



11. Measurement tool

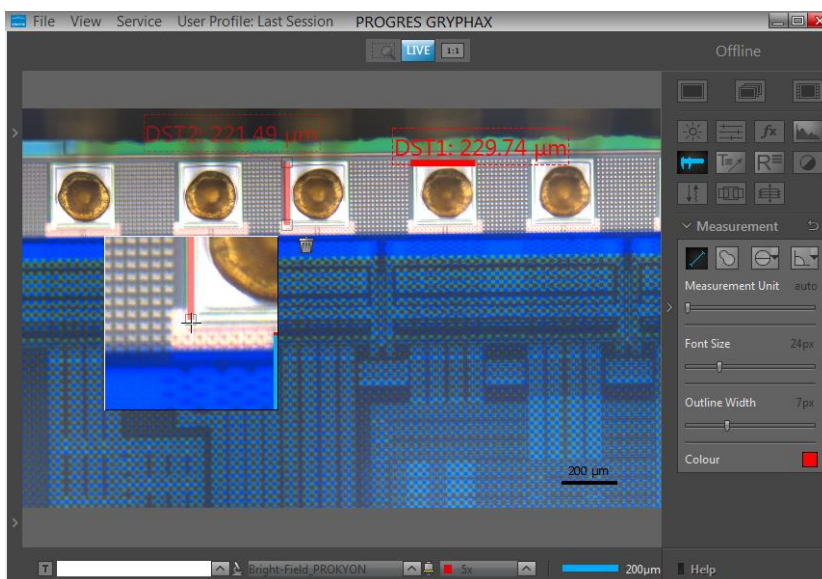


Measurement Tool of JENOPTIK GRYPHAX® software

The “[Measurement tool](#)” of JENOPTIK GRYPHAX software enables user to measure basic methods directly at the live image or at recorded images from Gallery.

General description:

The “[Measurement tool](#)” is part of the JENOPTIK GRYPHAX software. It contains scale bar and basic measurement methods as real-time measuring directly at the live preview or at recorded images from *Gallery* afterwards.



Preparations general:


To use Measurement tool you have to calibrate your microscope objectives in advance! Otherwise, the Measurement tool cannot be activated and used. To create measurement calibration you have to open software Preferences and navigate to option “Device Configuration”.


To calibrate the microscope you can use the JENOPTIK GRYPHAX® [calibration slide / stage micrometer](#) (order number: 648806).

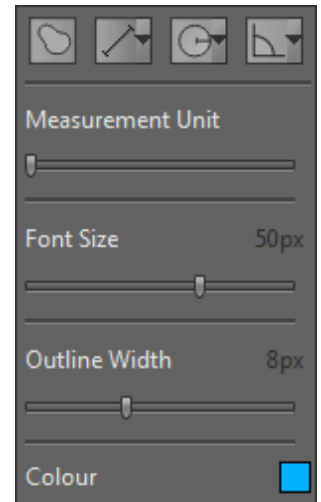
Please see the [video tutorial](#) how to calibrate the microscope objectives:
[Click here to watch the Video Tutorial – Device Configuration & Status Bar](#)












11.1 Start Measurement tool:

To **activate** the *Measurement tool* open the GRYPHAX Tool bar by pressing the arrow  on right-hand software site or use keyboard short cut (**ctrl / cmd + T**)


Click to the Measurement icon  at the tool bar, the Measurement widget will be displayed and contains the following measure tools and options:



-  **Line** (2-point) measurement for distances
 -  **Free-hand-line** measurement for non-straight distances
 -  **Multi-line-distance** measurement for multi-line distances
 -  **Parallel-line-distance** measurement for parallel distances
 -  **Circle-to-circle-distance*** measurement for distances of circle centers
 -  **Freeform** measurement for areas and distances
 -  **Circle** (3-point) measurement for radius & diameter
 -  **Angle** (4-point) measurement for interior & exterior angles
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- **Measurement unit** contains the following units in respect to the used method: Auto selection as default or nm, μm , mm, cm, m, mil, inch, ft, deg ($^{\circ}$) as well as similar area units
 - **Font size** by value 8 – 72px
 - **Outline width** by value 1 – 20px
 - **Colour** can be selected by color selector, click on color rectangle  to open color selector

(*available as of GRYPHAX version 2.2.0 or newer)

Note: Measurement tool is enabled only if record mode "Single shot" is selected and live image is activated before. Or a recorded image which were captured with calibration information is opened from Gallery. Images captured without measurement calibration cannot be measured afterwards!

Reset button  on a tool sets all properties to their initial values. Initial values are fixed.

11.2 Pre-define settings:


When no object is current or selected, the tool widgets show default properties. In this state default properties can be modified. They are stored in settings/profiles.


To **predefine** the general settings of measurement tool e.g. font size, outline width or colour by change of the according parameter without selecting any measurement method.


The settings for each drawing object can be individual adjusted after start of drawing or by selecting a drawn object from image window.



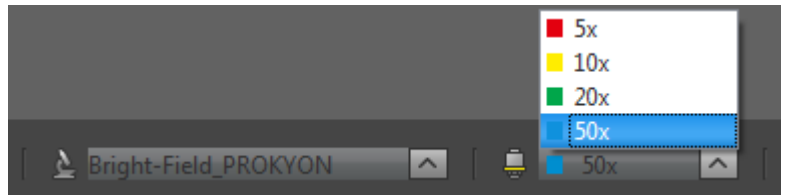
11.3 Start measuring:

To **start** measuring select record mode "Single shot" and **start live** by pressing the "Live"-button  or open a **recorded image** from Gallery which is captured with calibration information.


By **pressing** "Rec"  button all previously drawn measurement from **live preview** will be merge into the image. And cannot be modified afterwards. The according measurement data are stored at image meta-data and can be review by Report tool.

To **save** drawn measurement at loaded **recorded images** from Gallery, start Live preview  or load another image from Gallery. An **image copy** will be always saved **automatically** by software with a file name extension: "_copy_1" and increment the image copy number accordingly.

Attention: Take care that the correct "device" and "magnification / objective" is selected from *Status bar* **before** start with any measuring. Otherwise, the measurement results are not correct!

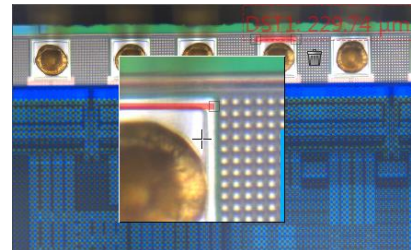


11.4 Creation (drawing) of objects:

In general, after **clicking** one of the measurement method buttons  (distances, freeform, circle or angle), the cursor changes into a cross and user can draw a measurement object of the type selected.

Additionally, a small floating pane is opened as image window overlay and shows a detailed view of a selected sector like as the magnifier tool.

Zoom level of magnifier can be **adjusted** on the used section of "zoom level" under *Preferences / General / Magnifier*



Pressing "Del" or "Esc" key before finishing an object, aborts the creation and removes unfinished objects.

Each drawn measurement object will be labelled by a fixed **prefix name** and a **counting number** according the object type and quantity.

For further details, please see measurement button descriptions below.

11.5 Draw a distance (2-point-line or Free-hand-line) & freeform measurement:

The line & free-hand-line and freeform measurement are 2-point-measurements.

To **draw** an object start with left mouse-click on first point and release. The start point is marked.

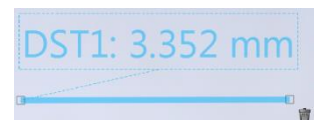
Move the mouse away and a colored semi-transparent line is drawn from the start point to the current mouse position (refreshed as long as the mouse is inside the image window) additionally the currently measured value is displayed near the start point.

Go to the end point and make left mouse-click and release.

For freeform the drawn curve will be **completed** by a straight line to the start point if end position is different from start point. The measured value is written near the starting point (including an auxiliary line) and will be shown the default unit automatically.



As long as the measurement object is **selected** the line and text are semi-transparent. A trash button appears right beside the measured value and the start- and end points are marked.



11.6 Draw a Multi-line-distance:


The Multi-line-distance consists of **two parts**. The first part is the **“base-line”**. Second part are the **measured distances** (Multi-line) which are aligned **perpendicular** to the base line.

User can draw multiple distance lines which are correlated to the base line.

To **draw** a base-line start with left mouse-click on first point and release. The start point is marked.



Move the mouse away and a colored semi-transparent line is drawn from the start point to the current mouse position (refreshed as long as the mouse is inside the image window) additionally the currently measured value is displayed near the start point.

Go to the end point and make left mouse-click and release.

The base-line will display a green “status” icon  which signal that the multi-line-distances can be drawn.



Add a multi-line-distances by left mouse click on measure point. A straight-line aligned perpendicular from this point to the base-line will be added. To add additional distance line repeat the step again.

Click on the green “status” icon  when measurement is finished. Status of icon change to colour “grey” , which signal that the measurement is deactivated.

To **reactivate** and change the multi-line-distance click on the grey status icon  again.

As long as a measurement object is **selected**, the line and text are semi-transparent. A trash button appears right beside the measured value and the start- and end points are marked.

11.7 Draw a Parallel-line-distance:


The Parallel-line-distance consists of **two parts**. The first part is the “**base-line**”. Second part are the **measured distances** (Parallel-line) which are parallel to the base line.

User can draw **multiple** distance lines which are correlated to the base line.

To **draw** a base-line start with left mouse-click on first point and release. The start point is marked.



Move the mouse away and a colored semi-transparent line is drawn from the start point to the current mouse position (refreshed as long as the mouse is inside the image window) additionally the currently measured value is displayed near the start point.

Go to the end point and make left mouse-click and release.

The base-line will display a green “status” icon  which signal that the Parallel-line-distances can be drawn.

Add a Parallel-line-distances by left mouse click on measure point. A straight line aligned parallel from this point to the base-line will be added. To add additional distance line repeat the step again.



Click on the green “status” icon  when measurement is finished. Status of icon change to colour “grey” , which signal that the measurement is deactivated.


To **reactivate** and change the Parallel-line-distance click on the grey status icon  again.

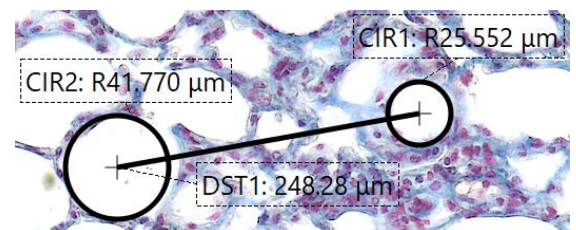
As long as a measurement object is **selected** the line and text are semi-transparent. A trash button appears right beside the measured value and the start- and end points are marked.

11.8 Draw a Circle-to-circle-distance measurement

The Circle-to-circle-distance measurement is a 2-point measurement which enables to **measure distances of two circle centers**.

It is a combination of *Circle* measurement and *Distance* line.

To **perform** 2 or more crircles must be drawn **before**. Afterwards the Circle-to-circle-distance  measurement can be used.



By **click** into the center position of a circle the start position will be connected to the center position automatically. **Draw** the distance line to the next circle center and release the mouse. Afterwards the end point automatically connects to the second circle center and the distance value will be displayed in between of both circles. Drawing of line is identical to the normal *line distance* measurement.

Note: Circle-to-circle-distance does not automatically re-connects to center position by change of position of Circle afterwards! Manually adjustment is not possible for Circle-to-circle-distance.

11.8 Draw a radius & diameter (circle) measurement:

The circle measurement is a 3-point-measurement which enables to measure circle which are bigger as the field of view of camera / image.

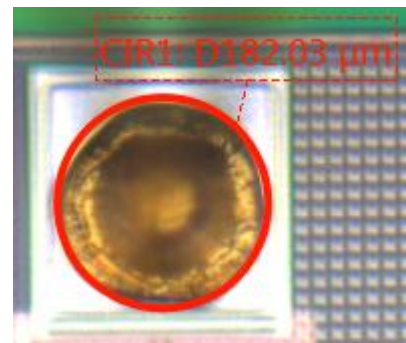
To **draw** an object start with left mouse-click on **first point** and release. The start point is marked.

Move the mouse away and a colored semi-transparent line is drawn from the start point to the current mouse position (refreshed as long as the mouse is inside the image window)

Go to the **second point** and make left mouse-click and release.

Move the mouse away and a colored semi-transparent circle is drawn instead of line from the first two points to the current mouse position. Additionally the currently measured value is displayed near the start point.

Go to the **end point (3rd)** and make left mouse-click again and release. The measured value is written near the starting point (including an auxiliary line) and will be shown the default unit automatically.



As long as the measurement object is **selected** the circle and text are semi-transparent. A trash button appears right beside the measured value and the start- and end points are marked.

Note: The measured value can be displayed as diameter or radius (marked by a "D" or "R"). Before the measurement will be done the user has to make the proper choice.

11.9 Draw an angle measurement:

The angle measurement is a 4-point-measurement which enables to measure angle which are bigger as the field of view of camera / image.

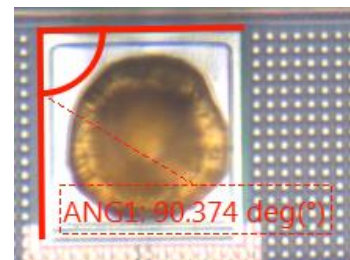
To **draw** an object start with left mouse-click on **first point** and release. The start point is marked.

Move the mouse away and a dashed auxiliary line is drawn from the start point to the current mouse position (refreshed as long as the mouse is inside the image window).

Go to the **second point** and make left mouse-click and release. The first dashed auxiliary line is drawn.

Go to the **3rd point** and make left mouse-click and release. A second dashed auxiliary line is drawn from this point to the current mouse position (refreshed as long as the mouse is inside of image window).

Go to the **end point (4th)** and make left mouse-click again and release. The dashed auxiliary lines becomes continuous line. The measured value is written near the angular point (including an auxiliary line).



As long as the measurement object is **selected** the angle and measurement value are semi-transparent. A trash button appears right beside the measured value and the start- and end points are marked.



11.10 Object selection:

Every object can be **selected** as the current one at live and captured images **before** image is recorded / saved with measurement overlay. The current object is displayed as semi-transparent and decorated with the trash icon. Most objects (except freeform & Free-hand-line object) when selected as the current one, also display grey, square control points which are used to modify the geometry of the object.

An object can be selected as the current one, by clicking it with the pointer tool - 'arrow' button on the main window's top bar. But when an active tool is other than the pointer tool (e.g. circle drawing tool), this requires switching the active tool off and switching the pointer tool on. To make it more convenient, the pointer tool can be temporarily activated by pressing the **"ctrl / cmd"** key. As long as the key is pressed, the pointer tool is active. When **"ctrl / cmd"** is released, the previously active tool activates again.

The current object can be **moved** and **reshaped** (except freeform & Free-hand-line object) using the pointer tool. When the annotation or measurement GUI widget is visible on the tool bar, the properties of the current object (colour, line width, etc.) are set in the widget.

11.11 Object multi-selection:

By marking a **rectangular area** with the pointer tool at the image window, one can also select more than one object. Multi-selected objects are also displayed as semi-transparent, but without their trash buttons. A multi-selection trash will be displayed in center of the selected objects to delete all. Pressing **"del"** key remove all selected objects.

Multi-selection can be also created, extended or modified by clicking on objects with the pointer tool while **"shift"** key is pressed. Objects selected can be moved together as well.

11.12 Deleting objects:

The current object can be **deleted** by clicking its trash icon , or pressing **"del"** key. Objects selected can be deleted together by pressing **"del"** key.

11.13 Changing object properties:

Object's properties can be **modified** using controls on the tool widget appropriate for the object. I.e. annotation objects (arrow, text) can have their properties modified using annotation tool widget and measurement objects - measurement tool widget. The properties of the current object are visible in the widget and can be modified. When more than one object is selected (multi-selection), some common properties (like: color or line width) for all selected objects can be modified.

Note: If a tool widget is closed, double-click on an object makes the object current and opens the appropriate tool widget at the toolbar.

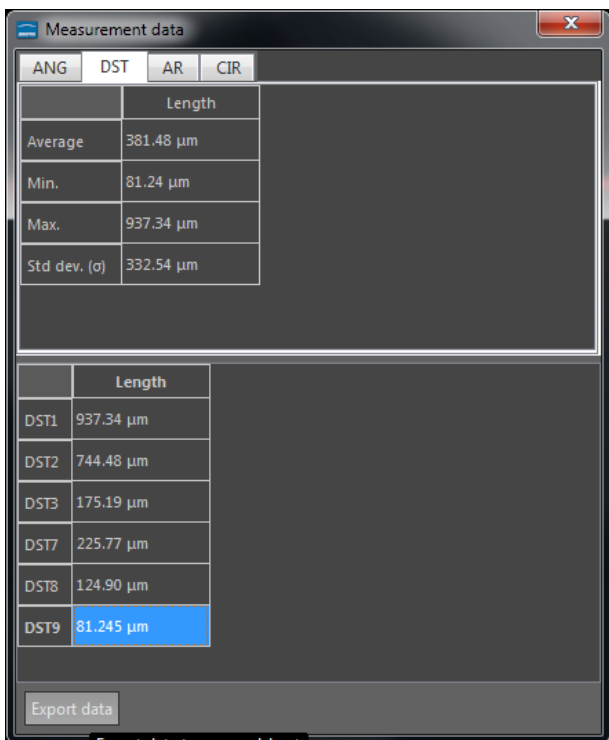


Export Measurements:

With “[Report tool](#)” of JENOPTIK GRYPHAX software, you can review measurement values, measurement statistics or export all measurement data from live or recorded images into file.

The “Measurement data” table of *Report Tool* contains the following statistics:
Average value, minimum value, maximum value and standard deviation (σ) according measurement type.

To [export](#) measurements objects open Report tool  and activate the “Measurement data” table . Press button “*Export data*” to save all measurements data into *.xml file.



Note: All functions and possibilities of *Report Tool* are described separately on [Report tool](#) section at manual.

Limitations:

- Measurement and Annotation are not available during time-lapse, video record, Z-stacking, Panorama or Fluorescence mode.
- No measurement available for images captured without measurement calibration data.

Video tutorial:

[Press the link](#) to watch the video tutorial for measurement tool of JENOPTIK GRYPHAX software.