TT-1903

Operating Microscope, One Head 0~180°, Manual Step Zoom, 4.8x~16x, For Dental, ENT, Ophthalmology, Gynecology

Instruction Manual

To ensure the safety and obtain satisfactory performance, please study this instruction manual thoroughly before start to use your instrument.

TT-1903 + beam slitter + demonstrator + video camera adapter + digital camera + computer

General Description

Operation Microscope Model TT-1903 (hereafter referred to as simply instrument) is a medical optical instrument with multiple function and application. The optical system of the instrument equipped with 0-180° inclinable binocular and magnification change system which offers 3-step magnification change. Fine focusing can be done by objective fine adjusting lever. Two objectives are available for different working distance and magnification. The illumination system of the instrument adopts coaxial illumination with 10W LED light source. The optical system of the instrument can be fitted with a beamsplitter, which makes video camera adapter and demonstrator attachable. Photos or moving photos can be taken during operation after connecting CCD camera or digital CCD camera with instrument. The beamsplitter, video camera adapter, CCD camera (C-mount 1/3 inch video camera attachable) and demonstrator are optional.

The instrument is suitable for various diagnosis, examination and general microscope operation. Due to its flexible and stable structure and easy operation, the instrument can be widely used for micro-operation in dental especially, and also can be used for micros-operation in ophthalmology, ear-nose-throat, gynecology and surgery.

The Environment For Use

a) Transport and Storing
● Ambient Temperature Range: -40℃-55℃
● Relative Humidity Range: 10%-80%
● Barometric Pressure Range: 500 hPa-1060 hPa
b) Operation
● Ambient Temperature Range: 5℃-40℃
● Relative Humidity Range: 30%-80%
● Barometric Pressure Range: 700 hPa-1060 hPa2

1. Precautions

1.1 After unpacking the carton, check the parts against the packing list first. If there is any difference, contact the sales department to protect your benefit.

1.2 When carrying and unpacking the carton, pay attention that the arrow on the carton shall be at upward position. Handle the instrument with care to prevent it from being damaged.

1.3 The instrument shall be used and kept in a clean and dry place with constant temperature in order to ensure the lifetime of the component in the instrument. Before using the instrument, make sure to step down the brake on the foot wheel to prevent the instrument from sliding to avoid accident. When moving the instrument in the room, it is recommended to push it at the lower part to prevent the instrument from being upset and damaged.

1.4 Do not touch the surface of the lens and prism with hand or hard objects.

1.5 When the LED bulb is broken and has to be replaced, make sure that the power is off and the bulb is fully cool down in order to prevent your finger from being hurt. Never touch the glass surface of the illumination bulb (LED bulb) with your finger directly. If the bulb surface is found oily and dirty, it shall be cleaned with flannelette soaked with alcohol before usage.

1.6 The counterweight of the base of the instrument is limited. When the arm is stretched, never press the instrument with strong force. Otherwise, the instrument can go down to get the operator or the instrument itself damaged.

1.7 Before using the instrument, make sure the connecting parts are fastened or adjusted to right position to avoid accident caused by the failure of the parts.

1.8 Never move any part of the instrument with strong force. Adjustment shall be done according to the instruction, especially for the operation handle, it shall not be turned with over force to prevent it from impacting the arm to get the components damaged.

1.9 Power shall be switched off after using the instrument. After use, the instrument shall be cleaned and covered with plastic cover to prevent dust.

2. Main Technical Data

2.1 Input voltage: AC100-240V, frequency: 50HZ-60HZ

2.2 Output: DC12V3A, 36W

2.3 Table of Optical Characteristics for **TT-1903** Operation Microscope:

TT-1903 Series Operation Microscope Optical Characteristics												
Eyepiece	**WF12.5x/20mm**											
Focal Length (mm)	F=200mm			F=250mm			F=300mm (Optional)			F=400mm (Optional)		
Zoom Body	1.6x	1.0x	0.6x	1.6x	1.0x	0.6x	1.6x	1.0x	0.6x	1.6x	1.0x	0.6x
Total Magnification	16x	10x	6.0x	12.8x	8.0x	4.8x	10.7x	6.7x	4.0x	8.0x	5.0x	3.0x
Linear Field (mm)	15.0	24.0	40.0	19.0	30.0	50.0	23.0	37.0	60.0	30.0	48.0	80.0
Diameter of Spot	57.00 mm			71.00 mm			86.00 mm			113.00 mm		
Exit Pupil Distance	20.00 mm											
Eyepiece	**WF10x/23mm**											
Focal Length (mm)	F=200mm			F=250mm			F=300mm (Optional)			F=400mm (Optional)		
Zoom Body	1.6x	1.0x	0.6x	1.6x	1.0x	0.6x	1.6x	1.0x	0.6x	1.6x	1.0x	0.6x
Total Magnification	12.8x	8.0x	4.8x	10.2x	6.4x	3.8x	8.5x	5.3x	3.2x	6.4x	4.0x	2.4x
Linear Field (mm)	16.0	26.5	43.0	20.0	33.0	53.0	24.5	39.5	64.5	32.0	52.5	85.5
Diameter of Spot	57.00 mm			71.00 mm			86.00 mm			113.00 mm		
Exit Pupil Distance	25.00 mm											

2.4 Table of Specification for **TT-1903** Operation Microscope：

Model	**TT-1903**
Binocular Head	Tilting 0~180°
Main Usage	Dental, ENT, Ophthalmology, Gynecology
Total Magnification	With Objective F=200mm: 6.0x, 10x, 16x With Objective F=250mm: 4.8x, 8.0x, 12.8x
Total Magnification (Optional)	With Objective F=300mm: 4.0x, 6.7x, 10.7x With Objective F=400mm: 3.0x, 5.0x, 8.0x
Eyepiece	WF12.5x/20mm
Head Magnification	8x
Interpupillary Distance	50~80mm Adjustable
Diopter	Both Left & Right Eyetube Diopter Adjustable ±7D
Zoom Body	3 Steps Zoom: 0.6x,1.0x,1.6x
Objective	F=200mm For Ear, Nose, Ophthalmology F=250mm For Dental
Objective (Optional)	F=300mm For Ear, Nose F=400mm For Throat
Focusing	Fine Focusing Range 10mm
Filter	Green, Yellow Filters Built-in
Balancing Arm	2-Part Arm With Universal Joints, **Counterweight Adjustable And Lockable**
Stand	2-Part Column + Five Star Base With Caster
Illumination System	Coaxial Illumination, 10W LED, Brightness Adjustable, >40000 Lux
Power Supply	Wide Range AC100~240V, DC12V 3A, 36W

3. Overall Structure of Instrument

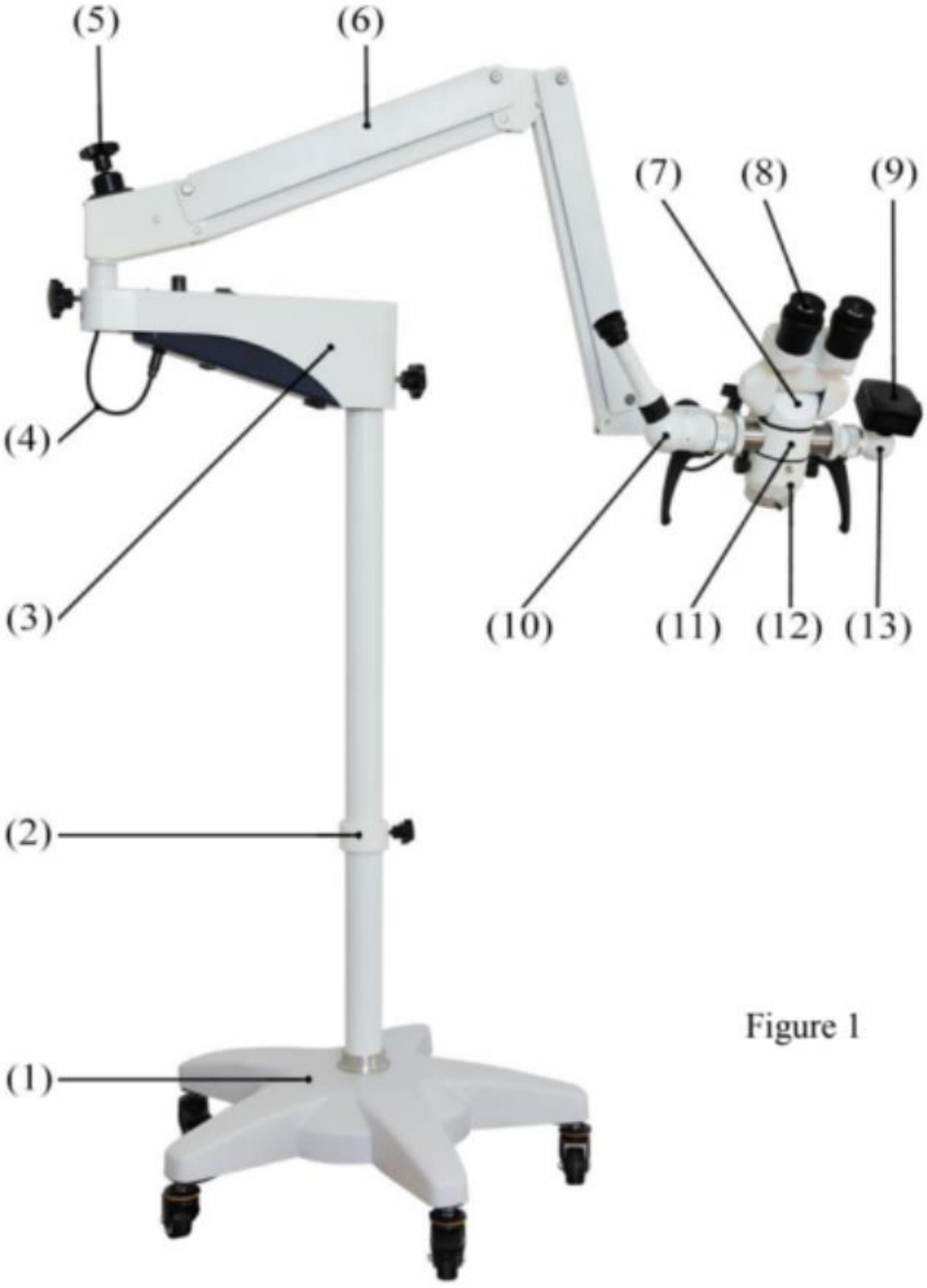


Figure 1

1. Base with wheels 2. Column 3. Power supply box 4. LED lamp plug
5. Torque adjusting hand wheel 6. Arm assembly 7. 0-180°Binocular 8. Eyepiece
9. CCD camera (optional) 10. Demonstrator (optional) 11. Beamsplitter (optional)
12. Magnification changer 13. Video camera adapter (optional)

4. Working Principle and Function of Main Parts

4.1 Head of Microscope

It is the main part of microscope, can connect beamsplitter, video camera adapter, Demonstrator,

Photo adapter and other accessories.

(1) Universal joint: Used to adjust viewing angle and direction.

(2) Filter: Built-in green and yellow filters.

(3) Magnification changer knob: Magnification can be changed by turning this knob.

(4) Binocular with eyepiece: 8X.

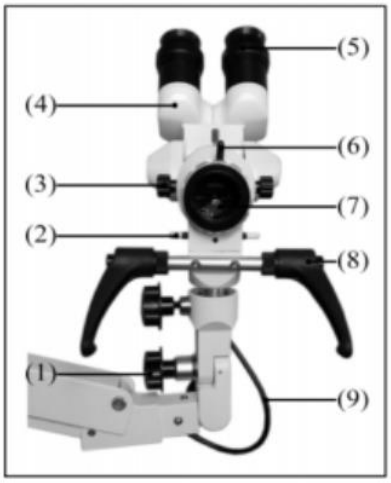
(5) Eyepiece: 12.5X.

(6) Fine focusing lever: It is used for fine focusing.

(7) Objective: F=200mm & F=250mm

(8) Handle: If the position of the lever is to be changed, press the button and turn the handle to the desired position. Then release the button.

(9) LED lamp power line.



4.2 Power supply box

It is an illumination control unit for the operation microscope. The power supply box is connected the arm and column; it is also used as part of the arm.

(1) Locking hand wheel

(2) Power input socket for power supply adapter DC12V3A

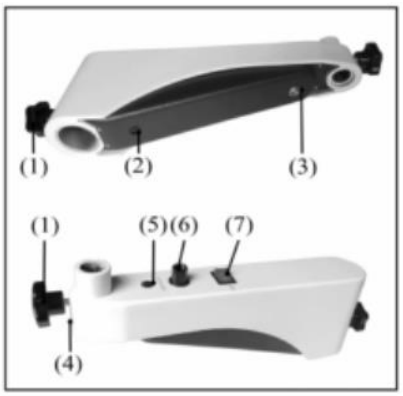
(3) DC output socket for LED lamp

(4) Arm rotation limit screw

(5) DC12V output socket for camera

(6) Brightness control knob

(7) Power switch



Note: Non-professional maintenance staffs do not open the power supply box.

4.3 Arm assembly (see Figure 1)

The arm assembly is an important part for supporting and moving the microscope and accessories. The optical system of the microscope, which consists of the rotating drum magnification change system, binocular observation unit and objective, is mounted on the arm assembly. The arm assembly can be moved to any desired position during operation. It is stable and reliable. You can adjust the counterweight of microscope and lock the arm.

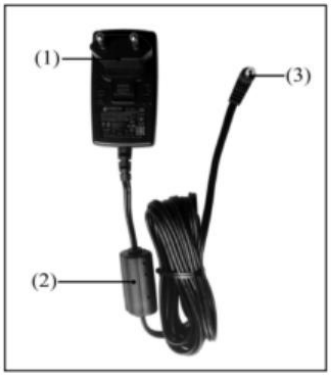
Torque adjusting hand wheel 6: It is used to keep the arm in balance when accessories are added to the microscope or reduced from the microscope. Locking hand wheel: After the instrument is adjusted in place, lock this hand wheel to make the instrument stable.

4.4 Power supply adapter

It provide DC12V3A power for power supply box, We provide various standard AC power plugs according to the customer's requirement.

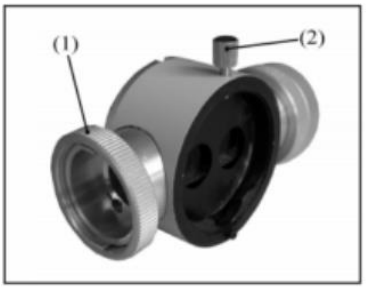
(1) AC power plug (European standard)

(2) Cable length 3m with Magnetic ring

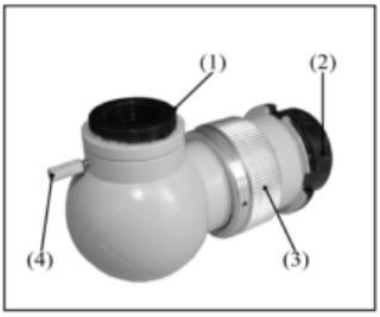


(3) Output connector (Coaxial 5.5x2.1mm plug)
Note: Non-professional maintenance staffs do not open the power supply adapter.

4.5 The description of other parts is as follows (see Figure 1):

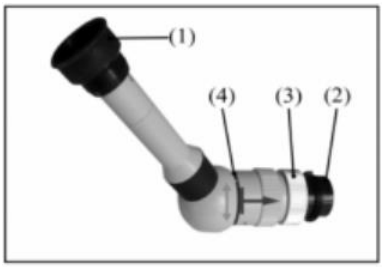


a. Beamsplitter 11 (optional): It is used to divide the light. It is provided with connections at left and right side for the connection of video camera adapter and demonstrator or SLR camera adapter etc.
(1) Connector for video camera adapter, demonstrator or photo adapter
(2) Locking screw



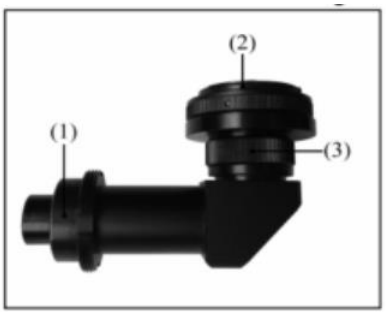
b. Video camera adapter 13 (optional): It is a component connected to the beamsplitter for optical image forming. It is suitable connected to video camera, which connector is 1/3 inches “C” or “CS”.

1) Screw connector, which connects with video camera
(2) Connector, which connects with beamsplitter
(3) Focusing hand wheel
(4) Locking screw8



c. Demonstrator 10 (optional): It is a monocular observation unit connected to the beamsplitter. It can be used for observation at the same time with the binocular observation unit.

(1) Eyepiece
(2) Connector, which connects with beamsplitter
(3) Image rotating hand wheel
(4) Observation position changer



d. SLR camera adapter (optional) It is an optical image-forming component that is connected to the beamsplitter. It is connected to a SLR camera or SLR digital camera with Nikon mount or Canon mount for photo taking. Please contact with supplier.

(1) Connector, which connects with beamsplitter
(2) Connector, which connects with SLR camera
(3) Focusing handwheel

5. Installation of Instrument

5.1 Installation of floor stand with wheels
Insert the column into the hole in base and tighten threaded nut.

5.2 Installation of power supply box
Put the box on the top of the column and tighten locking handwheel

5.3 Installation of arm

Loosen arm rotating angle limit screw and locking handwheel on the power box, insert the shaft of arm into hole in the power box and screwing in arm rotating angle limit screw and locking handwheel in power supply box. Insert the LED lamp plug into the DC output socket for LED lamp of power supply box. Note: The maximum rotation of the arm assemble shall not be more than 360 º. Otherwise, the LED lamp power line might be damaged.

5.4 Installation of beamsplitter (beamsplitter is optional)

Loosen screw of Magnification changer, fit beamsplitter then tighten screw.

5.5 Installation of binocular. The binocular is fitted in the same as 5.4

5.6 Change objectives

Turn the focusing lever clockwise, get down the objective fixed on magnification changer, then screw on the objective you need. Turn fine focusing lever counterclockwise to make the fine focusing lever in the middle position.

5.7 Installation of operation handle

Fix the operation handle on the head of microscope with 2 pcs screws

5.8 Installation of video camera adapter (video camera adapter is optional)

Insert video camera adapter into the mount of the beamsplitter and tighten the nut.

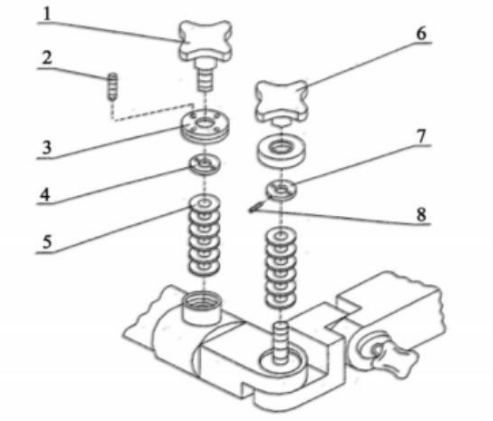
5.9 Installation of demonstrator (demonstrator is optional)

Insert demonstrator into the mount of the beamsplitter and tighten the nut.

6. Adjusting of Instrument

6.1 The elevation of the arm and adjustment of the torque balance When the accessory is reduced from the microscope, the microscope is out of balance. Turn torque adjusting handwheel to make the microscope in balance. Loose handwheel and let the arm go up and down over a wide range. When the arm is adjusted in the right height, tighten the handwheel.

6.2 Adjustment of universal coupling arm



The torque of the universal coupling arm is adjusted by the manufacturer before the instrument is

delivered. If the used finds the torque not suitable (too loose or too tight when turning), it can be adjusted by special person in the following way:

6.2.1 Screw off locking knob 1, screw 2 and nut 3. Tighten nut 4 to increase torque or vice versa. Then screw down nut 3, tighten screw 2 and screw 2 and screw in knob 1.

6.2.2 The torque adjustment of locking knob 6 is the same as that of locking knob 1. The torque is adjusted by nut 7.

7. Operation of instrument

7.1 Connect the power supply adapter with power supply box, and connect the power supply adapter with power socket

7.2 Press power switch. Turn dimmer knob for proper brightness. Note: Before switching off the power, make sure that the brightness is adjusted to minimum to prevent the lamp from being damaged when switching on again.

7.3 Hold handle, align the microscope with the object to be observed and move the microscope up and down, left and right till a distinct image is seen by the operator (The eyecup can be rolled down if the observer wears glasses). Then tighten handwheel. Fine focusing can be done by fine focusing lever during operation.

7.4 If the objective is to be replaced for magnification change, refocusing will be needed after replacement. (i.e. repeat step 7.3)
7.5 Step down the foot wheel brake during operation to present the instrument from being moved.

8. Care and Maintenance

The instrument shall be placed in a dry, dust-free and well-ventilated room where no corrosive chemicals are stored. The instrument shall not be disassembled by non-professional people, especially the optical part. Never touch the glass surface with finger. If the dust, dirt and oil on the glass surface is to be cleaned, first clean the dust off the surface with a clean and soft brush, then wipe the surface gently with degreased cotton soaked with a little absolute alcohol. The glass surface shall not be wiped frequently to avoid damage to the surface. The instrument shall be covered with clean cloth when it is not in use.

Often by the relative moisture shall be less than 80%, temperature shall be within 5 - 40ºC without temperature shock. It is forbidden to disassemble the instrument by an unqualified person, especially for optical parts, Do not touch the glass surface with finger directly. When cleaning, wipe the glass surface with absorbent cotton slightly moistened with absolute alcohol after the glass surface has been cleaned of dust with a clean and soft brush. Wipe it as few times as possible to avoid damage to the glass surface. Cover the instrument with a clean cloth cap when it lies in idle.

9. Transportation and Storage

During transportation, the instrument shall be placed according to the indication marked on the

package. Pay attention to moisture and vibration. If the instrument is to be stored for a long period, it shall be cleaned and put into the package and kept in a dry and well ventilated store room without any corrosive chemicals. The relative humidity of the room shall not exceed 80% and the temperature shall be controlled in the range of -40 ° C - 55 ° C without any temperature shock.

10. Trouble-shooting Guide

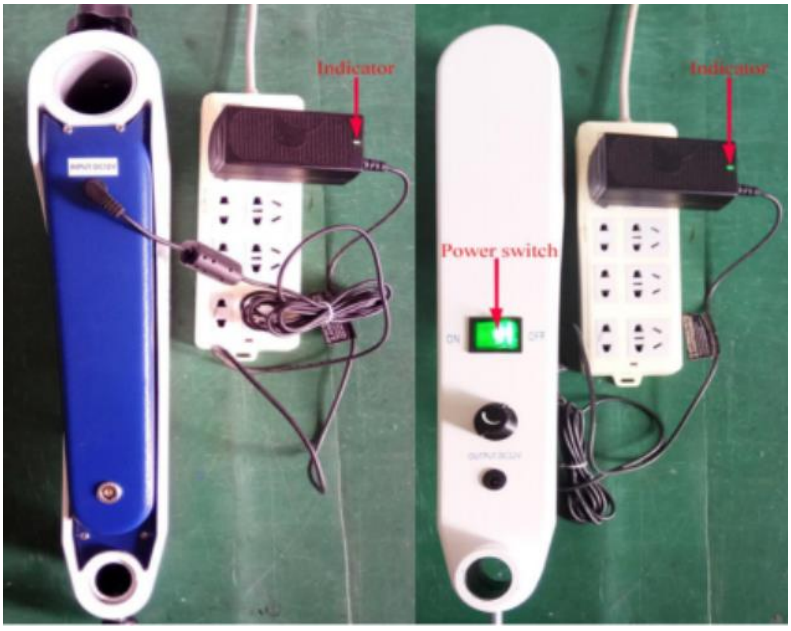
In case there is any trouble, please first refer to the trouble-shooting guide. If it still cannot work, please contact the authorized distributor.

Trouble	Possible reason	Remedy
No working	Power supply adapter is not connected	Connect the power supply adapter
	No switch on the main power	Switch on the main power
	Main power is broken-down	Contact a local electrician
Illumination does not light	The LED lamp is not connected correctly	Connect again
	No switch on the main power	Switch on the main power
	Main power is broken-down	Contact a local electrician
	Electric parts are broken-down	Contact the authorized distributor
	The bulb is burnt	Replace the spare bulb

11. Fault Checking and Solution for LED illumination System.

After installation, power-on test according to user's manual, or during using operation microscope, find no light, please check according to the following steps:

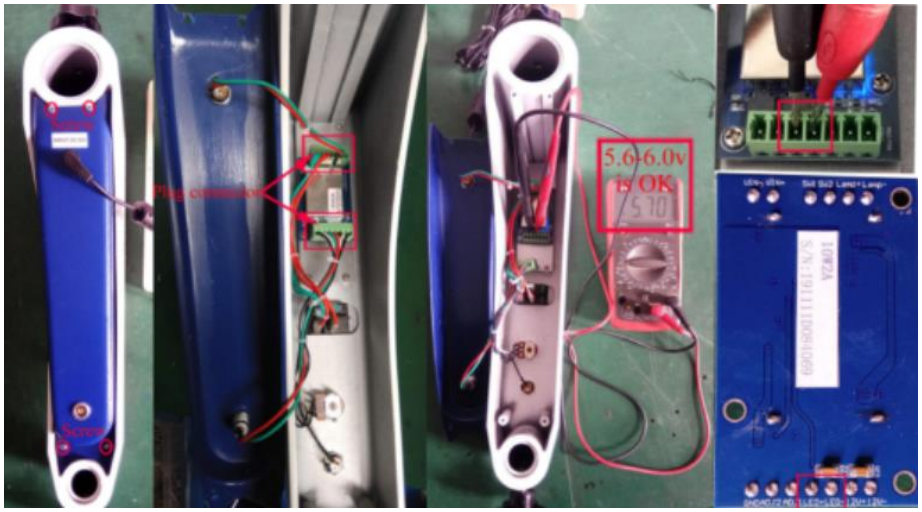
11.1 Connect power supply adapter to power supply and power supply box. By this time, the indicator light of power supply adapter is always on. Turn on the power switch on the power box. The power input is normal if the switch indicator is on. The power input is abnormal if the switch indicator is off, please check: A. Connection of the power supply adapter again. B. Where the power supply adapter is damaged, if yes, please replace.



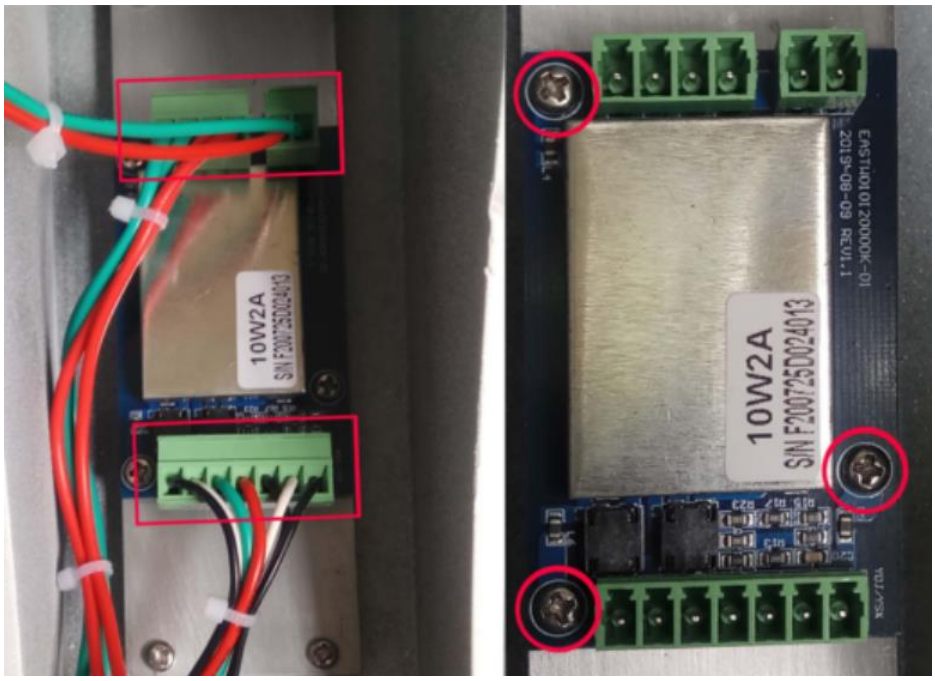
11.2 When the switch indicator is on, turn brightness control knob to the maximum, and checks the

connection of LED lamp plug of microscope arm and the DC output socket for LED lamp in power supply box. If the connection is OK, please use the multi-meter to check whether there is a DC output voltage (about DC5.5-6.0v without load) between two jacks of DC output socket for LED lamp on the bottom of the power supply. If No, please check according to step 3. If yes, please check according to step 5 after insert LED lamp plug into the DC output socket.

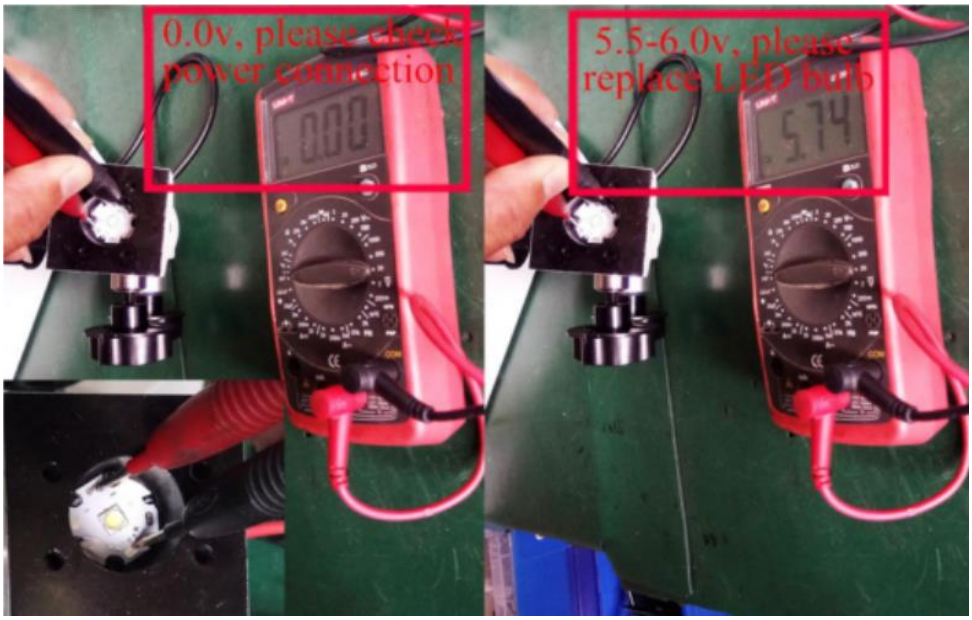
11.3 Remove four screws in red circle, open under cover from power supply box. Press the plug connectors in LED drive circuit board and repeat step 2. If not, DC output voltage yet, remove the plug connector of output port. Use the multi-meter to check whether there is a DC output voltage (about DC5.5-6.0v without load) between LED- and LED+. If No, please replace the LED drive circuit board. If yes, please connect the connector of output port and check according to step 2.



11.4 When replacing the LED drive circuit board, remove plug connectors and three screws in red circle. Replace LED drive circuit board and restore.



11.5 Use the multi-meter to check whether there is a DC input voltage (about DC5.5-6.0v without load) between LED- and LED+ of LED bulb. If No, please check connection of power line from power supply box to LED bulb. If yes, please replace LED bulb.

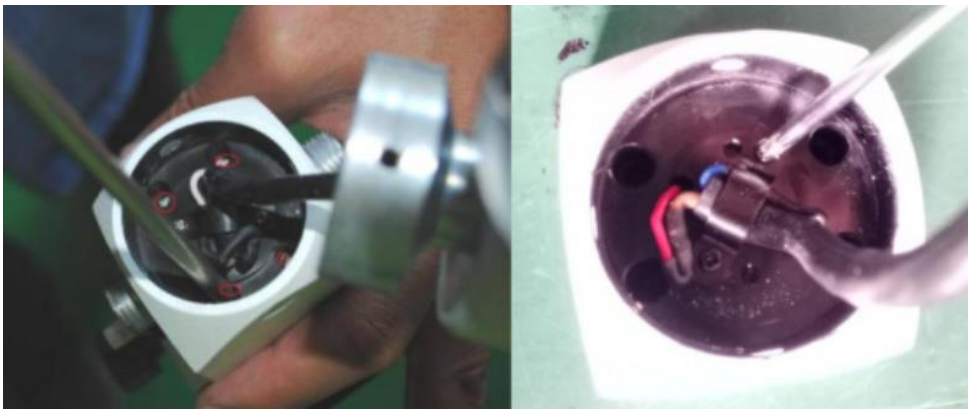


11.6 If you have two operation microscopes in your hand, you can cross check, for example, install this microscope whose LED bulb no light to the power supply box of other microscope.

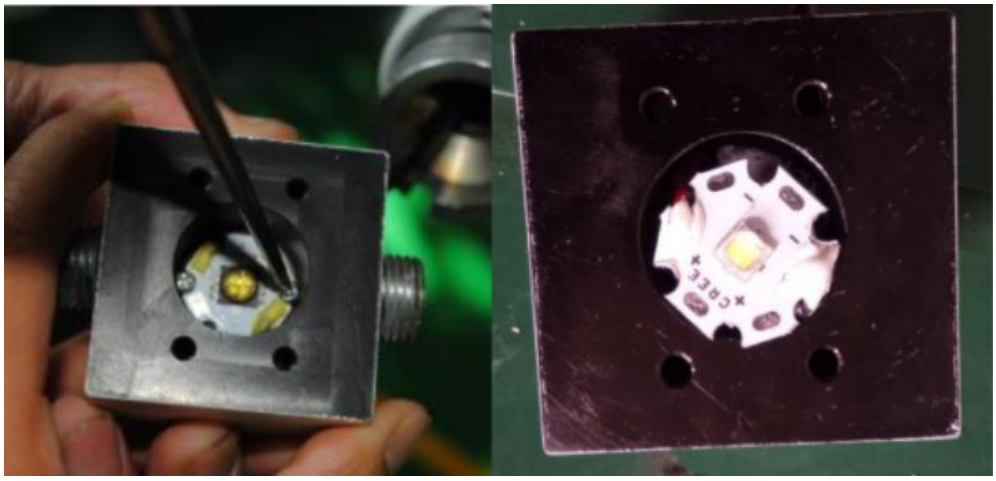
11.7 The guide to replacing the LED bulb

A. Remove three screws fixed microscope head and separate microscope head from the arm.

B. Remove four screws in red circle and separate the LED lamp seat from the microscope head. Lose wire clip.



C. Remove two screws fixed LED bulb and separate LED bulb from LED bulb seat. Welding-off two electric wire from LED bulb and remember the welding position for each electronic wire. Weld two electric wires to the LED lamp according to original welding position. Then assemble the microscope head according to the reverse order.



Packing List of TT-1903 Operation Microscope

A. Microscope Carton:

1. Balance arm with binocular and magnification changer……1 set
2. Beamsplitter (optional)……..…1 pc
3. Video camera adapter (optional)……..…….1 pc
4. CCD camera (optional)……..……...……1 pc
5. Demonstrator(optional)……..……..…1 pc
6. Objectives

F=200mm (fitted on the microscope)……..……..……1 pc
F=250mm ……..……..1 pc
F=300mm (optional)……..……..……1 pc
F=400mm (optional)……..……..……1 pc
7. Power supply box ……..……..……1 set
8. Handle……...……..1 set
9. Handwheel……..……..…….2 pcs
10. Power supply adapter……..……..1 set
11. Screwdriver……..…… 2 pcs
12. Spare LED bulb……..……..1 pc
13. User's manual……..……....1 copy

B. Floor Stand Carton

1. Base with wheels……..……..…….1 set
2. Column……..……..2 pcs
3. Threaded cover……..……..1 pc