TKH AIRPORT SOLUTIONS

Installation and Operation Manual

LED PAPI 803 – 6.6A

LED AGL

Airfield Ground Lighting

V1.0

Preface

- Please read this manual carefully and make sure you understand its contents.
- Failure to read the manual may result in serious injury, or serious damage to equipment.
- Ensure these instructions are always accessible to all users. Before use, read and understand the contents of this manual.

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Table of Contents

Preface 2

Document Information 2

Table of Contents 3

1. About this Manual 5

1.1 Symbols Used 5

1.2 Storing the Manual 6

1.3 Limitations of the Document 6

1.4 Terms and Abbreviations 6

1.5 Liability and Warranty 7

1.6 Manufacturer Details 7

2. Safety 8

2.1 Qualified Personnel 8

2.2 Intended Use 9

2.3 Installation 9

2.4 Operation 10

2.5 Action in the Event of a System or Component Malfunction 10

2.6 Photobiological Safety 11

2.7 Transport and Storage 11

3. About the LED PAPI 803 – 6.6A 12

3.1 Specifications 12

3.2 Standards 12

3.3 Light Characteristics 12

4. PAPI Operation 13

4.1 Theory of PAPI Placement 13

5. Inspection 15

6. Mechanical Installation 16

6.1 Mount the Legs 16

6.2 Concrete Foundation 16

6.3 Height Difference 17

6.4 Mounting of a PAPI Unit 18

6.5 Electrical Installation 19

6.6 Calibration 20

6.7 RS485 Connection 22

6.8 Software for Adjustment 23

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6.9 Signal List & Data 25
6.10 Post Installation 27
7. Flight Check 28
8. Spare Parts List 28
9. Maintenance and Troubleshooting 29
9.1 Maintenance LED PAPI 803 – 6.6A Unit 29
9.2 Troubleshooting 29

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1. About this Manual

This manual contains information about the installation, de-installation, operation, maintenance and troubleshooting of the LED PAPI 803 – 6.6A.

1.1 Symbols Used

The following marking conventions are used in this manual to draw attention to specific topics or actions:

DANGER! - This sign indicates a hazardous situation that, if not avoided, will result in death or serious injury.

WARNING - This sign indicates a hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION - This sign indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

NOTICE – This sign indicates a situation that could result in damage to property or equipment.

The following symbols are used on equipment and in this manual to warn of potential hazards:

DANGER of electric shock or arc flash. Failure to observe this warning will result in serious injury or death.

WARNING or **CAUTION**: where this symbol is used on the equipment, it is mandatory to consult the manual to find out the nature of potential hazards and any actions which have to be taken to avoid them.

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1.2 Storing the Manual

- This manual is a part of your product. Store the manual in a location that can be easily accessed by personnel working on the product.
- It is the responsibility of the company operating this equipment to ensure that its personnel is provided with a copy of this manual.

1.3 Limitations of the Document

TKH Airport Solutions reserves the right to revise this document without prior notice.

The data provided in this document is based on the most recent information at the time of publication. TKH Airport Solutions continually ensures its products meet current technological standards. As a result, it is possible that there may be some differences between the product and the information in this manual.

For further information regarding adjustment, maintenance or repair which is not described in this document, please contact the Service department of TKH Airport Solutions via service@tkh-airportsolutions.com.

The information in this document concentrates solely on use of the products as intended by the manufacturer.

1.4 Terms and Abbreviations

This document may include the terms and abbreviations as listed below.

AGL	Airfield Ground Lighting
CEDD	Contactless Energy and Data Distribution
EASA	European Aviation Safety Agency
FAA	Federal Aviation Administration
HPS	High Power System
ICAO	International Civil Aviation Organization
IEC	International Electrotechnical Committee
LED	Light Emitting Diode
NUID	Node Unique Identification
PAPI	Precision Approach Path Indicator

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1.5 Liability and Warranty

TKH Airport Solutions cannot be held responsible for injuries or damage resulting from non-standard, unintended use, faulty or improper installation of its equipment, or failure to follow the instructions and safety guidelines in this manual. The safety of any system incorporating the LED PAPI 803 – 6.6A is the responsibility of any site installation, commissioning, maintenance, and operations personnel using the system.

Unintended uses include the following actions:

1. Making changes to equipment that have not been recommended or described in this manual or using parts that are not genuine TKH Airport Solutions replacement parts or accessories.
2. Failing to make sure that auxiliary equipment complies with approval agency requirements, local codes, and all applicable safety standards if not in contradiction with the general rules.
3. Using materials or auxiliary equipment that are inappropriate or incompatible with your TKH Airport Solutions equipment.
4. Allowing unskilled personnel to perform any task on or with the equipment.

NOTICE

Disregarding the safety instructions in this manual will result in the loss of warranty in case of damage.

Refer to the general TKH Airport Solutions Terms and Conditions document supplied with your sales order contract for a complete liability and warranty description.

NOTICE

Before operating the PAPI (4 units) system, a UK-CAA CAP168, appendix 6D compliant flight check must be conducted.

1.6 Manufacturer Details

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For service requests, please contact the TKH Airport Solutions Service department:

Email: service@tkh-airportsolutions.com

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2. Safety

This section contains general safety instructions for using your TKH Airport Solutions equipment. Some safety instructions may not apply to the equipment in this manual. Note all warnings and follow all instructions carefully. Failure to do so may result in personal injury, death, or property damage.

To use this equipment safely,

- Refer to the International Standard IEC 61820, Electrical installation for lighting and beaconing of aerodromes - Constant current series circuits for aeronautical ground lighting - System design and installation requirements, and to the International Standard IEC 61821, Electrical installations for lighting and beaconing of aerodromes - Maintenance of aeronautical ground lighting constant current series circuits for instructions on safety precautions.
- Observe all safety regulations. To avoid injuries, always remove power prior to making any wire connections and touching any live part. Refer to the International Standards IEC 61820 & IEC 61821.
- In addition, for a parallel power supply also consider the International Standard IEC 60598 (for Class I equipment)
- Read and become familiar with the general safety instructions provided in this section of the manual before installing, operating, maintaining, or repairing this equipment.
- Read and carefully follow the instructions given throughout this manual for performing specific tasks and working with specific equipment.
- Store this manual within easy reach of personnel installing, operating, maintaining, or repairing this equipment.
- Follow all applicable safety procedures required by your company, industry standards, and government or other regulatory agencies.

2.1 Qualified Personnel

Only qualified and authorized personnel are allowed to install, operate or maintain this equipment.

The term ‘qualified personnel’ is defined here as individuals who thoroughly understand the equipment and its safe installation, operation or maintenance. Qualified personnel are physically capable of performing the required tasks, are familiar with all relevant and local safety rules and regulations, and have been trained to safely install, operate or maintain the equipment. It is the responsibility of the company installing, operating or maintaining this equipment to ensure that its personnel meet these requirements.

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2.2 Intended Use

Use of this equipment in ways other than described in the datasheet and this manual may result in personal injury, death, or property damage. TKH Airport Solutions cannot be held responsible for injuries or damage resulting from non-standard, unintended application of its equipment. This equipment is designed and intended only for the purpose described in this manual. Uses not described in this manual are considered to be unintended use. Unintended use may result from taking the following actions:

- making changes to equipment that have not been recommended or described in this manual or using parts that are not genuine TKH Airport Solutions replacement parts or accessories
- using materials or auxiliary equipment that are inappropriate or incompatible with your TKH Airport Solutions equipment
- allowing unqualified personnel to perform any task

2.3 Installation

A thorough understanding of system components and their requirements will help you install the system safely and efficiently. Failure to follow these safety procedures can result in personal injury or death.

Read the safety and installation sections of all system component manuals before installing your equipment.

- Allow only qualified personnel to install TKH Airport Solutions equipment and auxiliary equipment. Use only approved equipment. Using unapproved equipment in an approved system may void agency approvals and will void the warranty.
- Make sure all equipment is rated and approved for the environment in which you are using it.
- Follow all instructions for installing components and accessories.
- Install all electrical connections according to local codes and regulations, provided they are not in contradiction with the general rules.
- Use only electrical wire of sufficient gauge and insulation to handle the rated current and voltage demand. All wiring must meet local codes.
- Route electrical wiring along a protected path. Make sure the wires will not be damaged by moving equipment and animals (e.g. rodents).
- Protect components from damage, wear, and harsh environmental conditions.
- Allow sufficient room for maintenance, panel accessibility (power products), and cover removal (power products).
- Protect equipment with safety devices as specified by applicable safety regulations.
- If safety devices must be removed for maintenance, re-install them immediately after the work is completed and check them for proper functioning.

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2.4 Operation

Only qualified personnel (see section Qualified Personnel) should operate this equipment. Read all system component manuals before operating this equipment. A thorough understanding of system components and their operation will help you operate the system safely and efficiently.

- Before starting this equipment, check all safety interlocks, fire-detection systems, and protective devices such as panels and covers. Make sure all devices are fully functional. Do not operate the system if these devices are not working properly. Do not deactivate or bypass automatic safety interlocks or locked-out electrical disconnects or pneumatic valves.
- Never operate equipment with a known malfunction.
- Do not attempt to operate or service electrical equipment if standing water is present.
- Use this equipment only in the environments for which it is rated. Do not operate this equipment in humid, flammable, or explosive environments unless it has been rated for safe operation in these environments.
- Never touch exposed electrical connections on equipment while the power is ON. Verify that exposed electrical connections are de-energized.
- Never look directly in the light source while the power is ON.

2.5 Action in the Event of a System or Component Malfunction

Do not operate a system that contains malfunctioning components. If a component malfunctions, turn the system OFF immediately.

- Disconnect and lock out electrical power.
- Repair or replace the malfunctioning component according to instructions provided in its manual. Allow only qualified personnel to perform maintenance, troubleshooting, and repair tasks. Only persons who are properly trained and familiar with TKH Airport Solutions equipment are permitted to service this equipment.
- Always use safety devices when working on the equipment.
- Follow the recommended maintenance procedures in your equipment manuals.
- Do not service or adjust any equipment unless another person trained in first aid and Cardiopulmonary Resuscitation (CPR) is present.
- Connect all disconnected equipment ground cables and wires after servicing equipment. Ground all conductive equipment.
- Use only approved TKH Airport Solutions replacement parts. Using unapproved parts or making unapproved modifications to equipment may void agency approvals, impair specified performance and create safety hazards.
- Check interlock systems periodically to ensure their effectiveness.
- Do not attempt to service electrical equipment if standing water is present. Use caution when servicing electrical equipment in a high-humidity environment.
- Use tools with insulated handles when working with electrical equipment.

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2.6 Photobiological Safety

Photobiological safety conforms to IEC 62471 for beams emitted in white color:

RISK GROUP 2: Possibly hazardous optical radiation emitted from this product. Do not stare at the operating lamp. May be harmful to the eyes.

1. For viewing distances greater than 1600 mm, the product is Risk Group 1 or lower.
2. Use protection goggles or any similar protection method.

Photobiological safety conforms with IEC 62471 for beams emitted in other colors:

RISK GROUP 0 or 1: Optical radiation emitted from LED lights may be harmful to the eyes. Do not stare with bare eyes at a fixture operating at high intensity. Use protection goggles or any similar protection method.

Goggles with a transmission factor of 5% or less in the 400-530 nm band have been tested and provide adequate protection.

2.7 Transport and Storage

If the equipment is stored before installation, it must be protected from the weather in a dry and secure environment, free of condensation and dust.

Keep the equipment in the original packing it was shipped in, until it is going to be installed.

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3. About the LED PAPI 803 – 6.6A

The TKH Airport Solutions PAPI System is designed to provide pilots with a clear visual reference for maintaining the correct approach angle during landing. The system comprises four lighting units that work together to indicate whether the aircraft's approach path is too high, too low, or on the correct glide path, ensuring safer landings.

Fully compliant with ICAO (International Civil Aviation Organization) regulations, the PAPI System is installed adjacent to the runway threshold. This advanced system enhances runway safety, particularly in challenging environments and weather conditions, offering reliable visual guidance to pilots.

3.1 Specifications

Enclosure:	Aluminium powder coated RAL1028 (yellow) / double glass
Mounting:	Rigid, 12x M12
Ambient Temperature:	-40° C to +55° C
IP rating:	IP 66
Weight:	30 kg
Input:	2.8 – 6.6 A from AGL transformer | 200 W secondary transformer
Power Consumption:	100 W per unit (400 W total)[1]
Life expectancy:	100,000+ hours
Dimensions:	L 946 mm x W 534 mm x H 426 mm

3.2 Standards

The LED PAPI 803 – 6.6A is developed in compliance with:

- ICAO Annex 14 Volume I
- FAA L-880 / L-881 & E-3007

3.3 Light Characteristics

Light source:	LED, steady burning
Light color:	White 5700 K / Red 630 nm
Light intensity:	+ 30,000 cd / + 15,000 cd
Vertical beam profile:	as per ICAO
Color chromaticity:	as per ICAO
Photometry:	According ICAO Annex 14 Volume I

[1] *Power consumption is for the PAPI lighting unit only, not taking into account cable losses, transformer efficiency etc.*

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4. PAPI Operation

This chapter will explain the operation of the PAPI system.

4.1 Theory of PAPI Placement

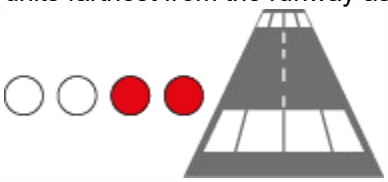
The PAPI system shall consist of a wing bar with four equally spaced sharp-transition lamp units. The system shall be located on the left side of the runway unless it is physically impracticable to do so.

NOTICE

Where a runway is used by aircraft requiring visual roll guidance which is not provided by other external means, then a second wing bar may be provided on the opposite side of the runway.

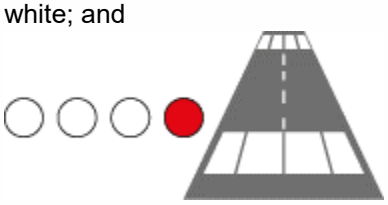
The wing bar of a PAPI shall be constructed and arranged in such a manner that a pilot making an approach will:

a. when on or close to the approach slope, see the two units nearest the runway as red and the two units farthest from the runway as white;



[CORRECT]

b. when above the approach slope, see the one unit nearest the runway as red and the three units farthest from the runway as white; and when further above the approach slope, see all the units as white; and



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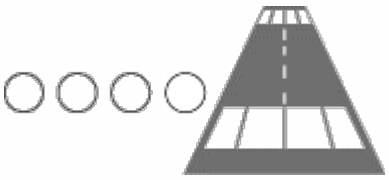
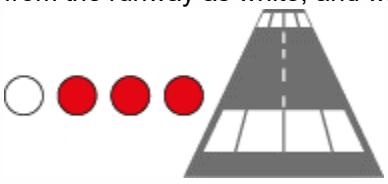
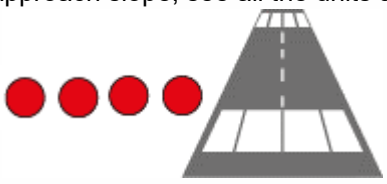


[TOO HIGH]

c. when below the approach slope, see the three units nearest the runway as red and the unit farthest from the runway as white; and when further below the approach slope, see all the units as red.



[SLIGHTLY LOW]



[TOO LOW]

The light units shall be located as in the basic configuration illustrated in Figure below. Installation tolerances given.

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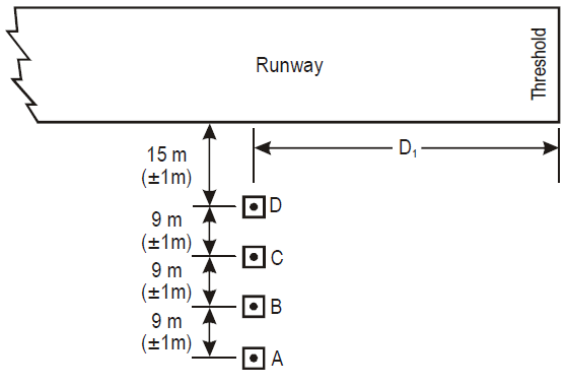

Figure 1: Typical PAPI wing bar

The units forming a wing bar shall be mounted so as to appear to the pilot of an approaching aeroplane to be substantially in a horizontal line. The light units shall be mounted as low as possible and are frangible due to their ball joint mounted feet.

For determining the exact locations of the PAPI units, please follow the relevant ICAO and/or local aviation authority standards.

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5. Inspection

Inspect the transport boxes

Before installation, the transport boxes must be inspected for damage and defects. If the transport box appears to be damaged, keep the transport box and cushioning material until the contents of the box have been checked for completeness and the equipment is checked mechanically and electrically.

NOTICE

If the equipment has been damaged during transport, put the product and all other parts back into the transport box and contact your shipper and carrier.

Inspect the contents of the transport boxes

Inspect the contents of the transport boxes. Compare the contents of the transport boxes with the purchase order and/or packing list. A PAPI system comes as a set of four units. In case an APAPI system was ordered, the system comprises a set of two units.

This manual focuses on a PAPI system of 4 units. Parts that are inside the shipment are at least:

- 4 PAPI units
- 12 PAPI legs (300 mm standard length)
- 1 Digital Inclination meter

If any item is missing, or if there is any visible damage or defect, contact your local TKH Airport Solutions agent or TKH Airport Solutions Service via service@tkh-airportsolutions.com.

CAUTION

Do not unpack the equipment before it reaches the installation site to avoid damage due to transportation and handling.

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6. Mechanical Installation

This chapter contains instructions for mechanical installation of the LED PAPI 803 – 6.6A.

6.1 Mount the Legs

Place the PAPI unit on its top side and mount legs to PAPI unit with a 24-mm wrench. For correct leg position see figure 6.

Figure 3: Mount legs on PAPI unit

6.2 Concrete Foundation

In order to fix the PAPI lighting units to the ground, the use of a concrete foundation is recommended. For the exact PAPI location, see chapter 4.

For the individual mounting, a minimum concrete foundation of $1000\ (mm\ Length)\ x\ 800\ (mm\ Width)\ x\ 250\ (mm\ height)$ is advised as shown in the image below.

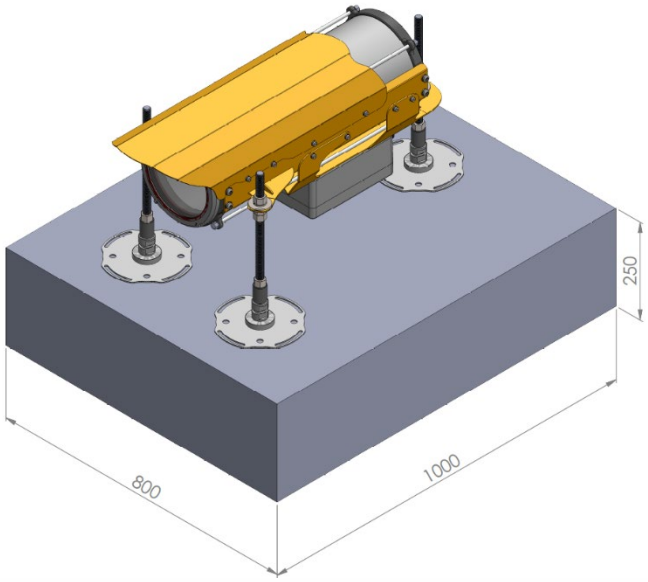

Figure 4: Concrete foundation

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NOTICE

The requirement for the concrete construction is a general requirement. The concrete construction can vary based on the soil type of the airport. Always consult local civil engineering staff for the correct dimensions.

6.3 Height Difference

When constructing the concrete bases, make sure the height of the concrete base is the same from A to B. The PAPI system provides up to 100 mm of standard adjustment to counter any level changes in the concrete bases.

NOTICE

Follow ICAO 5.3.5.28 "*…The light units shall be mounted as low as possible and shall be frangible."* Minor differences in height are permitted.

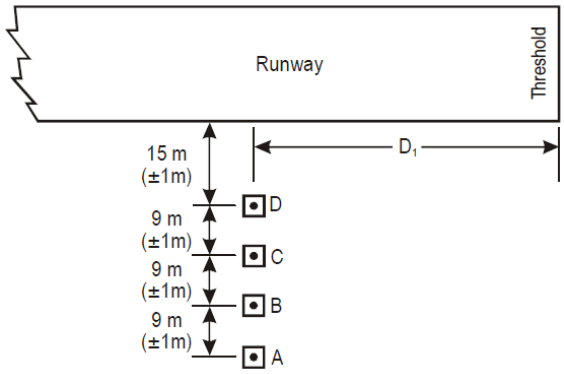

Figure 5: Concrete base locations

The nuts in the legs can be used to adjust the PAPI height, as explained in chapter 6.6. When there is a variation in the concrete slab surface, optional PAPI legs can be purchased in order to raise the PAPI for each unit to be horizontally aligned (at the same height). There are 3 configurations:

Standard A: 39-49 cm **Optional B: 42-65 cm** **Optional C: 65-87 cm**

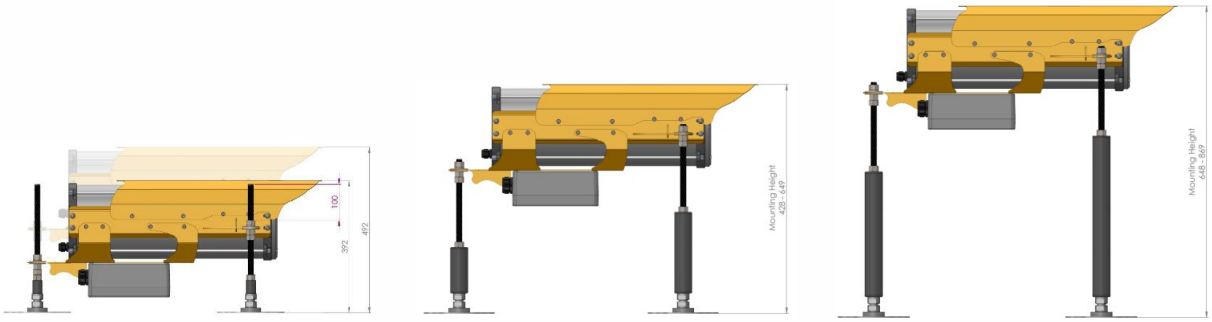

Figure 6: PAPI height configurations

CAUTION

When the PAPI system is not horizontally aligned, performance will be affected.

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6.4 Mounting of a PAPI Unit

Mount all PAPI units on their concrete bases. The dimensions of the PAPI unit are shown in the image below. The mounting feet of the PAPI are rotatable.

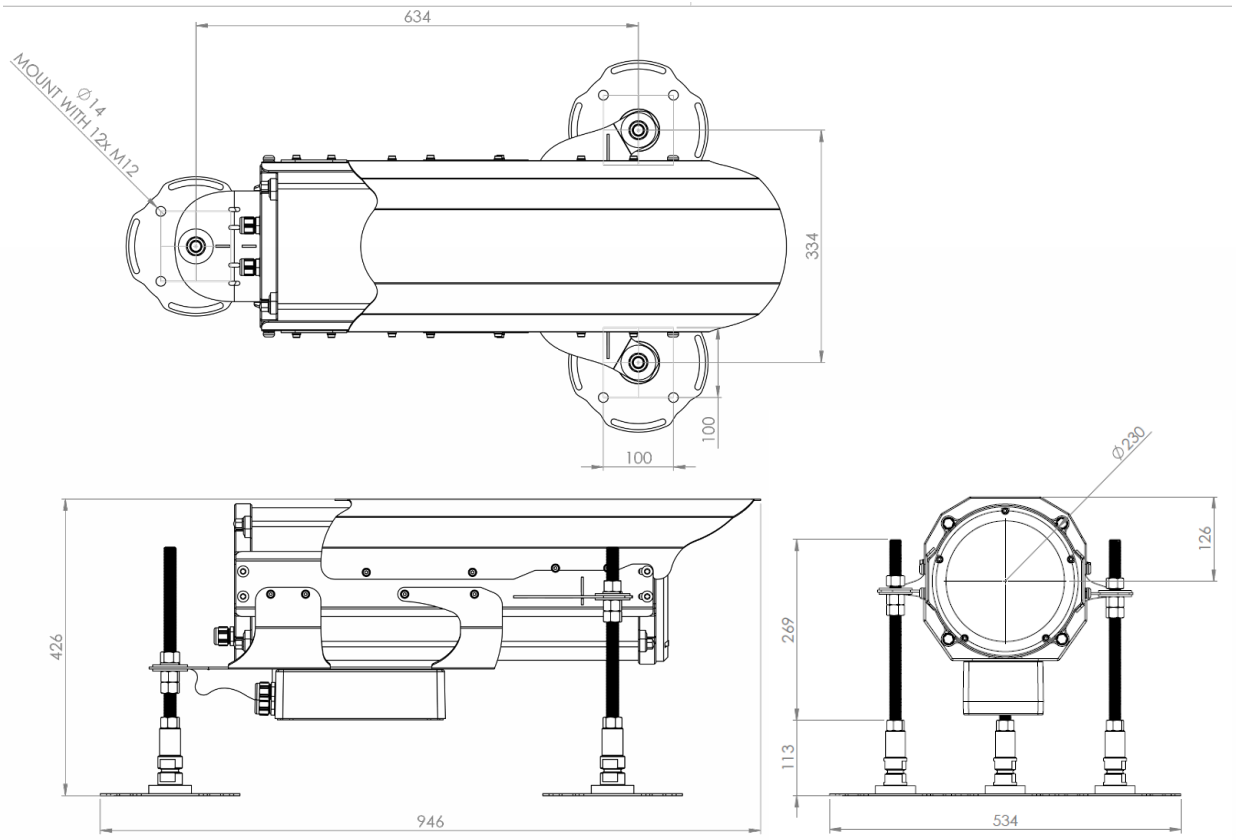

Figure 7: Dimensions

Ensure that, once all PAPI units are installed, every foot is properly fastened and secured. Label the units A through D. Unit A is the unit farthest from the runway.

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6.5 Electrical Installation

For the electrical installation of the PAPI system, follow the diagram below:

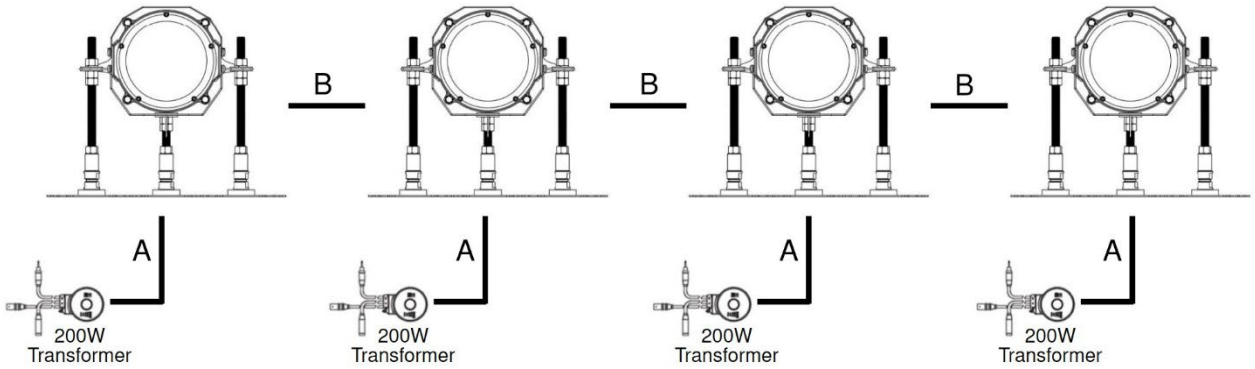

Figure 8: Electrical Installation

The cable marked as "A" in the above diagram:

This is the cable coming out of the junction box which should be connected to the secondary transformer.

→ We recommend a 200 Watt secondary transformer.
EFLA - KR651 85043180/ FI - Transformer 200W Earthed 6.6A/6.6A 50/60Hz 5000V

The cable marked as "B" in the above diagram:

This is an interconnecting twisted pair cable that should have an outer diameter of 5-9 mm. This cable communicates internal faults of the PAPI and ensures all PAPI units are switched off when a fault is detected.

→ For this interconnection the following cable can be used, or similar:
LAPP - UNITRONIC® Li2YCYv (TP) – 0031366 - data cable; 1X2X0.5

The Cable B should be connected inside the junction box where the cables are marked 'A' and 'B'.

After completing all connections, check that all wiring is installed correctly and connect the external earthing to the M4 facility on the unit (see section 6.9 for the location) before starting the calibration. The wiring and earthing must not be changed after the calibration is completed.

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6.6 Calibration

Once all lighting units are connected, power up the PAPI units one by one. Calibrate each light using an inclination meter, adjusting to the desired angle as described in chapter 4 and in the steps outlined below. Ensure that each PAPI lighting unit is in an upright position; otherwise, the unit will not start.

If a problem occurs with any unit, always switch off the power before inspecting or adjusting the connections.

When all units illuminate, the PAPI is ready for calibration. The use of a digital inclination meter is advised for this process. The image below shows this digital inclination meter.

Figure 9: Digital inclination meter

NOTICE

This inclination meter is preliminary alignment only. The flight check inspector will use calibrated tools to set the PAPI into its final alignment.

6.6.1 Position X & Y angle

The X angle of the PAPI is the Elevation and the Y angle is the Roll of the PAPI unit, as shown in the image below.

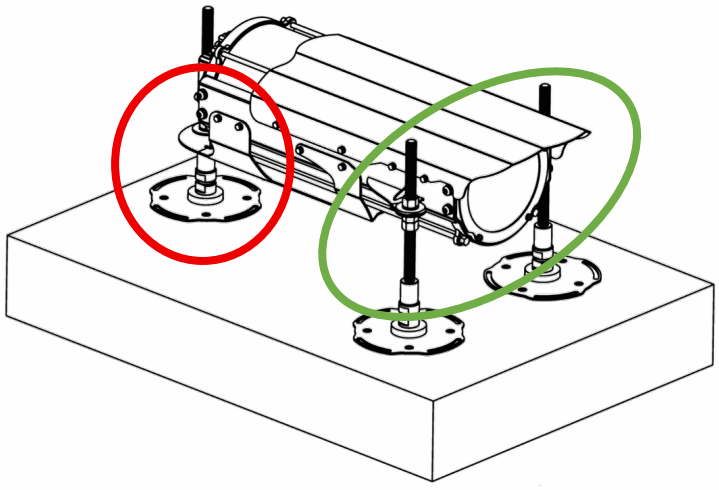

Figure 10: position X & position Y and adjustment

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6.6.2 Adjusting the angle value

In order to adjust the Roll angle of the PAPI, place the meter perpendicular on top of the glare cap as shown in the image below. First use the front two legs in order to adjust the Y-Angle to 0.0. When this is done, tighten the bolts, then adjust the X-Angle to the desired angle, following the flight path.

Figure 11: Y-angle, perpendicular *X-angle, collinear*

To adjust the legs, loosen the M16 nuts by using a 24 mm wrench.

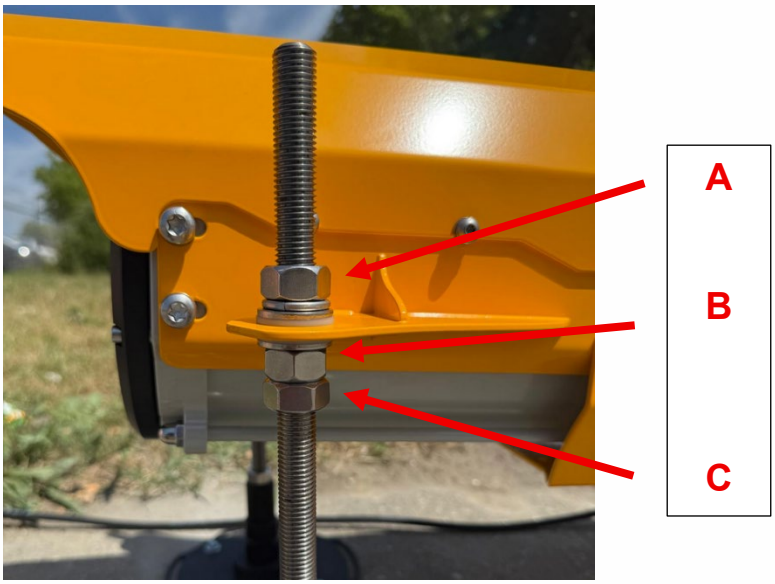

Figure 12: loosen the M16 nuts

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Each PAPI leg has 3 nuts used for the levelling of the PAPI unit. Loosen nut A and C to give appropriate clearance. Use nut B to level the unit. Once the desired angle is achieved, tighten nut A first, making sure the angle stays. When the nuts A & B are tightened, tighten nut C.

When replacing a PAPI unit, make sure nut B and C do not move.

6.6.3 Adjusting POS. X value

Now adjust the elevation angle, marked by POS. X on the PAPI by turning the back foot of the PAPI.

Repeat all these steps for each PAPI lighting unit.

6.7 RS485 Connection

The RS485 connection is made inside the junction box located underneath the PAPI. Connect the RS485 communication cables to the corresponding terminals, ensuring that the correct polarity is maintained.

The cables are clearly marked:

- A – RS485.A
- B – RS485.B

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6.8 Software for Adjustment

After mechanically installing the PAPI, the PAPI system's internal angle sensor needs to be set to the desired glide path angle as set forth in chapter 4 of this manual. In order to do this, there are two ways:

Option 1: Via RS485 interface
The PAPI is accessible via a freeware serial communication program, such as **CoolTermWin64Bit** which can be downloaded online. We recommend using an RS485 to USB converter such as the **Olimex LTD USB-RS485** to connect a laptop via USB to the RS485 cables.

The RS485 communication cables are located in the grey junction box underneath the PAPI. Screw the cap off the bottom of the junction box and connect the RS485 wires to the converter as described in chapter 6.7.

When connecting via the CoolTermWin64Bit software, set the baud rate to 19200.

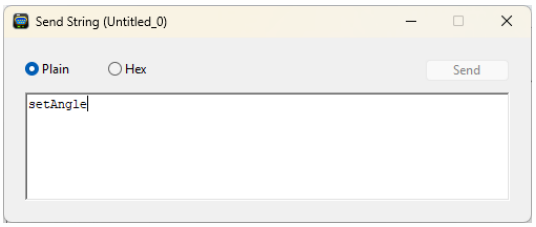
To set the PAPI internal angle, make sure all connections are made and you are connected to the PAPI. Use the following commands:

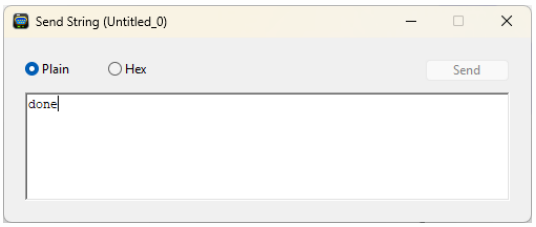
"setAngle" → (wait 5 seconds → confirm that angle information is sent) → **"done"**

NOTICE

The PAPI will not switch on if the saved angle is different from the current angle and the unit will enter error mode. Doing the above procedure will save the current angle into the saved angle.

This should look like this:





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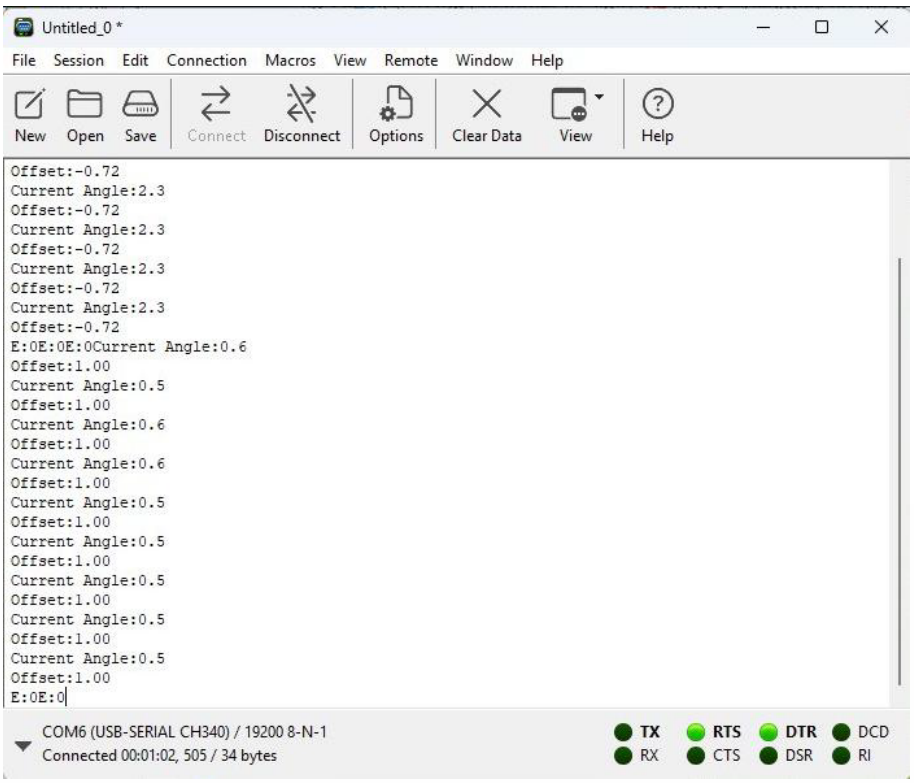

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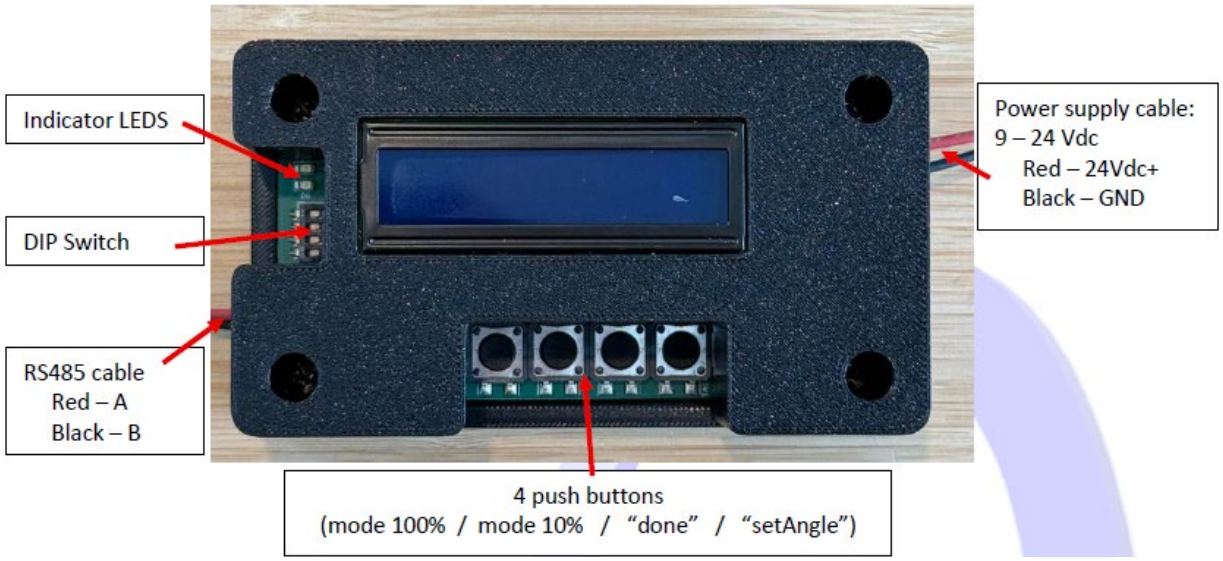
Option 2: Via PAPI Programmer.

Optionally, a handheld programmer can be provided for alignment and commissioning of the PAPI system. The below image shows this handheld programming device and its functionality:



This programmer can be directly plugged into the RS485 cable of the PAPI as described in the previous chapter:

- Blue wire to port A
- Green wire to port B

To set the PAPI internal angle, make sure all connections are made and you are connected to the PAPI. Use the following commands:

"setAngle" → (wait 5 seconds → confirm that angle information is sent) → **"done"**

6.9 Signal List & Data

The PAPI includes software that communicates via the two wires marked as A and B inside the junction box. This chapter will detail the flow of communication and their functions.

6.9.1 Installation communication

For the installation of the PAPI the RS485 interface will be used. This has a "plaintext" communication protocol which can be utilized in order to install and troubleshoot the PAPI. This communication is a RS485 interface to the PAPI.

The below table shows the commands and descriptions

TEXT command	Description
setAngle	*Set programming mode;*

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	Set the PAPI into programming mode. In this mode it does not validate angle misalignment and can be moved freely
done	*Set current angle;* Once the desired angle is set, this command stores the information into the PAPI
stopAngle	*Stop angle validation;* With this command the angle validation is disabled until a complete reset of the PAPI
sethf	*Fan+Heater test;* With this command the fan and heater will turn on for 60seconds.
mode7	*Mode 7 activated;* Turns the PAPI on at 100% light intensity
mode6	*Mode 6 activated;* Turns the PAPI on at 30% light intensity
mode5	*Mode 5 activated;* Turns the PAPI on at 10% light intensity
mode4	*Mode 4 activated;* Turns the PAPI on at 3% light intensity
mode3	*Mode 3 activated;* Turns the PAPI on at 1% light intensity
mode2	*Mode 2 activated;* Turns the PAPI on at 0.3% light intensity
mode1	*Mode 1 activated;* Turns the PAPI on at 0.1% light intensity
mode0	*Mode 0 activated;* Switched off the PAPI

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When no command is sent over the secondary RS485, it will send the status of the PAPI regularly over the bus communication:

E:0; this means that the PAPI is operating in good and normal operation
E:1; this means that the PAPI has detected an error or misalignment

CAUTION When E:1 is sent to the other PAPI units, all of them will switch off automatically.

6.10 Post Installation

After the PAPI light units are installed and calibrated, follow the post-installation checklist:

1. Fasten all M16 nuts used for the adjustment of the PAPI units
2. Check if the PAPI light units are fastened correctly and secured.
3. After fastening the M16 nuts, verify with the inclination meter that the X and Y angles have not changed. Re-calibrate if necessary.
4. Check that the external earthing is connected to the M4 facility highlighted in the image below and that all wiring is installed correctly. The earthing and wiring must already be installed during the electrical installation (section 6.5), before calibration.

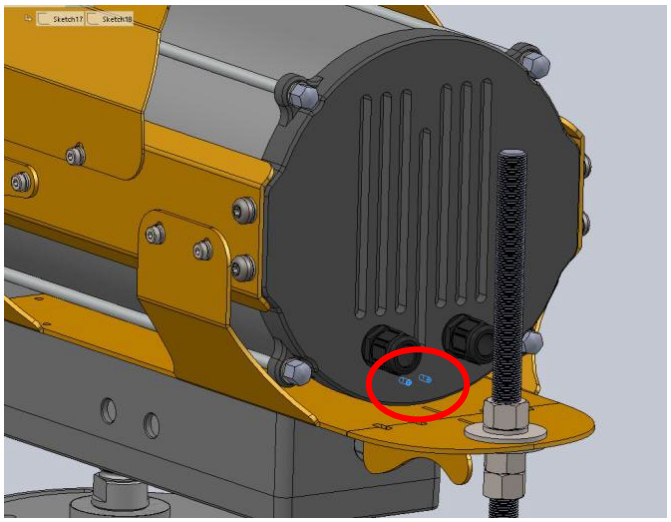

Figure 13: external earthing applied

CAUTION Do not look into the light output of the PAPI from a distance closer than 5 meters as the PAPI emits radiation caused by a unidirectional focused light source and is very bright. Failure to do so can result in personal injury.

CAUTION No modification must be made to the enclosure without prior consultation with the manufacturer.

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7. Flight Check

When all the above steps are followed correctly and the PAPI is now in its operating position, a flight check must be conducted according to the UK-CAA CAP168, appendix 6D.

8. Spare Parts List

When there are any defects on parts of the PAPI 6.6A Lighting units, the below spare parts can be ordered:

- PAPI Lighting Unit
- Housing with front glass and solar/rain protector
- Box with Electronic board
- Set 300 mm / 200 mm foot
- Frangible bolt
- Baseline Digital Inclinometer

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9. Maintenance and Troubleshooting

9.1 Maintenance LED PAPI 803 – 6.6A Unit

To keep the PAPI units operating efficiently, follow a preventive maintenance schedule. Refer to FAA AC 150/5340-26 for more detailed information.

Interval	Maintenance task	Action
Weekly	• Check for proper function. • Check for misaligned fixtures using the inclinometer • Check for dirty lenses	All fixtures have to function. Check X and Y axis of each PAPI unit. Straighten, level, and align light fixture. Clean dirty lenses with glass cleaner.
Twice a year	• Check for presence of corrosion or loose or chipped paint.	Scrape off corrosion and repaint the light fixture.
Annually	• Check the customer-installed wire connections (junction box underneath the unit and CEE/IEC 60309 connector) for loose connections. Do not open the PAPI unit itself since it is sealed (IP66) • Calibration Inclinometer (If applicable)	Test the connections with a multimeter and repair faulty/improper wire connections. Calibrate inclinometer.

Table 2: Maintenance

9.2 Troubleshooting

Allow only qualified personnel to perform the following tasks. Observe and follow the safety instructions in this document and all other related documentation. Lock out the circuit fuse inside the control system unit to ensure the circuit cannot be energized remotely before or during any attempt to service the light fixture.

Note: the PAPI is a sealed unit (IP66) and cannot be opened. Servicing is limited to the customer-installed wiring and the replacement of complete assemblies as listed in the spare part list (chapter 8).

Problem	Possible cause	Corrective Action
LED will not turn on	Defective supply cable	Measure the series circuit current at the CEE/IEC 60309 connector with a clamp meter (6.6 A at 100% intensity, mode 7). If no current is present, perform a continuity and insulation test on the supply cable from the controller and repair or replace the cable
	Loose connection(s)	Repair any faulty or improper wire connections. Test the customer-installed wire connections in the junction box underneath the unit and inside CEE/IEC 60309 power connector with a multimeter (continuity test). Only the

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		customer-installed wiring can be inspected; the PAPI unit itself is sealed.
	Defective LED module	Verify the power supply and check the status output on the RS485 interface (chapter 6.8). If the unit communicates (E:0/E:1) but emits no light, the LED module is defective. The unit must be repaired by the manufacturer. Contact TKH Airport Solutions for support.
	Defective electronics	Verify the power supply. If the supply is correct but the unit does not communicate on the RS485 interface (no E:0/E:1 status, section 6.8), the electronics are defective. The unit must be repaired by the manufacturer. Contact TKH Airport Solutions for support.
	Moisture inside the fixture	Inspect the front glass and lens for cracks. The unit is sealed (IP66); in case of moisture ingress, replace the housing with front glass as a complete assembly as described in the spare parts list. Replace all electrically damaged components. Contact TKH Airport Solutions for support.

Table 3: Troubleshooting

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Company profile:

TKH Airport Solutions is an innovator in airfield ground lighting, offering a complete range of LED AGL products. We build upon the know-how from a long and successful tradition of pioneering developments in the AGL and connectivity industry. Being part of the TKH Group, our company can build on a history of more than 90 years in smart connectivity, energy distribution and AGL.

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