Airfield Lighting

Manual

SafeLED IQ Elevated Light

- Approach Centre Line
- Approach Crossbar
- Approach Side Row
- Wing Bar
- Runway End
- Runway Threshold
- Stop Bar

SAFEGATE GROUP

***Note**: This page is blank for convenient double-sided printing.*

SAFELED IQ ELEVATED
MANUAL
CONTENTS

Documentation

This document includes Airfield Lighting information with a focus on safety, installation and maintenance procedures.
For more information, see www.safegate.com.

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

Copyright

History

Version	Date	Description
1.0	December 2011	First release
1.1	July 2011	Second release
1.2	January 2013	Third release
1.3	August 2015	Fourth release
1.4	November 2015	Fifth release

***Note**: This page is to be updated with every authorised change to the document.*

Abbreviations and Terms

This document may include abbreviations and terms.

Abbreviation	Term
CAA	Civil Aviation Authority
CCR	Constant Current Regulator
CU	Concentrator Unit
FAA	Federal Aviation Administration
ICAO	International Civil Aviation Organization
IEC	International Electrotechnical Committee
LED	Light Emitting Diode
LMS	Light Monitor and Switch unit
NATO	North Atlantic Treaty Organization
STAC	Service Technique de l'Aviation Civile (France)
STANAG	Standardization Agreement (NATO)
ASP	Airfield Smart Power
A-SMGCS	Advanced Surface Movement Guidance & Control System
SMGCS	Surface Movement Guidance & Control System

1. INTRODUCTION

SafeLED IQ Elevated is a high intensity, unidirectional, LED-based light fixture. The SafeLED IQ Elevated is equipped with integrated IQ technology, the Safegate ASP system, for easy individual monitoring and control. It has encapsulated electronics and is designed for harsh weather environments with all castings in aluminium, fixings in stainless steel and IP67 protected housing. Few mechanical parts provide easy handling and low maintenance.

1.1 SAFETY INSTRUCTIONS

WARNING! *PRIOR TO THE COMMENCEMENT OF WORK ALL ELECTRICAL SERVICES MUST BE ISOLATED FROM THE SUPPLY AND CONNECTED TO EARTH. FULL DETAILS OF THE WORK INVOLVED MUST BE GIVEN TO THE AUTHORISED PERSON RESPONSIBLE FOR THE ELECTRICAL ENGINEERING SERVICES AT THE AIRPORT WITH REGARD TO THE DURATION OF THE WORK AND SO ON... IT IS RECOMMENDED THAT PRIOR TO STARTING ANY CUTTING WORK THE NATURE AND LOCATION OF SERVICES SUCH AS CABLE DUCTS AND SO ON. SHOULD BE IDENTIFIED ANY INSTALLATION OR MAINTENANCE WORK SHOULD ONLY BE CARRIED OUT BY TRAINED AND EXPERIENCED PERSONNEL*

HIGH LIGHT INTENSITY, DO NOT STARE DIRECTLY INTO THE LIGHT BEAM AT A CLOSE DISTANCE.

1.2 DESCRIPTION OF THE LIGHT FIXTURE

The SafeLED IQ Elevated is a unidirectional high intensity LED fixture provided with optional white, green or red LEDs.

The fixture is made for a 6.6 A constant current version. The electrical connection is with one secondary cable to a transformer with an FAA L-823 plug.

The fixture can be mounted on a 60 mm pole or directly on a frangible collar with 2" NPS or 2" BSP threads.

1.3 SAFELED IQ AND SELECTION OF ISOLATION TRANSFORMER

The isolation transformer power rating is specified at 6.6A. This is another way of specifying the maximum voltage on the secondary side before the transformer saturates.

Example: a **300 W transformer** can deliver a maximum of 300 W / 6.6 A = 45 V before the transformer saturates. When this happens it cannot transfer all current from the primary side to the secondary side.

To find the maximum power rating for the transformer at a lower current,

in our case 2 A, we calculate 45 V x 2 A = 90 VA,

which equals a **maximum load of 90 W at 2 A**.

Example:

Transformer rating at 6.6 A	Max total load at 2 A
45 W	13 W
65 W	19 W
100 W	30 W
150 W	45 W
200 W	60 W
300 W	90 W

The same is true for the power rating in kVA for the CCR.

Example: a **3 kVA CCR** (normally rated for 6.6A) can give maximum

3000 VA / 6.6 A = 454 V.

This gives a rated **maximum output power at 2 A** of

454 V x 2 A = **908 W**. Other aspects can lead to even lower available power.

The secondary load of an isolation transformer in a SafeLED IQ system includes:

- Light fixture load
- Cable losses

1.3.1 Light fixture load

The light fixture load is the total wattage of the light fixture.

AC-E	58 W	Approach Centreline / Crossbar
AS-E	20 W	Approach Side Row
RT-E	53 W	Runway Threshold
RN-E	16 W	Runway End
SB-E	11 W	Stop Bar

1.3.2 Secondary cable losses

The cable, including any extensions, between the isolation transformer and the light fixture adds power losses (here expressed in Watts per meter).

Example of cable losses at different current and different cable areas

	6.6 A Operation	2A Operation
2.5 mm² Cu-wire:	0.6 W/m	0.06 W/m
4.0 mm² Cu-wire:	0.4 W/m	0.04 W/m
***Note**: Secondary cable lengths should not exceed 100 m.*		

1.3.3 Transformer selection guidelines

Calculation Example for transformer selection:

6.6 A mode

Fixture type RT-E: 53 W

Secondary cable length 35 meters, 2.5 mm2, -> 0.6 W/m = 21 W cable power loss

Total load 53 W + 21 W = **74 W**

Max total load for a 65 W transformer is 65 W at 6.6 A.

Result: Transformer rating should be at least **100 W**

2 A mode

Fixture type RN-E: 16 W

Secondary cable length 50 meters, 4.0 mm2 -> 0.04 W/m = 2 W cable power loss

Total load 16 W + 2 W = **18 W**

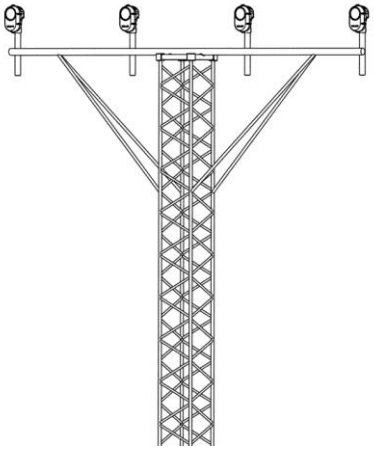
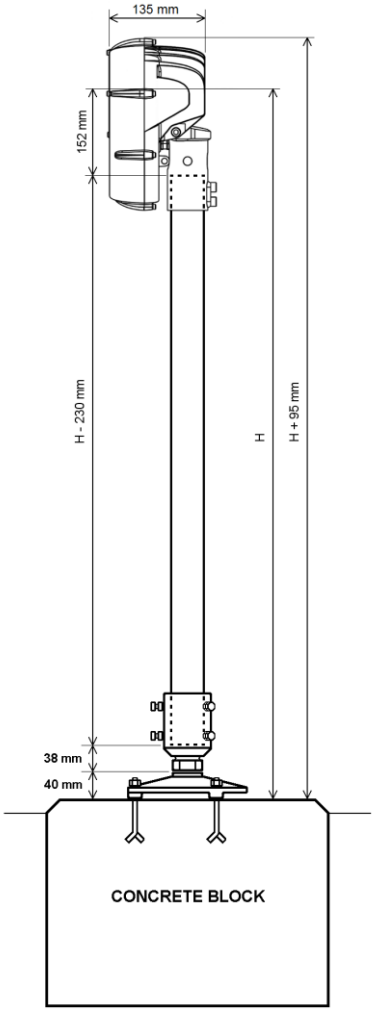
Max total load for a 100 W transformer is 30 W at 2 A.

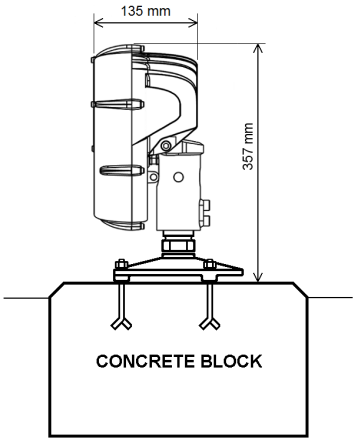
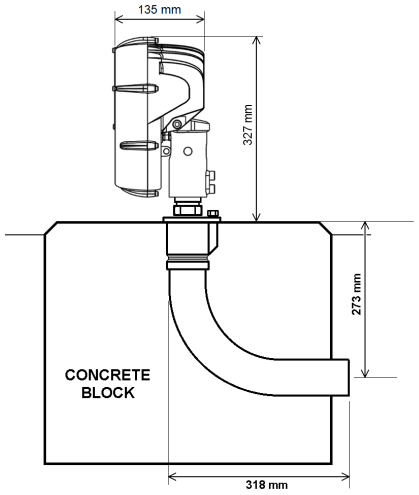
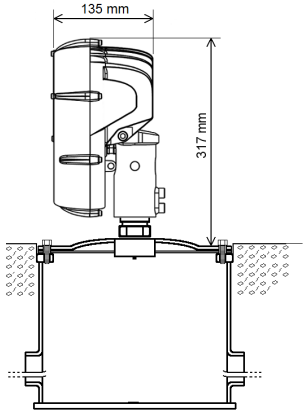
Result: Transformer rating should be at least **100 W**

2. INSTALLATION

2.1 TYPICAL INSTALLATION

The light fixture can be installed on different supports as follows:

Description	Image example
• Above 1.8 m on mast.	 FIGURE 1 – FITTING ON MAST
• Up to 1.8 m on a pole and frangible coupling.	 FIGURE 2 - FITTING ON TRIPOD STAND AND POLE

Description	Image example
• Ground level mounting with a frangible collar on a tripod stand.	 FIGURE 3 – FITTING ON TRIPOD STAND AND FRANGIBLE COLLAR
• Ground level mounting with a frangible collar on conduit elbow.	 FIGURE 4 – FITTING ON CONDUIT ELBOW AND FRANGIBLE COLLAR
• Ground level mounting with frangible collar on FAA deep can and base plate. • On any other support with 2” NPS or 2” BSP thread.	 FIGURE 5 - FITTING ON FAA BASE PLATE AND FRANGIBLE COLLAR

2.2 ANGLE ADJUSTMENT

The recommended standard angles for SafeLED Elevated light fitting can be found in the sections *2.2.1 Azimuth angle* and *2.2.2 Altitude angle*.

2.2.1 Azimuth angle

A) Approach lighting
- Centre Line and Crossbars within 22,5m form the centre line = 0°
- Crossbars beyond 22,5m from the centre line = Toe in of 2°
- Side Row Barrettes = Toe in of 2°

B) Runway Threshold Lighting = Toe in of 3,5°

C) Runway Threshold Wing Bar Lighting = Toe in of 2°

D) Runway End Lighting = 0°

E) Stop Bar Lighting = 0°

2.2.2 Altitude angle

A) Approach Lighting
- Centre Line and Crossbars installed within
  0 to 315m from the threshold = +5,5°
  316m to 475m from the threshold = +6°
  476m to 640m from the threshold = +7°
  641m and beyond from the threshold = +8°

- Side Row Barrettes installed within
  0 to 115m from the threshold = +5,5°
  116m to 215m from the threshold = +6°
  216m and beyond from the threshold = +6,5°

B) Runway Threshold Lighting = +5,5°

C) Runway Threshold Wing Bar Lighting = +5,5°

D) Runway End Lighting = +2,5°

E) Stop Bar Lighting = +4,5°

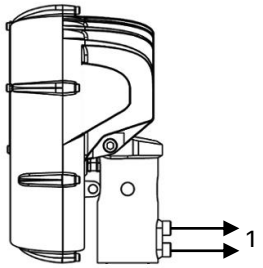
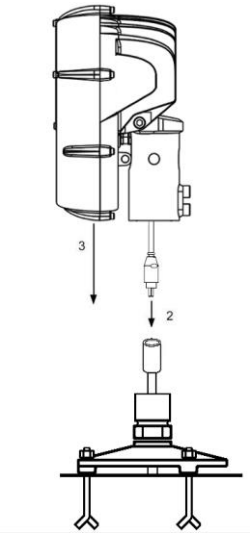
2.3 TOOLS REQUIRED

The following tools are recommended for installation:

- Allen keys
- A wrench
- One brush or cloth

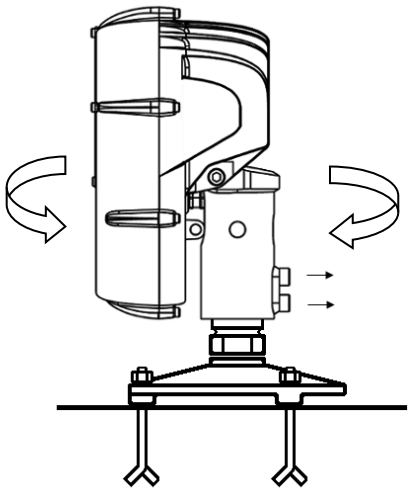
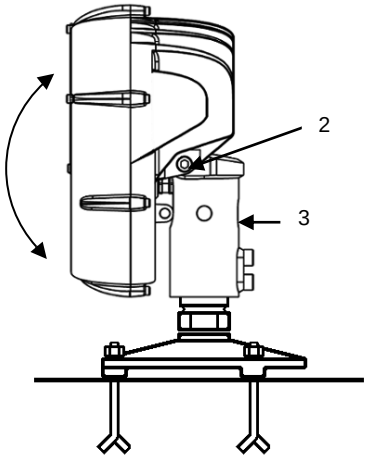
***Note**: Provided that the base intended to receive the light fixture has been properly installed, no other specific tool is required.*

2.4 INSTALL/REMOVE ON/FROM A SUPPORT

Install the light fixture on a support	Image examples
Before you start • Open the box and verify that the characteristics of the light fixture correspond to your design requirements, such as: type, actual installation position, colour, direction and electrical supply.	 FIGURE 6 – PREPARATION
1. Loosen (but do not remove) the 2 setting screws (M10x16mm) on the fixture with an allen key.	
2. Connect the light plug (male) to the power supply cable plug (female). 3. Adjust the light to the horizontal and vertical using the setting screws. Fasten the two setting screws with an allen key, make sure to hold the optical head so it does not turn when fastening the screws. • After installation, check that the light fixture functions properly.	 FIGURE 7 – PLACEMENT

Remove the light fixture from the support
1. Loosen (but do not remove) the 2 setting screws on the fixture with an allen key. 2. Remove the light from its support. 3. Disconnect the light plug from the power supply cable plug.

2.5 SET THE LIGHT

Set the light	Image example
1. Adjust the light horizontally by loosen the two setting screws.	 FIGURE 8 – HORIZONTAL ADJUSTMENT
2. Adjust the light vertically first by loosen (do not remove) the two M10x16mm bolts. 3. Adjust the angle with the vertical setting screw with an allen key Nr. 5 (approximately 2˚ per revolution).	 FIGURE 9 – VERTICAL ADJUSTMENT

2.6 DECLARATION OF THE SIGHT DEVICE

The SafeLED IQ Elevated is a unidirectional light fixture used on airfields to guide moving aircraft. Therefore the direction of the light fixture is important and needs to be aligned both vertically and horizontally. This can be made with the help of a Sight Device placed on the light fixture during installation.

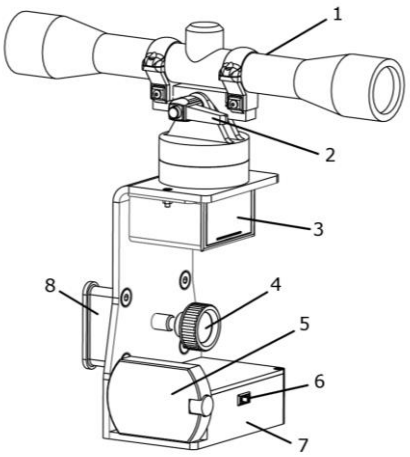
There are two versions of the Sight Device: a manual and a digital version. The digital version is connectable to a computer. This makes it possible to read out the alignment of a light fixture up to 13 meters from the object. The digital Sight Device also makes it possible to align the light fixture without a physical reference point. Magnetoresistive sensors are utilized to provide the reliability and accuracy. The alignment results (horizontal and vertical alignment) are presented on the computer screen in the graphical interface called “The Navigator”.

Both the manual and the digital Sight Device are equipped with an aiming telescope which can be rotated ±360° and has four pre-set steps with an increment of 90° per step, in order to facilitate the horizontal adjusting. They also have an inclinometer helping to adjust the light fixture vertically.

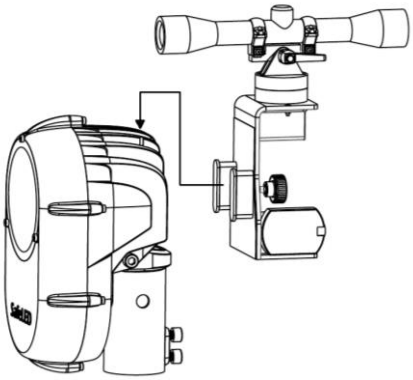
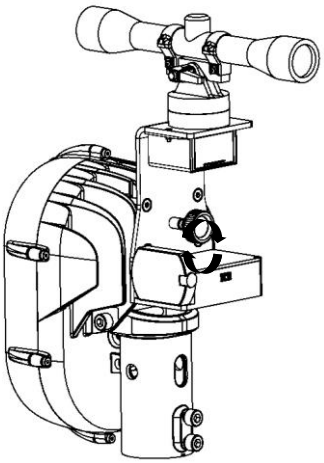
***Note**: The digital output is meant as an aid to the manual adjusting.*

FIGURE 10 – SIGHT DEVICE

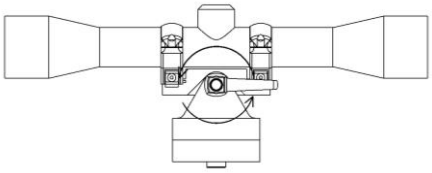
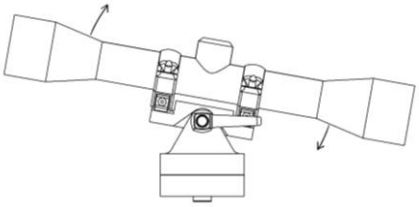
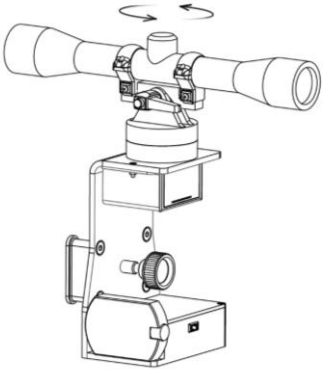
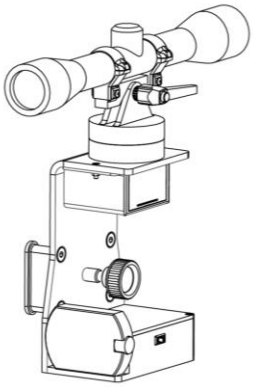
FIGURE 11 – SIGHT DEVICE DIGITAL

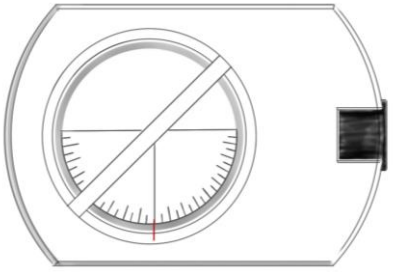
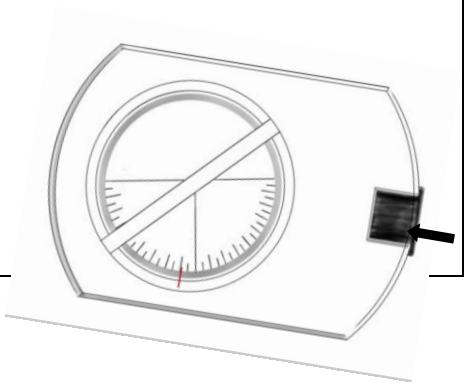
Design	Image example
1. Aiming telescope 2. Mounting screw 3. 9V battery box 4. Set screw 5. Clinometer 6. On/Off Switch 7. Box for the Navigator hardware 8. Rail	 FIGURE 12 – SIGHT DEVICE

2.7 MOUNTING THE SIGHT DEVICE

Mounting the Sight Device	Image example
1. Slide the two rails of the Sight Device into the slots on the back of the flanges. 2. Make sure the rails are all the way down in the slots for highest stability.	 FIGURE 13 – RAILS INTO SLOTS
3. Turn the set screw clockwise until the Sight Device is fastened hard enough not to slide out of the slots. 4. The Sight Device is now ready for operation.	 FIGURE 14 – FASTEN THE SET SCREW

2.8 MANUAL ADJUSTMENT OPERATION

MANUAL ADJUSTMENT OPERATION	Image example
1. By loosen the mounting screw it is easy to adjust the aiming telescopes elevation angle, ±15°. This facilitates the adjustment operation if aiming points doesn't have the same eminence as the telescope.	 FIGURE 15 – LOOSEN THE MOUNTING SCREW
2. After adjusting the aiming telescope elevation angle, make sure to fasten the mounting screw again.	 FIGURE 16 – ADJUSTING ELEVATION ANGLE
3. As mentioned before, the aiming telescope can also be rotated horizontally.	 FIGURE 17 – ROTATION OF AIMING TELESCOPE
4. It can be rotated ±360° and has four pre-set steps with an increment of 90° per step.	 FIGURE 18 – INCREMENT OF 90°

5. Use the clinometer to adjust the light fixture vertically. The Sight Device is designed to make the clinometer and light fixture perpendicular to each other. This makes it easy to read the angle of the fixture.	 FIGURE 19 – CLINOMETER (0°)
6. For best result, use the more accurate scale by looking into the magnifier (see arrow in the figure to the right).	

2.9 DIGITAL ADJUSTMENT OPERATION

2.9.1 SETUP

To set up the Navigator environment, following steps, must be performed. Before starting the adjustment operation:

1. Run the install.exe file and choose a file folder where the program files should be stored for program execution.
2. Connect the hardware to the computer with the enclosed serial port cable. The cable is designed with pins that are not flipped and is NOT a null modem cable.

2.9.2 PROGRAM OPERATION

The following steps are to be performed for program operation:

1. Switch the Navigator power ON.
2. Close down any other programs that could potentially interfere with the rapid serial port communication of the Navigator.
3. Go to the installation directory and run Navigator.exe file to start the program.
4. In the selector for serial ports, choose the serial port which has the Navigator connected to it.
5. The measuring time for the Sight Device can be set from zero seconds and up. Zero seconds will give you continuous update of heading and pitch data. The continuous measure mode is a fast way to roughly adjust the light fixture to the right position. Setting a measuring time between three to five seconds will give a more accurate measure and is recommended to fine tune the position of the LED fixture.
6. If necessary, you can set the heading offset to your desired value at the heading offset input. Default setting is zero offset.
7. Start measurement by clicking on the Measure button.
8. Adjust the pitch angle of the fixture to zero degrees before adjusting the heading.
9. Adjust the fixture to the right pitch angle when the fixture is heading in the right direction.

2.9.3 USER INTERFACE OVERVIEW

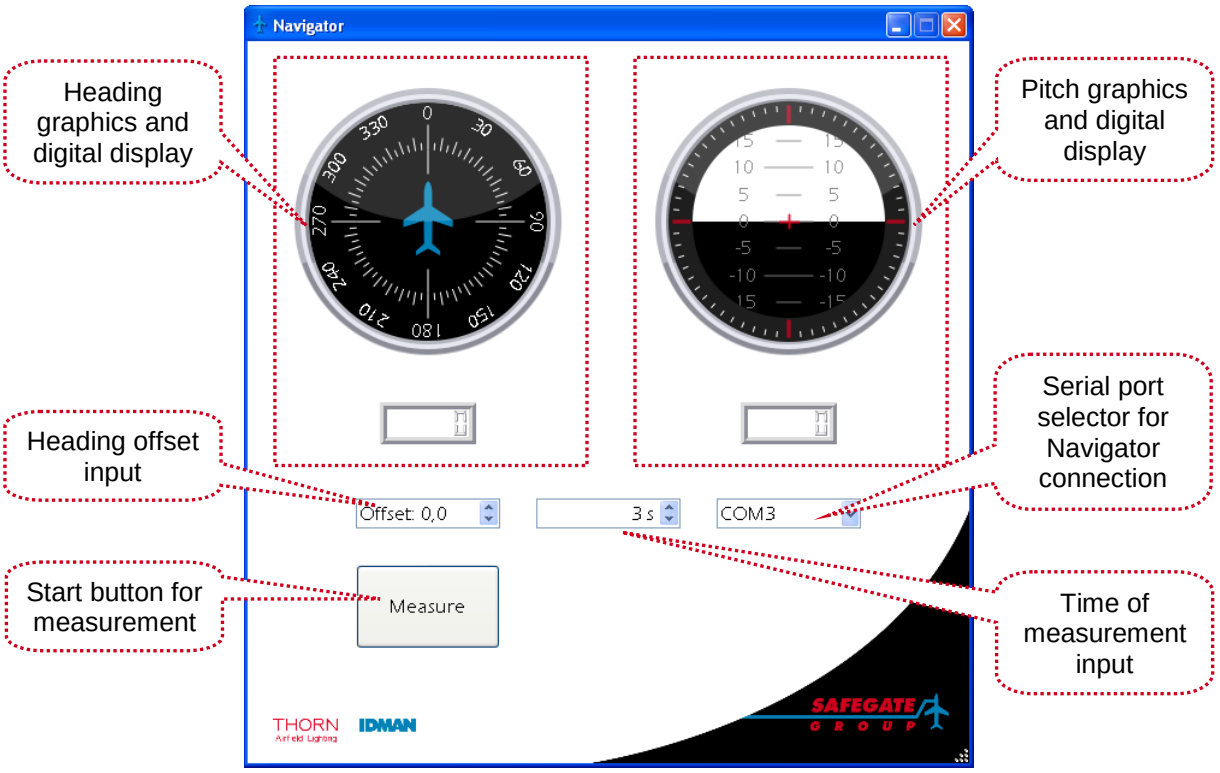


FIGURE 21 – USER INTERFACE OVERVIEW

2.9.4 STATUS BAR MESSAGES

Status bar messages	
Measurement complete	Measurement was successful with stabilized conditions during the selected time of period. No errors occurred. Heading data and pitch data are presented in the graphics and numeral in the digital display shift colour to black.
Signal disturbance, restarting measurement…	Measurement is interfered with ambient disturbances and an attempt to restart measurement is performed. Try to separate the device from interference caused by mobile phones, AC/DC motors, large ferrous metals etc. If measurement fails to elapse, battery power may be low. Make sure you're using a 9 volt battery with at least 24mA current capability.
Measurement aborted due to data loss	A failure occurred when trying to read the data stream from serial port. Check cable connection and power supply. Check that the selected serial port has the Navigator hardware connected to it. Typically, most program hangs will occur in servicing the port and necessitate a power down reset to resume communication.
Device not connected	The Sight Device is not connected to the PC serial port. Check connections or try connecting to a different serial port.

3. OPERATION WITH CONTROL AND MONITORING SYSTEM

3.1 ASP SAFECONTROL SYSTEM TECHNOLOGY

A Safegate ASP-SC system is designed to provide individual monitoring of airfield lighting using the series circuit as a means of communicating status information from airfield lights and sensors. The same concept is used for lighting control providing the foundation for SMGCS or A-SMGCS, which includes for example automation of stop bars with or without sensors, taxiway guidance (routing) in combination with status monitoring. For more information, see ASP-SafeControl documentation.

3.2 SAFELED IQ AND THE 2A CONCEPT

The ASP-SC System, using the IQ concept, is designed to provide selective switching and/or monitoring of airfield lighting by use of an addressable switching unit inside each individually controlled light. A SafeLED IQ light is connected to the secondary side of a standard series circuit isolation transformer. Communications to/from a SafeLED IQ light uses a unique power line communication technique developed by Safegate Group where the communication signals are superimposed on the series circuit current.

In a 2A system the CCR is set at a low constant current and the ASP-SafeControl manages the intensity level of every single SafeLED IQ light fixture. Furthermore the SafeLED IQ light fixtures could have different light intensity levels in the same circuit.

3.3 SENSOR INTERFACE UNIT (SIU)

Sensors for presence- and direction detection of aircraft and vehicles on the airfield can easily be interfaced to the ASP-SC system using an SIU. The SIU communicates the detect/no-detect status signals as well as its own status to the series circuit in the same manner as the SafeLED IQ. The SIU is also connected to the secondary side of a standard isolation transformer using a standard 2-pin FAA-style connector. Connection to the sensor is established using an IP68 rated 7-pin connector. The SIU can also supply the sensor with DC-voltage from a built-in current to voltage converter.

3.4 NETWORK CONCENTRATOR UNIT (NCU)

The NCU concentrates all incoming status information from the field, both lamp and sensor statuses. The NCU includes redundant capability.

3.5 SERIES CIRCUIT MODEM (SCM)

The SCM is an interface to the series circuit which receives command from an NCU. The SCM connects to the series circuit via a standard isolation transformer and to an NCU via standard RS485 or RS232 serial communication.

3.6 SERIES CIRCUIT FILTER (SCF)

The SCF is connected across the Constant Current Regulator (CCR) series circuit output and is used to contain the communication signalling within the airfield circuit and minimize feedback into the regulator.

3.7 CONTROL SYSTEM INTERFACE

The NCU operates as the ASP-SC system main interface interpreting commands sent from the Host/Supervisor System (including the Safegate ASP-SC system) and in turn controlling the appropriate SafeLED IQ as directed. It maintains all lighting and error status, sensor detections as reported from the airfield components and is the central point of the ASP-SC system as operated from each vault. Individual lights can be grouped in lighting segments spanning one or more series circuits, for example an interleaved stop bar. In turn, the NCU provides alarm status for percentage and adjacent lamp failure within those defined lighting segments per requirements for low visibility operations. Airfield lighting and ASP-SC system component status are constantly monitored and updated to the Host/Supervisor system upon occurrence.

3.8 PROGRAMMING SAFELED IQ

SafeLED IQ can be delivered as a pre-programmed unit with field position information and monitor/control parameter settings.

The SafeLED IQ can also be programmed during maintenance or updated remotely from the sub-station if installed in a circuit using the Wake on Circuit function.

3.8.1 Hardware Equipment Set up

The following hardware is required for SafeLED IQ programming:

- SCM – Series Circuit Modem.
- LPC – SafeLED IQ/Sensor Interface Unit (SIU) Programming Control unit.
- Cable(s) – power and communication.
- PC – including ASP-SC Maintenance Tool (AMT) software for programming.

The following are instructions how to set up the hardware equipment required for SafeLED IQ programming.

Connect the LPC unit to SCM unit

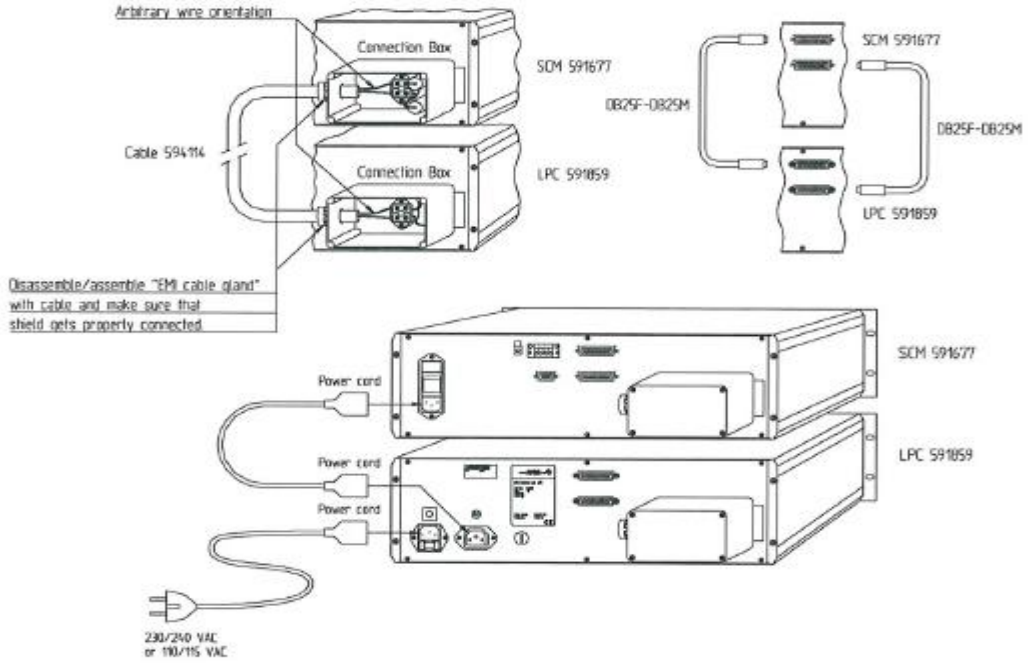


FIGURE 22 – HW SETUP FOR PROGRAMMING

1. Check the voltage selector is in the appropriate position: 120 or 240 V.
2. Connect the LPC unit to the SCM unit using the cables supplied.
   Connections are made at the rear of each unit.

Connect a PC to the SCM unit

- Using the cable supplied (RS-232), connect the shorter cable end with LOAD/RESET (591836) to the PC and the longer cable end to the LPC.

***Note**: For more information, see the marking on the LOAD/RESET box.*

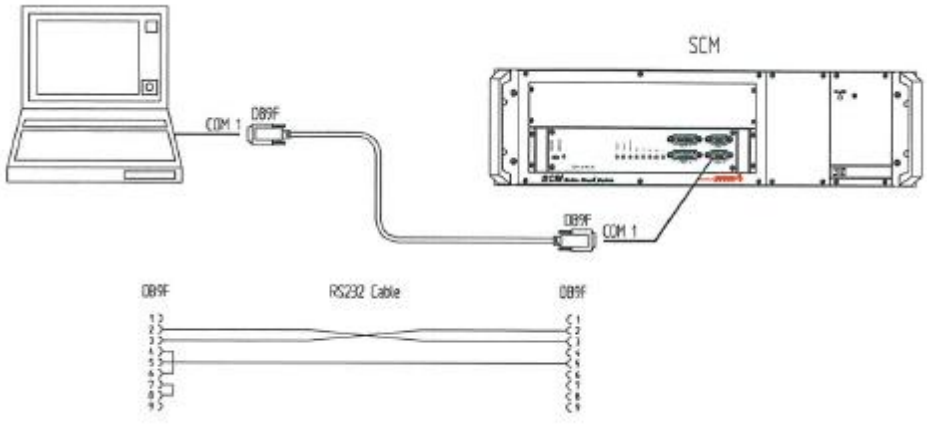


FIGURE 23 – CONNECT PC TO SCM

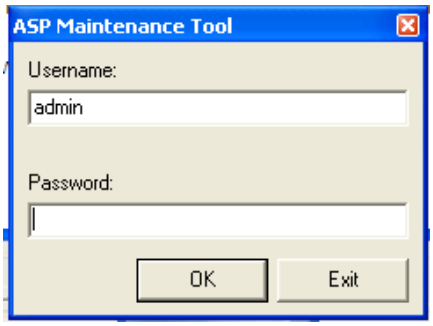
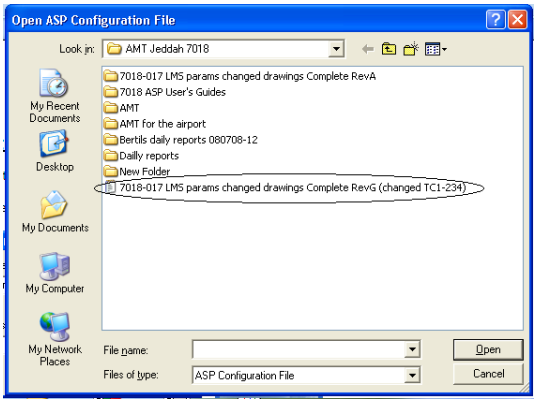
Connect the LPC to a SafeLED IQ product

FIGURE 24 – CONNECT LPC TO LIGHT

1. Using the cable supplied (594115), connect to **Output 1** or **Output 2** to a SafeLED IQ product. ***Note**: The Short Circuit Plug should be connected to the output NOT in use, either **Output 1** or **Output 2**. The two outputs are connected in series to give equal functionality.*
2. Make sure the **Remote** button on the LPC is NOT pressed before you start programming.
3. Turn on the **Power** button.

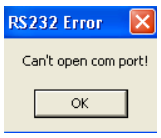
3.8.2 Software Programming

ASP-SC Maintenance Tool (AMT) software is required for SafeLED IQ product configuration. The following are instructions how to use AMT software (version 3.3 or later) for SafeLED IQ product configuration.

Program a SafeLED IQ product	
1. Make sure the Remote button on the LPC is NOT pressed in (off) before you start programming. 2. Start the AMT program on the PC and if **Can't open COM port** appears, click **OK**.	 FIGURE 25 – AMT START
3. Enter the following information: Enter Username: for example, **guest** Enter Password: ******** for example, **safegate** ***Note:*** *User name and password may differ.* 4. Click **OK**.	 FIGURE 26 – AMT LOGIN
5. Chose the text file with the required airport and light to use. 6. Select the file and click **Open**.	 FIGURE 27 – AMT TEXT FILE

7. Select to use the correct COM-port, if required.
   ***Note**: To check which COM-port is in use on your PC, go to windows **Start**, right click on **My computer** and select **Properties**. Select the **Hardware** tab and click **Device Manager**. Select **Ports (COM & LPT)** to view the COM-port in use, for example **USB to Serial bridge (COM 2)**.*
8. Set the connection to **LPU**.

***Note**: If an **RS232 Error** window appears, click **OK**.*



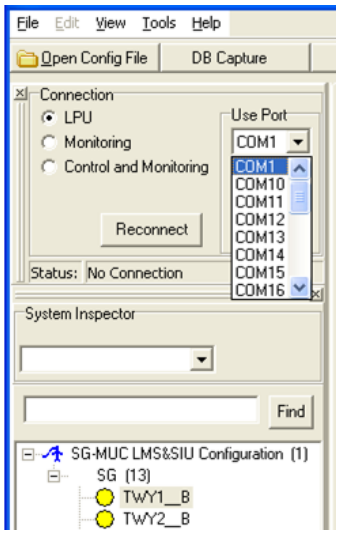


FIGURE 28 – AMT COM PORT

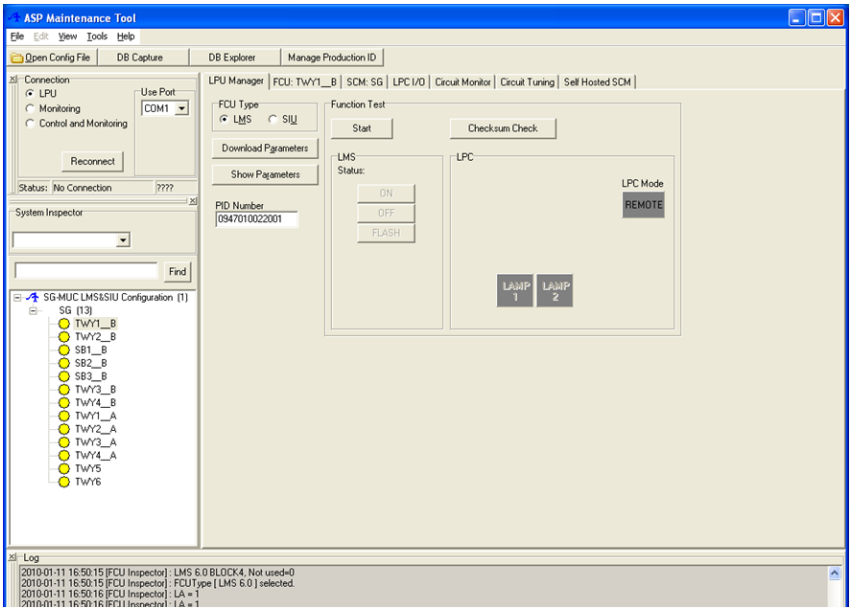


FIGURE 29 – AMT TOOL

9. Check the **LPU** tab (default) appears in the upper area of the window.
10. From the configuration list (to the left), select the circuit name, for example SG (11) and then the light parameter name to configure, for example, SB1_B.
    ***Note**: Product may require configuration of both sides or only one side. Parameter name __A is for A-side and __B is for B-side of SafeLED IQ.*

11. Check the SafeLED IQ for the Production ID (**PID**) number.

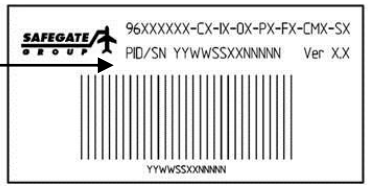


FIGURE 30 – CHECK PID

12. From the LPU Manager tab, enter the **PID Number** in the text field, manually or using a bar code reader.
***Note**: The number corresponds to the product information number found on the bottom of the SafeLED IQ, as in the previous step.*

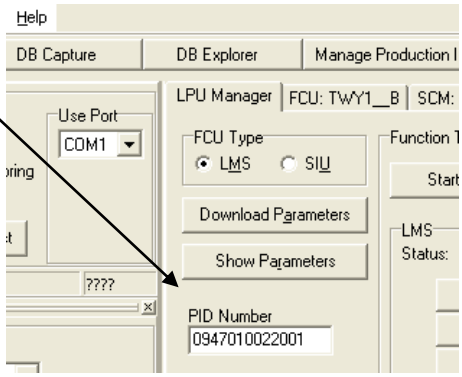


FIGURE 31 – AMT ENTER PID

13. Click **Download Parameters**, to start an automatic parameter download.

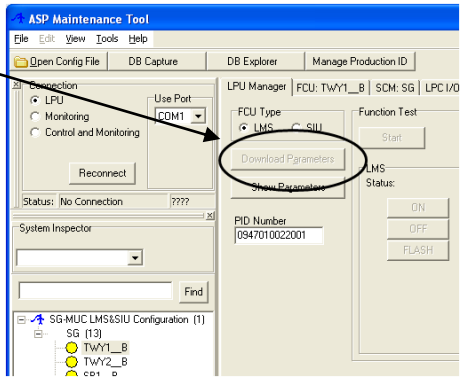


FIGURE 32 – AMT DOWNLOAD PARAMS

14. Click **Continue** to confirm parameter download.
15. The SCM unit should now sound and configuration progress information appears in the log at the bottom of the window.
***Note**: If there is no sound from the SCM during configuration, check settings for example COM port or cables.*

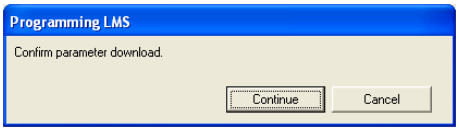


FIGURE 33 – AMT CONFIRM PARAMS

16. When downloading the parameters is complete, a checksum check starts to ensure the SafeLED IQ has received the new parameters without fault.
If the unit without fault,
click **OK** and the unit is now ready to use.

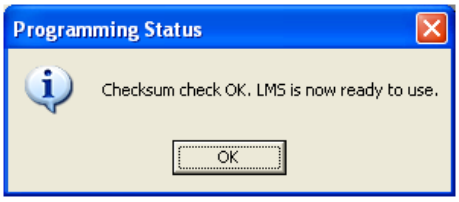


FIGURE 34 – AMT CHECKSUM

17. Disconnect the SafeLED IQ product cable.

18. Turn off the SCM, LPC for at least 30 seconds to fully power down the SafeLED IQ or when no more SafeLED IQ products are to be configured.

19. Turn on the LPC to power up the SafeLED IQ, for example an RGL, set to flash as default, should flash.

3.9 CONNECTION IN A SERIES CIRCUIT

3.9.1 Operational characteristics

The extent of use of all SafeLED IQ functionality is determined by the application. All functionality described in this document is not necessarily used at a specific installation. This section is a summary of common functionality available in SafeLED IQ light fixture.

3.9.2 Power On or Default State

The SafeLED IQ light fixture is configured to a predefined state when the series circuit is energized. This feature is called *default state* and the options are LAMP ON, LAMP OFF or LAMP FLASHING. The option to select depends on the light function for a SafeLED IQ light fixture and the operative requirements.

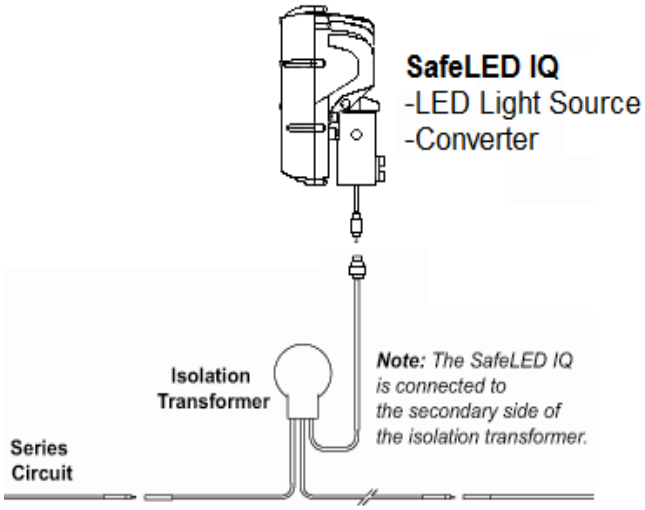


FIGURE 35 – SERIES CIRCUIT CONNECTION

3.9.3 Safe State

If communication between the SafeLED IQ and the SCM is interrupted or lost, IQ functionality (after a programmable timeout) sets the lamp to a predefined state known as **safe state**. Safe state can be set to **LAMP ON**, **LAMP OFF**, **LAMP FLASHING** or **no change**.

3.9.4 Command Memory

When current in the series circuit is lost, for example if a CCR is turned off or for any other reason, SafeLED IQ remembers the current lamp status for a limited amount of time. The IQ can be configured, once current is restored in the circuit, to set the lamp to the previous state, typically the last commanded state before a power loss. This feature, when enabled, overrides the default state.

It is possible to apply a condition based on the amount of time current was lost. The SafeLED IQ sets the lamp to the default state if current was restored beyond this time limit. The time limit is programmable from 1 to 20 seconds approximately.

3.9.5 SoftON/SoftOFF

The SafeLED IQ can be programmed to delay the physical turning on or off of the lamp upon reception of a command from the SCM. The purpose of **SoftON/SoftOFF** is to mitigate the sudden load change to which the CCR is subjected when a large portion of the load is commanded on or off with a single command. The command acknowledge from the SafeLED IQ is unaffected, and thereby neither is the response time. Without this feature it may not be possible to turn on/ off all or most of the lights on a circuit with a single command, without the CCR tripping because of over- or under-current.

The physical delay is programmable on an individual level in 10ms increments. There is no response time impact when **SoftON/SoftOFF** is enabled.

4. MAINTENANCE

4.1 BEFORE YOU START

WARNING! *WHEN A LIGHT FIXTURE HAS BEEN REMOVED FROM ITS BASE, THE BASE MUST BE EITHER FITTED WITH A COVER OR A RESERVE LIGHT FIXTURE PUT IN ITS PLACE.*
IT IS RECOMMENDED THAT ONLY AUTORIZED PERSONNEL DISASSEMBLE LIGHT FIXTURES WITH PRIOR AGREEMENT FROM SAFEGATE.

4.2 BASIC MAINTENANCE

The following are recommended maintenance tasks to ensure equipment is in correct operating condition.

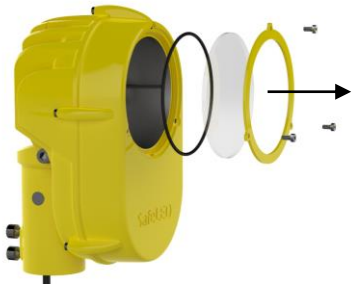
- Visual inspection of the light fixture.
- Remove dust from exposed surfaces of the light fixture.
- Checking the proper fixing of the light fixture on its support.
- Detailed inspection of the light fixture.
- Checking of the glass and housing for damage.

4.3 TOOLS REQUIRED

- Allen keys
- Torque Wrench
- One brush or cloth (General cleaning).

4.4 REPLACE THE GLASS

Before replacing the glass, see section 4.1 BEFORE YOU START.

Replace the glass	Image examples
Disassemble 4. Unscrew the 3 screws (M5x8) on the front and remove the front plate. 5. Remove the glass. 6. Remove the O-ring gasket.	 FIGURE 36 – DISASSEMBLE GLASS
Assemble 7. Place a new O-ring gasket in position. 8. Place the new glass in position. 9. Place the front plate in position. 10. Fasten the screws on the front plate with a torque of 6 Nm.	 FIGURE 37 – ASSEMBLE GLASS

4.5 REPLACE THE LED BOARD

Replace the LED board	Image examples
Disassemble 11. Disassemble the front, by loosen the five screws (M5x25) from the back using an allen key Nr. 4. 12. Remove the front and the gasket. 13. Unscrew the screws (M4x6) in the LED board with an allen key Nr 3. 14. Disconnect the cable to the LED board. 15. Use a flat screw driver to put pressure on the side of the LED board from the track where the cable went through.	 FIGURE 38 – DISASSEMBLE LED BOARD
Assemble 16. Remove the old interface material from the surface were the LED board was mounted (a razor blade can be useful). 17. Place the LED board in position and fasten the screws with the spring washers with a torque of 3.5 Nm. 18. Connect the cable to the LED board. 19. Replace the gasket between the front and the back. 20. Assemble the front, fasten the screws with a torque of 6 Nm.	 FIGURE 39 – ASSEMBLE LED BOARD

4.6 REPLACE THE CONVERTER

4.6.1 Version 1, trafo converter

Replace the converter	Image examples
Disassemble 21. Disassemble the front, by loosen the five screws (M5x25) from the back using an allen key Nr. 4. 22. Remove the front and the gasket. 23. Unscrew the screws (M4x20) holding the converter with an allen key Nr 3. 24. Detach blade receptacles from converter. 25. Detach LED cable from LED board.	 FIGURE 40 – DISASSEMBLE LED BOARD
Assemble 26. Remove the old blade receptacle from the cable and remove cable and cable gland. 27. Mount new cable and cable assembly according to instruction (48000877). 28. Attach the secondary cable to the converter using the provided insertion tool according to instruction (48000877). 29. Fasten the converter to the back housing using 2 pcs M4x12 DIN912/ISO4762 screws, torque: 2 Nm. 30. Attach LED cable to LED board. 31. Assemble the front, fasten the M5x25 screws with a torque of 6 Nm.	 FIGURE 41 – ASSEMBLE LED BOARD

4.6.2 Version 2, High Power Converter

Replace the converter	Image examples
Disassemble 32. Disassemble the front, by loosen the five screws (M5x25) from the back using an allen key Nr. 4. 33. Remove the front and the gasket. 34. Unscrew the M4x12 DIN912/ISO4762 screws holding the converter with an allen key Nr 3. 35. Detach LED cable from LED board.	 FIGURE 42 – DISASSEMBLE CONVERTER
Assemble 36. Attach the secondary cable to the converter using the provided insertion tool. 37. Fasten the converter to the back housing using 2 pcs M4x12 DIN912/ISO4762 screws, torque: 2 Nm. 38. Attach LED cable to LED board. 39. Assemble the front, fasten the M5x25 screws with a torque of 6 Nm.	 FIGURE 43 – ASSEMBLE CONVERTER

5. SUPPORT

Safegate Group Website

The Safegate Group Website, www.safegate.com, offers information regarding our airport solutions, products, company, news, links, downloads, references, contacts and more.

5.1 RE-CYCLING

Local Authority Re-cycling

The disposal of Safegate Group 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.

Safegate Group Re-cycling

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

Safegate Group 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 labelled as follows:

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

Safegate Group 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.
***Note**: For more information, see www.safegate.com, or contact Safegate Group Support via email at support@safegate.com or phone +46 40 699 1740.*

5.2 SPARE PARTS

Spare parts are available for Airfield Lighting light fixtures. For more information see the Spare Parts List document.

***Note**: Contact Safegate Group for assistance with ordering spare parts.*

***Note**: This page is blank for convenient double-sided printing.*

Check in to the future

How many aircraft can your airport handle today?
Can this number be increased without adverse effects on the airport's safety level?
It is a known fact that traffic volume will rise in the foreseeable future. More movements will demand monitoring of the entire airport. Requirements will be sharpened and the development of an integrated system controlling not only ground movements but also air traffic close to the airport is of the highest interest.
The International Civil Aviation Organization (ICAO) already describes A-SMGCS, Advanced Surface Movement Guidance and Control System, as the answer to the future modern airport need to control the entire airport space in one superior system.

To a larger extent than today's systems, A-SMGCS will rely on automated processes to give both pilots and traffic controllers exact information about positions and directions. Safegate Group delivers complete A-SMGCS solutions already, as well as all vital parts relating to it.
Safegate Group can check your airport into the future – today!

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SAFEGATE GROUP

Safegate Group offers solutions for increased safety, efficiency and environmental benefits to airports worldwide. The company was founded in 1973 and has its headquarters in Malmö, Sweden. Safegate Group has more than 70 partners around the globe in order to be close to its customers.
Earlier members of Safegate Group include Thorn AFL and Idman, who both have over 40 years of experience in airfield lighting solutions for airports and heliports. The latest member of Safegate Group is Avibit, a leading provider of next generation software applications and integration of efficient air traffic control systems. Safegate Group's complete range of products and services, a "one-stop shop", provides solutions to customers and airborne travellers around the globe.

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