

# MANUAL



## *TOOL MASTER Basic plug & play Solution*



en

Neither the whole nor any part of this documentation may be reproduced, passed on to third parties, stored in a database system or translated into another language without the written permission of Evoset AG.

Steg, March 2022

Valid from software version: V.3.9.6.0

The information contained in this document may not be amended without prior notification. Evoset AG will therefore not accept any liability.

Evoset AG disclaims all warranties, any legal responsibility or any liability for consequential damages arising from or in connection with the content or use of this manual.

Furthermore, Evoset AG hereby disclaims all warranties, any legal responsibility or any liability for consequential damages arising from the incorrect use of the hardware and/or software.

The layout or design of the hardware can be changed without prior notice. Evoset AG will therefore not accept any liability.

All other trademarks and product designations used in this manual are the property of the respective companies and manufacturers.

Evoset AG waives all property rights with regard to the named trademarks and product designations that do not belong to them.

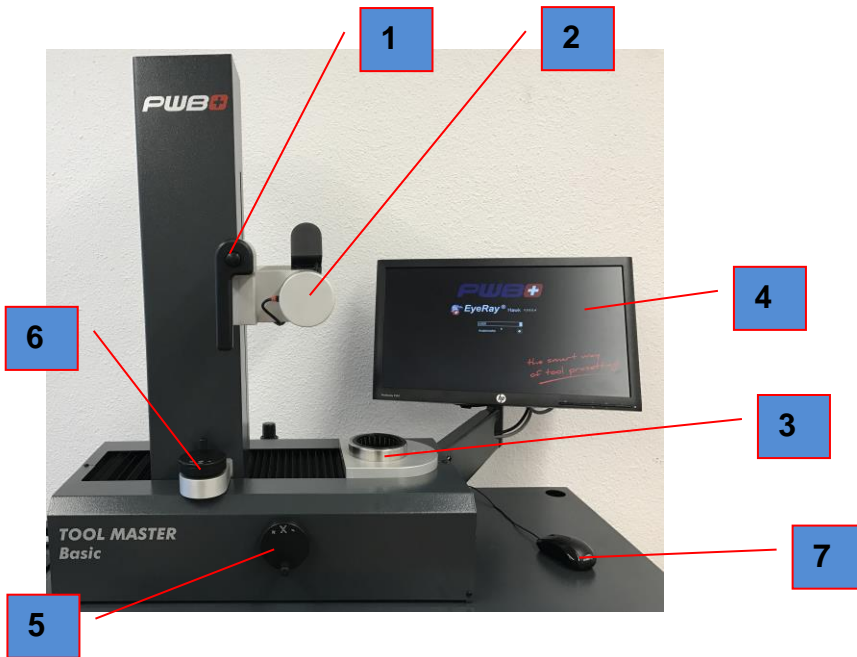
# Contents

<b>1 INSTRUMENT DESCRIPTION</b> .....	<b>4</b>
1.1 FRONT AND BACK VIEW .....	4
<b>2 INSTRUMENT INSTALLATION</b> .....	<b>5</b>
2.1 PACKING LIST.....	5
<b>3 OPERATING THE UNIT</b> .....	<b>6</b>
3.1 AXIS MOVEMENT.....	6
3.2 SWITCH-ON THE UNIT AND THE HP MINI PC.....	6
<b>4 IMAGING SYSTEM EYE RAY®</b> .....	<b>7</b>
4.1 LOG-IN SCREEN.....	7
4.2 START EYE RAY® AND LOG-IN .....	8
4.2.1 <i>Standard calibration of the unit</i> .....	9
4.2.2 <i>Only units with linear scales: cross reference marks</i> .....	10
4.3 SCREEN REPRESENTATION EYERAY®.....	10
4.4 MENU STRUCTURE.....	11
4.5 BASIC SETTINGS .....	13
4.5.1 <i>illumination</i> .....	13
4.5.2 <i>Align camera</i> .....	14
4.5.3 <i>Parallelism correction</i> .....	15
4.5.4 <i>Absolute zero point</i> .....	16
4.5.5 <i>Parameter</i> .....	17
4.6 SHORTCUTS.....	21
4.6.1 <i>Create shortcuts</i> .....	21
4.6.2 <i>Delete shortcuts</i> .....	22
4.7 MEASURING .....	23
4.7.1 <i>Focus bar/ indicator</i> .....	23
4.7.2 <i>Choose a reference point</i> .....	24
4.7.3 <i>Select a measuring function (MF)</i> .....	26
4.7.4 <i>Description of the measuring functions</i> .....	27
4.7.4.1 Basic measuring functions	27
4.7.4.2 Define measuring window/ range	29
4.7.5 <i>Select a measuring method</i> .....	30
4.7.6 <i>Description of the measuring methods</i> .....	31
4.7.6.1 Maximum method	31
4.7.6.2 Preset mode	32
4.7.6.3 Screen method	33
4.7.6.4 Multi cutter method	34
4.7.6.5 Fixed Axes	35
4.7.6.6 Centre point method	36
4.7.6.7 Theoretical angle/ radius	38
4.7.7 <i>Select axis measuring mode/ counter display</i> .....	40
4.8 PRINTING MEASURED VALUES .....	42
4.8.1 <i>Print label / standard</i> .....	42
4.8.2 <i>Customized label EyeRay®/ Optional</i> .....	42
4.8.3 <i>Print „Report“ (optional)</i> .....	42

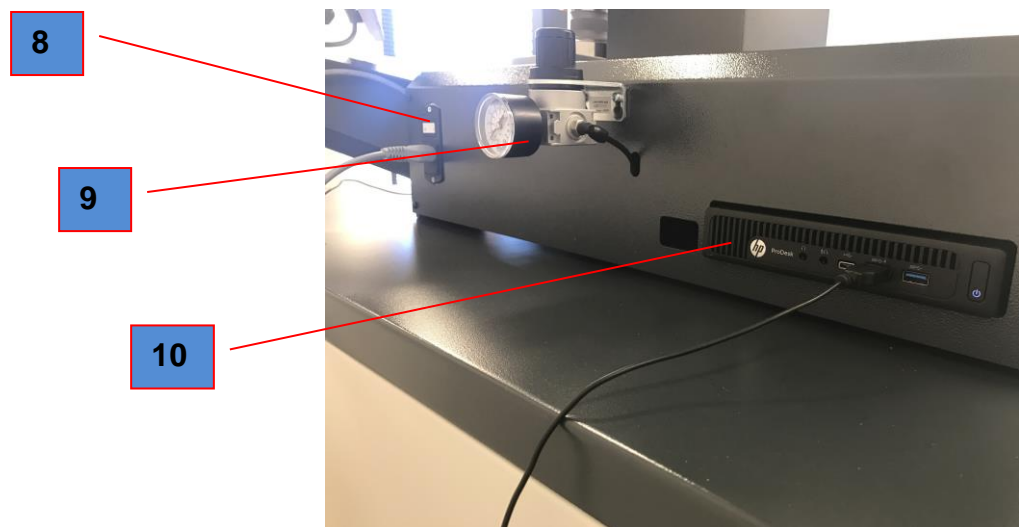
4.9	DATA TRANSFER .....	43
4.9.1	<i>Tool list</i> .....	43
4.9.2	<i>Open PDF file</i> .....	46
4.10	DATA BASE .....	47
4.10.1	<i>Reference point data base</i> .....	47
4.10.1.1	Description of the input fields:	48
4.10.1.2	Samples of reference points:	50
4.10.2	<i>Backup and Restore</i> .....	51
<b>5</b>	<b>OPTIONAL FUNCTIONS .....</b>	<b>53</b>
5.1	CUSTOMIZED LABEL EYERAY® (SW OPTION) .....	53
5.2	DATA TRANSFER POSTPRO EYERAY® (SW OPTION) .....	53
5.3	DATA TRANSFER RFID CHIP/ EYERAY® (SW OPTION).....	53
5.4	CENTRE HEIGHT MEASURING WITH CAMERA/EYERAY® (OPTION) .....	53
5.5	CUSTOMIZED MEASURING FUNCTION (SW- OPTION).....	53
<b>6</b>	<b>TROUBLESHOOTING .....</b>	<b>54</b>
<b>7</b>	<b>DIAGRAMS .....</b>	<b>57</b>
7.1	OVERVIEW CONNECTIONS TM BASIC.....	57
7.2	CONNECTION USB HUB/ SPINDLE KV .....	59
7.3	PNEUMATICALLY CONNECTIONS .....	60
7.3.1	<i>Tool pot: Needle bearing</i> .....	60
7.3.2	<i>Tool pot: Spindle KV</i> .....	61
<b>8</b>	<b>DECLARATION OF CONFORMITY .....</b>	<b>62</b>

## 2 Instrument description

### 2.1 Front and back view



### Back view



1. Handle to unlock / lock and move both axis
2. Camera
3. Tool spindle
4. HP Display (non touch)
5. Fine adjustment wheel X-axis
6. Fine adjustment wheel Z-axis
7. Mouse
8. Switch On/Off (230V)
9. Pneumatic unit (5bar)
10. HP ProDesk

### 3 Instrument installation

#### 3.1 Packing list



**Unit complete  
mounted with  
monitor on arm  
holder  
(plug & play)**

**ATTENTION :** If the instrument has been stored at a temperature below 5 °C, wait for a few hours before unpacking to prevent the instrument parts from condensation. Condensation can affect sensitive parts of the instrument. Keep the original packaging

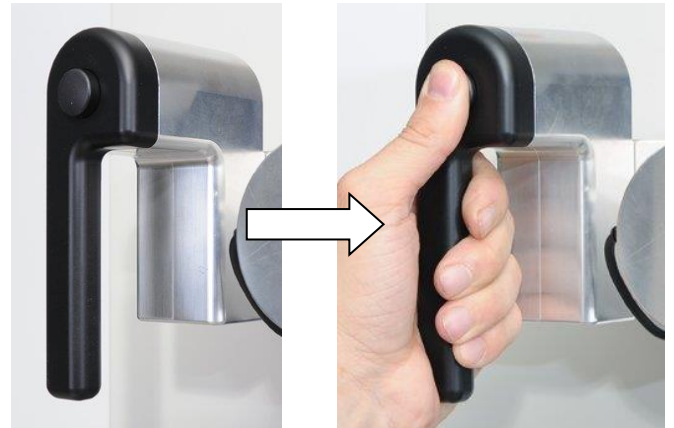
## 4 Operating the unit

### 4.1 Axis movement

As soon as the compressed air (5-6 bar) is connected to the unit will both axes be locked.

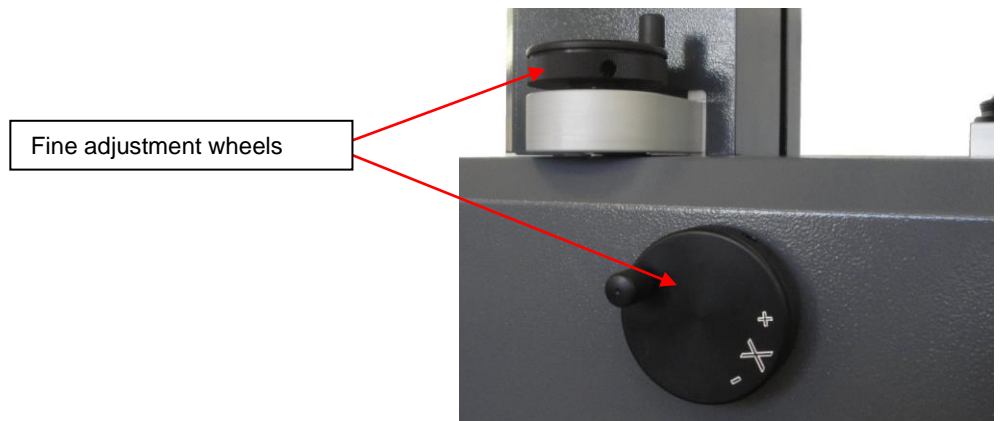
#### Fast movement:

Push the button on the black handgrip to release the axis clamping, and move the carriage/camera to the desired position.

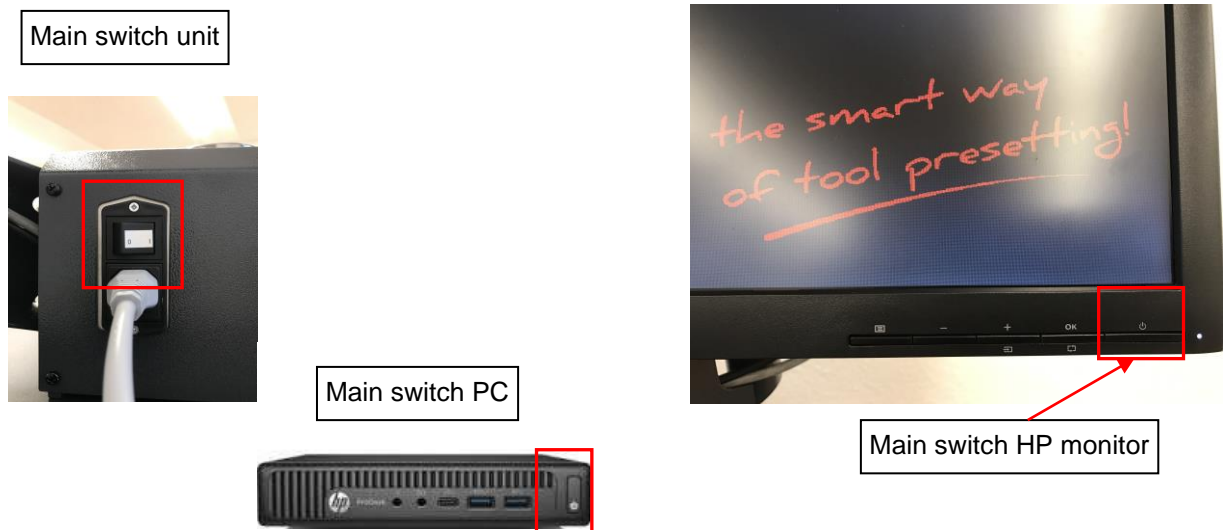


#### Fine adjustment:

Release the button of the hand grip and use the fine adjustment wheels "X" and "Z" to move the axes micron-wise.



### 4.2 Switch-on the unit and the HP mini PC



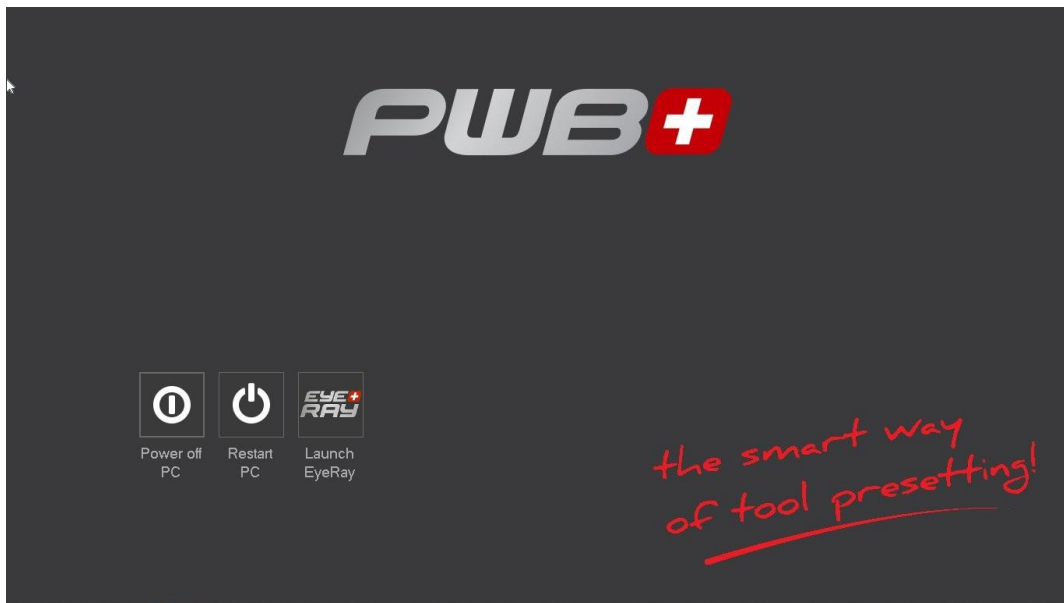
## 5 Imaging system Eye Ray ®

### 5.1 Log-In screen



Note: Please make sure, that there is no USB stick or other device connected to the “HP PC”, while the unit starts up. The unit will not start up correctly.

Start screen:



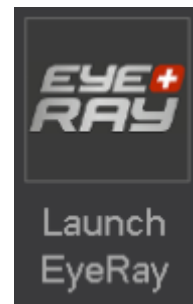
Icons:



Shut down PC



PC restart

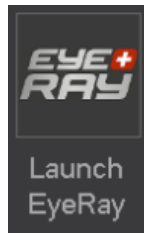


Start EyeRay® software

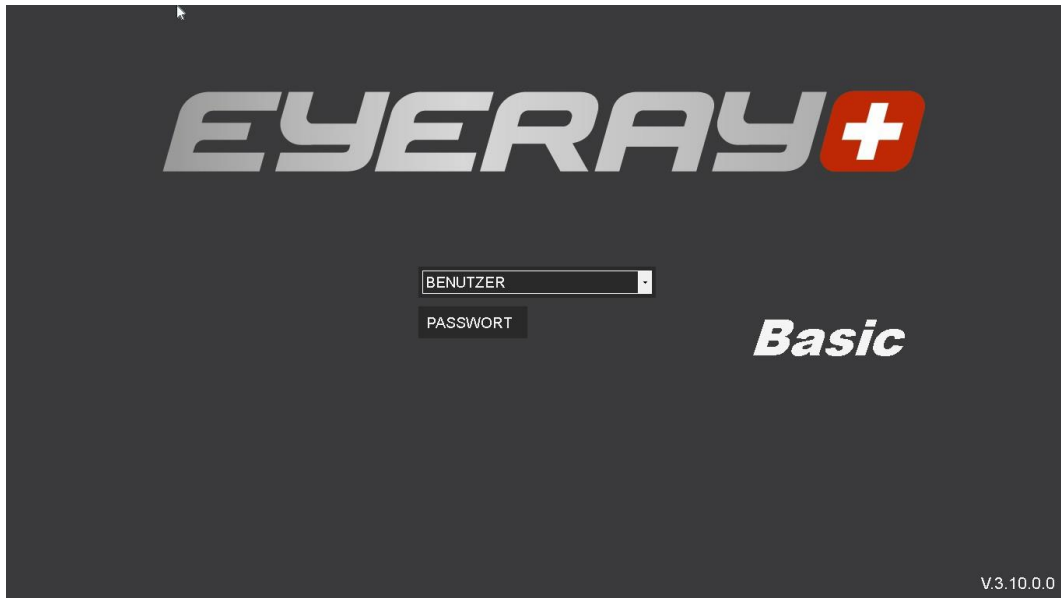


## 5.2 Start Eye Ray® and Log-In

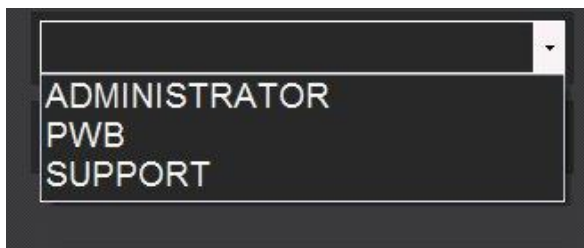
Click on the icon “Launch Eye Ray”



The Software starts and the Log In selection opens:



Click on the arrow beside the User Input field. A list of the defined user will be shown.



Selection:

**User ID**  
**Password**

Administrator  
admin

**User ID**  
**Password**

PWB  
pwb

**User ID:**  
**Password:**

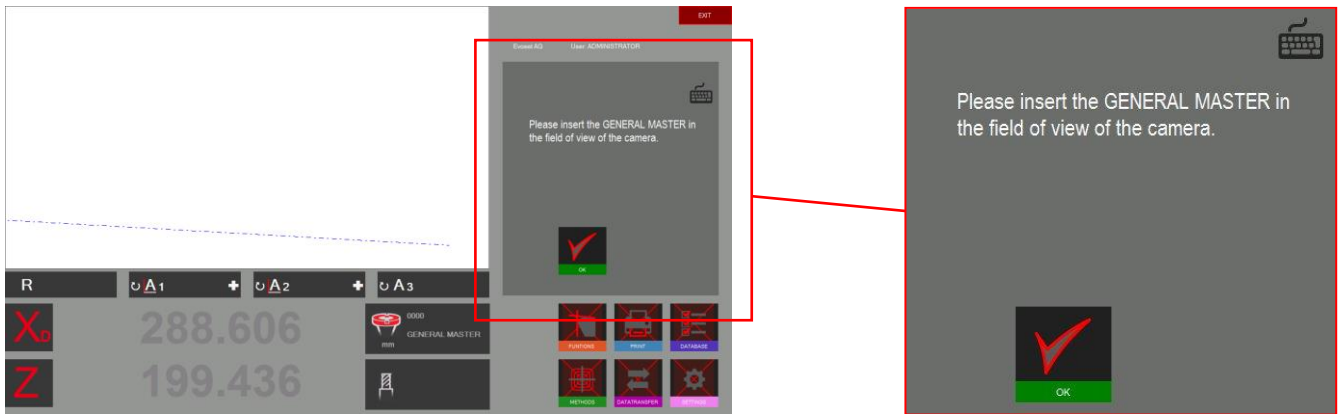
**Support (Only for online support purposes)**  
----

Confirm with:



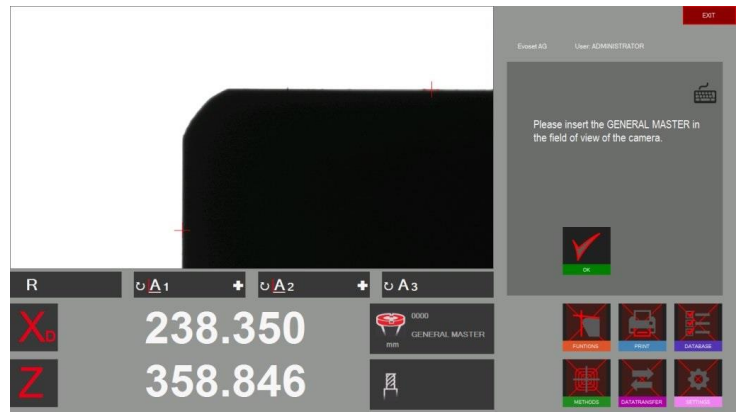
## 5.2.1 Standard calibration of the unit

EyeRay® starts up, and the calibration window appears.

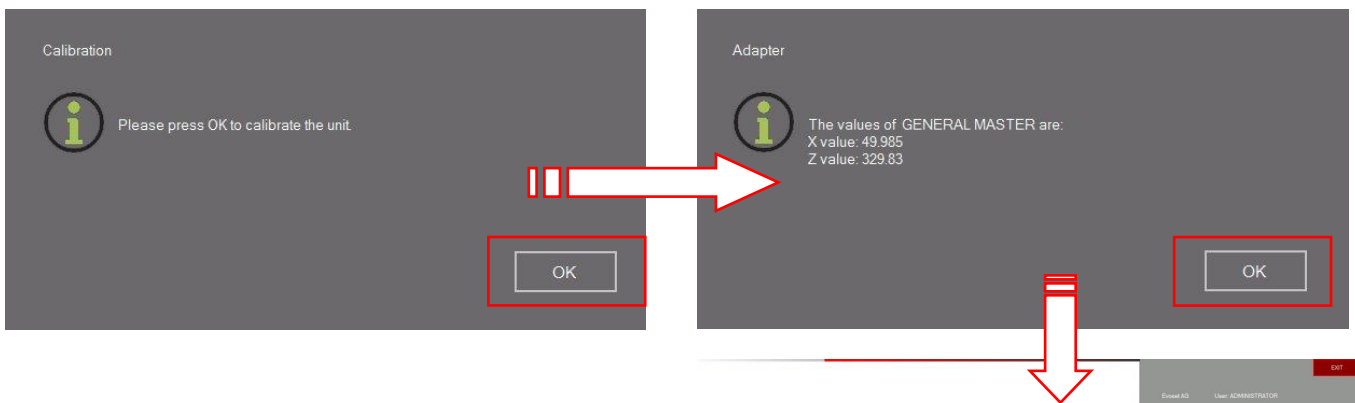


Put the master mandrill in the spindle and position it in the camera view area.

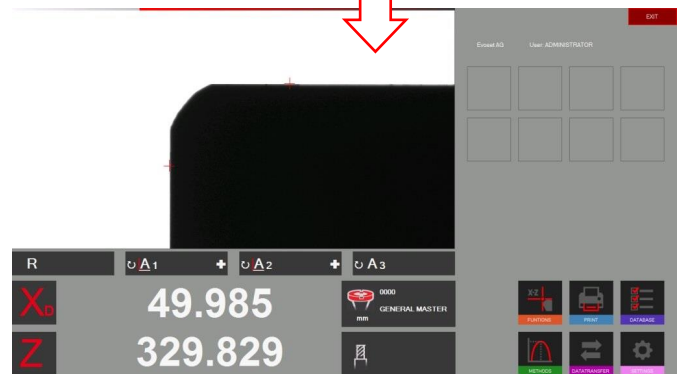
Confirm with:



A pop up window shows the nominal values of the master mandrill.



Confirm the message with „ok“ => EyeRay® finishes the calibration.

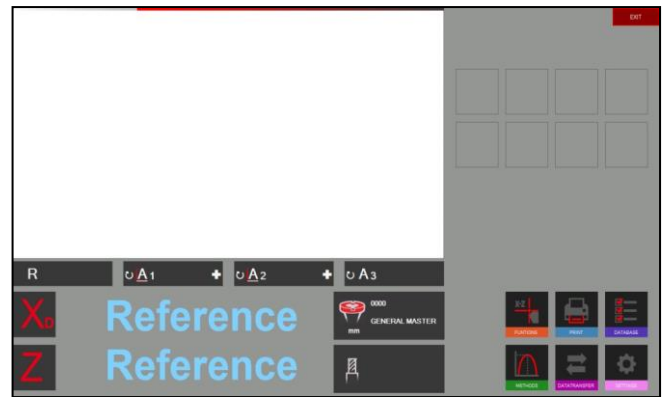


## 5.2.2 Only units with linear scales: cross reference marks

The software opens and shows on both axes „Reference“.

Move both axes using the Black Hand grip until both axes crossed the reference mark.

As soon as the reference marks are crossed will the counter displays start counting.



## 5.3 Screen representation EyeRay®

Dynamic focus bar

Camera live image

General information: user, version, language

Shortcuts

EyeRay® Buzzard V2.4.0.3 EN EXIT  
8/31/2015@5:28 PM Computer: PWB\_172  
Evoset AG User: ADMINISTRATOR

R 0.465 A1 90.24° + A2 170.48° + A3

X<sub>0</sub> 67.905  
Z 169.911

0000 GENERAL MASTER mm

KV SPINDLE FUNCTIONS PRINT DATABASE  
METHODS DATATRANSFER SETTINGS

Counter values

Reference point Information window

Tool Information window

Geometrical value indiation: radii/ angles

Spindle functions (KV)/ optional

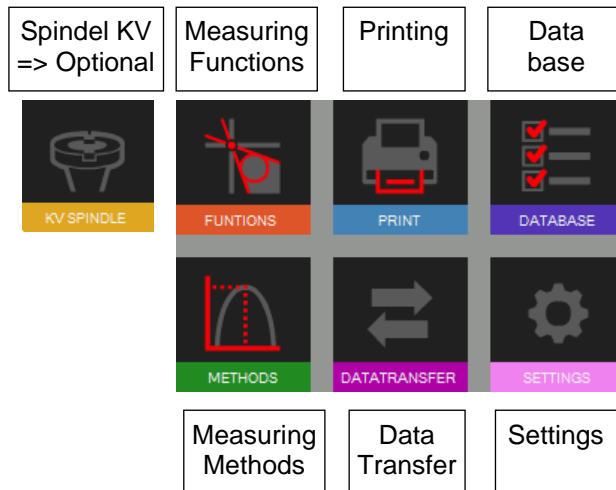
Basic icons




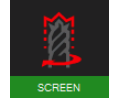

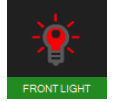


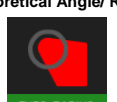








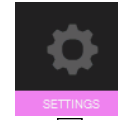






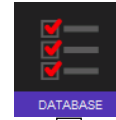
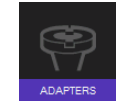
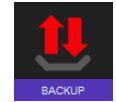




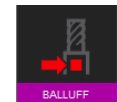
**Eye Ray® => Easy to use:**

**Operate the software just by 6 Basic icons**

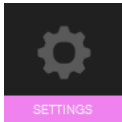
## 5.4 Menu structure

Enter all the sub menus by using the 6 basic icons:

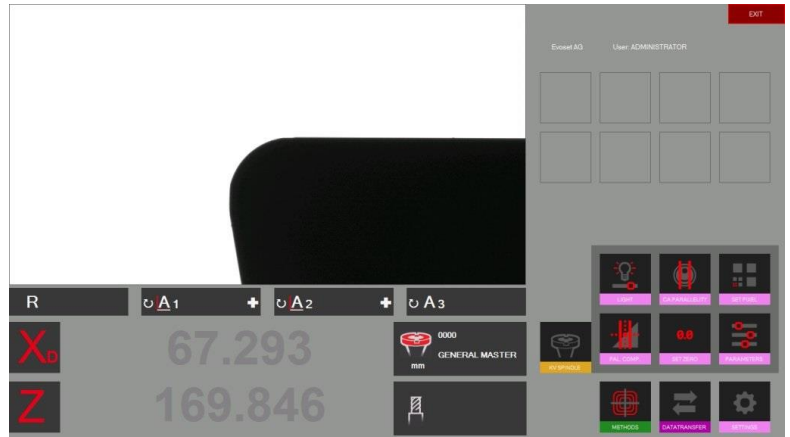
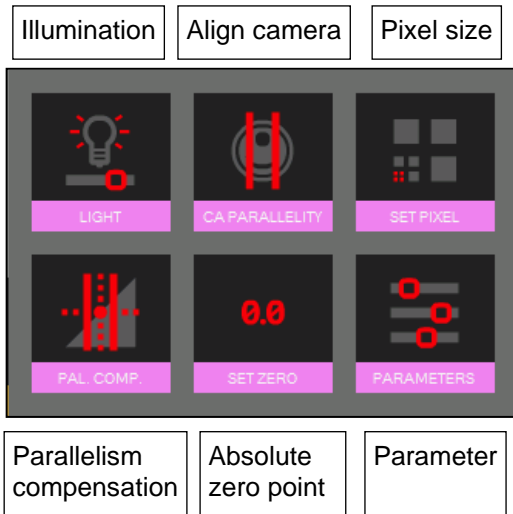


<p><b>Meas. method</b></p>  <p><b>Maximum</b></p>  <p><b>Pre-set</b></p>  <p><b>Screen</b></p>  <p><b>Multi cutting</b></p>  <p><b>Front light</b></p>  <p><b>Fixed axis</b></p>  <p><b>Centre point</b></p>  <p><b>Theoretical Angle/ Radius</b></p>  <p><b>Punkt-messung</b></p>  <p><b>F</b></p> 	<p><b>Meas. function</b></p>  <p><b>Special MF*</b></p>  <p><b>*= Optional</b></p>	<p><b>Printing</b></p>  <p><b>Label Format 1</b></p>  <p><b>Label Format 2*</b></p>  <p><b>Report*</b></p>  <p><b>*= Optional</b></p>	<p><b>Basic settings</b></p>  <p><b>Illumination</b></p>  <p><b>Align camera</b></p>  <p><b>Pixel size</b></p>  <p><b>Parallelism corr.</b></p>  <p><b>Abs. zero point</b></p>  <p><b>Parameter</b></p> 	<p><b>Database</b></p>  <p><b>Reference point</b></p>  <p><b>Backup restore</b></p>  <p><b>*= Optional</b></p>	<p><b>Data transfer</b></p>  <p><b>Tool list manager</b></p>  <p><b>Open PDF</b></p>  <p><b>Send file*</b></p>  <p><b>Write to chip*</b></p>  <p><b>*= Optional</b></p>
--	--	---	--	---	---

## 5.5 Basic settings



Click on this icon to open the menu with the 5 basic settings



### 5.5.1 illumination

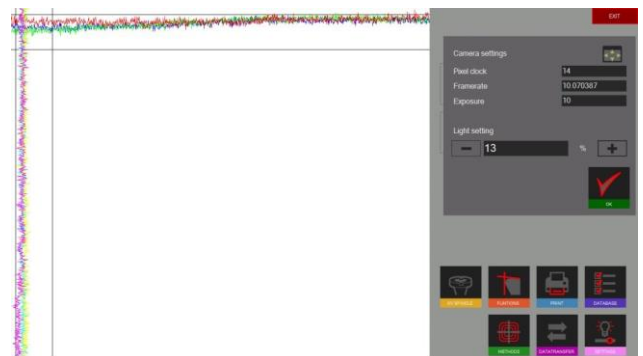
Open the basic settings with the icon



Use this icon to check and adjust the intensity of the illumination

The horizontal lines show the intensity of the light at the top, in the centre and at the bottom of the live image.

The vertical lines show the intensity of the light Rightward, in the centre and leftward of the live image



All the horizontal lines have to be within the tolerance.

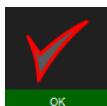
All the vertical lines have also to be within the tolerance.

To improve light intensity:

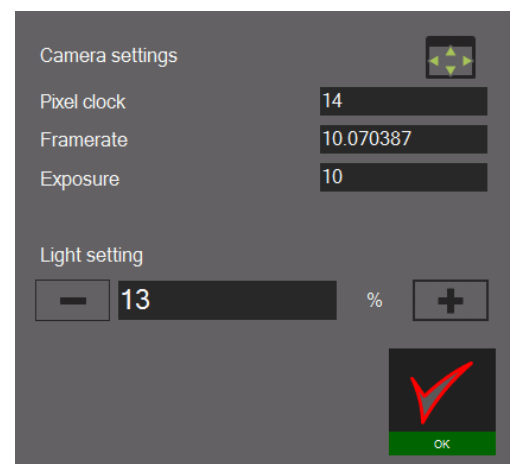
- Clean the camera lens
- Clean the illumination lens

If there is still not enough light intensity, use the “+” icon to increase the light until the lines are within the tolerance fields.

Confirm with



Check the illumination from time to time => At least once in the week or more when the light around the unit is changing a lot.

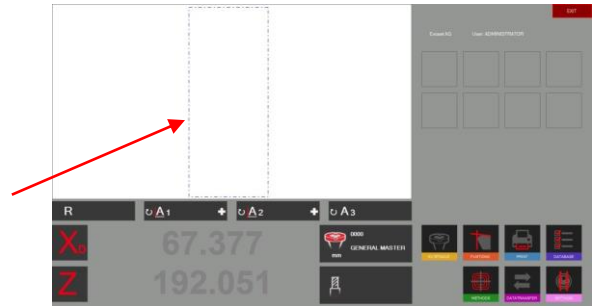


## 5.5.2 Align camera

Put in the master mandrill or a tool which's contour is parallel to the vertical camera axis.



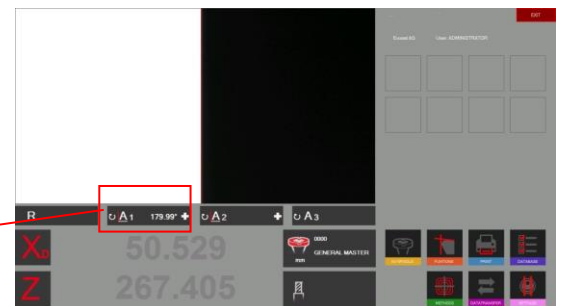
Click on this icon to set the camera.  
Move the vertical contour of the master to the ROI/ Region of interest (Rectangle in dashed lines)



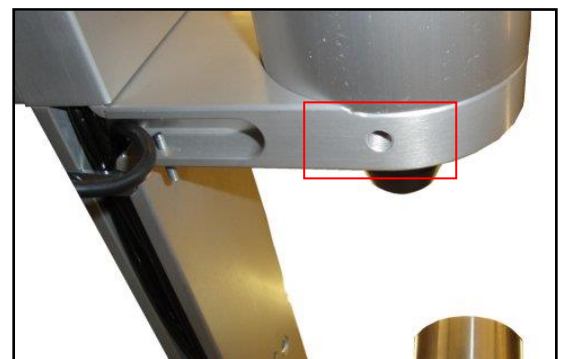
The angle indicator "A1" shows the difference from the vertical contour of the mandrill to the vertical axis of the camera.

The value has to be less than  $\pm 0.02^\circ$ .

⇒ Permissible values:  $179.98^\circ - 0.02^\circ$



If the deviation is bigger than  $\pm 0.02^\circ$ , loosen the fixing screw at the aluminium holder of the camera.  
Turn the camera a little until you reach the maximum permitted value and tighten the camera again.



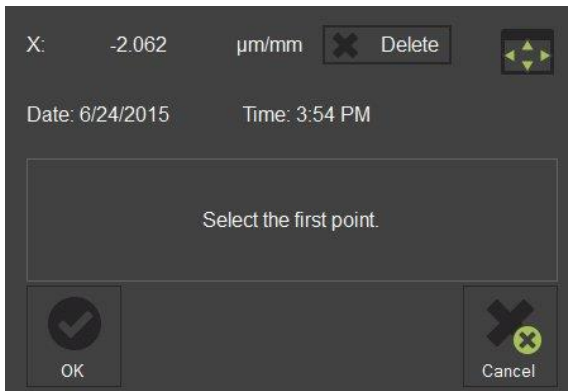
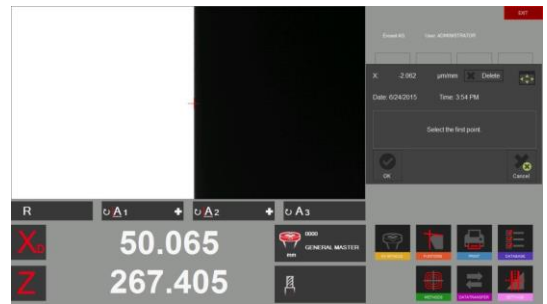
### 5.5.3 Parallelism correction

This function is used to adjust parallelism errors between the column and the axis of the tool pot.

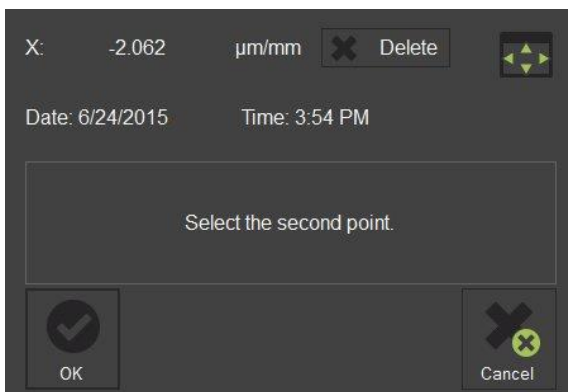


Open the operation with this icon and put in the master mandrill

The software advises to measure the first point at the bottom of the master mandrill. Move the camera down and confirm the measurement.



Move the camera up and measure a second point on the upper end of the master mandrill.



Confirm with

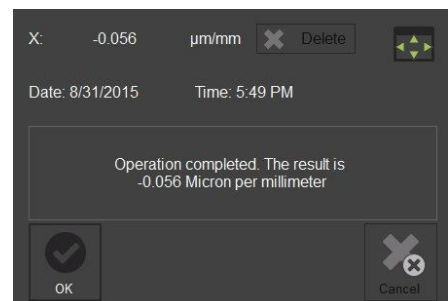


The result appears in the window as shown rightward.

-0.056 Micron/ mm means a correction of 0.016mm on a height of 300 mm.

This error will now be corrected all the time by the software.

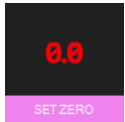
As soon as you finished the procedure of the parallelism correction, will the system advise you to calibrate the instrument. This has to be done, because of the new recorded parallelism error factor. Please see chapter "4.5.4 Set the absolute zero point" for further advise.



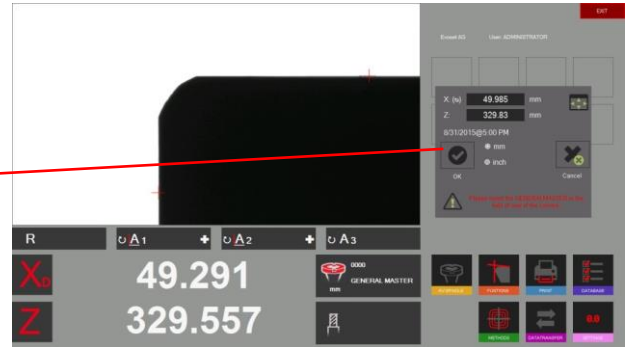
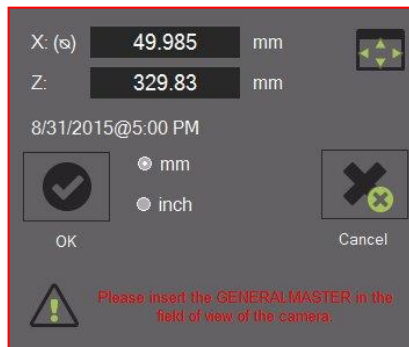


## 5.5.4 Absolute zero point

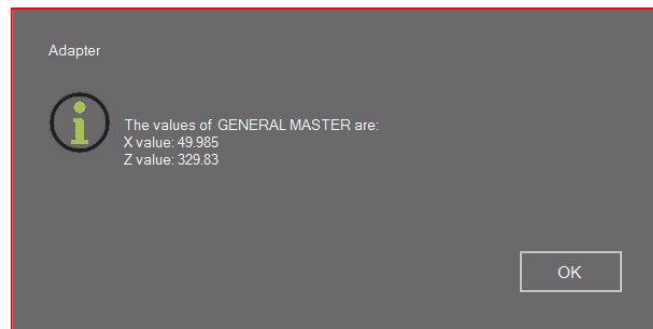
Put in the master mandrill



The icon leftwards starts the procedure.

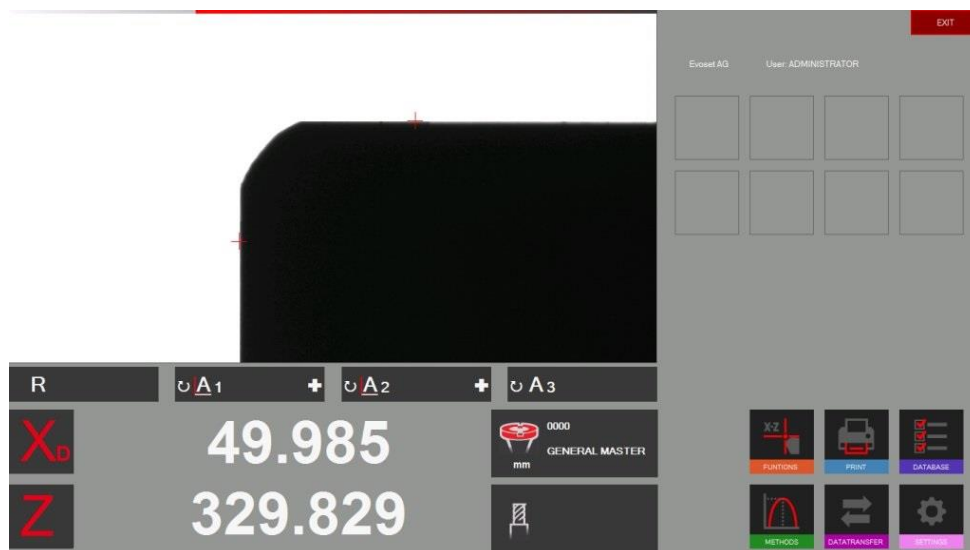


It appears a window that shows the nominal values of the master mandrill (engraved on the mandrill). If the values aren't the same as marked on the mandrill can it be changed in this window. Also can the unit be defined (metric/ inches).



Check that the values on the reference control window are the nominal values.  
Master mandrill: Compare the values with the engraved values on the master mandrill.

Confirm with "ok" to set the absolute zero point.  
The unit is now calibrated and ready to measure.



## 5.5.5 Parameter



Open the parameters by clicking on the icon leftward



Changes are only possible if logged in as Administrator!

### Index „General“:

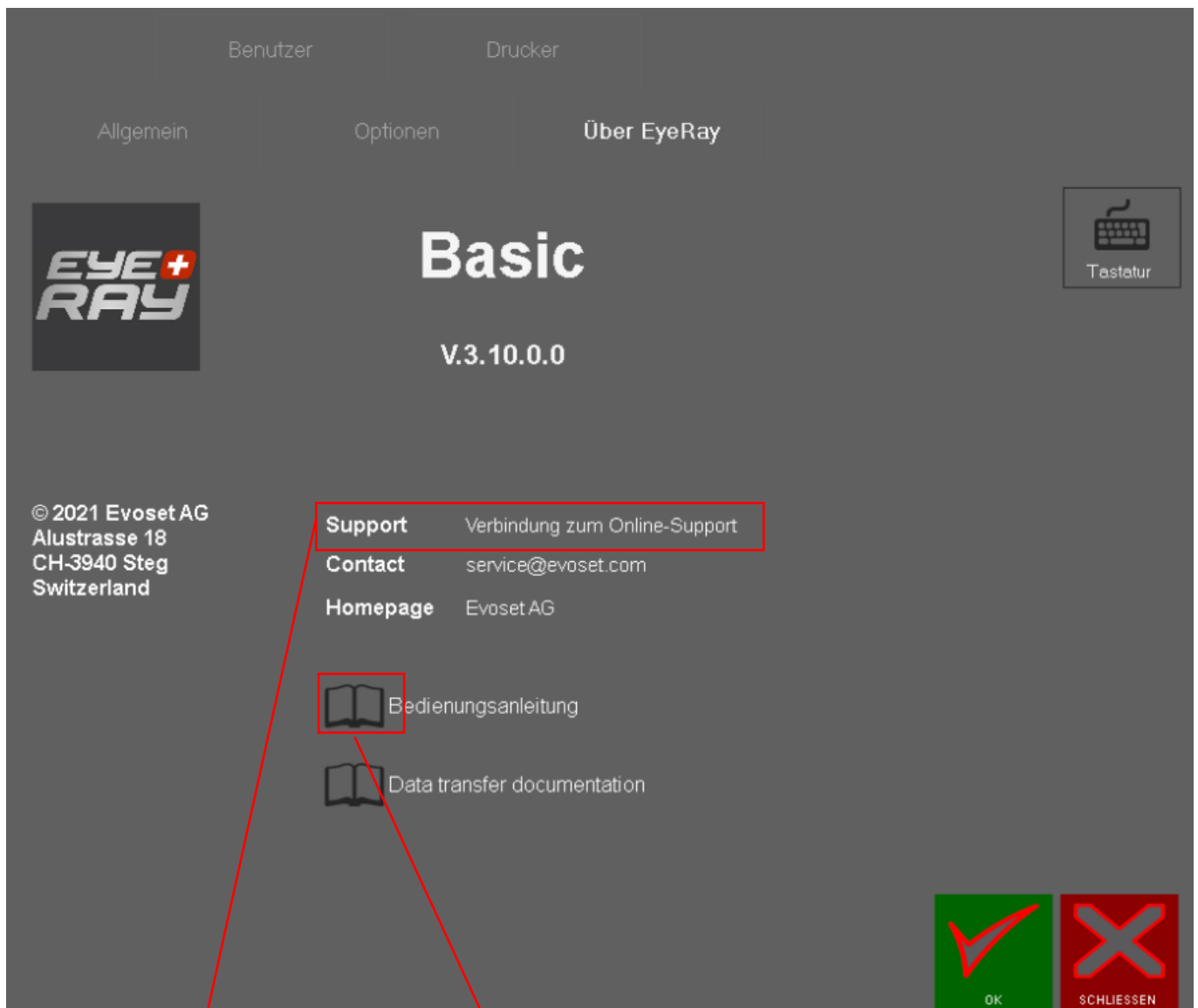
- To change the company name, Language settings, Logo etc.

### Chapter “Options”:

- Change reset factor of the maximum method/ angle factor etc.
- Define a default MF  
=> This MF will be set as default after homing the unit etc.
- Date Format

## Index „About EyeRay...“

- To open the user's manual, connection to online support, contact info.



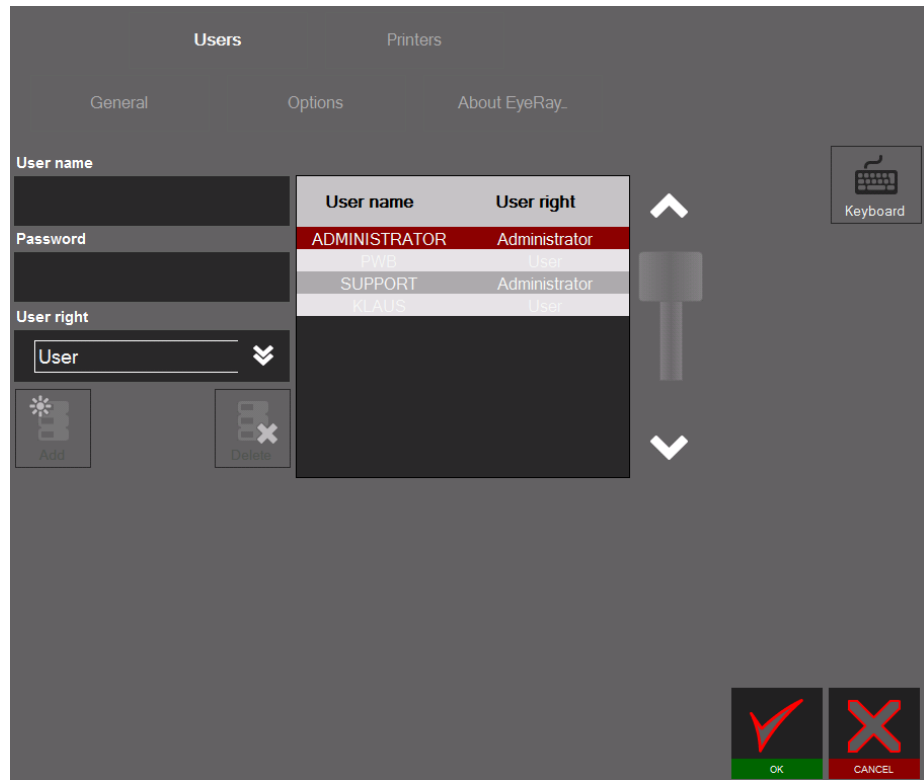
Manual: opens the owner's manual as a PDF file

„Support“:

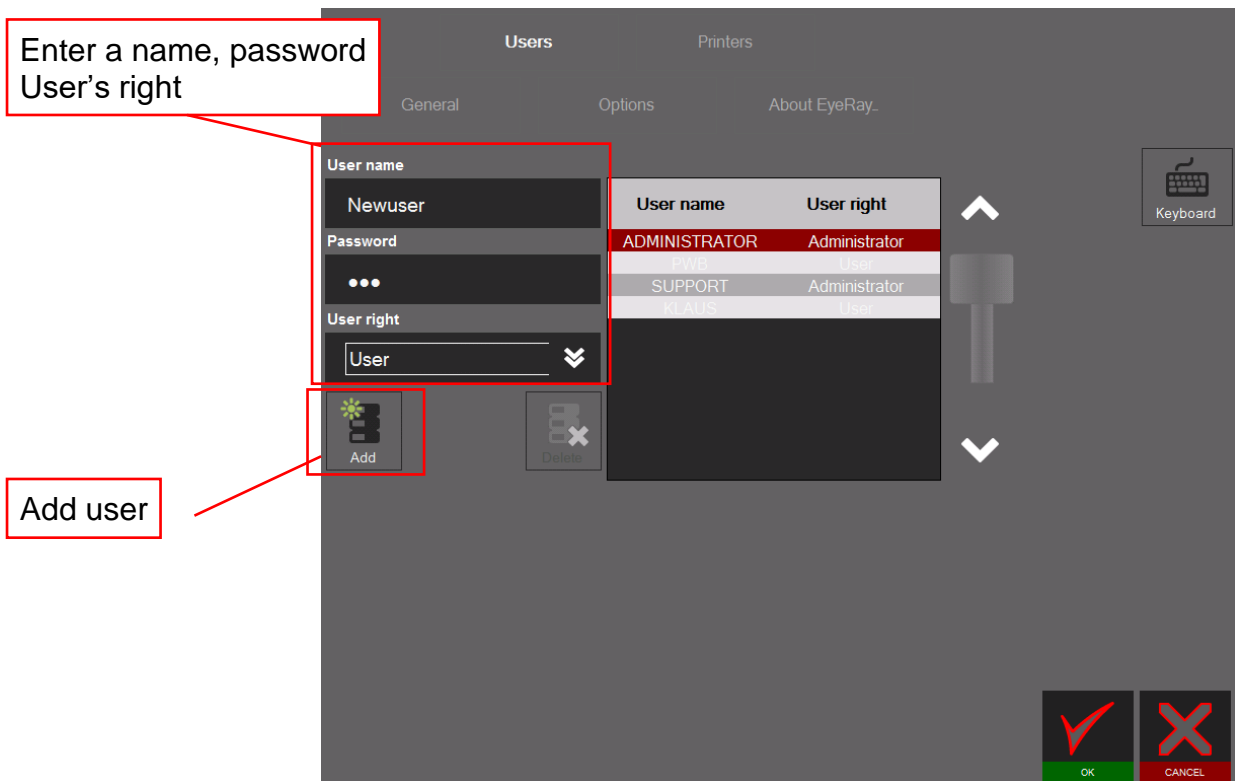
- Internet connection required !
  - Opens automatically a website to enter a 6 digit code for the online support.
- ⇒ Please call +41 922 04 50 to get the code.

## Index "Users"

-Administrate users/ definition of user rights

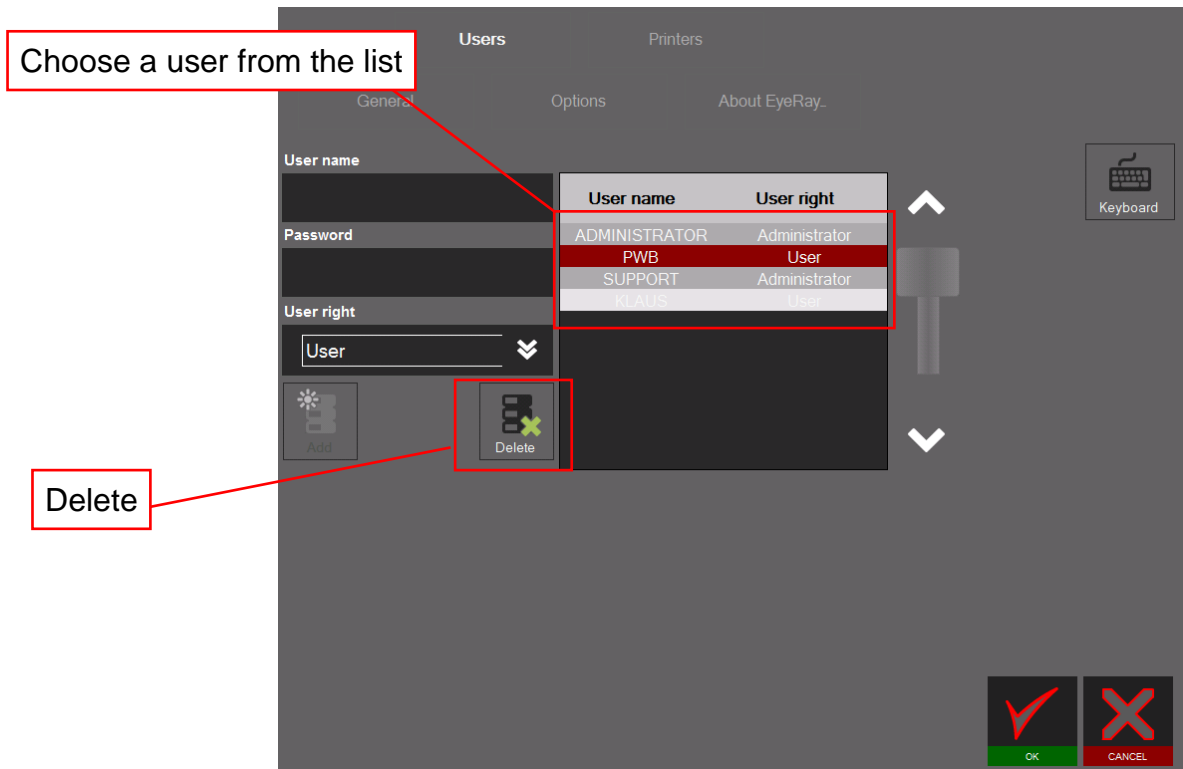


*Add a user:*

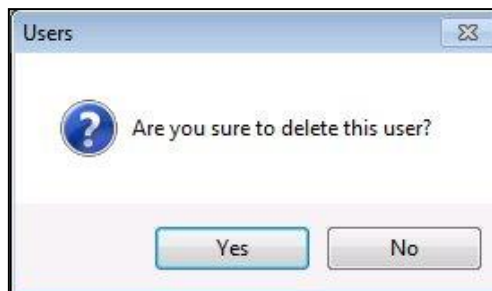


The user "Support" cannot be modified

Delete a user:

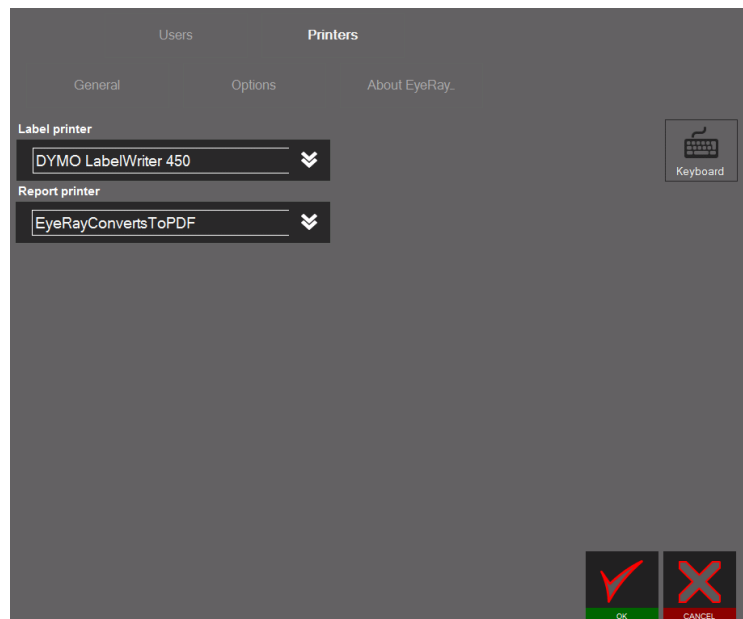


Confirm the appearing message to Delete the user.



### Index "Printers"

- Selection of the installed printers



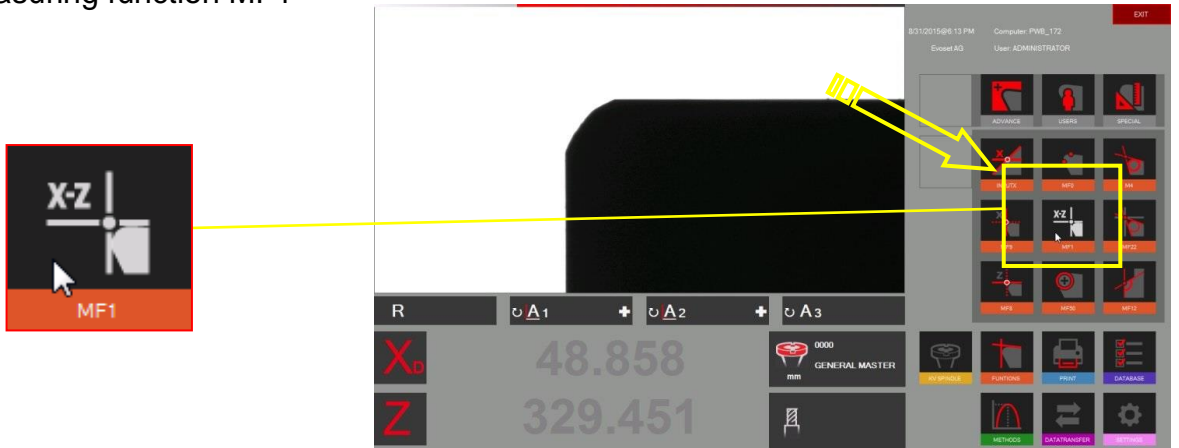
## 5.6 Shortcuts

Shortcuts can be created for often used functions or methods to open them timesaving. Max. 8 shortcuts can be created. Are all shortcuts fields taken, can an existing one be overwritten by a new shortcut.

### 5.6.1 Create shortcuts

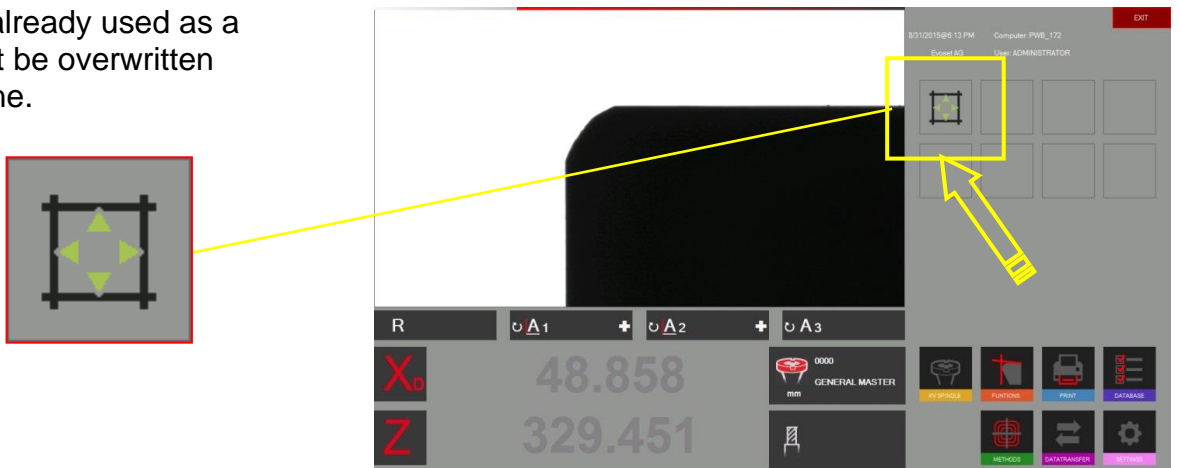
Click and hold the left mouse button in the **lower area** of the icon, which you want to add to the shortcuts.

Example: Measuring function MF1

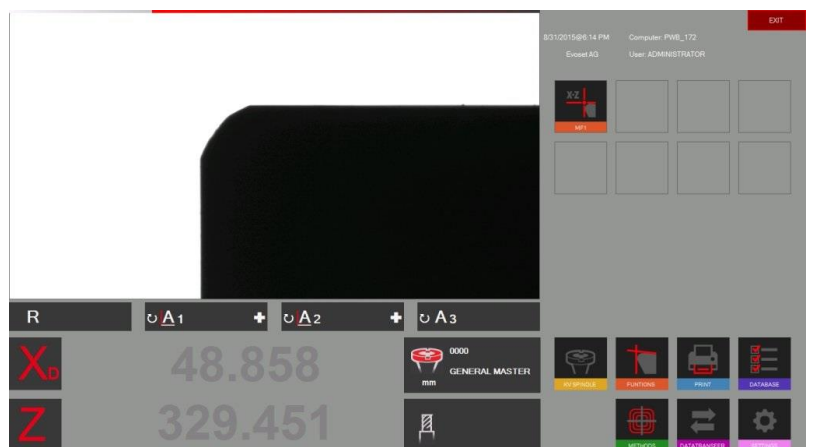


Move the icon upwards to a Shortcut field by using the left mouse button.

If the field is already used as a Shortcut will it be overwritten by the new one.

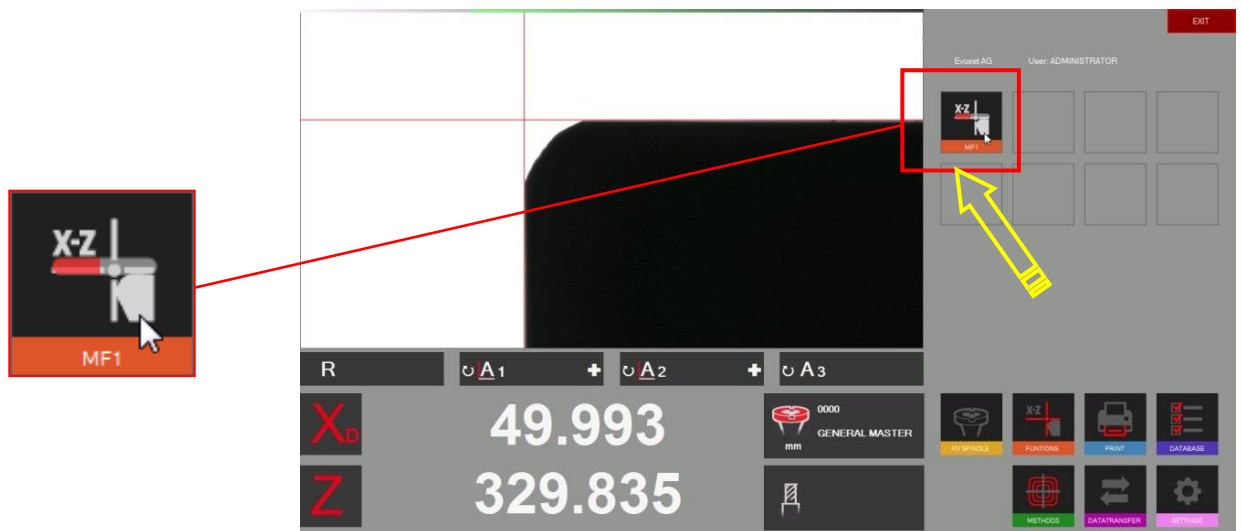


The function is now to find in the shortcuts area

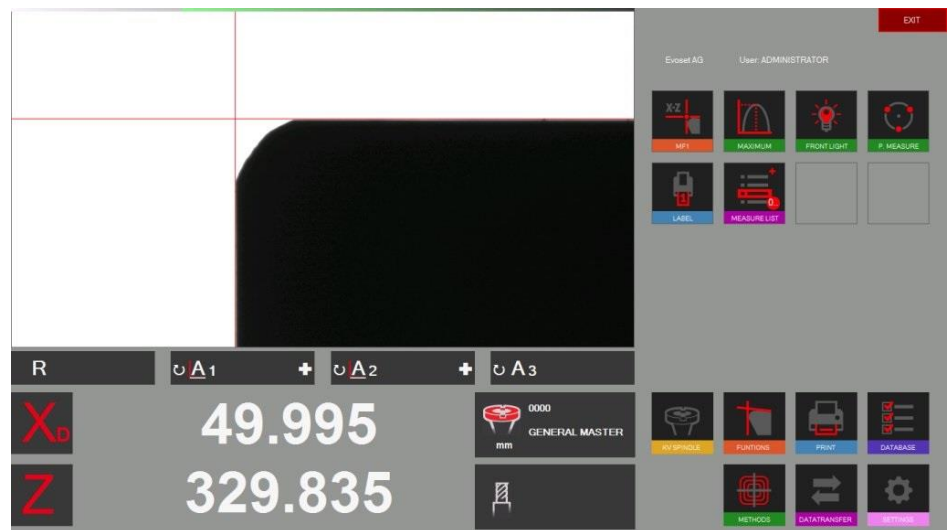


## 5.6.2 Delete shortcuts

Click and hold the left mouse button on the shortcut.



Please find hereunder an example of different shortcuts (Measuring functions and methods).



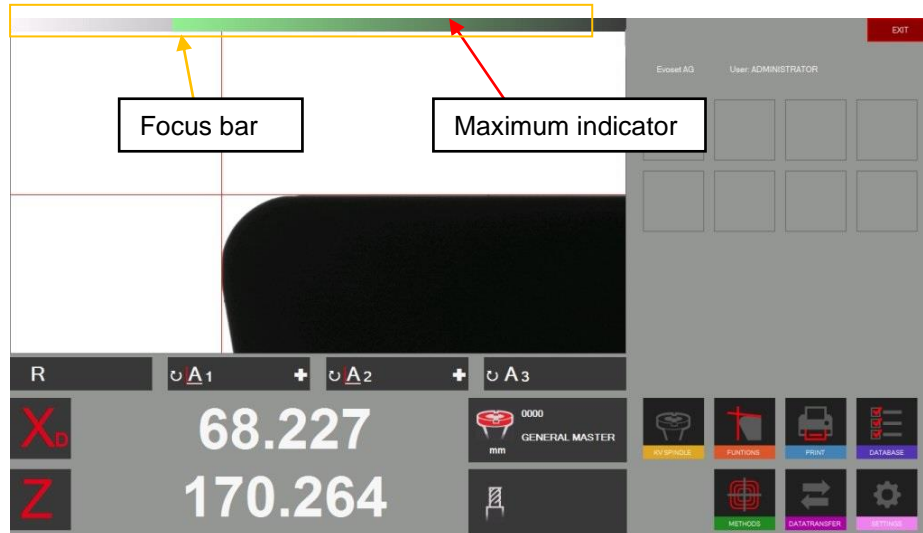
Maximum 8 shortcuts can be created.

## 5.7 Measuring

### 5.7.1 Focus bar/ indicator

#### Description:

The focus bar/ indicator and the maximum indicator help to turn the tool to its maximum deviation and to set the maximum camera focus.



It is located on the upper area of the screen.

If you turn the tool slowly in the camera area you will see that the right part (maximum indicator) of the focus bar move to the left until you reach the maximum and come back when you turn the tool further.

Turn a tool slowly to see how the “Focus Bar” operates.

#### How to use the “Focus Bar”:

Put in a tool and move it to the camera live image.

Turn the tool => the “maximum indicator” is **BLACK** and moves to the left



Turn the tool further until the “maximum indicator” moves back to the right and turns to **RED**.  
=> Means the maximum focus became crossed.



Turn the tool slowly to the opposite direction until the “Maximum indicator” turns to **GREEN** colour.



When the focus is set will the bar automatically be minimised. If the tool is turned again will the bar be shown in its original size to make the use more comfortable.



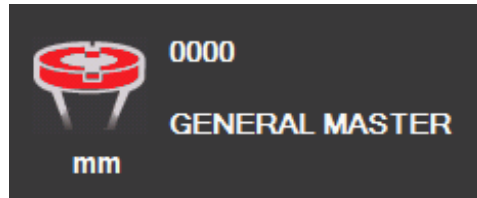


## 5.7.2 Choose a reference point

Put in a tool.

Before measuring a tool is the right "Reference point" to choose

Click on the reference point icon



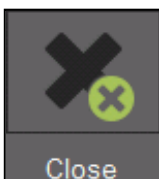
It appears a list with all defined reference points

Adapter N°	Name	Mode	Select
0000	GENERAL MASTER	Reference Value	<input checked="" type="checkbox"/>
1	ISO50	Offset Value	<input checked="" type="checkbox"/>
10	HSK 63	Offset Value	<input checked="" type="checkbox"/>
11	sk40	Offset Value	<input checked="" type="checkbox"/>
22	Sk 30	Offset Value	<input checked="" type="checkbox"/>

Description of the icons:



Scroll the list

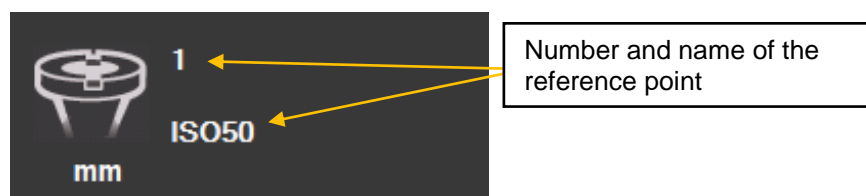


Close list without selection

Choose a reference point by DoubleClick on it.

The chosen reference point will be shown in the Reference point window

Example:





Two different kind of reference points/adaptors can be stored:  
- Adaptors with reference values  
- Offset adaptors

### Adaptor with reference value:

This kind of reference point is used to calibrate the unit.

Examples: Master mandrill/ "Master tools" with known dimensions/ calibration tools

Mostly is there one adaptor with reference values stored, used to calibrate the unit  
=> General master/ Master mandrill.

### Offset adaptor/ adaptor with offset value:

This kind of reference point is used to measure tools with other types of tool holders than the basic spindle.

Examples. PWB Adaptors like ISO/ HSK/ Capto etc.

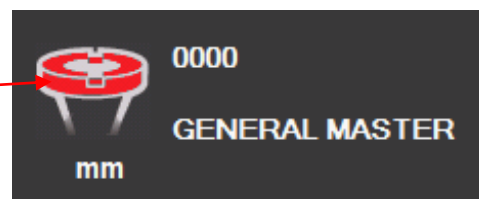
Mostly is the offset value used in the Z axis. The diameter axis is usually equal to the centre of the tool pot => No offset necessary (Exception: for example turning tools)

### Indication of an adaptor with reference values/absolute reference point:



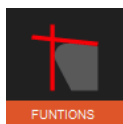
The red highlighted adaptor symbol shows that this adaptor is an „Absolute reference point“

Red highlighted => Adaptor with absolute reference values.



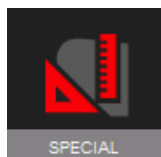
Please note: The unit has to be calibrated with the assigned calibration tool when selecting an adaptor with reference values!!

### 5.7.3 Select a measuring function (MF)



Icon to open the basic measuring functions.

Most measuring tasks can be complied with the basic measuring functions.



Special measuring functions (on request)

Evoset/ PWB item number: P270590.

See Chapter „5.8/ Customized measuring function“

## 5.7.4 Description of the measuring functions

Generally:

The measuring function defines the way how the imaging system analyses the cutting edge

### 5.7.4.1 Basic measuring functions



#### MF1

This function measures the highest point on the tool contour in the horizontal direction (X) and the highest point in the vertical direction (Z): so-called point measurement.



#### MF8

This function measures only the highest point on the tool contour in the vertical direction (Z), means only the length of the tool.



#### MF9

Measures only the highest point on the tool contour in the horizontal direction (X), means only the diameter respectively the radius of the tool.



#### M4

This function places both measuring lines L1 and L2 on the tool contour and measures the angles of both lines and also the including angle: so-called line measurement. Furthermore it measures the radius of the tool cutting edge.



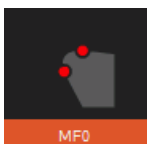
#### Input X

Measures the height of a contour, by default diameter value. Indicates also the angle of the cutting edge.



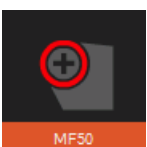
#### MF0

Function to check the master mandrill by single measuring points in each axis.



#### MF50

This function measures the radius of a tool cutting edge and shows at the same time the center point of this radius.





## MF22

This function places both measuring lines L1 and L2 on the tool contour and measures the angles of both lines and also the including angle.

At the same time it measures the radius of the tool cutting edge and also the highest point in the horizontal direction (X) and the highest point in the vertical direction (Z).

(MF22 = combination of M4 and MF1)



## MF12

This function places both measuring lines L1 and L2 on the tool contour and measures the angles of both lines and also the including angle. Furthermore it measures the radius of the tool cutting edge.

Difference between MF12 and M4:

Functions with the index “**MF12**” can also be used to define a measuring area within the camera view. This way can specific edges on the tool be measured (for example on step drills or form tools)..

### 5.7.4.2 Define measuring window/ range

The EyeRay® gives you the opportunity to create user-defined (Tailor made) measuring functions.

Due to the innovative and flexible EyeRay® is the operator able to modify/change an existing measuring function and store it as his own “user- created” function.

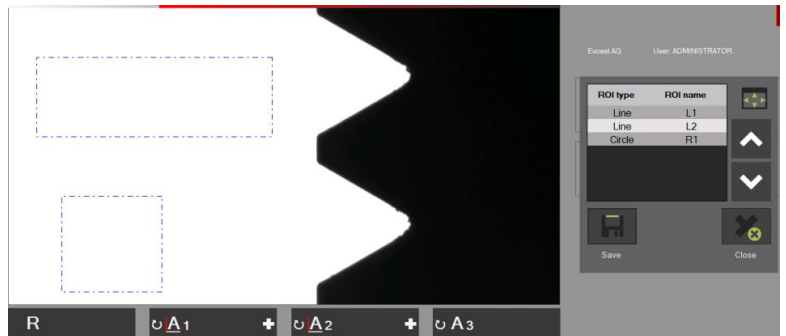
Mostly is the function MF12 be used to create tailor made functions:



MF12

Choose MF12 and click with the mouse in the live image area of the camera.

Two blue rectangles (Regions of interest/ ROI) will appear in the live image, and a control window opens.

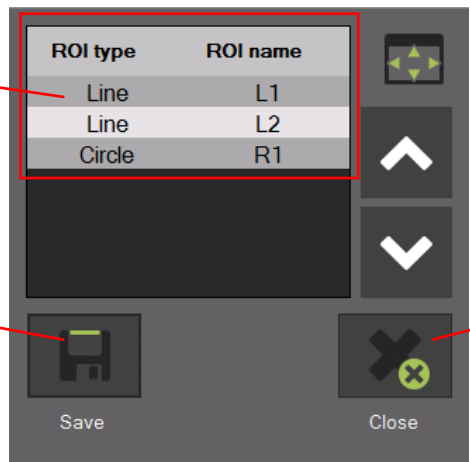


#### Functions of the control window:

Choose Region of interest (ROI)

Save tailor made function

Close window



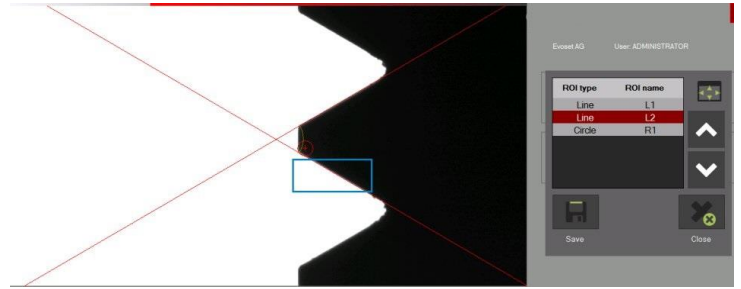
#### Set the ROI

Use the left Mouse button to change the position of the selected ROI

Use the right Mouse button to change the size of the selected ROI



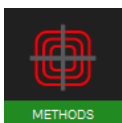
Position both lines and the radius (if desired) at its position:



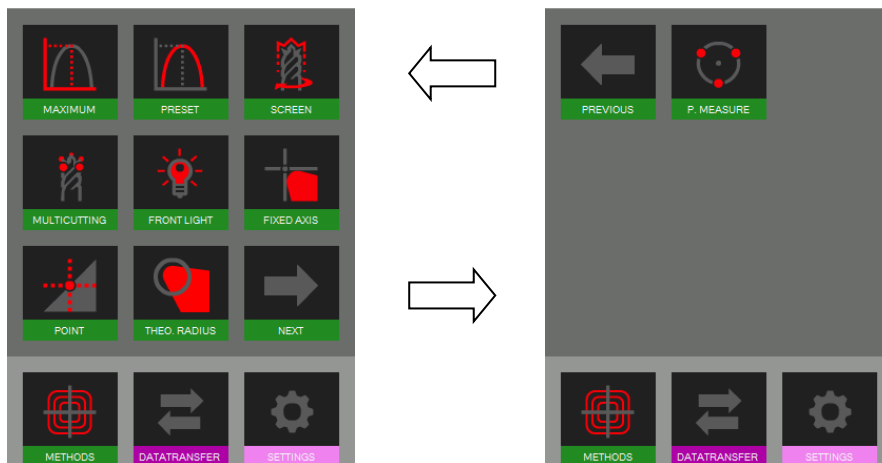
### 5.7.5 Select a measuring method

With the measuring method defines the user, based on which operation mode he wants to proceed to measure the tool.

The measuring methods are listed on two pages. Browse the pages by using the arrow icon.



Icon measuring methods.



Symbols/ Methods:



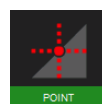
Maximum method



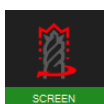
Fixed axis method



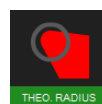
Preset method



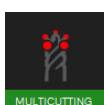
Centre point method



Screen method



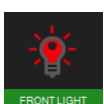
Theoretical angle/ radius



Multi cutting method



Point measuring



Front light method

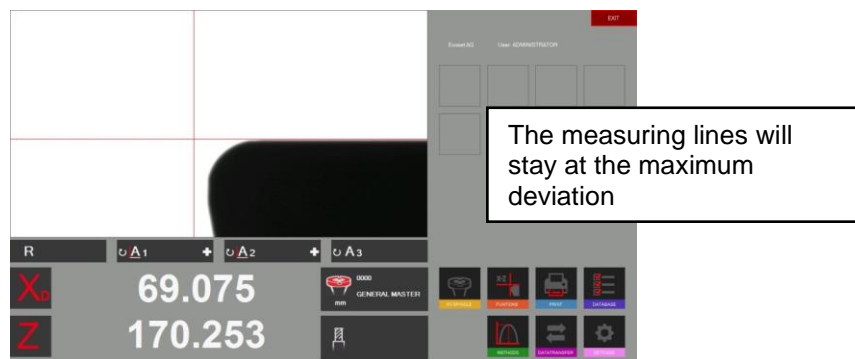
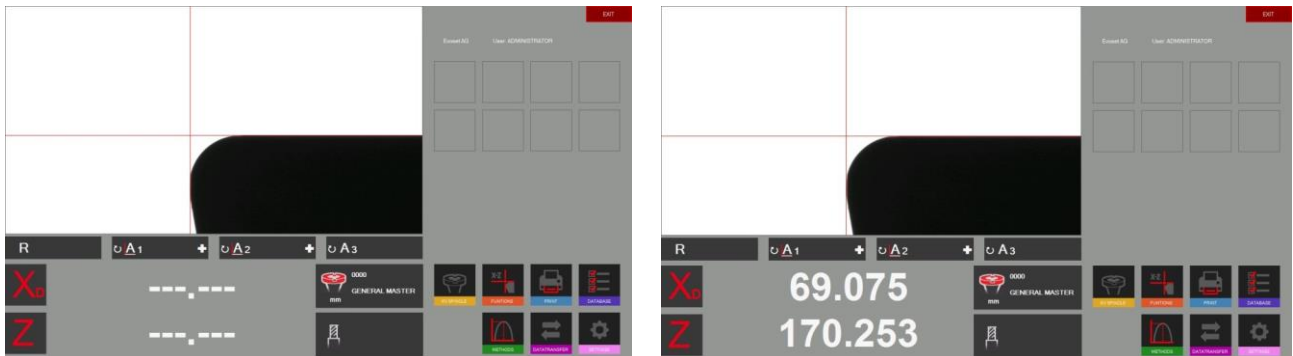
## 5.7.6 Description of the measuring methods

### 5.7.6.1 Maximum method



Use the Maximum Hold function to measure the **maximum X and Z values** without using the focus bar=> rotate the tool and the display will show the maximum values

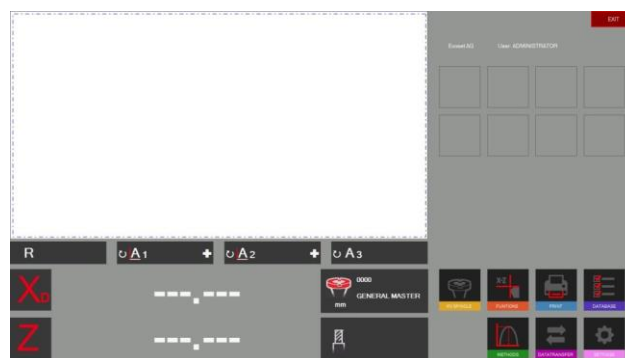
Turn the tool slowly in the vision area of the camera. The software automatically picks up the highest point and places the measuring line on this position. The indicated values are the maximum values of the tool.



If the tool is turned out of the camera field, will the system execute a reset according to the timer settings in the parameters (Chapter 4.5.5/ Parameter/ Index Options).

The counters in "X" and "Z" are showing dot lines.

The system is ready to measure the next tool





### 5.7.6.2 Preset mode



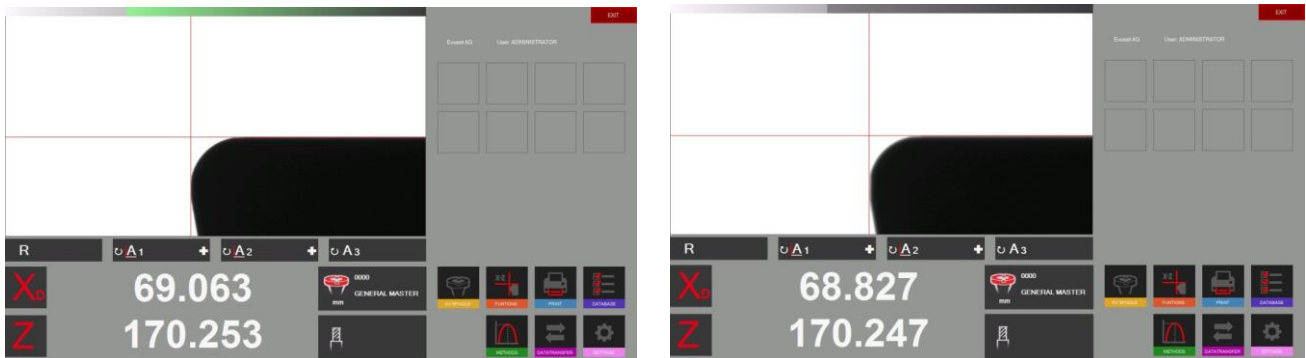
Activate the “Preset” method with the icon on the left.

When to use the preset function: To set a tool like a boring head to a specific  $\varnothing$  or length.

Difference to the “Maximum Method”: The measuring lines are always following the cutting edge.

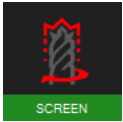
Put the tool in and set the maximum focus with the help of the focus indicator in the upper area of the live image.

When turning the tool in the spindle, are the measuring lines following the cutting edge in both directions.



The measuring lines always follow the cutting edge

### 5.7.6.3 Screen method



When to use the Screen Function:

If tools with a spiral, like a drill or a ball nosed tool, or tools where the shape of the tool is located on more than one cutting edge are to measure, can the Screen Function be very helpful.

A form tool cannot always be measured by searching the highest point. An image of the complete tool is needed. The “screen method” fulfils exactly this need.

Turn the tool slowly one turn in front of the camera view.

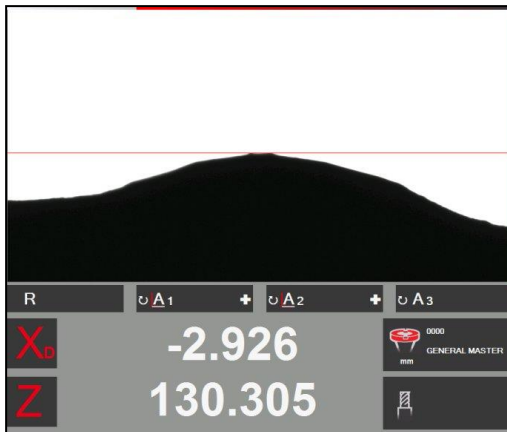
The result that you see in the live image area is the contour that the tool will leave in the working piece.

Now can the contour be measured by choosing a measuring function.

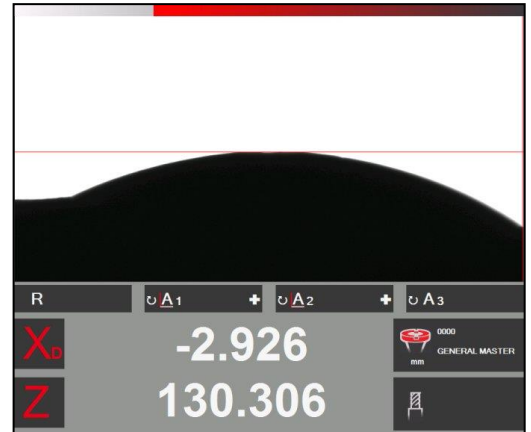


Example Ball nose cutter:

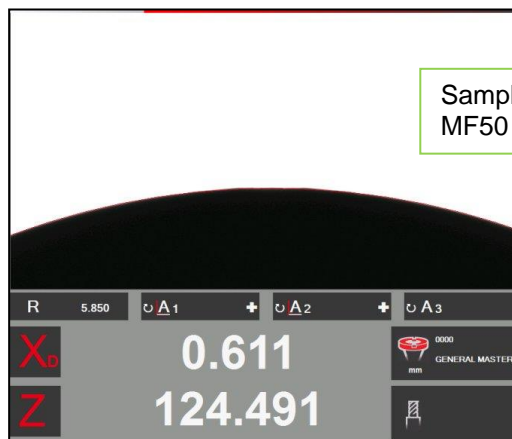
1.



2.

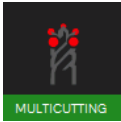


3.



Sample: Measured with MF50

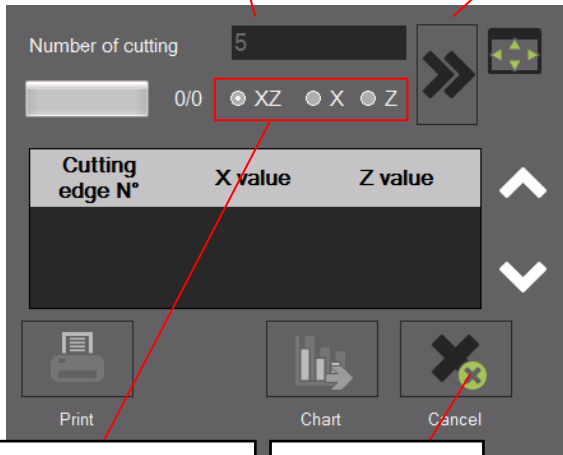
### 5.7.6.4 Multi cutter method



Measuring a tool with more than one cutting edge and to compare the single edges with each other can be done with the multi cutter method.



Enter the number of cutting edges of the tool      Start multi cutter method



Choose which values shall be indicated      Close Multi cutter method

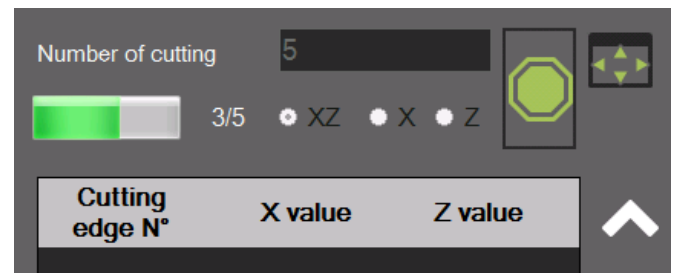
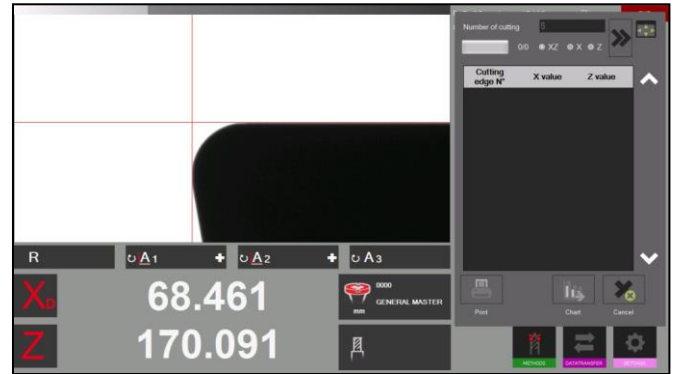
Start the procedure with:

Turn now the tool slowly until every cutting edge became measured. You will see the process indicated in the status bar.

Please note: The first cutting edge initialises the mode, after that starts the procedure.

If all the cutting edges are measured shows the software a graphic with the result. The result can also be shown in form of a chart.

The biggest value is shown in “green”, and the smallest in “red” colour.

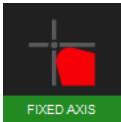


Cutting edge N°	X value	Z value
1	80.693	98.565
2	80.675	98.557
3	80.668	98.566
4	80.722	98.550
5	80.667	98.981



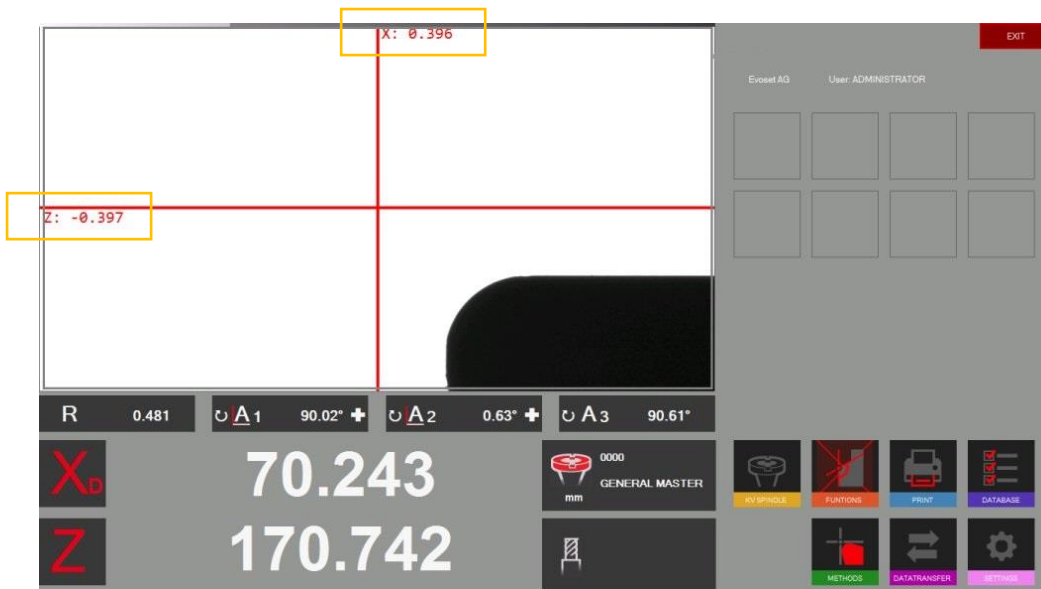
### 5.7.6.5 Fixed Axes

To measure the length and the diameter with fixed axis (“projector mode”)



Click on this icon to open the “Fixed Axes” method

The fix reticule appears, indicating also the distance between the cutting edge and the reticule. It is shown in red colour.



Put the tool in and set the maximum focus with the help of the focus indicator.

Move the cutting edge with the fine adjustment to the reticule.

If the tool gets closer to the line, will it change its colour to **Brown** (Thick line).



If the tool is only a few microns away from the line, will the colour change to **Orange** (Thin line)



When the line becomes **Green** is the tool touching the reticule (Indicators show 0.000mm).

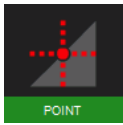


Did you pass the measuring point will the line become orange again.

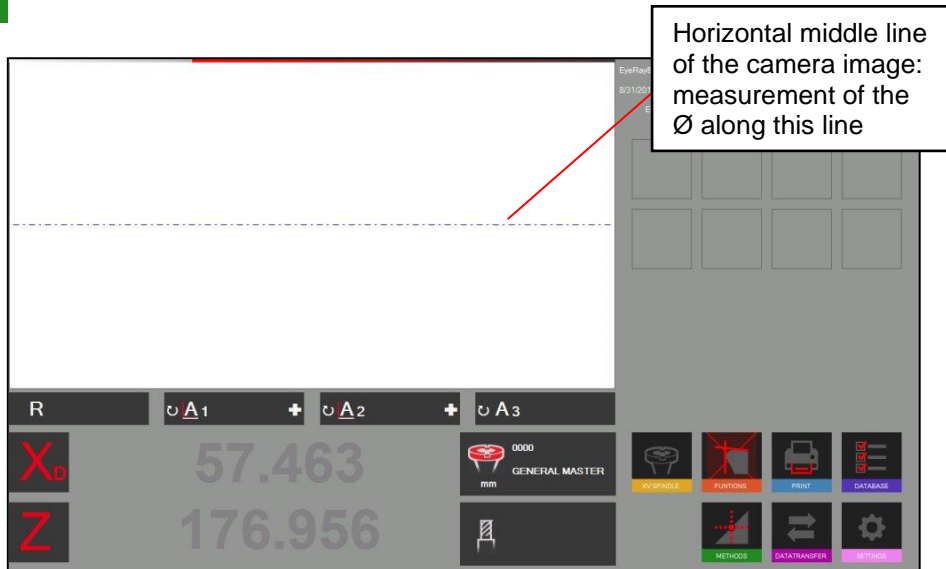
### 5.7.6.6 Centre point method

In the centre point method is just one pixel along the horizontal middle line of the camera view active.

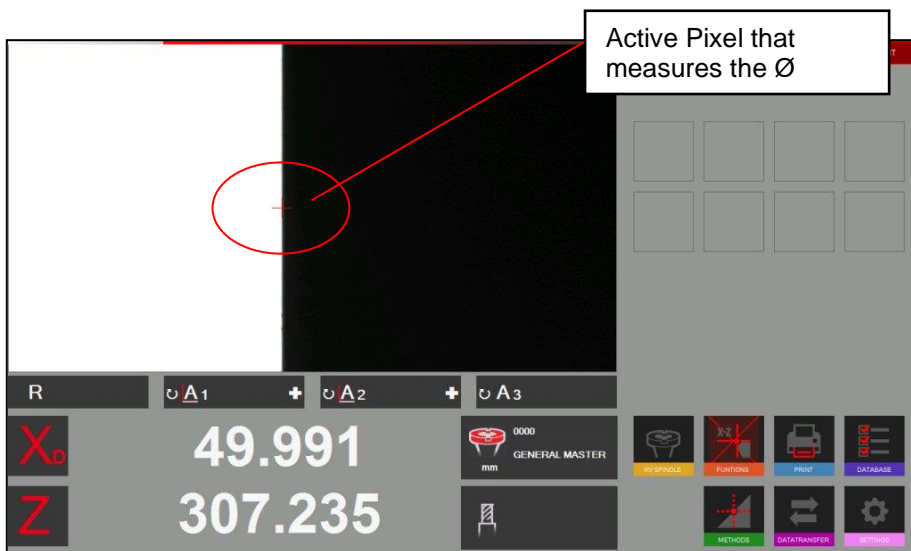
Applications: to check the run out or the  $\varnothing$  of a cylindrical piece, check the parallelism of the mandrill to the column of the presetter



Click on this icon to open the centre point method



Put in a cylindrical tool (Master mandrill):



The software indicates the diameter and on the Z axis the absolute height (Fixed axis).

When you move the tool to the left or the right will the point follow along the horizontal middle line.

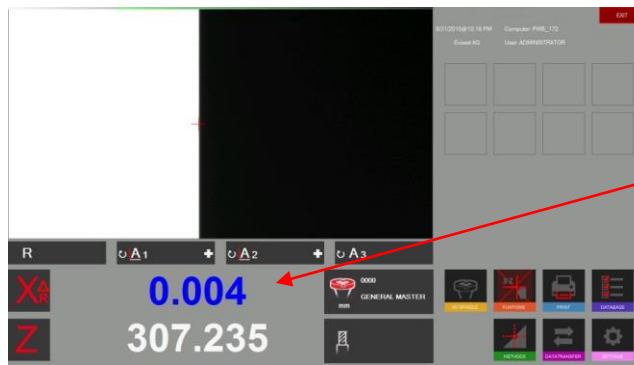
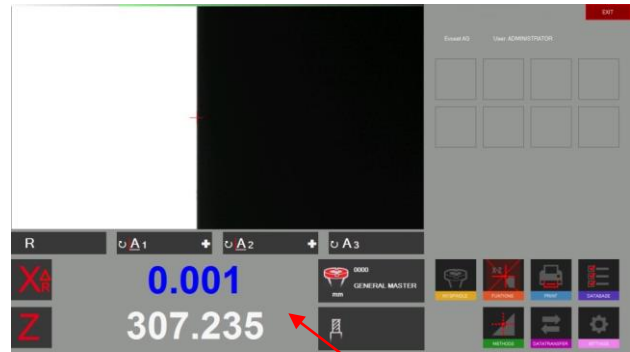
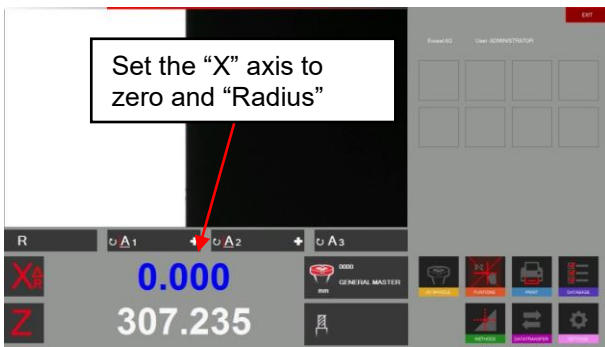
Examples:

### Run out measuring using the centre point method

Place a cylindrical shaft or the master mandrill in the tool pot and measure the diameter with the centre point method.

Set the “X” axis to zero and to Radius mode.

Turn the tool => The X axis shows the deviation.

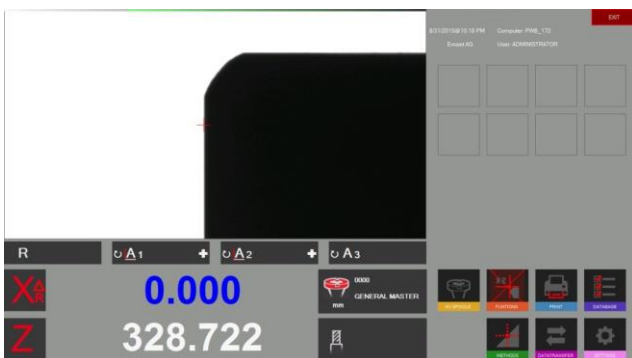


Turn the tool: The X axis shows the deviation

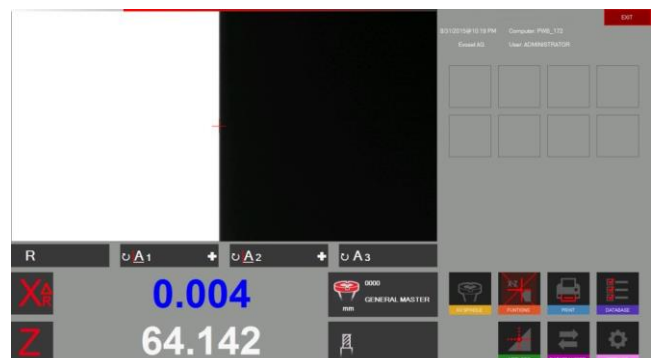
### Check parallelism from the mandrill to the column

Measure the diameter with the centre point method in the upper area of the mandrill. Set the X axis to “0.000” and to “Radius mode”.

Move the camera down along the mandrill. The X axis counter indicates the difference.



Measure the Ø on top of the mandrill and set “X” to “0.000” and “Radius”



Move the camera down and measure the Ø at the bottom

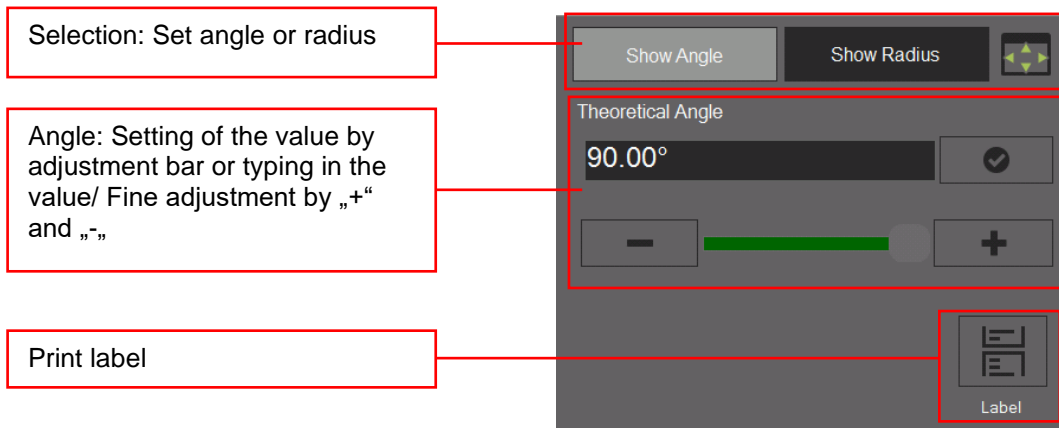
### 5.7.6.7 Theoretical angle/ radius



Use this icon to open the method „theoretical angle/ radius“.

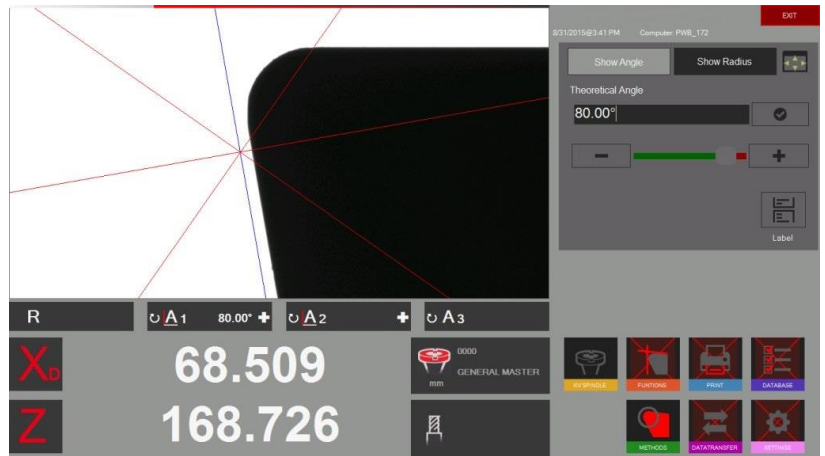
This method is used to draw an angle or radius by default values.

It appears a setting window:

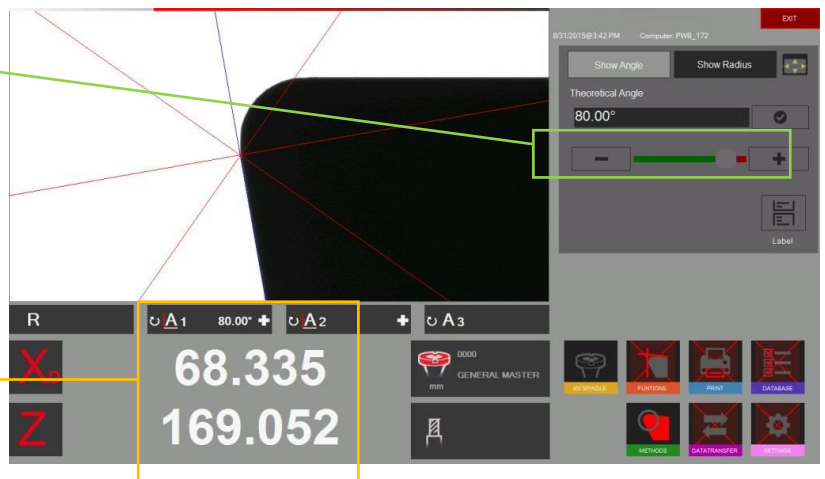


Using the method „theoretical angle“:

Move the reticule by using the mouse to the cutting edge.....



..and set the angle along the cutting edge by using the adjustment bar and the fine adjustment.



Counters „X“ and „Z“ are showing the centre position of the reticule.  
„A1“ shows the set angle.

Method „Theoretical radius“:

Choose „Radius“ in the setting window::

Choose „Show radius“

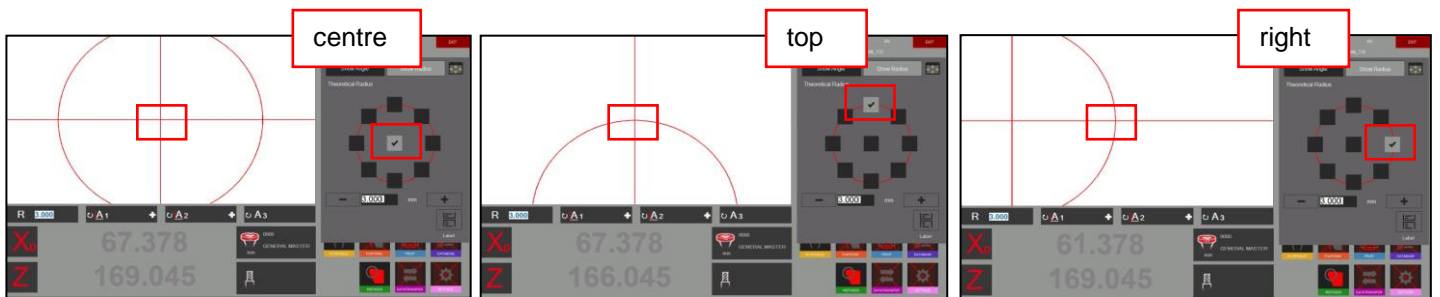
When drawing a big radius (bigger than 6mm), with centre in the middle of the camera view, will the circle line not be visible anymore in the active camera view. This chart is provided to catch the circle line in the middle, to make it visible again (samples below).

Set value by typing in or using the fine adjustment „+“ and „-“

Print label

Samples with different circle line settings along the above chart:

Circle => r=3mm



Using the method „Theoretical radius“:

Draw a circle (type it in) and catch the circle line along the chart as desired (Sample: „top“)

Move the circle line to the cutting edge and ...

... set the radius using the fine adjustment

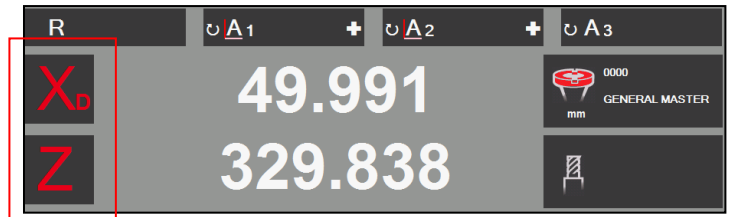
The counters „X“ and „Z“ are showing the position of the centre point. „R“ shows the set radius.

„Top“

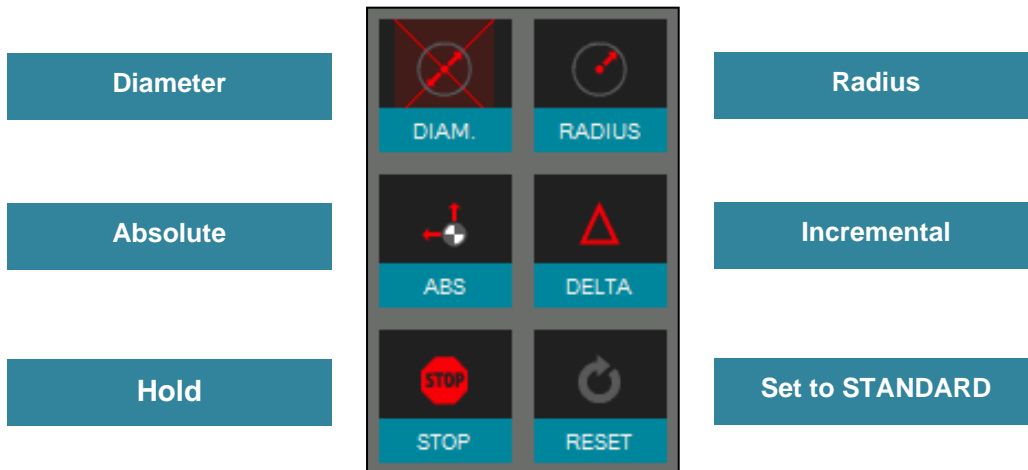


### 5.7.7 Select axis measuring mode/ counter display

The measuring result is indicated under the camera image in the measuring result area.



Click on the “X” or “Z” sign to open the shortcut menu of the different axis display modes.



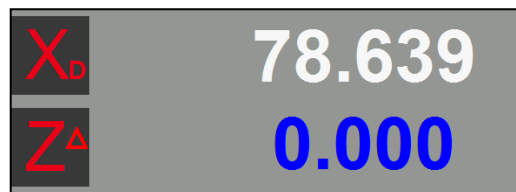
The button “Set to standard” will show the value as defined in the active “reference point”.



In the incremental mode will the chosen axis set to “0.000” and the colour changes to blue. Also will the mode be indicated by a small icon beside the axis name.

X mode “absolute”

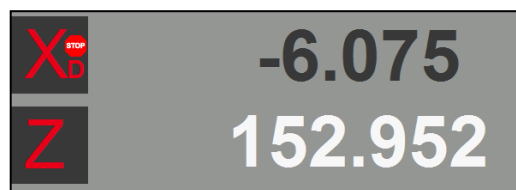
Z mode “incremental”



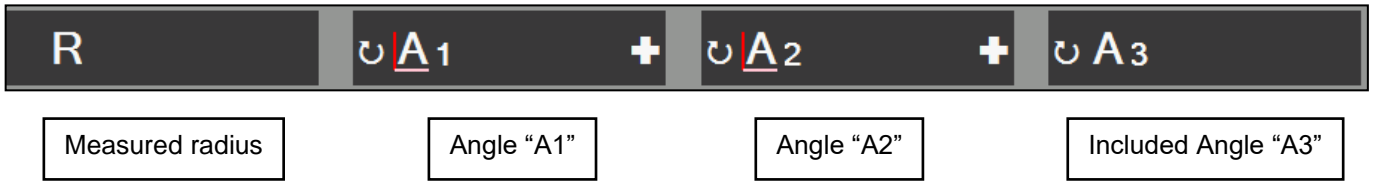
In the “Hold” mode will the value of the chosen axis be frozen and the colour changes to black. Also will the mode be indicated by a small icon beside the axis name.

X mode “Hold”

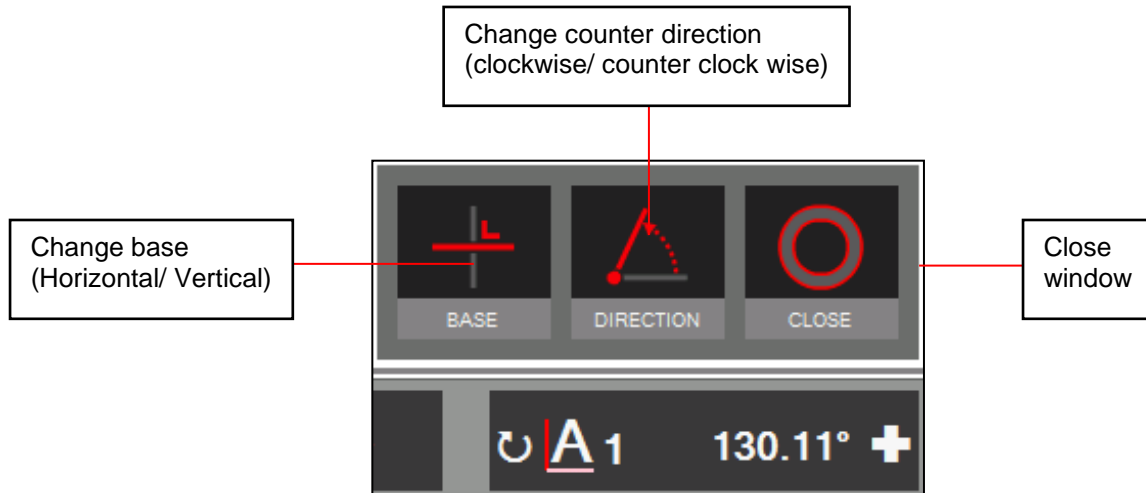
Z mode “absolute”



The measured angles and radii will be indicated above the counter values and are described below:

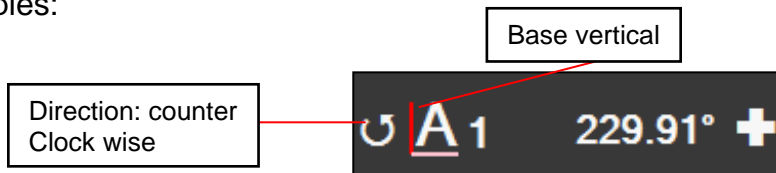


Click on the "+" sign to open a window, where the base of the angle calculation and the Direction of the angle measurement can be changed

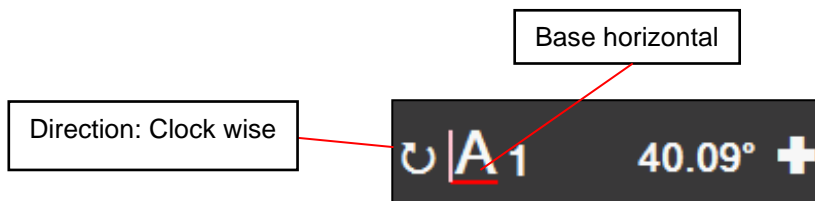


Examples:

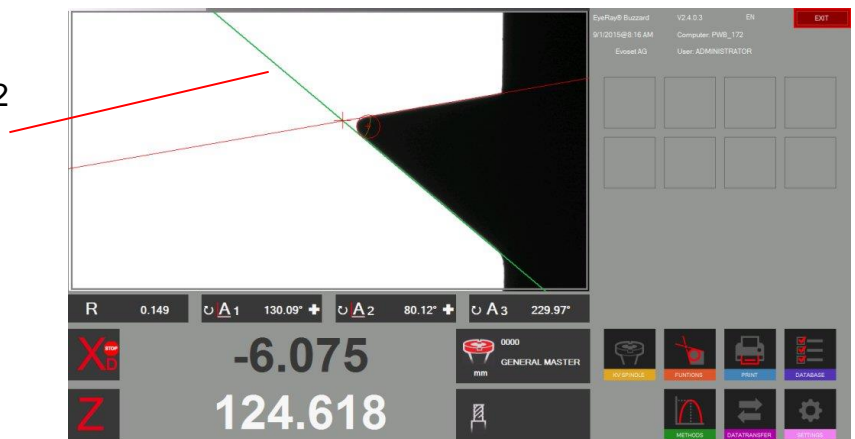
1)



2)



If you click on the character A1 or A2 the corresponding line on the live image will be shown in green colour for a few seconds



## 5.8 Printing measured values



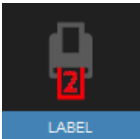
Click on this icon to show the installed printing options

### 5.8.1 Print label / standard



To print out a single label.

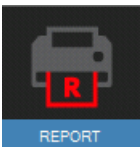
### 5.8.2 Customized label EyeRay®/ Optional



A second label format can be customized regarding customers specifications. On request.

Evoset / PWB item number: P270540  
See chapter 5.3 „ Customized label EyeRay® “

### 5.8.3 Print „Report“ (optional)



Print our a customized label format

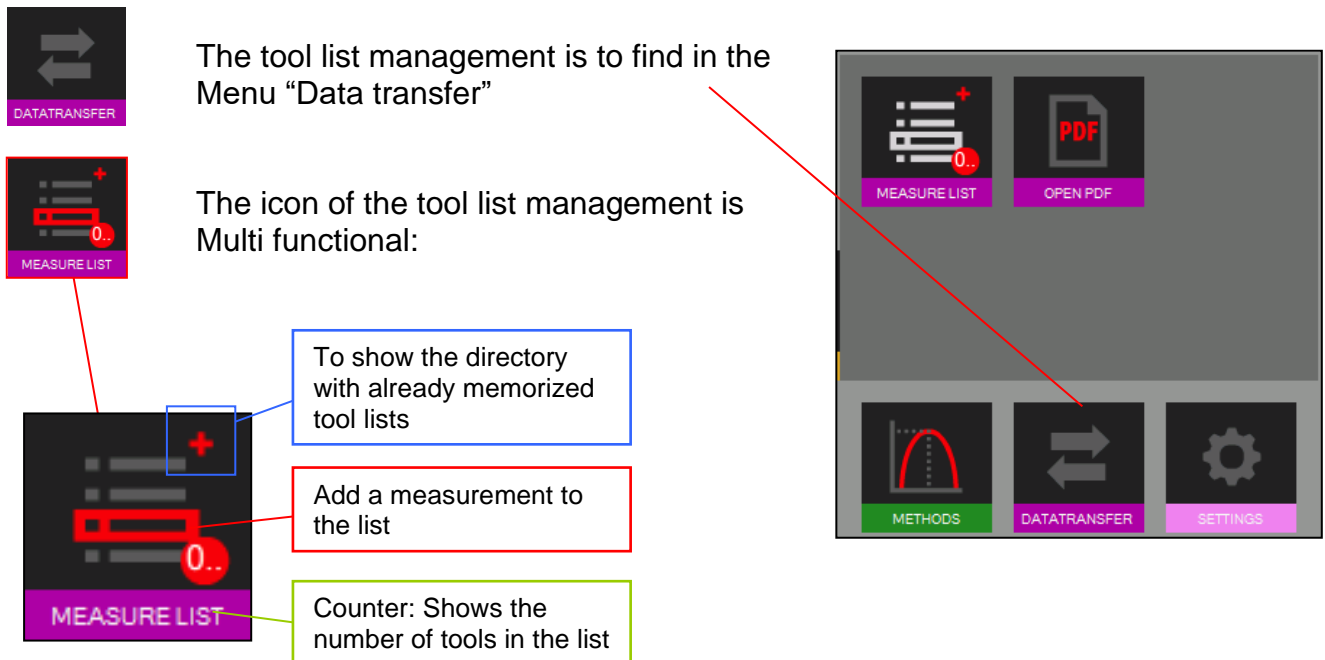
Evoset/ PWB Artikel Nummer: P270550  
See page 5.2 „print report“

## 5.9 Data Transfer

### 5.9.1 Tool list

Example:

This feature allows generating and saving a tool list for every piece you produce.



The tool list management is to find in the Menu "Data transfer"

The icon of the tool list management is Multi functional:

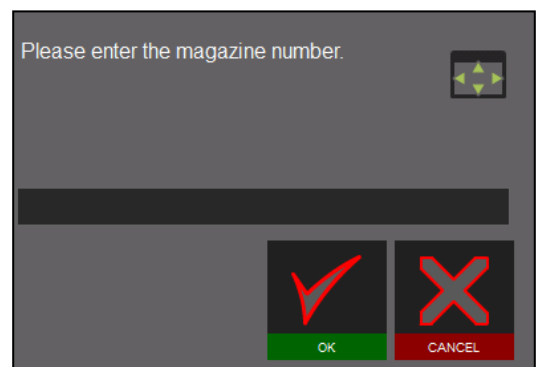
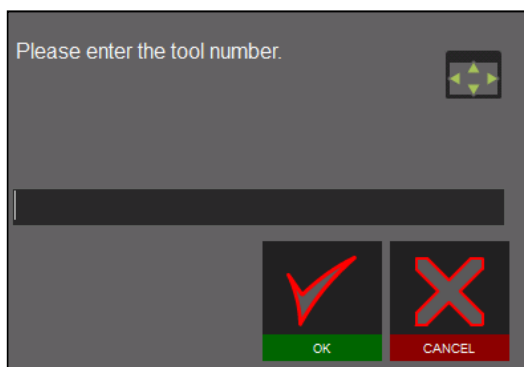
- To show the directory with already memorized tool lists
- Add a measurement to the list
- Counter: Shows the number of tools in the list

Click the red frame in the tool list icon to add your measurement to the tool list

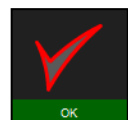


Input fields for the tool number and the magazine number will open.

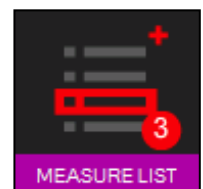
Please note: No entry needed.



Confirm with:



The counter shows always the numbers of tools in the tool list.  
Example: The tool list contains 3 tools.



Click on the “+” button of the Tool list icon to show the list.

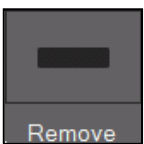


Tool Number	Cutting edge	Magazine number	X value	Z value	Angle 1	Angle 2	Angle 3	Radius
1	1	1	-6.075	124.618	130.09°	80.12°	229.97°	0.146
2	1		11.900	133.981	0	0	0	0
3	1	56	11.898	137.981	0	0	0	0

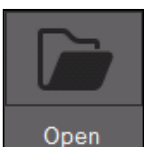
Functions:



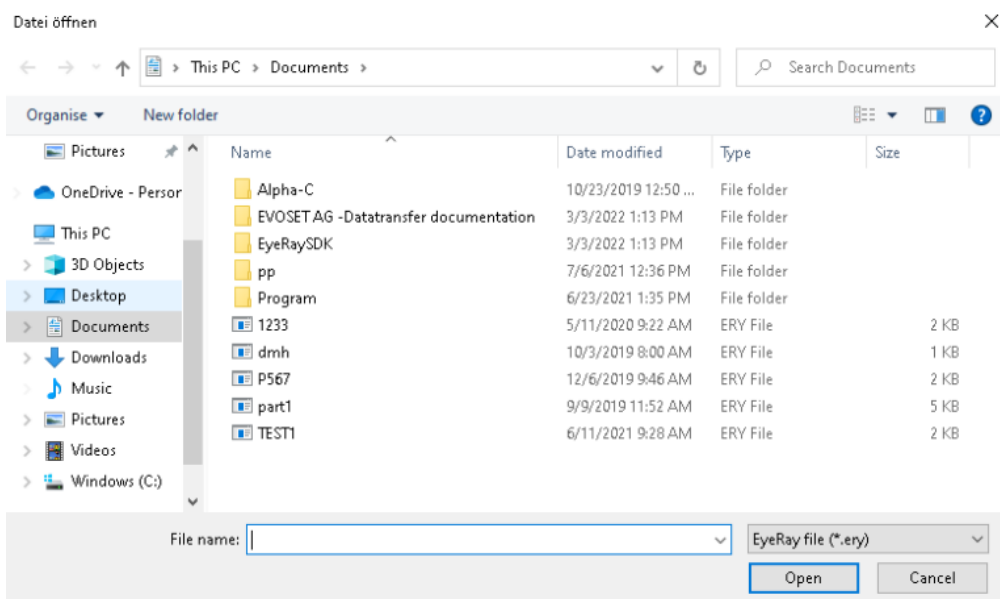
Add a new measuring to the list

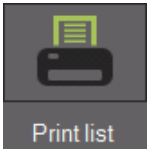


Delete the highlighted measuring list



To open the directory of the tool lists

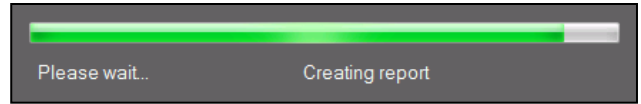




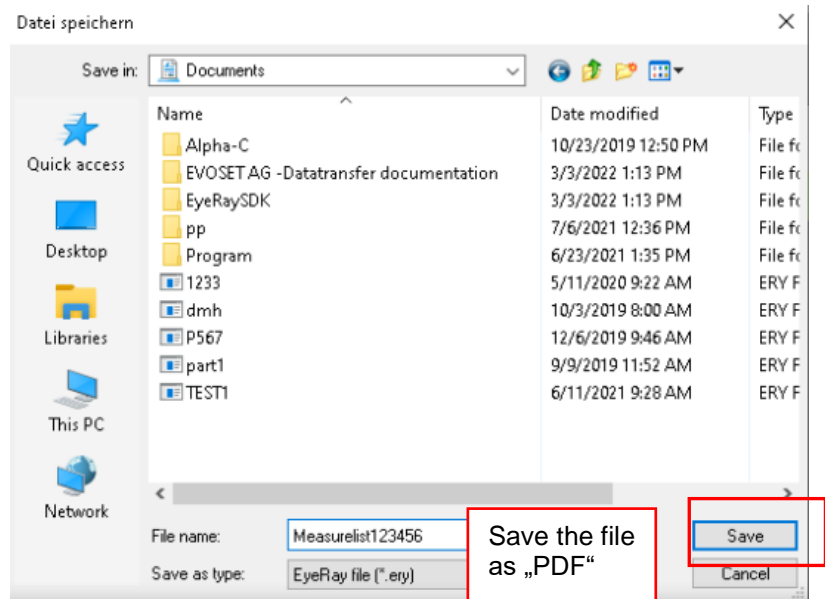
To print out the list on a printer (A4 printer has to be installed and set as report printer in the parameters, otherwise will a PDF file be created by default)

Default (PDF):

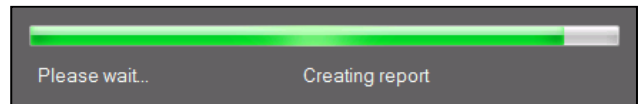
Report creation:



Save:



Report creation:



Opening: after saving will the file automatically be opened:

# EVOSET

EvoSet AG  
Alustrasse 18.

CH-3940 - Steg - Switzerland  
Tel: +41 27 922 0450  
service@evoset.com  
www.evoset.com

## Liste der Messungen

Datum 3/3/2022

Bezugspunkthname 0000 GENERAL MASTER

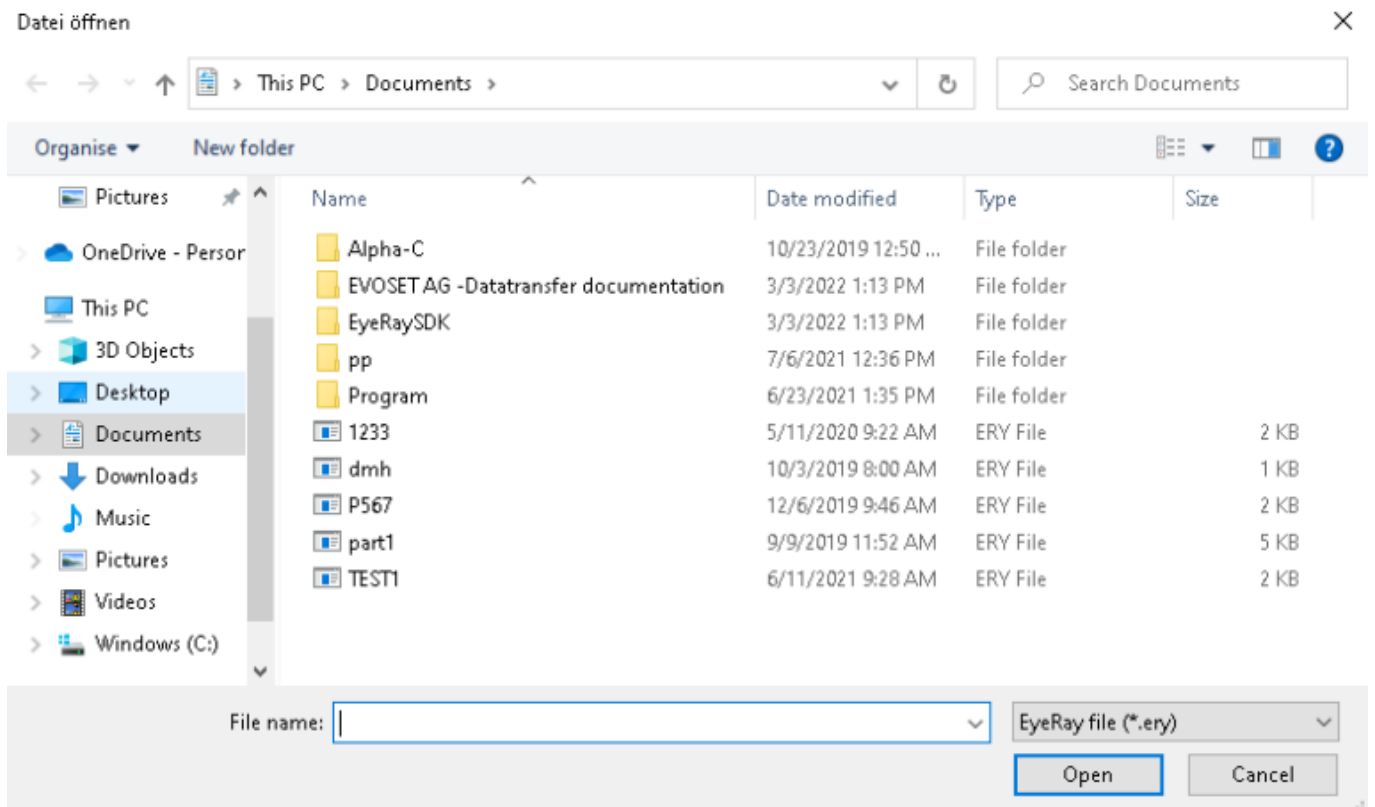
Werkzeug Nr.	Werkzeugname	Schneide	Magazin Nr.	X	Z	A1	A2	A3	R
1		1	1	29.991	91.100	0	0	0	0
2		1	2	29.991	91.101	0	0	0	0
3		1	3	29.374	90.887	0	0	0	0

## 5.9.2 Open PDF file

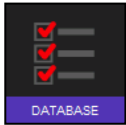


Use this icon to open saved PDF files as measuring lists or reports.

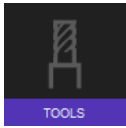
It opens a window, where you can browse the system to open, rename and move PDF files to other directories as a USB stick, or to delete files.



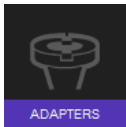
## 5.10 Data base



This icon opens the data base functions.



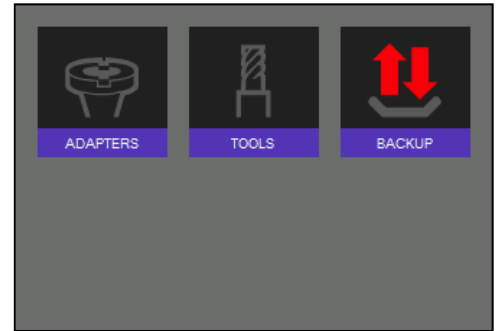
Tool data base



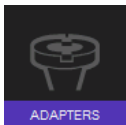
Open reference points data base



Icon to backup or restore



### 5.10.1 Reference point data base



Icon to open the reference point data base

The first adaptor/ reference point is always the “General Master”, used to calibrate the unit. It has always the number “0000” and cannot be deleted

It's a so called “Absolute Zero Point”, means, that the unit will be calibrated with such a Reference Point.

N° Adapter	0000	<input checked="" type="radio"/> mm	<input type="radio"/> inches
Name	GENERAL MASTER	<input checked="" type="radio"/> Diameter	<input type="radio"/> Radius
Creation date	11/9/2012	<input checked="" type="radio"/> Reference value	<input type="radio"/> Offset value
Notes		<input type="checkbox"/> Axes reversed	<input type="checkbox"/> Mirror X
Image		<input type="checkbox"/> Mirror Z	
	X	49.985	X
	Z	329.83	Z

← Previous
Next →
 Search
 New
 Modify
 Delete
 Keyboard
 OK
 Cancel

The reference point “000” cannot be modified.



### 5.10.1.1 Description of the input fields:

#### Information:

N° Adapter	Number of the reference point
Name	Description of the reference point (Sample: name of the machine/ Name of the tool holder type)
Creation date	automatically set
Notes	Remarks
Image	Click in this area and browse the computer to add an image to the reference point.

#### Options:

- mm       inches      Defines the unit for the reference point
- Diameter       Radius      Measuring result in Diameter or in Radius
- Offset value      Standard setting: The offset value is the difference between the zero point of the Master mandrill (General Master) and the zero point of the used tool holder system. **Mostly used.**  
**So called: offset/relative zero point!**
- Reference value      Different absolute zero points can be assigned beside the "General Master".  
 The nominal values have to be entered in the input field for "X" and "Z".  
**So called: absolute/ reference zero point**
- Axes reversed      The vertical axis will become the X axis and the horizontal axis will become the Z axis.
- Mirror X
- Mirror Z      Changes the counting direction of the axis

X	0	
Z	15.42	

Input field for the „X“ and „Z“ values.  
Enter either offset values or reference values depending on the settings made above.

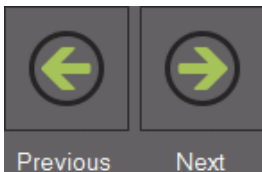
Axis description: to enter an axis name. The axis will be shown as it becomes set here => sample: Change “X” axis description to “A” axis.

Mostly will here be entered the Z axis offset value (engraved values on the PWB adaptor).

If the reference point has “reversed axes”: Define on which axis the measurement mode R/D should be activated

If the axes are not reversed is the R/D mode on the X-Axis.

Functions:



Browse the data base from a reference point to the next



Search the data abase for a specific reference point



Add a new reference point



Save modifications



Delete reference point



Show “on-Screen-Keybaord”



Select adaptor



Close list

### 5.10.1.2 Samples of reference points:

1.)

Reference point No: 63

Relative reference point for a machine with HSK-A63 tool holder system.

- Offset Values:

X = 00.00mm

Z = 15.42mm

N° Adapter: 10  
Name: HSK 63  
Creation date: 6/15/2015  
Notes: [Empty]  
Image: [Placeholder: Click here to add a picture]

Unit:  mm  inches  
Type:  Diameter  Radius  
Reference:  Reference value  Offset value  
Mirrors:  Mirror X  Mirror Z  
Options:  Axes reversed

X: 0  
Z: 15.42

Buttons: Previous, Next, Search, New, Modify, Delete, Keyboard, OK, Cancel

2.)

Reference point No: 400

The image shows a relative reference point for a machine with VDI40 tool holder system.

- Reversed axis
- Changed counting direction in Z-axis.
- R/D mode on X-axis active
- Offset values:

X= 00.00mm

Z= 35.55mm

N° Adapter: 100  
Name: VDI30  
Creation date: 9/1/2015  
Notes: [Empty]  
Image: [Placeholder: Click here to add a picture]

Unit:  mm  inches  
Type:  Diameter  Radius  
Reference:  Reference value  Offset value  
Mirrors:  Mirror Z  Mirror X  
Options:  Axes reversed

Z: 35.55  
X: 30.35

Buttons: Previous, Next, Search, New, Modify, Delete, Keyboard, OK, Cancel

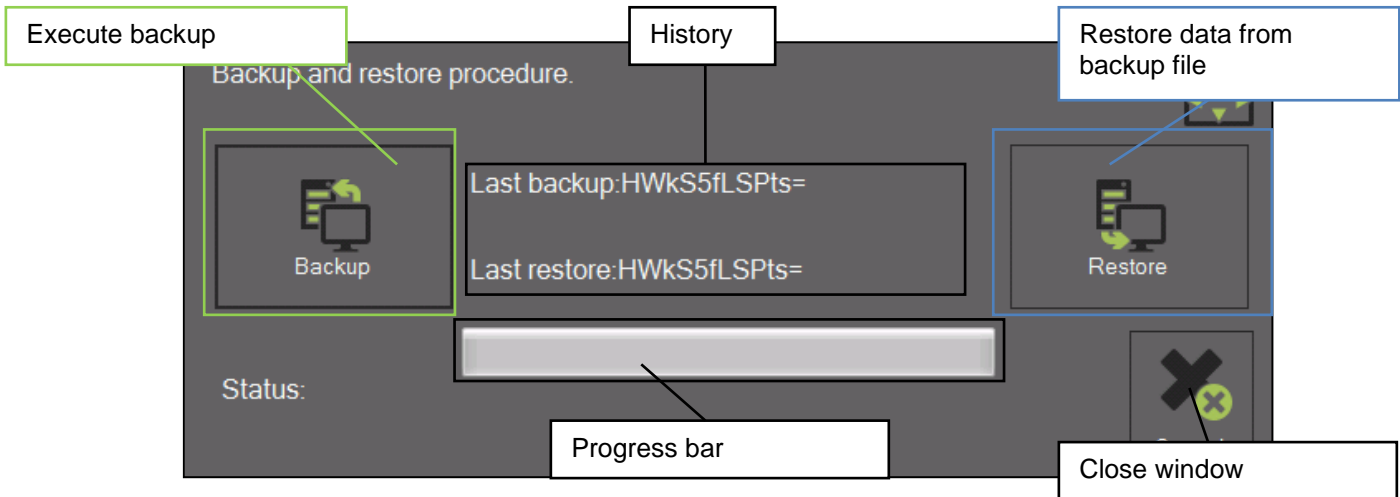
## 5.10.2 Backup and Restore

The backup procedure saves the data bases of the EyeRay® system. All adaptors, tools (units with tool data base), corrections and calibration data (pixel size etc) will be saved in a backup file.



This icon opens the backup and restore functions.

Description of the icons:



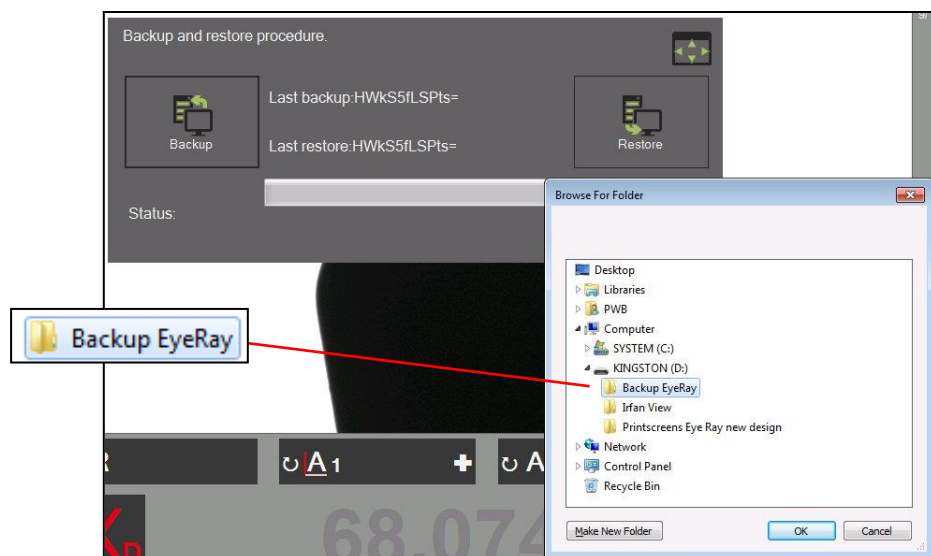
Perform backup:

Start the procedure with the icon rightwards:



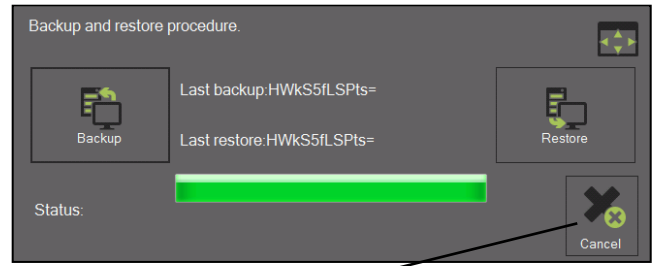
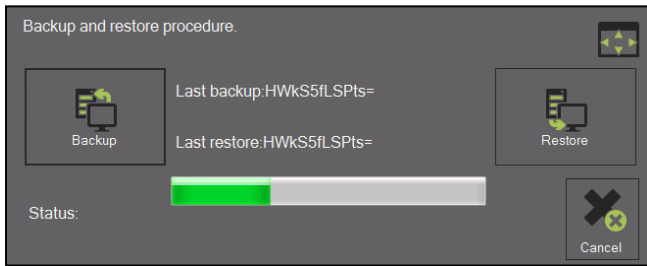
It opens a window, to choose the directory for the backup:

Create a folder, name it “backup EyeRay” and start the procedure with „ok“.



The backup must be done on a USB stick and not on the PC itself!

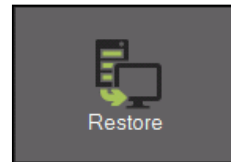
The bar shows the progress of the backup. This operation may take several minutes.



Close the window after finishing the backup procedure.

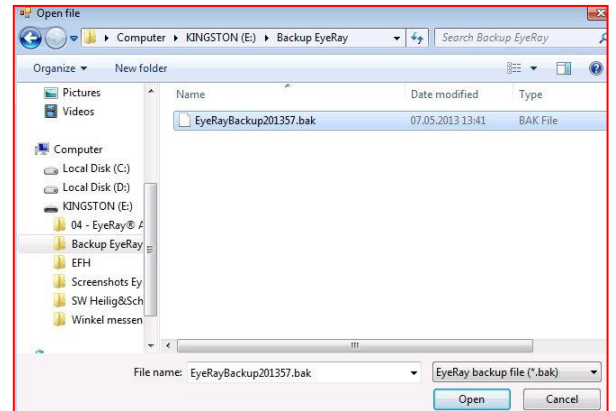
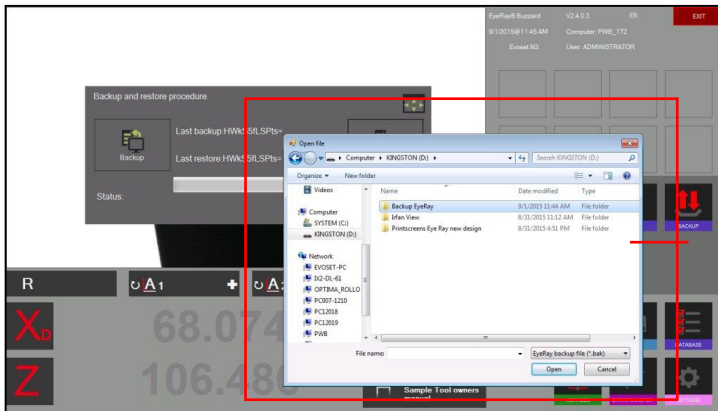
### Restore:

Open the restore procedure with the icon rightwards:

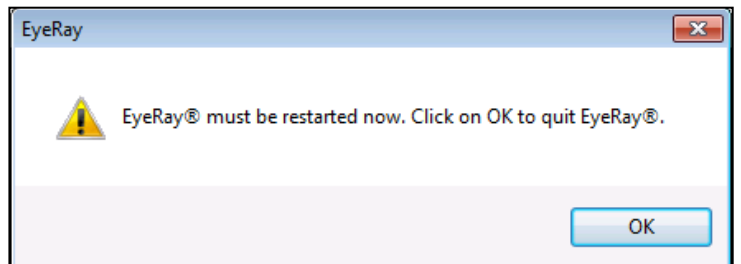
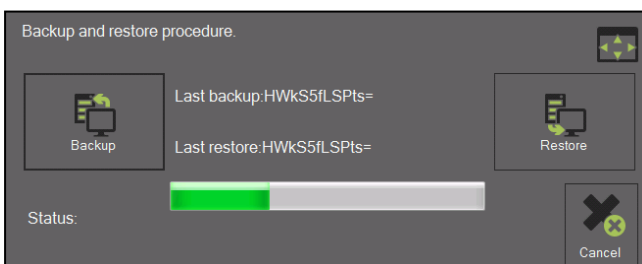


Choose the backup file, which has to be restored .

Select the file „EyeRayBackup.....bak“ and start the restore process with „Open“.



The bar shows the progress of the restore procedure. This may take several minutes.



After finishing the restore operation must the software be restarted.

## **6 Optional functions**

### **6.1 Customized label EyeRay® (SW option)**

To print out a customized label.

Item number: P270540 / Customized label EyeRay®

### **6.2 Data transfer PostPro EyeRay® (SW Option)**

Data transfer to a network or machining centre.  
Multiple post processors possible.

Item numbers: P270220 / Data transfer license EyeRay®  
P270215 / Data transfer PostPro EyeRay® / per control

### **6.3 Data transfer RFID chip/ EyeRay® (SW option)**

Data transfer by data carrier on tool holder (RFID chip).  
Multiple post processors possible.

Item number: P270225 (contains Software / Licence and Hardware for the Tool Master)

### **6.4 Centre height measuring with camera / EyeRay® (option)**

Centre height measuring through second camera (horizontal camera).  
The camera can be retrofitted and becomes assembled on the lateral plate of the tool master.

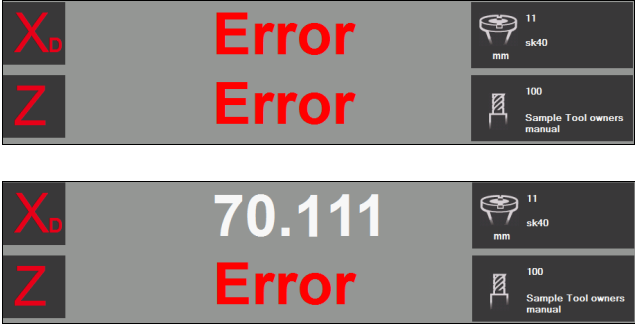
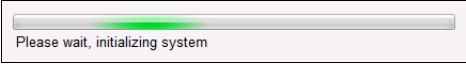
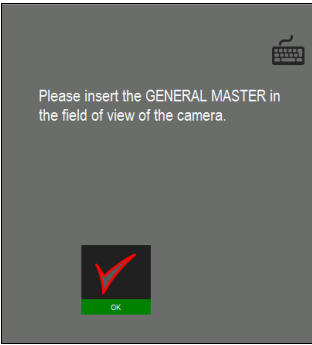
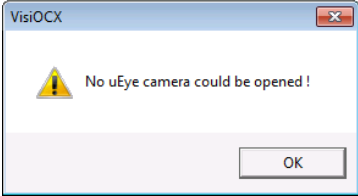

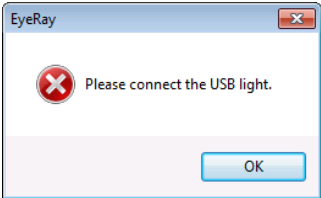


Item number: P270110 / Centre height measuring with camera / EyeRay®


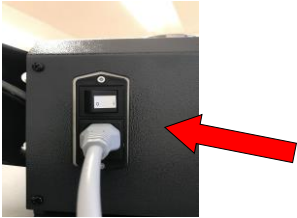


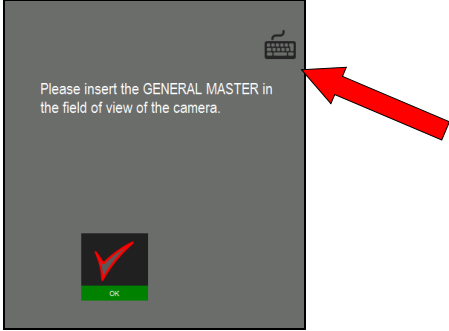
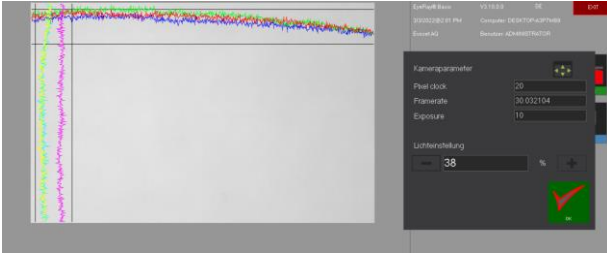
### **6.5 Customized measuring function (SW option)**

Specifications sheet created special measuring function.

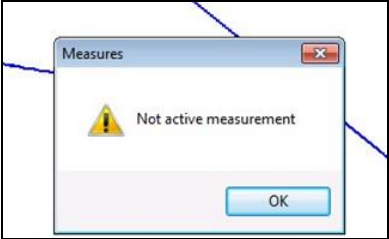
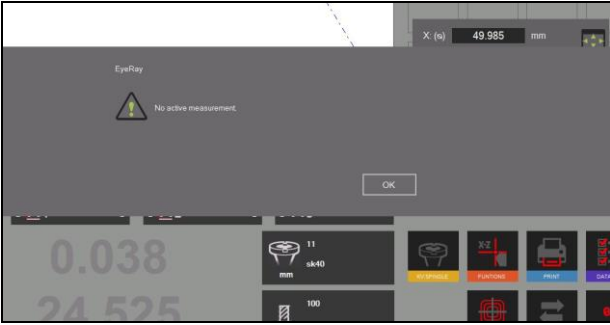
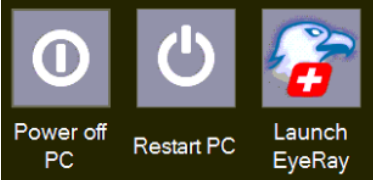
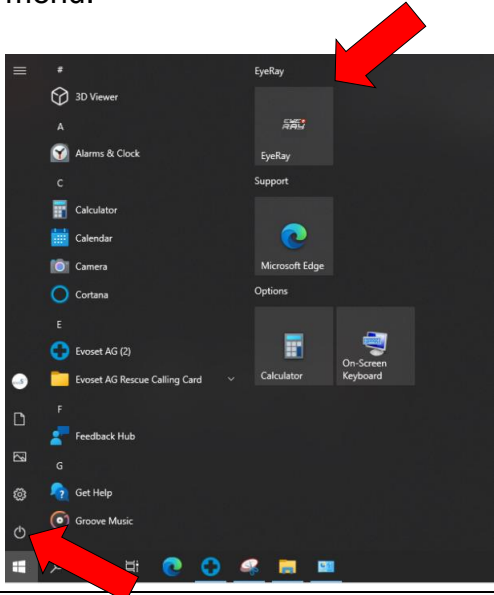
Item number: P270590

## 7 Troubleshooting

Problem	Troubleshooting
<p><b>(1)</b>  <b>Error</b> on X and/or Z axis</p>  <p><b>Remark:</b> This <b>Error</b> could appear when disconnecting a USB flash drive from the PC.</p>	<p>1.) Check the USB connection between the PC and the TOOL MASTER</p> <p>2a.) Disconnect the USB connection between the PC and the TOOL MASTER and reconnect it after a few seconds.</p> <p>2b.) This will initialize the system.</p>  <p>2c.) After that you'll have to calibrate the unit.</p> 
<p><b>(2)</b>            Message "No uEye camera could be opened !" during the launch of the EyeRay® software</p> 	<p>1.) Check the USB connection between the PC and the TOOL MASTER</p> <p>2a.) After the login close the EyeRay® software by clicking the red button (top right)</p>  <p>2b.) Restart the EyeRay® software again</p>
<p><b>(3)</b>            Message "Please connect the USB light" during the launch of the EyeRay® software</p> 	<p>1.) Check the USB connection between the PC and the TOOL MASTER</p> <p>2.) Check if the main switch at the back side of the TOOL MASTER is <b>ON</b></p>  <p>3a.) After the login close the EyeRay® software by clicking the red button (top right)</p>  <p>3b.) Restart the EyeRay® software again</p>

Problem	Troubleshooting
<p><b>(4a)</b> Blue screen after launching the EyeRay® software</p> 	<p>1.) Check the USB connection between the PC and the TOOL MASTER</p> <p>2.) Check if the main switch at the back side of the TOOL MASTER is <b>ON</b></p>  <p>3a.) Close the EyeRay® software by clicking the red button (top right)</p>  <p>3b.) Restart the EyeRay® software again</p>
<p><b>(4b)</b> Still blue screen after launching the EyeRay® software (point <b>(4a)</b> already passed)</p> 	<p>1.) Open the “light calibration” by entering <b>Ctrl</b> and <b>L</b> <u>one after the other</u></p> <p>If there is no keyboard connected, open the on-screen keyboard by clicking the keyboard button in the blue calibration window</p>  <p><u>Remark:</u> On the on-screen keyboard you have to click <u>twice</u> on the <b>Ctrl</b> button before clicking the <b>L</b> button.</p> <p>2.) Change the “light setting” value until all the lines are inside the two tolerance zones</p> 



Problem	Troubleshooting
<p><b>(5a)</b> Unit cannot be calibrated. The following message appears:</p> 	<p>Position the mandrill in the view of the camera</p>
<p><b>(5b)</b> There are no measuring lines to calibrate the unit. Message “Not active measurement” appears.</p> 	<p>1.) Start the light calibration and control the light intensity. ⇒ follow the point <b>(4b)</b></p> <p>2.) Now you can calibrate the unit</p>
<p><b>(6)</b> The EyeRay® “start menu” is <u>not</u> displayed</p> 	<p>Restart the EyeRay® software by clicking the EyeRay® icon in the Windows® start menu.</p>  <p>“Power off” or “Restart” the PC by the Windows® start menu.</p>

# 8 Diagrams

## 8.1 Overview connections TM Basic

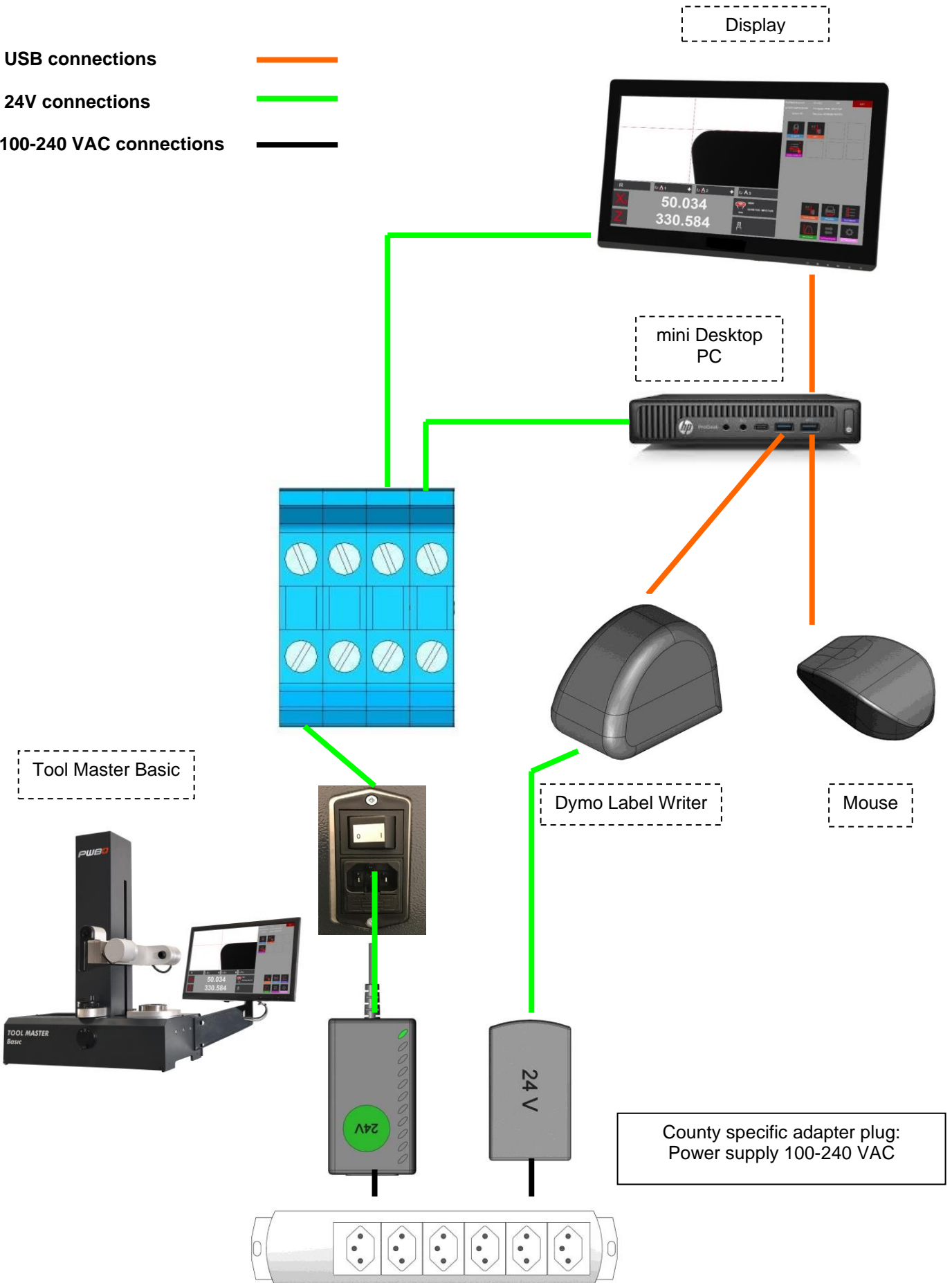
= USB connections

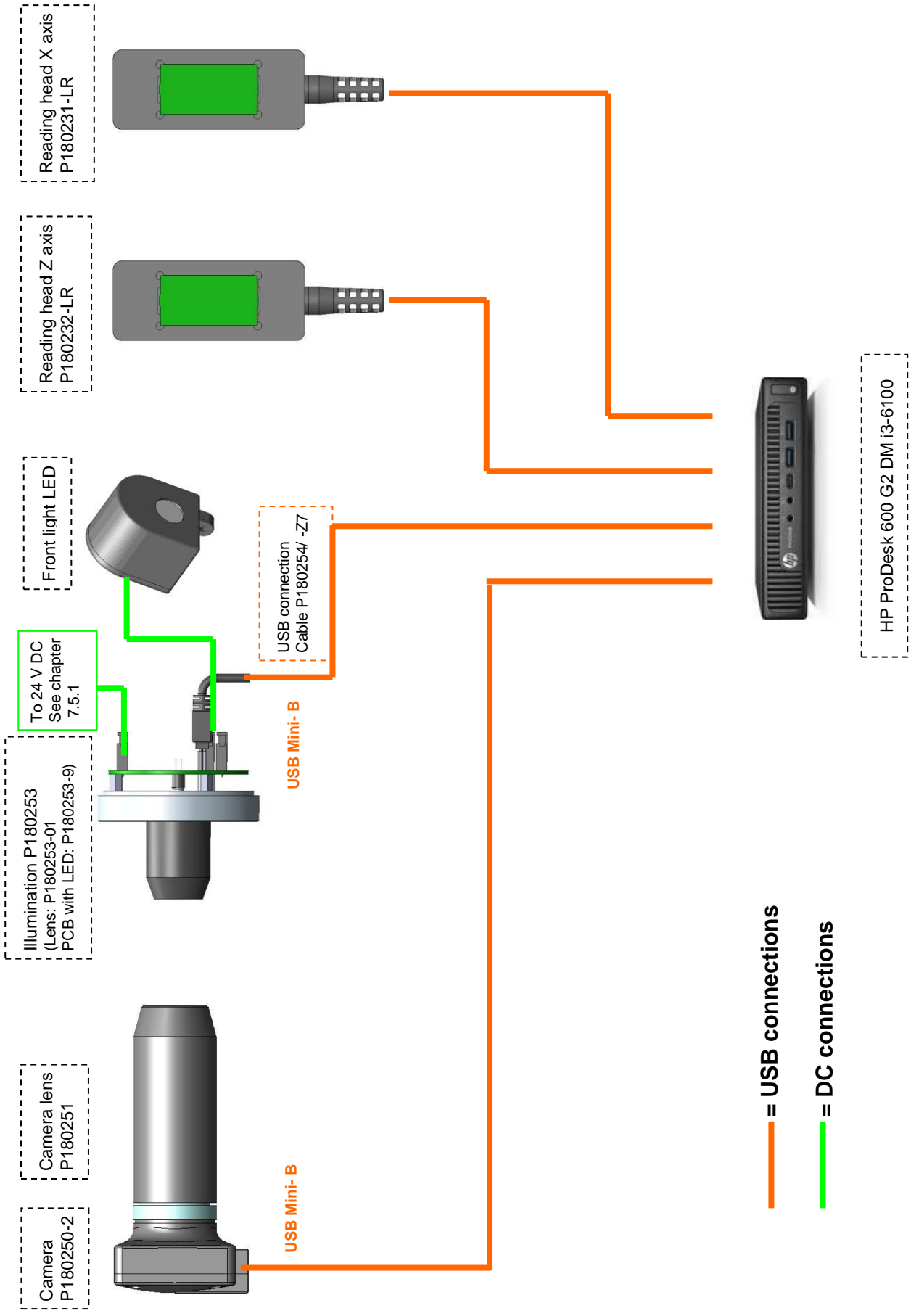


= 24V connections

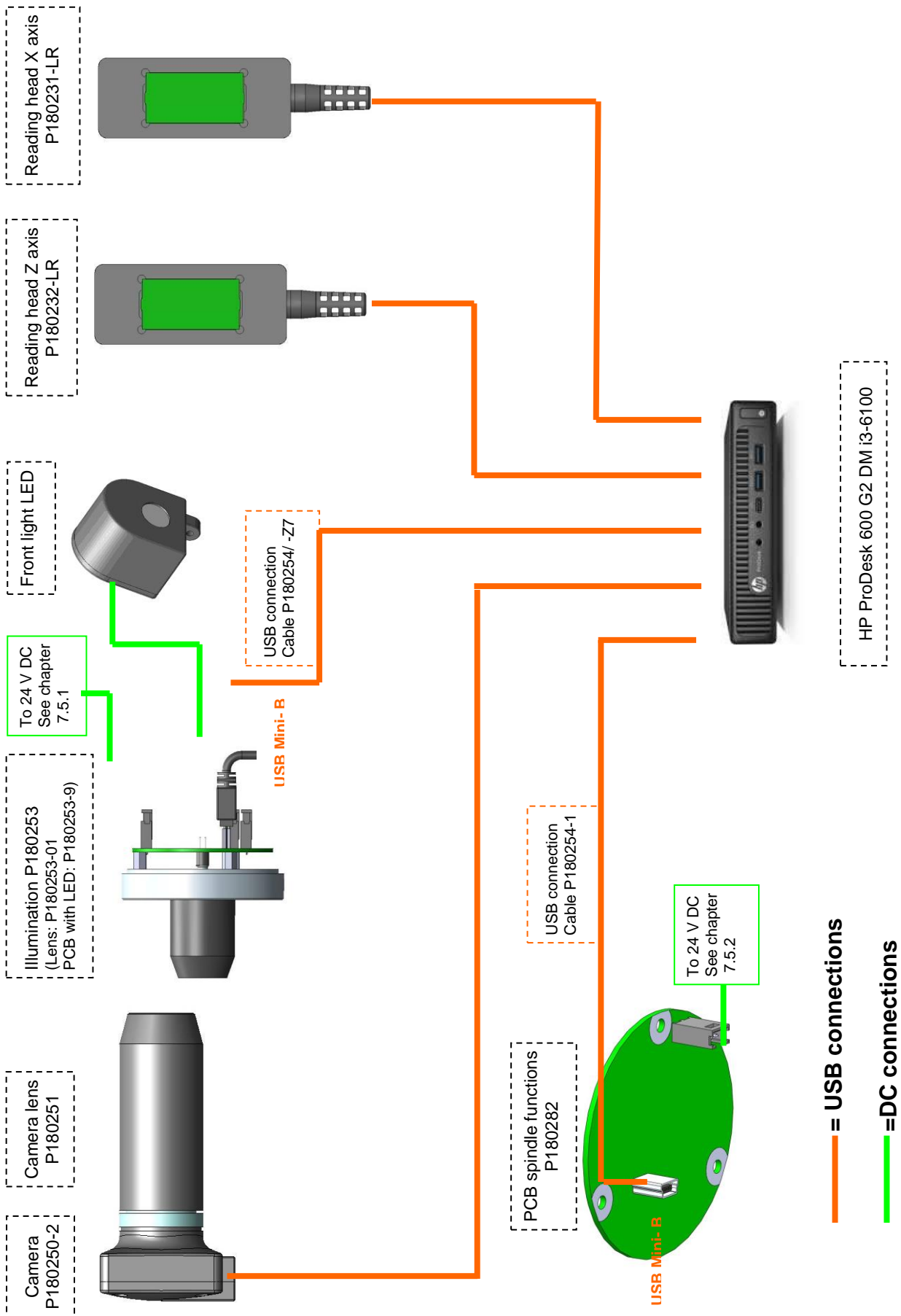


=100-240 VAC connections



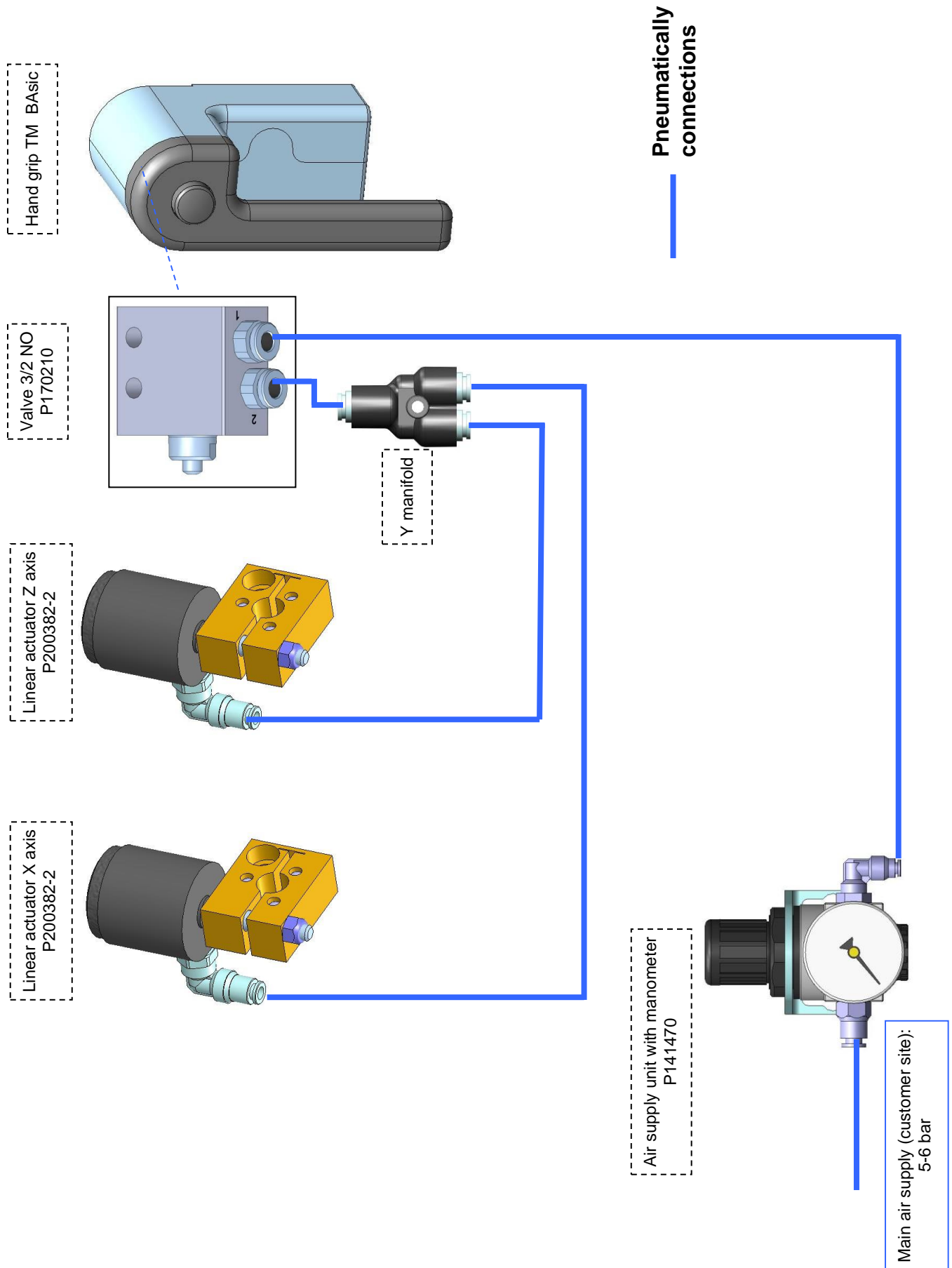


## 8.2 Connection USB hub/ Spindle KV

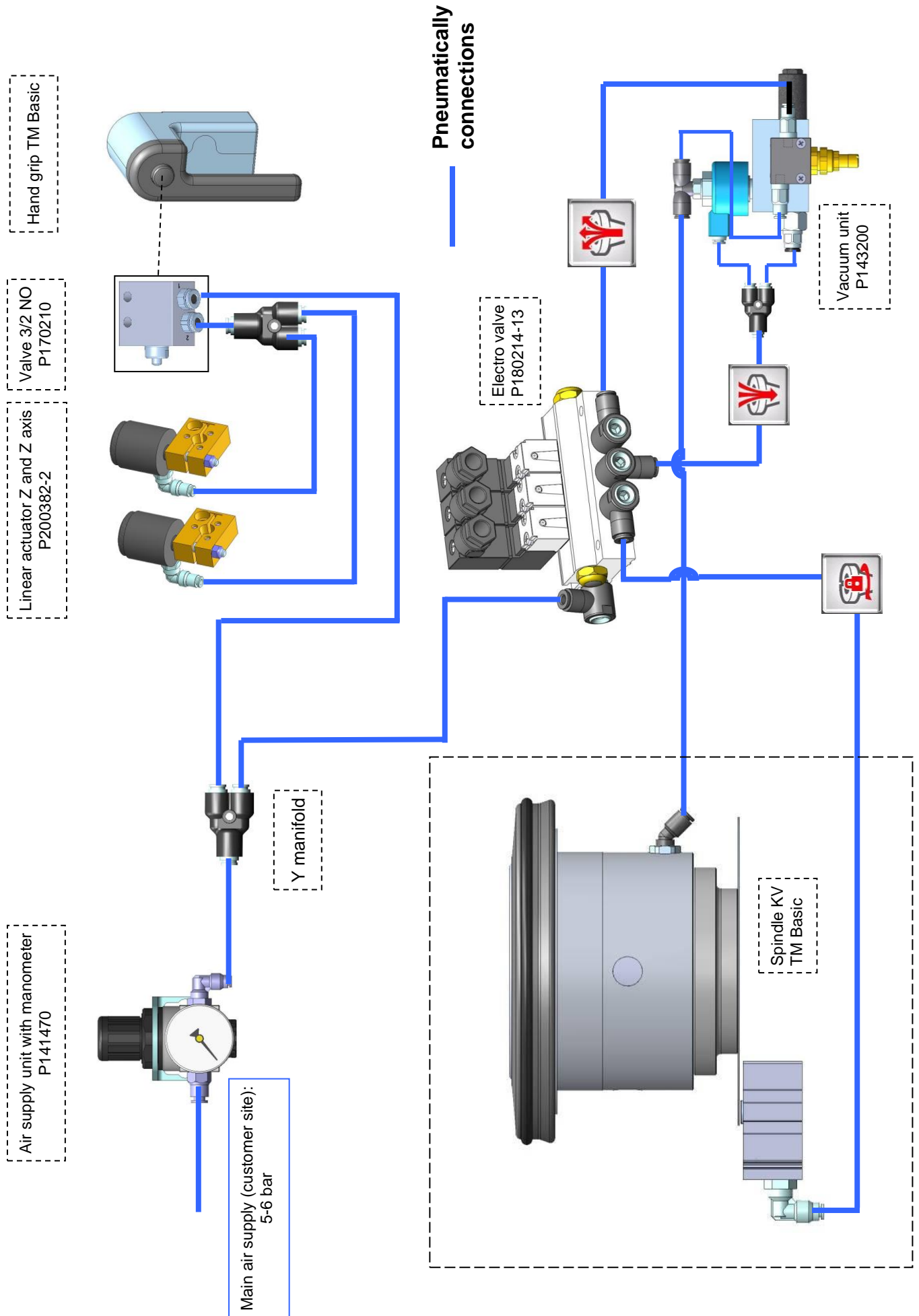


## 8.3 Pneumatically connections

### 8.3.1 Tool pot: Needle bearing



### 8.3.2 Tool pot: Spindle KV



## 9 Declaration of conformity

**KONFORMITÄTSERKLÄRUNG  
DECLARATION OF CONFORMITY  
DÉCLARATION DE CONFORMITÉ**



**Evoset AG**  
Alustrasse 18  
CH-3940 Steg  
☎ +41 27 922 04 50



erklärt, dass das **Werkzeugvoreinstellgerät** :  
*declares that the **tool presetter** :*  
*déclare que le **banc de pré réglage** :*

**SERIEN-NR. :**  
**SERIAL NUMBER :**  
**N° DE SÉRIE :**

**MODELL :**  
**MODEL :**  
**MODÈLE :**

**TOOL MASTER Basic**

**MARKE :**  
**BRAND :**  
**MARQUE :**

**PWB**

mit folgenden Richtlinien übereinstimmt :  
*are in accordance with the following directives :*  
*est conforme aux directives suivantes :*

**RICHTLINIEN :**  
**DIRECTIVES :**  
**DIRECTIVES :**

**2006 / 42 / EC  
2004 / 108 / EC  
2006 / 95 / EC**

**NORMEN :**  
**STANDARDS :**  
**NORMES :**

**EN 61326-1:2006**

**Evoset AG**

Stevan Vukicevic  
Technical Director  
Steg, 02.03.2022