

# GUIDE | TAGARNO MEASUREMENT APP

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TAGARNO Measurement application enables you to perform precise measurements directly from your FHD microscope.

To use the Measurement application, the mouse and keyboard must be connected as described under the section called Connection in the product manual.

## Calibrations

To perform accurate measurements, you need to make a new calibration or recall a previous calibration. Different lenses require different procedures, so please follow the appropriate procedure for the mounted lens. Read more in “You have received” section below.

### 1. You have received

When buying the measurement application, you receive calibration sheets from D to I for Dot grid calibration and a ruler for linear calibration. Calibration sheets A, B and C are available at: [www.tagarno.com/download-calibration-sheets-abc](http://www.tagarno.com/download-calibration-sheets-abc)

NB: The calibration sheets provided can be used with lenses up to +10. Use the custom Dot grid or linear calibration methods for lenses +25 and higher.

### 2. New calibration

When performing a calibration, four current values are locked and saved in the application:

- Zoom level
- Focus height
- Close-up lens
- Scaling factor

After the calibration is performed, the proportions will only be measurable within the focus area.

### Method 1 - Dot grid

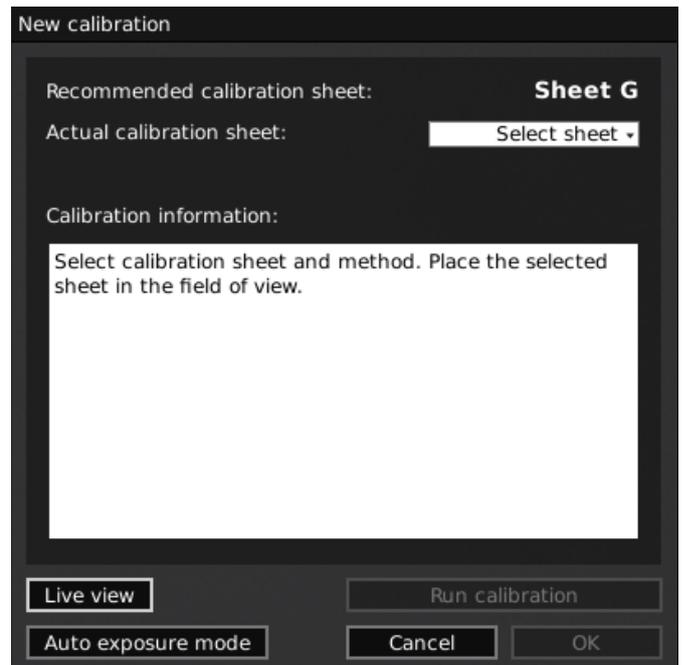


Advanced calibration is done automatically by placing a predefined dot grid calibration sheet under the camera and taking a picture.

While running the calibration, the software will automatically compensate for lens curve distortion and non-linearity and carry out calculations with a precision of sub-pixels.

1. Select a suitable magnification level
2. Press New calibration in the top menu bar

A separate window will now appear.



3. Depending on current zoom level and close-up lens, the app will recommend a calibration sheet for the calibration. Place the recommended calibration sheet straight under your microscope, so that the top row of dots is visible.

Here is the list of the range covered by each TAGARNO calibration sheet.

Sheet	Range [mm]		Range [inches]	
	min	max	min	max
A	204	340	8.03	13.39
B	123	204	4.84	8.03
C	74	123	2.91	4.84
D	44	74	1.73	2.91
E	26	44	1.02	1.73
F	16	26	0.63	1.02
G	10	16	0.39	0.63
H	6	10	0.24	0.39
I	3	6	0.12	0.24

- Let the app know that the correct sheet has been placed under the microscope by selecting the recommended calibration sheet in the drop down under Actual calibration sheet
- Click Run calibration and check if the result says PASS.

Note! If the calibration sheet is placed incorrectly, the calibration will fail. If the Result says FAIL, switch to Live view to adjust the position of the calibration sheet and recalibrate by pressing Run calibration again.

- When the calibration is complete, click OK to save the new calibration and close calibration state
- Click Cancel to close without saving the calibration

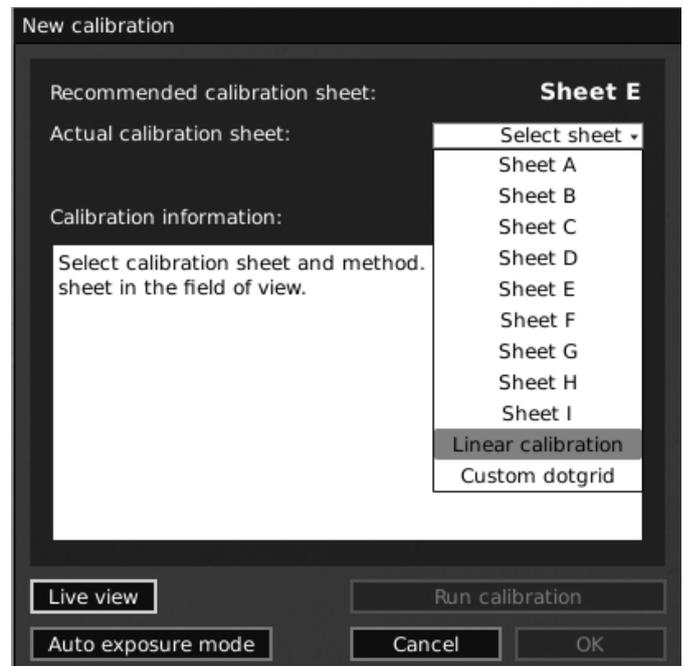
Method 2 - Linear calibration



This is a calibration method where you use a reference line and state the line length. The measurement accuracy depends on the user's diligence when drawing the reference line.

Linear calibration does not compensate for lens curve distortion.

- Once again, start by selecting a suitable magnification level
- Press New calibration
- Now, choose Linear calibration in the drop down menu under Actual calibration sheet



- Find an object with measurable distances (eg. a ruler) and place it under the microscope
- Select Linear calibration in the drop down menu
- Provide the distance you want to measure and matching unit
- If needed, zoom in and adjust the end points of the reference line for increased precision

Note! When measuring on a ruler, always measure from forefront to forefront of the lines on the ruler

- Click Run calibration.

Note! If the markers is placed incorrectly, the calibration will fail. If the Result says FAIL, switch to Live view to zoom in and adjust the position of the markers and recalibrate by pressing Run calibration again.

- When the calibration is complete, click OK to save the new calibration and close calibration state
- Click Cancel to close without saving the calibration

### Method 3 - Custom grid



Advanced calibration is done automatically by placing any predefined dot grid calibration tool under the camera and taking a picture. While running the calibration, the software will automatically compensate for lens curve distortion.

The dots should at least have a diameter of 20px on the screen to be recognized by the calibration mechanism.

1. Once again, select a suitable magnification level
2. Press New calibration
3. Now, select Custom dotgrid in the drop down under Actual calibration sheet
4. Provide the dot spacing measure and matching unit
5. Place the calibration grid straight under the microscope, so that the top row of dots is visible
6. Click Run Calibration and check if the Result says PASS

Note! If the calibration sheet is placed incorrectly, the calibration will fail. If the Result says FAIL, switch to Live view to zoom in and adjust the position of the markers to adjust the position of the calibration sheet and recalibrate by pressing Run calibration again.

7. When the calibration is complete, click OK to save the new calibration and close calibration state. Click Cancel to close without saving the calibration.
8. Click Cancel to close without saving the calibration

### 3. Delete a calibration



#### Delete calibration

To delete a saved calibration, click the Delete calibration button in the top menu bar. Then, click on the calibration you want to delete in the Recall dropdown menu.

A warning dialog box prevents you from deleting a calibration unintentionally. Press "OK" to delete the calibration.

### 4. Saving and recalling a calibration

The application will store and recall a calibration, so that you do not have to recalibrate every time the software has been closed. To choose a saved calibration, select it in the Recall dropdown menu in the top menu bar.

NB: When you readjust a calibration, the camera focus locks. This means that you might have to readjust the physical distance between the camera and the object you are looking at (focus height) to display the image sharply.

When recalling a calibration, it is important that you use the same close up lens as during the initial calibration. Only calibrations with the chosen lens will be available in the drop down menu.

All measurement annotations will remain after recalling a calibration. All measurement values will also be recalculated based on the selected values. If needed, use the Edit function to readjust any measurement. See next page.

## Tool menu

### 1. Function shortcuts

Function key shortcuts (F1-F10) have been assigned to the drawing and annotation functions. The tool tip shows the assigned function key. See assigned shortcuts at each function below.

NB: When you mouseover a menu point, a text box will show tool tips.



#### Magnification level

Use the keyboard to change magnification level. Press the magnification field to state an exact magnification level.



#### Object and text color adjustment

Use this function to set the colors for drawings and texts before using a tool. You are not able to edit the color after using the tool.

Latest settings are persistent during power down.  
The hue is set to black by default.



#### Background color adjustment

Adjust the color of the text annotation background before using the text annotation tool. You are not able to edit the color after starting using the tool.

Latest settings are persistent during power down. The hue is set to transparent by default.

1 px

#### Line width

Choose the line width of your measurement lines in pixels (px). Latest settings are persistent during power down. The width is set to 1 px by default.

14 pt

#### Text size

State the text size of your measurement units and text annotations in points (pt). Latest settings are persistent during power down. The size is set to 14 pt by default.

mm

#### Choose measurement units

Choose your preferred measurement units in the dropdown menu. It is possible to choose between mm, cm and inches.



#### F1: Edit

In edit mode, all adjustable points will be shown as a small circle which highlights (red circle) on mouse over.

When a point is highlighted, you can choose and relocate the point. In view mode, the points are hidden. By right-clicking on a point, you are able to delete the point.



#### F2: Clear all

Use this button to clear all drawings. Then Clear All is selected, a warning dialog enables you to cancel the operation if it was selected by accident.



#### F3: Point-to-point measurement

With this measurement tool, it is possible to measure the distance between two points. Use left mouse click to place the two end points.

NB: Holding down Shift when placing the end point will make the line go horizontal or vertical.

NB: Holding down Ctrl while placing the start and end points of this tool will make it snap to the center of a measured circle. This can be used to easily measure the distance between the center of two measured circles.

NB: Press Ctrl to extend the base lines when placing the lines. This can be used for measuring the distance between parallel objects. When the line has been placed, the base lines return to their default length.

NB: Press Alt key while placing the last point of the measurement to offset the measurement line annotation with dash lines. This is useful if the annotation is difficult to read when placed at default.



#### Shift + F3: Distance to line measurement

Measure the distance between a line and a point.

NB: Press Ctrl to extend the base lines when placing the lines.



#### F4: Polyline measurement

Place two or more points to get the length of each distance plus the length of the full polyline.

NB: Holding down Shift when placing the end point will make the line go horizontal or vertical.

NB: Holding down Ctrl while placing the start and end points of this tool will make it snap to the center of a measured circle. This can be used to easily measure the distance between the center of two measured circles.



#### F5: Diameter measurement

This tool enables you to calculate a diameter of a circle. Place three points in the periphery of a circle and it will calculate the diameter. Use left mouse click to place the three points.



#### F6: Radius measurement

This tool enables you to calculate a radius of a circle. Place three points in the periphery of a circle and it will calculate the radius. Use left mouse click to place the three points.



### F7: Angle measurement

This function makes it possible to measure any given angle. Use left mouse click to place four points - two on each side of the angle you want to measure.



### F8: Area measurement

Use this function to make a polygon area measurement. Use left mouse click to place at least three points. To stop adding points to your polygon just right-click on the mouse.



### F9: Text Annotation

This function makes it possible to add text annotations anywhere in the window.

Use the Keyboard to type the text. Move the text box to the wanted location and left click the mouse to confirm the position.

The feature includes auto completion allowing you to easily select or delete previously entered text annotations.



### F10: Arrow Annotation

With this tool, it is possible to add arrow annotations anywhere in the window. Use the left mouse button to place the endpoints. The second point is the end of the arrow.

## 2. Other toolbar features

Use the other features in the toolbar to change image mode, correct lens curve distortion, take a snapshot, change your settings and more.



### Live View

Use this button to toggle between live and still image mode. In Live mode, the live camera image is active. In Still image mode, the latest snapshot will be shown.



### Lens Correction

This function takes the calibration data and corrects the image for lens curve distortion. Lens correction can only be processed in a calibrated state, not in lineary calibrated mode.

Moreover, this button can be used to toggle between latest snapshot and a corrected version of the snapshot.



### Snapshot

Use this button to take a snapshot of the live image. The snapshot will not be saved automatically.

NB: When using the mouse wheel to zoom digitally on a snapshot, the center of the zoom follows the mouse position.



### Settings

Once clicking this icon, a pop-up window will allow you to adjust the sensitivity of your mouse and the number of decimals to be displayed with your measurements.

### Mouse

Adjust the mouse sensitivity by selecting a point on the bar between slow and fast.

### Decimals

Choose the number of decimals you want your measurements to be displayed with by using the drop down menu.

### Text

Choose how line length annotations should be displayed: Select All text horizontal to have the text displayed horizontally on the monitor. When unselected (default), the text will be parallel to the line. All previous length annotations will change to the selected setting.



### Save Image

This button gives a choice between saving the image you took before with or without drawing overlay. When saving with drawing overlay, the actual view will be saved (including digital zoom).

When taking a picture, an information window will appear for a few seconds showing the file name and storage location.

The image will be saved on the inserted USB memory stick. If a USB memory stick is not attached, the image is saved internally on the microscope, provided the share file mode is turned on. Otherwise an error message will appear and you are not able to save images.

NB! You can also use the control box to save images with the tool box on the image. Read more about this in the user guide for your microscope.



### Close

Use this function or hold center button down for a few seconds to close the measurement application.



### Move Toolbar

Press and hold left mouse button down to move the toolbar around the window and place it by releasing the mouse button.