

Tormach® Tool Assistant

Operator Manual



Questions or comments?
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UM10290_Tormach_Tool_Assistant_0814C

Contents

| | |
|--|----|
| 1. Introduction | 1 |
| 2. Products | 2 |
| 3. Running the Program | 2 |
| 4. Opening Files..... | 3 |
| 5. Saving Files | 5 |
| 6. Entering Data in the Tool Table | 6 |
| 7. Working with the Data File | 7 |
| 8. Measuring Tool Height..... | 9 |
| 9. Entering Data Manually | 9 |
| Zeroing the Digital Height Gauge | 9 |
| 10. Entering Data by Using the USB Interface | 10 |
| Zeroing the USB Interface | 10 |
| Appendix 1 | 13 |

1. Introduction

Tool Assistant is a free software program that provides easy editing of CNC tool offset tables from Mach3 CNC controllers. It includes a quick tool editing function that allows the user to enter complete tool descriptions using a few mouse clicks. Tool tables can be saved as native Mach3 files, or as Excel type CSV files which are used by many CAM programs.

When combined with the Tormach Digital Height Gauge and USB interface, Tool Assistant will allow instant tool offset measurements simply through a click of a button. Conventional electronic tool setters used in modern machine shops typically cost \$15,000 or more. Now you can have the same functionality with TTS tooling for a fraction of that cost.

2. Products

This manual covers use of the following products included in the Tormach Tool Assistant kit:

- Tool Assistant Software CD (PN 32083)
- 8" Digital Height Gauge (PN 31761)
- USB Interface for Digital Height Gauge (PN 31865)

3. Running the Program

When you open the Tool Assistant software for the first time you see the Terms of Use screen shown in Figure 1. Before you can use the software you must agree that the Tool Assistant software will only be used with genuine Tormach Tooling System (TTS) tooling.

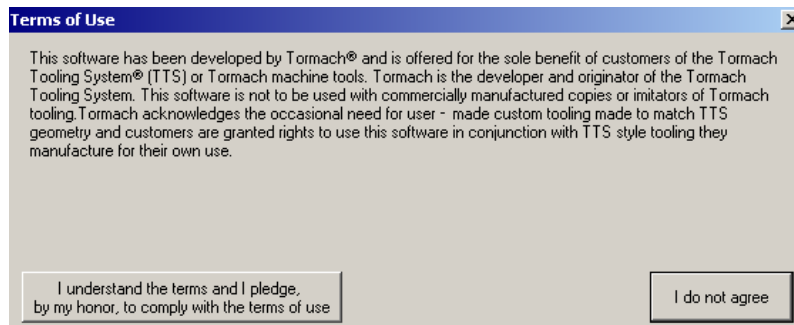


Figure 1. Terms of Use Screen

After click on the button to indicate compliance with the Terms of Use the main Tool Assistant window opens as shown in Figure 2.

Opening Files

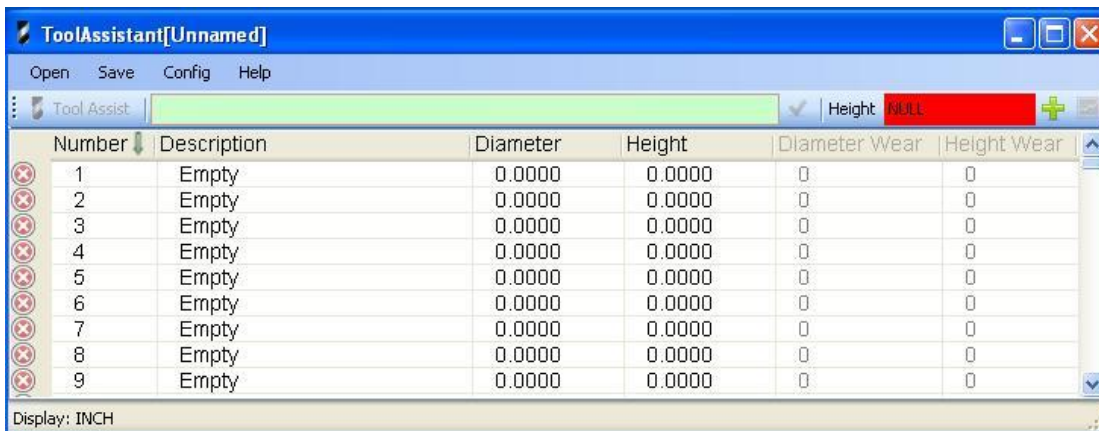


Figure 2. Main Tool Assistant Window

4. Opening Files

Begin by clicking on the “Open” menu. You are three options as shown in Figure 3. You can create a New tool file by clicking “New.” To open an existing tool file click “Open Existing File” and browse to find the file you want to open. You can also open a Machine Tool File. The location of the “Machine Tool File” must be set in using the “Config” menu prior to using the “Open Machine Tool File” menu item.

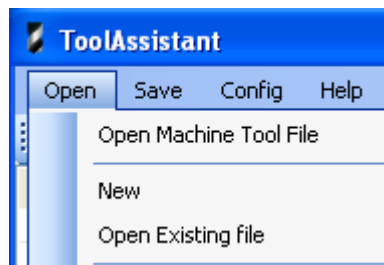


Figure 3. Open Menu Choices.

To configure the software to use a Machine Tool File click on the “Config” menu. The Config screen shown in Figure 4 appears.

Opening Files

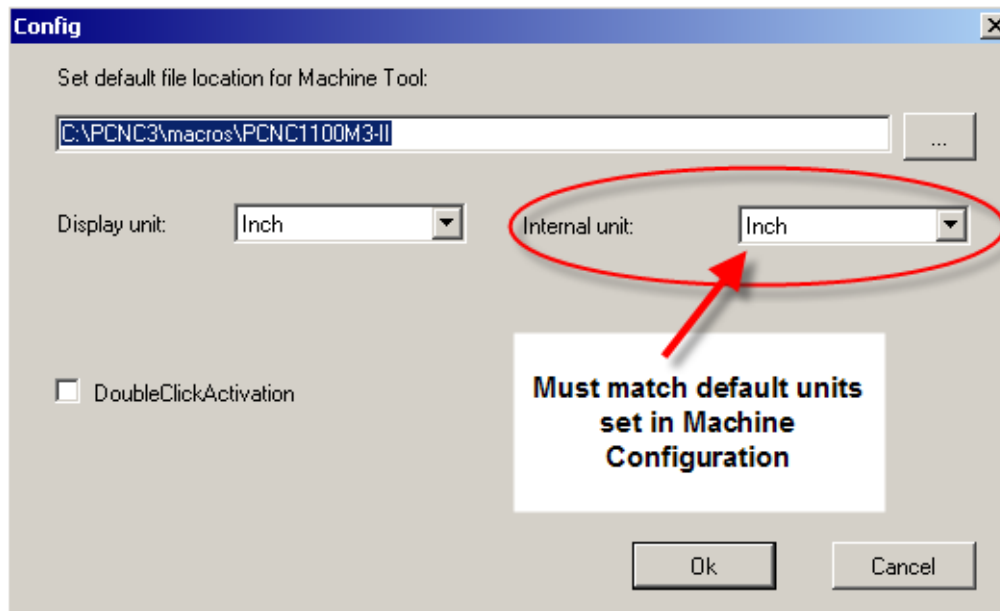


Figure 4. Config Menu

Use the button on the top right of the Config menu to browse for and select the default file location for your Machine Tool Table file. For Tormach machines the Machine Tool Table file will typically be located in C:\PCNC3\macros with the folder name identical to the machine configuration file name. For example, if your machine configuration file is: PCNC1100M3-II.xml your Tool Table file will be located in: C:\PCNC3\macros\PCNC1100M3-II. After the file has been selected you must ensure that the internal units, shown in the red circle, match the native units set in your machine configuration file. This will always be “Inches” for Tormach machines. This setting is not affected by G20/G21 commands.

Display units can be set to “Inch” or “mm” and changed at any time. The numbers in the tool table display will be converted as needed. Finally uncheck “DoubleClickActivation” if you want to enter data using a single click on a data cell. When configuration is complete click “OK.”

After the configuration has been completed click on “Open Machine Tool File” in the “Open” menu to open the tool table you configured for an existing machine. A Warning message will appear reminding you that the Mach3 (PCNC) software must not be open when reading from or writing to the tool data table. Close the Mach3 (PCNC) software if necessary and then click “OK” to close the Warning window. The tool table will open.

5. Saving Files

Use the Save Menu to save changes to the current file or to save changes under a new file name as shown in Figure 5.

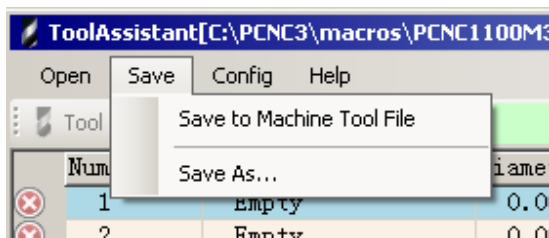


Figure 5. Save Menu

If you attempt to close the program without saving changes the message shown in Figure 6 appears. If you want to save changes click “Yes” and then use the Save Menu to save changes prior to exiting the program.

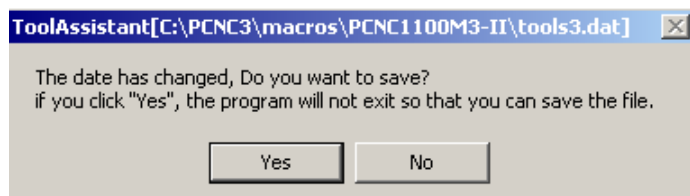
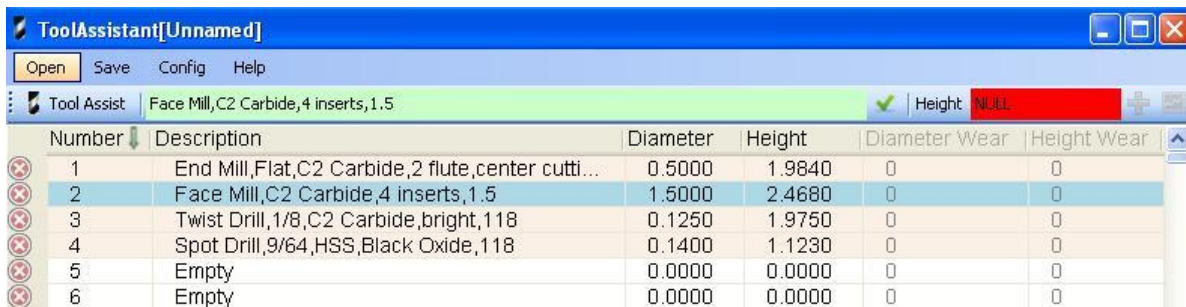


Figure 6. Save prior to exiting reminder message.

6. Entering Data in the Tool Table

The data in the table can be edited by clicking in a cell and editing the information in the upper window (Highlighted in green in Figure 7). This is similar editing data in a Microsoft Excel® worksheet. The Diameter and Height information can also be edited directly in a cell by right clicking on a cell to bring up the edit window.



| Number | Description | Diameter | Height | Diameter Wear | Height Wear |
|--------|--|----------|--------|---------------|-------------|
| 1 | End Mill,Flat,C2 Carbide,2 flute,center cutti... | 0.5000 | 1.9840 | 0 | 0 |
| 2 | Face Mill,C2 Carbide,4 inserts,1.5 | 1.5000 | 2.4680 | 0 | 0 |
| 3 | Twist Drill,1/8,C2 Carbide,bright,118 | 0.1250 | 1.9750 | 0 | 0 |
| 4 | Spot Drill,9/64,HSS,Black Oxide,118 | 0.1400 | 1.1230 | 0 | 0 |
| 5 | Empty | 0.0000 | 0.0000 | 0 | 0 |
| 6 | Empty | 0.0000 | 0.0000 | 0 | 0 |

Figure 7. Machine Tool Table with 4 Tools Specified.

By right clicking on a cell in the Description column you bring up the Tool Assistant screen shown in Figure 8. Click on a tool type in the window on the left and a series of pull down menus will appear on the right. You can use these menu items to easily and accurately identify the tool type. Click “ok” when you are done to post the information in the tool description cell. The tool description menu items can be customized as discussed in Appendix 1.

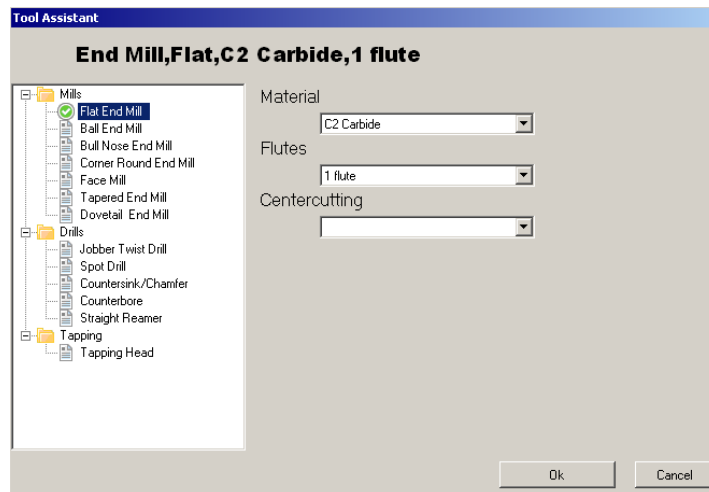


Figure 8. Tool Assistant Screen

Working with the Data File

The Tool Assistant screen can also be accessed by clicking on a row in the tool table and clicking on the “Tool Assist” button as shown in Figure 9.

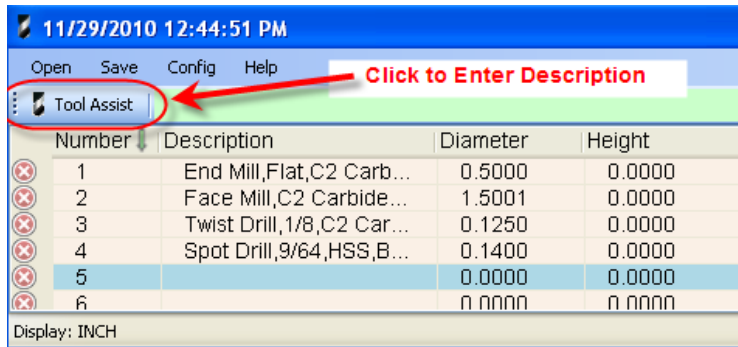


Figure 9. Tool Assistant Button

7. Working with the Data File

Data in any column can be sorted by clicking on the column name. The sort order can be reversed by clicking on the green arrow that appears when a column heading is selected. Data sorted by Diameter is shown in Figure 10.

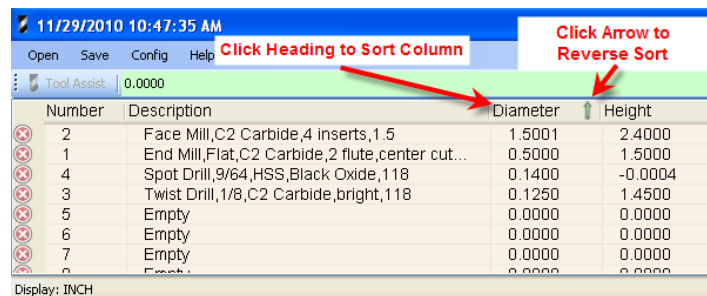


Figure 10. Sorting Data

Tool numbers can be changed by right clicking on a tool number and entering a new number. You are then given the option of overwriting or swapping positions with another tool as shown in Figure 11.

Working with the Data File

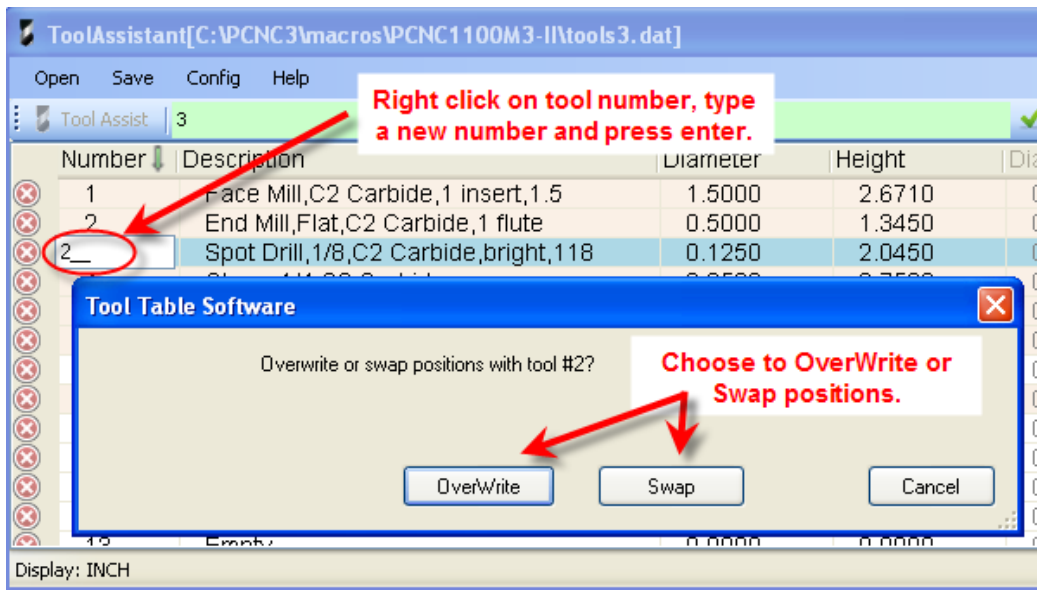


Figure 11. Changing Tool Numbers

To clear data click on the row to select it and right click or double left click on the red "x" on the left side of the window as shown in Figure 12. Click "Yes" to confirm the operation and the data row is deleted.

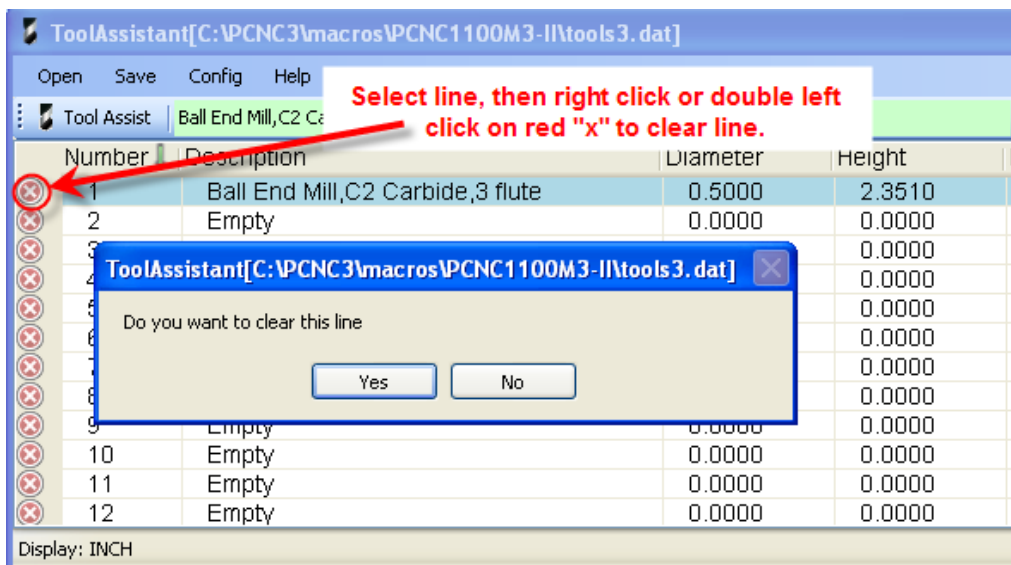


Figure 12. Clearing Data

8. Measuring Tool Height

To measure a tool height first mount your tool in a TTS Tool Holder and place the TTS Tool Holder on a block or reference cylinder as shown in Figure 13. Prior to taking measurements you must zero the Height Gauge and/or the USB Interface, as discussed below, at either the top surface of the block or at the top of another reference surface such as the top of a cylinder. The tool height measurement will be the distance from the reference surface to the end of your tool.

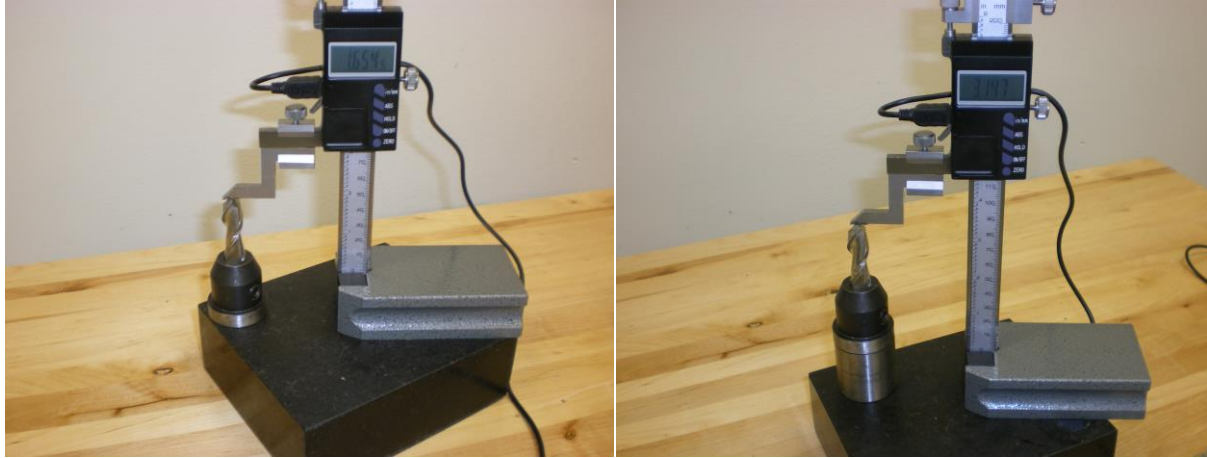


Figure 13. Measuring tool height using the block surface as a reference (left) or a cylinder as a reference (right).

9. Entering Data Manually

The digital height gauge can be used to manually measure tool heights as shown in Figure 14. The operator can then manually enter tool height data into the tool table.

Zeroing the Digital Height Gauge

Prior to use the zero point for the digital height gauge must be set. This is commonly done by placing the gauge on a block as shown in Figure 15.



Figure 14. Manual Height Measurement

Entering Data by Using the USB Interface

To zero the height gauge screen reading press the “zero” button on the Height Gauge with the measurement arm resting firmly on the clean, flat, reference surface.

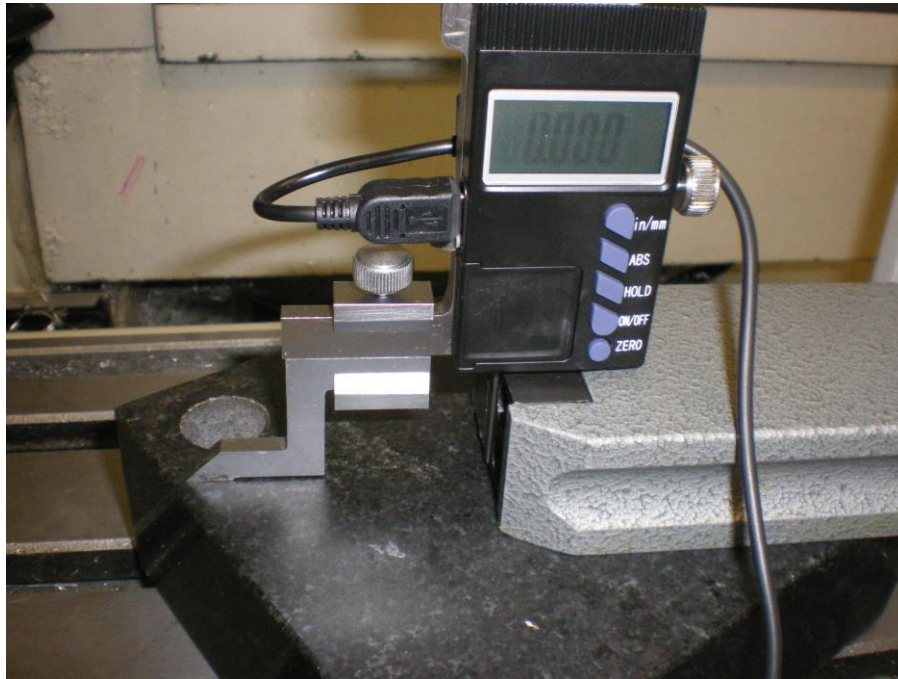


Figure 15. Zeroing the Digital Height Gauge on block surface.

Once you have set the zero point for the Digital Height Gauge you can measure tool heights as shown in Figure 14. Then enter the data into the tool table as discussed in Section 6 above. It is important to note that zeroing the display on the Digital Height Gauge does not zero the scale used by the USB Interface. The USB Interface must be set to zero separately as discussed in the next section.

10. Entering Data by Using the USB Interface

By using the USB Interface the Digital Height Gauge can be used to automatically enter tool height data directly into the tool table.

Zeroing the USB Interface

Prior to use the zero point for the USB Interface must be set. This is commonly done by placing the gauge on a block as shown in Figure 15, or a reference cylinder, as shown in Figure 16.

NOTE: *Zeroing the USB Interface must be done separately from zeroing the Height Gauge.*

Entering Data by Using the USB Interface



Figure 16. Zeroing the USB Interface using a reference cylinder.

It is important to note that zeroing the display on the Digital Height Gauge does not zero the scale used by the USB interface. The scales are separate and the USB Interface must be set to zero separately. To zero the USB Interface connect the USB connector to your computer and the smaller connector to the Digital Height Gauge. Then click the blue box on the right side of the menu bar as shown in Figure 17. If you want the USB Interface reading and the readout on the digital height gauge to match you must zero them both with the height gauge in the same position.

The software will remind you to zero the USB Interface by flashing the “Set to Zero” button the first time you connect the device to your computer.

NOTE: The USB Interface reading appears in red with the word “NULL” if the height gauge has not been physically connected to your computer.

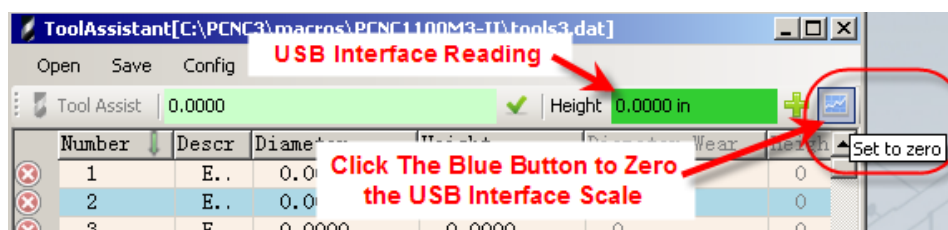


Figure 17. Zeroing the USB Interface Reading

Entering Data by Using the USB Interface

Once you have set the zero point for the USB Interface there are two ways to enter height data automatically. With the USB Interface plugged in to both the computer and the height gauge either (1) right click on the desired height cell in the tool table and then click on the “+” symbol on the right side of the menu bar as shown in Figure 18, or (2) click on the desired height cell and press the “Acquire Data” button on the USB Interface as shown in Figure 19. The height reading is then automatically entered into the tool table.

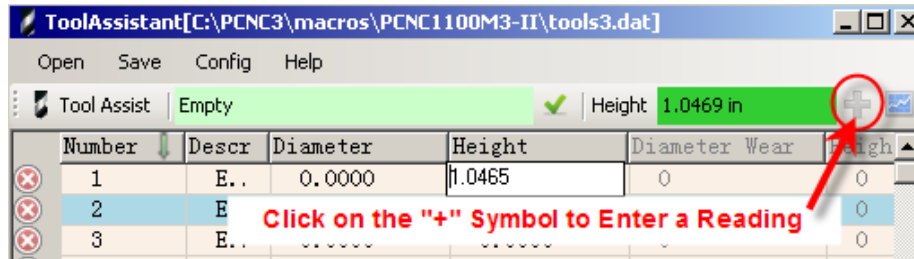


Figure 18. Using the Menu Bar “+” symbol to enter height data.

With either method after a height reading is made and entered the height cell below the currently selected cell becomes active. Additional height readings can then be made by simply changing tools and clicking either the “+” symbol or pressing the Acquire Data button.



Figure 19. Using the “Acquire Data” button on the USB Interface

Appendix 1

The tool descriptions used by Tool Assist can be modified by the user to accommodate custom tooling. Tool descriptions are located in the file: toolassist.lst. This file is located in the same folder as the Tool Assistant software.

New tool descriptions can be added as shown below where “NEW MATERIAL” and “NEW FLUTE” have been added to the Flat End Mill descriptions:

1.1. Flat End Mill [End Mill,Flat]

Material [, C2 Carbide,, C3 Carbide,, cobalt; HSS; NEW MATERIAL]

Flutes[, 1 flute,, 2 flute,, 3 flute,, 4 flute,, 5 flute; NEW FLUTE]

Centercutting[;, center cutting]

New tools can be added as well. This is shown below, where a new end mill has been added:

1.8. NEW End Mill [NEW End Mill,Flat]

Material [, C2 Carbide,, C3 Carbide,, cobalt; HSS; NEW MATERIAL]

Flutes[, 1 flute,, 2 flute,, 3 flute,, 4 flute,, 5 flute; NEW FLUTE]

Centercutting[;, center cutting]

The original toolassist.lst file is shown below to serve as a reference.

1. Mills

1.1. Flat End Mill [End Mill,Flat]

Material [, C2 Carbide,, C3 Carbide,, cobalt; HSS;]

Flutes[, 1 flute,, 2 flute,, 3 flute,, 4 flute,, 5 flute]

Centercutting[;, center cutting]

1.2. Ball End Mill [Ball End Mill]

Material [, C2 Carbide,, C3 Carbide,, cobalt; HSS]

Flutes[, 1 flute,, 2 flute,, 3 flute,, 4 flute]

1.3. Bull Nose End Mill [Bull Nose End Mill]

Material[, C2 Carbide,, C3 Carbide,, cobalt; HSS]

Flutes[, 1 flute,, 2 flute,, 3 flute,, 4 flute]

Corner Radius[, 0.020 rad,, 0.030 rad,, 0.045 rad,, 0.060 rad]

1.4. Corner Round End Mill [Corner Round End Mill]

Material [, C2 Carbide,, C3 Carbide,, cobalt,, HSS]

Flutes [, 1 flute,, 2 flute,, 3 flute,, 4 flute]

Corner Radius[, 1/16 rad,, 3/32 rad,, 1/8 rad,, 5/32 rad,, 3/16 rad,, 1/4 rad,, 5/16 rad,, 3/8 rad,, 7/16 rad,, 1/2 rad, 5/8 rad,, 3/4 rad]

1.5. Face Mill [Face Mill]

Material[, C2 Carbide,, C3 Carbide,, cobalt,, HSS]

Inserts[1 insert,, 2 inserts,, 3 inserts,, 4 inserts,, 5 inserts,, 6 inserts]

Diameter[, 1.5,, 2,, 2.25,, 2.5,, 38 mm]

1.6. Tapered End Mill [Tapered End Mill]

Material[, C2 Carbide,, C3 Carbide,, cobalt,, HSS]

Flutes [, 1 flute,, 2 flute,, 3 flute,, 4 flute]

Taper angle [, 3 degrees,, 5 degrees,, 7 degrees,, 10 degrees,, 15 degrees,, 20 degrees,, 25 degrees,, 30 degrees,, 45 degrees]

1.7. Dovetail End Mill [Dovetail Cutter]

Material[, C2 Carbide,, C3 Carbide,, cobalt,, HSS]

Flutes [, 1 flute,, 2 flute,, 3 flute,, 4 flute]

Angle [, 45,, 60]

2. Drills

2.1. Jobber Twist Drill [Twist Drill]

If Fractional[, 1/16,, 5/64,, 3/32,, 7/64,, 1/8,, 9/64,, 5/32,, 11/64,, 3/16,, 13/64,, 7/32,, 15/64,, 1/4,, 17/64,, 9/32, 19/64,, 5/16,, 21/64,, 11/32,, 23/64,, 3/8,, 25/64,, 13/32,, 27/64,, 7/16,, 29/64,, 15/32,, 31/64,, 1/2,, 5/8,, 3/4,, 7/8,, 1擱]

If Letter Drill [, A,, B,, C,, D,, E,, F,, G,, H,, I,, J,, K,, L,, M,, N,, O,, P,, Q,, R,, S,, T,, U,, V,, W,, X,, Y,, Z]

If Number [, #1,, #2,, #3,, #4,, #5,, #6,, #7,, #8,, #9,, #10,, #11,, #12,, #13,, #14,, #15,, #16,, #17,, #18,, #19,, #20,, #21,, #22,, #23,, #24,, #25,, #26,, #27,, #28,, #29,, #30, #31,, #32,, #33,, #34,, #35,, #36,, #37,, #38,, #39,, #40,, #41,, #42,, #43,, #44,, #45,, #46,, #47,, #48,, #49,, #50,, #51,, #52,, #53,, #54,, #55,, #56,, #57,, #58,, #59,, #60]

Material[, C2 Carbide,, C3 Carbide,, cobalt,, HSS]

Coating [bright,, Black Oxide,, TiN,, TiAlN,, TiCN]

Angle [, 118 ,, 130 ,, 135]

2.2. Spot Drill [Spot Drill]

Appendix 1

If Fractional[, 1/16;, 5/64;, 3/32;, 7/64;, 1/8;, 9/64;, 5/32;, 11/64;, 3/16;, 13/64;, 7/32;, 15/64;, 1/4;, 17/64;, 9/32;, 19/64;, 5/16;, 21/64;, 11/32;, 23/64;, 3/8;, 25/64;, 13/32;, 27/64;, 7/16;, 29/64;, 15/32;, 31/64;, 1/2;, 5/8;, 3/4;, 7/8;, 1]

If Letter Drill [, A;, B;, C;, D;, E;, F;, G;, H;, I;, J;, K;, L;, M;, N;, O;, P;, Q;, R;, S;, T;, U;, V;, W;, X;, Y;, Z]

If Number [, #1;, #2;, #3;, #4;, #5;, #6;, #7;, #8;, #9;, #10;, #11;, #12;, #13;, #14;, #15;, #16;, #17;, #18;, #19;, #20;, #21;, #22;, #23;, #24;, #25;, #26;, #27;, #28;, #29;, #30;, #31;, #32;, #33;, #34;, #35;, #36;, #37;, #38;, #39;, #40;, #41;, #42;, #43;, #44;, #45;, #46;, #47;, #48;, #49;, #50;, #51;, #52;, #53;, #54;, #55;, #56;, #57;, #58;, #59;, #60]

Material[, C2 Carbide;, C3 Carbide;, cobalt;, HSS]

Coating [bright;, Black Oxide;, TiN;, TiAlN;, TiCN]

Angle [, 118 ;, 130 ;, 135]2.3.

2.3. Countersink/Chamfer [Chamfer/Countersink]

Diameter [,1/16;, 1/8;, 5/32;, 3/16;, 1/4;, 5/16;, 3/8;, 9/16;, 5/8;, 3/4;, 7/8;, 1]

Angle [,60;, 82;, 90;, 100;, 125]

Material[, C2 Carbide;, C3 Carbide;, cobalt;, HSS]

2.4. Counterbore [Cbore]

Capscrew Size [, 1/4;, 5/16;, 3/8;, 7/16;, 1/2;, #4;, #5;, #6;, #8;, #10]

Material[, C2 Carbide;, C3 Carbide;, cobalt;, HSS]

2.5. Straight Reamer [Straight Reamer]

Diameter [, 1/16;, 5/64;, 3/32;, 7/64;, 1/8;, 9/64;, 5/32;, 11/64;, 3/16;, 13/64;, 7/32;, 15/64;, 1/4;, 17/64;, 9/32;, 19/64;, 5/16;, 21/64;, 11/32;, 23/64;, 3/8;, 25/64;, 13/32;, 27/64;, 7/16;, 29/64;, 15/32;, 31/64;, 1/2;, 5/8;, 3/4;, 7/8;, 1] Material[, C2 Carbide;, C3 Carbide;, cobalt;, HSS]

3. Tapping

3.1. Tapping Head

Type of tapping head [Tension/Compression Tap Head;, Reversing Tap Head]

If Metric select tap from [, M3 x .50 mm;, M3 x .60 mm;, M4 x .70 mm;, M4 x .75 mm;, M5 x .80 mm;, M5 x .90 mm;, M6 x .75 mm;, M6 x 1.00 mm;, M7 x .75 mm;, M7 x 1.00mm;, M8 x 1.00 mm;, M8 x 1.25 mm;, M10 x 1.25 mm;, M10 x 1.50 mm;, M12 x 1.50 mm;, M12 x 1.75 mm]

If Imperial select tap from [, 2-56;, 3-48;, 4-40;, 6-32;, 8-32;, 10-24;, 10-32;, 12-24;, 1/4-20;, 1/4-28;, 5/16-20;, 5/16-24;, 3/8-16;, 3/8-24;, 7/16-14;, 7/16-20;, 1/2-13;, 1/2"-20]