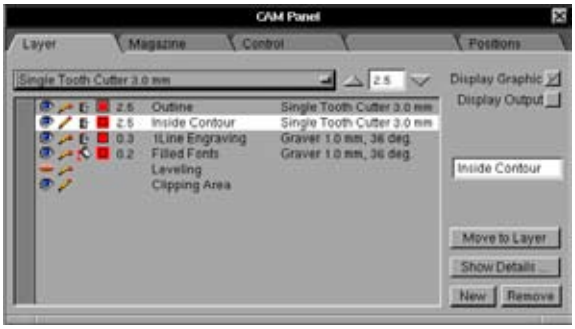
# Cenon Practical Tip: 10 Steps to Success

**Please Note...**
This quick reference cannot replace the comprehensive printed user's guide. It is just intended to be a summary of the working steps which you have to take to process your workpiece. Please refer to the manual for all basics and further information.

**1. Opening a File**
- *Open* a file which you have previously exported as EPS, AI, DFX, etc via the *Document* menu of Cenon. Different colors of EPS files will be separated to Cenon layers, the original layers of DXF files will remain unchanged.

**2. Assigning the Tools**
- On the *Layer* page of the *CAM* panel, you have to assign a tool to each layer. Please assign a name to each layer, too.
- For safety reasons, check also whether the *Parameters* (on the *Magazine* page) of all tools which are used in your current project are correct.
- If you cannot find your desired tool via the selection on the *Layer* page, you should possibly try another *Magazine*.

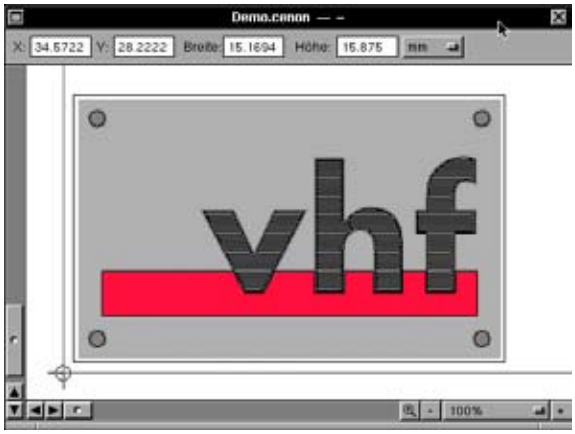



**3. Setting the Dipping Depth**
- Enter the *dipping depth* for each layer (for contour milling, this will be the thickness of the material) in the input field next to the tool selection.
- Some materials can not be milled in one working cycle. Click on *Details* and activate in such a case *Stepwise Z* (tick this option first and enter the dipping depths for the respective steps then).

**4. Tool Radius Correction**
- Engraving, e. g. filled fonts: inward correction = margin is within the red square
  single line fonts: no tool radius correction = margin is directly on the red square
- Milling out workpieces: outward correction = margin is outside the red square
  milling pockets or contours into the workpiece: see engraving

**5. Filling Areas**
- For engraving or milling pockets, you can decide if certain areas should be cleared out. To enable this, you have to "cant over" the little bucket in the layer list to fill the areas on this layer. For milling contours, the bucket remains standing upright, i. e. the areas will not be filled.

**6. Path Calculation/Output Order**
- After you have set all layer parameters, you can start the path calculation by ticking the *Display Output* check box. Then the graphics window shows in addition to your imported graphics the calculated engraving and milling paths.
- In case of an automatic tool change, don't forget to set the output order of the layers. Just drag and drop the layers into the right order while you have pressed the *Ctrl* key. (Please note: do the engravings first, then the milling works). The list will be processed from the bottom up.




**7. Fixing Your Workpiece**
- For most CAM systems it would be best if you fix your workpiece in the front left corner of the machine. Check if the cross-hair cursor (it indicates the starting position of the output) in the graphics window is a little bit left below the graphics.

**8. Clamping the Tool**
- Now clamp the tool for the first layer which has to be machined either by hand or with the automatic tool changer (for clamping a tool automatically, select the required tool in the *Magazine*, then click on *Parameters* and press the button *Select/Deselect*).

**9. Accessing the Workpiece Origin**
- Click on the *Control* tab. Move the x and y axis of your machine to the starting position (lower left corner of the workpiece). You can now either enter the values directly via keyboard (do not forget to confirm by pressing *ENTER*) or you can click with your mouse on the appropriate arrows. A third possibility would be to move the CAM system with the cursor keys on the numerical pad of your keyboard.
- Move *Z* so far downwards until the tip of the tool remains slightly above the workpiece. When the distance has become quite small, you can enable the adjustment mode (by ticking the checkbox left of Z). Using this mode, you can leave the current XY position and scratch the surface in the scrap area. Switch on the spindle manually and move downwards in steps of 1/10 mm until you scratch the surface just a little bit. Then you can deactivate the adjustment mode again and switch off the spindle.

**10. Starting the Output**
- After you have checked all settings once again, you can start the output.

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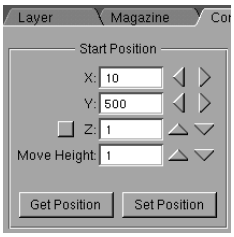
# Cenon Practical Tip: Automatic z Adjustment

*z adjustment unit in the moment of measuring between tool tip and workpiece surface*

**General Information**

The automatic z adjustment unit is used to adjust the workpiece origin in z direction – i. e. the workpiece surface – within seconds with highest precision. The workpiece itself does not have to be scratched any more.

**Preparation**




- Access the workpiece origin (*Start Position*) in x and y direction using the *CAM* panel of Cenon (tab *Control*).
- If you then tick the box next to the *Z* position, you will activate the so-called adjustment mode. So you can move to another x/y position over the workpiece for measuring the height without affecting the actual x/y starting position.
- Please move a few centimeters to the inside of the workpiece, so that there is enough space to put the adjustment unit safely on the workpiece (compare illustration on the left).

**Adjustment/Measuring**


- When you have accessed the x/y position for measuring and click on the downward arrow in z direction once, the automatic z adjustment starts and you will get the adjacent warning message.
- Now place the adjustment unit in such a way between workpiece and tool that the round metal measuring point will be touched in any case by the tool when it is moving downwards. Do not press the *Start* button until you have made this sure.
- Then the z axis starts to move slowly downwards until the contact has been closed by touching the metal measuring point with the tool. The z axis will stop immediately and move up again a little bit to release the adjustment unit.
- Now you can remove the adjustment unit from the working area and deactivate the adjustment mode by removing the tick next to the *Z* position. The machine will move back to the previously set workpiece origin and uses the value which has been measured just before as new z Position. The thickness of the adjustment unit will be added automatically.

**Attention**

- The z axis will stop only when an electrical contact can be closed between the metal measuring point and the tip of the tool. If the measuring point should be missed, the axis will continue to move downwards and adjustment unit, tool, spindle and workpiece can be damaged. On top of that there is a risk of injury when you grab by hand into the range of dangers during the measuring process. So leave the danger zone of the tool after you have placed the adjustment unit correctly!
- As an electrical contact has to be closed for the measurement, you must use only tools which are made of conductive materials (metal). Do not use diamond tools (MCD and PCD) and no coated tools with the automatic z adjustment unit.

**Tip**

You can lower the z axis – before activating the adjustment mode – already a little bit. So you'll save time during the measuring process because the axis will be lowered here rather slowly. Furthermore you can align the measuring point to the position of the tip of the tool more easily.

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# Cenon Practical Tip: Workpiece Levelling

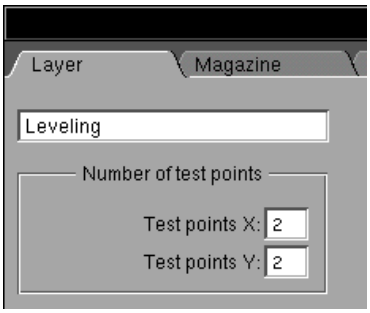
*workpiece levelling unit (mounted left of the spindle)*

**General Information**

This electronic measuring device levels inequalities on the workpiece surface. The controller calculates the height profile and lifts respectively lowers the z-axis accordingly so that the dipping depth will be consistent everywhere on the workpiece.

**Preparation**

- If the workpiece levelling unit has been installed correctly, Cenon's *CAM* panel (tab *Layer*) will show an additional layer named *Levelling*.
- Now switch this layer to *editable* (symbolized by an undamaged pencil) and switch all other layers to *not editable* (symbolized by a broken pencil).
- Draw a rectangle on the levelling layer within which the levelling process should be performed. Advantegeously you should place it in a way that it closely surrounds all elements which have to be processed. However, you must make sure that the rectangle will not exceed the limits of the workpiece. The whole positioning range of your CAM system will be reduced during the levelling process by the distance between levelling sensor and spindle.



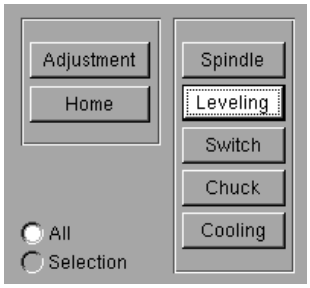

- In the *Layer Details* section (accessible via the *Layer* panel by double-clicking the levelling layer or by clicking on *Show Details*) you set the number of measuring points in x and y direction (see image right). Here you enter the absolute number of measuring points within the area of the levelling rectangle. You can use the following values as a clue for common plate formats: for smaller workpieces you should have one measuring point about every 50 mm, for larger workpieces one measuring point about every 100 mm is usually sufficient.
- Close all layers (shut eye) except the levelling layer (open eye).

**Levelling the Workpieces**

- Now approach your starting position using Cenon's *CAM* panel (tab *Control*). The center of the spindle is the reference point for the levelling procedure, too. The offset between levelling sensor and spindle will be corrected automatically after the start.
- Set the positioning height of the levelling sensor low enough, so that the z axis does not have to move too long distances for each measuring sequence. This would extend the total time required for the levelling process unnecessarily. However, make sure that the positioning height is not too low on the other hand, because – due to the tolerances in the material thickness – there may be some areas on your workpiece where the height is not sufficient. You will risk in such a case that the levelling sensor scratches the material which can damage in the worst case both, the sensor and your workpiece.
- Finally start the levelling process by clicking on the *Start* button. Your CAM system now measures the previously defined number of points on your workpiece by approaching each point and lowering the sensor until a contact to the surface has been established.

**Processing the Workpieces**

- When the levelling process is finished, clamp the tool with which you want to process your workpiece.
- Activate the *Levelling* button. Only then the z axis will be adjusted automatically according to the calculated height profile of the workpiece.
- Set the z origin (*Start Position Z*) within the range of the levelling area.
- Close the levelling layer and open the layer(s) which you want to process.
- Start the output by pressing the *Start* button

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# Cenon Practial Tip: Rotary Axis

*Rotay axis with three-jaw chuck (left) and tailstock unit with sleeve (right)*

**General Information**

A rotary axis with optional tailstock unit makes it possible to process round workpieces circumferential, mainly for engraving a round workpiece and for milling slots or other shapes. The workpiece has to be fixed in the three-jaw chuck of the rotary axis. With the help of the tailstock unit, longer workpieces can be fixed reliably from both sides.

**Preparation**

- The first step is to activate the rotary axis and to de-activate the y axis of your CAM system at the same time. For this purpose please open the dialog box *Preferences* via the Cenon menu *Info*. There you have to click on the *CAM* tab. Under the entry *Device for XYZ Output* you have to select the provided configuration file for the output to the rotary axis. The file name ends with *_xtz*. All necessary settings for the operation have been made in this file.
- As soon as you have selected the new configuration file, the CAM system performs a reference drive and the y axis moves to the center of the rotary axis. It will always remain at this position during the operation of the rotary axis.
- When you have finished your work with the rotary axis and want to use the regular working area of your CAM system again, please select – as described above – the original configuration file (without *_xtz*).

**Calculating the Output Scale**

- You have to manually calculate the scale in y direction of all objects which you want to put out. This is necessary because the rotation distance of the axis varies depending on the diameter of the workpiece. An example clarifies the matter: in order to cover a distance of 50 mm on a cylinder with a diameter of 100 mm, the axis has to rotate by approximately 57 degrees. For the same distance on a cylinder with a diameter of 50 mm, the axis already has to rotate by approximately 114 degrees, so the rotation has doubled. And a cylinder with a diameter of 15 mm would be too small to cover a distance of 50 mm on it.

Font sample

Font sample for Ø 80 mm

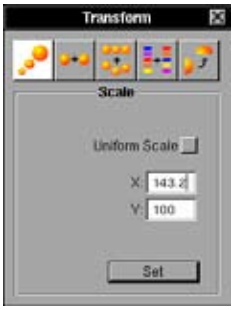
Font sample for Ø 50 mm

*Examples for distortion of fonts: the first line shows the font with its regular width, the fonts beneath have been stretched for different workpiece diameters, their height, however, always remains the same*

- Thus all drawing objects in a Cenon file which you want to mill or engrave have to be scaled in y direction according to the following formula:

$$\text{Scaling factor} = \frac{11459}{\text{Object diameter in mm}}$$

- Using this formula you can easily calculate the scaling factor (in per cent) which you have to enter in the *Transform* panel under *Scale*. Sample calculation for 80 mm diameter: 11459/80 = 143.2
- **Attention!** In case of rotated objects you have to scale – according to the rotation – either x or y in the *Transform* panel. In our example we want to engrave the font in the direction of rotation of the axis. The text box has to be rotated by 90 degrees for this purpose. As the scaling always refers to the unrotated object, you have to scale the x direction here. The item *Uniform Scale* must not be checked.
- A provided file (Drehachse.cenon) shows for your orientation a segmentation in angles of 90 degrees. You can use this file for drawing your objects on a free layer. After the scaling process you will see approximately which extent of your workpiece will be covered.




*Transform Panel in Cenon*

**Processing the Workpieces**

- Once you have scaled all objects, you can access the starting position for the output. This will be done with the *Control* tab in Cenon's *CAM* panel. Please note, however, a specific characteristic of the rotary axis: **all values** for the **y axis** will be entered **in degrees**! The values for x and z axis as well as the flight height will still be entered in mm.
- **Attention!** Make sure that the x starting position is far enough away from the jaws of the chuck. Otherwise the tool can collide with a jaw while this axis is rotating. This could damage both, tool and jaw.
- Depending on where you place the cross-hair cursor on your drawing, the machine starts processing your workpiece. The axis rotates clockwise (regarded from the chuck) when you enter positive values. So if you place the cross-hair cursor slightly above the drawing, additional positioning ways can be reduced.

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