Horus Help

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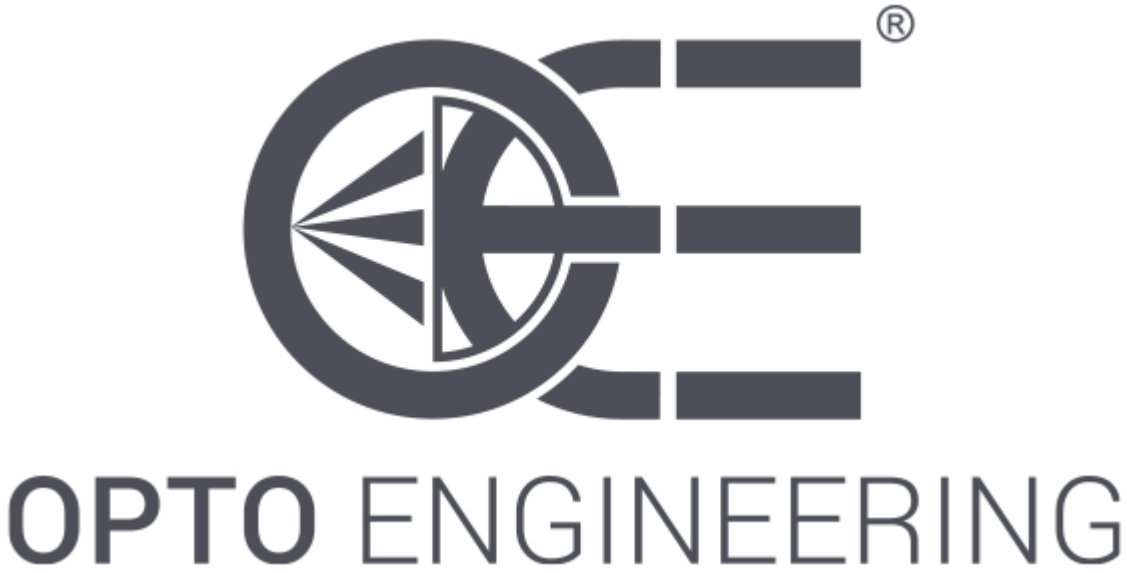


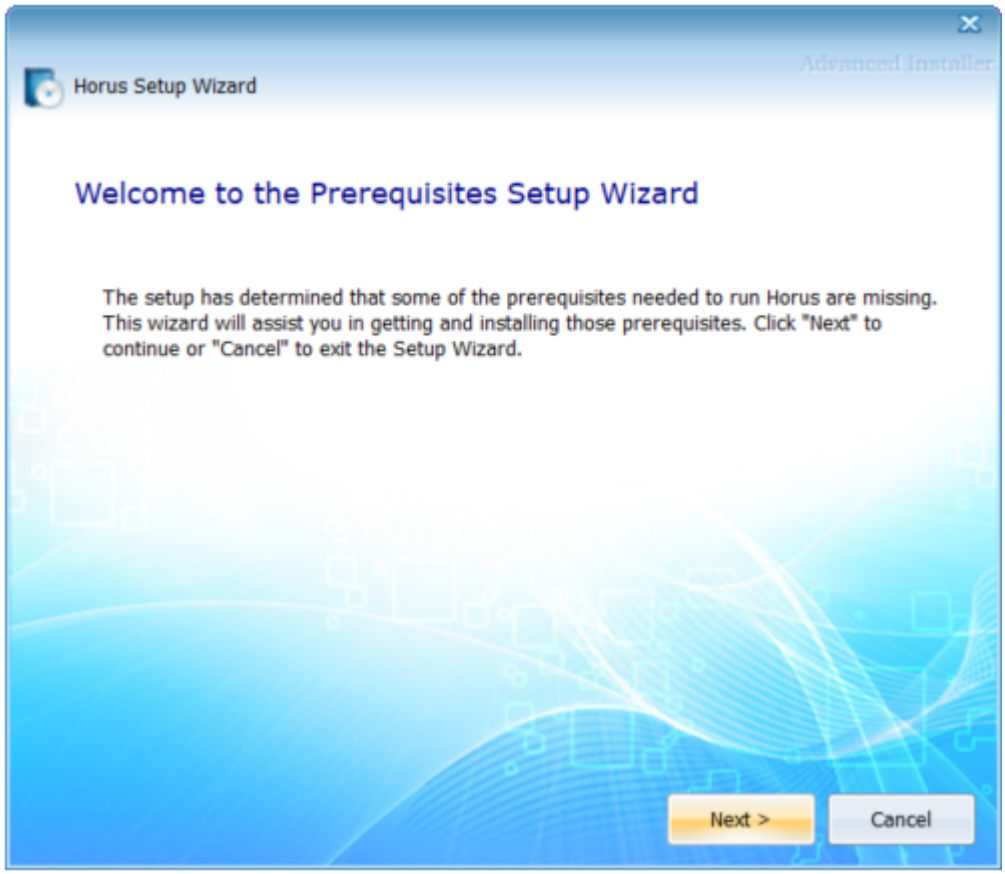
Horus Resource Center

Download

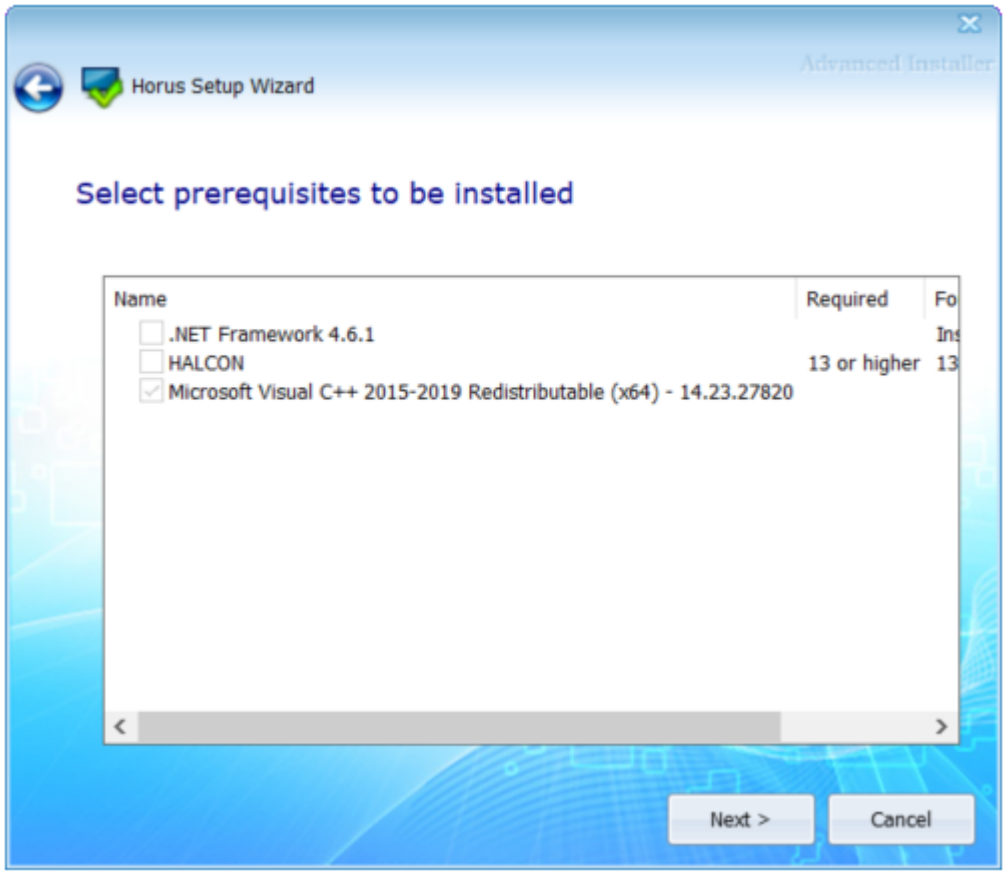
Horus Download

Quick Installation Guide

Access the website Horus Download
to download and save the file in a folder. When the download is complete, run the file as an administrator.
If you do not have administrator rights you will not be able to install the program, it is also advisable to disable antivirus and firewall during installation.
Confirm the will to continue to any Windows's™ (Smart Screen, UAC etc.) requests.



Press Next .



If the installation program evaluates the lack of basic prerequisites for the installation of Horus, these will be automatically downloaded and installed.
Press Next, the installation of the prerequisites will begin.

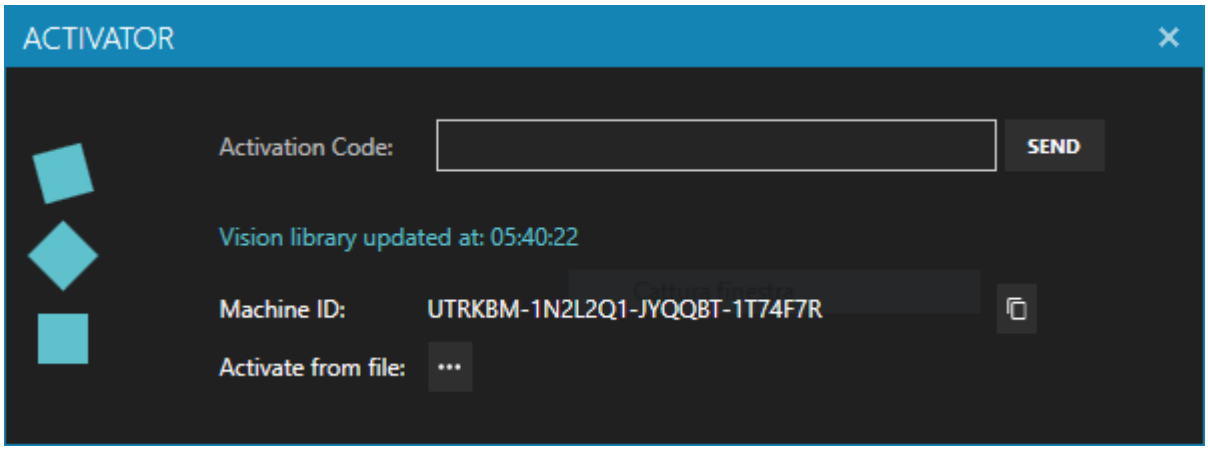
After installation of the prerequisites, the installation program will continue with the installation of Horus.
Press Next , then Typical , it is advisable to leave unchanged the destination folder C:\OptoEng\ , press Next then Install and at the end of the installation Finish .

Reboot your computer.

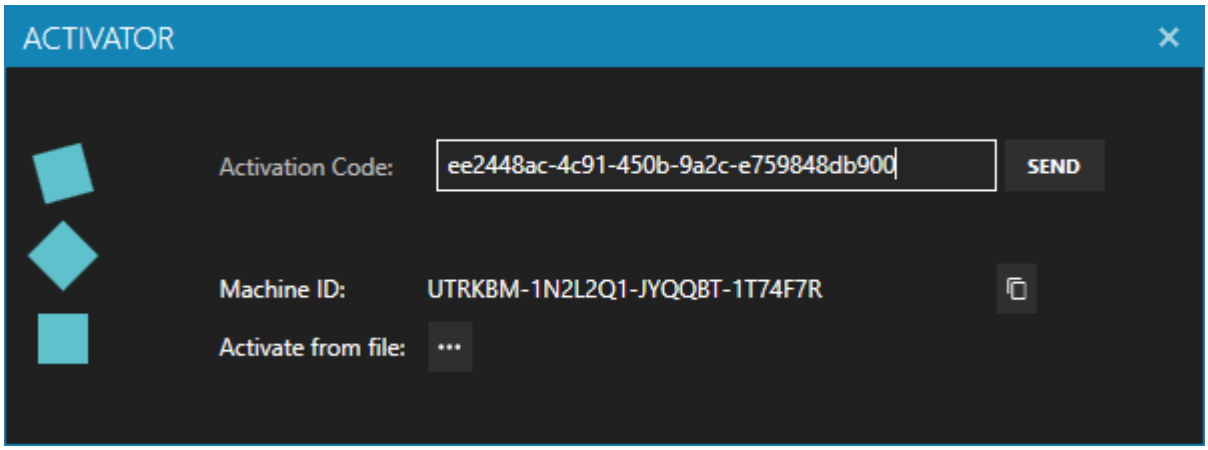
Horus and Activator icons will be created on the desktop, launch the Activator to proceed with the request / acquisition of the license.

Confirm the will to continue to any Windows's™ (UAC etc.) requests; the Activator must always be run as an administrator.

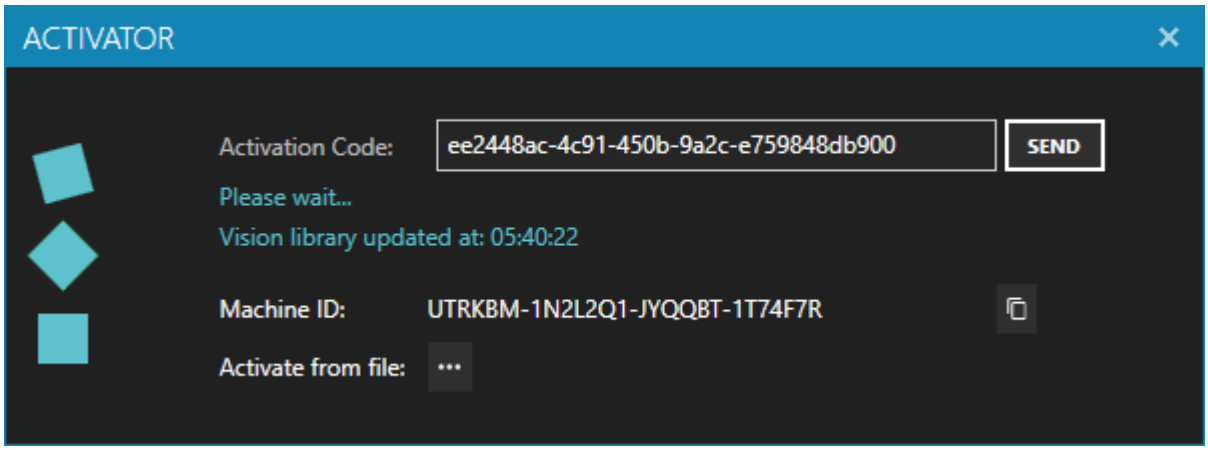
When the activator is opened it will automatically download the vision libraries license update if available.



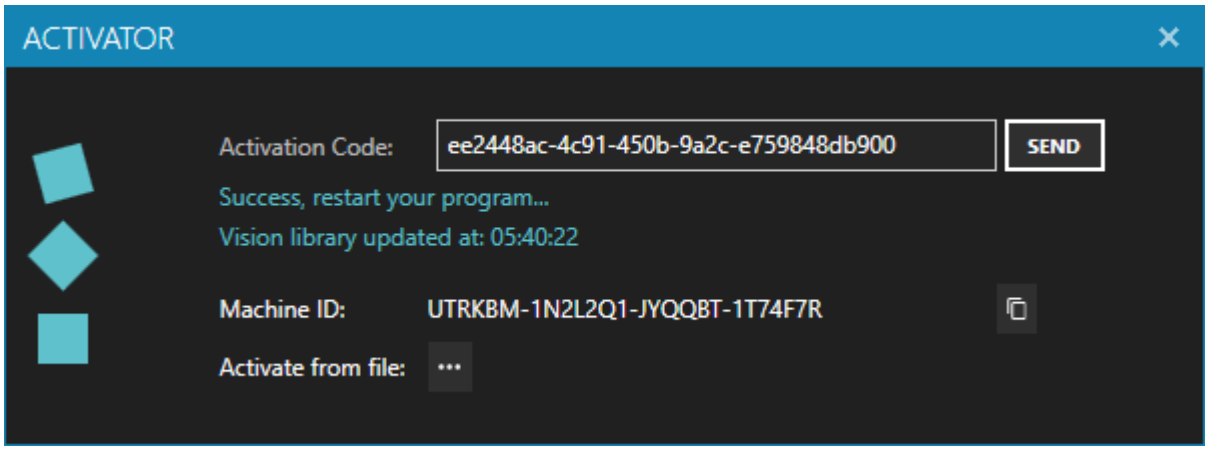
Enter the activation code provided by your sales representative and press Send.



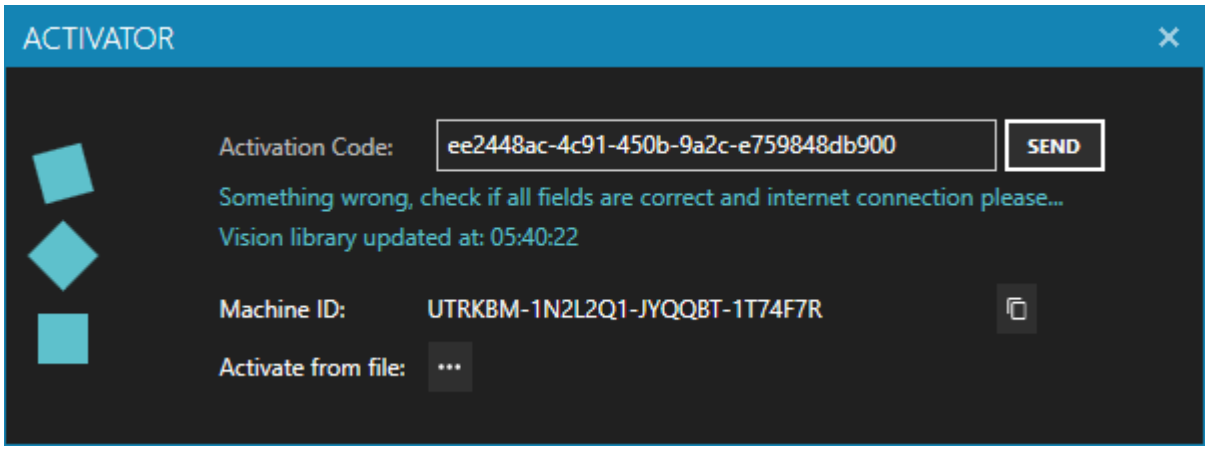
The activator will check the code via the Internet and download the licenses.



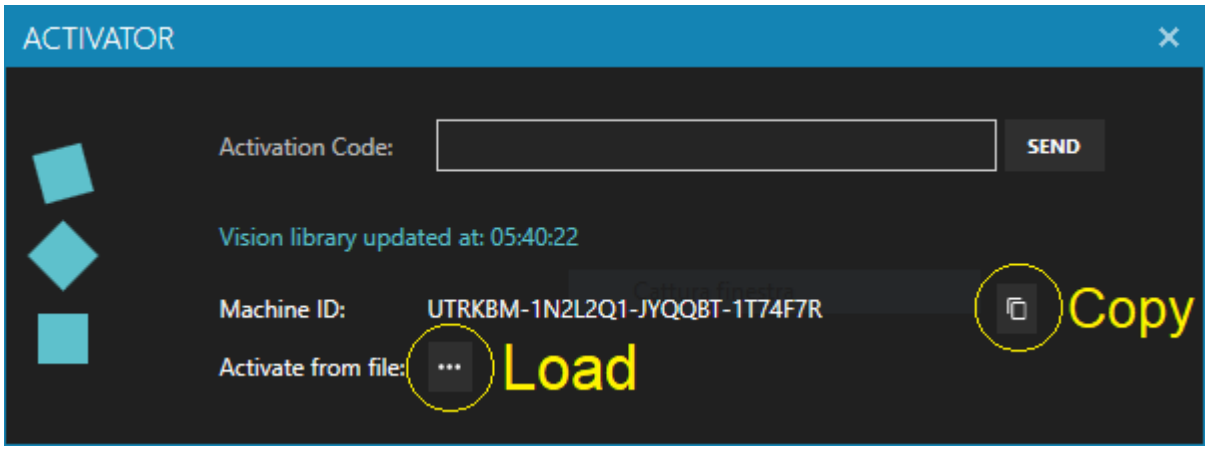
If the license is downloaded you can close Activator and launch Horus.



In the event of an error, check the activation code with your sales representative, also check that you have a working Internet connection (free of firewall / antivirus, etc).



In cases where the internet is not available or it is not possible to bypass the corporate firewall, manual activation is possible. This must first be agreed with technical support.
Copy your Machine ID and send it to the email that will be communicated to you. You will receive an mnl file to load.



At the first run, Horus will look for the license file; if this is not present, a warning message will appear.

The system should connect to the Internet only during license activation. For demo versions it is also necessary to launch the Activator before the first Horus's start at the beginning of each month of the evaluation period to update the vision libraries license.

System Requirements

CPU:	Intel i7 Quad-Core (> 3GHz)
RAM:	8 GB DDR4 (min.)
HDD:	256 GB SSD (or more depending on the type/number of projects)
GPU:	GTX1050
VDU:	1920x1080 (min.)
OS:	MS Windows 10 Pro 64 Bit
Camera:	Genicam, Usb3Vision, GigEVision are supported as standard/generic cameras. Other cameras supported are COE, MatrixVision, IDS, Flir (others can be implemented on request).

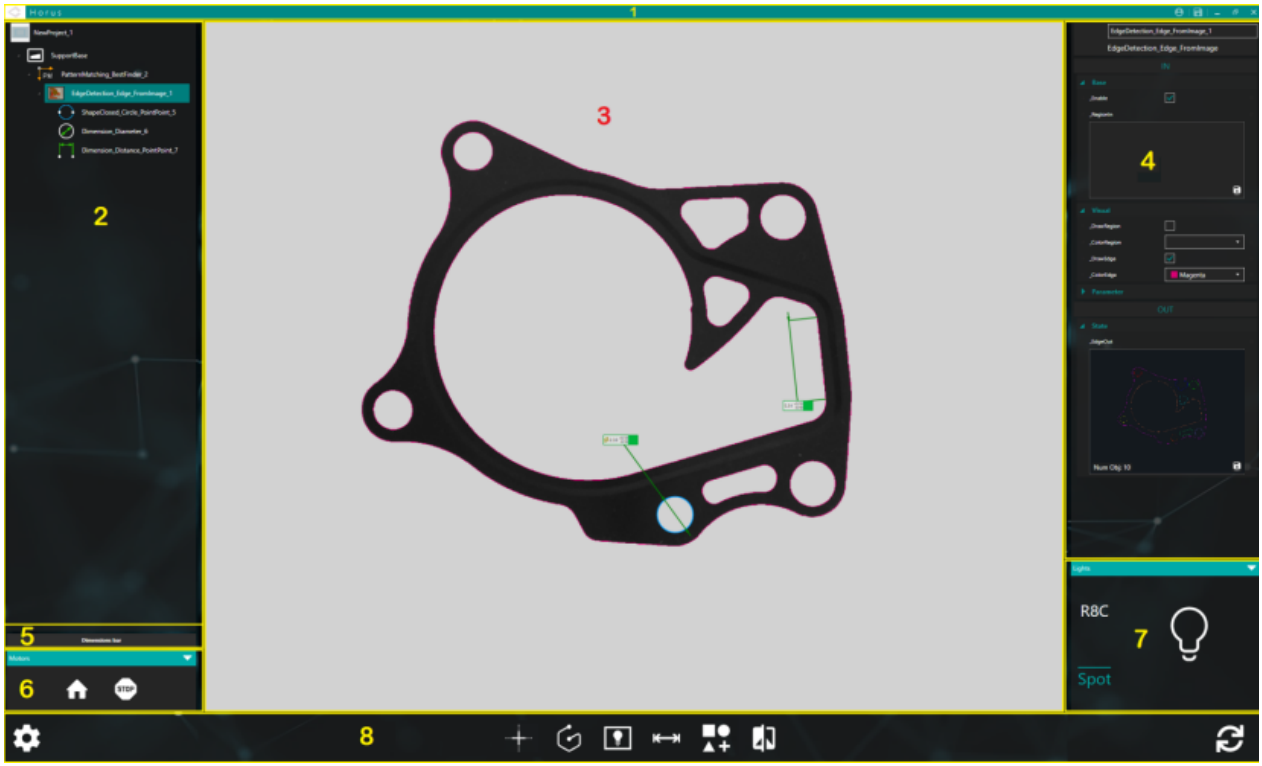
If you have an ethernet camera, you need a dedicated LAN port.

Security Requirements:

The licensed version of Horus does not need to be connected to LAN / Internet. If the machine in which the software is installed is connected to some kindof network, it is the user's responsibility to take all safety measures.

Main Interface

In this reference guide will be described the general functions included in Horus V3, in order to allow the user to easily handle the software and get access to a walkthrough of the tasks that are needed to create programs and perform analysis.



Horus is a software developed for high accuracy measurements; it's designed to be a live software in order to keep tracking of the object to measure and get fast results.

The main interface of Horus is divided into five section:

1. Header;
2. Object Tree;
3. 2D Visualizer;
4. Property Bar;
5. Motors Console;
6. Lights Console;
7. Dimension Bar;
8. Main Console.

Each of these section allows the user to access to different features of the software.

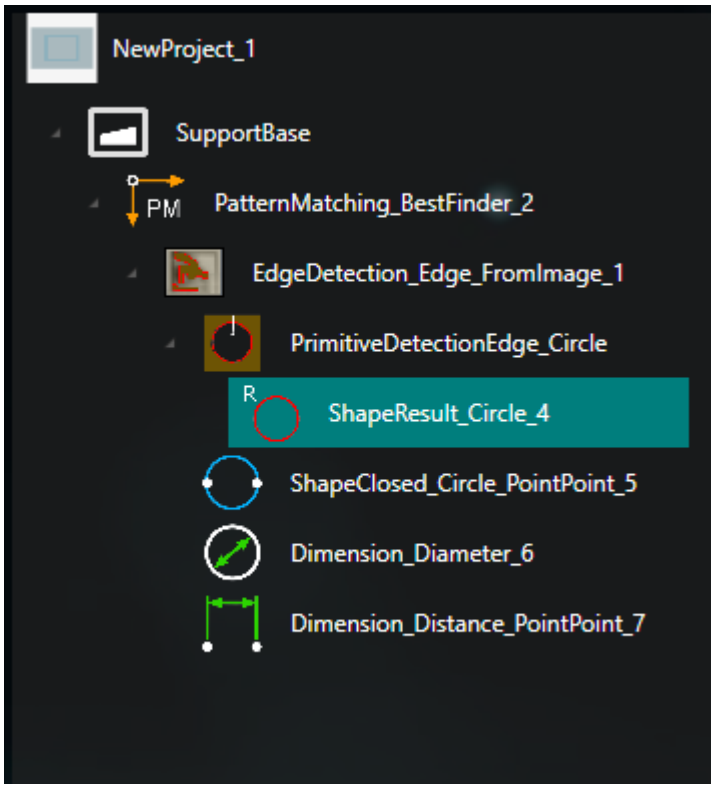
Header

The header shows the logo and the name of the application. This features can be personalized, as well as the colour and theme of the software (for details see Settings Menu).

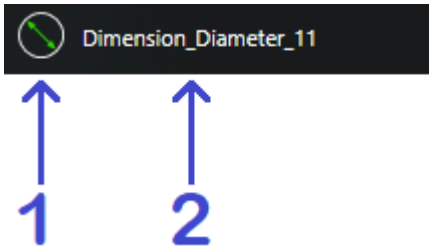
In addition, a user login and save button is displayed at the right hand side with the window controls.

Object Tree

Horus is an “object based” system, which means that a program is seen as sequence of tasks performed by object specifically designed; the sequence of these objects create the logic of the program and the analysis. Even if the program starts from a defined model / template , so the user can simply add what he is interested in, this explains why the objects are displayed in the tree in a particular order.



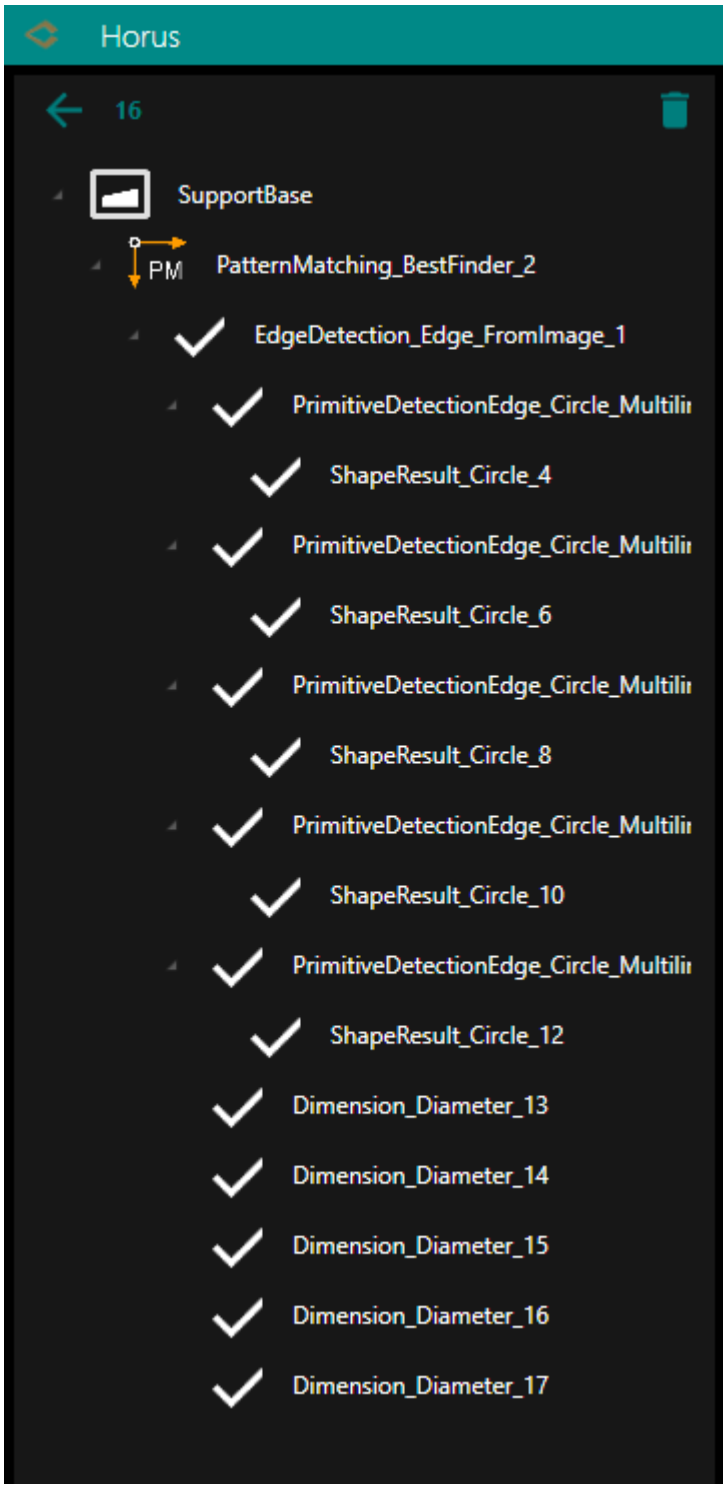
Every object element is composed by:



1. Icon Object: the icon of the object;
2. Name Object: the name of the object;

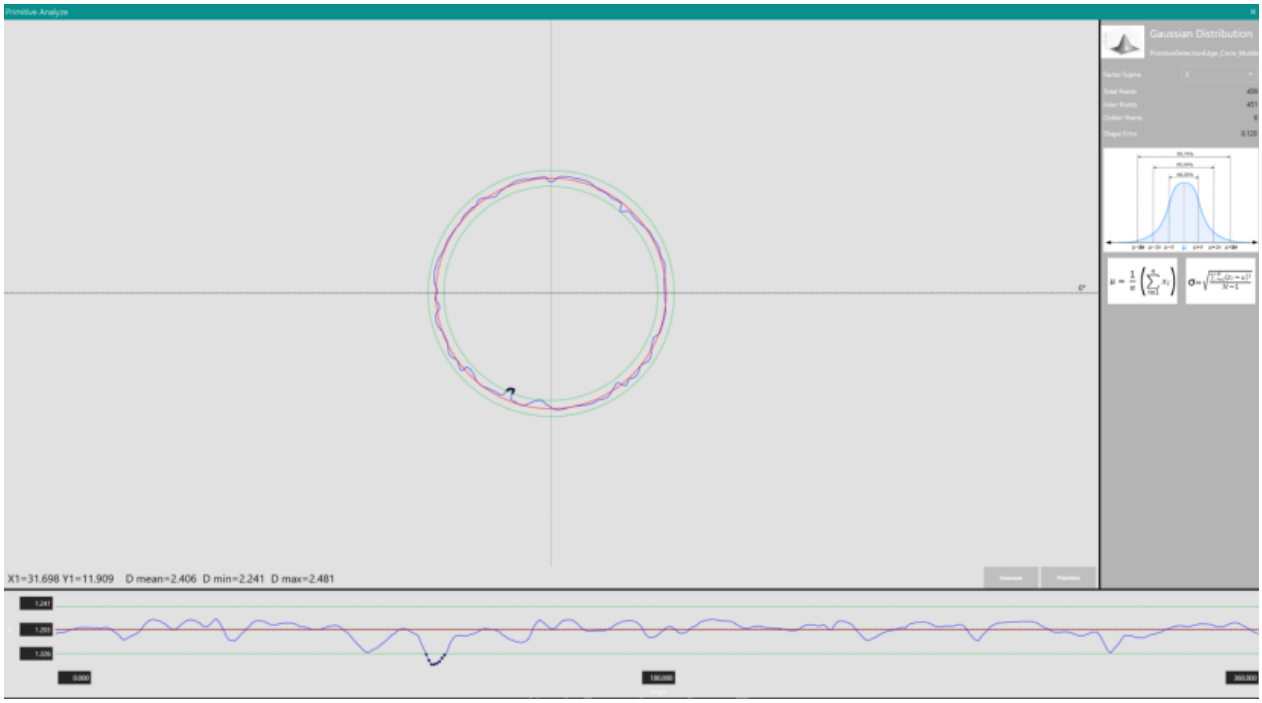
It is possible to inspect each primitive detected on the part; look the property bar and select "Primitive Analyze".

If you want to delete a single item select it and press the trash icon. If you want to select multiple objects click with the right mouse button and all objects of that level or lowers will be selected. To deselect the single object click on it with the left mouse button, or right click if you want to deselect all.

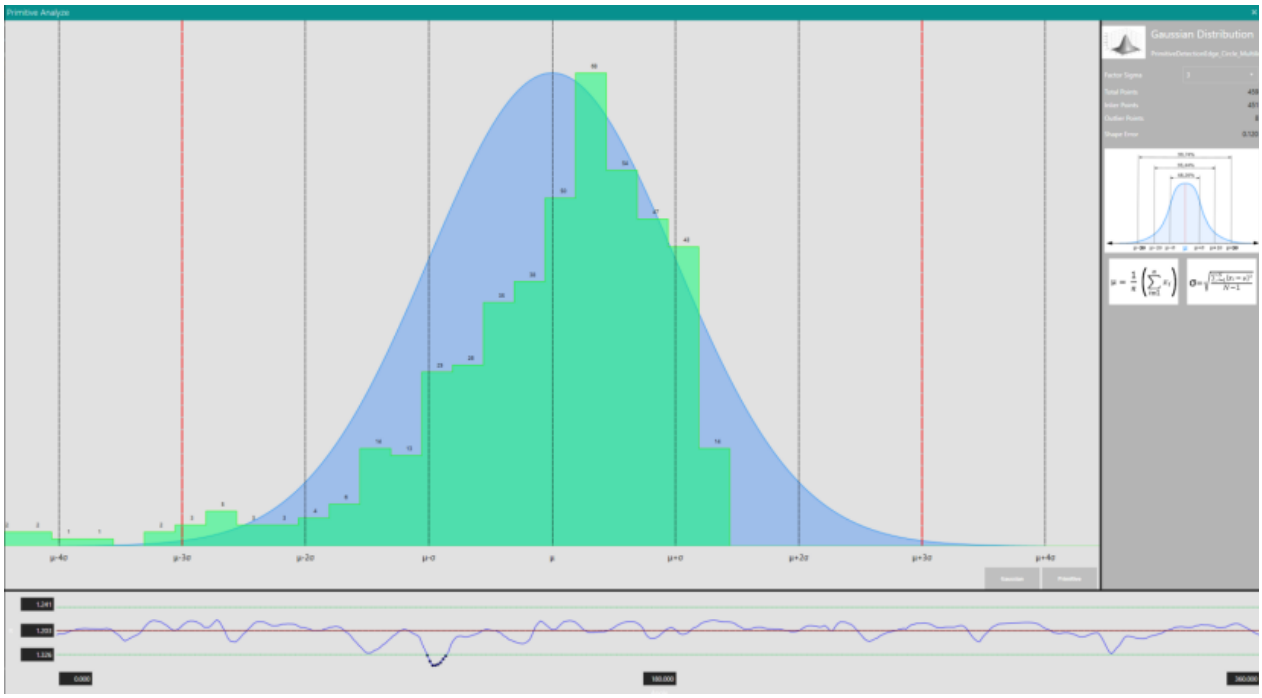

Horus
16
SupportBase
PM
PatternMatching_BestFinder_2
EdgeDetection_Edge_FromImage_1
PrimitiveDetectionEdge_Circle_Multili
ShapeResult_Circle_4
PrimitiveDetectionEdge_Circle_Multili
ShapeResult_Circle_6
PrimitiveDetectionEdge_Circle_Multili
ShapeResult_Circle_8
PrimitiveDetectionEdge_Circle_Multili
ShapeResult_Circle_10
PrimitiveDetectionEdge_Circle_Multili
ShapeResult_Circle_12
Dimension_Diameter_13
Dimension_Diameter_14
Dimension_Diameter_15
Dimension_Diameter_16
Dimension_Diameter_17

Inspect Primitives

After selecting "Primitive Analyze" an interface will be shown with the information of the points of the edge used to detect the primitive.

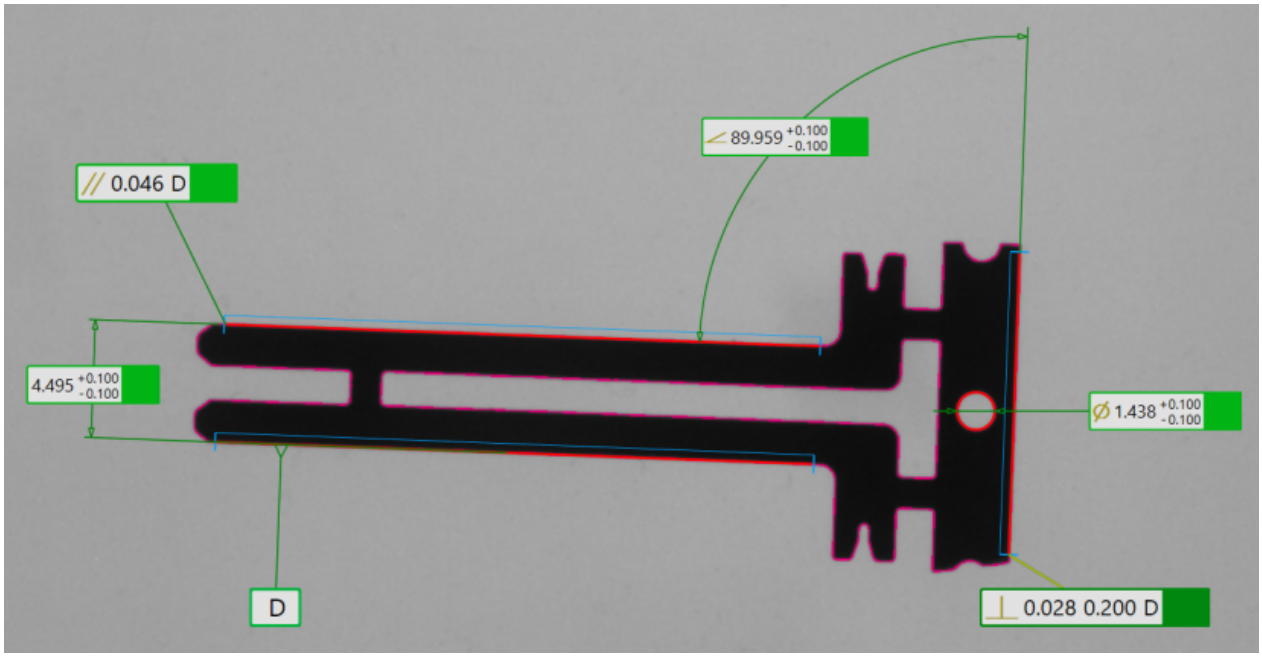


You can use it to see the points distribution, the sigma based filter and gaussian distribution.

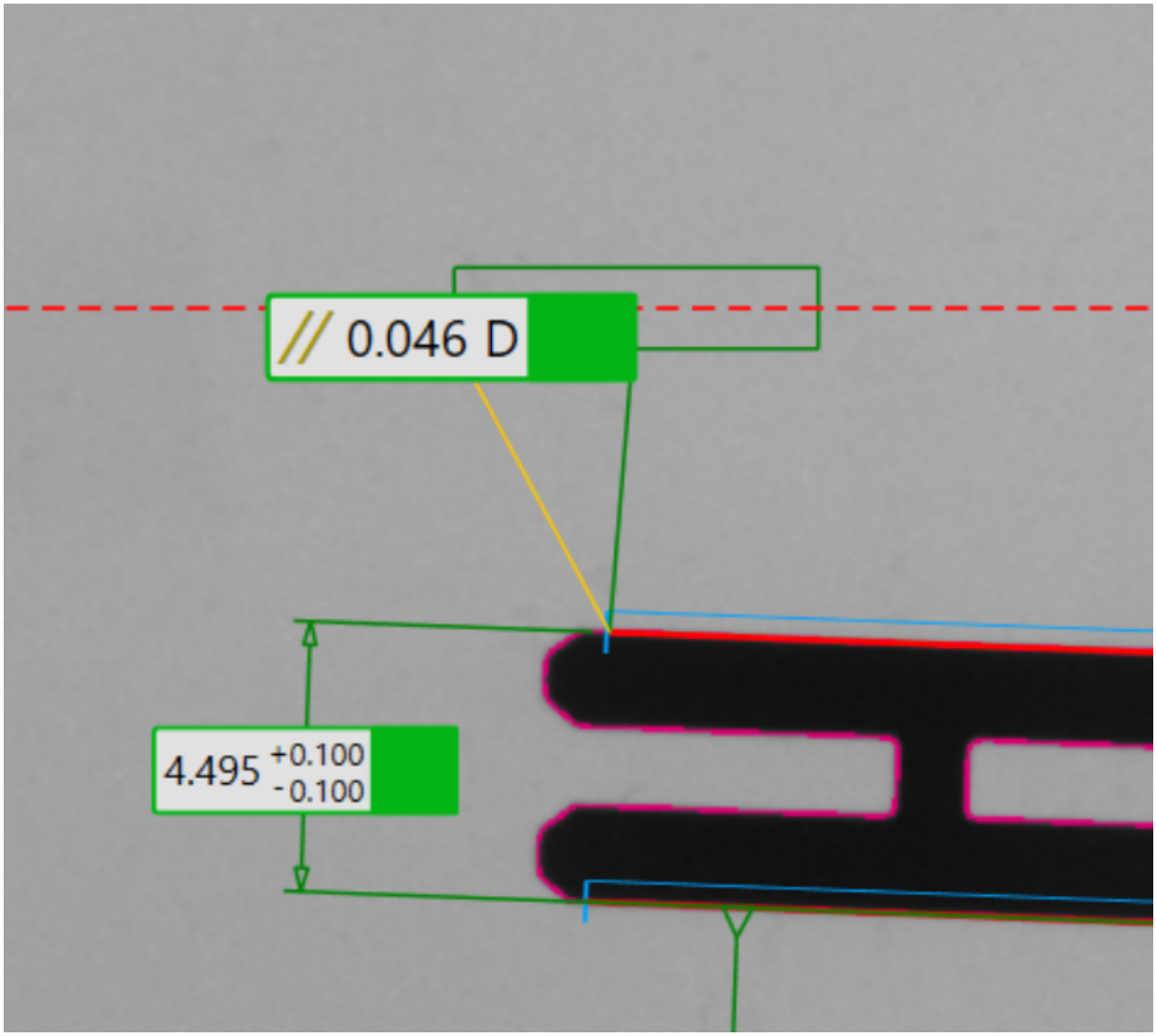


2D Visualizer

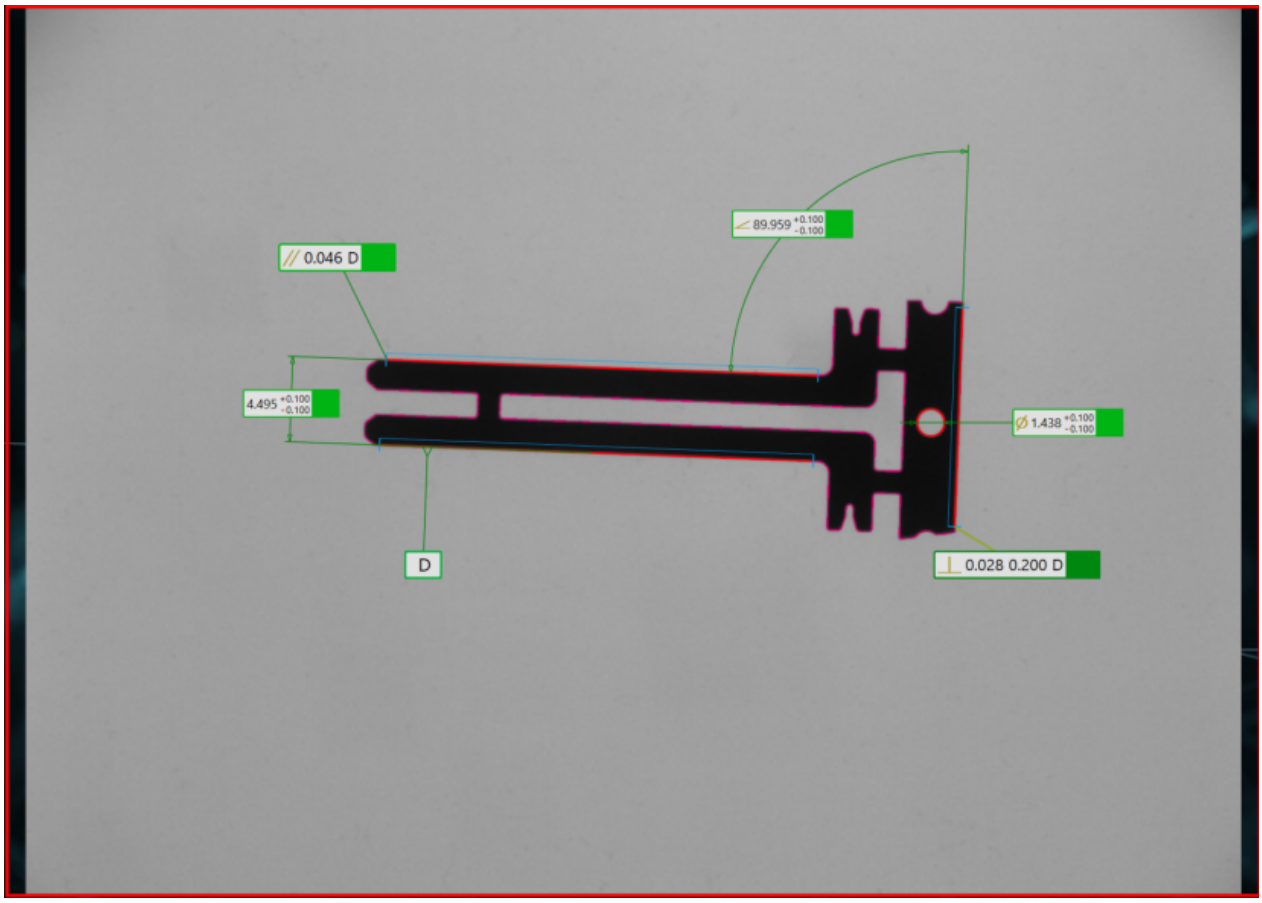
The image captured by the framegrabber, the dimensions as well as all the drawing objects and shapes are displayed on the visualizer.



User can add element selecting features on the screen and edit them on the visualizer dragging the objects.



NOTE: While editing, you may see the visualizer has red border.

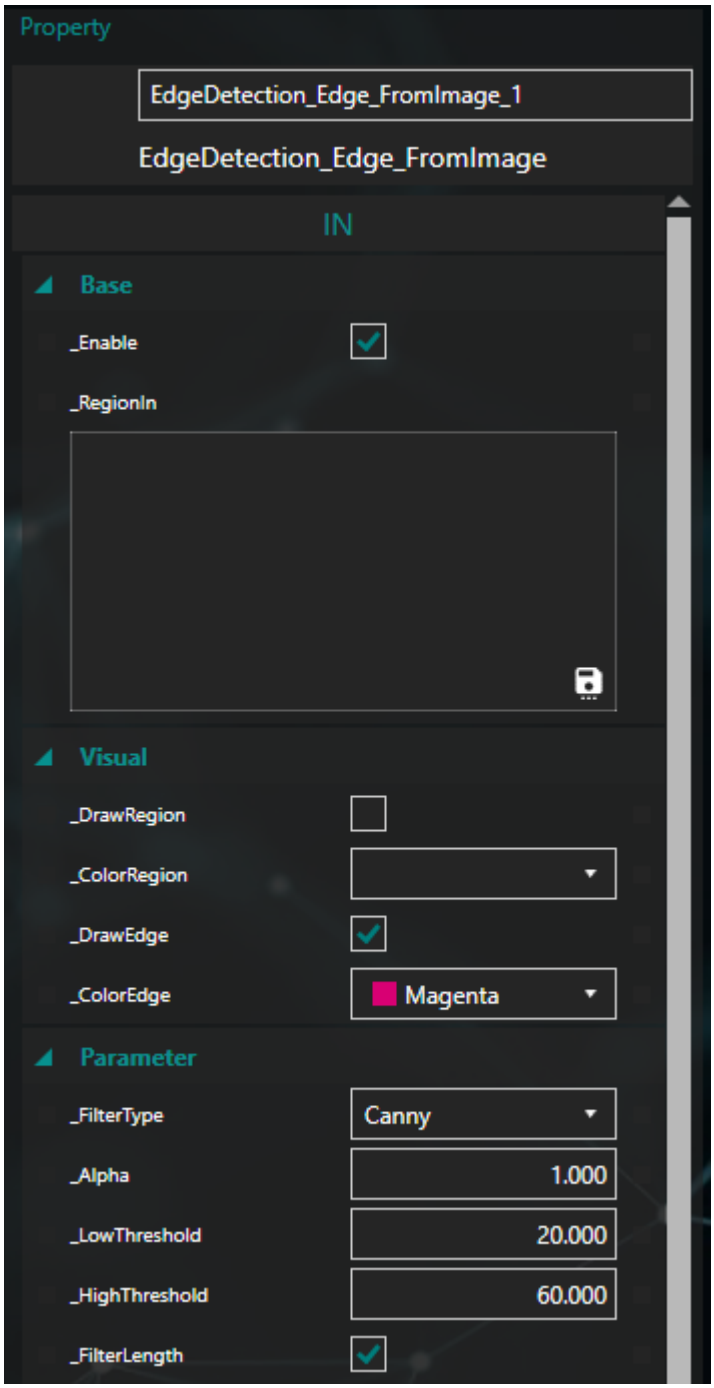


That's an indication that the image is currently frozen to allow the user to edit the program even if the framegrabber is keep acquiring new image.
Press **Esc** to exit the editing mode.

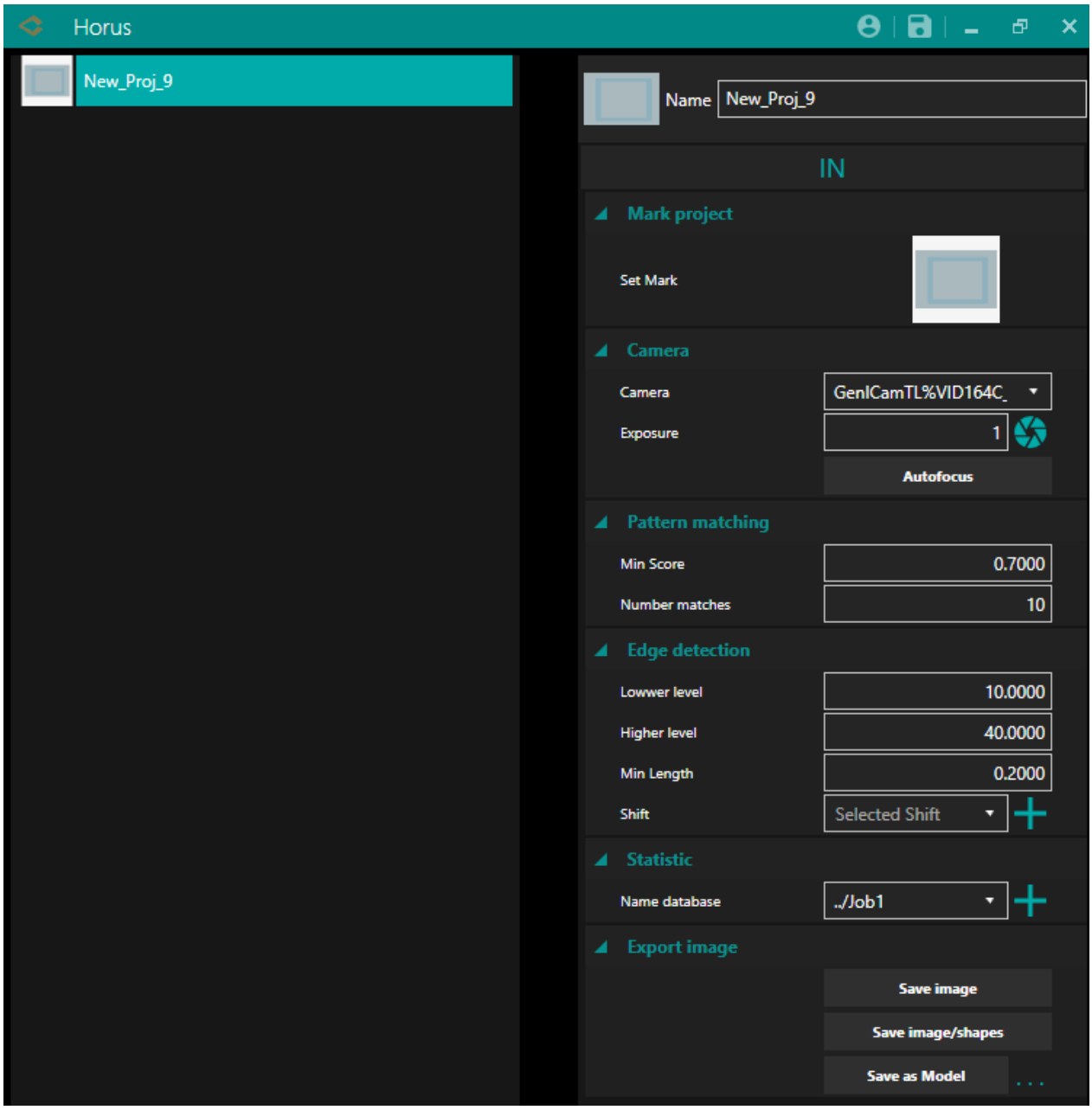
Property Bar

When an object is selected (from the objects tree or on the 2D visualizer) its properties are shown in the property bar, set on the right hand side of

the screen.



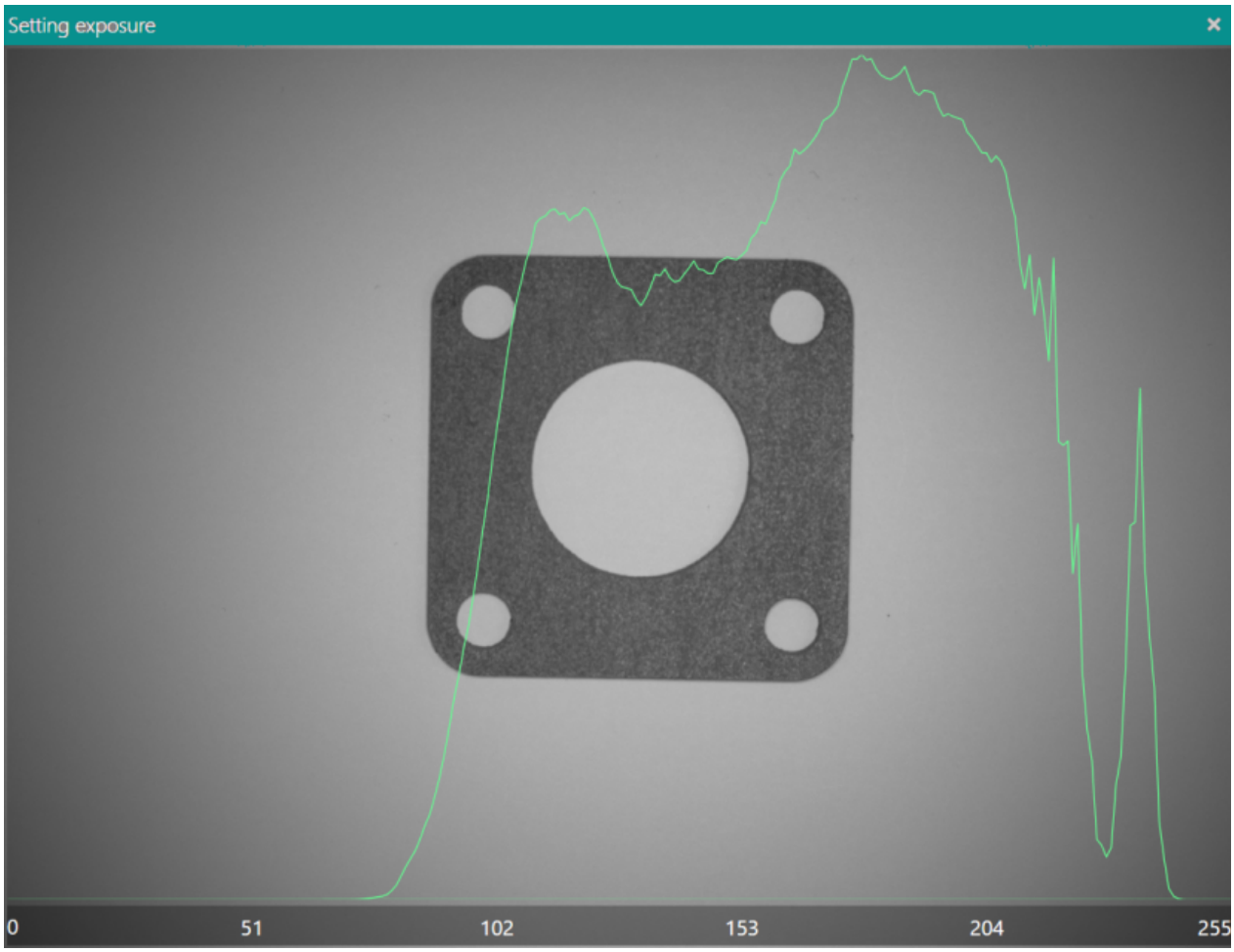
In the right bar the user can change the name of the object and the properties; the number of the properties depends on the user level, in order to give access to advanced features only to the expert users.



Selecting the project instead, you can change the name, assign a mark, modify settings including the camera and its exposure, set the parameters for the pattern matching and the edge detection. Particular attention must be paid to the values Min Score (the percentage needed to recognize your item, for example 0.70 means that I need 70% of my model to be able to say I recognize my object) and Number Matches (the maximum number of pieces to be recognized, for example with 12 pieces if NM is equal to 10 he will choose the first 10 pieces closest to the model).
You can also change the name of the database where to save the statistics and export the acquired image in various formats. If you press Save Image also the calibration is saved with it. If you press Save Image/Shapes you save the image as a sort of print screen, together with the image a customizable document is generated.

Exposure

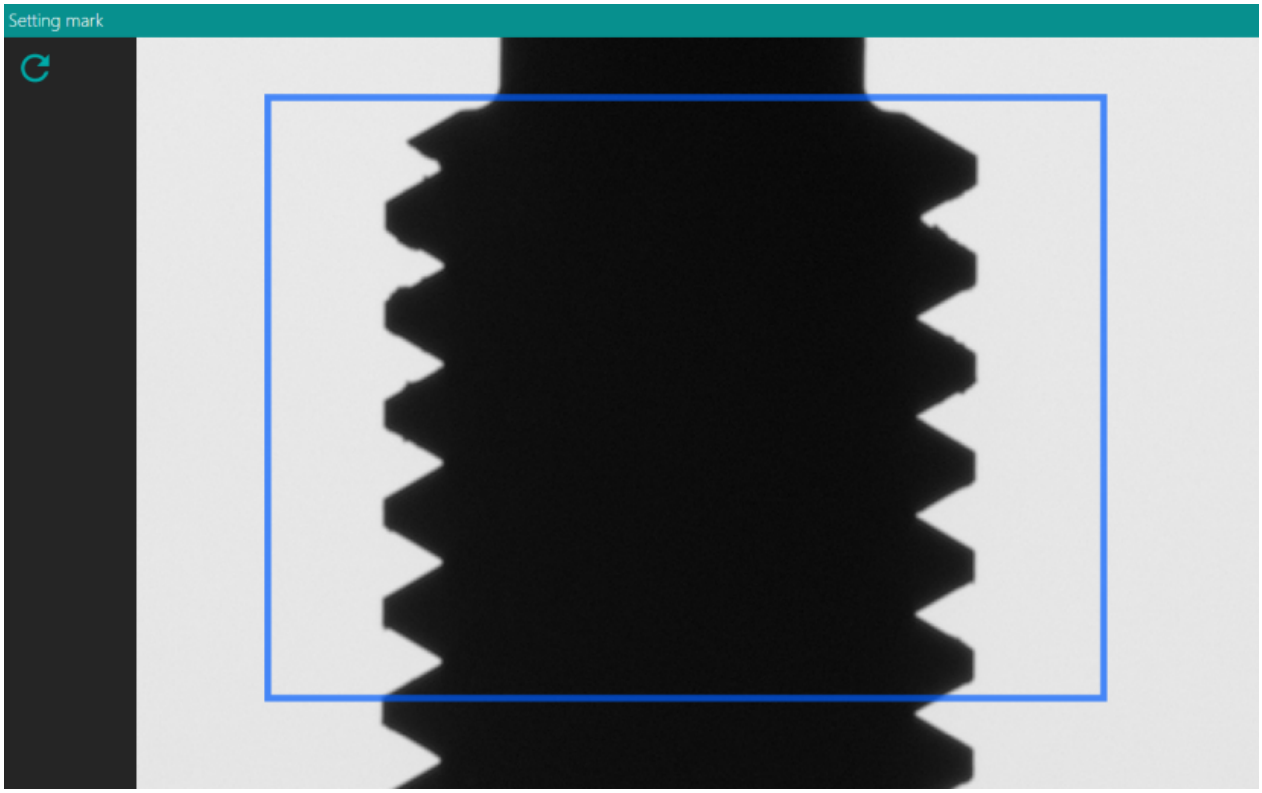
Adjust the exposure time.



Try to find the right exposure by moving the slider at the bottom of the page or by entering the value in the box next to it. Be careful not to have a part of the histogram above 255 because you are overexposing.

Setting Mark

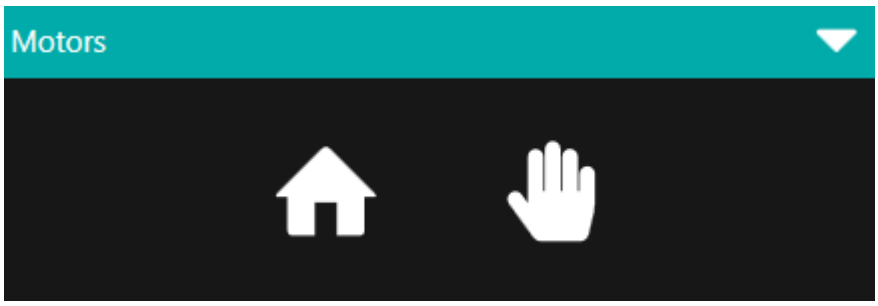
Assign a mark.



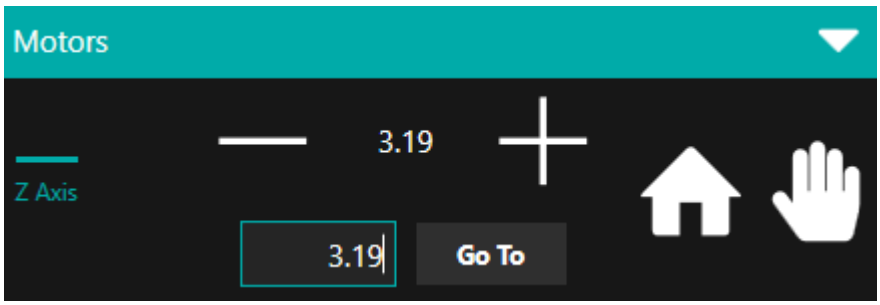
With mark you can select a representative part of your image and assign it to the current project, like an icon, to make the project easier to select when you open Horus. Click on the thumbnail next to SetMark to open its window. After pressing the refresh icon if necessary, move and / or resize the colored rectangle. With the area selected, close the window and press the save button.

Motors Console

You can control your motor devices from Horus. Before using the motors, configure them in the motor settings menu where if the device has some problem this will be highlighted by an exclamation point at the bottom right.



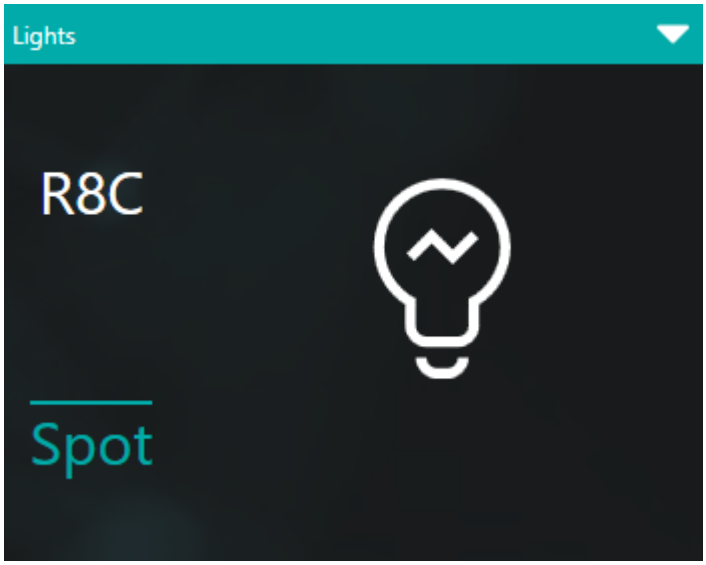
At the top of the window you can homing and/or stop the motor. Once the homing has been performed correctly, it will be possible to have full access to all the features.
Otherwise check the motor settings menu if there is any error.



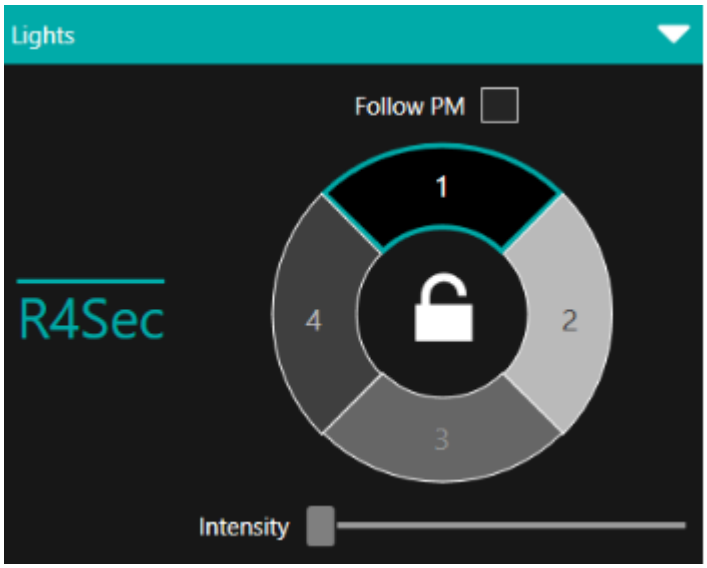
At the bottom you can move the motors in jog or set the position manually.
Choose the axis you want to move, use the + or - keys to move manually (the current position is indicated between the two keys) or enter a value and press the GoTo key to go to a specific position.

Lights Console

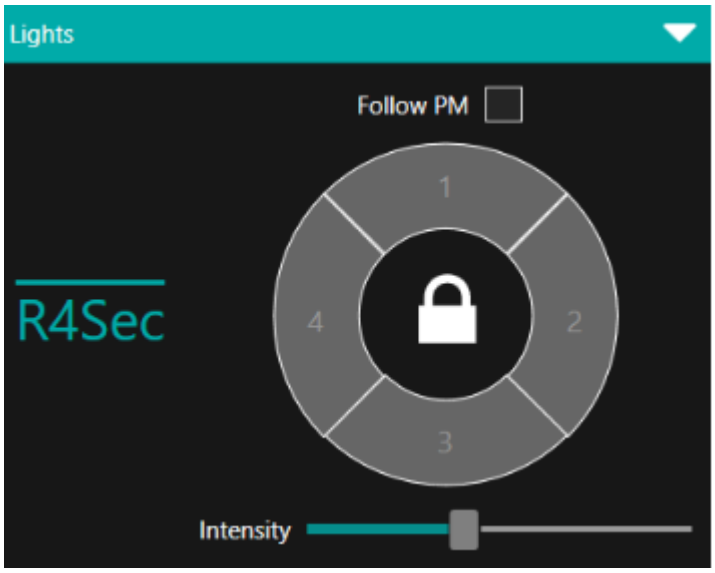
Depending on the lighting device you set, you can turn on/off the lights or the individual sector simply by clicking on it.



If you have a PWM controller, a slider will allow you to adjust its intensity. For multi-sector illuminators, first select the sector to be adjusted.

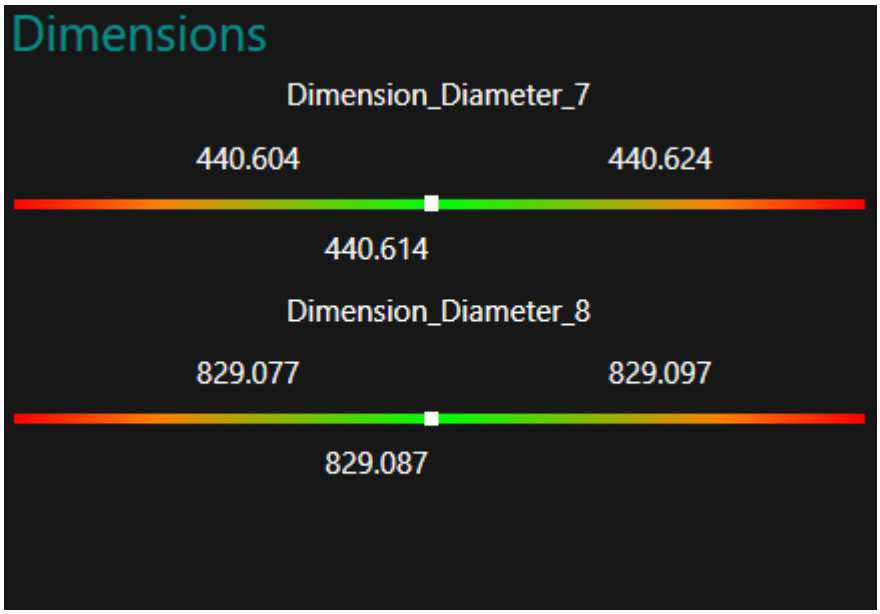


Closing the padlock the intensity will be adjusted for all sectors.



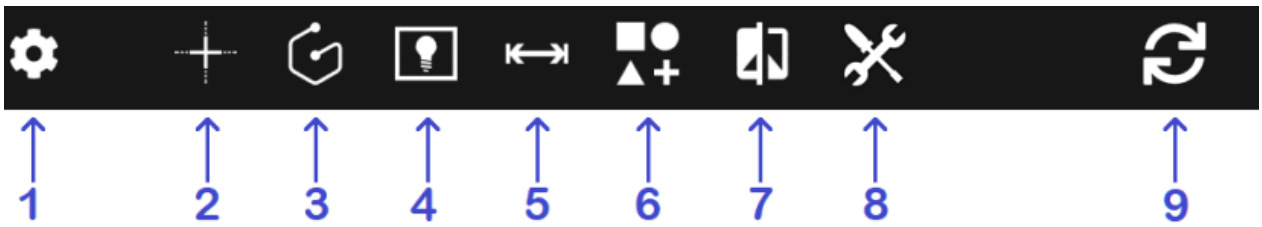
Dimension Bar

Shows how the measurement values are placed within the tolerance range.



Main Console

The main console includes all the basic functions that are useful to use the program.

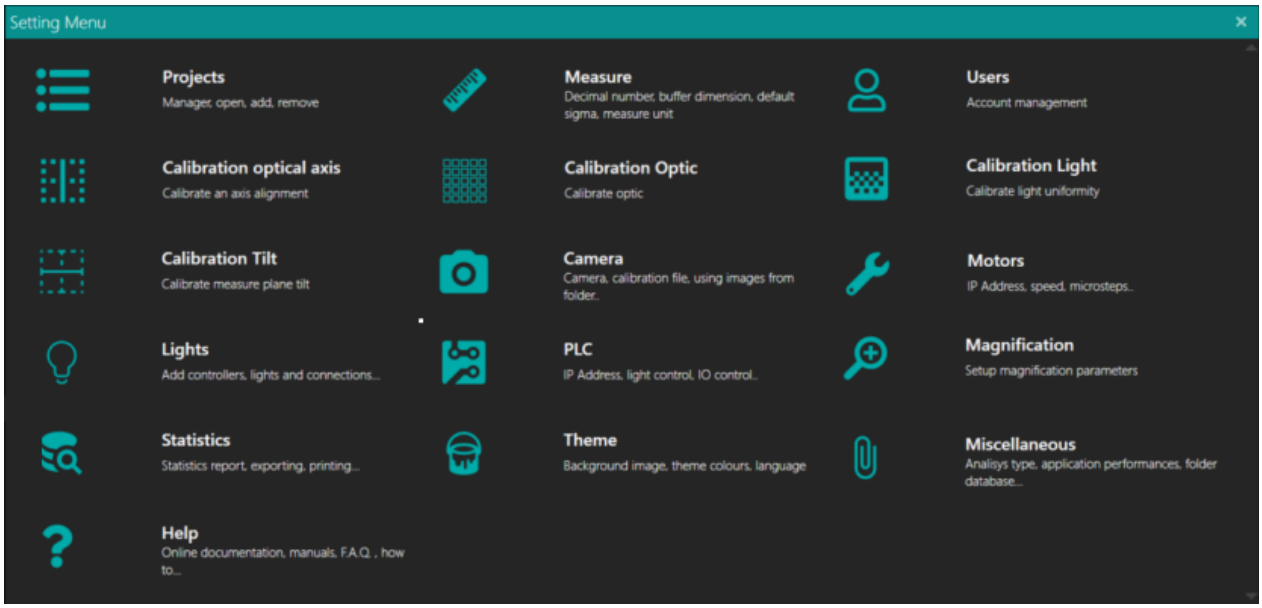


Common functions needed to measure and inspect an object, or in general everything is necessary to create a good program, can be found in the main console.
There are several groups, each one is dedicated to one particular function.

1. Settings Menu;

2. Pattern Matching;
3. Detection;
4. Gray Scale;
5. Measure;
6. Shapes Construction;
7. Dxf;
8. Advanced Optional Plugins;
9. Statistics.

Settings Menu



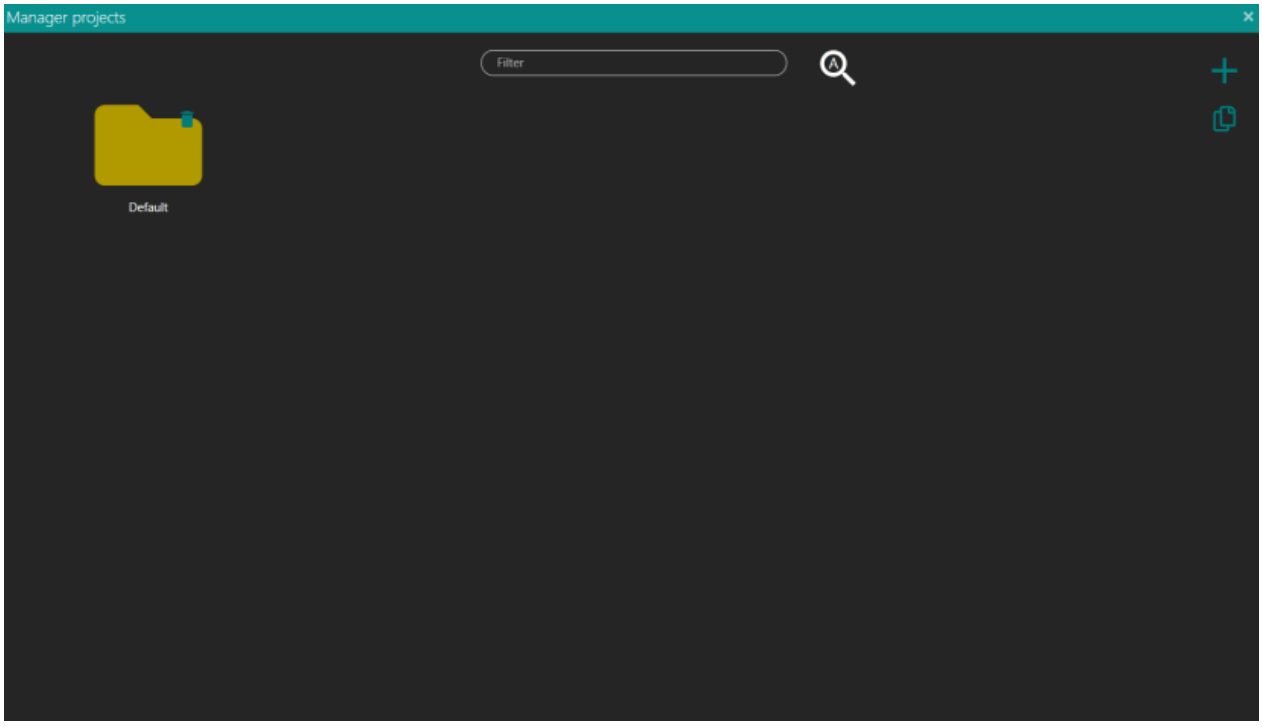
Settings Menu is the general menu where you can find features to personalize or set your application.

- Projects;
- Measure;
- Users;
- Calibration Optical Axis;
- Calibration Optic;

- Calibration Light;
- Calibration Tilt;
- Camera;
- Motors;
- Lights;
- PLC;
- Magnification;
- Statistics;
- Theme;
- Miscellaneous;
- Help.

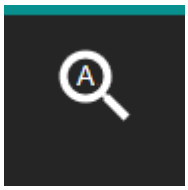
Projects

Manage your projects.

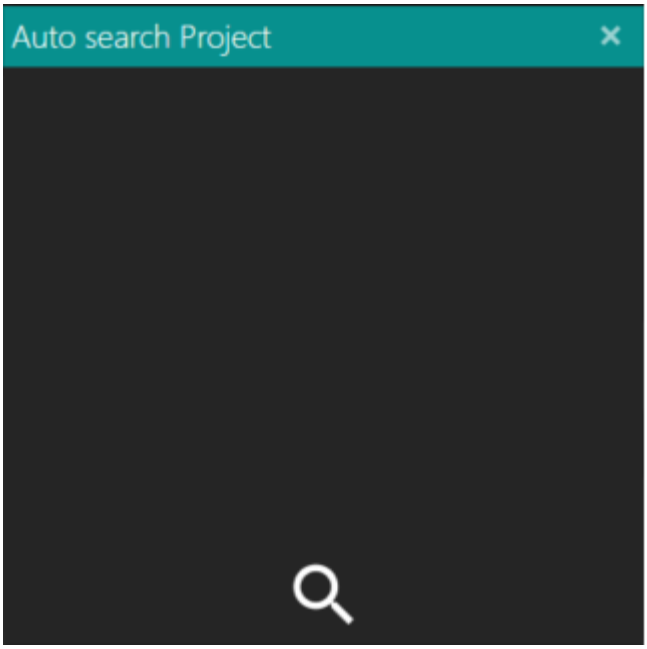


The projects menu allows the user to navigate the projects that are stored in the machine or create/edit them.
On the first level you can organize your folder for the project that you want to manage. You can add (plus icon button) or duplicate your folder's project (double sheet icon button, displayed when a folder is selected). You can also delete the folder's project (trash icon button).

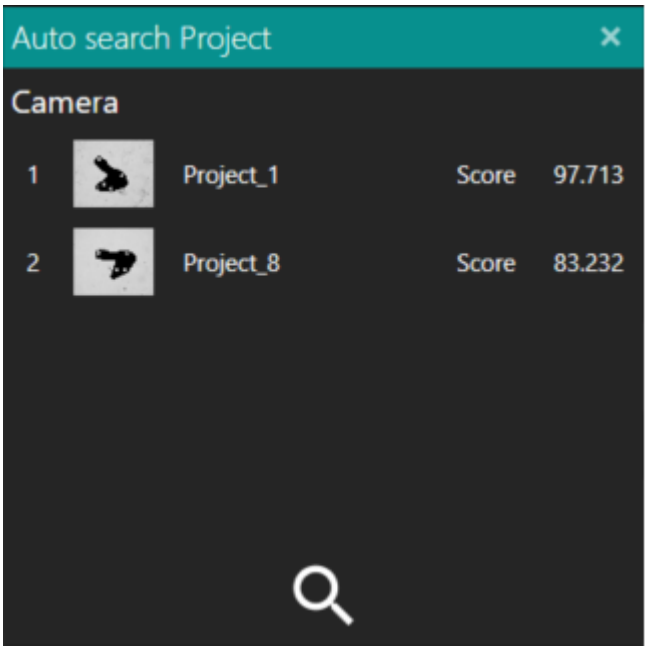
At the top you can enter a filter for quick search of a project or proceed to automatic search selecting the lens icon:



The search feature is a short-cut to open a saved project using the current object under the camera or using the QR Code assigned to the product.

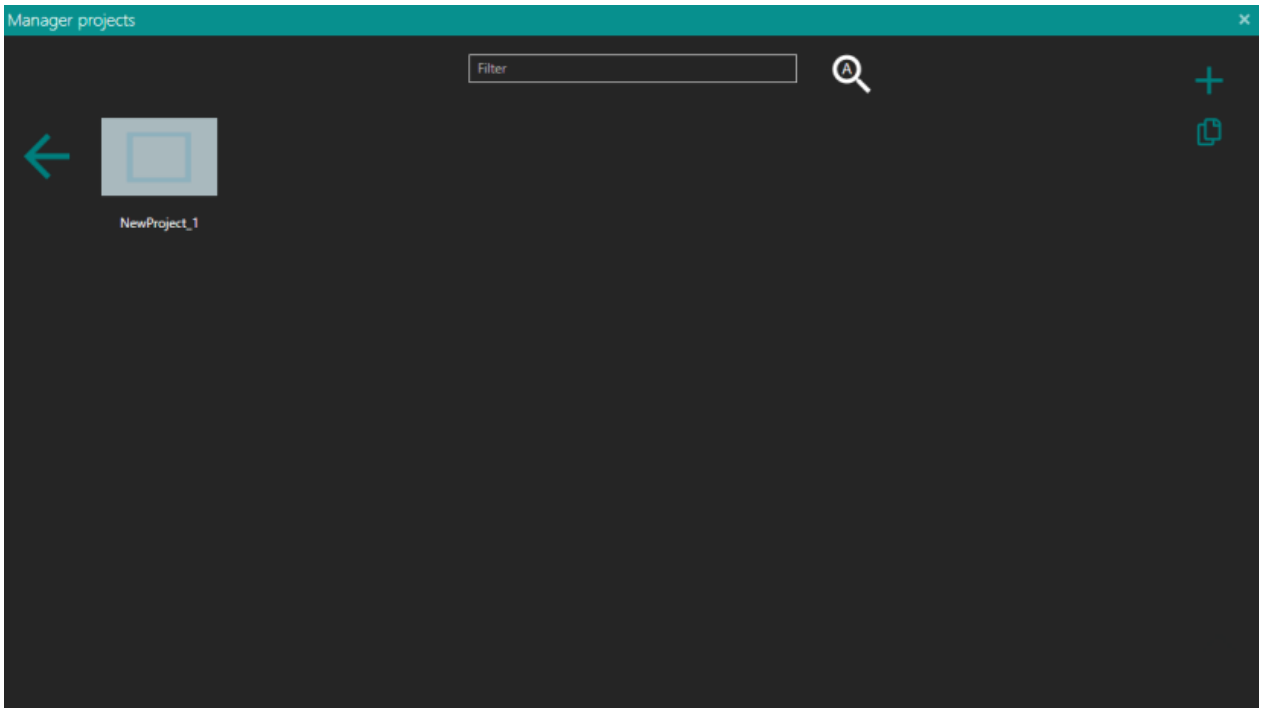


When the object under the camera is set, it is necessary to just click on search.
If the input from the camera matches more than one project, the search feature shows a list of them with the matching score.

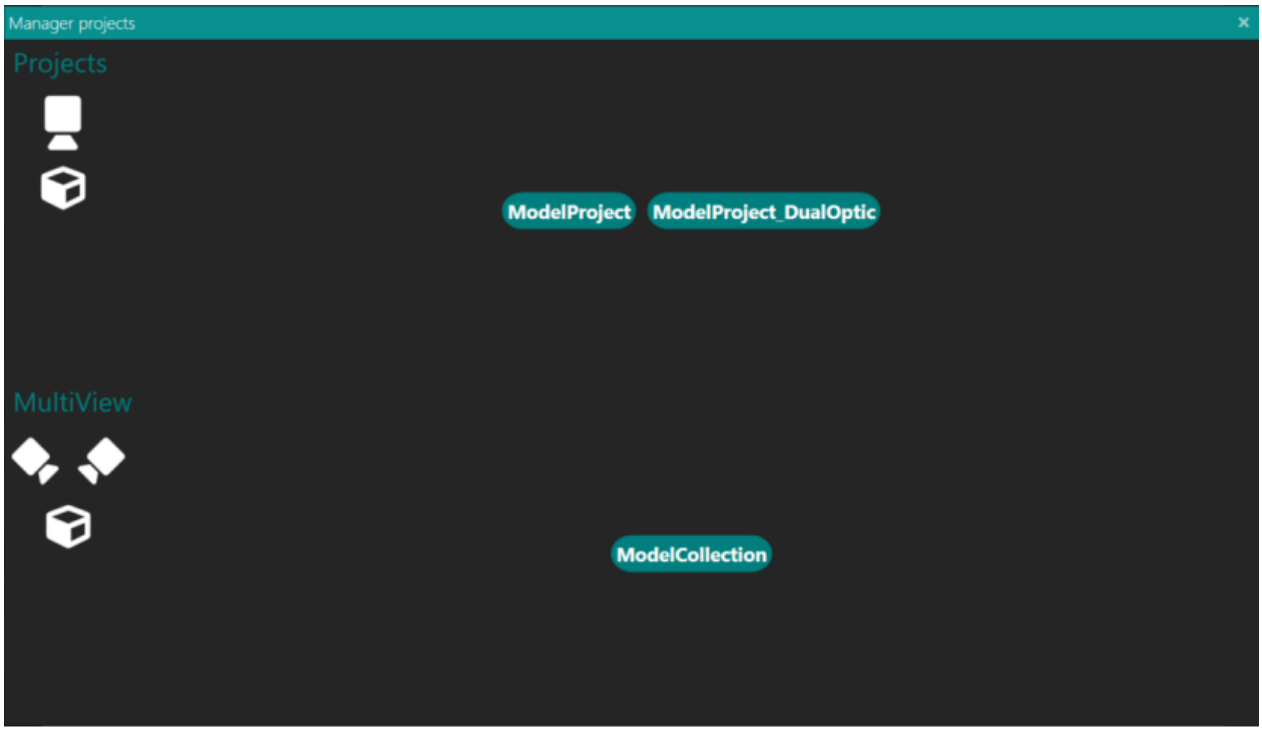


Saving a project created using an ImgFromFile (see PropertyBar) makes the search tool to not find it if the input comes from a camera. Furthermore, if the input is an Image uploaded, it will find only the projects saved with the ImgFromFile enabled.

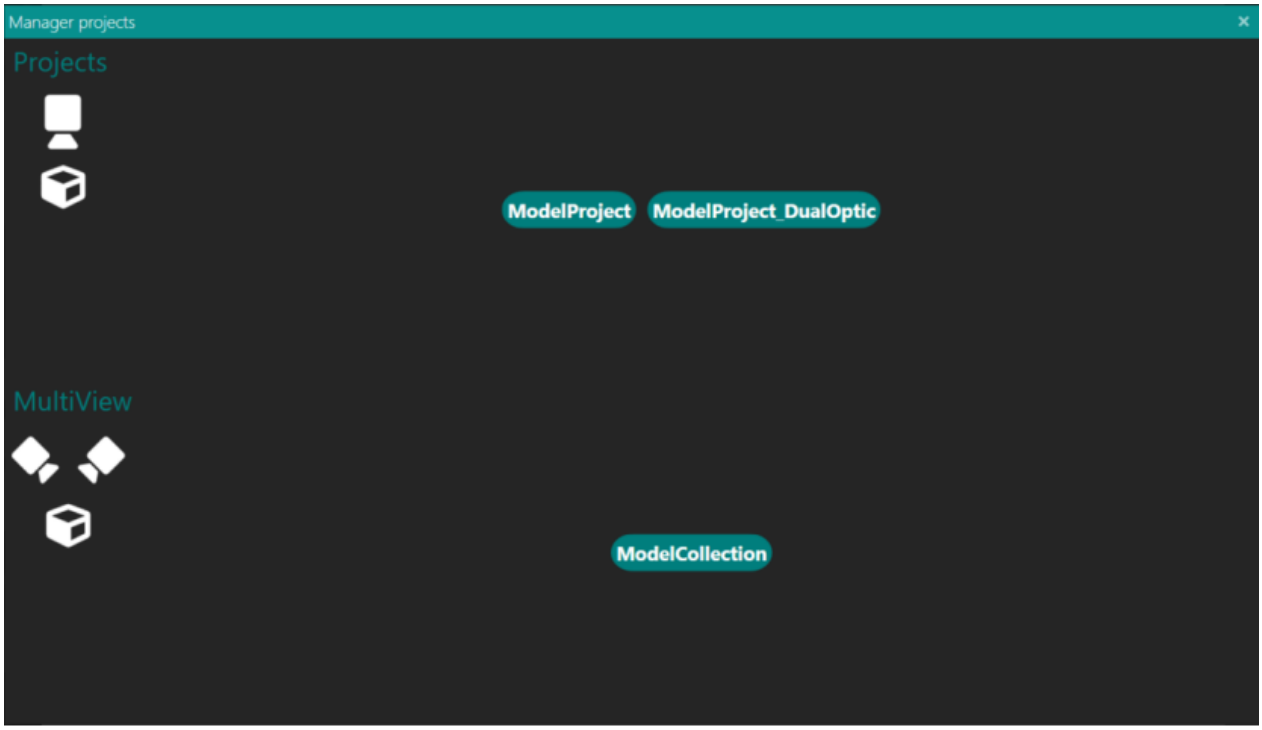
On the second lever (inside a folder) you can create or manage projects alike folder's project.



By pressing the add button you can choose whether to create a new project (ModelProject) or a collection of projects (ModelCollection).



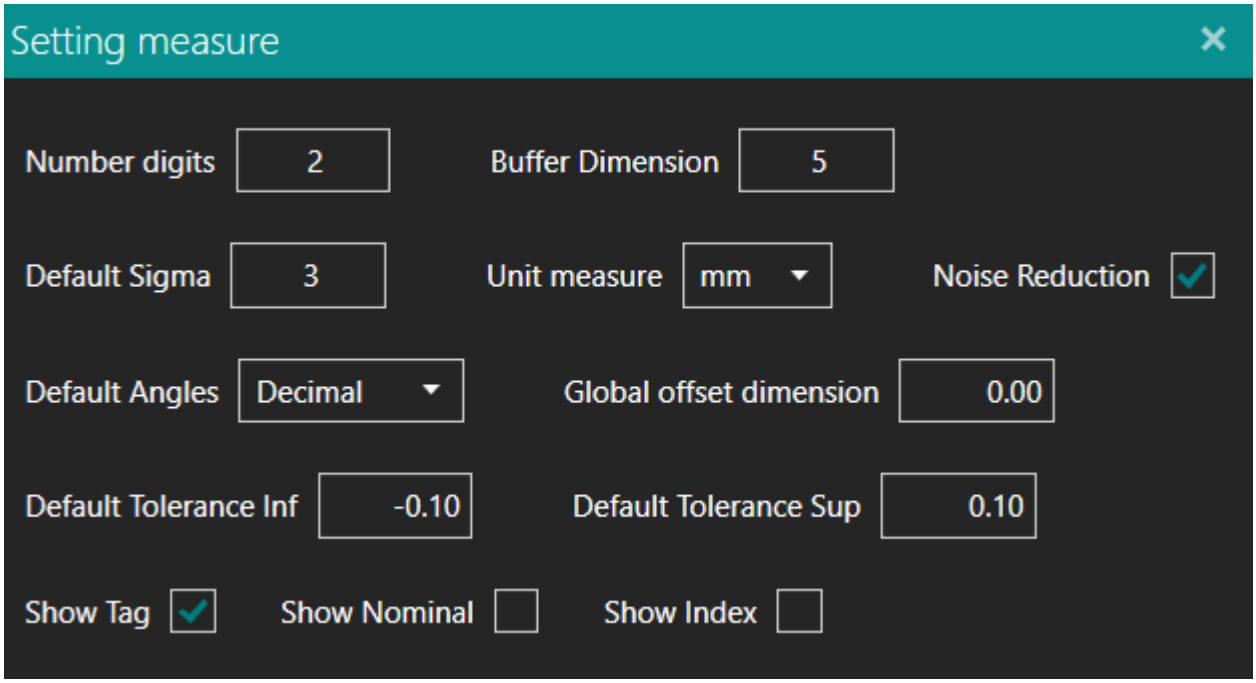
If you choose to create a collection, once opened, the list of projects contained in the collection will appear on the left bar with the possibility of selecting the work project.



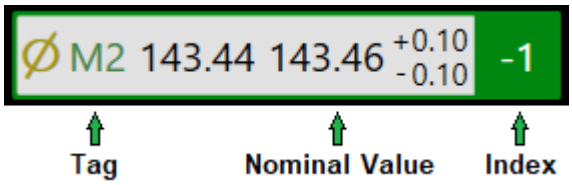
By pressing the add button (+ icon) you can add an existing project (Open) to the collection or add a new project (ModelProject).

Measure Setting

Configure dimensions and measures.



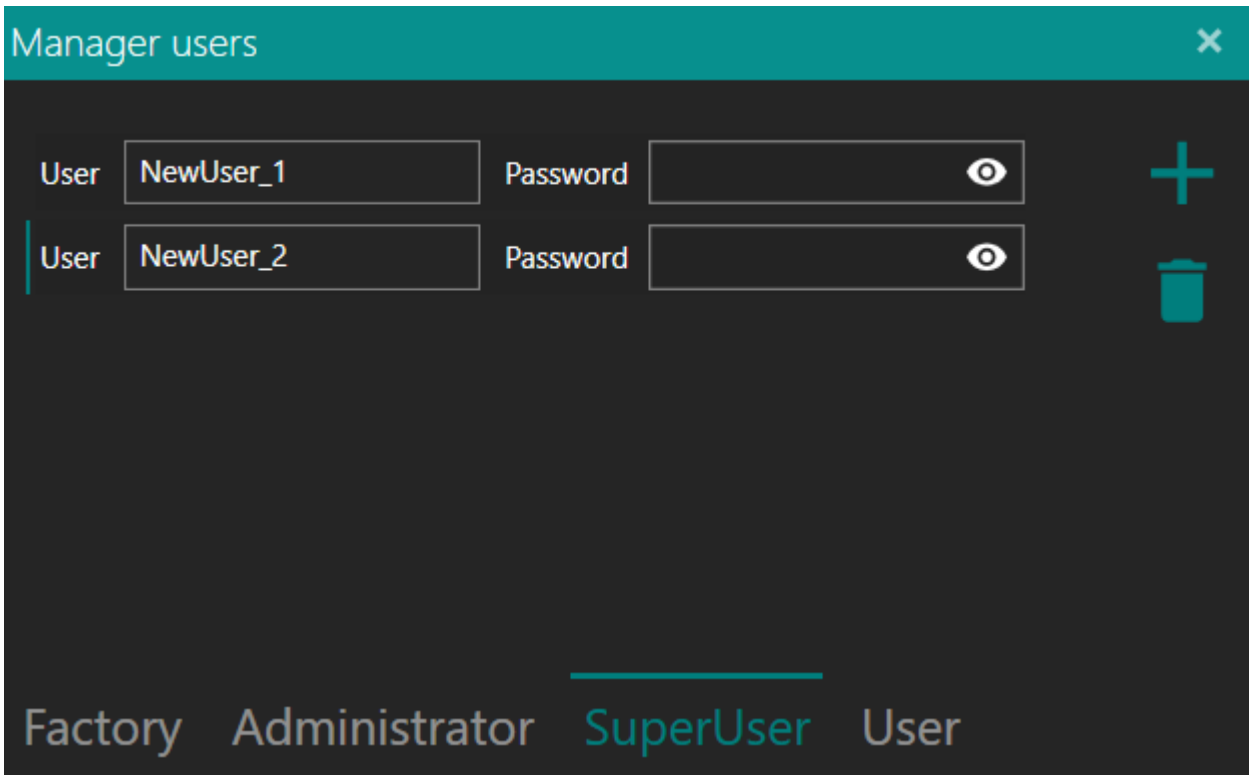
- Number of digits after the decimal separator;
- Buffer dimension to stabilize live measurement values by averaging n values;
- Default sigma for fitting the primitives;
- Unit of measure for dimensions;
- Noise reduction to stabilize the measurement result for small value changes;
- Default type for angle measurement (decimal or degree);
- Offset for dimensions;
- Lower and upper default tolerance;
- Show Tag, Nominal Value, Index of dimension:



The first two values can be set in the Property Bar, the third is calculated by the system as an index of deviation between the nominal value and that is measured, with respect to the lower / upper tolerance values.

Manager Users

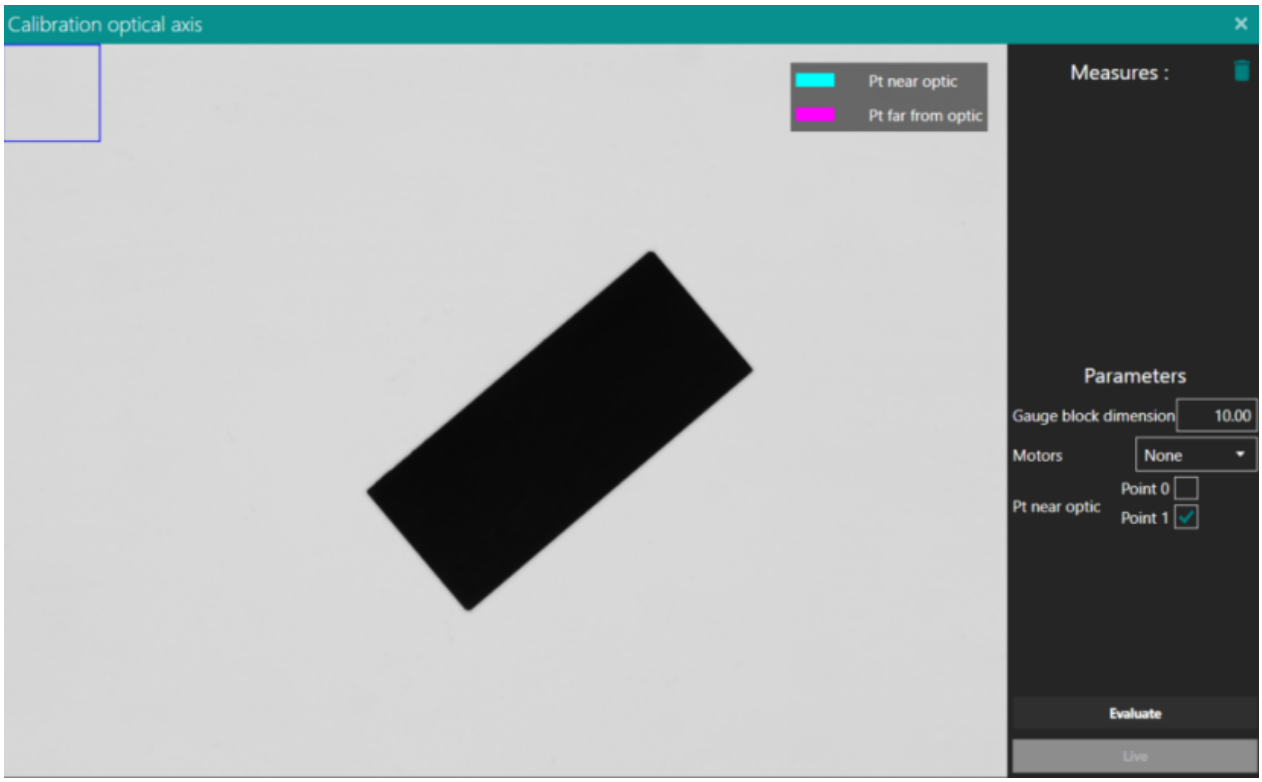
Create and manage users.



Users can be divided into four categories: Factory, Admin, SuperUser and User. The Factory user can administer Admin, SuperUser and User users. The Admin user can administer SuperUser and User users, and so on.
To add new user, use the + icon buttons on the right side. Each user must have a unique name regardless of the category they belong to.
To remove a user, use the trash icon buttons on the right side.

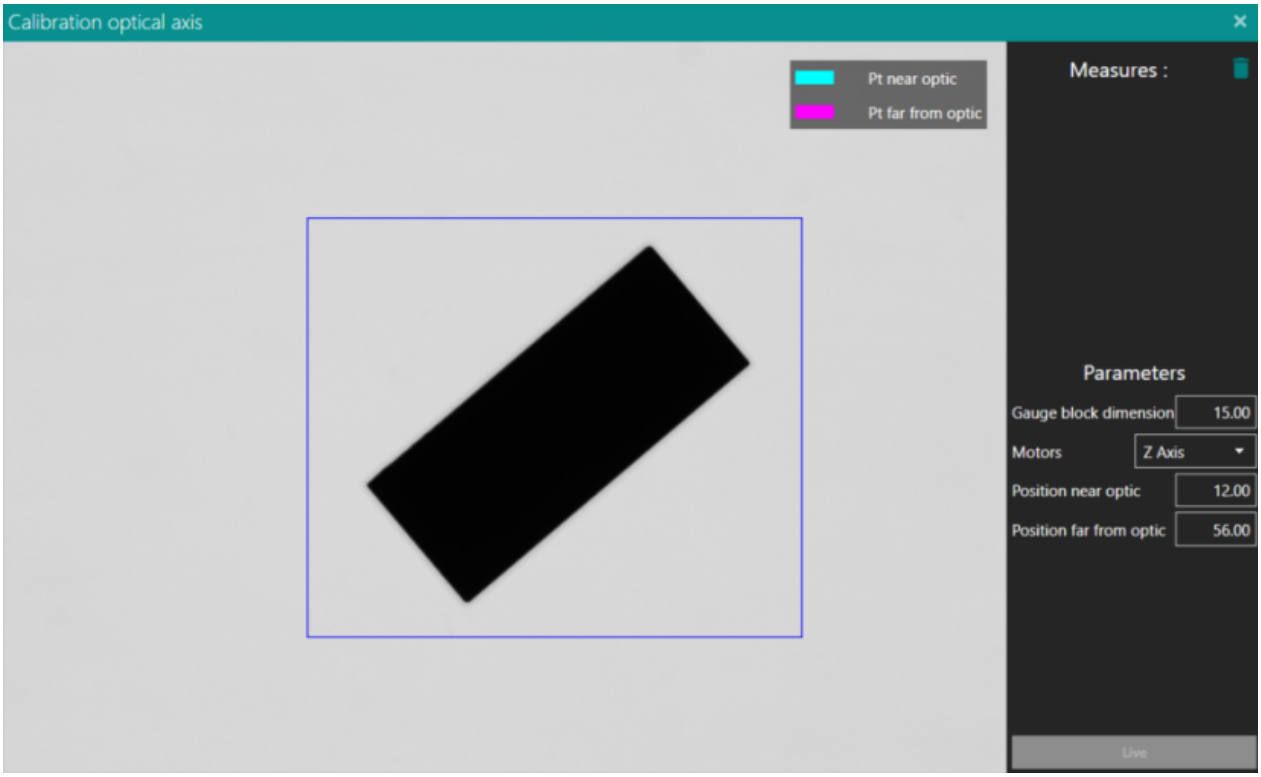
Calibration Optical Axis

To calibrate.

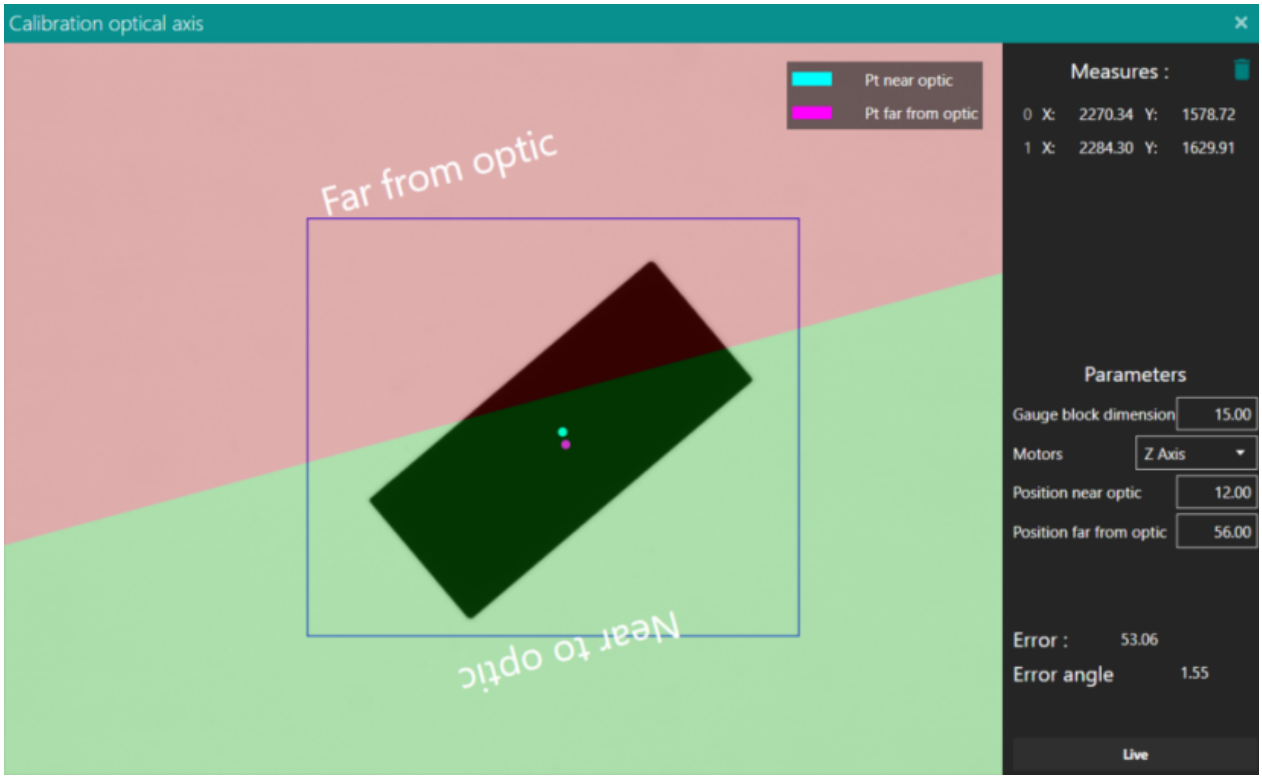


The optical axis calibration is performed by a Johansson gauges blocks. The objective is to make the optical axis as parallel as possible with the Z axis of movement.

a)Automatic procedure:
Find, by actuating the motor along the Z axis, the two positions at the two ends of the depth of field in which the gauge block is in focus and note the values.
Start the calibration procedure from the Settings Menu, select the *Z axis* motor from the *Motors* drop-down box.
Drag and change the size of the rectangle on top left to include the gauge block and enter its dimensions in the box on the right.
Always in the box on the right, enter the two previously noted positions of the motor.

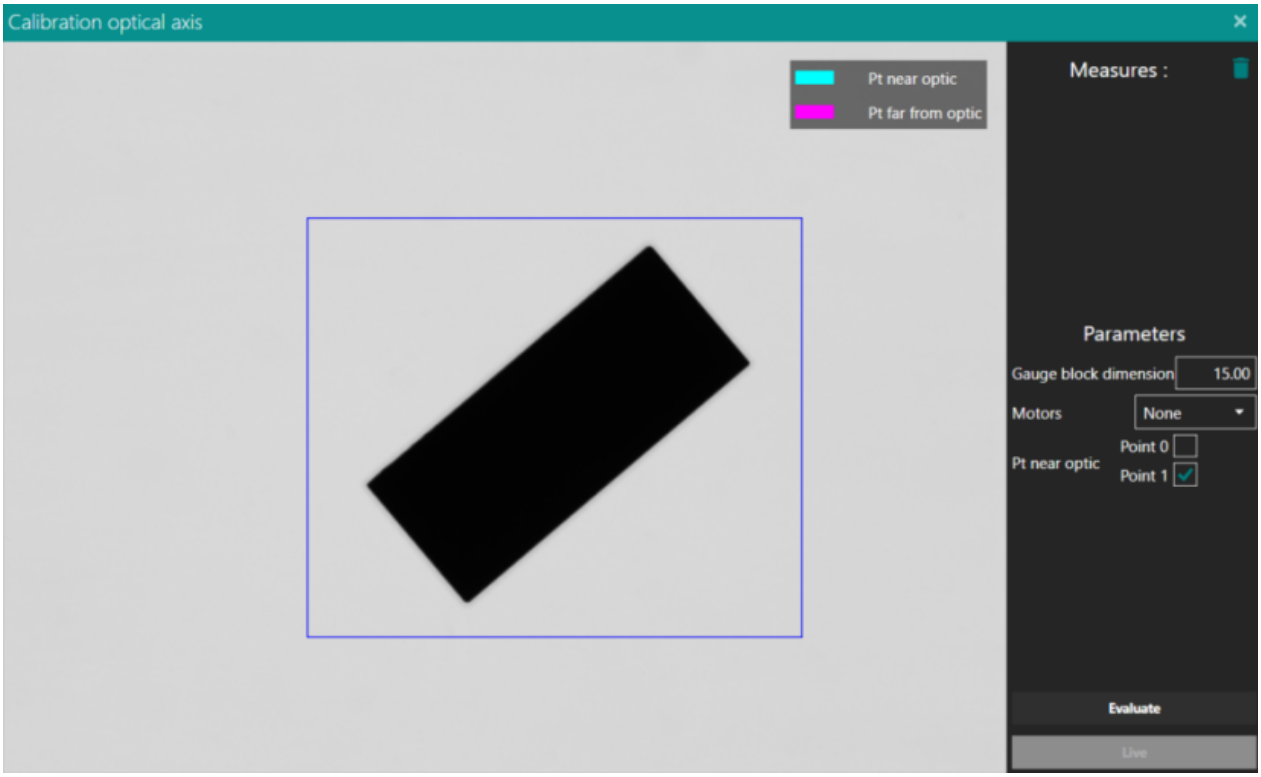


Press once on the image outside the rectangle containing the gauge block.

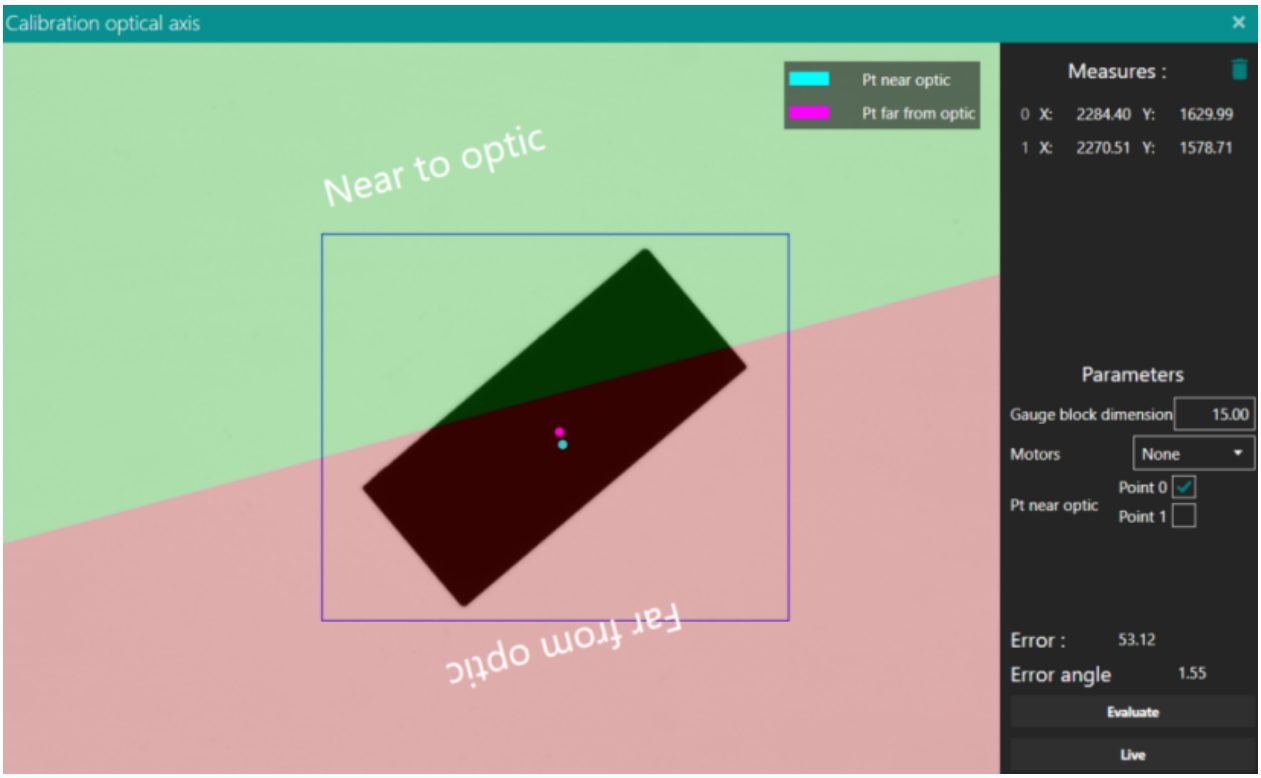


At the end of the two measurements the value of the error in pixels and the offset angle in degrees will be shown. The image will indicate how to move the plan to correct the error.

b)Manual procedure:
First find, by manually operating the Z axis, the two positions at the two ends of the depth of field in which the gauge block is in focus and note the values.
Start the calibration procedure from the Settings Menu, select *None* from the *Motors* drop-down box.
Drag and change the size of the rectangle on top left to include the gauge block and enter its dimensions in the box on the right.



Using the motor console, position yourself manually on the first position, click on the image outside the selection rectangle to get the first pair of values.
Position yourself manually on the second position, click on the image outside the selection rectangle to obtain the second pair of values.
In the right box *Pt(point) near optic* select which of the two points is closest to the optics.

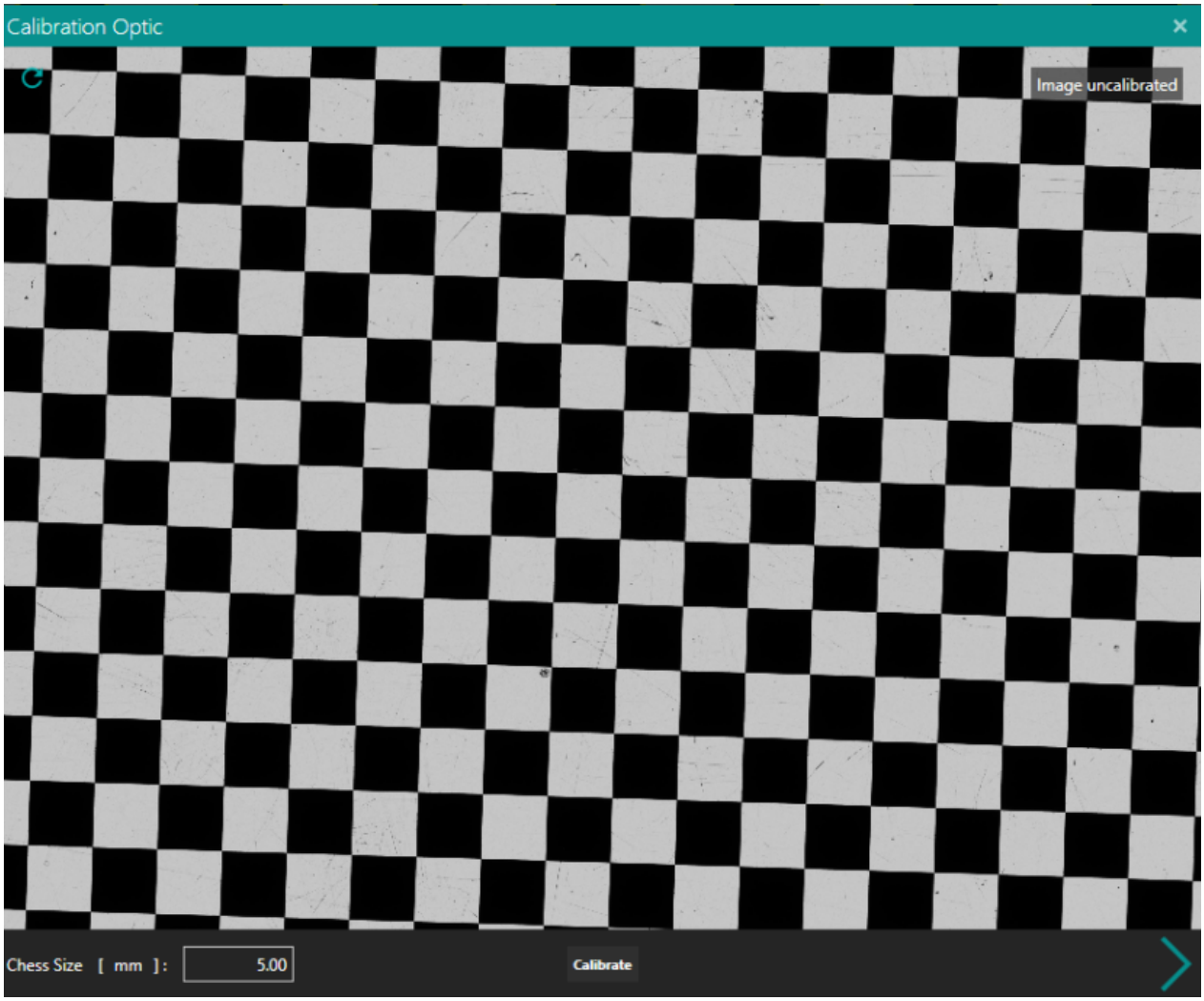


Press Evaluate at the end of the two measurements and the value of the error in pixels and the offset angle in degrees will be shown. The image will indicate how to move the plan to correct the error.

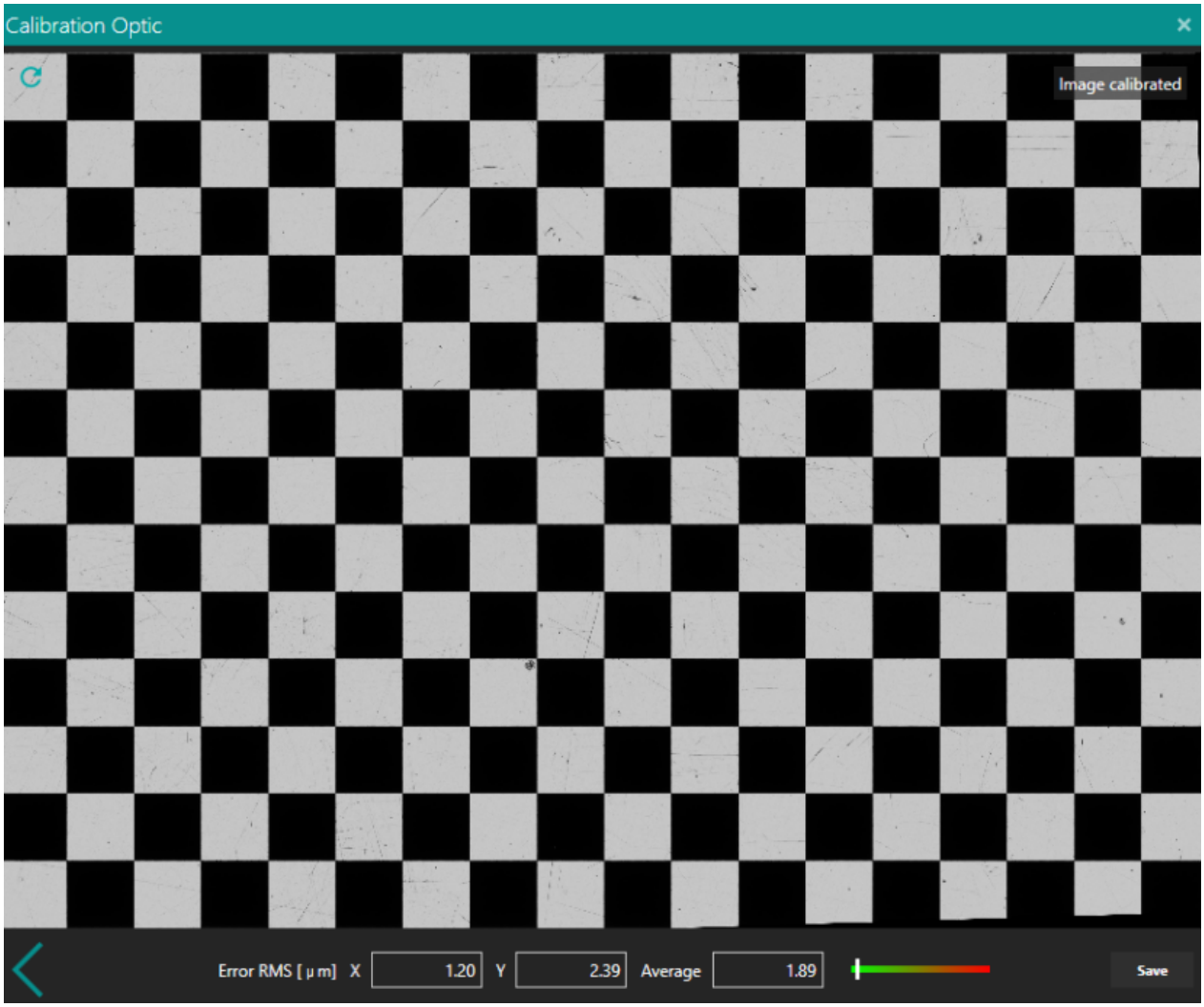
After adjusting the plan, press the basket icon and repeat the procedure until the error is minimized.
With the Live button the algorithm continues to calculate the second position, useful to see what happens adjusting the plan, but not accurate as repeating the entire procedure.

Calibration Optic

To calibrate.



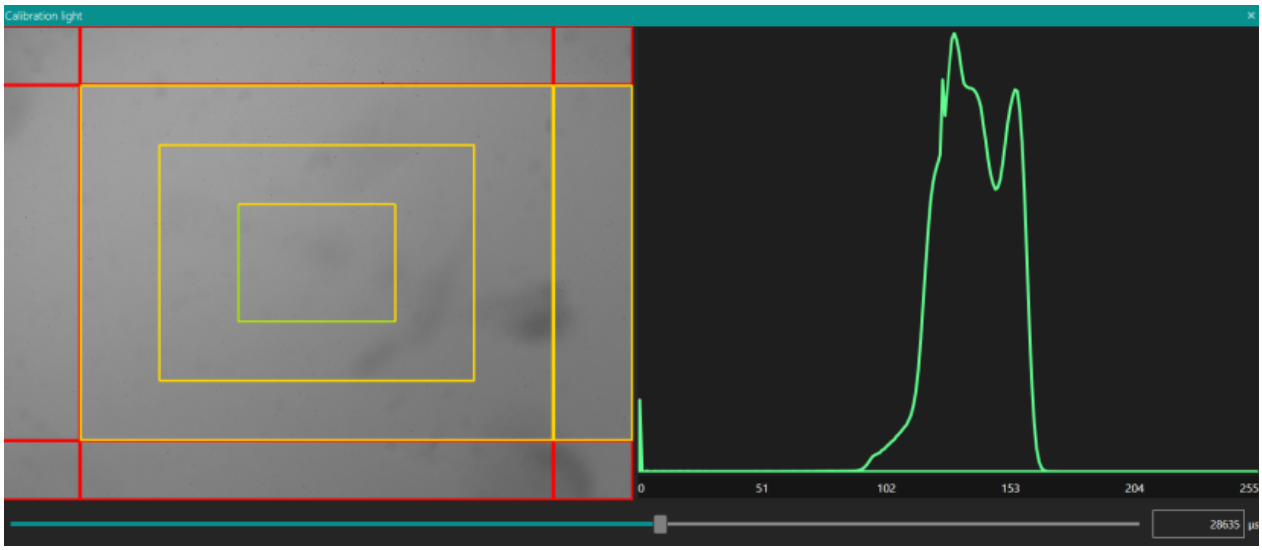
The optical calibration is performed by a chessboard of at least 5X5 chess within the FOV.
Put the chessboard as straight as possible, make sure that the first column shows only half chess as shown in the image, enter the size of the single chess in millimeters or in the unit of measurement set in Measure and then press calibrate; the system will automatically calibrate the image.
In some particularly difficult conditions the operation can take a few minutes.



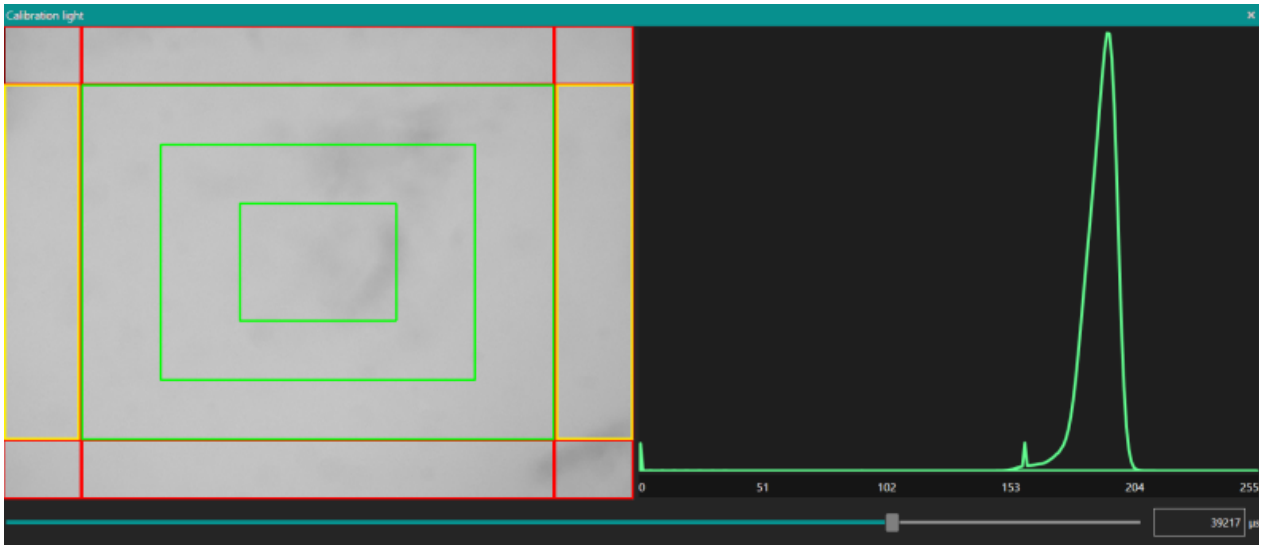
If everything is correct, the rectified image will appear with calibration process errors in micrometers; a cursor indicator will give you a qualitative evaluation of the calibration just done.
Then you can save the calibration as file to be able to select it from the Camera settings.
If a zoom lens is used, the procedure must be repeated for each magnification value.

Calibration Light

To calibrate.



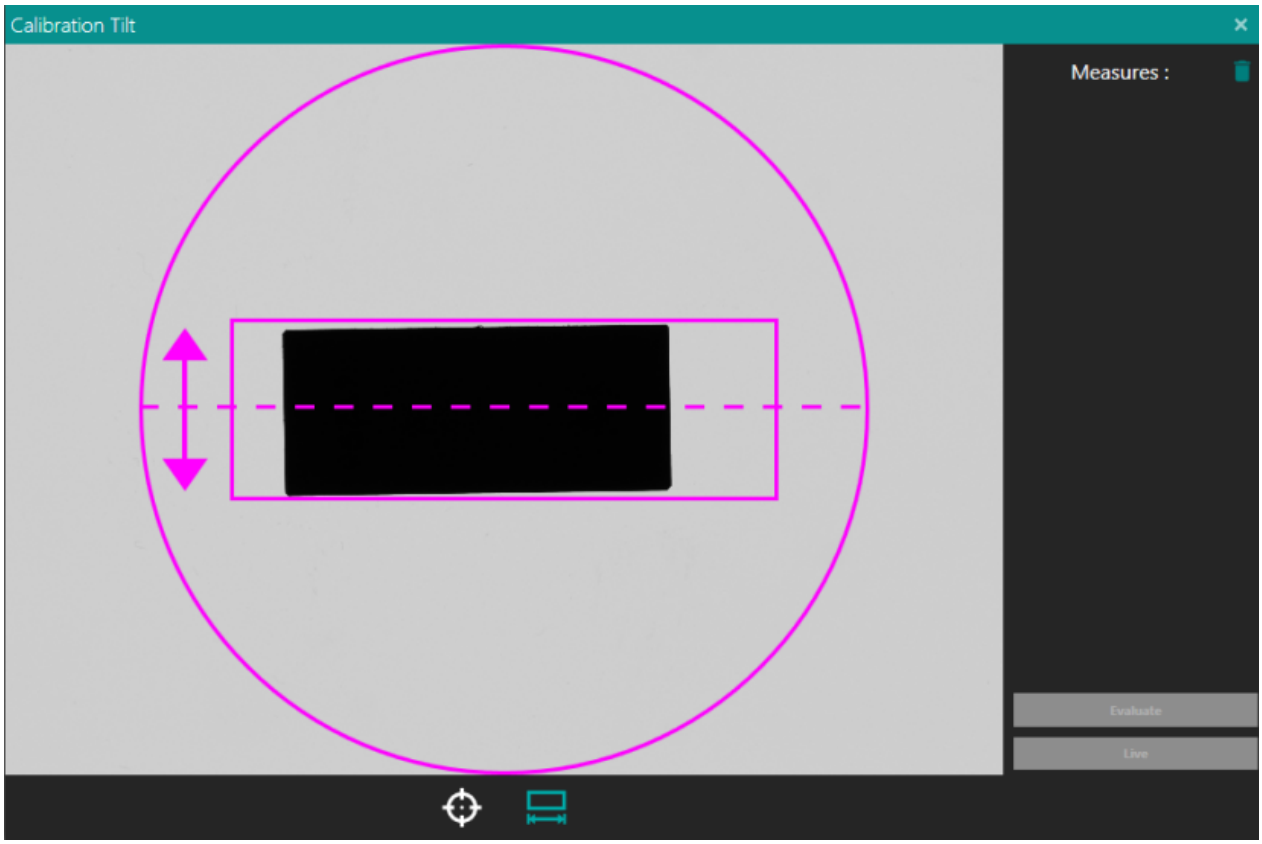
Calibration Light helps you to find a uniform illumination of your work surface. On the left side, the work area is divided into several panels, moving the camera or the light source, the ideal condition is achieved when all the squares are colored green. In the case these are yellow or worse red means that area is in proportion far from the ideal average value.



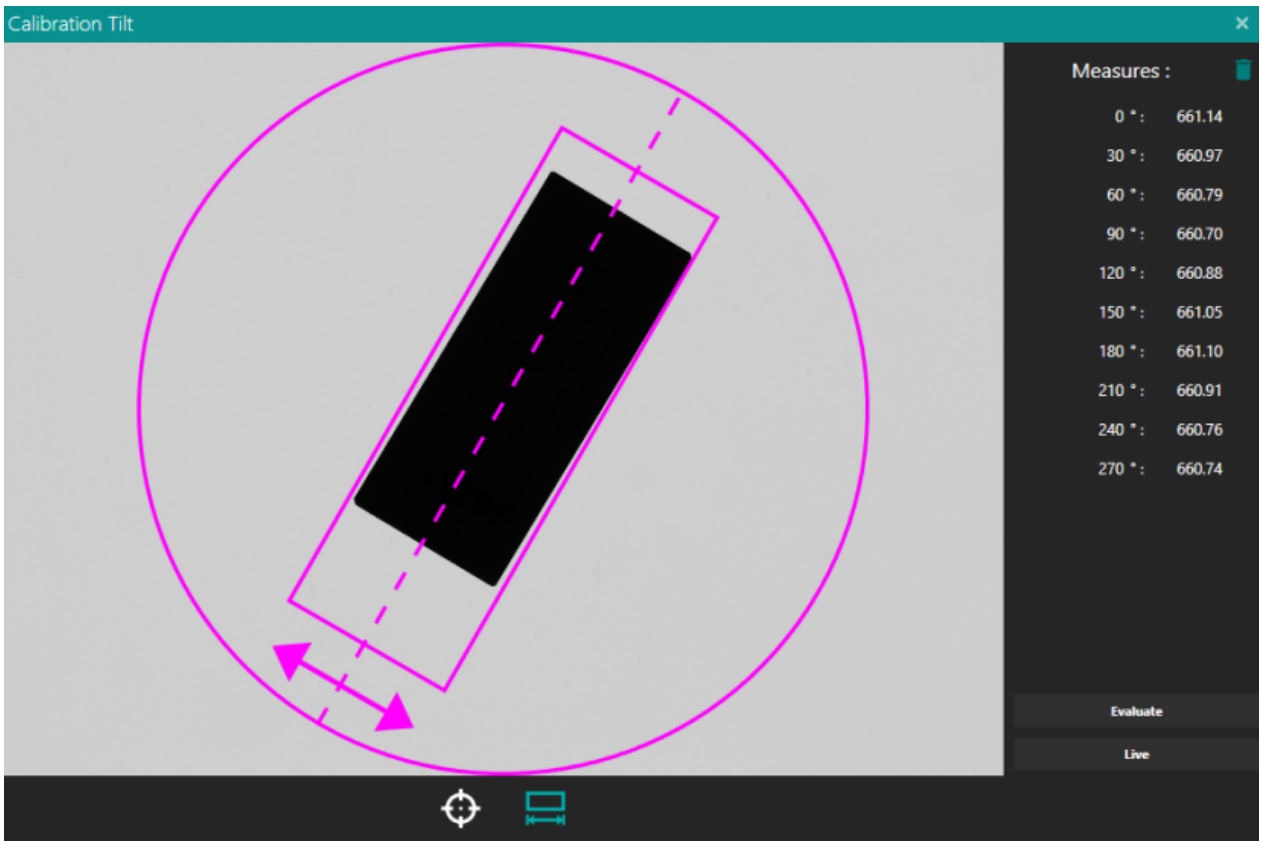
On the right side an image histogram acts as a graphical representation of the tonal distribution in your image. It plots the number of pixels for each tonal value. By looking at the histogram you will be able to judge the entire tonal distribution at a glance.The ideal condition is realized as all the points are concentrated in the average value (medium gray) in a very narrow Gaussian. Slider at the bottom can help you find the right exposure.

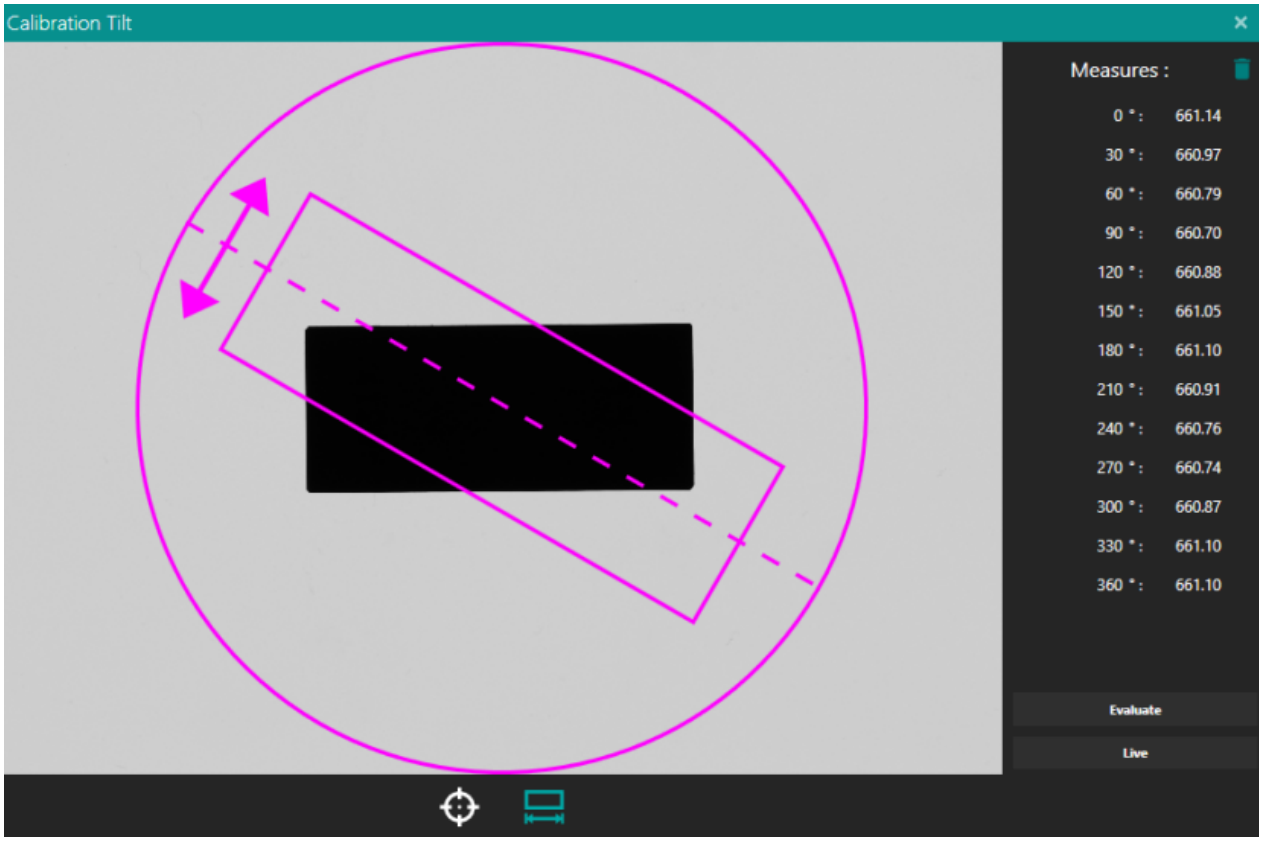
Calibration Tilt

Calibration Tilt helps you to mitigate a possible inclination of the work plan that can lead to an incorrect vision and relative measurement errors.
Position your Gauge blocks following the instructions on the screen and click on the image.



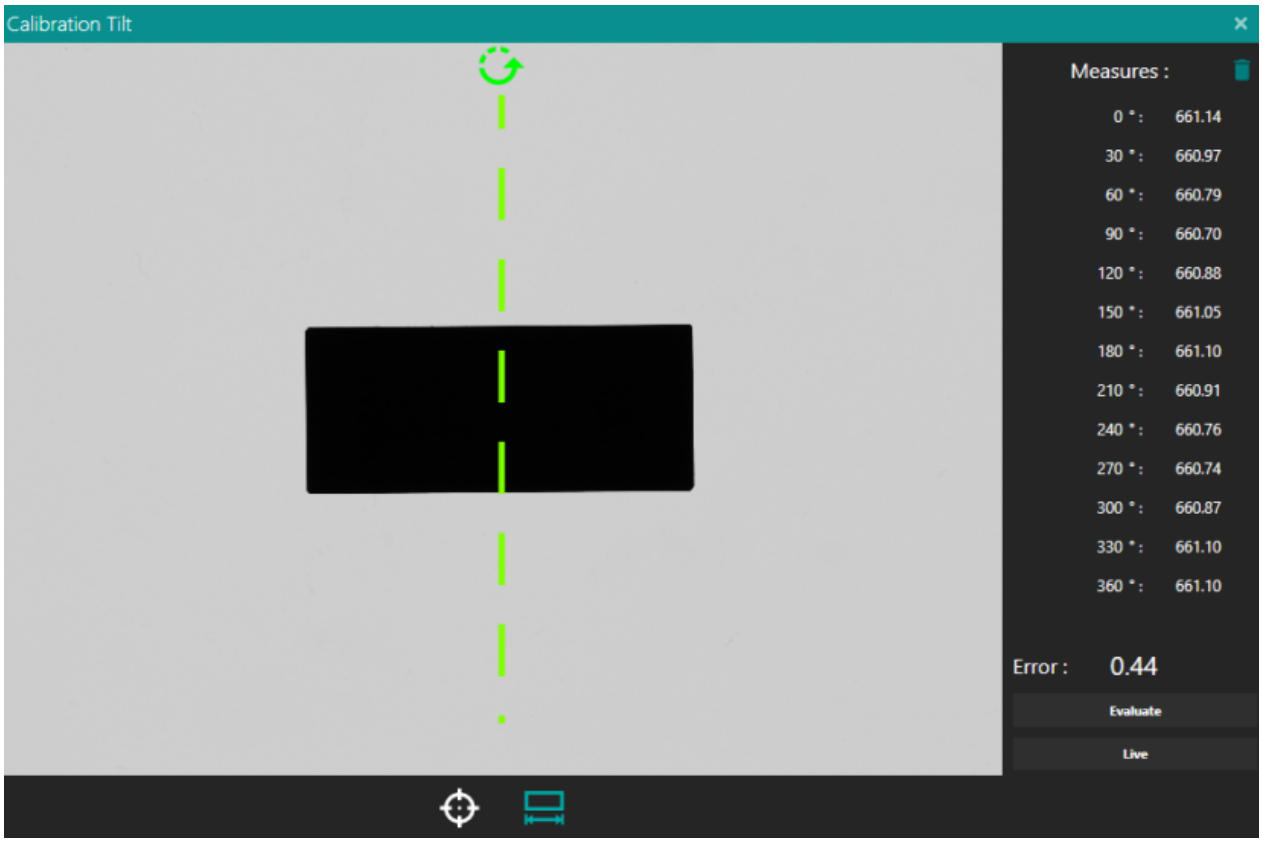
Move the gauge blocks following the proposed track by clicking in the image each time to confirm the position. The individual measures in pixels will appear on the right hand column.



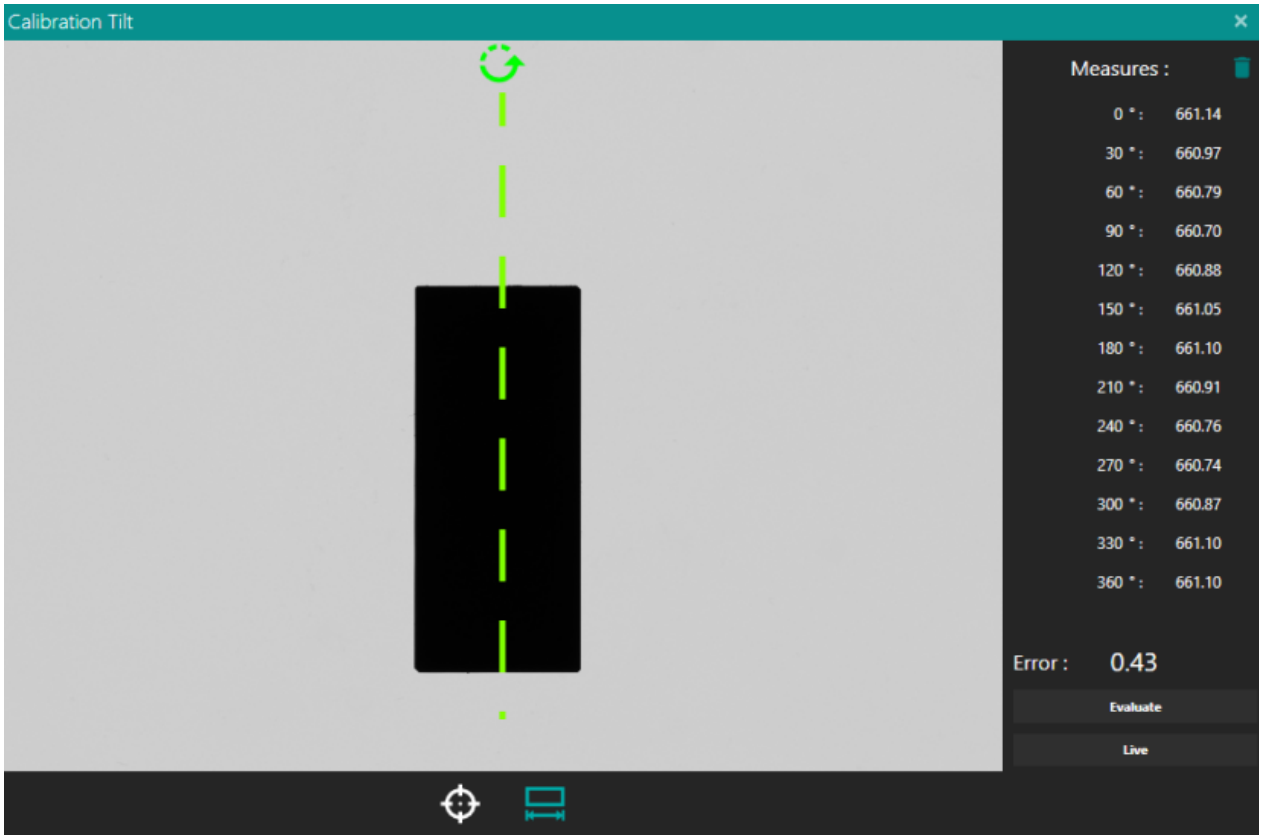


After a few measurements, press the Evaluate button; the program will

indicate with a green axis the direction in which the imbalance is present.

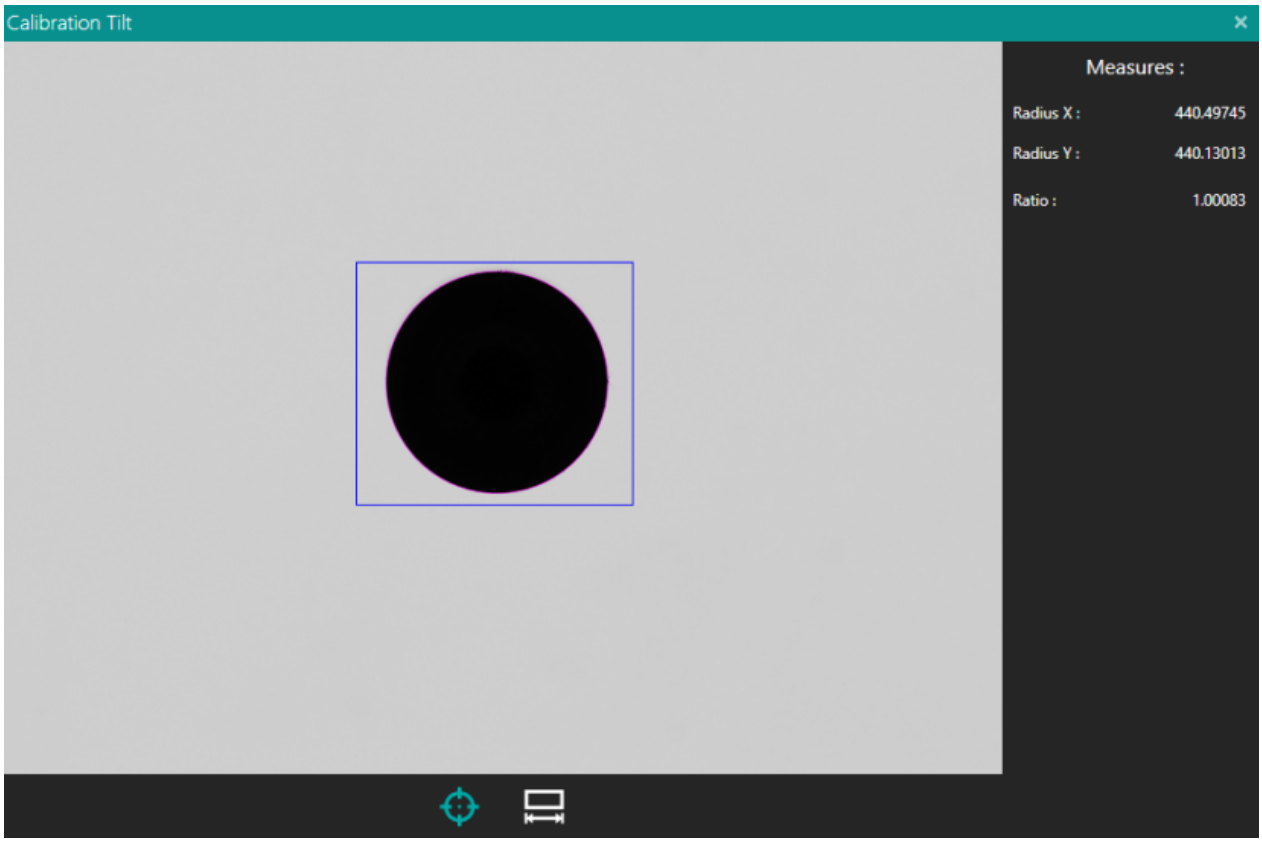


Put your gauge blocks in axis, press the Live button and try to minimize the error by tilting the plane along the indicated axis.



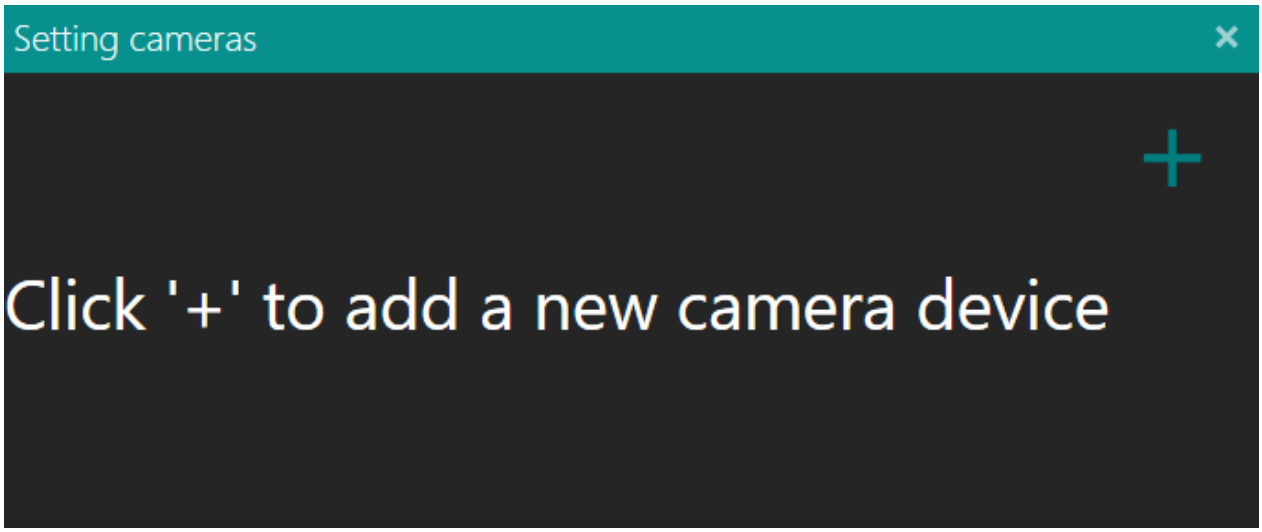
In Pin mode

position the cylinder in the FOV, drag the rectangle to include it, the system will immediately enter live mode. Change the inclination of the plane until you have a ratio of 1 at least up to the fifth decimal place.

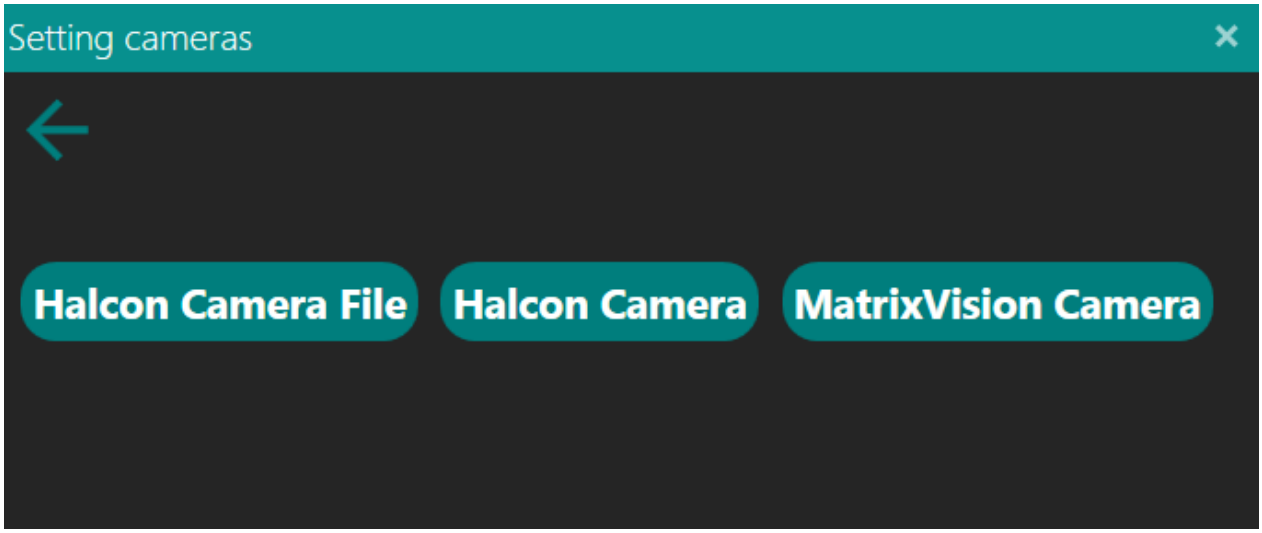


Camera

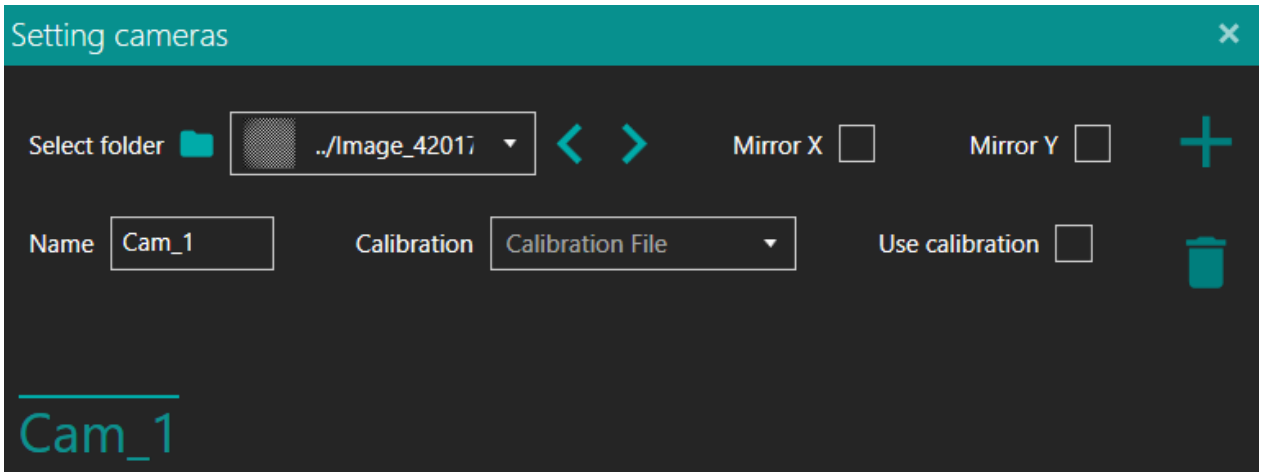
Control the acquisition device.



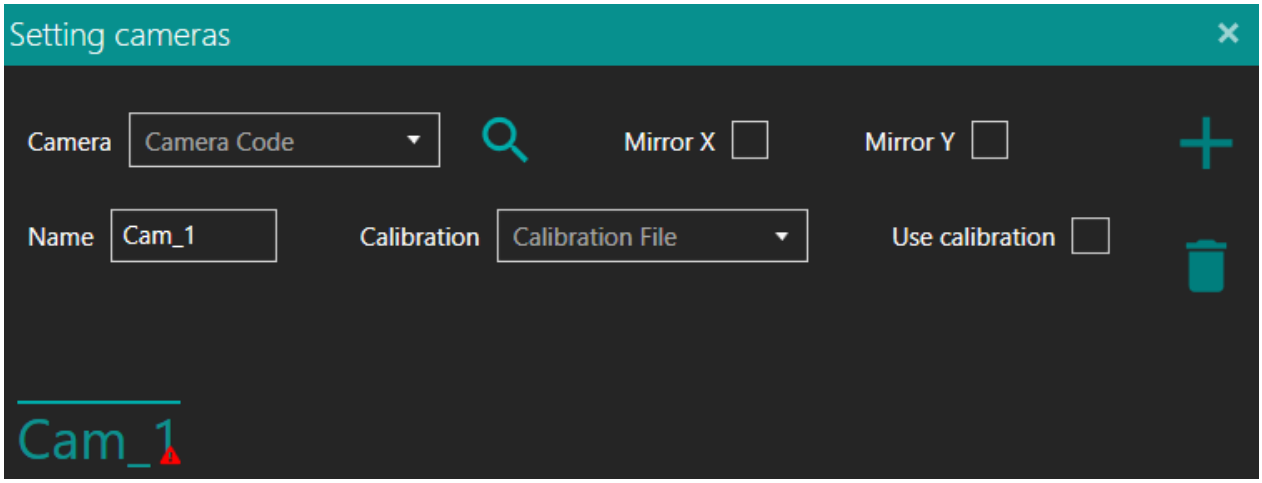
To add new camera use the + icon buttons on the right side and make a pre-selection of the family type of camera to use or select 'Halcon Camera File' if you want to use images on disk.



If you select images you have to select the folder containing the images you want to use (folder icon button). If the folder has multiple images, it is possible to manually switch between images (drop-down curtain or arrow icon button). The other options are the same if you select camera.



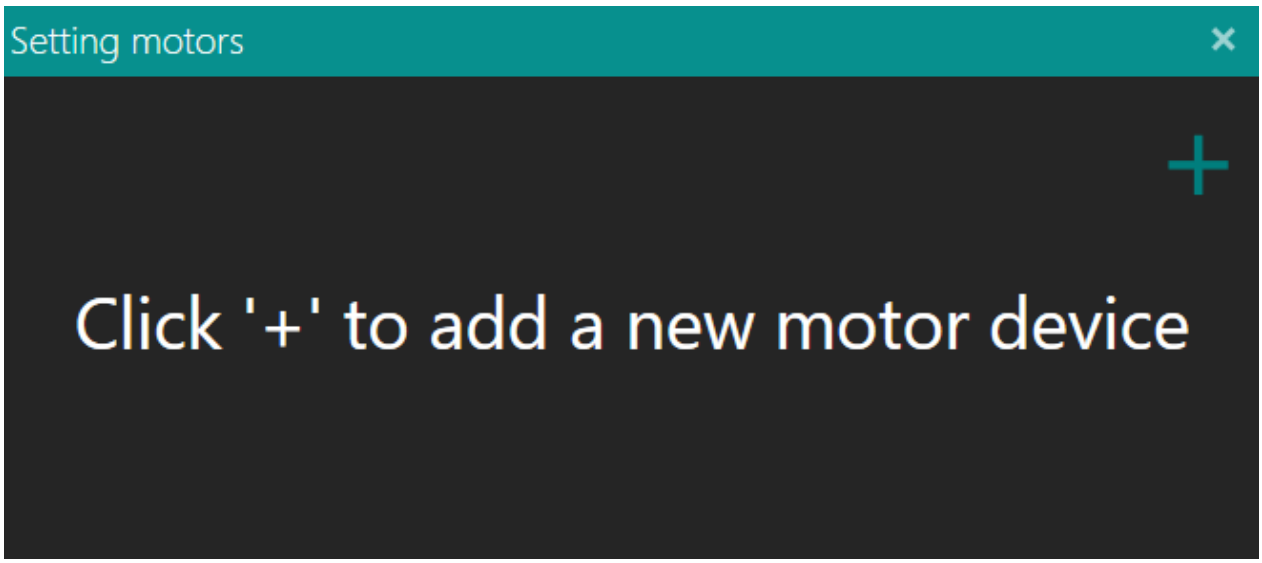
If you select a family type of camera you can select it or use the automatic search function (magnifying glass).
Through the two check boxes it is possible to invert the left-right (Mirror X) or high-low (Mirror Y) display.
With calibration you can select automatic calibration (.dat) or manual calibration (.mncal) to be used after checking 'Use calibration'.



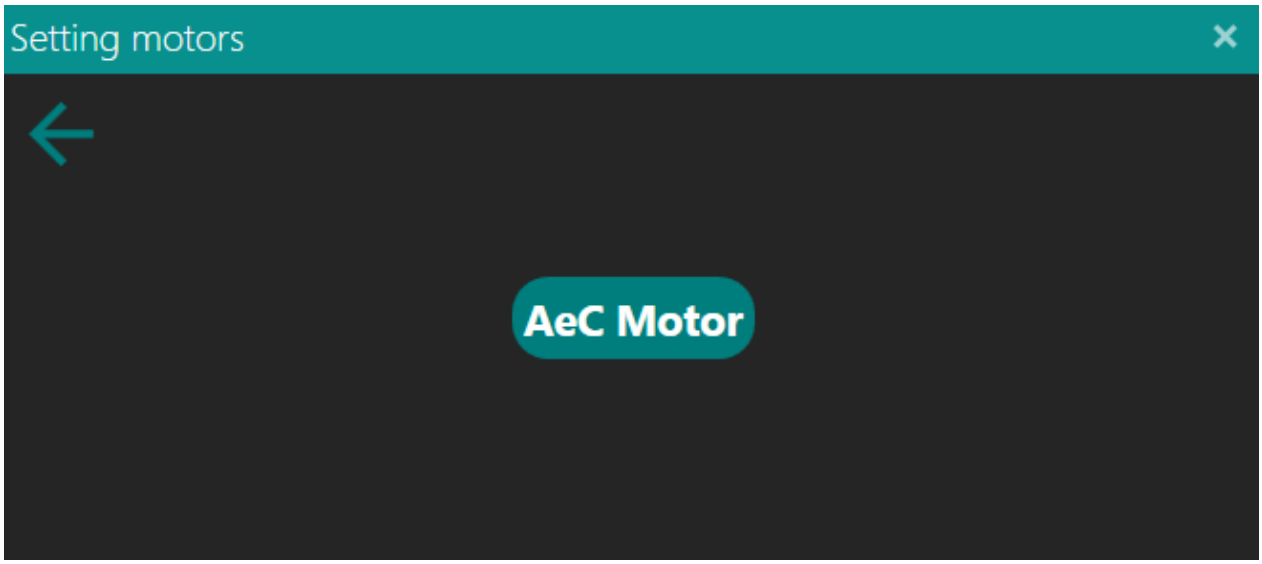
In the last line the list of the available camera is shown. To switch from one camera to another, simply select it from the list. To add new camera or remove the selected camera, use the + or trash icon buttons on the right side.
In the event of communication problems with the device, a red triangle with an exclamation mark will appear next to the name of the affected device.

Motor

Manage motor drivers.



To add new motor use the + icon buttons on the right side and make a pre-selection of the family type of motor.



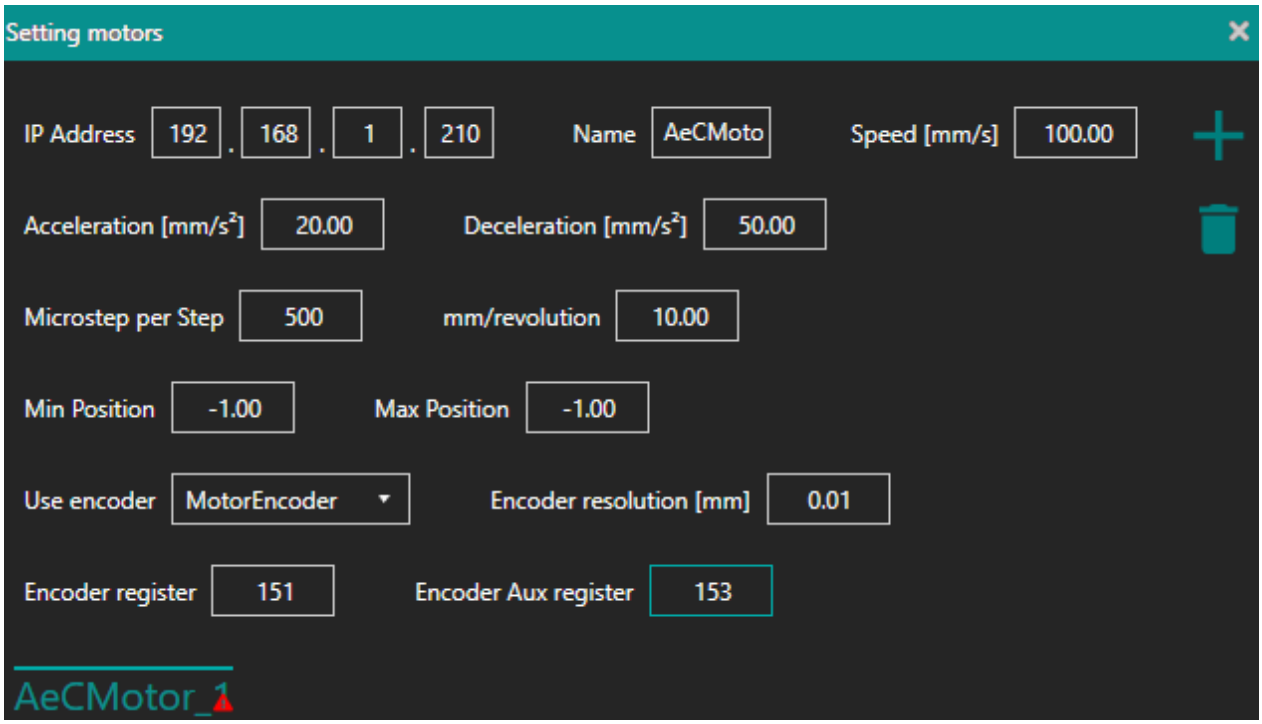
Enter the IP address and optionally change the name of the motor driver.

You may also enter the values of speed, acceleration/deceleration, microsteps per step and mm for motor revolution.

The permitted range of movement must be entered in Min/Max Position (-1.00 function disabled).

If an encoder is used, specify whether it is integrated stepper motor encoder or an external encoder connected to the drive and its resolution.

In the following fields, you can specify the address of the registry for the motor encoder or external encoder, check the updated AeC manuals for the correct values.

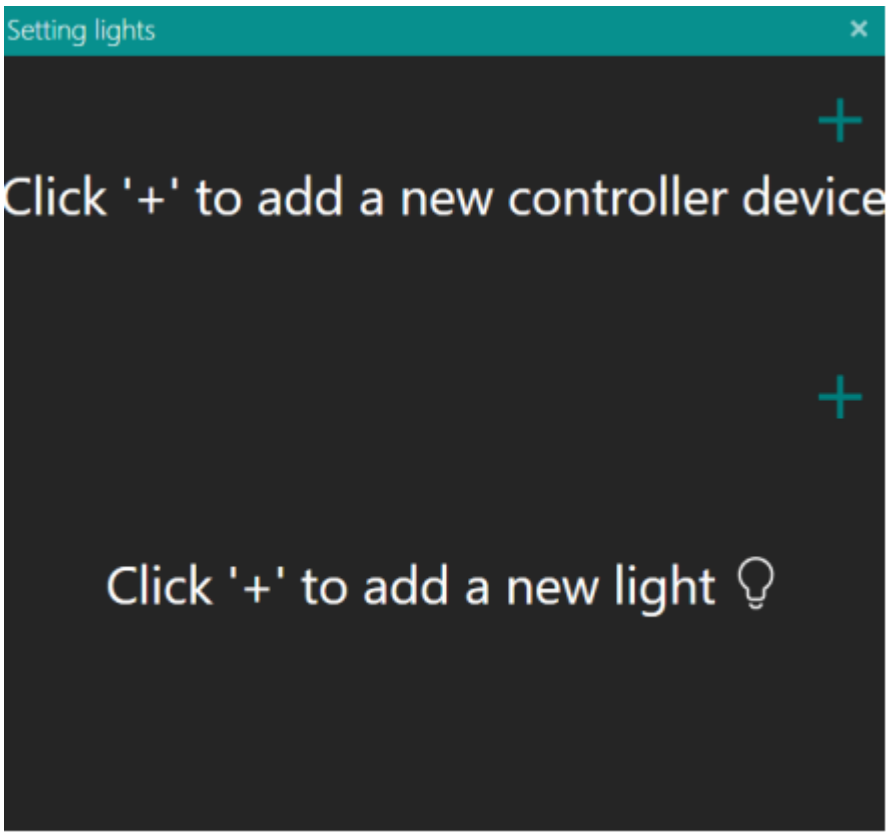


The selected motor controller is highlighted by -, to go to the next one select its name. To remove the selected motor controller, use the trash icon buttons on the right side.

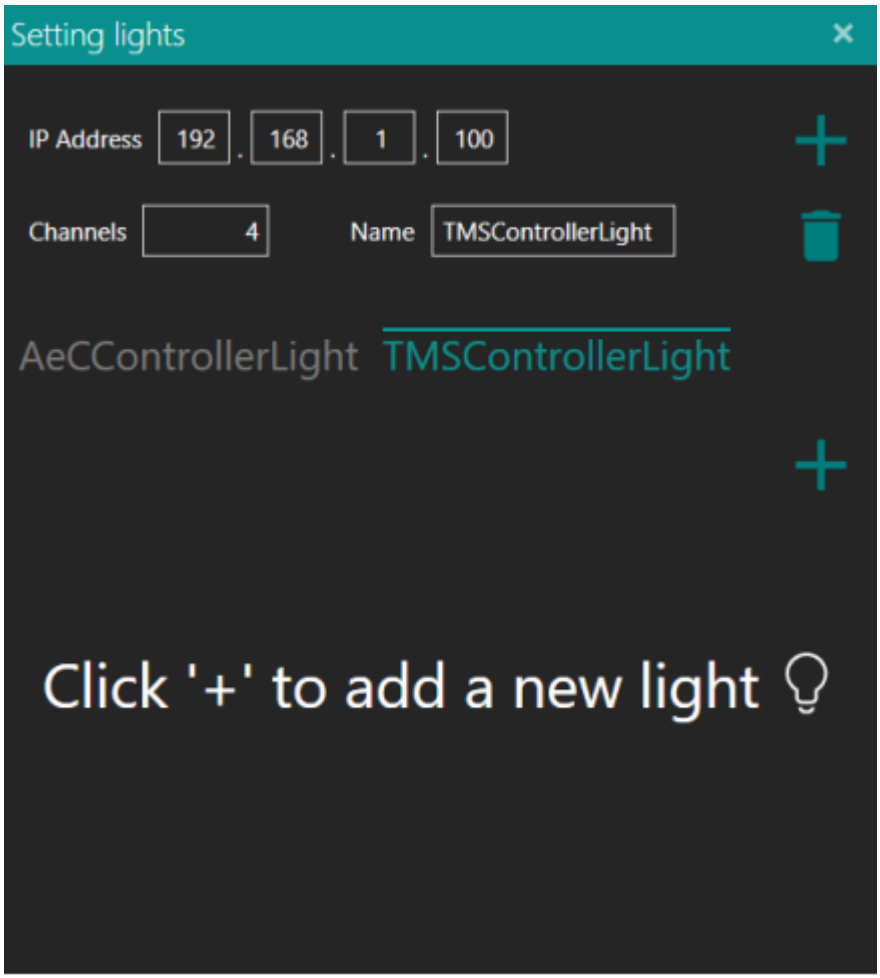
In the event of communication problems with the device, a red triangle with an exclamation mark will appear next to the name of the affected device.

Light

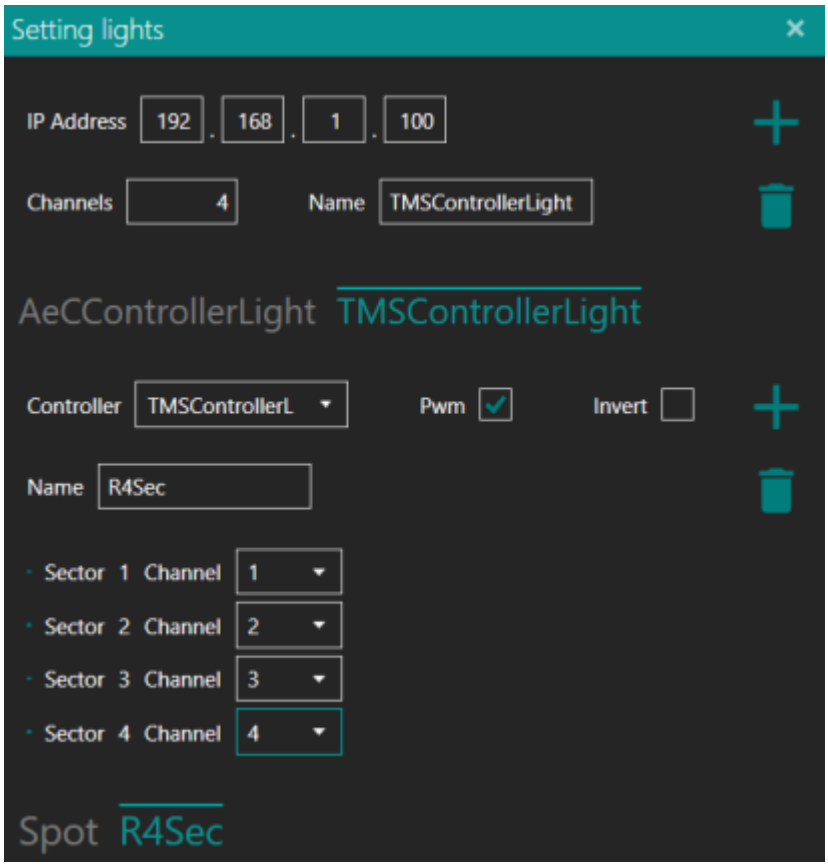
Setting light controllers.



Click + to add a new lighting controller and select model from those available. Enter the IP address, the number of available channels and optionally change the name of the controller.
To delete a controller, click on the trash icon. The selected controller is highlighted by -, to go to the next one select its name.



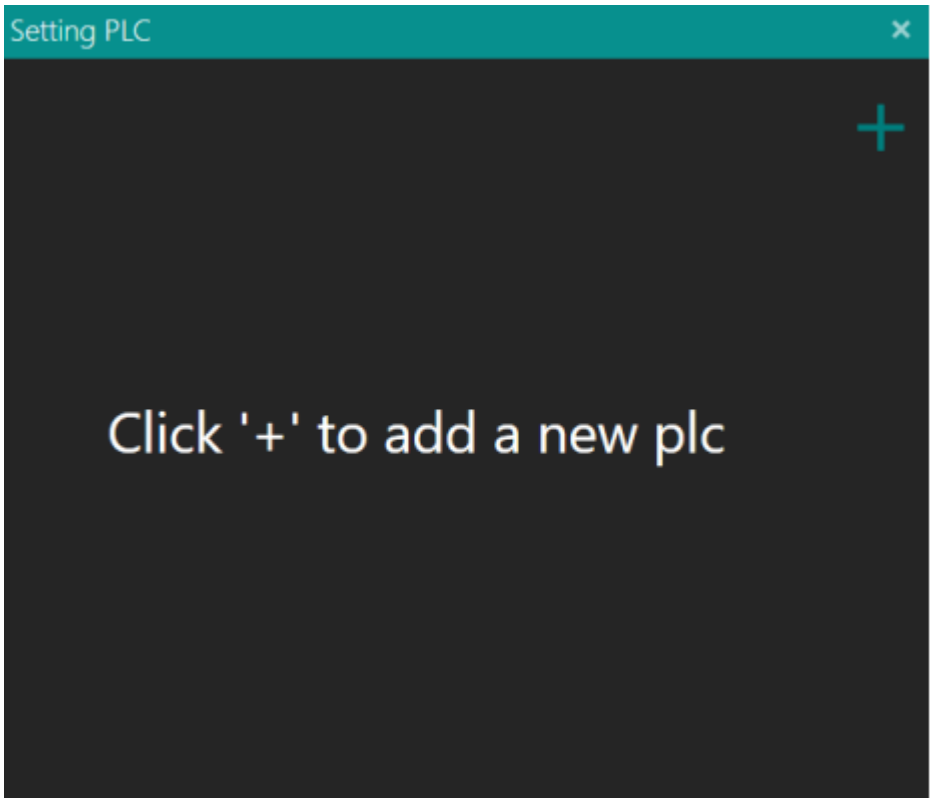
Click + to add a new light and select the model from those available. Choose the name of the controller from which it is managed, if the intensity is fixed or pwm and a name for the light.
The invert option changes the ignition order for the circular illuminators, useful if these are positioned below the object to be illuminated.
For each sector select the channel of the controller to which the light is connected.



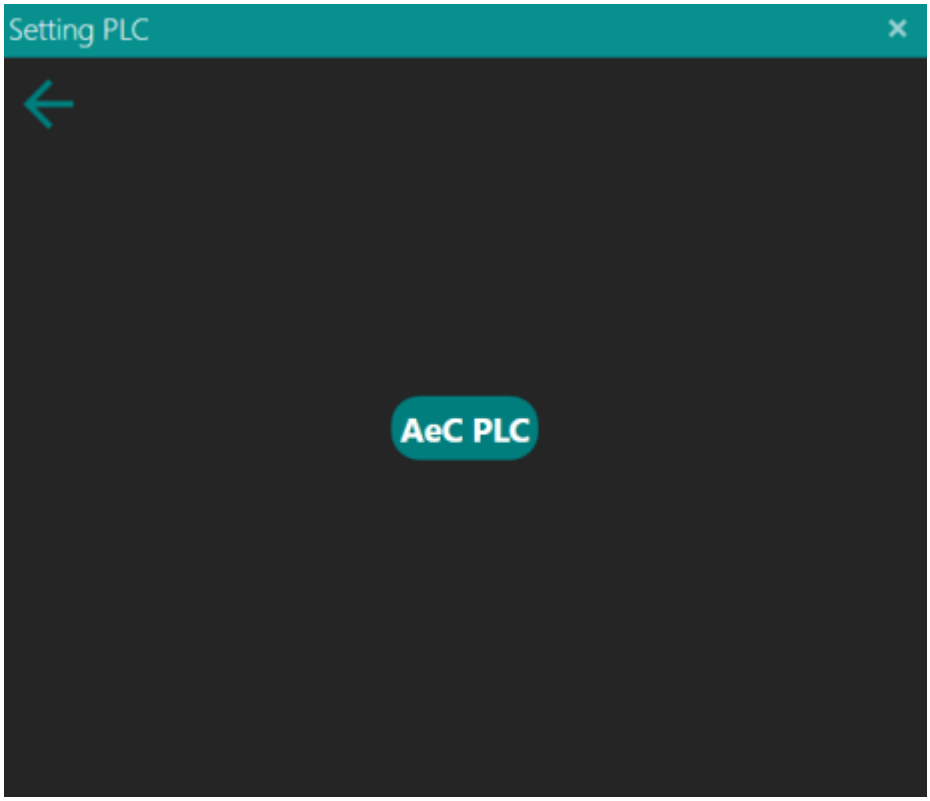
The selected light controller is highlighted by -, to go to the next one select its name. To remove the selected light controller, use the trash icon buttons on the right side.
In the event of communication problems with the device, a red triangle with an exclamation mark will appear next to the name of the affected device.

Plc

Setting PLC controllers.

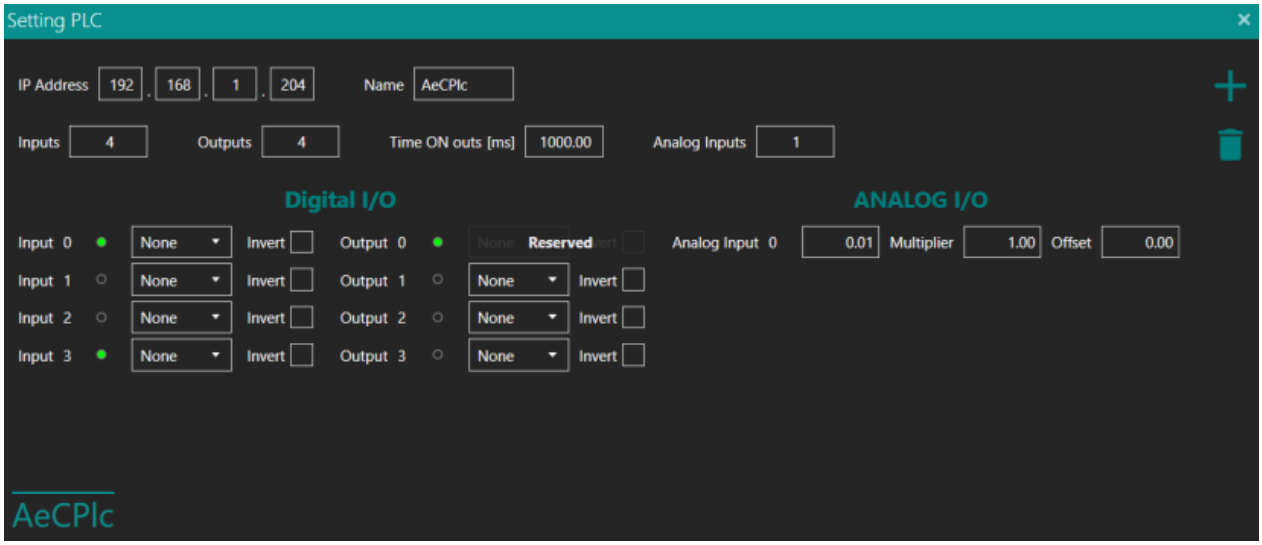


Click + to add a new PLC controller and make a pre-selection of the family type of PLC.



Enter the IP address and optionally change the name of the controller.
Also enter the number of available digital inputs and outputs channels, and finally number of available analog inputs.
With TimeON you can choose how many milliseconds the output, managed

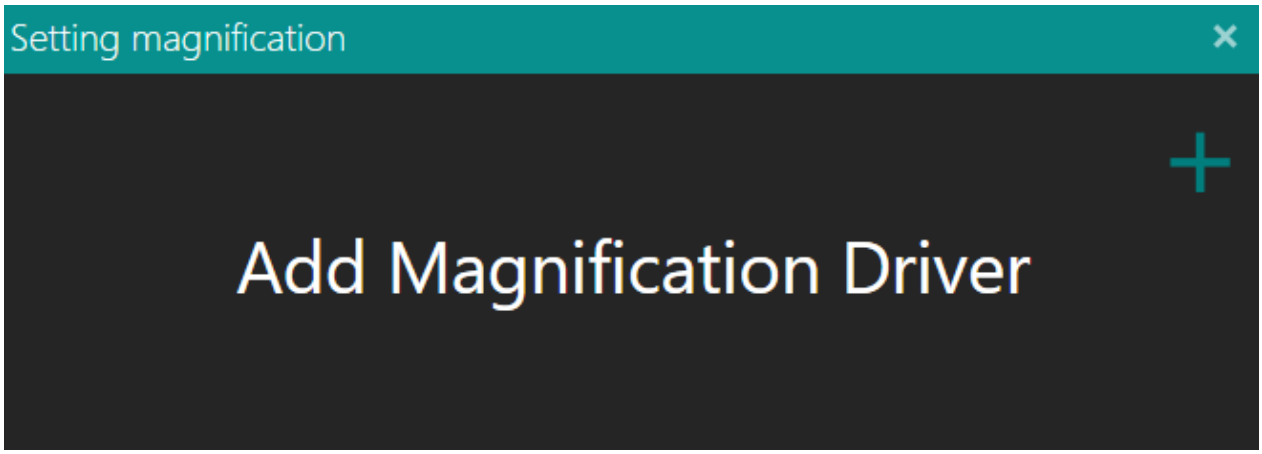
by an event, must remain active.
For each digital inputs and outputs you can assign the specific function and check its status; you can also activate or deactivate the outputs by clicking on the small circle.
If the same controller was used to manage n lights, in light settings, the first n channels are reserved for them.
You can also read the analog inputs and assign a multiplication and / or offset factor to be applied for each input.



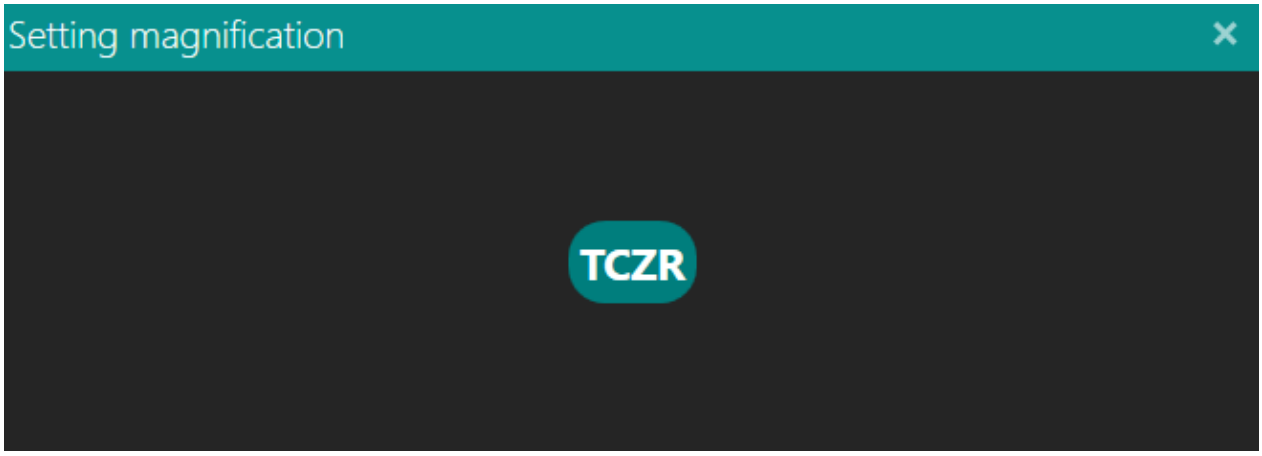
The selected PLC controller is highlighted by -, to go to the next one select its name. To remove the selected PLC controller, use the trash icon buttons on the right side.
In the event of communication problems with the device, a red triangle with an exclamation mark will appear next to the name of the affected device.

Magnification

Manage magnification controllers.



To add new magnification use the + icon buttons on the right side and select model from those available.



Enter the IP address, model and optionally change the name.

The selected magnification controller is highlighted by -, to go to the next one select its name. To remove the selected magnification controller, use the trash icon buttons on the right side.
In the event of communication problems with the device, a red triangle with an exclamation mark will appear next to the name of the affected device.

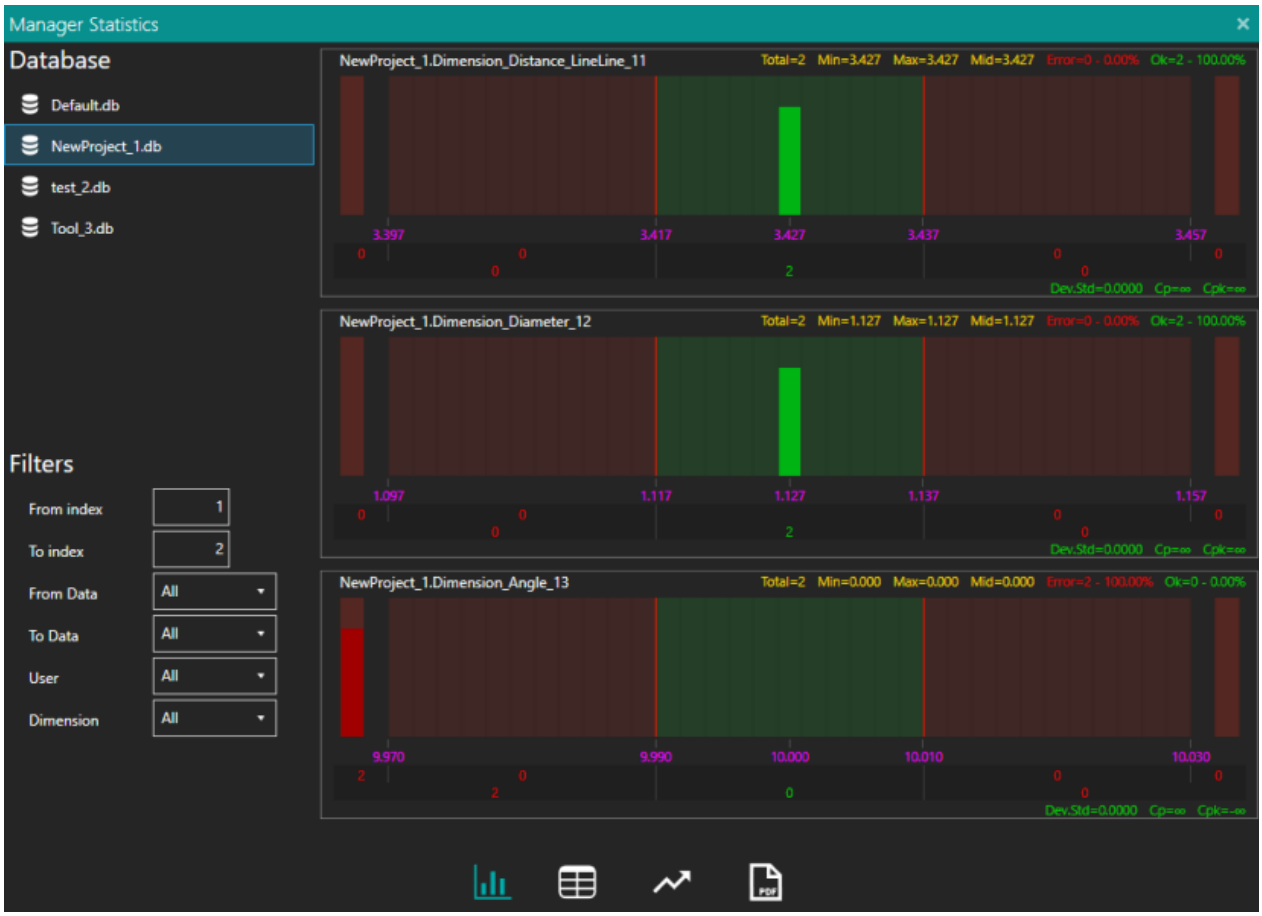
Statistics

View and filter statistical data.

1. Graphic;
2. Table;
3. Capability;
4. Print.

Statistics Graphic

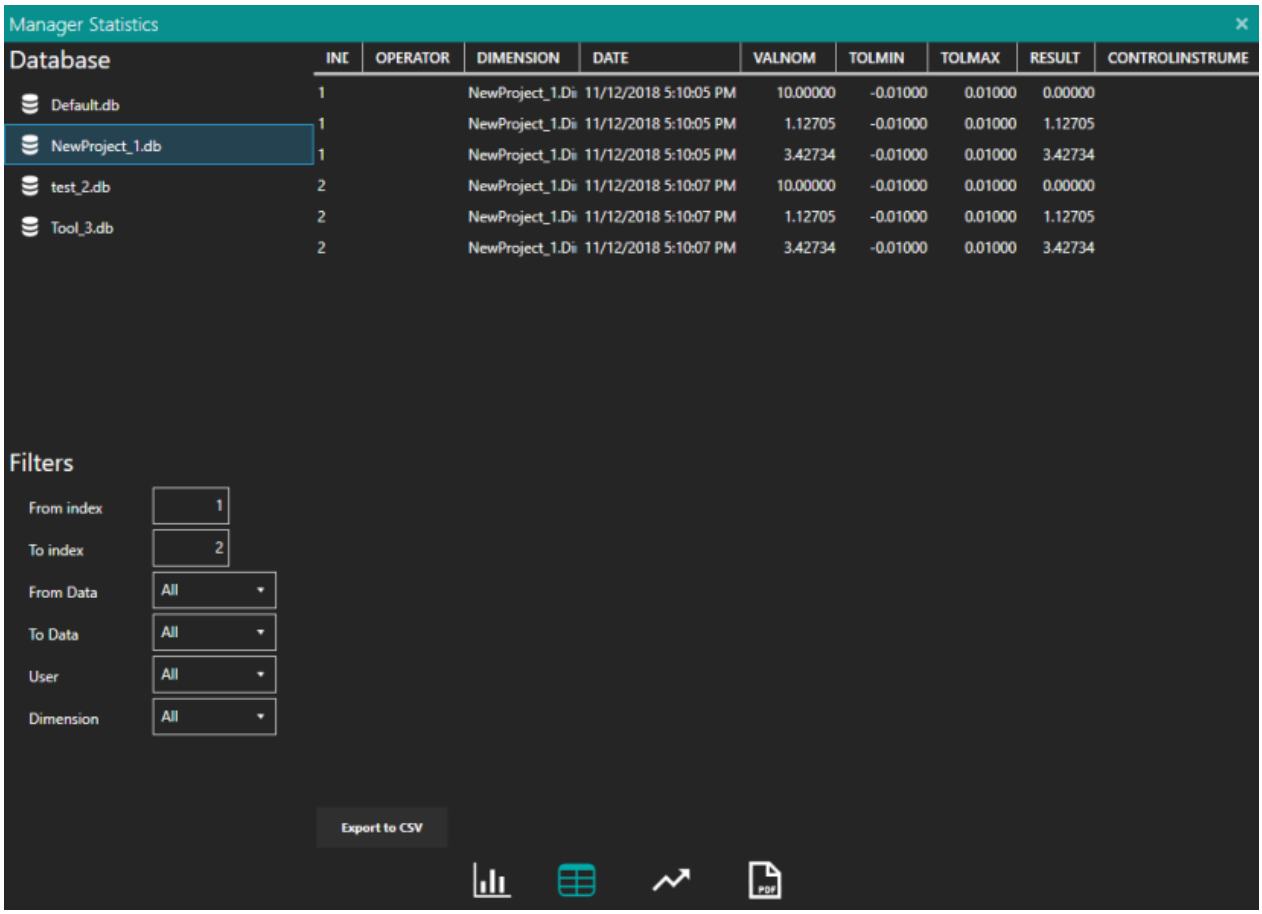
View and filter statistical data.



After selecting the reference database and setting a possible filter, the statistical data are graphically displayed within the measurement range set as acceptable.

Statistics Table

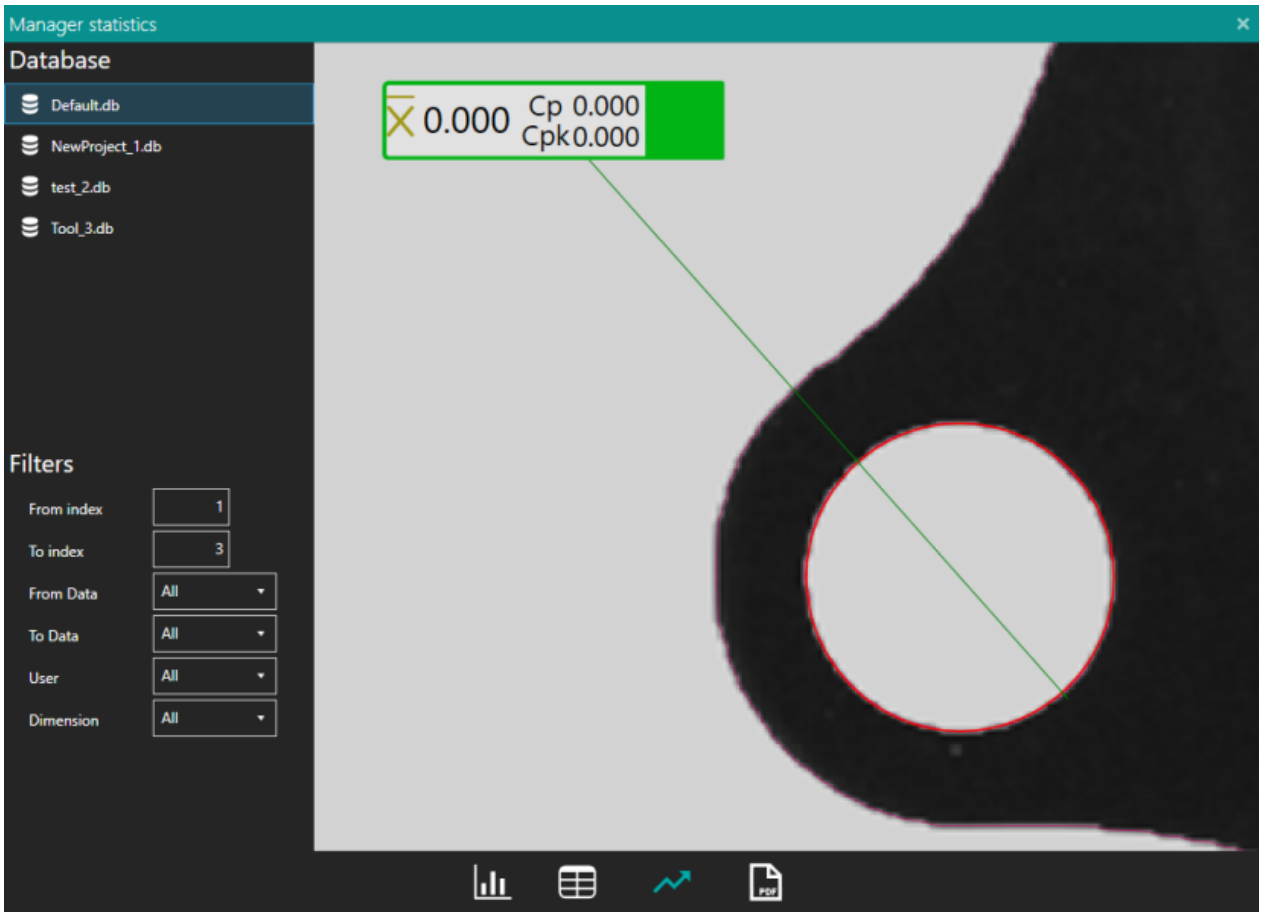
View and filter statistical data.



After selecting the reference database and setting a possible filter, the statistical data are represented in tabular form with the possibility of ascending or descending sorting by clicking on the column containing the data of interest.

Statistics Capability

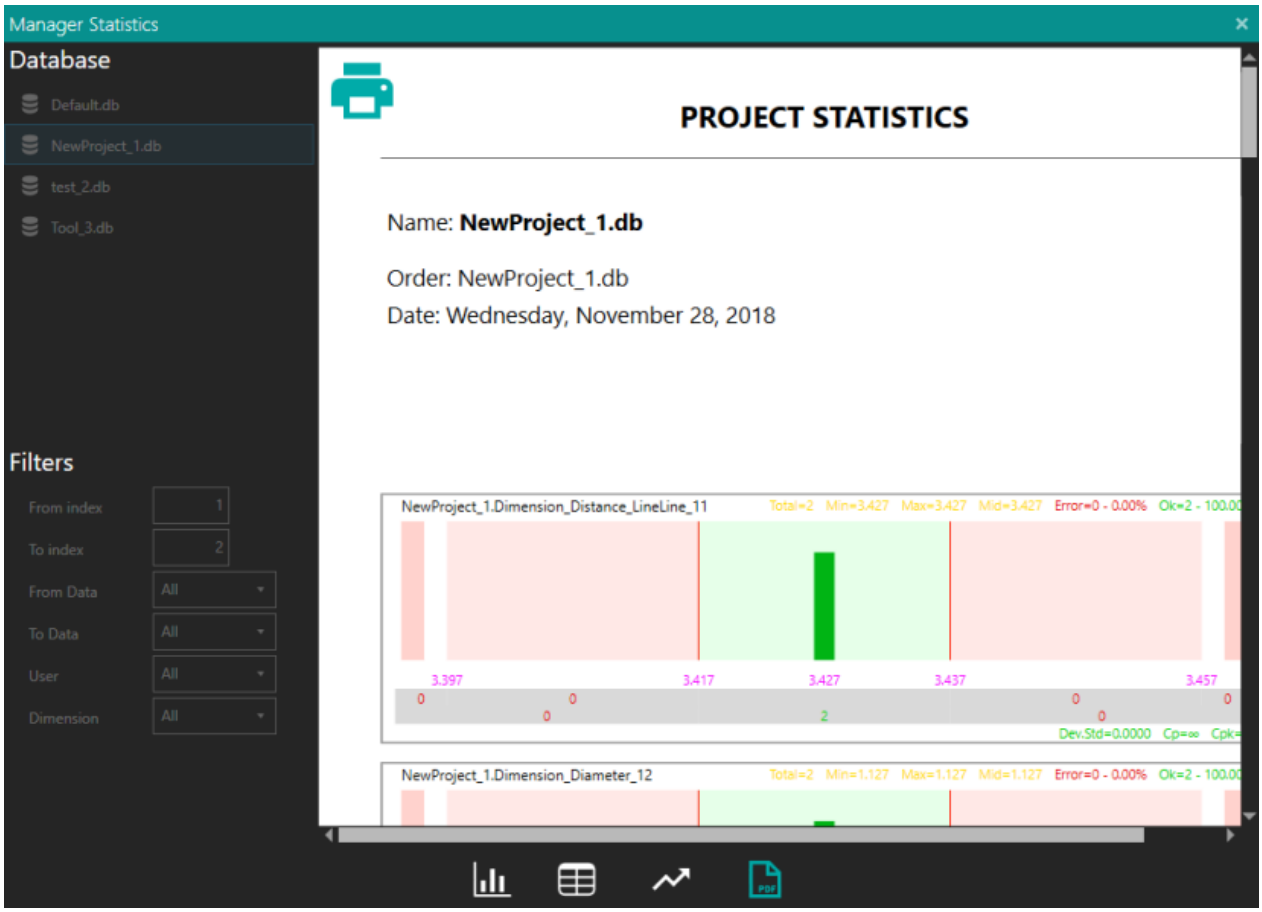
View and filter statistical data.



After selecting the reference database and setting a possible filter, the statistical data are represented in terms of target x-bar and process capability rates.

Statistics Print

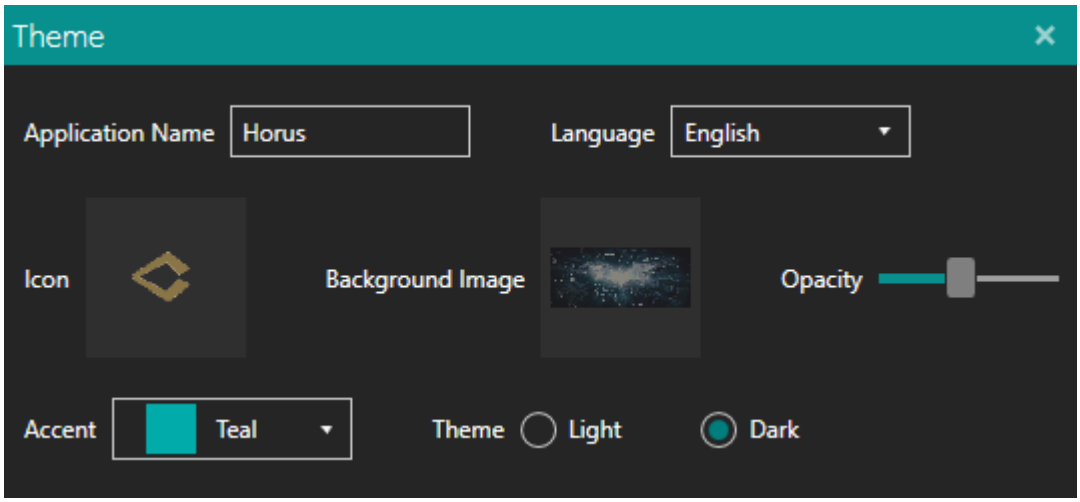
View and filter statistical data.



Convert statistical data in pdf format for printing or saving to file.

Theme

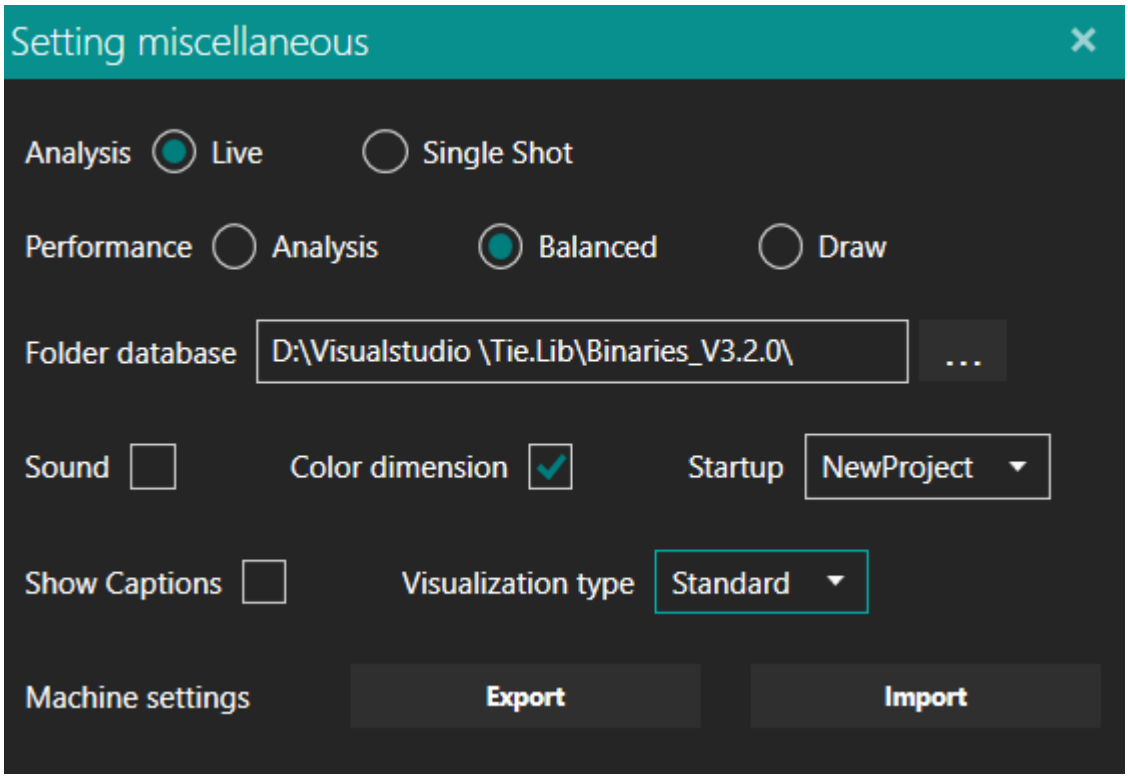
Configure and set Horus.



In the demo window you can change the name of application, the language of text labels and its icon.
By clicking on the background image it is possible to modify it and manage its opacity with the cursor.
You can also change the the colour scheme (accent) and theme between black (dark) and white (light).

Miscellaneous

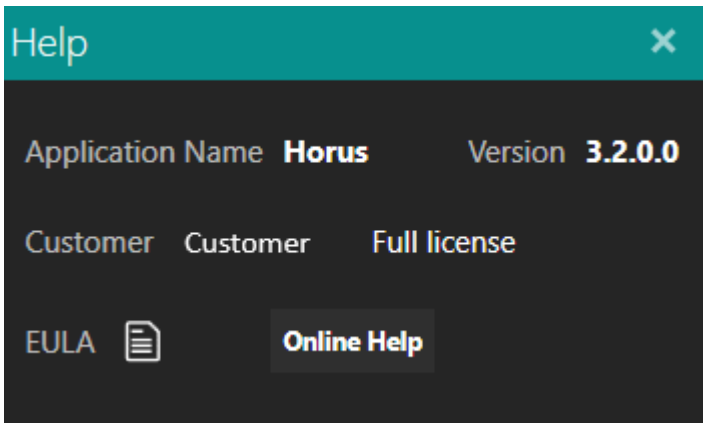
Adjusts several common features.



You can choose the type of analysis between Live or Single Shot. It also possible to adjust the performance more oriented to the draw, to the measure or in-between.
The database is used to store the data and report of your measure. You can choose the folder here and the database name on the Object Tree by selecting the project home.
With Sound, you can enable or disable sound feedback on the measurement result.
With Color Dimension you can enable or disable the intermediate gradation in colors on the measurement result.
You can also choose whether to start with the default project, the previously opened project or open the project manager.
Show Captions makes the labels permanent on Main Console.
Through Visualization type you can switch from standard mode to guru mode. In the guru mode further technical parameters are displayed in Calibration Optic / Light to refine the calibration process.
You can also Export or Import the Machine Settings (data of project, collection, users, calibration, camera, motor, light, magnification, theme, global parameters and so on) on a single .mch file.

Help

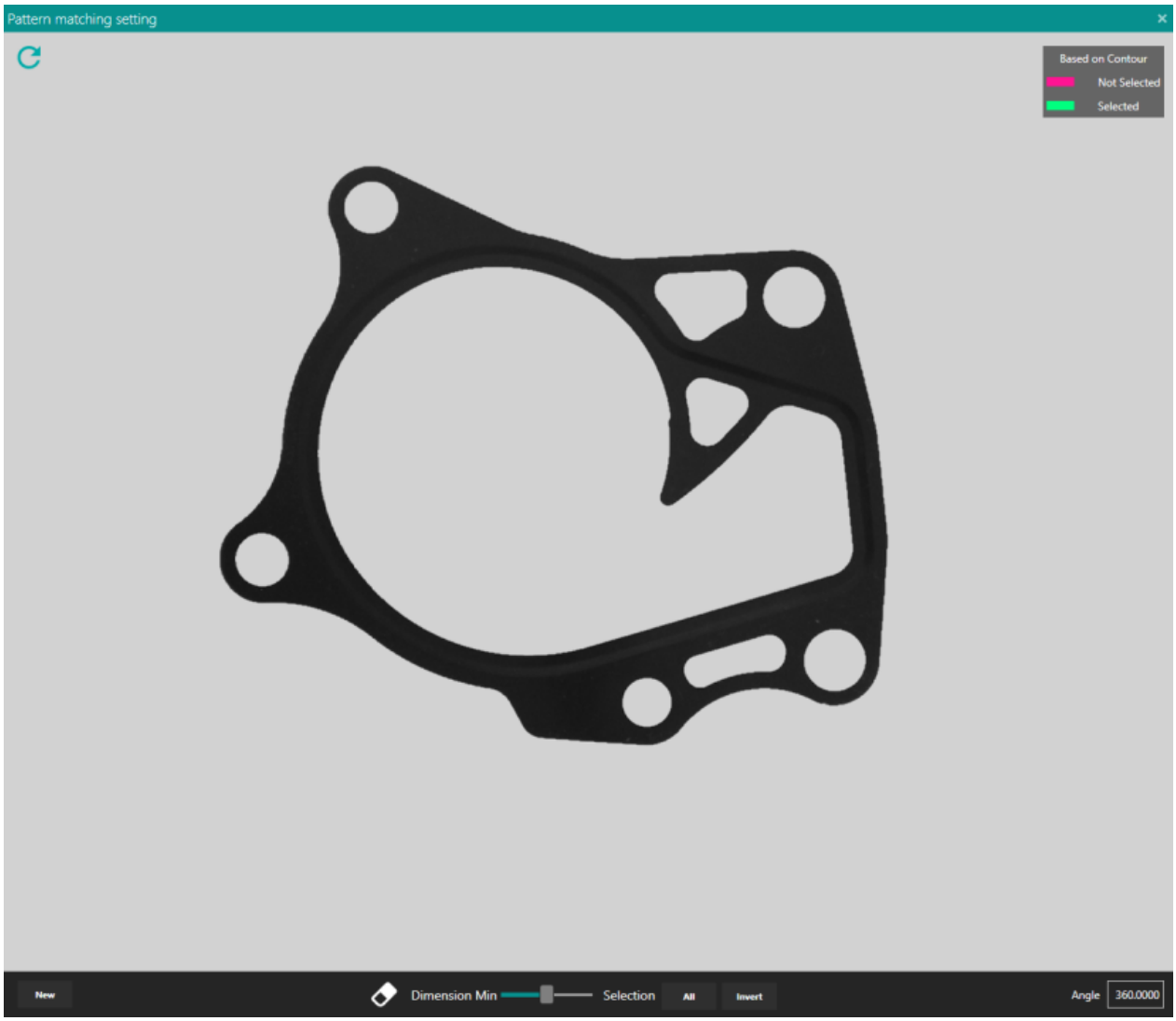
Help and information about Horus.



In this menu you will find the current version of Horus, the name of the license holder and the expiration date in case of evaluation copy. There is also a link to our EULA.
Last but not least you will find the link to our resource centre where in addition to the help you will find numerous other documentation, videos and tutorials about Horus.

Pattern Matching

Pattern matching allows Horus to track the object and keep measuring it.

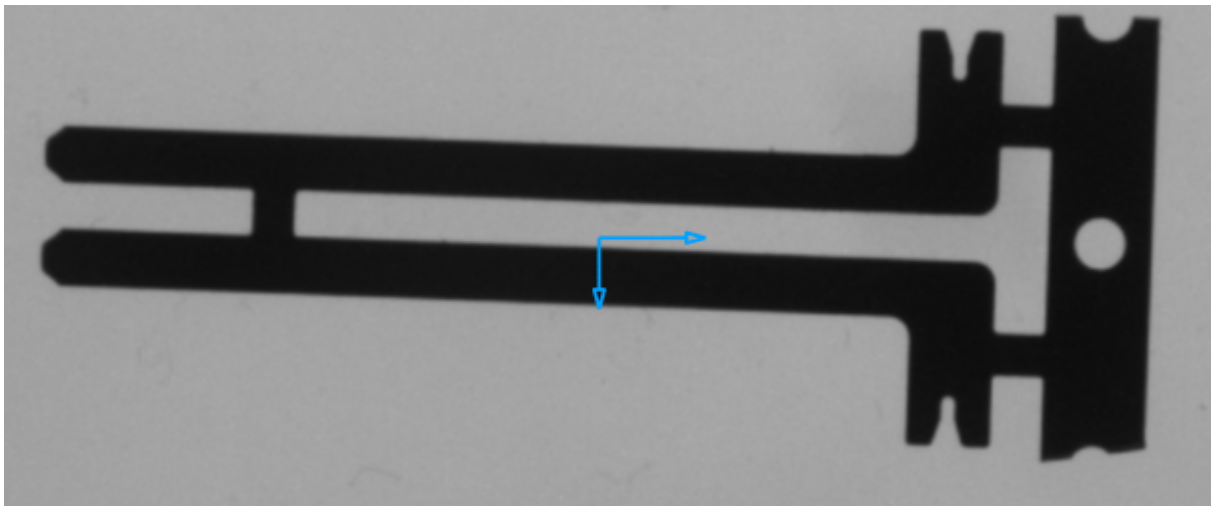


In this way, you can create the program and then place the part in every position you want and let the software to measure it.
You can create a new model in three different ways:

- Edge: if you have backlight source and clear edge.
- Dxf: if you have dxf drawing of your part.
- Image: if have light above your object and/or unclear edges.

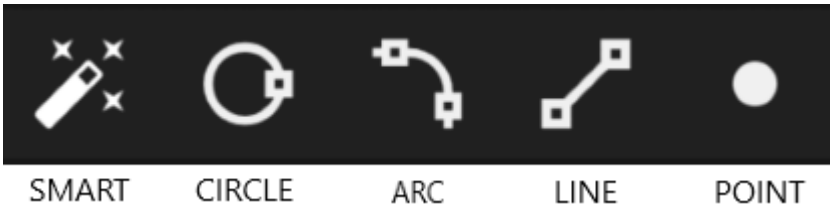
You select the features you want to be part of the model. You can also delete parts with an eraser or filter some small edges using the dimension tool in the bottom bar.
Angle recognition adjust the angle in order to lock it in a certain range.

Close the window to let the software finalize the model, you can see the software is now detecting the position of the object.

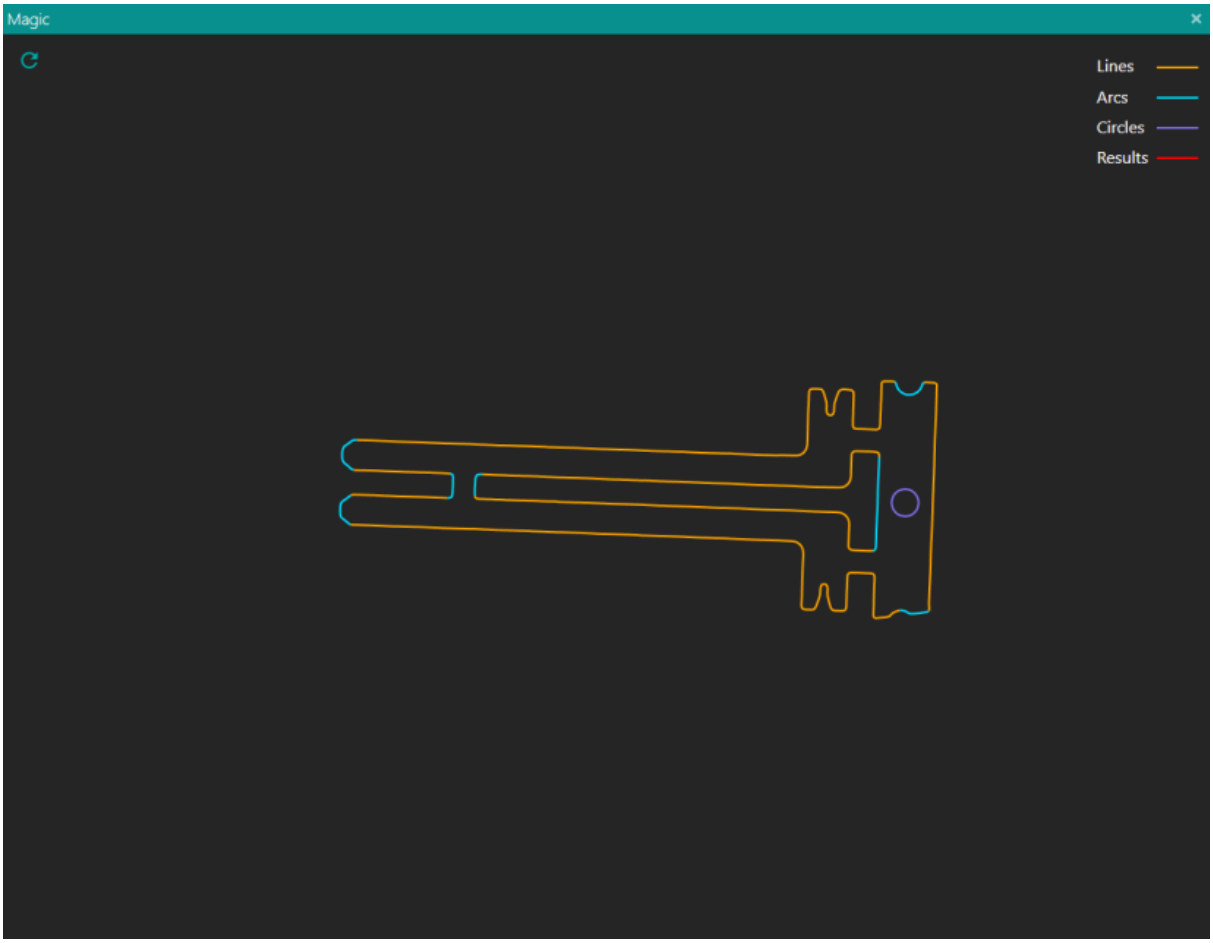


Detection

The detection feature has the aim to detect primitives on the object based on the edge and it has a "smart" mode and different manual modes for different primitive shapes to be found.



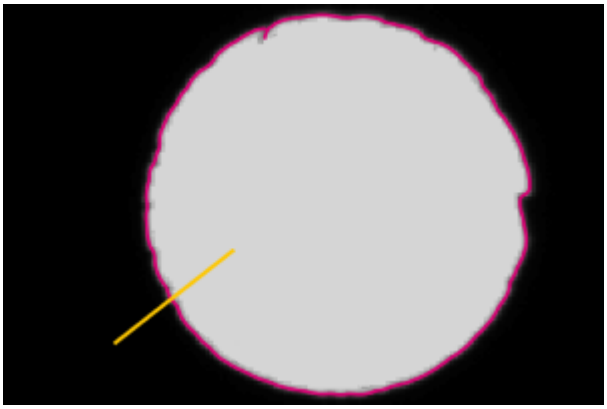
- Smart
  The “smart” mode detects all the primitives and suggest which primitive is possible to create (color scale to the right).
  In order to create the primitives click on the them:



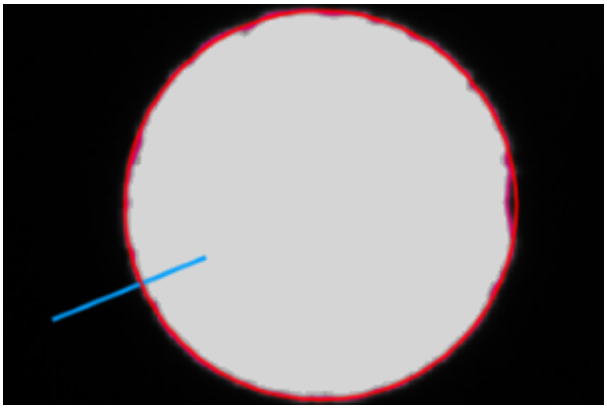
Moreover, it is possible to edit the "smart" mode in order to correct errors in the detection and impose the correct shape.
Select the type you want to use and click on the the part to correct the element. The manual commands allow to select arbitrarily the primitives choosing between circle, arc, line or point, as shown in the following examples.

The detection feature does the analysis, it is possible to verify the matching clicking on the Primitive Analyse.

- Circle



click inside the primitive to be recognized



click outside the primitive and confirm to obtain it

To discern a primitive with the manual mode, it is necessary to guide the program by clicking inside and outside the supposed circle

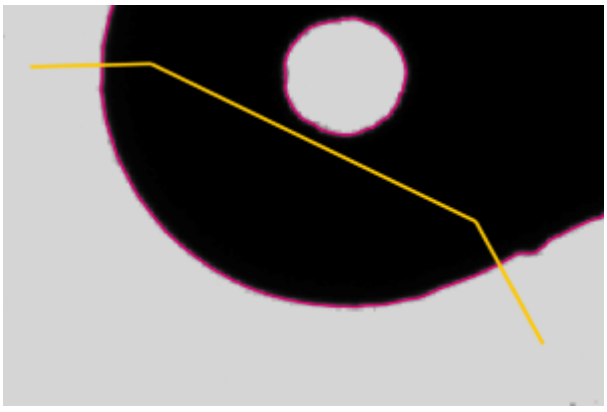
- Arc and Line

click on both sides of the line to set one beginning

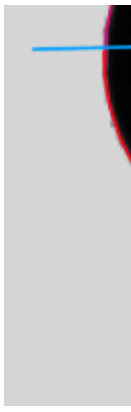
click on one side to set the lenght

click on the

click on both sides of the line to set one beginning



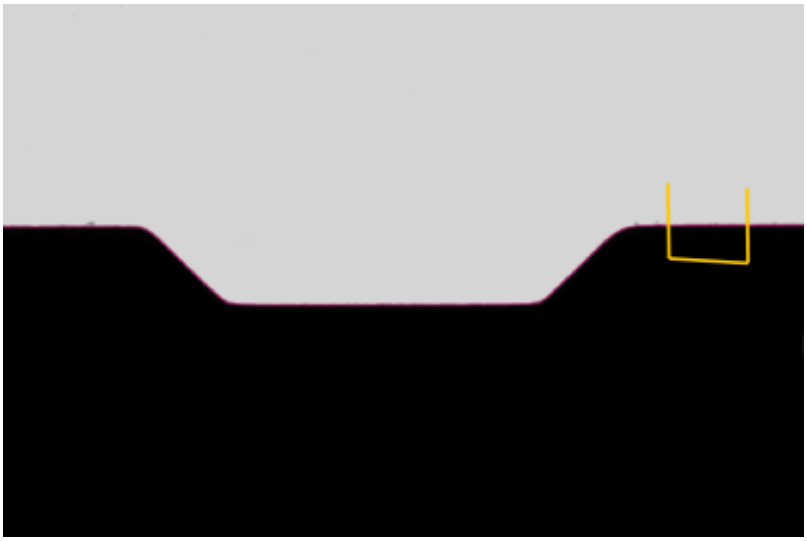
click on both sides to set the end of the primitive



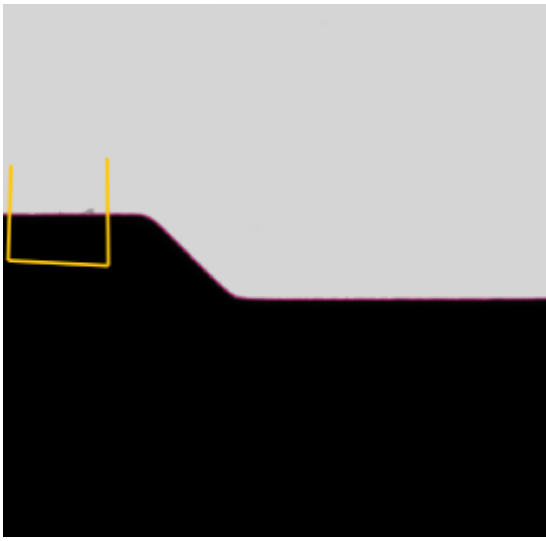
To detect Arc and Line the points to be clicked are four in order to cut the edges of the shape: the first and the last pair of points create an intersection that define respectively the beginning and the end of the selected primitive.

There is the possibility to draw an arbitrary number of selections, with

the aim to avoid parts and connect others.

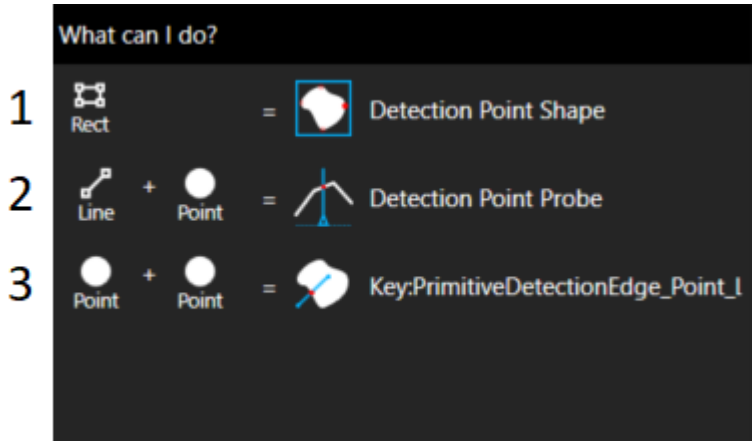


create a arc or line selection

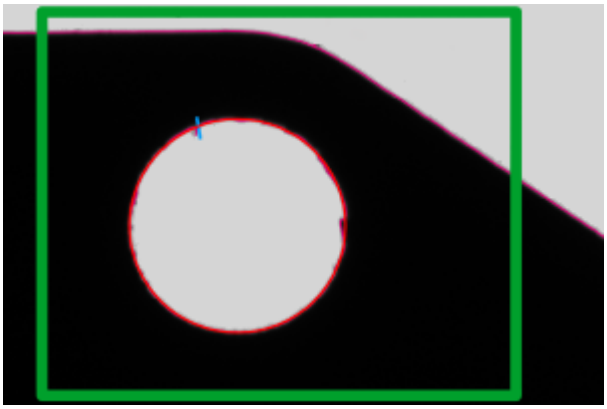


create another arc or line sele

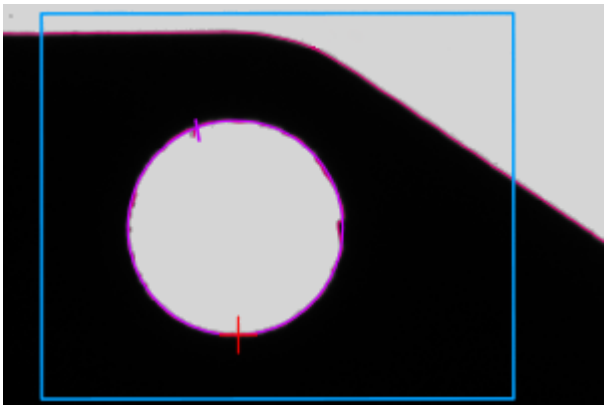
- Point



1)



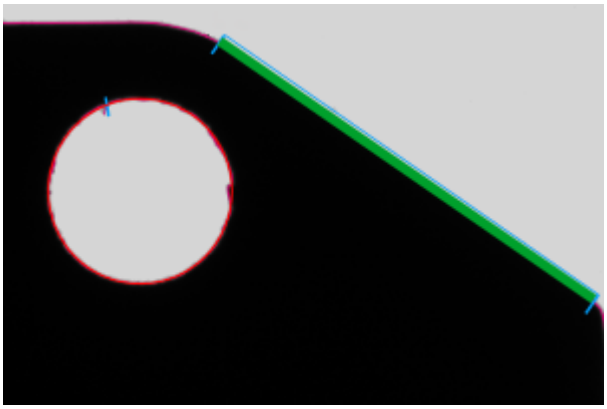
Select a rectangle



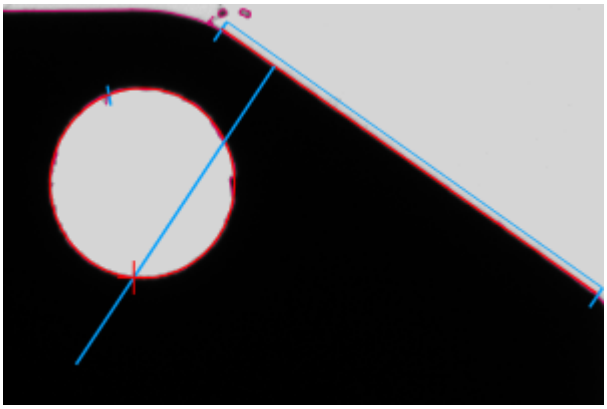
Confirm to find the higher, lower, leftmost or rightmost point of the primitive inside the border of

the rectangle

2)

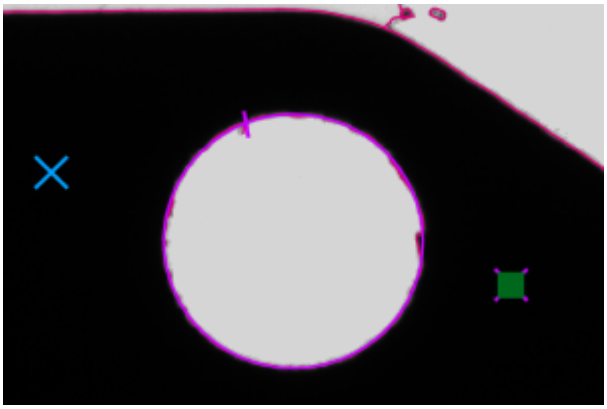


Select a line

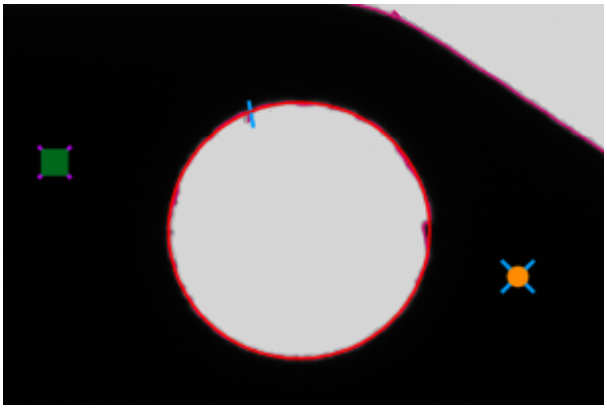


Set one point in order to create the orthogonal to the line passing through the point and find the intersection(s) with the primitive (closest, furthest or any)

3)



Set one point



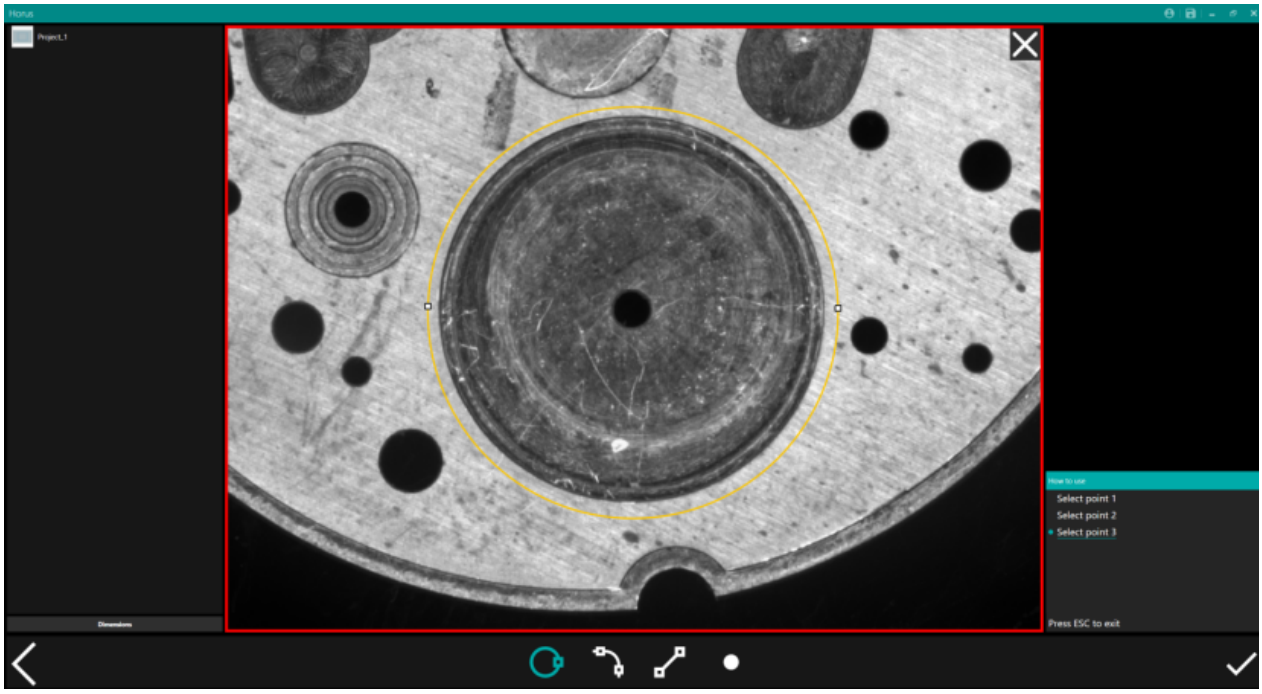
Set another point

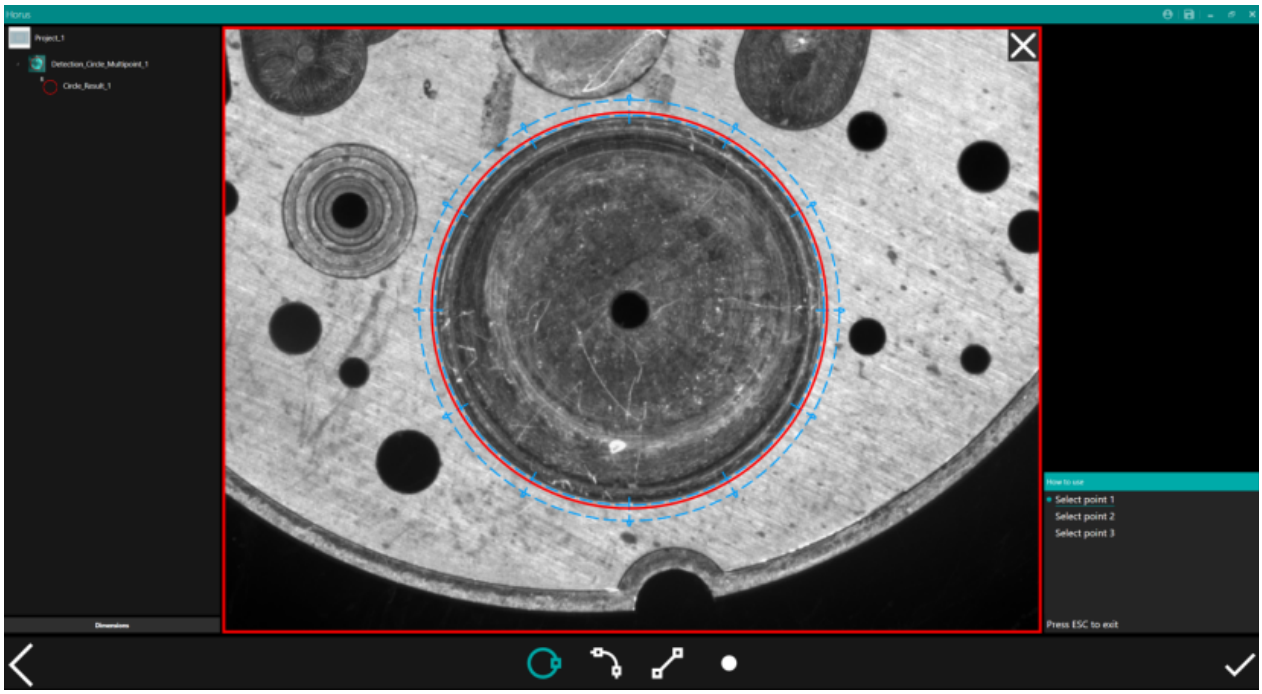
Confirm to the line

Gray Scale

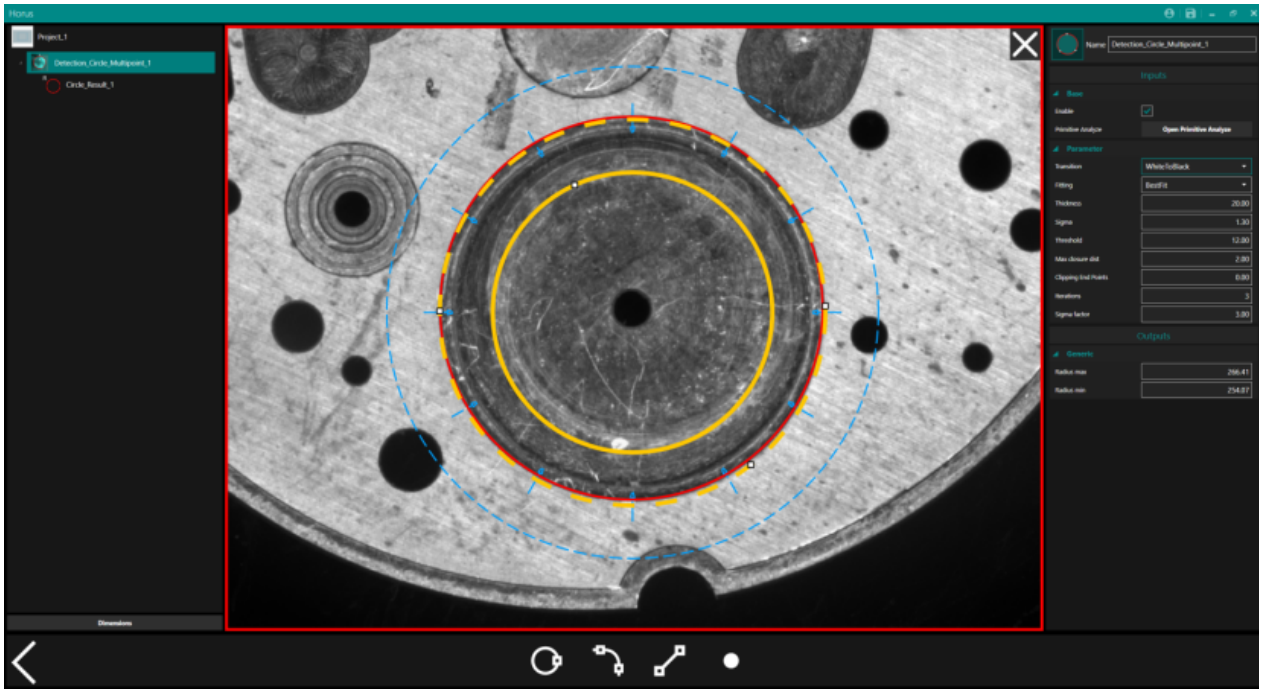
Gray scale tools are developed to detect primitives when edges is not clear and the image has a gray tones (such as when a front illumination is used).

The tool uses a region to detect the start gray value and then search for the transition in the scan direction.
For example, to identify a circle select *Grayscale* - *Circles*, click at the two ends of the area where you want to find the primitive, move the mouse outwardly to surround the area, and then press click again.

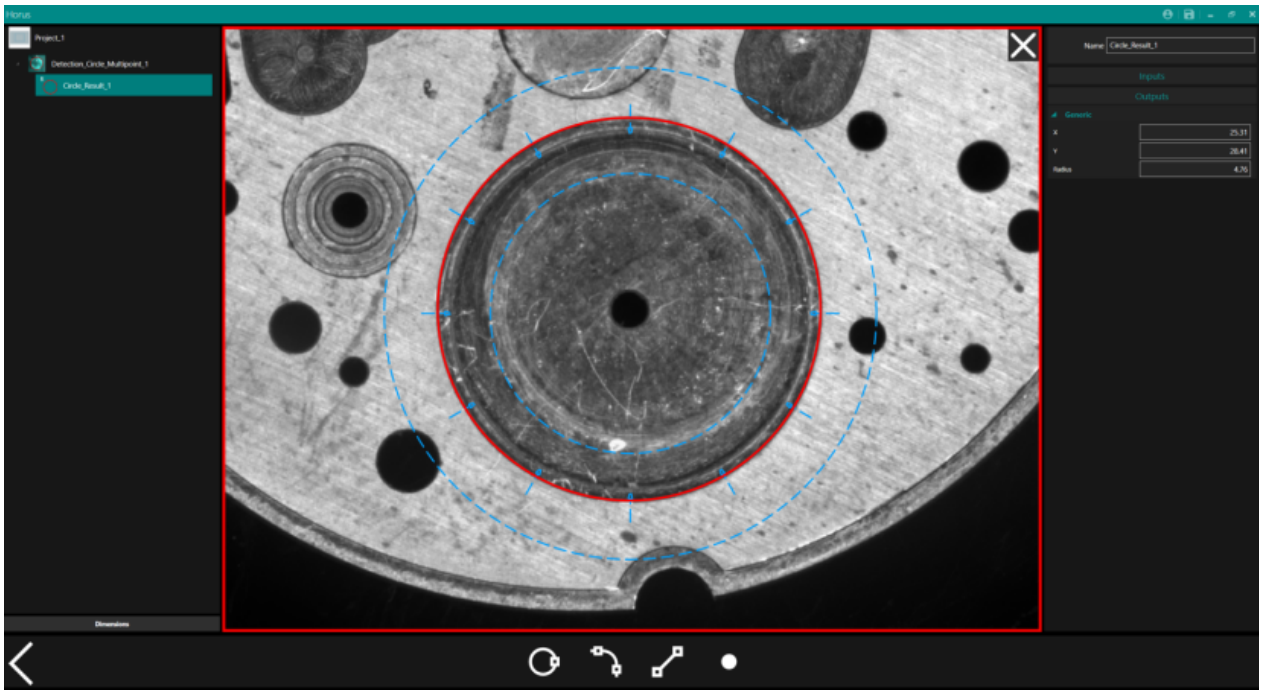




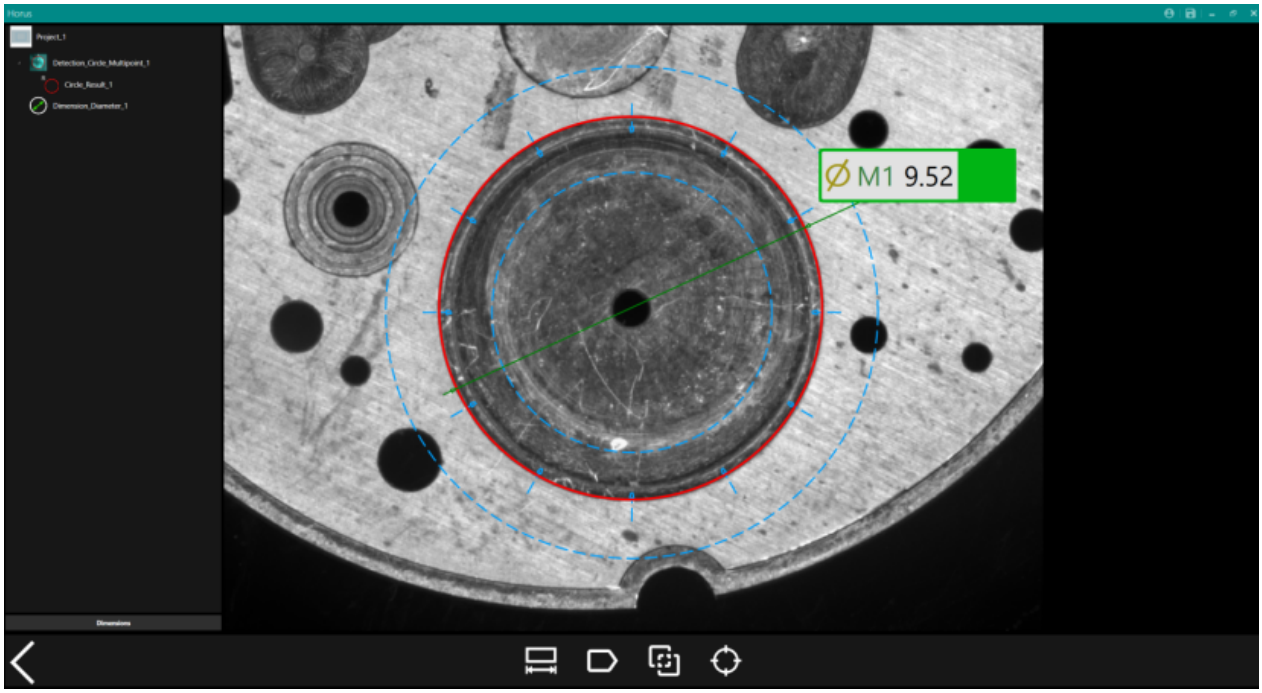
Select the newly generated detection in the object tree.
Select the type of transition in the property bar (black to white or white to black) adjust the outer and inner circle so that the tool identifies the desired circumference (you can also change the values in the property bar for fine tuning).



Check if the resulting circle satisfies you otherwise repeat the previous procedure.



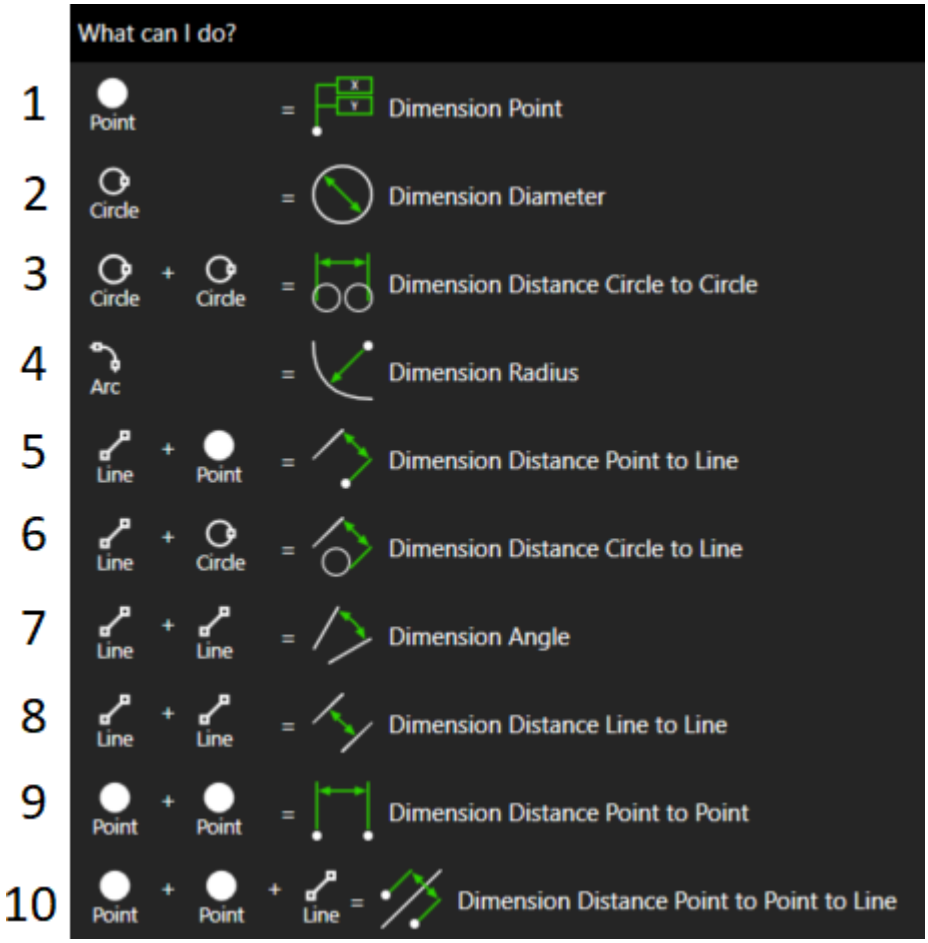
Now you can proceed to the measurement as usual.



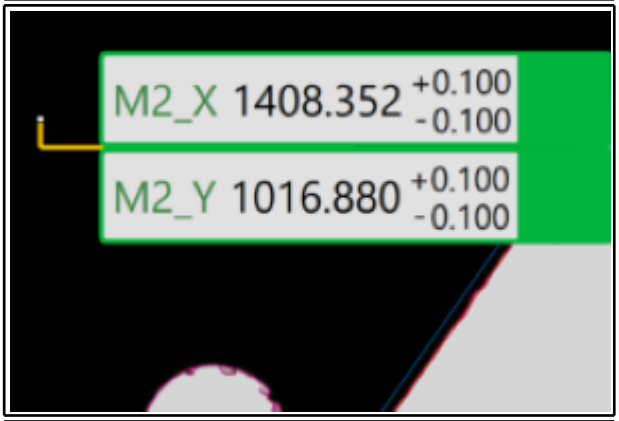
Measure

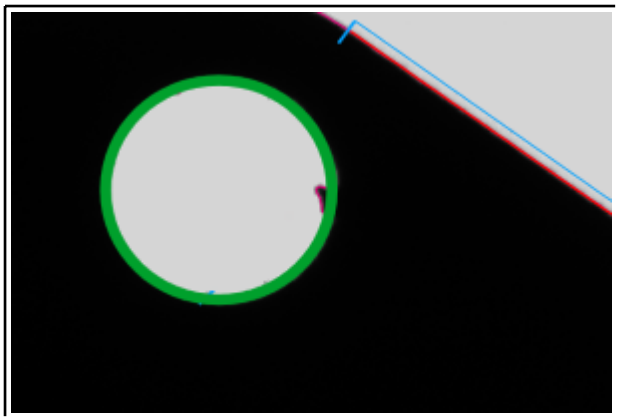
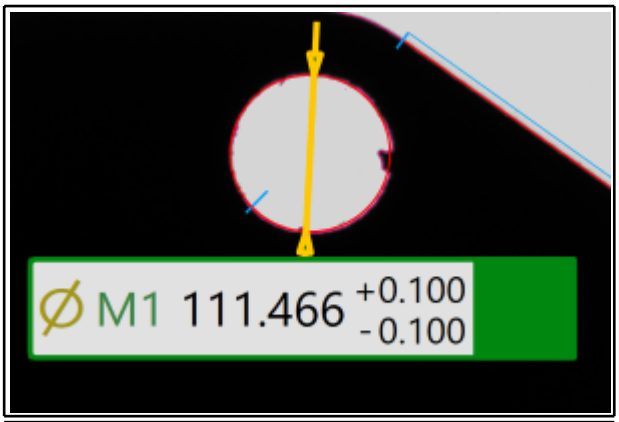
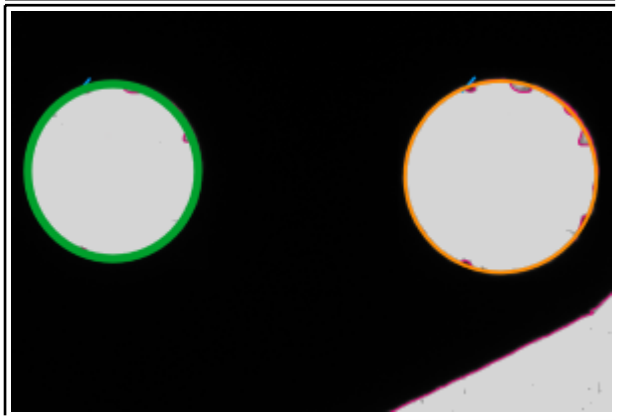
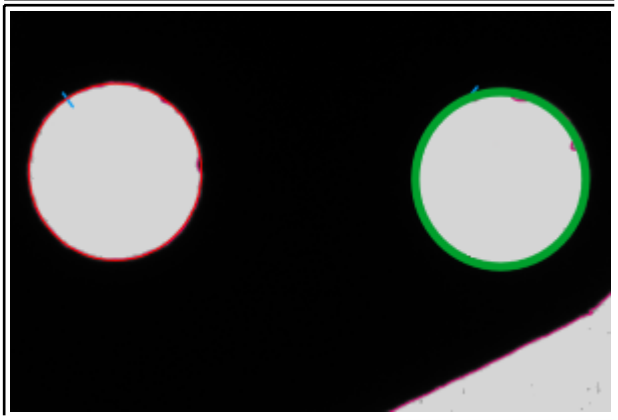
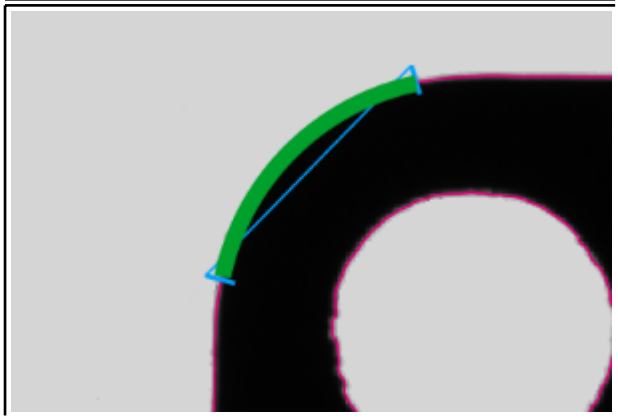
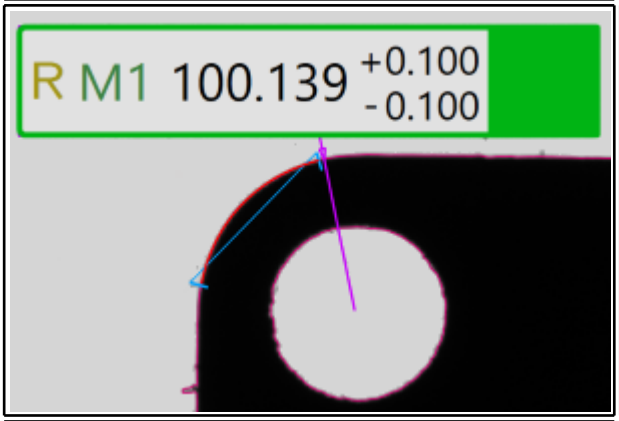
The measure group allows you to create dimensions, references, geometric tolerances one the primitives and easily create custom measurements in crosshair mode. Once you created all the primitives you are interested in, you can start add measurements.

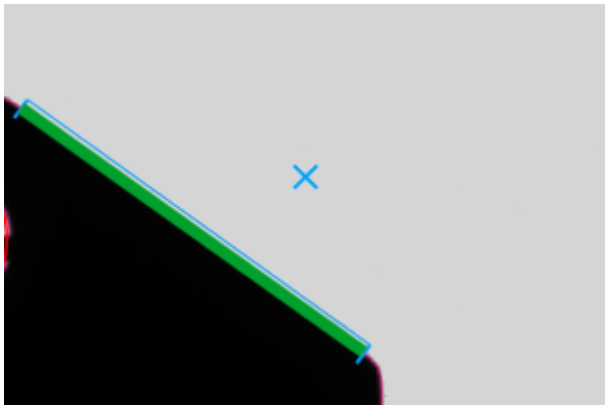
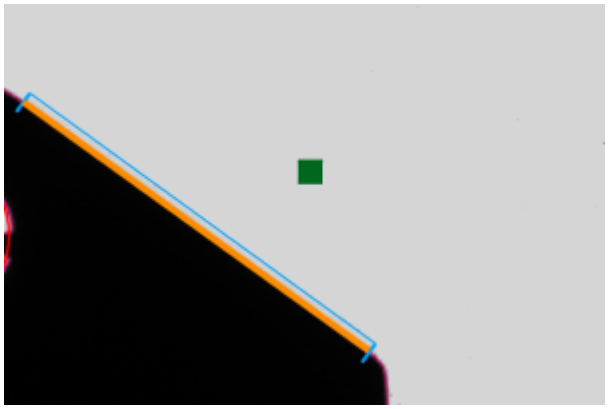
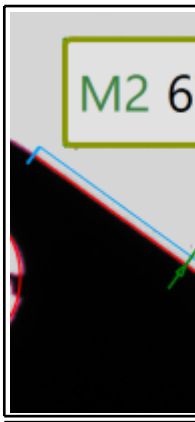
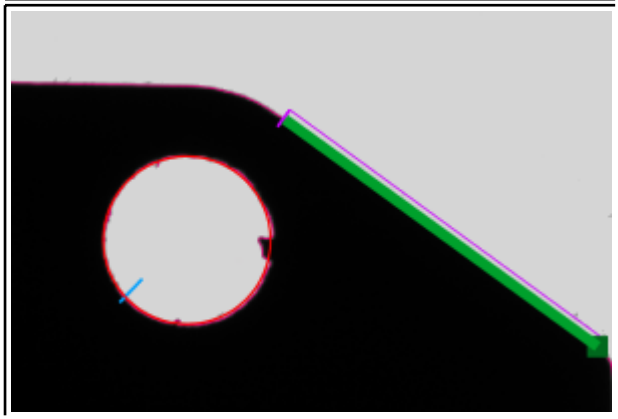
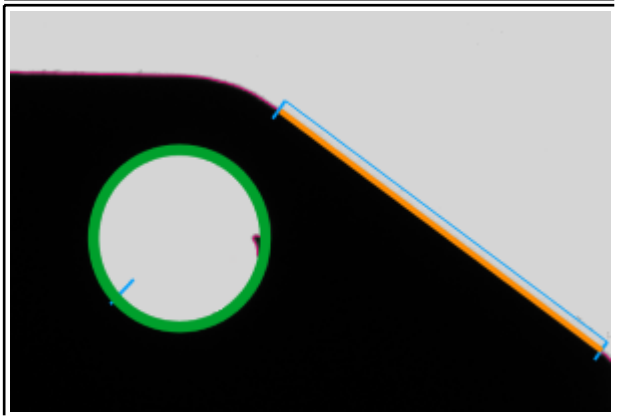
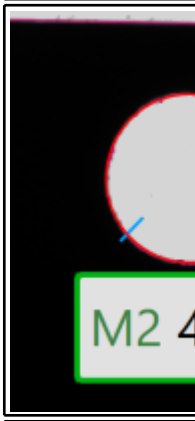
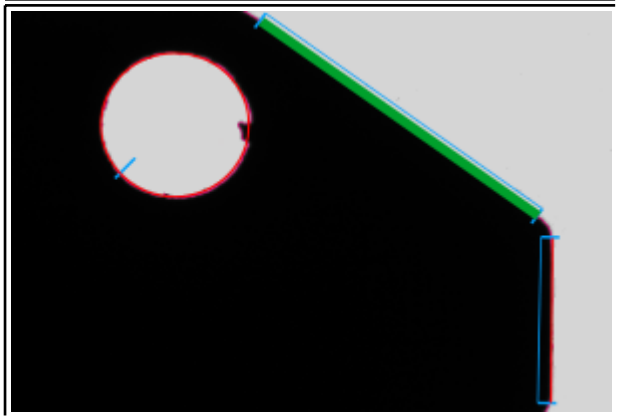
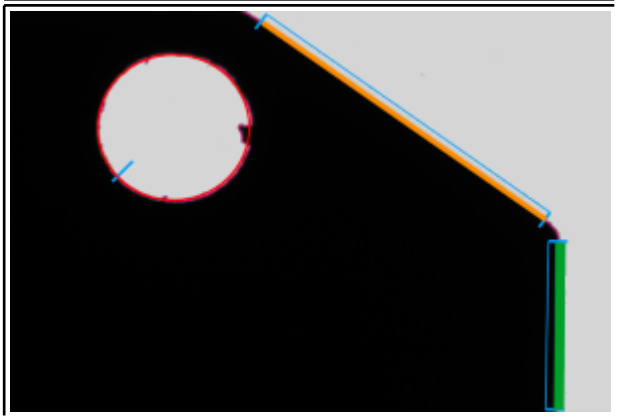
- Dimension: on the right hand of the screen appears a guide of the possible combinations for the measurements, as shown in the following picture:

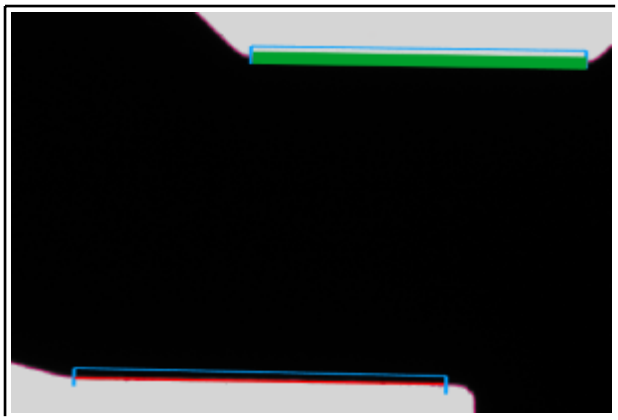


Every case is shown in the following pictures.

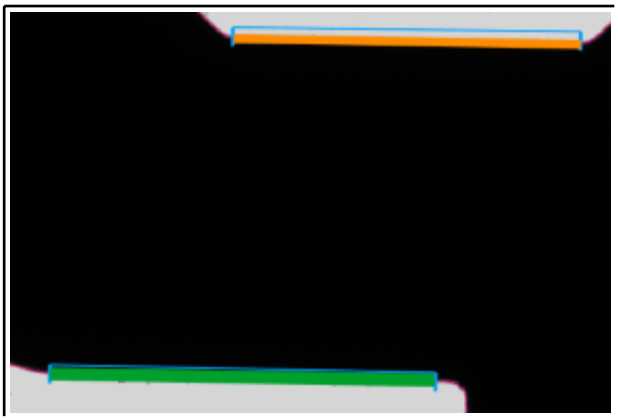
1)		
		
set one point	confirm to obtain the point coordinate	
2)		

		
select a circle	confirm to obtain the circle diameter	
3)		
		
select a circle	select a second circle	confirm to ob
4)		
		
select an arc	confirm to obtain the arc diameter	
5)		

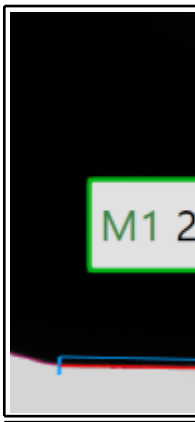
		
select a line	select a point	confirm to ob
6)		
		
select a line	select a circle	confirm to ob
7)		
		
select one line	select another line (not parallel)	confirm to
8)		



select one line

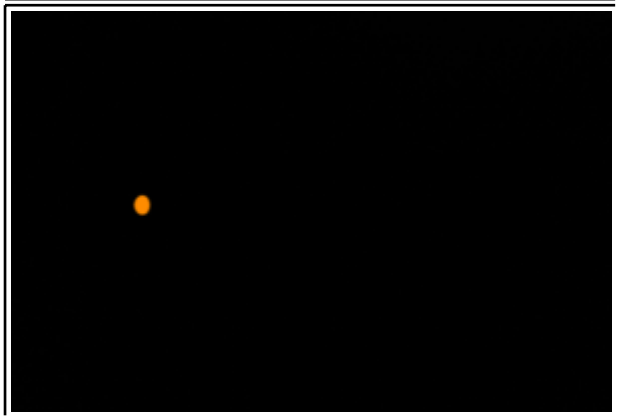


select the other line

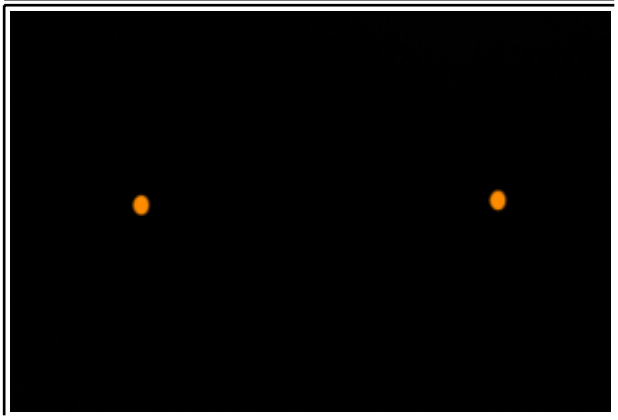


confirm to ob

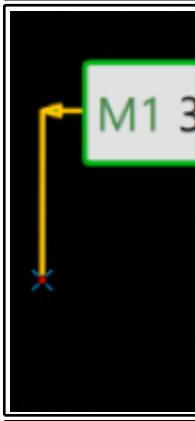
9)



select one point

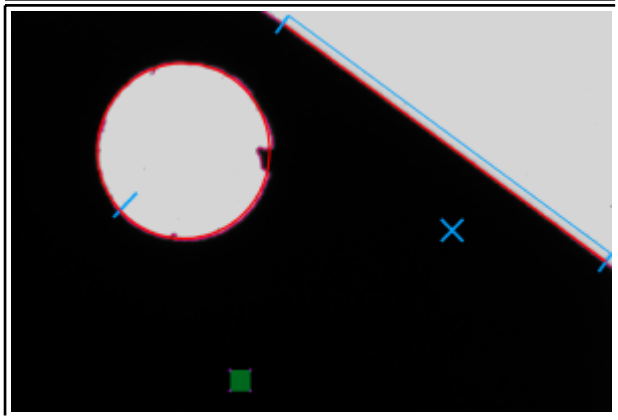


select another point

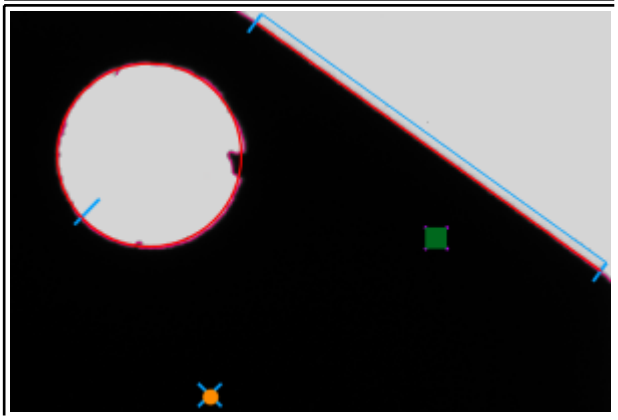


confirm to ob

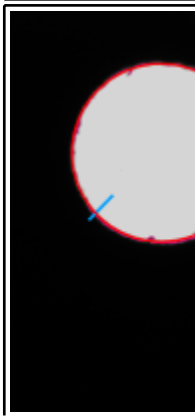
10)



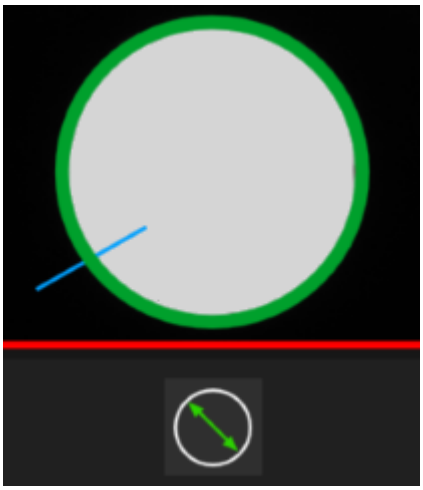
select one point



select the second point

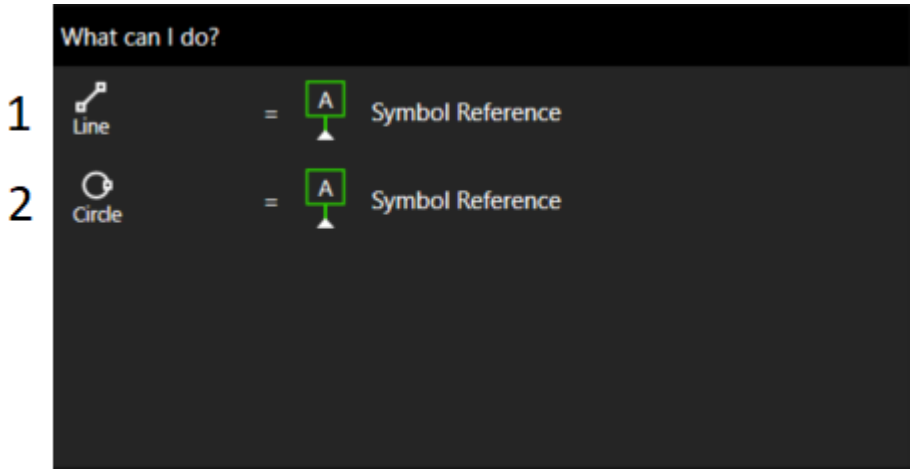


Now, it is necessary to select which kind of measure has to be performed by selecting directly a primitive on the 2DVisualizer or through the Object Tree.
Once, select one primitive on the bottom of the screen appears which action is possible to perform according to the selected elements.

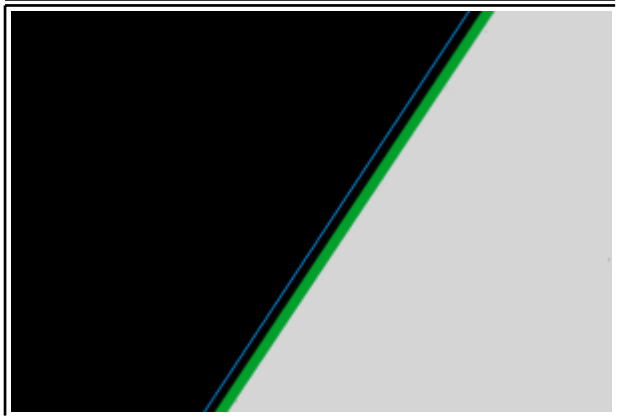
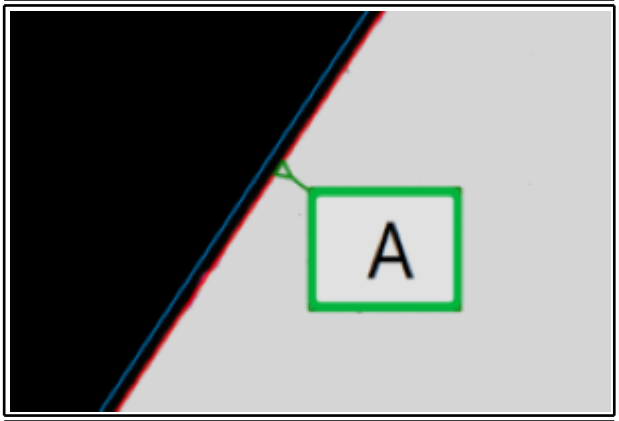


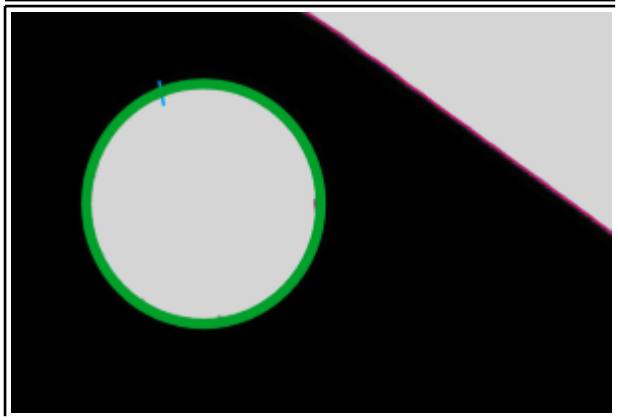
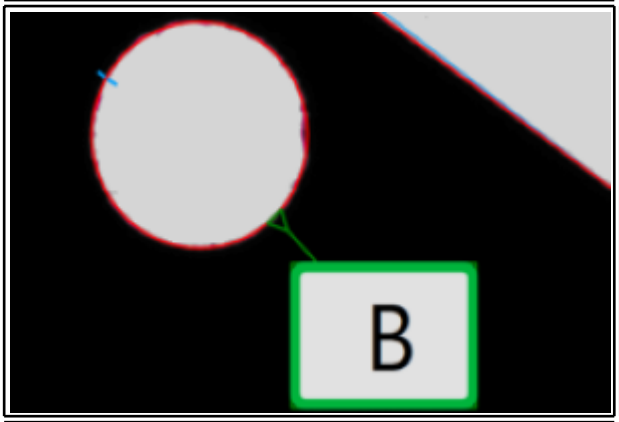
The labels can be moved by clicking on it, outside the measurement editor, and drag it.

- References: help the setting of the tolerances by giving a label to the designed primitive.



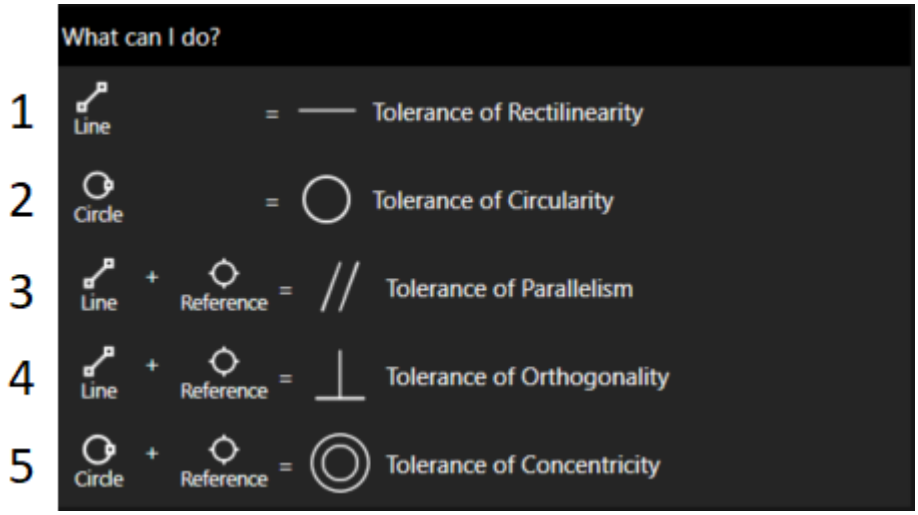
Every case is shown in the following pictures.

1)	
	
Select a Line	Symbol Reference (to a Line)

2)		
		
Select a Circle	Symbol Reference (to a Circle)	

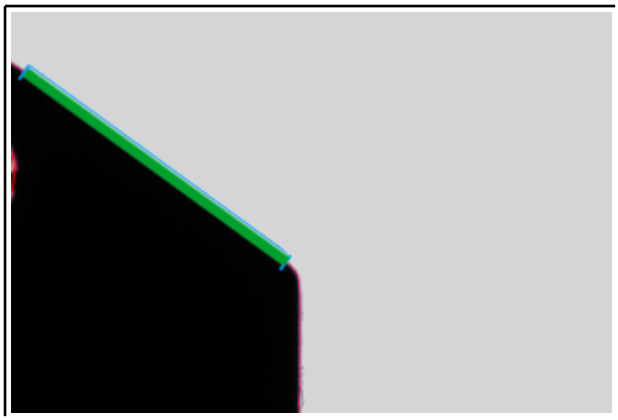
Select a primitive to attach a label with a letter.

- Tolerances: aided by the right-hand guide, after setting the reference, select the object on which to perform tolerance checks of circularity, parallelism and orthogonality.

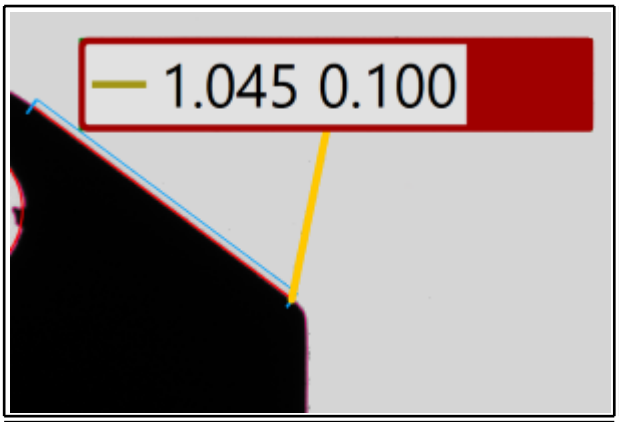


As for the dimension, in order to show a tolerance it is necessary to select the right combination of primitive as shown in the following figures.

1)		

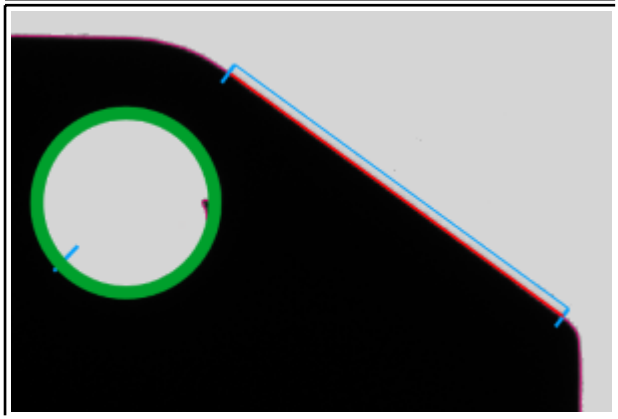


select a line

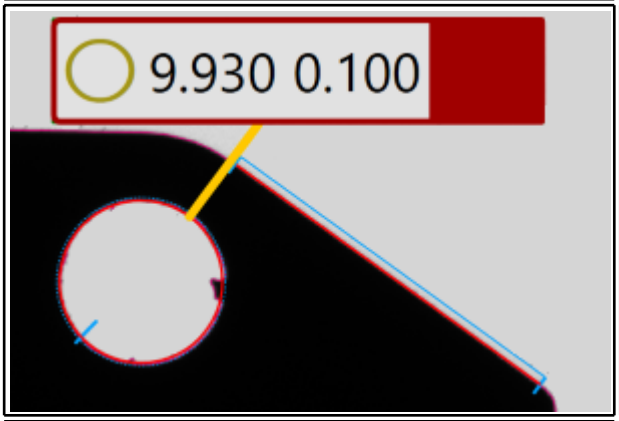


confirm to obtain the tolerance of the line

2)

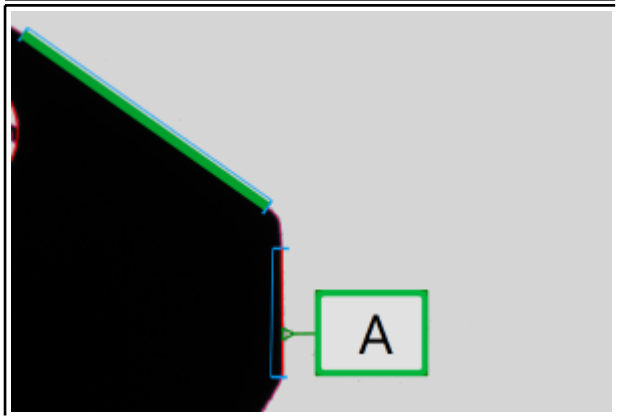


select a circle

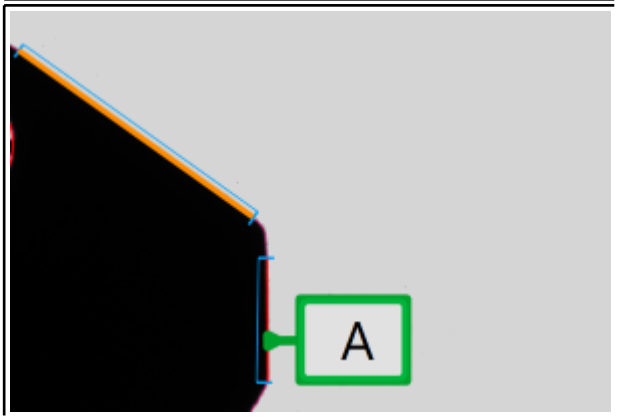


confirm to obtain the tolerance of the circle

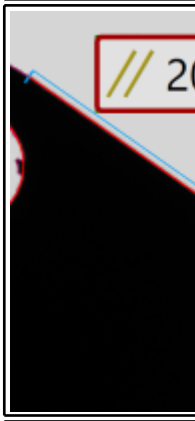
3)



select one line

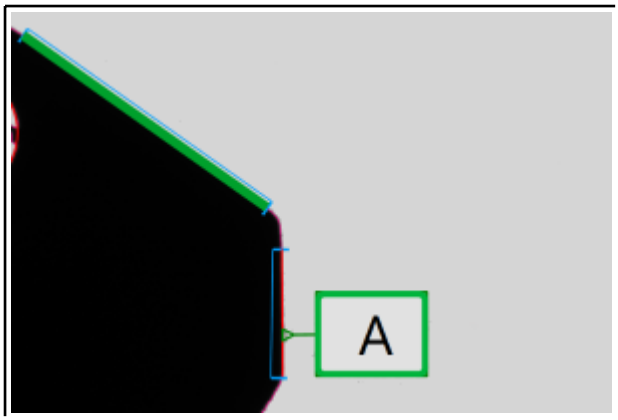


select a reference of another line

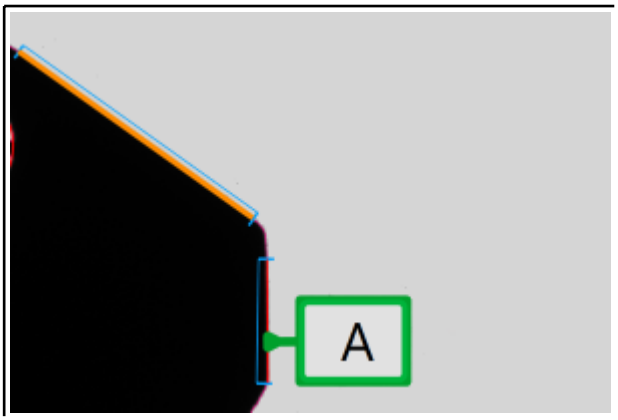


confirm to obta

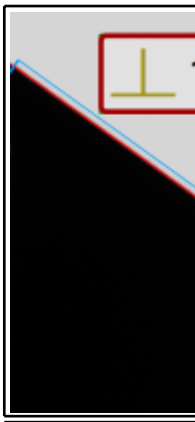
4)



select one line

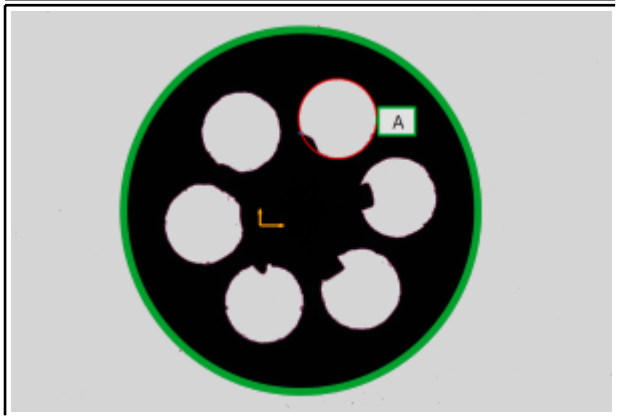


select a reference of another line

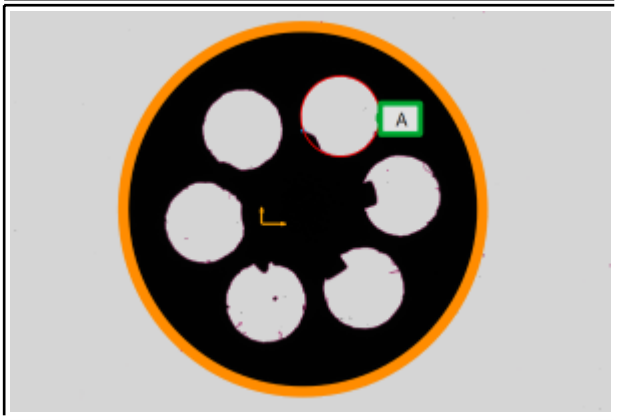


confirm to obtai

5)



select one circle



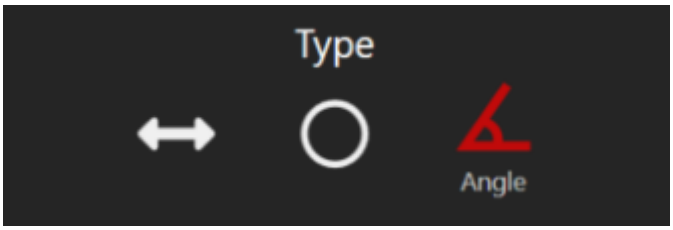
select another circle

confirm to ob

Furthermore, every dimension and tolerance can be edited in the right bar choosing the nominal value and the upper and lower tolerance.

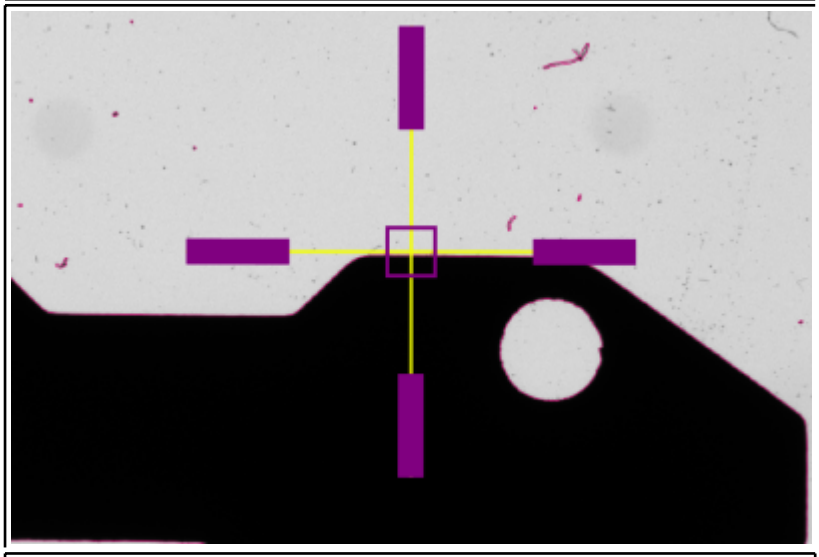
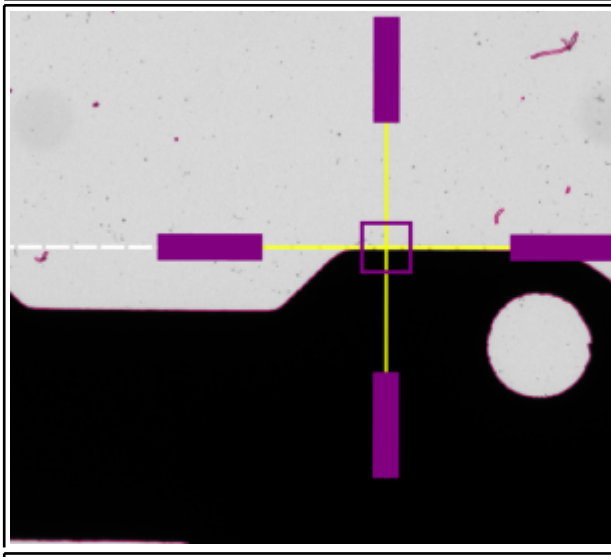
- Crosshair: allows to obtain measurements without the support of the primitive. In order to do that read the following steps:

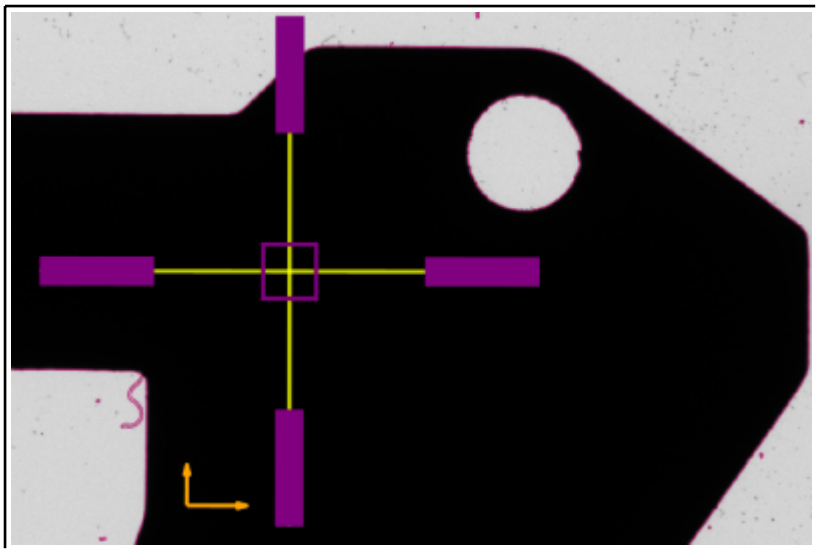
  Select the type of measurement (distance, diameter, angle),



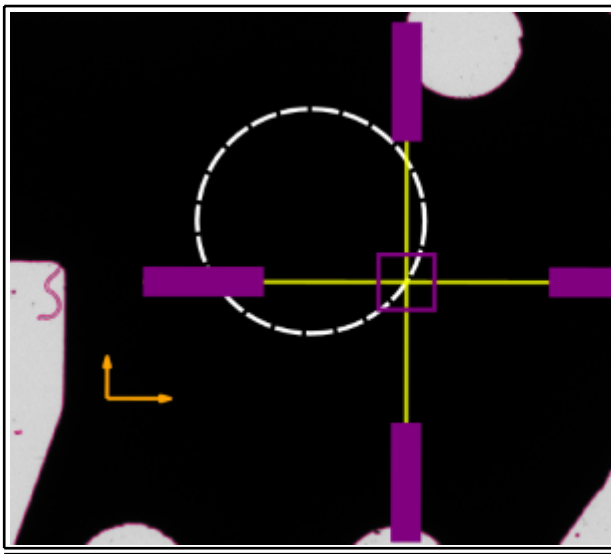
drag (by placing the mouse inside its centre square) the crosshair above the point where to start the measurement.
It is also possible to rotate the crosshair by positioning the mouse above purple outer rectangles and dragging it. Reset the counter,

and move the crosshair over the end point to be measured.

Distance crosshair	
	
drag the pointer to the zero point	press "Set zero" set the measure poi
Diameter crosshair	

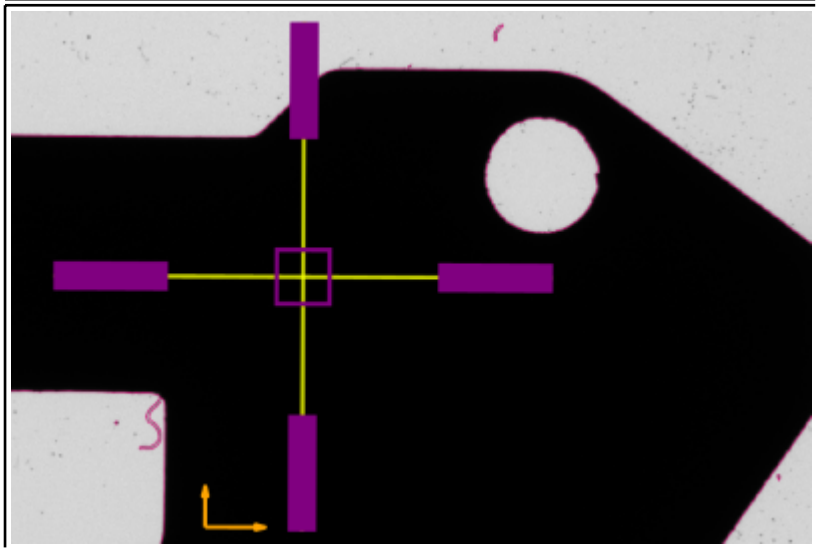


drag the pointer to the zero point

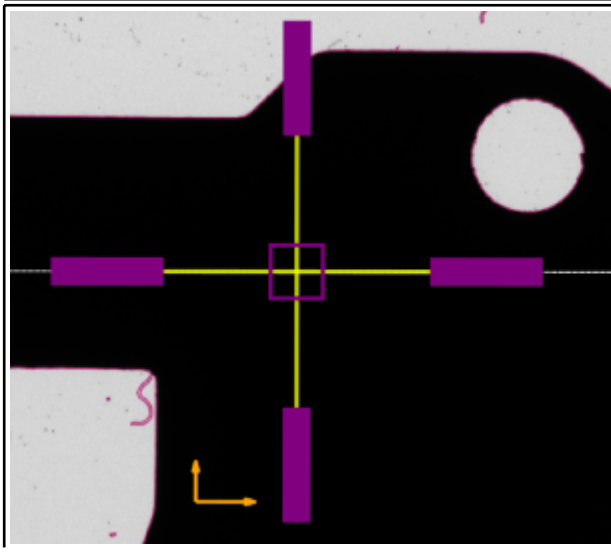


move the pointer to have the measurement of the d
the menu

Angle crosshair



drag the pointer to the zero point

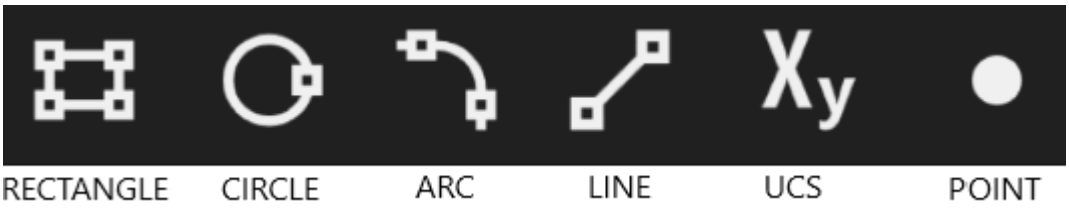


press "Set zero" set the measure poi

On the command bar you can read the measures you are looking for.

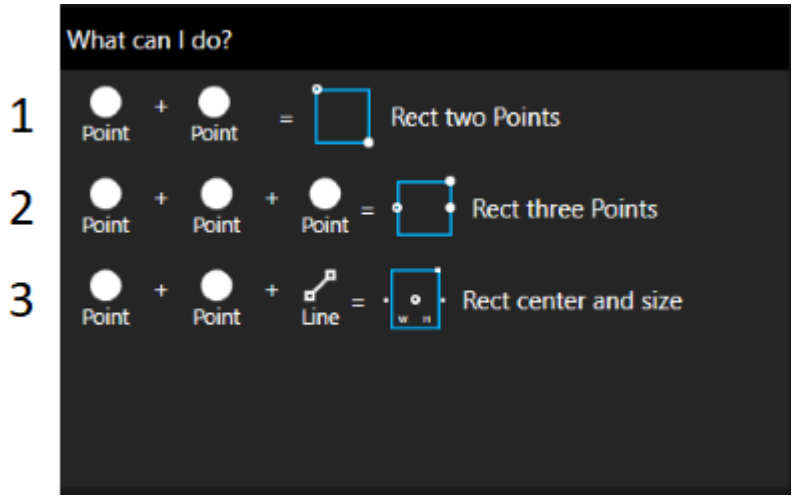
Shapes Construction

The shapes group is used to create and draw shapes,constructions such as axis, intersections, lines and so on.



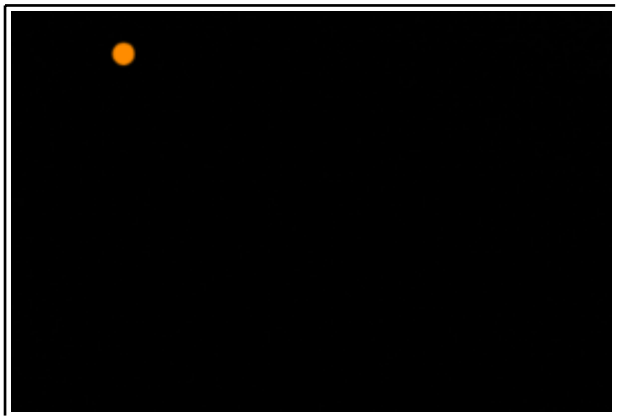
There are six possible features, each with a guide will prompt on right hand of the screen. Points, lines and circles specified on the guides are both primitive or shapes already create on the 2DVisualizer.

- Rectangles:

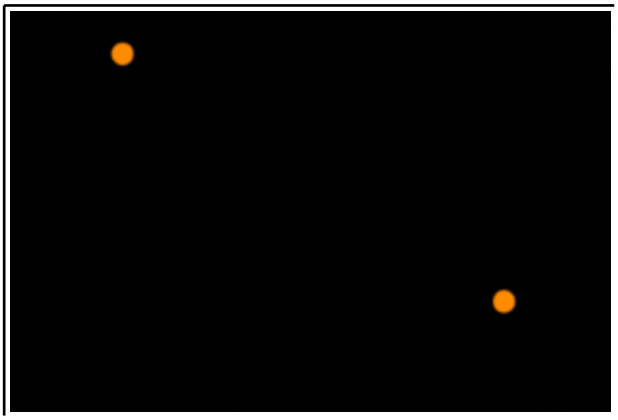


Instruction step by step:

1)



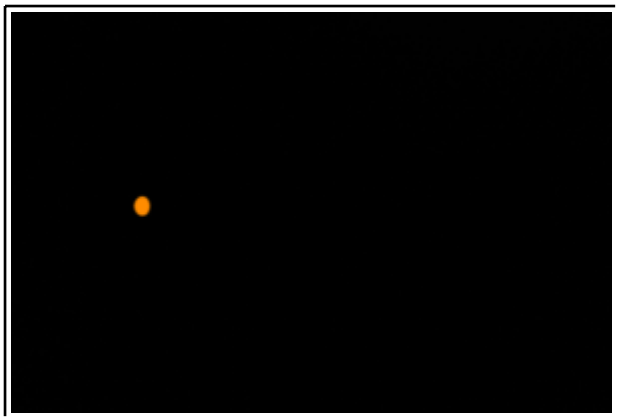
Set one point



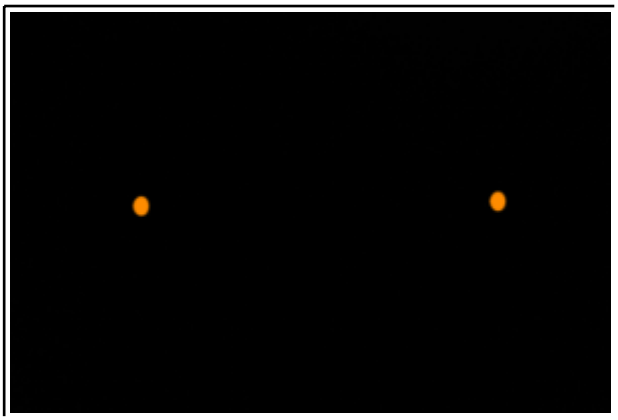
set a second point

confirm to con

2)

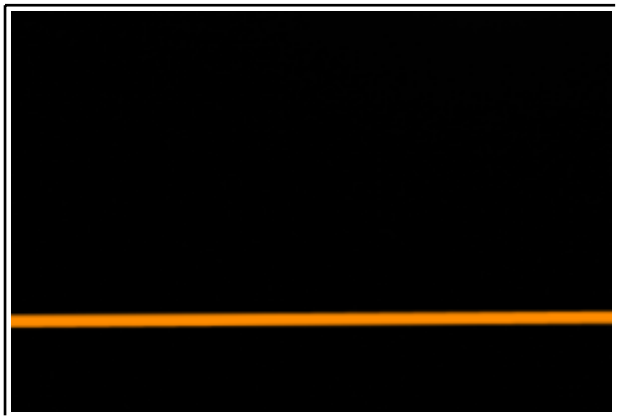


Set one point

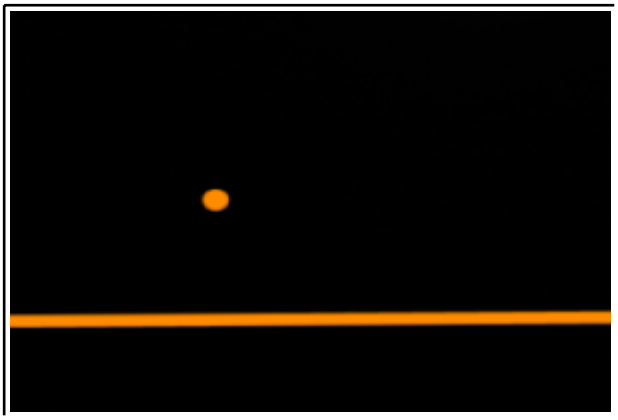


set a second point

3)

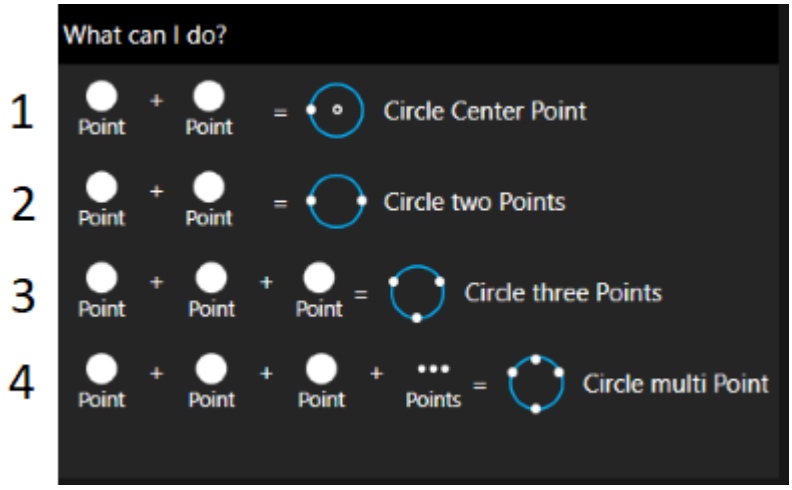


Select a line



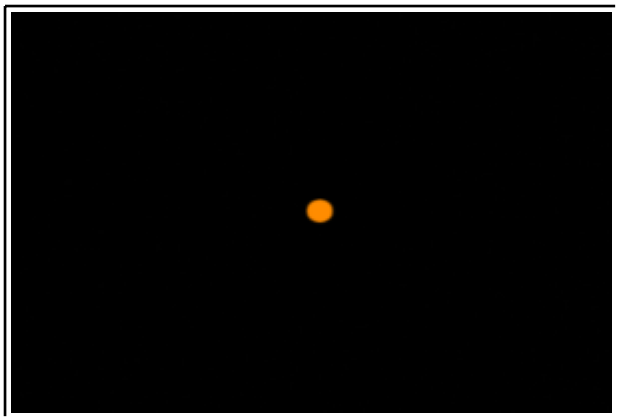
set one point

- Circles:

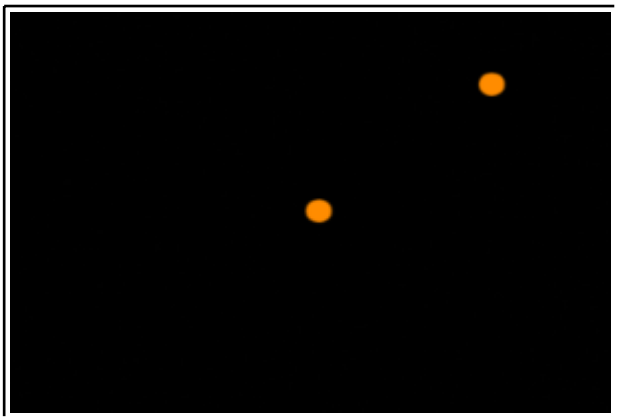


Instruction step by step:

1)



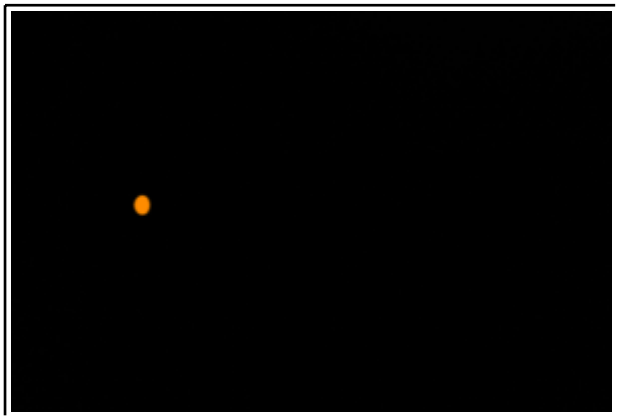
Set one point



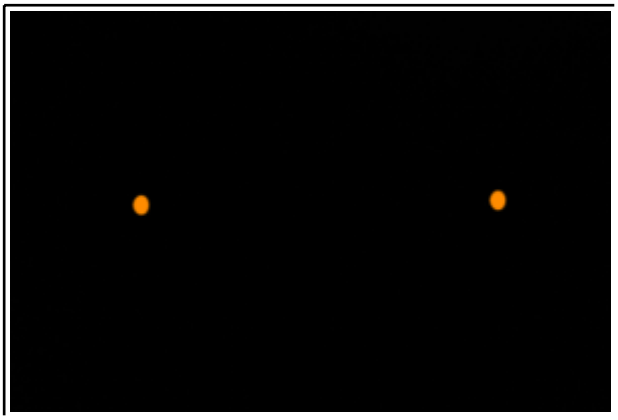
set a second point

confirm to cons centre

2)



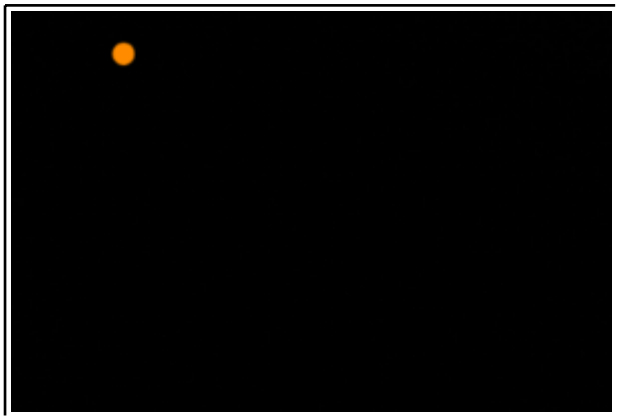
Set one point



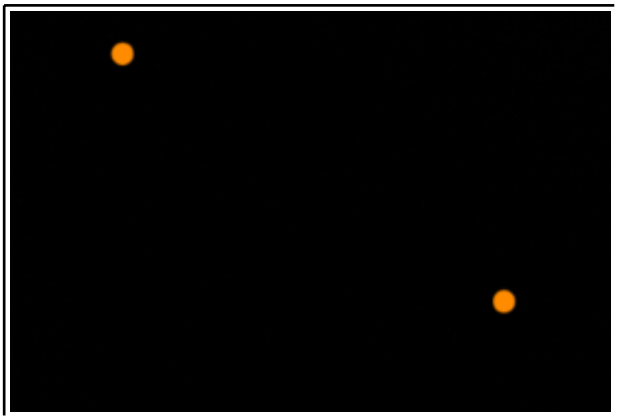
set a second point

confirm to cons

3)

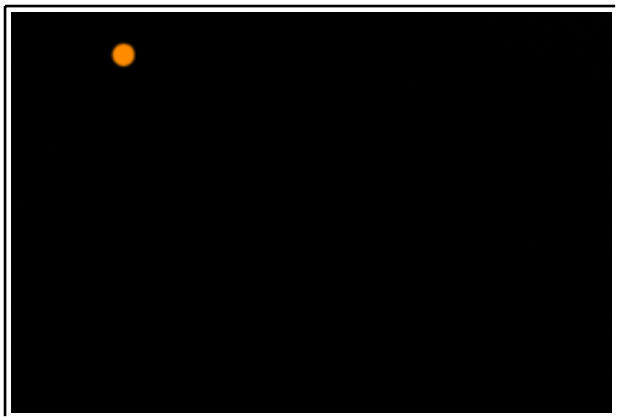


Set one point

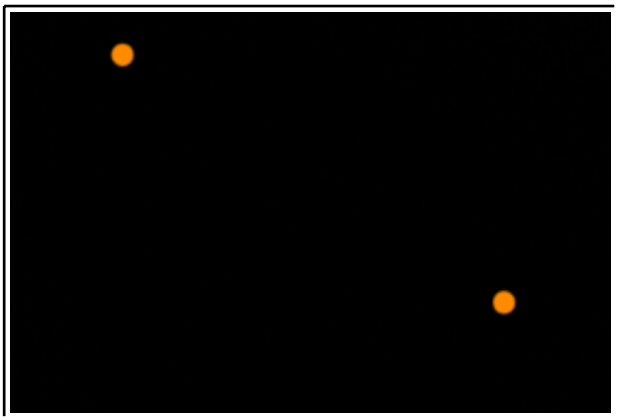


set a second point

4)

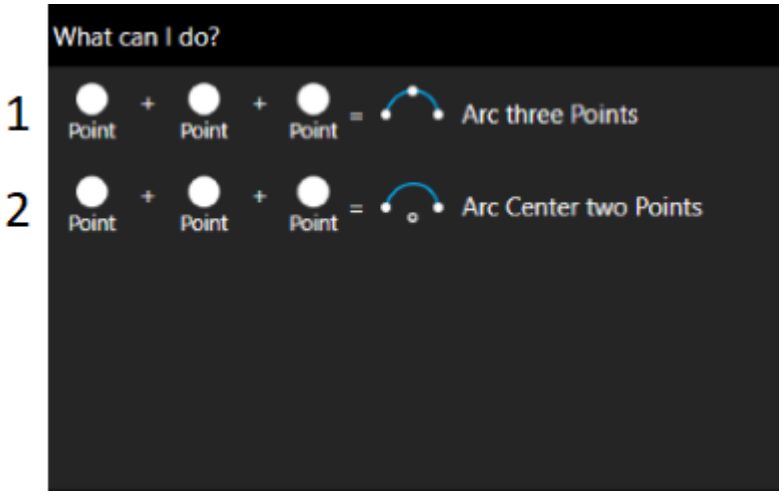


Set one point



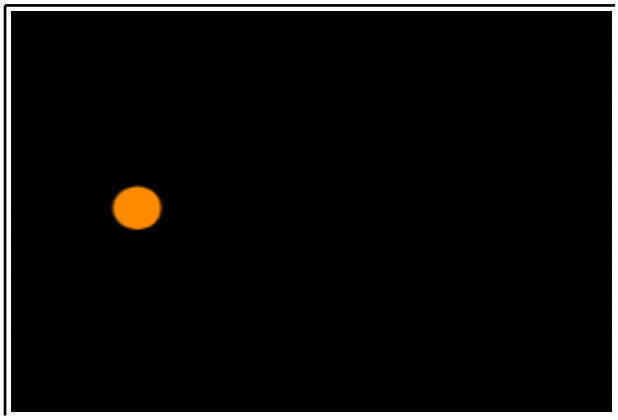
set a second point

- Arcs:



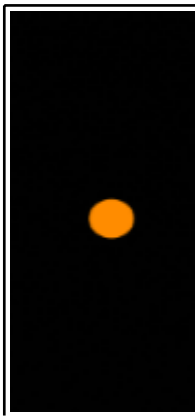
Instruction step by step:

1)



Set one point

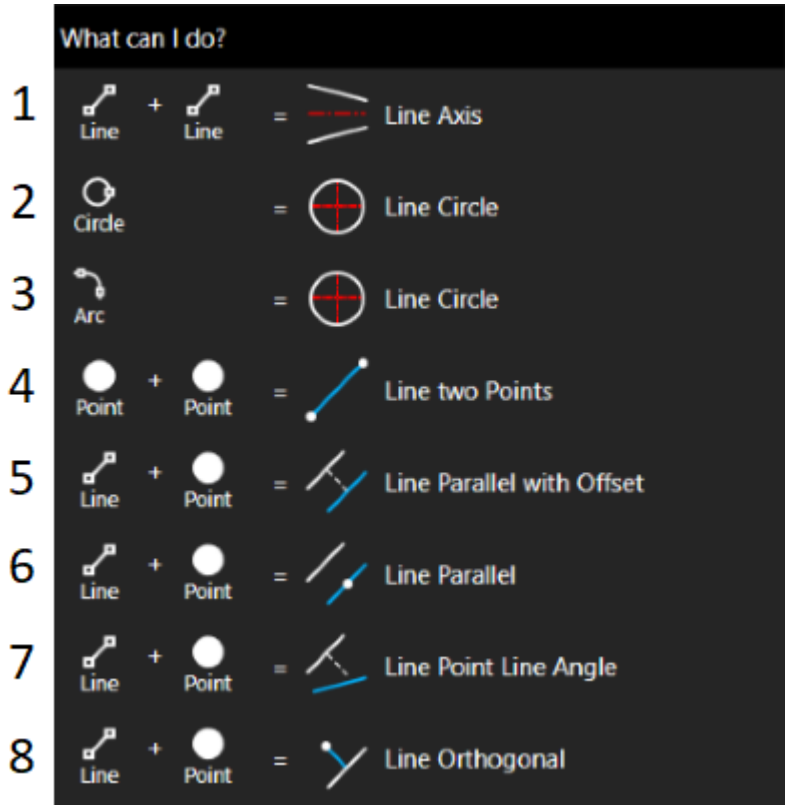
set a second point



2)

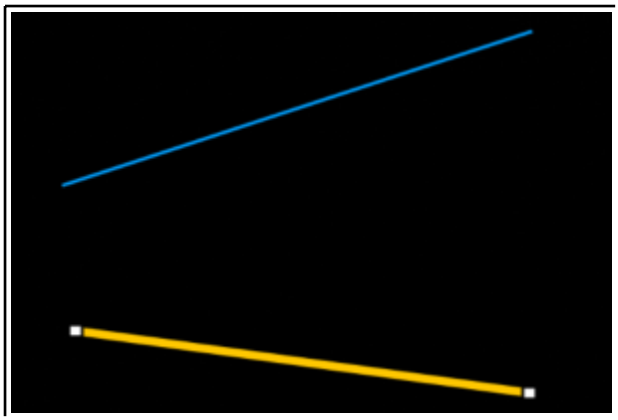
		
Set one point	set a second point	

- Lines:

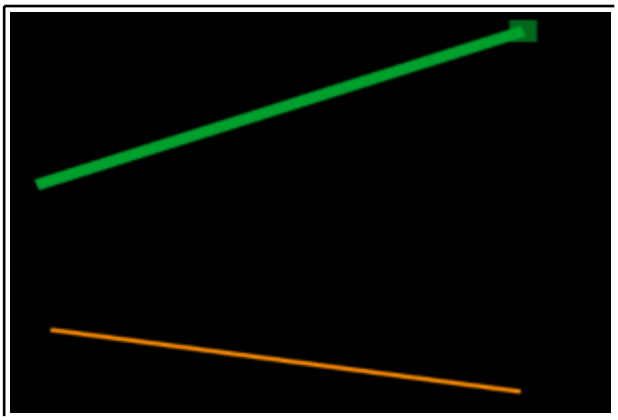


Instruction step by step:

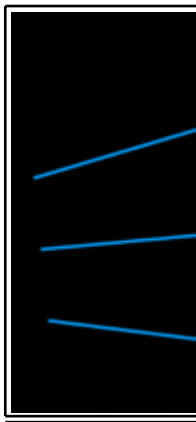
1)



Select one line

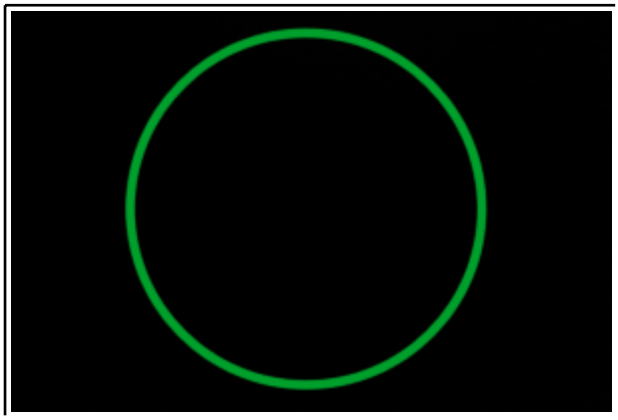


Select another line

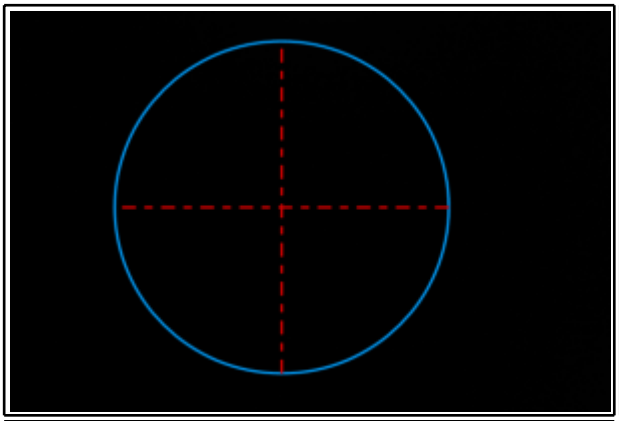


Confirm to c

2)

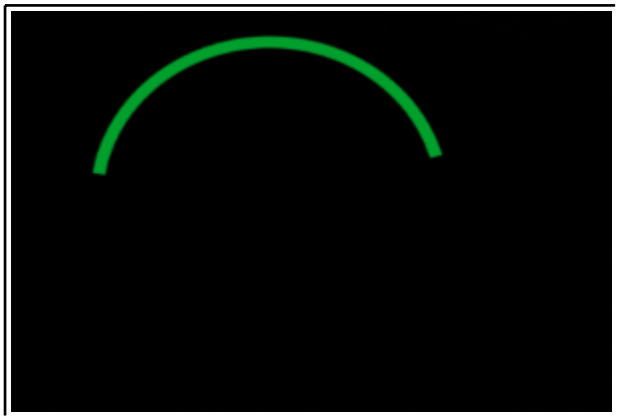


Select a circle

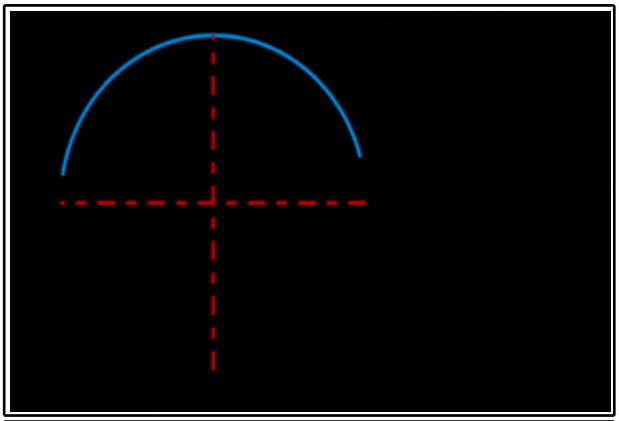


Confirm to construct the two orthogonal diameters parallel to the axes

3)

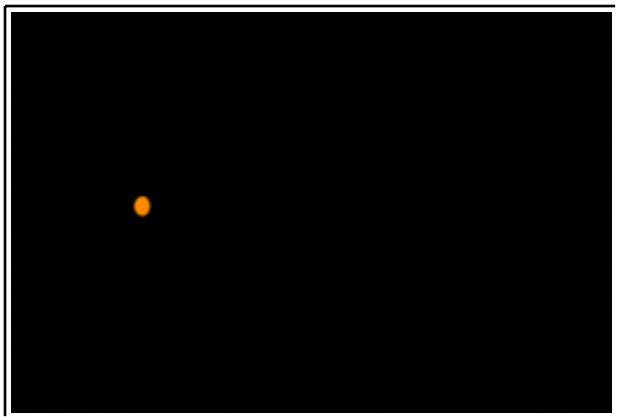


Select an arc

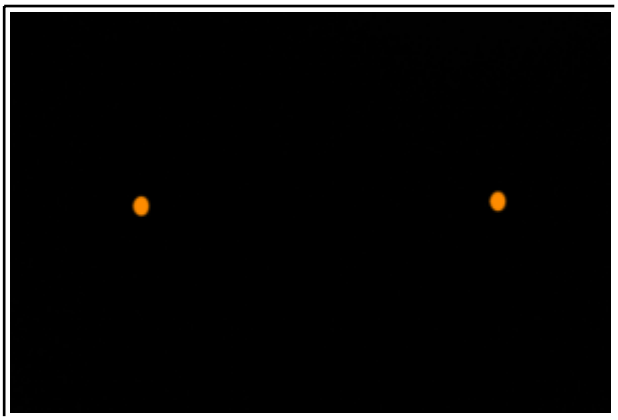


Confirm to construct the two orthogonal diameters parallel to the axes

4)



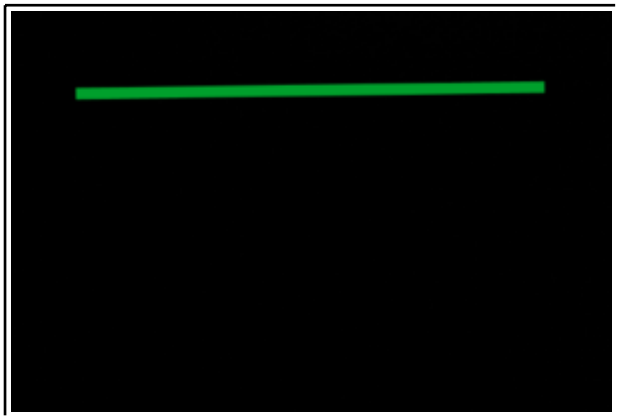
Select a point



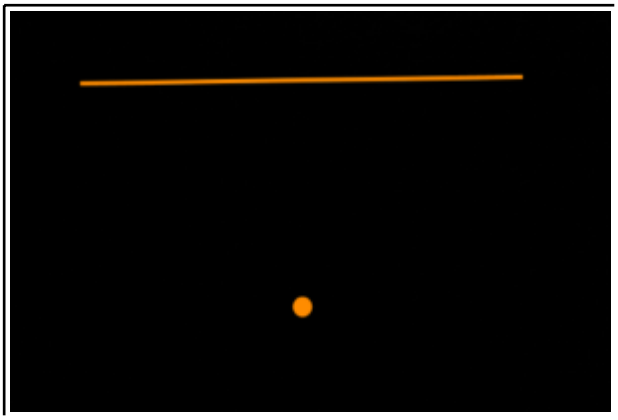
Select another point

Confirm to c

5)



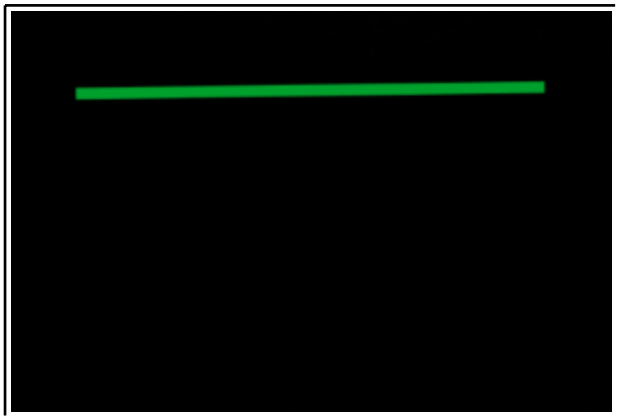
Select a line



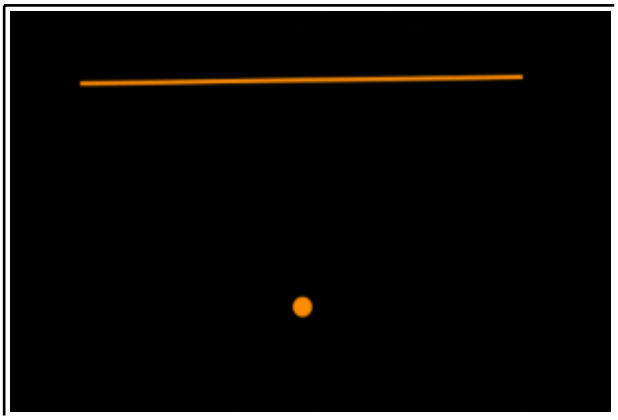
Set one point

Confirm to cons

6)



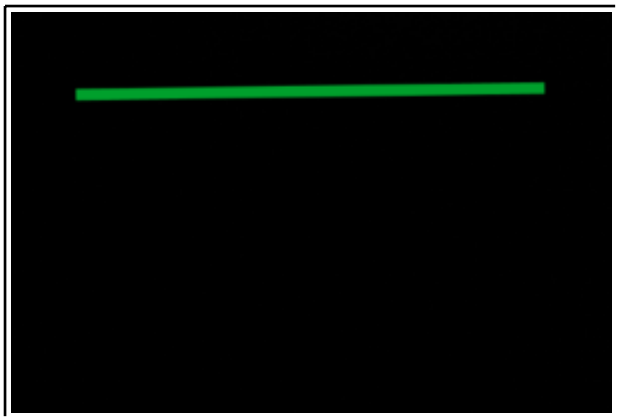
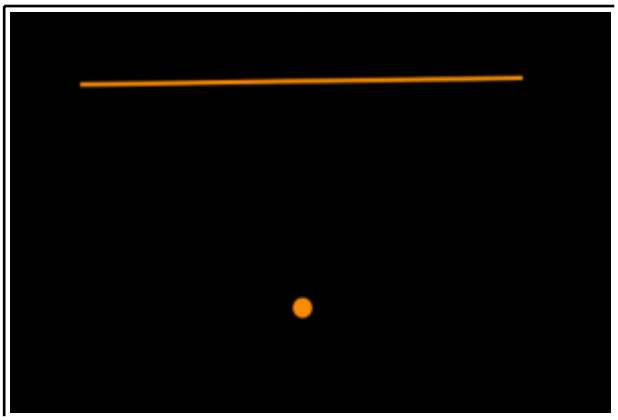
Select a line



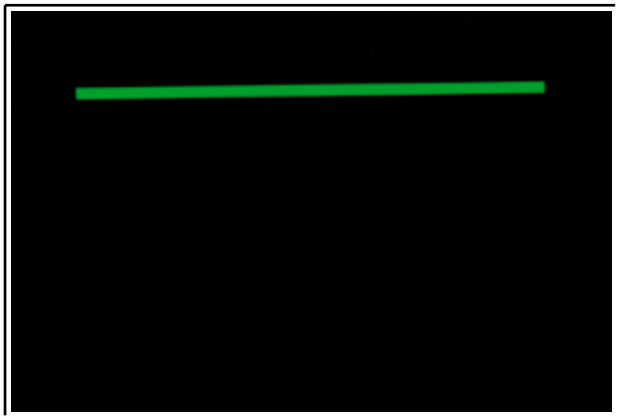
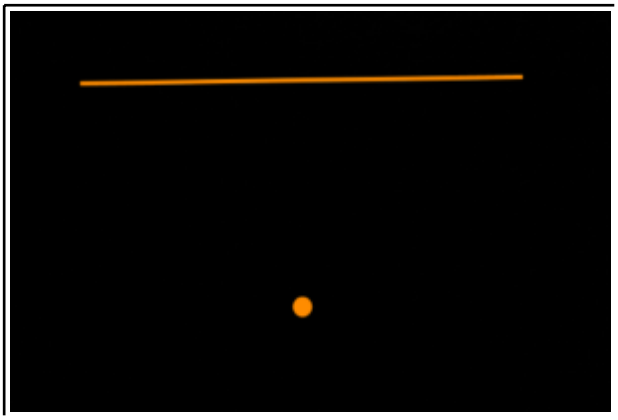
Set one point

Confirm to cons
throug

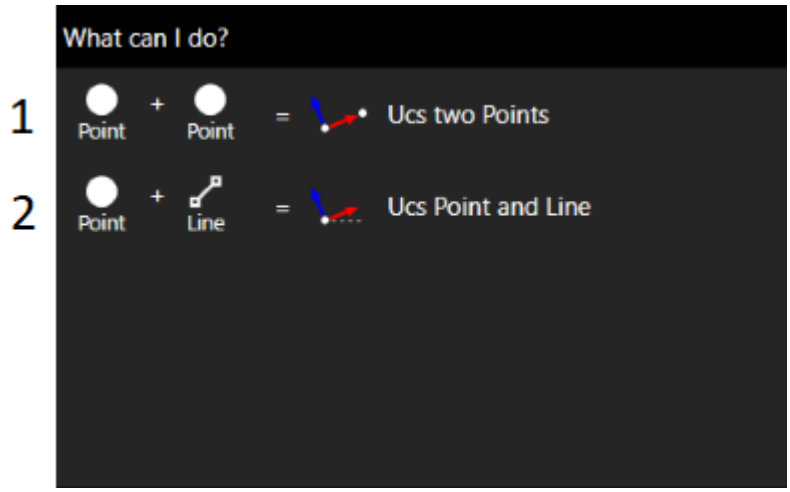
7)

		
Select a line	Set one point	Confirm to co point

8)

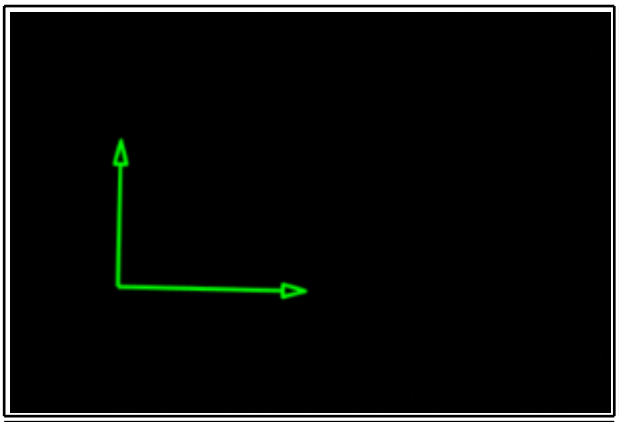
		
Select a line	Set one point	Confirm to co pa

- New Ucs (User coordinate system) Reference:

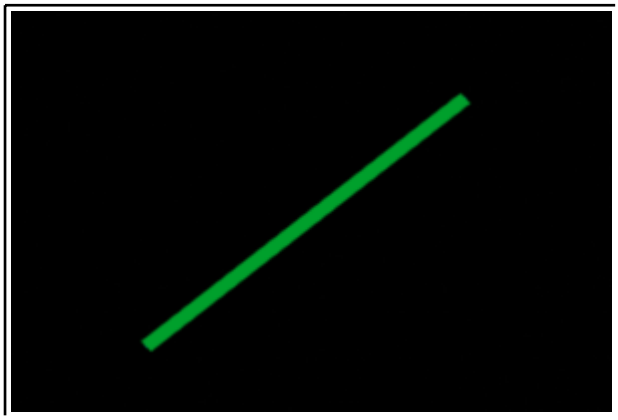
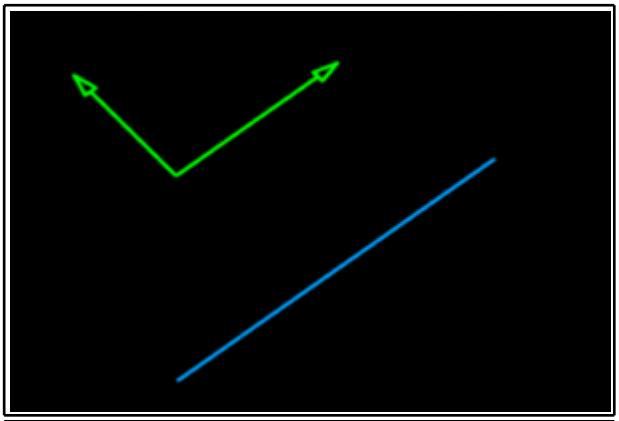


Instruction step by step:

1)

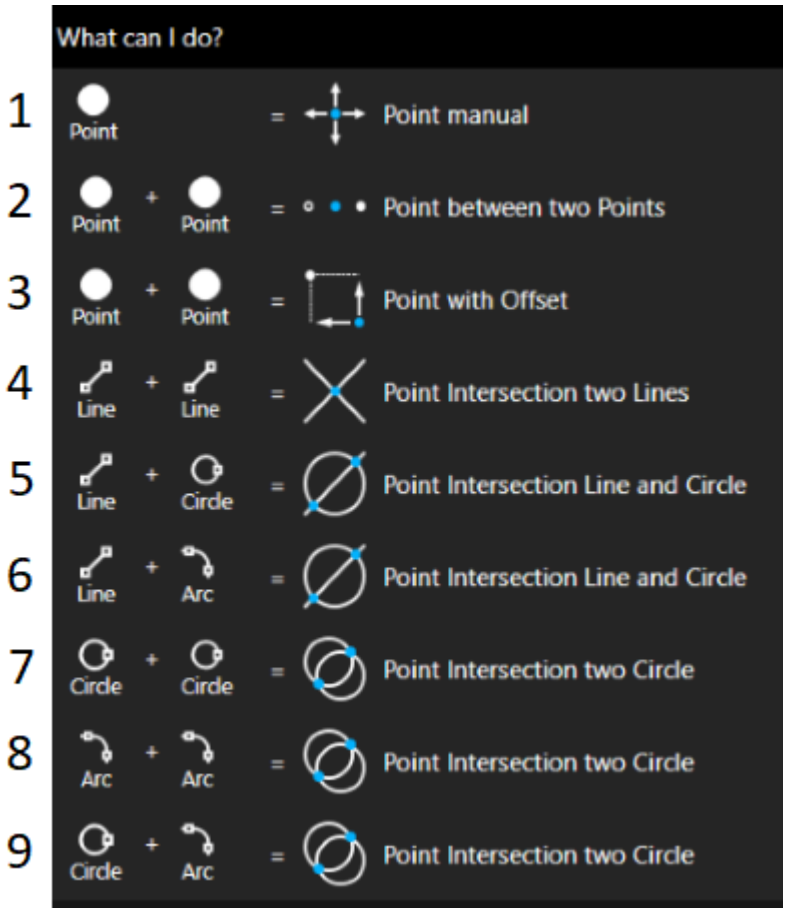
	
Set a point	Confirm to set a new Ucs centred in the point

2)

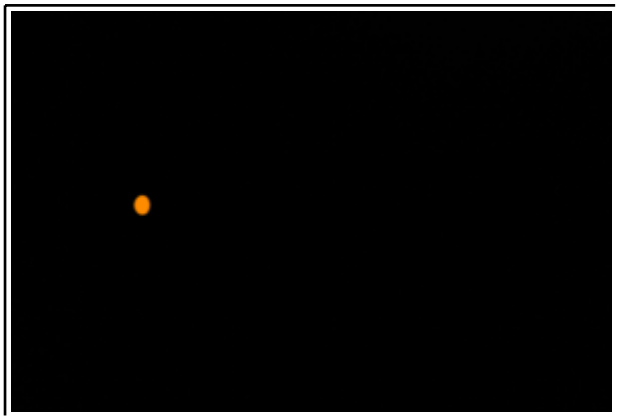
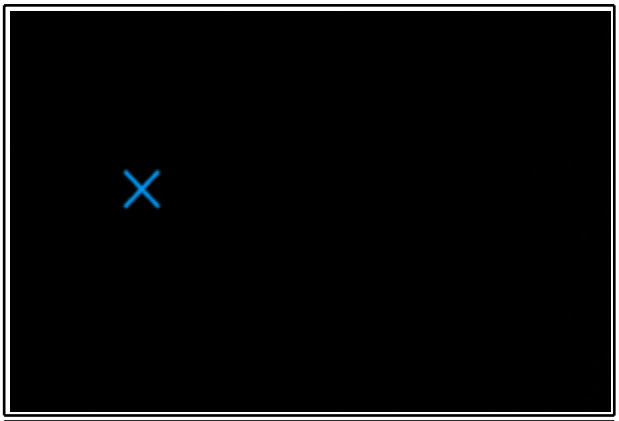
	
Select a line	Confirm to set a new Ucs centred in the point, having as x axes the parallel of the line

- Points:

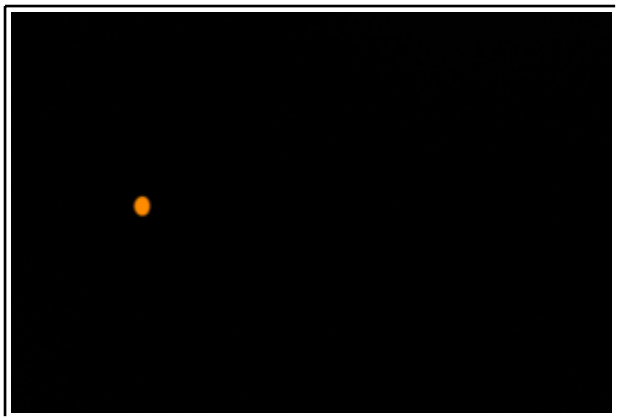
1)



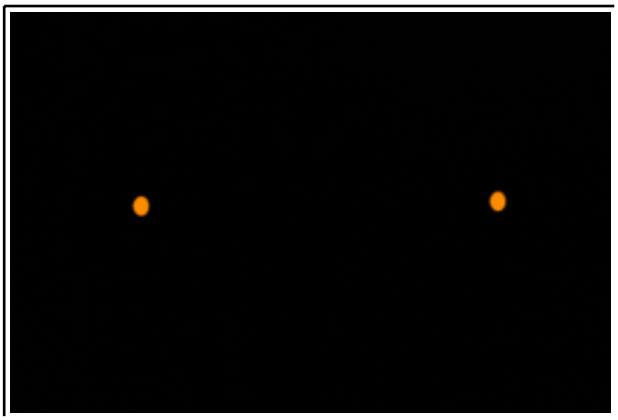
Instruction step by step:

2)	
	
set a point	Confirm to make it as a part of the object

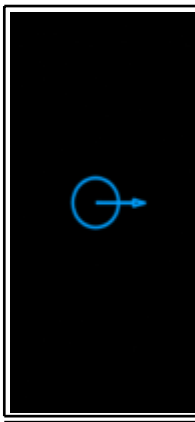
3)



set a point

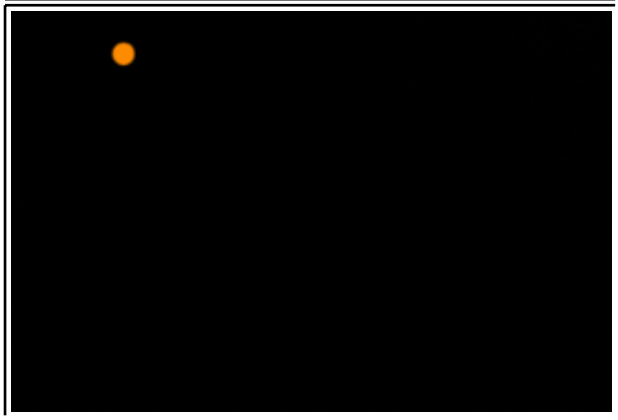


set another point

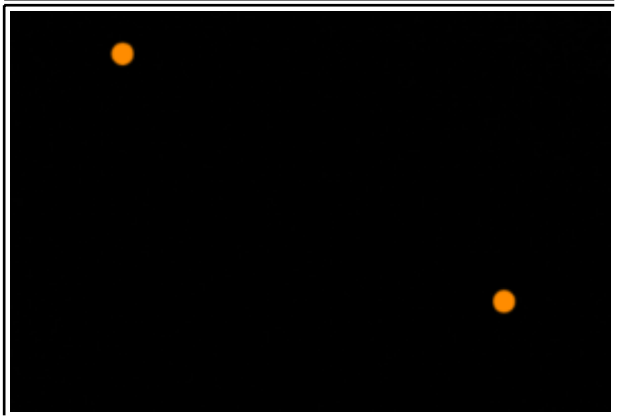


Confi

4)



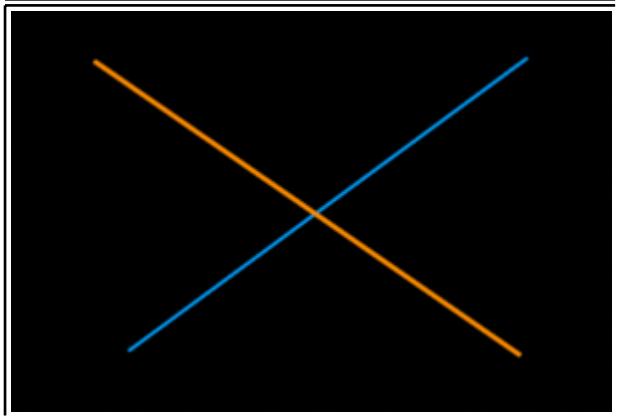
set a point



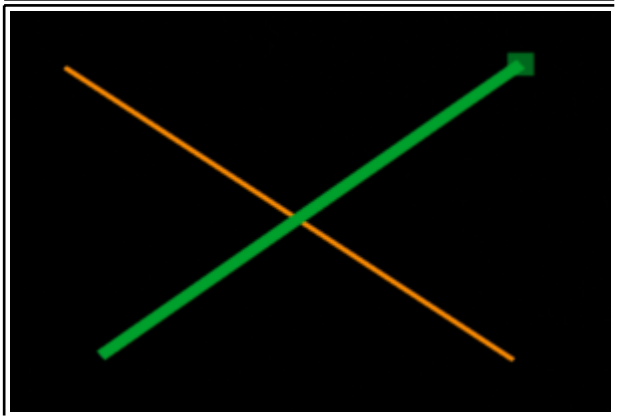
set another point

Confirm to obt
taking the t

5)



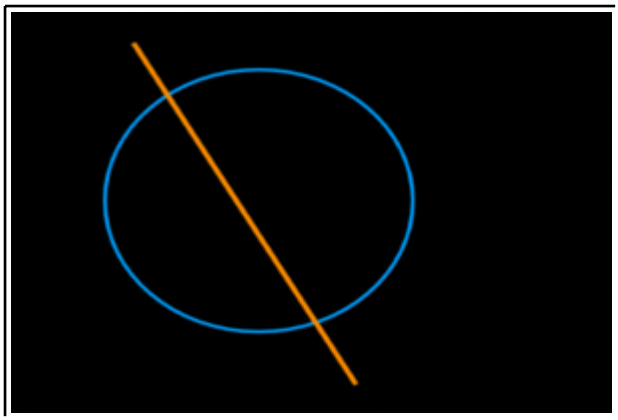
Select a line



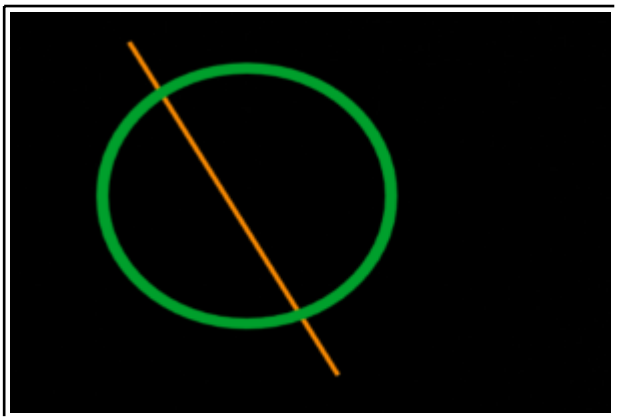
Select another line

Confirm to obta

6)



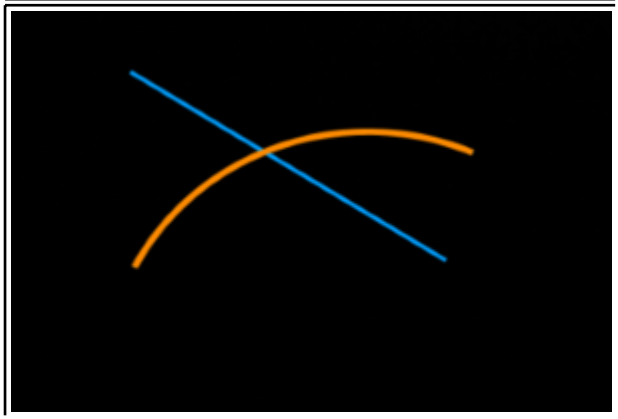
Select a line



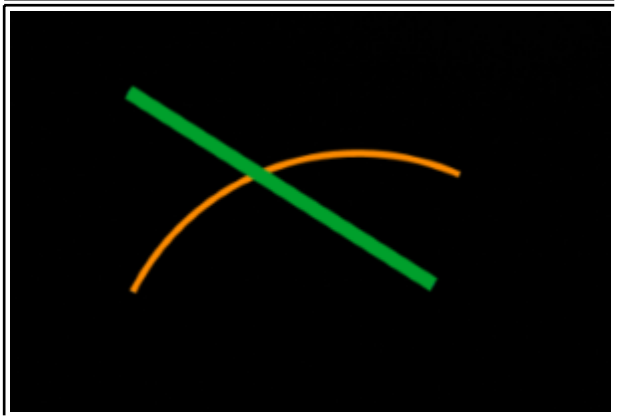
Select a circle

Confirm to

7)



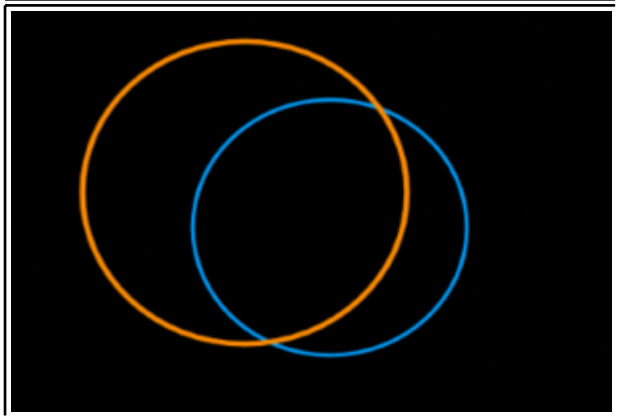
Select an arc



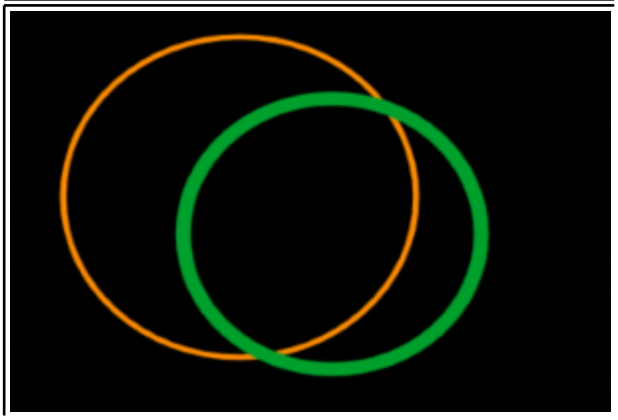
Select a line

confirm to obta

8)



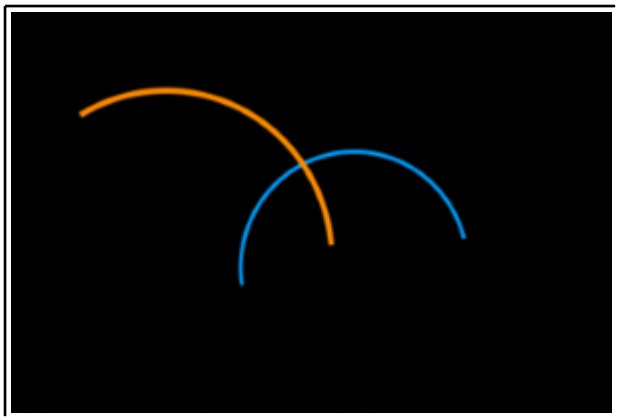
Select one circle



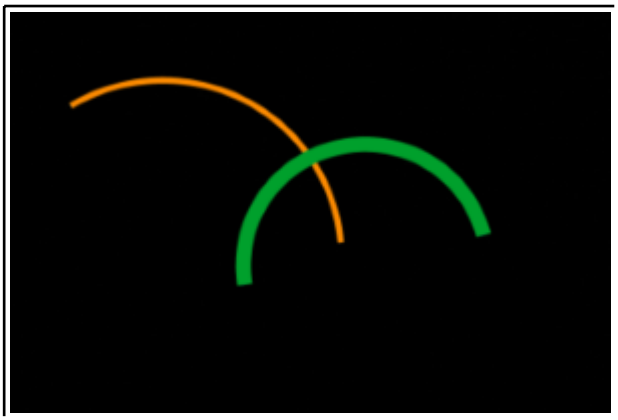
Select another circle

Confirm to

9)



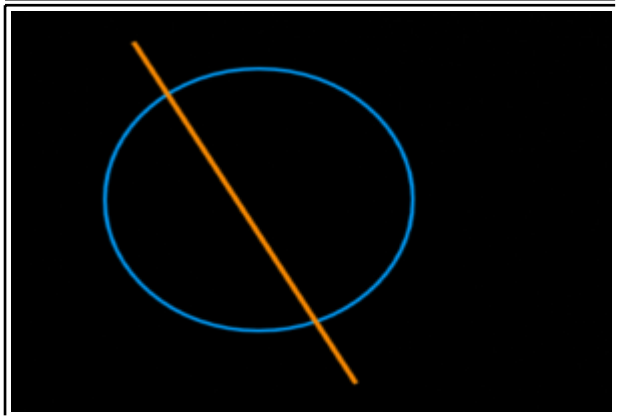
Select an arc



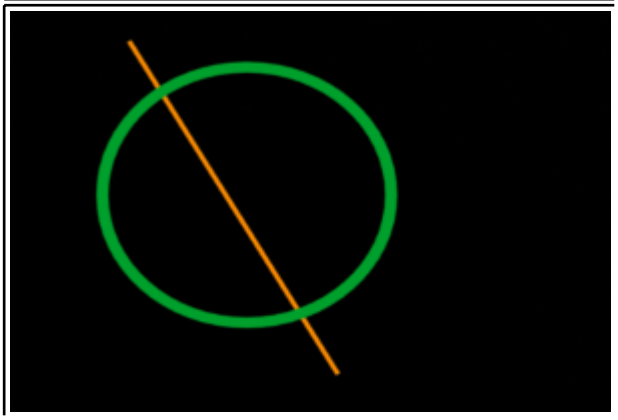
Select another arc

Confirm to obta

10)



Select a circle



Select an arc

Confirm to obta

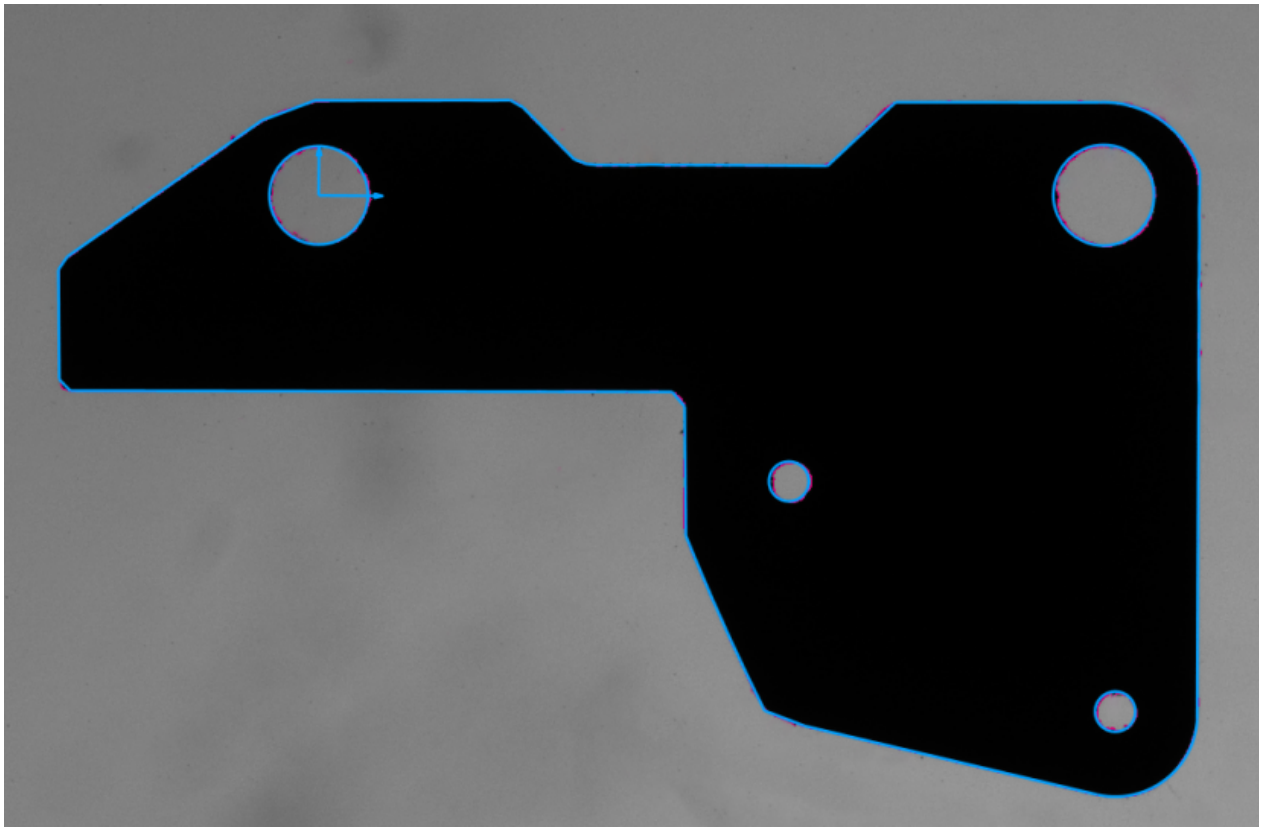
When you select a shapes, a guide will prompt in order to suggest you what you can do.
Click on the visualizer to start creating shapes, press **ESC** to exit.

DXF

Dxf menu allows you to import/export a/to dxf.

You can use:
- Base to import the dxf as a list of points;
- Objects to import the dxf as a list of objects (primitive);
- Export in dxf.

After importing, the program will automatically search for the best alignment.



Statistics

Save to database your measures for subsequent analysis.

This option is only available when all the parameters (camera or file image, engine, light, plc) are set correctly.