Nikon

Upright Microscope

ECLIPSE

Ni-U

Instruction Manual

Assembly/Maintenance

Introduction

Thank you for purchasing a Nikon product.

This instruction manual is written for users of the Nikon ECLIPSE Ni-U microscope. To ensure correct usage, read this manual carefully before operating this product.

- No part of this manual may be reproduced or transmitted in any form without prior written permission from Nikon.
- The contents of this manual are subject to change without notice.
- The equipment described in this manual may differ from the actual product in its appearance.
- Although every effort has been made to ensure the accuracy of this manual, errors or inconsistencies may remain. If you note any points that are unclear or incorrect, please contact your nearest Nikon representative.
- Some of the equipment described in this manual may not be included in the set you have purchased.
- If you intend to use any other equipment with this product, read the manual for that equipment too.
- If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- Training: This product can be used without special training, provided that this manual is read thoroughly before use. Kindly contact your nearest Nikon representative if you have any questions, find any errors, or wish to provide us with your opinion.

Contents of the Manual

The instruction manual for ECLIPSE Ni-U is provided as two volumes.

♦ **Operation**
- Safety Precautions
- Components
- Microscopy Procedures
  - Operation Flowchart
  - Bright/Dark-field Microscopy
  - Epi-fluorescence Microscopy
  - Differential Interference Contrast Microscopy
  - Phase Contrast Microscopy
  - Motorized Bright-field Microscopy
  - Motorized Epi-fluorescence Microscopy
- Individual Operations

♦ **Assembly/Maintenance (This manual)**
- Assembly
- Troubleshooting
- Maintenance and Storage
- Specifications

Before reading the “Assembly/Maintenance” manual, read the “Safety Precautions” in the “Operation” manual.

Symbols Used in This Manual

The following symbols are used in this manual.

♦ **Symbols for Safety**

⚠ **WARNING** ⚠ **CAUTION**	Highlights important information that should be noted for safety. Read “Safety Precautions” for details.

♦ **Other Symbols**

	Indicates information you should note or comply with to prevent defects or malfunction of this product.
	Indicates information you should be aware of in using this product, as well as other useful information.

Summary of Contents (See the next page for the detailed contents.)

Contents

Chapter 1

Assembly

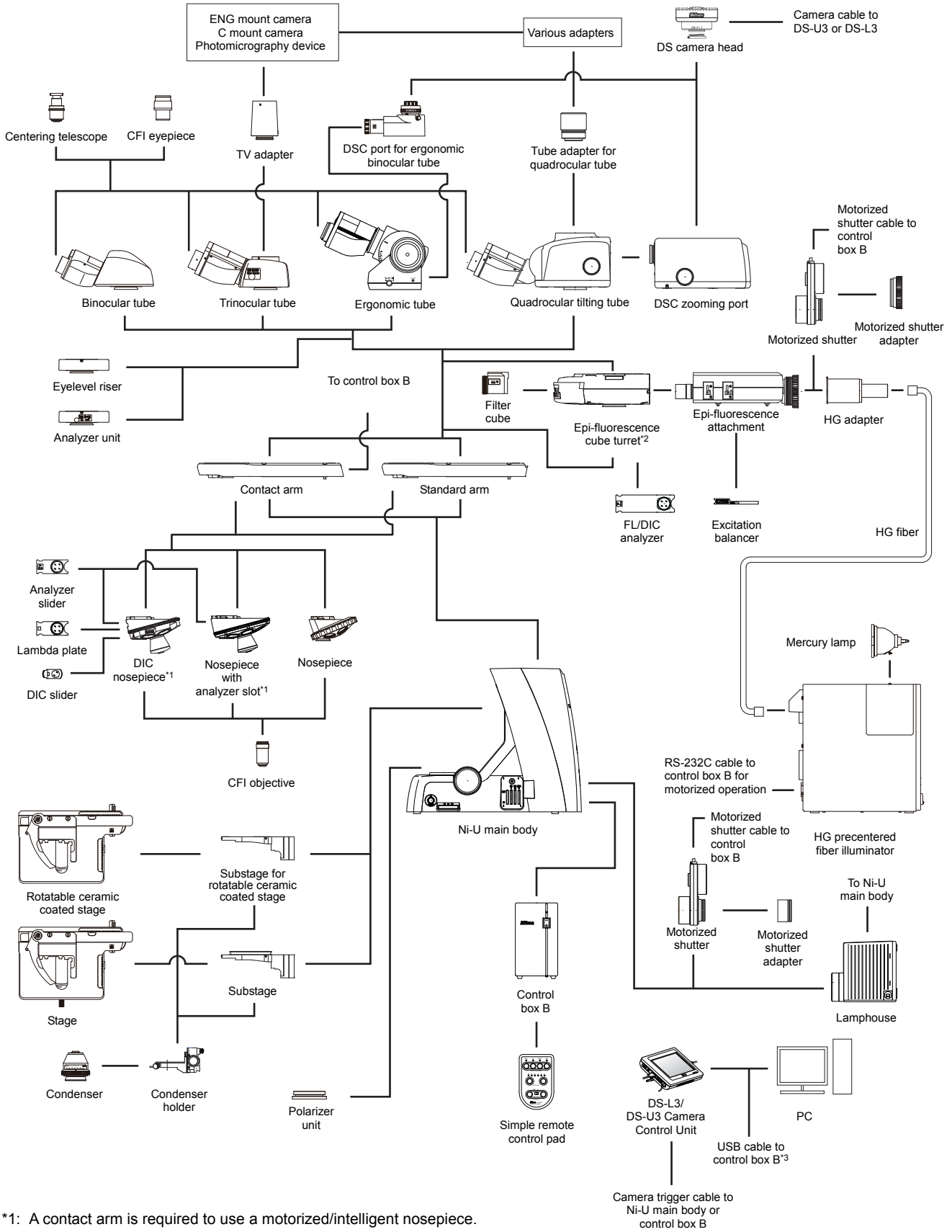
This chapter contains an Ni-U system configuration diagram, a list of its components, and explains how to assemble the system.

Read appropriate notes such as ⚠CAUTION “9 Cautions on assembling and installing the product” at the beginning of the separately provided instruction manual “Operation” or “4 Installation location” in “Notes on Handling the Product” in the same manual before you work on assembling.

■ Assembly tools provided with the microscope

- Hex driver x3: 2 mm across flats x3
- Hex wrench x2: 3 and 4 mm across flats

1 ECLIPSE Ni-U System Configuration



*1: A contact arm is required to use a motorized/intelligent nosepiece.

*2: A contact arm is required to use a motorized/intelligent epi-fluorescence cube turret.

*3: DS-U3 DS camera control unit can not be connected via USB.

2 Components List

The ECLIPSE Ni-U components are shown in the table below.
Depending on when you purchased the ECLIPSE Ni-U, there may be devices not yet available for use and devices not listed that are already available for use. Contact your nearest Nikon representative for details.

Device	Device Name	Model	Remarks
Microscope main body	ECLIPSE Ni-U (12V 100W 100-240V power supply for illumination integrated)	ECLIPSE Ni-U	
Illuminator for dia-illumination	Precentered lamphouse (12V 100W)	NI-LH	
	Halogen lamp (100W)	PHILIPS 7724 OSRAM HLX 64623	
Arm	Standard arm	NI-SAM	Combine with a manual model such as manual nosepiece
	Contact arm	NIU-CAM	Combine with a motorized models such as intelligent/motorized nosepiece
Tube	Binocular tube	C-TB	C-TBM mildew-proof type also available
	Trinocular eyepiece tube F	C-TF	C-TFM mildew-proof type also available
	Trinocular eyepiece tube T	C-TT	
	Ergonomic tube	C-TE2	
	Quadrocular tilting tube	NI-TT	
DSC port	DSC port for ergonomic binocular tube	C-TEP2	Connected to Nikon DS camera head or other C mount camera. Nikon DS camera head is controlled from DS-L3/DS-U3.
	DSC zooming port for quadrocular tube	NI-RPZ	
Eyepiece	CFI eyepiece	CFI CFI UW	
	Centering telescope	C-CT	
Nosepiece	Universal quintuple nosepiece	L-NU5	
	BD quintuple nosepiece	L-NBD5	
	Sextuple nosepiece	C-N	
	Sextuple nosepiece with analyzer slot	C-NA	
	Sextuple DIC nosepiece	D-ND6	
	Intelligent DIC sextuple nosepiece	NI-ND6-I	
	Intelligent Septuple nosepiece	NI-N7-I	
	Motorized DIC sextuple nosepiece	NI-ND6-E	
	Motorized septuple nosepiece	NI-N7-E	
Objective	CFI objective	CFI LU Plan Fluor Epi LU Plan Fluor BD	LU Plan Fluor Epi/BD can be attached to the L-NU5 or L-NBD5 nosepiece. LU nosepiece adapter is required to attach a non-BD objective to L-NBD5.
Substage	Substage	NI-SS	Rotatable ceramic coated stage can not be attached
	Substage for rotatable ceramic coated stage	NI-SSR	
Stage	Right handle stage with 2S holder	C-SR2S	
	Left handle stage with 2S holder	C-SL2S	
	Right handle ceramic coated stage with 1S holder	C-CSR1S	
	Left handle ceramic coated stage with 1S holder	C-CSL1S	
	NI-U right handle rotatable ceramic coated stage with holder	NIU-CSRR2	
	NI-U left handle rotatable ceramic coated stage with holder	NIU-CSLR2	
Condenser holder	Condenser holder	NI-CH	
Condenser	Dark field condenser (Oil) and (Dry)		
	C-C aplanatic condenser		
	C-C achromat condenser No.9		
	C-C abbe condenser No.9		
	X LWD condenser		
	C-C slide achro condenser 2-100x		
	C-C achromat swing-out condenser 1-100x		
	C-C phase turret condenser		Cannot be used when rotatable ceramic coated stage is attached.
	DIC condenser (Oil)	D-CUO	Used with OIL DIC module
	Universal condenser (Dry)	NI-CUD	Supports DRY DIC module, PH module, dark field module, NI-CALN1 2-4x auxiliary lens, D-C 2-4x auxiliary lens
Epi-fluorescence cube turret	Cube turret	NI-FLT6	A filter cube and NI-FA FL/DIC analyzer attachable.
	Intelligent epi-fluorescence cube turret	NI-FLT6-I	
	Motorized epi-fluorescence cube turret	NI-FLT6-E	
Epi-fluorescence attachment	Epi-fluorescence attachment	NI-FLEI	D-FB excitation balancer attachable.
Mercury lamp illuminator	HG precentered fiber illuminator	C-HGFI	
	Motorized HG precentered fiber illuminator	C-HGFIE	
Analyzer unit/ Slider	Analyzer slider for DIC	D-DA	Can be attached to C-NA, D-ND6, NI-ND6-I, NI-N7-I, NI-ND6-E, or NI-N7-E nosepiece.
	Analyzer tube for simple polarization	C-ISA	Combined with C-SP polarizer unit.
	Analyzer tube for first-order red compensation	C-IA	Combined with C-TP polarizer unit.
	Analyzer slider for simple polarization	D-SA	
	Analyzer slider for first-order red compensation	C-AS	
	DIC slider	D-C	Can be attached to D-ND6, NI-ND6-I, or NI-ND6-E nosepiece.
	Lambda plate	D-LP	Can be attached to D-ND6, NI-ND6-I, or NI-ND6-E nosepiece.
Polarizer unit	DIC rotatable polarizer unit	D-DP	
	Polarizer unit for simple polarization	C-SP	
	Polarizer unit for first-order red compensation	C-TP	
Shutter	Motorized shutter	NI-SH-E	For connection, NI-SHCL motorized shutter cable is required and is connected to the control box B.
	Motorized shutter adapter for upright epi-fl	NI-SHAEP-U	
	Motorized shutter adapter for dia-illumination	NI-SHADI	
Controller	Control box B	NI-CTLB	
	Simple remote control pad	NI-SRCP	
	DS-L3/DS-U3 camera control unit	DS-L3 DS-U3	DS-L3 is connected to the control box B via USB cable DS-L3/DS-U3 is connected to the Ni-U main body or the control box B via C-CTC camera trigger cable L3/U3 DS camera I/F cable is used to connect to the camera
Eyelevel riser	Eyelevel riser	C-ER	
Variable intermediate magnification unit	Variable intermediate magnification unit	Y-IM	
DSC retention support	DSC support column	NI-RPS	
	DSC adapter A and B	NI-RPSAA NI-RPSAB	
Tube adapter for quadrocular tube	Tube adapter for quadrocular tube	C-TAQ	Can be attached to the quadrocular tilting tube. Attach a C mount camera, ENG mount camera or a photomicrography device via various adapters.
TV adapter	TV adapter	Y-TV Y-TV55	Y-TV can be attached to C-TF or C-TT trinocular tube. Connect a C mount camera, ENG mount camera, or photomicroscopy device with an adapter. Y-TV55 can be attached to C-TF or C-TT trinocular tube. Connect a C mount camera with C mount adapter 0.55x.

3 Assembly Method

Introduction

Ni-U is a manual microscope. Basically, a manual model is attached for each device consisting the microscope. However, for nosepiece, epi-fluorescence cube turret, and HG precentered fiber illuminator, motorized models can be attached. In this case, contact arm, control box B, and simple remote control pad are required. In addition, in order to configure information for motorized devices, DS-L3 DS camera control unit must be connected. Motorized devices on Ni-U can be controlled from DS-L3.

Note that when using epi-fluorescence cube turrets by layering, motorized/intelligent epi-fluorescence cube turret can only be used in 1st layer.

Assemble the device according to the following procedure.

Precautions for connecting cables

Cable connections are required for some motorized devices.

Be sure to turn off the power to the microscope and peripheral devices before starting cable connection.

Cable connections are described in each assembly step. Nikon recommends connecting cables at the end of the assembly. See “20 Connect the motorized device cable.” for the connector connections.

Information setting regarding motorized models

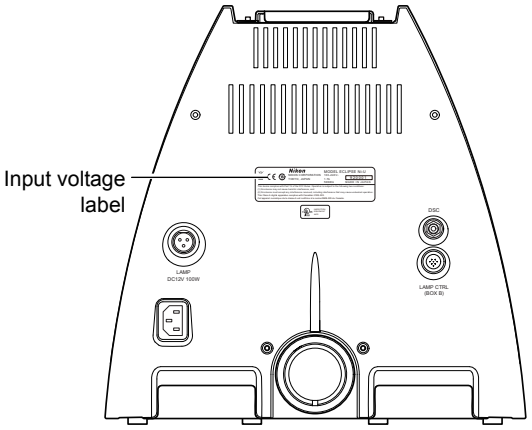
Set information of the motorized devices or optical element attached on the microscope setup menu for the DS-L3 DS Camera Control Unit. (See Chapter 3 “19 Operations on DS-L3” - “19.1 Setting Up the Microscope.)

1 Check the input voltage.

Check the input voltage indicated on the back of the microscope. Use the microscope only if the indicated input voltage matches the power supply voltage for the area in which the microscope will be used.

WARNING

If the indicated voltage and the supplied voltage differ, do not attempt to use the microscope. Contact your nearest Nikon representative.

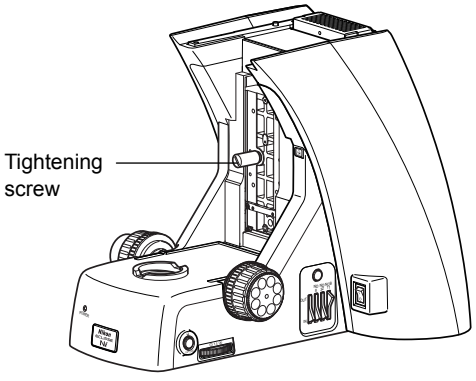


Checking the input voltage (Microscope rear view)

Unlocking the elevating section

Tool: flathead screwdriver

After you confirm that the input voltage is correct, loosen and remove the tightening screw at the front of the elevating section.



Unlocking the elevating section

2 Attach the DIA motorized shutter (optional).

The motorized shutter is attached by Nikon.
Contact your nearest Nikon representative when the DIA motorized shutter needs to be attached or removed.

3 Attach the lamp.

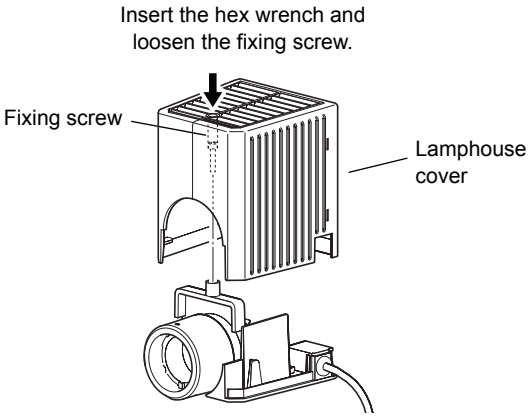
Tool: Hex wrench (3 mm across flats)

> **Lamp handling precautions**
> Avoid touching the glass surface of the lamp with your bare hands.

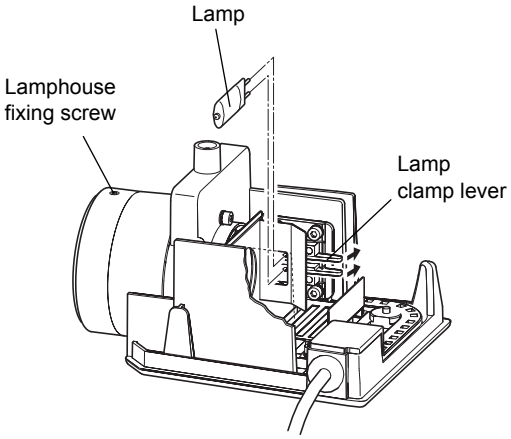
(1) Loosen the lamphouse cover fixing screw and lift up the cover to remove.

(2) Insert the lamp clamp lever to open the socket pin hole. Attach the lamp while holding down the lever. Put the lamp clamp lever back to its original position.
Designated lamp: PHILIPS7724
or OSRAM HLX64623

(3) Reattach the cover back to its original position and tighten the lamphouse cover fixing screw.



Removing the lamphouse cover



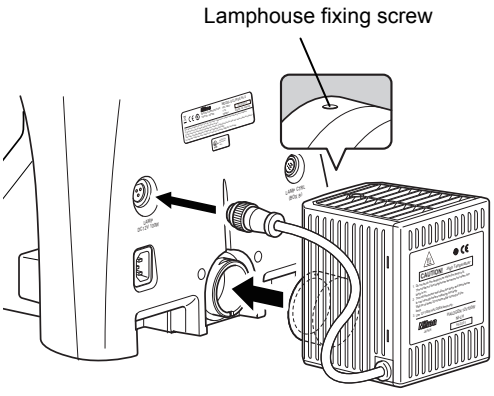
Attaching the lamp

4 Attach the lamphouse for dia-illumination.

Tool: Hex driver (2 mm across flats)

(1) Insert the lamphouse at the rear of the microscope and tighten the fixing screws.

(2) Connect the dia-illumination lamphouse cable to the LAMP connector on the rear of the main body.



Securing the dia-illumination lamphouse

5 Attach the standard arm/contact arm.

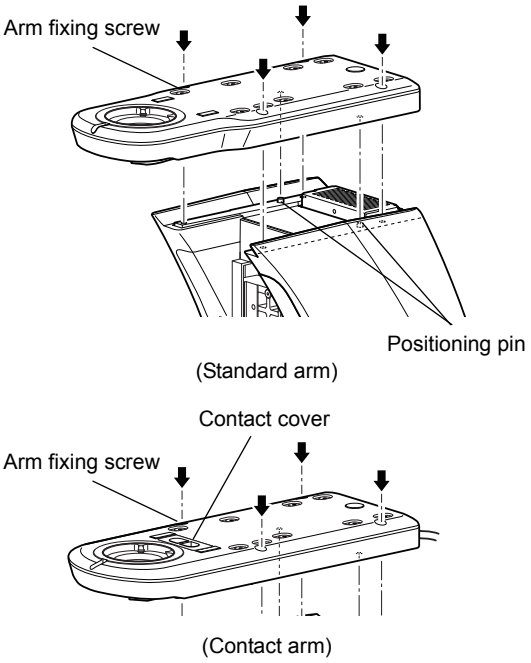
The attachment procedure is the same for standard arm and contact arm. To use the motorized accessories, attach the contact arm. The contact arm has a contact. When attaching a motorized device on the arm, remove the contact cover beforehand.

Tool: Hex wrench (4 mm across flats)

(1) Place the arm while aligning it with the two positioning pins on the main body and tighten the four fixing screws.

(2) When using contact arm, connect the cable from the CONTACT ARM1 connector to the CONTACT ARM1 connector on the control box B.

(3) Connect the cable from the CONTACT ARM2 connector to the CONTACT ARM2 connector on the control box B.



Attaching the arm

6 Attach the epi-fluorescence cube turret and epi-fluorescence attachment (required for epi-fluorescence microscopy).

Tool: Hex driver (2 mm across flats)
Hex wrench (3 mm across flats)

First, connect the epi-fluorescence cube turret and epi-fluorescence attachment and then attach them on the microscope arm.

(1) Insert the positioning pin of the epi-fluorescence attachment while aligning it with the positioning hole on the epi-fluorescence cube turret side, and then tighten the connection fixing screws (x2) on the epi-fluorescence cube turret with a hex driver.

(2) When using a motorized or intelligent epi-fluorescence cube turret, remove the contact cover on the contact arm beforehand.
(Contact cover is not removed for manual epi-fluorescence cube turret.)

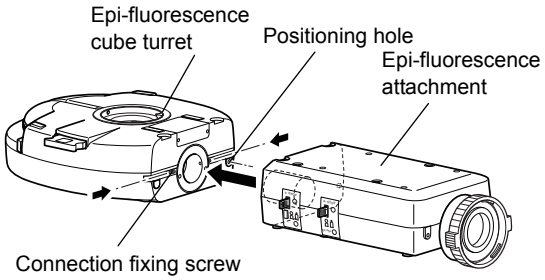
(3) Loosen the fixing screw on the front of the arm using a hex driver so that the tip of the screw does not protrude into the connecting section.

(4) Align the round dovetail and convex contact on the bottom of the epi-fluorescence cube turret with the round dovetail and concave contact of the arm and slide the entire mounted attachment to the rear.
(There is no concave contact in manual epi-fluorescence cube turret.)

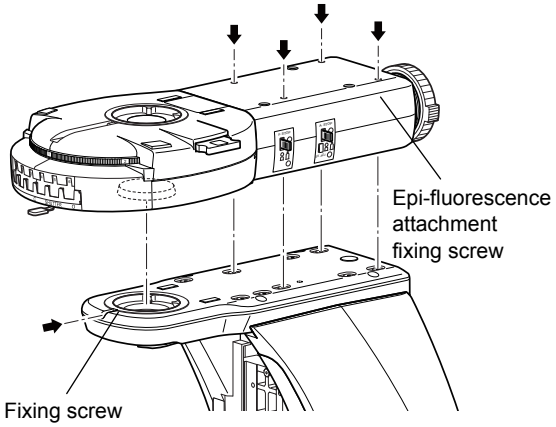
(5) Tighten the fixing screw loosened in step (3).

(6) Tighten the four fixing screws on top of the epi-fluorescence attachment.

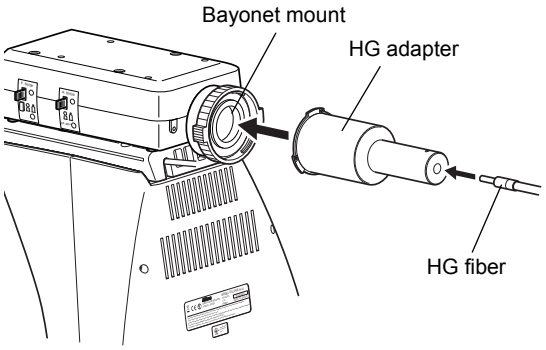
(7) Attach the HG adapter to the bayonet mount at the rear of the epi-fluorescence attachment and connect the HG precentered fiber illuminator. (See the instruction manual provided with the HG precentered fiber illuminator.)



Connecting epi-fluorescence cube turret and epi-fluorescence attachment



Attaching and fixing epi-fluorescence cube turret and epi-fluorescence attachment set



Attaching the HG adapter

■ Attaching a filter cube

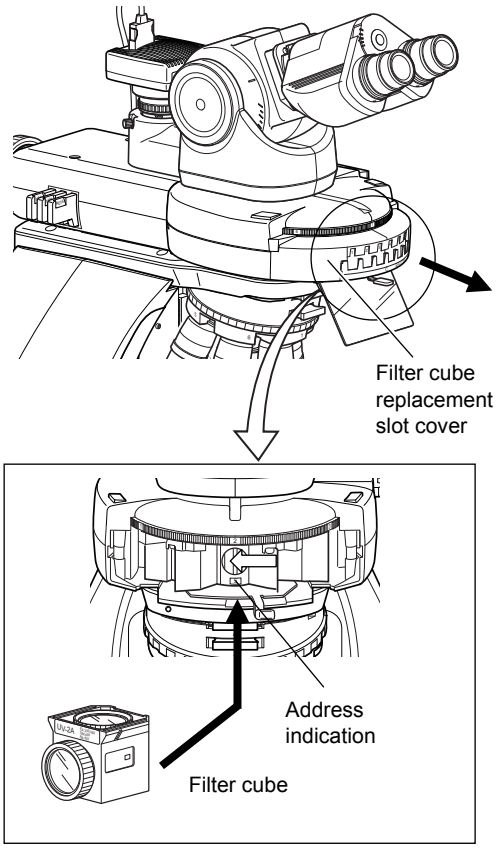
⚠ Precautions for attaching and removing the cube

- Be sure to check that the light source is turned off before attaching or removing the cube.
- Be sure to check that the power switch for microscope main body is turned off and then attach the cube by rotating the cube switchover turret. Also for the motorized epi-fluorescence cube turret, attach it by manually rotating the inside turret.

(1) Pull out the filter cube replacement cover on the front of the epi-fluorescence cube turret to remove it.

(2) Attach the filter cube to the slot.

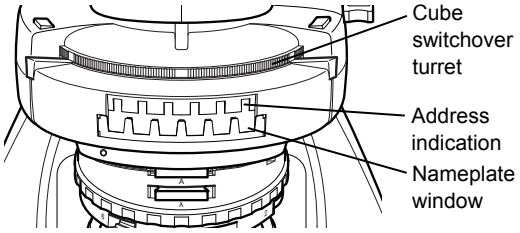
(3) Insert the filter cube nameplate into the slot cover window.
Insert into the same address window as the address shown inside the slot.



(4) Turn the cube switchover turret to attach the filter cubes in the remaining slots and also insert the nameplates.

> **For bright-field microscopy**
>
> For bright-field microscopy, be sure to make the address 1 empty.
>
> For motorized/intelligent epi-fluorescence cube turret, only address 1 can be set to [OPEN].

(5) Restore the slot cover back to its original position.



Attaching a filter cube

■ Replacing excitation and barrier filters

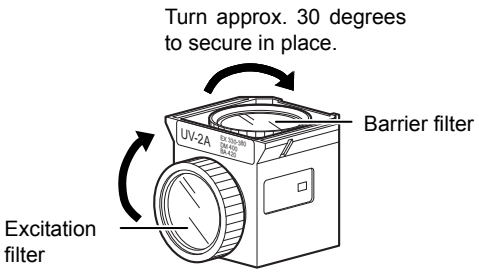
The excitation filter, barrier filter, and dichroic mirror can be removed from the cube for replacement.

Excitation filters are screw-in filters, while barrier filters are slide-in filters.

Align the projection on the barrier filter with the groove on the filter cube and turn clockwise by approximately 30 degrees to secure it in place.

Orientation of the filter

- The filter is two-faced. Be aware that the filter does not face a wrong side. Nikon filters have an arrow indication printed on the outer frame. Make sure that the arrow faces the direction of a dichroic mirror when attaching the filter.
- Contact your nearest Nikon representative when the dichroic mirror needs to be replaced.

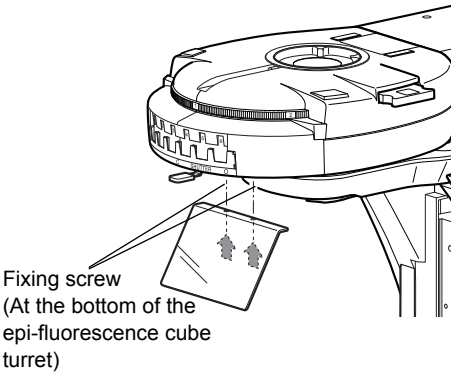


Replacing the excitation and barrier filters

■ Attaching a light shielding plate

Tool: Hex driver (2 mm across flats)

Lightly screw the two fixing screws provided with the light shielding plate into the front bottom of the epi-fluorescence cube turret. Hook the convex part of the light shielding plate to the two fixing screws and tighten the fixing screws.



Fixing the light shielding plate

7 Attach the quadrocular tilting tube and DSC zooming port for quadrocular tube.

Tools: Hex driver (2 mm across flats)
Hex driver (2.5 mm across flats, provided with DSC zooming port)
Hex wrench (3 mm across flats)
Hex wrench (4 mm across flats)

First connect the quadrocular tilting tube and DSC zooming port for quadrocular tube, then attach them on the microscope arm (if epi-fluorescence cube turret or epi-fluorescence attachment is attached, on top of that).

(1) Remove the tightening screws at the bottom of the tube with the hex wrench (4 mm across flats).

(2) Insert the positioning pin of the DSC zooming port while aligning it with the positioning hole on the tube side, and then tighten the connection fixing screws (2.5 mm across flats) on the top of the tube with a hex wrench.

(3) Loosen the fixing screw on the front of the arm using a hex driver (2 mm across flats) so that the tip of the screw does not protrude into the connecting section. (The fixing screw at the front of the turret, if epi-fluorescence cube turret is attached.)

(4) Loosen the fixing screws (x2) on both sides of the zooming port with a hex driver (2 mm across flats).

(5) Align the round dovetail of the quadrocular tube with the round dovetail of the arm and slide the entire attached devices to the rear.

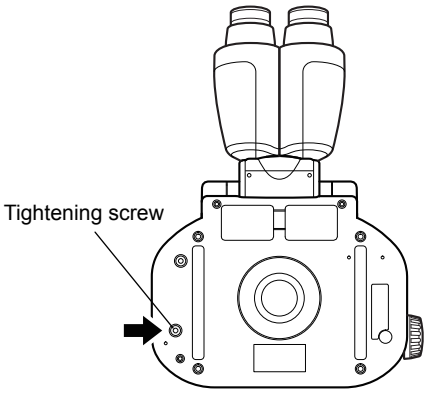
(6) Tighten the fixing screw loosened in step (3).

(7) Tighten the fixing screws (x2) on top of the zooming port with a hex wrench (3 mm across flats).

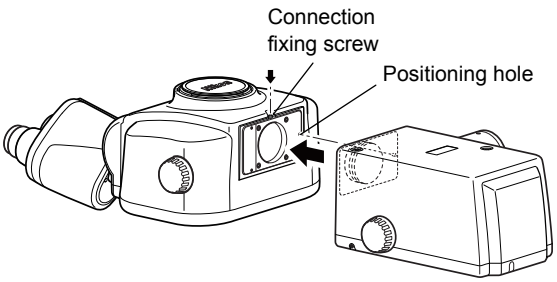
(8) Tighten the fixing screws (x2) loosened in step (4).

(9) Affix the provided sticker to cover the hole for the zooming port fixing screw.

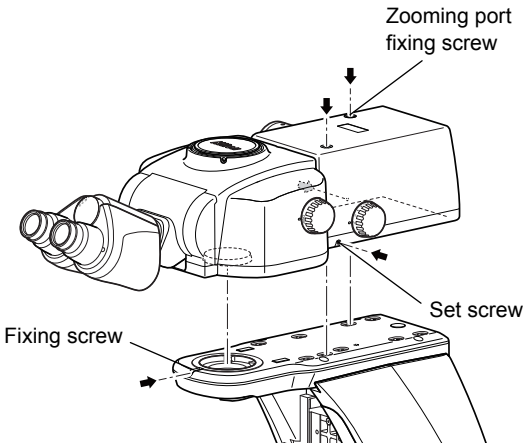
When attaching on the epi-fluorescence cube turret, the location of the fixing screws at the front is deep so it will be easier that you insert the hex driver (2 mm across flats) into the screw before placing the quadrocular tube or that you have a pen light when working.



Removing the tube tightening screw (Tube bottom view)



Connecting the quadrocular tube and DSC zooming port



Fixing the quadrocular tube and DSC zooming port set

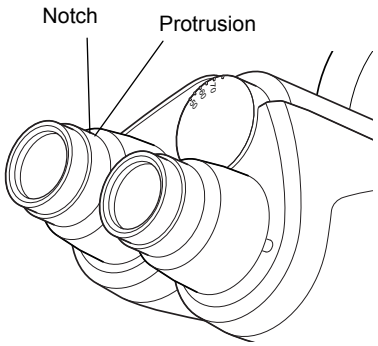
8 Attach the EPI motorized shutter (optional).

The motorized shutter is attached by Nikon.
Contact your nearest Nikon representative when the EPI motorized shutter needs to be attached or removed.

9 Attach eyepieces.

Make sure the notch on the eyepiece side and the protrusion of the eyepiece sleeve are aligned, then insert the eyepieces.

> **Notch on eyepiece**
>
> The eyepiece has a notch to prevent rotation. When attaching, match the notch with the protrusion on the eyepiece sleeve. The eyepiece lens will not be positioned properly if the notch is not matched with the protrusion.



Attaching eyepieces

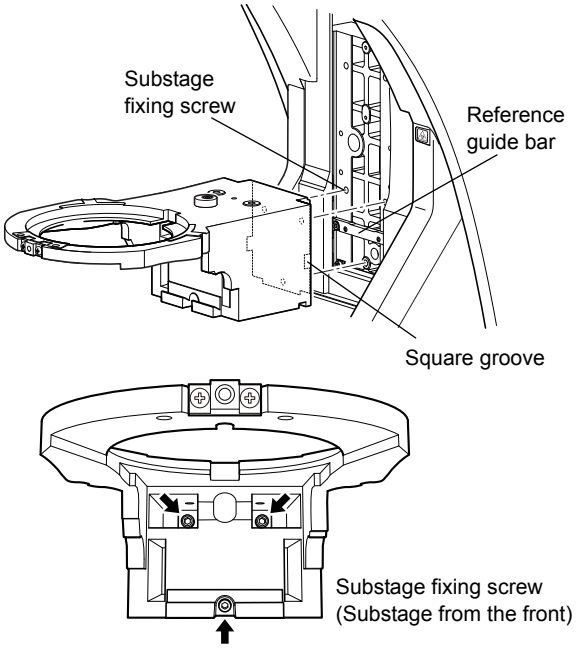
10 Attach the substage.

Attach NI-SS substage or NI-SSR substage for rotatable stage suitable for the type of the stage used. The procedure is the same for both models.

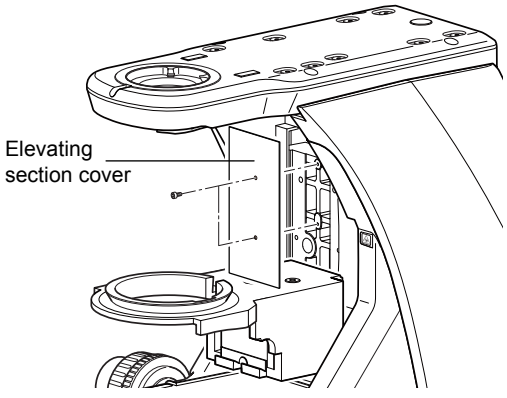
Tools: Hex driver (2 mm across flats)
Hex wrench (3 mm across flats)

(1) Place the square groove on the substage onto the reference guide bar on the elevating section of the main body. Move the substage to the left, press it against the reference surface of the elevating section, and tighten the drop-proof fixing screws (x3) with hex wrench (3 mm across flats).

(2) Put the provided elevating section cover onto a front of the elevating section and tighten the provided two screws with hex driver (2 mm across flats) to secure.



Attaching the substage



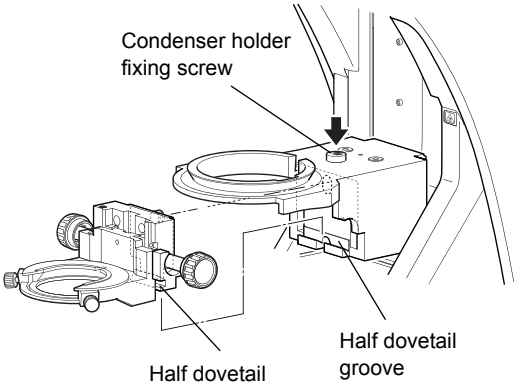
Attaching the elevating section cover

11 Attach the condenser holder.

Attach a condenser holder to the substage. (Remove or attach the condenser holder after detaching the stage.)

Tool: Hex wrench (3 mm across flats)

Hook the half dovetail of the condenser holder onto the half dovetail groove of the lower substage and push it against the reference surface. Then, tighten the fixing screw on the top of the substage.



Attaching the condenser holder

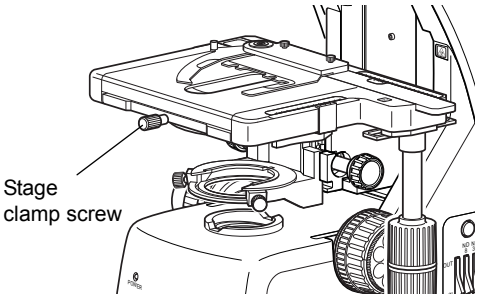
12 Attach the stage.

12.1 For standard stage

(1) Turn the coarse focus knob until the substage is brought to the lowermost position.

(2) Loosen the stage clamp screw on the front of the stage.

(3) Align the stage with the round dovetail of the substage and secure it in place with the stage clamp screw.



Securing the standard stage

12.2 For rotatable ceramic coated stage

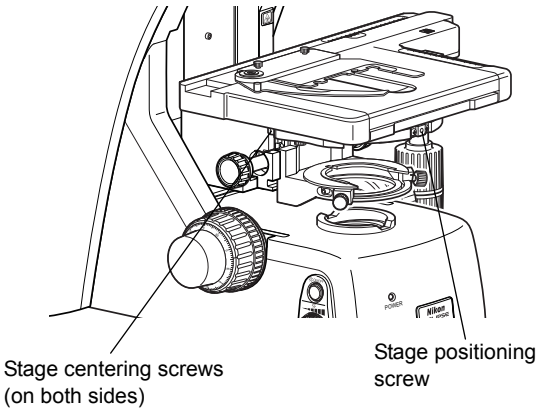
Tools: Hex driver (2 mm across flats)
Centering tool: Ball-point hex drivers provided with the product (x2)

(1) Sufficiently loosen the two right and left centering screws on the back of the substage and the stage positioning screw on the front of the stage using a hex driver.

(2) Attach by engaging the round dovetail at the bottom of the stage with the round dovetail of the substage.

(3) Center the stage and then tighten the stage positioning screw.
(See Chapter 3, “3 Bringing the Target into the Optical Path (Horizontal Stage Movement, Rotation) - ■Centering the rotatable ceramic coated stage” in the “Operation”)

> **When removing the stage**
> When removing the stage, loosen the stage centering screws (x2) and stage positioning screw.



Securing the rotatable ceramic coated stage

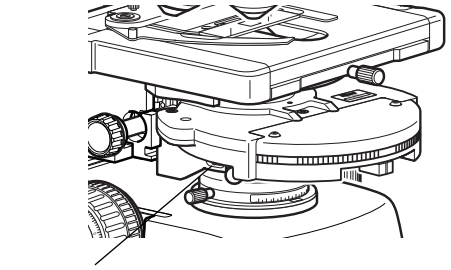
13 Attach the condenser.

Tool: Hex driver (2 mm across flats)

(1) Turn the coarse focus knob until the substage is brought to the upper limit.

(2) Turn the condenser focus knob until the condenser holder reaches the bottom.

(3) Fit the round dovetail of the condenser to the condenser holder so that the Nikon nameplate faces front and tighten the fixing screw of the condenser holder with a hex driver.



Securing the condenser

■ Attaching the optical module to the universal condenser

The turret has one empty hole and six optical module mounting holes. The empty hole is address 1 and the optical module cannot be attached here. The desired optical module can be mounted in the mounting holes of address 2 to 7.

Tool: Hex driver (2 mm across flats)

- **DIC module on the condenser (required for differential interference contrast microscopy)**

  There are DIC modules [D-C DIC N1 DRY], [D-C DIC N2 DRY], and [D-C DIC NR DRY]. Select the DIC module appropriate for the objective. (See following table.) If the combination is not correct, differential interference contrast image cannot be obtained or the contrast decreases significantly.

  To support for particular purposes, module for higher contrast or resolution are available. Note, however, that in principle the contrast contradicts the resolution of the differential interference contrast image (the higher the contrast, the lower the resolution).

- **PH module (required for phase contrast microscopy)**

  There are PH modules [D-C PH-1], [D-C PH-2], and [D-C PH-3]. Select the PH module with a matching PH code with the PH objective.

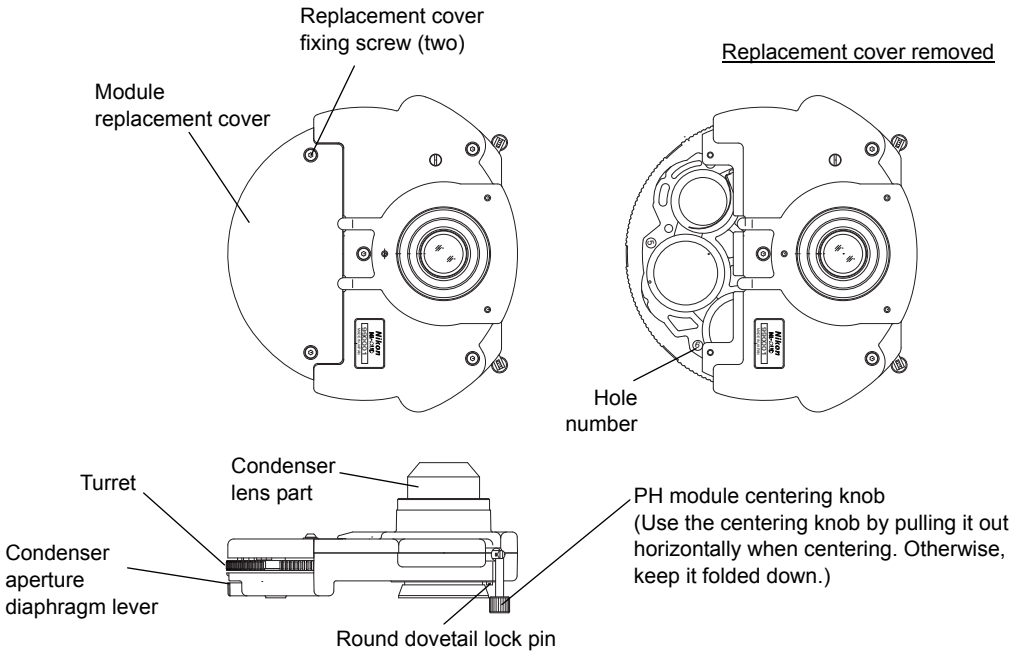
- **Dark field module (required for dark-field microscopy)**

  The dark field module [D-C DF] can be used with any objective with a numerical aperture (NA) of 0.7 or less. Note, however, that 2x and 4x objectives are not supported.

- **2-4x auxiliary lens (required for low magnification bright-field microscopy)**

  2x and 4x objectives can only be used for bright-field microscopy. In this case, select a 2-4x auxiliary lens. Two types of 2-4x auxiliary lens are available with different diameter and different condenser turret attachment address: 2-4x auxiliary lens [NI-CAL N1] and 2-4x auxiliary lens [D-C 2-4x].

NI-CUD Universal Condenser Structure



(1) Remove the cover.

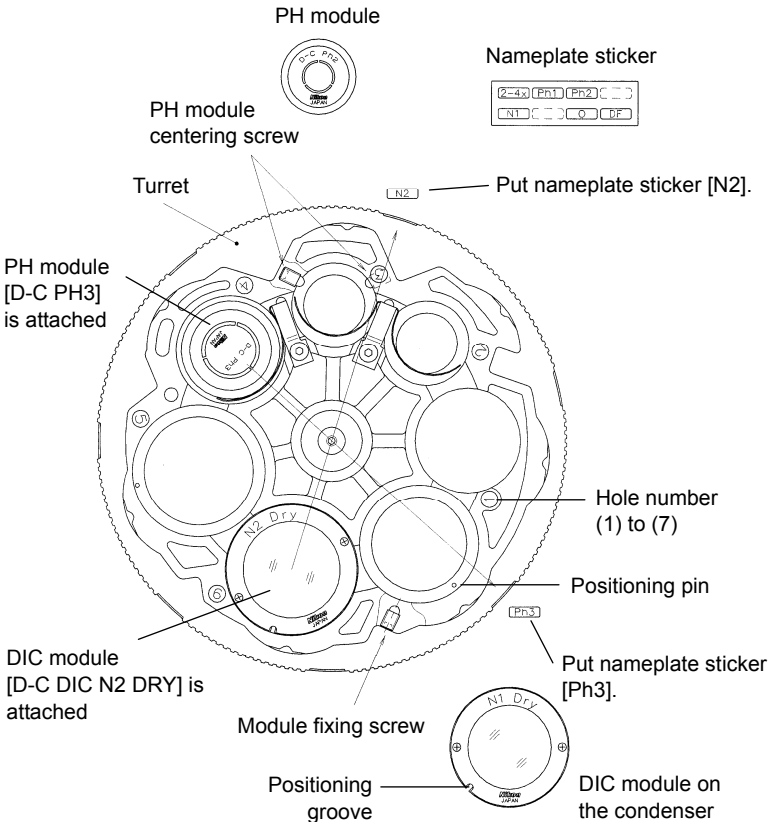
Remove two screws securing the module replacement cover using the provided hex driver and remove the cover.

(2) Attach the optical module.

A number is shown near the mounting hole. Attach the optical module in the specified hole. Turn the turret to bring the desired hole to an accessible position for attaching the optical module. Place the module with its name facing up.

Module positioning hole number

Hole number	Module
1	Empty: For bright-field microscopy (module not attachable)
2 or 3	PH module [D-C PH-1]
	PH module [D-C PH-2]
4	PH module [D-C PH-3]
5 or 6	DIC module [D-C DIC N2 DRY]
	DIC module [D-C DIC NR DRY]
	Dark field module [D-C DF]
	2-4x auxiliary lens [D-C 2-4x] (ϕ39)
7	DIC module [D-C DIC N1 DRY]
	2-4x auxiliary lens [NI-CALN1] (ϕ35)



[Procedure for attaching the DIC module on the condenser, dark-field module, and 2-4x auxiliary lens]

Holes (5), (6), and (7) have their positioning pin and module fixing screw.

- First check that the tip of the module fixing screw is not inside the hole. If it is inside, place that hole into the optical path, lift the Ph module centering knob at right rear of the condenser, and turn the centering screw to loosen the module fixing screw. After it is loose, pull out the knob and restore it to the original position.
- Determine the orientation of the module so that the positioning pin on the hole can be inserted into the groove on the opposite side of the surface with the module name and attach the module. As the grooves for the dark-field module and 2-4x auxiliary lens are wider compared to the pin, they do not need a strict orientation, unlike the DIC module on the condenser.
- Bring the attached hole into the optical path, turn the centering screw, and tighten the module fixing screw to secure. After it is tightened, pull out the knob and restore it to the original position.

[Attaching PH module]

Holes (2), (3), and (4) have a spring.

- First check that the tips of the two Ph module centering screws are not inside the hole. If it is inside, place that hole into the optical path, lift the Ph module centering knob at right and left rear of the condenser, and turn the centering screw to loosen the module fixing screw. After it is loose, pull out the knob and restore it to the original position.
- Place the module with its name facing up.
- Place it into the hole by pushing the spring away.

(3) Attach the nameplate sticker.

Affix a nameplate sticker for each module to the turret perimeter. Arrange stickers so that, when the condenser is attached to the microscope, the module name currently in the optical path is always indicated by the sticker at the front position. (i.e., stickers are put across from the corresponding module)

Put the sticker [O] for the empty hole.

Put the sticker [NR] provided with the DIC module when [NR] type of DIC module on the condenser has been attached. This sticker is not provided with the universal condenser.

Combination of DIC slider on the objective and DIC module on the condenser (when using the NI-CUD universal condenser)

Objective		Standard combination		Contrast-oriented		Resolution-oriented	
		DIC module on the condenser	DIC slider on the objective	DIC module on the condenser	DIC slider on the objective	DIC module on the condenser	DIC slider on the objective
10x	Plan Fluor 10X Plan Apo 10XA (DIC allowed for eco only) Plan Apo λ 10X S Fluor 10X Plan Fluor 10X W	N1 Dry	10x				
20x	Plan Fluor 20X Plan Fluor 20X MI Plan Apo 20X Plan Apo VC 20X Plan Apo λ 20X S Fluor 20X Fluor 20X W	N2 Dry	20x	N1 Dry	20X-C		
40x	Plan Fluor 40X Plan Apo 40X Plan Apo λ 40X S Fluor 40X Apo LWD 40X WI λS		40X I		40X I-C		
	Plan Fluor 40X Oil S Fluor 40X Oil Apo 40X WI λS		40X II				
	Fluor 40X W Apo 40X W NIR		40X III				
60x	Plan Apo VC 60X H Plan Apo 60X Plan Apo λ 60X Fluor 60X W Apo TIRF 60X Oil Apo 60xW NIR		60X I			NR Dry	60X I-R
	Plan Fluor 60X Oil Plan Fluor 60X A Plan Apo λ 60X Oil Apo 60X H λS		60X II				60X II-R
	Plan Apo VC 60XA WI (eco) Plan Apo IR 60X WI		60X IV				60X IV-R
100x	Plan Apo VC 100X H Plan Apo λ 100X Oil Apo TIRF 100X Oil Plan Apo 100X NCG Oil (eco)		100X□				100XI-R
	Plan Fluor 100X Oil Plan Fluor 100X Oil, iris		100X II				100X II-R
	Plan 100X W		100X III				

■ Attaching the DIC module to DIC condenser oil

D-CUO is provided with two sliders. Incorporate the oil condenser-specific DIC modules [D-C DIC N2 OIL] and [D-C DIC NR OIL] to each slider.

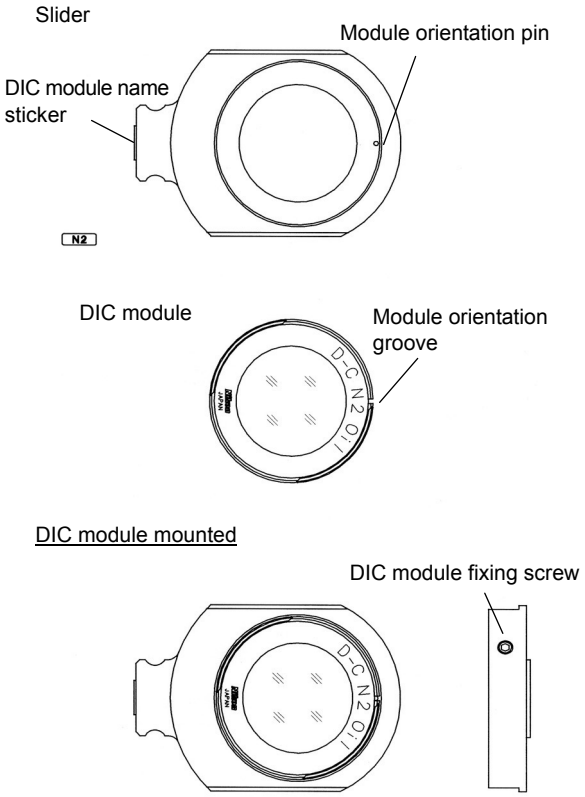
Select the DIC module appropriate for the objective. (See the next table.)

To support for particular purposes, module for higher contrast or resolution are available.
Note, however, that in principle the contrast contradicts the resolution of the differential interference contrast image (the higher the contrast, the lower the resolution).

(1) Attach the DIC module to the slider.

Identify the slider for the DIC module by the prism name sticker ([N2] and [NR]) affixed to the handle, and attach the DIC module to it.

Align the module orientation groove on the bottom of the DIC module with the slider's orientation pin and tighten the DIC module fixing screw on the slider.



Attaching the DIC module

(2) Insert the DIC module (slider) into the condenser.

For the differential interference contrast microscopy, insert the slider with the DIC module until it reaches the condenser main body.

Pull out the slider from the condenser when switching over to the bright-field microscopy.

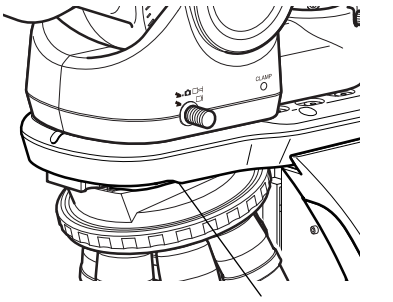
Combination of DIC slider on the objective and DIC module on the condenser (when using the D-CUO DIC condenser)

Objective		Standard combination		Resolution-oriented	
		DIC module on the condenser	DIC slider on the objective	DIC module on the condenser	DIC slider on the objective
10x	Plan Fluor 10X Plan Apo 10XA (allowed for eco only) Plan Apo λ 10X S Fluor 10X Plan Fluor 10X W				
20x	Plan Fluor 20X Plan Fluor 20X MI Plan Apo 20X Plan Apo VC 20X Plan Apo λ 20X S Fluor 20X Fluor 20X W	N2 Oil	20x		
40x	Plan Fluor 40X Plan Apo 40X Plan Apo λ 40X S Fluor 40X Apo LWD 40X WI λS		40X I		
	Plan Fluor 40X Oil S Fluor 40X Oil Apo 40X WI λS		40X II		
	Fluor 40X W Apo 40X W NIR		40X III		
60x	Plan Apo VC 60X H Plan Apo 60X Plan Apo λ 60X Fluor 60X W Apo TIRF 60X Oil Apo 60xW NIR		60X I	NR Oil	60X I-R
	Plan Fluor 60X Oil Plan Fluor 60X A Plan Apo λ 60X Oil Apo 60X H λS		60X II		60X II-R
	Plan Apo VC 60XA WI (eco) Plan Apo IR 60X WI		60X IV		60X IV-R
100x	Plan Apo VC 100X H Plan Apo λ 100X Oil Apo TIRF 100X Oil Plan Apo 100X NCG Oil (eco)		100XI		100XI-R
	Plan Fluor 100X Oil Plan Fluor 100X Oil, iris		100X II		100X II-R
	Plan 100X W		100X III		

14 Attach the nosepiece.

Tool: Hex driver (2 mm across flats)

Lift the nosepiece at a position slightly toward yourself than directly below the arm and attach while sliding it back. Continue sliding the nosepiece back until its front position is aligned with the front of the arm. Tighten the fixing screw on the right side of the arm.



Fixing the nosepiece

15 Attach the objective.

Screw the objective into the nosepiece. Screw straight and all the way in.

> **Objective handling precautions**
>
> When handling the objective, be careful not to touch the tip of the lens and contaminate it with fingerprints.

> **Objective attaching sequence**
>
> Attach the objective so that the magnification increases when the nosepiece is rotated clockwise when viewed from the top.

16 Attach the DIC rotation polarizer unit (required for differential interference contrast microscopy).

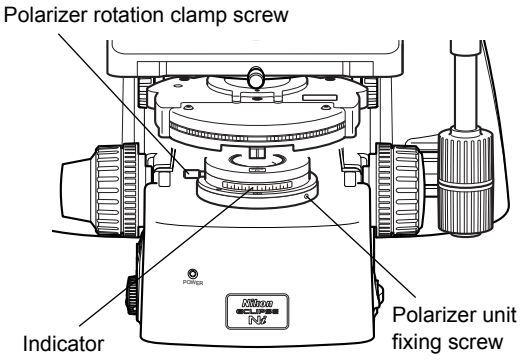
Tool: Hex driver (2 mm across flats)

(1) Loosen the polarizer rotation clamp screw, rotate the polarizer to align the indicator lines, and then clamp it.

(2) Put the rotatable polarizer unit over the field lens on the microscope base.

(3) Use the hex driver to tighten the polarizer unit fixing screw at the position where the indicator line faces the front.
Be sure to adjust the vibration direction before the microscopy.

(See Chapter 2, “4 Differential Interference Contrast Microscopy - 14 Adjust the orientation (vibration direction) of the polarizer and analyzer” in “Operation" instruction manual.)

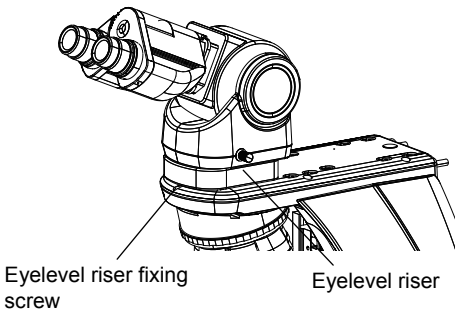


Fixing the polarizer

17 Attach the eyelevel riser (optional).

Tool: Hex driver (2 mm across flats)

Place the eyelevel riser on the arm, and tighten the fixing screws on the front of the arm using a hex driver (2 mm across flats).



Securing the eyelevel riser

18 Attach a camera and connect the DS camera control unit (optional).

18.1 When attaching to the DSC port for the ergonomic binocular tube

Tool: Hex driver (2 mm across flats)

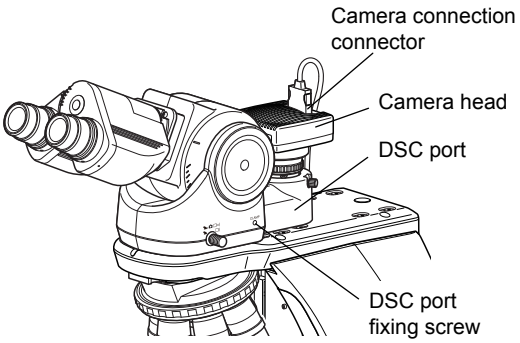
(1) Screw the camera head into the C mount on the DSC port.

(2) Remove the rear cover of the ergonomic tube and insert the DSC port.

(3) Secure the DSC port in place with the DSC port fixing screw using the tool provided with the microscope.

(4) Connect the camera connection connector for the camera head and the camera connector for the DS-L3/DS-U3 DS camera control unit using a provided camera cable.

(5) Connect the EXT.I/O connector for DS-L3/DS-U3 with the DSC connector for the microscope or the Ex-OUT connector for the connector box B using a camera trigger cable.
For DS-L3, a USB cable can also be used for connecting the USB (H) connector for DS-L3 and the USB connector for the connector box B.



Attaching a camera to the DSC port for the ergonomic binocular tube

Precautions for connecting the camera trigger cable

When connecting the camera trigger cable with the DSC connector, be sure to insert it completely.

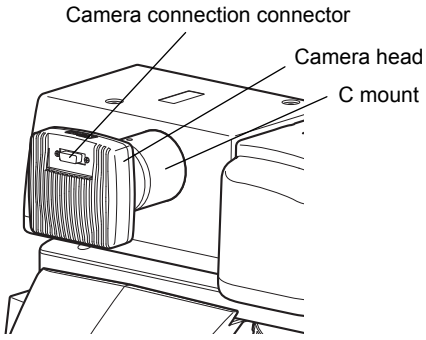
Prior to photomicrography, adjust the camera position as appropriate. (See Chapter 3 “18 Capturing Images - Photomicroscopy” in the “Operation”)

18.2 When attaching to the DSC zooming port for quadrocular tube

(1) Screw the camera head into the C mount on the DSC port.

(2) Connect the camera connection connector for the camera head and the camera connector for the DS-L3/DS-U3 DS camera control unit using a provided camera cable.

(3) Connect the EXT.I/O connector for DS-L3/U3 with the Ex-OUT connector for the microscope or the Ex-OUT connector for the connector box B using a camera trigger cable.
For DS-L3, a USB cable can also be used for connecting the USB (H) connector for DS-L3 and the USB connector for the connector box B.



Attaching a camera to the DSC zooming port for quadrocular tube

Precautions for connecting the camera trigger cable

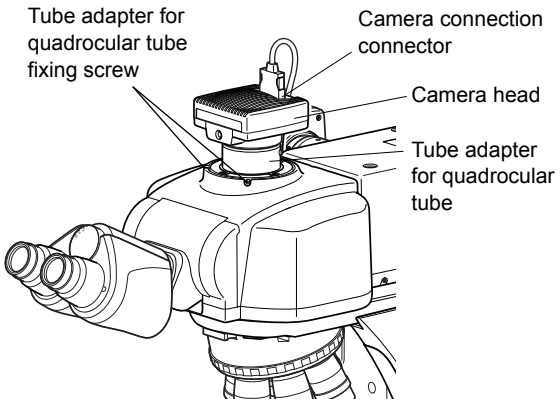
When connecting the camera trigger cable with the DSC connector, be sure to insert it completely.

Prior to photomicrography, adjust the camera position and adjust the focus on the monitor as appropriate. (See Chapter 3 “18 Capturing Images - Photomicroscopy” in the “Operation”)

18.3 When attaching to the quadrocular tilting tube

Tool: Hex driver (2 mm across flats)

Attach the tube adapter for quadrocular tube to the quadrocular tilting tube and tighten the two fixing screws. Attach a C mount camera, an ENG mount camera or a photomicrography device via each adapter to the trinocular tube adapter.



Attaching the tube adapter for quadrocular tube

18.4 When attaching a camera to the trinocular tube

Attach a C mount camera, an ENG mount camera or a photomicrography device via an adapter to the trinocular tube.

19 Replace the ND filter (optional).

Tool: Hex driver (2 mm across flats)

The ND filter in the ND filter cassette of the Ni-U main body can be replaced as follows:

(1) Check that the microscope power switch is OFF.

(2) Press all ND filter IN/OUT switches to the “IN” side.

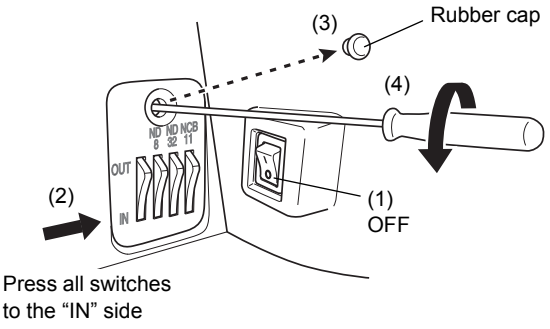
(3) Remove the rubber cap attached to the top of the filter cassette cover (it can be removed with your finger).

(4) Insert a hex driver in the hole with the rubber cap removed and loosen the internal screw. (The screw is drop-proof and not detached from the cover.)

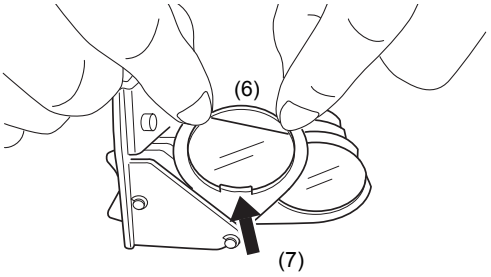
(5) Hold the ND filter IN/OUT switch and pull out the cassette.

(6) Hold the end of the filter holding frame and widen slightly to remove the filter.

(7) When attaching the filter, place the filter on the holding frame at the position indicated with the arrow and slide it in.



Removing the filter cassette



Replacing the filter

20 Connect the motorized device cable.

Precautions for connecting cables

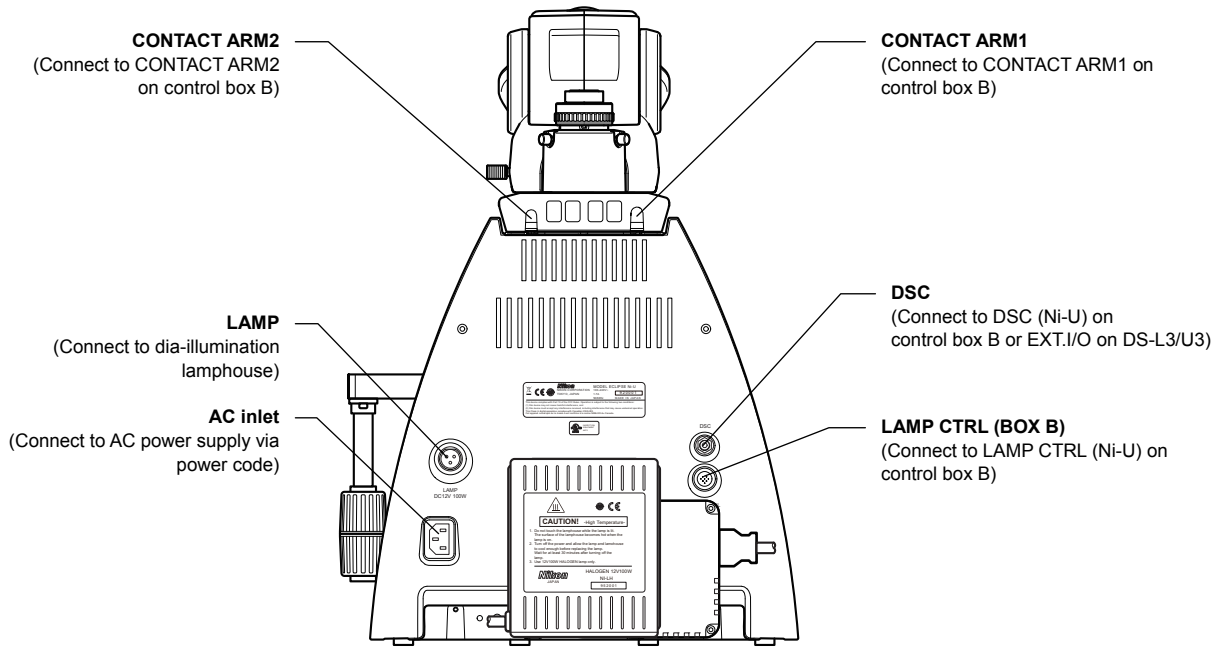
Make sure that the microscope and peripheral equipment are turned off before connecting the cable.

When the microscope is motorized, see the figure on next page and connect the cable correctly.

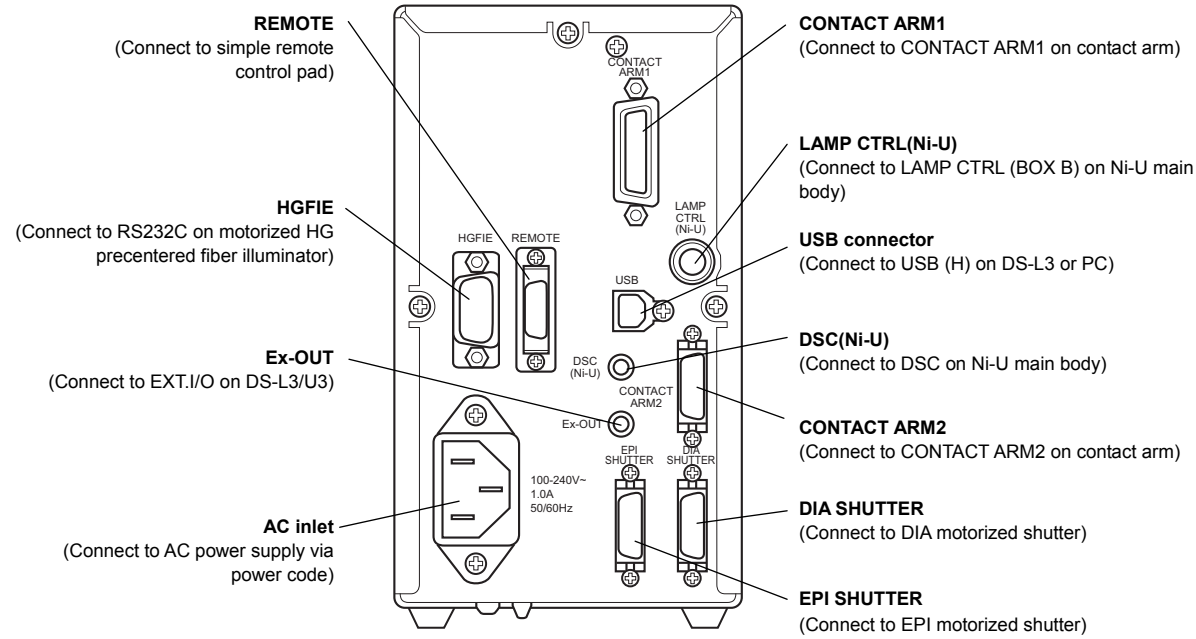
- To connect the LAMP CTRL (BOX B) on the microscope to the LAMP CTRL (Ni-U) on the control box B, the lamp control cable is required.
- To connect the DSC on the microscope to the DSC (Ni-U) on the control box B, the C-CTC camera trigger cable L3/U3 is required.
- To connect the USB (H) on the DS-L3 to the USB on the control box B, a USB cable is required.
- To connect the EXT.I/O on the DS-L3/U3 to the DSC on the microscope or the Ex-OUT on the control box B, the C-CTC camera trigger cable L3/U3 is required.
- To connect the motorized shutter to the EPI SHUTTER or DIA SHUTTER on the control box B, the NI-SHCL motorized shutter cable long is required.
- To connect the RS232C on the C-HGFIE motorized HG precentered fiber illuminator to the HGFIE on the control box B, an RS232C cross-wired cable is required (commercial, D-Sub9 pin female for both connectors).

Precautions for connecting the camera trigger cable

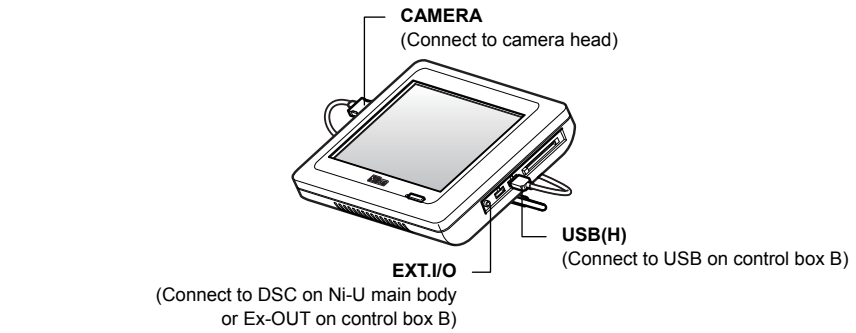
When connecting a camera trigger cable with the DSC connector, be sure to insert it completely.



Ni-U main body rear



Control box B rear



DS-L3 DS camera control unit

21 Connect the power cord.

(1) Make sure that the microscope is turned off (the power switch is pressed to “O” position).

(2) Plug the power cord into the AC inlet on the microscope main body.

(3) Plug the other end of each power cord into a wall outlet.

Connecting the power cord to the connected motorized device

Check that the power switch for control box B or DS camera control unit is turned off, plug the power cord into the AC inlet, and then plug the other end to the wall outlet.

Chapter

2

Troubleshooting

Misuse of this product may adversely affect performance, even if this product is properly functional. If any of the problems described in this chapter occurs, be sure to check the table for possible causes before requesting service.

If you detect problems that are not listed in the table or the problem still persists after measures are taken, turn off the device and contact your nearest Nikon representative.

1 Optical System and Operation

1.1 General

Problem	Cause	Measure
Dirty or dusty field of view when looking into eyepiece.	Dirt or dust rotates when the eyepiece is turned. ➡ The eyepiece is dirty.	Clean the eyepiece. (→See Chapter 3, “2.1 Cleaning Lenses” in the “Assembly/Maintenance”.)
	Dirt or dust does not rotate when eyepiece is turned ➡ (1) to (5)	
	(1) The specimen is dirty if dirt or dust moves when the specimen is moved on stage.	(1) Clean the specimen.
	(2) The tip of the condenser lens is dirty if dirt or dust goes in and out of view when the condenser is moved up and down while using a low magnification objective.	(2) Clean the condenser. (→See Chapter 3, “2.1 Cleaning Lenses” in the “Assembly/Maintenance”.)
	(3) The objective is dirty if dirt or dust disappears when the objective is switched.	(3) Clean the objective. (→See Chapter 3, “2.1 Cleaning Lenses” in the “Assembly/Maintenance”.)
	(4) The field diaphragm image is not focused on the specimen surface. (Condenser adjustment is incorrect)	(4) Make sure the condenser is focused and centered. (See Chapter 3, “5 Focusing and Centering the Condenser” in the “Operation”.)
	(5) An aperture diaphragm is stopped down too far.	(5) Open it to proper size. (→See Chapter 3, “6 Adjusting the Aperture Diaphragm” in the “Operation”.)
Dirt or dust appears on the monitor.	Dirt or dust on the monitor moves when the camera is turned ➡ Lens or specimen is dirty or dusty.	Check and clean it in accordance with the “Dirt or dust does not rotate when eyepiece is turned” of “Dirty or dusty field of view when looking into eyepiece”.
	Dirt or dust on the monitor does not move when the camera is turned ➡ The camera is dirty.	Remove the camera and clean it in accordance with the camera's instruction manual.
Image quality is poor. Contrast is poor. Resolution is poor.	No cover glass is attached.	Attach a cover glass of the specified thickness (0.17 mm). (However, no cover glass is required for an NCG objective.)
	The thickness of the cover glass is inadequate.	
	A high magnification objective appropriate for hemocytometer cover glass thickness (0.4 mm, 0.7 mm) is not used.	Use the high magnification objective (e.g. CFI LWD 40xC) appropriate for observation using thick cover glass.
	The objective correction ring does not match the thickness of the cover glass. (for the objective with a correction ring)	Correct the ring as appropriate.
	The lens and specimen are dirty or dusty.	Check and clean them in accordance with “Dirt or dust does not rotate when eyepiece is turned” of “Dirty or dusty field of view when looking into eyepiece”.

Problem	Cause	Measure
Image quality is poor. Contrast is poor. Resolution is poor.	An aperture diaphragm is stopped down too far. Otherwise, it is open too much.	Open it to the proper size. (→See Chapter 3, “6 Adjusting the Aperture Diaphragm” in the “Operation”.)
	The field diaphragm image is not focused on the specimen surface. (Condenser adjustment is incorrect)	Make sure the condenser is focused and centered. (See Chapter 3, “5 Focusing and Centering the Condenser” in the “Operation”.)
	No immersion oil is applied to the tip of an oil-immersion objective.	Apply our designated non-fluorescent immersion oil. (→See Chapter 3 “12 Oil Immersion/Water Immersion” in the “Operation”.)
	The designated immersion oil is not used.	
	The immersion oil contains air bubbles.	Remove the air bubbles. (→See Chapter 3 “12 Oil Immersion/Water Immersion” in the “Operation”.)
	The immersion oil adheres to the tip of the dry-type objective.	Clean it as appropriate. (→See Chapter 3 “12 Oil Immersion/Water Immersion” in the “Operation”.)
Field of view is too bright.	The ND filters are out of the optical path.	Place the ND filters into the optical path. (→See Chapter 3 “1.2 Adjustment with ND Filters” in the “Operation”.)
	The lamp voltage is too high.	Turn the brightness control knob to the mark position and adjust the brightness with the ND filters. (See Chapter 3, “1 Adjusting the Brightness of a Diascopic Image” in the “Operation”.)
Field of view is too dark.	The lamp voltage is too low.	Turn the brightness control knob to the mark position and adjust the brightness with the ND filters. (See Chapter 3, “1 Adjusting the Brightness of a Diascopic Image” in the “Operation”.)
	The condenser aperture diaphragm is stopped down too far.	This should normally be adjusted to 70 to 80% of numerical aperture of the objective. (→See Chapter 3, “6 Adjusting the Aperture Diaphragm” in the “Operation”.)
	The field diaphragm image is not focused on the specimen surface.	Make sure the condenser is focused and centered. (→See Chapter 3, “5 Focusing and Centering the Condenser” in the “Operation”.)
	The optical path is not switched to binocular 100%.	Set to binocular 100%. (→See Chapter 3, Section 10 “Switching the Optical Path of the Tube” in the “Operation”.)
Image is yellowish or very bluish.	The NCB11 filter is not used.	Use the NCB11 filter. (→See Chapter 3 “1.2 Adjustment with ND Filters” in the “Operation”.)
	Lamp voltage is too low or too high.	Turn the brightness control knob to the mark position and adjust the brightness with ND filters. (See Chapter 3, “1 Adjusting the Brightness of a Diascopic Image” in the “Operation”.)
Visually observed image color does not match color of image on monitor.	White balance of the camera is not set correctly.	Set the white balance in accordance with the camera's instruction manual.
The entire field of view is bluish or yellowish.	A filter cube is in the optical path even though epi-fluorescence observation is not being performed.	Remove the filter cube from the optical path.

Problem	Cause	Measure
Lack of visibility around periphery of field of view. Illumination is uneven across the field of view. Field of view is not visible.	Parts are attached incorrectly.	Confirm that parts (nosepiece, condenser, etc.) are correctly attached. (→See Chapter 1, “3 Assembly Method” in the “Assembly/Maintenance”.)
	Movable part of manually operated unit is not switched correctly.	Correctly set the optical path switching knob, nosepiece, filter cube switchover turret, condenser turret, and slider, etc. (Move the part until it clicks.)
	Field diaphragm image is not focused on the specimen surface.	Make sure the condenser is focused and centered. (See Chapter 3, “5 Focusing and Centering the Condenser” in the “Operation”.)
	Field diaphragm is stopped down too far.	Open the field diaphragm slightly wider than the field of view. (→See Chapter 3, “8 Adjusting the Field Diaphragm” in the “Operation”.)
Lack of visibility around periphery of field of view. Illumination is uneven across the field of view. Field of view is not visible.	Incorrect combination of the objective with the condenser.	Adopt an appropriate combination. (→See Chapter 3, “7.1 Compatibility of Condenser Type and Objective Magnification” in the “Operation”.)
	When using objectives with 4x or less, 2-4x auxiliary lens of universal condenser is not in the optical path or condenser switching such as swing-out or sliding operation is not performed.	Bring 2-4x auxiliary lens of universal condenser in optical path. For other condensers, swing-out or slide the condenser.
	The lamp is attached incorrectly.	Attach it correctly. (→See Chapter 1, “3 Assembly Method, 3 Attach the lamp” in the “Assembly/Maintenance”.)
	The lens and specimen are dirty or dusty.	Clean them as appropriate. (→See Chapter 3, “2.1 Cleaning Lenses” in the “Assembly/Maintenance”.)
Out of focus with an objective of high magnification.	The specimen is upside down.	Turn up the cover glass and attach it to the stage. (→See Chapter 2 “2 Bright/Dark-field Microscopy - 7 Place a specimen on the stage, and move the stage to bring the target into view” in the “Operation”.)
	The thickness of the cover glass is inadequate.	Attach a cover glass of the specified thickness (0.17 mm).
	Fail-safe device for specimen damage protection of the objective is pushed in.	Some objective has a stopper to keep the pushed in state. Turn the tip of the object to release. If the objective does not have a stopper, do not pull because the tip cannot be turned. In this case, contact your nearest Nikon representative.
A focal deviation is high when switching over objectives.	Objective lens is attached incorrectly.	Screw the objective all the way in. (→See Chapter 1, “3 Assembly Method - 15 Attach the objective” in the “Assembly/Maintenance”.)
	Diopter adjustment has not been performed.	Perform diopter adjustment. (→See Chapter 3 “4 Adjusting the Diopter” in the “Operation”.)
Image is not in focus although the stage is raised to the highest position.	The stage is attached incorrectly.	Attach it correctly. (→See Chapter 1, “3 Assembly Method - 12 Attach the stage” in the “Assembly/Maintenance”.)
	The refocusing position is set lower than the focusing position.	Loosen the coarse focus clamp ring to the limit which clamps the refocusing mechanism. (→See Chapter 3 “2.3 Refocusing” in the “Operation”.)

Problem	Cause	Measure
One side of the field of view (up, down, right, or left) is not focused. The image flows (i.e. becomes asymmetrically defocused when moving the focal point)	The nosepiece is not attached correctly, or has not been fully rotated to the click stop position.	Attach it correctly and rotate it to the click stop position. (→See Chapter 1, “3 Assembly Method, 14 Attach the nosepiece” in the “Assembly/Maintenance”.)
	The specimen is tilted relative to the stage surface.	Position the specimen in place on the stage. (→See Chapter 2 “2 Bright/Dark-field Microscopy - 7 Place a specimen on the stage, and move the stage to bring the target into view” in the “Operation”.)
	The stage is tilted.	Attach the stage correctly. (→See Chapter 1, “3 Assembly Method - 12 Attach the stage” in the “Assembly/Maintenance”.)
	The substage is tilted.	Attach the substage correctly. (→See Chapter 1, “3 Assembly Method, 10 Attach the substage” in the “Assembly/Maintenance”.)
	The condenser is tilted.	Attach the condenser securely. (→See Chapter 1, “3 Assembly Method, 13 Attach the condenser” in the “Assembly/Maintenance”.)
Images in right and left eyepieces are not coincident.	Interpupillary adjustment has not been performed.	Perform interpupillary adjustment. (→See Chapter 2 “2 Bright/Dark-field Microscopy - 10 Adjust the interpupillary distance” in the “Operation”.)
	Diopter adjustment has not been performed.	Perform diopter adjustment. (→See Chapter 3 “4 Adjusting the Diopter” in the “Operation”.)
Eyes become fatigued.	Diopter adjustment has not been performed.	Perform diopter adjustment. (→See Chapter 3 “4 Adjusting the Diopter” in the “Operation”.)
	Brightness is inadequate.	Adjust the brightness using the brightness control knob or ND filters to attain a suitable brightness. (See Chapter 3, “1 Adjusting the Brightness of a Diascopic Image” in the “Operation”.)
The specimen does not move smoothly.	The specimen holder is not securely-fixed to the stage.	Fix the holder securely. (→See Chapter 2 “2 Bright/Dark-field Microscopy - 7 Place a specimen on the stage, and move the stage to bring the target into view” in the “Operation”.)
	Rotating torque of the stage knob is set too heavy.	Adjust to the appropriate torque weight. (→See Chapter 3 “3 Bringing the Target into the Optical Path - Adjusting the knob rotation torque” in the “Operation”.)
Difficult to focus.	Rotating torque of the coarse focus knob is set too heavy.	Adjust to the appropriate torque weight. (→See Chapter 3 “2.2 Focus Knobs on the Main Body - Adjusting the rotating torque of the coarse focus knob” in the “Operation”.)
The optical path does not switch when the quadrocular tilting tube is used.	The quadrocular tilting tube is fastened.	Unfasten it. (Remove the tightening screw for the quadrocular tilting tube.) (→See Chapter 1 “3 Assembly Method - 7 Attach the quadrocular tilting tube and DSC zooming port for quadrocular tube” in the “Assembly/Maintenance”.)

1.2 Epi-fluorescence Microscopy

Problem	Cause	Measure
Lack of visibility around periphery of field of view. Illumination is uneven across the field of view. Field of view is not visible.	The filter cube is misaligned.	Push the cube in to the limit. (→See Chapter 1 “3 Assembly Method, 6 Attach the epi-fluorescence cube turret and epi-fluorescence attachment - ■ Attaching a filter cube” in the “Assembly/Maintenance”.)
A fluorescent image is not visible (when the lamp is ON).	The shutter is closed.	Open the shutter. (→See Chapter 3 “14.3 Protecting the Sample and Preventing It from Decoloration (Using the Shutter)” in the “Operation”.)
	The selection of the filter cube is incorrect.	Use a correct filter cube. (→See Chapter 3 “14.2 Selecting Filters” in the “Operation”.)
The fluorescent image is very dark (when the lamp is ON).	The ND filters of the epi-fluorescence attachment are in the optical path.	Remove the ND filters from the optical path as necessary. (→See Chapter 3 "14.4 Adjusting the Brightness of the Fluorescent Image (Using ND Filters and the Aperture Diaphragm)” in the “Operation”.)
	A halogen light source is used for a dark specimen.	Change the light source to a mercury lamp.
	A designated objective is not used at UV or V excitation.	Use a designated objective.
	The room is bright.	Make it darker.
The fluorescent image quality is poor.	The dia-illumination lamp is on.	Turn off the dia-illumination lamp.
	The filter cube being used is not suitable for the specimen.	Use a filter cube suitable for the specimen. (→See Chapter 3 “14.2 Selecting Filters” in the “Operation”.)
	The objective or cover glass is dirty.	Clean it as appropriate. (→See Chapter 3, “2.1 Cleaning Lenses” in the “Assembly/Maintenance”.)
The contrast of the fluorescent image is poor.	The immersion oil is fluorescent.	Use the non-fluorescent immersion oil. (→See Chapter 3 “14.7 Other Considerations Concerning Epi-Fluorescence Microscopy” in the “Operation”.)
	The slide glass is fluorescent.	Use a non-fluorescent slide glass. (→See Chapter 3 “14.7 Other Considerations Concerning Epi-Fluorescence Microscopy” in the “Operation”.)
	Stray light is entering from the condenser.	Lower the condenser, or remove the condenser and attach a shielding tube.

1.3 Differential Interference Contrast Microscopy

Problem	Cause	Measure
Lack of visibility around periphery of field of view.	The universal condenser's turret is at the intermediate position.	Rotate it to the click stop position. (→See Chapter 3 “7.2 Using the NI-CUD Universal Condenser (Dry)” in the “Operation”.)
	The DIC slider is at the intermediate position for an oil condenser.	Push in the slider until it reaches the limit. (→See Chapter 3 “7.3 Using the D-CUO DIC Condenser (Oil)” in the “Operation”.)
	The DIC module on the objective is at the intermediate position.	Attach it correctly. (→See Chapter 3 “15.2 Using Optical Elements” in the “Operation”.)
	Incomplete attachment of nosepiece.	Attach it correctly. (→See Chapter 1, “3 Assembly Method, 14 Attach the nosepiece” in the “Assembly/Maintenance”.)
	The polarizer and an analyzer are at the intermediate position.	Switch over correctly. (→See Chapter 3 “15.2 Using Optical Elements” in the “Operation”.)
	The lambda plate is at the intermediate position.	Make sure that it is attached to the limit. (→See Chapter 3 “15.2 Using Optical Elements” in the “Operation”.)
No contrast.	The polarizer is out of the optical path.	Bring the polarizer into the optical path. (→See Chapter 2 “4 Differential Interference Contrast Microscopy - 14 Adjust the orientation (vibration direction) of the polarizer and analyzer” in the “Operation”.)
	The analyzer is out of the optical path.	Bring the analyzer into the optical path. (→See Chapter 2 “4 Differential Interference Contrast Microscopy - 14 Adjust the orientation (vibration direction) of the polarizer and analyzer” in the “Operation”.)
	A correct DIC module on the condenser has not been selected.	Select the DIC module suitable for the objective used. (→See Chapter 1 “3 Assembly Method - 13 Attach the condenser, ■ Attaching the optical module to the universal condenser”, and “■Attaching the DIC module to DIC condenser oil” in the “Assembly/Maintenance”.)
	The DIC slider on the objective is out of the optical path.	Bring the DIC slider on the objective into the optical path. (→See Chapter 2 “4 Differential Interference Contrast Microscopy - 16 Attach the DIC slider (on the objective) to the nosepiece” in the “Operation”.)
	Incorrect combination of the objective and the DIC slider on the objective.	Use the DIC slider suitable for the objective. (→See Chapter 1 “3 Assembly Method - 13 Attach the condenser, ■ Attaching the optical module to the universal condenser”, and “■Attaching the DIC module to DIC condenser oil” in the “Assembly/Maintenance”.)
	The immersion oil is not sufficient in the oil condenser, and air bubbles are between the slide and the condenser.	Apply the immersion oil again. (→See Chapter 3 “12 Oil Immersion/Water Immersion” in the “Operation”.)

Problem	Cause	Measure
Poor contrast.	The orientation of the polarizer is incorrect.	Adjust the orientation of the optical system correctly. (→See Chapter 2 “4 Differential Interference Contrast Microscopy - 14 Adjust the orientation (vibration direction) of the polarizer and analyzer” in the “Operation”.)
	A correct DIC module on the condenser has not been selected.	Select the DIC module suitable for the objective used. (→See Chapter 1 “3 Assembly Method - 13 Attach the condenser, ■ Attaching the optical module to the universal condenser”, and “■Attaching the DIC module to DIC condenser oil” in the “Assembly/Maintenance”.)
	Incorrect combination of the objective and the DIC slider on the objective.	Use the DIC slider suitable for the objective. (→See Chapter 1 “3 Assembly Method - 13 Attach the condenser, ■ Attaching the optical module to the universal condenser”, and “■Attaching the DIC module to DIC condenser oil” in the “Assembly/Maintenance”.)
	Dusty objective, condenser, and specimen.	Gently wipe dust off. (Special attention should be paid to dust.) (→See Chapter 3, “2.1 Cleaning Lenses” in the “Assembly/Maintenance”.)
	The field diaphragm image is not focused on the specimen surface.	Make sure the condenser is focused and centered. (→See Chapter 3 “5 Focusing and Centering the Condenser” in the “Operation”.)
	The immersion oil is not sufficient in the oil condenser, and air bubbles are between the slide and the condenser.	Apply the immersion oil again. (→See Chapter 3 “12 Oil Immersion/Water Immersion” in the “Operation”.)

1.4 Phase Contrast Microscopy

Problem	Cause	Measure
Poor contrast.	The PH module of the condenser does not match the phase plate image of the objective.	Adjust so that they match. (→See Chapter 2 “5 Phase Contrast Microscopy - 14 Center the PH module” in the “Operation”)
	The PH module of the condenser does not match the Ph code of the objective.	Put the PH module with the same Ph code as the objective into the optical path. (→See Chapter 2 “5 Phase Contrast Microscopy - 16 Adjust the PH module in the condenser with the Ph objective to be used” in the “Operation”.)
	The phase contrast of the specimen is too large.	Change the mounting agent or thickness of the specimen when preparing the specimen. (→See Chapter 3 “16.1 Tips for Phase Contrast Microscopy” in the “Operation”.)
	The type of the Ph objective is not suitable for phase contrast of the specimen.	Use a Ph objective suitable for the specimen. (→See Chapter 3 “16.1 Tips for Phase Contrast Microscopy” in the “Operation”.)

2 Electrical Requirements

2.1 General

■ Power

Problem	Cause	Measure
There is no power even though the power switch is on.	The power cord is not connected, or is connected improperly.	Connect the cable properly. (→See Chapter 1, “3 Assembly Method, 20 Connect the motorized device cable” in the “Assembly/Maintenance”.)
A motorized accessory does not operate.	A contact arm is not used.	Use a contact arm. (→See Chapter 1, “3 Assembly Method, 5 Attach the standard arm/contact arm” in the “Assembly/Maintenance”.)
	The motorized unit connected to the contact arm is attached incorrectly.	Attach the motorized unit correctly. (→See Chapter 1, “3 Assembly Method” in the “Assembly/Maintenance”.)
	The motorized unit connected to contact arm is not in correct combination.	Attach the motorized unit in the correct combination. (→See Chapter 1, “3 Assembly Method - Introduction” in the “Assembly/Maintenance”.)
Contact arm LED is blinking.	The motorized unit connected to contact arm is not in correct combination.	Attach the motorized unit in the correct combination. (→See Chapter 1, “3 Assembly Method - Introduction” in the “Assembly/Maintenance”.)

■ Illumination

Lamp does not light.	There is no power supplied.	Plug in the power cord. (→See Chapter 1, “3 Assembly Method, 21 Connect the power cord” in the “Assembly/Maintenance”.)
	The lamp has burned out.	Replace the lamp with the specified type. (→See Chapter 3, “1 Replacing the Lamp” in the “Assembly/Maintenance”.)
	The lamp is not attached.	Attach a designated lamp. (→See Chapter 1, “3 Assembly Method, 3 Attach the lamp” in the “Assembly/Maintenance”.)

■ Controls on the main body/controller

Problem	Cause	Measure
Brightness cannot be adjusted with the dia-illumination brightness control knob.	Operation is disabled.	Change the setting. (→See Chapter 3 “1.1 Adjustment by Lamp Voltage” - ✔ Turning lamp ON, brightness adjustment control” in the “Operation”.)
The simple remote control pad does not work to move the motorized unit.	A contact arm is not used.	Use a contact arm. (→See Chapter 1, “3 Assembly Method - 5 Attach the standard arm/contact arm” in the “Assembly/Maintenance”.)
	Cables for the contact arm, control box, and the simple remote control pad are not connected properly.	Connect the cable properly. (→See Chapter 1, “3 Assembly Method - 20 Connect the motorized device cable” in the “Assembly/Maintenance”.)

■ Motorized nosepiece

Problem	Cause	Measure
Motorized nosepiece does not move at all.	The motorized nosepiece is attached incorrectly.	Attach it correctly. (→See Chapter 1, “3 Assembly Method, 14 Attach the nosepiece” in the “Assembly/Maintenance”.)
Objectives cannot be switched smoothly.	Objectives are mounted on rather one side of the nosepiece.	Attach objective evenly.
	The rotation stop function from address 1 to 6 (7) is set.	Turn off rotation stop. (→See Chapter 3 “19 Operations on DS-L3” - “19.1 Setting Up the Microscope - (4) Configuring the settings related to the movement” in the “Operation”.)
The motorized nosepiece skips addresses.	The toggle function is ON.	Turn the toggle function OFF. (→See Chapter 3 “19 Operations on DS-L3” - “19.1 Setting Up the Microscope - (4) Configuring the settings related to the movement” in the “Operation”.)

2.2 Epi-fluorescence Microscopy

Problem	Cause	Measure
The mercury lamp does not work.	There is no power supplied.	Plug in the power cord. (→Check your illuminator's manual.)
	The lamp has burned out.	Replace the lamp with the specified type. (→Check your illuminator's manual.)
	The mercury lamp is not attached.	Attach a designated lamp. (→Check your illuminator's manual.)
	The mercury lamp's connector is not connected to the illuminator.	Connect it to the power supply. (→Check your illuminator's manual.)
The mercury lamp burns out soon after it is turned on.	The lamp type is incorrect. The lamp is at end of its life.	Replace the lamp with the specified type. (→Check your illuminator's manual.)

■ Motorized epi-fluorescence cube turret

Problem	Cause	Measure
The filter cube does not switch.	The motorized epi-fluorescence cube turret is attached incorrectly.	Attach it correctly. (→See Chapter 1 “3 Assembly Method, 6 Attach the epi-fluorescence cube turret and epi-fluorescence attachment - ■ Attaching a filter cube” in the “Assembly/Maintenance”.)
	In layered configuration, motorized or intelligent epi-fluorescence cube turret is connected to the 2nd layer.	Replace the motorized or intelligent epi-fluorescence cube turret in the 2nd layer with the manual epi-fluorescence cube turret.
The shutter does not move.	The motorized epi-fluorescence cube turret is attached incorrectly.	Attach it correctly. (→See Chapter 1 “3 Assembly Method, 6 Attach the epi-fluorescence cube turret and epi-fluorescence attachment - ■ Attaching a filter cube” in the “Assembly/Maintenance”.)
Cannot configure to “OPEN”.	Configuration “OPEN” is exclusive to epi-fluorescence cube turret address 1. Other addresses cannot be configured to “OPEN”.	Use it as it is.

Chapter

3

Maintenance and Storage

This chapter describes how to replace the halogen lamp and how to clean and store the product.

1 Replacing the Lamp

⚠ CAUTION

- Beware of burns: Wait until the lamp and nearby parts have cooled (approximately 30 minutes) before replacing the lamp.
- Beware of electrical shock: Turn off the power switch and unplug the power cord from the wall outlet.
- Beware of abnormal heat generation: Use only the designated lamp.
- Beware of soiling: Avoid touching the glass surface of the lamp with bare hands. Soiling may reduce the service life of the lamp.
- Lamphouse cover: Make sure the lamphouse cover is securely fitted to the lamphouse after lamp replacement.
- Used lamps: Do not break used lamps. It should be disposed of as industrial waste, according to local regulations and rules.

Tool: Hex wrench (3 mm across flats)

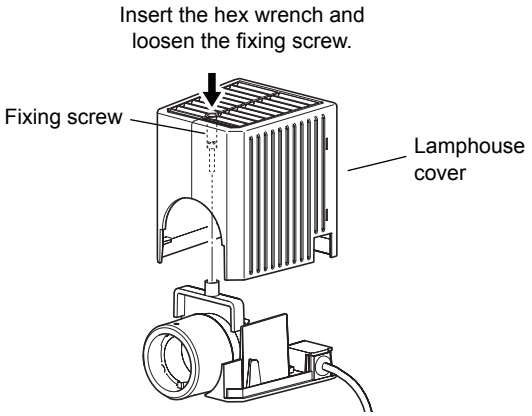
(1) Loosen the lamphouse cover fixing screw and lift up the cover to remove.

(2) Hold down the lamp clamp lever and remove the old lamp.

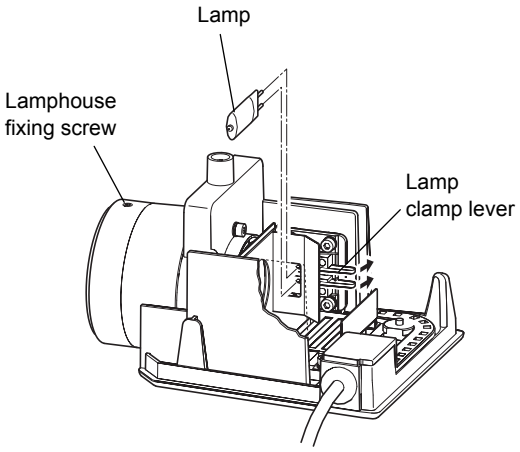
(3) Attach a new lamp. Avoid touching the glass surface of the lamp with your bare hands. Attach the new lamp while holding down the lamp clamp lever. Put the lamp clamp lever back to its original position.

Designated lamp: PHILIPS7724 or OSRAM HLX64623

(4) Reattach the cover back to its original position and tighten the lamphouse cover fixing screw.



Removing the lamphouse cover



Attaching the lamp

2 Cleaning

Clean and decontaminate the microscope and lenses in accordance with the following procedure.

■ **Tools used for cleaning**

- Blower
- Soft brush
- Soft cotton cloth, lens tissue, gauze, etc.
- Absolute alcohol (ethyl or methyl alcohol), medical alcohol
- Petroleum benzene (use only for cleaning immersion oil)

⚠ CAUTION

- Petroleum benzine and absolute alcohol used for cleaning are highly flammable. Be careful when handling these materials, particularly around open flames or when turning the power switch on or off.
- Follow the instructions provided by the manufacturer when using petroleum benzine or absolute alcohol.
- When cleaning the product, do not use organic solvents (alcohol, ether, thinner, etc.) for coated, plastic, or printed areas. It will result in discoloration or peeling of printed characters.
- Petroleum benzine should be used only to wipe off immersion oil from the objective, and never to clean the entrance lens at the bottom of the eyepiece tube, prism surface of the eyepiece tube, or the filters.

2.1 Cleaning Lenses

Keep the lens free of dust and fingerprints. If there is contamination on the lenses or filters, image quality decreases.

If any of the lenses become dirty, clean them by following the procedure given below.

■ **Cleaning light dirt (dust)**

(1) Blow dust off using an air blower.

(2) If this is insufficient, brush away dust with a soft brush or wipe away gently with a piece of gauze.

■ **Cleaning tough dirt (fingerprint or grease)**

Moisten lightly a piece of soft, clean cotton cloth, lens tissue, or gauze with absolute alcohol (ethyl or methyl alcohol) and wipe the dirt off.

Tips on wiping

Do not reuse cotton cloth, lens tissue, or gauze that have already been used.

2.2 Cleaning Parts Other than the Lens

■ **Cleaning light dirt (dust)**

Wipe with a silicon cloth.

■ **Cleaning tough dirt (fingerprint or grease)**

Dampen a piece of gauze a little with neutral detergent and wipe the dirt gently.

2.3 Cleaning Immersion Oil

(1) Wipe with petroleum benzine.

(2) Finish off the cleaning with absolute alcohol (ethyl or methyl alcohol) after cleaning with petroleum benzene.

If petroleum benzene is not available

If petroleum benzene is unavailable, use methyl alcohol alone. However, typically wipe three or four times because the detergency is weak.

2.4 Decontaminating the Product

For routine disinfection of this product, Nikon recommends using 70% medical alcohol.

Use of organic solvents on plastic parts may result in discoloration.

Cautions on disposal

If contact occurs between a sample and this product, determine whether the sample is hazardous. If the sample is hazardous, follow the standard procedures for your facility.

3 Transportation

Before transporting the following devices, be sure to fasten the devices.

- Manual quadrocular tilting tube

  Attach the tightening screw removed from the bottom of the tube in Chapter 1 “3 Assembly Method - 7 Attach the quadrocular tilting tube and DSC zooming port for quadrocular tube.” Set the optical path switching dial to the [F] position in advance.

- Manual DSC zooming port

  Set the zoom dial to 0.6x. (no tightening screw)

4 Storage

- Store this product in a dry location where mold is unlikely to form.
  Storage conditions are as follows: temperature (-20°C to +60°C), humidity (90% RH max., no condensation)
- Store the objectives and eyepieces in a desiccator or similar container with a drying agent.
- Place a cover over this product to protect it from dust.
- Switch off the microscope (press the power switch to the “O” position) and wait for the lamphouse to cool before covering this product with a cover.

5 Regular Inspections (Charged)

To maintain the performance of this product, Nikon recommends periodic inspections (chargeable service). Contact your nearest Nikon representative for details.

Chapter

4

Specifications

1 Microscopy (Principles)

Use objectives and eyepieces of the microscope to magnify minute cells and tissue optically, and manipulate levers and knobs of the microscope unit to adjust the focus or move the observation point. Then observe or take photographs of the sample fixed on the slide.

■ Intended use of this product (for medical care)

This microscope is intended for use in microscopic examination, diagnostics, observation and experiment of cells and tissues at hospitals or other facilities or by doctors in private practice in the field of pathology, anatomy, and cytology.

The microscopy with diascopic/reflected illuminations is used to observe a sample fixed on the slide (cells and tissue) as the specimen.

The product is classified as an in-vitro diagnostic medical device.

This product is not intended for use for measurement. The scale on the focus knob and stage is an indicator to reproduce the position and does not guarantee the value of the thickness or length of a sample measured using this scale.

■ Intended user

It is intended for the researchers, medical professional and those who work on experiments in the field of pathology and cytology.

2 Performance Properties

■ Nikon Microscope ECLIPSE Ni-U

Model		ECLIPSE Ni-U
Main body		
	Optical system	Infinity-corrected CF optical system Objective CFI60 Eyepiece: Field number 22 (when using ergonomic tube or binocular tube), Field number 25 (when using trinocular tube T/F or quadrocular tilting tube) **Field number when used in two layers.** When two epi-fluorescence cube turrets are used by layering, field number is 22.
	Focusing unit	Vertical movement: Manual one-axis coarse/fine adjustment knob motion (calibration markings for fine motion: 1 µm per scale) Stroke: 3 mm upward, 26 mm downward (focal position as a reference) Coarse focus knob: Approx. 7.8 mm/rotation, Fine focus knob: Approx. 0.1 mm/rotation With refocusing mechanism
	Dia-illumination system	Fly-eye illumination, 12V 100W illumination power supply integrated (100-240V), with photomicrography voltage function Light source: 12V100W long-life halogen lamp (Designated lamphouse: NI-LH precentered lamphouse) (Designated lamp: PHILIPS 7724 or OSRAM HLX64623) ND filter cassette (4 holders integrated, NCB11, ND8, ND32 and empty, Filter removable/replaceable), Diffuser integrated (non-removable)

Tube	Binocular tube (binocular section 100%) Trinocular tube F (Binocular : adapter = 100:0, 0:100) Trinocular tube T (Binocular : adapter = 100:0, 20:80, 0:100) Ergonomic tube (Binocular section 100%) (with DSC port mounted, binocular : DSC port = 50:50) Quadrocular tilting tube (Binocular : adapter = 100:0, 0:100) (with DSC port mounted, binocular : adapter : DSC port = 0:0:100)
Arm	Standard arm Contact arm: Required for motorized operation
Nosepiece	Universal quintuple, BD quintuple, sextuple, sextuple with analyzer slot, DIC sextuple, intelligent DIC sextuple, septuple intelligent, motorized DIC sextuple, and motorized septuple
Substage	Two types: for standard stage and rotatable ceramic coated stage, one for rotatable ceramic coated stage is equipped with rotatable stage centering screws Attached to the elevating section of the main body
Stage	• Right/left handle stage (with specimen holder) • Right/left handle ceramic coated stage (with specimen holder) (Right handle ceramic coated stage without specimen holder as well) • Right/left handle rotatable ceramic coated stage (with specimen holder) Travel range: X: ±78 mm, Y: ±54 mm Rotation angle: The stage can be rotated clockwise by 195° and counterclockwise by 7° from the reference position (rotation angle 0°).
Condenser holder	Equipped with condenser focus knob, condenser centering screws. Attached to a substage
Condenser	Universal condenser: Attach optical modules for differential interference contrast, phase contrast, or dark-field microscopy to a turret. C-C phase turret condenser: Optical module for phase contrast and dark-field and shutter embedded DIC condenser (oil): Differential interference contrast optical module OIL (slider) attached Other condensers: Abbe condenser, achromat condenser, dark field condenser (dry and oil), aplanatic condenser, X LWD condenser, 2-100X slide achro condenser, 1-100X achromat swing-out condenser
Ni-U microscope input ratings	100-240VAC, 50/60Hz, 1.7A
Power cord	• When used in 100-120 V regions outside Japan UL listed detachable power cord set, 3 conductor grounding (3 conductor grounding Type SVT, No.18 AWG, 3 m long maximum, rated at 125 VAC minimum) • When used in 220-240 V regions Detachable power cord set approved according to EU/EN standard, 3 conductor grounding (3 conductor grounding Type H05VV-F, 3 m long maximum, rated at 250 VAC minimum) • When used inside Japan PSE approved detachable power cord set, 3 conductor grounding (3 conductor grounding Type VCTF 3 x 0.75 mm^2, 3 m long maximum, rated at 125 VAC minimum)

■ Control Box B for Nikon Microscope

Model	NI-CTLB
Connected to:	Ni-U main body and contact arm
Communication/control	Ni-U main body and contact arm Motorized epi-fluorescence cube turret, intelligent epi-fluorescence cube turret Motorized nosepiece, intelligent nosepiece Motorized shutter (up to two units) Motorized HG precentered fiber illuminator Simple remote control pad DS-L3 DS camera control unit PC
Input ratings	100-240VAC, 50/60Hz, 1.0A
Power cord	• When used in 100-120 V regions outside Japan UL listed detachable power cord set, 3 conductor grounding (3 conductor grounding Type SVT, No.18 AWG, 3 m long maximum, rated at 125 VAC minimum) • When used in 220-240 V regions Detachable power cord set approved according to EU/EN standard, 3 conductor grounding (3 conductor grounding Type H05VV-F, 3 m long maximum, rated at 250 VAC minimum) • When used inside Japan PSE approved detachable power cord set, 3 conductor grounding (3 conductor grounding Type VCTF 3 x 0.75 mm^2, 3 m long maximum, rated at 125 VAC minimum)

■ Simple Remote Control Pad for Nikon Microscope

Model	NI-SRCP
Connected to:	Control box B
Control	Motorized epi-fluorescence cube turret Motorized nosepiece Motorized shutter (up to two shutters) Motorized HG precentered fiber illuminator's ND value, shutter
Switch/indicator	Eight function switches One operation toggle switch 10 LED indicators

3 Physical Properties

■ Nikon Microscope ECLIPSE Ni-U

Model	ECLIPSE Ni-U
Operating conditions	Temperature: 0°C to +40°C Humidity: 60% RH max. (no condensation) Altitude: 2000 m max. Pollution degree: Degree 2 Installation: Category II Electrical shock protection class: Class I Indoor use only
Transport/storage conditions	Temperature: -20°C to +60°C Humidity: 90% RH max. (no condensation)
External dimensions and weight	Ni-U main body Dimensions: 320 (W) x 315 (H) x 383 (D) mm (excluding projections) Weight: Approx. 11 kg
Safety standards	• UL/cUL recognized product Including the following motorized devices: • NI-CTLB Control Box B • NIU-CAM Contact Arm • NI-LH Precentered Lamphouse • NI-SRCP Simple Remote Control Pad • NI-N7-E Motorized Septuple Nosepiece • NI-ND6-E Motorized DIC Sextuple Nosepiece • NI-N7-I Intelligent Septuple Nosepiece • NI-ND6-I Intelligent DIC Sextuple Nosepiece • NI-FLT6-E Motorized Epi-fluorescence Cube Turret • NI-FLT6-I Intelligent Epi-fluorescence Cube Turret • NI-SH-E Motorized Shutter • C-HGFIE HG Precentered Fiber Illuminator • This product meets FCC Part 15B Class A requirements. This equipment 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 equipment is operated in a commercial environment. This equipment 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 equipment 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. • This Class A digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada. • This product complies with Australian EMC (AS/NZS CISPR11 Group 1 Class B). CE Marking • This product meets EU IVD Directive requirements. • This product meets EU Low Voltage Directive requirements. • This product meets EU EMC Directive requirements.

■ Control Box B for Nikon Microscope

Model	NI-CTLB
Operating conditions	Temperature: 0°C to +40°C Humidity: 60% RH max. (no condensation) Altitude: 2000 m max. Pollution degree: Degree 2 Installation: Category II Electrical shock protection class: Class I Indoor use only
Transport/storage conditions	Temperature: -20°C to +60°C Humidity: 90% RH max. (no condensation)
External dimensions and weight	External dimensions: 93 (W) x 160 (H) x 220 (D) mm (excluding projections) Weight: 2.2 kg

■ Simple Remote Control Pad for Nikon Microscope

Model	NI-SRCP
Operating conditions	Temperature: 0°C to +40°C Humidity: 60% RH max. (no condensation) Altitude: 2000 m max. Pollution degree: Degree 2 Installation: Category II Electrical shock protection class: Class I Indoor use only
Transport/storage conditions	Temperature: -20°C to +60°C Humidity: 90% RH max. (no condensation)
External dimensions and weight	External dimensions: 76 (W) x 20 (H) x 120.5 (D) mm (excluding projections) Weight: 0.2 kg