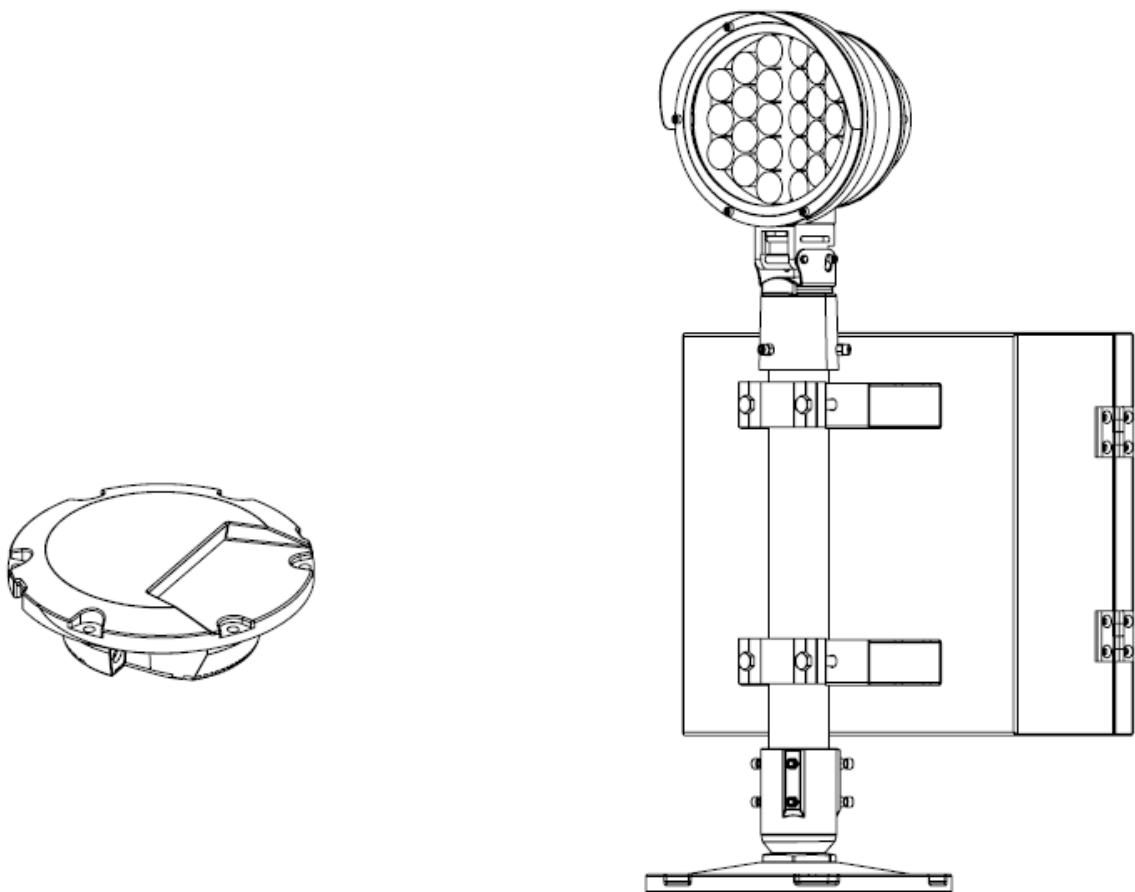


LED AIRFIELD LIGHTING



CONTENT

Disclaimer/Standard Warranty	6
1. Safety	7
2. Introduction.....	8
2.1. Models & Variants.....	9
2.2. Product Features.....	10
2.3. Electrical Properties	11
2.4. Photometric properties.....	11
2.5. Mechanical Properties.....	12
2.6. Main Components.....	15
2.7. Nameplate	18
3. Installation.....	19
3.1. Configurations of the system	19
3.2. Tools Required	20
3.3. Unpacking Unit	20
3.4. Installing Light Fixture and Branch Control Box.....	21
3.4.1. Elevated Fixture Installing on Extension Rod.....	21
3.4.2. Elevated Fixture Install on the Frangible Mast.....	22
3.4.3. Inset Fixture Installed on the 12-inch Base.....	23
3.5. Calibrating the Glowing Direction	25
3.5.1. Adjusting the Light Fixture Level.....	25
3.5.2. Horizontal ZERO Angle Adjustment	26

3.5.3.	PITCH Angle Adjustment	27
3.6.	Electrical Installation	28
3.6.1.	Wiring of the Main Control Cabinet	28
3.6.2.	Wiring of the Branch Control Box-25mm ²	31
3.6.3.	Wiring of the Branch Control Box-4mm ²	33
3.6.4.	Terminal Resistance	35
3.6.5.	Connection of the System-25mm ²	36
3.6.6.	Connection of the System-4mm ²	37
3.6.7.	Set up the Toggle Switch	38
3.6.8.	Set up the Knob Coding Switch	38
4.	Operation	40
4.1.	Introduction Main Operation panel	40
4.2.	Introduction of Touch Screen Operation	41
5.	Maintenance	49
5.1.	Main Control Cabinet Maintenance Mode	49
5.2.	Watertightness Test Procedure	50
5.3.	Basic Maintenance Program	51
5.4.	Trouble Shooting	52
6.	Support	54
6.1.	Customer Service	54
6.2.	Recycling	54

6.3.	About HDK	54
------	-----------------	----

Hangdakang Mechanical & Electrical Technology (Wuhan) Co., Ltd.

Address: Building No. 10, Optic and mechanical park, High tech 5# Road, East lake tech district, Wuhan, Hubei, China

Tel: +86-27-63498449

Email: airport@hdk-aero.com.

Website: <http://www.hdk-aero.com>

LIST OF TABLES

Table 1	List of the Light Series	9
Table 2	Maintenance Mode Master Control Unit Knob Coding Switch Setting	39
Table 3	Maintenance Mode Slave Control Unit Knob Coding Switch Setting	39
Table 4	Suggested Maintenance Program Plan	51
Table 5	Trouble Shooting	52

LIST OF FIGURES

Figure 1	Flashing Lights Appearance	8
Figure 2	Major Dimensions of the Elevated Light Fixture	12
Figure 3	Major Dimensions of the Inset Light Fixture	13
Figure 4	Major Dimensions of the Control Box	13
Figure 5	Major Dimensions of the Main Control Cabinet	13
Figure 6	Exploded View of the Elevated Light Structure	16
Figure 7	Exploded View of the Inset Light Structure	17
Figure 8	Layout of the System	19
Figure 9/10	Installation on Extension Rod	21
Figure 11	Flange Mounting Size of Branch Box	22
Figure 12	Installation on the Frangible Mast	22
Figure 13	Installation of Inset Light on 12-inch Light Base	24
Figure 14	Light Fixture Level Adjustment	25
Figure 15	Glowing Direction Adjustment	26
Figure 16	PITCH Angle Adjustment	27
Figure 17	Wiring of the Main Control Cabinet	28
Figure 18	Schematic Diagram of the Main Control Cabinet	29
Figure 19	Wiring of the Branch Control Box-25mm ²	31
Figure 20	Schematic Diagram of the Branch Control Box-25mm ²	32
Figure 21	Wiring of the Branch Control Box- 4mm ²	33
Figure 22	Schematic Diagram of the Branch Control Box- 4mm ²	34
Figure 23	Internal Wiring of The 5-core Connectors	35
Figure 24	Terminal Resistance	35
Figure 25	Connection of The System-25mm ²	36
Figure 26	Connection of The System- 4mm ²	37
Figure 27	Knob Coding Switch & Toggle Switch	38
Figure 28	Main Operation panel	40
Figure 29	Watertightness Test	50

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 given by HDK exclude all cases of gross negligence and handling of all products.

In case of avoidable defects or failure of one of HDK products, caused by mechanical, electrical or physical defects, they will be repaired by means of appropriate delivery of spare parts or repair.

Replacement and delivery of spare parts shall be subject to the requirements of correct storage of the products, correct installation of the products, correct maintenance of the products and the submission of a written complaint to HDK regarding the avoidable defects.

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 is limited with regard to the cost of the labor required for disassembly and assembly of the product and the delivery of the corresponding products.

Hangdakang Mechanical & Electrical technology (Wuhan) co. LTD cannot be held responsible 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 is considered incorrect and is excluded from any warranty.

Included are:

- Use of HDK products outside the intended operating values.
- 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.

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 not operated properly. 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).

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.

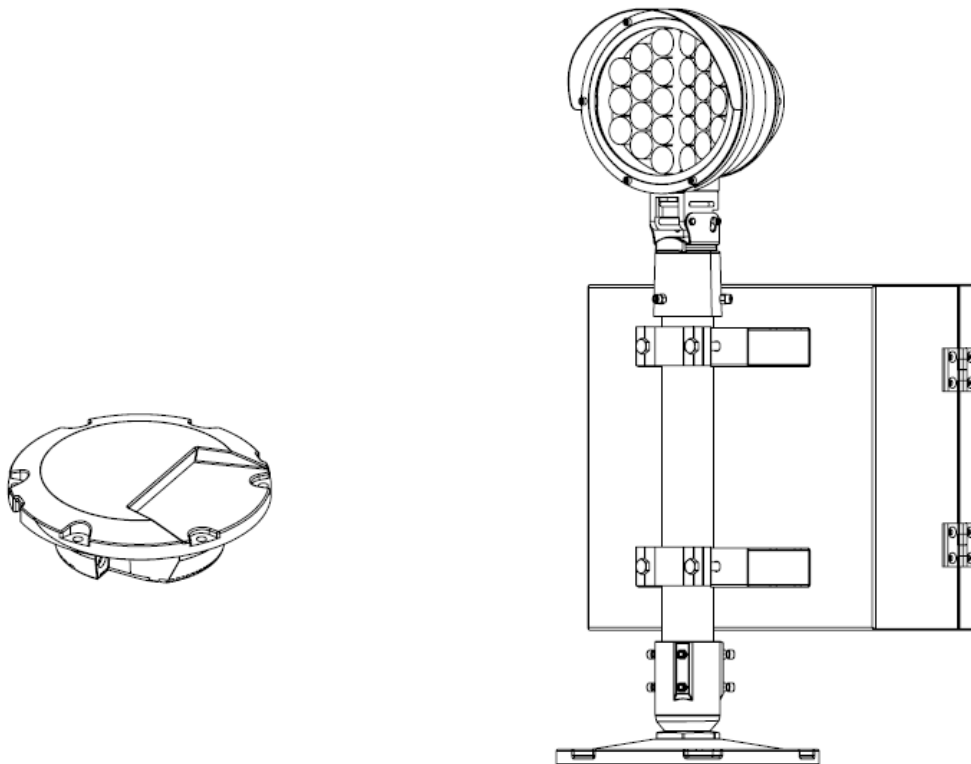
Note:

Explanations and supplements to parts of the description.

2. Introduction

The flashing lighting system produced by Hangdakang Mechanical & Electrical Technology Co., LTD. (hereinafter referred to as "HDK") can be applied to airfields with various conditions. The elevated lights are equipped with three-axis independent angle adjustment and calibration function. The product has met the requirements of ICAO, CAAC, IEC and FAA standard and is famous for its ultra-durable structure, extreme elegant design as well as long maintenance-free period. The light source itself is made from energy-saving and long-life LED.

Figure 1 – Flashing Lights Appearance



2.1. Models & Variants

This manual presents essential information for handling, installation and maintenance operations of the flashing lights. The series can be divided into different models according to the number of luminous units and power supply type of the system. All models are shown in following table:

Table 1 - List of the Light Series

Application	Model	Power Supply
Elevated Runway Threshold Identification Lights	ELE-RTIL(L)	220VAC / White (Flashing)
Inset Runway Threshold Identification Lights	ILE-RTIL(L)	220VAC / White (Flashing)
Elevated Sequenced Flashing Lights	ELE-SFLS(L)	220VAC / White (Flashing)
Inset Sequenced Flashing Lights	ILE-SFLS(L)	220VAC / White (Flashing)

2.2. Product Features

The flashing lighting system and the runway threshold identification lights use energy-saving, long-life LED light sources.

The main components of sequenced flashing lighting system and the runway threshold identification lights system are main control cabinet, branch control boxes and light fixture.

The main components of elevated lights include front cover module, optical assembly, sealing ring, rear cover module and installation adjustment assembly. The front and rear covers are made of aluminum alloy, and the front cover is made of high-strength scratch-proof material. The main components of inset lights are aluminum alloy top cover, bottom cover, glass cover, optical components and sealing ring. The top cover is made of aluminum alloy, and the bottom cover is aluminum alloy high pressure precision casting. All the fasteners are made of 316 stainless steel.

The light source of the product is OSRAM LED. The optical components of the product adopt a complete universal design.

The lights fixture can be mounted on approach mast or flange using a frangible coupling.

The performance indicators of the light fixture meet the following standards:

(current version)

- ICAO Annex 14, Volume 1, & Aerodrome Design Manual
- EASA CS-ADR-DSN

2.3. Electrical Properties

Note: The main-supply air-breaker must meet the following requirements:



$I_{sd} > 450A$, $T_{sd} > 15ms$

Otherwise, there is a risk of overload protection tripping.

System input power to the main control cabinet

- AC 220V $\pm$ 10% 50Hz/60Hz

Input power to the branch control box

- AC 220V $\pm$ 10% 50Hz/60Hz

Power rating

- | | |
|---|-----|
| ● Elevated / Inset Flashing Light | 31W |
| ● Main Control Cabinet Power Consumption | 10W |
| ● Branch Control Box Power Consumption | 6W |
| ● Elevated / Inset Runway Threshold Identification Lights | 31W |

2.4. Photometric properties

Flashing rate

- Elevated / Inset Flashing Lights

Flash Frequency 1Hz or 2Hz

- Elevated / Inset Runway Threshold Identification Lights

Flash Frequency 1Hz or 2Hz

Light beam distribution

- Elevated Flashing Lights H: $\pm 15^\circ$, V: $\pm 5^\circ$

- Inset Flashing Lights H: $\pm 15^\circ$, V: $2^\circ \sim 12^\circ$
- Elevated Runway Threshold Identification Lights H: $\pm 15^\circ$, V: $\pm 5^\circ$
- Inset Runway Threshold Identification Lights H: $\pm 15^\circ$, V: $2^\circ \sim 12^\circ$

Light intensity

- Elevated Flashing Lights

Step 1: 150cd~450cd; Step 2: 800cd~2000cd; Step 3: 8000cd~20000cd

- Inset Flashing Lights

Step 1: 150cd~600cd; Step 2: 500cd~2000cd; Step 3: 5000cd~20000cd

- Elevated Runway Threshold Identification Lights

Step 1: 150cd~450cd; Step 2: 800cd~2000cd; Step 3: 8000cd~20000cd

- Inset Runway Threshold Identification Lights

Step 1: 150cd~600cd; Step 2: 500cd~2000cd; Step 3: 5000cd~20000cd

2.5. Mechanical Properties

Figure 2 – Major Dimensions of the Elevated Light Fixture

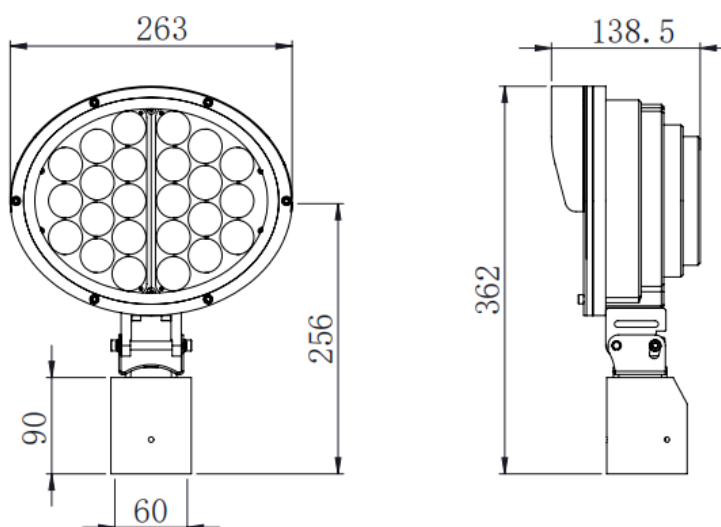
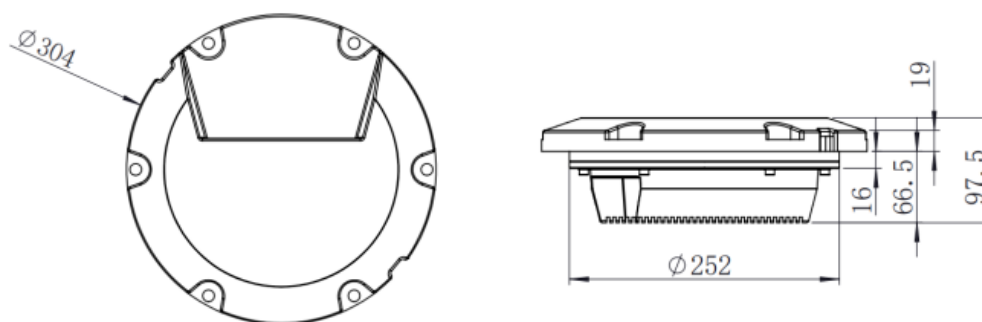
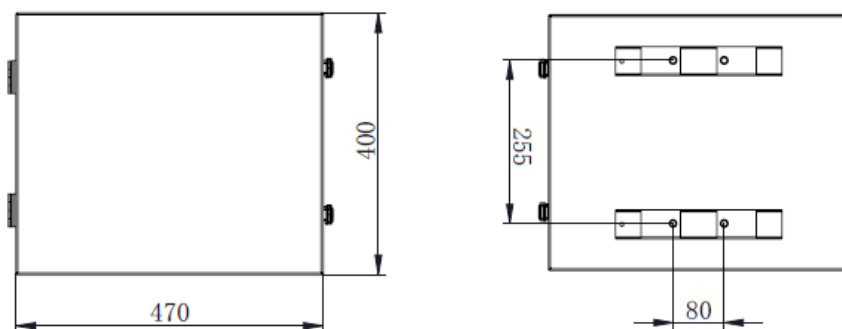
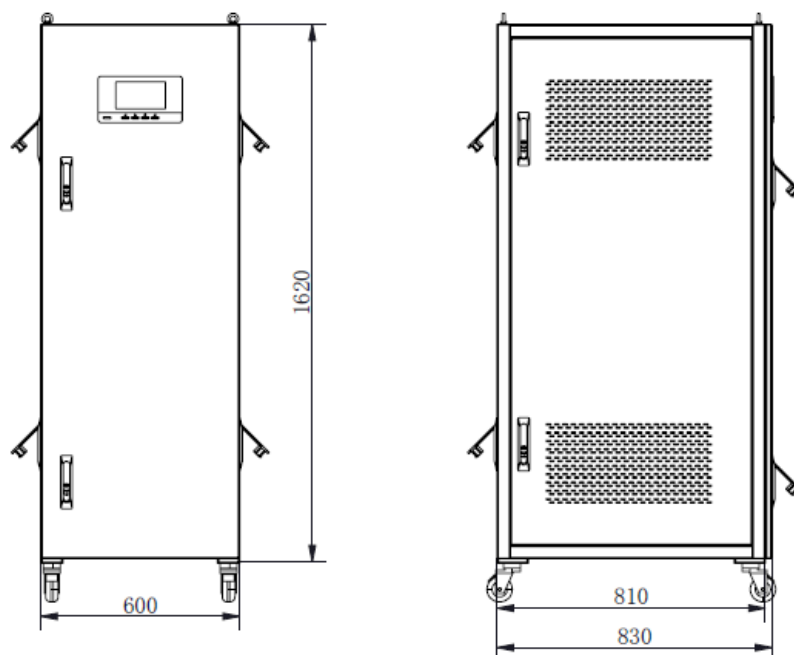


Figure 3 – Major Dimensions of the Inset Light Fixture**Figure 4 – Major Dimensions of the Branch Control Box****Figure 5 – Major Dimensions of the Main Control Cabinet**

Degree of Protection

- Main Control Cabinet IP22 (IEC 60598-1)
- Branch Control Box IP65 (IEC 60598-1)
- Elevated Light Fixture IP65 (IEC 60598-1)
- Inset Light Fixture IP67 (IEC 60598-1)

Operating Temperature

- Main Control Cabinet -55°C ~ +55°C
- Branch Control Box -55°C ~ +55°C
- Elevated / Inset Light Fixture -55°C ~ +55°C

Storage Temperature

- Main Control Cabinet -55°C ~ +85°C
- Branch Control Box -55°C ~ +85°C
- Elevated / Inset Light Fixture -55°C ~ +85°C

Weight

- Elevated Light Fixture 4.2kg
- Inset Light Fixture 6.5kg
- Branch Control Box 11kg
- Main Control Cabinet 133kg

2.6. Main Components

The elevated light fixture contains following main components:

Front Cover Module

- Visor
- Transparent front cover (High-strength scratch, resistant glass material)

Optical Component

- LED luminaire source with the color of white.
- LED Aluminum-based circuit board
- Heat sink
- Adapter board

Rear Cover Module

- Aluminum alloy back cover (spray plastic anti-corrosion treatment)
- Aviation plug

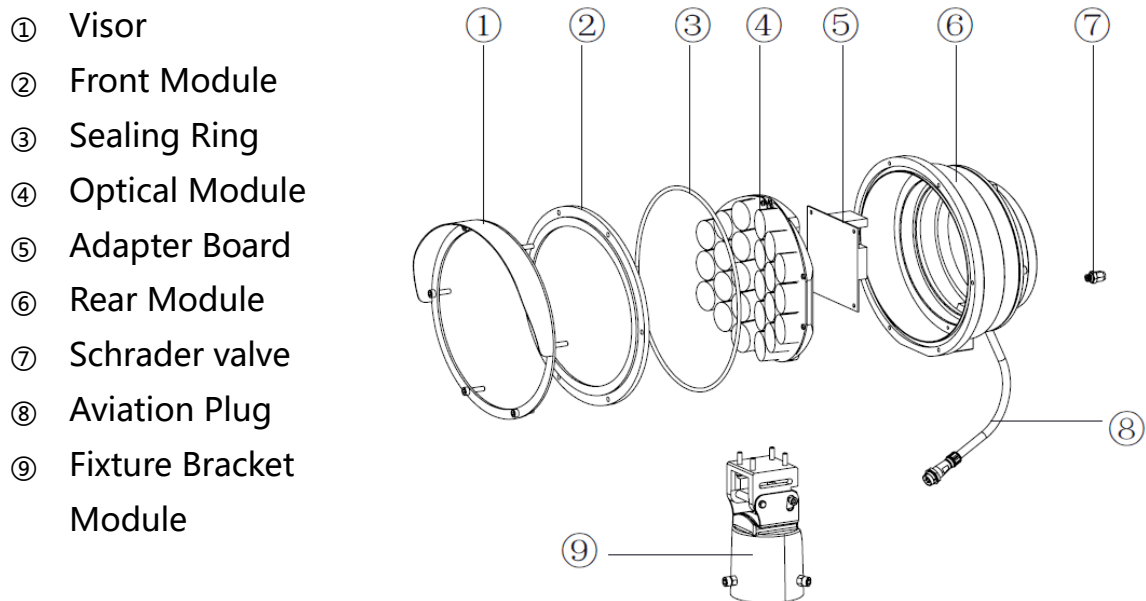
Light Fixture Bracket Module

- Top bracket
- Bottom bracket
- Adjusting parts (The vertical regulation range is from 0 ° to 12 °)

Others

- Light fixture Body sealing ring
- Fastener (Anti-corrosion 316 stainless steel)
- Thermal grease

Figure 6 – Exploded View of the Elevated Light Structure



The inset light fixture contains following main components:

Top Cover

- Aluminum alloy top cover with surface anodizing treatment
- Ultra-durable silicate glass
- High performance sealing silicone
- Glass Holder

Optical Component

- LED luminaire source with the color of white.
- LED Aluminum-based circuit board
- Heat sink
- Optical lens

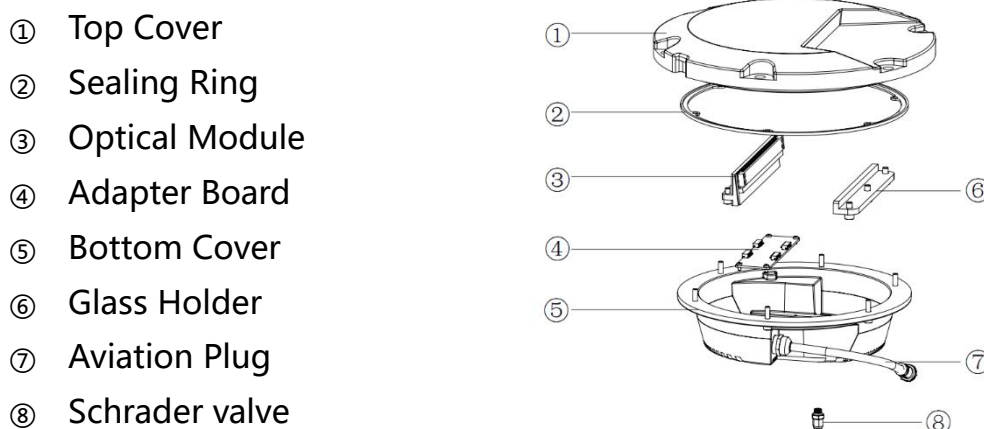
Bottom Cover

- Aluminum alloy bottom cover with electrophoretic anti-corrosion treatment
- Adapter board
- Power supply cable
- Aviation plug

Others

- Light fixture Body sealing ring
- Fastener - Anti-corrosion stainless steel
- Thermal grease

Figure 7 – Exploded View of the Inset Light Structure



2.7. Nameplate

Sequenced Flashing Light

Model: ELE-SFLS(L)

Input: AC 220V

Color: White

Power: 31W

SN: 4HJ1009

www.hdk-aero.com



Runway Threshold Identification Light

Model: ELE-RTIL(L)

Input: AC 220V

Color: White

Power: 31W

SN: 5AL1235

www.hdk-aero.com



SFLS Main Control Cabinet

Model: SFLS

Input: AC 220V

Frequency: 50/60Hz

Size: 600×830×1620mm

Rated Capacity: 3KVA

Date: 2025.01.13

SN: 6AG3002

www.hdk-aero.com



SFLS Branch Control Box

Model: SFLS

Input: AC 220V

Frequency: 50/60Hz

Date: 2025.03.06

www.hdk-aero.com



RTIL Main Control Cabinet

Model: RTIL

Input: AC 220V

Frequency: 50/60Hz

Size: 600×830×1620mm

Rated Capacity: 3KVA

Date: 2025.06.28

SN: 6AG0001

www.hdk-aero.com



RTIL Branch Control Box

Model: RTIL

Input: AC 220V

Frequency: 50/60Hz

Date: 2025.03.15

www.hdk-aero.com



3. Installation

WARNING: Before any operations, make sure that circuit is disconnected from the voltage supply, switch off the Constant Current Regulator to power off the circuit.



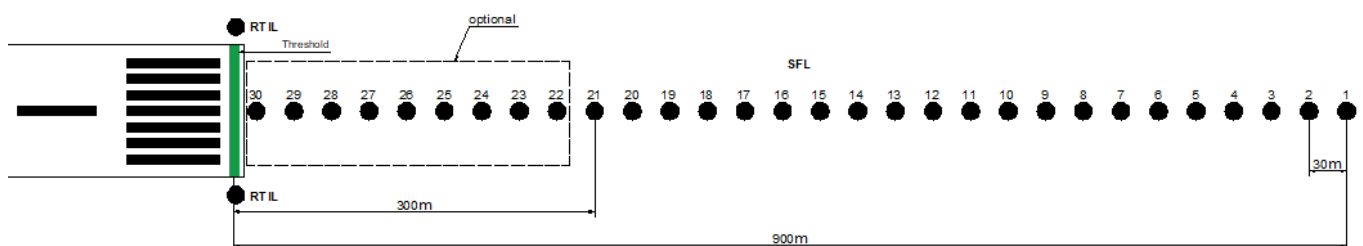
For the installation location requirements of the light fixture, see the EASA CS-ADR-DSN certification specifications and guidance material for aerodrome design or the ICAO Annex 14, Volume 1 as reference.

3.1. Configurations of the system

ICAO Annex 14, Volume 1 recommendation: If the center line beyond 300 m from the threshold consists of barrettes, each barrette beyond 300 m should be supplemented by a flashing light, except where such lighting is considered unnecessary taking into account the characteristics of the system and the nature of the meteorological conditions.

And ICAO Annex 14, Volume 1 Recommendation: Runway threshold identification lights should be installed at the threshold of a non-precision approach runway when additional threshold conspicuity is necessary or where it is not practicable to provide other approach lighting aids; and where a runway threshold is permanently displaced from the runway extremity or temporarily displaced from the normal position and additional threshold conspicuity is necessary.

Figure 8 – Layout of the System



3.2. Tools Required

The tools and materials required for installation are listed below:

- Socket wrench (Specification: 11mm, 16mm/17mm)
- Allen wrench (Specification: Metric No. 5)
- Open-end Wrench
- HDK light fixture handle tool for top cover (or two large flat-head screwdrivers)
- Cable seam sealing material and insulating tape
- Unidirectional elevated adjusting jig
- Inclinometer
- Impact drill and accessories
- Clean cloth

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



3.3. Unpacking Unit

Please check carefully whether the package is intact. After opening the package, please promptly claim compensation from the carrier if the product and accessories in the package are damaged.

When receiving the light fixture cargo, please confirm whether the product information on the cargo list is consistent with the actual construction design. At the same time, please check whether the quantity, type, specification, color and other characteristics of the light fixtures on the cargo list are consistent with those of the actual cargo. If you find any problem, please contact the supplier as soon as possible.

CAUTION: The packaging of this product can be used for various purposes such as future maintenance, uninstallation and transportation of the light fixture. Please keep the product packaging properly after receiving the cargo.



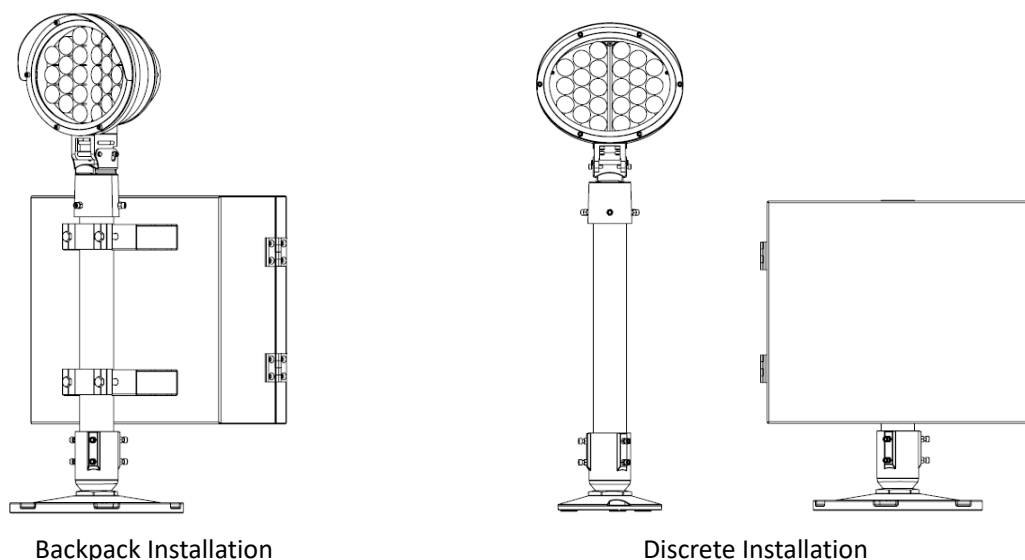
3.4. Installing Light Fixture and Branch Control Box

Please check the following items before proceeding:

Please confirm that the angle of the light fixture base is consistent with the design requirements and construction regulations.

3.4.1. Elevated Fixture Installing on Extension Rod

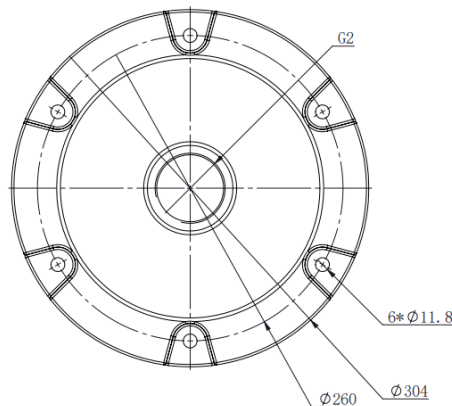
Figure 9/10 – Installation on Extension Rod



Note: If the length of the SFLS extension rod exceeds 1 m, the discrete installation method is recommended. If adopt the Backpack Installation, the length of the RTIL or SFLS extension rod not exceeds 0.47m.



Figure 11 – Flange Mounting Size of Branch Box



- Use an air compressor to blow and dry the threading tube;
- Confirm the installation position of the flange, pre-embed M10 bolts or M10 expansion bolts, fix the flange of the light fixture on the foundation surface, then tighten the frangible mast sleeve of the light fixture after fixing the flange;
- Install the extension pole into the breakable coupling, and then connect the branch control box and the light to the extension pole and fix it.

CAUTION:

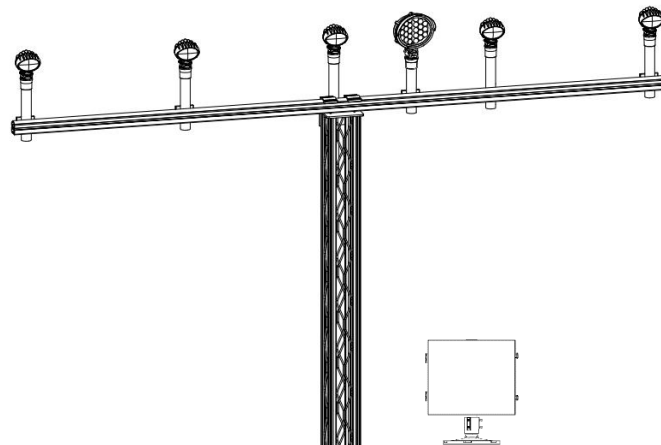


Be careful not to cut or press the cable during the operation.

Do not use high-speed power tools to tighten the bolts, as this may cause slippage.

3.4.2. Elevated Fixture Install on the Frangible Mast

Figure 12 – Installation on the Frangible Mast



Please check the following items before proceeding:

- Please confirm that the mounting bracket of the frangible mast is consistent with the design requirements and construction regulations.

CAUTION: Please install our products in accordance with the relevant local regulations and the construction team's construction regulations. This section only provides the theoretical installation method that uses the Lattix frangible masts sold by our company as an example.



- Please Pre-install the light fixture on the ground, then the power supply cable of the light fixture through the mounting sleeve according to plug and socket connection method. Finally, fix the light fixture using the mounting sleeve on the crossbar;
- Calibrate the installing direction of the light fixture;
- Tighten the fixing bolt so that the light fixture can be fixed to the mounting;

CAUTION: Do not use high-speed power tools to tighten the bolts, as this may cause slippage.



3.4.3. Inset Fixture Installed on the 12-inch Base

Before installation, the following items should be confirmed:

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

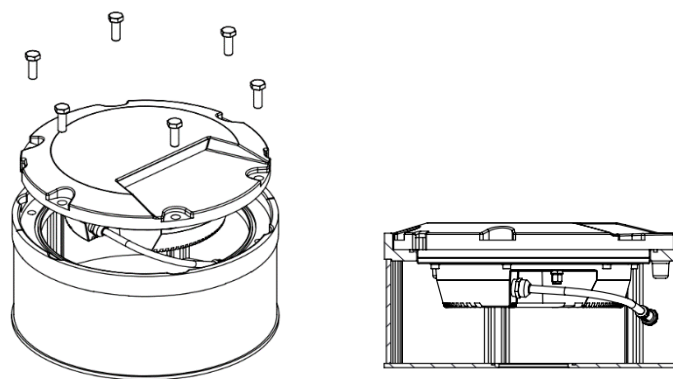
Note: The light sealing ring is the sealing ring used when the lamp is installed to the base, while the lamp body sealing ring is the sealing ring used when the lamp itself is assembled, so it should be distinguished. The specification of light sealing ring depends on the base. Hangdakang provides O-type 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 13 – Installation of Inset Light 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.
- Put the light into the base slowly according to the light-emitting direction.
- Tighten six M10 fixing bolts, and gradually tighten the bolts with a torque wrench until the torque is a proper value, torque value refer to below items:

4F Runway ^①: not less than 37.28Nm ^②

4E Runway ^①: not less than 33.69Nm

Runways and taxiways of 4D and below: not less than 24.5Nm

Note:

①. The reference is only valid when runway with displaced thresholds

②. According to the FAA ENGINEERING BRIEF NO.83A In-Pavement Light Fixture Bolts, the largest Airbus A380 model is calculated.

Note: The bolt torque of table above is the recommended plan. The actual implementation of the plan should be subject to setting torque value according to the airport scale.



3.5. Calibrating the Glowing Direction

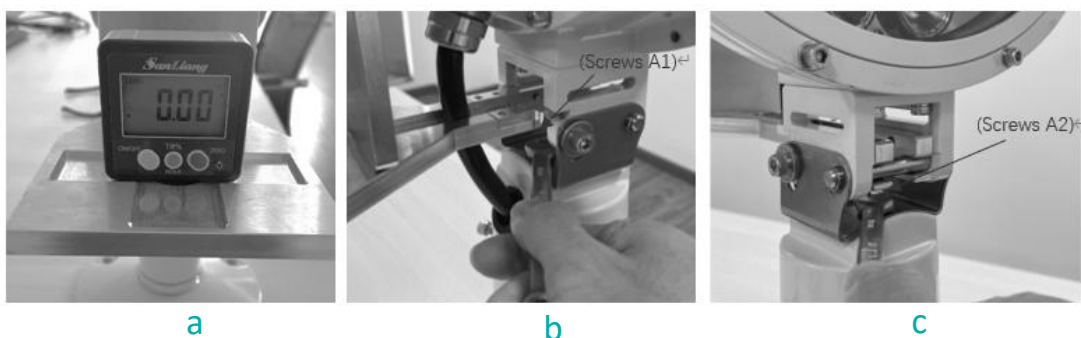
Note: Before the steps of calibrating begin, all the positioning of light fixture have done.



3.5.1. Adjusting the Light Fixture Level

- Inset the adjusting jig into the light fixture, Check the left-right sway angle of light fixture as follows
- Place the inclinometer in the direction of perpendicular to the light emission, ensure the angle reading value is within the range of $-0.5^{\circ} \sim 0.5^{\circ}$ (Figure a)
- If exceeds, loosen the 2 fixing screws(A1 & A2) on the light fixture bracket (Figure b & c) by 8mm wrench, adjust the left-right until the reading value meets the requirement

Figure 14 – Light Fixture Level Adjustment



3.5.2. Horizontal ZERO Angle Adjustment

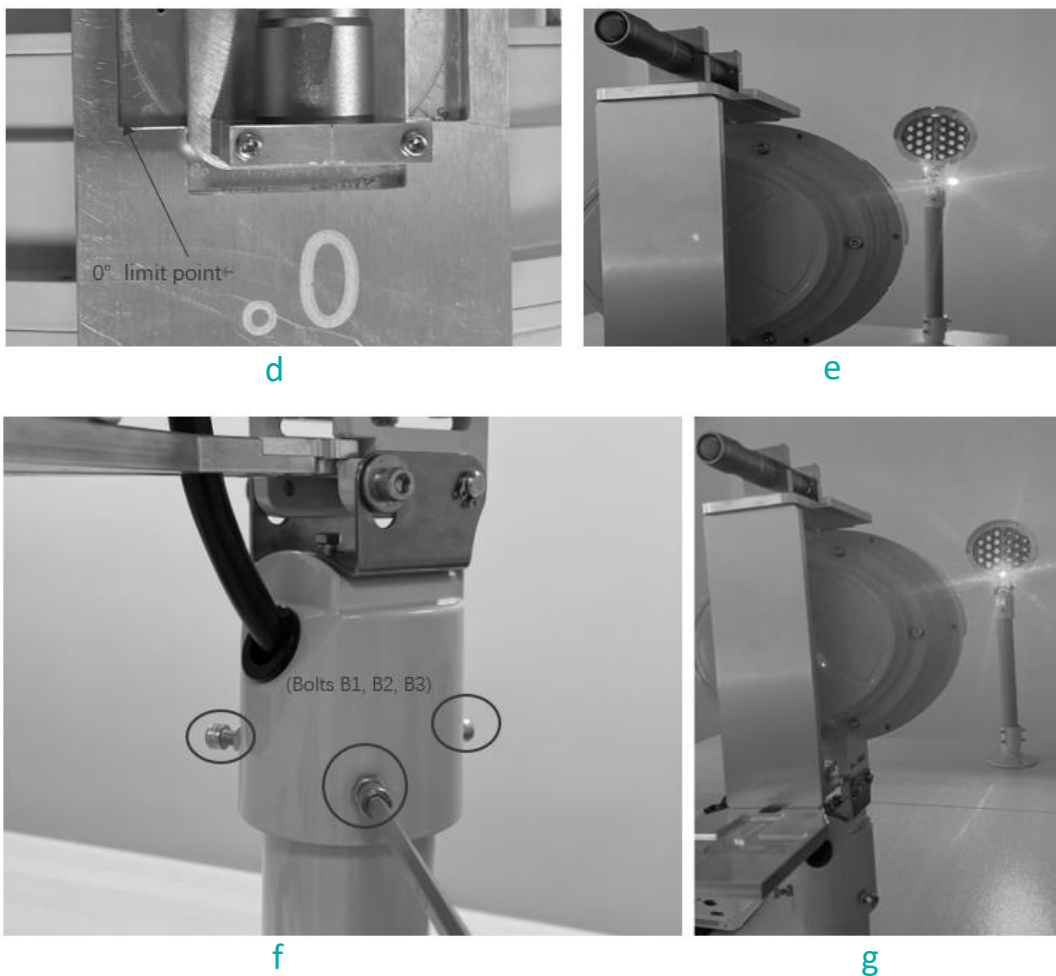
Note:



Recommendation: adjust angle from outside to inside of the entire approach lighting.

- Inset the angle adjusting jig into light fixture, stuck the 0° limiter (Figure d), activate the laser, (Figure e)
- loosen slightly the 3 bolts (B1, B2 & B3) under the light fixture (Figure f), rotate the light fixture, until the laser beam center sight cast to the middle line of the light fixture or upright rod as the reference point (Figure g), which is located vertically corresponding in neighbouring barrette of the approach light. Then fasten the 3 bolts, turn off the laser.

Figure 15 – Glowing Direction Adjustment



Note:

Recommendation: the reference point better choose the light fixture which is in front of the one being adjusted. Regarding to the light in the first barrette, can refer the light of 2nd barrette which is at the back.

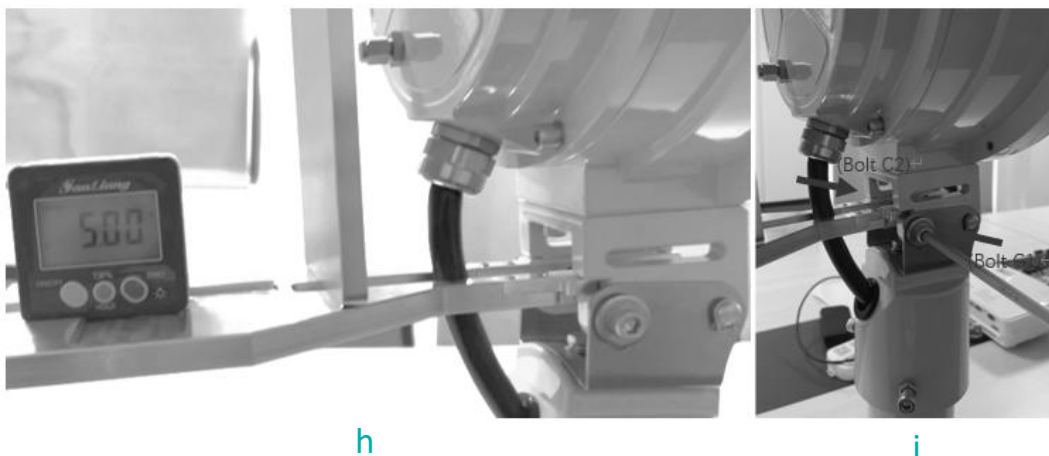
CAUTION:

Fasten the 3 bolts slowly and evenly, make sure the laser beam not shift throughout the operation.

3.5.3. PITCH Angle Adjustment

- Place the inclinometer on the angle adjusting jig on the direction(Figure h), loosen the 2 bolts(C1 & C2)
- Adjust the pitch angle of the light fixture to the specified value in accordance with the requirement in ICAO Annex 14 volume I by loosening and fastening the 2 bolts mutually. Tighten the lock bolts (figure i)
- Complete all the light fixture adjustment according to the above steps.

Figure 16 – PITCH Angle Adjustment



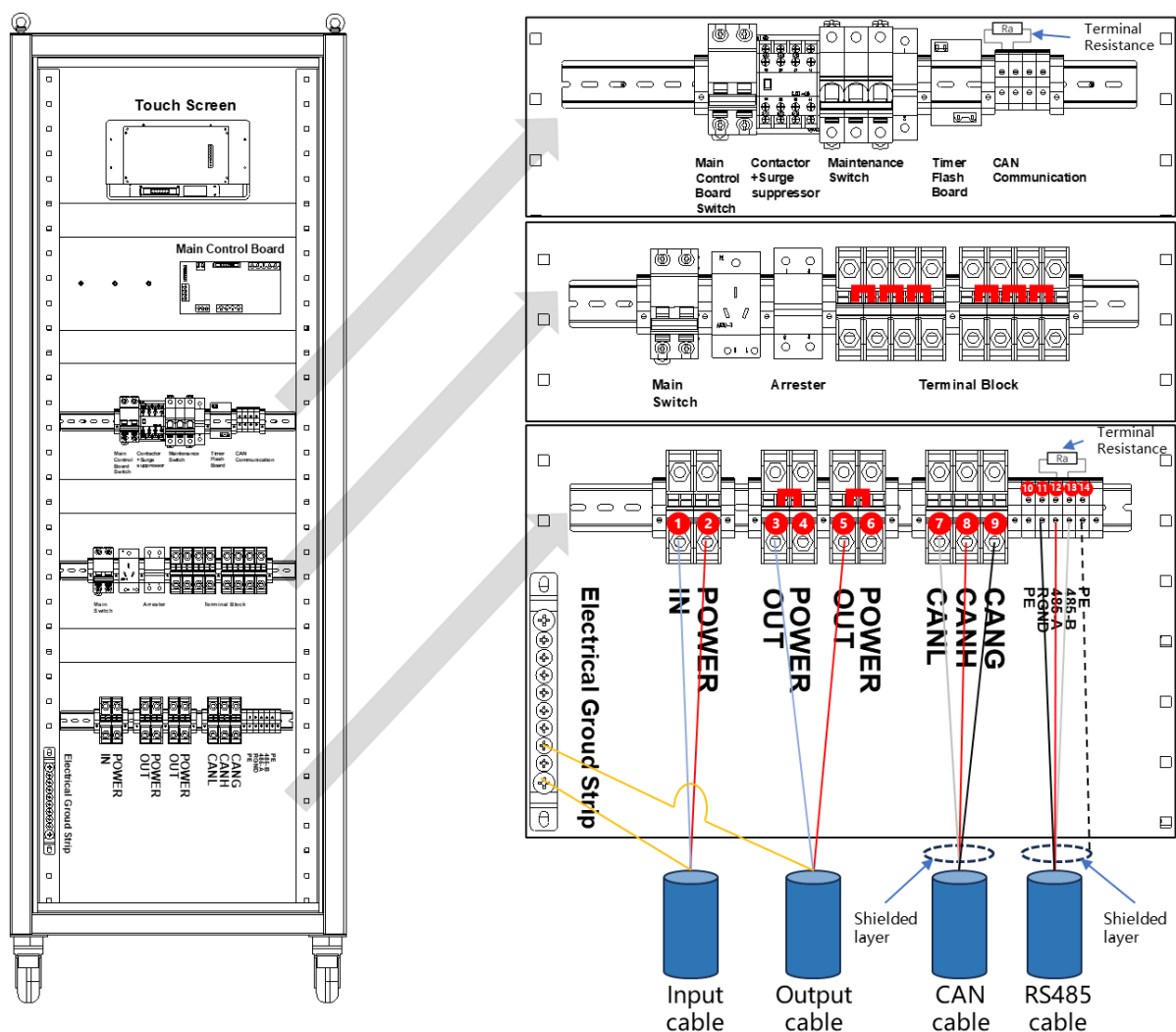
3.6. Electrical Installation

WARNING: Before starting the electrical installation, please make sure that the power circuit of the flashing lighting system is powered off, that is, turn off the system power of the circuit.



3.6.1. Wiring of the Main Control Cabinet

Figure 17 – Wiring of the Main Control Cabinet

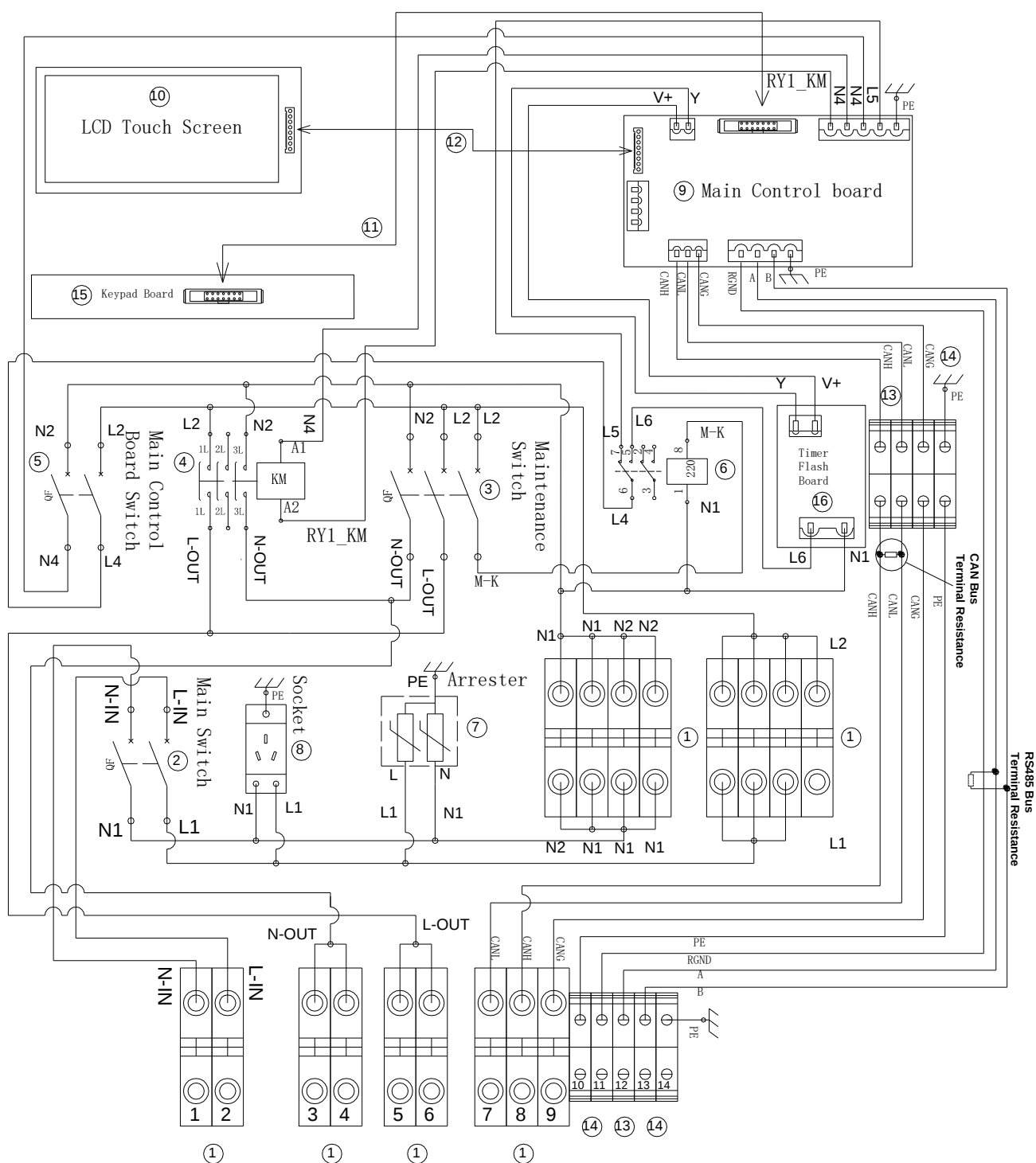


- The terminals of the main control cabinet are input terminals, output terminals, CAN communication terminals and RS485 communication terminals.

- The input terminals: Red wire is fire wire (L); Blue wire is the zero line (N); Yellow-Green wire is the ground line (PE).
- The output terminals: Red wire is fire wire (L); Blue wire is the zero line (N); Yellow-Green wire is the ground line (PE).
- CAN communication terminals: Red wire is CANH; Grey wire is CANL; Black wire is CANG.
- RS485 communication terminals: Red terminal is 485-A; Grey wire is 485-B; Black wire is RGND.
- The main control cabinet input is 220 VAC, the recommended input cable: 3-core copper cable 25mm²;
- The main control cabinet output is 220 VAC, the recommended input cable: 3-core copper cable 25mm²;
- CAN communication recommended cable: 2*2*2mm² twisted-pair shielded cable, one twisted-pair connect to CANL and CANH, another twisted-pair for CANG and reserved.
- RS485 communication recommended cable: 2*2*2mm² twisted-pair shielded cable, one twisted-pair connect to 485_A and 485_B, another twisted-pair for GND and reserved.

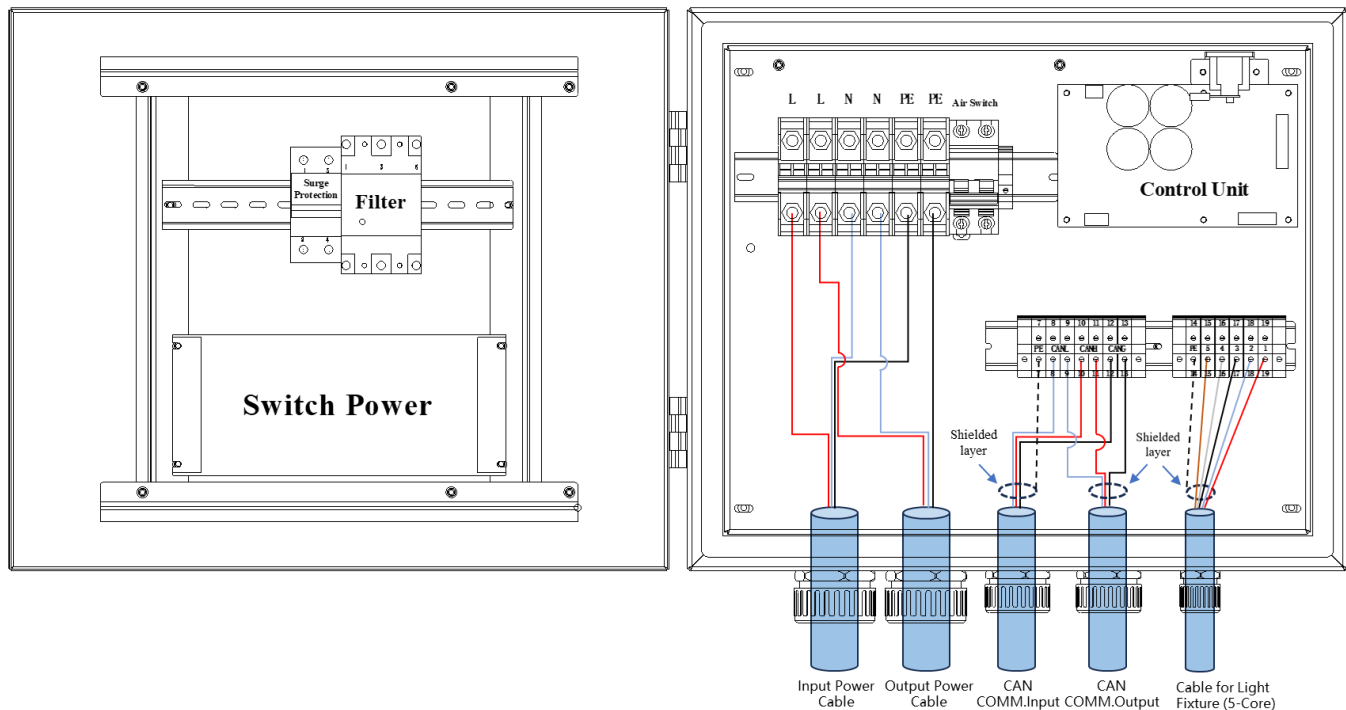
Figure 18 – Schematic Diagram of the Main Control Cabinet

NO.		Specification
NO.	Wire Description	① RTO 8-TC 35mm ² Terminal Block
	POWER-IN (N)	② 5SY4263-8CC D63 2P Switch
	POWER-IN (L)	③ 5SY6363-8CC D63 3P Switch
	POWER-OUT (N)	④ 3RT6072-1AN20 32A 220V Contactor
		3RT6926-1CD00 Surge Suppressor
	POWER-OUT (L)	⑤ 5SY7210-8CC 10A 2P Switch
		⑥ G2R-2-SN(L) 220V Coil Assembly
	CAN Communication wire CANL	⑦ 5SD7462-3CR Arrester
		⑧ AC30-110 Socket
	CAN Communication wire CANH	⑨ Main Board
	CAN Communication wire CANG	⑩ LCD Touch Screen
	CAN Shielded Layer	⑪ 14PIN Ribbon Cable 1.5m
	485 Communication wire GND	⑫ HY2-8PIN Ribbon Cable
	485 Communication wire A (High)	⑬ UK10N 10mm ² Terminal Block
	485 Communication wire B (Low)	⑭ USLKG6N 6mm ² Terminal Block
	485 Shielded Layer	⑮ Keypad Board
		⑯ Timer Flash Board



3.6.2. Wiring of the Branch Control Box-25mm²

Figure 19 – Wiring of the Branch Control Box-25mm²

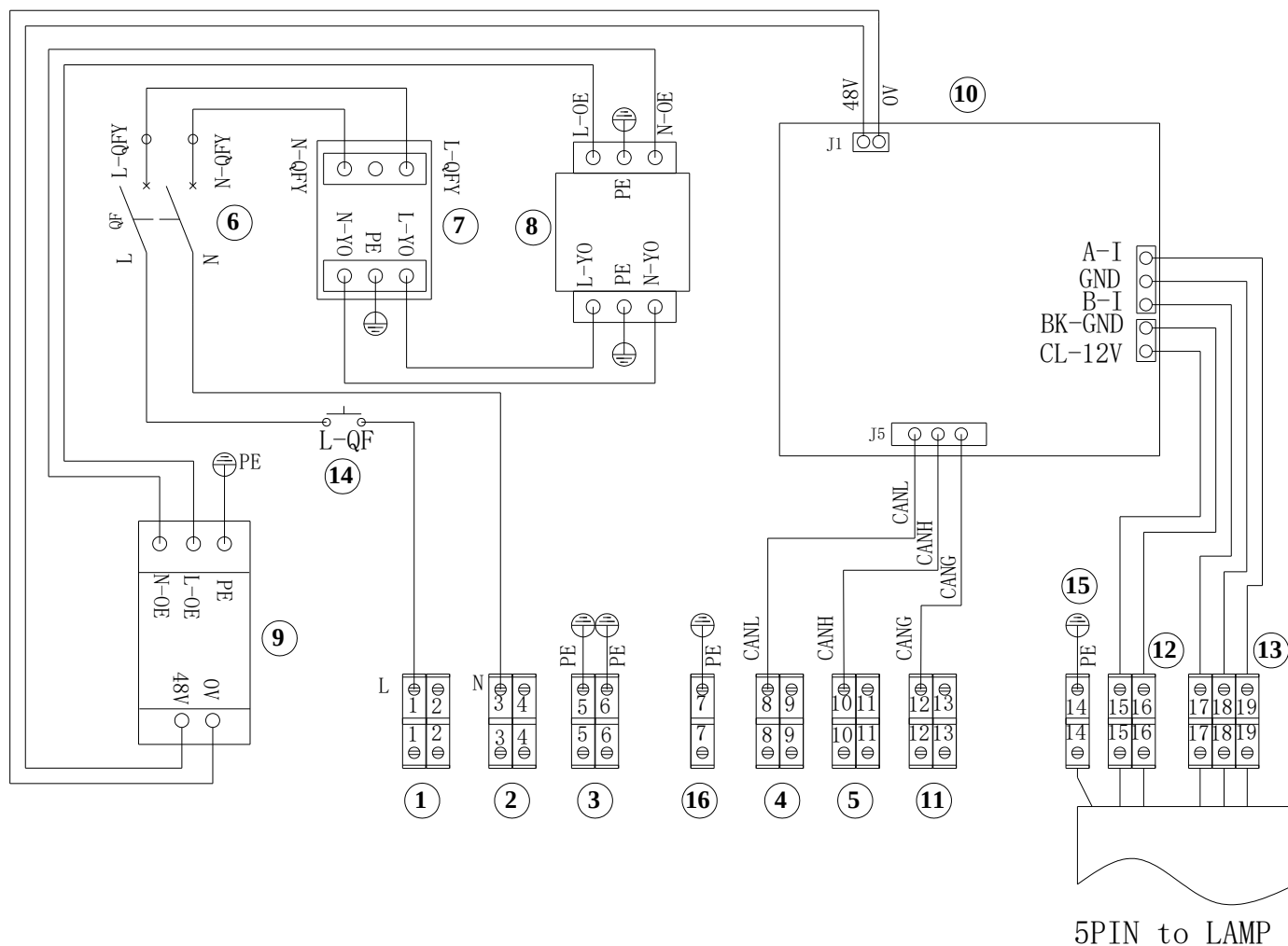


- The Branch control Box input and output are 220 VAC, the recommended input and output cable: 3-core copper cable 25mm²;
- The CAN communication cable recommended: 2*2*2mm² twisted-pair shielded cable, one twisted-pair connect to CANL and CANH, another twisted-pair for CANG and reserved.
- The cable for light fixture recommended: 5-core shielded copper cable 3*2.5mm²+2*1mm², The 5-core cable compatible with the aviation plug shall have an outer diameter ranging from 9 mm to 16.5 mm. The wire sequence of the five-core cable must correspond one-to-one to the numerical designations at both the terminal strip and the aviation plug. Figure19 & Figure 23.

Note:



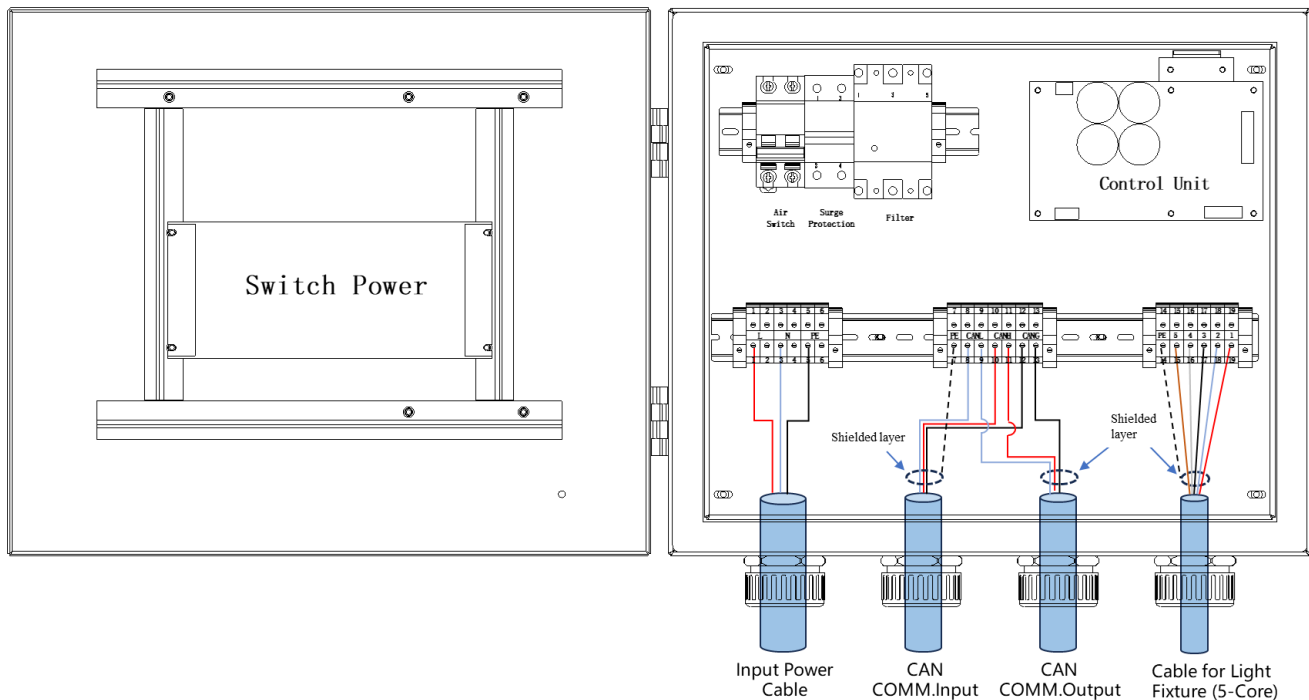
The shielded layer of CAN communication output cable need not be grounded. The shielded layer only requires one end to be grounded.

Figure 20 – Schematic Diagram of the Branch Control Box-25mm²


SN	DESCRIPTION	SPEC.
①	Terminal (L)	RTO 8-TC
②	Terminal (N)	RTO 8-TC
③	Terminal (PE)	RTO 8-TC
⑮ ⑯	Terminal (PE)	Typ USLKG10
④	Terminal (CANL)	Typ UK 10N (Grey)
⑤	Terminal (CANH)	Typ UK 10N (Grey)
⑪	Terminal (CANG)	Typ UK 10N (Yellow)
⑫ ⑬	Terminal (Lamp)	Typ UK 10N (Grey)
⑥	Air switch	10A 2P 400V
⑦	Surge Protection	6KV 3KA
⑧	Filter	CW4L2-6A-R
⑨	Switch Power	LMF750-23B48UH
⑩	Control Unit	/
⑭	Travel Switch	ME/8108

3.6.3. Wiring of the Branch Control Box-4mm²

Figure 21 – Wiring of the Branch Control Box-4mm²



- The Branch control Box input is 220 VAC, the recommended input cable: 3-core copper cable 4mm²;

Note:

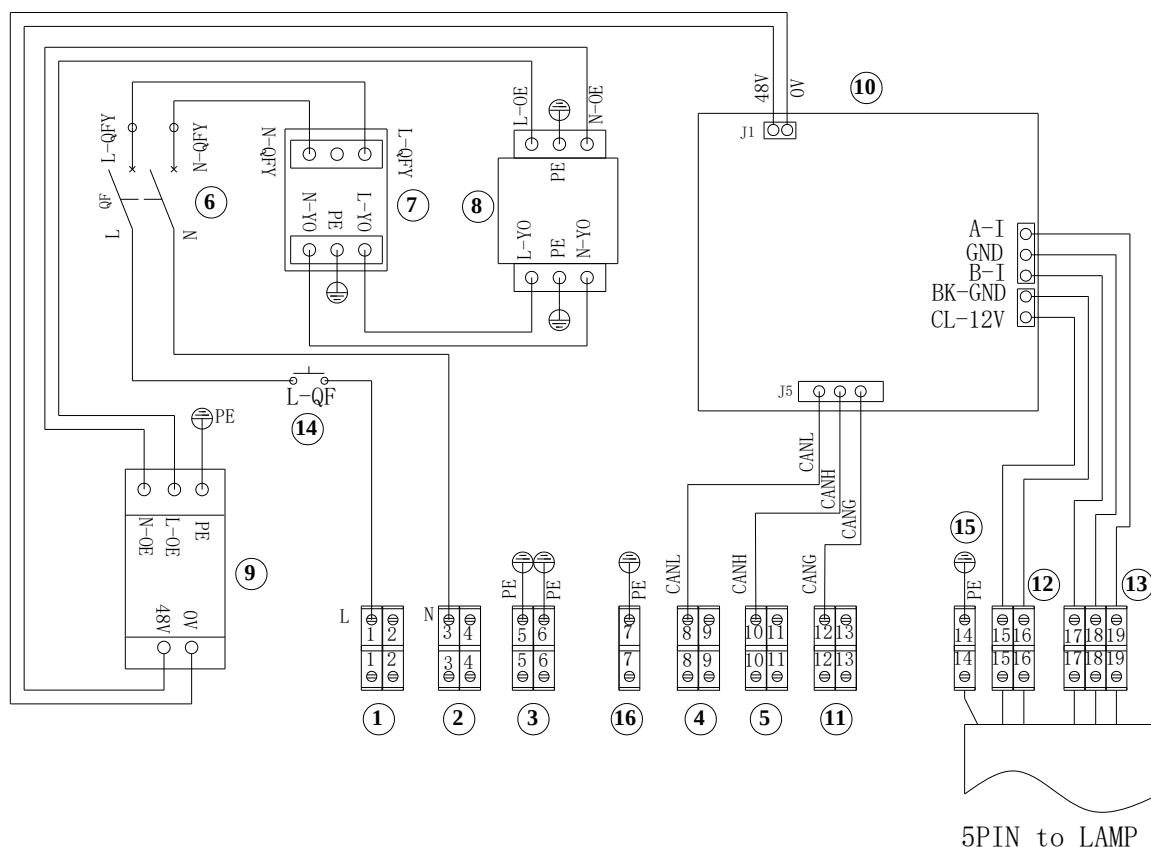


Wiring of the 4mm² needs to provide one distributor per luminaire (the total number of distributors equals the number of luminaires in the system). All distributors should be installed inside the electrical shaft and must be protected from direct sunlight and rain. After the main cable passes through a distributor, tap off a branch cable to supply power to the branch box.

- The CAN communication cable recommended: 2*2*2mm² twisted-pair shielded cable, one twisted-pair connect to CANL and CANH, another twisted-pair for CANG and reserved.
- The cable for light fixture recommended: 5-core shielded copper cable 3*2.5mm²+2*1mm², The 5-core cable compatible with the aviation plug shall have an outer diameter ranging from 9 mm to 16.5 mm. The wire sequence of the five-core cable must correspond one-to-one to the numerical designations at both the terminal strip and the aviation plug.

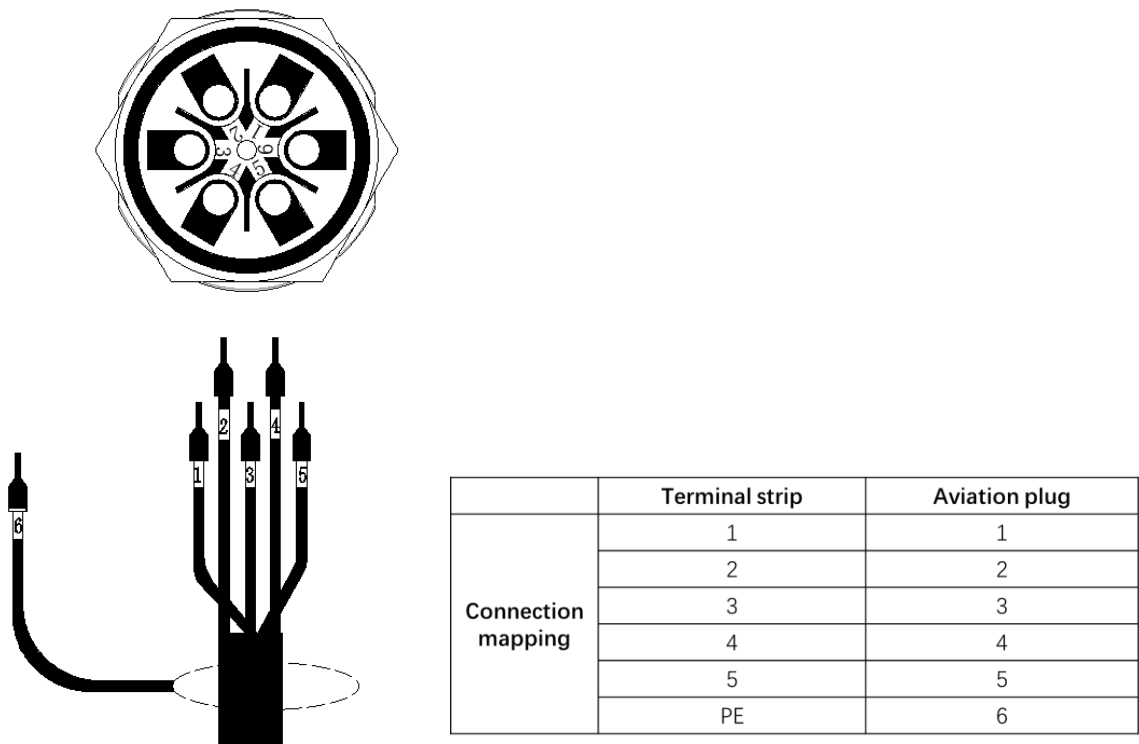
Figure21 & Figure 23.

Note: The shielded layer of CAN communication output cable need not be grounded. The shielded layer only requires one end to be grounded.


Figure 22 – Schematic Diagram of the Branch Control Box-4mm²


SN	DESCRIPTION	SPEC.
①	Terminal (L)	Typ UK 10N (Grey)
②	Terminal (N)	Typ UK 10N (Grey)
③ ⑮ ⑯	Terminal (PE)	Typ USLKG10
④	Terminal (CANL)	Typ UK 10N (Grey)
⑤	Terminal (CANH)	Typ UK 10N (Grey)
⑪	Terminal (CANG)	Typ UK 10N (Yellow)
⑫ ⑬	Terminal (Lamp)	Typ UK 10N (Grey)
⑥	Air switch	10A 2P 400V
⑦	Surge Protection	6KV 3KA
⑧	Filter	CW4L2-6A-R
⑨	Switch Power	LMF750-23B48UH
⑩	Control Unit	/
⑭	Travel Switch	ME/8108

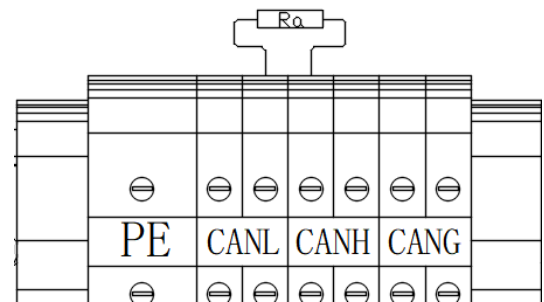
Figure 23 – Internal wiring of the 5-core Connectors



3.6.4. Terminal Resistance

To avoid signal reflection at the end of the can communication cable, we provide a 120Ω terminal resistance that needs to be installed between the two sets of CAN communication terminals in #1 light branch control box at the end. As shown in below Figure, the resistance is connected to the terminals CANL and CANH in the #1 branch control box.

Figure 24 – Terminal Resistance

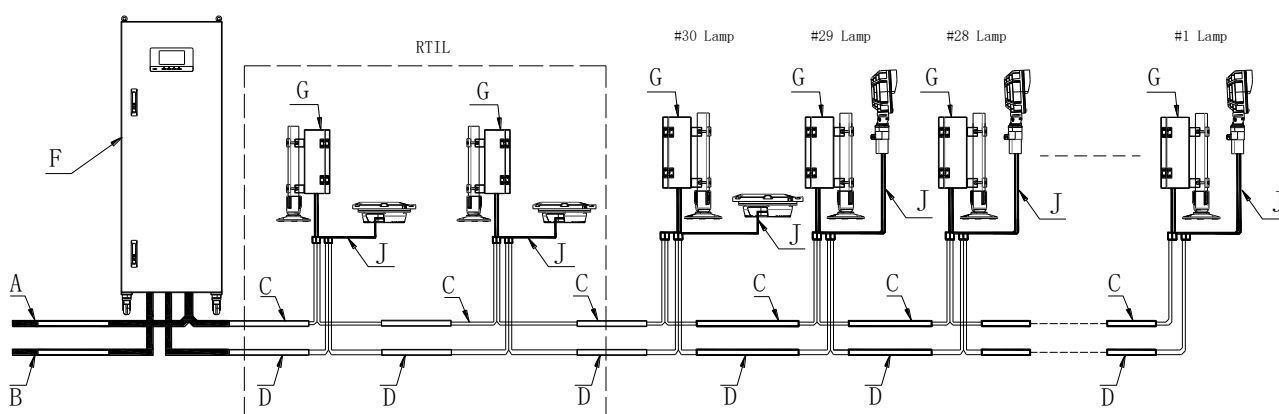


3.6.5. Connection of the System-25mm²

Note: The insulation resistance between the power line L and N in the system shall be greater than 20MΩ. Please disconnect all the air switch during the insulation resistance test.



Figure 25 – Connection of the System-25mm²



A: 485 Communication cable (To ALCMS)

B: Power supply cable (AC 220V)

C: CAN communication cable

D: Main cable

F: Main control cabinet

G: Branch control box

J: Lamp cable

spec: Twisted shielded copper cable 2×2×2mm²

spec: 3-core copper cable 3×25mm²

spec: Twisted shielded copper cable 2×2×2mm²

spec: 3-core copper cable 3×25mm²

spec: 5-core shielded copper cable 3×2.5mm²+2×1mm²

Note: If the length of the CAN communication cable between the main control cabinet and the separate branch control box is greater than 5km, a repeater module should be added in the middle of the CAN communication cable between the main control cabinet and the branch control box to enhance the communication signal. And the repeater module need a base. The repeater module is not required when the communication cable length is less than 5km.

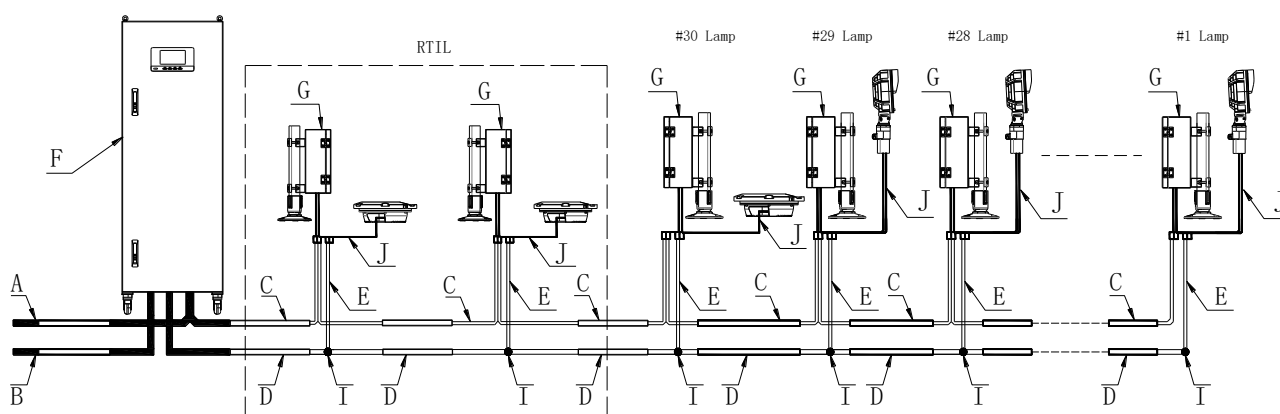


3.6.6. Connection of the System-4mm²

Note: The insulation resistance between the power line L and N in the system shall be greater than 20MΩ. Please disconnect all the air switch during the insulation resistance test.



Figure 26 – Connection of the System-4mm²



A: 485 Communication cable (To ALCMS)

B: Power supply cable (AC 220V)

C: CAN communication cable

D: Main cable

E: Branch cable

F: Main control cabinet

G: Branch control box

I: Distributor (25mm² to 4mm²)

J: Lamp cable

spec: Twisted shielded copper cable 2×2×2mm²

spec: 3-core copper cable 3×25mm²

spec: Twisted shielded copper cable 2×2×2mm²

spec: 3-core copper cable 3×25mm²

spec: 3-core copper cable 3×4mm²

spec: 5-core shielded copper cable 3×2.5mm²+2×1mm²

Note: If the length of the CAN communication cable between the main control cabinet and the separate branch control box is greater than 5km, a repeater module should be added in the middle of the CAN communication cable between the main control cabinet and the branch control box to enhance the communication signal. And the repeater module need a base. The repeater module is not required when the communication cable length is less than 5km.



3.6.7. Set up the Toggle Switch

In the flashing lighting system, the branch box control unit can be set to the master or the slave. After this setting, when the communication signal between the main control cabinet and the branch control box fails, the field lamps can operate in maintenance mode.

Toggle switch setting:

- When the toggle switch is moved to the upper position, the control unit is preset for the master, and when the toggle switch is moved to the lower position, the control unit is preset for the slave.

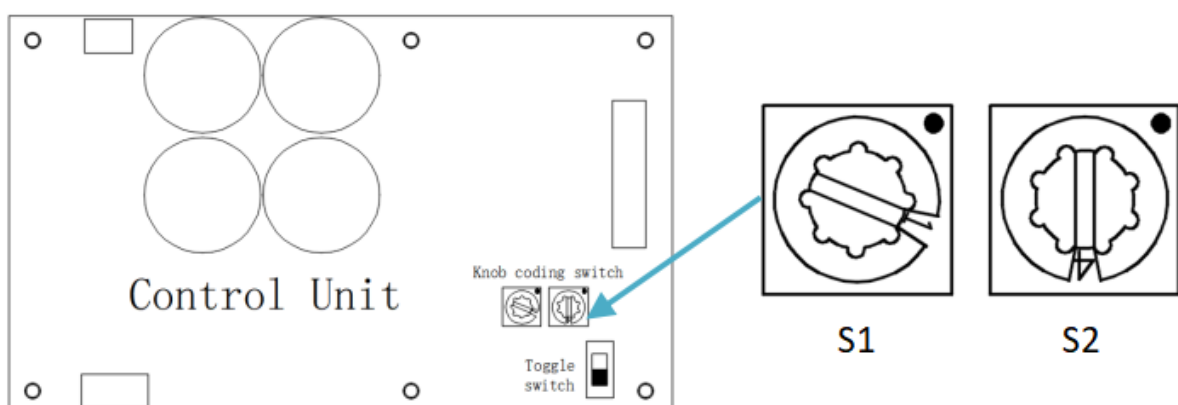
Note: In a flashing system, just need to set a branch control box for the master, and the others are set as the slave. The default maintenance operation mode of the SFLS is lighting step 1, with a flash frequency of 1 Hz. The default maintenance operation mode of the RTIL is shown in the table 2 and table 3.



3.6.8. Set up the Knob Coding Switch

There are two knob coding switch on the control unit (S1 & S2), as the following figure.

Figure 27 – Knob Coding Switch & Toggle Switch



- Each knob encoding switch has 16 bits, they are "0, 1, 2, 3, 4, 5, 6, 7, 8, 9, a, b, c, d, e, f" respectively.
- In the sequenced flashing lighting system, the left knob code(S1) represents the tens digit of the flashing light' s number, and the right knob code (S2) represents the units digit of the flashing light' s number. For example, In the #14 branch control box, the knob coding switch (S1) on the left switches to "1" position, and the knob coding switch (S2) on the right switches to "4" position.
- In the runway threshold identification lighting system, See the table 2 and table 3 for the knob switch settings.

Table 2 - Maintenance Mode Master Control Unit Knob Coding Switch Setting

Maintenance Mode Running Status		"S1" Knob Position	"S2" Knob Position
Flashing Rate	Flashing Step		
1Hz	Step 1	A	1
1Hz	Step 2	A	2
1Hz	Step 3	A	3
2Hz	Step 1	B	1
2Hz	Step 2	B	2
2Hz	Step 3	B	3

Table 3 - Maintenance Mode Slave Control Unit Knob Coding Switch Setting

Maintenance Mode Running Status		"S1" Knob Position	"S2" Knob Position
Flashing Rate	Flashing Step		
Following The Master	Following The Master	C	1

4. Operation

4.1. Introduction Main Operation panel

Figure 28 – Main Operation Panel

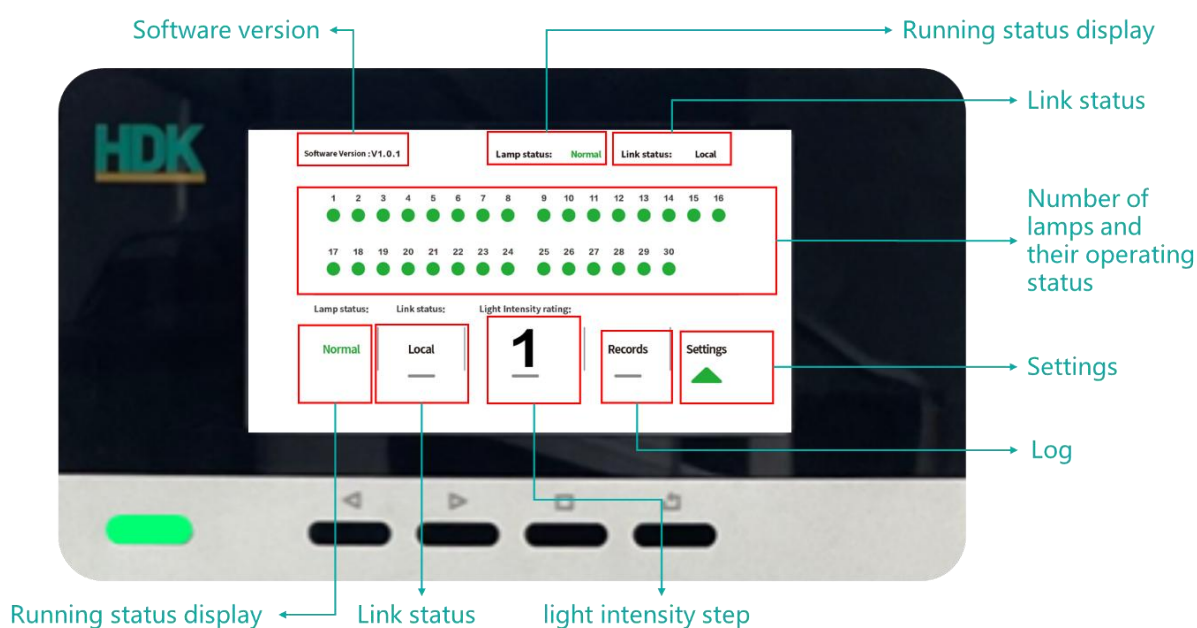


- ① Touch screen: Set up and display the Flashing Lighting System operation information.
- ② Lamp status display LED: display the operation status of all numbered lamps;
LED is green — lamp running normally;
LED is red — lamp abnormal;
LED is Yellow (FLASHING) — Main Control Cabinet is switched to maintenance mode, lamp running according to the preset program;
LED is out — lamp not enabled.
- ③ Button: It can work in conjunction with the touchscreen to complete the corresponding settings and operations.

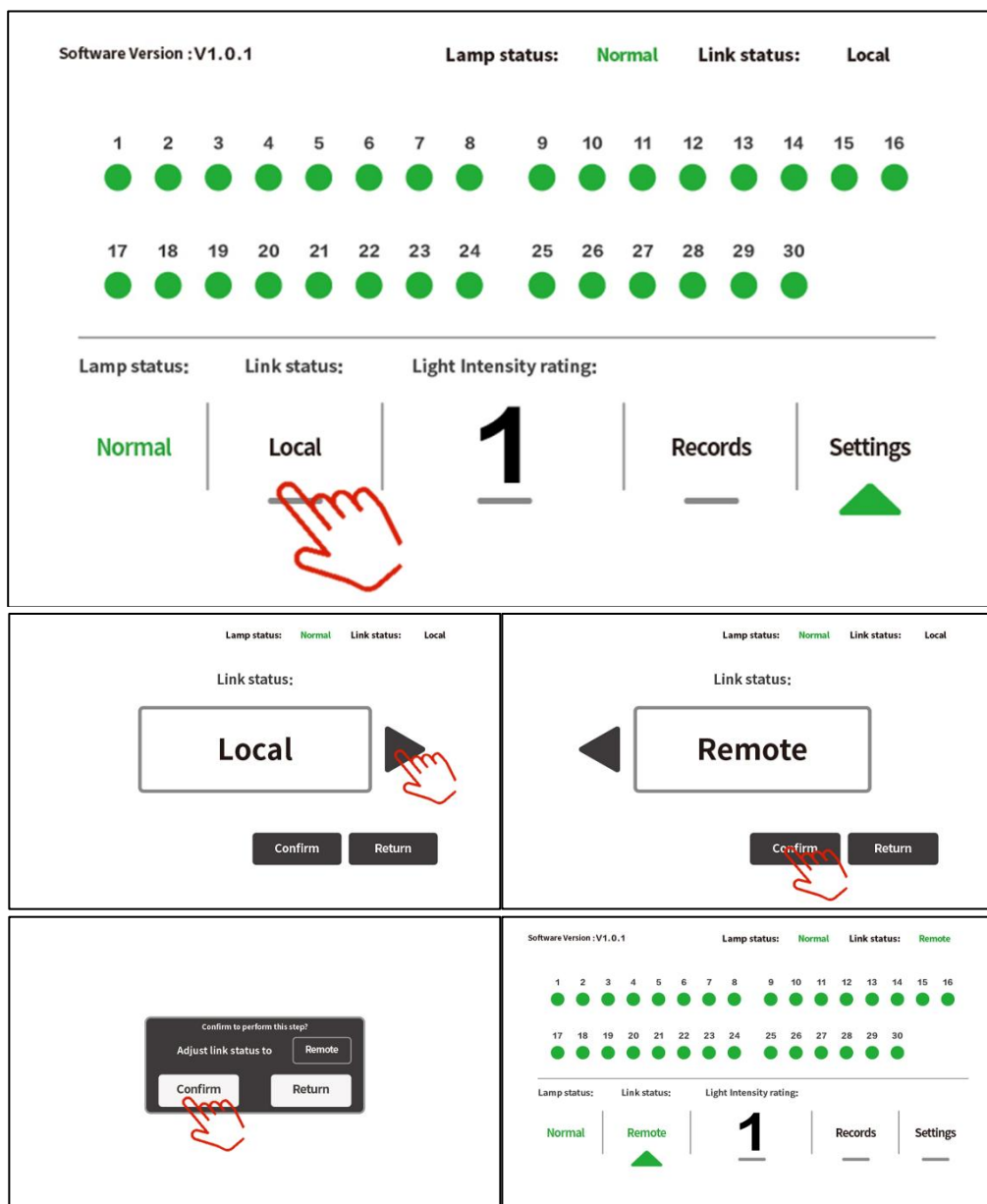
4.2. Introduction of Touch Screen Operation

The touch screen can set up and display the Flashing Lighting System operation information.

- The boot run screen contains software version; working status information display; link status information; number of lamps and their operating status; light intensity step information; flashing log and setting information.



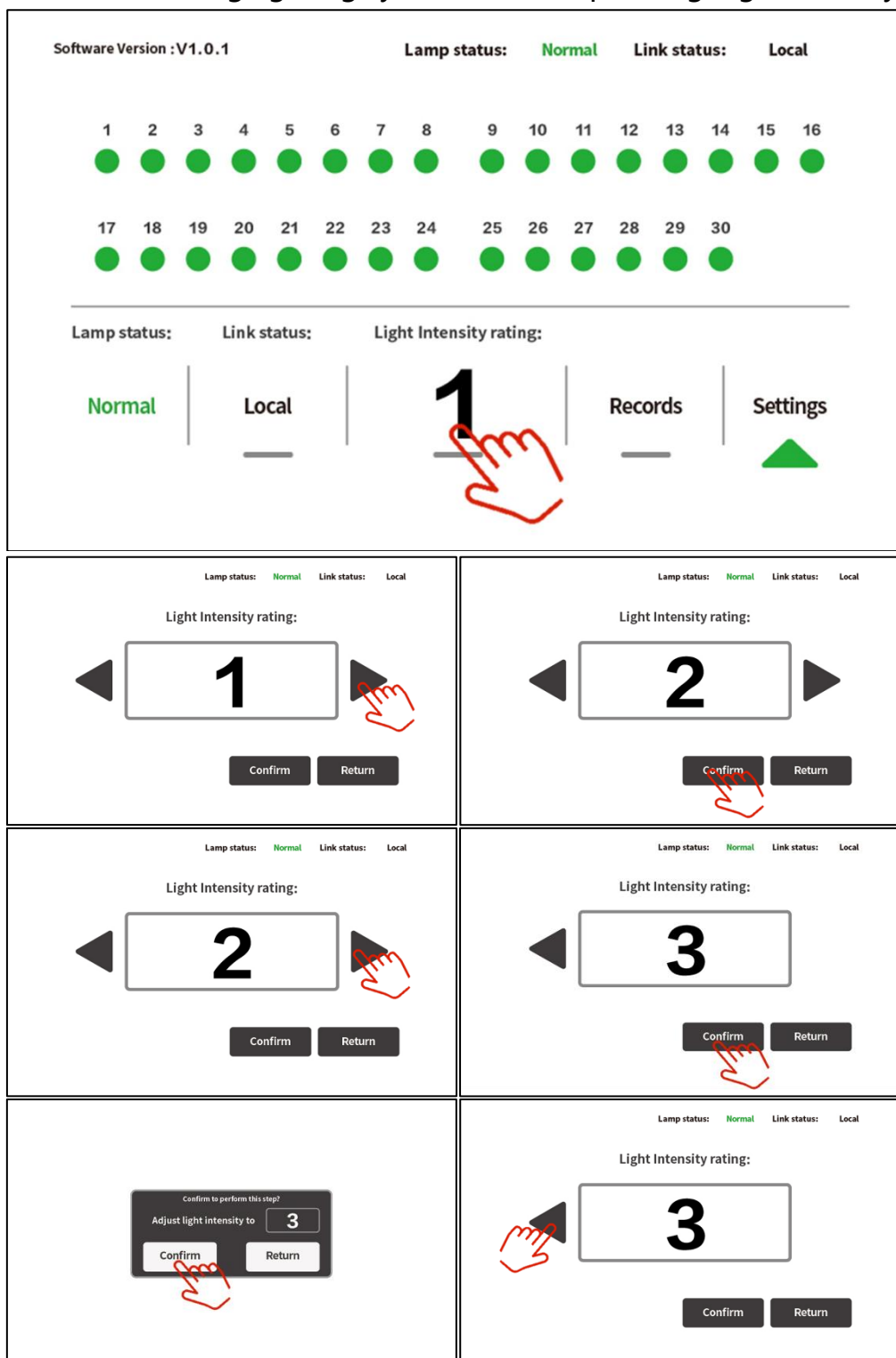
- Click the Link status to switch the system between local mode and remote mode



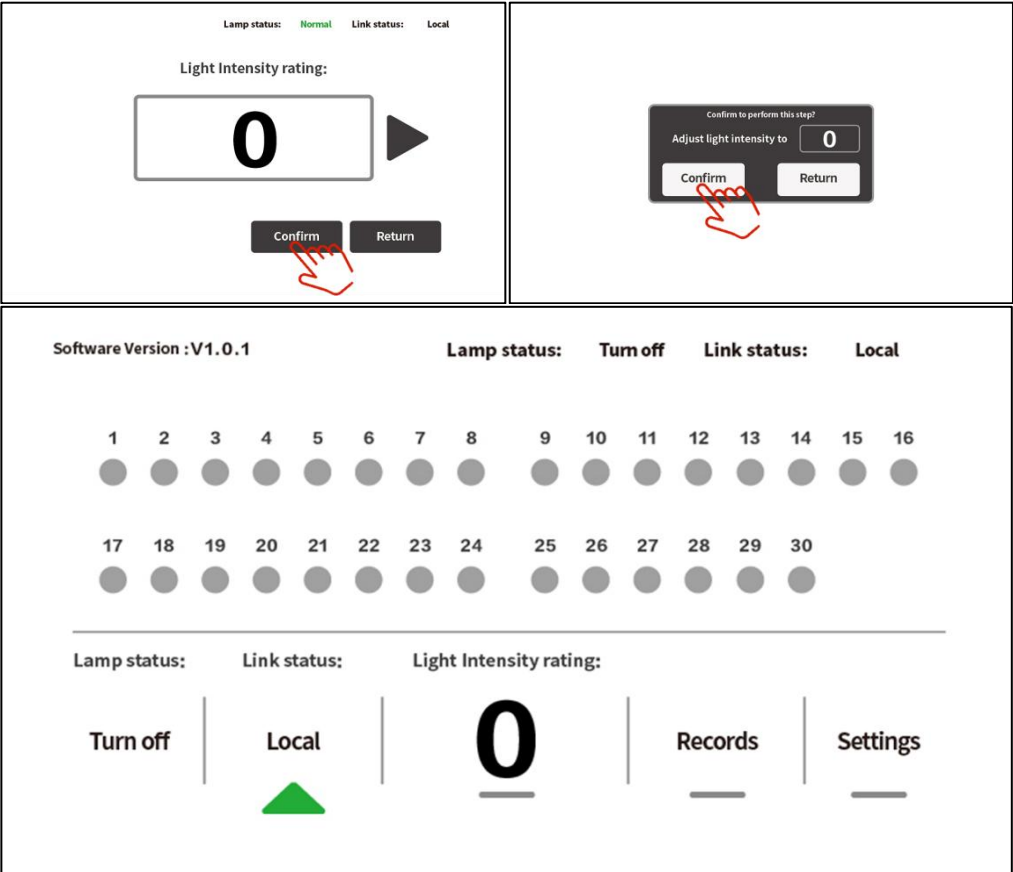
Note: When switching from local mode to remote mode, the Flashing Lighting System will continue to maintain its pre-switch operating state, and the monitoring system can send new commands based on the current operating state.



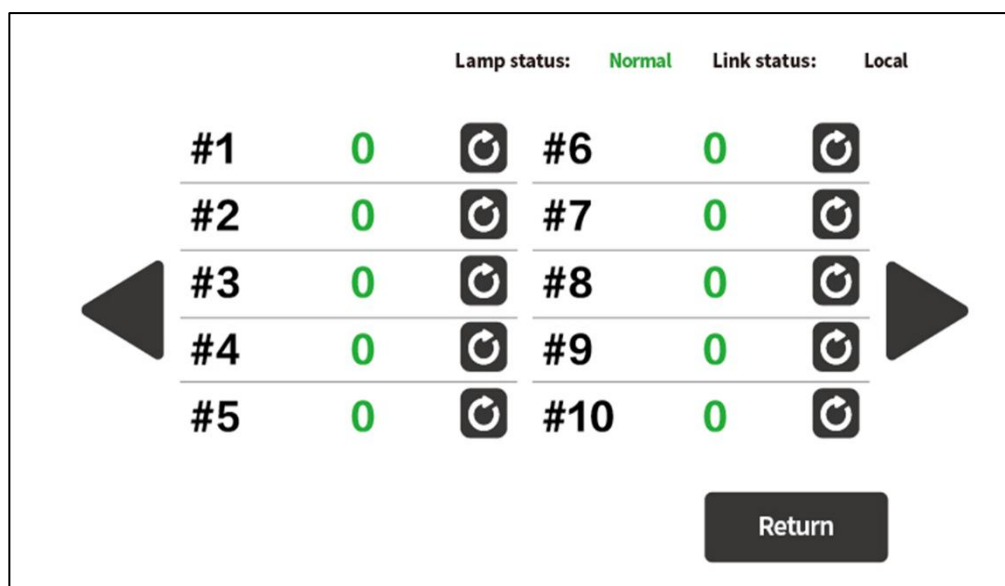
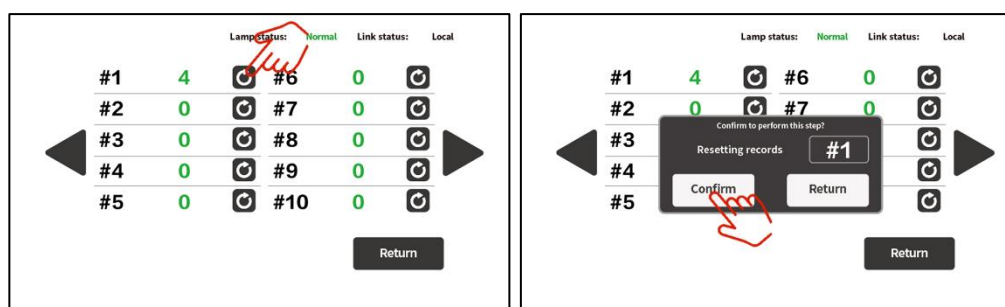
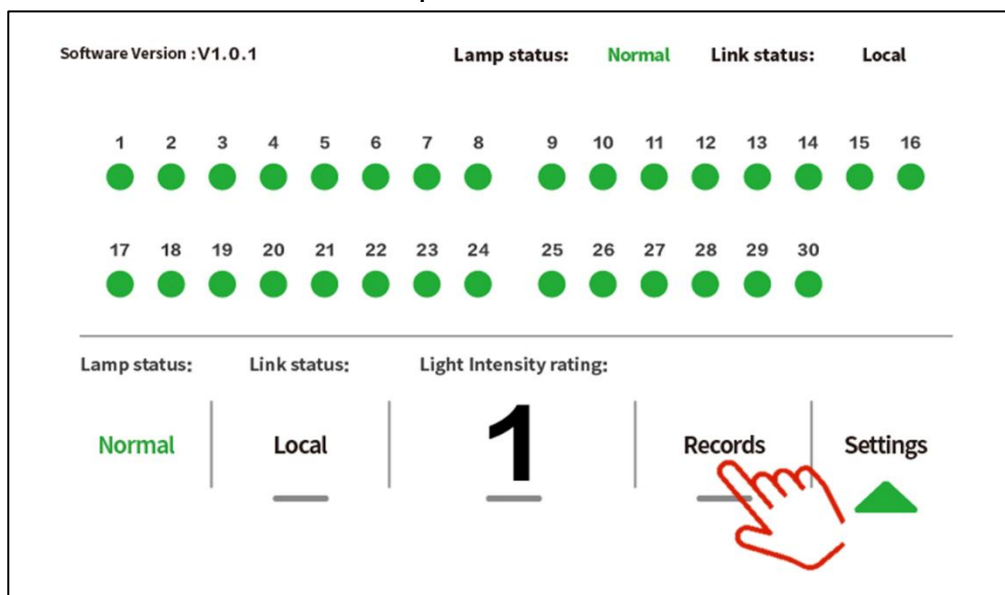
- Click the light intensity rating to switch the different step mode from 0 to 3,
 "0"——flashing lighting system off;
 "1"——flashing lighting system is local operating low intensity mode;
 "2"——flashing lighting system is local operating medium intensity mode;
 "3"——flashing lighting system is local operating high intensity mode;



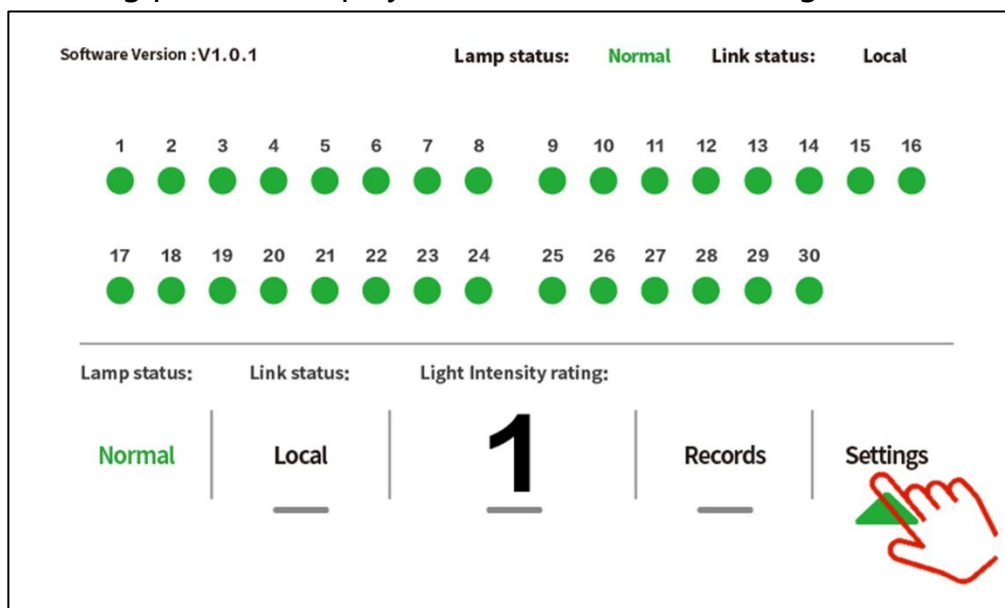
LED Flashing Lighting System User Manual



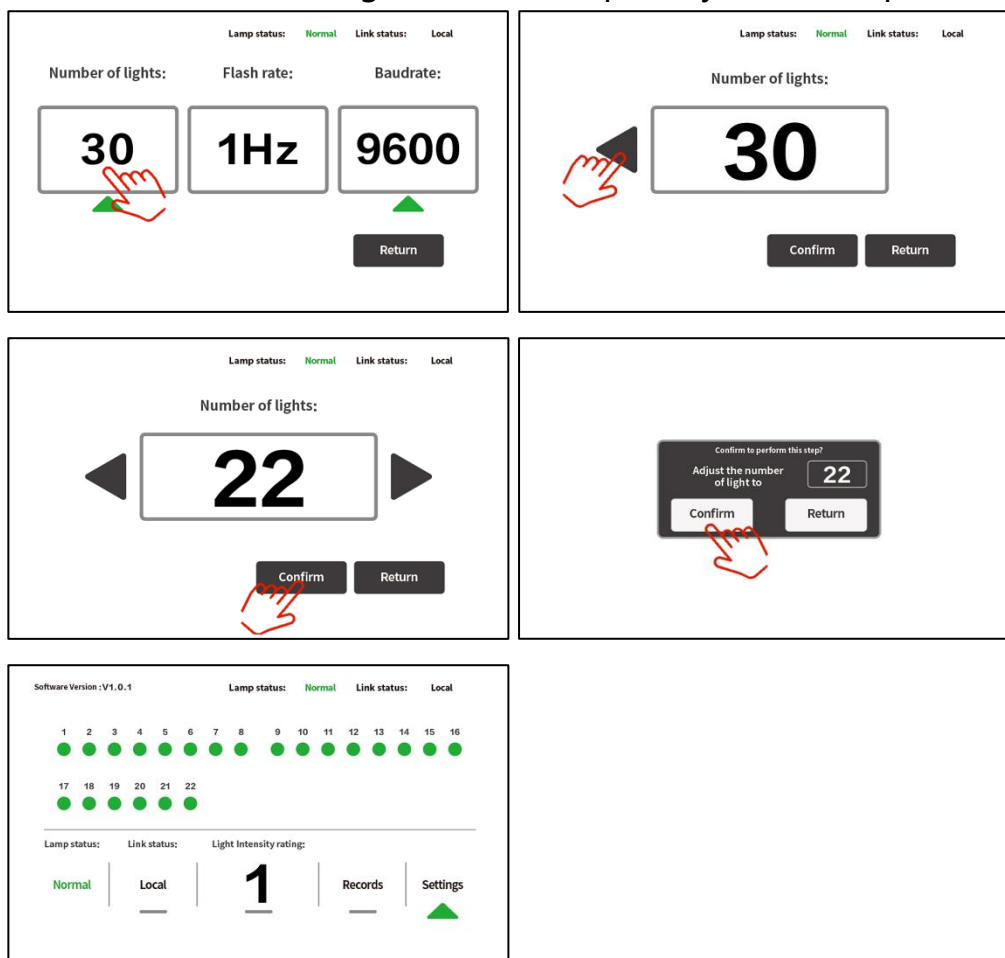
- All lamps running time record information can be viewed in the log record, Click the Records to switch corresponding interface, You can reset the records of individual lamp.



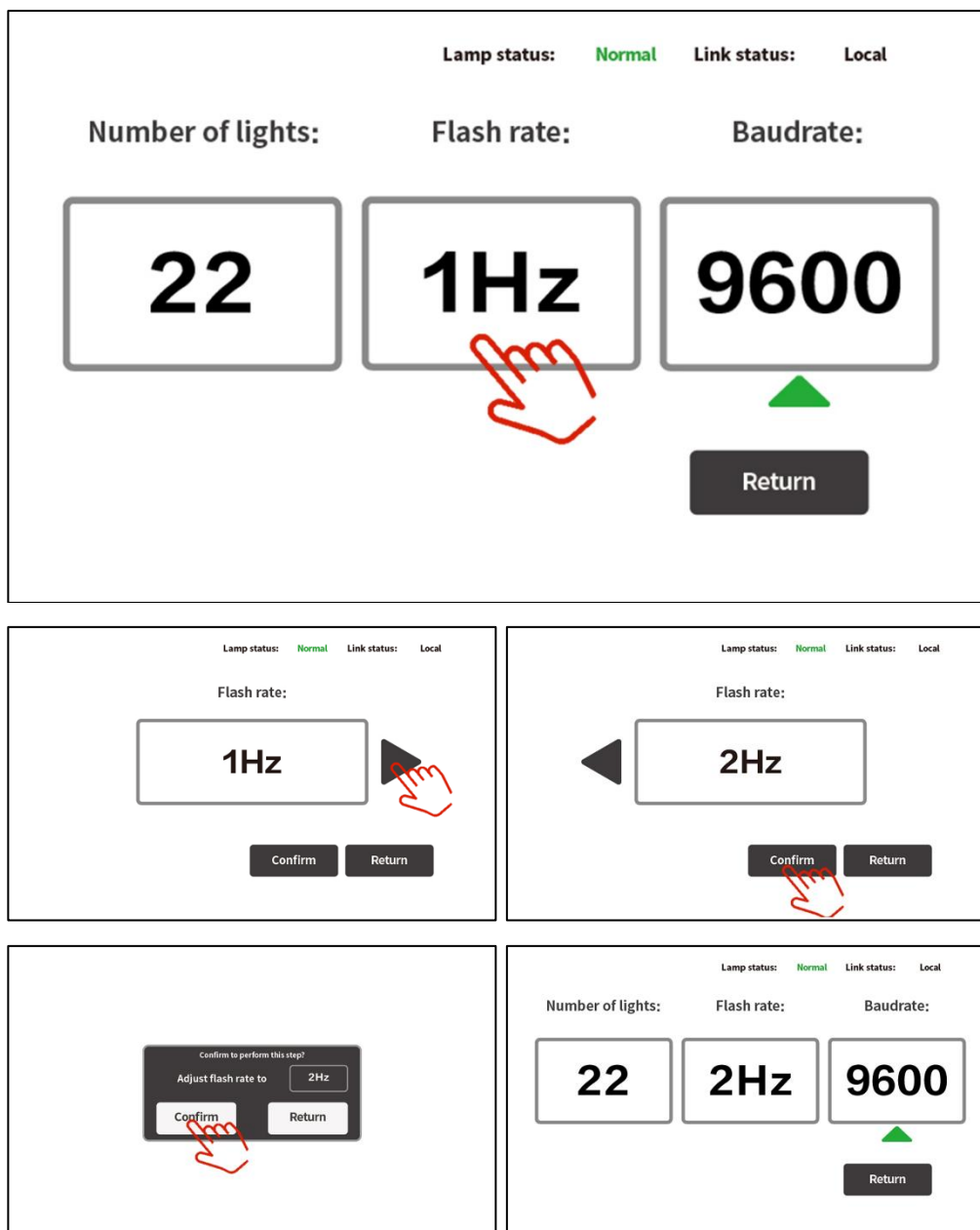
- The number of lamps installed display; flash mode display; communication setting port rate display; You can click into "Settings":



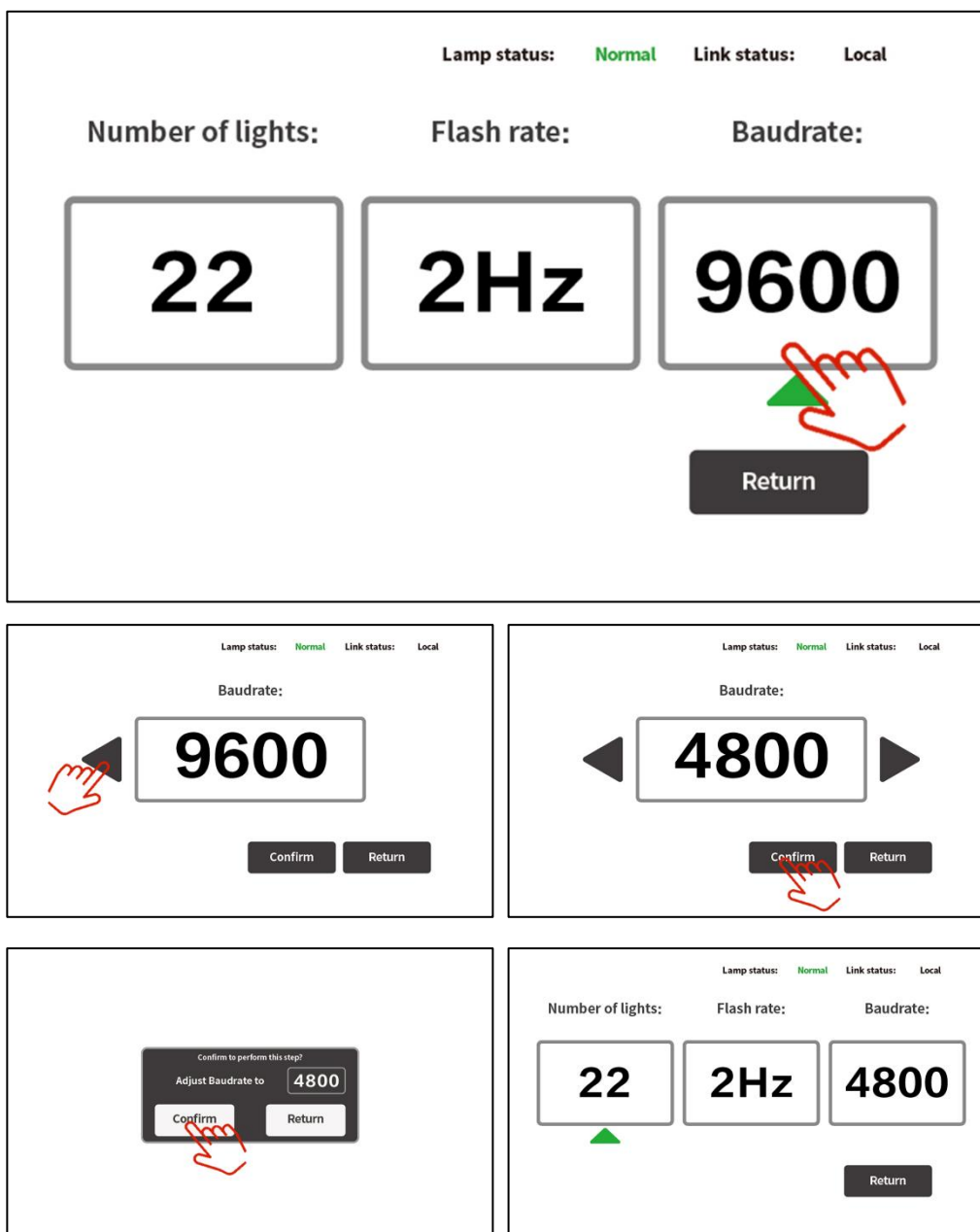
- click the number of lights to set the quantity of the lamps installed;



- click the Flash rate to set the flash mode, you can select "1 time/second" , "2 times/second" ;



- click the Baudrate to set the communication baud rate, you can select "1200", "2400", "4800" and "9600", usually set to "4800"



5. Maintenance

5.1. Main Control Cabinet Maintenance Mode

In maintenance mode, the main control cabinet only supplies power for the field lamps. And in this situation the control module in the main control cabinet can be maintained or replaced, and the lamps of the flashing lighting system can operate normally in a pre-set mode.

Maintenance mode operation

- Open the back cabinet door of the main control cabinet;
- Keep the “Main Switch” on;
- Switch on the “Maintenance Switch” , after this the maintenance indicator lamp on the panel is on. The touchscreen will turn off and the indicator on the operation panel will flash yellow;

At this moment is the maintenance mode, the main control board and panel have been power off. Disconnect all cables at the rear of the main control board and remove the six fixing screws so that the board can be took down for replacement and maintenance.

WARNING: In the maintenance mode, the devices in the back door of the main control cabinet are still energized. Please pay attention to the safety during operation to prevent electric shock.



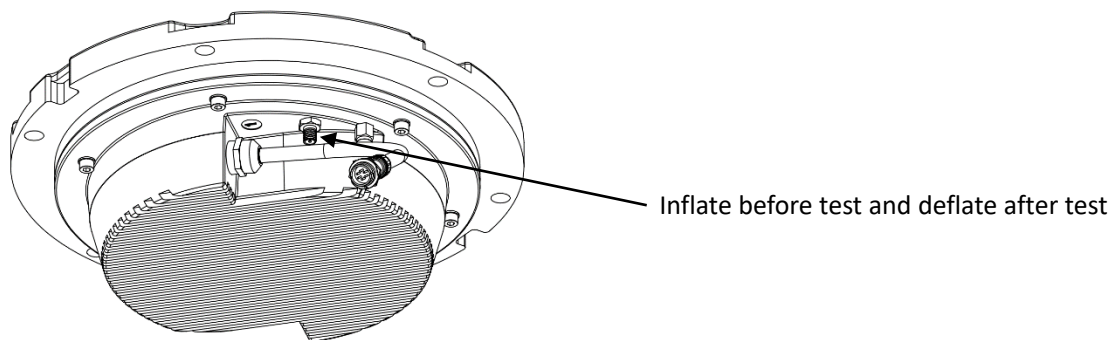
DANGER: For safety reasons, it is highly recommended to turn off the main switch when replacing or maintenance, even if the situation is an emergency.



5.2. 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 29 – Watertightness Test



Note: After any bottom cover opening operation, the watertightness of inset light fixture must be checked again. The method of checking can refer to IEC 61827 section 6.4.1.6.



5.3. Basic Maintenance Program

According to the requirements of 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, the suggested maintenance program plan is listed in following table.

Table 4 - Suggested Maintenance Program Plan

Maintenance Frequency	Maintenance Task
Daily	1.Check if the glowing condition 2.Check the elevation angle and straightness of the elevated light
Semiannual	1.Check if there is any damage to the light fixture body. 2.Clean the dust and dirt on the light fixture surface. 3.Check the fixing condition and the bolt torque of the light fixture. 4.Check the integrity of the seal glue of the light base.
Annual/Biennial	1.Check the sealing performance of the light fixture 2.Clean the optical component (If necessary). 3.Check the surface coating integrity of the elevated light
Irregularly scheduled	1.Check and maintenance conducted for special reasons



Note: The table above is the recommended plan. The actual implementation of the plan should be subject to the maintenance regulations of the customers;

5.4. Trouble Shooting

Table 5 - Trouble Shooting

Malfunction	Trouble Shooting Step
Main cabinet “number of lamps display” area shows some RED, field lamps not flashing	1. Switch OFF the main-cabinet main power. Measure the resistance between every pair of CANH, CANL and CANG on the main-cabinet terminals, (expected: CANH-CANG$\approx$10 kΩ, CANL-CANG$\approx$10 kΩ, CANH-CANL 60-90 Ω). If any value is out of range, go to the field and check every branch-box whose indicator is red; 2. Check whether the travel switch in the sub-box is loose; re-tighten and test to ensure normal operation; 3. On the branch-box driver board, check whether the CAN plug is loose,unplug and press it back until fully seated; 4. On the branch-box terminal block, check whether the CAN wires are loose; tighten every CAN terminal with a Phillips screwdriver; 5. Verify that the DIP-switch address on the driver board matches the branch-box number; if wrong, set the correct address according to the box ID. 6. Disconnect the CAN plug, power plug and lamp plug from the driver board.Measure the CAN plug base resistance on the driver board: (expected: CANH-CANG$\approx$1 MΩ, CANL-CANG$\approx$1 MΩ, CANH-CANL$\approx$50 kΩ). Replace the driver board if any value is abnormal; 7. Switch the main cabinet power ON. If faults remain, proceed as follows: 7.1 Open every branch-box and unplug all CAN plugs. 7.2 Plug in the CAN plug of fault branch-box #1 only; press and hold the travel switch while powering the box; observe whether the lamp flashes (wait 10 s). 7.3 If the lamp still does not flash, replace its driver board. 7.4 After replacement, if the lamp flashes normally, repeat 7.2–7.3 for sub-boxes #2, #3 ... in turn. 8. If any fault persists after all branch-boxes have been checked, contact HDK after-sales immediately.
Main cabinet “number of lamps display” area shows all RED lamps	1. Restart the main cabinet power; see if the fault clears itself. 2. Switch OFF main power. Check CAN wiring inside the main cabinet for looseness, tighten any loose screws; 3. Check the CAN wiring of branch-box nearest to the main cabinet for looseness, tighten any loose screws. Meantime,check whether the power supply of the power line is normal; 4. If CAN wiring and power line are confirmed good, replace the main control board inside the main cabinet, then switch the main power and check whether the fault is cleared; 5. If the fault remains after steps 1-4, contact HDK after-sales immediately.
Main cabinet “number of lamps display” area shows all GREEN, but some field lamps do not flash	1. In the relevant branch-box, check whether the lamp-cable plug on the driver board is loose; re-seat it firmly. 2. Check the wire sequence in the extension-joint between the branch-box and the lamp, if wrong, remake or replace the extension cable; 3. Disconnect the faulty lamp’s extension joint and connect it temporarily to a spare lamp head, If the fault is eliminated, replace the LED board or lamp head. 4. If the fault is still present, replace the driver board in the branch-box.
Water leak inside the lamp	1. Check the sealing of the transparent front cover; 2. If the fault is not eliminated, check the sealing ring;

	3. If the fault is not eliminated, check the power cord seal head.
Unable to dim normally	1. Confirm that the 220VAC to the branch control box without problems; 2. If the fault is not eliminated , replace the driver board in the branch control box.
Unstable glowing	1. Enable the maintenance mode, working in the maintenance mode is the main control cabinet failure 2. If the fault is not eliminated, check the connection between the main control cabinet and the separate branch control box 3. If the fault is not eliminated, replace the driver board in the branch control box.

6.Support

6.1. Customer Service

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

After-sales service hotline

China: +86-27-63498449

Please prepare the following information in advance in order to get the service quickly:

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

6.2. Recycling

Improper disposal of scrapped electronic equipment may have a negative impact on the environment and human health. Regarding the recycling of electronic products, please follow the local laws and regulations.

6.3. About HDK

Handakang Electrical & Mechanical Technology Corp. Ltd., established in 2003 in Wuhan/China is an already 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.

You can contact us at

Beijing**Address**

Room 607-610, Building 2 of Sailing International Greenland,
Houshayu, Shunyi District, Beijing

Tel

+86-10-80480105

Email

airport@hdk-aero.com

Wuhan**Address**

Building No. 10, Optic and mechanical park, High tech 5# Road,
East lake tech district, Wuhan, Hubei, China

Tel

+86-27-63498449

Email

airport@hdk-aero.com

Homepage www.hdk-aero.com

WeChat official account