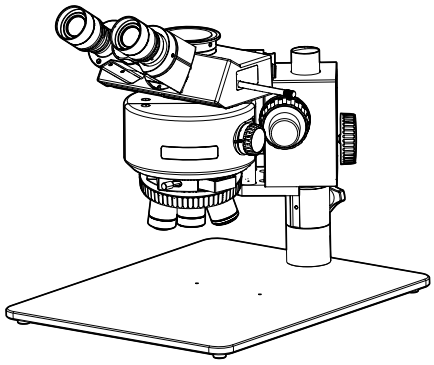


Instructions

BXFM

System Microscope

This instruction manual is for the system microscope model BXFM.
To ensure the safety, obtain optimum performance and to familiarize yourself fully with the use of this system, we recommend that you study this manual thoroughly before operating this system, and always keep this manual at hand when operating this system.
Retain this instruction manual in an easily accessible place near the work desk for future reference.
For details of products included in the configuration of this system, see page 10.

Optical Microscope and Accessory

This product is applied with the requirements of standard IEC/EN61326-1 concerning electromagnetic compatibility.

- Emission Class A
- Immunity Industrial electromagnetic environment

Emissions exceeding the level required by aforementioned standards may occur if this product is electrically connected to other equipment.

Some interference may occur if this product is used in residential environments.

In accordance with European Directive on Waste Electrical and Electronic Equipment, this symbol indicates that the product must not be disposed of as unsorted municipal waste, but should be collected separately.

Refer to your local Evident distributor in EU for return and/or collection systems available in your country.

NOTE: This product has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the product is operated in a commercial environment. This product generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this product in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC WARNING: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the product.

For Korea only

이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.

Contents

Introduction

This microscope employs the UIS2 (UIS) optical systems. If you use eyepiece, objective, observation tube or condenser, etc. together with this microscope, be sure that they apply to the UIS2 (UIS) optical system series. Using inappropriate units restricts the performance.
(There are units usable with the BX series. Contact Evident or refer to the latest version of catalogs.)

Configuration of instruction manuals

Read all the instruction manuals provided with the units you purchased.
The following instruction manuals are prepared for the units to be used with this system.

Instruction manuals	Main contents
BXFM system microscope (this instruction manual)	Reflected light brightfield observation, reflected light darkfield observation, reflected light simple polarization observation, reflected light differential interference contrast observation, reflected light fluorescence observation and reflected light infrared observation
LED and LDP light source	Connection of the light guide illumination system with the liquid light guide, etc.
U-RFL-T power supply for mercury burner / U-RX-T power supply for xenon burner	Connection of the mercury lamp housing with the power supply
TH4 halogen lamp power supply unit	Connection of the halogen lamp housing with the power supply
BX3M-PSLED Power supply for LED	Power supply for LED
BX3M-CB/CBFM Control box/FM Control box	Connection of the cable for motorized nosepiece with the control box Connection of the cable for MIX slider with the control box
Coded function system	Connection of the cable of coded nosepiece with the control box Connection of the cable of coded reflected light illuminator with the control box

Label of the immersion oil

Read the label of the immersion oil you purchased.

Immersion oil	Major contents
IMMOIL-8CC IMMOIL-500CC IMMOIL-F30CC	Contains the cautions and handling methods of the immersion oil.

Intended use

This product has been designed to observe magnified images of specimens in industrial applications.
Appropriate specimens can include semiconductors, electrical components, molded articles, or mechanical parts.
Industrial applications include observation, inspection or measurements.
Do not use this product for any purpose other than its intended use.

Safety precautions

If the product is used in a manner not specified by this manual, the safety of the user may be imperiled. In addition, the product may also be damaged. Always use the product according to this instruction manual.

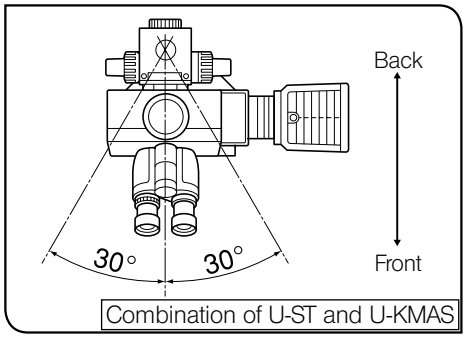
The following symbols are used in this instruction manual.

⚠CAUTION : Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

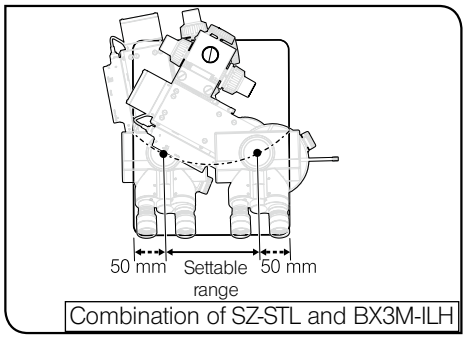
NOTE : Indicates a potentially hazardous situation which, if not avoided, may result in damage to the product or other property.

TIP : Indicates the useful knowledge or information for use.

⚠ CAUTION - Installation of the product -



Combination of U-ST and U-KMAS



Combination of SZ-STL and BX3M-ILH

Install the microscope on a sturdy, level table or bench.

If you install the microscope on an unstable table or a tilted table, the microscope may drop and you may get injured.

Prevent the microscope from overturning.

The microscope becomes unstable if the height of the microscope is increased by the accessories mounted on it. In this case, as this microscope may be overturned, take the actions to prevent the microscope from overturning.

Attach each unit at the appropriate angle.

- If you use the BXFM system in combination with the stand (U-ST), attach the BXFM frame (BXFM-F) at within ±30 degrees with respect to the column. Also, attach the reflected light illuminator for BF (U-KMAS) so that the lamp housing comes to the right side when viewed from the front.
- When using the BXFM system in combination with the large stand (SZ-STL) and the illuminator holder for BXFM (BX3M-ILH), set the attaching angle of the BXFM frame (BXFM-F) in the range where the center position of the objective used for observation is placed inside from the both edges of the large stand by 50mm.

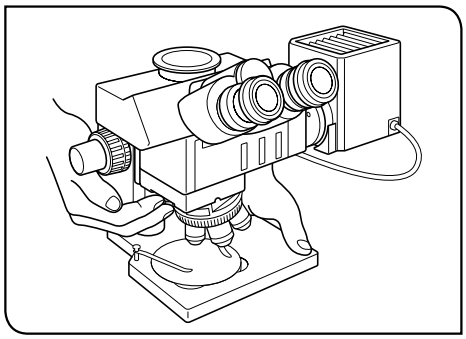
Do not combine with the unit which makes the microscope unstable.

- Be sure to observe the total weight limit of the units loaded onto the illuminator holder as shown below.

Illuminator holder	Total weight limit of the units
BX3M-ILH	• Without the assist spring for BXFM (BXFM-ILHSPU): Upper limit: 7.5 kg, lower limit: unlimited • With the assist spring for BXFM (BXFM-ILHSPU): Upper limit: 11.5 kg, lower limit: 6.5 kg * * If the total weight is lighter than 6.5 kg, accuracy of the fine focusing knob of the BXFM frame can not be assured.
BXFM-ILHS	Upper limit: 7.5 kg, lower limit: unlimited

- Do not use the illuminator holder for BXFM (BX3M-ILH) with combination of the stand (U-ST), because this makes the system unstable.
- When using the illuminator holder for BXFM (BX3M-ILH) with combination of the large stand (SZ-STL), the image may fluctuate or blur irregularly when a 50X or higher-power objective is used. It is recommended to fabricate an exclusive clamping tool to clamp the BXFM frame (BXFM-F).

⚠ CAUTION - Carrying the microscope



Hold the BXFM frame and the stand.

When moving the microscope, hold the stand by the bottom with one hand, and hold the BXFM frame with the other hand.
Holding the coarse/fine focusing knobs or lamp housing, etc., may damage the microscope.

Remove the sample and the units.

When carrying the microscope, be sure to remove the sample and the eyepieces to prevent them from dropping.
Also, remove units attached. If you carry the microscope attached with units, the danger to drop the microscope will be increased due to the heavier weight.

Do not slide on the top surface of the table.

Do not move the microscope by sliding on the top surface of the table. The rubber legs may be damaged.

⚠ CAUTION - Electric safety -

Always use the power cord provided by Evident.

If the proper AC adapter, the power cord and other cables are not used, the electric safety and the EMC (Electro-Magnetic Compatibility) performance of the product cannot be assured. If no power cord is provided, please select the proper power cord by referring to the section “Proper selection of the power cord” at the end of this instruction manual.

Always connect the ground terminal.

Connect the ground terminal of the power cord and that of the power outlet. If the product is not grounded, our intended electric safety and EMC performance of the product can not be assured.

Do not use the product in close proximity to the sources of strong electromagnetic radiation.

Proper operation may be interfered. The electromagnetic environment should be evaluated prior to operation of the product.

Remove the power cord in case of emergency.

In case of emergency, be sure to unplug the power cord from the power cord connector on the product or from the wall power outlet.

Install the product at the location where you can reach the power cord connector or the wall power outlet at hand to remove the power cord quickly.

⚠ CAUTION - Protection for electric shock -

Keep the power cord and cables sufficiently away from the lamp housing.

If the power cord and cables contact a hot area of the lamp housing, they could melt and cause electric shock.

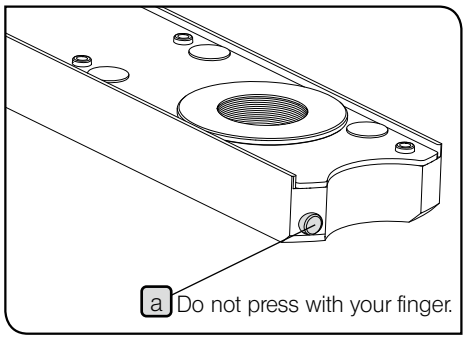
Do not insert any tools or metal fragments in the air vents of the product.

Doing so could cause electric shock, ignition or failure of the product.

Do not touch the product with a wet hand.

In particular, if you touch the main switch of the power unit or the power cord with a wet hand, electric shock, ignition or failure of the product may be caused.

⚠ CAUTION - LED (light emitting diode) -



Do not look directly at the light from the LED light source for a long time.

The LED built in this product is basically eye-safe. However, do not look directly at the light from the LED lamp house for a long time, since it may cause damage to your eyes.
If the laws or regulations for workers health and safety have been established, follow them when using the microscope.

Do not look directly at the light coming out from the objective or the specular reflection light from the specimen.

Do not look directly at the light coming out from the objective for a long time, since it may cause damage to your eyes.

Do not expose your skin to the light coming out from the objective for a long time.

If your skin is exposed to the light coming out from the objective for a long time, you may get burned.

Do not press the micro switch of the MIX slider for reflected light observation (U-MIXR) with your finger.

If you press the micro switch a of the MIX slider for reflected light observation with your finger, the MIX slider for reflected light observation may emit the light.

Do not insert the MIX slider for reflected light observation (U-MIXR) upside down.

Do not insert the MIX slider for reflected light observation upside down. Otherwise, the light coming out from the MIX slider for reflected light observation enters your eyes through the eyepiece and your eyes may be damaged.

⚠ CAUTION - Protection for injury -

Do not pull the cable with an excessive force.

If you pull the cable connected to the FM control box (BX3M-CBFM) with an excessive force, the control box may drop and you may get injured.

⚠ CAUTION - Halogen lamp housing / Mercury lamp housing -

Confirm that the lamp is attached properly and cords are connected properly.

Remove the power cord from the product when replacing the lamp.

To avoid electric shock hazards and burns when replacing the lamp, set the main switch of the power supply for the light source to O(OFF), then remove the power cord from the product in advance. When you replace the lamp immediately after use of the microscope, wait until the lamp housing and the lamp are sufficiently cooled down.

Applicable lamp	**[For U-LH100L3, U-LH100IR]** 12V100WHAL-L (made by PHILIPS Co. 7724I) 12V100WHAL (made by PHILIPS Co. 7023) **[For U-LH100HGAPO, U-LH100HG]** USH-103OL (made by Ushio Inc.)

Secure the sufficient space around the lamp housing.

The surface of the lamp housing on the back of the microscope gets very hot. Therefore, when installing the microscope, secure the sufficient space around the lamp housing, particularly on the top surface. After the microscope is installed, check that the space below the lamp housing is sufficiently secured.

The lifetime of the lamp housing (not lamp) is 8 years or 20,000 illumination hours, whichever occurs first, as a guideline. For details, see ”10 Preventive inspection sheet for illumination devices” on page 78.

⚠ CAUTION - Safety symbols -

The following symbols are placed on this product.
Study the meaning of the symbols and always use the product in the safest possible manner.

Symbol	Meaning
⚠	Indicates a non-specific general hazard. Follow the description given after this symbol or in the instruction manual.
⚠	Indicates that the surface becomes hot, and should not be touched with bare hands. It may cause burns.
⚠	Indicates high voltage. Take special care to prevent electric shock.
I	Indicates that the main switch is ON.
O	Indicates that the main switch is OFF.

Caution labels

The cautions are displayed on the portions which require special cautions during use and operation. Be sure to follow these instructions.

Caution label position	Reflected light illuminator for BF/DF (BX3M-RLA-S)	〔High temperature〕	⚠
	Coded universal reflected light illuminator (BX3M-URAS-S)	〔High temperature〕	⚠
	Shutter for coded universal reflected light illuminator (BX3M-URAS-S)	〔High temperature〕	⚠
	DF converter (U-RCV)	〔High temperature〕	⚠
	100 W halogen lamp housing for IR (U-LH100IR)	〔High temperature〕	⚠
	100 W halogen lamp housing (U-LH100L-3)	〔High temperature〕	⚠
	100 W mercury lamp housing (U-LH100HG) / 100 W mercury apo lamp housing (U-LH100HGAPO)	〔High temperature〕 〔Electric shock〕	⚠ ⚠
	LED and LDP light source (U-LGPS)	〔High temperature〕 〔Electric shock〕	⚠ ⚠
	Power supply (TH4-100) / Power supply (TH4-200)	〔High temperature〕 〔Electric shock〕	⚠ ⚠
	ND filter (U-25ND50-2) / ND filter (U-25ND25-2) / ND filter (U-25ND6-2) / Frost filter (U-25FR) / Interference contrast filter (U-25IF550) / L42 filter (U-25L42) / Light balancing filter (U-25LBD) / Yellow filter (U-25Y48) / Empty slider (U-25) / Light balancing amber filter (U-25LBA)	〔High temperature〕	⚠

When caution labels are dirty or peeled off, contact Evident for replacement or inquiries.

Handling Precautions

NOTE • **This microscope is a precision instrument. Handle it with care and avoid subjecting it to a sudden or severe impact.**

- **Never disassemble any part of the product. Otherwise, failure could be caused.**
- **Do not use this product in areas where it may be subjected to direct sunlight, high temperature and/or humidity, dust or vibrations.**
  (For conditions of operating environments of this product, see "6 Specifications" on page 54.)
- **Before attaching or detaching the units other than the MIX slider for reflected light observation (U-MIXR), set the main switch of each unit to O(OFF).**

Maintenance and Storage

1. Do not leave stains or fingerprints on the lenses or filters. If they get dirty, blow away dust with a commercially available blower and gently wipe the lens or filter with a piece of cleaning paper (or clean gauze).
   Only when cleaning fingerprints and oil stains, slightly moisten a piece of cleaning paper with commercially available absolute alcohol and wipe them off with it.

⚠CAUTION **Since the absolute alcohol is highly flammable, it must be handled carefully. Be sure to keep it away from open flames or potential sources of electrical sparks. For example, the electrical equipment that is switched on and off may cause the ignition of a fire. Also, always use absolute alcohol only in a well-ventilated room.**

2. Wipe the portions other than lens with a dry soft cloth. If the dirt cannot be removed by dry-wiping, moisten a soft cloth with diluted neutral detergent and wipe the dirty surface with it.

NOTE **Do not use the organic solvents because they may deteriorate the coated surface or plastic parts.**

3. After using the product, be sure to set the main switch to O(OFF), wait until the lamp housing is cooled down sufficiently, and keep it covered with a dust cover during storage.
4. Before disposing of this product, be sure to follow the regulations and rules of your local government. Contact Evident for any questions.
5. If the hour counter of the power supply shows 300 hours, set the main switch to O(OFF) for safety purpose, wait 10 minutes or more and replace the lamp. (See page 75.)

NOTE **The mercury burner contains high-pressure gas in the tube. If you keep using the mercury burner exceeding its lifetime significantly, the distortion accumulates in the glass tube to cause the explosion in rare cases.**

In case that the mercury burner explodes

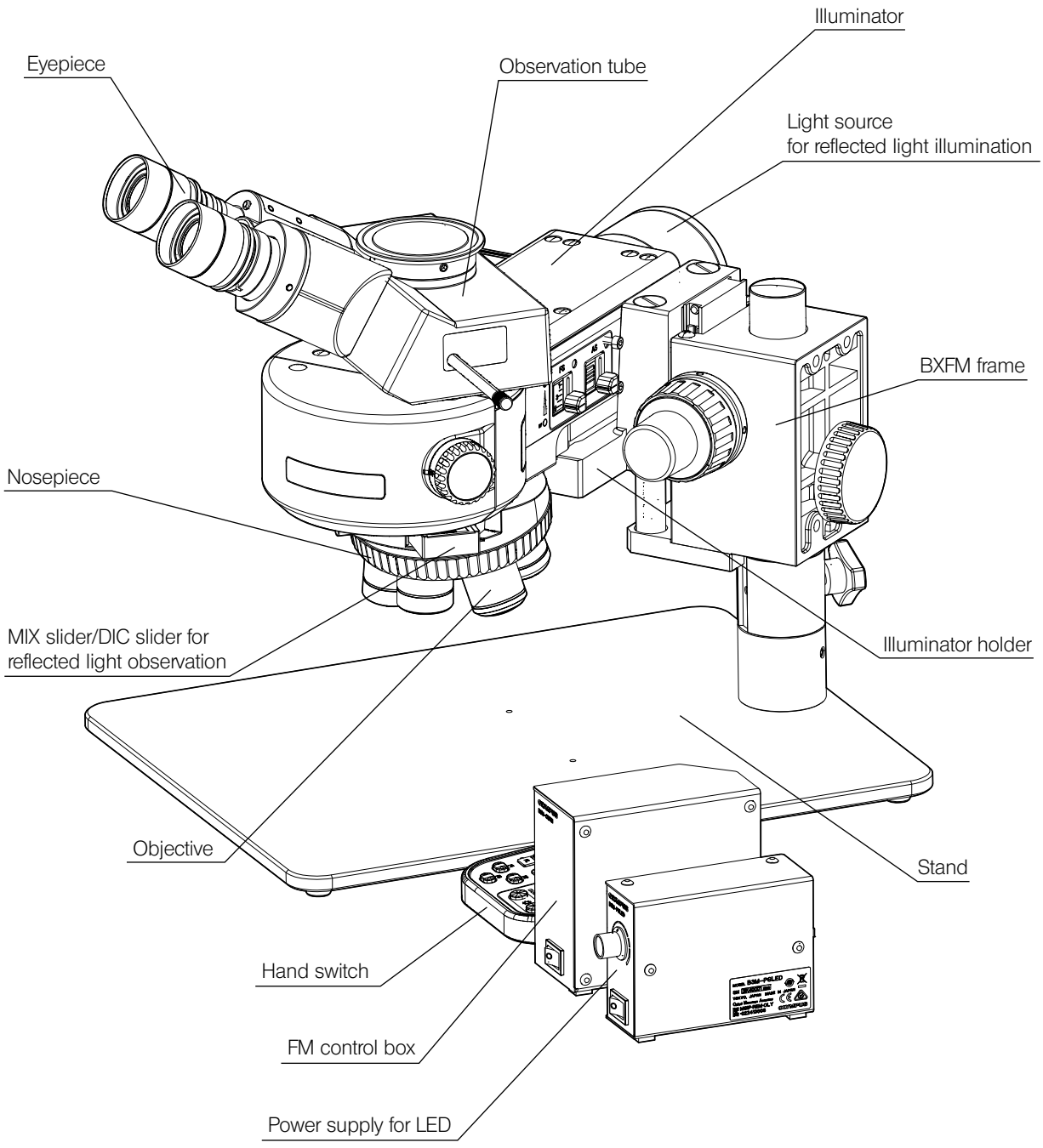
Follow the procedures below in case that the mercury burner explodes.

- Unplug the power cord from the outlet. Leave the place and ventilate for at least 30 minutes.
- After the burner and the lamp housing have cooled down, collect the remaining mercury with packing tape, paper or dropper, etc.
- Seal the collected mercury and tools used completely in a nonmetallic container, and ask the waste disposer to dispose of them.
- If there is any possibility that you have inhaled mercury steam, consult the doctor immediately and follow his/her instructions.

6. The used mercury burner must be disposed of as the industrial waste. If you cannot dispose of it by yourself properly, contact Evident for assistance.

1 Nomenclature of units

The diagram shown in this section shows the major units only. For units combinable to this product, see ”2 List of combinable units” (page 10).



2 List of combinable units

● : Combination available (including units with restrictions)
× : Combination prohibited
— : Unnecessary for observation

Units \ Observation method		Reflected light						
		Brightfield	Darkfield	Brightfield/ darkfield simultaneously	Simple polarization	Differential interference contrast	Fluorescence	Infrared
BXFM frame	BXFM-F	●	●	●	●	●	●	●
Observation tube	U-BI30-2	●	●	●	●	●	●	×
	U-TBI-3	●	●	●	●	●	●	×
	U-TR30-2	●	●	●	●	●	●	×
	U-TR30IR	●	×	×	×	×	×	●
	U-ETR-4	●	●	●	●	●	●	×
	U-TTR-2	●	●	●	●	●	●	×
	U-SWTR-3	●	●	●	●	●	●	×
	U-SWETTR-5	●	●	●	●	●	●	×
	U-TLU	●	●	●	●	●	●	×
	U-TLUIR	●	×	×	×	×	×	●
Intermediate attachment	U-DP	●	●	●	●	●	●	●
	U-DP1XC	●	●	●	●	●	●	●
	U-ECA	●	●	●	●	●	●	×
	U-CA	●	●	●	●	●	●	×
	U-EPA2	●	●	●	●	●	●	●
	U-CPA	●	●	●	●	●	●	×
	U-OPA	●	●	●	●	●	●	×
	U-TRU	●	●	●	●	●	●	×
Illuminator holder	BX3M-ILH	●	●	●	●	●	●	●
	BXFM-ILHS	●	×	●	●	●	×	×
Illuminator	BX3M-KMA-S	●	×	●	●	●	×	×
	BX3M-RLA-S	●	●	●	●	●	×	●
	BX3M-RLAS-S	●	●	●	●	●	×	×
	BX3M-URAS-S	●	●	●	●	●	●	●
	U-KMAS	●	×	●	●	●	×	×
Illuminator Option	U-RCV	●	●	●	●	●	●	×
	U-LLGAD	●	●	●	●	●	●	×
Light source for reflected light illumination	BX3M-LEDR	●	●	●	●	●	×	×
	U-LH100HGAPO	●	●	●	●	●	●	×
	U-LH100HG	●	●	●	●	●	●	×
	U-LH100L-3	●	●	●	●	●	×	×
	U-LH100IR	●	×	×	×	×	×	●
	U-LGPS	●	●	●	●	●	●	×
Power supply	U-RFL-T	●	●	●	●	●	●	×
	TH4-100	●	●	●	●	●	×	●
	TH4-200	●	●	●	●	●	×	●
	BX3M-PSLED	●	●	●	●	●	×	×

BXFM-F is categorized as optical microscope, other products are categorized as optical microscope accessory.

● : Combination available (including units with restrictions)
× : Combination prohibited
— : Unnecessary for observation

Units \ Observation method		Reflected light						
		Brightfield	Darkfield	Brightfield/ darkfield simultaneously	Simple polarization	Differential interference contrast	Fluorescence	Infrared
Light sources	U-LLG150	●	●	●	●	●	●	×
	U-LLG300	●	●	●	●	●	●	×
	U-RMT	●	●	●	●	●	×	●
Nosepiece	U-P4RE	●	×	×	●	●	●	●
	U-P5BDRE	●	●	●	●	●	●	●
	U-P6RE	●	×	×	●	●	●	●
	U-5RE-2	●	×	×	●	×	●	●
	U-D6RE	●	×	×	●	●	●	●
	U-D6RE-ESD-2	●	×	×	●	●	●	●
	U-D7RE	●	×	×	●	●	●	●
	U-5BDRE	●	●	×	●	×	●	●
	U-D5BDRE	●	●	●	●	●	●	●
	U-D6BDRE	●	●	●	●	●	●	●
	U-5RES-ESD	●	×	×	●	×	●	●
	U-D5BDRES-ESD	●	●	●	●	●	●	●
	U-D6RES	●	×	×	●	●	●	●
	U-D6BDRES-S	●	●	●	●	●	●	●
	U-D7RES	●	×	×	●	●	●	●
	U-D5BDREMC	●	●	●	●	●	●	●
	U-D6REMC	●	×	×	●	●	●	●
	U-D6BDREMC	●	●	●	●	●	●	●
	BX3M-RMCBL	●	●	●	●	●	●	●
	BD-M-AD	●	●	×	●	●	●	●
Stand	SZ-STL	●	●	●	●	●	●	●
	U-ST	●	●	●	●	●	●	●
Slider for reflected light illumination	U-25ND6	●	●	●	●	●	●	●
	U-25ND25	●	●	●	●	●	●	●
	U-25ND50	●	●	●	●	●	●	●
	U-25LBD	●	●	●	●	●	×	×
	U-25IF550	●	●	●	●	●	×	×
	U-25L42	●	●	●	●	●	×	×
	U-25FR	●	●	●	●	●	×	×
	U-25Y48	●	●	●	●	●	×	×
	U-25LBA	●	●	●	●	●	×	×
	U-BP1200IR	×	×	×	×	×	×	●
	U-BP1100IR	×	×	×	×	×	×	●
	U-25	●	●	●	●	●	●	●
Slider for differential interference contrast	U-DICR	×	×	×	×	●	×	×
	U-DICRH	×	×	×	×	●	×	×
	U-DICRHC	×	×	×	×	●	×	×

● : Combination available (including units with restrictions)

× : Combination prohibited

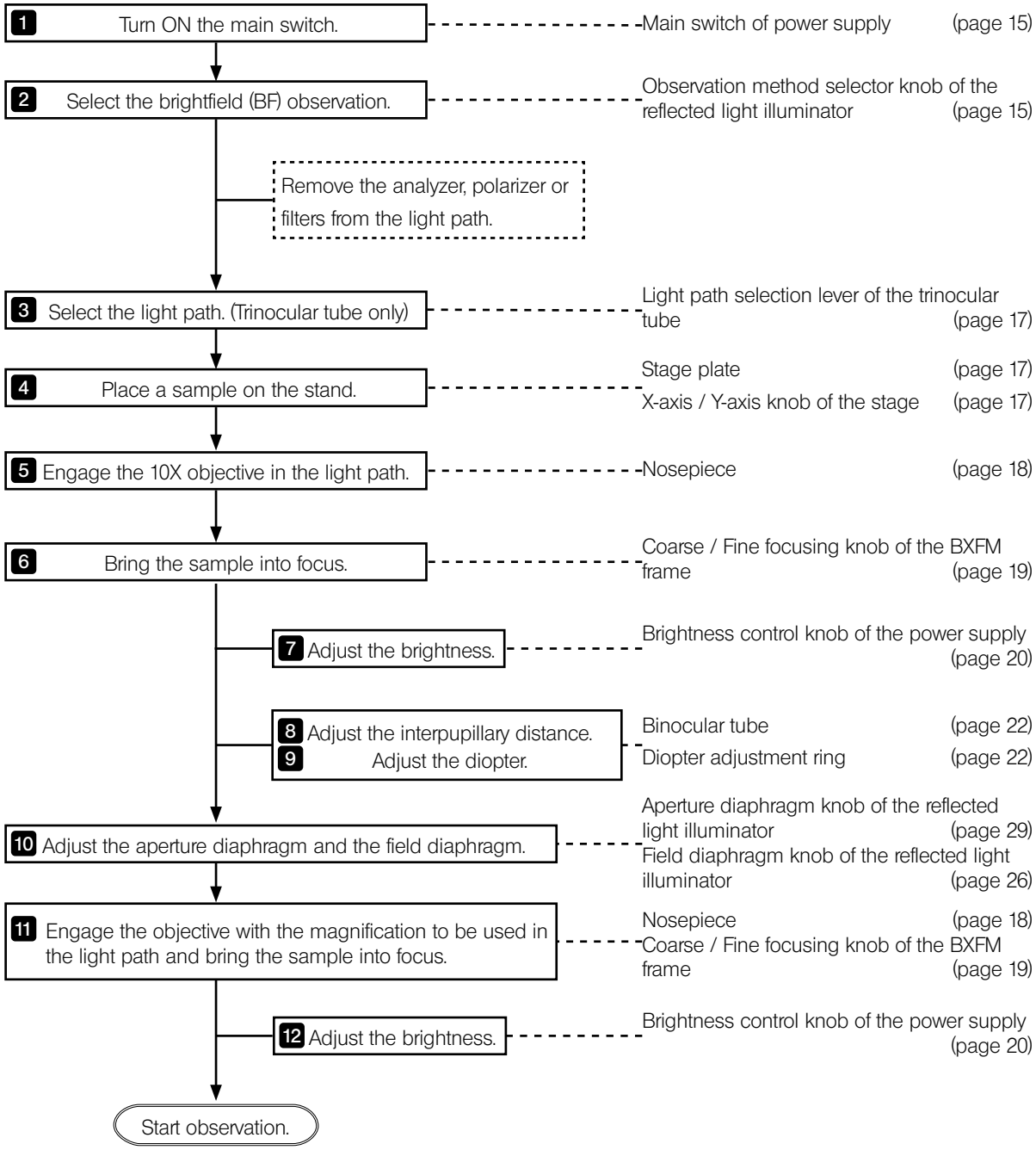
— : Unnecessary for observation

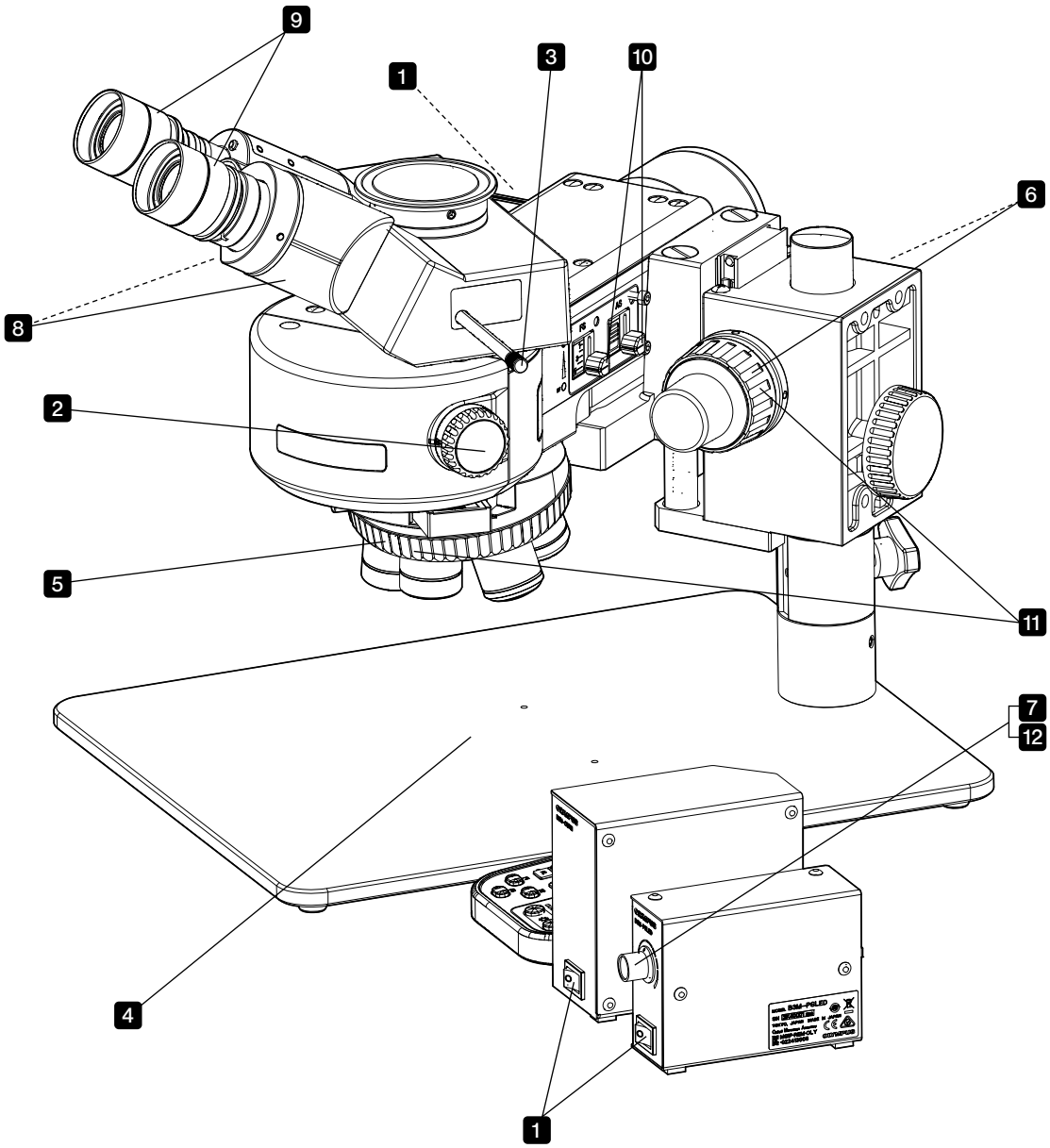
Units \ Observation method		Reflected light						
		Brightfield	Darkfield	Brightfield/ darkfield simultaneously	Simple polarization	Differential interference contrast	Fluorescence	Infrared
MIX slider for reflected light observation	U-MIXR	—	×	●	—	×	×	—
	U-MIXRCBL	—	×	●	—	×	×	—
Polarizing element	U-AN-2	×	×	×	●	●	×	×
	U-AN360-3	×	×	×	●	●	×	×
	U-PO3	×	×	×	●	●	×	×
	U-POTP3	×	×	×	●	●	×	×
	U-AN360IR	×	×	×	●	×	×	●
	U-POIR	×	×	×	●	×	×	●
	U-AN360P	×	×	×	●	●	×	×
Mirror unit	U-FF	—	—	—	—	—	●	—
	U-FBF	●	×	●	●	●	×	●
	U-FDF	×	●	×	×	×	×	×
	U-FBFL	●	×	●	●	●	×	×
	U-FWBS	×	×	×	×	×	●	×
	U-FWGS	×	×	×	×	×	●	×
	U-FWUS	×	×	×	×	×	●	×
	U-FDICR	×	×	×	●	●	×	×
Camera adapter	U-TV0.25XC	●	●	●	●	●	●	×
	U-TV0.35XC-2	●	●	●	●	●	●	×
	U-TV0.5XC-3	●	●	●	●	●	●	×
	U-TV0.63XC	●	●	●	●	●	●	×
	U-TV1XC	●	●	●	●	●	●	●
	U-TV1X-2	●	●	●	●	●	●	●
	U-CMAD3	●	●	●	●	●	●	●
Hand switch	BX3M-HS	●	●	●	●	●	●	●
	U-HSEXP	●	●	●	●	●	●	●
	BX3M-HSRE	●	●	●	●	●	●	●
	TH4-HS	●	●	●	●	●	●	●
Control box	BX3M-CBFM	●	●	●	●	●	●	●
	U-CBS	●	●	●	●	●	●	●
Eyepiece	WHN10X	●	●	●	●	●	●	—
	WHN10X-H	●	●	●	●	●	●	—
	CROSSWHN10X	●	●	●	●	●	●	—
	SWH10X-H	●	●	●	●	●	●	—
Objective	Refer to "8 Optical performance list «UIS2 series»" (Page 58).							
Other optional units	BXFM-ILHSPU	●	●	●	●	●	●	●
	DSX-CALS-HR	●	—	—	—	—	—	—

3 Basic operations of the microscope (brightfield observation)

This section describes the operating procedures of the reflected light brightfield observation and the transmitted light brightfield observation, which is the basis of observation methods. The reflected light simple polarization observation and the reflected light differential interference contrast observation, etc. are described in "4 Various observation methods".

3-1 Reflected light brightfield observation procedures





TIP Make a copy of this observation method guide. Place it near the microscope so that you use it when operating the microscope.

3-2 Turning ON the main switch

1 If the control box (BX3M-CB) is combined, set the main switch of the control box to ▌(ON). When the power is ON, the beep sound is heard once.

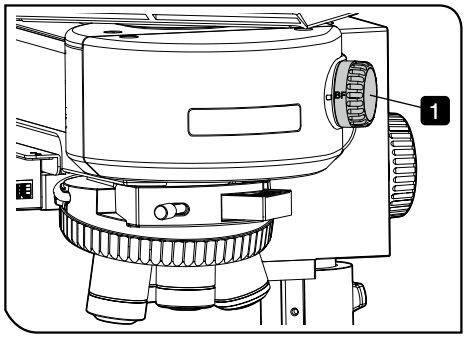
2 If the control box for coded function (U-CBS) is combined, set the main switch of the control box for coded function to ▌(ON).

3 If following units are combined, set the main switch of respective unit to ▌(ON).

Combinable units	Unit to set to ON
Mercury lamp housing	Main switch of the power supply for mercury burner (U-RFL-T)
Light source	LED and LDP light source (U-LGPS)
Halogen lamp housing	Main switch of the halogen lamp power supply unit (TH4)
LED lamp housing	Main switch of the Power supply for LED (BX3M-PSLED)

For details, refer to the instruction manual provided with the respective unit.

3-3 Selecting the observation method



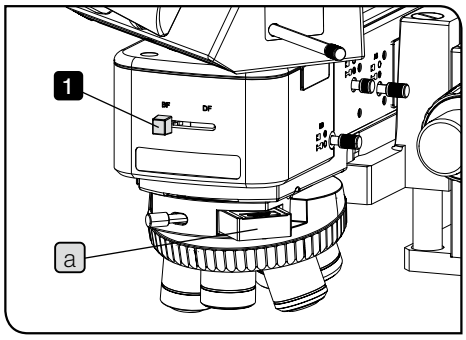
1 When BX3M-RLAS-S is combined

1 Select the observation method with the observation method selector knob.

Display	Function
BF	The brightfield observation is selected.
DF	The darkfield observation is selected.
DIC/PO	The differential interference contrast observation or the polarization observation is selected.

2 When BX3M-KMA-S is combined

The reflected LED light illuminator for BF (BX3M-KMA-S) is available only for the brightfield observation. The other observation methods cannot be selected.

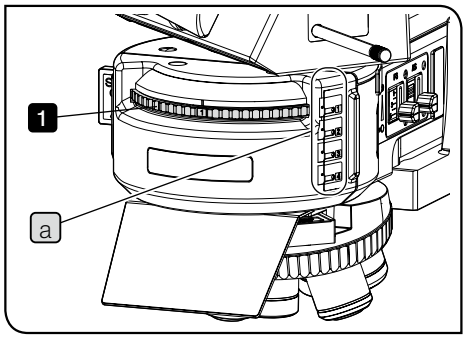


3 When BX3M-RLA-S is combined

1 Select the observation method using the brightfield/darkfield selector knob.

Display	Function
BF	The brightfield observation is selected.
DF	The darkfield observation is selected.

NOTE
- **Slide the brightfield/darkfield selector knob to the stopper position completely.**
- **The dummy slider [a] is attached to the nosepiece as a factory default. Be sure to keep this dummy slider inserted to prevent flares before use.**

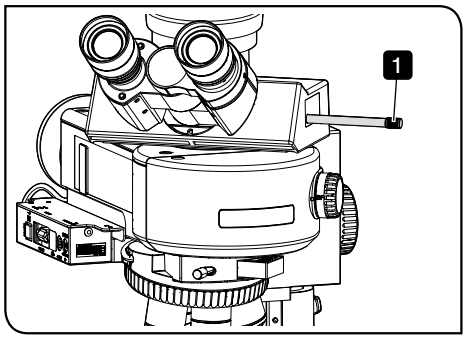


4 When BX3M-URAS-S is combined

1 Turn the turret to select the observation method.
You can check which No. selects which observation method by the inscription pocket [a]. Note that the indicator sheet should be inserted properly in the inscription pocket when attaching the mirror unit.

Indicator sheet	Function
BF	Brightfield observation
BFL	Brightfield observation (Use when the mercury lamp housing is combined.)
DF	Darkfield observation
DIC/PO	Differential interference contrast observation / Polarization observation
FL(WBS)	Fluorescence observation with B excitation
FL(WGS)	Fluorescence observation with G excitation
FL(WUS)	Fluorescence observation with U excitation

3-4 Changing between the eyepiece light path and the camera light path

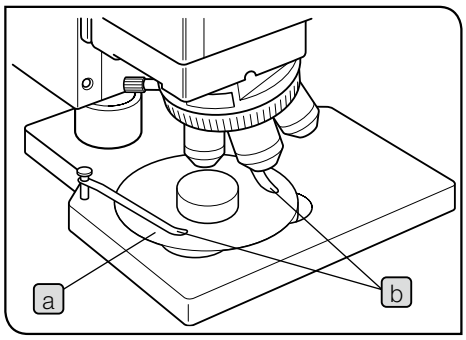


You can select the light path for observing with the eyepiece or the light path for observing with the display, etc. through the camera.

1 Slide the light path selection lever of the trinocular tube to select the light path.

Trinocular tube	Light path selection lever position		
	Pressed in	Middle	Pulled out
U-TR30-2 U-SWTR-3	Eyepiece 100%	Eyepiece 20% Camera 80%	Camera 100%
U-TR30IR	Eyepiece 100%	Eyepiece 0% Camera 0% (Shutter)	Camera 100%
U-TTR-2	Eyepiece 50% Camera 50%	Eyepiece 100%	Camera 100%
U-ETR-4 U-SWETR	Eyepiece 100%		Camera 100%
U-SWETTR-5	Eyepiece 100%		Eyepiece 20% Camera 80%

3-5 Placing a sample on the stand

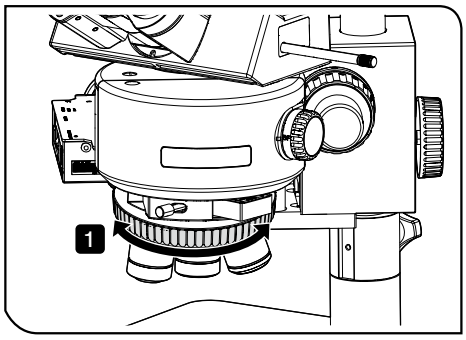


1 Placing a sample

1 Place the sample on the stage plate [a] before observation. When using the stand (U-ST), hold the sample with the specimen holder [b] as needed.

TIP If the sample is not flat and/or parallel, the reflected light does not return to the objective and you cannot perform the observation.

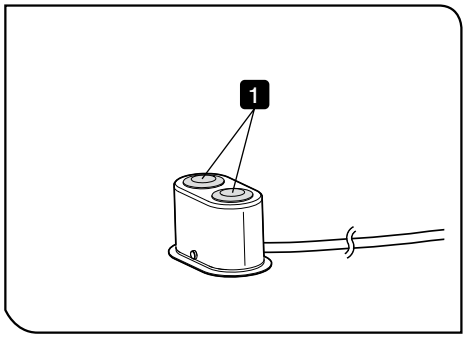
3-6 Selecting the objective



NOTE **When selecting the objective, be careful not to collide with the sample.**

When the manual or coded nosepiece is combined

1 Turn the nosepiece to select the objective.

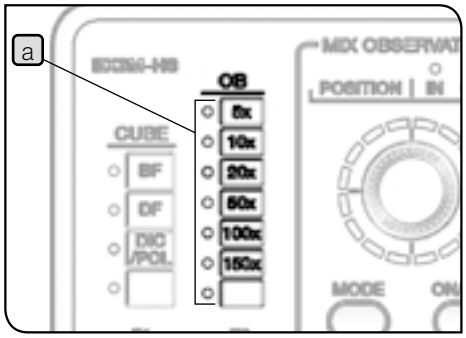


When the motorized nosepiece is combined

1 Press the button of the hand switch for motorized nosepiece (BX3M-HSRE) to select the objective.

TIP The nosepiece rotation direction specified by pressing the button can be changed by setting the dip switch on the side of the FM control box (BX3M-CBFM).
Before setting the dip switch, set the main switch to O(OFF).

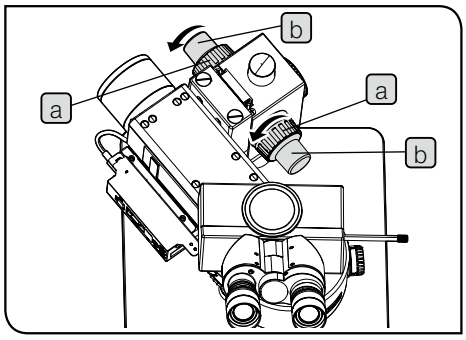
For settings of the dip switch, refer to the instruction manual provided with the BX3M-CBFM.



When the motorized nosepiece and the hand switch are combined

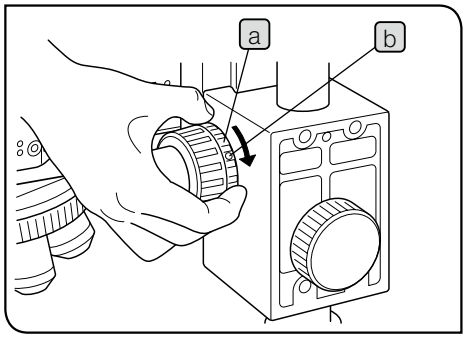
The lighting of the OB indicator a of the hand switch (BX3M-HS) is changed according to the selection of the objective.

3-7 Focusing



1 Moving the BXFM frame vertically

Turn the coarse focusing knob [a] and the fine focusing knob [b] in the arrow direction to move the BXFM frame downward. (The objective approaches the sample.)

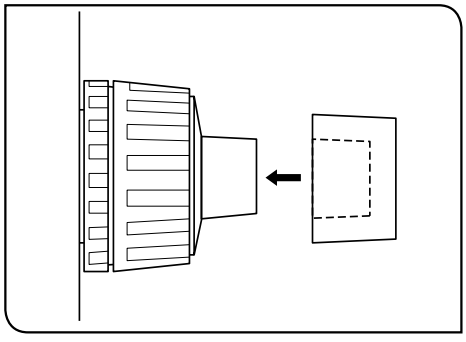


2 Adjusting the tension of the coarse focusing knob

NOTE **Be sure to use the tension adjustment ring [a] for adjusting the tension of the coarse focusing knob.**

The tension of the coarse focusing knob is adjusted to the easy-to-use tension, but if you want to change the tension, turn the tension adjustment ring [a] in the arrow direction to increase the tension and turn in the opposite direction to decrease the tension. If the focus obtained with the fine focusing knob is lost soon, the tension is set too loose. In this case, turn the tension adjustment ring [a] in the arrow direction to increase the tension.

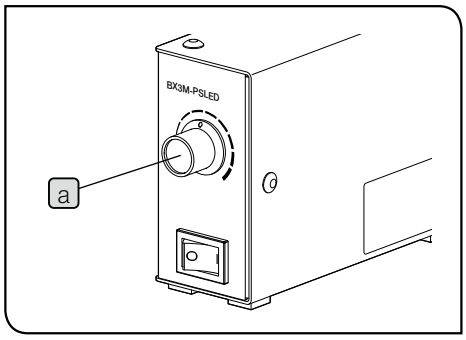
TIP If you want to increase the tension of the tension adjustment ring, insert the provided Allen screwdriver into the hole [b] (either one of 4 positions) of the adjustment ring to increase the tension.



3 Using the rubber cap for fine focusing knob

Putting this rubber cap on the fine focusing knob allows you to turn the fine focusing knob lightly and bring the sample into focus finely and easily.

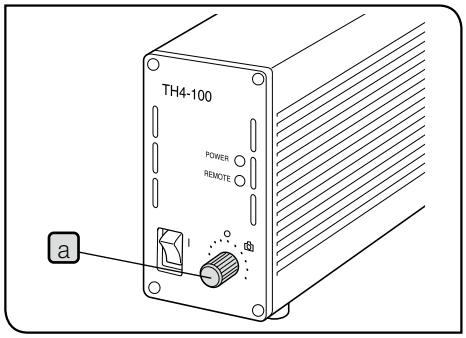
3-8 Adjusting the brightness



1 When the LED lamp housing is combined

Turn the brightness control knob of the power supply for LED (BX3M-PSLED) [a] clockwise to increase the brightness of the illumination.

For details of the power supply for LED (BX3M-PSLED), refer to the instruction manual provided with the unit.



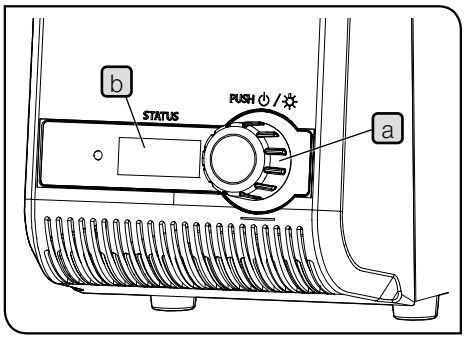
2 When the halogen lamp housing is combined

Turn the brightness control knob [a] of the halogen lamp power supply unit (TH4) to MAX (high voltage side) to increase the brightness of the illumination.

For details of the halogen lamp power supply unit (TH4), refer to the instruction manual provided with the unit.

3 When the mercury lamp housing is combined

Engage the ND filter in the light path and adjust the transmittance of the illumination light. For details, see "3-13 Inserting the reflected light illumination filter" (page 32).



4 When the light source is combined

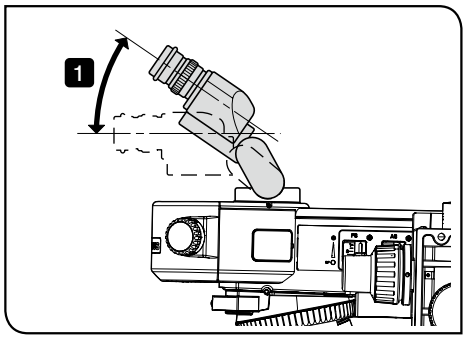
Rotate the light intensity adjustment dial [a] to adjust the light intensity.

TIP

- Rotating the light intensity adjustment dial [a] allows you to change the numerical characters (Min: 010, Max: 100) on the counter [b] in increments of 5.
- The larger the numerical characters on the counter [b] become, the brighter the lamp becomes.

For details of the LED and LDP light source (U-LGPS), refer to the instruction manual provided with the unit.

3-9 Adjusting the observation tube



1 Tilting adjustment

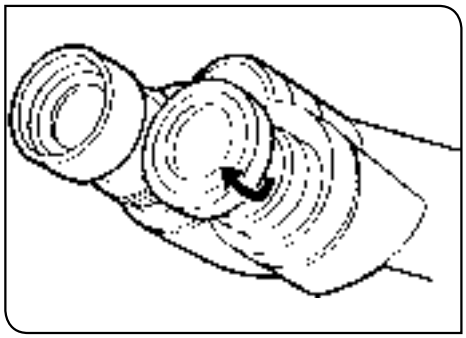
This function is available when U-TBI-3, U-TTR-2 or U-SWETTR-5 is combined.

You can adjust the observation tube to the easy-to-see height and angle so that you can observe with a comfortable posture.

Observation tube	Adjustable angle
U-TBI-3	5° to 35°
U-TTR-2	5° to 35°
U-SWETTR-5	0° to 35°

1 Hold the binocular and move it vertically to set to the desired position.

NOTE
- **Be careful, if you apply the excessive force to the binocular from the upper or lower limit stop position, the system may be damaged.**
- **The intermediate attachment is not available with U-TBI-3.**
- **If you observe scratches or dirt on the mirror surface in the darkfield observation with U-TBI-3, ghosts may appear in some cases.**



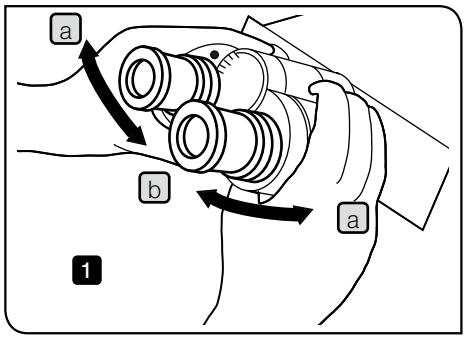
2 Using the eye shades

When wearing eyeglasses

Use the eye shades in the folded-down position.

When not wearing eyeglasses

Extend the folded eye shades in the direction of the arrow. Observation becomes comfortable, since it prevents extraneous light from entering between the eyepieces and eyes.



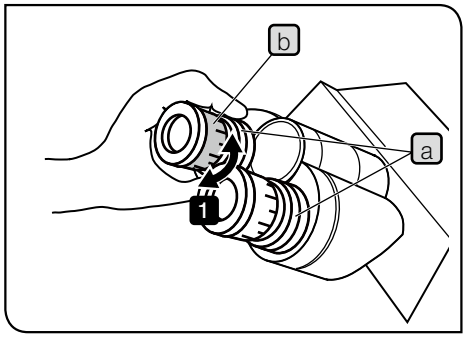
3 Adjusting the interpupillary distance

The adjustment of the interpupillary distance is to adjust the distance between two eyepieces to fit to the distance between your two eyes. By doing so, you can see the single microscope image so that the fatigue of your eyes during observation can be reduced.

1 While setting the right and left eyepieces in parallel, move the binocular in the [a] or [b] direction until the right and left fields of view coincide completely. The number shown by the indicator (•) of the left side eyepiece sleeve is the interpupillary distance.

TIP Remember your interpupillary distance so that you can adjust it easily in the next observation.

4 Adjusting the diopter



Adjust the diopter according to right and left eyes of the observer.

When the eyepiece is not equipped with the eyepiece micrometer

1 While pressing the lower part [a] of the eyepiece, turn the diopter adjustment ring [b] to set the index to "0". Perform this operation for right and left eyepieces.

2 Adjust the interpupillary distance.

3 Place the sample.

4 Engage the 10X objective in the light path and turn the coarse/fine focusing knobs to bring the sample into focus.

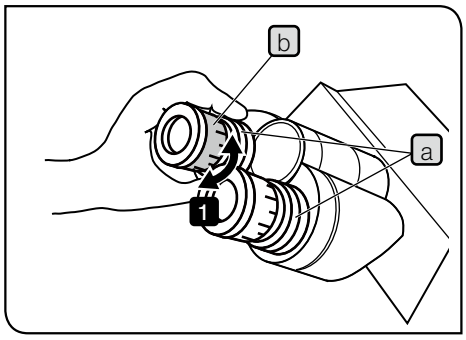
5 Change to the 50X objective or higher and turn coarse/fine focusing knobs to bring the sample into focus.

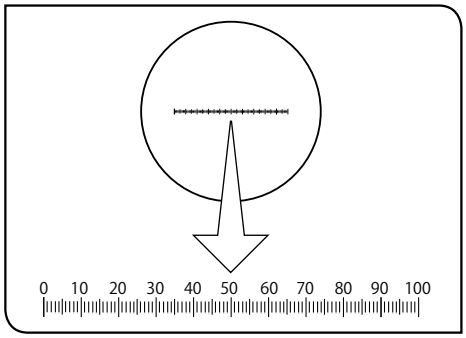
6 Change to the 10X objective. While looking into the left eyepiece with your left eye, turn the diopter adjustment ring [b] to bring the sample into focus. In the same manner, while looking into the right eyepiece with your right eye, turn the diopter adjustment ring to bring the sample into focus.

7 Change to the 50X objective or higher again and turn coarse/fine focusing knobs to bring the sample into focus.

8 Change to the 10X objective and confirm that the sample is brought into focus with the right and left eyepieces.

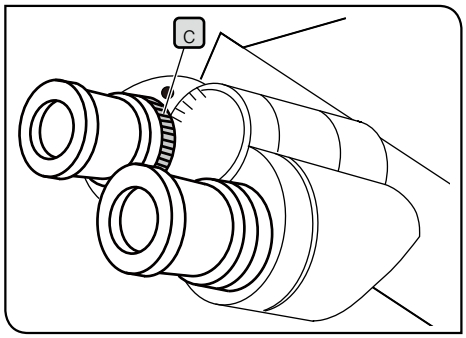
9 If the sample is not brought into focus, bring the sample into focus in the same manner as 6 and repeat from 7 to 9 again.





When the eyepiece is equipped with the eyepiece micrometer

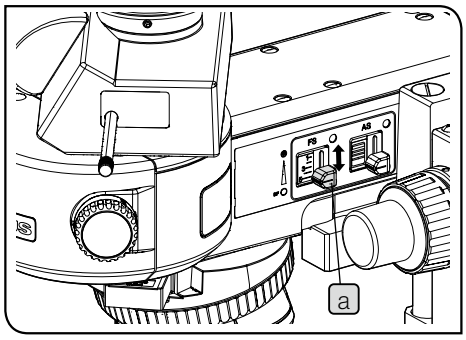
1. While looking into the eyepiece equipped with the eyepiece micrometer, turn the diopter adjustment ring [b] to adjust so that the scales or lines of the eyepiece micrometer in the field of view are clearly visible. If you turn the diopter adjustment ring [b], keep pressing the lower part [a] of the eyepiece.
2. Place the sample.
3. Engage the 10X objective in the light path. While looking into the eyepiece equipped with the eyepiece micrometer, turn the coarse/fine focusing knobs to bring the sample into focus.
4. Turn the diopter adjustment ring [b] of the eyepiece not equipped with the eyepiece micrometer to bring the sample into focus.



When the observation tube is equipped with the interpupillary distance adjustment ring [c]

Perform the same operation as described above.
However, since the eyepiece is not equipped with the diopter adjustment ring [b], use the interpupillary distance adjustment ring [c] of the observation tube.

3-10 Adjusting the field diaphragm of the reflected light illumination



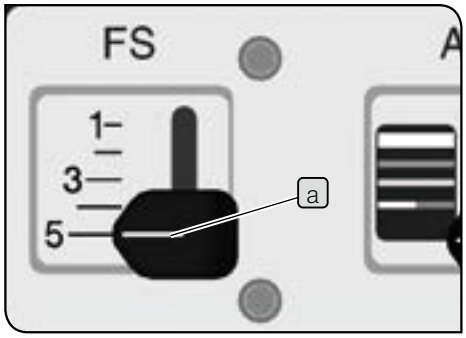
The picture shows BX3M-RLAS-S.
The same operation parts are also provided to BX3M-URAS-S.

1 Using the field diaphragm (FS)

When BX3M-RLAS-S or BX3M-URAS-S is combined

1 Move the field diaphragm knob [a] of the reflected light illuminator vertically to adjust the field diaphragm.

	Field diaphragm knob position				
	5		3		1
Field diaphragm	Open to maximum	←		→	Close to minimum



Scale of the field diaphragm knob

When using the units described in the following tables, aligning the position of the field diaphragm knob [a] with the number shown in the table enables to increase the contrast of the observation image. Narrowing down the field diaphragm increases the contrast furthermore and prevents the flares. Note, always set to 5 for the darkfield observation.

‹When observing the image with eyepiece›

	Observation tube	
	U-SWTR-3 U-SWETTR-5 (Field number: 26.5)	Others (Field number: 22)
Field diaphragm knob position	4	3

‹When acquiring the image with camera›

Set the field diaphragm knob position according to the combination of the image sensor size and the camera adapter as shown in the table below. Note, the image sensor size of DP22/DP73 is 1/1.8 inch and the image sensor size of DP27 is 2/3 inch.

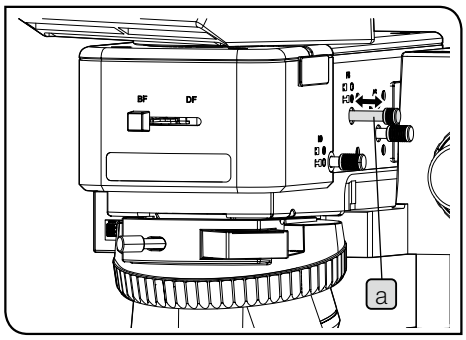
When BX3M-RLAS-S is combined

Image sensor size / Camera adapter	1/3.2 inch	1/3 inch	1/2.5 inch ≀ 1/2 inch	1/1.8 inch ≀ 2/3 inch	1 inch
0.5X	2	2	3	3	5
0.63X	1	2	2	3	4
1X	1	1	1	2	3

When BX3M-URAS-S is combined

Image sensor size / Camera adapter	1/3.2 inch ≀ 1/3 inch	1/2.5 inch ≀ 1/2 inch	1/1.8 inch ≀ 2/3 inch	1 inch
0.5X	2	3	3	5
0.63X	2	2	3	4
1X	2	2	2	3

NOTE
- **If the field diaphragm is not centered, the area around the field of view may be darkened partially. For the centering of the field diaphragm, see "Centering of the field diaphragm (FS)" (page 26).**
- **If observing the image with the eyepiece using the field diaphragm settings same as those when acquiring the image with the camera, the area around the field of view may be darkened partially.**



When using BX3M-RLA-S

1 Move the field diaphragm lever (a) of the reflected light illuminator as follows to adjust the field diaphragm.

	Field diaphragm lever position		
	Pressed in		Pulled out
Field diaphragm	Open to maximum	⟷	Close to minimum

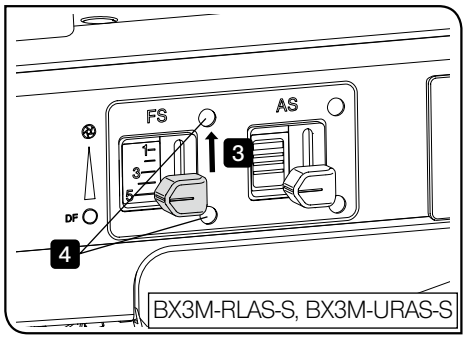
2 Adjusting during observation

Reflected light brightfield observation

Adjust the illuminated area in order to acquire the high contrast image.
Narrow down the field diaphragm so that the field diaphragm image is circumscribed to the field of view depending on each objective you use, and block the unnecessary light.

Reflected light darkfield observation

Be sure to open the field diaphragm during the observation.



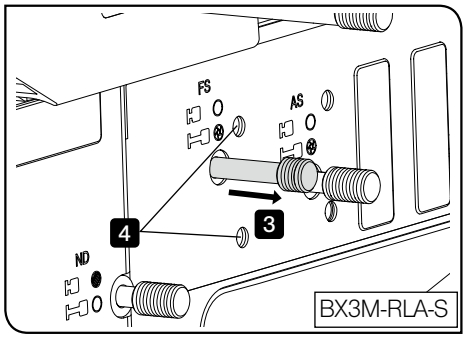
3 Centering of the field diaphragm (FS)

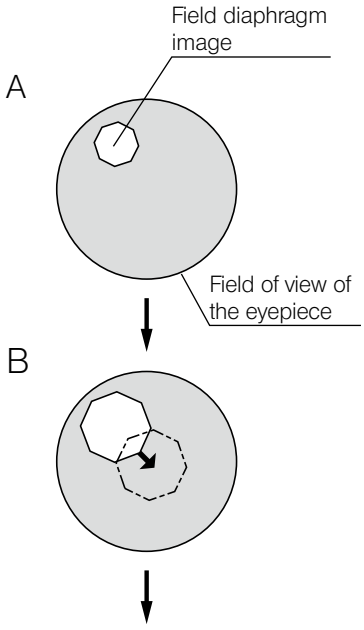
NOTE **When centering the field diaphragm, be careful not to touch the X-axis and Y-axis of the stage with your arm.**

TIP Use the Allen screwdriver provided with the microscope to perform the centering.

1 Select the brightfield observation (BF). For procedures to select the observation method, see "3-3 Selecting the observation method" (page 15).

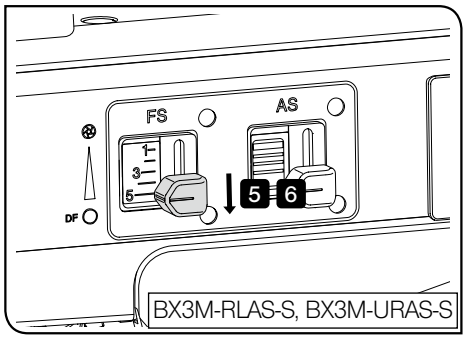
2 Turn the nosepiece to engage the 10X objective in the light path and place the sample on the stage to bring it into focus approximately.

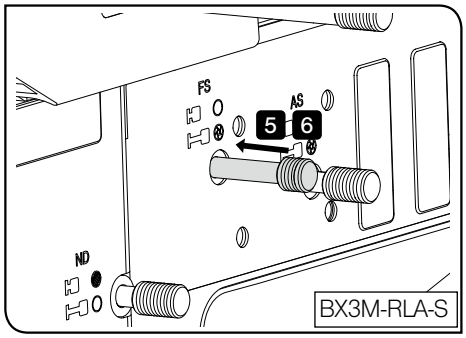




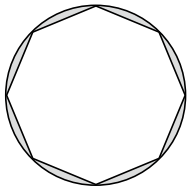
3 Move the field diaphragm knob (field diaphragm lever) of the reflected light illuminator to narrow down the diameter of the field diaphragm image to the minimum approximately. (Picture A)

4 Insert the Allen screwdriver in the FS centering screws (2 pcs.) of the reflected light illuminator and turn each to adjust the field diaphragm image to come to the center of the field. (Picture B)

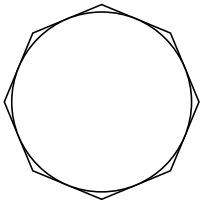




C



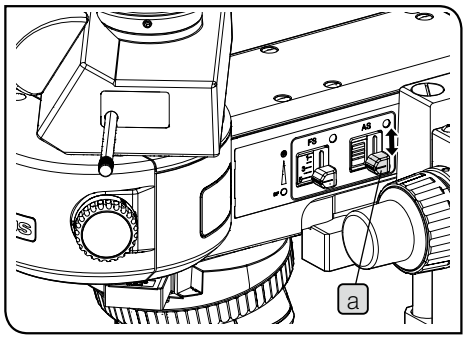
D



5 Move the field diaphragm knob (field diaphragm lever) to open the field diaphragm image until the field diaphragm image inscribes to the field of view. (Picture C) If the field diaphragm image is decentered, try centering again.

6 Open the field diaphragm until the field diaphragm image becomes almost the same size (inscribe) as the field of view. (Picture D)

3-11 Adjusting the aperture diaphragm of the reflected light illumination



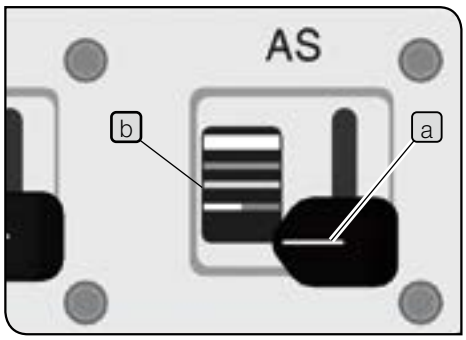
The picture shows BX3M-RLAS-S.
The same operation parts are also provided to BX3M-URAS-S.

1 Using the aperture diaphragm (AS)

When BX3M-RLAS-S or BX3M-URAS-S is combined

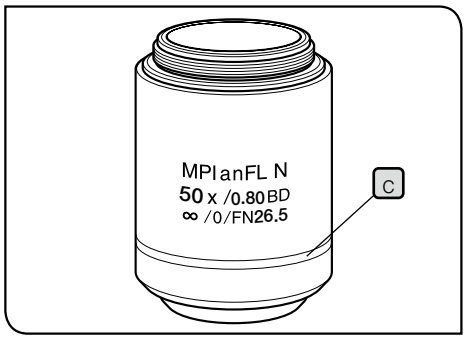
1 Move the aperture diaphragm knob [a] of the reflected light illuminator vertically to adjust the aperture diaphragm.

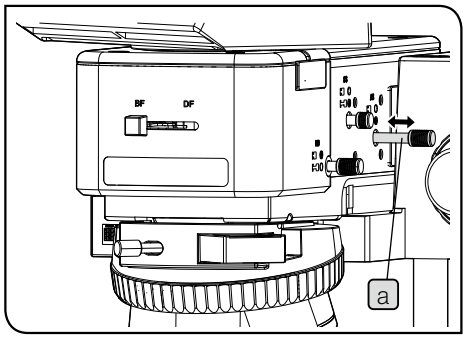
	Aperture diaphragm knob position (color bar)				
	None (Bottom end)	Red/ Yellow	Green	Light blue	White
Aperture diaphragm (AS)	Open ⟷				Close



Scale of aperture diaphragm knob

The color (color bar) of the scale [b] corresponds to the band color [c] of the objective. Aligning the aperture diaphragm knob [a] position (color bar) with the band color of the objective engaged in the light path enables to set the aperture diaphragm appropriately. (Not available for 1.25X and 2.5X objectives)

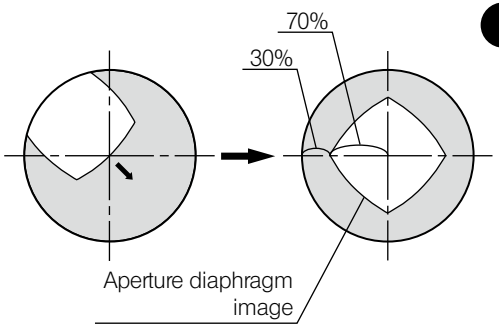




When using BX3M-RLA-S

1 Move the aperture diaphragm lever [a] of the reflected light illuminator as follows to adjust the aperture diaphragm.

	Aperture diaphragm lever position		
	Pressed in		Pulled out
Aperture diaphragm (AS)	Open to maximum ⟷		Close to minimum



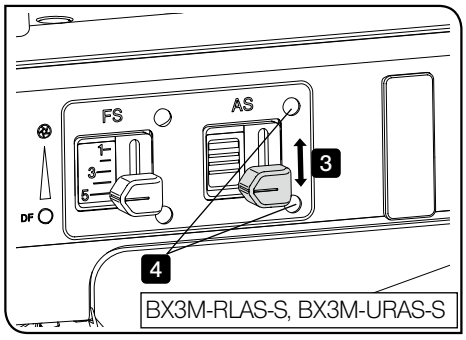
2 Adjusting during observation

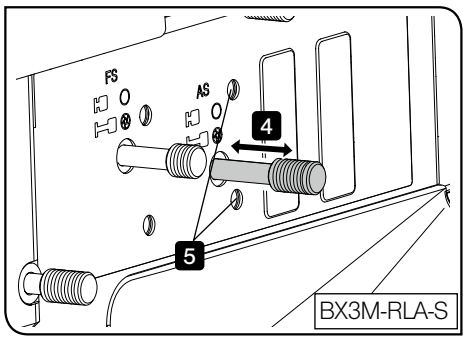
Reflected light brightfield observation

When using BX3M-RLA-S, narrow down the aperture diaphragm to between 70 and 80% of the numerical aperture of the objective to perform the excellent observation.

Reflected light darkfield observation /
Reflected light fluorescence observation

Open the aperture diaphragm during the observation.





3 Centering of the aperture diaphragm (AS)

NOTE **When centering the aperture diaphragm, be careful not to touch the X-axis/Y-axis knob of the stage with your arm.**

TIP Use the Allen screwdriver provided with the microscope to perform the centering.

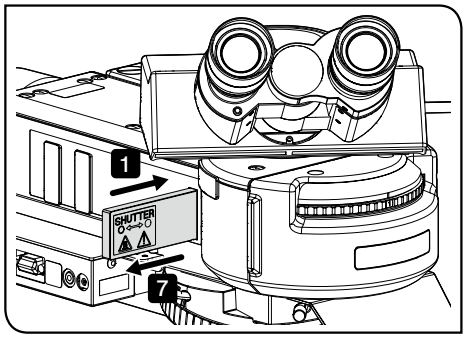
1. Select the brightfield observation (BF). For procedures to select the observation method, see "3-3 Selecting the observation method" (page 15).
2. Turn the nosepiece to engage the 10X objective in the light path.
3. Attach the total reflection mirror to the stage and bring the sample into focus approximately.
4. Pull out the eyepiece. While looking into the eyepiece sleeve, move the aperture diaphragm knob (aperture diaphragm lever) to adjust the diameter of the aperture diaphragm image to approximately 70% of the field of view.
5. If the aperture diaphragm image is displaced from the center of the field of view, insert the Allen screwdriver to the AS centering screws (2 pcs.) of the reflected light illuminator and turn each to adjust the aperture diaphragm image to come to the center of the field of view.

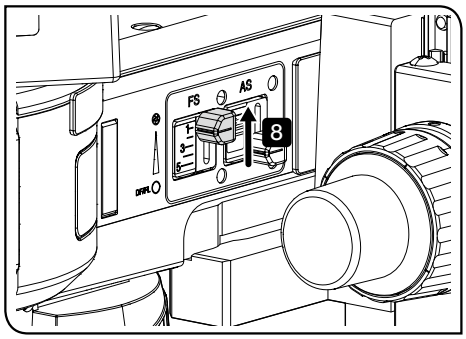
3-12 Centering the mercury burner

The centering of the mercury burner is necessary when U-LH100HG/U-LH100HGAPO is combined with the system.

The mercury burner emits the light by means of discharge produced when a current is supplied across electrodes. If the electrode position is shifted to cause the light not falling on the sample appropriately due to replacing the burner, etc., the observation image becomes dark. In this case, it is necessary to adjust the positions of electrodes of the mercury burner. This operation to adjust the electrode positions is called the centering of the mercury burner.
Adjust the electrode positions by projecting the light emission across electrodes on the stage (arc image) while looking at the arc image position.

TIP The mercury burner centering is not required every time before observation, but is recommended after the burner is replaced or when the observation image seems dark.





TIP Before performing centering, turn ON the main switch of the power supply for mercury lamp housing and wait until the illumination light does not flicker and the brightness becomes stable.

1 Insert the shutter until a clicking sound is heard, and engage the shutter in the light path.

2 Engage the fluorescence mirror unit other than that with U-excitation (U-FWUS) in the light path. If your mirror unit is with U-excitation only, use the fluorescence mirror unit with U-excitation. In this case, be sure to observe through the antiglare plate.

NOTE **Do not open the cover on the front of BX3M-URAS-S during fluorescence observation.**

3 Engage the 10X objective in the light path and place the centering target U-CST on the stage.

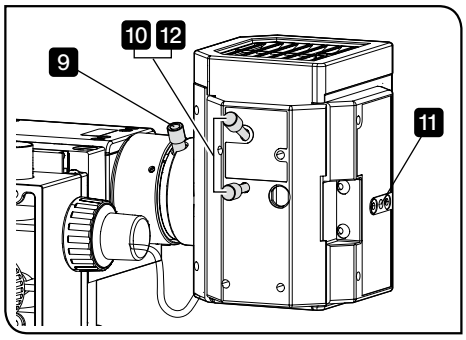
4 While looking into the eyepiece, bring the cross-line with a double circle into focus.

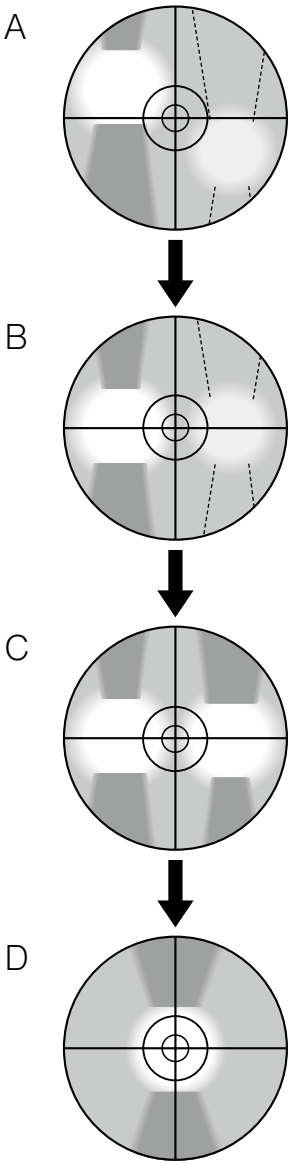
5 Move the stage to coincide the cross-line with the center of the field of view.

6 Turn the nosepiece to engage the position not attached with the objective (remove the objective cap) in the light path.

7 Pull out the shutter until a clicking sound is heard, and remove the shutter from the light path.

8 Move the field diaphragm knob to narrow down the field diaphragm.
BX3M-URAS-S : Position "1"





The above picture shows the image of the arc image projected to U-CST during centering the mercury burner. This image picture may differ depending on the state of the mercury lamp housing.

9 Turn the collector lens focusing knob to project the arc image on U-CST. (Picture A)
If the arc image is not projected, turn the burner centering knobs.

10 Turn the burner centering knobs to move the arc image to the center of the right (left) half of the field of view. (Picture B)

11 Insert the Allen screwdriver in the mirror focusing screw on the back of the lamp housing and turn it to bring the mirror arc image into focus. (Picture C)

12 Turn the burner centering knobs to overlay the arc image with the mirror arc image. (Picture D)

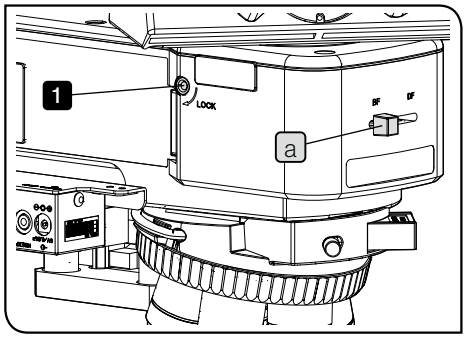
TIP During observation, turn the collector lens focusing knob to adjust the observation field to become uniform.

3-13 Inserting the reflected light illumination filter

1 Using the ND filter lever

This function is available only with BX3M-RLA-S.

The ND filter links with the selection of the observation method. Using this ND filter reduces the glare when the light path is changed from the darkfield (DF) to the brightfield (BF). Use the brightfield/darkfield selector knob [a] to select the observation method.

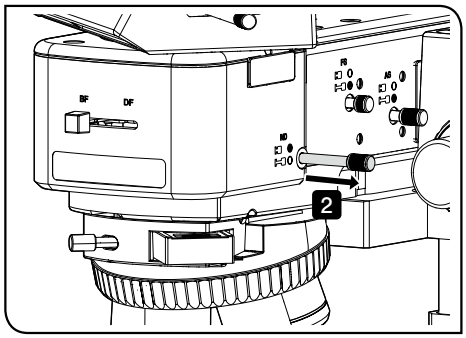


Canceling the link

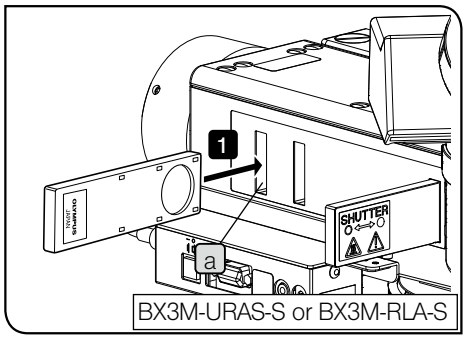
As factory default, the ND filter is linked with the selection of the observation method.

If the brightness is not sufficient when performing the brightfield observation or the DIC observation, you can cancel this link.

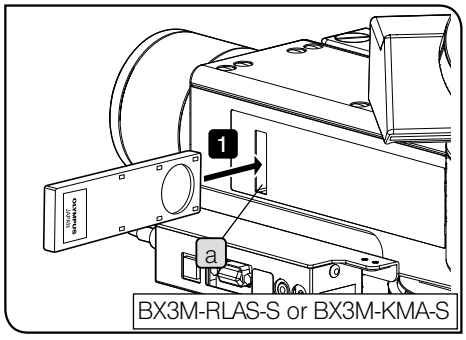
1 Insert the Allen screwdriver into the hole on the left side of the reflected light illuminator to loosen the screw that connects the ND filter sufficiently. By doing so, the ND filter lever works.



2 Pull out the ND filter lever and remove the ND filter from the light path.



BX3M-URAS-S or BX3M-RLA-S



BX3M-RLAS-S or BX3M-KMA-S

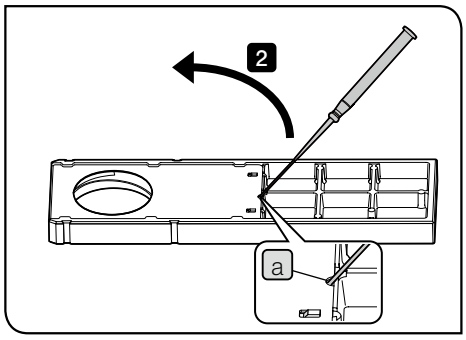
2 Using the filter

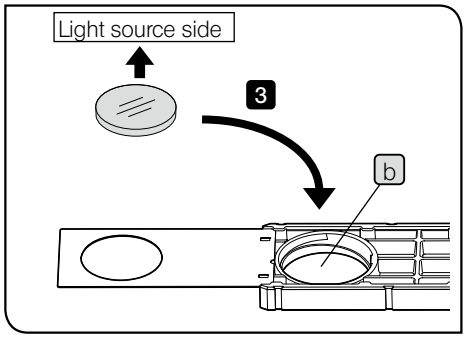
1 Insert the filter slider suitable for the intended observation into the filter insertion slot [a] to engage in the light path. Be sure to insert the filter slider from the left side of the reflected light illuminator. The first level (position where the clicking sound is heard first) is an empty hole. The filter is engaged in the light path at the second level (position where the clicking sound is heard next).

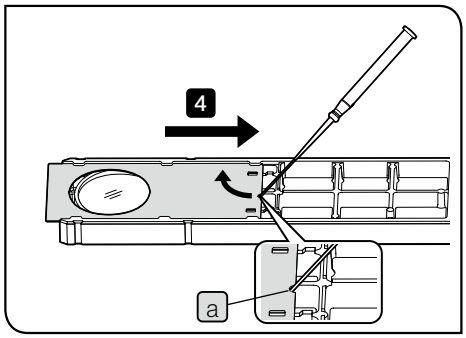
Filter slider position	Light path
First level (pulled out)	Empty hole
Second level (pressed in)	Filter

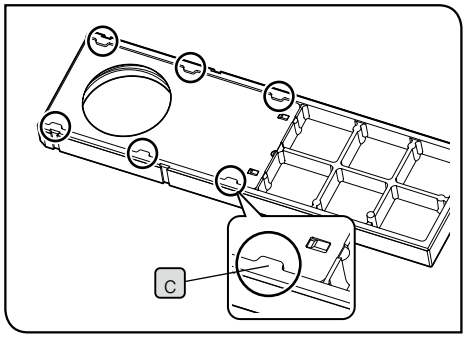
Filter to use	Purpose
U-25LBD (Color temperature conversion filter)	Sets the illumination light of the halogen bulb to the daylight color.
U-25LBA (Color temperature conversion filter)	Sets the illumination light of LED to the illumination color of the halogen bulb.
U-25IF550 (Green filter)	Increases the contrast of the observation image.
U-25Y48 (Yellow filter)	Contrast filter for semiconductor wafer observation
U-25ND50-2 (Light volume adjustment filter)	Adjusts the brightness of the light source. (Transmittance: 50%)
U-25ND25-2 (Light volume adjustment filter)	Adjusts the brightness of the light source. (Transmittance: 25%)
U-25ND6-2 (Light volume adjustment filter)	Adjusts the brightness of the light source. (Transmittance: 6%)
U-25FR (Frost filter)	The light volume decreases, but the illumination without unevenness can be obtained.
U-25L42 (UV cut filter)	Cuts the ultraviolet ray to prevent the tarnish on the polarizer caused by the mercury lamp housing.
U-BP1100IR (Band-pass filters for IR)	Filter for IR (wavelength: 1100 nm) observation
U-BP1200IR (Band-pass filters for IR)	Filter for IR (wavelength: 1200 nm) observation
Empty slider U-25	Used by combining arbitrary filters.

TIP If you want to insert the filter from the right side of the reflected light illuminator, contact Evident.









Attaching the arbitrary filter

The arbitrary filter with the following size can be inserted to the empty slider (U-25).

Diameter	Ø25 mm
Thickness	2.6 mm or less

1 Set the display surface of the empty slider facing down and the surface attached with the cover facing up.

2 Insert the precision screwdriver in the notch [a] of the cover diagonally, and raise and slide the cover with the precision screwdriver to open the cover.

3 Insert the arbitrary filter in the filter mounting hole [b] of the slider.

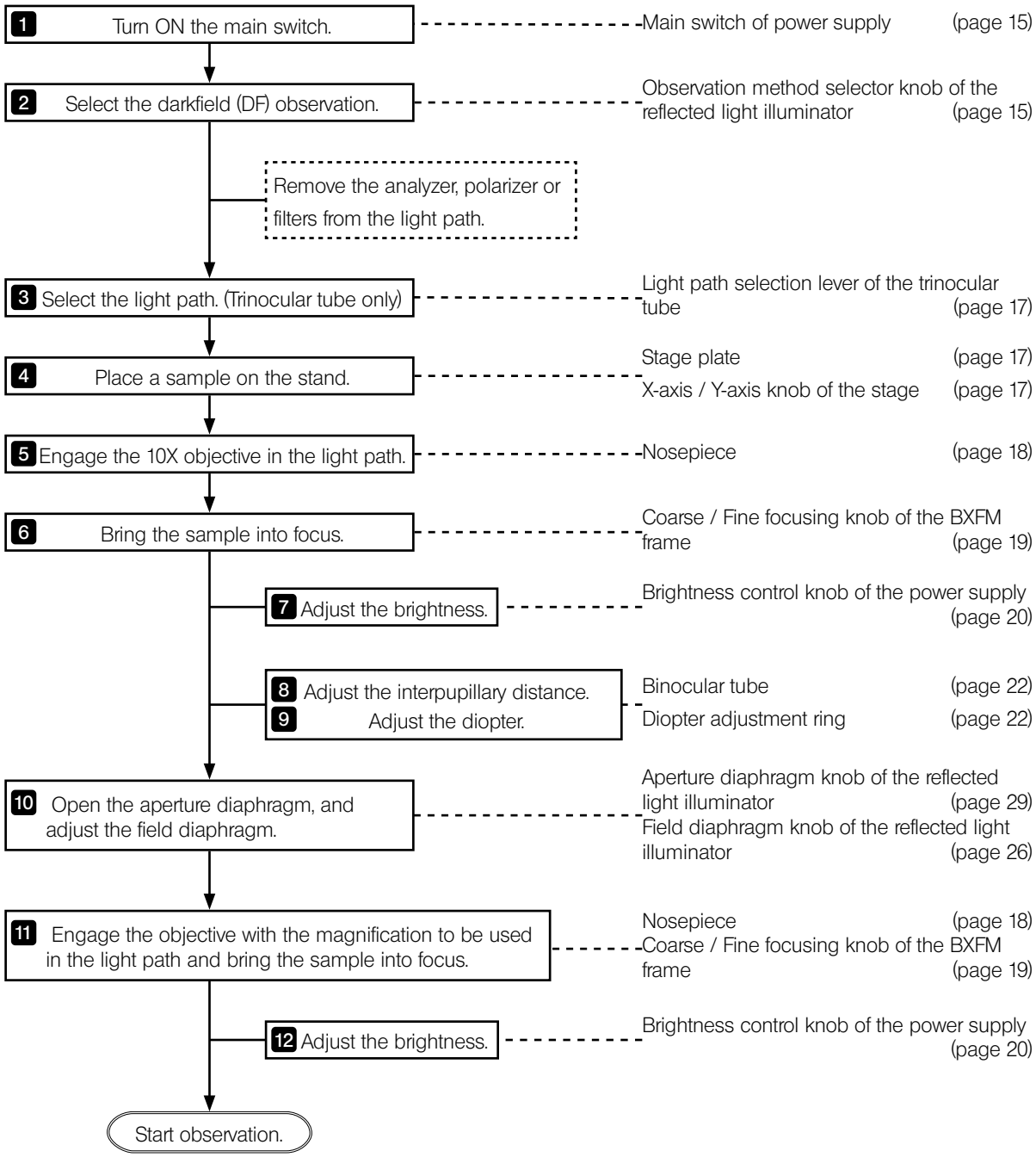
NOTE **If the orientation of the filter to use is specified, insert the filter so that the filter surface of the light source side faces up.**

4 Insert the precision screwdriver in the notch [a], and raise and slide the cover with the precision screwdriver to return the cover to the original position. At this time, slide the cover under the tabs (6 positions) [c] until the "clap" sound is heard.

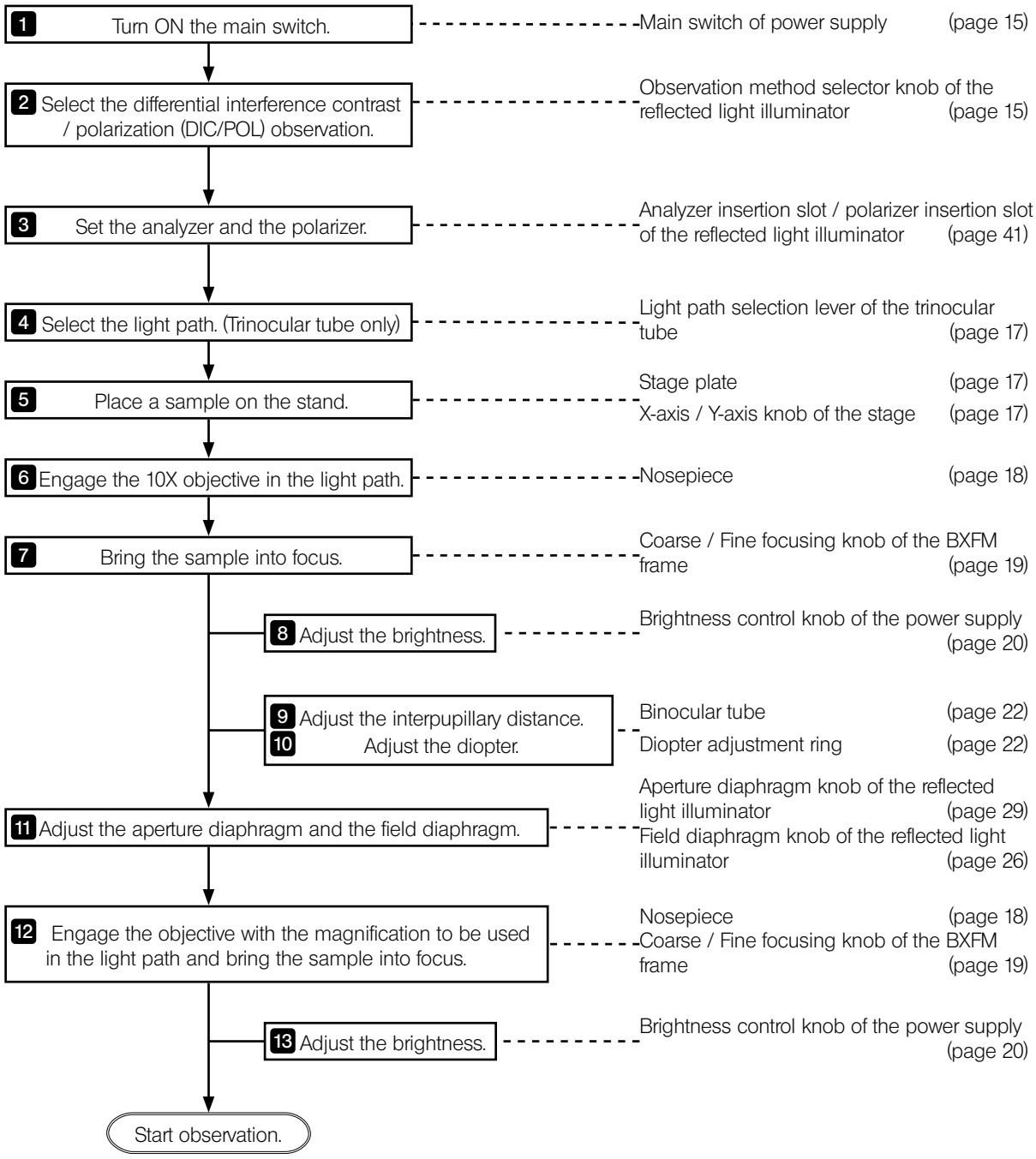
4 Various observation methods

This section describes the operating procedures of the observations other than the reflected brightfield observation. The operating procedures of the reflected brightfield observation are described in "3 Basic operations of the microscope (brightfield observation)".

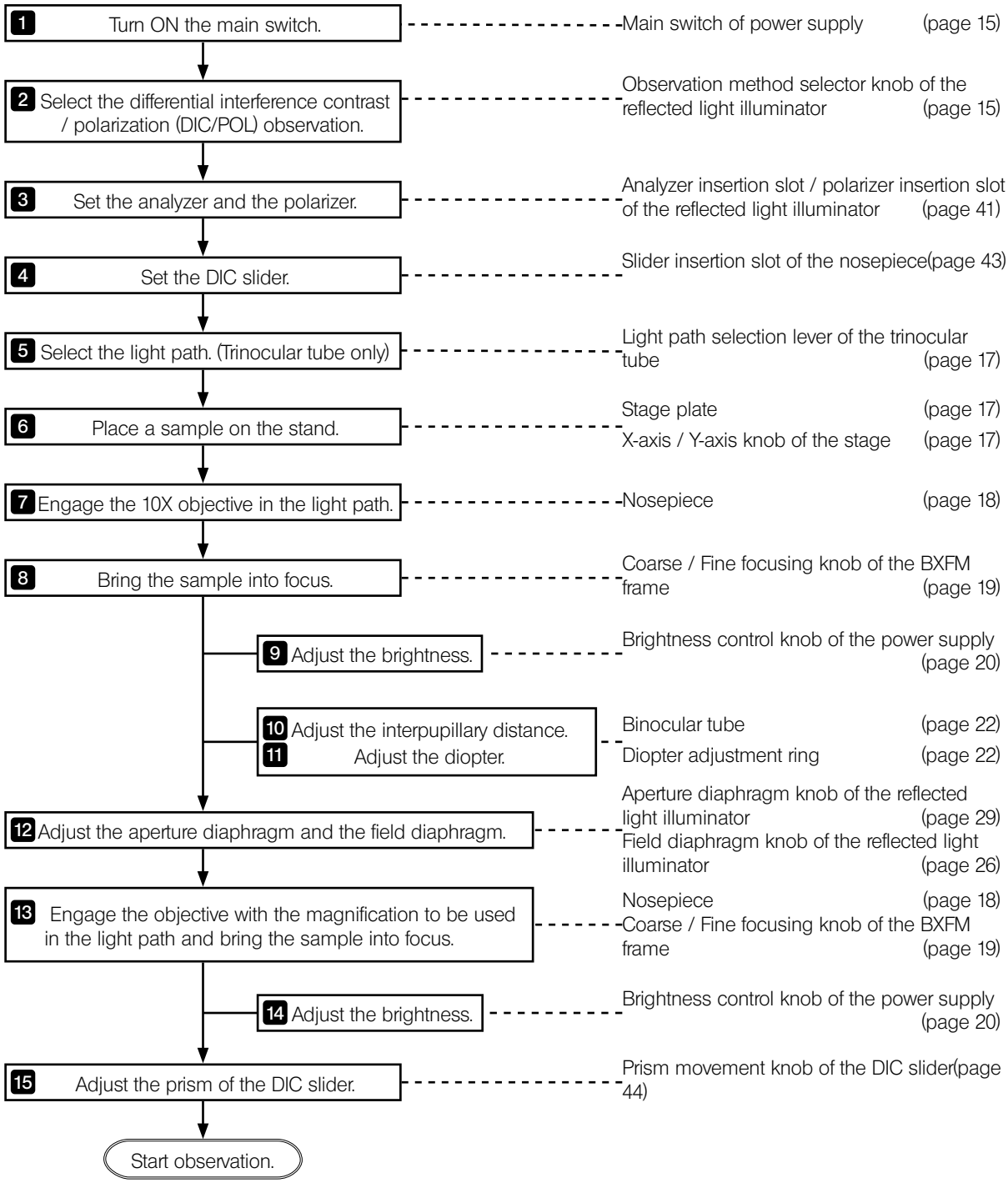
4-1 Reflected light darkfield observation procedures



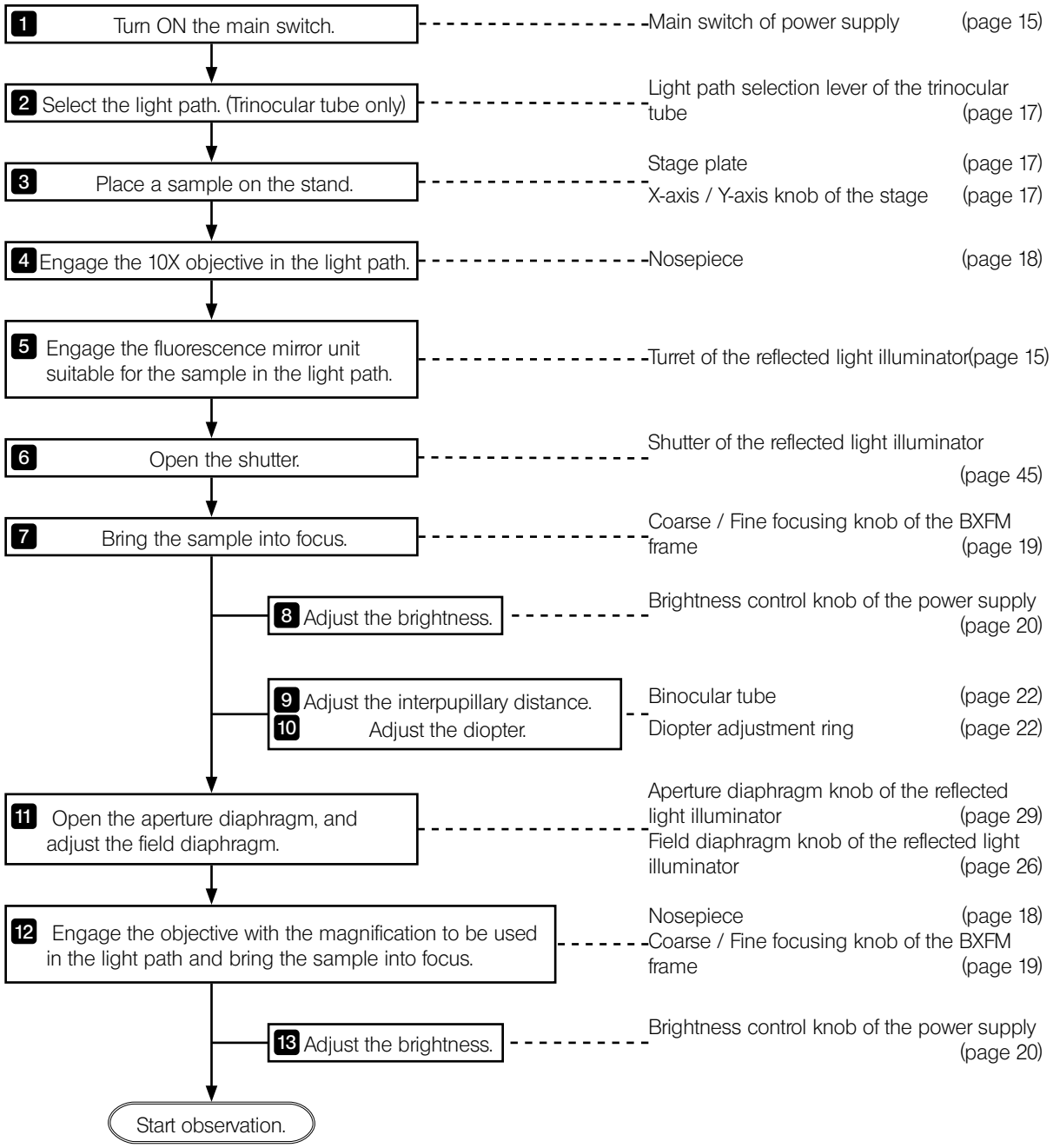
4-2 Reflected light simple polarization observation procedures



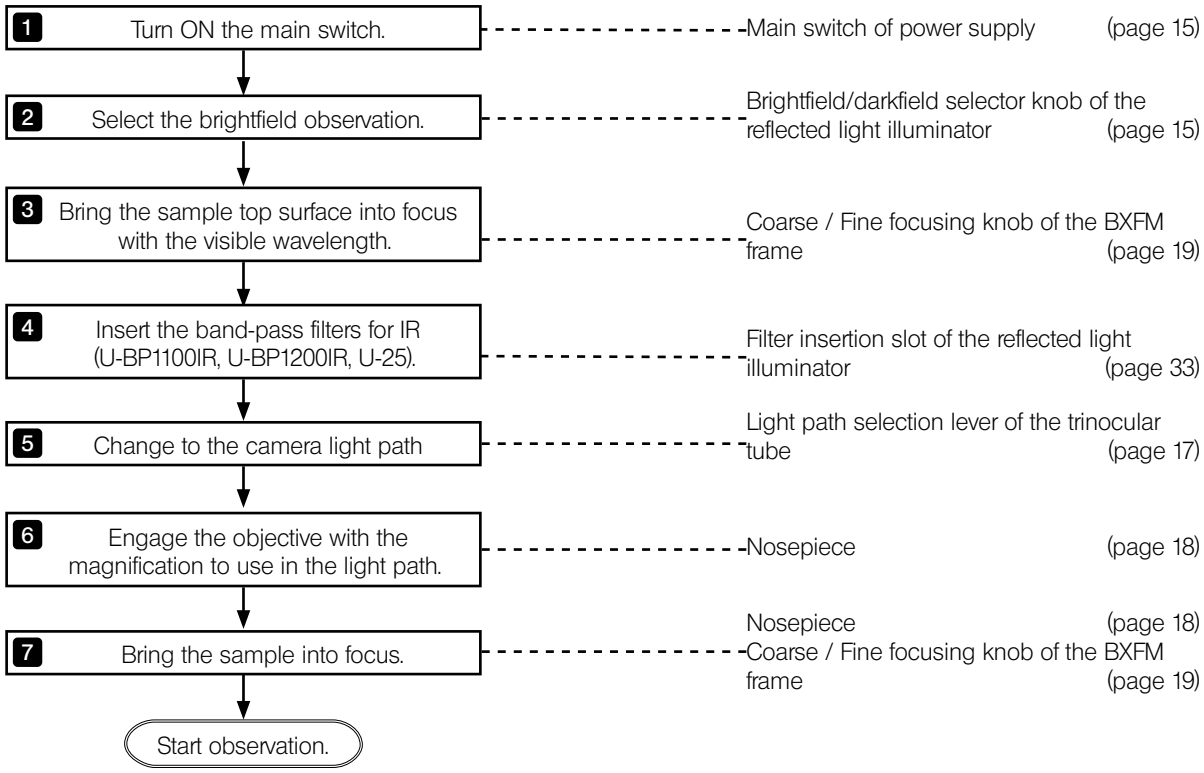
4-3 Reflected light differential interference contrast (DIC) observation procedures



4-4 Reflected light fluorescence observation procedures



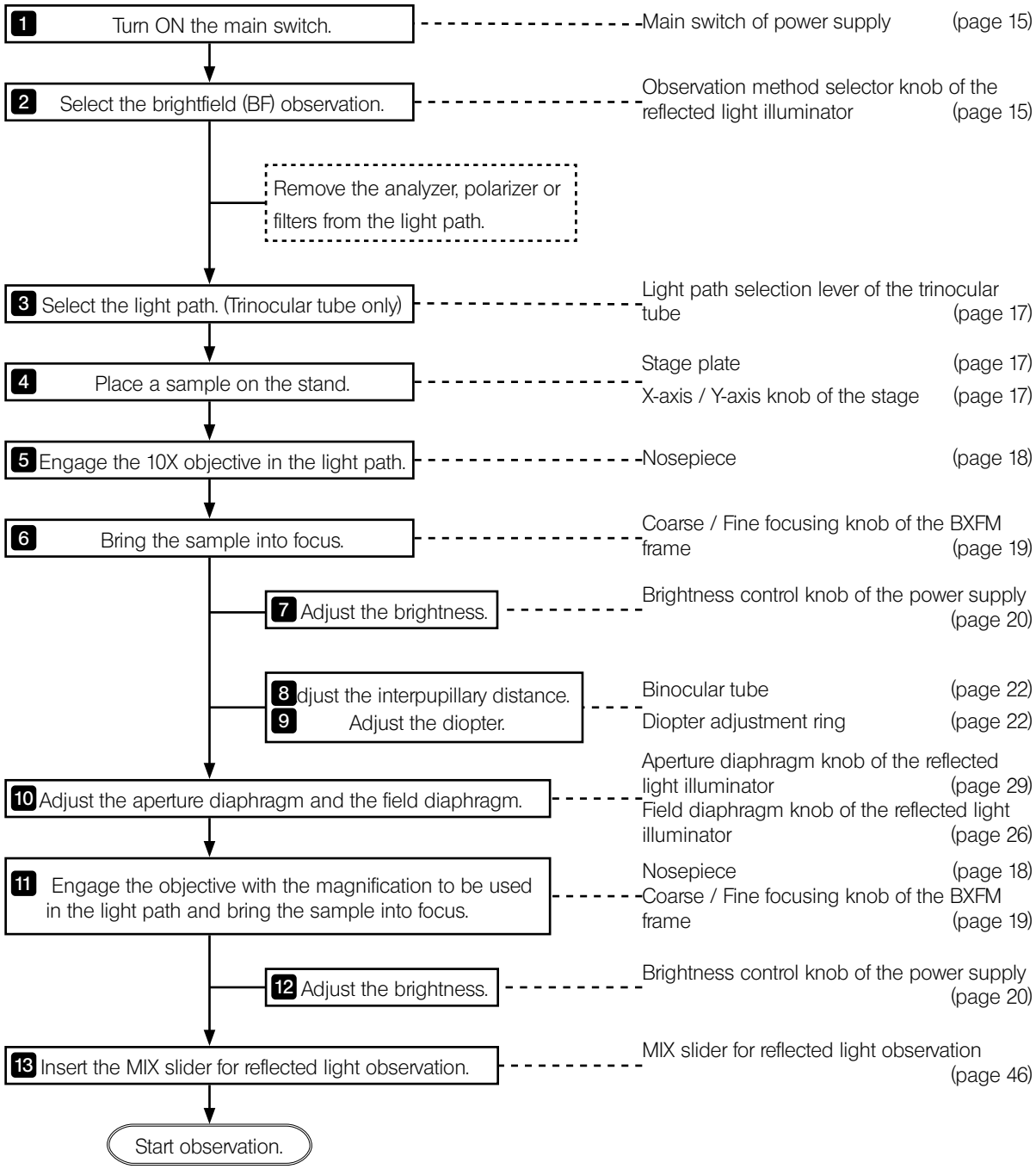
4-5 Reflected light infrared observation procedures



NOTE

- **Combining the reflected polarizer slider for IR and the rotatable analyzer slider for IR (U-POIR, U-AN360IR) cuts the reflection to the sample surface to acquire the image with the higher resolution.**
- **Using the correction collar mechanism of the objective reduces the aberration to acquire the bright image with the high resolution.**

4-6 Reflected light simultaneous observation for BF/DF



4-7 Setting the analyzer and the polarizer of the reflected light illumination

1 When BX3M-URAS-S, BX3M-RLA-S or BX3M-KMA-S is combined

NOTE
- **When performing the sensitive tint observation using the DIC slider (U-DICRH), combine with the polarizer (U-POTP3).**
- **When using the mercury lamp housing, be sure to use the L42 filter (U-25L42) to prevent the polarizer from tarnish.**

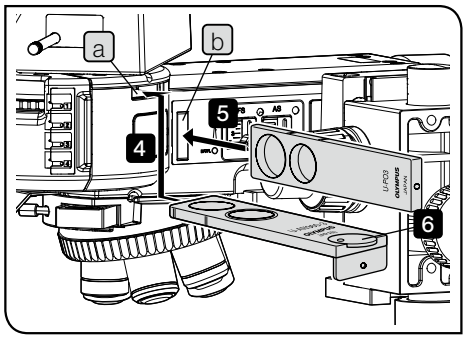
1 If the DIC slider is engaged in the light path, remove it from the light path. For details, see "4-8 Inserting the DIC slider" (page 43).

2 Engage the 10X objective or 20X objective in the light path and bring the sample into focus approximately.

3 If the cover or the dummy slider is attached to the analyzer insertion slot [a] or the polarizer insertion slot [b], remove it.

4 Insert the analyzer in the analyzer insertion slot [a].

Analyzer insertion position	Light path
First level (pulled out)	Empty hole
Second level (pressed in)	Analyzer



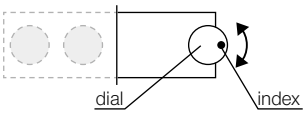
The picture shows the insertion parts of BX3M-URAS-S. The same insertion parts are also provided to BX3M-RLA-S or BX3M-KMA-S.

5 Insert the polarizer (U-PO3 or U-POTP3) in the polarizer insertion slot [b] with the display surface facing to the front side.

Polarizer insertion position	Light path
First level (pulled out)	Empty hole
Second level (pressed in)	Polarizer

6 Turn the analyzer rotation dial to adjust the analyzer.

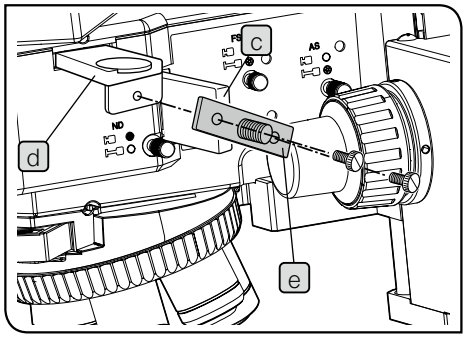
Observation with crossed Nichols*:
Set the index of the dial to the position shown in the picture on the right.



Observation without crossed Nichols*:
Turn the dial while looking at the observation image and align it with the position where you can view the desired observation image.

* The crossed Nichols means the state that the field of view becomes the darkest.

TIP During DIC observation, the analyzer rotation dial must be set to the crossed Nichols state.



Using the connection plate (BX3M-RLA-S/BX3M-KMA-S)

Connecting the polarizer (U-PO3 or U-POTP3) [c] and the analyzer [d] to the provided connection plate [e] with the clamping knob allows you to attach or detach the polarizer and the analyzer at the same time.

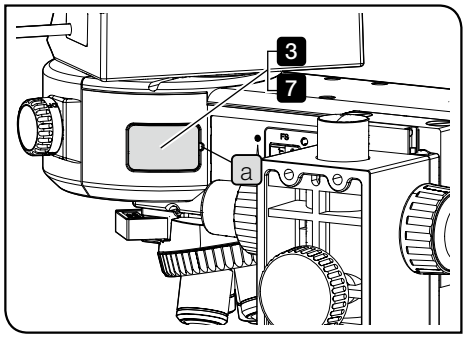
TIP The connection plate cannot be used with BX3M-URAS-S.

2 When BX3M-RLAS-S is combined

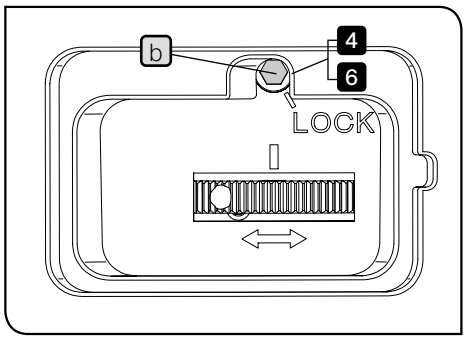
Adjusting the analyzer finely

1 If the DIC slider is engaged in the light path, remove it from the light path. For details, see "4-8 Inserting the DIC slider" (page 43).

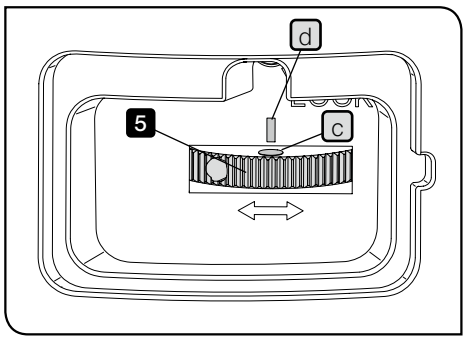
2 Engage the 10X objective or 20X objective in the light path and bring the sample into focus approximately.



3 Insert a stick with a fine point, such as a precision screwdriver, etc. in the notch [a] and catch the cover to remove it.



4 Loosen the screw [b] to unlock.



5 Turn the dial to adjust the analyzer.
Observation with crossed Nichols*: Align the white circle index [c] of the dial with the white line [d].
Observation without crossed Nichols*: Turn the dial while looking at the observation image and align it with the position where you can view the desired observation image.

* The crossed Nichols means the state that the field of view becomes the darkest.

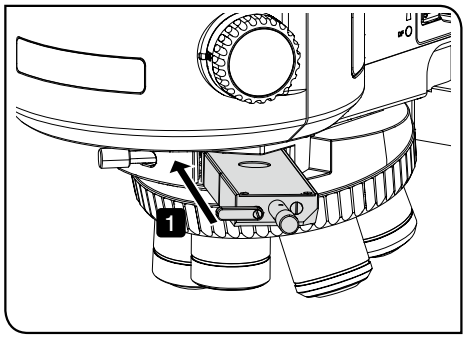
TIP During DIC observation, the analyzer rotation dial must be set to the crossed Nichols state.

6 Tighten the screw [b] to lock the dial rotation.

7 Close the cover to return to the original state.

4-8 Inserting the DIC slider

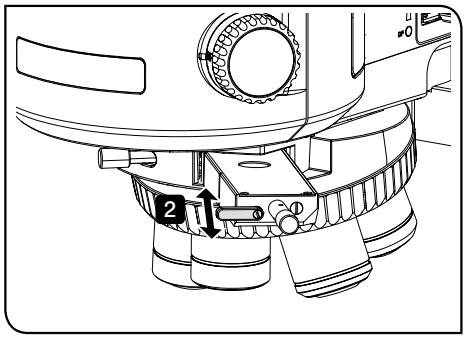
This operation is necessary when the DIC slider for reflected light observation (U-DICR, U-DICRH or U-DICRHC) is combined with the system.



1 Inserting the DIC slider

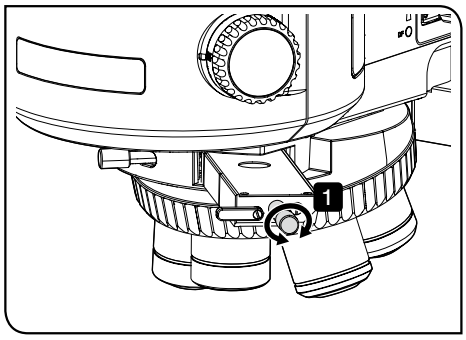
1 Push in the DIC slider to the second level (position where the clicking sound is heard).

DIC slider position	Light path
First level (pulled out)	OUT
Second level (pressed in)	IN



2 When using the DIC slider U-DICR, slide the selection lever depending on the objective to use.

Light path selection lever position	objective to use	
Pulled out	UIS2	LMPLFLN/LMPLFLN-BD series
	UIS	LMPlanFl/LMPlanFl-BD series LMPlanApo/LMPlanApo-BD series
Pressed in	UIS2	MPLFLN/MPLFLN-BD series MPLAPON series
	UIS	UMPlanFl/UMPlanFl-BD series MPlanApo20X, 100X MPlanApo100XBD



2 Adjusting the prism

1 Turn the prism movement knob of the DIC slider to select the interference color with the highest contrast according to the sample.

U-DICR :
U-DICRHC : } The interference color of the background changes continuously from the gray sensitive color to the magenta sensitive color (from -100 to 600 nm).

U-DICRH : The interference color of the background changes continuously from -100 to 100 nm.

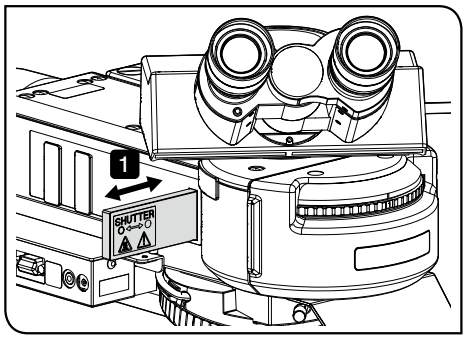
- If you select the gray color for the background color, you can observe the three dimensional image with high contrast in the gray sensitive color with the highest sensitivity.
- If you select the magenta sensitive color for the background color, even a small phase difference can be viewed by a variation of the color.

TIP If you want to select the magenta sensitive color for the background color when using U-DICRH, engage the polarizer U-POTP3 in the light path. For details, see "4-7 Setting the analyzer and the polarizer of the reflected light illumination" (page 41).

NOTE **The detection sensitivity during DIC observation is very high. Be careful, particularly, for dirt or dust on the sample surface.**

TIP The detection sensitivity is direction-oriented. If you turn the sample using the rotational stage, the contrast could be higher.

4-9 Opening/Closing the shutter

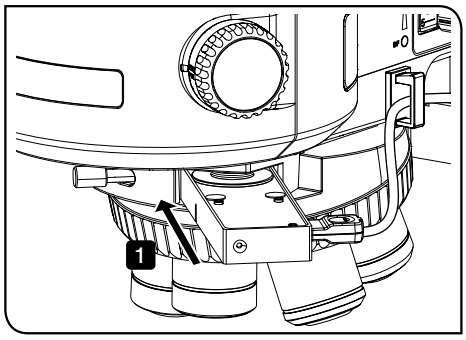


This operation is necessary when the coded universal reflected light illuminator (BX3M-URAS-S) is combined.

1 Push in the shutter to the second level (position where the clicking sound is heard).

Shutter position	Light path
First level (pulled out)	OUT
Second level (pressed in)	IN

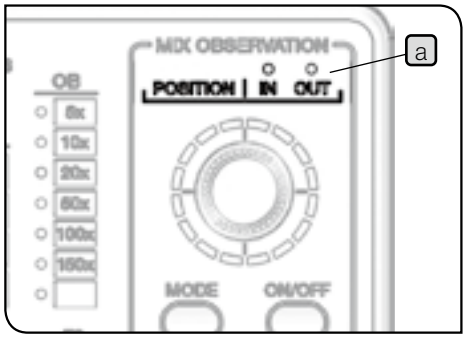
4-10 Inserting the MIX slider for reflected light observation



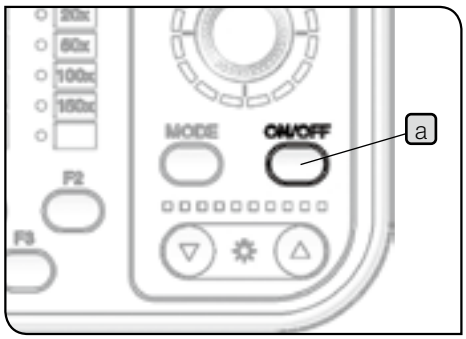
1 Inserting the MIX slider for reflected light observation

1 Push the MIX slider for reflected light observation (U-MIXR) in the second level (position where the clicking sound is heard).

MIX slider for reflected light observation position	Light path
First level (pulled out)	OUT
Second level (pressed in)	IN



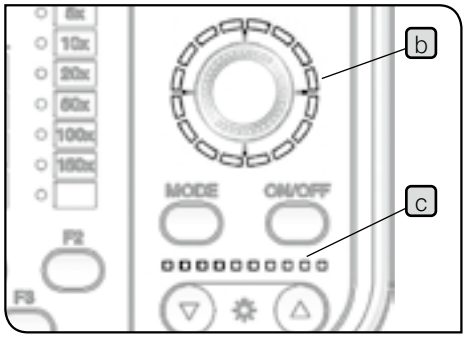
The state whether the MIX slider for reflected light observation is engaged in or removed from the light path can be checked by the POSITION indicator [a] of the hand switch (BX3M-HS).

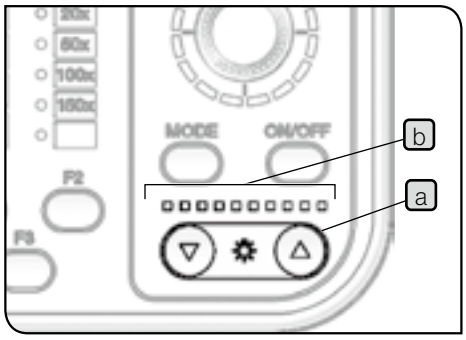


2 Turning ON the illumination of the MIX slider for reflected light observation

1 If you press the ON/OFF button [a] of the hand switch (BX3M-HS) to set it to ON, the illumination of the MIX slider for reflected light observation (U-MIXR) turns ON.

State	Indicator ([b], [c])	Function
ON	Turns ON.	The illumination turns ON.
OFF	Turns OFF.	The illumination turns OFF.





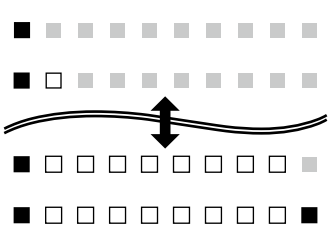
3 Adjusting the brightness

1 Press the light intensity button [a] of the hand switch (BX3M-HS) to adjust the brightness of the illumination.

Button	Operation	Function
▼	Short press	Darken by predetermined quantity.
	Long press	Darken continuously.
▲	Short press	Brighten by predetermined quantity.
	Long press	Brighten continuously.

Indicator

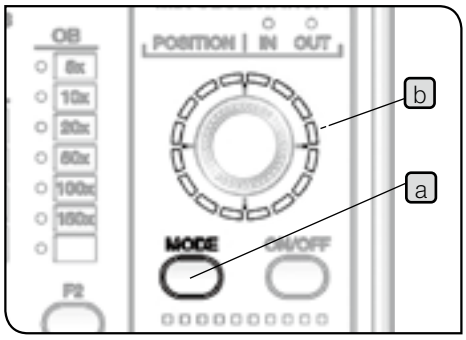
The light intensity state can be checked by the indicator [b].



Brightness : OFF
(Light intensity value : 0%)

Brightness : Maximum
(Light intensity value : 100%)

■ : Turns ON in blue. □ : Turns ON in white. ■ : Turns OFF.



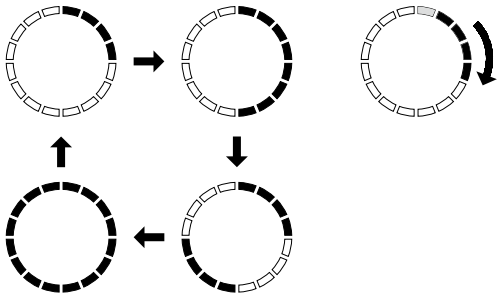
4 Selecting the illumination pattern

1 Press the MODE button [a] of the hand switch (BX3M-HS) to select the illumination pattern. The indicator [b] turns ON according to the illumination pattern.

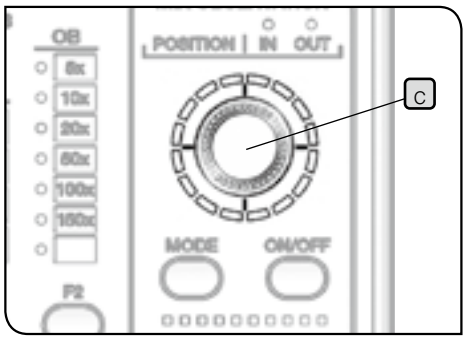
Operation	Function
Short press	Changes the illumination pattern.
Long press (Short press while the illumination pattern is rotating automatically)	The illumination pattern rotates automatically clockwise. (The automatic rotation stops.)

Short press

Long press

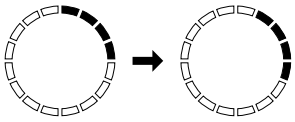


: The illumination turns ON and the indicator turns ON in blue.

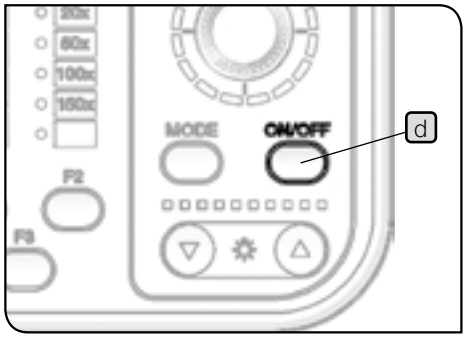


2 Turn the dial [c] to change the illumination position. The illumination position shifts in the rotated direction by one scale at a time.

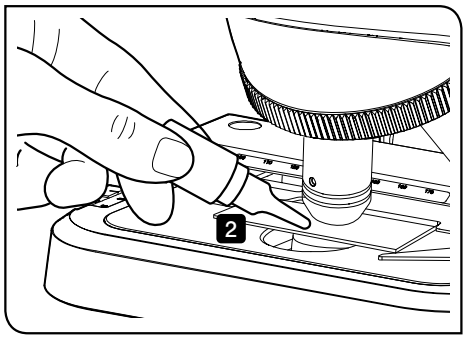
(Example of clockwise rotation)



NOTE **While the illumination pattern is rotating automatically, you cannot operate the dial [c] and the ON/OFF button [d].**



4-11 Using the oil immersion objective



Apply the specified oil (immersion oil) to the tip of the oil immersion objective. Otherwise, the observation image can not be brought into focus.

NOTE **Always use the immersion oil made by Evident. If you use the immersion oil other than those made by Evident, the correct optical performance cannot be exhibited.**

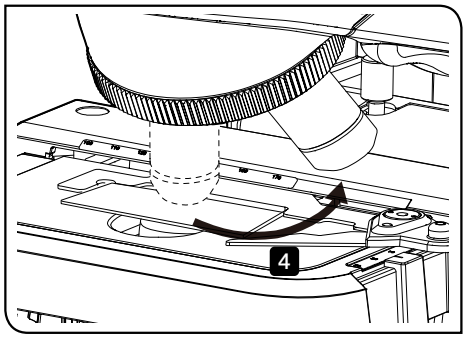
1 Change the objective in order from the low magnification to the high magnification to bring the sample into focus.

2 Before engaging the oil immersion objective in the light path, apply a drop of the immersion oil on the observation area of the sample.

3 Turn the nosepiece, engage the oil immersion objective in the light path and bring the sample into focus using the fine focusing knob.

NOTE **• If bubbles are contained in the oil, the visibility of the image is deteriorated. Check that the bubbles are not contained in the oil.**

• To remove bubbles, turn the nosepiece slightly and move the oil immersion objective back and forth once or twice.



4 After use, lower the stage, turn the nosepiece 90° and remove the objective attached with the oil from the sample. Then, wipe off the immersion oil completely from the tip of the objective and the tip of the condenser lens using a piece of cleaning paper or the gauze slightly moistened with the absolute alcohol. Wipe off the immersion oil on the sample in the same way.

NOTE **If lenses or samples are left keeping the immersion oil attached, the oil adheres and the correct observation may not be performed.**

⚠ CAUTION **Follow the cautions indicated in the label of the immersion oil.**

5 Troubleshooting

Depending on how you use, the performance of this microscope may not be exhibited, though they are not failure. If problems occur, please review the following list and take remedial action as needed.
If you cannot improve the phenomena after checking the entire list, please contact Evident for assistance.

5-1 Optical systems

Phenomena	Cause	Remedy	Page
a) The halogen bulb or the mercury burner does not light.	The lamp is burned out.	Replace with the new lamp.	73
b) The halogen bulb or the mercury burner flashes on and off.	The halogen bulb or the mercury burner is about to burn out.	Replace the halogen bulb or the mercury burner.	73
c) The halogen bulb or the mercury burner burns out quickly.	You are not using the proper halogen bulb or the mercury burner.	Replace with the proper halogen bulb or the mercury burner.	73
d) Even though the lamp lights, the field of view is dark.	The aperture diaphragm and the field diaphragm are not opened sufficiently.	Open the aperture diaphragm sufficiently, and open the field diaphragm until the field diaphragm circumscribes the field of view.	24, 28
	The analyzer or the polarizer are in the light path.	Remove the analyzer or the polarizer from the light path.	41
	Light path selection lever of the trinocular tube is at the [camera] position.	Set the light path selection lever of the trinocular tube to the [eye] [camera] or the [eye] position.	17
	The observation method selector knob or lever or the turret is at the halfway position.	Select the observation method selector knob or lever or the turret surely.	15
	The shutter is engaged in the light path.	Remove the shutter from the light path.	45
e) Though the brightness control knob or the light volume adjustment dial is rotated, the illumination does not become brighter.	The halogen bulb or the mercury burner is burned out.	Replace the halogen bulb or the mercury burner.	73

Phenomena	Cause	Remedy	Page
f) The peripheral area of the field of view becomes dark. Or, the brightness of the field of view is not even.	The light path selection lever of the trinocular tube is not stopped at the correct position.	Stop the light path selection lever of the trinocular tube at the position where the clicking sound is heard.	17
	The observation method selector knob or lever or the turret is at the halfway position.	Select the observation method selector knob or lever or the turret surely.	15
	The objective is not correctly engaged in the light path.	Turn the nosepiece to the position where the clicking sound is heard and engage the objective in the light path.	18
	The nosepiece is not attached correctly.	Push in the nosepiece along the mounting dovetail until it touches the end, and secure it.	68
	The centering of the field diaphragm is not performed.	Perform the centering of the field diaphragm correctly.	26
	The field diaphragm is narrowed down too much.	Open the field diaphragm sufficiently.	24
	The filter is not engaged in the light path correctly.	Stop the filter at the position where the clicking sound is heard.	33
	The ND filter lever is not stopped at the correct position.	Stop the ND filter lever at the position where the clicking sound is heard.	32
	The ND filter is not linked completely.	Set the ND filter correctly whether to link or cancel.	32
	The lamp is not attached correctly.	Push in the terminal of the halogen bulb completely until it touches the end.	73
	The analyzer and the polarizer are not inserted correctly.	Engage the analyzer and the polarizer in the light path correctly.	41
g) Dust or dirt is visible in the field of view.	The tip of the eyepiece or objective or the sample is dirty.	Clean them sufficiently.	8
h) The observation image glares.	The aperture diaphragm is narrowed down too much.	Adjust the aperture diaphragm according to the numerical aperture of the objective to use.	28
i) The observation image is viewed in white haziness or not visible clearly.	The objective for UIS2(UIS) series is not used.	Replace with the objective for UIS2(UIS) series.	58
	The dummy slider is not inserted in the nosepiece.	Insert the dummy slider in the nosepiece.	16
	The nosepiece is not attached correctly.	Push in the nosepiece along the mounting dovetail until it touches the end, and secure it.	68
	The objective is not correctly engaged in the light path.	Turn the nosepiece until the clicking sound is heard and engage the objective in the light path.	18
	The tip of the eyepiece or the sample is dirty.	Clean them sufficiently.	8

Phenomena	Cause	Remedy	Page
j) The one-sided blur appears in the observation image.	The nosepiece is not attached correctly.	Push in the nosepiece along the mounting dovetail until it touches the end, and secure it.	68
	The objective is not correctly engaged in the light path.	Turn the nosepiece until the clicking sound is heard and engage the objective in the light path.	18
	The sample is not parallel to the stage.	Correct the sample to parallel to the stage or change the sample.	17
	The sample exceeds the specified weight.	Replace with another sample.	17
k) The observation image shifts when defocusing.	The nosepiece is not attached correctly.	Push in the nosepiece along the mounting dovetail until it touches the end, and secure it.	68
	The objective is not correctly engaged in the light path.	Turn the nosepiece until the clicking sound is heard and engage the objective in the light path.	18
	The aperture diaphragm is narrowed down the centering is not performed yet.	Perform the centering of the aperture diaphragm.	29
j) During the fluorescence observation, the background becomes brighter.	This is caused by the in-house fluorescence of the transmitted light illumination optical systems.	Insert the light shield sheet in the space of the stage.	16

5-2 Coarse/fine focusing

Phenomena	Cause	Remedy	Page
a) The tension of the coarse focusing knob is too tight.	The tension adjustment ring of the coarse focusing knob is tightened too firmly.	Loosen the tension adjustment ring so that the tension of the coarse focusing knob becomes the appropriate tightness.	19
b) The stage descends on its own weight. Or the sample is defocused due to the slip of the coarse focusing knob.	The tension adjustment ring of the coarse focusing knob is loosened too much.	Tighten the tension adjustment ring so that the tension of the coarse focusing knob becomes the appropriate tightness.	19
c) The sample is defocused. (The BXFM frame does not descend.)	The mounting position of the BXFM frame is too high.	Lower the mounting position of the BXFM frame.	19, 64

5-3 Observation tube

Phenomena	Cause	Remedy	Page
a) The fields of view of two eyes do not coincide.	The interpupillary distance is not adjusted correctly.	Adjust the interpupillary distance correctly.	22
	The diopter of two eyes is not compensated.	Compensate the diopter correctly.	22
	The different eyepiece is used for right and left eyes.	Use the same eyepiece for right and left eyes.	10
	The user is not used to the parallel optical axis.	The following measures may help this problem: Do not look at the image immediately after looking into the eyepiece, but look at the whole field of view or release your eyes from eyepieces and look afar once, and then look into the eyepieces.	–

Repair request

If you cannot improve the phenomena after taking the above remedies, please contact Evident for assistance.

At that time, please tell them the following information as well.

- Product name and abbreviation (Example: stage with coaxial knobs on the bottom right U-SVRM)
- Product number
- Phenomena

6 Specifications

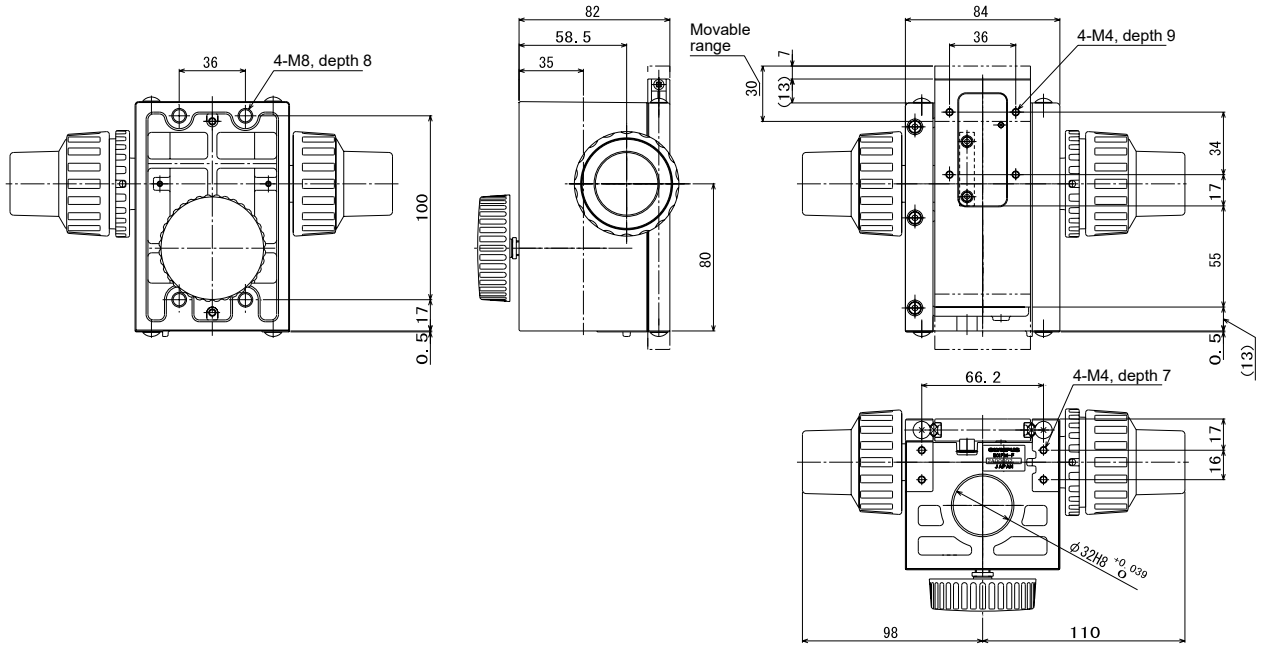
Configuration units		Product name	Specifications
Focusing unit	BXFM frame	BXFM-F	Vertically movable objective Movable range: 30 mm Fine focusing knob: Moving distance per one rotation: 0.2 mm Coarse focusing knob: Moving distance per one rotation: 36 mm Equipped with tension adjustment mechanism
Observation tube	Binocular tube	U-BI30-2	Field number 22
		U-TBI-3	Field number 22, tilting type
	Trinocular tube	U-SWTR-3	Field number 26.5
		U-SWETTR-5	Field number 26.5, tilting type, for upright image observation
		U-TR30-2	Field number 22
		U-TR30IR	Field number 22, for infrared observation
		U-ETR-4	Field number 22, for upright image observation
		U-TTR-2	Field number 22, tilting type
Illuminator for reflected light illumination		BX3M-KMA-S	For brightfield/DIC/simple polarization observations, built-in LED light source
		BX3M-RLA-S	For brightfield/darkfield/DIC/simple polarization/infrared observations
		BX3M-RLAS-S	For brightfield/darkfield/DIC/simple polarization observations, coded type, built-in LED light source
		BX3M-URAS-S	For brightfield/darkfield/simple polarization/fluorescence/infrared observations, coded type, detachable mirror unit (attachable to 4 positions)
		U-KMAS	For brightfield/DIC/simple polarization observations Field number 26.5
Light source for reflected light illumination	LED lamp housing	BX3M-LEDR	White LED; Maximum current: 700 mA
	Halogen lamp housing	U-LH100L-3 U-LH100IR	Applicable bulb: 12V100WHAL-L (7724 made by PHILIPS) Average bulb lifetime: Approx. 2,000 hours (Used in accordance with rating) 12V100WHAL (7023 made by PHILIPS) Average bulb lifetime: Approx. 100 hours (Used in accordance with rating) Bulb voltage adjustment range: DC 1.0 V to 12.0 V (Changeable continuously) Power supply: TH4-100, TH4-200
	Mercury lamp housing	U-LH100HGAPO U-LH100HG	Applicable burner: USH-103OL (made by Ushio Inc.) Average burner lifetime: Approx. 300 hours (Used in accordance with rating) Power supply: U-RFL-T
	Light source for light guide illumination	U-LGPS	Light guide: U-LLG150, U-LLG300 Light guide adapter: U-LLGAD

Configuration units		Product name	Specifications
Nosepiece	Manual type	U-5RE-2	5 holes
		U-D6RE	6 holes, detachable slider
		U-D6RE-ESD	6 holes, detachable slider, support ESD
		U-D7RE	7 holes, detachable slider
		U-5BDRE	5 holes, darkfield observation available
		U-D5BDRE	5 holes, darkfield observation available, detachable slider
		U-D6BDRE	6 holes, darkfield observation available, detachable slider
	Manual type (Coded type)	U-5RES-ESD	5 holes, support ESD
		U-D6RES	6 holes, detachable slider
		U-D7RES	7 holes, detachable slider
		U-D5BDRES-ESD	5 holes, darkfield observation available, detachable slider, support ESD
		U-D6BDRES-S	6 holes, darkfield observation available, detachable slider, support ESD
	Motorized type	U-D5BDREMC	5 holes, darkfield observation available, detachable slider
		U-D6REMC	6 holes, detachable slider
		U-D6BDREMC	6 holes, darkfield observation available, detachable slider, support ESD
Slider	For differential interference contrast	U-DICR	Standard type
		U-DICRH	High resolution type
		U-DICRHC	High contrast type
	For MIX	U-MIXR	Equipped with LED ring illumination, light control by hand switch

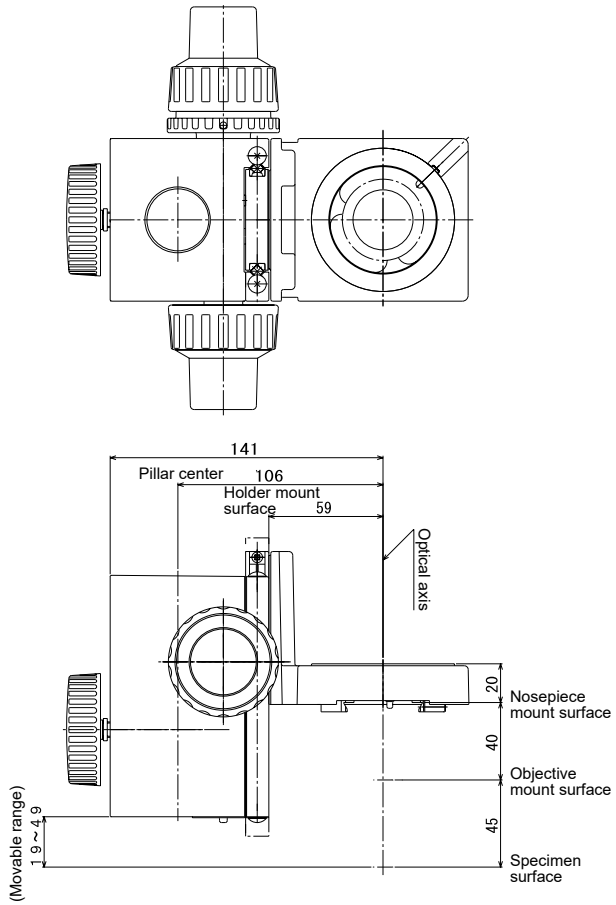
Operating environment
• Indoor use • Altitude: Max. 2,000 meters • Ambient temperature: 5 to 40 °C (41 to 104 °F) • Maximum relative humidity: 80% for temperatures up to 31 °C (88 °F) (without condensation) In case of over 31 °C (88 °F), the relative humidity is decreased linearly through 70% at 34 °C (93 °F), 60% at 37 °C (99 °F), and to 50% at 40 °C (104 °F). • Supply voltage fluctuations: Not to exceed ±10% of the normal voltage. • Pollution degree 2 (in accordance with IEC60664-1) • Installation/Overvoltage category : Ⅱ (in accordance with IEC60664-1)

7 Main dimension diagram

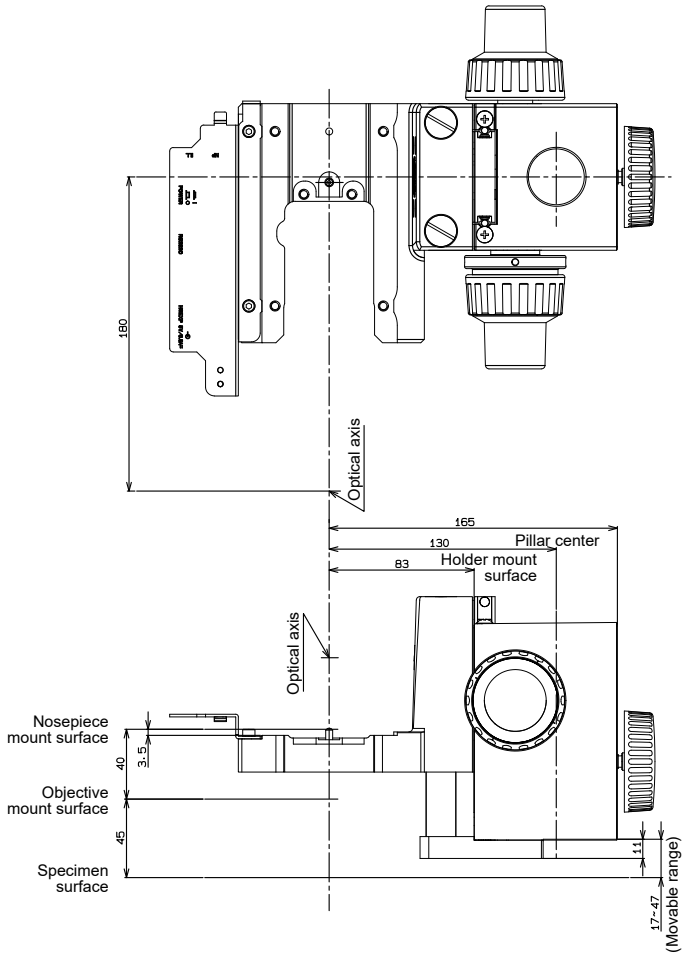
BXFM frame
BXFM-F



Provided with Illuminator mounting holder S
BXFM-F + BXFM-ILHS



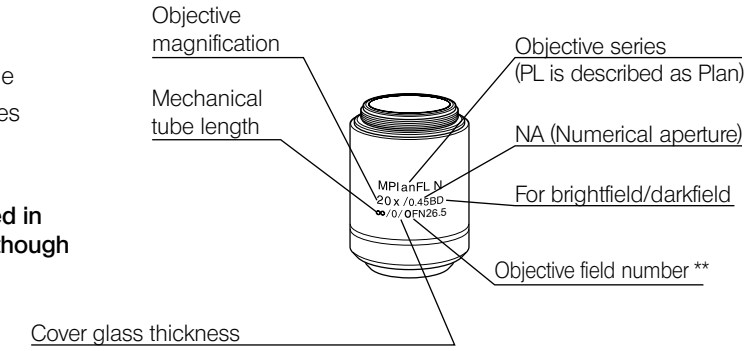
Provided with Illuminator Mounting Holder / Assist spring for BXFM
BXFM-F + BX3M-ILH + BXFM-ILHSPU



8 Optical performance list «UIS2 series»

The following table shows the combined optical performance of the eyepiece and the objective. The picture on the right shows the various performances displayed on the objective.

NOTE **There are objectives that can be used in combination with this product even though they are not listed here. Contact Evident for details.**



** "FN" is displayed instead of "OFN" depending on the objective.

Observation method by objective

Series name	Magnification	Bright-field	Dark-field	DIC	Polar-ization	Fluores-cence	Infrared
MPLN Plan Achromat	5X/10X/20X/50X/100X	●					
MPLN-BD Plan Achromat for brightfield/darkfield	5X/10X/20X/50X/100X	●	●				
MPLFLN Plan Semi Apochromat	1.25X*1/2.5X*1/5X/10X/20X/40X *2/50X/100X	●		●	●	●	
MPLFLN-BD Plan Semi Apochromat BD	5X/10X/20X/50X/100X/150X	●	●	●	●	●	
MPLFLN-BDP Plan Semi Apochromat for reflected light polarization	5X/10X/20X/50X/100X	●	●	●	●	●	
LMPLFLN Long working distance Plan Semi Apochromat	5X/10X/20X/50X/100X	●		●	●	●	
LMPLFLN-BD Long working distance Plan Semi Apochromat for brightfield/darkfield	5X/10X/20X/50X/100X	●	●	●	●	●	
SLMPLN Long working distance Plan Achromat	20X/50X/100X	●					
PLAPON Plan Apochromat	1.25X/2X	●					
MPLAPON Plan Apochromat	50X/100X	●		●	●		
	100XO2	●			●		
LCPLN-IR Plan Achromat for observation through glass	20X/50X/100X	●					●
LCPLFLN-LCD Long working distance Plan Semi Apochromat	20X/50X/100X	●		●			
PLN-P Polarization Plan Achromat	4X	●			●	●	
ACHN-P Polarization Achromat	10X/20X/40X	●			●	●	
	100XO	●			●	●	
UPLFLN-P Plan Semi Apochromat for polarization	4X	●			●	●	
	10X/20X/40X/	●		●	●	●	
	100XO	●		●	●	●	

*1 For reflected light brightfield observation

*2 Not available for reflected light DIC observation.

Basic information by objective

	Optical performance / Series name	Notation	Magnification	Numerical aperture	Working distance (mm)	Cover glass thickness (mm)	Eyepiece			
							WHN10X(FN22)		SWH10X(FN26.5)	
							Total magnification	Actual field of view (mm)	Total magnification	Actual field of view (mm)
UIS series	MPLN Plan Achromat (OFN22) **	MPlanN	5X	0.10	20.0	–	50X	4.4	–	–
			10X	0.25	10.6	–	100X	2.2		
			20X	0.40	1.3	0	200X	1.1		
			50X	0.75	0.38	0	500X	0.44		
			100X	0.90	0.21	0	1000X	0.22		
	MPLN-BD Plan Achromat for brightfield/darkfield (OFN22) **	MPlanN-BD	5X	0.10	12.0	–	50X	4.4	–	–
			10X	0.25	6.5	–	100X	2.2		
			20X	0.40	1.3	0	200X	1.1		
			50X	0.75	0.38	0	500X	0.44		
			100X	0.90	0.21	0	1000X	0.22		
	MPLFLN Plan Semi Apochromat (OFN26.5) ** *OFN22 only for 1.25X	MPlanFLN	1.25X	0.04	3.5	–	12.5X	17.6	–	–
			2.5X	0.08	10.7	–	25X	8.8	25X	10.6
			5X	0.15	20.0	–	50X	4.4	50X	5.3
			10X	0.30	11.0	–	100X	2.2	100X	2.65
			20X	0.45	3.1	0	200X	1.1	200X	1.33
			40X	0.75	0.63	0	400X	0.55	400X	0.67
			50X	0.80	1.0	0	500X	0.44	500X	0.53
			100X	0.90	1.0	0	1000X	0.22	1000X	0.27
	MPLFLN-BD Plan Semi Apochromat for brightfield/darkfield (OFN26.5) **	MPlanFLN-BD	5X	0.15	12.0	–	50X	4.4	50X	5.3
			10X	0.30	6.5	–	100X	2.2	100X	2.65
			20X	0.45	3.0	0	200X	1.1	200X	1.33
			50X	0.80	1.0	0	500X	0.44	500X	0.53
			100X	0.90	1.0	0	1000X	0.22	1000X	0.27
			150X	0.90	1.0	0	1500X	0.15	1500X	0.18
	MPLFLN-BDP Plan Semi Apochromat for reflected light polarization (OFN26.5) **	MPlanFLN-BDP	5X	0.15	12.0	–	50X	4.4	50X	5.3
			10X	0.25	6.5	–	100X	2.2	100X	2.65
			20X	0.40	3.0	0	200X	1.1	200X	1.33
			50X	0.75	1.0	0	500X	0.44	500X	0.53
			100X	0.90	1.0	0	1000X	0.22	1000X	0.27
	LMPLFLN Long working distance Plan Semi Apochromat (OFN26.5) **	LMPlanFLN	5X	0.13	22.5	–	50X	4.4	50X	5.3
			10X	0.25	21.0	–	100X	2.2	100X	2.65
			20X	0.40	12.0	0	200X	1.1	200X	1.33
			50X	0.50	10.6	0	500X	0.44	500X	0.53
			100X	0.80	3.4	0	1000X	0.22	1000X	0.27
	LMPLFLN-BD Long working distance Plan Semi Apochromat for brightfield/darkfield (OFN26.5) **	LMPlanFLN-BD	5X	0.13	15.0	–	50X	4.4	50X	5.3
			10X	0.25	10.0	–	100X	2.2	100X	2.65
			20X	0.40	12.0	0	200X	1.1	200X	1.33
			50X	0.50	10.6	0	500X	0.44	500X	0.53
			100X	0.80	3.3	0	1000X	0.22	1000X	0.27

	Optical performance / Series name	Notation	Magnification	Numerical aperture	Working distance (mm)	Cover glass thickness (mm)	Eyepiece			
							WHN10X(FN22)		SWH10X(FN26.5)	
							Total magnification	Actual field of view (mm)	Total magnification	Actual field of view (mm)
UIS series	SLMPLN Long working distance Plan Achromat (OFN26.5) **	SLMPlanN	20X	0.25	25.0	0	200X	1.1	200X	1.33
			50X	0.35	18.0	0	500X	0.44	500X	0.53
			100X	0.60	7.5	0	1000X	0.22	1000X	0.27
	PLAPON Plan Apochromat	PlanApoN	1.25X	0.04	5.0	–	12.5X	17.6	12.5	21.2
			2X	0.08	6.2	–	20X	11	20X	13.25
	MPLAPON Plan Apochromat	MPlanApoN	50X	0.95	0.35	0	500X	0.44	500X	0.53
			100X	0.95	0.35	0	1000X	0.22	1000X	0.27
			100XO2*1	1.45	0.1	0	1000X	0.22	1000X	0.27
	LMPLN-IR Long working distance Plan Achromat (OFN22) **	LMPlanN	5X	0.1	23	0	50X	4.4	50X	5.3
			10X	0.3	18	0	100X	2.2	100X	2.65
	LCPLN-IR Plan Achromat for observation through glass (OFN22) **	LCPlanN*2	20X	0.45	8.3	0-1.2	200X	1.1	200X	1.33
			50X	0.65	4.5	0-1.2	500X	0.44	500X	0.53
			100X	0.85	1.2	0-0.7	1000X	0.22	1000X	0.27
	LCPLFLN-LCD Long working distance Plan Semi Apochromat (OFN26.5) **	LCPlanFLN*2	20X	0.45	7.4-8.3	0-1.2	200X	1.1	200X	1.33
			50X	0.70	2.2-3	0-1.2	500X	0.44	500X	0.53
			100X	0.85	0.9-1.2	0-0.7	1000X	0.22	1000X	0.27
	PLN-P Polarization Plan Achromat (OFN22) **	PlanN	4X	0.10	18.5	–	40X	5.5	–	–
	ACHN-P Polarization Achromat (OFN22) **	AchN	10X	0.25	6.0	–	100X	2.2	–	–
			20X	0.40	3.0	0.17	200X	1.1	–	–
			40X	0.65	0.45	0.17	400X	0.55	–	–
			100XO*1	1.25	0.13	0.17	1000X	0.22	–	–
	UPLFLN-P Plan Semi Apochromat for polarization (OFN26.5) **	UPlanFLN	4X	0.13	17.0	–	40X	5.5	–	–
			10X	0.3	10.0	–	100X	2.2	–	–
			20X	0.5	2.1	0.17	200X	1.1	–	–
			40X	0.75	0.51	0.17	400X	0.55	–	–
			100XO*1	1.3	0.20	0.17	1000X	0.22	–	–

*1 Oil immersion objective

*2 Equipped with the correction collar available for aberration correction according to the silicon thickness or the glass thickness.

Abbreviations used for objective

Ex) M PL (Plan) FL N 100 BD

- M: For metal (without cover)
  - LM: For long working distance metal
  - SLM: For super long working distance metal
  - LC: For observation through glass
- PL (Plan): Plan: Corrects the image plane curvature around the field.
- FL: None: Achromat: Corrects the aberration by 2 wavelengths (blue and red).
  - FL: Semi-apochromat: Corrects the color aberration in the visible range (from blue-violet to red)
  - APO: Apochromat: Corrects the color aberration in the entire visible range (from violet to red)
- N: None: UIS objective
  - N: UIS2 objective
- 100: Number: Objective magnification
- BD: None: For brightfield
  - BD: For brightfield/darkfield
  - BDP: For brightfield/darkfield, polarization
  - IR: For infrared

Glossary in optical performance table

Working distance: Distance between the tip of the objective and the focal position

Numerical aperture: Important value that determines the performances (resolution, focal depth and brightness) of the objective

- Resolution・・・Increases in proportion to the numerical aperture.
- Focal depth・・・Decreases in proportion to the numerical aperture.
- Brightness・・・Increases in proportion to the square of the numerical aperture. (comparing with the same magnification)

Resolution: Indicates the limit where the objective can identify two approaching images using the distance between 2 points on the sample surface.

Focal depth: Indicates the sample depth focused at the same time. The depth increases when the aperture diaphragm is narrowed down and decreases when the numerical aperture of the objective becomes larger.

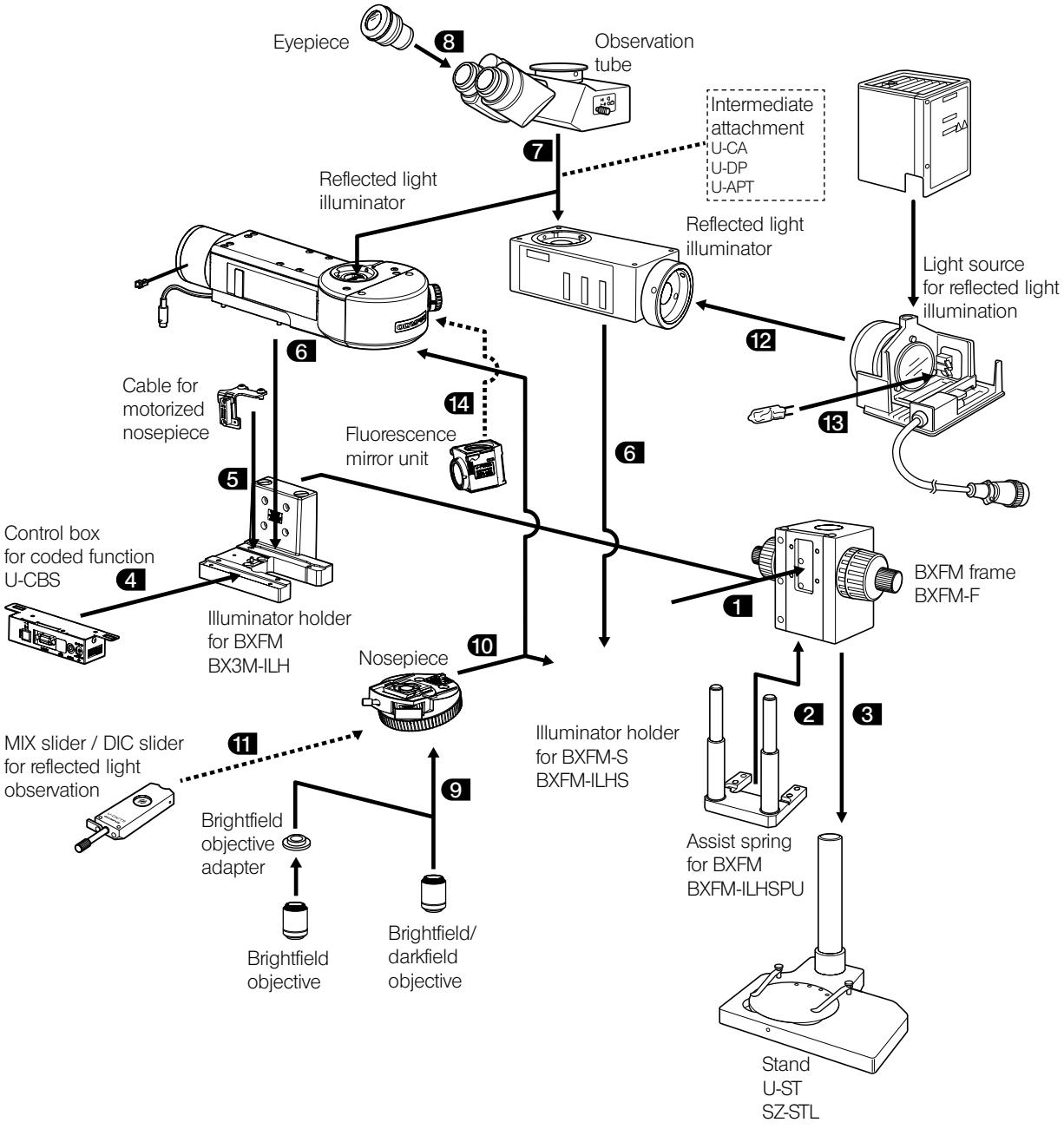
Field number: Indicates the diameter of the image area visible by the eyepiece in mm.

Actual field: Indicates the diameter of the field area on the sample surface in mm.

9 Assembly

9-1 Assembly diagram

The numbers in the following diagram represent the order to attach each unit.
The units shown in the following diagram are typical examples. For combination of units, contact Evident or refer to the latest catalogs. (In order to ensure the performance, ask Evident to attach/detach the units.)



→ : Can be combined.

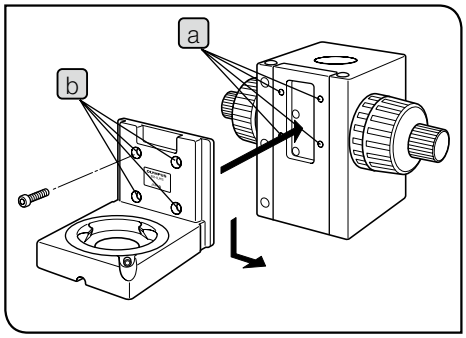
⇢ : May not be combined depending on units.

For the polarization observation, refer to the instruction manual provided with the unit.

9-2 Assembly procedures

Assemble the units using the Allen screwdriver (opposite side: 3 mm ⟷) and the Allen wrench (opposite side: 4 mm ⌐) provided with the microscope. Use the Allen screwdriver if not specified.

NOTE **Before attaching units, remove dust and dirt from the attaching area and attach units carefully so as not to scratch them.**

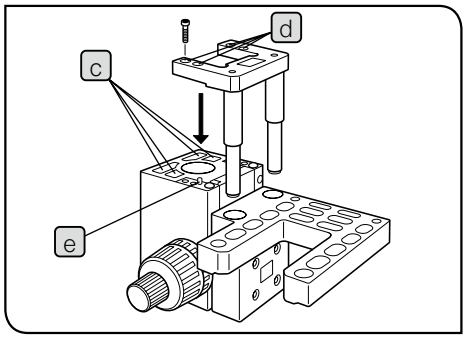


This picture shows the procedure to attach the Illuminator holder for BXFM-S (BXFM-ILHS). The same procedure also applies when attaching other illuminator holders.

1 Attaching the illuminator holder

1. Align the mounting hole [a] of the BXFM frame (BXFM-F) with the screw holes [b] (4 positions) of the illuminator holder, and tighten the screws (4 pcs.) provided with the illuminator holder to secure the illuminator holder using the Allen screwdriver.

TIP To obtain the reference position, clamp the illuminator holder by attaching it completely to the bottom and right side of concave area of the BXFM frame.

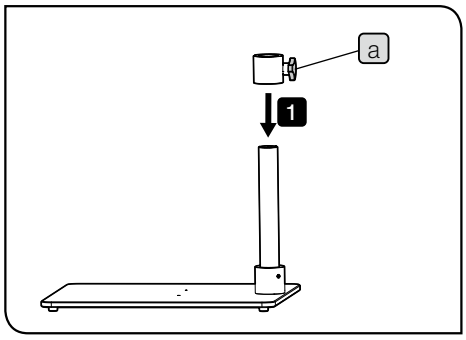


2 Attaching the Assist spring for BXFM

TIP When using the illuminator holder for BXFM (BX3M-ILH), attach the assist spring for BXFM if required.

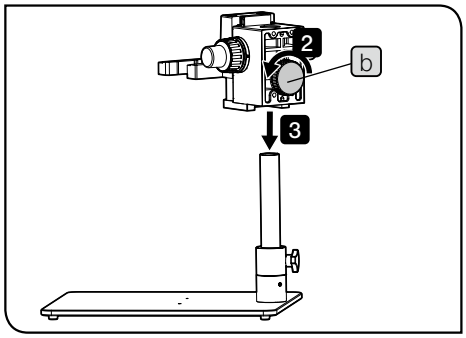
1. Place the BXFM frame (BXFM-F) upside down.
2. Align the mounting hole [c] of the BXFM frame (BXFM-F) with the screw holes [d] (4 positions) of the assist spring for BXFM (BXFM-ILHSPU), and tighten the screws (4 pcs.) provided with the assist spring for BXFM to secure the assist spring for BXFM using the Allen screwdriver.

TIP To obtain the standard position, push the assist spring to the right side completely and secure it keeping it contacted to the positioning surface [e].



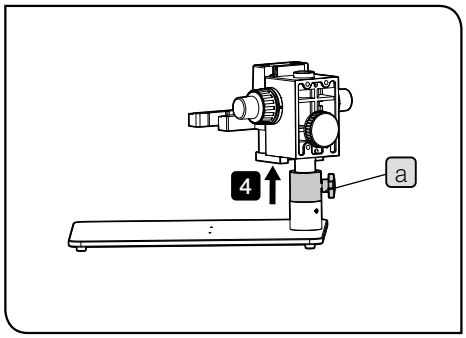
3 Attaching the BXFM frame

1 Turn the knob [a] of the drop prevention ring to loosen it and insert the drop prevention ring into the column of the stand.

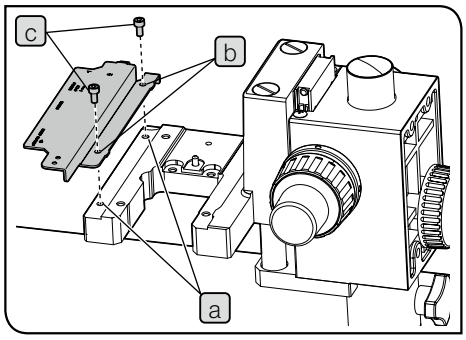


2 Turn the knob [b] of the BXFM frame (BXFM-F) to loosen it.

3 Insert the BXFM frame into the column of the stand, stop it at the position you want to secure it and turn the knob of the BXFM frame (BXFM-F) to tighten it.



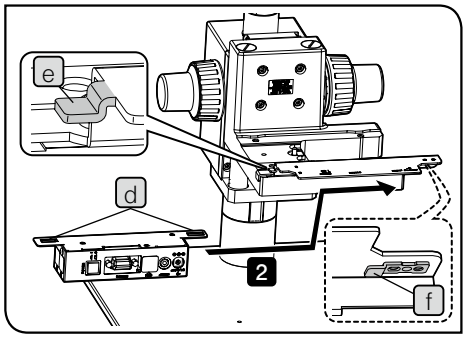
4 Raise the drop prevention ring until it touches the bottom of the BXFM frame and turn the knob [a] to tighten it.

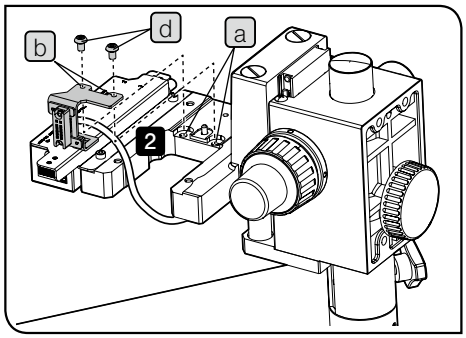


4 Attaching the control box for coded function

The control box for coded function (U-CBS) must be attached when combining the coded reflected light illuminator or the coded revolving nosepiece with the microscope.

1. Align the screw holes [a] (2 positions) of the illuminator holder for BXFM (BX3M-ILH) with the mounting holes [b] (2 positions) of the provided bracket, and tighten the provided screws [c] to secure it.
2. Attach the hangers of the control box for coded function [d] (2 positions) by hanging them on the hooks [e] and [f] of the bracket.

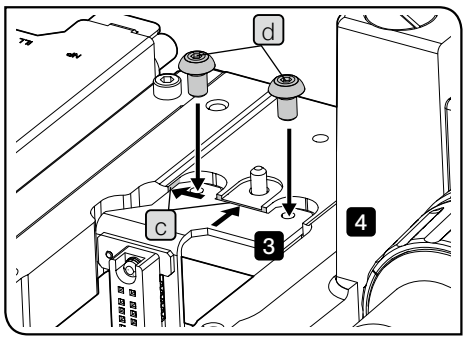




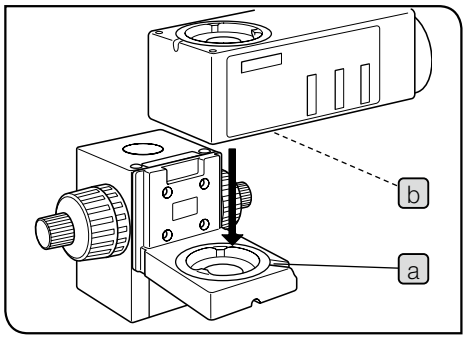
5 Attaching the cable for motorized nosepiece

The cable for the motorized nosepiece (BX3M-RMCBL) must be attached when combining the motorized nosepiece to the microscope.

1. Align the mounting holes [b] (2 positions) of the cable for the motorized nosepiece with the screw holes [a] (2 positions) on the illuminator holder for BXFM (BX3M-ILH).
2. While pushing the metal plate of the cable for the motorized nosepiece to the [c] position of illuminator holder for BXFM (BX3M-ILH), tighten the provided screw [d] to secure the metal plate.
3. Connect the cable that comes out from the lower area of the illuminator holder for BXFM (BX3M-ILH) to the connector of the FM control box (BX3M-CBFM).



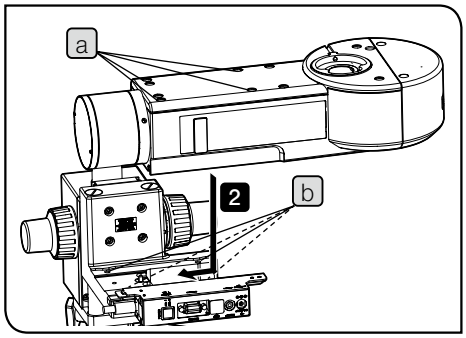
For connection of the cable for motorized nosepiece (BX3M-RMCBL) with the FM control box (BX3M-CBFM), refer to the instruction manual provided with the BX3M-CBFM.



6 Attaching the reflected light illuminator

Attaching U-KMAS

1. Loosen the illuminator clamping screw [a] using the Allen screwdriver.
2. Insert the circular dovetail [b] at the lower area of the reflected light illuminator for BF (U-KMAS) into the mounting portion of the illuminator holder for BXFM-S (BXFM-ILHS) and tighten the clamping screw [a] firmly.



This picture shows the procedure to attach BX3M-RLAS-S. The same procedure applies when attaching other reflected light illuminators.

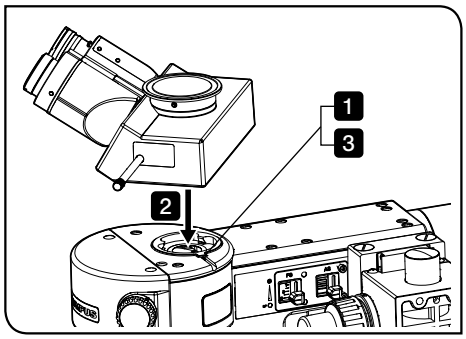
Attaching the reflected light illuminator other than U-KMA

Use the dedicated Allen wrench ( ) provided with the reflected light illuminator to attach the reflected light illuminator.

1. Without aligning the mounting screws [a] (4 positions) of the reflected light illuminator with the mounting screw holes [b] of the illuminator holder for BXFM (BX3M-ILH) at first, place the reflected light illuminator on the mounting surface at the slightly right position.
2. Then, push the reflected light illuminator to the end of the left side. This is the correct attaching position.
3. While pushing the reflected light illuminator to the end of the left side, tighten the mounting screws [a] (4 positions) using the dedicated Allen wrench to secure the illuminator.
4. Attach the caps (4 positions) of the mounting screws provided with the reflected light illuminator to the [a] position.

NOTE **The cable comes out from the back of the coded reflected light illuminator (BX3M-RLAS-S, BX3M-URAS-S). Be careful not to put the cable between the illuminator and the microscope frame.**

TIP Use the tweezers, etc when removing the caps of the screws attached to the reflected light illuminator.



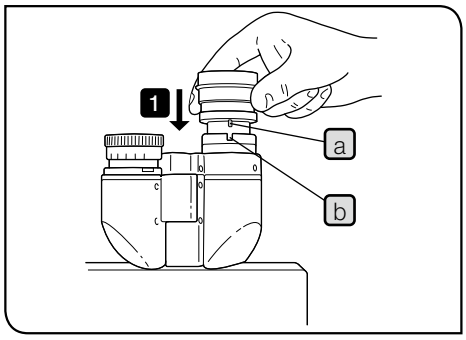
This picture shows the procedure to attach the trinocular tube (U-TR30-2). The same procedure applies when attaching other observation tubes.

7 Attaching the observation tube

1 Loosen the observation tube clamping screw of the observation tube attaching portion using the Allen screwdriver.

2 Fit the circular dovetail of the observation tube into the observation tube attaching portion so that the scale numbers of the interpupillary distance displayed on the observation tube face to the front.

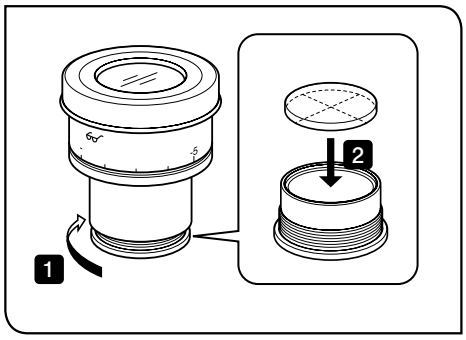
3 Tighten the observation tube clamping screw to secure the observation tube.



8 Attaching the eyepiece

1 Insert the eyepiece until it touches the eyepiece sleeve.

NOTE
- **When using the eyepiece equipped with the micrometer, insert the eyepiece into the right eyepiece sleeve. In this case, attach the eyepiece so that the eyepiece positioning pin [a] enters the groove [b] below the eyepiece sleeve.**
- **The super widefield observation tube is equipped with positioning grooves on both eyepiece sleeves. Be sure to attach the eyepieces by aligning both eyepiece positioning pins with the grooves.**



Attaching the eyepiece micrometer

The eyepiece micrometer can be attached to WHN10x-H. Purchase the micrometer with the size Ø24 mm and thickness 1.5 mm.

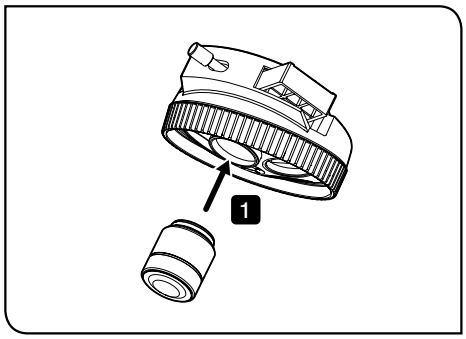
1 Remove the built-in micrometer frame from the eyepiece by rotating it in the arrow direction.

TIP Depending on the case, the micrometer frame may be tightened too firmly and it cannot be rotated. If you grab the micrometer frame too firmly, it will be deformed and cannot be turned furthermore. Grab around the micrometer frame lightly with the equal force to turn it or push it to the rubber sheet placed on the desk and turn to remove it.

2 Insert the micrometer into the micrometer frame with the display surface of the micrometer facing down.

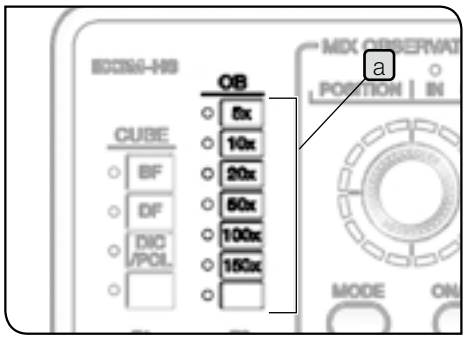
3 Put the micrometer frame back to the eyepiece.

NOTE
- **Be careful not to touch the lens with your fingers during working.**
- **Do not tighten the micrometer frame with excessive force.**



9 Attaching the objective

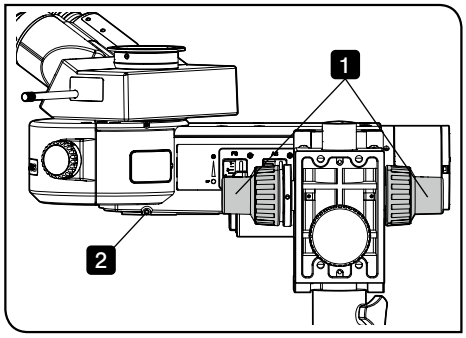
1 Attach the objectives by screwing them into the nosepiece mounting holes.



When the motorized nosepiece and the hand switch are combined

Attach the magnet sheet corresponding to the objectives attached in 1 to the OB indicator display pocket a of the hand switch (BX3M-HS).

The magnet sheet is provided with the hand switch (BX3M-HS).

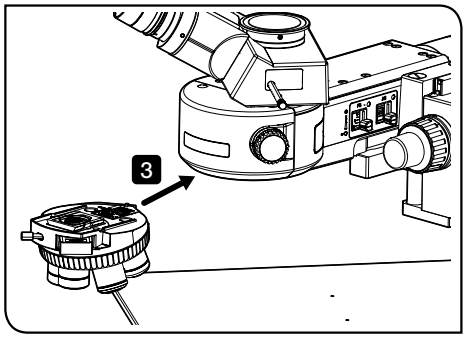


10 Attaching the nosepiece

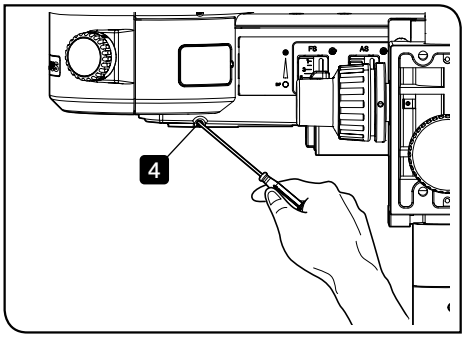
1 Turn the coarse focusing knob to lower the BXFM frame sufficiently.

2 Loosen the nosepiece clamping screw using the Allen screwdriver.

NOTE **Be careful, if the clamping screw is loosened too much, it may be come off.**



3 Insert the nosepiece from the front side along the nosepiece mounting dovetail of the reflected light illuminator, and push it until it touches the end.



4 Hold the Allen screwdriver between the pointing finger and the thumb, and tighten the nosepiece clamping screw to secure the nosepiece.

Attaching the coded nosepiece

5 Connect the cable to the connector of the control box for coded function (U-CBS).

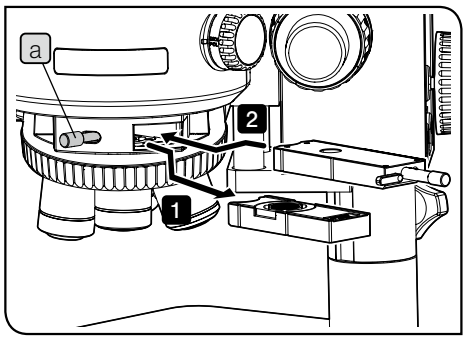
NOTE
- **When attaching or detaching the nosepiece attached with the cable, be sure to remove the cable from the connector in advance.**
- **If you want to change the nosepiece to the motorized nosepiece when using the system combined with the manual nosepiece, remove the reflected light illuminator together when removing the manual nosepiece. In order to combine the motorized nosepiece, the cable for motorized nosepiece (BX3M-RMCBL) must be attached before attaching the reflected light illuminator. For details, see "Attaching the cable for motorized nosepiece" (page 65).**

For connection of the cable of coded nosepiece with the control box for coded function (U-CBS), refer to the instruction manual provided with the U-CBS.

Attaching the motorized nosepiece

5 Set the number of objective mounting holes of the nosepiece using the dip switch on the side of the FM control box (BX3M-CBFM).

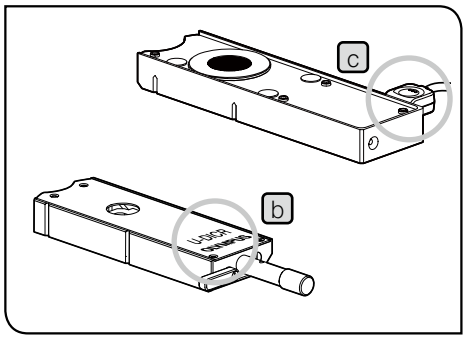
For setting the dip switch, refer to the instruction manual for BX3M-CBFM.



11 Attaching the MIX slider / DIC slider for reflected light observation

1 Loosen the mounting knob [a] on the front of the nosepiece and pull out the dummy slider.

2 Insert the DIC slider for reflected light observation or the MIX slider for reflected light observation into the slider insertion slot of the nosepiece by paying attention to the orientation of the slider, and stop inserting at the first level (when the clicking sound is heard at first).



Orientation of the slider when inserting

DIC slider for reflected light observation: Set the display surface facing up. ([b])

MIX slider for reflected light observation: Set the connector to the right side. ([c])

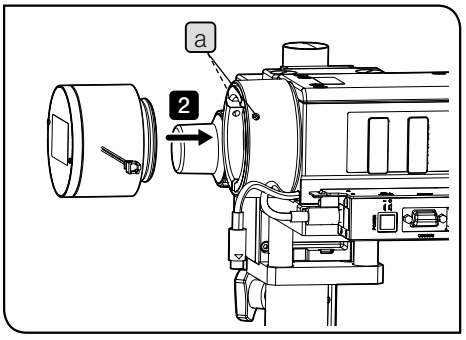
3 Tighten the mounting knob [a] to secure the slider.

When the MIX slider for reflected light observation is attached

4 Connect the cable to the connector of the FM control box (BX3M-CBFM).

TIP Lay out the cable using the provided cable holders so as not to interfere the operations of the product.
The cable holders are provided with the cable for U-MIXR (U-MIXRCBL).

For connection of the cable for the MIX slider with the FM control box (BX3M-CBFM), refer to the instruction manual provided with the BX3M-CBFM.



This picture shows the procedure to attach the reflected LED lamp housing (BX3M-LEDR). The same procedure applies when attaching other light sources.

12 Attaching the light source for reflected light illumination

The light source for reflected light illumination must be attached when the reflected light illuminator (BX3M-URAS-S or BX3M-RLA-S) is combined with the microscope.
If you want to attach the reflected LED lamp housing, the mercury lamp housing (during darkfield observation), and the double lamp housing adapter (U-DULHA) when BX3M-URAS-S is combined, the DF converter (U-RCV) must be attached.

1 Loosen the mounting screws [a] (2 positions) of the reflected light illuminator using the Allen screwdriver.

NOTE **Be careful, if the mounting screw is loosened too much, it may be come off.**

2 Insert the light source for reflected light illumination or the liquid light guide adapter into the light source mounting hole of the reflected light illuminator until it touches the end.

NOTE **When attaching the halogen lamp housing or the mercury lamp housing, attach it so that the radiation fin faces up.**

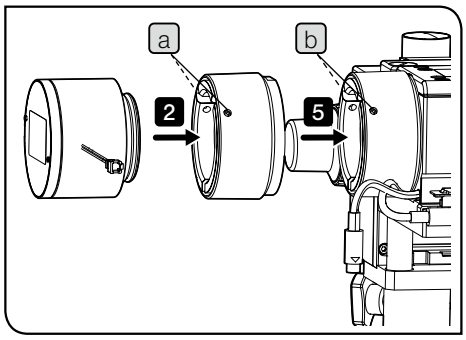
⚠CAUTION **Do not light the mercury burner when the lamp housing is not attached to the microscope because the UV rays in its light are harmful to your eyes.**

3 Tighten the mounting screws [a] (2 positions) of the reflected light illuminator using the Allen screwdriver.

4 If the reflected LED lamp housing is attached, connect the cable to the connector on the back of the power supply for LED (BX3M-PSLED).
If the halogen lamp housing is attached, connect the cable to the power supply (TH4).
If the mercury lamp housing is attached, connect the cable to the power supply (U-RFL-T).

For connections of following units, refer to the instruction manual provided with the respective unit.

- Cable connection of the reflected LED lamp housing
- Cable connection of the halogen lamp housing
- Cable connection of the mercury lamp housing
- Connection of the LED and LDP light source (U-LGPS) and the liquid light guide, etc.



This picture shows the procedure to attach the reflected LED lamp housing (BX3M-LEDR). The same procedure applies when attaching the mercury lamp housing.

Attaching the reflected LED lamp housing or the mercury lamp housing (during darkfield observation) to BX3M-URAS-S

1 Loosen the mounting screws [a] (2 positions) of the DF converter (U-RCV) using the Allen screwdriver.

NOTE **Be careful, if the mounting screw is loosened too much, it may be come off.**

2 Insert the light source for reflected light illumination into the light source mounting hole of the DF converter until it touches the end.

3 Tighten the mounting screws [a] (2 positions) of the DF converter using the Allen screwdriver.

4 Loosen the mounting screws [b] (2 positions) of the reflected light illuminator using the Allen screwdriver.

5 Insert the light source for reflected light illumination attached with the DF converter into the light source mounting hole of the reflected light illuminator until it touches the end.

NOTE **When attaching the mercury lamp housing, attach it so that the radiation fin faces up.**

6 Tighten the mounting screws [b] (2 positions) of the reflected light illuminator using the Allen screwdriver.

7 If the reflected LED lamp housing is attached, connect the cable to the connector on the back of the power supply for LED (BX3M-PSLED.

If the mercury lamp housing is attached, connect the cable to the power supply (U-RFL-T).

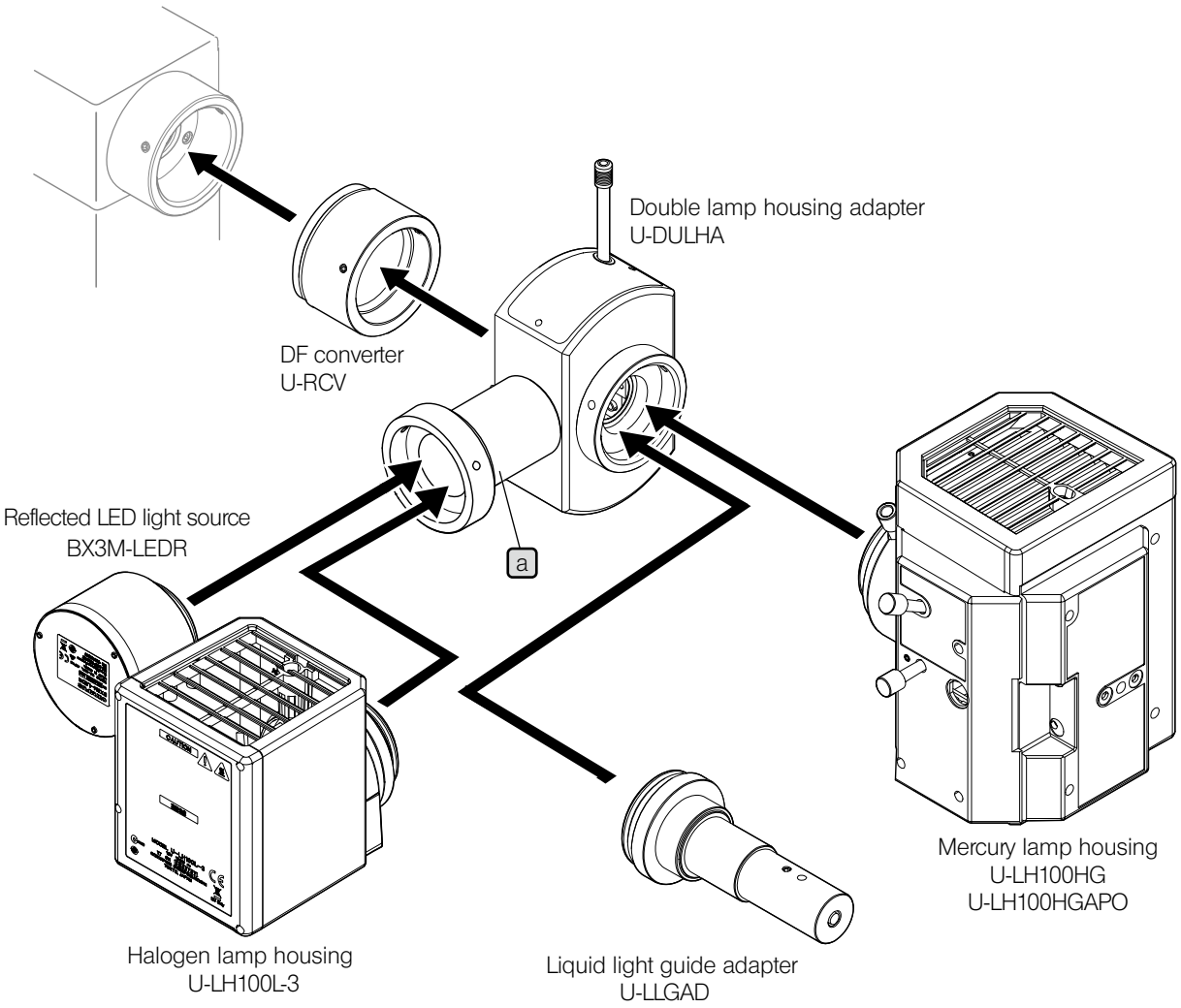
For connections of following units, refer to the instruction manual provided with the respective unit.

- Cable connection of the reflected LED lamp housing
- Cable connection of the mercury lamp housing

Attaching two lamp housings

NOTE • The attachable lamp housings or adapters are restricted in combinations, orders and directions. Attach them as shown in the picture below.

• Attach the double lamp housing adapter (U-DULHA) so that the [a] part shown in the following picture comes to the left side horizontally when facing to the back side of the microscope frame.

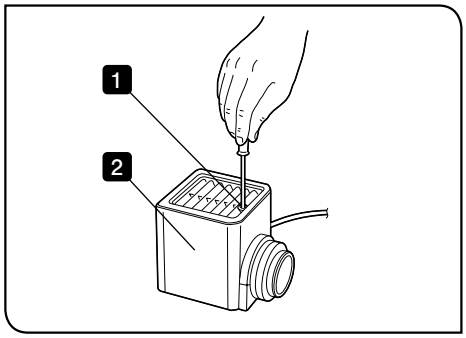


13 Attaching the lamp

NOTE **When replacing the lamp, set the main switch of the power supply to O (OFF) and wait until the lamp housing and the lamp are sufficiently cooled down.**

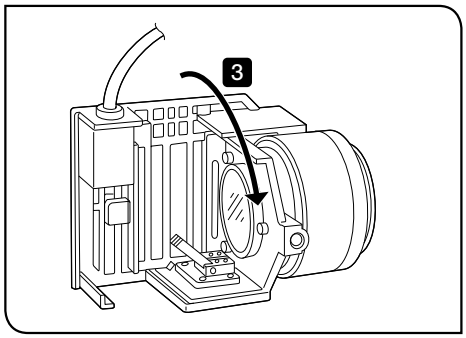
Attaching the halogen bulb

Applicable bulb	12V100WHAL-L (made by PHILIPS Co. 7724I) 12V100WHAL (made by PHILIPS Co. 7023)

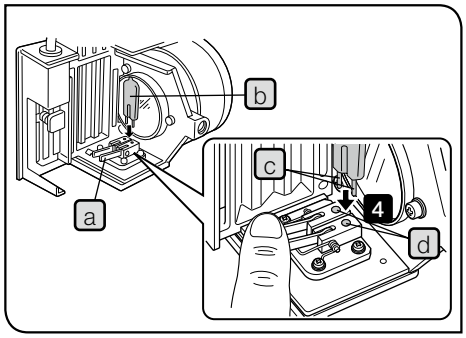


1 Loosen the clamping screw on the top of the lamp housing using the Allen screwdriver.

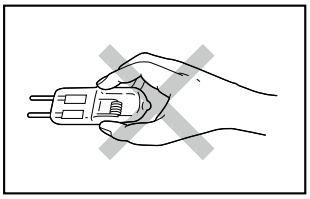
2 Raise the lamp housing and remove it.



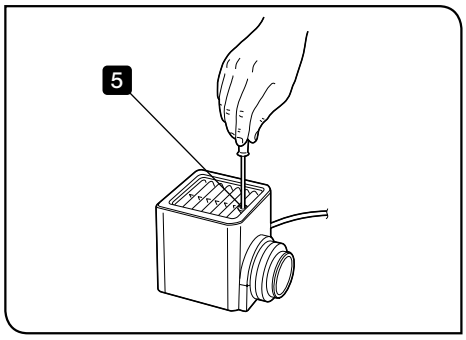
3 Tilt the lamp socket in the arrow direction by 90°.



4 While pressing down the bulb fixing lever [a], hold the halogen bulb [b] wrapped with gauze, etc. and insert the terminal [c] until it touches the pin position [d].
Place the bulb fixing lever [a] carefully to the original position to secure the bulb.

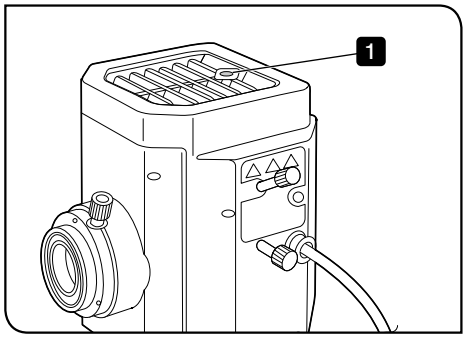


NOTE **Be careful not to touch the bulb directly with your hand and avoid leaving fingerprints or stains on the lamp. Otherwise, the bulb may be exploded due to glass distortion caused by the stains. If fingerprints or stains are attached to the bulb, clean it by wiping gently with a piece of cleaning paper slightly moistened with absolute alcohol.**



5 Fit the halogen lamp housing from the above and while pressing down the fixing screw, tighten it with the Allen screwdriver.

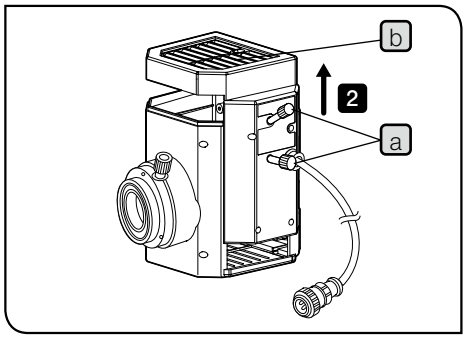
⚠CAUTION **Cautions when replacing the bulb during observation:**
The bulb, the lamp housing and areas around the lamp housing are extremely hot during and right after use.
Set the main switch to O(OFF) and disconnect the power cord. Wait until the bulb, the lamp housing and areas around the lamp housing are sufficiently cooled down and replace the old bulb with the applicable bulb.



Attaching the mercury burner

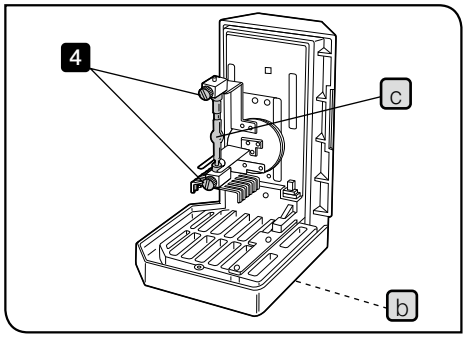
Applicable burner	USH-103OL (made by Ushio Inc.)

1 Loosen the clamping screw on the top of the lamp housing using the Allen screwdriver.



2 Hold the upper section of the lamp housing and pull it upward to remove the socket part.

NOTE **To prevent malfunctions, do not hold the lamp housing by the centering knobs [a].**

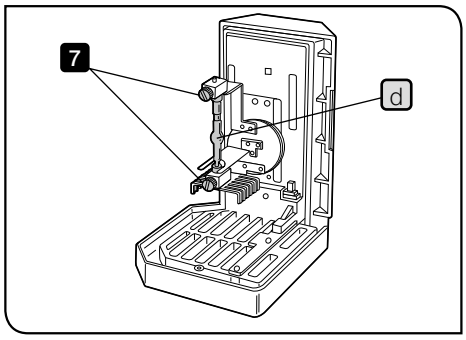


3 Place the socket part so that the radiation fin [b] faces down.

4 Loosen the lamp clamping screws (2 pcs.) of the socket part.

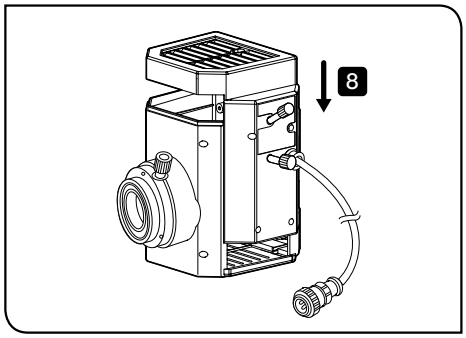
5 Hold the mercury burner [c] attached and remove the lower side from the mount first and then remove the upper side.

TIP The socket part is attached with either one of followings:
- Dummy burner for transportation (factory default)
- Old burner (to be replaced)



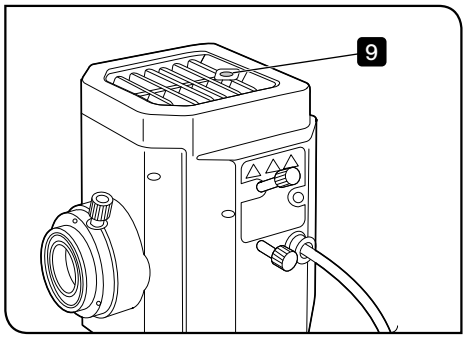
6 Hold the new mercury burner wrapped with gauze, etc. and attach the + (positive) pole of the mercury burner [d] to the fixed mount on the upper side, then attach the - (negative) pole to the mount on the lower side.

NOTE **Be careful not to touch the burner directly with your hand and avoid leaving fingerprints or stains on the lamp. Otherwise, the burner may be exploded due to the glass distortion caused by the stains. If fingerprints or stains are attached to the burner, clean it by wiping gently with a piece of cleaning paper slightly moistened with absolute alcohol.**



7 Tighten the burner clamping screws (2 pcs.) of the socket part.

8 Align the external surfaces of the lamp housing with those on the socket part, push the lamp housing straight downward and place the socket part to the original position.

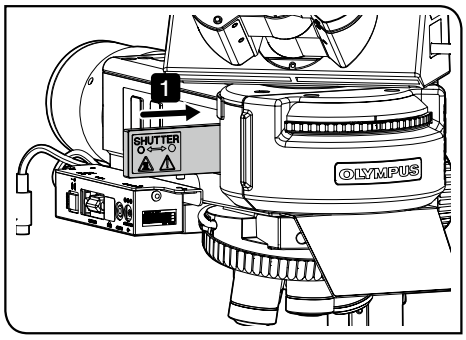


9 Tighten the clamping screw using the Allen screwdriver.

10 Set the life counter of the power supply for mercury burner (U-RFL-T) to "0.0". For details, refer to the instruction manual provided with the unit.

Lamp service life

USH-103OL: 300 hours
This value assumes the light cycles composed of 2 hours of lighting and 30 minutes of extinction. Turning ON and OFF with the cycle shorter than this will seriously shorten the service life of the lamp.

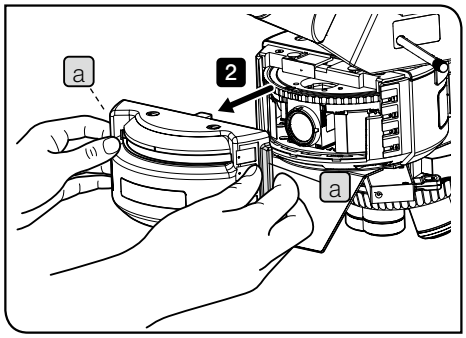


14 Attaching the fluorescence mirror unit

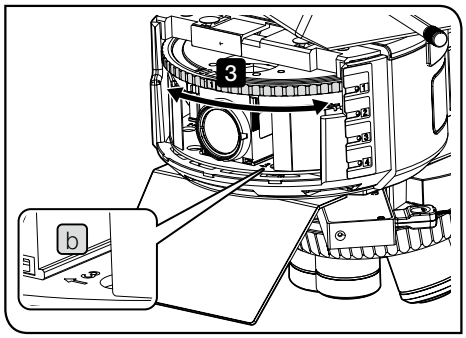
The fluorescence mirror unit must be attached when the coded universal reflected light illuminator (BX3M-URAS-S) is combined with the microscope.

NOTE **When attaching the fluorescence mirror unit, be sure to engage the shutter in the light path for safety purpose.**

1 Engage the shutter in the light path.

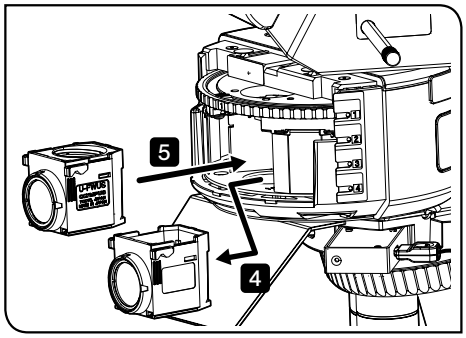


2 Hold the both sides of the cover [a] on the front of the illuminator lightly and pull it to the front side.



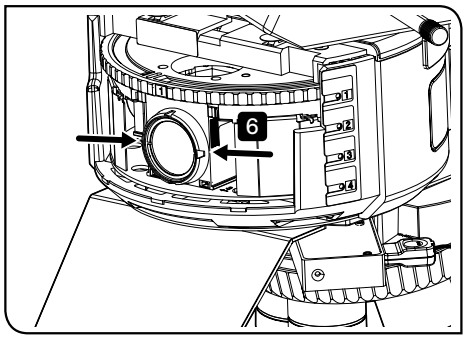
3 Turn the turret until the position number [b] of the fluorescence mirror unit to be replaced comes to the front side, and stop it when the clicking sound is heard.

⚠CAUTION **Be careful not to allow your fingers being caught.**

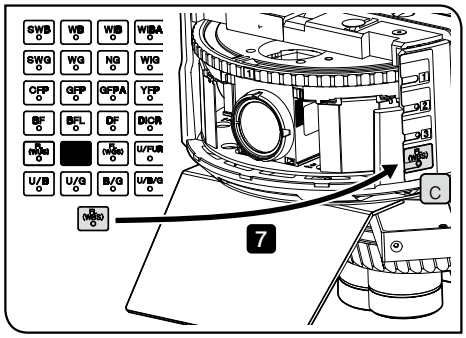


4 Hold the side of the fluorescence mirror unit to be replaced, and pull it to the front side to remove it.

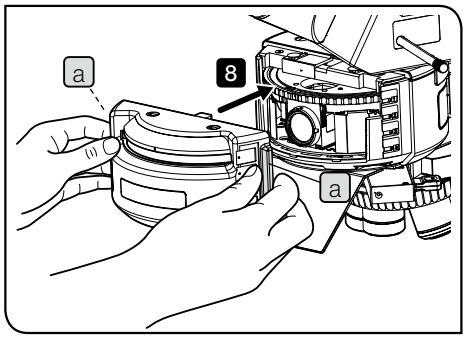
5 Insert the new fluorescence mirror unit in the position where the old fluorescence mirror unit was removed until it touches the end.



6 Hold the both sides of the inserted fluorescence mirror unit between the thumb and the pointing finger, and swing it from side to side lightly to confirm that the fluorescence mirror unit is secured firmly. Without this operation, the fluorescence mirror unit may be attached being tilted.



7 Insert the indicator sheet corresponding to the fluorescence mirror unit which was inserted in **5** in the inscription pocket [c]. The indicator sheet is provided with BX3M-URAS-S.



8 Hold the knob [a] of the cover and close the cover.

10 Preventive inspection sheet for illumination devices

- We recommend performing “Preventive Inspections“ periodically (every time you replace lamps and at least once every 6 months).
- The table below identifies the check items to be observed. Put (X) if not applicable or (✓) if applicable.
- If there are any check marks (✓), immediately stop using the product and request inspection to Evident or replace with new illumination device(s).
- If you detect an abnormality other than those listed below or Evident products other than illumination devices, also stop using the product and request inspection to Evident.
- The repair, replacement and inspection that passed the warranty period are paid-services.

If you have any questions, please contact Evident.

	Check results (Date)			
Check items	/	/	/	/
1. More than 8 years have passed since original purchase of the illumination device, or the total using time exceeds 20,000 hours of use.				
2. Lamp does not light sometimes even though the main switch is turned ON. (Only when using the halogen bulb)				
3. Dirt or substances are attached around the main switch.				
4. The light flickers if you move a lamp cable or illumination devices.				
5. Lamp cable is unusually hot to the touch.				
6. Burning or smoke odor.				
7. The light still flickers even though the lamp is replaced. (Only when using the halogen bulb)				
8. Signs of deformation, backlash, or looseness, etc. when you assemble/ disassemble the illumination device. (I.e. it is hard to open/ close the lid during lamp-replacement.)				
9. Lamp connection terminals have become discolored or tarnished, or the colors of the right and left terminals are different. (Only when using the halogen bulb)				
10. Illumination device/ housing has become deformed, cracked or tarnished in any way.				
11. Lamp cables or wiring parts have become deformed, cracked or tarnished in any way.				
12. Frequent repairs to similar devices put into use at the same time as the unit being checked.				

If the spaces are not enough for check , copy this sheet.

11 Proper selection of the power supply cord

If no power supply cord is provided, please select the proper power supply cord for the product by referring to "Specifications" and "Certified Cord" below:

Caution : In case you use a non-approved power supply cord for Evident products, Evident can no longer warrant the electrical safety of the product.

Specifications

Voltage rating	125 V AC (for 100-120 V AC area) or, 250 V AC (for 220-240 V AC area)
Current rating	6 A minimum
Temperature rating	60 ˚C minimum
Length	3.05 m maximum
Fittings configuration	Grounding type attachment plug cap. Opposite terminates in molded-on IEC configuration appliance coupling.

Table 1 Certified cord

A power supply cord should be certified by one of the agencies listed in Table 1 , or comprised of cordage marked with an agency marking per Table 1 or marked per Table 2. The fittings are to be marked with at least one of the agencies listed in Table 1. In case you are unable to buy locally the power supply cord which is approved by one of the agencies mentioned in Table 1, please use replacements approved by any other equivalent and authorized agencies in your country.

Country	Agency	Certification mark	Country	Agency	Certification mark
Argentina	IRAM		Italy	IMQ	
Australia	SAA		Japan	JET	
Austria	ÖVE		Netherlands	KEMA	
Belgium	CEBEC		Norway	NEMKO	
Canada	CSA		Spain	AEE	
Denmark	DEMKO		Sweden	SEMKO	
Finland	FEI		Switzerland	SEV	
France	UTE		United Kingdom	ASTA BSI	
Germany	VDE		USA	UL	
Ireland	NSAI				

Table 2 HAR flexible cord

Approval organizations and cordage harmonization marking methods

Approval organization	Printed or embossed harmonization marking (May be located on jacket or insulation of internal wiring)		Alternative marking utilizing black-red-yellow thread (Length of color section in mm)		
			Black	Red	Yellow
Comite Electrotechnique Belge (CEBEC)	CEBEC	‹HAR›	10	30	10
Verband Deutscher Elektrotechniker (VDE) e.V. Prüfstelle	‹VDE›	‹HAR›	30	10	10
Union Technique de l´Electricite´ (UTE)	USE	‹HAR›	30	10	30
Instituto Italiano del Marchio di Qualita´ (IMQ)	IEMMEQU	‹HAR›	10	30	50
British Approvals Service for Electric Cables (BASEC)	BASEC	‹HAR›	10	10	30
N.V. KEMA	KEMA-KEUR	‹HAR›	10	30	30
SEMKO AB Svenska Elektriska Materielkontrollanstalter	SEMKO	‹HAR›	10	10	50
Österreichischer Verband für Elektrotechnik (ÖVE)	‹ÖVE›	‹HAR›	30	10	50
Danmarks Elektriske Materialkontroll (DEMKO)	‹DEMKO›	‹HAR›	30	10	30
National Standards Authority of Ireland (NSAI)	‹NSAI›	‹HAR›	30	30	50
Norges Elektriske Materiellkontroll (NEMKO)	NEMKO	‹HAR›	10	10	70
Asociacion Electrotecnica Y Electronica Espanola (AEE)	‹UNED›	‹HAR›	30	10	70
Hellenic Organization for Standardization (ELOT)	ELOT	‹HAR›	30	30	70
Instituto Portages da Qualidade (IPQ)	np	‹HAR›	10	10	90
Schweizerischer Elektro Technischer Verein (SEV)	SEV	‹HAR›	10	30	90
Elektriska Inspektoratet	SETI	‹HAR›	10	30	90

Underwriters Laboratories Inc. (UL)	SV, SVT, SJ or SJT, 3 X 18AWG
Canadian Standards Association (CSA)	SV, SVT, SJ or SJT, 3 X 18AWG

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