



MERMAID INDUSTRY LIMITED

MEDECO II SERIES LED Operating Light



Operating Instructions Single Light and Combination Light

NOTE: Product photos on this manual just for reference

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1. General

1.1 Introduction

The General purpose description of led operating light can be described as:

1.1.1 Surgical operating illumination in the hospital. In particular, the operating light is available to the requirements of sterilization and purification surgical wards.

Besides, illumination for encephalic, thoracic operating,

1.1.2 Operating illumination used in Laborator

operating, maintenance and troubleshooting of mermaid- series of operating light. (that can be simply LED) There is written description on wall and mobile products.

The special features of LED Light are:

- Balancer will make light body's balance stable and reliable.
- The device may ensure that illumination degree of operating light is permanently efficient, excellent depth of illumination and low shadow level.
- Streamline design with lower air damp coefficient may be used in high-demand purifying operating room.
- Suitable light and color temperature may provide high-quality optics performance.
- By means of controller device you can adjust operation conditions of operating light, such as light intensity and size of the operative field.
- Auto-monitoring computer program will track the whole process of using the device.
- Independent electrical system of combination products will improve device's reliability.

1.2 General information

- Only the manufacturer is responsible for any malfunction, physical destruction, and personnel damage or quality difference caused by improper use or maintenance due to user's inobservance of advised schemes. Under the circumstances that electrical and mechanical protection equipments have some deflection or provisions on maintenance procedure are disobeyed, operating of the device is forbidden.
- Only the manufacturer or the third party appointed by it may make any change or extension of device installation or device itself. These changes must conform to valid provisions established by the local country of device and conform to general trade customs.
- Please keep the manual in a safe place for future reading at any moment. Before using the device, you should read the manual carefully, be familiar with the operating methods and make full use of its performance.
- If power characteristics don't conform to Provision 1 in Chapter 7 Specifications



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before Installing Operating Light, Mermaid series of operating light can't make the most of its efficiency, and proper function can't be guaranteed.

1.3 Guarantee

Mermaid LED is guaranteed for 12 months, starting from the date of delivery to the end user. During the expiration date, fragile components such as bulb and fuse don't enjoy free quality guarantee.

1.4 Information about product liability

Mermaid LED considers itself responsible for the consequences of safety, reliability and performance of the equipment only if:

- Installation, modifications or repairs have been performed only by the manufacturer, or by an agent expressly authorized by it.
- The equipment is used in accordance with the use's manual.

1.5 Receiving inspection

Transportation risks of the device will be born by the consignee.

- The declaration on the dispute of any loss or damage during transportation must be made under the circumstance that the carrier is on spot when delivering, and the specification must be enclosed in the consignment invoice.

1.6 Product transportation and storage

The device is transported and stored in the following environment:

Ambient temperature: between -10°C and +60°C

Relative air moisture: between 10% and 75%

Air pressure: between 500hPa and 1060hPa

1.7 CE Certification

The device complies with the requirement of the EC guideline regarding products, 93/42/EEC. Performing the standards of enterprise's registered products:

- Medical electrical equipment—Part1:
General requirements for safety—IEC60601-1:
Electromagnetic compatibility—Requirement and tests (IEC60601-1-2)
- Medical electrical equipment—Part2-41:
Particular requirements for safety of surgical luminaires and luminaires for diagnosis. (IEC60601-2-41)

2. Before Operating

2.1 Range of application

- Mermaid LED is a medical light for use in hospital treatment room.
- As a matter of principle, light combinations with two or three light heads should be used for more security again light failure and a better brightness of the

operating field than single light head, because a failure of some components in some circumstances is still possible.

2.2 Safety information



ATTENTION!

Incorrect operation and non-observance of safety measure can cause serious incidents. Therefore make sure that you read and understood the information in your user's manual.



ATTENTION!

The Collision of supporting arms and other mechanical parts should be avoided. A serious collision could result in light being damaged or parts knocked off and falling into the surgical area.



ATTENTION!

The sign appears on the light source parts (see 4.2)

Its meanings: When replacing a worn led diode, you should do as follow,

- must cut off electric source
- taking off the worn led diode until it cools
- replacing the same type led diode



WARNING!

Disassembling or assembling the light head, bounce of the balance must be avoided when the light head is installed or uninstalled. Strong compression strength will make the balancer string up rapidly, and therefore cause the damage of balancer parts and people. (see 6.2.3)



WARNING!

To avoid the risk of electric shock, this equipment must only be connected to supply mains with protective earth point. Connection reliability of it should be achieved

The device is not suitable for use in the presence of flammable mixtures.

Do not use the device in the presence of a flammable anaesthetic mixture with air or with oxygen or with nitrous oxide.

Do not use oxygen with this system.

Don't use in the place filled with inflammable gases, anaesthetic and NO gas.

No use-serviceable parts inside, before servicing to authorized representative or manufacturer!



CAUTION!

To avoid infection or contamination with bacteria please following Hygienic preparation section.

Ensure sterile conditions during bronchial aspiration, and always use sterilizable handle.

To reduce the risk of increased bacterial growth, infection, illness, or injury from contamination, thoroughly clean, disinfection, sterilizing and dry all reusable detachable parts of the device and thoroughly dry any moisture or condensation in the tubing at the end of every treatment, following the instructions for it . (see 4.4)



CAUTION!

Electric equipment should never be left unattended when power on. Always switch off immediately after using.

Main power must be off before cleaning.

Do not use or store outside of specified environmental conditions.

Not use accessories not recommended by the manufacturer.

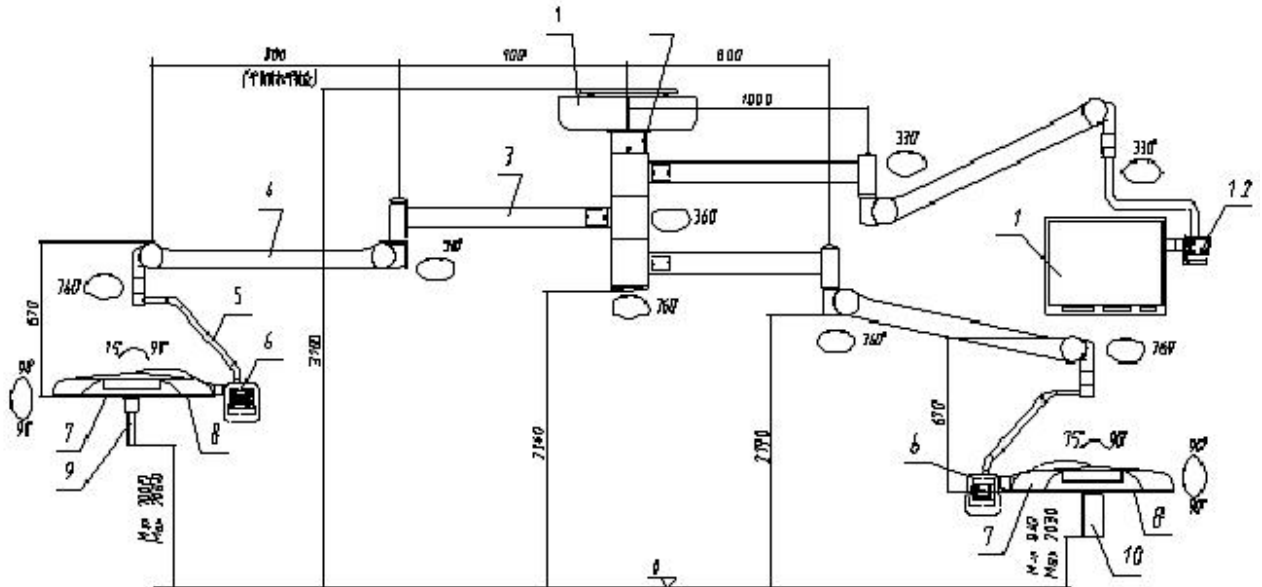
The device must be used for the designated purpose only.

DO NOT use attachments not recommended by manufacturer.

Before use, check the device for proper assembly. All parts should be seated firmly in place.

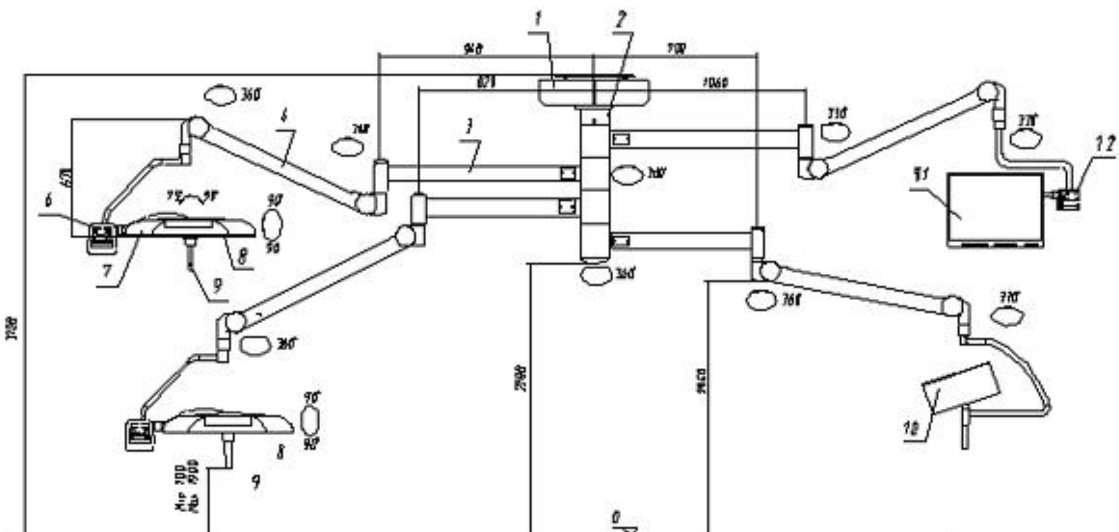
Improper use of the grounding plug can result in a risk of electrical shock.

3.3 LED 3



- | | | |
|----------------------------|-------------------------|-------------------------|
| 1.Ceiling cover | 2.Drop Tube | 3.Horizontal swivel arm |
| 5.Balancer | 5.Vertical gimbal joint | 6.Control panel |
| 7.Light head | 8.Plasti cpanel | 9.Sterizable handle |
| 10.Camera video light head | 11.LCD dispaly | 12.Camera control panel |

3.4 LED 4



- | | | |
|----------------------------|-------------------------|-------------------------|
| 1.Ceiling cover | 2.Drop Tube | 3.Horizontal swivel arm |
| 6.Balancer | 5.Vertical gimbal joint | 6.Control panel |
| 7.Light head | 8.Plasti cpanel | 9.Sterizable handle |
| 10.Camera video light head | 11.LCD dispaly | 12.Camera control panel |

4. Operation

WARNING: Before operating for the first time according to the contents in the section, please make sure that operating light has been installed correctly and debugged properly

4.1 LED LIGHT CONTROL PANEL:

1. ON/OFF
Switch on/off the light
2. Endoscopy adjustment
3. Color temperature adjustment
4. Brightness adjustment



4.2 System variants

Mermaid LED operating light are available in the following system variants:

1. **LED 1** as a single light
2. **LED 2** as a double
3. **LED 3** as a triple light
4. **LED 4** as a double light and a camera and a LCD display and with battery

Cleaning, sterilization, disinfection

After operating light has been used for a period of time, dust, blood and body fluid will be accumulated on the crust and the light panel. Therefore, the device must be cleaned.

4.2.1 Crust cleaning

Cleaning must be performed with fluid wax and soft cloth, which may not only clean the crust, but also protect the paint layer. For serious feculence, repeated cleaning with alcohol should be performed.

Caution: Cleaning with acidic, alkaline liquor or rubbing solvent must be forbidden.

4.2.2 Plastic panel cleaning

Because light panel is made up of macromolecule materials, there are serious feculences or dross on its surface, which will produce very great influences on the light source. Therefore, the cleaning must be performed only with neutral detergent and clean soft cloth.

Caution: Cleaning with acidic, alkaline liquor or rubbing solvent must be forbidden.

4.2.3 Handle disinfection

Disinfection handle is made up of high temperature-resistant materials, so it may be disinfected in the boiled water below Celsius 134° and medical alcohol.

Caution: Cleaning with solutions such as formalin must be forbidden.

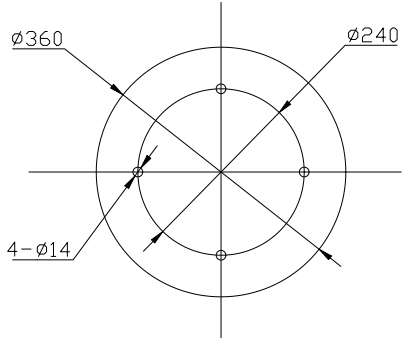
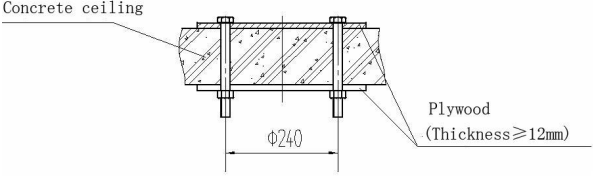
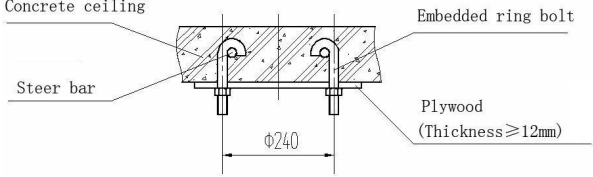
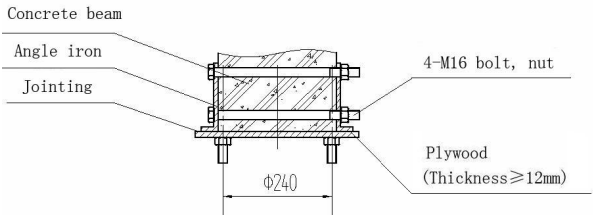
5. Safety regulations, Trouble shooting

5.1 Basic requirement

Operating light is a special device hanging in the roof of operating room, and the security of basic installation is especially important. The product's basic requirement is to be capable of loading **500 kg** static load, have enough rigidity, and insure bearable load and rigidity. Standard height of operating room is 3 meters.

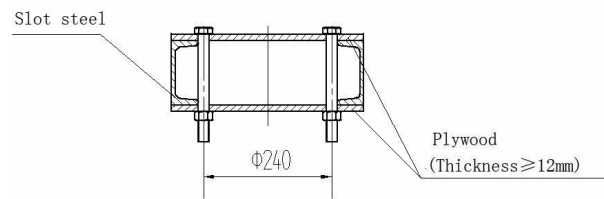
Notice: the users are responsible for infrastructure construction and security.

Preset modes (only for reference)

Requirement description	Design
<p>5.1.1 Dimensions of preset plywood Four $\Phi 14$ holes are processed on the plywood, and hole positions are evenly distributed among $\Phi 240$ mm diameters. Plywood thickness ≥ 12mm, and the material is No.45 Steel. Plywood external diameter $\geq \Phi 360$mm, and may also be processed into square dimension $\geq \square 360$mm.</p>	
<p>5.1.2 Ceiling plywood-type A piece of plywood is placed respectively at the top and bottom of the ceiling and it should be fixed with M12 bolt, nut, spring gasket and flat gasket. M12 bolt (with screw thread) should be longer 60mm than the plywood.</p>	
<p>5.1.3 Ceiling pre-embedding When construction is being performed on the ceiling, four ring bolts (M12) should be embedded into the ceiling, and ring bolts must be jointed with the steel bar. Position and dimension of ring bolts should be decided according to the requirements in Figure 1. M12 bolt (with screw thread) should be longer 60mm than the plywood.</p>	
<p>5.1.4 Beam joining mode The plywood should be jointed with the angle iron, and the holes should be drilled in the beam and then M16 bolts and nuts should be fixed in the beam. Four M12×60 bolts should be jointed on the plywood, and their dimensions should be processed according to the requirements in Table 2.1.</p>	

5.1.5 Installation modes of channel steel

Two pieces of channel steel will be installed on the wall, and the plywood will be fixed with M12 bolts. M12 bolt (with screw thread) should be longer 60mm than the plywood. Notice: The installation of channel steel must ensure that operating light won't shake when it is used.



Requirement description

5.1.6 Basic currency

Soleplate's dimension of the company is identical with other domestic companies. If the user replaces the product, foundation board needn't be altered. If the user replaces the product, foundation board needn't be altered. For safety, the user should carefully check the intensity and status of original foundation board.

If the dimension of existing foundation board doesn't conform to the dimension required by the company, the company may customize commutating board for the users.

5.1.7 Solutions of super-high operating room

If the height of operating room is more than 3.2 meter, height-extending shelf must be installed on the plywood, and the users may order the shelf in the company.

5.1.8 Power cabling requirements

Power requirement for operating light is **(220-230V~, 50Hz, 500VA)**
 The users must install power switch (**10A**) on the metope in operating room, and the power switch must cut off phase line and neutral line of the power simultaneously. Cabling position of power supply cords should be from power switch to foundation board. Secure capacity of power supply cords is **15A**.

WARNING: (1) grounding cords of the power part must be reliable. Independent safety grounding cords must be connected, and be connected with protection earth terminal of operating light.

(2) Wire fixed by user has to meet the request for 227

IEC 53

(3) The power switch should comply with the standard IEC 61058-1 and IEC60601-1

5.2 Troubleshooting performed by the users

Phenomenon	Possible reason	Solution
Power indicator light on the control panel isn't on	Power isn't switched on	Turn on power's switch on the wall
	Power board's electrical wires are cut off	Reconnect power board's electrical wires
Power indicator light on the control panel isn't on	Fuse is burned out	Replace the fuse
Light source of operating light is glittering	Network power's voltage is too low	Install balanced power supply
Some led chip isn't light	circuit wafer spoilt	Replace the circuit wafer
Balancing force is too tight or too loose	Balancer's spring is too big or too small	Adjust balancer's spring
Revolver can't be oriented	Revolver's chassis isn't horizontal	Adjust chassis's nuts
	Damper is loose	Screw tight the damper
Light body can't be oriented	The bolts of light body rubber gasket are loose	Screw tight the bolts

Above-mentioned troubleshooting operating should be performed according to related chapters in the manual.

WARNING:

- When performing the troubleshooting, network power must be cut off.
- Repairs or adjustments must be made only by **the manufacturer**, or by an agent expressly authorized by it or their official authorized agent.
- Interference by a third party will invalidate any customer claims under our guarantee.

6. Installation, Debugging

6.1 Packing box

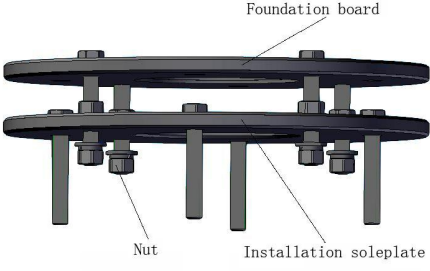
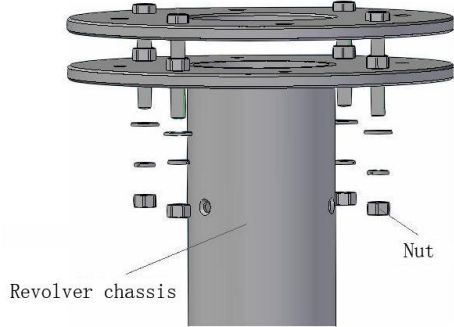

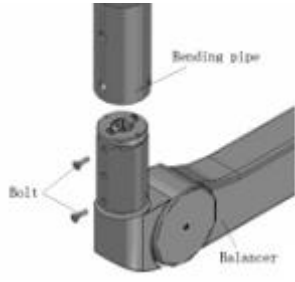
Shipping list for products with above-mentioned specifications is as follows:

Product model	Packing box's name	Amount	Wight
II LED 700	Single revolver, balancer	1	50kg
	light head box	1	22kg
II LED 500	Single revolver, balancer	1	50kg
	light head box	1	16kg
II LED 700 700	double revolver, balancer	1	73kg
	light head box	2	22kg+22kg
II LED700 500	double revolver, balancer	1	73 kg
	light head box	2	22kg+16kg
II LED500 500	double revolver, balancer	1	73kg
	light head box	2	16kg+16kg

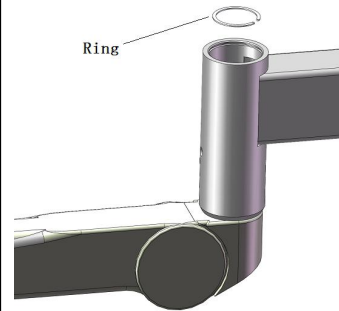
6.2 Device installation

WARNING: (1) Check foundation board's status once again, and make sure its security.

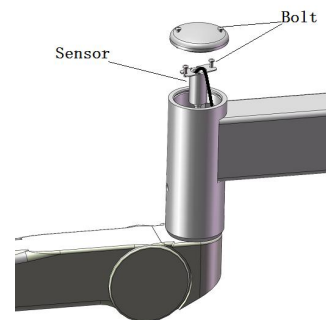
(2) Check electrical connection and safety fully, and make sure its security. The installation must be performed strictly according to the following requirements and procedures.

Installation description	Design
<p>6.2.1 Installing the soleplate Screw four M12 nuts into the foundation soleplate; embed four holes of installation soleplate into 4 pieces of screw of foundation soleplate, and then screw plat gasket, spring gasket and nuts. Adjust bottom nuts so as to make installation soleplate keep horizontal. Screw tight the above 4 nuts.</p>	
<p>6.2.2 Installing the Drop tube Screw four M12 nuts into the installation soleplate; embed four holes of revolver chassis into 4 pieces of screw of foundation soleplate, and then screw plat gasket, spring gasket and nuts. Adjust bottom nuts so as to make the revolver's chassis keep horizontal, and screw tight the nuts.</p>	
<p>6.2.3 Installing the balancer 1 Dismantle two socket head bolts located in the connection point of balancer and revolver, insert revolver's driver into the axis hole of connection point, and screw up the bolts. Caution: don't dismantle other two countersunk head bolts.</p>	
<p>6.2.4 Installing the balancer 2 Dismantle 4 bolts of the balancer, push the balancer into the axis hole of the revolver, and screw 4 bolts into the screw.</p>	

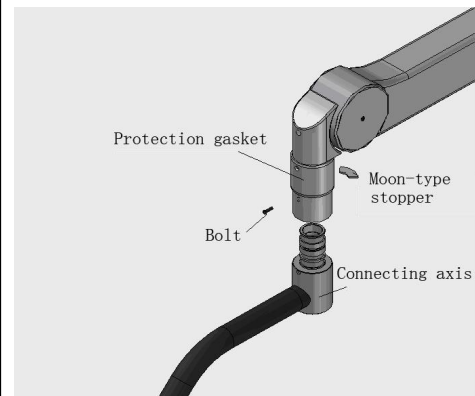
6.2.5 Installing the balancer 2
 Insert the balance arm to swivel, use tools to lock the balance arm by retainer ring



6.2.6 Installing the balancer 2
 Insert the Sensor to balance arm, fix it by screw, then close the cover plate and tighten the screw



6.2.7 Installing the light body
 Screw down protection set's bolts at the front of the balancer, push up the protection set, and pull out moon-type stopper.
 Push connection axis between lamp body and balancer into connecting hole at the front of the balancer, press into the moon-type stopper, push the protection set into the original position, and screw up the bolts.



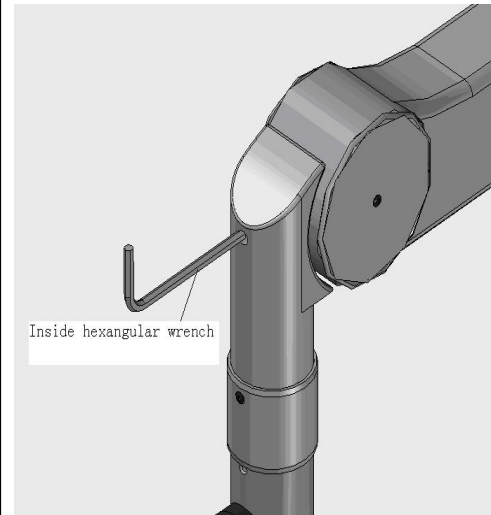
Caution: Moon-type stopper must be pushed completely into the slot.

6.2.8 Installing light source parts 2
 Align orientation nail of light source part with the flute of light head plastic gasket, and push into the light source part upwards.

6.2.9 Disassembly of balancer's orientation nail

After the lamp body has been installed properly, push forward the plastic cap at the back end of the balancer, open the plastic covers at both sides, and dismantle two inner hexagon bolts on the balancer and one outer hexagon bolt on the side. Fold the plastic cover and plastic cap.

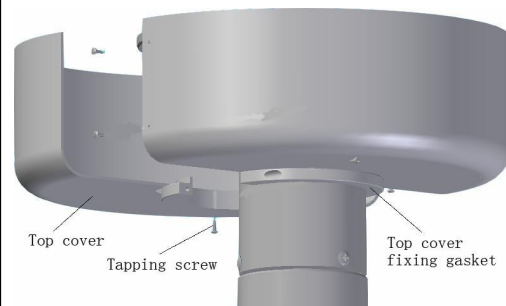
Warning: Disassembly of orientation nail must be performed after the lamp body is installed .and without load in the balancer, Strong compression strength will make the balancer string up rapidly, and therefore cause the damage of balancer parts.



6.2.10 Installing the top cover

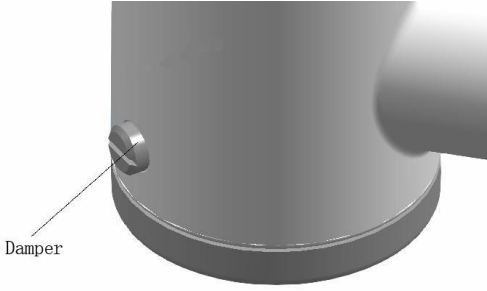
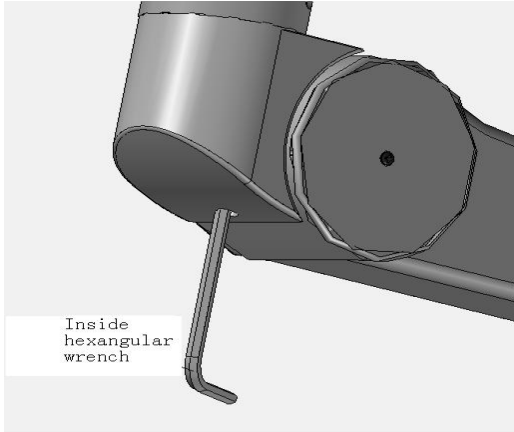
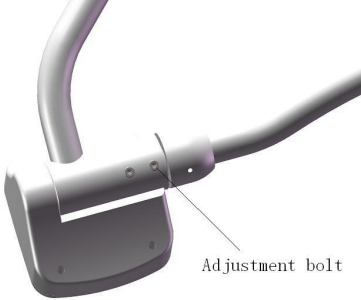
Loosen the bolts on top cover's fixing gasket, place the top cover on the revolver, and then join the top cover with 6 tapping screws.

Fold the top cover's fixing gasket, and embed the steps of top cover fixing gasket into the top cover's holes. Push up the top cover so as to make the top keep horizontal with the revolver's chassis or ceiling. Screw tight inner hexagon bolt of top cover fixing gasket.



6.3 Debugging

Contents	Design
<p>6.3.1 Horizontal adjustment Rectify horizontal state of the revolver with the gradienter. If there is no gradienter, loosen the revolver's damper, and spread fully the light to the biggest dimension. Screw up the soleplate's nuts with the light in inclining direction until each running part of the light has basically been stopped.</p>	<p>See Section 2 Chapter 6 Installation.</p>

<p>6.3.2 Damp adjustment After horizontal adjustment, screw tight the damper until appropriate degree. Make the light orient in any position, and the light won't move automatically without outside force.</p>	 <p>Damper</p>
<p>6.3.3 balancer adjustment Open the plastic cover in the front of the balancer, take out the adjustment pole, and pull the lamp head so as to make adjustment nuts of the balancer appear in the adjustment slot of the balancer. Insert the adjustment pole into the adjustment nuts, and adjust the balancer's pull until appropriate degree. Embed the adjustment pole into the plastic cover, and close the plastic cover.</p>	 <p>Inside hexangular wrench</p>
<p>6.3.4 Rotating adjustment of light body connecting tube Adjust inner hexagon bolt with inner hexagon wrench until appropriate rotating force. Notice: The light body's rotating pull has been adjusted before leaving the factory, and therefore generally the users don't need to make any adjustment.</p>	 <p>Adjustment bolt</p>

6.4 Wire connection, replacing the fuse

- **Cutline of power board connection**
 Electrical wires connection of power board should be performed according to the cutline requirements. Electrical wires connection of power board, transformer and DC input have been performed properly before leaving the factory. Connecting the network power to AC input will do.
- When the voltage dips for 100ms(40%), the light flickers, once removing the interference, it can restore to its normal mode by itself at once. that above phenomenon will not affect diagnosis or treatment, So user can equip uninterruptable power supply for the



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light.

- Power cord specification: 227 IEC 53, 300/500, nominal cross-sectional area: 1.5(mm² Cu)
- Outline of replacing the fuse
Pull out the damaged fuse from the plugboard, and perform the replacement according to fuse specification marked in Section 2 Chapter 7 Troubleshooting of operating light in the instructions.

WARNING: Before replacing the fuse, power must be cut off.

Reference standard of sign of the protection ground :IEC 601-1-1988

WARNING: Power wires must be connected according to outline colors.

7. Technical data

7.1 Standard model configuration

II LED700 700(700mm+700mm Lamp Head)

II LED700 500(700mm+500mm Lamp Head)

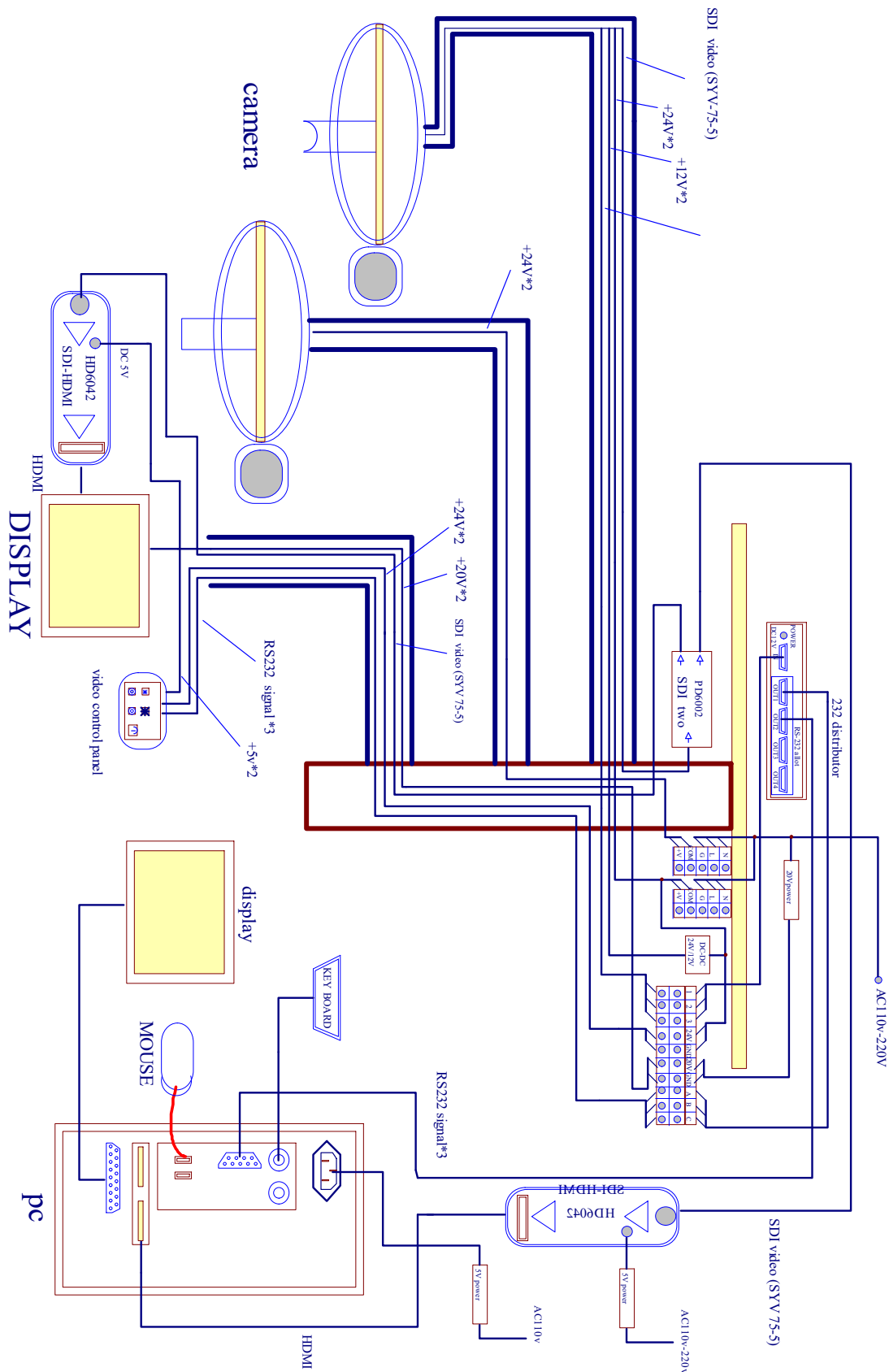
II LED500 500(700mm+500mm Lamp Head)

II LED700 (700mm Lamp Head)

II LED500 (500mm Lamp Head)

7.2 Technical specifications for LED light

Technical specifications for lights	700 Lamp head	500 Lamp head
Central illuminance at 1m working distance (Adjust range)	40,000~18,0000 lux	40,000~160,000 lux
Focusable light-field size at 1 m distance	120~300mm	120~300mm
Colour temperature	4,300±500K	4,300±500K
Depth of Focus	>700mm	>700mm
Colour Index Ra	>95	>95
Power	110-240V 50/60Hz	110-240V 50/60Hz
Bulbs	80pcs	48pcs
Effective bulb service life	>50,000h	>50,000h
Diameter of lamp housing	700mm	500mm
Installation height (Ceiling type)	280~320 cm	280~320 cm





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