



SCM600 Operation Microscopes

Operation Instruction



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	Protective Grounding sign.		Tilt warning signs, the ground of the installation of equipment should keep level, its Angle should be less than 5°, otherwise it will affect the equipment use and sliding.
	warning sign		"Balance weight" sign, the hanging weight is less than or equal to 6KG
	do not lean on sign		Do not rely on signs
	REF code		Batch number: production date + batch
	Keep dry		Avoid the sun
	Please refer to manual		Manufacture
	Fragile item		Special treatment of discarded electrical and electronic equipment
	Do not step		Put upward
	CE Marking		Class product

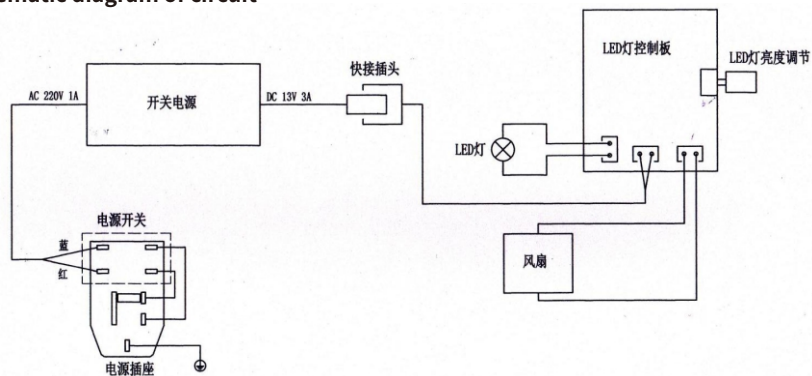
Table of Content

- 1. Function and scope of application ----- 1
- 2. Principle of structure----- 2
- 3. Features and performance indexes----- 3
- 4. Installation of instruments ----- 4
- 5. Usage----- 5
- 6. Maintenance and attentions----- 6
- 7. Frequently problems and solutions----- 6
- 8. List of extra components and equipments is on packing list----- 6
- 9. Interpretation of graphics, symbols, abbreviations and other contents used in the instrument ----- 6
- 10. After-sales service----- 7
- 11. Schematic diagram of circuit----- 7

10. After-sales service

This instrument's warrant is one year and lifetime maintenance.
The recommended service life of this instrument is 5 years.
After-sales service center tel: 0757-81806002
Please contact the distributor or the manufacturer if there is any problem with the product.

11. Schematic diagram of circuit



Warning:

1. Professional training is required for the installation, use and maintenance of the equipment.
2. The power input of the machine should suit the requirements of this manual.
3. Be sure to turn off the power supply before replacing vulnerable parts or opening shells.
4. Please do not place the equipment on the ground of which gradient is greater than 5°, otherwise it will affect the equipment use and sliding on the ground.
5. Please do not hang or cover extra items on the equipment. Otherwise it will affect the use of equipment or will damage the equipment.
6. Please do not lean on the equipment, otherwise it may cause the equipment to dump. Please move the equipment gently to ensure that the equipment is protected effectively.
7. Please do not touch the shell of heating components such as lighting system (except the handle), otherwise, it may cause burns.

1. Function and scope of application

1.1 SCM600 Operation Microscopes is used to magnify and image the tiny lesion of the patient through the principle of optical amplification. Doctors can observe the tiny lesion of the patient through the eyepiece on the Operation Microscopes, which is convenient for surgery.

1.2 Scope of application: it is applicable to microsurgery except ophthalmology. The instrument does not touch the patient's body.

2. Principle of structure

The appearance of the instrument is shown in figure 1. It consists of four basic parts: optical system, frame, lighting system and electrical device.



Figure 1

2.1 Optical system and lighting system

The structure of the microscope is shown in figure 2, which is in the form of single binocular.

6.2.9 Please do not knock the microscope host, in order to avoid losing the machine parts and affecting the optical performance

6.2.10 The machine should not be used when the arm is extended to the maximum state in order to avoid causing the machine to tip over. During the movement of the whole machine, the arms of the machine should be folded and locked, and the locking device on the castor should be loosened before moving the machine; After moving in place, lock the casters to prevent the machine from sliding.

6.2.11 The electrical schematic diagram attached to the instrument is for maintenance reference only. If the diagram is changed, the notice will not separate informs

6.2.12 The warranty period of this instrument is one year. If the microscope is occurred trouble, please contract with manufacture and the manufacturer will send engineers to inspect and repair.

6.2.13 Normal operating conditions of the instrument : (maximum input power: 30VA)

1) Environment

A) Environmental temperature 5 ° C - 35 ° C

B) Relative humidity 20% ~ 80%

C) Atmospheric pressure 700hpa-1060hpa

D) Power supply: 100-240 v~, 50hz/60 HZ

6.2.14 Transportation and storage conditions

In the process of handling, transportation, the equipment should be to carry on relatively flat road, if you need, the angle should be 5° or less.

A) Environment humidity range: to 40° - 55°

B) Relative humidity 20% ~ 80%

C) Atmospheric pressure range: 500hpa-1060hpa

D) The requirements of translation are mentioned in the contract. The mounted microscope should be placed in environment which is no more than 80% relative humidity, no corrosive gas and other harmful substances and good ventilation.

6.2.15 Environmental protection

This instrument and accessories, in the use of the process will not produce environmental pollutants.

At the end of the service life of instrument and its accessories, improper disposal of waste may affect the environment. Please do not discard it casually. It is suggested that the goods should be returned to the company for processing.

7. Frequently problems and solutions

Problems	solutions
When a microscope is used, yellow and white light appear in the field of view at the same time.	Please check whether the filter adjustment knob is twisted in right position
When using the microscope, there is no view of light spot, dark spot or lack of light spot (not round).	Please check whether the magnification adjustment knob is twisted in right position
When the microscope is used, the swing force of the balance arm is uneven.	Using 7mm outer hexagonal sleeve to adjust the tension of the spring, so that the upper and lower pressure of the balance arm is basically flat to achieve the best use state.
Loose parts appear after long use.	Open the white silicone plug and use the Allen wrench to slightly adjust the top wire in the hole, so that the preload force of the component rotation can reach the best force.
Turn on the power switch and the microscope lights flicker.	It is normally phenomenon

8. List of extra components and equipments is on packing list

9. Interpretation of graphics, symbols, abbreviations and other contents used in the instrument

3. Features and performance indexes

3.1.1 Main microscope eyepiece barrel hinge for the optical system can tilt $0^{\circ} \sim 90^{\circ}$ continuously; So that doctors in a variety of different surgical operations can get the most comfortable position.

3.1.2 The instrument adopts the drum type parallel light variation system, with clear imaging, strong stereoscopic sense and large depth of field, which can suit the requirements of various deep cavity surgeries.

3.1.3 The instrument can carry out any adjustment of five degrees to ensure that any surgeon can get the best position of observation.

3.2 Optical performance

3.2.1 Total magnification and field of view

A big objective $f' = 250\text{mm}$

magnification (X)	3.5	5	8	12.8	20
Field of view (mm)	59	37	24	15	9.5

3.2.2 Total magnification error $\pm 7.5\%$

3.2.3 The magnification difference between the optical systems is not greater than 1.5%.

3.2.4 Field of view consistency between the left and right optical systems: the offset in the vertical direction of the object mirror plane shall not be greater than 0.2mm, and the offset in the horizontal direction shall not be greater than 0.4mm.

3.2.5 The focal length difference between the left and right optical systems shall not be greater than 25mm at 3.2x and 2.8mm at 20x.

3.2.6 The maximum magnification field ratio shall not be less than 20 line pairs /mm.

3.2.7 Around view as between tilt is not greater than 2° .

3.2.8 The difference in pupil height between the left and right exit pupil of the optical system shall be not more than 1.5mm at position 0.

3.2.9 The minimum adjustment range of pupil distance is 55-75mm.

3.2.10 Minimum adjustment range of visibility +6 - -6

3.2.11 The relative tolerances of left and right field of view is greater than 2.5%.

3.2.12 The illumination at the center of the light spot on the item's surface is less than 30000Lx.

3.2.13 Color rendering index(CRI) greater than 85% and irradiance is greater than $1000 \text{ w} / \text{m}^2$.

3.3 Mechanical properties

This instrument is equipped with a safety locking device. Under normal handling, the hand wheel should be locked tightly. During adjustment, the locking device can be loosened.

The range of micro-movement lifting is not less than 13mm.

The movable joint operation should be smooth, flexible and accurate. There is no phenomenon of shaking, automatic sinking or stuck after fastening. The rack should be in good balance at any position.

3.4 Electrical performance.

Safety level: Class I devices. Single-phase network power supply: 100-240V, 50Hz/60Hz.

Product input power 30VA. The fuse F1AL 250V $\Phi 5 \times 20$.

3.4.1 The operating noise of the surgical microscope is not greater than 65db.

3.4.2 The impedance of protection grounding is less than 0.1Ω

3.4.3 Ground leakage at normal operating temperature does not exceed 0.5ma, and does not exceed 1mA under a single failure.

3.4.4 The dielectric strength at normal operating temperature:

A) The power supply part of the network and the protective grounded enclosure parts should be able to withstand 50Hz, 1500V sine wave test voltage in 1min without breakdown and flashover (A-a1);

B) Intermediate circuit (between transformer secondary 13V winding and enclosure) should be able to withstand 50Hz, 500V sine wave test voltage in 1min without breakdown and flashover (A-a1)

3.4.5 Technical instruction and operation instruction are combined. Users can obtain relevant technical information from the manufacturer for self-maintenance.

3.4.6 The equipment has no special requirements for electromagnetic compatibility, and portable and mobile RF communication equipment has no impact on the equipment. The equipment has no emission source and electrostatic discharge power supply. The increase and replacement of accessories in the system will not lead to the increase of equipment emission and the decrease of disturbance immunity. The equipment should not be used to close to or stack with other equipment.

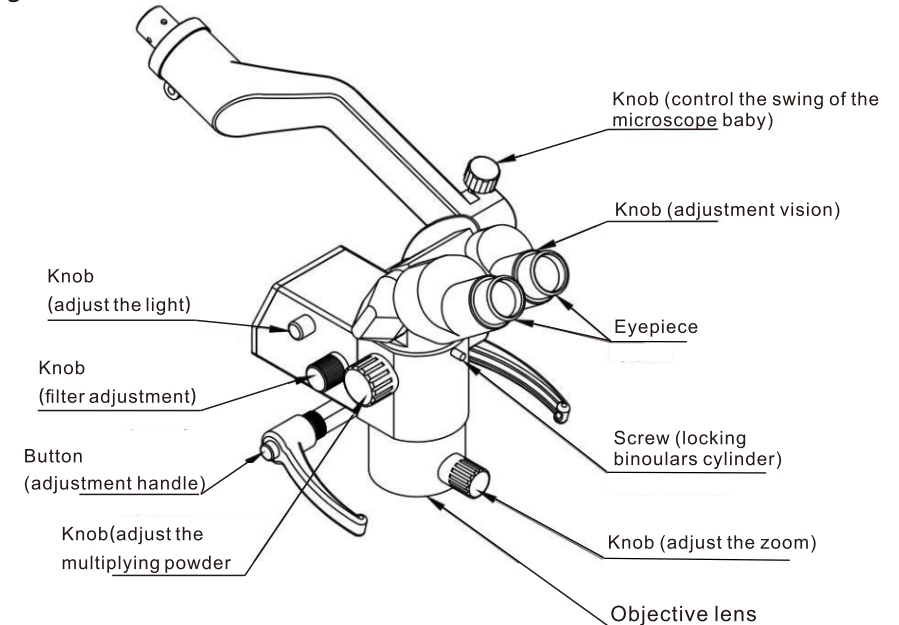
3.4.7 The protection level of the equipment shell is "IPX0". This device is "non-AP /APG device".

3.4.8 Operation mode: continuous operation.

4. Installation of instruments

Please refer to "installation instructions of SCM600"

5. Usage



5.1 Adjustment before using operating microscope

5.1.1 According to the operation habit of the operator, loosen the corresponding locking knob, adjust the operator's position, the observed surface and the relative position of the operation microscope, so that the operator can get the best observation position, ensuring that the host of the operation microscope is placed directly above the observed surface, and make the zoom objective lens of the operation microscope be about 250mm away from the observed surface;

5.1.2 Plug in the power plug, turn on the power switch, and twist the light adjusting knob clockwise to turn on the light. The operator can adjust the light brightness according to the use situation; Twist the light knob counterclockwise until you hear a "click", indicating the light is off (if operator use photocuring, twist the filter adjustment knob to turn the light yellow);

5.1.3 Adjusting the ratio adjustment knob at 3.2 X, the eyepiece tube on the scale line between the + - (can be adjusted according to the different vision of the operator proper diopter adjustment knob, to achieve the most clear view), adjust the distance of the eyepiece, make it consistent with the operator of PD (through the eyepiece observed image overlap together, at this point as the distance of the eyepiece in accordance with operator PD), operation as shown in the figure below, through the eyepiece objects, mobile microscope for objects in the field of view of the central, adjust the zoom device, make the observed surface in the clear observation of state;

5.1.4 Set the magnification adjustment knob at 20X and adjust the zoom knob to make the observed surface in the clearest observation state. If the observed surface cannot be made in a clear observation state within the adjustment range of the zoom adjustment knob, the observed surface can be made in a clear observation state by moving the microscope host up and down.

5.1.5 Set the magnification adjustment knob at 3.2x, and adjust the visibility adjustment knobs respectively to make the observed surface in the clearest observation

5.1.6 Repeat the steps from 5.1.4 to 5.1.5, so that the observed surface is under clear observation at 3.2x and 20X. As long as both 3.2x and 20X multiples are under clear observation, the remaining multiples can also be under clear observation.

5.1.7 Lock the locking knob of each movable joint to complete the adjustment before using the microscope.

5.2 The use of surgical microscopes in clinical practice should follow the relevant industry norms of microsurgical treatment.

6. Maintenance and attentions

6.1 Maintenance

The daily cleaning, preventive inspection and maintenance of the instrument shall be carried out by the operator. It is recommended to carry out daily maintenance of the instrument before using. The recommended maintenance period of the instrument is two months.

6.1.1 Please follow the installation guide before use method connection wire of each part. The switch should turn off before using microscope. If you do not use it for a long time, you must cover the main unit of the microscope with a dust-proof bag to prevent the machine from being stained with dust and affect subsequent use; before covering the main unit with a dust-proof bag, unplug all the cables of the main unit; so the place where the instrument is used and kept (generally refers to the operating room) should keep clean. Prevent corrosion from dust, moisture, and acid and alkali.

6.1.2 Pay attention to keep the optical lens clean, and do not touch the surface of the optical lens with your fingers. If there is dust on the lens surface, bounce it off with a clean brush or brush or wipe it off with a clean gauze cloth. If the hand is touched carelessly or lens has smeary, usable cotton wool is touched a few ethyl ether alcohol mixture (alcohol 30% ethyl ether 70%) wipe, wipe when do not let mixture infiltrate lens interior. Avoid lens degumming or mildew. Wiping the lens should be from the center of the clockwise spiral gently, repeat 2 to 3 times until the lens is clear; If there is slight dust on the lens, the 3 way syringe on the tooth chair can be used to blow off the lens at a distance of about 15~20cm (the blown gas cannot contain water vapor). Please do not wipe the lens with any detergent other than industrial alcohol, so as to avoid water residue affecting the optical performance of the lens.

6.2 Attentions

6.2.1 This instrument belongs to level I equipment. It is required that the power supply network (100- 220V~,50Hz/60 Hz) has a good grounding wire.

6.2.2 The power cord of the instrument is only used for electrical connection, and should not be pulled excessively to force.

6.2.3 Power cables involve the safety of instrument users. Please protect them properly. If the outer protective sleeve of the cable is damaged, please replace it in time. The power plug must be not damped.

6.2.4 When replacing the fuse, please switch off the power, unplug the power plug, change into the same model specifications (250 v Φ F1AL 5 x20) fuse tube, the risk of safety in case.

6.2.5 In a thunderstorm, please do not switch on the power to avoid damage to the machine.

6.2.6 When move any joint parts, please make sure to loosen the corresponding locking knob, and then move the corresponding joint parts, in order to do not damage the machine.

6.2.7 If the machine is not rotating smoothly or stuck, do not forcibly turn or pull the machine to avoid damage to the machine. If you find such problems, you should check whether the corresponding locking part is loosened. If the locking knob is loose and such problems still occur, please consult relevant technical personnel or contact the manufacturer for after-sales service.

6.2.8 Do not aim the light at the patient's eyes



Figure 2

The optical system of the microscope is shown in figure 3. It consists of big objective lens 1, drum telescope system 2, small objective lens 3, optical hinge group 4, oblique prism 5, and eyepiece 6.

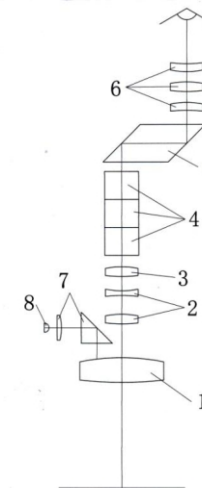


Figure 3

The optical principle is: the large objective lens 1 emerges parallel light into the drum telescope system 2 (turning 2 can switch the magnification) when the item is focused according to adjusting mechanical adjustment and item is lighted by lighting system. The parallel lighting continues to exit and passes through the small objective lens 3. And then the light from the small objective lens 3 is transferred to 0° ~ 90° to the oblique prism 5 according to the optical hinge group 4. Finally the image is observed by eye on eyepiece 6 and the image have magnified. The lighting system is composed of light source 8 and concentrator 7. The principle is that: the light emitted by light resource enters the concentrator system and illuminate the surface of item.