

THE TOOL ROOM MILL

QUICK START GUIDE



Haas Automation Inc.

This Quick Start Guide has been developed to assist you in becoming familiar with the operation of the Haas Tool Room Mill as a manual machining mill.

This guide also demonstrates the sequence of steps needed to utilize the full CNC machining capability of the Tool Room Mill.

For Manual Operation follow the steps 1 through 5 within this guide. This will familiarize you with the control.

For CNC Operation follow steps 1 through 10, excluding step 4. This will assist you in inputting the information about tools and part location that the Tool Room Mill requires for successful operation.

Steps 8, 9 and 10 reference you to the *Operator's Manual*. Due to the complex nature of the topics, we will only make general comments about proper pre-machining preparations. For further advice or education about Tooling, Work Holding, Programming etc., contact your local Haas Factory Outlet (HFO).

As you follow the steps, you will be directed to press specific keys to accomplish the tasks. The *Control Pad Keys* are listed in bold within the left and right angle brackets. Example: <RESET> Additional information on these steps are found in the *Operator's Manual* in the section referenced.



For information relating to the positive and negative travels of the X, Y & Z axes, see *Operator's Manual*.

Familiarize yourself with the safety section of the Operator's Manual before attempting the steps in the Quick Start Guide.

THE STEPS:

1. Power On
2. Zero the Machine
3. Mounting the Part
4. Operating Modes¹
5. Cutting Tools
6. Work Coordinate Set²
7. Tool Offsets²
8. Programming²
9. Trial Run²
10. Machine Part²

¹Manual only

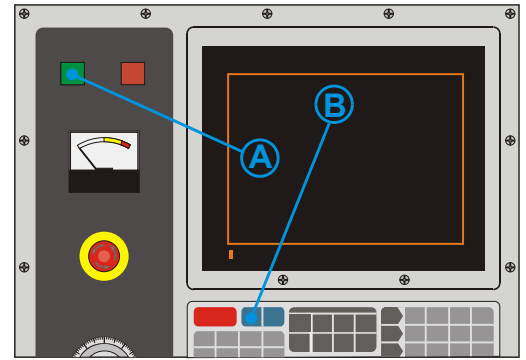
²CNC only

1 POWER ON

Press <POWER ON>. **A** The mill performs an internal check of its functions and then displays the Alarms Page. Normally the alarm "102 Servos Off" is displayed. If this is true go to step 2. If a message was left the Message Page will be displayed; go to step 2.
(See Operator's Manual Section 3)

2 ZERO THE MACHINE

Press <POWER UP RESTART>. **B** This step tells the machine to find home / machine zero, so it can be referenced during the machining operations
(See Operator's Manual Section 3)



3 MOUNTING THE PART

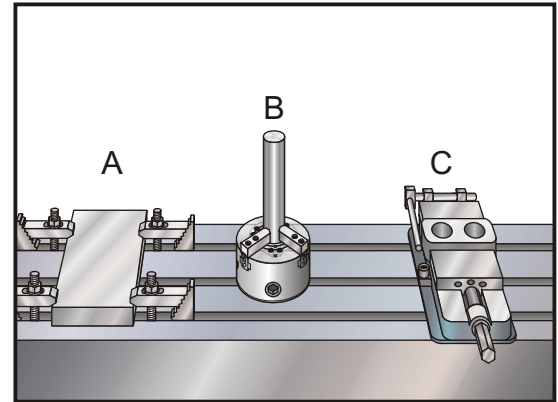
It will be necessary to properly secure the part to the table. This can be done a number of ways: vises, chucks or the use of T-bolts and toe clamps. The machining operation will have a significant influence on that decision. Plan the milling operation before securing the part. We have illustrated one type of vise here. Contact your local HFO for further information.

SQUARING A VISE (Reference illustration to the right)

1. Make sure the part is bolted within the table limits
2. Check for sufficient tool clearance
3. Bolt the part or fixtures securely to the table.

The diagram shows a few different ways of properly clamping a workpiece.

- A. Toe clamps - Grips the edges of a part. Useful for engraving or other operations that do not require machining to the very ends of a part.
- B. Chuck - Cylinders, hex stock etc. can be held.
- C. Vise - Capable of holding parts in a repeatable position as an aid in production runs



4 OPERATING MODES

The Tool Room Mill can operate in any one of three modes: Manual, Jog Index or CNC. The Manual and Jog Index modes will be explained in this guide; for CNC operation refer to the Operator's Manual.

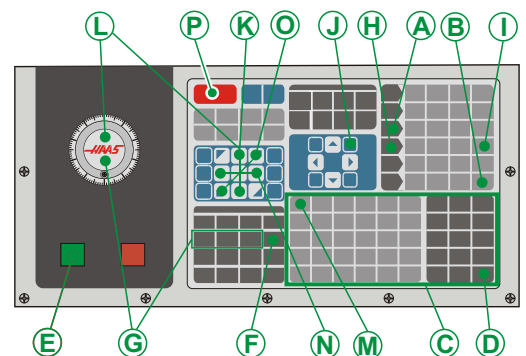
Note: The hand held safety switch must be pressed in order for the mill to do any automatic functions. Any time the switch is released the spindle and axes motion will stop. The machine can be started again by holding the safety switch down and pressing Cycle Start (it is not necessary to hold the Cycle Start switch down).

4.1 ENGAGING MANUAL MODE

To perform machining operations in the "X", "Y", and "Z" axes in manual mode, you must first turn on the spindle before you enter into the jog mode.

1. Press <MDI DNC> **A**
 2. Press <ERASE PROG> **B** (to clear screen)
 3. Type S200 M03 **C** (200 = spindle speed)
 4. Press <WRITE/ENTER> **D**
 5. Press <CYCLE START> **E** (spindle on)
- To adjust spindle speed:
Press <HANDLE CONTROL SPINDLE> **F** and use the **jog handle** **G** to control speed, or press the spindle **override keys** **G**
6. Press <HANDLE JOG> **H**
 7. Press <.1 100.> **I** (The mill will move at a fast rate when the handle is turned)
 8. Press <PAGE UP> **J** to bring up the POS-JOG (JOG) view

9. Press <-Z> or <+Z> **K** the travel of the "Z" axis may now controlled either with the **jog handle** or the **jog keys**, **L** which must be pressed and held
10. Press <SHIFT> **M**
11. Press <-X> or <+X> **N** The "X" axis is now in manual mode
12. To add the "Y" axis Press <SHIFT> **M**
13. Press <-Y> or <+Y> **O** The "Y" axis is now in manual mode
14. **Only if you intend to proceed to Section 5.2**
Press <RESET> **P** (this will stop the spindle and disengage manual mode)



JOG OFFSET: (See **E** Below)

Values added here allow you to reuse the Travel Limits and Jog Index Distance values at a different location in one or all axes.

TRAVEL LIMITS: (See **A, B, H & F** Below)

Default values are: X = 30", Y = 12", & Z = 16".

JOG INDEX DISTANCE: (See **C, D & G** Below)

The values shown are the last entered values prior to powering down the machine.

4.2 JOG INDEX MODE (See pocket milling illustration at lower right.)

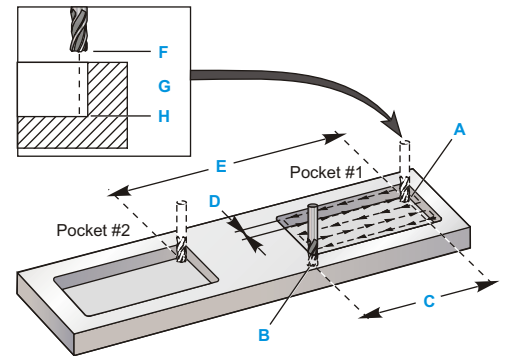
The Jog Index mode allows the operator to set limits electronically. This is similar to the mechanical stops you may have used on other manual mills. The max and min limits govern the amount of area you can machine in. Limits can be utilized in the manual mode using the axis wheels or the jog axis keys on the control. The steps below use the keys on the control. For more information refer to the Tool Room Mill Operator's Addendum. To practice the cutting of the two pockets shown to the right, a practice template is included in the Tool Room Mill Operator's Addendum. Place it on the mill and follow the steps below. **Press <DELETE> to reset travel limits.**

1. *Jog the "X", "Y" and "Z" axes to position "A" of pocket #1
2. Press <ORIGIN> **A**
3. *Jog to position "A" on pocket #2
4. Record the "X" value for use later
5. *Jog the "X" axis back to position "A" of pocket #1
6. **Cursor B** to "X" MAX (on the screen)
Press <ALTER> **C**
7. **Cursor B** to "Y" MAX (on the screen)
Press <ALTER> **C**
8. *Jog the "X" and "Y" axes to position "B"
9. **Cursor B** to "X" MIN (on the screen)
Press <ALTER> **C**
10. **Cursor B** to "Y" MIN (on the screen)
Press <ALTER> **C**
11. Press <.01 10.> **D**
12. **Cursor B** to Jog Index Distance "X"
(on the screen)
Type a value greater than the pocket size for the "X" travel; include decimal (The limits will stop the cut)
13. Press <F1> **F** to enter the value.
14. **Cursor B** to Jog Index Distance "Y"
Type the distance you want the tool to travel for each cut; include decimal (Radius of the tool)
15. Press <F1> **F** to enter the value
16. Press <SHIFT> **G**
17. Press <JOG LOCK> **H**
(Puts you in the Jog Index Mode)
18. Select +X, -X and +Y as necessary to move along the cutting pattern for pocket #1

* This step not shown in detail; you should be able to perform this action from previous sections
Continue to Section to 4.2.1 to learn how to set Jog Offset and move to pocket #2

Jog Screen

	JOG OFFSET	X	Y	Z
E		0.0000	0.0000	0.0000
	TRAVEL LIMITS			
B	MIN	-2.2100	-0.7200	-0.7500
A	MAX	0.0000	0.0000	0.0000
	JOG INDEX DISTANCE			
C		-3.0000	-0.1250	-1.0000
D				

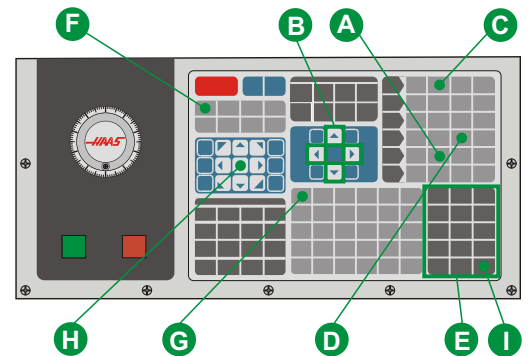


- A** = "X" & "Y" most positive travel limit.
B = "X" & "Y" most negative travel limit.
C = A value greater than A + B.
D = The tool step-over distance.
E = "A position" of pocket #1 + the distance to "A position" of pocket #2 (entered after cutting pocket #1)
F = The travel limit UP
G = A value greater than F + H or the distance to travel for a pecking cycle.
H = The travel limit DOWN

4.3 JOG OFFSET

19. *Handle Jog the "X" and "Y" axes to position "A" of pocket #1 [if not already there]
20. **Cursor B** to Jog Offset "X"
21. **Type the value E** from section 5.2 step 4
22. Press <WRITE / ENTER> **I**
23. * Handle jog to position "A" of pocket #2
24. Press <SHIFT> **G**
25. Press <JOG LOCK> **H**
(Puts you in the Index Mode)
26. *Select +X, -X and -Y as necessary to move along the cutting pattern for pocket #2

NOTE: You can move toward pocket #2 but not back toward pocket #1 because you are outside of the limits for pocket #1.

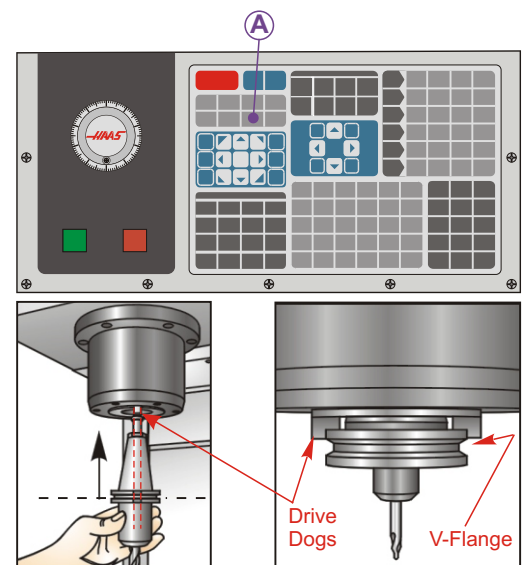
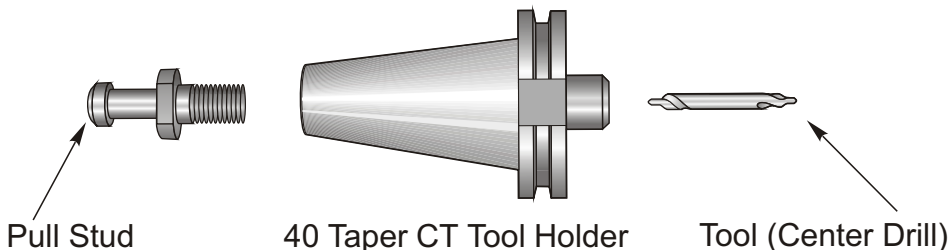


5 CUTTING TOOLS

The machining operations to be performed will dictate which tools will be needed. Set up these tools in the proper tool holders. The Tool Room Mill uses CT40 tooling. You will need to provide the correct pull studs, tool holders and cutting tools. Contact your local HFO for further information.

LOADING A TOOL INTO THE SPINDLE

1. Raise the spindle to eye level with the jog handle
2. Position the tool in the spindle, align drive dogs with slots on V-flange (Press firmly)
3. Press and hold <TOOL RELEASE> **A** for approximately 1 second. (You will feel the tool holder being pulled up into the spindle. Verify the tool holder is seated properly and that the drive dogs are aligned with the slots in the V-flange, if not, remove tool and reinsert)



CAUTION: Do not place fingers above the V-flange of the tool holder. Injury will result.

6 WORK COORDINATE SET CNC MODE ONLY

For ease of operation and to simplify this step, we will be using a pointer to locate the part on the table. It is general practice to use an edge finder to maintain a high degree of accuracy.

In order for the mill to accurately machine a workpiece, the mill needs to know where the part is located on the table. The mill must be jogged, with a pointer tool in the spindle, until it reaches the top left corner of the part. This position is part zero. These values will be entered into G54.

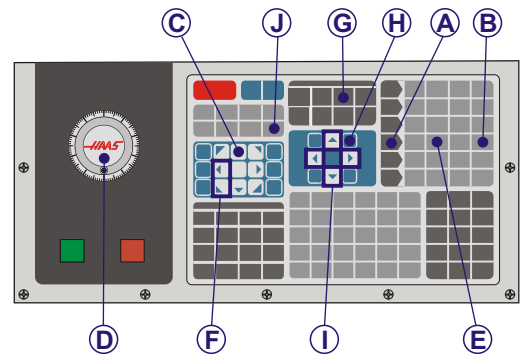
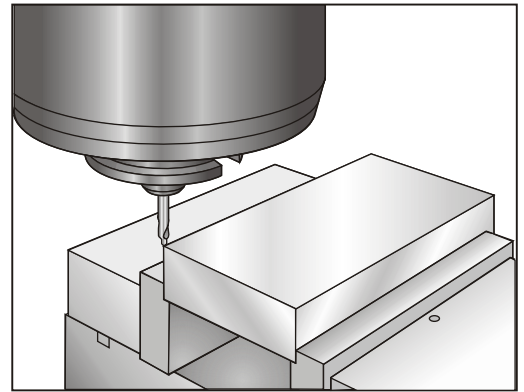
For example: **G90 G54 G00 X0 Y0** This program line will reference the "X", "Y" and "Z" values, located in G54, and move to those positions.

LOCATING THE PART

1. Place the material in the vise and tighten
2. Load a pointer tool in the spindle.
(See **4 CUTTING TOOLS** in this guide)
3. Press <HANDLE JOG> **A**
4. Press <.1 100.> **B** (The mill will move at a fast speed when the handle is turned)
5. Press <+Z> **C**
6. **Handle jog D** the "Z" axis approx. 1" above the part
7. Press <.001 1.> **E** (The mill will move at a slow speed when the handle is turned)
8. **Handle jog D** the "Z" axis approx. 0.2" above the part
9. Select between the **X** and **Y** **F** axes and **handle jog D** the tool to the upper left corner of the part. (See *illus. at right*)
10. Press <OFFSET> **G**
11. Press <PAGE UP> **H** repeatedly until you see the Work Zero Offset Page
12. **Cursor I** to G54 Column "X"
13. Press <PART ZERO SET> **J** to load the value into the "X" axis
14. Press <PART ZERO SET> **J** to load the value into the "Y" axis

CAUTION: Do Not Press "Part Zero Set" a third time, doing so will load a value into the "Z" axis. This will cause a crash or "Z" axis alarm when the program is run.

(See Operator's Manual Section 4)



7 TOOL OFFSET CNC MODE ONLY

The next step is to touch off the tools. Doing this defines the distance from the tip of the tool to the top of the part. Another name for this is Tool Length Offset, which is designated as H in a line of machine code; the distance for each tool is entered into the Tool Offset Table.

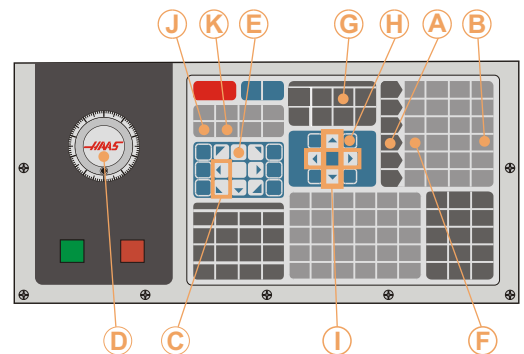
For example: **G43 H1 Z1** The machine will reference the Tool Length Offset Table with G43 and use the "Z" distance (H ##) listed for tool 1.

SETTING TOOLS

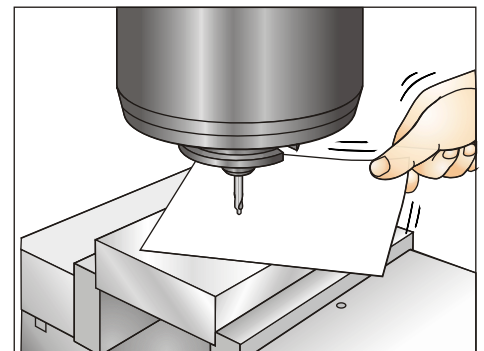
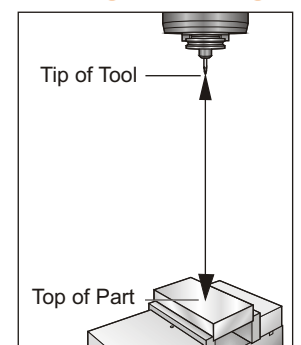
1. Load the tool in the spindle
(See **4 CUTTING TOOLS** in this guide)
2. Press <HANDLE JOG> **A**
3. Press <.1 100.> **B** (The mill will move at a fast rate, when the handle is turned)
4. Select between the **X** and **Y** axes **C** and **handle jog D** the tool near the center of the part
5. Press <+Z> **E**
6. **Handle jog D** the "Z" axis approximately 1" above the part
7. Press <.0001 .1> **F** (The mill will move at a slow rate when the handle is turned)
8. Place a sheet of paper between the tool and the work piece. Carefully move the tool down to the top of the part, as close as possible, and still be able to move the paper
9. Press <OFFSET> **G**
10. Press <PAGE UP> **H** as many times as necessary to get to the CLNT (LENGTH) (RADIUS) page for tool #1
11. **Cursor I** to Geometry for position #1
12. Press <TOOL OFFSET MESUR> **J**
This will take the "Z" position located in the bottom left of the screen and put it the tool number position
13. Press <NEXT TOOL> **K**

CAUTION: The next step will cause the spindle to move upward rapidly in the "Z" axis

(See Operator's Manual Section 3)



Tool Length is measured from the tip of the tool to the top of the part with the "Z" axis at its home position.



8 PROGRAMMING CNC MODE ONLY

(See Operator's Manual Section 4)

9 TRIAL RUN CNC MODE ONLY

(See Operator's Manual Section 3)

10 MACHINING A PART CNC MODE ONLY

(See Operator's Manual Section 3)