Motic®

PX43 BIO / PX43 FS6

Inverted Microscope
Instruction Manual

Complete reading of this manual before opeartion is required.

Note

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

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MOTIC HONG KONG LIMITED

This manual is written for use with Motic PX43 BIO inverted biological microscope and PX43 FS6 inverted fluorescence microscope.

For your safety, please read this manual carefully before using this product. Please do not discard this manual and always keep it near the product for easy reference.

We have been working hard to improve our instruments to meet the requirements of modern research techniques and testing methods, including modifying the mechanical structure and optical design of the instruments.

Therefore, all instructions and illustrations in this manual, including all specifications, are subject to change without prior notice.

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Content

Security Information

To avoid electric shock, do not touch the part of the lamp holder that provides voltage and current to the bulb when the light is turned on very brightly.

In all cases where this symbol is used, it is necessary to consult this manual in order to determine the nature of potential hazards and any necessary measures that must be taken.

When using this product, protective grounding is essential; Please ensure that the user plugs it into a good protective grounding socket.

When placing the device, please ensure that the plug or appliance coupler is in an emergency state.

The equipment should be used on a table and not on the ground.

To ensure safety, only use the lampshade provided by Motic.
Always follow the additional safety recommendations in the lamp manual to understand the specific safety warnings for the lamp or light source.

Do not touch the lamp holder when the light is on, as it has high voltage and should always be operated with care!

Due to the large amount of heat generated by the light bulb, do not touch the housing, socket, or light bulb when it is turned on or still very hot.

Ensure that the voltage range switch is set to match the available line voltage.

Before replacing the fuse, disconnect the power supply.

Warning Additional Safety Precautions LUMOS3 LED Fluorescent Light Box

- When the lighting system is still safe, preventive measures should be taken for this powerful fluorescent lighting product.
- When operating these products, please always follow the following safety precautions, otherwise it may cause personal injury or damage.
- Depending on the selected wavelength, the product may emit strong ultraviolet radiation, always avoid contact with eyes and skin. Do not look directly at the light output of the light source, as emissions can cause irreversible damage to the eyes or skin.
- Before turning on the power, please ensure that the light source is securely connected to the microscope.
- Disconnect the main power by unplugging the power cord from the power outlet, and connect the light source to the microscope. Simply plug in the power cord.
- There are no repairable components inside the LUMOS3 LED fluorescent light box. Disassembling any screws and covers will result in compromised safety.
- Throughout the entire lifespan of the system, the DC power supply device should be regularly inspected.
- Any electronic device connected to this product must comply with the requirements of EN/IEC 62368 and other locally valid safety rules and standards.
- Warning: This product may emit ultraviolet radiation. Avoid eye and skin contact with unshielded products.
- Warning: This product may emit harmful light radiation. Do not look directly at work lights as it may cause eye injury.
- Attention: The infrared radiation emitted by this product should be avoided from contact with the eyes and appropriate protective equipment or goggles should be used.

1. Instrument Safety Instructions

1.1 General safety tips

Before using this instrument, please be sure to understand this operating manual. If you want to install this instrument yourself, please read Chapter 4 and Chapter 5 carefully.

1.2 Safety Signs

sign	significance
	Indicates that the main switch is turned on (ON)
	Indicates that the main switch is turned off (OFF)
	Representing alternating current
	Indicates uncertain general danger. Please follow the instructions following this symbol or follow the requirements of the user manual.
	The surface is hot to the touch, please do not touch it directly
	Be careful of electric shock

If the label becomes dirty or falls off, please contact Motic China Group., Ltd. for replacement.

1.3 Instrument safety and EMC

- This microscope complies with the standards GB4793.1-2007 and YY 0648-2008 "Safety of Electrical Measurement, Control, Adjustment, and Laboratory Equipment Regulations on design, production, and inspection.
- Electromagnetic compatibility complies with GB/T18268.1-2010 and GB/T18268.26-2010 standards.

1.4 Warranty Statement

PX43 BIO, PX43 FS6, and their original accessories are only allowed to be used for the technical processes described in this operating manual. The manufacturer shall not be held responsible for any damage caused by improper operation.

Please note the following warranty statements for PX43 BIO and PX43 FS6:

- Please confirm the following matters when receiving the product:

a. Remove the outer cardboard box and extract the inner cardboard box from the outer cardboard box;

b. Remove the inner carton and pull out the foam box from the inner carton;

c. Remove the foam box and take out the microscope. And check whether the product has been damaged during transportation;

d. Check the completeness of the configuration based on the randomly configured packing list;

e. If the product is damaged or the configuration is incomplete during transportation, please contact the manufacturer or distributor in a timely manner.

- The manufacturer is responsible for the quality assurance of material defects and product quality defects that occur during delivery.
- If any defects are found, please inform the manufacturer immediately.
- Manufacturers should promptly repair or replace products upon receiving notification of product deficiencies.
- Manufacturers do not assume warranty responsibility for defects caused by natural wear and tear (especially wear and tear parts and consumables) and improper use.
- Operating errors, negligence, or unauthorized disassembly of the instrument, or replacement of instrument components, will result in the invalidation of all warranty rights.
- Only designated personnel can operate the instrument. Operators must have received relevant training and be familiar with knowledge related to microscopy techniques. This device can only be used on a stable, hard, smooth, and fire-resistant workbench.
- If the equipment is not used according to the manufacturer's specified method, it may damage the protection provided by the equipment.

1.5 Preventive maintenance and inspection

- Appearance inspection: Check whether the buttons, switches, and knobs of the equipment are loose or misplaced, and whether the plugs and sockets are oxidized, corroded, or have poor contact. Whether the power cord is aging, and whether the connections of various connecting wires and pipelines are correct.
- Cleaning and maintenance: Clean the electrical and mechanical parts on the surface and inside of the equipment, clean the plugs related to the equipment, and prevent connection
  Poor contact, lubricate necessary mechanical parts with oil.
- Function check: Power on the device and check if all indicator lights and indicators are normal; Enter each function setting mode, adjust and set the phase
  Turn off the switch and button, and check if all functions of the device are normal.
- Performance testing and calibration: Check whether the output value errors of the equipment exceed the relevant standard requirements, and identify the parameter values that exceed the standard range Refer to the instructions for necessary adjustments and calibration to ensure that all technical indicators of the equipment meet the standards and ensure the quality of the instrument.
- Safety inspection: including electrical safety inspection and mechanical inspection Electrical safety inspection: Check for any damage to various leads, plugs, and connectors
  Whether the loss, grounding impedance, and leakage current are within the standard range; ②
  Mechanical inspection: Check if the mechanical components are secure and functioning properly, Check for any looseness, detachment, or rupture of the connecting components.
- Personnel training management: Regularly provide application technology training to operators to enable them to understand the basic structure and principles of the equipment, and become familiar with the equipment
  Learn the various performance and functions of the equipment, learn the daily maintenance and upkeep methods of the equipment, master the correct usage methods and operating procedures, and especially be proficient in
  Take measures to ensure the safety of the instrument and relevant precautions, and keep training records.
- Equipment maintenance cycle: Inspect the equipment once a year. According to the characteristics, service life, usage rate, and failure rate of the equipment, it shall be managed by the person in charge
  Engineers should submit specific reports and make timely adjustments.

2. Overview

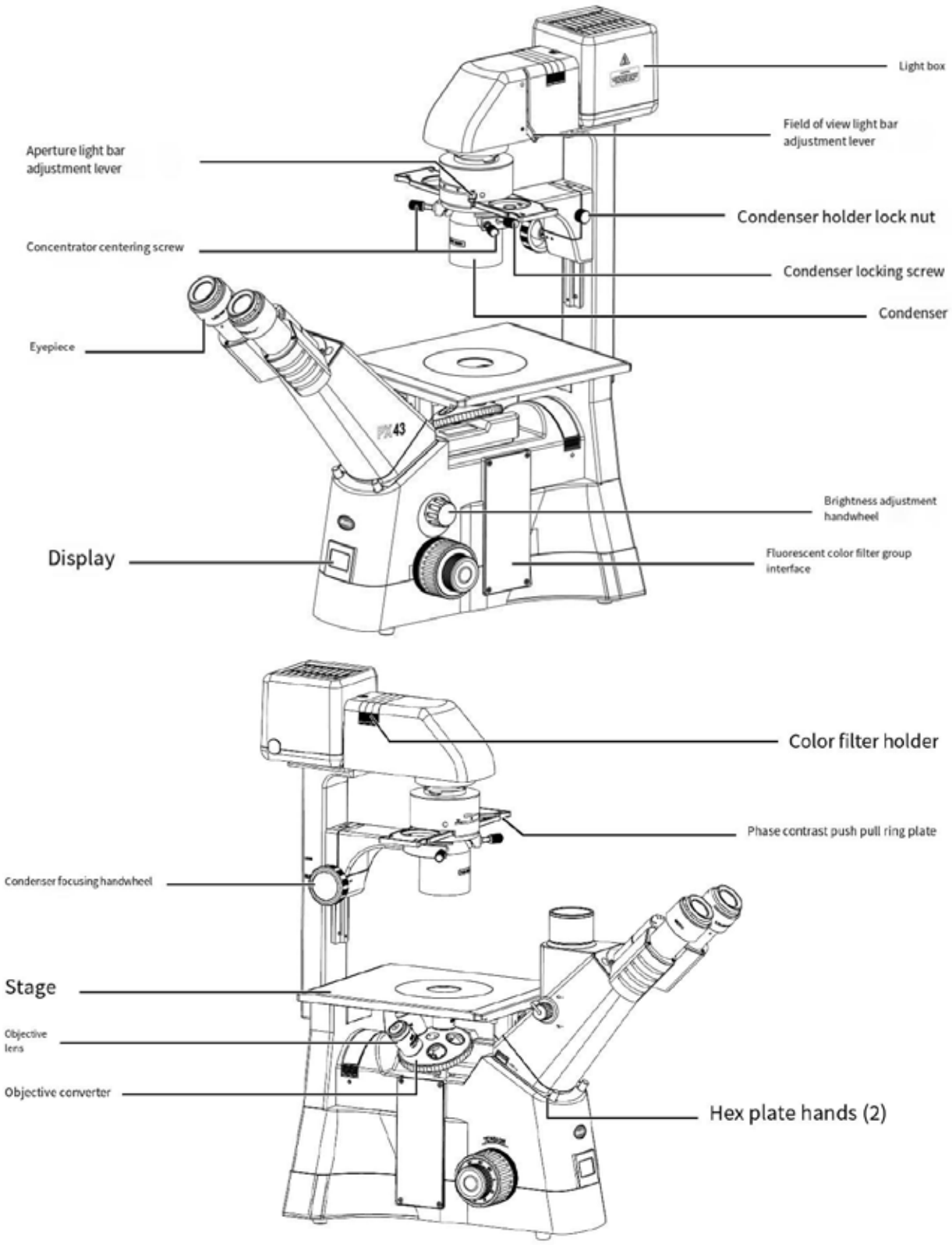
2.1 The use

- Scope of application:
  Used for microscopic magnification observation of clinical samples.
- The instrument uses an infinity chromatic aberration corrected CCIS optical system.
  Optical system: The objective lens images at infinity, and the tube mirror is added so that the image falls on the intermediate image plane, and this intermediate image plane is then imaged by the eyepiece. Because the distance between the objective lens and the tube mirror can be varied without affecting the quality of the image, this structure allows the distance between the objective lens and the eyepiece to be adjustable. Since this infinite optical system has a parallel optical path between the objective lens and the tube lens, it is possible to attach some intermediate accessories, such as beam-splitting prisms, fluorescent devices, etc., which function without affecting the image quality.
- The instrument has multiple accessories that can achieve observation effects such as bright field, phase contrast, and fluorescence.

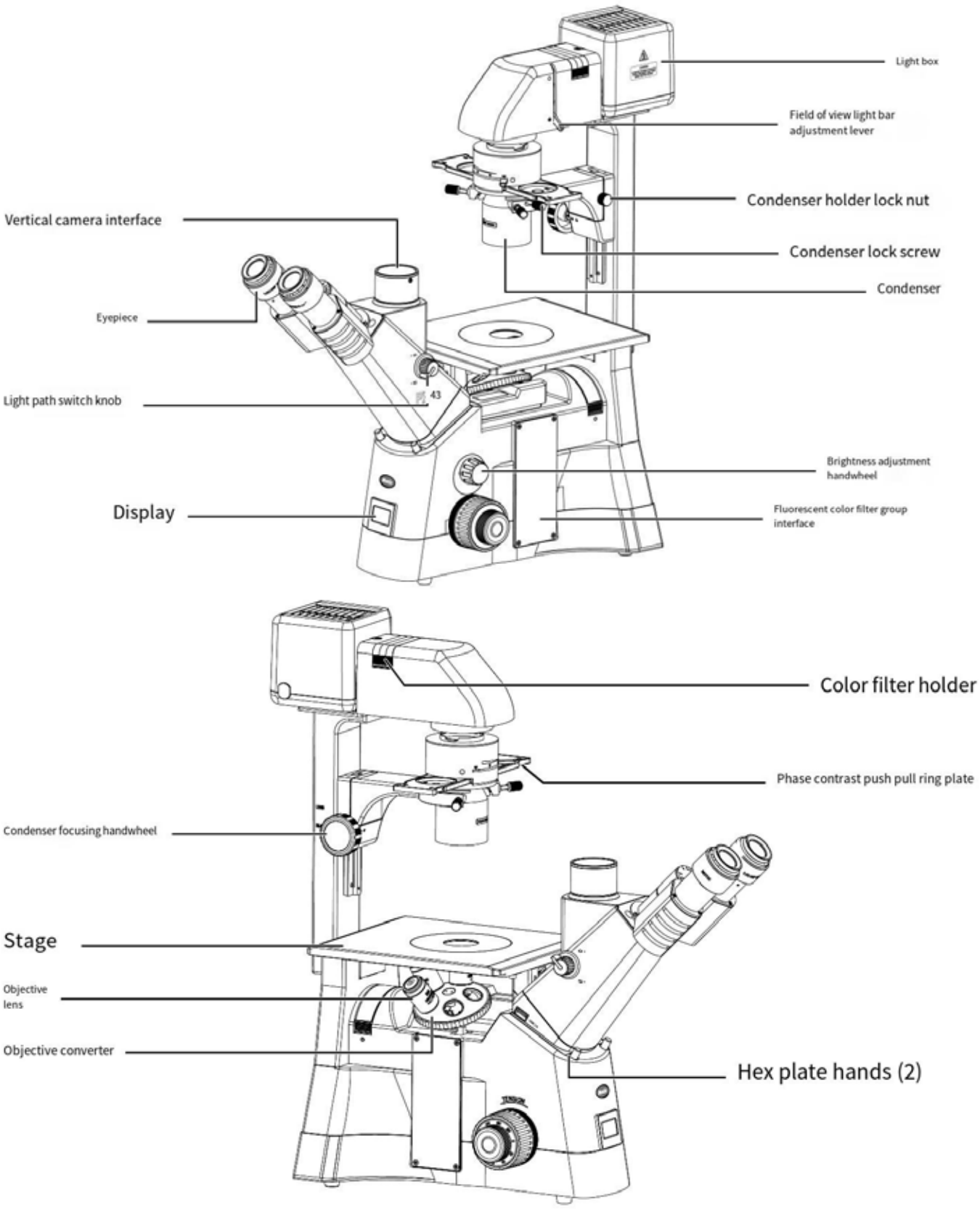
2.2 Product structure composition

This product consists of a base, mirror arm, stage, focusing mechanism, eyepiece, tube, converter, objective lens, fluorescent device, and light source component; Optional phase contrast device, photography camera device, interchangeable horizontal moving stage, and external image acquisition and display system.

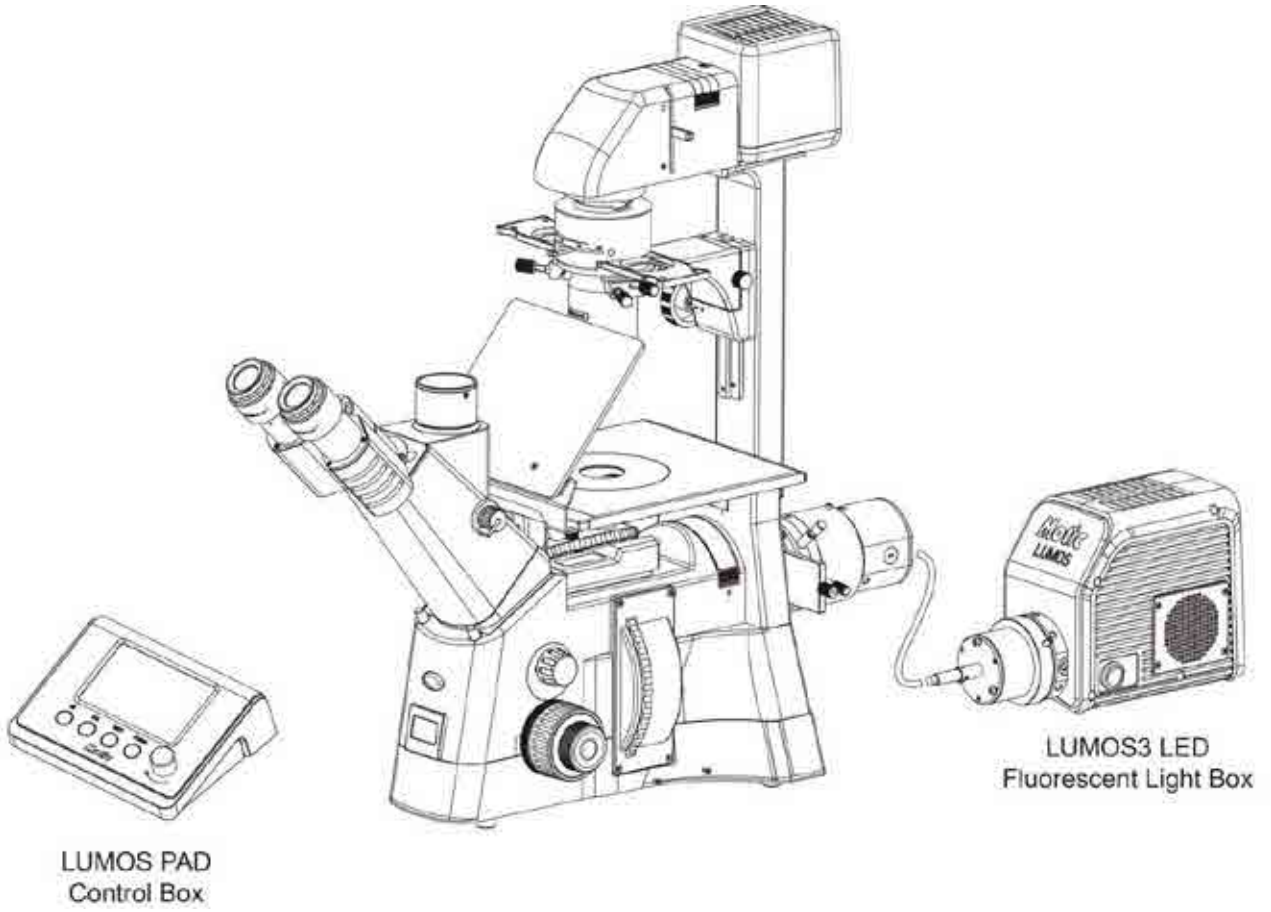
2.2.1 PX43 BIO Inverted Biological Microscope (Binocular)



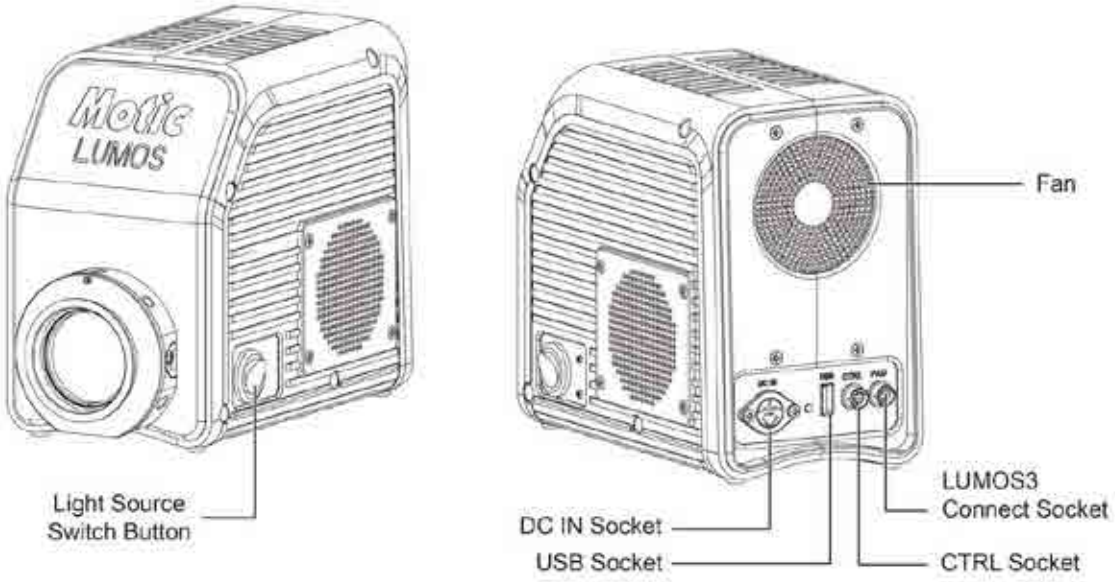
2.2.2 PX43 BIO Inverted Biological Microscope (Three Eyes) 2.2.1 PX43 Bio Inverted biological microscope (three eyes)



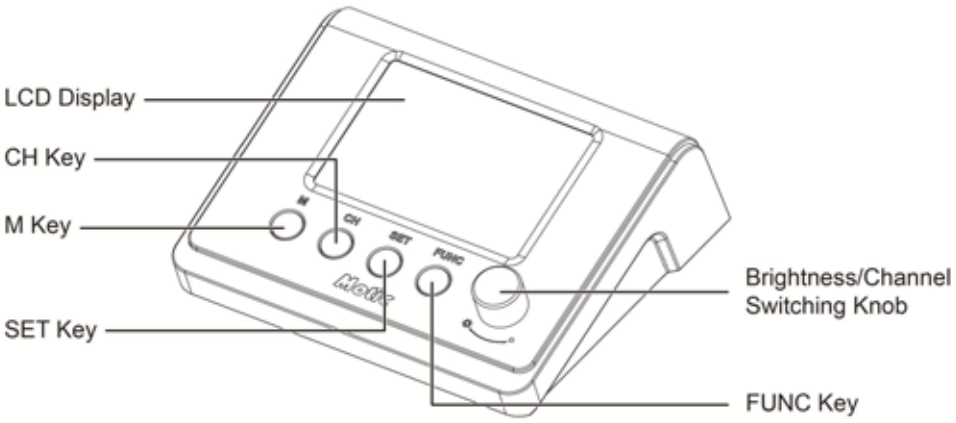
2.2.3 PX43 FS6 inverted fluorescence microscope (three eyes) with LUMOS3 LED fluorescent light box



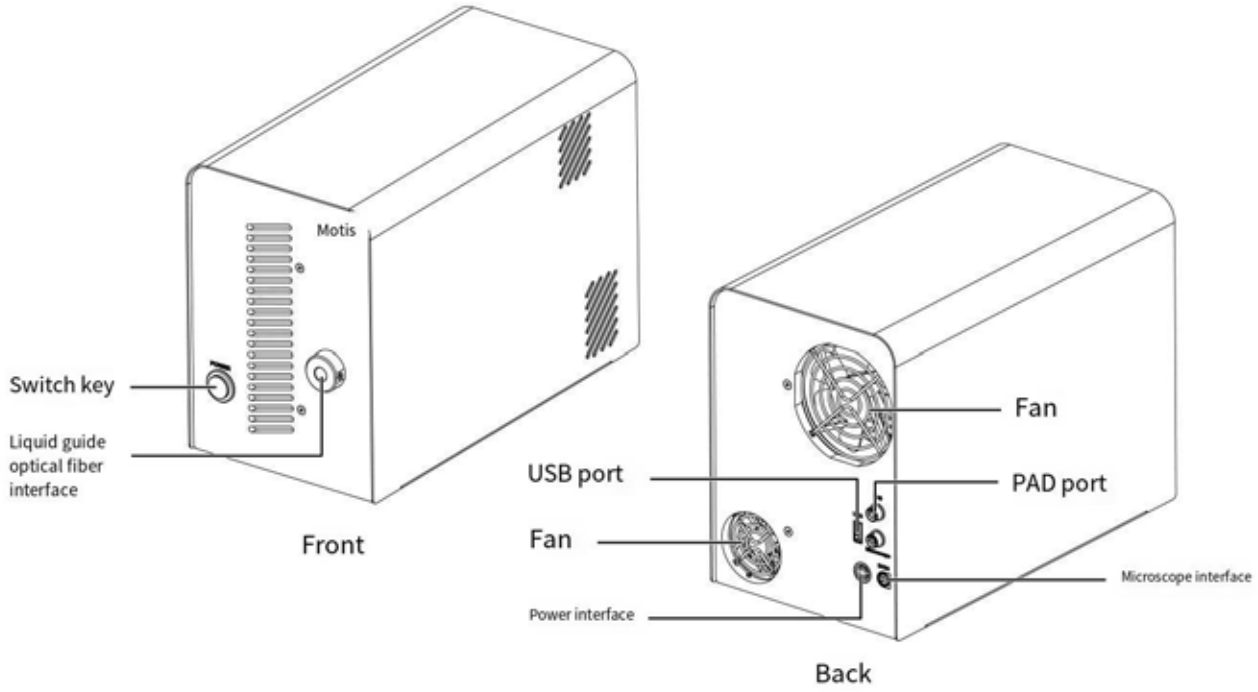
2.2.4 LUMOS3 LED Fluorescent Light Box (* * For instructions on using LUMOS3 LED Fluorescent Light Box, (* * For Instructions on using LuMOS3 LED Fluorescent light Box, please refer to the LUMOS3 User Manual)



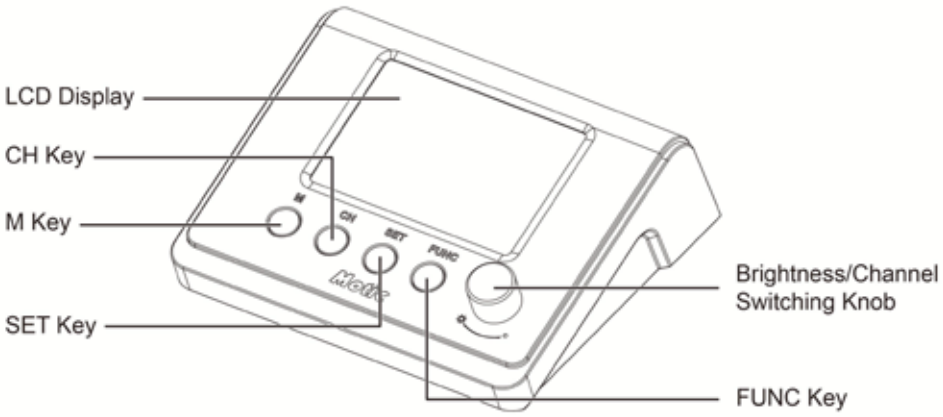
2.2.5 LUMOS3 PAD control box



2.2.6LUMOS7 LED Fluorescent Light Box (* * For instructions on using LUMOS7 LED Fluorescent Light Box, please refer to the LUMOS7 User Manual)

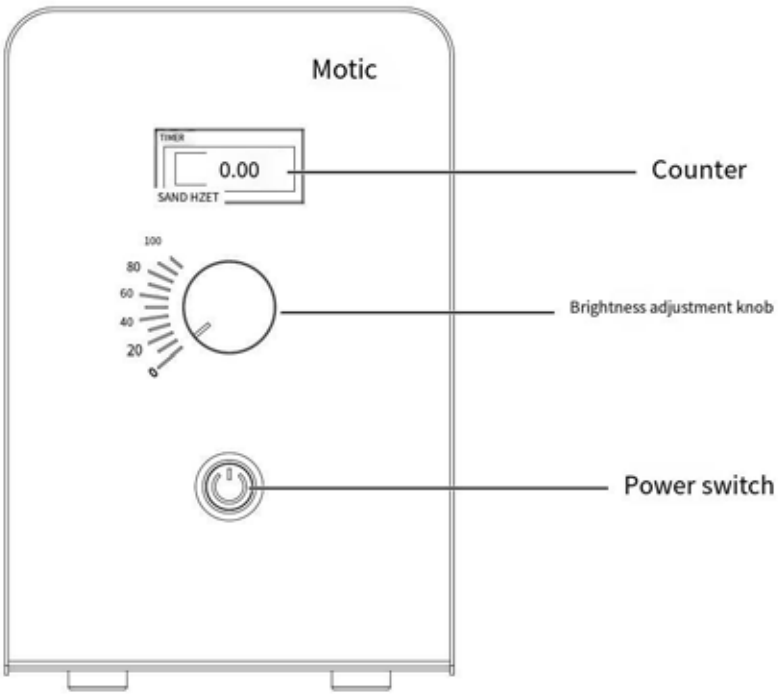


2.2.7 LUMOS7 PAD Control Box

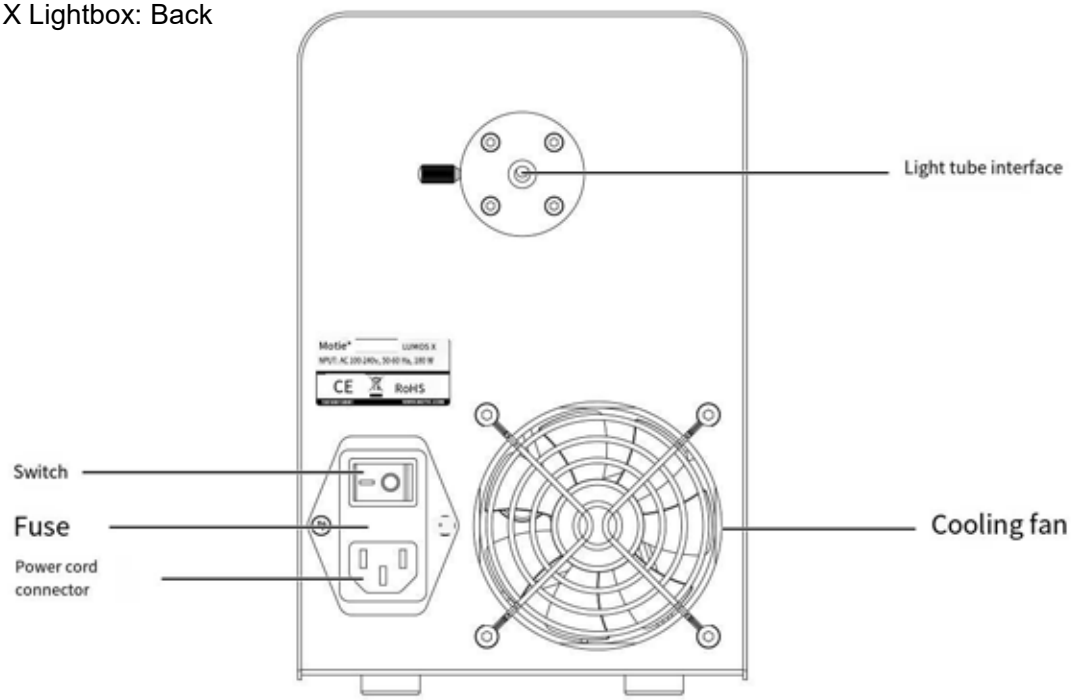


2.2.8 LUMOS X Fluorescent Light Box (* * Please refer to the LUMOS X user manual for instructions on using LUMOS X fluorescent light boxes)

LUMOS X Lightbox: Front



LUMOS X Lightbox: Back



2.3 Configuration table

2.3.1PX43 BIO

optical system	Infinite Distance Chromatic aberration Correction Optical System (CCIS)
Viewing cylinder	360° rotation
Tilt	45° tilt
Three eye splitter ratio	20/80; 0/100（optional）
Binocular tube pupil distance	48-75 mm
Eyepiece visibility adjustment	Binocular vision adjustable +/ -4D
Eyepiece	UC 10X23
Converter	Tape Code Converter
Objective sorting	
Objective lens	Plan 4x/0.1 PH0,WD12.6 Plan 10x/0.25 PH1,WD4.1 Plan LWD 20x/ 0.3PH1,WD4.7 Plan LWD 40x/0.5 PH1,WD3.0 Plan 4x/0.1 PH0,WD12.6 Plan 10x/0.25 PH1,WD10.2 Plan UC LWD 20x/0.40 PH1,WD8.2 Plan UC LWD 40x/0.55 PH1,WD2.0 Plan UC LWD 60x/0.65 PH2,WD2.0
Objective mounting thread	W 4/5"x1/36" (RMS standard)
Stage	Movable movable stage group can be mounted
Stage dimensions	200 X 239 mm
Stage X-axis Y-axis travel	128 X 86 mm
condenser	ELWD N.A.0.3 (WD=72mm) ELWD N.A.0.5 (WD=28mm)
Diaphragm	Variable diaphragm
Focusing mechanism	Coarse micro coaxial with adjustable torque
Fine focus accuracy	2μm
Focusing stroke	10mm
Upper limit bit	Focal side up 7mm
Transmitted lighting	50W halogen lamp, 10W LED
Lighting features	Energy saving mode, you can set the duration (within 15 minutes)ECO, Can display light source intensity

Power supply external/built-in	Built-in switching power supply
Power supply	110-240V (CE)
Accessories	Dust cover, power cord, wrench
Dimensions	543 X 233 X 587mm
Net weight	About 13.5Kg

Observation method

Bright Field	There are
Phase contrast	There are

2.3.2PX43 FS6

Optical System	Infinite Distance Chromatic aberration Correction Optical System (CCIS)
Viewing cylinder	360° rotation
Tilt	45° tilt
Three eye splitter ratio	20/80; 0/100（optional）
Binocular tube pupil distance	48-75 mm
Eyepiece visibility adjustment	Binocular vision adjustable +/ -4D
Eyepiece	UC 10X23
convertor	Tape Code Converter
Objective sorting	
Long phase contrast objective	Plan 4x/0.1 PH0,WD12.6 Plan 10x/0.25 PH1,WD4.1 Plan LWD 20x/ 0.3PH1,WD4.7 Plan LWD 40x/0.5 PH1,WD3.0 Plan 4x/0.1 PH0,WD12.6 Plan 10x/0.25 PH1,WD10.2 Plan UC LWD 20x/0.40 PH1,WD8.2 Plan UC LWD 40x/0.55 PH1,WD2.0 Plan UC LWD 60x/0.65 PH2,WD2.0
Long range fluorescent objective	Plan Fluor LD LWD 4x/0.13,WD17.2 Plan Fluor LD LWD 10x/0.3,WD11.2 Plan Fluor LD LWD 20x/0.45,WD5.0 Plan Fluor LD LWD 40x/0.65,WD1.3

Long range fluorescent phase contrast objective	Plan Fluor LWD 10x/0.30 PH1,WD11.2 Plan Fluor LWD 20x/0.45 PH1,WD5.0 Plan Fluor LWD 40x/0.65 PH1,WD1.3
Objective mounting thread	W 4/5"x1/36" (RMS standard)
Stage	Movable movable stage group can be mounted
Stage dimensions	200 X 239 mm
Stage X-axis Y-axis travel	128 X 86mm
Condenser lens	ELWD N.A.0.3 (WD=72mm) ELWD N.A.0.5 (WD=28mm)
Diaphragm	Variable diaphragm
Focusing mechanism	Coarse micro coaxial with adjustable torque
Fine focus accuracy	2μm

Focusing stroke	10mm
Upper limit bit	Focal side up 7mm
Color filter block	DAPI, FITC, TRITC, etc
Color filter block holder	Complete the filter block group
Fall-out illumination	LUMOS3, LUMOS7, LUMOS X gold halide lamps
Transmitted lighting	50W halogen lamp, 10W LED
Lighting features	Energy-saving mode, can set the duration (within 15 minutes)ECO, can display the intensity of the light source
External/built-in power supply	Built-in switching power supply
Power supply	110-240V (CE)
Accessories	Dust cover, power cord, wrench
Dimensions	543 X 233 X 587mm
Net weight	About 15Kg

Observation mode

Bright Field	There are
Phase contrast	There are
Fluorescent	There are

2.4 Some performance indicators refer to the following:

- Observation cylinder: in line with the requirements of GB/T 2985-2008 Article 4.17;
- Eyepiece: magnification tolerance does not exceed ±5%;
- Converter: The converter positioning is accurate and stable, its repeatability error is not more than 0.025mm;
- Objective lens: flat-field achromatic objective; And meet the requirements of GB/T 2985-2008 article 4.2;
- Objective lens converter: positioning should be accurate and stable, and its repeatability error is not more than 0.025mm;
- Fine tuning empty back is not more than 0.008mm;
- The clear area of the image in the field of view should be concentric with the field of view, without a clear and fuzzy phenomenon;
- The optical axis of the lighting system and the observation system should be the same, the lighting in the field of view is uniform, and there is no bright side dark or blocking light phenomenon.

3. Work environment

3.1 Working environment

- Indoor use;
- Altitude: within 2000 meters above sea level（above this height, need to be corrected according to the national standard coefficient)
- Ambient temperature: +5°C ~ +40°C;
- Humidity: 30% ~ 75%（no condensation）;
- Voltage: power supply voltage fluctuation is not greater than the nominal voltage ±10%;
- Air pressure: 75kPa ~ 106kPa

3.2 Storage Environment

- Temperature: -40°C to +55°C
- Humidity: 10% to 90%（non-condensing）
- Transport (equipment stored in packaging) : Allowed ambient temperature of -40°C to +55°C, humidity of 10% to 90%(non-condensing）.

The PX43 BIO and PX43 FS6 are high-precision devices that should be protected from sun exposure, kept dry, and fragile handling during transportation . Contact the manufacturer (see back cover) or Motic dealer if you need to pack the equipment for long distance shipping .

What to watch for:

- Production date : See Certificate for details
- Service life : 8 years

4. Microscope installation

To ensure smooth operation, place the microscope on a stable and reliable table or a work surface with a shock absorber.

4.1 Check the input voltage

- Automatic voltage selector devices are suitable for worldwide voltage configurations, but it is recommended to use only one type of power cord that matches the rated voltage in your area . If the power cord is used incorrectly, it may cause a fire or damage the instrument.
- To prevent electric shock, make sure the power switch is turned off before connecting the power cord.
- Electrical specifications:

  PX43 BIO:

  Input voltage: AC 100-240 V, 50-60 Hz

  Input power: 60 W

  PX43 FS6:

  Input voltage: AC 100-240 V, 50-60 Hz

  Input power: 60 W

4.2 Light Source Part

4.2.1 Halogen lamp

As a light source, quartz halogen lamps have a higher brightness and color temperature than traditional tungsten lamps, and are about four times brighter.

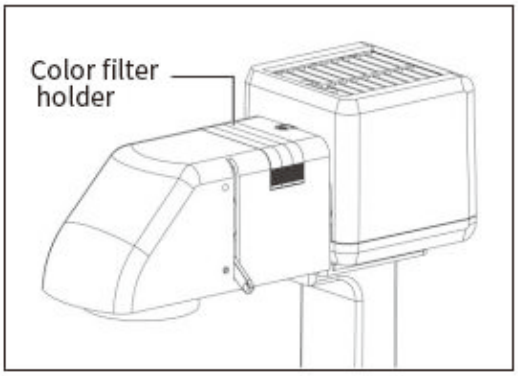
As long as the voltage of the bulb remains the same, the halogen lamp will remain at the same brightness and color temperature, whether it is new or nearing the end of life.

4.2.2 LED light source

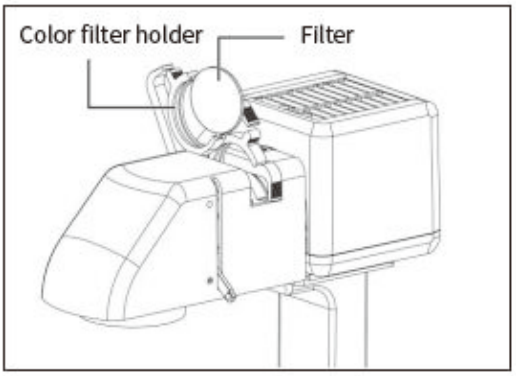
LED light source, as an economical and environmentally friendly light source, provides a more stable color temperature, more efficient lighting and longer service life.

4.3 Installation of color filters (or ground glass)

- Turn up the filter seat and pull out the filter from the filter seat (Figure 1-1); Turn the filter seat up and insert the filter into the filter in the seat. (Figure 1-2)



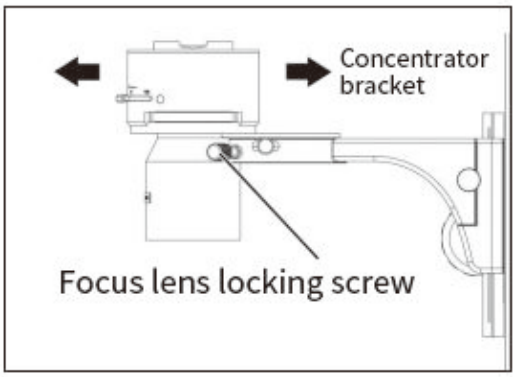
(Figure 1-1)



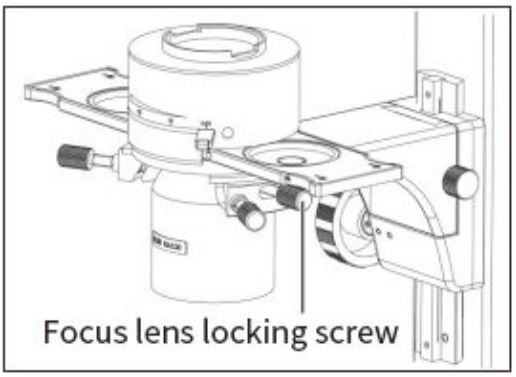
(Figure 1-2)

4.4 Installation of the condenser

- Push the ring dovetail of the condenser into the condenser carrier（Figure 2-1）, with the aperture stop adjusting rod and the side marked with the indication facing forward, and tighten with the condenser locking screw. (Figure 2-2)



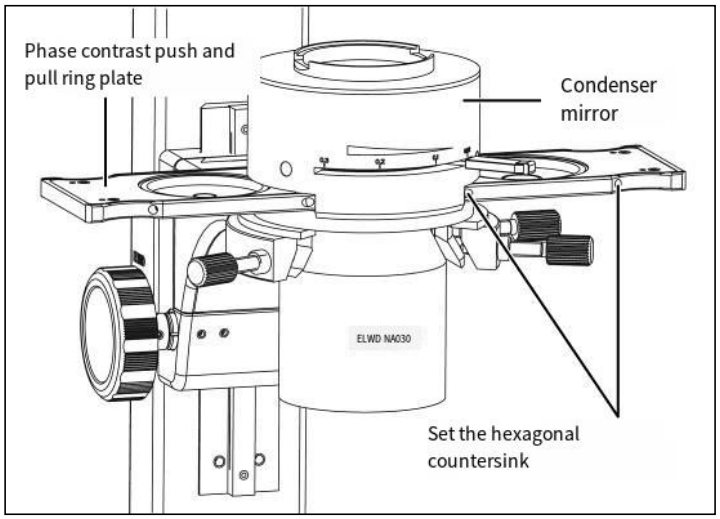
(Figure 2-1)



(Figure 2-2)

- When using phase contrast observation, insert the phase contrast push and pull plate with the side with the adjusting hexagonal countersink facing forward. (Figure 2-3)
- The adjustable condenser is adjusted to its height by engaging the pinion and rack, and is placed in the dovetail slot of the lighting post and locked with the condenser holder the tightening nut is fixed tightly.

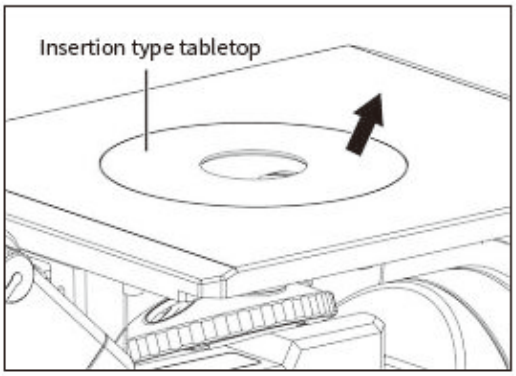
- Observe with the centering telescope, use the hex wrench to adjust the screws in the phase liner push-pull plate, so that the ring plate in the phase liner push-pull plate and the image plate in the objective lens coincide, refer to **"5.6 Phase liner microscopic observation"** for details **.**



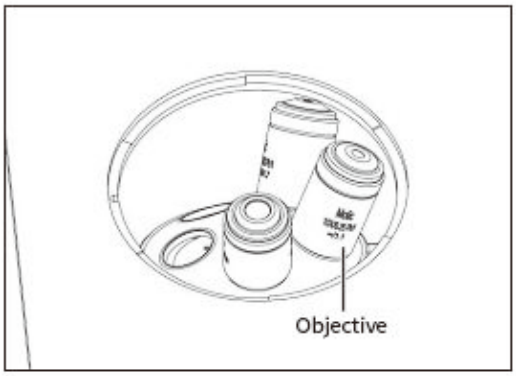
(Figure 2-3)

4.5 Installation of the objective lens

- Remove the insert plate from the stage. (Figure 3-1)
- Install the objective lens on the converter so that the direction of the increase in the multiple of the objective lens is consistent with the direction of the clockwise rotation of the converter. (Figure 3-2)
- Put the plug-in bench back in place.
- After the objective lens is installed, configure the relevant information. For details, see **"5.8.6.2 Objective Configuration"**.



(Figure 3-1)

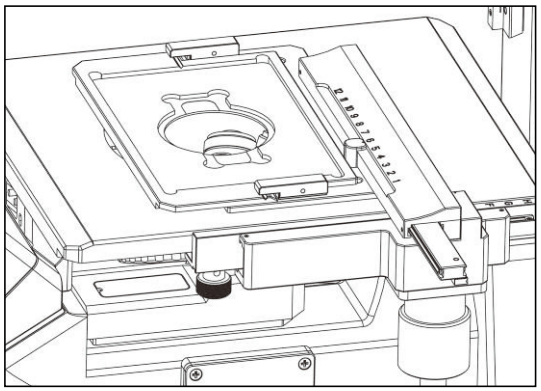


(Figure 3-2)

4.6 Installation of the attached mechanical stage

- Lock the attached mechanical stage with the lower right side of the stage from the bottom up with two assembly screws.
- Attach the mechanical stage as an alternative. For ordinary cell vessels, the platform X/Y is allowed to move precisely. About choosing the corresponding utensil

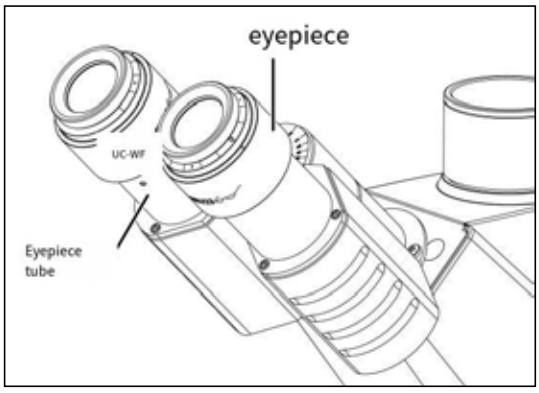
For the dish carrier, please contact your local Motic supplier.



(Figure 4)

4.7 Installation of the eyepiece

- Remove the dust cover from the eyepiece barrel.
- Insert the eyepiece into the eyepiece tube. (Figure 5)
- If eye guards are used on the eyepieces, adjust them for optimal use.



(Figure 5)

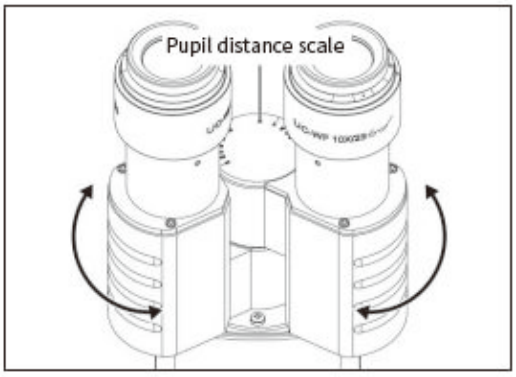
5. Setting of Microscope

5.1 Adjustment of pupil distance (Figure 6-1)

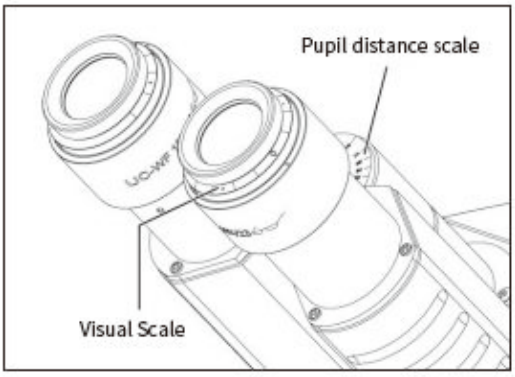
- Before the pupil distance is adjusted, the sample is focused through a 10x objective lens.
- The pupil distance is adjusted so that the images in the left and right visual fields coincide. This procedure allows the observer to observe a specimen with both eyes.

5.2 Adjustment of diopter (Figure 6-2)

- Diopter adjustment compensates for the difference in left and right visual degree, making simultaneous binocular observation easier. In addition, this adjustment reduces the objective lens the amount of out-of-focus caused when multiples are switched. This phenomenon is more obvious when viewed with a low power objective.
- Rotate the viewability compensation ring on each eyepiece until you reach the **"0"** position.
- Turn the 10x objective into the light path and observe with your right eye while turning the coarse fine-tuning focus handwheel to focus the sample.
- Observe with the left eyepiece and adjust only the degree compensation ring on the left eyepiece barrel until the image is clear.



(Figure 6-1)

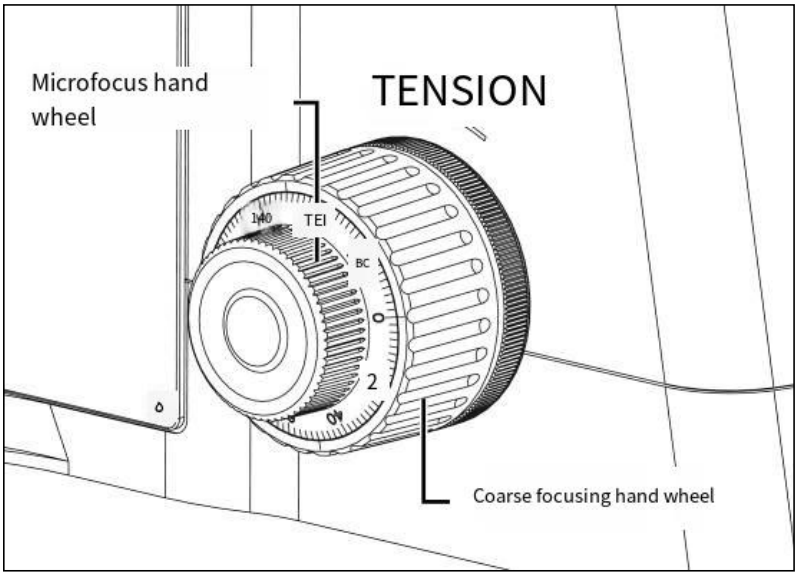


(Figure 6-2)

5.3 Coarse and Micro focus (Figure 7-1)

- Focusing is achieved by rotating the coarse and fine focusing wheels on both sides of the main body, and driving the objective lens converter lifting group to move vertically through corresponding structures.

- When the left coarse and fine focusing handwheel rotates clockwise (when the right coarse and fine focusing handwheel rotates counterclockwise), it will drive the objective lens converter lifting group to move vertically, otherwise it will move downward.
- The coarse focusing handwheel rotates once, the stage moves by 0.2mm, and the fine focusing handwheel rotates by 2 microns per grid (i.e. the scale is 2 microns per grid).



(Figure 7-1)

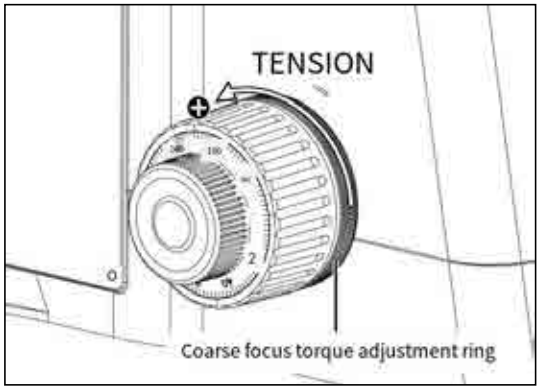
Do not attempt any of the following actions, if doing so will damage the focusing mechanism:

- Grip the hand wheel on one side while spinning the other hand wheel separately.
- Rotate the coarse action focus and micro-action focus handwheels past their limit position.

5.4 Adjustment of coarse focus torque (tightness) (Figure 7-2)

- Push the phase liner push-pull ring plate to the middle position where the phase liner ring plate is not placed focus the sample.
- Set the aperture diaphragm of the spotting lens to adjust the numerical aperture of the illumination system, which has an important effect on the image resolution, contrast, depth of field and aperture. It has an important effect on image resolution, contrast, depth of field and brightness.
- Gradually closing the aperture diaphragm decreases the resolution and brightness of the image, but at the same time increases the contrast and depth of field. By adjusting, the concentrator

When the numerical aperture of the aperture diaphragm is adjusted to match the numerical aperture of the objective lens by 2/3, the most perfect image will be obtained.

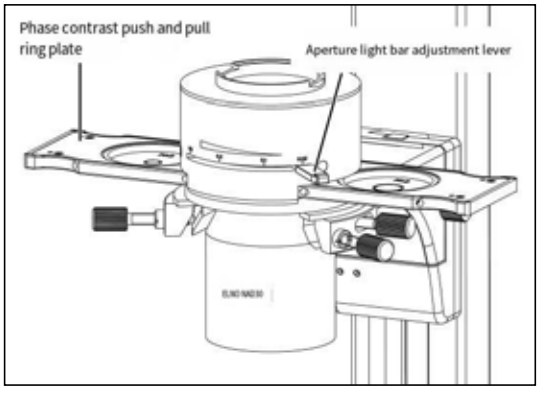


(Figure 7-2)

5.5 Bright field microscopic observation

- Push the phase liner push-pull ring plate to the middle position where the phase liner ring plate is not placed focus the sample.
- The aperture stop of the condenser is set up to adjust the numerical aperture of the lighting system, which affects the resolution, contrast, depth of field and quality of the image Brightness has an important effect.
- Gradually closing the aperture will reduce the resolution and brightness of the image, but increase the contrast and depth of field. By adjusting, the condenser

The most perfect image will be obtained when the numerical aperture of the aperture diaphragm is the same as 2/3 of the numerical aperture of the objective lens.



(Figure 8)

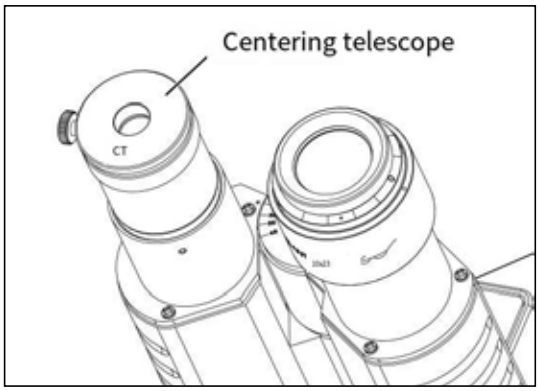
5.6 Phase contrast microscopic observation

- The phase contrast objective is marked with the words **"Ph"** : Ph0, Ph1, Ph2.

- When looking at the phase contrast, be sure that the ring plate used coincides with the markings on the objective.
- Set the numerical aperture to its maximum.

When observing the phase contrast, the condenser aperture stop needs to be kept fully open, otherwise the aperture stop will block the ring type light passing part of the ring plate and make the light
The line cannot pass through, and the phase contrast effect cannot be obtained.

- Turn the 10x phase contrast objective (Ph1) into the light path.
  Push the phase contrast ring plate marked **"Ph1"** into the light path.
- Similarly, when viewing with a 4x phase contrast objective (Ph0), push the **"Ph0"** phase contrast ring plate into the light path; And when using a 20x phase contrast objective (Ph1) or 40x phase contrast objective (Ph1), the **"Ph1"** phase contrast ring plate should be pushed into the optical path.
- Unplug one eyepiece and replace it with a centering telescope (Figure 9).

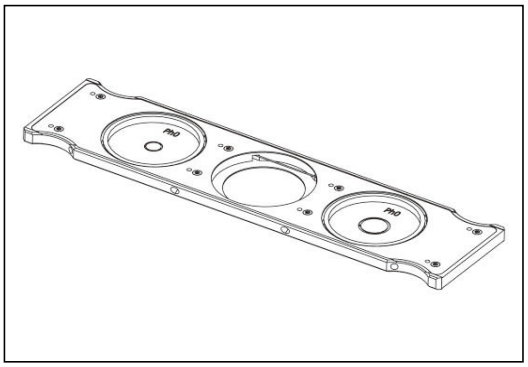


(Figure 9)

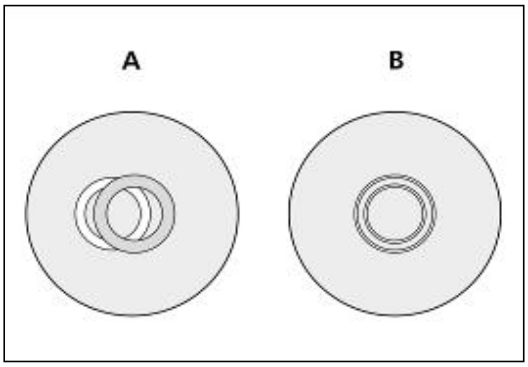
- In order to obtain the best phase contrast results, the use of green interference filters is recommended.
- For better brightness when viewing with a high power phase contrast objective, it is best to pull out the filter insert plate.
- When replacing the phase contrast ring plate, place the ring plate in the ring plate hole of the phase contrast push and pull plate in the correct direction (Figure 10-1), using an Allen wrench (1.5mm) Adjust the ring plate until the center of the phase plate and ring plate completely coincide (Figure 10-2).
- Pull out the eyepiece on the centering telescope until both the phase plate in the objective and the ring plate in the phase contrast push and pull plate are clearly visible.
- If the phase plate and ring plate are not centered, adjust the ring plate using the randomly

configured Allen wrench（Figure 10-3）until the phase plate and ring plate are completely centered

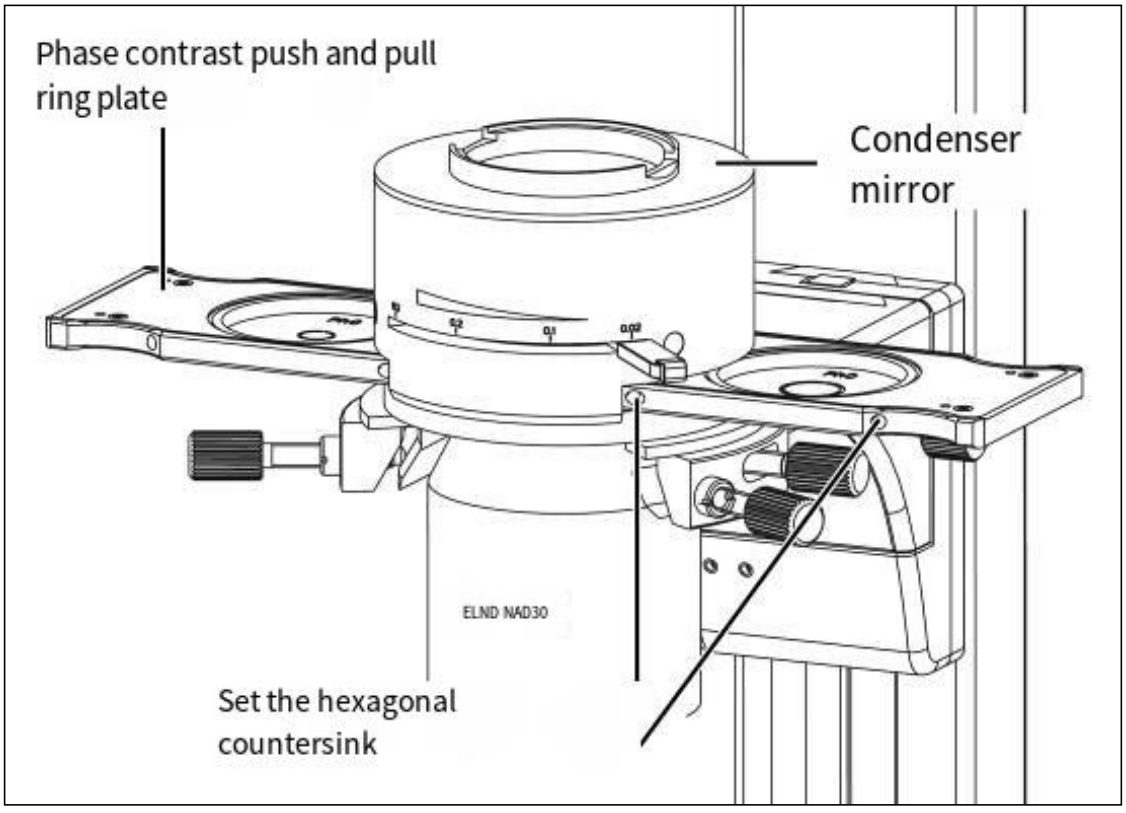
- The phase plates coincide. In the case that the phase plate and the ring plate do not coincide, the ideal phase contrast effect cannot be obtained.



(Figure 10-1)



(Figure 10-2)



(Figure 10-3)

5.7 Choice of color filter

Two color filters can be placed in the color filter insert board

Type of filter	Uses
Neutral color filters	Adjust brightness in microscope photography
Green interference filter 546nm	Used for phase contrast observation and contrast
Blue filter	For routine microscopic observation and photomicrography

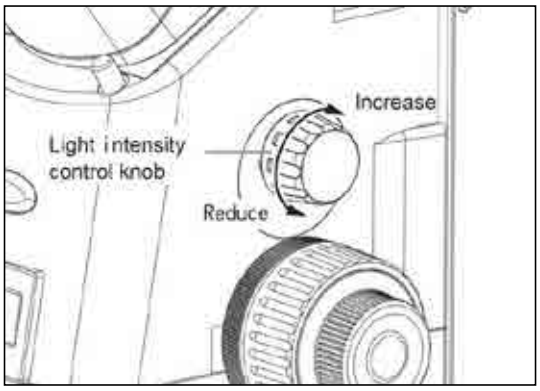
5.8 Dimming hand wheel operation

a. There are two basic operations of the dimming hand wheel, which can meet most daily use scenarios if you are slightly familiar with them.

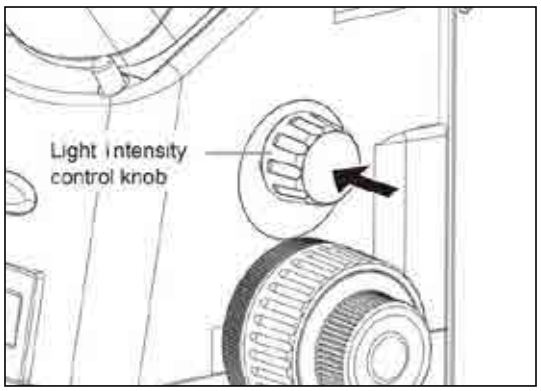
- Rotation: Adjust the brightness of the light source (Figure 11-1)
- Click: Fall (LUMOS3) or Transmission Light Source switch (Figure 11-2)

b. There are four advanced operations of the dimming hand wheel, mainly related to the setting of the microscope related configuration.

- Click: In addition to the function of falling or transmitting light source switching, when the menu selection item appears, it is also used as a menu selection function;
- Double click: when LUMOS3 is connected, it can switch the LUMOS3 channel; In the LUMOS3 setting interface, you can also enter the lighting mode type setting;
- Press and hold for 2 seconds: When the LUMOS3 is connected and the LUMOS3 power is turned on, the LUMOS3 setting screen is entered.
- When LUMOS3 is not connected, the system Settings screen is displayed. At the same time, it is also saved as the setting and used when returning to the main interface;
- Press and hold for 4 seconds: When LUMOS3 is connected and the LUMOS3 power is turned on, the microscope system Settings screen is entered (Holding down for 2 seconds will display the LUMOS3 setup screen first).



(Figure 11-1)



(Figure 11-2)

5.8.1 Home Screen

The main screen is shown below. It is divided into three areas, of which the left area is the light source information, the middle area is the objective lens information, and the right area is the filter block information.

5.8.1.1 Light source information

As shown in the picture, the value below the light source information area is the light source brightness value, indicating the brightness of the current light source (range 0-99).

Dimming hand wheel operation:

The user can adjust the brightness of the light source by rotating the dimming handwheel, and the value on the display will change with the user's operation. See the following section "Adjusting Light Source Brightness" for details.

The icon above the light source information area, as shown in the picture, indicates the type of light source that is currently adjustable by the dimmer hand wheel.

Icon 1:  The current transmitted light source (LED or halogen lamp) is lit, and the dimmer handwheel can adjust the brightness of the transmitted light source

Icon 2: 

The current falling light source (LUMOS3) is lit, and the dimmer handwheel can adjust the brightness of the transmitted light source. Here the icon letter G indicates that the LUMOS3 channel currently being controlled is G. When you rotate the dimmer hand wheel, the brightness of the light source in the G channel changes. When the light source is in effect, double-click the dimmer handwheel to switch the LUMOS3 channel (when the current filter block is configured with multiple LUMOS3 light source channels).

The transmitted light source and the falling light source can be set to single light source mode or double light source mode, for details, see the following content: Set the light source lighting mode.

Dimming hand wheel operation:

Click the dimming hand wheel to switch between the falling light source and the transmitted light source. If the light source is set to single light source mode, only the current light source is lit when switching the light source, and the brightness can be adjusted through the dimming handwheel.

If set to dual light mode, both light sources will light up at the same time, but only the type of light shown by the current icon can be changed by the dimmer handwheel. Click the dimmer handwheel to switch to another light source and adjust the brightness.

Note: If the light source (LUMOS3) is not connected, clicking the dimmer handwheel operation has no effect.

5.8.1.2 Objective Information

The upper side is the objective icon, and the lower side indicates the current objective information, which can be Null（no objective）, 4x, 10x, 20x, 40x, 60x.

The objective information follows the user's operation to switch in real time.

The user can set the type of objective lens to be installed in different holes of the converter through the dimming hand wheel. For details, see the following sections.

5.8.1.3 Color Filter Information

The upper side is the color filter icon, and the lower side is the current color filter information, including the following types: Null（empty）, Cy5, Cyan, DAPI ，Endow ，FITC, Texas, TRITC, Yellow. The filter block information follows the user's operation to switch in real time.

The user can set the filter type installed in different hole positions of the filter assembly through the dimming handwheel. For details, please refer to the following chapters.

5.8.2 Adjust the brightness of light source

Rotate the dimmer handwheel to adjust the brightness of the current light source.

When the current light is falling, double click the dimmer handwheel to switch the LUMOS3 light source channel（when the current filter block is configured with multiple LUMOS3 light source channels).

At the same time of user operation, the display screen will automatically switch to the brightness display interface (see the following description). In the brightness display interface, if the user does not operate the dimming handwheel for 3 seconds, the display screen will automatically return to the main interface.

Note: The dimmer handwheel can be rotated to adjust the brightness of the *light source only if the converter is positioned at the correct objective and the filter wheel is positioned at the correct filter position.*

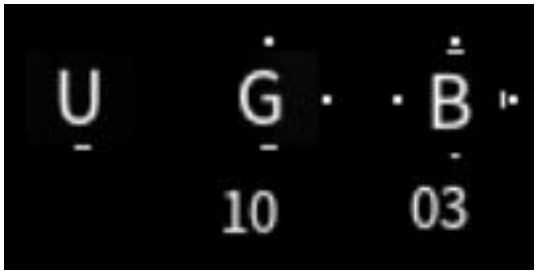
The brightness display interface is shown in the picture below:

a. LED brightness indicator interface

The icon on the left indicates that the current light source is the LED light source, and the value on the right is the brightness value of the LED light source.

b. Halogen light indicator interface

c. LUMOS3 Brightness indicator screen



LUMOS3 built-in 3 light source UV, Green, Blue, respectively corresponding to the interface icon U, G, B, the value below the icon is the brightness value of the light source. Note that the U light source icon is different from G and B, there is no luminous effect (small dot style around the outer circle of the circular icon), indicating that the U light source is off, and the ICONS G and B with luminous style indicate that G and B channels are lit at this time. The horizontal line below the icon G indicates that the current channel that can adjust the brightness through the dimmer handwheel is channel G. Double-click the dimmer handwheel and you can switch to another channel (when multiple channels are opened).

The user can use the dimmer handwheel to set the LUMOS3 light source channel to use for each filter. See the following section for details.

5.8.3 Objective Lens display interface

When the display is located in the main interface or brightness display interface, if the user turns the objective lens converter, the display will automatically switch to the objective lens display interface (as shown in the following figure), displaying the current objective information. If the user does not operate the objective converter within 3 seconds, the display will automatically return to the main interface.

5.8.4 Color filter display interface

When the display is located in the main interface or brightness display interface, if the user rotates the color filter rotating disk, the display will automatically switch to the color filter display interface (as

shown in the following picture), and display the current color filter information. If the user does not operate the color filter turntable within 3 seconds, it will automatically return to the main interface.

5.8.5 LUMOS3 Settings

LUMOS3 setup operations can only be performed if the PX43 is connected to LUMOS3.

5.8.5.1 Setting the LUMOS3 channel corresponding to the color filter

LUMOS3 built-in 3 light source channels UV, G, B, you can set the required LUMOS3 light source channel for each color filter block.

Dimming hand wheel operation:

When the display displays the main screen, press down the dimmer handwheel and hold it for 2 seconds, and release the dimmer handwheel after hearing a beep. The display screen shows the setting interface of LUMOS3 light source, as shown in the picture below:

The horizontal line below the U icon indicates the channel that is currently being set. Icon U has no luminous effect, ICONS G and B have luminous effect, indicating that under the current filter block, the UV channel does not work, while the G and B channels are lit.

Scroll to the right to display the name of the current color filter. Turn the color filter dial to the next position, the current Settings will be automatically saved, you can start the next color filter corresponding to the LUMOS3 light source channel Settings.

Dimming hand wheel operation:

Click the dimmer handwheel to switch to the next LUMOS3 channel, and the lower horizontal line will move accordingly.

Turn the dimmer handwheel up or down to set the channel open or close. When the channel is open, it has a luminous effect, such as channel G and channel B in the above picture. When the channel is closed, there is no luminous effect, such as channel U in the above picture.

Press down the light handwheel and hold it for 3 seconds to save and exit the current operation. After all color filters are set up, you can return to the main screen through this operation.

Double click on the dimmer hand wheel to enter the setting interface of light source lighting mode.

5.8.5.2 Setting Light Source Lighting Mode

The PX43 can be set to single light mode or dual light mode.

Single light mode: falling light source and transmitted light source, only one light source is lit at any time.

Dual light source mode: Both the transmitted and transmitted light sources are lit at the same time.

Please note: Light source lighting mode Settings are only supported when LUMOS3 is connected.

Dimmer hand wheel operation:

In the LUMOS3 light source setting interface, double-click the dimmer handwheel to enter the light source lighting mode setting interface. As shown in the picture below:

On the left is the light source lighting mode icon, and on the right is the current color filter model.

Single Light mode

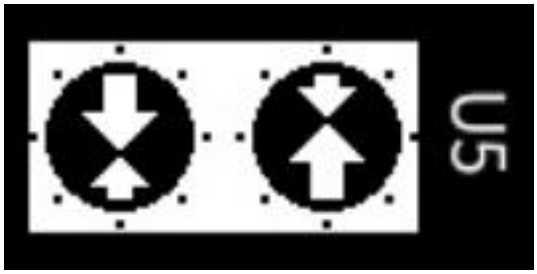
Dual light mode

Dimming hand wheel operation:

Rotate the dimmer handwheel to switch between single light mode and dual light mode.

Dimmer handwheel operation:

Click the dimmer handwheel, select and save to switch to the currently selected lighting mode. The icon on the left side can be observed to change to a white background.



Dimmer hand wheel operation:

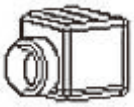
Press down on the dimmer handwheel and hold for 3 seconds, save and exit.

5.8.6 System Settings

Dimming hand wheel operation:

In the main interface, if LUMOS3 is not connected, press down the light handwheel and hold for 2 seconds, hear a beep, you can enter the system setting interface; If the LUMOS3 power supply is connected and turned on, press the time to reach 2 seconds, the LUMOS3 light source setting interface will be entered first, at this time, continue to press the dimmer handwheel, wait 2 seconds, hear another beep, release the dimmer handwheel, you can enter the system setting interface.

There are 5 setting items in the system setting interface, as follows:

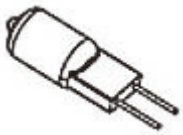
	Light source selection
	Objective configuration
	Color filter configuration
	ECO time Settings
	Function setting

Dimming hand wheel operation:

Rotate the dimmer handwheel to switch between these 5 Settings. Click the dimmer handwheel to go to the current setting item to set.

5.8.6.1 Light Source Selection

As shown in the image below, the light source selection screen displays either a halogen lamp icon or an LED icon.



Halogen lamp

LED

Dimming hand wheel operation:

Rotate the dimming handwheel up to display the LED icon; Turn the dimmer handwheel down to display the halogen lamp icon. Click on the dimmer handwheel to display a checkmark and select the current light source. Press and hold for 3 seconds to return to the home screen.

5.8.6.2 Objective Configuration

The objective configuration interface is shown in the figure below. On the right side is the objective model to be configured for the current objective converter hole. The unselected objective model has a black background and the selected objective model has a white background. After the current hole configuration is complete, you can operate the converter to the next hole to continue to complete the configuration, and the previous configuration information will be automatically saved.

Dimming hand wheel operation:

Rotate the dimmer handwheel, and the right objective lens model (Null, 4x, 10x, 20x, 40x, 60x) will change accordingly. Click the dimmer handwheel to select the current objective and the objective information changes to a white background (as shown in the image below).

The color filter configuration interface is as shown in the following figure. On the right side is the color filter model to be configured for the hole position of the rotating disc of the current color filter. The unselected filter type has a black background, and the selected filter type has a white background. After the current hole configuration is complete, you can operate the filter turntable to the next hole to continue to complete the configuration, and the previous configuration information will be automatically saved.

Dimming hand wheel operation:

Rotate the dimmer handwheel, and the right color filter type (Null, Cy5, Cyan, DAPI, Endow, FITC, Texas, TRITC, Yellow) will switch accordingly. Click on the dimmer handwheel to select the current filter model, and the filter information will change to a white background (as shown in the image below).

5.8.6.4 Setting ECO Time

The ECO(Energy Saving mode) time setting screen is shown in the following figure. The setting time in the picture is 15 minutes and 0 seconds. That is, when the user does not operate the microscope (operating the dimmer hand wheel, turning the objective converter, turning the color filter dial) for 15 minutes, the PX43 will turn off the microscope light source. The display displays the ECO picture. When the user operates the dimming handwheel again, turns the objective converter, and turns the color filter dial, the PX43 will turn the microscope light source back on and return to the previous working state. The ECO has a minimum setup time of 3 seconds.

Dimming hand wheel operation:

Click the dimmer handwheel to select the time setting bit. As shown in the picture, the white line below the number marks the data bit that is currently being set. Click on the dimmer hand wheel and the white line will bounce around below the number.

Rotate the dimmer handwheel and the number in the current set bit will switch between 0-9.

Press and hold for 3 seconds, the current setting will take effect, the time digit display will change to a white background (as shown below), and return to the main screen after releasing the dimmer handwheel.

5.8.6.5 Function Settings

Function Settings You can set the following:

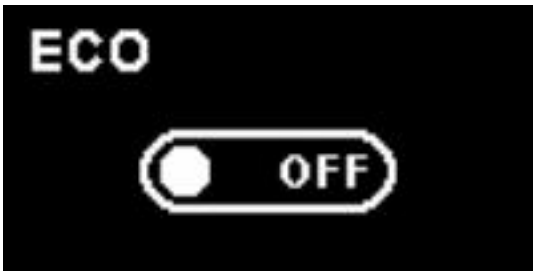
- ECO function switch: Controls whether the ECO function is enabled.
- Sound switch: controls whether the buzzer sounds;
- Light management function switch: control brightness memory function is working;
- Restore Factory Settings: Restore factory Settings.

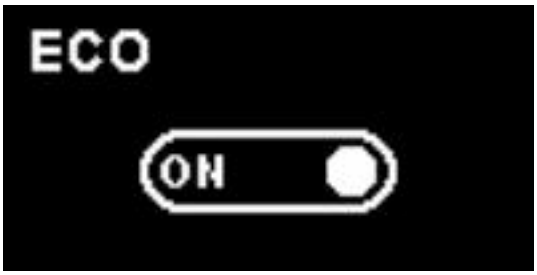
Dimmer hand wheel operation:

Rotate the dimming hand wheel to switch between the above 4 Settings.

5.8.6.5.1 ECO function switch

The following figure shows the ECO switch interface. The left figure shows that the ECO function is enabled, and the right figure shows that the ECO function is disabled. The ECO function is enabled by default.



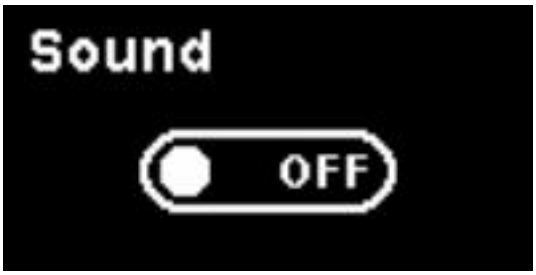


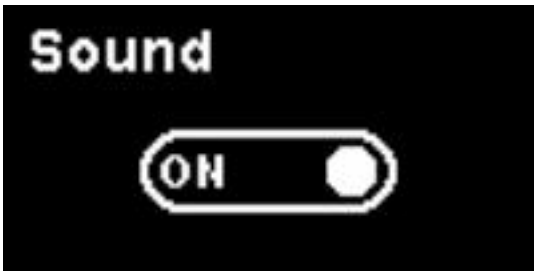
Dimming hand wheel operation:

Click the dimmer handwheel to switch ON and OFF options, and the Settings take effect at the same time and are automatically saved.

5.8.6.5.2 Sound switch

The Sound switch interface is shown below to control whether the buzzer sounds. The picture on the left shows the Sound function is on, and the picture on the right shows the Sound function is off. The Sound function is on by default.





Dimming hand wheel operation:

Click the dimmer handwheel to switch ON and OFF options, and the Settings take effect at the same time and are automatically saved.

5.8.6.5.3 Light management Function switch

The Light management function refers to: 3 seconds after the user adjusts the brightness of the light source, it will automatically remember the brightness value of the light source under the current state (the position of the objective lens converter and the position of the color filter disc). When the user returns to the same state again, the brightness of the light source will be automatically set to the previous memorized state. For example: the user works under a 4x objective lens, adjusts the brightness value of the light source to 4 for observation, and after 3 seconds, the PX43 remembers the brightness value corresponding to the 4x objective lens to 4. Then the user turns to the 10x objective lens for observation and adjusts the brightness value of the light source to 10. After 3 seconds, the PX43 remembers the brightness value corresponding to the 10x objective lens to 10. At this time, if the

user returns to the 4x objective lens and continues to observe, the PX43 will automatically set the brightness of the light source to 4(that is, the brightness value used by the user when observing under the 4x objective lens), without the user's manual adjustment. Similarly, if the user switches to the 10x objective, the PX43 will automatically set the brightness of the light to 10. The Light management function always returns the PX43 to the illumination it was when the user was looking at it, making the microscope easier to use.

The Light management switch interface is shown in the following picture, the left picture shows that the Light management function is on, and the right picture shows that the Light management function is off. By default, the Light management function is enabled.

Dimmer hand wheel operation:

Click the dimmer handwheel to switch ON and OFF options, and the Settings take effect at the same time.

Note: The Light management function is always turned on by default when the microscope is turned on each time, that is, the above Settings are only effective for this use, and Light management is still turned on when the microscope is turned on next time.

5.8.6.5.4 Restore Factory Settings Restore factory Settings

Restore Factory Settings restores the Settings of the PX43 microscope to the default state, i.e. :

(a) The current light source is selected as LED light source;

(b) All objective light sources have a brightness value of 8;

(c) The objective converter is configured with 4x, 10x, 20x, 40x, 60x;

(d) Color filter turntable configuration color filter model is: Cy5, Cyan, DAPI, Endow, FITC, Null;

(e) ECO function is opened, and the time is set to 15 minutes;

(f) Sound is ON, that is, the buzzer sounds.

The following figure shows the Restore Factory Settings screen.

Dimming hand wheel operation:

Click the dimming hand wheel to CONFIRM the operation, and add 1 to the number displayed after confirm on the display screen（as shown in the following figure）. After confirming 3 times, start to perform the operation of restoring factory Settings.

The progress bar is displayed during the operation and the Succeed message will be displayed after the operation is complete.

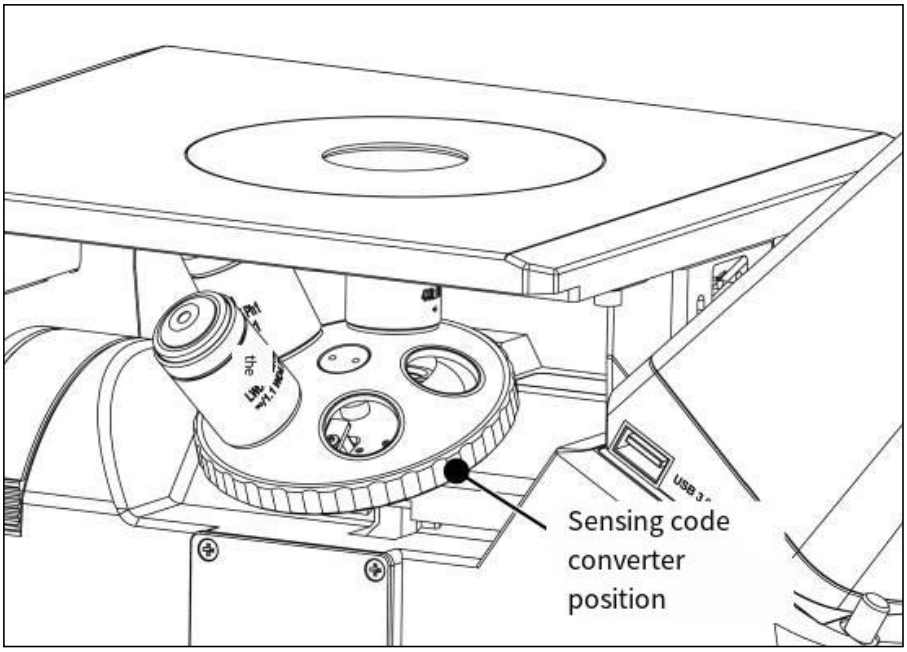
Dimming hand wheel operation:

Press and hold for 3 seconds to return to the main screen.

5.9 Automatic brightness adjustment (Figure 12)

- Turn the required objective lens into the optical path by turning the converter, and adjust the brightness according to the actual sample section. After 3 seconds of continuous illumination,
- The system will store this brightness value and repeat the previous lighting setting when the converter's objective in the same position is turned into the optical path again .

- It may also be necessary to adjust the setting manually each time you use it, and once the new brightness setting lasts for 3 seconds, the system overwrites the last setting.
- Repeat the procedure as above for all converter objective lens positions



(Figure 12)

6. Adjustment of Photomicrography

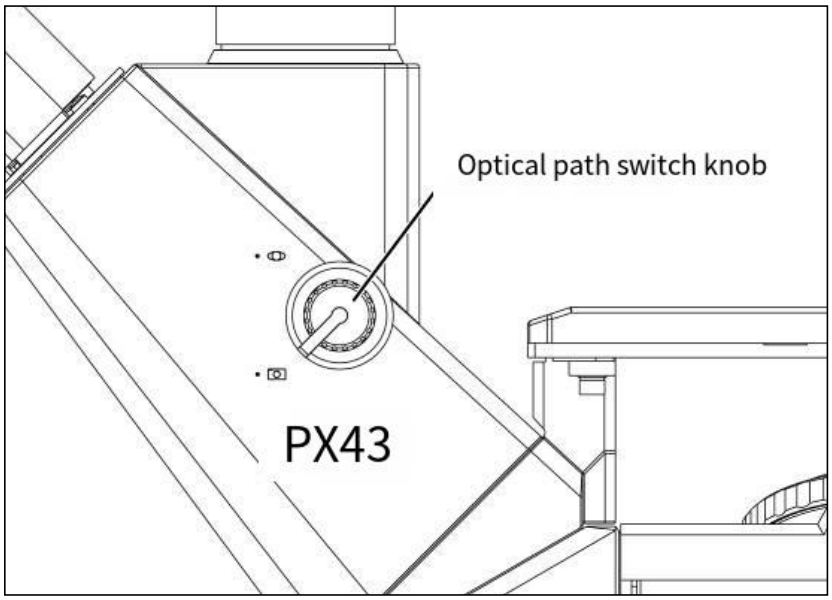
- Switch the light path through the light path switch knob (Figure 13). The two optical paths are assigned as: binocular tube/triocular tube 100:0 or binocular tube /Triocular 20:80(visual: camera photography).
- Before making photomicrographic observations, check the following items to make sure they have been done correctly:

  a.The condenser is centered.

  b. The field of view stop should open and close exactly tangent to the edge of the eyepiece's field of view.

  c.During phase contrast observation, the phase contrast ring plate and the objective lens phase plate have been aligned.

  d.Refer to the instruction manual of the camera used for detailed steps of photomicrographic adjustment.



(Figure 13)

7. Use an Oil-immersed Objective

- The Oil immersion objective is marked with the additional lettering **"oil"** and dipped into the oil between the specimen and the front of the objective.
- The immersed oil provided by Motic is a synthetic, non-fluorescent and non-resinous oil with a refractive index of 1.515
- Typically, with a few exceptions, the glass cover must be used with the oil immersion objective. The thickness deviation is not important because there is a layer of oil immersed above the glass cover to compensate.
- Each immersion objective comes with a small bottle of oil for easy application to the cover glass.
- Remove air bubbles from the nozzle of the fuel tank before use.
- Dipping oil must be used sparingly.
- It must be ensured that there are no air bubbles. To check for air bubbles, remove an eyepiece, open the field of view light bar as much as possible, and watch the inside of the eyepiece for the exit of the objective pupil (the exit pupil will appear as a bright circle).
- If it is difficult to see if there are bubbles, use a phase centering telescope and rotate the eyepiece portion of the centering telescope to focus on the exit pupil of the objective at Bubbles in the oil will make the sample image worse. To remove bubbles, add more by rotating the nose to swing the submerged objective back and forth more oil, or wipe off the oil and apply new oil.
- Put a drop of dipping oil on the glass lid.
- Make contact with the glass lid, then focus.
- Use lens cleaning paper to view and wipe the clean objective.
- Any oil film that remains on the submerged objective, or that spreads to the surface of the dry objective will have a noticeable negative effect on the image effects .To remove an oil film, wet the lens paper towel or clean cloth with petroleum benzene, gently wipe the lens surface, and wipe the lens surface with anhydrous ethanol (ethanol or methanol)
- Petroleum gasoline and anhydrous gasoline are highly flammable. Use extreme caution when handling.

8. Install the PX43 FS6 Fluorescent Device

8.1 Tools required for the installation of the fall fluorescence device

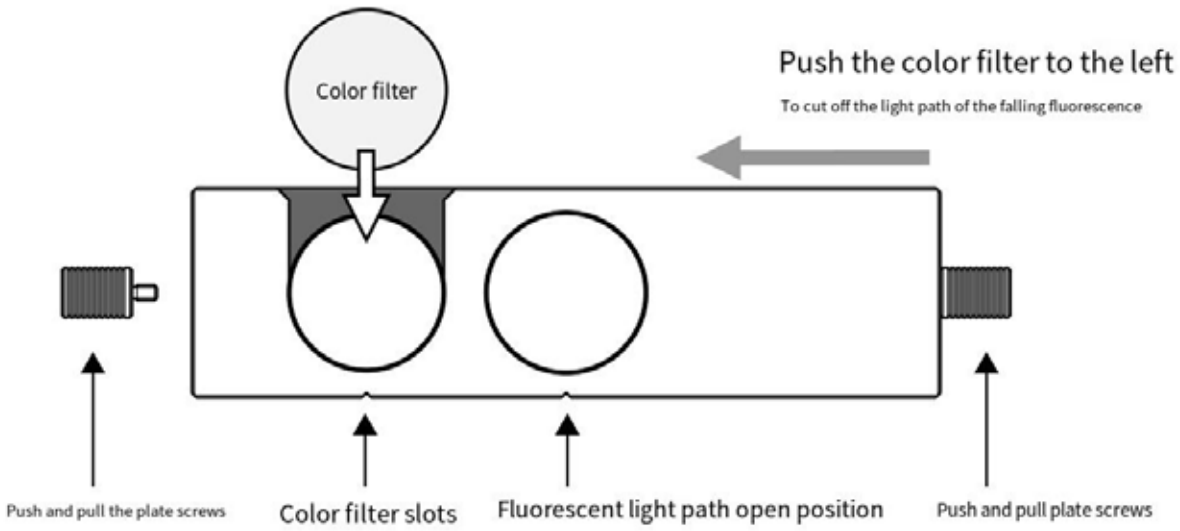
- Because the fall fluorescence device and the main machine need to use M2, M3, M6 hex cylindrical head screw and M4 hex cone end set screw,
- Therefore, it is necessary to use 1.5mm, 2mm, 2.5mm and hexagonal wrenches during assembly.

This installation tool will be distributed randomly.

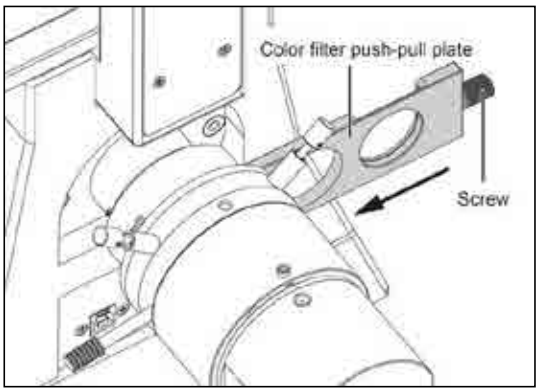
Note: Please turn off the power supply of the microscope and unplug the power cord before installation.

8.2 Installation of the push and pull plate of the color filter

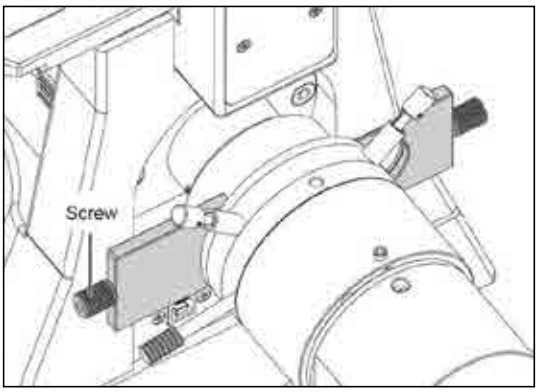
- Loosen the screws on one side of the push and pull plate of the color filter.（Figure 14-1）
- Swing the filter slot to the left and face the operator, and insert the filter push and pull plate into the body of the fall fluorescence device.（Figure 14-2）
- Lock the loose screws from the front. (Figure 14-3)



(Figure 14-1)



(Figure 14-2)

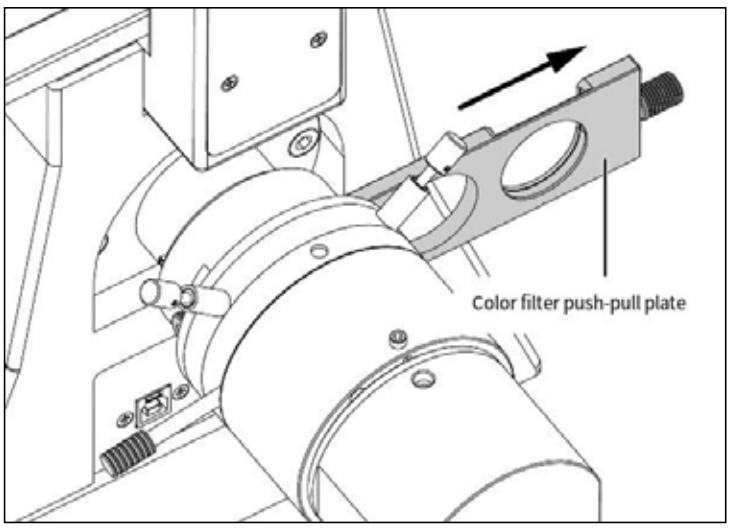


(Figure 14-3)

8.2.1 Color filter push-pull plate

- When the observation work is interrupted in the middle, please push the color filter to the pull plate push left (FIG. 15) and place in a non-porous position, cutting off light to prevent specimen fail.
- It can also be used when the specimen needs to be viewed through transmission illumination

The above method is used to cut off the fall-out lighting.



(Figure 15)

8.3 Installation of fluorescent filter group

Note: We have 5 filter groups and one empty position for BF TL

Note: Turn off the light source before switching or inserting a new filter group!

Watch out

- Always keep 5 filter groups in the fluorescent intermediate. Do not leave any filter group slots empty, as bright light may get in and damage the user 's eyes.
- If the filter group turntable is not filled with five filter groups, block the empty portion of the filter group's skateboard with **"DIA-ILL"**.
- Never perform lamp alignment without a UV filter set in the light path, as harmful UV radiation from the lamp can enter the eye and cause blindness.

8.3.1 Filter group installation

Note: Please avoid separating the filter group itself. Because filters are directional selective, incorrect assembly can damage the filter.

Remove the filter group for shipping.

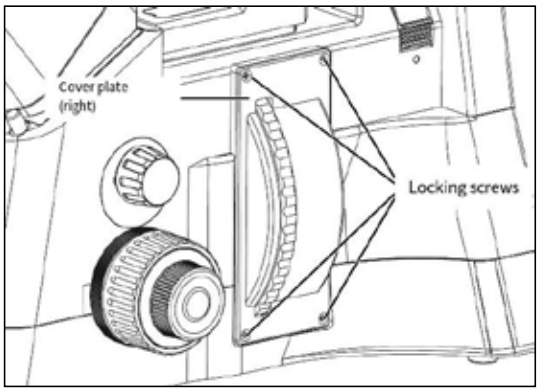
Step 1: Loosen the four locking screws on the right cover plate（Figure 16-1）and remove the right cover plate.（Figure 16-2）

Step 2: Place the filter group into the filter group turntable and lock the two screws holding the filter group in place.（Figure 16-3）

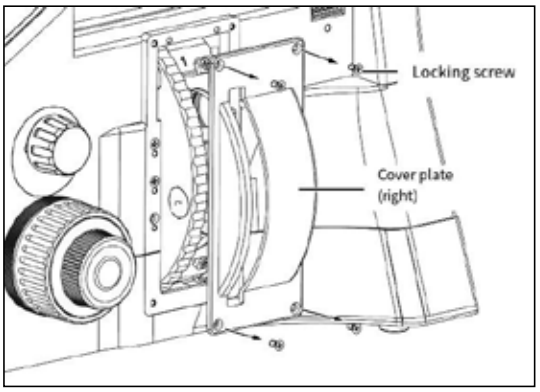
Step 3: Configure the corresponding information after the optical filter group is installed. For details, see 5.8.6.3 Configuring Color Filters.

Step 4: Repeat steps 1-3 above to install the rest of the filter group. It is recommended that when the number of filter groups is less than 6（including empty filter group）, please install the filter group as far as possible.（Figure 16-4）

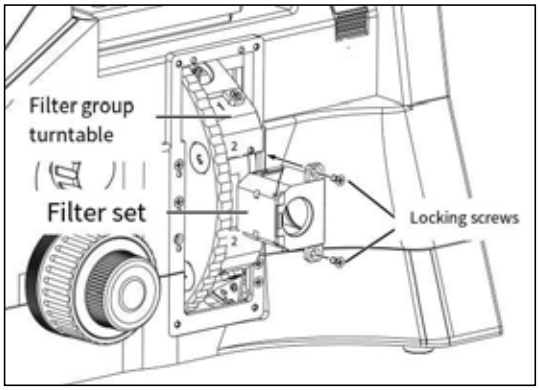
Step 5: Install back right cover plate and lock the four locking screws to secure. (Figure 16-5)



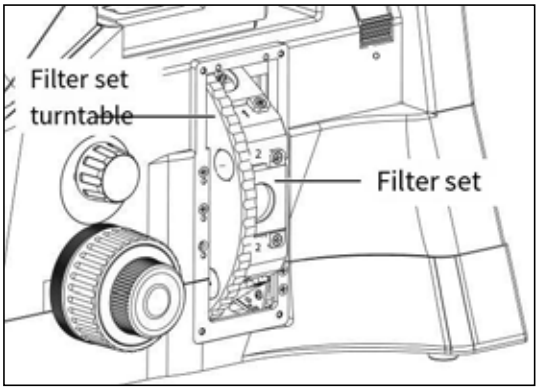
(Figure 16-1)



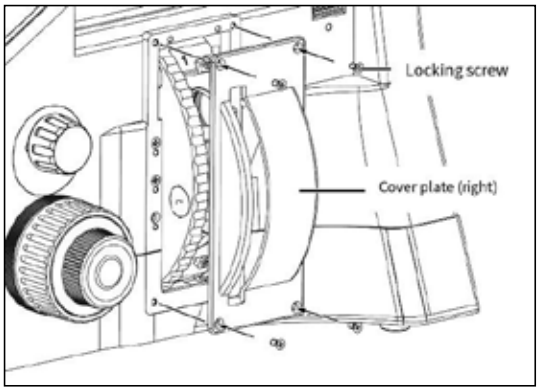
(Figure 16-2)



(Figure 16-3)



(Figure 16-4)



(Figure 16-5)

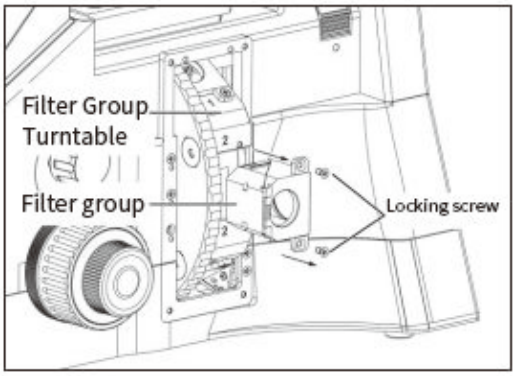
8.3.2 Removing the filter group

Step 1: Loosen the four locking screws on the right cover plate（Figure 16-1）and remove the right cover plate.（Figure 16-2）

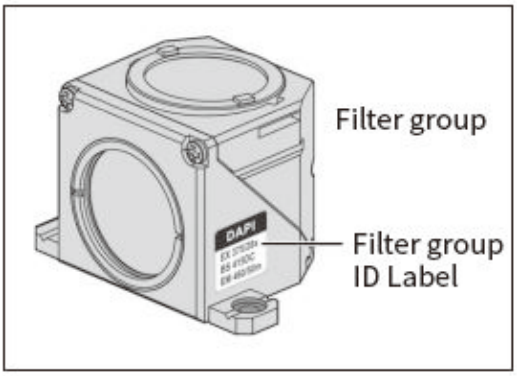
Step 2: Loosen the two screws holding the filter group in place and remove the filter group from the filter group turntable.（Figure 17-1）.

Step 3: Remove the corresponding filter group ID tag.（Figure 17-2）

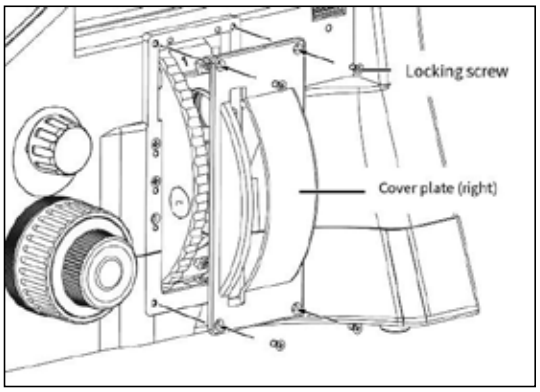
Step 4: Install **the** right cover plate and lock the four locking screws to secure it. (Figure 17-3)



(Figure 17-1)



(Figure 17-2)



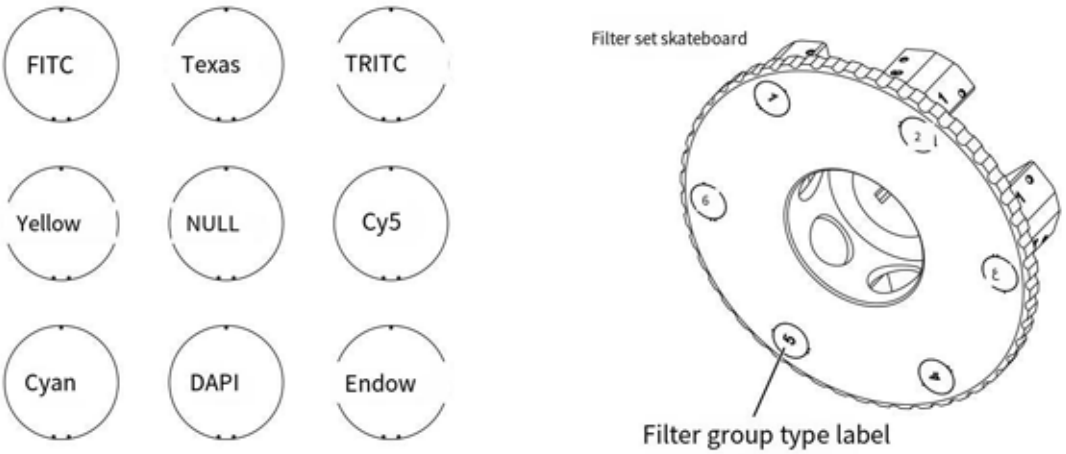
(Figure 17-3)

8.4 Filter group ID label

- Attach the filter group ID tag to the front of the fluorescent device.（Figure 17-2）
- Select the ID tag that represents the group of filters in the turntable and attach it to the appropriate location. (Figure 18-1)
- Each label shows the corresponding excitation mode for each filter group. Select the label corresponding to the filter group and insert it into the corresponding slot;（Figure 18-2）

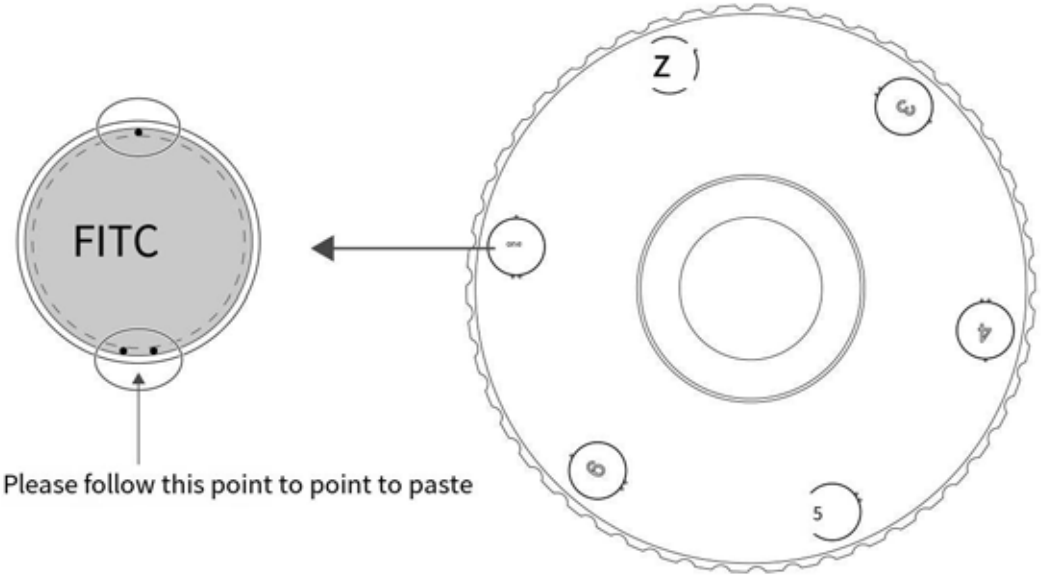
8.5 Filter Group Type label

- Position labels **"1", "2", "3", "4", "5", "6" are** used to indicate (Figure 18-1)



(Figure 18-1)

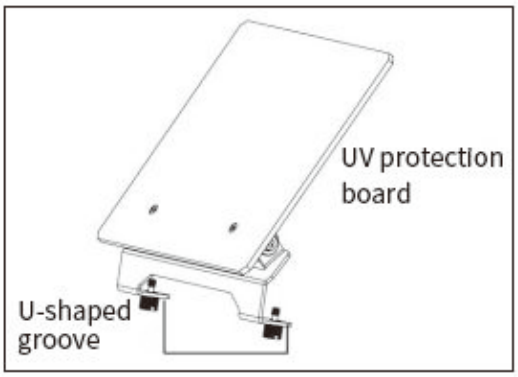
- The position of each filter group on the filter group skateboard. (Figure 18-2)



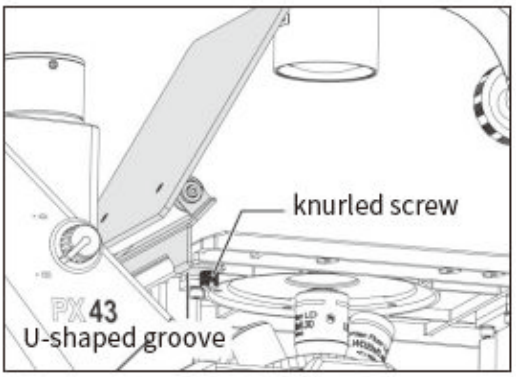
(Figure 18-2)

8.6 Installation of the UV shield

- The UV protection plate is used to protect the user's eyes from ultraviolet rays.
- Insert the two U-shaped slots (Figure 19-1) of the UV protection plate into the two knurled screws (Figure 19-2) at the bottom of the stage, and tighten the knurled screws to ensure that the UV protection plate does not fall off.



(Figure 19-1)



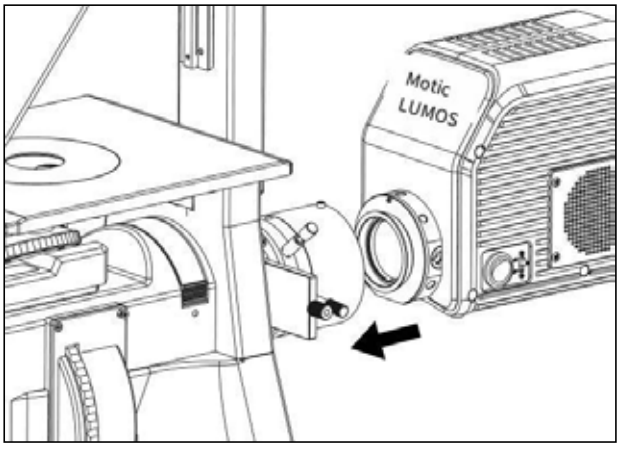
(Figure 19-2)

8.7 Connection of the LUMOS3 light box to the microscope

A. The LUMOS3 light box is directly connected to the microscope

Step 1: Align the dovetail dovetail pin on the LUMOS3 light box with the dovetail bracket on the fluorescent device. (Figure 20-1)

Step 2: Lock the light box to the fluorescent device with a 2.5mm **hex wrench.**



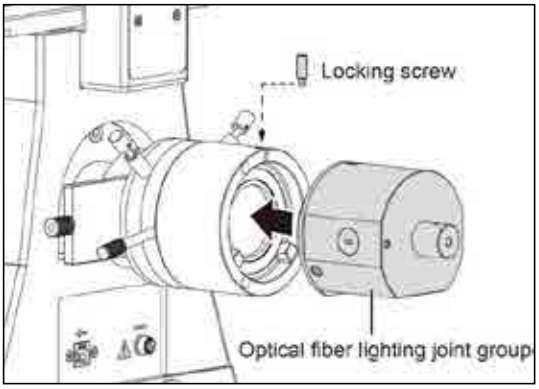
(Figure 20-1)

B. The LUMOS3 light box is connected to the microscope by optical fiber, splice group, etc

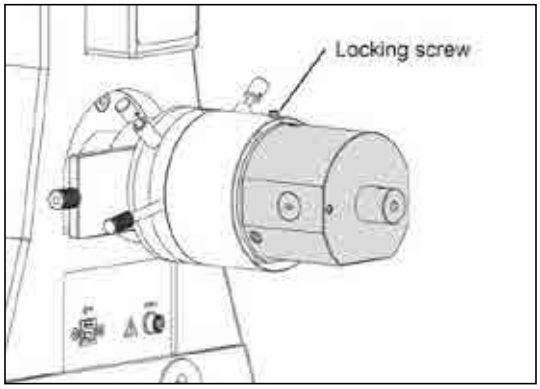
Step 1:Connect the optical fiber lighting joint group with the microscope fluorescence device Align the positioning pin on the dovetail tenon of the optical fiber lighting joint group with the positioning groove of the dovetail bracket on the fluorescence device, and lock the locking screw on the fluorescence device (Figure 21-1, Figure 21-2).

Step 2: Position the positioning pin on the dovetail of the LUMOS3 joint group with the positioning groove on the dovetail of the LUMOS3 joint group, and lock the setting screw on the LUMOS3 joint group. (Figure 21-3, Figure 21-4)

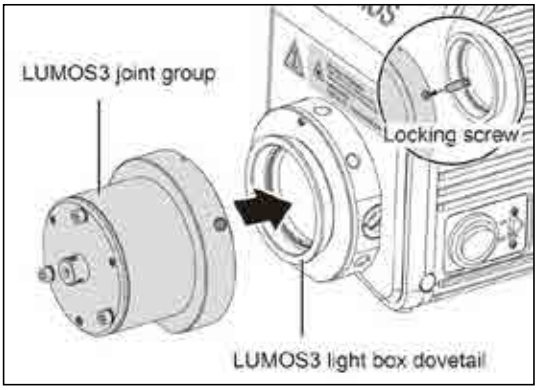
Step 3: Insert one end of the optical fiber into the optical fiber lighting connector group and lock the screws at the connector end of the optical fiber. Insert the other end of the optical fiber into the LUMOS3 connection head group and lock the screws at the optical fiber connector（Figure 21-5）



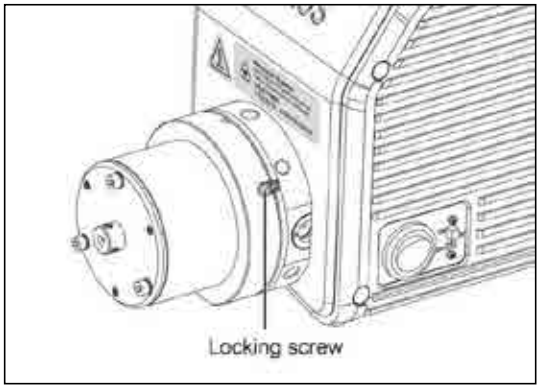
(Figure 21-1)



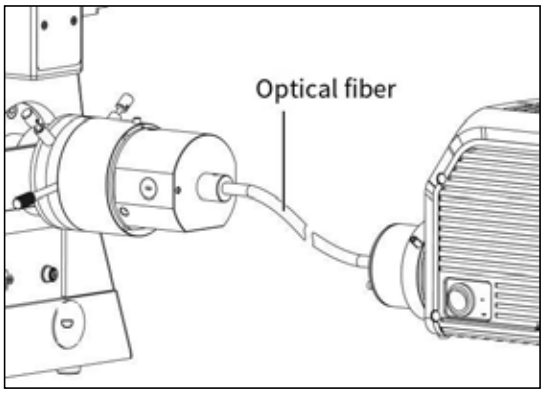
(Figure 21-2)



(Figure 21-3)



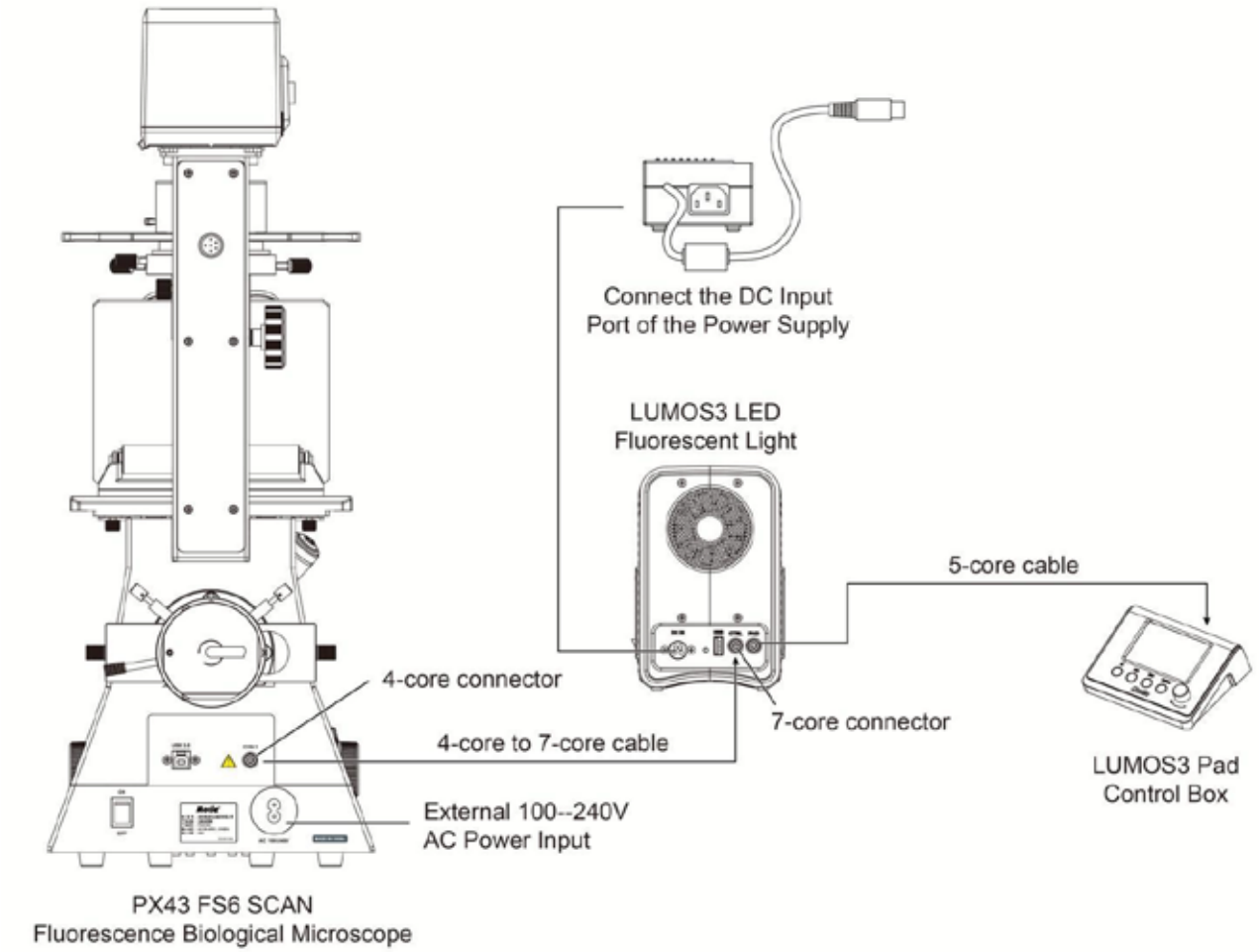
(Figure 21-4)



(Figure 21-5)

8.7.1 Connecting the cable to LUMOS3 and using the port: (Figure 22)

1. Connect the **DC IN** to the DC input port of the power supply.
2. **CTRL** control port for 4-core to 7-core cable connection to microscope body and LUMOS3 data transfer to ANNALSIS port.
3. Connect the LUMOS3 to the PAD with a USB cable.



(Figure 22)

8.7.2 Setting the light intensity of the fall fluorescence intermediate

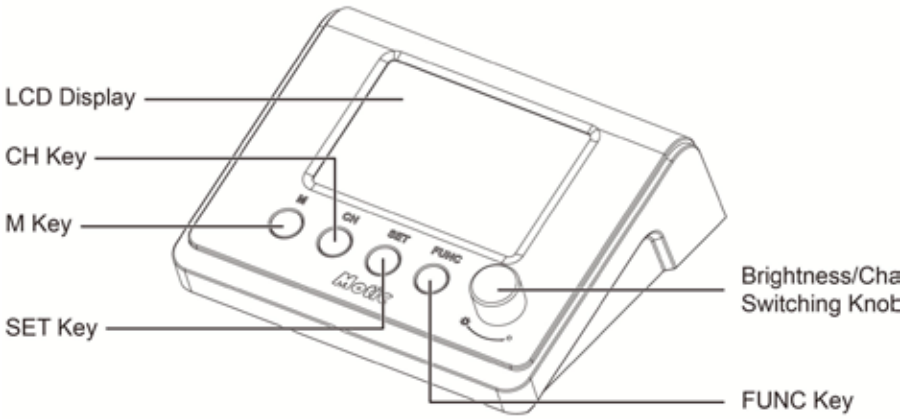
- Effective when using the PX43 FS6 fluorescent turntable and LUMOS3.
- The desired channel and light intensity can be set according to each combination of filter block and objective.

  a.Switch to fluorescent lighting (the LED indicator light of the fluorescent intermediate shows blue).

  b.Switch to the desired color filter in the fluorescent intermediate turntable to bring the sample into focus.

  c.The desired channel can be turned off/on by increasing and decreasing the brightness at the same time (LUMOS3 PAD U channel for ultraviolet excitation light,B channel for blue excitation light, G channel for green excitation light).

  d. After 3 seconds, the microscope automatically remembers the current brightness design value.

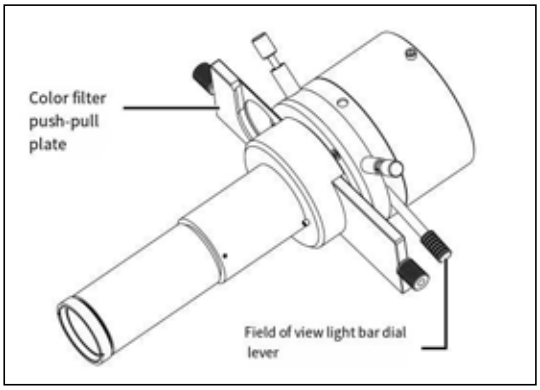


LUMOS3 PAD control box

(Figure 23)

8.7.3 Field of View Light bar adjustment

- The size of the field of view light bar determines the extent to which the specimen is illuminated. The opening and closing size of the field of view light bar can be adjusted by flicking the lever. In normal use, the light bar generally opens and closes to the edge of the field of view slightly larger location.
- If the light bar is opened too large for the required lighting range, the excess light will enter the field of view and flicker in the field of view, creating an image contrast will deteriorate.
- It also makes sense to reduce too much lighting to prevent the decay of the specimen's fluorescence.

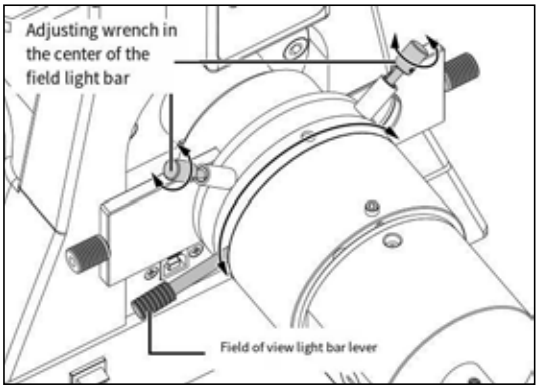


Invert the fluorescent attachment body

(Figure 24)

8.7.4 Adjustment of the center of the field of view light bar

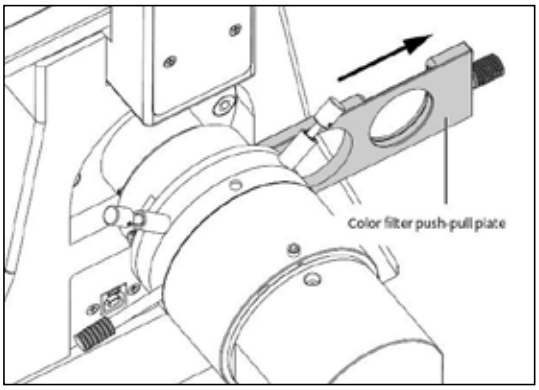
- Move the field of view light bar to **"C"**, that is, turn down the field of view light bar.
- If the light bar is offset, the two hex wrenches at the light bar of the field of view can be turned. Make the center of the reduced light bar concentric with the field of view.
- Open the field of view light bar so that it is slightly larger than the edge of the field of view.



(Figure 25)

8.7.5 The use of color filter push-pull plate without holes

- When the observation work is interrupted in the middle, please push the color filter push-pull plate to the left. Hold it in a non-porous position to cut off light and prevent decay of the specimen.
- When it is necessary to observe the specimen through transmission illumination, such as phase contrast for microscopic observation, the above methods can also be used to cut off the fall-out illumination.



(Figure 26)

8.7.6 Neutral color filter

- Neutral filters evenly reduce the illumination intensity of all wavelengths. In order to prevent photoattenuation of the specimen, this filter can be added color plates to reduce the intensity of the output light without changing the color temperature.

Neutral color filters in relation to light intensity

Neutral color filters
ND2（Light transmittance: 50%)
ND4（transmittance: 25%）
ND16（light transmittance: 6.25%）

8.7.7 Insulated color filter

- The thermal filter is placed in front of the light source to reduce the heat transferred to the excitation filter and prevent interference of the coating layer of the filterDamage.
- However, for infrared excited systems, the thermal filter must be removed, because it cannot allow light from the near infrared and infrared regions to pass through.

8.7.8 Filter group

- The filter group is designed as a separate module, which contains a set of excitation filter (EX), blocking filter (BA) and color separation splitting Color filter (DM).
- The function of the excitation filter is to maximize the transmission of the desired excitation band light and suppress the rest of the band light.
- The function of the blocking filter is to maximize the excited fluorescence to pass through and not to let the excited light through.
- The color separation filter and the incident excitation light into 45° Angle, its function has two: one is to reflect the direction of the specimen wavelength shorter excitation light; The second is to let a longer wavelength of excited fluorescence through.

9. Trouble Shooting Table

When you are using this phone, you may encounter some problems. The following table will list the problems you may encounter and the resulting problems
Reasons.

9.1 Optical and mechanical failures

Symptoms	Causes
Dark edges of the field of view or uneven light and dark within the field of view	Light bulb not installed properly
	The color filter board is in the middle and not inserted in place
	The phase contrast push-pull plate is not pushed to the intended position
	Condenser is not installed in place
	The aperture stop is open too small
	The objective converter is out of position
	The light switch lever is not in position (For PX43 BIO tri-mesh/PX43 FS6 tri-mesh only)
There is dirt in the field of view	The aperture light bar is closed too small
	There is dirt on the surface of the sample
Image quality: No image or details can not be distinguished under observation	Using a bright field objective
	The phase contrast ring plate is not pushed into the light path
	The ring plate used does not correspond to the marking of the phase contrast objective
	The ring plate does not coincide with the phase plate in the objective
	The thickness of the sample container exceeds the operating range of the objective lens
Excessive eye strain	No adjustment of pupil distance
	No adjustment of visual acuity
	The lighting level is not appropriate
	The left and right eyepiece have a different field of view

9.2 Electrical Faults

Symptoms	Causes
Light bulb not working	Power is not plugged in.
	Light bulb not installed properly.
	In smart sensing mode, and the user left more than the set time.
	The light bulb is broken.
The lighting is not at the right level	A non-specified bulb was used.
The bulb burns out immediately.	Use a non-designated light bulb.
The light flickers or has inconsistent brightness	Poor contact at the joint.
	The bulb used is nearing the end of its useful life.
	The bulb is not fully inserted into the socket positioning hole.

10. Care and Service

10.1 Lens and color filter

- For the cleaning of the lens surface and color filter, first blow off the dust of the floating table with the washing ear ball. If there is still dirt, it is best to use soft clean brush or gauze to remove.
- Gauze or lens paper dipped in a mixture of anhydrous ethanol and ether（in a ratio of 3:7, anhydrous ethanol 3: ether 7）can only remove fingers stains such as stripes, grease, etc.
- Use a mixture of anhydrous ethanol and ether（anhydrous ethanol 3: ether 7 in a ratio of 3:7）to wipe off the tar oil.
- The tar oil on the objective lens can only be wiped off with a mixture of anhydrous ethanol and ether（at a ratio of 3:7, anhydrous ethanol 3: ether 7）.
- Because the mixture of anhydrous ethanol and ether burns easily, use extreme caution when operating in an environment with an open flame.
- Do not rub the same area with gauze or lens paper more than once.

10.2 Clean painted parts and plastic parts

- Do not use organic solution（such as ethanol, ether, diluent, etc.) or its diluent for cleaning. Otherwise it will cause the paint layer to fade or peel.
- Stubborn dirt can be wiped with a gauze dampened with a soft cleaner.
- Plastic surfaces can only be cleaned with a soft cloth dipped in water

10.3 When not in use

- When not in use, cover the instrument with an ethylene dust cover and place it where the humidity is low and it is not easy to mold the instrument. The objective lens, eyepiece, and color filter should be placed in a container with a desiccant.

10.4 Replacement of light bulb/LED module

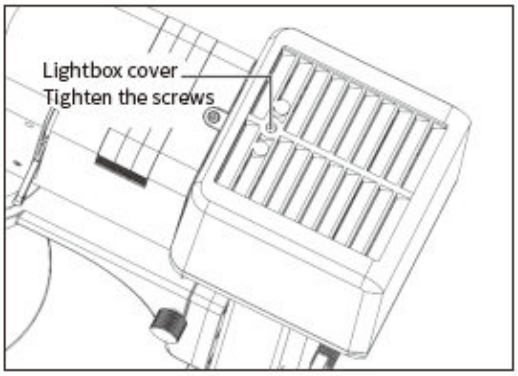
Warnings

To avoid electric shocks, make sure the power switch is turned off and unplug the power cord before installing and removing the bulb.

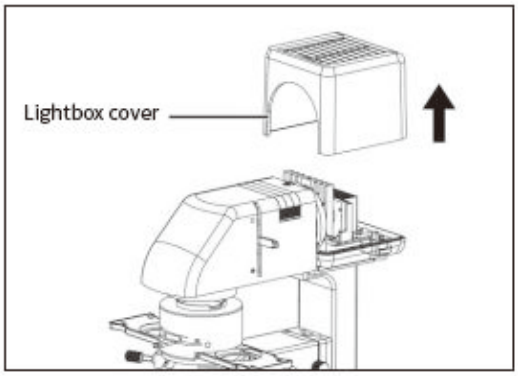
The glass surface of the light bulb may be very hot. Do not replace the lamp until it has completely cooled.

10.4.1 50W halogen light set

- The halogen lamp is 12V/50W, please note that the new replacement bulb specifications are consistent with this.
- To prevent electric shock, make sure the power switch is off and unplug the power cord before changing the bulb.
- Use an Allen wrench to loosen the fastening screws on the light box cover（Figure 27-1）, pull the light box cover up and remove it.（Figure 27-2）

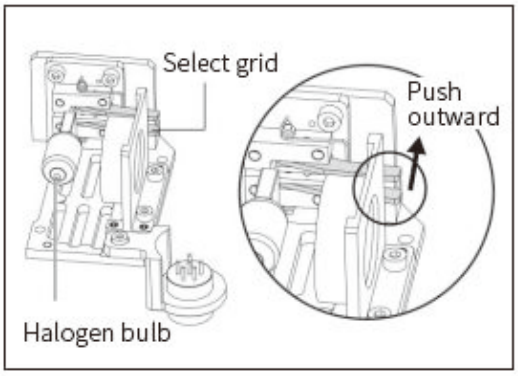


(Figure 27-1)

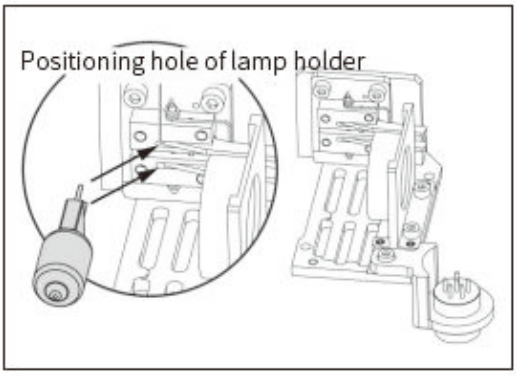


(Figure 27-2)

- Push the "selection grid" outward (Figure 27-3), remove the old bulb, insert the pin of the new bulb into the positioning hole of the lamp holder（Figure 27-4）,
- Relax the "selection grid" in the picture to secure it. When installing, be careful that the bulb is not tilted. (Figure 27-4)



(Figure 27-3)



(Figure 27-4)

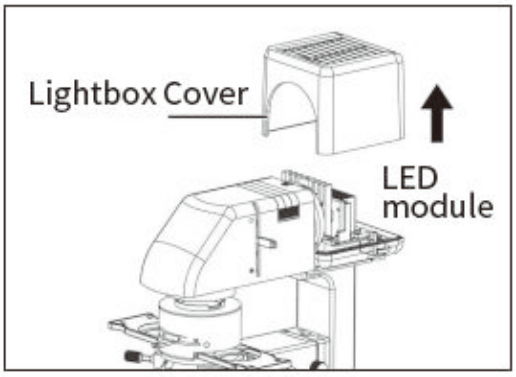
- When installing the bulb, do not touch the glass surface of the bulb directly with your bare fingers, otherwise you will leave fingerprints, grease, etc., in the bulb glass on the surface, when the bulb

is lit, it will form scorch marks and reduce the lighting brightness of the bulb. If there is dirt on the glass surface of the bulb, use a lens wipe it clean with paper.

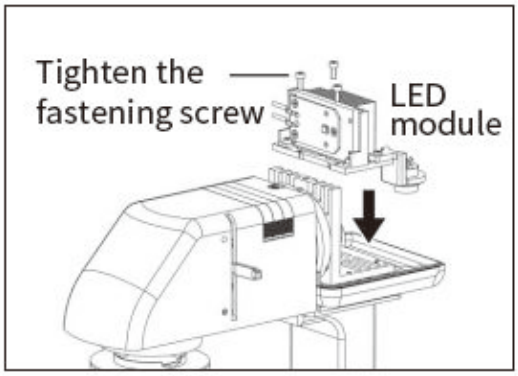
- After you have finished replacing the light bulb, put the light box cover back on and lock the light box cover tightly with an Allen wrench.

10.4.2 LED light source

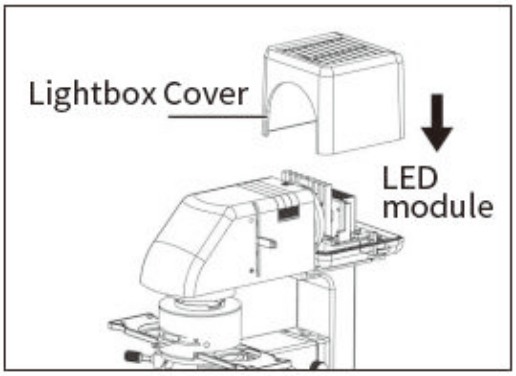
- To prevent electric shock, make sure the power switch is off and unplug the power cord before replacing the LED module.
- LED module and halogen lamp group can share the light box group.
- Use an Allen wrench to loosen the fastening screws on the light box cover（Figure 27-1）, pull the light box cover up and remove it.（Figure 28-1）
- When installing the LED module, lock the two locking screws at the corresponding position of the LED module.（Figure 28-2）, use a 1.5mm hex wrench to lock the lighting module to the lamp base.
- After replacing the LED module, reinstall the light box cover and lock the light box cover tightly with an Allen wrench.（Figure 28-3）
- LED lighting modules and halogen lamps share lamp holders and can be directly interchangeable, which is a patented Motic design. (Figure 28-4)



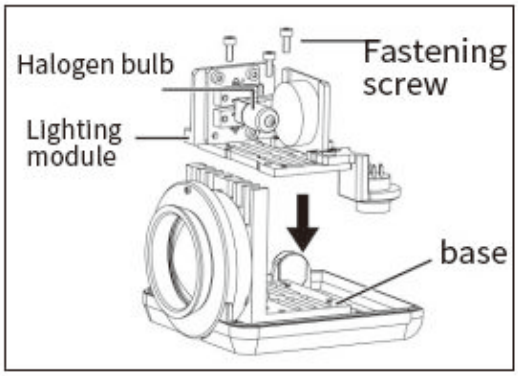
(Figure 28-1)



(Figure 28-2)



(Figure 28-3)



(Figure 28-4)

- Reinstall the light box cover to its original position after installation and use an Allen wrench to lock the fastening screws on the light box cover.

The correct operation can ensure the long-term use of the microscope without obstacles. For repairs please contact your nearest **Motic** dealer or contact our technical service department directly.

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