



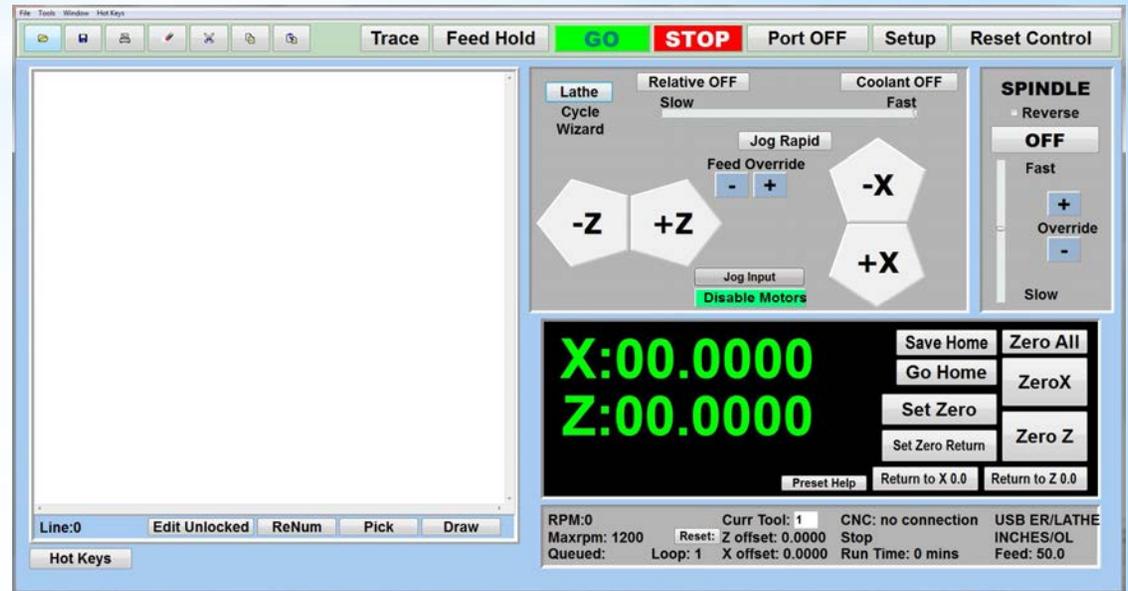
The MX Software

Use it on your CNC Mill...



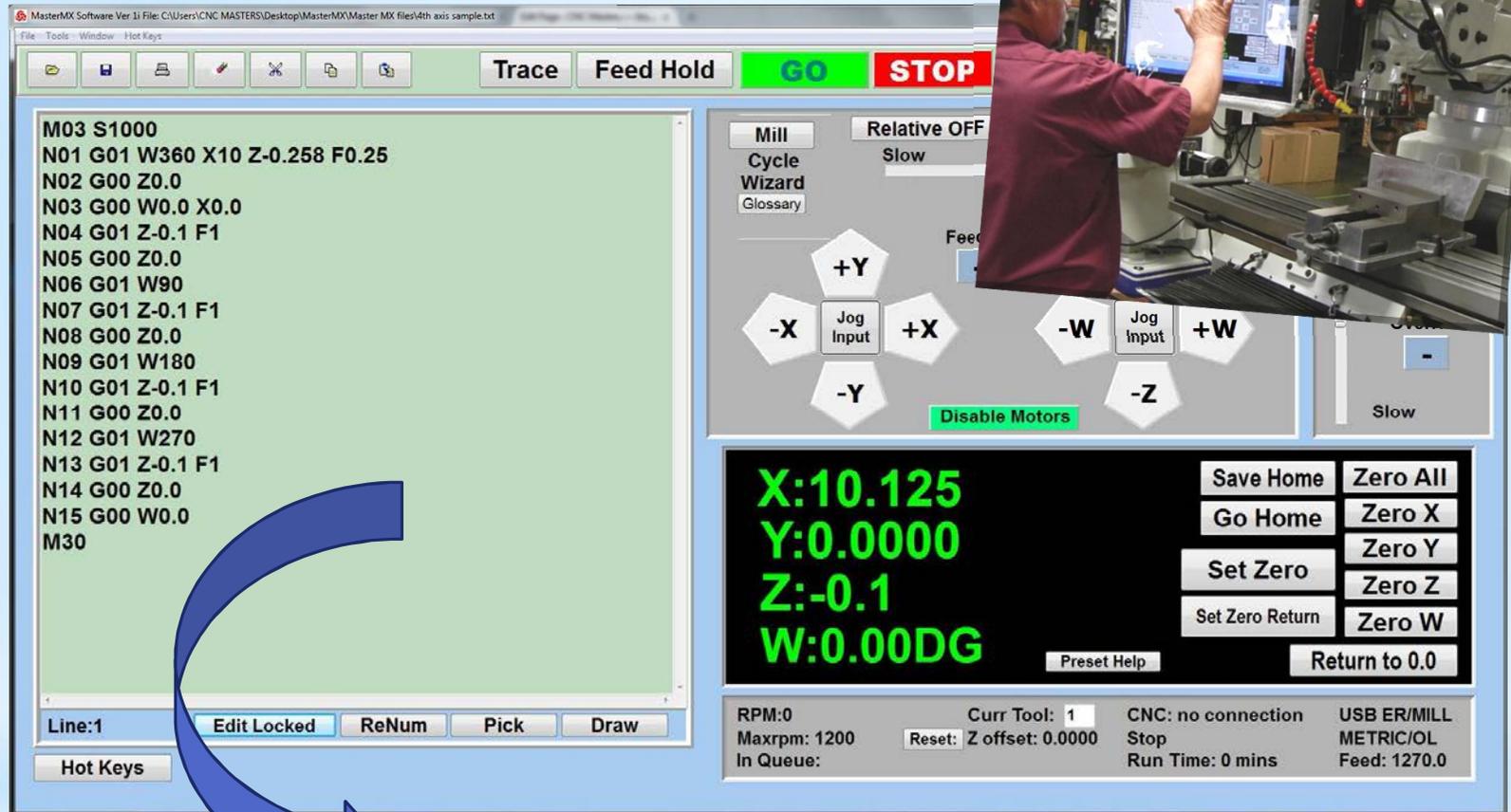
Designed to seamlessly work with your CNC Masters machine.

Use it on your CNC Lathe...





CNC MASTERS



* The Master MX Software is a PC based application system designed to work with 64 bit operating systems: Windows 10, 8, or 7 through your standard USB port interface on lap tops or desk tops. The interface is designed to used with touch screen monitors too.



USB Cable
Do not exceed 8 feet



You also have the optional coolant and spindle speed controls.

The screenshot displays the CNC MASTERS software interface. On the left, the 'File' menu is open, showing options like 'New', 'Open', 'Save', and 'Exit'. Below the menu is a G-code editor window containing the following code:

```
N04 G01 Z-0.1 F1  
N05 G00 Z0.0  
N06 G01 W90  
N07 G01 Z-0.1 F1  
N08 G00 Z0.0  
N09 G01 W180  
N10 G01 Z-0.1 F1  
N11 G00 Z0.0  
N12 G01 W270  
N13 G01 Z-0.1 F1  
N14 G00 Z0.0  
N15 G00 W0.0  
M30
```

The main control panel on the right includes a 'STOP' button, 'Port OFF', 'Setup', and 'Reset Control' buttons. It features 'Relative OFF' and 'Coolant OFF' sections with 'Slow' and 'Fast' sliders. A 'Jog Rapid' section contains 'Jog Input' buttons for +Y, -Y, +X, -X, +Z, -Z, +W, and -W, along with a 'Feed Override' section with '-' and '+' buttons. A 'Disable Motors' button is located below the jog buttons. On the far right, the 'SPINDLE' section has a 'Reverse' checkbox, an 'OFF' button, and a speed slider with '+' and '-' buttons. At the bottom right, there is a 'Save Home', 'Go Home', 'Set Zero', 'Set Zero Return', and 'Return to 0.0' section. The status bar at the bottom shows 'RPM:0', 'Curr Tool: 1', 'CNC: no connection', 'USB ER/MILL', 'Maxrpm: 1200', 'Reset: Z offset: 0.0000', 'Stop', 'Run Time: 0 mins', 'METRIC/OL', and 'In Queue: Feed: 1270.0'. A blue arrow labeled 'Editor' points to the G-code editor window.

With a few clicks of the mouse or using touch screen technology, you can easily navigate through the Master interface importing saved programs into the Editor from the File drop down menu using standard windows features. You can type in a program or import CAM generated G-code tool paths into the Editor.

The X Y Z and W arrow driving buttons are displayed from the point of view of the cutter to avoid confusion when the table and saddle moving.



The screenshot shows the CNC MASTERS software interface. A 'Hot Keys' menu is open, listing the following key assignments:

- Hot Keys: F7
- Go: F8
- Port: F9
- Edit: F5
- Stop: Space Bar
- Jog Input: J

The main control panel includes buttons for **STOP**, **Port OFF**, **Setup**, and **Reset Control**. It also features a **SPINDLE** control section with a **Reverse** checkbox and a **OFF** button. The status display shows:

X:0.0000
Y:0.0000
Z:0.0000
W:0.00DG

Buttons for **Save Home**, **Zero All**, **Go Home**, **Zero X**, **Set Zero**, **Zero Y**, **Set Zero Return**, **Zero Z**, **Zero W**, **Preset Help**, and **Return to 0.0** are visible.

The bottom status bar displays:

Line:0 Edit Locked ReNum Pick Draw

Hot Keys Go:G Port:O Pause:P Home:H Rapid/Feed:F
ZeroAll:A ZeroX:X ZeroY:Y ZeroZ:Z ZeroW:W Spindle:S Reset:R

Hot Keys is an alternative method to easily control your machine using your hard or touch screen keyboard. One can jog the axes with the arrow keys, press P to pause a program, press S to turn Spindle On, G to run a program, Space Bar to Stop, J to record your individual movements one line at a time to create a program by teach mode.



MasterMX Software Ver 3i File: C:\Users\CNC MASTERS\Desktop\MasterMX\Master MX files\With axis sample.txt

File Tools Window Hot Keys

Trace Feed Hold **GO** **STOP** Port OFF Setup Reset Control

```

M03 S1000
N01 G01 W360 X10 Z-0.258 F0.25
N02 G00 Z0.0
N03 G00 W0.0 X0.0
N04 G01 Z-0.1 F1
N05 G00 Z0.0
N06 G01 W90
N07 G01 Z-0.1 F1
N08 G00 Z0.0
N09 G01 W180
N10 G01 Z-0.1 F1
N11 G00 Z0.0
N12 G01 W270
N13 G01 Z-0.1 F1
N14 G00 Z0.0
N15 G00 W0.0
M30
  
```

Line:1 Edit Locked ReNum Pick Draw

Hot Keys

Mill Cycle Wizard Glossary

Relative OFF Slow Fast

Coolant OFF Fast

Jog Rapid

Feed Override - +

+Y +X -X -Y -W -Z +W +Z

Jog Input

Disable Motors

SPINDLE

Reverse

OFF

Fast

+ Override -

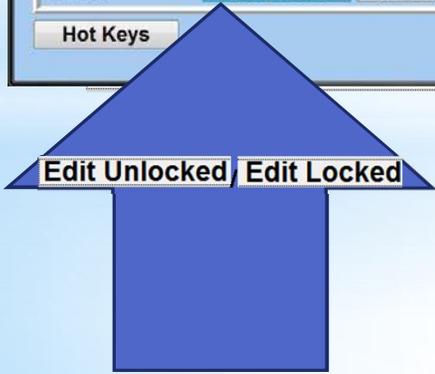
Slow

X:10.125
Y:0.0000
Z:-0.1
W:0.00DG

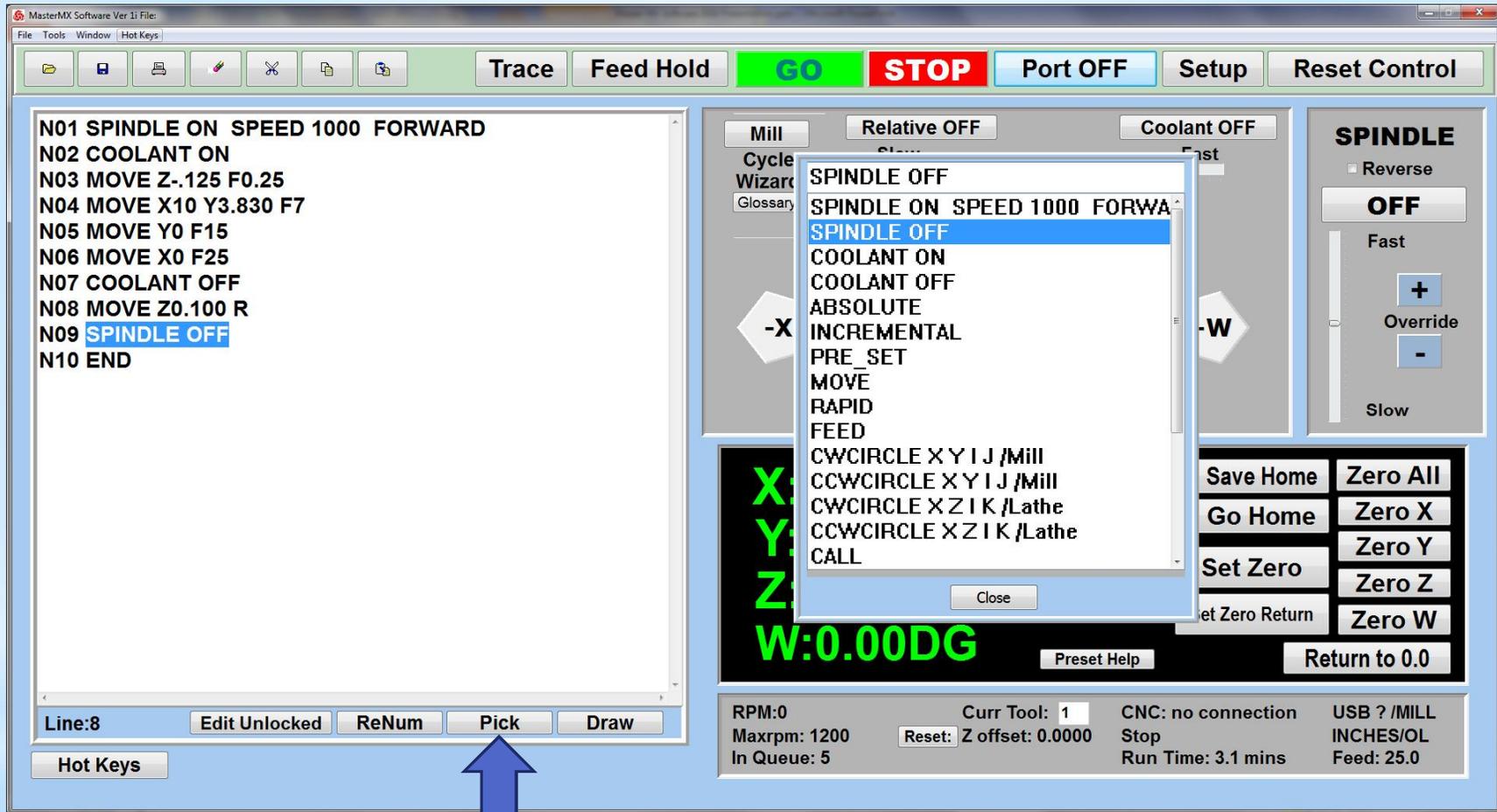
Save Home Zero All
Go Home Zero X
Set Zero Zero Y
Set Zero Return Zero Z
Zero W

Preset Help Return to 0.0

RPM:0 Maxrpm: 1200 In Queue: Curr Tool: 1 Reset: Z offset: 0.0000 CNC: no connection Stop Run Time: 0 mins USB ER/MILL METRIC/OL Feed: 1270.0



The Master defaults to an "Edit Locked" green editor screen. To create or edit your tool path program, you will have to "Edit Unlock" first which will turn the screen to a white color. This Edit Locked feature keeps your tool path program from being accidentally changed.



The screenshot shows the MasterMX Software Ver 3.1 interface. The main window contains a G-code editor on the left with the following code:

```

N01 SPINDLE ON SPEED 1000 FORWARD
N02 COOLANT ON
N03 MOVE Z-.125 F0.25
N04 MOVE X10 Y3.830 F7
N05 MOVE Y0 F15
N06 MOVE X0 F25
N07 COOLANT OFF
N08 MOVE Z0.100 R
N09 SPINDLE OFF
N10 END
  
```

At the bottom of the editor, the 'Line:8' is highlighted, and the 'Pick' button is visible. A blue arrow points to the 'Pick' button. A context menu is open over the 'Pick' button, listing various commands:

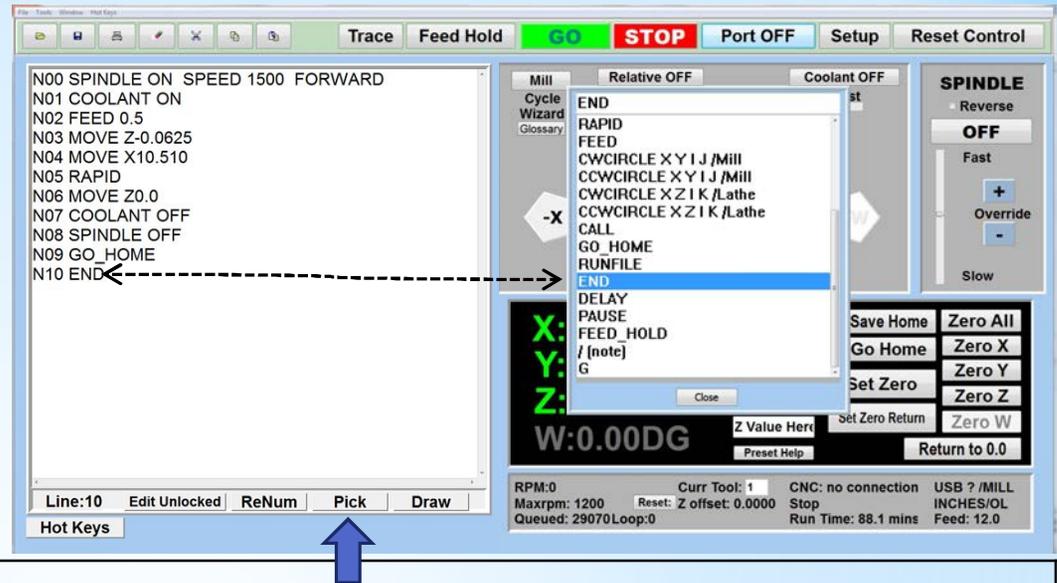
- SPINDLE OFF
- SPINDLE ON SPEED 1000 FORWARD
- SPINDLE OFF
- COOLANT ON
- COOLANT OFF
- ABSOLUTE
- INCREMENTAL
- PRE_SET
- MOVE
- RAPID
- FEED
- CWCIRCLE X Y I J /Mill
- CCWCIRCLE X Y I J /Mill
- CWCIRCLE X Z I K /Lathe
- CCWCIRCLE X Z I K /Lathe
- CALL

The interface also features a top toolbar with buttons for Trace, Feed Hold, GO, STOP, Port OFF, Setup, and Reset Control. On the right side, there are controls for Mill, Relative OFF, Coolant OFF, and SPINDLE (OFF, Fast, Slow, Override). At the bottom right, there are buttons for Save Home, Go Home, Set Zero, and Return to 0.0, along with status information like RPM:0, Curr Tool: 1, and Run Time: 3.1 mins.

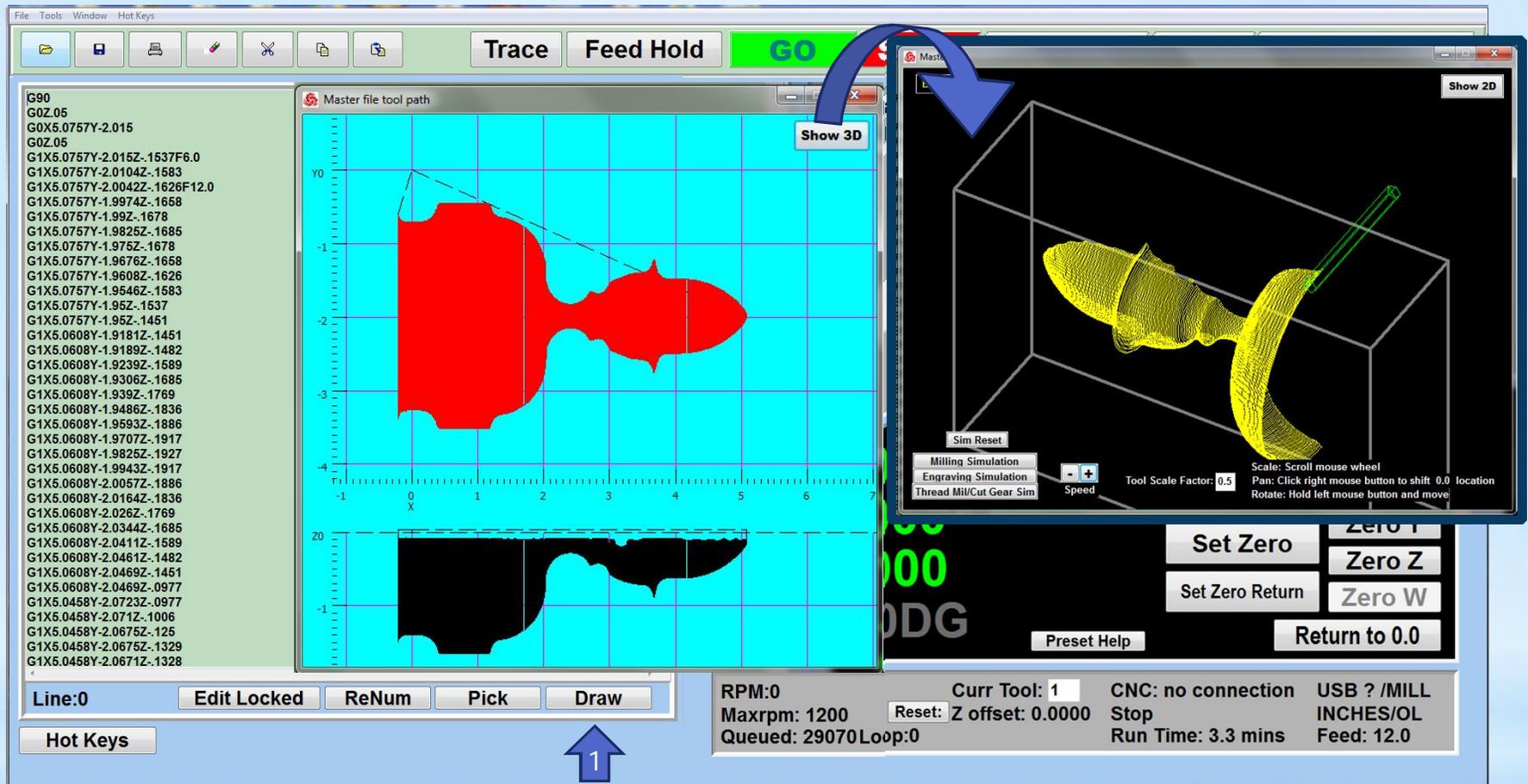
While in "Edit Unlocked" mode, you can write FANUC style G-codes directly into the Editor, or select commands off the "Pick" menu and write your tool path program in conversational mode such as what is written in the Editor box. You can even mix between conversation commands and G-codes in the same program.



With the Pick Menu, you can easily write a simple program without G-codes. You also interchange between codes and conversational commands in the same program. Using a CAM is always best for complicated applications and the Master has no problem receiving an imported FANUC based program with the correct post processor.



Pick Menu Features	Description
ABSOLUTE	Same as G90. The Master defaults to Absolute mode.
INCREMENTAL	Same as G91.
SPINDLE ON	Same as M03 for computer variable spindle control.
MOVE	Same as G00, G01. Move three or four axes simultaneously on the same tool path.
PRE_SET	Can't start from a 0.00 position? With Pre-Set, you can enter the coordinate you want to begin the tool path program. For example, Z axis is 0.5" above the material. Pre-Set will automatically start the Z coordinate at 0.5" on the counter.
RAPID	Quickly retract or relocate the tool after an operation above the application. Rapid up to 100 inches per minute of travel.
FEED	Slowly feed your axes with a minimum of 0.1 inches per minute of travel.
CWCIRCLE X Y I J	Same as G02. Enter in the coordinates for X Y I J and let the Master machine your arcs for you. Z movement can be added for helical applications.
CCWCIRCLE X Y I J	Same as G03.
CALL	CALL allows you to repeat as needed a sub-program with one line instead of having to re-write the sub-program several times within the larger program.
GO_HOME	GO HOME allows you to create an offset position on the machine. End your program with GO HOME on production runs to give you clearance of the axes to exchange parts on the machine.
DELAY	Stop the program at a particular point and delay further execution for the time shown in milliseconds up to 40,000.
PAUSE	Same as M00, or type in PAUSE in the middle of a program. Hit Enter to resume the program. You can also press P on the keyboard to pause the program.
RUNFILE	If the program is very long, using the RUNFILE command will read the program directly from your C drive.
\ (NOTE)	Using a \ in front of the notation, the Master will simply ignore this in the program.
SPINDLE OFF	Same as M05.
COOLANT ON	Same as M08. Control the coolant pump directly into your program.
COOLANT OFF	Same as M09.
END	Same as M30.

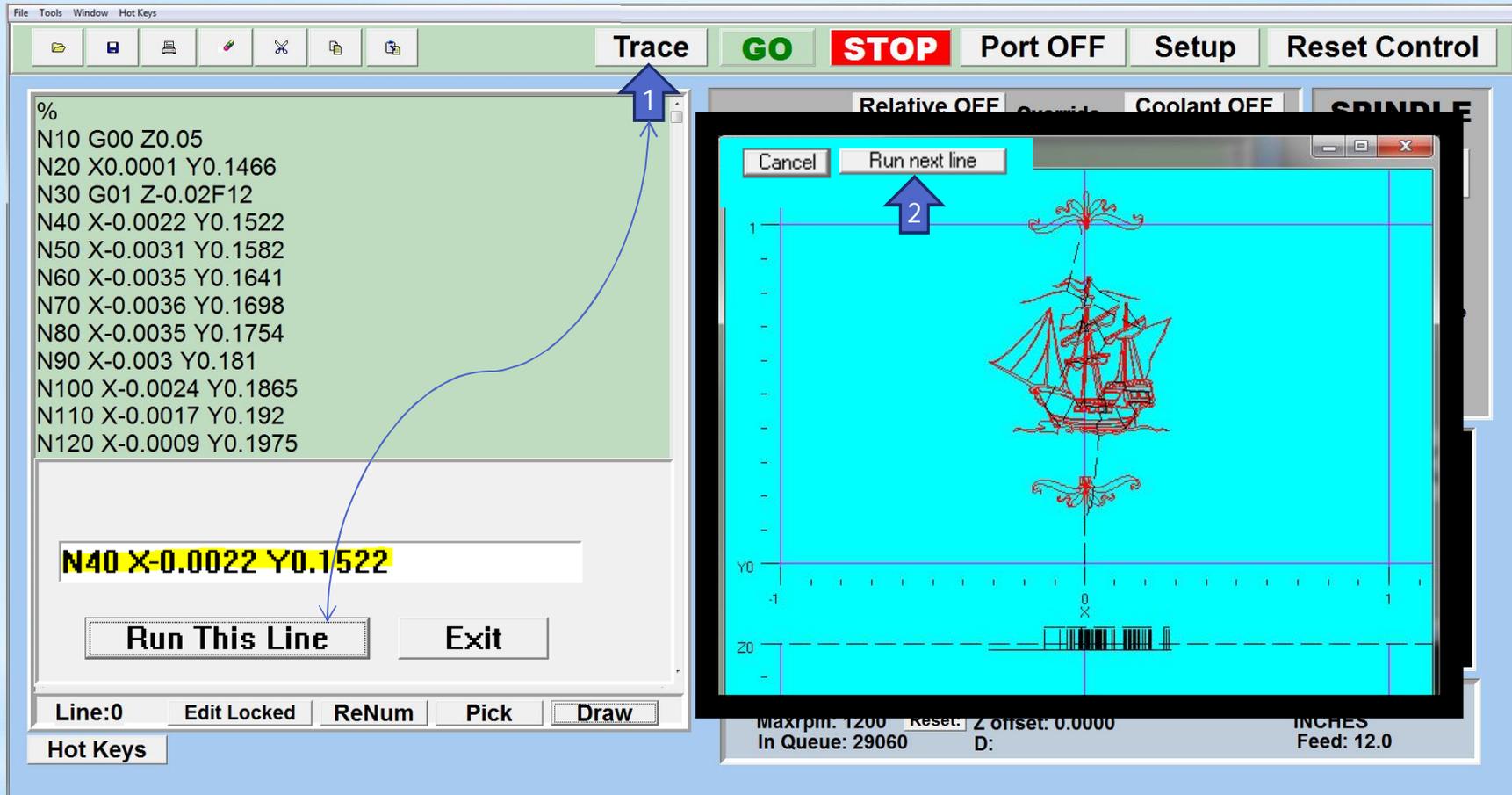


The screenshot displays the CNC MASTERS software interface. On the left, a list of G-code commands is shown, including G90, G0Z.05, G0X5.0757Y-2.015, and various G1X and G1Y commands with coordinates. The main window shows a 2D tool path drawing on a grid, with a red area representing the tool path and a black area representing the workpiece. A blue arrow points from the 'Draw' button at the bottom to the 2D drawing. To the right, a 3D simulation window is open, showing a yellow tool path and a green tool. A blue arrow points from the 'Show 3D' button in the 2D window to the 3D simulation window. The bottom of the interface features a status bar with various controls and information:

- Line:0** | **Edit Locked** | **ReNum** | **Pick** | **Draw**
- Hot Keys** | **1**
- RPM:0** | **Maxrpm: 1200** | **Queued: 29070Loop:0**
- Curr Tool: 1** | **Reset: Z offset: 0.0000**
- CNC: no connection** | **USB ? /MILL**
- Stop** | **INCHES/OL**
- Run Time: 3.3 mins** | **Feed: 12.0**

Additional controls include **Set Zero**, **Set Zero Return**, **Zero Z**, **Zero W**, **Return to 0.0**, **Preset Help**, **Sim Reset**, **Milling Simulation**, **Engraving Simulation**, **Thread Mill/Cut Gear Sim**, **Speed**, **Tool Scale Factor: 0.5**, and **Show 2D**.

Hit Draw to view your tool path program drawing, or even simulate the tool path in 3D mode. This can be helpful to quickly verify your program before running it. You can also slow down or speed up the drawing or simulation process.



The screenshot displays the CNC MASTERS software interface. At the top, there is a menu bar with 'File', 'Tools', 'Window', and 'Hot Keys'. Below the menu bar is a toolbar with icons for file operations and a 'Trace' button. The main window is divided into several sections:

- Code Editor:** Contains a list of G-code lines from N10 to N120. Line N40, 'X-0.0022 Y0.1522', is highlighted in yellow. Below the code editor is a 'Run This Line' button and an 'Exit' button.
- Control Panel:** Located at the top right, it includes buttons for 'GO', 'STOP', 'Port OFF', 'Setup', and 'Reset Control'. Below these are status indicators for 'Relative OFF', 'Coolant OFF', and 'SPINDLE'.
- 2D Drawing Window:** A window titled 'Run next line' showing a 2D plot of a ship's hull. The plot has a cyan background and a red wireframe of the ship. The axes are labeled 'X' and 'Y'. A 'Cancel' button is visible in the top left of this window.
- Status Bar:** At the bottom, it shows 'Line:0', 'Edit Locked', 'ReNum', 'Pick', 'Draw', 'Maxrpm: 1200', 'Reset: Z offset: 0.0000', 'In Queue: 29060', 'D:', 'INCHES', and 'Feed: 12.0'.

Two blue arrows with numbers '1' and '2' are overlaid on the image. Arrow '1' points from the 'Trace' button in the toolbar to the 'Run This Line' button. Arrow '2' points from the 'Run next line' button in the drawing window to the 'Trace' button.

1. Run the machine on Trace mode. You can run each tool path independently, one line at a time to study the tool path movement on the machine to verify the position of the application and if any fixture/vise is in the way of the cutter's path.
2. You can also verify your program by clicking on the Trace and Draw buttons together. This will allow you to view each tool path independently in the Draw Window.



The screenshot displays the CNC MASTERS control software interface. At the top, there is a menu bar with 'Tools', 'Window', and 'Hot Keys'. Below the menu bar is a toolbar with buttons for 'Trace', 'Feed Hold', 'GO', 'STOP', 'Port OFF', 'Setup', and 'Reset Control'. The 'GO' button is highlighted in green, and the 'STOP' button is highlighted in red. A blue arrow labeled '2' points to the 'Tools' menu, which is open, showing options like 'Go From Line', 'Beep End Prog.', 'Delete Config.cn3', 'Find USB', and 'Change Text Size'. A blue arrow labeled '3' points to the 'GO' button. The main window displays a G-code program with the following lines:

```

G0X5.0757Y-2.015
G0Z.05
G1X5.0757Y-2.015Z-.1537F6.0
G1X5.0757Y-2.0104Z-.1583
G1X5.0757Y-2.0042Z-.1626F12.0
G1X5.0757Y-1.9974Z-.1658
G1X5.0757Y-1.99Z-.1678
G1X5.0757Y-1.9825Z-.1685
G1X5.0757Y-1.975Z-.1678
G1X5.0757Y-1.9676Z-.1658
G1X5.0757Y-1.9608Z-.1626
G1X5.0757Y-1.9546Z-.1583
G1X5.0757Y-1.95Z-.1537
G1X5.0757Y-1.95Z-.1451
G1X5.0757Y-1.9484Z-.1451
G1X-.2197Y-.5842Z-.0915
G0Z.05
G0X0Y0
END
  
```

Below the program is a 'Line:0' field and buttons for 'Edit Locked', 'ReNum', 'Pick', and 'Draw'. A 'Hot Keys' button is also present. The right side of the interface features a control panel with 'Mill' and 'SPINDLE' sections. The 'Mill' section includes 'Relative OFF', 'Coolant OFF', 'Jog Rapid', 'Feed Override', and 'Jog Input' buttons for X, Y, Z, and W axes. The 'SPINDLE' section includes a 'Reverse' checkbox, 'OFF' button, and 'Fast', 'Override', and 'Slow' speed controls. Below the control panel is a large display showing real-time readouts: X:0.0000, Y:0.0000, Z:0.0000, and W:0.00DG. To the right of the readouts are buttons for 'Save Home', 'Zero All', 'Go Home', 'Zero X', 'Set Zero', 'Zero Y', 'Set Zero Return', 'Zero Z', and 'Zero W'. A 'Return to 0.0' button is also present. At the bottom right, there is a 'Preset Help' button. The bottom status bar displays: RPM:0, Maxrpm: 1200, Queued: Loop:0, Curr Tool: 1, Reset: Z offset: 0.0000, CNC: no connection, Done+, Run Time: 88.1 mins, USB ? /MILL, INCHES/OL, Feed: 12.0.

1. When running a program, the In Queue window will display the tool paths fed into the machine control unit. The master feeds the control unit a pattern of three tool paths at a time for "continuous machining" to avoid slight interruptions as the machine waits for it's next tool path command. The counters also display a "real-time" readout while the machine is in cnc operation without counting ahead of the movement.
2. Under Tools, run a "Go From Line" command if you need to begin in the middle program instead of starting from the first line.
3. Press Go to run your program or Stop to kill all CNC movement on the machine.



The screenshot displays the CNC Masters software interface. On the left, a G-code program is shown in a text area, with the current line highlighted in blue. The program includes various G-codes for positioning and tool changes. At the top, there are control buttons for 'Trace', 'Feed Hold', 'GO', and 'STOP'. In the center, there are jog controls with directional buttons (+X, -X, +Y, -Y) and a 'Jog Input' button. A 'Disable Motors' button is located below the jog controls. On the right, there is a 'Control' panel with buttons for 'Save Home', 'Go Home', 'Set Zero', 'Set Zero Return', 'Zero All', 'Zero X', 'Zero Y', 'Zero Z', and 'Zero W'. At the bottom, there is a status bar showing RPM, Maxrpm, Queued, Curr Tool, Z offset, CNC connection status, Run Time, and Feed rate.

G-code Program:

```

G90
G0Z.05
G0X5.0757Y-2.015
G0Z.05
G1X5.0757Y-2.015Z-.1537F6.0
G1X5.0757Y-2.0104Z-.1583
G1X5.0757Y-2.0042Z-.1626F12.0
G1X5.0757Y-1.9974Z-.1658
G1X5.0757Y-1.99Z-.1678
G1X5.0757Y-1.9825Z-.1685
G1X5.0757Y-1.975Z-.1678
G1X5.0757Y-1.9676Z-.1658
G1X5.0757Y-1.9608Z-.1626
G1X5.0757Y-1.9546Z-.1583
G1X5.0757Y-1.95Z-.1537
G1X5.0757Y-1.95Z-.1451
G1X5.0609Y-1.9481Z-.1451
G1X-.2197Y-.5842Z-.0915
G0Z.05
G0X0Y0
END
  
```

Status Bar:

RPM:0 Curr Tool: 1 CNC: no connection USB ? /MILL
 Maxrpm: 1200 Reset: Z offset: 0.0000 Done+ INCHES/OL
 Queued: Loop:0 Run Time: 88.1 mins Feed: 12.0

1. Easily de-energize the axis motors by clicking Disable Motors to crank each axis by hand, and then press Reset Control to re-energize the axis motors.
2. Feed Hold in the middle of a program, and step through the program one line at a time.



The screenshot displays the CNC MASTERS software interface. At the top, there is a menu bar (File, Tools, Window, Hot Keys) and a control bar with buttons for Trace, Feed Hold, GO (green), STOP (red), Port OFF, Setup, and Reset Control. The main window is divided into several sections:

- Program Editor:** A text area on the left showing a G-code program. The current line is highlighted in blue:


```
G1X-.2197Y-.5842Z-.0915
G0Z.05
G0X0Y0
END
```
- Coordinate Readout:** A central panel showing current coordinates:

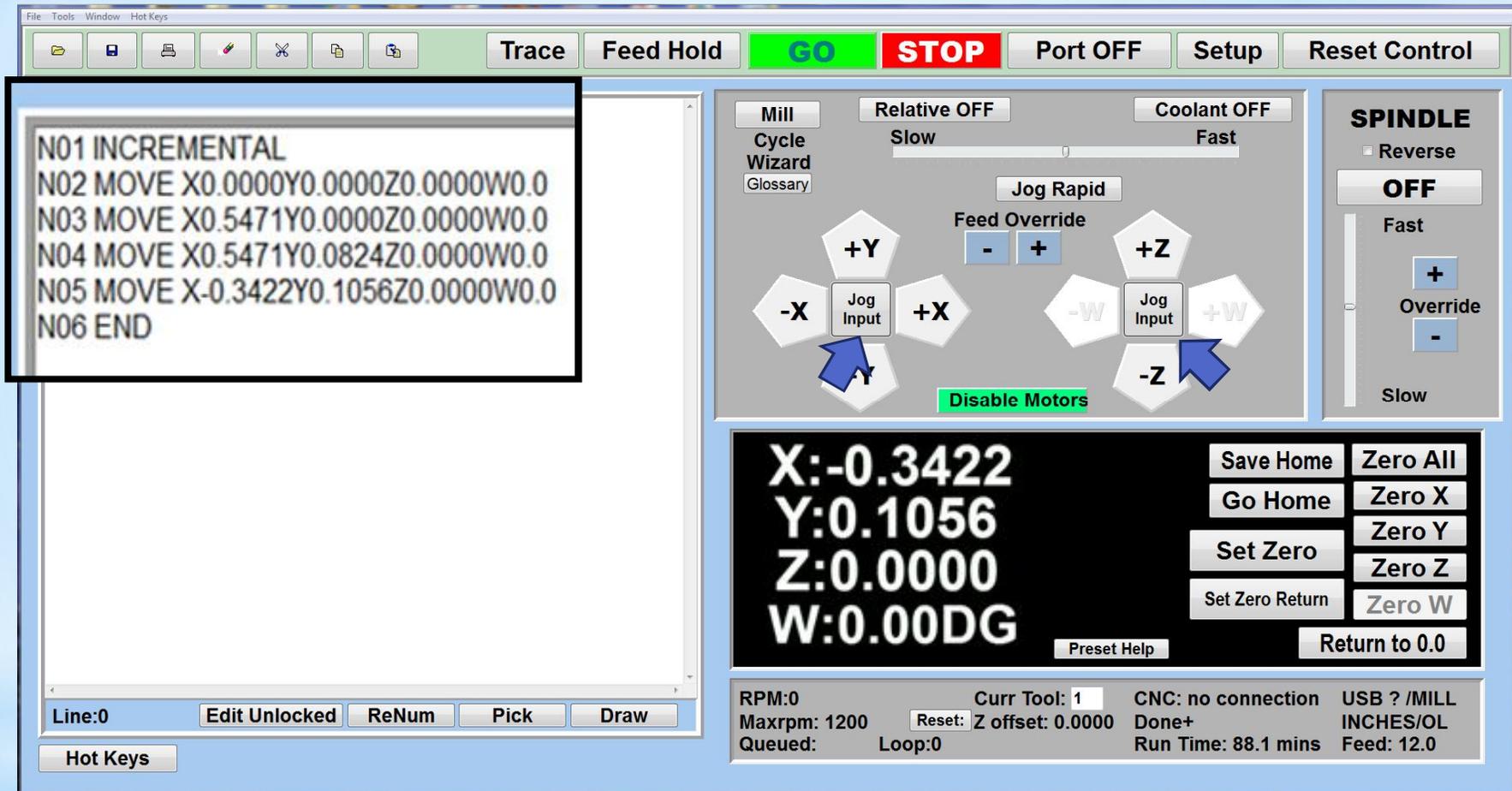
X	0.0000
Y	0.0000
Z	0.525
W	0.0000
- Jog Controls:** A panel with a "Relative ON" toggle, a "Coolant OFF" indicator, and a "Slow" feed rate slider. Below the slider are jog buttons for -X, +X, -Y, +Y, -Z, and +Z. A "Disable Motors" button is also present. Blue arrows point to the "Relative ON" toggle and the -Z jog button.
- SPINDLE Controls:** A panel on the right with a "Reverse" checkbox, a "Fast" indicator, and a "Slow" indicator. It includes a "Jog Input" section with + and - buttons and an "Override" section with + and - buttons.
- Home/Zeroing Panel:** A large black panel at the bottom right showing current coordinates in green:

X:0.0000	Save Home	Zero All
Y:0.0000	Go Home	Zero X
Z:0.0000	Set Zero	Zero Y
W:0.00DG	Set Zero Return	Zero Z
		Zero W
	Preset Help	Return to 0.0
- Status Bar:** A bottom-most bar showing system information:

RPM:0	Curr Tool: 1	CNC: no connection	USB ? /MILL
Maxrpm: 1200	Reset: Z offset: 0.0000	Done+	INCHES/OL
Queued:	Loop:0	Run Time: 88.1 mins	Feed: 12.0

Use Relative ON to enter a specific coordinate to jog any of your axes to an exact location. Without having to write a program, you can jog an *exact amount* on any of the axes without needing to keep the key pressed down and mistakenly over-step the movement releasing your finger too slowly off the jogging button.

For example, let's say you need to drill a hole exactly 0.525" using the Z. So you enter 0.525 in the Z box. Next, adjust the JOG FEED RATE slider for the desired feed rate. Then "click once" on the +Z or -Z button to activate the travel. In this case you click once the -Z button first to drill the hole exactly 0.525". Then click once on the +Z button to drive the axis back up 0.525".



The screenshot displays the CNC MASTERS software interface. At the top, there is a menu bar (File, Tools, Window, Hot Keys) and a toolbar with icons for file operations and a status bar with buttons for Trace, Feed Hold, GO (green), STOP (red), Port OFF, Setup, and Reset Control.

The main interface is divided into several sections:

- Program Editor:** A window on the left shows a G-code program:


```

      N01 INCREMENTAL
      N02 MOVE X0.0000Y0.0000Z0.0000W0.0
      N03 MOVE X0.5471Y0.0000Z0.0000W0.0
      N04 MOVE X0.5471Y0.0824Z0.0000W0.0
      N05 MOVE X-0.3422Y0.1056Z0.0000W0.0
      N06 END
      
```
- Machine Controls:** A central panel includes buttons for Mill, Cycle Wizard, and Glossary. It features a Relative OFF/Slow to Fast slider, Coolant OFF/Fast slider, and Jog Rapid buttons. A Feed Override section has minus and plus buttons. Jog Input buttons for X, Y, Z, and W axes are arranged in a cross pattern, with blue arrows pointing to the X and Z axes. A Disable Motors button is at the bottom.
- Spindle Control:** A SPINDLE section on the right has a Reverse checkbox, an OFF button, and a Fast to Slow slider with plus and minus override buttons.
- Position Display:** A large black box shows current coordinates:


```

      X:-0.3422
      Y:0.1056
      Z:0.0000
      W:0.00DG
      
```

 To the right are buttons for Save Home, Go Home, Set Zero, Set Zero Return, Zero All, Zero X, Zero Y, Zero Z, Zero W, and Return to 0.0. A Preset Help button is also present.
- Status Bar:** At the bottom, it shows:


```

      RPM:0           Curr Tool: 1   CNC: no connection  USB ? /MILL
      Maxrpm: 1200   Reset: Z offset: 0.0000  Done+             INCHES/OL
      Queued:         Loop:0      Run Time: 88.1 mins  Feed: 12.0
      
```
- Editor Tools:** At the bottom left, there are buttons for Line:0, Edit Unlocked, ReNum, Pick, Draw, and Hot Keys.

Jog Input - Teach Mode:

You can create a tool path program by storing each point-to-point movement by simple jogging an axis. Click on either of the Jog Input buttons to store each movement on the Editor Screen. You can then add Spindle ON, feed commands, and press GO to run the new program as needed. This is a great feature to help you learn to create a program by the movements you make on the machine without necessarily writing out an entire program first.



The screenshot displays the CNC MASTERS control interface. At the top, there is a menu bar (File, Tools, Window, Hot Keys) and a toolbar with icons for file operations. Below the toolbar are buttons for 'Trace', 'Feed Hold', 'GO', 'STOP', 'Port OFF', 'Setup', and 'Reset Control'. The main control area is divided into several sections:

- Left Panel:** Contains a large empty window for graphics or tool paths, with buttons for 'Mill', 'Cycle Wizard', and 'Glossary'.
- Center Panel:** Features a 'Relative OFF' section with a 'Slow' to 'Fast' slider. Below it is a 'Jog Feed' section with a 'Feed Override' slider and a 'Jog Feed' button. Further down are 'Jog Input' buttons for X, Y, Z, W axes, and a 'Disable Motors' button.
- Right Panel:** Labeled 'SPINDLE', it includes a 'Reverse' checkbox, an 'OFF' button, and a speed slider from 'Fast' to 'Slow' with a 'Jog Input' button for 'Override'.
- Status Display:** Shows 'X:0.0000', 'Y:0.0000', 'Z:0.0000', and 'W:0.00DG'. It also includes buttons for 'Save Home', 'Zero All', 'Go Home', 'Zero X', 'Set Zero', 'Zero Y', 'Set Zero Return', 'Zero Z', 'Zero W', 'Preset Help', and 'Return to 0.0'.
- Bottom Status Bar:** Displays 'RPM:0', 'Curr Tool: 1', 'CNC: no connection', 'USB ? /MILL', 'Maxrpm: 1200', 'Reset: Z offset: 0.0000', 'Done+', 'INCHES/OL', 'Queued: Loop:0', 'Run Time: 88.1 mins', and 'Feed: 9.4'. A 'Hot Keys' button is also present.

1. Jog Feed and Rapid with Override: You can adjust feeds using the slider from slow minimum 0.1" per minute to a rapid of 100" per minute of travel. The  allows you to fine tune feeds in 10% increments while the program is in motion.
2. Spindle Speed with Override: You can adjust speeds using the slider from a slow minimum 0 RPM to the max RPM according to the machine. The  allows you to fine tune RPMs in 10% increments while the program is in motion.



The screenshot displays the CNC MASTERS software interface. At the top, there is a menu bar with 'File', 'Tools', 'Window', and 'Hot Keys'. Below the menu bar is a toolbar with icons for file operations and a row of control buttons: 'Trace', 'Feed Hold', 'GO' (green), 'STOP' (red), 'Port OFF' (blue), 'Setup', and 'Reset Control'.

The main interface is divided into several sections:

- Left Panel:** A large empty white area for displaying a program or tool path.
- Top Right Panel:** Contains buttons for 'Mill Cycle Wizard' and 'Glossary'. It features a 'Relative OFF' section with a 'Slow' to 'Fast' slider and a 'Coolant OFF' section with a 'Fast' to 'Slow' slider. Below these are 'Jog Feed' and 'Feed Override' (-, +) buttons. A central 'Jog Input' section has directional buttons for +Y, -X, +X, -Y, +Z, -W, +W, and -Z. A 'Disable Motors' button is at the bottom.
- Right Panel:** Labeled 'SPINDLE', it includes a 'Reverse' checkbox, a large 'OFF' button, and a 'Fast' to 'Slow' speed slider with '+' and '-' override buttons.
- Bottom Right Panel (highlighted with a red circle):** A control panel for zeroing the axes. It shows 'X:0.0000', 'Y:0.0000', 'Z:0.0000', and 'W:0.00DG'. A 'Preset:' field contains 'Y-0.325'. Buttons include 'Save Home', 'Go Home', 'Set Zero', 'Set Zero Return', 'Zero All', 'Zero X', 'Zero Y', 'Zero Z', 'Zero W', and 'Return to 0.0'. Blue arrows point to the 'Y:0.0000' display and the 'Preset:' field.
- Bottom Left Panel:** Shows 'Line:0', 'Edit Unlocked', 'ReNum', 'Pick', and 'Draw' buttons. A 'Hot Keys' button is also present.
- Bottom Status Bar:** Displays machine parameters: 'RPM:0', 'Maxrpm: 1200', 'Queued:', 'Loop:0', 'Curr Tool: 1', 'Reset: Z offset: 0.0000', 'CNC: no connection', 'Done+', 'Run Time: 88.1 mins', 'USB ? /MILL', 'INCHES/OL', and 'Feed: 9.4'.

1. Pre-set directly into the counters by typing in your beginning coordinate if you cannot start your program at 0.00.
2. The counters X Y Z can display in inches or mm. You can make this change in the Setup or by G-code. The optional W rotary table axis displays in degrees.
3. Zero all counters or zero each counter independently. With one click of the Return to 0.0 button, all axes will travel back to 0.0 on the machine.

File Tools Window Hot Keys
Trace
Feed Hold
GO
STOP
Port OFF
Setup
Reset Control

```
SET_ZERO X-7.2261 Y-4.0418 Z-1.2415 W0.0000
HOME X15.25 Y0.00 Z4.0
```

Mill Cycle Wizard Glossary
Relative OFF Slow Fast
Coolant OFF

Jog Feed
Feed Override

+Y
-X
-Y

Jog Input
+X

+Z
-W
-Z

Jog Input
+W

Disable Motors

SPINDLE

 Reverse

OFF

Fast

+
Override
-

Slow

X:0.0000
Y:0.0000
Z:0.0000
W:0.00DG

Save Home
Zero All

Go Home
Zero X

Set Zero
Zero Y

Set Zero Return
Zero Z

Zero W

Return to 0.0

RPM:0
Maxrpm: 1200
Queued:

Reset: Z offset: 0.0000
Loop:0

Curr Tool: 1
CNC: no connection
Done+
Run Time: 88.1 mins

USB ? /MILL
INCHES/OL
Feed: 9.4

Line:2
Edit Unlocked
ReNum
Pick
Draw

Hot Keys

Set Zero

Set Zero Return

Set and save your 0.00 position on the machine. These coordinates will be recorded as the first line of the program in the Editor Screen. Should you desire to return to this program at a later date, you will only have to click on the Set Zero Return button. This will command the machine to automatically jog each axis to its saved "set" 0.00 position according to the recorded coordinates at the first line of the program.



The screenshot displays the CNC Masters software interface. At the top, there is a menu bar with 'File', 'Tools', 'Window', and 'Hot Keys'. Below the menu bar is a toolbar with icons for file operations and control buttons: 'Trace', 'Feed Hold', 'GO' (green), 'STOP' (red), 'Port OFF', 'Setup', and 'Reset Control'.

The main window is divided into several sections:

- Program Editor:** A text area on the left containing G-code. The first line is 'SET_ZERO X-7.2261 Y-4.0418 Z-1.2415 W0.0000'. The second line, 'HOME X15.25 Y0.00 Z4.0', is highlighted in yellow. Other lines include 'MOVE Z-0.625 F0.25', 'MOVE X5.0 Y-1.325 F1.5', 'MOVE Z0 R', 'MOVE X0 Y0 R', 'MOVE Z-1.25 F0.25', 'MOVE X5.0 Y-1.325 F1.5', 'GO_HOME', and 'END'. The 'GO_HOME' line is also highlighted in yellow. Blue arrows point to the first and last lines of the program.
- Machine Controls:** A central panel with buttons for 'Mill', 'Cycle Wizard', and 'Glossary'. It features a 'Relative OFF' indicator and a 'Coolant OFF' indicator. A 'Jog Feed' slider is set to 'Slow'. Below this are 'Jog Input' buttons for '+Y', '-X', '+X', and '-Y' on the left, and '+Z', '-W', '+W', and '-Z' on the right. A 'Feed Override' section has '-' and '+' buttons. A 'Disable Motors' button is at the bottom.
- SPINDLE Control:** A panel on the right with a 'Reverse' checkbox, a 'SPINDLE OFF' indicator, and a 'Fast' to 'Slow' speed slider with '+' and '-' override buttons.
- Status Display:** A large black area showing current coordinates in green: 'X:0.0000', 'Y:0.0000', 'Z:0.0000', and 'W:0.00DG'. To the right are buttons for 'Save Home', 'Go Home', 'Set Zero', 'Set Zero Return', 'Zero All', 'Zero X', 'Zero Y', 'Zero Z', 'Zero W', and 'Return to 0.0'. Blue arrows point to 'Go Home' and 'Return to 0.0'.
- Bottom Panel:** Displays machine status: 'RPM:0', 'Maxrpm: 1200', 'Queued:', 'Curr Tool: 1', 'Reset: Z offset: 0.0000', 'Loop:0', 'CNC: no connection', 'Done+', 'Run Time: 88.1 mins', 'USB ? /MILL', 'INCHES/OL', and 'Feed: 9.4'. A 'Preset Help' button is also present.
- Footer:** A 'Hot Keys' button is located at the bottom left.

A "Home" and a "Zero" position will help immensely when running the same program multiple times. For example: Let's say you need to machine one application times 100 pieces. This usually requires a jig to retain that physical 0.00 position. But in this case, you want the program to end with clearance of the axes to easily switch out the next piece of stock and start again. With Save Home, you have the ability to save this offset home position while still retaining your Set Zero position where the machine will mill your part out. Pressing Save Home will record this new position under the Set Zero line in your program.

Pressing Go Home will jog your axes back to your "saved home" position where you originally pressed the Save Home command. You can also input GO_HOME from the Pick Menu as its own tool path in your program. So at the completion of your program it will end the axes at your Home position. Replace your piece of stock, and then press the Return to 0.0 to start your next run.



The screenshot displays the CNC Masters software interface. At the top, there is a menu bar (File, Tools, Window, HotKeys) and a control bar with buttons for Trace, Feed Hold, GO (green), STOP (red), Port OFF (blue), Setup, and Reset Control. A blue arrow points to the Setup button.

The main window is divided into several sections:

- G-code Editor:** Shows a list of G-code lines (N01 to N21). Line N05 is highlighted with 'T2' in yellow. Line N10 is highlighted with 'T3' in yellow. Line N15 is highlighted with 'T4' in yellow.
- Tools Window:** A 'Quick Tool Offset Return Set' table with columns for Reset, Height, Dia., and RPM. Tools T1 through T10 are listed. T2, T3, and T4 are highlighted in yellow. A 'CAUTION!' label is present. Buttons for 'Cancel' and 'Save' are at the bottom.
- Jog Controls:** A central area with directional buttons (+X, -X, +Y, -Y, +Z, -Z, +W, -W) and a 'Jog Input' box. A 'Feed Override' section has '-' and '+' buttons. A 'Disable Motors' button is at the bottom.
- SPINDLE Controls:** Includes a 'Reverse' checkbox, a 'SPINDLE OFF' button, and a speed control slider with '+' and '-' buttons for 'Override'.
- Position Display:** Shows current coordinates: X:0.0000, Y:0.0000, Z:0.0000, W:0.00DG. Buttons for 'Save Home', 'Go Home', 'Set Zero', 'Set Zero Return', 'Zero All', 'Zero X', 'Zero Y', 'Zero Z', 'Zero W', and 'Return to 0.0' are present.
- Status Bar:** Displays machine parameters: RPM:0, Maxrpm: 1200, Queued:, Curr Tool: 1, Reset: Z offset: 0.0000, Loop:0, CNC: no connection, Done+, Run Time: 88.1 mins, USB ? /MILL, INCHES/OL, Feed: 9.4.

At the bottom of the interface, there are buttons for 'Line:0', 'Edit Unlocked', 'ReNum', 'Pick', and 'Draw'. A blue arrow points to the 'Draw' button. A 'Hot Keys' button is also visible.

Tool Height Compensation allows for accurate height offsets when making a tool change with quick change tools within a program. Up to 10 tool changes can be made. This feature can be very effective for improved productivity if your application requires several tool changes.

Tool Radius Offsets can also be done. If you choose to use a G41/G42 for a radius tool offset, you can enter the diameter in the Tools Window under Setup, and the machine will offset the radius of the tool.

Diameter of Tool: By entering the size of the cutter in the Setup > Tools Window, you can also view the tool paths according to cutter size in the Draw window.



The screenshot displays the CNC MASTERS software interface. On the left is the 'Setup' window, and on the right is the main control panel.

Setup Window:

- General | Tools | Auto Tool
- Scale Calibration: X 0.5000, Y 0.5000, Z 0.5000
- XYRapid: 50
- ZRapid: 30
- Scale: X1.0 Y1.0 Z1.0
- Calibration Factor: X1.0 Y1.0 Z1.0
- Draw Delay (0-99): 0, Max RPM: 1200
- Mode: Mill, Lathe X=DIA, 3D Printing
- Unit: Inches, 4th Axis Active
- Unit: Millimeters, C-Type 4th Axis
- Spindle delay in milliseconds: 4000
- Closed-loop, Autho. Code: HX92915
- Buttons: Cancel, Save

Main Control Panel:

- Buttons: Hold, GO, STOP, Port OFF, Setup, Reset Control
- Buttons: Mill, Cycle Wizard, Glossary
- Relative: OFF, Slow, Fast
- Coolant: OFF, Fast
- Jog Feed
- Feed Override: -, +
- Jog Input: +Y, -X, +X, -Y, +Z, -W, +W, -Z
- SPINDLE: Reverse, OFF, Fast, +, Override, -, Slow
- Disable Motors

Display and Controls:

- Coordinates: X:0.0000, Y:0.0000, Z:0.0000, W:0.00DG
- Buttons: Save Home, Zero All, Go Home, Zero X, Set Zero, Zero Y, Set Zero Return, Zero Z, Zero W, Return to 0.0, Preset Help
- Status: RPM:0, Maxrpm: 1200, Queued: Loop:0, Curr Tool: 1, Reset: Z offset: 0.0000, CNC: no connection, Done+, Run Time: 88.1 mins, USB ? /MILL INCHES/OL, Feed: 9.4

In the Setup window, you will find other useful features such as:

Adjust Rapid on the axes from .1" to 100"/minute of travel.

Scale feature allows you to quickly double the size or miniaturize the size of the application.

Calibration Factor allows you to fine tune an axis for enhanced repeatability.

Inch/mm Display allows you to change from inch to mm mode.

Max RPM allows you to synchronize the spindle motor belt or gear positions for computer variable spindle control.

Change the Face of the Master to Lathe Mode or Mill Mode for any of our CNC machines.

File Tools Window Hot Keys

Trace Feed Hold **GO** **STOP** Port OFF Setup Reset Control

General Tools Auto Tool

Scale Calibration X 0.5000 Y 0.5000 Z 0.5000

XRapid 50

ZRapid 30

Scale X1.0 Y1.0 Z1.0

Calibration Factor X1.0 Y1.0 Z1.0

Draw Delay (0-99) 0 Max RPM 1200

Mill
 Lathe X=DIA
 3D Printing

Inches
 4th Axis Active

Millimeters
 C-Type 4th Axis

Spindle delay in milliseconds 4000

Closed-loop
 Autho. Code HX92915

Cancel Save

Lathe Cycle Wizard

Relative OFF Slow Fast

Coolant OFF Fast

Jog Rapid

Feed Override - +

-Z +Z

-X +X

Jog Input

Disable Motors

SPINDLE

Reverse

OFF

Fast

+ Override -

Slow

X:00.0000

Z:00.0000

Line:0

Edit Locked ReNum Pick Draw

Hot Keys

Save Home

Zero All

Go Home

ZeroX

Set Zero

Zero Z

Set Zero Return

Return to X 0.0

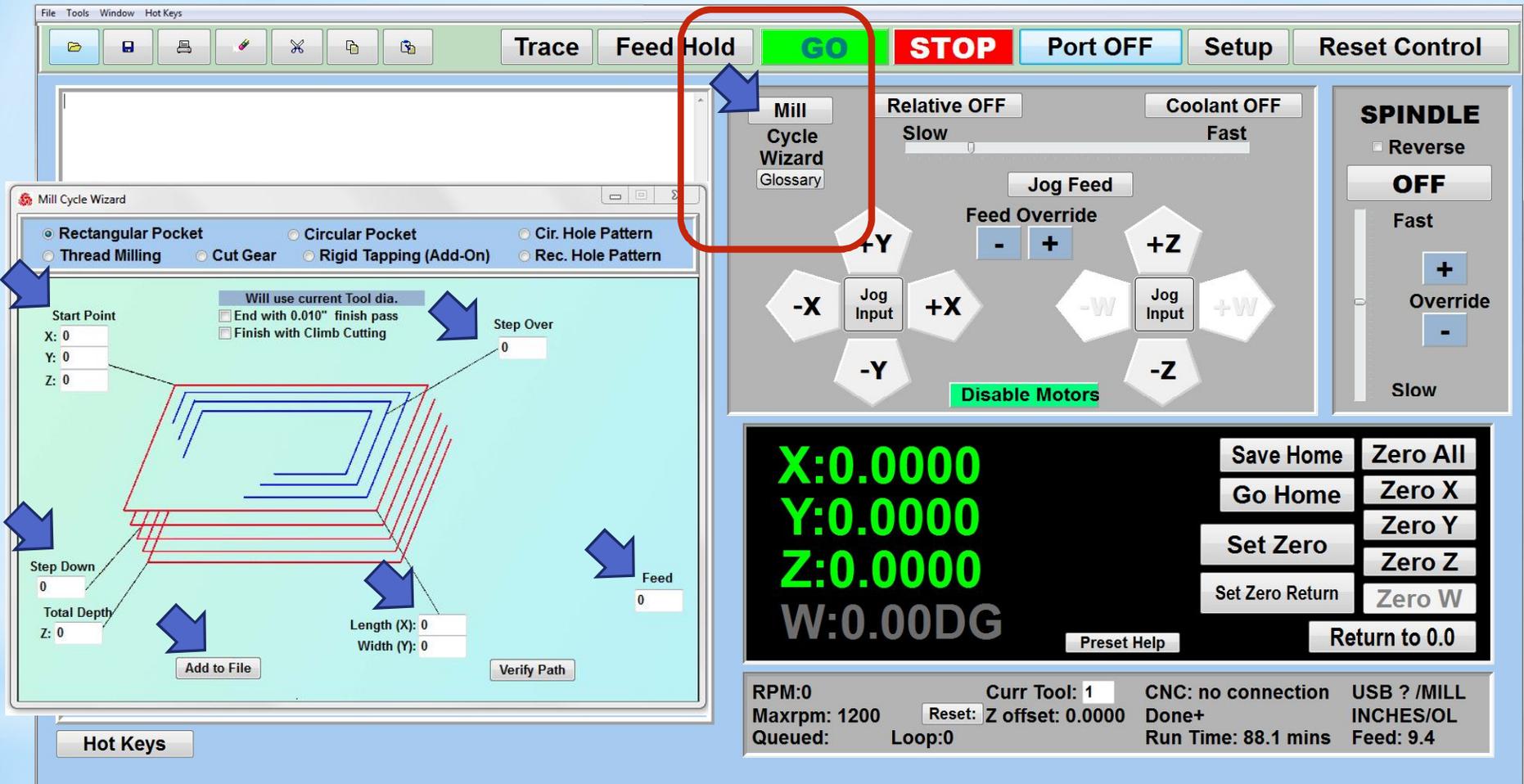
Return to Z 0.0

RPM:0 Curr Tool: 1 CNC: no connection USB ? /MILL

Maxrpm: 1200 Reset: Z offset: 0.0000 D : INCHES/OL

Queued: Loop: 1 X offset: 0.0000 Run Time: 0 mins Feed: 50.0

The Master MX can easily be switched from a mill to lathe operations interface.



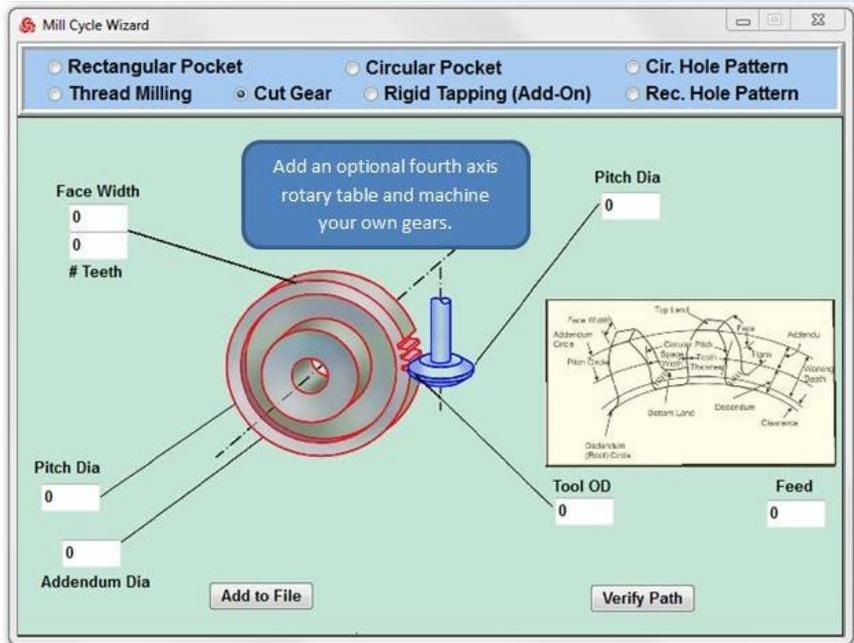
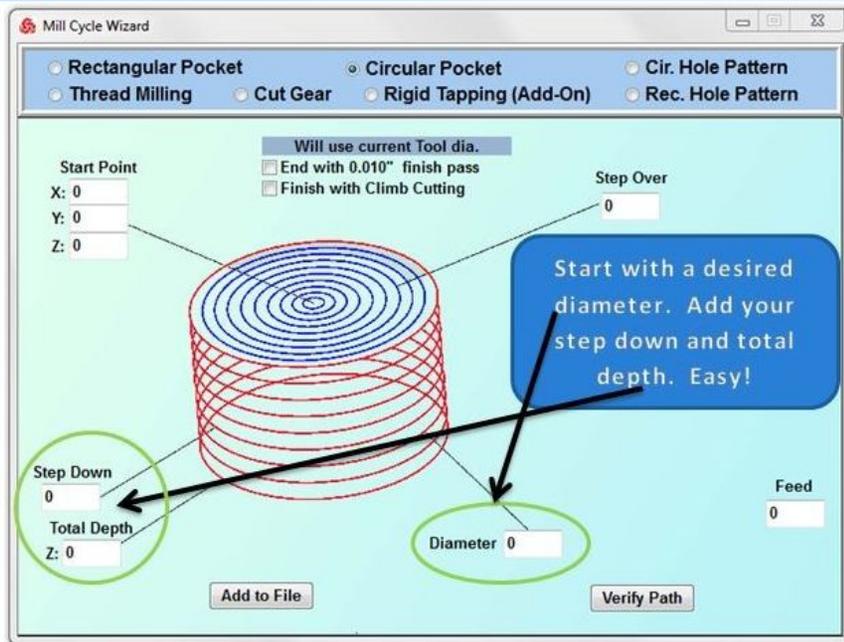
The screenshot displays the CNC MASTERS software interface. At the top, a menu bar includes File, Tools, Window, and Hot Keys. Below it is a toolbar with icons for file operations and a row of control buttons: Trace, Feed Hold, **GO** (highlighted in green), STOP, Port OFF, Setup, and Reset Control. The main control area features a 'Mill Cycle Wizard' window on the left, which is currently set to 'Rectangular Pocket'. It includes fields for Start Point (X: 0, Y: 0, Z: 0), Step Over (0), Step Down (0), Total Depth (Z: 0), Length (X: 0), and Width (Y: 0). A 3D visualization of a rectangular pocket is shown with blue arrows pointing to various parameters. The right side of the control panel includes 'Relative OFF' (Slow to Fast), 'Coolant OFF' (Fast), 'Jog Feed', 'Feed Override' (-/+), 'Jog Input' (+X, -X, +Y, -Y, +Z, -Z, +W, -W), and a 'SPINDLE' section with 'Reverse' (OFF), 'Fast', 'Override' (+/-), and 'Slow' settings. A 'Disable Motors' button is also present. At the bottom, a status display shows coordinates: X:0.0000, Y:0.0000, Z:0.0000, W:0.00DG. To the right of the coordinates are buttons for 'Save Home', 'Zero All', 'Go Home', 'Zero X', 'Set Zero', 'Zero Y', 'Set Zero Return', 'Zero Z', 'Zero W', and 'Return to 0.0'. A 'Preset Help' button is also visible. The bottom status bar shows: RPM:0, Maxrpm: 1200, Queued: Loop:0, Curr Tool: 1, Reset: Z offset: 0.0000, CNC: no connection, Done+, Run Time: 88.1 mins, USB ? /MILL, INCHES/OL, and Feed: 9.4.

The Cycle Wizards makes it easy to create a simple tool path without needing to use a CAD and CAM software.

Create circle patterns and profiles, slots, rectangular pocketing, thread milling, gear cutting, rigid tapping (with optional encoder kit) and peck drilling applications programs with a few key entries.

Use the Mill Wizards to do..

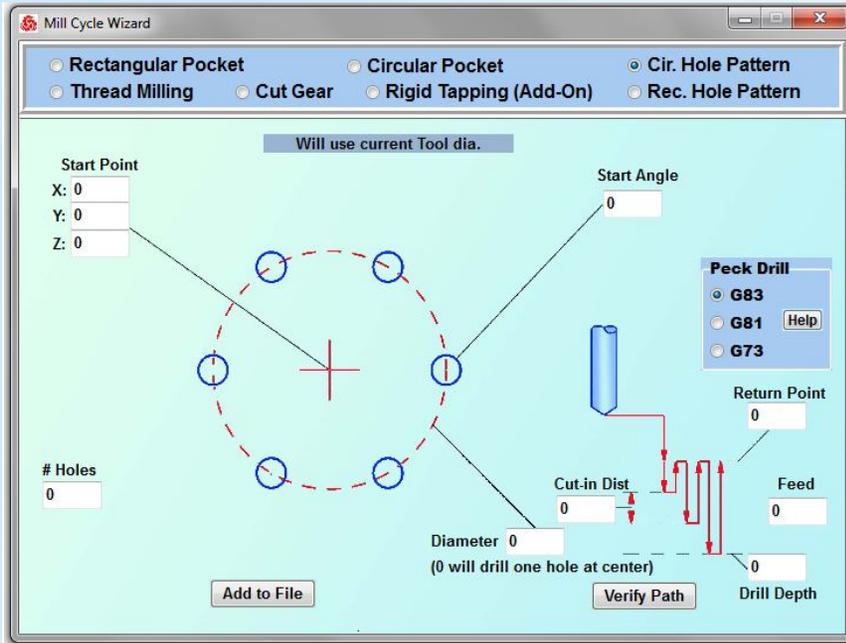
Circle Pocketing



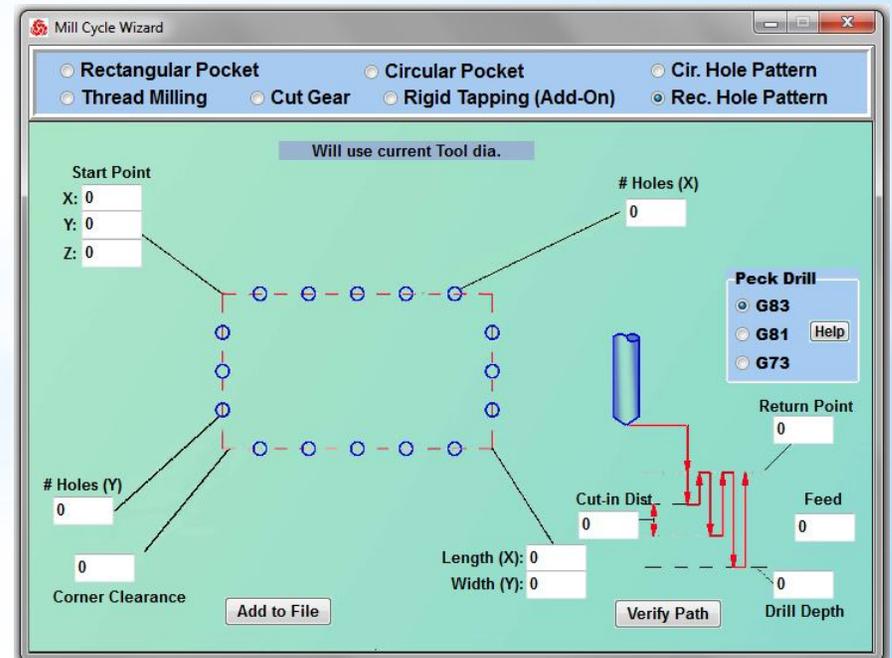
Gear Cutting

Use the Mill Wizards to do..

Circular Hole Drilling Pattern

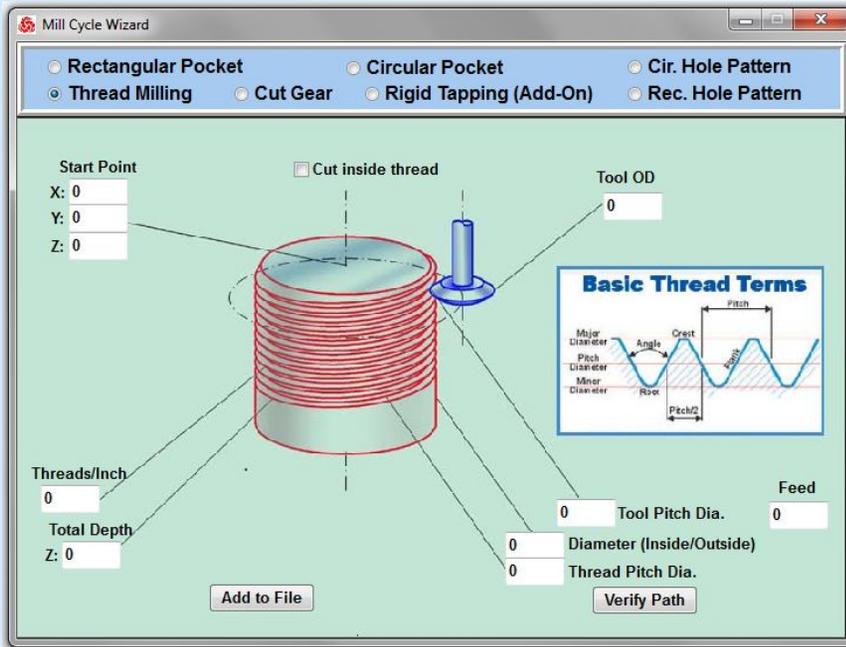


Rectangular Hole Drilling Pattern

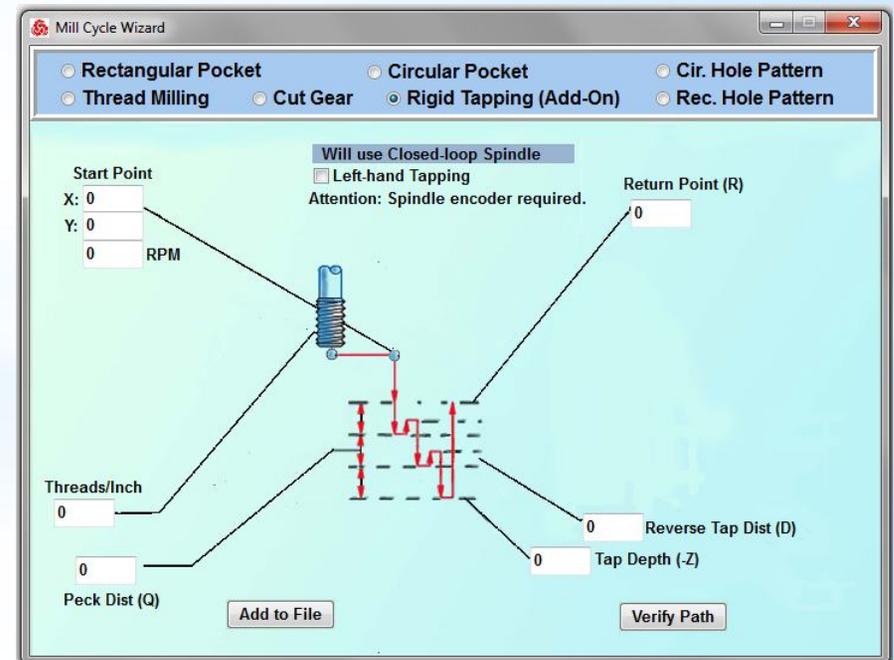


Use the Mill Wizards to do..

Thread Milling



Rigid Tapping



Lathe Cycle Wizard

G76 Threading Cycle
 G71 Turning/Boring Cycle
 G72 Facing Cycle

Start Point X: Z:
 Final Diameter (X)
 Position of (Z)
 Amount of Taper (I) 0.0
 Total Depth (K)
 First Pass Depth (D)
 Thread Insert Angle (A) 60
 Threads per inch

Cut type: External Internal
 Right Hand Left Hand

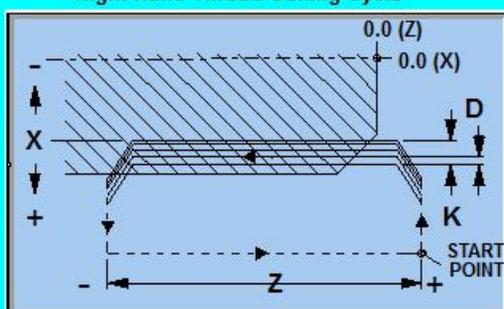
Compound Infeed (from chart)

RPM SFM
 RPM Constant Cutting Speed

Spindle: Forward Reverse

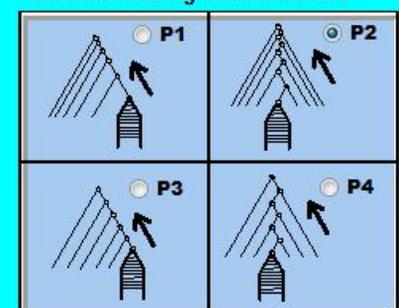
Three lines of code will be added to the program:
Spindle code, Start Point code, Cycle code

Right Hand Thread Cutting Cycle



Select threading infeed method

<input type="radio"/> P1	<input checked="" type="radio"/> P2
<input type="radio"/> P3	<input type="radio"/> P4



Threading Cycles



Use the Lathe Wizards to do...

Lathe Cycle Wizard

G76 Threading Cycle G71 Turning/Boring Cycle G72 Facing Cycle

Start Point X: Z:

Final Diameter (X)

Position of (Z)

Amount of Taper (I) 0.0

Total Depth (K)

First Pass Depth (D)

Feed Inch/Min.

Cut type: External Internal

RPM SFM

RPM Constant Cutting Speed

Spindle: Forward Reverse

Three lines of code will be added to the program:
Spindle code, Start Point code, Cycle code

Turning Cycle

A technical diagram titled "Turning Cycle" showing a cross-section of a lathe workpiece. The diagram illustrates the geometry of a turned part with a diameter 'D', a total depth 'K', and a start point. The Z-axis is horizontal, with '0.0 (Z)' at the right end and a negative direction to the left. The X-axis is vertical, with '0.0 (X)' at the top and a positive direction downwards. A "START POINT" is indicated at the right end of the workpiece. The diagram shows the workpiece being turned from a larger diameter to a smaller diameter 'D' over a length 'K'.

Turning & Boring Cycles



Use the Lathe Wizards to do...

Lathe Cycle Wizard

G76 Threading Cycle G71 Turning/Boring Cycle G72 Facing Cycle

Start Point X: Z:

Final depth (Z)

Position of (X)

Amount of Taper (I) 0.0

Total Depth (K)

First Pass Depth (D)

Feed Inch/Min.

RPM SFM

RPM Constant Cutting Speed

Spindle: Forward Reverse

Three lines of code will be added to the program:
Spindle code, Start Point code, Cycle code

Facing Cycle

The diagram illustrates the facing cycle on a lathe. It shows a cylindrical workpiece with a hatched section representing the material to be removed. The Z-axis is horizontal, with 0.0 (Z) at the right end and a negative direction to the left. The X-axis is vertical, with 0.0 (X) at the top. The starting point is marked with a '+' and labeled 'START POINT'. The final depth is marked with a '-' and labeled 'Final Depth (Z)'. The amount of taper is labeled 'I', total depth is 'K', and first pass depth is 'D'.

Facing Cycles



In summary, the MX supports....

- Tool Height/Length Compensation up to Ten Tools within one program
- Tool Radius Offsets
- Feed Hold - pause and step through your program while opting to shut the spindle off and then resume program
- Coolant Control - optional
- Variable Spindle Control from 0 to max - optional
- Spindle Encoder for rigid tapping - optional
- Jog Feed/Teach Mode - create a program simply by jogging your axes
- Feed and Spindle Speed Over-Rides on the fly
- Relative exact movement positioning without writing a program – type in one movement and one-click your jog +/- arrow to drive that exact movement
- Press Go from another location other than 0.00 - just preset the new coordinates directly into the counters
- Save 0.00 *and* a home offset position for future program production runs
- Live Counter Display during computer numerical control movement without jumping ahead
- Displays and runs in either inches or millimeters
- 4th axis interpolation - simultaneous motion with the other axes - optional
- Rapids up to 100"/minute
- Trace Mode - Run one line independently at a time from beginning to end in your program to help you study the movement and establish your setup
- Editor Locked/Unlocked to easily write and edit your program and prevent accidental typing during a program run
- Displays Run Time
- Hot Keys - if your preference is to control your machine by keyboard such as the arrows, space bar, and letters simply open the Hot Keys command
- Run Sub-Routine programs using CALL for nesting applications or to mass produce the same part on a constant loop.
- Disable Motors – Easily disable motors to hand crank each axis. Re-engage the motors for cnc control in one click.
- Use a touch screen monitor or control your machine with your pc mouse all by true USB.

The MX is designed to be seamless....none of this having to pre-engineer or tune the software to work with your machine. Just plug in the machine to a pc and play!



The Master Software supports these standard G-Codes and M-Codes for our CNC Mills:

G00 = Position (Fast speed)
G01 = Linear interpolation (Feed speed)
G02 = Circular interpolation (CW)
G03 = Circular Counter-clockwise interpolation (CCW)
Format: X__Y__I__J__ I,J are relative distance from start to center. Z can be added for helical designs.
G40 = Cancels G41 and/or G42
G41 = Tool Radius compensation left
G42 = Tool Radius compensation right
G70 = Input in inches
G71 = Input in millimeters
G73 = High-Speed Peck Drilling Cycle
G81 = Drilling Cycle
G82 = Counter Boring Cycle
G80 = Cancel Cycle
G83 = Deep Hole Peck Drilling Cycle
G90 = Absolute move (Modal)
G91 = Relative/Incremental move (Modal)

M00 = Pause
M03 = Spindle on
M04 = Spindle on reverse
M05 = Spindle off
M08 = Coolant on
M09 = Coolant off
M30 = End program

The Master Software supports these standard G-Codes and M-Codes for our CNC Lathes:

G00 = Position (Fast speed/Rapid)
G01 = Linear interpolation (Feed speed)
G02 = Circular interpolation (CW)
G03 = Counter Clockwise Circular interpolation (CCW)
Format: X__Z__I__K__ I,K are relative distance from start to center.

G04 = Dwell time
G20 = Input in inches
G21 = Input in millimeters
G71 = Turning Cycle
G72 = Facing Cycle
G74 = Peck Drilling
G76 = Threading cycle
G90 = Absolute move (Modal)
G91 = Incremental move (Modal)

M03 = Spindle on
M04 = Spindle on reverse
M05 = Spindle off
M08 = Coolant on
M09 = Coolant off
M30 = End program

The MX is a free download. Try it today.



Our Pledge to You...

When you do business with CNC Masters, you will be doing business with a company who cares about its customers. We take our after sales tech support very seriously by phone or email for as long as your company owns a CNC Masters machine purchased directly from us. We understand that your company has invested in CNC Masters to help you along the way. It does not matter how many years have passed, we will be happy to assist by guiding you over the phone or by email step by step if needed. We will help you trouble shoot the the mechanics, electronics, and explain the functions on the Master Software.

We are honored you have chosen CNC Masters over other brands in the market so it will remain our goal to help you put your product out in the market as quickly as possible.

Master Software updates will also be made available to you for as long as the hardware in the control unit can sustain it.

Thank you for watching, and be sure to email us with any questions you may have at sales@cncmasters.com.