



**Inverted Microscope
ECLIPSE Ti**

Ti Setup Tools
(Ti Control)

Software Manual

Introduction



Thank you for purchasing a Nikon product.

This manual describes how to install and use the Ti Setup Tools software (TiControl) for Ti series microscopes. To ensure correct use, please read this manual carefully before operating the product. Refer to the hardware manual for detailed information on how to connect your microscope and discussions of the system configuration.

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- 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 may be impaired.

■ Required knowledge

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

■ About the example screens used in the manual

In this manual, screens for which English is selected in the "Ti Setup Tools (TiControl)" Language settings are used.

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, refer to the user's manual.

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1

Preparations

This chapter describes hardware and the Nikon Ti Setup Tools (Ti Control) software requirements and how to install and uninstall the software.

1.1

Hardware and Software Requirements

CAUTION

- Before installing the Nikon Ti Setup Tools (Ti Control), confirm that your computer meets the minimum requirements given below for memory and available hard disk space.
- Install the application before connecting your PC and microscope system.

PC unit

Item	Specifications
CPU	Processor of 1 GHz or higher
Memory	1 GB or more (for 32-bit OS) 2 GB or more (for 64-bit OS)
Hard disk drive	100 MB or more free space
Expansion slots	One PCI slot
Video RAM	128 MB or more
OS	Windows 7 Professional SP1 or later (32-bit/64-bit, Japanese or English version) Windows 10 Pro (64-bit, Japanese or English version)
Other	The Ti Setup Tools (Ti Control) software is not guaranteed to be compatible with all PCs. Please contact your distributor for detailed compatibility information.

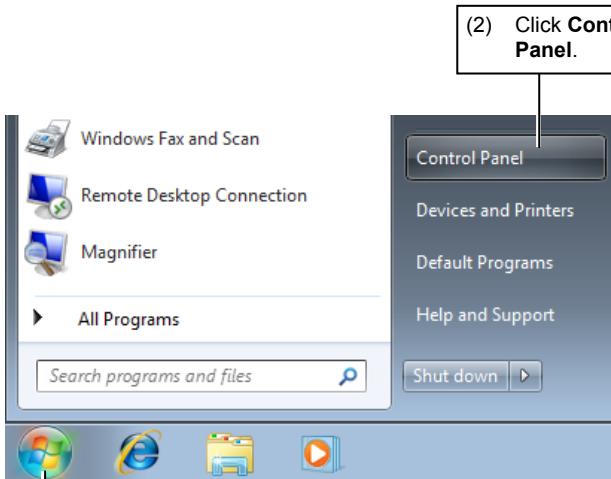
Display

Item	Specifications
Resolution	1,280 x 1,024 pixels. A monitor/video card capable of True Color output is recommended.

1.1.1**Checking Available RAM**

Check the amount of available RAM in the **System Properties** dialog box.

[Memory] There must be at least 1 GB (32-bit OS) or 2 GB (64-bit OS).

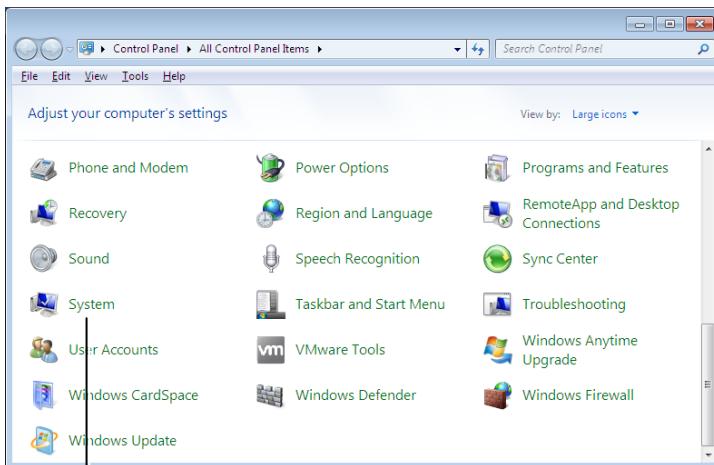
Procedure**▼ Start menu**

(1) Click the **start** button.

(2) Click **Control Panel**.

(1) Click the **start** button.

(2) Click **Control Panel** to display the **Control Panel** window.

▼ Control Panel Window

(3) Double-click the **System** icon.

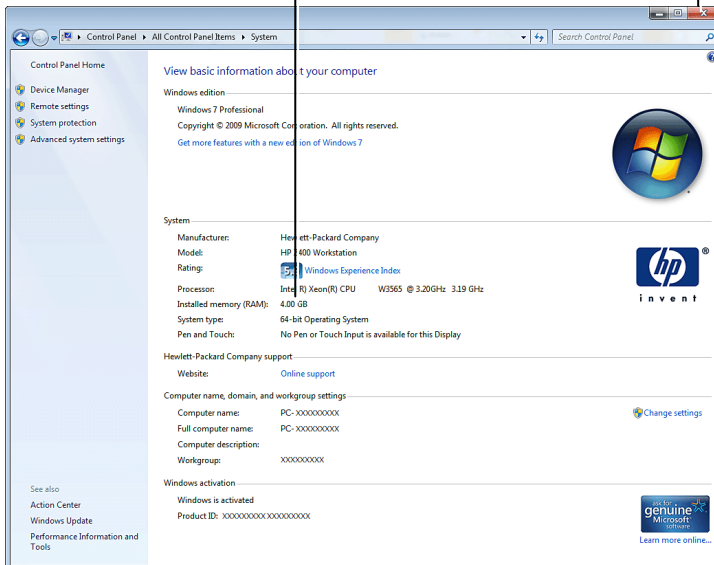
(3) Double-click the **System** icon in the **Control Panel** window. The **System Properties** dialog box appears.

This figure shows the **Control Panel** window when **Large icons** is selected as the view method.

▼ System Properties dialog box

(4) Check the installed memory here.

(5) Click the **Close** button.



(4) In the **System Properties** dialog box, check that the installed memory for 32-bit OS is at least 1 GB or the installed memory for 64-bit OS is at least 2 GB.

(5) Click the **Close** button to close the **System Properties** dialog box.

1.1.2 Checking the Free Hard Disk Space

Check the amount of free space on the hard disk in the **Computer** window.

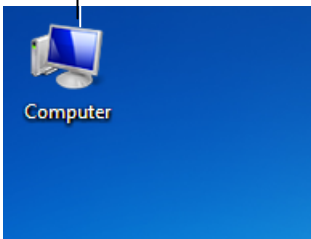
If there is insufficient free space on the hard disk, increase the available free space by uninstalling any unnecessary applications.

[Hard disk drive] The hard disk must have at least 100 MB of free space.

Operating procedure

▼ Desktop

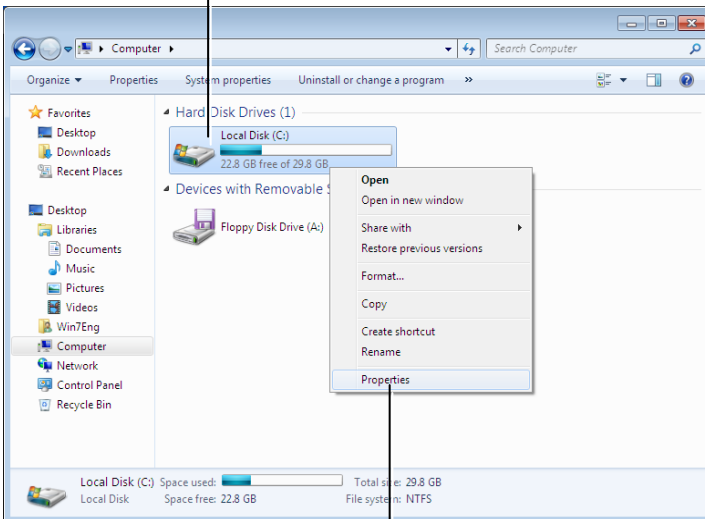
- (1) Double-click the **Computer** icon.



- (1) Double-click the **Computer** icon.
The **Computer** window appears.

▼ Computer window

- (2) Right-click on the **Local Disk** icon.

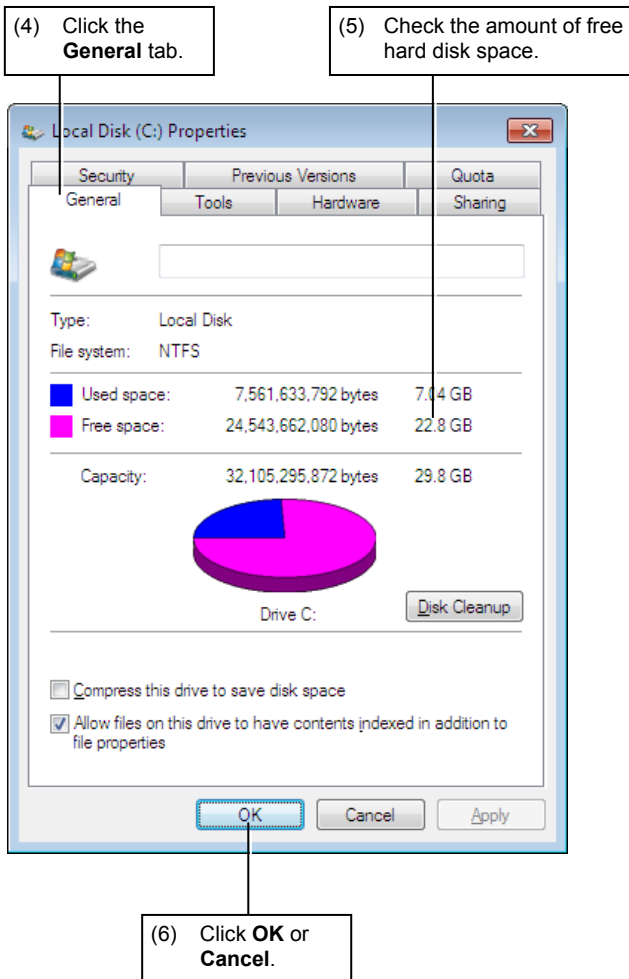


- (2) Right-click on the **Local Disk** icon in the **Computer** window to which you want to install the application.
The shortcut menu appears.

- (3) Click **Properties** in the Shortcut menu.
The **Properties** dialog box for the selected drive appears.

- (3) Click **Properties**.

▼ Local Disk Properties dialog box



(4) Click the **General** tab in the **Local Disk Properties** dialog box.

(5) Check that 100 MB or more free space is available on the hard disk.

(6) Click **OK** or **Cancel** to close the **Local Disk Properties** dialog box.

1.2 Installing the Application

This section describes how to install the Nikon Ti Setup Tools (Ti Control).

CAUTION

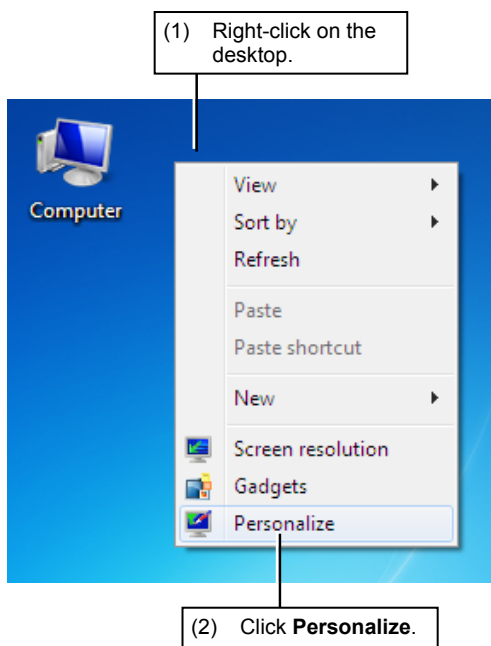
- Install the application before connecting the PC to the Ti microscope system.
- To install the Nikon Ti Setup Tools (Ti Control), you must login to your computer with a user account with Administrator rights.

1.2.1 Closing All Other Application

Before installing Nikon Ti Setup Tools (Ti Control), close all background programs such as the screensaver and anti-virus utility.

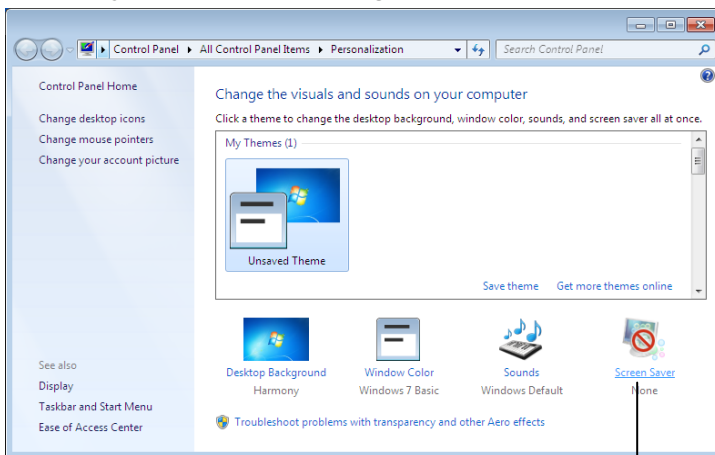
Closing the screensaver

▼ Shortcut menu on the desktop



- (1) Right-click on the desktop to display a shortcut menu.
- (2) Click **Personalize** in the shortcut menu. The **Personalization** dialog box appears.

▼ Display Personalization dialog box

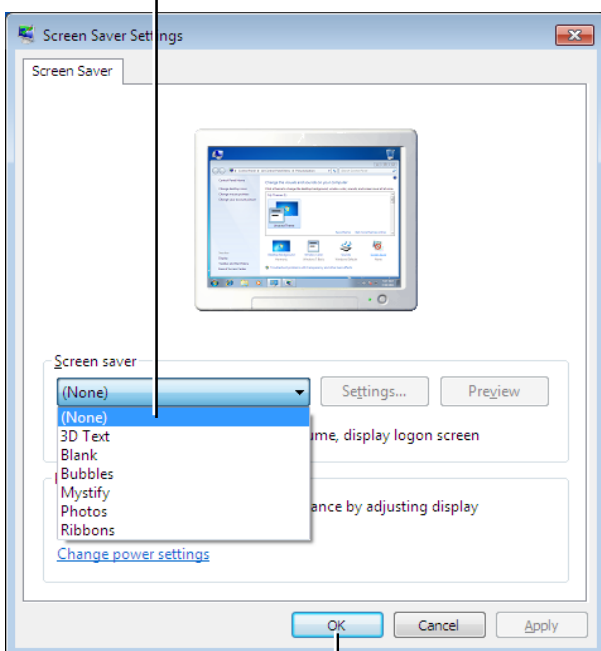


(3) Click the **Screen Saver**.

- (3) Click **Screen Saver** in the **Personalization** dialog box. The **Screen Saver Settings** dialog box appears.

▼ Screen Saver Settings dialog box

(4) Select “(None).”



(5) Click the **OK** button.

- (4) In the **Screen Saver Settings** dialog box, select “**(None)**” from the **Screen saver** pulldown menu.

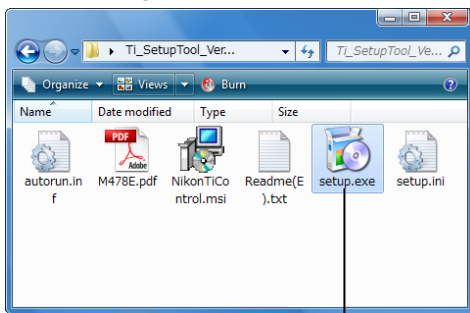
- (5) Click the **OK** button.

1.2.2**Executing the Setup Wizard**

To install the application software, execute the setup wizard (setup.exe) supplied with this manual, then follow the on-screen instructions.

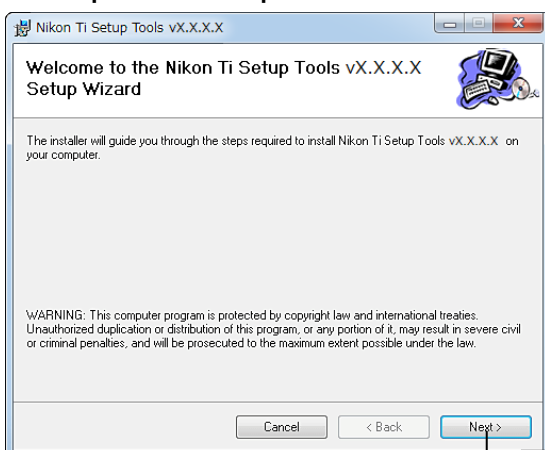
CAUTION

- To install the Nikon Ti Setup Tools (Ti Control), you must login to your computer with a user account with Administrator rights.
- For information on uninstalling Nikon Ti Setup Tools (Ti Control), refer to Section 1.3, “Uninstalling the Application.”

Executing the Setup Wizard**▼ Executing the Setup Wizard**

- (1) Double-click the **setup.exe** icon.

- (1) Double-click the **setup.exe** in the installer folder downloaded from the website. The Setup wizard startup screen appears.

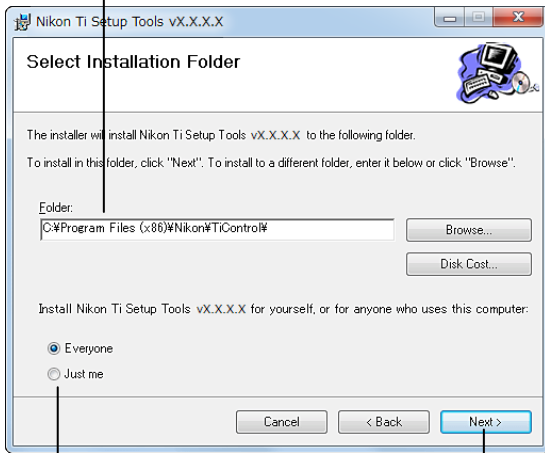
Installation procedure**▼ Setup wizard startup screen**

- (2) Click the **Next** button.

- (2) Click the **Next** button in the **Setup wizard startup** screen. The Installation folder setup screen appears.

▼ Installation folder setup dialog box

(3) Specify the folder in which to install the application software.



(4) Specify the user for Nikon Ti Setup Tools (Ti Control).

(5) Click the **Next** button.

- (3) In the Installation folder setup dialog box, specify the folder in which the Nikon Ti Setup Tools (Ti Control) will be installed.

Shown below is the default installation folder.

For 32-bit: C:\Programs Files\Nikon\TiControl\

For 64-bit: C:\Programs Files (x86)\Nikon\

TiControl\To install the software in a different folder, click the, **Browse...** button.

- (4) Specify the user for Nikon Ti Setup Tools (Ti Control).

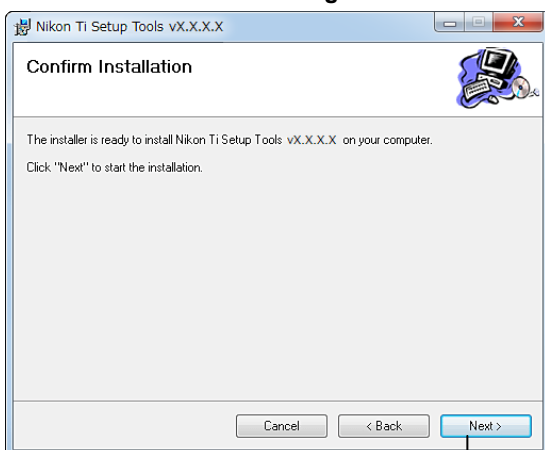
“Everyone” Applied to all users of this PC.

“Just me” Applied only to the user who has logged in to this PC.

- (5) Select the desired folder and then click the **Next** button.

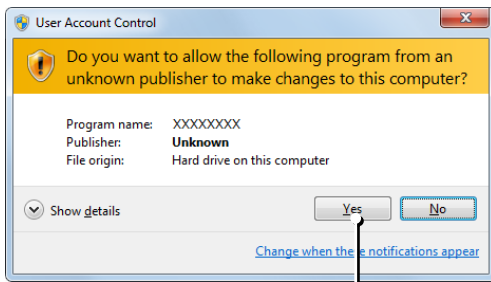
The Confirm Installation dialog box appears.

▼ Confirm Installation dialog box



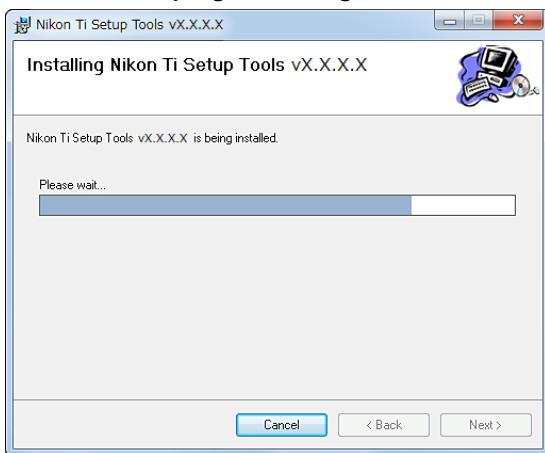
(6) Click the **Next** button.

- (6) Click the **Next** button in the Confirm Installation dialog box. The software is installed in the specified folder.

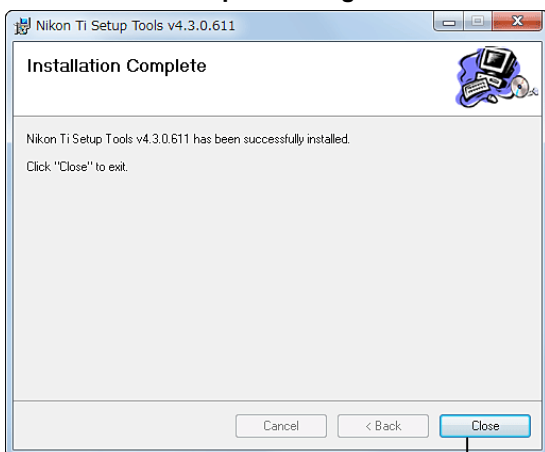
▼ User Account Control dialog box

(7) Click the **Yes** button.

- (7) If a **User Account Control** dialog box appears, click the **Yes** button. The installation starts.

▼ Installation progress dialog box

The installation progress dialog box appears.

▼ Installation complete dialog box

(8) Click the **Close** button.

- (8) After the installation, the dialog box shown on the left appears.
Click the **Close** button to exit the wizard.

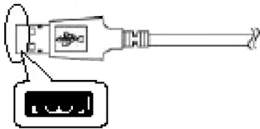
The application is now installed.

1.2.3 Installing Device Drivers

After installing the Nikon Ti Setup Tools (Ti Control), connect the computer and microscope system with a USB cable.

When the system is connected to the PC for the first time, the driver is installed automatically.

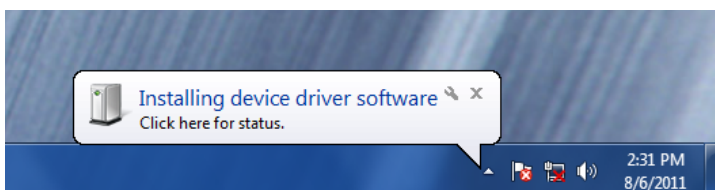
▼ USB connector



- (1) Plug the USB cable's A connector into the port on the PC and the other end into the USB port on the microscope system.

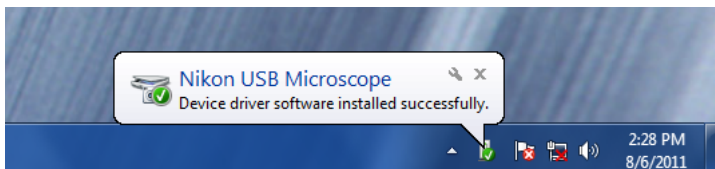
NOTE: When the system includes the Ti microscope but no hub, connect the cable to the USB connector on the microscope body.

When the system includes a hub, connect the cable to a USB connector on the hub controller A (or hub controller A-U)



- (2) Turn on the microscope system.

The installation of the driver automatically starts.



The driver is now installed.

1.3

Uninstalling the Application

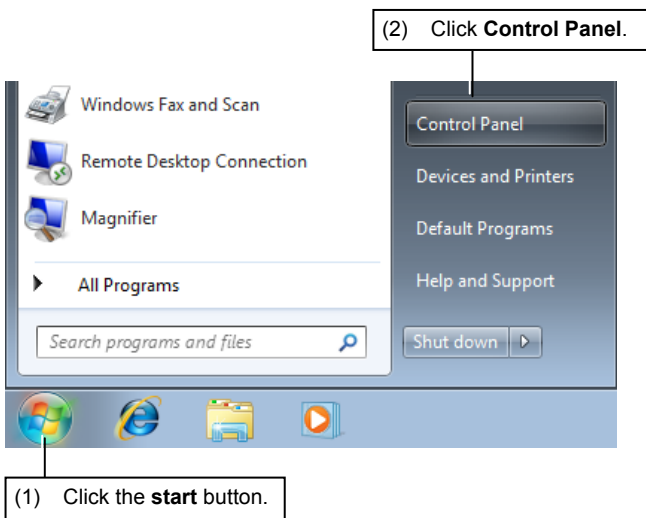
If you no longer need the Nikon Ti Setup Tools (Ti Control) and wish to uninstall it (remove it from the hard disk drive), uninstall it using the **Programs and Features** utility in the **Control Panel**.

CAUTION

- Once uninstalled, the application software cannot be used unless it is installed again.

Uninstallation procedure

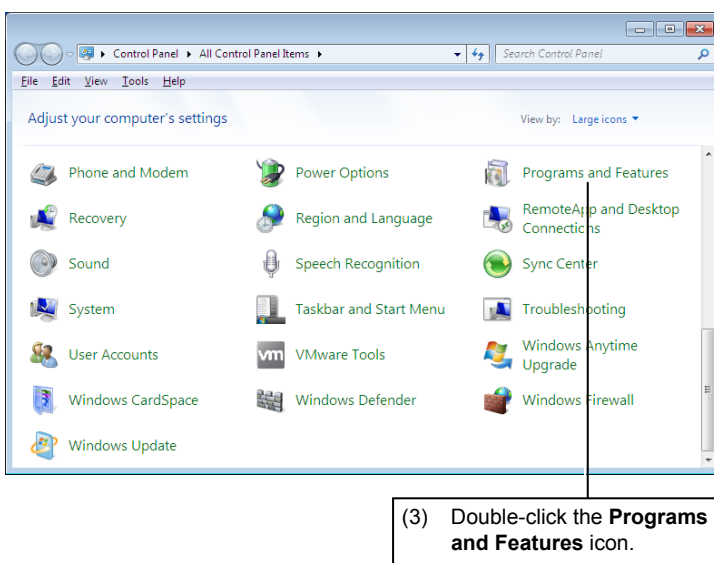
▼ Start menu



(1) Click the **start** button.

(2) Choose **Control Panel** to display the **Control Panel** window.

▼ Control Panel window



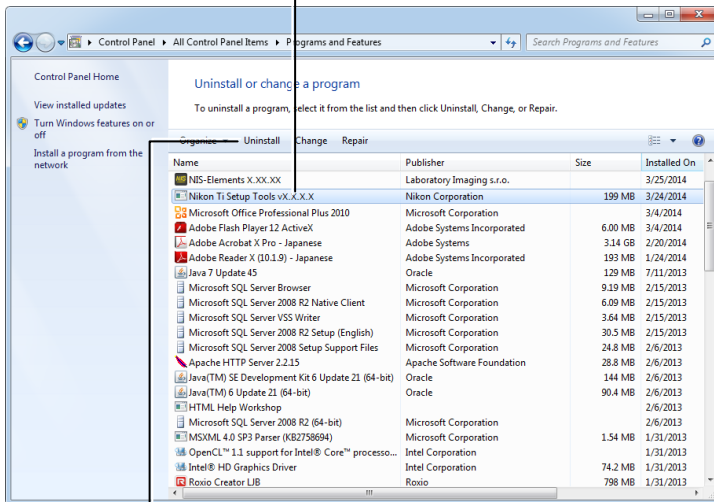
(3) Double-click the **Programs and Features** icon in the **Control Panel** window. The dialog box to select programs to be uninstalled appears.

This figure shows the **Control Panel** window when **Large icons** is selected for View by.

1.3 Uninstalling the Application

▼ Dialog box to select programs to be uninstalled

(4) Select "Nikon Ti Setup Tools vX.X.X.X."

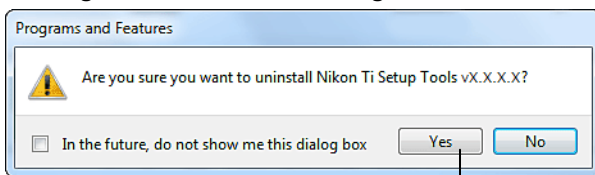


(5) Click the **Uninstall** button.

(4) Select **Nikon Ti Setup Tools vX.X.X.X** from the list in the dialog box.
("vX.X.X.X" varies with the version number.)

(5) Click the **Uninstall** button.

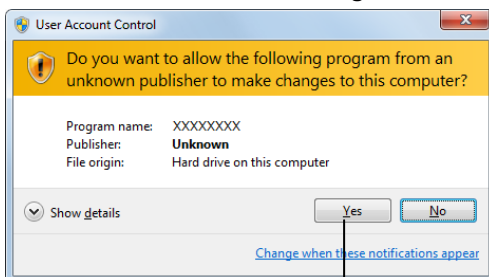
▼ Programs and Features dialog box



(6) Click the **Yes** button.

(6) When the **Programs and Features** dialog box appears, click the **Yes** button.

▼ User Account Control dialog box



(7) Click the **Yes** button.

(7) When the **User Account Control** dialog box appears, click the **Yes** button.
The uninstallation starts.

The uninstallation progress dialog box appears, and the application is deleted from the PC.

The application is now uninstalled.

When you install Nikon the Ti Setup Tools (Ti Control), the following two applications are installed to the PC.

- **Ti Setup Tools Control**

This application is used to operate the microscope system from the PC. The current status of the microscope system can also be acquired.

For information on how to use this application, refer to Chapter 3, "Ti Setup Tools Control Window Operation."

- **Ti Setup Tools Setting**

This application is used to change the microscope system configuration information when necessary.

For information on how to use this application, refer to Chapter 4, "Ti Setup Tools Setting Window Operation."

CAUTION

- If you are using the Nikon Ti Setup Tools (Ti Control) for the first time, register the microscope system information to the microscope's memory using the Ti Setup Tools Setting window.
- If new information is transmitted to the microscope system, the information currently store in the microscope system will be overwritten by the new information. Nikon recommends assigning a file name and the saving setup information (including optional registrations) specified in the Ti Setup Tools Setting Window to a file.
- If the power to the microscope system is turned off while the Ti Setup Tools (Ti Control) is running, finish the application software and then restart it.
- A single PC can control a single microscope system (Ti microscope and Hub). If two or more microscope systems are connected to a single PC, they may not work correctly. Do not connect two or more microscope system to a single PC.
- If you wish to change the USB cable connection, turn off the microscope system, unplug the USB cable, plug the cable into another USB connector, and then turn on the microscope system again. If the cable connection is changed while the microscope system power remains turned on, the system may not work correctly.
- When microscope system information is transmitted to the microscope system using the Ti Setup Tools (Ti Control), you may be required to restart the microscope system to activate the transmitted information. (See Note below.)
- The following operation requires microscope system restart.

Piezo information setting using Ti Setup Tools ("Data Transmission to the Microscope System" in "Ti Setup Tools Control Window Operation")

Note:

The power supply depends on the system configuration.

If no Ti microscope is included in the system, turn off the power unit temporarily and then turn on the power supply again.

When a Hub is included in the system, turn off the Hub unit temporarily and then turn on the Hub again.

This manual describes how to use the Ti Setup Tools (Ti Control) using screens for which English is selected in the "Ti Setup Tools (TiControl)" Language settings.

For information on Language settings, refer to Section 4.21, "Layout Settings."

3

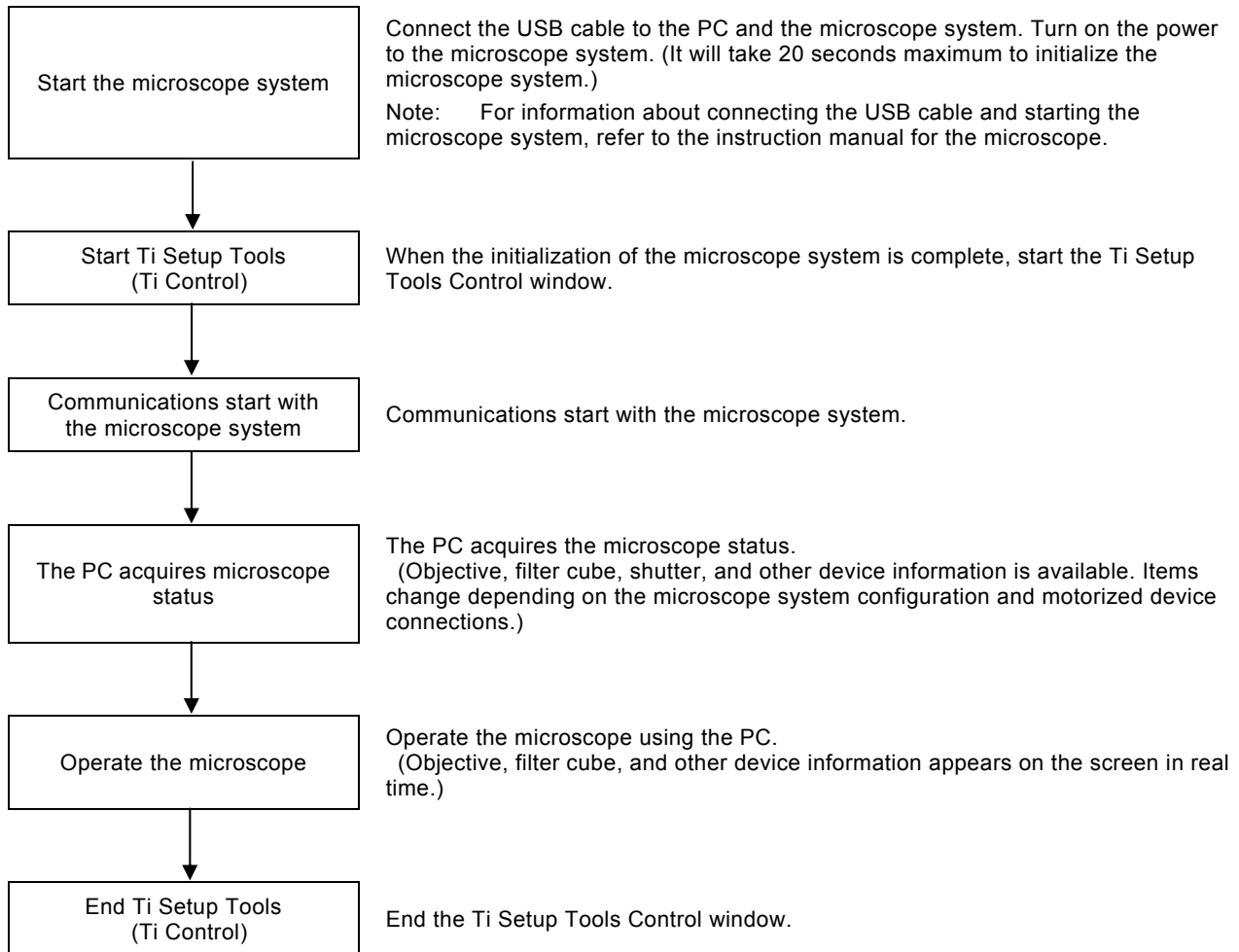
Ti Setup Tools Control Window Operation

The Ti Setup Tools Control window shows microscope system conditions in real time and operates motorized devices during microscopy.

3.1

Ti Setup Tools Control Window Workflow

The following is the Ti Setup Tools Control window workflow to operate the microscope system.



Settings can be changed in the Ti Setup Tools Setting window during microscopy. For details, refer to Section 3.5, "Setting".

3.2

Starting and Ending the Ti Setup Tools Control Window

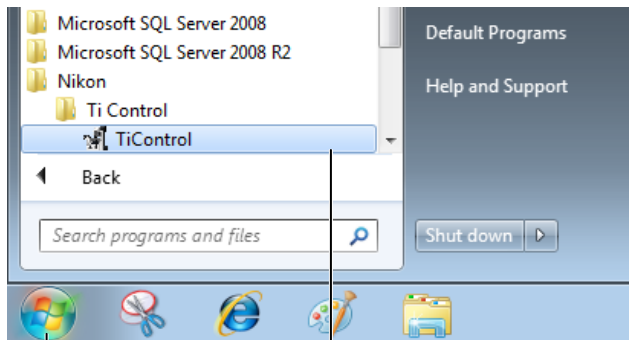
You can start and end the Ti Setup Tools Control window in several ways. This section describes the general methods: the Start menu to start the software and the Exit button in the operation window to end the software.

3.2.1

Starting Up

Procedure

▼ Start menu



(1) Click the **start** button.

(2) Point to **All Programs, Nikon, and Ti Control**. And then click **TiControl**.

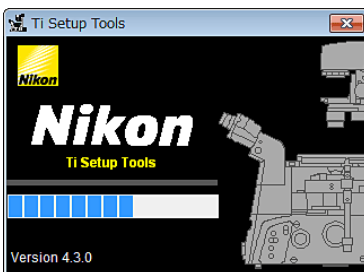
Confirm that the microscope system is connected correctly before starting the PC.

- (1) Click the **start** button.
- (2) Point to **All Programs, Nikon, Ti Control**, and then click **TiControl**. The **Ti Setup Tools (Ti Control)** starts.

CAUTION

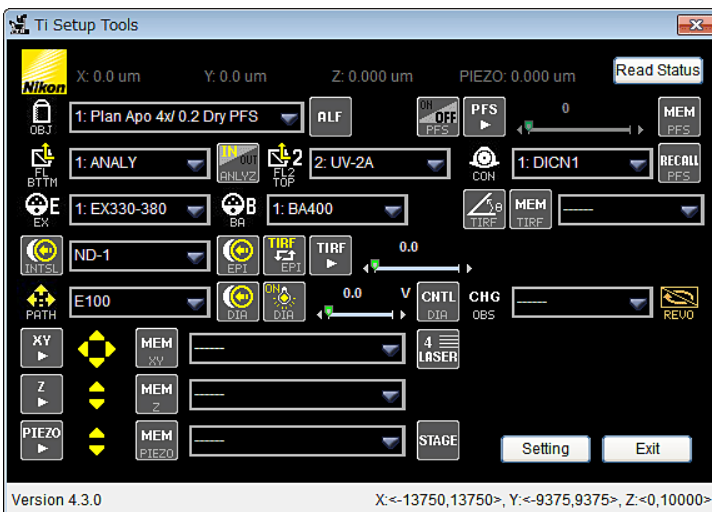
Do not unplug the USB cable that connects the microscope with the PC while Ti Setup Tools (Ti Control) is running.

▼ Ti Setup Tools splash window



- (3) The PC acquires the microscope status. The **Ti Setup Tools Control window** appears.

▼ Control window

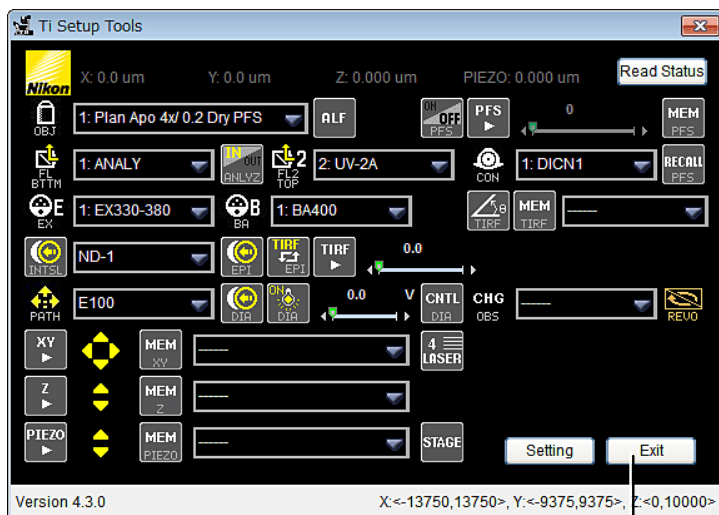


3.2.2

Ending the Software

Procedure

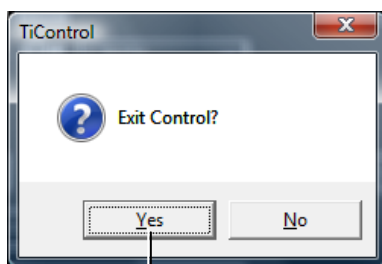
▼ Control window



(1) Click the **Exit** button.

(1) Click the **Exit** button.

Communications with the microscope system end and the software ends.

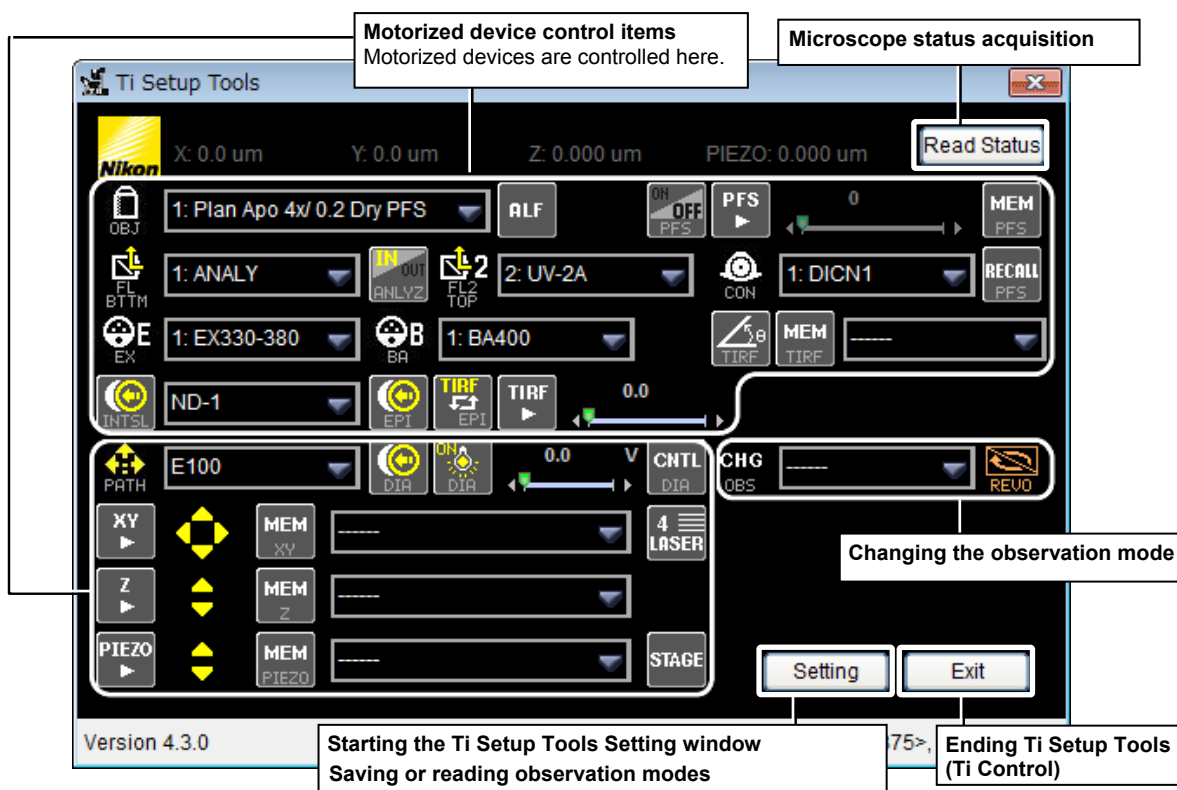


(2) Click **Yes** to end the software.

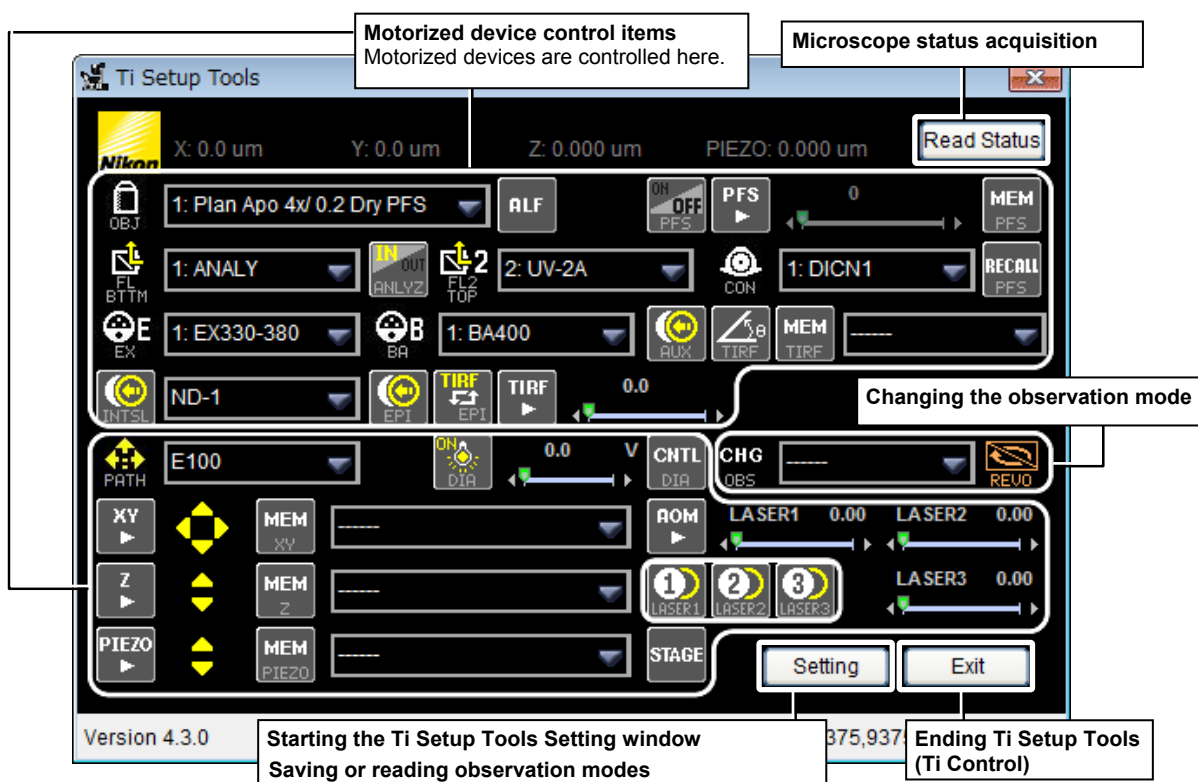
(2) A confirmation message appears. Click **Yes** to end communications with the microscope system, and end the software.

3.3 Layout of the Ti Setup Tools Control Window

▼ Control window (with LU4A 4 Laser Unit A connected)



▼ Control window (with C-LU3EX 3 Laser Unit EX connected)



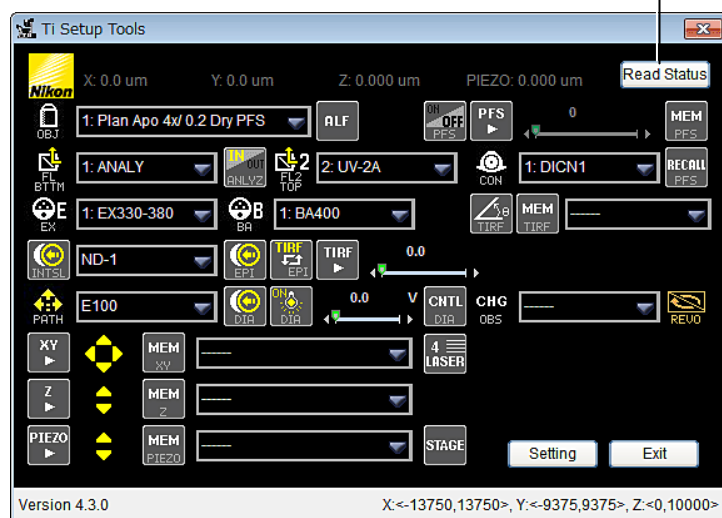
3.4 Communications

When the settings of an objective, or a filter cube are changed in the Ti Setup Tools Control window, the microscope system status must be acquired again.

▼ Control window

(1) Click the **Read Status** button.

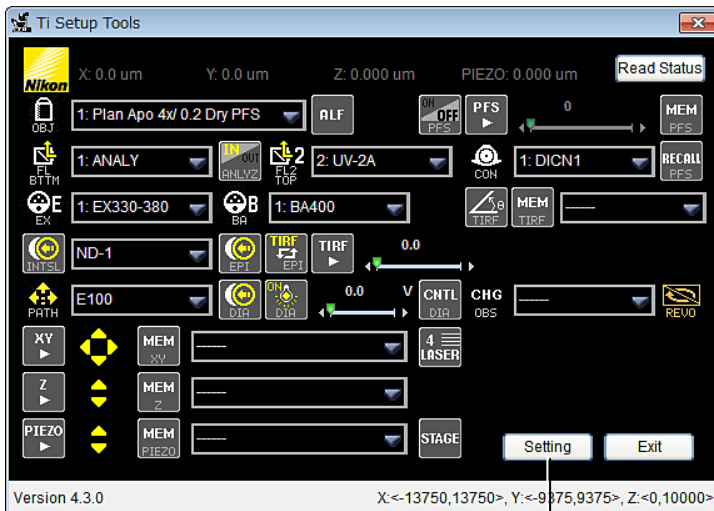
(1) Click the **Read Status** button.
The current microscope system status is acquired.



3.5 Setting

The Ti Setup Tools Setting window can be opened on the Ti Setup Tools Control window to set up an objective, a filter cube, or other device.

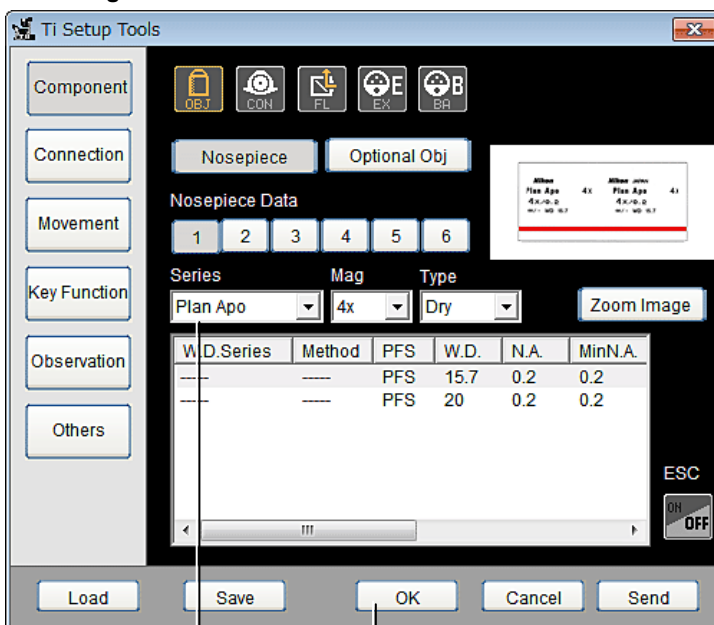
▼ Control window



(1) Click the **Setting** button.

(1) Click the **Setting** button in the **Ti Setup Tools Control window**.

▼ Setting window



(2) Set up the settings.

(3) Click the **OK** button.

(2) Specify the conditions in the **Ti Setup Tools Setting window**. For details, refer to Chapter 4, "Ti Setup Tools Setting window Operation."

(3) To accept the settings, click the **OK** button. The settings are sent to the microscope system and the **Ti Setup Tools Setting window** closes. (The settings are reflected and registered in the microscope system.)

When the **Send** button is clicked, the settings are sent to the microscope system but the **Ti Setup Tools Setting window** remains open. To close the window in this case, click the **X** button in the upper right corner.

3.6**Controlling Motorized Devices**

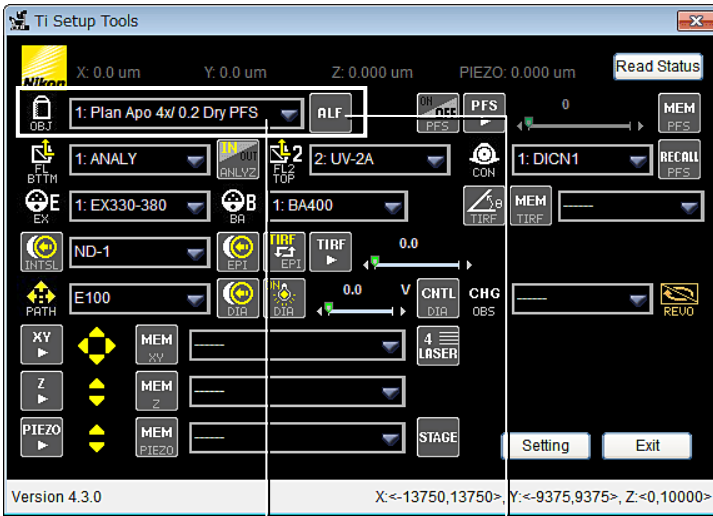
The list below shows controllable motorized devices.

- Objective (3.6.1)
- PFS (3.6.2)
- Filter 1 (3.6.3)
- Filter 2 (3.6.4)
- Condenser (3.6.5)
- EX filter (3.6.6)
- BA filter (3.6.7)
- AUX shutter (3.6.8)
- Optical fiber light source (3.6.9)
- Epi shutter (3.6.10)
- Micrometer (3.6.11)
- Optical path selector (3.6.12)
- Dia shutter (3.6.13)
- Dia illuminator (3.6.14)
- Observation mode settings (3.6.15)
- XY stage (3.6.16)
- Z stage (3.6.17)
- Piezo stage (3.6.18)
- X, Y, Z, and Piezo stage (3.6.19)
- 3 Laser Unit - AOM (LUSU) (3.6.20)
- 4 Laser Unit A - AOTF (3.6.21 to 3.6.23)

3.6.1

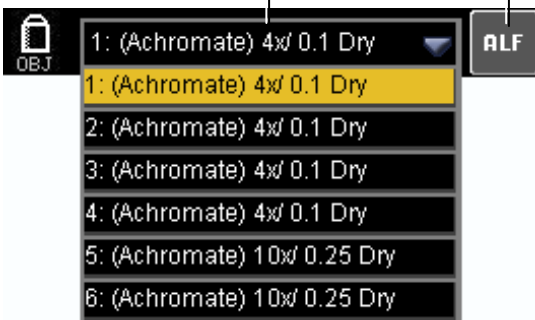
Objective

▼ Control window



(1) Nosepiece
address combo
box

(2) **ALF** button

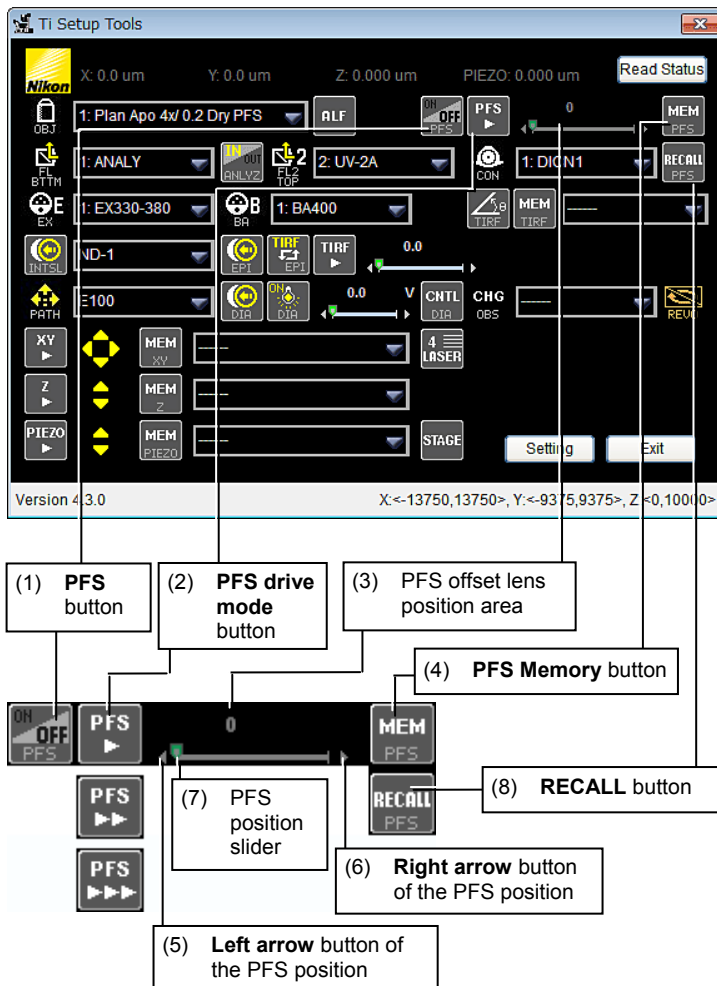


- (1) To rotate the nosepiece, operate the address combo box. The address combo box shows the nosepiece socket address. Specify the objective to be used here. Objective information is registered and set up in the **Ti Setup Tools Setting window**, and shown in the combo box.
- (2) To set up the Z position for the nosepiece socket address, click the **ALF** button.

3.6.2

PFS

▼ Control window

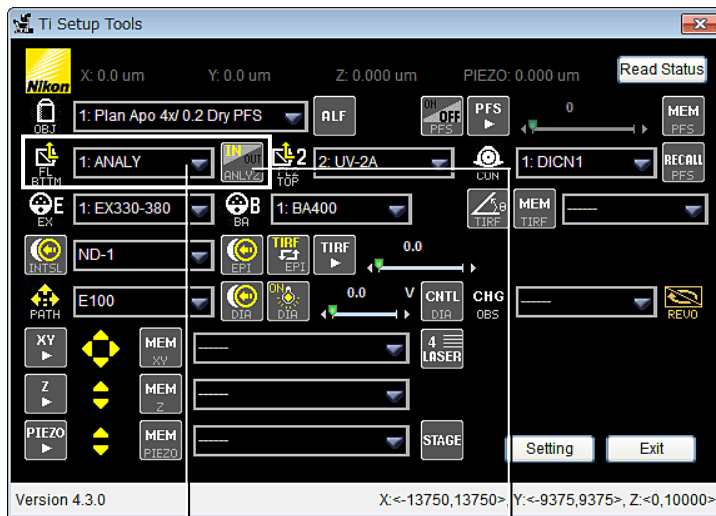


- (1) To turn on/off the PFS, click the **PFS** button.
- (2) To change the PFS drive mode between the coarse, fine, and extra-fine movement, click the **PFS drive mode** button. The travel amount for coarse is 100, that for fine is 10, and that for extra-fine is 1.
- (3) The PFS offset lens position area shows the current position of the PFS offset lens.
- (4) To save the PFS offset lens position of the nosepiece socket address, click the **PFS Memory** button.
- (5) To move the PFS position to the left, click the **Left arrow** button of the PFS position. If the position reaches the minimum limit, the position does not change even the **Left arrow** is clicked.
- (6) To move the PFS position to the right, click the **Right arrow** button of the PFS position. If the position reaches the maximum limit, the position does not change even the **Right arrow** is clicked.
- (7) To move the PFS position right and left, the **Position slider** can be used too.
- (8) To read the PFS position for the objective, click the **RECALL** button.

3.6.3

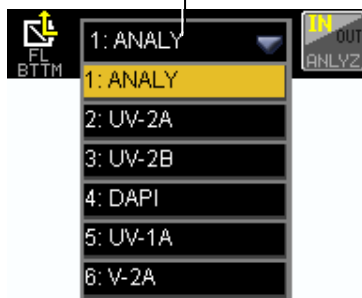
Filter 1

▼ Control window



(1) Filter 1 address
combo box

(2) Analyzer button

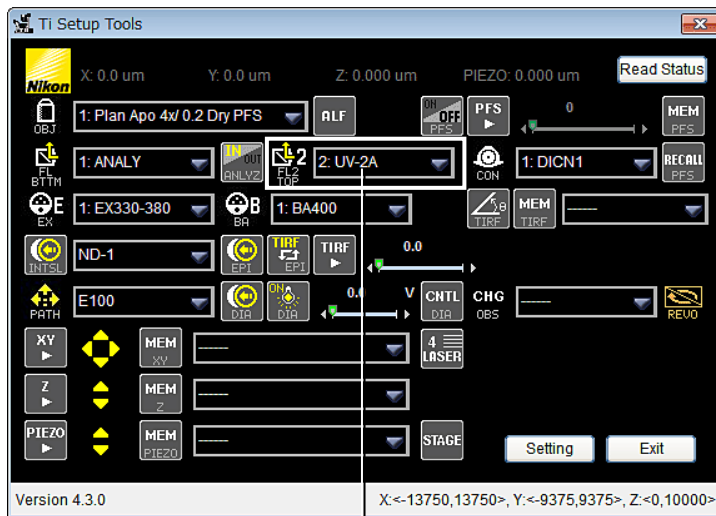


- (1) To change the filter 1 (lower tier) address, operate the address combo box for it. The address combo box shows the filter 1 (lower tier) address. Specify the filter to be used here. Filter information is registered and set up in the **Ti Setup Tools Setting window**, and shown in the combo box.
- (2) To insert or remove the analyzer, click the **Analyzer** button.

3.6.4

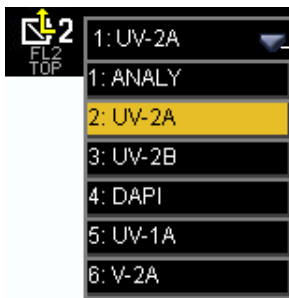
Filter 2

▼ Control window



- (1) To change the filter 2 (upper tier) address, operate the address combo box for it. The address combo box shows the filter 2 (upper tier) address. Specify the filter to be used here. Filter information is registered and set up in the **Ti Setup Tools Setting window**, and shown in the combo box.

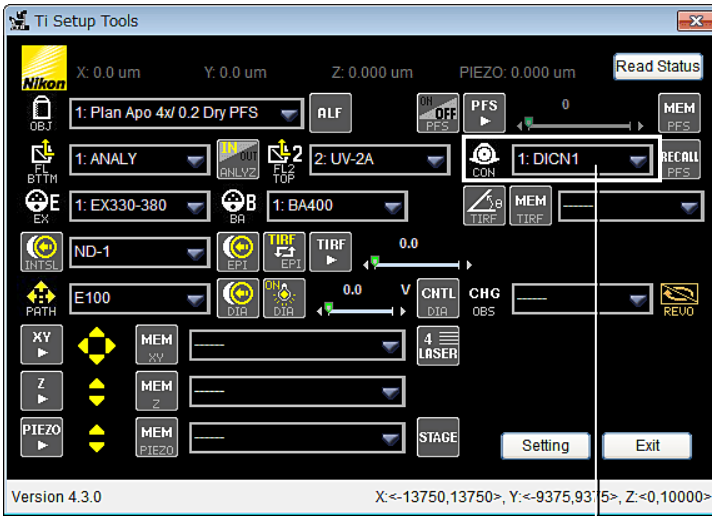
(1) Filter 2 address
combo box



3.6.5

Condenser

▼ Control window



(1) Condenser address
combo box

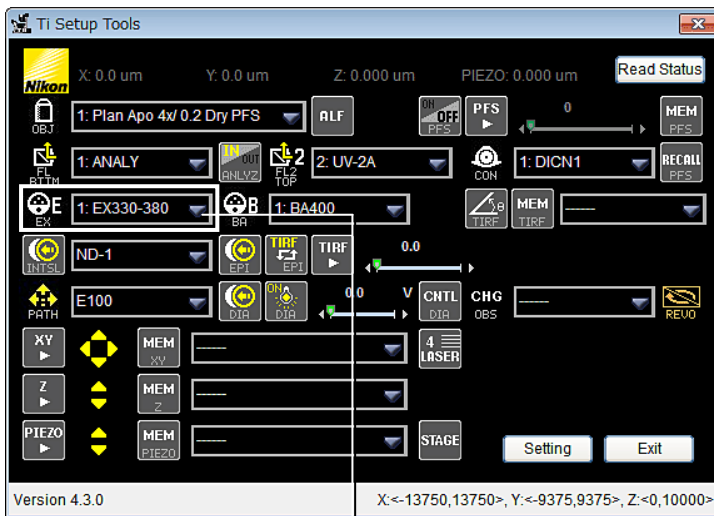


- (1) To change the condenser address, operate the address combo box for it. The address combo box shows the condenser address. Specify the condenser to be used here. Condenser information is registered and set up in the **Ti Setup Tools Setting window**, and shown in the combo box.

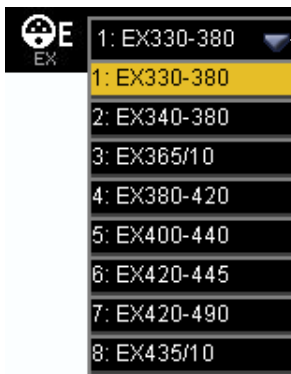
3.6.6

EX Filter

▼ Control window



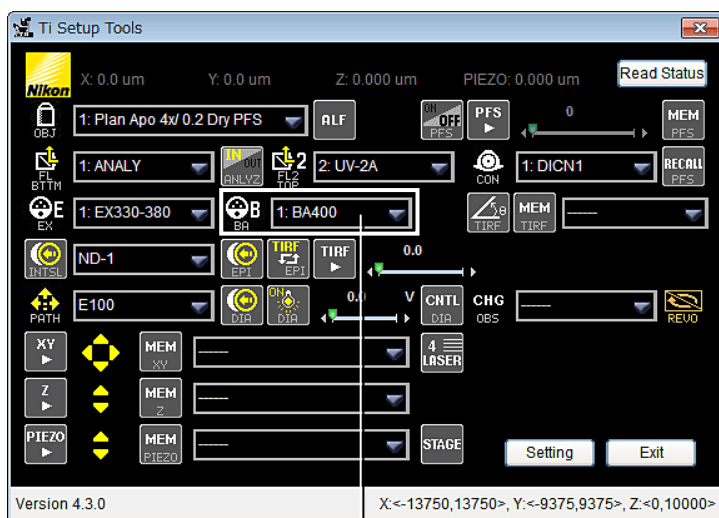
- (1) To change the EX filter address, operate the address combo box for it. The address combo box shows the EX filter address. Specify the filter to be used here. EX filter information is registered and set up in the **Ti Setup Tools Setting window**, and shown in the combo box.



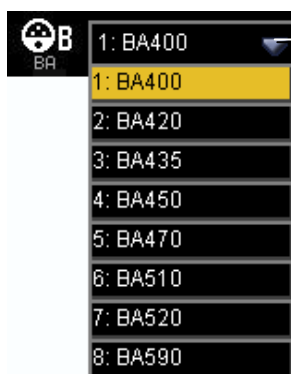
3.6.7

BA filter

▼ Control window



(1) BA filter address
combo box

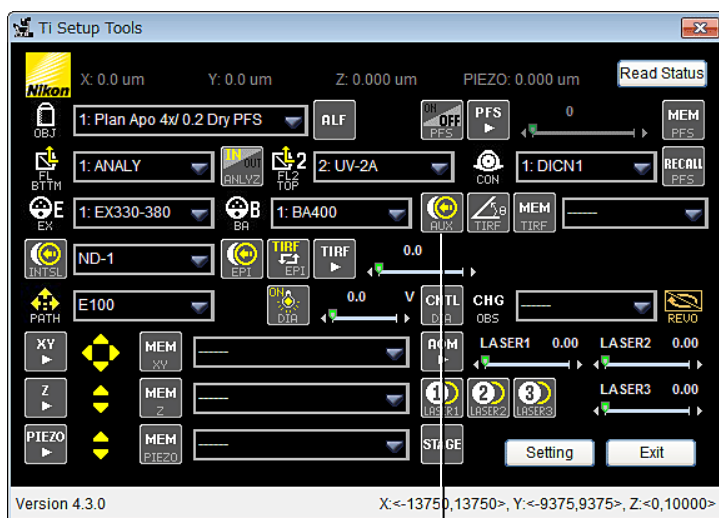


- (1) To change the BA filter address, operate the address combo box for it. The address combo box shows the BA filter address. Specify the filter to be used here. BA filter information is registered and set up in the **Ti Setup Tools Setting window**, and shown in the combo box.

3.6.8

AUX Shutter

▼ Control window



(1) AUX shutter button

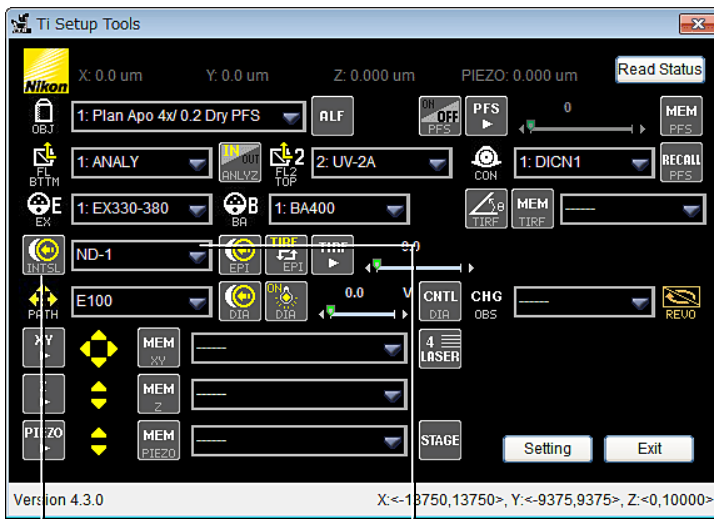


- (1) To open/close the AUX shutter, click the **AUX** button. Shutter information is registered and set up in the **Ti Setup Tools Setting window**.

3.6.9

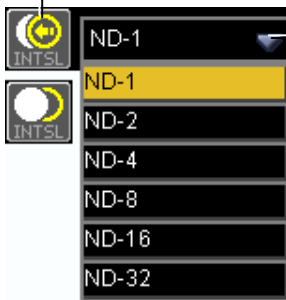
Optical Fiber Light Source

▼ Control window



(1) INTSL button

(2) ND filter combo box for the optical fiber light source

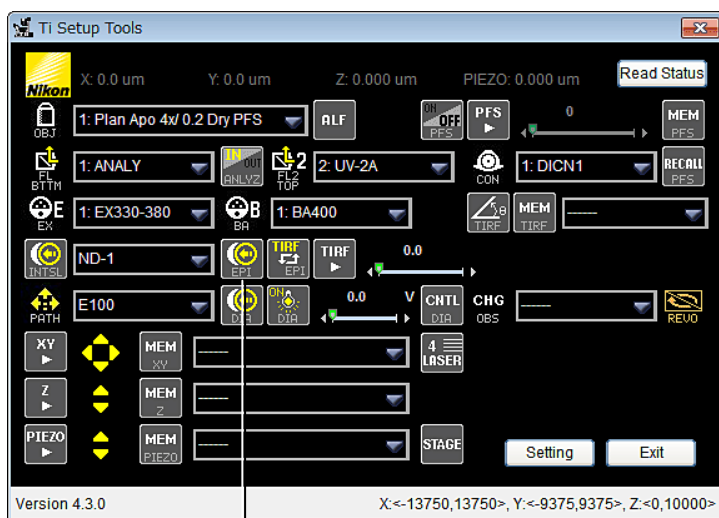


- (1) To open/close the shutter for the optical fiber light source (Intensilight), click the **INTSL** button.
- (2) To change ND filters for the optical fiber light source, operate the **ND filter** combo box.

3.6.10

Epi Shutter

▼ Control window



(1) EPI button

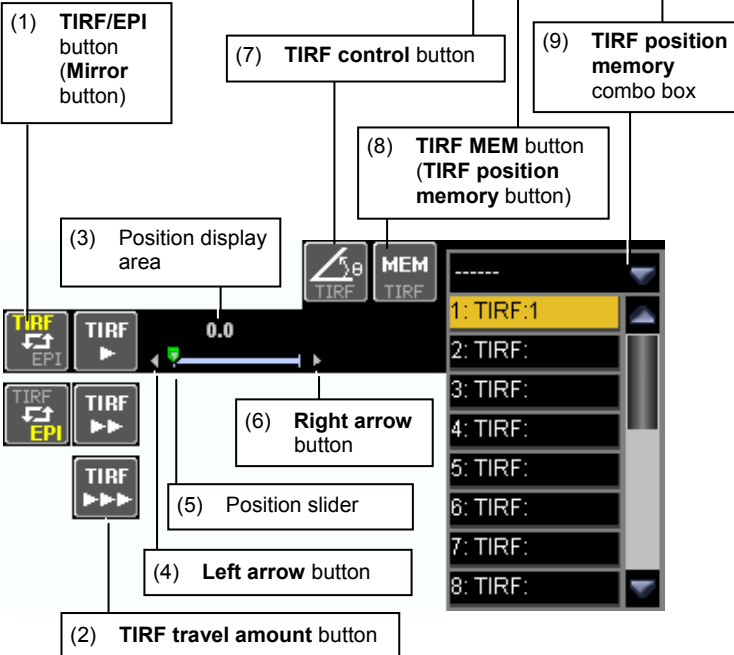
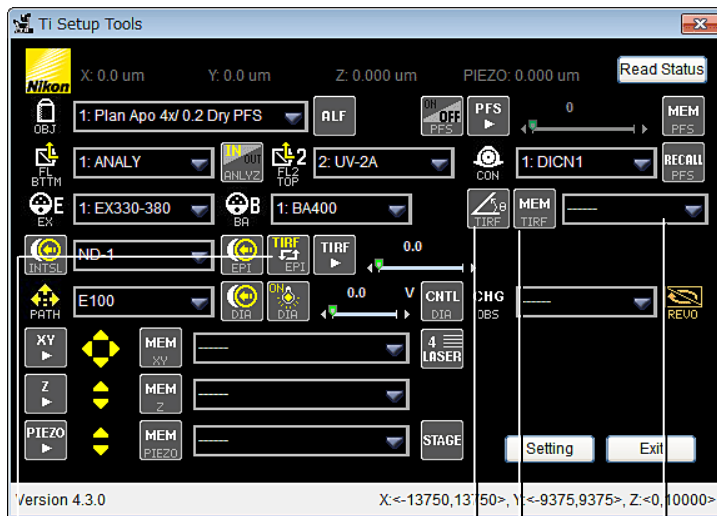


- (1) To open/close the Epi shutter (shutter for episcopic illumination), click the **EPI** button. Shutter information is registered and set up in the **Ti Setup Tools Setting window**.

3.6.11

Micrometer

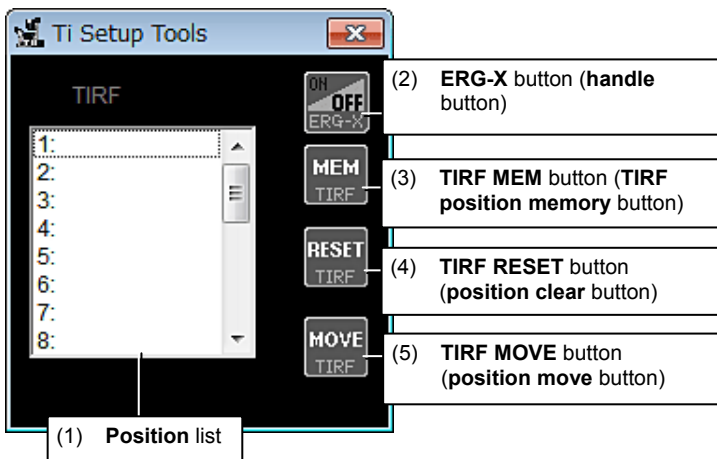
▼ Control window



- (1) To select illumination between TIRF illumination and epi illumination, click the **TIRF/EPI** button (**Mirror** button).
- (2) To change the TIRF travel amount between coarse, fine, and extra-fine movement, click the **TIRF travel amount** button. The travel amount for coarse is 100, that for fine is 10, and that for extra-fine is 1.
- (3) The position display area shows the current position.
- (4) To move the TIRF slider position to the left, click the **Left arrow** button of the TIRF position. If the position reaches the minimum limit, the position does not change even the **Left arrow** is clicked.
- (5) To move the TIRF position right and left, the **Position slider** can be used too.
- (6) To move the TIRF slide position to the right, click the **Right arrow** button of the TIRF position. If the voltage is the maximum limit, the voltage does not change even the **Right arrow** is clicked.
- (7) To open the **TIRF control** window, click the **TIRF control** button.
- (8) To register the current TIRF illumination position, click the **TIRF MEM** button (**TIRF position memory** button). Registered positions appear in the combo box.
- (9) To move the TIRF illumination to a registered position, select it in the **TIRF position memory** combo box.

Note: To overwrite a registered position, perform either way:
 Overwrite a position on the **TIRF control** window.
 Or, select a position, move the TIRF slider position, and then register the new position.

▼ TIRF control window

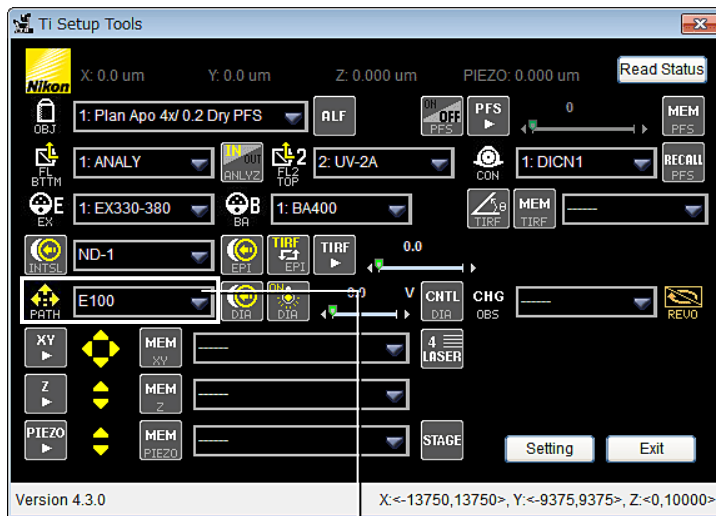


- (1) Select a memory number (1 to 20) in the **Position** list.
- (2) To turn on/off the ERG-X, click the **ERG-X** button (**handle** button).
- (3) To register the current TIRF illumination position, click the **TIRF MEM** button (**TIRF position memory** button). Registered positions appear in the **Position** list.
- (4) To clear a memory, select it and click the **TIRF RESET** button (**position clear** button).
- (5) When a memory number is selected and the **TIRF MOVE** button (**position move** button) is clicked, the position slide changes to the position and its position appears in the **TIRF position** list.

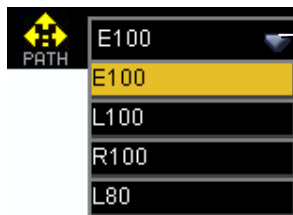
3.6.12

Optical Path Selector

▼ Control window



(1) Address combo box

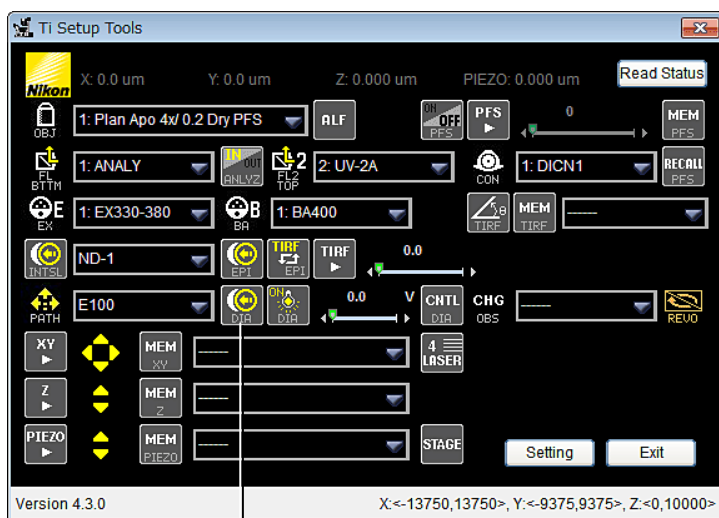


- (1) To change the optical path, operate the address combo box for it. The address combo box shows the optical path. Specify the optical path to be used here.

3.6.13

DIA Shutter

▼ Control window

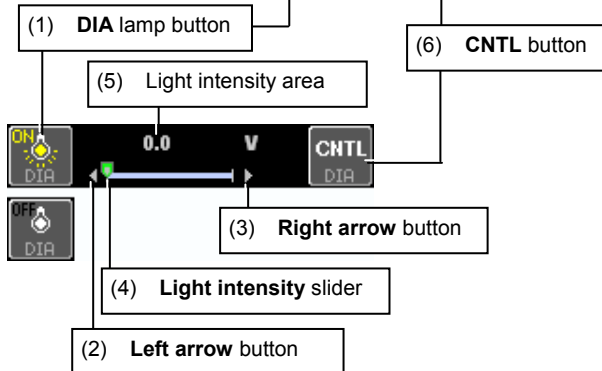
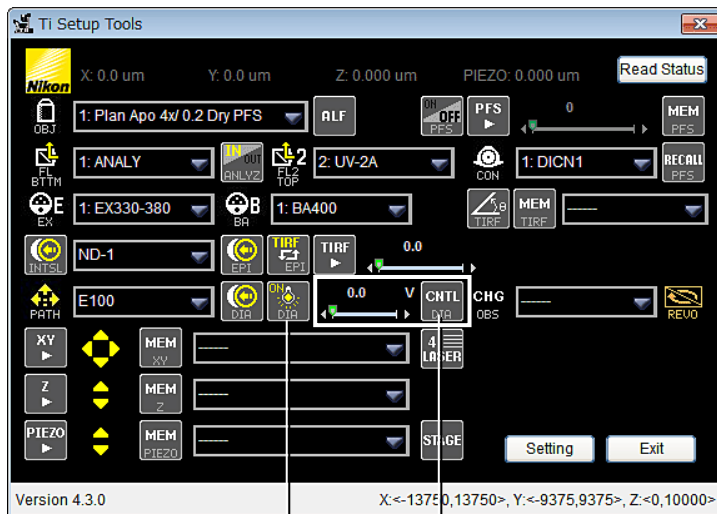


- (1) To open/close the DIA shutter (shutter for diascope illumination), click the **DIA** button. Shutter information is registered and set up in the **Ti Setup Tools Setting window**.

3.6.14

Diascopic Illumination

▼ Control window

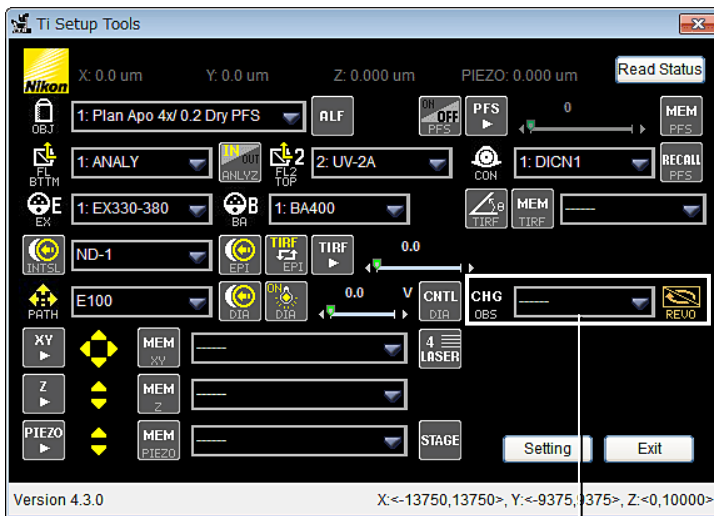


- (1) To turn on/off diascope illumination, click the **DIA** lamp button.
- (2) To decrease the dia illumination lamp voltage, click the **Left arrow** button of the dia illuminator. If the voltage is the minimum limit, the voltage does not change even the **Left arrow** is clicked.
- (3) To increase the dia illumination lamp voltage, click the **Right arrow** button of the dia illuminator. If the voltage is the maximum limit, the voltage does not change even the **Right arrow** is clicked.
- (4) To adjust the dia lamp voltage, the **Light intensity slider** can be used too.
- (5) The voltage display area indicates the current brightness of the dia illumination lamp.
- (6) To enable/disable the dia lamp controls (**DIA**, **Voltage slider**, **Right arrow**, and **Left arrow** buttons) on the screen, click the **CNTL** button. When the controls are disabled, the illuminator body can control their functions.

3.6.15

Observation Mode Settings

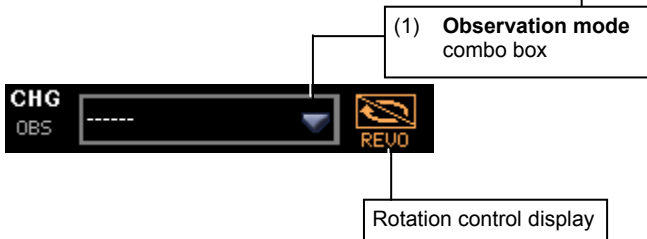
▼ Control window



- (1) To change observation modes, operate the **Observation mode** combo box.

Observation modes can be controlled in the **Ti Setup Tools Setting window**.

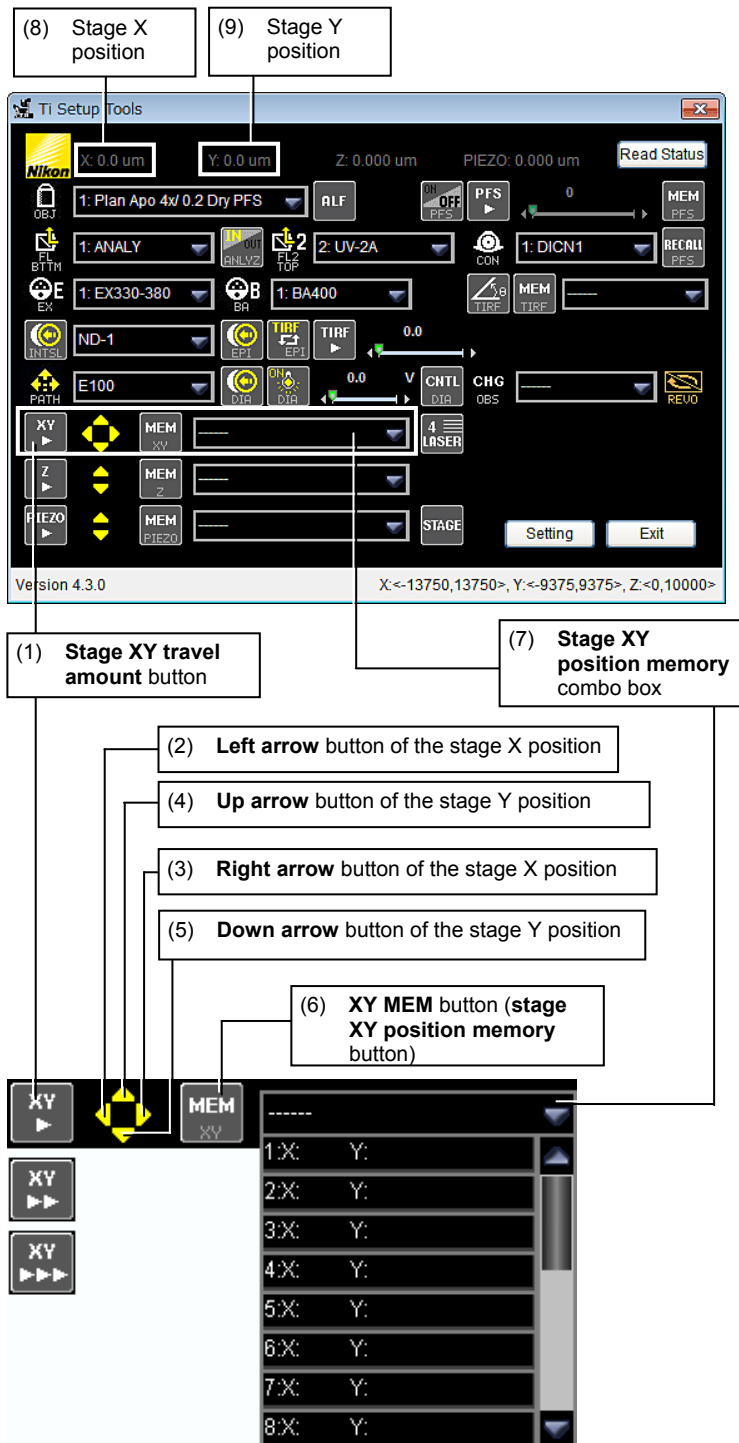
Note: In the rotation stop mode, there may be a case where the nosepiece does not rotate. Check the rotation control display.



3.6.16

XY Stage

▼ Control window



- (1) To change the stage XY travel amount between coarse, fine, and extra-fine movement, click the **Stage XY travel amount** button.
- (2) To move the stage position in the X-axis decrement direction, click the **Left arrow** button of the stage X position. If the position reaches the minimum limit, the position does not change even the **Left arrow** is clicked.
- (3) To move the stage position in the X-axis increment direction, click the **Right arrow** button of the stage X position. If the position reaches the maximum limit, the position does not change even the **Right arrow** is clicked.
- (4) To move the stage position in the Y-axis increment direction, click the **Up arrow** button of the stage Y position. If the position reaches the maximum limit, the position does not change even the **Up arrow** is clicked.
- (5) To move the stage position in the Y-axis decrement direction, click the **Down arrow** button of the stage Y position. If the position reaches the minimum limit, the position does not change even the **Down arrow** is clicked.
- (6) To register the current stage XY position, select a number of the combo box and click the **XY MEM** button (**Stage XY position memory** button).
- (7) To move the stage to a registered XY position, select it in the **Stage XY position memory** combo box.
- (8) This area shows the stage X position.
- (9) This area shows the stage Y position.

Note: The travel amount depends on the combination of the **Stage XY travel amount** button and the magnification of the objective.

Note: To overwrite a registered position, perform either way:

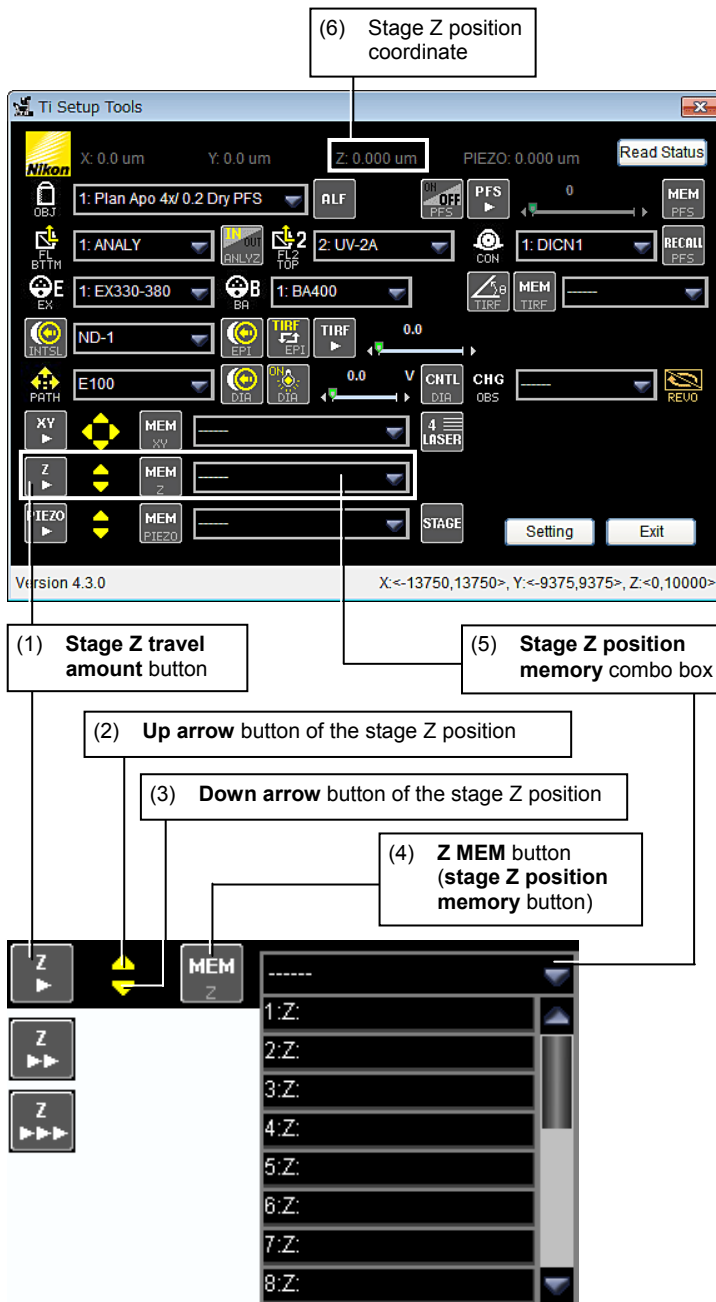
Overwrite a position on the **Stage Settings** window.

Or, select a position, move the stage position, and then register the new position.

3.6.17

Z Stage

▼ Control window



- (1) To change the stage Z travel amount between coarse, fine, and extra-fine movement, click the **Stage Z travel amount** button.
- (2) To move the stage position in the Z-axis increment direction, click the **Up arrow** button of the stage Z position. If the position reaches the maximum limit, the position does not change even the **Up arrow** is clicked.
- (3) To move the stage position in the Z-axis decrement direction, click the **Down arrow** button of the stage Z position. If the position reaches the minimum limit, the position does not change even the **Down arrow** is clicked.
- (4) To register the current stage Z position, select a number of the combo box and click the **Z MEM** button (**Stage Z position memory** button).
- (5) To move the stage to a registered position, select it in the **Stage Z position memory** combo box.
- (6) This area shows the stage Z position.

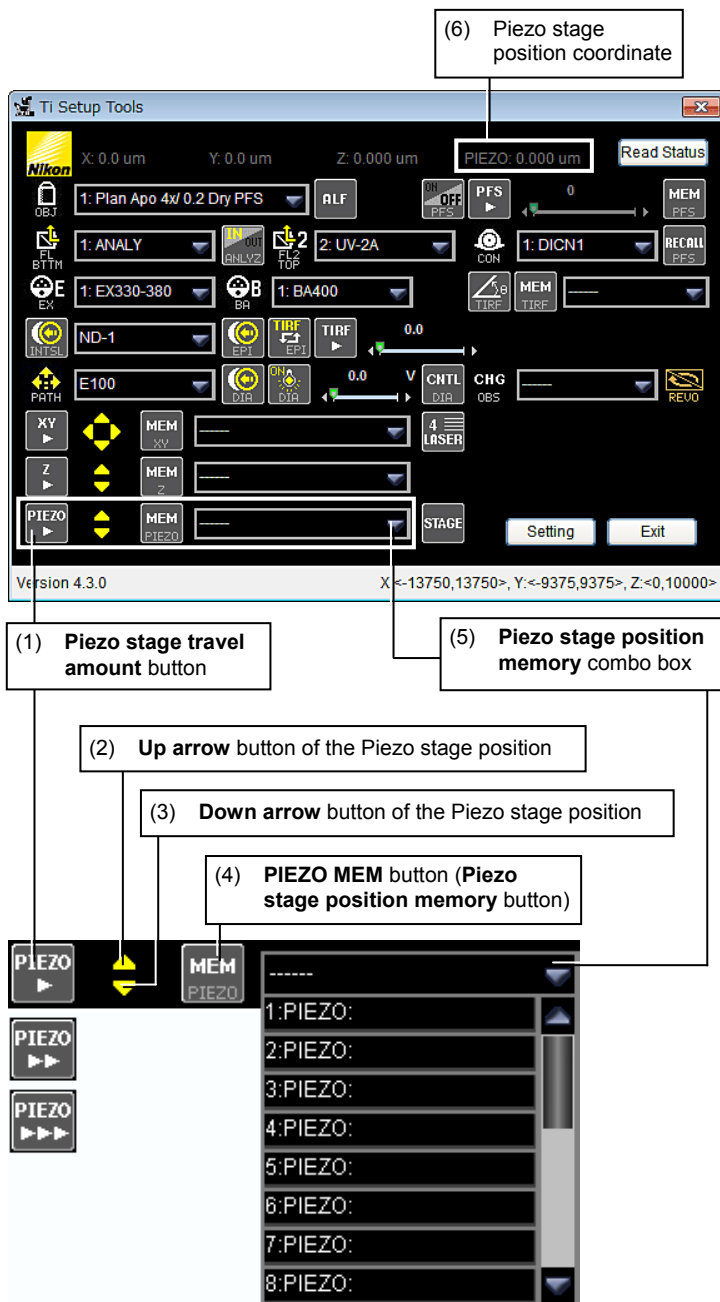
Note: The travel amount depends on the combination of the **Stage Z travel amount** button and the magnification of the objective.

Note: To overwrite a registered position, perform either way:
 Overwrite a position on the **Stage Settings** window.
 Or, select a position, move the stage position, and then register the new position.

3.6.18

Piezo Stage

▼ Control window



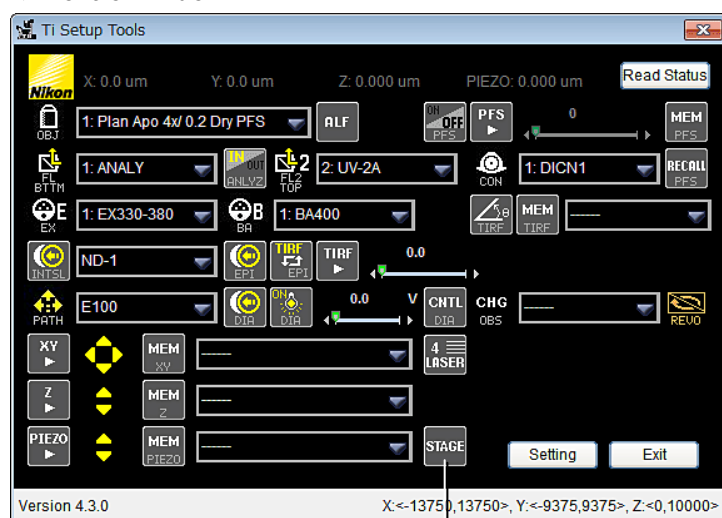
- (1) To change the Piezo stage travel amount between coarse, fine, and extra-fine movement, click the **Piezo Stage travel amount** button.
- (2) To move the Piezo stage position in the increment direction, click the **Up arrow** button of the Piezo stage position. If the position reaches the maximum limit, the position does not change even the **Up arrow** is clicked.
- (3) To move the Piezo stage position in the decrement direction, click the **Down arrow** button of the Piezo stage position. If the position reaches the minimum limit, the position does not change even the **Down arrow** is clicked.
- (4) To register the current Piezo stage position, select a number of the combo box and click the **PIEZO MEM** button (**Piezo stage position memory** button).
- (5) To move the stage to a registered position, select it in the **Piezo stage position memory** combo box.
- (6) This area shows the Piezo stage position.

Note: The travel amount depends on the combination of the **Piezo stage travel amount** button and the magnification of the objective.

Note: To overwrite a registered position, perform either way:
 Overwrite a position on the **Stage Settings** window.
 Or, select a position, move the stage position, and then register the new position.

3.6.19 X, Y, Z, and Piezo Stage Settings

▼ Control window

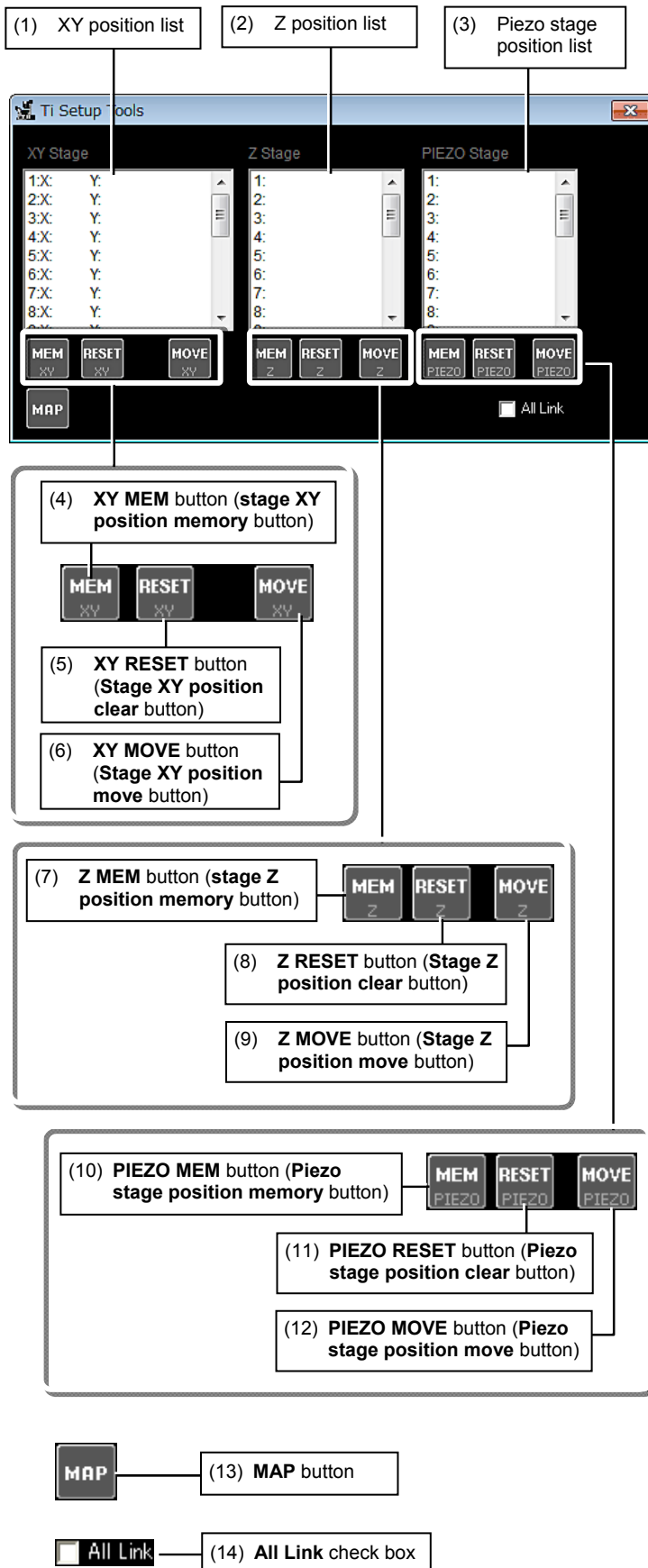


- (1) To open the Ti Setup Tools (Ti Control) Stage Settings window, click the **STAGE** button (Stage Settings window button).

(1) **STAGE** button (Stage Settings window button)

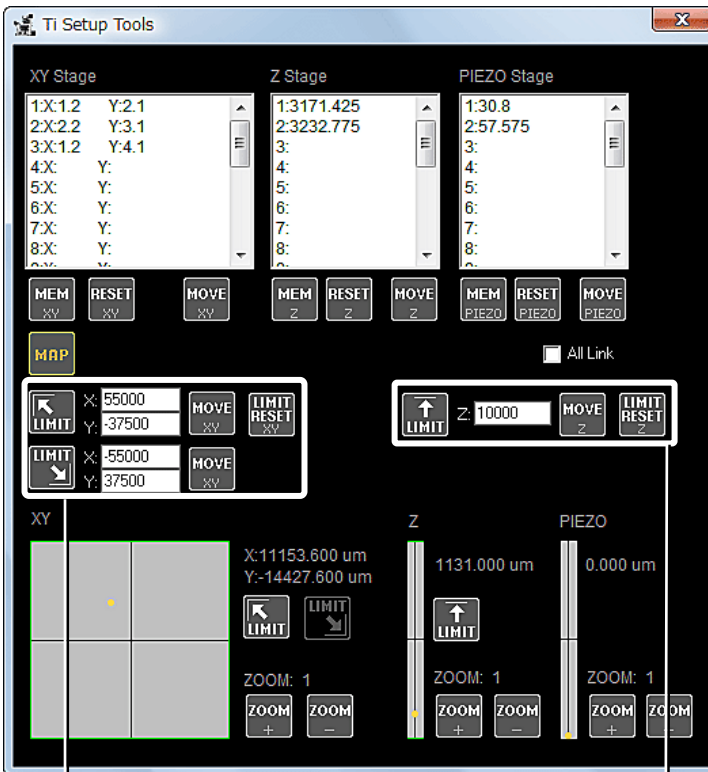


▼ Ti Control Stage Settings window (map closed)



- (1) The registered XY position of the stage appears here. Select a memory (1 to 20) to operate it.
- (2) The registered Z position of the stage appears here. Select a memory (1 to 20) to operate it.
- (3) The registered Z position of the Piezo stage appears here. Select a memory (1 to 20) to operate it.
- (4) To register the current stage XY position to the selected memory, click the **XY MEM** button (**Stage XY position memory** button).
- (5) To clear the XY values of the selected memory, click the **XY RESET** button (**Stage XY position clear** button).
- (6) To move the stage to the XY position of the selected memory, click the **XY MOVE** button (**Stage XY position move** button).
- (7) To register the current stage Z position to the selected memory, click the **Z MEM** button (**Stage Z position memory** button).
- (8) To clear the Z value of the selected memory, click the **Z RESET** button (**Stage Z position clear** button).
- (9) To move the stage to the Z position of the selected memory, click the **Z MOVE** button (**Stage Z position move** button).
- (10) To register the current Piezo stage position to the selected memory, click the **PIEZO MEM** button (**Piezo stage position memory** button).
- (11) To clear the value of the Piezo stage of the selected memory, click the **PIEZO RESET** button (**Piezo stage position clear** button).
- (12) To move the Piezo stage to the position of the selected memory, click the **PIEZO MOVE** button (**Piezo stage position move** button).
- (13) To show/hide the map, click the **MAP** button.
- (14) To move all positions (X, Y, Z, and Piezo positions) with a click, check the **All Link** check box.

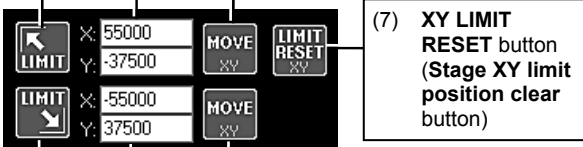
▼ Ti Control Stage Settings window (map opened)



(2) Starting-point LIMIT button (Stage XY position limit (starting point) setting button)

(1) Starting-point XY position coordinates text box

(3) XY MOVE button (Stage XY position move button)



(7) XY LIMIT RESET button (Stage XY limit position clear button)

(6) XY MOVE button (Stage XY position move button)

(4) End-point XY position coordinates text box

(5) End-point LIMIT button (Stage XY position limit (end point) setting button)

(9) Upper LIMIT button (Stage Z position limit setting button)

(8) Z position coordinate text box



(10) Z MOVE button (Stage Z position move button)

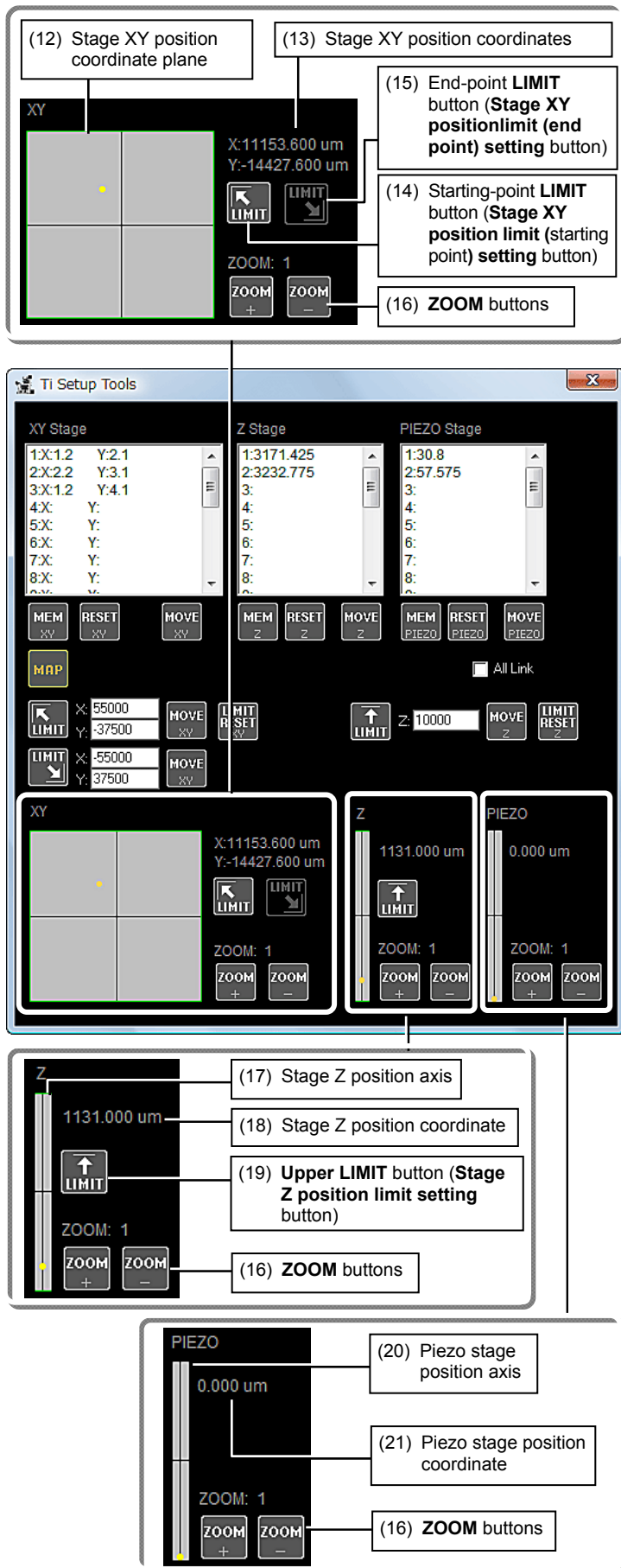
(11) Z LIMIT RESET button (Stage Z limit position clear button)

The Stage Settings window allows you to move the stage to a desired position and set a limit for the stage movement range.

Note: If the firmware of any of the Ti-E, HUB-A, HUB-AU, and HUB-B does not support the GUI to set a limit for the stage movement range, the GUI is not displayed.

- (1) Enter XY coordinate values in the starting-point XY position coordinates text box. (X: -55000 to 55000, Y: -37500 to 37500)
- (2) To set the XY stage limit (starting point) to the coordinate position entered in the starting-point XY position coordinates text box, click the **Starting-point LIMIT button (Stage XY position limit (starting point) setting button)**.
- (3) To move the XY stage to the coordinate position entered in the starting-point XY position coordinates text box, click the **XY MOVE button (Stage XY position move button)**.
- (4) Enter XY coordinate values in the end-point XY position coordinates text box. (X: -55000 to 55000, Y: -37500 to 37500)
- (5) To set the XY stage limit (end point) to the coordinate position entered in the starting-point XY position coordinates text box, click the **End-point LIMIT button (Stage XY position limit (end point) setting button)**.
- (6) To move the XY stage to the coordinate position entered in the end-point XY position coordinates text box, click the **XY MOVE button (Stage XY position move button)**.
- (7) To clear the specified XY limit, click the **XY LIMIT RESET button (Stage XY limit position clear button)**.
- (8) Enter the Z coordinate value in the Z position coordinate text box.
- (9) To set the Z stage limit (upper limit) to the coordinate position entered in the Z position coordinate text box, click the **Upper LIMIT button (Stage Z position limit setting button)**.
- (10) To move the Z stage to the coordinate position entered in the Z position coordinate text box, click the **Z MOVE button (Stage Z position move button)**.
- (11) To clear the specified Z limit, click the **Z LIMIT RESET button (Stage Z limit position clear button)**.

▼ Ti Control Stage Settings window (map opened)

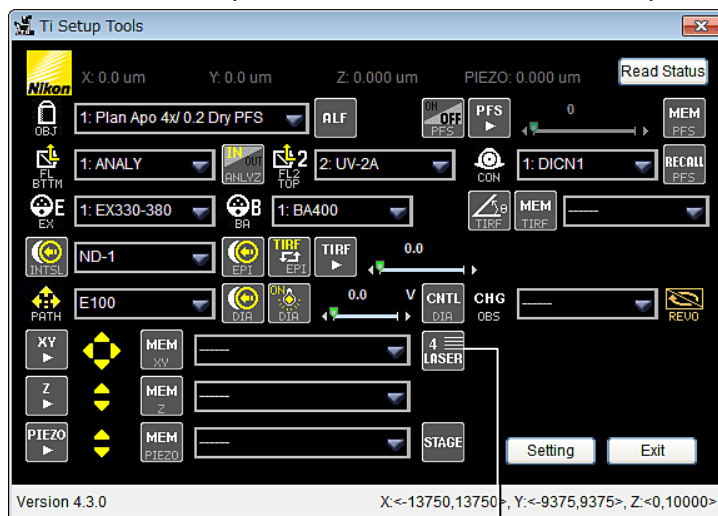


- (12) The stage XY position coordinate plane plots the current stage position on the XY plane.
The XY stage movable range is indicated with a green frame. (When a limit for the stage movement range is set, the XY stage cannot be moved outside the green frame of the movable range.)
- (13) The stage XY position coordinates indicate the current stage coordinate on the XY plane.
- (14) To set the current XY coordinate position as a limit (starting point) of the XY stage, click the **Starting-point LIMIT button (Stage XY position limit (starting point) setting button)**.
- (15) To set the current XY coordinate position as a limit (end point) of the XY stage, click the **End-point LIMIT button (Stage XY position limit (end point) setting button)**.
- (16) The **ZOOM** buttons change the zoom magnifications in ten steps. To enlarge, use the **ZOOM +** button. To reduce, use the **ZOOM -** button. Adjust the magnification to check stage movement steps. The current position is marked in yellow. And the destination position (selected position) is marked in green. When the magnification is changed, the green mark (selected position) and axes are redrawn.
- (17) The stage Z position axis plots the current stage Z position.
The Z stage movement upper limit is indicated with a green line. (When the upper limit for the stage movement is set, the Z stage cannot be moved above this green line.)
- (18) The stage Z position coordinate indicates the current stage Z coordinate.
- (19) To set the current Z coordinate position as a limit (upper limit) of the Z stage, click the **Upper LIMIT button (Stage Z position limit setting button)**.
- (20) The Piezo stage position axis plots the current piezo stage position.
- (21) The Piezo stage position coordinate indicates the current piezo stage coordinate.

3.6.20

AOTF Control with LU4A 4 Laser Unit A Connected (For System where Optical Paths are Switched between 0 and 100 for the CONFOCAL-TIRF)

▼ Control window (with LU4A 4 Laser Unit A connected)



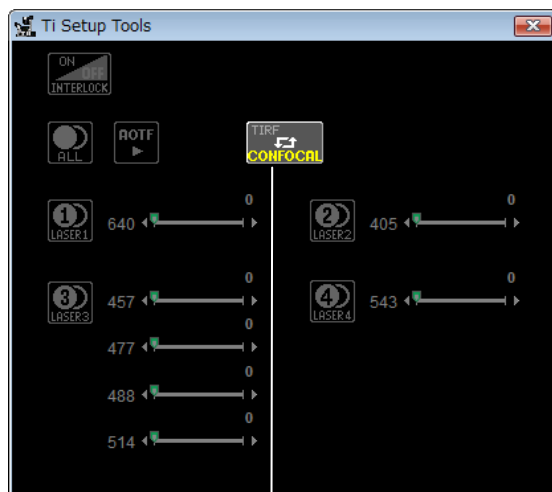
(1) 4 LASER button



This section describes AOTF control in a configuration where optical paths of lasers are switched between 0 and 100 for confocal microscope systems and Ti series TIRF illuminator unit (TI-TIRF-E and TIRF+PAU etc.)

- (1) Click the **4 LASER** button to display the 4 LASER Control window.

▼ 4 LASER Control window



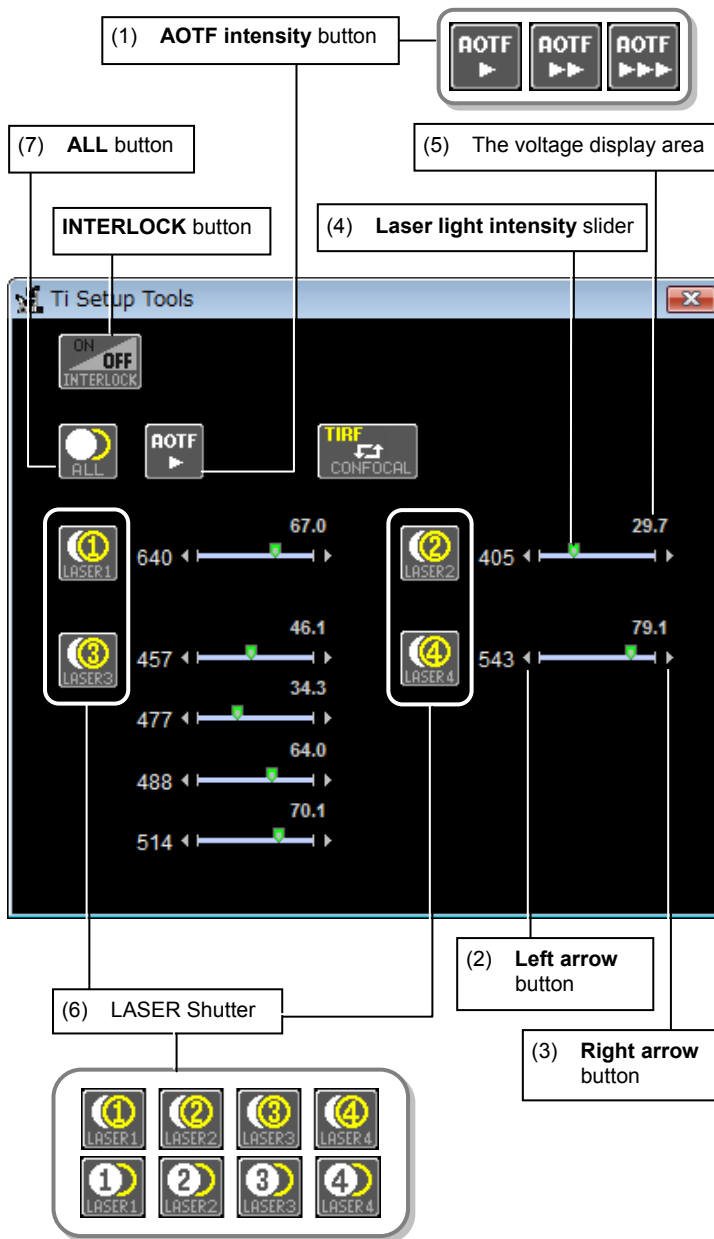
(1) TIRF ↔ CONFOCAL button



- (1) Click the **TIRF ↔ CONFOCAL** button to switch to the control screen on the **TIRF** side.

Note: Whenever the 4 LASER Control window is started, the control screen on the **CONFOCAL** side is displayed. For Ti Setup Tools (Ti Control), however, you cannot control the laser power or shutter on the **CONFOCAL** side.

▼ 4 LASER Control window



- (1) To change the AOTF between the coarse, fine, and extra-fine movement, click the **AOTF intensity** button. The light intensity amount for coarse is 100, that for fine is 10, and that for extra-fine is 1.
- (2) Click the **Left arrow** button of the LASER1, LASER2, LASER3 and LASER4 to adjust the laser output. If the voltage indicates the minimum limit, the voltage does not change with the **Left arrow** button clicked.
- (3) Click the **Right arrow** button of the LASER1, LASER2, LASER3 and LASER4 to adjust the laser output. If the voltage indicates the maximum limit, the voltage does not change with the **Right arrow** button clicked.
- (4) Move the **laser light intensity** slider to change the laser voltage.
- (5) The voltage display area indicates the current laser light intensity of the laser voltage.
- (6) To open/close the LASER Shutter, click the **LASER Shutter 1, LASER Shutter 2, LASER Shutter 3 and LASER Shutter 4** button. Shutter information is registered and set up in the **Ti Setup Tools Setting window**.
- (7) Clicking the **ALL** button will turn the voltages of all lasers to zero through the AOTF software shutter. (This will not change the display on the screen for the **laser light intensity** slider or the voltage display area.)

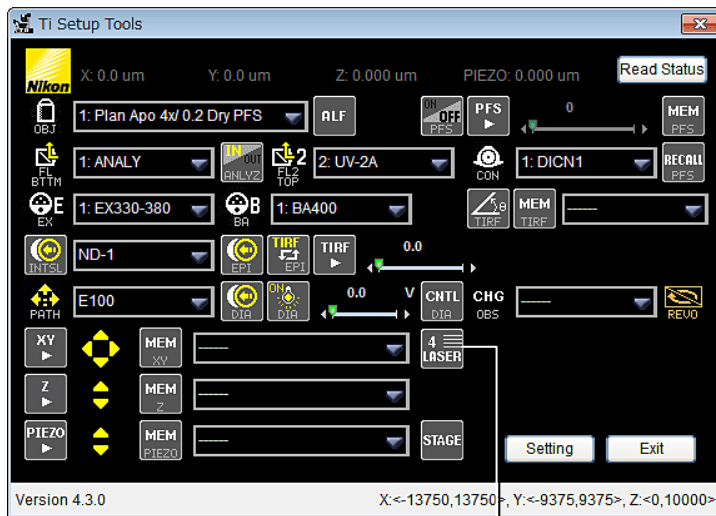
Note: The **INTERLOCK** button displays the Interlock status.

If the Ti-E's optical paths do not meet the L100/R100/B100 requirement, the Interlock functions to automatically close all the shutters. (Even for optical paths meeting the L100/R100/B100 requirement, the Interlock functions automatically when the laser cover or the Interlock cable comes off. If this occurs, the Interlock is not automatically cancelled even when the laser cover has been put back. To cancel the Interlock, click the **INTERLOCK** button in the 4 LASER Control window.)

3.6.21

AOTF Control with LU4A 4 Laser Unit A Connected (For System where Light Level Splits on a 50/50 Basis for the TIRF-PAU)

▼ Control window (with LU4A 4 Laser Unit A connected)



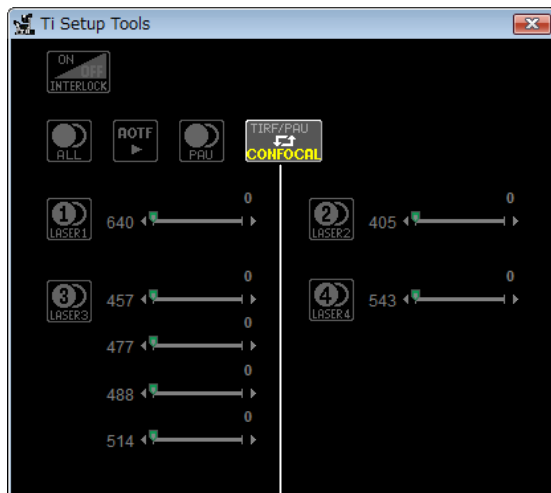
(1) 4 LASER button



This section describes AOTF control in a configuration where the level of laser light is split on a 50/50 basis by Ti series TIRF illuminator unit (TI-TIRF-E etc.,) and PAU (Ti series TI-PAU Photo Activation Illuminator Unit).

- (1) Click the **4 LASER** button to display the 4 LASER Control window.

▼ 4 LASER Control window



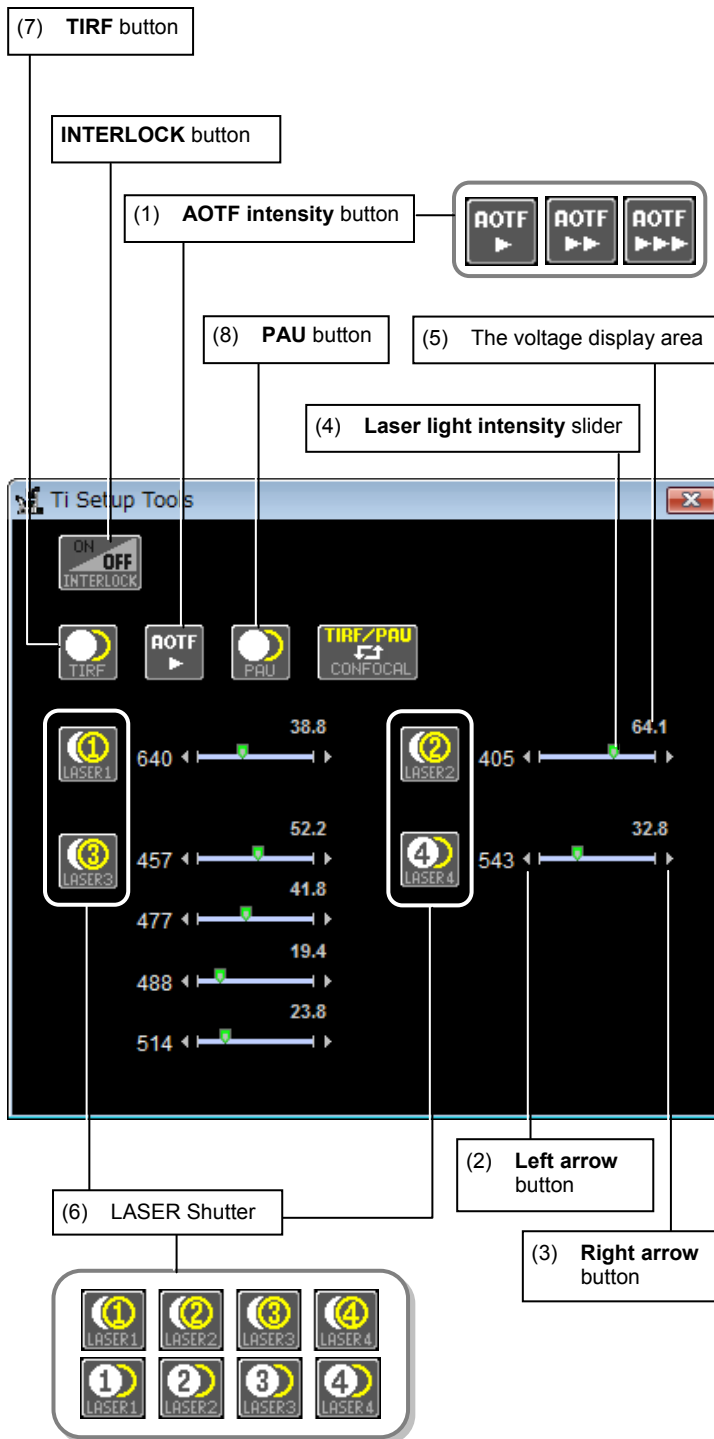
(1) TIRF/PAU ↔ CONFOCAL button



- (1) Click the **TIRF/PAU ↔ CONFOCAL** button to switch to the control screen on the **TIRF/PAU** side.

Note: Whenever the 4 LASER Control window is started, the control screen on the **CONFOCAL** side is displayed. For Ti Setup Tools (Ti Control), however, you cannot control the laser power or shutter on the **CONFOCAL** side.

▼ 4 LASER Control window



- (1) To change the AOTF between the coarse, fine, and extra-fine movement, click the **AOTF intensity** button. The light intensity amount for coarse is 100, that for fine is 10, and that for extra-fine is 1.
- (2) Click the **Left arrow** button of the LASER1, LASER2, LASER3 and LASER4 to adjust the laser output. If the voltage indicates the minimum limit, the voltage does not change with the **Left arrow** button clicked.
- (3) Click the **Right arrow** button of the LASER1, LASER2, LASER3 and LASER4 to adjust the laser output. If the voltage indicates the maximum limit, the voltage does not change with the **Right arrow** button clicked.
- (4) Move the **laser light intensity** slider to change the laser voltage.
- (5) The voltage display area indicates the current laser light intensity of the laser voltage.
- (6) To open/close the LASER Shutter, click the **LASER Shutter 1, LASER Shutter 2, LASER Shutter 3** and **LASER Shutter 4** button. Shutter information is registered and set up in the **Ti Setup Tools Setting window**.
- (7) To open/close Shutter 6 having the TIRF assigned, click the **TIRF** button.
- (8) To open/close Shutter 5 having the PAU assigned, click the **PAU** button.

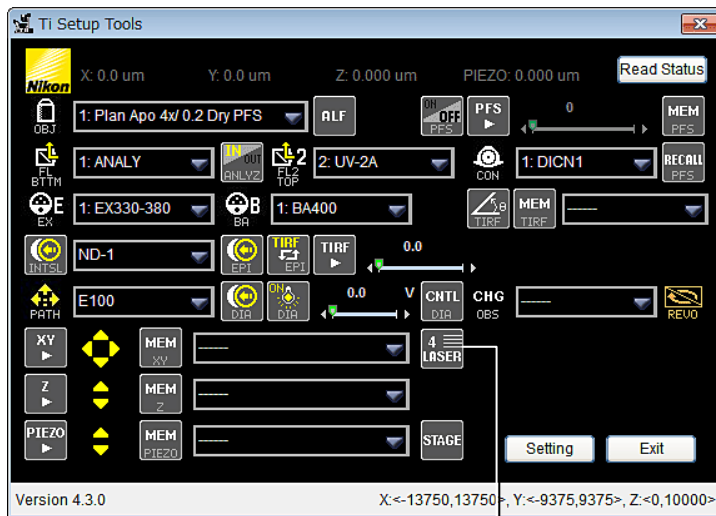
Note: The **INTERLOCK** button displays the Interlock status.

If the Ti-E's optical paths do not meet the L100/R100/B100 requirement, the Interlock functions to automatically close all the shutters. (Even for optical paths meeting the L100/R100/B100 requirement, the Interlock functions automatically when the laser cover or the Interlock cable comes off. If this occurs, the Interlock is not automatically cancelled even when the laser cover has been put back. To cancel the Interlock, click the **INTERLOCK** button in the 4 LASER Control window.)

3.6.22

AOTF Control with LU4A 4 Laser Unit A Connected (For a Simple Configuration having no Optical Path Switching Unit)

▼ Control window (with LU4A 4 Laser Unit A connected)



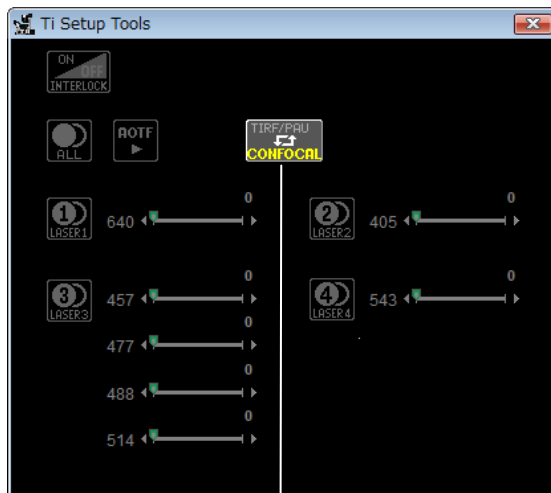
(1) 4 LASER button



This section describes AOTF control in a simple configuration having no optical path switching unit.

- (1) Click the **4 LASER** button to display the 4 LASER Control window.

▼ 4 LASER Control window



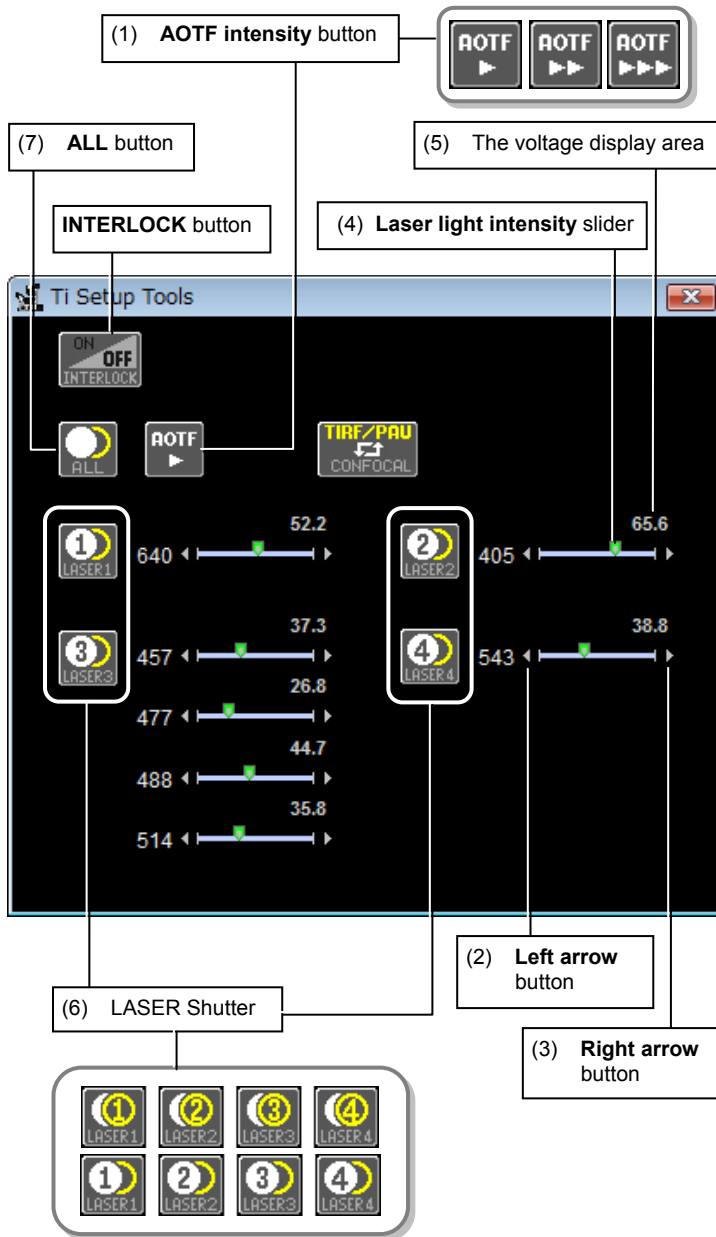
(1) TIRF/PAU↔CONFOCAL button



- (1) Click the **TIRF/PAU↔CONFOCAL** button to switch to the control screen on the **TIRF/PAU** side.

Note: Whenever the 4 LASER Control window is started, the control screen on the **CONFOCAL** side is displayed. For Ti Setup Tools (Ti Control), however, you cannot control the laser power or shutter on the **CONFOCAL** side.

▼ 4 LASER Control window



- (1) To change the AOTF between the coarse, fine, and extra-fine movement, click the **AOTF intensity** button. The light intensity amount for coarse is 100, that for fine is 10, and that for extra-fine is 1.
- (2) Click the **Left arrow** button of the LASER1, LASER2, LASER3 and LASER4 to adjust the laser output. If the voltage indicates the minimum limit, the voltage does not change with the **Left arrow** button clicked.
- (3) Click the **Right arrow** button of the LASER1, LASER2, LASER3 and LASER4 to adjust the laser output. If the voltage indicates the maximum limit, the voltage does not change with the **Right arrow** button clicked.
- (4) Move the **laser light intensity** slider to change the laser voltage.
- (5) The voltage display area indicates the current laser light intensity of the laser voltage.
- (6) To open/close the LASER Shutter, click the **LASER Shutter 1, LASER Shutter 2, LASER Shutter 3 and LASER Shutter 4** button. Shutter information is registered and set up in the **Ti Setup Tools Setting window**.
- (7) To open/close the **Shutter 6**, click the **ALL** button. (For a simple configuration having no optical path switching unit, the shutter under the control of the **ALL** button is a mechanical shutter.)

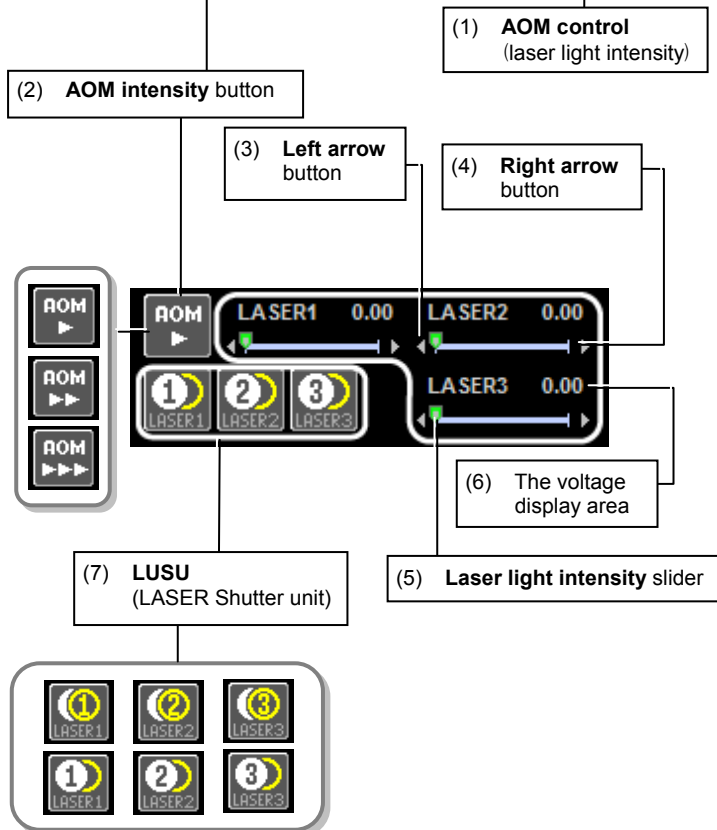
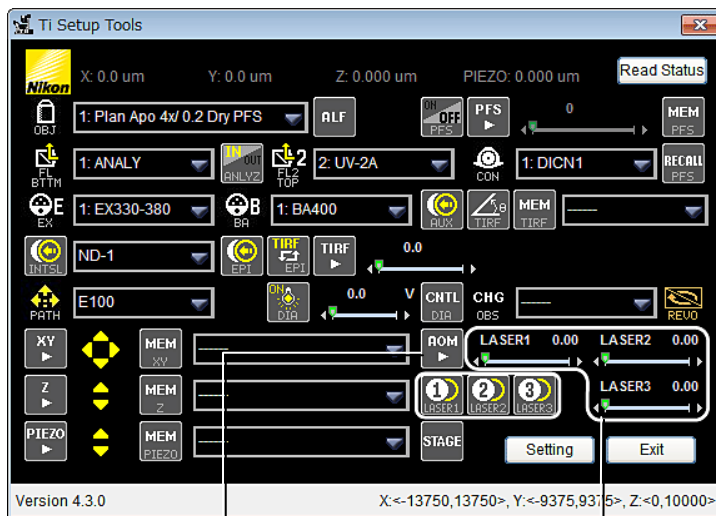
Note: The **INTERLOCK** button displays the Interlock status.

If the Ti-E's optical paths do not meet the L100/R100/B100 requirement, the Interlock functions to automatically close all the shutters. (Even for optical paths meeting the L100/R100/B100 requirement, the Interlock functions automatically when the laser cover or the Interlock cable comes off. If this occurs, the Interlock is not automatically cancelled even when the laser cover has been put back. To cancel the Interlock, click the **INTERLOCK** button in the 4 LASER Control window.)

3.6.23

AOM (LUSU) Control with C-LU3EX 3 Laser Unit EX Connected

▼ Control window (with C-LU3EX 3 Laser Unit EX connected)



- (1) Adjust the desired amount in the range between 0 to 100 % or the laser output for each laser using the **AOM control**.
- (2) To change the AOM between the coarse, fine, and extra-fine movement, click the **AOM intensity** button. The light intensity amount for coarse is 100, that for fine is 10, and that for extra-fine is 1.
- (3) Click the **Left arrow** button of the LASER1, LASER2, and LASER3 to adjust the laser output. If the voltage indicates the minimum limit, the voltage does not change with the **Left arrow** button clicked.
- (4) Click the **Right arrow** button of the LASER1, LASER2, and LASER3 to adjust the laser output. If the voltage indicates the maximum limit, the voltage does not change with the **Right arrow** button clicked.
- (5) Move the **laser light intensity** slider to change the laser voltage.
- (6) The voltage display area indicates the current laser light intensity of the laser voltage.
- (7) To open/close the LASER Shutter, click the **LASER Shutter 1**, **LASER Shutter 2** and **LASER Shutter 3** button. Shutter information is registered and set up in the **Ti Setup Tools Setting window**.

Note: For controlling AOM, attach the D/A board "NI-6713" manufactured by National Instruments. (Be sure to install the D/A board driver, NI DAQmx 8.7.1.)

Note: The following laser output control cannot be performed when installed, and be sure to set the GUI display to OFF in the **Ti Setup Tools Setting window**.

- Coherent Model RADIUS405 (405)
- JDS Uniphase Model 1677P (594)
- JDS Uniphase Model 1125P (633)

4

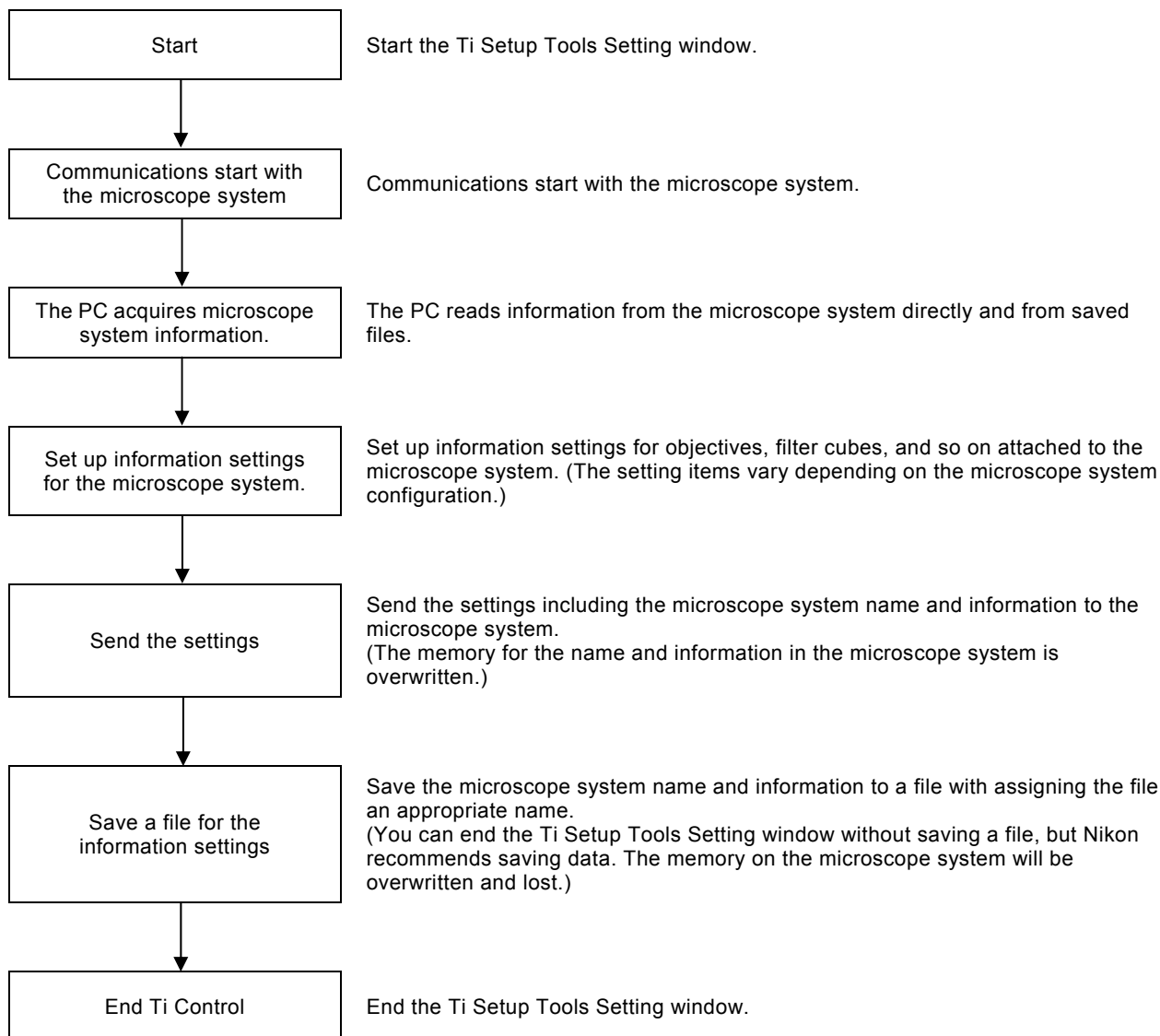
Ti Setup Tools Setting Window Operation

The Ti Setup Tools Setting window can be used to change microscope system information as necessary when a part of the system is changed.

4.1

Ti Setup Tools Setting Window Workflow

The following is the Ti Setup Tools Setting window workflow to set up microscope system information.



4.1.1 Setting Item List

The list below shows the items specified in the Ti Setup Tools Setting window.

Component (4.5 to 4.9)

- OBJ : Objective (4.5)
 - Objective settings (4.5.1)
 - Objective registration (4.5.2)
- CON : Condenser (4.6)
 - Condenser settings (4.6.1)
 - Condenser registration (4.6.2)
- FL : Filter (4.7)
 - Filter turret 1 settings (4.7.1)
 - Filter turret 2 settings (4.7.2)
 - Filter cube registration (4.7.3)
- EX : EX filter (4.8)
 - EX filter settings (4.8.1)
 - EX filter registration (4.8.2)
- BA : BA filter (4.9)
 - BA filter settings (4.9.1)
 - BA filter registration (4.9.2)

Connection (4.10 to 4.15)

- Shutter : Shutter settings (4.10)
- DSC : Digital camera settings (4.11)
- FL Change : FI turret settings (4.12)
- PIEZO Stage : Piezo stage settings (4.13)
- MICROSCOPE : Microscope settings (4.14)
- Laser : Laser Unit settings (4.15)
 - 4 Laser Unit A connection settings (4.15.1)
 - 3 Laser Unit connection settings (4.15.2)

Mode Registration (4.16 to 4.17)

- ALF : ALF settings (4.16)
- REVO : Rotation Control Mode (4.17)

4.1 Ti Setup Tools Setting Window Workflow

Key Function (4.18 to 4.19)

- ERGO : Ergo controller settings (4.18)
- KEY BOARD: Shortcut key settings (4.19)

Observation Mode (4.20)

- REG MODE : Observation mode settings (4.20)
 - 4 Laser Unit A connection settings (4.20.1)
 - 3 Laser Unit connection settings (4.20.2)

Others (4.21 to 4.23)

- Layout settings (4.21)
- Control settings (4.22)
- Version (4.23)

4.2

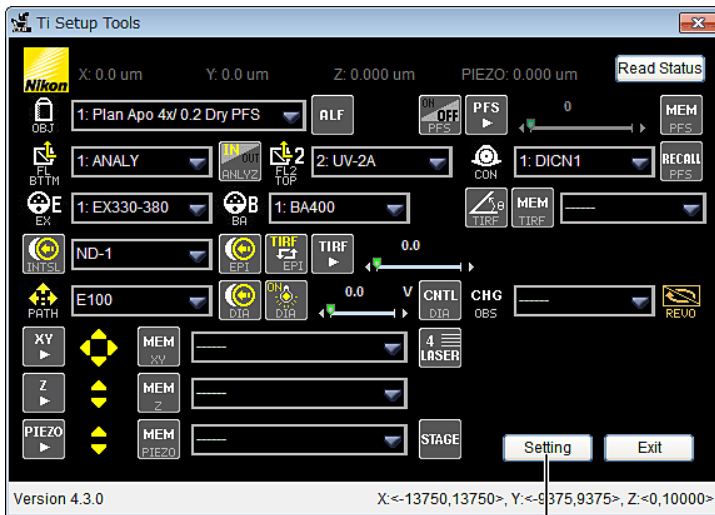
Starting/Ending the Ti Setup Tools Setting Window

4.2.1

Starting Up

Procedure

▼ Control window

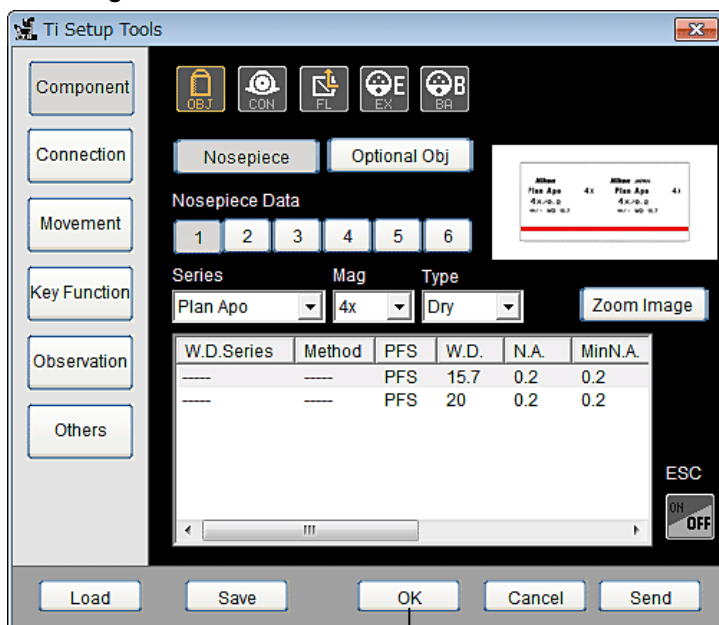


- (1) Click the **Setting** button in the **Ti Setup Tools Control** window.

4.2.2 Ending the Software

Procedure

▼ Setting window



(1) Click the **OK** button.

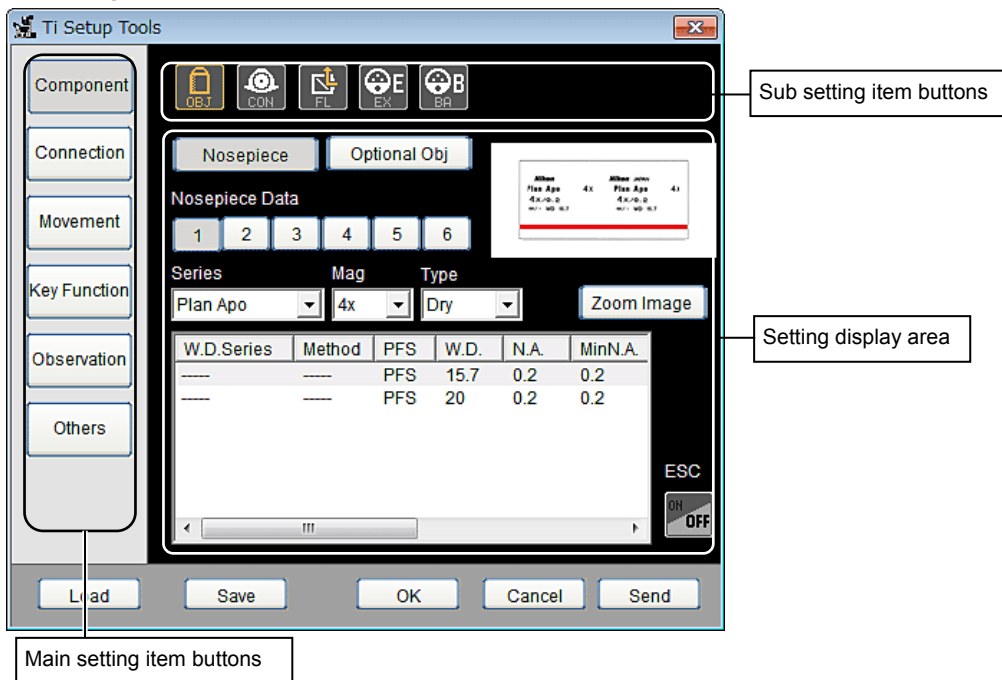
- (1) To accept the settings, click the **OK** button. The settings are sent to the microscope system and the **Ti Setup Tools Setting window** closes. (The settings are reflected and registered in the microscope system.)

When the **Send** button is clicked, the settings are sent to the microscope system but the **Ti Setup Tools Setting window** remains open. To close the window in this case, click the **X** button at the upper right corner.

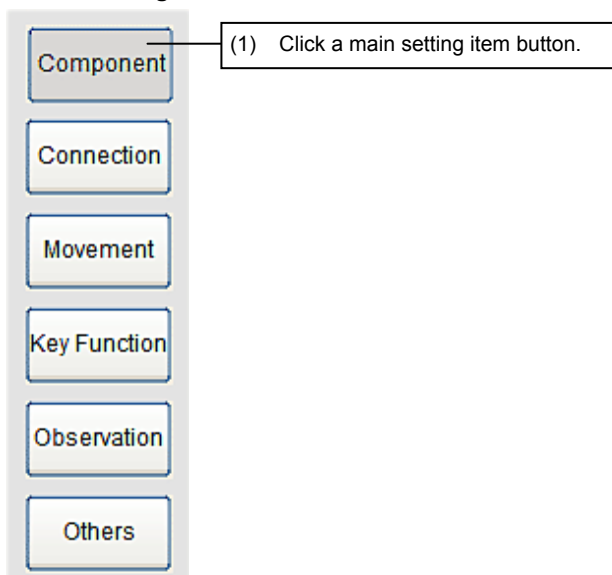
4.3 Ti Setup Tools Setting Window Configuration

The Ti Setup Tools Setting window consists of main setting item buttons, sub setting item buttons, and a setting display area.

▼ Setting window



▼ Main setting item button



- (1) Click a main setting item button. Sub setting item buttons and a setting display area appear.

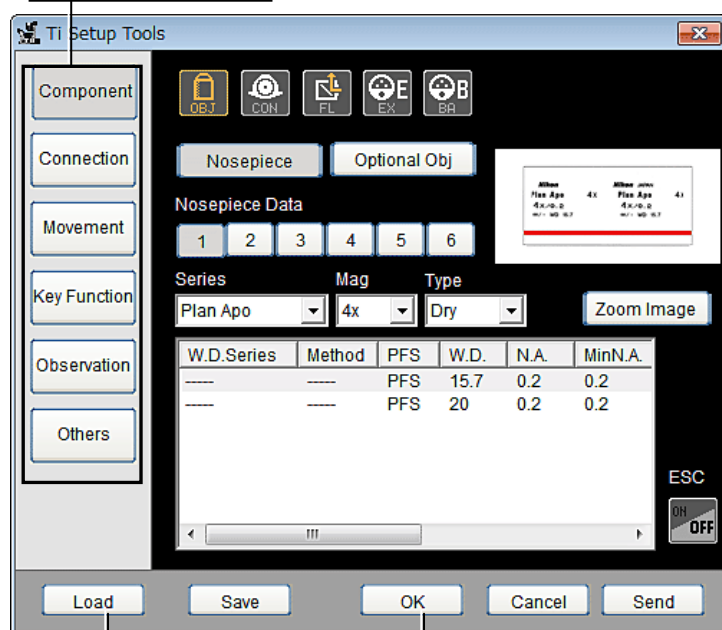
4.4 Saving/Loading a Setting File

The Ti Setup Tools Setting window can be used to set up information as described below:

When a file is prepared, it can be read to set up the microscope system. The microscope system information can be modified in the Ti Setup Tools Setting window.

▼ Setting window

(3) Set up items.

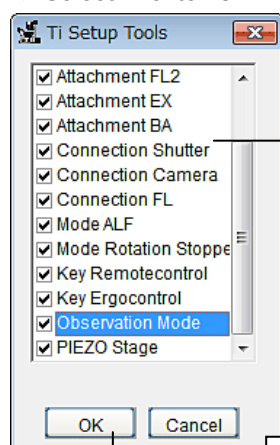


(1) Click the **Load** button.

(4) Click the **OK** button.

- (1) Click the **Load** button and select an information file (***.xml).
- (2) A window opens indicating data items saved in the selected file. Select data items and click the **OK** button. Ti Control reads and reflects the information.
- (2)-1 A window opens indicating data items saved in the selected file. Check the items to be applied.
- (2)-2 Click the **OK** button. Ti Control loads the checked items and reflects them to the settings.
- (3) Click a main setting item button and modify settings.
- (4) To accept the settings, click the **OK** button. Settings are sent to the microscope system. When the data transportation is complete, the **Ti Setup Tools Setting window** closes automatically.

▼ Select File Items window



(2)-1 Check items to be loaded.

(2)-2 Click the **OK** button.

To accept the settings but leave the **Ti Setup Tools Setting window** open, click the **Send** button.

To cancel the settings and close the **Ti Setup Tools Setting window**, click the **Cancel** button.

To save the settings to a file (***.xml), click the **Save** button.

4.5**Objective**

The following sections are provided for objective settings:

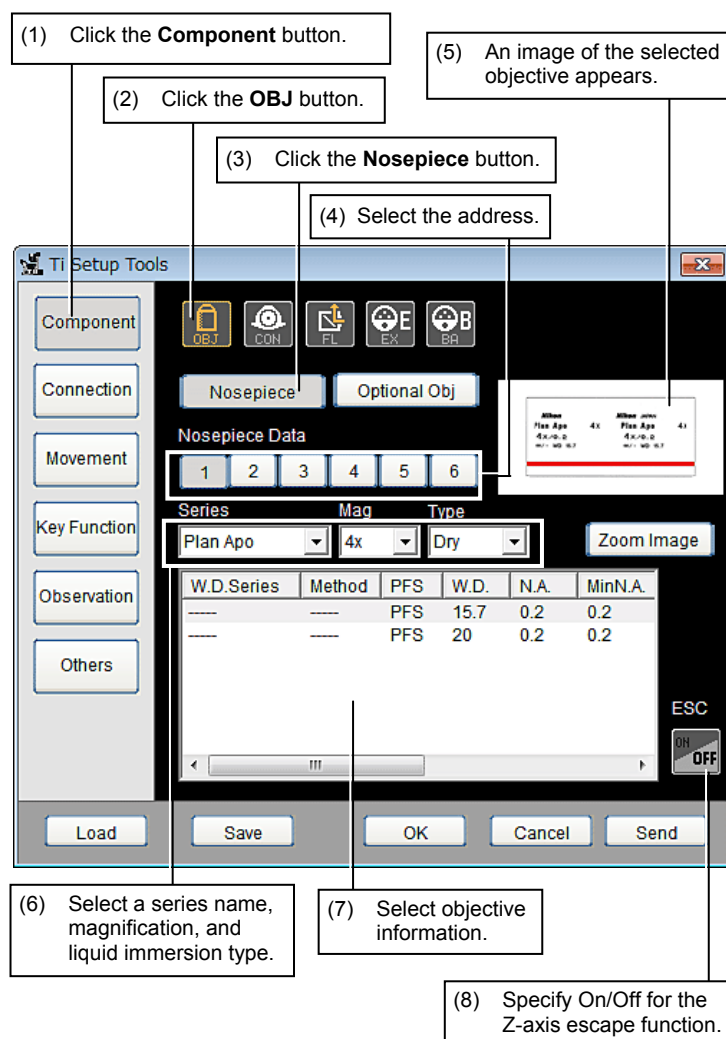
- **Objective settings:** (only for microscope systems equipped with a motorized nosepiece or an intelligent nosepiece)
Specify objective information for each nosepiece socket address.
- **Objective registration:** (only for microscope systems equipped with a motorized nosepiece or an intelligent nosepiece)
Register new objective information for not-registered objectives in the list box. (Up to 10 objectives)

4.5.1 Objective Settings

To open the **Objective setting** window, click the **Component** button on the main panel, and then click the **OBJ** button on the sub panel.

Then, in the **Objective setting** window, specify the objective information for each address of the nosepiece.

▼ Objective Setting window



- (1) Click the **Component** button on the main panel.
- (2) Click the **OBJ** button on the sub panel.
- (3) Click the **Nosepiece** button.
- (4) Select the address for which you want to specify objective information.
- (5) When selected, an image of the objective appears.
- (6) Select a series name, magnification, and liquid immersion type from the list box.
- (7) A list appears displaying the objective information. Select the objective information from the list.
- (8) Specify the Z-axis escape function (**ESC ON/OFF**) for the address.

Note:

To register a new objective that does not appear in the list box (series name, magnification, or liquid immersion type), click the **Optional Obj.** button. The **Objective registration** window appears. For details, refer to Section 4.5.2, "Objective Registration."

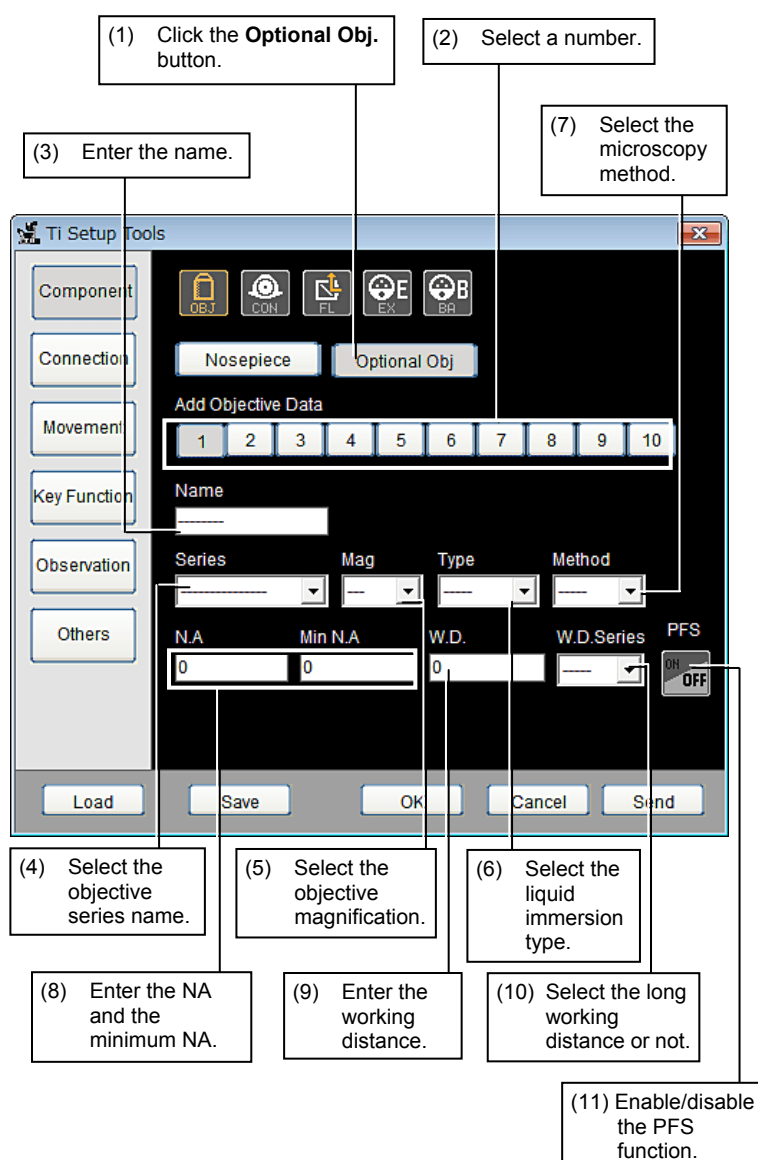
4.5.2 Objective Registration

If information on the objective is not registered in the series name, magnification, or immersion type list box, it can be registered. Click the **Optional Obj.** button in the **Objective setting** window to open the **Objective registration** window.

Up to ten objectives can be registered in the **Objective registration** window.

Ten items can be registered for one objective. They are name, series name, magnification, liquid immersion type, microscopy method, N.A., minimum N.A., working distance, working distance series, and PFS setting.

▼ Objective registration window



- (1) Click the **Optional Obj.** button.
- (2) Select a number to register objective information.
- (3) Enter the name of the objective in the **Name** text box. (Up to eight characters. Alphanumeric characters and following special characters: +, -, *, /, #, and &)
- (4) Select the objective series from the **Series** list box.
- (5) Select the objective magnification from the **Mag.** list box.
- (6) Select the objective type from the **Type** list box.
- (7) Select the microscopy method of the objective from the **Method** list box.
- (8) Enter the numerical aperture in the **N.A.** text box and the minimum numerical aperture in the **Min N.A.** text box. (Up to four characters: numeric characters and ".")
- (9) Enter the working distance of the objective in the **W.D.** text box. (Up to five characters: numeric characters and ".")
- (10) Select the objective working distance series from the **W.D. Series** list box.
- (11) Click the **PFS** button to enable/disable the PFS function for the objective.

4.6 Condenser

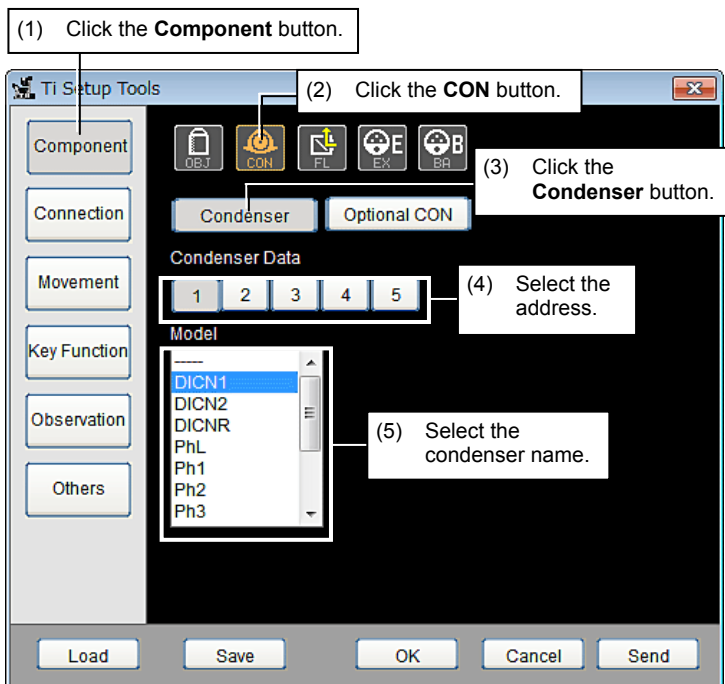
The following sections are provided for condenser settings:

- **Condenser settings:**
Specify condenser information for each condenser turret address (position).
- **Condenser registration:**
Register new condenser names.

4.6.1 Condenser Settings

To open the **Condenser setting** window, click the **Component** button on the main panel, and then click the **CON** button on the sub panel.

▼ Condenser setting window



- (1) Click the **Component** button on the main panel.
- (2) Click the **CON** button on the sub panel.
- (3) Click the **Condenser** button.
- (4) Select the address of the condenser in the **Condenser Data** area to specify information.
- (5) Select the condenser name from the **Model** list.

Note:

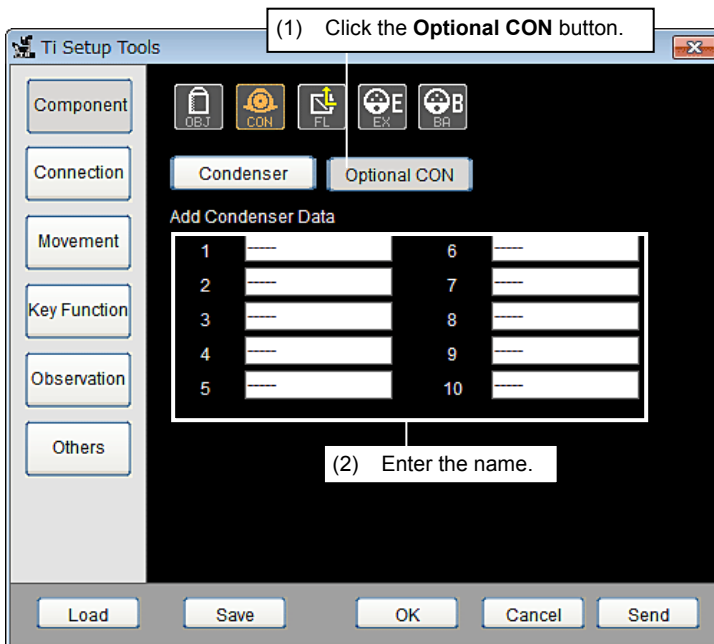
To register a new condenser, click the **Optional CON** button. The **Condenser registration** window appears. For details, refer to Section 4.6.2, "Condenser Registration."

4.6.2 Condenser Registration

New condensers can be registered to open the **Condenser registration** window, click the **Optional CON** button in the **Condenser setting** window

Up to ten condensers can be registered in the **Condenser registration** window.

▼ Condenser registration window



- (1) Click the **Optional CON** button in the **Condenser setting** window.
 - (2) Enter a new condenser name in the **Add Condenser Data** area. (Up to five characters. Alphanumeric characters and following special characters: +, -, *, /, #, and &)
- The new name appears in the **Model** list in the **Condenser setting** window.

4.7 Filter

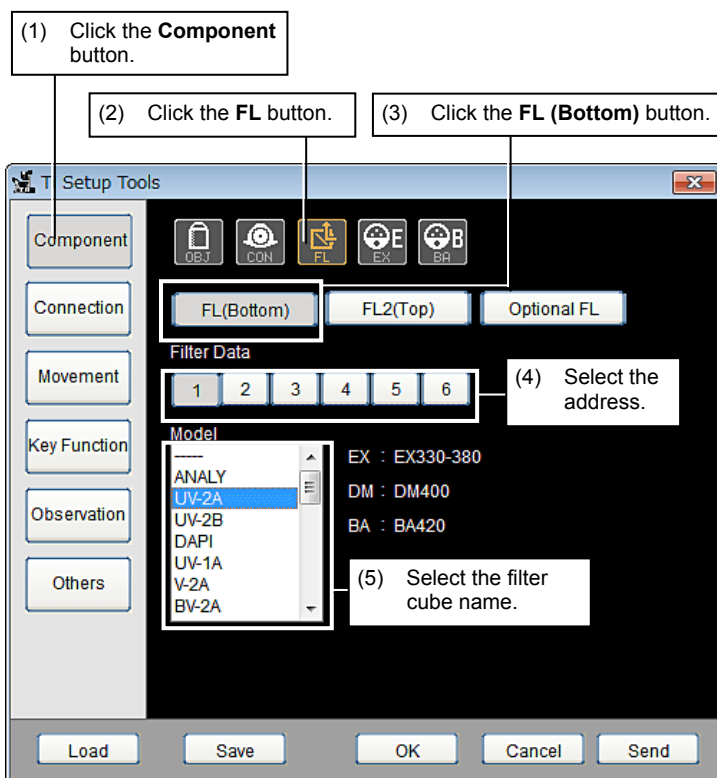
The following sections are provided for filter settings.

- **FL turret 1 settings:**
Specify filter information for each FL turret 1 address (filter cube position of the lower tier).
- **FL turret 2 settings:**
Specify filter information for each FL turret 2 address (filter cube position of the upper tier).
- **Filter cube registration:**
Register new filter cube names, EX filters, dichroic mirrors, and BA filters.

4.7.1 FL Turret 1 Settings

To open the **FL turret 1 setting** window, click the **Component** button on the main panel, and then click the **FL** button on the sub panel.

▼ FL turret 1 setting window



- (1) Click the **Component** button on the main panel.
- (2) Click the **FL** button on the sub panel.
- (3) Click the **FL (Bottom)** button.
- (4) Select the address of the filter cube in the **Filter Data** area to specify information.
- (5) Select the filter cube name from the **Model** list.

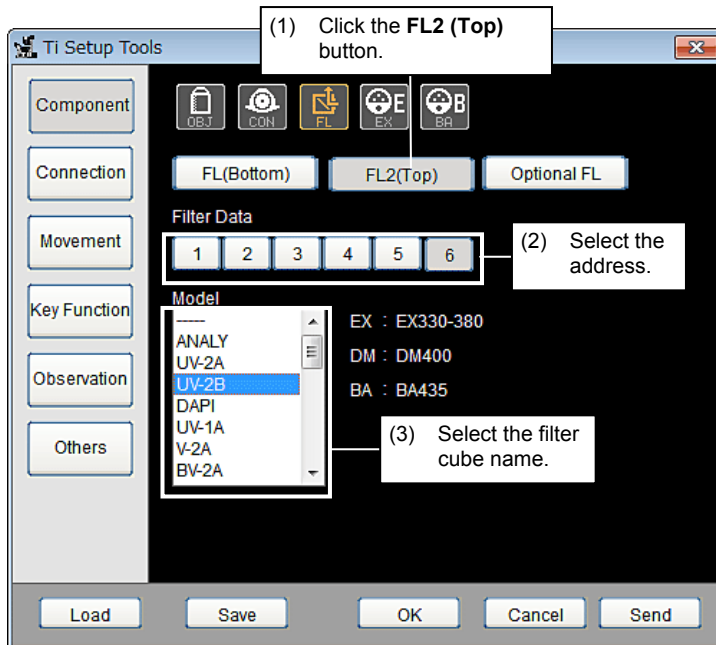
Note:

To register a new filter cube, click the **Optional FL** button. The **Filter cube registration** window appears. For details, refer to Section 4.7.3, "Filter Cube Registration."

4.7.2 FL Turret 2 Settings

To open the **FL turret 2 setting** window, click the **Component** button on the main panel, and then click the **FL2 (Top)** button on the sub panel.

▼ FL turret 2 setting window



- (1) Click the **FL2 (Top)** button in the Filter cube setting window.
- (2) Select the address of the filter cube in the **Filter Data** area to specify information.
- (3) Select the filter cube name from the **Model** list.

Note:

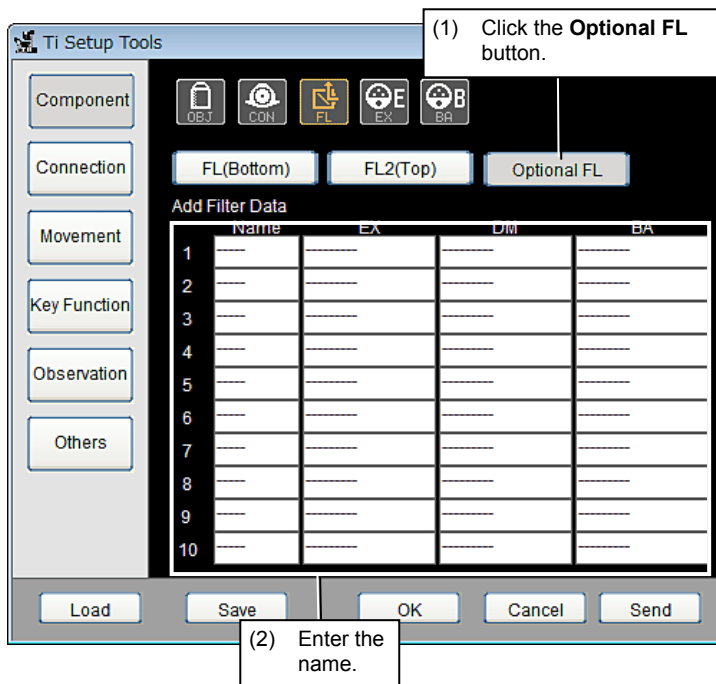
To register a new filter cube, click the **Optional FL** button. The **Filter cube registration** window appears. For details, refer to Section 4.7.3, "Filter Cube Registration."

4.7.3 Filter Cube Registration

New filter cubes can be registered. To open the **Filter cube registration** window, click the **Optional FL** button in the **Filter cube setting** window.

Up to ten filter cubes can be registered in the **Filter cube registration** window.

▼ Filter cube registration window



(1) Click the **Optional FL** button in the **Filter cube setting** window.

(2) Enter the filter cube name. (Up to five characters. Alphanumeric characters and following special characters: +, -, *, /, #, and &)

(3) Enter data for EX, DM, and BA. (Up to five characters. Alphanumeric characters and following special characters: +, -, *, /, #, and &)

The new name appears in the **Model** list in the **FL turret setting** window.

4.8

EX Filter

The following sections are provided for excitation light (EX) filter settings.

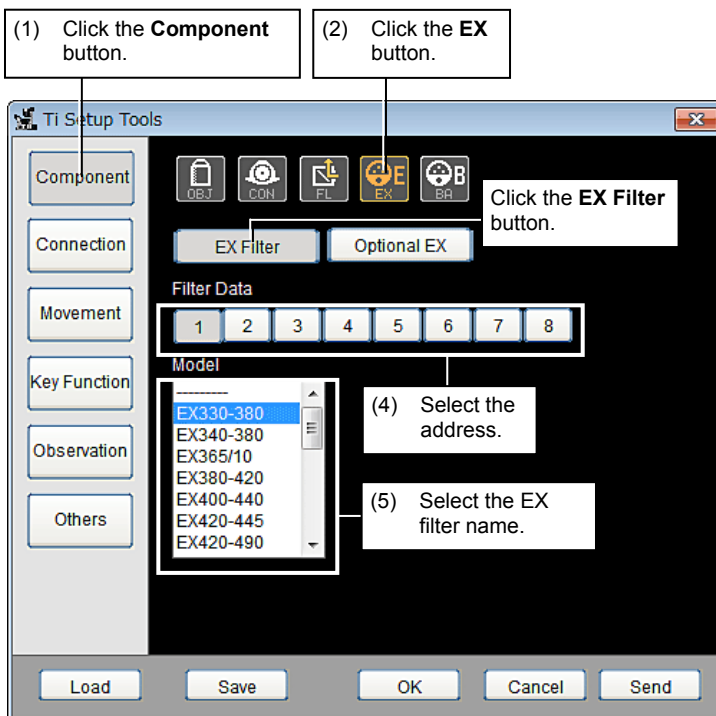
- **EX filter settings:**
Specify filter information for each EX filter turret address (EX filter position).
- **EX filter registration:**
Register new EX filter names.

4.8.1

EX Filter Settings

To open the **EX filter setting** window, click the **Component** button on the main panel, and then click the **EX** button on the sub panel.

▼ EX filter setting window



- (1) Click the **Component** button on the main panel.
- (2) Click the **EX** button on the sub panel.
- (3) Click the **EX Filter** button.
- (4) Select the address of the EX filter in the **Filter Data** area to specify information.
- (5) Select the EX filter name from the **Model** list.

Note:

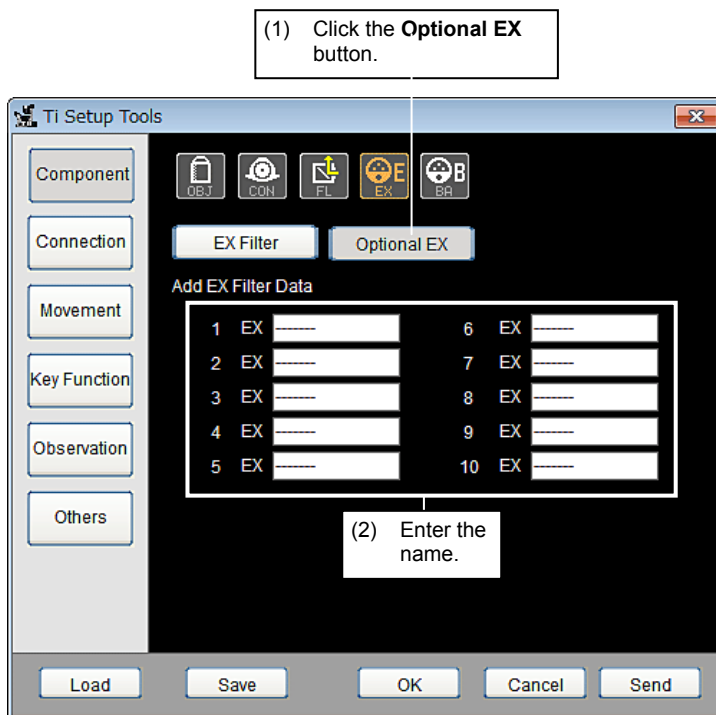
To register a new EX filter, click the **Optional EX** button. The **EX filter registration** window appears. For details, refer to Section 4.8.2, "EX Filter Registration."

4.8.2 EX Filter Registration

New EX filters can be registered. To open the **EX filter registration** window, click the **Optional EX** button in the **EX filter setting** window.

Up to ten EX filters can be registered in the **EX filter registration** window.

▼ EX filter setting window



- (1) Click the **Optional EX** button in the **EX Filter setting** window.
- (2) Enter the EX filter name. (Up to seven characters. Alphanumeric characters and following special characters: +, -, *, /, #, and &. "EX" is added to the name automatically.)

The new name appears in the **Model** list in the **EX filter setting** window.

4.9 BA Filter

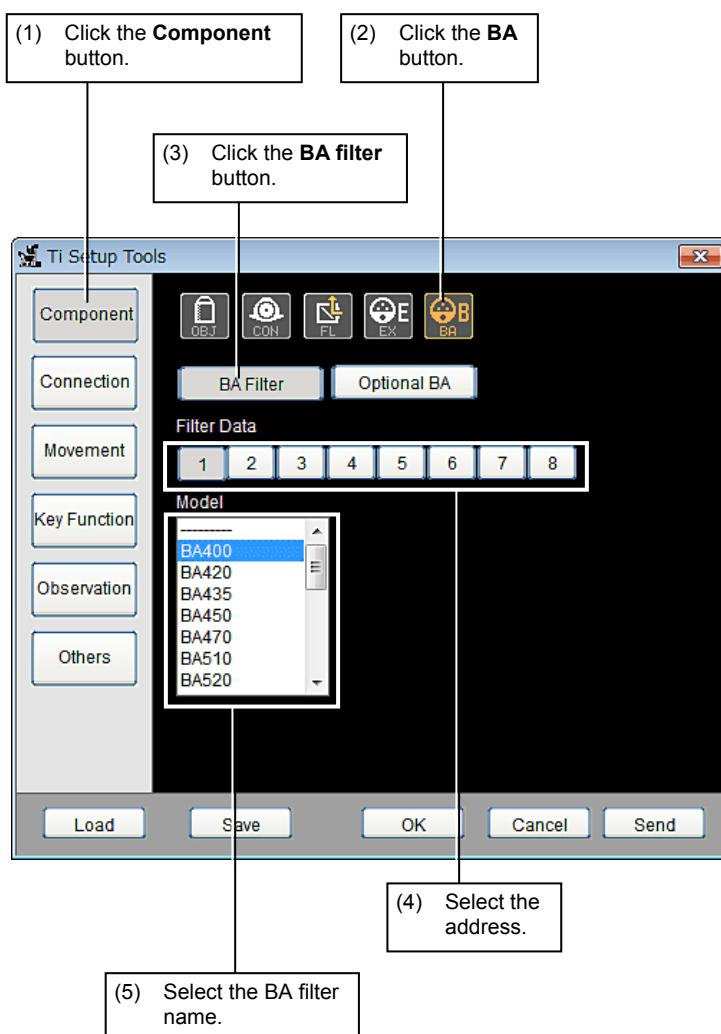
The following sections are provided for barrier (BA) filter settings.

- **BA filter settings:**
Specify filter information for each BA filter turret address (BA filter position).
- **BA filter registration:**
Register new BA filter names.

4.9.1 BA Filter Settings

To open the **BA filter setting** window, click the **Component** button on the main panel, and then click the **BA** button on the sub panel.

▼ BA filter setting window



- (1) Click the **Component** button on the main panel.
- (2) Click the **BA** button on the sub panel.
- (3) Click the **BA Filter** button.
- (4) Select the address of the BA filter in the **Filter Data** area to specify information.
- (5) Select the BA filter name from the **Model** list.

Note:

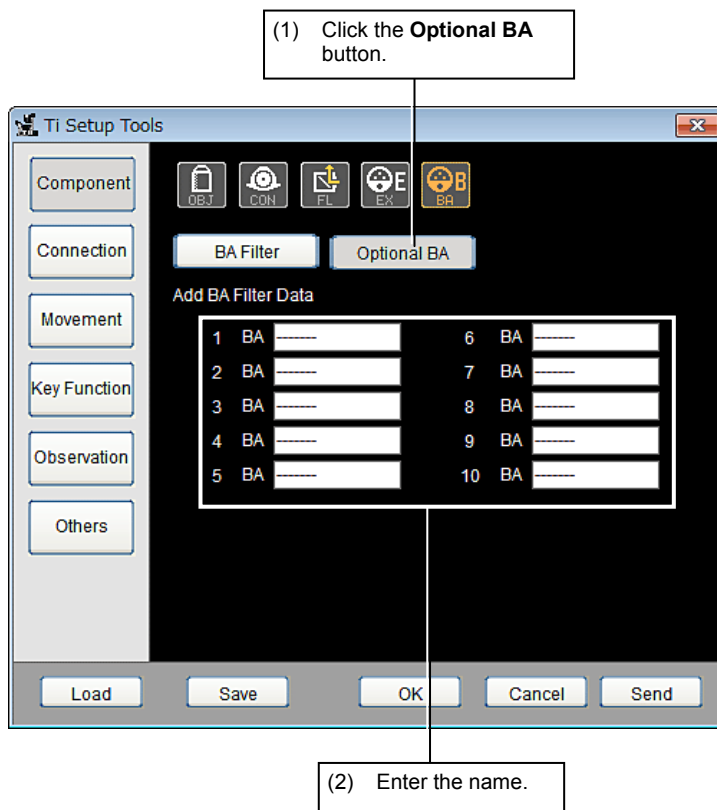
To register a new BA filter, click the **Optional EX** button. The **BA Filter registration** window appears. For details, refer to Section 4.9.2, "BA Filter Registration."

4.9.2 BA Filter Registration

New BA filters can be registered. To open the **BA Filter registration** window, click the **Optional BA** button in the **BA Filter setting** window.

Up to ten BA filters can be registered on the **BA Filter registration** window.

▼ BA filter registration window



- (1) Click the **Optional BA** button in the **BA Filter setting** window.
- (2) Enter the BA filter name. (Up to seven characters. Alphanumeric characters and following special characters: +, -, *, /, #, and &)

The new name appears in the **Model** list on the **BA filter setting** window.

4.10 Shutter Settings

To open the **Shutter setting** window, click the **Connection** button on the main panel, and then click the **Shutter** button on the sub panel.

The following items can be set for shutters.

- **Shutter manufacturer settings:**
Specify the manufacturers of shutter 1 and shutter 2.
- **Shutter application settings:**
Specify the application of shutter 1 and shutter 2.

▼ Shutter setting window

(1) Click the **Connection** button.

(2) Click the Shutter button.

(3) Specify the manufacturer and the application of the shutter 1.

(1) Click the **Connection** button on the main panel.

(2) Click the **Shutter** button on the sub panel.

(3) Specify the manufacturer and application of shutter 1.

(4) Specify the manufacturer and application of shutter 2.

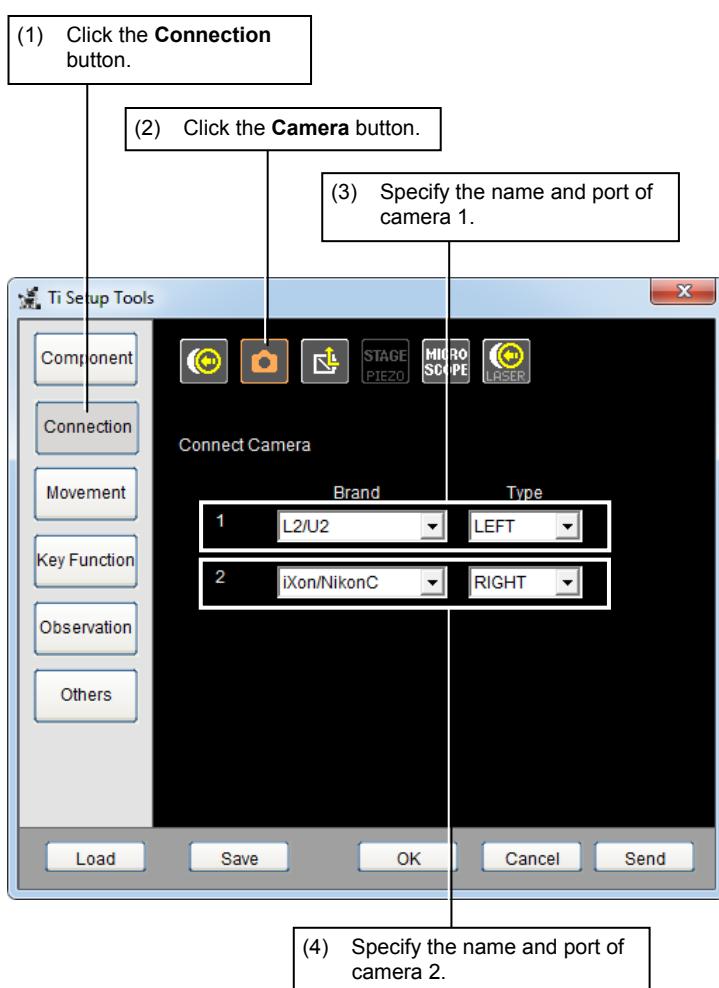
4.11 Camera Settings

To open the **Camera setting** window, click the **Connection** button on the main panel, and then click the **Camera** button on the sub panel.

The following items can be set for digital cameras.

- **Camera manufacturer settings:**
Specify the camera name of camera 1 or camera 2.
- **Camera port settings:**
Specify the camera port of camera 1 or camera 2.

▼ Camera setting window



- (1) Click the **Connection** button on the main panel.
- (2) Click the **Camera** button on the sub panel.
- (3) Specify the name and port of camera 1.
- (4) Specify the name and port of camera 2.

Note:

iXon/NikonC and **L2/U2** are displayed in the **Brand** list.

When a digital camera DS-U3-Qi1mc, DS-L3-Qi1mc, DS-Qi2 or DS-Ri2 is used, select **iXon/NikonC**.

When a digital camera DS-U2-Qi1mc or DS-L2-Qi1mc is used, select **L2/U2**.

4.12 FL Turret Connection

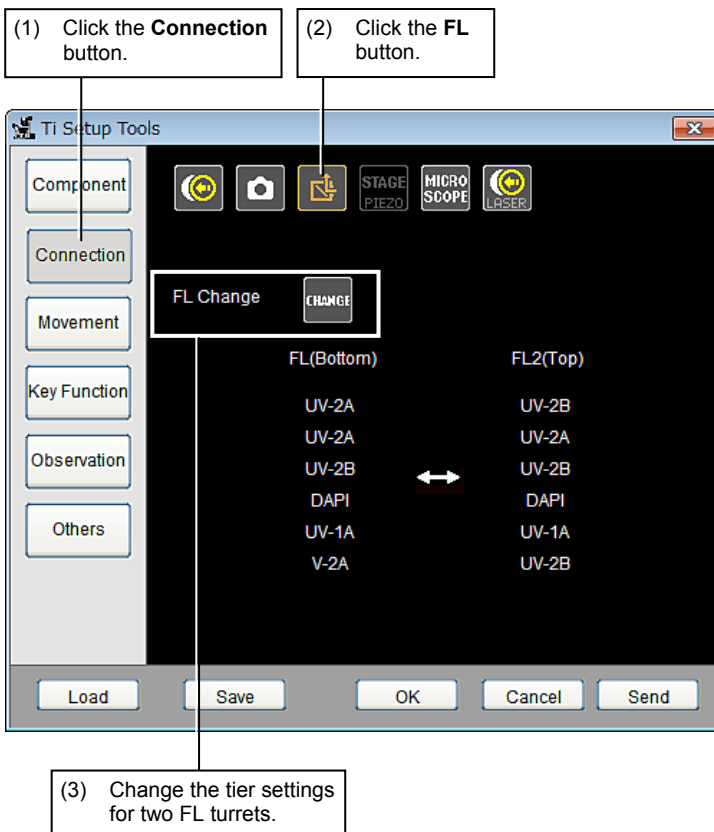
To open the **FL turret connection** window, click the **Connection** button on the main panel, and then click the **FL** button on the sub panel.

The following item can be set for FL turrets.

- **FL turret tier setting:**

Change the tier settings for two FL turrets.

▼ FL turret connection window



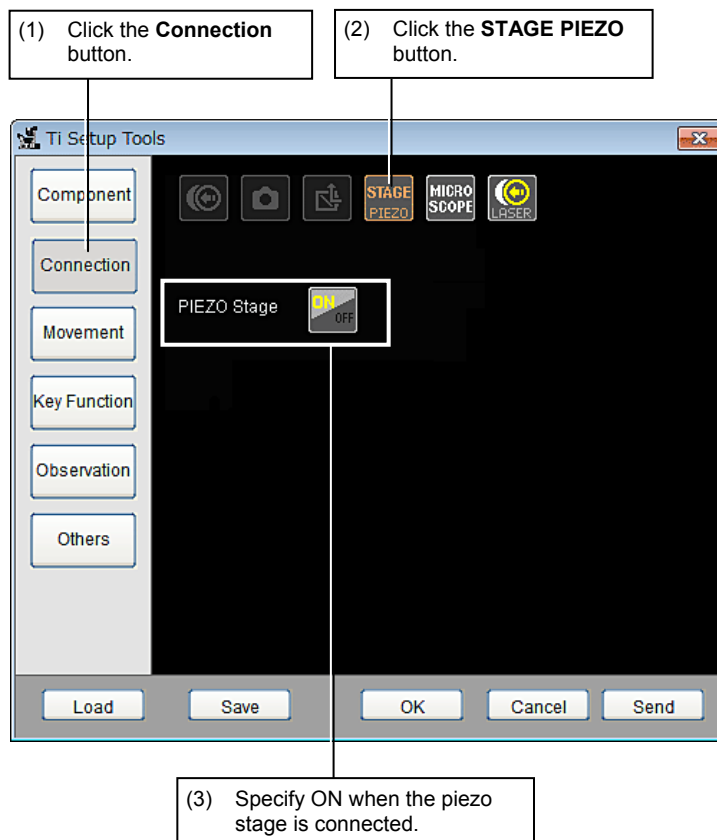
- (1) Click the **Connection** button on the main panel.
- (2) Click the **FL** button on the sub panel.
- (3) Change the filter tier settings.

4.13 Piezo Stage Connection

This item can be selected only for the Ti-E or Ti-E/B microscope. To open the **Piezo stage connection** window, click the **Connection** button on the main panel, and then click the **STAGE PIEZO** button on the sub panel.

- **Piezo stage connection:**
Specify ON when the piezo stage is connected.

▼ Piezo stage connection window



- (1) Click the **Connection** button on the main panel.
- (2) Click the **STAGE PIEZO** button on the sub panel.
- (3) Specify ON when the piezo stage is connected.

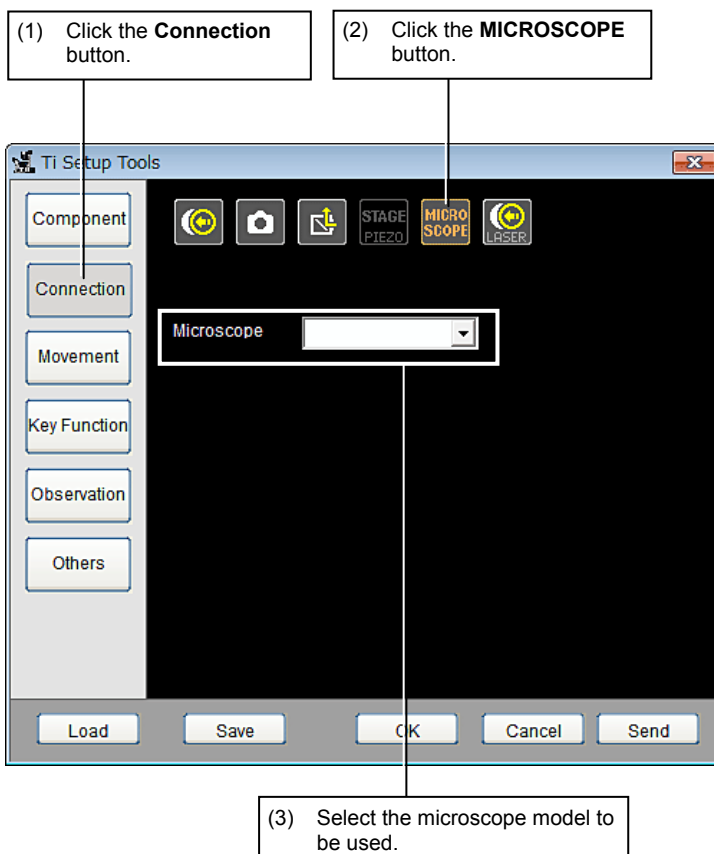
4.14 Microscope Model Setting

To open the Microscope setting window, click the **Connection** button on the main panel, and then click the **MICROSCOPE** button on the sub panel. The following item can be set for microscope information.

- **Microscope model setting:**

Specify the microscope model to be used.

▼ Microscope model setting window



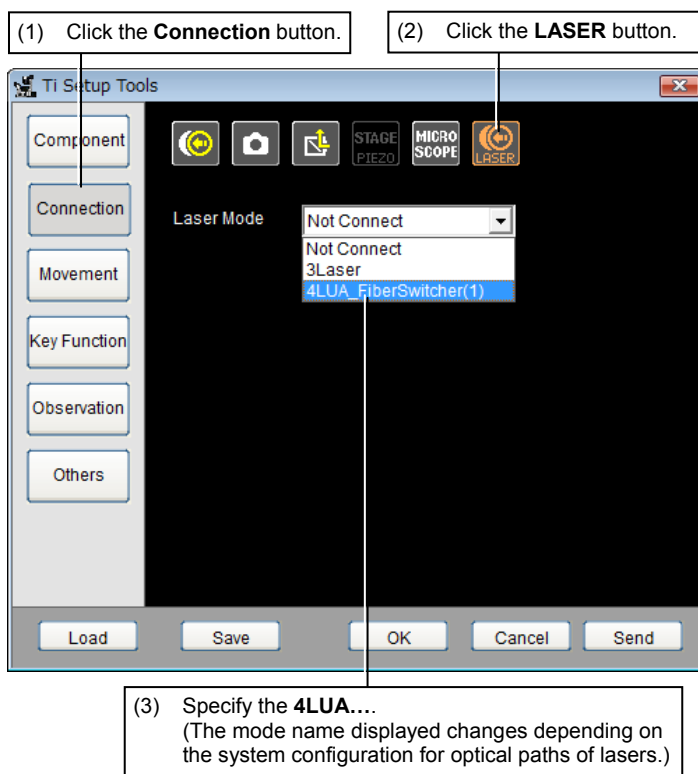
- (1) Click the **Connection** button on the main panel.
- (2) Click the **MICROSCOPE** button on the sub panel.
- (3) Specify the microscope model to be used.

4.15 Laser Unit Settings

To open the laser-connection setting window, click the **Connection** button on the main panel, and then click the **LASER** button on the sub panel.

4.15.1 LU4A 4 Laser Unit A Settings

▼ Laser Mode Selection window

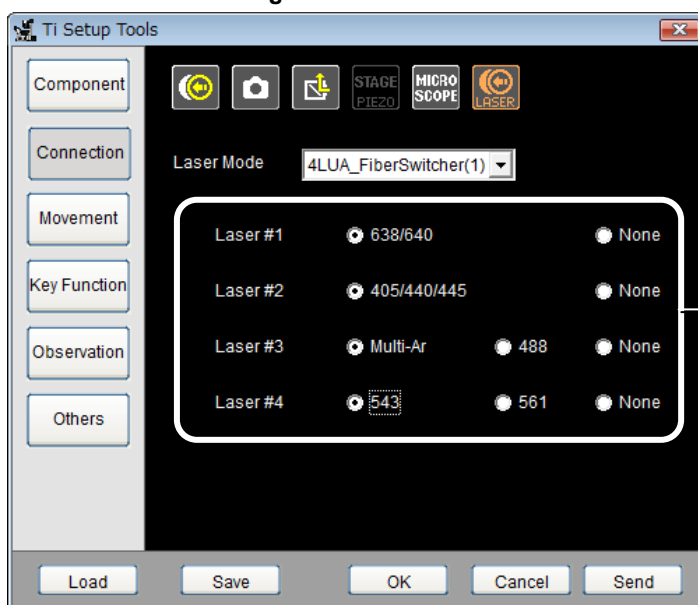


- (1) Click the **Connection** button on the main panel.
- (2) Click the **LASER** button on the sub panel.
- (3) Specify the Laser Mode.

Note: When the laser mode for LU4A 4 Laser Unit A is selected, the mode name displayed changes depending on the system configuration for optical paths of lasers.

- For system where **Optical Paths are switched between 0 and 100 for the CONFOCAL-TIRF**, the following mode name applies:
4LUA_FiberSwitcher(1)
- For system where **light level splits on a 50/50 basis for the TIRF-PAU**, the following mode name applies:
4LUA_FiberSplitter(1)
- For a simple configuration having no **Optical Path Switching Unit**, the following mode name applies:
4LUA_Single(1)

▼ 4 Laser Unit A Setting window



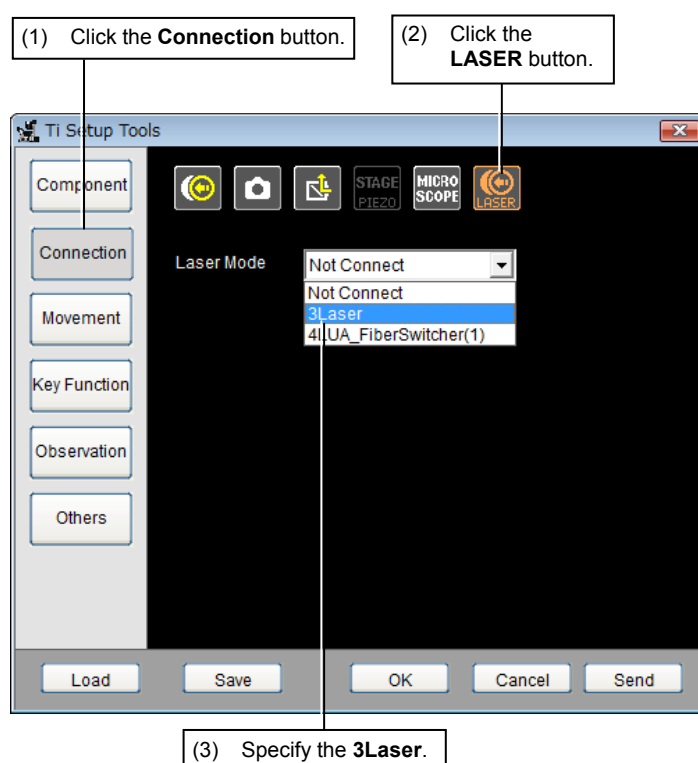
- (4) Specify the Laser to use.

4.15.2 C-LU3EX 3 Laser Unit EX-AOM (LUSU) Settings

The following items can be set for AOM (LUSU).

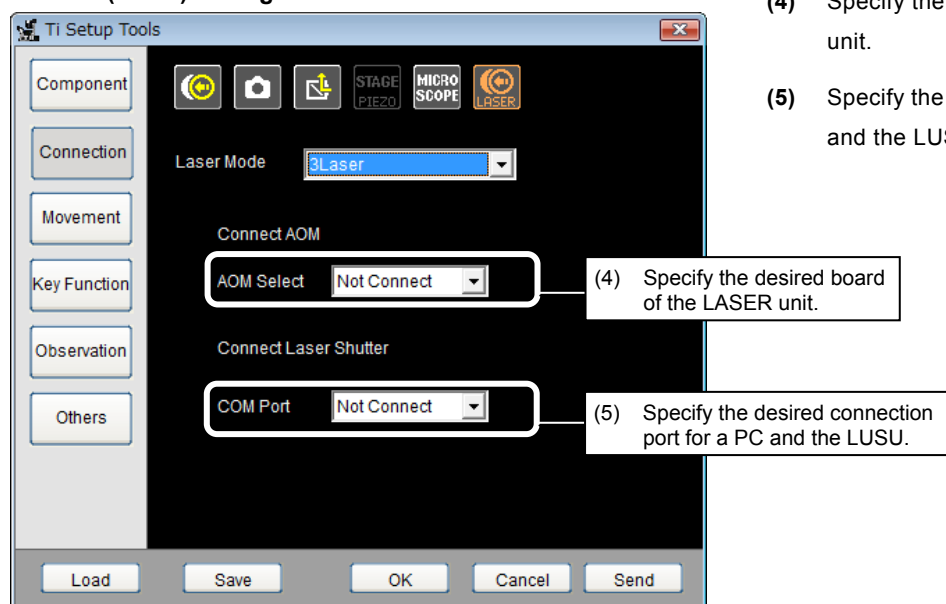
- **Setting the AOM:**
Sets the board of the LASER unit
- **Setting the LUSU (LASER Shutter unit):**
Sets the connection port on a PC and the LUSU

▼ Laser Mode Selection window



- (1) Click the **Connection** button on the main panel.
- (2) Click the **LASER** button on the sub panel.
- (3) Specify the Laser Mode.
Select the **3Laser** when you want to connect the C-LU3EX 3 Laser Unit EX.

▼ AOM (LUSU) setting window



- (4) Specify the desired board of the LASER unit.
- (5) Specify the desired connection port for a PC and the LUSU (LASER Shutter Unit).

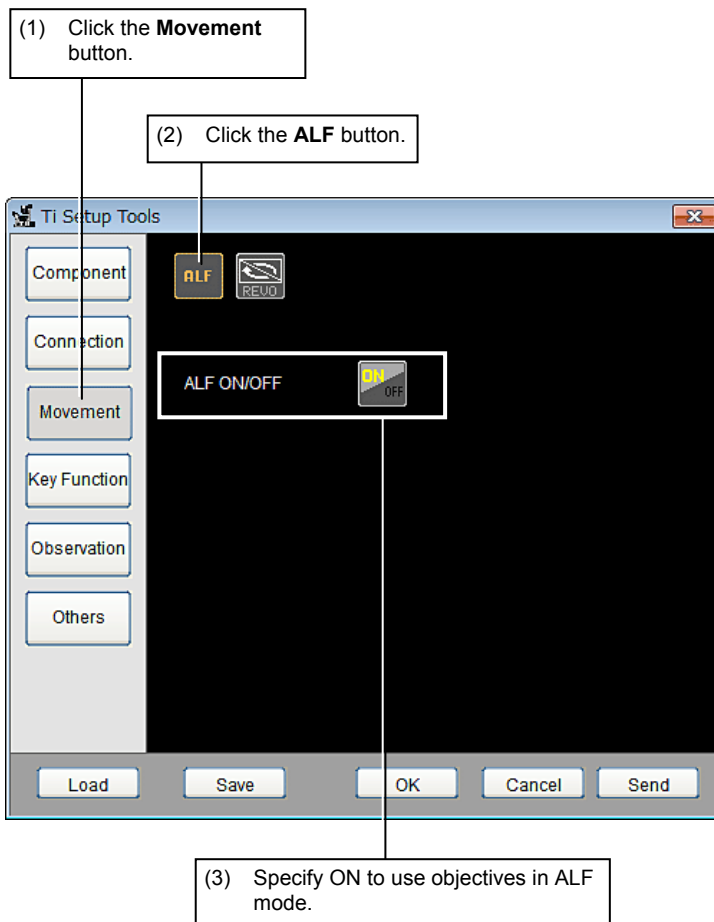
4.16 ALF Mode

To open the **ALF mode** window, click the **Movement** button on the main panel, and then click the **ALF** button on the sub panel.

The following item can be set for auto link focus (ALF) information.

- **ALF on/off:**
Specify ON to use objectives in ALF mode.

▼ ALF mode window



- (1) Click the **Movement** button on the main panel.
- (2) Click the **ALF** button on the sub panel.
- (3) Specify ON to use objectives in ALF mode.

4.17 Rotation Control Mode

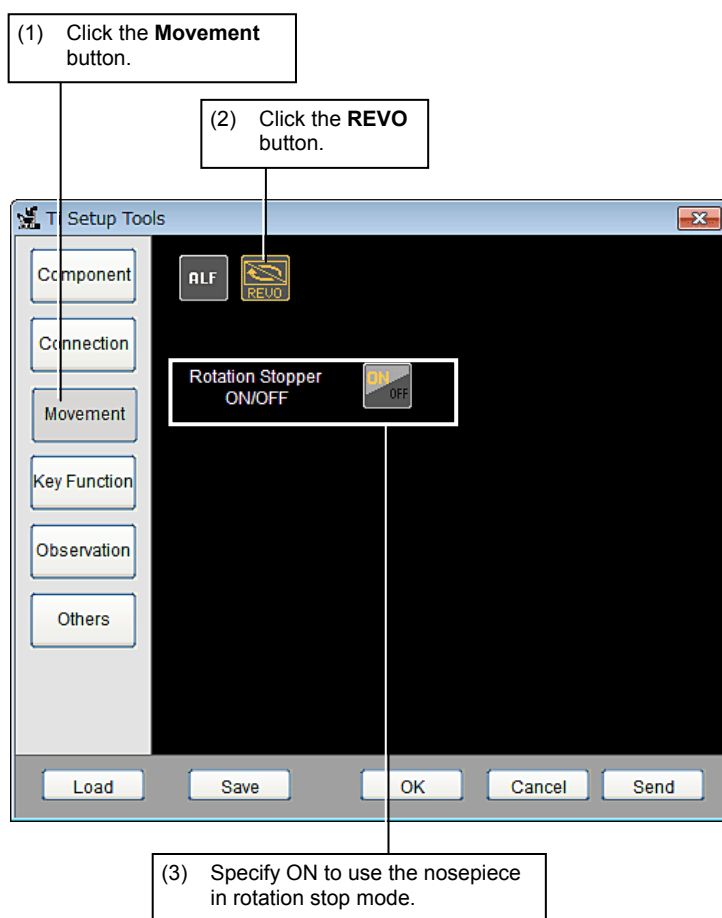
To open the **Rotation control mode** window, click the **Movement** button on the main panel, and then click the **REVO** button on the sub panel.

The following item can be set for nosepiece rotation control.

- **Rotation control on/off:**

Specify ON to use the nosepiece in rotation stop mode.

▼ Rotation control mode window



- (1) Click the **Movement** button on the main panel.
- (2) Click the **REVO** button on the sub panel.
- (3) Specify ON to use the nosepiece in rotation stop mode.

4.18 Ergo Controller Button Settings

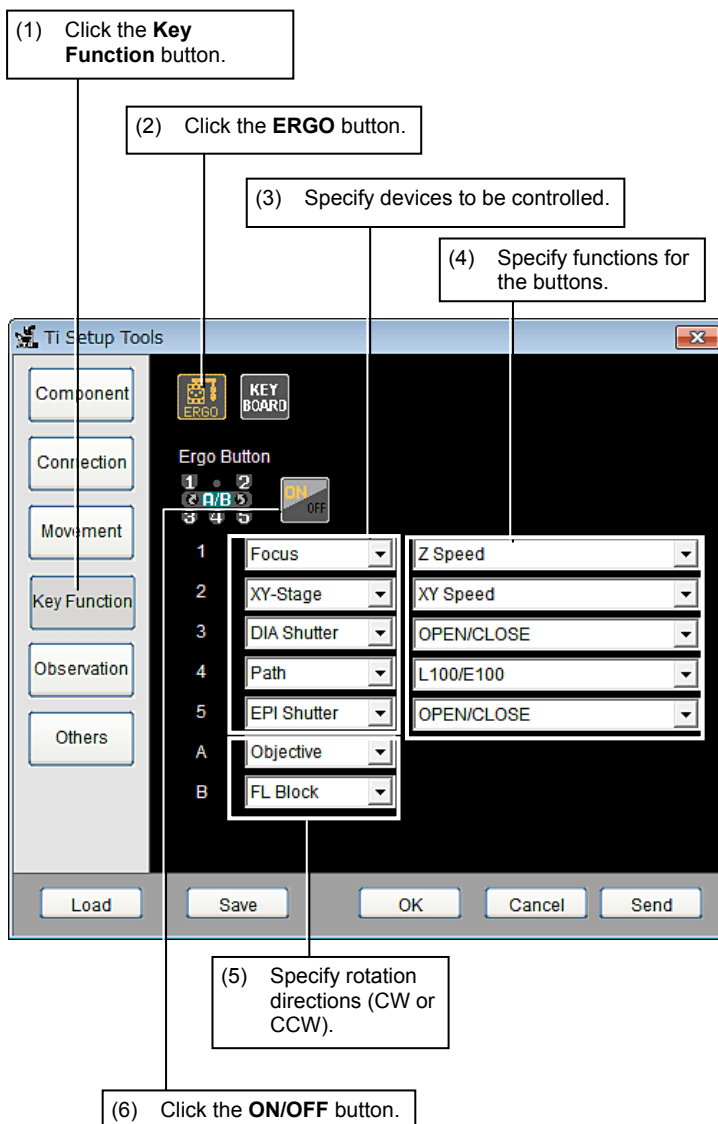
To open the **Ergo controller button setting** window, click the **Key Function** button on the main panel, and then click the **ERGO** button on the sub panel.

The following item can be set for ergo controller information.

- **Ergo controller button settings:**

Specify functions for the Button 1 to 5, A, and B of the ergo controller.

▼ Ergo controller button setting window



- (1) Click the **Key Function** button on the main panel.
- (2) Click the **ERGO** button on the sub panel.
- (3) Specify devices for buttons 1 to 5.
- (4) Specify functions for buttons 1 to 5.
- (5) Specify the rotation direction (CW or CCW) for Button A and B.
- (6) Click the **ON/OFF** button to enable/disable the buttons on the front panel of the controller. (When the button is OFF, the buttons on the Ergo controller are disabled.)

4.19 Shortcut Key Settings

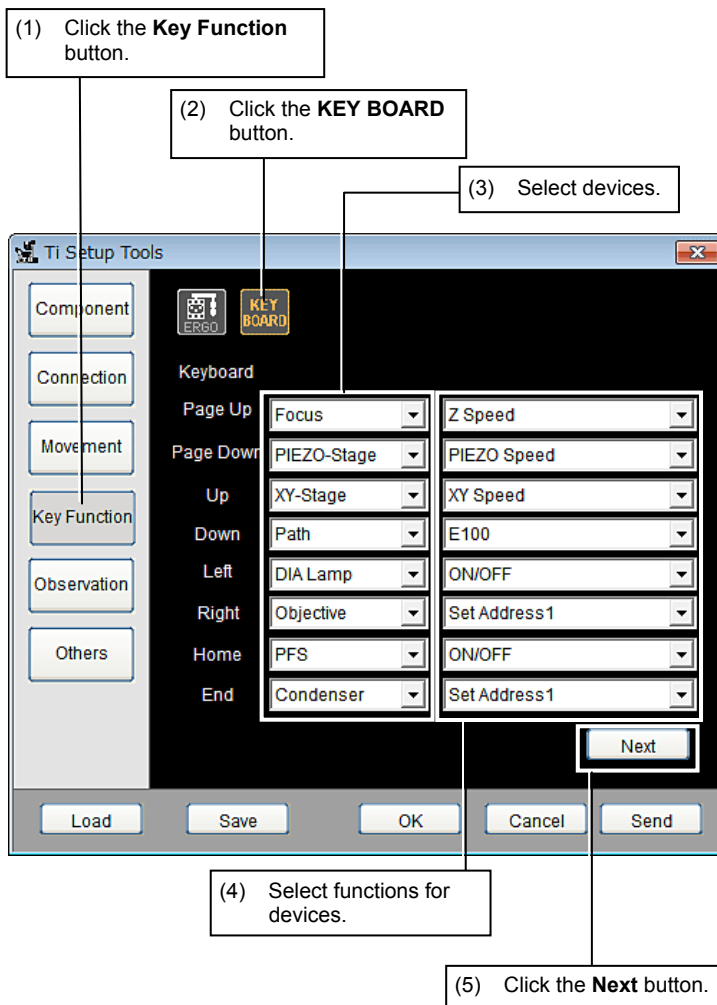
To open the **Shortcut key setting** window, click the **Key Function** button on the main pane, and then click the **KEY BOARD** button on the sub panel.

The following shortcut keys can be set.

- **Shortcut key settings:**

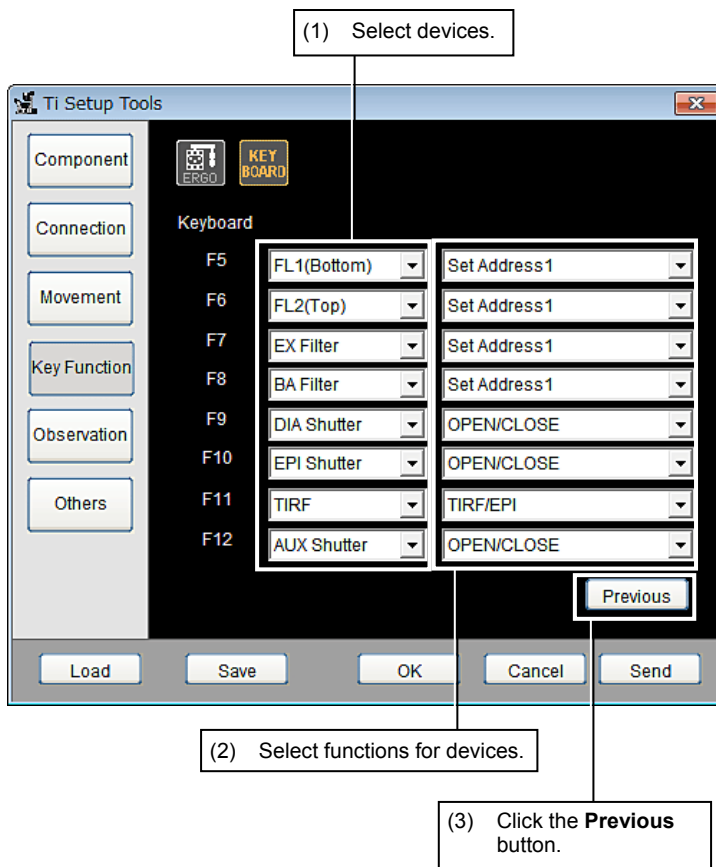
Functions for the following keys can be assigned: PAGE UP, PAGE DOWN, UP ARROW, DOWN ARROW, RIGHT ARROW, LEFT ARROW, HOME, END, F5, F6, F7, F8, F9, F10, F11, and F12.

▼ Shortcut key setting window (first page)



- (1) Click the **Key Function** button on the main panel.
- (2) Click the **KEY BOARD** button on the sub panel.
- (3) Select devices from the list.
- (4) Select functions for the devices.
- (5) Click the **Next** button to open the second page of the **Shortcut key setting** window.

▼ Shortcut key setting window (second page)



- (1) Select devices from the list.
- (2) Select functions for the devices.
- (3) Click the **Previous** button to open the first page of the **Shortcut key setting** window.

4.20 Observation Mode

To open the **Observation mode** window, click the **Observation** button on the main panel, and then click the **REG MODE** button on the sub panel.

A different screen appears depending on the laser unit connected.

The following items can be set for observation modes. Up to eight observation modes can be registered.

- **Observation mode name:**
Specify names for observation modes.
- **Device conditions for observation mode:**
Specify device conditions for observation modes.

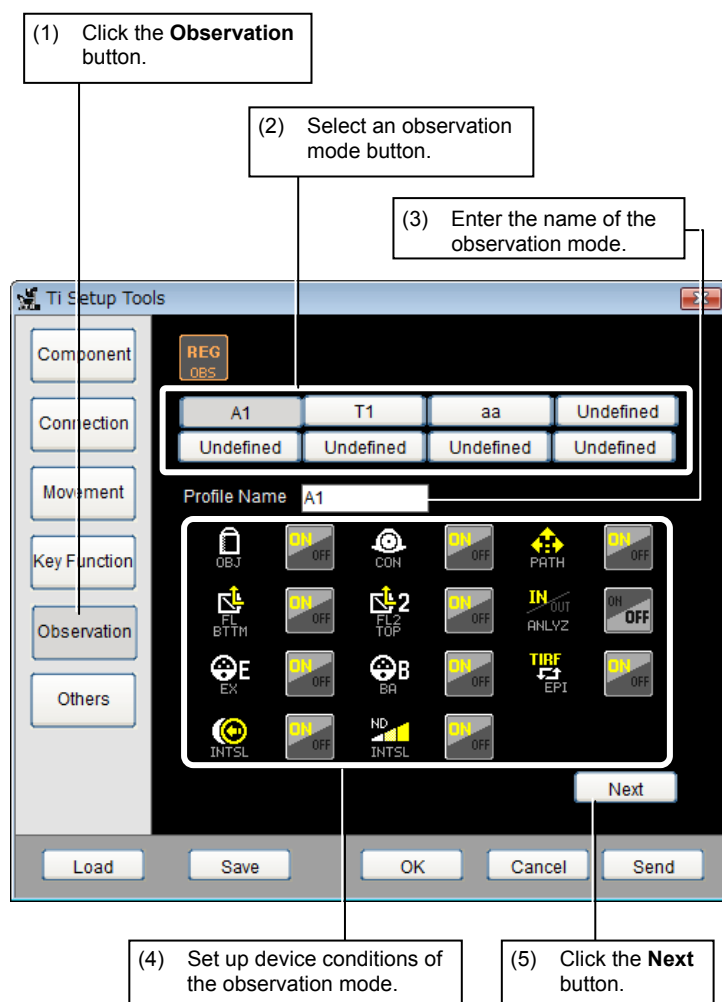
Note: Each device condition is applied when the ON/OFF button is pressed.

4.20.1

Observation Mode with LU4A 4 Laser Unit A Connected

This section describes the screen for setting the Observation Mode with LU4A 4 Laser Unit A connected.

▼ Observation mode setting window (first page)



- (1) Click the **Observation** button on the main panel.
- (2) Select an observation mode (User 1 to User 8).
- (3) Enter a name for the selected observation mode.
- (4) Set up the device conditions for the observation mode.

Use the **OBJ** button to set up objective conditions.

Use the **CON** button to set up condenser conditions.

Use the **PATH** button to set up optical path selectors.

Use the **FL BTTM** button to set up filter turret 1 conditions.

Use the **FL2 TOP** button to set up filter turret 2 conditions.

Use the **ANLYZ** button to set up analyzer conditions.

Use the **EX** button to set up EX filter conditions.

Use the **BA** button to set up BA filter conditions.

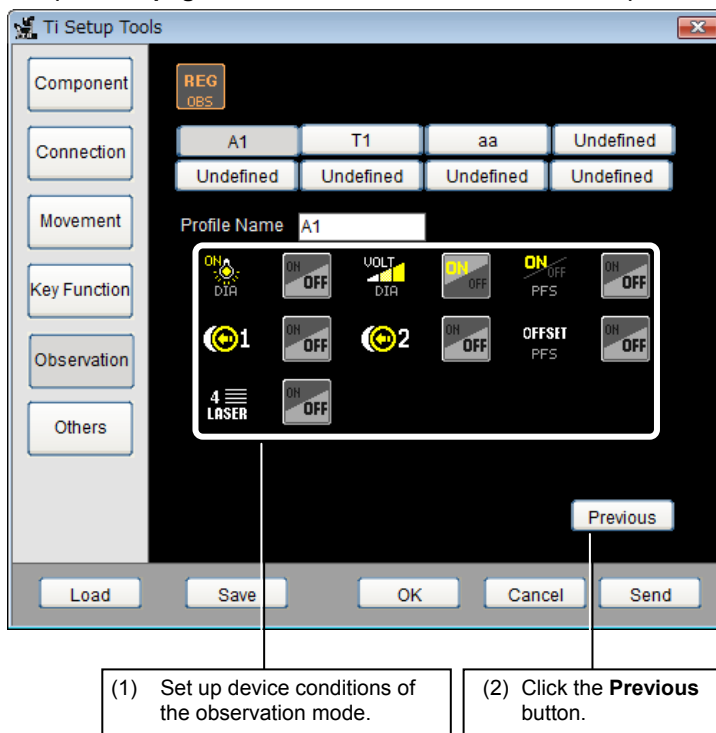
Use the **TIRF/EPI** button to select illumination between TIRF and Epi.

Use the **INTSL** button to set up optical fiber illuminator (shutter) conditions.

Use the **INTSL ND** button to set up optical fiber illuminator (ND filter) conditions.

- (5) Click the **Next** button to open the second page of the **Observation mode setting** window.

▼ **Observation mode setting window**
(Second page with LU4A 4 Laser Unit A connected)



(1) Set up device conditions of the observation mode.

(2) Click the **Previous** button.

- (1) Set up the device conditions for the observation mode.

Use the **DIA ON** button to set up dia illuminator (on/off) conditions.

Use the **DIA VOLT** button to set up dia illuminator (light intensity) conditions.

Use the **Shutter 1** button to set up shutter 1 conditions.

Use the **Shutter 2** button to set up shutter 2 conditions.

Use the **PFS ON/OFF** button to set up PFS conditions.

Use the **PFS OFFSET** button to set up PFS offset conditions.

Click the **4LASER** button and assign a setting as to whether the status of lasers for LU4A 4 Laser Unit A is saved. (The saved setting can be retrieved with the CHG.)

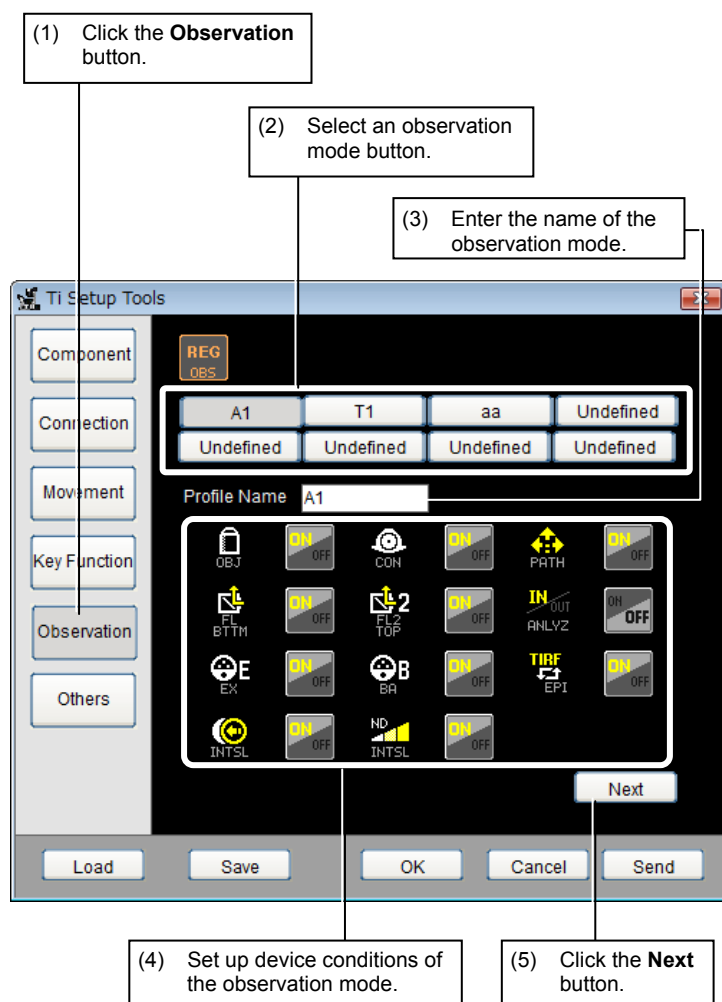
- (2) Click the **Previous** button to open the first page of the **Observation mode setting** window.

4.20.2

Observation Mode with C-LU3EX 3 Laser Unit EX Connected

This section describes the screen for setting the Observation Mode with C-LU3EX 3 Laser Unit EX connected.

▼ Observation mode setting window (first page)



- (1) Click the **Observation** button on the main panel.
- (2) Select an observation mode (User 1 to User 8).
- (3) Enter a name for the selected observation mode.
- (4) Set up the device conditions for the observation mode.

Use the **OBJ** button to set up objective conditions.

Use the **CON** button to set up condenser conditions.

Use the **PATH** button to set up optical path selectors.

Use the **FL BTTM** button to set up filter turret 1 conditions.

Use the **FL2 TOP** button to set up filter turret 2 conditions.

Use the **ANLYZ** button to set up analyzer conditions.

Use the **EX** button to set up EX filter conditions.

Use the **BA** button to set up BA filter conditions.

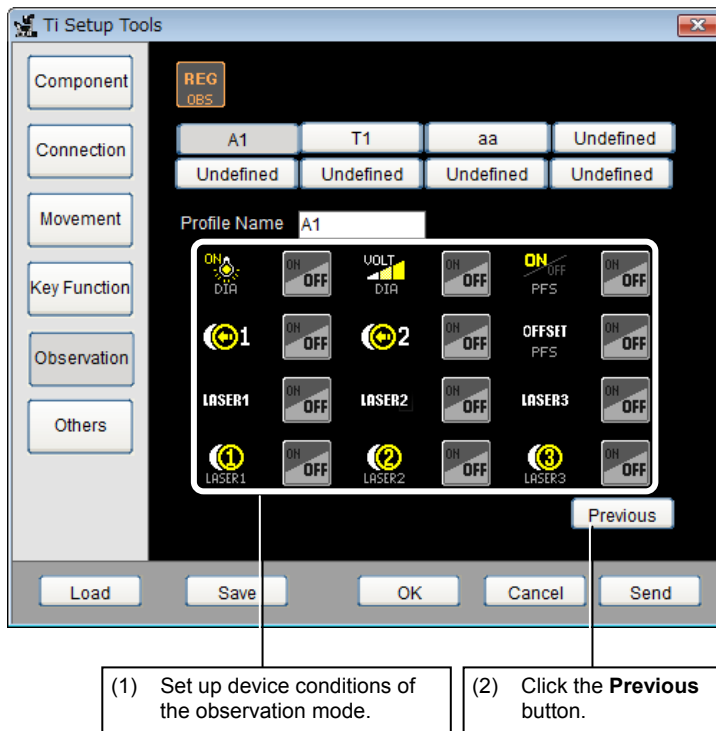
Use the **TIRF/EPI** button to select illumination between TIRF and Epi.

Use the **INTSL** button to set up optical fiber illuminator (shutter) conditions.

Use the **INTSL ND** button to set up optical fiber illuminator (ND filter) conditions.

- (5) Click the **Next** button to open the second page of the **Observation mode setting** window.

▼ **Observation mode setting window**
(Second page with C-LU3EX 3 Laser Unit Ex connected)



- (1) Set up the device conditions for the observation mode.

Use the **DIA ON** button to set up dia illuminator (on/off) conditions.

Use the **DIA VOLT** button to set up dia illuminator (light intensity) conditions.

Use the **Shutter 1** button to set up shutter 1 conditions.

Use the **Shutter 2** button to set up shutter 2 conditions.

Use the **PFS ON/OFF** button to set up PFS conditions.

Use the **PFS OFFSET** button to set up PFS offset conditions.

Use the **LASER1** button to save or un-save the current **LASER1** setting. (The saved setting can be retrieved with the CHG.)

Use the **LASER2** button to save or un-save the current **LASER2** setting. (The saved setting can be retrieved with the CHG.)

Use the **LASER3** button to save or un-save the current **LASER3** setting. (The saved setting can be retrieved with the CHG.)

Use the **LASER Shutter 1** button to set the current LASER shutter 1 setting.

Use the **LASER Shutter 2** button to set the current LASER shutter 2 setting.

Use the **LASER Shutter 3** button to set the current LASER shutter 3 setting.

- (2) Click the **Previous** button to open the first page of the **Observation mode setting** window.

4.21 Layout Settings

To open the **Screen layout setting** window, click the **Others** button on the main panel, and then click the **GUI** button on the sub panel.

The following items can be set for the screen display.

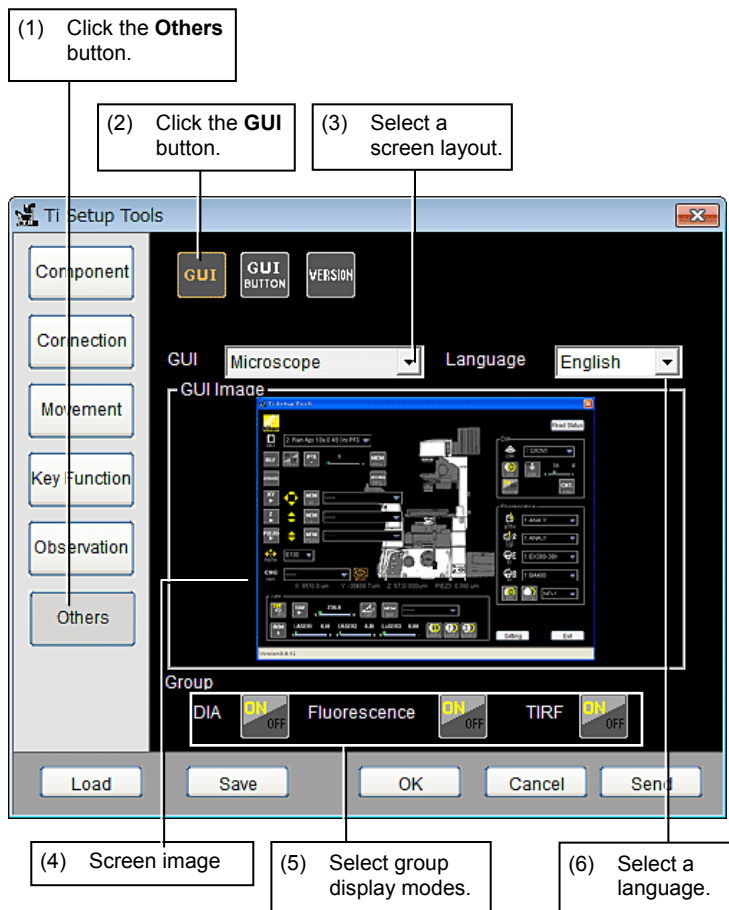
- **GUI display settings:**

Eight screen layouts are available: Normal, Microscope, Square, Grouped square, Wide, Grouped wide, Height, Grouped height.

- **Language settings:**

English, Chinese, or Japanese can be selected.

▼ Screen layout setting window



- (1) Click the **Others** button on the main panel.
- (2) Click the **GUI** button on the sub panel.
- (3) Select a screen layout.
- (4) A screen image appears.
- (5) Select group display modes for dia illumination, fluorescence illumination, and TIRF illumination.
- (6) Select a language. English, Chinese, or Japanese can be selected.

Note:

For the Microscope, Grouped square, Grouped wide, and Grouped height layouts, a DIA area, Fluorescence area, and TIRF area can be displayed.

Refer to Appendix, "Layouts" for example images of the eight screen layouts.

4.22 Control Button Settings

To open the **Control button setting** window, click the **Others** button on the main panel, and then click the **GUI BUTTON** button on the sub panel.

The following item can be set for the screen display.

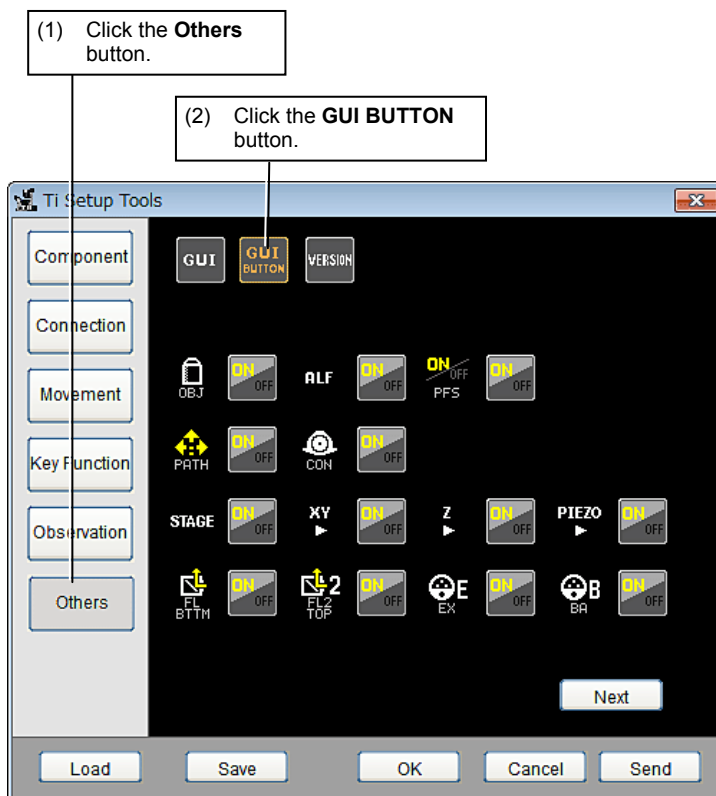
- **Control button settings:**

All control buttons can be shown/hidden on the screen.

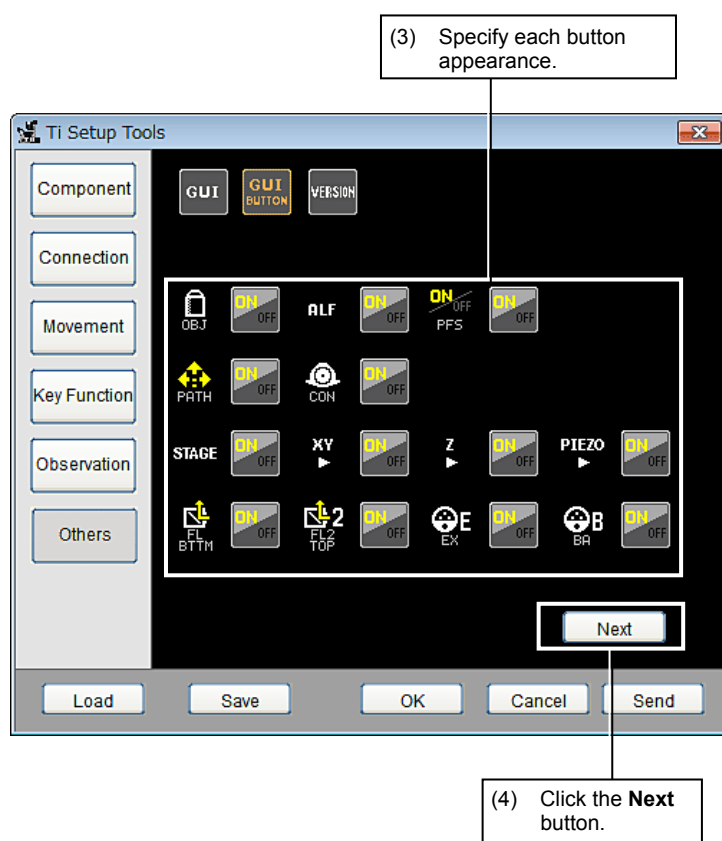
▼ Control button setting window (first page)

(1) Click the **Others** button on the main panel.

(2) Click the **GUI BUTTON** button on the sub panel.



▼ Control button setting window (first page)



(3) Specify the appearance of each button.

Use the **OBJ** button to show/hide the objective button.

Use the **ALF** button to show/hide the ALF button.

Use the **PFS** button to show/hide the PFS button.

Use the **PATH** button to show/hide the optical path selector button.

Use the **CON** button to show/hide the condenser button.

Use the **STAGE** button to show/hide the stage button.

Use the **STAGE XY** button to show/hide the stage XY button.

Use the **STAGE Z** button to show/hide the stage Z button.

Use the **STAGE PIEZO** button to show/hide the piezo stage button.

Use the **FL BTM** button to show/hide the filter turret 1 button.

Use the **FL 2 TOP** button to show/hide the filter turret 2 button.

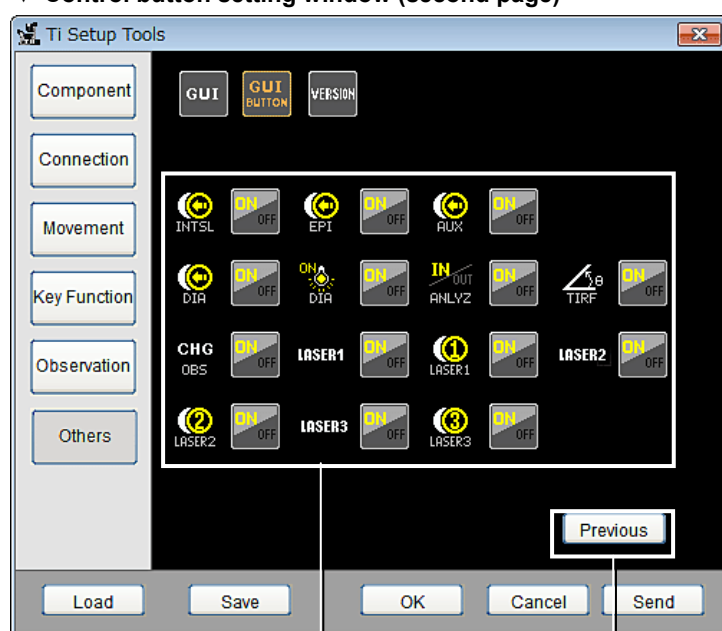
Use the **EX** button to show/hide the EX filter button.

Use the **BA** button to show/hide the BA filter button.

(4) Click the **Next** button to open the second page of the **Control button setting** window.

Note: To show the button on other windows, select **ON**. To hide the button, select **OFF**.

▼ Control button setting window (second page)



(1) Specify each button appearance.

(2) Click the **Previous** button.

(1) Specify the appearance of each button.

Use the **INTSL** button to show/hide the optical fiber light source button.

Use the **EPI** button to show/hide the epi illumination shutter button.

Use the **AUX** button to show/hide the AUX shutter button.

Use the **DIA** button to show/hide the dia illumination shutter button.

Use the **DIA ON** button to show/hide the dia illumination button.

Use the **ANLYZ** button to show/hide the analyzer button.

Use the **TIRF** button to show/hide the TIRF illumination button.

Use the **CHG OBS** button to show/hide the observation mode button.

Use the **LASER1** button to show/hide the LASER1 display.

Use the **LASER Shutter 1** button to show/hide the LASER Shutter 1 button.

Use the **LASER2** button to show/hide the LASER2 display.

Use the **LASER Shutter 2** button to show/hide the LASER Shutter 2 button.

Use the **LASER3** button to show/hide the LASER3 display.

Use the **LASER Shutter 3** button to show/hide the LASER Shutter 3 button.

(2) Click the **Previous** button to open the first page of the **Control button setting** window.

Note: To show the button on other windows, select **ON**. To hide the button, select **OFF**.

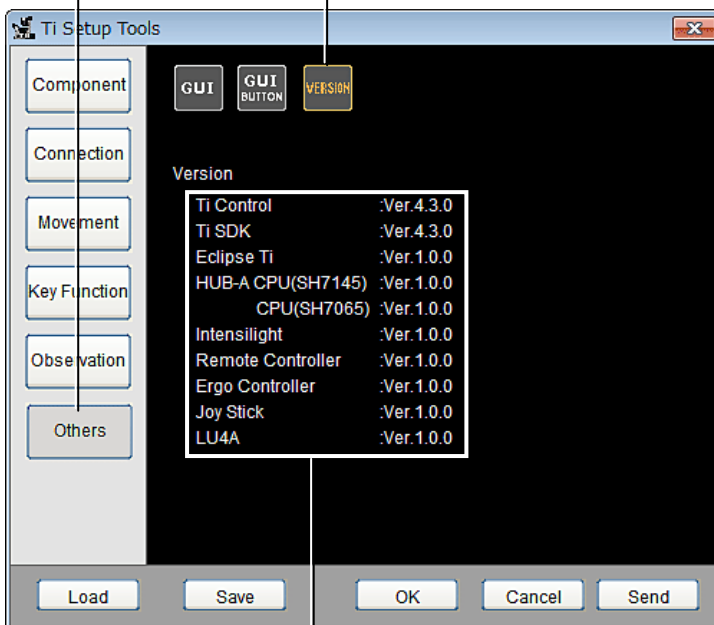
4.23 Version

To open the **Version** window, click the **Others** button on the main panel, and then click the **VERSION** button on the sub panel.

▼ Version window

(1) Click the **Others** button.

(2) Click the **VERSION** button.

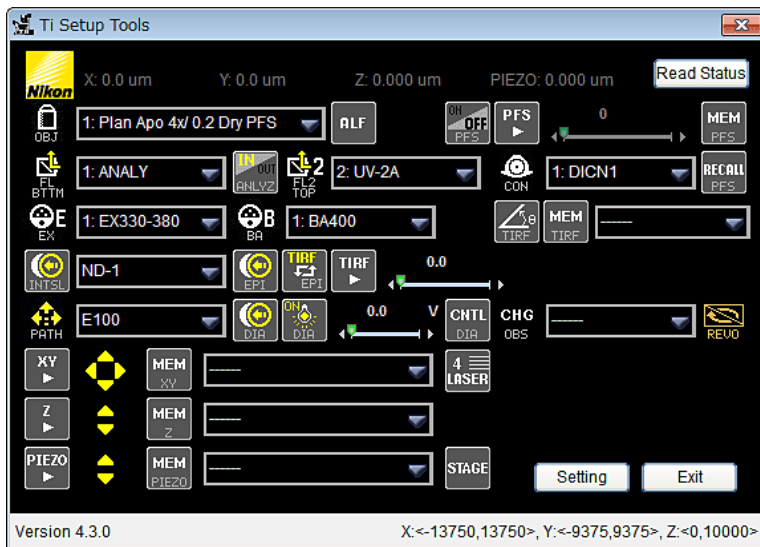


(3) Version numbers appear.

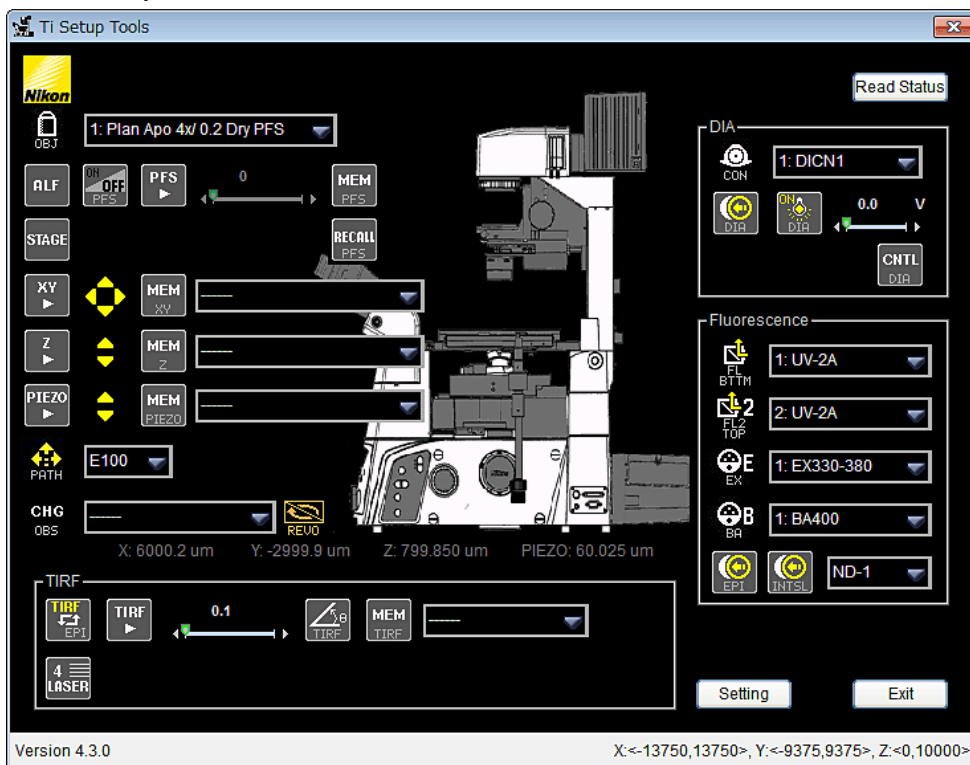
- (1) Click the **Others** button on the main panel.
- (2) Click the **VERSION** button on the sub panel.
- (3) Software versions and device firmware versions appears.

Appendix Layouts

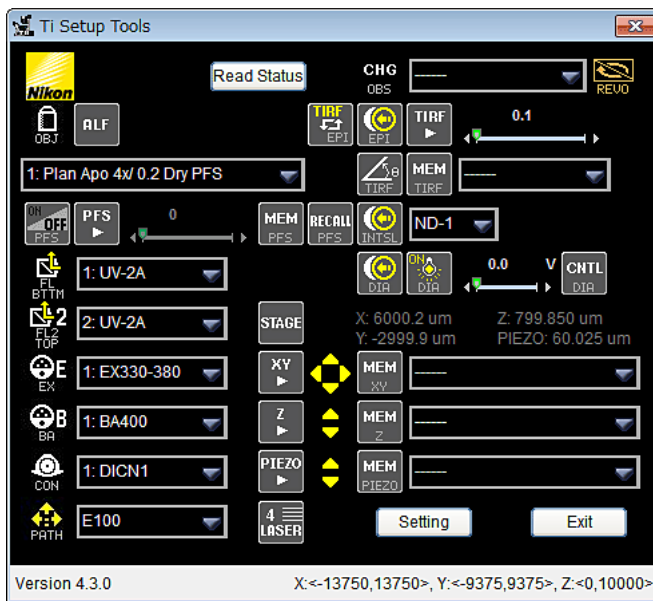
▼ Normal



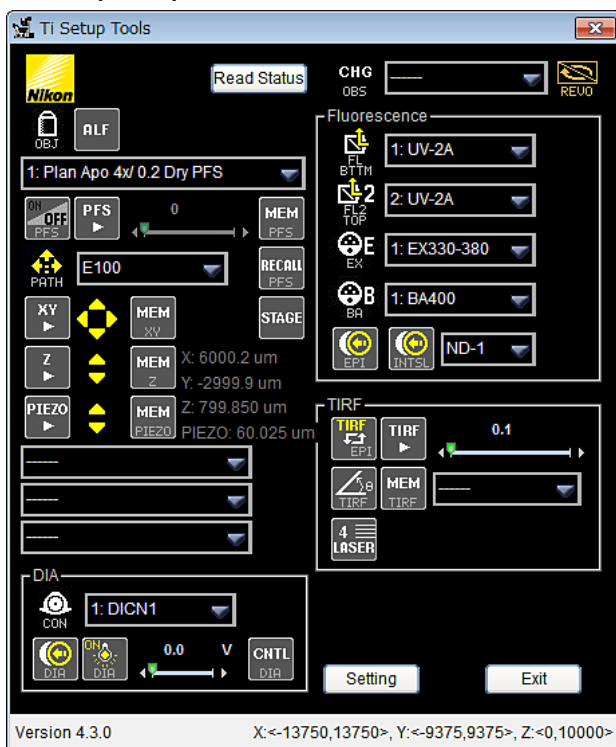
▼ Microscope



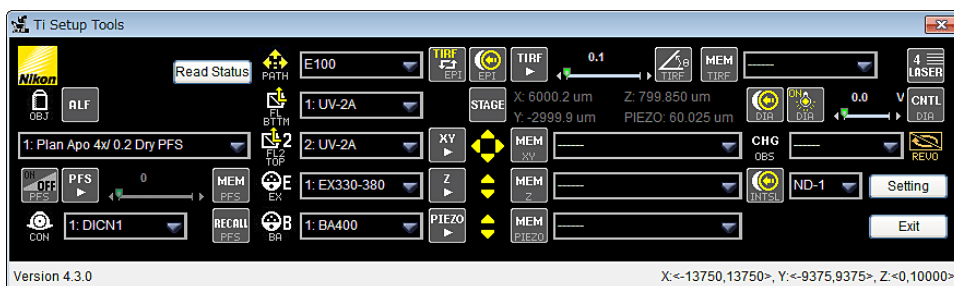
▼ Square



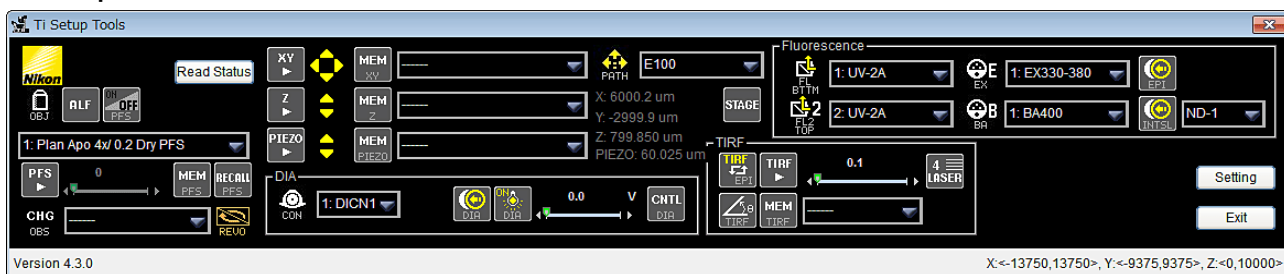
▼ Grouped Square



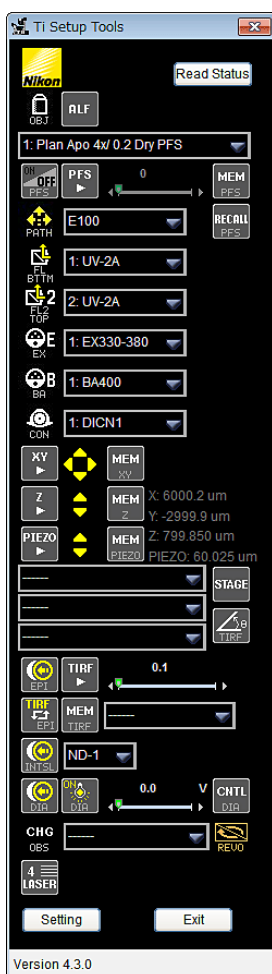
▼ Wide



▼ Grouped Wide



▼ Height



▼ Grouped Height

