GLIDEWELL DENTAL

Calibration of the TS150e

For Technical Support: 1.866.303.6697 or technicalsupport@glidewelldental.com

1.0 PURPOSE

This document describe the steps necessary to manually calibrate the TS150e.

2.0 DEFINITIONS

2.1 BRadius (R) – Radius between B-axis center of rotation and material

2.2 Center Offset (D) – distance between center of rotation between A-axis and B-axis

2.3 M1_Home_Offset (AHO) – A axis home offset

2.4 M2_Home_Offset (BHO) – B axis home offset

2.5 G54_OffsetX - offset between machine X-axis zero and G54 X-axis zero

2.6 G54_OffsetY - offset between machine Y-axis zero and G54 Y-axis zero

2.7 G54_OffsetZ - offset between machine Z-axis zero and G54 Z-axis zero

2.8 CtsPerDegA – Counts per degree of A-axis

2.9 CtsPerDegB – Counts per degree of B-axis

2.10 OringOffsetX – Machine offset in X-axis

2.11 OringOffsetY – Machine offset in Y-axis

2.12 XAxisScaleCorrection – set to 1

2.13 XAxisCorrectionAng – set to 0

3.0 MATERIAL/EQUIPMENT

3.1 Digital Caliper

3.2 TS150 Calibration Software

3.3 PMMA Calibration Blocks -- IOS P/N 40820-01

3.4 4mm bur

3.5 2mm end mill

3.6 11mm torque wrench set at 3.95 Nm (for tightening collet nut)

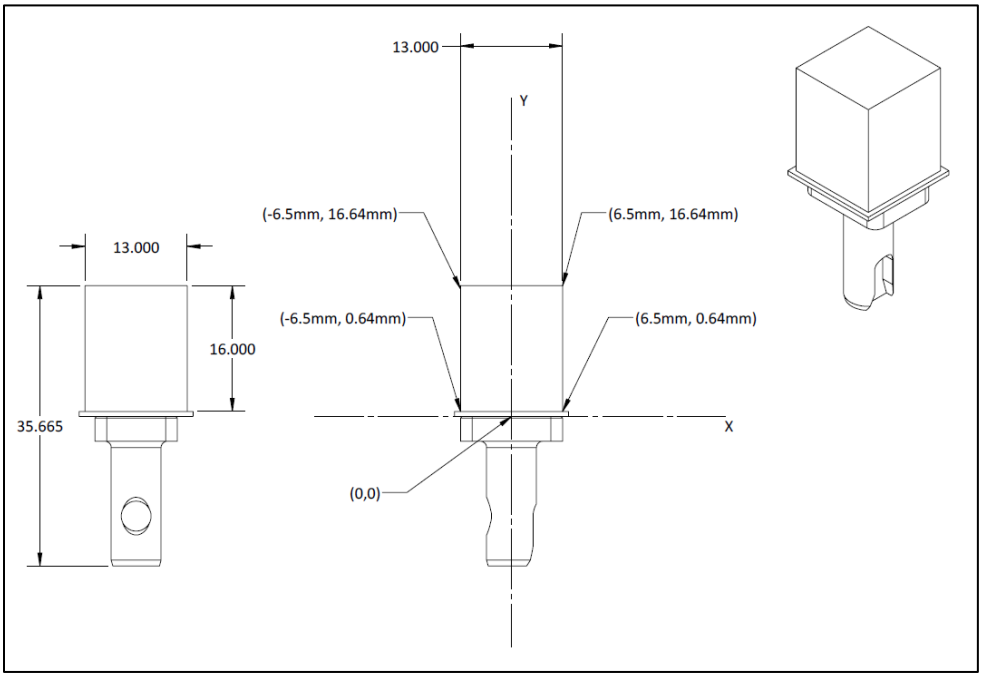
3.7 2.5mm hex driver

3.8 Distilled water

3.9 Micrometer

4.0 PROCEDURE

Overview: Calibration is achieved by adjusting the calibration parameters of the mill. An initial calibration cube is milled to check the status of the machine. When the mill is not calibrated, the cube will appear distorted and may have a step or twist. When the mill is calibrated, the cube has no distortions and will have the dimensions shown below. During the calibration process, measurements of the cube are entered into the calibration software to create new calibration parameters. Iterating this process 3-6 times will calibrate a machine.



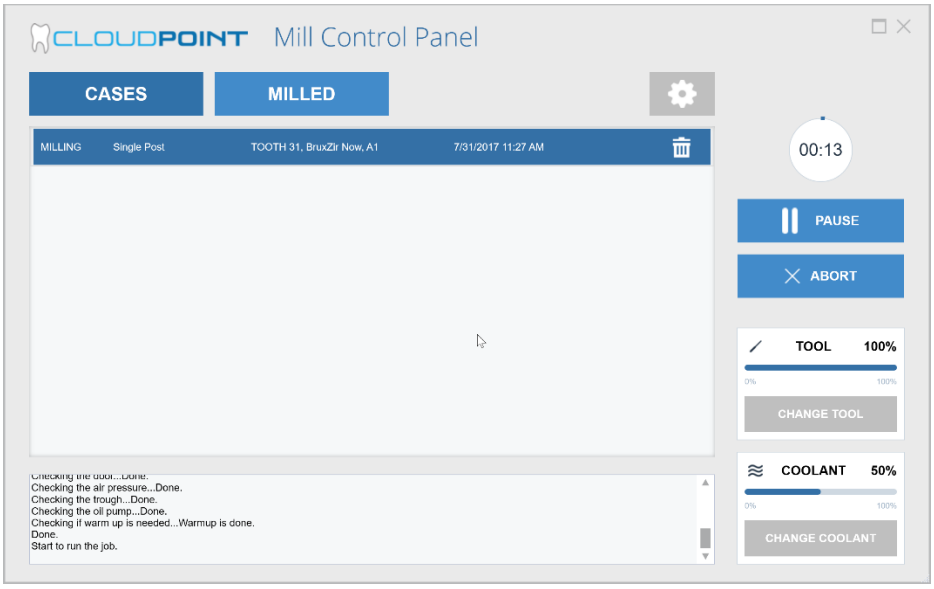
4.1 Prepare the Reservoir

4.1.1 Remove the coolant and fill the reservoir with plain, distilled water.

4.1.2 Remove the top filter from the trough to prevent clogging.

4.2 Homing and Initializing

Once the mill and computer are on, the Mill Control Panel should automatically open and start homing the mill. Make sure that the mill is connected to the computer before logging in or the Control Panel will open and fail to home because it does not sense the mill. Otherwise, you will need to wait 60 seconds for it to try again.



4.3 Changing the Control Panel from “User” mode to “Technician” mode

4.3.1 Close the Mill Control Panel

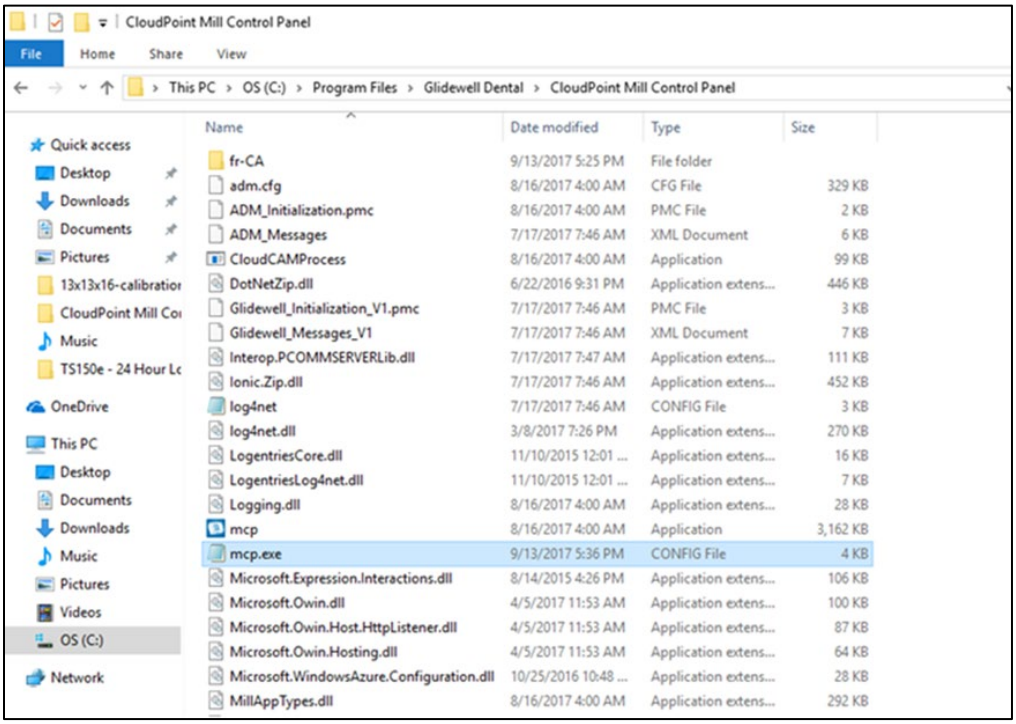
4.3.1.1 On the Mill Control Panel screen click the “X” in the top right corner to close the screen.

4.3.1.2 Right click on the MCP icon on the system tray (bottom right corner of the display screen).

4.3.1.3 Click “Close CloudPoint Mill Control Panel” to shut down the MCP service.

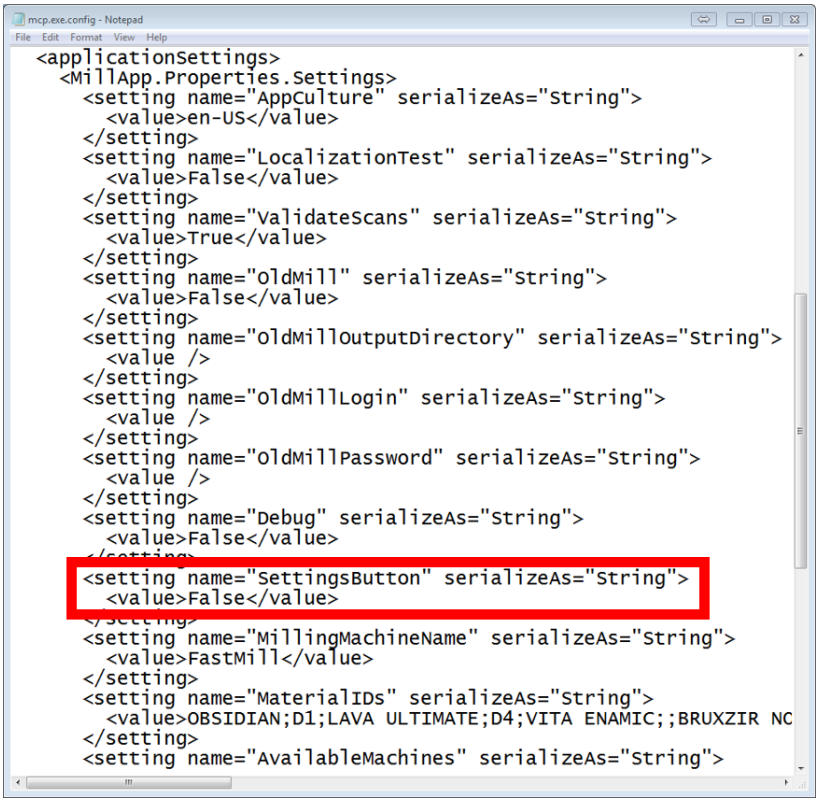
4.3.2 Open “File Explorer” and navigate to C:/Program Files/Glidewell Dental/CloudPoint Mill Control Panel.

4.3.3 Scroll down to the mcp.exe file (file type is config file) and right click on it.



4.3.4 In the drop-down menu select the edit, or edit with notepad, option.

4.3.5 Once in Notepad, look for the settings name “SettingsButton”.



4.3.6 Change state from False to True. The state is case sensitive so make sure to type it as it is shown.

4.3.7 Once you have changed the state, save and close the file.

NOTE: If you are not able to save because of Administrator privileges, save the file to the desktop and then move it back to the Mill Control Panel folder and replace the old one.

4.4 Open the Mill Control Panel

4.4.1 Go to the task bar search engine and type mill. The Mill Control Panel should be the first thing that comes up.

4.4.2 Click on it or just hit enter and the application will open.

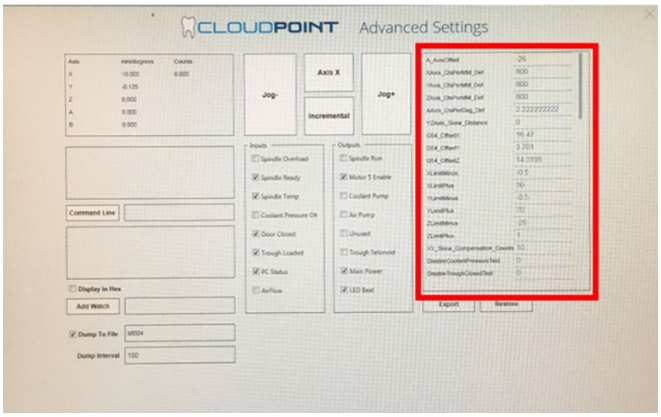
5.5 Checking the Mill Parameters

5.5.1 Click on the Settings button.

5.5.2 Enter the password “1234” and the settings page will open.

5.5.3 Check the settings against the file sent from Glidewell per the serial number of the mill.

5.5.4 Review the parameters to confirm they match.



5.5.5 If they do not match, then you must manually update the parameters to match the file from Glidewell.

5.5.5.1 When entering the data you will need to enter a password “IOSTECH”. The password is case sensitive.

5.5.5.2 When you have completed entering the data, click “apply”.

5.5.5.3 Close the settings page by clicking on the “X” at the top right corner of the settings page and you will return to the main screen of the Mill Control Panel.

5.6 Installing the Cutting Tool

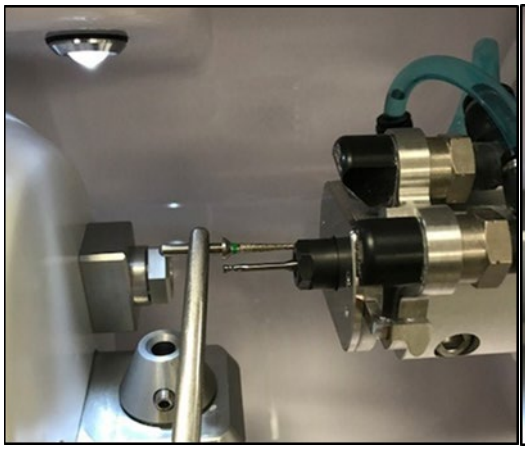
5.6.1 Loosen the collet nut.

5.6.1.1 Push the spindle lock button in and rotate the spindle until the lock engages.

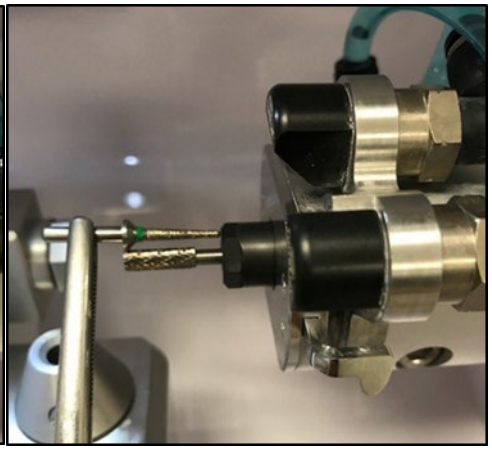
5.6.1.2 Keep the spindle lock button pushed in and use the torque wrench provided with the mill to loosen the collet nut.

5.6.2 Place the cutting tool into the collet as shown in the picture below.

5.6.3 Make sure to match its length against a BruxZir or Obsidian grinding bur as shown below.



2mm end mill



4mm bur

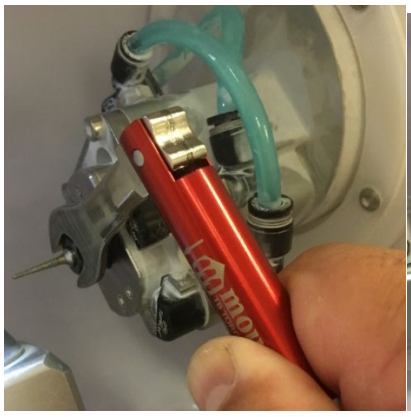
- The 2mm end mill is used with the Z axis program.
- The 4mm bur is used with the XY axis program.

If the tool is not inserted to the correct length, it will cause a tool length error and the program will not run.

5.6.4 To tighten the collet nut:

5.6.4.1 Push the button of the spindle lock in and rotate the spindle until the spindle lock engages the spindle.

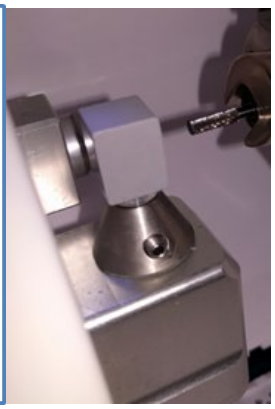
5.6.4.2 Keep the spindle lock button pushed in and use the torque wrench provided with the mill to tighten the nut until the wrench handle snaps down. At this point the nut is torqued correctly. Be sure the spindle lock is released and the spindle can rotate freely.



5.7 Loading the Material

5.7.1 Before placing the material in the material holder, check the mandrel to make sure the slot is facing away from you and the dimple is facing towards you. The block will only go in one way.

5.7.2 Load a material into the material holder making sure the mandrel is sitting flush with the material holder.

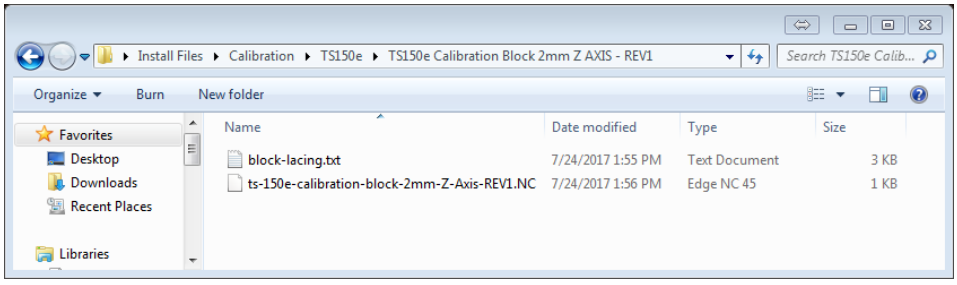


5.7.3 Standing directly in front of the block, check visually that the block is square with the base of the mandrel. If the block is twisted left or right, replace it with a block that is glued correctly to the mandrel.

5.7.4 Tighten the setscrew using the hex driver provided with the mill. Making sure the setscrew is firmly tightened.

5.8 Running the Calibration Block Program

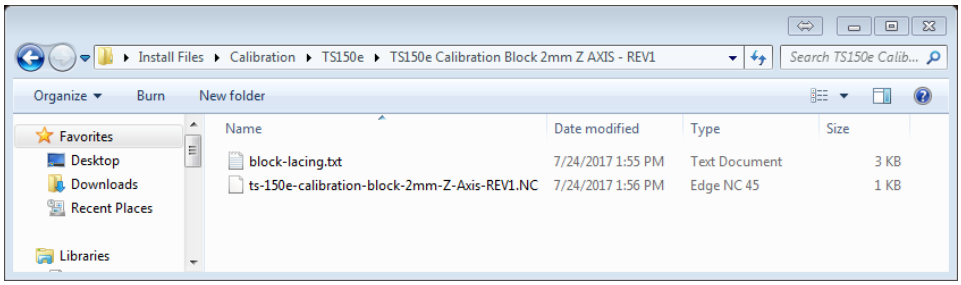
5.8.1 Click on the “Load button” to search for the NC folder, the search window will always open in the last folder that was searched.



5.8.2 Choose the TS-150e NC program and click open. (#1 then #2).

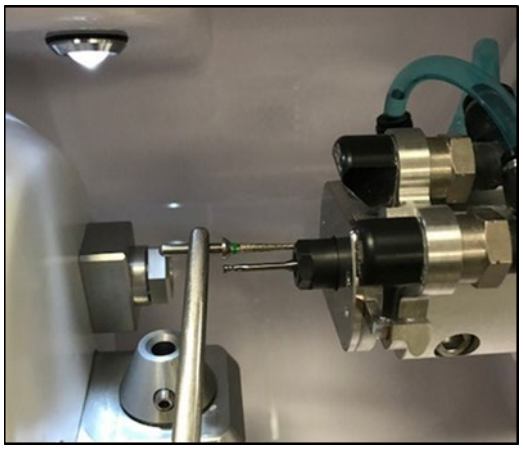
1. ts-150e-calibration-block-2mm-Z-Axis– REV1.NC
2. ts-150e-calibration-block-4mm-XY-Axis.NC

Ensure the correct file is chosen and that you are using the proper cutting tool with the program.



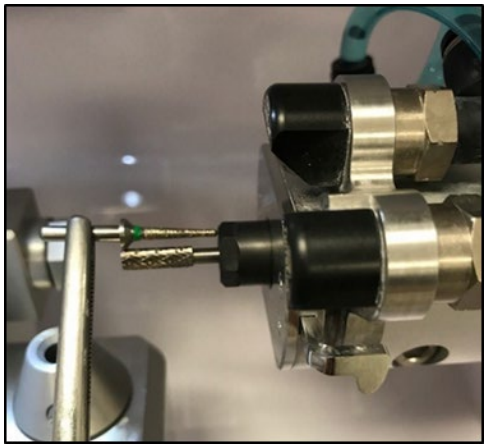
5.8.3 Load the PMMA calibration block per section 5.7.

5.8.4 Load the 2mm endmill per section 5.6.Making sure the length of the tool out of the collet is approximately the length of the diamond bur.



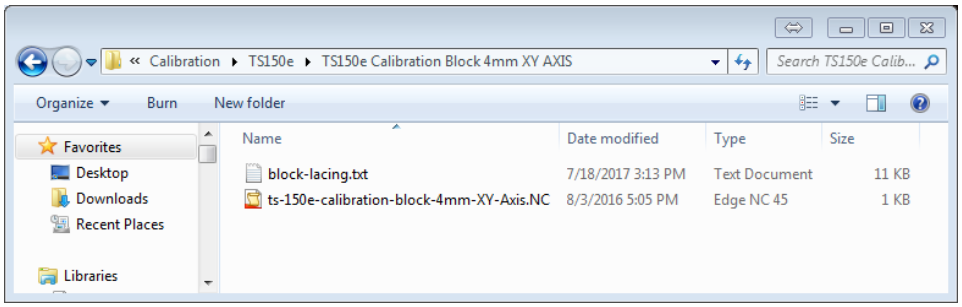
5.8.5 The program will now run.

5.8.6 Once the first program completes, remove the PMMA calibration block and change the cutting tool to the 4mm bur per section 5.6. Making sure the length of the tool out of the collet is approximately the length of the diamond bur.



5.8.7 Choose TS150e calibration block 4mm.NC for the TS150e and click “open”.

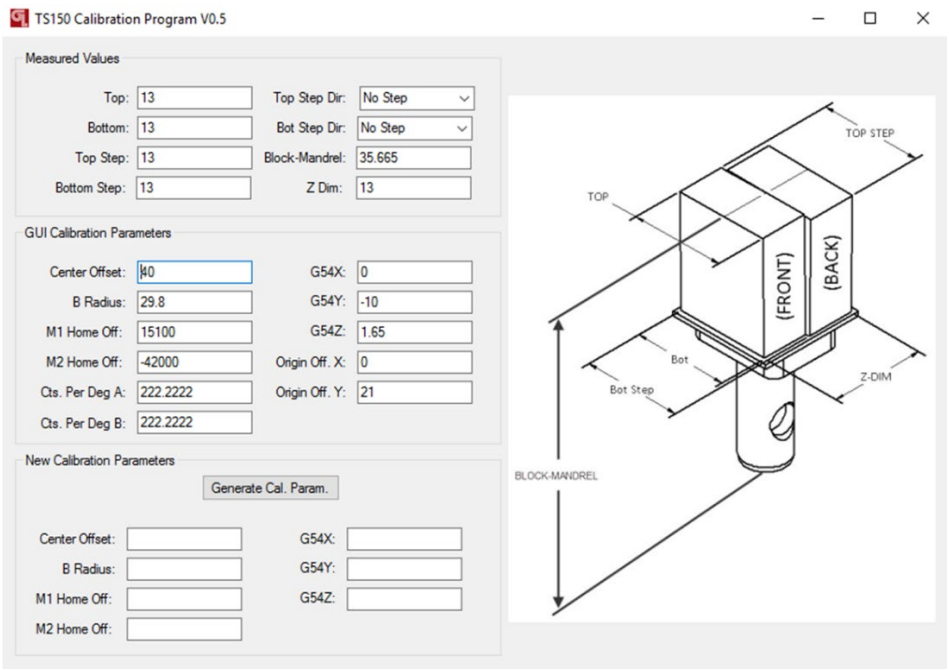
Take care to ensure the correct file is chosen for the mill type and that you are using the correct cutting tool with the correct program.



5.8.8 The program will now run.

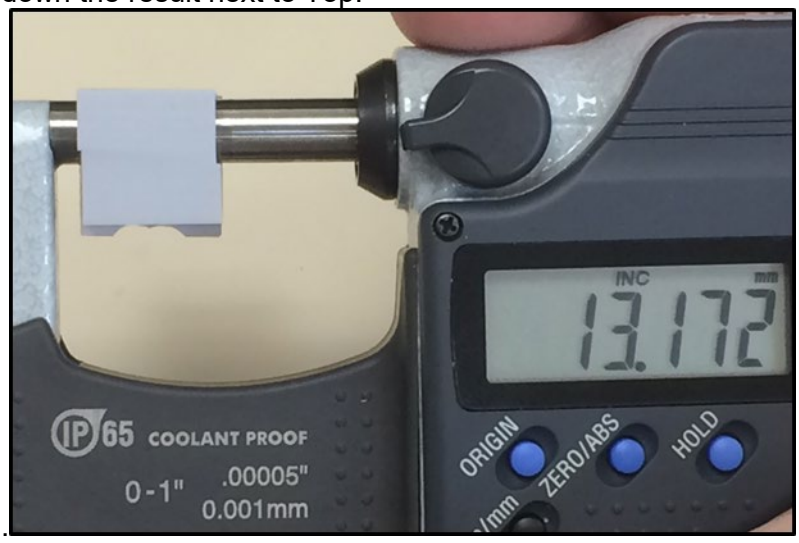
5.8.9 When the program is complete remove the block and dry it.

5.8.10 When milling is complete, open the TS150 calibration program.

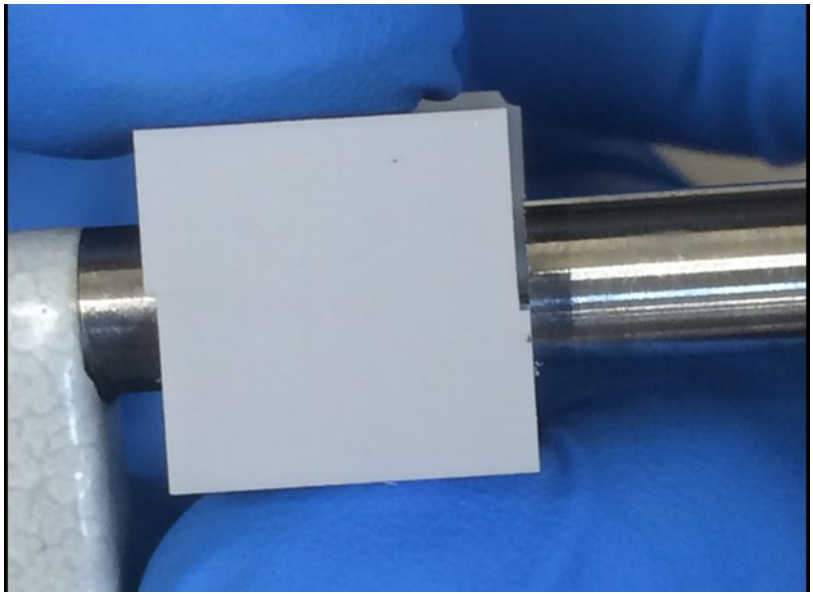


5.8.11 Using a digital caliper measure the Block-Mandrel dimension and using a micrometer measure the rest of the dimensions on the finished block.

5.8.12 Measure the “Top” of the block (without measuring the step) and write down the result next to Top.



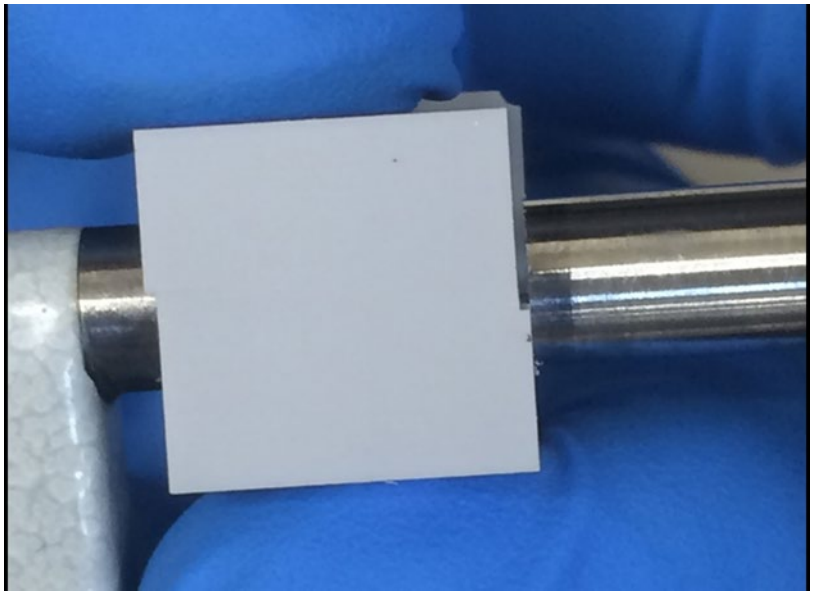
5.8.13 Measure the “Top step” of the block and write down the result next to Top step.



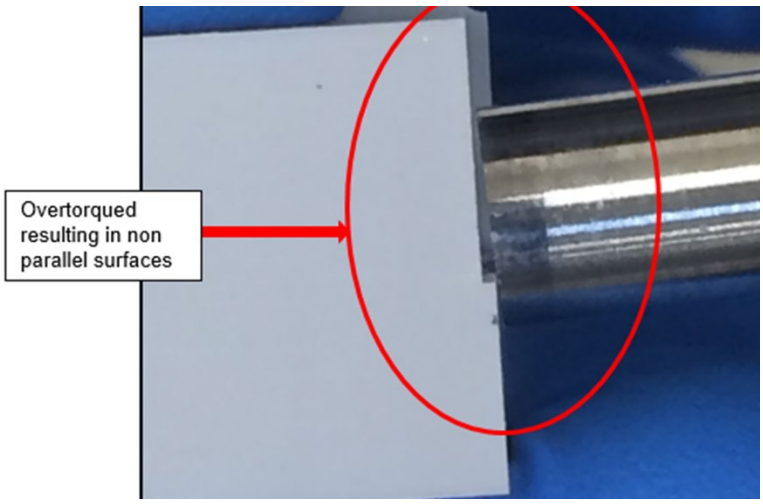
NOTE: When measuring both sides, do not over torque the micrometer. The ends of the micrometer should stay as parallel as possible to the block surfaces. The block should not move. Any force felt on the block indicates that the micrometer was over torqued. When you over torque while measuring a measurement error may occur.

5.8.14 Measure the “Bottom” of the block (without measuring the step) and write down the result next to Bottom.

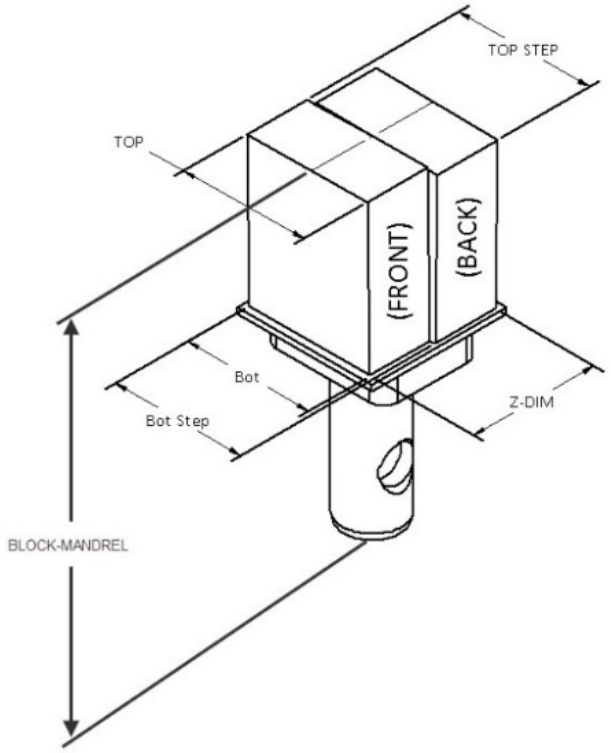
5.8.15 Measure the “Bottom step” of the block and write down the result next to Bottom step.



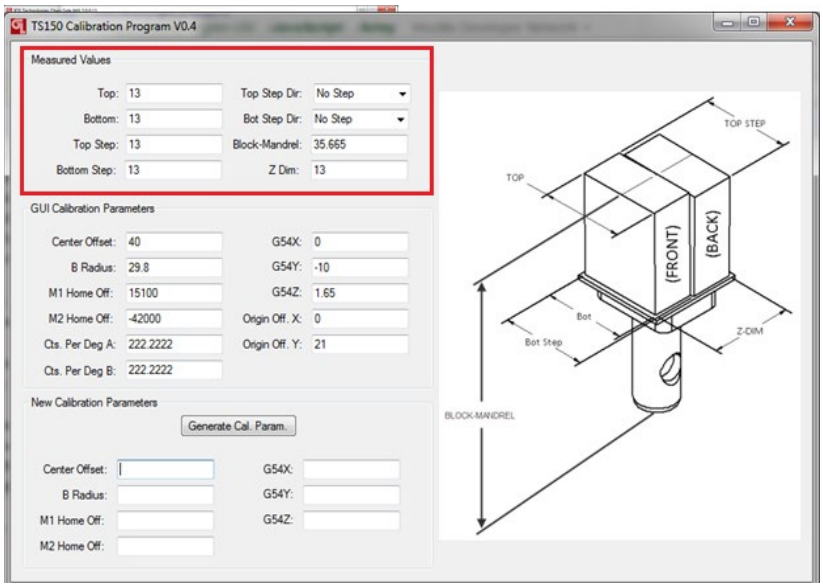
NOTE: When measuring both sides, do not over torque the micrometer. The ends of the micrometer should stay as parallel as possible to the block surfaces. The block should not move. Any force felt on the block indicates that the micrometer was over torqued. When you over torque while measuring a measurement error may occur.

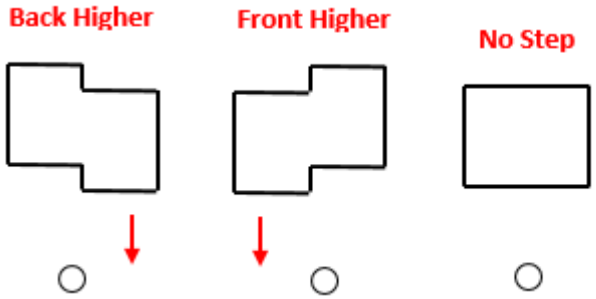


Measurements	(mm)
Top	
Bottom	
Top Step	
Bottom Step	
Z-Dimension	
Block-Mandrel Dimension	



5.8.16 Enter the new measurements into the calibration program.

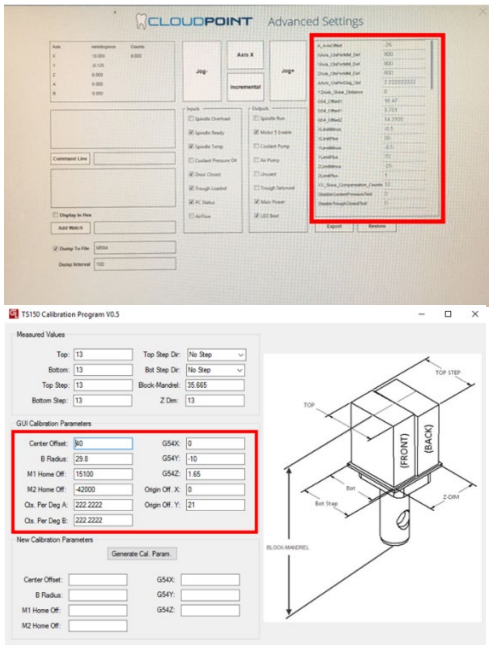




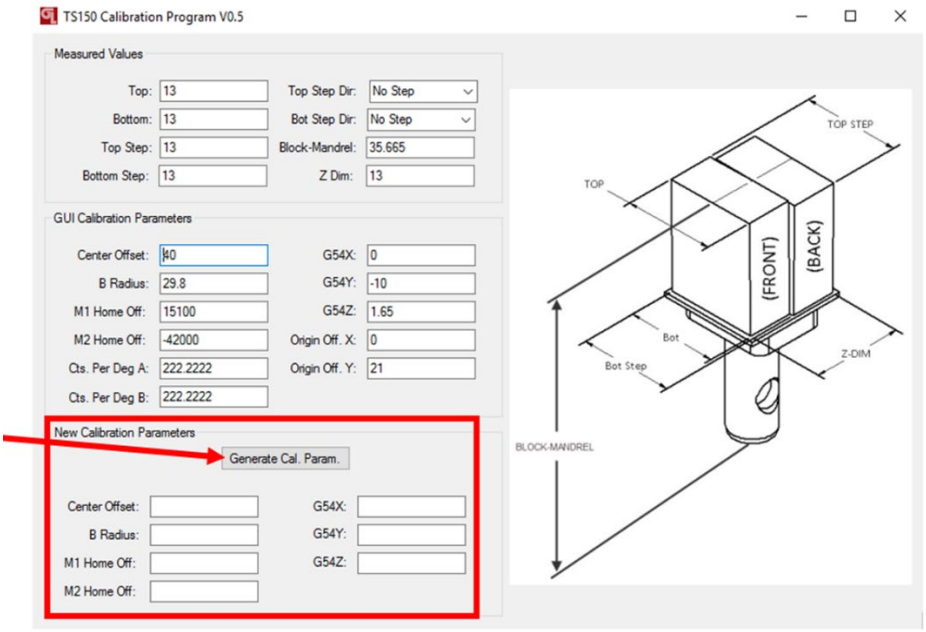
The circle indicates the dimple is facing the operator.

5.8.17 For Top Step Direction, when facing the set screw hole, enter whether the front or back face protrudes higher at the top side of the block; towards you is higher. For Bottom Step Direction enter whether the front or back face protrudes higher for the bottom side of the block. Example: image above shows the top step direction is back higher, and the bottom step direction is also back higher.

Enter the mill settings used for milling the calibration block from the Advanced Settings page in MCP to the matching fields under the GUI parameters section.



5.9 Click **Generate Calibration Parameters.**



5.9.1 Go back to the Advanced Settings page to view the previous calibration parameters. Enter the new calibration parameters into the mill settings. When entering the data you will need to enter a password “IOSTECH”. The password is case sensitive.

5.9.2 Click **the “Apply” button**, then click **yes**. This will make the changes effective. The mill will reset with the new values.

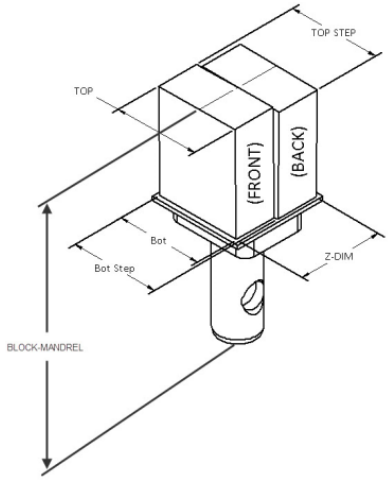
5.9.3 Run a new calibration block on the machine with the new parameters. With each iteration, the mill will get closer to being calibrated. It may take 3 to 6 blocks to fully calibrate a machine.

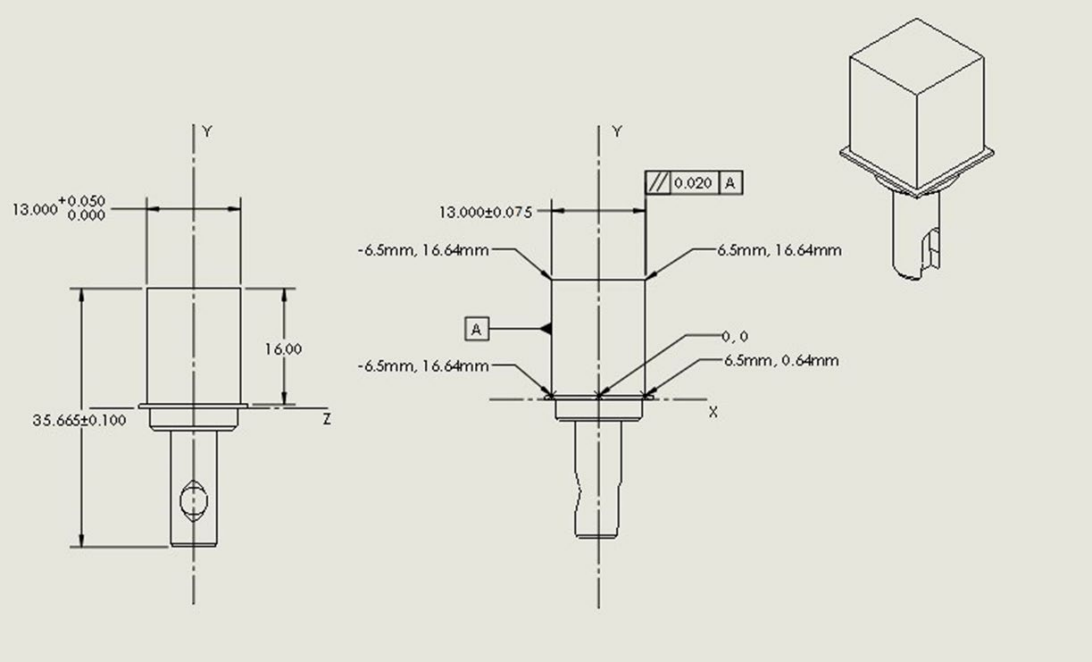
5.9.4 When the step has been eliminated and the top and bottom measurements are in spec, input 13.00 for top, top step, bottom and bottom step and continue calibration.

5.9.5 Repeat the process until a block with no distortions and all the correct dimensions (see below) is produced. The mill is calibrated. Please note that we should get as close to nominal measurements as possible since over time the machine may lose calibration. This calibration process can get within 20 microns of the nominal measurements but the machine is considered calibrated if the machine is within the tolerances in the figure

below. Note there is a parallelism tolerance of 20 microns between surfaces along the x axis. The parallelism tolerance is the difference in measurement in the x dimension between top and bottom of the block.

Measurements	(mm)
Top	13±0.075
Bottom	13±0.075
Top Step	13±0.075
Bottom Step	13±0.075
Z-Dimension	13-13.05
Block-Mandrel Dimension	35.665±0.10
X-Dimension Planar Tolerance	0.020





5.10 CHANGING THE CONTROL PANEL FROM "TECHNICIAN" MODE TO "USER" MODE WHEN THE CALIBRATION CHECK IS COMPLETE.

5.10.1 Close the Mill Control Panel

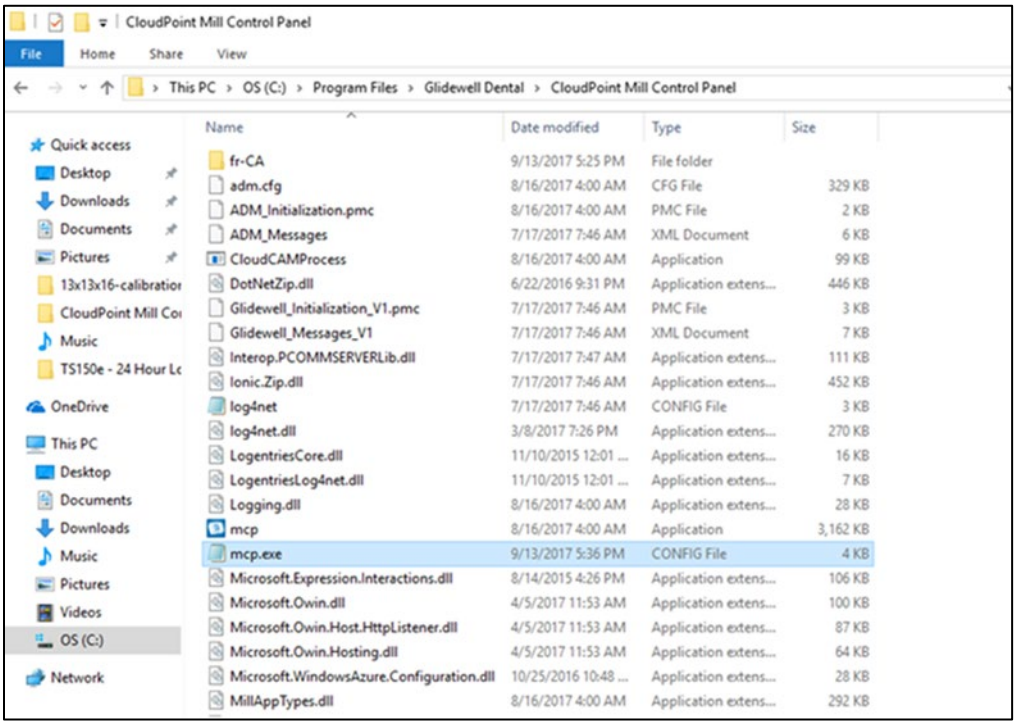
5.10.2 On the Mill Control Panel screen click on the "X" in the top right corner to close the screen

5.10.3 Then go to the system tray (bottom right corner of the display screen) and right click on the MCP icon.

5.10.4 Click "Close CloudPoint Mill Control Panel" to shut down the MCP service.

5.10.5 Go into "File Explorer" and navigate to C:/Program Files/Glidewell Dental/CloudPoint Mill Control Panel.

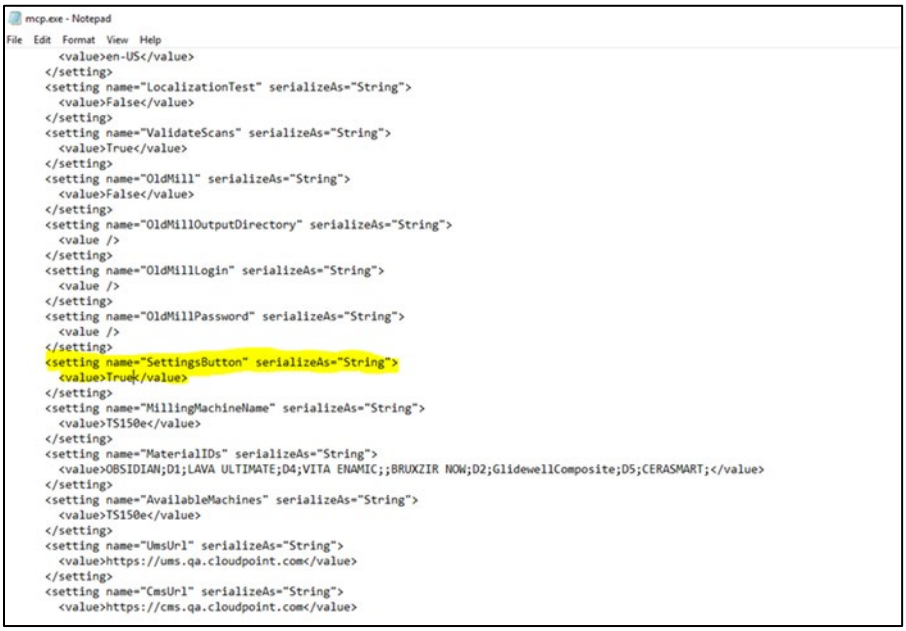
5.10.6 Scroll down to the mcp.exe file (file type is config file and right click on it.



5.10.7 Select the edit or edit with notepad option and file will open

5.10.8 Once in Notepad, look for the settings name “SettingsButton”

5.10.9 Change state from True to False. The state is case sensitive so make sure to type it as it is shown.



5.10.10 Once you have changed the state, save and close the file.

NOTE: If you are not able to save because of Administrator privileges, save the file to the desktop and then move it back to the Mill Control Panel folder and replace the old one.

5.11 Clean Mill & Trough

5.11.1 Mill

5.11.1.1 Wipe down the outside using a clean rag/towel.

5.11.1.2 With clean water (distilled preferable), a tooth brush and clean towel; brush and wipe all surfaces to prevent buildup of debris.

5.11.2 Trough

5.11.2.1 Remove the trough using the round button on the bottom right side of the mill.

5.11.2.2 Clean trough with water and remove any debris.

5.11.2.3 Clean outer and inner filters with hot water and remove any debris or buildup.

For Technical Support: 1.866.303.6697 or technicalsupport@glidewelldental.com

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