logos biosystems

CELENA® X

HIGH CONTENT IMAGING SYSTEM

USER MANUAL

PUBLISHING DETAILS
CELENA® X High Content Imaging System, User manual
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DISCLAIMER
The contents of this document are subject to change without notice.
The CELENA® X High Content Imaging System is for scientific research use only.
Do not disassemble the device on any occasion as this will invalidate your warranty.

TRADEMARKS
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LED Filter Cubes are LTC Licensed Products provided under an intellectual property license from Life Technologies Corporation.

Table of Contents

1. General

1.1 About this user manual

This user manual provides the information necessary to operate the CELENA® X High Content Imaging System. **PLEASE READ THIS USER MANUAL BEFORE OPERATING THE SYSTEM.** If any part of this user manual is not clear, please contact Customer Support for assistance.

1.2 Explanation of symbols

Safety notes

Safety notes in this user manual are introduced with a symbol and a signal word to describe the severity of the hazard.
Follow these safety notes and proceed with caution to avoid accidents, personal injury, damages to property.

This symbol and the word "WARNING" indicate a possible hazardous situation that, if not avoided, could cause death or serious injury.

This symbol and the word "CAUTION" indicate a possible hazardous situation that, if not avoided, could result in minor or moderate injury.

This symbol and the word "NOTICE" indicate a possible hazardous situation that, if not avoided, could result in damage to property or the environment.

Hints, recommendations

This symbol emphasizes useful tips and recommendations as well as information for the efficient and trouble-fee use of the product.

2. Safety information

2. 2.1 Device symbols

2. 2. Electrical symbols

Symbol	Description
	Power symbol

2. 2. Safety symbol

Symbol	Description
	Risk group 3. UV emitted from this device may be hazardous. Avoid eye exposure.
	Invisible laser radiation. Avoid exposure to beam. Class 3b laser product.
	Follow instructions for use

Environmental symbol

Symbol	Description
	Waste Electrical and Electronic Equipment (WEEE). Do not dispose of this product as unsorted municipal waste. Follow local waste ordinances for proper disposal provisions to reduce the environmental impact of WEEE.

Package symbol

Symbol	Description
	Fragile
	Keep dry
	Temperature limit
	Atmospheric pressure limitation
	Humidity limitation

2.2 Device safety

General safety

⚠ WARNING

Do not touch the device or its components with wet hands.

Use only the provided power cord. If the proper components are not used, electrical safety of the device cannot be guaranteed.

Connect the grounding terminal of the device and electrical outlet properly. If the device is not grounded, electrical safety of the product cannot be guaranteed.

Do not use a damaged electrical cord or an aged electrical outlet socket.

Do not use multiple sockets or extension cables. If the device is connected using them, electrical safety of the product cannot be guaranteed.

Do not expose the device to intense ultraviolet light.

This device uses a Class 3B near infrared laser that is in accordance with IEC/EN 60825-1. Direct exposure to and diffuse reflections of the laser can be hazardous to the eye.

- Avoid eye or skin exposure to direct or scattered radiation.
- Make the CELENA® X main unit door is closed when imaging to protect your eyes.

The device uses ultraviolet LEDs. The light emitted from this device may result in eye injury.

- Avoid looking directly at the light.
- Make the CELENA® X main unit door is closed when imaging to protect your eyes.
- Always turn off the light before changing LED filter cubes or objectives.

Do not modify the device without authorization of the manufacturer. Modification can result in electrical hazards or performance degradation.

The device is not suitable for use in the presence of a flammable anesthetics mixture with air, or with oxygen, or nitrous oxide.

⚠ CAUTION

Operate the device in the conditions described in the Operating Conditions.

Ensure that the input voltage is compatible with the power supply voltage of the product.

Turn on the device only after connecting the power cord and AC adapter to both of the power source and the instrument. Turn off the device before disconnecting the power cord and/or moving the instrument.

Disconnect the power cord in the case of abnormalities.

Protect the computer from being infected with viruses and malware.

Do not locate the device to make it difficult to operate the disconnection of device.

NOTICE

Install the device on a level and sturdy surface. Avoid vibrations from other devices. The device can withstand light shock and vibration. However, excessive shock and/or vibration may damage the instrument. Leave sufficient space around the device for air circulation and cooling. Take care that the device does not overheat during long and continuous operation.

Use components provided or authorized by Logos Biosystems. If the proper combination of components is not used, product safety cannot be guaranteed.

Electrical connection

CELENA® Controller	
Rated voltage	100 – 240 VAC
Rated supply frequency	50/60 Hz
Power consumption	3.0 – 6.0 A

Environmental conditions

Operation	
Installation Site	Indoor use only

Operating Temperature	+10 °C – +35 °C
Relative Humidity	20 % – 80 % at non-condensation
Atmospheric pressure	70 kPa – 106 kPa
Altitude	≤ 2,000 m
Pollution Degree	2
Storage	
Storage Temperature	-20 °C – + 70 °C
Relative Humidity	10 % – 90 % at non-condensation
Atmospheric pressure	70 kPa – 106 kPa

Device disassembly

⚠ WARNING

Do not disassemble the instruments or wipe the supplied computer in any event as this will invalidate your warranty. If the device is damaged or malfunctioning, contact your local sales representative.

Personal safety

Safety guidelines

⚠ WARNING

Wear appropriate personal protective equipment (PPE) when handling reagents and samples to avoid exposure.

When using toxic agents, radioactive materials, or pathogenic microorganisms belonging to WHO Risk Groups 2-4, follow national laws and regulations for biosafety level requirements. Read all user manuals thoroughly before using the instrument.

⚠ CAUTION

Keep all user manuals in a safe and accessible place for future reference.

Safety standards

European standards

Symbol	Description
CE	The CE mark indicates that this device conforms to all applicable European Community provisions for which this marking is required. Users must be aware of and follow the conditions described in this manual for operating the instrument. The protection provided by the device may be impaired if the device is used in a manner not specified by Logos Biosystems.

Korean standards

Symbol	Description
KC	The KC certification mark indicates that this device conforms with Korea's product safety requirements for electrical and electronic equipment and components for which this marking is required.

United States standards

Type	Description
FCC Part 18	This device complies with Part 18 of the FCC Rules.

3. Getting Started

3.1 Product contents

Your CELENA® X High Content Imaging System is shipped with the following components:

CELENA® X main unit

- Camera module (installed as ordered)
- Condenser (installed as ordered)
- Filter cubes (installed as ordered)
- Objectives (installed as ordered)
- *(Optional)* Laser autofocus module (installed as ordered)

CELENA® X Controller

Software

- **CELENA® X Explorer**
- **CELENA® X Cell Analyzer**

PC

- Desktop
- Keyboard
- Mouse
- *(Optional)* Monitor

Accessories

- Universal Vessel Holder
- Microplate Holder
- Single Slide Holder
- Power Cord
- Cable PS-1
- Cable PS-2
- Cable SIG
- Cable USB 2.0
- Cable USB 3.0
- *(Optional)* Cable Laser AF (included with the Laser autofocus module)
- Flathead Screwdriver
- CELENA® X Cell Analyzer Verification Key
- USB drive, 64 GB (includes the user manual and installation guide)

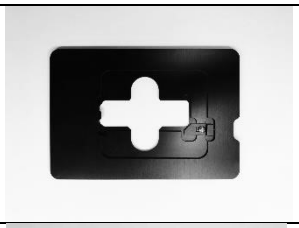
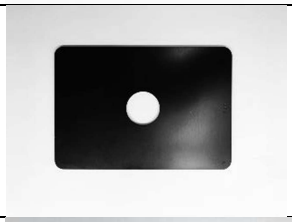
Note

Inspect the product package upon delivery to ensure that all components have been included. If anything is missing, contact your local sales representative. Damage that may occur during shipping and handling is not covered by warranty and must be filed with the carrier.

CELENA® X Main unit

CELENA® X Controller

Accessories

Single Slide Holder	
Universal Vessel Holder	
Microplate Holder	
Cable PS-1	

Cable PS-2

Cable SIG

Cable USB 2.0

Cable USB 3.0

(Optional) Cable Laser AF

Power cord

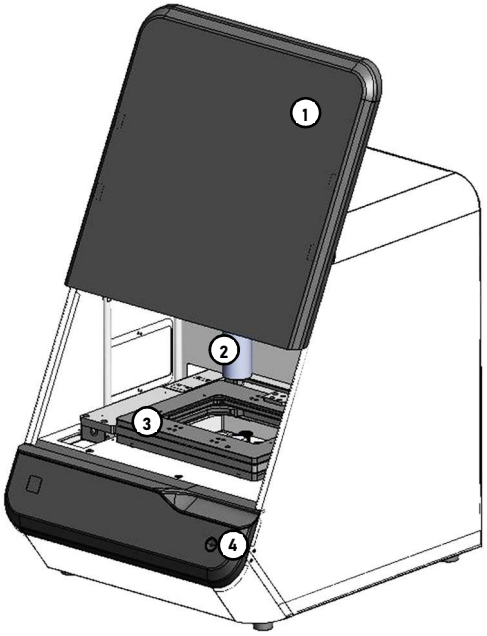
Flathead Screwdriver	

3.2 Product description

CELENA® X

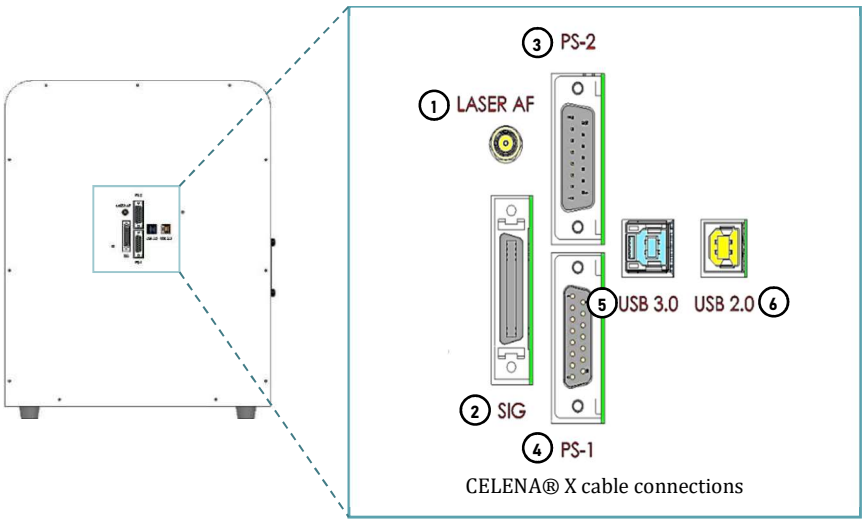
CELENA® X is an integrated imaging system designed for rapid, high content image acquisition. Customizable imaging protocols, image-based and laser autofocusing modules, and motorized XYZ stage simplify slide scanning and well plate imaging.

CELENA® X main unit



CELENA® X main unit

① **Door:** Open the door to locate a vessel holder on the X/Y stage and close it before operating CELENA® X Explorer.
② **Condenser:** The illuminating module for brightfield imaging and/or phase-contrast imaging.
③ **Motorized X/Y stage:** Scan a sample in X and Y direction.
④ **Power button:** Turn on the power by pressing the power button. Turn off the power by pressing the power button for 3-5 seconds.



Back of the CELENA® X main unit

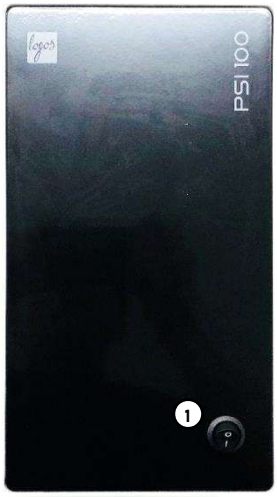
① Laser AF: Deliver the output signal from the laser autofocus module.
② SIG: Transmit the communication signals between the main unit and the controller.
③ PS-1: Deliver DC power from the controller to the main unit.
④ PS-2: Deliver power from the controller to LED light sources.
⑤ USB 3.0: Deliver power to cameras and transmits the communication signals between the cameras and the computer.
⑥ USB 2.0: Transmit the communication signals between the main unit and the computer.

⚠ WARNING

This device uses Class 3B near infrared laser and ultraviolet LEDs. Make the CELENA® X main unit door is closed when imaging to protect your eyes. Direct exposure to and diffuse reflections of the laser can be hazardous to the eye.

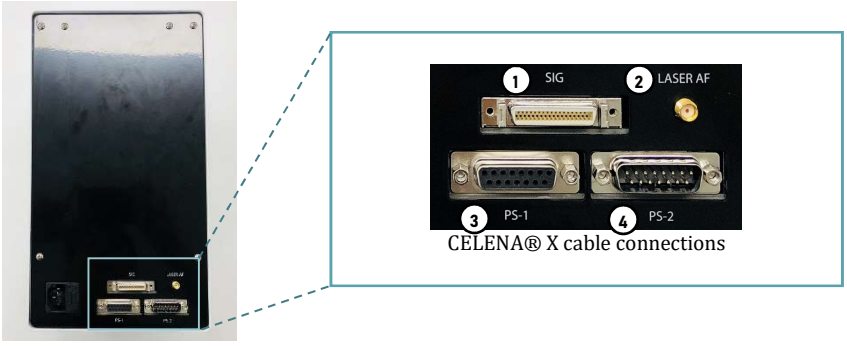
CELENA® X Controller

The CELENA® X Controller controls the power supply to and mechanical stages of the CELENA® X.



Front of the CELENA® X Controller

① **Power switch:** power on/off



CELENA® X cable connections

Back of the CELENA® X Controller

① **SIG:** Transmit the communication signals between the main unit and the controller.
② **Laser AF:** Deliver the output signal from the laser autofocus module.
③ **PS-1:** Deliver DC power from the controller to the main unit.

④ **PS-2:** Deliver power from the controller to LED light sources.

Software

CELENA® X Explorer

The CELENA® X is controlled by the integrated CELENA® X Explorer software. CELENA® X Explorer is pre-installed to the computer supplied with the device.

CELENA X Explorer

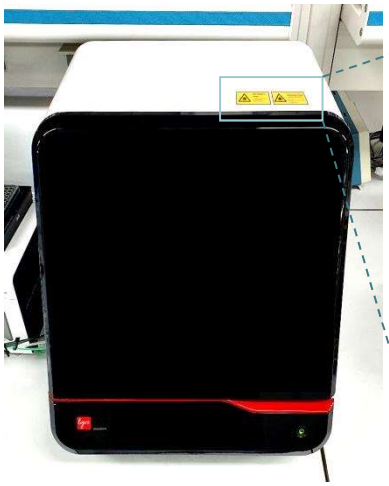
CELENA® X Cell Analyzer

CELENA® X Cell Analyzer is used to process and analyze images to quantify numerous cellular phenotypes simultaneously. CELENA® X Cell Analyzer also provides tools to edit and annotate images as well as create videos.

CELENA X Cell Analyzer

CELENA® X Labels

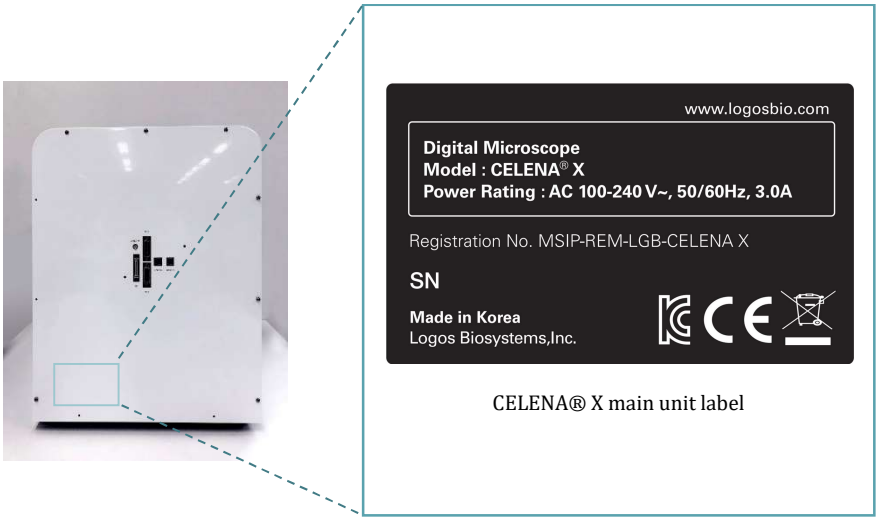
CELENA® X Labels



Top of the CELENA® X Main unit

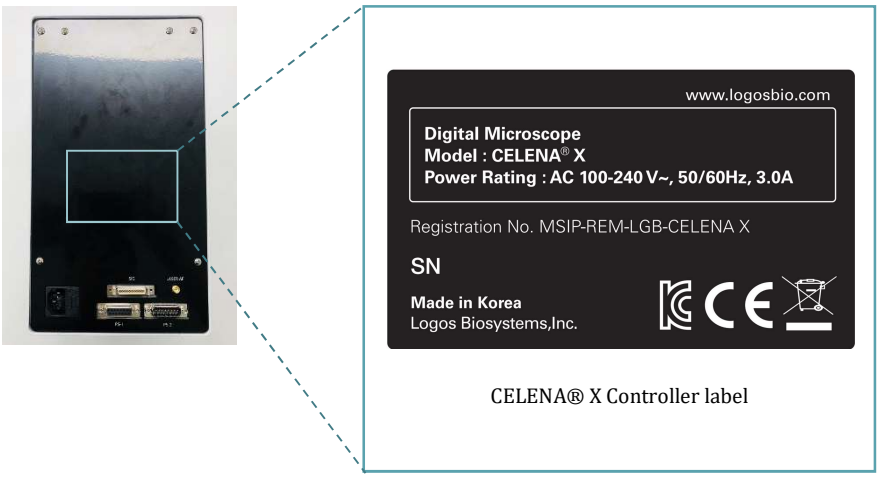
Laser safety label

UV light safety label



CELENA® X main unit label

Back of the CELENA® X main unit



CELENA® X Controller label

Back of the CELENA® X Controller

3.3 Setting up

Unpacking

CELENA® X main unit

Move the unpacked boxes to the site of operation.
Open the CELENA® X box and remove the Styrofoam top and sides. Lift the CELENA® X out of its box by grasping its base firmly.

Place the CELENA® X on a flat, level surface that is free of vibration. Anti-vibration tables are recommended for optimal use. Leave sufficient space around the device for proper ventilation and to prevent overheating.

⚠ CAUTION

When moving the CELENA® X, do not attempt to lift or move the device without assistance. It is recommended that two or more people lift the device together while taking the proper safety measures to avoid injury

NOTICE

Do not subject the CELENA® X to sudden impact or excessive vibration. Handle the device with care to prevent damage.

Do not expose the device to intense ultraviolet light.

⚠ CAUTION

Changing the configuration of the computer supplied with the CELENA® X (i.e., erasing the hard drive to remove programs, etc.) voids the product warranty.

CELENA® X Controller

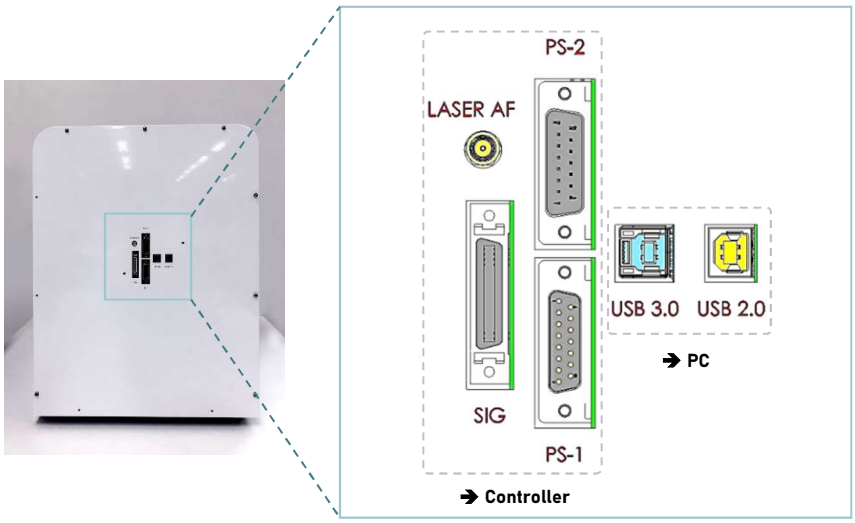
Place the Controller near the CELENA® X main unit. A separate surface is recommended for optimal use but is not necessary.

Connections

Unpack the cables from the accessories box and attach as specified below:

CELENA® main unit & Controller	CELENA® X main unit & PC
Cable PS-1 (I10331)	USB 2.0 (I10335)**
Cable PS-2 (I10332)	USB 3.0 (I10336)**
Cable SIG (I10333)	
Cable AF (I10334)*	

**Included if the laser AF module was purchased and installed*
***Make sure to plug into the blue USB 3.0 ports at the back of the PC, not the front*



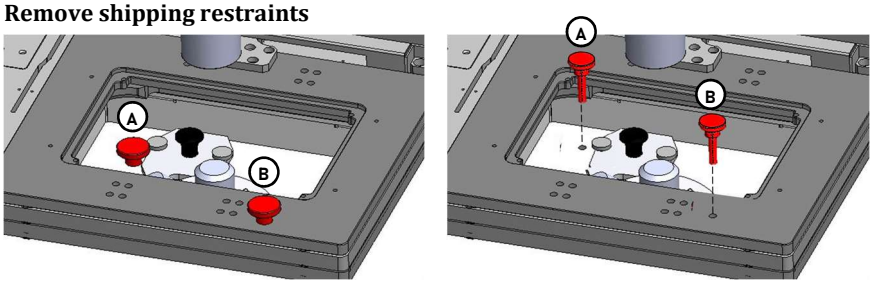
Back of the CELENA® X main unit

The CELENA® X is compatible with 4K Ultra HD (UHD) monitors only and not in accordance with size of monitors.

Shipping guard/restraints

Your CELENA® X main unit is shipped with two shipping restraints installed (X/Y stage, LED filter cube stage) to prevent damage to the device from shock and vibration during transport.

Remove shipping restraints



1. Unscrew screw A and pull it up to remove it from the LED filter cube stage cover.
2. Unscrew screw B and pull it up to remove it from the X/Y stage.

⚠ CAUTION

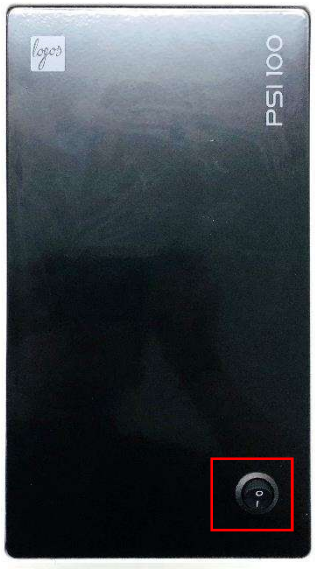
The shipping restraints must be removed before the CELENA® X is turned on.

Store the screws in the accessories box for future use. Make sure they are accessible in case you need to pack up for maintenance and servicing purposes.

Turn on the CELENA® X

Turn on in this order:

- Turn on CELENA® X Controller by pressing the power switch.



- Turn on CELENA® X main unit by pressing the power button.

- Run CELENA® X Explorer on the PC

Note

Using other programs as well as CELENA® X Explorer at the same time can affect both imaging and analysis time. Using only CELENA® X Explorer is recommended when imaging and acquisition.

Install filter cubes and objectives

Note

CELENA® X Explorer must be on to install filter cubes and objectives.

For detailed instructions on how to install filter cubes, go to 6.2 Change filter cubes.

For detailed instructions on how to install objectives, go to 6.3 Change objectives.

Make sure the installed filter cubes and objectives match what is set in the **CHANNELS** panel.

Shut down the CELENA® X

Note

Explorer must be shut down before the device to allow the stages to dock for safety.

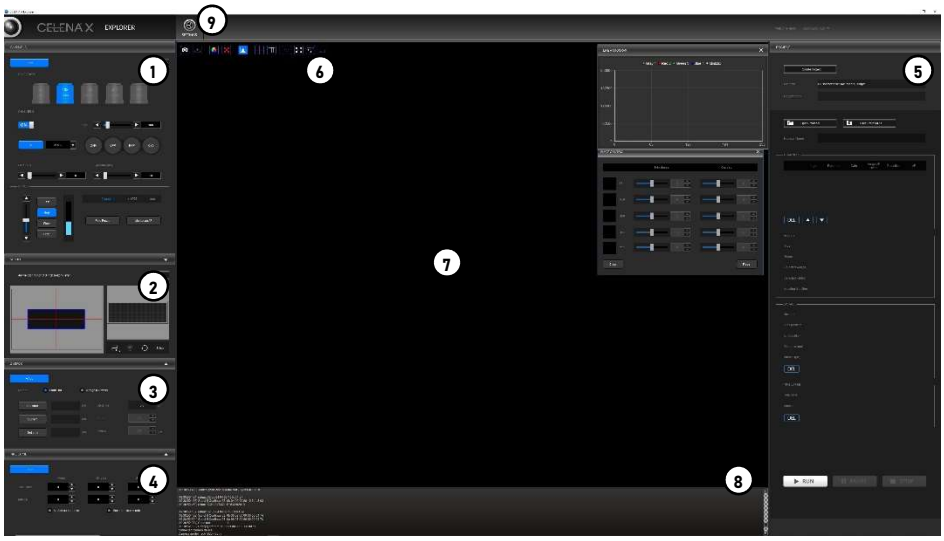
Turn off in this order:

- Close CELENA® X Explorer by clicking x button on the top right corner of Explorer.
- Turn off CELENA® X main unit by pressing the power button for 3-5 seconds.
- Turn off CELENA® X controller by pressing the power button.

4. CELENA® X Explorer

4.1 User interface

The CELENA® X Explorer is the graphical user interface for the CELENA® X High Content Imaging System.

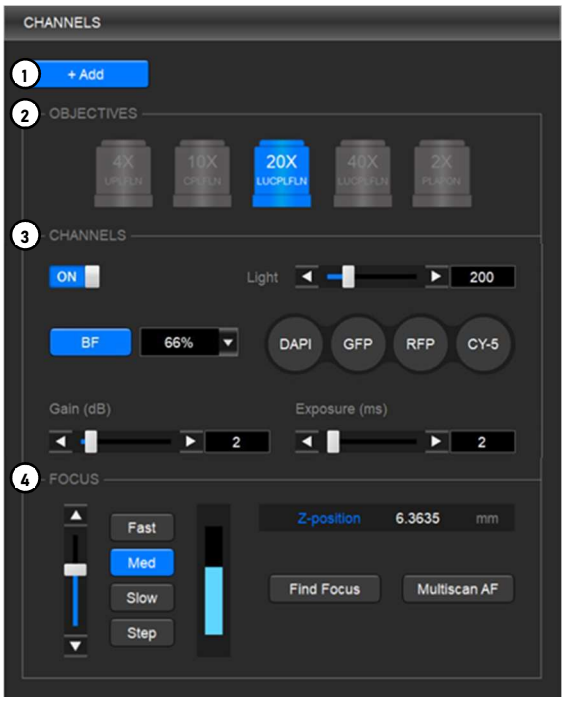


CELENA® X Explorer

① **CHANNELS:** Gives control over light, camera, and focus settings.
② **VESSEL**: Allows you to select the appropriate vessel, wells, and fields to capture.
③ **Z-STACK:** Allows you to capture multiple planes along the Z-axis.
④ **TIME LAPSE:** Allows you to set up time lapse sequences.
⑤ **PROJECT:** Allows you to run, load, save, and edit automated imaging projects.
⑥ **Toolbar:** Has tools for capturing and visualizing the current field of view.
⑦ **Viewing area:** Shows the current field of view.
⑧ **System messages:** Displays system messages.
⑨ **Settings:** Allows you to set system options and perform calibration procedures.

Channels

This panel is used to set light, camera, and focus parameters for a project.



① **Add:** Adds the CHANNELS settings to the project protocol.
② **Objectives:** Allows you to select from the currently installed objectives.
③ **Channels:** Allows you to select from the currently installed filter cubes and adjust light and camera settings.
④ **Focus:** Allows you to find focus and set up autofocusing.

Objectives

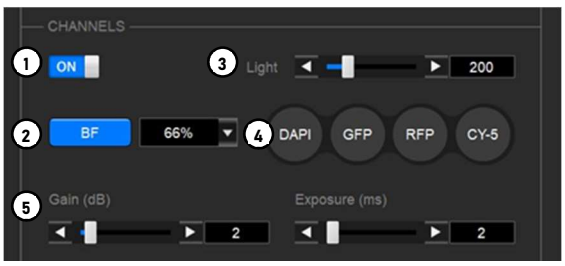
This panel is used to select from the currently installed objectives.

The magnification and label on each objective reflects its profile, which can be modified in **Settings > Objectives**.

Click the desired objective to select the corresponding magnification. You can select only one objective at a time. The selected objective is highlighted in blue.

Channels

This panel is used to set the light and camera settings.



① **ON/OFF:** Use to turn the light source on and off. When the light is on, the viewing area shows the sample illuminated with the selected light source.
② **Condenser:** Is installed at the time of purchase (BF: brightfield, PH: phase-contrast condenser).
In case of brightfield condenser, click the condenser (BF) button for transmitted light.
The dropdown menu allows you to control the condenser's iris diaphragm.

- AUTO Automatically adjusts to accommodate the selected objective
- 100% Used for objectives with high magnification
- 66% Used for objectives with medium magnification
- 33% Used for objectives with low magnification
- 0% Used for fluorescence imaging

In case of phase-contrast condenser, click the condenser (BF/PH) button for transmitted light.
The dropdown menu allows you to control the condenser's iris diaphragm or phase-contrast annuli.

- AUTO-BF Automatically adjusts to accommodate the selected objective with iris diaphragm
- AUTO-PH Automatically adjusts to accommodate the selected objective with phase-contrast annulus
- 100% Used for objectives with high magnification
- 66% Used for objectives with medium magnification
- 33% Used for objectives with low magnification
- 0% Used for fluorescence imaging
- PH2 Used for PH2 phase-contrast objective
- PH1 Used for PH1 phase-contrast objective
- PHL Used for PHL phase-contrast objective

③ **Light:** Controls the brightness of the selected channel. To adjust, move the slider in the desired direction or enter the desired value in the text box. Light intensity is controlled as a single parameter and expressed as a value between 1-1000.

④ **Filter cubes:** Represents the fluorescence channels available for imaging. Up to four interchangeable filter cubes may be installed at once for multichannel fluorescence imaging. Click the desired channel to select the corresponding light source. The selected filter cube is highlighted in blue. You can select only one channel at a time. Each filter cube can be renamed and its pseudocolor selected in **Settings > Filter Cubes.**

⑤ **Gain and exposure:** Controls the camera capture settings. To adjust, move the slider in the desired direction or enter the desired value in the text box. Gain is the camera's amplification of the signal.

- Gain is the camera's amplification of the signal.

  $$\text{Gain(dB)} = 20 \times \log\left(\frac{V_{out}}{V_{in}}\right)$$

  8-bit: 0-36 dB
  12-bit: 0-24 dB
- Exposure is the amount of time that the camera shutter is open to allow light into the sensor.
- Exposure range: 0-10,000 ms

⚠ WARNING

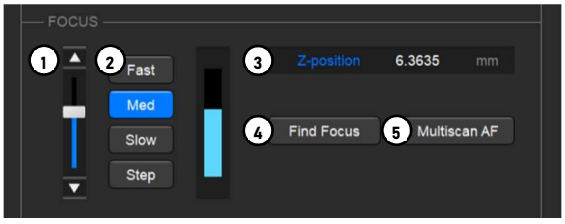
This device uses Class 3B laser and ultraviolet LEDs. Make the CELENA® X door is closed when imaging to protect your eyes. Direct exposure to and diffuse reflections of the laser can be hazardous to the eye.

Note

Minimize the time that the sample is being exposed to light to prevent from photobleaching and/or phototoxicity.

Focus

The focus panel is used to find focus and to set up autofocusing for batch processing in the currently selected channel.



① **Focus slider:** Used to adjust focus. The focus slider represents the full focal range. Adjust focus by moving the slider in the desired direction.

② **Z-stage speed:** Used to adjust the speed at which the Z-stage moves with each action. For fine focusing at high magnifications, set the focus speed to Slow. When Step is selected, the Z-stage moves the distance of the selected objective's depth of focus with each click.

③ **Z-position:** Shows the position of the Z-stage and used to adjust focus. The focus position is expressed in mm along the Z-axis. Adjust focus by entering the desired value in the text box.

④ **Find focus:** Used for instant autofocusing.

⑤ **Multiscan AF:** Used to set repeated autofocusing during an experiment.

The CELENA® X has two autofocus options: 'Find Focus' for instant autofocusing and 'Multiscan AF' for repeated autofocusing during an experiment.

Find Focus
Find Focus is used to have the CELENA® X find the optimal focal plane based on the image.

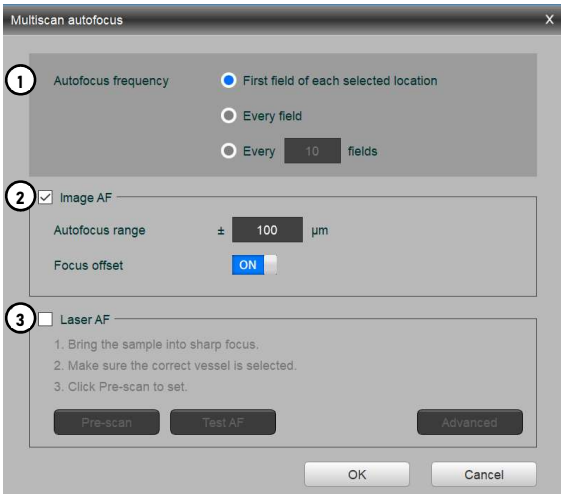
Set the range to scan from the current focal position.
- A long search range is useful when finding the focal plane of an unknown object.
- A short search range is useful for fine focusing.

Note

The speed of the image-based autofocus is entirely dependent on the set exposure. Reducing the exposure will increase focusing speed.

Multiscan AF
Multiscan AF is used to set up autofocusing for demanding batch image acquisitions such as multi-well plate imaging, slide scanning, and time-lapse imaging.

Prior to setting up Multiscan AF, make sure to bring the current field into sharp focus. The field must be focused sharply to setup subsequent autofocusing correctly.



IMPORTANT! If using this feature, Multiscan AF must be set up for each channel used.

① **Autofocus frequency:** Used to set the autofocus frequency to use during an automated scan.
- First field of each selected location
- Every field
- Every _ fields

Optimal AF frequency and range settings in Multiscan AF mode

	Optimal AF frequency	Optimal AF range
Multi-well plates	at least 1 field/well	±100 µm
Slides	every 10-20 fields	±10 µm

**Optimal AF frequency is also affected by objective magnification. Adjust accordingly.*
**Optimal AF range is also dependent on vessel bottom flatness. Adjust accordingly.*

When setting up Multiscan AF, you can select to use either the image-based or laser autofocus (optional; installed upon purchase).

A comparison of the CELENA® X autofocusing modes

	Image-based AF	Laser AF
Imaging speed	**Moderate**	**Fast**
	6 minutes 1 color, 10 ms exposure, 96-well plate	**2 minutes** 1 color, 10 ms exposure, 96-well plate
	9.5 minutes 3 colors, 10 ms exposure, 96-well plate	**3.5 minutes** 3 colors, 10 ms exposure, 96-well plate
Applicable magnifications	**All**	**10X-60X**
Photobleaching	**Yes**	**No**
Scratches, particles in sample	**Affected**	**Not affected**
Scratches, particles, and/or fingerprints on bottom surface	**Not affected**	**Affected**
Cell number, illumination conditions	**Affected**	**Not affected**

② **Image AF:** Select to set up image-based autofocusing.
Make sure the current field is focused sharply.
- **Autofocus range:** Use to set the range to scan from the current focal position.
- **Focus offset:** Choose to turn the focus offset on or off. The CELENA® X will calculate the difference between what the system defines as the optimal focal plane and what you define as the focal plane of interest and automatically calibrate the focus accordingly.

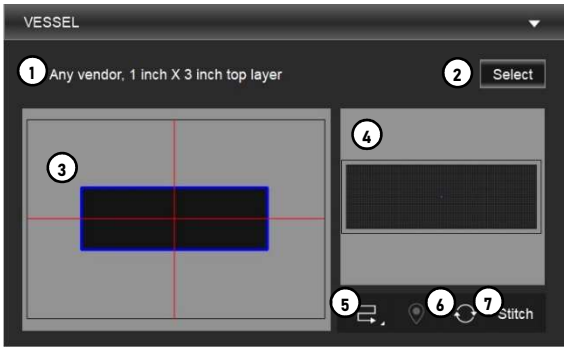
③ **Laser AF:** Select to set up laser-based autofocusing.
Make sure the current field is focused sharply and the correct vessel is selected.
- **Pre-scan:** Use to have the CELENA® X configure the laser autofocus settings.
- **Test AF:** Use to test the accuracy of the configured laser autofocus.

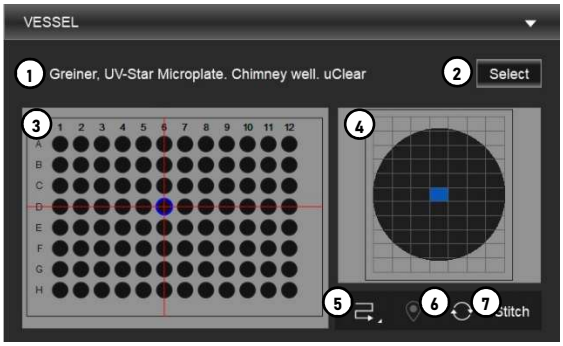
Note

Laser AF is not compatible with the following:
- Objectives with magnifications below 10X.
- PHC phase contrast objectives.
- LED filter cubes with an emission wavelength exceeding 750 nm.

Vessel

This section allows you to select the appropriate vessel, area, and fields to image.





① **Current vessel:** Shows the currently selected vessel.
② **Select vessel:** Allows you to select a vessel. Use the dropdown menus to select the vessel category and type. If the vessel you need is not available, go to **Settings > Vessels** to create a vessel.
③ **Vessel map:** Represents the currently selected vessel.
④ **Well map:** Represents the currently selected well. The field size within each well changes with the selected magnification.
⑤ **Acquisition order:** Allows you to specify the order in which selected areas are to be captured.
⑥ **Clear**: Clears the currently selected vessel and the fields.
⑦ **Stitch**: Shows whether image overlapping during acquisition is selected or not.

Note

If using an objective with a correction collar, adjust the correction collar as necessary according to the bottom thickness of the selected vessel.

View a specific area/well: Double-click the desired area/well in the vessel map to move the stage to its respective location. The currently displayed area/well is rimmed in blue and indicated by red crosshairs.

Select a specific area/well for imaging: Click and drag to select multiple areas/wells in the vessel map. Otherwise, click each area/well. Selected areas/wells are filled in with yellow.

Select a specific field for imaging: Click and drag to select multiple fields in the well map. Otherwise, click each field. Selected fields are filled in with yellow.

Select the acquisition order: Click one of the following buttons to specify the order in which selected areas are to be captured.

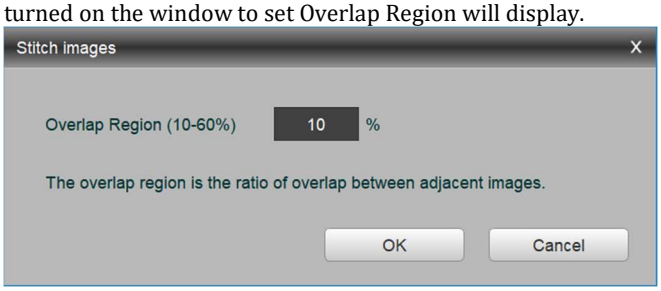
 Horizontal, zigzag

 Horizontal, rightward

 Vertical, zigzag

 Vertical, downward

Select Stitch: Click Stitch button if you want to acquire images with overlap. If the button is turned on the window to set Overlap Region will display.

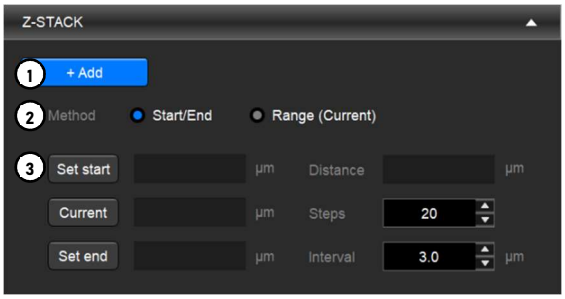


Note

Stitch is not supported for 16-bit images.
This feature does not perform stitching during image acquisition. Use CELENA® X Cell Analyzer to stitch images acquired by CELENA® X Explorer.

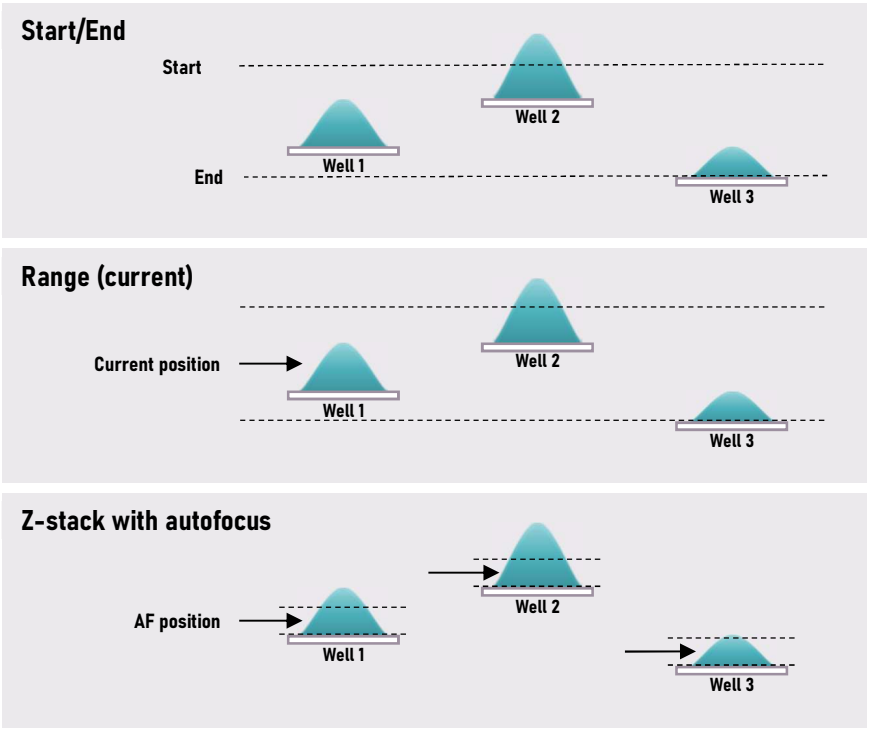
Z-stack

This panel allows you to set up Z-stack imaging. These settings apply to each added channel.



① **Add:** Adds the Z-STACK settings to the project protocol.
② **Method:** Allows you to select from Z-stack imaging methods.
③ **Z-stack settings:** Allows you to set the Z-stack imaging parameters.

There are three methods of operation:

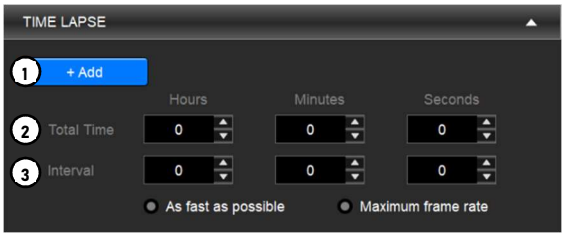


Z-stack methods

- **Start/End:** Set the start and end positions of the Z-stack.
  - Set start: Use to set the current focal plane as the start position.
  - Set end: Use to set the current focal plane as the end position.
  - Once the start and end positions have been set, the Z-stack distance is automatically calculated.
- **Range (Current):** Set the distance above and below the current Z-position.
  - Above (+): Use to set how far above the current focal plane to capture.
  - Below (-): Use to set how far below the current focal plane to capture.
- **Z-stack with autofocus:** If autofocus is selected with Start /End or Range (Current) Z-stack images are acquired after autofocusing. This method should be used when well-to-well focal variations are extreme. Multiscan AF must be set up first.
- **Distance:** The total distance between the start and end positions of the Z-stack. This is automatically calculated.
- **Steps:** The number of planes to capture along the Z-axis.
- **Interval:** The distance in µm between each focal plane captured.

Time lapse

This panel allows you to set up time lapse imaging for the project protocol. This applies to each channel. Selected fields are captured at set intervals over an allotted period of time.



① **Add:** Adds the TIME LAPSE settings to the project protocol.
② **Total time:** Allows you to set the total imaging time.
③ **Interval:** Allows you to set the time period that must elapse before a new set of images are captured.

The interval can be set manually or one of the two options below can be used to capture a new set of images immediately after capturing the previous set with no delay.

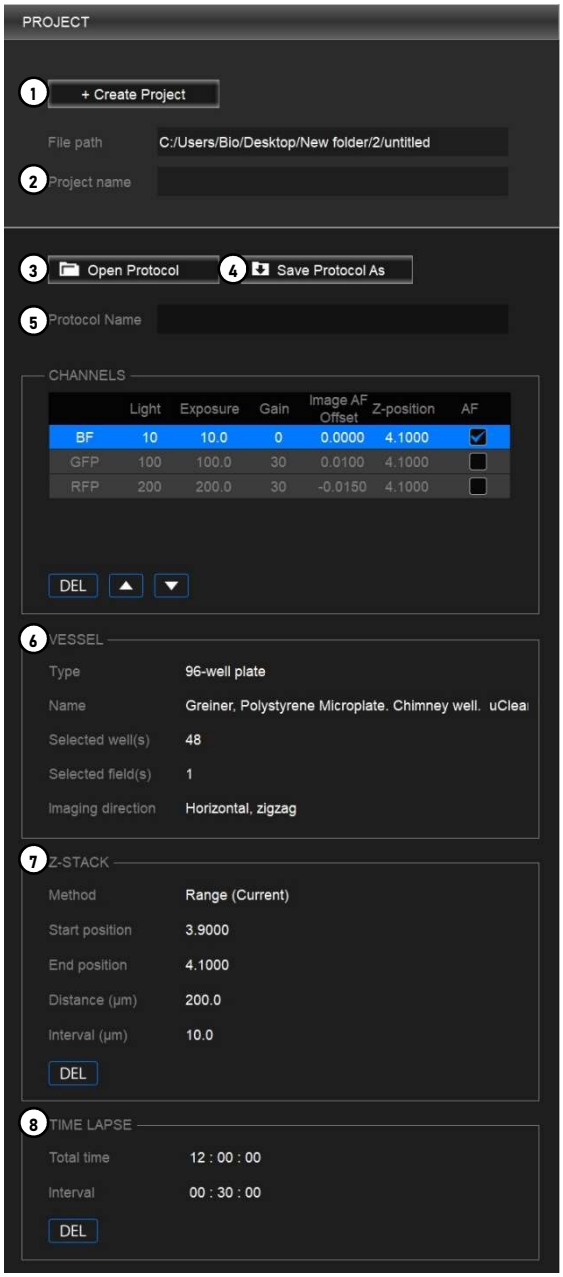
- **As fast as possible:** Can be used when imaging in multiple channels to capture the maximum number of images possible without stopping.
- **Maximum frame rate:** Can only be used when imaging a single field in a single focal plane with one channel to capture up to 30 frames per second. This option can be used for high-speed experiments such as calcium imaging.

Note: The interval will take into account other protocol settings such as the autofocus settings and exposure time.

Project

The project control panel is used to:

- Create and run a project
- Open or save a project protocol



① **Create project:** Allows you to start a project to image. This creates a project folder where all generated data will be stored.

- Project file (*.cxproj*): Stores project information, images, and associated metadata. This file can be opened in Cell Analyzer for analysis.
- Captured images
- Image thumbnails

Note: Save projects on the computer from which you are running Explorer.
Do not save the project to an external hard drive or a USB drive as this can affect imaging time.

② **Project details:** Shows you the file path and name of a created project.

③ **Open protocol:** Allows you to open a previously saved protocol. This opens a previously saved protocol file (*.cxprotocol*). When you open a protocol, make the appropriate adjustments to each parameter as needed.

④ **Save protocol as:** Allows you to save a protocol. This saves a protocol file (*.cxprotocol*) for future use.

⑤ **Protocol details:** Shows you the protocol details.

⑥ **VESSEL**: Shows the selected vessel information and selected wells and fields.

⑦ **Z-STACK**: Shows the Z-stack settings.

⑧ **TIME LAPSE**: Shows the TIME LAPSE settings.

Toolbar

The toolbar has tools for capturing and visualizing the current field of view.

	Capture		Save
	Pseudocolor		Highlight saturated pixels
	Live histogram		
	Center lines		Gridlines

① **Capture:** Click once to capture an image in the viewing area and turn off the light. Click again to clear the image from the viewing area and turn on the light.
② **Save:** Saves the captured image in the viewing area.
③ **Pseudocolor:** Shows the sample illuminated with the selected light source in pseudocolor. Go to **Settings > Filter cubes** to change the pseudocolor for each channel.
④ **Highlight saturated pixels:** Displays the pixels in saturated areas on an image. Go to **Settings > Camera** to change the color to label saturated pixels.
⑤ **Live histogram:** Shows a graphical representation of tonal values in real time.
⑥ **Center lines:** Shows center lines in the viewing area.
⑦ **Gridlines:** Shows gridlines in the viewing area.

Messages

This panel is used to display system messages. You can resize the message panel by dragging the top border.
Not all system messages indicate problems with your system.

The message text can be copied for troubleshooting.

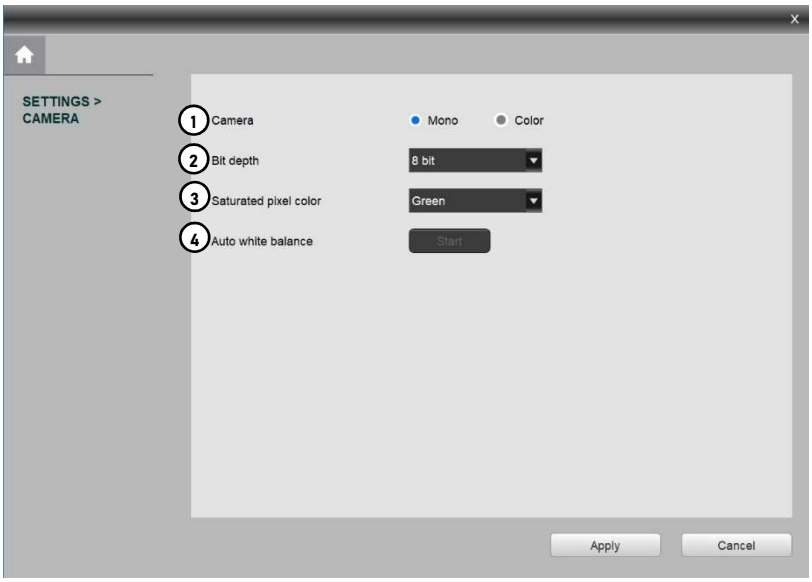
- To copy all the messages, right-click inside the message panel and click **Select All** from the context menu. Right-click the selection and select **Copy** from the context menu. The selection is copied and can be pasted as desired.
- To copy a specific message, select the desired message and right-click the selection. Select **Copy** from the context menu. The selection is copied and can be pasted as desired.

Settings

Settings allows you to set system options and perform calibration procedures. To access the Settings window, click the Settings wheel  above the tool bar.

Camera

The camera settings allows you to select the camera, bit depth, saturated pixel color, as well as auto white balance of the color camera.



① **Camera:**
- Mono: Selects a monochrome camera.
- Color: Selects a color camera,

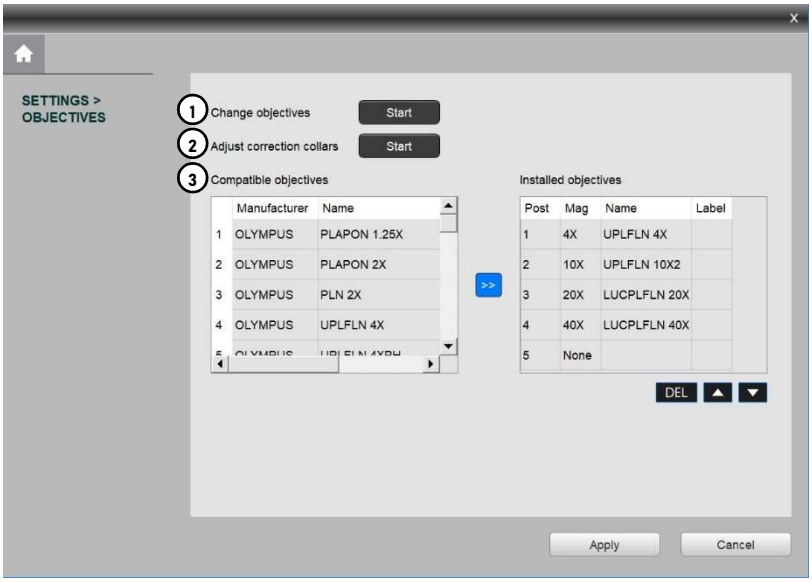
② **Bit depth:** Can select to capture images in 8-bit or 16-bit with the monochrome camera (the actual bit depth of 16-bit images is 12-bit).

③ **Saturated pixel color:** Can select to color saturated pixels in red, green, or blue.

④ **Auto white balance:** Adjusts color intensities to render colors correctly when using the color camera.

Objectives

The objectives settings allow you to change objectives, adjust objective correction collars, and set the description for each installed objective. See 6.3 Change objectives to learn how to change objectives.



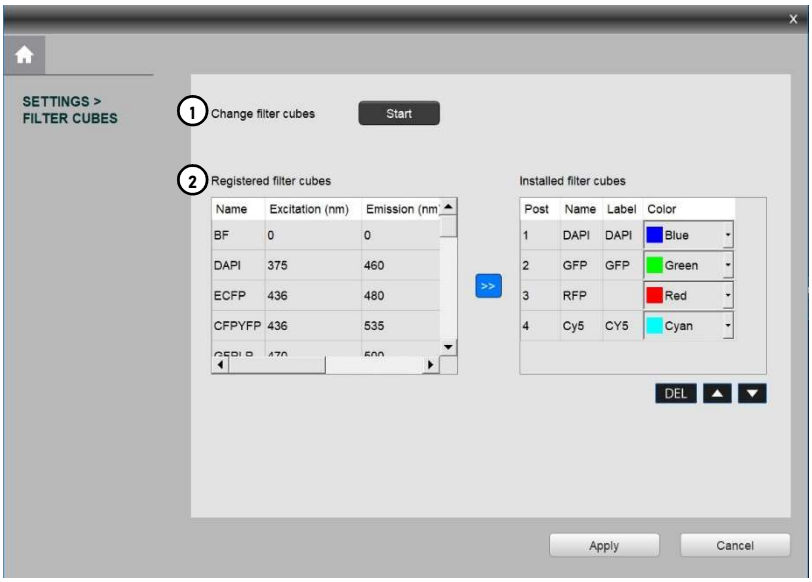
① **Change objectives:** Can be used to install and remove objectives.

② **Adjust correction collars:** Can be used to adjust the correction collar of objectives.

③ **Objective information**: Can be used to set the installed objectives and label them.

Filter cubes

The filter cubes settings allows you to change filter cubes and set the pseudocolor and description for each installed filter cube. See 6.2 Change filter cubes to learn how to change filter cubes.

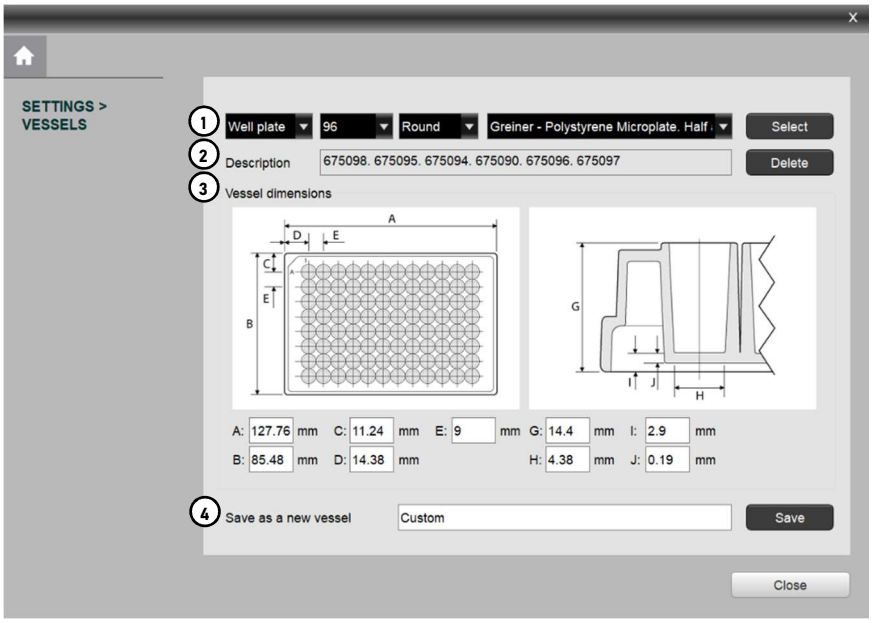


① **Change filter cubes:** Can be used to install and remove filter cubes.

② **Filter cube information:** Can be used to set the installed filter cubes, assign their associated pseudocolors, and label them.

Vessels

The vessels settings allows you to create and edit custom vessels.



① **Vessel details:** Can be used to select the vessel type, number of wells, well shape, and vessel name.
② **Vessel description:** Shows the associated catalog numbers of the selected vessel.
③ **Vessel dimensions:** Shows the dimensions of the selected vessel.
④ **Save as a new vessel:** Allows you to create a new vessel.

Create a vessel
Select the vessel type.

Select the number of wells.

Select the well shape.

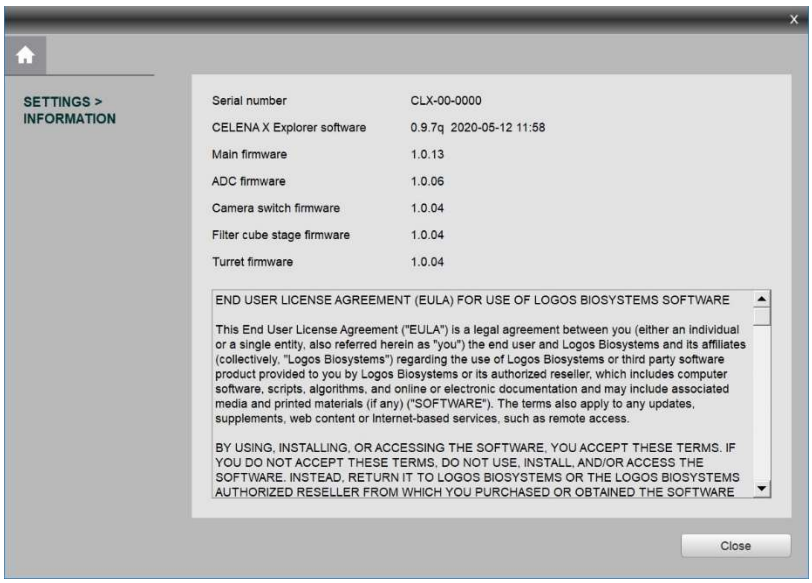
Input the vessel dimensions: plate length (A), plate width (B), A1 row offset (C), A1 column offset (D), well spacing from center to center (E), plate height (G), well diameter bottom (H), flange/skirt height (I), well bottom thickness (J).

Name the vessel in Save as a new vessel.

Click **Save**.

Information

This section contains information about hardware, software, and the end user license agreement (EULA).



4.2 Workflow

Create a project protocol

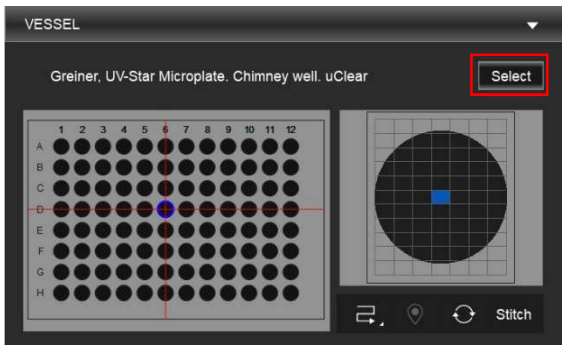
Overview

Upon starting Explorer, you will create a new project protocol to capture images.

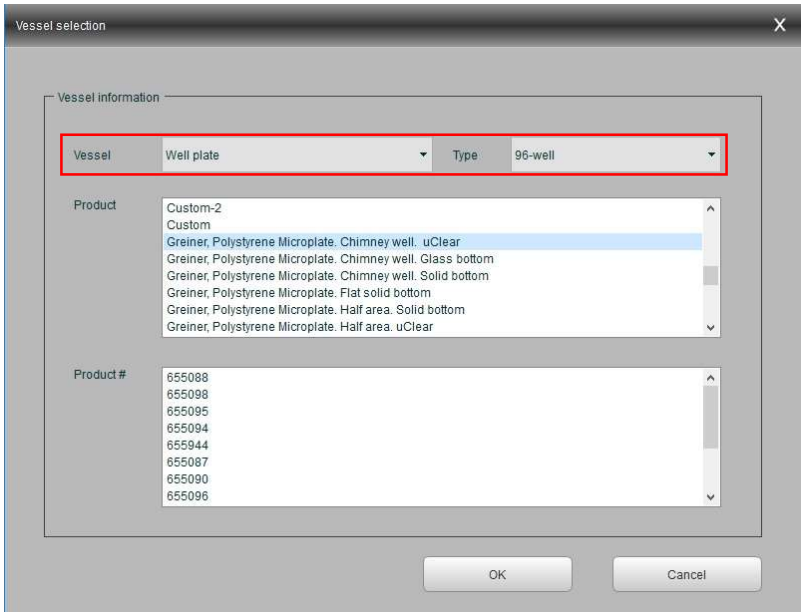
Select vessel.
▼
Select objective.
▼
Select a channel.
▼
Set light and camera parameters.
▼
Focus on the sample.
▼
Adjust light.
▼
Set Multiscan AF options.
▼
Click **Add** [CHANNELS].
▼
Repeat for all necessary channels.
▼
Select areas and fields to be captured.
▼
(Optional) Set up Z-stack imaging.
▼
Click **Add** [Z-STACK].
▼
(Optional) Set up time lapse imaging.
▼
Click **Add** [TIME LAPSE].
▼
Create a project.
▼
Run the automated scan.

1. Select a vessel

In the VESSEL panel, click **Select** to bring up the vessel selection window.



Use the dropdown menus to select the vessel category and type.
Available vessel types are well plates and slides.



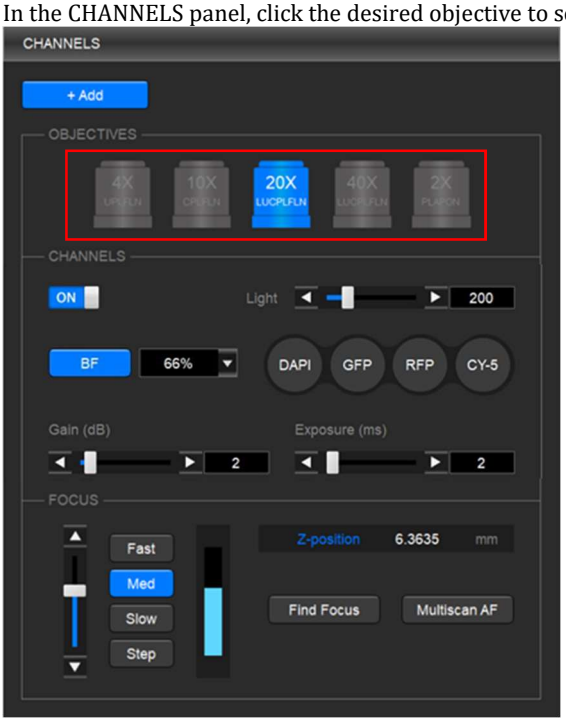
Click the correct vessel in Product tab.
It is crucial that you select the correct vessel to ensure proper focusing and vessel navigation.
If the vessel you need is not available, go to **Settings > Vessels** to create a vessel.

NOTICE

Be careful not to drop the vessel into the CELENA® X when placing it on the vessel holder.

2. Select an objective

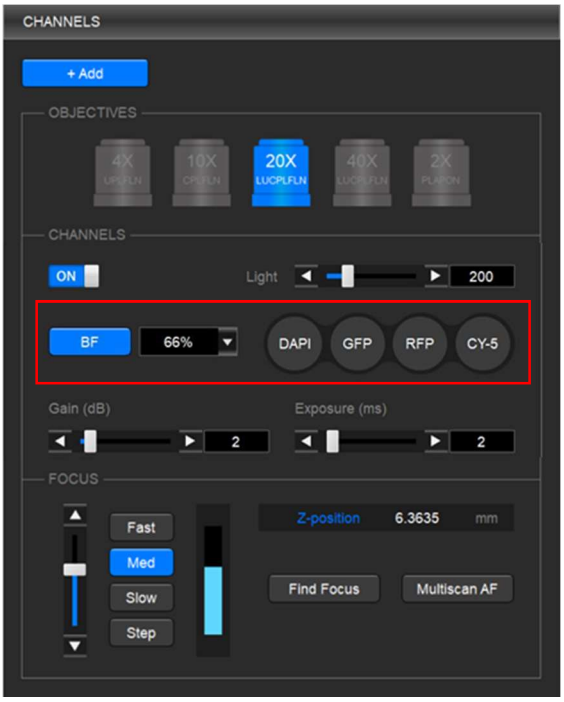
In the CHANNELS panel, click the desired objective to select the corresponding magnification.



You can select only one objective for each project/protocol. If the objective you need is not available, go to **Settings > Objectives** to install a different objective.

3. Set up the channels

In the CHANNELS panel, set up channels as needed.



⚠ WARNING

This device uses Class 3B laser and ultraviolet LEDs. Make the CELENA® X door is closed when imaging to protect your eyes. Direct exposure to and diffuse reflections of the laser can be hazardous to the eye.

Note

Minimize the time that the sample is being exposed to light to prevent from photobleaching and/or phototoxicity.

Select a channel

Click the desired channel and adjust the condenser's iris diaphragm.

- For brightfield imaging, click BF or PH for transmitted light. Use the dropdown menu to control the condenser's iris diaphragm as desired.
- For fluorescence imaging, click the desired fluorescence channel to select the corresponding light source. If the channel you need is not available, go to **Settings > Filter cubes** to install a different filter cube.

Tips:

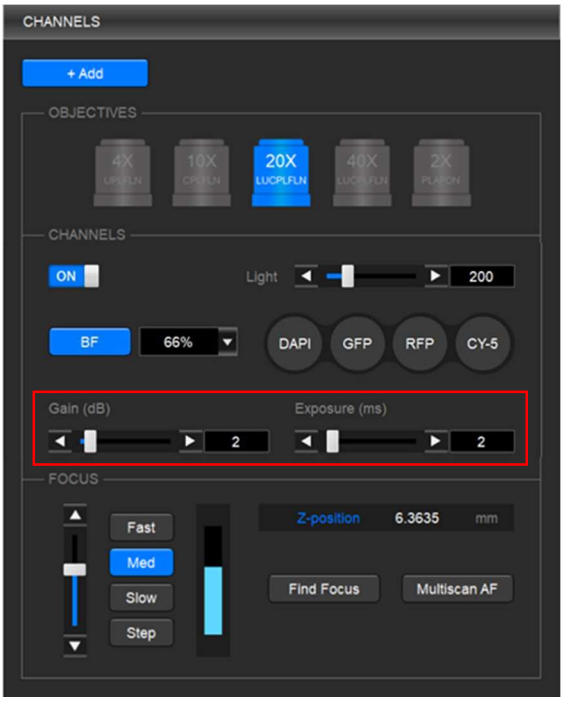
- When searching for a sample, increase gain and decrease exposure for a faster frame rate.
- Decrease gain to reduce background noise and increase exposure to improve signal intensity for imaging.

Adjust light intensity

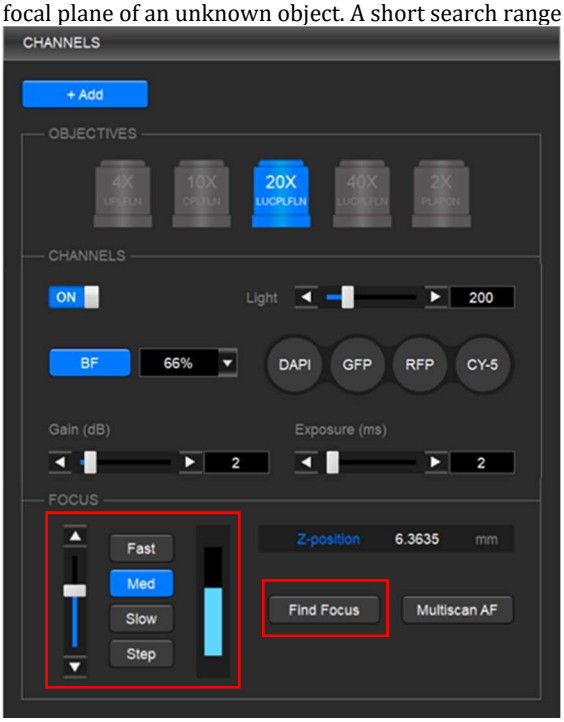
Move the slider in the desired direction or enter the desired value in the text box.

Adjust camera gain and exposure

Move the slider in the desired direction or enter the desired value in the text box.



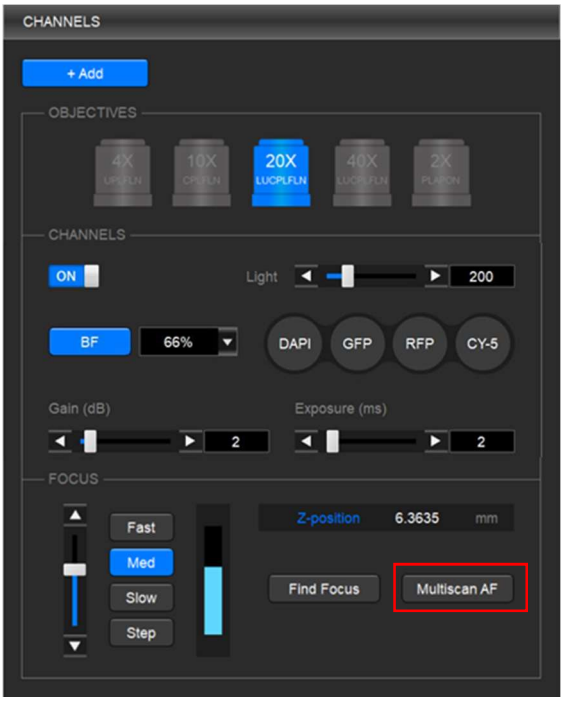
Focus sharply.
Move the focus slider in the desired direction or enter the desired value in the Z-position box. Alternatively, click **Find Focus** to have the CELENA® X find the optimal focal plane. Set the range to scan from the current focal position. A long search range is useful when finding the focal plane of an unknown object. A short search range is useful for fine focusing.



Note

The speed of the image-based autofocus is entirely dependent on the set exposure. Reducing the exposure (< 10 ms) will increase focusing speed.

Set up Multiscan AF.
Click **Multiscan AF** to set up autofocusing for demanding batch image acquisitions such as multi-well plate imaging, slide scanning, and time-lapse imaging. Select how often to autofocus during an automated scan. Select whether to use the image-based or laser autofocus.

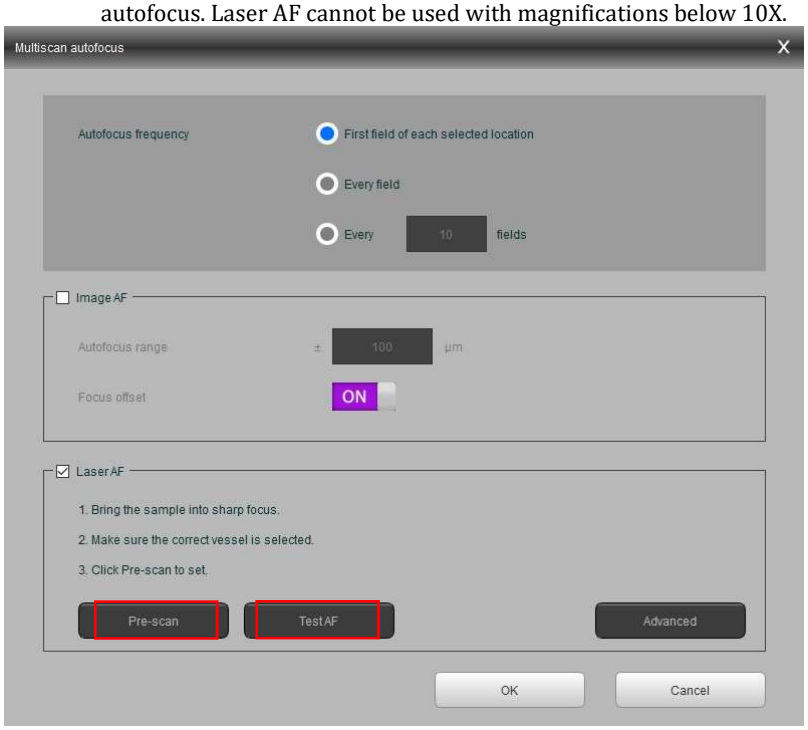


- **Image-based:** Make sure the current field is focused sharply. Set the range to scan from the current focal position. You can choose to turn the user-defined focus offset on or off. The user-defined focus offset means that the system will calculate the difference between what the system defines as the optimal focal plane and what the user defines as the focal plane of interest and automatically calibrate the focus accordingly.

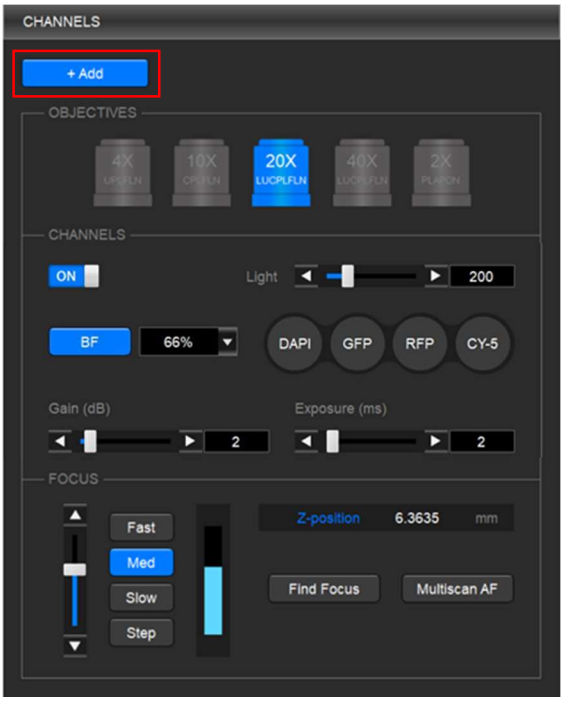
Note

When using this feature for imaging in multiple channels, Multiscan AF must be set for each channel. This is especially important when the fluorescent markers in different channels are in different focal planes.

- **Laser AF:** Make sure the current field is focused sharply. The vessel information must be correct. Click Pre-Scan to have the CELENA® X configure the laser autofocus settings. Click Test AF to test the accuracy of the configured laser autofocus. Laser AF cannot be used with magnifications below 10X.



Add to the project protocol.
Click **Add**.



Repeat for all necessary channels.

4. **Select areas and fields to be captured**

In the VESSEL panel, select the well(s) to image in the vessel map.

Click individual wells or drag and drop to select multiple wells. Wells selected for imaging will be filled with yellow.

Select the field(s) to image within each well in the well map.

Click individual fields or drag and drop to select multiple fields. Fields selected for imaging will be field with yellow.

5. **(Optional) Set up Z-stack imaging**

In the Z-STACK panel, select a Z-stack method and set appropriately.

- **Start/End:** Move the focal plane to the desired start Z-position and click **Set Start**. Move the focal plane to the desired end Z-position and click **Set End**. Select **Interval** to capture images at specific intervals (µm) or **Steps** to capture a specific amount of images (steps) and enter the desired value.
- **Range (current):** Move the position to the desired start position. To set the imaging range, enter how far above (+) and below (-) the current position to set the imaging range. Select **Interval** to capture images at specific intervals (µm) or **Steps** to capture a specific amount of images (steps) and enter the desired value.

Click **Add.**

6. **(Optional) Set up time lapse imaging**

In the TIME LAPSE panel, set the total imaging time and imaging interval.

Click **Add.**

Note

Set up time lapse imaging last so that the CELENA® X can account for the other imaging options you have set, which affect the time required to capture one image.

7. **Create a project**

In the PROJECT panel, click **Create Project**.

Name the project and designate where to save the project folder.

Note

Save projects on the computer from which you are running Explorer.
Do not save the project to an external hard drive or a USB drive as this can affect imaging time.

Save a project protocol

To save the set protocol for future use, click **Save Protocol As** in the PROJECT panel.

Name the protocol and designate the file path.

Load a project protocol

To load a previously saved protocol, click **Open Protocol** in the PROJECT panel.

Make the appropriate adjustments to each parameter as needed. This is especially important for the Multiscan AF feature and Z-stack imaging. Make sure to adjust Multiscan AF settings for each channel being imaged. To apply each change, click the **Add** button above each panel.

Run a project protocol

Once a protocol has been set and project has been created, click **RUN** at the bottom of the PROJECT panel.

Note

Make sure the CELENA® X main unit door is closed for fluorescence imaging applications to block ambient light and improve fluorescence image quality.

Pause/stop a project protocol

To pause a running project, click **PAUSE** at the bottom of the PROJECT panel.

To resume a running project, click **RESUME** at the bottom of the PROJECT panel.

To stop a running project, click **STOP** at the bottom of the PROJECT panel.

View project results

When a project is complete, you can scroll through the captured images using the vessel and well maps.

The project file (*.cxproj*) can be opened in CELENA® X Cell Analyzer for analysis.

5. Maintenance

5.1 General care

Clean surfaces of the main unit and controller with a soft cloth dampened with distilled water or 70% ethanol. Immediately wipe dry with a clean cloth.

⚠ WARNING

Do not pour or spray liquids directly onto the instrument.

To avoid electrical shock or damage, do not wet electrical wires or connections.

If liquid is spilled on the instrument, turn off the power and wipe dry immediately.

Do not exchange components between instruments unless they have been provided or authorized by Logos Biosystems.

NOTICE

Use only optical-grade cleaning materials to clean optical components.

Do not use abrasive or sharp-edged devices when cleaning the system.

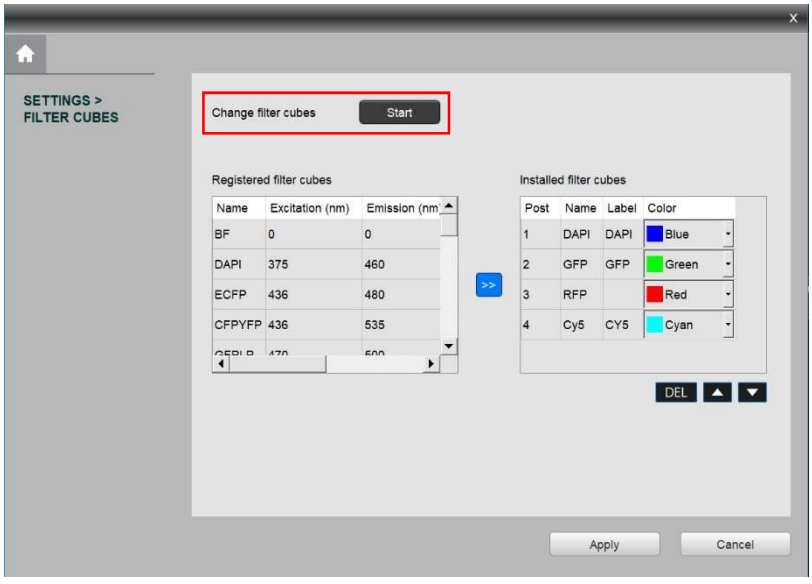
5.2 Change filter cubes

Procedure

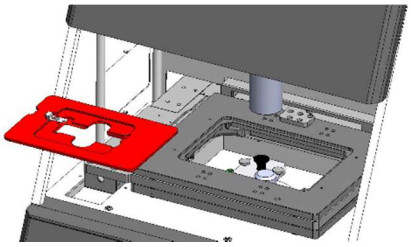
Go to **Settings > Filter Cubes**.

Click **Change filter cubes**.

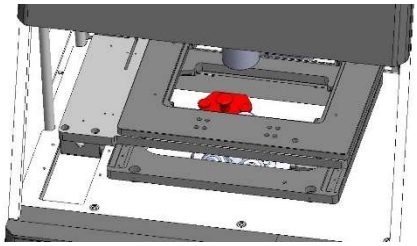
Click **Start**.

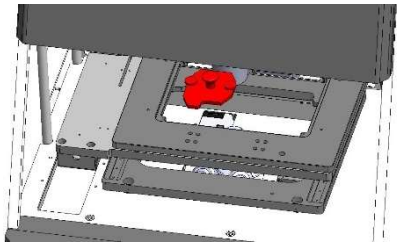


Remove the vessel holder from the stage.

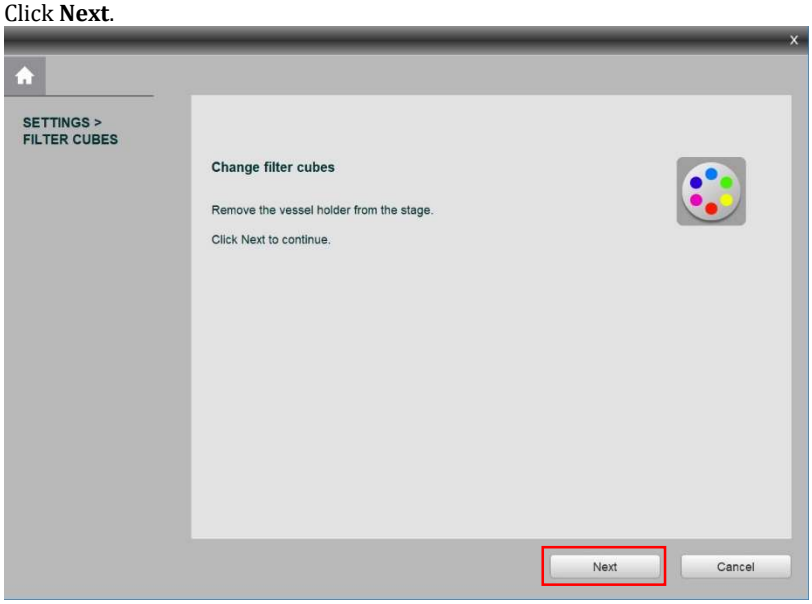


Remove the filter cube stage cover.

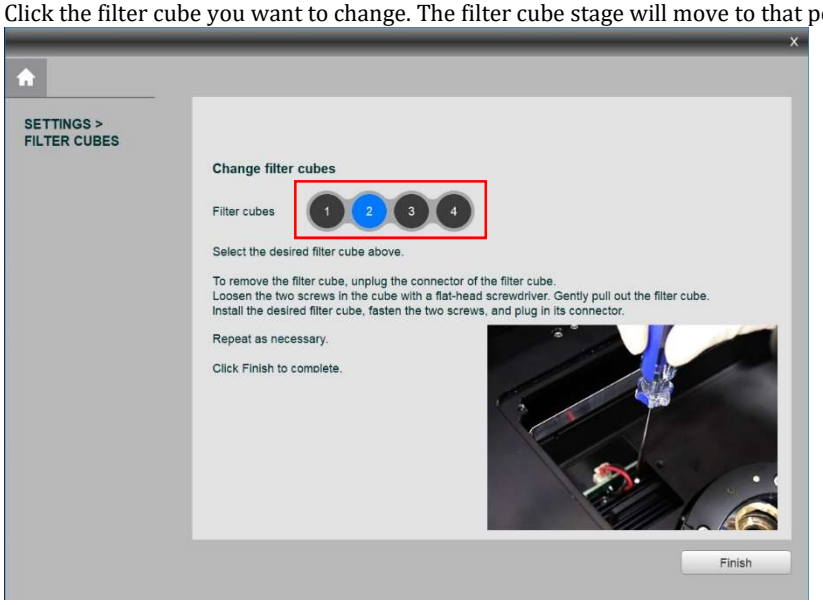




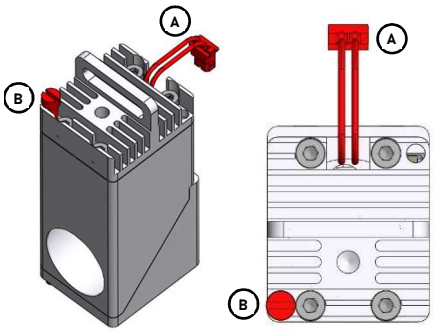
Click **Next**.



Click the filter cube you want to change. The filter cube stage will move to that position.



Unplug the connector (A) of the filter cube. Loosen the screw (B) in the cube with a flat-head screwdriver.

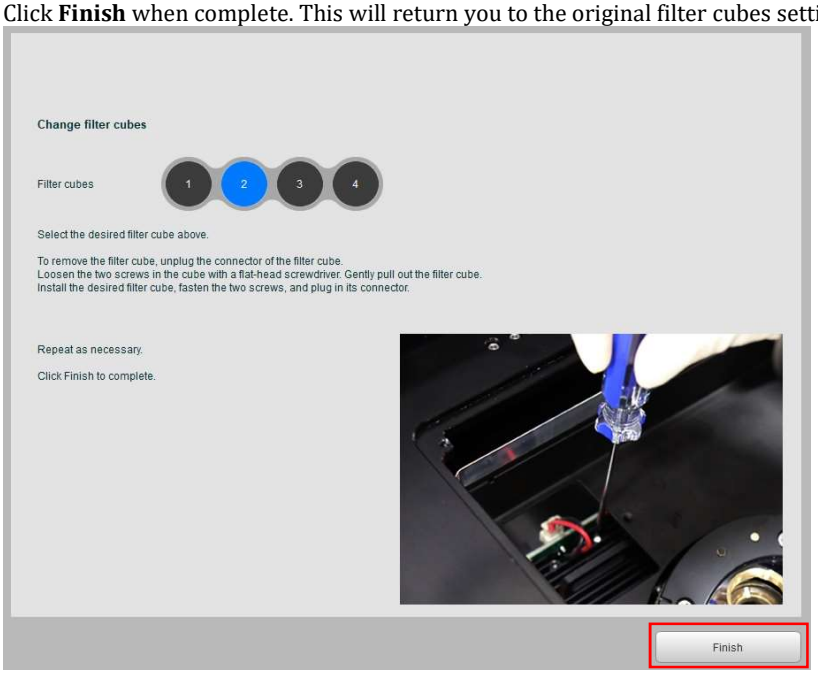


Gently pull out the filter cube.

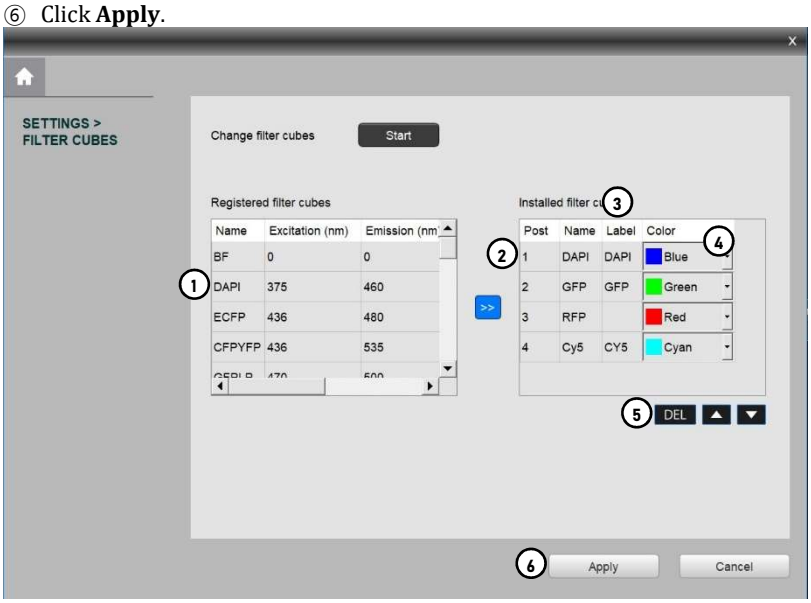
Insert the desired LED filter cube, fasten the screw, and plug in its connector.

Repeat as necessary.

Click **Finish** when complete. This will return you to the original filter cubes settings window.



① Select the installed filter cube from the registered filter cubes list.
② Select the post in which it was installed from the installed filter cubes list and click **>>**.
③ Double-click the label box to change how it shows up in the CHANNELS panel.
④ Use the Color drop-down menu to assign the filter cube a pseudocolor.
⑤ Use the **DEL**, ▲, and ▼ buttons to edit the list of installed filter cubes as needed.
⑥ Click **Apply**.



5.3 Change objectives

Note

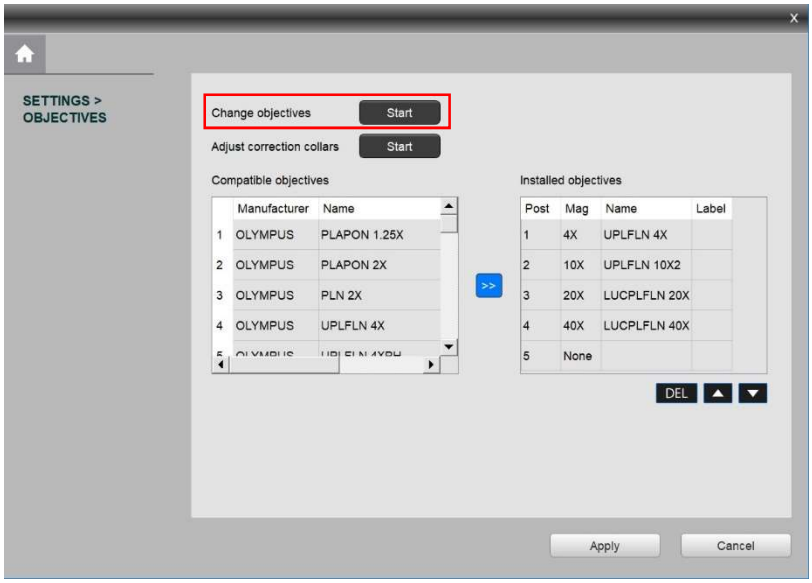
Use only objectives compatible with CELENA® X specified in Compatible objectives. If you use an objective not compatible with CELENA® X the performance and the safety cannot be guaranteed.

Procedure

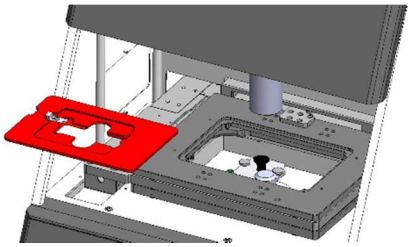
Go to **Settings > Objectives**.

Select **Change objectives**.

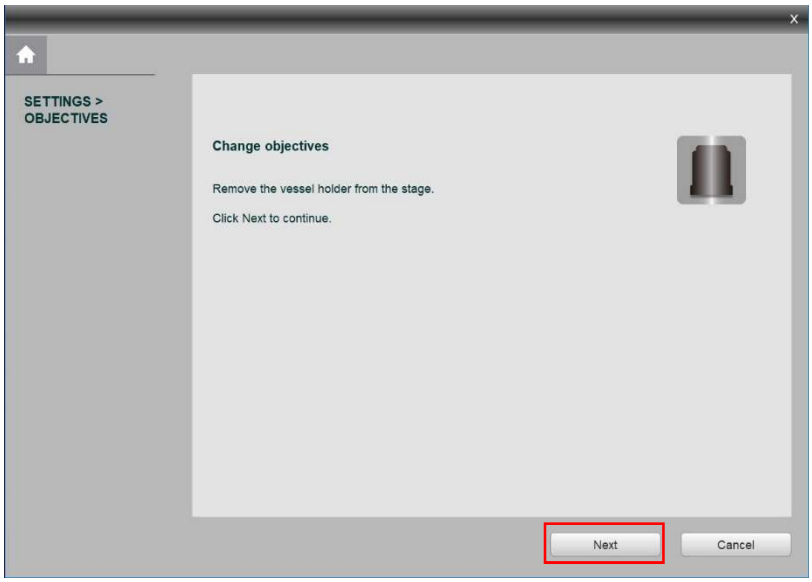
Click **Start**.



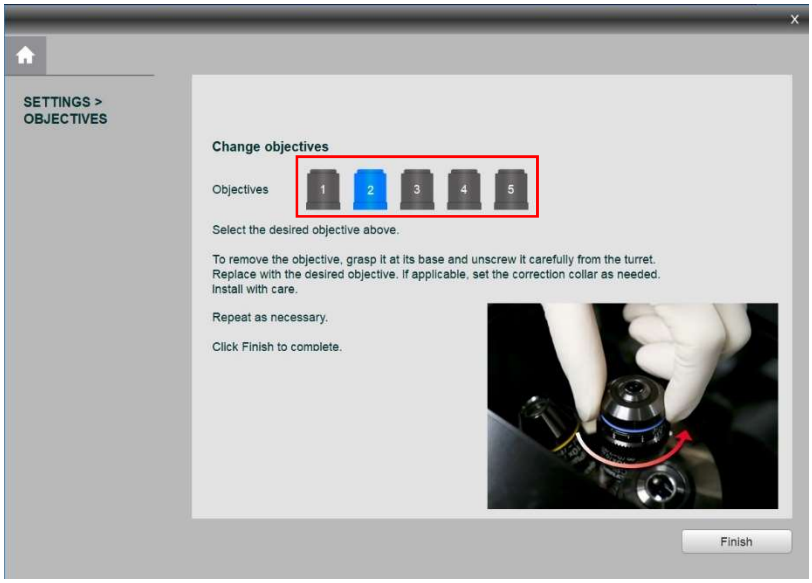
Remove the vessel holder from the stage.



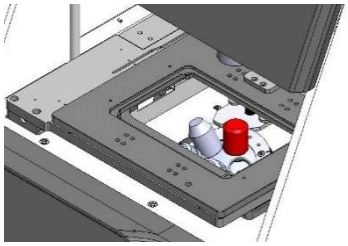
Click **Next**.

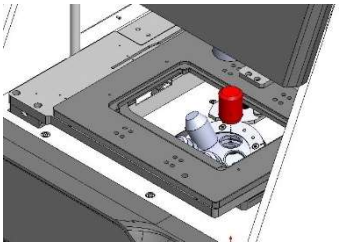


Click the objective you want to change. The turret will turn to that position.



Grasp the objective at its base and unscrew it from the turret.



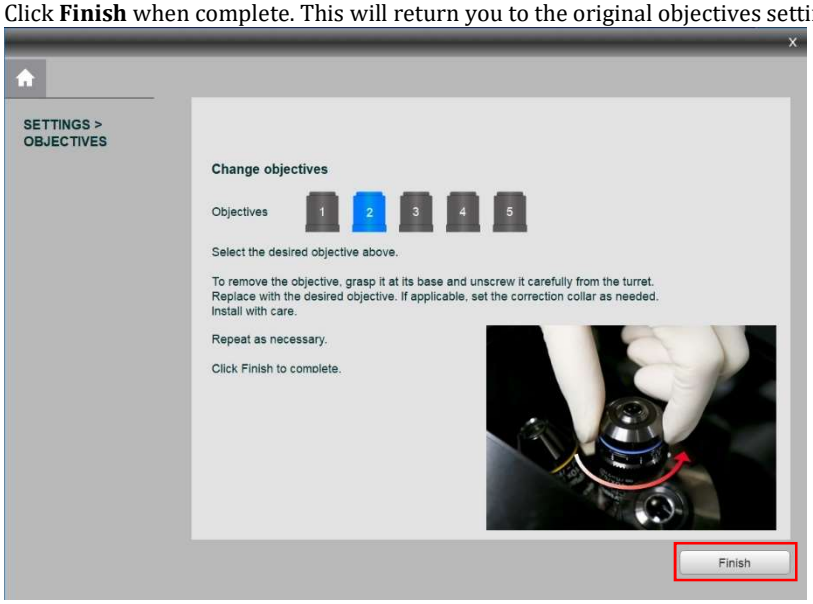


Replace it with the desired objective and screw it in securely.

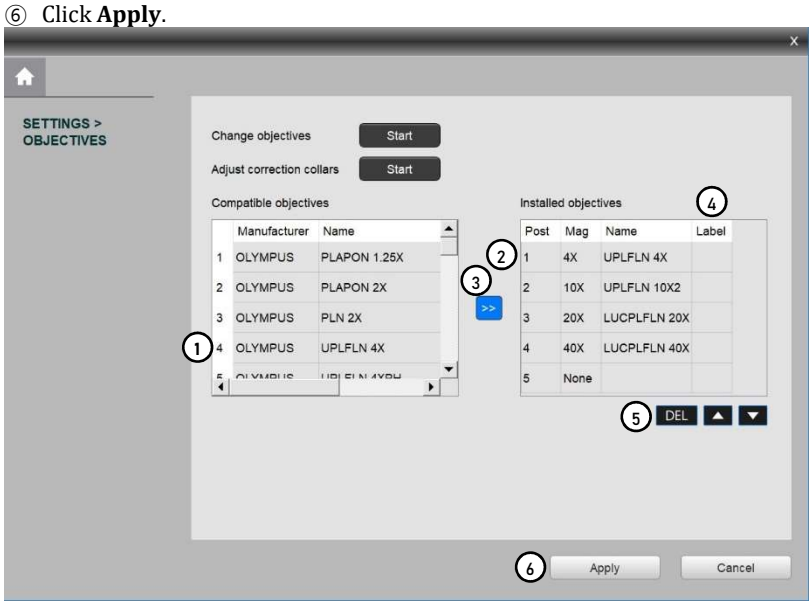
If applicable, set the correction collar (A) as needed.

Repeat as necessary.

Click **Finish** when complete. This will return you to the original objectives settings window.



① Select the installed objective from the compatible objectives list.
② Select the post in which it was installed from the installed objectives list.
③ Click **>>**.
④ Double-click the label box to change how it shows up in the CHANNELS panel. If it is blank, the label will be the name of the objective.
⑤ Use the **DEL**, ▲, and ▼ buttons to edit the list of installed objectives as needed.
⑥ Click **Apply**.



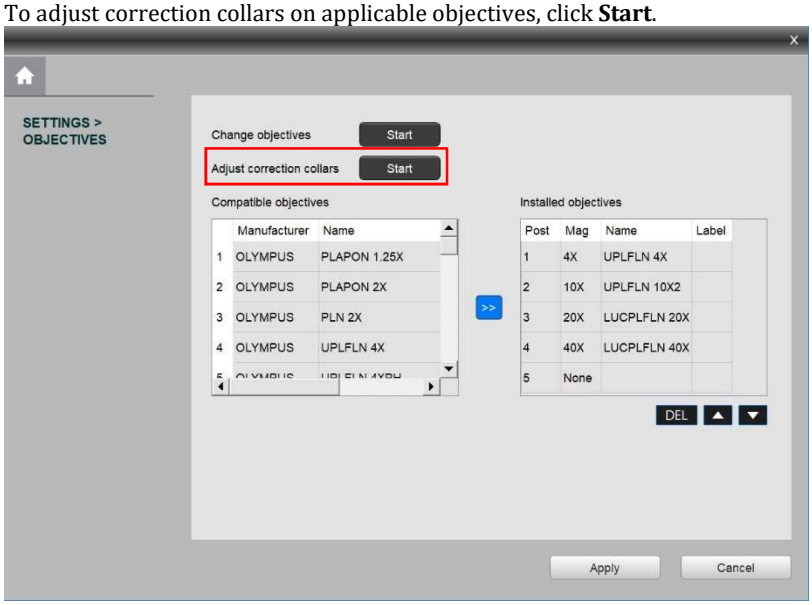
6.4 Adjust objective correction collars

Procedure

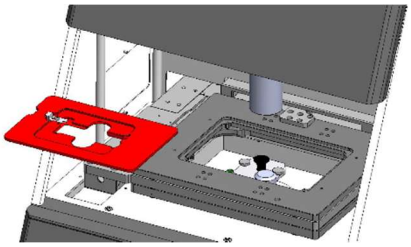
Go to **Settings > Objectives**.

Click **Adjust correction collars**.

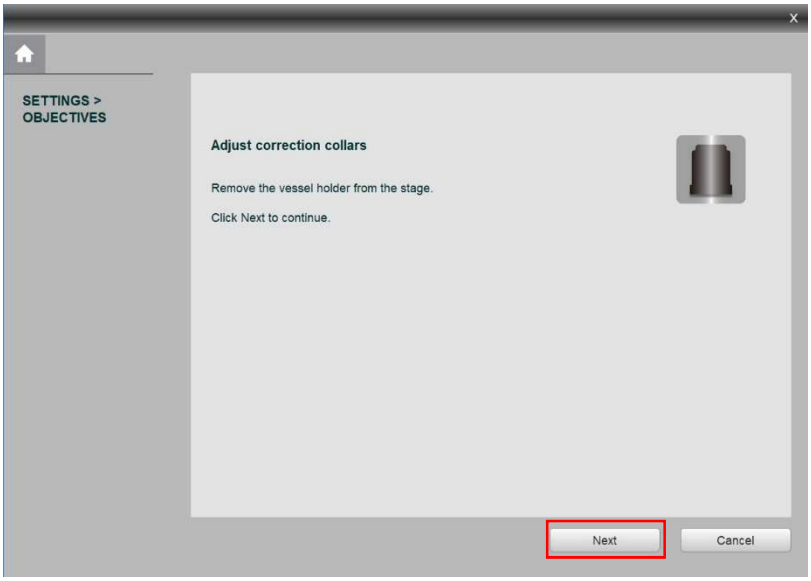
To adjust correction collars on applicable objectives, click **Start**.



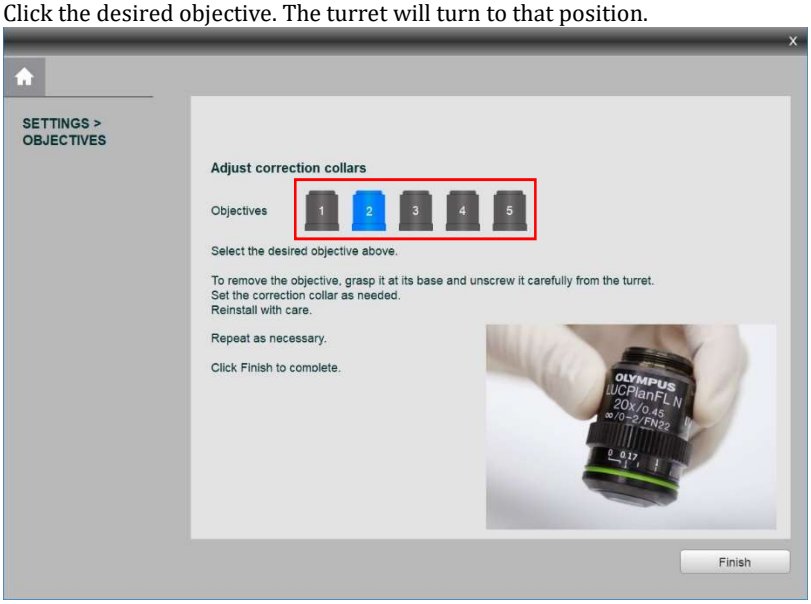
Remove the vessel holder from the stage.



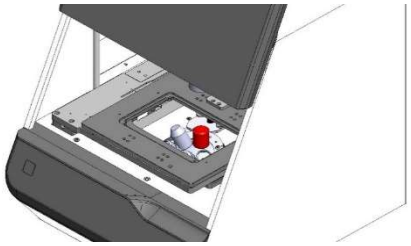
Click **Next**.

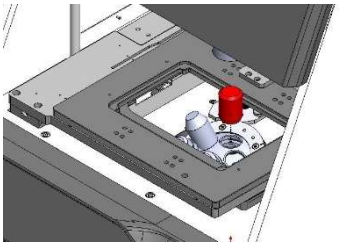


Click the desired objective. The turret will turn to that position.



Grasp the objective at its base and unscrew it from the turret.



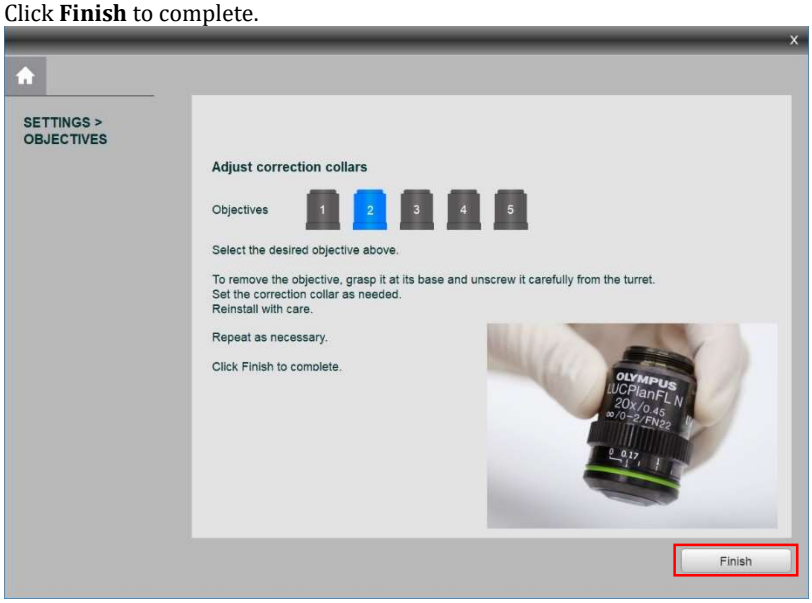


Set the correction collar (A) as needed.

Reinstall the objective with care.

Repeat as necessary.

Click **Finish** to complete.



5.5 Version up

Procedure	Backup the files, CELENA X Explorer.ini and CELENA X_User.db to your desktop. You can find the CELENA X Explorer.ini in the same folder the executable file (exe.) is located and CELENA X_User.db file in the User folder. You do not need to uninstall the existing software if re-writing has been done successfully. In case an error message (*.dll) pops up, uninstall the existing software and install the new software. Check if the folder, Explorer remains. (Logosbiosystems > Logosbiosystems > CELENA X > Explorer) If the Explorer folder exists, delete the folder. Install the new software. Overwrite the backup files, CELENA X Explorer.ini and CELENA X_User.db to the original locations.

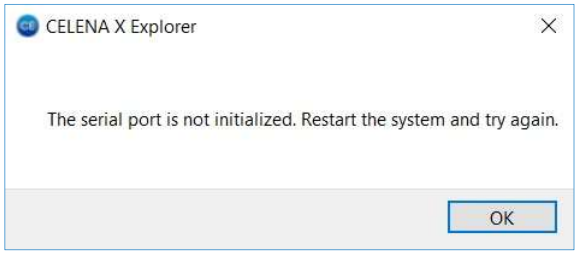
Appendix A: Troubleshooting

Image quality

Uneven focus	Make sure the vessel bottom is clean and free of fingerprints. Place the vessel in the appropriate vessel holder. Make sure it fits snugly and lies flat. Make sure you focus sharply on a sample before setting up the autofocus for Multiscan AF. Make sure you have selected the correct vessel. Make sure the objective correction collar (if available) is set to the correct vessel thickness.
Difficulty in focusing on a coverslipped sample	Make sure the coverslip is facing up if using an objective corrected for 1.0 mm. Make sure the coverslip is facing down if using an objective corrected for 0.17 mm. If using an objective with a correction collar, make sure the objective correction is set to the desired vessel thickness and place the coverslipped sample accordingly.
Dim image	Set the iris diaphragm according to the objective and condenser used. Increase light intensity.
Spots or blurs on image	Clean the objective lens carefully and appropriately. Make sure the vessel bottom is clean and free of fingerprints.
Black viewing area	Turn on the light on in the CHANNELS panel. Center the sample over the objective.
Red viewing area, or red patches on image	Decrease light intensity until the red highlights disappear. Click to deactivate the Highlight Saturated Pixels button in the toolbar.

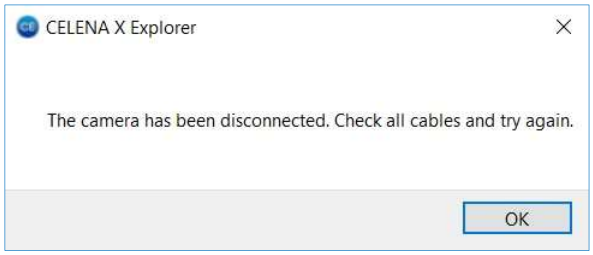
Explorer

The serial port is not initialized. Restart the system and try again.	Close the message window. Turn off the instrument. Check whether the cables of PS-1, PS-2 and SIG are properly connected. Reconnect the USB2.0 cable. Restart the computer. Turn on the instrument. Restart Explorer.



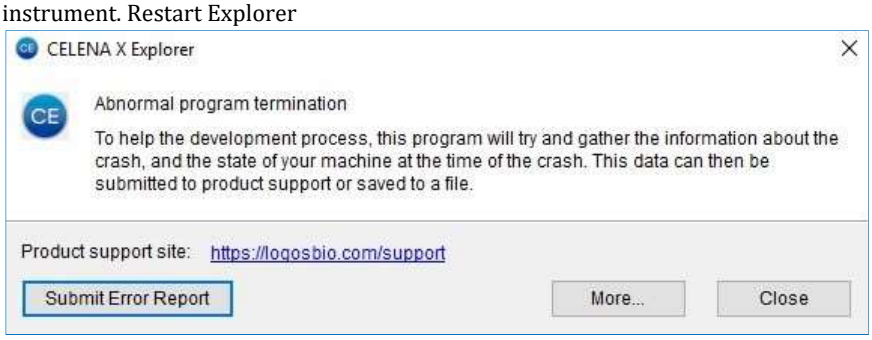
The camera has been disconnected. Check all cables and try again.

Close the message window. Turn off the instrument. Check whether the cables of PS-1, PS-2 and SIG are properly connected. Reconnect the USB3.0 cable. Turn on the instrument. Restart Explorer.



Abnormal program termination

Close the message window. Turn off the instrument. Check whether the cables of PS-1, PS-2 and SIG are properly connected. Reconnect USB2.0 and USB3.0 cables. Turn on the instrument. Restart Explorer



If this window still appears contact your local distributor or the service engineer.

Image irresponsive to changes in focus or stage position

Turn on the light in the CHANNELS panel.

Inactive buttons

Some of the buttons are contextual and only the controls relevant for the task at hand will be available.

Inactive save button

Click the Capture button in the toolbar first.

Inactive RUN button

Make sure channels have been added to the project protocol.

Mechanical

Stage does not move

Remove the shipping restraint.

Filter cube stage does not move

Remove the shipping restraint.

Vessel does not fit correctly

Use the appropriate vessel holder.

Appendix B: Specifications

CELENA® X High Content Imaging System

Supported labware	Slides, multi-well plates (6 to 1536 wells), petri dishes, culture flasks
Imaging modes	4-channel fluorescence, brightfield, color brightfield, and phase-contrast (optional)
Light source	High power LED filter cubes with adjustable intensity (>50,000 hours per filter cube)
Filter cube stage	Motorized; 4 interchangeable fluorescence filter cubes and 1 brightfield
Available filters	DAPI, EGFP, RFP, mCherry, ECFP, EYFP, DSRed, Cy5, Cy7, Cy3/TRITC Long Pass, GFP Long Pass, Cy5 Long Pass and custom filters
Objective turret	Motorized; 5 interchangeable objectives
Compatible objectives	1.25-100X; Olympus, Zeiss, and Logos Biosystems objectives Only objectives with RMS-thread and the parfocal length of 60 mm are compatible.
Condenser	Motorized; basic or phase contrast condenser Basic: 60 mm LWD condenser, 4-positions Phase contrast: 60 mm LWD condenser, 4-positions with 3 phase annuli
Camera	Single or dual camera module(s) Monochrome: CMOS, 1.92 MP *(optional)* Color: CMOS, 1.92 MP
Image outputs	Monochrome: 16-bit (12-bit dynamic range) TIF, PNG, or JPG Color: 24-bit color TIF, PNG, or JPG Movies: MP4
Autofocus method	Image-based autofocus *(optional)* Laser autofocus • Wavelength: 780 nm • Output power: 10 mW
Stage	Motorized X/Y-stage (120 mm x 80 mm); motorized Z-stage (10 mm)
Stage control	CELENA® X Explorer
Computer	External PC running Windows™ 10
Monitor	4K UHD monitor
Power	CELENA® X Controller: 100 – 240 VAC, 50/60 Hz, 3.0 – 6.0 A
Dimensions	CELENA® X main unit: 39 x 46 x 50 cm (15.4 x 18.1 x 19.7 in) CELENA® X Controller: 17 x 30 x 23 cm (6.7 x 11.8 x 9.1 in)
Weight	CELENA® X main unit: 33 kg (72.8 lbs) CELENA® X Controller: 7 kg (15.4 lbs)

Appendix C: Ordering Information

Instruments

Cat #	Product		
CX30000	CELENA® X High Content Imaging System • CELENA® X main unit • CELENA® X Controller • External PC with CELENA® X Explorer installed • Universal Vessel Holder • Microplate Holder • Single Slide Holder		
	Options:		
	Camera	CX30200	Monochrome Camera Module
		CX30201	Dual Camera Module
	Condenser	CX30300	Phase Condenser
		CX30301	Brightfield Condenser
	AF module	CX30400	Image-based AF
		CX30401	Laser AF Module

Objectives

Olympus

High resolution fluorescence				
Cat #	**Objective**	**NA**	**WD (mm)**	**Correction (mm)**
I10030	UPLFLN 4X	0.13	17	-
I10031	UPLFLN 10X2	0.3	10	-
I10034	LUCPLFLN 20X	0.45	6.6-7.8	0-2
I10035	LUCPLFLN 40X	0.6	2.7-4.0	0-2
Fluorescence and phase contrast				
Cat #	**Objective**	**NA**	**WD (mm)**	**Correction (mm)**
I10038	UPLFLN 4XPH	0.13	17	-
I10039	UPLFLN 10X2PH	0.3	10	1
I10042	LUCPLFLN 20XPH	0.45	6.6-7.8	0-2
I10043	LUCPLFLN 40XPH	0.6	3.0-4.2	0-2
Low and high magnification				
Cat #	**Objective**	**NA**	**WD (mm)**	**Correction (mm)**
I10046	PLAPON 1.25X	0.04	5	-
I10047	PLAPON 2X	0.08	6.2	-
I10050	UPLSAPO 60XO	1.35	0.15	0.17
I10051	UPLSAPO 100XO	1.4	0.13	0.17

LED filter cubes

Cat #	Filter cube	Excitation (nm)	Emission (nm)
I10130	DAPI	375/28	460/50
I10131	EGFP	470/30	530/50
I10132	RFP	530/40	605/55
I10133	mCherry	580/25	645/75
I10134	ECFP	436/20	480/40
I10135	EYFP	500/20	535/30
I10136	DSRed	530/40	620/60
I10137	Cy5	620/60	700/75
I10138	Cy7	710/75	810/90
I10139	Cy3/TRITC Long Pass	530/40	570lp
I10140	GFP Long Pass	470/40	500lp

I10141	Cy5 Long Pass	620/60	665lp
I10142	Custom	-	-

Accessories

Cat #	Product
I10411	Microscope Calibration Slide #1

Appendix D: Purchaser Notification

Limited use label license

Research use only

The purchaser of this product should use this product only for research for the sole benefit of the purchaser. By use of this product, the purchaser agrees to be bounded by the terms of this limited use statement whether the purchaser is a for-profit or a not-for-profit entity.

If the purchaser is not willing to accept the conditions of this limited use statement and this product is unused, the Company will accept return of the product with a full refund.

The purchaser cannot resell or otherwise transfer (a) this product (b) its components or (c) materials made using this product or its components to a third party for Commercial Purposes.

Commercial Purposes mean any and all uses of this product and its components by a party for monetary or other consideration, including but not limited to, (a) product manufacture, (b) providing a service, information, or data, (c) therapeutic, diagnostic, or prophylactic purposes, or (d) resale of this product or its components whether or not such product and its components are resold for use in research.

Logos Biosystems, Inc. ("Company") will not claim any consideration against the purchaser of infringement of patents owned or controlled by the Company which cover the product based on the manufacture, use or sale of a therapeutic, clinical diagnostic, vaccine, or prophylactic product developed in research by the purchaser in which this product or its components was employed, provided that neither this product nor any of its components was used in the manufacture of such product.

For any use other than this limited use label license of research use only, please contact the Company or email info@logosbio.com for more information.

LTC licensed products

LED filter cubes

LED Filter Cubes are LTC Licensed Products provided under an intellectual property license from Life Technologies Corporation. The transfer of this product is conditioned on the buyer using the purchased product solely in research conducted by the buyer, and the buyer must not (1) use this product or its components for (a) diagnostic, therapeutic or prophylactic purposes; or (b) manufacturing, and/or (2) sell or transfer this product or its components for resale, whether or not resold for use in research. For information on purchasing a license to this product for purposes other than as described above, contact Life Technologies Corporation, 5791 Van Allen Way, Carlsbad, CA 92008 USA or outlicensing@lifetech.com.

Device warranty

Warranty

Logos Biosystems, Inc. ("Company") warrants to the original purchaser ("Purchaser") that the device ("Instrument"), if properly used and installed, will be free from defects in materials and workmanship and will conform to the product specifications for a period of one (1) year ("Warranty Period") from the date of purchase. If the Device under this limited warranty fails during the Warranty Period, the Company, at its sole responsibility, will: within and up to 30 calendar days of purchase, refund the purchase price of the Device to the Purchaser if the Device is in original conditions; or, after 30 calendar days of purchase, only replace or repair the Device for up to the Warranty Period without issuing a credit.

In no event shall the Company accept any returned device (including its components) that might have been used or contaminated in some labs, including but not limited to, HIV or other infectious disease or blood-handling labs. This limited warranty does not cover refund, replacement, and repair incurred by accident, abuse, misuse, neglect, unauthorized repair, or modification of the Instrument. This limited warranty will be invalid if the Device is disassembled or repaired by the Purchaser.

In case that the Company decides to repair the Instrument, not to replace, this limited warranty includes replacement parts and labor for the Instrument. This limited warranty does not include shipment of the Device to and from service location or travel cost of service engineer, the costs of which shall be borne by the Purchaser. Every effort has been made to ensure that all the information contained in this document is correct at its publication. However, the Company makes no warranty of any kind regarding the contents of any publications or documentation as unintended or unexpected errors including occasional typographies or other kinds are inevitable. In addition, the Company reserves the right to make any changes necessary without notice as part of ongoing product development. If you discover an error in any of our publications, please report it to your local supplier or the Company. The Company shall have no responsibility or liability for any special, incidental, indirect or consequential loss or damage resulting from the use or malfunction of the Instrument.

This limited warranty is sole and exclusive. The Company makes no other representations or warranties of any kind, either express or implied, including for merchantability or fitness for a particular purpose with regards to this Instrument. To obtain service during the Warranty Period, contact your local supplier or the Company's Technical Support team.

Out of warranty service

Please contact your local supplier or the Company's technical support team in order to obtain out-of-warranty service. If necessary, repair service will be charged for replacement parts and labor hours incurred to repair the Instrument. In addition, the Purchaser is responsible for the cost of shipping the Device to and from the service facility and, if necessary, the travel cost of a service engineer after 30 calendar days of purchase, only replace or repair the Device for up to the Warranty Period without issuing a credit.

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