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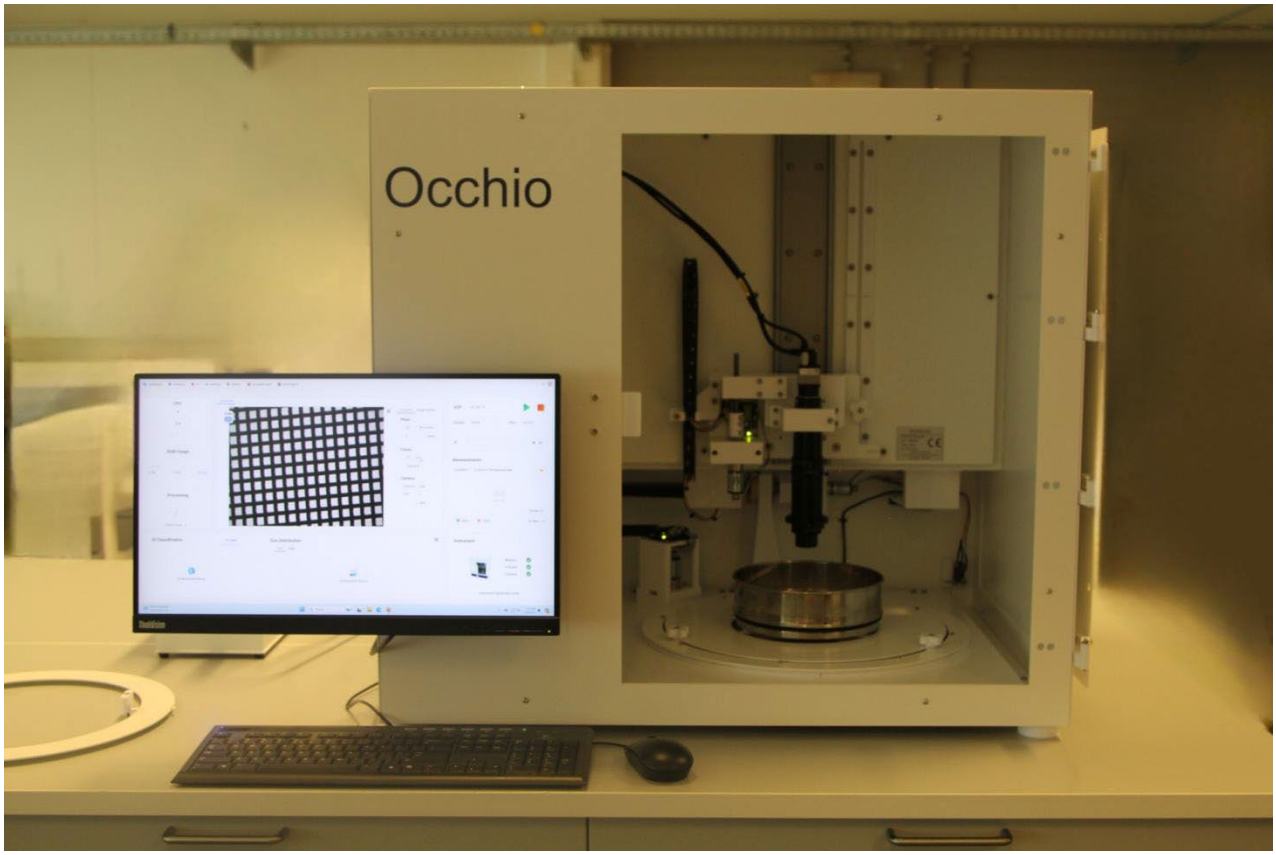

Sievecal SN300058

User Manual

Occhio®

Occhio S.A. Official Document V1.3.1

July 2024

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Catalog

Quick Notes:

How to Use this Manual

Welcome to the official Occhio user manual. Please read this manual carefully and completely before beginning instrument operations. Failure to comply with all direction may result in inaccurate measurements and or hardware failure. The information supplied in this manual is essential to optimizing your user experience with your Occhio instrument.

Photos will be included in this document and referenced frequently for easy comprehension. The Photos will be labeled with numbers which correspond to the numbers in bullet form found within the text.

The **Sievecal** is a sensitive instrument which has been designed and built for precision measurements. Handle this instrument with care!

Please read the “Safety Information” chapter carefully to prevent any injuries to people and or damages to property.

This manual does not include repair instructions as Occhio does not advise nor authorize the repair or modification of any instrument. Repairs and or modifications must be done by an Occhio technician or under the express consent of Occhio. **Failure to comply will exonerate Occhio from any and all warranty obligations.**

Safety Information

Your **Sievecal** is a high-performance, precision instrument. Designed for Nano-particle measuring, it is built with state-of-the-art, sensitive electronic and mechanical components; therefore, please follow all safety instructions contained in this manual regarding transportation, assembly and operation.

This instrument is used in the detection of subvisible particles for multiple material applications. Make sure that all regulations for hazardous materials are observed, including disposal after analysis.

General Safety Instructions

As the operator of this system, it is your responsibility to understand how this instrument operates, know what safety guidelines must be followed, including guidelines for the sample, and have an emergency plan in the event of an accident.

Make sure that:

1. Every person who works with, or in the proximity of, this instrument had read and understood the safety regulations and operation instruction and is familiar with the safe and intended use of the instrument.
2. Unauthorized personnel do not have access to this instrument.
3. Every person working with this instrument always has access to this user manual.
4. When working with potentially hazardous materials, there is a clear and well communicated protocol in place in the event of an accident.

Instrument Handling

Transportation

To ensure proper operation of this instrument, be careful when transporting and installing it. Handle this instrument with care and do not try to move this instrument alone; this instrument should be moved either by two people simultaneously or with the assistance of a purpose-build, mechanical aid.

Reactive substances

This instrument may come in contact with corrosive or otherwise reactive elements. It is imperative to wash all surfaces that may come in contact with these elements before and after each analysis with the appropriate cleaning substance and in the appropriate manner according to the health and safety instructions of the material being analyzed.

PC and data handling

The computer supplied with your Occhio instrument has been purpose built to handle the demanding data transfer and acquisition needs of the instrument and software. Do not modify or add any hardware components without first consulting Occhio.

Warning! It is not advised to save images and or analysis results on a server. Often, the speed of the server is not adequate for the data transfer required by Callisto 3D and or the hardware components within the instrument. Instead, save all images and analysis results locally and, if desired, copy these files to transfer them to the server.

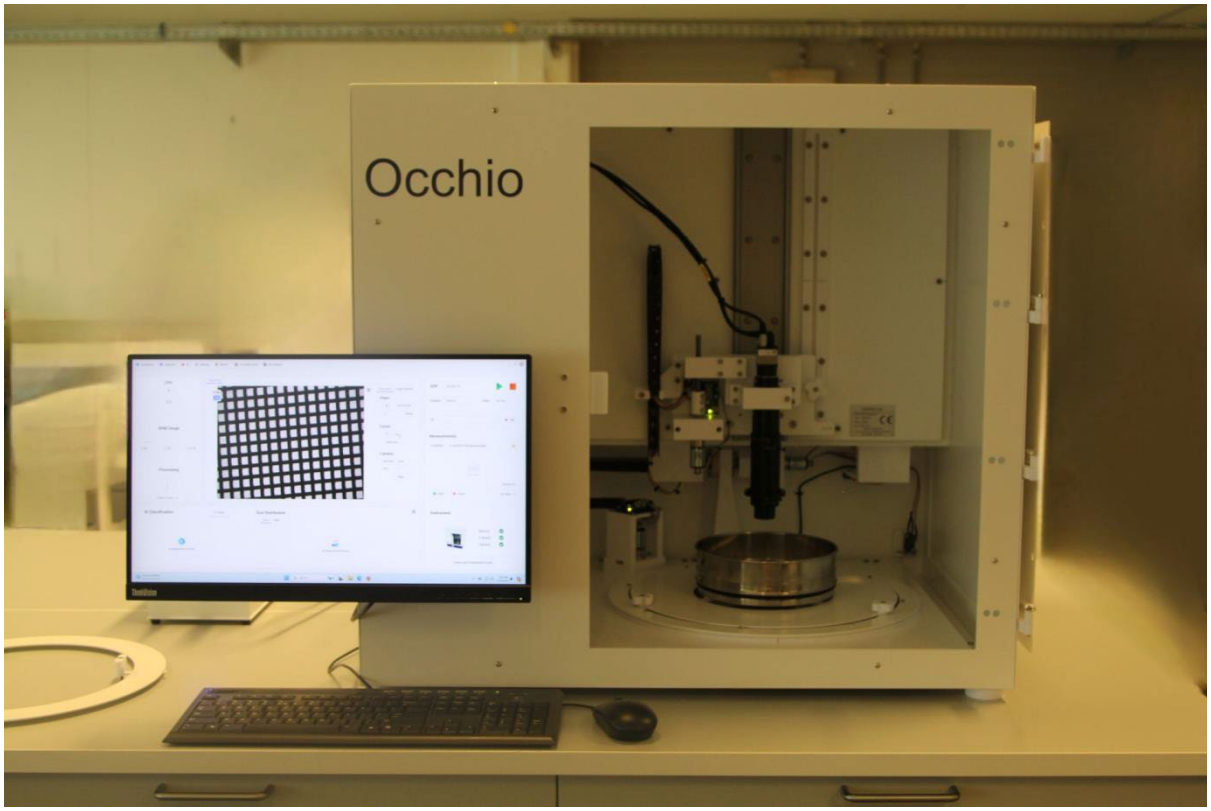
Repairs

Occhio instruments should not, under any circumstance of than risk of personal injury, be repaired, modified, or used to perform tasks that they were not intended for. This should only be done by an Occhio technician or under the express consent of Occhio.

Occhio will not assume any liability for damage resulting from the non-compliance of the express safety instructions provided in this manual or otherwise communicated to the operator.

Instrument Introduction:

The **Occhio Sievecal,** with a new, sleek design and fully motorized controls, is easy to use and delivers repeatable, accurate results. Independently certified to meet **ISO 13322-1** standards, this instrument also uses software which adheres to **ISO 9276-6** norms. If additional information is required, which is not covered in this manual, please contact us directly by visiting our website at:
http://www.occhio.be/contact.html



Installation:

Incorrect assembly could damage sensitive components and or lead to inaccurate measurements. Turn off or disconnect the power source before assembling or disassembling this instrument. Do not lift alone!

Instrument :

Instrument model: Occhio SIEVECAL

Dimensions:

Width	62.5 cm
Length	85 cm
Height	77 cm

Placement:

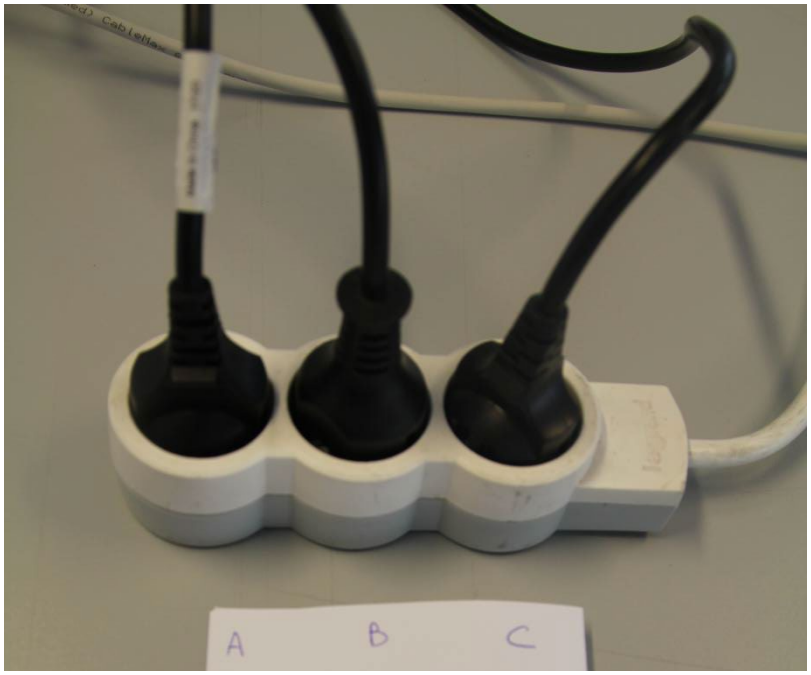
Before Instrument setup, it is important to verify that:

1. The instrument support (i.e. the table or countertop where the instrument will be installed) is level left to right and front to back.
2. There is adequate space for the instrument, cables, slide-out viewing area, and accompanying computer with monitor, keyboard and mouse.
3. The surface is clean and free of obstructions.
4. The instrument support can withstand the weight of the instrument.

Cable Connections:

Power Supply

This system requires at least 3 outlet power sources. If possible, connect directly to the outlets without using extension cords and avoid circuits will many resistors or frequent power surges.



Power Supply required: (50/60 Hz; 110 or 230 volts)

A. Computer
B. Monitor
C. Instrument power supply

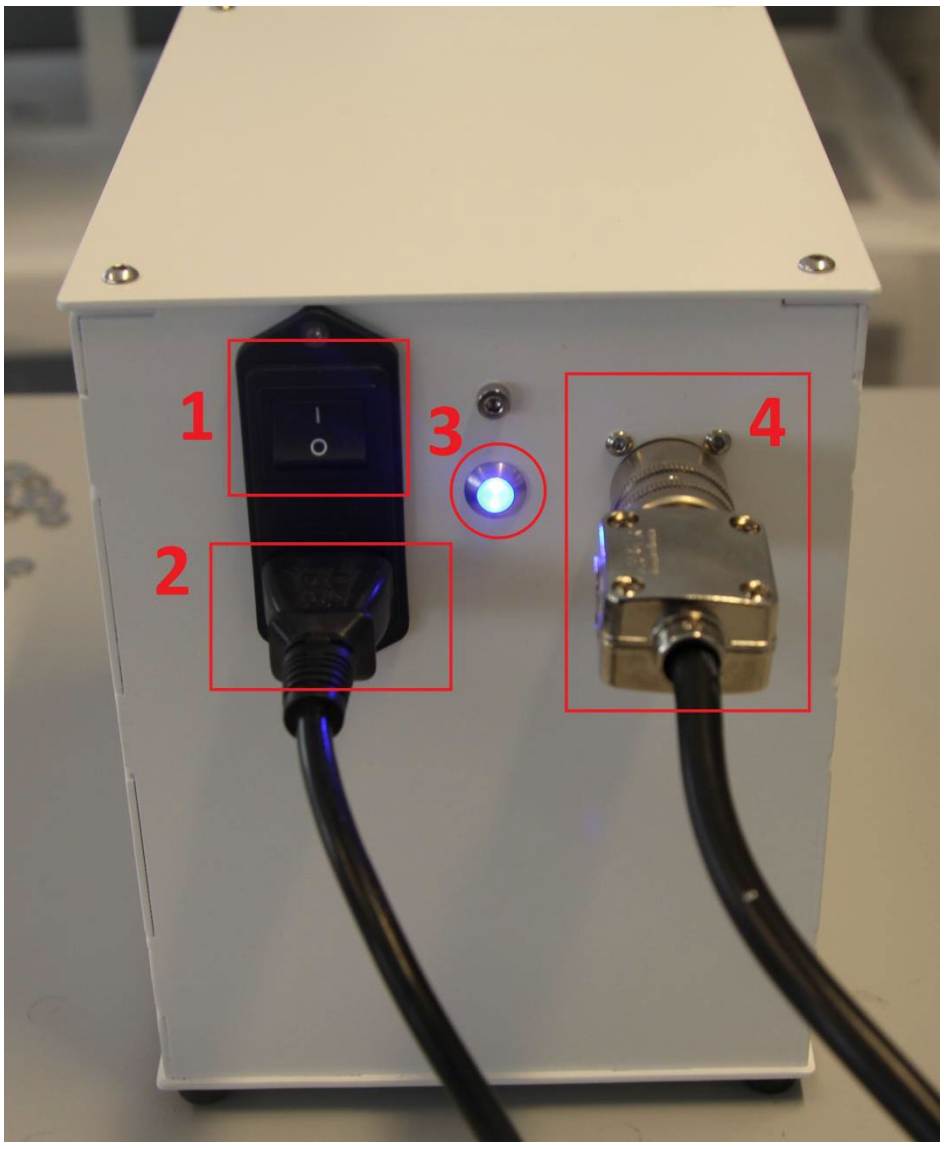
Power Converter

1. **ON/OFF Switch:** Use this switch to connect or disconnect the power supply to the instrument

2. **Power IN:** This is the plug-in which supplies power from the main outlet to the converter.

3. **LED:** When illuminated, this LED indicates that the power switch is in the ON position and that there is current being supplied to the instrument.

4. **Power outlet:** Once the electricity has been converted it is fed into the instrument via this cable.

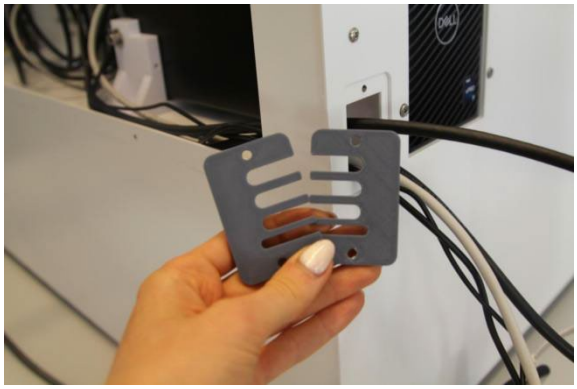


Instrument connections

Cable connections can be found on the left-hand side of the instrument.

How to install the cable combs:

A. Make sure you have both cable combs.



B. Place the first cable comb, then the second one.

Align the two cable combs face-to-face.

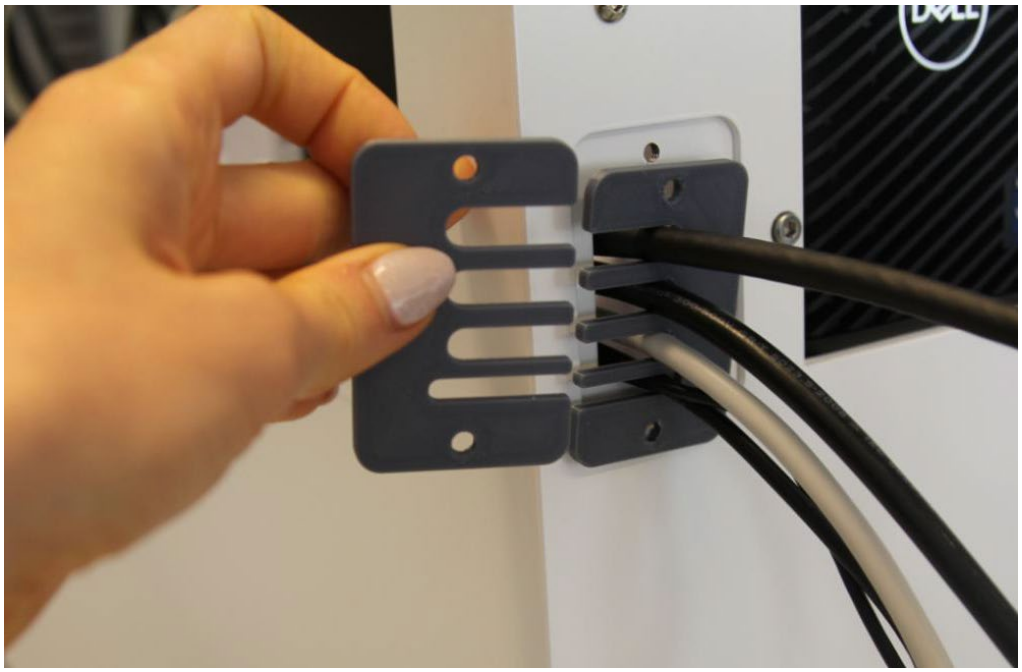
Make sure to place the cable comb with the larger gap facing upwards and the finer gap facing downwards.

The first slot contains the monitor cable.

The second slot contains the power supply.

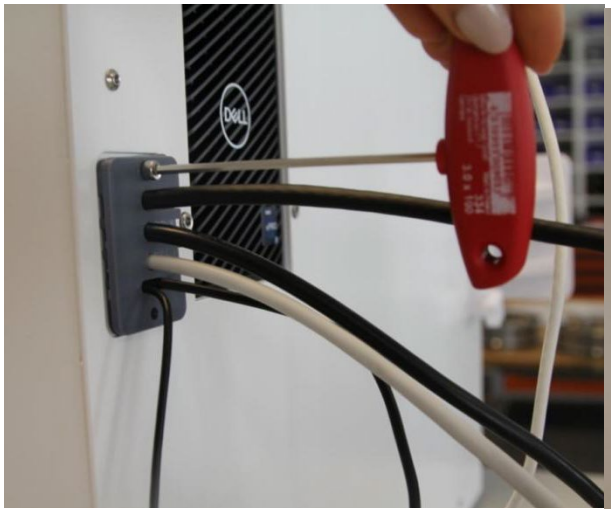
The third slot contains the network cable.

And the last, the longest and thinnest slot, contains the mouse and keyboard cables.

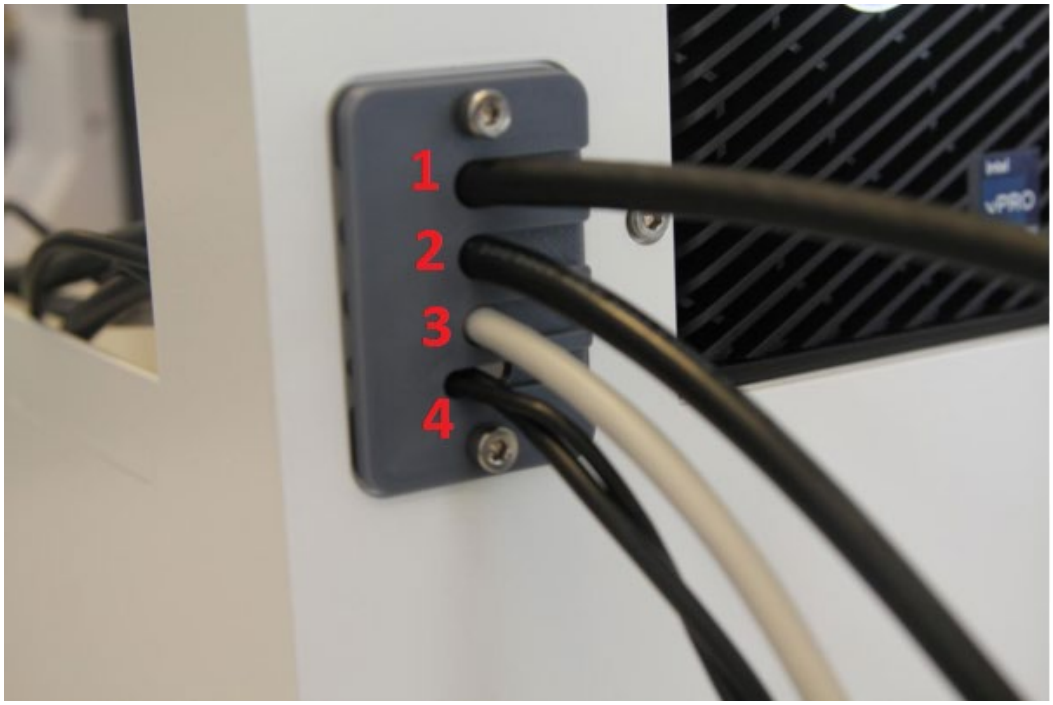


C. Use the appropriate tool

D. Then screw in the two screws.



Once the action is completed, you will have this:

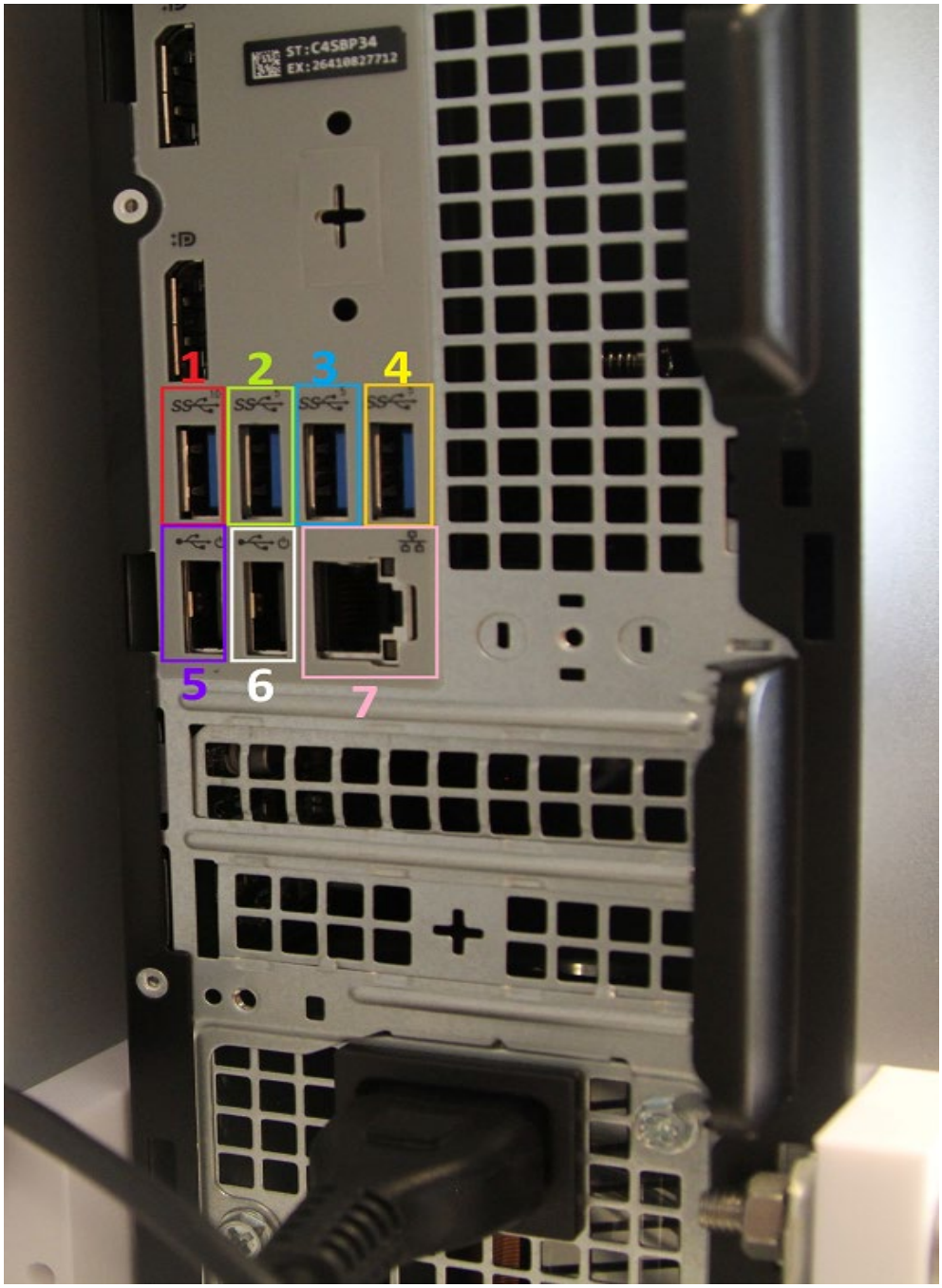


1. Monitor
2. Power supply
3. Network
4. Usb mouse and keyboard

Computer

To complete the cable connections, connect the other end of the cables to the computer. This allows the computer to communicate with and control the instrument.

In the back of the computer, using the specified ports, information can be found in **this document**, connect the following cables.



1. **Camera Connection:** The camera cable can be distinguished by its larger cable diameter and a metal connection end.
2. **Mouse**
3. **Keyboard**
4. **Dongle**
5. **Input/Output Card**
6. **Motor Controler**
7. **Network**

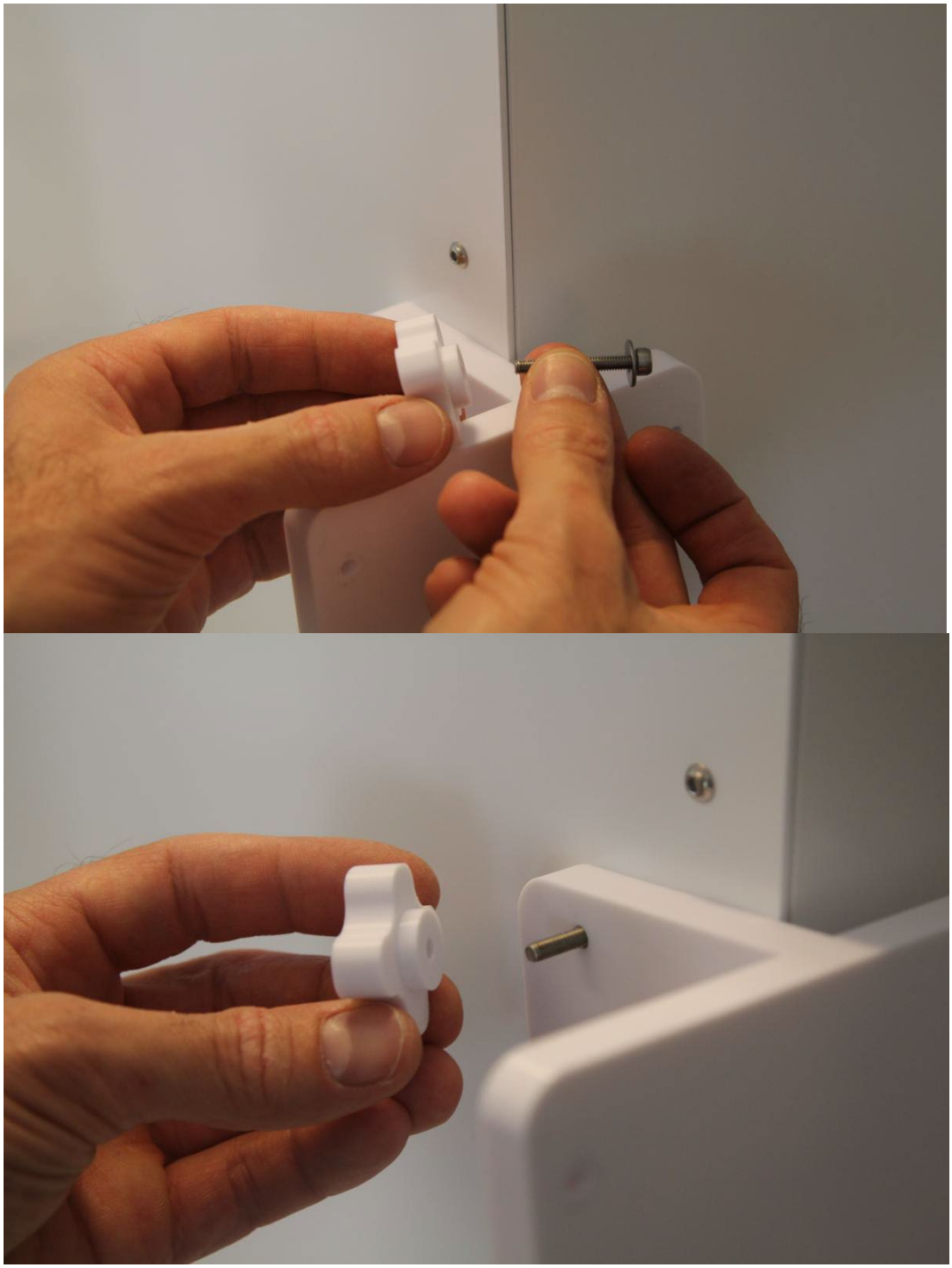
Secure Dongle:

One Secure Dongle is supplied with every Occhio instrument and or software purchase. It is the key to the software and without it, the operator will not have access to the software. This dongle must remain connected to the computer both for opening the software and during software use. **Use USB 2.0 or above** (see image below)

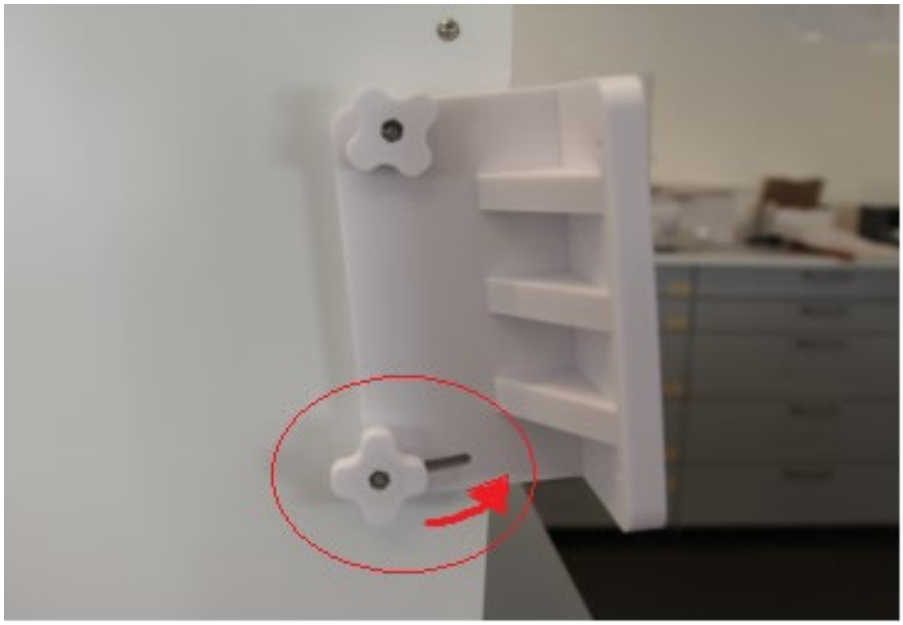
Machine malfunction:

If the light does not turn on, the user should unplug and replug the corresponding (gray) cable.

Attachment of the computer monitor mount:



You can adjust the screen's tilt using the wheel at the bottom.



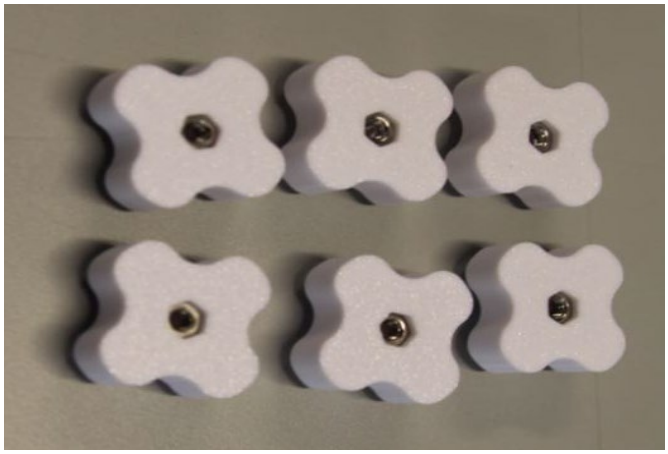
The rear face of the instrument.

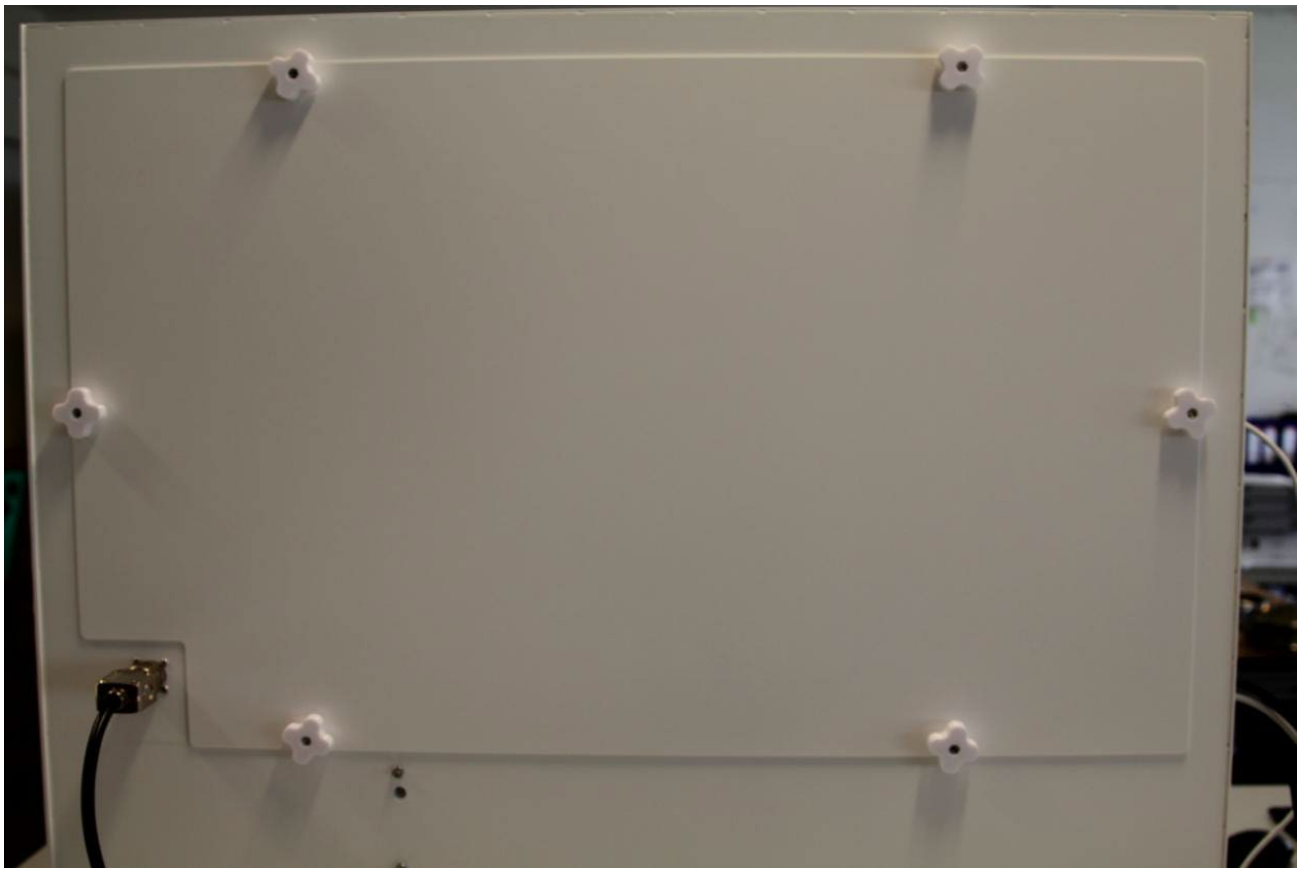
Once the cabling is done,

make sure to replace the rear panel of the instrument.

Insert the screws into the corresponding openings.

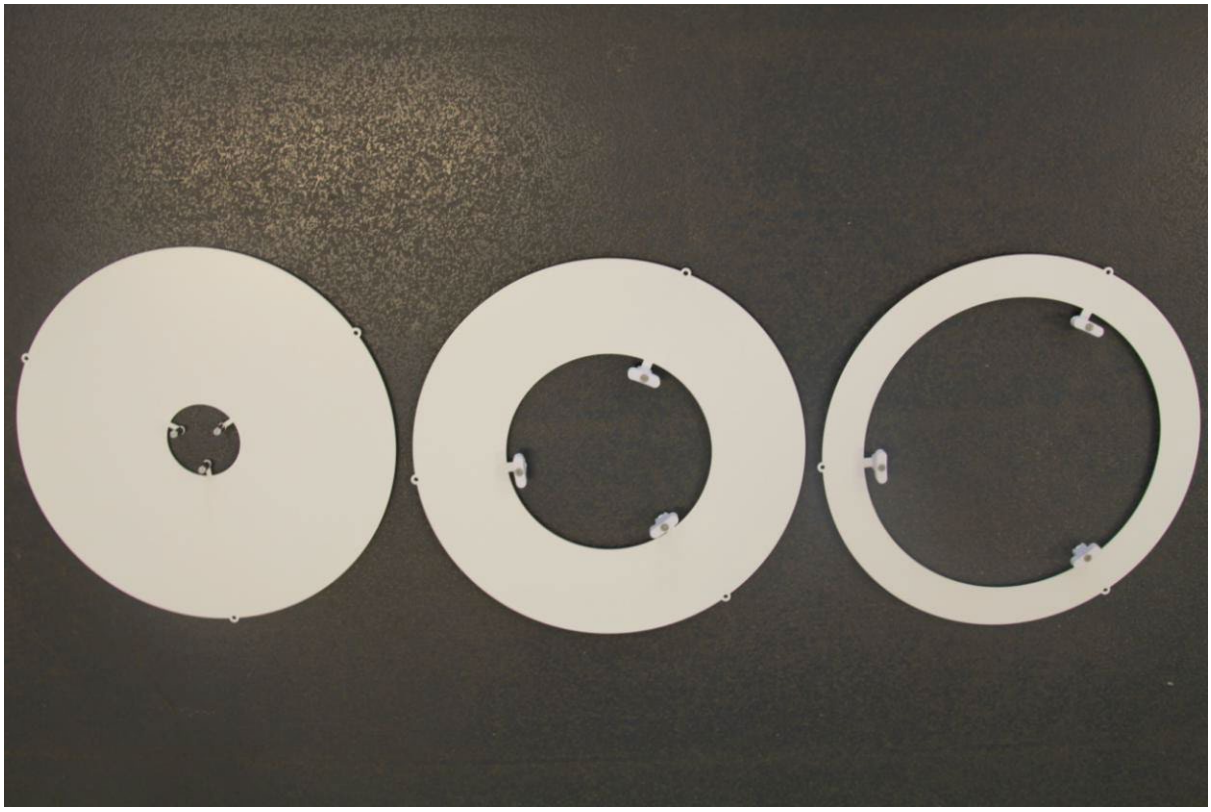
Then use the 6 fasteners to secure the rear panel of the instrument.





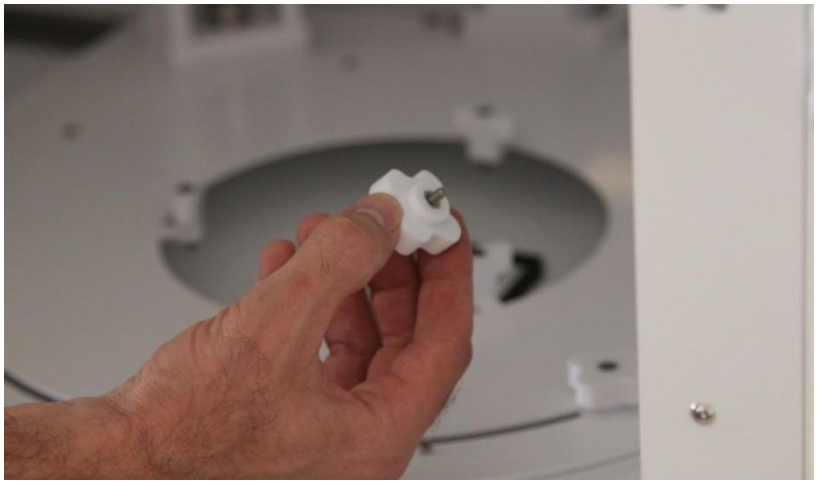
Main features

There are 4 sizes of sieve support frame:
1. Sieve size(diameter) 4 inches
2. Sieve size (diameter) 8 inches
3. Sieve size (diameter) 12 inches
4. And Without any, which corresponds to 18 inches

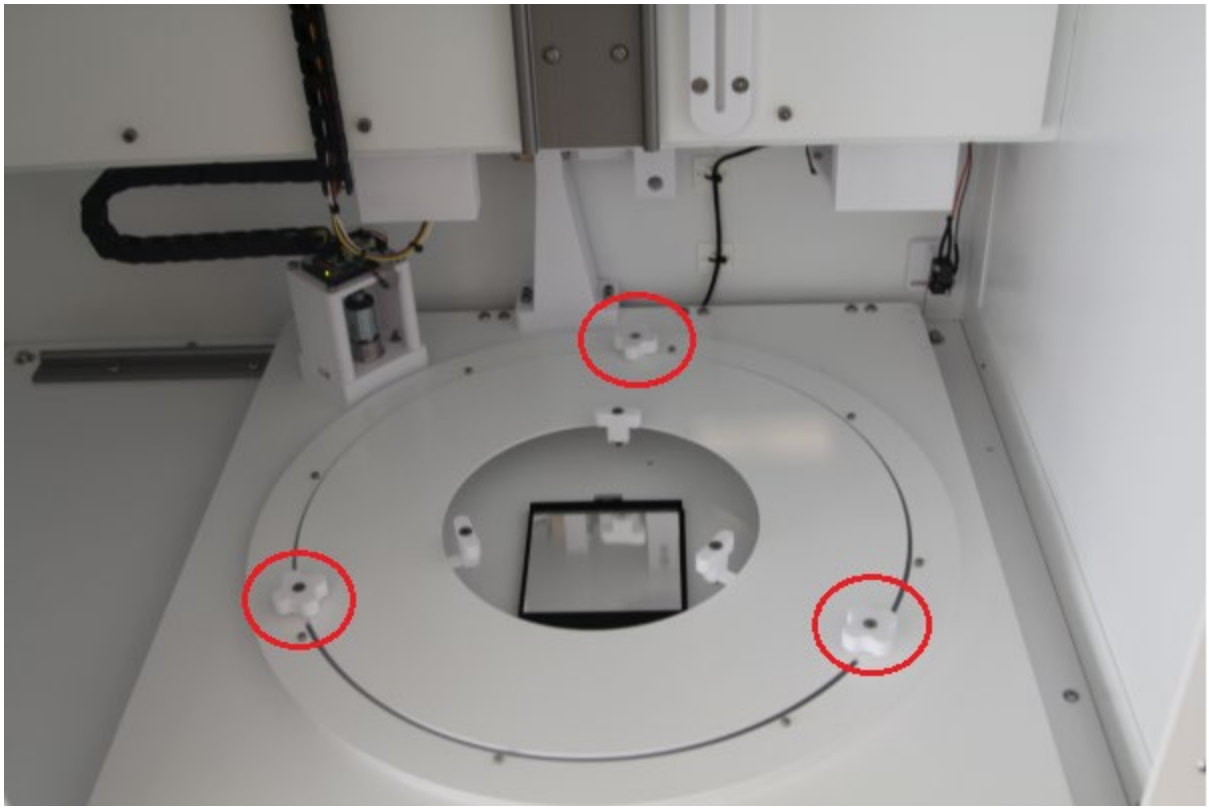


How to place the sieve support frames

Place the desired sieve support frame, then take the 3 fasteners.



And finish by securely screwing in the three fasteners.



Armadillo

Armadillo is software created and developed by the engineers at Occhio. Used in conjunction with any Occhio instrument, this software receives and deciphers the vast amount of digital information which is supplied during microscopy analyses. Certified to conform with **ISO 9276-6** Norms, this software uses powerful algorithms to interpret, characterize, and sort each particle independently. With its evaluation tools, **Armadillo** allows the user to thoroughly review analysis results for thousands of different applications. Though inclusive, this software remains user friendly and intuitive with an easy to use menues and descriptions which appear when the cursor is hovered over a button. If additional information is required, which was not covered in this manual, please contact us directly by visiting our website at: **http://www.occhio.be/contact.html**

Installation:

The Armadillo software should only be installed by, or with the direct assistance of, an Occhio professional. In the unlikely event you experience technical difficulties, do not uninstall or otherwise modify the software; instead, please contact the Occhio headquarters.

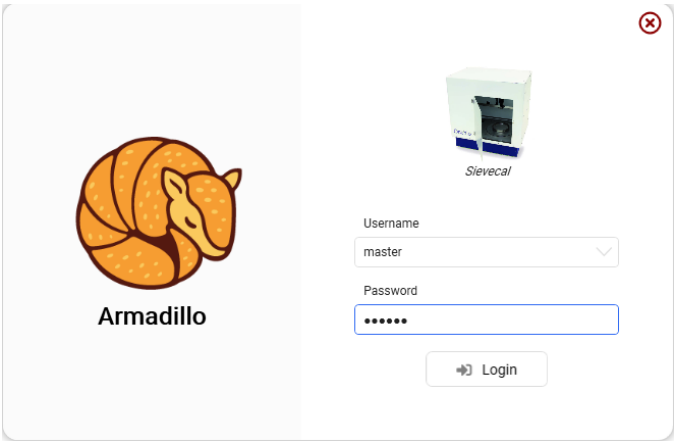
Initialization and Home Screen:

 **Before opening the software, verify that you have administrator privileges for the computer you are working with and that the Occhio supplied USB dongle is inserted into a USB 2.0 or above port. When finished, turn off the screen or shut down the computer completely. Do not use the Sleep or Hibernate mode!**

To Initialize the Armadillo software, double left-click the icon located on the desktop.

Authentication / Login

The login menu is the first option presented to the user. This authentication window is used to access the profiles defined by the user in the User Menu.



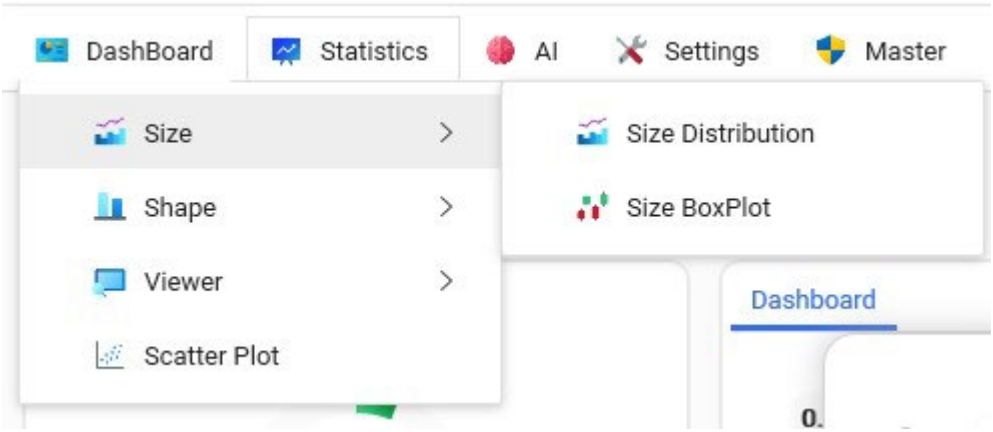
Menu bar

The menu bar includes all the functionalities of the software.

1. Dashboard This window allows you to:

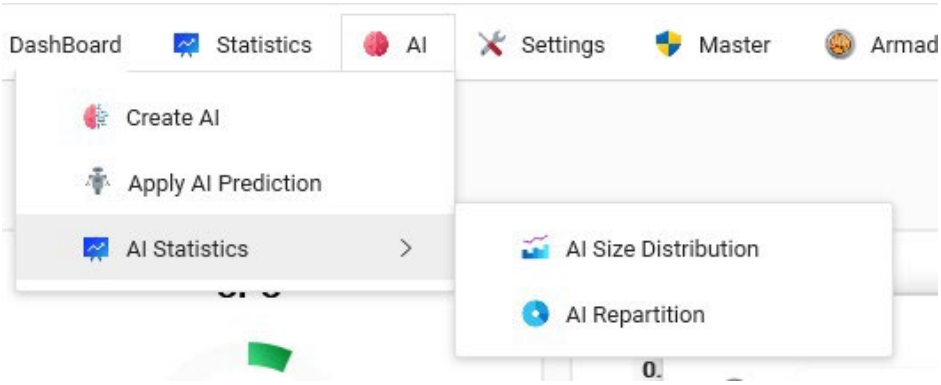
- Visualize live images
- Open and close analyses
- Check the status of the instrument
- Display live data, computer performance, analysis progression, and autofocus process
- Manually check the settings of the SOP, autofocus process, motor motion, and camera settings
- Start the Armadillo Paint software

2. Statistics Menu The Statistics menu shows graphs, data, and statistics of the selected measurement.



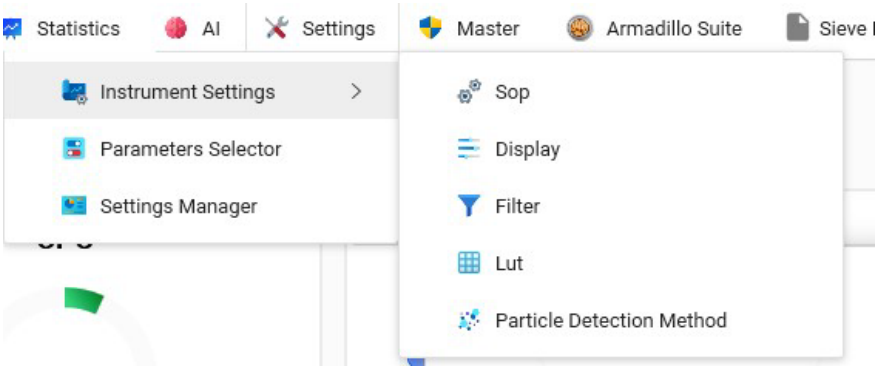
3. A.I.

The A.I. menu is dedicated to the classification of particles using artificial intelligence.



4. Settings menu

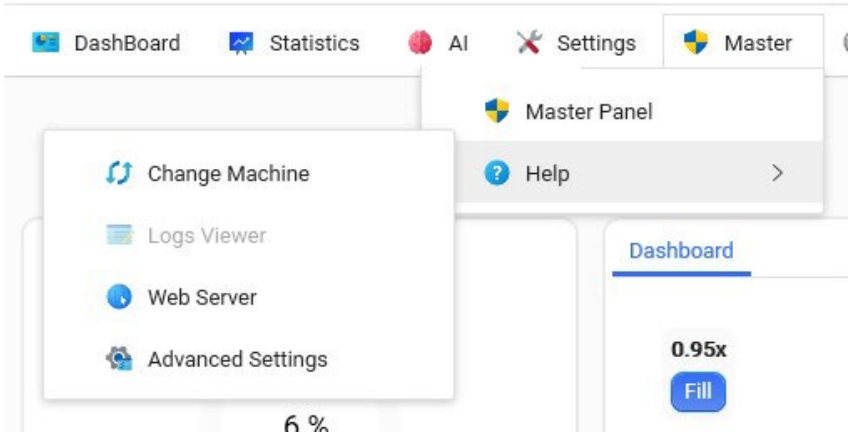
The Settings menu contains all the settings used to operate the instrument and compute data.



5. Master menu

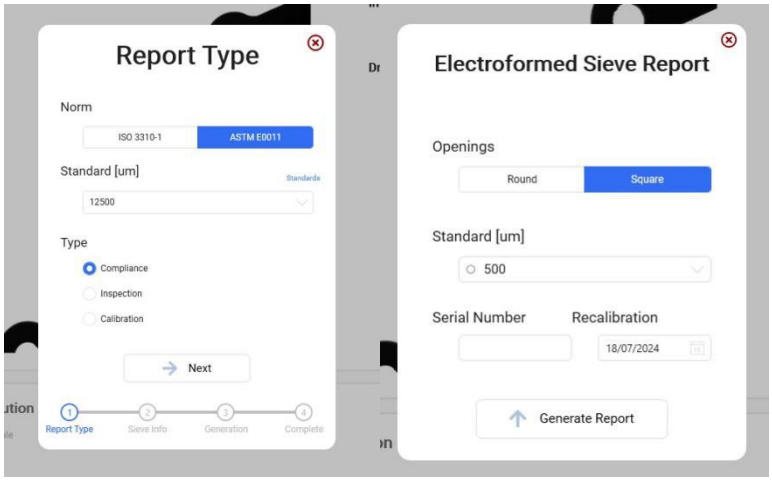
The Help menu in the Master menu allows you to set the instrument model, visualize the logs (audit trail), access web server functionalities, and adjust advanced settings.

The Master Panel is available only to users with master rights. This panel allows for user management, including creating and deleting users, choosing passwords, and assigning user rights.



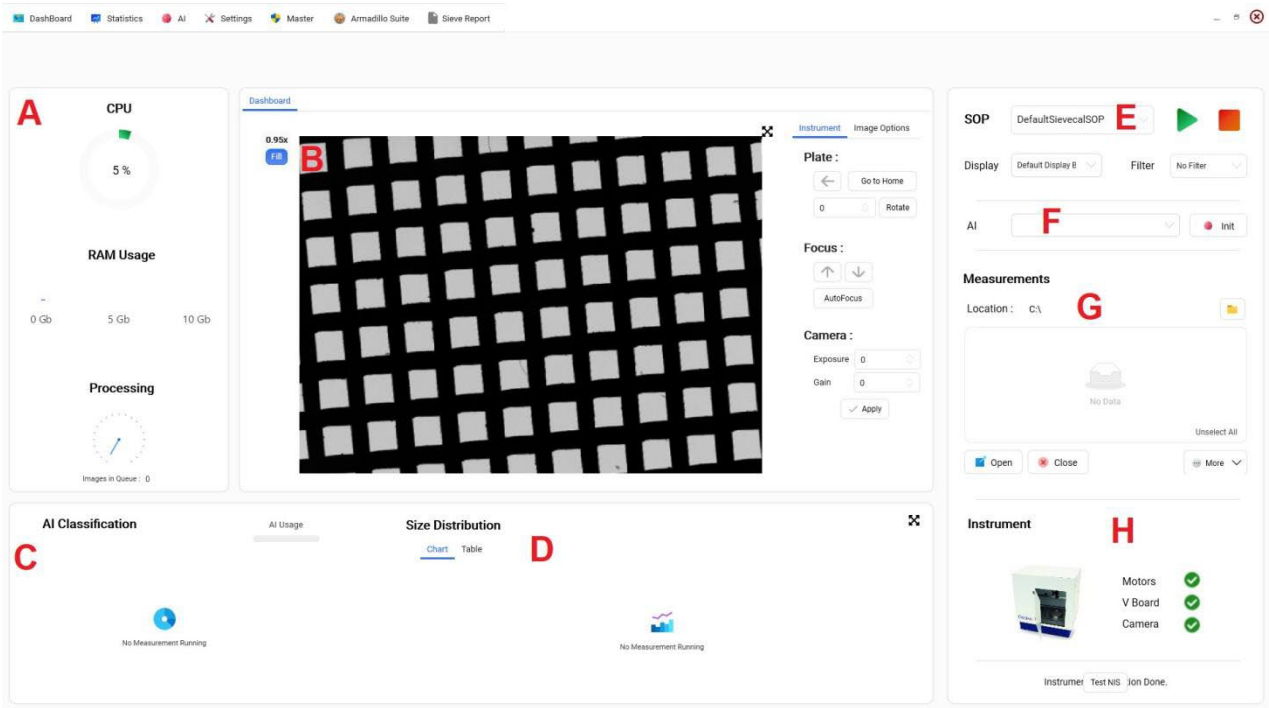
6. Sieve Report menu

The Sieve Report menu allows you to generate and print a report of the sieve analysis.



Dashboard

The Dashboard is always found at the top left of the screen and serves to provide information to the user, launch an analysis, apply filters and displays to files, and open and close one or more analyses.



Section A:

The CPU gauge displays the CPU utilization during analysis or data computing.

The RAM gauge represents the allocated memory during the measurement process.

The processing gauge indicates the current state of processing during the measurement or computation process.

Section B:

This section is dedicated to the live image display. It allows users to apply instrument settings and commands while directly visualizing any changes made. It serves as a manual mode that is useful for testing instrument functionality, visualizing particles, or cleaning the cell.

Section C:

This section is dedicated to showcasing Artificial Intelligence (AI) detection. If "unknown" is displayed, it means that no AI selections were made during the analysis.

Section D:

This section presents a real-time size distribution graph, including particle counting and size classes based on the previously selected display settings before starting the analysis.

Section E:

This section allows users to select the method (SOP), starting and stopping the analysis process. It also provides options to choose the display settings (size classes and visualization features) and select a filter.

Section F:

This section allows users to select an AI to be applied during the analysis. To apply an AI, you need to choose it from the menu list and then initialize it by clicking the 'init' button.

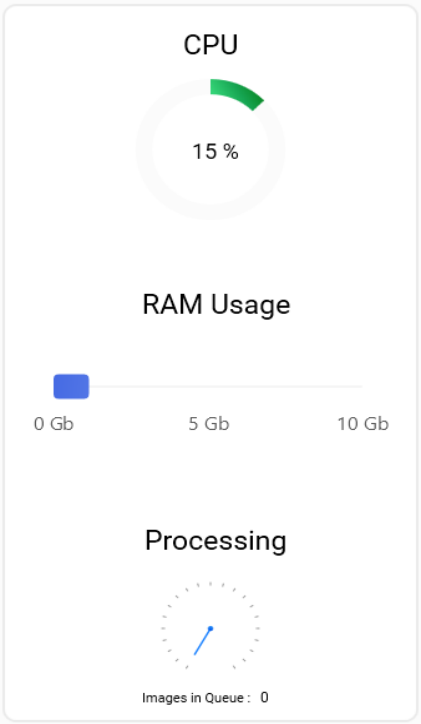
Section G:

This section allows users to choose the analysis folder, which is the location where the analysis results are stored. It also provides options to open or close a file and select or deselect a file during post-analysis statistics calculation.

Section H:

This section displays the state of the instrument, including the instrument device state and visualize the data related to the selected analysis (if the analysis is selected on section G)

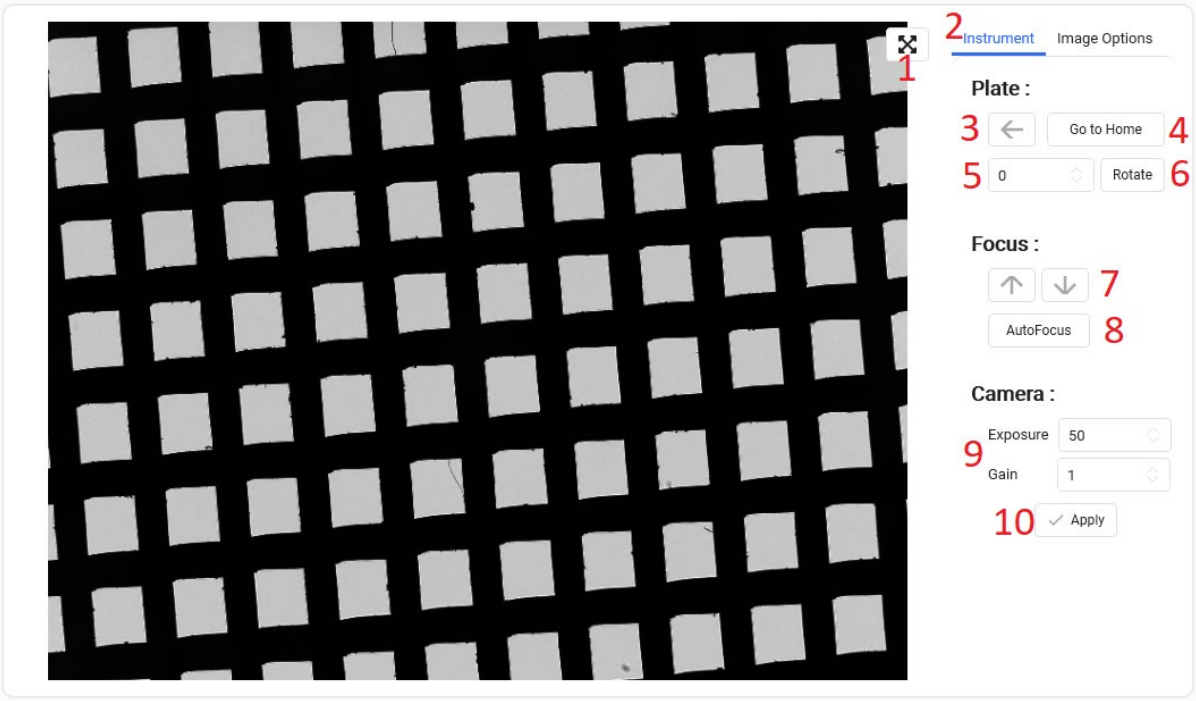
CPU RAM and Processing gauges



On the left-hand side of the Dashboard, there is a set of gauges. These gauges provide the user with an indication of the progress of the analysis while it is being performed. When an analysis is in progress, the gauges will be highlighted in blue.

The power button is used to close the software and save all parameters.

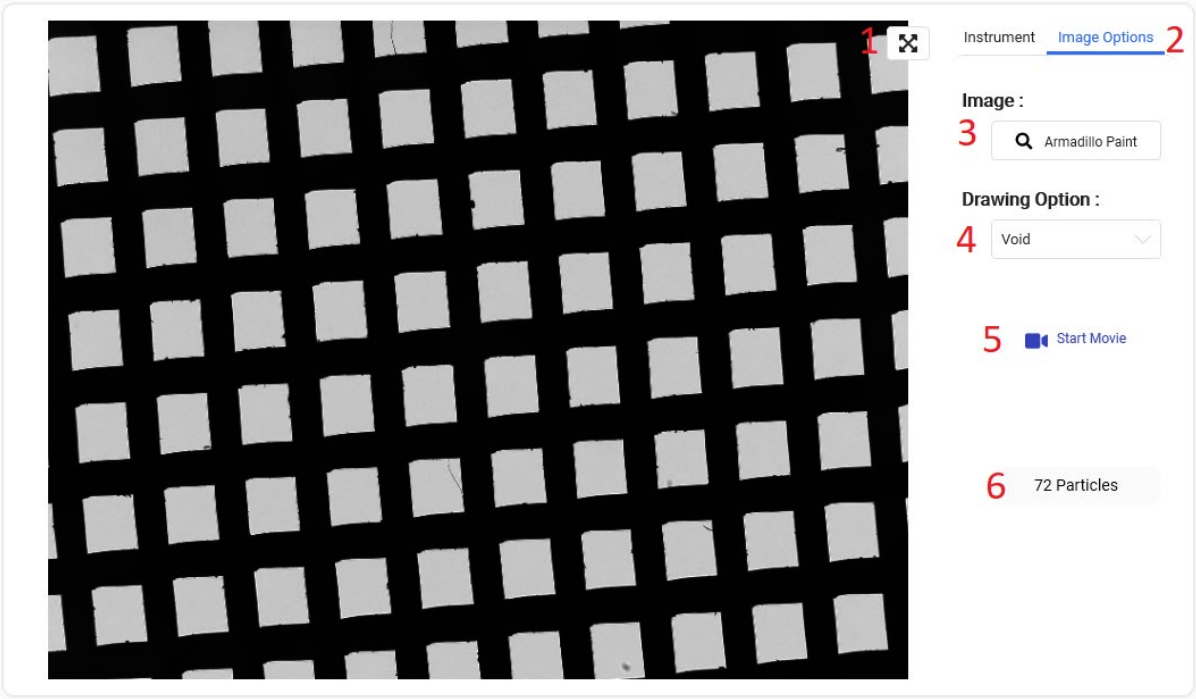
Live image, instrument control panel



The Live tab allows the user to view acquired images in real-time and manually control the instrument.

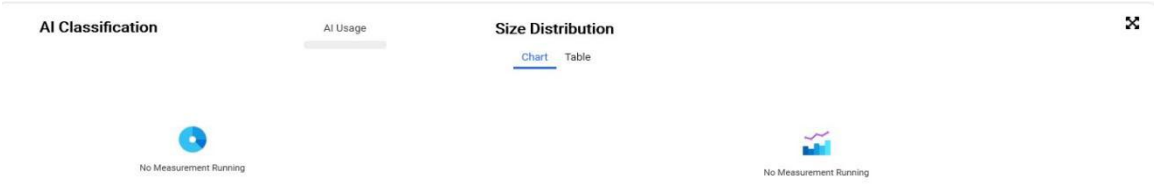
1. To expand the image to fill the entire tab frame.
2. To access the instrument menu.
3. To move the sieve plate to the left.
4. To return the sieve support to its home position.
5. To rotate the sieve, specify the degree of rotation (positive degrees for clockwise rotation and negative degrees for counterclockwise rotation).
6. Click the button to apply the rotation.
7. Click the up or down arrow to move the camera position (Z-axis or focusing axis) up or down; the displacement corresponds to the number of steps specified in the SOP (AutofocusNbrStep value in SOP).
8. Click the Autofocus button to activate it; the autofocus button uses the focus settings from the selected SOP.
9. Camera settings: Exposure is the shutter time of the camera in µs; Gain is the amplification applied to the camera signal.
10. Click to apply the camera settings.

Live image, image options



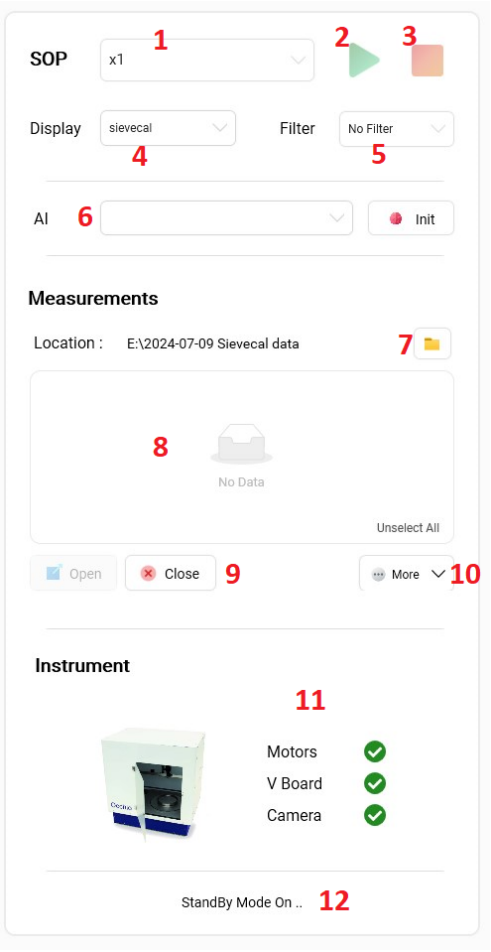
1. To expand the image to fill the entire tab frame.
2. To access the Image Options Menu.
3. To open the Armadillo Paint software.
4. The Drawing option allows you to visualize particle outlines and other particle parameters according to your selected SOP settings.
5. The Start Movie button records a movie from the live mode; this button is useful for online applications.
6. The number of particles detected in the current image.

Artificial Intelligence classification and live size distribution



The A.I. and Size tab shows the A.I. classification and size distribution in real-time during the measurement. The size distribution is displayed according to the current display settings.

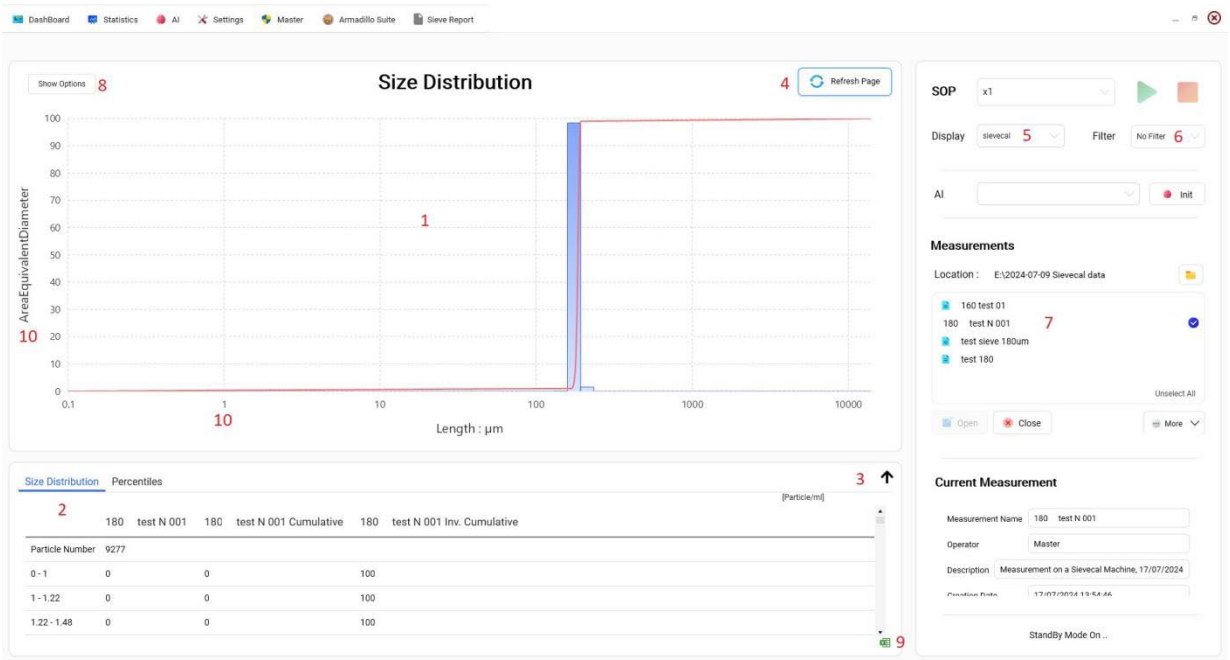
Measurement panel



1. **SOP Drop-Down Menu**: Select the Standard Operating Procedure before starting the analysis.
2. **Play Button**: Start the analysis.
3. **Stop Button**: Stop the analysis.
4. **Display Drop-Down Menu**: Select the display settings.
5. **Filter Drop-Down Menu**: Select or deselect a filter.
6. **Artificial Intelligence Drop-Down Menu**: Select and initialize AI.
7. **File Storage Location Button**: Click to select or change the location where the analysis files are stored.
8. **Opened Analyses Windows**: Display the analyses that are currently open.
9. **Open and Close Analyses Buttons**: Manage the opening and closing of analyses.
10. **Additional Computation Options Button**: Access special user data computing options integrated into this part of the software.

11. **Instrument Connection Diagnostics**: This tab shows the communication between the instrument components and Armadillo software.
12. **Instrument Status**: Allows the user to visualize the current status of the instrument.

Measurement Statistics, Size Distribution



1. Size Distribution Graph: Displays the size distribution of particles.

2. Size Distribution Values and Percentiles: Shown according to the selected size classes in the display settings.

3. Expand Data Table Button: Click this button to expand the data table.

4. 'Refresh Page' Button: Computes the size distribution of the selected file according to the current display settings (5) and current filter (6).

5. Selected Display: Allows you to choose the size distribution parameters, including size classes, axis settings, size parameters, and percentiles.

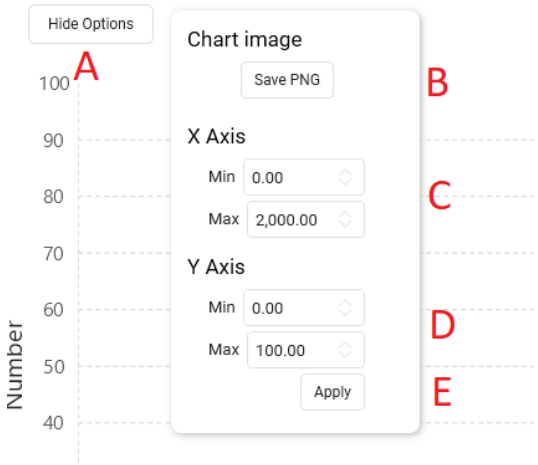
6. Filter Application: If a filter is selected, only the particles included by the filter will be used to compute the size distribution. To avoid applying a filter, select the "No filter" option from the drop-down list.

7. Opened Analyses List: Shows the analyses that are currently open. To open an analysis, use the 'Open' button, which appears only in the Dashboard menu.

8. 'Show Options' Button: Allows you to view and apply zoom settings.

9. Export Table: Export the table to a ".xlsx" file format.

10. X and Y Axes Values: Based on the selected display settings.



A : Hide the option box

B : Save Png image of the current size distribution

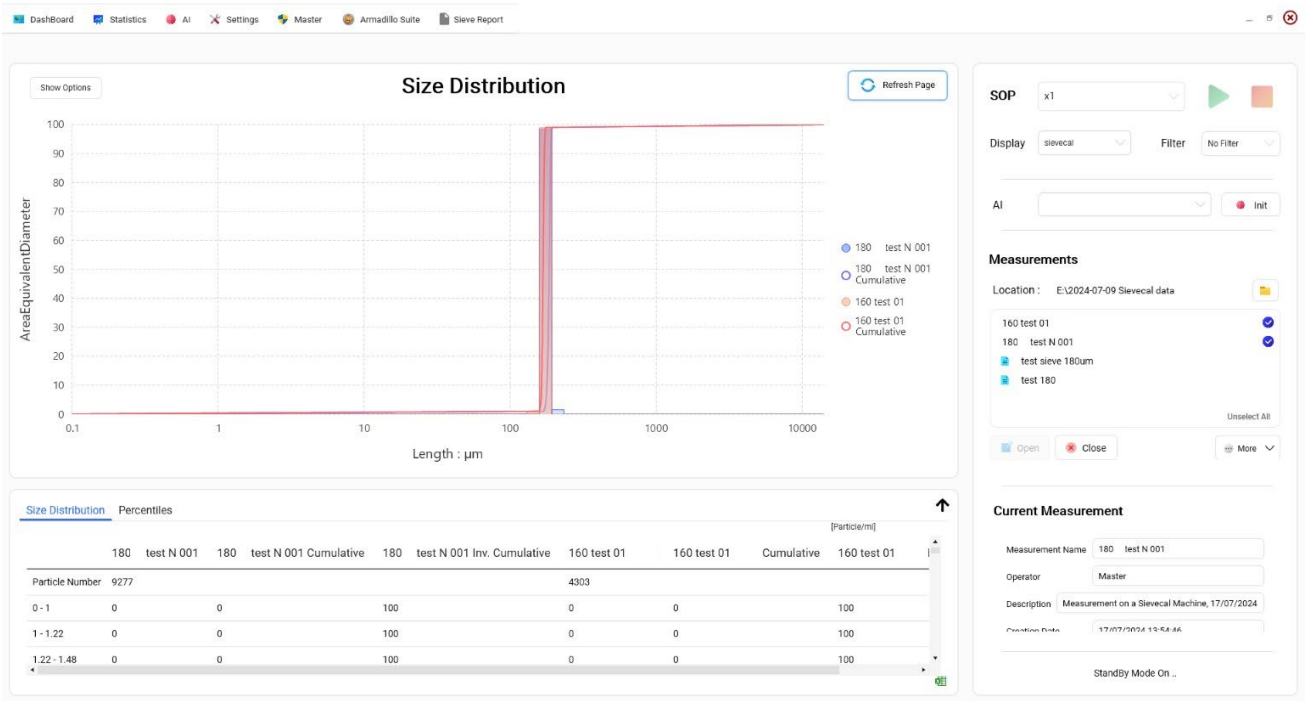
C : X Axis zoom

D : Y Axis zoom

E : Apply zoom values to the graph

Measurement Statistics, File Size Distribution

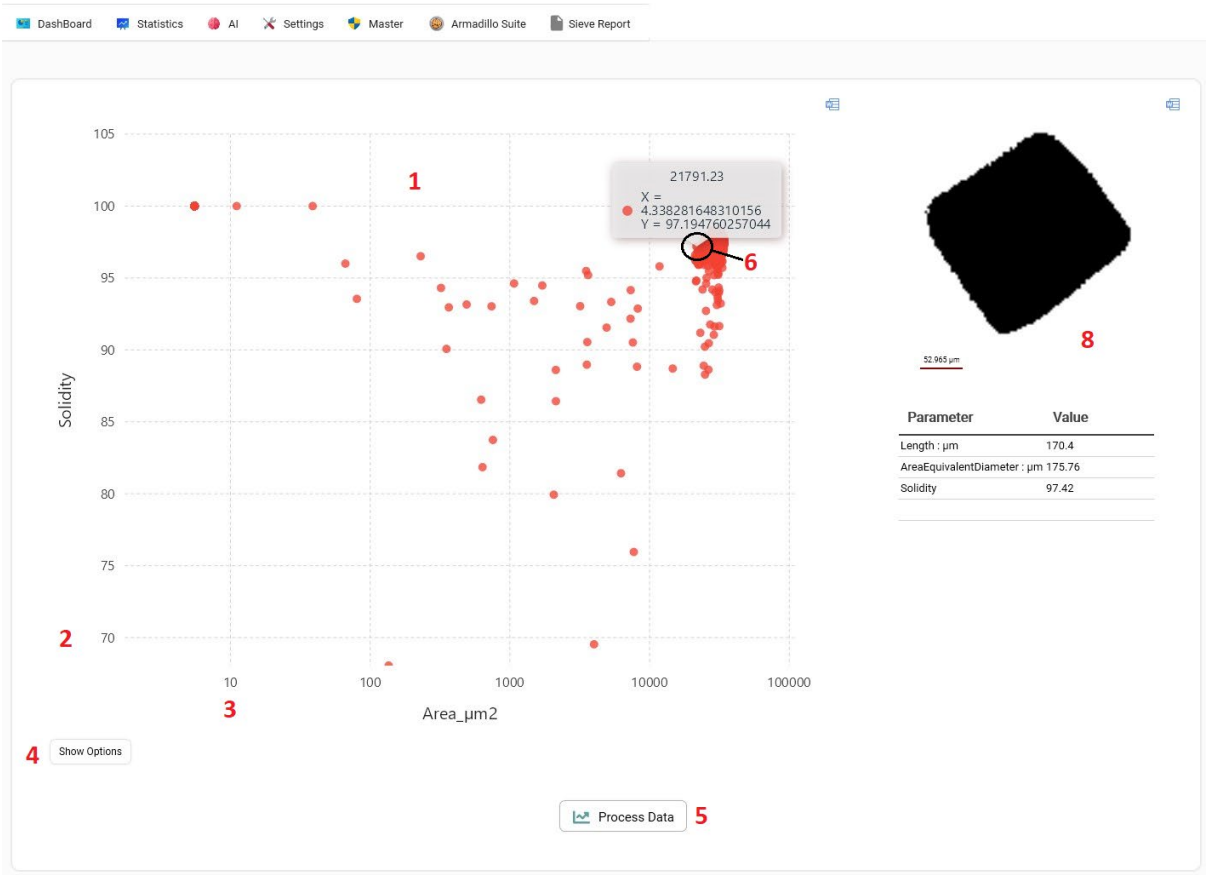
You can also compute size distribution of 2, 3 or 4 files by selected files and refresh



Measurement Statistics, Shape Distribution

1. **Shape Distribution Plot**: Displays the distribution of shape parameters.
2. **Shape Parameter**: Defined according to the selected display settings (10).
3. **X-Axis Scale**: Ranges from 0% to 100% (shape parameters are always defined on a percentage scale).
4. **Y-Axis Scale**: Ranges from 0% to 100% (number or volume weighted according to the display settings).
5. **Shape Distribution Table**: Shows detailed data on shape distribution.
6. **Refresh Button**: Select an analysis file (10) and then press ‘Refresh Page’ to display the shape distribution. Repeat this step to compute other analyses.
7. **Save Figure**: Export the figure as a '.png' file.
8. **Export Table**: Export the table as a '.xlsx' file.
9. **Current Displayed Analysis**: Shows the analysis currently being displayed.
10. **Current Display**: Refers to the display settings currently applied.
11. **Current SOP** : Refers to the SOP settings currently applied.

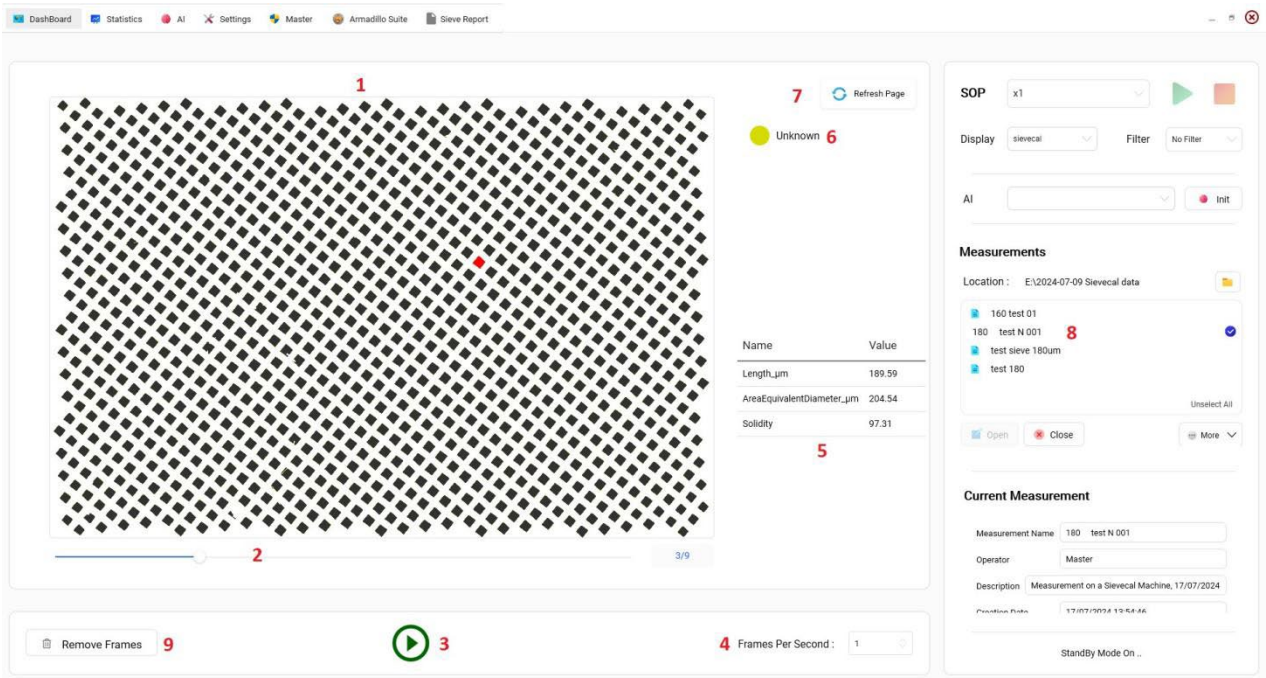
Measurement Statistics, Scatter plot



1. **Scatter Plot Graph**: Each dot represents a particle or multiple particles with the same values for the X-axis and Y-axis parameters.
2. **Y-Axis with Autoscale**: Automatically adjusts the scale of the Y-axis.
3. **X-Axis with Autoscale**: Automatically adjusts the scale of the X-axis.
4. **Show Options Button**: Provides options for selecting X-axis and Y-axis parameters.
5. **Process Data**: Computes the selected analysis data according to the chosen parameters.
6. **Mouse Pointer on Scatter Plot**: Displays the coordinates of a single dot. Click the button to view detailed information about the particle.
7. **Particle Image and Information**: Displays the particle's image along with its information and parameters.

Viewer, Movie

The Movie function allows you to simulate a sequence of frames from all images captured during the analysis.



1. Current Frame of the Movie: Displays the frame currently being viewed.

2. Progression Bar and Frame Number: Shows the progress of the movie and the number of the current frame.

3. Play/Pause Controls: Play the movie or pause it.

4. Frame Rate: Default value is set to 1 frame per second.

5. Parameters List: Lists the parameters that can be displayed for each individual particle in the movie.

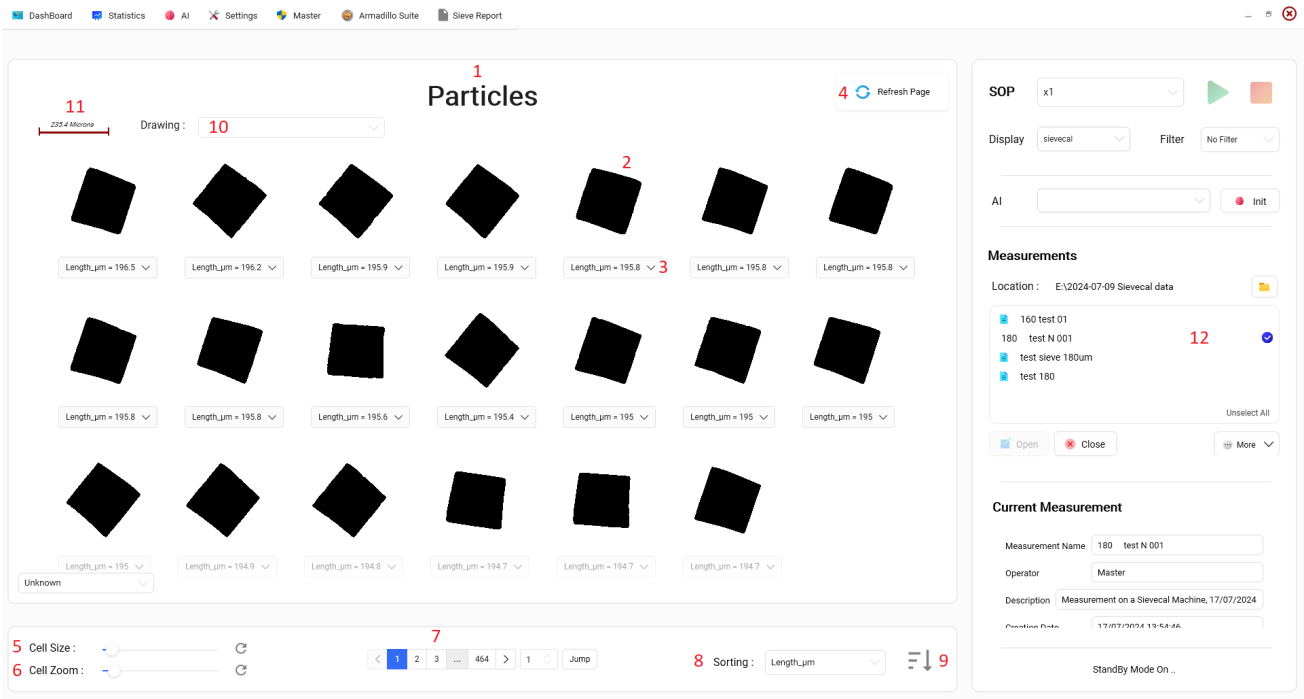
6. A.I. Prediction Dialog Box: Displays predictions made by the A.I. for the particles.

7. Refresh Button: Press this button after selecting the analysis (8) to generate the movie.

8. Current Analysis: Shows the analysis currently being used to generate the movie.

9. Remove Frames Button: Allows you to create a new analysis without the selected frames.

Viewer, Particles Viewer



1. Particles Viewer Window: Displays the particle images and data.

2. Single Particles: View individual particles within the window.

3. Drop-Down List of Parameters: Select from the parameters computed for each particle.

4. Refresh Page Button: Allows you to display the particles from the selected analysis (12).

5. Cell Size: Adjusts the size of each individual particle. Increasing the cell size decreases the number of cells per page.

6. Cell Zoom:The zoom level applied to each particle within the cell.

7. Page Counter: Shows the current page number in the particle viewer.

8. Sorting: Allows you to arrange particles based on the selected parameter.

9. Arrange Particles: Sort particles from largest to smallest or vice versa.

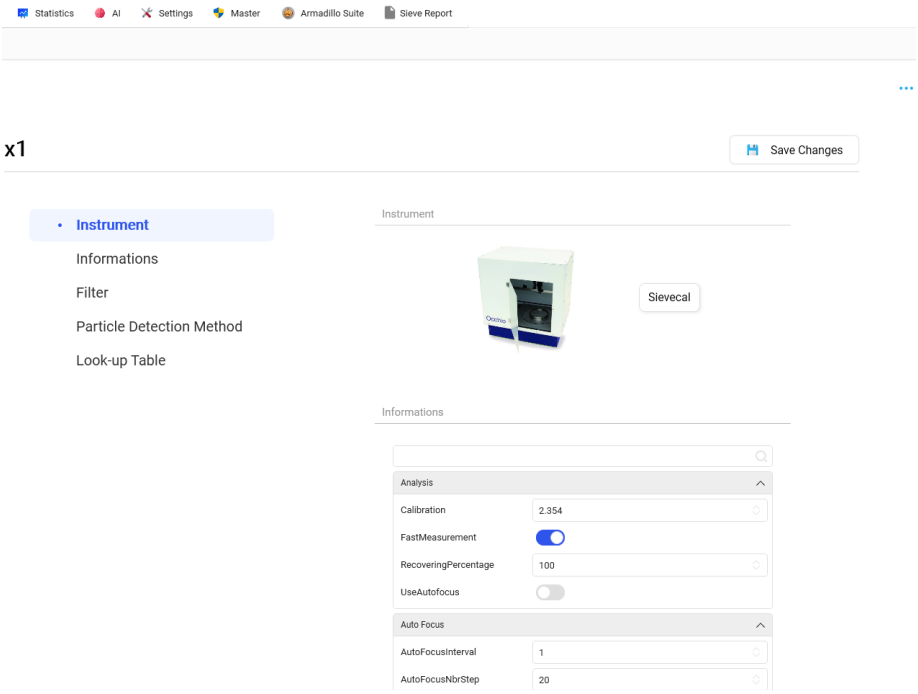
10. Drawing Option: Allows you to draw the selected particle parameter.

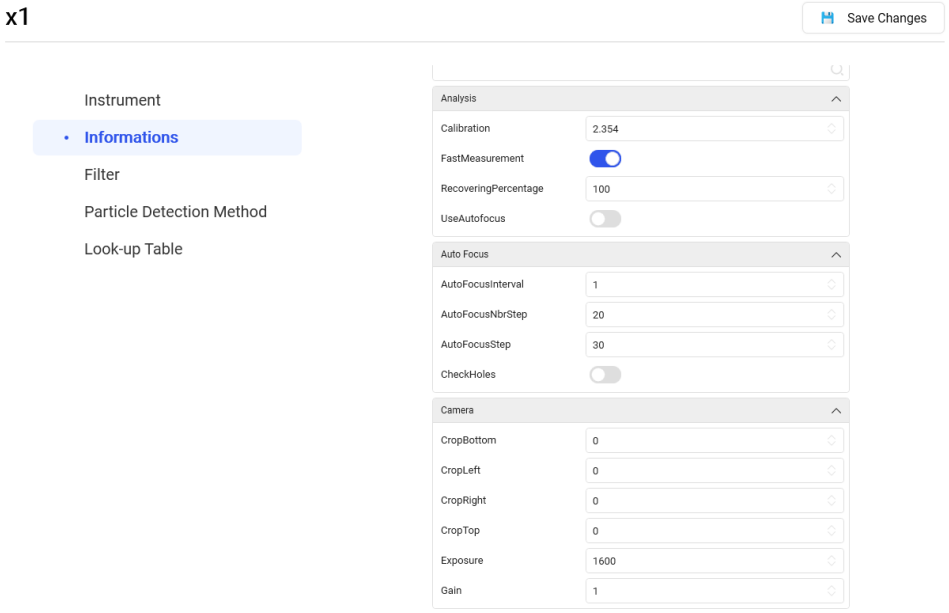
11. Image Scale: Adjusts the scale of the particle images.

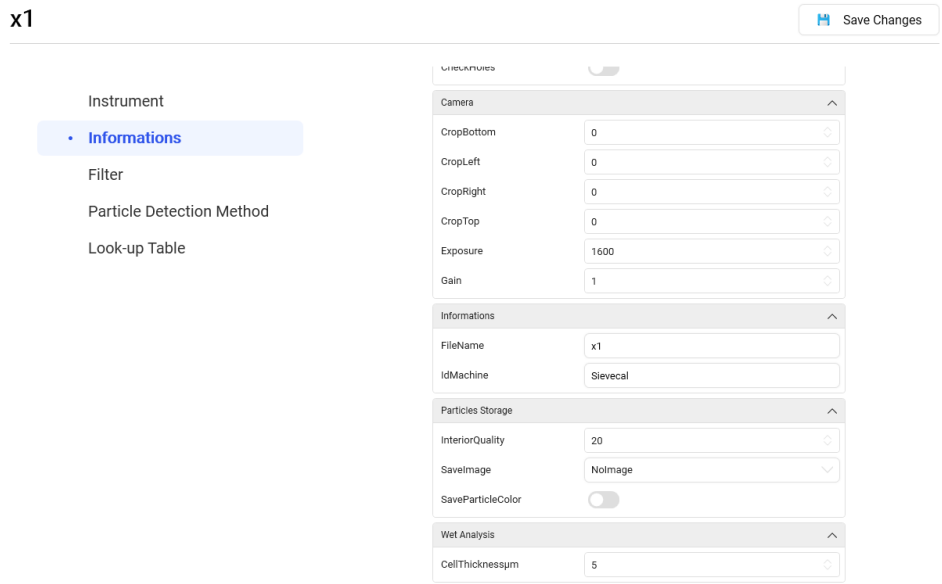
12. Current Measurement: Displays the measurement currently being analyzed.

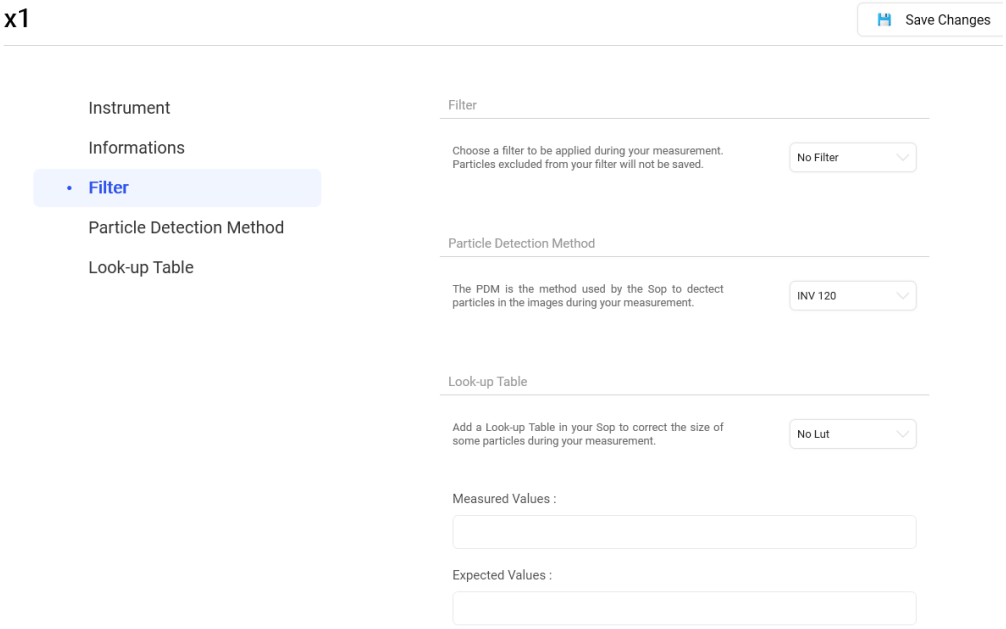
Settings, SOP

SOP Window Information









This display varies depending on the instrument used. The following images and explanations of the SOP window are specific to the Occhio Sievecal.

1.SOP Information contains the settings of the instrument used during the analysis process:

- Autofocus Interval: The frequency of the autofocus procedure. (1: Autofocus is applied to all images; 4: Autofocus is applied once every 4 images)

- Autofocus Nbr Step: The number of steps in the autofocus procedure, defining the distance in the Z-axis to achieve focus (Z displacement = NbrSteps × StepSize)

- Autofocus Step: The size of a single step used during the focusing procedure.

- Calibration [µm/pixel]: The optical resolution of the lens, expressed in µm/pixel. This value allows conversion from the number of pixels to dimensions in µm. Changes to calibration settings will affect the instrument's accuracy.

- Check Holes: Displays the detected sieve holes at the end of the analysis.

- Exposure [µs]: The amount of light per unit area reaching the photographic film or electronic image sensor, determined by shutter speed, lens aperture, and scene luminance.

- Fast Measurement: An option that allows scanning each diameter of the sieve in random mode. For each diameter, from the border to the center of the sieve, the instrument analyzes one image per diameter by randomly rotating the sieve. The number of diameters depends on lens resolution and sieve diameter.

- File Name: The name of the current SOP.

- Gain: The gain of the camera signal used to increase image brightness.

- Id Machine: The name of the current instrument (Sievecal).

- Recovery Percentage: [Information not provided; consider including details if available.]

- MillsUpFunnel [ms]: The duration of the funnel elevation at the start of the analysis.

- Number of Images Before Stopping: The maximum number of images allowed during the analysis. When this number is reached, the analysis stops.

- Priming Duration: Determines the vibrational intensity and duration needed to introduce the sample into the viewing area before the analysis begins.

- Save Image: Allows you to save single particle images, the entire set of analysis images, images containing particles, or none.

- Save Particle Color: This option allows you to save the color or grayscale level (depending on the camera sensor type) of each particle.

- Show Background Dynamique: Displays the background image during measurement.

- Use Current Filter: Applies the selected filter during measurement.

2.Particles Detection Method

PDM (Particle Detection Method) is a file generated by a dedicated interface (PDM Creator or Armadillo Paint) and loaded into the method. During measurement, the PDM is applied to the acquired images to recognize and compute particle outlines.

- Simple PDM: Uses a single threshold value. For example, if a threshold of 100 is set, pixels with a grayscale value less than 100 are considered part of the particle and are used to calculate the contour.

- Complex PDM: Combines thresholds and image transformations, mainly used when the contrast between particles and the background is minimal.

3.Instrument

- The image of the instrument in use.

4.SOP Look-Up Table

- Size Discrepancies: To address naturally occurring size discrepancies, the standard size is entered under "Expected Values," while the size measured by the instrument without compensation is entered under "Measured Values."

Add these values to the calibration table using the Armadillo menu (Menu Bar: Settings, LUT).

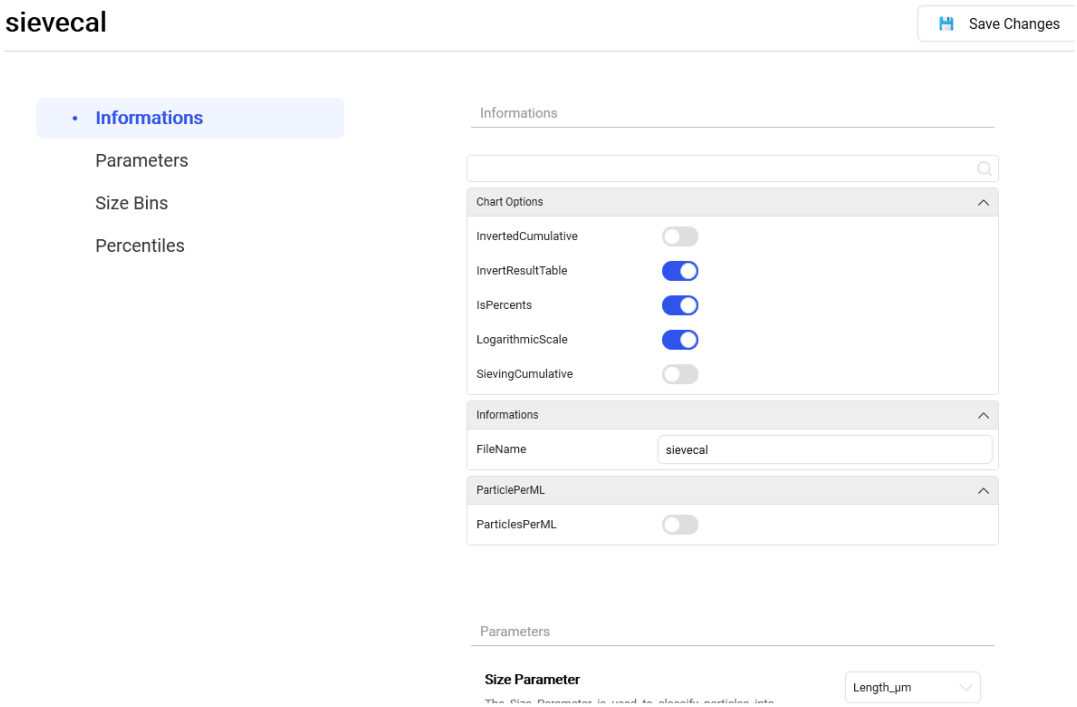
Once the calibration table is completed, Armadillo's specialized algorithm will correct errors in future analyses.

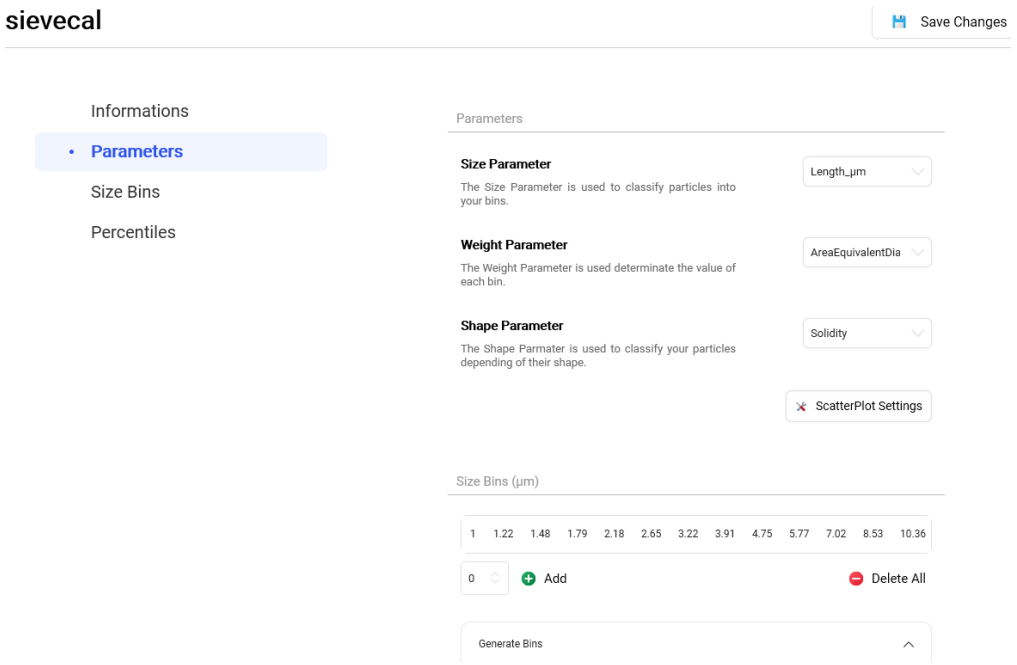
Every calibration is documented and stored for quality assurance.

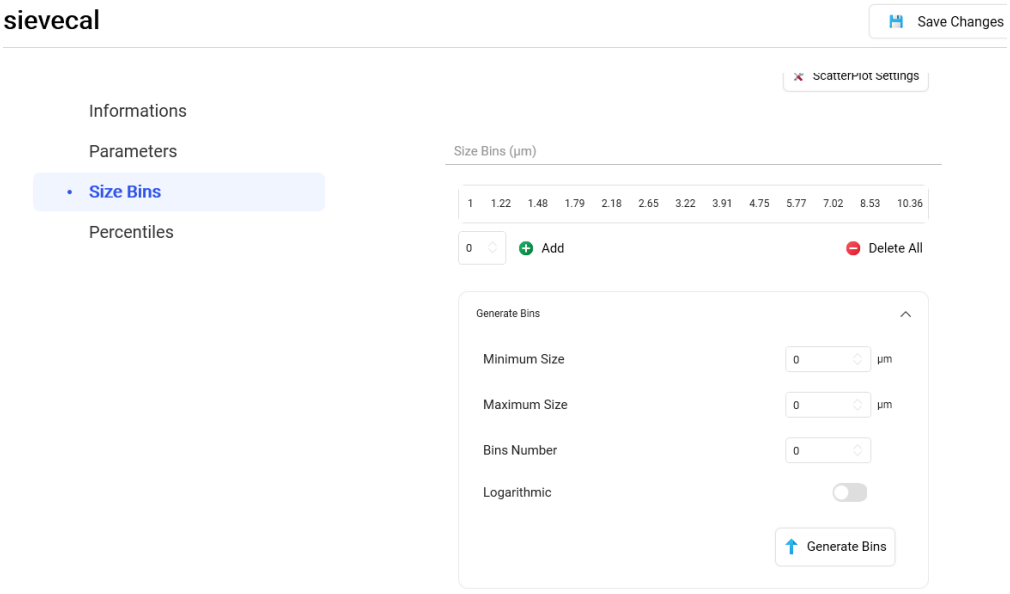
5.To modify or save the SOP, use the unlock and save buttons.

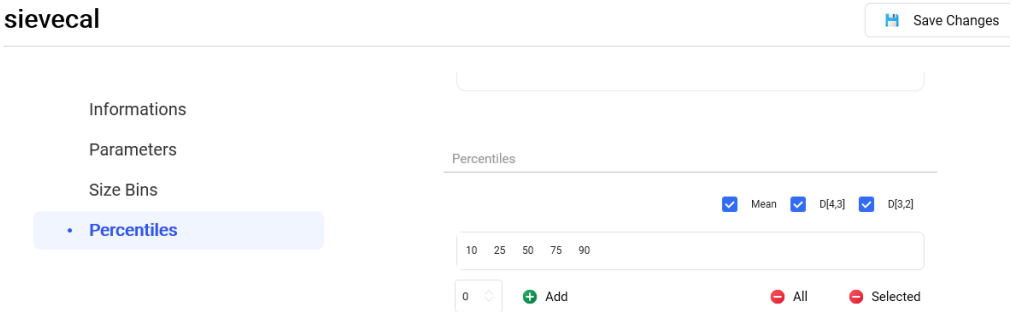
Settings, Display

Display window informations




sievecal
Save Changes
Informations
Parameters
Size Bins
Percentiles
Parameters
Size Parameter
The Size Parameter is used to classify particles into your bins.
Length_µm
Weight Parameter
The Weight Parameter is used determinate the value of each bin.
AreaEquivalentDia
Shape Parameter
The Shape Parmater is used to classify your particles depending of their shape.
Solidity
ScatterPlot Settings
Size Bins (µm)
1 1.22 1.48 1.79 2.18 2.65 3.22 3.91 4.75 5.77 7.02 8.53 10.36
0
Add
Delete All
Generate Bins


sievecal
Save Changes
ScatterPlot Settings
Informations
Parameters
Size Bins
Percentiles
Size Bins (µm)
1 1.22 1.48 1.79 2.18 2.65 3.22 3.91 4.75 5.77 7.02 8.53 10.36
0
Add
Delete All
Generate Bins
Minimum Size
0
µm
Maximum Size
0
µm
Bins Number
0
Logarithmic
Generate Bins


sievecal
Save Changes
Informations
Parameters
Size Bins
Percentiles
Percentiles
Mean
D[4,3]
D[3,2]
10 25 50 75 90
0
Add
All
Selected

Size Bins (µm):

This is the list box that contains the display size classes (bins), type the bin value on the text box and press ADD button to enter the bin in the list. To erase the entire bins list press on button Delete All, to delete one by one select before the bin and then press on Delete Selected button.

Bins Generation:

Use this menu to generate a list of bins automatically, just enter the upper and lower limit of the size distribution and the number of classes. Specify the scale (linear or logarithmic) than press Generate Bins button.

Percentiles:

This is the list of the percentiles (D50%, D16% .....) computed and displayed during the analysis, type a value and use the buttons ADD or Delete to modify the list.

Display Informations:

-Inverted cumulative displays the cumulative graph from 100% to 0%

-Invert result table allow display the size distribution table from top to bottom and not from right to left (vertical table or horizontal table)

-IsPercent is the Y axis proportion is expressed percent scale (Ex. 20% of sample from 1µm to 5µm)

-Logarithmic Scale allows use logarithmic scale for X axis graph

-Shape Bins is the number of bins to compute shape distribution, typically we use 100 bins (corresponding 1 bin every 1%)

-File name is the name of the selected display

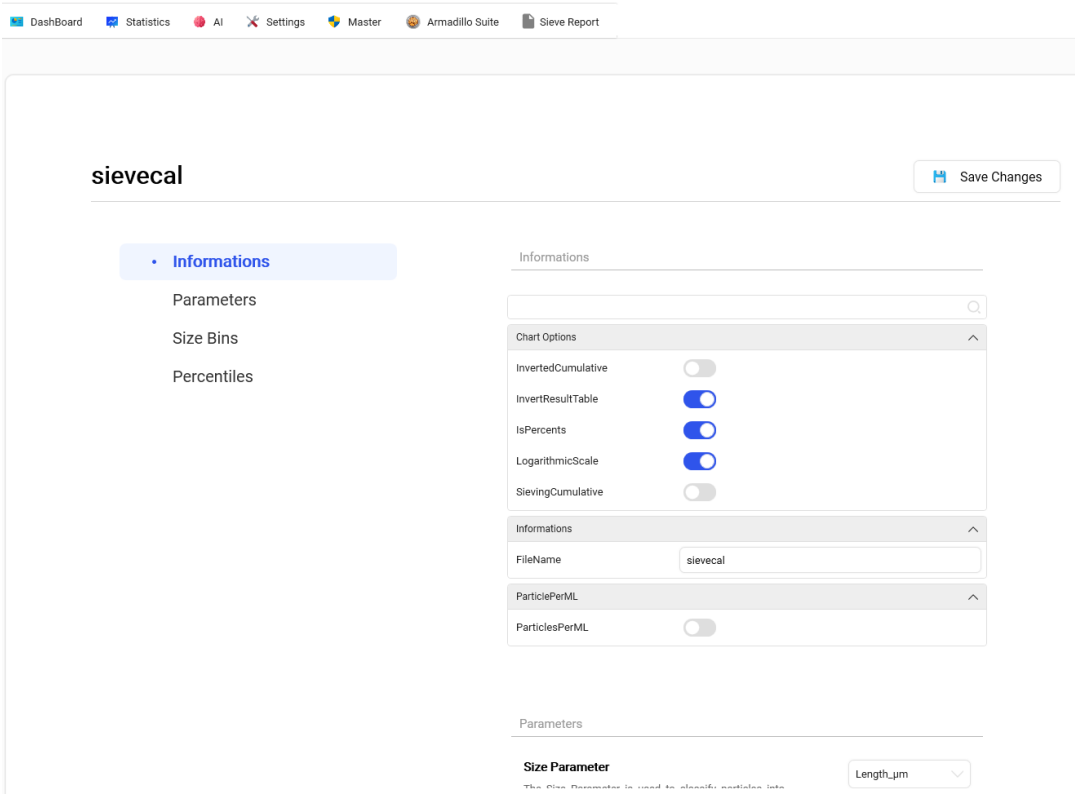
-Particles Per ml is the menu dedicated to particles density distribution (particles counting) is used only for the liquid dispersion applications

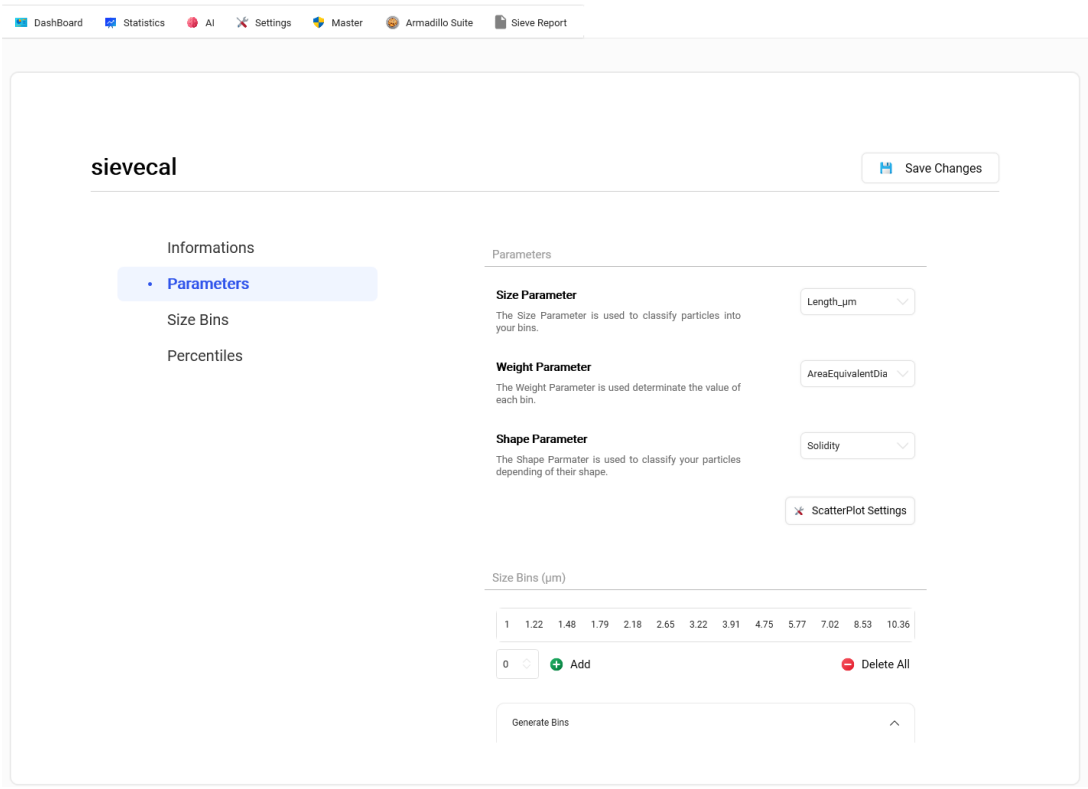
-Size Parameter is the size parameter assigned to the current display. The size parameter is used to compute size distribution graph

-Weight parameter determine if the proportion (%) of a size bin is weighted by volume, surface or not weighted (size distribution by number)

-Shape Parameter is the shape parameter assigned to the current display. The shape parameter is used to compute shape distribution graph

Settings, display





1. Display Information

- Inverted Cumulative: Displays the cumulative graph from 100% to 0%.

- Invert Result Table: Allows the size distribution table to be displayed vertically (from top to bottom) rather than horizontally (from right to left).

- IsPercent: Indicates whether the Y-axis proportion is expressed on a percent scale (e.g., 20% of the sample from 1 µm to 5 µm).

- Logarithmic Scale: Enables the use of a logarithmic scale for the X-axis graph.

- Shape Bins: Specifies the number of bins used to compute shape distribution. Typically, 100 bins are used (corresponding to 1 bin for every 1%).

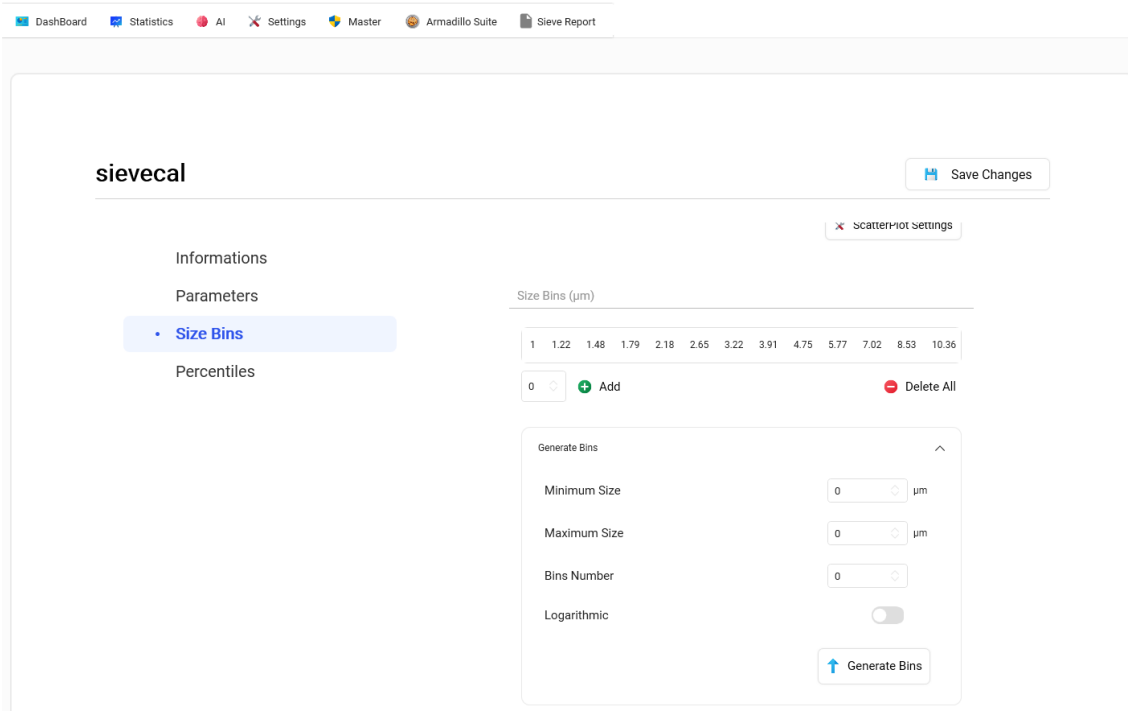
- File Name: The name of the selected display.

- Particles Per ml: Refers to the menu dedicated to particle density distribution (particle counting), applicable only for liquid dispersion applications.

- Size Parameter: The size parameter assigned to the current display. This parameter is used to compute the size distribution graph.

- Weight Parameter: Determines if the proportion (%) of a size bin is weighted by volume, surface, or not weighted (size distribution by number).

- Shape Parameter: The shape parameter assigned to the current display. This parameter is used to compute the shape distribution graph.

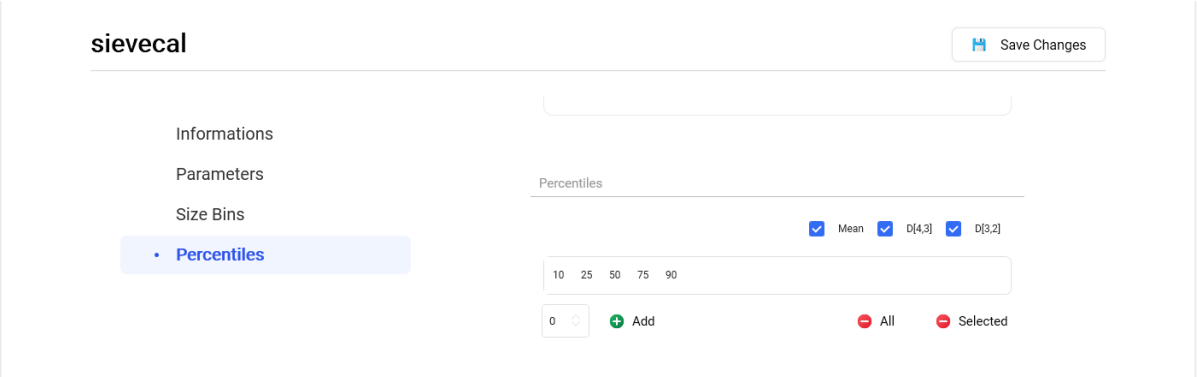


2.Size Bins (µm)

- This list box contains the display size classes (bins). Type the bin value into the text box and press the ADD button to include the bin in the list. To clear the entire bins list, press the Delete All button. To delete bins one by one, select the bin first and then press the Delete Selected button.

3.Bins Generation

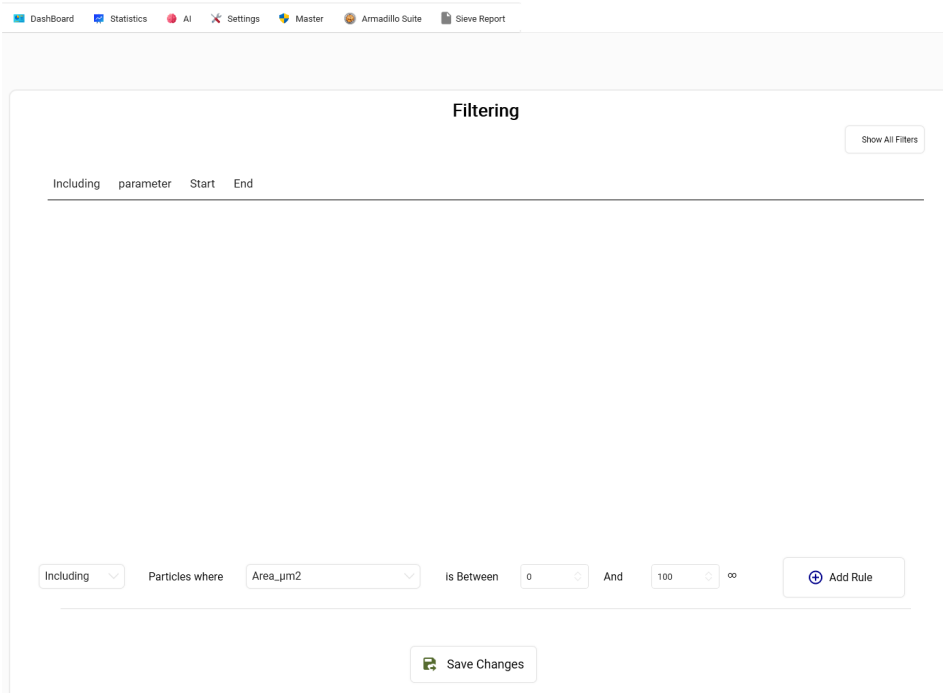
- Use this menu to automatically generate a list of bins. Enter the upper and lower limits of the size distribution and the number of classes. Specify the scale (linear or logarithmic) and then press the Generate Bins button.



4.Percentiles

- This section lists the percentiles (e.g., D50%, D16%) computed and displayed during the analysis. Type a value and use the ADD or Delete buttons to modify the list.

Settings, filter



Filtering Tab:

The Filtering tab allows the user to edit data in a non-destructive manner after the analysis has been completed.

To define a filter, follow these steps:

1. Include or Exclude Selected Particles: Specify whether to include or exclude particles based on the filter criteria.

2. Define the Parameter: Choose the parameter associated with the filter, which could be a size or shape parameter.

3. Define the Domain of the Filter: Set the range for the filter. For a size parameter, this could be from 10 µm to 300 µm. For a shape parameter, it could be from 5% to 25%.

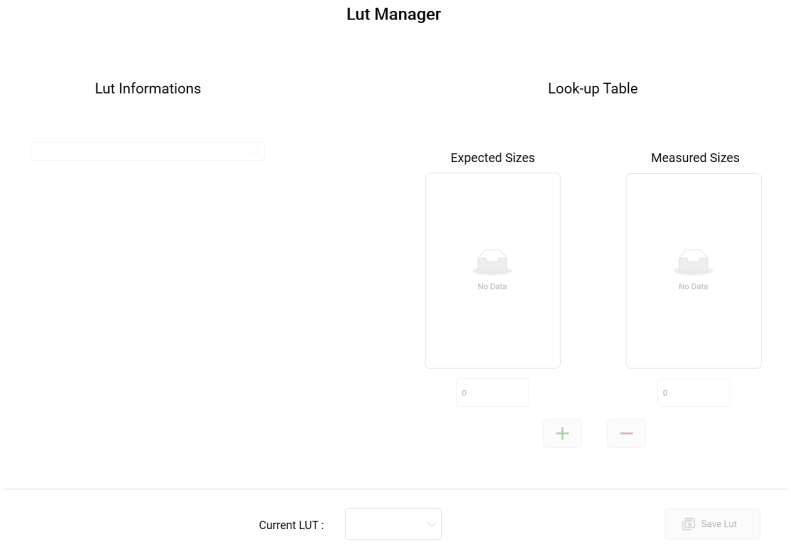
4. Add the Rule: Add the defined rule to the filter.

After adding the desired rules (you can remove a rule by clicking on it), save the filter.

Once the filter is created, select it in the Measurement Panel (see Measurement Panel).

To apply the filter, press the Refresh Page button on the selected graph tab (Size Distribution, Shape Distribution, Particles Viewer).

Settings, LUT



Lookup Table (LUT) and Calibration Process

The lookup table (LUT) completes the calibration process of the instrument.

- Optical Calibration: The initial calibration is determined by the optical configuration of the instrument. This optical calibration does not change unless the lens is replaced, but it should be checked periodically.

- Lookup Table Calibration: The second calibration involves using a lookup table (LUT) to match measurement results with a standard reference sample. The LUT contains the necessary points to align the instrument's results with the standard sample values.

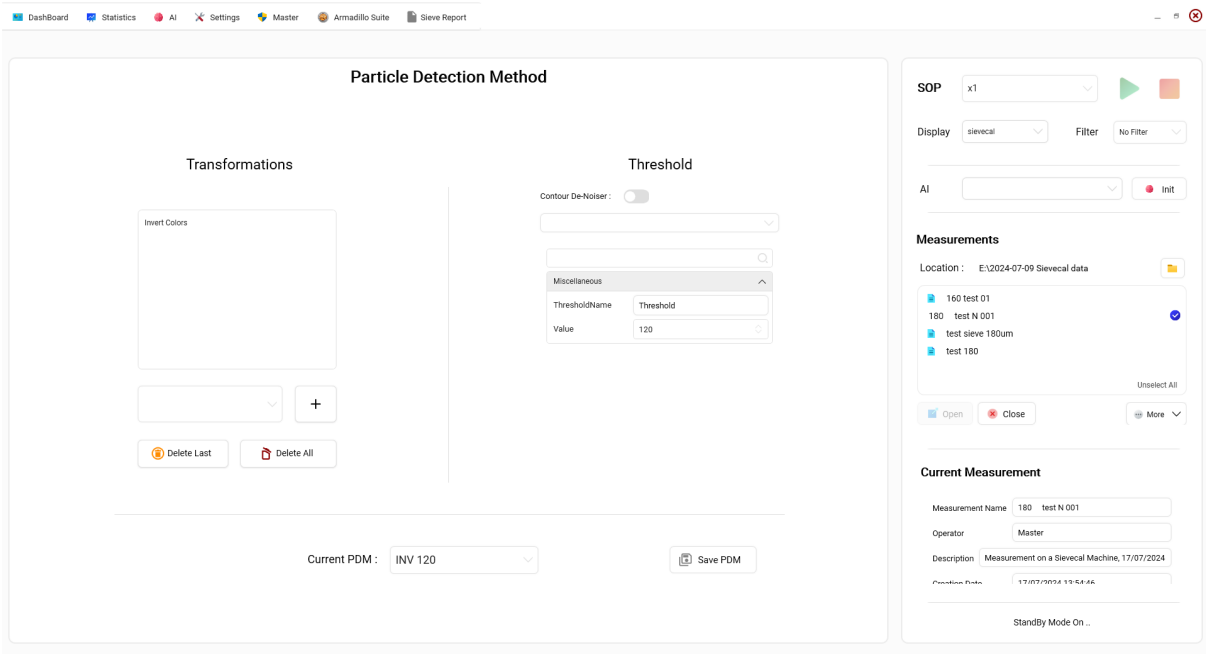
LUT Information

It is crucial to ensure that every field is filled in accurately to the best of the operator's knowledge. This ensures the validity of the calibration and allows the standard to be traced for record-keeping or in case of a standard recall.

- Size Discrepancies: To address naturally occurring discrepancies, enter the standard size in the left column and the size measured by the instrument without calibration in the right column. Add these values to the calibration table by clicking the “plus” button. To remove a calibration entry, select the size to be removed and click the “minus” button.

Once the calibration table is completed, Armadillo’s specialized algorithm will correct errors in all future analyses. Every calibration is documented and stored for quality assurance.

Settings, PDM



The PDM tab is the dedicated interface for creating a Particle Detection Method (PDM). During measurement, the PDM is applied to the acquired images to recognize and compute particle outlines.

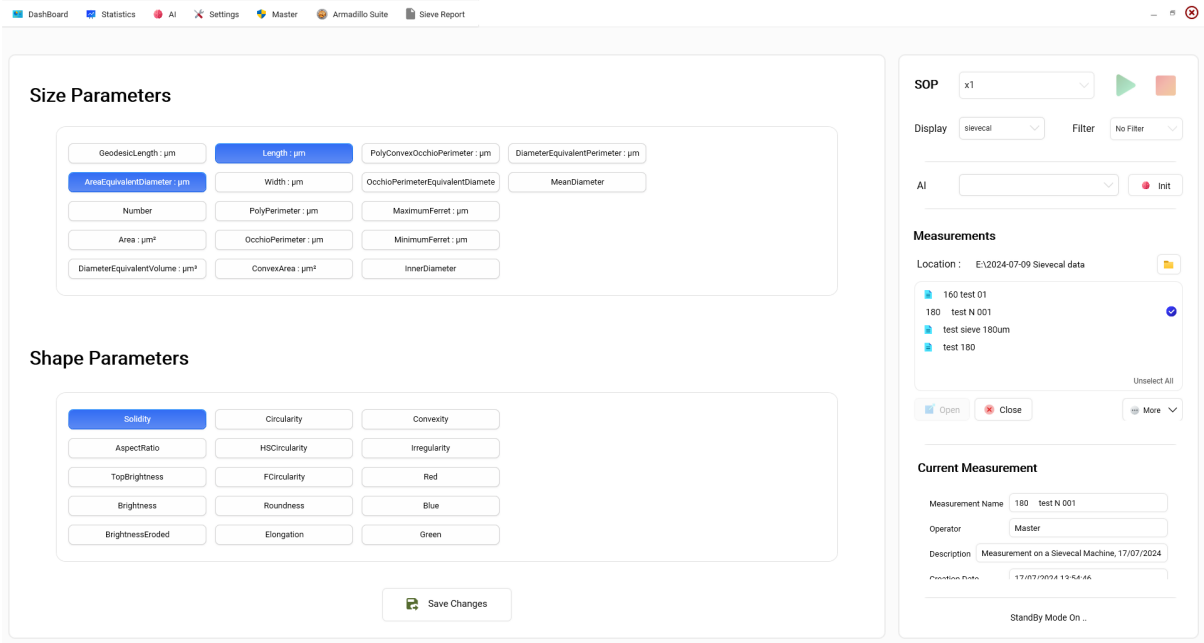
- Simple PDM: Uses a single threshold value. For example, if the threshold value is set to 100, pixels with a grayscale value less than 100 are considered part of the particle and will be used to calculate its contour.

- Complex PDM: Combine thresholds and image transformations, which are particularly useful when the contrast between the particles and the image background is minimal.

- Transformation Menu: Allows you to select one or more transformations. The transformations you add will be applied sequentially to each acquired image according to the list order, from top to bottom.

- Threshold Menu: Allows you to set a threshold value from 0 to 255 (typical values range from 100 to 180). The threshold is applied after the transformations.

Settings, Parameters Selector

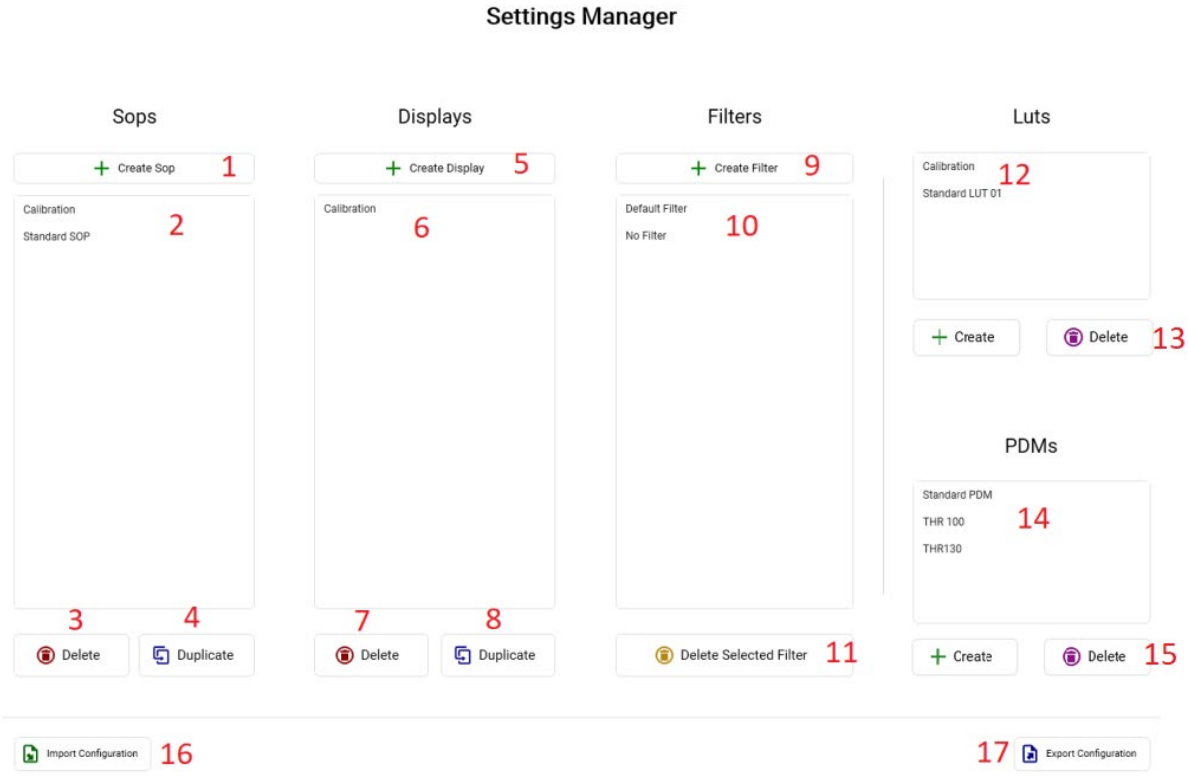


The Parameters Slector menu allows you to define user preferences. Only the selected parameters will appear in the software selection lists.

- Selection Process: Click to select or unselect a parameter, then click save changes to store your selection.

- Modifying Selections: You can modify this selection at any time without impacting the analysis databases. Only the SOP (Standard Operating Procedure) affects the measurement results.

Settings, Settings Manager



1. Press the button to create a new SOP, enter the SOP name in the dialog box, and save.

2. List of the existing SOPs.

3. Delete the selected SOP from the list.

4. Duplicate the selected SOP, enter the duplicate SOP name in the dialog box, and save.

5. Press the button to create a new display, enter the display name in the dialog box, and save.

6. List of the existing displays.

7. Delete the selected display from the list.

8. Duplicate the selected display, enter the duplicate display name in the dialog box, and save.

9. Press the button to create a new filter, enter the filter name in the dialog box, and save.

10. List of the existing filters.

11. Delete the selected filter from the list.

12. List of the existing LUTs.

13. Delete the selected LUT from the list.

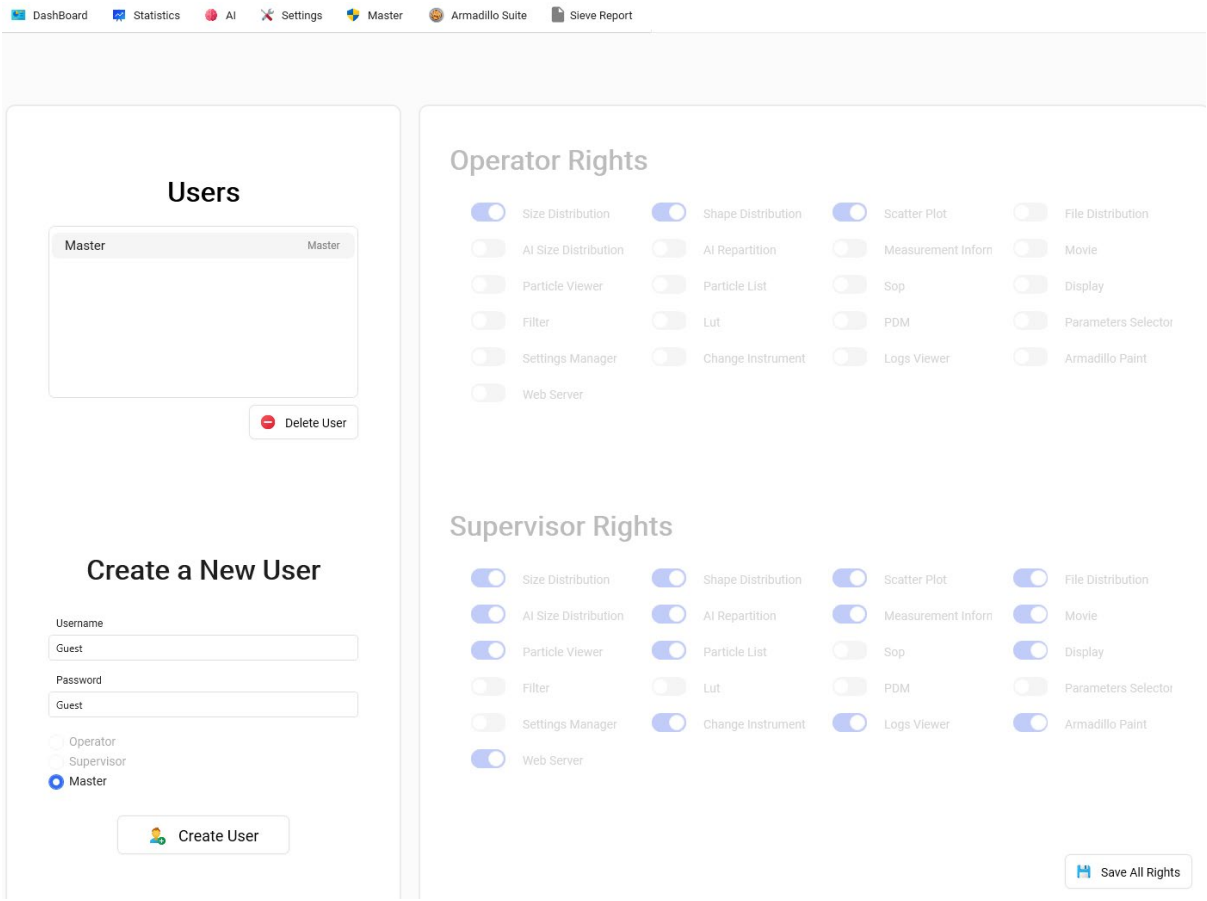
14. List of the existing PDMs.

15. Delete the selected PDM from the list.

16.Import Configuration: Allows importing complete instrument settings from another instrument (the instrument must be the same model with the same optical configuration).

17. Export Instrument Configuration: Allows exporting the entire instrument settings.

Master-Master panel



Armadillo provides the ability to create and define three different user levels:

1. Master User: This user has full access to the entire menu and functionalities of Armadillo.

2. Operator User: This user has specific rights assigned through the options table.

3. Supervisor User: This user also has specific rights assigned through the options table.

Only a Master User can access the Master Panel and manage user rights.

To create a new user, follow these steps:

1. Enter the user name.

2. Enter the user password.

3. Define the user's rights (Operator, Supervisor, Master).

4. Press the "Create Users" button.

To delete a user:

1. Select the user.

2. Click on the "Delete User" button.

To activate a new user:*

1. Exit Armadillo.

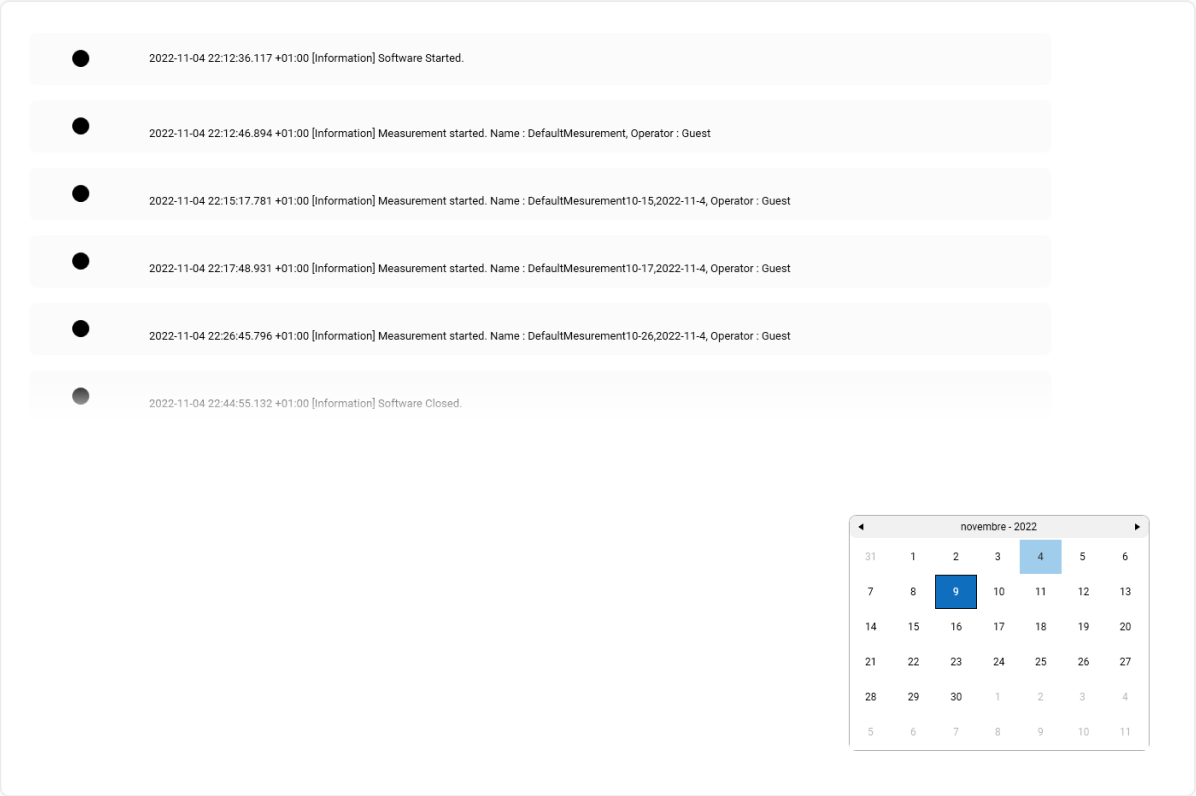
2. Restart the software.

Master-Help-Change Machine

Armadillo is a comprehensive software designed to work with all Occhio instruments. It is a complete software solution that can manage each instrument with its corresponding Standard Operating Procedure (SOP). This means that Armadillo adapts to the specific instrument being used to analyze a sample while maintaining a consistent approach to presenting results and computing particle size and shape characterization.

To change the instrument, simply select the desired instrument and apply the change. This menu is also accessible in the startup menu, so if the instrument is changed there, it will be ready to use immediately. However, if you choose to change the instrument through the Help menu, you will need to restart the software to activate the change.

Master-Help-Logs Viewer



The log functionality allows a history of events attached to a process to be stored. These events are time-stamped and ordered according to time. In short, the log or audit trail is a kind of "logbook" of a system. It can be consulted if necessary, for example, to identify the origin and author of an instruction or modification.

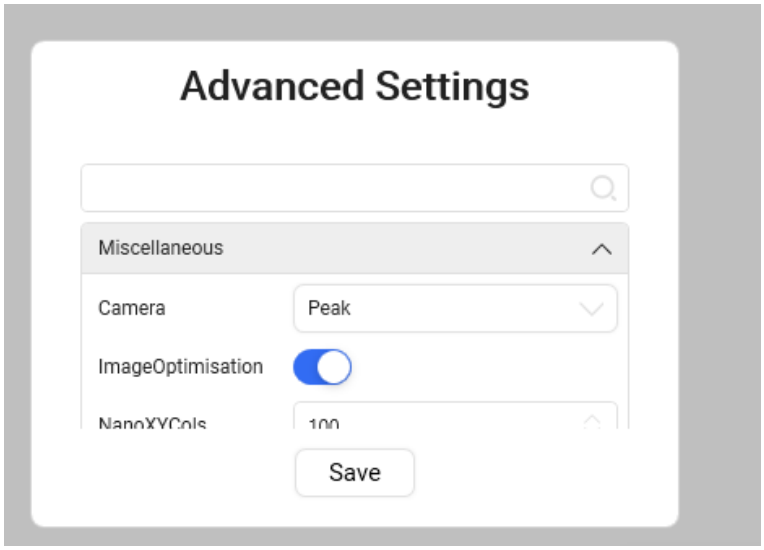
To visualize the log history:

1. Select the date in the calendar.

2. The corresponding log will appear in the main window.

A copy of the log file is also available on the HDD.

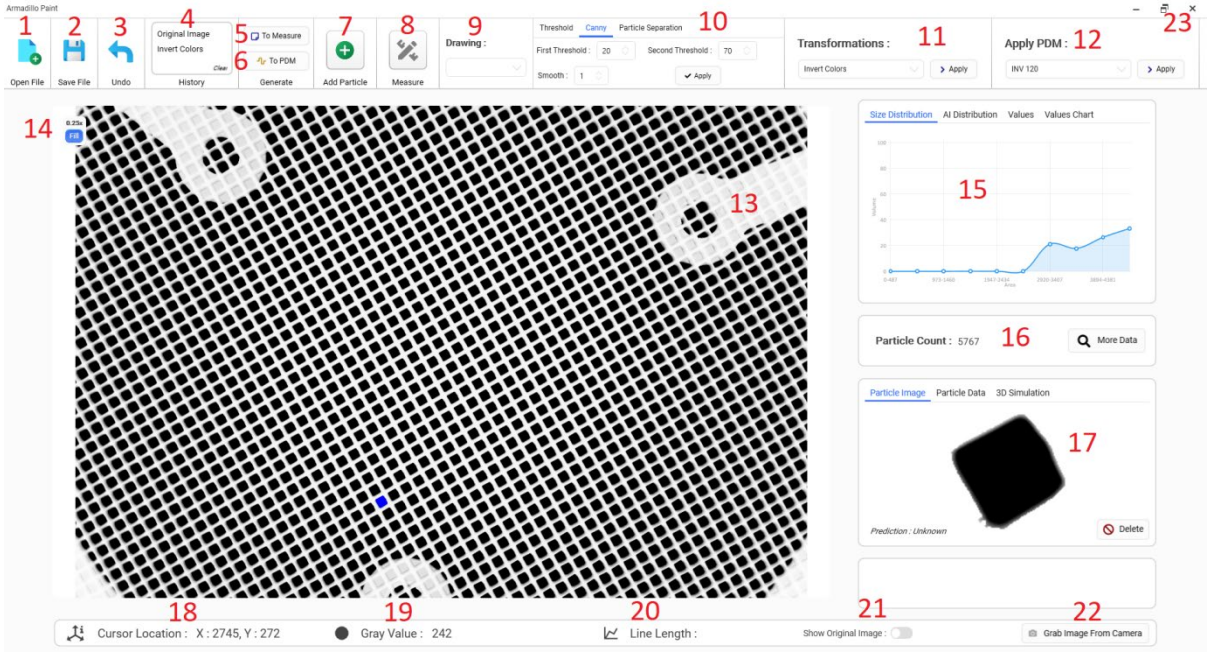
Master-Help-Advanced Settings



This menu provides users with the ability to modify advanced settings for the instrument, such as configuring the camera driver. For Sievecale models, the camera utilizes Peak drivers.

Armadillo-Suite- Paint

Armadillo Paint is dedicated software designed to evaluate image processing by tuning the SOP parameters on a single frame. This frame is typically an image acquired by the instrument but can also be an external image acquired by another device such as a microscope or an optical bench. The results obtained from manipulating the image are computed and displayed in real-time, demonstrating the reliability of the method. Armadillo Paint is a tool dedicated to creating and validating analysis methods.



1. To open an image file

2. To save the current image file

3. To remove the last transformation

4. History of the applied transformations

5. Create a measurement file based on the data computed on the current image; the file will be directly available in the Armadillo menu

6. Create a new PDM based on current transformations and threshold

7. To create an artificial particle

8. Measurement tools

9. Overlay the selected parameters outline on the particles contained in the current image

10. To choose threshold type and threshold values, which are directly applied to the image

11. To choose and apply a transformation from the drop-down list; more transformations can be applied sequentially

12. To apply an existing PDM

13. Current image

14. Zoom option

15. Distribution real-time graph and data

16. Real-time particles counter

17. Selected particle display and data

18. To show the coordinates of the pointer on the image

19. Gray scale value (0 to 255) corresponding to the pointer position on the image

20. To compute a line length

21. To show the original image and how the image and particles appear after processing. This functionality is useful to verify the method after thresholding and transformations

22. To acquire an image from the camera. Note that the existing image will be replaced; save the current image before pressing the button if you want to keep it.

23. To close the paint window

Instrument settings

With x0.3 front lens

SOP name	Suggested sieve size range	SOP purpose
x0.3x0.75	1700µm to 16000µm	Sieve calibration
x0.3X1	-	Sieve calibration
x0.3x2	-	Sieve calibration
x0.3x3	-	Sieve calibration
x0.3x4.5	-	Sieve calibration

Without x0.3 front lens

SOP name	Suggested sieve size range	SOP purpose
x0.75	-	Sieve calibration
x1	280µm to 1600µm	Sieve calibration
x2	-	Sieve calibration
x3	-	Sieve calibration
x4.5	38µm to 250µm	Sieve calibration

SOP: x0.3x0.75 - Standard SOP from 1700µm to 16000µm sieve opening

- ✓ Sieve size range: from 1700µm to 16000µm
- ✓ SOP purpose: sieve calibration according with ISO and ASTM norms
- ✓ Use the X0.3 focus spacer to set lens working distance (before check the distance do not forget to screw the x0.3 front lens)

SOP Informations

Autofocus Interval	1
Autofocus Nbr Step	30
Autofocus Step	40 (µm)
Calibration	**11.41 (µm/pixel) SN300058**
Check Holes	Unselected
Exposure	1400
Fast Measurement	Unselected
File Name	X0.3x0.75
Gain	1
Id Machine	Sievecal
Recovering Percentage	300
Save Image	No Images*
Save Particles Color	Unselected
Use Autofocus	unselected
Use Current Filter	Unselected
Particle Detection Method	INV 160 (Invert image + threshold 160)
SOP Look-up Table	Not applied

* * The user could save or not the original images. In case 'All Image' option is selected all the images of the analysis will be saved on the disk. Take care to remove the images periodically to avoid disk saturation.

SOP: x0.3x1

- ✓ Sieve size range: we have decided not to use this SOP (mm sieve range is covered by the SOP x0.3x0.75 and x0.3x2)
- ✓ SOP purpose: sieve calibration according with ISO and ASTM norms
- ✓ Use the X0.3 focus spacer to set lens working distance (before check the distance do not forget to screw the x0.3 front lens)

SOP Informations

Autofocus Interval	1
Autofocus Nbr Step	30
Autofocus Step	40 (µm)
Calibration	**8.451 (µm/pixel) SN300058**
Check Holes	Unselected
Exposure	1600
Fast Measurement	Unselected
File Name	X0.3x1
Gain	1
Id Machine	Sievecal
Recovering Percentage	100
Save Image	No Images*
Save Particles Color	Unselected
Use Autofocus	unselected
Use Current Filter	Unselected
Particle Detection Method	INV 160 (Invert image + threshold 160)
SOP Look-up Table	Not applied

* * The user could save or not the original images. In case 'All Image' option is selected all the images of the analysis will be saved on the disk. Take care to remove the images periodically to avoid disk saturation.

SOP: x0.3x2

- ✓ Sieve size range: from 710µm to 1400µm
- ✓ SOP purpose: sieve calibration according with ISO and ASTM norms
- ✓ Use the x0.3 focus spacer to set lens working distance (before check the distance do not forget to screw the x0.3 front lens)

SOP Informations

Autofocus Interval	1
Autofocus Nbr Step	30
Autofocus Step	40 (µm)
Calibration	**4.202(µm/pixel) SN300058**
Check Holes	Unselected
Exposure	1400
Fast Measurement	Unselected
File Name	X0.3x2
Gain	2
Id Machine	Sievecal
Recovering Percentage	50
Save Image	No Images*
Save Particles Color	Unselected
Use Autofocus	unselected
Use Current Filter	Unselected
Particle Detection Method	INV 160 (Invert image + threshold 160)
SOP Look-up Table	Not applied

* * The user could save or not the original images. In case 'All Image' option is selected all the images of the analysis will be saved on the disk. Take care to remove the images periodically to avoid disk saturation.

SOP: x0.3x3

- ✓ Sieve size range: we have decided not to use this SOP (mm sieve range is covered by the SOP x0.3x0.75 and x0.3x2)
- ✓ SOP purpose: sieve calibration according with ISO and ASTM norms
- ✓ Use the x0.3 focus spacer to set lens working distance (before check the distance do not forget to screw the x0.3 front lens)

SOP Informations

Autofocus Interval	1
Autofocus Nbr Step	30
Autofocus Step	20 (µm)
Calibration	**2.817(µm/pixel) SN300058**
Check Holes	Unselected
Exposure	1750
Fast Measurement	Unselected
File Name	X0.3x3
Gain	3
Id Machine	Sievecal
Recovering Percentage	100
Save Image	No Images*
Save Particles Color	Unselected
Use Autofocus	unselected
Use Current Filter	Unselected
Particle Detection Method	INV 160 (Invert image + threshold 160)
SOP Look-up Table	Not applied

* * The user could save or not the original images. In case 'All Image' option is selected all the images of the analysis will be saved on the disk. Take care to remove the images periodically to avoid disk saturation.

SOP: x0.3x4.5

- ✓ Sieve size range: we have decided not to use this SOP (mm sieve range is covered by the SOP x0.3x0.75 and x0.3x2)
- ✓ SOP purpose: sieve calibration according with ISO and ASTM norms
- ✓ Use the x0.3 focus spacer to set lens working distance (before check the distance do not forget to screw the x0.3 front lens)

SOP Informations

Autofocus Interval	1
Autofocus Nbr Step	40
Autofocus Step	10 (µm)
Calibration	**1.881(µm/pixel) SN300058**
Check Holes	Unselected
Exposure	3200
Fast Measurement	Unselected
File Name	X0.3x4.5
Gain	3
Id Machine	Sievecal
Recovering Percentage	100
Save Image	No Images*
Save Particles Color	Unselected
Use Autofocus	unselected
Use Current Filter	Unselected
Particle Detection Method	INV 160 (Invert image + threshold 160)
SOP Look-up Table	Not applied

* * The user could save or not the original images. In case 'All Image' option is selected all the images of the analysis will be saved on the disk. Take care to remove the images periodically to avoid disk saturation.

SOP: x0.75

- ✓ Sieve size range: we have decided not to use this SOP (µm sieve range is covered by the SOP x1, x2 and x4.5)
- ✓ SOP purpose: sieve calibration according with ISO and ASTM norms
- ✓ use the NOx0.3 focus spacer to set lens working distance (before check the distance do not forget **remove the x0.3** front lens)

SOP Informations

Autofocus Interval	1
Autofocus Nbr Step	30
Autofocus Step	10 (µm)
Calibration	**3.181(µm/pixel) SN300058**
Check Holes	Unselected
Exposure	1350
Fast Measurement	Unselected
File Name	X0.75
Gain	1
Id Machine	Sievecal
Recovering Percentage	100
Save Image	No Images*
Save Particles Color	Unselected
Use Autofocus	unselected
Use Current Filter	Unselected
Particle Detection Method	INV 120 (Invert image + threshold 120)
SOP Look-up Table	Not applied

* * The user could save or not the original images. In case 'All Image' option is selected all the images of the analysis will be saved on the disk. Take care to remove the images periodically to avoid disk saturation.

SOP: x1 Standard SOP from 400 µm to 710 µm sieve opening

- ✓ Sieve size range: from 400µm to 1700µm
- ✓ SOP purpose: sieve calibration according with ISO and ASTM norms
- ✓ use the NOx0.3 focus spacer to set lens working distance (before check the distance do not forget **remove the x0.3** front lens)

SOP Informations

Autofocus Interval	1
Autofocus Nbr Step	40
Autofocus Step	10 (µm)
Calibration	**2.335(µm/pixel) SN300058**
Check Holes	Unselected
Exposure	1500
Fast Measurement	Selected
File Name	x1
Gain	1
Id Machine	Sievecal
Recovering Percentage	100
Save Image	No Images*
Save Particles Color	Unselected
Use Autofocus	Selected
Use Current Filter	Unselected
Particle Detection Method	INV 110 (Invert image + threshold 110)
SOP Look-up Table	Not applied

* * The user could save or not the original images. In case 'All Image' option is selected all the images of the analysis will be saved on the disk. Take care to remove the images periodically to avoid disk saturation.

SOP: x2

- ✓ Sieve size range: from 400µm to 710µm
- ✓ SOP purpose: sieve calibration according with ISO and ASTM norms
- ✓ use the NOx0.3 focus spacer to set lens working distance (before check the distance do not forget **remove the x0.3** front lens)

SOP Informations

Autofocus Interval	1
Autofocus Nbr Step	40
Autofocus Step	5 (µm)
Calibration	**1.155(µm/pixel) SN300058**
Check Holes	Unselected
Exposure	1500
Fast Measurement	Selected
File Name	X2
Gain	2
Id Machine	Sievecal
Recovering Percentage	100
Save Image	No Images*
Save Particles Color	Unselected
Use Autofocus	Selected
Use Current Filter	Unselected
Particle Detection Method	INV 120 (Invert image + threshold 120)
SOP Look-up Table	Not applied

* * The user could save or not the original images. In case 'All Image' option is selected all the images of the analysis will be saved on the disk. Take care to remove the images periodically to avoid disk saturation.

SOP: x3

- ✓ Sieve size range: we have decided not to use this SOP (µm sieve range is covered by the SOP x1, x2 and x4.5)
- ✓ SOP purpose: sieve calibration according with ISO and ASTM norms
- ✓ use the NOx0.3 focus spacer to set lens working distance (before check the distance do not forget **remove the x0.3** front lens)

SOP Informations

Autofocus Interval	1
Autofocus Nbr Step	40
Autofocus Step	5 (µm)
Calibration	**0.778 (µm/pixel) SN300058**
Check Holes	Unselected
Exposure	1620
Fast Measurement	Selected
File Name	X3
Gain	3
Id Machine	Sievecal
Recovering Percentage	50
Save Image	No Images*
Save Particles Color	Unselected
Use Autofocus	Selected
Use Current Filter	Unselected
Particle Detection Method	INV 120 (Invert image + threshold 120)
SOP Look-up Table	Not applied

* * The user could save or not the original images. In case 'All Image' option is selected all the images of the analysis will be saved on the disk. Take care to remove the images periodically to avoid disk saturation.

SOP: x4.5, Standard SOP from 38µm to 400µm sieve opening

- ✓ Sieve size range: from 38µm to 400µm
- ✓ SOP purpose: sieve calibration according with ISO and ASTM norms
- ✓ use the NOx0.3 focus spacer to set lens working distance (before check the distance do not forget **remove the x0.3** front lens)

SOP Informations

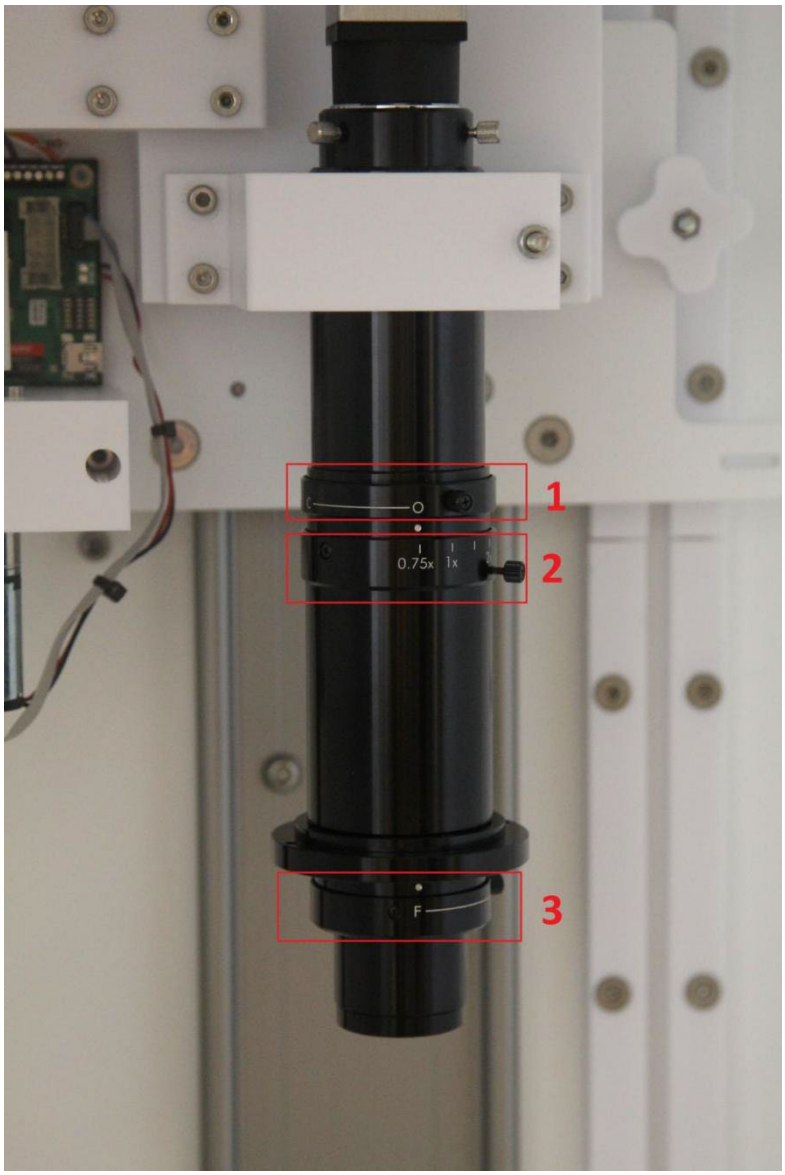
Autofocus Interval	1
Autofocus Nbr Step	40
Autofocus Step	5 (µm)
Calibration	**0.520 (µm/pixel) SN300058**
Check Holes	Unselected
Exposure	2900
Fast Measurement	Selected
File Name	X4.5
Gain	3
Id Machine	Sievecal
Recovering Percentage	50
Save Image	No Images*
Save Particles Color	Unselected
Use Autofocus	Selected
Use Current Filter	Unselected
Particle Detection Method	INV 120 (Invert image + threshold 120)
SOP Look-up Table	Not applied

* * The user could save or not the original images. In case 'All Image' option is selected all the images of the analysis will be saved on the disk. Take care to remove the images periodically to avoid disk saturation.

Lens settings

Three tuning wheel are present on the lens:

1. Lens diaphragm: always set in OPEN position
2. Magnification wheel, allowed magnifications are: x1; x2; x3; x4.5
3. Focus wheel: always set on FAR position



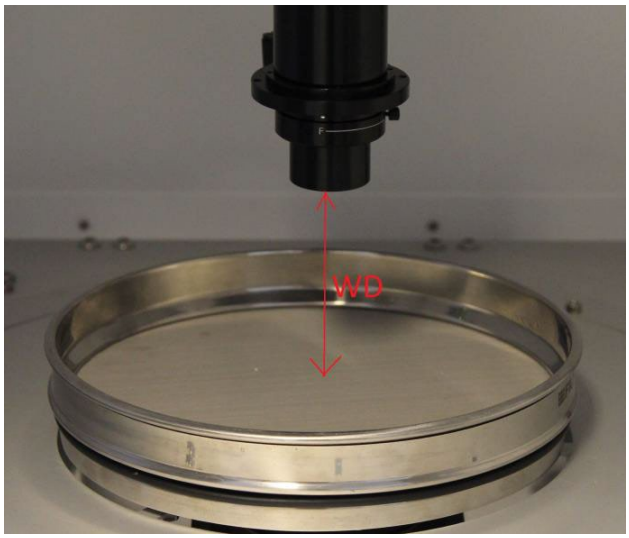
Lens calibration

The calibration of the lens is computed for each instrument by using a certified calibration reticule

Instrument Serial number	**300058**
Calibration date	**28/02/2025**
Certified calibration reticule	**PN:59281 SN:0153**
MAGNIFICATION	**Calibration**
X0.75	3.181 µm/pixel (focus shim NOx0.3)
X1	2.335 µm/pixel (focus shim NOx0.3)
X2	1.155 µm/pixel (focus shim NOx0.3)
X3	0.778 µm/pixel (focus shim NOx0.3)
X4.5	0.520 µm/pixel (focus shim NOx0.3) + focusing
X0.3x0.75	11.409 µm/pixel (focus shim x0.3)
X0.3x1	8.451 µm/pixel (focus shim x0.3)
X0.3x2	4.202 µm/pixel (focus shim x0.3) + focusing
X0.3x3	2.817 µm/pixel (focus shim x0.3) + focusing
X0.3x4.5	1.881µm/pixel (focus shim x0.3) + focusing

Change the magnification and set the working distance

The working distance (WD) is the distance from the lens end and the sieve surface

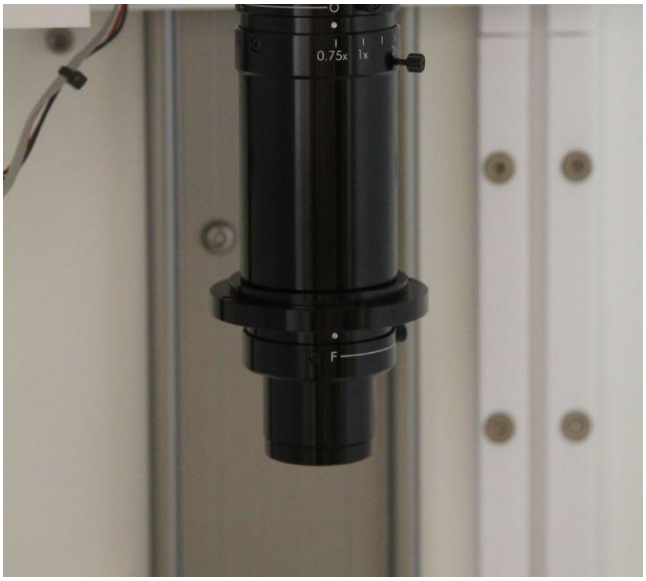


Working distance depends to the X0.3 front lens, two focus shim are supplied with the instruments, each focus shim allows to set easily the working distance corresponding to the sharp* focus for each magnification.

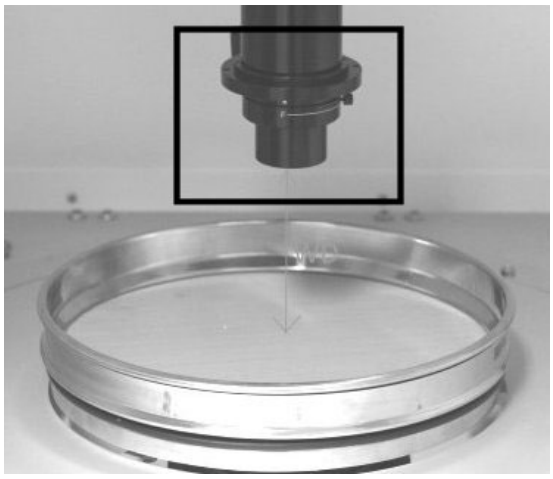
*after check the focus position by using the focus shim, use the arrow on Armadillo dash board to increase focus sharpness.

Before change the working distance add or remove the X0.3 front lens

Zoom lens with front lens:



Zoom lens without front lens:



Make sure to mount the x3 lens using the large shim:

For calibration, be sure to remove the lens when place the small shim.

Ensure that the two rear white blocks are approximately at the same height.

Bloc 1 : Aluminium support

Bloc 2 : Lens support

Use the focus arrows on the Armadillo Dashboard for a fine tuning of the WD.

The right working distance is always set by verification of the sharpness of the image by using the focusing arrows on the dashboard.

Start the analysis and print the sieve report

1. Dispose the sieve in the instrument
2. Select the corresponding magnification
3. Check or set the working distance
4. Select the SOP on armadillo menu (measurement panel)
5. Start the analysis (measurement panel)
6. Enter measurement name and press start
7. To print the report start report windows by click on the report button (menu Bar) than select the corresponding sieve opening and norm.

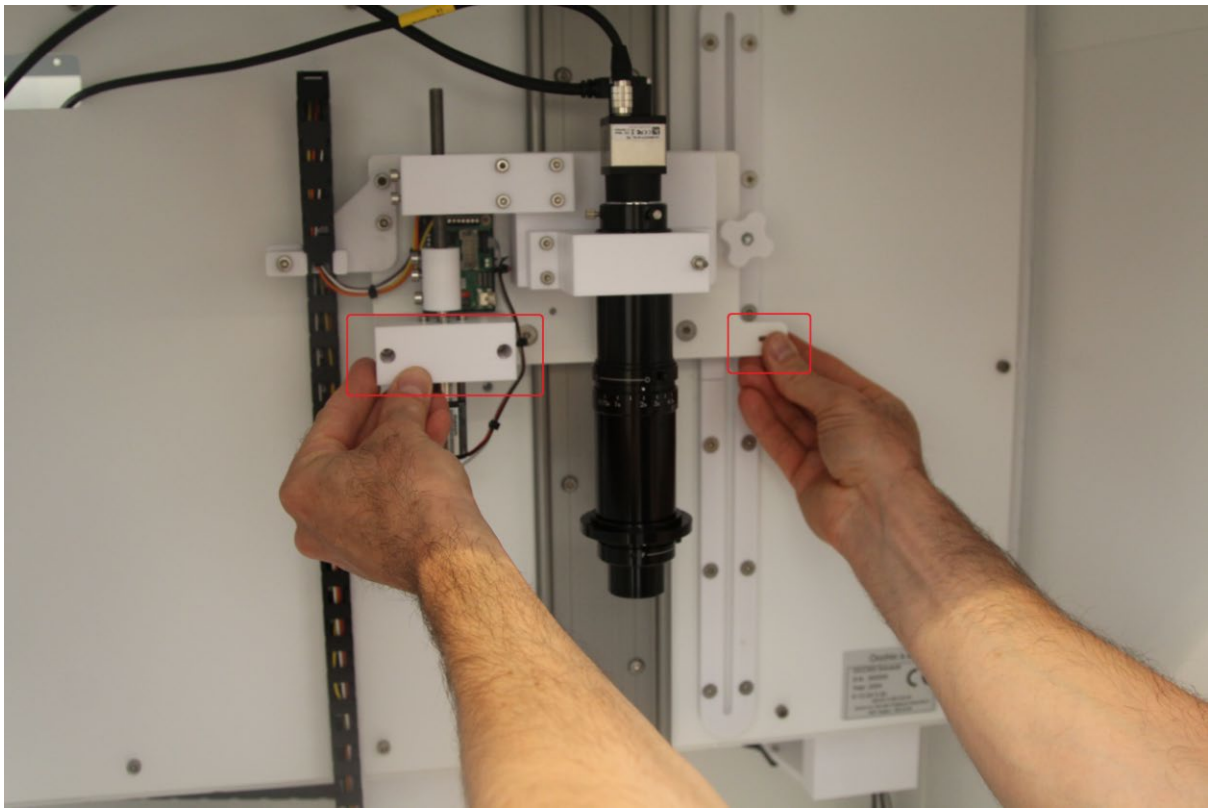
ATTENTION:

When manually adjusting the height of the objective, please follow these instructions:

1. Left hand:Push ONLY on the block at the bottom left.

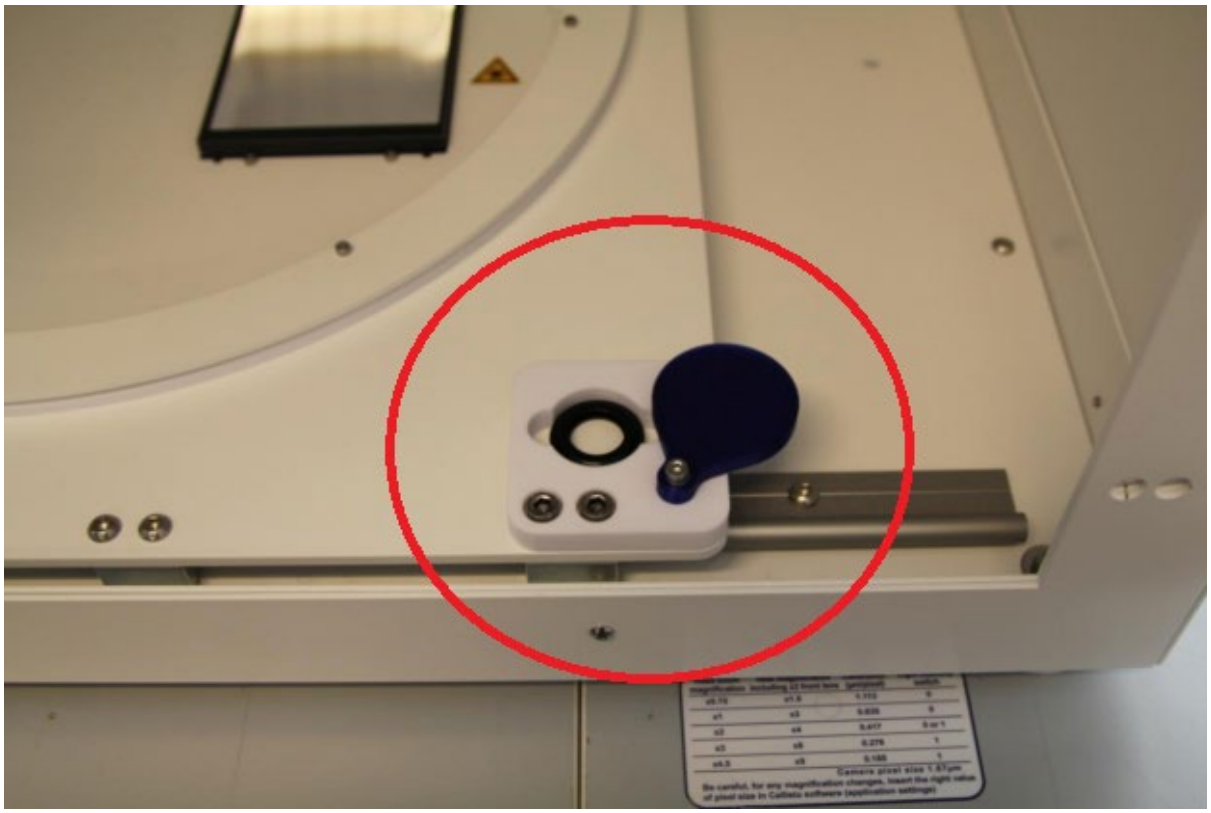
2. Right hand: Push on the fixed lever to the right.

Make sure to follow these instructions to avoid damaging the equipment.



Protection lens

If you are not using the x0.3 lens, please store it in the designated storage area on the bottom right and make sure to close the cover properly to avoid dust.



Advanced settings :

HomingAcceleration : 3000

Homing SpeedSwithc : 1000

MotorAcceleration : 3000

MotorDecelleration : 3000

MotorVelocity : 4000