

# Instructions

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# **BXC-CBRML**

## Modular Microscope Assemblies Hardware

### Notes

This instruction manual is for Modular Microscope Assemblies.

To ensure safety, obtain optimum performance and to familiarize yourself fully with the use of this product, we recommend that you study this manual thoroughly before operating this product, and always keep this manual at hand when operating this product.

Retain this instruction manual in an easily accessible place near the work desk for future reference.

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 distributor in EU for return and/or collection systems available in your country.

#### **Research and Industrial Use Only**

This product is categorized as FCC Part15 Class A exempt device. Using this product may affect other equipment in the environment. The operator of this exempted product shall be required to stop operating the product upon a finding by the Commission or its representative that the product is causing harmful interference. Operation shall not resume until the condition causing the harmful interference has been corrected.

#### **For Korea only**

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

1. Introduction .....	1
2. Safety precautions .....	2
2.1 CAUTION: Safety precautions .....	2
2.2 WARNING: Prevention of electric shock .....	2
2.3 CAUTION: Electric safety .....	2
2.4 CAUTION: LED (BX3M-LEDR/U-MIXR-2) .....	3
2.5 Safety symbols .....	3
2.6 Caution engraving/label .....	4
2.7 Specifications .....	4
2.8 Restrictions .....	4
3. Assembly .....	5
3.1 Installing the control box .....	5
3.2 Setting up BXC-CBRML .....	6
3.3 Attaching the reflected light illuminator .....	7
3.4 Attaching the objectives .....	8
3.5 Attaching the nosepiece .....	8
3.6 Attaching the light source for reflected light illumination .....	10
3.6.1 Attaching the LED illumination .....	10
3.6.2 Attaching the liquid light guide .....	10
3.6.3 Attaching two lamp housings .....	11
3.7 Connecting the cables .....	12
3.7.1 Connecting the motorized nosepiece and the cable .....	12
3.7.2 Connecting the MIX slider and the cable .....	13
3.7.3 Connecting the reflected LED light source or the reflected light illuminator and the cable .....	13
3.7.4 Connecting the control box and the cable .....	14
4. Operation procedures .....	19
4.1 Status display of the indicators on BXC-CBRML .....	19
4.2 Inserting the MIX slider .....	20
4.3 Removing/attaching the color filter from/to the MIX slider .....	20
5. Maintenance and Storage .....	22
5.1 Cleaning of each part .....	22
6. Troubleshooting .....	23
6.1 Optical systems .....	23
6.2 Observation tube .....	24
6.3 Drive system .....	24
7. Proper selection of the power supply cord .....	26

# 1. Introduction

## Configuration of instruction manuals

Read all the instruction manuals supplied with the units you purchased.

The following instruction manuals are prepared for the units to be used with this product.

Manual names	Main contents
BXC-CBRML Safety manual	Safety precautions
BXC-CBRML Hardware manual	Safety precautions, specifications and assembly method
BXC-CBRML Command reference manual	How to use RS-232C communication commands. For details, contact us.

## Intended use

This product is designed to observe magnified images of specimens in industrial applications.

Appropriate samples include semiconductors, electrical components, molded parts or mechanical parts.

Industrial applications include observation, inspection or measurements.

Do not use this product for any purpose other than its intended use.

## 2. 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.

### **WARNING:**

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

### **CAUTION:**

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices or potential material damage.

### **NOTE:**

Indicates a potential situation which, if not avoided, may result in failure of this instrument.

### **TIP:**

Indicates the useful knowledge or information for use.

### 2.1 **CAUTION:** Safety precautions

#### Transportation

**When carrying each unit, be careful not to drop it.**

If the unit falls, your foot, etc. may get injured.

### 2.2 **WARNING:** Prevention of electric shock

**Never disassemble any part of this product.**

It could cause electric shock or failure of the product.

**Do not touch the product with wet hands.**

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

**Do not bend, pull or tie the power cord/cables in a bundle.**

Otherwise they could be damaged, causing a fire or an electric shock.

**Keep the power cord and cables well 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.

### 2.3 **CAUTION:** Electric safety

**Always use the power cord specified by us.**

If the proper AC adapter and the power cord are not used, the electric safety and the EMC (Electromagnetic Compatibility) performance of the product can not be assured.

**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.

**Disconnect the power cord in case of emergency.**

In case of emergency, disconnect the power cord from the power cord connector on the product or from the power outlet. Install the product at the location where you can reach the power cord connector or the power outlet at hand to disconnect the power cord quickly. If you cannot install the product at the location described above, check the rated current of this product and prepare the suitable disconnecting devices.

**Do not connect or disconnect the power cord, cables and units while the power is on.**

**2.4 CAUTION: LED (BX3M-LEDR/U-MIXR-2)**

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

If you feel that the light from LED unit is too bright during observation, adjust the light intensity using the brightness control knob before continuing the observation. The LED built in this product is basically eye-safe. However, do not look directly at the light from the LED unit for a long time, since it may cause damage to your eyes.

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

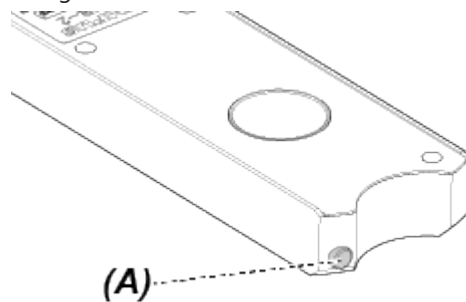
Do not look directly at the light coming out from the objective for a long time, since it may cause damage to your eyes.

**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-2) 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-2) upside down.**

If you insert the MIX slider for reflected light observation upside down, the light coming out from the MIX slider for reflected light observation enters your eyes through the eyepiece and your eyes may be damaged.

**2.5 Safety symbols**

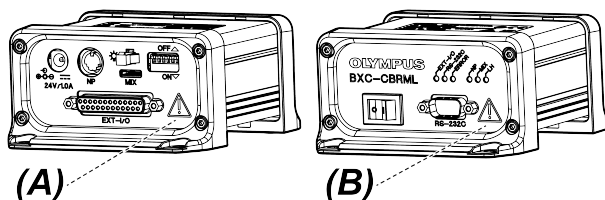
The following symbols are placed on this product.

Study the meaning of the symbol and always use the product in the safest possible manner.

Symbol	M e a n i n g
	Indicates a non-specific general hazard. Follow the description given after this symbol or in the instruction manual
	Indicates that the seesaw type main switch is ON. (Seesaw type is the type of switch where ON or OFF is selected by pressing it to ON or OFF side.)
	Indicates that the seesaw type main switch is OFF.

## 2.6 Caution engraving/label

Safety labels are placed on the portions which particularly require special cautions when using or operating this product. Be sure to follow these instructions.



Label position	Safety label	Instructions in the instruction manual	Relevant page
(A), (B)		[Caution for electric safety] [Caution for prevention of electric shock]	<u>2</u> <u>2</u>

If a caution engraving or label is dirty or peeled off, contact us for the replacement or other inquiry.

## 2.7 Specifications

Rating

AC adapter	Input: 100-240 V $\sim$ 50/60 Hz 1.4 A(Max) Output: 24.0 V $\text{---}$ 2.71 A(Max)
Control box	Input: 24 V $\text{---}$ 2.5 A(Max)

Operating environment

Temperature	5 to 40°C (41 to 104 °F)
Humidity	0 to 85%
Variation of power supply voltage	$\pm$ 10%
Pollution degree	2 (in accordance with IEC60664)
Installation category (excess voltage category)	II (in accordance with IEC60664)
Installation location	Flat surface ( $\pm$ 2° or less) The product does not overturn even though it is tilted to $\pm$ 10°.
Conditions for safety standards	<ul style="list-style-type: none"> <li>Indoor use</li> <li>Altitude: Max. 2000 meters</li> <li>Temperature: 5 to 40 °C (41 to 104 °F)</li> <li>Relative humidity: 20 to 80% (up to 31 °C/88 °F) (without condensation)</li> </ul> <p>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).</p>

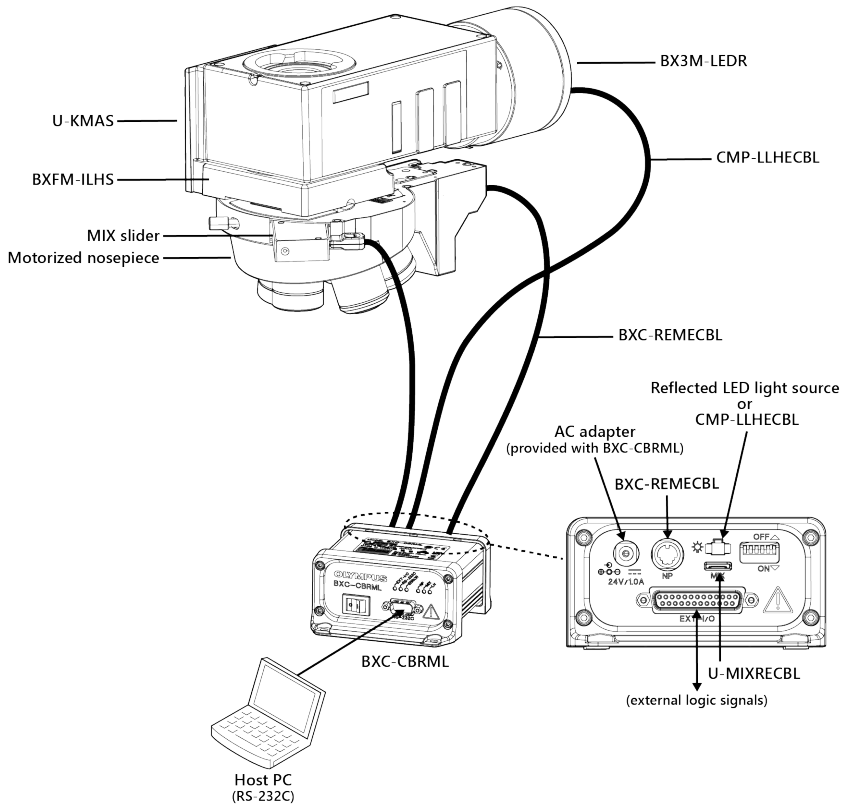
## 2.8 Restrictions

Maximum number of CMP-LLHECBL (3m) that can be connected is two.

# 3. Assembly

## ⚠ CAUTION:

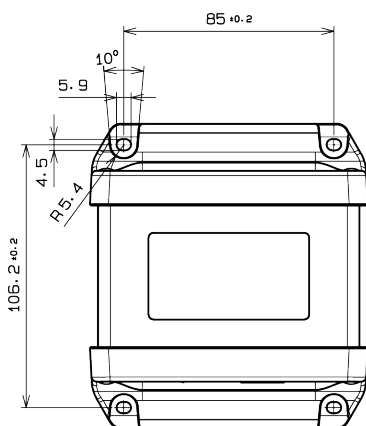
The use of this product in combination with systems that are not specified in this manual cannot be guaranteed. If you wish to use this product in combination with systems that are not specified in this manual, take measures under your responsibility so that the use of this product in combination with systems you will use complies with standards required in your local area.



## 3.1 Installing the control box

When securing the control box to the floor, wall or ceiling, attach it with screws.

Positions of screw holes:



Recommended screw: M4, L: 8 mm or longer

Washer: M4

1. Remove four rubber feet from the control box using a tool such as tweezers.
2. Insert washers between the screw holes and the screws and tighten four screws.

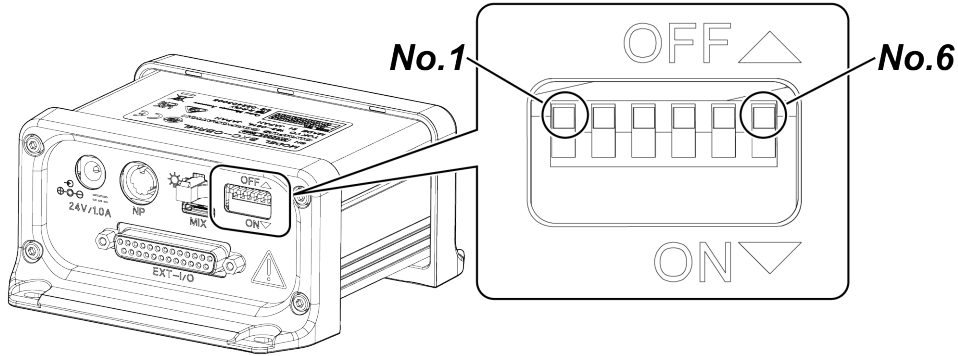


**NOTE:**

Do not tighten the screws too much. Doing so may damage the product.

### 3.2 Setting up BXC-CBRML

1. Confirm that the DIP switch on BXC-CBRML is set properly.



The allocated functions of the DIP switches are shown in the table below.

□ : Factory default setting

SW-No.						Function	Note
1	2	3	4	5	6		
Off						Buzzer sound	The buzzer sound is heard
On							The buzzer sound is not heard
	Off					Nosepiece (NP)	5Position-NP
	On						6Position-NP
		Off				Communication	RS-232C communication
		On					External logic signal control
			Off			LIM-Mode1	Refer to the "LIM-Mode" table below
			On				
				Off		LIM-Mode2	Refer to the "LIM-Mode" table below
				On			
					Off	NP Control*1	Rotate through the highest numbered hole
					On		Does not rotate through the highest numbered hole

#### LIM-Mode

SW-No.			LIM-Mode	Note			
3	4	5					
Off	Off	Off	RS-232C	LIM setting mode	Specify the LIM setting with LMIL and LMMIL commands. Switching the OB position does not change the light intensities of the LED lamp and MIX.		
Off	Off	Off					
Off	Off	On					
Off	On	On					
On	Off	Off	Ext-I/O	LIM setting mode	Specify the LIM setting for the current OB position with LIMSET signal "Lo". Switching the OB position does not change the light intensities of the LED lamp and MIX.		
On	On	Off				LED LIM mode	LIM function operates with the specified light modulation value for LED lamp only.
On	Off	On				MIX LIM mode	LIM function operates with the specified light modulation value for MIX slider only.
On	On	On				LED, MIX LIM mode	LIM function operates with the specified light modulation value for both the LED lamp and the MIX slider.

**TIP:**

\*<sup>1</sup> NP Control

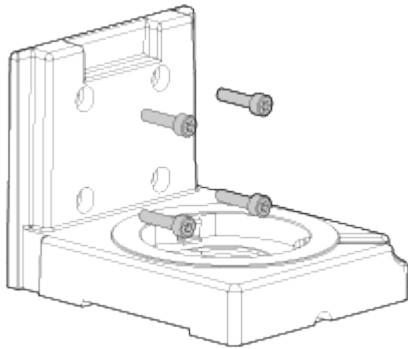
Selecting "Rotate through the highest numbered hole" rotates the nosepiece to the specified hole using the shortest path. Selecting "Does not rotate through the highest numbered hole" rotates the nosepiece in the opposite direction if the shortest path to the specified hole goes through the highest numbered hole. By attaching a low-magnification objective to hole 1 and a high-magnification objective to the highest numbered hole, you can avoid an objective colliding with the sample when the nosepiece is rotated.

### 3.3 Attaching the reflected light illuminator

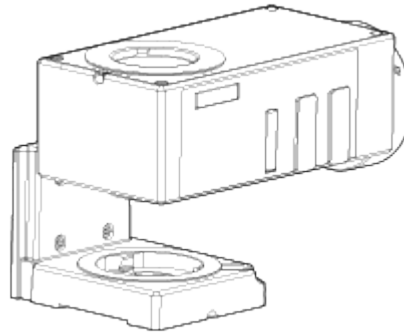
1. Secure the reflected light illuminator to your device. The figures illustrate a combination of the small brightfield reflected light illuminator (U-KMAS) and the illuminator holder for BXFM (BXFM-ILHS). For details on how to attach them, refer to the instruction manual provided with BXFM. For mounting dimensions, refer to the data sheet for each device.

**NOTE:**

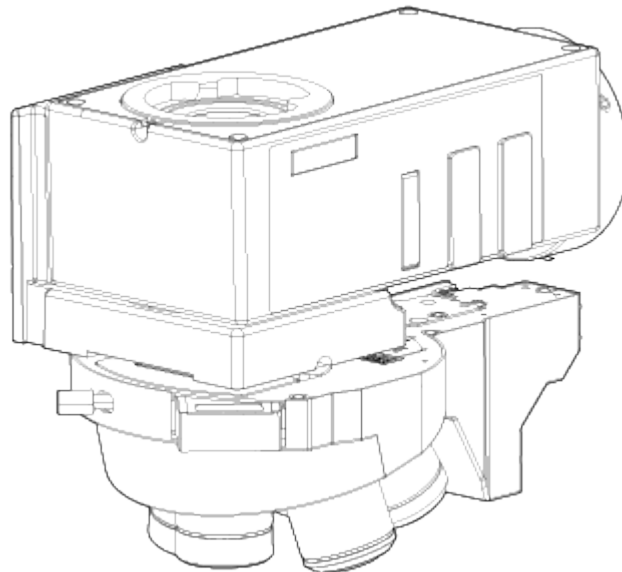
When attaching the reflected light illuminator to your device, secure it in the orientation in which the reflected light illuminator will be horizontal as shown in the following figures.



Attaching the illuminator holder for BXFM, BXFM-ILHS



Attaching the small brightfield reflected light illuminator, U-KMAS

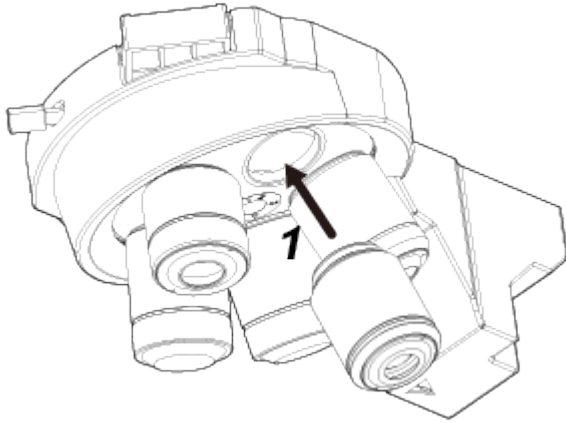


### 3.4 Attaching the objectives

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

**NOTE:**

- Start from the nosepiece mounting hole 1 in the order of the lowest to the highest magnification objective.
- Attach the objectives starting from the nosepiece mounting hole 1 without leaving any holes in between empty.
- Make sure to place caps on any holes to which objectives are not attached.

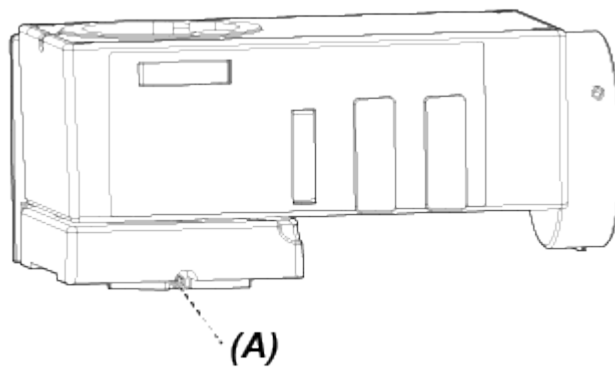


### 3.5 Attaching the nosepiece

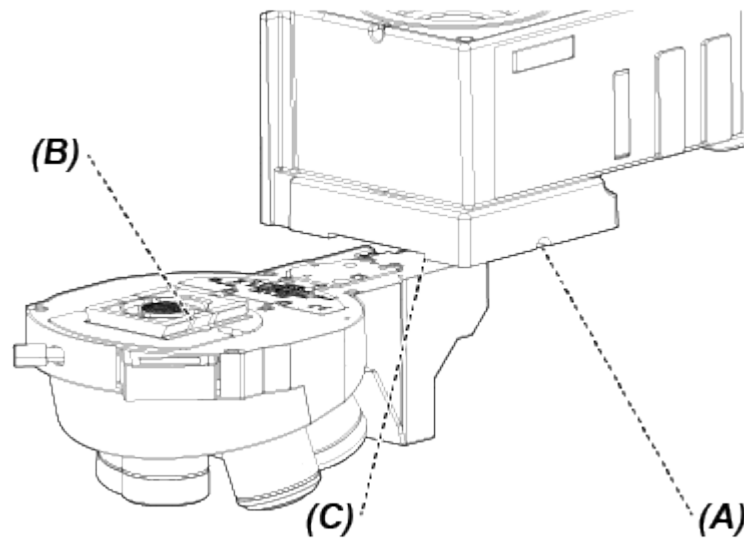
1. Loosen the nosepiece clamping screw (A) using the Allen screwdriver provided with the reflected light illuminator.

**NOTE:**

If the clamping screw is loosened too much, the nosepiece is caught with the clamping screw and it cannot be attached. And, if the clamping screw is loosened further, the clamping screw may come off.



2. Insert the nosepiece from the front side by aligning the slide dovetail (B) of the nosepiece with the nosepiece mount dovetail (C) of the reflected light illuminator, and push it until it touches the end.



3. While pushing the nosepiece in the attaching direction with your left hand, hold the Allen screwdriver between the pointing finger and the thumb and tighten the nosepiece clamping screw (A) to secure the nosepiece.

## 3.6 Attaching the light source for reflected light illumination

### 3.6.1 Attaching the LED illumination

1. Loosen two mounting screws (A) on the reflected light illuminator (BX3M-KMAS, BX3M-RLA-S, BX3M-URAS-S) using an Allen screwdriver.

**NOTE:**

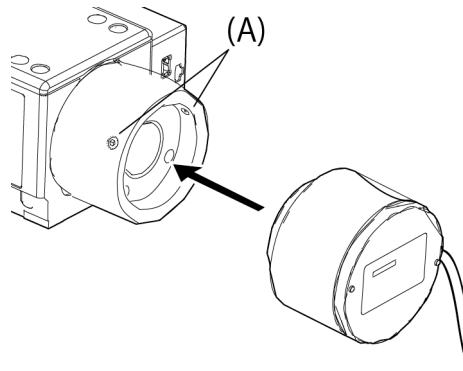
Be careful, if the mounting screw is loosened too much, it may come off.

2. Insert the reflected LED light source into the light source mounting hole of the reflected light illuminator until it touches the end.

**NOTE:**

When attaching the reflected LED light source, attach it so that the cable for the reflected LED light source comes to the right side when looking from the back of the reflected light illuminator.

3. Tighten two mounting screws (A) of the reflected light illuminator using the Allen screwdriver.



### 3.6.2 Attaching the liquid light guide

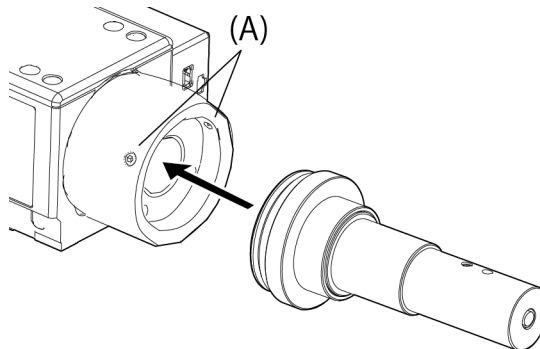
1. Loosen two mounting screws (A) on the reflected light illuminator (BX3M-URAS-S) using an Allen screwdriver.

**NOTE:**

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

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

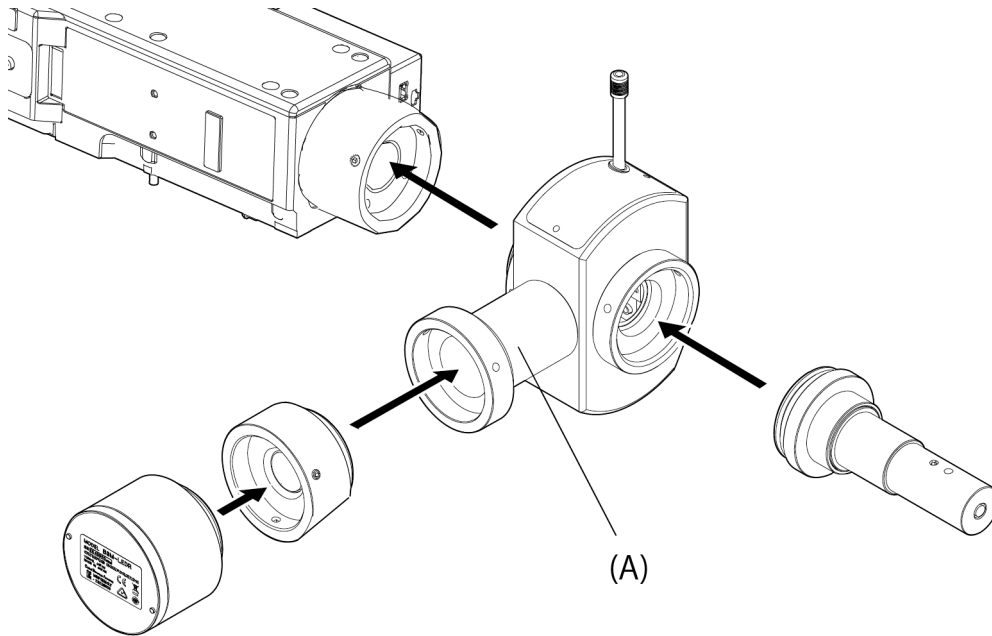
3. Tighten two mounting screws (A) of the reflected light illuminator using the Allen screwdriver.



### 3.6.3 Attaching two lamp housings

**NOTE:**

- The attachable lamp housings or adapters are restricted in combinations, orders and directions. (See the figure below.)
- Attach the double lamp housing adapter (U-DULHA) so that the part indicated as (A) in the figure below is on the left side and horizontal when facing the back side of the reflected light illuminator.



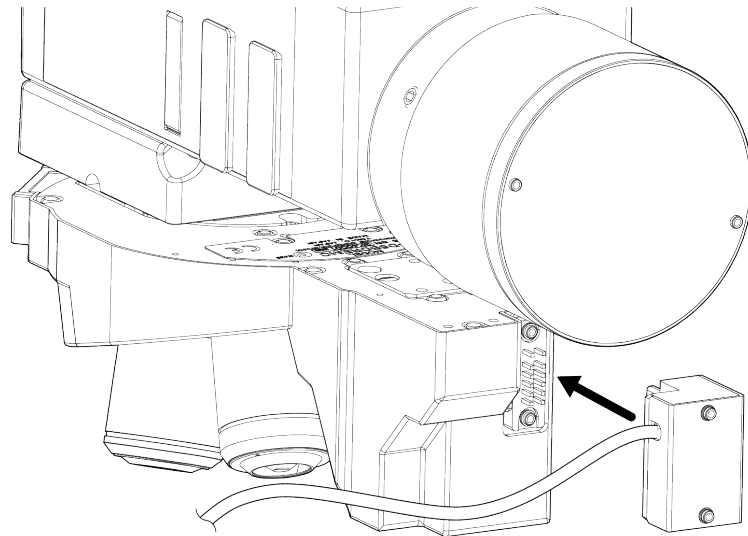
## 3.7 Connecting the cables

### NOTE:

- Before connecting or disconnecting cables, set the main switch to **○(OFF)** and unplug the power cord from the outlet.
- For safety purposes, connect the power cord plug last.
- Cables are vulnerable when bent or twisted. Never subject them to excessive force.
- Be sure to connect only cables specified by us to the connectors.  
Connect the connectors in the correct orientation paying attention to the shape of the connector.  
If the connector is attached with clamping screws, be sure to tighten them.

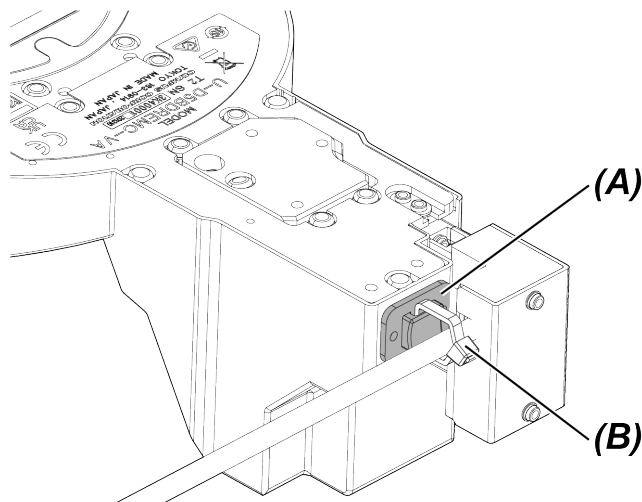
### 3.7.1 Connecting the motorized nosepiece and the cable

1. Connect the motorized nosepiece and the extension cable for motorized nosepiece BXC-REMECBL.



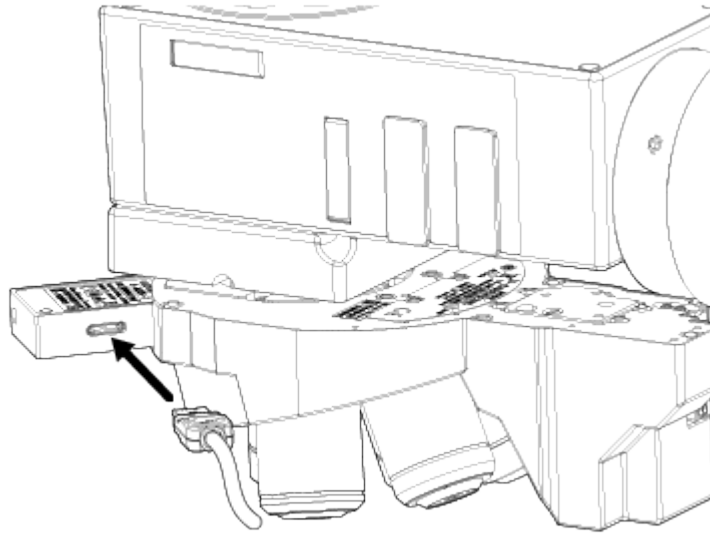
### TIP:

The connector of the extension cable for motorized nosepiece BXC-REMECBL does not have any clamping screws. Securing the cable with the wiring fixture (A) and a cable tie (B) provided with the extension cable for motorized nosepiece BXC-REMECBL as shown in the figure will prevent the cable from coming off.



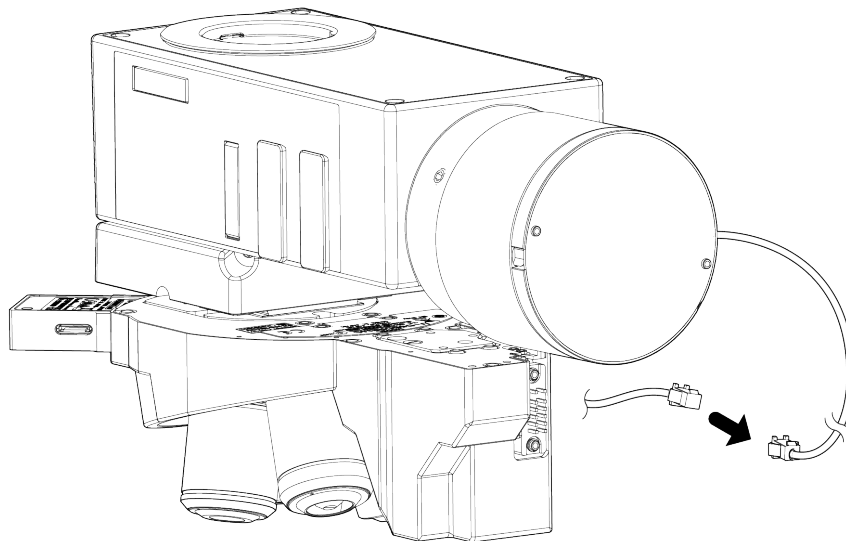
### 3.7.2 Connecting the MIX slider and the cable

1. Connect the MIX slider for reflected light observation and the cable for MIX slider for reflected light observation U-MIXRECBL.



### 3.7.3 Connecting the reflected LED light source or the reflected light illuminator and the cable

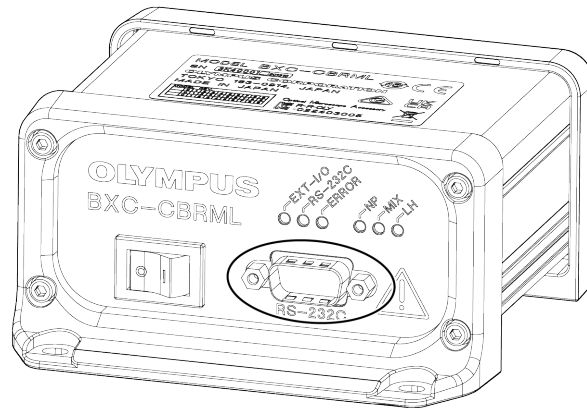
1. Connect the cable for the reflected LED light source and the cable for the reflected light illuminator CMP-LLHECBL.





### 3.7.4 Connecting the control box and the cable

1. Connect RS-232C cable to the connector on the front panel of the control box BXC-CBRML.



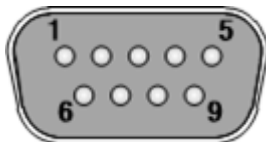
- To connect to a PC, use a D-Sub9 pin (female)-D-Sub9 pin (female) straight-through cable. (If you use an incorrect cable, the product may be damaged.)
- The connector on the front panel of the control box BXC-CBRML: D-sub9pin DCE assignment
- Mating clamping screw: #4-40 UNC
- The following table shows the settings for communication (Fixed value)

Baudrate	19200 [bps]
Data bit	8 [bits]
Parity	even
Stop bit	1 or 2 [bits] (switching the setting not required) *
Terminator	CR+LF
Flow control	None

\*The setting of the stop bits for communicating from the Host-PC to BXC-CBRML. The setting of the stop bits for communicating from BXC-CBRML to the Host-PC is fixed to "2".

#### TIP:

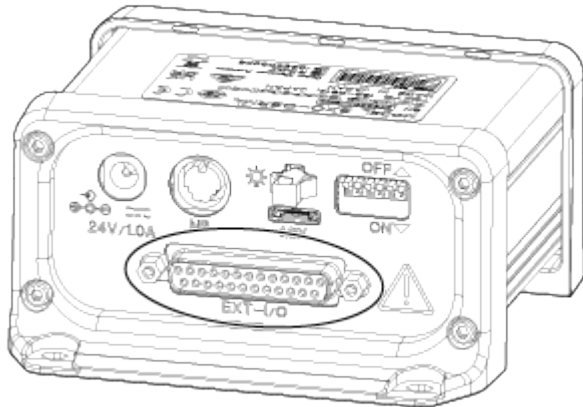
If connecting to a device other than a PC, do so at your own risk. Refer to the following table for the connections.



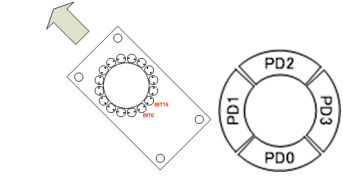
No.	Signal name	I/O	Function
2	RXD	OUT	Transmitted data
3	TXD	IN	Received data
5	GND	—	Signal ground
7	RTS	IN	Request to send
8	CTS	OUT	Clear to send

Pins not indicated are not internally connected and pins 7 and 8 are internally connected to each other.

2. If you will use external logic signals, connect the cable to the external logic signal interface connector on the back panel of the control box BXC-CBRML.



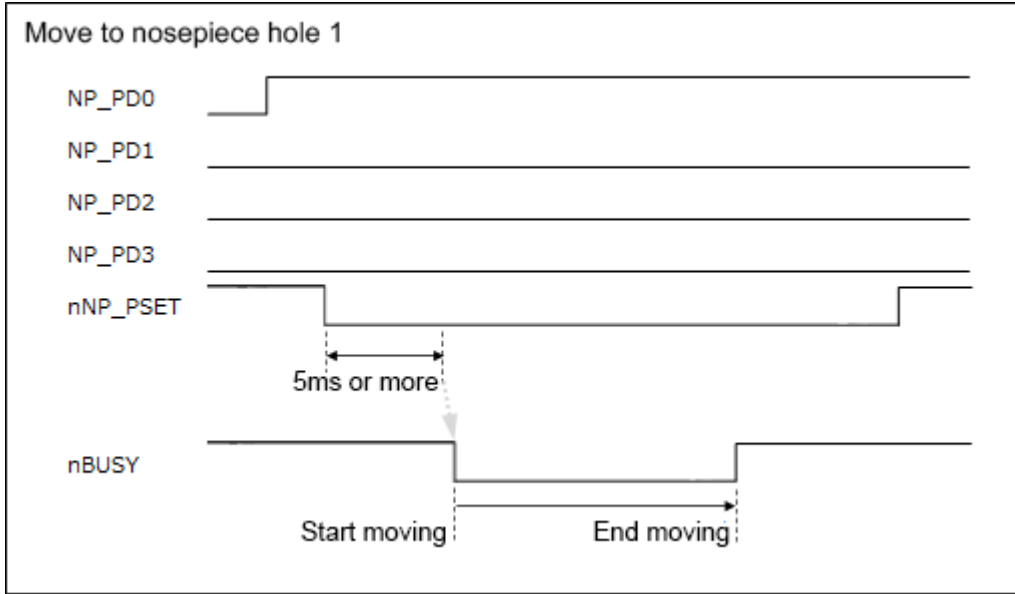
Pin-No.	Signal name	I/O	Corresponding unit	Note	Remarks							
					NP0	Np1	NP2	NP-No.	NP0	Np1	NP2	NP-No.
1	NP_PD0	I	Motorized nosepiece	Nosepiece hole position information (3Bit)	0	0	0	—	0	0	1	4
2	NP_PD1	I			1	0	0	1	1	0	1	5
3	NP_PD2	I			0	1	0	2	0	1	1	6
					1	1	0	3	1	1	1	—
4	nNP_PSET	I		Nosepiece movement instruction	Inputting "Lo" moves the nosepiece to the hole positions specified by Np_PD0-PD2.							
5	nLIMSET	I	BXC-CBRML	LIM setting	Inputting "Lo" stores in the memory the current nosepiece hole position and the combination of LED and MIX light modulation value.							
6	VD0	I	LED lamp housing MIX slider	Light modulation data (8Bit)	LED lamp housing: 0 (completely off) - 255 (Max light modulation) MIX slider: 0 (completely off) - 100 (Max light modulation) * For the MIX slider, a value between 101 and 255 is treated as 100 (no light modulation).							
7	VD1	I										
8	VD2	I										
9	VD3	I										
10	VD4	I										
11	VD5	I										
12	VD6	I										
13	VD7	I										
14	nLED_VSET	I	LED lamp housing	Light modulation data setting	Inputting "Lo" sets the LED light modulation value specified by VD0-VD7.							
15	nMIX_VSET	I	MIX slider	Light modulation data setting	Inputting "Lo" sets the MIX light modulation value specified by VD0-VD7.							
16	nLED_ON	I	LED lamp housing	On/Off control	Inputting "Lo" turns on the LED. Inputting "Hi" turns off the LED. (light modulation value is retained)							

Pin-No.	Signal name	I/O	Corresponding unit	Note	Remarks
17	nMIX_PD0	I	MIX slider	On/Off control of the specified segment	Inputting "Lo" turns on each illumination segment specified by [nMIX_PD0] - [nMIX_PD3]. Inputting "Hi" turns off each illumination segment specified by [nMIX_PD0] - [nMIX_PD3]. <a href="#">To nosepiece</a> 
18	nMIX_PD1	I			
19	nMIX_PD2	I			
20	nMIX_PD3	I			
21	nRESERVE	I	—	Reserved	Always input "Hi".
22	nBUSY	O	—	Processing status notification	Outputs "Lo" during processing such as moving the nosepiece. Outputs "Hi" after the process is complete.
23	nERROR	O	—	Error notification	Outputs "Lo" (Error) if a setting/action for the previous control could not be made. Outputs "Hi" if a setting/action for the previous control was completed (successful). * Even during an error state, Error returns to "Hi" output if the setting/action succeeds with the next control. * For a Fatal-Error, "Lo" output is retained until the power is turned on again.
24	+5V_USER	—	—	Power supply	+5V power supply from the user system (for driving the photocoupler)
25	GND_USER	—	—	GND	Reference GND of the GND output terminal (22, 23Pin) of the user system

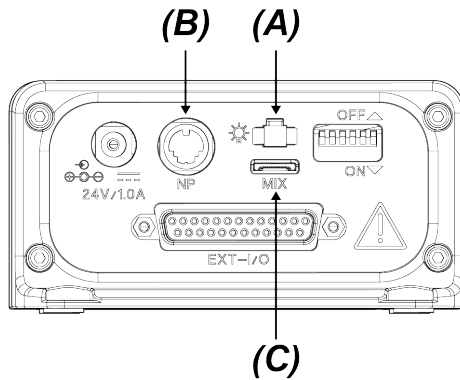
- All input/output signals (23 types) except the power supply and GND are isolated by the photocoupler inside the product (on the embedded substrate).
- Input logic level is fixed when "Lo" or "Hi" state continues longer than 5 msec.
- For all input signals, "Hi" = Open, "Lo" = GND\_USER. Input current per 1 terminal is 4 mA (typ). Maximum input voltage to the +5V\_USER terminal is 5.5 V.
- For all output signals (I/O = "O"), "Hi" = +5V\_USER - 1.0V or higher, "Lo" = 0.4V or lower. Maximum source current per 1 terminal is ±3 mA.
- When the power is turned on, the On/Off state and light modulation value of the LED lamp housing, and turned-on segments and light modulation value of the MIX slider are restored to the state immediately before the power was turned off.
- No setting/action is made for the states of each input signal before turning on the power.

**TIP:**

The following diagram shows the timing chart for each signal when moving to nosepiece hole 1.

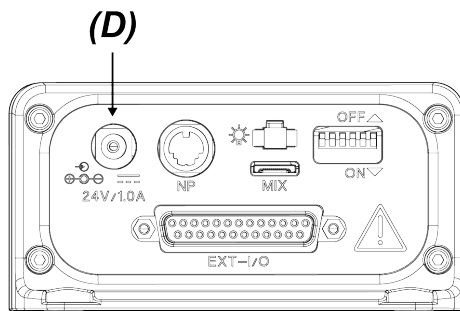


- 3.** Connect the cable to a connector on the back panel of the control box BXC-CBRML.



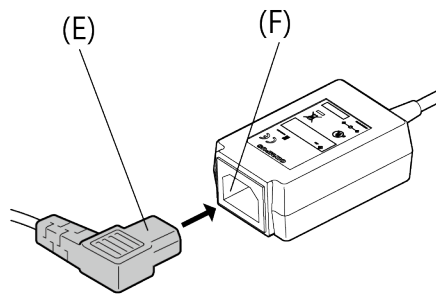
(A)	Reflected LED light source or the reflected light illuminator (CMP-LLHECBL)
(B)	Motorized nosepiece (BXC-REMECBL)
(C)	MIX slider (U-MIXRECBL)

- 4.** Connect the control box BXC-CBRML and the AC adapter (provided with BXC-CBRML).

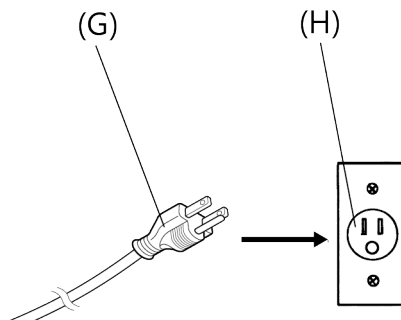


(D)	AC adapter (provided with BXC-CBRML)
-----	--------------------------------------

- 5.** Securely insert the power cord connector (E) into the connector (F) of the AC adapter.



- 6.** Insert the power cord plug (G) into a power outlet (H).

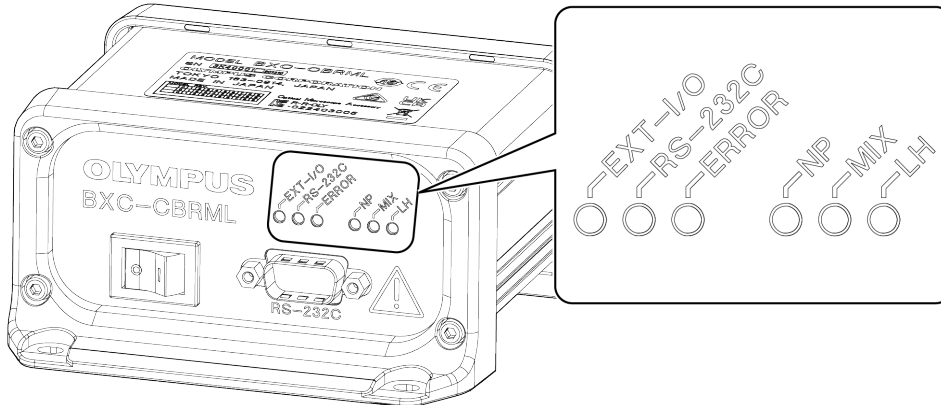


# 4. Operation procedures

1. Turn on the control box.
2. Control each unit using RS-232C communication commands from a PC.  
For details on RS-232C communication commands, refer to the command reference manual.

## 4.1 Status display of the indicators on BXC-CBRML

The following table shows the status display of each indicator.

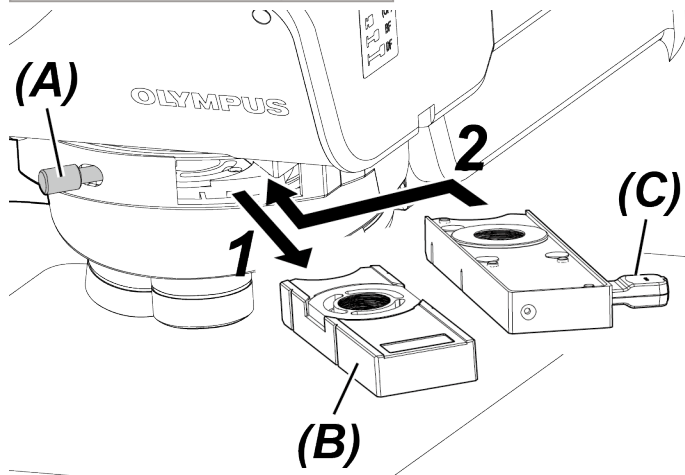


Symbol	Color	Displays the status of	Status		
			●Off	○On	◎Flashing
EXT-I/O	Green	External logic I/F	Not selected	Selected	—
RS-232C	Blue	RS-232C	Not selected	Selected	—
ERROR	Red	Fatal error	No error	Fatal error occurred	—
NP	Green	Motorized nosepiece	Not connected	Connected (normal)	Control malfunction
MIX	Green	MIX slider	Not connected	Connected (normal)	Control malfunction
LH	Green	LED lamp housing	Turned off	Turning on	Control malfunction

## 4.2 Inserting the MIX slider

1. Loosen the mounting knob (A) at the rear right of the nosepiece and pull out the dummy slider (B).
2. Insert the MIX slider (U-MIXR-2) (C) to the slider insertion slot of the nosepiece so that the connector comes to the right side, and push it in the second level (position where the clicking sound is heard).

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

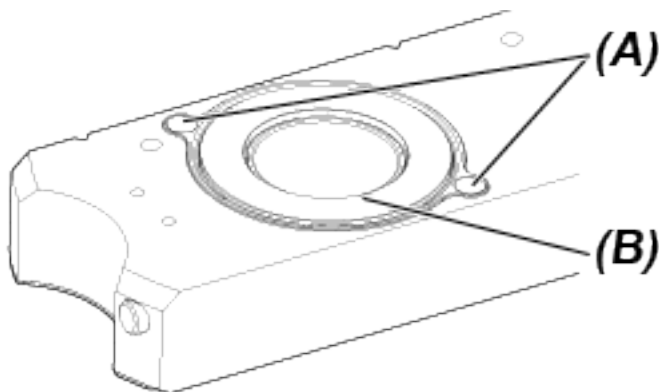


3. Tighten the mounting knob (A) to secure the slider.

## 4.3 Removing/attaching the color filter from/to the MIX slider

### Removing

1. Loosen two mounting screws (A) using a Phillips screwdriver (M2).
2. Remove the color filter (B) from the MIX slider.



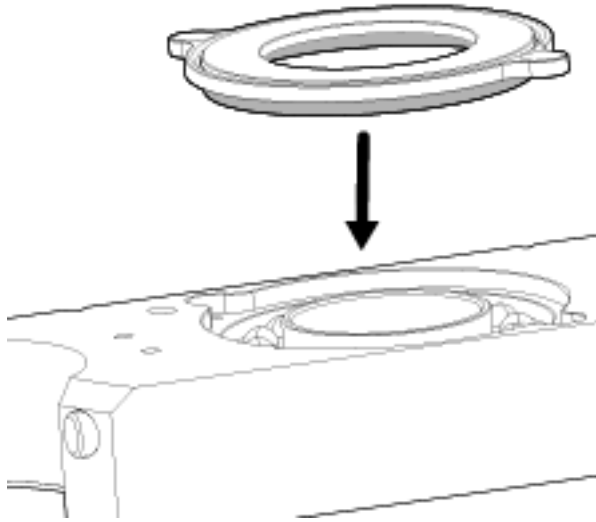
## Attaching

1. Attach the color filter (A) to the MIX slider.

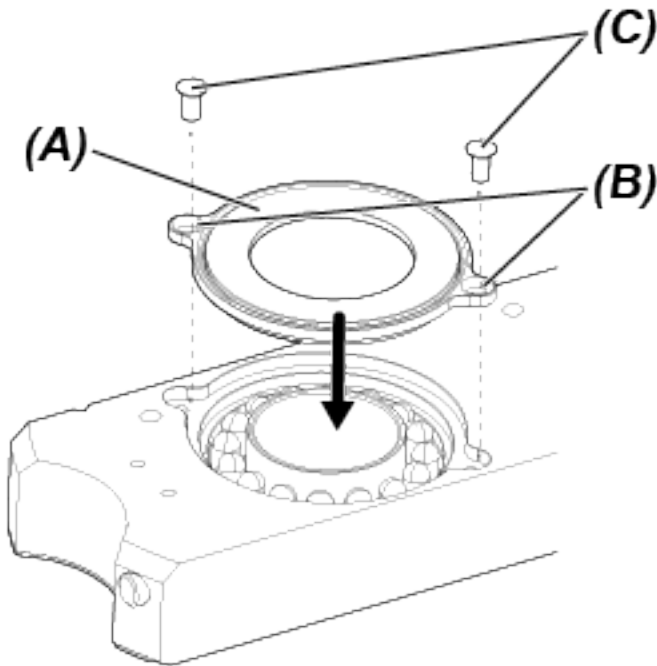
**NOTE:**

The color filter must be attached on the right side; attaching it on the opposite side may result in its damage.

Attach the color filter, orienting the side with the filter protruded facing down (toward the MIX slider).



2. Insert the screws (C) in two screw holes (B) and tighten them using a Phillips screwdriver (M2).



State	Function
Color filter is attached	Color of the illumination turns white
Color filter is removed	Color of the illumination turns bluish-white



# 5. Maintenance and Storage

## 5.1 Cleaning of each part

### Lens and filter

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 washed-out 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.

### **⚠WARNING:**

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 the absolute alcohol only in a well-ventilated room.

### Portions other than lenses

Wipe the portions other than lenses with a dry soft cloth. If dirt/dust cannot be removed by dry-wiping, moisten a soft cloth with diluted neutral detergent and wipe off dirt/dust with it.

### **NOTE:**

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

### To extend the life of the nosepiece

Using only a specific hole (partial segment) of the nosepiece may result in the grease inside the nosepiece to spread unevenly and the motion of the nosepiece to deteriorate in rare cases.

To avoid this problem, you can use the OBREF command to rotate the nosepiece once to have the grease evenly applied.

The following measures are recommended:

- Rotate the nosepiece about once a week.
- Rotate once CW (clockwise) and once CCW (counterclockwise.)




For details, refer to the command reference manual.

# 6. 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 us for assistance.

## 6.1 Optical systems

Phenomena	Cause	Remedy	Reference page
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.	—
	The analyzer or the polarizer is in the light path.	Remove the analyzer or the polarizer from the light path.	—
	Light path selection lever of the trinocular tube is at the  position.	Set the light path selection lever of the trinocular tube to the  or the  position.	—
	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.	—
	The shutter is engaged in the light path.	Remove the shutter from the light path.	—
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.	—
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.	—
	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.	—
	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.	—
	The nosepiece is not attached correctly.	Push in the nosepiece along the mounting dovetail until it touches the end, and secure it.	<a href="#">8</a>
	The filter is not engaged in the light path correctly.	Stop the filter at the position where the clicking sound is heard.	—
	The analyzer and the polarizer are not inserted correctly.	Engage the analyzer and the polarizer in the light path correctly.	—
Dust or dirt is visible in the field of view.	The eyepiece, the tip of the objective or the sample is dirty.	Clean them sufficiently.	<a href="#">22</a>
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.	—
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.	—
	The dummy slider is not inserted in the nosepiece.	Insert the dummy slider in the nosepiece.	<a href="#">20</a>

Phenomena	Cause	Remedy	Reference page
	The nosepiece is not attached correctly.	Push in the nosepiece along the mounting dovetail until it touches the end, and secure it.	<a href="#">8</a>
	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.	—
	The tip of the objective or the sample is dirty.	Clean them sufficiently.	<a href="#">22</a>
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.	<a href="#">8</a>
	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.	—
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.	<a href="#">8</a>
	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.	—
	The aperture diaphragm is narrowed down but the centering is not performed yet.	Perform the centering of the aperture diaphragm.	—

## 6.2 Observation tube

Phenomena	Cause	Remedy	Reference page
The fields of view of two eyes do not coincide.	The interpupillary distance is not adjusted correctly.	Adjust the interpupillary distance correctly.	—
	The diopter of two eyes is not compensated.	Compensate the diopter correctly.	—
	The different eyepiece is used for right and left eyes.	Use the same eyepiece for right and left eyes.	—
	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.	—

## 6.3 Drive system

Phenomena	Cause	Remedy	Reference page
Cannot communicate with the PC.	Communication settings are not correct.	Specify the communication settings correctly.	<a href="#">14</a>

Phenomena	Cause	Remedy	Reference page
	Wrong cable is used.	Use a correct cable.	<a href="#">14</a>
	Wrong command is used.	Refer to the command reference manual.	—
MIX slider does not light up.	The MIX slider is not attached to the nosepiece correctly.	Attach the MIX slider to the nosepiece correctly.	<a href="#">20</a>
The nosepiece does not move.	The nosepiece setting to select either the 6Position-NP or 5Position-NP on the DIP switch is wrong.	Specify the correct nosepiece setting on the DIP switch.	<a href="#">6</a>
	Only a specific hole (partial segment) is used.	Refer to "To extend the life of the nosepiece" and evenly apply the grease.	<a href="#">22</a>

#### Repair request

If you cannot improve the phenomena after taking the above remedies, please contact us for assistance. At that time, please tell them the following information as well.

- Product name and abbreviation (Example: BXC-CBRML)
- Product number
- Phenomena

# 7. Proper selection of the power supply cord

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



















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

## 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 60 °C minimum
Temperature rating	3.05 m maximum
Length	Grounding type attachment plug cap. Opposite terminates in molded-on IEC
Fittings configuration	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 Materielkontroll (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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