Airfield Lighting

Manual

PAPI – Precision Approach Path Indicator (IDM 6005)

- 2-Lamp, 1-Leg Sharp Transition Device
- 2-Lamp, 4-Leg Sharp Transition Device

THORN Airfield Lighting IDMAN

SAFEGATE GROUP

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

MANUAL

PAPI – PRECISION APPROACH PATH INDICATOR

(IDM 6005)

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Documentation

This document includes Elevated Lights 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	November 2010	First Release
1.1	March 2014	Second 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)

1. INTRODUCTION

In this section you can find a general description and safety instructions related to the installation and usage of the unit.

The precision approach path indicator systems IDM 6005 are designed to give visual indications of the desired approach slope. Possible system configurations are APAPI, PAPI on the left side of the runway and PAPI on both sides of the runway, if visual roll guidance is needed but not provided by other external means. The system is to be provided if one or more of the following conditions exist:

- Turbojets or other aeroplanes with similar approach guidance requirements use the runway.
- Pilot has difficulties due to inadequate guidance or misleading information.
- Obstacles in the approach area involve serious hazard if an aeroplane descends below the normal approach path.
- Physical conditions cause a hazard at either end of runway in the event of possible overrun or undershoot.
- Terrain or meteorological conditions cause unusual turbulence to the aeroplane during its approach.

The unit have many advantages and special features:

- Separate dust filter - clean optics under all conditions.
- Accurate transition sector - 2,5 minutes of arc.
- Housing meets the highest standard in dust tightness.
- Frangible couplings in the legs and light weight - minimized risk of damage.
- Fast, accurate, reliable and easy to check vertical alignment with electronic clinometer.
- Easy installation and horizontal alignment due to H-frame construction in 4-leg version

1.1 SAFETY INSTRUCTIONS

Make sure you read this section and are familiar with safety precautions before any work is started.

1.1.1 Product Safety

Airfield lighting fixtures in a constant current circuits are connected in a circuit via isolating transformers with currents between 2.0 – 6.6A in the primary circuits.. The primary voltages, depending on the circuitry, are usually several kilovolts and therefore lethal. Although the open circuit voltages of the isolating transformers are much lower, the peak voltage while opening the secondary circuit under current is also hazardous. So it is vitally important to follow all the safety regulations with adequate circumspection.

In the design of this equipment all the practical safety aspects have been taken into account. It is also important to strictly follow existing international or national regulations, the instructions established by civil aviation authority or airport operator and the following instructions.

1.1.2 Electrical Maintenance

Valid safety regulations must always be followed. Never carry out any maintenance or maintenance measures before the current is confirmed as safely disconnected. Use extreme caution when disconnecting or connecting high voltage primary connectors.

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 THE LIKE SHOULD BE IDENTIFIED. ANY INSTALLATION OR MAINTENANCE WORK SHOULD ONLY BE CARRIED OUT BY TRAINED AND EXPERIENCED PERSONNEL. ALSO, WHEN WORKING ON CIRCUITS USING AIRFIELD SMART POWER SYSTEM (ASP) THE SCM MUST BE TUNED OFF.*

1.1.3 Mechanical Maintenance

When maintaining mechanical components, it is important to follow the instructions for electrical maintenance.

1.2 DESCRIPTION OF THE FITTING

The IDM 6005 is a sharp transition device for PAPI systems.

1.3 DELIVERY OF THE UNIT

Each unit is supplied completely assembled, tested and sealed, ready for installation.

The electrical connection is made via one cable assembly. The cable is equipped with an FAA L-823 style 5 plug.

Each unit is individually packed in a durable cardboard box, labelled with its reference name and code.

Overview of lights

Light	Colours	Power	Description
IDM 6005	C/R	2x200W	1 leg, built-in vertical alignment device
	C/R	2x200W	1 leg, inclinometer alignment
	C/R	2x200W	4-leg

For more information, see www.safegate.com.

2. INSTALLATION

In this section you can find a description of the different steps for successful installation of the unit. Before you start, make sure you have read and understand §1.1 Safety Instructions.

When removing the unit from its packaging box, check that nothing is broken.

The screw tapping of the frangible support can be either 2 in. NPS (American standard - 11.5 threads per inch) or 2 in. BPS (British standard - 11 threads per inch). Check support and base tapings fit.

The following tools and accessories are required for installation and removal of the unit:

Standard tools and accessories:

- Keys openings 10, 13, 17, 19 and 22 mm
- Key for housing
- Pointed pliers
- Screwdriver
- Spirit level

Special tools and accessories:

- Alignment device IDM 6475 and electronic clinometers (for 4-leg only)
- Socket 19 mm, T-wrench and extension piece (for 4-leg only)

The installation steps refer to:

1. Installing the mounting frame
2. Installing and aligning the unit
3. Aligning the unit with electronic inclinometer
4. Making connections

2.1 INSTALLING THE MOUNTING FRAME

Determining the exact PAPI sitting is referred to ICAO Annex 14 Volume I 5th edition 2009, Aerodrome Design Manual Part 4 Visual Aids, 4rd edition 2004, National/local authorities regulations and recommendations, Design/survey drawings and other relevant material for the particular application.

The foundation of the PAPI unit has to be 900 mm x 700 mm rectangular or ø 1000 mm circular concrete base with a root, deep enough not to be affected by frozen ground or flooding water. The surface of the concrete base should be smooth to enable secure fixing of the installation frame. For specifying the location and installation tolerances refer to § 2 Installation).

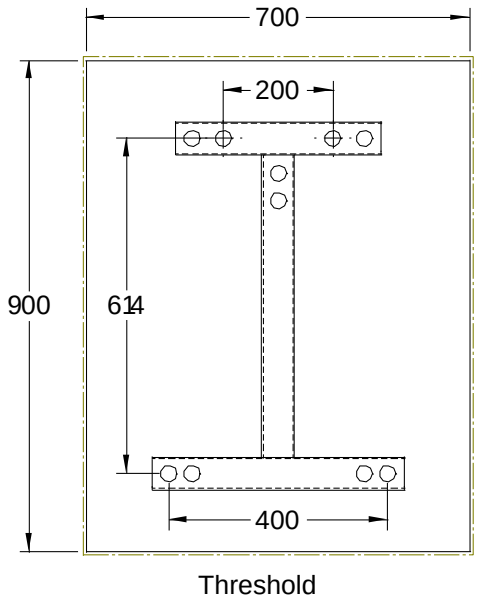


FIGURE 1 – INSTALLATION OF THE MOUNTING FRAME

2.2 INSTALLING AND ALIGNING THE UNIT

2-lamp, 1-leg unit

(a) Mark the anchor bolt locations to the foundation with the help of the base plate. Note the direction of the base plate.

(b) Drill adequate holes to the foundation and put anchors to the holes.

(c) Fasten the base plate to the basement with six M10x85 bolts.

(d) Fasten the PAPI unit to the base plate with three bolts.

(a) Untighten the screws and adjust the unit so that it will be parallel to the runway centerline.

(b) Tighten the screws.

(c) Adjust the vertical position of the unit with the built-in spirit level so that the bubble settles in the middle of the marking lines.

(d) Check that the unit is precisely on a horizontal plane by using an additional spirit level on the top of the lens and reflector assembly.

(e) Open the locking nut of the built-in alignment device and adjust the pointer to the desired angle according to the location of the unit.

Note: *Angles are marked on the scale in 5 angular minute intervals.*

(f) Fasten the locking nut.

(g) Open the locking wing nuts.

(h) Adjust the unit to the desired angle by turning the adjusting wing nut so that the bubble settles in the middle of the marking lines.

(i) Tighten the locking wing nuts.

(j) Check that the adjustments have not changed during the tightening.

(k) Close the housing of the unit.

(l) Attach the dust filter if not done already at factory.

(m) Remove the seal cap from the bottom of the dust filter.

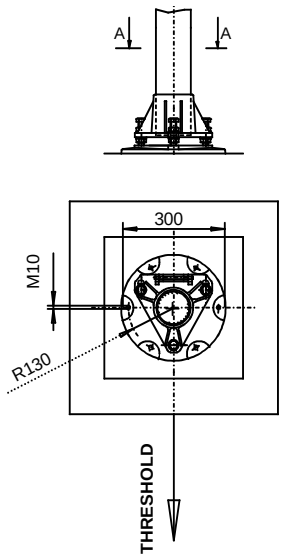


FIGURE 2 – INSTALLATION ON A BASE PLATE

2-lamp, 4-leg unit

(a) Place the mounting frame on the foundation.

(a) Place the alignment device on the frame.

(b) Fasten the thumb screws.

(a) Align the frame horizontally by the aid of an aiming point.

(b) Mark the anchor bolt locations to the foundation with the help of the mounting frame.

(c) Drill adequate holes to the foundation and put anchors to the holes.

(d) Fasten the mounting frame to the foundation with four M10 nuts.

(e) Before final tightening check the horizontal alignment with the alignment device.

(f) Place the legs to the clamping bushes and tighten the fastening screws.

(g) Remove the alignment device from the mounting frame.

(h) Unlock and remove the cover of the PAPI unit.

(i) Place the unit on the legs and attach the fixing screws.

(j) Place a spirit level on top of the lens assembly and reflector assembly and adjust the horizontal level of the unit by loosening the fastening nuts and turning the links of the legs.

(k) Fasten the nuts when both ends of the unit are adjusted.

(l) The height of the front glass centre point can be adjusted by loosening the fastening nuts and turning the link equally on both front legs. Check the horizontal level on top of the lens assembly and tighten the fastening screws.

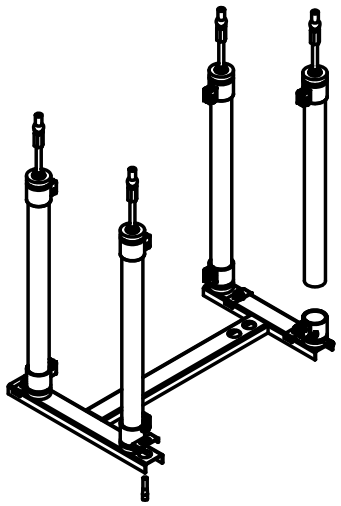


FIGURE 3 – INSTALLATION ON A MOUNTING FRAME

2.3 ALIGNING THE UNIT WITH AN ELECTRONIC INCLINOMETER

2-lamp, 1-leg unit

(a) Read carefully the *Operator's Manual* supplied with the electronic inclinometer.

(b) Switch on the inclinometer and set the display mode to show either degrees, decimals or degrees minutes depending on the manner how the setting angles are established.

(c) Mark the anchor bolt locations to the foundation with the help of the base plate.

(d) Drill adequate holes to the foundation and put anchors to the holes.

(e) Fasten the base plate to the basement with six M10x85 bolts.

(f) Fasten the PAPI unit to the base plate with three bolts.

(g) Open the screws and adjust the unit so that it will be parallel to the runway centerline.

(h) Tighten the screws.

(i) Check that the unit is precisely on a horizontal plane by using an additional spirit level on the top of the lens and reflector assembly. Adjustment is done using the fastening bolts and nuts.

(j) Place the inclinometer on the reference plane inside the luminaire so that the longer edge of the inclinometer is parallel to the edge of the reference plane.

(k) Make sure that the inclinometer is set to absolute measurement mode.

(l) Open the locking wing nuts.

(m) Adjust the unit to the desired angle by turning the adjusting wing nut so that the inclinometer, which is placed on to the reference plane, shows the desired setting angle.

(n) Tighten the locking wing nuts.

(o) Check that the adjustments have not changed during the tightening.

(p) Close the housing of the unit.

(q) Attach the dust filter if not done already at factory.

(r) Remove the seal cap from the bottom of the dust filter.

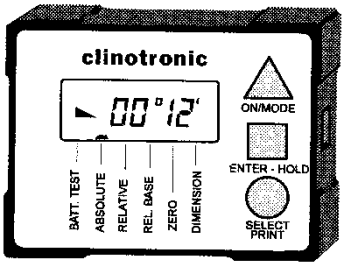
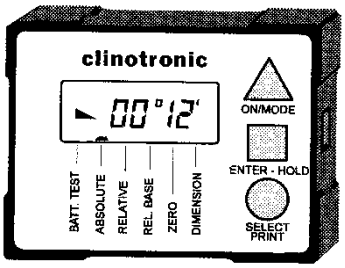


FIGURE 4 – ELECTRONIC INCLINOMETER

2-lamp, 4-leg unit	
(a) Read carefully the Operator's Manual supplied with the electronic inclinometer. (b) Switch on the inclinometer and set the display mode to show either degrees, decimals or degrees minutes depending on the manner how the setting angles are established. (c) Place the inclinometer on the reference plane inside the luminaire so that the longer edge of the inclinometer is parallel to the edge of the reference plane. (d) Make sure that the inclinometer is set to absolute measurement mode. (e) Adjust the luminaire to the desired vertical setting angle by loosening the fastening nuts of the rear legs and adjust by turning the links equally on both rear legs. **Note:** *When setting the vertical angle, the horizontal level must be simultaneously observed by placing a spirit level on top of the reflector assembly.* (f) When correct angle is achieved check once more the horizontal level both in front end and rear end of the luminaire. (g) Check that the adjustments have not changed during the tightening. (h) Check the simultaneous transition of the channels using low current and wearing dark eye protection lenses by watching towards the luminaire at a distance of 10 -15 m at different heights. (i) Close the housing of the unit. (j) Attach the dust filter if not done already at factory. (k) Remove the seal cap (if existing) from the bottom of the dust filter.	 FIGURE 5 – ELECTRONIC INCLINOMETER

2.1 MAKING CONNECTIONS

2.1.1 Supply Connections

Description
(a) Connect the luminaire cables from the transformer through the entries to the terminal blocks as follow: Pin 1: White Pin 2: Black (b) Tighten the cable glands. (c) Plug in the connectors of the lamps. (d) If the heating cable is installed, connect the earthing to the pin 1 of the heater terminal block.

Image example

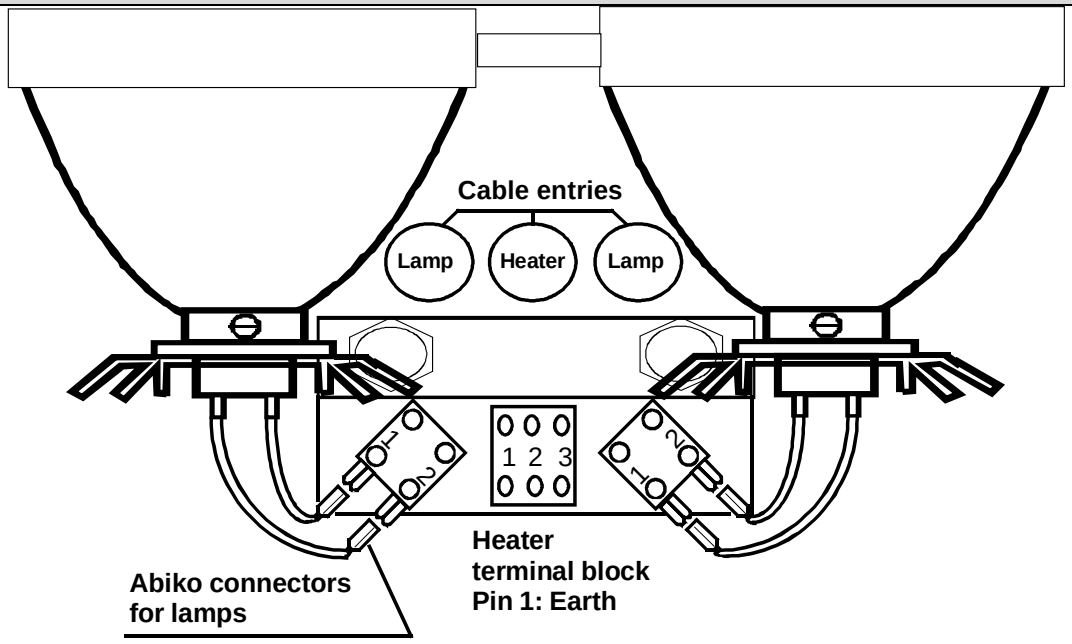
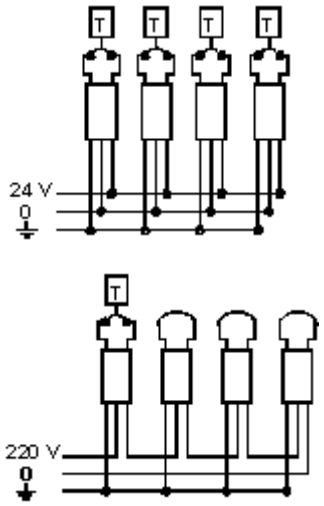


FIGURE 6 – CONNECTIONS IDM 6005

2.1.2 Heater Connections

Description	Image example
Heating is an accessory of IDM 6005. The connection of the heating cable and thermostat is done with 24V AC supply voltage, and with 220V AC supply voltage.	 FIGURE 7 – ALTERNATIVE CONNECTIONS OF THE HEATING CABLE

3. MAINTENANCE

In this section you can find a description of the different steps for the maintenance of the unit.

Before you start, make sure you have read and understand §1.1 Safety Instructions.

Find out the location of the light unit that needs maintenance. If the purpose is to replace an existing light unit with new one, make sure that corresponding unit is available.

WARNING! *WHEN A FITTING HAS BEEN REMOVED FROM ITS BASE, THE BASE MUST BE EITHER FITTED WITH A COVER OR A RESERVE FITTING PUT IN ITS PLACE.*

IT IS RECOMMENDED THAT ONLY AUTORIZED PERSONNEL DISASSEMBLE FITTINGS WITH PRIOR AGREEMENT FROM SAFEGATE.

3.1 BASIC MAINTENANCE PROGRAMME

There are recommended maintenance tasks to ensure that the equipment is in correct operating condition.

Maintenance tasks	
Weekly	• Visual inspection of the unit. • Removal of dust from external surfaces of the unit.
Monthly	• Check of the optical window, check for mechanical damage. • Check for proper fixing of the fitting in its base.
Yearly	• Detailed inspection of the fitting. • Check of the body resistance, check for mechanical damage (for example cracks around prism windows). • Clean of the optical windows.

A daily function check is referred to in the document:
ICAO, Airport Services Manual Part 9, Airport Maintenance Practice and FAA AC 150/5340-26A, Maintenance of airport visual aids facilities.

The light is designed for outdoor operation, however storing the light outside without using it is a risk for damage to light components. For a longer storage time (more than a week), it is recommended to store the light indoors in a dry and dust free environment and at room temperature. Proper storage ensures trouble free replacement procedures. It is strongly recommended not to store any electrical equipment outside.

***Note**: Only the most common maintenance procedures are instructed in following paragraphs. Construction of the luminaire allows that it can be fully disassembled and all the parts can be replaced if needed*.

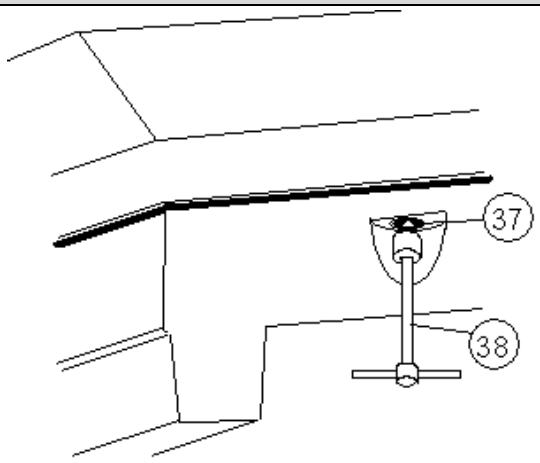
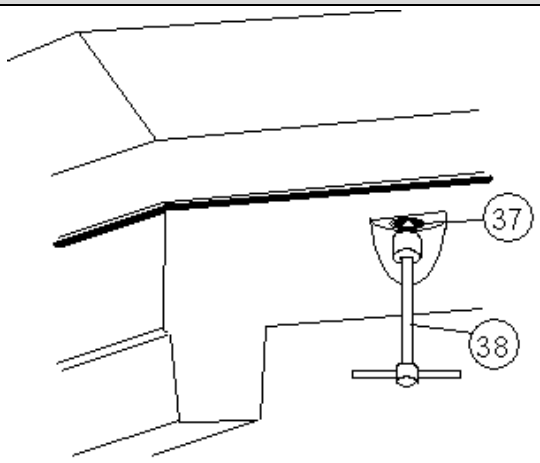
3.2 WORKSHOP MAINTENANCE

Before you start, make sure you have read and understand §1.1 Safety Instructions.

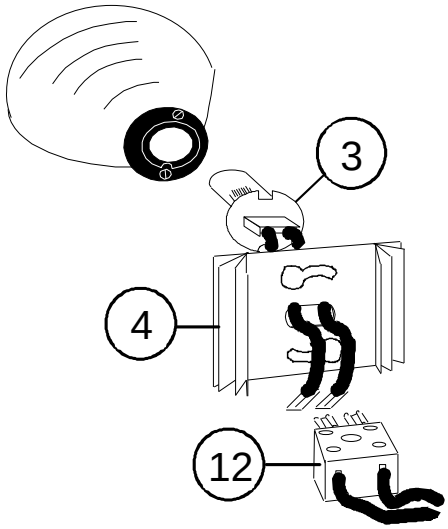
The workshop maintenance refers to following:

1. Opening/ closing a hosing
2. Replacing a lamp
3. Replacing a colour filter
4. Replacing a reflector
5. Replacing a front glass
6. Replacing a dust filter
7. Replacing a cover sealing
8. Replacing a heating cable and a thermostat

3.2.1 Opening/ Closing a Housing

Open	
(a) Open the lock (37) with locking key (38). (b) Lift the cover from the back edge with the help of the hinge in the front edge. (c) Lift off the top cover.	 FIGURE 8 – OPENING A HOUSING
Close	
(a) Pull the cover backwards. (b) Check that the sealing of the cover is properly seated. (c) Tighten the locking screws. **Note:** *Always when opening the unit, clean dust and moisture which have possibly penetrated into it. Use dry, soft cotton cloth for cleaning of reflectors, colour filters, lenses and front glass.*	 FIGURE 9 – CLOSING A HOUSING

3.2.2 Replacing a Lamp

Remove	
(a) Open the unit (see § 3.2.1 Opening/ Closing a Housing). (b) Take off the lamp wires from connector (12). (c) Loosen the screws by two turns, turn the heat sink (4) clockwise and detach the cooling plate from the lamp holder by pulling it gently and pull off the lamp (3).	 FIGURE 10 – LAMP REPLACEMENT
Replace	
(a) Pass the wires of the new lamp (200 W, 6.6 A) through the opening of the cooling plate and put the new lamp on its place, so that the semi-circular hole in the lamp socket matches to the steering pin. (b) Put the cooling plate on its place. (c) Check that the lamp is properly in its place by turning the lamp and pushing it gently at the same time. (d) Tighten the screws. (e) Connect the wires in the connector (12). (f) Close the unit (see § 3.2.1 Opening/ Closing a Housing).	

3.2.3 Replacing a Colour Filter

Remove

(a) Open the unit (see § 3.2.1 Opening/ Closing a Housing).

Note: *Use cotton gloves or similar in order not to make greasy fingerprints on the colour filter.*

(b) Open the nuts (1).

(c) Remove the washers (2).

(d) Open the thumb nuts.

(e) Remove the filter fastener (4).

(f) Remove the damaged filter straight upwards.

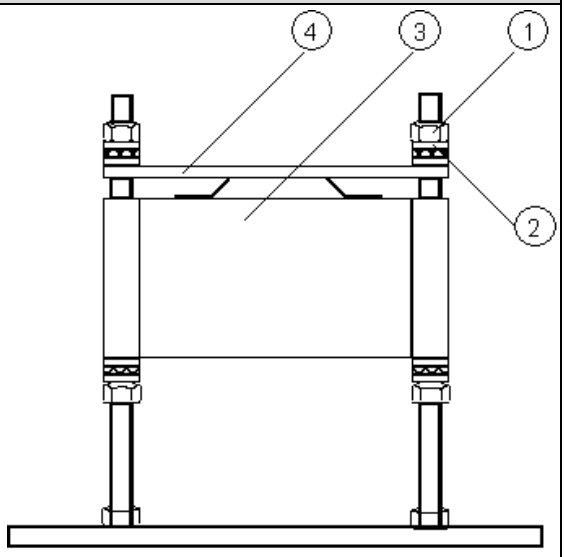


FIGURE 11 – COLOUR FILTER REPLACEMENT

Replace

(a) Put in the new filter so that the polished edge of the filter comes lowest.

Note: *This can be recognised by the aluminium foils on the corners.*

(b) Check that the lower nuts are sealed with varnish.

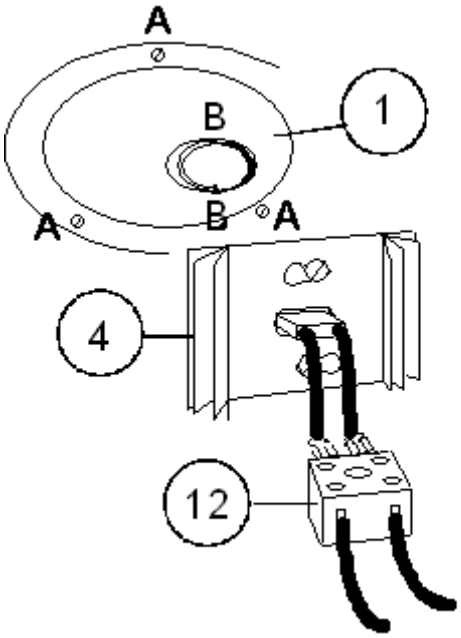
(c) Do the assembly in reverse order.

Note: *Do not tighten the thumb nuts too much in order to avoid breaking of the filter.*

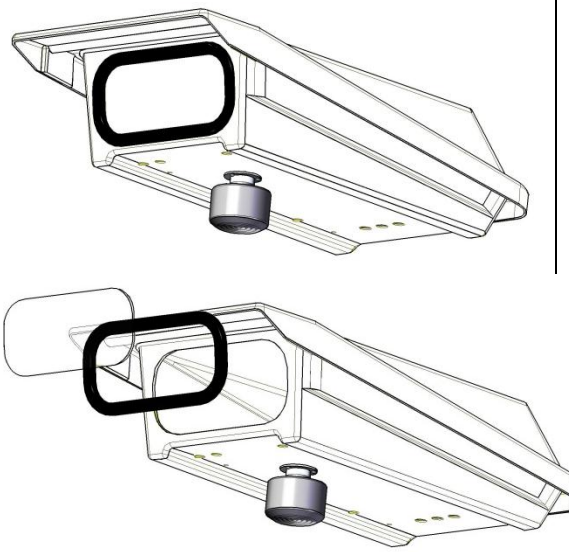
When tightening the nuts (1) hold the thumb nuts still with pointed pliers in order to avoid breaking of the filter.

(d) Close the unit (see § 3.2.1 Opening/ Closing a Housing).

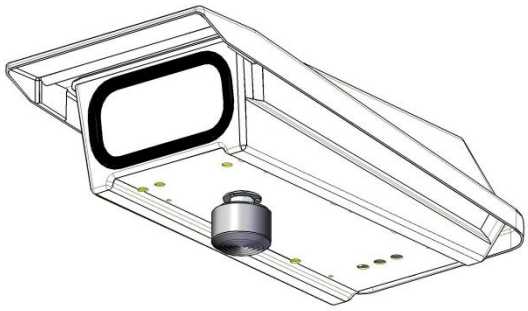
3.2.4 Replacing a Reflector

Remove	
(a) Open the unit (see § 3.2.1 Opening/ Closing a Housing). (b) Disconnect the lamp wires from the terminal block (12) and remove the lamp. (c) Unfasten the screws (A) and remove the reflector from the frame. (d) Open the screws B to remove the lamp holder from reflector.	 FIGURE 12 – REFLECTOR REPLACEMENT
Replace	
(a) Replace the lamp holder to the new reflector and fasten the screws (B). **Note:** *Be careful not to scratch the reflecting surface with screwdriver.* (b) Fasten reflector to its frame with screws A. (c) Replace the lamp and connect the wires to terminal block (12). (d) Close the unit (see § 3.2.1 Opening/ Closing a Housing).	

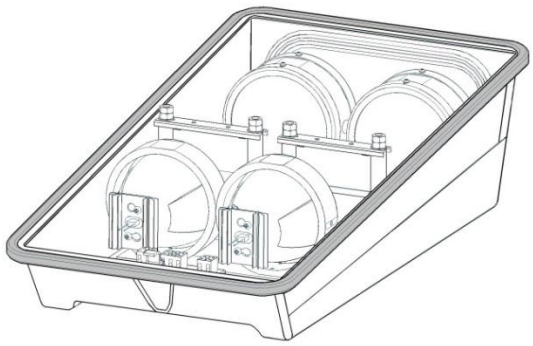
3.2.5 Replacing a Front Glass

Remove	
(a) Open the unit (see § 3.2.1 Opening/ Closing a Housing). (b) Protect the optics with paper or similar. (c) Remove the wedge rubber from its trace by suitable hook. (d) Press the front glass from inside to remove the glass from the gasket.	 FIGURE 13 – FRONT GLASS REPLACEMENT
Replace	
(a) Check the gasket and if necessary replace. If old gasket is used, clean it properly before unit the gasket to the housing. ***Note:*** *The joint must be directed upwards.* (b) Press the front glass into the groove of the gasket using rounded hook. Be careful not to damage the gasket. (c) Replace the metal sheet to the gasket inside the housing and center the sheet with respect to the front glass opening. (d) Attach the wedge rubber into its trace by suitable tool. **Note:** *The joint must be directed downwards.* (e) Remove the protection of the optics. (f) Close the unit (see § 3.2.1 Opening/ Closing a Housing).	

3.2.6 Replacing a Dust Filter

Remove	
(a) Remove the dust filter by turning it clockwise. (b) Remove the protection cover from the threaded end of the dust filter.	 FIGURE 14 – DUST FILTER REPLACEMENT
Replace	
(a) Before putting new dust filter on its place, check that the gasket is on its place on the bottom of threading part. (b) Fasten the dust filter by turning it counter-clockwise. (c) Remove the seal cap from the bottom of the dust filter.	

3.2.7 Replacing a Cover Sealing

Remove	
(a) Open the unit (see § 3.2.1 Opening/ Closing a Housing). (b) Remove the old sealing by pulling it straight out from the unit.	 FIGURE 15 – COVER SEALING REPLACEMENT
Replace	
(a) Put the new sealing on its place and check that the edge of the cover comes tightly all over in the sealing trace. (b) Close the unit (see § 3.2.1 Opening/ Closing a Housing).	

3.2.8 Replacing a Heating Cable and a Thermostat

Remove

(a) Switch off the electricity of the heating circuit.

(b) Open the unit (see § 3.2.1 Opening/ Closing a Housing).

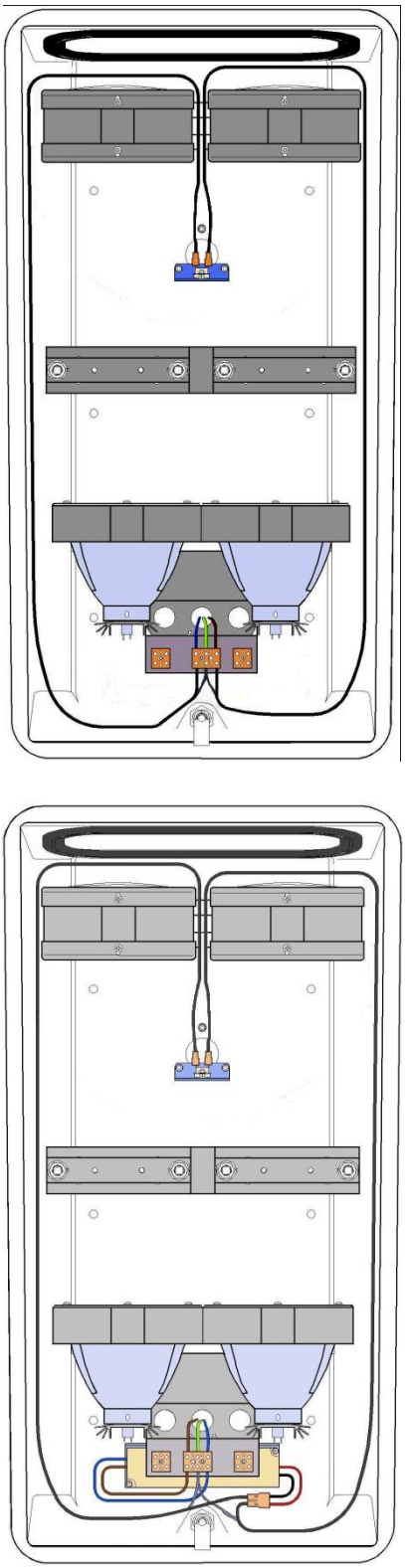
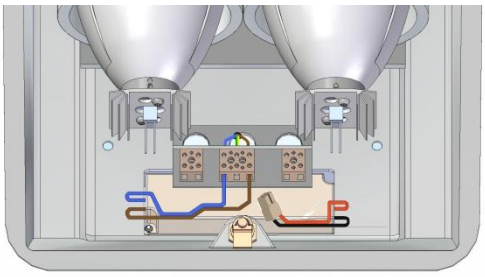


FIGURE 16 – HEATING CABLE REPLACEMENT
(24V Heater and 230V Heater)

	 FIGURE 17 – THERMOSTAT REPLACEMENT
Replace	
(a) Change faulty thermostat or heating cable with a new one. (b) Check that the heating cable is in such a position that it cannot be burnt by sunbeam or light beam through the lenses. (c) Check that the heating cable is not overlapping itself. (d) Close the unit (see § 3.2.1 Opening/ Closing a Housing).	

4. 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 Safegate Group is committed to minimal disturbance for airport operations.

Safegate Group Support	
Safegate Group knows that our equipment is used in one of the busiest industries in the world, where down-time costs money and creates delays for airlines and their passengers. As one of the world's leading suppliers of airport systems, Safegate Group is committed to ensuring that our customers are able to get the most out of your equipment, regardless of the location or the time of day. For this reason, Safegate Group has established the Safegate Group Support service. Safegate Group Support is a unique service provided by Safegate Group to our customers, free of charge during the warranty period or as a service contract. Any time of day, any day of the year, a Safegate Group engineer is on standby to answer questions and assist with any problems that may arise. Qualified technical assistance is just a phone call or an e-mail away, 24-7 worldwide. ✉ support@safegate.com ☎ +46 40 699 1740	 

4.1 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.
***Note**: There is also a **Client/Partner login** area for the latest information and updates, if available.*

4.2 RE-CYCLING

4.2.1 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.

4.2.1 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.*

4.3 SPARE PARTS

Spare parts are available for Airfield Lightning fittings. For more information see the Spare Parts List document.

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

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.

www.safegate.com