M&H

TOUCH PROBE AND TOOL SETTER

USER GUIDE

GUIDE TO CALIBRATING TOUCH PROBES AND TOOL SETTERS

Using the touch probe

Place the dial gauge on the ruby ball as shown in *Figure 1*. Apply pressure to the gauge and then use the handwheel to find the highest point of the ball in both the X and Z directions. Loosen screws 'C', then adjust the screws A opposite each other simultaneously to reduce the eccentricity.

This can be done by setting one screw towards the dial gauge, checking the pressure, and then rotating the touch probe 180 degrees in the main spindle so that the other screw is facing the dial gauge. Check the pressure in this way too, and tighten and loosen the screws until the dial gauge is at the arithmetic mean of the two values.

Repeat the above steps with the screws in the other direction, then check the run-out. If you have managed to get it within about 0.02 mm, tighten the screws 'C' a little and repeat the above procedure with the screws 'A'.

Once you have reduced the run-out to within 5 µm, you can tighten the screws 'C'. Check back to see what the dial gauge reads, because tightening the screws 'C' may make the result worse. In this case, the screws 'A' can still be moved minimally to improve the result. Try to reduce the run-out to almost zero.

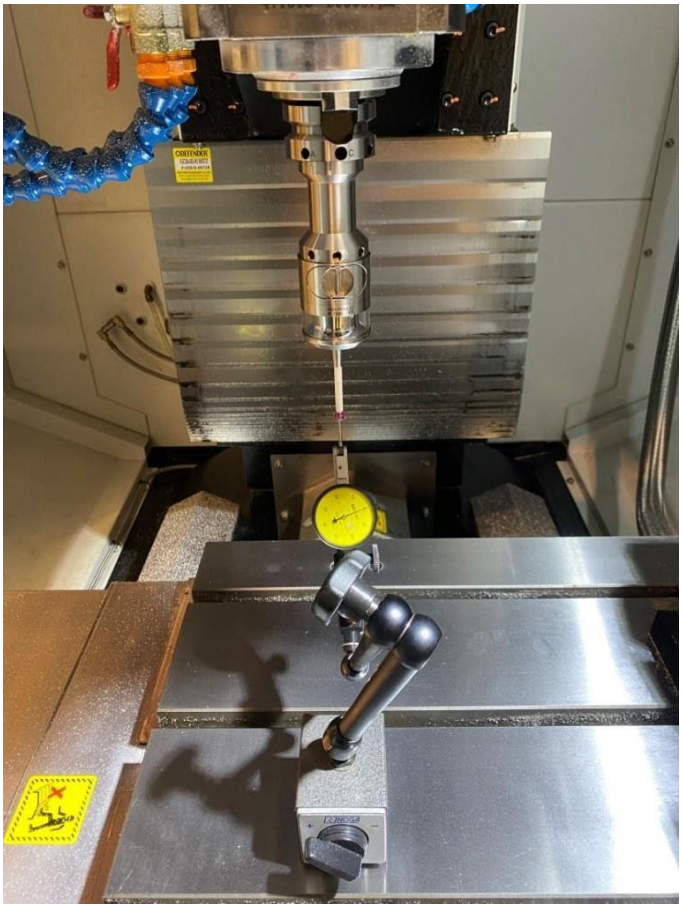

Figure 1 Relationship between the workpiece gauge and the dial gauge

There are two ways to turn on the touch probe. The first is to press the icon of the touch probe on the control panel (*Figure 2*), the second is to use the device on a selected tool post and it will automatically be switched on. To do this, open the View/PLC (Nézet/PLC) text window. Find the serial number of the PLC DWORLD associated with the tool setter (*Figure 3*), then double-click on the machine name and see which tool post is associated with the touch probe (*Figure 4*). If the touch probe is used in this tool post, it will automatically be switched on.

Figure 2 The icon of the touch probe

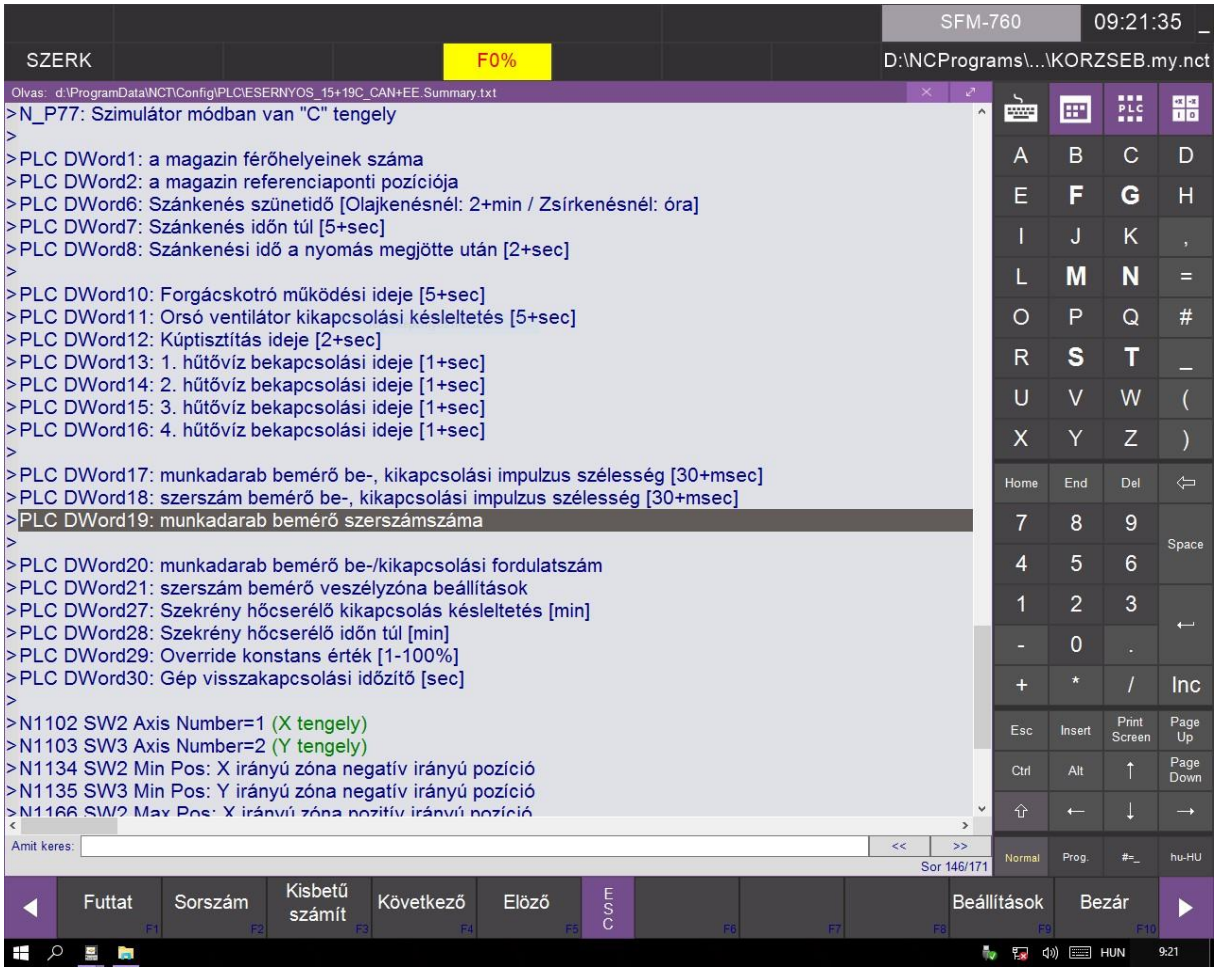

Figure 3 The View/PLC text window

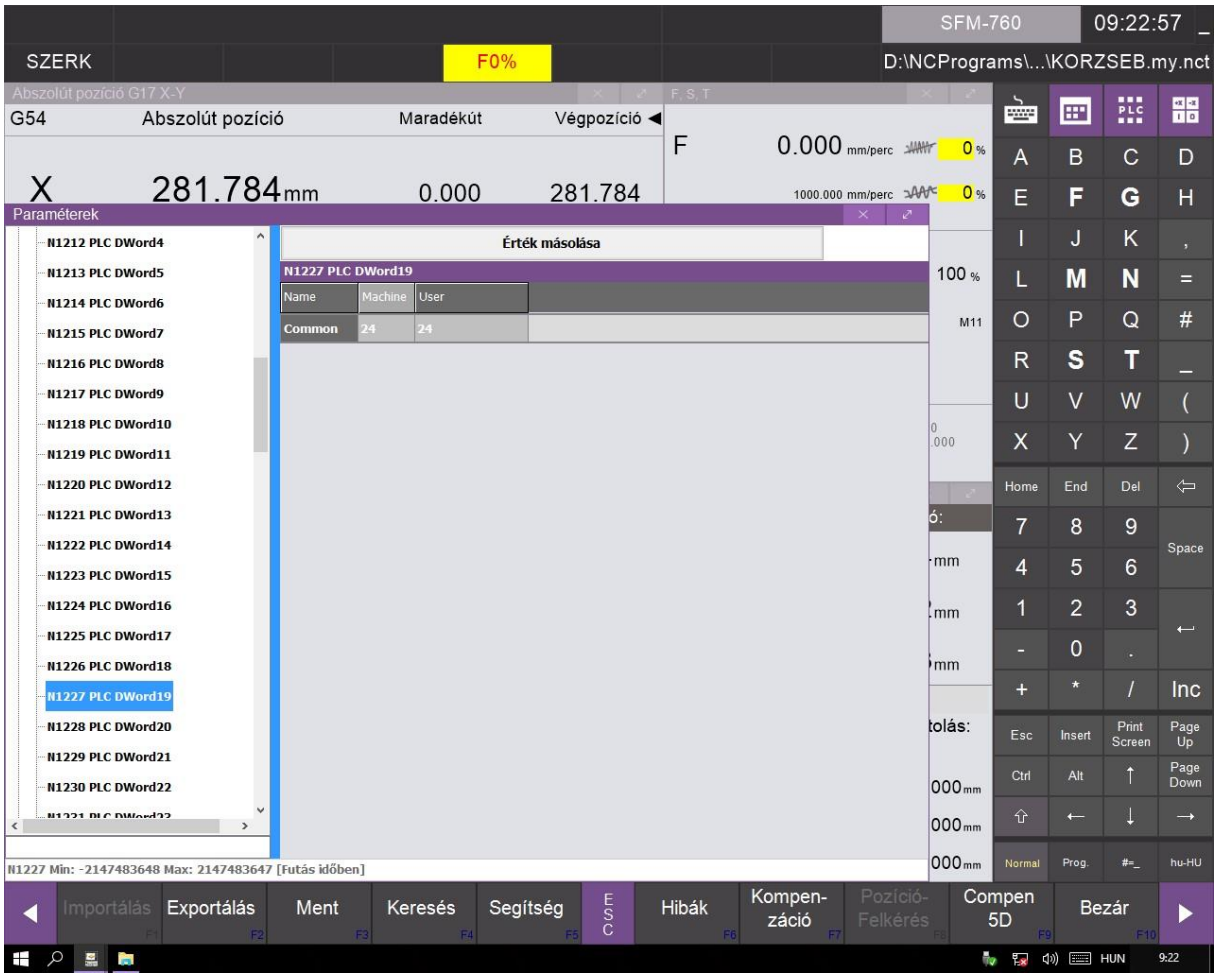

Figure 4 The remarkable tool post is among the parameters

Clean the table and place a calibration ring on it. Place the touch probe in the centre of the ring and switch it on.

From among the icons, click on the selected button shown in *Figure 5*; the calibration window will pop up. Enter the diameter of the ring and the Z-direction touch point (if this is the plane of the table, enter zero). After clicking on the radial calibration, the window shown in *Figure 6* will be seen, with, of course, still empty cells. Press the cycle start button and turn the override to 100%. When the program is executed, it will print the measured values. It can be seen that in this case there is an error of 0.9 µm in the X direction, and 5.3 µm in the Y direction. These errors will be taken into account by the controller during calibration.

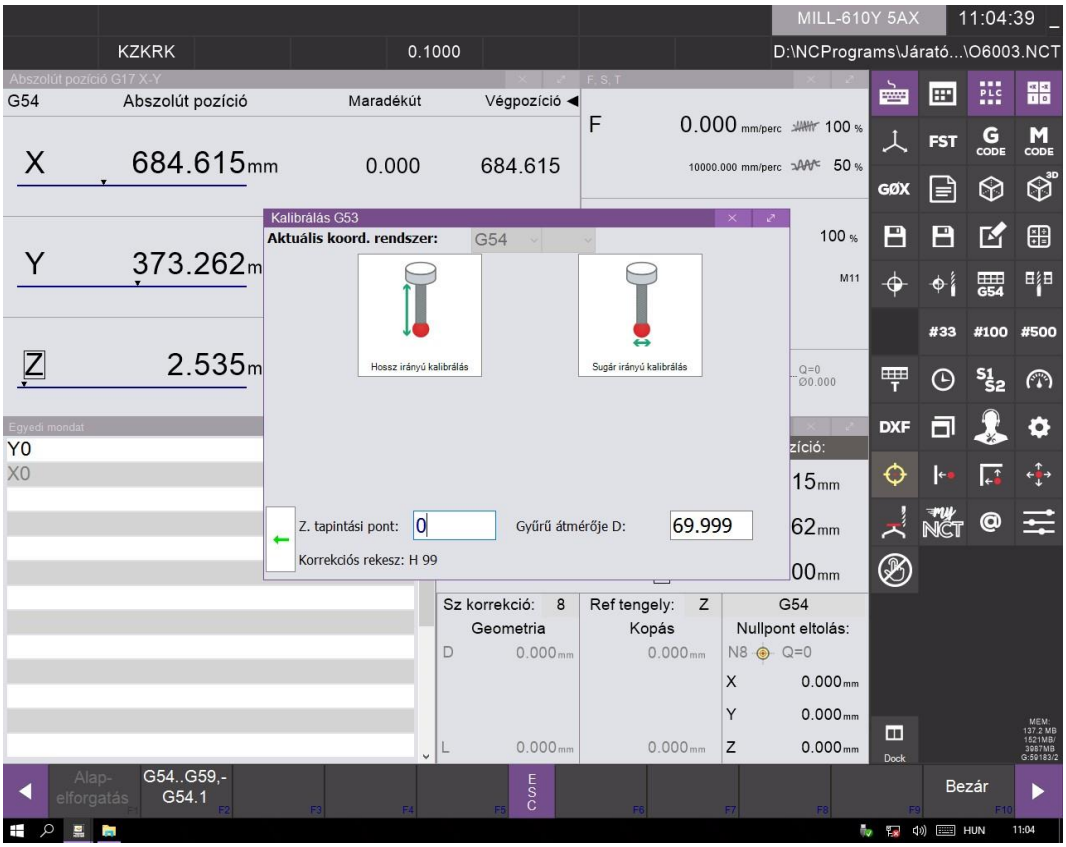

Figure 5 Calibration

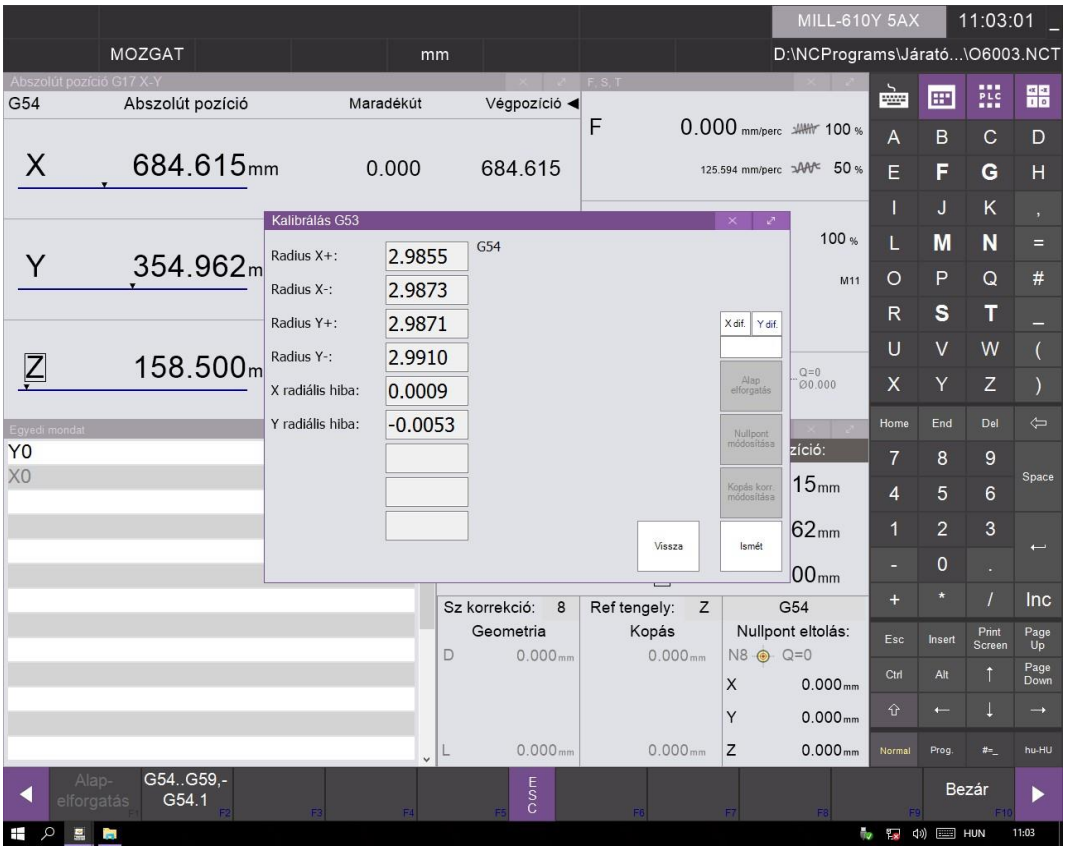

Figure 6 Radial calibration

After the radial calibration, the longitudinal calibration can be performed. Now click on this icon in the window shown in *Figure 5*. Also press a cycle start button, and turn the override to 100%. When the measurement is finished, the measured length and the touch points will be displayed. This can be seen in *Figure 7*.

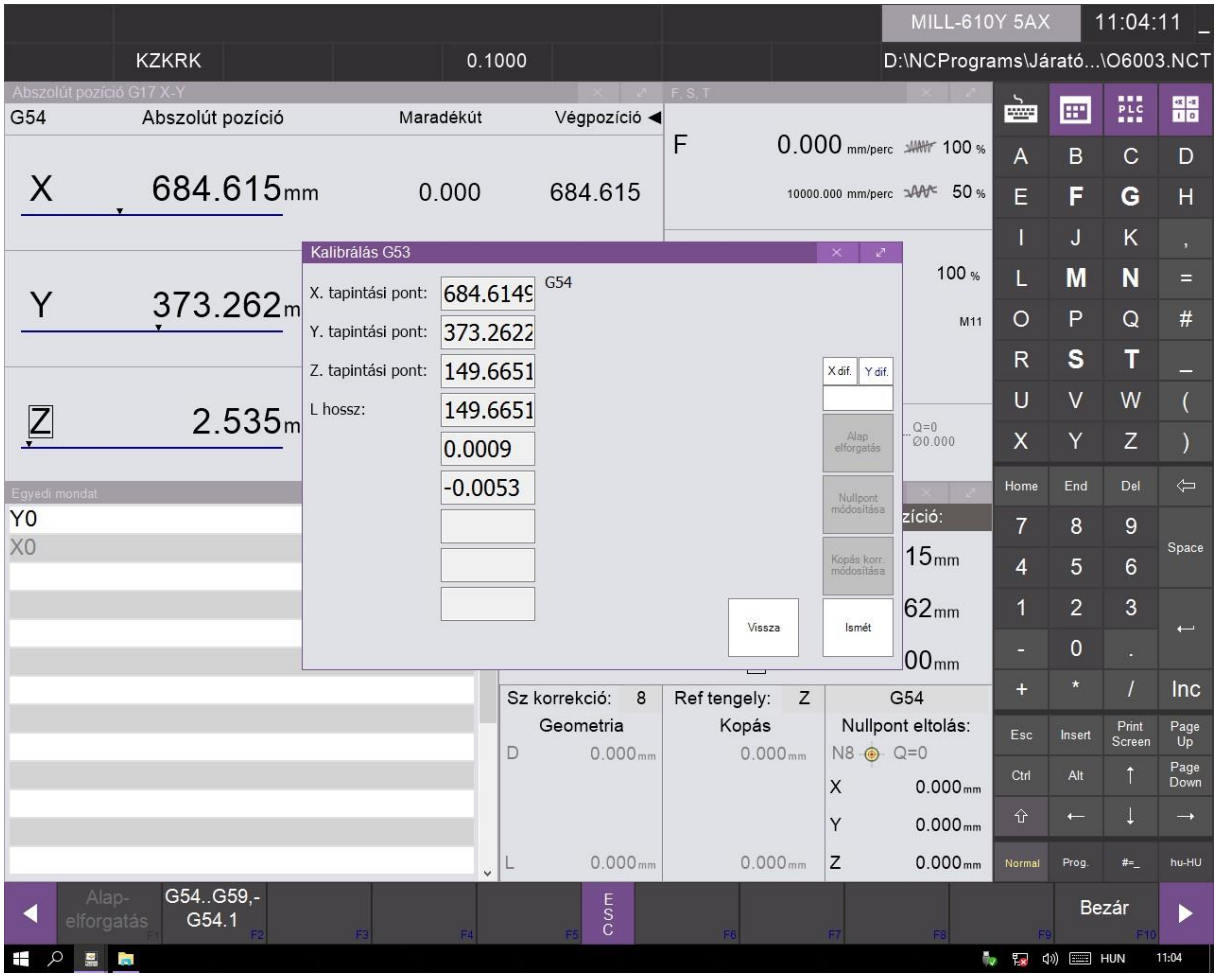

Figure 7 Longitudinal calibration

When completed, by the use of the icons next to the calibration it can be selected whether to measure a surface, a corner or a stud/borehole/pocket. When measuring the latter, it is needed to enter an approximate diameter or the width in the X and Y directions. The lowering can be left blank, in which case it will remain at its default value. Once the measurement is completed, misalignment compensation or zero point modification can be chosen, and even the value of wear compensation can also be modified.

Using the tool setter

Place the base of the tool setter in one corner of the table so that not to run to an end stop when measuring our tools. In its box, the tool setter has a calibrating pin, the exact diameter of which is engraved into its casing. Note this value and place the pin in a tool holder. Then change to any tool position and place the assembled calibration tool in the spindle. Use a raporter to measure the length of the tool. Using the handwheel, move to a position (with micron accuracy!) where no longer can the raporter be slid just under the pin (see *Figure 8*) (never move the tool with the raporter directly underneath it!). Remain in this position and enter the height of your raporter in the Z cell of the Offsets/Measurement/Correction measurement (Eltolások/Bemérés/Korrekció-bemérés) (*Figure 9*).

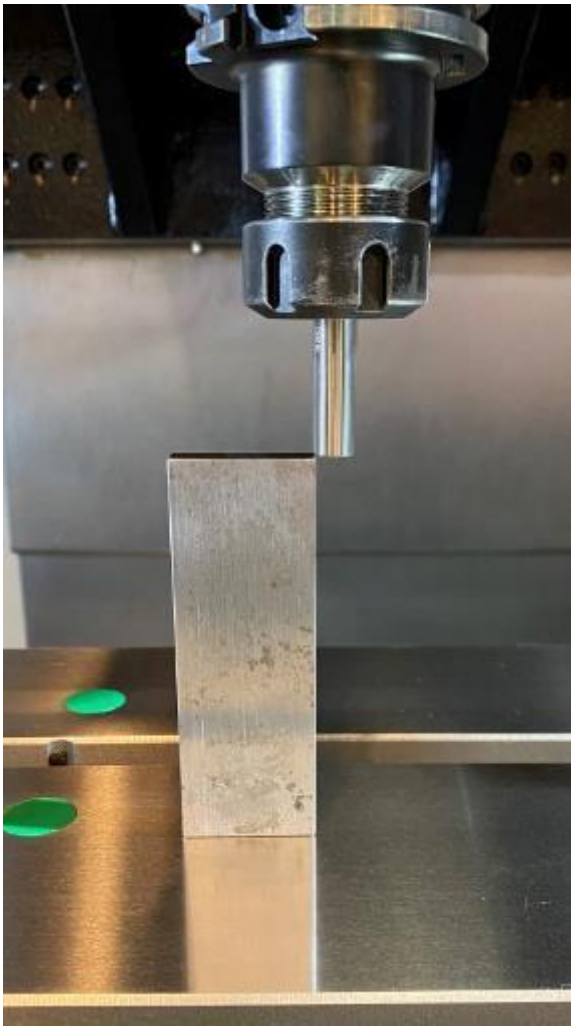

Figure 8 Calibrating the measuring pin

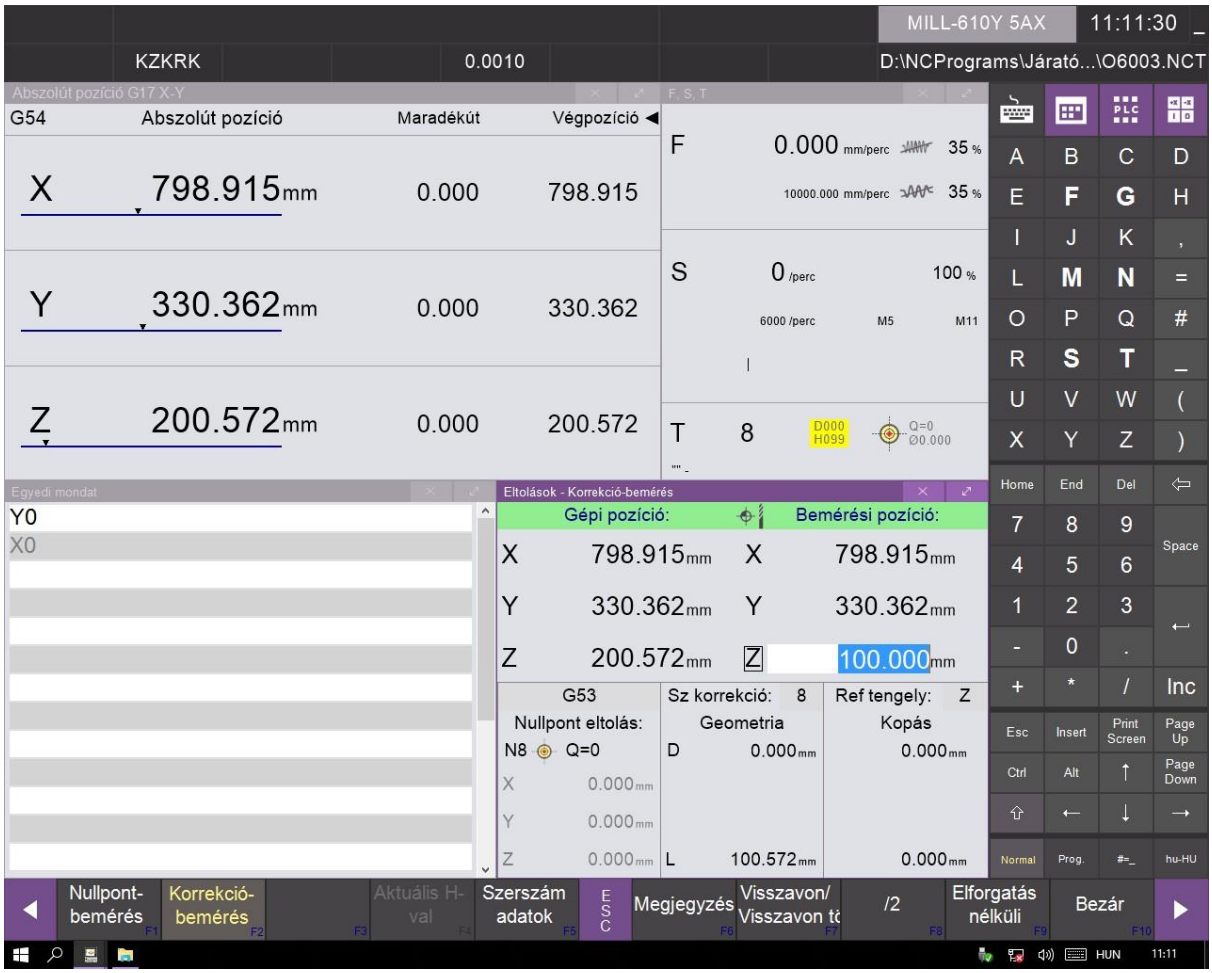

Figure 9 Entering the height of the raporter in the correction field

When completed, place the tool setter on its base and move the calibration tool over the disc. Turn on the device by the use of the button illustrated below:

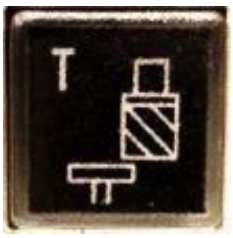

Figure 10 The button for turning on the tool setter

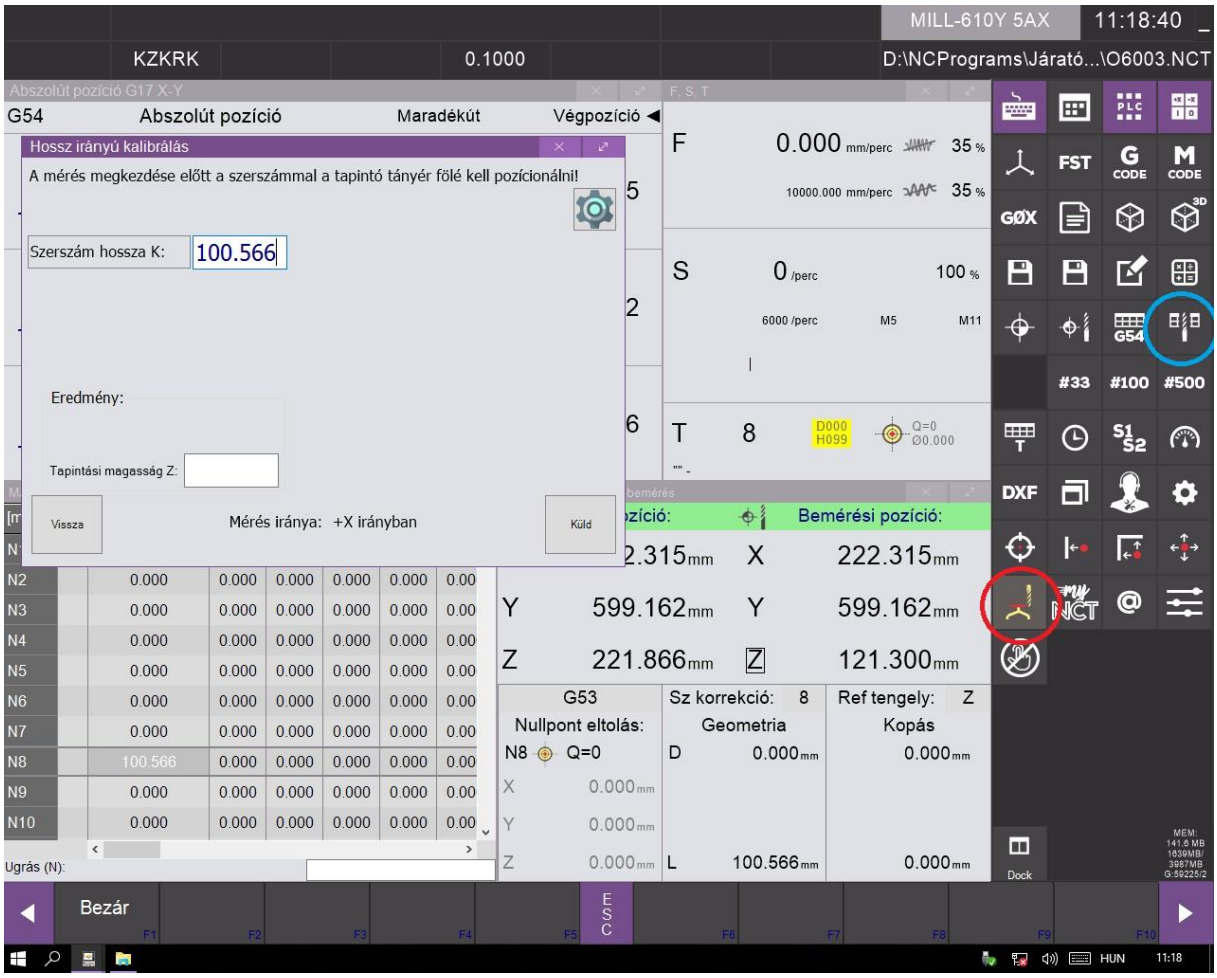

Figure 11 Calibrating the tool setter

After turning on, click on the icon of the tool compensation table marked with blue circle in the *Figure 11* and on the icon of the tool setter marked with red circle. When the latter window has opened, enter the menu items Calibration (Kalibrálás) and Longitudinal calibration (Hosszirányú kalibrálás). Check the number of the tool post where the calibration device is, and then copy the tool length (L geometry) from the compensation table in the calibration window (in this case it is 100.566 mm). After that, in the gear window select the direction of measurement (in most cases direction is unessential) and press the button Send (Küld); press a cycle start and rotate the override. When the measurement is completed, the control will display the height of touching.

After the longitudinal calibration, the radial calibration can be performed. Enter the diameter of the tool (diameter of the calibration pin) and the diameter of the disc (always 37 mm) as indicated in *Figure 12*. After pressing the gear icon, select the measurement direction again and then again *Send-cycle start-override* (*Küld-ciklus start-override).* When the calibration is finished, the program will display the of touch centre points.

Figure 12 Calibrating the centre point

Once the calibration is complete, setting a tool can be carried out. Change in a tool of your choice (for a first try, it can be a simple end mill or even a calibration pin for practice) and position over the dial. In the length measurement menu item (*Figure 13*), enter the desired compensation cell (usually it is equal to the number of the tool changed in) and the approximate diameter of the tool. In the gear menu item, again select the measurement direction, and most importantly, select the direction of rotation. **This rotation must always have such a direction at which the cutting edges of the tool do not separate material from the disc (usually direction M4)!** Once everything has been checked, and then again the usual *Send-cycle start-override (Küld-ciklus start-override).* When the calibration is finished, the tool length will be displayed and this value will be saved in the correction table.

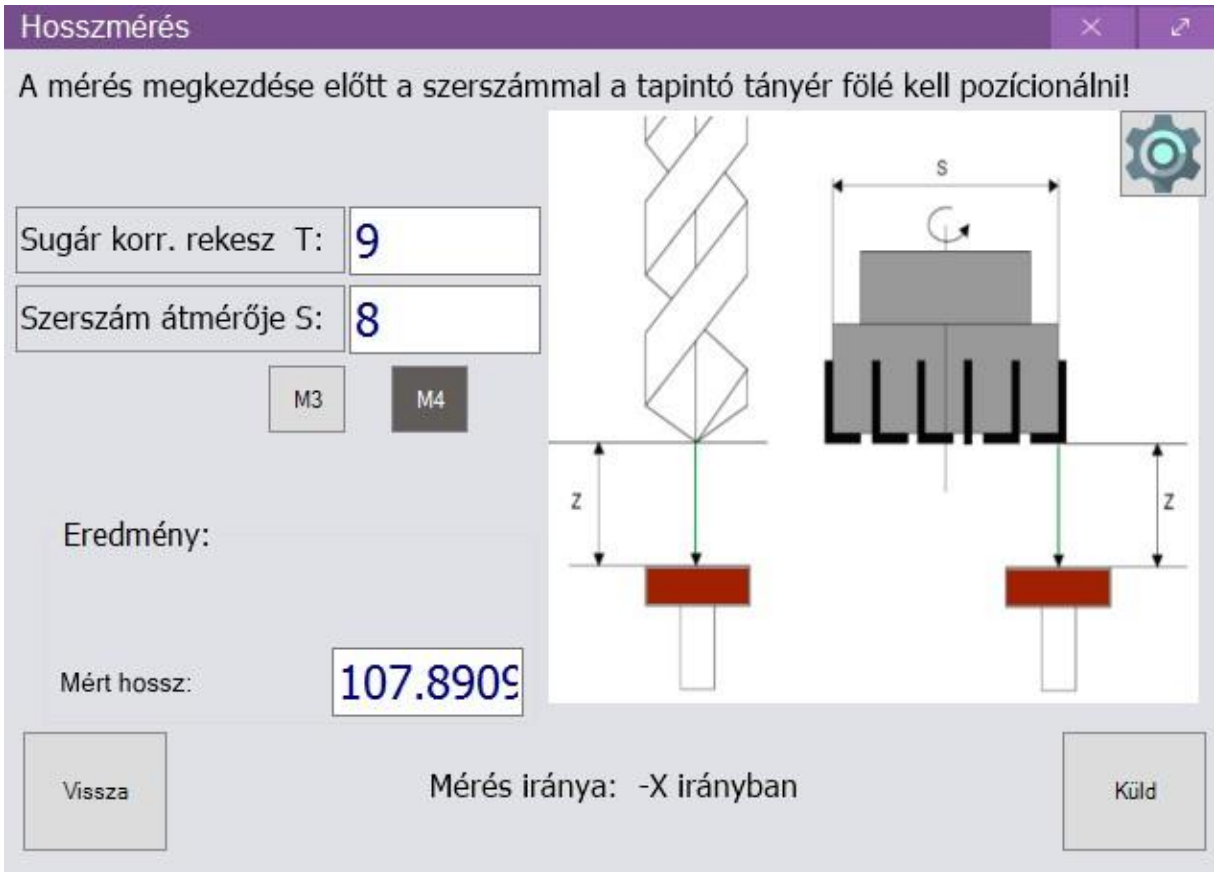

Figure 13 Measuring the tool length

After length measurement, the last operation, namely diameter measurement can be started. To do this, select this menu item and position over the disc again. Enter the compensation cell and the diameter of the tool. Select the direction of measurement and the direction of rotation. After *Send-cycle start-override (Küld-ciklus start-override)*, the measurement starts. When the control is finished, it displays the measured values. It can be seen in *Figure 14* that the length and diameter values have been automatically copied by the control into the desired compensation slot.

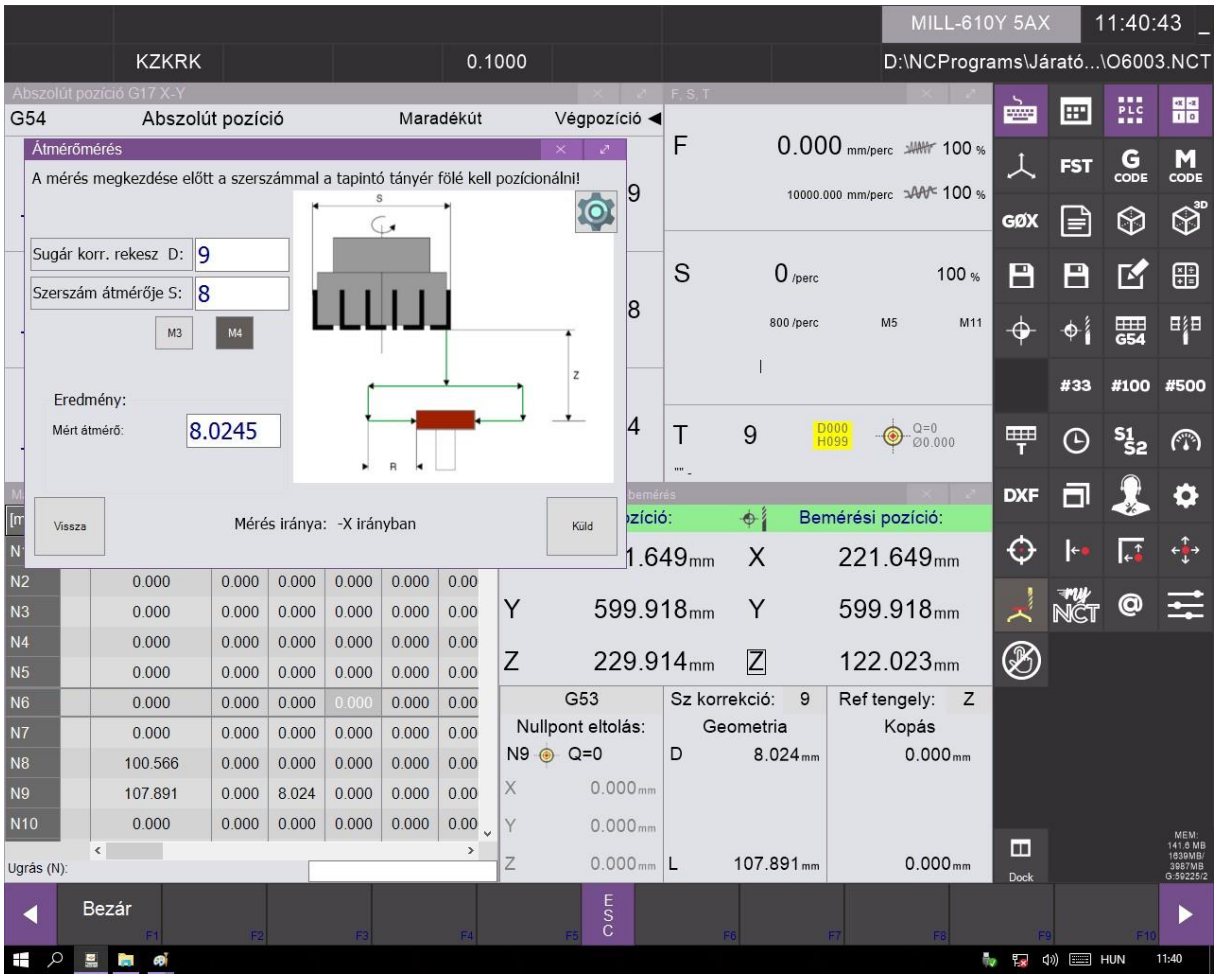

Figure 14 The length measurement and the compensation table