INSCOPER

User Guide

Configurator

v2.0

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Table of contents

1. Configurator 5

1.1 Overview 5

1.1.1 The configuration workflow 5

1.1.2 Target audience 5

1.1.3 Contents 5

1.1.4 Support 5

1.2 Get Started 7

1.2.1 1. Start the Configurator 7

1.2.2 2. Choose what to open 7

1.2.3 3. Build the configuration 8

1.2.4 4. Save 9

1.2.5 Where to go next 9

1.3 Building a configuration 10

1.3.1 Creating a Configuration 10

1.3.2 Importing Hardware 13

1.3.3 Setup Wizard 16

1.3.4 Configuring a Device 19

1.3.5 Turrets and Filter Wheels 25

1.3.6 Filter Manager 28

1.3.7 Connections 31

1.3.8 Advanced Configuration 34

1.4 Special cases 40

1.4.1 Handling Ambiguous Devices 40

1.4.2 Focus and Autofocus 43

1.4.3 Shutter 45

1.4.4 Camera Trigger 46

1.4.5 Camera ROI Synchronization 47

1.4.6 ILDA (MaxIlda) 50

1.4.7 Virtual Objective 55

1.4.8 Generic Devices 58

1.5 Imaging software 63

1.5.1 Imaging Software Layout 63

1.5.2 Imaging Software Advanced Settings 66

1.6 Reference 71

1.6.1 Changelog 71

1.6.2 Interface Reference 75

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1.6.3 Expert Mode 80
1.6.4 Troubleshooting 82
1.6.5 Glossary 85
1.7 Legal 92
1.7.1 Legal Information 92

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1. Configurator

1.1 Overview

A certified installer sets up the Inscoper hardware, connects all components, and installs both the Inscoper Imaging Software and the Inscoper Configurator. Together, these elements form the operational basis of the system.

The **Inscoper Configurator** sets up microscopy systems driven by the **Inscoper Device Controller**. Use it to declare, connect, and manage the hardware components of an instrument, and to generate a configuration that meets the requirements of the experiment.

The diagram below shows the physical architecture of a typical system. The computer reaches the hardware along two paths: through the **Inscoper Device Controller**, which drives every device wired to its physical ports, and directly, through external resource drivers such as Micro-Manager or a camera DLL.

Mermaid Diagram

The Configurator produces or edits a configuration folder that the Inscoper Imaging Software (IIS) loads to initialize and operate the connected hardware. The diagram below shows the role of each tool and the users who interact with it.

Mermaid Diagram

1.1.1 The configuration workflow

A configuration is built in five stages, which the Configurator presents in order.

Stage	What you do	Page
1	Create a configuration, open an existing one, or clone one.	Choose what to open
2	Select the models present on the instrument and import them.	Importing hardware
3	Declare which functions of each device are in use, fill in the required startup values, and map every function to a port on the Device Controller. The setup wizard walks through these steps device by device.	Setup wizard, Configuring a device, Connections
4	Arrange the controls that the end user sees in the Imaging Software.	Imaging Software layout
5	Write the configuration folder to disk.	Saving a configuration

1.1.2 Target audience

- **System integrators** who install microscopy systems controlled by Inscoper Device Controllers.
- **Advanced users** who modify or adjust the hardware, with appropriate precautions.

1.1.3 Contents

This documentation provides step-by-step procedures for the main configuration tasks: importing hardware, declaring the functions and connections of each device, laying out the Imaging Software, and saving the configuration. The Interface reference describes every screen and control, and the Glossary defines the terms used throughout.

1.1.4 Support

If a problem occurs during configuration, see Troubleshooting or contact Inscoper Support.

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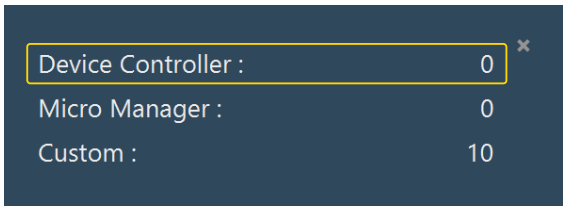
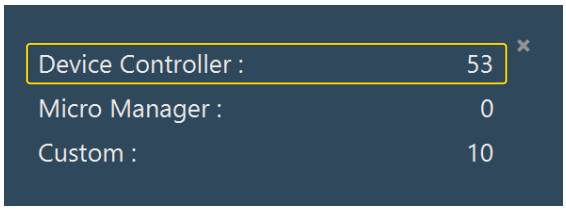
1.2 Get Started

This page follows a first configuration, from launching the application to saving the result.

1.2.1 1. Start the Configurator

Launch the Configurator from its desktop shortcut or from the executable in the installation directory.

On startup, the Configurator connects to the Device Controller and reports the number of drivers found per source. **Device Controller** counts the drivers read from the Device Controller; **Micro Manager** and **Custom** count the drivers found in the external resource directories.

Device controller not detected	Device controller connected
	

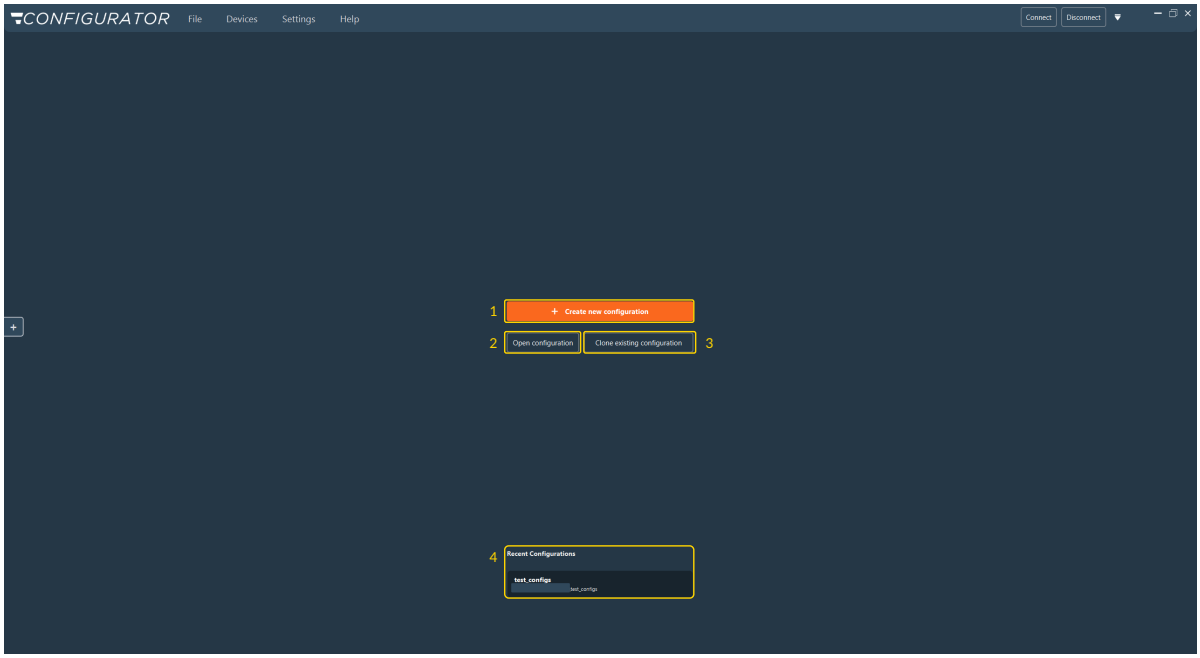
If **Device Controller** shows 0, check that the Device Controller is powered on and connected to the computer. Then click **Connect** at the top right of the window, and select Devices > Reload Devices to read the hardware library again.

Without a Device Controller, use Devices > Load Devices From File to load a hardware library (`descriptions.xml`) previously exported from a connected Configurator with Devices > Save Devices To File.

1.2.2 2. Choose what to open

The application opens on the Welcome screen.

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To do this	Click
Start a configuration from scratch	**Create new configuration (1)**
Load a configuration that already exists	**Open configuration (2)**
Work on a copy, leaving the original untouched	**Clone existing configuration (3)**
Reopen one of the last three configurations	Its entry under **Recent Configurations (4)**

Clone existing configuration opens the **Clone Configuration** window, which asks for the configuration to clone and, optionally, a folder in which to save the copy. See Cloning a configuration.

1.2.3 3. Build the configuration

With a configuration open, the main workspace shows the imported hardware on the left and the panel of the selected item on the right.

The setup wizard guides each newly imported device through a fixed sequence. The configuration view, built around the **Imported Hardware** tree, gives access to the same settings for any device in any order.

Mermaid Diagram

1. **Import hardware.** Open the hardware importation panel from the handle on the left edge, select the models present on the instrument, set how many of each, and import. See Importing hardware.
2. **Follow the setup wizard.** The setup wizard opens on import and presents the imported devices back to back. For each device, it runs only the steps that device requires:
   - **Configure**: declare which functions of the device are in use. See Configuring a device.
   - **Set Connection**: map each selected function to a port on the Device Controller. See Connections.
   - **Turret configuration**: record what is mounted in each objective, filter cube, or filter wheel slot. See Turrets and filter wheels.

   Click **Next** to advance. The wizard closes after the last device.
3. **Complete what remains from the tree.** Enter the startup values that the instrument applies when it initializes, and finish any step skipped in the wizard. In the **Imported Hardware** tree, an orange dot ● marks a missing startup value or turret slot, and a red connection icon marks a missing connection.

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4. **Lay out the interface.** Click **Next** at the bottom right of the window. The Configurator lists any outstanding items, then opens the Imaging Software layout stage, where you arrange the controls the end user sees.

> **Note**
>
> **Skip Device** and **Skip All** leave the wizard early without discarding any imported device. Every wizard step is also reachable from the **Imported Hardware** tree.

1.2.4 4. Save

Save with File > Save, `^ Ctrl` + `S`, or the **Save** button at the bottom right of the layout stage. The configuration takes the name of the selected folder, and the Imaging Software loads that folder.

See Creating a configuration.

1.2.5 Where to go next

- Interface reference: the main window, every menu command, and the application settings.
- Expert Mode: the additional settings exposed during commissioning.
- Troubleshooting: the messages most often encountered during an installation.

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1.3 Building a configuration

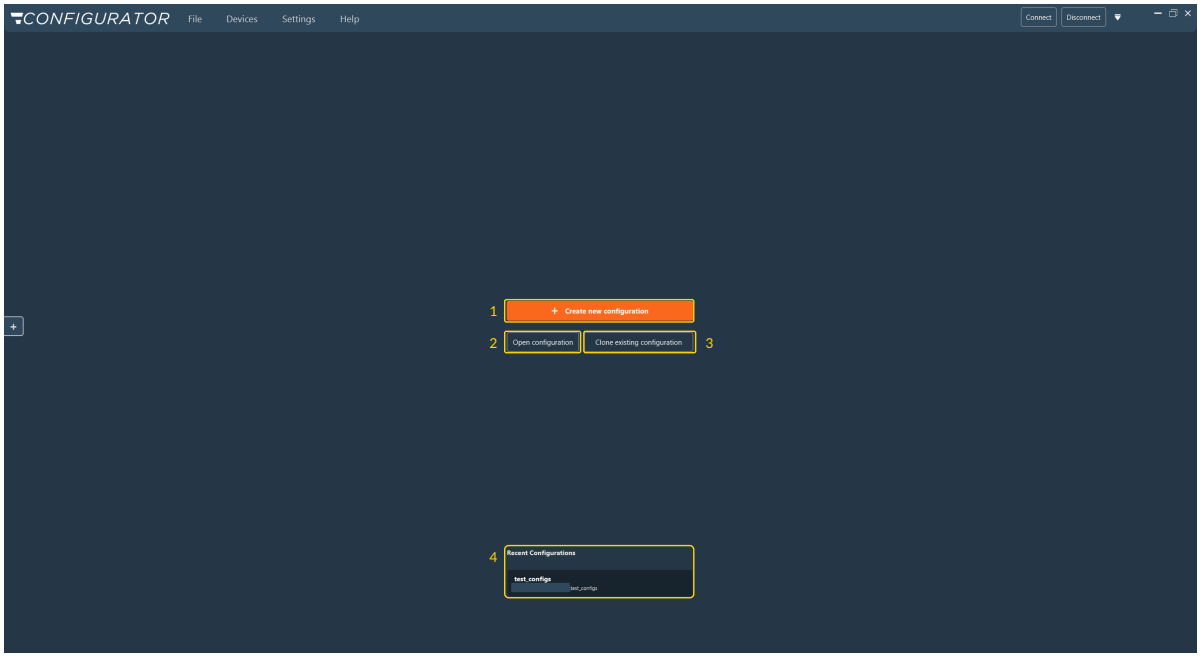
1.3.1 Creating a Configuration

A configuration describes an entire Inscoper system. It lists the devices present and the functions of each device that are in use. For each function, it records the startup values the function requires and its connection to the Inscoper Device Controller. It also defines the layout of the controls presented in the Inscoper Imaging Software.

A microscopy system must have a configuration before Inscoper software can drive it.

Creating a new configuration

From the Welcome screen:



- Click **Create new configuration (1)** to start an empty configuration.
- Click **Open configuration (2)** to load an existing configuration folder.
- Click **Clone existing configuration (3)** to work on a copy of an existing configuration, leaving the original untouched. See Cloning a configuration.
- Click an entry under **Recent Configurations (4)** to reopen one of the last three configurations.

With a configuration already open, use the **File** menu instead:

- File > New Config, or `^ Ctrl` + `N`.
- File > Open Config, or `^ Ctrl` + `O`.

Each loaded configuration occupies its own **tab** at the bottom of the main workspace. Several configurations can be open at the same time. Click a tab to switch between them.

CLONING A CONFIGURATION

Clone a configuration to adapt it for a similar instrument, or to test modifications without altering the configuration in use.

1. Click **Clone existing configuration** on the Welcome screen. The **Clone Configuration** window opens.
2. In **Configuration to Clone**, select the folder of the configuration to copy. This field is mandatory.
3. In **New Save Location (Optional)**, select the folder that will hold the copy, or leave the field empty.
4. Click **Confirm**.

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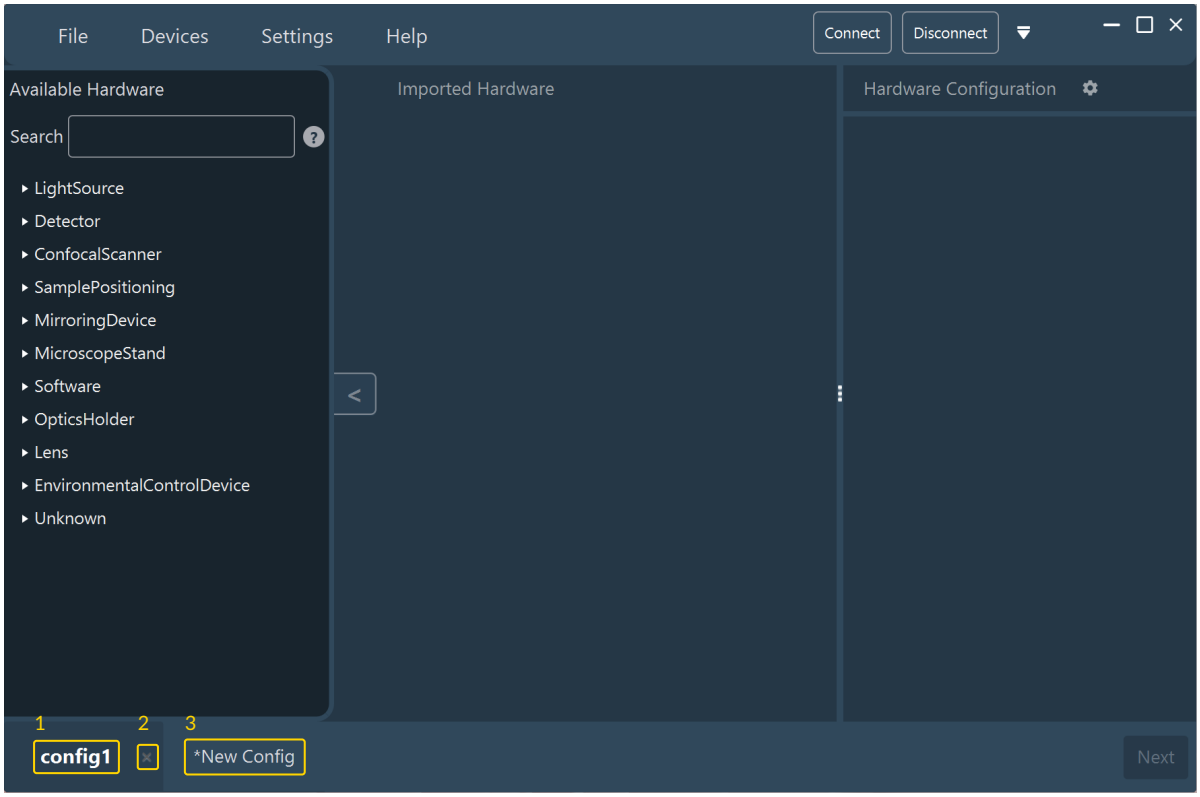
The result depends on the second field:

New Save Location	Result
A folder is selected	The Configurator copies the configuration into the selected folder, then opens the copy. The copy takes the name of that folder.
Left empty	The Configurator opens the copy as a new, unsaved configuration that is not linked to any folder. Nothing is written to disk until you save; File > Save then asks for a folder.

In both cases, the original configuration is not modified.

> **Warning**
>
> Select an empty folder as the save location. Files of the cloned configuration replace any file of the same name already present in that folder.

The configuration tab



- **Tab name (1)**: the folder name of the configuration. The active tab is shown in bold.
- **Close (2)**: closes the configuration. The Configurator asks for confirmation if the configuration has unsaved changes.
- **Unsaved changes (3)**: a leading asterisk marks a configuration with unsaved changes. A configuration that has never been saved is named New Config.

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Saving a configuration

Method	Behavior
File > Save, or `^ Ctrl` + `S`	Writes to the assigned folder. If no folder is assigned yet, a file browser opens first.
File > Save As	Writes to a folder you select, and makes that folder the new target of the configuration.
Save at the bottom right of the Imaging Software layout stage	Writes the whole configuration, including the layout.

Folder name

The configuration adopts the name of the folder you select. Choose a folder name that identifies the instrument, because this name appears in the tab and in the recent configurations list.

Once saved, the configuration appears under **Recent Configurations** on the Welcome screen. This list retains a maximum of three entries.

What a saved configuration contains

The saved folder holds the complete description of the instrument: the imported devices and their selected functions, the startup values, the Device Controller connections, the acquisition recipes generated from those choices, and the Imaging Software layout. The Imaging Software and the standalone Inscoper API read this folder directly.

Opening a configuration built with an earlier hardware library

The hardware library is supplied by the Device Controller firmware and evolves with it. When the description of a device stored in a configuration no longer matches the description in the current hardware library, the Configurator rebuilds that device from the current description and reports the change on opening:

> Incompatibility detected for hardware <manufacturer>-<model>. The hardware has been reloaded from a newer version.

After such a message, review the affected device: check its selected functions and startup values, and re-enter any that were not carried over.

Next step: Proceed to Importing hardware.

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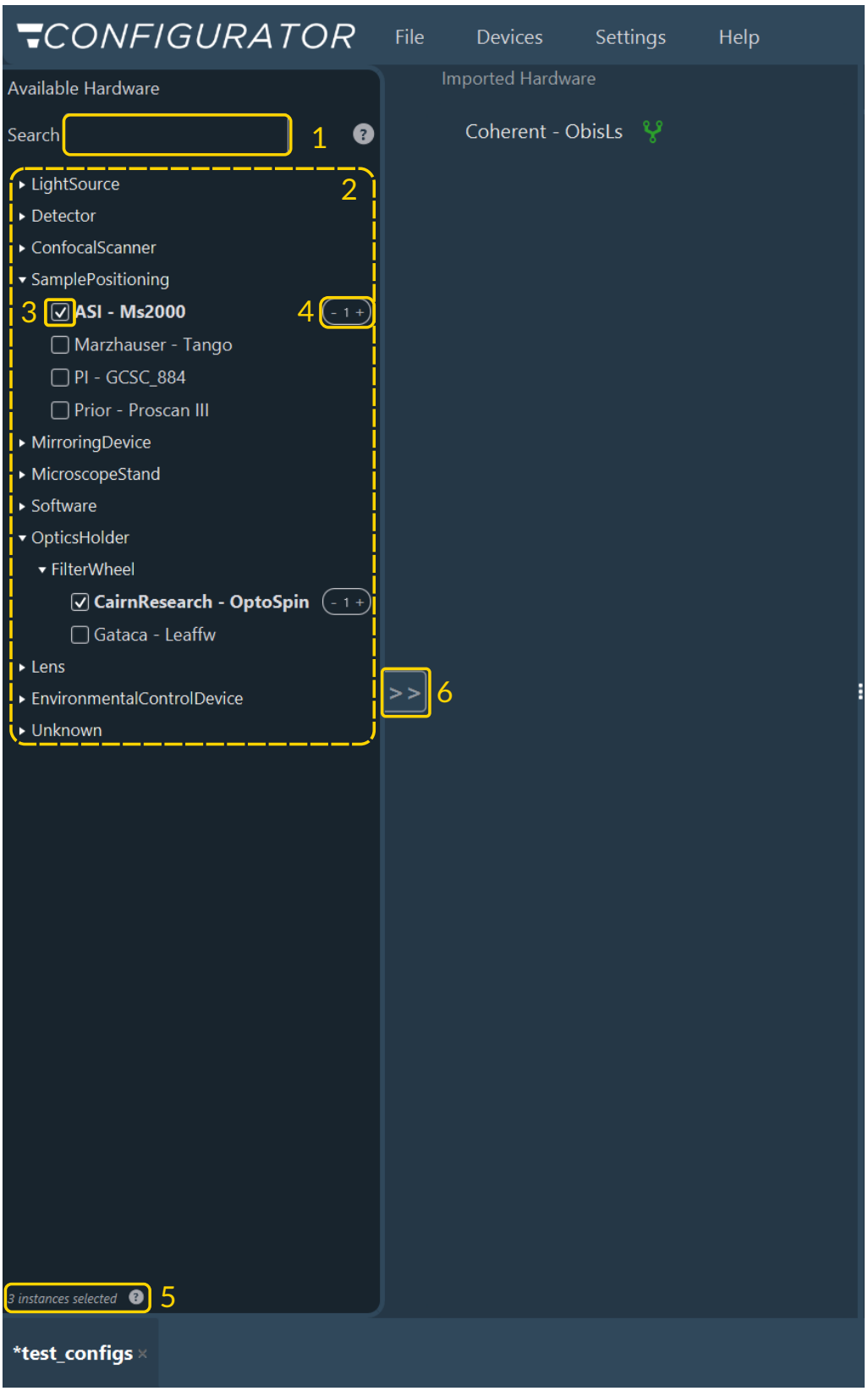
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1.3.2 Importing Hardware

The **hardware importation panel** lists every model the Configurator knows about and adds the selected models to the active configuration. Models come from the hardware library, which is read from the Device Controller firmware when it is connected, or from a stored file when it is not.

Opening the panel

Click **+** on the left edge of the main workspace, or select Devices > Import Device. The **+** button blinks while the configuration is still empty. While the panel is open and no model is selected, the button reads **<**; click it to close the panel.



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Selecting models

1. **Search (1)**: Filters the tree as you type and expands the parent categories of the matching entries. The help icon beside the field explains what to do when a model is absent.
2. **Category tree (2)**: Groups the available models by device type: LightSource, Detector, ConfocalScanner, SamplePositioning, MirroringDevice, MicroscopeStand, Software, OpticsHolder, Lens, and EnvironmentalControlDevice. Models not yet assigned a type are grouped under Unknown.
3. **Model checkbox (3)**: Selects a model for import. Select as many models as the instrument requires before importing; the Configurator keeps the selection while you search for the next one.
4. **Instance stepper (4)**: Appears once a model is selected. Use **+** and **−** to set the number of identical units, for example two cameras of the same model.
5. **Selection counter (5)**: Reports the number of instances currently selected. The help icon beside it lists them.
6. **Import (6)**: As soon as a selection exists, the panel button changes from **<** to **>>** and blinks. Click it to add every selected instance to the configuration and close the panel.

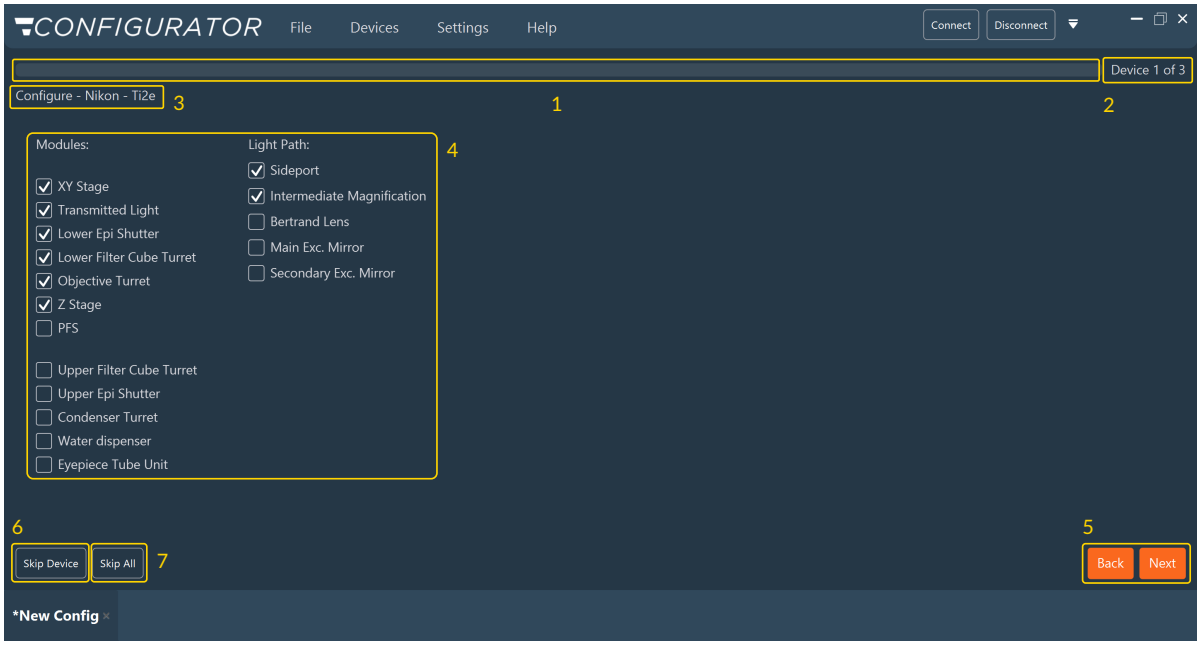
> **Note**
>
> The device types come from the Light Microscopy (LiMi)-Model, the community metadata model curated by QUAREP-LiMi. Inscoper does not define these types. It assigns each model in the hardware library the LiMi-Model type that best matches what the device physically is. When no type matches, the model is classified as a SoftwareModule and listed under Software; the MaxiILDA is one example. The Inscoper LiMi Library documents the model and its types.

> **Note**
>
> Every configuration must contain at least one objective device, which the Imaging Software uses to compute the pixel size at the sample. If the objective turret is not motorized, or if the instrument has a single fixed objective, import the Virtual Objective, listed as Inscoper - Virtual Objective under Software.

> **Tip**
>
> If the exact model is absent from the tree, import a device of the same series and adjust its parameters afterward, or contact Inscoper Support to have the model added to the hardware library.
>
> If the hardware has no communication protocol and is driven only by a TTL or analog line of the Device Controller (laser enable, fiber switch, analog-modulated laser, camera trigger), import the matching generic device, listed as Inscoper - … in the tree.

What happens on import

Importing adds each device to the **Imported Hardware** tree and opens the setup wizard, which presents the newly imported devices one at a time. Click **Skip All** to leave the wizard at any point; the devices remain imported, and you can configure them from the tree.



The wizard shell describes the numbered elements of the wizard (1–7).

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Devices driven through an external driver

Some models are not driven entirely by the Device Controller. A camera, for example, is usually triggered by the Device Controller, while its sensor settings (exposure, binning, and readout speed) are driven by the vendor driver installed on the computer. Such a model still appears as a single entry in the tree, and importing it brings in both parts at once.

For these models, declare the directory holding the vendor libraries under Settings > Edit Settings > Add External Resources before importing. If the driver is absent, the model is still imported, but the controls it provides are missing from the device view.

Removing a device

Select the device in the **Imported Hardware** tree and press `⌦ Del`, or right-click it and select **Delete**. The Configurator asks for confirmation. Removing a device also removes its connections and its entries in the Imaging Software layout.

Next step: Proceed to Configuring a device.

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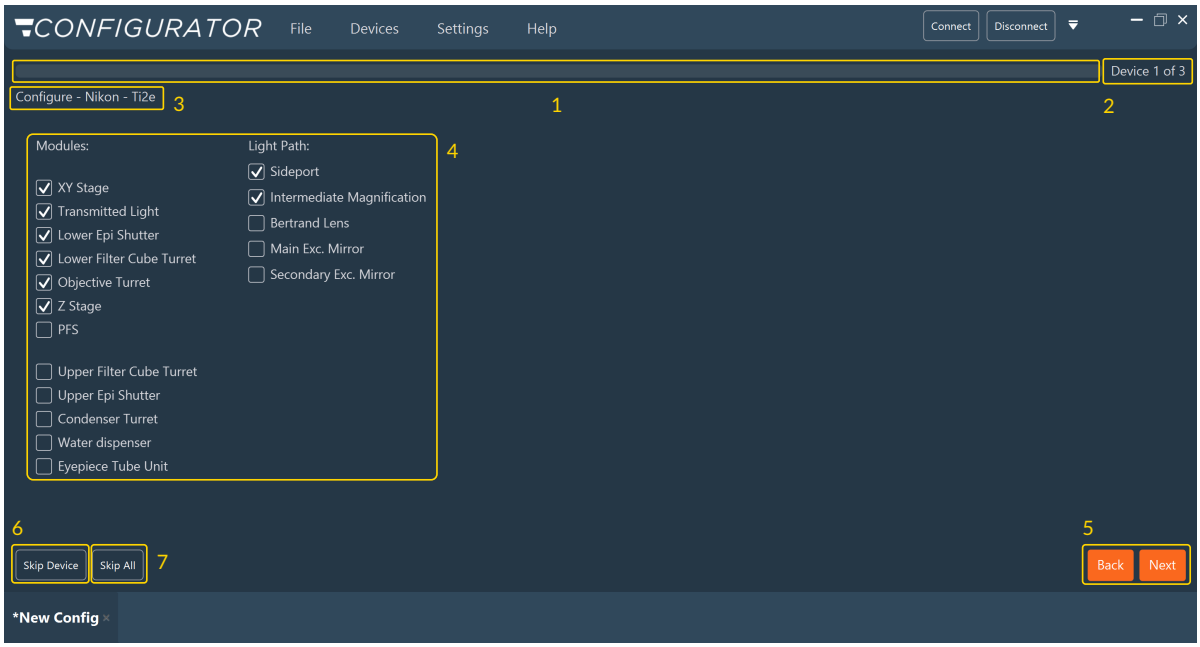
1.3.3 Setup Wizard

The **setup wizard** opens automatically after importing hardware. It presents the newly imported devices one at a time and, for each device, only the steps that device still needs.

The wizard is optional. Every step it presents is also reachable from the **Imported Hardware** tree, and leaving the wizard never discards an imported device.

The wizard shell

While active, the wizard replaces the central part of the main window.



Element	Purpose
Progress bar (1)	Position within the whole sequence, across all devices.
Device n of m (2)	Position within the list of imported devices.
Step title (3)	The current step and device, for example Configure - Nikon - Ti2e or Nikon - Ti2e - Set Connection.
Function list (4)	Functions the device provides. All are checked by default. Uncheck the functions that are not installed on the system.
Back / **Next** (5)	Move one step backward or forward.
Skip Device (6)	Abandon the remaining steps of the current device and move to the next device.
Skip All (7)	Close the wizard, leaving every remaining step unvisited.

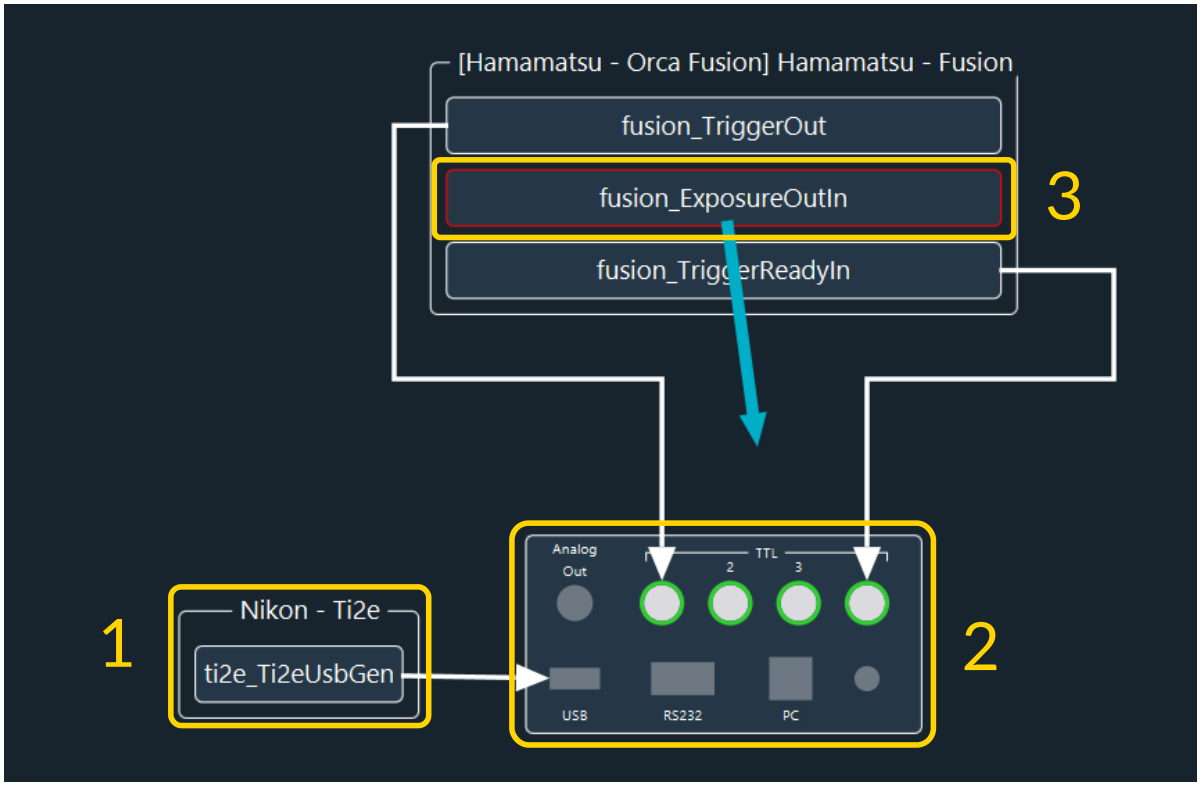
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Steps

The steps presented depend on the functions the device supports and on the selections made in earlier steps. Each step displays the same view as the corresponding entry in the **Imported Hardware** tree.

Step	Documented under
Configure device	Configuring a device
Set Connection	Connections
Turret configuration	Turrets and filter wheels

The **Set Connection** step embeds the connection view inside the wizard shell. It shows the connection cell of the current device (1), the Device Controller panel (2), and the cells of other devices that are still unconnected, outlined in red (3).



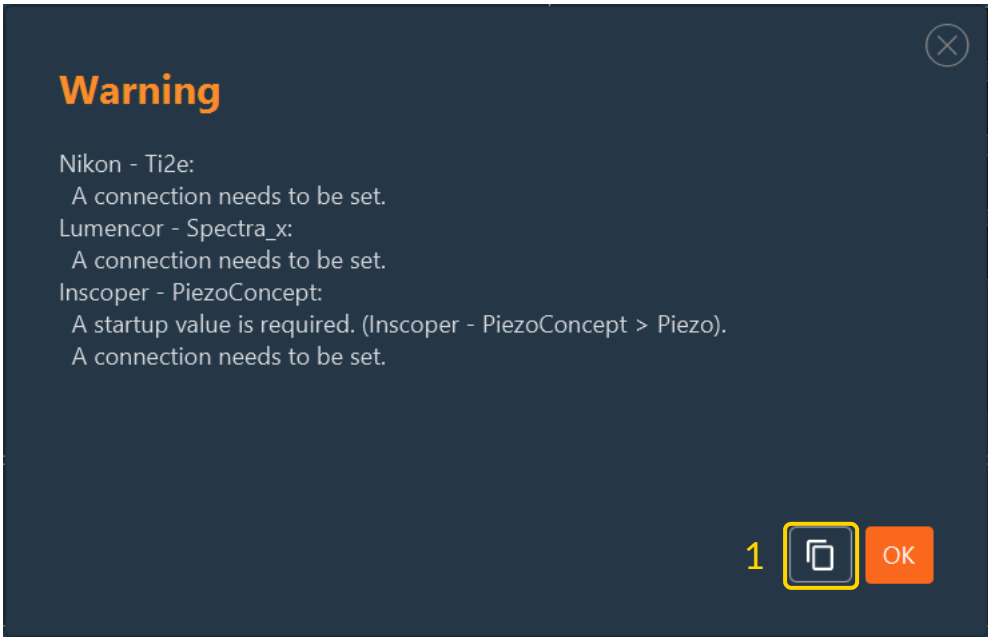
> **Note**
>
> Skipping a step does not apply default values. The configuration remains incomplete, and the validation check described below reports every skipped item.

Validation before the next stage

When you click **Next** on the last device, the Configurator lists every missing startup value and connection, grouped by device. The report opens in a popup. Click the copy icon (1) to copy the report to the clipboard, for example to send it to Inscoper Support.

The report is informational. It does not prevent moving on to the Imaging Software layout stage.

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Next step: Proceed to Imaging Software layout.

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1.3.4 Configuring a Device

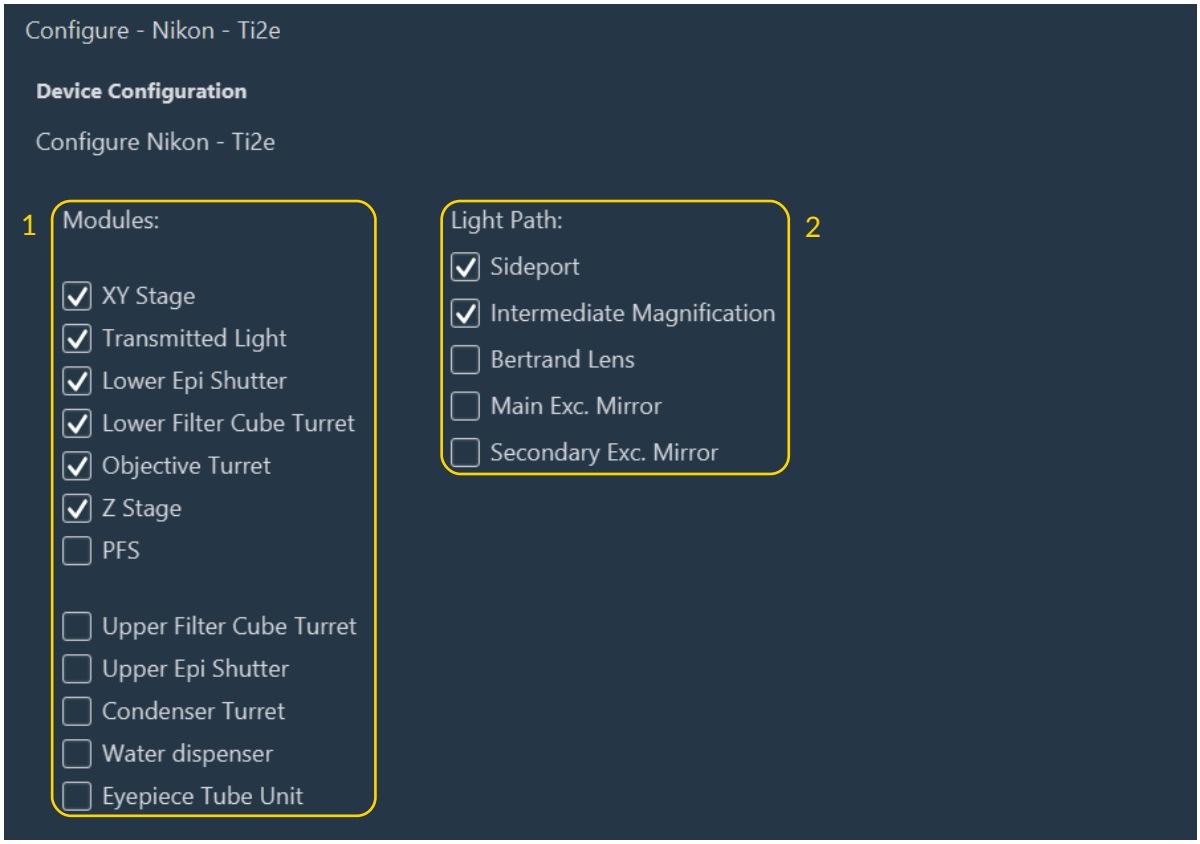
Use this page to declare which functions of an imported device are in use, supply the values those functions require, and read the status markers in the **Imported Hardware** tree.

This stage follows hardware importation and precedes connections.

Guided selection

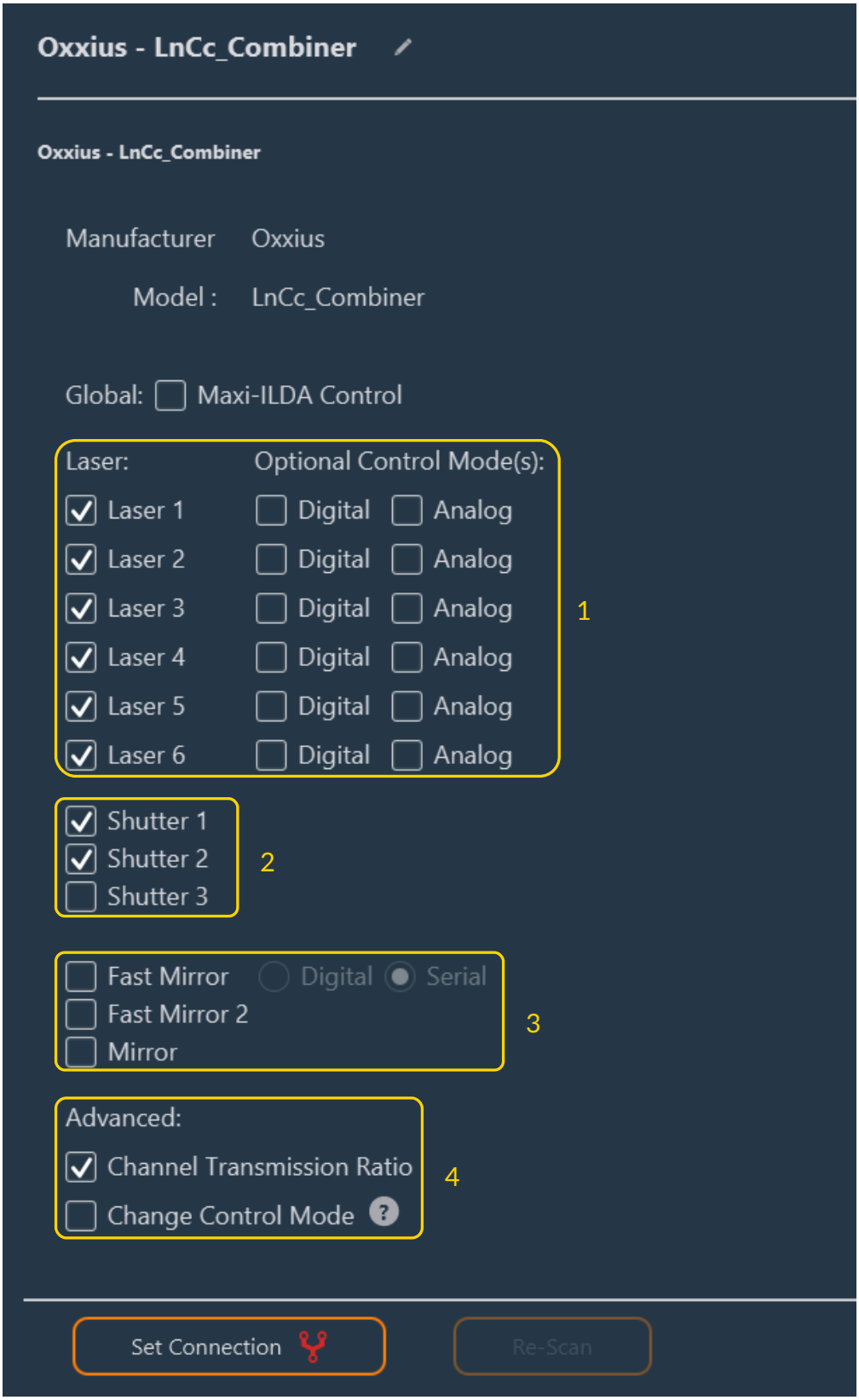
The Configurator works by **selection**, not by deletion. Each device presents a configuration view supplied by the Device Controller firmware. This view offers the functional choices the model supports, such as modules, optical paths, and control modes. From these choices, the Configurator derives which parameters belong to the configuration and which connections they require.

On a Nikon Ti2e inverted microscope stand, for example, the view groups its choices under **Modules (1)** and **Light Path (2)**. Selecting **Objective Turret** under **Modules** adds the turret control functions and the connection that carries them. Clearing the checkbox removes both.



The controls offered depend entirely on the model. A laser combiner, for instance, exposes per-laser control modes (1), shutters (2), mirrors (3), and an advanced section (4).

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Tip

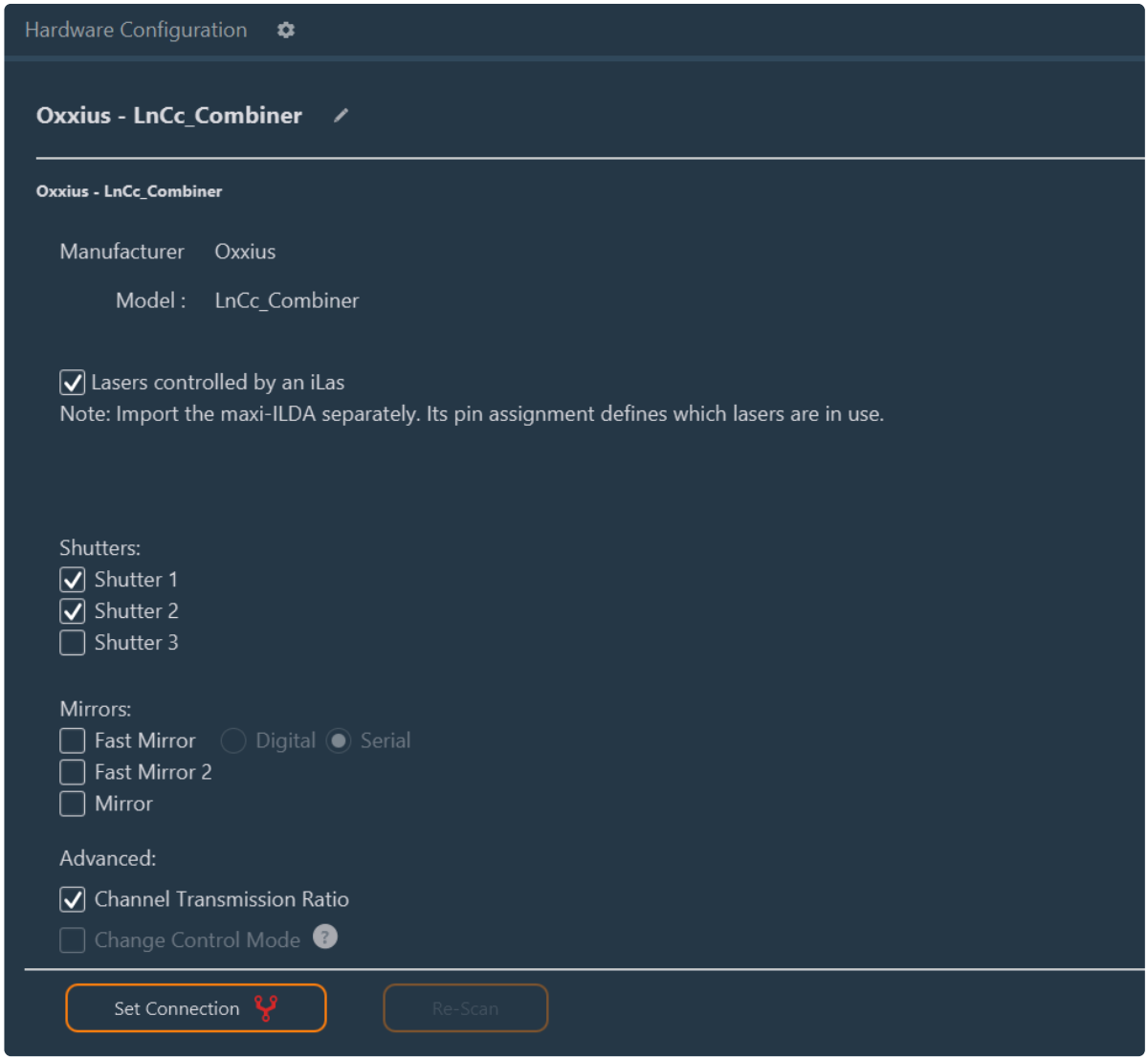
Where a choice is not self-explanatory, a help icon appears beside it, as for **Change Control Mode** (4). Hover over the icon to read the description supplied by the firmware.

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The device view

Select a device in the **Imported Hardware** tree to open its view.

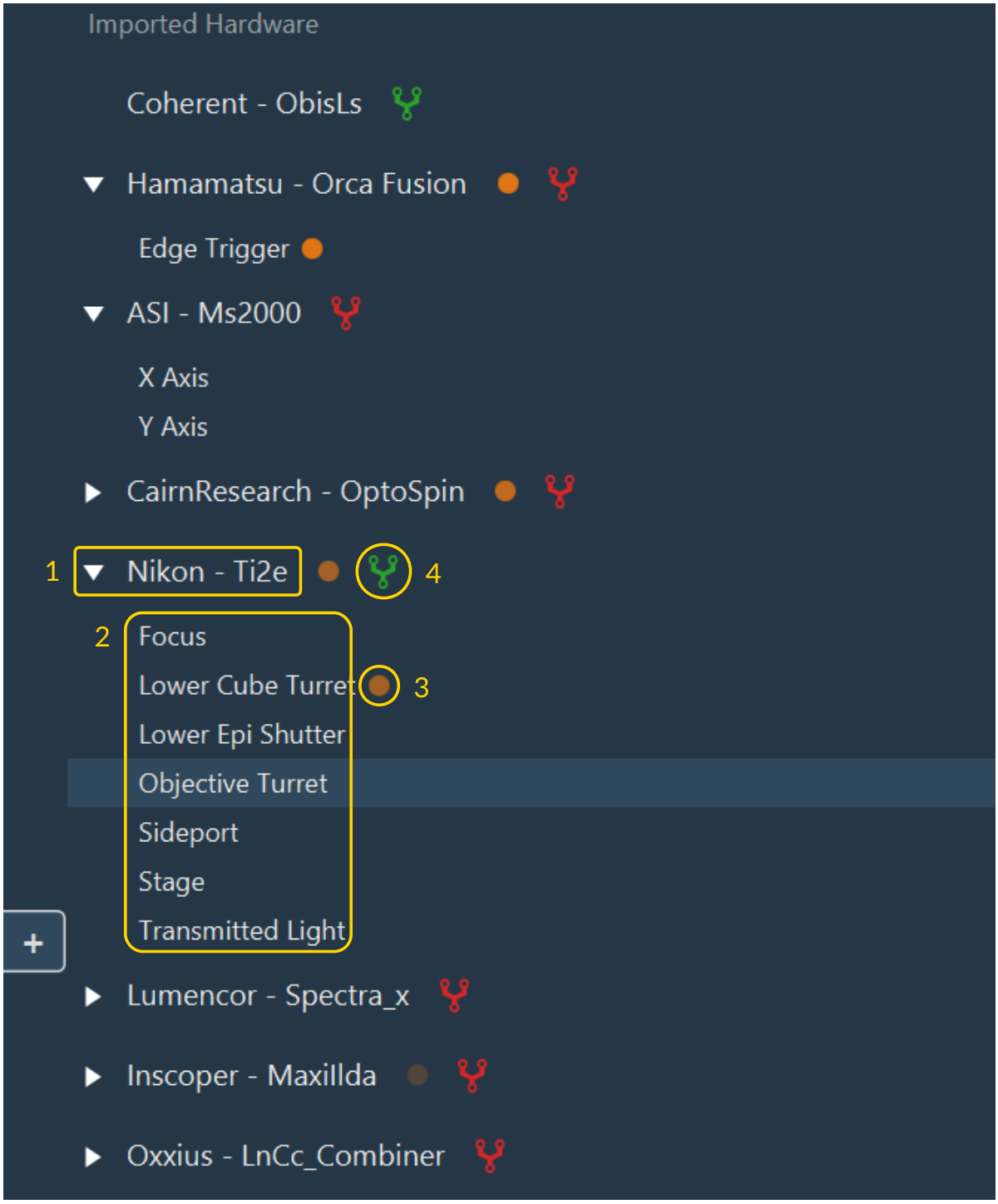
Element	Purpose
Title and pencil icon	The name of the device in this configuration. Click the pencil to rename it. Names must be unique within a configuration.
Manufacturer, **Model**	Read-only identification, taken from the hardware description.
Configuration controls	The guided-selection controls described above.
Set Connection	Opens the connection view restricted to this device.
Re-Scan	Interrogates the physical device and removes the functions it does not report. Available only when the Device Controller is connected and the device answers.



Function groups

Expand a device (1) in the tree to reveal its **groups** (2). A group corresponds to one function of the instrument, such as a turret, a shutter, a focus axis, or a stage axis. Select a group to open its parameters.

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The groups that appear depend on what you selected in the device view. Clearing Objective Turret in the Nikon Ti2e view, for example, removes the Objective Turret group from the tree.

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Status markers in the tree

Two kinds of marker appear beside the entries: the orange dot (3) and the connection icon (4).

Marker	Meaning
Green connection icon	Every connection this device requires is defined.
Orange connection icon	Some, but not all, of the required connections are defined.
Red connection icon	None of the required connections are defined. See Connections.
Orange dot	At least one required startup value is missing, a turret group still has an unfilled slot, an ambiguous element has no role assigned, or a camera has no valid pixel size. The dot also appears on the specific group that needs attention.

Work through the entries carrying an orange dot before advancing to the next stage. The Configurator lists every outstanding item when you click **Next**; see Validation.

Group parameters and startup values

Selecting a group opens its **Parameters** table.

Column	Description
Name	The parameter name, with its unit where one applies.
Startup Value	The value applied when the system initializes. Select the checkbox to enable the value, then enter it.

Expert Mode adds the **Sub-device Name**, **Type**, **Post Init**, and **Fixed** columns.

A **startup value** is the state the instrument is placed in when the Imaging Software starts. Supplying one is mandatory for the parameters marked with an orange dot in the tree, and optional otherwise.

Turret groups replace this table with a dedicated editor. See Turrets and filter wheels.

Advanced parameters

In Expert Mode, camera groups offer an additional button that opens the parameters not exposed in normal operation. The axes of a stage follow the roles of its axes; a generic axis is assigned as described in Generic axes.

Button	Shown on	Content
Advanced Camera Parameters	Camera groups, in Expert Mode.	**Camera Parameters** and **Camera Streams** tabs, such as the pixel size and the trigger streams reported by the hardware. See Camera Trigger.

> **Warning**
>
> Advanced parameters change how the Device Controller drives the hardware. Modify them only when instructed to do so by Inscoper Support or by the hardware vendor documentation.

Several other device categories (Focus, Autofocus, Shutter, and ILDA) add their own fields to a group once a parameter is recognized as playing that role. See Special cases for the full list.

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Camera pixel size

The Imaging Software uses the pixel size of each camera, the physical size of one sensor pixel, to scale the acquired images. When the configuration targets the Imaging Software, the view of a camera device shows this value, in µm, for each camera that the device drives.

- A pixel size read from the camera during a Scan is locked and marked (read from camera).
- A pixel size the camera cannot report, as on the PCO Panda, is entered in the field. After each Scan that could not read it, the **Camera pixel size** window asks for it, with the current value as a suggestion. Enter or confirm the value given in the camera datasheet, then validate the window.

A valid pixel size lies between 0.5 µm and 50 µm. An invalid value is highlighted, the **Camera pixel size** window stays open until every value is valid, and the device carries the orange dot in the tree until the value is corrected.

Managing devices in the tree

Right-click a device to open its context menu, which offers one command:

- **Delete**: Removes the device, its groups, its connections, and its layout entries. The Configurator asks for confirmation first. Pressing `⌦ Del` with the device selected has the same effect.

> **Duplicating a device**
>
> Version 2.0.1 removed the **Duplicate** command from the context menu, as it did not behave reliably. To add a second unit of the same model, import it from the importation panel and configure it like the first.

Next step: Proceed to Connections.

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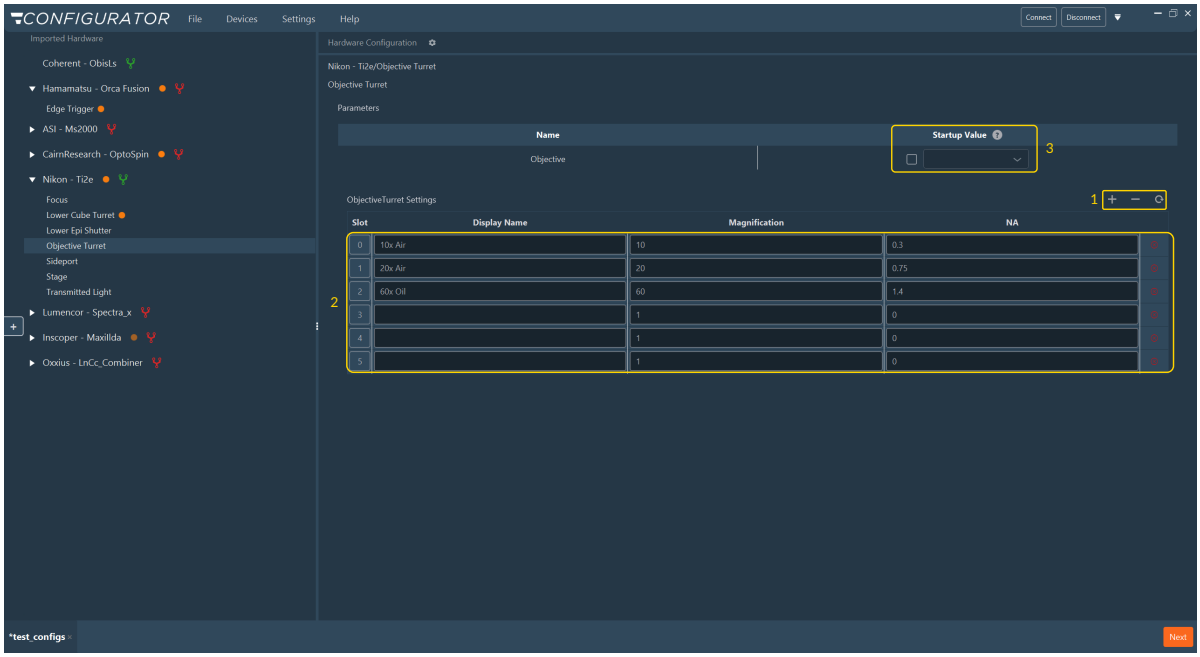
1.3.5 Turrets and Filter Wheels

When the selected group holds a turret, the standard parameters table is replaced by an editable slot table. Use it to record what is physically mounted in each slot, so that the Imaging Software can offer objectives, filter cubes, and filters by name rather than by position index.

Supported turret types

Turret type	Description
Objective turret	A motorized turret holding objective lenses.
Filter cube turret	A turret holding complete optical filter cube assemblies.
Filter wheel	A rotating wheel holding individual optical filters.

The slot table



1. **Row buttons (1)**: **+** adds a slot, **−** removes the last slot, and the circular arrow reloads the slot list from the device when the Device Controller is connected. **+** and **−** are hidden when the device declares its positions, unless the configuration already holds a slot added manually.
2. **Slot table (2)**: One row per position on the turret. Double-click a cell to edit it.
    - Enter a **Display Name** for every occupied slot.
    - Enter the optical parameters for that turret type.
    - Leave unoccupied slots empty, so that the Imaging Software does not offer them.
3. **Startup Value (3)**: The slot the turret moves to when the system initializes. Select the checkbox to enable the value, then choose a slot from the drop-down menu.

COLUMNS COMMON TO ALL TURRET TYPES

Column	Description
Slot	The position index on the turret. This is the value sent to the hardware.
Display Name	The label shown to the user in the Imaging Software. Leave it empty for an unoccupied slot.

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OBJECTIVE TURRET

Column	Description
Magnification	The magnification factor of the objective, for example `60` for a 60× objective.
NA	The numerical aperture of the objective.

The Imaging Software uses these two values to compute the pixel size and the scale bar. Enter them for every occupied slot.

> **Tip**
>
> Every configuration must contain at least one objective device. If the objective turret is not motorized, or if the instrument has a single fixed objective, import the Virtual Objective so that the objectives can still be described and used by the Imaging Software.
>
> The **Magnification** and **NA** columns fill in automatically when the **Display Name** is formatted as `<magnification>x/<NA> <immersion>`, for example `10x/0.3 Air`.
>
> **Display Name** and **Magnification** update each other. A magnification entered for an unnamed slot names it (`10` gives `10x`), and a new magnification replaces the one stated in the name (`Plan-Apo 63x/1.4` becomes `Plan-Apo 40x/1.4`). A decimal comma is accepted, as in `1,25x`.

FILTER CUBE TURRET AND FILTER WHEEL

Column	Description
Excitation Filter	The excitation filter of the cube.
Emission Filter	The emission filter of the cube.

Filters are chosen from the filter library. Each filter list also offers two entries that are not library elements:

- **Empty** for an empty position;
- **Block** for a position that lets no light through.

To add a filter, record its transmittance ranges, or inspect it in the light spectrum visualizer, click **Manage Filters** in the header of the filter column. The Filter Manager opens on a new element of the kind the column lists, for example a dichroic for a dichroic wheel. The Filter Manager is also available from Settings > Filter Manager.

> **Tip**
>
> The excitation and emission filter columns of a cube fill in automatically when the **Display Name** names the cube (e.g., GFP).
>
> In a filter wheel, the filter of a slot is suggested from its **Display Name**, in this order: the name of a library element, the `<cube> Excitation` and `<cube> Emission` convention, the library filter whose passband best fits a stated wavelength (e.g., `GFP 525/50`), then the only element that matches the name. The suggestion follows the name while it is edited and is withdrawn when nothing matches. A filter selected manually is kept, unless the name is changed to a wavelength that this filter does not pass. Default names such as `0` , `Pos 3` , or `Empty` suggest nothing. Selecting a filter for an unnamed slot names the slot after it.

> **Note**
>
> Numerical columns accept decimal values. Values are stored with the precision required by the recipe generator, and the table applies a consistent display format.

> **Tip**
>
> A turret group carrying an orange dot ● in the **Imported Hardware** tree still has a slot without a name, or is missing a mandatory startup value. See Status markers in the tree.

Next step: Proceed to Connections.

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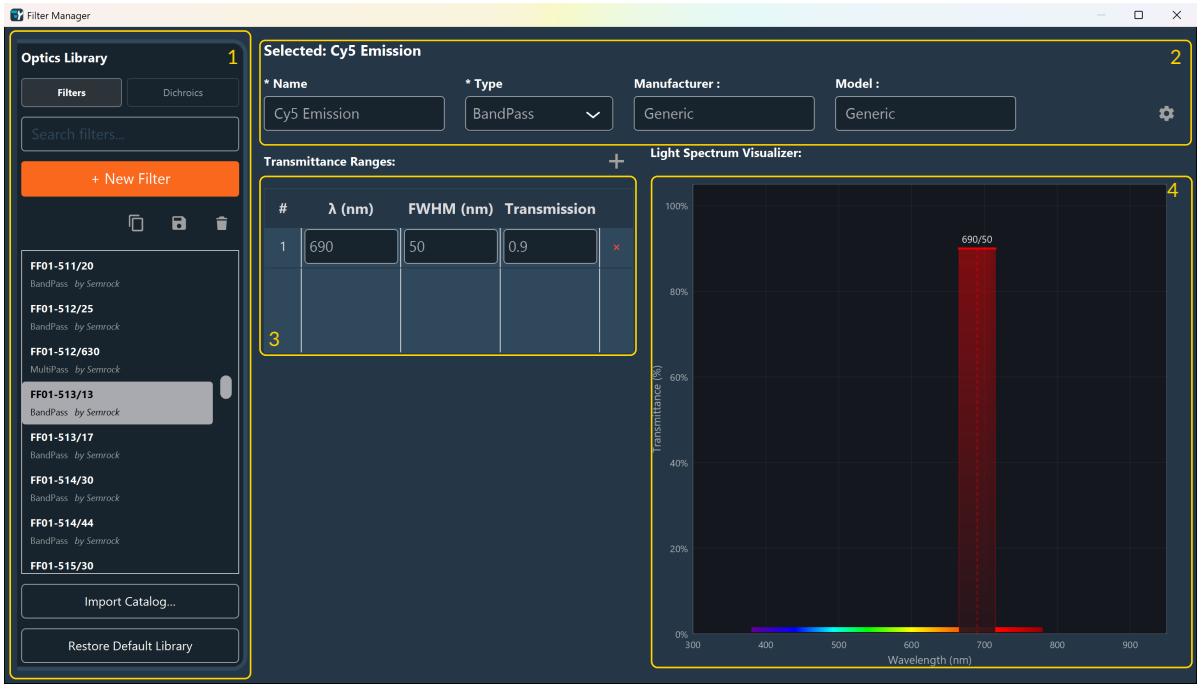
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1.3.6 Filter Manager

The Filter Manager holds the **optics library** — the filters and dichroic mirrors available to filter cube turrets and filter wheels across every configuration. An element defined here is not tied to a single configuration: pick the same catalog reference in any turret slot table and it points back to this one shared definition.

Open it from **Settings > Filter Manager**, or click **Manage Filters** in the header of a filter column of the turret editor. Opened from a turret, the Filter Manager starts on a new element of the kind that column lists.

The editor layout



1. **Optics Library (1)**: **Filters** and **Dichroics** switch which of the two libraries the sidebar lists. The search box filters that list. **+ New Filter** (or **+ New Dichroic**) creates a blank entry; the copy, save, and trash icons above the list duplicate, save, or delete the selected entry. **Import Catalog...** merges a vendor XML file into the library, and **Restore Default Library** resets it to the shipped set.
2. **Identification (2)**: **Name**, **Type**, **Manufacturer**, and **Model** for the selected entry. **Manufacturer** lists Semrock and Chroma, then every manufacturer already named in the library; another name can be typed. The gear icon opens **Advanced parameters** — the read-only Identifier, the Catalog Number, the Lot Number, and any other optional attribute that applies to that element's type.
3. **Range tables (3)**: **Transmittance Ranges**, present for both filters and dichroics. Editing a Dichroic adds a second **Reflectance Ranges** table next to it, since a dichroic mirror both transmits and reflects.
4. **Light Spectrum Visualizer (4)**: Plots the ranges from the tables across the visible spectrum, so a band's position and width can be checked at a glance.

Filters and dichroics

Kind	Represents	Range tables
Filter	A single optical filter — bandpass, longpass, shortpass, notch, multipass, bandstop, or other.	Transmittance only.
Dichroic	A dichroic mirror, which splits light by reflecting one band and transmitting another.	Transmittance and Reflectance.

Both are stored and searched separately: switching the toggle switches the list, the **+ New...** button label, and which range tables are shown.

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Recording a range

Column	Description
#	The row's position; purely informational.
λ (nm)	The center wavelength of the band.
FWHM (nm)	The full width at half maximum — the band's width. Leave the row alone for a longpass or shortpass edge, where the cut is a single wavelength rather than a band.
Transmission (or **Reflectance**)	The fraction of light passed (or reflected) at the peak, from 0 to 1.

Click **+** above a table to add a row, or the **×** at the end of a row to remove it.

A new filter starts as a **BandPass** filter with one Transmittance range of 500 nm and 20 nm FWHM; a new dichroic starts with one range at 500 nm without FWHM.

> **Naming shortcut**
>
> Typing a wavelength into **Name** — for example `Cy5 Emission 690/50`, or just `690/50` — reshapes the starting range with that center and width, and a name without a wavelength restores the starting values. A wavelength is read only as a three-digit center between 300 nm and 900 nm, optionally followed by a width (`525`, `525/50`, `FF01-525/50`); catalog numbers such as `49002` are ignored. The turret slot table reads names with the same rule. This only ever touches the starting row: editing that range by hand, or adding a second one, stops the name from overwriting it. A **LongPass** or **ShortPass** type, or a name the editor reads as a dichroic, fills in the wavelength alone, since FWHM does not apply to a cut edge.

Name and Identifier

Name is a free-text label you can change at any time. The **Identifier** shown in Advanced parameters is generated once, when the entry is first saved, and never changes afterward — it is what a turret slot table actually stores when you assign a filter. Renaming an entry later cannot orphan a configuration that already references it.

Importing a vendor catalog

Import Catalog… reads an NBOList XML file — the same format the library itself is stored in — and adds any filter or dichroic it does not already have. A summary reports how many elements were added, how many were already present, how many were renamed to avoid a collision, and how many were rejected.

Keyboard shortcuts

Shortcut	Action
Ctrl+S	Save the selected entry.
Delete	Delete the selected entry (outside a text field).
Ctrl+C	Copy the selected entry.
Ctrl+V	Paste the copied entry as a new duplicate.

> **Required to save**
>
> An entry needs a **Name**, a **Type**, and at least one Transmittance range before it can be saved. Leaving the editor with unsaved changes — by switching Filters/Dichroics, selecting another entry, or closing the window — prompts to save or discard them.

Next step: Proceed to Connections.

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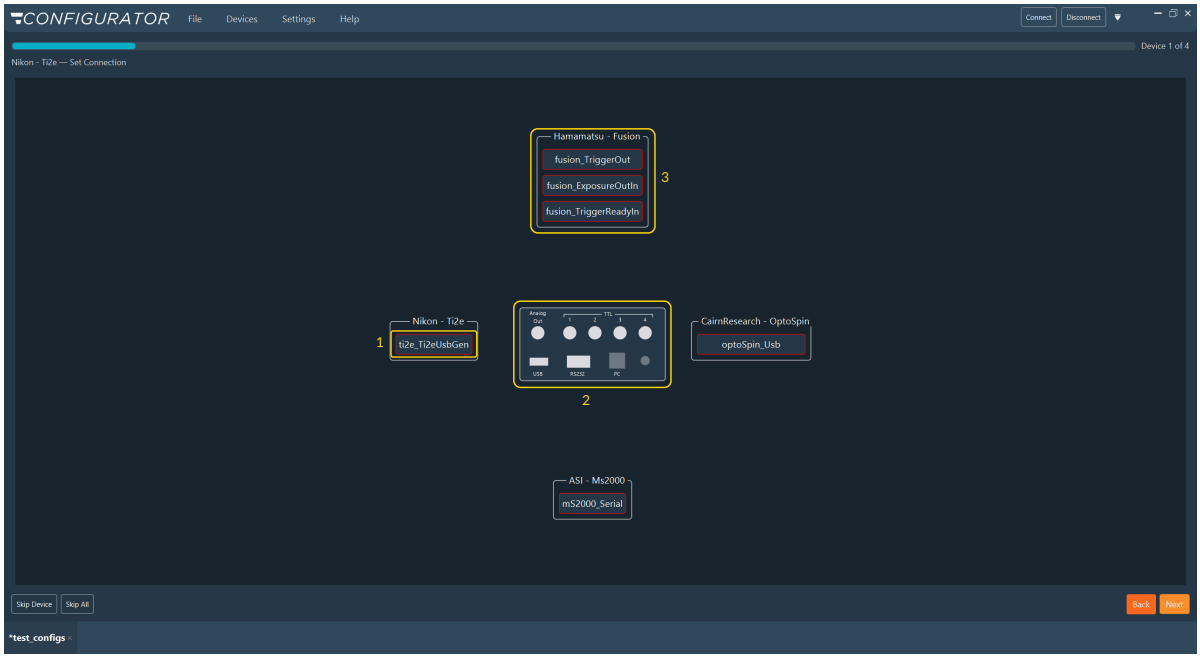
1.3.7 Connections

The **connection view** records how each function selected in the device view is wired to the Inscoper Device Controller. This mapping tells the Device Controller which physical port carries which command.

Opening the connection view

- Click **Set Connection** in the view of a device, or
- Advance through the setup wizard, which presents a **Set Connection** step for each imported device.

Only the connections that the current selection requires are shown. Clearing a function in the device view removes its connection cell from this view.



1. **Connection cell (1)**: One cell per function that requires wiring, grouped under the device it belongs to. Drag a cell onto a port to create the link.
2. **Device Controller panel (2)**: The ports of the connected Device Controller model. The panel shown here exposes an **Analog Out** line, four **TTL** lines, a **USB** port, an **RS232** port, and the **PC** link.
3. **Unconnected cells (3)**: A red outline marks a cell whose link is still missing. Hover the cell to read why, for example `NOT_ENOUGH_OUTPUT`, which reports how many outputs the function needs.

The port panel matches the Device Controller model that is connected. Models differ in the number of TTL, analog, and serial lines they expose.

Creating a link

1. Locate the connection cell of the function to wire.
2. Drag the cell onto the target port on the Device Controller panel.
3. Repeat for every cell outlined in red.

When the link is accepted, the red outline is cleared and the connection icon of the device in the **Imported Hardware** tree turns from red to green.

Cable type

A cell can only be dropped on a port that carries the signal it needs. A serial function cannot be assigned to a TTL line, and a TTL trigger cannot be assigned to the RS232 port.

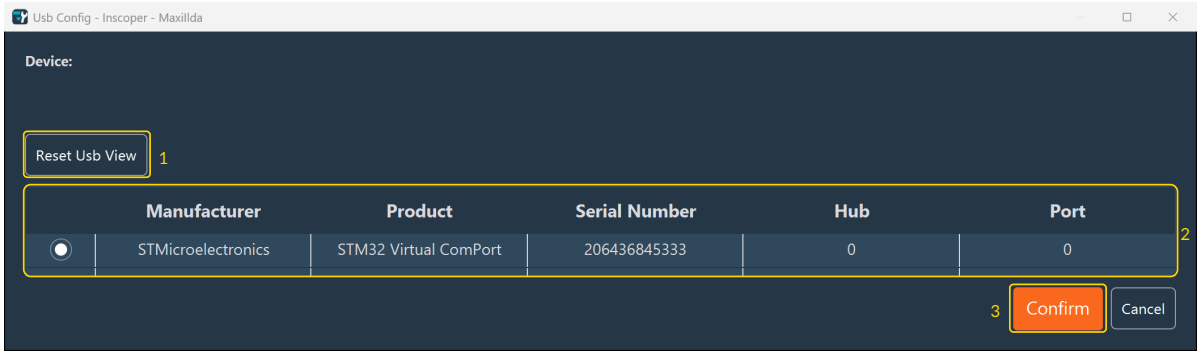
Tip

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A single device can be dropped using different connectors. The available connectors for the selected device will be highlighted in green on the Device Controller panel. For example, the Lumencor SpectraX can be controlled via a USB or RS232 port.

Assigning a USB device

Dropping a cell on the **USB** port opens the USB configuration window for that device.



The table lists the USB devices the Device Controller currently sees, with their **Manufacturer**, **Product**, **Serial** number, **Hub**, and **Port**. Enabling Expert Mode adds four columns: **VID**, **PID**, **Num Interface** (number of USB interfaces the device exposes), and **Driver**.

1. If the device is missing from the table, click **Reset Usb View** (1). The Device Controller rescans its USB bus, then the table is reloaded.
2. Select the row of the device in the table (2).
3. Click **Confirm** (3) to apply the selected row to the device, or **Cancel** to close the window without changing the assignment.

Note

An empty table means that the Device Controller does not currently see any USB device. Verify that the instrument is powered and cabled, then click **Reset Usb View**. Allow the delay set by **Seconds To Wait After USB Reset** in the application settings before the table is repopulated.

Internal hub

On Device Controller models other than type S, the first row of the USB list corresponds to the internal hub of the controller. It is present for diagnostic purposes and confirms that internal communication is functional.

Arranging the view

Action	Control
Move a device group or the Device Controller panel	Drag it.
Pan the workspace	Drag the background.
Zoom	Scroll wheel.
Reset the view	Double-click the scroll wheel.
Manage the arrow	Right click to change arrow's color or delete arrow.

Rearranging the view is cosmetic. It has no effect on the configuration.

Checking the result

A configuration is complete with respect to connections when every entry in the **Imported Hardware** tree carries a green connection icon. The Configurator also reports every missing connection when you click **Next**; see Validation.

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Next step: Proceed to Imaging Software layout.

2026-10-15

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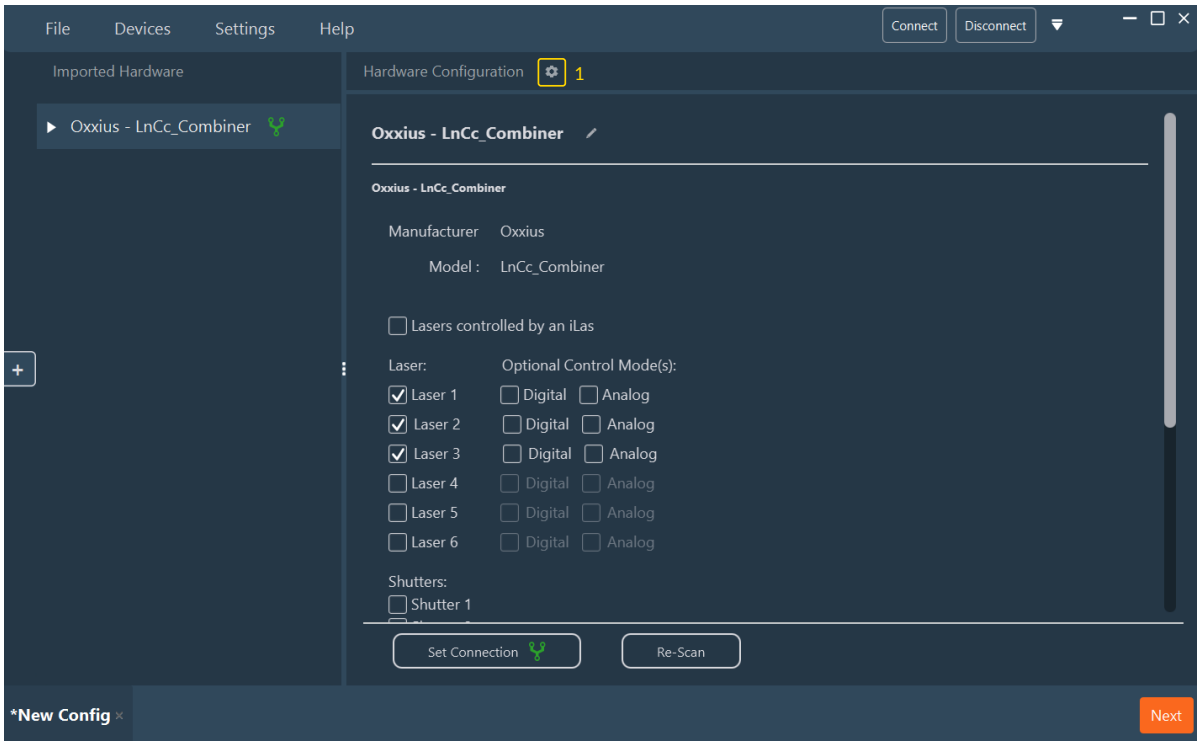
1.3.8 Advanced Configuration

Calibration

A **calibration** records a dependency between devices, so that the Imaging Software offers the correct options for the current state of the instrument. A typical example is a correction collar setting or a stage travel range that depends on the objective in place.

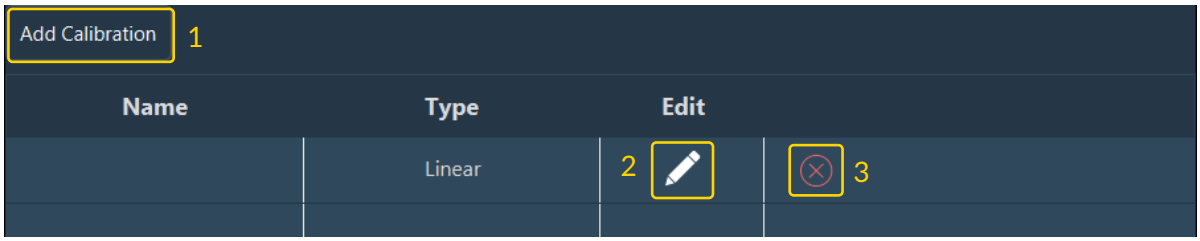
OPENING THE CALIBRATION WINDOW

Click the gear icon (1) in the **Hardware Configuration** header of the main workspace.



The **Advanced Parameters** window opens on the **Calibration** tab, which lists the calibrations of the configuration. The second tab, **External Parameters**, is described in External Parameters.

1. Click **Add Calibration** (1). A new row of type **Linear** is added to the list.
2. Click the pencil icon (2) of the row to open the calibration for editing.
3. To delete a calibration, click the red cross (3) of its row.

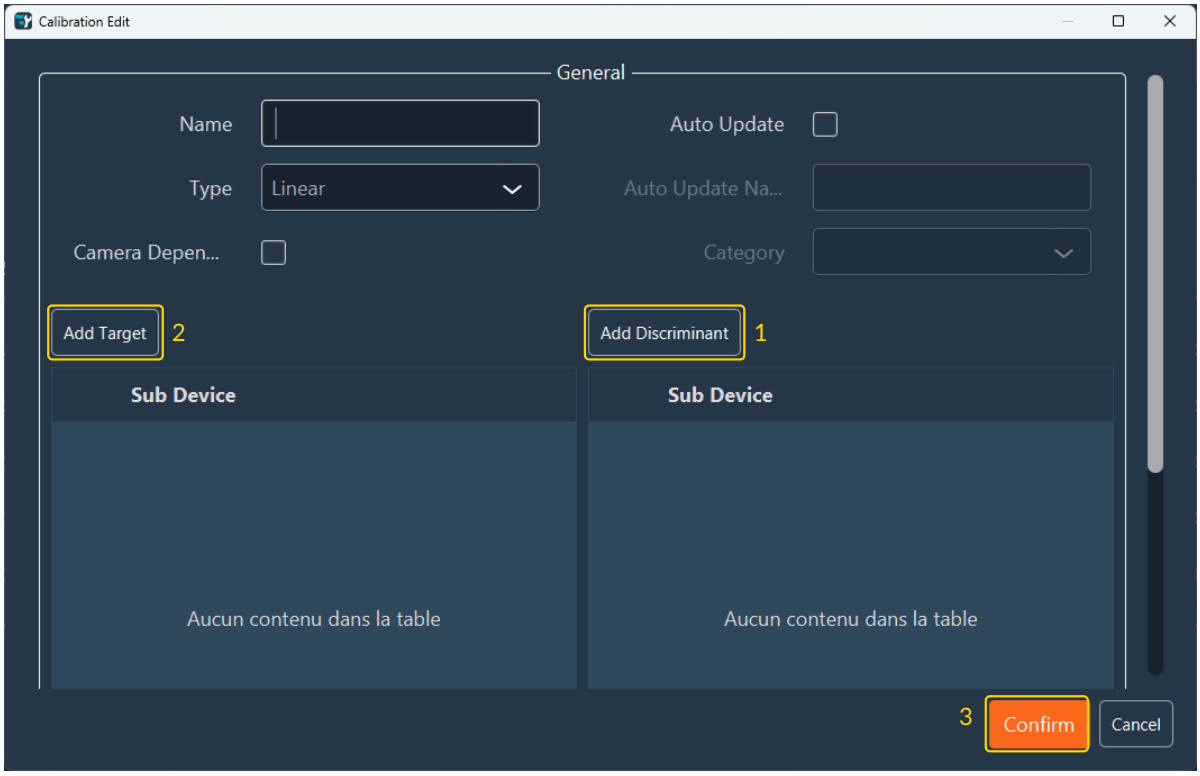


Column	Description
Name	The name of the calibration, as displayed in the Imaging Software.
Type	The interpolation used between the recorded points.
Edit	Opens the calibration for editing.

EDITING A CALIBRATION

The **Calibration Edit** window opens.

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General

Field	Description
Name	The name shown to the user.
Type	The relation applied between recorded points: • **Linear**: linear function (ax + b). • **Linear Delta**: linear function applied to the change in value. • **Bilinear**: plane in three dimensions (ax + by + c). • **Piecewise Linear**: piecewise linear approximation. • **Constant**: fixed value between two devices. • **Formula**: user-defined formula.
Camera Dependent	Select this when the calibration differs from one camera to another.
Auto Update	Select this to have the calibration recomputed automatically when the discriminant changes.
Auto Update Name	The name under which the automatic update is presented. Available when **Auto Update** is selected.
Category	The category of the Imaging Software interface in which the automatic update is offered. Available when **Auto Update** is selected.

Below the **General** section, a second section shows the fields of the selected type: an **Interpolator** parameter for **Linear**, **Linear Delta**, and **Piecewise Linear**; **Interpolator 1** and **Interpolator 2** for **Bilinear**; and a table of variables, filled with **Add Variable**, for **Formula**. **Constant** has no further fields.

Targets and discriminants

A calibration relates one or more **targets** to one or more **discriminants**.

- A **discriminant** is the parameter whose value selects which calibration entry applies. The objective turret is the usual discriminant. On a manual turret, the Virtual Objective provides it.
- A **target** is the parameter whose value the calibration supplies for each state of the discriminant.
- Click **Add Discriminant** (1), then choose the discriminant parameter in the new row.
- Click **Add Target** (2), then choose the target parameter in the new row.

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- Click **Confirm** (3) to store the calibration, or **Cancel** to discard the changes.

> **Note**
>
> Calibrations are stored with the configuration. Values recorded during use are updated by the Imaging Software, not by the Configurator.

Next step: Return to Creating a configuration to save the configuration.

2026-10-15

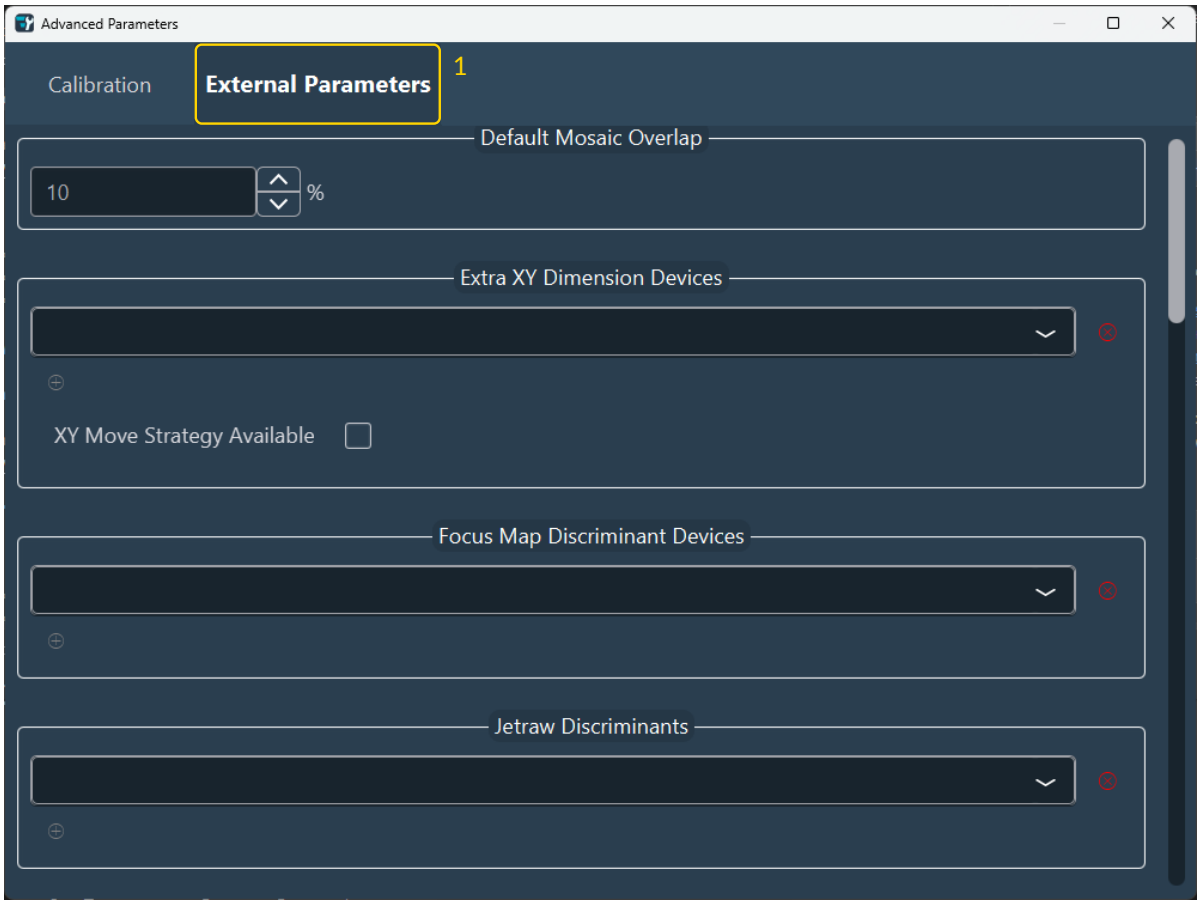
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External Parameters

The **External Parameters** tab holds instrument-wide settings that the Imaging Software reads at startup and that belong to no single device: the default mosaic overlap, the devices that key focus maps and compression calibrations, startup behavior, and the device assignments of the FLIM and Sparq modules.

OPENING THE TAB

1. Click the gear icon in the **Hardware Configuration** header of the main workspace. The **Advanced Parameters** window opens on the Calibration tab.
2. Click **External Parameters** (1).



Every section is always displayed, whether or not the matching hardware or license is present. Scroll down to reach the sections below **Jetraw Discriminants**.

DEVICE LISTS

Most sections hold a list of device parameters, entered one per row:

- Choose a parameter in the drop-down list of a row. The list offers every parameter of every imported device, without filtering by type, so check that the parameter chosen matches the purpose of the section.
- Click **+** below the list to add a row, and the red **×** beside a row to remove it.
- Empty rows are ignored when the configuration is saved.
- Removing a device from the configuration also removes its parameters from every list of this tab.

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MOSAIC AND POSITIONS

Setting	Description
Default Mosaic Overlap	The overlap between adjacent tiles, in percent, applied to every new mosaic area created in the Imaging Software. Existing mosaic areas keep their own overlap.
Extra XY Dimension Devices	Device parameters displayed next to the stage X, Y, and Z fields in the header of the XY, positions, and mosaic dimension editors of the Imaging Software. Each field shows the current value of the parameter and can be edited there. The value is not stored with the positions.
XY Move Strategy Available	Shows the **Move Strategy** selector in the positions and tiling editors of the Imaging Software's complex acquisitions. **XY Split** breaks each stage move between two positions into X steps, then Y steps, none longer than the set **Step**; **Fastest** moves directly.

FOCUS MAPS

Setting	Description
Focus Map Discriminant Devices	Device parameters for which the Imaging Software keeps a separate focus map per value. With the objective turret in this list, for example, each objective keeps its own focus surface, and changing the objective displays the focus map recorded for it.

JETRAW COMPRESSION

Setting	Description
Jetraw Discriminants	Device parameters that key the Jetraw calibration. Jetraw is a lossless compression for sCMOS images that requires a noise calibration of each camera. With a parameter in this list, for example a camera gain or readout mode, the Imaging Software stores one calibration per camera and per value of that parameter, and applies the matching one to each image. Jetraw requires a license.

STARTUP AND MAINTENANCE

Setting	Description
Reset USB At Startup	Resets the USB link to the Device Controller when the Imaging Software starts, before the configuration is loaded.
Seconds Before Reconnection	The delay, in seconds, between the USB reset and the reconnection. Available only when **Reset USB At Startup** is selected.
Emulation Available	Allows devices to be emulated. When a device fails to initialize at startup, the Imaging Software offers to emulate it, and the device manager shows an **Emulate** button for each driver and device.
White Balance Available	Adds the camera white balance calibration to the camera settings of the Imaging Software.

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FLIM AND SPARQ MODULES

These sections assign device parameters to the roles of optional acquisition modules. Leave them empty when the module is absent. Each module also requires a license.

Setting	Description
PCO FLIM Camera	The camera used for PCO FLIM acquisitions. Selecting it enables the darkfield and referencing calibrations of the module.
PCO FLIM Bracketing Discriminants	Device parameters that key the PCO FLIM referencing calibration.
PCO FLIM Darkfield Discriminants	Device parameters that key the PCO FLIM darkfield calibration.
Flim	The parameters that drive gated (fast) FLIM acquisition: **Add Delay**, **Reset Delay**, **Delay Generator**, **Gate Width**, **Delay Number**, and **Scan Mode**, with the **Scan Mode ON Value** and **Scan Mode OFF Value** sent to the scan mode parameter. **Flim Discriminants** key the FLIM calibration.
Sparq	**Speckle Mode**: the parameter toggled by the Sparq acquisition and locked during Sparq live. **Target Thickness**: the parameter read as a processing input. **Sparq Live Discriminants**: parameters whose change restarts the Sparq live display.

See also: Calibration, Focus and Autofocus, Virtual Objective, and Interface reference.

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1.4 Special cases

1.4.1 Handling Ambiguous Devices

Why some devices are ambiguous

For most devices, the Configurator knows what each part of the device does (e.g., a shutter, a filter wheel, or a focus drive) and sets it up automatically.

Some hardware does not allow this. The same output or axis can serve different functions depending on how the hardware is mounted on the microscope. Typical examples:

- A multi-axis motion controller whose axes are numbered (Axis 1, Axis 2, ...) rather than named. Each axis can drive the X or Y axis of the stage, the focus, or a piezo, depending on the wiring.
- A controller output that can drive either a shutter or a filter wheel, depending on what is connected to it.

Only the installer knows the actual setup. The Configurator therefore marks these parts as **ambiguous** and asks the installer to assign their role.

What the installer must do

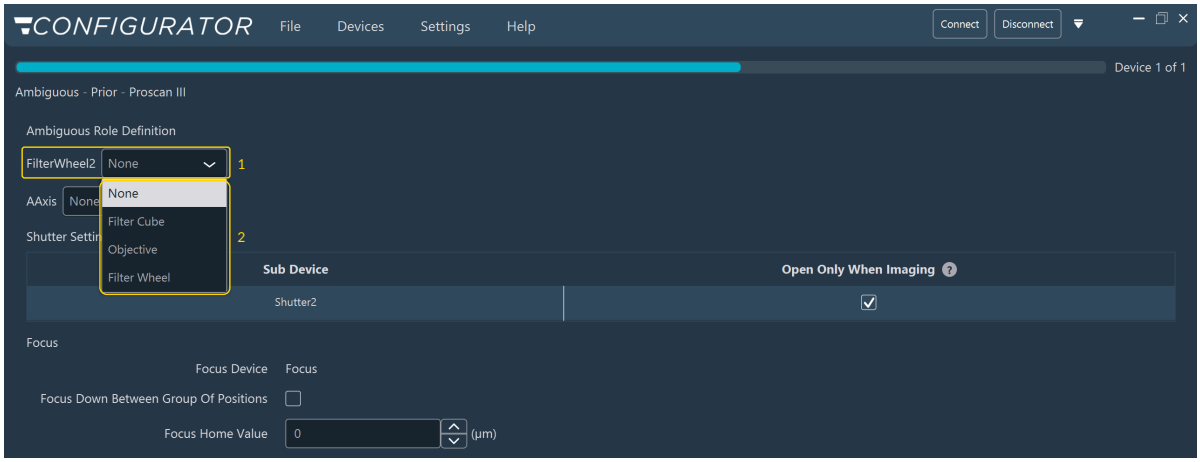
On the **Configure** step of the device, ambiguous elements are offered like any other function. On a Prior Proscan III, for example, **Filter wheel 2** (1) and **Axis A (4th axis)** (2) can each drive several kinds of hardware.



When at least one ambiguous element is selected, the wizard adds a step named **Ambiguous - [Device Name]**, which lists the elements to define.

1. In the **Ambiguous Role Definition** panel, locate each ambiguous element (1). Each element has its own drop-down list.
2. Open the drop-down list (2) and select the role that matches the hardware (e.g., X axis, Y axis, Focus, Piezo, Shutter, Objective turret, Filter cube, or Filter wheel). The list only offers the roles possible for that element.
3. Select **None** if the element is not used as any of the listed roles. It then remains available as a plain settings element.

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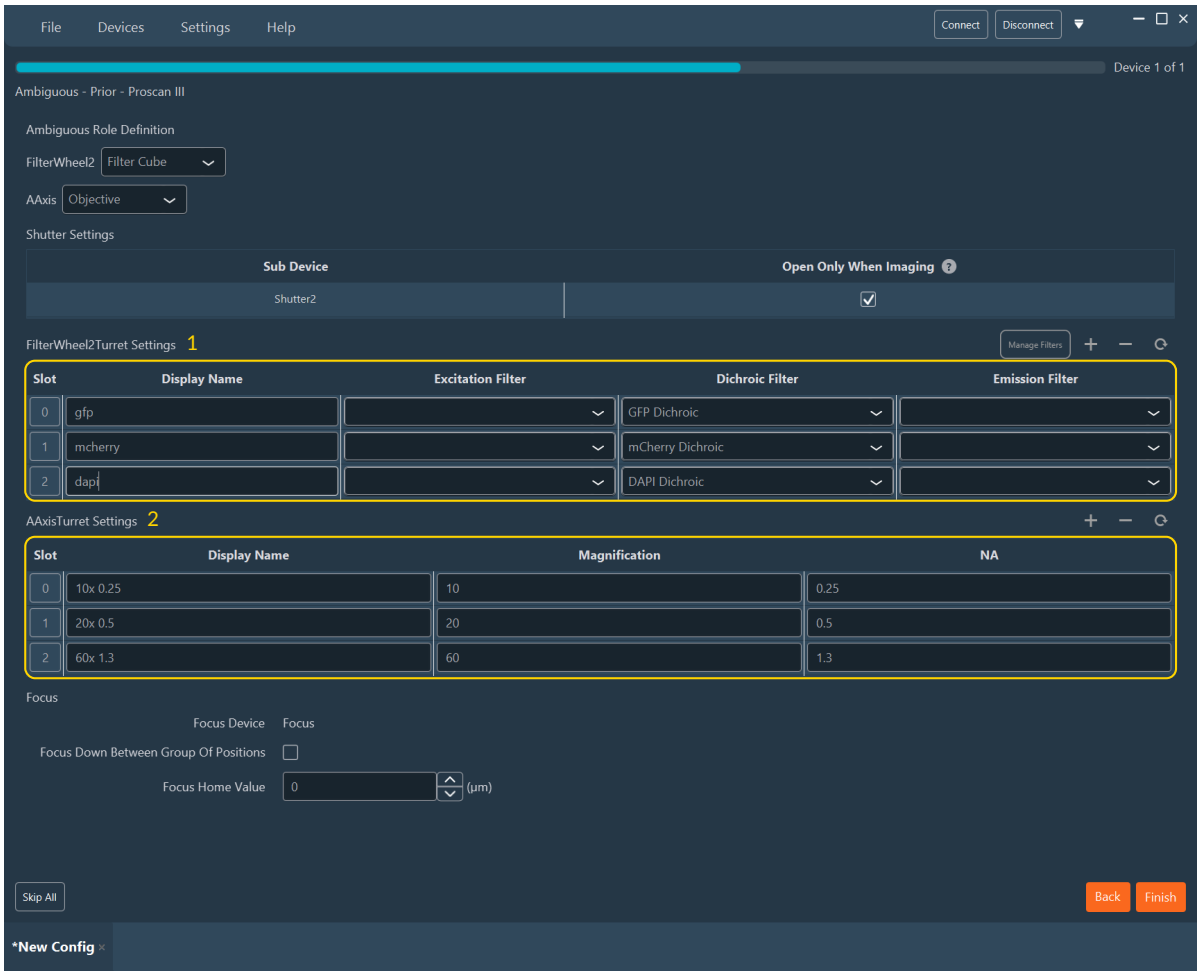
The drop-down list stays empty until a role is chosen. **None** is a valid choice and must also be selected explicitly.

Note: Assign each role to one element only. If two axes are both defined as Focus, only the first one is used.

TURRETS

If an element is defined as an objective turret, a filter cube turret, or a filter wheel, a slot table appears. Fill in the objective or filter mounted at each position, as described in Turrets and Filter Wheels.

In the example below, **FilterWheel2** is defined as a filter cube turret, which adds a slot table with excitation, dichroic, and emission filters (1). **AAxis** is defined as an objective turret, which adds a slot table with magnification and NA (2).



GENERIC AXES

A generic axis of a multi-axis controller is an ambiguous element whose possible roles are X axis, Y axis, Focus, and Piezo. The stage of the controller takes its axes from these roles: the axes defined as X axis and Y axis, and the axis defined as Focus for Z. A generic axis set to **None** is driven as a plain setting.

A configuration saved by version 2.0.2 or earlier does not record the role of a generic axis. When it is opened, the role is taken from the stage axes that the configuration recorded. Check the role of each generic axis after opening such a configuration.

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What the chosen role changes

The role defines how Inscoper Imaging Software uses the element during acquisition:

- Axes defined as X axis and Y axis form the motorized stage.
- An axis defined as Focus or Piezo moves for focusing, Z-stacks, and autofocus.
- A turret or filter wheel displays the names entered in its table.

An element left undefined is not used by the acquisition software for that role. For example, an axis that drives the focus but has no role assigned does not move during a Z-stack.

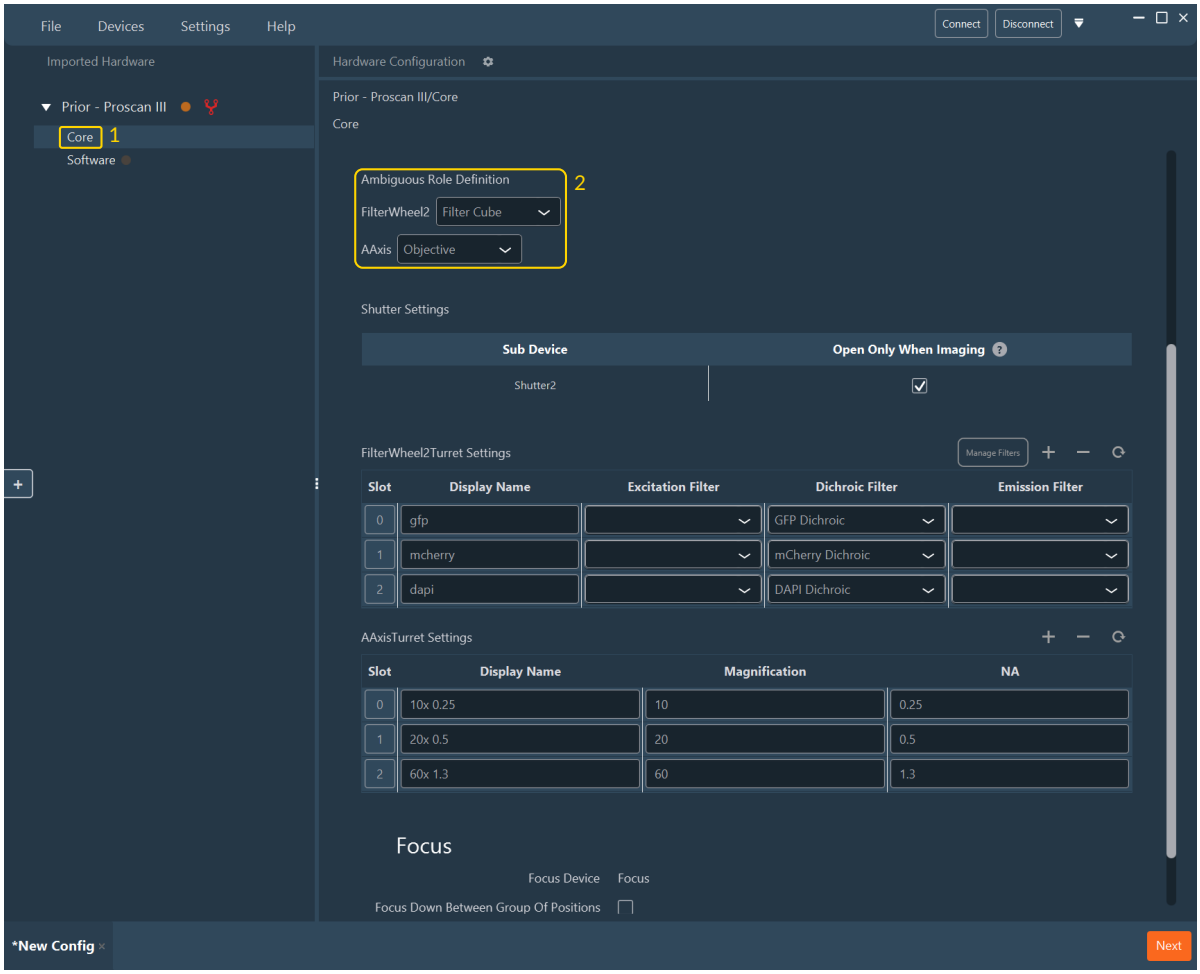
Pending definitions

Until a role is chosen for every ambiguous element, an orange dot ● appears next to the element, its group, and its device in the **Imported Hardware** tree. Hover over the dot to display the pending items. See Status markers in the tree.

Reviewing or editing a definition

The chosen roles are saved with the configuration. To review or edit them:

1. In the **Imported Hardware** tree, expand the device and select the group that holds the ambiguous elements, for example **Core** (1).
2. Change the roles in the **Ambiguous Role Definition** section (2) at the top of the group view.



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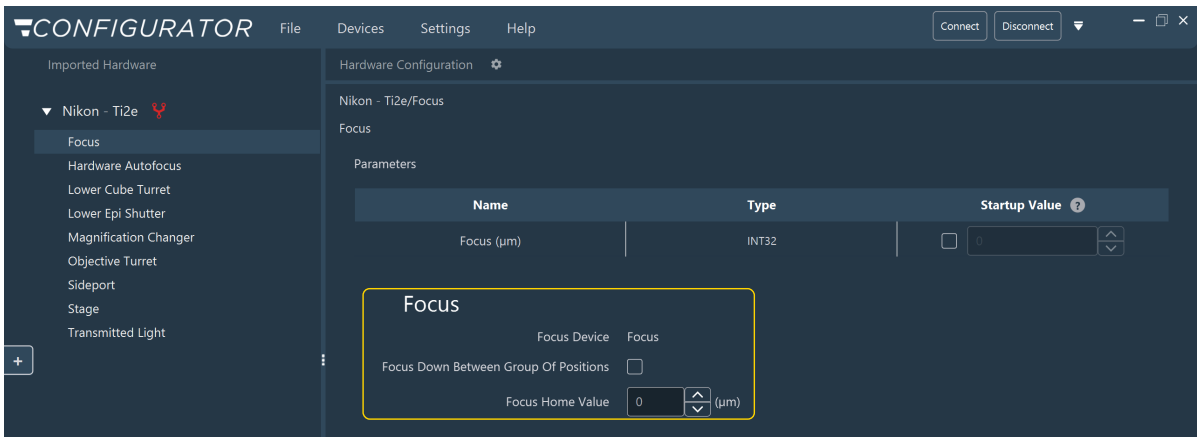
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1.4.2 Focus and Autofocus

Focus and **Autofocus** are not devices in their own right — they are roles that the Configurator assigns to a parameter of an imported device (most often a stage axis, but also a piezo or a dedicated autofocus module). Once a parameter carries one of these roles, its group in the **Imported Hardware** tree gains the fields described below.

A parameter is given the **Focus** role either directly from its hardware description, or through the Ambiguous role selector if the description leaves it undetermined, as for the numbered axes of a multi-axis motion controller.

Focus



The Focus panel is always visible. It shows the parameter that carries the role (**Focus Device**, read-only) and two settings:

Field	Description
Focus Down Between Group Of Positions	When checked, the focus moves to **Focus Home Value** at the first position of each new group of positions — typically when the stage moves to the next well of a multiwell plate — so that the objective clears the plate during the move. If an Autofocus Mode Device is assigned (see below), the move happens only while autofocus is off, or when its mode is set to switch off between groups of positions. Unchecked by default.
Focus Home Value	The position the focus moves to when **Focus Down Between Group Of Positions** applies. It has no effect when that box is unchecked. Defaults to `0`, and is reset to `0` whenever a different parameter takes the Focus role.

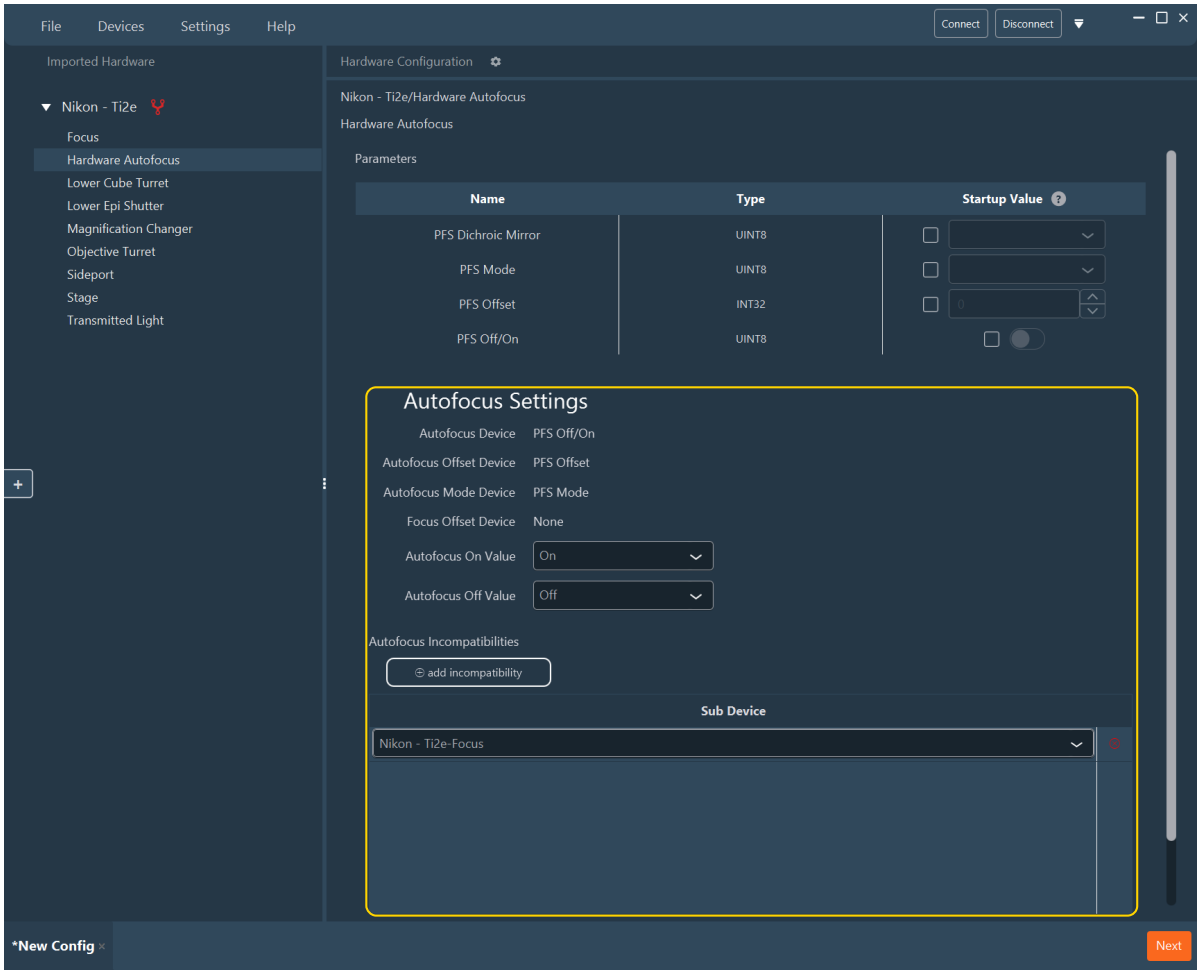
Autofocus

Autofocus is built from up to four independent roles, each assigned the same way as Focus:

Role	Purpose
Autofocus Device	The switch that turns the hardware autofocus on and off. The other autofocus settings take effect only when this role is assigned.
Autofocus Offset Device	The autofocus offset. The imaging software sets it at the start of each position or timepoint while autofocus is on, and again after each autofocus run.
Autofocus Mode Device	The operating mode, which determines when the imaging software switches autofocus off during an acquisition (between timepoints, between positions, between groups of positions, or never).
Focus Offset Device	The difference between the focus set in the position list and the focus after autofocus correction. The imaging software uses it to apply drift correction across every plane of a Z-stack.

The panel lists which parameter carries each role (read-only), followed by the settings below. The whole panel is visible only in Expert Mode.

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Field	Description
Autofocus On Value, **Autofocus Off Value**	The values written to the Autofocus Device to switch autofocus on and off. Off defaults to `0`. On defaults to `1`, but is replaced by the parameter's own default value when one exists, so check it. **Mandatory** once the Autofocus Device role is assigned: if either value is empty when you click **Next**, a warning naming the parameter appears and the Configurator stays on the current stage.
Autofocus Incompatibilities	The focus devices that cannot run a Z-stack while hardware autofocus is on. When a Z-stack is driven by a listed device, the imaging software switches autofocus off for the stack and moves that device to each plane. The table is filled automatically with every parameter that carries the Focus role.

Note

The Configurator also stores the Autofocus Mode values (defaults `1` = off between timepoints, `2` = off between positions, `3` = off between groups of positions, `4` = always on) and the Focus Offset Home Value (the value the focus offset is reset to at the start of each position or timepoint, pre-filled from the parameter's default value, otherwise `0`). These values are not editable in the panel; they must match what the Autofocus Mode Device and Focus Offset Device expect.

Warning

The Incompatibilities table is rebuilt from the configuration whenever a device group is opened or a parameter is added or removed. A Focus parameter you delete from the table reappears, and any entry that does not carry the Focus role is dropped.

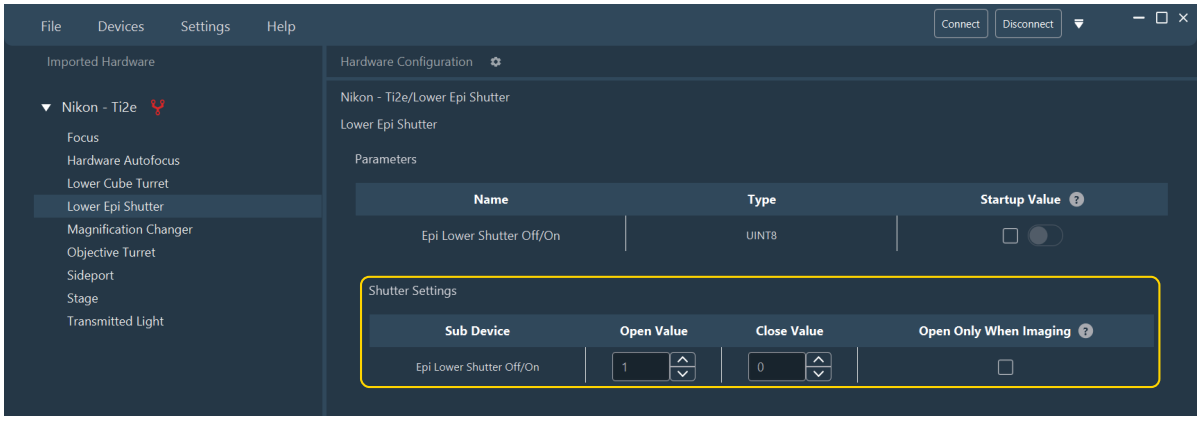
See also: Configuring a device, Handling Ambiguous Devices, Validation.

2026-10-14

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1.4.3 Shutter

Any parameter carrying the **Shutter** role — from its hardware description, or chosen manually from the Ambiguous role selector when the description leaves it undetermined — gets a row in a **Shutter Settings** table shown in its group.



Field	Description
Open Value, **Close Value**	The values that open and close the shutter. Visible only in Expert Mode. Optional; default to `1` (open) and `0` (close).
Open only when imaging	Whether the shutter opens only while an acquisition is running, rather than staying open continuously. Always visible. Optional; starts checked, unless the hardware description marks the device as needing to always stay updated, in which case it starts unchecked. Change it at any time to match how the instrument should behave.

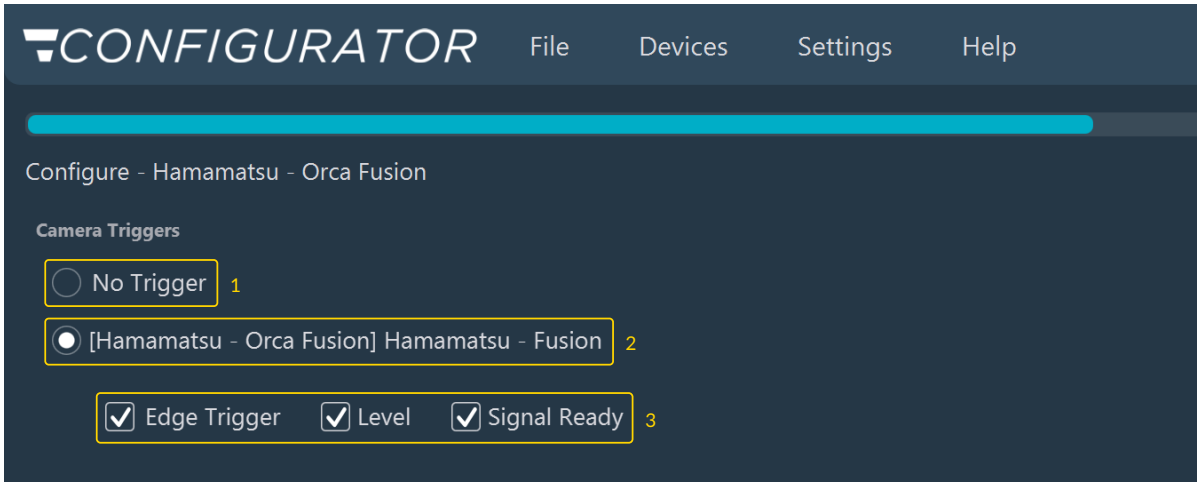
See also: Configuring a device.

2026-10-06

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1.4.4 Camera Trigger

The **Camera Triggers** section of a camera's device view lists, as radio buttons, every trigger source available to that camera. It is part of the camera's configuration view, alongside the guided-selection controls.



1. **No Trigger (1)**: Always offered. Select it when the camera is not triggered by another device.
2. **Trigger source (2)**: One radio button per available source, for example the Inscoper trigger device of the camera, as shown here, or a shared ConfocalNL controller when the instrument has one.
3. **Trigger signals (3)**: Displayed when an Inscoper trigger source is selected. **Edge Trigger**, **Level**, and **Signal Ready** are all selected by default. Clear the signals that are not wired between the camera and the Device Controller.

Selecting one of the offered options, including **No Trigger**, is the only mandatory action.

> **Note**
>
> The **Advanced Camera Parameters** button, available in Expert Mode on a camera group, is unrelated to this choice: it opens a **read-only** diagnostic view (pixel size and the trigger streams the hardware reports) rather than an editable setting. Use it to check the physical setup, not to configure the trigger.

See also: Camera ROI synchronization, Configuring a device.

2026-10-15

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1.4.5 Camera ROI Synchronization

On an instrument with several cameras, two or more cameras can be grouped so that the Imaging Software treats them as viewing the same field. A camera that belongs to no group is handled on its own.

Group cameras that image the same field of view with matching sensor geometry, for example two identical cameras behind an image splitter. Leave the other cameras ungrouped.

Effect in the Imaging Software

For the cameras of a group, the Imaging Software applies the following behavior:

Function	Cameras in the same group	Camera in no group
Regions of interest (ROIs)	An ROI drawn on the image of one camera is also displayed on the images of the other cameras of the group.	ROIs drawn on its image apply to that camera only.
Crop	**Confirm Crop**, hardware or software, applies the same crop region to every camera of the group.	The crop is set from the ROIs drawn on that camera only.
Camera calibrations	Calibrations recorded per camera, such as shading correction, mosaic, TIRF, FRAP, and FLIM calibrations, are stored once for the whole group and shared by its cameras.	The camera has its own calibrations.
Multiwell plate calibration	The well center is located on one image per group.	The well center is located on the image of each camera.

A shared ROI or crop takes the same position on the image of each camera of the group. Group only cameras whose images are registered to each other, with the same sensor size and orientation. Otherwise, the shared region covers a different area of the sample on each camera.

Calibrations after a change of grouping

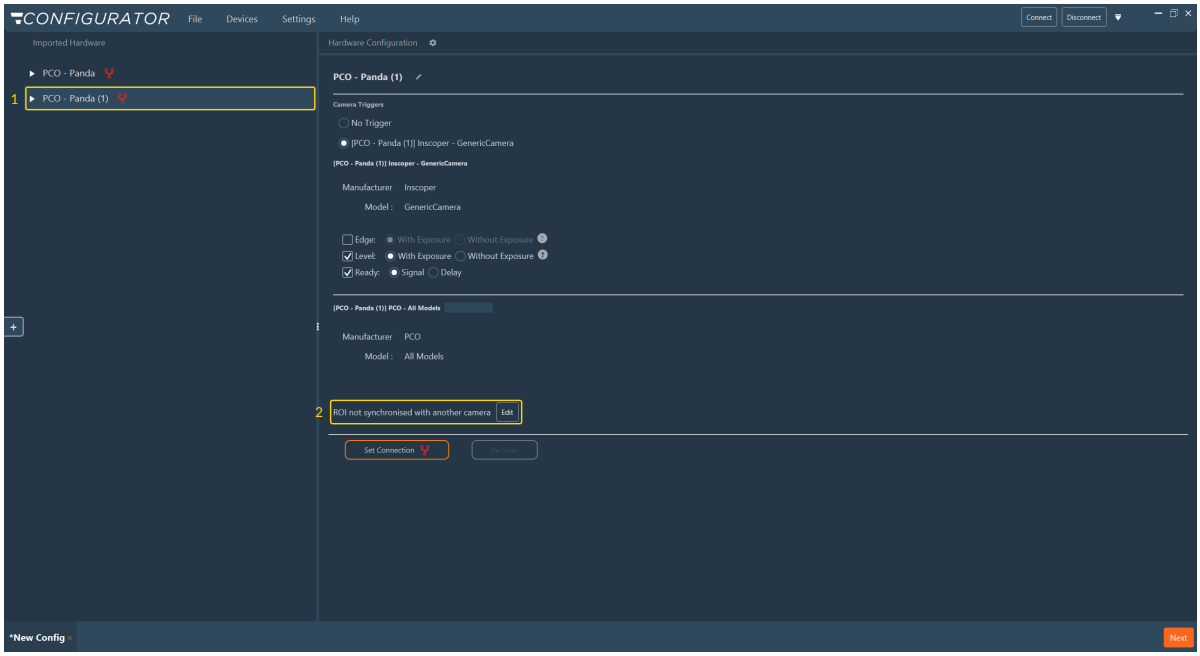
The Imaging Software stores each camera calibration under the identifier of the group. Changing the grouping of a camera changes this identifier, so the calibrations recorded before the change are no longer associated with that camera. Repeat the camera calibrations in the Imaging Software after grouping or ungrouping cameras.

Note

ROI synchronization is available from version 2.0.1. In a configuration created with an earlier version, every camera starts ungrouped.

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Where the setting appears



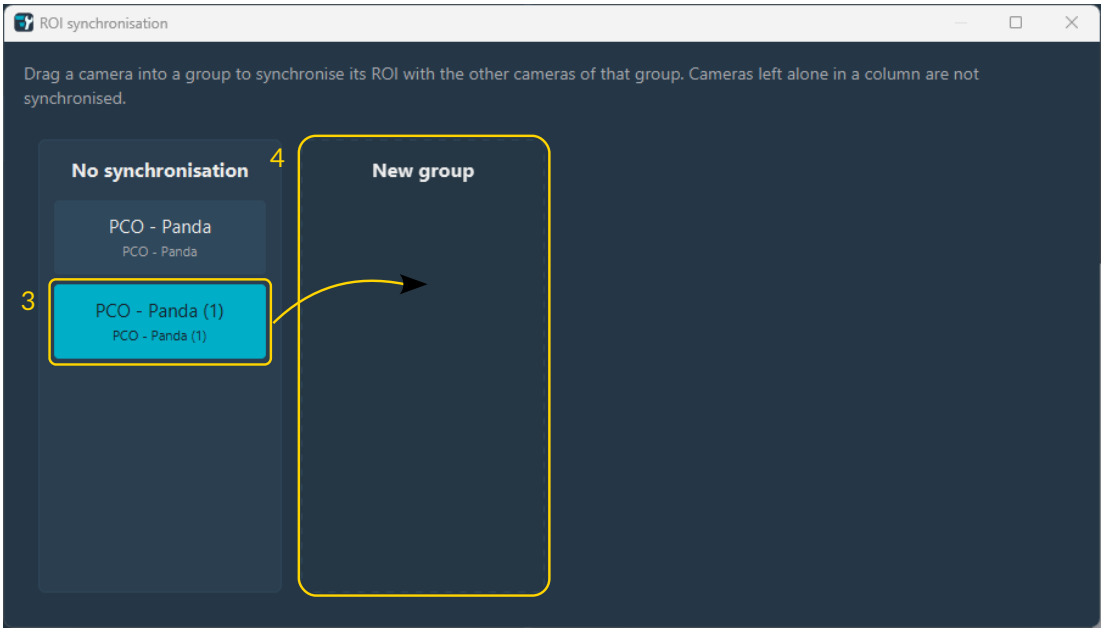
Select a camera in the **Imported Hardware** tree (1). When the configuration holds at least two cameras, the device view displays a line below the list of internal devices, followed by an **Edit** button (2). The line states the current grouping of that camera:

Line	Meaning
ROI not synchronised with another camera	The camera belongs to no group.
ROI synchronised with followed by camera names	The camera shares its ROI with the cameras listed.

The line is not displayed when the configuration holds a single camera, since that camera has nothing to synchronize with.

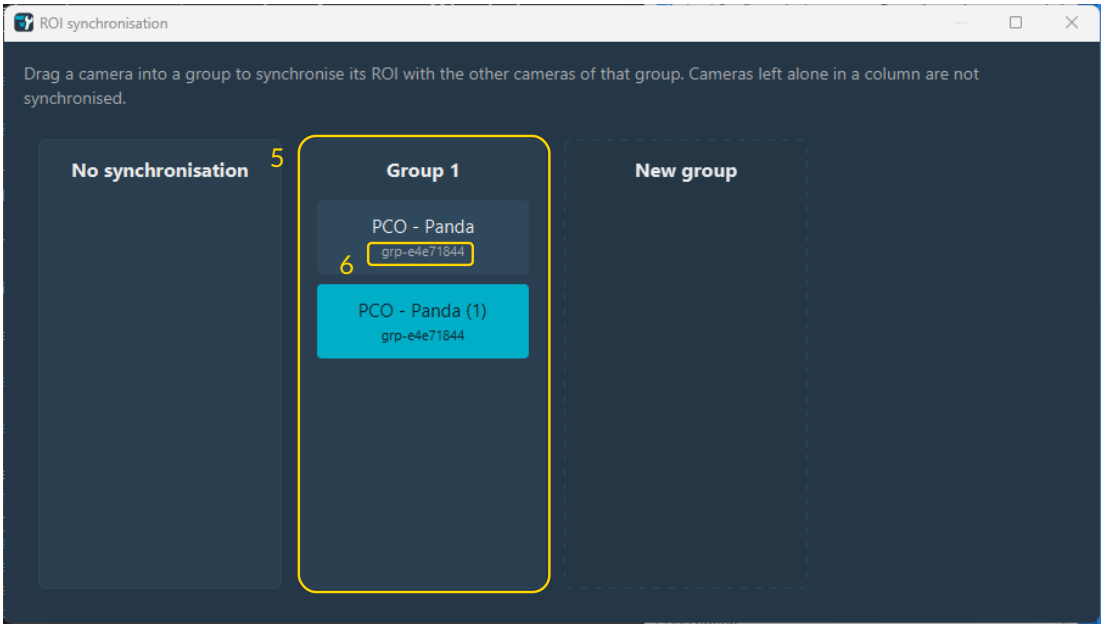
Grouping cameras

1. Select one of the cameras to group in the **Imported Hardware** tree (1), then click **Edit** (2). The **ROI synchronisation** window opens. It lists every camera of the configuration, not only the selected one, and the selected camera starts highlighted.
2. Drag the camera card (3) onto the **New group** column (4). The Configurator creates **Group 1** and places the camera in it.



3. Drag each other camera to synchronize onto the **Group 1** column (5). Each card in the group then shows the same group identifier (6).

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4. Close the window. The device view of each grouped camera now reads ROI synchronised with followed by the names of the other cameras of the group.

The columns of the window have the following effect:

Column	Effect
No synchronisation (left)	The camera keeps its own ROI.
Group 1, **Group 2**, …	The camera shares its ROI with the other cameras of that column.
New group (right)	Starts a new group with the camera, or cameras, dropped there.

To move a camera, use either method:

- **Drag and drop.** Drag the camera card onto the target column. The drop can land anywhere in the column.
- **Context menu.** Right-click the camera card and select the target column from the menu.

To move several cameras at once, select them first: click a card to select it, then `^ Ctrl`-click or `⇧ Shift`-click the others. Dragging, or moving through the context menu, any selected card then moves the whole selection. Several cameras dropped together on **New group** form a single group. Click an empty area of the window to clear the selection.

Each camera card shows the camera name and, below it, the group identifier that the configuration stores for that camera (6). The Configurator generates this identifier, for example `grp-e4e71844`. For a camera in no group, the identifier is the camera name itself.

When changes take effect

Each move applies to the configuration at once. The window has no **Confirm** button, and closing it keeps the changes. As with any other modification, save the configuration (File > Save) to write the grouping to disk.

When the window is closed, any group that holds only one camera is dissolved, and that camera returns to **No synchronisation**. A group can therefore be built one camera at a time without being lost between two moves, but a group of one is not retained.

See also: Camera trigger, Configuring a device.

2026-10-14

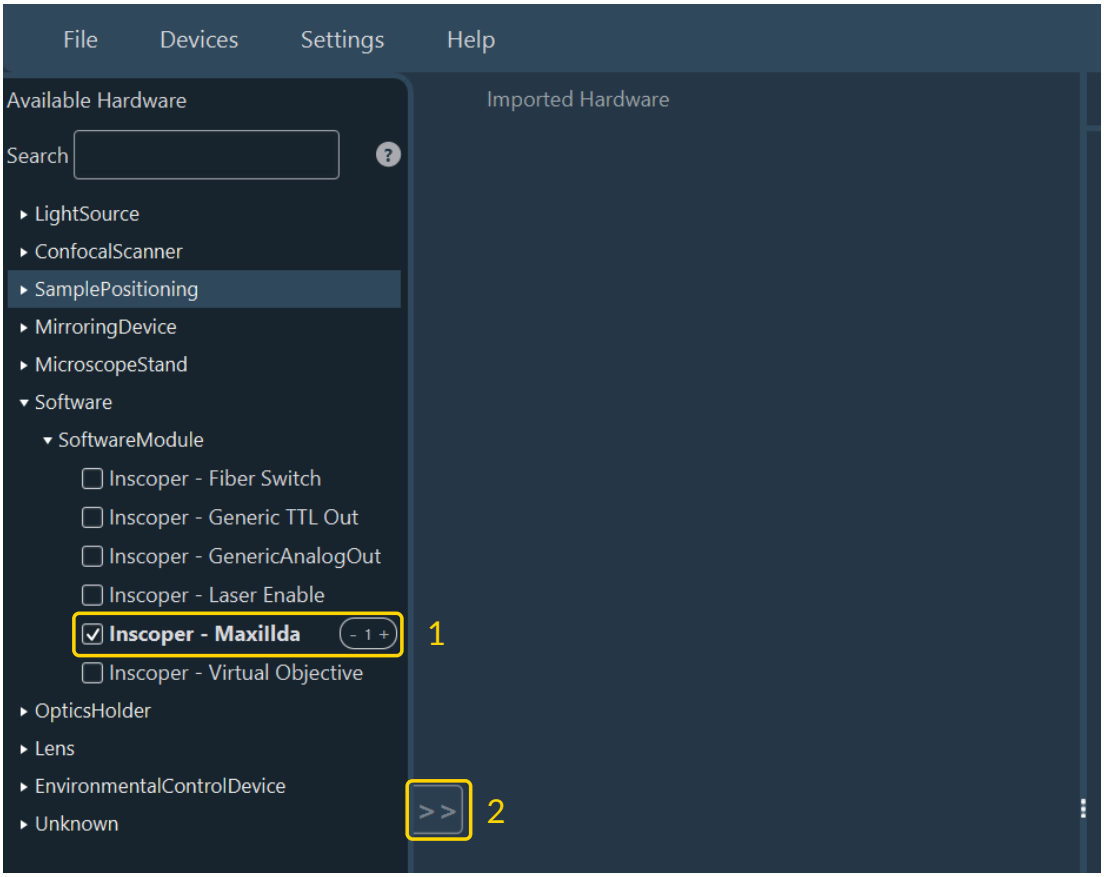
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1.4.6 ILDA (MaxIlda)

This page applies only when a **MaxIlda** device is imported. It covers the initial setup in the configuration wizard and the **Advanced Ilda Parameters** window, with its **Ilda Functions**, **Laser**, **Frap Mode**, **Tirf Mode**, and **Illumination Mode** tabs.

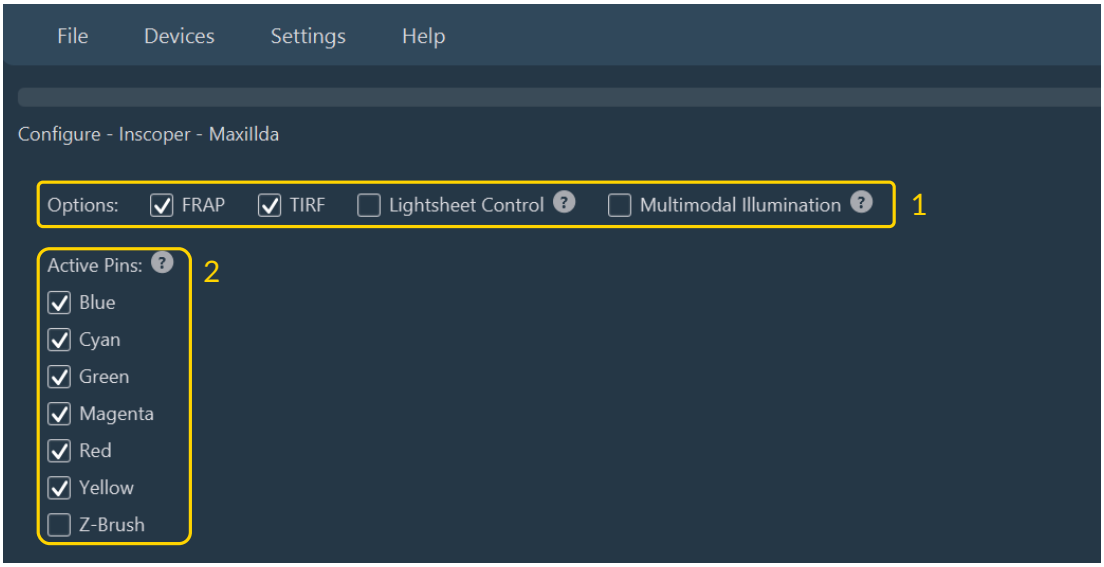
Configuring the device in the wizard

1. In the hardware importation panel, select **Inscoper - MaxIlda** under Software > SoftwareModule (1), then click **>>** (2) to import it.



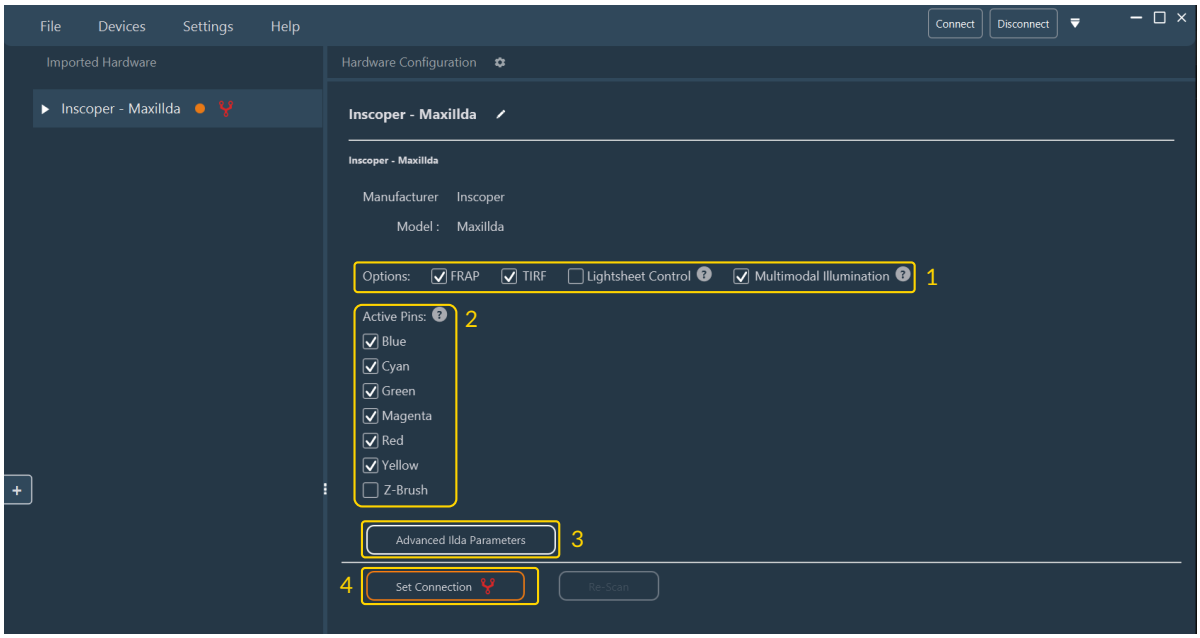
2. On the **Configure** step, select the illumination functions of the system under **Options** (1):
   - **FRAP**
   - **TIRF**
   - **Lightsheet Control**: select this when the ILDA is connected to a light sheet system.
   - **Multimodal Illumination**: select this to switch between illumination modes (FRAP, TIRF, and spinning disk) on a multimodal system. It is required when the system includes both FRAP and a spinning disk module.
3. Under **Active Pins** (2), select the color and intensity pins in use on the ILDA connector.

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4. On the **Set Connection** step, link the MaxIlda to the Device Controller, as described in Connections.

Once the wizard is complete, select the device in the **Imported Hardware** tree to review its configuration. The device view repeats the **Options** (1) and **Active Pins** (2) sections, and adds the **Advanced Ilda Parameters** button (3) and the **Set Connection** button (4).



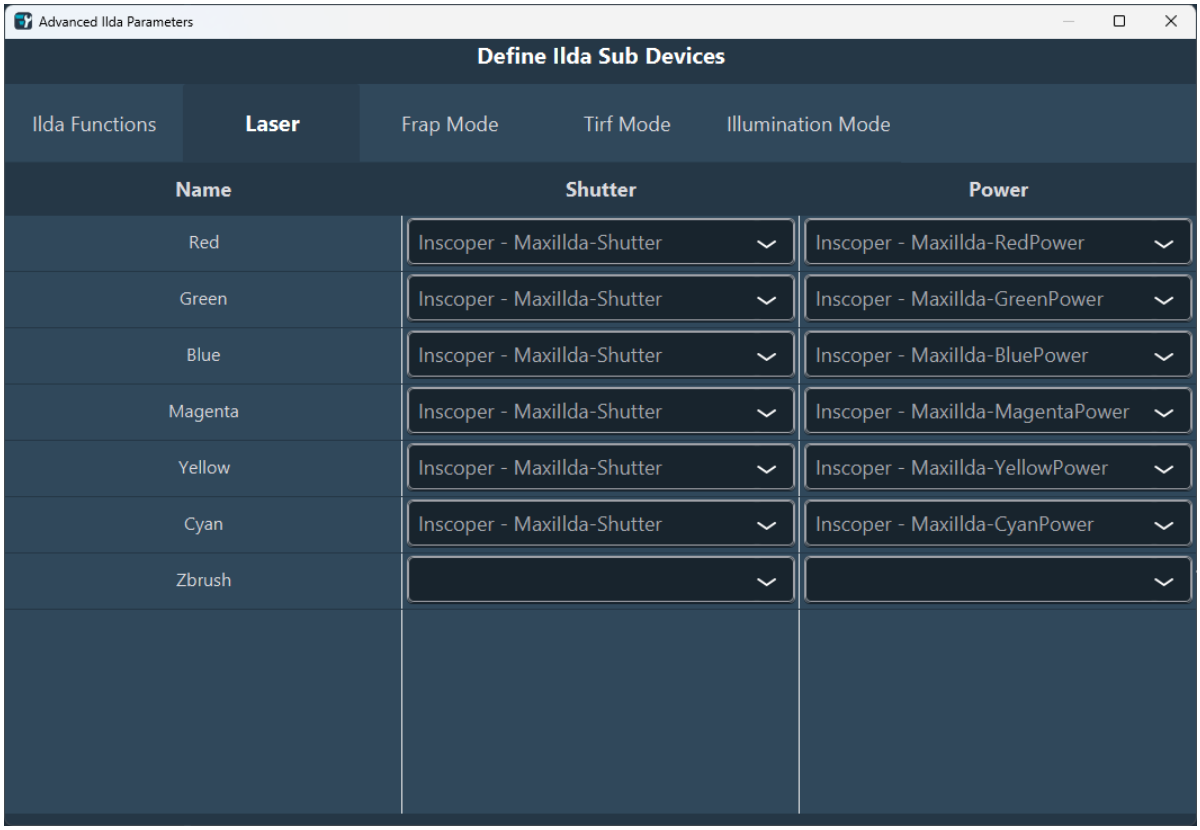
Advanced Ilda Parameters

Click **Advanced Ilda Parameters** (3) to open the window that assigns the parameters of each mode. Most fields are filled in automatically from the hardware description of the devices already imported and tagged: interpoint distance, pulse time, TIRF angle and penetration depth, fire preview, and the active channels of each mode. A mode only becomes active once the parameters it needs are present and correctly tagged, which is a consequence of the guided-selection step. Modify or complete these assignments at any time.

LASER TAB

Laser power and shutter are only assigned automatically when the name of the laser contains a recognized color (red, green, blue, magenta, yellow, or cyan) that matches a tagged parameter. If the name of a laser does not match, or if the assignment is incorrect, set **Power** and **Shutter** manually from the drop-down lists of this tab.

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CALIBRATION DISCRIMINANTS

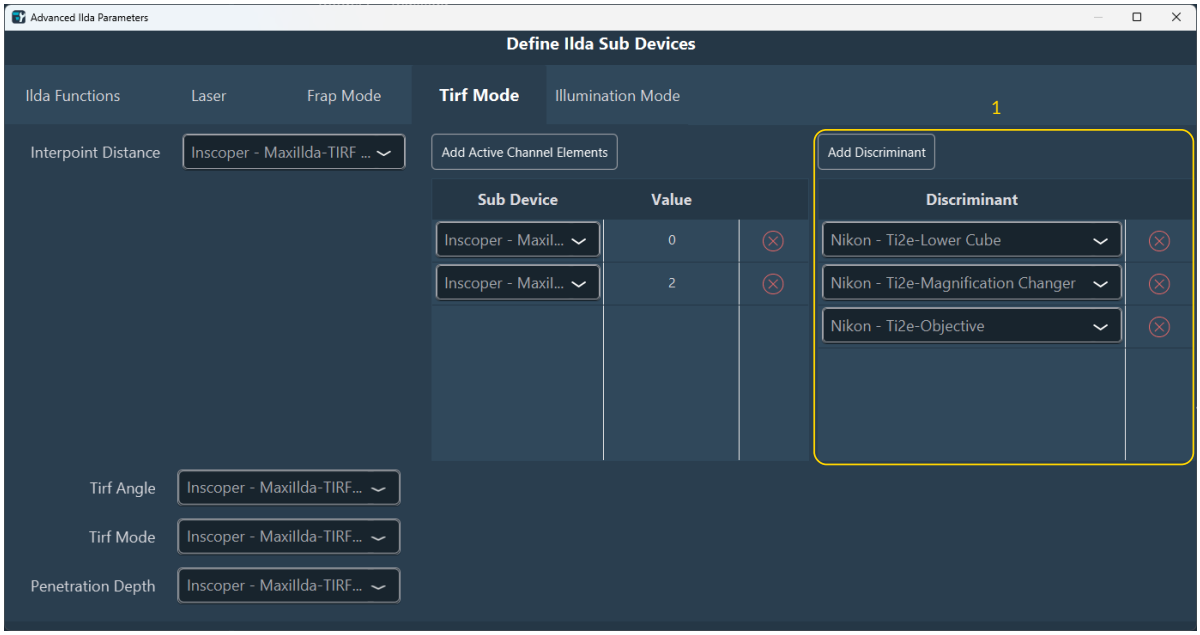
A **discriminant** is a parameter whose state changes which calibration applies. For example, changing the filter cube or the objective changes the calibration that the mode must use. Each discriminant added to the table requires one calibration entry per state of that parameter (each cube, each objective, and so on).

The **Frap Mode**, **Tirf Mode**, and **Illumination Mode** tabs each carry a **Discriminants** table (1). Click **Add Discriminant** to add a row, and the red cross of a row to remove it. The table is pre-populated as matching parameters are added to the configuration:

Tab	Pre-populated with
Frap	Filter cube
Tirf	Objective, filter cube, magnification and de-magnification lenses, and filter wheel
Illumination	Nothing. Add discriminants manually if the calibration must vary with one of these parameters.

An empty table means that the calibration is not split along any parameter.

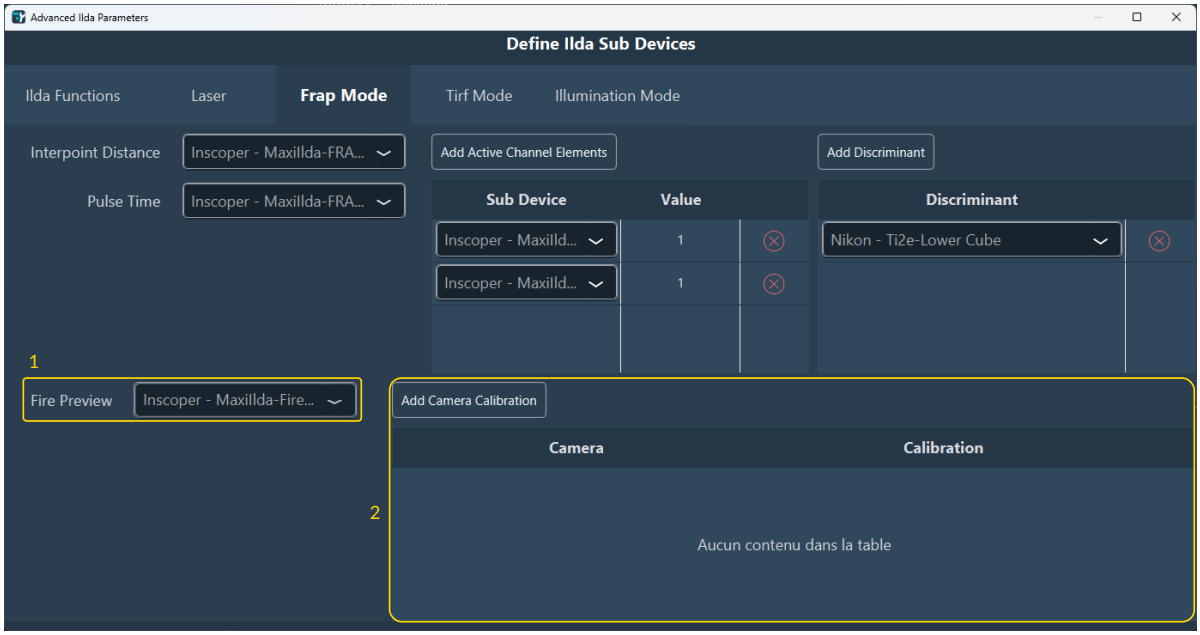
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FRAP TAB: FIRE PREVIEW AND CAMERA CALIBRATION

The **Frap Mode** tab additionally offers two optional settings:

1. **Fire Preview (1)**: The parameter that enables the fire preview function.
2. **Camera Calibration (2)**: A manually edited table, with one row per camera and its calibration value. Click **Add Camera Calibration** to add a row.



Terms

ILDA

The galvanometer-based illumination modules, Ilas and Starscan. When such a module is imported, its device view offers the illumination modes it supports, together with an **Advanced Ilda Parameters** section.

Illumination Mode

The illumination mode selected on a multimodal system: **Frap Mode**, **Tirf Mode**, **ROI Mode**, or **Illumination Mode**. Each mode is enabled by its **Active** checkbox, and each declares the **Active Channel Elements** that identify the channel it applies to.

Interpoint Distance

The distance between two successive points of a scan.

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Pulse Time

The time between two successive points of a scan, that is, the interval between two galvanometer instructions.

Fire Preview

The parameter that enables the fire preview function, the continuous scanning of an ROI.

Tirf Angle

The position of the point, or of the arc, on the circle described by the galvanometers.

Penetration Depth

The angle of the laser at the lens outlet, which sets the depth of penetration of the evanescent field.

Scan Mode

The parameter that switches the module into scanning operation, with its ON and OFF values.

See also: Configuring a device, Calibration.

2026-10-15

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1.4.7 Virtual Objective

The **Virtual Objective** is a software-only device supplied by Inscoper. It declares an objective turret to the system when the physical turret is not motorized. The Imaging Software then knows which objective is in use and takes it into account.

When to use it

Every configuration must contain at least one objective device, so that the Imaging Software has at least one magnifying device from which to compute the pixel size at the sample. When the objective turret is motorized, the microscope stand or its dedicated controller already provides that device.

Import a Virtual Objective when:

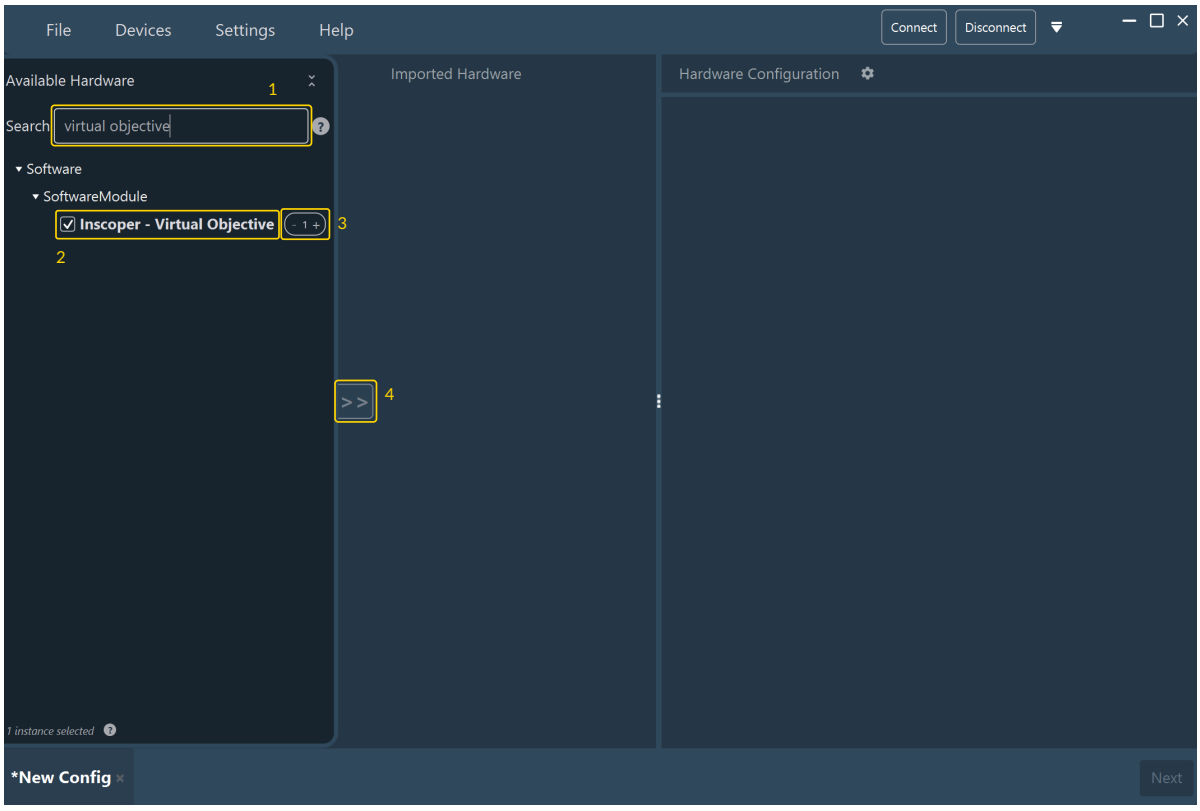
- the microscope has a manual objective turret;
- the microscope has a single fixed objective;
- an objective must appear in the configuration so that it can be used as a calibration discriminant.

Do not import it when the turret is already driven through the microscope stand or a dedicated controller: that device already provides its own objective turret group.

> **Warning**
>
> The value stored by the Virtual Objective is a declaration, not a measurement. Nothing verifies that the objective in the light path matches the selected slot. Every value derived from it (pixel size, scale bar, measurements, and objective-dependent calibrations) is correct only as long as the operator keeps the selection in step with the hardware.

Importing it

Import the Virtual Objective like any other model, from the hardware importation panel:



1. Type `Virtual Objective` in the **Search** field (1).
2. Select the **Inscoper - Virtual Objective** checkbox (2), listed under Software > SoftwareModule. It carries no physical hardware type.
3. Set the instance counter (3) to the number of manual objective turrets. A stand with two objective turrets needs two instances.

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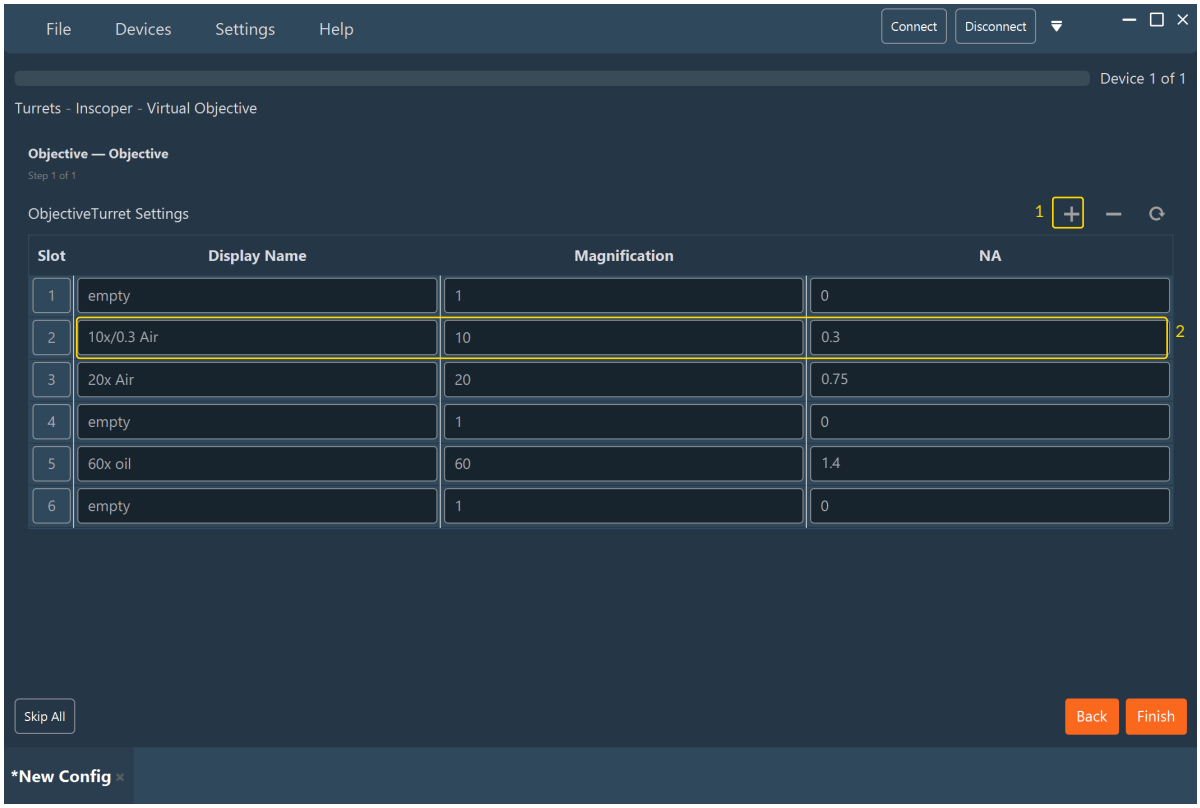
4. Click **>>** (4) to move the selection to **Imported Hardware**.

The device has no connection of any kind: no serial port, no TTL line, and no USB link. It never appears in the Connections step, and no cable has to be declared for it.

Setting it up

The device exposes one group, **Objective Turret**, described as an objective turret. Its configuration therefore uses the slot table documented in Turrets and filter wheels.

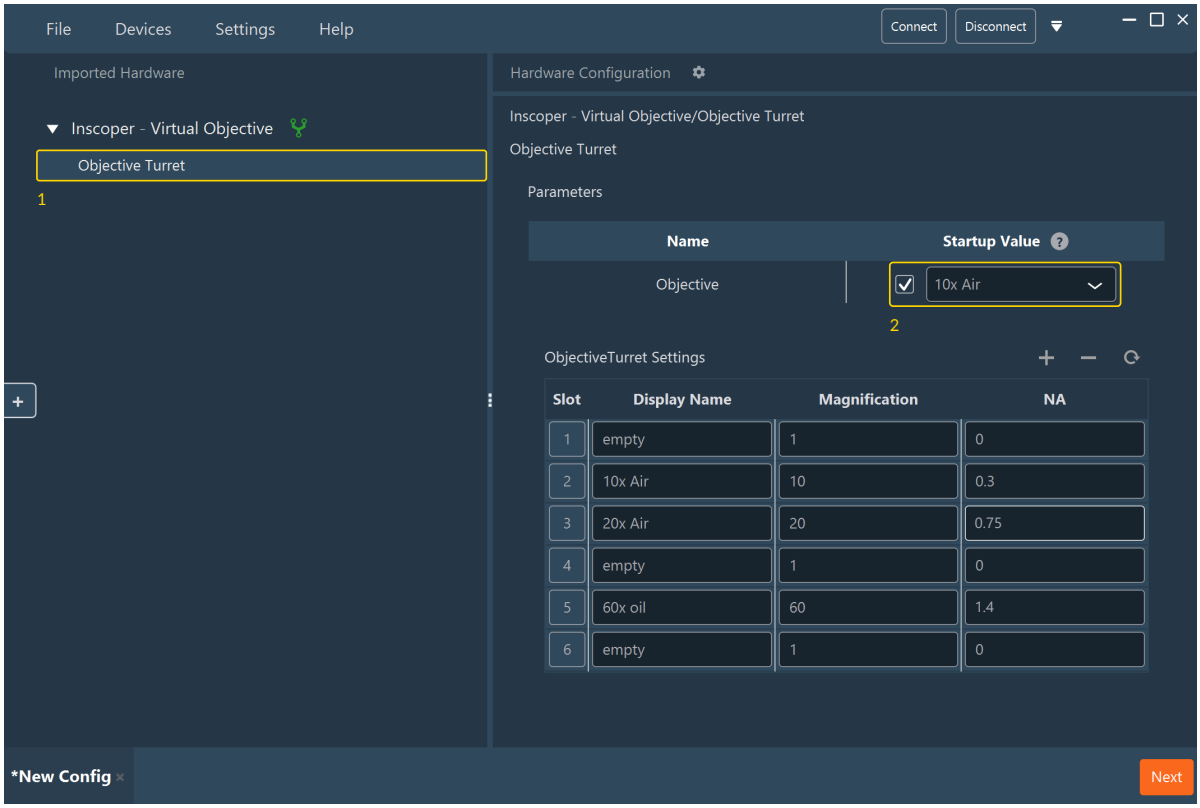
SLOT TABLE



1. Click **+** (1) until the number of rows matches the number of positions on the physical turret.
2. For every occupied slot, type the objective in the **Display Name** field as `<magnification>x/<NA> <immersion>`, for example `10x/0.3 Air` (2). The **Magnification** and **NA** columns of that row fill in automatically.
3. Check the **Magnification** of every occupied slot, and correct it if needed. The Imaging Software divides the camera pixel size by the magnification to compute the pixel size at the sample, which is the reason the device exists.
4. Leave unoccupied slots empty.

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STARTUP VALUE



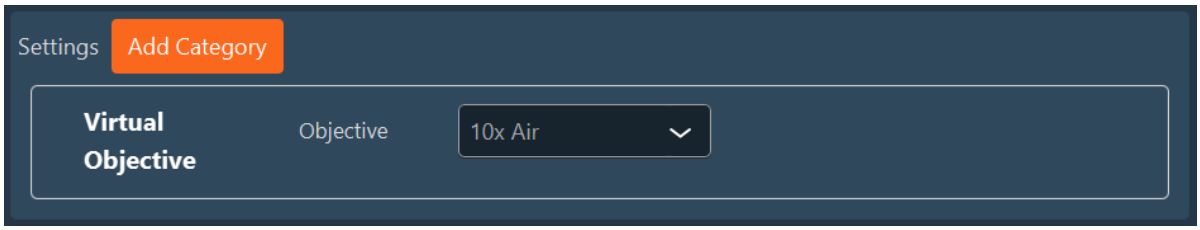
1. In the **Imported Hardware** tree, select **Objective Turret** (1) under the imported Virtual Objective device.
2. In the **Startup Value** column (2), select the checkbox and choose the objective that is normally in place when the instrument is switched on. The list shows the display names entered in the slot table.

The firmware selects slot `1` when it initializes, so a configuration with no startup value starts on the first slot.

No other setting is required. The device declares no diagnostic to run against hardware and is always reported as available.

In the Imaging Software

Once configured, the group behaves like a motorized objective turret in the Imaging Software layout. The objective appears as a selector listing the slot display names. Changing the selection updates the pixel size and the scale bar.



Because the rest of the system trusts this selection, place the selector where the operator sees it, not in an advanced section. An operator who turns the turret by hand can then correct the declared slot immediately.

See also: Turrets and filter wheels, Camera Trigger, Configuring a device, and Calibration.

2026-10-07

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1.4.8 Generic Devices

A generic device represents hardware that has no communication protocol of its own and is driven only by a TTL line, an analog line, or both, of the Device Controller.

> **Note**
>
> Several generic devices produce the same electrical signal. For example, Fiber Switch, Mirror Switcher, LiveSR, and Laser Enable all drive one TTL line between 0 V and 5 V. They differ in the **role** their hardware description declares, which determines:
>
> - where the control appears in the Imaging Software: in the channel settings or nowhere;
> - whether the value can change during an acquisition or is set once at startup;
> - whether the Configurator treats the line as a shutter, an intensity, a magnification, or a camera trigger.
>
> Select the device by the role the hardware plays in the instrument, not by the type of line it uses.

Choosing a device

The hardware…	Use	Connection(s) required	Control in the Imaging Software
Needs one TTL line held high from startup and never changed (laser enable, interlock)	Laser Enable	1 Generic TTL Output	None
Has two states (off/on) that depend on the channel and carry no dedicated meaning (fiber or light-path selector)	Fiber Switch	1 Generic TTL Output	On/off switch in the channel settings
Switches the light path between a FRAP scanner and widefield fluorescence	Mirror Switcher	1 Generic TTL Output	`FRAP` / `Fluorescence` drop-down list in the channel settings
Is the two-position intermediate magnification of a LiveSR module	LiveSR	1 Generic TTL Output	`1x` / `1.67x` drop-down list in the channel settings
Must receive one fixed-width TTL pulse per exposure (camera trigger)	Generic Trigger	1 Generic TTL Output	None; selected as the camera trigger
Is a laser with an analog power input, with or without a digital on/off input	Generic Laser Modulation	1 Generic Analog Output, plus 1 Generic TTL Output (optional)	Power slider and shutter in the channel settings

Behavior common to TTL devices

SIGNAL LEVELS

`1` drives the line high (5 V); `0` drives it low (0 V). There is no inversion setting: to invert a channel-dependent device, assign the opposite state to each channel; to invert a shutter, swap **Open Value** and **Close Value** in the Shutter Settings table (Expert Mode).

STABILIZATION DELAYS

Fiber Switch, Mirror Switcher, and LiveSR each have two stabilization delays (µs, startup values). After each output change, the Device Controller waits for one of them before it executes the next command, to let the hardware settle:

- **Stabilization Delay After 0** applies when the line goes low (0 V);
- **Stabilization Delay After 1** applies when the line goes high (5 V).

Set a delay to `0` to skip the wait for that transition.

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Laser Enable

Laser Enable drives one TTL line to a fixed level after the Device Controller initializes, and leaves it there. Use it for an enable, key switch, or interlock input that must be held high for the hardware to operate, and that the Imaging Software never needs to change.

Parameter	Description	Default
Laser Enable	Level applied at startup: `1` enabled, `0` disabled.	`1`

Laser Enable is the only parameter. It is a startup value, applied once the Device Controller has initialized. The device does not appear in the Imaging Software.

Laser Enable has no configurable stabilization delay. The Device Controller waits a fixed 1 ms after the line goes high, and does not wait after it goes low.

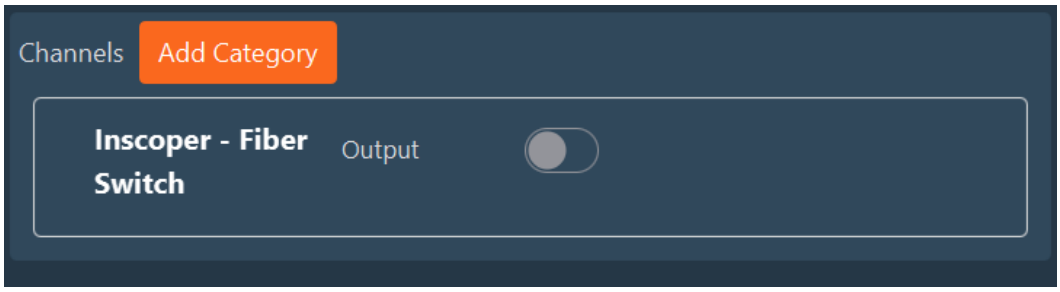
Do not use Laser Enable to switch a laser on and off between channels; use Generic Laser Modulation instead.

Fiber Switch

Fiber Switch drives one TTL line whose level is set per channel. Use it for any two-state element whose position depends on the channel being acquired, such as an optical fiber switch or a light-path selector.

Parameter	Description	Default
Output	Line level: `0` low, `1` high. Set per channel in the Imaging Software.	—
Stabilization Delay After 0	Wait after the line goes low, in µs. See Stabilization delays.	1000 µs
Stabilization Delay After 1	Wait after the line goes high, in µs.	1000 µs

In the Imaging Software: an on/off switch in the channel settings.



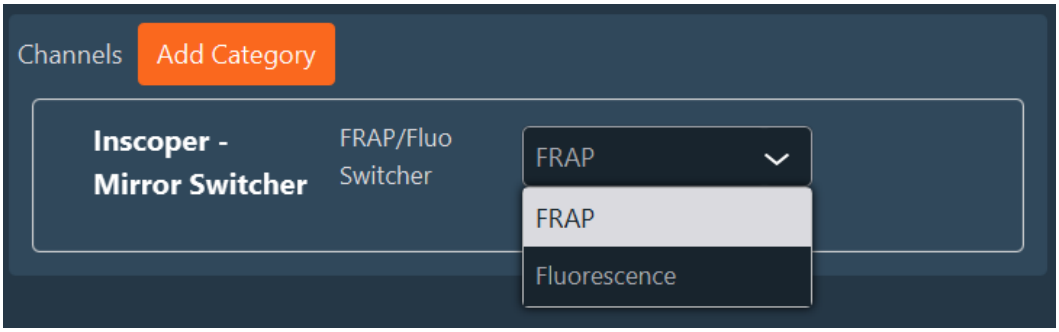
Mirror Switcher

Mirror Switcher drives a motorized mirror that directs the light path either to a FRAP scanner or to widefield fluorescence illumination.

Parameter	Description	Default
FRAP/Fluo Switcher	`FRAP` (line low) or `Fluorescence` (line high). Set per channel in the Imaging Software.	—
Stabilization Delay After 0	Wait after switching to `FRAP`, in µs. See Stabilization delays.	1 000 000 µs (1 s)
Stabilization Delay After 1	Wait after switching to `Fluorescence`, in µs.	1 000 000 µs (1 s)

In the Imaging Software: a `FRAP` / `Fluorescence` drop-down list in the channel settings.

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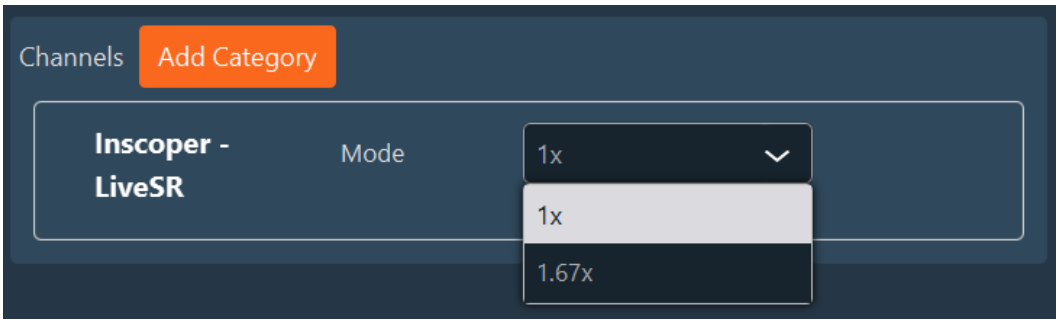
The 1 s defaults cover the mechanical motion of a typical mirror. Reduce them only if the manufacturer specifies a shorter switching time. If the mirror is wired with the opposite polarity, swap the two labels in the value table of the control's advanced settings, in the Imaging Software layout.

LiveSR

LiveSR drives the two-position intermediate magnification changer of a LiveSR super-resolution module.

Parameter	Description	Default
Mode	`1x` (line low) or `1.67x` (line high). Set per channel in the Imaging Software.	—
Stabilization Delay After 0	Wait after switching to `1x`, in µs. See Stabilization delays.	50 000 µs (50 ms)
Stabilization Delay After 1	Wait after switching to `1.67x`, in µs.	50 000 µs (50 ms)

In the Imaging Software: a `1x` / `1.67x` drop-down list in the channel settings.



> **Note**
>
> Because the device declares a magnification, the Imaging Software includes the selected factor in the pixel size of the acquired images.

Generic Trigger

Generic Trigger emits one positive TTL pulse of fixed width each time it is fired. Use it to trigger a camera, or another instrument, that starts an exposure on a rising edge.

Parameter	Description	Default
Trigger Width (us)	Duration of the high state of the pulse, in µs. The Device Controller waits for the full width before executing the next command.	500 µs

The line is driven low at initialization and at shutdown.

In the Imaging Software: no control. Generic Trigger is offered as a trigger source in the camera's device view when it is imported in the same device as the camera; see Camera trigger.

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Generic Laser Modulation

Generic Laser Modulation drives a laser that accepts an analog power-control voltage and, optionally, a digital on/off (gate) input. The analog line sets the power; the on/off function is exposed as a shutter.

Shutter Control. The device panel offers two options:

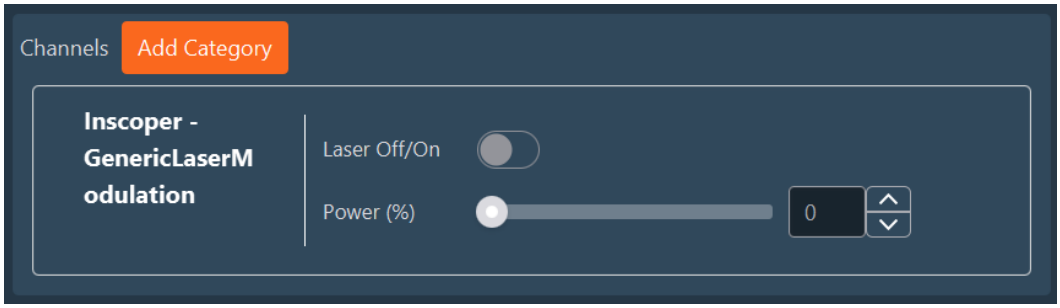
Option	Shutter driven by	When to choose it
TTL (default)	The Generic TTL Output, wired to the laser's digital input. The analog power is not changed when the shutter closes.	The laser has a digital modulation input.
No TTL	The Generic Analog Output itself: closing sets it to 0 V, opening restores the requested power. No TTL line is needed.	The laser has no digital input.

Parameter	Description	Default
Power (%)	Laser power, 0–100 %, step 0.01 %. The output voltage is **Power** × **Maximum Voltage** / 100.	0 %
Laser Off/On or **Laser Virtual Off/On**	The shutter, according to **Shutter Control**.	Off (TTL), On (virtual)
Maximum Voltage (mV)	Voltage corresponding to 100 % power, 0–10 000 mV. Set it to the maximum input voltage the laser accepts.	5000 mV
Power Delay	Wait after each power change, in µs.	0
Off Delay	Wait after the shutter closes, in µs.	1000 µs
On Delay	Wait after the shutter opens, in µs.	1000 µs

Maximum Voltage and **Power Delay** are enabled under **Advanced Parameters** in the device panel by the **Maximum Voltage** and **Power Stabilization Delay** checkboxes; **Off Delay** and **On Delay** are both enabled by the **Off/On Stabilization Delay** checkbox. When a checkbox is cleared, the default above applies. The off and on delays apply with either **Shutter Control** option.

> **Warning**
>
> Check the analog input range in the laser manufacturer's specification before the first acquisition. The default **Maximum Voltage** of 5000 mV exceeds the input range of lasers rated for 0–1 V or 0–2.5 V.

In the Imaging Software: the power appears as an intensity slider in the channel settings. The shutter is listed in the Shutter Settings table, where its open and close values can be swapped in Expert Mode for a laser with an inverted digital input. **Open only when imaging** is cleared by default for this device.



See also: Connections, Shutter, Camera trigger, Configuring a device.

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1.5 Imaging software

1.5.1 Imaging Software Layout

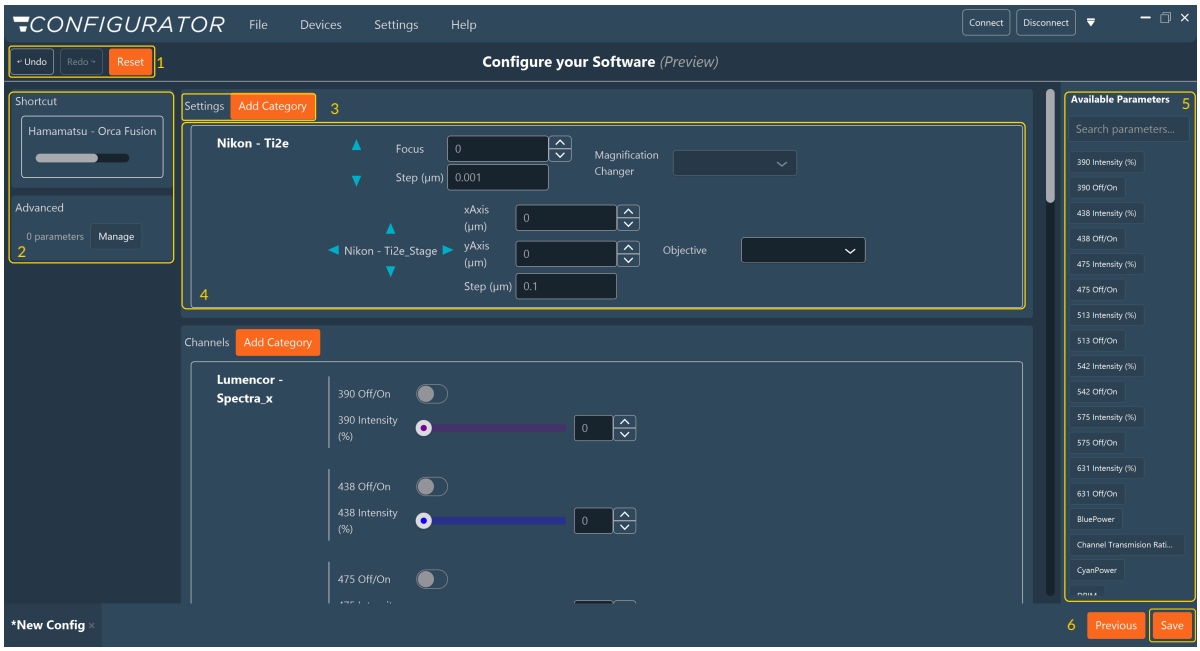
The layout stage defines the acquisition interface that the end user sees in the Inscoper Imaging Software. To open it, click **Next** in the main workspace.

The Configurator builds a first layout automatically from the configured hardware. Use the editor to refine it.

> **Note**
>
> Clicking **Next** in the main workspace first checks the configuration and may show a validation warning listing outstanding startup values and connections. See The validation warning lists outstanding items.

The editor

The header reads **Configure your Software (Preview)**: the controls displayed are those of the Imaging Software itself, rendered with the values of this configuration.



1. **History controls (1)**: **Undo**, **Redo**, and **Reset**. Right-click **Undo** or **Redo** to list the recorded steps. **Reset** opens the **Update Layout** window, which lists the parameters of the configuration and highlights those absent from the layout. The selected parameters are removed from their current position and placed again at their automatic position.
2. **Shortcut and Advanced panels (2)**: Two secondary destinations for controls. **Shortcut** holds the controls promoted to the Imaging Software shortcut bar. **Advanced** holds controls kept out of the routine interface. It shows how many parameters are assigned, and its **Manage** button lists them.
3. **Zone header (3)**: The name of the zone, with an **Add Category** button that creates an empty category in it.
4. **Category card (4)**: One card per category. Each card holds the controls of one or more devices. Drag a control to move it inside its category or to another category.
5. **Available Parameters (5)**: Every parameter of the configuration, with a search field. Drag a chip from this list into a category to add the control. Parameters already placed remain listed, so the same parameter can be shown in more than one place.
6. **Save (6)**: Writes the configuration, including the layout. **Previous** returns to the hardware stage.

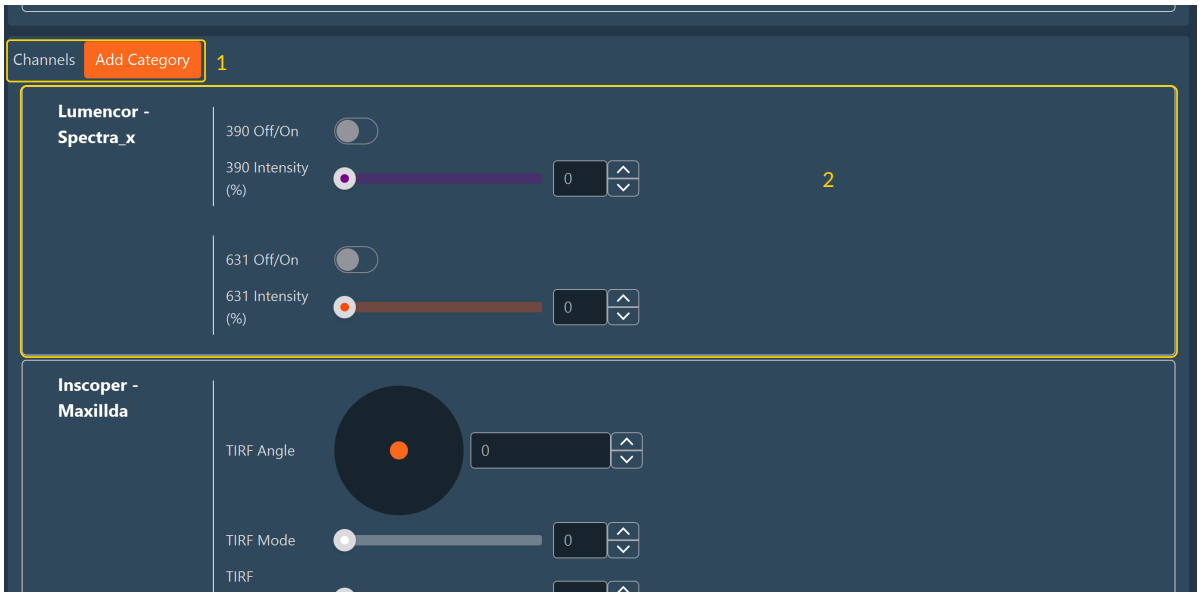
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Zones

The editor arranges controls into four zones.

Zone	Purpose
Settings	Instrument settings that hold across an acquisition, such as stage position, focus, and objective.
Channels	Controls that vary from one acquisition channel to the next, such as filters, shutters, and light source intensities.
Shortcut	Controls promoted to the shortcut bar for immediate access.
Advanced	Controls reserved for commissioning and calibration, hidden from the routine interface.

Settings and **Channels** occupy the central column, one below the other. Scroll down from the Settings zone to reach the header of the Channels zone (1) and its category cards (2).



Settings or Channels

Place a control in **Channels** only if its value must change between channels of the same acquisition. Placing an instrument-wide setting in **Channels** forces the user to set it separately for every channel.

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Editing the layout

Task	How
Move a control	Drag it to its destination. A placeholder marks the drop position.
Move several controls at once	`^ Ctrl`-click each control to select it, then drag the selection.
Send a control to another zone	Right-click the control, then choose the destination under **Send to...**.
Edit several controls at once	Select two or more controls, right-click the selection, and click **Batch Edit**. See Imaging Software advanced settings.
Add a category	Click **Add Category** in the zone header.
Rename a category	Click its name and type the new name.
Remove a category	Hover over the category card and click the **X** button.
Add a control	Drag its chip from **Available Parameters**.
Edit the settings of a control	Hover over the control and click the gear icon, or double-click the control. See Imaging Software advanced settings.
Undo or redo	`^ Ctrl` + `Z` to undo, `^ Ctrl` + `Y` or `^ Ctrl` + `⇧ Shift` + `Z` to redo, or the toolbar buttons.

Warning

Moving a control out of the **Channels** zone changes how the end user operates the instrument: the parameter can no longer be set per channel. After such a move, the Configurator displays a warning. To suppress the warning for subsequent moves, select **Don't show this again** before clicking **OK**. The choice is stored with the application settings.

Adding hardware after the layout exists

Returning to the hardware stage and importing further devices does not discard the layout. The parameters of the new devices are placed automatically at their default position, and they also appear in **Available Parameters**. The rest of the layout is preserved.

Saving

Click **Save** to write the configuration. The layout is stored with it and is applied the next time the Imaging Software loads this configuration.

Next step: Proceed to Calibration, or return to Creating a configuration to save.

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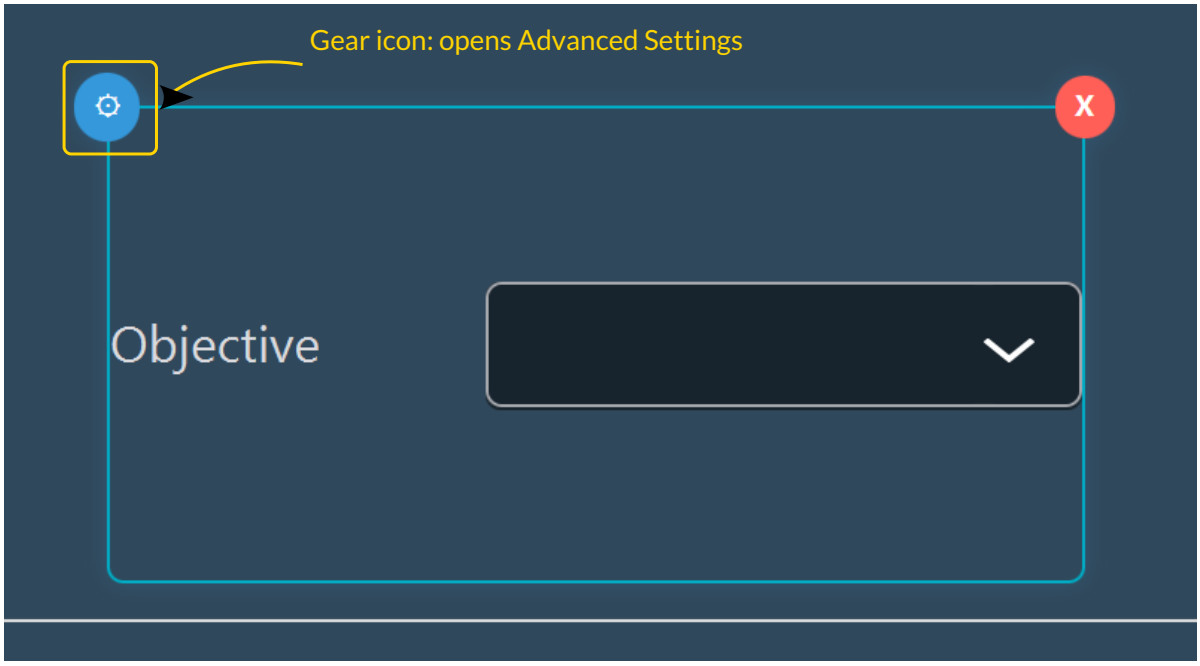
1.5.2 Imaging Software Advanced Settings

Each control in the Imaging Software layout has advanced settings that determine how the Imaging Software displays and constrains it: the label, the widget type, the numeric bounds, the unit, and the visibility rules.

The Configurator derives these settings from the hardware description when it generates the layout. Override them only where the derived values do not match the instrument.

Opening the advanced settings

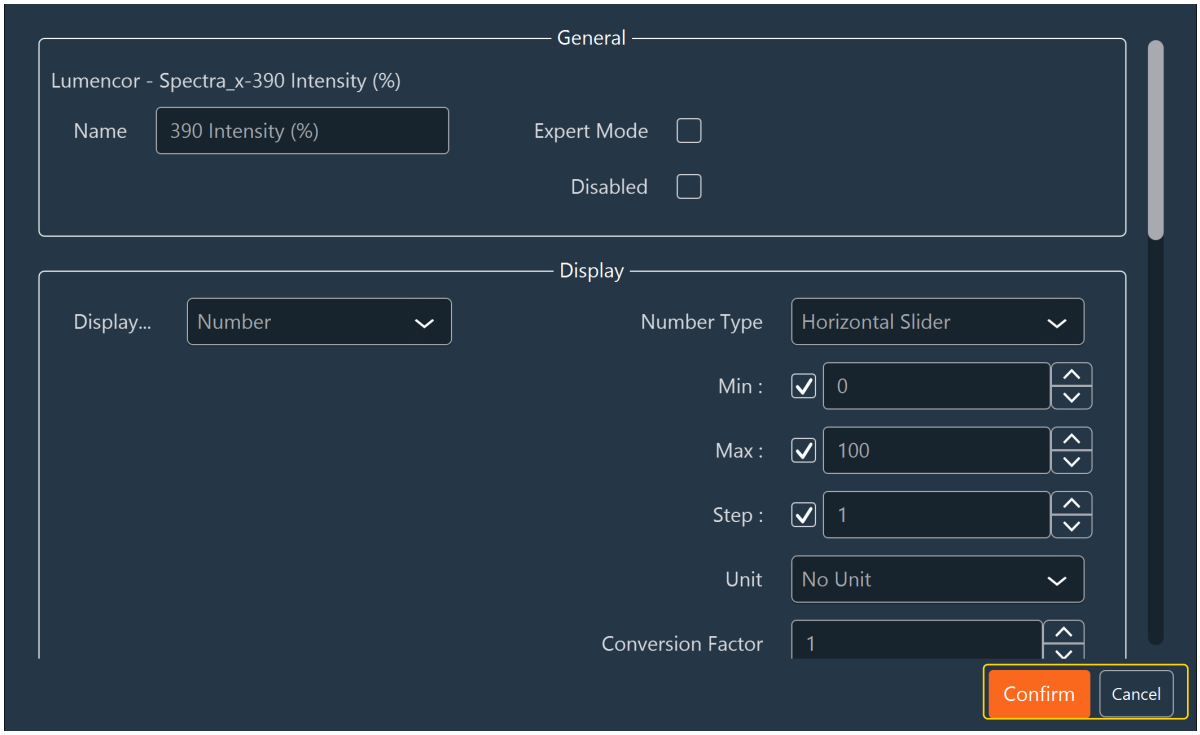
1. Click **Next** to open the layout stage.
2. Hover over the control in its category card. A gear icon appears on the control.
3. Click the gear icon, or double-click the control. The **Edit Parameter - control name** window opens.
4. Change the settings, then click **Confirm** to apply them, or **Cancel** to discard them.



The window is modal and applies to a single control. For a stage, the window covers the X and Y axes together and adds a field for the stage name.

The window has three sections: **General**, **Display**, and **Advanced**.

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General

The top of the section shows the full name of the parameter: the device name followed by the parameter name. Quote this name when reporting a problem.

Setting	Description
Name	The label of the control in the Imaging Software.
Expert Mode	Restricts the control to Expert Mode. The control is hidden in User Mode, the standard mode of the Imaging Software.
Disabled	Displays the control but prevents the user from changing its value.

Display

Display Type sets the widget that the Imaging Software uses for the control. Each type shows its own fields when selected.

Display type	Use for
Select	A parameter with a fixed set of named states, such as a turret position or a filter wheel position.
Switcher	A parameter with two states, such as a shutter.
Number	A continuous or stepped numeric parameter, such as a position, an intensity, or an exposure time.
Text	A read-only text parameter. This type has no further settings.

SELECT

Setting	Description
Select Type	**Combo Box** (drop-down list), **Toggle Button** (two-state switch), or **Radio Button** (one button per state).
Value table	One row per state: the **Value** sent to the hardware and the **Display Value** shown to the user. Click **Add Value** to append a row, and click the red cross to remove one.

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Filter wheel

For a five-position filter wheel with indices 0 to 4, select **Combo Box** and enter the following values.

Value	Display Value
0	DAPI
1	GFP
2	YFP
3	Cy3
4	Cy5

SWITCHER

Setting	Description
Switcher Type	**Switcher** (two-state switch) or **Button** (pair of labeled buttons).
Open Value, **Close Value**	The values sent to the hardware for each state.
Open Name, **Close Name**	The labels shown for each state. Only the **Button** type uses them.

NUMBER

Setting	Description
Number Type	**Number Field Only**, **Vertical Joystick**, **Theta Joystick**, **Horizontal Slider**, **Vertical Slider**, or **Potentiometer**.
Min, **Max**, **Step**	The bounds and increment of the control. Select the checkbox next to a field to override its value. When the checkbox is cleared, the value from the hardware description applies.
Unit	**No Unit**, **Distance**, or **Time**. The Imaging Software formats the value according to the **Distance Unit** or **Time Unit** set in Settings > Edit Settings.
Conversion Factor	The multiplier between the value displayed to the user and the value sent to the hardware. See Conversion factor.
Number Format	The display format of the value, which sets the number of decimal places.

Some number types have additional fields.

Number type	Additional fields
Horizontal Slider, **Vertical Slider**	**Log Mode** and its **Center Value**, **Slider Length**, **Slider Visible Export Mode Only**, and **Color**.
Vertical Joystick, **Theta Joystick**	**Joystick Name**, which groups the axes shown on the same joystick.
Potentiometer	**Angle Length Sub Device Id** and **Radius Percent Sub Device Id**: the parameters controlled by the angle and the radius of the widget.

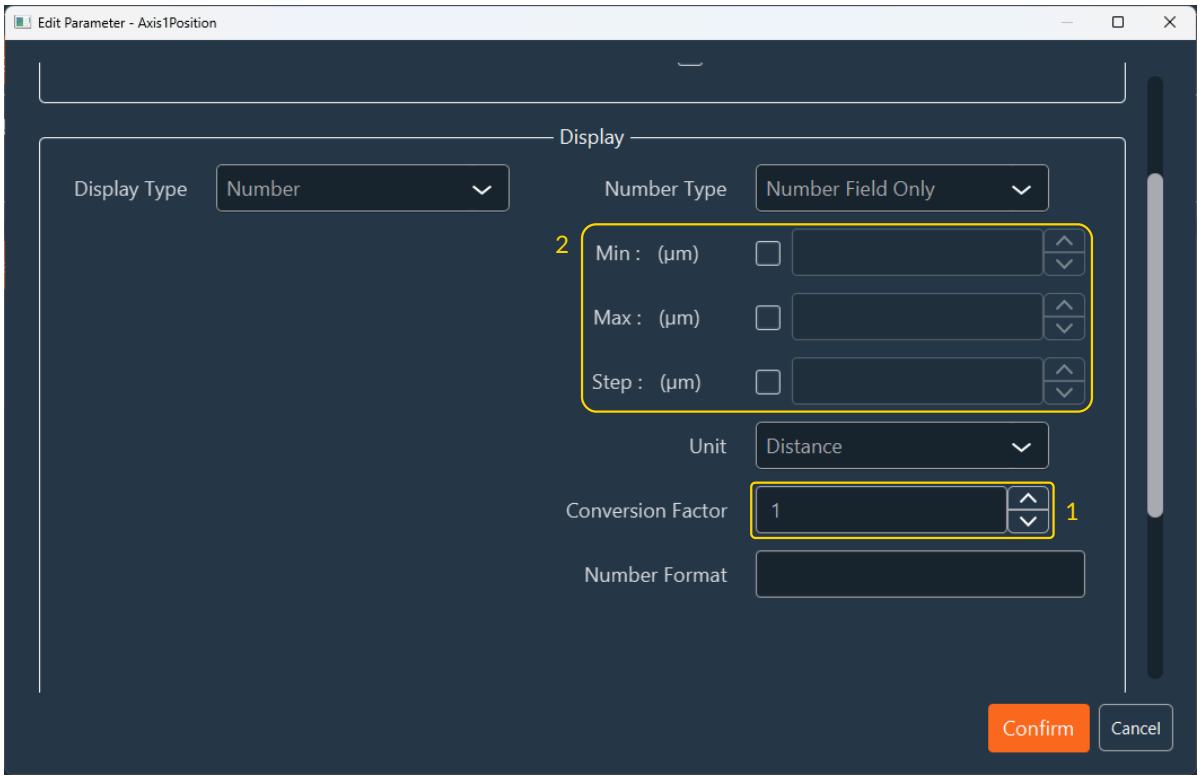
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> **Warning**
>
> **Min**, **Max**, and **Conversion Factor** determine the values sent to the hardware. An incorrect bound allows the Imaging Software to send the instrument to a position it cannot reach. Check these values against the hardware manufacturer's documentation.

Conversion factor

Some distance devices require a manual conversion factor.

1. Enter the factor in **Conversion Factor** (1).
2. Leave **Min**, **Max**, and **Step** (2) at their original values.
3. Click **Confirm**.



To check the result, save the configuration and load it in the Inscoper Imaging Software.

Advanced

Setting	Description
Channel Extra Param	Also offers the control as an additional channel-level parameter in the Imaging Software. The control keeps its position in the layout.
Acquisition Extra Param	Also offers the control as an additional acquisition-level parameter.
Tooltip	The text shown when the user hovers over the control.
State Changed Message	The message shown when the value of the control changes. Use it to warn the user of a change they must know about, such as a switched beam path.

Batch editing

To change the **Expert Mode**, **Disabled**, **Channel Extra Param**, or **Acquisition Extra Param** setting of several controls at once:

1. In the layout editor, `^ Ctrl`-click the controls to select them.
2. Right-click the selection and click **Batch Edit**.

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3. For each setting, choose **Yes**, **No**, or **No Change**, then click **Confirm**.

Settings left at **No Change** keep the individual value of each control.

2026-10-15

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1.6 Reference

1.6.1 Changelog

This page lists the changes in each published release of the Inscoper Configurator 2.0 series, most recent first. Each entry describes the effect visible to the person configuring a system. Internal changes with no visible effect are not listed.

The installed version is reported in Help > About.

> **Upgrading from version 1.3**
>
> Version 2.0 does not open configurations written by version 1.3.

Version 2.0.4

Released October 16, 2026. Corrective release. Installing it is recommended for every 2.0 installation.

ADDED

- **Camera pixel size.** When the configuration targets the Imaging Software, the view of a camera device shows the pixel size of each camera that the device drives, in µm. A value read from the camera during a Scan is locked and marked (read from camera). A value the camera cannot report is entered in this field, and the **Camera pixel size** window asks for it after each Scan that could not read it, with the current value as a suggestion. While a camera has no valid pixel size (0.5 µm to 50 µm), its device carries the orange dot in the tree. See Camera pixel size.

FIXED

- **Pixel size of cameras that do not report it.** On a camera whose driver cannot read the pixel size, such as the PCO Panda, each Scan reset the pixel size to 0, and the Imaging Software then received 0. A pixel size read during a Scan is now taken only when it is valid, and a value entered by hand is kept.

  > **Note**
  >
  > A configuration saved by an earlier version may hold a pixel size of 0 for such a camera. Open it, enter the pixel size given in the camera datasheet in the view of the camera device, and save the configuration again.

- **Windows opened during a Scan.** Several corrections:
  - the window asking whether to reuse a Scan result already stored for the device could open behind the progress indicator of the Scan;
  - the window listing the functions to create after a Scan displayed `StringBinding [invalid]` in place of the device name.

Version 2.0.3

Released October 15, 2026. Corrective release. Installing it is recommended for every 2.0 installation.

ADDED

- **Camera and trigger bundles.** The Hamamatsu ORCA-Fusion and the Photometrics Kinetix, Prime BSI, Prime BSI Express, and Moment cameras can be imported together with their Inscoper camera trigger, as the PCO Panda already could. The bundle pairs the camera with its trigger and presets the trigger signals that match the camera wiring. The presets are saved with the configuration and restored when it is reopened.
- **Expand and collapse all.** A button next to **Available Hardware** expands or collapses every device type of the importation tree, including a tree filtered by a search. The importation panel adjusts its width smoothly to the rows displayed.
- **Blocked positions.** A slot of a filter wheel or filter cube turret can be set to **Block**, for a position that lets no light through. See Turrets and filter wheels.
- **Filter suggestion.** In a filter wheel, the filter of a slot is suggested from its **Display Name**: the name of a library element, the `<cube> Excitation` and `<cube> Emission` convention, or the library filter whose passband best fits a stated wavelength,

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such as `GFP 525/50`. The suggestion follows the name while it is edited, and a filter selected manually is kept. Default names such as `0`, `Pos 3`, or `Empty` suggest nothing. Selecting a filter names an unnamed slot after it. See Turrets and filter wheels.

- **Manufacturer list.** The **Manufacturer** field of the Filter Manager lists Semrock and Chroma, then every manufacturer already named in the library. Another name can still be typed. See The editor layout.

CHANGED

- **Generic axes.** The generic axis of a multi-axis controller is now an ambiguous element. Its role (X axis, Y axis, Focus, Piezo, or None) is selected in **Ambiguous Role Definition**, and the stage axes now follow that role. A generic axis set to **None** is driven as a plain setting. See Handling Ambiguous Devices.

> **Note**
>
> A configuration saved by an earlier version takes the role of each generic axis from the stage axes it recorded. After opening it, check the role of each generic axis in **Ambiguous Role Definition**.

- **Focus moves on multi-axis controllers.** On a controller whose axes move only on a move-all command, such as the ASI MS2000 or the PI C-884, that command now follows every focus move, and the acquisition waits for the end of the move.

> **Note**
>
> The configuration files generated by an earlier version do not contain this command. Open each configuration that uses such a controller and save it again.

- **Manage Filters.** The **Manage Filters** button now sits in the header of each filter column of the slot table. Opened from there, the Filter Manager starts on a new element of the kind the column lists, rather than on the first element of the library. See Turrets and filter wheels.
- **New filter entries.** A new filter now starts as a band-pass filter with one editable range (500 nm, 20 nm wide), and a new dichroic with one range without width. A wavelength typed in **Name** reshapes this range. See Recording a range.
- **Wavelengths in names.** A name now states a wavelength only through a three-digit center between 300 nm and 900 nm, such as `525`, `525/50`, or `FF01-525/50`. Catalog numbers such as `49002` are no longer read as wavelengths. The Filter Manager and the slot table apply the same rule. See Recording a range.
- **Objective names.** In the objective turret, **Display Name** and **Magnification** now update each other. A magnification entered for an unnamed slot names it (`10` gives `10x`), and a new magnification replaces the one stated in the name (`Plan-Apo 63x/1.4` becomes `Plan-Apo 40x/1.4`). A decimal comma is accepted, as in `1,25x`. See Turrets and filter wheels.
- **Slot row buttons.** The **+** and **−** buttons are now hidden for a turret whose positions are declared by the device. They remain when the configuration holds a slot added manually, so that this slot can be removed. See Turrets and filter wheels.
- **Context menu.** The keyboard shortcut displayed next to a command is now smaller and dimmed. It was formatted like the command, so that the device menu read **Delete Delete**.

FIXED

- **Device settings.** A device setting saved with a value other than its default, such as the **Delay** ready mode of a camera trigger, could revert to its default when the configuration was reopened, and the generated files then lost the matching reference. The saved value is now restored.
- **Device panels.** Several corrections:
  - a change in the panel of a newly imported device could be ignored;
  - switching Expert Mode could reset settings that do not depend on it;
  - a panel could reset its values after a refused change or a change with no effect;
  - the warning about an outdated configuration format could be displayed for a device that has no configuration panel.
- **Ambiguous roles.** The role selected for an ambiguous element was not saved, and it was deduced again when the configuration was reopened. The deduction failed when nothing else indicated the role, for example on a filter wheel with only empty slots. The role is now saved and restored. See Handling Ambiguous Devices.
- **Empty filter wheel slots.** An empty slot could be saved in a form that the configuration format rejects, or not saved at all. It is now saved as an empty position, together with the side of the wheel (excitation, emission, or dichroic). Configurations saved by an earlier version still open.

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- **Slot order.** Clicking a column header of the slot table shuffled the slots. The columns are no longer sortable, and the slots keep their order.
- **Importation search.** After the importation tree was rebuilt (reopening the panel, switching Expert Mode, or reloading the hardware descriptions), the search text remained but no longer filtered the tree. The search is now applied after each rebuild, and it is cleared once the devices are imported.

WITHDRAWN

- **Advanced Stage Parameters.** The **Advanced Stage Parameters** window, its setup wizard step, and the selection of a priority stage have been removed. The stage axes are derived from the roles of the axes; select the role of a generic axis in **Ambiguous Role Definition**. See Handling Ambiguous Devices.

Version 2.0.2

Released October 6, 2026. Corrective release. Installing it is recommended for every 2.0 installation.

FIXED

- **Stages with an additional motorized axis.** On a stage that combines X and Y with a generic axis, the instruction that moves all axes together could be generated incorrectly. It is now generated correctly.
- **Tables.** The custom behavior of the Configurator tables could fail to load at startup, and the tables then fell back to the standard behavior. They now load as intended.

Version 2.0.1

Released October 5, 2026.

ADDED

- **Camera ROI groups.** Cameras that image the same field can now be grouped, so that the Imaging Software shares their regions of interest (ROI), crop, and camera calibrations. The groups are edited from the camera device view with **Edit**, in the **ROI synchronisation** window. See Camera ROI synchronization.
- **Advanced Parameters window. Calibration** and **External Parameters** are now two tabs of a single window. See External Parameters and Calibration.
- **Batch editing in the layout editor.** Several Imaging Software controls can be selected and edited together. Each field defaults to No change, so only the fields set explicitly are applied to the selection. See Imaging Software layout.
- **Objective library.** A reference list of Olympus (Evident) objectives is supplied with the application. It covers the objectives recognized by the IX85 Z-drift compensation (ZDC) autofocus.
- **Filter library.** The Filter Manager supplies a larger default library. This library includes generic FITC filters and the common dichroics, and records the advanced options of each entry. Filters and dichroics are presented as distinct entries.
- **Connections.** When a new connection replaces existing ones, the connections that will be removed are highlighted before confirmation. See Connections.

CHANGED

- **Clone existing configuration.** Cloning now opens a single window that asks for the configuration to clone and, optionally, a new save location. See Cloning a configuration.
- **USB device selection.** The USB device window has been simplified, and the manual entry view has been removed. The device detected on the chosen USB port is selected in advance. See Assigning a USB device.
- **Camera trigger.** A camera trigger is always selected by default. See Camera trigger.
- **Units.** The Imaging Software controls in the layout editor now display their unit, and the focus home value carries a unit. The default mosaic overlap is expressed in percent.
- **Layout editor.** The controls of the stand and the stage are placed first in the automatic layout. The TIRF interpoint distance is no longer displayed.
- **Layout preserved during a scan.** Scanning a device no longer resets the Imaging Software layout of that device.
- **Turret slots.** Slots can no longer be deleted from the turret slot table, because the number of slots is set by the hardware. See Turrets and filter wheels.

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- **Configurations from an earlier format.** When a configuration saved in an outdated format is opened, a warning is now displayed and the device descriptions stored in that configuration are not loaded. The Configurator no longer reports a hardware change when it lacks the current hardware description, for example when no controller is connected.

FIXED

- **Perfect Focus System (Nikon).** The autofocus sequence has been corrected, and the autofocus mode values now match those of the current firmware.
- **Complex acquisitions combined with FRAP.** Laser blanking is now switched off before every image that is not an illumination image. This prevents an incorrect laser state during complex acquisitions that include a FRAP step.
- **Sequence order.** The device, laser, and shutter settings are now applied before the ILDA instructions.
- **USB connections.** A USB connection could not be removed, as it was always reconnected to the first USB port. It can now be removed.
- **Device scan.** The identifier selection could be missing after a scan. It is now displayed.
- **Camera trigger.** The camera trigger is now verified before the configuration files are generated.
- **Configuration import.** A configuration created with a hardware library stored at a different location now imports its camera parameters correctly.
- **Device panels.** A device panel updated in the hardware library is now reloaded correctly.
- **USB device window.** The columns displayed when the window opened at startup were incorrect. They are now correct.
- **Connection view.** The connection lines now remain attached to their devices.
- **Filter Manager.** Minor alignment and display corrections.

WITHDRAWN

- **Duplicate (device).** The **Duplicate** command of the device context menu has been disabled temporarily, as it did not behave reliably. Configure each device separately until the command is restored. See Managing devices in the tree.

Version 2.0.0

Released August 3, 2026. First release of the 2.0 series. It replaces the 1.3 series and introduces the Welcome screen, the LiMi-typed hardware importation panel, the setup wizard, and the Imaging Software layout editor.

2026-10-16

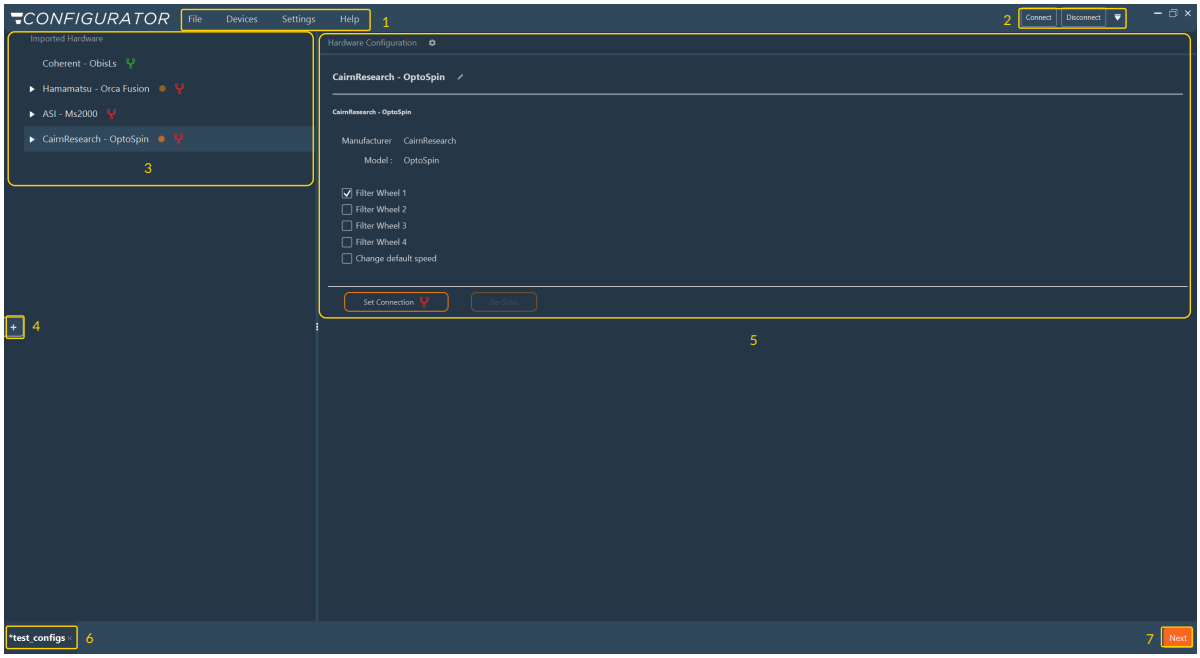
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1.6.2 Interface Reference

This page describes the main window, the menu commands, the Device Controller controls, and the application settings. For the configuration workflow itself, see Get started.

The main workspace

The main workspace opens once a configuration is loaded.

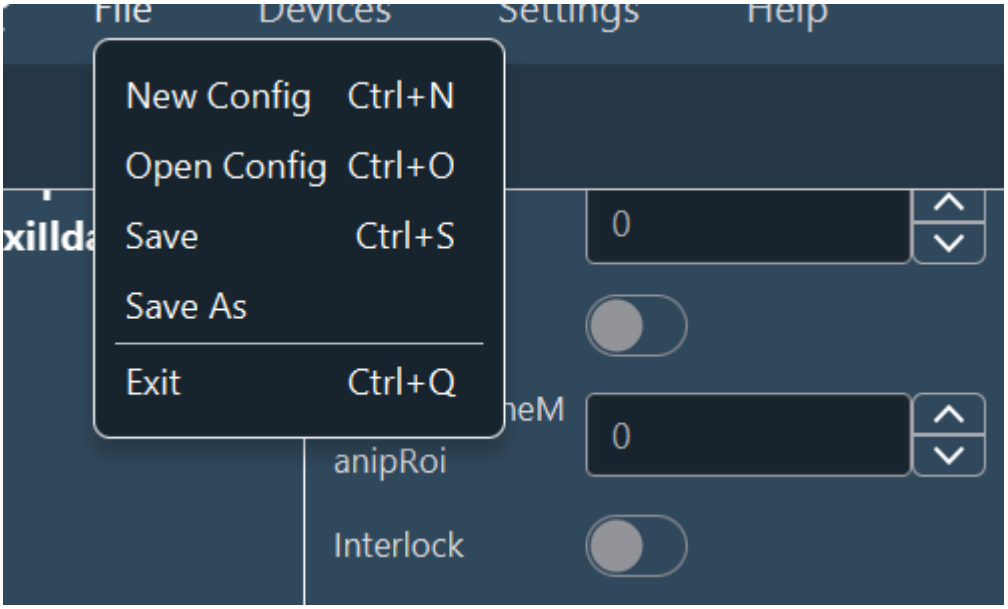


1. **Menu bar (1)**: File, Devices, Settings, and Help.
2. **Device Controller controls (2)**: **Connect**, **Disconnect**, and the drop-down menu described below.
3. **Imported Hardware (3)**: the tree of the devices in the active configuration. Expand a device to reach its function groups.
4. **Hardware importation handle (4)**: opens the hardware importation panel. The handle blinks while the configuration is empty.
5. **Hardware Configuration (5)**: the panel for the item selected in the tree. The gear icon in its header opens the **Advanced Parameters** window, with the Calibration and External Parameters tabs.
6. **Configuration tab (6)**: one tab per open configuration. A leading asterisk marks unsaved changes.
7. **Next (7)**: advances to the Imaging Software layout stage. **Previous** returns from it.

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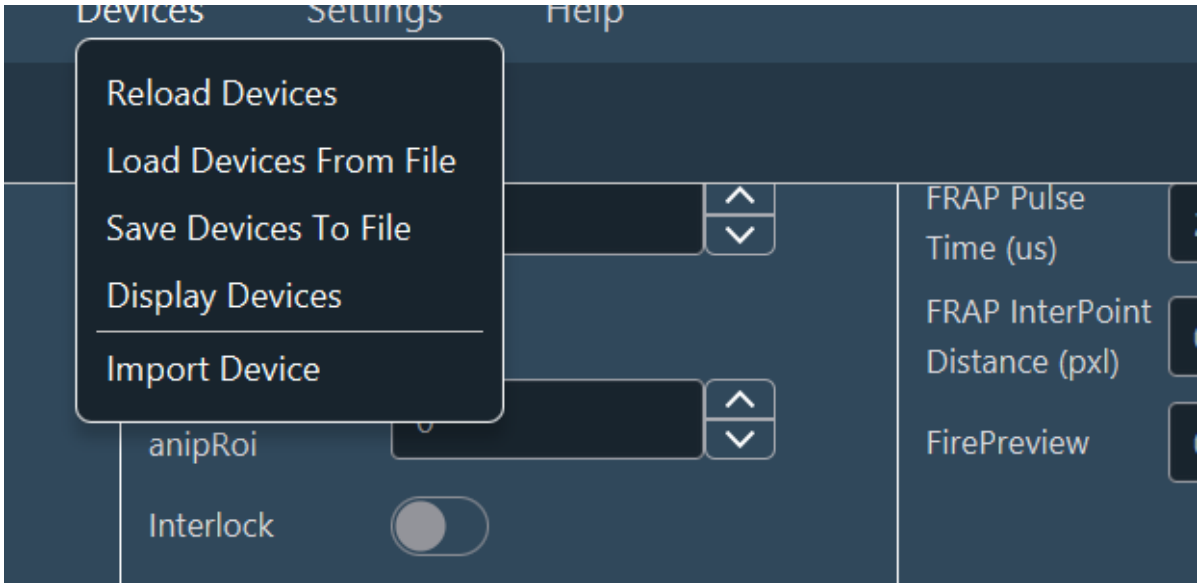
Menus

FILE



Command	Shortcut	Action
New Config	^ Ctrl + N	Opens an empty configuration in a new tab.
Open Config	^ Ctrl + O	Opens a file browser to load an existing configuration folder.
Save	^ Ctrl + S	Writes the active configuration. If no folder is assigned yet, a file browser opens.
Save As	–	Writes the active configuration to a different folder.
Exit	^ Ctrl + Q	Closes the Configurator after confirmation.

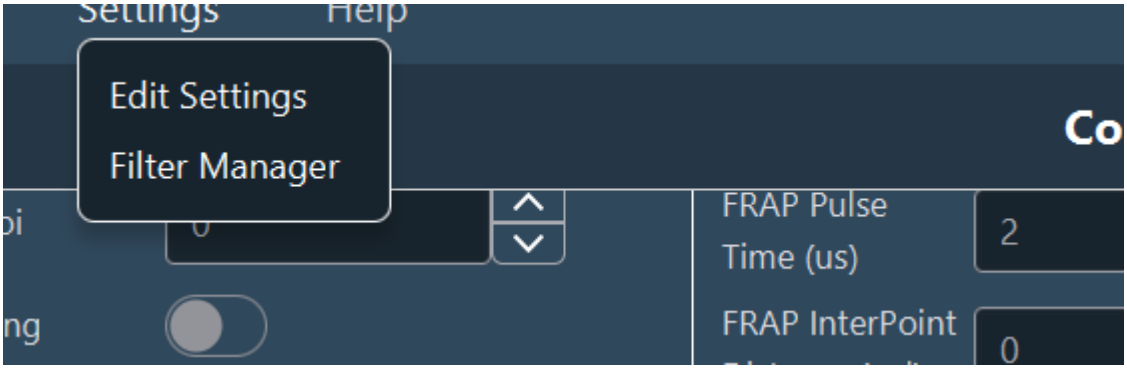
DEVICES



- **Reload Devices**: Reloads the hardware library from the Device Controller and from the external driver directories declared in the settings, then displays the number of drivers found per source.
- **Load Devices From File**: Reads a stored hardware library. Use this to work without a Device Controller.
- **Save Devices To File**: Writes the current hardware library to a local file.
- **Display Devices**: Displays the hardware library summary again.
- **Import Device**: Opens the hardware importation panel, as does the handle on the left edge of the window.

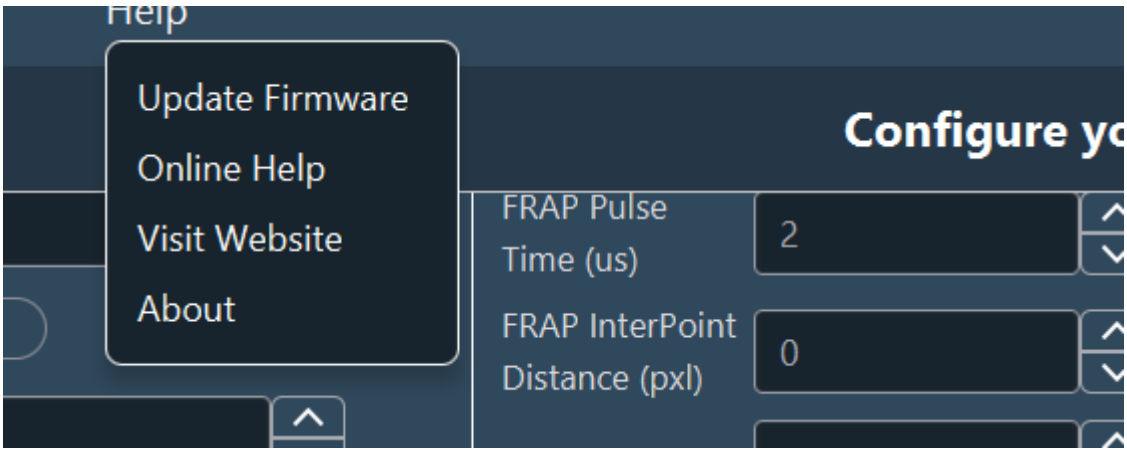
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SETTINGS



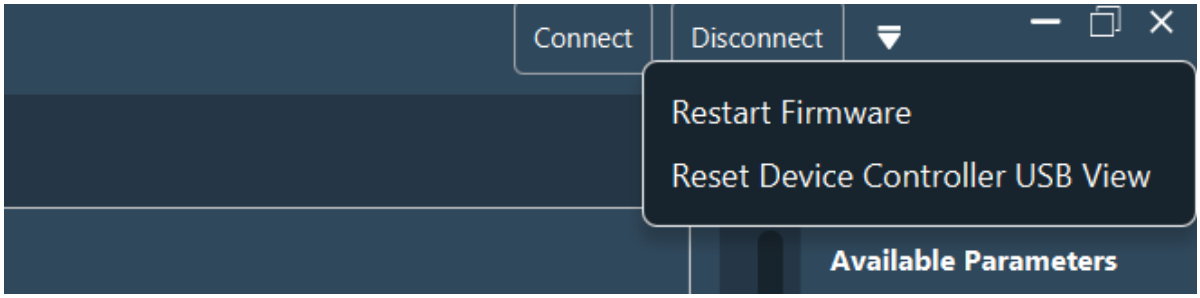
- **Edit Settings**: Opens the settings window described below.
- **Filter Manager**: Opens the optics library, where optical filters and dichroics are defined with their transmittance and reflectance ranges. The elements defined here are offered when a filter cube or filter wheel slot is filled in.

HELP



- **Update Firmware**: Opens a file browser to upload a firmware file (`.bin`) to the Device Controller.
- **Online Help**: Opens the Inscoper user guides.
- **Visit Website**: Opens the Inscoper website.
- **About**: Displays version information for the Configurator, the Inscoper API, and the firmware.

Device Controller controls



Control	Action
Connect	Establishes the connection with the Device Controller and loads its hardware library.
Disconnect	Terminates the connection.
Restart Firmware	Reboots the Device Controller firmware.
Reset Device Controller USB View	Rescans the USB devices attached to the Device Controller.

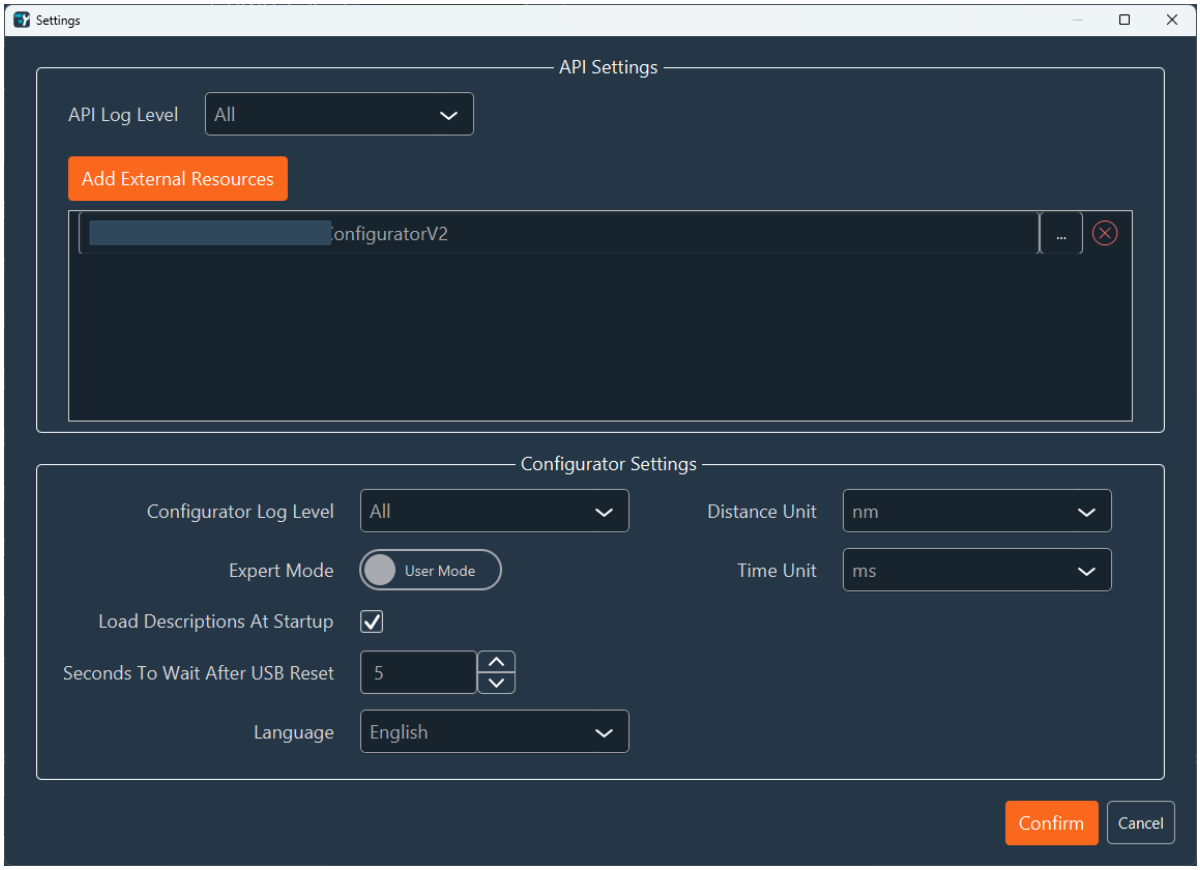
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Example

Use **Reset Device Controller USB View** after plugging in a device while the Configurator is already open, so that the new unit appears in the USB configuration table.

Application settings

Open the settings window with Settings > Edit Settings. Settings apply to the application, not to an individual configuration. Click **Confirm** to apply and save them.



API SETTINGS

Setting	Description
API Log Level	Verbosity of the Inscoper API log.
Add External Resources	Adds a directory that holds external driver libraries, such as Micro-Manager or vendor DLLs. Click **...** to browse for the directory, and the red cross to remove it.
Add Diag File	Loads a stored diagnostic file. Visible in Expert Mode only.

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CONFIGURATOR SETTINGS

Setting	Description
Configurator Log Level	Verbosity of the Configurator log.
Expert Mode	Switches between **User Mode** and **Expert Mode**. See Expert Mode.
Load Descriptions At Startup	Loads the hardware library automatically when the application starts.
Seconds To Wait After USB Reset	Delay, in seconds, between a USB rescan and the reading of the port list. Default: 5.
Language	Interface language.
Distance Unit	Unit used for distances, such as stage and focus positions.
Time Unit	Unit used for durations, such as exposure times.

Warning

Distance Unit and **Time Unit** set the unit in which values are displayed and entered. The active unit appears in parentheses after each parameter name; check it before typing a value. After switching units, verify the startup values of the affected devices.

2026-10-15

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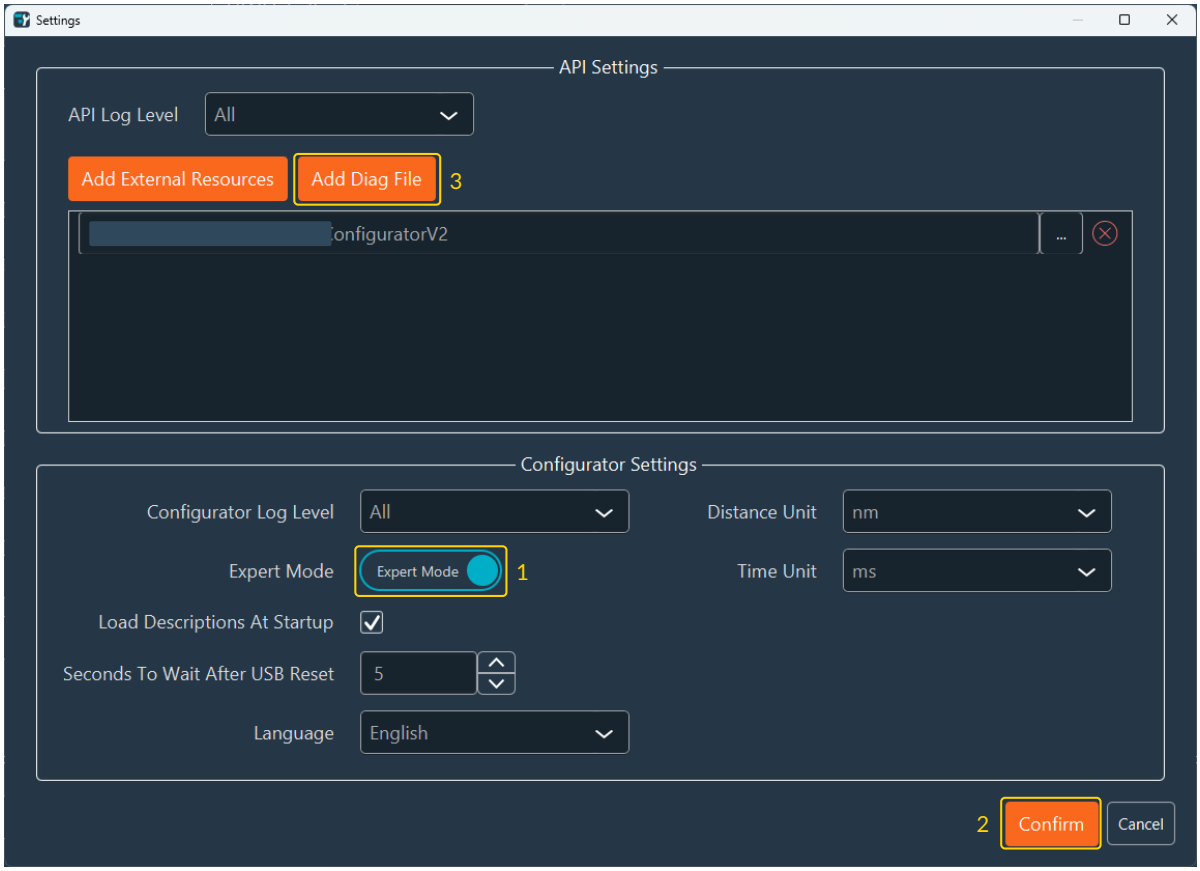
1.6.3 Expert Mode

The Configurator has two operating modes, which set how much detail the interface exposes.

- **User Mode** (default): hides the settings that a standard installation does not need.
- **Expert Mode**: exposes the additional columns, buttons, and settings required for commissioning and troubleshooting.

Switching modes

1. Open Settings > Edit Settings.
2. In the **Configurator Settings** section, set the **Expert Mode (1)** toggle. Its label reads either User Mode or Expert Mode.
3. Click **Confirm (2)**.



In Expert Mode, the **Add Diag File (3)** button appears in the **API Settings** section. The mode is stored with the application settings and is retained between sessions.

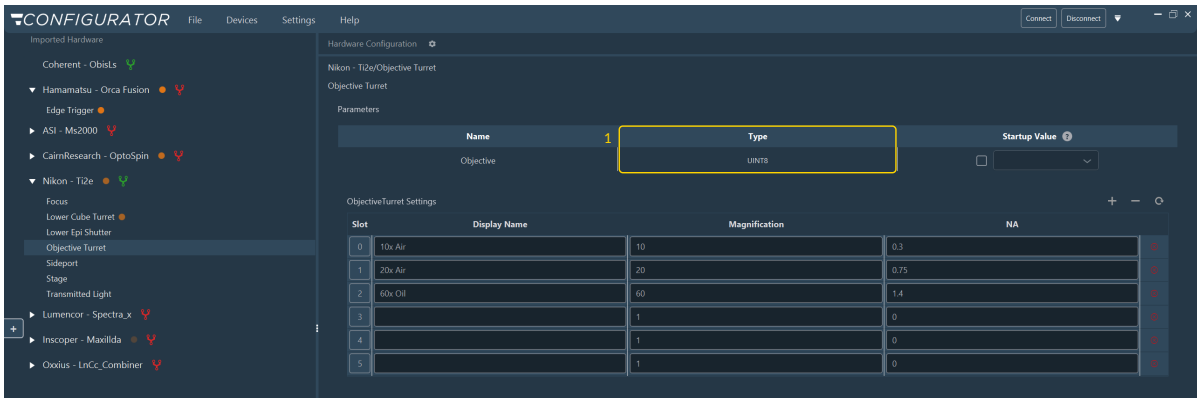
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What Expert Mode adds

Location	Addition
Settings window	**Add Diag File**, which loads a stored diagnostic file into the API resources. Use it to simulate the response of a device that is not physically connected: load a diagnostic file saved earlier from that device, and the Configurator behaves as if it had just interrogated it.
Hardware importation panel	The virtual devices (**Inscoper - Virtual ...**).
Group parameters table	The **Type** column, which reports the data type of each parameter.
Camera groups	The **Advanced Camera Parameters** button.
Focus groups	The piezo settings.
Autofocus groups	The autofocus settings, hidden entirely in User Mode.
Shutter groups	The **Open Value** and **Close Value** columns.
Connection view and **Set Connection** wizard step	The **Box Type** selector, when the Device Controller model has been read from the hardware. Otherwise the selector is shown in both modes.
USB configuration table	The **VID**, **PID**, **Num Interface**, and **Driver** columns.

The Special cases pages describe these device categories in detail.

The figure below shows an objective turret group in Expert Mode. The **Type (1)** column is absent from the same group in User Mode.



When to use each mode

Use **Expert Mode** during initial installation, when adding hardware, and when investigating a fault with Inscoper Support.

Return to **User Mode** for routine work. The reduced interface lowers the risk of changing a setting that should remain fixed once the instrument is commissioned.

> **Warning**
>
> The parameters exposed in Expert Mode change how the Device Controller drives the hardware. Modify them only when instructed by Inscoper Support or by the documentation of the hardware vendor.

2026-10-16

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1.6.4 Troubleshooting

This page collects the messages and situations most often encountered during an installation, with the action to take for each.

Starting the application

"NO VALID LICENSE FILE (INSCOPER.LIC) WAS FOUND."



The Configurator checks for a valid license at startup. The license is required only to read hardware parameters from the Device Controller, for example to scan a device or read its default values; the rest of the application remains usable without one.

Place `inscoper.lic` in the installation folder, next to the Configurator executable, then restart the application. This is the same license file as the one at the root of the Inscoper Imaging Software installation.

Hardware library

THE IMPORTATION PANEL IS EMPTY, OR A MODEL IS MISSING

The hardware library is supplied by the Device Controller firmware.

1. Verify that the Device Controller is connected. If it is not, click **Connect** in the title bar.
2. Reload the library with Devices > Reload Devices.
3. If the model is driven by an external library, declare its directory under Settings > Edit Settings > Add External Resources, then reload again.
4. If the model is still missing, import a device of the same series and adjust it, or contact Inscoper Support to have the model added.

WORKING WITHOUT A DEVICE CONTROLLER

Load a stored library with Devices > Load Devices From File. Export one from a connected system beforehand with Devices > Save Devices To File.

Opening a configuration

"INCOMPATIBILITY DETECTED FOR HARDWARE MODEL. THE HARDWARE HAS BEEN RELOADED FROM A NEWER VERSION."

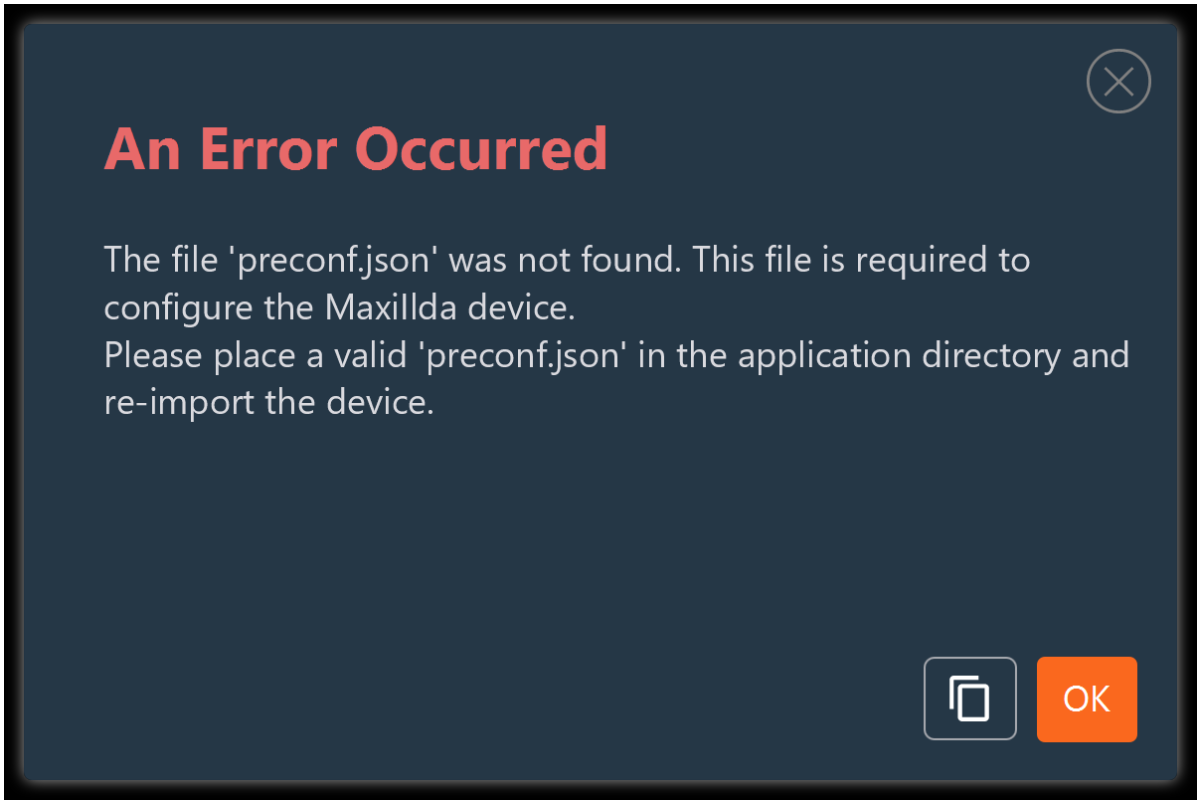
The stored description of that device no longer matches the description currently available, usually because the firmware was updated since the configuration was written. The Configurator rebuilds the device from the current description.

Review the affected device: its selected functions and startup values may need to be entered again. Save the configuration afterwards.

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Importing hardware

"THE FILE 'PRECONF.JSON' WAS NOT FOUND."



A Maxillda device was imported, but `preconf.json` is missing from the application directory. The Configurator uses this file to fill in the ILDA functions and modes automatically from the parameters of the device. Restore the file supplied with the installation, then import the device again.

Configuring devices

AN ORANGE DOT REMAINS BESIDE A DEVICE OR GROUP

A mandatory startup value is missing, a turret group still has an unnamed slot, or an ambiguous element has no role assigned. Open the group that carries the dot. For a startup value, enable it as described in Group parameters and startup values; For a turret group, fill in the missing slot as described in Turrets and filter wheels. For an ambiguous element, select its role as described in Handling Ambiguous Devices.

THE CONNECTION ICON STAYS RED

At least one function of the device is not mapped to a Device Controller port. Open the connection view with **Set Connection**, and link every cell outlined in red. See Connections.

A CONNECTION CELL REPORTS `NOT_ENOUGH_OUTPUT`

The function requires more Device Controller lines than are currently assigned to it. The tooltip of the cell gives the expected and actual counts. Assign the missing lines, or clear the function in the device view if it is not used.

The related codes `NOT_ENOUGH_INPUT`, `TOO_MANY_OUTPUTS`, and `TOO_MANY_INPUTS` report the same kind of mismatch for inputs, or for an excess of lines.

THE USB CONFIGURATION TABLE IS EMPTY

The Device Controller does not currently see any USB device.

1. Verify that the instrument is powered and cabled.
2. Click **Reset Usb View**, then wait for the delay set by **Seconds To Wait After USB Reset** (5 s by default).

RE-SCAN IS UNAVAILABLE

Re-Scan interrogates the physical device. It requires a connected Device Controller and a device that responds. Verify the connection state and the cabling.

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Advancing to the layout stage

THE VALIDATION WARNING LISTS OUTSTANDING ITEMS

Clicking **Next** in the main workspace does not open the layout stage immediately. The Configurator first checks the configuration and reports every outstanding item, device by device.



The report contains two kinds of item:

- **A startup value is required.** The named group has a mandatory parameter with no value. Open that group and supply it; see Startup values.
- **A connection needs to be set.** At least one function of the device is not mapped to a Device Controller port; see Connections.

The report does not block the workflow: you can continue to the layout stage and return later. However, a configuration saved with outstanding items does not drive the corresponding hardware. Resolve each item, then click **Next** again.

To report an installation problem to Inscoper Support, click the copy icon **(1)** beside **OK** to copy the whole report to the clipboard.

Diagnostics

Raise **API Log Level** and **Configurator Log Level** in Settings > Edit Settings before reproducing a fault, so that the logs contain the detail Inscoper Support needs. Restore the usual levels afterwards, because verbose logging slows the application.

If a problem persists, contact Inscoper Support with the configuration folder, the logs, and the version information from Help > About.

2026-10-15

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1.6.5 Glossary

This page defines the terms that appear in the Configurator interface and in this documentation. Terms are grouped by the stage of work in which they are encountered.

Application and configuration

Configurator

The application that produces a configuration for a microscopy system: the hardware in use, how it is wired to the device controller, and the interface offered by the imaging software.

Configuration

The complete description of one system, stored in a folder and opened as a tab in the Configurator. It holds the imported hardware, the selected functions and their startup values, the connections, the Imaging Software layout, and the calibrations.

Hardware Library

The catalog of hardware descriptions supplied by the Device Controller firmware. It is loaded when the Configurator connects to the Device Controller, and it populates the **Available Hardware** list used to import devices.

Imported devices are listed in the **Imported Hardware** tree, which is the working area of the hardware stage.

External Resources

Directories added in the application settings that hold driver libraries outside the Inscoper installation, such as Micro-Manager or vendor DLLs. Devices driven through those libraries cannot be configured until the directory is declared.

Expert Mode

The operating mode that exposes the settings required for commissioning and troubleshooting. The default is **User Mode**, which hides them. A single toggle in the Configurator settings switches between them. See Expert Mode.

Log Level

The verbosity of a log. The Configurator log and the API log are set independently in the application settings. Levels are inclusive: selecting **Debug** also records **Info**, **Warning**, **Error**, and **Fatal** messages.

Log Level	Description
All	Records every message.
Trace	Fine-grained information for in-depth debugging.
Debug	Detailed information for diagnosing an issue.
Info	Normal application events.
Warning	An unexpected situation that does not halt the application.
Error	An issue that prevents a specific function from operating.
Fatal	A critical failure in which core functions are lost.
Off	Disables logging.

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Distance Unit

The unit (nm, µm, or mm) in which the Configurator displays and accepts every distance value, such as a stage or focus startup value or a piezo range. It is set in Settings > Edit Settings and applies to the whole application, not per field. It changes how a value is shown and typed, not the physical quantity it represents.

Time Unit

The equivalent of distance unit for time values, such as a camera **Exposure**. It is also set in Settings > Edit Settings, with a choice of ns, µs, ms, or s.

API

The Inscoper API, the software layer through which the Configurator and the imaging software communicate with the device controller. Its version is reported in Help > About.

Hardware

Hardware

A peripheral of the system, either physical or virtual (software-defined). Each hardware item is controlled by a driver and is described by a set of parameters. A hardware item connects either to the device controller or directly to the computer, as a USB camera does.

In the **Imported Hardware** tree, one entry represents one hardware item; its children are its function groups.

Driver

The software component that controls a hardware item. A driver comes either from the device controller, through its hardware library, or from a library installed on the computer, such as Micro-Manager or a vendor DLL, declared as an external resource. At startup, the Configurator reports the number of drivers found per source. Some hardware items, such as a triggered camera, use both kinds of driver.

Group

A set of elements that corresponds to one function of the instrument, such as a turret, a shutter, a focus axis, or a stage axis. Selecting a group in the tree opens its **Parameters** table. See Configuring a device.

Parameter

An input value of a function, exposed in the parameters table of its group. Each row offers the parameter **Name** and its startup value. In expert mode, the table also shows the type column.

Startup Value

The value applied to a parameter when the system initializes. Select the checkbox to enable the value, then enter it. When the checkbox is cleared, the device keeps its current state instead of having it overwritten. A startup value is mandatory for the parameters flagged by an orange dot in the tree. See Startup values.

Type

The data type of a parameter, as declared by the firmware: `UINT8`, `INT8`, `UINT16`, `INT16`, `UINT32`, `INT32`, `UINT64`, `INT64`, `FLOAT`, `DOUBLE`, or `STRING`. Visible in expert mode only.

Advanced Parameters

The parameters of a camera group that are not exposed in normal operation. Open them with the **Advanced Camera Parameters** button, available in expert mode only. Not to be confused with the **Advanced Parameters** window, opened by the gear icon of the **Hardware Configuration** header, which holds the Calibration and External Parameters tabs.

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External Parameters

Instrument-wide Imaging Software settings that belong to no single device: default mosaic overlap, focus map and Jetraw discriminants, USB reset at startup, emulation, white balance, and the device assignments of the FLIM and Sparq modules. See External Parameters.

Setup Wizard

The guided sequence that opens after hardware importation and presents, for each newly imported device, the steps it still requires: device configuration, connection assignment, role assignment for ambiguous elements, and turret configuration. Using it is optional. See Setup wizard.

Scan

The interrogation of the physically connected hardware. The wizard uses it to detect which of the imported devices respond, and to pre-fill their hardware identifiers, such as ports, addresses, and serial numbers. In a device view, **Re-Scan** repeats the operation and removes the functions the device does not report. A scan requires the Device Controller to be connected.

TURRETS AND FILTERS

Turret

A motorized holder whose positions must be described one by one, so that the imaging software can offer them by name rather than by index. Three types are supported: **objective turret**, **filter cube turret**, and **filter wheel**. A turret group adds a slot table below the standard parameters table. See Turrets and filter wheels.

Slot

One position of a turret. The slot number is the value sent to the hardware; the **Display Name** is the label shown to the user. Objective slots also carry a **Magnification** and an **NA** (numerical aperture), from which the Imaging Software computes the pixel size and the scale bar.

Filter Manager

The window that holds the **optics library**, the shared list of optical filters and dichroics available to filter cube turrets and filter wheels. Each entry carries its **transmittance** ranges (and, for a dichroic, its **reflectance** ranges), expressed as wavelength and transmittance pairs, and is displayed in the light spectrum visualizer. Open it with Settings > Filter Manager.

CAMERA

Camera

A hardware item that acquires image data. A camera manages its own image buffers, acquisition parameters, and triggering modes.

Trigger Option

The source that triggers a camera, selected among the radio buttons of the camera device view. The options list every device that can trigger that camera, such as a co-located Inscoper trigger device or a shared ConfocalNL controller. **No Trigger** is always offered; select it when no other device triggers the camera, for example a camera connected to the computer by USB only. See Camera trigger.

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Camera Stream

The method that triggers image acquisition and controls exposure timing. It determines whether the camera exposes autonomously, on a software command, or on an external hardware signal. The streams derived for each camera are listed, read-only, in the **Camera Streams** tab of **Advanced Camera Parameters**, in expert mode.

Stream	Description
Internal	The camera exposes autonomously. Used for Live and snap operations, and for acquisitions that require no hardware driving.
Soft Trig	The camera is triggered by a software command; exposure time is handled by the computer.
Edge Trig	The camera is triggered by an external TTL edge; exposure time is internal to the camera and cannot vary within a sequence.
Level Trig	The camera is triggered by an external TTL level; exposure lasts as long as the level is asserted, which allows different exposure times within one sequence.

Snap

The acquisition of a single image, as opposed to the continuous acquisition started by **Start Acq** and ended by **Stop Acq**. The three functions are reported, read-only, in **Advanced Camera Parameters**.

> **Note**
>
> On some cameras, such as Maico or PcoFlim, one snap acquires several images — different wavelengths for Maico, different phases for PcoFlim.

SHUTTER

Shutter

A motorized element, inside or outside the microscope, that passes or blocks the beam of a light source.

> **Note**
>
> The values used for the two states (0/1, True/False) depend on the implementation of the device.

Open Only When Imaging

A shutter option. When it is enabled, the shutter opens only while the camera is acquiring. At all other times it stays closed to protect the sample, even when the software requests it open.

Device Controller

Device Controller

The Inscoper hardware unit (DC) that executes acquisition sequences and manages high-speed synchronization between devices. The **Box Type** identifies the model, and with it the number of TTL, analog, and serial ports available.

Firmware

The software running inside the Device Controller. It executes the sequences it receives from the imaging software, and it supplies the hardware descriptions and the configuration views used by the Configurator. It is updated with Help > Update Firmware and restarted with **Restart Firmware**.

Connections

A **connection** is the physical channel through which a function of a device is controlled. The connection view maps each function that requires wiring to a port of the device controller. See Connections.

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Key concepts:

- One connection cell is displayed per function that requires wiring; clearing the function in the device view removes its cell.
- A cell can only be dropped on a port that carries the signal it needs.
- A red outline marks a cell whose link is still missing.
- Connection assignment applies to devices driven by the Device Controller. Micro-Manager and custom drivers handle their own communication through their libraries.

> **Example**
>
> A motorized filter wheel might use a **Serial** connection to send position commands and read status, a **TTL Input** to read a home position sensor, and a **TTL Output** to report movement completion.

USB View

The list of USB devices that the device controller currently sees, shown when a connection cell is dropped on the **USB** port. Each row reports the **VID** and **PID** — the Vendor and Product identifiers that distinguish a USB peripheral — together with the manufacturer, product, serial number, driver, hub, and port.

Reset Usb View rescans the USB bus and reloads the table; the delay observed before the table is read back is set by **Seconds To Wait After USB Reset** in the application settings.

Inscoper Imaging Software

Imaging Software

The acquisition software (IIS) that loads the configuration produced by the Configurator. The Configurator defines the interface that the Imaging Software presents: which controls exist, how they are laid out, how each one is rendered, and which calibrations are available.

Control

The element of the Imaging Software interface through which the end user reads or sets one parameter, such as an objective selector, a shutter switch, or an exposure time field. Each control is placed in a category of the layout, and its display type sets the widget used to render it: a drop-down menu, a switch, a slider, or a joystick. See Imaging Software advanced settings.

Layout

The arrangement of the Imaging Software controls, defined in the layout editor of the second stage. The Configurator builds a first layout from the configured hardware; the editor refines it. See Imaging Software layout.

Zone

One of the four destinations of the layout: **Settings** for instrument-wide values, **Channels** for values that change from one acquisition channel to the next, **Shortcut** for controls promoted to the shortcut bar, and **Advanced** for controls reserved for commissioning.

Category

A named card inside a zone that groups controls. Categories are created, renamed, and removed in the layout editor. They also define the groups of controls that the Imaging Software presents.

Display Type

The kind of widget the Imaging Software uses for a control: **SELECT** for a fixed set of named states, **SWITCHER** for a two-state parameter, **NUMBER** for a numeric parameter, or **TEXT** for a read-only string. Each type exposes its own settings, such as the value table of a SELECT or the bounds and unit of a NUMBER. See Imaging Software advanced settings.

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Conversion Factor

The multiplier applied between the value displayed to the user and the value sent to the hardware, for a NUMBER control.

Calibration

Calibration

A model that records a dependency between parameters, so that the Imaging Software can supply the correct value for the current state of the instrument — a correction collar or a stage travel range that depends on the objective in place, for example. See Calibration.

Type	Description
Linear	`sd1 = a * sd2 + b`.
Linear Delta	Variant of the linear formula that exposes the alpha parameter in the Imaging Software (used for soSPIM).
Bilinear	A 3D plane (`ax + by + c`).
Piecewise Linear	Curve approximation by segments.
Constant	A fixed value between two parameters.
Formula	A custom formula, whose free terms are declared in the **Variable** table.

Discriminant

The parameter whose value selects which calibration entry applies. Each calibration is stored per combination of discriminant values, so changing a discriminant invalidates the current entry. The objective turret is the usual discriminant.

> **Example**
>
> In a FRAP calibration, changing the objective or the filter calls for a new calibration.

Target

The parameter whose value the calibration supplies for each state of the discriminant.

Interpolator

The parameter used by the formula to compute the value of a target — the parameter other than the discriminant. Formulas with two independent variables use **Interpolator 1** and **Interpolator 2**.

> **Example**
>
> In `sd1 = a * sd2 + b` :
>
> - `sd1` : target.
> - `sd2` : interpolator.
> - `a` and `b` : computed during the calibration.

Camera Dependent

Marks a calibration whose recorded values differ from one camera to another.

Auto Update

Marks a calibration that is recomputed automatically when its discriminant changes. The **Auto Update Name** is the label under which the automatic update is offered to the user.

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1.7 Legal

1.7.1 Legal Information

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- EP3123149
- US10330911
- FR3019324

Smart Microscope Automation:

- EP4111249
- US12474564
- FR3107604

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INSCOPER continuously improves its products and documentation. Product specifications and documentation may change without notice and are incorporated into future software releases and documentation updates.

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