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1. Features & Specifications

1.1 Features

The YZ20P5 Operation Microscope is a portable microscope. Its small and portable machine body makes it highly agile. It is sure to meet the requirements for general ophthalmic micro-surgical.

The microscope is a single binocular one, with three magnification steps, offering sharp image and large field of vision. A cold light source is used in the illumination system, which is harmless to the tissue of eye. With quality halogen bulbs, PHILIPS or OSRAM, being used, the illumination is bright and even. An intensifying red-reflex module is added.

A spring balance system is designed for the arm so that the microscope can move upwards and downwards stopping at any desired position. Fine focusing adjustment can be performed. The adjusting functions of the equipment include magnification, focusing and inclination, while focusing can also be controlled by foot switch.

The environment requirements for using this equipment is temperature +10℃ to +40℃, relative humidity 30% to 75%, atmospheric pressure 50hPa to 1060hPa.

1.2 Specifications

(1) Parameter of microscope

Focus length of objective f = 200mm

Eyepieces 12.5×/16B

Magnification & Visual Field:

Objective focus	Total magnification	Visual field (mm)	Illumination field (mm)
F200	5.3X	Φ38	Φ40
F200	8X	Φ25	Φ40
	12X	Φ17	

(2) Working distance 190mm

(3) Parameter of Binocular tube

Inclined binocular tubes 45°

Diopter adjustment range ±6D

Pupil distance range 50mm～70mm

Height of eyecups 18mm

(4) Parameter of Illumination

6°+0° Coaxial illumination

Maximum intensity 30000Lx or up

(5) Parameter of Position adjustment

Maximum stretching radius of arm 870mm

Vertical movement range (from floor to front surface of big objective) 700mm～1100mm

Range of fine focusing adjustment 30mm

(6) Parameter of Electric

Input voltage AC220V±10%/50Hz±1%, or
AC110V±10%/50Hz±1%

Input power 120VA

Fuse T type AC250V 1.25A、T type AC125V 2.5A

(For example 51S-013H、51S-025L)

Bulb 12V/100W

(Medical halogen lamp Bulb with cold reflection)

Electrical safety Conform to standard IEC601-1 Type I, Class B

2. The name and use of components

[1] Caster

Move and support the equipment

[2] Foot control switch

Be used to control the focusing functions of microscope

[3] Floor stand

Be used to support & fix stand pillar

[4] Stand pillar

[5] Fuse

Two (1.25A/2.5A) are used to power supply

[6] Light-adjusting knob

Used for continuous adjustment of illumination intensity.

[7] Power supply switch

Be used to switch on or switch off power supply.

[8] Spare bulb module

In case the working bulb burnt during an operation, the spare lamp module may be inserted so as to ensure the operation to be continued smoothly.

[9] Bulb module

[10] 7-pin plug/socket

Connecting wires for focusing control

[11] Fixing nut

This nut lets microscope suspend on the small horizontal arm. Though there is protective melt, you must check this nut tightened or not.

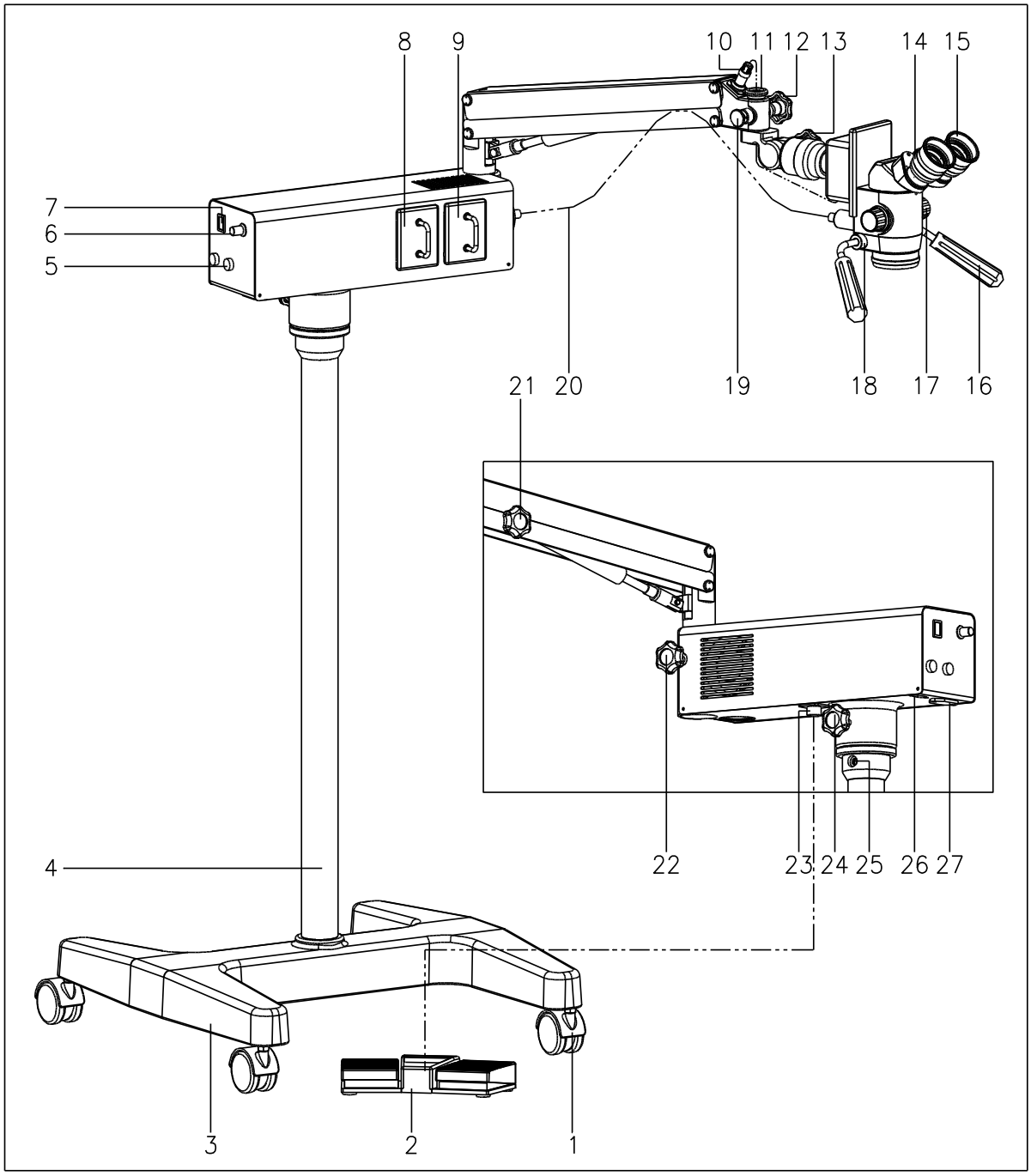


Fig 1

[12] Star fixation knob (with sterilized cap)

Fix the revolving angle of the suspended spindle of microscope.

[13] Star fixation knob (with sterilized cap)

Lock the microscope and make it not revolve at up and down plane.

[14] Diopter adjusting ring

Adjust ocular diopter by rotating this ring. The range of adjustment is ±6D.

[15] Eyecups

Adjust exit-pupil distance. Its height is 18mm and it may be taken off or rolled down.

[16] Manipulating handle (with sterilized cap)

For rough focusing, move the microscope up and down or right and left.

[17] Magnification knob (with sterilized cap)

Three magnification steps are provided. With different objectives the magnification factor of each step differs. Rotating the knob to change the magnification.

[18] Fixing block circle

Fix the manipulating handle so that it will not loose.

[19] Fuse pin

Avoid the microscope dropping when the fixing nut looses while unloading it or suspending it.

[20] Fiber optic

Lead the light beam from bulbs to the operating position.

[21] Star fixation knob(with sterilized cap)

Lock the little arm by tightening it firmly so as to prevent the microscope from moving up and down.

[22] Star fixation knob

Tighten it in order to lock the little arm and make the microscope not move vertically.

[23] 5-pin plug/socket

Connect the foot switch.

[24] Star fixation knob

Tighten it in order to lock the light source box to make it not revolve when moving or storing.

[25] Inner hexagonal tightening bolt

Lock the stand pillar and the light source box

[26] 110/220V selecting switch.

[27] Power plug

Input power supply

3. Assembly

This equipment may be installed either by user self with reference to the manual or by the servicemen sent by the manufacturer or authorized representatives when facing real difficulties.

This equipment is packed in one package. Please open the packages in the direction indicated by the mark on the packages. Take out all the parts and assemble them according to the following procedures:

3.1 Assembly of stand pillar

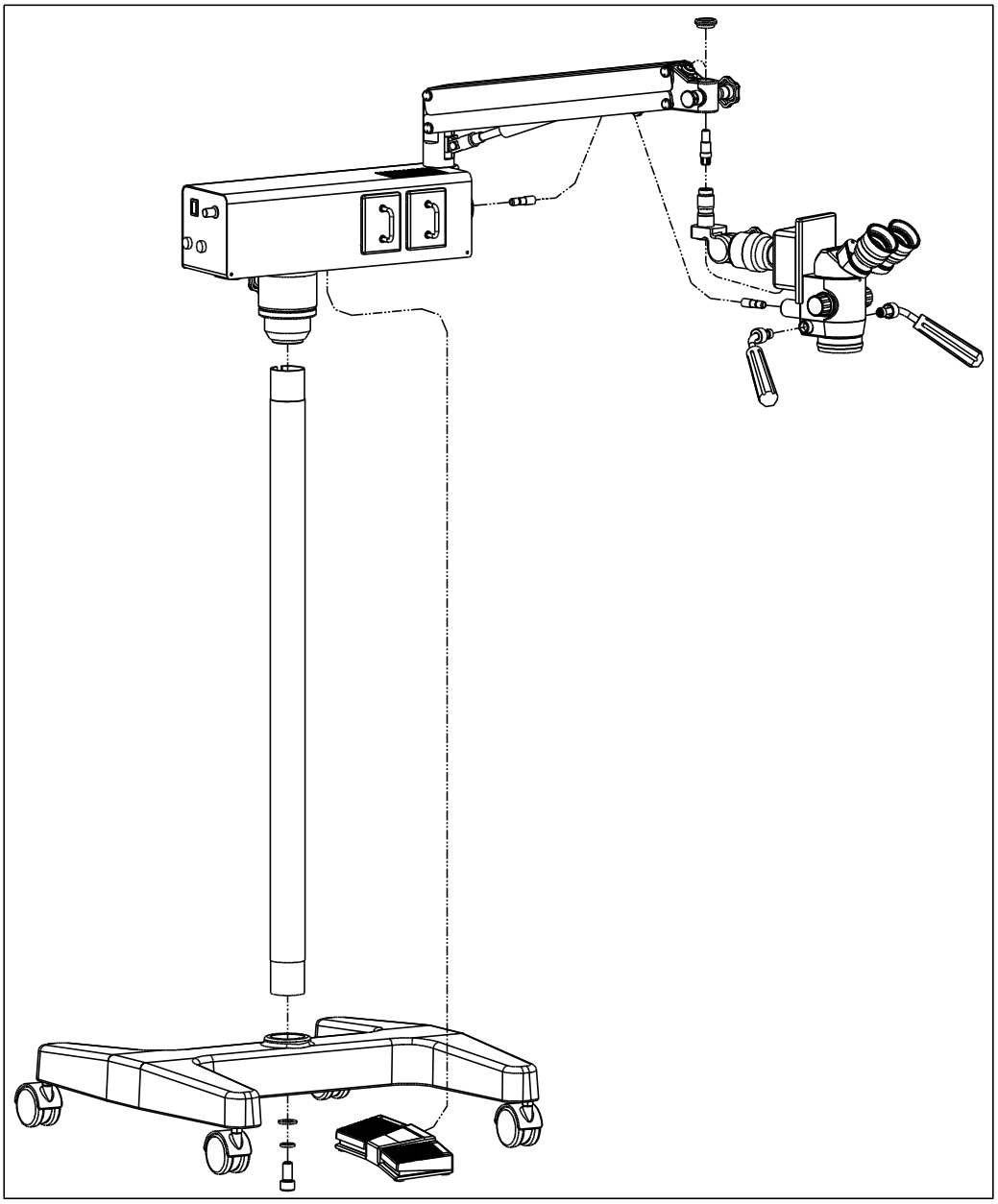


Fig. 2

(1) Please take out the floor stand[3] from the package, lay it on the ground.

(2) Take out the stand pillar [4], turn out the inner hexagonal bolt and gasket of its end，insert it into the hole of the floor stand[3] ，and then turn the stand pillar [4] to make the column pin on the base support clip in the groove on the end of stand pillar，assemble in order the unassembled gasket、spring gasket、inner hexagonal blot，and fasten it firmly with 10mm hexagonal wrench (Fig.2).

3.2 Assembly of light source box

Take out the light source box while not loosen the tightening bolt of the star knob [21] in order to avoid the small arm rebounding and harm people，set the bottom of the light source box into the stand pillar [4] and insert the inner hexagonal tightening blot [25]into the groove of the end

of stand pillar [4] and fasten it firmly with 6mm hexagonal wrench(Fig.2).

3.3 Assembly of microscope

(1) First check the tightening blot of star knob [12], make sure that the end of the bolt does not protrude out of the hole surface.

(2) Remove the fixing nut [11]. Pull out the safety pin [19] with one hand，hold the connecting part of microscope with another hand. Insert the shaft into the hole of the arm from the bottom to top. Then release the safety pin [19], it will spring back to the groove on the shaft. Finally fasten the fixing nut [18] (Fig. 2).

(3) Insert the 7-pin plug [10] into the 7-pin socket. Pay attention to align marks for alignment on both the plug and socket.

3.4 Assembly of manipulating handle

Insert the manipulating handle [16] into the holes on the two sides of the microscope holder respectively. The proper handle position should be down to an angle of 40° (as shown in Fig. 1). Then fasten the fixing block circle on the project plane of the two sides of the microscope and make the manipulating handle not to move axile direction (Fig. 2).

3.5 Assembly of fiber optics

(1) Remove the fiber optics protective cover.

(2) Insert one end of the fiber optics [20] into the side hole of the light source box and insert another end into the hole behind the microscope (Fig. 2).

4. Preparations for use

(1) Check whether the mains voltage, frequency complies with what required by the equipment. If not, do not start it.

⚠ **Caution: Set the input voltage at 220V. When it is 110V，please switch the selecting switch [26]to the 110 block and change the fuse[5] as type AC125 2.5A fuse tube we supplied.**

(2) Check the grounding of power supply. Make sure the equipment have a good ground-wire connection.

(3) The equipment comes with a three-core power cable. Please select matched power socket.

⚠ **Caution: Please use the power cable provided by the manufacturer or the power cable according with IEC227 standard to ensure that the equipment is well grounded.**

(4) When the powder switch [7] on the power controlling box is pressed at "ON" position, power is on. When pressed at "OFF" position, power is off. The switch should always be "OFF" before the power wire is connected with power socket.

(5) Insert the plug of the power wire of the equipment into the mains' outlet (It must be well grounded).

(6) Switch on the power. Check whether the illumination system works properly.

(7) After checking, please turn off power switch on power controlling box and disconnect

the power plug and cover the equipment with dust cover.

5. Use of instrument

5.1 Use of foot control switch (Fig. 3)

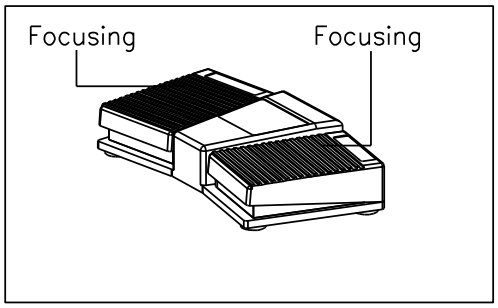


Fig.3

(1) First connect the 5-pin plug on the foot control switch [2] with the 5-pin socket [23]under the power controlling box (Fig.1). Pay attention to align marks for alignment on both the plug and socket. Then connect power cable with mains outlet and switch on the power switch [7]. so that you start foot control.

(2) For fine focusing, step down the left pedal of the foot control switch, the microscope moves down; while step down the right pedal, the microscope moves up(Fig.3).

5.2 Installation & adjustment before the use

(1) Sterilize the manipulating handles and sterilizable caps in advance.

(2) Make the little arm to be in a horizontal position. Adjusting the height, ensure that the objective is about 200mm from the surgical site.

(3) Switch on power supply, check the bulbs. If any bulb burns, replace it immediately.

⚠ **Caution: Burnt bulbs must be replaced before an operation to ensure that the operation may be performed without interruption.**

5.3 Adjustment during using

(1) First move the equipment to a proper position and skid the brake to prevent the equipment from moving easily. Connect the power plug with power socket [27] on the microscope.

(2) Place the foot switch [2] to a suitable position. Connect the 5-pin plug of the foot switch with the socket under the power controlling box.

(3) Insert the plug of power cable under the power controlling box into the mains outlet. Then switch on power switch [7].

(4) Move the fine focusing drag to the starting position, where the fine focusing indicator point to the central point of the drive, by using the foot switch [2] or the focusing knob.

(5) Illumination intensity adjustment. Rotate the light adjusting knob [6] on the power controlling box clockwise to increase the intensity, counterclockwise to reduce the intensity. Adjust it until appeal the operation.

(6) Rough focusing. Loose the star fixation knob [21], hold the handle [16] to move the microscope upwards or downwards to position the light spot on the surgical site and adjust the focus till the image is clear with 8x magnification. Manipulating method referes to 5.1(2).

(7) Eyecup adjustment.The eyecup [15] can reduce the observing disturbance coming from the foreign light. The height is limitted to 18mm. If a doctor wearing glasses makes the operation, need to roll down the eyecup, that is turn the rubber eyecup over the ocular tube.

(8) Diopter adjustment. The adjustment range of the diopter adjusting ring [14] of the ocular is ±6D, with 1D for each division. Rotate the diopter adjusting ring, match the value on the scale of the diopter adjusting ring with the diopter of the surgeon. If the surgeon wears glasses, align "0" position on the diopter adjusting ring to the white line mark on the ocular tube because glasses has corrected the surgeon's vision.

(9) Pupil distance adjustment. While adjusting the pupillary distance, you can observe while rotate the pupillary distance adjusting knob, until both eyes see properly, visual fields coincide and stereoscopic effect obtained. If the pupillary distance of the surgeon is known, adjust directly to this value indicated on the surface of the PD adjusting rod.

★The above steps should be done before surgeon's personal sterilization.

(10) Move the microscope upwards. Put the sterilizable caps at the following places:

Star fixation knob [12], [13], [21] Manipulating handle[16] Magnification knob [17]

★Disposable sterile cover may be used to cover the microscope at the surgeon's choice. After that, move the microscope to position the light spot on the center of the surgical site.

5.4 Movement & storage after the using

(1) Put off all of the sterilized cap and knob and sterilize them for the next use.

(2) Draw the microscope back to the nearest position to the stand. Fasten every star knob firmly so as to fix the arm and the microscope.

(3) Disconnect power wire and foot switch plug, store in a suitable place.

(4) Loose the brake of the caster[1] before moving.

(5) Grasp the power control box firmly with two hands in order to move the equipment slowly and carefully meanwhile avoid bumping and leaning.

(6) Replace burnt bulb if any for the next use. Refer the method to 6.1.1.

6. Maintenance

6.1 Replacing the consumable parts.

⚠ **Caution: Replaced parts are treated as ordinary industrial rubbish.**

6.1.1 Replacing the bulbs

(1) The lamp house is equipped with a spare bulb module [8]. In case the bulb burnt out during an operation, only need to turn off power switch and pull out the bulb module

[9](Fig. 7) then insert the spare bulb module [8] to the same direction as being pulled out. After that, switch power on and continue the operation.

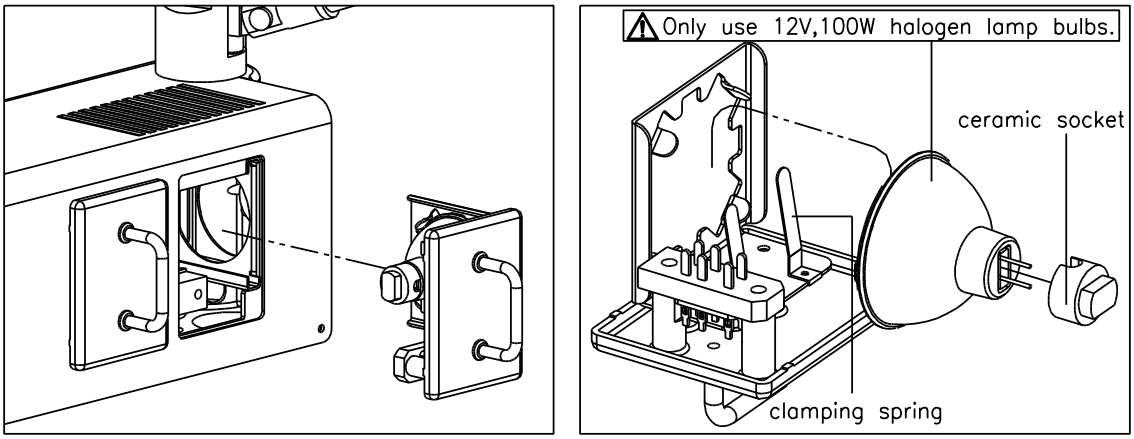


Fig.4

(2) After the operation, replace the burnt bulb immediately for next operation. While replacing, pull out ceramic socket and take the bulb out of two clamping springs. Then replace a new bulb in a reverse way (Fig. 4).

⚠ **Caution: watch out for hot bulbs.**

(3) Insert the bulb module to the same direction it was removed.

⚠ **Caution: Please use the special bulb for the equipment**

6.1.2 Replacing the fuse

Remove the fuse holder under the power controlling box. Replace it with a new fuse, then fasten the cover.

⚠ **Caution: Only use fuses of the same type, specification and rated value. To be safe, please disconnect power from the mains outlet before remove the lower cover and replace the fuse.**

6.2 Cleaning & sterilization

(1) Every equipment has been fully checked before delivery ensuring its proper perfomance. However, a proper maintenance is necessary. It should not be disassemblied by unskilled or unqualified technicians. Otherwise the equipment may be damaged and the performance may be affected. It is advised by the manufacturer that the equipment takes regular maintenance at three month's interval or according to the specific condition.

(2) Do not place the equipment in a dusty, moist or corrosive environment to avoid damage to the equipment.

(3) Do not disassemble lenses yourself. If there is dust stained on the lens, blow them with a blowball or brush them with a dust pen. Greasy or water stains can be cleaned off with mirror-cleaning paper or a drop of liquid solvent (1:1mixture of C2H5OH and CH3OCH3), then blow it carefully. Be careful to prevent the solvent from infitrating the edges of lens.

(4) The outer surface of the equipment may be cleaned with wet cloth. The remaining stains can be cleaned off with the mixture of 50% C2H5OH and 50% H2O (distilled). Please

not use corrosive cleaning agent.

(5) Eyecups should be cleaned with water. Place them on the eyepieces after dry.

(6) All sterilizable caps should be autoclave sterilized. Suggested conditions are as following: temperature: 120℃, time: 20min; or temperature:134℃, time: 5min.

(7) The accessories not in use should be put in a closed box with desiccant.

Table 1 Trouble Shooting Guide

Trouble	Possible Cause	Remedy
Illumination doesn't light	The cable isn't connected correctly with the power socket.	Connect the power cable correctly.
	The position of the light adjusting knob is wrong after switching on power switches.	Adjust the light-adjusting knob.
	The bulb plug doesn't connect correctly with its socket.	Take out bulb, scrape oxide. Then reinstall, screw the locking bolt firmly.
	The bulb has burnt (The mains exceed voltage rating).	Replace new bulb (stabilize the voltage rating).
	The fuse has blown.	Change the fuse.
The foot switch does not work.	The plug of foot switch is not well connected with the socket under the powder controlling box. The two connectors on the second arm are not well connected.	Connect again.
The light spot is too dark or not even.	The bulb socket is bad plugged.	Plug it correctly.
	The fiber optics is not inserted to the end.	Insert it to the end.

6.3 Trouble-shooting guide

In case there is any trouble, please check according to the following table. If it still does not work, please contact the Repair Department of 66 Vision Tech Co., Ltd. General Factory. (Refer to Table 1 Trouble Shooting Guide)

6.4 Order consumable parts

	Name	Specification	Suggested Type
YZ20P5 Operation Microscope	Medical halogen bulb with cool reflection.	AC12V/100W	HLX64627 (OSRAM)
	Fuse	T type AC250 1.25A T type AC125 2.5A	51S-025L,51S-013H (HOLLYLAND CO.,LTD.)

7. Responsibility

We may provide the circuit diagram, electric component list and other details of the equipment at the request of customers to meet their need for repairing.

If any information, service or consultation is needed, please contact with us directly or with our authorized distributors.

8. Transportation, Storage & Rejection

During the transportation, take care to protect it from wetness, upside down and violent vibration. The relative humidity should be 10% to 90%, environmental temperature -10℃ to +40℃ and atmospheric pressure 500hPa to 1060hPa.

This equipment should be stored in a well-ventilated room without corrosive gas where the relative humidity should be 10% to 90% and environmental temperature -10℃ to +40℃. If the assembled equipment should be moved or transported in short distance, please lock all the movable parts (refer to5.4). The inclination angle should be less than 10°. If for long distance transportation, please repack it with original packages.

If it is stored for over five years, please contact with us directly or with our authorized distributor to check the equipment again.

Discard the equipment according to the local environment protection regulations. Do not pollute environment.

9. Spare parts & tools of the instrument

1. Sterilized cap for Star fixation knob	4
2. Sterilized cap for magnification knob	2
3. Sterilized cap for Manipulating handle	2
4. Medical halogen bulb with cool reflection (12v 100w)	1
5. T type AC250 1.25A; T type Ac 125 2.5A fuse tube	4/each
6. 6mm inner hexagonal wrench	1
7. 10mm inner hexagonal wrench	1
8. P54M bulb socket	2

10. Assembly of the optional accessories (additional order)

10.1 Erect geminate ocular drawtubes (for ENT)

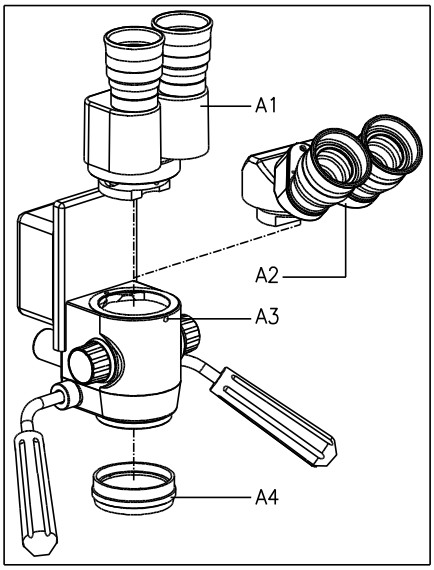
Unscrew the inner hexagonal tightening bolt [A3] by the 2mm inner hexagram screw drive. Take down the 45° oblique geminate ocular drawtubes [A2] and fix the erect geminate ocular drawtubes [A1]. Then screw down the inner hexagonal tightening bolt [A3] by the 2mm inner hexagram screw drive. (Fig.5)

10.2 Universal coupling (for ENT)

It is used for ENT that the universal coupling [C1] and the erect geminate ocular drawtubes' [A1] combination. The microscope lens can be rotated in X, Y, Z plane after the star fixation knob [C2] is unscrewed. (Fig.7)

10.3 Objective, F175mm/F250mm/F300mm/F350mm/F400mm

Unscrew the objective [A4] under microscope and fix the special objective [A4]. The magnification is as 1.14/0.8/0.67/0.57/0.5 times as before. The size of visual field is as 0.875/1.25/1.5/1.75/2.0 times as before. (Fig.5)



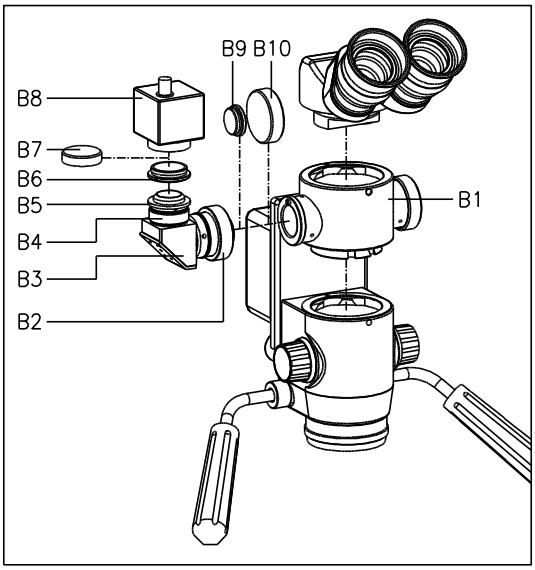


Fig.5 Fig.6

[A1] erect geminate ocular drawtubes
[A2] 45° oblique geminate ocular drawtubes
[A3] inner hexagonal tightening bolt [A4] objective
[B1] beam splitter[B2] screw flange
[B3] CCD adapter [B4] focus adjusting ring
[B5] screw flange [B6] CCD connector
[B7] dust-proof cover [B8] CCD
[B9] dust-proof cover [B10] dust-proof cover

10.4 10x ocular

Pull out the 12.5x ocular from the geminate ocular drawtubes and insert the 10x ocular. The magnification is as 0.8 times as before. The size of visual field is as the times as before.

10.5 Beam splitter, CCD adapter

(1) 10.5.1 Unscrew the inner hexagonal tightening bolt [A3] by the 2mm inner hexagram screw drive.

(2) 10.5.2 Fix the beam splitter [B1] in the microscope.

(3) 10.5.3 Select one beam split-port in the left or right side of the beam splitter as the position of the CCD adapter [B3]. Unscrew the dust-proof cover [B10] on the beam split-port and keep it well.

(4) 10.5.4 Take out the CCD adapter [B3] and screw off the dust-proof cover [B7] [B9]. Fix the CCD adapter [B3] into the microscope beam split-port and wedge the orientation bolt of the beam split-port into the orientation groove of the CCD adapter [B3]. (There are three grooves on the plane. Select one according to your need.) Screw down the screw flange [B2] on the top of the adapter.

(5) 10.5.5 Screw off the lens and screw flange of the CCD [B8] and keep them well. Screw the CCD connector [B6] into the CCD lens and tighten it.

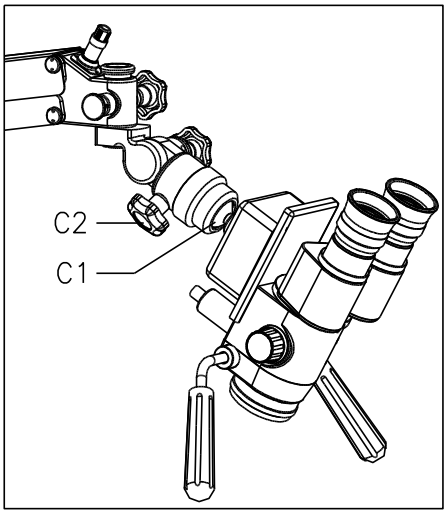
(6) 10.5.6 Screw down the CCD with the CCD adapter [B3].

(7) 10.5.7 Connect the power plug to the appointed power.

(8) 10.5.8 Connect one end of the video frequency wire to the CCD signal fan-out. The other end should be connected to the Video In port of the monitor or video camera. Switch on the power after all have been done. Observe the image on the monitor and rotate the focus-adjusting ring [B4] to make the image clear. Attention to the orientation of the image. Rotate the CCD out by inches till the image's orientation is right if it is declining. Screw down the screw flange [B5] to lock it.

(9) 10.5.9 Fix the geminate ocular drawtubes to the beam splitter [B1] and screw the inner hexagonal tightening bolt [A3] by the 2mm inner hexagram screw drive. (Fig.6)

⚠ **Attention: After the above assembly, the dynamic balance of the small arm should be adjusted. Deploy the small arm horizontally, and drag the microscope up and down, and then compare the resistance between upwards moving and downwards moving. Rotating the balance adjustment bolt counter clockwise by the single-groove screw tool [C1]. If the resistance of downwards moving is bigger, then rotate the balance adjustment bolt clockwise by the single-groove screw tool. Do this repeatedly till the resistances of upwards moving and downwards moving are almost equivalent. Then the small arm may stay steadily in any position of ±20° relative to horizontal line. (Fig.8)**



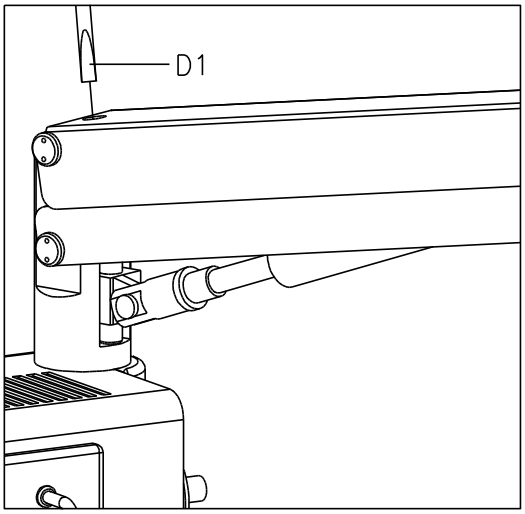


Fig.7 Fig.8

[C1] universal coupling [C2] star fixation knob

[D1] single-groove screw tool (provide for yourself)

10.6 Clamp rack, fission column

Fix the clamp rack [E2] on one side of the table [E3]. Make the inboard side of the clamp rack [E2] cling to the edge of the table before clamp. Screw the lead screw to make the cushion to be pressed under the table. Lift the spanner 90° relative to the lead screw and clamp them. Assembly of the lamp-house box [E1] is indicated in 3.2. (Fig.9)

Assembly of the underside of the column [F3] is indicated in 3.1. Fix it to the base [3]. Screw the upside of the column [F2] into the underside of the column. Screw down the upside through the spanner hole [F1]. (Fig.10)

10.7 Handy casing

The handy casing is composed of three canvas-bags, a luggage barrow (ordering them according to your need).

The camera package includes the following components:

1. 1/4“ CCD	1pc
2. CCD adapter	1pc
3. Beam splitter	1pc
4. transformer	1pc
5. Video frequency line (with adapter)	1pc
6. 2mm inner hexagram screw drive	1pc

★ **Design or specifications are subject to change without prior notice.**

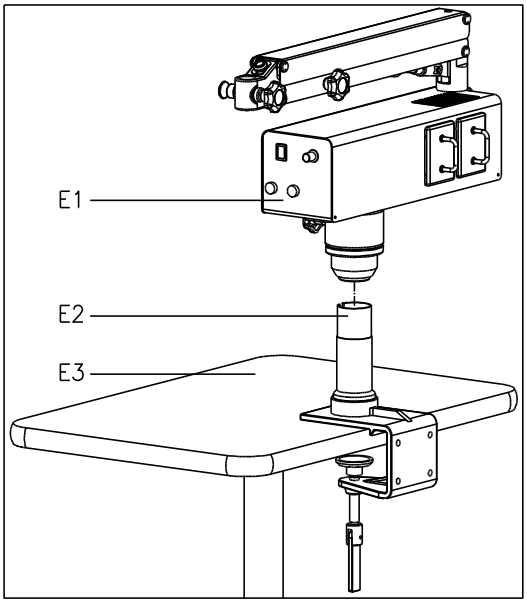


Fig.9

[E1] lamp-house box
[E3] table

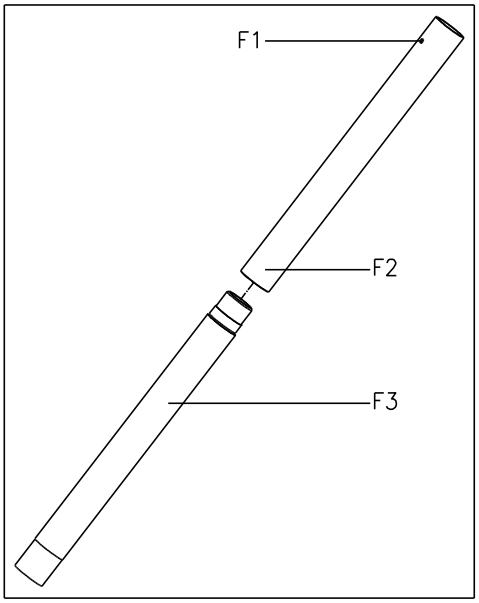


Fig.10

[E2] clamp rack
[F1] spanner hole
[F2] upside of the column
[F3] underside of the column