label	Toe-in	Installation
C.L →	right	to the left of the center line when looking in the direction of the (main) beam
C.L ←	left	to the right of the center line when looking in the direction of the (main) beam
No label	no	on the center line

NB: the arrow points towards the R/ W centre line.

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 purchased from Siemens Airfield Solutions.

It is listed on page 11.

Chapter 2: Installation

Overview

Introduction

This and the following two chapters describe how to install the 12” F-Range inset lights.

Chapter 2 gives the general installation criteria.

Chapter 3 describes how to install the 12” F-Range inset lights on FAA deep bases.

In general, the installation procedures comply with the applicable sections in the ICAO Aerodrome Design Manual part 4, FAA Advisory Circulars and, if applicable, other National Codes or local rules.

Contents

This chapter contains the following topics.

General recommendations

Receiving, storage and unpacking

1. Upon receipt of goods at the site store, check all packings for visible damage. Every damaged box should be opened and its content inspected for damage.

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.

Electrical connection

The light assemblies covered by this manual are designed for connection to 6.6 or 20-A series circuits via one, two or three L-830 or L-831 isolation transformer(s).

The isolation transformers are to be ordered separately.

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 150/5345-46B

Equipment required for installation

Tool case

Siemens Airfield Solutions has designed a tool case (Siemens Airfield Solutions part number **1411.19.421**) including the basic tools necessary for the maintenance of the F-Range inset lights. It can also be used for the installation of the light fixture.

The table below lists the tools included in the case:

Description	PN	Description	PN
Tool case	6169.01.012	Hinged handle - short	8962.06.110
F-R pull out tool (see page 19)	1411.19.320	Torque wrench	8961.06.203
F-R extraction jig (see page 19)	1411.19.301	Grip	8961.10.110
F-Range opening tool (see page 21)	4071.53.220	Screwdriver flat blade AG. 8x150	8961.05.250
Adaptation 1/4” - 3/8” R.232	8961.06.010	Loctite 270	7870.05.110
Socket hex vis 3/8” J.9/16LA	8961.06.008	Natural hydraulic vacuum silicone grease	7850.42.210
Screwdriver (Phillips)	8961.05.200	Screwdriver, pozidriv AD.2x125	8961.05.220
Socket hex 3/8” vis M10 J.17LA	8961.06.000	Attack driver assembly	see below

Attack driver

The attack driver assembly is constituted of:

Description	PN
Attack driver	8961.04.100
Hammer 212A50	8961.04.110
Bit holder	8961.04.120
Bits END202	8961.04.130

Additional tools and equipment

In addition to the tools included in the tool case, other equipment may be required for installation or maintenance:

Description	PN
Molycote BG87 INERTA grease (to replace prism - see p. 23)	7850,05,050
Loctite 222	7870.05.140
Base (deep)	see cat.leaf.
Adapter ring	see page 13
Sealing compound for adapter ring	7835,55,151

Chapter 3: Installation on FAA Deep Bases

Overview

Introduction This chapter describes how to install the 12” F-Range inset lights on FAA deep bases.

Contents This chapter contains the following topics.

Overview of FAA deep bases and Siemens Airfield Solutions adapter rings

Introduction

The next table lists the FAA deep bases which can be used for the installation of an 12” F-range inset light and the Siemens Airfield Solutions adapter ring to use.

Toe-in

For applications where a toe-in is required, two solutions are possible:

1. light fittings with built-in toe-in; the adapter ring must be in the straight version.
2. light fittings without toe-in ; the adapter ring must include the required toe-in.

The toe-in is used in the following applications:

Toe-in	Application
2°	Approach side row and threshold wing bar
3.5°	Threshold

Table

FAA Deep Base	Adapter Ring description	Adapter Ring Code No	Screw type
E-1315 LB-1/ LB4A (diam 16”)	12” to 16” straight	1411.19.170	Metric
	12” to 16” toe-in right 3.5°	1411.19.190	Metric
	12” to 16” toe-in left 3.5°	1411.19.180	Metric
	12” to 16” toe-in right 2°	1411.19.770	Metric
	12” to 16” toe-in left 2°	1411.19.760	Metric
	12” to 16” straight (12 holes at 30°)	1411.19.160	UNC
	12” to 16” straight (6 holes at 60°)	1411.19.100	UNC
E-1315 LB-4 (diam 16”)	12” to 16” straight	1411.19.070	UNC
	12” to 16” toe-in right 3.5°	1411.19.110	UNC
	12” to 16” toe-in left 3.5°	1411.19.120	UNC
	12” to 16” straight	1411.19.130	Metric
	12” to 16” toe-in right 3.5°	1411.19.150	Metric
	12” to 16” toe-in left 3.5°	1411.19.140	Metric

* Only for fittings using 3 x 105 W lamps.

Deep Base references

Contact the Siemens Airfield Solutions Sales Department.

Installation method

Installation method

With this installation method, the light fixture is mounted onto the steel base, in which the isolating transformer may be located.

Deep Base Installation

For deep-base installation, contact Siemens Airfield Solutions Sales Department and see the figure below.

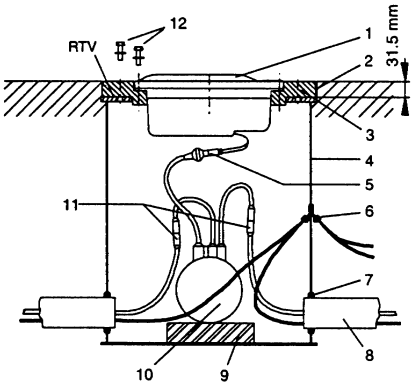
Adapter ring Installation

To install the adapter ring, proceed as follow:

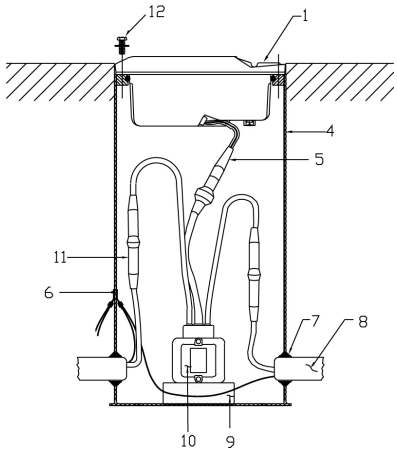
Step	Action
1	Clean the contact surfaces of the deep base and adapter ring.
2	Put onto the contact layer of the base a layer of RTV106 (Siemens Airfield Solutions NC 7835.55.151 or equivalent.
3	Mount the adapter ring onto the base and torque down the screws supplied with it. Refer to the table “Screws Overview” on page 44 for the tool to use, the torque to apply, and the eventual use of “Loctite” sealing compound.

Illustration

The illustrations below clarify the installations on FAA deep bases:



16" E-1315 LB1/ LB4/ LB4A



12 in. L-868 B

1. Light fitting	4. FAA deep base	7. Rubber grommet	10. Isolating transformer
2. Sealing resin	5. Secondary connector	8. Conduit	11. Primary connector
3. Adapter ring	6. Earthing lugs	9. Spacer	12. Screw, 3/8” or M10

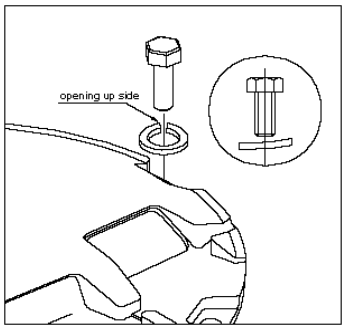
NOTE: When using an L-868B bottom section and top section, a minimum of 3-3/4-in. height must be used for the top section or the fixture will not fit. This dimension does not account for flange rings and/or spacers.

NOTE: For fixture replacement on an existing L-868C 15-in. light base, L-850D/E inset lights are supplied with 17.25-in.-diameter adapter rings. For new fixture installation using L-868B 12-in. light bases, L-850D/E are mounted directly to L-868B 12-in. light base without adapter ring.

Mounting and connection

How to mount the light assembly

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

Step	Action
1	Clean the contact surfaces between the light assembly and adapter ring and particularly its O-ring groove. Apply a light coat of neutral vacuum type silicone grease (Siemens Airfield Solutions PN 7850.42.210) to a new, clean O-ring gasket (E6).
2	Place the O-ring carefully in its groove. Never reuse an already used gasket.
3	Connect the light by inserting its two-pole plug(s) into the secondary receptacle(s) of the transformer(s), already installed in the base and connected to the primary series circuit.
4	Gently install the light fixture in the base using one of the lifting devices (see page 19).
5	Make sure that the washers are mounted correctly to avoid denting the cover. 
6	Torque down gradually and crosswise the 6 screws and washers (A1-A2) or self locking nuts. Refer to the table “Screws Overview” page 43 for the tool to use, the torque to apply and the eventual use of “Loctite”.

Make sure not to pinch the wires when mounting of the light fixture on the adapter ring.

Chapter 4: Maintenance

Overview

Introduction

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 will be described in detail in chapter 5.

Contents

This chapter contains the following topics.

Workshop maintenance and preventive maintenance

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 unserviceable in the field.

Siemens Airfield Solutions designed a set of workshop jigs for dismantling and re-assembling the fittings.

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 AC 150/5340-26.

For components mentioned in this chapter, refer to the exploded view on page 44.

Workshop maintenance and preventive maintenance, *continued*

Preventive maintenance tasks

In the table below you will find a checklist of 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.
Bimonthly	torque on hold-down bolts	Refer to the table “Screws Overview” on page 43 for the tool to use, the torque to apply, and the eventual use of “Loctite” sealing compound.
Semi-annually *	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 800 hours of operation at 6.6 A	Replace lamps of complete subsystems (e.g. R/W centreline)	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 800 hours, but, in practice, life spans of 2000 to 4000 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 150/5200-23 to avoid or at least to reduce damage to light fixtures.

* More frequently during rainy seasons.

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

Lifting tools

Siemens Airfield Solutions has developed 2 models of lifting tools (see illustrations below):

- Model a: simple tool used when the light fixture can be easily removed;
- Model b: a more sturdy tool to remove the light fixture in more difficult conditions.

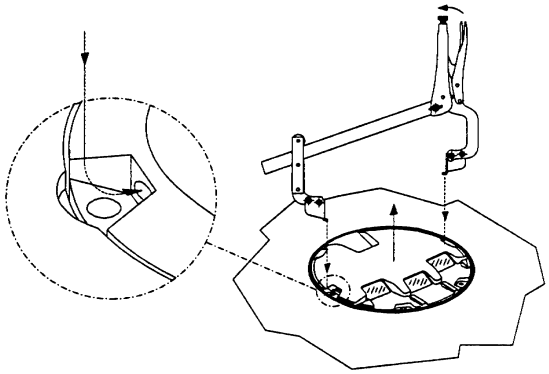
Procedure

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

Step	Action
1	Remove the six fixing screws and washers (A1-A2) or self locking nuts.
2	Fit the appropriate lifting tool (see figure below) into both holes located (180° apart) in the cover (B1), lift the optical unit out of the Eurobase 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	Take the optical unit back to the maintenance base where it can be serviced entirely.

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.

The illustration below clarifies the procedure:



Model a: F-R pull out tool - CN 1411.19.320

Chapter 5: Servicing in the Maintenance Base

Overview

Introduction

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

Preliminary

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

Refer to the table “Screws Overview” on page 43 for the tool to use, the torque to apply, and the eventual use of “Loctite” sealing compound.

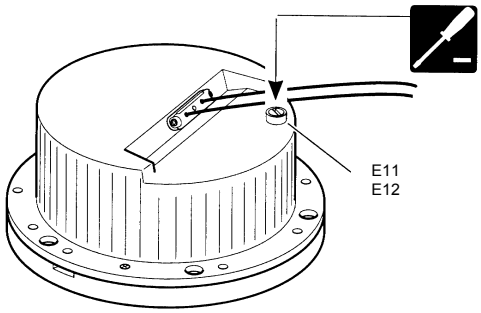
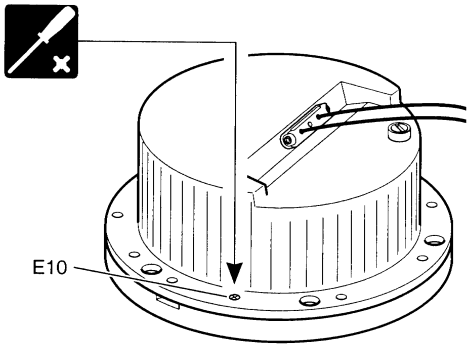
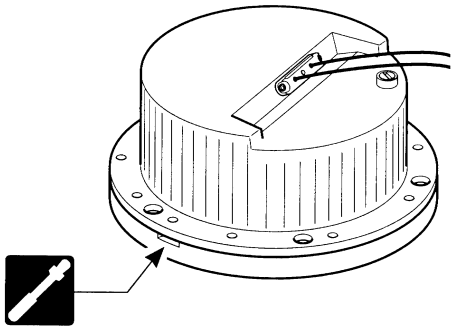
Contents

This chapter contains the following topics.

How to open the light assembly

Procedure

To open the light assembly, proceed as follows (for the tools to use, refer to page 43 “Screws Overview”):

Step	Action
1	Turn the light unit upside-down.
2	Remove the pressure relieve screw (E11). 
3	Remove the 6 screws (E10). The use of an attack driver may be required to unlock the screws (see page 11). 
4	Introduce the special opening tool (NC 4071.53.220 see page 11) in the dedicated slot between cover and inner cover and rotate it to separate the inner cover from the cover. 

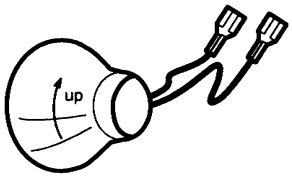
How to replace a lamp

Film disc cut-out

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

Procedure

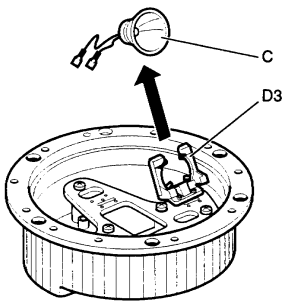
To replace a lamp, proceed as follows (for the tools to use, refer to page 43 “Screws Overview”):

Step	Action
1	Disconnect the fast-on connectors of the lamp from the terminal block (E1).
2	Remove the lamp (C) from the lampholder (D3), holding the reflector.
3	If a cut-out is used, remove it by loosening the screw which secures the cut-out clip to the terminal block (E1) and rotate cut-out clip free.
4	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.
5	Install a new lamp. To optimise photometric output, make sure that the lamp is correctly positioned with the "arrow" pointing upside (up).  ⚠ Never touch the quartz bulb of the lamp with your bare fingers. It will reduce the lifetime of the lamp considerably. Should it happen, clean the bulb with isopropyl alcohol.
6	Reassemble in reverse order.

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

Illustration

The illustration below clarifies the procedure:

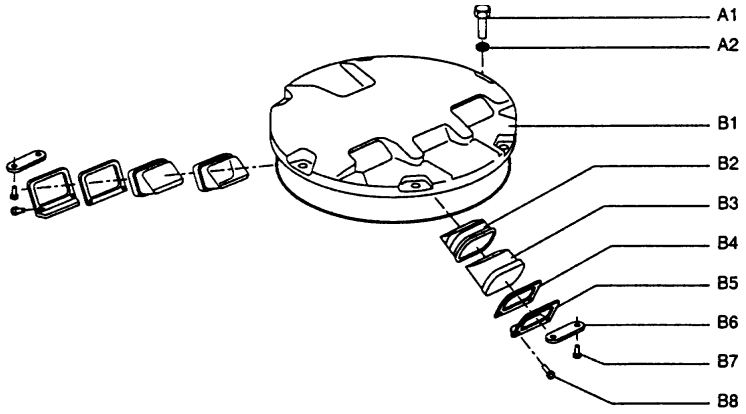


How to replace a prism

Procedure To replace a prism, proceed as follows (for the tools to use, refer to page 43 “Screws Overview”):

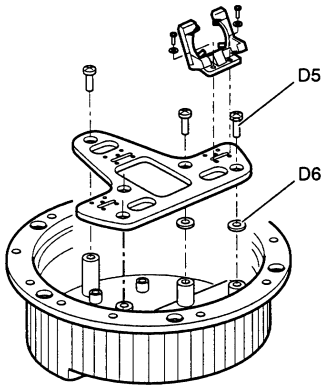
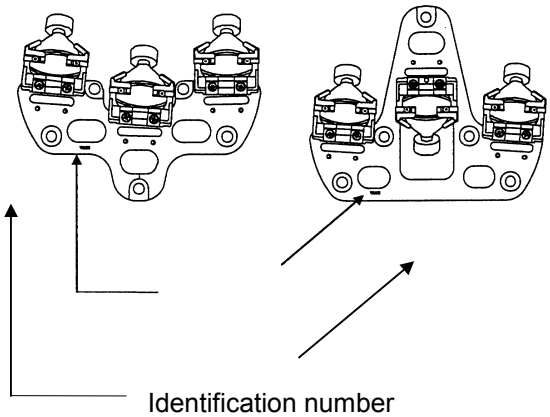
Step	Action
1	Remove the prism clamp plate (B6) secured in the cover.
2	Remove the prism keeper plate (B5) and the flat gasket (B4).
3	Push the prism (B3) with the sleeve gasket (B2) towards the inside of the cover.
4	Clean and degrease the prism chamber with any effective solvent. Never use any abrasive substance.
5	Apply a thin layer of lubricant MOLYKOTE BG87 INERTA (Siemens Airfield Solutions PN 7850.05.050) in the prism chamber using a small brush.
6	Bring a new sleeve gasket (B3) 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	Apply on both B8 screws a drop of “loctite” as indicated page 43, introduce them 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 the cross recessed pan head screws (B7).
12	Torque down the 4 B7 and B8 screws. Refer to the table “Screws Overview” on page 43 for the tool to use, the torque to apply, and the eventual use of “Loctite” sealing compound.

Illustration The illustration below clarifies the procedure:



How to replace the optical assembly

Procedure To replace the optical assembly, proceed as follows (for the tools to use, refer to page 43 “Screws Overview”):

Step	Action
1	Remove the lamp(s) as explained on page 22.
2	Remove the optical assembly by loosening the screws (D5). 
3 	Position the new optical assembly with new dampers (D6). Make sure that the new optical assembly bears the same three-character identification as the one to replace. This identification number is visible when the optical assembly is properly installed. 
4 	Torque down the fixing screws (D5). Refer to the table “Screws Overview” on page 43 for the tool to use, the torque to apply, and the eventual use of “Loctite” sealing compound.
5	Reinstall the lamp(s) as described on page 22.

How to replace the cable set assembly

Siemens Airfield Solutions cable sets

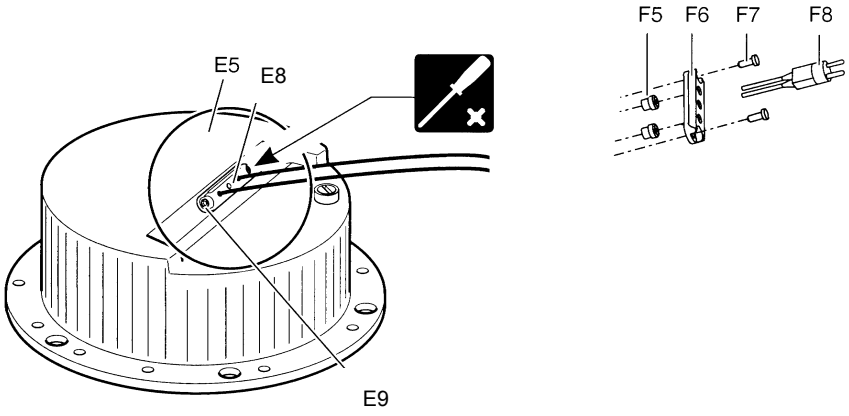
Only use Siemens Airfield Solutions cable sets. Usage of substitutes voids the warranty.

Procedure

To replace the cable set assembly, proceed as follows (for the tools to use, refer to page 43 “Screws Overview”):

Step	Action
1	Remove the optical assembly as described on page 24.
2	Remove both screws (E9) and the wire clamp (E8).
3	Cut the fast-on connectors (E3) from the cable assembly.
4	Pull the cable assembly out of the inner cover (E5) and discard the grommets (E7).
5	Bring the new Siemens Airfield Solutions cable assembly through the wire clamp (E8).  One wire per hole.
6	Put a new wire grommet (E7) 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.
8	Reinstall the wire clamp (E8) by means of both cross recessed pan head screws (E9). 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 spade connectors (E3, Siemens Airfield Solutions code Nr 6111.87.140) and connect to the terminals. Adjust the wires inside the inner cover.
11 	Torque the screws (E9). Refer to the table “Screws Overview” on page 43 for the tool to use, the torque to apply, and the eventual use of “Loctite” sealing compound.

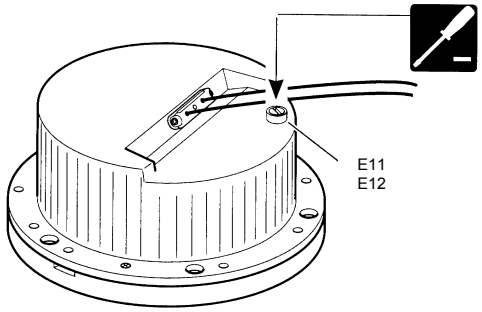
Illustration The illustration below clarifies the procedure:



How to close and test the light fixture

Procedure

To close an optical unit, proceed as follows (for the tools to use, refer to page 43 “Screws Overview”):

Step	Action
1	Turn the cover (B1) upside down.
2	Make sure that the contact surfaces with the O-ring are clean.
3	Put a new O-ring gasket (B9) greased with high quality neutral silicone grease (Siemens Airfield Solutions PN 7850.42.210) over the cover in the appropriate groove.
4	Remove the pressure release screw (E11). 
5	Gently put the inner cover (E5) on the cover (B1), taking into account the keying pin between both parts. Make sure the lampholders and lamps are correctly positioned and that the wires of the lamps do not get pinched between cover and inner cover.
6	Press the inner cover on the cover and secure with the screws (E10).
7	Check electrical insulation from each two-pole plug to frame by means of a 500 V insulation tester. Apply an AC or DC voltage not exceeding 15 V across each two-pole plug and observe normal operation of corresponding lamp.
8	Check waterproofness of the fitting by applying an overpressure of 1.4 Atm (14kP) via the pressure release hole. Whilst pressure is applied, immerse the light fixture for one minute in water and look carefully for any air bubbles emanating from the light fixture.
9	Make sure the O-ring seal (E12) is in good condition and secure the pressure release screw (E11). Refer to the table “Screws Overview” on page 43 for the tool to use, the torque to apply, and the eventual use of “Loctite” sealing compound.

Chapter 6: Troubleshooting

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
Light does not energize.	Lamp(s) defective	1. Replace lamp(s). 2. Replace film disc cut-out (when used).
	Loose or broken contacts	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 or secondary wiring	Check transformer output current with Am meter. Check power line between the light fixture and the transformer, including connectors.
Light does not energize at normal level.	Resistance too high or partial short circuit. Light misaligned. Dirty prisms.	1. Replace cable assembly or inner cover assembly. 2. Replace lamp(s) and/or transformer(s). 3. Clean prisms and check orientation of light.
Light beam out of alignment	Broken or damaged prism/cover	1. Replace prism or entire outer cover assembly. 2. Check lamp positioning.
Improper beam colour	Wrong prism	Replace prism with one of the proper colour.
	Dichroïc coating damaged	Replace prism.
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 fingers (lamp interior will have a yellow-white powdery appearance if air has entered through a hole or crack)	1. Replace lamp. 2. If used, replace film disc cut-out.

Chapter 7: Assemblies and Exploded View

Overview

Introduction

In this chapter you will find an overview of the main and sub-assemblies and the exploded views of the 12” F-Range inset lights.

Light Assembly Part Numbers

Refer below for the assembly part numbers for the inset light fixtures referenced in this manual.

Light Assembly Part Number	Inset Light Fixture
1TEA-X32XX102	L-850D runway threshold & runway end light, Style 2
1TEA-X2931102	L-850D runway end light, Style 2
1THA-X39X1102	L-850E runway approach threshold light, Style 2

Contents

This chapter contains the following topics.

Assemblies

Spare parts

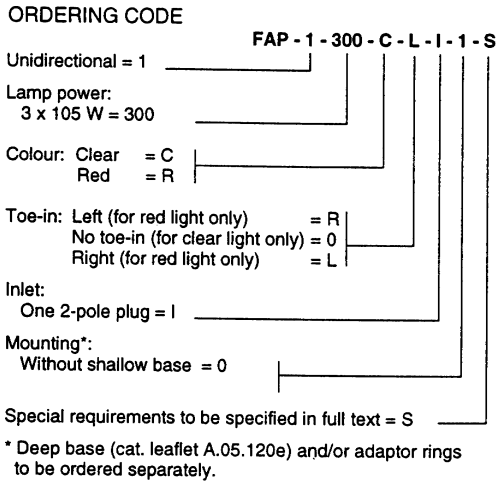
It is recommended to create a sufficiently large stock of spare parts to maintain the fittings. It will mainly consist of consumables like lamps, O-ring gaskets, film disc cutouts, etc. Other components that may need replacement, such as prisms, prism gaskets, terminal blocks and hardware even as sub-assemblies,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

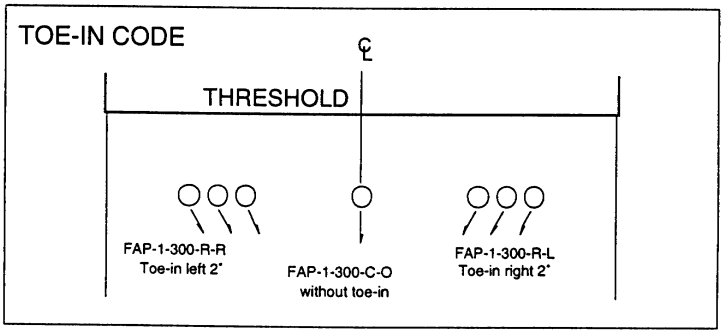
Ordering code FAP

The illustration below clarifies the structure of the ordering code for the FAP type.

Ordering code FAP

The illustration below clarifies the structure of the ordering code for the FAP type.





Remarks

The toe-in applies to the red beam only.

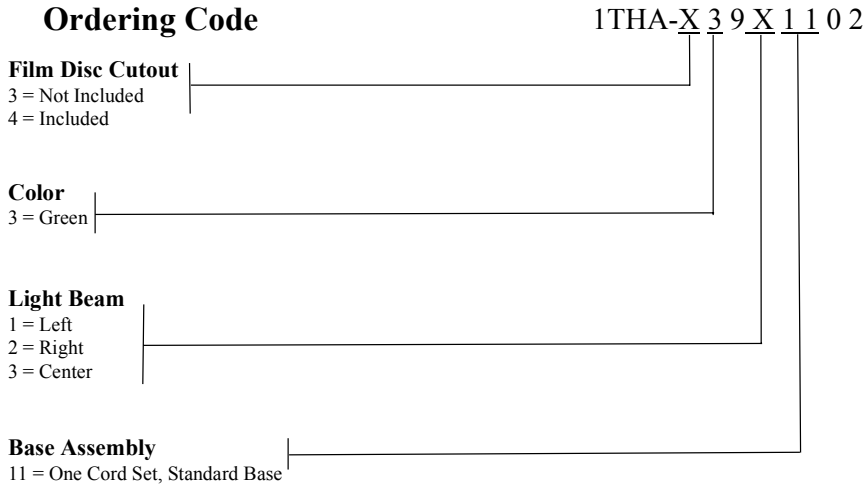
Film disc cutout: optional.

NOTE: Contact Siemens Airfield Solutions Sales Department for shallow base mounting options.

Assemblies, *continued*

Ordering code L-850E

The illustration below clarifies the structure of the ordering code for the L-850E type.



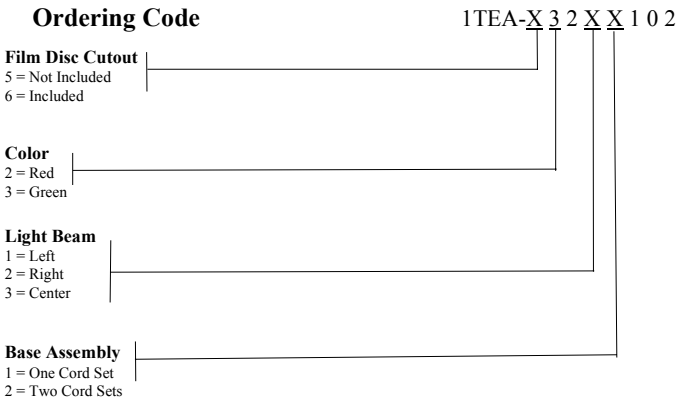
Remark

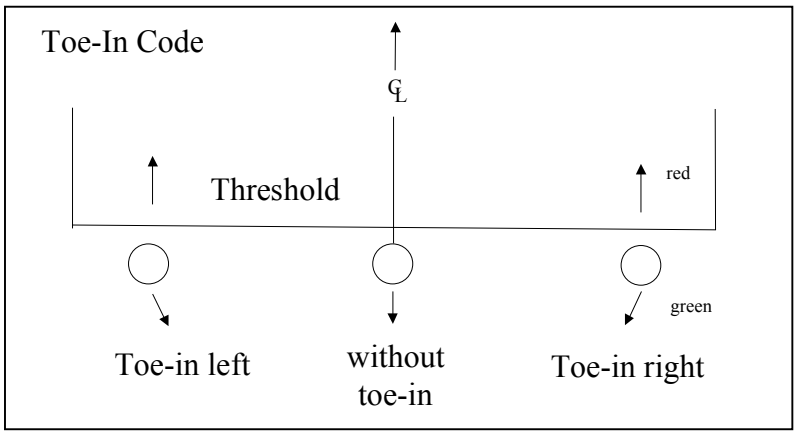
Film disc cutout: optional.

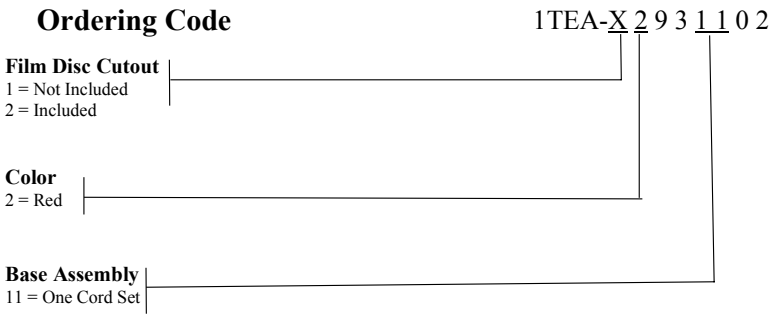
Assemblies, *continued*

Ordering code L-850D

The illustrations below clarify the structure of the ordering code for the L-850D type.
The first illustration shows the L-850D Runway Threshold & Runway End Light.
The second illustration shows the L-850D Runway End Light.







Remarks

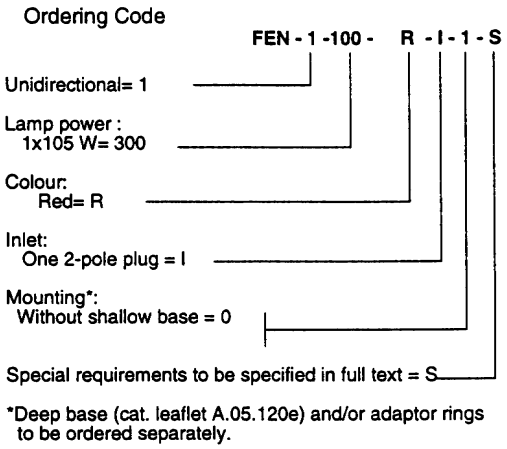
The toe-in applies to the green beam only (L-850E and L-850D, Runway Threshold and Runway End Light).

Film disc cutout: optional.

Assemblies, *continued*

Ordering code FEN

The illustration below clarifies the structure of the ordering code for the FEN type.



NOTE: Contact Siemens Airfield Solutions Sales Department for shallow base mounting options.

List of tables

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

Assemblies, *continued*

Table 1 In the table below you will find all fixtures and main assemblies of the 12”F-Range inset lights (standard versions):

Fixtures				Main assemblies		
Cate-gory	**Descrip-tion**	**Siemens Airfield Solutions Ordering code**	**Siemens Airfield Solutions code**	**Cover**	**Optical assy**	**Inner cover**
L-850E	threshold	1THA-X39X1102	N/A	1411.41.020	1411.41.240	1411.41.110
L-850D	threshold + end	1TEA-X32XX102	N/A	1411.41.010	1411.41.280	1411.41.130
	End	1TEA-X2931102	N/A	1411.40.040	1411.41.260	1411.41.130
FAP	approach	FAP-1-300-C-O-I-0	1TAA51931100	1411.41.000	1411.41.200	1411.41.100
		FAP-1-300-R-L-I-0	1TAA52911100	1411.41.060	1411.41.220	1411.41.100
		FAP-1-300-R-R-I-0	1TAA52921100	1411.41.060	1411.41.210	1411.41.100
FEN	rwy end	FEN-1-100-R	1TEA12931100	1411.41.030	1411.41.260	1411.41.120

Note : the lamps are listed together with the parts list of the optical assembly.

Table 2 In the table below you will find all fixtures and main assemblies of the 12”F-Range inset lights (special versions):

Fixtures				Main assemblies		
Cate-gory	**Description**	**Ordering code**	**Siemens Airfield Solutions code**	**Cover**	**Optical assy**	**Inner cover**
L-850D	threshold +	Not applicable	1TEA53211100	1411.41.010	1411.41.290	1411.41.180
	end		1TEA53231100	1411.41.010	1411.41.280	1411.41.180
	End		1TEA53221100	1411.41.010	1411.41.270	1411.41.180

Note : the lamps are listed together with the parts list of the optical assembly.

Assemblies, *continued*

Table 3 In the table below you will find the parts and main assemblies of the12" F-Range covers for the L-850E and L-850D light assemblies.

No.	Siemens Airfield Solutions part number	Description	1411.40.xxx										
			000	010	020	030	040	050	060	070	080	090	100
B1	1411.42.000	machined FAP/L-850E (3-lamp) cover with positioning pin											
B1	1411.42.010	machined L-850E (2-lamp) cover with positioning pin											
B1	1411.42.020	machinedL-850D cover with positioning pin											
B2	4071.50.030	prism sleeve gasket	2	2	2	2	1	1	2	2	2	2	1
B3	1428.00.250	FAP clear prism											
B3	1428.00.270	FAP/L-850D/FEN red prism							1	1	1	1	1
B3	1428.00.280	L-850E/D green prism											
B4	4071.50.042	flat prism gasket	2	2	2	2	1	1	2	2	2	2	1
B6	4071.50.360	prism clamp	2	2	2	2	1	1	2	2	2	2	1
B7	7125.00.450	Screw TFC M5X10 DIN 965-Z INOXA2	4	4	4	4	2	2	4	4	4	4	2
B8	4071.53.701	stainless steel cross recess pan head screw M5 x 12	4	4	4	4	2	2	4	4	4	4	2
B9	7080.90.710	O-ring seal	1	1	1	1	1	1	1	1	1	1	1

Assemblies, *continued*

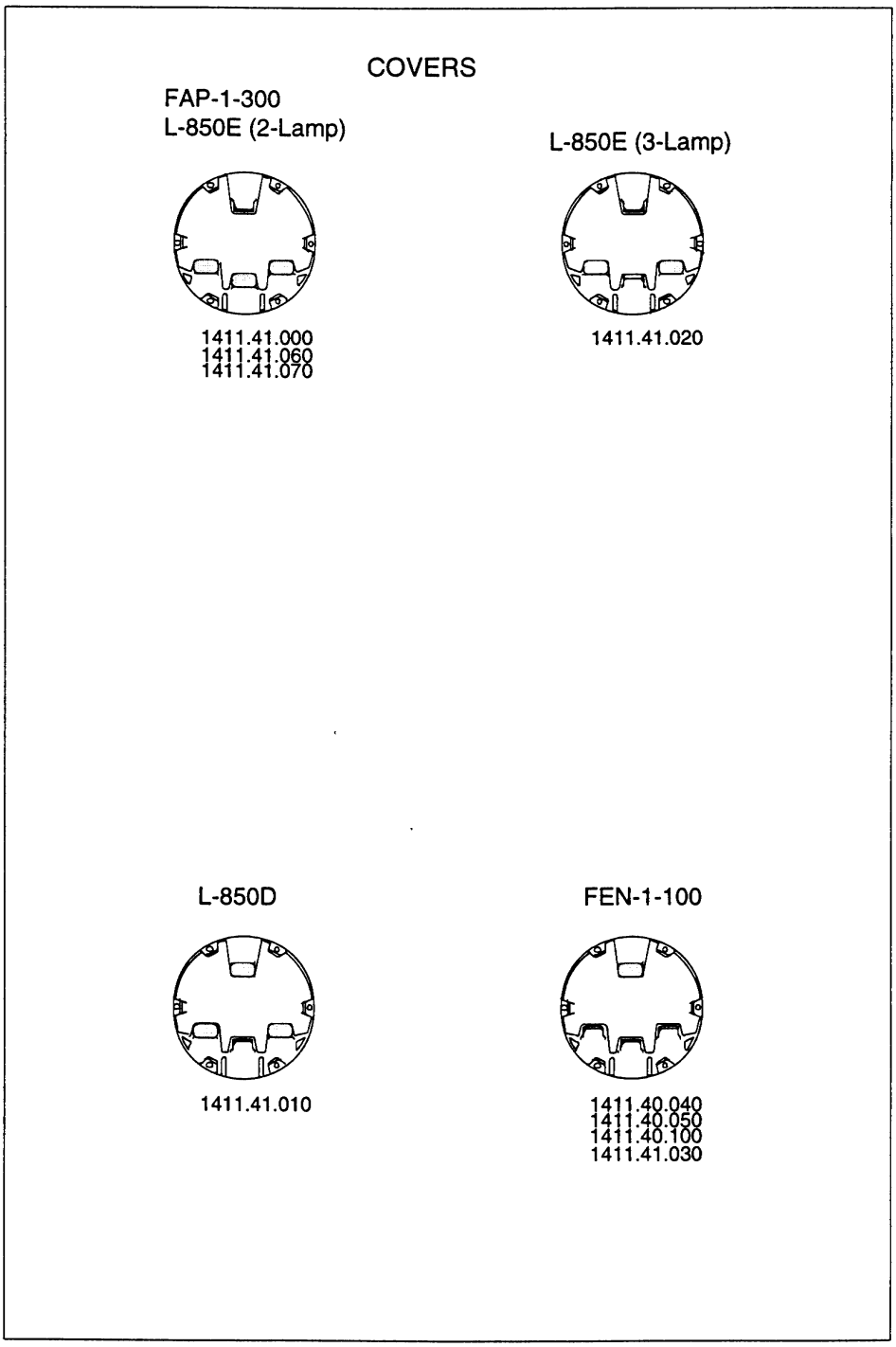
Table 4 In the table below you will find the parts of the12” F-Range covers for the L-850E and L-850D light assemblies.

No.	Siemens Airfield Solutions part number	Description	1411.41.xxx							
			000	010	020	030	040	050	060	070
B1	1411.42.000	machined FAP/L-850E (3-lamp) cover with positioning pin	1						1	1
B1	1411.42.010	machined L-850E (2-lamp) cover with positioning pin			1					
B1	1411.42.020	machined L-850D cover with positioning pin		1						
B2	4071.50.030	prism sleeve gasket	3	3	2	1	2	2	3	3
B3	1428.00.250	FAP clear prism	3							
B3	1428.00.270	FAP/L-850D/FEN red prism		1		1				
B3	1428.00.280	L-850E/D green prism		2	2				3	3
B4	4071.50.041	flat prism gasket	3	3	2	1	2	2	3	3
B5	4071.50.051	prism keeper plate	3	3	2	1	2	2	3	3
B6	4071.50.360	prism clamp	3	3	2	1	2	2	3	3
B7	7125.00.450	stainless steel cross recess countersunk head screw M5 x 10	6	6	4	2	4	4	6	6
B8	4071.53.701	stainless steel cross recess pan head screw M5 x 12	6	6	4	2	4	4	6	6
B9	7080.90.710	O-ring seal	1	1	1	1	1	1	1	1

Assemblies, *continued*

Illustrations

The illustration below shows the FAP, FEN, L-850E (2/3-lamp), and L-850D 12" F-Range covers:



Assemblies, *continued*

Table 5 In the table below you will find the parts of the FAP, FEN, L-850E (2/3-lamp), and L-850D 12” F-Range optical assemblies and lamps:

No.	Siemens Airfield Solutions part number	Description	1411.41.xxx						
			200	210	220	230	240	250	260
C	2990.40.900	cold mirror prefocus halogen lamp 105 W - 6.6 A - 1000 hrs	3	3	3	2	2	2	1
D1	7110.08.367	Screw THRD M4X10 SCR CR Z/INOXA2	6	6	6	4	4	4	2
D2	7284.10.416	Lockwasher M4	6	6	6	4	4	4	2
D3	4071.63.040	FAP clear/ L-850E (2-lamp)/L-850D/FEN lamp sup. assy	3			2	2	2	1
D3	4071.60.610	FAR red/ L-850E (3-lamp) lamp sup. assy		3	3				
D4	4071.62.120	FAP clear optical support (no toe-in)	1						
D4	4071.62.140	FAP red/L-850E (3-lamp) optical support (left toe-in)		1					
D4	4071.62.150	FAP red/ L-850E (3-lamp) optical support (right toe-in)			1				
D7	4071.62.160	L-850E (2-lamp) /L-850D optical support (left toe-in)				1			
D7	4071.62.170	L-850E (2-lamp) /L-850D optical support (no toe-in)					1		
D7	4071.62.180	L-850E (2-lamp) /L-850D/FEN optical support (right toe-in)						1	1
D5	4071.53.701	stainless steel cross recess pan head screw M5x12	5	5	5	5	5	5	5
D6	63A0222	grommet	5	5	5	5	5	5	5

Table 5, *continued* In the table below you will find the parts of the FAP, FEN, L-850E (2/3-lamp), and L-850D 12” F-Range optical assemblies and lamps:

No.	Siemens Airfield Solutions part number	Description	1411.41.xxx						
			270	280	290	300	310	320	330
			Lamps						
C	2990.40.900	cold mirror prefocus halogen lamp 105 W - 6.6 A - 1000 hrs	3	3	3	2	2	1	1
			Optical Assemblies						
D1	7110.08.367	Screw THRD M4X10 SCR CR Z/INOXA2	6	6	6	4	4	2	2
D2	7284.10.416	Lockwasher M4	6	6	6	4	4	4	2
D3	4071.63.040	FAP clear/ L-850E (2-lamp)/L-850D//FEN lamp sup. assy	3	3	3	2	2	1	1
D3	4071.60.610	FAR red/ L-850E (3-lamp) lamp sup. assy							

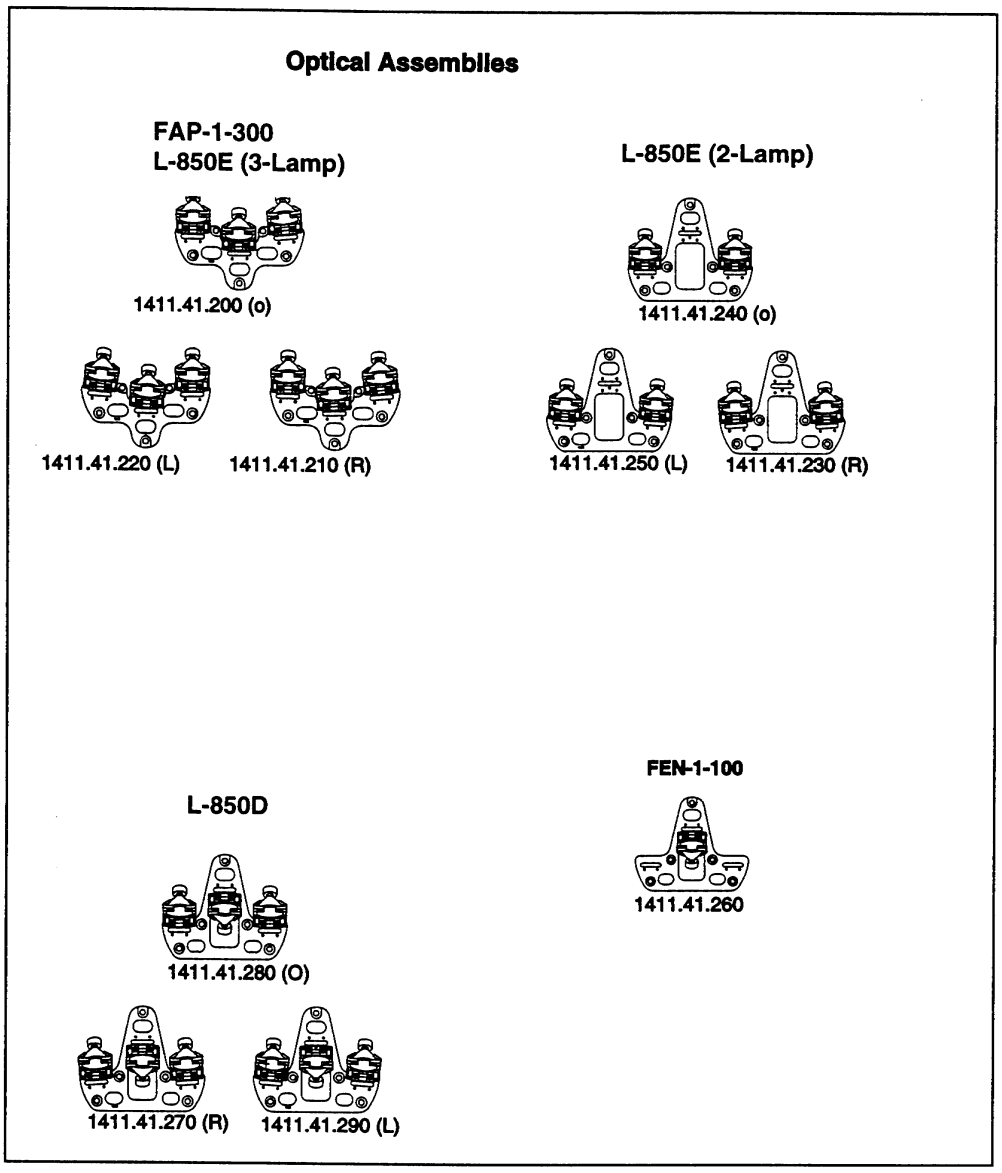
Table 5, *continued* In the table below you will find the parts of the FAP, FEN, L-850E (2/3-lamp), and L-850D 12" F-Range optical assemblies and lamps:

No.	Siemens Airfield Solutions part number	Description	1411.41.xxx						
			270	280	290	300	310	320	330
			Optical Assemblies						
D4	4071.62.120	FAP clear optical support (no toe-in)							
D4	4071.62.140	FAP red/ L-850E (3-lamp) optical support (left toe-in)							
D4	4071.62.150	FAP red/ L-850E (3-lamp) optical support (right toe-in)							
D7	4071.62.160	L-850E (2-lamp) /L-850D optical support (left toe-in)	1						
D7	4071.62.170	L-850E (2-lamp) /L-850D optical support (no toe-in)		1					
D7	4071.62.180	L-850E (2-lamp) /L-850D/FEN optical support (right toe-in)			1				
D5	4071.53.701	stainless steel cross recess pan head screw M5x12	5	5	5	5	5	5	5
D6	63A0222	grommet	5	5	5	5	5	5	5

Assemblies, *continued*

Illustrations

The illustration below shows the 12” F-Range optical assemblies:



Toe-in

For some applications, the inset lights are delivered with built-in toe-in. According to this toe-in, those lights are to be installed to the left or to the right of the centre line.

Label	Toe-in	Installation
R	right	to the left of the centre line
L	left	to the right of the centre line
O	straight	-

Assemblies, *continued*

Table 6 In the table below you will find the parts of the 12” F-range inset lights inner covers:

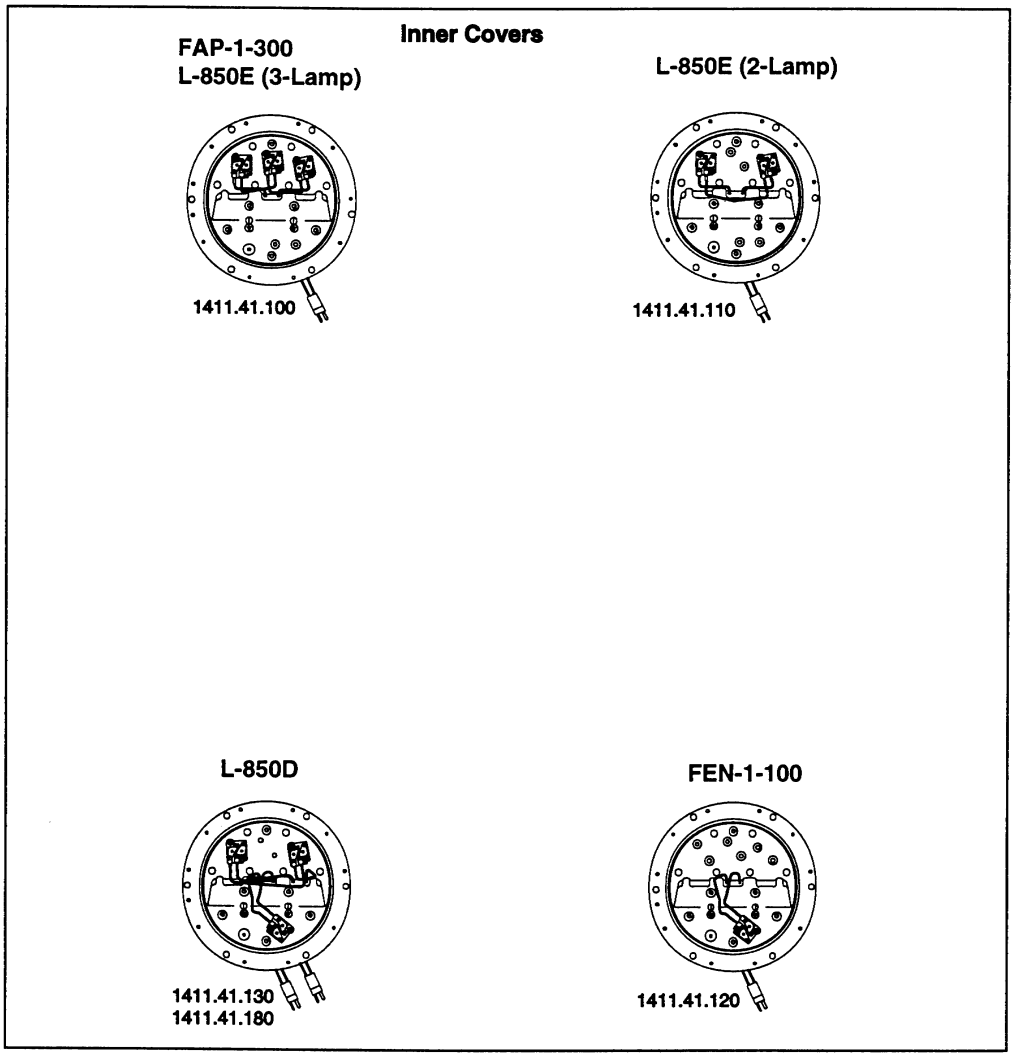
No.	Siemens Airfield Solutions part number	Description	1411.41.xxx								
			100	110	120	130	140	150	160	170	180
E1	1411.21.000	terminal block assembly with fixing hardware and with cut-out	3	2	1	3	2	2	2	2	3
E1	1411.21.010	terminal block assembly with fixing hardware and w/o cut-out	3	2	1	3	2	2	2	2	3
E2	1411.21.140	cable assembly	2	1		1			1	1	2
E3	6111.87.140	female fast-on connector	2	2	2	4	4	4	2	2	2
E4	73A0133-31	FAA L-823 two-pole plug with 48-cm wires AWG 12	1	1	1	2	2	2	1	1	1
E5	4071.62.630	inner cover machined for one cable inlet	1	1	1				1	1	1
E5	4071.62.650	inner cover machined for two cables inlet				1	1	1			
E6	7080.90.650	O-ring seal	1	1	1	1	1	1	1	1	1
E7	6126.01.031	wire grommet	2	2	2	4	4	4	2	2	2
E8	4071.50.090	wire clamp	1	1	1	2	2	2	1	1	1
E9	7110.08.367	Screw THRD M4X10 SCR CR Z/INOXA2	2	2	2	4	4	4	2	2	2
E10	7125.00.450	Screw TFC M5X10 DIN 965-Z INOXA2	10	10	10	10	10	10	10	10	10
E11	4070.77.150	pressure release screw	1	1	1	1	1	1	1	1	1
E12	7080.90.016	O-ring seal	1	1	1	1	1	1	1	1	1
E13	xxxx.xx.xxx	identification plate	1	1	1	1	1	1	1	1	1

The part number for the tool kit for the basic tools necessary for maintenance of the F-Range inset lights is 1411.19.421.

Assemblies, *continued*

Illustrations

The illustration below shows the 12” F-Range inner covers:



Screws Overview

Table The table below gives for each screw used in F-Range 12: the reference on the Exploded view, the type of screw, the tool to use (refer to page 11, “Equipment required for installation”), and the type of “Loctite” when needed and the torque.

Screw	Tool	Loctite	Torque
A1 – 7200.13.806 – Screw FT.HEX 3/8”-16UNC X 7/8”	Socket hex vis 3/8” J.9/16LA	Loctite 270 7870.05.110	21 Nm/ 190 Lb.in
B7 - 7125.00.450 - Screw TFC M5X10 DIN 965-Z INOXA2	Screwdriver, pozidriv AD.2x125	Loctite 270 7870.05.110	3.5 Nm/ 31 Lb.in
B8 - 4071.53.701 - stainless steel cross recess pan head screw M5 x 12	Screwdriver, pozidriv AD.2x125	No	3.5 Nm/ 31 Lb.in
D1 - 7110.08.367 - Screw THRD M4X10 SCR CR Z/INOXA2	Screwdriver, pozidriv AD.2x125	No	3.3 Nm/ 30 Lb.in
D5 - 4071.53.701 - stainless steel cross recess pan head screw M5x12	Screwdriver, pozidriv AD.2x125	No	3.5 Nm/ 31 Lb.in
E9 - 7110.08.367 - Screw THRD M4X10 SCR CR Z/INOXA2	Screwdriver, pozidriv AD.2x125	No	3.5 Nm/ 31 Lb.in
E10 - 7125.00.450 - Screw TFC M5X10 DIN 965-Z INOXA2	Screwdriver, pozidriv AD.2x125	Loctite 222 7870.05.140	4.5 Nm/ 41 Lb.in
E11 - 4070.77.150 pressure release screw	Screwdriver flat blade AG. 8x150	No	4.5 Nm/ 41 Lb.in
Screws delivered with adapter ring for installation on deep base	Socket hex vis 3/8” J.9/16LA	No	21 Nm/ 190 Lb.in

Exploded view

12” L-850D/E F-Range

The illustration below represents the exploded view of an L-850D/E/FAP/FEN 12” F-Range inset light.

(Part references are those used throughout the text of this manual):