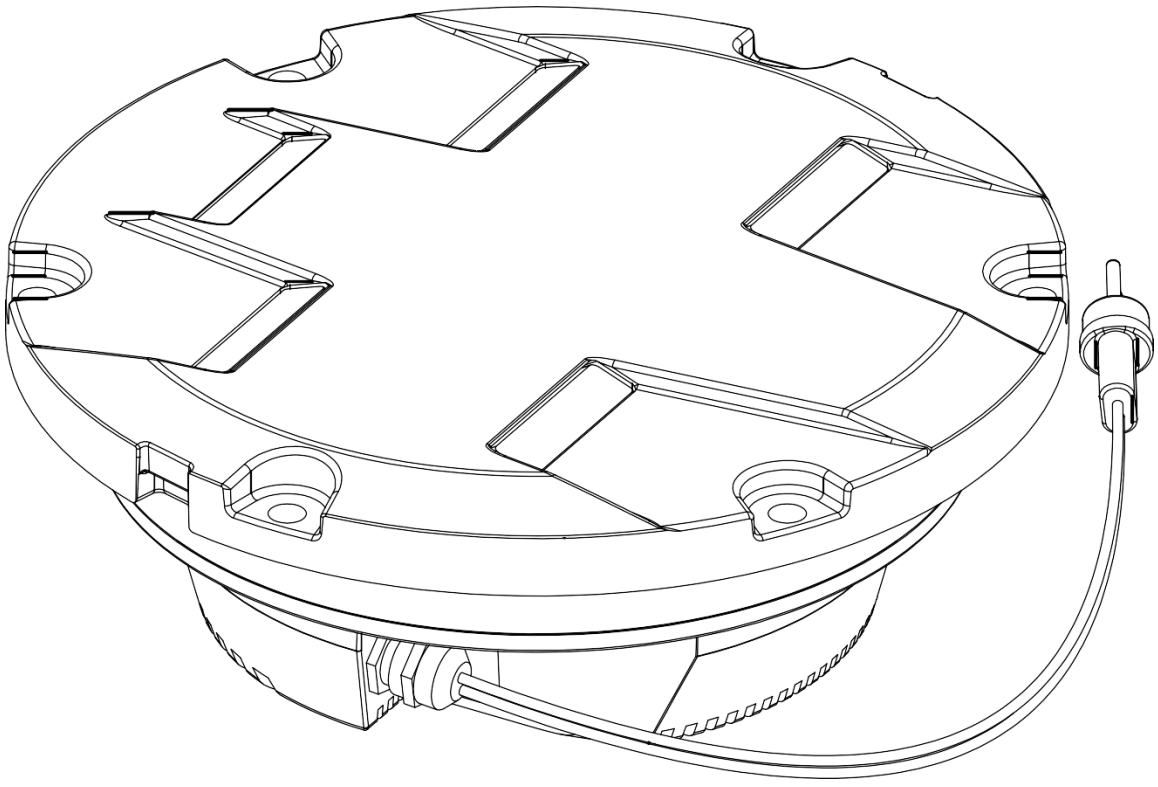
LED AIRFIELD LIGHTING



Content

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Disclaimer/Standard Warranty

All products manufactured by Hangdakang mechanical & electrical technology (Wuhan) co. LTD, hereinafter referred to as HDK, meet the requirements of CAAC, ICAO and IEC. All warranties provided by HDK exclude all cases of gross negligence and handling of all products.

In case of avoidable defects or failure caused by mechanical, electrical or physical defects, the company will provide the necessary spare parts for repair.

The replacement and delivery of spare parts shall meet the requirements of proper storage, installation, and maintenance of the products, and shall submit the spare parts requirements to the Company in writing.

Hangdakang mechanical & electrical technology (Wuhan) co. LTD reserves the right to inspect the avoidable defective or damaged products in its own company facilities.

The obligations of Hangdakang Mechanical & Electrical technology (Wuhan) Co. LTD are limited to the labor cost required for disassembly and assembly of the product and the delivery of the corresponding products.

Hangdakang Mechanical & Electrical technology (Wuhan) co. LTD assumes no liability for injury or damage resulting from any incorrect use of the equipment. All products and their equipment are explicitly designed for their intended use only. Any other use outside the scope of the instructions is considered incorrect and excluded from the warranty.

Included are:

- Use HDK products outside of their intended operating use.
- Any changes or modifications to products that are not explicitly approved.
- Use of unauthorized, incompatible or unapproved tools by HDK or local regulations.

Local regulations on labour safety must always be followed in addition to those of HDK.

HDK reserves the right of interpretation within the scope permitted by law.

1. Safety

Airfield Ground Lighting is installed in high voltage series circuits, where the primary voltage is usually from several hundred to thousand volts and can be fatal if operated improperly. International or national standards referring to the electrical safety and safety of electrical operations should be strictly implemented during the operation and at any stage where powered lighting products are handled or maintained. Correct safety code must be followed during any operation in lighting circuit On and Off state conditions.

Pay attention to all safety instructions in this user manual. Negligence in following safety practices and instructions can result in serious injury, accident, or death. Safety instructions are categorized following the IEC standard and accompanied by an icon accordingly. Safety instructions and icons are listed and explained below:

DANGER:

Risk of electrical shock or flashover. Before any operations disconnect the equipment from line voltage, never connect or disconnect live circuits. Failure to observe "Danger" may result in severe injury, death, or equipment damage.

WARNING:

Failure to observe "Warning" may result in personal injury, death or equipment damage.

CAUTION:

Ignoring or violating “Caution” may cause damage to equipment.

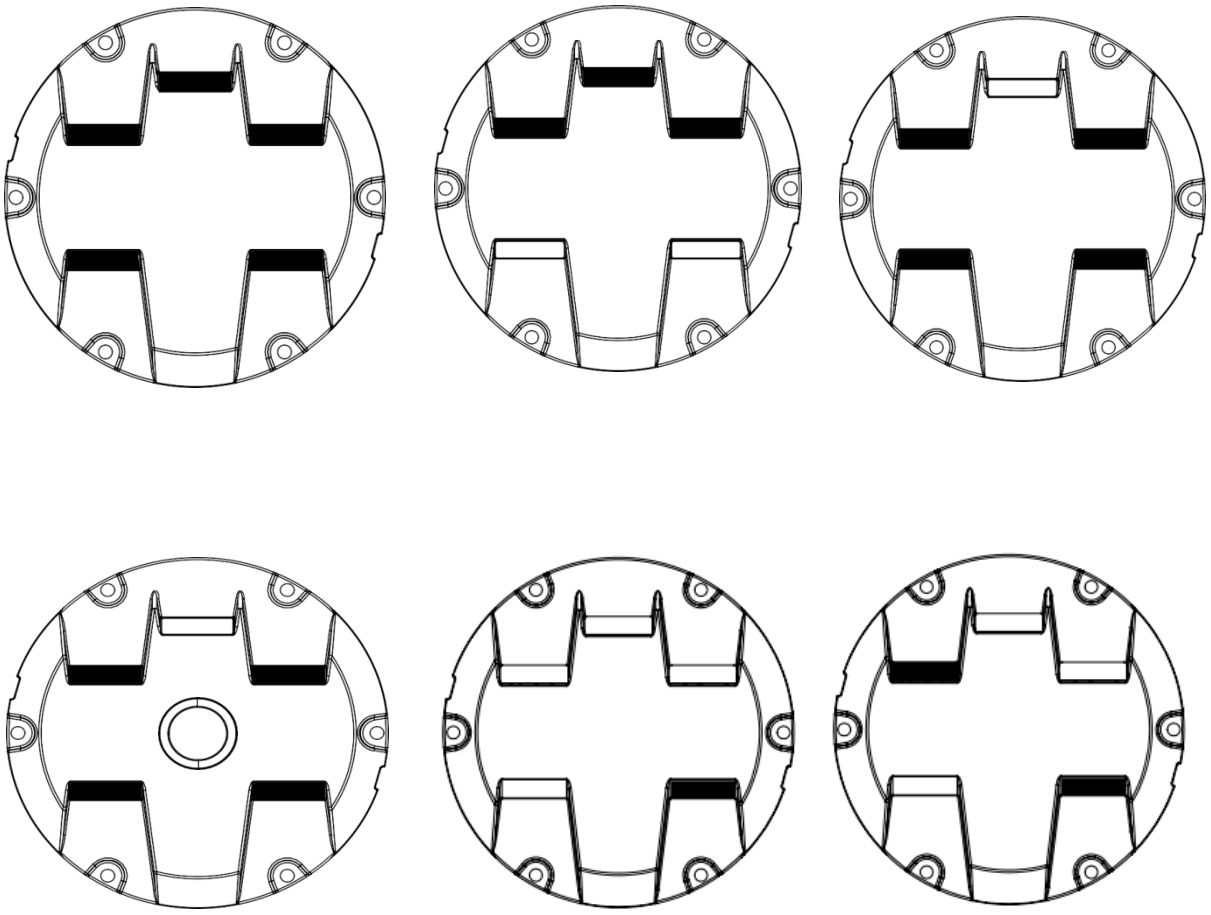
Note:

Explanations and supplements to some of the text description

2. Introduction

The 12-inch inset series lights produced by HDK adopt imported LED light sources with energy saving and long service life. This series of lamps has the characteristics of durable structure, exquisite appearance, long maintenance-free period and so on, and has the function of omnidirectional hovering guidance. The products are designed and produced according to ICAO, CAAC, IEC, FAA standards. The product is suitable for airports in various environments.

Figure 1 – 12-inch inset light series (black color block is the light-emitting window)



2.1. Models & Variants

This manual is applicable to the 12-inch inset series light series produced by Hangdakang. The series lights are divided into different models according to the application, light output direction and color, and power input. The list of models is shown in Table 1-2:

Table 1　List of runway lights

product name	model	Control direction	colour	CAAC type	ICAO type	FAA type
Runway Edge	ILB-REH-WW-S(L)	Bidirectional/ single	White/ White	L-1H-2/ L-1J-2	A2-9/ A2-10	L-850C
	ILB-REH-WY-S(L)	Bidirectional/sing le	White/Yellow			
	ILB-REH-WR-S(L)	Bidirectional/sing le	White/Red			
	ILB-REH-YR-S(L)	Bidirectional/sing le	Yellow/Red			
	ILB-REH-WW-S/O(L)	Bidirectional/sing le	White/White (incl.Hover Guidance)			
	ILB-REH-WY-S/O(L)	Bidirectional/sing le	White/Yellow (incl.Hover Guidance)			
	ILB-REH-WR-S/O(L)	Bidirectional/sing le	White/Red (incl.Hover Guidance)			
	ILB-REH-YR-S/O(L)	Bidirectional/sing le	Yellow/Red (incl.Hover Guidance)			
Threshold	ILB-THR(L)	Unidirectional	Green	L-1A	A2-3	
Threshold Wing Bar	ILB-TWB(L)	Unidirectional	Green	L-1B	A2-4	
Runway End	ILB-RWE-R(L)	Unidirectional	Red	L-1F	A2-8	

Threshold/ Runway End	ILB-THRE-D(L) ILB-THRE-S(L)	Bidirectional/single	Green/Red Green/Red	L-1A/L-1G	A2-3/ A2-8	
Runway Center Line	ILB-RCL-WW-S(L) ILB-RCL-WR-S(L)	Bidirectional/single Bidirectional/single	White/White White/Red	L-1D/L-1E	A2-6/ A2-7	L-850A
Touchdown Zone	ILB-TDZ(L)	Unidirectional	White	L-1C	A2-5	L-850B
Rapid Exit Taxiway Indicator	ILB-RETIL(L)	Unidirectional	Yellow	L-1D/L-1E	A2-6/ A2-7	
Take-off Hold Lights	ILB-THLS(L)	Unidirectional	Red		A2-26	

Note: The configuration of Hangdakang runway edge airfield lighting covers L-1H-2/L-1J-2 of CAAC and Figure A2-9 and Figure A2-10 of ICAO.

Table 2 List of approaching light

product name	model	Control direction	colour	CAAC type	ICAO type	FAA type
Approach Center Line	ILB-APH(L)	Unidirectional	White	L-4A	A2-1	
Approach Cross Bar	ILB-APH(L)	Unidirectional	White	L-4A	A2-1	
Approach Side Row	ILB-ASR(L)	Unidirectional	Red	L-4B	A2-2	

2.2. Product features

This series of lights adopts energy-saving and long-life LED light source.

The main parts of the 12-inch inset light fixture are aluminum alloy top cover, bottom cover, glass prism, LED light source, driving circuit components, sealing ring and so on. The top cover is forged and cast by aluminum alloy, and the bottom cover is formed by high-pressure precision casting of aluminum alloy. All fasteners are made of 316 stainless steel, and the sealing ring is made of high-temperature and aging-resistant silicone rubber. 12-inch inset light fixture is of stable installation structure with heat dissipation design.

The light source of the light fixture is imported LED brand (matching optic lens), and the light fixture adopts fully universal design.

This series of light fixture can be used in the existing AC series circuit, and equipped with isolation transformers with corresponding power, which can be used for dimming control of five light intensity levels.

The light fixture is equipped with secondary cable and L-823 electrical connection plug-in conforming to FAA standard. It can be installed on 12-inch base or on an isolation transformer box.

Each performance index of the light fixture meets the following standards:

- CAAC AC-137-CA-2015-01~04 & MH 5001-2021
- ICAO Annex 14, Volume 1, 9th Edition & Aerodrome Design Manual
- EASA CS-ADR-DSN Issue 6
- FAA AC150/5345-46E & Engineering Brief No. 67D
- IEC TS 61827-2004
- AENA DIN-DSEYN-PPT
- TCCA TP312 5th Edition
- UK CAA CAP 168 Edition 12

2.3. Electrical Properties

Input cable

- FAA L823 connector for single lead light fixture and 2 connectors for dual lead light fixture

Input current

- 2.8A-6.6A_{eff} AC

Sine wave CCR

- $I_{peak\ max}$ = 9.88A

Thyristor CCR

- $I_{peak\ max}$ = 12.60A, j_{min} = 45°

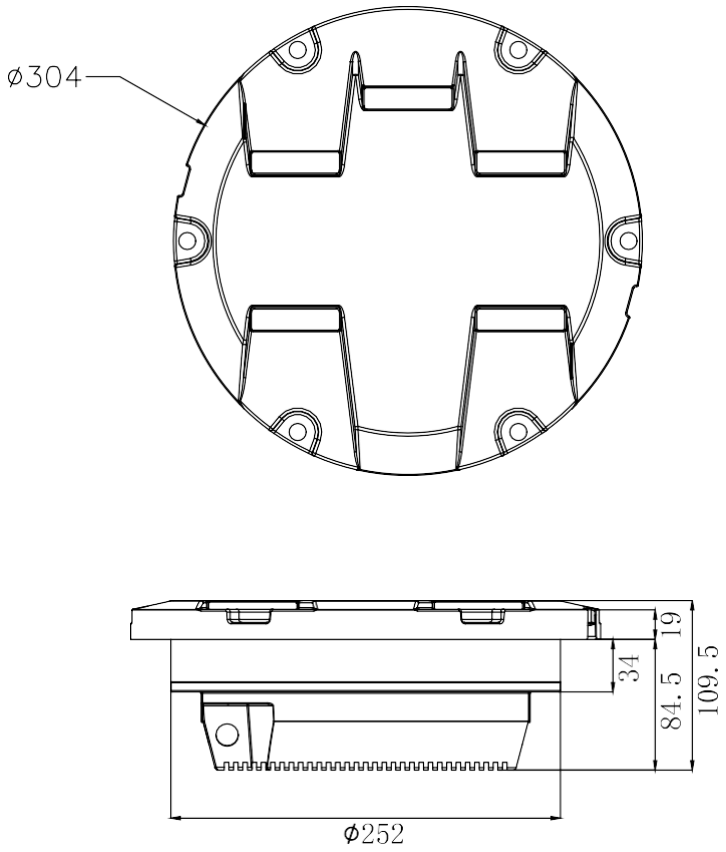
Table 3 Requirements for Specification of Isolation Transformer

Product name	Model	Suggested Transformer Specs
Runway Edge	ILB-REH-WW-S(L)	≥100W
	ILB-REH-WY-S(L)	≥100W
	ILB-REH-WR-S(L)	≥65W
	ILB-REH-YR-S(L)	≥65W
	ILB-REH-WW-S/O(L)	≥100W
	ILB-REH-WY-S/O(L)	≥100W
	ILB-REH-WR-S/O(L)	≥65W
	ILB-REH-YR-S/O(L)	≥65W
Threshold	ILB-THR(L)	≥50W
Runway End	ILB-RWE-R(L)	≥45W
Threshold Wing Bar	ILB-TWB(L)	≥50W

Threshold/Runway End	ILB-THRE-D(L)	≥65W*2
Runway Center Line	ILB-RCL-WW-S(L)	≥45W
	ILB-RCL-WR-S(L)	≥45W
Touchdown Zone	ILB-TDZ(L)	≥45W
Rapid Exit Taxiway Indicator	ILB-RETIL(L)	≥45W
Take-off Hold Lights	ILB-THLS(L)	≥45W
Approach Center line	ILB-APH(L)	≥100W
Approach Cross Bar	ILB-APH(L)	≥100W
Approach Side Row	ILB-ASR(L)	≥45W

2.4. Mechanical Properties

Figure 2 – Major dimensions of light fixture



The diameter of top cover

- 304mm,

Flange thickness

- 19 mm.

Diameter of bottom cover

- 252mm,

Height

109.5mm

Protection degree

- IP68 (IEC 60598-1)

Operating temperature

- -55°C ~ +55°C

Storage temperature

- -55°C ~ +85°C

Weight

- Net weight: 8.7kg
- Gross Weight: 9.5kg

Package Dimensions

- size 390x365x130mm

2.5. Product Components

The HDK 12-inch inset series light fixture include the following components:

Top cover assembly (hereinafter referred to as "top cover")

- Aluminum alloy top cover and the surface with anodizing treatment or hard anodizing treatment
- Ultra-durable silicate glass prism or Reinforced prism
- High performance sealing silica gel

Optic assembly

- LED light source-White/Red/Yellow/Green color
- LED aluminum-based circuit board
- Reflector

Driver module

- LED driving circuit board
- Encapsulation glue
- Heat Sink

Bottom cover assembly(hereinafter referred to as "bottom cover")

- Aluminum alloy bottom cover with electrophoretic anti-corrosion treatment
- Power cord-plug: FAA L-823 style 6, secondary cable: FAA 150/5345-7F standard.
- Power cord sealing head

Consumable parts

- Light body seal- L-shaped rubber ring
- Fasteners-Corrosion-resistant 316 stainless steel
- Stainless steel locking plate
- Thermal grease
- Prism gasket (with window mark)

Figure 3 – Explosion diagram of light structure

① Top Cover

② O- Sealing Ring

③ Optic Module

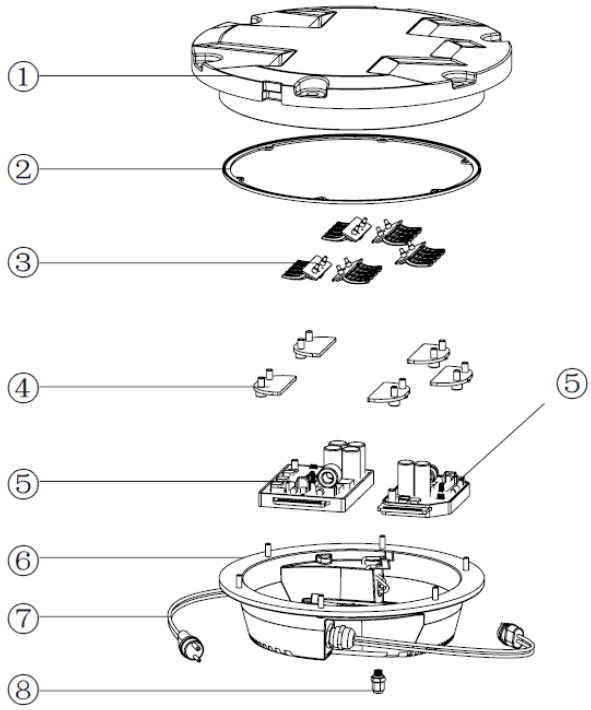
④ Prism Holder

⑤ Driver Module

⑥ Bottom Cover

⑦ Power Cable

⑧ Schrader valve



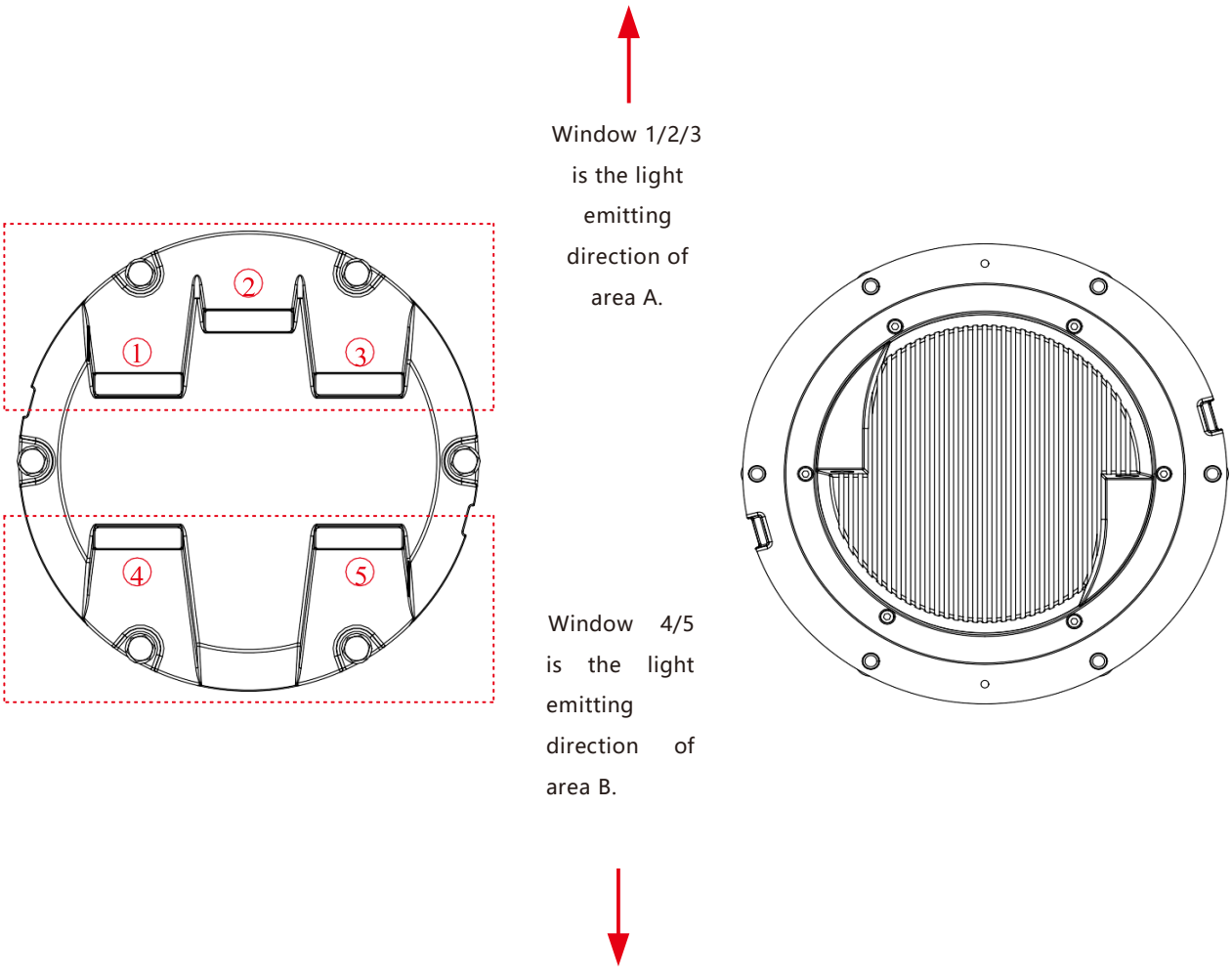
2.6. Marking Instructions of Light Fixture

CAUTION: This section is very important. Please read it carefully whether it is installation or maintenance.

2.6.1 Window number

Overlooking the 12-inch inset light fixture, the side with three windows is area A, and another side with two windows is area B. The windows are numbered 1 to 5 respectively, as shown in the figure 5:

Figure 4 – Diagram of window number of 12-inch inset light fixture.

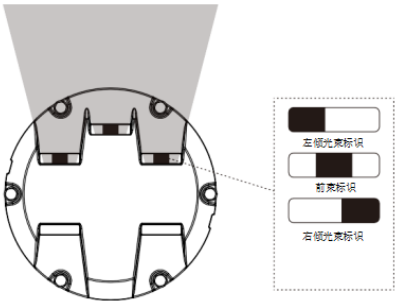


2.6.2 Window light-emitting numbering

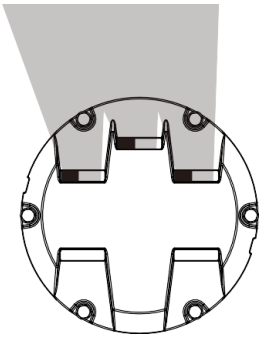
The optic toe-in has been adopted in Hangdakang 12-inch inset light fixture, that is, for light fixture with optic toe-in, the screw hole position and window position are the same as those without optic toe-in, and the signs of luminous color and direction are located in the window prism.

Figure 5 – 12-inch inset light fixture light emitting direction identification

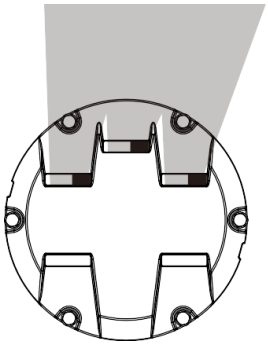
A. Unidirectiona three-window(Middle)



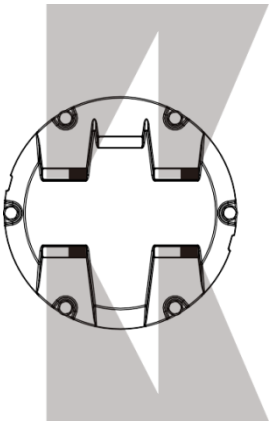
B. Unidirectional three-window(left)



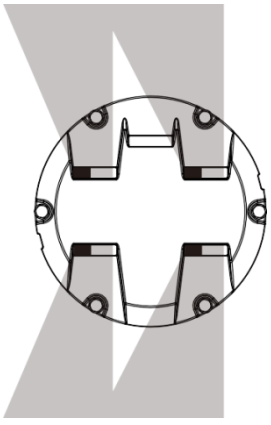
C.Unidirectional three-window(right)



D. Bidirectionl four windows(A right;B left)

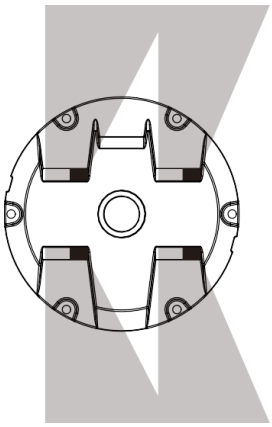


E. Bidirectioanl four windows(A left;B right)

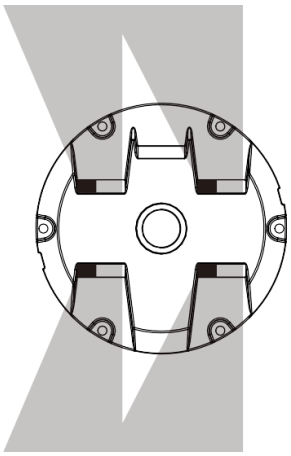


F. Bidirectional four windows (A right; B left)- With hovering guidance (middle)

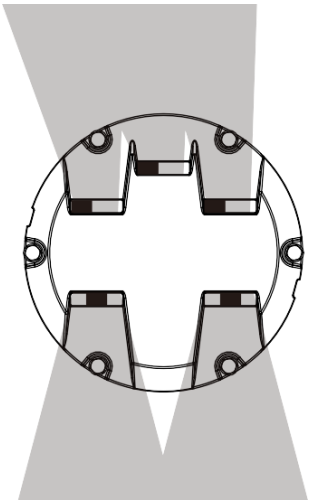
G. Bidirectional four-window(A left; B right)- -With hovering guidance (middle)



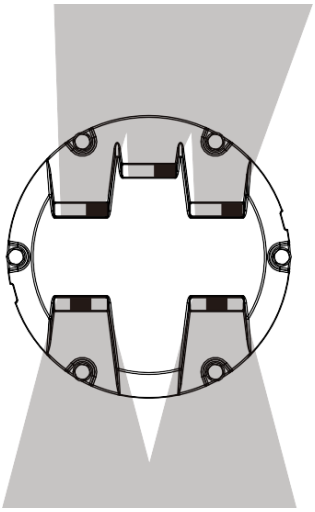
H. Bidirectional five-window(A left B Middle)



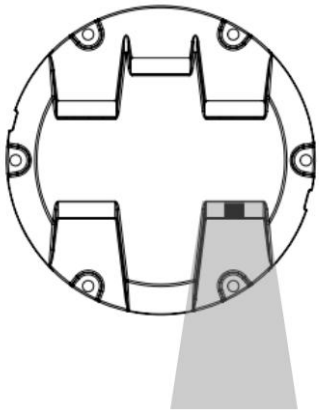
I. Bidirectional five-window(A right; B middle)

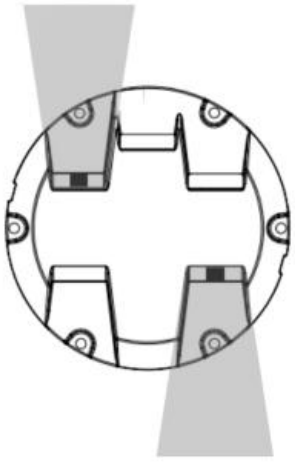


J. Unidirectional window B Middle

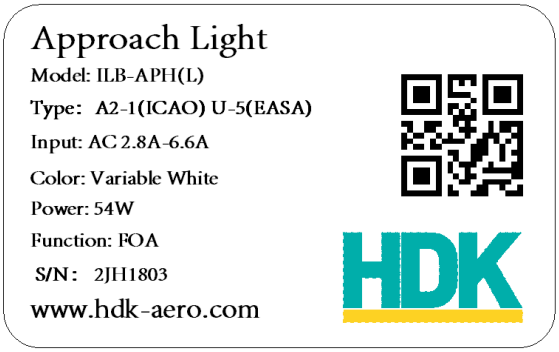


K. Bidirectional window A and B Middle





2.6.3 Nameplate



3. Installation

WARNING: Before installation, please make sure that the primary circuit of the light fixture is powered off, that is, turn off the constant current regulators power of the circuit. Meantime, ensure the integrality of the light fixture, and it is strictly prohibited to cut the cable plug to avoid affecting the watertightness and after-sales service of it.

Note: For the installation position of light, please refer to the technical standard of flight area of civil airport MH5001 and the requirements in ICAO Annex 14, Volume 1 to determine the installation position.

3.1. Tools preparation

Installation tools and materials are as follows

- HDK light fixture handle tool for top cover (or two large flat-head screwdrivers)
- Hexagon wrench: 16mm/17mm
- Clean cloth

Note: The handle for top cover is a special tool for disassembling the light, which can be ordered from HDK.

3.2. Unpack the Unit

Please carefully check whether the outer packaging is in good condition. After opening the packaging, if you find that the products and accessories in the packaging are damaged, please claim compensation from the carrier in time.

When receiving the goods of light, please confirm whether the product information on the goods list is consistent with the construction design. At the same time, check whether the quantity, type, specification, color and other characteristics of light on the cargo list are consistent with the actual object. If you find any problems, please contact the supplier in time.

CAUTION: This product package can be used for various purposes such as maintenance, disassembly and subsequent transportation of light. Please keep this product package properly after receiving the goods.

3.3. Installed on the base of 12-inch inset light

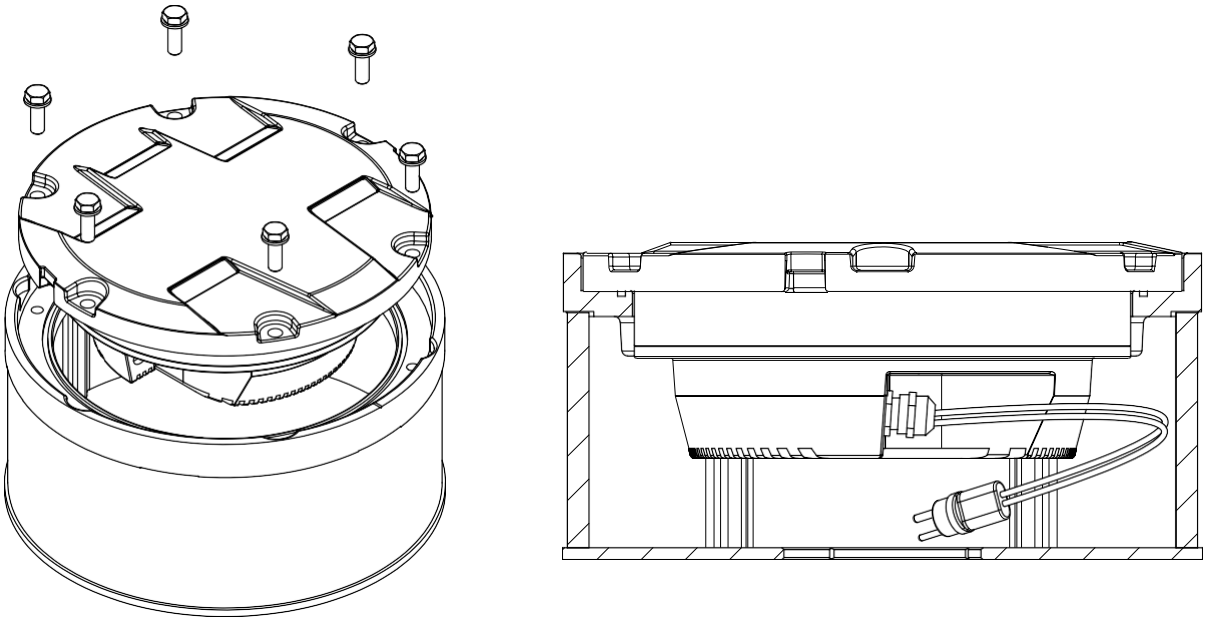
Before installation, the following items should be confirmed:

- Confirm that the pre-embedded base meets the requirements of FAA AC 150-5345-42L-868, otherwise it may not be installed.
- Confirm that the pre-embedded angle of the base meets the design requirements and construction specifications.
- Ensure that the length of the reserved secondary cable is 30-50cm for installation and maintenance.

Note: **The light sealing ring is the sealing ring used when the lamp is installed to the base, while the light body sealing ring is the sealing ring used when the lamp itself is assembled, so it should be distinguished. The specification of light sealing ring depends on the base. Hangdakang provides O-type and T-type light sealing rings.**

CAUTION: Be careful not to cut the cable during operation, ensure that the sealing ring of the light is in correct position, and the sealing ring cannot be displaced during putting into the base. Do not use high-speed power tools to fasten the bolts, so as not to cause thread slipping.

Figure 6 – Diagram of 12-inch inset light installed on 12-inch base



- Remove dirt and moisture from the base, and ensure that the light base is clean and dry during the subsequent operation.
- Install the sealing ring between the light and the base.
- Connecting the ground wire between light base and bottom cover of the light is necessary.
- Put the light into the base slowly according to the light-emitting direction.
- Tighten six M10 fixing bolts and use a torque wrench to gradually tighten the bolts to a torque value, torque value refer to section 4.4, Table 6

CAUTION: When disassembling the light fixture, the old sealing ring of the light fixture must be replaced every time.

3.4. Disassembly of light fixture

- Loosen six M10 external hexagon light fixing bolts and take out the light with a 12-inch light special top cover handle tool or two large flat-head

screwdrivers.

- Separate the secondary cable connector connected to the isolation transformer.
- Take out the light fixture.

Note: 12-inch lamp light special top cover handle tool can be ordered from HDK.

WARNING: After the airport is put into use, the maintenance department of airfield lighting should provide enough spare parts according to the relevant management requirements. After the lights are dismantled, they should be installed on the original base in time according to the steps in 3.3 of this article. After the lights are dismantled, they should carefully check and take away all tools and parts on site to avoid "FOD".

CAUTION: During field operation, the prism of lights should be avoided to be dirty, and the lights should be properly placed on the transport vehicle after being dismantled to avoid damage.

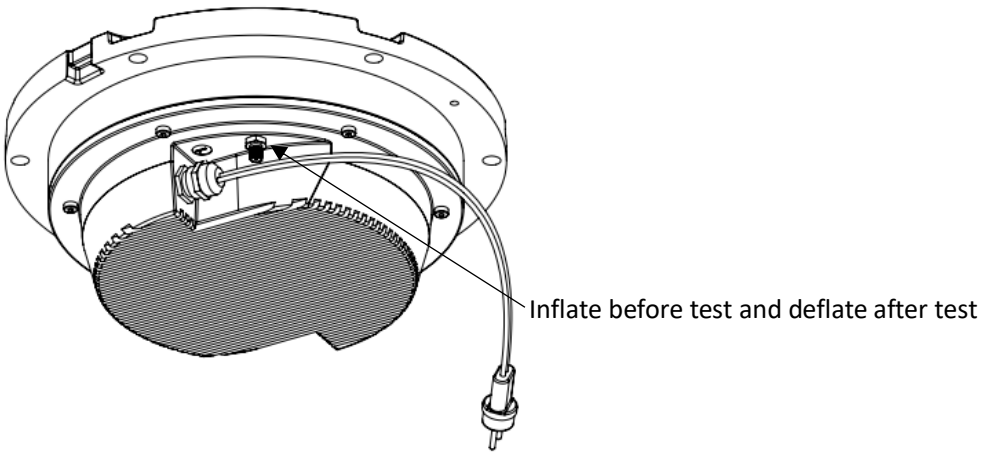
4. Maintenance

Note: **For trouble shooting, please refer to 4.7 of this article. After any bottom cover opening operation,the inset light watertightness must be checked again.The method of checking can refer to IEC 61827 section 6.4.1.6.**

4.1. Watertightness test procedure

- Prior to performing this test, the wire leads shall be subjected to a tension of 14 kg, for 5 min to test the integrity of the seal where the leads enter the inset light fixture.
- The entire inset light fixture shall then be submerged in water at least 76 mm below the surface, subjected to an internal air pressure of 140 kPa and maintained for a period of 10 min.
- Any leakage shall be reason for rejection.
- Press the thimble in the middle of the schrader valve core with allen wrench for 10 seconds to deflate the light fixture after this test.

Figure 7 – Watertightness Test



4.2. General maintenance procedure

According to CCAR-140-R1, AP-140-CA-2009- 1, ICAO, Airport Services Manual Part 9, Airport Maintenance Practice and FAA AC 150/5340-26, Maintenance of airport visual AIDS facilities and other documents, the recommended maintenance plan is shown in table 4.

Table 4 General Maintenance Plan of 12-inch inset light fixture

Maintenance frequency	Maintenance content
daily	1.Check the light-emitting 1.Check the top cover of the lamp for damage.
Semiannual	2.Remove the dirt on the surface of the light fixture. 3.Check whether the light fixture is in the correct position in the base, and check the bolt torque.
Annual/Biennial	1.Check the sealing performance of light fixture. 2.Clean the optic components (if necessary)

Note: The above is the suggested scheme, and the specific implementation shall be subject to the maintenance regulations of customers.

Table 5 Specification Sheet of Screws & Washers

Screw name	Screw specification	Installation torque (Nm)	quantity
Light fixture body screw	M5 flat gasket M5x18 hexagon head	4	6/6
Drive module screw	M3×6 Phillips round head	1.2	4 x drive module qty.
Optic assembly screw	M3×12 Phillips round head	1.2	2 x qty. of windows
Omnidirectional optic	M3×6 Phillips round head	1.2	3

assembly screw			
Pressure plate screw	M6×12 Cylindrical head hexagon	6	2 x qty. of windows

4.3. Tools preparation

Before installation, the following items should be confirmed:

- 12-inch lamp removal tool (HDK light fixture handle tool for top cover or two large flat-head screwdrivers)
- Torque wrench(specification: 16mm/17mm)
- Socket wrench: 16mm/17mm
- Phillips screwdriver (specifications: PH1/Ph3)
- Allen Wrench: Metric No.4.
- 13/16 open-ended wrench
- Clean rag
- Dust-free cloth special for cleaning optic lens
- Optic lens cleaner
- Thermal grease
- tweezers

4.4. Maintenance Items

For the lights deployed on the runway/taxiway, there are the following maintenance items:

Table 6 Maintenance Items for 12-inch Inset Light Fixture (Deployed)

No.	Maintenance project	Methods/steps
1	Check the light-emitting .	Visual inspection
2	Check the top cover of the light for damage.	Visual inspection
3	Clean the dirt on the surface of light fixture	Use a clean rag or brush.
4	Check whether the light is in the correct position in the base.	Visual inspection
5	Check bolt torque	Using torque wrench to confirm the torque is 4F Airport①： Not less than 37.28 Nm② 4E Airport①： Not less than 33.69 Nm 4D and Inferior Airport： Not less than 24.5 Nm Notes: ①.Including taxiway light fixture installed in the runway area ②.According to FAA ENGINEERING BRIEF NO.83A In-Pavement Light Fixture Bolts, With the largest A380 model for the calculation
6	Check the sealing performance	Look carefully through the window glass to see if there is water stain inside.
7	Disassembly of faulty light fixture	See article 3.4.
8	FAIL OPEN module	See 4.6 of this article.

CAUTION: When cleaning the dirt on the surface of light fixture, do not use a rag covered with dirt and sand, or a hard brush to rub the surface of the glass prism, so as not to scratch the surface of the prism and reduce the luminous performance of light. Wipe the glass surface gently with a clean soft rag, and use optic lens cleaner if necessary.

When the lights are not used, they should be stored in the open air, but in a dry and clean indoor environment, and the storage temperature should meet the requirements.

After the light fixtures are removed from the runway/taxiway, the maintenance items are shown in Table 7:

Table 7 Maintenance Items for 12-inch inset light fixture (Non-deployed)

No.	Maintenance items	Method/steps
1	Test whether it works properly.	Connect the light fixture with power and visually inspect the light fixture
2	Trouble shooting	Refer to article 4.7.
3	Check the sealing performance	Carefully observe whether there is water stain inside the window glass or open the light top cover to see if there is water stain inside the light.
4	Replace sealing ring	Refer to article 4.5.1.
5	Replace the drive circuit board.	Refer to 4.5.1 and 4.5.2 of this article in turn.
6	Cleaning optic components	Refer to 4.5.1, 4.5.2 and 4.5.3 of this article in turn.
7	Replace the optic component.	Refer to 4.5.1, 4.5.2 and 4.5.3 of this article in turn.
8	Replace the top cover/replace the top cover	Refer to 4.5.1, 4.5.2, 4.5.3 and 4.5.5 of this article in turn.
9	Replace the bottom cover.	Refer to article 4.5.1.
10	Replace the power cord	Refer to 4.5.1 and 4.5.5 of this article in turn.

4.5. Operating Procedure

WARNING: Please make sure to read the "Safety Instructions" carefully before operation.

CAUTION: Make sure to use screws and gaskets that meet the requirements and specifications during maintenance, otherwise it may lead to potential safety hazards.

Please keep the site environment clean during maintenance.

It is not allowed to touch the optic components with bare hands during maintenance, otherwise it may affect the service life of the light source and reduce the optic performance. If there is dirt on the optic components, please carefully wipe it with a soft, clean and dry non-woven dust-free cloth. The optic components include prisms and LED light sources.

4.5.1 Assembly and disassembly of light fixture body

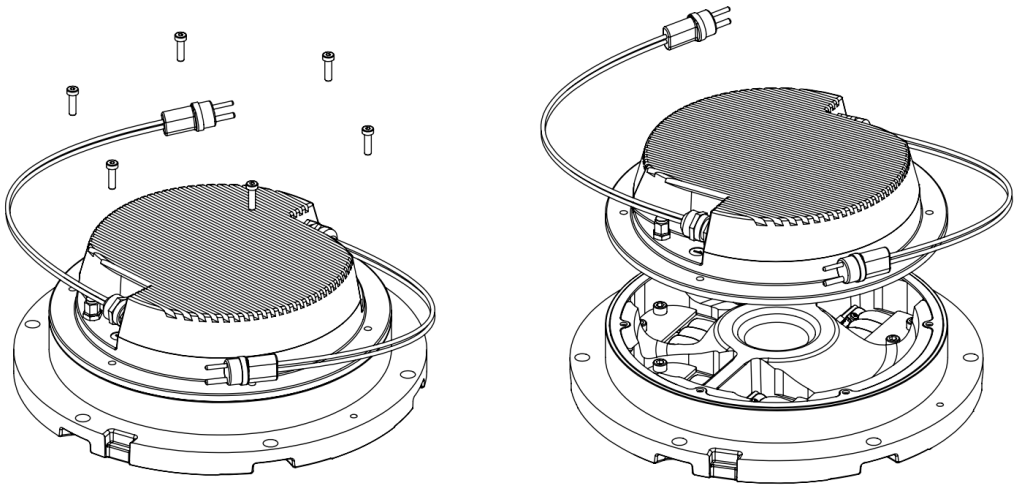
Disassemble the bottom cover:

- Turn the light fixture upside down.
- Use an Allen wrench (size: Metric No.4) to unscrew 6 screws.
- Open the back cover.
- Unplug the power cord terminal.
- Take out the L-shaped sealing ring of the light body.

Note: If the screws are fixed tightly, do not use power tools to unscrew them directly. Use hand tools to loosen them first, and then use power tools.

If the bottom cover of the rear cover is not easy to separate from the top cover, use a flat screwdriver to pry it lightly at the joint.

Figure 8 – Diagram of disassembly and assembly of light fixture body



Assemble the bottom cover:

- Clean the dirt and dust inside the light fixture, the contact surface between

the top cover and the bottom cover, and the groove of the O-ring, and keep them clean and dry.

- Put in a new light fixture body sealing ring.
- Insert the plug-in of the power cord into the drive board tightly.
- If possible, the light fixture can be checked by power-on before the bottom cover is installed.
- Close the top and bottom covers, as shown in Figure 8. Align the six screw holes and screw the bolts with an Allen wrench (specification: Metric No.4) with a torque of 4Nm.

Note: The installation of the bottom cover has a fool-proofing design. If the orientation of the bottom cover is incorrect, all the screw holes cannot be aligned.

CAUTION: A brand-new light body sealing ring must be replaced in each maintenance, so as to ensure the best sealing state.

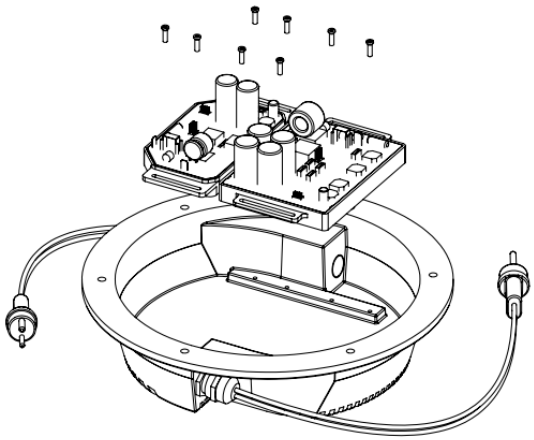
4.5.2 Assembly and disassembly of drive module

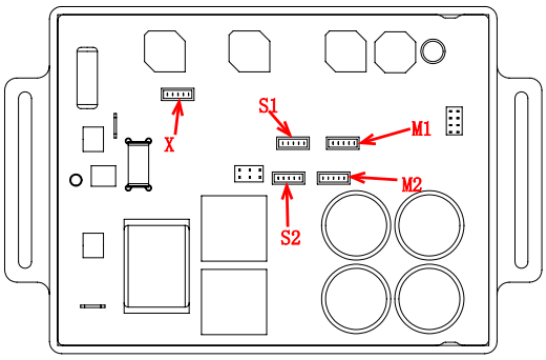
Remove the drive module:

- Unplug the jumper wire from the light source.
- Use a Phillips screwdriver (PH1) to remove 4pcs screws of the drive module
- Pick up the drive module.

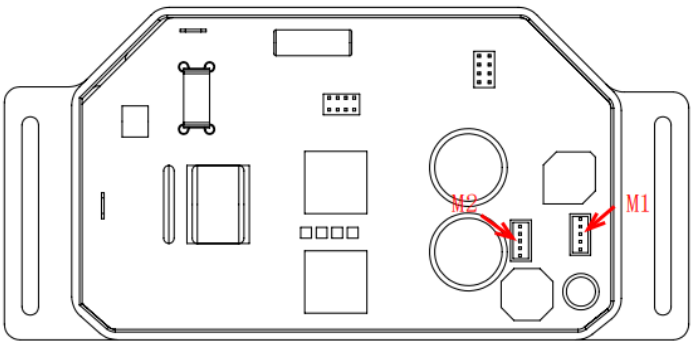
Note: There are two PCB modules (main board and auxiliary board) in the dual lead Threshold/Runway End light. Other models have only one piece of main board

Figure 9 – Diagram of disassembly and assembly of drive module





Main board



Auxiliary board

Assemble the drive module:

4.5.2.1 Runway Edge

- Make sure that the cable terminal of the light source is plugged in and coated with 704 silicone gel.
- After connecting window ① and ③ light source cables with M1 and M2 ports of PCB main board, apply 704 silicone gel.
- Connect window ④ and ⑤ light source cables with S1 and S2 ports of PCB main board, and then apply 704 silicone gel.
- Connect the hover guidance light source cable with the X port of PCB main board, and if there is no hover guidance, the X port is no need to connect, and apply 704 silicone gel.
- Put the drive module into the bottom cover and align the screw holes.
- Install the screws with a Phillips screwdriver (PH1) with a torque of 1.2Nm.
- Insert the power cord port into the power input terminal of the PCB main board tightly.

4.5.2.2 Approach, Threshold and Threshold Wing Bar.

- Make sure that the cable terminal of the light source is plugged in and coated with 704 silicone gel.
- After connecting window ① and ③ light source cables with M1 and M2 ports of PCB main board, apply 704 silicone gel.
- Connect the window ② light source cable to the S1 port of the PCB main board, and then apply 704 silicone gel. The S2 port is short-circuited with the rightmost two pins with a jumper cap, and X is not connected.
- Put the drive module into the bottom cover and align the screw holes.
- Install the screws with a Phillips screwdriver (PH1) with a torque of 1.2Nm.
- Tightly insert the power cord port into the power input terminal of the PCB main board.

4.5.2.3 Threshold/Runway End (Single Lead)

- Make sure that the cable terminal of the light source is plugged in and coated with 704 silicone gel.
- After connecting window ① and ③ light source cables with M1 and M2 ports of PCB main board, apply 704 silicone gel.
- After connecting the window ② light source cable with the X port of the PCB main board, apply 704 silicone gel.
- Connect window ④ and ⑤ light sources cables with S1 and S2 ports of PCB main board, and then apply 704 silicone gel.
- Put the drive module into the bottom cover with the screw holes aligned.
- Install the screws with a Phillips screwdriver (PH1) with a torque of 1.2Nm.
- Tightly insert the power cord port into the power input terminal of the PCB main board

4.5.2.4 Runway End

- Make sure that the cable terminal of the light source is plugged in and coated with 704 silicone gel.
- Connect the window ⑤ light source cable with the M1 port of the PCB auxiliary board, and then apply 704 silicone gel. The M2 port is short-circuited with the rightmost two pins with a jumper cap, and other interfaces are not connected (the PCB auxiliary board is driven of Runway End).
- Put the drive module into the bottom cover with the screw holes aligned.
- Install the screws with a Phillips screwdriver (PH1) with a torque of 1.2Nm.
- Tightly insert the power cord port into the power input terminal of the PCB main board

4.5.2.5 Threshold/Runway End (Dual Lead)

- After connecting window ① and ③ light source cables with M1 and M2 ports of PCB main board, apply 704 silicone gel (the PCB main board is driven of Threshold).
- Connect the window ② light source cable to the S1 port of the PCB main board, and then apply 704 silicone gel. The S2 port is short-circuited with the rightmost two pins with a jumper cap, and X is not connected.
- Connect the window ④ and ⑤ light source cables with the ports M1 and M2 of the PCB auxiliary board, and then apply 704 silicone gel (the PCB auxiliary board is driven of Runway End).
- Put the drive module into the bottom cover with the screw holes aligned.
- Install the screws with a Phillips screwdriver (PH1) with a torque of 1.2Nm.
- Tightly insert the port of the power cord (Line 1) into the power input terminal of the PCB main board
- Tightly insert the port of the power cord (Line 2) into the power input terminal of the PCB auxiliary board.

4.5.2.6 Runway Center Line

- Make sure that the cable terminal of the light source is plugged in and coated with 704 silicone gel.
- After connecting window ① and ⑤ light source cables with M1 and M2 ports of PCB main board, apply 704 silicone gel.
- The S1 and S2 port are short-circuited with the rightmost two pins with a jumper cap, and X is not connected.
- Put the drive module into the bottom cover and align the screw holes.
- Install the screws with a Phillips screwdriver (PH1) with a torque of 1.2Nm.
- Tightly insert the power cord port into the power input terminal of the PCB

main board.

Note: Be sure to insert the wire in place and pull it gently without falling off. The driving module must correspond to the light model and light-emitting direction as described above.

4.5.3 Disassembly of Optic assembly

Optic assembly are LED aluminum-based circuit board and reflector.

CAUTION: Please wear rubber gloves for the following operations. During the operation, avoid direct contact with the light-emitting surface of optic components, including LED light source and the inner surface of reflector.

Remove the optic assembly:

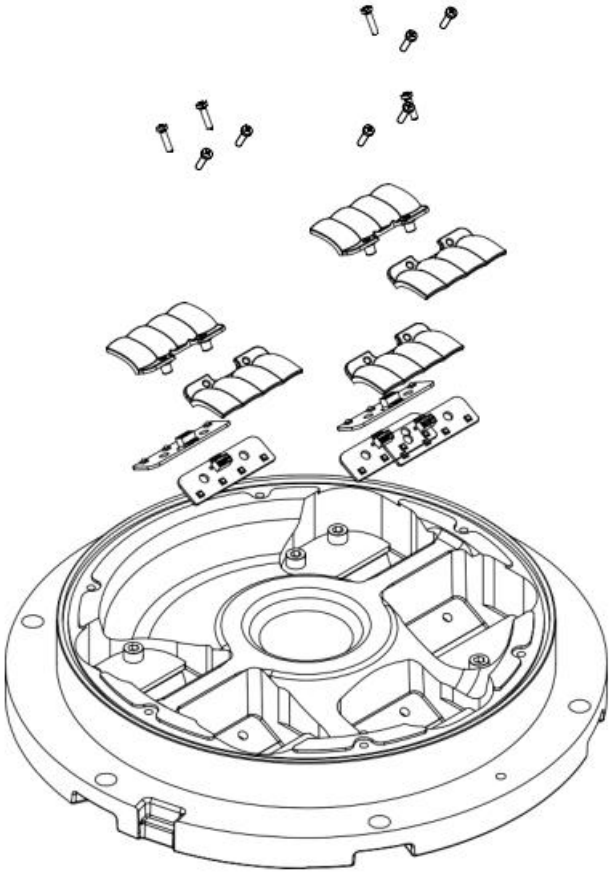
- Carefully unplug the cable from the light source assembly.
- Use a Phillips screwdriver (PH1) to remove the screws of the light source assembly.
- Remove the reflector and LED aluminum-based circuit board from the light source assembly in turn.
- After removing the light source assembly, please place it properly.

Installation of optic assembly:

- Coat the LED aluminum-based circuit board with thermal conductive silicone grease.
- Attach the LED aluminum-based circuit board to the bevel next to the top cover window, and align the two holes.

- Insert the "mounting foot" of the reflector into the mounting hole and fasten it tightly.
- Tighten the screw with a Phillips screwdriver (PH1) with a torque of 1.2Nm.
- Connect the light LED board cable.

Figure 10 – Diagram of assembling and disassembling optic components



Bidirectional light fixture-with hovering guidance:

Remove the LED hovering guidance optic assembly:

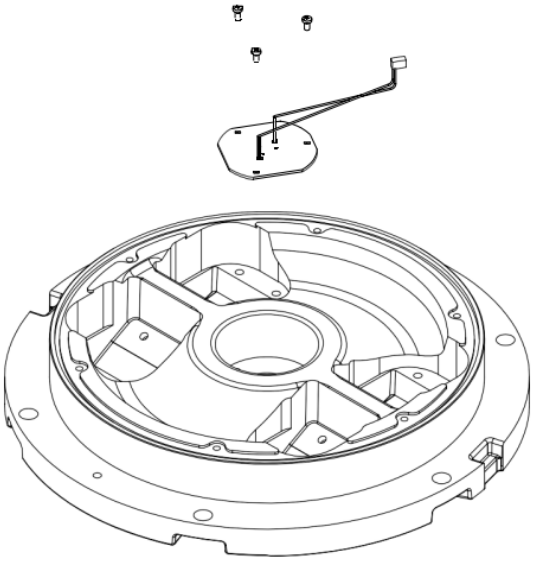
- Carefully unplug the cable from the light source assembly.
- Use a Phillips screwdriver (PH1) to remove the screws of the light source assembly.

- Remove the light source assembly (LED hovering guidance light board)
- After removing the light source assembly, please place it properly.

Assemble the LED hovering guidance optic assembly:

- Align the LED hovering guidance light board with the mounting screw hole position of the top cover.
- Tighten the screw with a Phillips screwdriver (PH1) with a torque of 1.2Nm.
- Connect the cable of LED light board.

Figure 11 – Diagram of assembling and disassembling optic components (with hovering guidance)



Note:

Thermal conductive silicone grease should not be coated too much or too thick, just cover the aluminum substrate evenly.

When installing the reflector, the two mounting feet should fall down at the same time, and brute force must not be used to avoid damaging the reflector. The light source assembly must be installed according to the model and light-emitting direction of the light.

If the light fixture has an optic toe-in angle, the light-emitting deflection direction of the light source assembly should correspond to the light-emitting mark on the window.

4.5.4 Disassembly of Prism holder

It is not necessary to remove the prism holder to maintain the light source, and it is only necessary to remove it when the top cover or prism needs to be replaced.

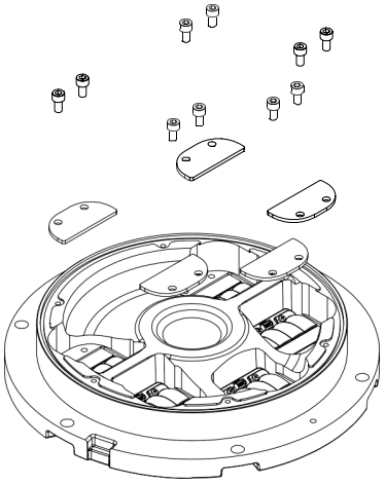
Remove the prism holder:

- Use No.5 Allen wrench to remove M6 fastening screw from the holder.
- Gently pick up the holder.
- Remove the silica gel gasket between the prism and the holder

Assemble prism holder:

- Prepare silica gel gaskets for each prism, and place it at the bottom of the prism. Please pay attention to the marks on the gasket. The side of gasket with mark should press close to the prism
- Place the holder on the slot, press the gasket and align it with the two mounting holes, and pay attention to avoid gasket displacement during the operation.
- Use No.5 Allen wrench to tighten six M6 screws with a torque of 6Nm.

Figure 12 – Diagram of disassembly and assembly of prism holder



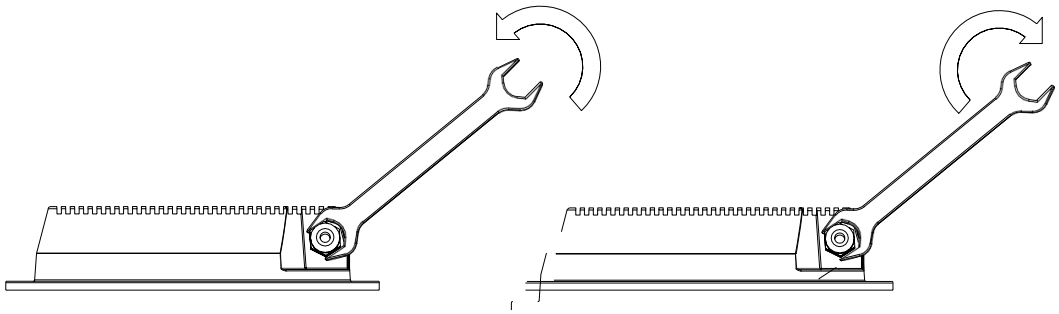
Note: The back of the silica gel gasket has the window light-emitting mark (color and toe-in angle direction). Please select the gasket corresponding to the light-emitting color and direction. See 2.6.2 of this manual for a detailed description of Window light emitting numbering

4.5.5 Disassembly of Power cord

Remove the power cord:

- Remove the sealing head of the power cord and place the opening of the bottom cover down on a working surface.
- Use a 13/16 open-ended wrench to clamp the root of the power cord sealing head and turn it counterclockwise until the sealing head is completely separated from the mounting hole of the bottom cover.
- Pull out the cable and clean the mounting hole of the bottom cover.

Figure 13 – Diagram of disassembly and assembly of power cord



Assemble the power cord:

- Take the new fittings to be replaced, pass the cables through the mounting holes of the bottom cover respectively, and reserve a cable with a length of 10 cm inside.

- Screw the sealing head of the power cord into the mounting hole of the bottom cover clockwise, and respectively tighten the root of the sealing head and the cable locking hexagonal nut with a 13/16 open-ended wrench. If cable is loose, tighten the locking nut.

4.6. Fail Open function

Description of English abbreviation:

- FON: without LED fail open function.
- FOA: With Fail open and automatic reset
- FOM: With Fail open and automatic reset

Applicable environment:

- FON: Applicable for circuits without a individual lamp monitoring unit.
- FOA: Applicable for circuits with specific a individual lamp monitoring units.
- FOM: Applicable for circuits with a individual lamp monitoring unit.

Note: **Plug the corresponding module (FOA/FOM) into the light driver, then the driver will have the function of fail open. The FOA/FOM module is shown in Figure 14.**

Functional features:

FON:

There is no LED fail open function. After the LED light source is damaged, the main controller will not do anything to the light input (the secondary side of the transformer).

FOA:

a) The automatic LED fail open function is realized through FOA module. When the LED fails,

the main controller will disconnect the relay, and the input terminal of the light fixture (the secondary side of the transformer) will form an open circuit. The individual lamp monitoring unit can know that the light fixture has failed by detecting the open circuit.

b) It can prevent accidental misjudgment of light fixture. When the individual lamp monitoring unit detects the failure of the light fixture, if the fixture can be powered on again for detection, the fixture will re-judge whether the LED is invalid, and if it is detected that the LED is normal again, it will keep working normally.

Note: The light fixture with the FOA module, after the FOA module is disconnected and the llight fixture is powered on again, the master control takes about 10s of power-on detection time to re-determine whether the LED is faulty.

c) For the maintenance of LED light fixture with failure, after replacing the new LED light source, the fixture can continue to be used without replacing the FOA module parts.

Note: If the light fixture with LED failure are not replaced in time, the open circuit state will be cleared and the resistance value will return to normal after the light fixture are powered off, which will cause the individual lamp monitoring unit to misjudge the light fixture (mistakenly think that the normal one have been replaced), and the light fixture may be repeatedly powered on for detection and feedback the LED failure fault many times.

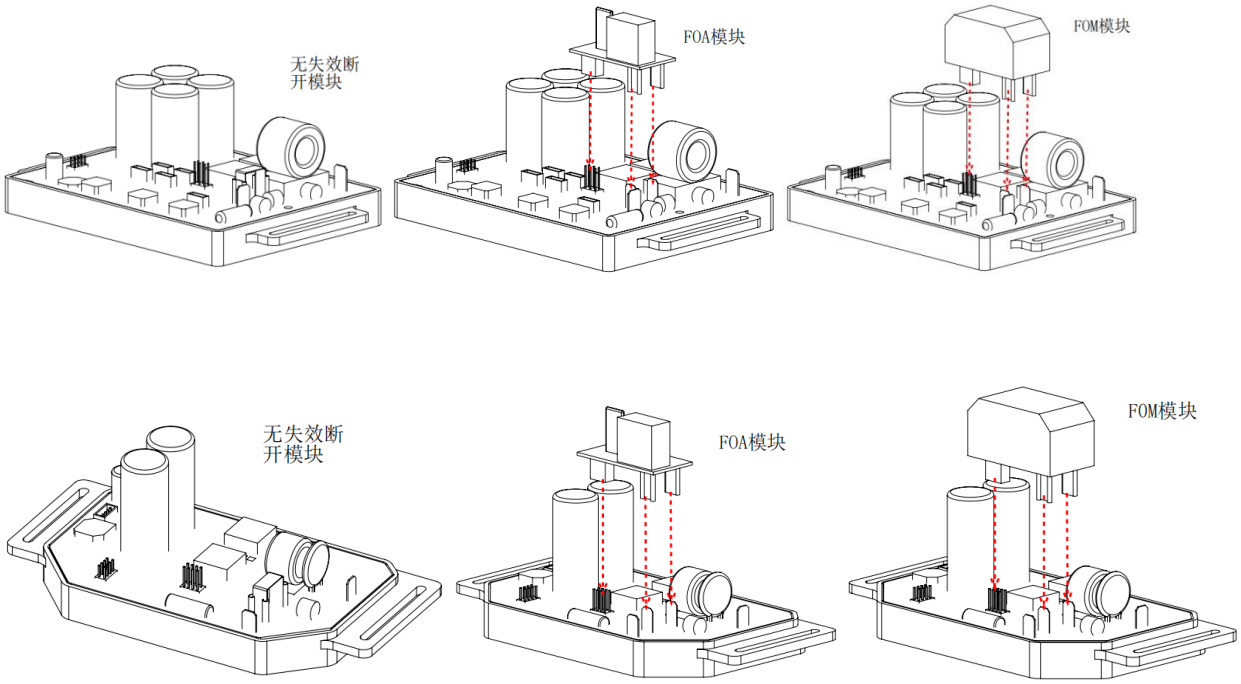
FOM:

a) It has the function of LED failure detection. When the LED fails, the main control FOM module will open the circuit by permanently disconnecting the input terminal (the secondary side of the transformer), and the individual lamp monitoring unit can detect the light fixture failure. In principle, it can be compatible with any type of individual lamp monitoring unit.

b) The FOM module is a disposable part. When the light fixture with failed LED are repaired,

the FOM module needs to be replaced at the same time before it can be used again.

Figure 14 – Diagram of fail open module



4.7. Trouble Shooting

Table 8 Trouble Shooting

Malfunction	Trouble shooting steps
The light fixture is on in one side and another side is off (Bidirectional light fixture)	1. Open the bottom cover and check the connecting wire between the driver board and the light board; 2. If the fault is not eliminated, check the cable connection between the light source on the fault side and the driver board; 3. If the fault is not eliminated, replace the light source at the fault side; 4. If the fault is not eliminated, replace the fault side driver board;
Unable to work (Unidirectional/Bidirectional light fixture)	1. Turn on the light again after turning it off for one minute; 2. If the fault is not eliminated, check the power cord plug; 3. If the fault is not eliminated, open the bottom cover and check the wiring between the power cord and the driver board; 4. If the fault is not eliminated, check the driver board;
Water leakage inside light fixture	1, check the window sealing performance 2. If the fault is not eliminated, open the bottom cover and check the L-shaped sealing ring and the sealing ring groove on the lamp housing; 3. If the fault is not eliminated, check the sealing head of the power cord;
Unable to control intensity levels normally	1, confirm the CCR and isolation transformer trouble-free, operation without problems; 2. If the fault is not eliminated, replace the main driver board;
Light-emitting is unstable and flickering	1.Confirm that the specifications of CCR and isolation transformer match the operation requirements of light fixture, and there is no fault and no problem in operation; 2. If the fault is not eliminated, replace the main driver board; 3. If the fault is not eliminated, contact the manufacturer for further instructions

5. Service support

5.1. Customer service

If you need after-sales service, please contact us through the after-sales service hotline or sales consultant.

After sales service hotline
+86-27-63498449

Before contacting, please prepare the following information in advance so as to get the service quickly:

- Product name and serial number
- Airport code or company name
- Your phone number and email address

5.2. Recycling

Improper disposal of scrapped electronic equipment may bring negative impacts on the environment and human health. Please follow the relevant local laws regarding the recycling of electronic products.

5.3. About HDK

Handakang Electrical & Mechanical Technology Corp. Ltd., established in 2003 in Wuhan/China is a professional locally known provider of Airfield Lighting, Navigation Aids, Frangible Mast Systems and Heavy Duty Support Equipment. In 2017 HDK started to create a new LED Airfield Lighting Portfolio supported by known capacities from Europe, to become the supplier for Airfield Customers in China, Asia, Europe and all over the World for reliable, efficient and innovative Airfield Lighting Products at highest quality.

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