

Upright Motorized Microscope



Ni-E

Instruction Manual

Assembly/Maintenance

Introduction

Thank you for purchasing a Nikon product.

This instruction manual is written for users of the Nikon ECLIPSE Ni-E 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-E is provided in two volumes.

♦ Operation

Safety Precautions

Components

Microscopy Operations

Before Microscopy

Operation Flowchart

Bright/Dark-field Microscopy Procedure

Epi-fluorescence Microscopy Procedure

Differential Interference Contrast Microscopy

Procedure

Phase Contrast Microscopy Procedure

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

0

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.)

Introduction

Contents of the Manual Symbols Used in This Manual

Assembly

Troubleshooting

Maintenance and Storage

Specifications

Contents

		Intr	oduction		i
			Conte	nts of the Manual	ii
			Symbo	ols Used in This Manual	ii
		Sur	mmary of Cor	ntents	iii
		ou.	innary or cor		
pter	Assembly				1
		1	ECLIPSE N	Ni-E System Configuration	2
		2		ts List	
		3		Method	
				uction : Motorized Device Combination	
			[1]	Check input voltage.	
			[2]	Unfasten the elevating section.	
			[3]	Escape the elevating section.	
			[4]	Attach the motorized ND filter wheel (optional)	
			[5]	Attach the DIA motorized shutter (optional) Attach the lamp	
			[6]	Attach the dia-illumination lamphouse	
			[7] [8]	Attach the dia-ilidifination famphouse.	
			[9]	Attach the connector box (optional).	
			[10]	Attach the epi-fluorescence cube turret and epi-fluorescence attachment	10
			[.0]	(required for epi-fluorescence microscopy)	11
				Attaching the filter cube	
				Replacing excitation and barrier filters	
				Attaching the light shielding plate	
			[11]	Attach the motorized barrier filter wheel (optional).	
				Attaching the barrier filter	15
			[12]	Attach the quadrocular tilting tube and DSC zooming port for	
				quadrocular tube.	
			[13]	Attach the motorized excitation filter wheel (optional)	
				Attaching the excitation filter	
			[14]	Attach the EPI motorized shutter (optional).	
			[15]	Attach eyepieces	
			[16]	Attach the substage	
			[17]	Attach the stage.	
				[17.1] Rotatable ceramic coated stage	
			[40]	[17.2] Motorized XY stage Attach the condenser	
			[18]	[18.1] Motorized universal condenser	
				[18.2] Manual condenser (with the condenser holder)	
				Attaching the optical module to the universal condenser	
				Attaching the DIC module to DIC condenser	
			[19]	Attach the nosepiece	
			[20]	Attach the objective	
			[21]	Attach the DIC rotation polarizer unit (required for differential	
				interference contrast microscopy).	31
			[22]	Attach the eyelevel riser (optional)	
			[23]	Attach a camera and connect the DS camera control unit (optional)	
			-	[23.1] Attaching a camera to the DSC zooming port for quadrocular tube	
				[23.2] Installing a camera head to the DSC port for ergonomic	
				binocular tube[23.3] Installing a camera head to the quadrocular tilting tube	
				[23.3] Installing a camera head to the quadrocular tilting tube	
				[20.7] Instaining a camera nead to the timocular tube	00

Contents

		[24]	Replace the ND filter	34
		[25]	Connect the motorized unit cable	34
		[26]	Connect the power cord.	35
Chapter 2	Troubleshootin	ıg		37
	1	Optical Sy	stem and Operation	38
		1.1	General	38
		1.2	Epi-fluorescence Microscopy	
		1.3	Differential Interference Contrast Microscopy	
		1.4	Phase Contrast Microscopy	44
	2	Electrical S	System	45
		2.1	General	
		2.2	Epi-fluorescence Microscopy	51
Chapter 3	Maintenance a	nd Stora	ge	53
	1	Replacing	the Lamp	54
	2	Cleaning		55
		2.1	Cleaning Lenses	55
		2.2	Cleaning Parts Other than the Lens	55
		2.3	Cleaning Immersion Oil	56
		2.4	Decontaminating the Product	56
	3	Restoring	Microscope Data to Factory Default	56
	4	Transporta	tion (Using the fastening position mode switch)	57
	5	Storage		57
	6	Periodic In	spections (Charged)	58
Chapter 4	Specifications			59
4	opecinications			
	1	Microscop	y (Principles)	60
	2	Performan	ce Properties	60
	3	Physical P	roperties	63

Chapter

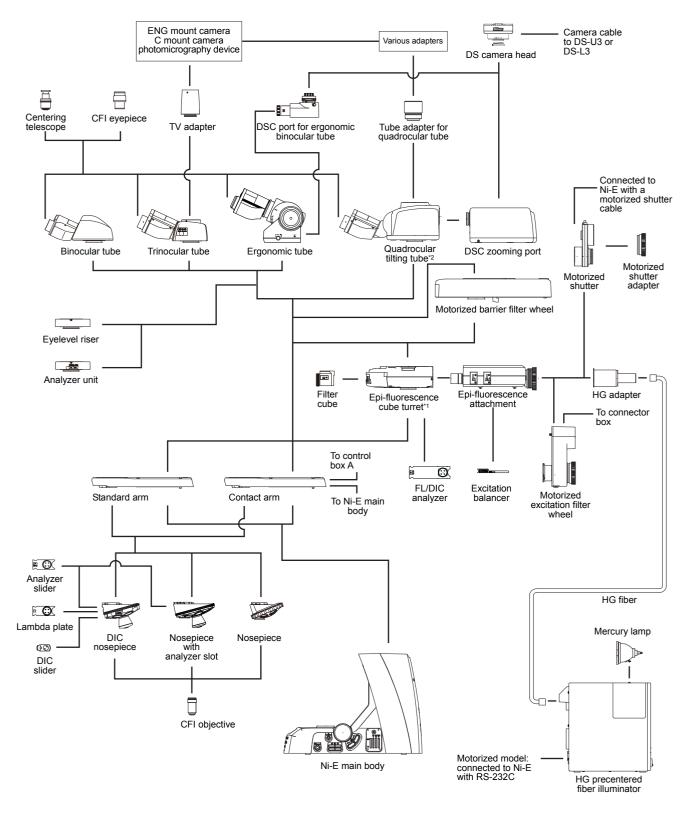
Assembly

This chapter contains the system configuration diagram and components list for Ni-E, and instructions on assembling the system.

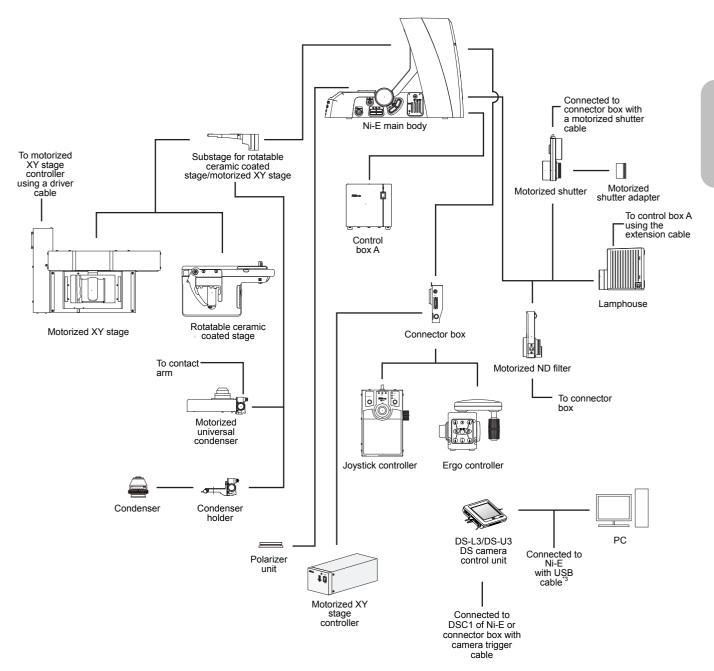
Read appropriate notes such as <u>\(\)</u> CAUTION "9 Cautions on assembling and installing the product" at the beginning of the separately provided instruction manual "Operation" or "4 Installation location" in "Notes on Handling the Product" in the same manual before you work on assembling.

- Assembly tools provided with the microscope
 - Hex driver x3: 2 mm across flats (for all three)
 - Hex wrench x2: 3 and 4 mm across flats

1 ECLIPSE Ni-E System Configuration



- *1: Use with a motorized quadrocular tilting tube or motorized barrier filter wheel requires a motorized or intelligent epi-fluorescence cube turret.
- *2: Use with a motorized DSC zooming port requires a motorized quadrocular tilting tube.



*3: USB connection is not available for DS-U3 DS camera control unit.

2 Components List

The ECLIPSE Ni-E components are shown in the table below.

Depending on when you purchased the ECLIPSE Ni-E product, there may be products not yet available for use and products 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-E (12V 100W 100-240V external power supply for illumination)	ECLIPSE Ni-E	
Illuminator for dia-illumination	Precentered lamphouse (12V 100W)	NI-LH	
	Halogen lamp (100W)	PHILIPS 7724 OSRAM HLX 64623	
	Standard arm	NI-SAM	Combine with a manual model such as a nosepiece.
Arm	Contact arm	NIE-CAM	Combine with a motorized models such as an intelligent or motorized nosepiece for Ni-E.
	Binocular tube	С-ТВ	C-TBM mildew-proof type also available
	Trinocular tube F	C-TF	C-TFM mildew-proof type also available
Tube	Trinocular eyepiece tube T	C-TT	
lube	Ergonomic tube	C-TE2	
	Quadrocular tilting tube	NI-TT	
	Motorized quadrocular tilting tube	NI-TT-E	
	DSC port for ergonomic binocular tube	C-TEP2	
DSC port	DSC zooming port for quadrocular tube	NI-RPZ	Connected to Nikon DS camera head or other C mount camera
200 poil	Motorized DSC zooming port for quadrocular tube	NI-RPZ-E	Nikon DS camera head control is DS-L3/DS-U3.
Eyepiece	CFI eyepiece	CFI CFI UW	
	Centering telescope	C-CT	
	Universal quintuple nosepiece	L-NU5	
	BD quintuple nosepiece	L-NBD5	
	Sextuple nosepiece	C-N	
	Sextuple nosepiece with analyzer slot	C-NA	
Nosepiece	Sextuple DIC nosepiece	D-ND6	
	Intelligent DIC sextuple nosepiece	NI-ND6-I	
	Septuple intelligent nosepiece	NI-N7-I	
	Motorized sextuple DIC 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. To attach a non-BD objective to L-NBD5, an LU Nosepiece Adapter is required.
Substage	Substage for rotatable ceramic coated stage/motorized XY stage	NI-SSR	
	NI-E Right Handle Rotatable Ceramic Coated Stage with Holder	NIE-CSRR2	
Stage	NI-E Left Handle Rotatable Ceramic Coated Stage with Holder	NIE-CSLR2	
	Motorized XY stage	NI-S-E	
Condenser holder	Condenser holder	NI-CH	
	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		
Condenser	C-C Slide Achro Condenser 2-100x		
Condenser	C-C Achromat Swing-out Condenser 1-100x		
	DIC Condenser (Oil)	D-CUO	Used with DIC Module (Oil) mounted.
	Universal Condenser (Dry)	NI-CUD	Supports DIC Module (Dry), PH Module, D-C Dark Field Module, NI-CALN1 2-4x Auxiliary Lens, or D-C 2-4x Lens
	Motorized Universal Condenser (Dry)	NI-CUD-E	Same module as for NI-CUD, attached directly onto the substage
	Epi-fluorescence cube turret	NI-FLT6	
	Intelligent epi-fluorescence cube turret	NI-FLT6-I	Filter Cubes and NI-FA FL/DIC Analyzer Slider attachable.
	Motorized epi-fluorescence cube turret	NI-FLT6-E	
Epi-fluorescence cube turret	Motorized Universal Condenser (Dry) Epi-fluorescence cube turret Intelligent epi-fluorescence cube turret	NI-CUD-E NI-FLT6 NI-FLT6-I	Module, NI-CALN1 2-4x Auxiliary Lens, or D-C 2-4x Same module as for NI-CUD, attached directly onto substage

Chapter 1 Assembly

Device	Device Name	Model	Remarks
Epi-fluorescence attachment	Epi-fluorescence attachment	NI-FLEI	D-FB Excitation Balancer attachable
Maraumalama	HG Precentered Fiber Illuminator	C-HGFI	
Mercury lamp illuminator	Motorized HG precentered fiber illuminator	C-HGFIE	
	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 unit/	Analyzer tube for first-order red compensation	C-IA	Combined with C-TP Polarizer Unit
Slider	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.
	DIC rotatable polarizer unit	D-DP	
Polarizer unit	Polarizer unit for simple polarization	C-SP	
	Polarizer unit for first-order red compensation	C-TP	
	Motorized ND filter	NI-ND-E	Requires NIE-CB to be connected to Ni-E
Filter	Motorized excitation filter wheel	NI-EXW-E	Requires NIE-CB to be connected to Ni-E
	Motorized barrier filter wheel	NI-BAW-E	
	Motorized shutter	NI-SH-E	To connect a second unit (on the dia-illumination side), NIE-CB must be connected to Ni-E. An NI-SHCS motorized shutter cable short is required for connection.
Shutter	Motorized shutter adapter for upright epi-fl	NI-SHAEP-U	
	Motorized shutter adapter for inverted epi-fl	TI-SHAEP-I	Required when using NI-EXW-E motorized excitation filter wheel
	Motorized shutter adapter for dia-illumination	NI-SHADI	
	Control Box A	NI-CTLA	
	DS-L3/DS-U3 DS camera control unit	DS-L3 DS-U3	Connect DS-L3 with the Ni-E main body using an USB cable. Connect DS-L3/DS-U3 with the Ni-E main body or a connector box using a camera trigger cable. Connect it to the camera using a DS camera I/F cable.
Controller	Connector box	NIE-CB	- J
	Ergo controller	NI-ERG	Requires NIE-CB to be connected to Ni-E
	Joystick controller	NI-SJ	Requires NIE-CB to be connected to Ni-E
	Motorized XY stage controller	TI-S-CON	Requires NIE-CB to be connected to Ni-E
Eyelevel riser	Eyelevel riser	C-ER2	
	DSC support column	NI-RPS	
DSC retention support	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. Connect a C mount camera, ENG mouth 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: Motorized Device Combination

The available combinations are specified when installing the following four types of motorized device to Ni-E using contact arms. If any combination not allowed is used, an error message will be displayed when the power is turned on. Therefore, use only in specified combination.

<Target device>

- Motorized/Intelligent epi-fluorescence cube turret
- · Motorized barrier filter wheel
- · Motorized quadrocular tilting tube
- Motorized DSC zooming port for quadrocular tube

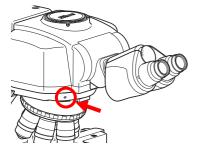
Available motorized device combination with contact arm

	1st level	2nd level	3rd level
Contact arm	Motorized quadrocular tilting tube with/without Motorized DSC zooming port (at rear)	_	_
Contact arm	Motorized/Intelligent epi-fluorescence cube turret 1	- (Not connected)	_
Contact arm	Motorized/Intelligent epi-fluorescence cube turret 1	Motorized quadrocular tilting tube with/without Motorized DSC zooming port (at rear)	_
Contact arm	Motorized/Intelligent epi-fluorescence cube turret 1	Motorized/Intelligent epi-fluorescence cube turret 2	_
Contact arm	Motorized/Intelligent epi-fluorescence cube turret 1	Motorized/Intelligent epi-fluorescence cube turret 2	Motorized quadrocular tilting tube with/without Motorized DSC zooming port (at rear)
Contact arm	Motorized/Intelligent epi-fluorescence cube turret 1	Motorized barrier filter wheel	_
Contact arm	Motorized/Intelligent epi-fluorescence cube turret 1	Motorized barrier filter wheel	Motorized quadrocular tilting tube with/without Motorized DSC zooming port (at rear)

<Error display>

- (1) The message shown on the right side is displayed on the front display panel of the Ni-E.
- (2) The power LED on the front of the contact arm blinks at 0.2 second interval. (normally ON without blinking)

* Ille9al Connection * [ER3]



Power LED blinking

(3) A buzzer beeps repeatedly.

Assemble the device in accordance with the following procedure.

Cables are required for some motorized devices, but assembly may be easier if cables are connected after all devices are assembled. See "25 Connect the motorized unit cable" for the locations of all cables.

/!\ Precautions for connecting a cable

Cable connections are required for some motorized and peripheral 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 (except when connecting a cable for the motorized universal condenser). See "25 Connect the motorized unit cable." for the connector connections.

Information setting regarding motorized models

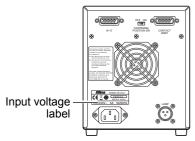
Set information of the motorized devices or optical element attached on the microscope setup menu for the DS-L3 DS Camera Control Unit. (See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope.)

Check input voltage.

Check the input voltage indicated on the back of control box A. 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 to seek advice.

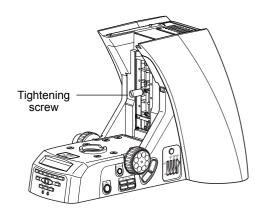


Checking the input voltage

Unfasten the elevating section.

Tool: flathead screwdriver

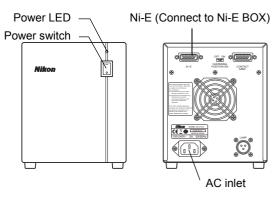
Loosen and remove the tightening screw at the front of the elevating section.



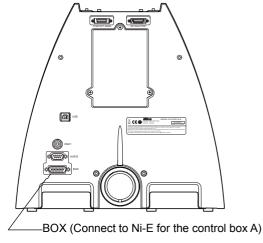
Unfasten elevating section

3 Escape the elevating section.

- Check that the power switch for control box A is OFF. (Power LED is off.)
- (2) Connect the Ni-E connector on control box A with the BOX connector on the rear of the microscope using a cable.
- (3) Plug in the power cord to the AC inlet of the control box A and the other end of the power cord to a wall outlet
- (4) Turn on the power for control box A. (Power LED turns on.)
- (5) Turn the focus knob to move the elevating section to the upper limit.
- (6) Turn off the power for control box A. (Power LED turns off.)
- (7) Remove the power cord from the wall outlet.
- (8) Remove the connected connection cable and power cord from the microscope and control box A.



Control Box A (Front/Rear)

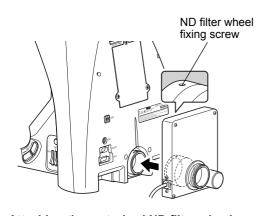


Ni-E Microscope (Rear)

4 Attach the motorized ND filter wheel (optional).

Tool: Hex driver (2 mm across flats)

- (1) Attach it to lamphouse mount at the rear of the microscope base and tighten the fixing screws from the top.
- (2) Connect the motorized ND filter wheel cable to the ND connector on the connector box.



Attaching the motorized ND filter wheel

5 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 mounted or removed.

6 Attach the lamp.

Tool: Hex wrench (3 mm across flats)

Lamp handling precautions

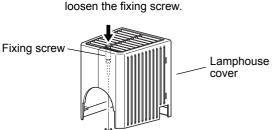
Avoid touching the glass surface of the lamp with your bare hands.

- (1) Loosen a lamphouse-cover fixing screw and lift up the cover to remove it.
- (2) Push in 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.

Specified lamp: PHILIPS7724

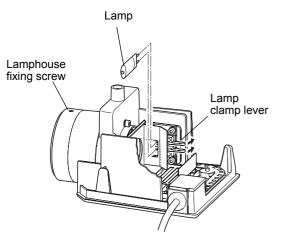
or OSRAM HLX64623

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



Insert the hex wrench and

Removing the lamphouse cover

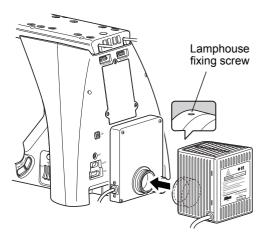


Attaching the lamp

7 Attach the dia-illumination lamphouse.

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 of the control box A using a relay cable.



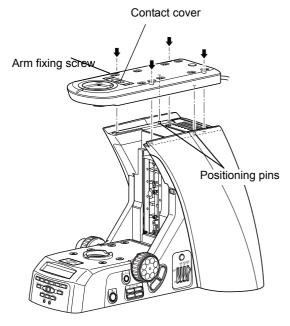
Securing the dia-illumination lamphouse

8 Attach the contact arm/standard arm.

The attachment procedure is the same for standard arm and contact arm. A contact arm must be attached when using motorized accessories. The contact arm has a contact point. Remove the contact cover before mounting the motorized device on the arm.

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 fixing screws (x4).
- (2) Connect the cable from the CONTACT ARM1 connector of the contact arm to the CONTACT ARM1 connector of control box A.
- (3) Connect the cable from the CONTACT ARM2 connector of the contact arm to the CONTACT ARM2 connector of the Ni-E main body.



Attaching the arm (Example of contact arm)

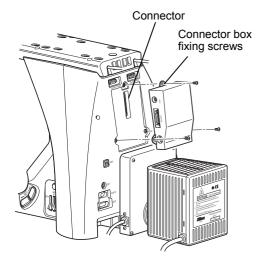
9 Attach the connector box (optional).

This must be attached when using the following devices:

- · Motorized ND filter wheel
- Ergo controller/joystick controller
- Motorized excitation filter wheel
- Motorized XY stage controller
- DIA motorized shutter (dia-illumination side)
- DSC2 connector to camera

Tool: Hex driver (2 mm across flats)

- Loosen fixing screws (x3) on the connector box mount to remove the cover.
- (2) Insert the connector on the connector box into the connector on the microscope.
- (3) Fix the connector box with previously removed screws.



Attaching the connector box

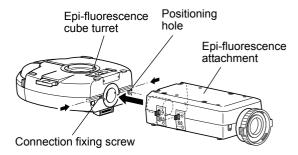
10

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

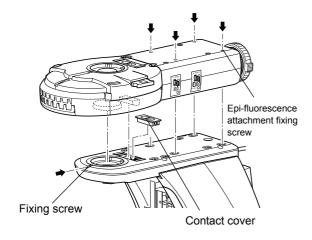
Tool: Hex driver (2 mm across flats)
Hex wrench (3 mm across flats)

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

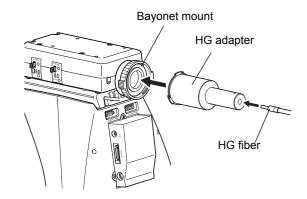
- (1) Insert the positioning pin of the epi-fluorescence attachment while aligning it with the positioning hole on the epi-fluorescence cube turret side, and then tighten the connection fixing screws (x2) on the epi-fluorescence cube turret with a hex driver.
- (2) When motorized or intelligent epi-fluorescence cube turret is used, remove the contact cover of the contact arm.
 (When the manual epi-fluorescence cube turret is used, do not remove the contact cover.)
- (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) Engage 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 then slide the entire mounted units to the rear side.
 - (The manual epi-fluorescence cube turret has no convex contact point.)
- (5) Tighten the fixing screw loosened in step (3).
- (6) Tighten the fixing screws (x4) on the top of the epi-fluorescence attachment using a hex wrench.
- (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 instruction manual provided with the HG precentered fiber illuminator.)



Connecting epi-fluorescence cube turret to epi-fluorescence attachment



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



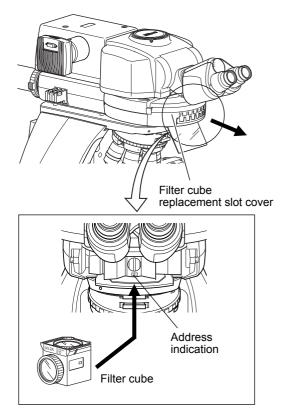
Attaching the HG adapter

■ Attaching the 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 control box A 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.
- Attach the filter cube to the slot. (2)
- Insert the filter cube nameplate into the slot cover

Insert into the same address window as the address shown inside the slot.



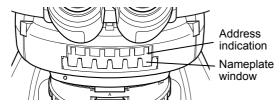
Turn the cube switchover turret to attach the filter cube in the remaining slots and also insert the nameplate.

For bright-field microscopy

For bright-field microscopy, be sure that address 1 is 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 the filter cube

■ Replacing excitation and barrier filters

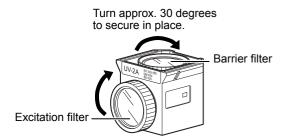
The excitation filter, barrier filter, and dichroic mirror can be removed from the cube for replacement.

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

Fit the projection on the barrier filter in 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.

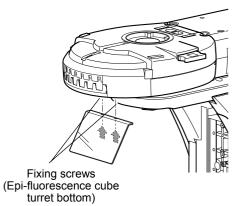


Replacing the excitation and barrier filters for the filter cube

■ Attaching the light shielding plate

Tool: Hex driver (2 mm across flats)

Tentatively screw the fixing screws (x2) provided with the shielding plate at the front bottom of the epi-fluorescence cube turret. Hook the concave part of the shielding plate to the fixing screws to attach it, and then tighten the fixing screws.



Fixing the shielding plate



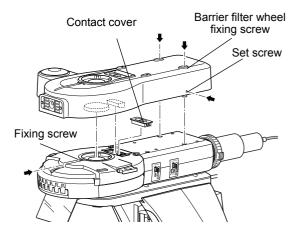
Attach the motorized barrier filter wheel (optional).

Tool: Hex driver (2 mm across flats)
Hex driver (2.5 mm across flats, included with barrier filter wheel)

Attach the motorized barrier filter wheel on the epi-fluorescence cube turret and epi-fluorescence attachment.

- Remove the contact cover on the top of the epi-fluorescence cube turret.
- (2) Loosen the fixing screw on the front of the epi-fluorescence cube turret using a hex driver (2 mm across flats) so that the tip of the fixing screw does not protrude into the connecting section.
- (3) Loosen the set screws (x2) on both sides of the motorized barrier filter wheel with a hex driver (2.5 mm across flats).
- (4) Engage the round dovetail and the convex contact at the bottom of the motorized barrier filter wheel with the dovetail and concave contact of the epi-fluorescence cube turret, and then slide the entire mounted units to the rear side.
- (5) Tighten the fixing screw loosened in (2).
- (6) Tighten the screws (x2) on the top of the motorized barrier filter wheel using a hex driver (2.5 mm across flats).
- (7) Tighten the set screws loosened in step (3).

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



Attaching the motorized barrier filter wheel

Attaching the barrier filter

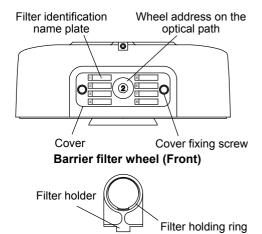
The wheel has one empty hole and seven filter holder attachment sections. The empty hole is address 1 and the barrier filter cannot be attached here. Attach the desired barrier filter (\$\phi25\$/thickness 5 mm or less) in a wheel at address 2 to 8.

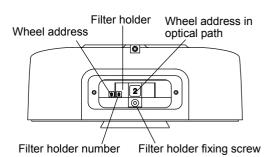
Precaution for attaching/removing the barrier filter

- Be sure to check that the illuminator is off when attaching or removing the barrier filter.
- When attaching the barrier filter, check that the power of control box A is OFF and manually rotate the motorized barrier filter wheel to attach it.
- (1) Loosen the cover fixing screws (x2) at the barrier filter mount and remove the cover.
- Manually rotate the wheel until you see the desired (2) wheel address.
- Use a hex driver (2 mm across flats) to remove the filter holder fixing screw and pull out the filter holder.
- (4) Remove the holding ring from the filter holder.
- Place the barrier filter in the filter holder and secure it with a holding ring. (Attach the filter at a slightly tilted angle.)
- (6) Insert the filter holder into the wheel and tighten the filter holder fixing screw. Be sure to attach at the same wheel address as the filter holder number.
- Replace the cover at the barrier filter mount and (7) tighten the fixing screws to secure the cover.

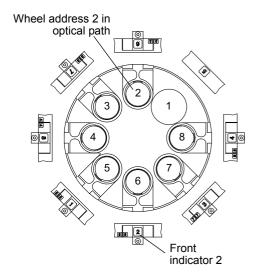
A nameplate indicating the filter type can be attached on the cover at the barrier filter mount.

The number at the front center of the filter holder indicates the barrier filter wheel address currently in the optical path.





Attaching the filter holder which has the same number as the wheel address.



Relationship between wheel address in optical path and indicator at front

12

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, included with DSC zooming port)

Hex wrench (3 mm across flats)

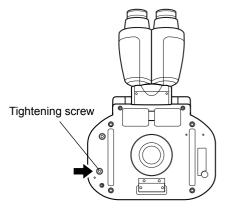
Hex wrench (4 mm across flats)

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

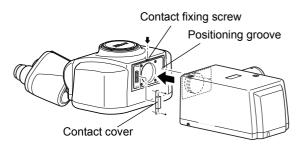
- (1) Remove the tightening screws at the bottom of the tube using a hex wrench (4 mm across flats).
- (2) Remove the contact covers at the rear of the tube. (The manual quadrocular tilting tube has no contact point.)
- (3) Insert the positioning pin on the DSC zooming port in the tube while aligning it with the positioning hole on the tube, and then tighten the contact fixing screw on the top of the tube using a hex wrench (2.5 across flats).
- (4) Remove the contact cover of the contact arm.

 (When the manual quadrocular tilting tube is used, do not remove the contact cover.)
- (5) 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. (If epi-fluorescence cube turret or barrier filter wheel is attached, the fixing screw at the front of that unit.)
- (6) Loosen the set screws (x2) on both sides of the zooming port using a hex driver (2 mm across flats).
- (7) Engage the round dovetail and the convex contact of the quadrocular tube with the dovetail and concave contact of the arm, and then slide the entire mounted units to the rear side.
 (The manual quadrocular tilting tube has no
 - convex contact.)
- (8) Tighten the fixing screw loosened in step (5)..
- (9) Tighten the fixing screws (x2) on the top of the zooming port using a hex wrench (3 mm across flats).
- (10) Tighten the set screws loosened in step (6).
- (11) Adhere the provided sticker to cover the hole for fixing the zooming port.

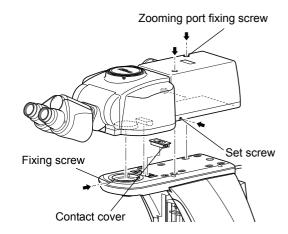
When attaching the quadrocular tube and DSC zooming port to the epi-fluorescence cube turret or barrier filter wheel, the location of the fixing screws at the front of those units is deep so it will be easier that you insert the hex driver (2 mm across flats) into the screw before placing the quadrocular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



Removing the tube tightening screw (bottom of the tube)



Connecting the quadrocular tube and DSC zooming port



Fixing the quadrocular tube and DSC zooming port set

13

Attach the motorized excitation filter wheel (optional).

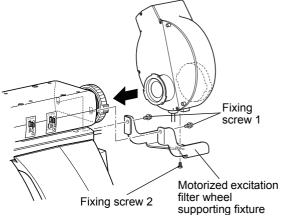
Tool: Hex wrench (3 mm across flats)

- (1) Connect the opening of the excitation filter wheel to the bayonet mount of the epi-fluorescence attachment.
- (2) Press the excitation filter wheel supporting fixture against the rear of the epi-fluorescence attachment (location (2)) while pressing it against the bottom (location (1)) of the excitation filter wheel.
- (3) Tighten the support fixture with fixing screws 1 (x2) and fixing screw 2 (x1) in this order.

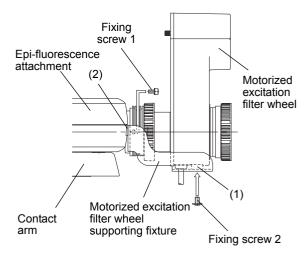
Precaution for tightening fixing screw 1

Tighten the fixing screw 1 while pressing the support fixture firmly so that there is no gap at location (1). If there is a gap, the excitation filter wheel will be attached at an angle when fixing screw 2 is tightened.

(4) Connect the cable for the motorized excitation filter wheel to the EX connector for the connector box.



Attaching the motorized excitation filter wheel



Fixing the supporting fixture

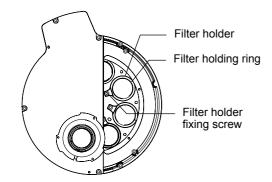
■ Attaching the excitation filter

Up to eight ϕ 25/6 mm or less thickness excitation filters can be attached. However, filters can be attached up to seven because a shielding plate is put into one location out of eight.

One \$45 ND filter can be attached to each excitation filter mount. Use reflection type ND filter.

Precaution for attaching/removing the excitation filter

- Be sure to check that the illuminator is off when attaching or removing the excitation filter.
- When attaching the excitation filter, check that the power of control box A is OFF and manually rotate the motorized excitation filter wheel to attach.
- (1) Loosen the cover fixing screws (x2) at the excitation filter mount and remove the cover.
- (2) Manually rotate the wheel until you see the desired wheel address.
- (3) Use a hex driver (2 mm) to remove the filter holder fixing screw and pull out the filter holder.
- (4) Remove the holding ring from the filter holder. Remove the shielding plate if it is inserted.
- (5) Place the excitation filter (or shielding plate) in the filter holder and secure it with a holding ring. Be sure to attach a shielding plate to the filter holder which has no excitation filter attached except when using it as empty.
- (6) Insert the filter holder into the wheel and tighten the filter holder fixing screw.
- (7) Place the cover at the excitation filter mount back to the original position and tighten the fixing screws.



Attaching the excitation filter

14 Attach the EPI motorized shutter (optional).

The motorized shutter is attached by Nikon.

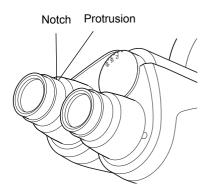
Contact your nearest Nikon representative when the EPI motorized shutter needs to be mounted or removed.

15 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

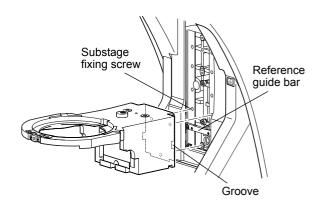
16 Attach the substage.

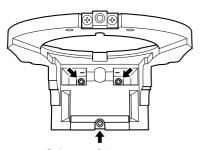
Tools: Hex driver (2 mm across flats) Hex wrench (3 mm across flats)

- (1) Place the groove of the substage on the reference guide bar in the elevating section of the main body. Move the substage to the left side, push it against the reference surface, and then tighten the drop-proof fixing screws (x3) using a hex wrench (3 mm across flats).
- (2) Put the provided elevating section cover onto the front of the elevating section and tighten the provided screws (x2) using a hex driver (2 mm across flats).

Elevating section front cover

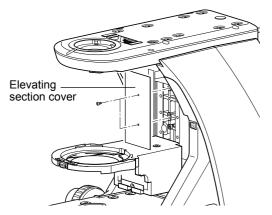
When you intend to attach the motorized universal condenser in "18 Attach the condenser.", you do not need to attach the elevating section front cover in this step (2).





Substage fixing screw (Substage from the front)

Attaching the substage



Attaching the elevating section cover

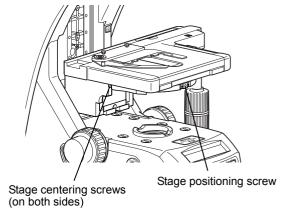
17 Attach the stage.

17.1 Rotatable ceramic coated stage

Tool: Hex driver (2 mm across flats)

Centering tool: provided ball-pointed hex drivers (x2)

- (1) Sufficiently loosen the right and left centering screws (x2) on the back of the substage and the stage positioning screw on the front of the stage using a hex driver.
- (2) Attach by aligning 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. For the centering of the rotatable ceramic coated stage, see Part 1, Chapter 3 "5.1 Operating the Rotatable Ceramic Coated Stage" in the "Operation" instruction manual.



Securing the rotatable ceramic coated stage

Removing the stage

When removing the stage, loosen the two stage centering screws and stage positioning screw.

17.2 Motorized XY stage

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

♠ CAUTION

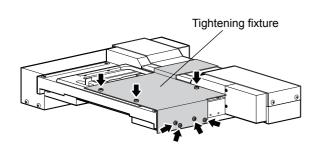
When handling the stage, be sure to hold the bottom base.
 Carelessly holding other parts will result in loss of precision or device failure.

Combination with the motorized universal condenser

When the motorized universal condenser is attached first, the motorized XY stage cannot be mounted. Attach the motorized XY stage before mounting the motorized universal condenser.

1 Remove the tightening fixture

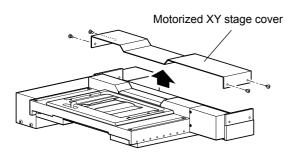
Loosen the seven hexagon socket head bolts at the top and right side of the stage using a hex wrench (3 mm across flats) and remove the tightening fixture.



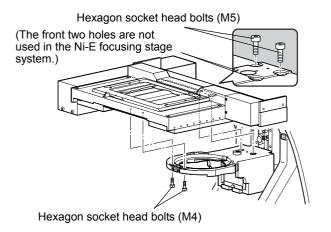
Removing the tightening fixture

2 Attach the stage

- Remove the motorized XY stage cover fixing screws (x4) using a hex driver and remove the cover.
- Align the attachment holes inside the stage with the (2) screw holes on the substage to place the stage.
- (3) Tighten the four hexagon socket head bolts (M4 x2, M5 x2) provided with the stage and secure the stage.
- Attach the cover removed in step (1). (4)



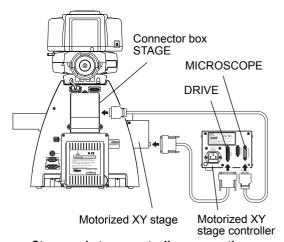
Removing the cover



Securing the motorized XY stage

3 Connect the cable

- Using the microscope connection cable, connect the MICROSCOPE connecter of the TI-S-CON motorized XY stage controller to the STAGE connector of the connector box at the rear of Ni-E.
- Using the driver cable, connect the motorized XY stage to the DRIVE connector of the stage controller.



Stage and stage controller connection

Motorized XY stage controller fuse

The motorized XY stage controller will not operate if its fuse is blown. Replace the fuse in accordance with the following procedure.

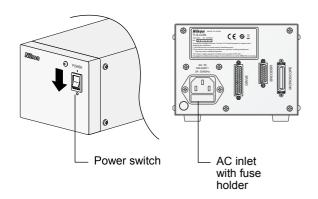
[Fuse replacement method]

/ WARNING

- To prevent electric shock or malfunctions, always turn off the power of the motorized XY stage controller (press to the "O" position) and unplug the power cord from the wall outlet before replacing the fuse.
- Use only the specified fuse. Use of other fuse may result in malfunction or fire.
 Specified fuse: 250V, 6.3A, time lag φ5.2 x 20 mm (Manufacturer: SOC Corp., Model: ET)

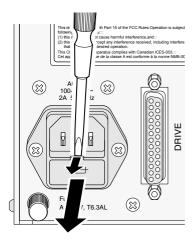
/ CAUTION

- Check that the contact is not damaged before attaching. If it is damaged, power may not turn on or overheating may occur.
- Firmly place the fuse in the fuse holder. If it is not firmly placed, overheating or smoke may occur due to dropped fuse or bad contact.
- After replacing the fuse, make sure the fuse holder is securely attached.
- (1) Push the power switch at the front of the motorized XY stage controller to "O" position and pull out the power cord if it is connected.



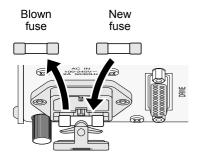
Power off the motorized XY stage controller

(2) Pull out the fuse holder using a flathead screwdriver.

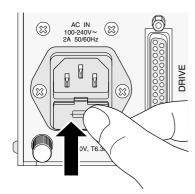


Pulling out the fuse holder

(3) Pull the blown fuse and remove it from the fuse holder. Place a new fuse in the fuse holder.



Replacing the fuse



Pushing the fuse holder

(4) Push in the fuse holder.

18 Attach the condenser.

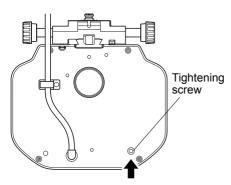
18.1 Motorized universal condenser

Tool: Hex wrench (3 mm across flats)

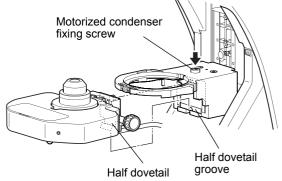
Combination with the motorized universal condenser

When the motorized universal condenser is attached first, the motorized XY stage cannot be mounted. Attach the motorized XY stage before mounting the motorized universal condenser.

- (1) Remove the tightening screw at the bottom of the condenser using a hex wrench (3 mm across flats).
- (2) If the front cover is attached to the elevating section, remove it.
- (3) Hook the half dovetail of the motorized condenser onto the half dovetail groove of the lower substage, push it against the reference surface, and then tighten the fixing screw at the top of the substage to secure.

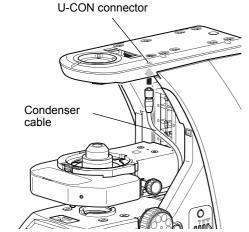


Removing the tightening screw (bottom of the condenser)

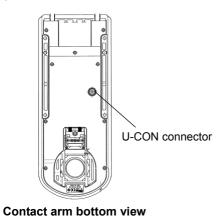


Attaching the Motorized universal condenser

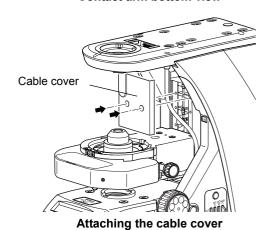
(4) Connect the condenser cable to the U-CON connector at the bottom of the contact arm.



Connecting the cable to the U-CON connector



(5) Attach the provided cable cover to the condenser on the front side of the elevating section, and then tighten the fixing screws (x2) to fix it. The vertical position can be determined by hooking the protrusion at the back of the cable cover to the top of the elevating section.



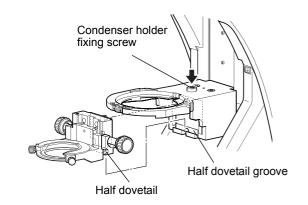
18.2

Manual condenser (with the condenser holder)

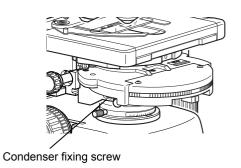
Tools: Hex driver (2 mm across flats) Hex wrench (3 mm across flats)

When attaching the manual condenser, the condenser holder must be attached to the substage.

- (1) Hook the half dovetail of the condenser holder onto the half dovetail groove of the lower substage, push it against the reference surface, and then tighten the fixing screw at the top of the substage using a hex wrench.
- (2) Turn the coarse focus knob until the substage is brought to the upper limit.
- (3) Turn the condenser focus knob until the condenser holder reaches the bottom.
- (4) Engage the round dovetail of the condenser with the condenser holder so that the Nikon nameplate faces front and tighten the fixing screw of the condenser holder using a hex driver.



Attaching the condenser holder



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 6.

Tool: Hex driver (2 mm across flats)

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

DIC module includes [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 the 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, modules 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)

PH module includes [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.

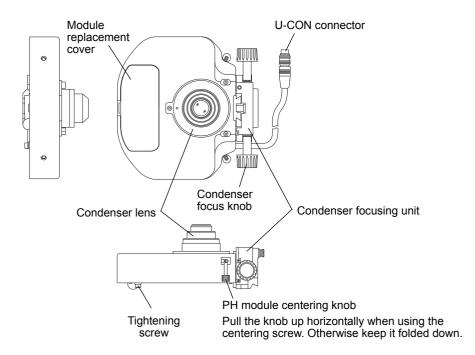
• Dark-field module (required for dark-field microscopy)

The dark field module 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, [NI-CAL N1] and [D-C 2-4x] are available with different diameter and different condenser turret attachment address.

Universal Condenser Structure (example: NI-CUD-E)



(1) Remove the cover.

For NI-CUD-E, open the module replacement cover.

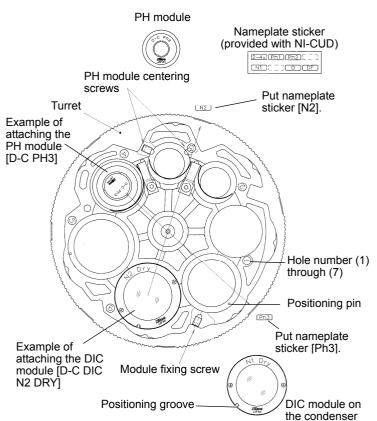
For NI-CUD, remove two screws securing the module replacement cover using the provided hex driver and remove the cover.

(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]			
2 01 3	PH module [D-C PH-2]			
4	PH module [D-C PH-3]			
	DIC module [D-C DIC N2 DRY]			
5 or 6	DIC module [D-C DIC NR DRY]			
	Dark field module [D-C DF]			
	2-4x auxiliary lens [D-C 2-4x] (\phi39)			
7	DIC module [D-C DIC N1 DRY]			
,	2-4x auxiliary lens [NI-CALN1] (\phi35)			



[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 the 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. (When using a manual universal condenser)

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.

Combinations of the DIC Slider on the Objective and the DIC Module on the Condenser (when NI-CUD-E/NI-CUD universal condenser is used)

		Standard combination		Contrast-oriented		Resolution-oriented	
	Objective		DIC slider (objective)	DIC module (condenser)	DIC slider (objective)	DIC module (condenser)	DIC slider (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		20x	N1 Dry	20X-C		
	Plan Fluor 40X Plan Apo 40X Plan Apo λ 40X S Fluor 40X Apo LWD 40X WI λS		40X I		40X I-C		
40x	Plan Fluor 40X Oil S Fluor 40X Oil Apo 40X WI \(\lambda\)S		40X II				
	Fluor 40X W Apo 40X W NIR		40X III				
	Plan Apo VC 60X H Plan Apo 60X Plan Apo λ 60X Fluor 60X W Apo TIRF 60X Oil Apo 60xW NIR	N2 Dry	60X I				60X I-R
60x	Plan Fluor 60X Oil Plan Fluor 60X A Plan Apo λ 60X Oil Apo 60X H λS		60X II			NR Dry	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 I				100XI-R
	Plan Fluor 100X Oil Plan Fluor 100X Oil, iris		100X II				100X II-R
	Plan 100X W		100X III	<u>/</u>	<u> </u>		

■ Attaching the DIC module to DIC condenser

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.)

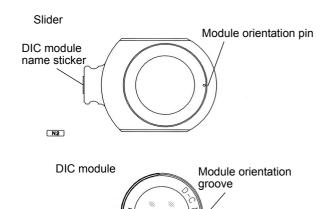
To support for particular purposes, modules for higher contrast or resolution are available.

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.

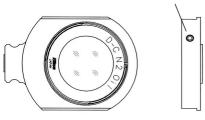
Identify the slider for the DIC module by the prism name sticker ([N2] and [NR]) affixed to the handle, and attach the DIC module to it.

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.





DIC module fixing screw



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 unit.

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

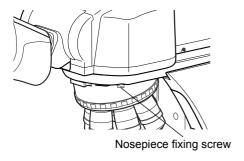
Combinations of the DIC Slider on the Objective and the DIC Module on the Condenser (when D-CUO DIC Condenser Oil is used)

		Standard	combination	Resolu	tion-oriented
	Objective	DIC module (condenser)	DIC slider (objective)	DIC module (condenser)	DIC slider (objective)
10x	Plan Fluor 10X Plan Apo 10XA (DIC allowed for ecoonly) 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		20x		
	Plan Fluor 40X Plan Apo 40X Plan Apo λ 40X S Fluor 40X Apo LWD 40X WI λS		40X I		
40x	Plan Fluor 40X Oil S Fluor 40X Oil Apo 40X WI \(\lambda\)S		40X II		
	Fluor 40X W Apo 40X W NIR		40X III		
	Plan Apo VC 60X H Plan Apo 60X Plan Apo λ 60X Fluor 60X W Apo TIRF 60X Oil Apo 60xW NIR	N2 Oil	60X I		60X I-R
60x	Plan Fluor 60X Oil Plan Fluor 60X A Plan Apo λ 60X Oil Apo 60X H λS		60X II	NR Oil	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		

19 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

20 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.

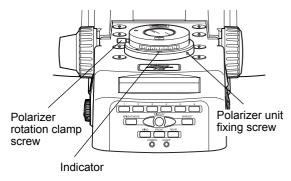
Attach the DIC rotation polarizer unit (required for differential interference contrast microscopy).

Tool: Hex driver (2 mm across flats)

- 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, and secure it.

Be sure to adjust the vibration direction before the microscopy.

(See Chapter 2, "5 Differential Interference Contrast Microscopy Procedure - 14 Adjust the orientation (vibration direction) of the polarizer and analyzer" in the "Operation" instruction manual.)



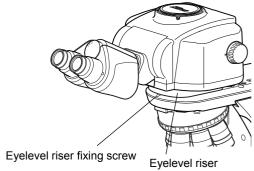
Fixing the polarizer unit



22 Attach the eyelevel riser (optional).

Tool: Hex driver (2 mm across flats)

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



Fixing the eyelevel riser

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

Attaching a camera to the DSC zooming port for quadrocular tube.

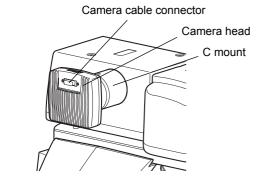
- Screw the camera head to the C mount of the DSC (1) port. Align and fit the positioning pin of the DS camera with the positioning groove on the C mount on the left of the zooming port, and tighten the two camera fixing screws.
- Connect the camera connector for the camera head (2) and the camera connector for the DS-L3/DS-U3 DS camera control unit using a provided camera cable.
- Connect the EXT.I/O connector for DS-L3/U3 with the DSC1 connector for the microscope or the DSC2 connector for the connector box using a camera trigger cable.

For DS-L3, the USB cable can also be used for connecting the USB (H) connector for DS-L3 and the USB connector for the microscope.



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

Prior to photomicrography, adjust the focus on the monitor as appropriate. (See Chapter 3 "22 Capturing Images - Photomicroscopy" in the "Operation" instruction manual.)



Attaching a camera to the DSC zooming port for quadrocular tube

23.2 Installing a camera head to the DSC port for 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 using the tool provided with the microscope.
- (4) Connect the camera connector for the camera head with the camera connector for the DS-L3/DS-U3 DS camera control unit using the provided camera cable.
- (5) Connect the EXT.I/O connector for DS-L3/U3 with the DSC1 connector for the microscope or the DSC2 connector for the connector box using a camera trigger cable.
 For DS-L3, the USB cable can also be used for

For DS-L3, the USB cable can also be used for connecting the USB (H) connector for DS-L3 and the USB connector for the microscope.



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

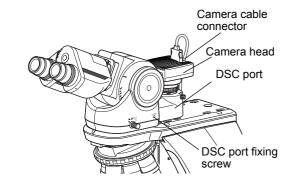
Prior to photomicrography, adjust the focus on the monitor as appropriate. (See Chapter 3 "22 Capturing Images – Photomicroscopy" in the "Operation" instruction manual.)

23.3 Installing a camera head to the quadrocular tilting tube

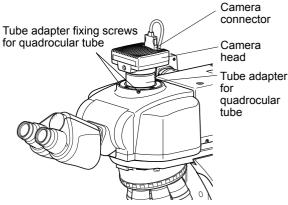
Tool: Hex driver (2 mm across flats)

Attach the tube adapter for quadrocular tube to the quadrocular tilting tube and tighten the fixing screws (x2).

Attach the C mount camera, ENG mount camera and a photomicrography device via various adapters to the tube adapter.



Attaching the camera to the ergonomic binocular tube DSC port



Attaching a camera to the tube adapter for quadrocular tube

23.4 Installing a camera head to the trinocular tube

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

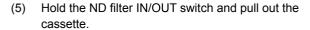


24 Replace the ND filter (optional).

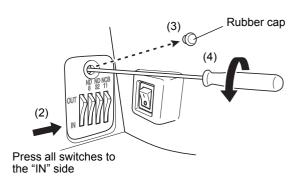
Tool: Hex driver (2 mm across flats)

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

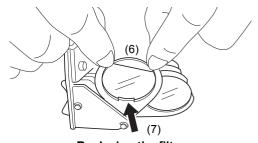
- Check that the power switch for control box A is OFF.
- Press all ND filter IN/OUT switches to the "IN" side. (2)
- Remove the rubber cap attached to the top of the filter cassette cover. (it can be removed with your finger)
- Insert a hex driver in the hole with the rubber cap (4) removed and loosen the internal screw. (The screw is drop-proof and not detached from the cover.)



- Hold the end of the filter holding frame and widen slightly to remove the filter.
- 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

Connect the motorized unit cable.

Precautions for connecting a cable

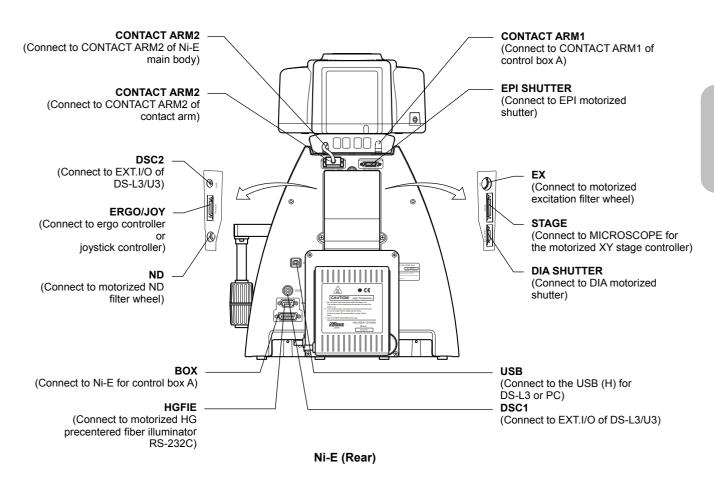
Be sure to turn off the power to the microscope and peripheral units before connecting a cable.

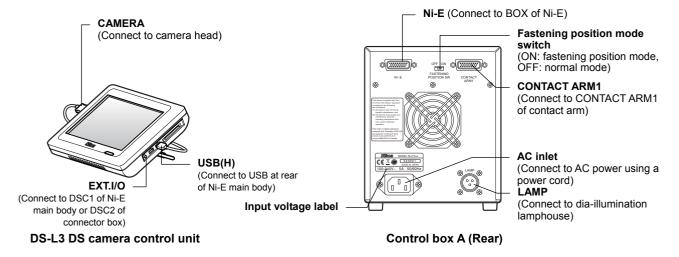
Refer to the connector figure and connect cables correctly.

- The extension cable included in the control box A is required to connect the dia-illumination lamphouse and the LAMP for the control box A.
- An USB cable is required to connect the USB (H) for DS-L3 and the USB for the microscope.
- The C-CTC Camera Trigger Cable U3/L3 is required to connect EXT.I/O connector for DS-L3/U3 with the DSC1 connector for the microscope or the DSC2 connector for the connector box.
- The NI-SHCS Motorized Shutter Cable Short is required to connect the motorized shutter with EPI SHUTTER or DIA SHUTTER.
- The RS232C cross cable (commercially available, both connectors have a D-Sub9 pin (female) in shape) is required to connect the RS-232C for the motorized HG precentered fiber illuminator with the HGFIE for the microscope.



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





26 Connect the power cord

- (1) Check that the power switch for control box A is off (press the switch to the "O" position).
- (2) Plug the power cord into the AC inlet on control box A.
- (3) Plug the other end of the power cord into a wall outlet.

Connecting the power cord to the connected motorized unit

Check that the power to the connected device such as a DS camera control unit, etc. 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 occur, 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
	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 the 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.
Dirty or dusty field of	(2) The tip of the condenser lens is dirty if	(2) Clean the condenser.
view when looking into eyepiece.	dirt or dust goes in and out of view when the condenser is moved up and down while using a low magnification objective.	(→See Chapter 3 "2.1 Cleaning Lenses" in the "Assembly/Maintenance".)
	(3) The objective is dirty if dirt or dust	(3) Clean the objective.
	disappears when the objective is switched.	(→See Chapter 3 "2.1 Cleaning Lenses" in the "Assembly/Maintenance".)
	(4) The field diaphragm image is not focused on the specimen surface.	(4) Make sure the condenser is focused and centered.
	(Condenser adjustment is incorrect.)	(See Chapter 3 "7 Focusing and Centering the Condenser" in the "Operation".)
	(5) An aperture diaphragm is stopped	(5) Open it to proper size.
	down too far.	(→See Chapter 3 "8 Adjusting the Aperture Diaphragm" in the "Operation".)
	Dirt or dust on the monitor moves when the camera is turned.	
Dirt or dust appears on the monitor.	The lens or specimen is dirty or dusty.	Check and clean it in accordance with "Dirt or dust does not rotate when the 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.
	No cover glass is attached.	Attach a cover glass of the specified thickness
	The thickness of the cover glass is inadequate.	(0.17 mm). (However, no cover glass is required for an NCG objective.)
	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 a thick cover glass.
Image quality is poor. Contrast is poor. Resolution is poor.	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 the eyepiece is turned" of "Dirty or dusty field of view when looking into eyepiece".
	An aperture diaphragm is stopped down	Open it to the proper size.
	too far. Otherwise, it is open too much.	(→See Chapter 3 "8 Adjusting the Aperture Diaphragm" in the "Operation".)

Problem	Cause	Measure
	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 "7 Focusing and Centering the Condenser" in the "Operation".)
Image quality is poor.	No immersion oil is applied to the tip of an oil-immersion objective.	Apply our designated non-fluorescent immersion oil.
Contrast is poor.	The designated immersion oil is not used.	(→See Chapter 3 "14 Oil/Water Immersion" in the "Operation".)
Resolution is poor.	The immersion oil contains air bubbles.	Remove the air bubbles. (→See Chapter 3 "14 Oil/Water Immersion" in the "Operation".)
	The immersion oil adheres to the tip of the dry-type objective.	Clean it as appropriate. (→See Chapter 3 "14 Oil/Water Immersion" in the "Operation".)
	The ND filters are out of the optical path.	Place the ND filters in the optical path. (→See Chapter 3 "3.2 Adjustment with ND Filters" in the "Operation".)
Field of view is too bright.	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 "3.2 Adjustment with ND Filters" in the "Operation".)
	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 "3.2 Adjustment with ND Filters" 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.
Field of view is too dark.		(→See Chapter 3 "8 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 "7 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 12 "Switching the Optical Path of the Tube", "Operation".)
	The NCB11 filter is not used.	Use the NCB11 filter. (→See Chapter 3 "3.2 Adjustment with ND Filters" in the "Operation".)
Image is yellowish or very bluish.	The 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 "3.2 Adjustment with ND Filters" 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.	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
	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	Make sure the condenser is focused and centered.
	the specimen surface.	(See Chapter 3 "7 Focusing and Centering the Condenser" in the "Operation".)
Lack of visibility around periphery of field of view.	Field diaphragm is stopped down too far.	Open the field diaphragm slightly wider than the field of view.
Illumination is uneven across the field of view.	rield diaphilagin is stopped down too far.	(→See Chapter 3 "10 Adjusting the Field Diaphragm" in the "Operation".)
Field of view is not		Adopt an appropriate combination.
visible.	Incorrect combination of the objective with the condenser.	(→See Chapter 3 "9.1 Compatibility of Condensers with the Magnification of Objectives" 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.
		Attach it correctly.
	The lamp is attached incorrectly.	(→See Chapter 1 "3 Assembly Method - 6 Attach the lamp" in the "Assembly/Maintenance".)
		Clean them as appropriate.
	The Lens and specimen are dirty or dusty.	(→See Chapter 3 "2.1 Cleaning Lenses" in the "Assembly/Maintenance".)
	The specimen is upside down.	Turn up the cover glass and attach it to the stage.
		(→See Chapter 2 "3 Bright/Dark-field Microscopy Procedure - 8 Place a specimen on the stage, and move the stage to bring the target into view" in the "Operation".)
Out of focus with an objective of high	The thickness of the cover glass is inadequate.	Attach a cover glass of the specified thickness (0.17 mm).
magnification.	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 is attached incorrectly.	Screw the objective all the way in. (→See Chapter 1 "3 Assembly Method - 20 Attach the objective." in the "Assembly/Maintenance".)
	Dionter adjustment has not been	Perform diopter adjustment.
	Diopter adjustment has not been performed.	(→See Chapter 3 "6 Adjusting the Diopter" in the "Operation".)
		Attach it correctly.
Image is not in focus although the stage is	The stage is attached incorrectly.	(→See Chapter 1 "3 Assembly Method - 17 Attach the stage" in the "Assembly/Maintenance".)
raised to the highest		Check and reset the set value.
position.	The refocusing position is set lower than the focusing position.	(→See Chapter 3 "23.1 Setting Up the Microscope - (6-4) Software Limit" in the "Operation".)

Problem	Cause	Measure
	The nosepiece is attached incorrectly or not rotated to the click stop position.	Attach it correctly and rotate it to the click stop position. (→See Chapter 1 "3 Assembly Method - 19 Attach the nosepiece" in the "Assembly/Maintenance".)
One side of the field of view (up, down, right, or left) is not focused.	The specimen is tilted relative to the stage surface.	Position the specimen in place on the stage. (→See Chapter 2 "3 Bright/Dark-field Microscopy Procedure - 8 Place a specimen on the stage, and move the stage to bring the target into view" in the "Operation".)
The image flows (i.e. becomes asymmetrically defocused when moving	The stage is tilted.	Attach the stage correctly. (→See Chapter 1 "3 Assembly Method - 17 Attach the stage" in the "Assembly/Maintenance".)
the focal point)	The substage is tilted.	Attach the substage correctly. (→See Chapter 1 "3 Assembly Method - 16 Attach the substage" in the "Assembly/Maintenance".)
	The condenser is tilted.	Attach the condenser securely. (→See Chapter 1 "3 Assembly Method - 18 Attach the condenser" in the "Assembly/Maintenance".)
Images in left and right eyepieces are not	Interpupillary adjustment has not been performed.	Perform interpupillary adjustment. (→See Chapter 2 "3 Bright/Dark-field Microscopy Procedure - 11 Adjust the interpupillary distance" in the "Operation".)
coincident.	Diopter adjustment has not been performed.	Perform diopter adjustment. (→See Chapter 3 "6 Adjusting the Diopter" in the "Operation".)
	Diopter adjustment has not been performed.	Perform diopter adjustment. (→See Chapter 3 "6 Adjusting the Diopter" in the "Operation".)
Eyes become fatigued.	Brightness is inadequate.	Adjust the brightness using the brightness control knob or ND filters to attain a suitable brightness. (See Chapter 3 "3 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 "3 Bright/Dark-field Microscopy Procedure - 8 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 "5.1 Operating the Rotatable Ceramic Coated Stage - Adjusting the knob rotation torque" in the "Operation".)
Difficult to focus. (When using ergo controller and joystick)	The focusing speed of the focus knob is not set properly.	Set to the appropriate focusing speed. (→See Chapter 3 "20 Using the Ergo Controller" and "21 Using the Joystick Controller" 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 - 12 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 , 10 Attach the epi-fluorescence cube turret and epi-fluorescence attachment - ■ Attaching the filter cube" in the "Assembly/Maintenance".)
A fluorescent image is not visible (when the	The shutter is closed.	Open the shutter. (→See Chapter 3 "16.3 Protecting the Sample and Preventing It from Decoloration (Using the Shutter)" in the "Operation".)
lamp is ON).	The selection of the filter cube is incorrect.	Use a correct filter cube. (→See Chapter 3 "16.2 Selecting Filters" in the "Operation".)
The fluorescent image is	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 Section 16.4 "Adjusting the Brightness of the Fluorescent Image (Using ND Filters and the Aperture Diaphragm)" in the "Operation".)
very dark (when the lamp is ON).	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 dia-illumination lamp is on.	Turn off the dia-illumination lamp.
The fluorescent image quality is poor.	The filter cube being used is not suitable for the specimen.	Use a filter cube suitable for the specimen. (→See Chapter 3 "16.2 Selecting Filters" in the "Operation".)
quality is poor.	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	The immersion oil is fluorescent.	Use the non-fluorescent immersion oil designated by Nikon. (→See Chapter 3 "16.9 Other Notes on Epi-fluorescence Microscopy" in the "Operation".)
poor.	The slide glass is fluorescent.	Use a non-fluorescent slide glass. (→See Chapter 3 "16.9 Other Notes on 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
	The universal condenser's turret is at the intermediate position.	Rotate it to the click stop position.
		(→See Chapter 3 "9.3 Using the Universal Condenser (Dry) NI-CUD".)
	The DIC slider is at the intermediate	Push in the slider until it reaches the limit.
	position for an oil condenser.	(→See Chapter 3 "9.4 Using the D-CUO DIC Condenser (Oil)".)
	The DIC slider for the objective is at the	Attach it correctly.
Lack of visibility around periphery of field of view	intermediate position.	(→See Chapter 3 "17.2 Using Optical Elements".)
peripriery of field of view		Attach it correctly.
	Incomplete attachment of nosepiece.	(→See Chapter 1 "3 Assembly Method - 19 Attach the nosepiece" in the "Assembly/Maintenance".)
	The polarizer and an analyzer are at the	Switch over correctly.
	intermediate position.	(→See Chapter 3 "17.2 Using Optical Elements".)
	The lambda plate is at the intermediate	Make sure that it is attached to the limit.
	position.	(→See Chapter 3 "17.2 Using Optical Elements".)
	The polarizer is out of the optical path.	Bring the polarizer into the optical path.
		(→See Chapter 2 "5 Differential Interference Contrast Microscopy Procedure - 14 Adjust the orientation (vibration direction) of the polarizer and analyzer" in the "Operation".)
		Bring the analyzer into the optical path.
	The analyzer is out of the optical path.	(→See Chapter 2 "5 Differential Interference Contrast Microscopy Procedure - 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.	Bring the DIC module suitable for the objective to use into the optical path.
No contrast		(→See Chapter 1 "3 Assembly Method - 18 Attach the condenser - ■ Attach the optical module to the universal condenser - ■ Attaching the DIC module to DIC condenser" in the "Assembly/Maintenance".)
		Bring it into the optical path.
	The DIC slider for the objective is out of the optical path.	(→See Chapter 2 "5 Differential Interference Contrast Microscopy - 16 Attach the DIC slider (on the objective) to the nosepiece" in the "Operation".)
		Use a DIC slider suitable for the objective.
	Incorrect combination of the objective with the DIC slider for the objective.	(→See Chapter 1 "3 Assembly Method - 18 Attach the condenser - ■ Attaching the optical module to the universal condenser, ■ Attaching the DIC module to DIC condenser - ■ Attaching the DIC module to DIC condenser" in the "Assembly/Maintenance".)
	The immersion oil is not sufficient in the oil	Apply the immersion oil again.
	condenser, and air bubbles are between the slide and the condenser.	(→See Chapter 3 "14 Oil/Water Immersion" in the "Operation".)

Problem	Cause	Measure
	The orientation of the polarizer is incorrect.	Adjust the orientation of the optical system correctly.
		(→See Chapter 2 "5 Differential Interference Contrast Microscopy Procedure - 14 Adjust the orientation (vibration direction) of the polarizer and analyzer" in the "Operation".)
		Bring the DIC module suitable for the objective to use into the optical path.
	A correct DIC module on the condenser has not been selected.	(→See Chapter 1 "3 Assembly Method - 18 Attach the condenser - ■ Attaching the optical module to the universal condenser, ■ Attaching the DIC module to DIC condenser - ■ Attaching the DIC module to DIC condenser" in the "Assembly/Maintenance".)
		Use a DIC slider suitable for the objective.
Poor contrast	Incorrect combination of the objective with the DIC slider for the objective.	(→See Chapter 1 "3 Assembly Method - 18 Attach the condenser - ■ Attaching the optical module to the universal condenser, ■ Attaching the DIC module to DIC condenser - ■ Attaching the DIC module to DIC condenser" in the "Assembly/Maintenance".)
	Duatu chicative condenses and anacimon	Gently wipe dust off. (Special attention should be paid to dust.)
	Dusty objective, condenser, and specimen	(→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 "7 Focusing and Centering the Condenser" in the "Operation".)
	The immersion oil is not sufficient in the oil	Apply the immersion oil again.
	condenser, and air bubbles are between the slide and the condenser.	(→See Chapter 3 "14 Oil/Water Immersion" in the "Operation".)

1.4 Phase Contrast Microscopy

Problem	Cause	Measure
	The PH module of the condenser does not match the phase plate image of the objective.	Adjust so that they match. (→See Chapter 2 "6 Phase Contrast Microscopy Procedure - 14 Center the PH module" in the "Operation".)
Poor contrast	The PH module of the condenser and the objective selected do not match.	Put the PH module with the same Ph code as the objective into the optical path. (→See Chapter 2 "6 Phase Contrast Microscopy Procedure - 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 "18.1 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 "18.1 Tips for Phase Contrast Microscopy" in the "Operation".)

2 Electrical System

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. Or, the cable between the control box and the main body is not connected, or is connected improperly.	Connect the cable properly. (→See Chapter 1 "3 Assembly Method - 25 Connect the motorized unit cable" in the "Assembly/Maintenance".)
	A contact arm is not used.	Use a contact arm. (→See Chapter 1 "3 Assembly Method - 8 Attach the contact arm/standard arm" in the "Assembly/Maintenance".)
	A connector box is not used.	Use the connector box. (→See Chapter 1 "3 Assembly Method - 9 Attach the connector box" in the "Assembly/Maintenance".)
A motorized accessory does not operate.	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: Motorized Device Combination" 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: Motorized Device Combination" in the "Assembly/Maintenance".)

■ Illumination

	There is no power supplied.	Plug in the power cord. (→See Chapter 1 "3 Assembly Method - 26 Connect the power cord" in the "Assembly/Maintenance".)
	The lamp has burned out.	Replace the lamp with the specified type.
Lamp does not light.		(→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 - 6 Attach the lamp" in the "Assembly/Maintenance".)
		Change the setting.
Lamp does not turn off.	Operation is disabled.	(→See Chapter 3 "23 Operation on DS-L3 - 23.1 Setting Up the Microscope - (3) Configuring the Button Functions - (3-1) Ni-E microscope button" in the "Operation".)

■ Controls/buzzer on the main body

Problem	Cause	Measure
Buttons on the main body do not respond.	Operation is disabled.	Change the setting. (→See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope - (3) Configuring the Button Functions - (3-1) Ni-E microscope button" in the "Operation".)
Motorized devices are not interlocked by pressing the FUNCTION button.	The MODE function is not set.	Set the MODE function. (→See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope - (5) Set Mode Function" in the "Operation".)
Brightness cannot be adjusted with the dia-illumination brightness control knob.	Operation is disabled.	Change the setting. (→See Chapter 3 "23 Operation on DS-L3" - 23.1 Setting Up the Microscope - (3) Configuring the Button Functions - (3-1) Ni-E microscope button".)
Buzzer does not sound.	The buzzer is set to mute.	Change the setting. (→See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope - (6) Configuring Other Functions" in the "Operation".)
When the power switch is turned on, a series of short beeps sound, and the Escape button lamp blinks.	The vertical movement counter is abnormal.	Press the Escape button and initialize the vertical movement. When initialization is complete, the buzzer emits a long buzz. (The buzzer emits beeps for 20 seconds. If the escape button is not pressed during this time, vertical movement will automatically be initialized.)
Motorized devices are not interlocked by pressing the MODE switching button.	The interlock setting is OFF.	Turn the setting ON. (→See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope - (4) Configuring the Movement" in the "Operation".)

■ Stage vertical movement

Problem	Cause	Measure
Focus cannot be adjusted with the focus knob.	The focal position is outside the range limited by the software.	Disable the software limit. (→See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope - (6) Configuring Other Functions" in the "Operation".)
	The focus knob is disabled.	Enable the focus knob. (→See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope - (6) Configuring Other Functions" in the "Operation".)
	The stage elevating section is in the escape state.	Press the Escape button to reset the escape state.
Parfocal correction is not performed when the objective is changed.	Parfocal correction is OFF.	Turn the setting ON. (→See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope - (4) Configuring the Movement" in the "Operation".)
Focus is not corrected or is corrected improperly when parfocal correction is performed after the objective is changed.	The focal points of the objectives are not set properly.	Set the correct focal point for each objective. (→See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope - (4) Configuring the Movement" in the "Operation".)
Pressing the Escape button does not retract the stage elevating section.	The retracted position is lower than the lower limit of the vertical motion range.	Not escaped because the elevating section is already away from the retracted position. No action is necessary.

Problem	Cause	Measure
XYZ speed interlock is ON, but the sensitivity of vertical stage movement does not switch corresponding to the objective.	Information for objectives is not configured. (If the objective information is not configured, the sensitivity of vertical stage movement is not changed.)	Configure the objective information. (→See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope - (1) Setting Optical Elements Installation Information" in the "Operation".)
Vertical movement is displayed as "+13000.000um to -2000.000um".	The stage vertical movement part is not attached correctly.	Attach it correctly. (→See Chapter 1 "3 Assembly Method - 16 Attach the substage" 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 - 19 Attach the nosepiece" in the "Assembly/Maintenance".)
	A function to restrict the nosepiece rotation stop by vertical movement position is set.	Turn off rotation stop or rotate after changing the vertical movement position. (→See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope - (4) Configuring the Movement" in the "Operation".)
	Objectives are mounted on rather one side of the nosepiece.	Attach objective evenly.
Objectives cannot be switched smoothly.	The rotation stop function from address 1 to 6 (7) is set.	Turn off rotation stop. (→See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope - (4) Configuring the Movement" in the "Operation".)
The motorized nosepiece skips addresses.	The toggle function is ON.	Turn the toggle function OFF. (→See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope - (4) Configuring the Movement" in the "Operation".)
The stage does not retract when it should when the objective is being switched (or retracts when it should not).	Incorrect escape setting	Configure correctly. (→See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope - (4) Configuring the Movement" in the "Operation".)

■ Motorized universal condenser

Problem	Cause	Measure
The motorized universal condenser's turret and aperture diaphragm do not move at all.	The motorized universal condenser is attached incorrectly.	Attach it correctly. (→See Chapter 1 "3 Assembly Method - 18 Attach the condenser" in the "Assembly/Maintenance".)
The center of the optical module is not aligned with the optical axis.	Control error. Or, the turret was moved by hand while the power is ON.	Turn on the power supply again. Do not move the turret by hand while the power is ON.
The motorized universal condenser's turret does not interlock when the objective is switched.	The interlock setting is OFF.	Turn the setting ON. (→See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope - (4) Configuring the Movement" in the "Operation".)

Problem	Cause	Measure
The motorized universal condenser's aperture diaphragm does not interlock when the objective is switched.	The interlock setting is OFF.	Turn the setting ON. (→See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope - (4) Configuring the Movement" in the "Operation".)
	Interlocking conditions are not satisfied.	Check motorized device combination and setting. (→See Chapter 3 "19.2 Interlocking Function" in the "Operation".)
The optical module corresponding to an objective is not moved into the optical path when the objective is switched.	Incorrect configuration of the objectives and modules	Correct the setting for each. (→See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope - (1) Setting Optical Elements Installation Information" in the "Operation".)
	The turret was moved manually while the power is ON.	Turn on the power supply again. Do not move the turret by hand while the power is ON.
The aperture diaphragm is not adjusted appropriately when the objective is switched.	Incorrect configuration of the objectives	Configure correctly. (→See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope - (1) Setting Optical Elements Installation Information" in the "Operation".)
Objectives are configured correctly, but the aperture diaphragm is not adjusted appropriately when the objective is switched.	The aperture diaphragm correction value for objective change is not appropriate.	Set interlock setting to "75%". Or, set another appropriate value. (→See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope - (4) Configuring the Movement" in the "Operation".)
	Focusing and centering of the condenser is not correct.	Configure correctly. (See Chapter 3 "7 Focusing and Centering the Condenser" in the "Operation".)
Configuration of address 1 is set to "OPEN" and cannot be changed.	Structurally, a filter cannot be attached to address 1. Therefore, it is preset to "OPEN" and cannot be changed.	Use it as it is.
Cannot configure to "OPEN".	Configuration "OPEN" is exclusive to motorized universal condenser address 1. Other addresses cannot be configured to "OPEN".	Use it as it is.

■ Field diaphragm

Problem	Cause	Measure
Field diaphragm does	The interlock setting is OFF.	Turn the setting ON. (→See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope - (4) Configuring the Movement" in the "Operation".)
objective is switched.	Interlocking conditions are not satisfied.	Check motorized device combination and setting. (→See Chapter 3 "19.2 Interlocking Function" in the "Operation".)
The field diaphragm is not adjusted appropriately when the objective is switched.	Incorrect configuration of the objectives	Configure correctly. (→See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope - (1) Setting Optical Elements Installation Information" in the "Operation".)
Objectives are configured correctly, but the field diaphragm is not adjusted appropriately when the objective is switched.	The field diaphragm correction value for objective changes is not appropriate.	Set interlock to "100%". Or, set another appropriate value. (→See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope - (4) Configuring the Movement" in the "Operation".)
	Focusing and centering of the condenser is not correct.	Configure correctly. (See Chapter 3 "7 Focusing and Centering the Condenser" in the "Operation".)

■ Motorized ND filter

Problem	Cause	Measure
Motorized nosepiece does not move at all.	The motorized ND filter cable is not connected.	Connect the cable properly. (→See Chapter 1 "3 Assembly Method - 25 Connect the motorized unit cable" in the "Assembly/Maintenance".)
The motorized ND filter does not interlock when the objective is switched.	The interlock setting is OFF.	Turn the setting ON. (→See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope - (4) Configuring the Movement" in the "Operation".)
	Interlocking conditions are not satisfied.	Check motorized device combination and setting. (→See Chapter 3 "19.2 Interlocking Function" in the "Operation".)
Brightness is not adjusted appropriately when the objective is switched.	Incorrect configuration of the objectives	Configure correctly. (→See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope - (1) Setting Optical Elements Installation Information" in the "Operation".)
Objectives are configured correctly, but the brightness is not adjusted appropriately when the objective is switched.	The ND filter status set for each objective is not appropriate.	Set interlock to "Standard". Or, set another appropriate status. (→See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope - (4) Configuring the Movement" in the "Operation".)
	Focusing and centering of the condenser is not correct.	Configure correctly. (→See Chapter 3 "7 Focusing and Centering the Condenser" in the "Operation".)
	Aperture diaphragm is not 75%.	Set to 75%. (→See Chapter 3 "19.2 Interlocking Function" in the "Operation".)

■ Ergo controller and motorized XY stage

• Button

Problem	Cause	Measure
The operation button does not respond. Both LEDs on the FL-OBJ toggle switch are off.	The ergo controller is not connected properly.	Connect the ergo controller properly. (→See Chapter 1 "3 Assembly Method - 25 Connect the motorized unit cable" in the "Assembly/Maintenance".)
The operation button does not respond. However, pressing the FL-OBJ toggle switch turns its LED on and off.	No function is assigned to the operation button.	Check and configure the assignment of function to the operation button.
		(→See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope - (3) Configuring the Button Functions" in the "Operation".)
	Input from the operation button is disabled.	Check and configure the enable/disable setting for the operation button input.
		(→See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope - (3) Configuring the Button Functions" in the "Operation".)
	Corresponding motorized device is not connected properly.	Connect the motorized device properly.

• Horizontal stage movement

Problem	Cause	Measure
	The motorized XY stage is not connected properly.	Connect the stage properly. (→See Chapter 1 "3 Assembly Method - 17 Attach the stage" in the "Assembly/Maintenance".)
Rotating the stage knobs does not move	The motorized XY stage is at the specimen removal position.	Press the operation button to release the specimen removal position.
the stage.		(→See Chapter 5 "1.18.3 Retracting the Elevating Section and Moving the Stage to the Specimen Removal Position" in the DS-L3 instruction manual "Microscope Operation".)
Pressing the operation button does not change		Press the operation button to release the specimen removal position.
the sensitivity (coarse/fine/extra fine) of horizontal stage movement.	The motorized XY stage is at the specimen removal position.	(→See Chapter 5 "1.18.3 Retracting the Elevating Section and Moving the Stage to the Specimen Removal Position" in the DS-L3 instruction manual "Microscope Operation".)
XYZ speed interlock is ON, but the sensitivity of stage XYZ movement does not switch corresponding to the objective.	Information for objectives is not configured. (If the objective information is not configured, the sensitivity of stage XYZ movement is not changed.)	Configure the objective information. (→See Chapter 3 "23 Operation on DS-L3" - "23.1 Setting Up the Microscope - (1) Setting Optical Elements Installation Information" in the "Operation".)

■ Motorized quadrocular tilting tube/Motorized DSC zooming port for quadrocular tube

Problem	Cause	Measure
The posting with done	The motorized quadrocular tilting tube is attached incorrectly.	Attach it correctly. (→See Chapter 1 "3 Assembly Method - 12 Attach the quadrocular tilting tube and DSC zooming port for quadrocular tube" in the "Assembly/Maintenance".)
The optical path does not switch.	The quadrocular tilting tube is fastened.	Unfasten it. (Remove the tightening screw for the quadrocular tilting tube.) (→See Chapter 1 "3 Assembly Method - 12 Attach the quadrocular tilting tube and DSC zooming port for quadrocular tube." in the "Assembly/Maintenance".)
Motorized zoom does not operate.	The motorized DSC zooming port is attached incorrectly.	Attach it correctly. (→See Chapter 1 "3 Assembly Method - 12 Attach the quadrocular tilting tube and DSC zooming port for quadrocular tube" in the "Assembly/Maintenance".)

2.2 Epi-fluorescence Microscopy

Problem	Cause	Measure
	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.
The mercury lamp does		(→Check your illuminator's manual.)
not work.	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 illuminator.
		(→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 - 10 Attach the epi-fluorescence cube turret and epi-fluorescence attachment - ■ Attaching the filter cube" in the "Assembly/Maintenance".)
The shutter does not move.	The motorized epi-fluorescence cube turret is attached incorrectly.	Attach it correctly. (→See Chapter 1 "3 Assembly Method - 10 Attach the epi-fluorescence cube turret and epi-fluorescence attachment - ■ Attaching the filter cube" in the "Assembly/Maintenance".)
The shutter does not move. (A series of short beep sounds.)	The shutter does not shield light for some reason.	Contact your nearest Nikon representative for advice.
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.

■Motorized excitation filter wheel/Motorized barrier filter wheel

Problem	Cause	Measure
The filter does not switch.	The motorized excitation filter wheel/motorized barrier filter wheel is not attached properly.	Attach it correctly. (→See Chapter 1 "3 Assembly Method - 11 Attach the motorized barrier filter wheel", "13 Attach the motorized excitation filter wheel" in the "Assembly/Maintenance".)
Address switches to 1 even though it is instructed to switch to another address.	The turret was moved manually while the power is ON.	Turn on the power supply again. Do not move the turret by hand while the power is ON.
	It was the first movement after switching from the sleep ON state to the sleep OFF state.	Initialization may be performed to seek the origin during first movement of the motorized device after sleep OFF. In this case, repeat the desired operation.
(For motorized barrier filter wheel) Configuration of address 1 is set to "OPEN" and cannot be changed.	Structurally, a filter cannot be attached to address 1. Therefore, it is preset to "OPEN" and cannot be changed.	Use it as it is.
Cannot configure to "OPEN".	Configuration "OPEN" is exclusive to motorized barrier filter wheel 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, clean the product, restore microscope data to factory default, and transport/store the microscope.

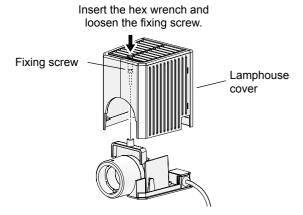
1 Replacing the Lamp

! CAUTION

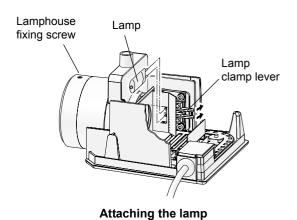
- Beware of burns: Wait until the lamp and nearby parts have cooled (approximately 30 minutes) before replacing the lamp.
- . Beware of electrical shock: Turn off the power switch and unplug the power cord from the wall outlet.
- Beware of abnormal heat generation: Use only the designated lamp.
- Beware 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)

- Loosen a 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



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

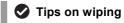
Keep the lens free of dust and fingerprints. If there is contamination on the lenses or filters, image quality decreases. If any of the lenses become dirty, clean them by following the procedure given below.

■ 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.



Do not reuse cotton cloth, lens tissue, or gauze that has 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 Restoring Microscope Data to Factory Default

Various configuration data can be restored to factory default with buttons on the Ni-E.

Use this method to restore objective device information to factory default.

<Procedure>

Turn on the power while holding down the following three buttons on the front of the main body.

- DISPLAY Previous button
- DISPLAY Next button
- Z-RESET button

Power switch ON

Turning on the power switch while holding down three buttons

When successful, the display shown on the right side appears and data is restored to factory default.

FLASH Data Initializing.

Restoration to factory default settings completed

4 Transportation (Using the fastening position mode switch)

When transporting the Ni-E main body or any motorized accessories, the device must be fastened or moved into the transportation position.

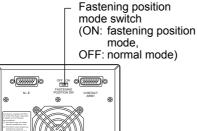
To fasten, press the fastening position mode switch at the rear of control box A to "ON" side and perform the following:

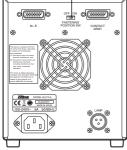
Keep the fastening position mode switch OFF during normal use of the microscope.

- (1) Check that the power switch for control box A is OFF. If it is ON, turn it OFF.
- (2) Turn ON the fastening position mode switch.
- (3) Turn on the power for control box A.

This moves the motorized devices of the Ni-E and the following motorized accessories attached to Ni-E to the default fastening position.

- Motorized elevating section
- · Motorized XY stage
- · Motorized quadrocular tilting tube
- Motorized DSC Zooming Port
- (4) After moving, turn OFF the control box A power switch and fasten the motorized elevating section, motorized XY stage, and motorized quadrocular tilting tube with the anchoring tool to transport. There is no anchoring tool for the motorized DSC zooming port. Transport it in this fastening position.
- (5) When fastened, turn OFF the fastening position mode switch.





Control box A (Rear)

Devices fastened manually

Before transporting the following devices, be sure to fasten the device with the tightening screw or manually configure the device so that it is in the stable state.

· Motorized universal condenser

Attach the tightening screw removed from the bottom of the condenser in Chapter 1 "3 Assembly Method - 18.1 Motorized universal condenser". Adjust the position of the condenser using a condenser centering screw and align the tightening screw hole position with the attachment position in advance.

· Manual quadrocular tilting tube

Attach the tightening screw removed from the bottom of the tube in Chapter 1 "3 Assembly Method - 12 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)

5 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 switch to the "O" position) and wait for the lamphouse to cool before covering this product with a cover.

6 Periodic Inspections (Charged)

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

Chapter

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 Z axis position display on the display panel at the front of main body, the XY coordinate position display of motorized XY stage, and the scale on the stage is an indicator to reproduce the position and does not guarantee the value of the thickness or length of a sample measured using them.

■ Intended user

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

Performance Properties

■ Nikon Microscope ECLIPSE Ni-E + Control Box A

Model	ECLIPSE Ni-E + NI-CTLA	
Main body		
Optical system	Infinity-corrected CF optical system	
	Objective CFI60	
	Eyepiece: Field number 22 (with ergonomic tube/binocular tube), 25 (with T/F trinocular tube/quadrocular tilting tube)	
	Field number when used in two layers.	
	When used with epi-fluorescence cube turrets in two layers or used with motorized barrier filter wheel on top of epi-fluorescence cube turret, the field number will be 22.	
Focusing unit	Vertical movement: Motorized one-axis coarse/fine adjustment knob motion	
	Stroke: 2 mm upward, 13 mm downward (with software limitation, from the focal position as a reference.)	
	With a refocusing mechanism via the Escape button	
Dia-illumination system	Fly-eye illumination, 12V 100W illumination power supply via control box A, with photomicrography voltage function	
	Light source: 12V 100W 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)	

Chapter 4 Specifications

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ort = 0:0:100)		
Standard arm		
Contact arm: required for motorized operation		
Universal quintuple, BD quintuple, sextuple, sextuple with analyzer slot, DIC sextuple, intelligent DIC sextuple, intelligent septuple, motorized DIC sextuple, and motorized septuple		
orclockwise by 7°		
Rotation angle: The stage can be rotated clockwise by 195° and counterclockwise by 7° from the reference position (rotation angle 0°).		
enser centering		
Attached to a substage		
Attach optical modules for differential interference contrast, phase contrast, or dark-field microscopy to a turret.		
uipped with		
anlanatio		
, aplanatic nromat swing-out		
nomat ownig out		
ed at 125 VAC		
conductor		
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)		
0 VAC minimum)		
rated at 125 VAC		

■ Motorized XY Stage + Motorized XY Stage Controller for Nikon Microscope

Model	NI-S-E + TI-S-CON	
Input rating voltage	100-240VAC, 50/60Hz, 2A	
Fuse rating	250V, 6.3A, time lag φ5.2 x 20 mm (Manufacturer: SOC Corp., Model: ET)	
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 Description of the power part and 2 conductor grounding.	
	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)	

3 Physical Properties

Model	ECLIPSE Ni-E +	- NI-CTLA
Operating conditions	Temperature:	0°C to +40°C
	Humidity:	60% RH max. (no condensation)
	Altitude:	2000 m max.
	Pollution degree	e: Degree 2
	Installation:	Category II
	Electrical shock protection class: Class I	
	Indoor use only	
Transport/storage	Temperature:	-20°C to +60°C
conditions	Humidity:	90% RH max. (no condensation)
External dimensions and weight	Ni-E main body Dimensions: Weight:	320 (W) x 315 (H) x 436.5 (D) mm (excluding projections) Approx. 11 kg
	Control box A	
	Dimensions:	143 (W) x 165 (H) x 360 (D) mm (excluding projections)
	_	•
Safety standards	 Meight: Approx. 5 kg 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. 	

■ Motorized XY Stage + Motorized XY Stage Controller for Nikon Microscope

Model	NI-S-E + TI-S-CON		
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	Temperature:	-20°C to +60°C	
conditions	Humidity:	90% RH max. (no condensation)	
Others	CE approved product		