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Occhio  Training Center



Sievecal

User Manual



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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 directions 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 Placement:

Instrument Footprint

Length	600 mm (23.62 inches)
Width	830 mm (32.67 inches)
Height	870mm (34.25 inches)
Weight	56 kg (123.46 pounds)

Before Instrument setup, it is important to verify that:

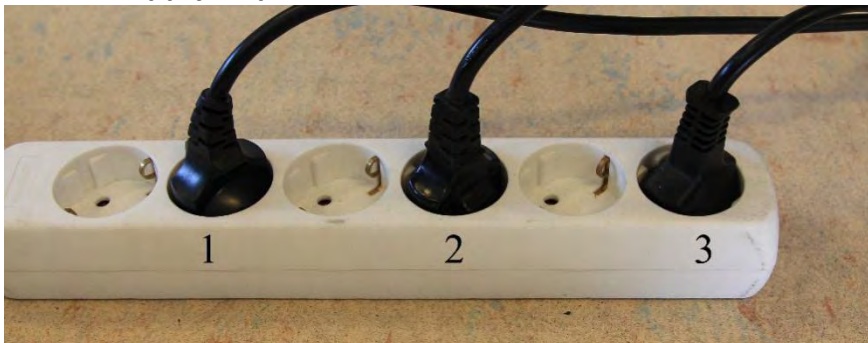
1. The instrument support (i.e. the table or countertop where the instrument will be installed) is level left to right and front to back.
2. There is adequate space for the instrument, cables, slide-out viewing area, and accompanying computer with monitor, keyboard and mouse.
3. The surface is clean 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 with many resistors or frequent power surges.

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



1. Computer
2. Monitor
3. Instrument power supply

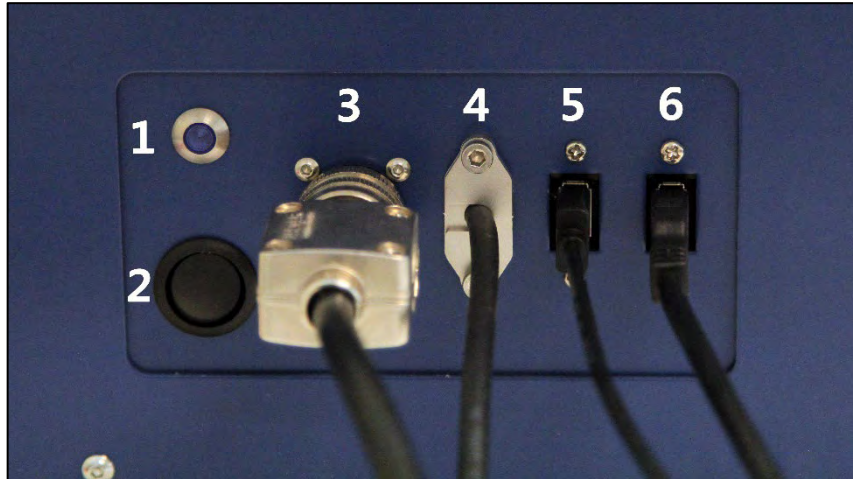
Power Converter

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

All Cable connections can be found on the left-hand side of the instrument. This includes:



1. **Blue LED:** This blue LED will be illuminated when the machine is turned on.
2. **ON/OFF Button:** This button is used to turn the machine on and off. Seen here in the off position.
3. **Power Supply IN:** This cable supplies the converted power to the instrument.
4. **Camera output cable:** Connected directly to the camera for better quality, there is no intermediate connection. The camera should be connected directly to the computer using a **USB 3.0 or 3.1** Port on the back of the Computer.
5. **Motor Communication:** Allow the computer to send and receive motor control information. **Use USB 2.0 or higher.**
6. **Interface Card:** This cable is used to send and receive signals to the various other components of the instrument. **Use USB 2.0 or higher.**

Computer

To complete the cable connections, connect the other end of the cables, seen on **page 9** of this document, 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 on **page 9 of 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. **Motor Communication**
3. **Syringe Communication**
4. **Interface Card**



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)



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 menus 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:

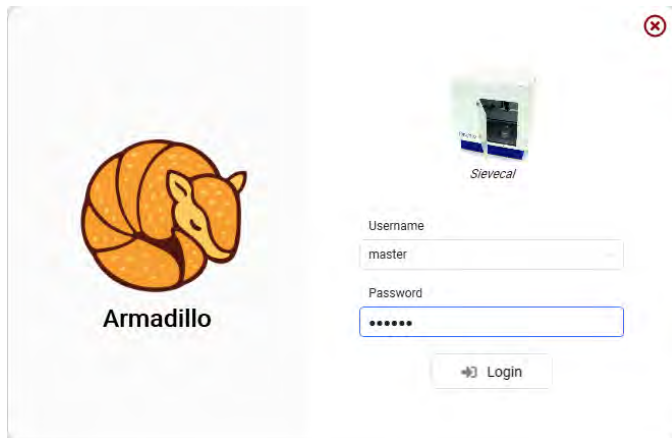


Before opening the software, verify that you have administrator privileges for the computer you are working with and that the Occhio supplied USB dongle is inserted into a USB 2.0 or above port. When finished, turn off the screen or shut down the computer completely. Do not use the Sleep or Hibernate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

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

Authentication / Login

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:

Visualize live image

Open and close analysis

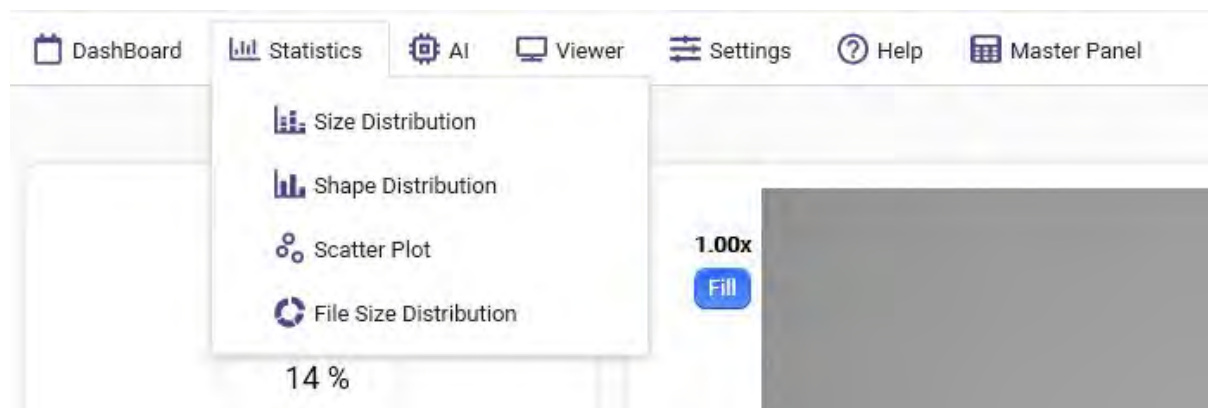
Check the status of the instrument

Display live data, computer performance, analysis progression and autofocus process

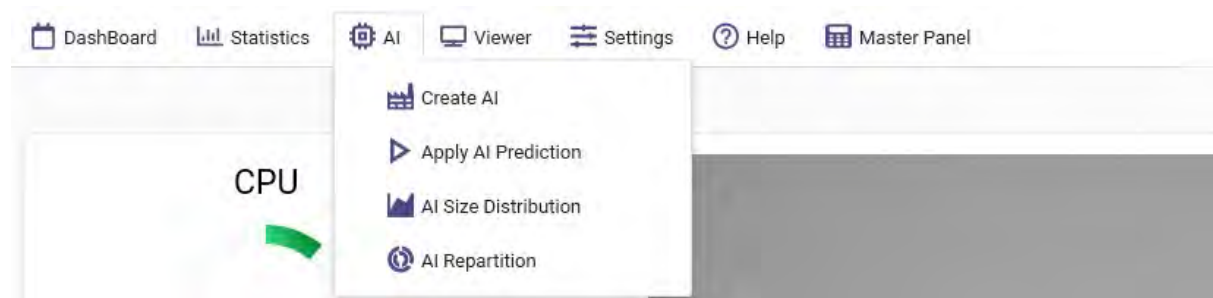
Check manually the setting of the SOP, autofocus process, motor motion and camera settings

Start Armadillo Paint software

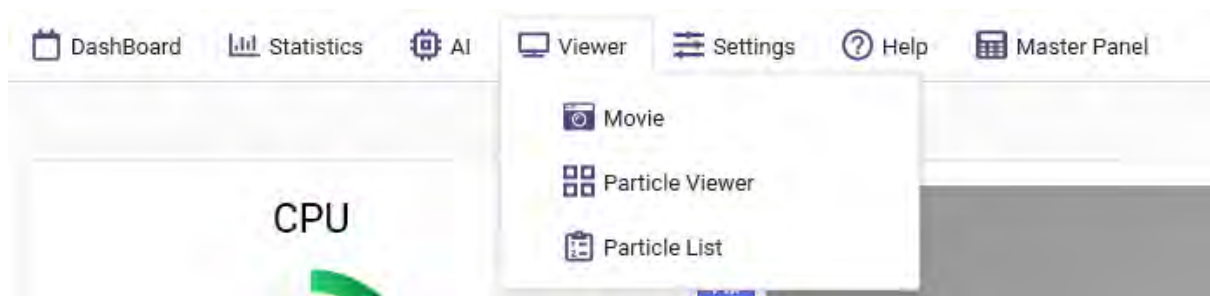
2. Statistics menu shows graph, data and statistics of the selected measurement



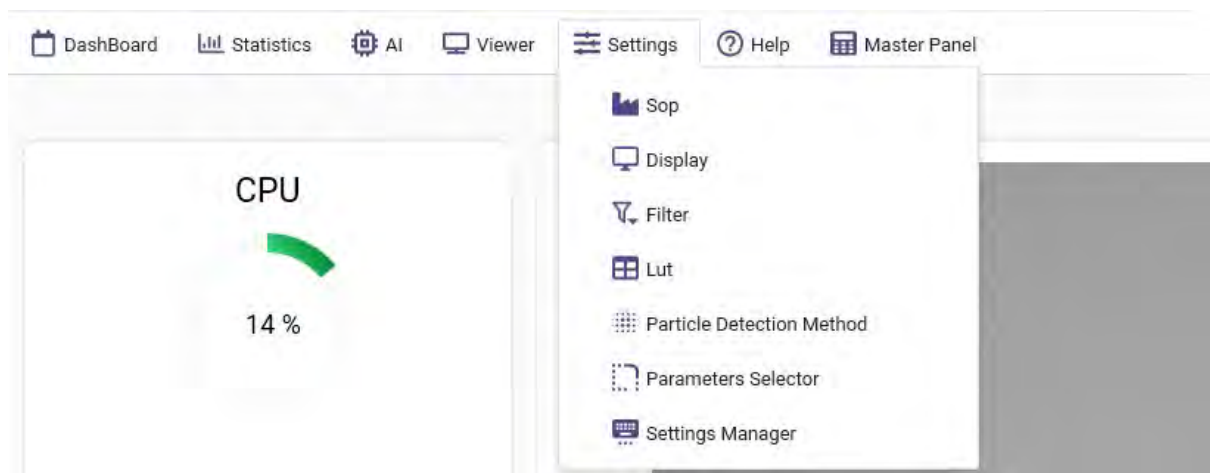
3. A.I. is the menu dedicated to the Artificial Intelligence particles classification



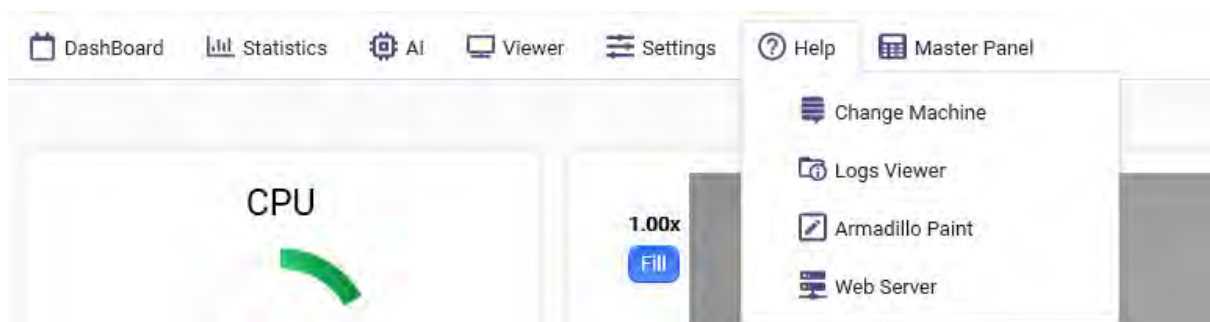
4. Viewer is the menu dedicated to particles visualization



5. Settings menu contains all the settings used to drive the instrument and compute data.



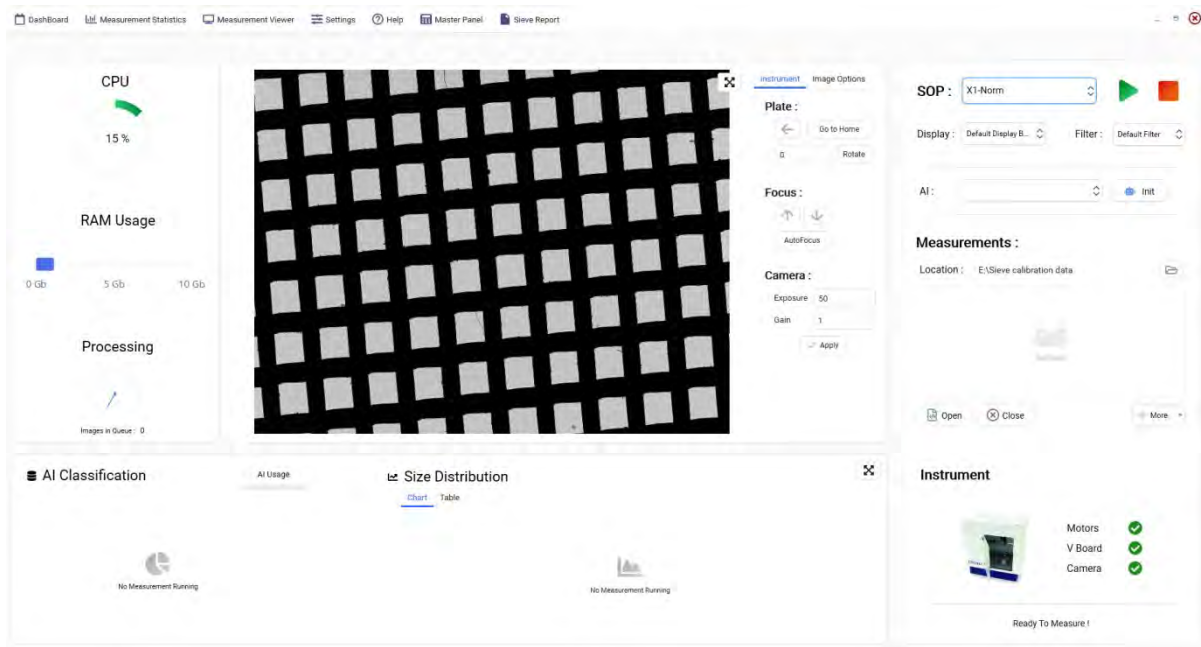
6. Help menus allows set instrument model, visualize the Logs (audit trail), start Armadillo Paint and Web Server functionalities



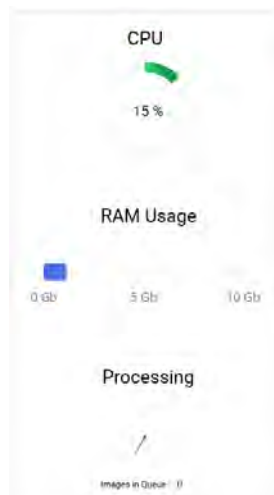
7. Master Panel, is available only if the user have master rights. This panel allows management of the users, as create and delete a user, chose a password and assign user rights.
8. Report menu allows generate and print a report

Dashboard

The Dashboard is found on the left-hand top of the screen at all times and serves to give information to the user, launch an analysis, or apply filters and displays to files, open and close one or more analysis.



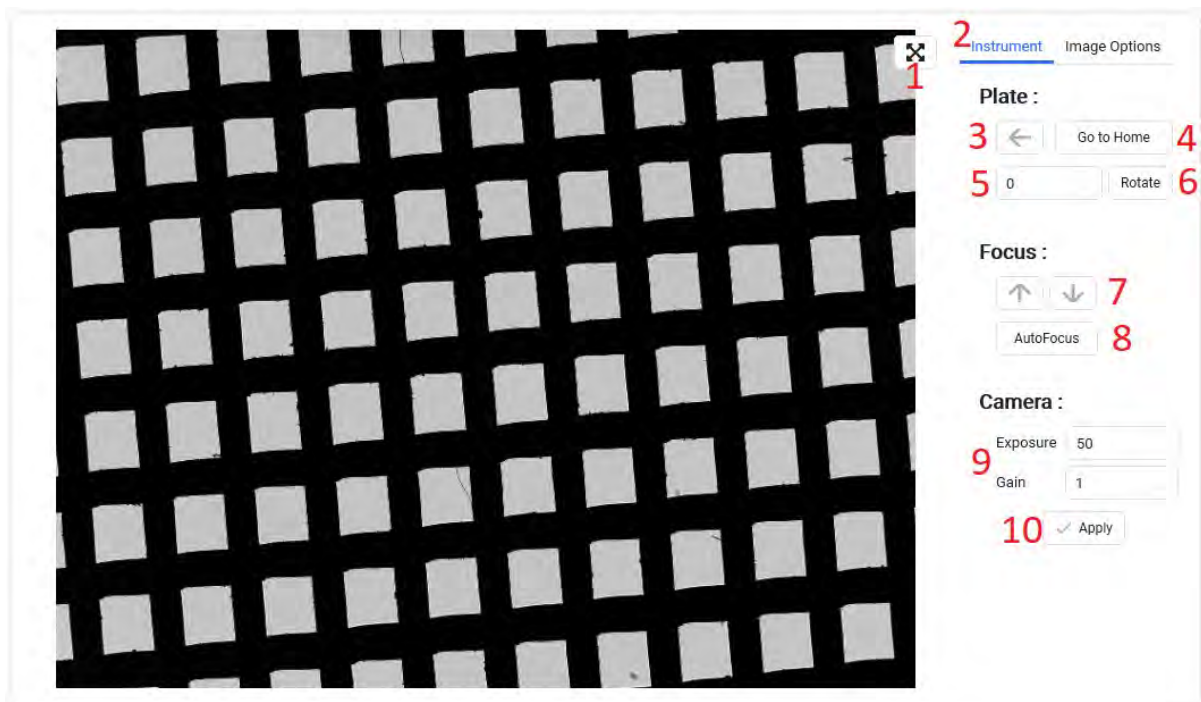
CPU RAM and Processing gauges



At the on the left-hand of the dashboard we see a set of gauges. The gauges give an indication to the user of the progress of the analysis while the analysis is being performed. When an analysis is being performed, the gauges will be highlighted blue.

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

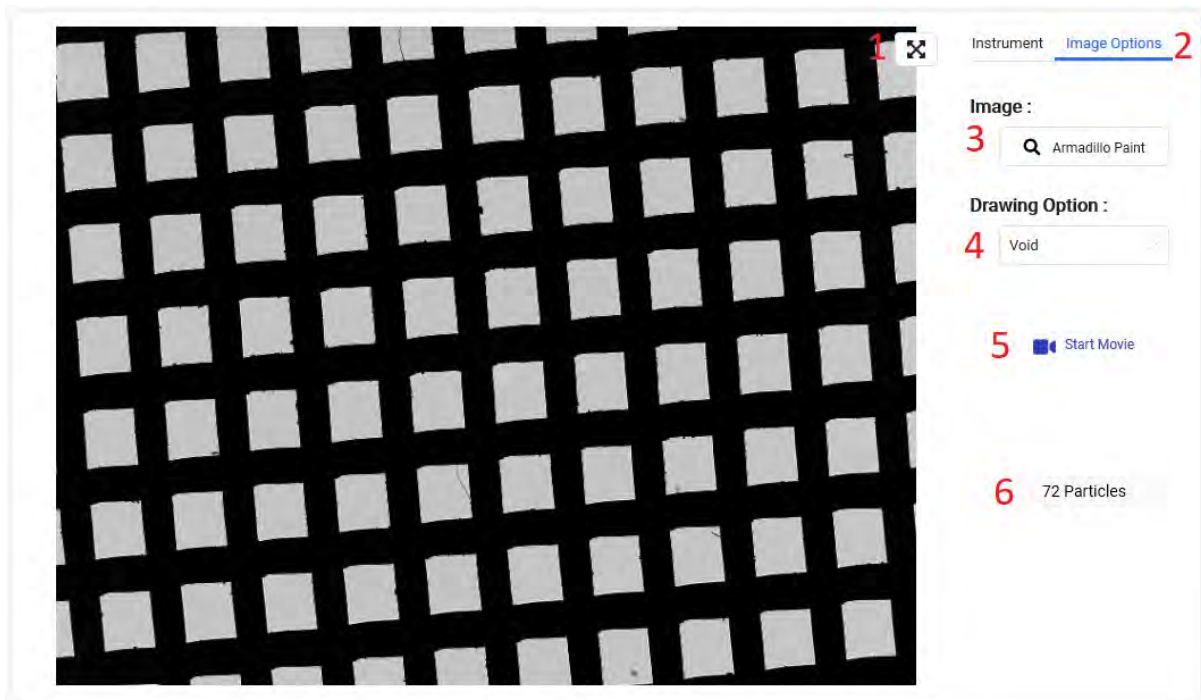
Live image, instrument control panel



The live tab allows the user to see in real time the acquired images and manually manipulate the instrument controls.

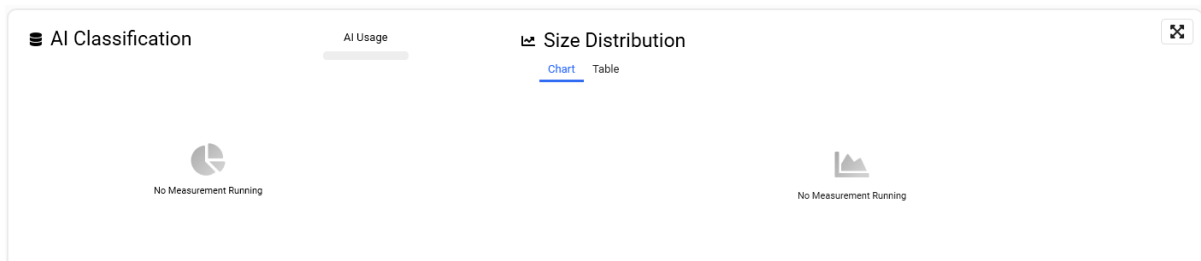
1. To expand the image on the entire tab frame
2. To entry instrument menu
3. Move the sieve plate to the left-hand
4. To move back to home position the sieve support
5. To rotate the sieve you need to specify the degree of rotation (positive degree for clockwise rotation and negative degree for anti clockwise rotation)
6. Click on button to apply the rotation.
7. Click on arrow up or arrow down to move up or move down the camera position (Z axe or focusing axe), the displacement applied corresponds to the de the number of step specified in the SOP (AutofocusNbrStep value on SOP)
8. Click on Autofocus button to run it, the autofocus button use the focus setting of the selected SOP
9. Camera settings: exposure is shutter time of the camera in μs , gain is the amplification applied to the camera signal
10. Click to apply camera settings

Live image, image options



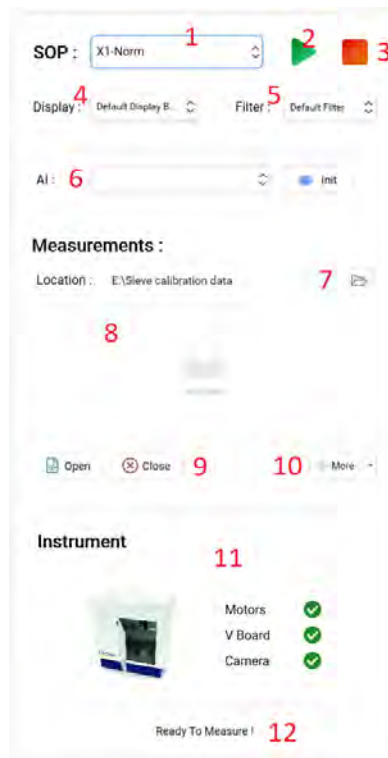
1. To expand the image on the entire tab frame
2. To entry Image Options Menu
3. To open Armadillo Paint software
4. Drawing option allow to visualize particles outline and others particles parameters according with your selected SOP settings
5. Start movie allows to record a movie from the live mode, this button is useful for on-line application
6. Is the number of particles detected in the current image

Artificial Intelligence classification and live size distribution



The the A. I. and Size tab, shows the A. I. classification and the Size distribution in real time during the measurement, size distribution is printed by using the current Display settings.

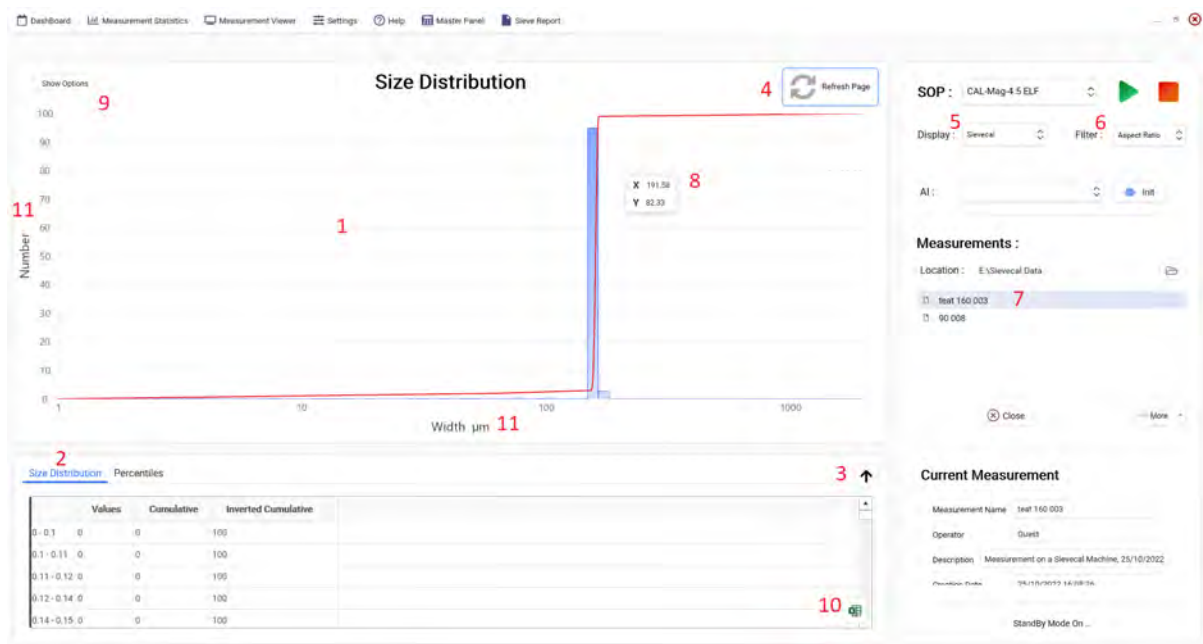
Measurement panel



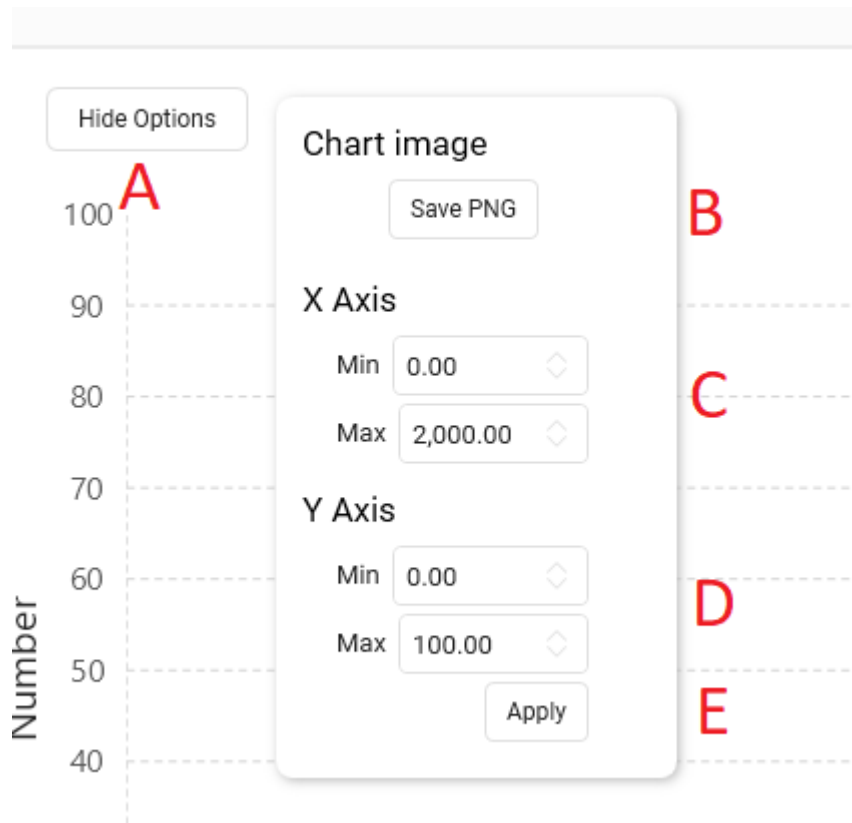
1. SOP drop down menu, to select the Standard Operating Procedure before start the analysis
2. Play button, to start the analysis
3. Stop button, to stop the analysis
4. Display drop down menu, to select the display settings
5. Filter drop down menu, to select or unselect a filter
6. Artificial Intelligence drop down menu, to select and initialize AI
7. Click on this button if you want to select or change the location where the analysis files are stored
8. Opened analyzes windows, to display the analyzes that are currently open
9. Open and Close analyzes buttons
10. Additional computations options button, some special users data computing are integrated in this part of the software
11. Instrument connection diagnostic, this tab shows the communication between the instrument components and Armadillo software

12. Status of the instrument, allows the user to visualize current status of the instrument

Measurement Statistics, Size Distribution



1. Size distribution graph
2. Size distribution values and percentiles, according with the display size classes
3. Click on this button to expand the data table
4. 'Refresh Page' button allows to compute size distribution of the selected file according with current display (5) and current filter (6)
5. Selected display allows to chose the size distribution parameters as size classes, axes settings, size parameter and percentiles
6. If a filter is selected only the particles included by the filter will be used to compute size distribution, if you don't want apply a filter select the option No filter in the drop down list
7. This list shows the opened analysis, to open an analysis use the button 'Open' this button appears only in the Dashboard menu
8. Indicate the coordinates of the pointer on the size graph
9. 'Shows Options' button allows see and apply zoom settings



A : Hide the option box

B : Save Png image of the current size distribution

C : X Axis zoom

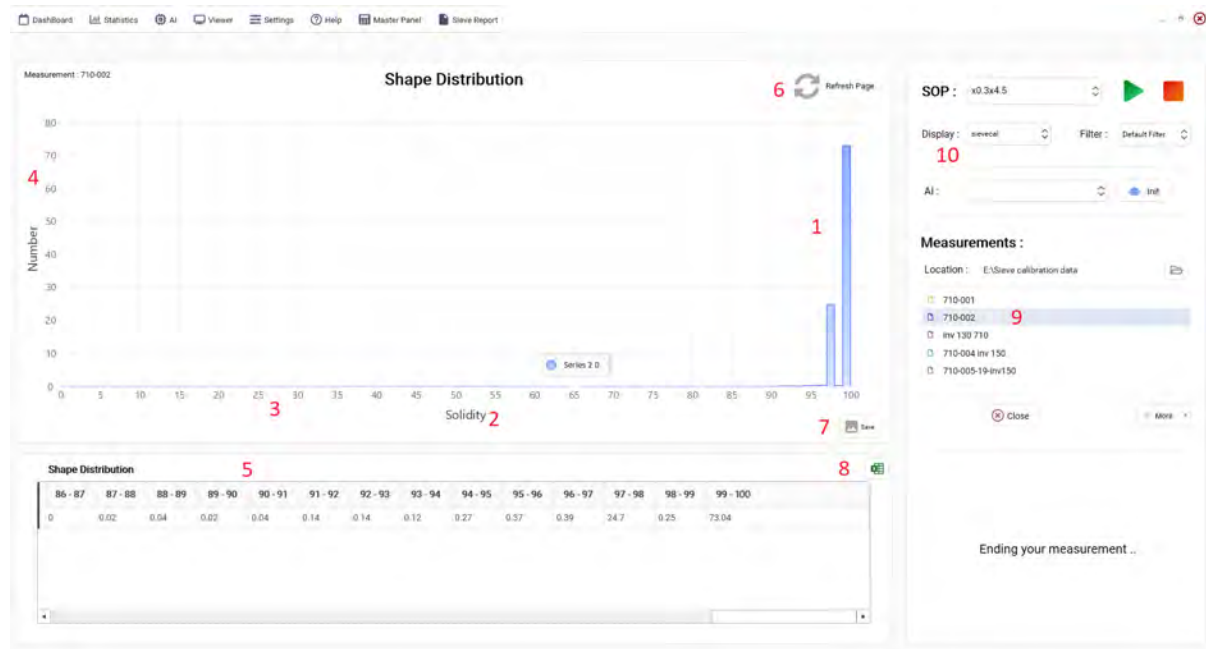
D : Y Axis zoom

E : Apply zoom values to the graph

10. Export the table to '.xlsx' file format

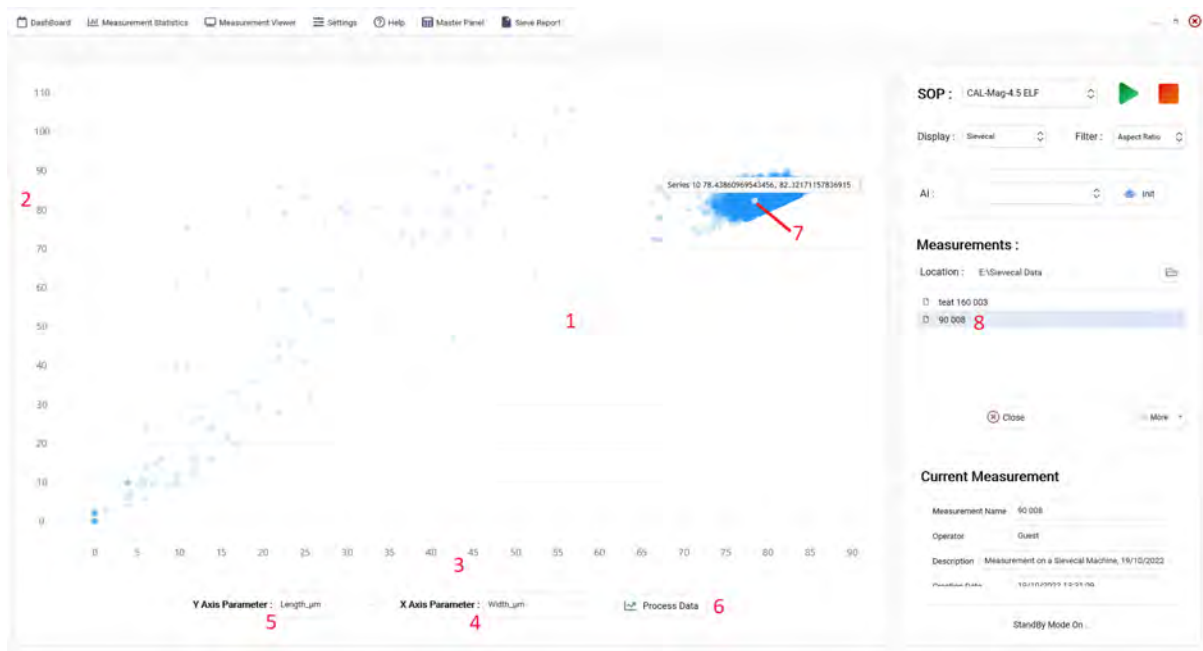
11. Are the X and Y Axes values based on the selected display settings

Measurement Statistics, Shape Distribution

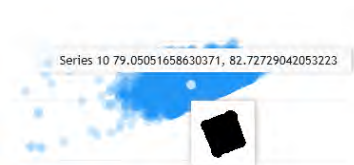


1. Shape distribution plot
2. Shape parameter, this parameter is defined on the selected display (10)
3. X axis scale from 0% to 100% (shape parameters are always defined in % scale)
4. Y axis scale 0% to 100% (number or volume weighted according with display setting)
5. Shape distribution table
6. Refresh button, select an analysis file (10) than press on Refresh Page to display shape distribution, repeat this point to compute others analyzes
7. Save '.png' figure
8. Export '.xlsx' table
9. Current displayed analysis
10. Current display

Measurement Statistics, Scatter plot



1. Scatter plot graph, each dot represent a particle or more particles that have the same values (X Axis parameter, Y Axis parameter)
2. Y axis with autoscale
3. X axis with autoscale
4. X axis parameters drop down menu
5. Y axis parameters drop down menu
6. Process data, allows computing selected analysis data (8) according with parameters (4 and 5)
7. Mouse pointer on scatter plot, visualization of single dot coordinates, click with right button to view the particle



8. Current displayed analysis

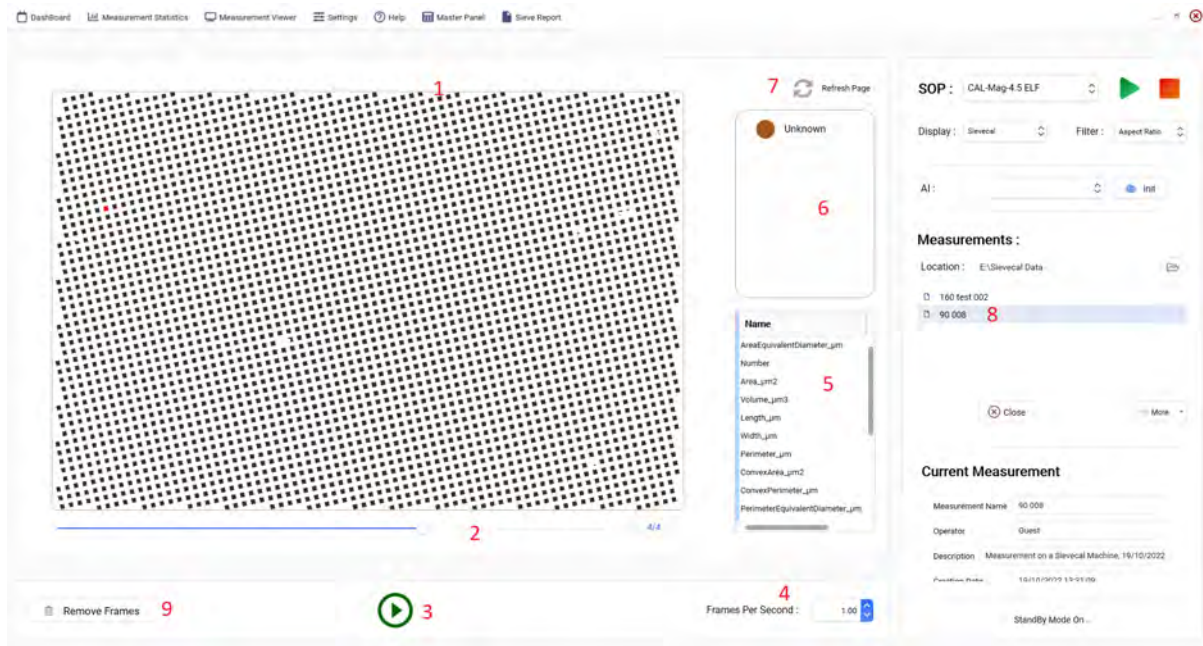
Measurement Statistics, File Size Distribution



1. File size distribution graph allows compare different samples size distributions
2. Sample 1 size distribution
3. Sample 2 size distribution
4. Sample 1
5. Sample 2
6. Size distribution data table
7. Save graph in '.png' format
8. Export data table in '.xlsx' format
9. Legend button
10. Refresh data button to compute data and graph corresponding to the selected analysis

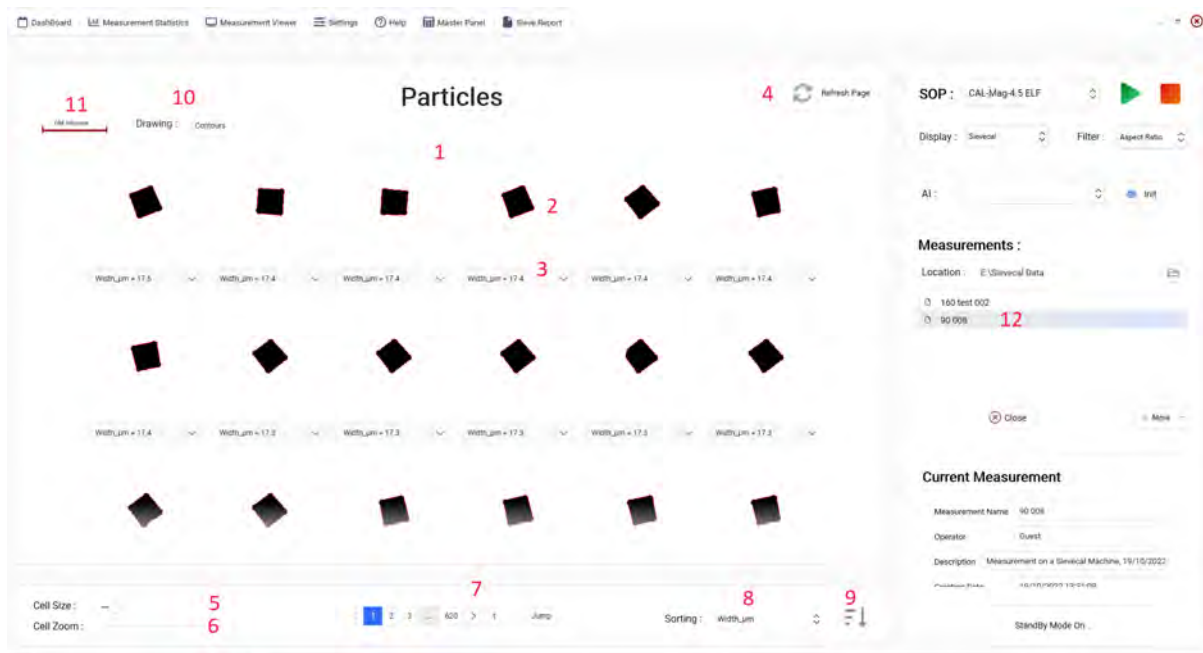
Viewer, Movie

Movie function allows to simulate a frame sequence of all images captured during the analysis.



1. Current frame of the movie
2. Progression bar and frame number
3. Play the movie, pause the movie
4. Frame rate, default value set at 1 frame per second
5. The list of the parameters that could be displayed on each single particles of the movie
6. A.I. prediction dialog box
7. Refresh button, press this button, after selecting the analysis (8), to generate the movie
8. Current analysis
9. Remove frames button allow to create a new analysis without selected frames

Viewer, Particles Viewer



1. Particles viewer windows
2. Single particles
3. Drop down list of the parameters computed for each particles
4. Refresh page button allows display the particles of the selected analysis (12)
5. Cell size allows to reduce or increase the size of each single particles, if the cell size increase the number of the cells per page decrease
6. Cell Zoom is the zoom applied for each particle in the cell
7. Page counter
8. Sorting allows you to arrange the particles based on the selected parameter
9. Arrange particles from the biggest one to the smallest one or viceversa
10. Drawing option allows to draw the selected particle parameter
11. Image scale
12. Current measurement

Settings, SOP

Sop Manager

Show All Sops

Sop Informations

Miscellaneous

AutoFocusInterval	1
AutoFocusNbrStep	40
AutoFocusStep	10
Calibration	1.98
CheckHoles	<input type="checkbox"/>
Exposure	120
FastMeasurement	<input checked="" type="checkbox"/>
FileName	Calibration-X1
Gain	1

Particles Detection Method :

INV 170

Instrument



Sop Look-up Table

No Lut

Measured Values :

Expected Values :

Save Changes

+ Create Sop

Sop Manager

Show All Sops

Sop Informations

FastMeasurement	<input checked="" type="checkbox"/>
FileName	Calibration-X1
Gain	1
IdMachine	Sievecal
RecoveringPercentage	70
SaveImage	AllImages
SaveParticleColor	<input type="checkbox"/>
UseAutofocus	<input checked="" type="checkbox"/>
UseCurrentFilter	<input type="checkbox"/>

Particles Detection Method :

INV 170

Instrument



Sop Look-up Table

No Lut

Measured Values :

Expected Values :

Save Changes

+ Create Sop

This display varies depending on the instrument used. The following images and explanations of the SOP window are valid only for the *Occhio Sievecal*.

SOP information contains the settings of the instrument in use during the analysis process.

- ✓ Autofocus interval: is the frequency of autofocus procedure (1 : the autofocus is applied on all the images, 4: autofocus is applied 1 time every 4 images)
- ✓ Autofocus Nbr Step: is the number of steps of the autofocus procedure, its define the distance in Z axis to get the sieve focus (Z displacement = NbrSteps x Step-Size)
- ✓ Autofocus Step: is the size of a single step used during focusing procedure.
- ✓ Calibration [$\mu\text{m}/\text{pixel}$]: is the optical resolution of the lens, is expressed in $\mu\text{m}/\text{pixel}$, this value allows conversion from number of pixels to dimension in μm . **The modification or replacement of the calibration settings will affect the accuracy of the instrument**
- ✓ Check Holes: at the end of the analysis the detected sieve holes are displayed
- ✓ Exposure [μs]: the amount of light per unit area (the image plane illuminance times the **exposure** time) reaching a photographic film or electronic image sensor, as determined by shutter speed, lens aperture and scene luminance
- ✓ Fast Measurement: is an option that allows scan each diameter of the sieve in random mode. For each diameter, from border to center of the sieve, the instrument will analyze one image / diameter by turning the sieve randomly, the number of diameter of a sieve depends of lens resolution and sieve diameter
- ✓ File name: is the name of the current SOP
- ✓ Gain: is the gain of camera signal, is use to increase image brightness
- ✓ Id MACHine: Sievecal, is the name of the current instrument
- ✓ Recovery Percentage:
- ✓ Id Machine: is the model of the instrument in use
- ✓ MillsUpFunnel [ms]: is the duration of the elevation of the funnel at the starting of the analysis
- ✓ Number of images before stopping: this is the maximum number of images allowed during the analysis, if this number is reached, the analysis stops.
- ✓ Priming Duration: Priming determines the vibrational intensity and duration desired to introduce the sample into the viewing area before the analysis begins

- ✓ Save Image: allows you to save single particle images, the entire analysis images, the images that contains particles or save nothing.
- ✓ Save Particle Color: this option allows you to save the color or the gray scale level (according with the camera sensor type) of each particle
- ✓ Show Background Dynamique: the background image is displayed during measurement
- ✓ Use Current Filter: is the filter applied during the measurement

Particles Detection Method

PDM is a file generated by a dedicated interface (PDM creator or Armadillo Paint) and loaded in the method. During the measurement the PDM is applied to the acquired images and allows recognize and compute particles outline.

A simple PDM uses only a threshold value, for example if we set a threshold value of 100, we can say that the pixel whose gray scale value is less than 100 belongs to the particle and will be used to calculate the contour.

Complex PDMs could combine the use of thresholds and image transformations and are mainly used when the contrast between the particles and the image background is minimal.

Instrument

The image of the instrument in use

SOP Look-up table

Size Discrepancies: to compensate for the naturally occurring phenomenon, the standard size is entered under the second line (Expected Values) and the size, measured by the instrument without compensation, is entered under the first line (Measured values). Add these numbers to the calibration table by using the dedicated Armadillo menu (Menu Bar: Settings, LUT). Once the Calibration table is filled in, Armadillo's specialized algorithm will correct for error in all future analyses. **Every Calibration is documented and stored on record for quality assurance.**

To modify or save the SOP use the unlock button and save button.

Settings, display

Display Informations

Chart Options

InvertedCumulative

InvertResultTable

IsPercents

LogarithmicScale

Chart Parameters

ShapeBins 101

Informations

Size Parameter : AreaEquivalentDiameter_μm

Weight Parameter : Volume_μm³

Shape Parameter : Solidity

Display Informations

LogarithmicScale

Chart Parameters

ShapeBins 101

Informations

FileName Calibration

ParticlePerML

CellThicknessμm 5

ParticlesPerML

Size Parameter : AreaEquivalentDiameter_μm

Weight Parameter : Volume_μm³

Shape Parameter : Solidity

Size Bins (μm)

150 300 600

0.00 + Add

Bins Generation

Minimum Size : 0.00 μm Maximum Size : 0.00 μm

Bins Number : 0 Logarithmic :

Percentiles

10 25 50 75 90

0 + Add

Size Bins (μm)

150 300 600

0.00 + Add

Bins Generation

Minimum Size : 0.00 μm Maximum Size : 0.00 μm

Bins Number : 0 Logarithmic :

Percentiles

10 25 50 75 90

0 + Add

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.

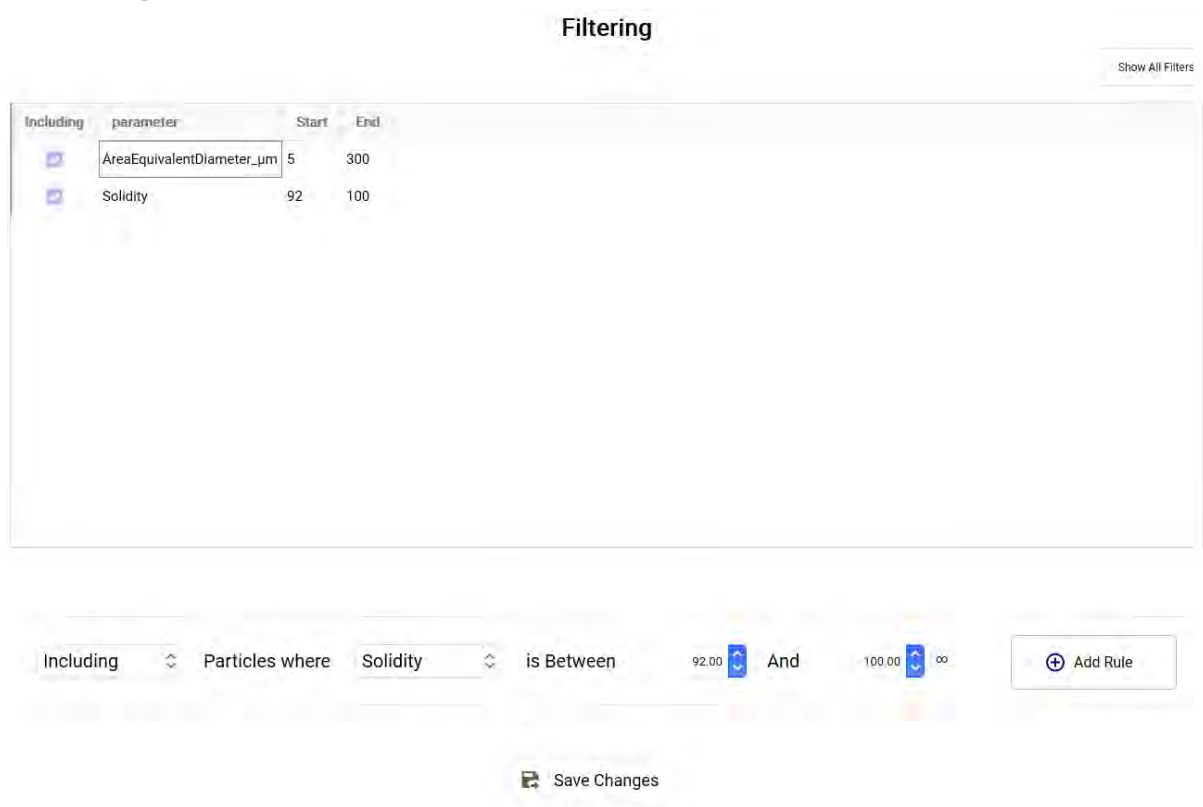
Percentiles

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 $1\mu\text{m}$ to $5\mu\text{m}$)
- ✓ 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, filter



The filtering tab lets the user edit the data in a non-destructive way after the analysis has finished.

To define a filter select the following rules:

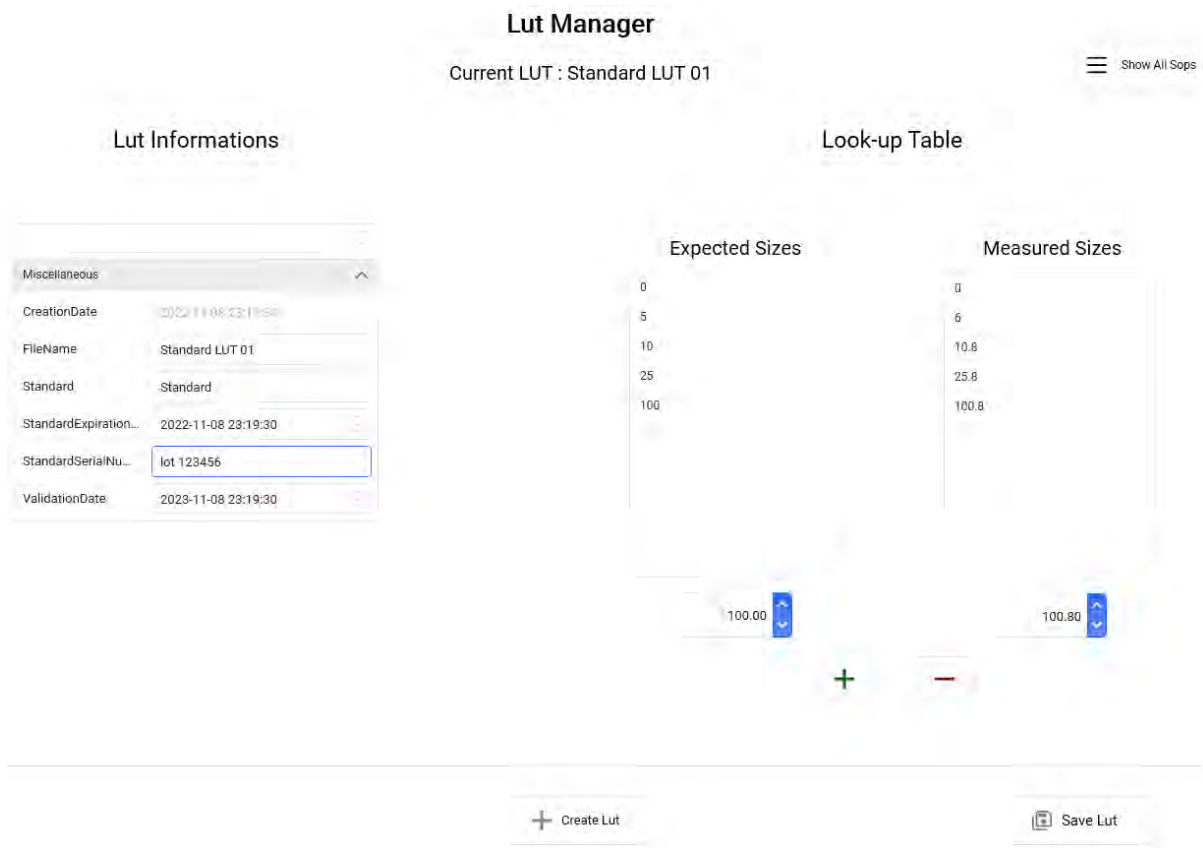
- ✓ Include or exclude selected particles
- ✓ Define the parameter associated to the filter, could be size or shape parameter
- ✓ Define the domain of the filter (from 10μm to 300μm for a size parameter or from 5% to 25% for a shape parameter)
- ✓ Add the rule

After adding a list of rules (you can remove a rule just by clicking on it) save the filter.

When the filter is created select the filter on measurement panel (see Measurement Panel point 5).

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

Settings, LUT



The lookup table complete the calibration process of the instrument. The first calibration is determinate by the optical configuration. The optical calibration doesn't change if you don't change the lens, but it could be checked periodically.

The second calibration is obtained by using a lookup table (LUT) the target is to match a measurement result with a standard reference sample.

The LUT contains the points necessities to match instrument results with standard sample values.

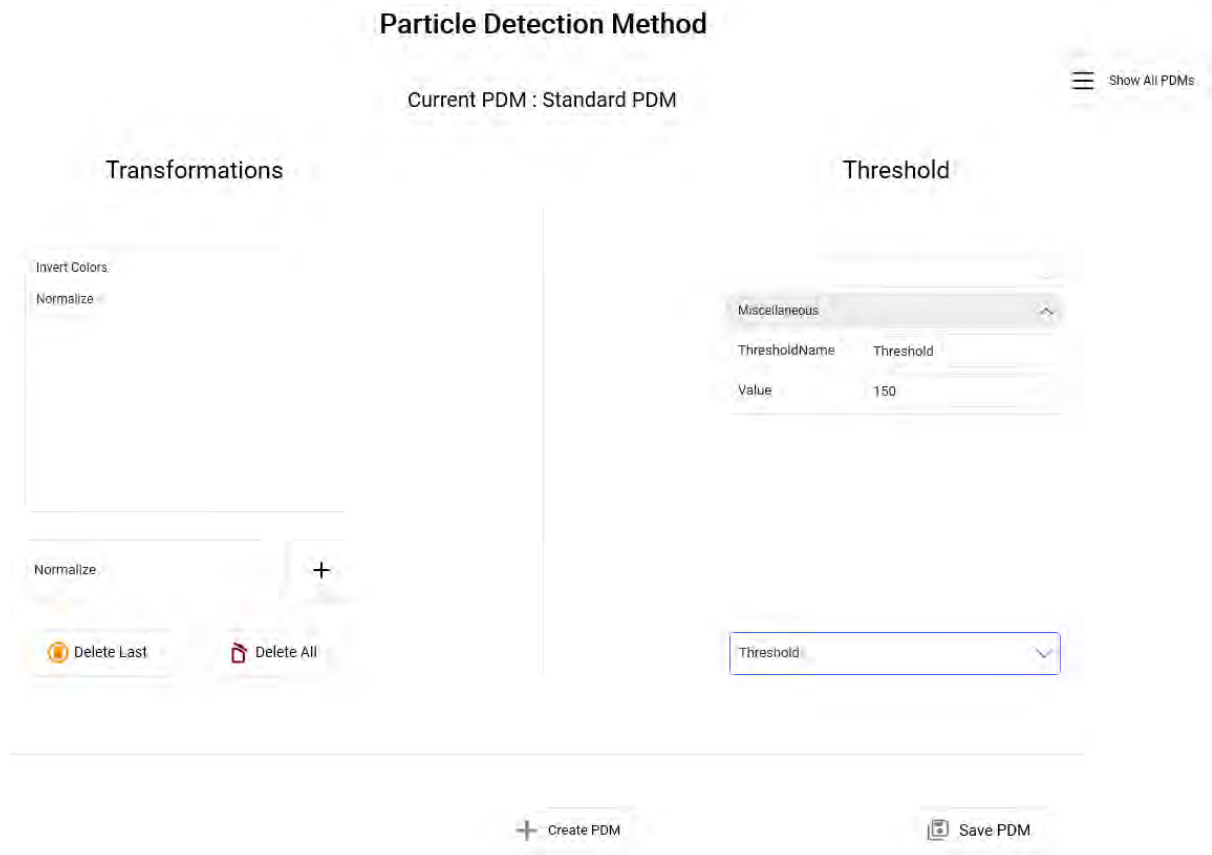
LUT information: It is crucial to ensure that every box is filled in correctly to the best of the operator's knowledge. This ensures the validity of the calibration and allows the standard¹ to be traced for record keeping or in the event of a standard recall.

Size Discrepancies: To compensate for the naturally occurring phenomenon, the standard size is entered under the left column and the size, measured by the instrument without calibration, is entered under the right column. Add these numbers to the calibration table by clicking the "plus" button. To remove a calibration, select the size which will be removed and click the "minus" button. Once the calibration table is

¹ standard: Media used as a measure, norm, or model in comparative evaluations.

filled in, Armadillo's specialized algorithm will correct for error in all future analysis. **Every Calibration is documented and stored on record for quality assurance.**

Settings, PDM



PDM tab is the dedicated interface to create a Particles Detection Method. During the measurement the PDM is applied to the acquired images and allows recognize and compute particles outline.

A simple PDM uses only a threshold value, for example if we set a threshold value of 100, we can say that the pixel whose gray scale value is less than 100 belongs to the particle and will be used to calculate the contour.

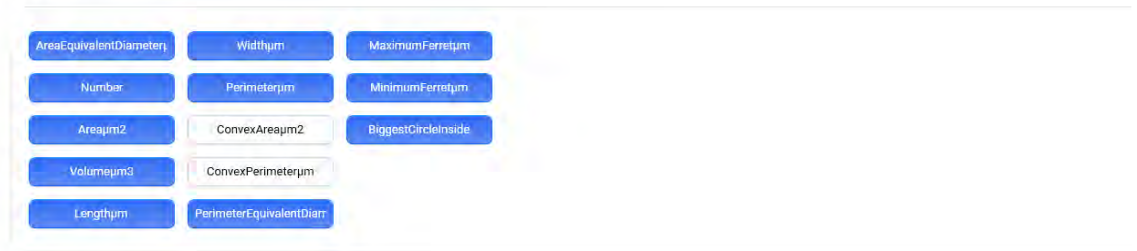
Complex PDMs could combine the use of thresholds and image transformations and are mainly used when the contrast between the particles and the image background is minimal.

Transformation menu allows to choose one or more transformation. The transformation added will be applied at each acquired image sequentially according to the list order, from top to bottom.

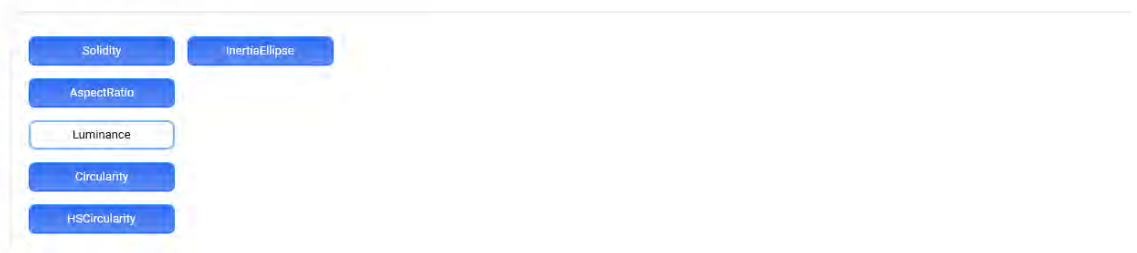
Threshold menu allows to choose a threshold value from 0 to 255 (typical values are in the range 100 - 180) threshold is applied after transformation


Settings, parameters

Size Parameters



Shape Parameters



 Save Changes

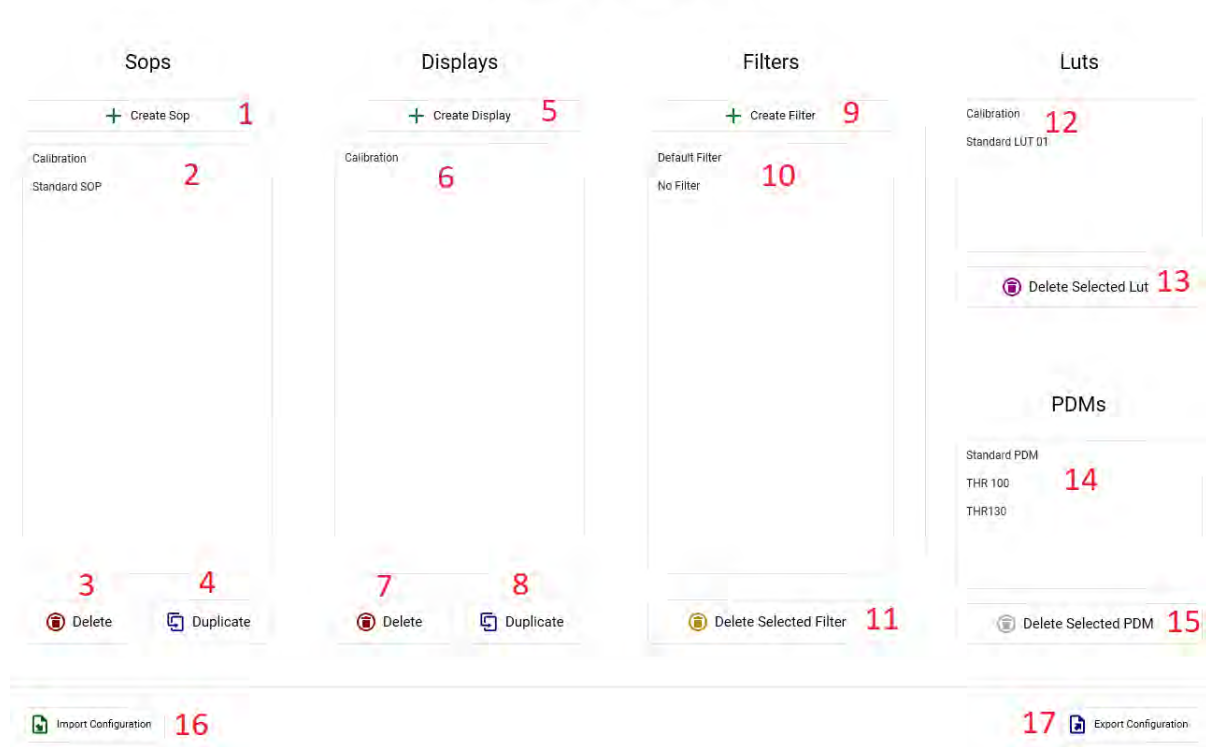
Parameters menu allows to define user preferences, only the selected parameter will appear in the software selection lists.

Click to select or unselect the parameter than click to save change to store the selection.

This selection could be modified at any time without any impacts on the analysis databases (only SOP have an incidence on the measurement results)

Settings, Settings Manager

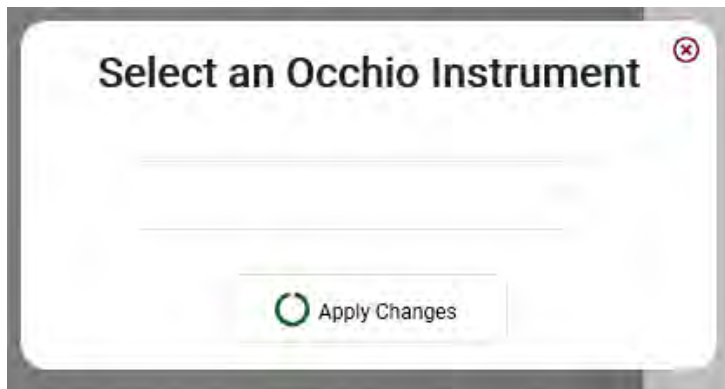
Settings Manager



1. Press the button to create a new SOP, enter SOP name in the dialog box and save.
2. List of the existing SOP
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 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 filter name in the dialog box and save.
10. List of the existing filters

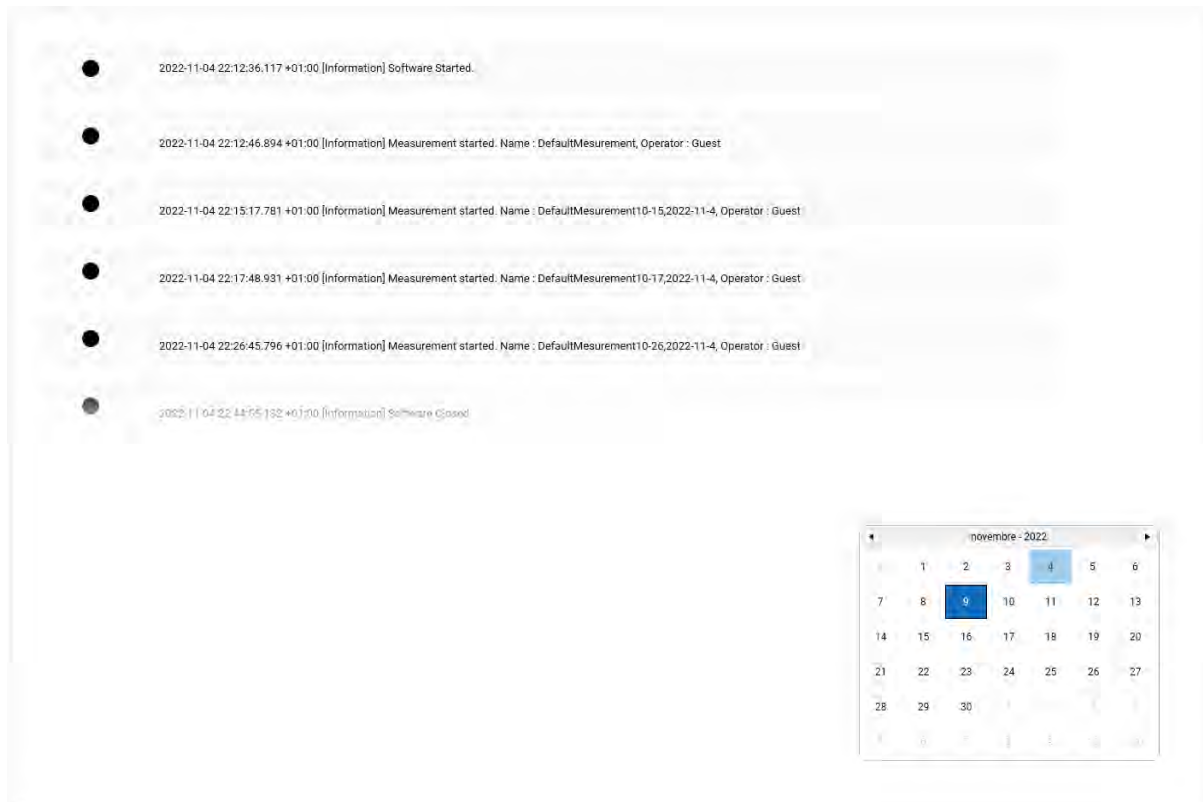
11. Delete the selected filter from the list
12. List of the existing LUTs
13. Delete the selected LUT from the list
14. List of the existing PDMs
15. Delete the selected PDM from the list
16. Import configuration allows to import complete instrument settings from another instrument (the instrument has to be the same, same model with the same optical configuration)
17. Export instrument configuration allows to export the entire instrument settings

Help, Change Machine



Select the instrument model from the list than apply change. This functionality allows Armadillo to switch to another Occhio instrument.

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 will be consulted if necessary, for example to try to identify the origin and the author of an instruction or modification.

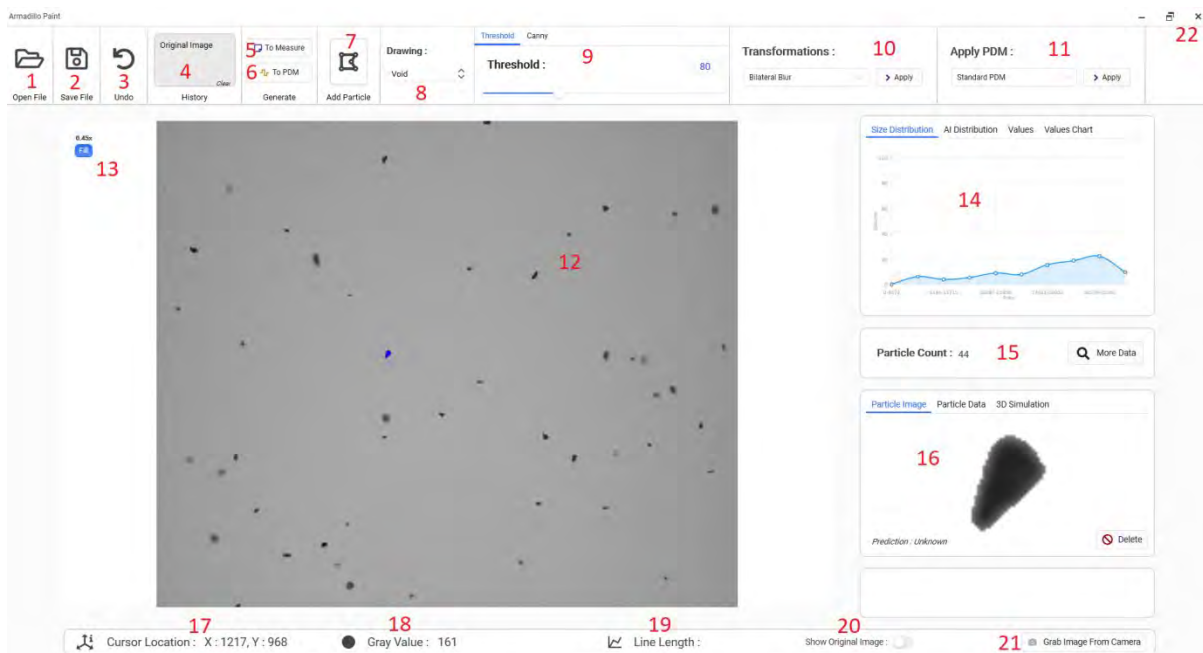
To visualize the log history, select the date in the calendar, corresponding log will appears on the main window. A copy of the log file is also available on the HDD.

Help, Armadillo Paint

Armadillo Paint is a dedicated software to evaluate image processing by tuning the SOP parameters on a single frame, typically an image acquired by the instrument, but also an external image acquired by another device such a microscope or an optical bench.

The results obtained by the manipulation on the image are directly computed and displayed and shows, in live, the reliability of the method.

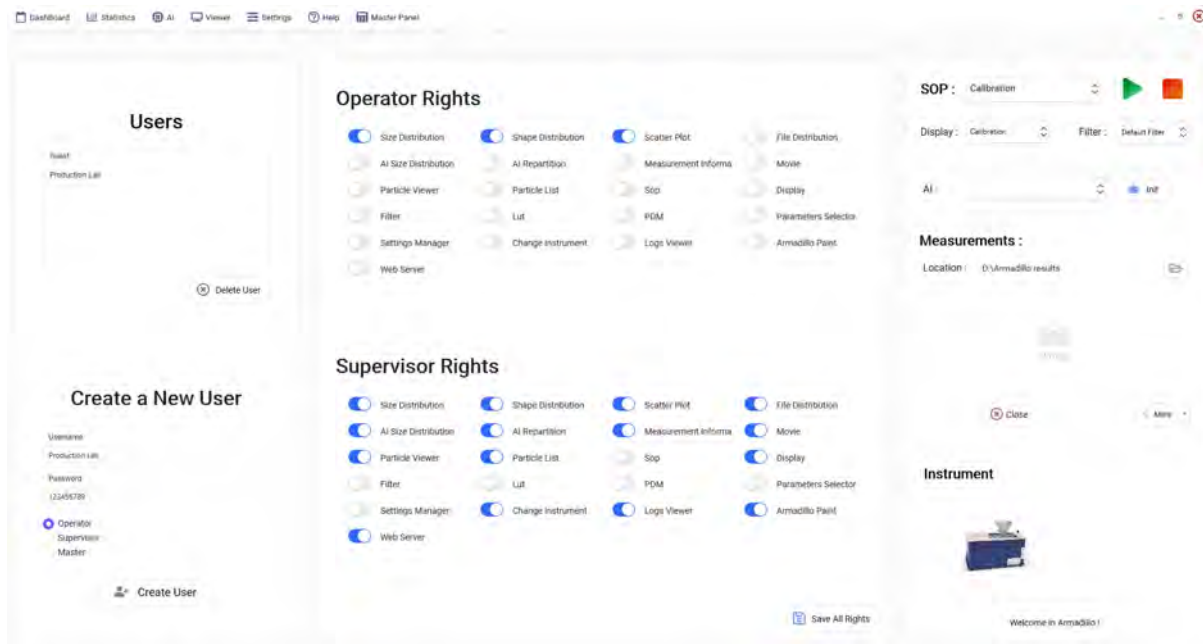
Armadillo Paint is a tool dedicated to create and validate analysis methods.



1. To open an image file
2. To save the current image file
3. To remove the last transformation
4. History of the applied transformation
5. Create a measurement file based on the data computed on the current image, the file will be directly available on the Armadillo menu
6. Create a new PDM based on current transformations and threshold
7. To create an artificial particle
8. Overlay the selected parameters outline on the particles contained in the current image

9. To choose threshold type and threshold values, the values are directly applied on the image
10. To choose and apply a transformation from the drop-down list, more transformation could be applied sequentially
11. To apply an existing PDM
12. Current image
13. Zoom option
14. Distribution real time graph and data
15. Real time particles counter
16. Selected particle display and data
17. To show the coordinates of the pointer on the image
18. Gray scale value (0 to 255) corresponding to the pointer position on the image
19. To compute a line length
20. To show the original image, how the image and particles appears after processing. This functionality is useful to verify the method after thresholding and transformations
21. To acquire an image from the camera. Note that the existing image will be replaced, save the current image before press the button if you want to keep it.

Master Panel



Master Panel allows to define three levels of users right:

1. Master users that have full instrument control
2. Supervisor users that have limited access to the instrument functionalities according with Supervisor Right panel entry
3. Operator users that have limited access to the instrument functionalities according with Operator Right panel entry

Only a Master level user could create, delete, give a password and assigns user right to an operator or supervisor levels user.

To create a new user, enter the user name, create the password, assign the right level and press the button 'Create User'. The new user will appear on the upper users list.

To delete a user, select the user on the list and press Remove User button.

Any modifications or any standard operations with the instrument by the current user will be recorded on the instrument Log file.

Emergency stop button



During the measurement close the front door.

In any case of any problem during the measurement press the emergency stop button and then close the software.

For any mechanical damages please contact Occhio support or our authorized distributor.

In case of emergency stop to restart the instrument unblock (by turning) the emergency button and then start Armadillo software.

Instrument settings

With x0.3 front lens

SOP name	Suggested sieve size range	SOP purpose
x0.3x0.75	1400µm to 12500µm	Sieve calibration
x0.3X1	-	Sieve calibration
x0.3x2	710 to 1400µm	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	400µm to 710µm	Sieve calibration
x2	160µm to 400µm	Sieve calibration
x3	-	Sieve calibration
x4.5	38µm to 160µm	Sieve calibration

SOP: x0.3x0.75

- ✓ Sieve size range: from 1400µm to 12500µm
- ✓ 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	12.06 (µm/pixel)
Check Holes	Unselected
Exposure	1500
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	8.818 (µm/pixel)
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	4.389 (µm/pixel)
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	2.939 (µm/pixel)
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	1.95 (µm/pixel)
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	3.228 ($\mu\text{m}/\text{pixel}$)
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 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: x1

- ✓ 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	10 (µm)
Calibration	2.412 (µm/pixel)
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 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: x2

- ✓ Sieve size range: from 160µm to 400 µm
- ✓ SOP purpose: sieve calibration according with ISO and ASTM norms
- ✓ use the NOx0.3 focus spacer to set lens working distance (before check the dis-tance do not forget **remove the x0.3** front lens)

SOP Informations

Autofocus Interval	1
Autofocus Nbr Step	40
Autofocus Step	5 (µm)
Calibration	1.184 (µm/pixel)
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 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: 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	0.796 ($\mu\text{m}/\text{pixel}$)
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 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: x4.5

- ✓ Sieve size range: from 38µm to 160µm
- ✓ 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

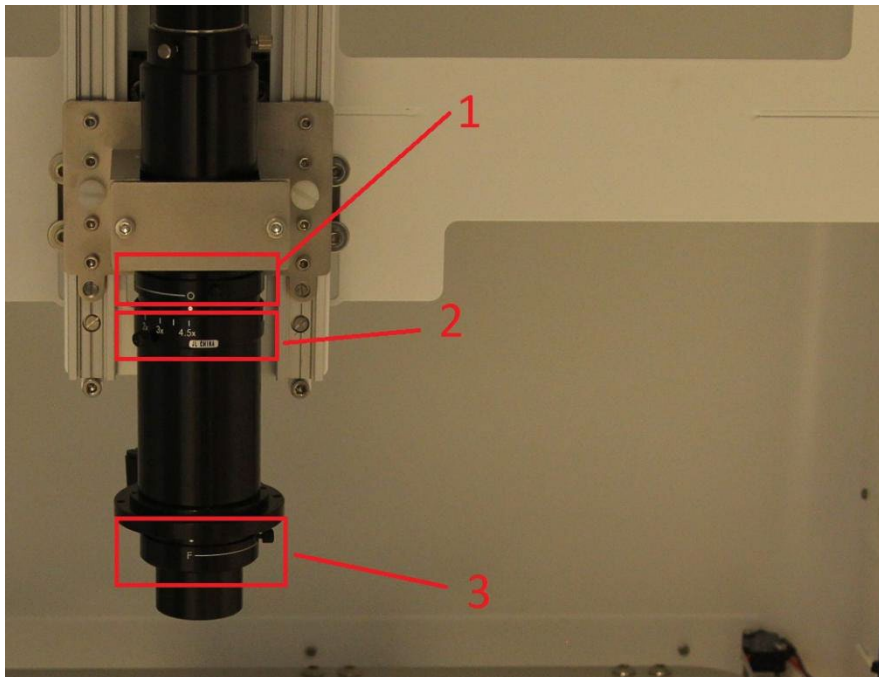
Autofocus Interval	1
Autofocus Nbr Step	40
Autofocus Step	5 (µm)
Calibration	0.528 (µm/pixel)
Check Holes	Unselected
Exposure	2900
Fast Measurement	Selected
File Name	X4.5
Gain	3
Id Machine	Sievecal
Recovering Percentage	50
Save Image	No Images*
Save Particles Color	Unselected
Use Autofocus	Selected
Use Current Filter	Unselected
Particle Detection Method	INV 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.

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



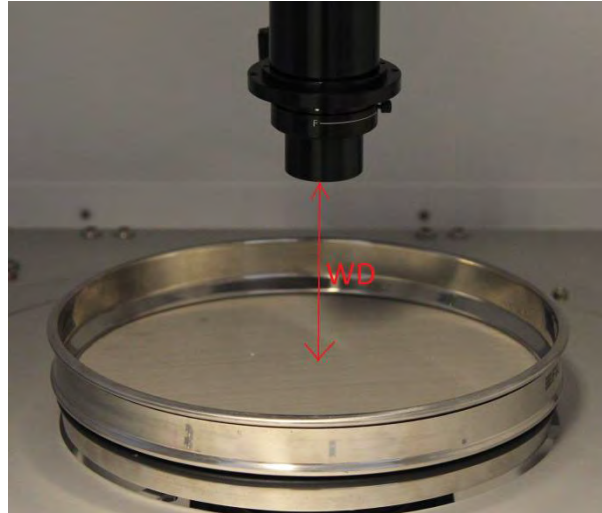
Lens calibration

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

Instrument Serial number	300053
Calibration date	10/01/2023
Certified calibration reticule	PN:59281 SN:0145
MAGNIFICATION	Calibration
X0.75	3.228 $\mu\text{m}/\text{pixel}$ (focus shim NOx0.3)
X1	2.412 $\mu\text{m}/\text{pixel}$ (focus shim NOx0.3)
X2	1.184 $\mu\text{m}/\text{pixel}$ (focus shim NOx0.3)
X3	0.796 $\mu\text{m}/\text{pixel}$ (focus shim NOx0.3)
X4.5	0.528 $\mu\text{m}/\text{pixel}$ (focus shim NOx0.3)
X0.3x0.75	12.06 $\mu\text{m}/\text{pixel}$ (focus shim NOx0.3)
X0.3x1	8.818 $\mu\text{m}/\text{pixel}$ (focus shim NOx0.3)
X0.3x2	4.389 $\mu\text{m}/\text{pixel}$ (focus shim NOx0.3)
X0.3x3	2.939 $\mu\text{m}/\text{pixel}$ (focus shim NOx0.3)
X0.3x4.5	1.95 $\mu\text{m}/\text{pixel}$ (focus shim NOx0.3)

Change the magnification and set the working distance

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

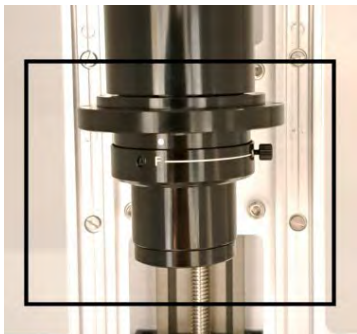


Working distance depends to the X0.3 front lens, two focus shim are supplied with the instruments, each focus shim allows to set easily the working distance corresponding to the sharp* focus for each magnification.

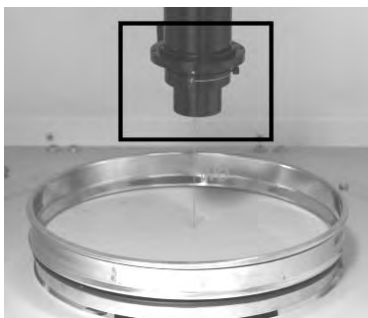
*after check the focus position by using the focus shim, use the arrow on Armadillo dash board to increase focus sharpness.

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

Zoom lens with front lens:



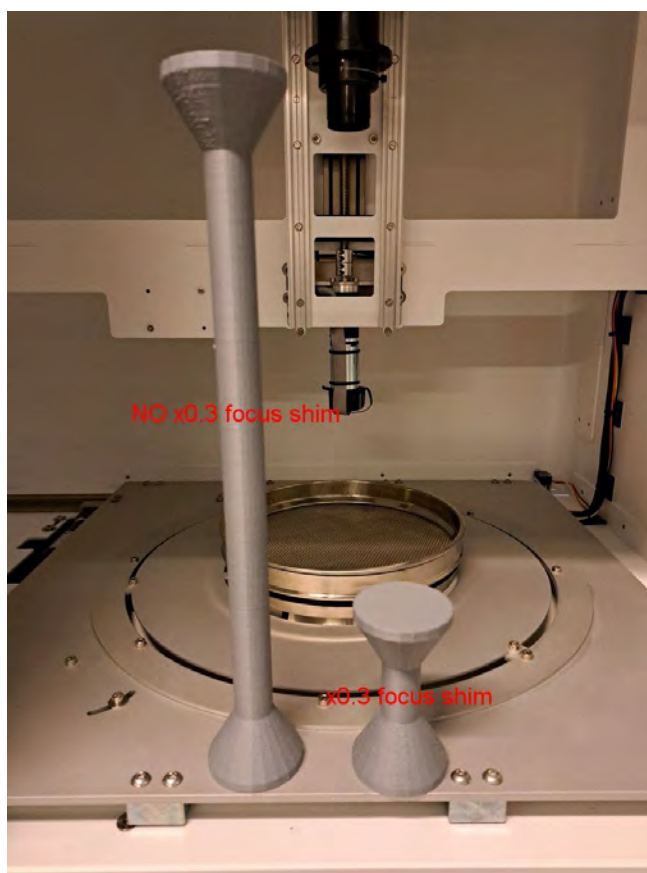
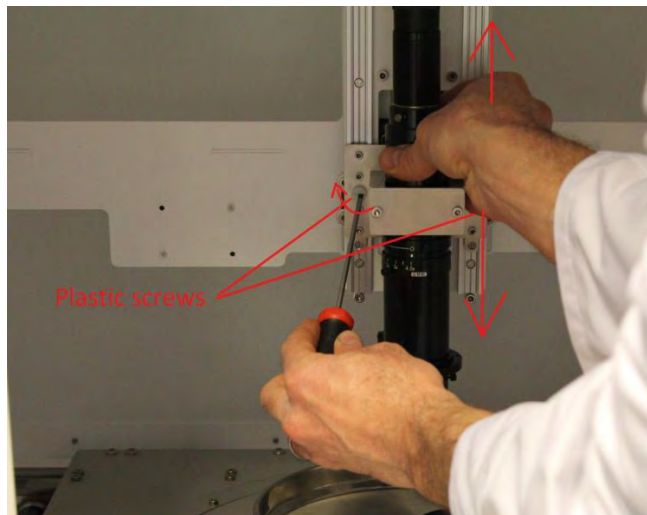
Zoom lens without front lens:

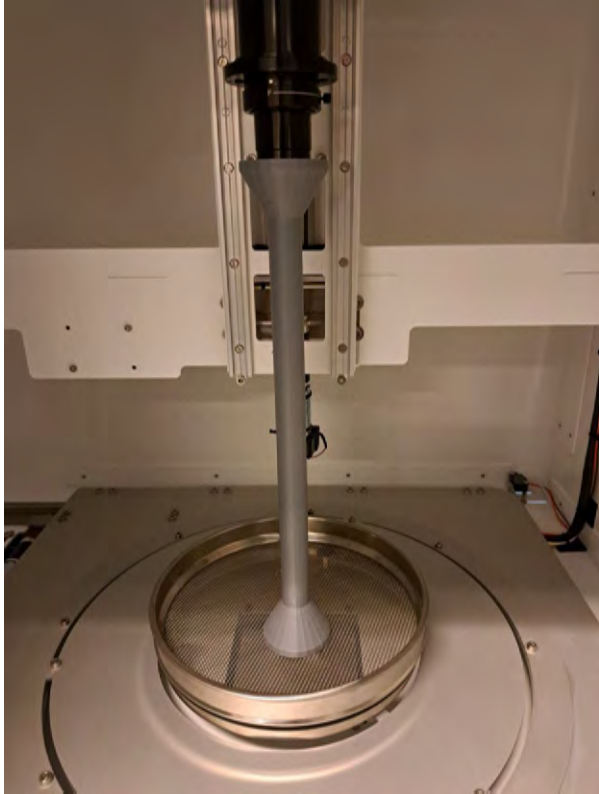


To set the working distance unscrew the two plastic screws, keep the position of the lens by your hand and move the lens up or down by position the corresponding spacer between the lens and the sieve. Close the two plastic screw and remove the focus shim.

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.