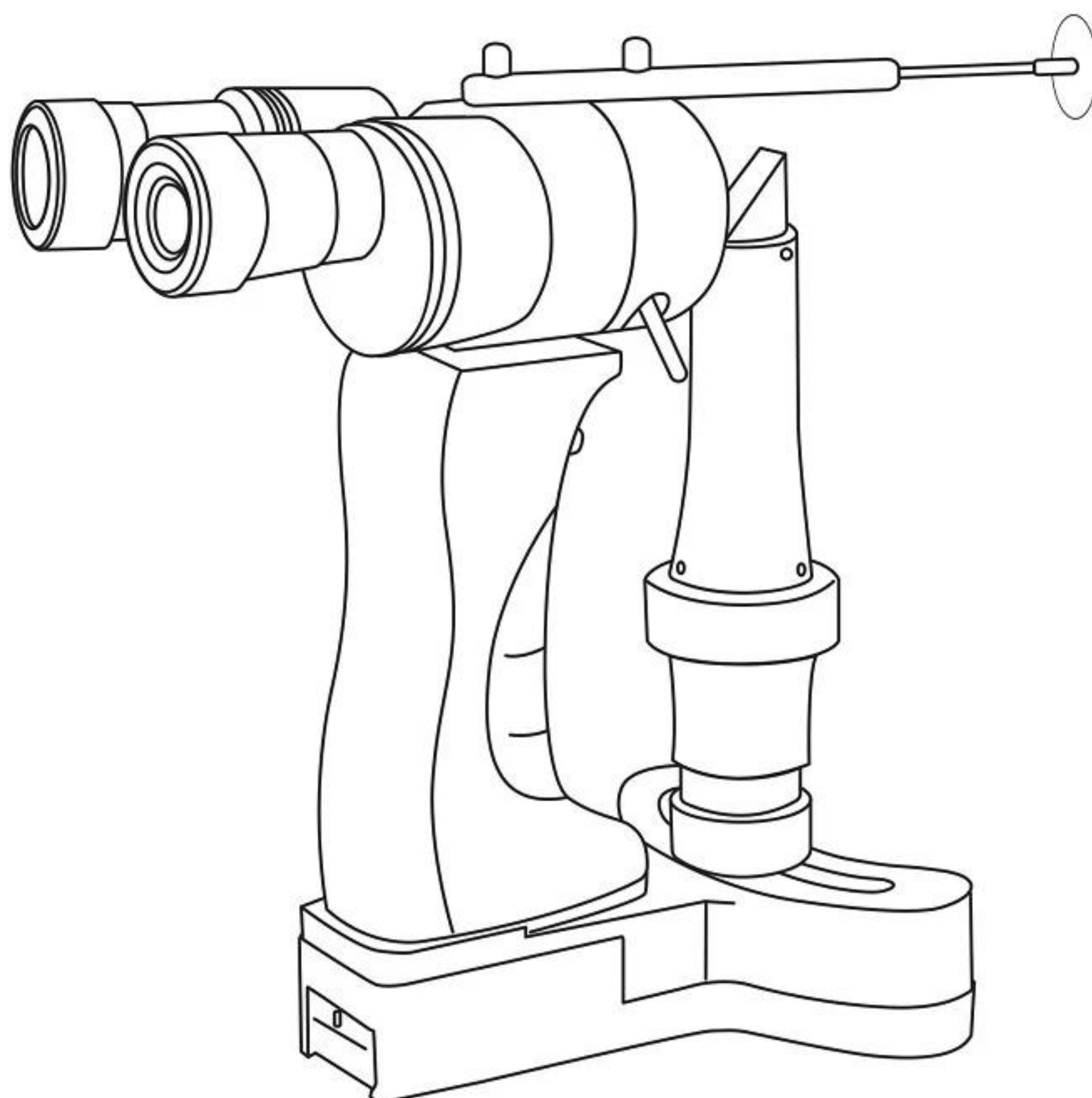


Operation Manual



Preface

Thank you for purchasing our ESL-700 portable slit-lamp microscope. Please read this manual carefully for the sake of your best use.

General Requirements for Safety

Please read carefully about following precautions to avoid unexpected personal injury as well as the product being damaged and other possible dangers.

Precautions

1. Do not use this instrument near a fire, or blast, or in a high temperature, or where there is much dust. Keep this instrument clean and dry generally.
2. Make sure that Li-battery is installed properly and works in good fashion.
3. Please don't touch the surface of the lens and mirror with hands or hard objects.
4. Do not irradiate the patient's pupil for a long time, otherwise it could lead to a declining eyesight.
5. Please take the Li-battery out and put the instrument into the special suitcase, when it is not in use for a long period of time.
6. Please discard the disused batteries in according with the local regulations.

7. In case there is any trouble, please contact the authorized distributor or our Repair Department.

*** THE SAFETY MARKS USED IN THIS INSTRUMENT**



Attention



TYPE B

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1. Characteristics and Specification

1.1 Scope of Application

The portable slit lamp provides precision in small dimensions for the examination of the anterior and posterior segments of the eye.

1.2 Characteristics

Belong to a kind of binocular stereoscopic microscope, ESL-700 portable slit-lamp microscope includes two parts, one is used for observing through binocular microscope and the other one is used for illumination by slit lamp.

With the virtues of smallness, handiness and easy-operating, it is the best choice for multiple locations, for instance, clinic, nursing home, hospital, ambulance.

1.3 Specification

Microscope Parameters

Magnification	10x	16x
Field of view	Φ 15	Φ 10
P.D. Adjustment	50 ~75mm	
Diopter Adjustment	± 8D	
Working Distance	60mm	
(Note: P.D.—pupil distance	PSL — portable	
slit-lamp microscope)		

Illumination parameters

Slit Width	0.2~12mm adjustable
Slit length	0.2、1、5、12mm
Slit illumination angle	$\geq \pm 30^\circ$
Illumination Valuation	15000lx
Light source	high luminance white LED

Filters

Cobalt blue,Red free,Color temperature conversion

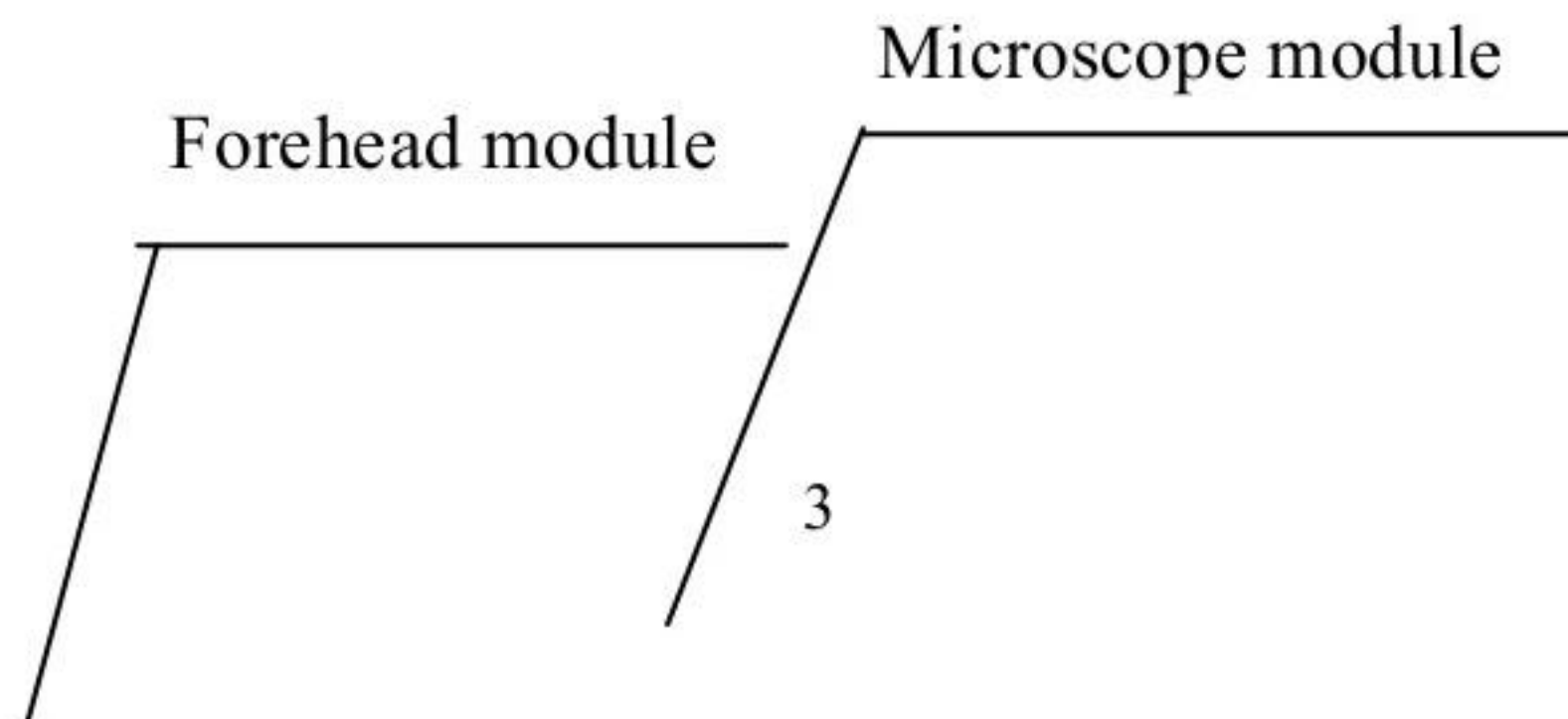
Power Supply Parameters`

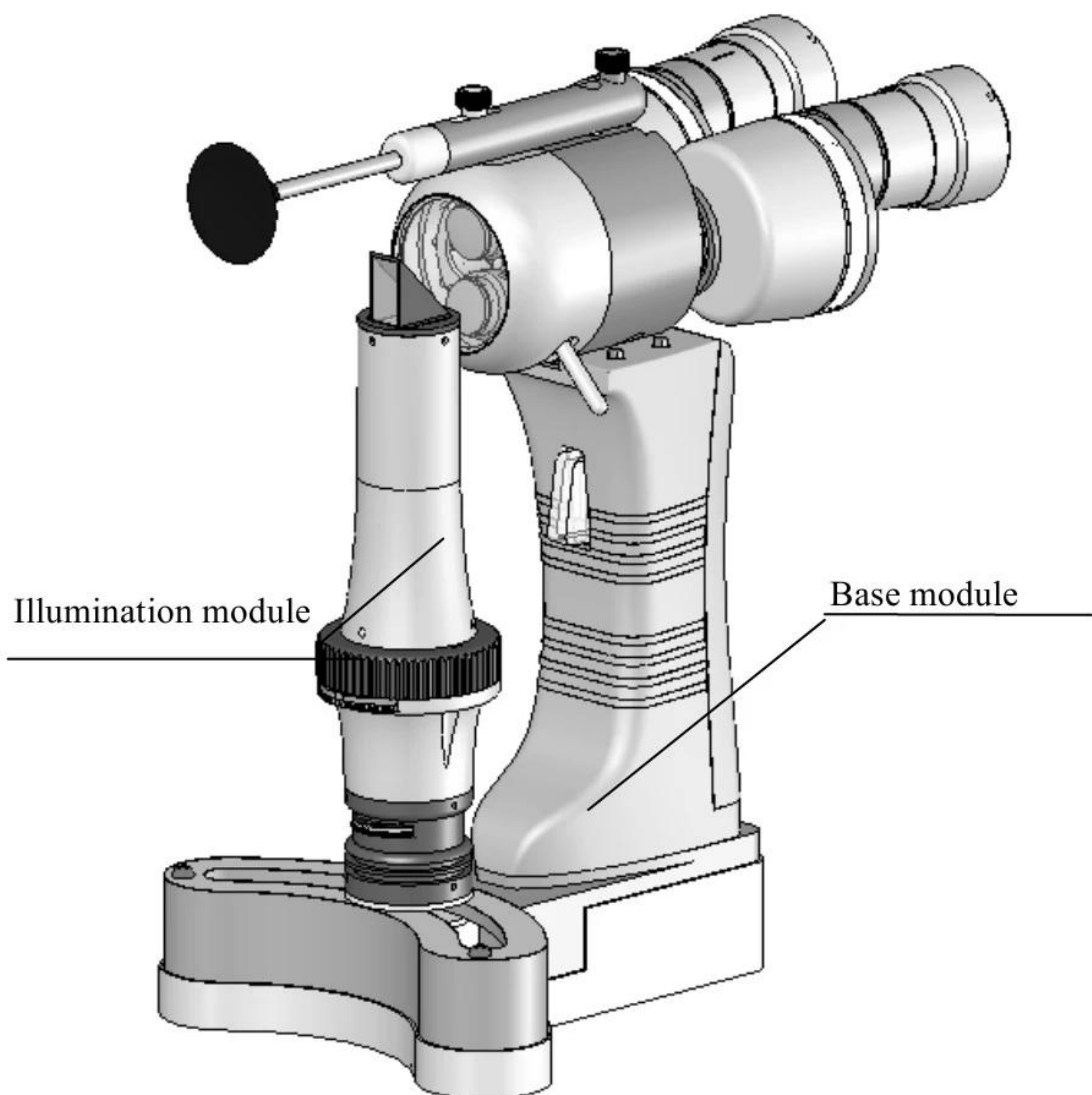
Charger	Input: AC 100-240V,50/60Hz Output:DC 8.4V/600mA
Li-battery	DC 7.4V/750mA 1.5hrs. operation at max. illumination
Power consumption	3 W

Weight and Size

Packing dimension	250x245x170 (mm)
Total weight	2200g
Net weight	900g

2. Components and applications





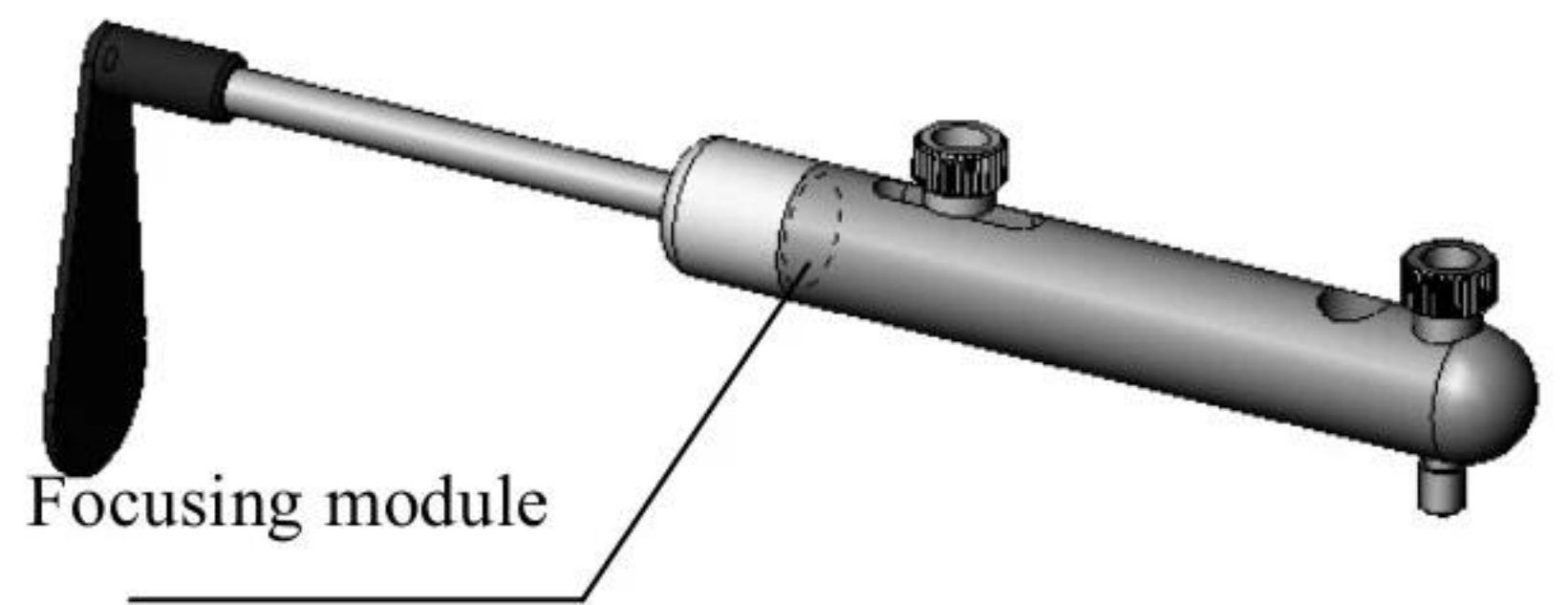


Fig.1

2.1 Forehead Module

Ensure working distance adjustable between the observer and the observed.

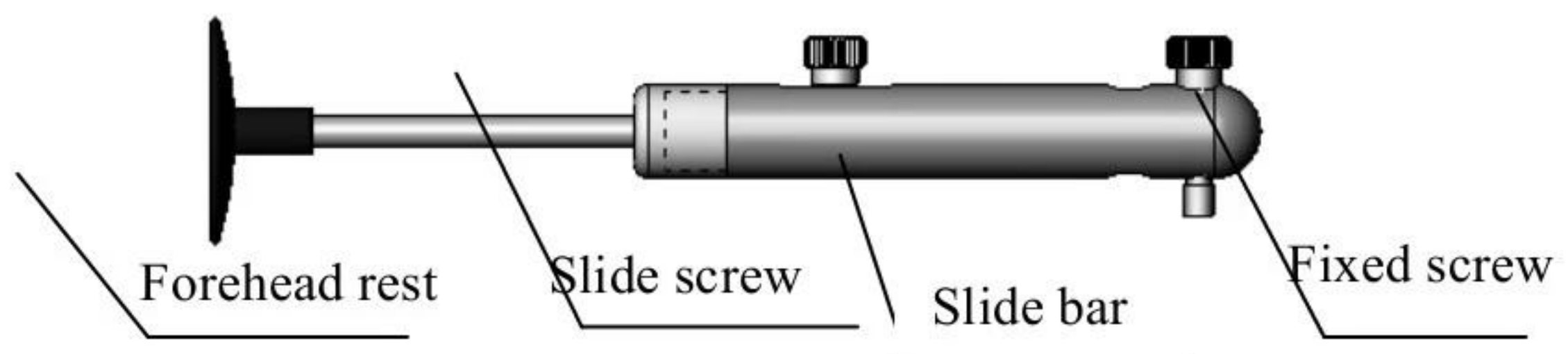


Fig.2

2.2 Microscope Module

Binocular stereoscopic microscope includes objective parts, prism parts and eyepiece parts. Magnification between 10x and 16x can be switched by turn the magnification bar in the side of microscope, P.D. can be adjusted by toggling the prism parts, ocular diopter can be adjusted by revolving eyepiece parts.

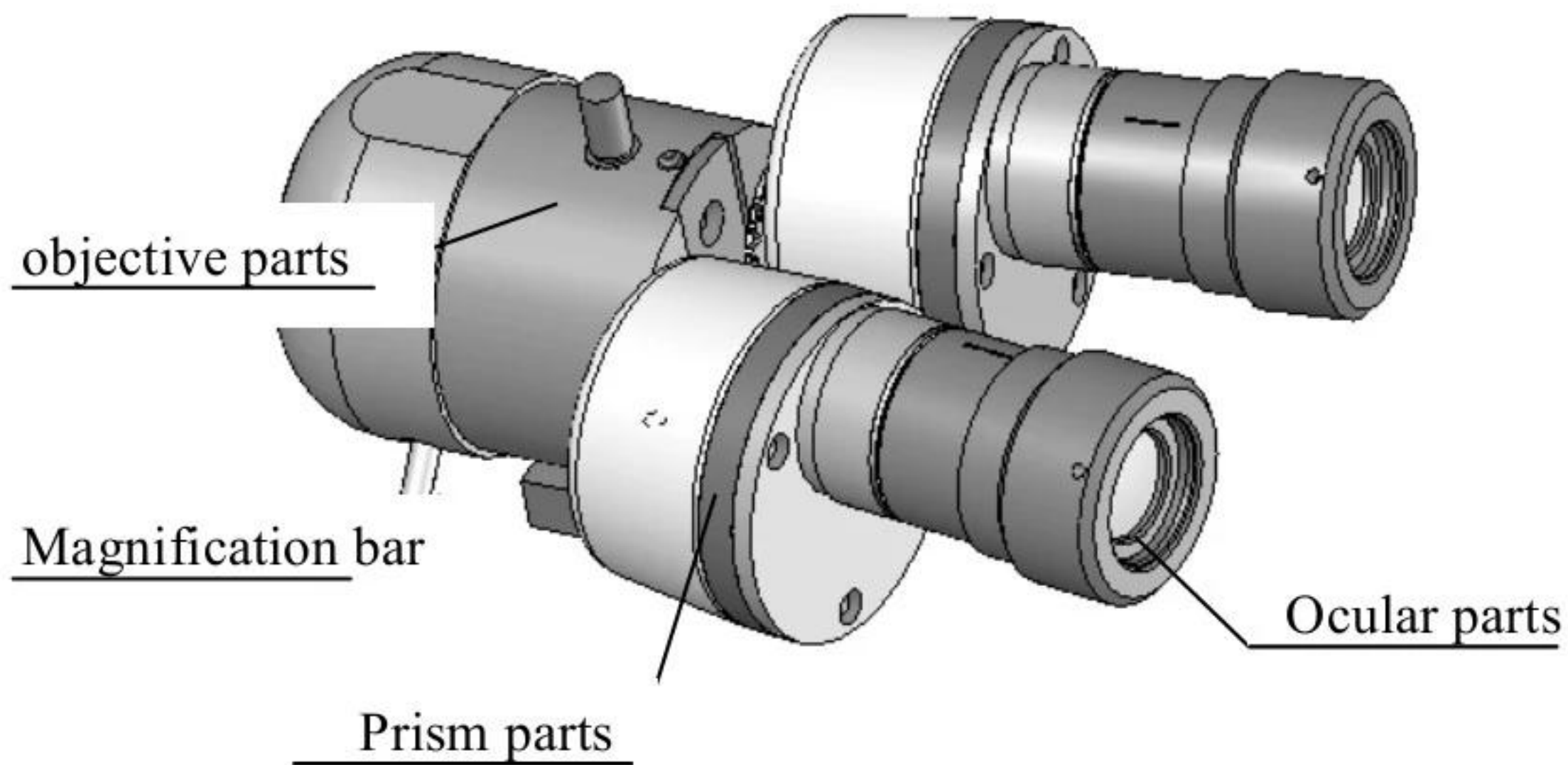


Fig.3

2.3 Base Module

Base module includes portable parts, power switch, indicator light, dimmer knob, battery, base and so on. Pushing the power switch can open up the light source, then the indicator light turn light, which tell us that the power is still on function, turning the dimmer knob can adjust the brightness of LED source.

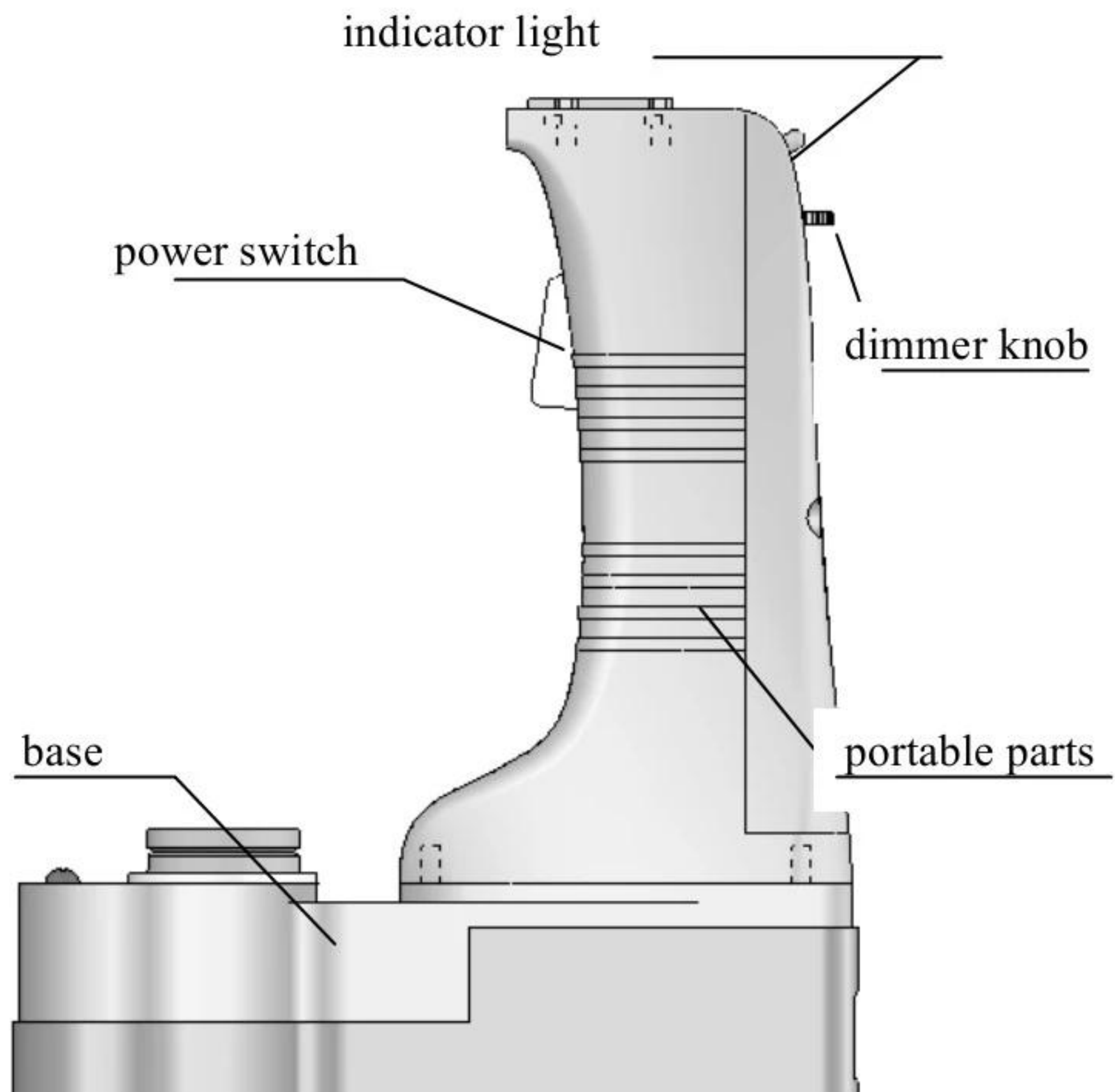


Fig.4

2.4 Illumination Module

Illumination module can accomplish multiple methods of illumination, includes different slit with, different spot, different color filter. The light source uses warm white LED, illumination module can rotate freely based on the base module in a large angle range, which is more than $\pm 30^\circ$. Turning the slit pan can control slit with, and change continuously in a range between 0.2~12mm;

Turn the spot dish, spots can be changed in sizes of $\Phi 0.2$ 、 $\Phi 1$ 、 $\Phi 5$ 、 $\Phi 12$; Filter dish can change the color of illumination spot, which includes cobalt blue, red free and achromaticity.

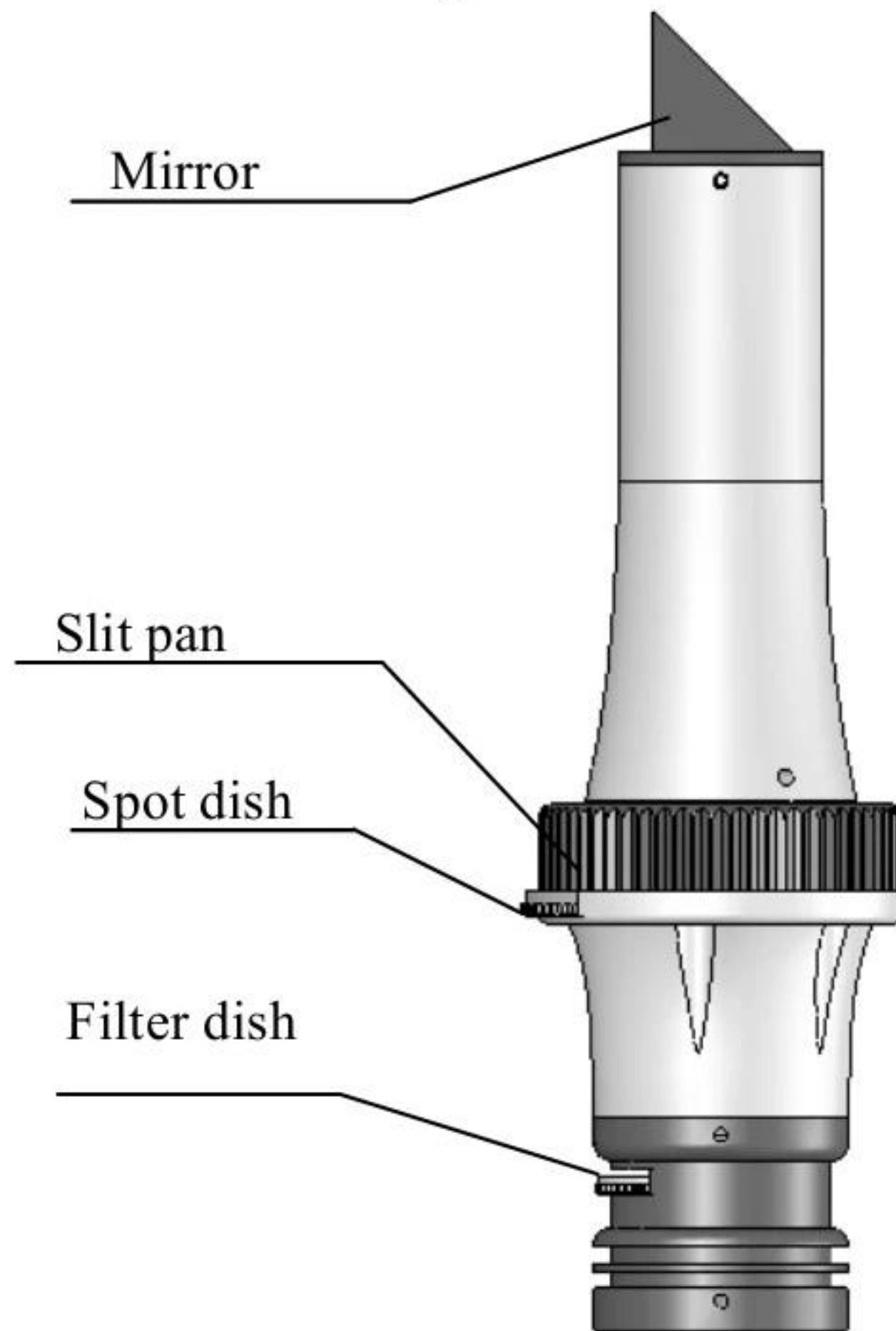


Fig.5

2.5 Focusing Module

Illumination module and microscope module focus in the same plane, which is the observed's eye position.

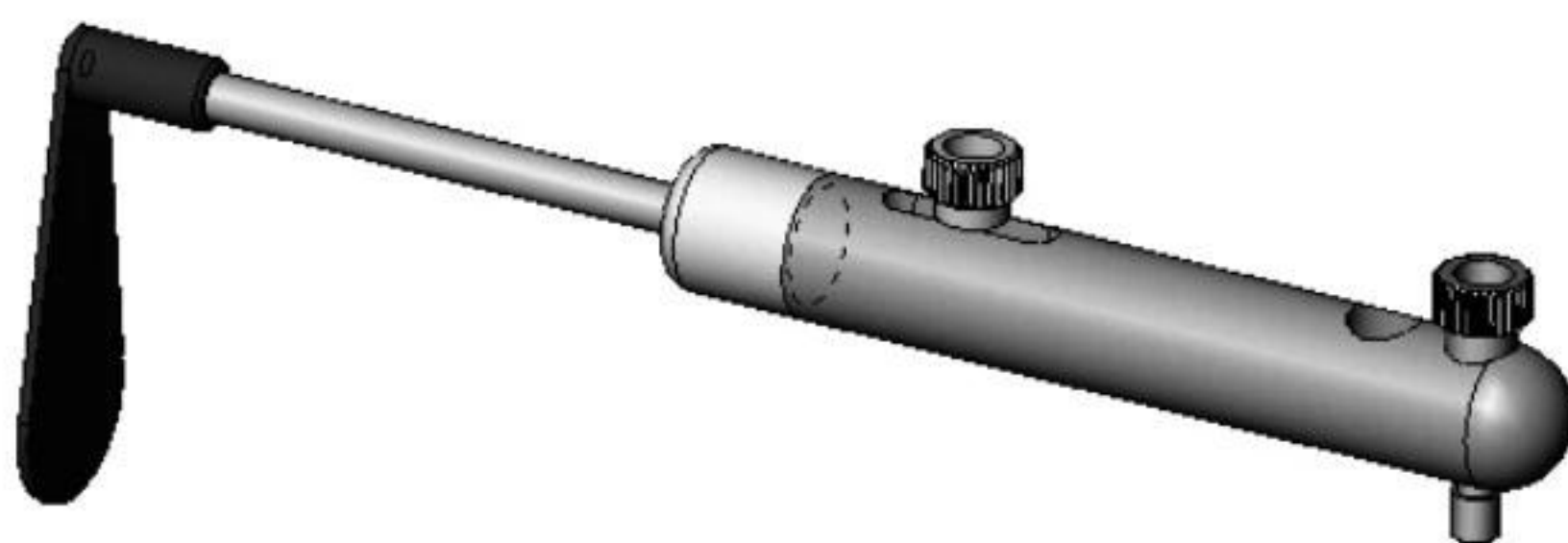


Fig.6

3. Assembly

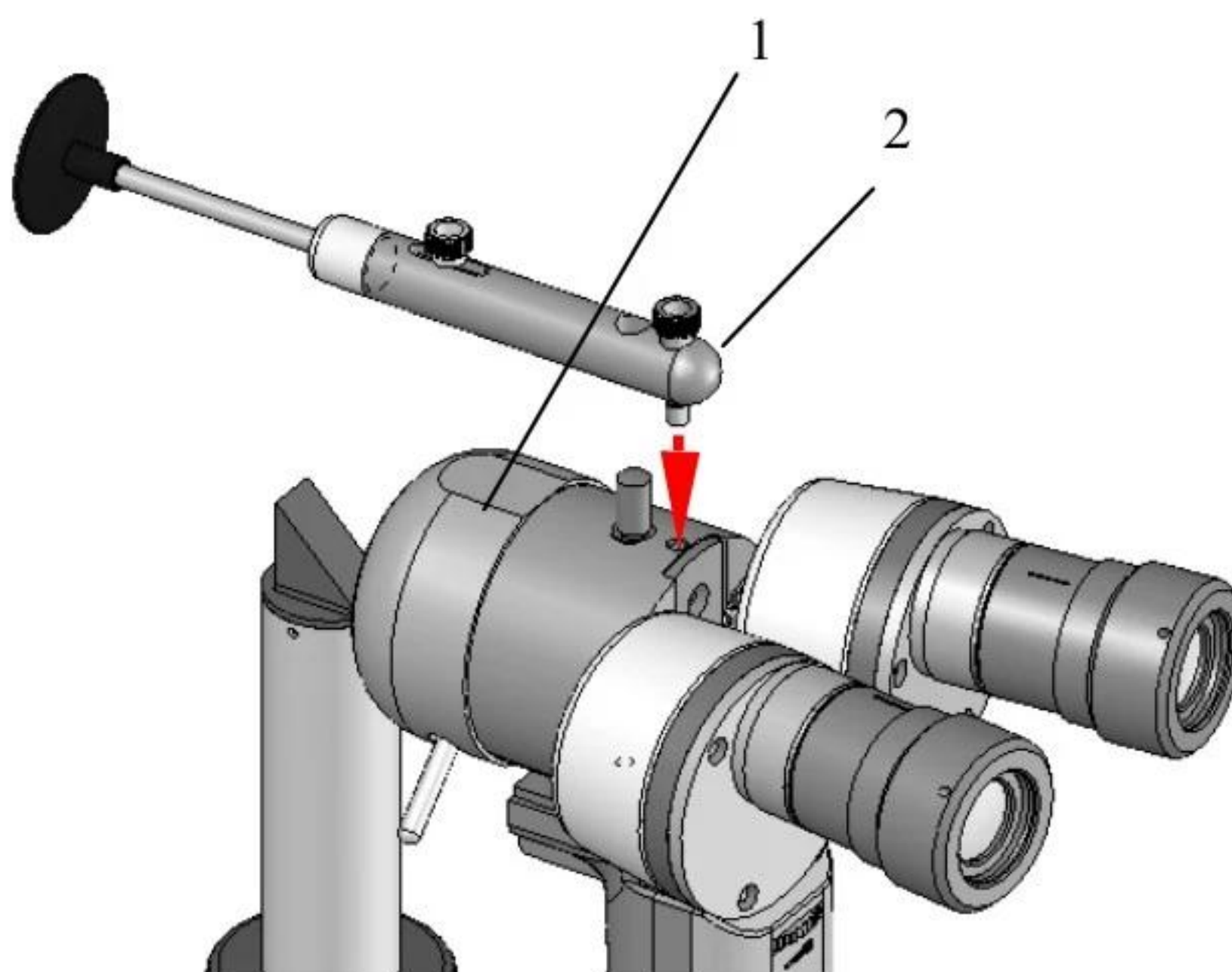


Fig.7

- 1) As shown in Fig.7, take part1 and part2 out of the box, and then screw the bolt in part2 by aiming at the screw hole in part1 as Fig.7.
- 2) As shown in Fig.8, inert the battery in

the direction of the arrow, reverse can not be approved.

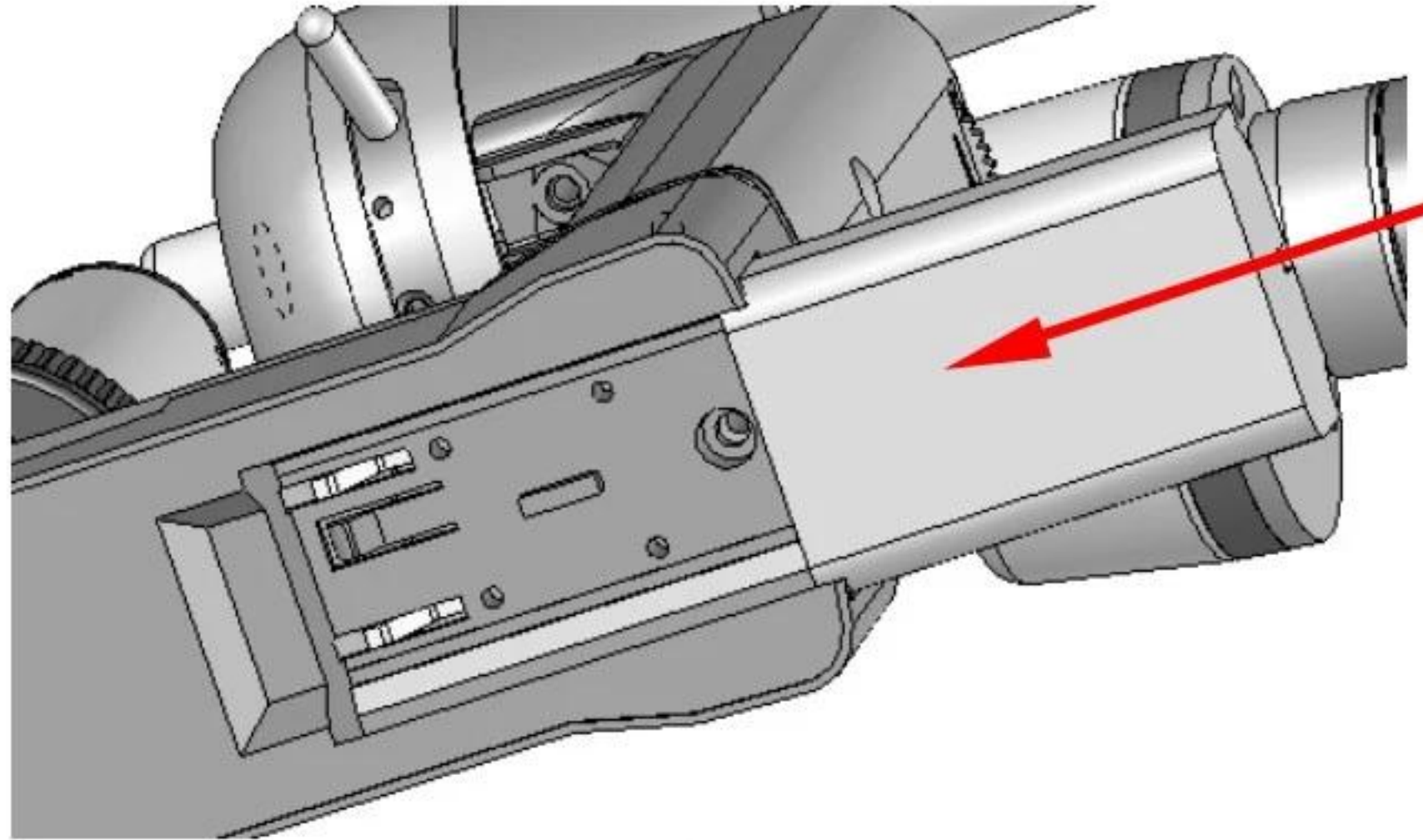


Fig.8

4. Preparation

- 1) Ensure the battery whether there is sufficient power, please recharge if low power.
- 2) Check the focusing module whether sliding freely or not by pushing or pulling the screw slides in the focus module.
- 3) Install focus module, and turn the power, check brightness of illumination source.
- 4) Revolving dimmer knob, check brightness change of light spot and rotation freely.
- 5) Check P.D. adjustment whether smooth or not by rotating the prism shell, check diopter adjustment whether smooth or not by rotating the eyepiece.
- 6) Check rotation of the spot dish , filter dish

and split knob by rotating them, notice the change in spots, filters and slit whether normal or not.

- 7) Switch the magnification bar, and check the change whether working properly.

5. Operation

5.1 Diopter compensation

The image plane of the microscope is calibrated according to the emmetropia. There is a deviation for different observed eyes, so it is necessary to adjust the ocular diopter:

- a) Firstly, install focusing module in the microscope.
- b) Secondly, turn on the power switch, one eye is aimed at one eyepiece, rotate the adjustment screw cap of the eyepiece from one side to the other until a sharp image appears.
- c) Finally, adjust another eyepiece in the same procedure.

5.2 P.D. adjustment

As shown in Fig.9, separate the prism box of the microscope to adjust the P.D. until both eyes could see the same image on the focusing plane through the eyepieces, and at the same time a stereostopic will be obtained. The P.D. can be adjusted between 50-75mm

continuously.

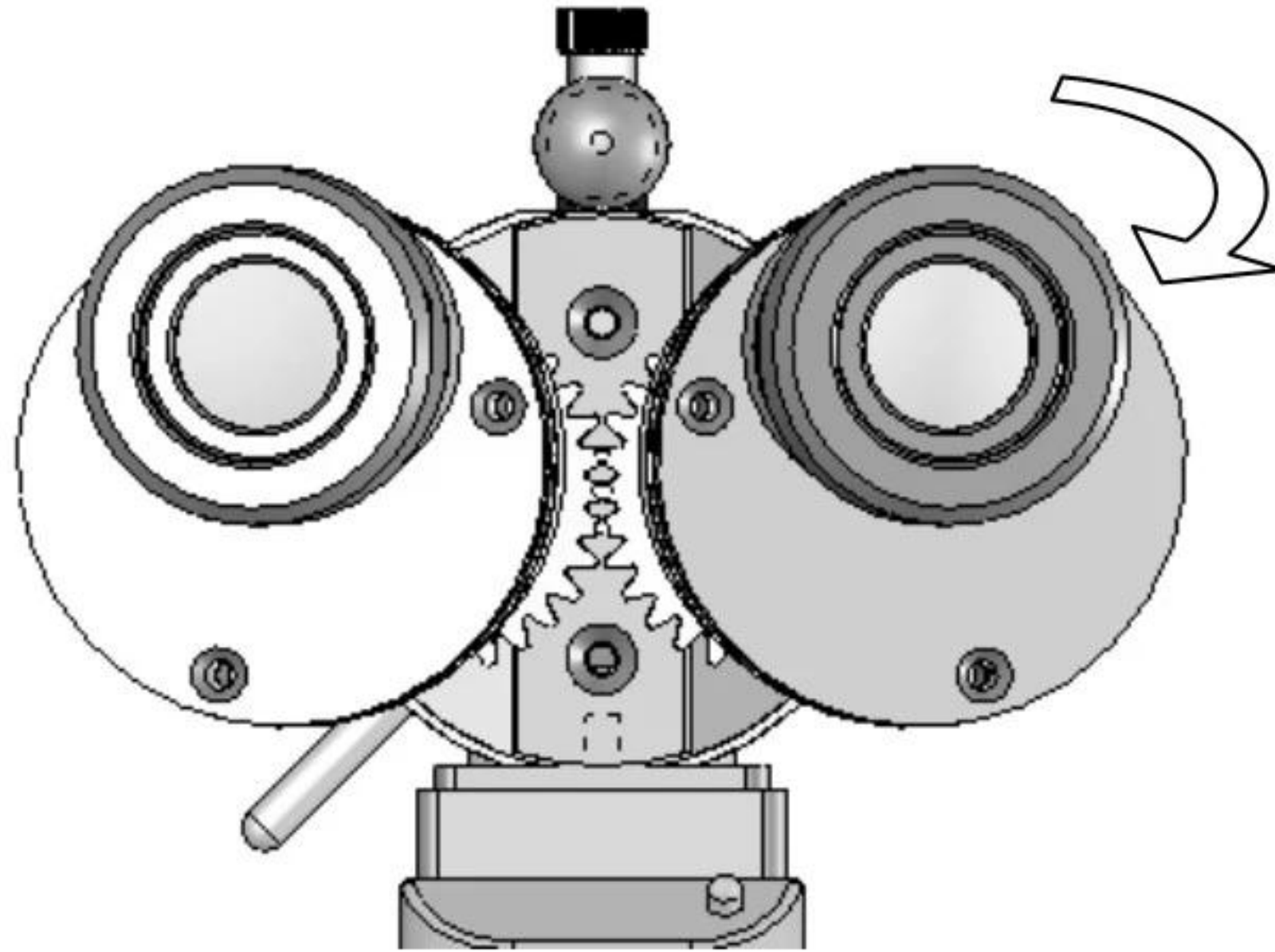


Fig.9

5.3 Working distance adjustment

Let the top of the forehead-rest against the patient's forehead, make sure patient's eye aligns with the centre of the telescope. Adjust the distance between the microscope and patient's eye by changing forehead rest length slightly until a sharp eye image appears, then tight the slide screw.

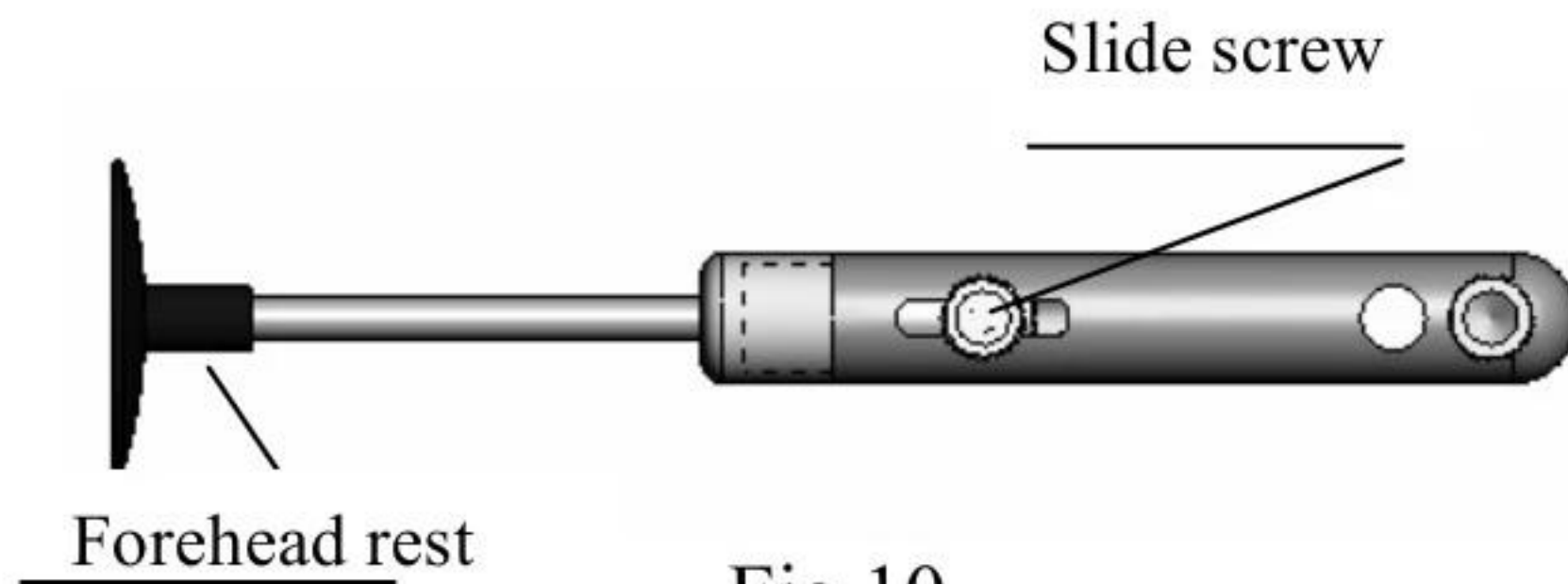


Fig.10

5.4 Slit width adjustment

The slit width can be changed continuously from 0.2 to 12mm. As shown in fig 5, turn the slit pan, the slit width decrease when rotating the knob clockwise, and increase contrary.

5.5 Spot size adjustment

There are four different kinds of spot sizes: $\Phi 0.2$, $\Phi 1$, $\Phi 5$, $\Phi 12$ for ESL-700 PSL. As shown in Fig.5, rotate the slit pan, the spots can be switched between the four different kinds of sizes.

5.6 Switching filter

As shown in fig 5, turn the filter pan, the illumination system can be switched between three different kinds of filters, B(cobalt blue), G(red free) and O(color temperature change), as show in Fig.11, so the surgeon's demands can be served.

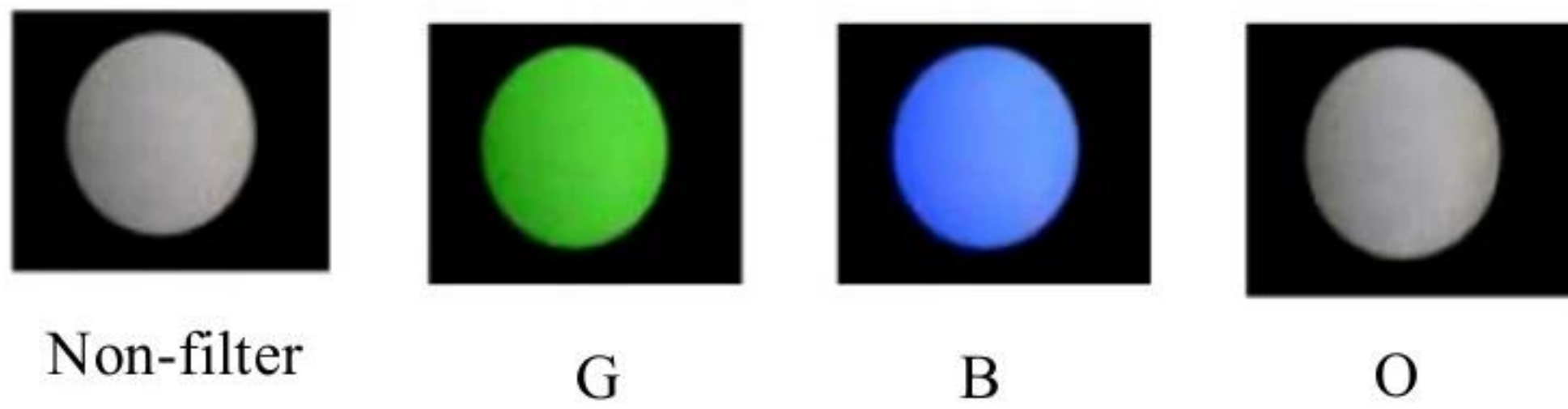


Fig.11

5.7 Switching magnification

The magnification in this instrument can be switched by turn the magnification bar or change eyepieces (10x eyepiece is the standard module, 16x eyepiece can be provided if necessary, as shown in Fig. 3).

When 10x eyepiece is used, turning the magnification bar in the microscope module, magnification can be switched between 10x and 16x, and if 16x eyepiece is used, the magnification can be switched between 16x and 25.6x.

5.8 Brightness adjustment

Turn the dimmer knob to adjust the LED brightness, turn it clockwise to minim the brightness, and increase contrary.

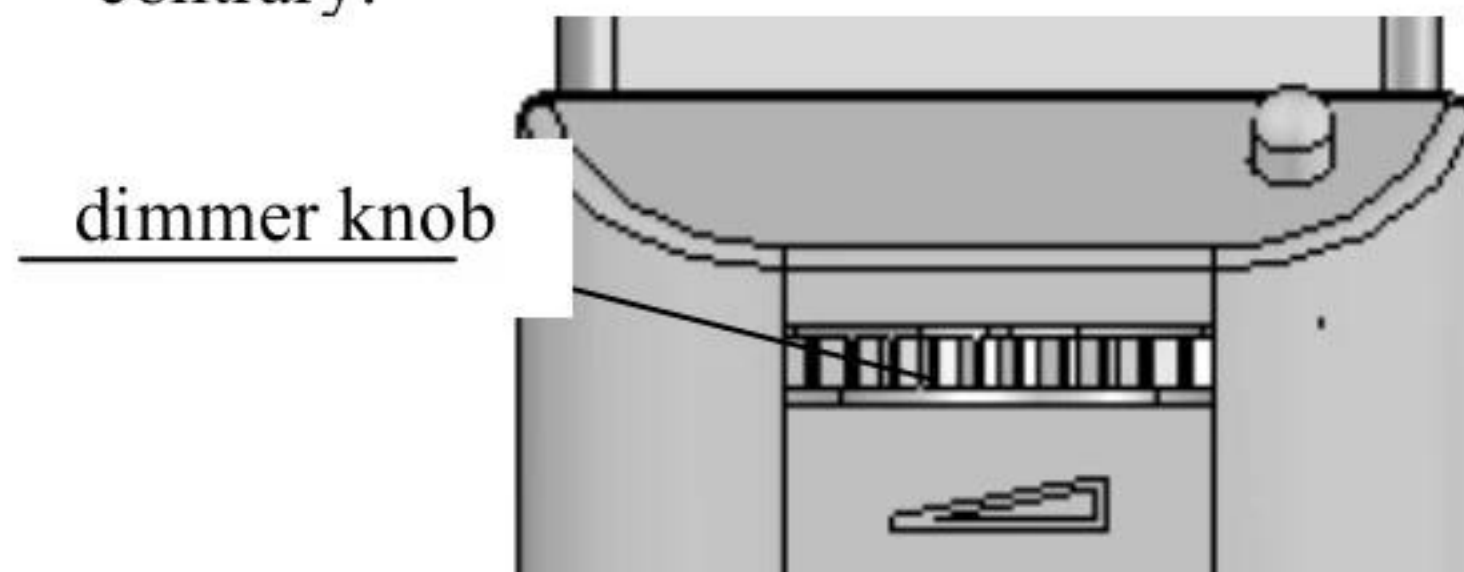


Fig.12

5.9 Charging

The normal charging time is about two hours. Make sure charging the battery for 12 hours when you use it in the first time. Please charge if you leave unused for a long time or power using up.

method of taking out battery:

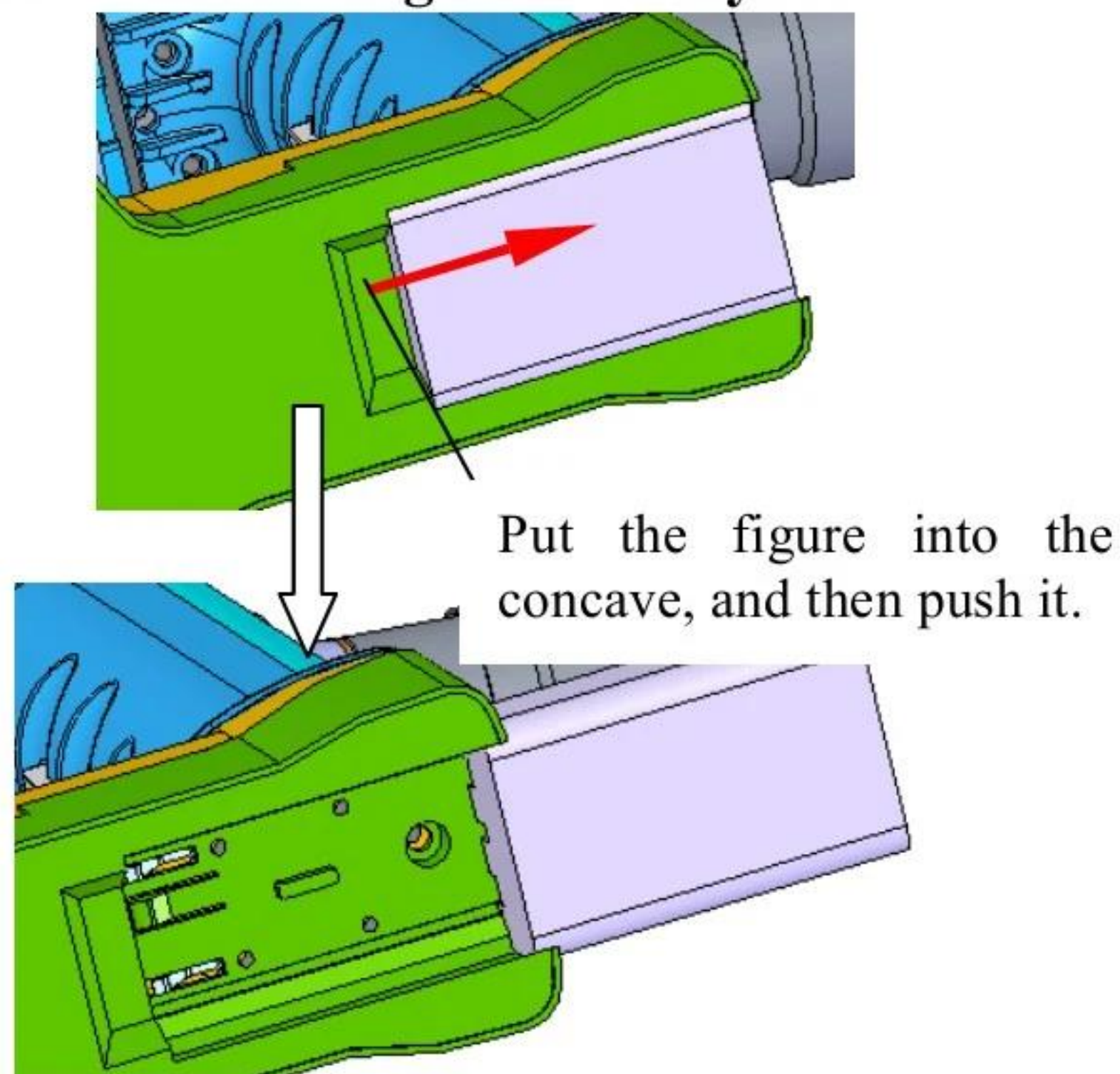


Fig.13

Charging:

As shown in Fig.14, put the battery into the charger, The red indicating lamp shows that the battery is charging. After fully charged, the red LED will change to green.

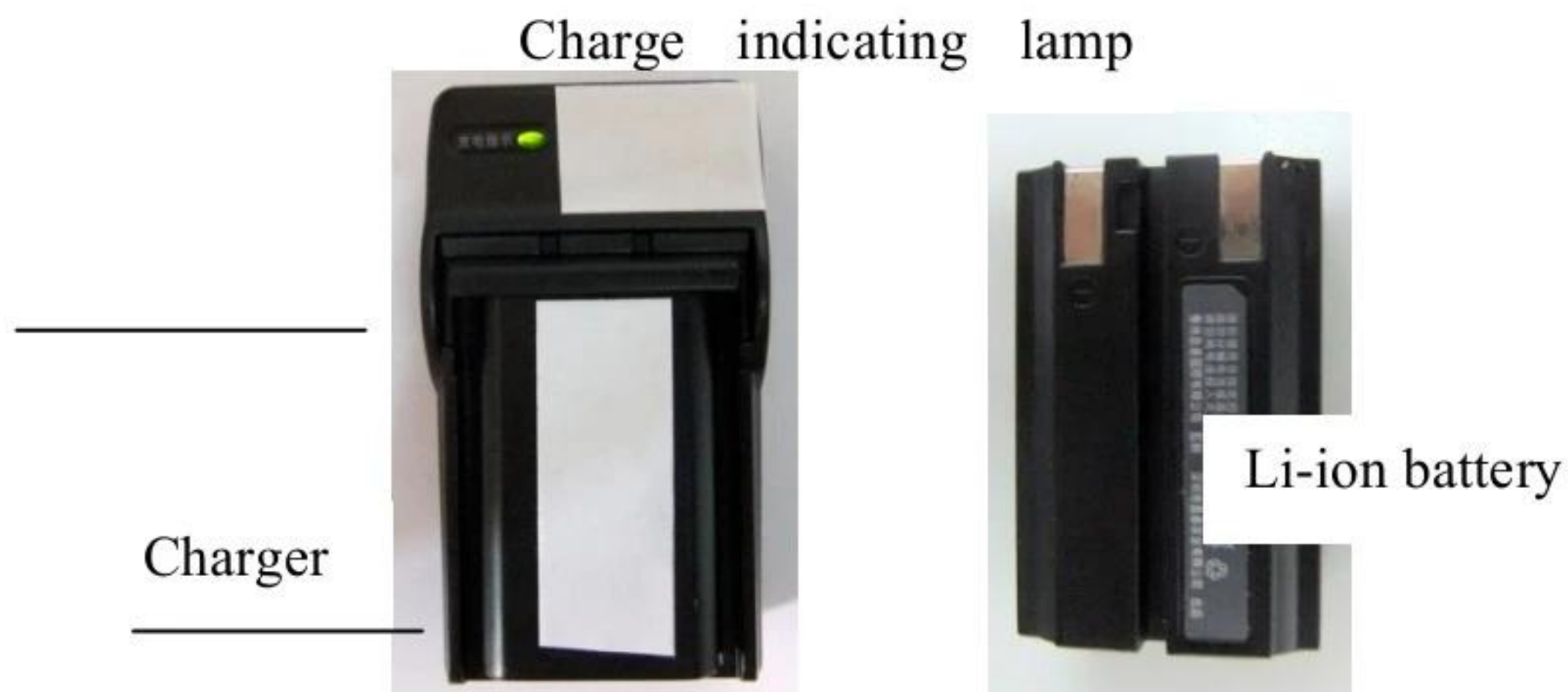


Fig.14

6. Maintenance

6.1 Battery storage

1) Do not mix different types of battery, otherwise it will cause exploding or other unexpected results.

2) Li-ion battery does not have memory effect, incomplete discharge will not decrease the capacity of the battery.

3) Li-ion battery does not allow over discharge, after discharge protection takes effect, recharge before use the battery.

4) Li-ion battery does not allow over charge. The charger provides with the over charge protection function.

5) There is the max. limits in charge-discharge number for Li-ion battery. Do not charge and discharge frequently.

6) Li-ion battery is best used under 25°C-40°C. The performance level will be decreased in over high or low

temperature. It is not suggested to use this instrument below 0°C or above 40°C.

7) Please take the Li-ion battery out of the instrument and fully charge and preserve it well, if not used for a long time.

8) Replace the Li-ion battery with the same type when it is broken.

9) Please do not place battery and metal parts together in the pocket, it may cause short-circuit in result of a fire.

10) Do not use broken battery or battery with surface broken.

11) Do not make the battery short circuit, or break up, or put it into fire.

12) Please use the special charger provided by us.

13) Please take out the battery and charge when the indicator light become dark or not light.

14) Take out the battery from the charger after charging, charge too long time will cause risk of over charge.

15) The Li-ion battery can charge and discharge above 300 cycles. The charge cycle depends on the electricity remainder. The less electricity remainder in battery, the longer life for it.



Attention: Discard the Li-ion battery in according with local regulation if the service time is up.

6.2 Cleaning

Check the surface of the eyepiece and mirror, case any finger print and grease remain on, wipe it off with soft cotton dipping with absolute alcohol. Check each parts of instrument, make sure it's clean.

6.3 Trouble avoiding guide

Trouble	Possible cause	Solution
No light	The battery is placed unaptly	Push out the the battery and re-pushing it again
		Pull the contacting reed down
	The power switch is damaged	Change new switch
	The light source is broken	Change new LED
	Slit width near 0	Adjust the slit pan
Light is too dark or asymmetrical	The dimmer knob locate at the left place	Adjust the dimmer knob to the biggest position
	The spot dish or the filter diah are not in the right position.	Make the spot dish or the filter dish in the right position.
The microscope module and	Have not adjust the ocular diopter	adjust the ocular diopter

illumination module can't focus in the same place		
Forehead rest can't slide	Glide screw is locked	Loosen the glide screw
The light can't turn off	Power switch is blocked	Contact us
	Power switch is broken	Contact us

7. Responsibility

We will supply circuit diagram of the instrument, electric component list, drawing annotation and calibration details according to the customer's need for repair.

If there is any need for enquiry of relative information, relative service or some questions, please contact with us directly or our authorized distributors.

8. Transportation and storage

- 1) During the transportation, be careful to protect it from wetness, upside down and violent vibration. The relative humidity should be keep from 10% to 90%, and environment temperature

-25°C to 40°C.

- 2) This instrument should be stored in a well ventilated room without corrosive gas where the relative humidity should be 10% to 80% and environment temperature -10°C to 40°C.
- 3) If the instrument has been used for over 5 years, please contact us or our authorized dealer, we will examine the instrument in assurance with it's normal.
- 4) Discarding instrument should act on the local environment protection regulations, please do not pollute the environment.

ESL-700 PORTABLE SLIT LAMP



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