M706E 19.4.Nx.9

Nikon

Application for Inverted Research Microscope ECLIPSE Ti2 Series

Ti2 Control

Ver. 2.20

Instruction Manual

(for Windows)

Introduction

Thank you for purchasing a Nikon product.

This manual describes how to install and use the application software “Ti2 Control” for Nikon Inverted Research Microscope ECLIPSE Ti2 series.

To ensure correct usage, read this manual carefully before operating this product.

Refer to the hardware manual for detailed information on how to connect your microscope and explanations about system configuration.

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- The contents of this manual are subject to change without notice.
- The equipment described in this manual might differ in its appearance from that of the actual product.
- Although every effort has been made to ensure the accuracy of this manual, errors or inconsistencies might remain. If you notice any points that are unclear or incorrect, please contact your local Nikon representative.
- If you intend to use any other equipment with this product, read the manual for that equipment too.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment might be impaired.
- The images shown in this document are for reference only, and may appear somewhat different from those actual application images.

Prerequisite knowledge

This manual assumes a basic familiarity with Windows.
If you come across unfamiliar terms or operations while reading through this manual, see the user's manual for your version of PC.

Screens used in this manual

This manual describes various operations in Windows 7 and Windows 10 by showing Windows 7 screens as examples. Procedures are virtually identical for Windows 7 and Windows 10. Depending on the specific operating system (hereinafter referred to as OS) type or version, the actual appearance of the screen or operations may not correspond precisely to the example screens shown at various points throughout the manual. For information on operations or screens specific to your version of Windows, see the user's manual of your version of Window.

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Disclaimer

Nikon shall not be liable for any damage or problems experienced by a user or third-party caused by the use of this software.

Notes on Using “Ti2 Control”

- This application is used to make settings for the Ti2-E/Ti2-A, control the Ti2-E, and display the Ti2-A status.
- For the first use of the microscope main body, always perform microscope system settings with the setup function, and transfer this information to the microscope system using “SEND.”
- When setup information is transferred to the microscope system, the previous information held in memory is overwritten.
- We recommend that the information (including arbitrary registrations performed with the setup function or other setting function) be assigned a file name and saved on the application side using the [Export] function in the [Import/Export] area on the setup screen.
- When controlling the microscope main body by the application other than Ti2 Control, operation from Ti2 Control on the Windows PC can be limited.
  “Locked” is shown in red on the top right of the Ti2 Control screen on the Windows PC during the limiting period.

Screens used in this manual

Menus and items displayed in “Ti2 Control” vary depending on the microscope system configuration and the connected motorized devices.

This manual describes functions for the Ti2-E and the Ti2-A separately by chapters. The screens of the Ti2-E are used as examples in the common chapters.

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Chapter
1

Preparation

This chapter describes the hardware and software required for “Ti2 Control” and how to install this application software.

1.1 Hardware and Software Requirements

CAUTION

Install the application before connecting your PC and the microscope system (Ti2-E, Ti2-A).

Item	Specifications
Processor	1GHz or faster processor
LAN	1000 Base-T
RAM	1 GB or more (for 32-bit OS)/2GB or more (64-bit OS)
Storage	There shall be 100 MB or more free space.
Resolution	Shall support 1280×1024-dot true color mode (recommended).
Video RAM	128 MB or more
Platform	Windows 7 Professional SP1 or later (32-bit or 64-bit Japanese or English) Windows 10 Pro (64-bit Japanese or English)
Remarks	Installer The “Ti2 Control” installer program can be downloaded from the Internet. “Ti2 Control” is not guaranteed to be compatible with all personal computers. Contact your distributor for detailed compatibility information.

1.2 Installing the Application

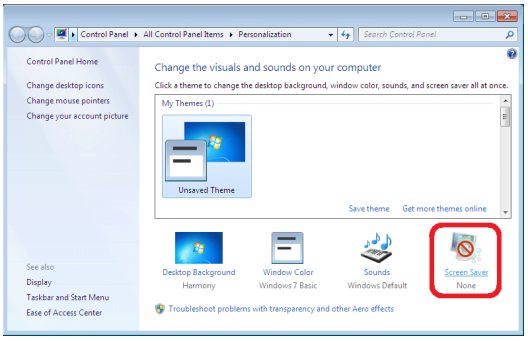
This section describes how to install the application.

CAUTION

- Be sure to install the application before connecting a PC to the microscope system using a USB. Connection using a USB before the installation may disable the correct installation of the device driver, making microscope system recognition by the PC impossible.
- To install “Ti2 Control,” you must log in to your PC with a user account with administrator rights.
- The uninstallation procedure for “Ti2 Control” is the same as that for other Windows applications.
- Uninstalling “Ti2 Control” from a PC in which both “Ti2 Control” and NIS-Elements are installed deletes the device driver, making Ti2 microscope recognition by NIS-Elements impossible.
  Do not uninstall “Ti2 Control” from a PC in which both “Ti2 Control” and NIS-Elements are installed.

1. Before installing “Ti2 Control,” end all system-resident programs, such as the screen saver and anti-virus software.

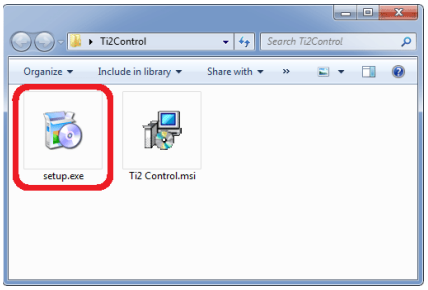
▼ **Preparing for installation**



2. Execute the setup wizard.

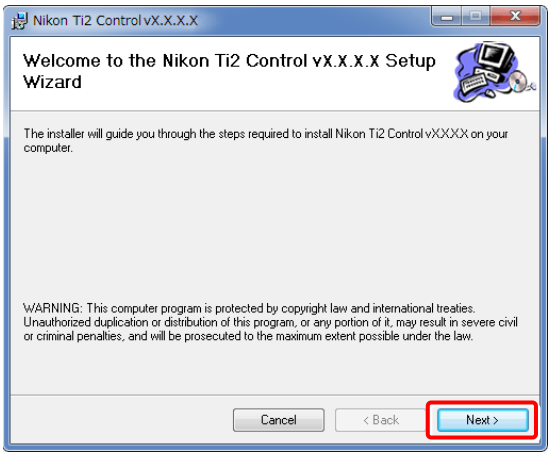
To install "Ti2 Control,” start the downloaded setup wizard (setup.exe) and follow the displayed messages.

▼ **Starting the setup wizard**



3. The installation destination setting screen appears when [Next] is clicked on the welcome screen of the setup wizard.

▼ **Welcome screen of the setup wizard**



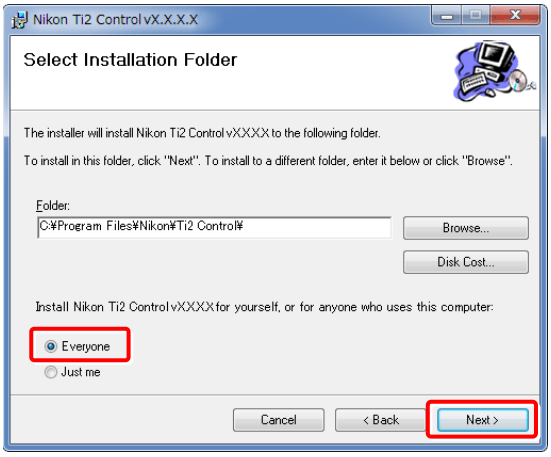
4. On the installation destination setting screen, specify a folder to install "Ti2 Control."

The default installation destination folder is as follows:

C:\Program Files\Nikon\Ti2 Control

To change the folder, click [Browse…].

▼ Installation destination setting screen



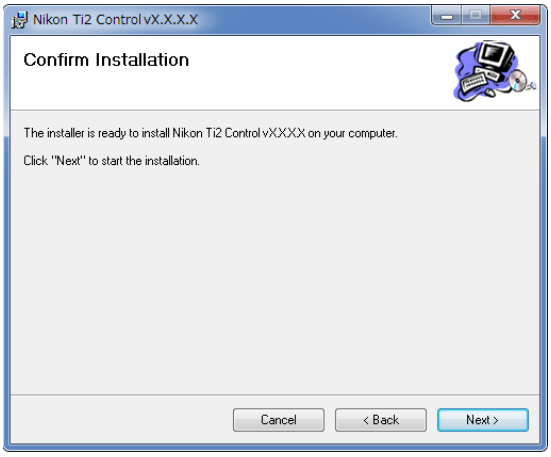
5. Specify the user of "Ti2 Control."

Everyone:	All users that will use this PC are applicable.
Just me:	Only the user who is currently logged in is applicable.

6. After specifying a folder, click [Next] to display the installation screen.

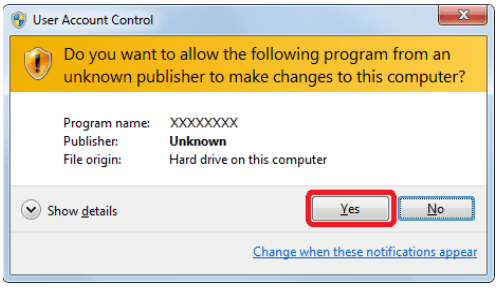
7. Click [Next] on the installation confirmation screen to start the installation.

▼ Installation screen



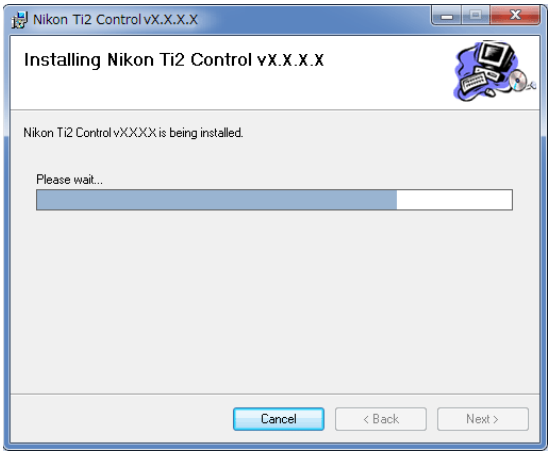
If the [User Account Control] confirmation screen is displayed, click [Yes] to start the installation.

▼ [User Account Control] confirmation screen



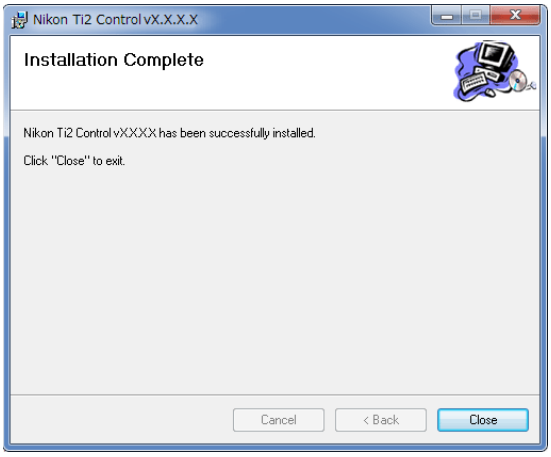
The installation progress screen appears.

▼ Installation progress screen



When installation is completed, the screen as shown on the right appears.
Click [Close] to end the installation procedure.

▼ **Installation Complete screen**



This completes the installation of “Ti2 Control.”

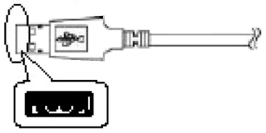
Installing the driver

After the “Ti2 Control” installation, connect the PC to the microscope system (TI2-CTRE controller for TI2-E when using the Ti2-E, or microscope main body when using the Ti2-A) via a USB connector.

The driver is installed automatically if the microscope system is connected to the PC for the first time.

1. Connect USB connector A of the USB cable to the PC.

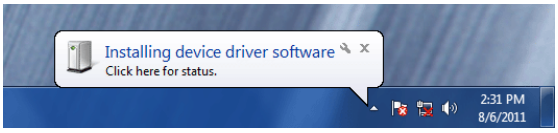
▼ **USB connector A**



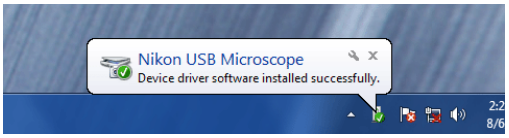
2. Connect the other end of the cable to the USB connector of the microscope system.

The detection wizard start screen appears.

When they are connected, the driver is installed automatically.



Installation is completed.



1.3 Starting Up the Application

This section describes how to start up and exit the application.

There are several ways to start or exit the application. Here is explained the typical method of starting from the [Start] menu and exiting by clicking [x] in the upper right corner of the operation screen.

1.3.1 Starting Up the Application

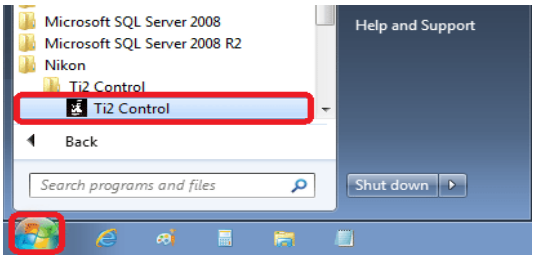
Make sure that the microscope system is connected to the PC, and then start the PC.

1. Click the [Start] button.

2. Click [All Programs], [Nikon], [Ti2 Control], and then [Ti2 Control].

The “Ti2 Control” splash screen appears.

▼ Starting up the application

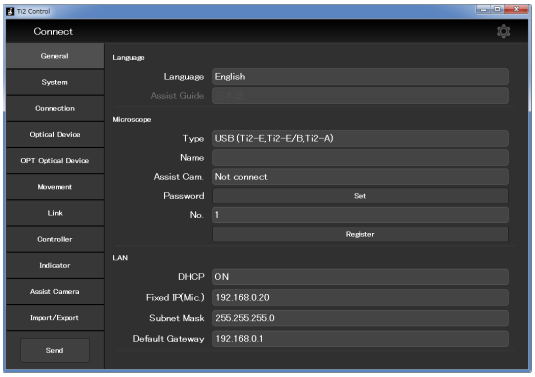


3. The microscope information is read and “Ti2 Control” starts.

CAUTION

Do not unplug the USB cable that connects to the microscope after starting "Ti2 Control."

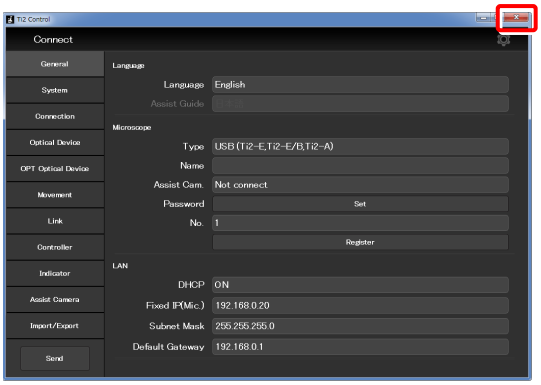
▼ Starting the application



1.3.2 Exiting the Application

1. Click the [x] button in the upper right corner of the screen.

▼ Exiting the application



Chapter 2

Setup: Ti2-A

This chapter describes how to register new microscope system settings when using the "Ti2 Control" application for the first time.

When microscope system settings are changed, this setup process allows only the relevant information of the microscope system to be changed.

2.1 Basic Setup Operations and Screens

2.1.1 Configuration of the Setup Screen

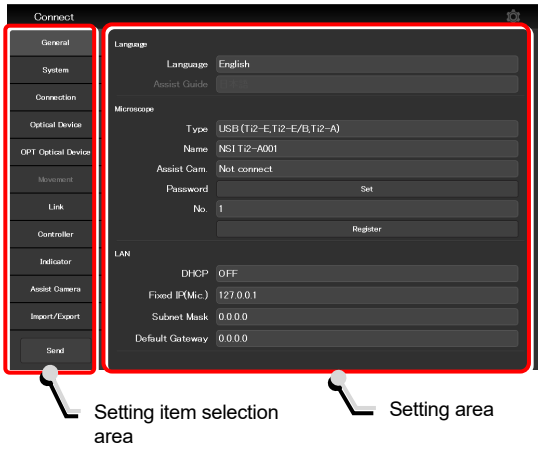
■ **Setting item selection area**

Click each button to change a setting item.

■ **Setting area**

Click a desired button in the setting item selection area to change the display items and settings.

▼ **Configuration of the setup screen**



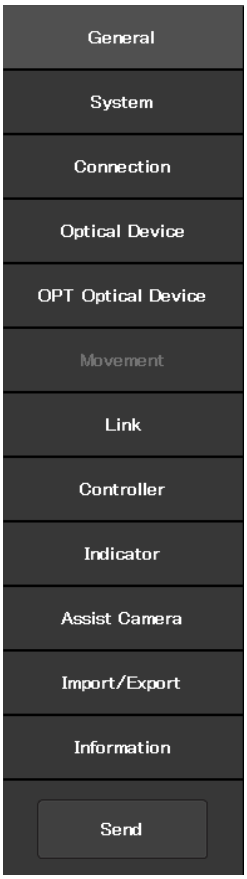
2.1.2 Setting Items

The setup function consists of 12 setting screens and one button:

> **SUPPLEMENTAL REMARKS**
> Depending on the window size, not all items may be displayed.
> Scroll the setting item selection area to select [General] or [Information].

- [General]: Basic settings of the microscope and the application
- [System]: Display and manual registration of the microscope configuration
- [Connection]: Settings of the connection destinations of devices
- [Optical Device]: Settings of optical devices
- [OPT Optical Device]: New registration of optical devices
- [Link]: Settings of linked control
- [Controller]: Setting the Controllable Functions
- [Indicator]: Setting the indicators
- [Assist Camera]: Setting the assist camera
- [Import/Export]: Reading and saving the settings
- [Information]: Display of the version information
- [Send]: Transmission of the setting information to the microscope system

▼ Setting items

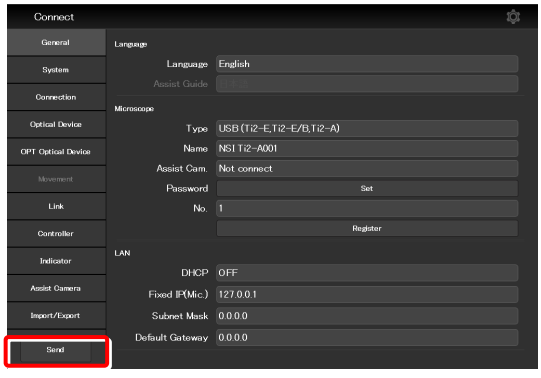


2.1.3 Sending Microscope System Information

■ Sending information to the microscope system

Click [Send] in the setting item selection area to display the confirmation screen.
Click [OK] to send the information set by the application to the microscope system.

▼ Setup screen

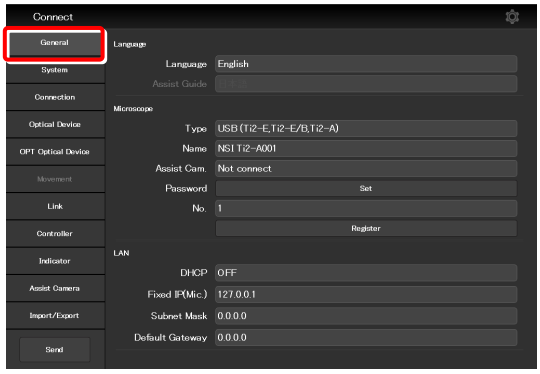


2.2 [General] Basic Settings of the Microscope and the Application

The General screen allows basic settings of the microscope and the application.

1. Select [General] from the setting item selection area.

▼ General settings



2.2.1 Setting the Language

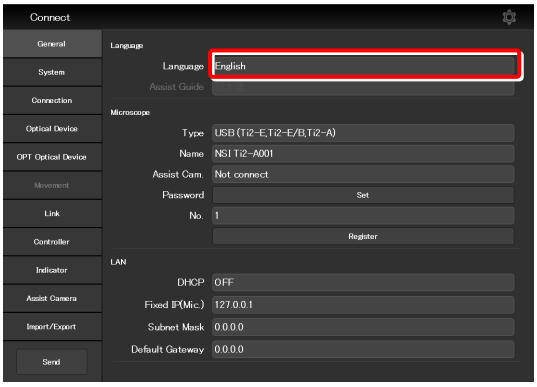
Set the language of this application.

1. Set the following item in the [Language] area.

Language:

Select the language to be used.

▼ Setting the language



2.2.2 Registering the Microscope System

This section describes how to register the microscope, the password and the assist camera.

1. Set the following items in the [Microscope] area.

Type:

Select the microscope to be connected.

Name:

Enter a registration name of the microscope system.

Assist Cam.:

Click the box to display a list of MAC addresses of the assist cameras.
Click the target MAC address and then [OK] to register the assist camera.

> **CAUTION**
>
> When an assist tube base unit is used, connect the LAN cable to the [LAN (CAM)] port at the back of the microscope main body to connect to the wireless router.

> **When registering a new microscope system**
>
> To register a new microscope system, be sure to register an assist camera too.
> When using a wireless router in this case, it is recommended to connect only one microscope system to the wireless router.

Password:

It is possible to make a setting so that a password is requested when accessing the microscope from a PC which is not registered for the microscope.
Enter any letters for the password. (Enter nothing if no password is to be set.)

No password is requested during an access if the microscope system is already registered on the PC.

No.:

Select a microscope number to be registered with the PC.
Up to 20 microscopes can be registered.

For each registered number, a registered name of the microscope system (or a MAC address) is displayed.

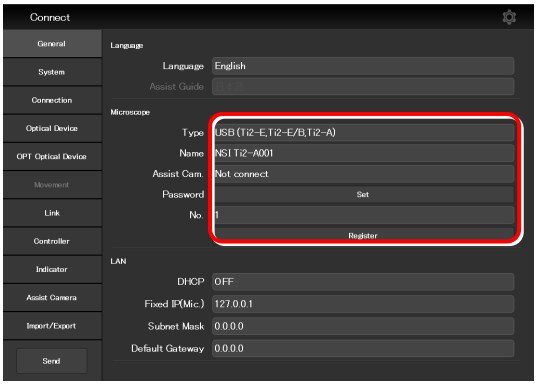
Register button:

Click this button to register the connected microscope as a “trusted microscope” with a microscope number specified in “No.” and save it in the device.

Connection to the microscope registered here is possible without a password.

> **CAUTION**
>
> Make sure any new microscope system is registered.

▼ Registering the microscope system



2.2.3 Setting the LAN

1. Set the following items in the [LAN] area.

DHCP:

Select whether to enable or disable the automatic allocation of the microscope's IP address.

Fixed IP(Mic):

Displays the fixed IP address of the microscope.

This IP address is not used when DHCP is enabled (ON).

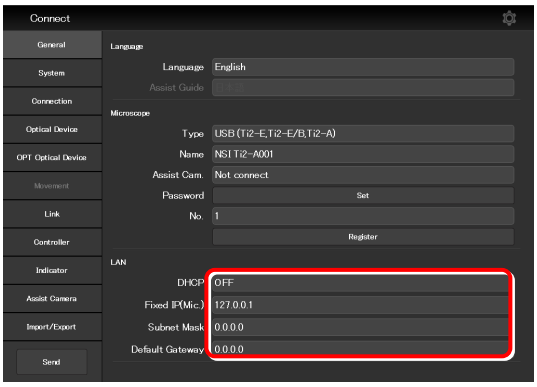
Subnet Mask:

Allows displaying or specifying the subnet mask of the microscope.

Default Gateway:

Allows displaying or specifying the default gateway of the microscope.

▼ Setting the LAN



2.3 [System] Display and Manual Registration of the Microscope Configuration

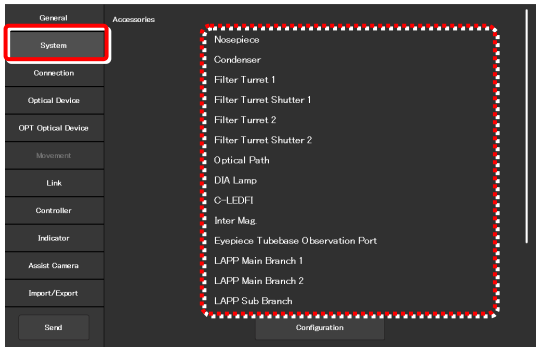
Clicking [System] displays a list of accessories mounted on the microscope system.

1. Select [System] from the setting item selection area.

A list of accessories connected to the microscope system is displayed.

2. Confirm the items displayed in the [Accessories] area.

▼ Display of the microscope configuration



2.3.1 Manually Registering the Microscope Configuration

This section describes how to register the accessories which cannot be automatically detected.

The following is the basic registration procedure.
The condenser is used as an example here.

Using a D-LH/LC precentered lamphouse (halogen lamp) for dia-illumination with the Ti2-A

When using a D-LH/LC precentered lamphouse as dia-illumination with the Ti2-A, manually register the lamphouse by the following procedure:

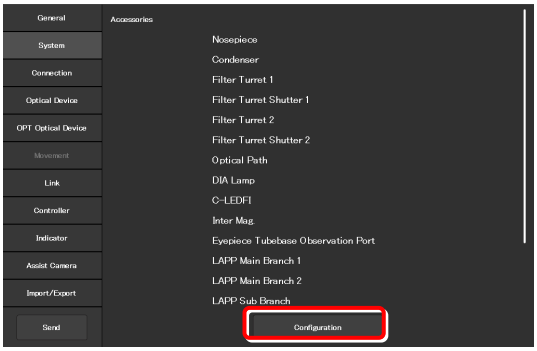
1) Disconnect the cable coming from the dia-illumination unit from the connector box on the rear surface of the microscope main body.
2) Specify [D-LH/LC Precentered Lamphouse] for the [DIA Lamp] in the microscope configuration setting screen for manual configuration, of TI2 Control.
3) Click [Send] in the setting item selection area to send the registration information.
4) End the application.
5) Power off the microscope system.
6) Connect the cable coming from the dia-illumination unit with the connector box on the rear surface of the microscope main body.
7) Power on the microscope system.

To continue registration, start up the application.

1. Click [Configuration] in the setting area.

A microscope configuration setting screen appears.

▼ Manually registering the microscope configuration

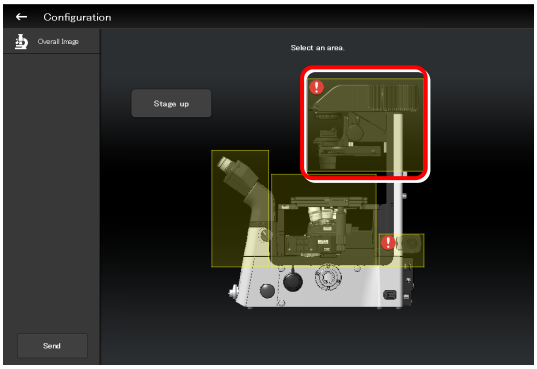


2. Click the area where accessory mounting information is to be registered.

A registration screen of the area is displayed.

> **SUPPLEMENTAL REMARKS**
>
> The mark is displayed at the upper left of the parts area if there is an accessory with no device information registered.

▼ **Microscope configuration setting screen**

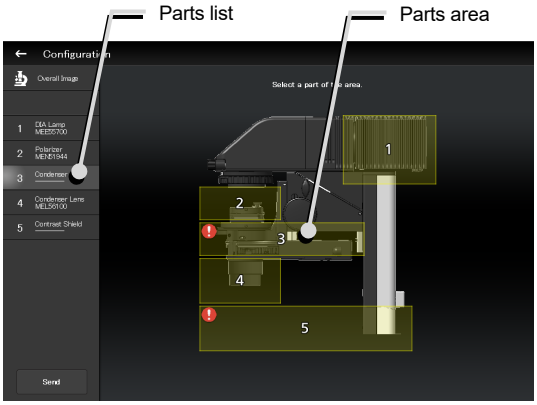


3. Click the parts area or the parts list on the left.

A list of products that can be registered for that part is displayed.

> **SUPPLEMENTAL REMARKS**
>
> The motorized devices and intelligent accessories mounted on the microscope, which are automatically detected, are displayed as being selected.
>
> If the selected and registered accessories are different from those actually mounted on the microscope, the accessory information is overwritten by the information on the automatically detected accessories.
>
> However, a different but similar product may be selected depending on the accessory even after automatic detection. Although this does not affect anything, the product can also be selected and registered again.

▼ **Per-area registration screen**

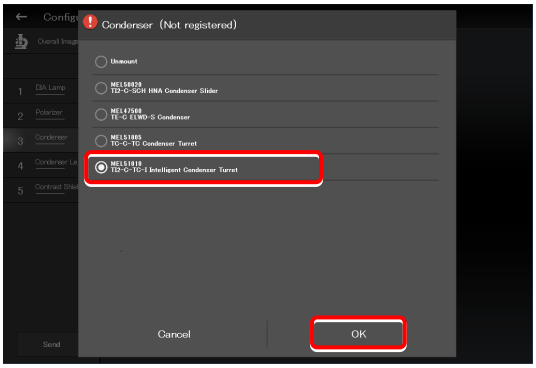


4. Select the name of the product to be registered.

> **SUPPLEMENTAL REMARKS**
>
> To register the accessory not being mounted, select [Unmount].

> **SUPPLEMENTAL REMARKS**
>
> When motorized devices and intelligent accessories are mounted on the microscope, only detected products are displayed in the product list.

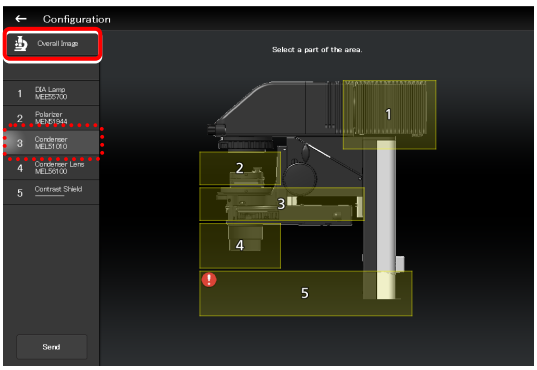
▼ **Product list dialog**



5. Click [OK].

A product code of the selected product is displayed on the second line of each item in the left parts list.

▼ **Per-area registration screen**



6. Click [Overall Image] to register an accessory for another parts area.

The screen returns to the microscope configuration setting screen.

7. Repeat steps 2 to 5 for each part to be registered.

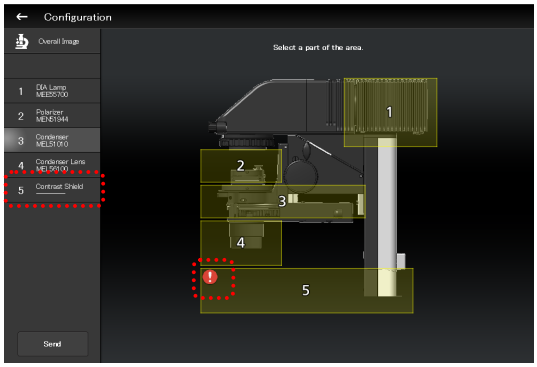
8. To finish manual registration of the microscope configuration, click [Send] to send the registration information or click [ ].

The edited information is not saved unless it is sent.

Sending information on the microscope configuration when there is a part without device information

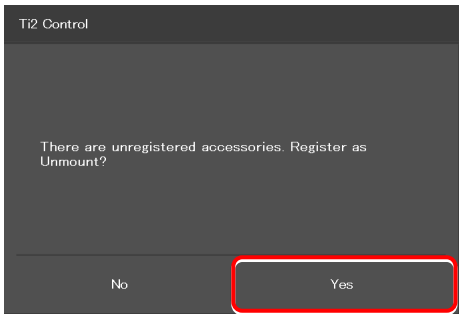
If there is a part without device information, the mark is displayed in the parts area, and [--------] is displayed in the parts list.

▼ **Per-area registration screen**



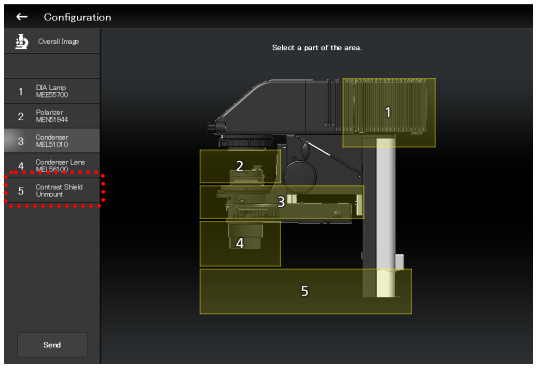
If transmission of the microscope configuration information is attempted in this state, a confirmation message for registering the part without device information to be [Unmount] appears.

▼ **Confirmation message**



After the transmission, [Unmount] is displayed under the part without device information.

▼ **Per-area registration screen after the transmission**



When using epi-illumination

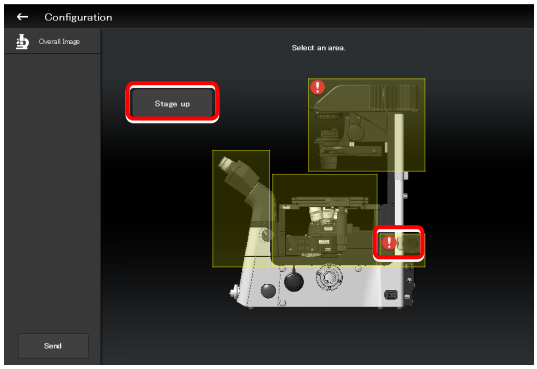
Click the area that includes the epi-illumination attachment.

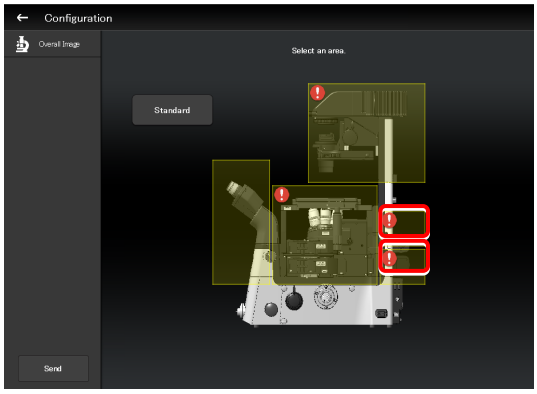
The registration screen for the epi-illumination attachment is displayed.

If a stage-up kit is used, epi-illumination attachments can be mounted in two tiers.

To register two tiers of epi-illumination attachments, click [Stage up].

▼ Registering an epi-illumination attachment





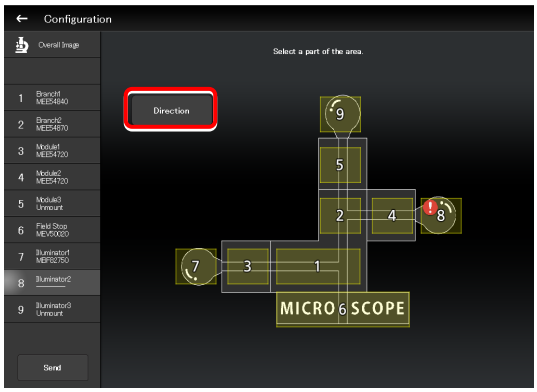
In a two-tier configuration, the upper and lower epi-illumination attachments are mounted in opposite directions. However, the application shows the two epi-illumination attachments in the same orientation.

The orientations of the two epi-illumination attachments can be shown in the same way as the actual ones by using the following procedure.

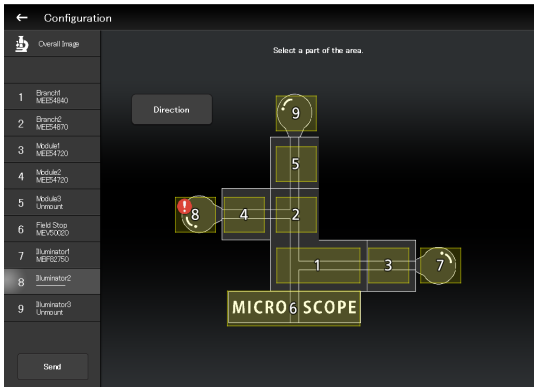
Select the epi-illumination attachment which is shown in the orientation opposite to the actual one.

Click [Direction] to invert the part orientation horizontally so that the display on the application is the same as the actual epi-illumination attachment.

▼ Inverting the orientation of the epi-illumination attachment



▼ Inverted layout



> **Using the TI2-F-FLS Simple Epi-FL Attachment**
>
> When specifying the TI2-F-FLS simple epi-fl attachment for [Branch1], set [Illuminator3] to the epi-illumination attachment.

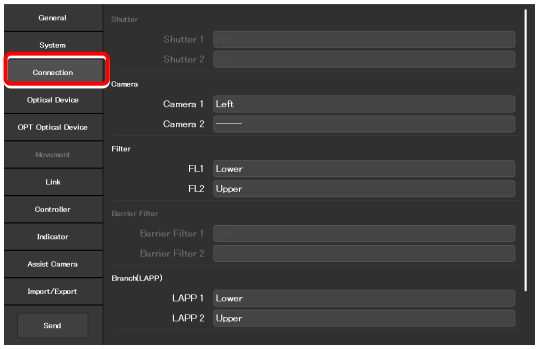
2.4 [Connection] Setting the Connection Destinations of Devices

This section describes how to set the connection (mounting) destinations of devices.

1. Select [Connection] from the setting item selection area.

The connection setting screen appears.

▼ Setting the connections of devices



2.4.1 Setting the Connections of Cameras

Select and set the ports to which connected cameras are attached from [Left] (left side port of the microscope main body), [Right] (right side port of the microscope main body), [Front] (tube base unit side port), or [Aux] (back port).

Set the camera installation position to display the camera in the microscope view on the Home screen.

1. Set the following items in the [Camera] area.

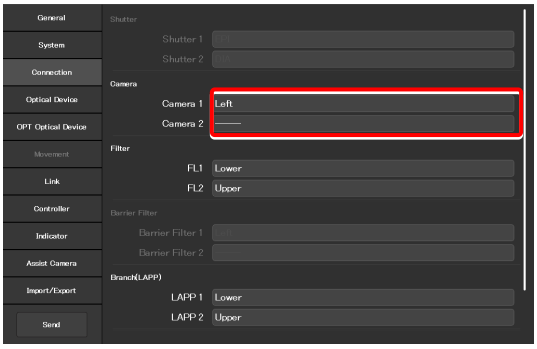
Camera 1:

Select the port to which the camera is attached.
If no camera is attached, select "---."

Camera 2:

Select the port to which the second camera is attached.
If only one camera is attached, select "---."

▼ Setting the cameras



2.4.2 Setting the Connections of FL Turrets

When the microscope system is set up in a stage-up configuration and two FL turrets are attached, specify the location to which each FL turret is attached, the upper tier (Upper) or the lower tier (Lower).

1. Set the following items in the [Filter] area.

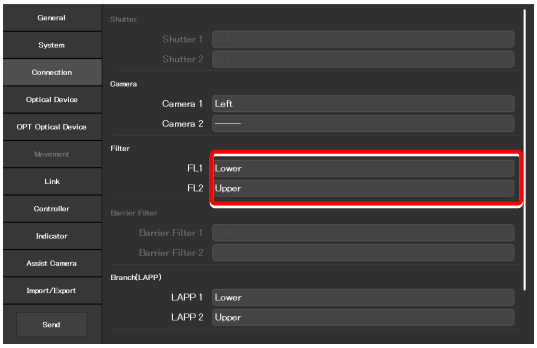
FL1:

Select the position to which the FL turret is attached.
If no FL turret is attached or only one FL turret is attached, this function cannot be set.

FL2:

Select the position to which the second FL turret is attached.
If only one FL turret is attached, this function cannot be set.

▼ Setting the FL turrets



2.4.3 Setting the Connections of Branches (LAPP)

When the microscope system is set up in a stage-up configuration and two main branches are attached, specify the location (the upper tier: Upper, or the lower tier: Lower) to which each main branch of the epi illumination attachment is attached.

1. Set the following items in the [Branch(LAPP)] area.

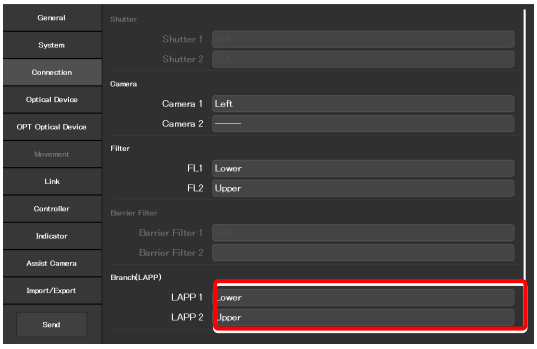
LAPP1:

Select the position to which the main branch is attached.
If no main branch is attached or only one main branch is attached, this function cannot be set.

LAPP2:

Select the position to which the second main branch is attached.
If only one main branch is attached, this function cannot be set.

▼ Setting the branch (LAPP)



2.4.4 Setting the C-LEDFI Epi-fl LED Illuminator

Set the LED wavelength of each channel of the C-LEDFI epi-fl LED illuminator.

1. Set the following items in the [C-LEDFI] area.

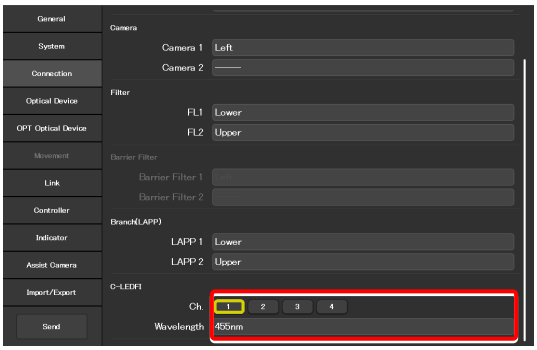
Ch.:

Select the channel number of the LED.

Wavelength:

Allows displaying or specifying the wavelength of the LED selected in [Channel].

▼ Setting the C-LEDFI



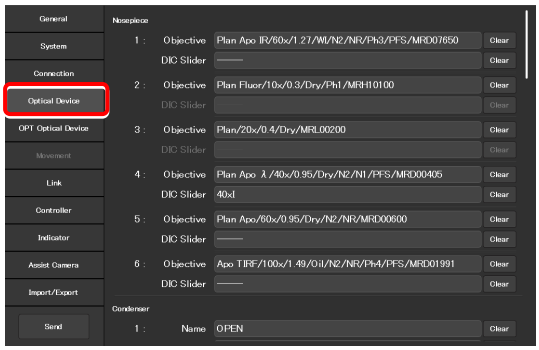
2.5 [Optical Device] Setting the Optical Devices

This section describes how to set objectives, condenser modules, fluorescence filter cubes, intermediate magnifications and optical path names.

1. Select [Optical Device] from the setting item selection area.

The optical device setting screen appears.

▼ **Setting optical devices**



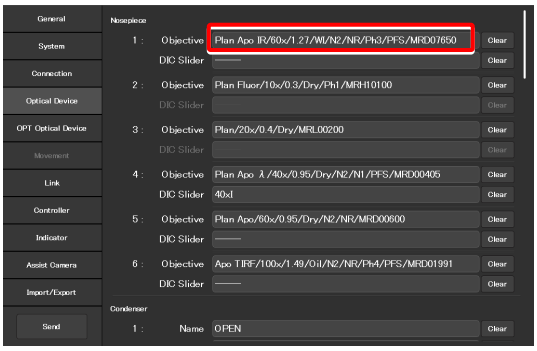
2.5.1 Setting the Nosepiece

Specify which objective is attached to each address of the nosepiece.

1. Click the [Objective] field in the [Nosepiece] area.

The list of the objectives is displayed.

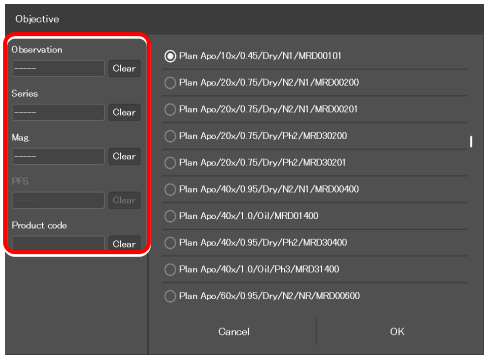
▼ **Setting the nosepiece**



2. Select an objective.

Selecting [Observation], [Series] or [Mag.] displays a list of objectives that match the conditions.

▼ **List of objectives**



Observation:

Allows a list of objectives to be narrowed down by specifying a microscopy technique.
(If the list does not include the target microscopy technique or the microscopy technique is unknown, select "---.")

Series:

Allows a list of objectives to be narrowed down by specifying a series name.
(If the series name is unknown, select “---.”)

Mag.:

Allows a list of objectives to be narrowed down by specifying a magnification.
(If the magnification is unknown, select “---.”)

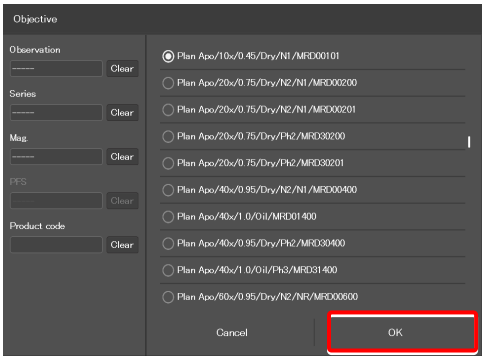
Product code

Enter the product code of the objective.

3. Click [OK].

The information about the objective is registered and displayed in the [Objective] field.

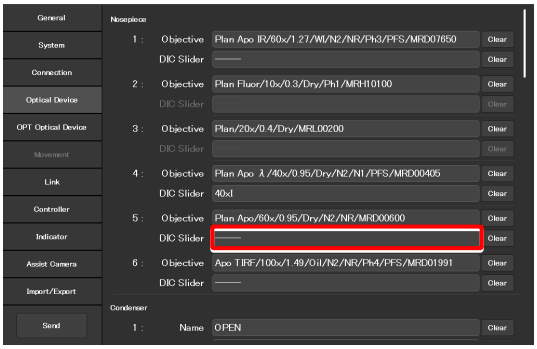
▼ **List of objectives**



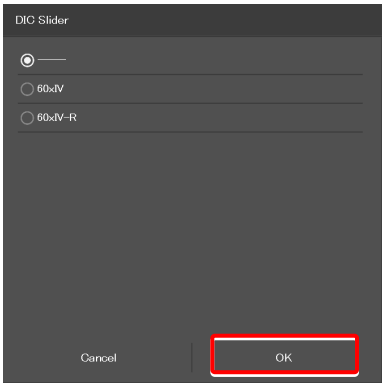
4. For objectives supporting DIC observation, click the [DIC Slider] field, select the required objective-side DIC slider from the list, and then click [OK].

The information about the objective-side DIC slider is registered and displayed in the [DIC Slider] field.

▼ **Setting the nosepiece**



▼ **List of DIC sliders**



5. Repeat steps 1 to 4 for each address of the nosepiece to be registered.

2.5.2 Setting the Condenser Module

Specify which condenser module is attached to each address of the condenser turret.

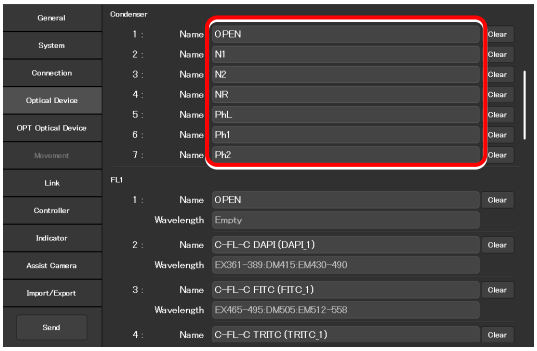
1. **In the [Condenser] area, click the [Name] field of each condenser turret address for which condenser module information is to be set.**

   The list of the condenser modules is displayed.

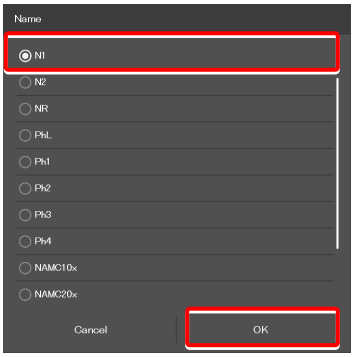
2. **Select a condenser module from the list, and then click [OK].**

3. **Repeat steps 1 and 2 for each condenser turret address for which condenser module information is to be set.**

▼ **Setting the condenser module**



▼ **Condenser module list**



2.5.3 Setting the Filter Cube

Specify which filter cube is attached to each address of the FL turret.

1. **In the [FL1] area, click the [Name] field of each FL turret address for which filter cube information is to be set.**

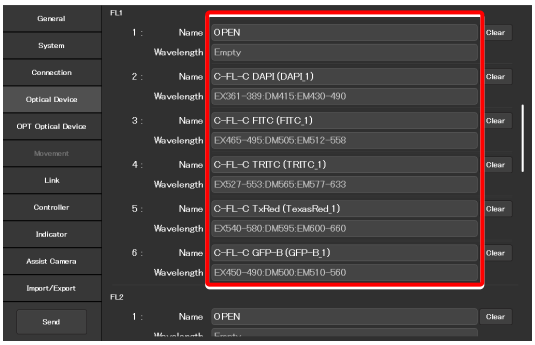
   The list of the filter cubes is displayed.

2. **Select a filter cube from the list, and then click [OK].**

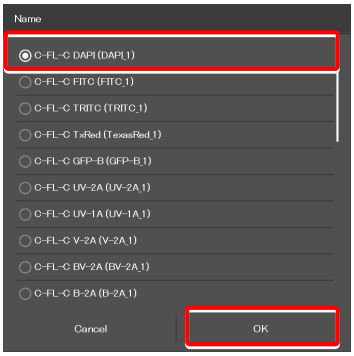
   When a filter cube name is selected, the [Wavelength] field is filled automatically.

3. **Repeat steps 1 and 2 for each FL turret address for which filter cube information is to be set.**

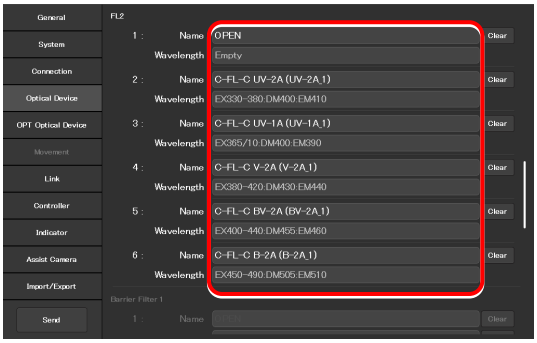
▼ Setting the filter cube



▼ Filter cube list



▼ For the second FL turret



SUPPLEMENTAL REMARKS

When a stage-up kit is used, up to two FL turrets can be connected.
When two FL turrets are connected, set the [FL2] area too.

2.5.4 Setting the Intermediate Magnification

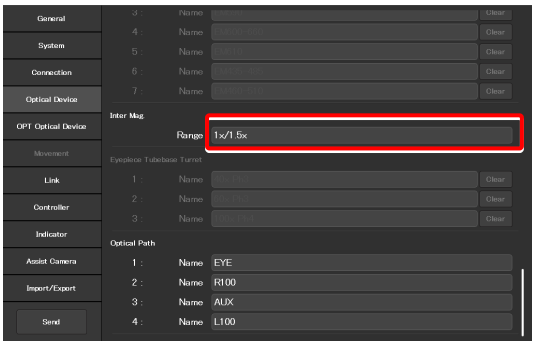
Set the intermediate magnification.

1. Set the following item in the [Inter Mag.] area.

Range:

Select the type of intermediate magnification lens (second tube lens) attached.

▼ Setting the intermediate magnification



2.5.5 Setting the Optical Path Name

Set the optical path name (output port name) to be displayed.

1. In the [Optical Path] area, click the [Name] field of each port address for which optical path information is to be set.

(Within 10 single-byte alphanumeric characters)

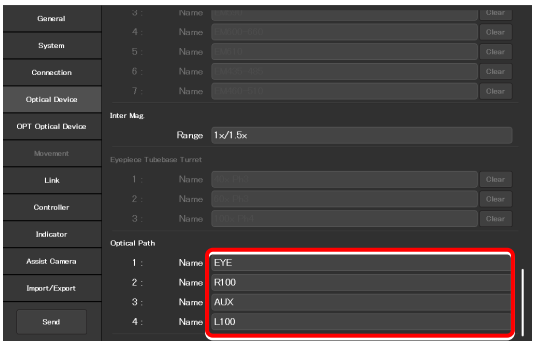
1: Eyepiece observation port

2: Right side port

3: 80% to the left side port and 20% to the eyepiece observation port (when using the Ti2-A E20L80)

4: Left side port

▼ Setting the optical path name



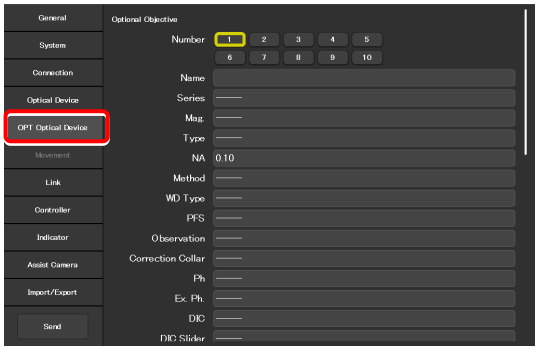
2.6 [OPT Optical Device] Registering a New Optical Device

This section describes how to newly register an optical device not listed in the [Optical Device] setting, such as an objective, a condenser module, or a filter cube.

1. Select [OPT Optical Device] from the setting item selection area.

The optional optical device setting screen appears.

▼ Registering a new optical device



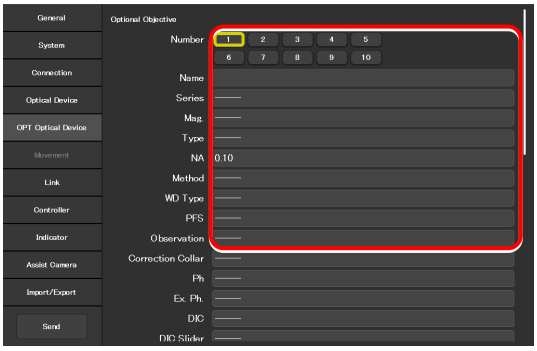
2.6.1 Registering a New Objective

Up to 10 new objectives can be registered.

The objectives registered here can be selected in [Objective] in [Optical Device].

1. Set the following items in the [Optional Objective] area.

▼ Registering a new objective



Number:

Register the number for which new objective information is to be registered. (Up to 10 objectives can be registered.)

Name:

Specify a name.

Series:

Select the type of the objective.

Mag.:

Select the magnification of the objective.

Type:

Select the immersion liquid type of the objective.

NA:

Enter the numerical aperture (NA) of the objective.

Method:

Select the usage of the objective.

WD Type:

Select the long-working-distance type of the objective.

PFS:

(Selection not needed)

Observation:

Select a microscopy technique.

Correction Collar:

For an objective with a correction collar, select Manual.

Ph:

For a phase contrast objective, select a PH code.

EX. Ph.:

(Selection not needed)

DIC:

For a DIC objective, select a corresponding condenser module.

DIC Slider:

For a DIC objective, select a corresponding objective-side DIC slider.

DIC HR/HC:

Select a type of the high-resolution or high-contrast condenser.

DIC Slider HR/HC:

Select a high-resolution or high-contrast objective-side DIC slider.

DF:

For an objective for DF microscopy, select a corresponding condenser module.

NAMC:

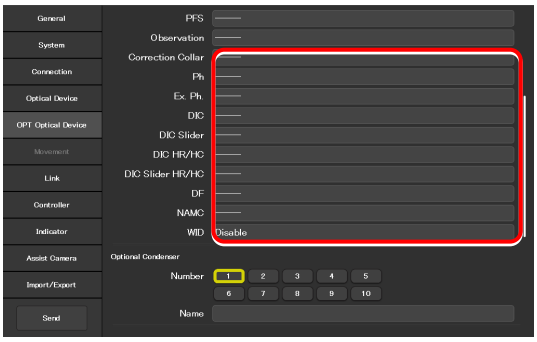
For an objective for NAMC microscopy, select a corresponding condenser module.

WID:

(Selection not needed)

2. To register another objective, select another number from [Number] and repeat step 1.

▼ Registering a new objective (continued from the previous page)



2.6.2 Registering a New Condenser Module

Up to 10 new condenser modules can be registered.

The condenser modules registered here can be selected in [Optional Condenser] in [Optical Device].

1. Set the following items in the [Optional Condenser] area.

Number:

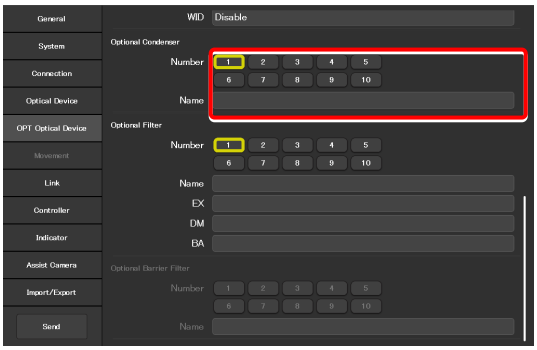
Select a number with which a new condenser module is to be registered.

Name:

Specify a name.

2. To register another condenser module, select another number from [Number] and repeat step 1.

▼ Registering a new condenser module



2.6.3 Registering a New Filter Cube

Up to 10 new filter cubes can be registered.

The filter cubes registered here can be selected in [FL1] (or [FL2]) in [Optical Device].

1. Set the following items in the [Optional Filter] area.

Number:

Select a number with which a new filter cube is to be registered.

Name:

Specify a name.

EX:

Specify an excitation filter name.

DM:

Specify a dichroic mirror name.

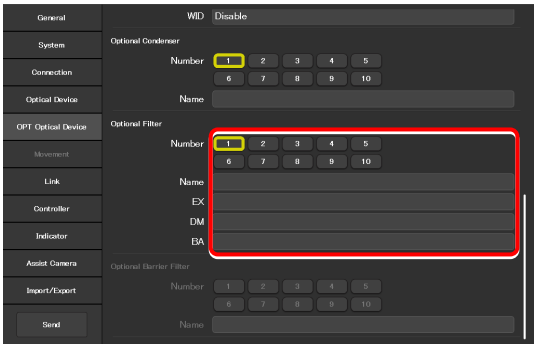
BA:

Specify a BA filter name.

> **When specifying an excitation filter or a dichroic mirror name**
>
> For an excitation filter name, specify "EX" as the first two letters and then specify the wavelength information.
> Examples: "EX450", "EX450-490" (delimited by a hyphen) or "EX450/40" (the center wavelength and width are delimited by a slash)
>
> Similarly, for a BA filter name, specify "BA" as the first two letters. For a dichroic mirror name, specify "DM" as the first two letters.

2. To register another filter cube, select another number from [Number] and repeat step 1.

▼ Registering a new filter cube



2.7 [Link] Setting the Linking Function

Specify whether diascopic LED illumination intensity is to be changed when the objective is switched.

1. Select [Link] from the setting item selection area.

The link control setting screen appears.

2. Set the following items in the [DIA Lamp] area.

Address:

Select the address of the nosepiece to which the target objective for link control is attached.

Intensity:

Specify an illumination intensity.
(Input range: 0 to 100)

Current button:

Use this button to read the current value of the device.

▼ Setting the illumination intensity of dia-illumination (DIA)

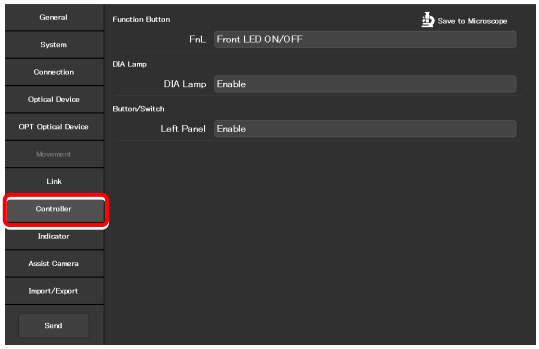
2.8 [Controller] Setting the Controllable Functions

This section describes how to assign functions to the function buttons on the Ti2-A microscope main body.

1. Select [Controller] from the setting item selection area.

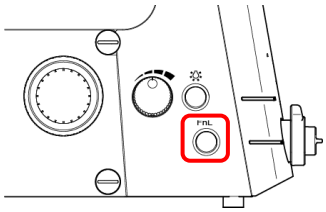
The function setting screen appears.

▼ Assigning functions



2.8.1 Setting the Function Buttons

Assign functions to the function button (FnL button) on the left operation panel of the Ti2-A microscope main body.

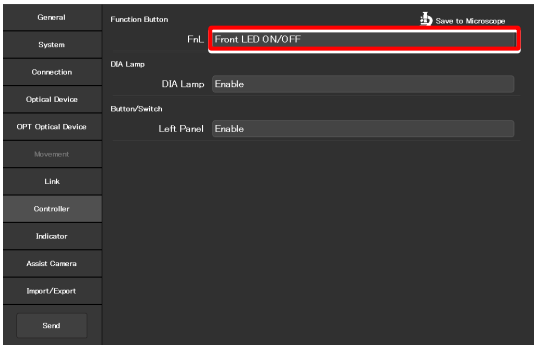


Left operation panel

1. To change the assigned function, click the [Function Button] area.

The subscreen of the function list for assignment is displayed.

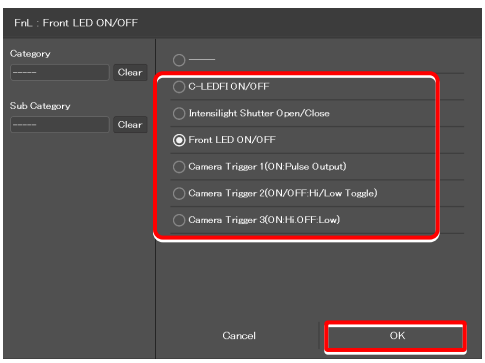
▼ Setting the Function Buttons



2. From the list, select the function to be assigned.

3. Click [OK].

▼ Subscreen of the function list for assignment



List of Functions Assigned to Function Buttons on the Ti2-A Microscope Main Body

The table below lists the functions that can be assigned to the function buttons on the Ti2-A microscope main body. (✓✓: Default setting, ✓: Settable)

No.	Indicated name	Functional overview	Settable
1	------- (NULL)	Nothing is to be set.	✓
2	C-LEDFI ON/OFF	Turns on or off the epi-fl LED Illuminator.	✓
3	Intensilight Shutter OPEN/CLOSE	Opens or closes the HG precentered fiber illuminator shutter.	✓
4	Front LED ON/OFF	Turns on or off the LED indicators on the front of the microscope main body.	✓✓
5	Camera Trigger 1 (ON: Pulse Output)	Output camera trigger 1 (pulse output)	✓
6	Camera Trigger 2 (ON/OFF: Hi/Low Toggle)	Output camera trigger 2 (toggling between Hi and Low)	✓
7	Camera Trigger 3 (ON: Hi, OFF: Low)	Output camera trigger 3 (momentary switching between High and Low)	✓

2.8.2 Setting Other Controllable Functions

1. Set the following items in the [DIA Lamp] area.

DIA Lamp:

Enable or disable the dia-illumination brightness adjuster operation.

2. Set the following item in the [Button/Switch] area.

Left Panel:

Enable or disable operation by the buttons or switches on the left operation panel of the microscope main body.

▼ Other settings

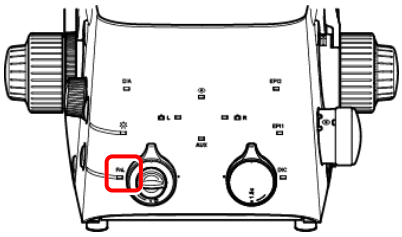
2.9 [Indicator] Setting the Indicators

This section describes the indicator settings of the Ti2-A microscope main body.

2.9.1 Setting the FnL Indicator on the Microscope

Assign the operating status of an arbitrary function to the FnL LED indicator on the front operation panel of the Ti2-A microscope main body.

In the initial state, no function is assigned to the FnL indicator. The indicators do not light unless a function is assigned.

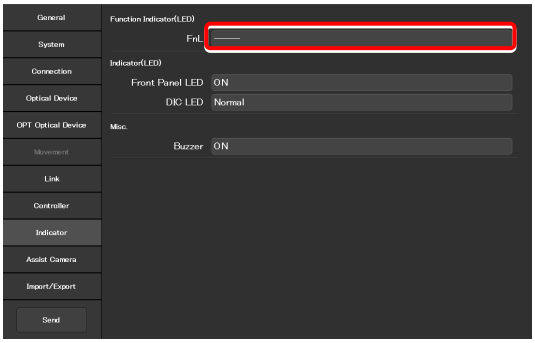


Front operation panel

1. **Set the following items in the [Function Indicator(LED)] area.**

   Select the status indication to be assigned to the LED indicator (FnL) on the front operation panel of the microscope main body.

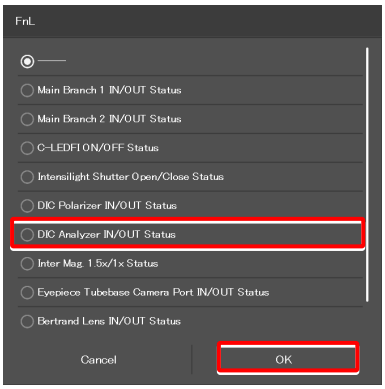
▼ Setting the LED indicators



2. **From the list, select the function to be assigned to the selected LED indicator.**

3. **Click [OK].**

▼ Subscreen of the function list for assignment



List of Indication Functions Assigned to the LED Indicator of the Ti2-A Microscope Main Body

The table below lists the LED indications that can be assigned to the FnL indicator on the Ti2-A microscope main body.

No.	Indicated name	Functional overview	States when set
1	-------	Nothing is to be set.	None
2	Main Branch 1 IN/OUT Status	Main branch 1 status	Lit: In, Extinguished: Out
3	Main Branch 2 IN/OUT Status	Main branch 2 status	Lit: In, Extinguished: Out
4	C-LEDFI ON/OFF Status	Selected LED unit status of the epi-fl LED illuminator	Lit: On, Extinguished: Off
5	Intensilight Shutter Open/Close Status	IntensiLight Shutter Status	Lit: Open, Extinguished: Closed
6	DIC Polarizer IN/OUT Status	DIC polarizer status	Lit: In, Extinguished: Out
7	DIC Analyzer IN/OUT Status	Analyzer slot status	Lit: In, Extinguished: Out
8	Inter Mag. 1.5x/1x Status	Intermediate magnification	Lit: 1.5x, Extinguished: 1x
9	Eyepiece Tubebase Camera Port IN/OUT Status	Tube base unit camera port status	Lit: EYE (port tube) with assist tube open Extinguished: DSC (port tube) with assist tube closed

No.	Indicated name	Functional overview	States when set
10	Bertrand Lens IN/OUT Status	Bertrand lens status	Lit: In, Extinguished: Out
11	Assist Camera ON/OFF Status	Assist camera power status	Lit: On, Extinguished: Off

2.9.2 Controlling the LED Indicators

This section describes how to control the indicator of the microscope main body.

1. Set the following items in the [Indicator(LED)] area.

Front Panel LED:

Turn on or off the LED on the front panel of the microscope main body.

DIC LED:

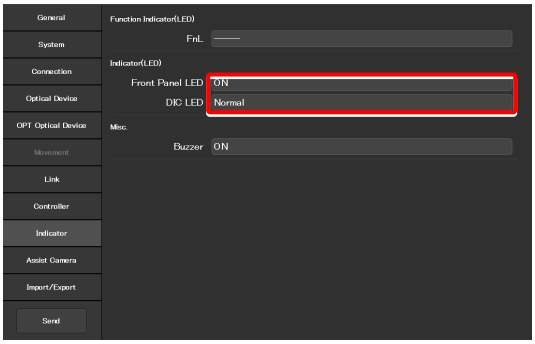
Select the behavior of the DIC indicator on the front panel of the microscope main body, which is used for identifying whether the DIC microscopy conditions are satisfied or not.

Always OFF: The indicator is always off. (It does not light nor blink even though DIC microscopy conditions are satisfied.)

ON-OFF: The indicator is lit when the DIC microscopy conditions are satisfied. (Not blinking)

Normal: The indicator is lit when the DIC microscopy conditions are satisfied, and it blinks when they are partly satisfied.

▼ Controlling the indicators (LED)



2.9.3 Other Control Items

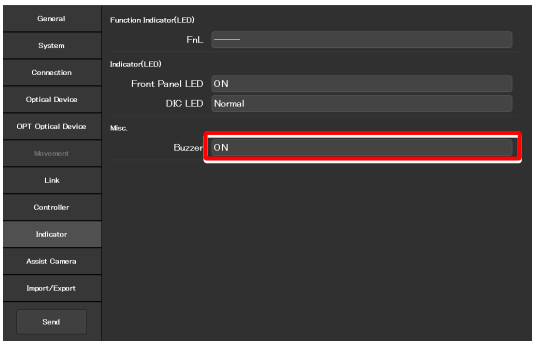
This section describes other control items.

1. Set the following item in the [Misc.] area.

Buzzer:

Enable (ON) or disable (OFF) the buzzer of the microscope main body.

▼ Other control items



2.10 [Assist Camera] Setting the Assist Camera

This section describes how to set the frame rate of the assist camera, the destination to save the images acquired by the assist camera, and the field of view adjustment options of the assist camera when the assist tube base unit is used.

1. Select [Assist Camera] from the setting item selection area.

The assist camera setting screen appears.

2. Set the following items in the [Assist Camera] area.

Frame Rate:

Select the frame rate of the assist camera.

Dest. to save:

Specify where the image data is to be saved (path to the folder), when an image is obtained by clicking the capture button.

Adjustment:

Click this to display the Adjustment screen.

The Adjustment screen allows the field of view of the assist camera to be adjusted to the same position and size of the field of view of the binocular part.

SUPPLEMENTAL REMARKS

It is necessary to adjust the assist camera's field of view in both states (in and out) of the Bertrand lens.

Follow the procedure below:

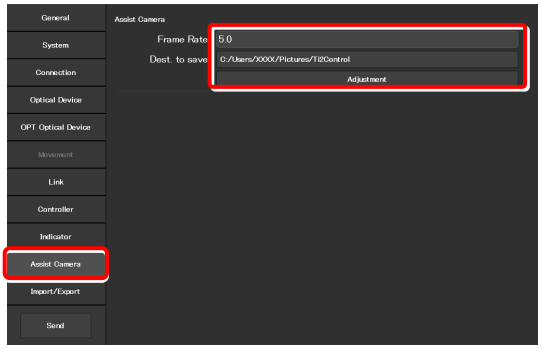
1) Adjust the assist camera's field of view in the current Bertrand lens state (in or out).
2) Click [OK] to apply the settings on the Adjustment screen.
3) Turn the Bertrand lens in/out dial on the microscope main body to place/remove the Bertrand lens into/from the optical path.
(Out -> In, or In -> Out)
4) Select [Assist Camera] from the setting item selection area, and then click the [Adjustment] button to display the Adjustment screen.
5) Adjust the assist camera's field of view in the current Bertrand lens state (in or out).
6) Click [OK] to apply the settings on the Adjustment screen.

Note that if an attempt is made to change the Bertrand lens position (in/out) with the Adjustment screen open, an error message appears and the Adjustment screen is closed.

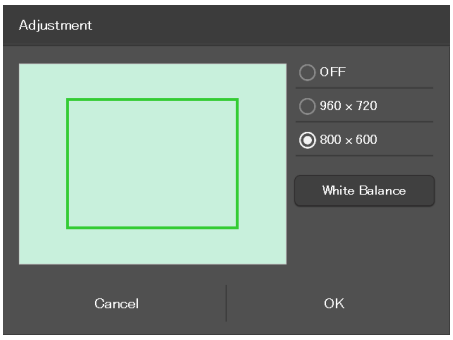
White Balance:

Automatically adjust the white balance of the current image displayed on the screen.

▼ Setting the assist camera



▼ Adjustment screen



2.11 [Import/Export] Importing and Exporting the Settings

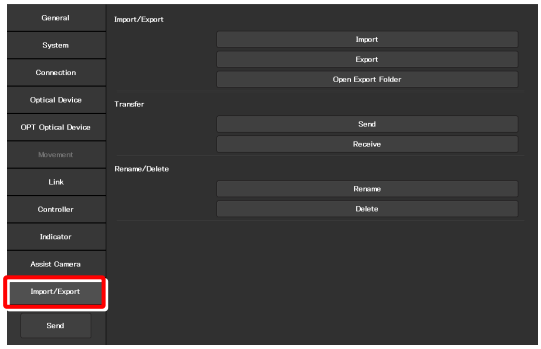
This section describes how to import and export the settings.

The settings made by using the “Ti2 Control” application can be saved (as a configuration file) in the PC and read later.

More than one configuration file can be saved, with a file for each user. The settings of the microscope system can be changed by reading different configuration files.

1. Select [Import/Export] from the setting item selection area.

▼ Import and export settings

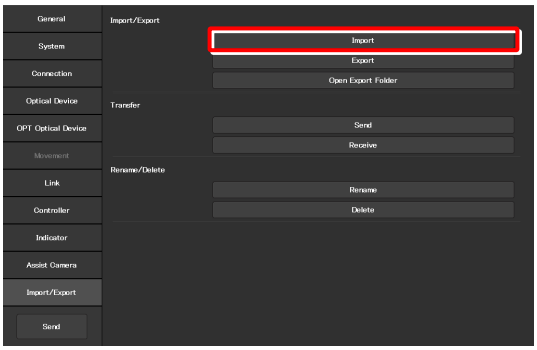


2.11.1 Importing the Settings

1. Click [Import] in the [Import/Export] area.

The Import screen appears.

▼ Importing the settings

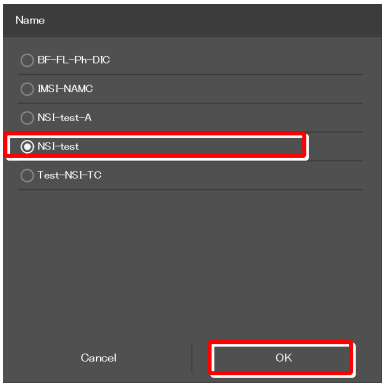


2. Select the setting information file to be imported.

▼ File selection screen

3. Click [OK].

The Import screen appears.

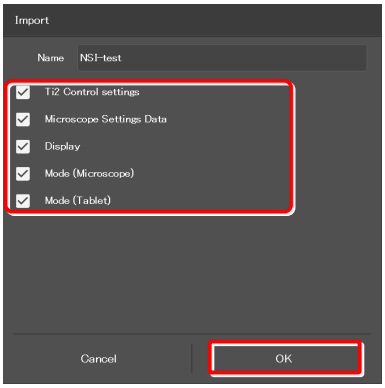


4. Select the type of the setting information to be imported.

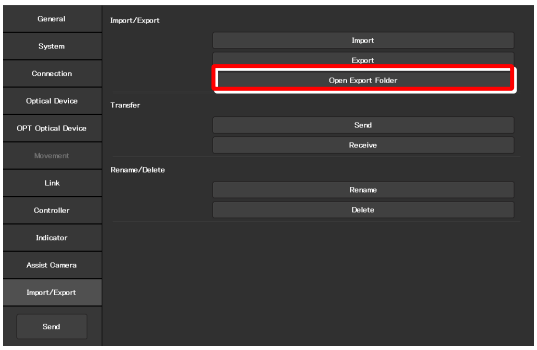
5. Click [OK].

The setting information that is saved is loaded and reflected on each setting screen.

▼ Import screen



▼ Open the export folder



SUPPLEMENTAL REMARKS

Click [Open Export Folder] to open the destination folder of the file in the Explorer.

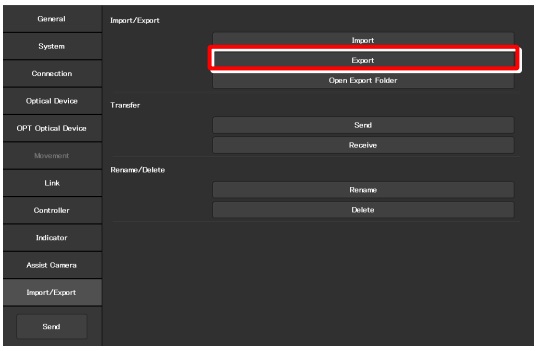
The path of the destination folder is as follows:

<C:\Users\%USERPROFILE%\AppData\Local\Nikon\Ti2 Control\Export>

2.11.2 Exporting the Settings

1. Click [Export] in the [Import/Export] area.

▼ **Exporting the settings**



2. Specify a file name in the [Name] field.

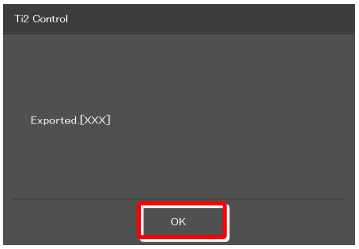
▼ **Exporting the settings**

3. Click [OK].

The setting information is saved.

4. On the export complete screen, click [OK].

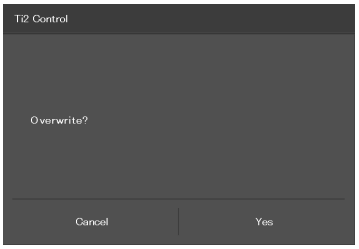
▼ **Completed**



SUPPLEMENTAL REMARKS

If the file name specified in step 2 already exists, a confirmation message appears after [Save] is clicked, asking whether the file is to be overwritten.
Click [Yes] to overwrite the file or [Cancel] to cancel saving the file.

▼ **Confirmation of overwriting**



2.11.3 Transmitting the Settings

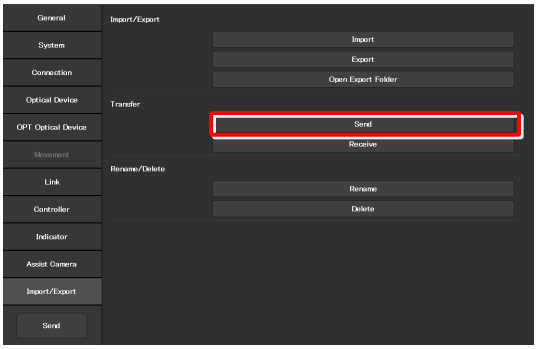
The setting files saved by the “Ti2 Control” application can be sent to or received from other terminals.

> **SUPPLEMENTAL REMARKS**
> Connect the transmission terminal and the reception terminal to the same wireless router.

1. **In the [Transfer] area of the transmission terminal, click [Send].**

   The file selection screen of the file to be sent appears.

▼ Sending the settings (transmission terminal)

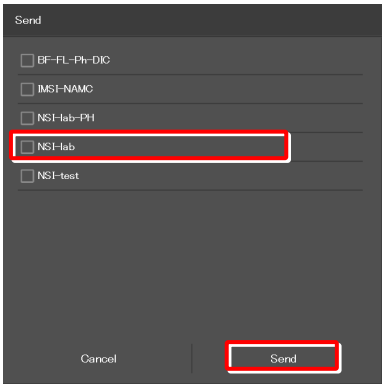


2. **Select a file to be sent.**

3. **Click [Send].**

   A transfer confirmation screen is displayed.

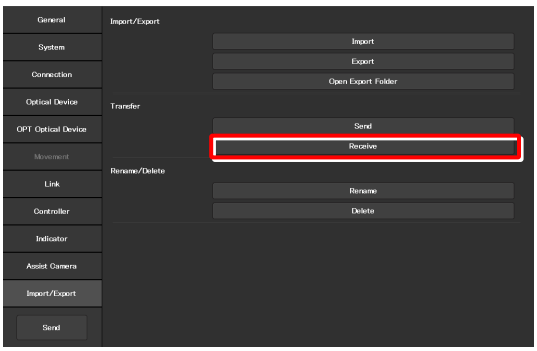
▼ Selecting a file to be sent (transmission terminal)



4. **In the [Transfer] area of the reception terminal, click [Receive].**

   The data reception standby screen appears.

▼ Receiving the settings (reception terminal)



5. Take a note of the IP address of the reception terminal displayed on the reception standby screen.

▼ **Reception standby screen**

6. In the transmission terminal, enter the receiver's IP address displayed in step 5 in the [Destination IP address] field.

7. Click [Send].

Data transfer starts.

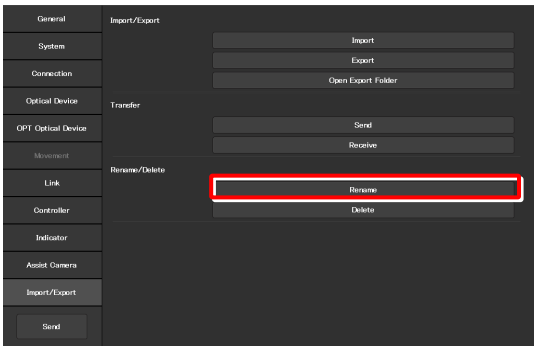
▼ **Confirming the transmission (transmission terminal)**

2.11.4 Changing the Setting Name

1. **Click [Rename] in the [Rename/Delete] area.**

   The selection screen of the file to be renamed appears.

▼ **Changing the setting name**

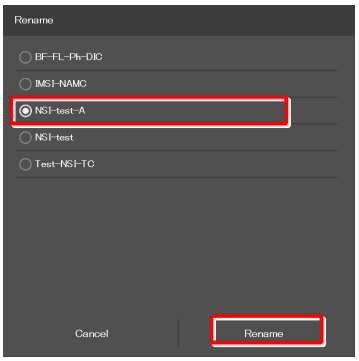


2. **Select the file to be renamed.**

3. **Click [Rename].**

   The rename screen appears.

▼ **Selecting a file**

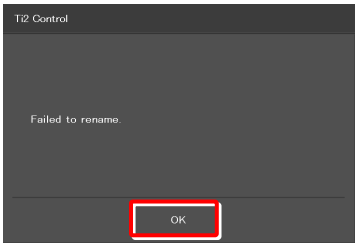


4. **Specify a file name in the [Name] field.**

5. **Click [OK].**

▼ **Rename**

▼ **Confirmation of overwriting**



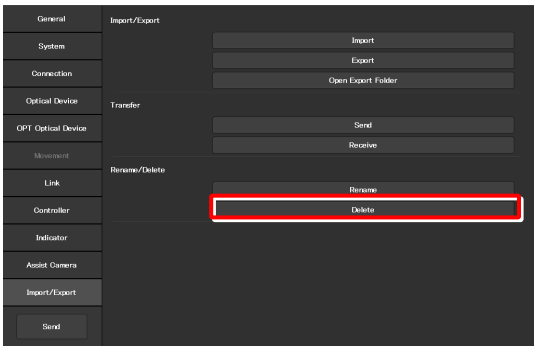
> **SUPPLEMENTAL REMARKS**
>
> If the file name specified in step 4 already exists, the name is not saved even though [OK] is clicked.
> In this case, perform the procedure from step 1 again with another name.

2.11.5 Deleting the Configuration File

1. Click [Delete] in the [Rename/Delete] area.

The file selection screen of the file to be deleted appears.

▼ **Deleting the configuration file**

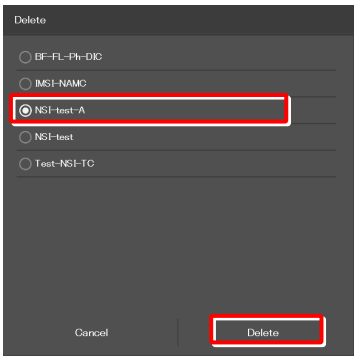


2. Select the file to be deleted.

3. Click [Delete].

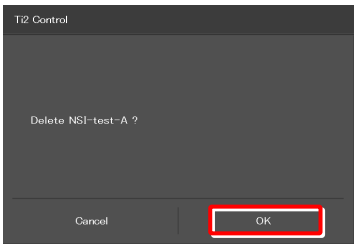
A deletion confirmation screen is displayed.

▼ **Selecting a file**



4. Click [OK] to delete the file.

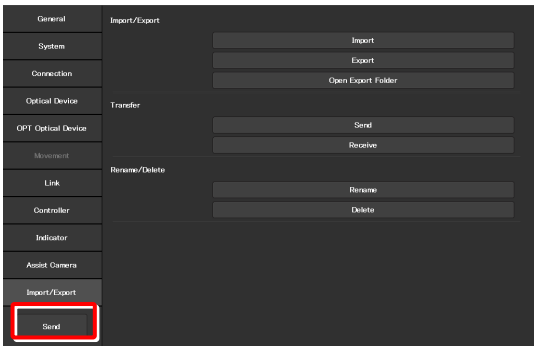
▼ **Confirmation of deletion**



This completes the setup procedure.

▼ **Sending the information to the microscope**

Click [Send] in the setting item selection area to send the setting information to the microscope.



2.12 [Information] Version Information

This section describes how to display the versions of the application and the microscope main body.

1. Select [Information] from the setting item selection area.

The application and microscope main body versions are displayed.

The version information on each Ti2 series microscope is displayed.

Version:

Ti2 Control version (this application)

Microscope:

Model: Name of the currently used microscope system

FW: Firmware version of the Ti2-A main body

MAC Address: MAC address of the microscope main body

Assist Camera:

FW: Firmware version of the assist camera when the assist tube base unit is in use

MAC Address: MAC addresses of the assist camera

▼ Version information

Chapter
3

Setup: Ti2-E

This chapter describes how to register new microscope system settings when using the "Ti2 Control" application for the first time.

When microscope system settings are changed, this setup process allows only the relevant information of the microscope system to be changed.

3.1 Basic Setup Operations and Screens

3.1.1 Configuration of the Setup Screen

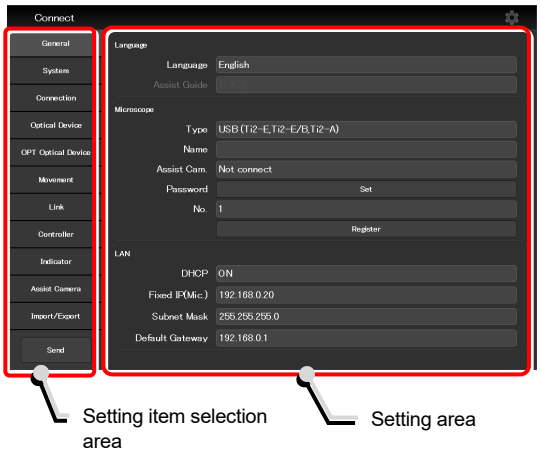
■ **Setting item selection area**

Click each button to change a setting item.

■ **Setting area**

Click a desired button in the setting item selection area to change the display items and settings.

▼ **Configuration of the setup screen**



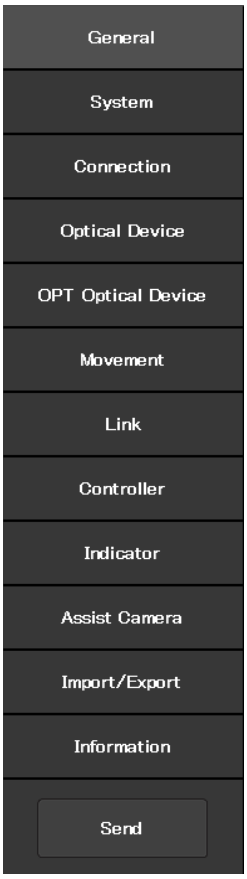
3.1.2 Setting Items

The setup function consists of 12 setting screens and one button:

> **SUPPLEMENTAL REMARKS**
> Depending on the window size, not all items may be displayed.
> Scroll the setting item selection area to select [General] or [Information].

- [General]: Basic settings of the microscope and the application
- [System]: Display and manual registration of the microscope configuration
- [Connection]: Settings of the connection destinations of devices
- [Optical Device]: Settings of optical devices
- [OPT Optical Device]: New registration of optical devices
- [Movement]: Settings of the movement
- [Link]: Settings of linked control
- [Controller]: Setting the motorized control of the motorized devices
- [Indicator]: Setting the indicators
- [Assist Camera]: Setting the assist camera
- [Import/Export]: Reading and saving the settings
- [Information]: Display of the version information
- [Send]: Transmission of the setting information to the microscope system

▼ Setting items

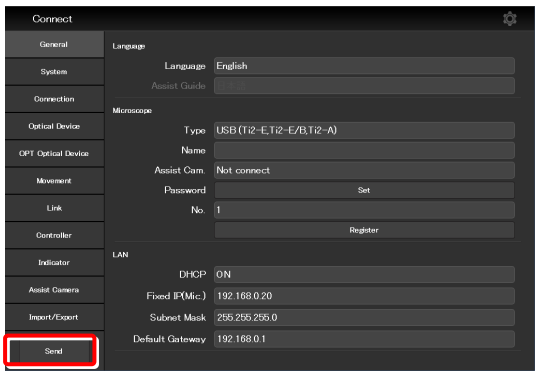


3.1.3 Sending Microscope System Information

■ Sending information to the microscope system

Click [Send] in the setting item selection area to display the confirmation screen.
Click [OK] to send the information set by the application to the microscope system.

▼ Setup screen

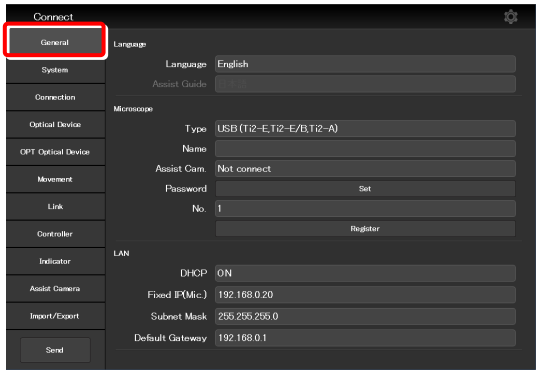


3.2 [General] Basic Settings of the Microscope and the Application

The General screen allows basic settings of the microscope and the application.

1. Select [General] from the setting item selection area.

▼ General settings



3.2.1 Setting the Language

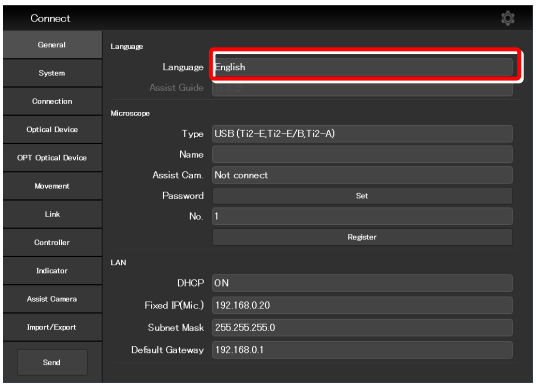
Set the language of this application.

1. Set as follows in the [Language] area.

Language:

Select the language to be used.

▼ Setting the language



3.2.2 Registering the Microscope System

This section describes how to register the microscope, the password and the assist camera.

1. Set the following items in the [Microscope] area.

Type:

Select the microscope to be connected.

Name:

Enter a registration name of the microscope system.

Assist Cam.:

Click the box to display a list of MAC addresses of the assist cameras.
Click the target MAC address and then [OK] to register the assist camera.

> **CAUTION**
>
> When an assist tube base unit is used, connect the LAN cable to the [LAN (CAM)] port at the back of the microscope main body to connect to the wireless router.

> **When registering a new microscope system**
>
> To register a new microscope system, be sure to register an assist camera too.
> When using a wireless router in this case, it is recommended to connect only one microscope system to the wireless router.

Password:

It is possible to make a setting so that a password is requested when accessing the microscope from a PC which is not registered for the microscope.
Enter any letters for the password. (Enter nothing if no password is to be set.)

No password is requested during an access if the microscope system is already registered on the PC.

No.:

Select a microscope number to be registered with the PC. Up to 20 microscopes can be registered.

For each registered number, a registered name of the microscope system (or a MAC address) is displayed.

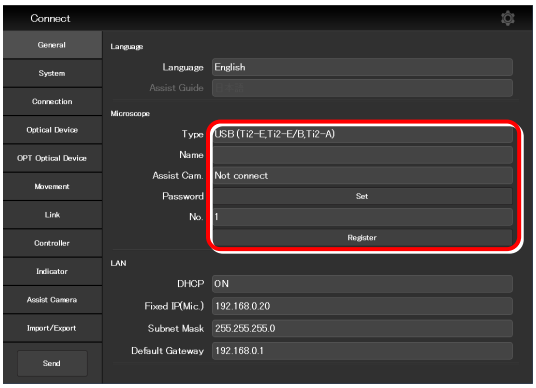
Register button:

Click this button to register the connected microscope as a “trusted microscope” with a microscope number specified in “No.” and save it in the device.

Connection to the microscope registered here is possible without a password.

> **CAUTION**
>
> Make sure any new microscope system is registered.

▼ Registering the microscope system



3.2.3 Setting the LAN

1. Set the following items in the [LAN] area.

DHCP:

Select whether to enable or disable the automatic allocation of the microscope's IP address.

Fixed IP(Mic):

Displays the fixed IP address of the microscope.

This IP address is not used when DHCP is enabled (ON).

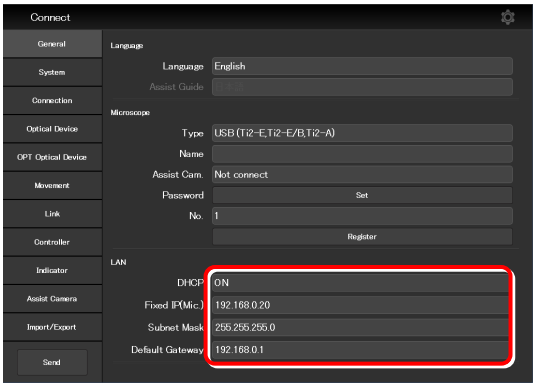
Subnet Mask:

Allows displaying or specifying the subnet mask of the microscope.

Default Gateway:

Allows displaying or specifying the default gateway of the microscope.

▼ Setting the LAN



3.3 [System] Display and Manual Registration of the Microscope Configuration

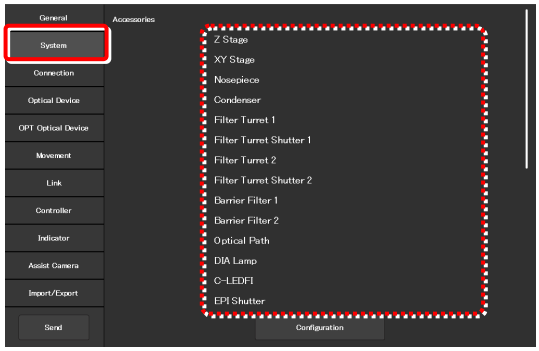
Clicking [System] displays a list of accessories mounted on the microscope system.

1. Select [System] from the setting item selection area.

A list of the accessories connected to the microscope system is displayed.

2. Confirm the items displayed in the [Accessories] area.

▼ Display of the microscope configuration



3.3.1 Manually Registering the Microscope Configuration

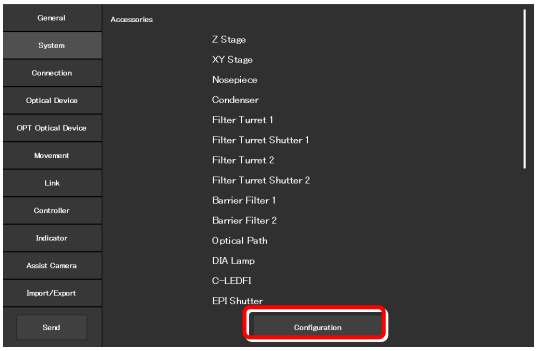
This section describes how to register the accessories which cannot be automatically detected.

The following is the basic registration procedure.

1. Click [Configuration] in the setting area.

A microscope configuration setting screen appears.

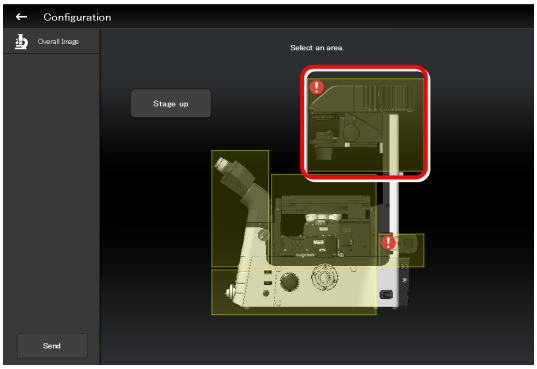
▼ Manually registering the microscope configuration



2. Click the area where accessory mounting information is to be registered.

A registration screen of the area is displayed.

▼ Microscope configuration setting screen



SUPPLEMENTAL REMARKS

The mark is displayed at the upper left of the parts area if there is an accessory with no device information registered.

In a stage-up configuration

When the microscope system is in a 2-tier stage-up configuration, click [Stage up] to change the configuration shown in the application to the stage-up configuration.

When the motorized BA filter wheel for stage up is mounted

When the FL turret and the motorized BA filter wheel for stage up (TI2-P-FWBS-E) are mounted in two tiers using a stage-up kit, click [Stage up] to manually register the motorized BA filter wheel for stage up to the lower tier.

3. Click the parts area or the parts list on the left.

A list of products that can be registered for that part is displayed.

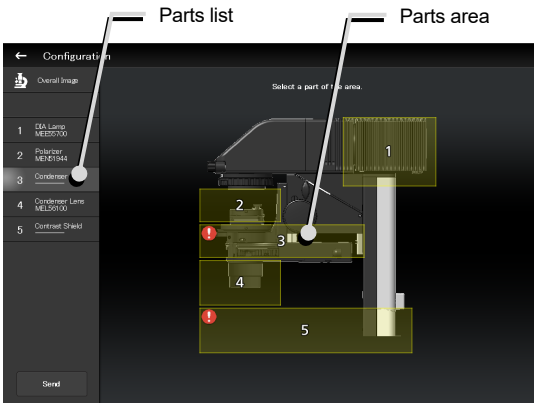
SUPPLEMENTAL REMARKS

The motorized devices and intelligent accessories mounted on the microscope, which are automatically detected, are displayed as being selected.

If the selected and registered accessories are different from those actually mounted on the microscope, the accessory information is overwritten by the information on the automatically detected accessories.

However, a different but similar product may be selected depending on the accessory even after automatic detection. Although this does not affect anything, the product can also be selected and registered again.

▼ **Per-area registration screen**



4. Select the name of the product to be registered.

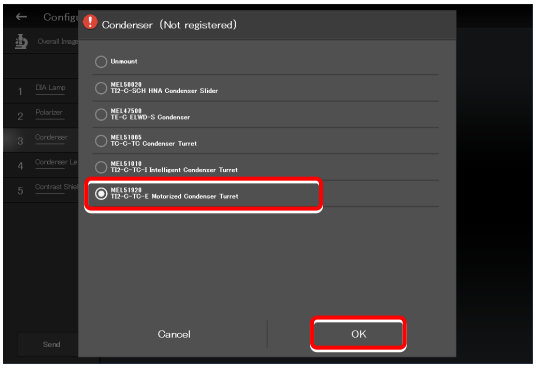
SUPPLEMENTAL REMARKS

To register the accessory not being mounted, select [Unmount].

SUPPLEMENTAL REMARKS

When motorized devices and intelligent accessories are mounted on the microscope, only detected products are displayed in the product list.

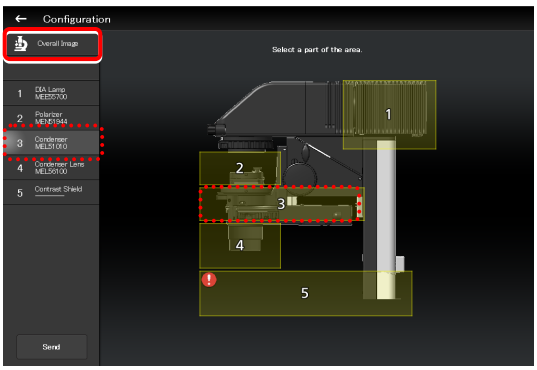
▼ **Product list dialog**



5. Click [OK].

A product code of the selected product is displayed on the second line of each item in the left parts list.

▼ **Per-area registration screen**



6. Click [Overall Image] to register an accessory for another parts area.

The screen returns to the microscope configuration setting screen.

7. Repeat steps 2 to 5 for each part to be registered.

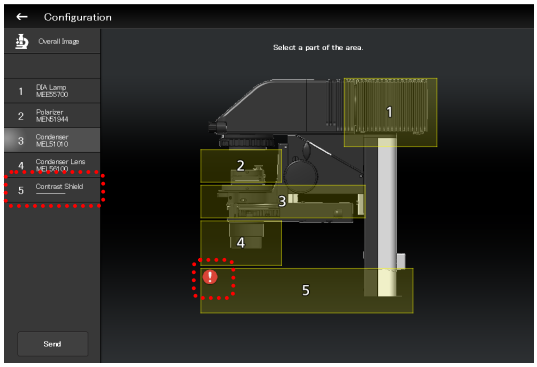
8. To finish manual registration of the microscope configuration, click [Send] to send the registration information or click [ ].

The edited information is not saved unless it is sent.

Sending information on the microscope configuration when there is a part without device information

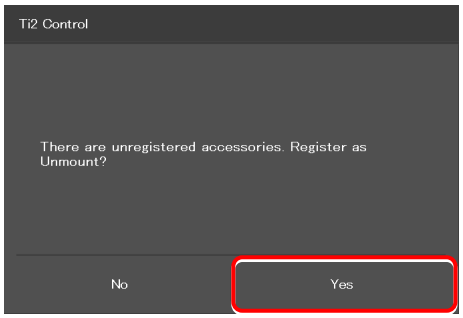
If there is a part without device information, the mark is displayed in the parts area, and [--------] is displayed in the parts list.

▼ **Per-area registration screen**



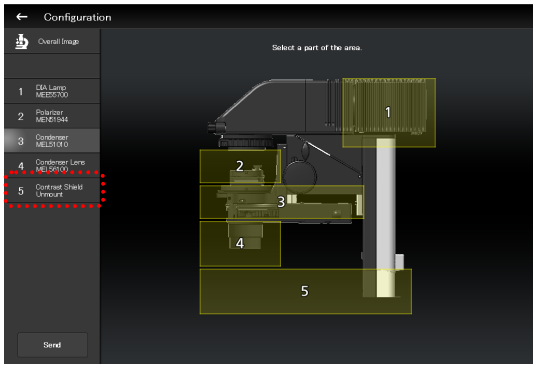
If transmission of the microscope configuration information is attempted in this state, a confirmation message for registering the part without device information to be [Unmount] appears.

▼ **Confirmation message**



After the transmission, [Unmount] is displayed under the part without device information.

▼ **Per-area registration screen after the transmission**



When using epi-illumination

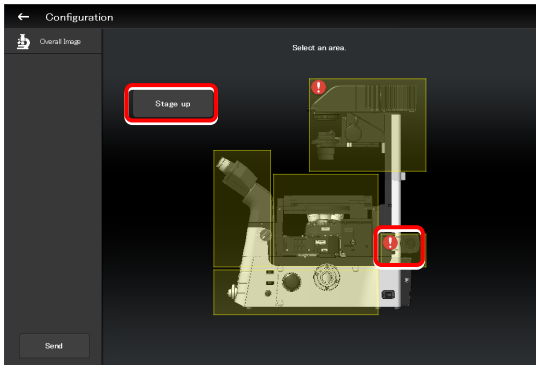
Click the area that includes the epi-illumination attachment.

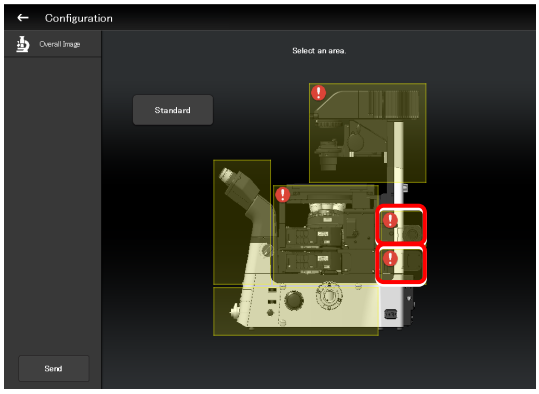
The registration screen for the epi-illumination attachment is displayed.

If a stage-up kit is used, epi-illumination attachments can be mounted in two tiers.

To register two tiers of epi-illumination attachments, click [Stage up].

▼ Registering an epi-illumination attachment





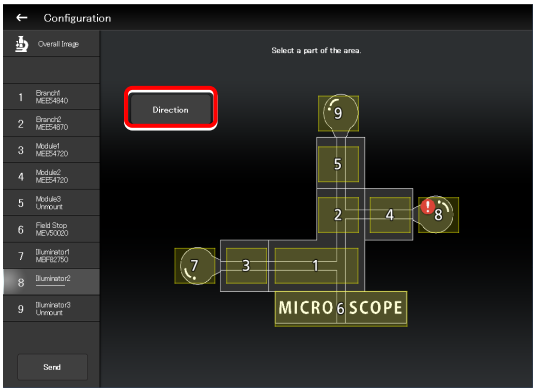
In a two-tier configuration, the upper and lower epi-illumination attachments are mounted in opposite directions. However, the application shows the two epi-illumination attachments in the same orientation.

The orientations of the two epi-illumination attachments can be shown in the same way as the actual ones by using the following procedure.

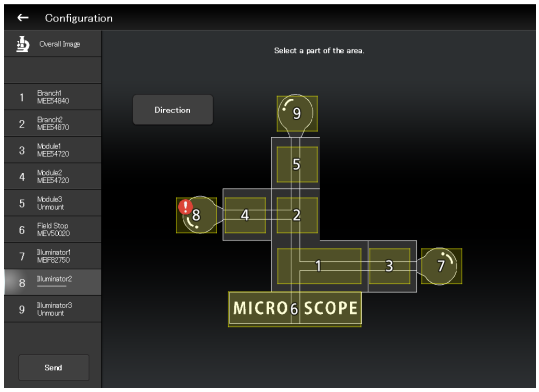
Select the epi-illumination attachment which is shown in the orientation opposite to the actual one.

Click [Direction] to invert the part orientation horizontally so that the display on the application is the same as the actual epi-illumination attachment.

▼ Inverting the orientation of the epi-illumination attachment



▼ Inverted layout



> **Using the TI2-F-FLS Simple Epi-FL Attachment**
>
> When specifying the TI2-F-FLS simple epi-fl attachment for [Branch1], set [Illuminator3] to the epi-illumination attachment.

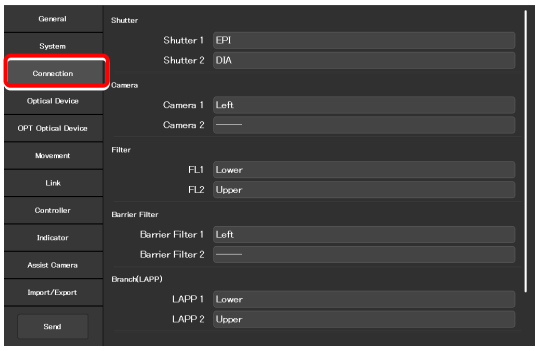
3.4 [Connection] Setting the Connection Destinations of Devices

This section describes how to set the connection (mounting) destinations of devices.

1. Select [Connection] from the setting item selection area.

The connection setting screen appears.

▼ Setting the connections of devices



3.4.1 Setting the Connections of Motorized Shutters

When the NI-SH-E motorized shutter is mounted, epi-illumination (EPI), dia-illumination (DIA), or auxiliary (AUX) can be selected and set as the mounting destination.

1. Set the following items in the [Shutter] area.

Shutter 1:

Select the mounting destination of the motorized shutter. If no motorized shutter is mounted, select "---."

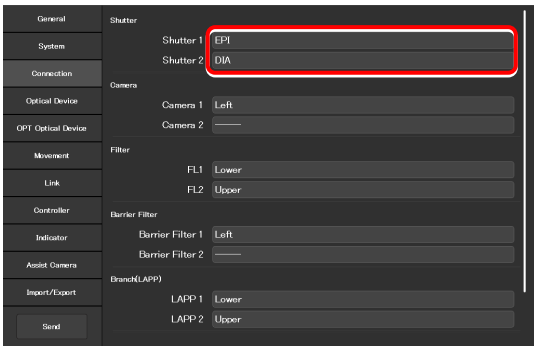
Shutter 2:

Select the mounting destination of the second motorized shutter. If only one motorized shutter is mounted, select "---."

SUPPLEMENTAL REMARKS

The same value cannot be specified for [Shutter 1] and [Shutter 2].

▼ Setting the connections of motorized shutters



3.4.2 Setting the Connections of Cameras

Select and set the ports to which cameras are attached from [Left] (left side port of the microscope main body), [Right] (right side port of the microscope main body), [Front] (tube base unit side port), or [Aux] (back port (for the Ti2-E only), or bottom port (for the Ti2-E/B only)).

Set the camera installation position to display the camera in the microscope view on the Home screen.

1. Set the following items in the [Camera] area.

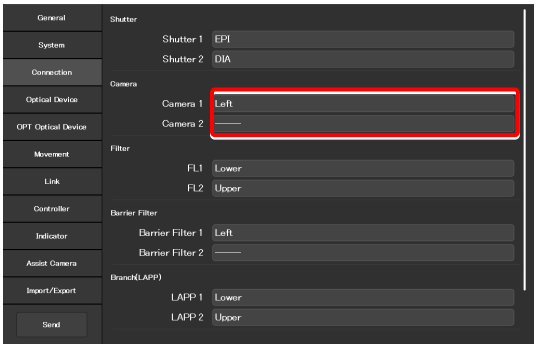
Camera 1:

Select the port to which the camera is attached.
If no camera is attached, select "---."

Camera 2:

Select the port to which the second camera is attached.
If only one camera is attached, select "---."

▼ Setting the cameras



3.4.3 Setting the Connections of FL Turrets

When the microscope system is set up in a stage-up configuration and two FL turrets are attached, specify the location to which each FL turret is attached, the upper tier (Upper) or the lower tier (Lower).

1. Set the following items in the [Filter] area.

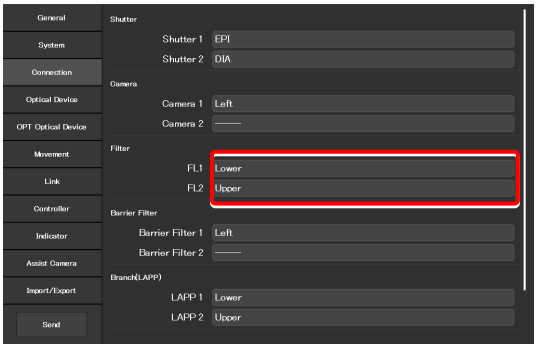
FL1:

Select the position to which the FL turret is attached.
If no FL turret is attached or only one FL turret is attached, this function cannot be set.

FL2:

Select the position to which the second FL turret is attached.
If only one FL turret is attached, this function cannot be set.

▼ Setting the FL turrets



3.4.4 Setting the Connections of BA Filter Wheels

Select and set the ports to which BA filter wheels are attached from [Left] (left side port), [Right] (right side port), or [Center] (lower tier of the stage-up kit).

1. Set the following items in the [Barrier Filter] area.

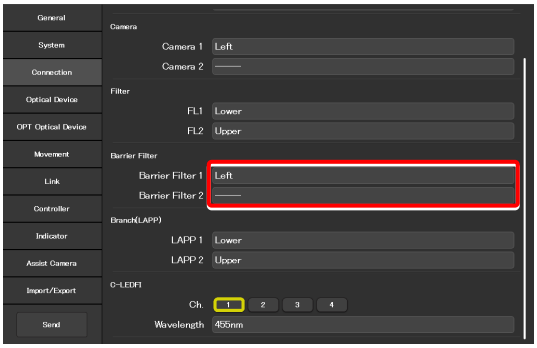
Barrier Filter 1:

Select the port to which the BA filter wheel is attached.
If no BA filter wheel is attached, select "---."

Barrier Filter 2:

Select the port to which the second BA filter wheel is attached.
If only one BA filter wheel is attached, this function cannot be set.

▼ Setting the BA filter wheels



3.4.5 Setting the Connections of Branches (LAPP)

When the microscope system is set up in a stage-up configuration and two main branches are attached, specify the location (the upper tier: Upper, or the lower tier: Lower) to which each main branch of the epi illumination attachment is attached.

1. Set the following items in the [Branch(LAPP)] area.

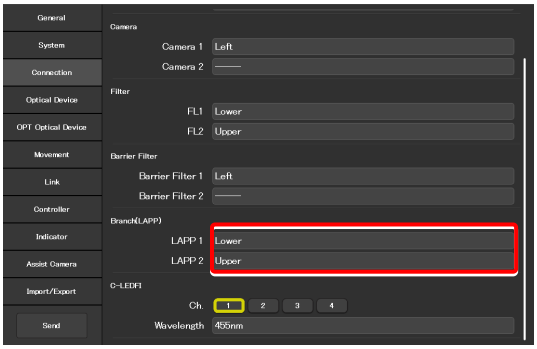
LAPP1:

Select the position to which the main branch is attached.
If no main branch is attached or only one main branch is attached, this function cannot be set.

LAPP2:

Select the position to which the second main branch is attached.
If only one main branch is attached, this function cannot be set.

▼ Setting the branch (LAPP)



3.4.6 Setting the C-LEDFI Epi-fl LED Illuminator

Set the LED wavelength of each channel of the C-LEDFI epi-fl LED illuminator.

1. Set the following items in the [C-LEDFI] area.

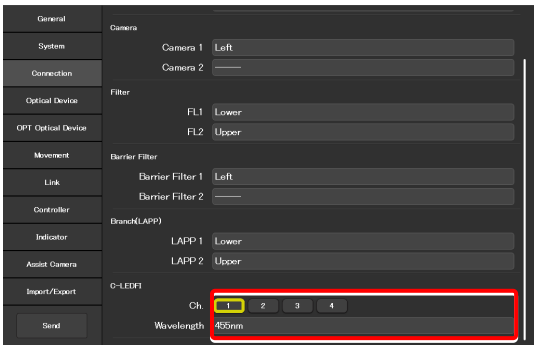
Ch.:

Select the channel number of the LED.

Wavelength:

Allows displaying or specifying the wavelength of the LED selected in [Channel].

▼ Setting the C-LEDFI



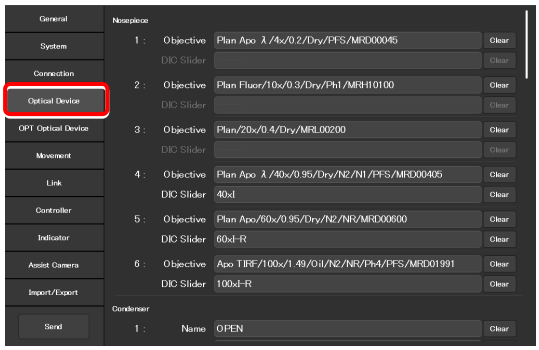
3.5 [Optical Device] Setting the Optical Devices

This section describes how to set objectives, condenser modules, fluorescence filter cubes, barrier filters (BA filters), intermediate magnifications, external phase contrast ring, and optical path names.

1. Select [Optical Device] from the setting item selection area.

The optical device setting screen appears.

▼ **Setting optical devices**



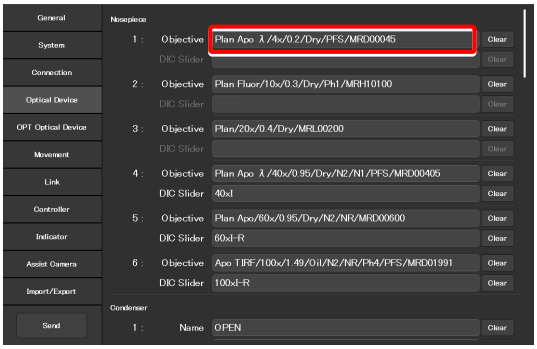
3.5.1 Setting the Nosepiece

Specify which objective is attached to each address of the nosepiece.

1. Click the [Objective] field in the [Nosepiece] area.

The list of the objectives is displayed.

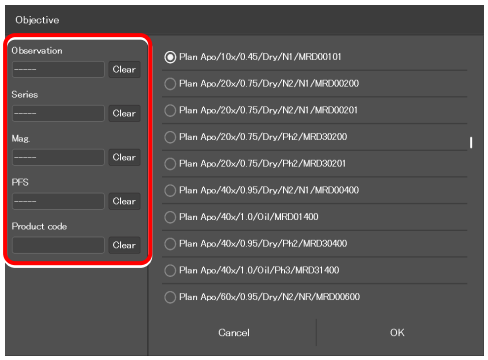
▼ **Setting the nosepiece**



2. Select an objective.

Selecting [Observation], [Series] or [Mag.] displays a list of objectives that match the conditions.

▼ **List of objectives**



Observation:

Allows a list of objectives to be narrowed down by specifying a microscopy technique.
(If the list does not include the target microscopy technique or the microscopy technique is unknown, select “---.”)

Series:

Allows a list of objectives to be narrowed down by specifying a series name.
(If the series name is unknown, select “---.”)

Mag.:

Allows a list of objectives to be narrowed down by specifying a magnification.
(If the magnification is unknown, select “---.”)

PFS:

Allows a list of objectives to be narrowed down by objectives that support PFS.

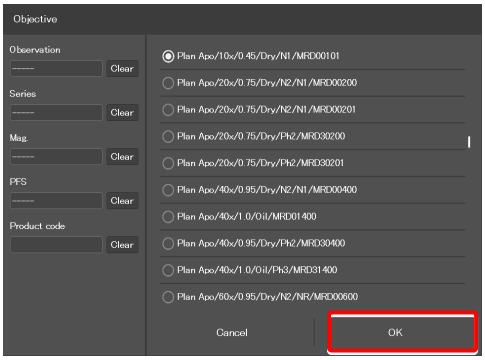
Product code:

Enter the product code of the objective.

3. **Click [OK].**

   The information about the objective is registered and displayed in the [Objective] field.

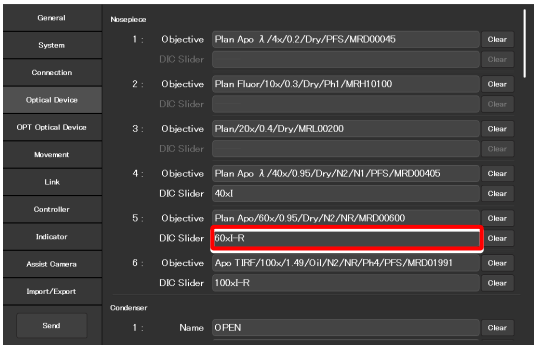
▼ List of objectives



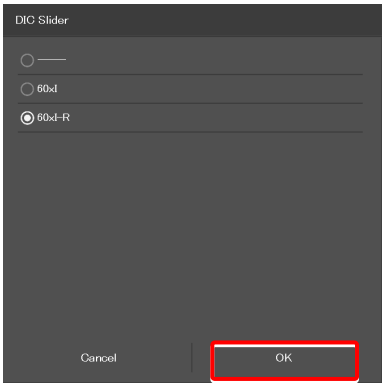
4. **For objectives supporting DIC observation, click the [DIC Slider] field, select the required objective-side DIC slider from the list, and then click [OK].**

   The information about the objective-side DIC slider is registered and displayed in the [DIC Slider] field.

▼ Setting the nosepiece



▼ List of DIC sliders



5. **Repeat steps 1 to 4 for each address of the nosepiece to be registered.**

3.5.2 Setting the Condenser Module

Specify which condenser module is attached to each address of the condenser turret.

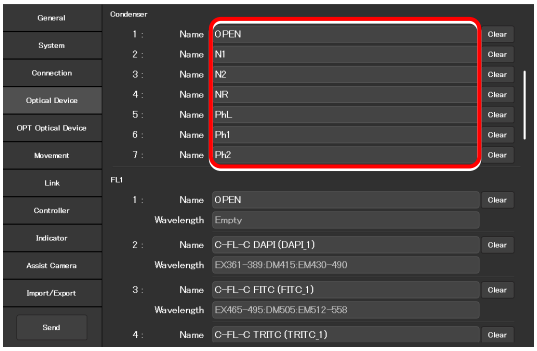
1. **In the [Condenser] area, click the [Name] field of each condenser turret address for which condenser module information is to be set.**

   The list of the condenser modules is displayed.

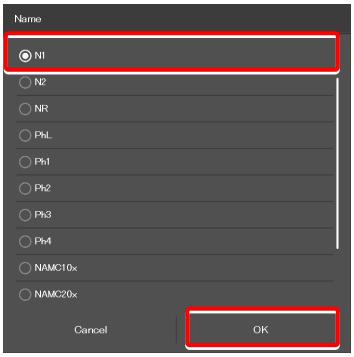
2. **Select a condenser module from the list, and then click [OK].**

3. **Repeat steps 1 and 2 for each condenser turret address for which condenser module information is to be set.**

▼ **Setting the condenser module**



▼ **Condenser module list**



3.5.3 Setting the Filter Cube

Specify which filter cube is attached to each address of the FL turret.

1. **In the [FL1] area, click the [Name] field of each FL turret address for which filter cube information is to be set.**

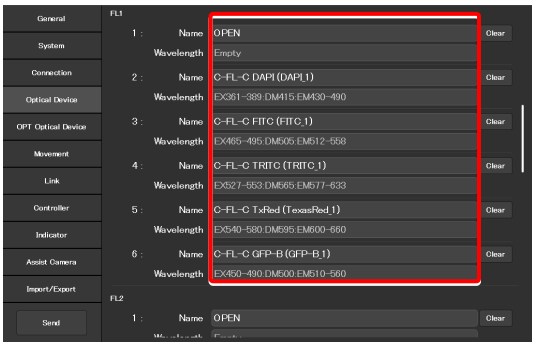
   The list of the filter cubes is displayed.

2. **Select a filter cube from the list, and then click [OK].**

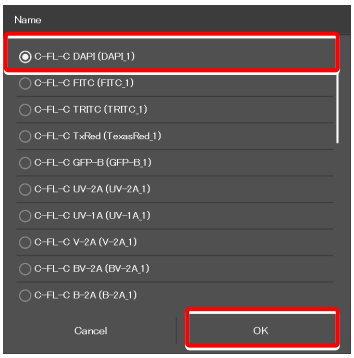
   When a filter cube name is selected, the [Wavelength] field is filled automatically.

3. **Repeat steps 1 and 2 for each FL turret address for which filter cube information is to be set.**

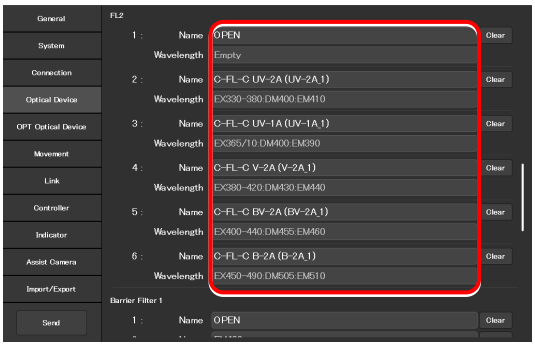
▼ Setting the filter cube



▼ Filter cube list



▼ For the second FL turret



SUPPLEMENTAL REMARKS

When a stage-up kit is used, up to two FL turrets can be connected.
When two FL turrets are connected, set the [FL2] area too.

3.5.4 Setting the BA Filter Wheels

Specify which BA filter (barrier filter) is attached to each address of the BA filter wheel.

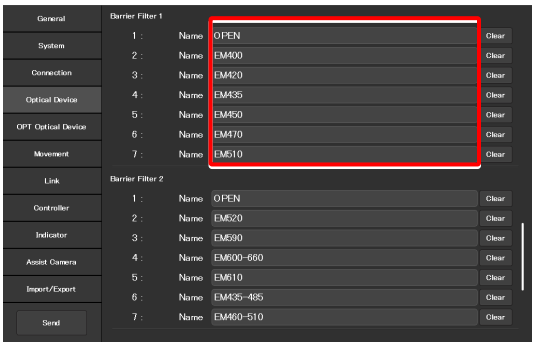
1. **In the [Barrier Filter 1] area, click the [Name] field of each BA filter wheel address for which BA filter information is to be set.**

   The list of the BA filters is displayed.

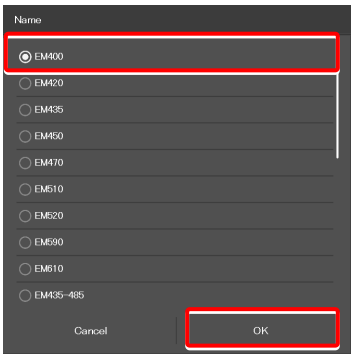
2. **Select a BA filter from the list, and then click [OK].**

3. **Repeat steps 1 and 2 for each BA filter wheel address for which the BA filter information is to be set.**

▼ **Setting barrier filter 1**



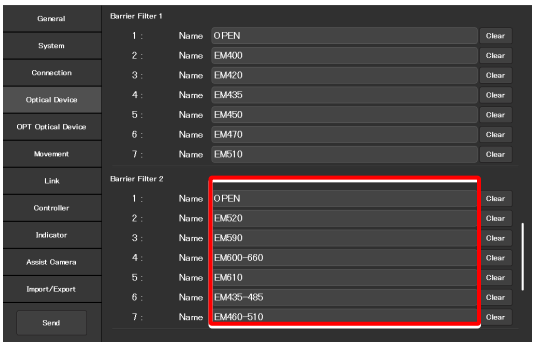
▼ **BA filter list**



SUPPLEMENTAL REMARKS

Up to two BA filter wheels can be connected.
When two BA filter wheels are connected, also set the [Barrier Filter 2] area.

▼ **For the second BA filter wheel**



3.5.5 Setting the Intermediate Magnification

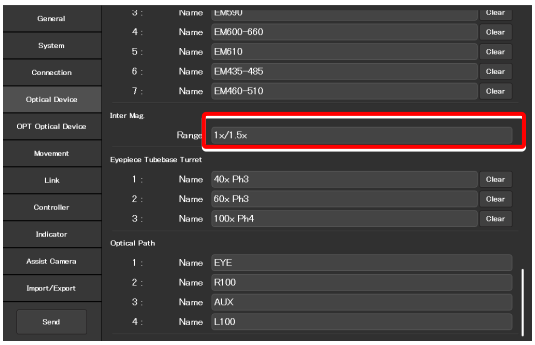
Set the intermediate magnification.

1. Set the following item in the [Inter Mag.] area.

Range:

Select the type of intermediate magnification lens (second tube lens) attached.

▼ Setting the intermediate magnification



3.5.6 Setting the External Phase Ring

When the motorized tube base unit for external phase contrast is used, specify which phase ring is attached to each address of the phase ring turret.

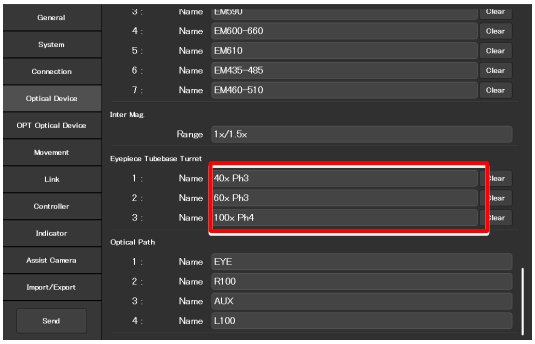
1. In the [Eyepiece Tubebase Turret] area, click the [Name] field of each turret address for which external phase ring information is to be set.

The list of the external phase rings is displayed.

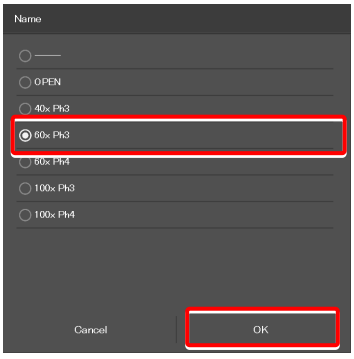
2. Select a phase ring from the list, and then click [OK].

3. Repeat steps 1 and 2 for each turret address for which phase ring information is to be set.

▼ Setting the external phase ring



▼ External phase ring list



3.5.7 Setting the Optical Path Name

Set the optical path name (output port name) to be displayed.

1. In the [Optical Path] area, click the [Name] field of each port address for which optical path information is to be set.

(Within 10 single-byte alphanumeric characters)

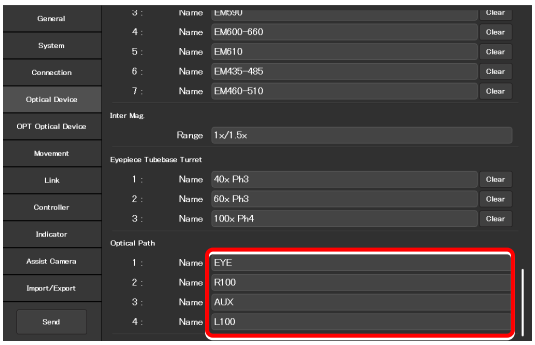
1: Eyepiece observation port

2: Right side port

3: 80% to the left side port and 20% to the eyepiece observation port (when using the optical path split prism)
Bottom port (when using the Ti2-E/B)

4: Left side port

▼ Setting the optical path name



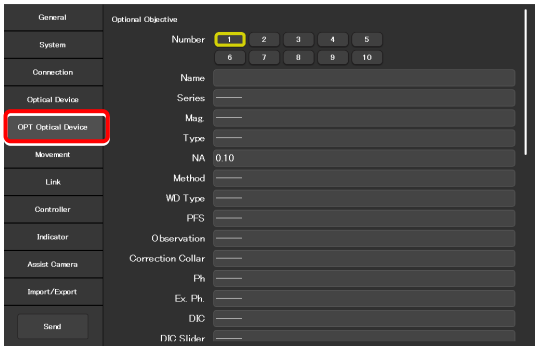
3.6 [OPT Optical Device] Registering a New Optical Device

This section describes how to newly register an optical device not listed in the [Optical Device] setting, such as an objective, a condenser module, a filter cube, or a BA filter.

1. Select [OPT Optical Device] from the setting item selection area.

The optional optical device setting screen appears.

▼ **Registering a new optical device**



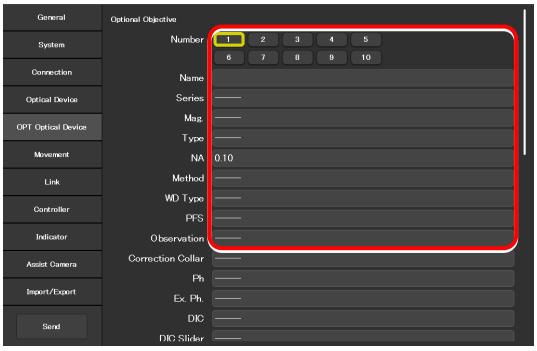
3.6.1 Registering a New Objective

Up to 10 new objectives can be registered.

The objectives registered here can be selected in [Objective] in [Optical Device].

1. Set the following items in the [Optional Objective] area.

▼ **Registering a new objective**



Number:

Register the number for which new objective information is to be registered. (Up to 10 objectives can be registered.)

Name:

Specify a name.

Series:

Select the type of the objective.

Mag.:

Select the magnification of the objective.

Type:

Select the immersion liquid type of the objective.

NA:

Enter the numerical aperture (NA) of the objective.

Method:

Select the usage of the objective.

WD Type:

Select the long-working-distance type of the objective.

PFS:

Select whether the PFS objective is used or not.

Observation:

Select a microscopy technique.

Correction Collar:

For an objective with a correction collar, choose from Manual and Motorized.

Ph:

For a phase contrast objective, select a PH code.

EX. Ph.:

For an external phase contrast objective, select the magnification of the objective.

DIC:

For a DIC objective, select a corresponding condenser module.

DIC Slider:

For a DIC objective, select a corresponding objective-side DIC slider.

DIC HR/HC:

Select a type of the high-resolution or high-contrast condenser.

DIC Slider HR/HC:

Select a high-resolution or high-contrast objective-side DIC slider.

DF:

For an objective for DF microscopy, select a corresponding condenser module.

NAMC:

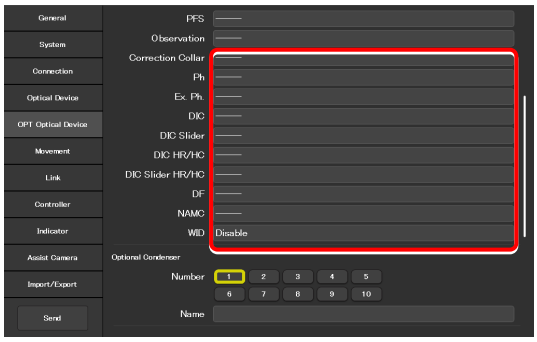
For an objective for NAMC microscopy, select a corresponding condenser module.

WID:

Select whether the objective supporting the water immersion dispenser is used or not.

2. To register another objective, select another number from [Number] and repeat step 1.

▼ Registering a new objective (continued from the previous page)



3.6.2 Registering a New Condenser Module

Up to 10 new condenser modules can be registered.

The condenser modules registered here can be selected in [Optional Condenser] in [Optical Device].

1. Set the following items in the [Optional Condenser] area.

Number:

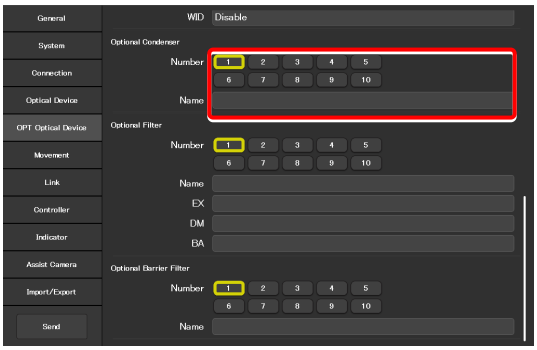
Select a number with which a new condenser module is to be registered.

Name:

Specify a name.

2. To register another condenser module, select another number from [Number] and repeat step 1.

▼ Registering a new condenser module



3.6.3 Registering a New Filter Cube

Up to 10 new filter cubes can be registered.

The filter cubes registered here can be selected in [FL1] (or [FL2]) in [Optical Device].

1. Set the following items in the [Optional Filter] area.

Number:

Select a number with which a new filter cube is to be registered.

Name:

Specify a name.

EX:

Specify an excitation filter name.

DM:

Specify a dichroic mirror name.

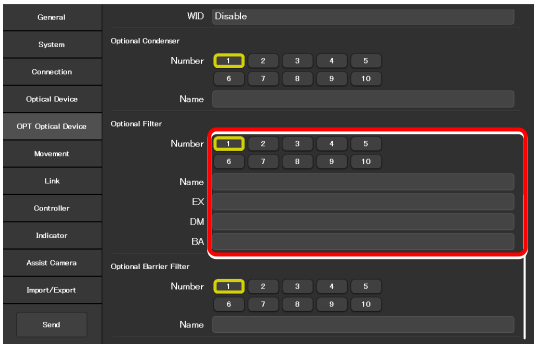
BA:

Specify a BA filter name.

> **When specifying an excitation filter or a dichroic mirror name**
>
> For an excitation filter name, specify "EX" as the first two letters and then specify the wavelength information.
> Examples: "EX450", "EX450-490" (delimited by a hyphen) or "EX450/40" (the center wavelength and width are delimited by a slash)
>
> Similarly, for a BA filter name, specify "BA" as the first two letters. For a dichroic mirror name, specify "DM" as the first two letters.

2. To register another filter cube, select another number from [Number] and repeat step 1.

▼ Registering a new filter cube



3.6.4 Registering a New BA Filter

Up to 10 new barrier (BA) filters can be registered.

The BA filters registered here can be selected in [Barrier Filter 1] (or [Barrier Filter 2]) in [Optical Device].

1. Set the following items in the [Optional Barrier Filter] area.

Number:

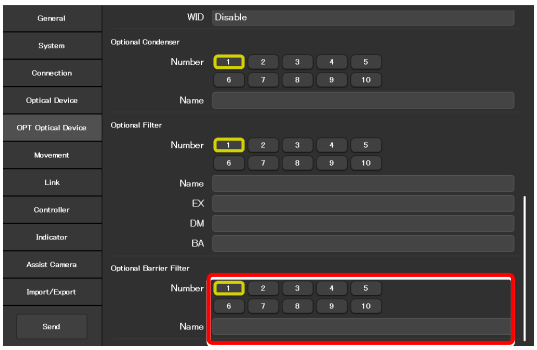
Select a number with which a new BA filter is to be registered.

Name:

Specify a name.

2. To register another BA filter, select another number from [Number] and repeat step 1.

▼ Registering a new BA filter



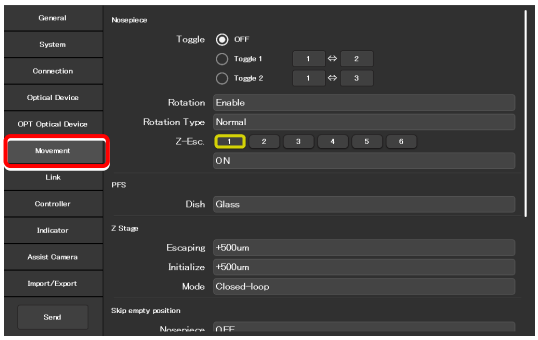
3.7 [Movement] Setting the Movement

This section describes how to set the movement of each motorized device.

1. Select [Movement] from the setting item selection area.

The movement setting screen appears.

▼ **Setting the movement**



3.7.1 Setting the Motorized Nosepiece

Set the movement of the motorized nosepiece.

1. Set [Toggle] in the [Nosepiece] area.

With this [toggle] setting, only registered two objectives can be toggles using the objective changeover switch of the microscope main body.

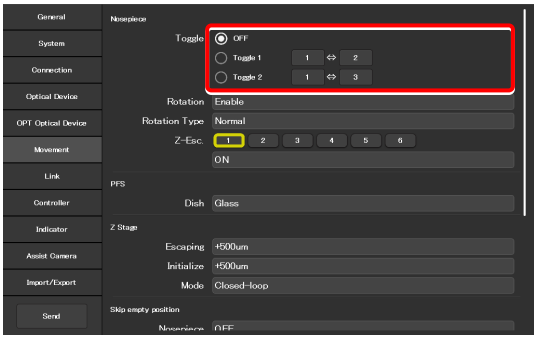
2. To use [Toggle], select a toggle number ([Toggle 1] or [Toggle 2].)

To rotate the nosepiece without using the toggle function, select [OFF].

3. From the left number filed, select the address of the nosepiece to which the first objective is attached.

4. From the right number filed, select the address of the nosepiece to which the second objective is attached.

▼ **Toggle setting**



5. Set the motorized nosepiece rotation.

Rotation:

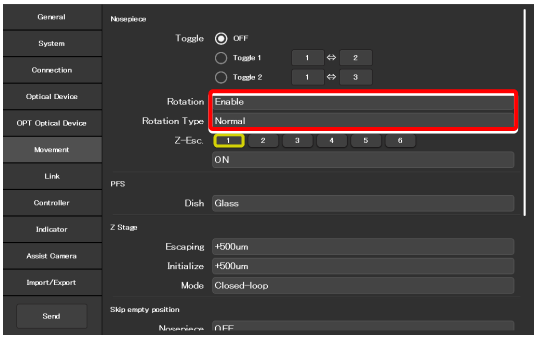
Select whether the nosepiece rotation is enabled or not.

Rotation Type:

Select the operating pattern of the nosepiece.

Normal:	Normal operation pattern
Shuttle:	The nosepiece moves from 1 to 6 (or 6 to 1) via all addresses.
ACC Type:	This is selected automatically when a motorized nosepiece of the motorized correction collar type is used.

▼ **Motorized nosepiece rotation**

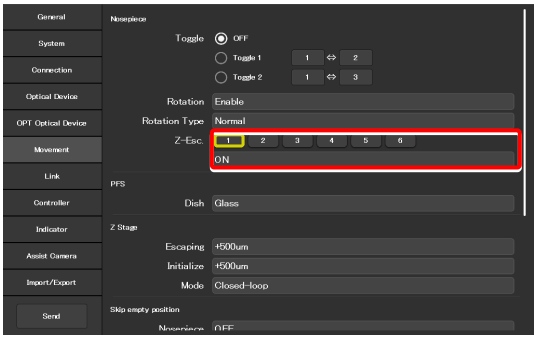


Z-Esc.:

It is possible to specify for each nosepiece address whether or not the objective is moved to the escape position when the nosepiece rotates.

Select the address of the nosepiece to which the target objective is attached.

If ON is set for an address, the objective is moved to the escape position before passing the selected address.



3.7.2 Setting the PFS

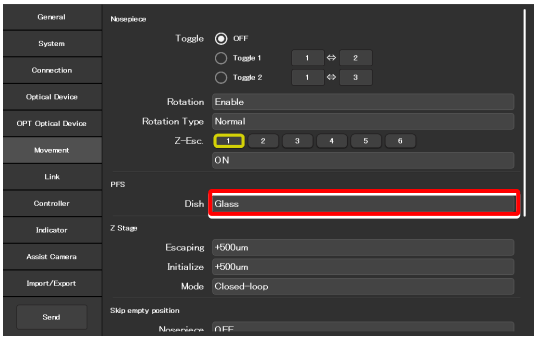
Set the type of the dish observed by using the PFS.

1. Set the following item in the [PFS] area.

Dish:

Select the dish type from [Glass] and [Plastic].

▼ Setting the PFS



3.7.3 Setting the Focusing Device (Z-Stage)

Set the movement of the focusing device (Z-stage).

1. Set the following items in the [Z-Stage] area.

Escaping:

Specify how far the objective is to be escaped when replacing the specimen.

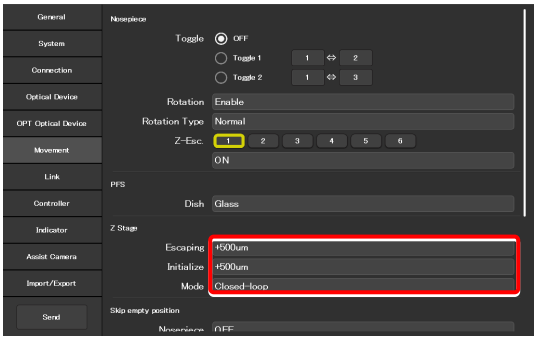
Initialize:

Specify where the objective is to be stopped when the microscope system is initialized.

Mode:

Select the focusing device control method from open loop and closed loop.
(This setting becomes effective when the controller for TI2-E is turned back on.)

▼ Setting the focusing device



3.7.4 Setting the Unallocated Address Skipping Function

If there is an address for which no optical device information is set when a motorized device rotates, specify whether to skip this address.

1. Set the following items in the [Skip empty position] area.

Nosepiece:

The nosepiece rotation when there is an address for which no objective information is set can be selected.
(ON: The address for which no objective information is set is skipped.)

FL1:

The FL turret 1 rotation when there is an address for which no filter cube information is set can be selected.
(ON: The address for which no filter cube information is set is skipped.)

FL2:

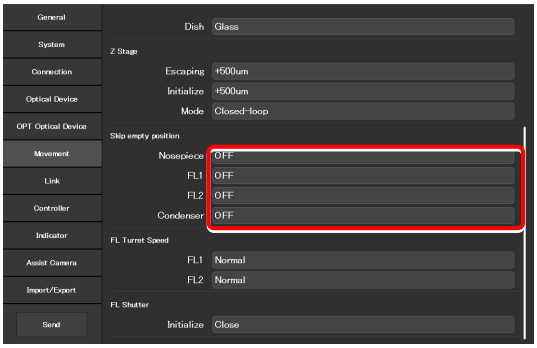
(Only when there is a second FL turret)

The FL turret 2 rotation when there is an address for which no filter cube information is set can be selected.
(ON: The address for which no filter cube information is set is skipped.)

Condenser:

Select the condenser turret rotation when there is an address for which no condenser module information is set.
(ON: The address for which no condenser module information is set is skipped.)

▼ Setting the unallocated address skipping function



3.7.5 Setting the Rotation Speed of FL Turrets

Set the rotation speed of the FL turret.

1. Set the following items in the [FL Turret Speed] area.

FL1:

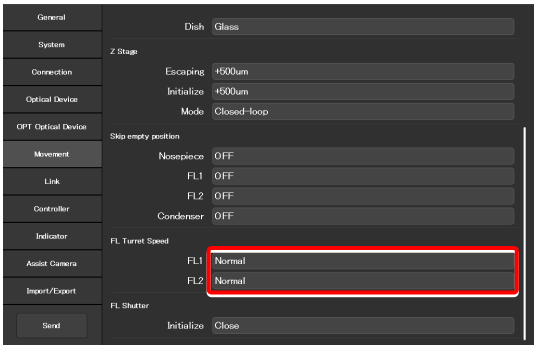
Select the rotation speed of FL turret 1 from [Normal] or [Slow].

FL2:

(Only when there is a second FL turret)

Select the rotation speed of FL turret 2 from [Normal] or [Slow].

▼ Setting the drive speed of FL turrets



3.7.6 Setting the Filter Shutter

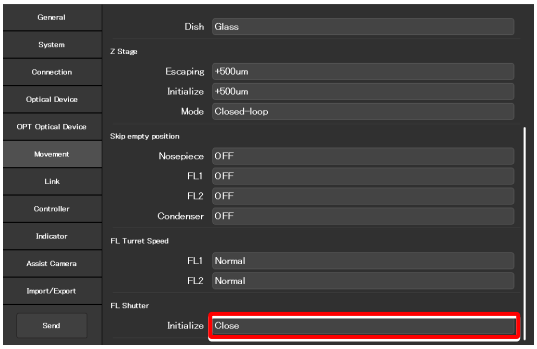
Set the FL turret shutter state when the microscope system is started.

1. Set the following item in the [FL Shutter] area.

Initialize:

From [Close] and [Open], select the FL turret shutter state when the microscope system is started.

▼ Setting the filter shutter



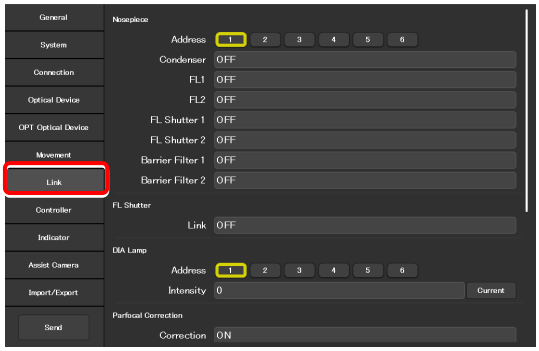
3.8 [Link] Setting the Linking Function

This section describes how to set the linking (interlocking) of other motorized devices when switching the objective.

1. Select [Link] from the setting item selection area.

The link control setting screen appears.

▼ Setting linked control



3.8.1 Setting a Linked Operation When the Objective Is Switched

Specify whether or not the devices are interlocked with the shuttle switches on the main body when they are depressed after the objective is switched.

1. Set the following items in the [Nosepiece] area.

Address:

Select the address of the nosepiece to which the target objective for link control is attached.

Condenser:

Select the condenser module to be linked when the objective is switched.

FL1:

Select the filter cube of FL turret 1 to be linked when the objective is switched.

FL2:

(Only when there is a second FL turret)

Select the filter cube of FL turret 2 to be linked when the objective is switched.

FL Shutter 1:

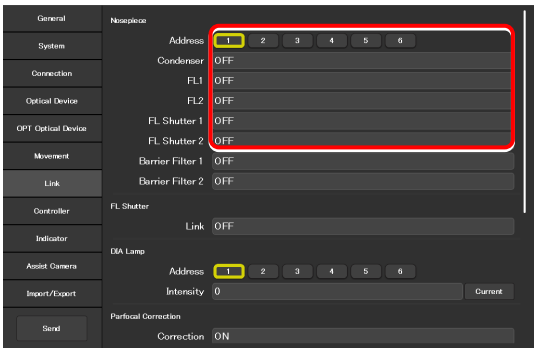
Select the state of the shutter of FL turret 1 to be linked when the objective is switched.

FL Shutter 2:

(Only when there is a second FL turret)

Select the state of the shutter of FL turret 2 to be linked when the objective is switched.

▼ Setting a linked operation when the objective is switched



Barrier Filter 1:

Select the BA filter of BA filter wheel 1 to be linked when the objective is switched.

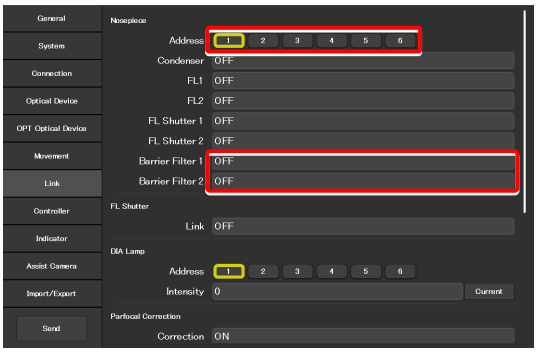
Barrier Filter 2:

(Only when there is a second BA filter wheel)

Select the BA filter of BA filter wheel 2 to be linked when the objective is switched.

2. If there is another objective as the target of link control, repeat step 1.

▼ Setting a linked operation when the objective is switched



3.8.2 Setting a Linked Operation of the Shutter

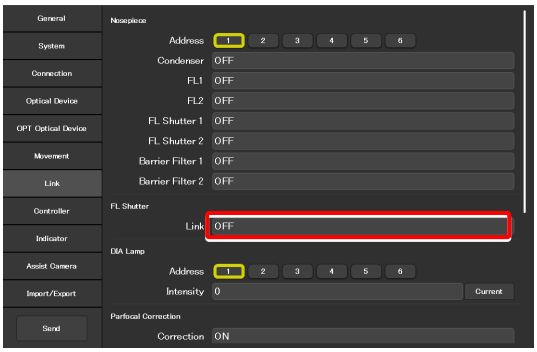
Specify whether the shutter (open/close) in the FL turret is to be linked when the FL turret is rotated.

1. Set the following item in the [FL Shutter] area.

Link:

Select [ON] to link the shutter when the objective is switched.

▼ Setting a linked operation of the shutter



3.8.3 Setting the Illumination Intensity of Dia-Illumination (DIA)

Specify whether diascopic LED illumination intensity is to be changed when the objective is switched.

1. Set the following items in the [DIA Lamp] area.

Address:

Select the address of the nosepiece to which the target objective for link control is attached.

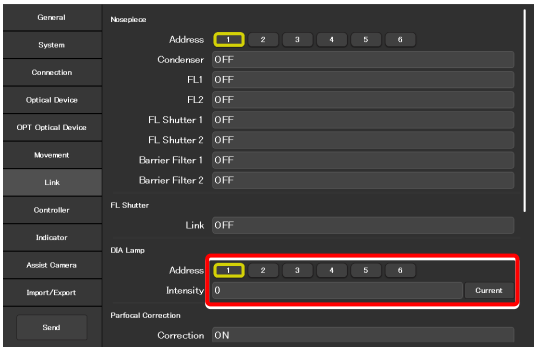
Intensity:

Specify an illumination intensity.
(Input range: 0 to 100)

Current button:

Use this button to read the current value of the device.

▼ Setting the illumination intensity of dia-illumination (DIA)



3.8.4 Setting the Parfocal Correction

If there is a shift in focal position when the objective is switched, this setting allows a correction.

1. **Set and confirm the following items in the [Parfocal Correction] area.**

   Position:

   Select the address of the nosepiece to which the objective that is in the optical path is attached.

   Status:

   Indicates whether the objective is corrected or not.

2. **Change the current objective to the maximum magnification objective on the microscope main body.**

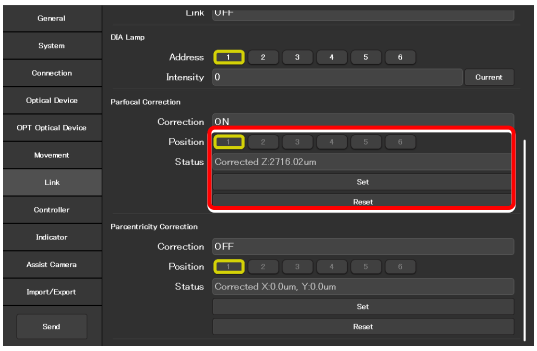
3. **Focus on the specimen on the microscope main body.**

4. **Click [Set].**

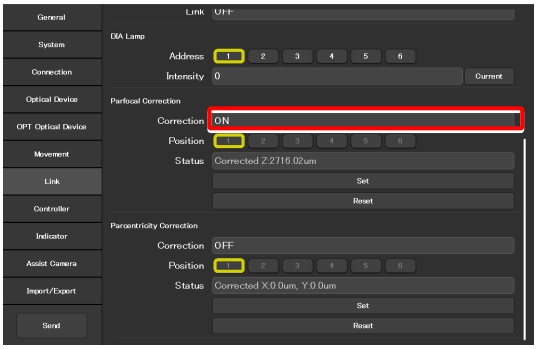
5. **Repeat steps 1 to 4 to set the focal position for all addresses.**

6. **Click the [Correction] field to select [ON] or [OFF] to enable or disable the parfocal correction.**

▼ **Setting the parfocal correction**



▼ **Setting the parfocal correction**



3.8.5 Setting the Parcentricity Correction

If there is a shift in center position when the objective is switched, this setting allows for correction.

1. **Set and confirm the following items in the [Parcentricity Correction] area.**

   Position:

   Select the address of the nosepiece to which the objective that is in the optical path is attached.

   Status:

   Indicates whether the objective is corrected or not.

2. **Change the current objective to the maximum magnification objective on the microscope main body.**

3. **Move the XY-stage so that an easy-to-identify object is at the center of the field of view.**

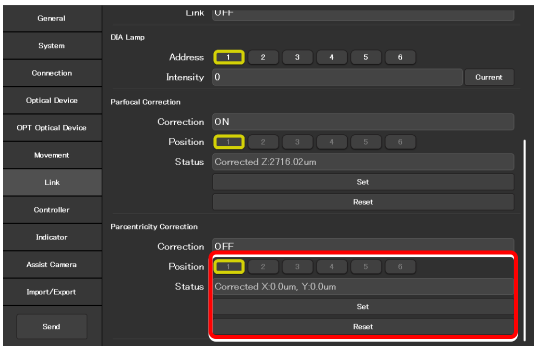
   Use this object as a mark to correct the objective at another address.

4. **Click [Set].**

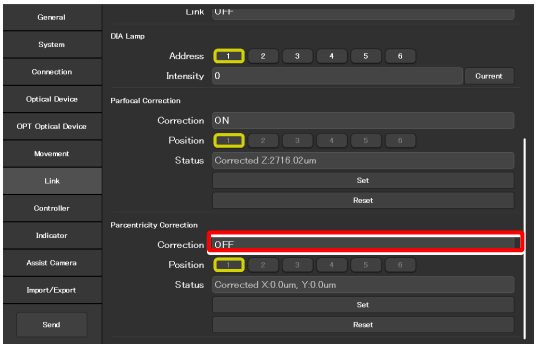
5. **Repeat steps 1 to 4 to set the center position for all addresses.**

6. **Click the [Correction] field to select [ON] or [OFF] to enable or disable the parcentricity correction.**

▼ **Setting the parcentricity correction**



▼ **Setting the parcentricity correction**



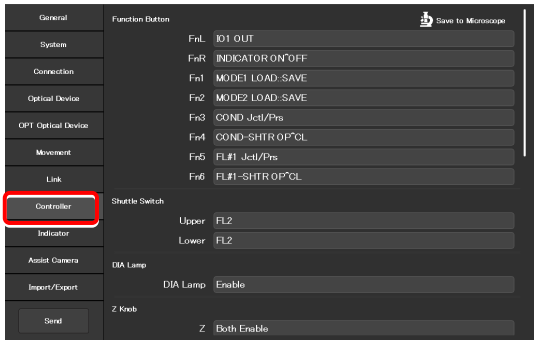
3.9 [Controller] Assigning Functions

This section describes how to assign functions to the function buttons and knobs on the Ti2-E microscope main body, and the joystick function buttons.

1. Select [Controller] from the setting item selection area.

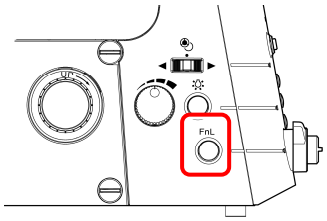
The function setting screen appears.

▼ Assigning functions

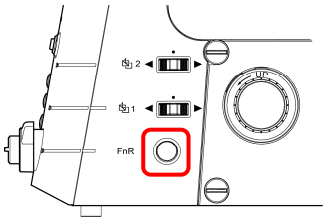


3.9.1 Setting the Function Buttons on the Microscope Main Body and the Joystick

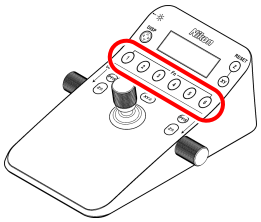
Assign functions to the function buttons (FnL and FnR) on the right and left operation panels of the Ti2-E microscope main body, or the function buttons (Fn1 to Fn6) of the joystick.



Left operation panel



Right operation panel

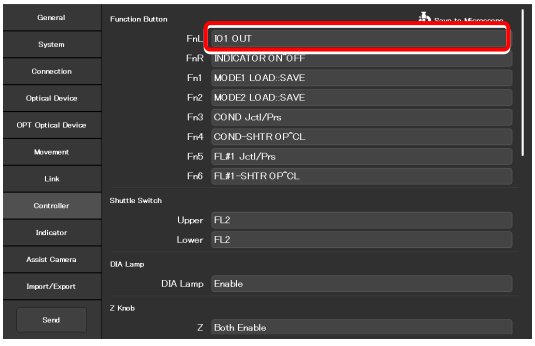


Joystick

1. To change the assigned function, click the relevant function button field in the [Function Button] area.

The subscreen of the function list for assignment is displayed.

▼ Setting the Function Buttons

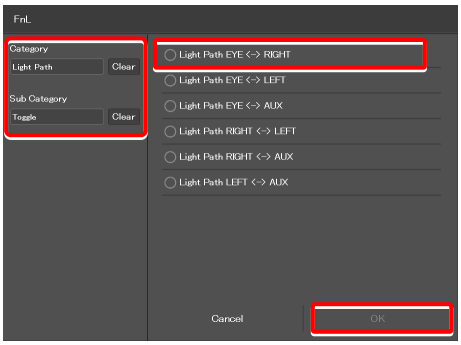


2. Narrow down the list by selecting an item from [Category] and [Sub Category] on the left pane, and then select a function to be assigned from the list on the right pane.

For the assignable functions, see “4.1 List of Functions Assigned to Function Buttons.”

3. Click [OK].

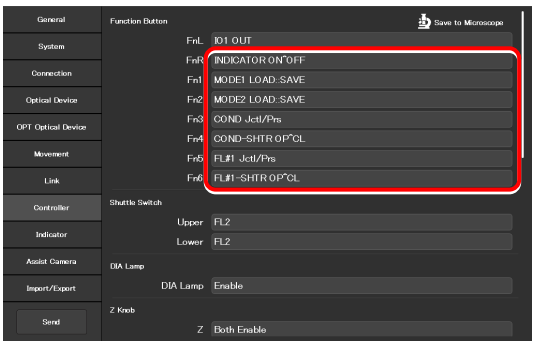
▼ Subscreen of the function list for assignment



4. Repeat steps 1 to 3 for each function to be registered.

> **SUPPLEMENTAL REMARKS**
>
> Setting information of the function buttons on the microscope main body and the joystick is saved in the microscope main body.

▼ **Setting the Function Buttons**

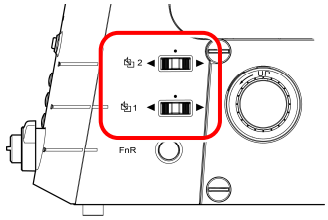


3.9.2 Setting the Shuttle Switches

Assign a different function to shuttle switch1 and 2 of the Ti2-E microscope main body.

(The default setting is the filter cube switches.)

▼ **Right operation panel**



1. Set the following items in the [Shuttle Switch] area.

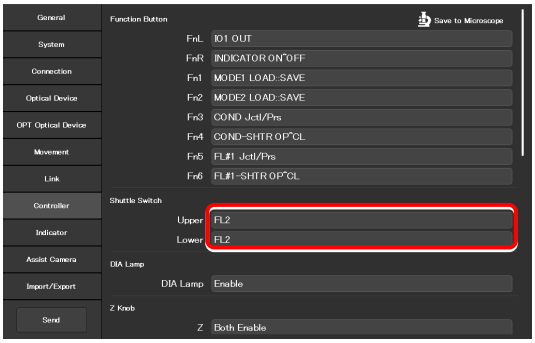
Upper:

Assign another operation function to shuttle switch 2 of the microscope main body.

Lower:

Assign another operation function to shuttle switch 1 of the microscope main body.

▼ **Setting the shuttle switches**



Shuttle switch function list

The table below lists the functions that can be assigned to the shuttle switches of the Ti2-E microscope main body.

Indicated name	Functional overview
FL1	Rotation of the 1st motorized FL turret, shutter state (open/close)
FL2	Rotation of the 2nd motorized FL turret, shutter state (open/close)
BA1	Rotation of the 1st BA1 wheel
BA2	Rotation of the 2nd BA2 wheel
Ex.Ph.	Rotation of the turret of the motorized tube base unit for external phase contrast
IntensiLight	Switching of the Intensilight ND filter, shutter state (open/close) * Supported in the firmware Ver.1.2.0 and later
FL1<Shutter only opens>	Rotation of the 1st motorized FL turret, shutter state (open only) * Once the shutter is open, the shutter does not close using this switch.
FL2<Shutter only opens>	Rotation of the 2nd motorized FL turret, shutter state (open only) * Once the shutter is open, the shutter does not close using this switch.

3.9.3 Setting the DIA Lamp

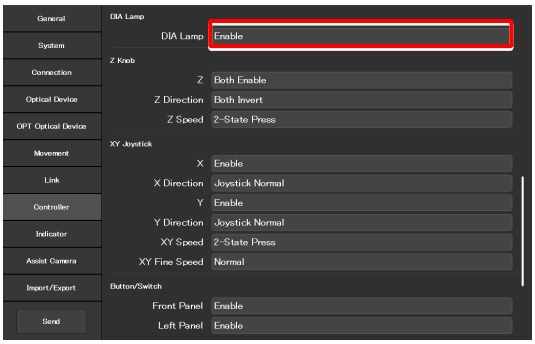
This section describes how to control the dia-illumination brightness adjuster.

1. Set the following item in the [DIA Lamp] area.

DIA Lamp:

Enable or disable the dia-illumination brightness adjuster operation.

▼ Setting the DIA Lamp



3.9.4 Setting the Z Knob

This section describes how to control the Z knob of the microscope main body and the joystick.

1. Set the following item in the [Z knob] area.

Z:

Enable or disable the focusing device (Z-stage) control by the focus knob of the microscope main body or the joystick.

Both Disable:	Both are disabled.
Ti2 Enable:	Only the microscope main body is enabled.
Joystick Enable:	Only the joystick is enabled.
Both Enable:	Both are enabled.

Z Direction:

Select the rotation direction of the focus knob and the moving direction of the focusing device (Z-stage) of the microscope main body and joystick.

Both Invert:	Both rotations are inverted.
Ti2 Normal/Joystick Invert:	Normal rotation of the microscope main body, and inverted rotation of the joystick
Ti2 Invert/Joystick Normal:	Inverted rotation of the microscope main body, and normal rotation of the joystick
Both Normal:	Both rotations are normal.

Z Speed

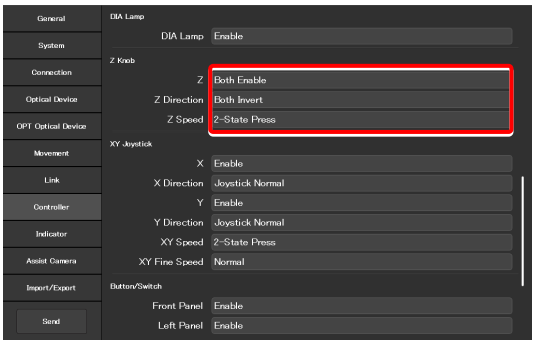
Select the behavior when the Z coarse-motion buttons of the microscope main body and the joystick are used.

2-State Press:	Coarse motion only while the Z coarse-motion button is pressed
2-State Toggle:	Switches between the coarse motion and the fine motion when the Z coarse-motion button is pressed once.
3-State:	Switches among the coarse motion, the fine motion, and the extra fine motion when the Z coarse-motion button is pressed each time.

SUPPLEMENTAL REMARKS

When 2-State Press or 2-State Toggle is selected, the movement speed of the focusing device (Z-stage) by the focus knob depends on the NA of the objective.

▼ Setting the Z knob



3.9.5 Setting the XY Joystick

This section describes how to control the XY movement by using the stage drive lever of the joystick.

Items to be displayed on the list depend on the firmware version of your microscope main body.

Firmware Ver.1.2.0 or later

1. Set the following items in the [XY Joystick] area.

X:

Enable or disable the stage control in the X-axis direction by using the stage drive lever of the joystick.

X Direction:

Select the stage movement direction on the X-axis initiated by using the stage drive lever of the joystick.

Joystick Normal:	The stage moves in the direction of the joystick motion.
Joystick Invert:	The stage moves in the opposite direction of the joystick motion.

Y:

Enable or disable the stage control in the Y-axis direction by using the stage drive lever of the joystick.

Y Direction:

Select the stage movement direction on the Y-axis initiated by using the stage drive lever of the joystick.

Joystick Normal:	The stage moves in the direction of the joystick motion.
Joystick Invert:	The stage moves in the opposite direction of the joystick motion.

XY Speed:

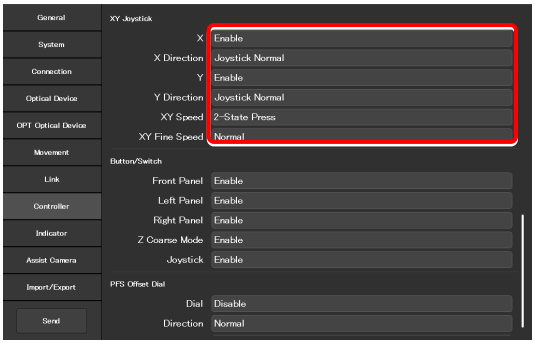
Select the behavior when the XY coarse-motion button of the joystick is used.

2-State Press:	Coarse motion only while the XY coarse-motion button is pressed
2-State Toggle:	Switches between the coarse motion and the fine motion when the XY coarse-motion button is pressed once.
3-State:	Switches among the coarse motion, the fine motion, and the extra fine motion when the XY coarse-motion button is pressed each time.

XY Fine Speed:

When "Normal" is selected, the XY stage moves in normal fine motion. When "Low" is selected, it moves in finer motion than "Normal."

▼ Setting the XY Joystick (firmware Ver.1.2.0 or later)



Firmware Ver.1.1.1 or earlier

For details on the firmware upgrade, contact your local Nikon representative.

1. Set the following items in the [XY Joystick] area.

X:

Enable or disable the stage control in the X-axis direction by using the stage drive lever of the joystick.

Y:

Enable or disable the stage control in the Y-axis direction by using the stage drive lever of the joystick.

XY Speed:

Select the behavior when the XY coarse-motion button of the joystick is used.

Pressing Coarse: Coarse motion only while the button is held down

Toggle: Switches between coarse motion and fine motion.

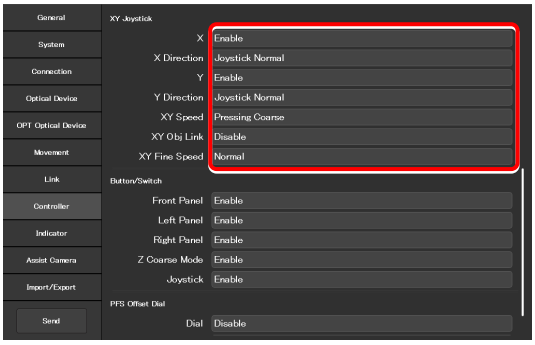
XY Obj Link:

Specify whether the speed of the XY stage is to be changed according to the magnification of the objective.

XY Fine Speed:

When "Normal" is selected, the XY stage moves in normal fine motion. When "Low" is selected, it moves in finer motion than "Normal."

▼ Setting the XY Joystick (firmware Ver.1.1.1 or earlier)



3.9.6 Controlling the Buttons and Switches

This section describes how to control each button (switch) of the microscope main body and joystick.

1. Set the following items in the [Button/Switch] area.

Front Panel:

Enable or disable operation by the buttons or switches on the front operation panel of the microscope main body.

Left Panel:

Enable or disable operation by the buttons or switches on the left operation panel of the microscope main body.

Right Panel:

Enable or disable operation by the buttons or switches on the right operation panel of the microscope main body.

Z Coarse Mode:

Enable or disable operation by the Z coarse-motion button of the focus knob on the both sides of the microscope main body.

Joystick:

Enable or disable operation by the buttons of the joystick.

▼ Controlling the buttons and switches

3.9.7 Controlling the PFS Offset Dial

This section describes how to control the PFS offset dial.

1. Set the following items in the [PFS Offset Dial] area.

Dial:

Enable or disable the control by the offset dial.

Direction:

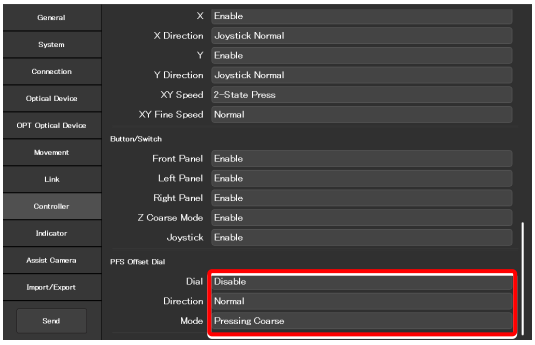
Select the rotation direction of the PFS offset dial.

Mode:

Select the behavior when the Z coarse-motion button of the offset dial is used.

Pressing Coarse:	Coarse motion only while the button is pressed
Toggle:	Switches between coarse motion and fine motion.

▼ Setting the PFS offset dial



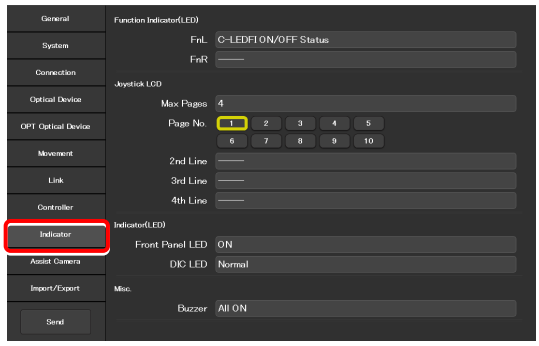
3.10 [Indicator] Setting the Indicators

Set the indicators of the Ti2-E.

1. Select [Indicator] from the setting item selection area.

The motorized device setting screen appears.

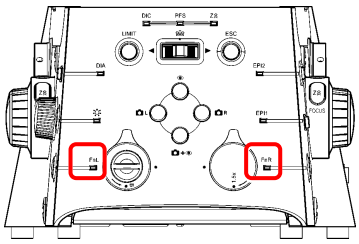
▼ **Setting the indicators**



3.10.1 Setting the FnL and FnR Indicators on the Microscope

Assign the operating status of an arbitrary function to the FnL or FnR LED indicator on the front operation panel of the Ti2-E microscope main body.

In the initial state, no function is assigned to the FnL and FnR indicators. The indicators do not light unless functions are assigned to them.

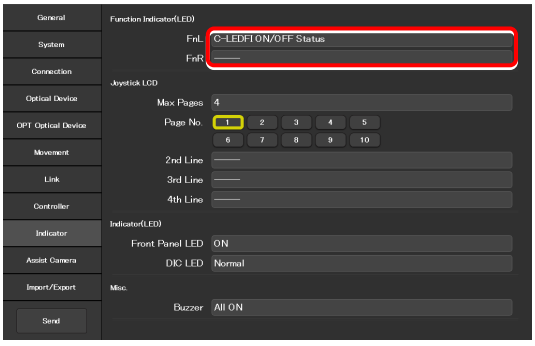


Front operation panel

1. Set the following items in the [Function Indicator(LED)] area.

Select the status indication to be assigned to the LED indicators (FnL and FnR) on the front operation panel of the microscope main body.

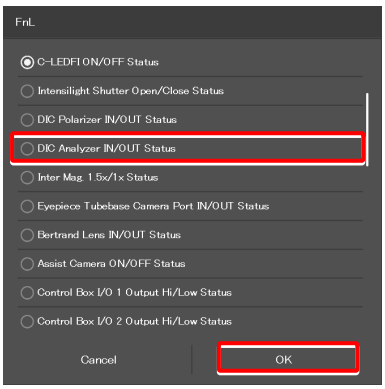
▼ **Setting the LED indicators**



2. From the list, select the function to be assigned to the selected LED indicator.

For the assignable indication functions, see “4.2 List of Indication Functions Assigned to the LED Indicators of the Ti2-E Microscope Main Body.”

▼ **Subscreen of the function list for assignment**



3. Click [OK].

3.10.2 Setting the LCD Display Screen of the Joystick

Set the function to be displayed on each LCD screen page of the joystick.

1. Set the following items in the [Joystick LCD] area.

Max Pages:

Set the maximum number of pages.

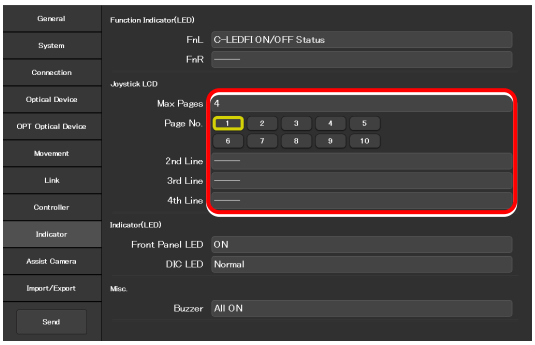
Page No.:

Select the target page number.

2nd Line to 4th Line:

Select the function to be assigned to each line.

▼ Setting the LCD display screen of the joystick

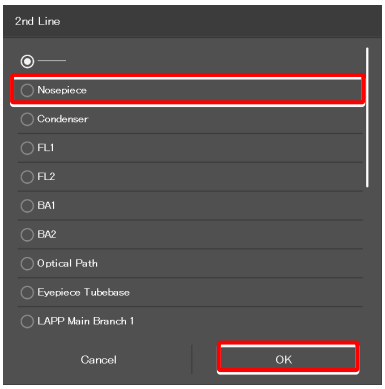


2. From the list, select the function to be assigned to the selected display area.

For the assignable functions, see “4.3 List of Functions Assigned to Joystick LCD Screen.”

3. Click [OK].

▼ Subscreen of the function list for assignment



3.10.3 Controlling the LED Indicators

This section describes how to control the indicator (LED) of the microscope main body and the joystick.

1. Set the following items in the [Indicator(LED)] area.

Front Panel LED:

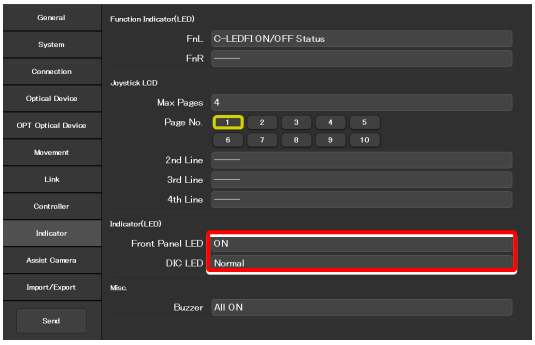
Turn on or off the LED on the front panel of the microscope main body.

DIC LED:

Select the behavior of the DIC indicator on the front panel of the microscope main body, which is used for identifying whether the DIC microscopy conditions are satisfied or not.

Always OFF:	The indicator is always off. (It does not light nor blink even though DIC microscopy conditions are satisfied.)
ON-OFF:	The indicator is lit when the DIC microscopy conditions are satisfied. (Not blinking)
Normal:	The indicator is lit when the DIC microscopy conditions are satisfied, and it blinks when they are partly satisfied.

▼ Controlling the indicators (LED)



3.10.4 Other Control Items

This section describes other control items.

1. Set the following item in the [Misc.] area.

Buzzer:

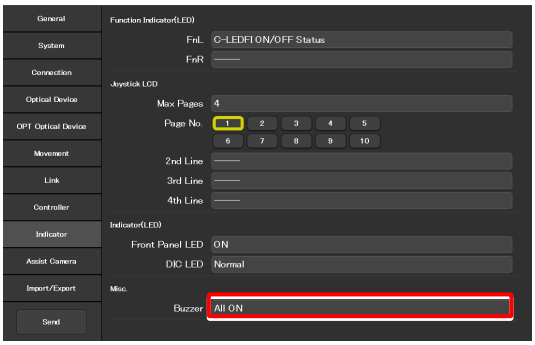
Select the buzzer setting of the microscope main body.

All OFF: All buzzers are disabled.

PFS OFF: Only the PFS buzzer is disabled.

All ON: All buzzers are enabled.

▼ Other control items



3.11 [Assist Camera] Setting the Assist Camera

This section describes how to set the frame rate of the assist camera, the destination to save the images acquired by the assist camera, and the field of view adjustment options of the assist camera when the assist tube base unit is used.

1. Select [Assist Camera] from the setting item selection area.

The assist camera setting screen appears.

2. Set the following items in the [Assist Camera] area.

Frame Rate:

Select the frame rate of the assist camera.

Dest. to save:

Specify where the image data is to be saved (path to the folder), when an image is obtained by clicking the capture button.

Adjustment:

Click this to display the Adjustment screen.

The Adjustment screen allows the field of view of the assist camera to be adjusted to the same position and size of the field of view of the binocular part.

SUPPLEMENTAL REMARKS

It is necessary to adjust the assist camera's field of view in both states (in and out) of the Bertrand lens.

Follow the procedure below:

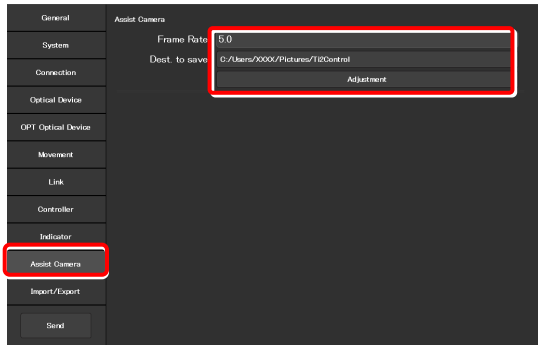
1) Adjust the assist camera's field of view in the current Bertrand lens state (in or out).
2) Click [OK] to apply the settings on the Adjustment screen.
3) Turn the Bertrand lens in/out dial on the microscope main body to place/remove the Bertrand lens into/from the optical path.
(Out -> In, or In -> Out)
4) Select [Assist Camera] from the setting item selection area, and then click the [Adjustment] button to display the Adjustment screen.
5) Adjust the assist camera's field of view in the current Bertrand lens state (in or out).
6) Click [OK] to apply the settings on the Adjustment screen.

Note that if an attempt is made to change the Bertrand lens position (in/out) with the Adjustment screen open, an error message appears and the Adjustment screen is closed.

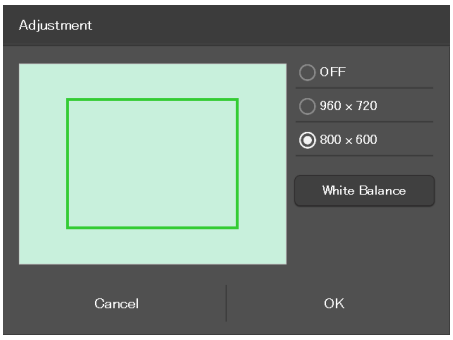
White Balance:

Automatically adjust the white balance of the current image displayed on the screen.

▼ Setting the assist camera



▼ Adjustment screen



3.12 [Import/Export] Importing and Exporting the Settings

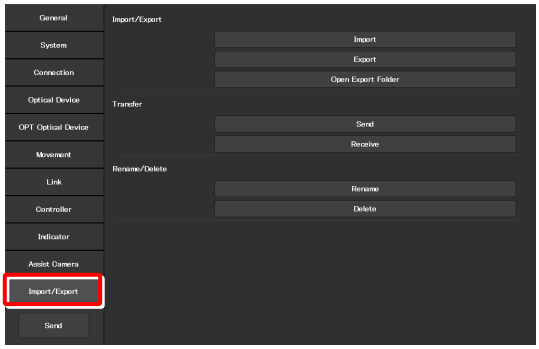
This section describes how to import and export the settings.

The settings made by using the “Ti2 Control” application can be saved (as a configuration file) in the PC and read later.

More than one configuration file can be saved, with a file for each user. The settings of the microscope system can be changed by reading different configuration files.

1. Select [Import/Export] from the setting item selection area.

▼ Import and export settings

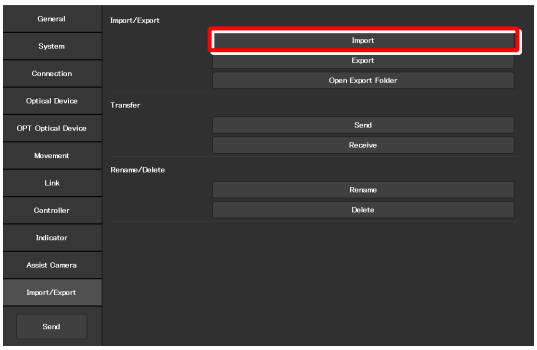


3.12.1 Importing the Settings

1. Click [Import] in the [Import/Export] area.

The Import screen appears.

▼ Importing the settings

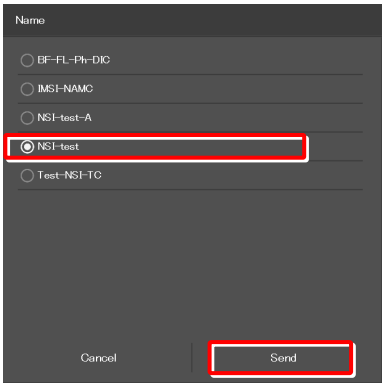


2. Select the setting information file to be imported.

▼ File selection screen

3. Click [OK].

The Import screen appears.

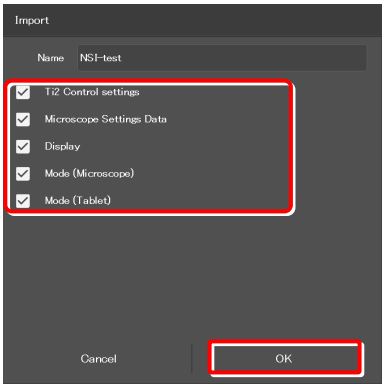


4. Select the type of the setting information to be imported.

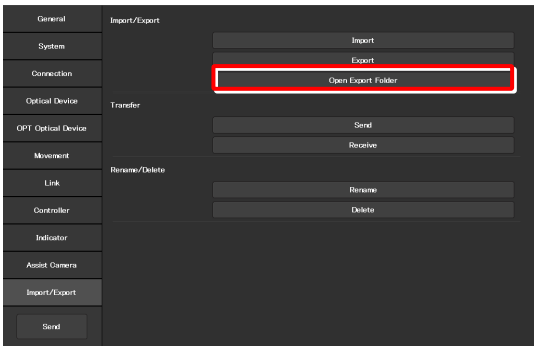
5. Click [OK].

The setting information that is saved is loaded and reflected on each setting screen.

▼ Import screen



▼ Open the export folder



SUPPLEMENTAL REMARKS

Click [Open Export Folder] to open the destination folder of the file in the Explorer.

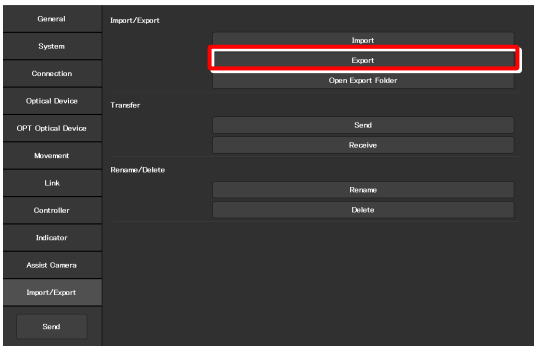
The path of the destination folder is as follows:

<C:\Users\%USERPROFILE%\AppData\Local\Nikon\Ti2 Control\Export>

3.12.2 Exporting the Settings

1. Click [Export] in the [Import/Export] area.

▼ **Exporting the settings**



2. Specify a file name in the [Name] field.

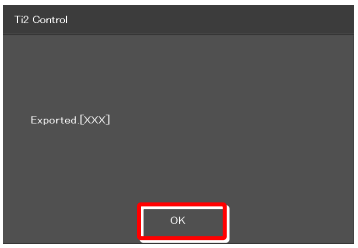
▼ **Exporting the settings**

3. Click [OK].

The setting information is saved.

4. On the export complete screen, click [OK].

▼ **Completed**



▼ **Confirmation of overwriting**

SUPPLEMENTAL REMARKS

If the file name specified in step 2 already exists, a confirmation message appears after [Save] is clicked, asking whether the file is to be overwritten.
Click [Yes] to overwrite the file or [Cancel] to cancel saving the file.

3.12.3 Transmitting the Settings

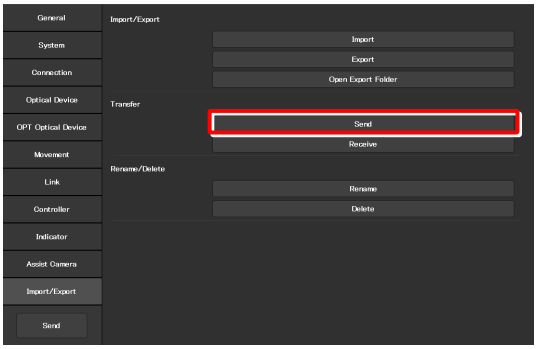
The setting files saved by the “Ti2 Control” application can be sent to or received from other terminals.

> **SUPPLEMENTAL REMARKS**
> Connect the transmission terminal and the reception terminal to the same wireless router.

1. In the [Transfer] area of the transmission terminal, click [Send].

The file selection screen of the file to be sent appears.

▼ **Sending the settings (transmission terminal)**

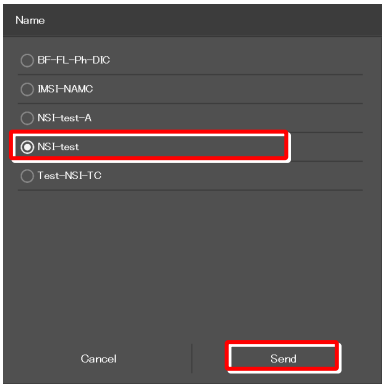


2. Select a file to be sent.

3. Click [Send].

A transfer confirmation screen is displayed.

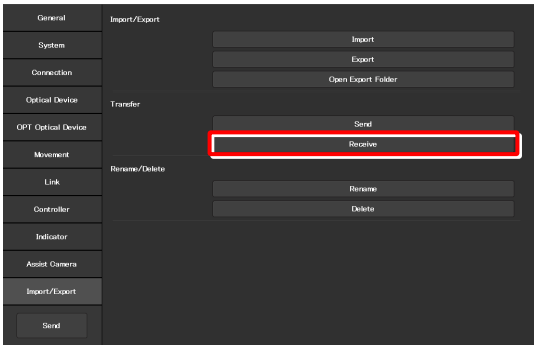
▼ **Selecting a file to be sent (transmission terminal)**



4. In the [Transfer] area of the reception terminal, click [Receive].

The data reception standby screen appears.

▼ **Receiving the settings (reception terminal)**



5. Take a note of the IP address of the reception terminal displayed on the reception standby screen.

▼ **Reception standby screen**

6. In the transmission terminal, enter the receiver's IP address displayed in step 5 in the [Destination IP address] field.

7. Click [Send].

Data transfer starts.

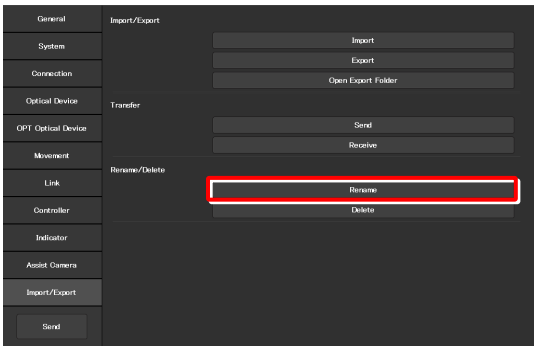
▼ **Confirming the transmission (transmission terminal)**

3.12.4 Changing the Setting Name

1. **Click [Rename] in the [Rename/Delete] area.**

   The selection screen of the file to be renamed appears.

▼ **Changing the setting name**

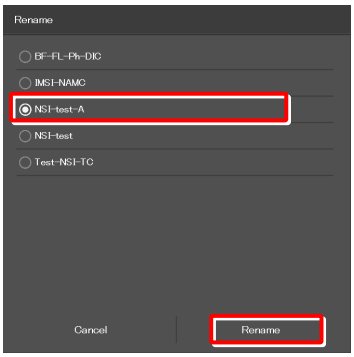


2. **Select the file to be renamed.**

3. **Click [Rename].**

   The rename screen appears.

▼ **Selecting a file**

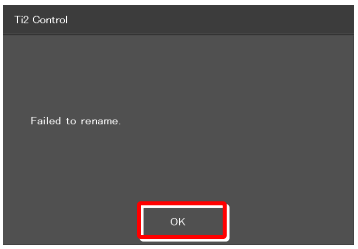


4. **Specify a file name in the [Name] field.**

5. **Click [OK].**

▼ **Rename**

▼ **Confirmation of overwriting**



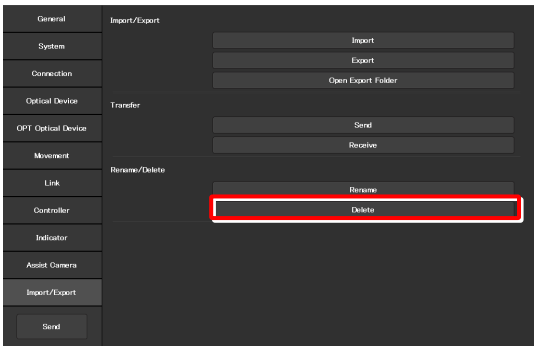
> **SUPPLEMENTAL REMARKS**
>
> If the file name specified in step 4 already exists, the name is not saved even though [OK] is clicked.
> In this case, perform the procedure from step 1 again with another name.

3.12.5 Deleting the Configuration File

1. Click [Delete] in the [Rename/Delete] area.

The file selection screen of the file to be deleted appears.

▼ **Deleting the configuration file**

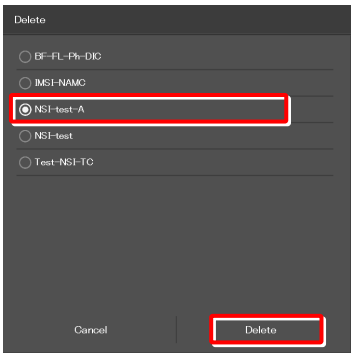


2. Select the file to be deleted.

3. Click [Delete].

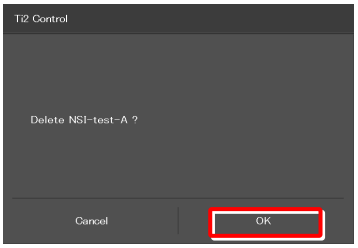
A deletion confirmation screen is displayed.

▼ **Selecting a file**



4. Click [OK] to delete the file.

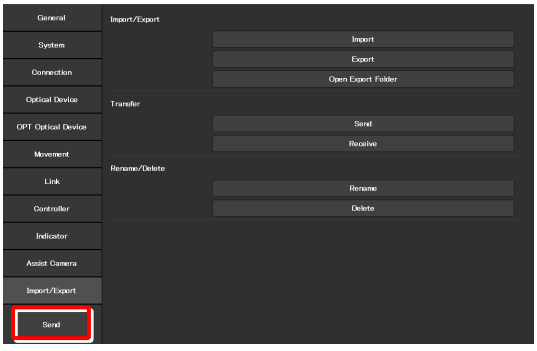
▼ **Confirmation of deletion**



This completes the setup procedure.

Click [Send] in the setting item selection area to send the setting information to the microscope.

▼ **Sending the information to the microscope**



3.13 [Information] Version Information

This section describes how to confirm the version of the application and the controller for the microscope.

1. Select [Information] from the setting item selection area.

The application, controller and microscope main body versions are displayed.

The version information on each Ti2 series microscope is displayed.

Version:

Ti2 Control version (this application)

Microscope:

Model: Name of the currently used microscope system

Main Body FPGA: FPGA version of the microscope main body

CTRE FW: Firmware version of the controller for TI2-E

CTRE FPGA: FPGA version of the controller for TI2-E

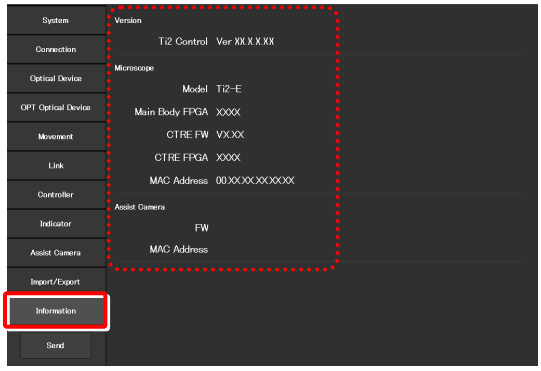
MAC Address: MAC address of the microscope main body

Assist Camera:

FW: Firmware version of the assist camera when the assist tube base unit is in use

MAC Address: MAC addresses of the assist camera

▼ Version information



Chapter
4

Appendix: Ti2-E

This chapter lists the functions assigned to function buttons on the Ti2-E microscope main body and the joystick.

4.1 List of Functions Assigned to Function Buttons

4.1.1 Initial Setting of the Function Buttons on the Ti2-E Microscope Main Body

The table below lists the default functions assigned to the function buttons on the Ti2-E microscope main body.

Button name	Display name in the application	LCD display name of the joystick	Functional overview
FnR button	I/O 1 TRIG.	IO1 OUT	Trigger output of control box I/O channel 1
FnL button	Indicator LED On<->Off	INDICATOR ON^OFF	Turns on or off the LED indicators on the front of the microscope main body.

4.1.2 Initial Setting of the Function Buttons on the Joystick

The table below lists the default functions assigned to the function buttons on the joystick.

Button name	LCD display name of the joystick	Indicated name in the application	Functional overview
Fn1	MODE1 LOAD::SAVE	MODE 1 LOAD::SAVE	Short press: Recalls Mode 1 setting. Long press: Memorizes Mode 1 setting.
Fn2	MODE2 LOAD::SAVE	MODE 2 LOAD::SAVE	Short press: Recalls Mode 2 setting. Long press: Memorizes Mode 2 setting.
Fn3	COND Jctl/Prs	Condenser Control with Joystick while pressing	Moving the joystick to the left in the X direction while holding down the button moves the condenser to the next address (forward.) Moving the joystick to the right in the X direction while holding down the button moves the condenser to the previous address (backward.)
Fn4	COND-SHTR OP^CL	Condenser Shutter OPEN <-> CLOSE	Moves the condenser shutter position.
Fn5	FL#1 Jctl/Prs	Filter Turret 1 Control with Joystick while pressing	Moving the joystick to the left in the X direction while holding down the button moves FL turret 1 to the next address (forward.) Moving the joystick to the right in the X direction while holding down the button moves FL turret 1 to the previous address (backward.)
Fn6	FL#1-SHTR OP^CL	FL Shutter OPEN <-> CLOSE	Opens or closes the FL turret 1 shutter.

4.1.3 Functions That Can Be Registered

The table below lists the functions that can be assigned to the function buttons on the Ti2-E microscope main body and the joystick (J/S).
All these functions can be assigned from “Ti2 Control.”

(✓✓: Default setting, ✓: Settable)

No.	Category	Sub-category	Indicated name (LCD display name of the joystick)	Functional overview	Setting availability from the joystick: J/S Fn1 to 6	Setting availability from the joystick: Main body FnL/FnR	Setting availability from the application: J/S Fn1 to 6	Setting availability from the application: Main body FnL/FnR
	------- (NULL)							
1		-------	------- (NULL)	Nothing is to be set.	✓	✓	✓	✓
	Nosepiece							
2		-------	Nosepiece Control with Joystick while pressing (NSPC Jctl/Prs)	Moving the joystick to the left in the X direction while holding down the button moves the nosepiece to the next address (forward.) Moving the joystick to the right in the X direction while holding down the button moves the nosepiece to the previous address (backward.)	✓		✓	✓
3		-------	Nosepiece Position 1 (NSPC P1)	Moves nosepiece to address 1.			✓	✓
4		-------	Nosepiece Position 2 (NSPC P2)	Moves nosepiece to address 2.			✓	✓
5		-------	Nosepiece Position 3 (NSPC P3)	Moves nosepiece to address 3.			✓	✓
6		-------	Nosepiece Position 4 (NSPC P4)	Moves nosepiece to address 4.			✓	✓
7		-------	Nosepiece Position 5 (NSPC P5)	Moves nosepiece to address 5.			✓	✓
8		-------	Nosepiece Position 6 (NSPC P6)	Moves nosepiece to address 6.			✓	✓
9		-------	Nosepiece Increment (NSPC INC)	Turns the nosepiece to the adjacent address (forward)			✓	✓
10		-------	Nosepiece Decrement (NSPC DEC)	Turns the nosepiece to the adjacent address (backward)			✓	✓

(✓✓: Default setting, ✓: Settable)

No.	Category	Indicated name (LCD display name of the joystick)	Functional overview	Setting availability from the joystick		Setting availability from the application	
	Sub-category			J/S Fn1 to 6	Main body FnL/FnR	J/S Fn1 to 6	Main body FnL/FnR
	Condenser						
11	-------	Condenser Control with Joystick while pressing (COND Jctl/Prs)	Moving the joystick to the left in the X direction while holding down the button moves the condenser to the next address (forward.) Moving the joystick to the right in the X direction while holding down the button moves the condenser to the previous address (backward.)	✓✓ (Fn3)		✓✓ (Fn3)	✓
12	-------	Condenser Position 1 (COND P1)	Moves condenser to address 1.			✓	✓
13	-------	Condenser Position 2 (COND P2)	Moves condenser to address 2.			✓	✓
14	-------	Condenser Position 3 (COND P3)	Moves condenser to address 3.			✓	✓
15	-------	Condenser Position 4 (COND P4)	Moves condenser to address 4.			✓	✓
16	-------	Condenser Position 5 (COND P5)	Moves condenser to address 5.			✓	✓
17	-------	Condenser Position 6 (COND P6)	Moves condenser to address 6.			✓	✓
18	-------	Condenser Position 7 (COND P7)	Moves condenser to address 7.			✓	✓
19	-------	Condenser Increment (COND INC)	Turns the condenser to the adjacent address (forward)			✓	✓
20	-------	Condenser Decrement (COND DEC)	Turns the condenser to the adjacent address (backward)			✓	✓
	Filter Turret 1						
21	-------	Filter Turret 1 Control with Joystick while pressing (FL#1 Jctl/Prs)	Moving the joystick to the left in the X direction while holding down the button moves FL turret 1 to the next address (forward.) Moving the joystick to the right in the X direction while holding down the button moves FL turret 1 to the previous address (backward.)	✓✓ (Fn5)		✓✓ (Fn5)	✓
22	-------	Filter Turret 1 Position 1 (FL#1 P1)	Moves FL turret 1 to address 1.			✓	✓
23	-------	Filter Turret 1 Position 2 (FL#1 P2)	Moves FL turret 1 to address 2.			✓	✓
24	-------	Filter Turret 1 Position 3 (FL#1 P3)	Moves FL turret 1 to address 3.			✓	✓
25	-------	Filter Turret 1 Position 4 (FL#1 P4)	Moves FL turret 1 to address 4.			✓	✓
26	-------	Filter Turret 1 Position 5 (FL#1 P5)	Moves FL turret 1 to address 5.			✓	✓
27	-------	Filter Turret 1 Position 6 (FL#1 P6)	Moves FL turret 1 to address 6.			✓	✓
28	-------	Filter Turret 1 Increment (FL#1 INC)	Turns FL turret 1 to the adjacent address (forward)			✓	✓
29	-------	Filter Turret 1 Decrement (FL#1 DEC)	Turns FL turret 1 to the adjacent address (backward)			✓	✓
	FL Turret 2						
30	-------	Filter Turret 2 Control with Joystick while pressing (FL#2 Jctl/Prs)	Moving the joystick to the left in the X direction while holding down the button moves FL turret 2 to the next address (forward.) Moving the joystick to the right in the X direction while holding down the button moves FL turret 2 to the previous address (backward.)	✓		✓	✓
31	-------	Filter Turret 2 Position 1 (FL#2 P1)	Moves FL turret 2 to address 1.			✓	✓
32	-------	Filter Turret 2 Position 2 (FL#2 P2)	Moves FL turret 2 to address 2.			✓	✓
33	-------	Filter Turret 2 Position 3 (FL#2 P3)	Moves FL turret 2 to address 3.			✓	✓
34	-------	Filter Turret 2 Position 4 (FL#2 P4)	Moves FL turret 2 to address 4.			✓	✓
35	-------	Filter Turret 2 Position 5 (FL#2 P5)	Moves FL turret 2 to address 5.			✓	✓
36	-------	Filter Turret 2 Position 6 (FL#2 P6)	Moves FL turret 2 to address 6.			✓	✓
37	-------	Filter Turret 2 Increment (FL#2 INC)	Turns FL turret 2 to the adjacent address (forward)			✓	✓
38	-------	Filter Turret 2 Decrement (FL#2 DEC)	Turns FL turret 2 to the adjacent address (backward)			✓	✓

(✓✓: Default setting, ✓: Settable)

No.	Category	Indicated name (LCD display name of the joystick)	Functional overview	Setting availability from the joystick		Setting availability from the application	
	Sub-category			J/S Fn1 to 6	Main body FnL/FnR	J/S Fn1 to 6	Main body FnL/FnR
	BA Filter Wheel 1						
39	-------	BA Filter Wheel 1 Control with Joystick while pressing (BA#1 Jctl/Prs)	Moving the joystick to the left in the X direction while holding down the button moves BA filter wheel 1 to the next address (forward.) Moving the joystick to the right in the X direction while holding down the button moves BA filter wheel 1 to the previous address (backward.)	✓		✓	✓
40	-------	BA Filter Wheel 1 Position 1 (BA#1 P1)	Moves BA filter wheel 1 to address 1.			✓	✓
41	-------	BA Filter Wheel 1 Position 2 (BA#1 P2)	Moves BA filter wheel 1 to address 2.			✓	✓
42	-------	BA Filter Wheel 1 Position 3 (BA#1 P3)	Moves BA filter wheel 1 to address 3.			✓	✓
43	-------	BA Filter Wheel 1 Position 4 (BA#1 P4)	Moves BA filter wheel 1 to address 4.			✓	✓
44	-------	BA Filter Wheel 1 Position 5 (BA#1 P5)	Moves BA filter wheel 1 to address 5.			✓	✓
45	-------	BA Filter Wheel 1 Position 6 (BA#1 P6)	Moves BA filter wheel 1 to address 6.			✓	✓
46	-------	BA Filter Wheel 1 Position 7 (BA#1 P7)	Moves BA filter wheel 1 to address 7.			✓	✓
47	-------	BA Filter Wheel 1 Increment (BA#1 INC)	Turns BA filter wheel 1 to the adjacent address (forward)		✓	✓	✓
48	-------	BA Filter Wheel 1 Decrement (BA#1 DEC)	Turns BA filter wheel 1 to the adjacent address (backward)		✓	✓	✓
	BA Filter Wheel 2						
49	-------	BA Filter Wheel 2 Control with Joystick while pressing (BA#2 Jctl/Prs)	Moving the joystick to the left in the X direction while holding down the button moves BA filter wheel 2 to the next address (forward.) Moving the joystick to the right in the X direction while holding down the button moves BA filter wheel 2 to the previous address (backward.)	✓		✓	✓
50	-------	BA Filter Wheel 2 Position 1 (BA#2 P1)	Moves BA filter wheel 2 to address 1.			✓	✓
51	-------	BA Filter Wheel 2 Position 2 (BA#2 P2)	Moves BA filter wheel 2 to address 2.			✓	✓
52	-------	BA Filter Wheel 2 Position 3 (BA#2 P3)	Moves BA filter wheel 2 to address 3.			✓	✓
53	-------	BA Filter Wheel 2 Position 4 (BA#2 P4)	Moves BA filter wheel 2 to address 4.			✓	✓
54	-------	BA Filter Wheel 2 Position 5 (BA#2 P5)	Moves BA filter wheel 2 to address 5.			✓	✓
55	-------	BA Filter Wheel 2 Position 6 (BA#2 P6)	Moves BA filter wheel 2 to address 6.			✓	✓
56	-------	BA Filter Wheel 2 Position 7 (BA#2 P7)	Moves BA filter wheel 2 to address 7.			✓	✓
57	-------	BA Filter Wheel 2 Increment (BA#2 INC)	Turns BA filter wheel 2 to the adjacent address (forward)		✓	✓	✓
58	-------	BA Filter Wheel 2 Decrement (BA#2 DEC)	Turns BA filter wheel 2 to the adjacent address (backward)		✓	✓	✓
	Light Path						
59	Set	Light Path Control with Joystick while pressing (PATH Jctl/Prs)	Move the joystick along the XY direction of the joystick while pressing the button for optical path switching: X+: R100, X-: L100, Y+: EYE, Y-: L80	✓		✓	✓
60	Set	Light Path EYE (PATH EYE)	Switches the optical path to EYE.			✓	✓
61	Set	Light Path RIGHT (PATH RIGHT)	Switches the optical path to R100.			✓	✓
62	Set	Light Path LEFT (PATH LEFT)	Switches the optical path to L100.			✓	✓
63	Set	Light Path AUX (PATH AUX)	Switches the optical path to AUX.			✓	✓
64	Toggle	Light Path EYE <-> RIGHT (PATH EYE^R)	Toggles the optical path between EYE and R100.			✓	✓
65	Toggle	Light Path EYE <-> LEFT (PATH EYE^L)	Toggles the optical path between EYE and L100.			✓	✓
66	Toggle	Light Path EYE <-> AUX (PATH EYE^AUX)	Toggles the optical path between EYE and AUX.			✓	✓
67	Toggle	Light Path RIGHT <-> LEFT (PATH R^L)	Toggles the optical path between R100 and L100.			✓	✓

(✓✓: Default setting, ✓: Settable)

No.	Category	Indicated name (LCD display name of the joystick)	Functional overview	Setting availability from the joystick		Setting availability from the application	
	Sub-category			J/S Fn1 to 6	Main body FnL/FnR	J/S Fn1 to 6	Main body FnL/FnR
68	Toggle	Light Path RIGHT <-> AUX (PATH R^AUX)	Toggles the optical path between R100 and AUX.			✓	✓
69	Toggle	Light Path LEFT <-> AUX (PATH L^AUX)	Toggles the optical path between L100 and AUX.			✓	✓
70	Set	Light Path Rotation (PATH ROT)	Switches the optical path from EYE to R100, AUX, L100 and then back to EYE.			✓	✓
	Z Drive						
71	-------	Z Drive Speed change (Z SPD)	Switches the Z-movement: Coarse/Fine (2-state), Coarse/Fine/Extra fine (3-state)			✓	✓
72	-------	Z Drive Display 0 Reset (Z DISP ZERO)	Resets the elevating movement (Z-axis coordinate) to 0.			✓	✓
73	-------	Z Drive ESCAPE <-> REFOCUS (Z ESC^ REFOCUS)	Toggles the elevating movement between escape and original positions.	✓		✓	✓
74	-------	Z Drive ESCAPE (Z ESC)	Places the elevating section in the escape position.			✓	✓
75	-------	Z Drive REFOCUS (Z REFOCUS)	Restores the elevating section in the original position.			✓	✓
76	-------	Z Drive Limit SET <-> CLEAR (Z-LMT SET::CLR)	Short pressing the button sets the current value to the software limit (Z limit). Long pressing the button releases the limit.			✓	✓
77	LOAD::SAVE	Z Drive LOAD::SAVE 1 (Z M1 LOAD::SAVE)	Short-tap: Recalls Z position 1. Long-tap: Memorizes Z position 1.			✓	✓
78	LOAD::SAVE	Z Drive LOAD::SAVE 2 (Z M2 LOAD::SAVE)	Short-tap: Recalls Z position 2. Long-tap: Memorizes Z position 2.			✓	✓
79	LOAD::SAVE	Z Drive LOAD::SAVE 3 (Z M3 LOAD::SAVE)	Short-tap: Recalls Z position 3. Long-tap: Memorizes Z position 3.			✓	✓
80	LOAD::SAVE	Z Drive LOAD::SAVE 4 (Z M4 LOAD::SAVE)	Short-tap: Recalls Z position 4. Long-tap: Memorizes Z position 4.			✓	✓
81	SAVE	Z Drive SAVE 1 (Z M1 SAVE)	Memorizes Z position 1.			✓	✓
82	SAVE	Z Drive SAVE 2 (Z M2 SAVE)	Memorizes Z position 2.			✓	✓
83	SAVE	Z Drive SAVE 3 (Z M3 SAVE)	Memorizes Z position 3.			✓	✓
84	SAVE	Z Drive SAVE 4 (Z M4 SAVE)	Memorizes Z position 4.			✓	✓
85	LOAD	Z Drive LOAD 1 (Z M1 LOAD)	Recalls Z position 1.			✓	✓
86	LOAD	Z Drive SAVE 2 (Z M2 LOAD)	Recalls Z position 2.			✓	✓
87	LOAD	Z Drive LOAD 3 (Z M3 LOAD)	Recalls Z position 3.			✓	✓
88	LOAD	Z Drive LOAD 4 (Z M4 LOAD)	Recalls Z position 4.			✓	✓
	XY Stage						
89	-------	XY Stage Speed Change (XY SPD)	Switches the XY-movement: Coarse/Fine (2-state), Coarse/Fine/Extra fine (3-state)			✓	✓
90	-------	XY Stage X Display 0 Reset (X DISP ZERO)	Resets the XY stage (X-axis coordinate) to 0.			✓	✓
91	-------	XY Stage Y Display 0 Reset (Y DISP ZERO)	Resets the XY stage (Y-axis coordinate) to 0.			✓	✓
92	-------	XY Stage XY Display 0 Reset (XY DISP ZERO)	Resets the XY stage (XY-axis coordinates) to 0.			✓	✓
93	-------	XY Stage FIXED SPEED Enable <-> Disable (XY FIXSPD ENA^DIS)	Turns on or off the joystick constant speed mode for the XY stage.	✓		✓	✓
94	-------	XY Stage Change FINE SPEED Standard <-> Slow (XY FIN-SPD STD^LO)	Sets the joystick fine speed for the XY stage to normal or low speed.	✓		✓	✓
95	LOAD::SAVE	XY Stage LOAD::SAVE 1 (XY M1 LOAD::SAVE)	Short-tap: Recalls XY position 1. Long-tap: Memorizes XY position 1.			✓	✓
96	LOAD::SAVE	XY Stage LOAD::SAVE 2 (XY M2 LOAD::SAVE)	Short-tap: Recalls XY position 2. Long-tap: Memorizes XY position 2.			✓	✓
97	LOAD::SAVE	XY Stage LOAD::SAVE 3 (XY M3 LOAD::SAVE)	Short-tap: Recalls XY position 3. Long-tap: Memorizes XY position 3.			✓	✓
98	LOAD::SAVE	XY Stage LOAD::SAVE 4 (XY M4 LOAD::SAVE)	Short-tap: Recalls XY position 4. Long-tap: Memorizes XY position 4.			✓	✓

(✓✓: Default setting, ✓: Settable)

No.	Category	Indicated name (LCD display name of the joystick)	Functional overview	Setting availability from the joystick		Setting availability from the application	
	Sub-category			J/S Fn1 to 6	Main body FnL/FnR	J/S Fn1 to 6	Main body FnL/FnR
99	SAVE	XY Stage SAVE 1 (XY M1 SAVE)	Memorizes XY position 1.			✓	✓
100	SAVE	XY Stage SAVE 2 (XY M2 SAVE)	Memorizes XY position 2.			✓	✓
101	SAVE	XY Stage SAVE 3 (XY M3 SAVE)	Memorizes XY position 3.			✓	✓
102	SAVE	XY Stage SAVE 4 (XY M4 SAVE)	Memorizes XY position 4.			✓	✓
103	LOAD	XY Stage LOAD 1 (XY M1 LOAD)	Recalls XY position 1.			✓	✓
104	LOAD	XY Stage SAVE 2 (XY M2 LOAD)	Recalls XY position 2.			✓	✓
105	LOAD	XY Stage LOAD 3 (XY M3 LOAD)	Recalls XY position 3.			✓	✓
106	LOAD	XY Stage LOAD 4 (XY M4 LOAD)	Recalls XY position 4.			✓	✓
	External Shutter						
107	Shutter1	External Shutter OPEN <-> CLOSE (SHTR#1 OP^CL)	Opens or closes motorized shutter 1.	✓	✓	✓	✓
108	Shutter2	External Shutter OPEN <-> CLOSE (SHTR#２ OP^CL)	Opens or closes motorized shutter 2.	✓	✓	✓	✓
	FL Shutter						
109	Shutter1	FL Shutter OPEN <-> CLOSE (FL#1-SHTR OP^CL)	Opens or closes the FL turret 1 shutter.	✓✓ (Fn6)		✓✓ (Fn6)	✓
110	Shutter2	FL Shutter OPEN <-> CLOSE (FL#2-SHTR OP^CL)	Opens or closes the FL turret 2 shutter.	✓		✓	✓
	Condenser Shutter						
111	--------	Condenser Shutter OPEN <-> CLOSE (COND-SHTR OP^CL)	Moves the condenser shutter position.	✓✓ (Fn4)		✓✓ (Fn4)	✓
	DIA LED						
112	--------	DIA LED Control with Z handle while pressing (DIA-LED Zctl/Prs)	Adjusts brightness by turning the focus knobs while pressing the button.	✓		✓	✓
113	--------	DIA LED ON <-> OFF (DIA-LED ON^OFF)	Turns on and off diascopic LED illumination.			✓	✓
114	--------	DIA LED UP (DIA-LED UP)	Increases the illumination intensity of diascopic LED illumination.			✓	✓
115	--------	DIA LED DOWN (DIA-LED DN)	Decreases the illumination intensity of diascopic LED illumination.			✓	✓
	DIA Halogen						
116	--------	DIA Halogen Control with Z handle while pressing (DIA-LMP Zctl/Prs)	Adjusts brightness by turning the focus knobs while pressing the button.	✓		✓	✓
117	--------	DIA Halogen ON <-> OFF (DIA-LMP ON^OFF)	Turns on and off halogen dia-illumination.			✓	✓
118	--------	DIA Halogen UP (DIA-LMP UP)	Increases the illumination intensity of halogen dia-illumination.			✓	✓
119	--------	DIA Halogen DOWN (DIA-LMP DN)	Decreases the illumination intensity of halogen dia-illumination.			✓	✓
	PFS						
120	--------	PFS ON <-> OFF (PFS ON^OFF)	Turns on and off the PFS.			✓	✓
121	--------	PFS DM IN <-> OUT (PFS-DM IN^OUT)	Moves the PFS dichroic mirror to the IN or OUT position.	✓		✓	✓
122	--------	PFS Offset Origin (PFS-OFST ORG)	Moves the offset lens to the reference position.		✓	✓	✓
123	--------	PFS LED OFF (PFS-LED OFF)	Turns off the PFS LED.			✓	✓
124	--------	PFS Offset dial Speed (PFS-OFST SPD)	Switches the PFS offset knob between coarse motion and fine motion.			✓	✓
	Tube Base						
125	--------	Tube Base Control with Joystick while pressing (EXPH Jctl/Prs)	Moving the joystick to the left in the X direction while holding down the button moves the external Ph turret of the tube base unit to the next address (forward.) Moving the joystick to the right in the X direction while holding down the button moves external Ph turret of the tube base unit to the previous address (backward.)	✓		✓	✓
126	--------	Tube Base Position O (EXPH PO)	Moves the tube base's external Ph turret to the address O.			✓	✓
127	--------	Tube Base Position 1 (EXPH P1)	Moves the tube base's external Ph turret to address 1.			✓	✓

(✓✓: Default setting, ✓: Settable)

No.	Category	Indicated name (LCD display name of the joystick)	Functional overview	Setting availability from the joystick		Setting availability from the application	
	Sub-category			J/S Fn1 to 6	Main body FnL/FnR	J/S Fn1 to 6	Main body FnL/FnR
128	--------	Tube Base Position 2 (EXPH P2)	Moves the tube base's external Ph turret to address 2.			✓	✓
129	--------	Tube Base Position 3 (EXPH P3)	Moves the tube base's external Ph turret to address 3.			✓	✓
130	--------	Tube Base Increment (EXPH INC)	Moves the external Ph turret of the tube base unit to the adjacent address (forward.)		✓	✓	✓
131	--------	Tube Base Decrement (EXPH DEC)	Moves the external Ph turret of the tube base unit to the adjacent address (backward.)		✓	✓	✓
	Main Branch						
132	--------	Main Branch Mirror1 IN <-> OUT (MBRANCH#1 IN^OUT)	Brings the epi-illumination attachment's Lapp main branch 1 to the IN or OUT position.	✓	✓	✓	✓
133	--------	Main Branch Mirror2 IN <-> OUT (MBRANCH#2 IN^OUT)	Brings the epi-illumination attachment's Lapp main branch 2 to the IN or OUT position.	✓	✓	✓	✓
	Sub Branch						
134	--------	Sub Branch Mirror IN <-> OUT (SBRANCH IN^OUT)	Brings the epi-illumination attachment's Lapp sub-branch to the IN or OUT position.	✓	✓	✓	✓
	C-LEDFI						
135	--------	C-LEDFI Select UNIT 1 (C-LED SLCT1)	Selects LED unit #1 of the epi-fl LED illuminator.			✓	✓
136	--------	C-LEDFI Select UNIT 2 (C-LED SLCT2)	Selects LED unit #2 of the epi-fl LED illuminator.			✓	✓
137	--------	C-LEDFI Select UNIT 3 (C-LED SLCT3)	Selects LED unit #3 of the epi-fl LED illuminator.			✓	✓
138	--------	C-LEDFI Select UNIT 4 (C-LED SLCT4)	Selects LED unit #4 of the epi-fl LED illuminator.			✓	✓
139	--------	C-LEDFI Rotation (C-LED SLCT ROT)	Switches LED unit of the epi-fl LED illuminator from #1 to #2, #3, #4, and then back to #1.			✓	✓
140	--------	C-LEDFI UP (C-LED UP)	Increases the illumination intensity of the selected LED unit of the epi-fl LED illuminator.			✓	✓
141	--------	C-LEDFI DOWN (C-LED DN)	Decreases the illumination intensity of the selected LED unit of the epi-fl LED illuminator.			✓	✓
142	--------	C-LEDFI ON <-> OFF (C-LED ON^OFF)	Turns on or off the selected LED unit of the epi-fl LED illuminator.			✓	✓
	Intensilight						
143	--------	Intensilight Control with Joystick while pressing (INTSL Jctl/Prs)	Moving the joystick to the left in the X direction while holding down the button increases the ND (brightness down.) Moving the joystick to the right in the X direction while holding down the button decreases the ND (brightness up.)			✓	✓
144	--------	Intensilight DOWN (INTSL DN)	Increases the ND of the IntensiLight (brightness down.)			✓	✓
145	--------	Intensilight UP (INTSL UP)	Decreases the ND of the IntensiLight (brightness up.)			✓	✓
146	--------	Intensilight Shutter OPEN <-> CLOSE (INTSL-SHTR OP^CL)	Opens or closes the Intensilight shutter.			✓	✓
	Correction Collar						
147	--------	Correction Collar Control with Z handle while pressing (COR-COL Zctl/Prs)	Moves the motorized correction collar in the +/- direction when the focus knobs are turned while the button is pressed.	✓		✓	✓
	MODE						
148	SAVE	MODE 1 SAVE (MODE1 SAVE)	Memorizes Mode 1 setting.			✓	✓
149	SAVE	MODE 2 SAVE (MODE2 SAVE)	Memorizes Mode 2 setting.			✓	✓
150	SAVE	MODE 3 SAVE (MODE3 SAVE)	Memorizes Mode 3 setting.			✓	✓
151	SAVE	MODE 4 SAVE (MODE4 SAVE)	Memorizes Mode 4 setting.			✓	✓
152	SAVE	MODE 5 SAVE (MODE5 SAVE)	Memorizes Mode 5 setting.			✓	✓
153	SAVE	MODE 6 SAVE (MODE6 SAVE)	Memorizes Mode 6 setting.			✓	✓
154	SAVE	MODE 7 SAVE (MODE7 SAVE)	Memorizes Mode 7 setting.			✓	✓
155	SAVE	MODE 8 SAVE (MODE8 SAVE)	Memorizes Mode 8 setting.			✓	✓
156	LOAD	MODE 1 LOAD (MODE1 LOAD)	Recalls Mode 1 setting.			✓	✓
157	LOAD	MODE 2 LOAD (MODE2 LOAD)	Recalls Mode 2 setting.			✓	✓
158	LOAD	MODE 3 LOAD (MODE3 LOAD)	Recalls Mode 3 setting.			✓	✓
159	LOAD	MODE 4 LOAD (MODE4 LOAD)	Recalls Mode 4 setting.			✓	✓

(✓✓: Default setting, ✓: Settable)

No.	Category	Indicated name (LCD display name of the joystick)	Functional overview	Setting availability from the joystick		Setting availability from the application	
	Sub-category			J/S Fn1 to 6	Main body FnL/FnR	J/S Fn1 to 6	Main body FnL/FnR
160	LOAD	MODE 5 LOAD (MODE5 LOAD)	Recalls Mode 5 setting.			✓	✓
161	LOAD	MODE 6 LOAD (MODE6 LOAD)	Recalls Mode 6 setting.			✓	✓
162	LOAD	MODE 7 LOAD (MODE7 LOAD)	Recalls Mode 7 setting.			✓	✓
163	LOAD	MODE 8 LOAD (MODE8 LOAD)	Recalls Mode 8 setting.			✓	✓
164	LOAD::SAVE	MODE 1 LOAD::SAVE (MODE1 LOAD::SAVE)	Short press: Recalls Mode 1 setting. Long press: Memorizes Mode 1 setting.	✓✓ (Fn1)	✓	✓✓ (Fn1)	✓
165	LOAD::SAVE	MODE 2 LOAD::SAVE (MODE2 LOAD::SAVE)	Short press: Recalls Mode 2 setting. Long press: Memorizes Mode 2 setting.	✓✓ (Fn2)	✓	✓✓ (Fn2)	✓
166	LOAD::SAVE	MODE 3 LOAD::SAVE (MODE3 LOAD::SAVE)	Short press: Recalls Mode 3 setting. Long press: Memorizes Mode 3 setting.	✓	✓	✓	✓
167	LOAD::SAVE	MODE 4 LOAD::SAVE (MODE4 LOAD::SAVE)	Short press: Recalls Mode 4 setting. Long press: Memorizes Mode 4 setting.	✓	✓	✓	✓
168	LOAD::SAVE	MODE 5 LOAD::SAVE (MODE5 LOAD::SAVE)	Short press: Recalls Mode 5 setting. Long press: Memorizes Mode 5 setting.			✓	✓
169	LOAD::SAVE	MODE 6 LOAD::SAVE (MODE6 LOAD::SAVE)	Short press: Recalls Mode 6 setting. Long press: Memorizes Mode 6 setting.			✓	✓
170	LOAD::SAVE	MODE 7 LOAD::SAVE (MODE7 LOAD::SAVE)	Short press: Recalls Mode 7 setting. Long press: Memorizes Mode 7 setting.			✓	✓
171	LOAD::SAVE	MODE 8 LOAD::SAVE (MODE8 LOAD::SAVE)	Short press: Recalls Mode 8 setting. Long press: Memorizes Mode 8 setting.			✓	✓
	I/O OUT						
172	TRIG.	I/O 1 TRIG. (IO1 OUT)	Trigger output of control box I/O channel 1	✓	✓✓ (FnR)	✓	✓✓ (FnR)
173	TRIG.	I/O 2 TRIG. (IO2 OUT)	Trigger output of control box I/O channel 2	✓	✓	✓	✓
174	TRIG.	I/O 3 TRIG. (IO3 OUT)	Trigger output of control box I/O channel 3			✓	✓
175	TRIG.	I/O 4 TRIG. (IO4 OUT)	Trigger output of control box I/O channel 4			✓	✓
176	TRIG.	I/O 5 TRIG. (IO5 OUT)	Trigger output of control box I/O channel 5			✓	✓
177	TRIG.	I/O 6 TRIG. (IO6 OUT)	Trigger output of control box I/O channel 6			✓	✓
178	TRIG.	I/O 7 TRIG. (IO7 OUT)	Trigger output of control box I/O channel 7			✓	✓
179	TRIG.	I/O 8 TRIG. (IO8 OUT)	Trigger output of control box I/O channel 8			✓	✓
180	High<-> Low Toggle	I/O 1 High <-> Low Toggle (IO1 HI^LO)	Switches the control box I/O channel 1 output between High and Low.	✓	✓	✓	✓
181	High<-> Low Toggle	I/O 2 High <-> Low Toggle (IO2 HI^LO)	Switches the control box I/O channel 2 output between High and Low.	✓	✓	✓	✓
182	High<-> Low Toggle	I/O 3 High <-> Low Toggle (IO3 HI^LO)	Switches the control box I/O channel 3 output between High and Low.			✓	✓
183	High<-> Low Toggle	I/O 4 High <-> Low Toggle (IO4 HI^LO)	Switches the control box I/O channel 4 output between High and Low.			✓	✓
184	High<-> Low Toggle	I/O 5 High <-> Low Toggle (IO5 HI^LO)	Switches the control box I/O channel 5 output between High and Low.			✓	✓
185	High<-> Low Toggle	I/O 6 High <-> Low Toggle (IO6 HI^LO)	Switches the control box I/O channel 6 output between High and Low.			✓	✓
186	High<-> Low Toggle	I/O 7 High <-> Low Toggle (IO7 HI^LO)	Switches the control box I/O channel 7 output between High and Low.			✓	✓
187	High<-> Low Toggle	I/O 8 High <-> Low Toggle (IO8 HI^LO)	Switches the control box I/O channel 8 output between High and Low.			✓	✓
188	PUSH	I/O 1 PUSH (IO1 HI/Prs)	Drives the control box I/O channel 1 output. High when pushed	✓	✓	✓	✓
189	PUSH	I/O 2 PUSH (IO2 HI/Prs)	Drives the control box I/O channel 2 output. High when pushed	✓	✓	✓	✓
190	PUSH	I/O 3 PUSH (IO3 HI/Prs)	Drives the control box I/O channel 3 output. High when pushed			✓	✓
191	PUSH	I/O 4 PUSH (IO4 HI/Prs)	Drives the control box I/O channel 4 output. High when pushed			✓	✓
192	PUSH	I/O 5 PUSH (IO5 HI/Prs)	Drives the control box I/O channel 5 output. High when pushed			✓	✓
193	PUSH	I/O 6 PUSH (IO6 HI/Prs)	Drives the control box I/O channel 6 output. High when pushed			✓	✓
194	PUSH	I/O 7 PUSH (IO7 HI/Prs)	Drives the control box I/O channel 7 output. High when pushed			✓	✓
195	PUSH	I/O 8 PUSH (IO8 HI/Prs)	Drives the control box I/O channel 8 output. High when pushed			✓	✓

(✓✓: Default setting, ✓: Settable)

No.	Category	Indicated name (LCD display name of the joystick)	Functional overview	Setting availability from the joystick		Setting availability from the application	
	Sub-category			J/S Fn1 to 6	Main body FnL/FnR	J/S Fn1 to 6	Main body FnL/FnR
	Ex.I/O OUT						
196	TRIG.	EXI/O 1 TRIG. (EXIO1 OUT)	Trigger output of extension box I/O channel 1			✓	✓
197	TRIG.	EXI/O 2 TRIG. (EXIO2 OUT)	Trigger output of extension box I/O channel 2			✓	✓
198	TRIG.	EXI/O 3 TRIG. (EXIO3 OUT)	Trigger output of extension box I/O channel 3			✓	✓
199	TRIG.	EXI/O 4 TRIG. (EXIO4 OUT)	Trigger output of extension box I/O channel 4			✓	✓
200	TRIG.	EXI/O 5 TRIG. (EXIO5 OUT)	Trigger output of extension box I/O channel 5			✓	✓
201	TRIG.	EXI/O 6 TRIG. (EXIO6 OUT)	Trigger output of extension box I/O channel 6			✓	✓
202	TRIG.	EXI/O 7 TRIG. (EXIO7 OUT)	Trigger output of extension box I/O channel 7			✓	✓
203	TRIG.	EXI/O 8 TRIG. (EXIO8 OUT)	Trigger output of extension box I/O channel 8			✓	✓
204	TRIG.	EXI/O 9 TRIG. (EXIO9 OUT)	Trigger output of extension box I/O channel 9			✓	✓
205	TRIG.	EXI/O 10 TRIG. (EXIO10 OUT)	Trigger output of extension box I/O channel 10			✓	✓
206	TRIG.	EXI/O 11 TRIG. (EXIO11 OUT)	Trigger output of extension box I/O channel 11			✓	✓
207	TRIG.	EXI/O 12 TRIG. (EXIO12 OUT)	Trigger output of extension box I/O channel 12			✓	✓
208	TRIG.	EXI/O 13 TRIG. (EXIO13 OUT)	Trigger output of extension box I/O channel 13			✓	✓
209	TRIG.	EXI/O 14 TRIG. (EXIO14 OUT)	Trigger output of extension box I/O channel 14			✓	✓
210	TRIG.	EXI/O 15 TRIG. (EXIO15 OUT)	Trigger output of extension box I/O channel 15			✓	✓
211	TRIG.	EXI/O 16 TRIG. (EXIO16 OUT)	Trigger output of extension box I/O channel 16			✓	✓
212	High<-> Low Toggle	EXI/O 1 High <-> Low Toggle (EXIO1 HI^LO)	Switches the extension box I/O channel 1 output between High and Low.			✓	✓
213	High<-> Low Toggle	EXI/O 2 High <-> Low Toggle (EXIO2 HI^LO)	Switches the extension box I/O channel 2 output between High and Low.			✓	✓
214	High<-> Low Toggle	EXI/O 3 High <-> Low Toggle (EXIO3 HI^LO)	Switches the extension box I/O channel 3 output between High and Low.			✓	✓
215	High<-> Low Toggle	EXI/O 4 High <-> Low Toggle (EXIO4 HI^LO)	Switches the extension box I/O channel 4 output between High and Low.			✓	✓
216	High<-> Low Toggle	EXI/O 5 High <-> Low Toggle (EXIO5 HI^LO)	Switches the extension box I/O channel 5 output between High and Low.			✓	✓
217	High<-> Low Toggle	EXI/O 6 High <-> Low Toggle (EXIO6 HI^LO)	Switches the extension box I/O channel 6 output between High and Low.			✓	✓
218	High<-> Low Toggle	EXI/O 7 High <-> Low Toggle (EXIO7 HI^LO)	Switches the extension box I/O channel 7 output between High and Low.			✓	✓
219	High<-> Low Toggle	EXI/O 8 High <-> Low Toggle (EXIO8 HI^LO)	Switches the extension box I/O channel 8 output between High and Low.			✓	✓
220	High<-> Low Toggle	EXI/O 9 High <-> Low Toggle (EXIO9 HI^LO)	Switches the extension box I/O channel 9 output between High and Low.			✓	✓
221	High<-> Low Toggle	EXI/O 10 High <-> Low Toggle (EXIO10 HI^LO)	Switches the extension box I/O channel 10 output between High and Low.			✓	✓
222	High<-> Low Toggle	EXI/O 11 High <-> Low Toggle (EXIO11 HI^LO)	Switches the extension box I/O channel 11 output between High and Low.			✓	✓
223	High<-> Low Toggle	EXI/O 12 High <-> Low Toggle (EXIO12 HI^LO)	Switches the extension box I/O channel 12 output between High and Low.			✓	✓
224	High<-> Low Toggle	EXI/O 13 High <-> Low Toggle (EXIO13 HI^LO)	Switches the extension box I/O channel 13 output between High and Low.			✓	✓
225	High<-> Low Toggle	EXI/O 14 High <-> Low Toggle (EXIO14 HI^LO)	Switches the extension box I/O channel 14 output between High and Low.			✓	✓
226	High<-> Low Toggle	EXI/O 15 High <-> Low Toggle (EXIO15 HI^LO)	Switches the extension box I/O channel 15 output between High and Low.			✓	✓
227	High<-> Low Toggle	EXI/O 16 High <-> Low Toggle (EXIO16 HI^LO)	Switches the extension box I/O channel 16 output between High and Low.			✓	✓
228	PUSH	EXI/O 1 PUSH (EXIO1 HI/Prs)	Drives the extension box I/O channel 1 output. High when pushed.			✓	✓
229	PUSH	EXI/O 2 PUSH (EXIO2 HI/Prs)	Drives the extension box I/O channel 2 output. High when pushed.			✓	✓
230	PUSH	EXI/O 3 PUSH (EXIO3 HI/Prs)	Drives the extension box I/O channel 3 output. High when pushed.			✓	✓
231	PUSH	EXI/O 4 PUSH (EXIO4 HI/Prs)	Drives the extension box I/O channel 4 output. High when pushed.			✓	✓

(✓✓: Default setting, ✓: Settable)

No.	Category	Indicated name (LCD display name of the joystick)	Functional overview	Setting availability from the joystick		Setting availability from the application	
	Sub-category			J/S Fn1 to 6	Main body FnL/FnR	J/S Fn1 to 6	Main body FnL/FnR
232	PUSH	EXI/O 5 PUSH (EXIO5 HI/Prs)	Drives the extension box I/O channel 5 output. High when pushed.			✓	✓
233	PUSH	EXI/O 6 PUSH (EXIO6 HI/Prs)	Drives the extension box I/O channel 6 output. High when pushed.			✓	✓
234	PUSH	EXI/O 7 PUSH (EXIO7 HI/Prs)	Drives the extension box I/O channel 7 output. High when pushed.			✓	✓
235	PUSH	EXI/O 8 PUSH (EXIO8 HI/Prs)	Drives the extension box I/O channel 8 output. High when pushed.			✓	✓
236	PUSH	EXI/O 9 PUSH (EXIO9 HI/Prs)	Drives the extension box I/O channel 9 output. High when pushed.			✓	✓
237	PUSH	EXI/O 10 PUSH (EXIO10 HI/Prs)	Drives the extension box I/O channel 10 output. High when pushed.			✓	✓
238	PUSH	EXI/O 11 PUSH (EXIO11 HI/Prs)	Drives the extension box I/O channel 11 output. High when pushed.			✓	✓
239	PUSH	EXI/O 12 PUSH (EXIO12 HI/Prs)	Drives the extension box I/O channel 12 output. High when pushed.			✓	✓
240	PUSH	EXI/O 13 PUSH (EXIO13 HI/Prs)	Drives the extension box I/O channel 13 output. High when pushed.			✓	✓
241	PUSH	EXI/O 14 PUSH (EXIO14 HI/Prs)	Drives the extension box I/O channel 14 output. High when pushed.			✓	✓
242	PUSH	EXI/O 15 PUSH (EXIO15 HI/Prs)	Drives the extension box I/O channel 15 output. High when pushed.			✓	✓
243	PUSH	EXI/O 16 PUSH (EXIO16 HI/Prs)	Drives the extension box I/O channel 16 output. High when pushed.			✓	✓
Indicator							
244	-------	Indicator LED On<->Off (INDICATOR ON^OFF)	Turns on or off the LED indicators on the front of the microscope main body.	✓	✓✓ (FnL)	✓	✓✓ (FnL)
Objective Combination							
245	-------	Objective Combination Run (OBJ-COMBI)	Linked operation of the nosepiece and optical devices			✓	✓

4.2 List of Indication Functions Assigned to the LED Indicators of the Ti2-E Microscope Main Body

4.2.1 Indication Functions That Can Be Registered

The table below lists the LED indications that can be assigned to the FnL and FnR indicators on the Ti2-E microscope main body.

No.	Indicated name	Functional overview	States when set
1	-------	Nothing is to be set.	None
2	Shutter 1 Open/Close Status	Shutter 1 open/closed status	Lit: Open, Extinguished: Closed
3	Shutter 2 Open/Close Status	Shutter 2 open/closed status	Lit: Open, Extinguished: Closed
4	Main Branch 1 IN/OUT Status	Main branch 1 status	Lit: In, Extinguished: Out
5	Main Branch 2 IN/OUT Status	Main branch 2 status	Lit: In, Extinguished: Out
6	Sub Branch IN/OUT Status	Sub branch status	Lit: In, Extinguished: Out
7	C-LEDFI ON/OFF Status	Selected LED unit status of the epi-fl LED illuminator	Lit: On, Extinguished: Off
8	Intensilight Shutter Open/Close Status	IntensiLight Shutter Status	Lit: Open, Extinguished: Closed
9	DIC Polarizer IN/OUT Status	DIC polarizer status	Lit: In, Extinguished: Out
10	DIC Analyzer IN/OUT Status	Analyzer slot status	Lit: In, Extinguished: Out
11	Inter Mag. 1.5x/1x Status	Intermediate magnification	Lit: 1.5x, Extinguished: 1x
12	Eyepiece Tubebase Camera Port IN/OUT Status	Tube base unit camera port status	Lit: EYE (motorized tube and port tube) with assist tube open Extinguished: DSC (motorized tube and port tube) with assist tube closed
13	Bertrand Lens IN/OUT Status	Bertrand lens status	Lit: In, Extinguished: Out
14	Assist Camera ON/OFF Status	Assist camera power status	Lit: On, Extinguished: Off
15	Control Box I/O 1 Output Hi/Low Status	Control box I/O channel 1 output status	Lit: High, Extinguished: Low
16	Control Box I/O 2 Output Hi/Low Status	Control box I/O channel 2 output status	Lit: High, Extinguished: Low
17	Control Box I/O 3 Output Hi/Low Status	Control box I/O channel 3 output status	Lit: High, Extinguished: Low
18	Control Box I/O 4 Output Hi/Low Status	Control box I/O channel 4 output status	Lit: High, Extinguished: Low
19	Control Box I/O 5 Output Hi/Low Status	Control box I/O channel 5 output status	Lit: High, Extinguished: Low
20	Control Box I/O 6 Output Hi/Low Status	Control box I/O channel 6 output status	Lit: High, Extinguished: Low
21	Control Box I/O 7 Output Hi/Low Status	Control box I/O channel 7 output status	Lit: High, Extinguished: Low
22	Control Box I/O 8 Output Hi/Low Status	Control box I/O channel 8 output status	Lit: High, Extinguished: Low
23	Extension I/O Box I/O 01 Output Hi/Low Status	Extension box I/O channel 1 output status	Lit: High, Extinguished: Low
24	Extension I/O Box I/O 02 Output Hi/Low Status	Extension box I/O channel 2 output status	Lit: High, Extinguished: Low
25	Extension I/O Box I/O 03 Output Hi/Low Status	Extension box I/O channel 3 output status	Lit: High, Extinguished: Low
26	Extension I/O Box I/O 04 Output Hi/Low Status	Extension box I/O channel 4 output status	Lit: High, Extinguished: Low
27	Extension I/O Box I/O 05 Output Hi/Low Status	Extension box I/O channel 5 output status	Lit: High, Extinguished: Low
28	Extension I/O Box I/O 06 Output Hi/Low Status	Extension box I/O channel 6 output status	Lit: High, Extinguished: Low
29	Extension I/O Box I/O 07 Output Hi/Low Status	Extension box I/O channel 7 output status	Lit: High, Extinguished: Low
30	Extension I/O Box I/O 08 Output Hi/Low Status	Extension box I/O channel 8 output status	Lit: High, Extinguished: Low
31	Extension I/O Box I/O 09 Output Hi/Low Status	Extension box I/O channel 9 output status	Lit: High, Extinguished: Low
32	Extension I/O Box I/O 10 Output Hi/Low Status	Extension box I/O channel 10 output status	Lit: High, Extinguished: Low
33	Extension I/O Box I/O 11 Output Hi/Low Status	Extension box I/O channel 11 output status	Lit: High, Extinguished: Low
34	Extension I/O Box I/O 12 Output Hi/Low Status	Extension box I/O channel 12 output status	Lit: High, Extinguished: Low
35	Extension I/O Box I/O 13 Output Hi/Low Status	Extension box I/O channel 13 output status	Lit: High, Extinguished: Low
36	Extension I/O Box I/O 14 Output Hi/Low Status	Extension box I/O channel 14 output status	Lit: High, Extinguished: Low
37	Extension I/O Box I/O 15 Output Hi/Low Status	Extension box I/O channel 15 output status	Lit: High, Extinguished: Low
38	Extension I/O Box I/O 16 Output Hi/Low Status	Extension box I/O channel 16 output status	Lit: High, Extinguished: Low

4.3 List of Functions Assigned to Joystick LCD Screen

4.3.1 Initial Settings of the LCD Display

The table below lists the default indication functions assigned to the LCD screen on the joystick.

In the initial setting, the LCD screen of the joystick has four pages.

Page	Line	Indicated name	Functional overview
Page 1	2nd line	Nosepiece	Information about objectives
	3rd line	Condenser	Information about condensers
	4th line	Optical Path	Information about optical path switching
Page 2	2nd line	FL1	Information about FL turret 1
	3rd line	Inter Mag.	Information about intermediate magnification
	4th line	Bertrand Lens	Information about the Bertrand lens
Page 3	2nd line	DIC Slider	Information about the DIC slider
	3rd line	DIC Polarizer/Analyzer Slot	Information about the DIC polarizer and analyzer slot
	4th line	-------	(Nothing is set.)
Page 4	2nd line	DIA Lamp	Information about LED dia-illumination
	3rd line	C-LEDFI	Information about the Epi-fl LED
	4th line	C-HGFI	Information about the Intensilight

4.3.2 Indication Functions That Can Be Registered

The table below lists the functions that can be assigned to the LCD screen on the joystick.

No.	Indicated name	Functional overview
1	-------	(Nothing is set.)
2	Nosepiece	Information about objectives
3	Condenser	Information about condensers
4	FL1	Information about FL turret 1
5	FL2	Information about FL turret 2
6	BA1	Information about BA filter wheel 1
7	BA2	Information about BA filter wheel 2
8	Optical Path	Information about optical path switching
9	Eyepiece Tubebase	Information about the tube base unit camera port
10	LAPP Main Branch 1	Main branch 1 (epi-illumination information)
11	LAPP Main Branch 2	Main branch 2 (epi-illumination information)
12	LAPP Sub Branch	Sub-branch (epi-illumination information)
13	Shutter	Information about the motorized shutter
14	DIA Lamp	Information about LED dia-illumination
15	DIC Slider	Information about the DIC slider
16	DIC Polarizer/Analyzer Slot	Information about the DIC polarizer and analyzer slot
17	Inter Mag.	Information about intermediate magnification
18	Bertrand Lens	Information about the Bertrand lens
19	C-LEDFI	Information about the Epi-fl LED
20	C-HGFI	Information about the Intensilight
21	Z	Information about the Z drive position (*)

(*) Available in Firmware Ver. 1.40 or later