GETTING STARTED WITH WINMAX LATHE
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DOCUMENTATION CONVENTIONS

This documentation uses several conventions to explain the safety features and emphasize key concepts. These conventions are described in this section.

Sample Screens

Sample screens in this documentation were taken from a WinMax single-screen control. All screens are subject to change. The screens on your system may vary slightly.

Softkeys

Softkeys are located on the side of the screen. You can set the softkeys to appear on either the right or left side of the screen. Refer to the Getting Started with WinMax for information about making this selection. Softkeys may change upon field entries or other softkey selection. References to softkeys in the documentation appear with the softkey’s corresponding F-key. For example, the Part Setup softkey from the Input screen is referenced as the PART SETUP F1 softkey.

Screen Areas

The screens are divided into the following areas, in addition to the row of softkeys:

Data Entry

The data entry area is located on the opposite side of the screen from the softkeys. Available softkeys may change even when the text and data entry area does not.

Fields in the data entry area display or receive information. Refer to Using the Touchscreen for information on entering information in fields.

Prompts and Error/Status Area

The bottom portion of the screen is reserved for prompts, program status and error messages.

Prompts provide help on data entry selections based on the field with the blinking cursor.

Errors and status messages occur anytime the status or error occurs. They are not based on the field with the blinking cursor. These messages provide machine information to the operator.

Error messages may also stop and/or prevent machine operation until the cause of the error is corrected.

Status Bar

The status bar contains
• The name of the open, selected program.
• A calculator icon—select the icon to display a working, on-screen calculator.
• Units of measure (Inch or Millimeters)—select the units of measure in the status bar to toggle between Inch and Metric.
• Programming mode (R for Radius; D for Diameter)—select the programming mode in the status bar to toggle between Radius and Diameter.
• A yellow icon—indicates the feed hold is on when visible.
• A red icon—indicates the Emergency Stop button has been pressed when visible.
• A keyboard icon—select the icon to display a working on-screen keyboard.
• The current time.

When viewed on a single-screen console, all icons appear in the same status bar; when viewed on a dual-screen console, the program name and calculator icon appear on the left screen status bar, and the unit of measure, keyboard icon and time appear on the right screen status bar.

**Console Buttons and Keys**

References to console buttons and keys appear in bold text throughout the documentation. For example, the Start Cycle button appears as the **Start Cycle** button and the Manual key appears as the **Manual** console key in text.

Refer to the *Getting Started with WinMax* manual for information about console buttons and keys, in addition to other information about using softkeys and the pop-up text entry window.

**Using the Touchscreen**

The console has a touchscreen for entering programming data. To make a selection, tap the screen on a softkey, field, or drop-down list using the stylus attached to the side of the console or another suitable pointing device.

**Icons**

This manual may contain the following icons:

**Caution/Warning**

⚠️ The operator may be injured and/or the machine severely damaged if the described procedure is not followed.
Important

→ Ensures proper operation of the machine and control.

Troubleshooting

❓ Steps that can be taken to solve potential problems.

Hints and Tricks

💡 Useful suggestions that show creative uses of the WinMax features.

Where can we go from here?

🌐 Lists several possible options the operator can take.
PROGRAMMING AND OPERATION INFORMATION

Hurco provides documentation for using WinMax software on a control or desktop in two formats: on-screen Help and PDF. The information contained in both formats is identical.

On-screen Help contains information about the current screen. If Help is not available for a screen, a Welcome screen appears with access to the Table of Contents, Index, or Search functions.

- To view the on-screen Help directly on a Hurco control, select the Help console key.
- To view the on-screen Help on the desktop software, select the Help icon in the menu bar.

PDF files are available on the hard drive. These files can be copied from the hard drive to a USB memory device and transferred to a PC for viewing and printing.

Using the On-screen Help

On-screen Help provides information about using WinMax. The Help is context-sensitive to the screen level. Press the console Help button to display the Help topic for the current screen. The following list describes Help functions:

- Buttons in the upper left-hand corner of the Help screen are used to move through Help topics and print screens.
  - Use the Hide button to hide the navigation pane.
  - Use the Back button to return to the previous Help screen.
  - Use the Print button to print the current displayed Help topic, if a printer is attached and configured. See Printing the Programming Manuals, on page - xv for more information about printing.
- Use the arrow buttons to move between pages within a Help topic and to move through topics.
- Use the Contents tab for a list of information sorted by subject:
  1. Select the “+” to expand the topic and view sub-topics.
  2. Select the topic to display it.
- Use the Index tab to show the Help index:
  1. Quickly scroll to an index topic by typing the topic in the box at the top of the index.
  2. Select a topic and the Display button to view the topic.
• Use the **Search** tab to search the Help for a word or phrase:
  1. Type the search word(s) into the text box at the top of the pane.
  2. Select the List Topics button. A list of topics that contain the search word(s) is displayed.
  3. Select a topic and the Display button to view that topic.

• Use the **Favorites** tab to save Help topics for quick access:
  1. Select the Add button at the bottom of the pane to add the current topic.
  2. Select a topic from the Favorites list, and select the Display button to view it.
  3. Select a topic from the Favorites list, and select the Remove button to remove it from the list.

## Printing the Programming Manuals

The WinMax On-screen Help is also provided in PDF format for easy printing. The information contained in the PDF files is identical to the on-screen Help. The PDF files may be copied to a floppy disk or USB memory device to be transferred to a PC for printing. Here are the steps to access the PDF files:

1. From the Input screen, select the **PROJECT MANAGER** F8 softkey.
2. Select the **FILE MANAGER** F7 softkey.
3. In the left-hand pane, navigate through the folders:
   • For WinMax Lathe on a machine, the path is D:\Hurco\Hurco Lathe\hlp.
   • For WinMax Desktop on a PC, the path is C:\Program Files\Hurco\Hurco Lathe\hlp.

   The PDF files will appear in the right-hand pane.

   ![The SHOW ALL FILE TYPES field in User Interface Settings must be set to YES (default is NO) in order to see the PDF files in the directory. Access the SHOW ALL FILE TYPES field in Auxiliary Mode, Utilities/ User Preferences/ User Interface Settings.](image)

4. Highlight the PDF file(s) in the right-hand pane, and select the **COPY** F2 softkey.
5. Ensure that your media is loaded (either a floppy disk in the disk drive or a USB memory device in the USB port), and navigate to the proper location in the left-hand pane of the DISK OPERATIONS screen (either the floppy drive A: or the USB port E:). Highlight the desired location.
6. Place the cursor in the right-hand pane and select the **PASTE** F3 softkey to paste the PDF file(s) to the desired location.

You may now remove your media and load the PDF file(s) onto a PC for printing.
# MACHINE AND CONSOLE BASICS

This section explains basic machine and console features.

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# Machine Components

Before using the machine, you should become familiar with its components. Because of European Committee (CE) requirements, Hurco machines sold in Europe may differ from those sold elsewhere. The figure below identifies some of the easily recognized components of a machine. The location of some components may differ on other models.

![Figure 1–1. Bar Feeder next to a TM6 Turning Center with Options](image)

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Hurco machines are available with several hardware and software options.

> Information about options is available from Hurco or your Hurco distributor.
Turret

Hurco turning centers use a turret to hold tools. Each tool is manually inserted into the turret.

- The turret contains boring blocks for holding tools and turning stations for holding turning tools.
- Bolts secure tools inserted in boring blocks; wedge clamps secure tools in their stations.
- Turret stations are numbered to identify and locate each tool.
- Use the Turret + (Plus) or - (Minus) console keys to increment or decrement the tool station.

Tools in the turret are described and programmed during Tool Setup. Refer to Tool Setup—Geometry Offsets, on page 4 - 17 for programming information.

Parts Catcher

The optional Parts Catcher holds a part after it has been cut. You can open the Parts Catcher door to take the part out while the next part is being cut. Refer to WinMax Lathe Options Parts Catcher, on page 10 - 1 for information about this option. Refer to the Maintenance and Safety Manual for information about the pneumatic system maintenance for this option.

Chip Conveyor

An optional chip conveyor is available for moving the scrap pieces of metal out of the machine. Chips that are not flushed out of the machine collect in the chip conveyor tank. Refer to WinMax Lathe Options Chip Conveyor, on page 4 - 1 for information about this option. Refer to the Maintenance and Safety Manual for information about tank and screen maintenance.

Coolant Drip Tray

The coolant drip tray is located under the machine. This removable tray collects the coolant as it drips during machine operation.

Tailstock and Chuck Gauges

The optional tailstock balances long pieces of stock while the spindle is turning and the piece is being cut. The tailstock touches the loose end of the stock, on the right-hand side, while the chuck holds the stock at the other end. The optional tailstock and chuck operate using hydraulics. The gauges show the hydraulic pressure. Refer to WinMax Lathe Options Tailstock Assembly, on page 14 - 1 and Collet Chuck, on page 5 - 1 for information about these options. Refer to the Maintenance and Safety Manual for information about hydraulic pressure setting.
Bar Feeder

The optional bar feeder places stock into the spindle, through hole in the left side of the machine. As the stock is cut, the feeder replaces it with a new piece as necessary. You can program a tool with a Bar Feed Block to pull the stock away from the feeder. Refer to WinMax Lathe Options Bar Feeder, on page 3 - 1 for information about this option.
Consoles

The console, and the electrical components required to operate it, are called the “control” or the “CNC” (Computer Numeric Control). Some electrical components are built into a separate enclosure kept in the machine’s electrical cabinet. Some internal components, such as drives and memory, are like those in a PC. Only the parts of the Windows® operating system that are necessary to run Hurco CNCs are used. Customers are not permitted to install software on the WinMax control. Pictured below are the Max5 dual-, Max4 dual-, and Max4 single-screen consoles.

Max5 dual-screen console
WinMax Interface Environment

There are three ways to navigate and enter data for programming:

- **Touchscreen**—use the stylus or other pointing device to select softkeys and drop-down lists for data entry and programming.
- **Keyboard**—use the function (F1-F12) keys and other keyboard shortcuts for navigation and to call up screens.
- **Ultimax classic edit mode**—use the console keys; for example, use the arrow keys for navigation and the enter key to accept data typed into a field. See *Edit Mode* below for more information.

**Edit Mode**

Edit Mode is set in Utilities. Refer to *User Interface Settings, on page 2 - 10*. WinMax has two edit modes:

- Ultimax Classic (default)—in this mode the console arrow keys are used to move between blocks and segments, and the Enter key is used to accept data after it is typed into a field.
- Windows Dialog—in this mode the console arrow keys do not navigate through fields and the Enter key is not required to accept data typed into a field.

<table>
<thead>
<tr>
<th>If you want to...</th>
<th>Ultimax Classic</th>
<th>Windows Dialog</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enter data into a field</td>
<td>Enter key to accept data</td>
<td>Enter key to accept data OR Down (or Up) arrow to accept data</td>
</tr>
<tr>
<td>Advance to next block</td>
<td>Right/Left arrows OR Next Block/Previous Block softkeys OR Page Up or Page Down key</td>
<td>Next Block/Previous Block softkeys OR Page Up or Page Down key</td>
</tr>
<tr>
<td>Advance to next segment or operation</td>
<td>Right/Left arrows OR Next segment/hole softkeys OR Page Up or Page Down key</td>
<td>Next segment/hole softkeys OR Page Up or Page Down key</td>
</tr>
<tr>
<td>Navigate to next or previous tool in Tool Setup</td>
<td>Left or right arrow keys</td>
<td>Page Up or Page Down keys</td>
</tr>
</tbody>
</table>

The right and left arrows will change the selection in fields with drop-down lists (such as Tool Type in Tool Setup) in either Ultimax Classic or Windows Dialog mode.
Full Precision Editing

Numbers with decimals are rounded to the decimal display limit (three digits for metric and four digits for imperial) when displayed in a field. Full Precision Editing allows you to view the full number (up to 12 digits after the decimal) and to edit it to a more precise point.

To open a pop-up box containing the number, put the cursor in a numeric decimal field:

- On the console press **F + decimal (.)**.
- On the desktop press **Ctrl + decimal (.)**.

![Figure 1–3. Full Precision Editing Pop-up Box](image)

Edit the number and select OK to save the changes. To close the pop-up box without saving changes, select Cancel.

Do not use Full Precision Editing to change numbers that are automatically calculated by WinMax. These numbers are calculated to their 12-digit maximum accuracy and changing them could result in changes to other automatic calculations in the program.

Softkeys

Softkeys have a three-dimensional look on the touch screen of the console. Each softkey is labeled with an operation. Touching the softkey selects its operation.

If a softkey appears "grayed out," the operation is not available because the cursor is not in a specific field or the machine does not support the feature.

Softkeys appear as buttons on the screen; their default location is the right side of the screen, but they can also be positioned on the left by changing the setting in **User Preferences** (see **Utilities, on page 2 - 1** for more information). Select a softkey using one of these methods:

- On the screen, select the softkey.
- On the console, simultaneously press the **F** key and the number that corresponds to the softkey (for example, **F + 1** will select the **F1** softkey). For dual-console machines, **ALT** + the softkey number will select softkeys on the graphics screen.
• On the keyboard (if using), press the corresponding function key (F1, F2, F3, etc).

**Drop-down Lists**

Many fields contain a choice of items that are viewed by pulling down a list:

![Figure 1–4. Example of a drop-down list](image)

**Expand and Collapse Files**

In the Program Manager, files can be expanded or collapsed as follows:

![Figure 1–5. Example of Expand and Collapse Files](image)
Sorting and Resizing Columns

On some screens that contain columns, data in a column can be sorted ascending to descending or descending to ascending by selecting the column heading. Columns can be resized by dragging the column divider in the header.

![Figure 1–6. Example of Sorting and Resizing Columns](image)

Pop-up Messages

During machine operation and programming, pop-up boxes may be displayed to convey prompts or status messages. These pop-up boxes can be closed by selecting the appropriate button (i.e., YES or NO or OK). Some pop-up boxes may only provide informational messages and will be displayed for a few seconds before they automatically close.

![Figure 1–7. Pop-up message example](image)

Certain pop-ups, such as the calculator, can be minimized by selecting the “—” in the upper right corner. These pop-ups will remain open but are “hidden” in the status bar, and can be viewed again by selecting the status bar button. These pop-ups can also be closed by selecting the “X” in the upper right corner:

![Figure 1–8. Pop-up showing minimize and close icons](image)
Status Bar

The Status Bar appears at the bottom of every WinMax screen. It displays the program name of the current active part program, a calculator icon, the current unit of measure (inch or mm), the keyboard icon, and the current time. When viewed on a Max console, all icons appear in the same status bar; when viewed on a dual-screen console, the program name and calculator icon appear on the left screen status bar, and the unit of measure, keyboard icon and time appear on the right screen status bar.

- **Calculator**—To use the calculator function, select the calculator icon.
- **Keyboard**—To use the on-screen keyboard, select the keyboard icon.
- **Unit of Measure**—To change the unit of measure, select the unit of measure (Inch or Metric). The unit of measure can be toggled and affects data block and tool setup screens.
- **Programming Mode**—To change the programming mode, select the R (Radius) or D (Diameter). The programming mode can be toggled and affects data block and tool setup screens.

![Figure 1–9. Status Bar and other areas](image-url)
**Pop-up Calculator**

Select the calculator icon in the Status Bar to open the calculator. The calculator appears on screen and is operated using a pointing device to select the calculator keys on screen.

![Pop-up Calculator](image)

*Figure 1–10. Pop-up Calculator*

When the calculator is minimized (with “—” in the upper right), the last calculation is retained, but when it is closed (with “X” in the upper right), the last calculation is erased.

**Pop-up Keyboard**

Enter part program names using the on-screen, pop-up keyboard. The pop-up keyboard is available for entering text, such as naming a part program.

![Pop-up Keyboard](image)

*Figure 1–11. Pop-up Keyboard*

1. Either select the keyboard icon located in the screen’s status bar or simultaneously press the Alt and Input keys on the console to activate the keyboard.
2. Use a pointing device such as the stylus to select characters from the keyboard.
3. Press the Enter key to update a field and advance the cursor after the characters are selected in the text field (e.g., after creating a program name).
4. Select the X located in the lower left corner of the text entry window to close the keyboard.
On-screen Help

On-screen Help provides information about using WinMax. The Help is context-sensitive to the screen level. Press the console Help button to display the Help topic for the current screen. The following list describes Help functions:

- Buttons in the upper left-hand corner of the Help screen are used to move through Help topics and print screens.
  - Use the Hide button to hide the navigation pane.
  - Use the Back button to return to the previous Help screen.
  - Use the Print button to print the current displayed Help topic, if a printer is attached and configured. See Accessing the WinMax Help in PDF format for printing, on page 1 - 13 for more information about printing.
- Use the arrow buttons to move between pages within a Help topic and to move through topics.
- Use the Contents tab for a list of information sorted by subject:
  1. Select the “+” to expand the topic and view sub-topics.
  2. Select the topic to display it.
- Use the Index tab to show the Help index:
  1. Quickly scroll to an index topic by typing the topic in the box at the top of the index.
  2. Select a topic and the Display button to view the topic.
- Use the Search tab to search the Help for a word or phrase:
  1. Type the search word(s) into the text box at the top of the pane.
  2. Select the List Topics button. A list of topics that contain the search word(s) is displayed.
  3. Select a topic and the Display button to view that topic.
- Use the Favorites tab to save Help topics for quick access:
  1. Select the Add button at the bottom of the pane to add the current topic.
  2. Select a topic from the Favorites list, and select the Display button to view it.
  3. Select a topic from the Favorites list, and select the Remove button to remove it from the list.
**Accessing the WinMax Help in PDF format for printing**

The WinMax On-screen Help is also provided in PDF format for easy printing. The information contained in the PDF files is identical to the on-screen Help. The PDF files may be copied to a USB memory device to be transferred to a PC for viewing or printing. Here are the steps to access the PDF files:

1. From the Input screen, select the PROGRAM MANAGER F8 softkey.
2. Select the DISK OPERATIONS F7 softkey.
3. In the left-hand pane, navigate through the folders:
   - For WinMax Lathe on a machine, the path is D:\Hurco\Hurco Lathe\hlp.
   - For WinMax Lathe Desktop on a PC, the path is C:\Program Files\Hurco\Hurco Lathe\hlp.
4. Highlight the PDF file(s) in the right-hand pane, and select the COPY F2 softkey.
5. Ensure that your media is loaded (a USB memory device in the USB port), and navigate to the proper location in the left-hand pane of the DISK OPERATIONS screen (USB port E:). Highlight the desired location.
6. Place the cursor in the right-hand pane and select the PASTE F3 softkey to paste the PDF file(s) to the desired location.
7. You may now remove your media and load the PDF file(s) onto a PC for viewing and printing.

The **SHOW ALL FILE TYPES** field in User Interface Settings must be set to YES (default is NO) in order to see the PDF files in the directory. Access the SHOW ALL FILE TYPES field in Auxiliary Mode, Utilities/ User Preferences/ User Interface Settings.
Control Panel Function Groups

The buttons, keys, and dials on the console are grouped by their functions. Here are the control panel groups on a WinMax Lathe Max console:

![Control Panel Groups Diagram](image)

1. Machine Control buttons
2. Axis and Spindle Control dials
3. Jog Control functions
4. Machine Operations keyboard
5. Programming keyboard

*Figure 1–12. Control Panel Groups*

**Machine Control**

Machine Control buttons start and stop machine operation as follows:

- **Emergency Stop Button**—There is an Emergency Stop button located on
the console. Press the Emergency Stop button to stop all motion and remove power from all electrical circuits. The red beacon flashes above the control. This button locks down when pressed. To release it, twist the button in the direction indicated by the arrows.

An Emergency Stop icon appears in the status bar at the bottom of the screen to show the Emergency Stop button has been pressed.

⇒ Learn the location of all Emergency Stop buttons on the turning center before operating.

⚠ If the Emergency Stop button is pressed during execution of a part program, the tool should be jogged clear of the part before resuming operation.

- **Power On**—enables the relay control system. This button must be illuminated to operate the machine, but may be switched off while creating or editing a part program.
- **Start Cycle**—activates machine operation. When the machine is in an active mode, the Start Cycle flashes to indicate the machine is ready. When this button is pressed, the light switches off or may stay on for the duration of the selected operation, depending on the operation.
- **Stop Cycle**—stops axes movement, then stops the spindle. The button lights and remains illuminated until another mode key is pressed.
- **Feed Hold**—stops all axes movement when the tool is in the programmed feedrate region, except a tap operation where motion is stopped when the tap is complete. Pressing the button a second time allows machine positioning to resume. The spindle is on and remains on. A yellow icon appears in the status bar at the bottom of the screen when the Feed Hold button is pressed, and the yellow beacon flashes above the control.

⇒ Learn the location of all Emergency Stop buttons on the turning center before operating.

⚠ If the Emergency Stop button is pressed during execution of a part program, the tool should be jogged clear of the part before resuming operation.

- **Power On**—enables the relay control system. This button must be illuminated to operate the machine, but may be switched off while creating or editing a part program.
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- **Stop Cycle**—stops axes movement, then stops the spindle. The button lights and remains illuminated until another mode key is pressed.
- **Feed Hold**—stops all axes movement when the tool is in the programmed feedrate region, except a tap operation where motion is stopped when the tap is complete. Pressing the button a second time allows machine positioning to resume. The spindle is on and remains on. A yellow icon appears in the status bar at the bottom of the screen when the Feed Hold button is pressed, and the yellow beacon flashes above the control.

Figure 1–13. Input screen with Feed Hold and Emergency Stop icons
Axis and Spindle Control

The override knobs are used to control machine movement and adjust the spindle and axes. The knobs on the upper console allow you to override the programmed axis feedrate, spindle speed settings, and the rapid traverse feedrate.

- **Axis Feed Rate**—controls the programmed axis feedrate while running a program. Turning the dial counterclockwise slows the feedrate; turning the dial clockwise increases the feedrate.
  - Select *Min* to slow the feedrate to 0% of the programmed value.
  - Select *Max* to increase the feedrate to 150% of the programmed value.
  - Select the 12:00 position (dial indicator straight up) to control the feedrate at its programmed value.

- **Rapid Override**—overrides the programmed rapid traverse feedrate. The turret will move at rapid traverse feedrate during position moves or non-turning motion. Turning the dial counterclockwise slows the feedrate; turning the dial clockwise increases the feedrate.
  - Select *Min* to slow the rapid feedrate to 0% of the programmed value.
  - Select *Max* to increase the rapid feedrate to 100% of the programmed value.

On TMX, TMX MY, and TMX MYS machines the Rapid Override also affects the indexing speed of the turret; however, the Maximum Rapid rate set in Program Parameters does not affect the indexing speed of the turret.

When the Rapid Override is set at 0% the turret will still move as the override minimum for the turret indexing speed is 1%.

**TMX machines**

- Rapid Override at 100% - Turret rotates at approximately 42 RPM (Maximum Speed).
- Rapid Override at 1% - Turret rotates at approximately 0.42 RPM (Minimum Speed).

**TMX MY and TMX MYS machines**

- Rapid Override at 100% - Turret rotates at approximately 83 RPM (Maximum Speed).
- Rapid Override at 1% - Turret rotates at approximately 0.83 RPM (Minimum Speed).
• **Spindle Speed**—controls the spindle speed. Turning the dial counterclockwise slows the spindle; turning the dial clockwise increases spindle speed.
  
  - Select *Min* to slow spindle speed to 0 RPM.
  - Select *Max* to increase spindle speed to 200% of the programmed spindle speed.

  The spindle reacts differently depending upon the Speed and Feed settings in the Tool Setup. Refer to *Turning Tool Setup Fields*, on page 4 - 20 for information about programming Speed and Feed.

  - If your spindle is set to IPM mode in Tool Setup, axis feedrate is unaffected by spindle speed override.
  - If your spindle is set to FPR mode in Tool Setup, the axis feedrate adjusts as the spindle speed is adjusted.

Two-Axis (TM series) and Two-Axis Programmable Tailstock (TMX series) turning centers have one **Spindle Speed** knob.

Live-Tooling (TMM series) and Live-Tooling and Y-Axis Motion (TMX MY series) turning centers have two Spindle Speed knobs:

  - **Spindle 1 Speed**—controls the Main spindle.
  - **Spindle 2 Speed**—controls the Live Tooling spindle.

Live-Tooling, Y-Axis Motion, and Sub-spindle (TMX MYS) turning centers have three Spindle Speed knobs:

  - **S1—S3 Speed** (concentric override knob)—the larger bottom knob controls the Main spindle; the smaller top knob controls the Sub spindle.
  - **S2 Speed**—controls the Live Tooling spindle.
Machine Operations

The Machine Operations console keys are used to run part programs and control the machine during cutting. These keys are labeled under the Machine Mode, Coolant, Spindle, and Turret groupings. An LED lights next to a selected key to indicate a mode is selected. Refer to Machine Operation Basics, on page 5 - 1 for details about operating the machine.

Machine Mode

The Machine Mode console keys have these functions:

- **Auto**—allows you to run a part program automatically in Auto mode. Please refer to Auto Mode Operation, on page 5 - 52 for details. Here is an Auto (Conversational) screen:

![Auto (Conversational) screen](image)

Figure 1–14. Auto (Conversational) screen

During execution of the part program in Auto or Single mode, you can switch between Auto and Single mode by pressing the corresponding console key. You can also select the Interrupt or Opt Stop keys at any time during execution of a part program in Auto or Single mode.

- **Interrupt**—halts machine operation, stopping the axis feed, spindle speed, and coolant during automatic execution of a program to allow manual functions, such as cleaning the workpiece. Press Auto to resume the part program.

- **Single**—allows you to run a part program automatically, but the machine stops the axes after each data block. Press the Start Cycle button, and the program runs, but the machine stops the axes at the end of each NC motion or action that is generated for the Conversational block. The spindle will continue running at the last programmed speed. Press the flashing Start Cycle button to resume the automatic machining operation and execute the next block.
Examine the part program to determine the precise tool movement to avoid interference before executing a Single Cycle operation.

- **Opt Stop**—stops the machine when this button is selected and there is a programmed Position block with Option Stop enabled. Machine operation resumes when you press the flashing Start Cycle button. If **Opt Stop** is not on, the Program will not stop at the Option Stop block.

- **Manual**—provides access to manual machine operations such as indexing the turret, setting Home for each axis, performing diagnostics, accessing accessories or options, performing chuck operations, turning on or off the worklight and washdown gun, and calibrating the machine. The Manual screen information for axes and spindles depends upon the machine configuration. Refer to Manual Mode Operation, on page 5 - 7 for details.

  ![Manual screen](image)

  **Figure 1–15. Manual screen (TMXMY5 machine configuration shown)**

**Coolant**

- **Auto**—enables the coolant to be automatically controlled On and Off while running a program in Auto Run mode, depending on the Coolant setting in Tool Setup for each tool used in a program. The Coolant LED is On in Auto mode or when using the optional Verification Graphics when the Coolant is programmed to be On.

  When enabled, the Coolant starts whenever the tool is selected in a data block. The coolant turns off at the end of the program or when a tool is selected that does not have Coolant On set. This key cannot be activated in Manual mode. In Auto mode, Coolant is automatically enabled. Pressing this key disables automatic coolant operation. Press **Auto** to enable Auto coolant control.

- **Primary**—functions only on machines equipped with a primary (i.e., flood) coolant system. Activates the primary coolant system when the machine is in Auto or Manual mode, and overrides a Coolant Auto operation. Press the Primary key a second time turns off this operation.
- **Secondary**—this feature is not currently available.

**Spindle**

These Spindle console keys are available for two-axis (TM and TMX series) machines:

- **On**—activates the spindle if the machine is in manual mode. The Spindle LED is On in Auto or Single mode. The **Start Cycle** button must also be pushed to start spindle rotation.

- **Off**—stops spindle rotation during manual operation if the **Spindle On** button was previously pressed. You can also use the Off key with the **Feed Hold** button to abort a program.

  In addition to pressing the Off console key, any of these methods stop spindle rotation for two-axis (TM series) machines:

  - Press the **Stop Cycle** button.
  - Press the **Manual** console key.
  - Depress the **Emergency Stop** button.

These Spindle console keys are available for live-tooling (TMM and TMX MY series) machines:

- **S1**—activates Spindle 1 (Main spindle) when pressed. The LED lights to verify Spindle 1 is active.

- **S2**—activates Spindle 2 (Live-tooling spindle) when pressed. The LED lights to verify Spindle 2 is active.

  Use any of these methods stop either active spindle’s rotation for live-tooling (TMM series) machines:

  - Press the **S1** console key when Spindle 1 is active.
  - Press the **S2** console key when Spindle 2 is active.
  - Press the **Stop Cycle** button.
  - Press the **Manual** console key.
  - Depress the **Emergency Stop** button.

The spindle must be stopped before the C axis is active for jogging using the x1, x10, or x100 console jog handwheel multiplier keys.

If you select a spindle for jogging then select to jog the C Axis, the spindle automatically stops.
These Spindle console keys are available for TMX MYS series machines:

- **S1**—activates Spindle 1 (Main spindle) when pressed. The LED lights to verify Spindle 1 is active.
- **S2**—activates Spindle 2 (Live-tooling spindle) when pressed. The LED lights to verify Spindle 2 is active.
- **S3**—activates Spindle 3 (Sub-spindle) when pressed. The LED lights to verify Spindle 3 is active.
- **S-Synch**—synchronizes Spindle 1 and Spindle 3 for on-the-fly part transfer. The LED lights to verify S-Synch is active.

Use any of these methods stop any active spindle rotation:

- Press the **S1** console key when Spindle 1 is active.
- Press the **S2** console key when Spindle 2 is active.
- Press the **S3** console key when Spindle 3 is active.
- Press the **S-Synch** button when S-Synch is active.
- Press the **Stop Cycle** button.
- Press the **Manual** console key.
- Depress the **Emergency Stop** button.

The spindle must be stopped before the C axis is active for jogging using the x1, x10, or x100 console jog handwheel multiplier keys.

If you select a spindle for jogging then select to jog the C Axis, the spindle automatically stops.

**Turret**

The Turret console keys are active only in Manual mode. The Turret LED is On during a tool change or if using the optional Verification Graphics when a tool change would occur.

- - (Minus)—Decrements the tool station once for each key press. For example, pressing the Turret minus key once changes the Active Tool from Tool 4 to Tool 3.
- + (Plus)—Increments the tool station once for each key press. For example, pressing the Turret plus key once changes the Active Tool from Tool 4 to Tool 5.

The **Start Cycle** button flashes when the Turret -/+ console key is pressed. Press the flashing button to manually move the turret.
Jog Units

A jog unit is used to manually jog the axes and control machine operation. Hand-held, or remote, jog units can be removed from the console and carried closer to the work piece.

Max5 Remote Jog Units

Max5 console offers a choice of remote jog units:

- Basic—portable hand-held unit with axes and machine operation controls.
- Premium—portable hand-held jog unit with all the features of the Standard jog unit, plus an LCD touchscreen that displays axes position in Manual mode, Part Setup, Tool Setup, Work Offsets, and Aux Work Offsets.
- Wireless—the Premium jog unit without wired connection.

Max4 Remote Jog Unit

The Console Jog Unit is standard on the Max4 console.

The hand-held remote Max4 Jog Unit is an option on the Max4 console.

Jog Unit Operation

Basic operation of a jog unit is as follows:

1. Select an axis with the Axis Select Switch.
2. Use the Jog Feed Keys:
   a. Select either the + or – Jog Feed Keys.
   b. Adjust Jog Feed Override to override the programmed axis feedrate.

OR

3. Use the Hand Wheel Multiplier:
   a. Select a hand wheel resolution with one of the Hand Wheel Multiplier Keys.
   b. Rotate the Jog Hand Wheel.

Other than the Emergency Stop button, the Jog Unit does not affect running programs.

The Wireless Remote Jog Unit must be paired with the machine before first use. See Wireless Jog Unit Pairing, on page 1 - 54.
Setting Jog Unit Parameters

To access the parameters:

1. Press the Manual Mode console key to display the Manual screen.
2. Press the Manual Function (F2) softkey. The Jog Unit parameters are displayed:
   - **Manual Jog Feed**—enter the desired manual jog axis feedrate. The range is from 0.0 to the machine’s maximum feedrate.

   An axis may have a maximum jog feedrate slower than other axes. This slower axis can only move at its maximum jog feedrate (and not the higher feedrate of other axes).

   For example, the X and Y axes on a machine each have a maximum jog feedrate of 787 inches per minute (ipm). The Z axis has a maximum jog feedrate of 100 ipm. Without using the jog feedrate override, the X and Y axes can jog at 787 ipm, but the Z axis is limited at 100 ipm.

   - **Manual Spindle Speed**—enter the spindle speed when the Spindle On console key is pressed. This value can not be greater than the machine’s maximum spindle speed. Entering a negative value (e.g., -500) causes the spindle to reverse (turn counterclockwise) at that speed.

   - **Rotary Jog Feed** (for machines with rotary or swivel axes)—enter the jog feedrate in RPM.
Max5 Remote Jog Units

Basic Remote Jog Unit

Pictured below is the Basic Unit. See Remote Jog Units, on page 1 - 28 for more details.
Premium Remote Jog Unit

Pictured below is the Max5 Premium Remote Jog. See Remote Jog Units, on page 1-28 for more information.
This is the view of the back of the Max5 Remote Jog Unit (both Basic and Premium):
Max4 Remote Jog Unit

1. Emergency Stop Button
2. Store Position Key
3. Hand Wheel Multiplier Keys
4. Jog Hand Wheel
5. Jog Feed Keys
6. Jog Feed Override
7. Axis Select Switch
Remote Jog Units

- **Emergency Stop**—stops all spindle and table motion.
- **Store Position**—records the current axis position in the part program’s setup screens.
- **LCD screen** (available only on Premium units)—displays Manual mode (MAN), Part Setup (PSU), Tool Setup (TSU), Work Offsets (WO), and Aux Work Offsets (AWO).

**Mode Selections** appear at the bottom of the LCD screen. Use the touchscreen to select a mode; a check mark appears by the current selection. Scroll up, down, left, and right, and select items using the touchscreen.

- **MAN**—manual mode. The display shows machine or part positions for X, Y, and Z. Positions are zone relative on dual-zone machines.
- **PSU**—Part Setup. The display shows current part setup information.
- **TSU**—Tool Setup. The display shows current tool setup information. The initial tool displayed is the current tool in spindle.
- **WO**—Work Offsets. The display shows G54, G55, G56, G57, G58, G59 and Shift values.
- **AWO**—Aux Work Offsets. The display shows offsets 1-93.

**Start Cycle** (Max5)—activates machine operation. The Start Cycle button on the Remote Jog Unit must be used in conjunction with the Enable button, located on the back of the jog unit. Press and hold the Enable button and press the Start Cycle button on the jog unit. The Enable button can be released after the cycle is started.

Both the Enable button and the Start Cycle button must be held down to run the spindle with the enclosure doors open.

- **Feed Hold** (Max5)—stops all axes movement (except a tap operation) when the tool is in the programmed feedrate region. Pressing the button a second time allows machine positioning to resume.
- **Stop Cycle** (Max5)—stops axes movement, then stops the spindle.
- **Axis Selector (& Override) Knob**—selects the axis to jog. On Premium unit only, this knob also control the override mode: feed, rapid, or spindle. Indicator appears on screen for selected axis. Axis selections are O, X, Z, C1, S1, W, Y, C3, and S3 depending on the configuration.

See Setting Jog Unit Parameters, on page 1 - 23 for instructions on setting the Jog Unit parameters.
• **Flashlight** (Max5)—toggle flashlight or machine work light on and off with this button. A short duration press toggles the flashlight. Flashlight illuminates from the top of the remote jog unit. A longer duration press toggles the machine work light.

• **Rapid Jog Rate Knob** (Max5)—controls the rapid jog rate when an axis is selected on the Axis Selector (& Override) Knob. On Premium model, when the Axis Selector & Override Knob is set to override mode (one of the bottom three positions), the Rapid Jog Rate Knob controls the override (feed, rapid, or spindle).

• **Jog Feed Override** (Max4)—control the jog speed (10% to 150%) of the nominal value. Jog % is displayed on the screen.

• **Jog Feed Keys**—select minus (-) or plus (+) jog direction.

• **Jog Handwheel**—select minus (-) or plus (+) jog direction.

• **Handwheel Multiplier Keys**—defines the hand wheel resolution.
  • **x1**—defines a one-to-one ratio (each click equals .0001 inch, or .00254 mm).
  • **x10**—defines a 10-to-one ratio (each click equals .001 inch, or .0254 mm).
  • **x100**—defines a 100-to-one ratio (each click equals 0.01 inch, or .254 mm. One full turn equals 1 inch, or 25.4 mm).

• **Enable button**—on machines with CE enabled, must be held to use the Start Cycle button and the +/- jog on the unit.
Enable Button

The Max5 Remote Jog, Max4 Remote Jog, single-screen and dual-screen consoles may be equipped with an Enable button. The Enable button is functional only on machines that have CE enabled.

The Enable button has three positions: fully up (off), middle (on), and fully down (off). The button must be in the middle position to be enabled. The Enable button is required for the following operations:

- **Start Cycle** (on Max5 Remote Jog only)—press and hold the Enable button and press the Start Cycle button on the unit. The Enable button can be released after the cycle is started.

  ![Enable button and Start Cycle button must be held down to run the spindle with the enclosure doors open.](image)

  It is not necessary to use the Enable button when using the Start Cycle button on the console.

- **+/− Jog**—press and hold the Enable button while simultaneously selecting either “+” or “−” button to jog the selected axis, only when the enclosure doors are open. If the enclosure doors are closed, it is not necessary to use the Enable button to jog the axes.

  It is not necessary to press and hold the Enable button to jog the axis using the hand wheel at x1, x10, or x100 speeds.
Programming Keyboard

Programming Mode console keys are named for the screens they activate:

- **Input**—displays the main programming screen used to create and edit part programs. From this screen, access Part Setup, Tool Setup, Part Programming, Programming Parameters, and Project Manager menus.

  ![Input Screen](image1.png)

  *Figure 1–16. Input Screen*

- **Review**—for Conversational programs, provides an outline view of the blocks currently programmed, including type of block and tool used. The left-hand pane lists all of the program blocks. The right-hand pane lists the elements for the selected Profile data block. Jump to a desired block by selecting the block and pressing **Enter**.

  ![Program Review Screen](image2.png)

  *Figure 1–17. Program Review screen—Conversational Part Programming*
For Numerical Control (NC) programs, the Review key displays the NC subroutines by number.

*Figure 1–18. Program Review screen—NC Programming*
- **Aux/Menu**—displays a pop-up menu for accessing functions for developing and managing programs.

  If using the WinMax Lathe Desktop software, select the F9 key to access this screen.

![Figure 1–19. Menu Console Key’s Pop-up selections](image)

A menu toolbar is also available by selecting anywhere on the status bar at the bottom of the screen. This toolbar provides access to the same functions as the pop-up menu. To close the toolbar, select the X in the upper right corner of the toolbar. The toolbar is standard with WinMax Lathe Desktop.

![Figure 1–20. Menu Toolbar](image)

- **Help**—displays on-screen help text. Place the cursor on a screen and press the Help console key for information about the screen. Refer to *On-screen Help*, on page 1-12 for more information.
**Standard Keys**

These keys function as they would on a standard AT-keyboard. They perform functions related to the programming mode: Tool Review, Program Review, and the NC editor mode.

- **Insert**—allows you to:
  - insert a tool at the current cursor location in the Tool Review screen.
  - insert a conversational data block at the current cursor location in the Program Review screen.
  - toggle the NC editor mode between Insert and Overwrite.

- **Delete**—allows you to:
  - delete a tool at the current cursor location in the Tool Review screen.
  - delete a conversational data block at the current cursor location in the Program Review screen.
  - delete a character to the right of the cursor for conversational programs.
  - delete all characters in a highlighted field.
  - delete a character at the current cursor location on the NC Editor screen.

- **Home**—positions the cursor:
  - at the first tool listed when in the Tool Review screen.
  - at the first data block listed when in the Program Review screen.
  - in the Block field for the first data block when in a data block other than a Profile.
  - in the Element field when in a Profile data block.
  - at the beginning of the line when in the NC Editor screen.

- **End**—positions the cursor:
  - at the last tool listed when in the Tool Review screen.
  - at the last data block listed when in the Program Review screen.
  - at the End of Program data block when in a data block other than a Profile.
  - at the New Profile Element data block when in the Element field in a Profile.
  - at the end of the line when in the NC Editor screen.

- **Page Up**—allows you to:
  - position the cursor at the beginning of the previous page or move backward in the conversational part program, depending on the type of screen.
  - jump to the first visible line in the program on the NC Editor screen.

- **Page Down**—allows you to:
  - position the cursor at the beginning of the next page or move forward in the conversational part program, depending on the type of screen.
  - jump to the last visible line in the program on the NC Editor screen.
Cursor Control Keys

These keys control cursor movement and perform programming operations:

- **Arrow keys**—up and down arrows move the cursor from one field to the next; left and right arrows cycle through all selections of a menu selection, moves through elements of a profile, or moves the cursor within a numeric field.

- **Enter key** (↵)—accepts the information typed in a text field or moves to the next field.

Special Function Keys

These keys provide additional functionality to many other keys. For example:

- **alt** (alternate) console key
  - `alt + Input` Display the Pop-up Text Entry Window.
  - `alt + Help` Produce a bmp screen capture.
  - `alt + right arrow` Tab through fields or through the windows in File Manager.
  - `alt + left arrow` Reverse tab through fields or the windows in File Manager.
  - `alt + Select` Simulate a right mouse click.
  - `alt + F + left arrow` Reverse tab through fields or the windows in File Manager. (Same function as alt + left arrow.)
  - `alt + F + Select` Simulate Shift + left mouse click.

- **C** (clear) console key—press to clear the value at the current cursor position. The **C** key works like an Esc key on a keyboard.
• **F** (function) console key

  | **F** + **Delete** | Delete the character to the left of the cursor. |
  | **F** + **Help**   | Produce a bmp screen capture.                   |
  | **F** + **End**    | Move the cursor to the end of a list.           |
  | **F** + **Home**   | Move the cursor to the top of a list.           |
  | **F** + **Page Down** | Move through a list.                          |
  | **F** + **Page Up** | Move through a list.                           |
  | **F** + **Select** | Simulate a left mouse click.                   |
  | **F** + **up arrow** | Move cursor to previous data block.             |
  | **F** + **down arrow** | Moves cursor to next data block.               |
  | **F** + **left arrow** | Moves cursor to previous element.              |
  | **F** + **right arrow** | Moves cursor to next element.                  |
  | **F** + **decimal (.)** | Enable Full Precision Editing. This feature displays a pop-up window showing 12 digits to the right of the decimal for the current field. |
  | **F** + 1 through 8 | Simulate function keys on keyboard (F1, F2, F3,...F8). |

**Numeric Keypad**

The numeric keypad allows you to enter numbers and calculate values on the screen.

  - Enter numeric data into fields on the screen.
  - Perform calculations using the mathematical symbols (÷, ×, −, +) on the keypad.

Follow these steps to calculate data values for screen fields:

1. Position the cursor on the field you want to calculate.
2. Type the number used in the calculation.
3. Press the console key of the operation you want to perform (÷, ×, −, +).
4. Press the **Enter** key.

For example, if a field contains the number 2, you can add 3.5 to the field by positioning the cursor in the field, typing “3.5,” pressing the “+” key, and pressing the **Enter** key.

**AT-Keyboard**

If the console is equipped with an AT-keyboard, it may be used to enter data into a field. Press the **Enter** key to update a field and advance the cursor.

💡 Press F1 through F8 to make softkey selections.
**Draw Key**

In addition to the Wireframe Graphics that appear on the Auto Run screen when running a program, you can access Wireframe Graphics and view the part shape by pressing the **Draw** console key. Select the Draw F1 softkey to display or re-draw the graphic.

![Figure 1–21. Wireframe Graphics Screen](image1)

**Verify Key**

You can access the Verification Graphics and view the tool path and stock removal of the part by pressing the **Verify** console key. Select the Draw F1 softkey to display or re-draw the graphic.

![Figure 1–22. Verification Graphics Screen](image2)

For information on using graphics with part programs, see *Verifying Part Programs—Graphics*, on page 4 - 86.
Communications Panel

Each Hurco machine may be connected to peripheral devices through a communications panel located on the machine’s electrical cabinet.

**Figure 1–23. Communications Panel**

Communication connectors may include a USB port, a serial port, and a network connector.

- The USB port is a high-speed port that allows you to connect multiple devices to the panel.
- The serial port is for sending and receiving serial data transmissions.
- The RJ45 connector is used for 10Base-T, unshielded twisted pair network cabling.

Refer to the *Maintenance and Safety Manual for Turning Centers* for more information about using the Communications Panel.
This section explains how to customize system settings, change screen appearance, print whole programs or parts of programs, perform serial read/write functions, and manage log files. These operations are accessed through the Utilities screen.

Select the Aux/Menu console key and this window with softkey selections appears on the screen:

If using the WinMax Lathe Desktop software, select the F9 key to access this screen.

Use the softkeys on the Auxiliary Menu screen to navigate to other parts of WinMax Mill. This section describes the Edit Lockout Mode and the Utility Screen.

Before using the Toggle Edit Lockout State for the first time, be sure to review Edit Lockout Mode—First Use, on page 2 - 14 and be familiar with how to use a password, set the desired level of access restriction, enable, and disable the mode.
Utility Screen

Select the **Utility Screen** softkey to access the Utility screen. You can also use the menu toolbar and select the **Utilities** icon to access this screen. These functions are available and are described in this section:

- System Configuration ....................................................... 2 - 3
- User Preferences .............................................................. 2 - 10
- Printing .............................................................................. 2 - 24
- Integrator Support Services ............................................... 2 - 25
- Restart Control ................................................................. 2 - 26
- Shutdown Control .............................................................. 2 - 26
- Serial I/O ........................................................................... 2 - 27
- Log Files ............................................................................ 2 - 28

Hurco recommends using the Shutdown Control command prior to turning off machine power to ensure that no data is lost. Please refer to *Shutdown Control, on page 2 - 26* for details.

The MORE ➔ F7 softkey accesses a second Utilities softkey menu. Select MORE ➔ F7 to toggle between the two Utilities softkey menus.

![Utility Screen Diagram](image)

*Figure 2–2. Utilities screen*
System Configuration

Press the **Aux/Menu** key followed by the **Utility Screen** softkey to access the Utilities screen and softkey menu. From the Utilities screen, select the SYSTEM CONFIGURATION F1 softkey to access the system settings. The System Configuration screen appears with fields displayed based on the machine configuration. These functions are available from the System Configuration softkey menu:

- **Hour Meters**
- **Machine Internet Protocol Address**
- **Hardware Configuration**
- **Software Options**
- **Configuration Files**

The majority of System Configuration screen fields contain values that reflect your machine’s software version, maximum settings, limits, and a record of the spindle and machine usage. However, you enter the value for the Control Power Off Timer field.

The machine type is displayed to the right of the System Configuration screen title. The remaining fields are defined as follows:

- **VERSION**—displays the current software version.
- **CONTROL POWER OFF TIMER (MINS)**—contains the number of minutes the machine can sit idle before the control power is automatically shut off. The units for this field is minutes. The range is from 0 to 600.
  - When 0 is entered, the timer is off. In other words, there is no time out.
  - When a number from 1 to 600 is entered, that number represents the number of minutes the machine can sit idle before shutting off the control power.

![System Configuration screen (TMX10MYS shown)](image-url)
• **MAXIMUM NUMBER OF TOOLS/STATIONS**—displays the number of tools and stations that can be programmed.

• **MAXIMUM SPINDLE RPM**—displays the highest possible spindle rpm speed for each spindle.

• **MAXIMUM OVERRIDES**—displays the highest possible override percentage for spindle speeds and feedrate that programs can run.
  
  • **SPINDLE %**. This setting overrides the manual setting on the Spindle Speed dial.
  
  • **FEED %**. This setting overrides the manual setting on the Axis Feed dial.

• **AXIS MINUS LIMIT, PLUS LIMIT, MAX SPEED**—display the maximum limit setting for each of these points. Axes are displayed based on the machine configuration.

**Hour Meters**

The software tracks the amount of time the machine is on and the amount of time each spindle runs.

Select the **HOUR METERS F1** softkey on the System Configuration screen to display the Hour Meters screen. Select the Exit F8 softkey to return to the System Configuration screen.

![Hour Meters screen](image)

*Figure 2–4. Hour Meters screen*

The fields on this screen are displayed based on the machine configuration. They are defined as follows:

• **MACHINE ON TIME**—displays how many hours, minutes, and seconds the machine has had control power on since the machine was commissioned.

• **MAIN SPINDLE ON TIME**—displays how many hours, minutes, and seconds the main spindle has been run since the machine was commissioned.
• **LT SPINDLE ON TIME**—displays how many hours, minutes, and seconds the live-tooling spindle has been run since the machine was commissioned.

• **SUB-SPINDLE ON TIME**—displays how many hours, minutes, and seconds the sub-spindle has been run since the machine was commissioned.

### Machine Internet Protocol Address

An IP (Internet Protocol) address is used to identify a particular host on a network. Each host on a network must have a unique IP address consisting of a 32-bit number usually presented in dotted decimal format; for example, 200.100.150.1. This format divides the address into four single byte values separated by decimal points. On most networks, the first three bytes represent the network and the last byte is the host. Following this practice, the first three bytes are the same for all hosts and the last byte is different for each host. On the Internet, these cryptic addresses usually are not used—most addresses are represented as plain text, which are converted to IP addresses by DNS, or Domain Name Server. The underlying protocol still uses the unique 32-bit IP addresses.

Select the **DISPLAY MACHINE IP ADDRESS** F2 softkey on the System Configuration screen to display the machine’s IP address in a pop-up window. Select OK in the window to close the pop-up window.

### Hardware Configuration

The Hardware Configurations screen provides access to tool setter calibration, along with auxiliary input and output configurations to enable auxiliary equipment or a unique machine function. To access the Hardware Configuration softkey menu, select the **HARDWARE CONFIGURATIONS** F3 softkey on the System Configuration screen. This screen appears:

*Figure 2–5. Hardware Configurations screen*
Tool Setter Calibration

Select the TOOL SETTER CALIBRATION F1 softkey on the Hardware Configurations screen to configure the Tool Setter option. Refer to WinMax Lathe Options Tool Setter, on page 16 - 1 for information about this feature.

![Tool Setter Calibration Screen](image)

Figure 2–6. Tool Setter Calibration screen

Auxiliary I/O Configuration

Select the AUXILIARY I/O CONFIGURATION F4 softkey on the Hardware Configurations screen to access the Auxiliary I/O Configuration screen, which in turn accesses four (4) Auxiliary Input/Output Configuration screens from these softkey choices:

- **OUTPUT 1 (M52 / M62) F1**
- **OUTPUT 2 (M53 / M63) F2**
- **OUTPUT 3 (M54 / M64) F3**
- **OUTPUT 4 (M55 / M65) F4**

Individually enable auxiliary equipment or a unique machine function from within a part program with these screens. Each of these screens allows you to program M codes for turning On and Off an auxiliary feature:

- M52 (on) / M62 (off)
- M53 (on) / M63 (off)
- M54 (on) / M64 (off)
- M55 (on) / M65 (off)
A screen like the sample below appears for each output selection. Each screen shows its Output M codes in its heading (circled in the sample).

![Auxiliary I/O Configuration Output screen](image)

*Figure 2–7. Auxiliary I/O Configuration Output screen*

Program the auxiliary device using the fields and softkeys. When the following selections are made, the M codes will turn on and off the device as described in these fields:

- **EMERGENCY STOP WILL**—select either NOT CLEAR THE OUTPUT or CLEAR THE OUTPUT. When the Emergency Stop state is active, the state of the output is based on the selection here.

- **INTERRUPT CYCLE WILL**—select either NOT CLEAR THE OUTPUT or CLEAR THE OUTPUT. While a part program is running and the Interrupt Cycle button is pressed, the state of the output is based on the selection here.

- **THE PROGRAM WILL**—select either NOT WAIT FOR A COMPLETION SIGNAL or WAIT FOR A COMPLETION SIGNAL. If WAIT FOR A COMPLETION SIGNAL is selected, the part program will wait at the M Code for the appropriate Input to go high.

- **THE COMPLETION SIGNAL WILL**—select either NOT CLEAR THE OUTPUT or CLEAR THE OUTPUT upon completing the part program. If CLEAR THE OUTPUT is selected, the Output will be automatically turned off when the appropriate Input goes to a high state.

To check that the logic is functioning properly and test the state of the circuitry, these softkeys are available on the Auxiliary I/O Configuration screen:

- **FORCE OUTPUT ON F4**—the Output State on-screen LED turns green when this softkey is selected.

- **FORCE OUTPUT OFF F5**—the Input State on-screen LED turns red when this softkey is selected.
Software Options

The Software Options screen allows you to view which software options are installed. In addition, options may be temporarily disabled and enabled again using the DISABLE SELECTED OPTION F2, and the ENABLE SELECTED OPTION F1 softkeys.

![Software Options Screen](image)

**Figure 2–8. Software Options screen**

Configuration Files

Machine Configuration files should be backed up upon completion of a software upgrade. Select the BACKUP CONFIG FILES F6 softkey on the System Configuration screen to copy machine configuration files onto a floppy diskette, USB storage device, or network drive.

Follow these steps to backup the Configuration files:

1. Determine the type of storage device for copying the Machine Configuration files from the control.
   - Insert the floppy disk for containing the configuration files into the floppy drive.
   - Insert the USB storage device for containing the configuration files into the USB port.
   - Select a network drive for containing the configuration files on the control.
2. From the System Configuration screen, select the BACKUP CONFIG FILES F6 softkey.
   - When you copy a file using a storage device or network drive, a pop-up window appears for choosing the location for the files to be copied.
3. Remove the storage device when the backup is complete, and store it in a safe location.

⚠️ If you use a network drive, be sure it is in a safe, secure location.

Previously saved machine configuration data can be used to restore machine configuration files in the event that the control hard drive is replaced. Select the RESTORE CONFIG FILES F7 softkey on the System Configuration screen to restore this data.

Follow these steps to restore the Configuration files:

1. Insert the storage device containing the backup configuration files.
2. From the System Configuration screen, select the RESTORE CONFIG FILES F7 softkey.
   
   ➔ When you restore a file using a storage device or network drive, a pop-up window appears for choosing the location for the files to be copied.

3. The system reboots when configuration files are restored. The software displays a pop-up message asking if it is OK to reboot now.
   ● Select OK to continue or Cancel to stop the process.
4. Remove the storage device when the restoration is complete, and store it in a safe location.

⚠️ If you use a network drive, be sure it is in a safe, secure location.
User Preferences

Press the **Aux/Menu** key followed by the **Utility Screen** softkey to access the Utilities screen and softkey menu. From the Utilities screen, select the **USER PREFERENCES F2** softkey. The User Preferences menu accesses softkey menus for changing screen settings. Select the **MORE ➔ F7** softkey to access additional user preferences. Select **EXIT F8** on the second menu to return to the first menu. The **EXIT F8** softkey on the first menu returns to the Utilities screen.

![Figure 2–9. User Preferences screen](image)

User Interface Settings

The **USER INTERFACE SETTINGS F1** softkey accesses a screen with the following fields. Change the screen appearance or behavior with the User Interface Settings selections.

![Figure 2–10. User Interface Settings screen](image)
For all of these fields, you can either use softkeys or the drop-down list to make selections.

- **SCREEN CONFIGURATION**—select Single Screen or Dual Screen for the type of screen used for the screen display. If changing the configuration, the software must be restarted to take effect. This field is available only on the desktop version of the software. This field is read-only on machine consoles.

- **APPLICATION FONT SIZE**—select Large or Small for the size of the font used on the screen display. This field is available only on the desktop version of the software.

- **LIST-ICON SIZE**—select Large or Small.

- **SOFTKEY MENU POSITION**—select Right or Left and the softkey menus appear on the side of the screen that you select.

- **EDIT MODE**—provides a choice between Windows and Ultimax editing behavior. The software defaults to Ultimax Classic.
  - **Ultimax Classic**—operates like previous Hurco Ultimax products, i.e., when you input data, you must press the Enter key for the software to accept the data.
  - The Show All File Types field must be set to YES in order to see the PDF files in the directory in which the Help documentation is stored. Please refer to *Accessing the WinMax Help in PDF format for printing, on page 1 - 13* for information about printing the Help.

- **ENABLE PROJECT RESTORE**—select Yes and all programs that are open upon machine power off will re-open for the next machine power on. Select No and all programs will close upon machine power off and will not be restored upon machine power on. If No is selected, AutoSave will not restore the program either.

- **SHOW ALL FILE TYPES**—select Yes or No for all file types to appear in the Project Manager screen when opening files.

- **SCREENSAVER TIMEOUT**—Determine how long the console can remain idle before the screen goes blank. Enter a time in minutes in this field. The screen will go blank after the entered time if console keys or buttons are not selected.

  - To re-display blank screens, touch the screen or press any console key. The first key or touch is used to re-activate the blank screen and will not activate the key or softkey pressed.

- **SHOW MACHINE TYPE SELECTOR**—select Yes for the Screen Type Selector window to appear upon launching the WinMax Lathe desktop software. The selected machine type will also appear on the Input screen of the desktop software. This field appears only for the desktop software.

- **EDIT LOCKOUT LEVEL**—sets the level of editing protection, **Partial** or **Full**,
to limit access to part programming softkeys and other functions when the Edit Lockout feature is enabled using the **Toggle Edit Lockout State** softkey located on the Auxiliary Menu screen. Please refer to *Edit Lockout Mode—First Use*, on page 2 - 14 for information about setting this mode.

With the Edit Lockout State enabled, these selections may be applied:

- **PARTIAL**—prevents changes to the part program. In addition, changes in Tool Setup are not automatically updated in the part program. When Partial is selected, the **Lock Part Setup** and **Lock Tool Setup** fields are available for selecting Yes or No.

- **LOCK PART SETUP**—with the Edit Lockout Level set to Partial, select YES to prevent changes to Part Setup in addition to preventing changes to the part program. Select No to allow changes to Part Setup while preventing changes to the part program.

- **LOCK TOOL SETUP**—with the Edit Lockout Level set to Partial, select YES to prevent changes to Tool Setup in addition to preventing changes to the part program. Select No to allow changes to Tool Setup while preventing changes to the part program.

- **FULL**—prevents changes to the part program, Part Setup and Tool Setup. When Full is selected, the **Lock Part Setup** and **Lock Tool Setup** fields are not available (grayed out). In addition, the Cycles Completed field on the Auto (Conversational) screen is not available for editing.

Refer to Table 2-1. *Edit Lockout Mode Feature Accessibility*, on page 2 - 13 for a complete listing of features that are affected by partial and full lockout.

You will be redirected to the Input screen if you are on a screen that becomes locked out when you enter the password.
Here is a feature comparison of Edit Lockout Mode On with Partial or Full Level selected, and Edit Lockout Mode Off status:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Edit Lockout Mode On</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Part Level</td>
<td>Full Level</td>
<td></td>
</tr>
<tr>
<td>Part Programming</td>
<td>Locked</td>
<td>Locked</td>
<td>Accessible</td>
</tr>
<tr>
<td>Program Parameters</td>
<td>Locked</td>
<td>Locked</td>
<td>Accessible</td>
</tr>
<tr>
<td>Program Review:</td>
<td>Locked</td>
<td>Locked</td>
<td>Accessible</td>
</tr>
<tr>
<td>Multiple Block Functions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Copy, Paste, Insert, Delete)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DXF</td>
<td>Locked</td>
<td>Locked</td>
<td>Accessible</td>
</tr>
<tr>
<td>DB Search / Block Jump</td>
<td>Locked</td>
<td>Locked</td>
<td>Accessible</td>
</tr>
<tr>
<td>Jump to Block</td>
<td>Locked</td>
<td>Locked</td>
<td>Accessible</td>
</tr>
<tr>
<td>(from Error Message)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part Setup—Work Offsets</td>
<td>Accessible</td>
<td>Locked</td>
<td>Accessible</td>
</tr>
<tr>
<td></td>
<td>with</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lock Part Setup</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>set to No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tool Setup</td>
<td>Accessible</td>
<td>Locked</td>
<td>Accessible</td>
</tr>
<tr>
<td></td>
<td>with</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lock Tool Setup</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>set to No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tool Offsets</td>
<td>Accessible</td>
<td>Locked</td>
<td>Accessible</td>
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<tr>
<td></td>
<td>with</td>
<td></td>
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<tr>
<td></td>
<td>Lock Tool Setup</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>set to No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>User Preferences</td>
<td>Accessible</td>
<td>Locked</td>
<td>Accessible</td>
</tr>
<tr>
<td>Part Counter</td>
<td>Accessible</td>
<td>Locked</td>
<td>Accessible</td>
</tr>
</tbody>
</table>

Table 2–1.  Edit Lockout Mode Feature Accessibility

Additional Edit Lockout considerations:

- **Runtime modifications**—Edit Lockout does not prevent a running program from modifying setup or itself. For instance, if the program uses macros that manipulate program variables or part or tool setup directly, this is allowed.

- **Overrides**—Feed overrides are controlled by the Feed Override Lockout parameter in Program Parameters. Since Program Parameters are not accessible in Partial or Full lockout mode, Feed Override Lockout should be set to YES so overrides cannot be adjusted while running the program.
Edit Lockout Mode—First Use

Prior to setting the state of the Edit Lockout Mode to On, the password should be reset from the factory default (HURCOLOCK).

Setting Edit Lockout Level Preferences

Set Edit Lockout Level to Partial or Full on the User Interface Settings screen:

1. Select the Aux/Menu console key. The Auxiliary Menu screen opens.
2. Select the Utility Screen softkey.
3. Select the User Preferences softkey.
4. Select the User Interface Settings softkey. The User Interface Settings screen appears.
5. Place the cursor in the Edit Lockout Level field. Select Partial or Full. When Partial is selected, the Lock Part Setup and Lock Tool Setup fields are available so you can also lock out Part Setup and/or Tool Setup.

   You will be redirected to the Input screen if you are on a screen that becomes locked out when you enter the password.

Reset Password

1. Select the Aux/Menu console key. The Auxiliary Menu screen opens.
2. Select the Utility Screen softkey.
3. Select the User Preferences softkey.
4. Select the User Interface Settings softkey. The User Interface Settings screen appears. When the cursor is in the Edit Lockout Level field, the Change Lockout Password softkey is available.

![Figure 2–11. User Interface Settings, Change Lockout Password softkey](image-url)
5. Select the Change Lockout Password softkey. A pop-up window appears with fields for entering the old password, new password, and new password confirmation.

6. Enter the information into the fields and select OK to save the changes.

⚠️ **Remember the new password!**

You will be redirected to the Input screen if you are on a screen that becomes locked out when you enter the password.

**Enable Edit Lockout Mode**

1. Select the **Toggle Edit Lockout State** softkey located on the Auxiliary Menu screen. When the softkey is selected, a pop-up box appears prompting for the password.

2. Enter the password and select OK. The Edit Lockout feature is enabled, and a confirmation message appears. Please refer to *Setting Edit Lockout Level Preferences, on page 2-14* for details about Partial and Full lockout levels.

**Disable Edit Lockout Mode**

1. Select the **Toggle Edit Lockout State** softkey located on the Auxiliary Menu screen. When the softkey is selected, a pop-up box appears prompting for the password.

2. Enter the password and select OK. The Edit Lockout feature is disabled, and a confirmation message appears. Please refer to *Setting Edit Lockout Level Preferences, on page 2-14* for details about Partial and Full lockout levels.
Conversational Settings

The CONVERSATIONAL SETTINGS F2 softkey accesses this screen:

![Conversational Settings Screen](image)

**Figure 2–12. Conversational Settings screen**

- **MATH ASSIST STYLE**—select Ultimax Classic or Standard Calculator.
  - **ULTIMAX CLASSIC**—uses an operating logic that uses the Enter key to perform functions.
    
    Examples of Ultimax Classic Math Assist:
    - If a field contains a value of 5 and you type “-2” the 5 changes to “-2.”
    - If a field contains a value of 5 and you type “2-” the 5 changes to “3.”

- **STANDARD CALCULATOR**—works like a calculator.

Examples of Standard Calculator Math Assist:
- If a field contains a value of 5 and you type “-2” the 5 changes to “3.”
- If a field contains a value of 5 and you type “2-” the 5 changes to “2” because the control expects a second value to be subtracted from 2.
NC Settings

The NC SETTINGS F3 softkey accesses the screen to select default settings for NC Programs:

![NC Settings Screen](image)

- **DEFAULT SPINDLE SPEED MODE**—select Constant Surface Speed (G96) or Direct RPM (G97).
- **DEFAULT FEED MODE**—select Inverse Time, Per Minute, or Per Revolution. This field specifies the mode assumed by the part program interpreter when either G93 (inverse time), G94 (per minute), or G95 (per revolution) is not programmed.
- **ISNC P, Q, R INTEGERS**—select the units the P, Q, and R values use with no decimal point (tenths, hundredths, or thousandths). This field appears for ISNC.
- **ENABLE GOUGE DETECTION**—select Yes or No to enable gouge protection when running NC programs. This field is available for ISNC.
- **M-CODE TRANSLATION MAP Softkey**—opens M-Code Translation Map table. See *M Code Translation, on page 5-2.*
AutoSave Settings

The AutoSave F4 softkey accesses the AutoSave Settings screen.

![AutoSave Settings screen](image)

*Figure 2–14. AutoSave Settings screen*

Use the AutoSave feature to periodically save a copy of the Conversational part program. While the part program is being saved, the system displays the “Autosaving Part Program” message.

- **ENABLE AUTOMATIC SAVE**—select Yes or No.
- **SAVE FREQUENCY (MINUTES)**—enter the minutes to specify the frequency for saving files if enabled.
- **SAVE ACTIVE PROGRAM ONLY**—select Yes to specify if only the active program should be saved or No if all open programs should be saved.

Programming changes made after the last AutoSave are lost if the machine is powered off. When the machine power is on and the User Interface Settings screen, Enable Project Restore field is set to Yes, the last AutoSave version of the program automatically appears on the screen.

AutoSave does not save a program to its original program name or drive. Refer to *Save Files, on page 3 - 5* for instructions on saving a program.
Select Language

The SELECT LANGUAGE F5 softkey accesses the Language Selection screen.

![Language Selection Screen](image)

Figure 2–15. Language Selection screen

1. Select a language from the list.
2. Select the **Load Language** softkey to install the Language files. The selected language appears in the Current Language field.

**Language Quick Toggle**

You can toggle between two languages from any screen in WinMax using the Language Quick Toggle feature. To set the primary and secondary languages, highlight a language in the list and select the **Set as Toggle Language 1** softkey (for primary language) or **Set as Toggle Language 2** softkey (for secondary language). The selected languages are shown at the top of the screen.

Use Ctrl + L on the keyboard or pop-up keyboard to switch back and forth between the languages on any screen in WinMax.
Data Logging Filters

From the User Preferences screen, select the DATA LOGGING FILTERS F6 softkey to access the Debug Data Logging Filters screen.

This screen assists Hurco Engineering with software troubleshooting. Files are created from the selections, providing system information.

When NO is selected in the Enable Data Logging field, none of the filter selections are active. NO is the default. This field resets to NO each time the WinMax software restarts.

Select YES and the message “Warning: Enabling data logging will reduce performance.” Select OK to close the message. The filters are available to be selected. Performance is slowed based on the number of filters selected.

A file is written for each selected filter (*.DMP file). If Enable Data Logging is set to No after filters have been selected, the filters with ON selected will still be ON, but log files are not created unless Yes is selected for Enable Data Logging.

These files are stored in a folder on the control’s Hard drive here: C:\LatheDumpFiles.

Figure 2–16. Data Logging Filters screen
Serial Port Settings

From the User Preferences screen, select the More ➔ F7 softkey to access the SERIAL PORT SETTINGS F1 softkey and the Serial Port Settings screen. Two serial port settings are available for transferring part programs between the control and various peripheral devices, such as a PC or an external disk drive. Make selections for mapping serial ports and setting Protocol, Baud Rate, Character Length, Stop Bits, and Parity for both ports on this screen.

![Serial Port Settings Screen](image)

**Figure 2–17. Serial Port Settings screen**

Serial Port Setup

- **COM PORT**—map each port as desired by entering the appropriate serial port. The range is 1 through 256.

- **PROTOCOL**—identifies the method that data is transferred between two devices. “Handshaking” is another term for protocol. The CNC uses hardware and software protocols. An operator writing communications utilities will find this information useful. Here are descriptions of the types of Protocol you can select from the Protocol field:
  - **CTS/RTS**—identifies the hardware flow control method as Clear to Send/Request to Send.
  - **XON/XOFF**—identifies the protocol using a software flow control method.
  - **FULL HANDSHAKE**—identifies the protocol using a software flow control method similar to XON/XOFF. The difference lies in the synchronization stage of Full Handshake.
• **BAUD RATE**—determines how fast data is transferred between two serial modems. Choose between seven baud rates using the drop-down list or softkeys. The baud rate is measured in characters per second.

  Improper cable connections and incompatible communications settings are the most common problems that prevent communication between two electronic devices. Refer to the *Parts Listing and Wiring Diagrams* manual for cabling requirements.

  Always use your fastest computer for transferring programs to the CNC.

  Conversational and NC programs can be transferred between the CNC’s memory and peripheral devices.

  • **CHARACTER LENGTH**—choose between 7 character bits or 8 character bits for Conversational or NC programming using the softkeys or drop-down list.

  • **STOP BITS**—choose between 1 and 1.5 stop bits for Conversational or NC programming using the softkeys or drop-down list.

  • **PARITY**—choose among None, Odd, or Even for Conversational or NC programming using the softkeys or drop-down list.

### FTP Server Settings

From the User Preferences screen, select the More ➤ F7 softkey to access the FTP SERVER SETTINGS F2 softkey and the FTP Server Settings screen.

![FTP Server Settings screen](image)

*Figure 2–18. FTP Server Settings screen*

Refer to WinMax Lathe Options *UltiMonitor*, on page 17 - 1 for information about this option.
MMI Uptime

From the User Preferences screen, select the More ➔ F7 softkey to access the MMI UPTIME F3 softkey to show the UPTIME screen. This screen shows the date and time the MMI (Man-Machine Interface, or software screen) began running. The Runtime field displays the number of days (D), hours (H), minutes (M) and seconds (S) for machine power on. Refer to Power Up, on page 5-2 for more information about machine and control power.

![Uptime Screen Image]

*Figure 2–19. Uptime screen*
Printing

Press the **Aux/Menu** key followed by the **Utility Screen** softkey to access the Utilities screen and softkey menu. From the Utilities screen, select the PRINTING F3 softkey to access the Printing screen. The Printing screen allows you to print sections of programs or entire part programs from the console. You can connect a printer to the machine using the USB port or print to a networked printer.

![Printing screen](image)

*Figure 2–20. Printing screen*

Use the arrow keys to move to each field or select a field with the stylus. Then use the TOGGLE check box F1 softkey for making selections to include when printing programs.

Refer to *Programming Basics, on page 4 - 1* for information about part programs.

You can print the entire program by selecting all of the check boxes or only select boxes for the parts of the program you wish to print. The following fields are available on the Printing screen for selecting programming information to include when printing:

- **PROGRAM BLOCKS**—you can either select Program Blocks to print all blocks, or you can identify a range of blocks to print in the FROM BLOCK and TO BLOCK fields.
- **PROGRAM PARAMETERS**
- **PART SETUP**
- **TOOL SETUP**
- **WEAR OFFSETS**
- **GEOMETRY OFFSETS**
- **PRINT SIZE**—move the slider from SMALL to LARGE to adjust the size of the printed text.
These softkeys are available on the Printing screen:

- **TOGGLE CHECKBOX** F1—select which sections of the current program to print.
- **PRINT** F3—display the Print pop-up window for entering printer selections. This is a standard Windows dialog for selecting a printer, print range, and number of copies.
- **PRINT SETUP** F4—display the Print Setup pop-up window for entering setup selections, such as printer, paper size, and orientation.
- **PRINT PREVIEW** F5—display a preview of the print selection. Use the softkeys that appear at the top of this preview screen to view different pages, zoom, and print.

![Print Preview screen](image)

*Figure 2–21. Print Preview screen*

**Integrator Support Services**

⚠️ The Integrator Support Services screen is for Hurco Certified Technicians use only in configuring and setting up the machine.

This screen is password protected. Unauthorized access to this area and changing machine settings may result in improper machine operation and/or damage to the machine.
Restart Control

The Restart Control command will remove control power, save all open programs in Project Manager based upon the last time AutoSave was performed for each open program, complete an orderly shutdown of the WinMax Lathe Max control, and then restart.

Follow these steps to use the Restart Control command:

1. Press the **Aux/Menu** key followed by the **Utility Screen** softkey to access the Utilities screen and softkey menu.
2. From the Utilities screen, select the RESTART CONTROL F5 softkey to access the Restart Control command. A pop-up message appears: “Are you sure you want to restart the control?”
3. Select Yes or No. When Yes is selected, the Restart Control command is performed. This feature saves time and avoids having to shut down the entire machine when it is only necessary to restart the control.

Shutdown Control

The Shutdown Control command will remove control power, save all open programs in Project Manager based upon the last time AutoSave was performed for each open program, and then complete an orderly shutdown of the WinMax Lathe Max control.

⚠️ You must use the Shutdown Control command prior to turning off machine power to ensure that no data is lost.

1. Follow these steps to use the Shutdown Control command:
2. Press the **Aux/Menu** key followed by the **Utility Screen** softkey to access the Utilities screen and softkey menu.
3. From the Utilities screen, select the SHUTDOWN CONTROL F6 softkey to access the Shutdown Control command. A pop-up message appears: “Are you sure you want to shut down the control?”
4. Select Yes or No. When Yes is selected, the Shutdown Control command is performed.
5. Wait for the shutdown process to finish before shutting off machine power at the Main Disconnect switch.
Serial I/O

Press the **Aux/Menu** key followed by the **Utility Screen** softkey to access the Utilities screen and softkey menu. From the Utilities screen, select the MORE ➔ F7 softkey followed by the SERIAL I/O F1 softkey to access the Serial I/O screen. Two serial ports are available on the control. The Serial I/O screen contains Status and Bytes Transferred fields for both ports. In addition, there are read, write, and abort softkeys for both ports.

![Figure 2–22. Serial I/O screen](image)

These fields appear on the Serial I/O screen:

- **STATUS**—displays status for this port as Available or Not Available.
- **BYTES TRANSFERRED**—indicates the number of bytes transferred for this port.

These softkeys are available on the Serial I/O screen. Duplicate sets of fields and softkeys are available on the Serial I/O screen for Port 1 and Port 2.

- **BEGIN READING FROM PORT 1 F1**—brings up 2 softkey choices: READ NC FROM PORT and READ CONV FROM PORT to identify the program format to read.
- **BEGIN WRITING TO PORT1 F2**—writes the program to the port.
- **ABORT PORT OPERATION F3**—halts the read or write operation for the port.
Log Files

Press the Menu key followed by the Utility Screen softkey to access the Utilities screen and softkey menu. From the Utilities screen, select the MORE → F7 softkey followed by the LOG FILES F2 softkey to access the Log Files screen. As the turning center runs, it generates three types of text prompts: Notification, Error, and Status. The Error and Status messages can be viewed in log files.

To manually produce a text file containing control registers for a particular moment in time, select the ALT +0 (zero) console keys. These files are also created by the control automatically under certain circumstances.

The control places the files into the Significant Events location described below. Example file name:

20111107 100403.shmDmp.txt

The filename represents the exact moment the file was created: [DATE]20111107+[TIME]100403.shmDmp.txt.

Accessing Log Files

Select the LOG FILES F7 softkey to access these log file selections.

- **ACTIVE ERROR LISTING F1**—displays a list of errors still in effect in the Active Error Listing screen. This list includes a date, time, filename and description for each error. PREVIOUS PAGE F1 and NEXT PAGE F2 softkeys become available for accessing multiple page lists. A CLEAR ALL F4 softkey clears the list.

- **ACTIVE STATUS LISTING F2**—displays a list of status messages still in effect in the Active Status Listing screen. Status messages relay information about the machine. PREVIOUS PAGE F1 and NEXT PAGE F2 softkeys become available for accessing multiple page lists. A CLEAR ALL F4 softkey clears the list.

- **ERROR HISTORY F3**—displays the last 50 error messages in the Error History screen. This list includes a date, time, filename and description for each error. PREVIOUS PAGE F1 and NEXT PAGE F2 softkeys become available for accessing multiple page lists. A CLEAR ALL F4 softkey clears the list.

- **STATUS HISTORY F4**—displays the last 50 status messages in the Status History screen. This list includes a date, time, filename and description for each status message. PREVIOUS PAGE F1 and NEXT PAGE F2 softkeys become available for accessing multiple page lists. A CLEAR ALL F4 softkey clears the list.
• **VIEW EVENT LOG FILE F7**—accesses the folder on the control containing the Significant Event files in an *Open* pop-up window. The example below shows Significant Event files (for example, “sev1_20111118”) and control register files (for example, 201111010130714.shmDmp.txt”)

![Figure 2–23. Open pop-up window for Significant Events files](image)

**Retrieving Log Files**

When it is necessary to copy certain files for service purposes, follow these steps:

1. Insert a USB flash memory device to the external connector on the communications port on the machine.
2. From the Input screen select the Project Manager *F8* softkey. The Project Manager screen opens.
3. Select the File Manager *F7* softkey. Directories containing system files are located in the left-hand pane. The Log files reside in the Part Programs (D) directory.
4. Navigate to the Significant Events folder following this path:
   
   Part Programs (D)/Hurco/WinMax/Output Files/Significant Events

5. Select the file(s) you wish to copy from the right-hand pane.
6. Select the Copy File(s) *F2* softkey.
7. In the left-hand pane, select the USB flash memory device (will probably indicate it is E drive in parentheses).
8. Select the Paste File(s) *F3* softkey. The files are now on the USB flash memory device, and can be transferred to a PC to be emailed.
PROJECT MANAGER

This section explains how to create and manage files and directories, set program properties, use File Manager, and access the UltiMonitor option using FTP Manager. Refer to WinMax Lathe Options *UltiMonitor, on page 17 - 1* for details about UltiNet. The following topics are explained in this section:

Overview ................................. 3 - 2
Managing Program Files ...................... 3 - 3
Set Program Properties ...................... 3 - 6
Use File Manager .......................... 3 - 7
Use the FTP Manager ..................... 3 - 9
Overview

Part programs are stored on the Computer Numeric Control (CNC) hard drive, network drive, or on removable USB devices. Each drive contains one main directory—the root directory. An operator cannot create this directory, but folders and sub-folders can be stored in it or in other drives, such as floppy drives or network drives.

Compare file management to a filing cabinet. The drives are like drawers in the filing cabinet. Subdirectories are the folders inside a drawer, or a drive. Folders and files are stored in the cabinet drawers. Part programs are like individual sheets of paper that are stored loosely on the drives or inside folders.

![Figure 3–1. Directory Structure](image)
Managing Program Files

Project Manager shows all part programs that are in the control’s memory to edit or run. Use the Program Manager menu to create, open, save, and close programs. Features of the Program Manager include:

- Ability to load more than one program at a time.
- Ability to load Conversational and NC programs at the same time.
- Ability to copy blocks from one program into another (blocks are copied in Program Review; Program Manager is used to switch between programs to facilitate copy and paste).
- A snapshot of the program.

Either press the Aux/Menu key or the Input key followed by the PROJECT MANAGER F8 softkey to access the Project Manager screen and softkey menu. You can also use the menu toolbar and select the Project Manager icon to access this screen.

A lock icon appears between the program name and path name when the file is in use on a network. When this icon is visible, the file cannot be edited, saved, or closed.

An “!” (exclamation mark) appears between the program name and path name when the file has been modified and not saved. Save the file to keep changes.

More than one program can be loaded in memory at a time. However, only the program that is highlighted will be the active program for editing, graphing, and running.

For detailed information about NC programming, refer to WinMax Lathe NC Programming Overview, on page 1 - 1
Create a New File

Either press the **Menu** key or the **Input** key followed by the **PROJECT MANAGER F8** softkey to access the Project Manager screen and softkey menu. You can also use the menu toolbar and select the **Project Manager** icon to access this screen.

Select the **NEW F1** softkey to create a blank part program. Choose the file type by selecting one of these softkeys:

- **CREATE HLT PROGRAM F1**—creates a new conversational part program named NONAME1.HLT.
- **CREATE NC PROGRAM F2**—creates a new NC part program named NONAME1.LNC.

Use the Save As feature to change the name from the default NONAME1.HLT or NONAME1.LNC to avoid saving one file over another. Refer to **Save Files, on page 3 - 5** for details.

Open a File

Select the **OPEN F2** softkey to open a previously saved part program. The Load Program screen displays a list of drives and folders for locating existing programs.

1. Select a folder and the files within the folder appear on the right-hand side.
2. Highlight the file to open.
3. Select the **LOAD SELECTED FILE(S) F1** softkey.

   The Load Program screen allows you to sort the file list by File, Size, or Date. To sort the list by any of these criteria, simply use the stylus and tap the appropriate header.

   If you sort by one header and then by another, the file list will sort first by the most recent header selected then by the previous selection. For example, selecting **File** then **Date** will sort the file list in ascending order by Date. If any files have the same date listed, they will be sorted alphabetically by file name within each date.

   Selecting a heading a second time inverts the order. For example, the alphabetical order for files sorted from A to Z will be sorted from Z to A with the second click of the heading.
Save Files

Select the SAVE F3 softkey to save the current part program onto a drive to which you have access. Select the SAVE AS F4 softkey to create a file by saving the current part program under a different name, as a different file type, or in a different location.

The Save Program screen appears. The left-hand pane shows the drives and folders. When you select a folder, the files stored in the folder appear in the right-hand pane. The file's size and date it was saved appear next to the file name.

![Image of Save Program screen]

**Figure 3–3. List of System Directories and File Names—Saving a File**

If the program name is the default NONAME1 or if you want to save a file with a different name, select the SAVE AS F4 softkey and the screen reverts to the list of drives and folders. The list opens in the same location as the current program with NONAME1.HLT in the FILE NAME field.

If the program was previously saved, you can select SAVE F1 and the program will save in the same drive, directory, and filename.

⚠️ Change the name from the default NONAME1.HLT to avoid saving one file over another.

<table>
<thead>
<tr>
<th>Creating a New Folder for Storing A File:</th>
<th>Saving the File in a Different Folder:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Highlight the folder where the new folder will reside.</td>
<td>1. Highlight the appropriate folder.</td>
</tr>
<tr>
<td>2. Select CREATE FOLDER F4.</td>
<td>2. Enter a file name.</td>
</tr>
<tr>
<td>3. Enter the folder name in the pop-up window and select OK.</td>
<td>3. Select SAVE F1.</td>
</tr>
</tbody>
</table>
Close a File

Press the Menu key to access the Project Manager screen and softkey menu. Select the CLOSE ➔ F5 softkey to remove a program or programs from the file listing. Multiple programs can be open (in memory) at one time. Having too many programs open can affect system performance. Close files to free up internal memory used for editing, graphing, and running programs.

Select CLOSE ALL PROGRAMS F3 or CLOSE SELECTED PROGRAM F5. If only one program is listed, then either softkey can be used. If more than one program is listed, then be sure to select the appropriate softkey.

Make note of the “!” (exclamation mark) status as closing a program that has not been saved will lose all changes made since the last time it was saved. If modifications have been made to a program that has not been saved, a prompt appears before closing.

- Select OK to continue the close operation without saving.
- Select Cancel to cancel the operation.

Set Program Properties

Select the PROGRAM PROPERTIES F6 softkey to change and store properties for the selected file. The settings originate from the Utilities screen, User Preferences, Conversational Settings screen. Refer to Conversational Settings, on page 2 - 16 for more information about the settings. You can override the defaults for a program using Program Properties.

These fields appear when this softkey is selected:

- **DISPLAY UNITS**—enter Inches or Millimeters for the unit of measurement used throughout the part programming for HLT files. This field does not apply to NC programs.
- **PROGRAMMING MODE**—enter Radius or Diameter for the programming mode. This field does not apply to NC programs.
- **DESCRIPTION**—enter a text description of the selected file. You can enter up to 47 characters on each of two lines. This text appears at the bottom of the Project Manager screen when the file is highlighted.
- **WRITE PROTECTION**—select ON to provide write protection for the current program. This selection prevents changes to the program from being saved. Select OFF to remove write protection and allow editing of the program.

These fields are displayed but cannot be changed on this screen:

- **NAME**—displays the file name of the program. This field is read-only. To change the name of the saved file, select the Exit key followed by the SAVE AS softkey.
- **PATH**—displays the path to the saved file. This field is read-only. To change the path for the saved file, select the EXIT F8 softkey followed by the SAVE AS F4 softkey.
Use File Manager

From the Project Manager screen, select the **FILE MANAGER F7** softkey to perform file management functions, such as renaming a folder or file name, or deleting files or folders from the drive.

The control detects when a USB drive is inserted or removed and updates the File Manager Directory. When the USB drive is detected, files can be loaded from and saved to the USB drive.

**Folders**

When a folder is highlighted in the left-hand pane, the softkey menu displays folder management options.

- **CUT FOLDER F1**—removes the selected folder from its current location and places it on a "clipboard." You may then paste the folder in another location. Make sure you do not cut or copy another folder before pasting the folder in its new location. The clipboard contains only the most recently cut or copied folder. Cutting a folder also cuts all files and folders contained with the folder.

- **COPY FOLDER F2**—places a copy of the selected folder on a "clipboard." Once a folder has been placed on the clipboard, you may paste it in a new location. The clipboard contains only the most recently cut or copied folder. Copying a folder also copies all files and folders contained within the folder.

- **PASTE FILE(S) INTO FOLDER F3**—places a copy of the most recently cut or copied file(s) or folder to the "clipboard" in the selected location. The file(s) or folder will remain on the clipboard and can be pasted elsewhere until another file or folder is cut or copied to the clipboard. Pasting a folder also pastes all files and folders contained within the folder.

- **CREATE FOLDER F4**—creates a new folder in the selected location. The control prompts you to enter a name for the new folder when you select this softkey. Enter the name that you wish to use for the new folder and click OK.

- **RENAME FOLDER F5**—allows you to rename the selected folder. When you select this softkey, a pop-up window appears prompting you to "Enter new file name." Enter the name for the folder and select OK. Select Cancel to keep the same folder name.

- **DELETE FOLDER F6**—deletes the selected folder along with any folders or files contained within the folder. This will not place a copy of the folder on the clipboard and you will not be able to retrieve a folder once it has been deleted. Use extreme caution when using this softkey. A message appears when you select it asking "Continue with delete operation?" If you are sure that you want to delete the folder, select OK. If you do not wish to delete the folder, select Cancel.
Files

When a file name is highlighted in the right-hand pane, the softkey menu provides file management options.

- **CUT FILE(S) F1**—removes the selected file from its current location and places it on a "clipboard." You may then paste the file in another location. Make sure you do not cut or copy another file before pasting the file in its new location. The clipboard contains only the most recently cut or copied file.

- **COPY FILE(S) F2**—places a copy of the selected file on the "clipboard." Once a file has been placed on the clipboard, you may paste it in a new location. The clipboard contains only the most recently cut or copied file.

- **PASTE FILE(S) F3**—places a copy of the last file that was cut or copied to the "clipboard" in the selected location. The file will remain on the clipboard after pasting and can be pasted elsewhere until another file is cut or copied to the clipboard.

- **RENAME FILE(S) F4**—allows you to rename the selected file. When you select this softkey, a pop-up window appears asking you to "Enter new file name." Enter the name you want to name the file and select OK. Select Cancel to keep the file name.

- **DELETE FILE(S) F5**—deletes the selected file. This will not place a copy of the file on the clipboard and you will not be able to retrieve a file once it has been deleted. Use extreme caution when using the Delete File(s) softkey. A message appears when you select this softkey asking "Continue with delete operation?" If you are sure that you want to delete the file, select OK. If you do not wish to delete the file, select Cancel.

- **LOAD SELECTED FILE F6**—loads the selected file into memory (this selection opens the file just as it does with the Project Manager/Open menu.

Other Softkeys

These softkeys appear on the File Manager screen whether a filename is highlighted or a folder is highlighted:

- **FTP MANAGER F7**—accesses the FTP Manager softkey menu. On the Project Manager screen, the FTP MANAGER softkey is F8. Refer to *WinMax Lathe Options* for details about the UltiMonitor option.

- **EXIT F8**—returns to the Project Manager screen
Use the FTP Manager

FTP (File Transfer Protocol) is a method of transferring files from one computer to another using the Internet and access the UltiMonitor option. Refer to WinMax Lathe Options UltiMonitor, on page 17 - 1 for details about UltiNet.

⇒ Customers using UltiNet should refer to the UltiMonitor section for product guidance.

Press the Menu key to access the Project Manager screen and softkey menu. The FTP MANAGER F8 softkey accesses the FTP Host List screen. The FTP MANAGER F7 softkey on the File Manager screen also accesses this same screen. From here, you can connect to or disconnect from, add, edit, and delete FTP servers which are identified on this list.

Refer to WinMax Lathe Options UltiMonitor, on page 17 - 1 for information about setting up the FTP server.
PROGRAMMING BASICS

This section explains basic programming information for Conversational and NC programming, such as required setup and program checking.

- Part Programming ................................................. 4 - 2
- Part and Tool Loading ............................................ 4 - 7
- Part Setup—Work Offsets ...................................... 4 - 11
- Tool Setup—Geometry Offsets ................................. 4 - 17
- Tool Review .......................................................... 4 - 77
- Program Parameters .............................................. 4 - 82
- Verifying Part Programs—Graphics ........................... 4 - 86
- Programming Training ............................................ 4 - 91
Part Programming

There are five main steps to follow before creating a part program on the control:

1. Plan the part programming operations.
2. Perform the tool- and part-loading operations. Refer to *Part and Tool Loading*, on page 4 - 7.
3. Enter the Part Setup information. Refer to *Part Setup—Work Offsets*, on page 4 - 11.
4. Enter the Tool Setup information. Refer to *Tool Setup—Geometry Offsets*, on page 4 - 17.
   - The Read/Write Geometry Offsets softkey accesses a menu that functions the same as the menu described in *Tool Geometry Offsets*, on page 4 - 67.
5. Enter the Program Parameters information. Refer to *Program Parameters*, on page 4 - 82.

The remaining softkeys are available for NC programming. Please refer to WinMax Lathe NC Programming Overview, on page 1 - 1, Importing and Exporting M Code Data, on page 1 - 29, M Code Translation, on page 5 - 2, and WinMax Lathe Options, NCPP Variables, on page 8 - 2 for information about their functions.

The Input screen contains softkeys for accessing menus for the programming tasks.

![Input Screen](image)

*Figure 4–1. Input Screen*

- Fields or softkeys appear grayed out and are not accessible when lockout mode is enabled.
The following diagram shows how the software is set up, starting with the Input screen, accessing Part Setup F1, Tool Setup F2, Part Programming F3 for programming Data blocks, Program Parameters F4, and Project Manager F8.

![WinMax Lathe Programming diagram](image)

*Figure 4–2. WinMax Lathe Programming diagram*
The following table identifies the types of data blocks that can be programmed from the Part Programming F3 softkey menu for each turning center machine type:

<table>
<thead>
<tr>
<th>Data Blocks</th>
<th>Softkey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position</td>
<td>F1</td>
</tr>
<tr>
<td>Turning</td>
<td>F2</td>
</tr>
<tr>
<td>Profile</td>
<td>F1</td>
</tr>
<tr>
<td>Thread</td>
<td>F2</td>
</tr>
<tr>
<td>Groove</td>
<td>F3</td>
</tr>
<tr>
<td>Hole</td>
<td>F4</td>
</tr>
<tr>
<td>Cutoff</td>
<td>F5</td>
</tr>
<tr>
<td>Exit F8 to New Block screen</td>
<td></td>
</tr>
<tr>
<td>Live Tooling</td>
<td>F3</td>
</tr>
<tr>
<td>Radial Milling</td>
<td>F1</td>
</tr>
<tr>
<td>Radial Holes</td>
<td>F2</td>
</tr>
<tr>
<td>Axial Milling</td>
<td>F4</td>
</tr>
<tr>
<td>Axial Holes</td>
<td>F5</td>
</tr>
<tr>
<td>Exit F8 to New Block screen</td>
<td></td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>F4</td>
</tr>
<tr>
<td>Change Parameters</td>
<td>F1</td>
</tr>
<tr>
<td>Change Part Setup</td>
<td>F2</td>
</tr>
<tr>
<td>M Code</td>
<td>F3</td>
</tr>
<tr>
<td>Bar Feed</td>
<td>F4</td>
</tr>
<tr>
<td>Comment</td>
<td>F5</td>
</tr>
<tr>
<td>NC Program Call</td>
<td>F6</td>
</tr>
<tr>
<td>More</td>
<td>F7</td>
</tr>
<tr>
<td>Repeat Start</td>
<td>F1</td>
</tr>
<tr>
<td>Repeat End</td>
<td>F2</td>
</tr>
<tr>
<td>More</td>
<td>F7</td>
</tr>
<tr>
<td>Exit F8 to New Block screen</td>
<td></td>
</tr>
<tr>
<td>Transfer</td>
<td>F5</td>
</tr>
<tr>
<td>Move Tailstock</td>
<td>F5</td>
</tr>
<tr>
<td>Exit F8 to Input Screen</td>
<td></td>
</tr>
</tbody>
</table>

*Table 4–1. Types of Data Blocks*
Planning

Before you begin programming, decide what material and tools are needed. It is important to be familiar with the axes motion on the machine and how to obtain the information required for the setup screens. These topics are described in this section.

![Figure 4–3. Turning Center Axes Motion](image)

Save your program with a unique, correct name before proceeding. Following this practice can help avoid accidentally deleting a file because of a generic filename. Refer to Save Files, on page 3 - 5 for details about saving files.

Axes Movement

Be familiar with the axis movement in preparation for programming. This diagram identifies positive (+) axis movement (and alternatively negative (-) axis movement), showing axes for all turning center configurations.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Workpiece</td>
</tr>
<tr>
<td>2</td>
<td>Machine Zero</td>
</tr>
<tr>
<td>3</td>
<td>Part Offset</td>
</tr>
</tbody>
</table>

Radial and axial tools are used for live tooling.

- Radial tooling approaches the stock in the -X axis direction.
- Axial tooling approaches the stock in the -Z axis direction.
This diagram identifies the radial and angular polar coordinates for live-tooling turning centers.

\[ r \]
The radial coordinate (the radial distance from the center).
\[ \theta \]
The angular coordinate, or the polar angle (counterclockwise angle from the X-axis).

<table>
<thead>
<tr>
<th><strong>r</strong></th>
<th>The radial coordinate (the radial distance from the center).</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>( \theta )</strong></td>
<td>The angular coordinate, or the polar angle (counterclockwise angle from the X-axis).</td>
</tr>
</tbody>
</table>

*Figure 4–4. Live-Tooling Turning Center Polar Coordinate Axes Motion*

**Setup Screens**

The part and tool setup screens describe the part and the tools used to cut the part. This information is necessary for the system to draw the part.

To perform many of the setup functions, use the axis controls to move the turret and record positions. Refer to *Axis and Spindle Control, on page 1 - 16* for information about axis controls.

⇒ Part and Tool Setup information is saved with conversational programs but not with NC programs.
Part and Tool Loading

This section describes loading the workpiece and the tools in preparation for programming the Part and Tool Setup screens.

Loading the Workpiece

In order to determine the reference point (part zero) in the part, first load the work piece (raw material or stock) into the chuck or optional collet. Refer to the Maintenance and Safety manual for information about hydraulic settings for the optional collet. Refer to Chuck Operations, on page 5 - 48 for information about operating the chuck.

Loading Live Tooling Tool Holders

Hurco TMM, TMX MY, and TMX MYS Series turning centers use tool holders mounted in turret turning stations to hold tools. Each tool holder must be inserted into the turret.

To insert the tool holder into the turret,

1. Index the turret forward or backward one station. Refer to Load Tools in Turret and Assign Tool Numbers, on page 4 - 9 for directions for indexing the turret.

2. Turn the splineshaft for the tool holder until the notch fits into the detent and the collar slides out. The following figures first show the collar in its unlocked position (1) and second in its locked position (2).

![Live Tooling Tool Holder Collar](image)

3. Follow the directions in the Load Tools in Turret and Assign Tool Numbers, on page 4 - 9 to mount the live tool holder in a non Active Tool Index location.

   Before using a live tool, check these items:

   - the sealing rings are present and not damaged.
   - the coupling profile is clean and not damaged.
   - the spindle locking mechanism is engaged.
Loading Tools

Hurco turning centers use a turret to hold tools. Each tool is manually inserted into the turret. There are multiple turning center configurations:

- Two Axis (TM series)
- Live Tooling (TMM series)
- Two Axis with Programmable Tailstock (TMX series)
- Live Tooling with Y-Axis Motion (TMX MY series)
- Live Tooling with Y-Axis Motion and Sub-spindle (TMX MYS series).

Tools in the turret are described and programmed during Tool Setup. Refer to Tool Setup—Geometry Offsets, on page 4 - 17 for programming information.

Two Axis (TM and TMX series)

- The turret contains boring blocks for holding tools and turning stations for holding turning tools.
- Bolts secure tools inserted in boring blocks; wedge clamps secure tools in their stations.

Live Tooling (TMM, TMXMY, and TMXMY S series)

- Tool holders are inserted and locked in place with VDI set screws.
- Static holders are used for turning and boring tools.
- Live tools use collet holders.

All series

- Turret stations are numbered to identify and locate each tool.
- Use the Turret Plus (+) or Minus (-) console keys to increment or decrement the tool station.
Load Tools in Turret and Assign Tool Numbers

To load tools in the turret and assign their tool numbers on the control,

1. Press the Manual console key to display the Manual screen.
2. Select the SET ACTIVE TOOL F1 softkey. The softkey menu changes for indexing the turret.

3. Enter the requested tool number in the Next Tool field using one of these methods:
   - Type in the tool number using the number pad on the console.
   - Select the INCREMENT NEXT TOOL NUMBER F1 softkey. The number in the Next Tool field will increase by one number from 1 through 99 and wrap back to 1 with each selection of the softkey.
   - Select the DECREMENT NEXT TOOL NUMBER F2 softkey. The number in the Next Tool field will decrease by one number from 1 back to 99 and wrap back through 1 with each selection of the softkey.
4. Use one of these three softkey choices to index the turret to the position requested in the Next Tool field:
   - **INDEX TURRET SHORT WAY** F4—moves the turret either forward or backward, whichever distance is the shortest to the station that has the requested tool.
   - **INDEX TURRET FORWARD** F5—moves the turret forward to the station that has the requested tool. For example, if the turret needs to move from station 10 to station 3, the turret moves through the positions as follows:
     
     station 10
     station 11
     station 12
     station 1
     station 2
     station 3

     The Index Turret Forward example applies to 12 station turning centers. For 10 station turning centers, station 1 follows station 10.
• **INDEX TURRET REVERSE** F6—moves the turret back to the station that has the requested tool. For example, if the turret needs to move from station 7 to station 3, the turret moves through the positions as follows:

```
station 7
station 6
station 5
station 4
station 3
```

⚠ Move the turret in the most efficient manner, keeping in mind the length of tools and how moving the turret will affect their position during each index.
Part Setup—Work Offsets

To set up your part you need to define the X and Z offsets that define the zero reference location for the part. All part program data will be referenced from the zero location.

The Change Part Setup data block can be used to insert changes in part setup information within a part program. For information about this type of data block, refer to WinMax Lathe Conversational Part Programming, Change Part Setup, on page 2 - 195.

Each part offset is stored in the Part Offset—Work Offsets screen. The offsets represent the X and Z values shifted from the machine zero location to the face of the part. Machine zero is set at the face and centerline of the spindle. The turret face is calibrated to the face, and the boring blocks are set to the centerline.

You may want to insert a tool in the turret to use as an edge finder when identifying the part offset.

Travel must stop before reaching Machine Zero.

This diagram shows the Part Offset (3) relative to Machine Zero (2):

![Diagram showing Part Offset (3) relative to Machine Zero (2)](image)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Workpiece</td>
</tr>
<tr>
<td>2</td>
<td>Machine Zero</td>
</tr>
<tr>
<td>3</td>
<td>Part Offset</td>
</tr>
</tbody>
</table>

*Figure 4–7. Part Offset Relative to Machine Zero*
There are up to 99 work offsets that can be programmed. Each offset is defined by storing the machine position for that axis. Typically this is done by jogging a tool to the part and storing the Machine Position for that tool.

In most programs, only one offset is used. A second offset is typically used when a part needs to be turned over, or flipped, in the same setup for establishing the zero location on the second side.

The current Work Offsets are saved with each Conversational program. You can save the Work Offsets to a separate file to use later. Refer to Part Setup Softkeys, on page 4 - 16 for information about saving and restoring offsets.

Begin the programming setup process with the Part Setup screen.

Either press the Aux/Menu key or the Input key followed by the PART SETUP F1 softkey to access the Part Setup screen and softkey menu. You can also use the menu toolbar and select the Part icon to access this screen.

The offsets displayed on the Part Setup - Work Offsets screen depend upon your machine configuration.

- TM and TMM series machines use one Part Setup - Work Offsets screen showing appropriate offsets.
- TMX, TMXMY, and TMXMYS machines use two Part Setup - Work Offsets screens. The second screen is accessed with the ADDITIONAL AXIS OFFSETS F3 softkey. This softkey does not appear for TM and TMM Series machines.

The following table shows the offsets that appear on the screens for each machine configuration:

<table>
<thead>
<tr>
<th>Model</th>
<th>Part Setup - Work Offset</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>C</td>
</tr>
<tr>
<td>TM</td>
<td></td>
</tr>
<tr>
<td>TMM</td>
<td></td>
</tr>
<tr>
<td>TMX</td>
<td></td>
</tr>
<tr>
<td>TMX MY</td>
<td></td>
</tr>
<tr>
<td>TMX MYS</td>
<td></td>
</tr>
</tbody>
</table>

Table 4–2. Part Setup—Work Offsets machine configurations
Here are samples of the two TMX MY series Part Setup - Work Offsets screens.

Figure 4–8. Live-Tooling and Y-Axis Motion (TMX MY Series) Part Setup—Work Offsets screens

Use either the touchscreen or the arrow keys to move the cursor to each Offset field and use the softkeys or type in data for the part setup for your part program.

- The **Home** console key jumps to the first offset in the program.
- The **End** console key jumps to the last offset in the program.
- The **Page Up** console key jumps to the previous page of the offset list, in increments of 10.
- The **Page Down** console key jumps to the next page of the offset list, in increments of 10.

Definitions for the fields and softkeys are located in these sections: *Part Setup Fields, on page 4 - 14* and *Part Setup Softkeys, on page 4 - 16.*
Part Setup Fields

The Part Setup fields are defined as follows:

- **#**—contains the index value that identifies each offset.

- **C OFFSET checkbox**—select this checkbox to enable the C Offset fields. When the checkbox is cleared, the C Offsets cannot be edited. The status of this checkbox is modal. It stays in effect until you change it, even upon a control reboot. This field is available for Live Tooling (TMM series), Live-Tooling and Y-Axis Motion (TMX MY series), and Live-Tooling, Y-Axis Motion, and Sub-spindle (TMX MYS series) turning centers.

- **X OFFSET checkbox**—select this checkbox to enable the X Offset fields. When the checkbox is cleared, the X Offsets cannot be edited. The status of this checkbox is modal. It stays in effect until you change it, even upon a control reboot.

- **C OFFSET**—contains the C location in machine coordinates for part zero. This field is available for Live Tooling (TMM series), Live-Tooling and Y-Axis Motion (TMX MY series), and Live-Tooling, Y-Axis Motion, and Sub-spindle (TMX MYS series) turning centers.

- **X OFFSET**—contains the X location in machine coordinates for part zero.

- **Z OFFSET**—contains the Z location in machine coordinates for part zero.

⚠ When the cursor is in a Z Offset field and **Store Machine Position** is pressed, a pop-up window appears requesting a tool offset (0-99). The control will adjust for the tool offset before entering the position in the selected field.

The pop-up contains the active tool’s programmed geometry offset. If the active tool is not programmed in Tool Setup, then the active tool number is used as the default offset.

Entering a zero (0) does not apply an adjustment.

After entering or accepting the tool offset, select **OK** to continue or **Cancel** to stop the operation.

- **W Offset (Tailstock or Sub-spindle) checkbox**—select this checkbox to enable the W Offset fields. When the checkbox is cleared, the W Offsets cannot be edited. The status of this checkbox is modal. It stays in effect until you change it, even upon a control reboot. This field is available for Two-Axis Programmable Tailstock (TMX series) turning centers only.

- **Y Offset checkbox**—select this checkbox to enable the Y Offset fields. When the checkbox is cleared, the Y Offsets cannot be edited. The status of this checkbox is modal. It stays in effect until you change it, even upon a control reboot. This field is available for Two-Axis Programmable Tailstock (TMX series) and Live-Tooling, Y-Axis Motion, and Sub-spindle (TMX MYS series) turning centers only.

- **W OFFSET (Tailstock or Sub-spindle)**—contains the W location in machine coordinates for part zero. This location is referenced from Machine Zero as shown in Figure 4–7. **Part Offset Relative to Machine Zero, on page 4 - 11.** This field is available for Two-Axis Programmable Tailstock (TMX series) turning centers only.
• **Y OFFSET**—contains the Y location in machine coordinates for part zero. Y-Axis motion allows the turret to move up or down and maintain the X-Axis position. This field is available for Live-Tooling and Y-Axis Motion (TMX MY series) and Live-Tooling, Y-Axis Motion, and Sub-spindle (TMX MYS series) turning centers.

• **On Sub-spindle check box**—indicates the offsets are applied to the sub-spindle when selected. This field is available for Live-Tooling, Y-Axis Motion, and Sub-spindle (TMX MYS series) turning centers only.

  All conversational part program data blocks following the offset are applied to the sub-spindle when an On Sub-spindle check box is selected.

• **ACTIVE OFFSET**—contains the index value (1 – 99) specifying which offset is active.

  You can also define a new Active Offset by inserting a Change Part Setup data block within your part program. Refer to WinMax Lathe Conversational Programming, *Change Part Setup, on page 2 - 195* for details.
Part Setup Softkeys

The Part Setup softkeys provide the following options:

- **PAGE UP F1**—scrolls up through the # fields, displaying groups of offsets.
- **PAGE DOWN F2**—scrolls down through the # fields, displaying groups of offsets.
- **ADDITIONAL AXIS OFFSETS F3**—toggles the screen to a second screen containing W Offset (Tailstock or Sub-spindle) fields and Y Offset fields.
  - The W Offsets are available for Programmable Tailstock (TMX series) and Live-Tooling and Y-Axis Motion (TMX MY series) and Live-Tooling, Y-Axis Motion, and Sub-spindle (TMX MYS) turning centers.
  - The Y Offsets are available for Live-Tooling and Y-Axis Motion (TMX MY series) turning centers and Live-Tooling, Y-Axis Motion, and Sub-spindle (TMX MYS) turning centers.
- **STORE MACHINE POSITION F5** (or **Store Machine Position** console key)—sets the current axis position as a Part Zero location. The cursor location defines which axis will be set. The current axis position appears in the DRO Part column as zero.
- **STOCK GEOMETRY**—allows you to specify the dimensions of the stock material so it displays properly in graphics (when Stock Outline field is enabled in Graphics Settings).
  - **Manual Stock Length**—when No, the software automatically sets the length and position of the stock. When Yes, stock length must be entered manually.
- **TABLE COMMANDS F7**—displays an additional softkey menu with choices for saving and restoring the offsets.
  - **WRITE TABLE TO FILE F2**—opens a Save Offset Table screen for naming and saving the offsets to a file. You can assign the file extension of your choice in the **File name** field. It is not possible to select an extension using the **Files of type** field.
  - **READ TABLE FROM FILE F4**—opens the Load Offset Table screen for selecting a folder and an offset file. When an offset file is selected from this screen, those offsets are read from the file and the values appear on the Part Setup - Work Offsets screen.
  - **CLEAR TABLE F7**—resets all values in the table to 0.000. A confirmation window appears prior to resetting the values.
  - **EXIT F8**—exits the Table Commands menu and returns to the first Part Setup - Work Offsets menu.
  - **EXIT F8**—exits the part setup process and returns to the Input screen.
Tool Setup—Geometry Offsets

You must enter data to describe the tools that will be used for the part program on a Tool Setup screen for each tool. If the Tool Number, Type, Insert Shape, and Edge Length (mm) or Insert Size (in) are not entered for each tool, the system will not have enough information to draw the part properly on the Graphics screen or to run the part.

When running a previously created part program, the Tool Setup must be carefully checked to be certain the tools described for the old program match the tools in the turret. If a tool breaks or is not available when running a previously created part program, the Tool Setup information must be changed.

Tool offsets are stored in the Tool Geometry Offsets screen in Tool Setup. Touch off the diameter and length of each tool from the part to identify these offsets. The information in the Geometry Offsets screen remains in the machine memory and is independent of the part program. You can save the offsets to a separate file to use later. Refer to Tool Geometry Offsets, on page 4 - 67 and Tool Wear Offsets, on page 4 - 74 for information about saving and restoring offsets.

Geometry offset and wear offset settings for each tool in Tool Setup are stored in the machine’s memory so you can switch programs without having to touch off the tools each time you change programs. Speeds and feeds may change for each program, but the relative tool positions and dimensions do not change if the tools are not moved or changed in the turret.

Create tool setup templates to simplify program development. Renaming the template file preserves the original template file for later use.

- To create a tool setup template, enter the tool description. Save the information as a program, using a program name that indicates the type of tools described.
- To use the saved template, recall the tool setup program, make any necessary changes for the new part program, and save the changed setup under a new name.

Either press the Aux/Menu console key or the Input console key followed by the TOOL SETUP F2 softkey to access the Tool Setup screen and softkey menu. You can also use the menu toolbar and select the Tool icon to access this screen.
The following figure is a sample Tool Setup screen with a tool number and tool type selected. Definitions for the fields and softkeys are located in the Turning Tool Setup Fields, on page 4 - 20 and Tool Setup Softkeys, on page 4 - 65 sections.

![Figure 4–9. Tool Setup screen](image)

The DRO (top left of the screen) shows the real-time position of the axes and machine status. The active tool is displayed in the DRO along with the Spindle RPM for all spindle types. Depending upon the machine configuration, the RPM is displayed for the Main Spindle (either Spindle or S1), a live-tool spindle (S2), and a sub-spindle (S3). The Machine and Part position information in the DRO will not appear if the machine is not calibrated or on the Desktop software. The fields in the bottom part of the screen describe the tool.

To enter information for a specific tool, or to find out whether any data already exists for that tool, type the tool number into the Tool field and press Enter. For example,

- If you enter a 1 in the Tool field, the screen will update to show existing data for tool number 1.
- If no data had been saved previously for tool 1, the TYPE field is empty and the remaining fields contain default values. This means that tool number 1 is currently available to be programmed. Add new tools by entering new numbers in the Tool Number field and enter data for each new tool.

Up to 99 tools can be programmed. Depending upon your machine configuration, the range for station numbers is 0 to 10 or 0 to 12. The default is 0. If 0 is left in the Station # field, the software uses the Tool number as the Station number.

If a tool is not assigned to a valid station number when you run the program, an error message appears on the screen.
The following Tool Review screen shows some scenarios for assigning station numbers:

![Tool Review Screen](image)

Figure 4–10. Tool Review screen

You can use one tool for more than one operation by assigning two tools to one station:

Tool 3/Station 3 (Grooving)
Tool 13/Station 3 (Cutoff the part with Grooving tool)

Or you can use one station to hold two different tools for ID work if you use a block with two holes:

Tool 4/Station 4 (Center Drill)
Tool 14/Station 4 (Drill)

For machines utilizing 10 or 12 tools or less (depending upon your machine configuration), you can leave the default Station Number entry of 0.

Use either a pointing device or the arrow keys to move the cursor to each Tool Setup field and use the softkeys or type in data to set up the tool descriptions for your part program.

The **Home** console key jumps to the first tool in the program.

The **End** console key jumps to the last tool in the program.

The **Page Up** console key jumps to the previous tool in Tool Setup.

The **Page Down** console key jumps to the next tool in Tool Setup.
Turning Tool Setup Fields

The fields on the Tool Setup screens change based on the tool type, unit of measurement, and programming mode. The fields for these tools are described in this section:

Custom ................................................................. 4 - 21
Turning ................................................................. 4 - 23
Boring ................................................................. 4 - 25
Center Drill ............................................................ 4 - 28
Drill ................................................................. 4 - 29
Threading ............................................................. 4 - 31
Grooving .............................................................. 4 - 32
Cutoff ................................................................. 4 - 35
Back Turning ........................................................ 4 - 37
Back Boring .......................................................... 4 - 39
Tap ................................................................. 4 - 42
Ream ................................................................. 4 - 43
Inserted Drill .......................................................... 4 - 44

Please refer to Live-Tooling Tool Setup Fields, on page 4 - 47 for information about Turning Tool setup.
Custom

- **TOOL**—identifies the tool number that will be used in the part program. Up to 99 tools can be defined. Use the number keys on the console to enter the tool number.

- **STATION #**—identifies the station number that will be used for this tool in the part program. The default is 0. The range is 0 to 10 or 0 to 12 depending upon your machine configuration. Refer to Tool to Turret Station Map Panel, on page 4 - 81 for more information about programming station numbers.

- **TYPE**—identifies the tool type to use for this tool number. The tool type determines the parameters required to define each tool. Select a tool type from the choices listed in this field. Select the down arrow to expand the list.

- **COMMENT**—allows you to enter up to 20 characters to help describe the tool. This field does not affect the part program. You can use either the programming keypad, the pop-up text window, or the optional keyboard to enter characters.

- **MAX DEPTH OF CUT**—identifies the maximum depth of cut that you can program with this tool. This value is copied into each new data block in the part program that uses this tool. If necessary, this parameter can be changed within a new data block when programming the part.

- **TOOL OFFSETS**—defines the Tool Geometry Offset and Wear Offset used for this tool. This value defaults to the current tool number. Be sure to verify Geometry and Wear Offsets for the tool. Refer to Tool Geometry Offsets, on page 4 - 67 and Tool Wear Offsets, on page 4 - 74 for details about these offsets.

- **Orientation Icon**—shows the orientation of the tool, selected from the Orientation pop-up window in Tool Geometry Offsets. Refer to Select the Tool Orientation, on page 4 - 73 for definitions of each icon.

- **INSERT TIP RADIUS**—displays the tip radius based on the Radius selection in Geometry Offsets. This field is read-only and can only be edited from the Radius field in the Geometry Offset screen. Refer to Select a Radius, on page 4 - 73 for information about changing this entry.

- **SPEED (RPM), SPEED (FPM), or SPEED (MPM)**—identifies the RPM value or Constant Surface Speed (CSS) value for this tool.
  - **RPM**—Revolutions per Minute (RPM value).
  - **FPM**—Feet per Minute (Constant Surface Speed (CSS) value).
  - **MPM**—Meters per Minute (Constant Surface Speed (CSS) value).

Select the MORE F7 softkey followed by the SPEED AS CSS F1 softkey for the Feet or Meters per Minute value.

Select the MORE F7 softkey followed by the SPEED AS RPM F2 softkey for the Revolutions per Minute value.
- **Spindle Direction**—identifies clockwise (CW) or counterclockwise (CCW) for the direction the tool will turn. The default is CW.

- **FEED (IPR), FEED (MMPR), FEED (IPM), or FEED (MMPM)**—identifies the programmed feed rate for this tool as either:
  - **IPR**—Inches per Revolution.
  - **MMPR**—Millimeters per Revolution.
  - **IPM**—Inches per Minute.
  - **MMPM**—Millimeters per Minute.

  Select the MORE F7 softkey followed by the FEED PER MINUTE F4 softkey for the Inches or Millimeters per Minute feed rate.

  Select the MORE F7 softkey followed by the FEED PER REVOLUTION F5 softkey for the Inches or Millimeters per Revolution feed rate.

- **COOLANT**—identifies the type of coolant to be used for this tool. Coolant may be programmed as OFF or Primary. The default is Primary. During Auto mode when running the program, the Primary coolant will be enabled whenever this tool is used if the Auto Coolant LED is on and OFF is not selected in the COOLANT field.

- **INSERT SHAPE**—identifies the geometry of the insert. This field is used only for graphical part program verification and is not required to run a part program. Select a shape from the standard shapes provided in the Insert Shape field’s drop-down list.

A graphical representation of the insert appears on the screen. Here are some examples of the available shapes:

![Sample Insert Shapes](image)

*Figure 4–11. Sample Insert Shapes—Custom Tool Setup*

- **INSERT SIZE (IC)** for Inch mode—identifies the size of the insert for programs using tools measuring in inches, which are defined by their Inscribed Circle diameter (IC). Select a size using the softkeys.

- **EDGE LENGTH** for Metric mode—identifies the length of the insert for programs using metric tools, which are defined by their Edge Length. Select a size using the softkeys.

- **INSERT LENGTH**—identifies the length of the insert when Parallelogram or Rectangle is the Insert Shape.

- **INSERT HEIGHT**—identifies the height of the insert when Parallelogram or Rectangle is the Insert Shape.

  There are no size, length, or height fields when Round is the Insert Shape.
• **LEAD ANGLE**—identifies the angle of the vertical plane and the front edge of the tool.

![Positive Lead Angle](image1) ![Negative Lead Angle](image2)

*Positive Lead Angle*—the front edge is leaning into the vertical plane  
*Negative Lead Angle*—The front edge is leaning back and the tip of the tool reaches the plane first

Figure 4–12. Positive and Negative Lead Angle examples—Custom Tool Setup

**Turning**

• **TOOL**—identifies the tool number that will be used in the part program. Up to 99 tools can be defined. Use the number keys on the console to enter the tool number.

• **STATION #**—identifies the station number that will be used for this tool in the part program. The default is 0. The range is 0-10 or 0 to 12 depending upon your machine configuration. Refer to Tool to Turret Station Map Panel, on page 4 - 81 for more information about programming station numbers.

• **TYPE**—identifies the tool type to use for this tool number. The tool type determines the parameters required to define each tool. Select a tool type from the choices listed in this field. Select the down arrow to expand the list.

• **COMMENT**—allows you to enter up to 20 characters to help describe the tool. This field does not affect the part program. You can use either the programming keypad, the pop-up text window, or the optional keyboard to enter characters.

• **MAX DEPTH OF CUT**—identifies the maximum depth of cut that you can program with this tool. This value is copied into each new data block in the part program that uses this tool. If necessary, this parameter can be changed within a new data block when programming the part.

• **TOOL OFFSETS**—defines the Tool Geometry Offset and Wear Offset used for this tool. This value defaults to the current tool number.

Be sure to verify Geometry and Wear Offsets for the tool. Refer to Tool Geometry Offsets, on page 4 - 67 and Tool Wear Offsets, on page 4 - 74 for details about these offsets.

• **Orientation Icon**—shows the orientation of the tool, selected from the Orientation pop-up window in Tool Geometry Offsets. Refer to Select the Tool Orientation, on page 4 - 73 for definitions of each icon.

• **INSERT TIP RADIUS**—displays the tip radius based on the Radius selection in Geometry Offsets. This field is read-only and can only be edited from the Radius field in the Geometry Offset screen. Refer to Select a Radius, on page 4 - 73 for information about changing this entry.
• **SPEED (RPM), SPEED (FPM), or SPEED (MPM)**—identifies the RPM value or Constant Surface Speed (CSS) value for this tool.
  - **RPM**—Revolutions per Minute (RPM value).
  - **FPM**—Feet per Minute (Constant Surface Speed (CSS) value).
  - **MPM**—Meters per Minute (Constant Surface Speed (CSS) value).

  Select the MORE F7 softkey followed by the SPEED AS CSS F1 softkey for the Feet or Meters per Minute value.

  Select the MORE F7 softkey followed by the SPEED AS RPM F2 softkey for the Revolutions per Minute value.

• **Spindle Direction**—identifies clockwise (CW) or counterclockwise (CCW) for the direction the tool will turn. The default is CW.

• **FEED (IPR), FEED (MMPR), FEED (IPM), or FEED (MMPM)**—identifies the programmed feed rate for this tool as either:
  - **IPR**—Inches per Revolution.
  - **MMPR**—Millimeters per Revolution.
  - **IPM**—Inches per Minute.
  - **MMPM**—Millimeters per Minute.

  Select the MORE F7 softkey followed by the FEED PER MINUTE F4 softkey for the Inches or Millimeters per Minute feed rate.

  Select the MORE F7 softkey followed by the FEED PER REVOLUTION F5 softkey for the Inches or Millimeters per Revolution feed rate.

• **COOLANT**—identifies the type of coolant to be used for this tool. Coolant may be programmed as OFF or Primary. The default is Primary. During Auto mode when running the program, the Primary coolant will be enabled whenever this tool is used if the Auto Coolant LED is on and OFF is not selected in the COOLANT field.

• **INSERT SHAPE**—identifies the geometry of the insert. This field is used only for graphical part program verification and is not required to run a part program. Select a shape from the standard shapes provided in the Insert Shape field’s drop-down list.

  A graphical representation of the insert appears on the screen. Here are some examples of the available shapes:

  ![Insert Shapes](image)

  **Figure 4–13. Sample Insert Shapes—Turning Tool Setup**
• **INSERT SIZE (IC)** for Inch mode—identifies the size of the insert for programs using tools measuring in inches, which are defined by their Inscribed Circle diameter (IC). Select a size using the softkeys.

• **EDGE LENGTH** for Metric mode—identifies the length of the insert for programs using metric tools, which are defined by their Edge Length. Select a size using the softkeys.

• **INSERT LENGTH**—identifies the length of the insert when Parallelogram or Rectangle is the Insert Shape.

• **INSERT HEIGHT**—identifies the height of the insert when Parallelogram or Rectangle is the Insert Shape.

  There are no size, length, or height fields when Round is the Insert Shape.

• **LEAD ANGLE**—identifies the angle of the vertical plane and the front edge of the tool.

  ![Positive Lead Angle](image1) ![Negative Lead Angle](image2)

  **Positive Lead Angle**—the front edge is leaning into the vertical plane

  **Negative Lead Angle**—The front edge is leaning back and the tip of the tool reaches the plane first

  *Figure 4–14. Positive and Negative Lead Angle examples—Turning Tool Setup*

**Boring**

• **TOOL**—identifies the tool number that will be used in the part program. Up to 99 tools can be defined. Use the number keys on the console to enter the tool number.

• **STATION #**—identifies the station number that will be used for this tool in the part program. The default is 0. The range is 0-10 or 0 to 12 depending upon your machine configuration. Refer to Tool to Turret Station Map Panel, on page 4 - 81 for more information about programming station numbers.

• **TYPE**—identifies the tool type to use for this tool number. The tool type determines the parameters required to define each tool. Select a tool type from the choices listed in this field. Select the down arrow to expand the list.

• **COMMENT**—allows you to enter up to 20 characters to help describe the tool. This field does not affect the part program. You can use either the programming keypad, the pop-up text window, or the optional keyboard to enter characters.
• **MAX DEPTH OF CUT**—identifies the maximum depth of cut that you can program with this tool. This value is copied into each new data block in the part program that uses this tool. If necessary, this parameter can be changed within a new data block when programming the part.

• **TOOL OFFSETS**—defines the Tool Geometry Offset and Wear Offset used for this tool. This value defaults to the current tool number.

  Be sure to verify Geometry and Wear Offsets for the tool. Refer to Tool Geometry Offsets, on page 4 - 67 and Tool Wear Offsets, on page 4 - 74 for details about these offsets.

• **Orientation Icon**—shows the orientation of the tool, selected from the Orientation pop-up window in Tool Geometry Offsets. Refer to Select the Tool Orientation, on page 4 - 73 for definitions of each icon.

• **INSERT TIP RADIUS**—displays the tip radius based on the Radius selection in Geometry Offsets. This field is read-only and can only be edited from the Radius field in the Geometry Offset screen. Refer to Select a Radius, on page 4 - 73 for information about changing this entry.

• **SPEED (RPM), SPEED (FPM), or SPEED (MPM)**—identifies the RPM value or Constant Surface Speed (CSS) value for this tool.
  - **RPM**—Revolutions per Minute (RPM value).
  - **FPM**—Feet per Minute (Constant Surface Speed (CSS) value).
  - **MPM**—Meters per Minute (Constant Surface Speed (CSS) value).

  Select the MORE F7 softkey followed by the SPEED AS CSS F1 softkey for the Feet or Meters per Minute value.

  Select the MORE F7 softkey followed by the SPEED AS RPM F2 softkey for the Revolutions per Minute value.

• **Spindle Direction**—identifies clockwise (CW) or counterclockwise (CCW) for the direction the tool will turn. The default is CW.

• **FEED (IPR), FEED (MMPR), FEED (IPM), or FEED (MMPM)**—identifies the programmed feed rate for this tool as either:
  - **IPR**—Inches per Revolution.
  - **MMPR**—Millimeters per Revolution.
  - **IPM**—Inches per Minute.
  - **MMPM**—Millimeters per Minute.

  Select the MORE F7 softkey followed by the FEED PER MINUTE F4 softkey for the Inches or Millimeters per Minute feed rate.

  Select the MORE F7 softkey followed by the FEED PER REVOLUTION F5 softkey for the Inches or Millimeters per Revolution feed rate.

• **COOLANT**—identifies the type of coolant to be used for this tool. Coolant may be programmed as OFF or Primary. The default is Primary. During Auto mode when running the program, the Primary coolant will be enabled whenever this tool is used if the Auto Coolant LED is on and OFF is not selected in the COOLANT field.
• **INSERT SHAPE**—identifies the geometry of the insert. This field is used only for graphical part program verification and is not required to run a part program. Select a shape from the standard shapes provided in the Insert Shape field’s drop-down list.

A graphical representation of the insert appears on the screen. Here are some examples of the available shapes:

![Insert Shapes Diagram]

Diamond - 80°  Square - 90°  Triangle - 60°  Round  Parallelogram - 82°

*Figure 4–15. Sample Insert Shapes—Boring Tool Setup*

• **INSERT SIZE (IC)** for Inch mode—identifies the size of the insert for programs using tools measuring in inches, which are defined by their Inscribed Circle diameter (IC). Select a size using the softkeys.

• **EDGE LENGTH** for Metric mode—identifies the length of the insert for programs using metric tools, which are defined by their Edge Length. Select a size using the softkeys.

• **INSERT LENGTH**—identifies the length of the insert when Parallelogram or Rectangle is the Insert Shape.

• **INSERT HEIGHT**—identifies the height of the insert when Parallelogram or Rectangle is the Insert Shape.

   There are no size, length, or height fields when Round is the Insert Shape.

• **LEAD ANGLE**—identifies the angle of the vertical plane and the front edge of the tool.

   ![Positive Lead Angle](image1)  ![Negative Lead Angle](image2)

   *Positive Lead Angle*—the front edge is leaning into the vertical plane  *Negative Lead Angle*—The front edge is leaning back and the tip of the tool reaches the plane first

*Figure 4–16. Positive and Negative Lead Angle examples—Boring Tool Setup*
Center Drill

- **TOOL**—identifies the tool number that will be used in the part program. Up to 99 tools can be defined. Use the number keys on the console to enter the tool number.

- **STATION #**—identifies the station number that will be used for this tool in the part program. The default is 0. The range is 0-10 or 0 to 12 depending upon your machine configuration. Refer to Tool to Turret Station Map Panel, on page 4 - 81 for more information about programming station numbers.

- **TYPE**—identifies the tool type to use for this tool number. The tool type determines the parameters required to define each tool. Select a tool type from the choices listed in this field. Select the down arrow to expand the list.

- **COMMENT**—allows you to enter up to 20 characters to help describe the tool. This field does not affect the part program. You can use either the programming keypad, the pop-up text window, or the optional keyboard to enter characters.

- **DIAMETER**—identifies the tool’s diameter. It is used for part program graphical verification. If the Surface Speed is defined as FPM, diameter is used to calculate the RPM. The diameter range is from 0 to 9.999.

- **TOOL OFFSETS**—defines the Tool Geometry Offset and Wear Offset used for this tool. This value defaults to the current tool number. Be sure to verify Geometry and Wear Offsets for the tool. Refer to Tool Geometry Offsets, on page 4 - 67 and Tool Wear Offsets, on page 4 - 74 for details about these offsets.

- **Orientation Icon**—shows the orientation of the tool, selected from the Orientation pop-up window in Tool Geometry Offsets. Refer to Select the Tool Orientation, on page 4 - 73 for definitions of each icon.

- **SPEED (RPM)**—identifies the Revolutions per Minute (RPM) value for this tool.

- **Spindle Direction**—identifies clockwise (CW) or counterclockwise (CCW) for the direction the tool will turn. The default is CW.

- **SURFACE SPEED**—identifies the Surface Speed in feet per minute (or meters per minute). When a value is entered in this field, the control automatically calculates the value for the Speed field.

- **COOLANT**—identifies the type of coolant to be used for this tool. Coolant may be programmed as OFF or Primary. The default is Primary. During Auto mode when running the program, the Primary coolant will be enabled whenever this tool is used if the Auto Coolant LED is on and OFF is not selected in the COOLANT field.

- **FEED PER REV**—identifies the Feed per Revolution.

- **FEED (IPM) or FEED (MMPM)**—identifies the programmed feed rate for this tool as either:
  - **IPM**—Inches per Minute.
  - **MMPM**—Millimeters Per Minute.

  The value for the Feed (IPM) or (MMPM) is calculated by the control using the Speed and Feed Per Rev field.
• **TOOL TIP ANGLE and TOOL LENGTH**—enter the tool tip angle and length in the fields that appear in the graphic. Selections for the Tool Tip Angle appear as softkey selections when the cursor is in this field.

![Tool Tip Angle and Tool Length Fields](image)

*Figure 4–17. Tool Tip Angle and Tool Length fields—Center Drill*

**Drill**

• **TOOL**—identifies the tool number that will be used in the part program. Up to 99 tools can be defined. Use the number keys on the console to enter the tool number.

• **STATION #**—identifies the station number that will be used for this tool in the part program. The default is 0. The range is 0-10 or 0 to 12 depending upon your machine configuration. Refer to Tool to Turret Station Map Panel, on page 4 - 81 for more information about programming station numbers.

• **TYPE**—identifies the tool type to use for this tool number. The tool type determines the parameters required to define each tool. Select a tool type from the choices listed in this field. Select the down arrow to expand the list.

• **COMMENT**—allows you to enter up to 20 characters to help describe the tool. This field does not affect the part program. You can use either the programming keypad, the pop-up text window, or the optional keyboard to enter characters.

• **DIAMETER**—identifies the tool’s diameter. It is used for part program graphical verification. If the Surface Speed is defined as FPM, diameter is used to calculate the RPM. The diameter range is from 0 to 9.999.

• **TOOL OFFSETS**—defines the Tool Geometry Offset and Wear Offset used for this tool. This value defaults to the current tool number.

Be sure to verify Geometry and Wear Offsets for the tool. Refer to Tool Geometry Offsets, on page 4 - 67 and Tool Wear Offsets, on page 4 - 74 for details about these offsets.

• **Orientation Icon**—shows the orientation of the tool, selected from the Orientation pop-up window in Tool Geometry Offsets. Refer to Select the Tool Orientation, on page 4 - 73 for definitions of each icon.

• **MAX X OFFSET**—identifies the maximum amount a tool can be offset from the spindle center line when boring a hole with a drill. This is useful for cases where you need to bore a hole larger than the tool diameter.
- **SPEED (RPM)**—identifies the Revolutions per Minute (RPM) value for this tool.

- **Spindle Direction**—identifies clockwise (CW) or counterclockwise (CCW) for the direction the tool will turn. The default is CW.

- **SURFACE SPEED (FPM) or SURFACE SPEED (MPM)**—identifies the surface speed per minute. When a value is entered in this field, the control automatically calculates the value for the SPEED field.
  - **FPM**—Feet per Minute.
  - **MPM**—Meters per Minute.

- **COOLANT**—identifies the type of coolant to be used for this tool. Coolant may be programmed as OFF or Primary. The default is Primary. During Auto mode when running the program, the Primary coolant will be enabled whenever this tool is used if the Auto Coolant LED is on and OFF is not selected in the COOLANT field.

- **FEED PER REV**—identifies the Feed per Revolution.

- **FEED (IPM) or FEED (MMPM)**—identifies the programmed feed rate for this tool as either:
  - **IPM**—Inches per Minute.
  - **MMPM**—Millimeters Per Minute.

  The value for the Feed (IPM) or (MMPM) is calculated by the control using the Speed and Feed Per Rev field.

- **TOOL TIP ANGLE and TOOL LENGTH**—enter the tool tip angle and length in the fields that appear in the graphic. Selections for the Tool Tip Angle appear as softkey selections when the cursor is in this field.

*Figure 4–18. Tool Tip Angle and Tool Length fields—Drill*
Threading

- **TOOL**—identifies the tool number that will be used in the part program. Up to 99 tools can be defined. Use the number keys on the console to enter the tool number.

- **STATION #**—identifies the station number that will be used for this tool in the part program. The default is 0. The range is 0-10 or 0 to 12 depending upon your machine configuration. Refer to Tool to Turret Station Map Panel, on page 4 - 81 for more information about programming station numbers.

- **TYPE**—identifies the tool type to use for this tool number. The tool type determines the parameters required to define each tool. Select a tool type from the choices listed in this field. Select the down arrow to expand the list.

- **COMMENT**—allows you to enter up to 20 characters to help describe the tool. This field does not affect the part program. You can use either the programming keypad, the pop-up text window, or the optional keyboard to enter characters.

- **MAX DEPTH OF CUT**—identifies the maximum depth of cut that you can program with this tool. This value is copied into each new data block in the part program that uses this tool. If necessary, this parameter can be changed within a new data block when programming the part.

- **TOOL OFFSETS**—defines the Tool Geometry Offset and Wear Offset used for this tool. This value defaults to the current tool number.

  Be sure to verify Geometry and Wear Offsets for the tool. Refer to Tool Geometry Offsets, on page 4 - 67 and Tool Wear Offsets, on page 4 - 74 for details about these offsets.

- **Orientation Icon**—shows the orientation of the tool, selected from the Orientation pop-up window in Tool Geometry Offsets. Refer to Select the Tool Orientation, on page 4 - 73 for definitions of each icon.

- **INSERT TIP RADIUS**—displays the tip radius based on the Radius selection in Geometry Offsets. This field is read-only and can only be edited from the Radius field in the Geometry Offset screen. Refer to Select a Radius, on page 4 - 73 for information about changing this entry.

- **SPEED (RPM)**—identifies the Revolutions per Minute (RPM) value for this tool.

- **Spindle Direction**—identifies clockwise (CW) or counterclockwise (CCW) for the direction the tool will turn. The default is CW.

- **COOLANT**—identifies the type of coolant to be used for this tool. Coolant may be programmed as OFF or Primary. The default is Primary. During Auto mode when running the program, the Primary coolant will be enabled whenever this tool is used if the Auto Coolant LED is on and OFF is not selected in the COOLANT field.
• **TOOL TIP ANGLE and TOOL LENGTH**—enter the tool tip angle and length in the fields that appear in the graphic. Selections for the Tool Tip Angle appear as softkey selections when the cursor is in this field.

![Figure 4–19. Tool Tip Angle and Tool Length fields—Threading Tool](image)

**Grooving**

• **TOOL**—identifies the tool number that will be used in the part program. Up to 99 tools can be defined. Use the number keys on the console to enter the tool number.

• **STATION #**—identifies the station number that will be used for this tool in the part program. The default is 0. The range is 0-10 or 0 to 12 depending upon your machine configuration. Refer to Tool to Turret Station Map Panel, on page 4 - 81 for more information about programming station numbers.

• **TYPE**—identifies the tool type to use for this tool number. The tool type determines the parameters required to define each tool. Select a tool type from the choices listed in this field. Select the down arrow to expand the list.

• **COMMENT**—allows you to enter up to 20 characters to help describe the tool. This field does not affect the part program. You can use either the programming keypad, the pop-up text window, or the optional keyboard to enter characters.

• **MAX STEP OVER (%)**—the maximum distance the tool can step over between grooving passes. The step over is a percentage of the tool width.

• **TOOL OFFSETS**—defines the Tool Geometry Offset and Wear Offset used for this tool. This value defaults to the current tool number.

⚠️ Be sure to verify Geometry and Wear Offsets for the tool. Refer to Tool Geometry Offsets, on page 4 - 67 and Tool Wear Offsets, on page 4 - 74 for details about these offsets.

• **Orientation Icon**—shows the orientation of the tool, selected from the Orientation pop-up window in Tool Geometry Offsets. Refer to Select the Tool Orientation, on page 4 - 73 for definitions of each icon.

• **INSERT TIP RADIUS**—displays the tip radius based on the Radius selection in Geometry Offsets. This field is read-only and can only be edited from the Radius field in the Geometry Offset screen. Refer to Select a Radius, on page 4 - 73 for information about changing this entry.
• **SPEED (RPM), SPEED (FPM), or SPEED (MPM)**—identifies the RPM value or Constant Surface Speed (CSS) value for this tool.
  - **RPM**—Revolutions per Minute (RPM value).
  - **FPM**—Feet per Minute (Constant Surface Speed (CSS) value).
  - **MPM**—Meters per Minute (Constant Surface Speed (CSS) value).

  Select the MORE F7 softkey followed by the SPEED AS CSS F1 softkey for the Feet or Meters per Minute value.

  Select the MORE F7 softkey followed by the SPEED AS RPM F2 softkey for the Revolutions per Minute value.

• **Spindle Direction**—identifies clockwise (CW) or counterclockwise (CCW) for the direction the tool will turn. The default is CW.

• **FEED (IPR), FEED (MMPR), FEED (IPM), or FEED (MMPM)**—identifies the programmed feed rate for this tool as either:
  - **IPR**—Inches per Revolution.
  - **MMPR**—Millimeters per Revolution.
  - **IPM**—Inches per Minute.
  - **MMPM**—Millimeters per Minute.

  Select the MORE F7 softkey followed by the FEED PER MINUTE F4 softkey for the Inches or Millimeters per Minute feed rate.

  Select the MORE F7 softkey followed by the FEED PER REVOLUTION F5 softkey for the Inches or Millimeters per Revolution feed rate.

• **COOLANT**—identifies the type of coolant to be used for this tool. Coolant may be programmed as OFF or Primary. The default is Primary. During Auto mode when running the program, the Primary coolant will be enabled whenever this tool is used if the Auto Coolant LED is on and OFF is not selected in the COOLANT field.
• **CALIBRATED CORNER**—identifies the corner of the tool that has been calibrated. Select Corner 1 or Corner 2 using the drop-down list or the softkeys.

! IMPORTANT: Grooving tools can point down, to the left, or up. The **Calibrated Corner** field and the **Orientation** determine the direction.

![Diagram of Calibrated Corner and Orientation examples—Grooving Tool](image)

**Figure 4–20. Orientation and Calibrated Corner examples—Grooving Tool**

If an illegal orientation is selected, the screen displays this image:

![Image showing illegal orientation](image)

**Figure 4–21. Illegal Orientation and Calibrated Corner example—Grooving Tool**

• **TOOL WIDTH and TOOL LENGTH**—enter the tool width and length in the fields that appear in the graphic.

![Diagram of Width and Tool Length fields](image)

**Figure 4–22. Width and Tool Length fields—Grooving Tool**
Cutoff

- **TOOL**—identifies the tool number that will be used in the part program. Up to 99 tools can be defined. Use the number keys on the console to enter the tool number.

- **STATION #**—identifies the station number that will be used for this tool in the part program. The default is 0. The range is 0-10 or 0 to 12 depending upon your machine configuration. Refer to Tool to Turret Station Map Panel, on page 4 - 81 for more information about programming station numbers.

- **TYPE**—identifies the tool type to use for this tool number. The tool type determines the parameters required to define each tool. Select a tool type from the choices listed in this field. Select the down arrow to expand the list.

- **COMMENT**—allows you to enter up to 20 characters to help describe the tool. This field does not affect the part program. You can use either the programming keypad, the pop-up text window, or the optional keyboard to enter characters.

- **MAX STEP OVER (%)**—the maximum distance the tool can step over between grooving passes. The step over is a percentage of the tool width.

- **TOOL OFFSETS**—defines the Tool Geometry Offset and Wear Offset used for this tool. This value defaults to the current tool number.

  Be sure to verify Geometry and Wear Offsets for the tool. Refer to Tool Geometry Offsets, on page 4 - 67 and Tool Wear Offsets, on page 4 - 74 for details about these offsets.

- **Orientation Icon**—shows the orientation of the tool, selected from the Orientation pop-up window in Tool Geometry Offsets. Refer to Select the Tool Orientation, on page 4 - 73 for definitions of each icon.

- **INSERT TIP RADIUS**—displays the tip radius based on the Radius selection in Geometry Offsets. This field is read-only and can only be edited from the Radius field in the Geometry Offset screen. Refer to Select a Radius, on page 4 - 73 for information about changing this entry.

- **SPEED (RPM), SPEED (FPM), or SPEED (MPM)**—identifies the RPM value or Constant Surface Speed (CSS) value for this tool.
  - **RPM**—Revolutions per Minute (RPM value).
  - **FPM**—Feet per Minute (Constant Surface Speed (CSS) value).
  - **MPM**—Meters per Minute (Constant Surface Speed (CSS) value).

  Select the MORE F7 softkey followed by the SPEED AS CSS F1 softkey for the Feet or Meters per Minute value.

  Select the MORE F7 softkey followed by the SPEED AS RPM F2 softkey for the Revolutions per Minute value.

- **Spindle Direction**—identifies clockwise (CW) or counterclockwise (CCW) for the direction the tool will turn. The default is CW.
• **FEED (IPR), FEED (MMPR), FEED (IPM), or FEED (MMPM)**—identifies the programmed feed rate for this tool as either:
  - **IPR**—Inches per Revolution.
  - **MMPR**—Millimeters per Revolution.
  - **IPM**—Inches per Minute.
  - **MMPM**—Millimeters per Minute.

    Select the MORE F7 softkey followed by the FEED PER MINUTE F4 softkey for the Inches or Millimeters per Minute feed rate.

    Select the MORE F7 softkey followed by the FEED PER REVOLUTION F5 softkey for the Inches or Millimeters per Revolution feed rate.

• **COOLANT**—identifies the type of coolant to be used for this tool. Coolant may be programmed as OFF or Primary. The default is Primary. During Auto mode when running the program, the Primary coolant will be enabled whenever this tool is used if the Auto Coolant LED is on and OFF is not selected in the COOLANT field.

• **CALIBRATED CORNER**—identifies the corner of the tool that has been calibrated. Select Corner 1 or Corner 2 using the drop-down list or the softkeys.

    Cutoff tools can point down, to the left, or up. The **Calibrated Corner** field and the **Orientation** determine the direction.

    ![Diagram of calibrated corner examples](image)

    **Figure 4–23. Orientation and Calibrated Corner examples—Cutoff Tool**

    If an illegal orientation is selected, the screen displays this image:

    ![Illegal orientation example](image)

    **Figure 4–24. Illegal Orientation and Calibrated Corner example—Cutoff Tool**
• **TOOL WIDTH and TOOL LENGTH**—enter the tool width and length in the fields that appear in the graphic.

![Figure 4–25. Width and Tool Length fields—Cutoff Tool](image)

**Back Turning**

- **TOOL**—identifies the tool number that will be used in the part program. Up to 99 tools can be defined. Use the number keys on the console to enter the tool number.

- **STATION #**—identifies the station number that will be used for this tool in the part program. The default is 0. The range is 0-10 or 0 to 12 depending upon your machine configuration. Refer to Tool to Turret Station Map Panel, on page 4 - 81 for more information about programming station numbers.

- **TYPE**—identifies the tool type to use for this tool number. The tool type determines the parameters required to define each tool. Select a tool type from the choices listed in this field. Select the down arrow to expand the list.

- **COMMENT**—allows you to enter up to 20 characters to help describe the tool. This field does not affect the part program. You can use either the programming keypad, the pop-up text window, or the optional keyboard to enter characters.

- **MAX DEPTH OF CUT**—identifies the maximum depth of cut that you can program with this tool. This value is copied into each new data block in the part program that uses this tool. If necessary, this parameter can be changed within a new data block when programming the part.

- **TOOL OFFSETS**—defines the Tool Geometry Offset and Wear Offset used for this tool. This value defaults to the current tool number.

Be sure to verify Geometry and Wear Offsets for the tool. Refer to Tool Geometry Offsets, on page 4 - 67 and Tool Wear Offsets, on page 4 - 74 for details about these offsets.

- **Orientation Icon**—shows the orientation of the tool, selected from the Orientation pop-up window in Tool Geometry Offsets. Refer to Select the Tool Orientation, on page 4 - 73 for definitions of each icon.

- **INSERT TIP RADIUS**—displays the tip radius based on the Radius selection in Geometry Offsets. This field is read-only and can only be edited from the Radius field in the Geometry Offset screen. Refer to Select a Radius, on page 4 - 73 for information about changing this entry.
• **SPEED (RPM), SPEED (FPM), or SPEED (MPM)**—identifies the RPM value or Constant Surface Speed (CSS) value for this tool.
  - **RPM**—Revolutions per Minute (RPM value).
  - **FPM**—Feet per Minute (Constant Surface Speed (CSS) value).
  - **MPM**—Meters per Minute (Constant Surface Speed (CSS) value).

Select the MORE F7 softkey followed by the SPEED AS CSS F1 softkey for the Feet or Meters per Minute value.

Select the MORE F7 softkey followed by the SPEED AS RPM F2 softkey for the Revolutions per Minute value.

• **Spindle Direction**—identifies clockwise (CW) or counterclockwise (CCW) for the direction the tool will turn. The default is CW.

• **FEED (IPR), FEED (MMPR), FEED (IPM), or FEED (MMPM)**—identifies the programmed feed rate for this tool as either:
  - **IPR**—Inches per Revolution.
  - **MMPR**—Millimeters per Revolution.
  - **IPM**—Inches per Minute.
  - **MMPM**—Millimeters per Minute.

Select the MORE F7 softkey followed by the FEED PER MINUTE F4 softkey for the Inches or Millimeters per Minute feed rate.

Select the MORE F7 softkey followed by the FEED PER REVOLUTION F5 softkey for the Inches or Millimeters per Revolution feed rate.

• **COOLANT**—identifies the type of coolant to be used for this tool. Coolant may be programmed as OFF or Primary. The default is Primary. During Auto mode when running the program, the Primary coolant will be enabled whenever this tool is used if the Auto Coolant LED is on and OFF is not selected in the COOLANT field.

• **INSERT SHAPE**—identifies the geometry of the insert. This field is used only for graphical part program verification and is not required to run a part program. Select a shape from the standard shapes provided in the Insert Shape field’s drop-down list.

A graphical representation of the insert appears on the screen. Here are some examples of the available shapes:

Diamond - 80°  Square - 90°  Triangle - 60°  Round  Parallelogram - 82°

*Figure 4–26. Sample Insert Shapes—Back Turning Tool Setup*
• **INSERT SIZE (IC)** for Inch mode—identifies the size of the insert for programs using tools measuring in inches, which are defined by their Inscribed Circle diameter (IC). Select a size using the softkeys.

• **EDGE LENGTH** for Metric mode—identifies the length of the insert for programs using metric tools, which are defined by their Edge Length. Select a size using the softkeys.

• **INSERT LENGTH**—identifies the length of the insert when Parallelogram or Rectangle is the Insert Shape.

• **INSERT HEIGHT**—identifies the height of the insert when Parallelogram or Rectangle is the Insert Shape.

  There are no size, length, or height fields when Round is the Insert Shape.

• **LEAD ANGLE**—identifies the angle of the vertical plane and the front edge of the tool.

  ![Positive Lead Angle](image1) ![Negative Lead Angle](image2)

  Positive Lead Angle—the front edge is leaning into the vertical plane

  Negative Lead Angle—The front edge is leaning back and the tip of the tool reaches the plane first

  *Figure 4–27. Positive and Negative Lead Angle examples—Back Turning Tool Setup*

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**Back Boring**

• **TOOL**—identifies the tool number that will be used in the part program. Up to 99 tools can be defined. Use the number keys on the console to enter the tool number.

• **STATION #**—identifies the station number that will be used for this tool in the part program. The default is 0. The range is 0 to 10 or 0 to 12 depending upon your machine configuration. Refer to Tool to Turret Station Map Panel, on page 4 - 81 for more information about programming station numbers.

• **TYPE**—identifies the tool type to use for this tool number. The tool type determines the parameters required to define each tool. Select a tool type from the choices listed in this field. Select the down arrow to expand the list.

• **COMMENT**—allows you to enter up to 20 characters to help describe the tool. This field does not affect the part program. You can use either the programming keypad, the pop-up text window, or the optional keyboard to enter characters.
• **MAX DEPTH OF CUT**—identifies the maximum depth of cut that you can program with this tool. This value is copied into each new data block in the part program that uses this tool. If necessary, this parameter can be changed within a new data block when programming the part.

• **TOOL OFFSETS**—defines the Tool Geometry Offset and Wear Offset used for this tool. This value defaults to the current tool number.

Be sure to verify Geometry and Wear Offsets for the tool. Refer to Tool Geometry Offsets, on page 4 - 67 and Tool Wear Offsets, on page 4 - 74 for details about these offsets.

• **Orientation Icon**—shows the orientation of the tool, selected from the Orientation pop-up window in Tool Geometry Offsets. Refer to Select the Tool Orientation, on page 4 - 73 for definitions of each icon.

• **INSERT TIP RADIUS**—displays the tip radius based on the Radius selection in Geometry Offsets. This field is read-only and can only be edited from the Radius field in the Geometry Offset screen. Refer to Select a Radius, on page 4 - 73 for information about changing this entry.

• **SPEED (RPM), SPEED (FPM), or SPEED (MPM)**—identifies the RPM value or Constant Surface Speed (CSS) value for this tool.
  - **RPM**—Revolutions per Minute (RPM value).
  - **FPM**—Feet per Minute (Constant Surface Speed (CSS) value).
  - **MPM**—Meters per Minute (Constant Surface Speed (CSS) value).

Select the MORE F7 softkey followed by the SPEED AS CSS F1 softkey for the Feet or Meters per Minute value.

Select the MORE F7 softkey followed by the SPEED AS RPM F2 softkey for the Revolutions per Minute value.

• **Spindle Direction**—identifies clockwise (CW) or counterclockwise (CCW) for the direction the tool will turn. The default is CW.

• **FEED (IPR), FEED (MMPR), FEED (IPM), or FEED (MMPM)**—identifies the programmed feed rate for this tool as either:
  - **IPR**—Inches per Revolution.
  - **MMPR**—Millimeters per Revolution.
  - **IPM**—Inches per Minute.
  - **MMPM**—Millimeters per Minute.

Select the MORE F7 softkey followed by the FEED PER MINUTE F4 softkey for the Inches or Millimeters per Minute feed rate.

Select the MORE F7 softkey followed by the FEED PER REVOLUTION F5 softkey for the Inches or Millimeters per Revolution feed rate.

• **COOLANT**—identifies the type of coolant to be used for this tool. Coolant may be programmed as OFF or Primary. The default is Primary. During Auto mode when running the program, the Primary coolant will be enabled whenever this tool is used if the Auto Coolant LED is on and OFF is not selected in the COOLANT field.
• **INSERT SHAPE**—identifies the geometry of the insert. This field is used only for graphical part program verification and is not required to run a part program. Select a shape from the standard shapes provided in the Insert Shape field’s drop-down list.

A graphical representation of the insert appears on the screen. Here are some examples of the available shapes:

![Sample Insert Shapes](image)

Figure 4–28. Sample Insert Shapes—Back Boring Tool Setup

• **INSERT SIZE (IC)** for Inch mode—identifies the size of the insert for programs using tools measuring in inches, which are defined by their Inscribed Circle diameter (IC). Select a size using the softkeys.

• **EDGE LENGTH** for Metric mode—identifies the length of the insert for programs using metric tools, which are defined by their Edge Length. Select a size using the softkeys.

• **INSERT LENGTH**—identifies the length of the insert when Parallelogram or Rectangle is the Insert Shape.

• **INSERT HEIGHT**—identifies the height of the insert when Parallelogram or Rectangle is the Insert Shape.

  ➞ There are no size, length, or height fields when Round is the Insert Shape.

• **LEAD ANGLE**—identifies the angle of the vertical plane and the front edge of the tool.

  ![Positive Lead Angle](image)  ![Negative Lead Angle](image)

  Positive Lead Angle—the front edge is leaning into the vertical plane  
  Negative Lead Angle—the front edge is leaning back and the tip of the tool reaches the plane first

Figure 4–29. Positive and Negative Lead Angle examples—Back Boring Tool Setup
Tap

- **TOOL**—identifies the tool number that will be used in the part program. Up to 99 tools can be defined. Use the number keys on the console to enter the tool number.

- **STATION #**—identifies the station number that will be used for this tool in the part program. The default is 0. The range is 0 to 10 or 0 to 12 depending upon your machine configuration. Refer to Tool to Turret Station Map Panel, on page 4 - 81 for more information about programming station numbers.

- **TYPE**—identifies the tool type to use for this tool number. The tool type determines the parameters required to define each tool. Select a tool type from the choices listed in this field. Select the down arrow to expand the list.

- **COMMENT**—allows you to enter up to 20 characters to help describe the tool. This field does not affect the part program. You can use either the programming keypad, the pop-up text window, or the optional keyboard to enter characters.

- **DIAMETER**—identifies the tool’s diameter. It is used for part program graphical verification. The diameter range is from 0 to 9.999.

- **TOOL OFFSETS**—defines the Tool Geometry Offset and Wear Offset used for this tool. This value defaults to the current tool number.

Be sure to verify Geometry and Wear Offsets for the tool. Refer to Tool Geometry Offsets, on page 4 - 67 and Tool Wear Offsets, on page 4 - 74 for details about these offsets.

- **Orientation Icon**—shows the orientation of the tool, selected from the Orientation pop-up window in Tool Geometry Offsets. Refer to Select the Tool Orientation, on page 4 - 73 for definitions of each icon.

- **PITCH**—identifies the distance between the threads. When you enter a value for Pitch, the control calculates the value for TPI when in Inch mode.

- **TPI**—identifies the threads per inch for inch taps. When you enter a value for TPI, the control calculates the value for Pitch when in Inch mode. This field is only available in Inch mode.

- **SPEED (RPM)**—identifies the Revolutions per Minute (RPM) value for this tool.

- **DIRECTION**—identifies Right-Handed or Left-Handed for the tap direction.

- **COOLANT**—identifies the type of coolant to be used for this tool. Coolant may be programmed as OFF or Primary. The default is Primary. During Auto mode when running the program, the Primary coolant will be enabled whenever this tool is used if the Auto Coolant LED is on and OFF is not selected in the COOLANT field.

- **FEED (IPM)** or **FEED (MMPM)**—identifies the programmed feed rate for this tool as either:
  - **IPM**—Inches per Minute.
  - **MMPM**—Millimeters Per Minute.

  The value for the Feed (IPM) or (MMPM) is calculated by the control using the Speed and either the Pitch or TPI field.
• **TOOL LENGTH**—enter the tool length in the field that appears in the graphic.

![Figure 4–30. Tool Length field—Tap](image)

**Ream**

• **TOOL**—identifies the tool number that will be used in the part program. Up to 99 tools can be defined. Use the number keys on the console to enter the tool number.

• **STATION #**—identifies the station number that will be used for this tool in the part program. The default is 0. The range is 0 to 10 or 0 to 12 depending upon your machine configuration. Refer to Tool to Turret Station Map Panel, on page 4 - 81 for more information about programming station numbers.

• **TYPE**—identifies the tool type to use for this tool number. The tool type determines the parameters required to define each tool. Select a tool type from the choices listed in this field. Select the down arrow to expand the list.

• **COMMENT**—allows you to enter up to 20 characters to help describe the tool. This field does not affect the part program. You can use either the programming keypad, the pop-up text window, or the optional keyboard to enter characters.

• **DIAMETER**—identifies the tool’s diameter. It is used for part program graphical verification. The diameter range is from 0 to 9.999.

• **TOOL OFFSETS**—defines the Tool Geometry Offset and Wear Offset used for this tool. This value defaults to the current tool number.

  Be sure to verify Geometry and Wear Offsets for the tool. Refer to Tool Geometry Offsets, on page 4 - 67 and Tool Wear Offsets, on page 4 - 74 for details about these offsets.

• **Orientation Icon**—shows the orientation of the tool, selected from the Orientation pop-up window in Tool Geometry Offsets. Refer to Select the Tool Orientation, on page 4 - 73 for definitions of each icon.

• **SPEED (RPM)**—identifies the Revolutions per Minute (RPM) value for this tool.

• **Spindle Direction**—identifies clockwise (CW) or counterclockwise (CCW) for the direction the tool will turn. The default is CW.
• **SURFACE SPEED (FPM) or SURFACE SPEED (MPM)**—identifies the Surface Speed. When a value is entered in this field, the control automatically calculates the value for the Speed field.
  
  • **FPM**—Feet per Minute.
  
  • **MPM**—Meters per Minute.

• **COOLANT**—identifies the type of coolant to be used for this tool. Coolant may be programmed as OFF or Primary. The default is Primary. During Auto mode when running the program, the Primary coolant will be enabled whenever this tool is used if the Auto Coolant LED is on and OFF is not selected in the COOLANT field.

• **FEED PER REV**—identifies the Feed per Revolution.

• **FEED (IPM) or FEED (MMPM)**—identifies the programmed feed rate for this tool as either:
  
  • **IPM**—Inches per Minute.
  
  • **MMPM**—Millimeters Per Minute.

  ⇒ The value for the Feed (IPM) or (MMPM) is calculated by the control using the Speed and Feed Per Rev field.

• **TOOL LENGTH**—enter the tool length in the field that appears in the graphic.

![Figure 4–31. Tool Length field—Ream](image)

**Inserted Drill**

• **TOOL**—identifies the tool number that will be used in the part program. Up to 99 tools can be defined. Use the number keys on the console to enter the tool number.

• **STATION #**—identifies the station number that will be used for this tool in the part program. The default is 0. The range is 0 to 10 or 0 to 12 depending upon your machine configuration. Refer to Tool to Turret Station Map Panel, on page 4 - 81 for more information about programming station numbers.

• **TYPE**—identifies the tool type to use for this tool number. The tool type determines the parameters required to define each tool. Select a tool type from the choices listed in this field. Select the down arrow to expand the list.

• **COMMENT**—allows you to enter up to 20 characters to help describe the tool. This field does not affect the part program. You can use either the programming keypad, the pop-up text window, or the optional keyboard to enter characters.
• **DIAMETER**—identifies the tool’s diameter. It is used for part program graphical verification. The diameter range is from 0 to 9.999.

• **DRILL GEOMETRY OFFSETS**—identifies the Tool Geometry Offset and Wear Offset used for this drill.

• **MAX X OFFSET**—identifies the maximum amount a tool can be offset from the spindle center line when boring a hole with a drill. This is useful for cases where you need to bore a hole larger than the tool diameter.

• **SPEED (RPM), SPEED (FPM), or SPEED (MPM)**—identifies the RPM value or Constant Surface Speed (CSS) value for this tool.
  - **RPM**—Revolutions per Minute (RPM value).
  - **FPM**—Feet per Minute (Constant Surface Speed (CSS) value).
  - **MPM**—Meters per Minute (Constant Surface Speed (CSS) value).

  Select the MORE F7 softkey followed by the SPEED AS CSS F1 softkey for the Feet or Meters per Minute value.

  Select the MORE F7 softkey followed by the SPEED AS RPM F2 softkey for the Revolutions per Minute value.

• **Spindle Direction**—identifies clockwise (CW) or counterclockwise (CCW) for the direction the tool will turn. The default is CW.

• **SURFACE SPEED (FPM) or SURFACE SPEED (MPM)**—identifies the surface speed per minute. When a value is entered in this field, the control automatically calculates the value for the SPEED field.
  - **FPM**—Feet per Minute.
  - **MPM**—Meters per Minute.

• **COOLANT**—identifies the type of coolant to be used for this tool. Coolant may be programmed as OFF or Primary. The default is Primary. During Auto mode when running the program, the Primary coolant will be enabled whenever this tool is used if the Auto Coolant LED is on and OFF is not selected in the COOLANT field.

• **FEED PER REV**—identifies the Feed per Revolution.

• **FEED (IPR), FEED (MMPR), FEED (IPM), or FEED (MMPM)**—identifies the programmed feed rate for this tool as either:
  - **IPR**—Inches per Revolution.
  - **MMPR**—Millimeters per Revolution.
  - **IPM**—Inches per Minute.
  - **MMPM**—Millimeters per Minute.

  Select the MORE F7 softkey followed by the FEED PER MINUTE F4 softkey for the Inches or Millimeters per Minute feed rate.

  Select the MORE F7 softkey followed by the FEED PER REVOLUTION F5 softkey for the Inches or Millimeters per Revolution feed rate.

• **TOOL LENGTH**—identifies the length of the tool.
• **BORE INSERT** programming area:
  • **MAX DEPTH OF CUT**—identifies the maximum depth of cut that you can program with this tool. This value is copied into each new data block in the part program that uses this tool. If necessary, this parameter can be changed within a new data block when programming the part.
  • **GEOMETRY OFFSETS**—defines the Tool Geometry Offset and Wear Offset used for this boring tool.
  • **TIP RADIUS**—displays the tip radius based on the Radius selection in Geometry Offsets. This field is read-only and can only be edited from the Radius field in the Geometry Offset screen. Refer to *Select a Radius,* on page 4 - 73 for information about changing this entry.
  • **INSERT SHAPE**—identifies the geometry of the insert. This field is used only for graphical part program verification and is not required to run a part program. Select a shape from the standard shapes provided in the Insert Shape field’s drop-down list.

A graphical representation of the insert appears on the screen. Here are some examples of the available shapes:

![Sample Insert Shapes](image)

**Figure 4–32. Sample Insert Shapes—Inserted Drill Tool Setup**

• **INSERT SIZE (IC)** for Inch mode—identifies the size of the insert for programs using tools measuring in inches, which are defined by their Inscribed Circle diameter (IC). Select a size using the softkeys.

• **EDGE LENGTH** for Metric mode—identifies the length of the insert for programs using metric tools, which are defined by their Edge Length. Select a size using the softkeys.

• **LEAD ANGLE**—identifies the angle of the vertical plane and the front edge of the tool.

![Positive Lead Angle](image) ![Negative Lead Angle](image)

**Figure 4–33. Positive and Negative Lead Angle examples—Inserted Drill Tool Setup**
Live-Tooling Tool Setup Fields

End Mill ............................................................... 4 - 47
Ball End Mill .......................................................... 4 - 50
Bull Nose Mill .......................................................... 4 - 52
Live Center Drill ....................................................... 4 - 54
Live Drill ............................................................... 4 - 56
Live Tap ................................................................. 4 - 58
Live Ream .............................................................. 4 - 60
Live Custom ........................................................... 4 - 62

Please refer to Turning Tool Setup Fields, on page 4 - 20 for information about Turning Tool setup.

End Mill

- TOOL—identifies the tool number that will be used in the part program. Up to 99 tools can be defined. Use the number keys on the console to enter the tool number.

- STATION #—identifies the station number that will be used for this tool in the part program. The default is 0. The range is 0 to 10 or 0 to 12 depending upon your machine configuration. Refer to Tool to Turret Station Map Panel, on page 4 - 81 for more information about programming station numbers.

- TYPE—identifies the tool type to use for this tool number. The tool type determines the parameters required to define each tool. Select a tool type from the choices listed in this field. Select the down arrow to expand the list.

- COMMENT—allows you to enter up to 20 characters to help describe the tool. This field does not affect the part program. You can use either the programming keypad, the pop-up text window, or the optional keyboard to enter characters.

- TOOL OFFSETS—defines the Tool Geometry Offset and Wear Offset used for this tool. This value defaults to the current tool number.

Be sure to verify Geometry and Wear Offsets for the tool. Refer to Tool Geometry Offsets, on page 4 - 67 and Tool Wear Offsets, on page 4 - 74 for details about these offsets.

- DIAMETER—identifies the tool’s diameter. It is used for part program graphical verification. The diameter range is from 0 to 9.999. This field is read-only and can only be edited from the Radius field in the Geometry Offset screen. Refer to Select a Radius, on page 4 - 73 for information about changing this entry.
• **ORIENTATION**—shows the orientation icon for the tool, selected from the Orientation pop-up window in Tool Geometry Offsets. Refer to *Select the Tool Orientation, on page 4 - 73* for definitions of each icon.

In addition to the Orientation Icon, **Radial, Axial, or Invalid** appears in the Orientation field to identify the live tool’s orientation. Here are examples:

![Live Tooling Orientation examples—End Mill Tool Setup](image)

Radial—the tool orientation is around the outside of the stock, along the C axis.

Axial—the tool orientation is perpendicular to the plane of the stock, along the Z axis.

Invalid—an incorrect orientation has been selected. Reset the orientation from the Orientation pop-up window in Tool Geometry Offsets.

*Figure 4–34. Live Tooling Orientation examples—End Mill Tool Setup*

Be aware of the length of radial tools. Radial tools that are too long can interfere with the Z-axis way cover when indexing the turret.

Be aware of the direction of the tool orientation when using the Sub-spindle on TMX MYS machines.

• **SPEED (RPM)**—identifies the Revolutions per Minute (RPM) value for this tool.

• **Spindle Direction**—identifies clockwise (CW) or counterclockwise (CCW) for the direction the tool will turn. The default is CW, which is the direction for right-hand tools when programming live tools.

• **SURFACE SPEED (FPM) or SURFACE SPEED (MPM)**—identifies the surface speed per minute. When a value is entered in this field, the control automatically calculates the value for the SPEED field.
  - **FPM**—Feet per Minute.
  - **MPM**—Meters per Minute.

• **COOLANT**—identifies the type of coolant to be used for this tool. Coolant may be programmed as OFF or Primary. The default is Primary. During Auto mode when running the program, the Primary coolant will be enabled whenever this tool is used if the Auto Coolant LED is on and OFF is not selected in the COOLANT field.

• **FEED/FLUTE (TOOTH)**—identifies the tool’s chipload. This entry will be used to automatically calculate the mill feed in all data blocks for this part program using this tool.

• **FLUTES**—identifies the number of cutting flutes for the tool. This entry will be used to automatically calculate the mill feed in all data blocks for this part program using this tool.
• **FEED (IPM)** or **FEED (MMPM)**—identifies the programmed feed rate for this tool as either:
  • **IPM**—Inches per Minute.
  • **MMPM**—Millimeters Per Minute.

  The value for the Feed (IPM) or (MMPM) is calculated by the control using the Speed and Feed Per Rev field.

• **L**—enter the length of the tool. When the cursor is in this field, the graphic changes to define what is meant by length.

![Figure 4–35. Tool Length field—End Mill](image)
**Ball End Mill**

- **TOOL**—identifies the tool number that will be used in the part program. Up to 99 tools can be defined. Use the number keys on the console to enter the tool number.

- **STATION #**—identifies the station number that will be used for this tool in the part program. The default is 0. The range is 0 to 10 or 0 to 12 depending upon your machine configuration. Refer to Tool to Turret Station Map Panel, on page 4 - 81 for more information about programming station numbers.

- **TYPE**—identifies the tool type to use for this tool number. The tool type determines the parameters required to define each tool. Select a tool type from the choices listed in this field. Select the down arrow to expand the list.

- **COMMENT**—allows you to enter up to 20 characters to help describe the tool. This field does not affect the part program. You can use either the programming keypad, the pop-up text window, or the optional keyboard to enter characters.

- **TOOL OFFSETS**—defines the Tool Geometry Offset and Wear Offset used for this tool. This value defaults to the current tool number.

  Be sure to verify Geometry and Wear Offsets for the tool. Refer to Tool Geometry Offsets, on page 4 - 67 and Tool Wear Offsets, on page 4 - 74 for details about these offsets.

- **DIAMETER**—identifies the tool’s diameter. It is used for part program graphical verification. The diameter range is from 0 to 9.999. This field is read-only and can only be edited from the Radius field in the Geometry Offset screen. Refer to Select a Radius, on page 4 - 73 for information about changing this entry.

- **ORIENTATION**—shows the orientation icon for of the tool, selected from the Orientation pop-up window in Tool Geometry Offsets. Refer to Select the Tool Orientation, on page 4 - 73 for definitions of each icon.

In addition to the Orientation Icon, **Radial**, **Axial**, or **Invalid** appears in the Orientation field to identify the live tool’s orientation. Here are examples:

- **Radial**—the tool orientation is around the outside of the stock, along the C axis.

- **Axial**—the tool orientation is perpendicular to the plane of the stock, along the Z axis.

- **Invalid**—an incorrect orientation has been selected. Reset the orientation from the Orientation pop-up window in Tool Geometry Offsets.

![Figure 4–36. Live Tooling Orientation examples—Ball End Mill Tool Setup](image)

Be aware of the length of radial tools. Radial tools that are too long can interfere with the Z-axis way cover when indexing the turret.

Be aware of the tool orientation direction when using the Sub-spindle on TMX MYS machines.
• **SPEED**—identifies the Revolutions per Minute (RPM) value for this tool.

• **Spindle Direction**—identifies clockwise (CW) or counterclockwise (CCW) for the direction the tool will turn. The default is CW, which is the direction for right-hand tools when programming live tools.

• **SURFACE SPEED (FPM) or SURFACE SPEED (MPM)**—identifies the surface speed per minute. When a value is entered in this field, the control automatically calculates the value for the SPEED field.
  
  • **FPM**—Feet per Minute.
  
  • **MPM**—Meters per Minute.

• **COOLANT**—identifies the type of coolant to be used for this tool. Coolant may be programmed as OFF or Primary. The default is Primary. During Auto mode when running the program, the Primary coolant will be enabled whenever this tool is used if the Auto Coolant LED is on and OFF is not selected in the COOLANT field.

• **FEED/FLUTE (TOOTH)**—identifies the tool’s chipload. This entry will be used to automatically calculate the mill feed in all data blocks for this part program using this tool.

• **FLUTES**—identifies the number of cutting flutes for the tool. This entry will be used to automatically calculate the mill feed in all data blocks for this part program using this tool.

• **FEED (IPM) or FEED (MMPM)**—identifies the programmed feed rate for this tool as either:
  
  • **IPM**—Inches per Minute.
  
  • **MMPM**—Millimeters Per Minute.

  The value for the Feed (IPM) or (MMPM) is calculated by the control using the Speed and Feed Per Rev field.

• **L**—enter the length of the tool. When the cursor is in this field, the graphic changes to define what is meant by this length.

![Figure 4–37. Tool Length field—Ball End Mill](image)

Be aware of the length of radial tools. Radial tools that are too long can interfere with the Z-axis way cover when indexing the turret.

Be aware of the tool orientation direction when using the Sub-spindle on TMX MYS machines.
Bull Nose Mill tools are used for milling operations.

- **TOOL**—identifies the tool number that will be used in the part program. Up to 99 tools can be defined. Use the number keys on the console to enter the tool number.

- **STATION #**—identifies the station number that will be used for this tool in the part program. The default is 0. The range is 0 to 10 or 0 to 12 depending upon your machine configuration. Refer to Tool to Turret Station Map Panel, on page 4 - 81 for more information about programming station numbers.

- **TYPE**—identifies the tool type to use for this tool number. The tool type determines the parameters required to define each tool. Select a tool type from the choices listed in this field. Select the down arrow to expand the list.

- **COMMENT**—allows you to enter up to 20 characters to help describe the tool. This field does not affect the part program. You can use either the programming keypad, the pop-up text window, or the optional keyboard to enter characters.

- **TOOL OFFSETS**—defines the Tool Geometry Offset and Wear Offset used for this tool. This value defaults to the current tool number.

  Be sure to verify Geometry and Wear Offsets for the tool. Refer to Tool Geometry Offsets, on page 4 - 67 and Tool Wear Offsets, on page 4 - 74 for details about these offsets.

- **DIAMETER**—identifies the tool’s diameter. It is used for part program graphical verification. The diameter range is from 0 to 9.999. This field is read-only and can only be edited from the Radius field in the Geometry Offset screen. Refer to Select a Radius, on page 4 - 73 for information about changing this entry.

- **ORIENTATION**—shows the orientation icon for of the tool, selected from the Orientation pop-up window in Tool Geometry Offsets. Refer to Select the Tool Orientation, on page 4 - 73 for definitions of each icon.

  In addition to the Orientation Icon, Radial, Axial, or Invalid appears in the Orientation field to identify the live tool’s orientation. Here are examples:

  - **Radial**—the tool orientation is around the outside of the stock, along the C axis.
  - **Axial**—the tool orientation is perpendicular to the plane of the stock, along the Z axis.
  - **Invalid**—an incorrect orientation has been selected. Reset the orientation from the Orientation pop-up window in Tool Geometry Offsets.

  *Figure 4–38. Live Tooling Orientation examples—Bull Nose Mill Tool Setup*
Be aware of the length of radial tools. Radial tools that are too long can interfere with the Z-axis way cover when indexing the turret.

Be aware of the tool orientation direction when using the Sub-spindle on TMX MYS machines.

- **SPEED**—identifies the Revolutions per Minute (RPM) value for this tool.
- **Spindle Direction**—identifies clockwise (CW) or counterclockwise (CCW) for the direction the tool will turn. The default is CW, which is the direction for right-hand tools when programming live tools.
- **SURFACE SPEED (FPM) or SURFACE SPEED (MPM)**—identifies the surface speed per minute. When a value is entered in this field, the control automatically calculates the value for the SPEED field.
  - **FPM**—Feet per Minute.
  - **MPM**—Meters per Minute.
- **COOLANT**—identifies the type of coolant to be used for this tool. Coolant may be programmed as OFF or Primary. The default is Primary. During Auto mode when running the program, the Primary coolant will be enabled whenever this tool is used if the Auto Coolant LED is on and OFF is not selected in the COOLANT field.
- **FEED/FLUTE (TOOTH)**—identifies the tool’s chipload. This entry will be used to automatically calculate the mill feed in all data blocks for this part program using this tool.
- **FLUTES**—identifies the number of cutting flutes for the tool. This entry will be used to automatically calculate the mill feed in all data blocks for this part program using this tool.
- **FEED (IPM) or FEED (MMPM)**—identifies the programmed feed rate for this tool as either:
  - **IPM**—Inches per Minute.
  - **MMPM**—Millimeters Per Minute.

  The value for the Feed (IPM) or (MMPM) is calculated by the control using the Speed and Feed Per Rev field.

- **L**—enter the length of the tool. When the cursor is in this field, the graphic changes to define what is meant by this length.

![Figure 4–39. Tool Length field—Bull Nose Mill](image)
• **R**—enter the radius of the tool tip. When the cursor is in this field, the graphic changes to define what is meant by this radius.

![Figure 4–40. Tool Tip Radius field—Bull Nose Mill](image)

**Live Center Drill**

• **TOOL**—identifies the tool number that will be used in the part program. Up to 99 tools can be defined. Use the number keys on the console to enter the tool number.

• **STATION #**—identifies the station number that will be used for this tool in the part program. The default is 0. The range is 0 to 10 or 0 to 12 depending upon your machine configuration. Refer to Tool to Turret Station Map Panel, on page 4 - 81 for more information about programming station numbers.

• **TYPE**—identifies the tool type to use for this tool number. The tool type determines the parameters required to define each tool. Select a tool type from the choices listed in this field. Select the down arrow to expand the list.

• **COMMENT**—allows you to enter up to 20 characters to help describe the tool. This field does not affect the part program. You can use either the programming keypad, the pop-up text window, or the optional keyboard to enter characters.

• **TOOL OFFSETS**—defines the Tool Geometry Offset and Wear Offset used for this tool. This value defaults to the current tool number.

  ![Warning](image)

  Be sure to verify Geometry and Wear Offsets for the tool. Refer to Tool Geometry Offsets, on page 4 - 67 and Tool Wear Offsets, on page 4 - 74 for details about these offsets.

• **DIAMETER**—identifies the tool’s diameter. It is used for part program graphical verification. The diameter range is from 0 to 9.999. This field is read-only and can only be edited from the Radius field in the Geometry Offset screen. Refer to Select a Radius, on page 4 - 73 for information about changing this entry.
• **ORIENTATION**—shows the orientation icon for the tool, selected from the Orientation pop-up window in Tool Geometry Offsets. Refer to *Select the Tool Orientation, on page 4 - 73* for definitions of each icon.

In addition to the Orientation Icon, **Radial**, **Axial**, or **Invalid** appears in the Orientation field to identify the live tool’s orientation. Here are examples:

![Orientation Icons](image)

**Radial**—the tool orientation is around the outside of the stock, along the C axis.

**Axial**—the tool orientation is perpendicular to the plane of the stock, along the Z axis.

**Invalid**—an incorrect orientation has been selected. Reset the orientation from the Orientation pop-up window in Tool Geometry Offsets.

*Figure 4–41. Live Tooling Orientation examples—Live Center Drill Tool Setup*

⚠️ Be aware of the length of radial tools. Radial tools that are too long can interfere with the Z-axis way cover when indexing the turret.

⚠️ Be aware of the tool orientation direction when using the Sub-spindle on TMX MYS machines.

• **SPEED**—identifies the Revolutions per Minute (RPM) value for this tool.

  • When a value is entered in the **SURFACE SPEED** field, the control automatically calculates the value for the **SPEED** field.

  ⇒ The value for the Feed (IPM) or (MMPM) is calculated by the control using the Speed and Feed Per Rev field.

• **Spindle Direction**—identifies clockwise (CW) or counterclockwise (CCW) for the direction the tool will turn. The default is CW, which is the direction for right-hand tools when programming live tools.

• **SURFACE SPEED (FPM) or SURFACE SPEED (MPM)**—identifies the surface speed per minute. When a value is entered in this field, the control automatically calculates the value for the **SPEED** field.

  • **FPM**—Feet per Minute.

  • **MPM**—Meters per Minute.

• **COOLANT**—identifies the type of coolant to be used for this tool. Coolant may be programmed as OFF or Primary. The default is Primary. During Auto mode when running the program, the Primary coolant will be enabled whenever this tool is used if the Auto Coolant LED is on and OFF is not selected in the COOLANT field.

• **FEED PER REV**—identifies the Feed per Revolution.

  ⇒ The value for the Feed (IPM) or (MMPM) is calculated by the control using the Speed and Feed Per Rev field.
• **FEED (IPM)** or **FEED (MMPM)**—identifies the programmed feed rate for this tool as either:
  - **IPM**—Inches per Minute.
  - **MMPM**—Millimeters Per Minute.

  The value for the Feed (IPM) or (MMPM) is calculated by the control using the Speed and Feed Per Rev field.

• **L**—enter the length of the tool. When the cursor is in this field, the graphic changes to define what is meant by this length.

![Figure 4–42. Tool Length field—Live Center Drill](image)

Be aware of the length of radial tools. Radial tools that are too long can interfere with the Z-axis way cover when indexing the turret.

Be aware of the tool orientation direction when using the Sub-spindle on TMX MYS machines.

• **TA**—enter the angle of the tool tip. When the cursor is in this field, the graphic changes to define what is meant by this angle. Selections for the Tool Tip Angle appear as softkey selections when the cursor is in this field.

![Figure 4–43. Tool Tip Angle field—Live Center Drill](image)

**Live Drill**

• **TOOL**—identifies the tool number that will be used in the part program. Up to 99 tools can be defined. Use the number keys on the console to enter the tool number.

• **STATION #**—identifies the station number that will be used for this tool in the part program. The default is 0. The range is 0 to 10 or 0 to 12 depending upon your machine configuration. Refer to Tool to Turret Station Map Panel, on page 4 - 81 for more information about programming station numbers.

• **TYPE**—identifies the tool type to use for this tool number. The tool type determines the parameters required to define each tool. Select a tool type from the choices listed in this field. Select the down arrow to expand the list.
• **COMMENT**—allows you to enter up to 20 characters to help describe the tool. This field does not affect the part program. You can use either the programming keypad, the pop-up text window, or the optional keyboard to enter characters.

• **TOOL OFFSETS**—defines the Tool Geometry Offset and Wear Offset used for this tool. This value defaults to the current tool number.

![Tool Offsets Example]

Be sure to verify Geometry and Wear Offsets for the tool. Refer to Tool Geometry Offsets, on page 4 - 67 and Tool Wear Offsets, on page 4 - 74 for details about these offsets.

• **DIAMETER**—identifies the tool’s diameter. It is used for part program graphical verification. The diameter range is from 0 to 9.999. This field is read-only and can only be edited from the Radius field in the Geometry Offset screen. Refer to Select a Radius, on page 4 - 73 for information about changing this entry.

• **ORIENTATION**—shows the orientation icon for of the tool, selected from the Orientation pop-up window in Tool Geometry Offsets. Refer to Select the Tool Orientation, on page 4 - 73 for definitions of each icon.

In addition to the Orientation Icon, **Radial**, **Axial**, or **Invalid** appears in the Orientation field to identify the live tool’s orientation. Here are examples:

![Orientation Examples]

- **Radial**—the tool orientation is around the outside of the stock, along the C axis.
- **Axial**—the tool orientation is perpendicular to the plane of the stock, along the Z axis.
- **Invalid**—an incorrect orientation has been selected. Reset the orientation from the Orientation pop-up window in Tool Geometry Offsets.

Be aware of the length of radial tools. Radial tools that are too long can interfere with the Z-axis way cover when indexing the turret.

Be aware of the tool orientation direction when using the Sub-spindle on TMX MYS machines.

• **SPEED**—identifies the Revolutions per Minute (RPM) value for this tool.

• **Spindle Direction**—identifies clockwise (CW) or counterclockwise (CCW) for the direction the tool will turn. The default is CW, which is the direction for right-hand tools when programming live tools.

• **SURFACE SPEED (FPM) or SURFACE SPEED (MPM)**—identifies the surface speed per minute. When a value is entered in this field, the control automatically calculates the value for the SPEED field.

  • **FPM**—Feet per Minute.
  • **MPM**—Meters per Minute.
• **COOLANT**—identifies the type of coolant to be used for this tool. Coolant may be programmed as OFF or Primary. The default is Primary. During Auto mode when running the program, the Primary coolant will be enabled whenever this tool is used if the Auto Coolant LED is on and OFF is not selected in the COOLANT field.

• **FEED PER REV**—identifies the Feed per Revolution.

• **FEED (IPM) or FEED (MMPM)**—identifies the programmed feed rate for this tool as either:
  - **IPM**—Inches per Minute.
  - **MMPM**—Millimeters Per Minute.

  The value for the Feed (IPM) or (MMPM) is calculated by the control using the Speed and Feed Per Rev field.

• **L**—enter the length of the tool. When the cursor is in this field, the graphic changes to define what is meant by this length.

• **TA**—enter the angle of the tool tip. When the cursor is in this field, the graphic changes to define what is meant by this angle.

![Figure 4–45. Tool Length field—Live Drill](image)

![Figure 4–46. Tool Tip Angle field—Live Drill](image)

**Live Tap**

• **TOOL**—identifies the tool number that will be used in the part program. Up to 99 tools can be defined. Use the number keys on the console to enter the tool number.

• **STATION #**—identifies the station number that will be used for this tool in the part program. The default is 0. The range is 0 to 10 or 0 to 12 depending upon your machine configuration. Refer to Tool to Turret Station Map Panel, on page 4 - 81 for more information about programming station numbers.

• **TYPE**—identifies the tool type to use for this tool number. The tool type determines the parameters required to define each tool. Select a tool type from the choices listed in this field. Select the down arrow to expand the list.
• **COMMENT**—allows you to enter up to 20 characters to help describe the tool. This field does not affect the part program. You can use either the programming keypad, the pop-up text window, or the optional keyboard to enter characters.

• **TOOL OFFSETS**—defines the Tool Geometry Offset and Wear Offset used for this tool. This value defaults to the current tool number.

Be sure to verify Geometry and Wear Offsets for the tool. Refer to Tool Geometry Offsets, on page 4 - 67 and Tool Wear Offsets, on page 4 - 74 for details about these offsets.

• **DIAMETER**—identifies the tool’s diameter. It is used for part program graphical verification. The diameter range is from 0 to 9.999. This field is read-only and can only be edited from the Radius field in the Geometry Offset screen. Refer to Select a Radius, on page 4 - 73 for information about changing this entry.

• **ORIENTATION**—shows the orientation icon for of the tool, selected from the Orientation pop-up window in Tool Geometry Offsets. Refer to Select the Tool Orientation, on page 4 - 73 for definitions of each icon.

In addition to the Orientation Icon, Radial, Axial, or Invalid appears in the Orientation field to identify the live tool’s orientation. Here are examples:

- **Radial**—the tool orientation is around the outside of the stock, along the C axis.
- **Axial**—the tool orientation is perpendicular to the plane of the stock, along the Z axis.
- **Invalid**—an incorrect orientation has been selected. Reset the orientation from the Orientation pop-up window in Tool Geometry Offsets.

![Figure 4–47. Live Tooling Orientation examples—Live Tap Tool Setup](image)

Be aware of the length of radial tools. Radial tools that are too long can interfere with the Z-axis way cover when indexing the turret.

Be aware of the tool orientation direction when using the Sub-spindle on TMX MYS machines.

• **SPEED**—identifies the Revolutions per Minute (RPM) value for this tool.

• **DIRECTION**—identifies Right-Handed or Left-Handed for the tap direction.

• **COOLANT**—identifies the type of coolant to be used for this tool. Coolant may be programmed as OFF or Primary. The default is Primary. During Auto mode when running the program, the Primary coolant will be enabled whenever this tool is used if the Auto Coolant LED is on and OFF is not selected in the COOLANT field.
- **PITCH**—identifies the distance between the threads. When you enter a value for Pitch, the control calculates the value for TPI when in Inch mode.

- **TPI**—identifies the threads per inch for inch taps. When you enter a value for TPI, the control calculates the value for Pitch when in Inch mode. This field is only available in Inch mode.

- **FEED (IPM) or FEED (MMPM)**—identifies the programmed feed rate for this tool as either:
  - **IPM**—Inches per Minute.
  - **MMPM**—Millimeters Per Minute.

  The value for the Feed (IPM) or (MMPM) is calculated by the control using the Speed and either the Pitch or TPI field.

- **L**—enter the length of the tool. When the cursor is in this field, the graphic changes to define what is meant by this length.

*Figure 4–48. Tool Length field—Live Tap*

**Live Ream**

- **TOOL**—identifies the tool number that will be used in the part program. Up to 99 tools can be defined. Use the number keys on the console to enter the tool number.

- **STATION #**—identifies the station number that will be used for this tool in the part program. The default is 0. The range is 0-10 or 0 to 12 depending upon your machine configuration. Refer to Tool to Turret Station Map Panel, on page 4 - 81 for more information about programming station numbers.

- **TYPE**—identifies the tool type to use for this tool number. The tool type determines the parameters required to define each tool. Select a tool type from the choices listed in this field. Select the down arrow to expand the list.

- **COMMENT**—allows you to enter up to 20 characters to help describe the tool. This field does not affect the part program. You can use either the programming keypad, the pop-up text window, or the optional keyboard to enter characters.

- **TOOL OFFSETS**—defines the Tool Geometry Offset and Wear Offset used for this tool. This value defaults to the current tool number.

Be sure to verify Geometry and Wear Offsets for the tool. Refer to Tool Geometry Offsets, on page 4 - 67 and Tool Wear Offsets, on page 4 - 74 for details about these offsets.
- **DIAMETER**—identifies the tool’s diameter. It is used for part program graphical verification. The diameter range is from 0 to 9.999. This field is read-only and can only be edited from the Radius field in the Geometry Offset screen. Refer to *Select a Radius, on page 4 - 73* for information about changing this entry.

- **ORIENTATION**—shows the orientation icon for of the tool, selected from the Orientation pop-up window in Tool Geometry Offsets. Refer to *Select the Tool Orientation, on page 4 - 73* for definitions of each icon.

In addition to the Orientation Icon, **Radial**, **Axial**, or **Invalid** appears in the Orientation field to identify the live tool’s orientation. Here are examples:

![Tool Offsets](image)

- **Radial**—the tool orientation is around the outside of the stock, along the C axis.
- **Axial**—the tool orientation is perpendicular to the plane of the stock, along the Z axis.
- **Invalid**—an incorrect orientation has been selected. Reset the orientation from the Orientation pop-up window in Tool Geometry Offsets.

*Figure 4–49. Live Tooling Orientation examples—Live Ream Tool Setup*

Be aware of the length of radial tools. Radial tools that are too long can interfere with the Z-axis way cover when indexing the turret.

Be aware of the tool orientation direction when using the Sub-spindle on TMX MYS machines.

- **SPEED**—identifies the Revolutions per Minute (RPM) value for this tool.
- **Spindle Direction**—identifies clockwise (CW) or counterclockwise (CCW) for the direction the tool will turn. The default is CW, which is the direction for right-hand tools when programming live tools.
- **SURFACE SPEED (FPM) or SURFACE SPEED (MPM)**—identifies the surface speed per minute. When a value is entered in this field, the control automatically calculates the value for the SPEED field.
  - **FPM**—Feet per Minute.
  - **MPM**—Meters per Minute.
- **COOLANT**—identifies the type of coolant to be used for this tool. Coolant may be programmed as OFF or Primary. The default is Primary. During Auto mode when running the program, the Primary coolant will be enabled whenever this tool is used if the Auto Coolant LED is on and OFF is not selected in the COOLANT field.
- **FEED PER REV**—identifies the Feed per Revolution
- **FEED (IPM) or FEED (MMPM)**—identifies the programmed feed rate for this tool as either:
  - **IPM**—Inches per Minute.
  - **MMPM**—Millimeters Per Minute.

  The value for the Feed (IPM) or (MMPM) is calculated by the control using the Speed and Feed Per Rev field.

- **L**—enter the length of the tool. When the cursor is in this field, the graphic changes to define what is meant by this length.

  ![Figure 4-50. Tool Length field—Live Ream](image)

Be aware of the length of radial tools. Radial tools that are too long can interfere with the Z-axis way cover when indexing the turret.

Be aware of the tool orientation direction when using the Sub-spindle on TMX MYS machines.

### Live Custom
- **TOOL**—identifies the tool number that will be used in the part program. Up to 99 tools can be defined. Use the number keys on the console to enter the tool number.

- **STATION #**—identifies the station number that will be used for this tool in the part program. The default is 0. The range is 0 to 10 or 0 to 12 depending upon your machine configuration. Refer to Tool to Turret Station Map Panel, on page 4 - 81 for more information about programming station numbers.

- **TYPE**—identifies the tool type to use for this tool number. The tool type determines the parameters required to define each tool. Select a tool type from the choices listed in this field. Select the down arrow to expand the list.

- **COMMENT**—allows you to enter up to 20 characters to help describe the tool. This field does not affect the part program. You can use either the programming keypad, the pop-up text window, or the optional keyboard to enter characters.

- **TOOL OFFSETS**—defines the Tool Geometry Offset and Wear Offset used for this tool. This value defaults to the current tool number.

  Be sure to verify Geometry and Wear Offsets for the tool. Refer to Tool Geometry Offsets, on page 4 - 67 and Tool Wear Offsets, on page 4 - 74 for details about these offsets.
• **DIAMETER**—identifies the tool’s diameter. It is used for part program graphical verification. The diameter range is from 0 to 9.999. This field is read-only and can only be edited from the Radius field in the Geometry Offset screen. Refer to Select a Radius, on page 4-73 for information about changing this entry.

• **ORIENTATION**—shows the orientation icon for the tool, selected from the Orientation pop-up window in Tool Geometry Offsets. Refer to Select the Tool Orientation, on page 4-73 for definitions of each icon.

In addition to the Orientation Icon, **Radial**, **Axial**, or **Invalid** appears in the Orientation field to identify the live tool’s orientation. Here are examples:

![Radial](image1.png)  
**Radial**—the tool orientation is around the outside of the stock, along the C axis.

![Axial](image2.png)  
**Axial**—the tool orientation is perpendicular to the plane of the stock, along the Z axis.

![Invalid](image3.png)  
**Invalid**—an incorrect orientation has been selected. Reset the orientation from the Orientation pop-up window in Tool Geometry Offsets.

Be aware of the length of radial tools. Radial tools that are too long can interfere with the Z-axis way cover when indexing the turret.

Be aware of the tool orientation direction when using the Sub-spindle on TMX MYS machines.

• **SPEED (RPM)**—identifies the Revolutions per Minute (RPM) value for this tool.

• **Spindle Direction**—identifies clockwise (CW) or counterclockwise (CCW) for the direction the tool will turn. The default is CW, which is the direction for right-hand tools when programming live tools.

• **SURFACE SPEED (FPM) or SURFACE SPEED (MPM)**—identifies the surface speed per minute. When a value is entered in this field, the control automatically calculates the value for the SPEED field.
  - **FPM**—Feet per Minute.
  - **MPM**—Meters per Minute.

• **COOLANT**—identifies the type of coolant to be used for this tool. Coolant may be programmed as OFF or Primary. The default is Primary. During Auto mode when running the program, the Primary coolant will be enabled whenever this tool is used if the Auto Coolant LED is on and OFF is not selected in the COOLANT field.
• **FEED/FLUTE (TOOTH)**—identifies the tool’s chipload. This entry will be used to automatically calculate the mill feed in all data blocks for this part program using this tool.

• **FLUTES**—identifies the number of cutting flutes for the tool. This entry will be used to automatically calculate the mill feed in all data blocks for this part program using this tool.

• **FEED (IPM) or FEED (MMPM)**—identifies the programmed feed rate for this tool as either:
  - **IPM**—Inches per Minute.
  - **MMPM**—Millimeters Per Minute.

  \[\text{The value for the Feed (IPM) or (MMPM) is calculated by the control using the Speed and Feed Per Rev field.}\]

• **L**—enter the length of the tool. When the cursor is in this field, the graphic changes to define what is meant by this length.

  ![Figure 4–52. Tool Length field—Live Custom](image)

• **R**—enter the radius of the tool tip. When the cursor is in this field, the graphic changes to define what is meant by this radius.

  ![Figure 4–53. Tool Tip Radius field—Live Custom](image)

• **TA**—enter the angle of the tool tip. When the cursor is in this field, the graphic changes to define what is meant by this angle.

  ![Figure 4–54. Tool Tip Angle field—Live Custom](image)
• **SA**—enter the angle of the tool shaft. When the cursor is in this field, the graphic changes to define what is meant by this angle.

![Figure 4–55. Tool Shaft Angle field—Live Custom](image)

**Tool Setup Softkeys**

Here is a Tool Setup screen showing the softkey menu that appears when you first enter Tool Setup.

![Figure 4–56. Tool Setup screen](image)

The softkeys on the Tool Setup screen perform these tasks:

- **PREVIOUS TOOL** F1—displays the Tool Setup for the previous sequentially numbered tool. This softkey is not available for the first tool.
- **NEXT TOOL** F2—displays the Tool Setup for the next sequentially numbered tool. This softkey is not available for the last tool.
- **GEOMETRY OFFSETS** F3—displays the Tool Geometry Offsets screen. Refer to Tool Geometry Offsets, on page 4 - 67 for details about this screen.
- **WEAR OFFSETS** F4—displays the Tool Wear Offsets screen. Refer to Tool Wear Offsets, on page 4 - 74 for details about this screen.
- **DELETE TOOL** F5—deletes all program settings for the tool number entered in the Tool field.
• **TOOL REVIEW**  
  
  *F6*—accesses the Tool Review Screen, listing each tool in numerical order and providing new softkey choices. Refer to Tool Review, on page 4 - 77 for details about this screen.

• **MORE ➔ F7**—accesses a second softkey menu with additional Tool Setup softkeys.

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**Figure 4–57. Tool Setup More ➔ softkey menu**

- **SPEED AS CSS**  
  
  *F1*—sets the cutting mode to use as the default for data blocks using this tool. Constant surface speed (CSS) produces a surface finish based on the proximity of the tool to the center of the part.

- **SPEED AS RPM**  
  
  *F2*—sets the cutting mode to use as the default for data blocks using this tool. RPM uses the same amount of revolutions per minute, regardless of the proximity of the tool to the center of the part.

- **FEED PER MINUTE**  
  
  *F4*—sets the cutting mode to use as the default for data blocks using this tool. The tool feeds forward at a constant rate regardless of the revolution of the spindle.

- **FEED PER REVOLUTION**  
  
  *F5*—sets the cutting mode to use as the default for data blocks using this tool. The tool feeds forward by a specified amount for each revolution of the spindle.

- **CHANGE TOOL NUMBER**  
  
  *F6*—displays a pop-up window for entering a new number for the tool showing in the Tool Setup screen.

- **TOGGLE UNITS**  
  
  *F7*—changes the units for all tools in the program from inch to metric or metric to inch.

- **EXIT**  
  
  *F8*—exits the second softkey menu and returns to the first menu or exits the tool setup process from the first softkey menu and returns to the Input screen.
Tool Geometry Offsets

The Tool Geometry Offsets screen stores the positions of your tools. The information in this screen remains in the machine memory and is independent of the part program. Generally, the offset is the same number as the tool in the turret. These offsets remain valid for the tool being programmed in Tool Offsets, provided the tool is not removed from the turret when switching from one program to another. You can save the Tool Geometry Offsets to a separate file to use later. Refer to Tool Geometry Offsets Softkeys, on page 4-68 for information about saving and restoring offsets.

Select the TOOL GEOMETRY OFFSETS F3 softkey from the Tool Setup screen. The Tool Geometry Offset screen displays and the cursor will be located in the offset for the active, programmed tool. If the tool has not been programmed in Tool Setup, the cursor is located in the offset equal to the index of the active turret station. In the sample screen below, Tool 1 is the active tool in tool setup; therefore, the cursor is located in the field for Z Offset 1.

![Tool Geometry Offsets screens](image)

Figure 4–58. Tool Geometry Offsets screens

Tool Geometry Offsets Fields

The Tool Geometry Offsets screen contains these fields:

- **JOB BLOCK Z**—displays the dimension for the Job Block Z plane. The Job Block Z plane is identified measuring a reference surface from Machine Zero. Touch tools against this plane to establish Z-axis geometry offsets relative to the turret face. Press the **Store Position** console key or softkey to store the offset in the Job Block Z field. This selection is unavailable when Work Offset Z is selected.

- **WORK OFFSET Z**—displays the dimension for the Work Offset Z plane. The Work Offset Z plane is measured from the Machine Zero location to the Part Offset location (part zero on the part). Touch tools against this plane to establish Z-axis geometry offsets. Press the **Store Position** console key or select the softkey to store the offset in the Work Offset Z field. This selection is unavailable when Job Block Z is selected.
• #—contains the index value that identifies each offset.

• X OFFSET—displays the X offset tool position. Up to 99 offsets can be programmed. Press the Store Position console key or select the softkey to store the offset in the X Offset field.

• Z OFFSET—displays the Z offset tool position. Up to 99 offsets can be programmed. Press the Store Position console key or select the softkey to store the offset in the Z Offset field.

• Y OFFSET—displays the Y offset tool position. Y Offset fields are accessed with the ADDITIONAL AXIS OFFSETS F3 softkey. Up to 99 offsets can be programmed. Press the Store Position console key or select the softkey to store the offset in the Y Offset field. This field is available for TMX MY and TMX MYS series machines.

• RADIUS—displays the tool radius obtained from the tool catalog.

⚠️ The Tool Radius must be less than 1/4 of the insert size.

• Orientation Icon—appears to the right of the Radius field and shows the tool orientation, which is established from the selections available in the Orientation pop-up window. Select the Orientation F4 softkey to open the pop-up window.

Tool Geometry Offsets Softkeys

The Tool Geometry Offsets softkeys provide these functions:

• PAGE UP F1—scrolls up through the # fields, displaying groups of offsets.

• PAGE DOWN F2—scrolls down through the # fields, displaying groups of offsets.

• ADDITIONAL AXIS OFFSETS F3—toggles the screen to a second screen containing Y Offset fields. This softkey is available for TMX MY and TMX MYS series machines. Select the softkey a second time to return to the first screen.

• The Y Offsets are available for tool setup adjustments to compensate for various tool insert sizes and to reduce the occurrence of burrs by allowing a tool to run off center.

• ORIENTATION ➔ F4—activates the Orientation pop-up window for selecting tool orientation. See Select the Tool Orientation, on page 4 - 73 for more information.

• STORE MACHINE POSITION F5 (or Store Machine Position console key)—stores an offset for the tool length based on the plane selection (Job Block Z or Work Offset Z) relative to the machine position. The cursor location defines which axis (X or Z) will be set.

• TOOL SETTER ➔ F6—refer to WinMax Lathe Options, Tool Setter, on page 16 - 1 for information about this option.
- **MORE ➔ F7**—displays an additional softkey menu with choices for saving and restoring the offsets.

- **HOME ➔ F1**—displays the Home softkey menu. Please refer to *Home the Machine, on page 5 - 5* for details about this softkey menu.

  ![](image)

  Be sure the path is clear for the axis movement before beginning this procedure. The axis order of calibration is set in Program Parameters in the Axis Order field. Refer to *Program Parameters, on page 4 - 82*.

- **WRITE TABLE TO FILE F2**—opens a Save Offset Table screen for naming and saving the offsets to a file. You can assign the file extension of your choice in the **File name** field. It is not possible to select an extension using the **Files of type** field.

- **READ TABLE FROM FILE F4**—opens the Load Offset Table screen for selecting a folder and file. When an offset file is selected from screen, those offsets are read from the file and the values appear on the Tool Geometry Offsets screen.

- **CLEAR TABLE F7**—resets all values in the table to 0.000. A confirmation window appears prior to resetting the values.

- **More F7 ➔**—exits the menu and returns to the Tool Geometry Offsets menu.

- **EXIT F8**—exits the Tool Geometry Offsets menu and returns to the Tool Setup screen.
**Measuring Tool Offsets**

Offsets are determined based on the type of tool. Tools are inserted into tool holders, which are inserted into the turret. The length of the tool includes the measurement of the tool insert between the turret face to the tip of the tool.

**Turning Tool Offset**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td><strong>Z Offset</strong>—Measure from the centerline of the tool holder shank to the outside tip of the tool inserted in the tool holder.</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td><strong>X Offset</strong>—Measure from the turret face to the tip of the tool inserted in the tool holder.</td>
</tr>
</tbody>
</table>

*Figure 4–59. Turning tool and tool holder—Front (left) and Side (right) views*
### Boring Bar Tool Offset

1. **Z Offset**—Measure from the centerline of the tool holder shank to the outside tip of the tool inserted in the tool holder.

2. **F Dimension**—Measure from the tool insert centerline to the highest tip of the tool inserted in the tool holder. Reference the tool manufacturer’s data sheet for the boring bar F-Dimension.

3. **X Offset**—100 mm - F Dimension
   - 100 mm is an example of the tool holder length as attached to the face of the turret. The actual centerline distance is stated on the tool holder by the tool holder manufacturer.
   - The F-Dimension is the measurement from the tool centerline to the outside tip of the tool inserted in the tool holder. Reference the tool manufacturer’s data sheet for the boring bar F-Dimension.

*Figure 4–60. Boring Bar tool and tool holder with F Dimension*
Axial Live Tool Offsets

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Z+ Offset</strong>—Measure from the tool holder shank centerline to the tool tip inserted in the left-facing side of the tool holder, toward the Main spindle.</td>
</tr>
<tr>
<td>2</td>
<td><strong>Z- Offset</strong>—Measure from the tool holder shank centerline to the tool tip inserted in the right-facing side of the tool holder, toward the Sub-spindle.</td>
</tr>
<tr>
<td>3</td>
<td><strong>X Offset</strong>—100 mm. (100 mm is an example of the tool holder length as attached to the face of the turret. The actual centerline distance is stated on the tool holder by the tool holder manufacturer.)</td>
</tr>
</tbody>
</table>

Figure 4–61. Axial Live tools and tool holder

Radial Live Tool Offset

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Z Offset</strong>—Measure at the tool holder shank centerline = 0.</td>
</tr>
<tr>
<td>2</td>
<td><strong>X Offset</strong>—Measure from turret face to tip of tool inserted in the tool holder.</td>
</tr>
</tbody>
</table>

Figure 4–62. Radial Live tool and tool holder
Select a Radius

1. Place the cursor in the Radius field for the offset that corresponds with the tool number in Tool Setup.

2. Select the SELECT RADIUS ➔ F6 softkey and the softkey menu provides radius values from which to choose for two-axis (TM Series) tools.

   Live tools must use a radius value for this field. Divide the tool diameter by two (2) and enter the radius.

3. Select the appropriate radius. The value appears in the Radius field and carries over to the BORE INSERT/TIP RADIUS field for two-axis (TM Series) tools or the DIAMETER field for Live tools in the Tool Setup screen.

4. Select the EXIT F8 softkey to return to the Tool Setup screen.

Select the Tool Orientation

1. Select the ORIENTATION ➔ F3 softkey. The Orientation pop-up window appears:

2. Select the appropriate orientation from the pop-up window.

   In general, ID tools use the orientations shown in the top row and OD tools use the orientations shown in the bottom row. The middle icon is used for tools requiring no orientation, such as a button tool.

   The Orientation selection does not affect the program for Fixed Center Drills, Fixed Drills, Fixed Taps, and Fixed Reams. The program does check the Orientation selection for all other tool types, including Live Tools.

Determine the Geometry Offsets

1. Select either JOB BLOCK Z or WORK OFFSET Z and enter its value under the selection to identify the Z plane.

2. Make sure the tool in the turret has the same tool number as the offset number that is being set.

3. Set the Axis Select Switch on the Jog Unit for the X axis.

4. Move the X axis and touch the tool off the workpiece.

5. Store the position with either the Store Position button on the jog unit or the STORE POSITION F6 softkey. Repeat steps 2 through 5 for the Z axis.

6. Enter the appropriate Radius for this tool.

7. Select the ORIENTATION F3 softkey to select the orientation for this tool from the pop-up window.
Tool Wear Offsets

It is good practice to periodically check tools for wear. You can store offsets for each tool in the Tool Wear Offsets screen.

Like the Tool Geometry Offsets screen, the Tool Wear Offsets screen stores adjusted values for any wear that occurs for a tool. The information in this screen remains in the machine memory and is independent of the part program. You can save the Tool Wear Offsets to a separate file to use later. Refer to Tool Wear Offset Softkeys, on page 4 - 75 for information about saving and restoring offsets.

The offset must use the same number as the tool in the turret. These offsets remain valid for the tool being programmed in Tool Offsets, provided the tool is not removed from the turret when switching from one program to another.

![Figure 4–64. Tool Wear Offsets screen](image)

**Tool Wear Offset Fields**

The Tool Wear Offsets screen contains these fields:

- #—contains the index value that identifies each offset.
- **X WEAR**—displays the amount of tool wear in the X axis.
- **Z WEAR**—displays the amount of tool wear in the Z axis.
- **RADIUS WEAR**—displays the amount of tool wear in the Radius.
**Tool Wear Offset Softkeys**

The Tool Wear Offsets softkeys provide these functions:

- **PAGE UP F1**—scrolls up through the # fields, displaying groups of offsets.
- **PAGE DOWN F2**—scrolls down through the # fields, displaying groups of offsets.
- **ADDITIONAL AXIS OFFSETS F3**—toggles the screen to a second screen containing Y Offset fields. This softkey is available for TMX MY and TMX MYS series machines.
- **ADJUST ➔ F5**—provides selections for the selected offset. The choices are +0.0001 F1, +0.001 F2, +0.01 F3, -0.01 F4, -0.001 F5, and -0.0001 F6.
- **TABLE COMMANDS ➔ F7**—displays an additional softkey menu with choices for saving and restoring the offsets.
  - **WRITE TABLE TO FILE F2**—opens a Save Offset Table screen for naming and saving the offsets to a file. You can assign the file extension of your choice in the File name field. It is not possible to select an extension using the Files of type field.
  - **READ TABLE FROM FILE F4**—opens the Load Offset Table screen for selecting a folder and file. When an offset file is selected from this dialog box, those offsets are read from the file and the values appear on the Tool Wear Offsets screen.
  - **CLEAR TABLE F7**—resets all values in the table to 0.000. A confirmation window appears prior to resetting the values.
  - **EXIT F8**—exits the Table Commands menu and returns to the Tool Wear Offsets menu.
- **EXIT F8**—exits the tool setup process and returns to the Input screen.

**Determine if Tool Wear Exists**

To determine if tool wear exists and enter offsets when appropriate,

1. Cut a part.
2. Measure the part after the cut.
3. Select the WEAR OFFSETS F4 softkey on the Tool Setup screen.
4. Position the cursor in the Wear field that matches the tool number of the tool in the turret.
5. Select the ADJUST ➔ F5 softkey for softkey choices to enter for the X, Z, or Radius offset. The choices are +0.0001 F1, +0.001 F2, +0.01 F3, -0.01 F4, -0.001 F5, and -0.0001 F6.
Automatic Feed and Speed Calculations

During Tool Setup, the control can calculate the appropriate feedrates and spindle speeds for drilling operations.

⇒ The operator can manually change all feed and speed values calculated by the control.

Entering Zero for Speed (RPM) Value

In order for the control to calculate spindle speed and axis feedrate for a tool during Tool Setup and carry those values forward throughout all the blocks that use that (drilling) tool number, follow these steps:

1. Enter a 0 in the Speed (RPM) field.
2. Enter a value in the Surface Speed field. The Feed per Rev field appears.
3. Enter value for the Feed per Rev field.

⚠ The control uses nominal feeds and speeds in calculating the initial feed and speed values. The control does not take into account material hardness and depth of cut. Be sure to check computed feeds and speeds to ensure they are appropriate and make any necessary adjustments.

Entering Actual Speed (RPM) Value

If you enter Speed (RPM) in Tool Setup, this value is transferred to all new data blocks using this tool. The feedrates must be entered manually in the data blocks.

⇒ If the Speed (RPM) field is changed in Tool Setup, the tool number must be re-entered in the data blocks in order to force the control to update the value.

⇒ Do not enter the Surface Speed value in the Tool Setup screen if the Speed (RPM) value is entered.

Formulas for Automatic Calculations

When performing a drilling operation, the control automatically calculates spindle speeds using this formula:

\[
\text{RPM} = \frac{\text{Surface Speed}}{\text{Diameter} \times \pi}
\]

When performing a drilling operation, the control uses this equation to calculate the feedrate:

Feedrate = Feed Per Rev x RPM
Tool Review

The Tool Review screen lists a summary of the tools programmed for the part program. Each tool and its assigned station number is listed in numerical order by tool number. You can select a tool on the list to access the Tool Setup screen for that tool.

Up to 99 tools can be programmed. Depending upon your machine configuration, the range for station numbers is 0 to 10 or 0 to 12. For Live-Tooling, Y-Axis Motion, and Sub-spindle (TMX MYS) series machines, there can be as many as 24 stations to accommodate tool setup for cutting stock in the sub-spindle.

Select the **TOOL REVIEW** F6 softkey from the Tool Setup screen, or press the **Menu** key followed by the **TOOL REVIEW** softkey to access the Tool Review screen and softkey menu. You can also use the menu toolbar and select the **Tool Review** icon to access this screen.

These standard console keys perform these functions with the Tool Review screen:

- The **Insert** console key functions the same as the **ADD TOOL** F7 softkey:
  2. Press the **Insert** key. The Tool Setup screen appears with the New Tool field.
  3. Enter a number for the new tool and press Enter. The Tool Setup screen appears with fields for entering tool setup information for the new tool.
• The **Delete** console key functions the same as the **DELETE TOOL F2** softkey:

1. Highlight the tool to be deleted in the Tool Review screen.
2. Press the **Delete** key. A pop-up message appears asking if you are sure you want to delete the tool.
3. Select **OK** to delete the tool or **Cancel** to cancel the deletion.

• The **Page Up** console key jumps to the first tool visible on the screen.
• The **Page Down** console key jumps to the last tool visible on the screen.

When the entire part program contains more tools than can be displayed on one screen, use the **Page Down** and **Page Up** console keys or the scroll bar located on the right-hand side of the screen to scroll through the listed tools.

You can cut, copy, and move tools to another location in a part program or even another program.

To select multiple tools, select the tool listed first and move the stylus down to the last tool without lifting the stylus.

With the optional AT-keyboard, you can use **Ctrl + select** (using the stylus) to select non-consecutive tools.

### Edit from the Tool Review Screen

Position the cursor on the tool you wish to edit, and select the **MULTIPLE TOOL FUNCTIONS F1** softkey on the Tool Review screen to access these editing features:

• **MULTIPLE TOOL FUNCTIONS F1**—accesses tool editing softkeys:
  - **CUT F1**—removes a tool from one program and allows you to paste it into another program. Refer to the steps listed in *To cut tools from a program and move to another*, on page 4 - 80 for directions for using this softkey.
  - **COPY F2**—copies tool setup information so you can either create a new tool using that tool setup or copy the tool information into another part program. Refer to *To copy a tool*, on page 4 - 79 or *To copy a tool to another part program*, on page 4 - 80 for directions for using this softkey.
  - **PASTE F3**—pastes tool setup information that has been copied or cut. Refer to these sections for directions for using this softkey: *To cut tools from a program and move to another*, on page 4 - 80, *To copy a tool*, on page 4 - 79, or *To copy a tool to another part program*, on page 4 - 80.
  - **DELETE F4**—deletes tool setup information for a tool or tools from the Multiple Tool Functions menu. Refer to the steps listed in *To delete tools*, on page 4 - 80 for directions for using this softkey.
  - **DELETE TOOL F2**—deletes the selected tool or tools from the Tool Review screen. A pop-up message appears confirming the action. Select **OK** to continue or **Cancel**.

You can also delete tools from the Tool Review screen using either the **DELETE TOOL F4** softkey in the Multiple Tool Functions menu or the **Delete** key.
PART PROGRAMMING F3—accesses the Part Programming softkey menu. Refer to WinMax Lathe Conversational Part Programming for information about programming data blocks.

PART SETUP F4—accesses the Part Setup softkey menu. Refer to Part Setup—Work Offsets, on page 4 - 11 for information.

TOOL SETUP F5—accesses the Tool Setup screen for the selected tool. To change a tool number after it is programmed, select TOOL SETUP F6, MORE F7, and CHANGE TOOL NUMBER F6.

VIEW TOOL TABLE F6—accesses the Tool to Turret Station Map Panel for viewing information about tool and station mapping on one screen. Refer to Tool to Turret Station Map Panel, on page 4 - 81 for information about this feature.

CLEAR TOOL TABLE F7—clears the entries in the Tool to Turret Station Map Panel. Changes Station entries to zero (0) and changes the field color from green to blue.

To copy a tool

You can copy a tool and renumber it to create a new tool in Tool Setup.

1. Select the tool you want to copy.
2. Select MULTIPLE TOOL FUNCTIONS F1.
4. Highlight the tool that will follow the copied tool.
5. Select PASTE F3. A pop-up window appears asking if you want to replace the tool that has been copied. For example, if you copy tool 2, the window contains this text:

   “Tool 2 already exists. Replace it? Yes No Cancel”

   - Select Yes to paste the copied tool over itself.
   - Select No and the window changes to ask what tool number to assign. Select Yes to accept the number provided in the window or type in a new number and select Yes to proceed.

   The copied tool appears in order in the list with the tool number assigned.

6. Save the revised program.
To copy a tool to another part program

You can copy a tool to a different part program using the COPY F2 and PASTE F3 softkeys.

1. Select the tool you want to copy.
2. Select MULTIPLE TOOL FUNCTIONS F1.
4. Access the Project Manager screen and Open the second part program if it is not already open.
5. Access the Tool Review screen for the second part program.
6. Highlight the tool that will follow the copied tool.
7. Select MULTIPLE TOOL FUNCTIONS F1.
8. Select PASTE F3. The tool that was copied from the other program appears above the highlighted tool on the Tool Review screen.
9. Save the revised program.

To cut tools from a program and move to another

You can cut a tool from a part program and move it to another part program. To tag a tool to be cut from a program and move it,

1. Select the tool you want to cut.
2. Select MULTIPLE TOOL FUNCTIONS F1.
4. Access the Project Manager screen and Open the second part program.
5. Access the Tool Review screen for the second part program.
6. Highlight the tool that will follow the cut tool.
7. Select MULTIPLE TOOL FUNCTIONS F1.
8. Select PASTE F3. The tool that was copied from the other program appears above the highlighted tool on the Tool Review screen.
9. Save the revised program.

To delete tools

You can permanently remove tools from the part program. To delete tools from the Multiple Tool Functions menu,

1. Select the tool you want to delete.
2. Select MULTIPLE TOOL FUNCTIONS F1.
3. Press the DELETE F4 softkey.

You can also delete tools directly from the Tool Review screen using the DELETE TOOL F2 softkey or the Delete key.

4. Save the revised program.
Tool to Turret Station Map Panel

The Tool to Turret Station Map Panel window shows tool number assignments and station number assignments for each tool. From the Tool Setup screen, select the TOOL REVIEW F6 softkey, followed by the VIEW TOOL TABLE F6 softkey to access this window.

![Figure 4–66. Tool to Turret Station Map Panel window](image)

- Each field on this table identifies one tool and the station number assigned to it.
- When a station number is assigned, the field is green; when a station number is not assigned, the field is blue.
- Select the CLEAR TABLE field in the lower right-hand corner to remove tool/station assignments. The fields will all become blue.
- Select the minus sign (−) in the upper right hand corner of this screen to minimize the view.
- Select the X in the upper right hand corner of this screen to Exit and close this screen.
Program Parameters

Program Parameters are stored with the conversational part program. These parameters apply to all data blocks in the conversational part program and are available for:

- Entering the rapid traverse feedrate.
- Setting maximum spindle RPM for spindle(s) configured on your turning center.
- Disabling or enabling axis feedrate override.
- Setting an optional stop before or after each tool change.
- Defining a tool change position for each tool change.

Either press the **Aux/Menu** key or the **Input** key followed by the **PROGRAM PARAMETERS F4** softkey to access the Program Parameters screen and softkey menu. This softkey is also available from other menus, such as Part Programming.

The screen configuration depends upon the type of turning center. Here is a Program Parameters screen for a Live-Tooling, Y-Axis Motion, and Sub-spindle (TMX MYS series) machine, showing all possible Program Parameters fields:

![Program Parameters screen](image)

**Conversational Part Program**

**ISNC Program**

For information regarding the Program Parameters, NC Variables softkey, please refer to Variables, on page 8 - 2, in the NCPP Option section of the Help.
A description of each of the program parameters follows:

- **RAPID TRAVERSE**—contains the feedrate for the axes to move between data blocks or in position blocks for positioning to turret rotation location. The default is 2540 MMPM (100 IPM).

- **MAX RPM OF WORKHOLDING (PRIMARY SPINDLE)**—identifies the maximum spindle speed for the primary spindle, no matter what CSS/FPM is programmed. This field can be set for each program depending on the setup, such as type of jaws, workpiece weight, workpiece strength. The default is 2540 MMPM (100 IPM).

- **MAX RPM OF WORKHOLDING (SUB-SPINDLE)**—identifies the maximum spindle speed for the sub-spindle, no matter what CSS/FPM is programmed. This field can be set for each program depending on the setup, such as type of jaws, workpiece weight, workpiece strength. This field appears for TMX MYS series machines. The default is 2540 MMPM (100 IPM).

- **MAX RPM (LIVE TOOLING SPINDLE)**—contains the maximum spindle RPM for the live tooling spindle. This field appears for TMM, TMX MY, and TMX MYS series machines. The default is the same as the machine maximum RPM.

- **FEED OVERRIDE LOCKOUT**—disables the axis feedrate override when YES is selected. The program will run in Auto at the programmed feedrate regardless of the position of the override knobs.

  The Feed Override Lockout does not affect the Rapid and Spindle overrides.

- **STOP BEFORE TOOL CHANGES**—performs an optional stop before each tool change if YES is selected for Conversational Part Programming (does not apply for NC Programs). You must also enable the Opt Stop console key to activate this function when running the program. If YES is selected and the Opt Stop key is not enabled, the optional stop will not occur.

  Select NO if an optional stop is not required before each tool change. YES is the default.

- **STOP AFTER TOOL CHANGES**—performs an optional stop after each tool change if YES is selected for Conversational Part Programming (does not apply for NC Programs). You must also enable the Opt Stop console key to activate this function when running the program. If YES is selected and the Opt Stop button is not enabled, the optional stop will not occur.

  Select NO if an optional stop is not required after each tool change. NO is the default.
- **USER DEFINED TOOL CHANGE POSITION**—contains default settings to be used if a tool change is required. These settings apply to each data block in the program for use when the tool specified in a data block is different than the tool in the previous block or when the current tool necessitates a tool change.

  These defaults can be overridden with selections in the Tool Change Override area on the Position Block screen or with the User Defined Tool Change Position selections in the Change Parameters data block.

- **WHERE**—moves turret to selected position:
  - **DON'T MOVE**—perform the tool change at current machine position.
  - **MOVE TO HOME**—moves the turret to the home position for the tool change.
  - **MOVE TO XZ**—moves the turret to the defined X, Z position. When MOVE TO XZ is selected, the Reference, X (Dia) or X (Rad), and Z fields are available for entering data. This field appears for TM, TMM, and TMX series machines.
  - **MOVE TO XYZ**—moves the turret to the defined X, Y, Z position. When MOVE TO XYZ is selected, the Reference, X (Dia) or X (Rad), and Z fields are available for entering data. This field appears for TMX MY and TMX MYS series machines.

- **REFERENCE**—determines whether the X and Z locations are relative to Part Zero or Machine Zero.

- **X (DIA) or (RAD)**—contains the X diameter or radius coordinate where the turret should move. When the cursor is in this field, the STORE MACHINE POSITION F2 softkey appears. Select this softkey to store the current machine position into the field.

- **Z**—contains the Z coordinate where the turret should move. When the cursor is in this field, the STORE MACHINE POSITION F2 softkey appears. Select this softkey to store the current machine position into the field.

- **AXIS ORDER (for TM, TMM, and TMX Series machines)**—contains the selection for the order the axes will move:
  - **SIMULTANEOUS F1**—from the current position the turret moves both axes together to the X and Z positions.
  - **FIRST X THEN Z F2**—from the current position the turret moves the X axis first to the X position then the Z axis to the Z position. This field is available for TM, TMM and TMX Series machines.
  - **FIRST Z THEN X F3**—from the current position the turret moves the Z axis first to the Z position then the X axis to the X position This field is available for TM, TMM and TMX Series machines.
• **AXIS ORDER (for TMX MY and TMX MYS Series machines)**—contains the selection for the order the axes will move:

  • **SIMULTANEOUS F1**—from the current position the turret moves all axes together to the X, Y, and Z positions.
  
  • **FIRST X THEN Z THEN Y F2**—from the current position the turret moves the X axis first to the X position, then the Z axis to the Z position, then the X’ axis moves in Y-Axis motion. This field is available for TMX MY and TMX MYS Series machines.
  
  • **FIRST Z THEN X THEN Y F3**—from the current position the turret moves the Z axis first to the Z position, then the X axis to the X position, then the X’ axis moves in Y-Axis motion. This field is available for TMX MY and TMX MYS Series machines.
  
  • **FIRST X THEN Y THEN Z F4**—from the current position the turret moves the X axis first to the X position, then the X’ axis moves in Y-Axis motion, then the Z axis to the Z position. This field is available for TMX MY and TMX MYS Series machines.
  
  • **FIRST Z THEN Y THEN X F5**—from the current position the turret moves the Z axis first to the Z position, then the X’ axis moves in Y-Axis motion, then the X axis to the X position. This field is available for TMX MY and TMX MYS Series machines.
  
  • **FIRST Y THEN X THEN Z F6**—from the current position the X’ axis moves in Y-Axis motion, then the turret moves the X axis to the X position, then the Z axis to the Z position. This field is available for TMX MY and TMX MYS Series machines.
  
  • **FIRST Y THEN Z THEN X F7**—from the current position the X’ axis moves first in Y-Axis motion, then the turret moves the Z axis to the Z position, then the X axis to the X position. This field is available for TMX MY and TMX MYS Series machines.

A run-time error can occur if the Axis Order selection requires the Y axis to move, but the X axis position interferes with the X’ axis moving to the Y home location without hitting its limit switch.

You can change Program Parameters within a part program using the Change Parameters data block. Refer to WinMax Lathe Conversational Part Programming, *Change Parameters, on page 2 - 192* for details.
Verifying Part Programs—Graphics

The graphics screen shows a graphical display of the part, tool paths, and stock removal, with a choice of views and configurations.

- The **Graphics** button displays the part:

- The **DRO** button displays the DRO with the part at the bottom of the screen:
• The **Graphics/DRO** button displays the part with the DRO at the bottom of the screen:
Max5 Graphics Screen Controls

**Zoom** in and out

**Pan** in selected direction

**Rotate** in selected direction in ISO view

**Reset All** to original view

**Opaque** view

**Measure**

**Fill**

**XY** End view  **XZ** Side view  **YZ** Top view

**Iso**metric view **Quad** view (all of above)

Run the entire **Part** program

Run **Single** block or segment of program

Run Program until programmed **Tool** change

Graphics **Speed** Control buttons

**Draw** part; becomes pause button when drawing in progress

**Clear** drawing; becomes a stop button that aborts drawing

**Select** point on drawing

**Jump** to location in program

**Capture** part snapshot to display in Prog. Manager & file loading

**Hi Res** displays high resolution view of the part area on screen

Access Graphics **Settings** (see below)
Graphics Settings

When the Settings button is active, the top portion of the screen contains these settings:

- **Display Settings**—selections for adjusting items appearing on the graphics display.
- **Performance Settings**—selections for graphics performance such as showing 3D Part Surface and chord error.
- **Machine Configuration**—selections for adjusting chuck, jaw, and graphics configuration.

**Display Settings**

- **Show Graphics**—the type of graphic display. When set to Tool Path or Show All, the following settings are available:
  - **Tool Path**—use slider to turn the tool path on or off in display (appears as red dashed line).
  - **Rapids**—use slider to turn rapid moves on or off in display (appear as yellow solid lines).
  - **Part Surface**—use slider to show the part surface in graphic display (appears as solid cyan line).
  - **Stock Outline**—use slider to show the stock outline, which is set in the stock geometry screen (appears as green solid line).
  - **Draw Tail Stock / Sub Spindle**—use slider to turn Tailstock and Sub-spindle on or off in display.
  - **Render Mode**—choose the rendering for the part display: Surface, Mesh, or All. Mesh displays a line rendering of the part. Surface displays a solid 3-dimensional part. Only applicable when Show Graphics is Solids or Show All.
  - **Enable Runtime Tool**—turn on to see simulated tool move around the part in graphics display while the machine is running; tool also shown when jogging tool near part.
  - **Background Color**—choose Black or White background color for the graphics window display.
  - **Default View**—the default graphics display view when WinMax is started, either XY plane, XZ plane, Isometric, or All Views.
  - **Draw Chuck and Jaw**—use slider to turn the chuck and jaw display on or off.
  - **Resolution**—use trackbar to set the resolution tolerance for solid simulation. Smaller numbers give higher resolution and accuracy in representing the cut part.
  - **Section View**—full, 1/2, or 3/4 solid stock.
  - **On Screen Graphics Controls**—Use the slider to show or hide the rotate, zoom, pan, full screen and zoom window icons.
  - **Solid Simulation**—Save and load a solid graphic simulation (.sim file). When a solid part has been drawn, select the Save button to save the .sim file. Select the Load button to load and open a .sim file.
**Performance Settings**

- **Show 3D Part Surface**—Use slider to show or hides the part surface. White lines represent the tool dimensions on the part. Black lines represent the programmed geometry. The softkey toggles between show and hide upon each selection.

- **Use chord error from program**—specify Yes or No to use the chord error value programmed in general parameters when rendering curves in NC in graphics display.

- **Graphics Chord Error**—the chord error to be used when drawing curves in graphics.

**Machine Configuration**

- **Chuck Diameter**—identifies the diameter of the chuck.
- **Chuck Width**—identifies the width of the chuck.
- **Jaw Height**—identifies the height of the jaw.
- **Jaw Length**—identifies the length of the jaw.
Programming Training

Learn how to create part programs in minutes on the easy-to-use WinMax Lathe Max Control. Hurco offers hands-on training classes to demonstrate the powerful programming capabilities of the control. Every customer will gain an advantage by attending the training classes.

WinMax Lathe Max Control training classes teach the machine operator to:

- Create part programs from blueprints.
- Minimize programming time.
- Decrease or eliminate programming mistakes—reducing scrap and programming downtime and extending tool life.
- Increase productivity.
- Enhance part programming capability with WinMax Lathe Max Control options.

Contact Hurco or your Hurco distributor for details about a Programming Training class.
MACHINE OPERATION BASICS

The Machine Operations console keys are used to run part programs loaded in memory and control the machine during cutting. This section contains information about the machine operations.

Before actually running a program on a machine, use the Wireframe Graphics or optional Verification Graphics to test the program. Refer to Verifying Part Programs—Graphics, on page 4 - 86 for details.

You can use the Emergency Stop button, the Interrupt key, or the Opt Stop key (programmed with Option Stop enabled) to stop machine operation. Please refer to Machine and Console Basics Machine Operations, on page 1 - 18 for information about these keys.

This section explains basic machine operations.

Power Up.......................................................... 5 - 2
Jogging the Axes Manually........................................... 5 - 6
Indexing the Turret using Console Keys......................... 5 - 6
Manual Mode Operation........................................... 5 - 7
Auto Mode Operation.............................................. 5 - 52
Running a Program................................................ 5 - 62
Shut Down the Control and Machine......................... 5 - 65
Power Up

The operator must perform routine checks before attempting to power up the machine. The machine is powered up first, then the control is powered up.

Routine Daily Checks

Several mechanical elements require visual inspection, regular maintenance, and lubrication checks to ensure proper machine operation. For detailed descriptions of these operations, refer to the *Maintenance and Safety Manual*.

Machine Power

The machine’s On/Off switch supplies power to the entire machine, including the control. The power switch is located behind the machine on the electrical cabinet door.

When the machine is turned on and boots up, start up and self-test information appears on the screen. When the machine boots up, the following information is displayed:

- BIOS Configuration information.
- Initialization messages.
- Windows® OS messages.
- The Hurco Lathes screen appears before all of the software is active.
- Boot up is complete when the Input screen is displayed, as shown below.

![Input Screen](image)

*Figure 5–1. Input Screen*

If the Input screen does not appear or contains error messages, refer to the *Maintenance and Safety Manual*, Troubleshooting, for assistance.
Control Power

Follow these steps to perform Control Power On:

1. If necessary, release all Emergency Stop buttons.
3. Press the Power On console button. This button lights up, and the Start Cycle console button begins to flash.
4. Press the Start Cycle button to turn on the machine servos. The Start Cycle button stops flashing. The lube pump and hydraulic pump are enabled; servo and spindle amplifiers are enabled.

Calibrate the Machine

The axes must be calibrated each time the machine is powered up. Machine calibration establishes the machine coordinate zero locations when viewed facing the machine.

This picture shows a TMXMY turning center with the enclosure door open. This model includes a sub-spindle; TMX and TMXMY models use a programmable tailstock instead of a sub-spindle.

The coordinates vary depending upon your machine configuration.

- X Zero is the centerline of the spindle.
- Y Zero is the centerline of the spindle.
- Z Zero is at the left of the machine, located approximately at the spindle face.
- W Zero is at the left of the machine, located approximately at the spindle face.
- C Zero is determined by the X axis, with either a radial or axial tool, with the C axis at C Home position.
- C3 Zero is determined by the X axis, with either a radial or axial tool, with the C3 axis at C3 Home position.
To avoid collisions, the X axis calibrates first in X positive direction, moving toward the back of the machine. Then the Z axis calibrates in Z positive direction, moving toward the right of the machine.

- The calibrated X value is the maximum X travel limit to the Spindle centerline.
- The calibrated Y value is aligned with the Spindle centerline.
- The calibrated Z value is the maximum Z travel limit.
- The calibrated W value is the maximum W travel limit.
- The calibrated C value is the repeatable index position for the C axis.
- The calibrated C3 value is the repeatable index position for the C3 axis.

To calibrate the machine, the machine and control power must be on, as described in Machine Power, on page 5 - 2 and Control Power, on page 5 - 3:

Be sure the path is clear for the axis movement before beginning this procedure.

1. Press the Manual button on the console to display the Manual screen.
2. Press the CALIBRATE MACHINE F8 softkey. The Start Cycle lamp flashes.
3. Press the Start Cycle button for axis calibration.
4. Press the Start Cycle button again for turret calibration.

After the machine has been calibrated, the axes positions appear on the Manual screen, as shown here. The axes displayed depend upon your machine configuration.

![Figure 5–3. TMX MY Series Manual Screen Showing Calibrated Axes](image-url)
Home the Machine

Home Machine is a rapid traverse feedrate move to return the axes from anywhere in the work area back to home (the original calibrated position).

- X Home is at the back of the machine.
- Y Home is at the back of the machine.
- Z Home is at the far right of the machine.
- W Home is the furthest position back from Machine Zero.
- C Home is the repeatable index position for the C axis.
- C3 Home is the repeatable index position for the C3 axis.

The Control Power must be On, and the machine must be calibrated before the Home procedure begins, as described in Control Power, on page 5-3 and Calibrate the Machine, on page 5-3. Follow this procedure to home the machine:

⚠️ Be sure the path is clear for the axis movement before beginning this procedure.

1. Press the Manual key to display the Manual screen.
2. Select the MANUAL FUNCTION SETUP F2 softkey.
3. Select the HOME F6 softkey. The Home softkey menu appears with softkey selections for each axis.
4. Select the appropriate softkey from the Home menu. The Home softkeys displayed on this menu depend upon your machine configuration. The Start Cycle button flashes.
5. Press the Start Cycle button. The machine moves only the axis or axes selected from the Home softkey menu at rapid traverse feedrate to home.

Warm Up the Machine and Spindle

Warming up an idle machine improves its performance. A machine that has been idle for at least an hour should be warmed up before cutting parts.

Follow this procedure to warm up the machine and spindle:

⚠️ Be sure the path is clear for the axis movement, including the tools and turret, before beginning this procedure.

1. Calibrate the axes, as described in Calibrate the Machine, on page 5-3.
2. Write a program that positions X and Z between the minimum and maximum travel values while running the spindle at 50% of its maximum RPM.
3. Use a pattern to run the program for the warm-up lasting 5-10 minutes.
4. Let the spindle run for a few minutes before stopping motion and beginning to program or run a part.
Jogging the Axes Manually

Follow these steps to manually jog the axes:

1. Select an axis with the Axis Select Switch.
2. Select a hand wheel multiplier key. The key illuminates when selected.
3. Use the Jog Feed Keys to jog the axis direction by selecting either + or –.
4. Override the programmed axis feedrate by turning the Jog Feed Override dial.
5. Rotate the Incremental Jog Wheel to manually jog the axes.

Indexing the Turret using Console Keys

To index the turret using the plus (+) or minus (-) Turret console keys,

1. Press the Manual console key to access the Manual screen.
2. Calibrate the machine. Refer to Calibrate the Machine, on page 5 - 3 for details.
3. Adjust the speed at which the turret moves using the Rapid Override console knob.

⚠️ On TMX, TMX MY, and TMX MYS machines the Rapid Override also affects the indexing speed of the turret; however, the Maximum Rapid rate set in Program Parameters does not affect the indexing speed of the turret.

When the Rapid Override is set at 0% the turret will still move as the override minimum for the turret indexing speed is 1%.

TMX machines
- Rapid Override at 100% - Turret rotates at approximately 42 RPM (Maximum Speed).
- Rapid Override at 1% - Turret rotates at approximately 0.42 RPM (Minimum Speed).

TMX MY and TMX MYS machines
- Rapid Override at 100% - Turret rotates at approximately 83 RPM (Maximum Speed).
- Rapid Override at 1% - Turret rotates at approximately 0.83 RPM (Minimum Speed).
4. Select the plus (+) or minus (-) Turret console key. The turret advances or reverses one station, depending upon the console key selection.

⚠️ If the CE Option is active and the enclosure door is open, you must press and hold the **Start Cycle** button while indexing the turret.

- The Tool/Station fields display the currently indexed station.
- The Tool field displays the first tool found that is also mapped to a station. If no station is mapped for the tool number, the software assigns the same number as the tool number to the station number.

Please refer to *Load Tools in Turret and Assign Tool Numbers, on page 4 - 9* for details about using the softkey selections available in the Manual screen, Set Active Tool menu.

**Manual Mode Operation**

Manual mode allows you to operate the machine manually for operations such as calibrating the machine, jogging the axes, loading tools, and setting up accessories. Press the **Manual** console key to display the Manual screen.

See the section for your machine type for information about the Manual screen:

- Two-Axis (TM Series) ............................................................. 5 - 8
- Live Tooling (TMM Series) ...................................................... 5 - 11
- Two-Axis Programmable Tailstock (TMX Series) ....................... 5 - 14
- Live-Tooling and Y-Axis Motion (TMX MY Series) ...................... 5 - 17
- Live-Tooling, Y-Axis Motion, and Sub-spindle (TMX MYS Series) .... 5 - 20
Two-Axis (TM Series)

The following Manual screen appears for Two-Axis (TM Series) machines.

Here is a sample TM Series Manual screen:

![Sample TM Series Manual screen](image)

**Figure 5-4. Two-Axis (TM Series) Manual screen**

**TM Series Manual Screen Fields**

These fields are available on the Manual screen:

- **MACHINE and PART**—displays the current position of each axis (depending upon your machine configuration) relative to machine and part zero. Refer to the Part Setup—Work Offsets, on page 4 - 11 for more information about setting Part Zero.
- **AXES STATUS**—displays Calibrated or Uncalibrated.
- **TOOL/STATION**—displays the currently indexed tool and its station number (pocket). Refer to Indexing the Turret using Console Keys, on page 5 - 6 for details about these fields.
- **SPINDLE RPM**—displays the current spindle RPM. This field is available for TM series machines.
- **FPM %**—displays the current Feedrate Per Minute percentage set with the Axis Feed Rate override knob.
- **RAP %**—displays the current Rapid Feedrate Per Minute percentage set with the Rapid override knob.
- **RPM%**—displays the current revolution per minute percentage set with the Spindle Speed override knob.
- **JOG %**—displays the current Jog Feedrate Per Minute percentage set with the Jog Feed override knob.
• **AXIS LIMIT SWITCHES:**—displays +X and +Z during calibration. In addition to the calibration verification, this field is also a diagnostic tool. Please refer to *Manual Turret Operation for TMX MY and TMX MY Series Machines, on page 5 - 43* for information about turret diagnostics.

• **FEED**—identifies the feedrate for this tool as either Inches per Minute (IPM) or Millimeters per Minute (MMPM) during Calibrate, Home Machine, and manual jog operations.

• **CONVEYOR**—displays Stopped, Forward, or Reverse. This field displays information based on the entry from the ACCESSORY OPERATIONS F4, CHIP CONVEYOR F1 softkey menu.

• **COOLANT**—displays On or Off based on the Coolant console key selection.

• **PARTS CATCHER**—displays Retracted, Advanced, or Unknown. This field displays information based on entries made in the ACCESSORY OPERATIONS F4, PARTS CATCHER F3 softkey menu. Unknown appears when neither Retracted or Advanced can be detected, if a fault is detected, or if the option is not active.

• **TAILSTOCK**—displays Retracted, Advanced, or Unknown. This field displays information based on entries made in the ACCESSORY OPERATIONS F4, TAILSTOCK F2 softkey menu. Unknown appears when neither Retracted or Advanced can be detected, if a fault is detected, or if the option is not active.

• **TOOL SETTER**—displays Retracted, Advanced, or Unknown. This field displays information based on entries made in the ACCESSORY OPERATIONS F4, Tool Setter F4 softkey menu. Unknown appears when neither Retracted or Advanced can be detected, if a fault is detected, or if the option is not active.

• **STEADY REST**—displays Clamped, Unclamped, or Unknown. This field displays only if the Steady Rest option is installed. Information is based on entries made in the ACCESSORY OPERATIONS F4, STEADY REST F8 softkey menu. Unknown appears when neither Clamped or Unclamped can be detected, if a fault is detected, or if the option is not active.

The STEADY REST LUBE DIAGNOSTICS F6 softkey accesses The Steady Rest Lube Diagnostics screen. Please refer to *Steady Rest Lubrication Diagnostics, on page 5 - 47* for details.

• **CHUCK STATE**—displays the main spindle chuck state as Closed or Opened and the chuck type as Collet, Internal, or External. These fields display information based on entries made in the CHUCK OPERATIONS F5 softkey menu. Refer to *Chuck Operations, on page 5 - 48* for details about this softkey menu.

• **CHUCKING TYPE**—displays the main spindle chuck type as Collet, Internal, or External. These fields display information based on entries made in the CHUCK OPERATIONS F5 softkey menu. Refer to *Chuck Operations, on page 5 - 48* for details about this softkey menu.

• **FOOTSWITCH MODE**—displays either Toggle or Hold-Open based on entries made in the CHUCK OPERATIONS F5 softkey menu. Refer to *Chuck Operations, on page 5 - 48* for details about this softkey menu.
TM Series Manual Screen Softkeys

These are the softkeys for Manual mode:

- **SET ACTIVE TOOL F1**—displays the Next Tool field and softkeys for setting turret positions and indexing the turret. Refer to Set Active Tool, on page 5 - 23 for details.

- **MANUAL FUNCTION SETUP F2**—displays axis feed, spindle speed, and spindle direction fields along with the Manual Function softkey menu. Please refer to Setting Jog Unit Parameters, on page 5 - 23 for details.

- **DIAGNOSTICS F3**—accesses the diagnostics softkey menu.
  - **TURRET DIAGNOSTICS F1**—allows you to perform turret diagnostics. Refer to Turret Diagnostics, on page 5 - 24 for details.
  - **LUBE F2**—accesses the Lube Diagnostics screen and the MANUAL LUBE F1 softkey for performing manual lubrication. Refer to Lube Diagnostics, on page 5 - 38 for details.
  - **CE DIAGNOSTICS F4**—accesses the CE Status & Diagnostics screen. Refer to CE Diagnostics, on page 5 - 39 for information about CE Diagnostics.
  - **INPUT/OUTPUT DIAGNOSTICS F5**—accesses the Input - Output Diagnostics screen. Refer to Input/Output Diagnostics, on page 5 - 42 for information about these diagnostics.

- **ACCESSORY OPERATIONS F4**—accesses options such as Chip Conveyor, Tailstock, Parts Catcher, Tool Setter, Auto Door, Steady Rest, Parts Conveyor, Oil Skimmer, Mist Collector, and Chuck Coolant. This menu provides active softkeys for each installed option.
  - Refer to Options, on page 1 - 1 in WinMax Lathe Options for programming information about these optional accessory operations.
  - Refer to the Turning Center Maintenance and Safety Manual for information about maintenance for the Accessory Operations.

- **CHUCK OPERATIONS F5**—accesses the softkey menu to open or close the chuck, set the chuck type, and set the footswitch mode.
  - Refer to Chuck Operations, on page 5 - 48 for information about operating the chuck.
  - Refer to Options, on page 1 - 1 in WinMax Lathe Options for programming information for the optional collet chuck.
  - Refer to the Turning Center Maintenance and Safety Manual for information about maintenance for the chuck.

- **TOGGLE WORKLIGHT F6**—turn the worklight located inside the machine on or off.

- **TOGGLE WASHDOWN GUN F7**—power the washdown gun located on the front right side of the machine on or off. When on, coolant will be on for the Washdown Gun when the door is open. The Washdown Gun is active when the Primary coolant is on.

- **CALIBRATE MACHINE F8**—establishes absolute zero for each axis on the turning center. See Calibrate the Machine, on page 5 - 3 for more information.
Live Tooling (TMM Series)

The following Manual screen appears for Live-Tooling (TMM Series) machines.

![Live Tooling (TMM Series) Manual screen](image)

**TMM Series Manual Screen Fields**

These fields are available on the Manual screen:

- **MACHINE and PART**—displays the current position of each axis (depending upon your machine configuration) relative to machine and part zero. Refer to the *Part Setup—Work Offsets, on page 4 - 11* for more information about setting Part Zero.
- **AXES STATUS**—displays Calibrated or Uncalibrated.
- **TOOL/STATION**—displays the currently indexed tool and its station number (pocket). Refer to *Indexing the Turret using Console Keys, on page 5 - 6* for details about these fields.
- **S1 RPM**—displays the current main spindle revolutions per minute. This setting is made with the Spindle 1 Speed override knob. This field is available for TMM series machines.
- **S2 RPM**—displays the current live-tooling spindle revolutions per minute. This setting is made with the Spindle 2 Speed override knob. This field is available for TMM series machines.
- **FPM %**—displays the current Feedrate Per Minute percentage set with the Axis Feed Rate override knob.
- **RAP %**—displays the current Rapid Feedrate Per Minute percentage set with the Rapid override knob.
- **JOG %**—displays the current Jog Feedrate Per Minute percentage set with the Jog Feed override knob.
• **S1 %**—displays the current spindle speed percentage for the main spindle. The % setting is made with the Spindle 1 Speed override knob. This field is available for TMM series machines.

• **S2 %**—displays the current spindle speed percentage for the live-tooling spindle. The % and RPM settings are made with the Spindle Speed 2 override knob. This field is available for TMM series machines.

• **AXIS LIMIT SWITCHES**:—displays +X and +Z during calibration. In addition to the calibration verification, this field is also a diagnostic tool. Please refer to *Manual Turret Operation for TMX MY and TMX MYS Series Machines*, on page 5 - 43 for information about turret diagnostics.

• **FEED**—identifies the feedrate for this tool as either Inches per Minute (IPM) or Millimeters per Minute (MMPM) during Calibrate, Home Machine, and manual jog operations.

• **CONVEYOR**—displays Stopped, Forward, or Reverse. This field displays information based on the entry from the ACCESSORY OPERATIONS F4, CHIP CONVEYOR F1 softkey menu.

• **COOLANT**—displays On or Off based on the Coolant console key selection.

• **PARTS CATCHER**—displays Retracted, Advanced, or Unknown. This field displays information based on entries made in the ACCESSORY OPERATIONS F4, PARTS CATCHER F3 softkey menu. Unknown appears when neither Retracted or Advanced can be detected, if a fault is detected, or if the option is not active.

• **TAILSTOCK**—displays Retracted, Advanced, or Unknown. This field displays information based on entries made in the ACCESSORY OPERATIONS F4, TAILSTOCK F2 softkey menu. Unknown appears when neither Retracted or Advanced can be detected, if a fault is detected, or if the option is not active.

• **TOOL SETTER**—displays Retracted, Advanced, or Unknown. This field displays information based on entries made in the ACCESSORY OPERATIONS F4, Tool Setter F4 softkey menu. Unknown appears when neither Retracted or Advanced can be detected, if a fault is detected, or if the option is not active.

• **STEADY REST**—displays Clamped, Unclamped, or Unknown. This field displays only if the Steady Rest option is installed. Information is based on entries made in the ACCESSORY OPERATIONS F4, STEADY REST F8 softkey menu. Unknown appears when neither Clamped or Unclamped can be detected, if a fault is detected, or if the option is not active.

The STEADY REST LUBE DIAGNOSTICS F6 softkey accesses The Steady Rest Lube Diagnostics screen. Please refer to *Steady Rest Lubrication Diagnostics*, on page 5 - 47 for details.

• **CHUCK STATE**—displays the main spindle chuck state as Closed or Opened and the chuck type as Collet, Internal, or External. These fields display information based on entries made in the CHUCK OPERATIONS F5 softkey menu. Refer to *Chuck Operations*, on page 5 - 48 for details about this softkey menu.

• **CHUCKING TYPE**—displays the main spindle chuck type as Collet, Internal, or External. These fields display information based on entries made in the CHUCK OPERATIONS F5 softkey menu. Refer to *Chuck Operations*, on page 5 - 48 for details about this softkey menu.

• **FOOTSWITCH MODE**—displays either Toggle or Hold-Open based on entries
made in the CHUCK OPERATIONS F5, More ➔ F7 softkey menu. Refer to Chuck Operations, on page 5 - 48 for details about this softkey menu.

- **SPINDLE CLAMPS**—displays the chuck state as On, Assist On, or Both Off. This field displays information based on entries made in the CHUCK OPERATIONS F5, More ➔ F7 softkey menu. Refer to Chuck Operations, on page 5 - 48 for details about this softkey menu.

**TMM Series Manual Screen Softkeys**

These are the softkeys for Manual mode:

- **SET ACTIVE TOOL** F1—displays the Next Tool field and softkeys for setting turret positions and indexing the turret. Refer to Set Active Tool, on page 5 - 23 for details.

- **MANUAL FUNCTION SETUP** F2—displays axis feed, spindle speed, and spindle direction fields along with the Manual Function softkey menu. Please refer to Setting Jog Unit Parameters, on page 5 - 23 for details.

- **DIAGNOSTICS** F3—accesses the diagnostics softkey menu:
  - **TURRET DIAGNOSTICS** F1—allows you to perform turret diagnostics. Refer to Turret Diagnostics, on page 5 - 24 for details.
  - **LUBE** F2—accesses the Lube Diagnostics screen and the MANUAL LUBE F1 softkey for performing manual lubrication. Refer to Lube Diagnostics, on page 5 - 38 for details.
  - **CE DIAGNOSTICS** F4—accesses the CE Status & Diagnostics screen. Refer to CE Diagnostics, on page 5 - 39 for information about CE Diagnostics.
  - **INPUT/OUTPUT DIAGNOSTICS** F5—accesses the Input - Output Diagnostics screen. Refer to Input/Output Diagnostics, on page 5 - 42 for information about these diagnostics.

- **ACCESSORY OPERATIONS** F4—accesses options such as Chip Conveyor, Tailstock, Parts Catcher, Tool Setter, Auto Door, Steady Rest, Parts Conveyor, Oil Skimmer, Mist Collector, and Chuck Coolant. This menu provides active softkeys for each installed option.
  - Refer to Options, on page 1 - 1 in WinMax Lathe Options for programming information about these optional accessory operations.
  - Refer to the Turning Center Maintenance and Safety Manual for information about maintenance for the Accessory Operations.

- **CHUCK OPERATIONS** F5—accesses the softkey menu to open or close the chuck, set the chuck type, and set the footswitch mode.
  - Refer to Chuck Operations, on page 5 - 48 for information.
  - Refer to Options, on page 1 - 1 in WinMax Lathe Options for programming information about the optional collet chuck.
  - Refer to the Turning Center Maintenance and Safety Manual for information about maintenance for the chuck.
- **TOGGLE WORKLIGHT** *F6*—turn the worklight located inside the machine on or off.

- **TOGGLE WASHDOWN GUN** *F7*—power the washdown gun located on the front right side of the machine on or off. When on, coolant will be on for the Washdown Gun when the door is open. The Washdown Gun is active when the Primary coolant is on.

- **CALIBRATE MACHINE** *F8*—establishes absolute zero for each axis on the turning center. See *Calibrate the Machine, on page 5 - 3* for more information.

## Two-Axis Programmable Tailstock (TMX Series)

The following Manual screen appears for Two-Axis Programmable Tailstock (TMX Series) machines.

![Figure 5–6. Two-Axis Programmable Tailstock (TMX Series) Manual screen](image)

### TMX Series Manual Screen Fields

These fields are available on the Manual screen:

- **MACHINE and PART**—displays the current position of each axis (depending upon your machine configuration) relative to machine and part zero. Refer to the *Part Setup—Work Offsets, on page 4 - 11* for more information about setting Part Zero.

- **AXES STATUS**—displays Calibrated or Uncalibrated.

- **TOOL/STATION**—displays the currently indexed tool and its station number (pocket). Refer to *Indexing the Turret using Console Keys, on page 5 - 6* for details about these fields.

- **WORK OFFSET**—displays the current Work Offset relative to Machine Zero. This field is available for TMX series machines.
• **S1 % and RPM**—displays the current spindle speed percentage for the main spindle. The adjacent RPM field displays the current main spindle revolutions per minute. The % and RPM settings are made with the Spindle Speed 1 override knob. This field is available for TMX series machines.

• **FPM %**—displays the current Feedrate Per Minute percentage set with the Axis Feed Rate override knob.

• **RAP %**—displays the current Rapid Feedrate Per Minute percentage set with the Rapid override knob.

• **JOG %**—displays the current Jog Feedrate Per Minute percentage set with the Jog Feed override knob.

• **FEED**—identifies the feedrate for this tool as either Inches per Minute (IPM) or Millimeters per Minute (MMPM) during Calibrate, Home Machine, and manual jog operations.

• **CONVEYOR**—displays Stopped, Forward, or Reverse. This field displays information based on the entry from the ACCESSORY OPERATIONS F4, CHIP CONVEYOR F1 softkey menu.

• **COOLANT**—displays On or Off based on the Coolant console key selection.

• **PARTS CATCHER**—displays Retracted, Advanced, or Unknown. This field displays information based on entries made in the ACCESSORY OPERATIONS F4, PARTS CATCHER F3 softkey menu. Unknown appears when neither Retracted or Advanced can be detected, if a fault is detected, or if the option is not active.

• **TOOL SETTER**—displays Retracted, Advanced, or Unknown. This field displays information based on entries made in the ACCESSORY OPERATIONS F4, Tool Setter F4 softkey menu. Unknown appears when neither Retracted or Advanced can be detected, if a fault is detected, or if the option is not active.

• **FOOTSWITCH MODE**—displays either Toggle or Hold-Open based on entries made in the CHUCK OPERATIONS F5, More ➔ F7 softkey menu. Refer to Chuck Operations, on page 5 - 48 for details about this softkey menu.

• **S1 CHUCK**—displays the main spindle chuck state as Closed or Opened and the chuck type as Collet, Internal, or External. These fields display information based on entries made in the CHUCK OPERATIONS F5, More ➔ F7 softkey menu. Refer to Chuck Operations, on page 5 - 48 for details about this softkey menu.

• **TAILSTOCK**—displays Retracted, Advanced, or Unknown. This field displays information based on entries made in the ACCESSORY OPERATIONS F4, TAILSTOCK F2 softkey menu. Unknown appears when neither Retracted or Advanced can be detected, if a fault is detected, or if the option is not active.

**TMX Series Manual Screen Softkeys**

These are the softkeys for Manual mode:

• **SET ACTIVE TOOL F1**—displays the Next Tool field and softkeys for setting turret positions and indexing the turret. Refer to Set Active Tool, on page 5 - 23 for details.

• **MANUAL FUNCTION SETUP F2**—displays axis feed, spindle speed, and spindle direction fields along with the Manual Function softkey menu. Please refer to Setting Jog Unit Parameters, on page 5 - 23 for details.
• **DIAGNOSTICS** *F3*—accesses the diagnostics softkey menu:
  • **TURRET DIAGNOSTICS** *F1*—allows you to perform turret diagnostics. Refer to *Turret Diagnostics, on page 5 - 24* for details.
  • **LUBE** *F2*—accesses the Lube Diagnostics screen and the MANUAL LUBE *F1* softkey for performing manual lubrication. Refer to *Lube Diagnostics, on page 5 - 38* for details.
  • **AXIS LIMIT SWITCHES** *F3*—displays the Axis Limit Switches screen with Axis Limits and Motor Load Percentages for each axis. Refer to *Axis Limit Switches, on page 5 - 39* for more information.
  • **CE DIAGNOSTICS** *F4*—accesses the CE Status & Diagnostics screen. Refer to *CE Diagnostics, on page 5 - 39* for information about CE Diagnostics.
  • **INPUT/OUTPUT DIAGNOSTICS** *F5*—accesses the Input - Output Diagnostics screen. Refer to *Input/Output Diagnostics, on page 5 - 42* for information about these diagnostics.
  • **ACCESSORY OPERATIONS** *F4*—accesses options such as Chip Conveyor, Tailstock, Parts Catcher, Tool Setter, Auto Door, Steady Rest, Parts Conveyor, Oil Skimmer, Mist Collector, and Chuck Coolant. This menu provides active softkeys for each installed option.
    • Refer to *Options, on page 1 - 1* in WinMax Lathe Options for programming information about these optional accessory operations.
    • Refer to the *Turning Center Maintenance and Safety Manual* for information about maintenance for the Accessory Operations.
  • **CHUCK OPERATIONS** *F5*—accesses the softkey menu to open or close the chuck, set the chuck type, and set the footswitch mode.
    • Refer to *Chuck Operations, on page 5 - 48* for information.
    • Refer to *Options, on page 1 - 1* in WinMax Lathe Options for programming information for the optional collet chuck.
    • Refer to the *Turning Center Maintenance and Safety Manual* for information about maintenance for the chuck.
  • **TOGGLE WORKLIGHT** *F6*—turn the worklight located inside the machine on or off.
  • **TOGGLE WASHDOWN GUN** *F7*—power the washdown gun located on the front right side of the machine on or off. When on, coolant will be on for the Washdown Gun when the door is open. The Washdown Gun is active when the Primary coolant is on.
  • **CALIBRATE MACHINE** *F8*—establishes absolute zero for each axis on the turning center. See *Calibrate the Machine, on page 5 - 3* for more information.
Live-Tooling and Y-Axis Motion (TMX MY Series)

The following Manual screen appears for Live-Tooling and Y-Axis Motion (TMX MY Series) machines.

![Manual Screen Image](image)

**Figure 5–7. Live-Tooling and Y-Axis Motion (TMX MY Series) Manual screen**

**TMX MY Series Manual Screen Fields**

These fields are available on the Manual screen:

- **MACHINE and PART**—displays the current position of each axis (depending upon your machine configuration) relative to machine and part zero. Refer to the *Part Setup—Work Offsets, on page 4 - 11* for more information about setting Part Zero.

- **AXES STATUS**—displays Calibrated or Uncalibrated.

- **TOOL/STATION**—displays the currently indexed tool and its station number (pocket). Refer to *Indexing the Turret using Console Keys, on page 5 - 6* for details about these fields.

- **WORK OFFSET**—displays the current Work Offset relative to Machine Zero. This field is available for TMX MY series machines.

- **S1 % and RPM**—displays the current spindle speed percentage for the main spindle. The adjacent RPM field displays the current main spindle revolutions per minute. The % and RPM settings are made with the Spindle Speed 1 override knob. This field is available for TMX MY series machines.

- **S2 % and RPM**—displays the current spindle speed percentage for the live-tooling spindle. The adjacent RPM field displays the current live-tooling spindle revolutions per minute. The % and RPM settings are made with the Spindle Speed 2 override knob. This field is available for TMX MY series machines.
- **FPM %**—displays the current Feedrate Per Minute percentage set with the Axis Feed Rate override knob.

- **RAP %**—displays the current Rapid Feedrate Per Minute percentage set with the Rapid override knob.

- **JOG %**—displays the current Jog Feedrate Per Minute percentage set with the Jog Feed override knob.

- **FEED**—identifies the feedrate for this tool as either Inches per Minute (IPM) or Millimeters per Minute (MMPM) during Calibrate, Home Machine, and manual jog operations.

- **CONVEYOR**—displays Stopped, Forward, or Reverse. This field displays information based on the entry from the ACCESSORY OPERATIONS F4, CHIP CONVEYOR F1 softkey menu.

- **COOLANT**—displays On or Off based on the Coolant console key selection.

- **PARTS CATCHER**—displays Retracted, Advanced, or Unknown. This field displays information based on entries made in the ACCESSORY OPERATIONS F4, PARTS CATCHER F3 softkey menu. Unknown appears when neither Retracted or Advanced can be detected, if a fault is detected, or if the option is not active.

- **TOOL SETTER**—displays Retracted, Advanced, or Unknown. This field displays information based on entries made in the ACCESSORY OPERATIONS F4, Tool Setter F4 softkey menu. Unknown appears when neither Retracted or Advanced can be detected, if a fault is detected, or if the option is not active.

- **FOOTSWITCH MODE**—displays either Toggle or Hold-Open based on entries made in the CHUCK OPERATIONS F5, More ➔ F7 softkey menu. Refer to *Chuck Operations, on page 5 - 48* for details about this softkey menu.

- **S1 CHUCK**—displays the main spindle chuck state as Closed or Opened and the chuck type as Collet, Internal, or External. These fields display information based on entries made in the CHUCK OPERATIONS F5, More ➔ F7 softkey menu. Refer to *Chuck Operations, on page 5 - 48* for details about this softkey menu.

- **S1 SPINDLE CLAMP**—displays the main spindle chuck state as On or Off. This field displays information based on entries made in the CHUCK OPERATIONS F5, More ➔ F7 softkey menu. Refer to *Chuck Operations, on page 5 - 48* for details about this softkey menu.

- **TAILSTOCK**—displays Retracted, Advanced, or Unknown. This field displays information based on entries made in the ACCESSORY OPERATIONS F4, TAILSTOCK F2 softkey menu. Unknown appears when neither Retracted or Advanced can be detected, if a fault is detected, or if the option is not active.
**TMX MY Series Manual Screen Softkeys**

These are the softkeys for Manual mode:

- **SET ACTIVE TOOL** $F_1$—displays the Next Tool field and softkeys for setting turret positions and indexing the turret. Refer to *Set Active Tool, on page 5 - 23* for details.

- **MANUAL FUNCTION SETUP** $F_2$—displays axis feed, spindle speed, and spindle direction fields along with the Manual Function softkey menu. Please refer to *Setting Jog Unit Parameters, on page 5 - 23* for details.

- **DIAGNOSTICS** $F_3$—accesses the diagnostics softkey menu:
  - **TURRET DIAGNOSTICS** $F_1$—allows you to perform turret diagnostics. Refer to *Turret Diagnostics, on page 5 - 24* for details.
  - **LUBE** $F_2$—accesses the Lube Diagnostics screen and the MANUAL LUBE $F_1$ softkey for performing manual lubrication. Refer to *Lube Diagnostics, on page 5 - 38* for details.
  - **AXIS LIMIT SWITCHES** $F_3$—displays the Axis Limit Switches screen with Axis Limits and Motor Load Percentages for each axis. Refer to *Axis Limit Switches, on page 5 - 39* for details.
  - **CE DIAGNOSTICS** $F_4$—accesses the CE Status & Diagnostics screen. Refer to *CE Diagnostics, on page 5 - 39* for information about CE Diagnostics.
  - **INPUT/OUTPUT DIAGNOSTICS** $F_5$—accesses the Input - Output Diagnostics screen. Refer to *Input/Output Diagnostics, on page 5 - 42* for information about these diagnostics.

- **ACCESSORY OPERATIONS** $F_4$—accesses options such as Chip Conveyor, Tailstock, Parts Catcher, Tool Setter, Auto Door, Steady Rest, Parts Conveyor, Oil Skimmer, Mist Collector, and Chuck Coolant. This menu provides active softkeys for each installed option. *Accessory Operations, on page 5 - 47*
  - Refer to the *Options, on page 1 - 1* in WinMax Lathe Options for programming information about these optional accessory operations.
  - Refer to the *Turning Center Maintenance and Safety Manual* for information about maintenance for the Accessory Operations.

- **CHUCK OPERATIONS** $F_5$—accesses the softkey menu to open or close the chuck, set the chuck type, and set the footswitch mode.
  - Refer to *Chuck Operations, on page 5 - 48* for information about operating the chuck.
  - Refer to *Options, on page 1 - 1* in WinMax Lathe Options for programming information for the optional collet chuck.
  - Refer to the *Turning Center Maintenance and Safety Manual* for information about maintenance for the chuck.

- **TOGGLE WORKLIGHT** $F_6$—turn the worklight located inside the machine on or off.

- **TOGGLE WASHDOWN GUN** $F_7$—power the washdown gun located on the front right side of the machine on or off. When on, coolant will be on for the Washdown Gun when the door is open. The Washdown Gun is active when the Primary coolant is on.
• **CALIBRATE MACHINE** F8—establishes absolute zero for each axis on the turning center. See *Calibrate the Machine, on page 5 - 3* for more information.

**Live-Tooling, Y-Axis Motion, and Sub-spindle (TMX MYS Series)**

The following Manual screen appears for Live-Tooling, Y-Axis Motion, and Sub-spindle (TMX MYS) Series machines.

![Figure 5–8. Live-Tooling, Y-Axis Motion, and Sub-spindle (TMX MYS Series) Manual screen](image)

**TMX MYS Series Manual Screen Fields**

These fields are available on the Manual screen:

- **MACHINE and PART**—displays the current position of each axis (depending upon your machine configuration) relative to machine and part zero. Refer to the *Part Setup—Work Offsets, on page 4 - 11* for more information about setting Part Zero.

- **AXES STATUS**—displays Calibrated or Uncalibrated.

- **TOOL/STATION**—displays the currently indexed tool and its station number (pocket). Refer to *Indexing the Turret using Console Keys, on page 5 - 6* for details about these fields.

- **WORK OFFSET**—displays the current Work Offset relative to Machine Zero. This field is available for TMX MYS series machines.

- **S1 %** and **RPM**—displays the current spindle speed percentage for the main spindle. The adjacent RPM field displays the current main spindle revolutions per minute. The % and RPM settings are made with the Spindle Speed 1 override knob. This field is available for TMX MY series machines.
• **S2 % and RPM**—displays the current spindle speed percentage for the live-tooling spindle. The adjacent RPM field displays the current live-tooling spindle revolutions per minute. The % and RPM settings are made with the Spindle Speed 2 override knob. This field is available for TMX MY series machines.

• **S3 % and RPM**—displays the current spindle speed percentage for the sub-spindle. The adjacent RPM field displays the current sub-spindle revolutions per minute. The % and RPM settings are made with the S1/S3 2 override knob. This field is available for TMX MY series machines.

• **FPM %**—displays the current Feedrate Per Minute percentage set with the Axis Feed Rate override knob.

• **RAP %**—displays the current Rapid Feedrate Per Minute percentage set with the Rapid override knob.

• **JOG %**—displays the current Jog Feedrate Per Minute percentage set with the Jog Feed override knob.

• **FEED**—identifies the feedrate for this tool as either Inches per Minute (IPM) or Millimeters per Minute (MMPM) during Calibrate, Home Machine, and manual jog operations.

• **CONVEYOR**—displays Stopped, Forward, or Reverse. This field displays information based on the entry from the ACCESSORY OPERATIONS F4, CHIP CONVEYOR F1 softkey menu.

• **COOLANT**—displays On or Off based on the Coolant console key selection.

• **PARTS CATCHER**—displays Retracted, Advanced, or Unknown. This field displays information based on entries made in the ACCESSORY OPERATIONS F4, PARTS CATCHER F3 softkey menu. Unknown appears when neither Retracted or Advanced can be detected, if a fault is detected, or if the option is not active.

• **TOOL SETTER**—displays Retracted, Advanced, or Unknown. This field displays information based on entries made in the ACCESSORY OPERATIONS F4, Tool Setter F4 softkey menu. Unknown appears when neither Retracted or Advanced can be detected, if a fault is detected, or if the option is not active.

• **FOOTSWITCH MODE**—displays either Toggle or Hold-Open based on entries made in the CHUCK OPERATIONS F5, More ➔ F7 softkey menu. Refer to Chuck Operations, on page 5 - 48 for details about this softkey menu.

• **S1 CHUCK**—displays the main spindle chuck state as Closed or Opened and the chuck type as Collet, Internal, or External. These fields display information based on entries made in the CHUCK OPERATIONS F5, More ➔ F7 softkey menu. Refer to Chuck Operations, on page 5 - 48 for details about this softkey menu.

• **S1 SPINDLE CLAMP**—displays the main spindle chuck state as On or Off. This field displays information based on entries made in the CHUCK OPERATIONS F5, More ➔ F7 softkey menu. Refer to Chuck Operations, on page 5 - 48 for details about this softkey menu.

• **S3 CHUCK**—displays the sub-spindle chuck state as Closed or Opened and the chuck type as Collet, Internal, or External. These fields display information based on entries made in the CHUCK OPERATIONS F5, More ➔ F7 softkey menu. Refer to Chuck Operations, on page 5 - 48 for details about this softkey menu.
• **S3 SPINDLE CLAMP**—displays the sub-spindle chuck state as On or Off. This field displays information based on entries made in the CHUCK OPERATIONS F5, More  F7 softkey menu. Refer to Chuck Operations, on page 5 - 48 for details about this softkey menu.

**TMX MYS Series Manual Screen Softkeys**

These are the softkeys for Manual mode:

- **SET ACTIVE TOOL F1**—displays the Next Tool field and softkeys for setting turret positions and indexing the turret. Refer to Set Active Tool, on page 5 - 23 for details.

- **MANUAL FUNCTION SETUP F2**—displays axis feed, spindle speed, and spindle direction fields along with the Manual Function softkey menu. Please refer to Setting Jog Unit Parameters, on page 5 - 23 for details.

- **DIAGNOSTICS F3**—accesses the diagnostics softkey menu:
  - **TURRET DIAGNOSTICS F1**—allows you to perform turret diagnostics. Refer to Turret Diagnostics, on page 5 - 24 for details.
  - **LUBE F2**—accesses the Lube Diagnostics screen and the MANUAL LUBE F1 softkey for performing manual lubrication. Refer to Lube Diagnostics, on page 5 - 38 for details.
  - **AXIS LIMIT SWITCHES F3**—displays the Axis Limit Switches screen with Axis Limits and Motor Load Percentages for each axis. Refer to Axis Limit Switches, on page 5 - 39 for details.
  - **CE DIAGNOSTICS F4**—accesses the CE Status & Diagnostics screen. Refer to CE Diagnostics, on page 5 - 39 for information about CE Diagnostics.
  - **INPUT/OUTPUT DIAGNOSTICS F5**—accesses the Input - Output Diagnostics screen. Refer to Input/Output Diagnostics, on page 5 - 42 for information about these diagnostics.

- **ACCESSORY OPERATIONS F4**—accesses options such as Chip Conveyor, Tailstock, Parts Catcher, Tool Setter, Auto Door, Steady Rest, Parts Conveyor, Oil Skimmer, Mist Collector, Chuck Coolant, and Part Ejector. This menu provides active softkeys for each installed option.
  - Refer to the Options, on page 1 - 1 in WinMax Lathe Options for programming information about these optional accessory operations.
  - Refer to the Turning Center Maintenance and Safety Manual for information about maintenance for the Accessory Operations.

- **CHUCK OPERATIONS F5**—accesses the softkey menu to open or close the chuck, set the chuck type, and set the footswitch mode.
  - Refer to Chuck Operations, on page 5 - 48 for information about operating the chuck.
  - Refer to the Options, on page 1 - 1 in WinMax Lathe Options for programming information for the optional collet chuck.
  - Refer to the Turning Center Maintenance and Safety Manual for information about maintenance for the chuck.

- **TOGGLE WORKLIGHT F6**—turn the worklight located inside the machine on or off.
• **TOGGLE WASHDOWN GUN**  
  F7—power the washdown gun located on the front right side of the machine on or off. When on, coolant will be on for the Washdown Gun when the door is open. The Washdown Gun is active when the Primary coolant is on.

• **CALIBRATE MACHINE**  
  F8—establishes absolute zero for each axis on the turning center. See *Calibrate the Machine, on page 5 - 3* for more information.

**Set Active Tool**

The Set Active Tool  
  F1 softkey accesses the **Next Tool** field on the Manual screen. In addition, the following softkey menu appears for setting the tool number and indexing the turret.

Please refer to *Part and Tool Loading, on page 4 - 7* for details about setting the active tool and indexing the turret. Refer to *Load Tools in Turret and Assign Tool Numbers, on page 4 - 9* for details about using the softkey selections available in the Manual screen, Set Active Tool menu. You may also select turret positions by indexing forward and reverse with the + (plus) or - (minus) Turret console keys.

**Setting Jog Unit Parameters**

The Jog Unit Parameters (axis jog feed, spindle speed, and spindle direction) are valid in Manual mode or Part and Tool Setup. To access these fields,

1. Press the **Manual** console key to display the Manual screen.

2. Press the **MANUAL FUNCTION SETUP**  
  F2 softkey. The Jog Unit fields appear:

   • **Jog Feed**—enter the desired manual jog axis feedrate. The feedrate can range from the maximum axis feedrate down to 1% of the maximum axis feedrate. The feedrate varies depending on the machine type.

   Note that not all axes may have the same maximum feedrate. Setting the Jog Feed to a value greater than the maximum feedrate of an axis will only jog that axis at its maximum feedrate.

   For example, the X axis on a machine has a maximum jog feedrate of 787 inches per minute (ipm). The Z axis has a maximum jog feedrate of 100 ipm, Jog Feed is set to 787 ipm. Without using the jog feedrate override, the X axis can jog at 787 ipm, but the Z axis is limited at 100 ipm.

   • **Spindle Speed**—enter the spindle speed RPM used when the Spindle On console key is pressed. This value cannot be greater than the machine’s maximum spindle speed.

   • **Spindle Direction**—select CW or CCW direction for right-hand and left-hand tools, respectively.
Manual Function Setup Softkeys

- **ORIENT MAIN SPINDLE** F3—appears when the cursor is in the Spindle Direction field for TMX MYS machines. Select this softkey to orient the Main spindle to the 0° position. This feature moves the spindle to the known 0° position and locks the spindle in place.

- **LOW GEAR** F3—sets the Main Spindle to Low Gear Range (Minimum RPM = 5; Maximum RPM = 600). The softkey appears when the cursor is in the Spindle Direction field for TM18 machines.

- **HIGH GEAR** F4—sets the Main Spindle to High Gear Range (Minimum RPM = 15; Maximum RPM = 1600). The softkey appears when the cursor is in the Spindle Direction field for TM18 machines.

- **HOME** F6—accesses the Home Machine softkey menu. Refer to *Home the Machine*, on page 5 - 5 for details.

- **TOGGLE WORKLIGHT** F7—turns the worklight inside the enclosure on or off.

Diagnostics

To perform diagnostics,

1. Press the **Manual** console key to access the Manual screen.
2. Select the **DIAGNOSTICS** F3 softkey to access the diagnostics softkey menu. These diagnostic functions are available:
   - **Turret Diagnostics**, on page 5 - 24
   - **Lube Diagnostics**, on page 5 - 38
   - **Axis Limit Switches**, on page 5 - 39
   - **CE Diagnostics**, on page 5 - 39
   - **Input/Output Diagnostics**, on page 5 - 42

Turret Diagnostics

To perform Turret Diagnostics and move the turret manually in single moves, select the DIAGNOSTICS F3 softkey in Manual mode. Select the TURRET DIAGNOSTICS F1 softkey to access the Turret Diagnostics screen for your machine configuration.

For TMM, TMX, TMX MY, and TMX MYS machines, a message appears after selecting the TURRET DIAGNOSTICS F1 softkey. The message is about referencing the turret before exiting the Turret Diagnostics screen to resume normal machine operation. Select the REFERENCE TURRET F2 softkey to perform this function.

Refer to the appropriate section below for your machine configuration for information about performing turret diagnostics.

- **TM Series Machines** ............................................................... 5 - 25
- **TMM Series Machines** ........................................................... 5 - 28
- **TMX Series Machines** ............................................................ 5 - 32
- **TMX MY and TMX MYS Series Machines** ............................... 5 - 35
TM Series Machines

The following Turret Diagnostics screen appears for Two-Axis (TM Series) machines.

![Turret Diagnostics Screen](image)

Figure 5–9. TM Series Turret Diagnostics screen

Machines equipped with CE interlocks require two people to complete some procedures. In addition, machines equipped with CE interlocks require the guard doors to be closed in order to power on the machine.

TM Series Turret Diagnostics Fields

Simulated indicator lights will display green when inputs or outputs are active and red when inactive. The fields on the Turret Diagnostics screen are defined as follows:

TM Series Output Command Fields

The Start Cycle button must be pressed for the corresponding softkey to activate the output. The softkeys allow the turret to be moved one step at a time.

- **INDEX FORWARD**—indicates the state of the forward output after pressing the INDEX TURRET FORWARD F5 softkey.
- **INDEX REVERSE**—indicates the state of the reverse output after pressing the INDEX TURRET REVERSE F6 softkey.
- **CLAMP TURRET**—verifies the turret is clamped when the indicator is green.
- **UNCLAMP TURRET**—verifies the turret is unclamped when the indicator is green.
- **ACTIVE TURRET STATION**—identifies the active turret station.
TM Series Input Status Fields

- **TURRET CLAMPED**—verifies the input is active when the indicator is green; verifies the turret is unclamped when the indicator is red.

- **TURRET IN-POSITION**—verifies the turret is at a valid station, either clamped or unclamped, when the indicator is green; verifies the turret is not at a valid station when the indicator is red.

- **POSITION **“A”, “B”, “C”, “D”**—verifies the sensor state for decoding the turret position. The combination of ABCD sensor inputs determines the turret position.

Refer to the following table to see which Position Sensors match each Turret Position.

### TM Series Turret Diagnostics Position Sensor Status

The following table shows which Position fields are active for each turret position:

<table>
<thead>
<tr>
<th>Turret Position</th>
<th>Active Tool</th>
<th>Position Sensor Status 10 Station</th>
<th>Position Sensor Status 12 Station</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>A B</td>
<td>A</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>C D</td>
<td>C</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>A B</td>
<td>B</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>A C D</td>
<td>A D</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>B C</td>
<td>A C</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>B D</td>
<td>B C</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>A D</td>
<td>A B D</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>A C</td>
<td>A C D</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>A B C</td>
<td>A B C</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>B C D</td>
<td>B C D</td>
</tr>
<tr>
<td>11</td>
<td>11</td>
<td>Not applicable</td>
<td>B D</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>Not applicable</td>
<td>D</td>
</tr>
</tbody>
</table>

*Table 5-1. Position Sensor Status*

When the turret is in the proper position and ready to operate in other modes, the following **Input Status fields** will have green indicators:

- TURRET CLAMPED
- TURRET IN-POSITION
- POSITIONS as appropriate according to the Position Sensor Status

In addition to the Input indicators, the **Output CLAMP TURRET** indicator will be green.
TM Series Turret Diagnostics Softkeys

When a Turret Diagnostics softkey is pressed, the Start Cycle button flashes. The Turret Diagnostics softkeys perform these functions after the Start Cycle button is pressed, activating the selected function:

- **CLAMP TURRET F3**—signals the turret to clamp by enabling the CLAMP TURRET Output. Upon completion of the operation, this state is indicated by both the Input TURRET CLAMPED and the Output CLAMP TURRET indicators turning green.

- **UNCLAMP TURRET F4**—signals the turret to unclamp by enabling the UNCLAMP TURRET Output. Upon completion of the operation, this state is indicated by both the Input TURRET UNCLAMPED and the Output UNCLAMP TURRET indicators turning green.

- **INDEX TURRET FORWARD F5**—increments the turret by one position. The appropriate Position Sensors turn green.

- **INDEX TURRET REVERSE F6**—decrements the turret by one position. The appropriate Position Sensors turn green.

When the turret is unclamped and the Tool Change/Turret Index routine is not running, the axes systems are immediately placed in a Feed Hold condition, prohibiting all axis motion. When Feed Hold is active, you cannot move the Turret using the +/- Console Jog keys.

To clear the Feed Hold condition and allow movement of the turret with the +/- Console Jog keys,

1. Press the Feed Hold button, putting it in the down/latched position.
2. Press the Feed Hold button again to release it and put it back in the up/unlatched position. The button’s light turns off, indicating the Feed Hold condition has been cleared.
**TMM Series Machines**

The following Turret Diagnostics screen appears for Live-Tooling (TMM Series) machines.

![Turret Diagnostics Screen](image)

> **Figure 5–10. TMM Series Turret Diagnostics screen**

Machines equipped with CE interlocks require two people to complete some procedures. In addition, machines equipped with CE interlocks require the guard doors to be closed in order to power on the machine.

**TMM Series Turret Diagnostics Fields**

Simulated indicator lights will display green when inputs or outputs are active and red when inactive. The fields on the Turret Diagnostics screen are defined as follows:

**TMM Series Output Command Fields**

The Start Cycle button must be pressed for the corresponding softkey to activate the output. The softkeys allow the turret to be moved one step at a time.

- **PBIT-01, PBIT-02, PBIT-04, PBIT-08, PBIT-16**—indicates the turret index position when the turret controller is in either Mode-01, Mode-02, or Mode-03.
- **Parity Bit**—indicates parity in binary code for requested turret position codes. The turret controller requires an even-numbered parity command. The Parity Bit is used to meet this requirement.
• **MODE-01, MODE-02, MODE-03**—indicates the turret mode selected in binary code. The following turret modes are supported:
  
  • 0 = Turret Motion Stop / Fault Reset
  • 1 = Automatic Mode Set Index Direction to Shortest Path
  • 2 = Automatic Mode Set Index Direction to CW Direction
  • 3 = Automatic Mode Set Index Direction to CCW direction

• **PTAB-01**—verifies an 8 tool turret is in use when the indicator is green.
• **PTAB-02**—verifies a 12 tool turret is in use when the indicator is green.
• **PTAB-03**—verifies Low or High inertia turret.
  
  • The system is set to Low (Standard) Inertia when the indicator is green.
  • The system is set to High Inertia when the indicator is off.

• **SPEEDSEL**—indicates Standard or Maintenance index speed.
  
  • The system is set to Standard Speed when the indicator is green.
  • The system is set to Maintenance Speed when the indicator is off.

• **PSTART**—signals the start of the Turret Index cycle.
• **ORIENT SP**—signals the start of the Spindle Orient cycle.

### TMM Series Input Status Fields

• **TURRET CLAMPED**—verifies the input is active when the indicator is green; verifies the turret is unclamped when the indicator is red.

• **TURRET IN-POSITION**—verifies the turret is at a valid station, either clamped or unclamped, when the indicator is green; verifies the turret is not at a valid station when the indicator is red.

• **POSITION BIT1, BIT2, BIT4, BIT8, BIT16**—indicates the sensor state for decoding the turret position. The combination of BIT sensor inputs determines the turret position. If the Turret Controller reports an alarm, then the indicator next to the position bit containing the alarm turns green. This action determines the 1 digit (xX) in the Alarm Code.

• **ALARM BIT1, BIT2, BIT4**—sends binary code alarms to the control. If the Turret Controller reports an alarm, then the indicator next to the alarm bit containing the alarm turns green. This action determines the 10 digit (XX) in the Alarm Code.

• **SP ORIENT COMPLETE**—indicates the spindle is in position for the turret to index.

• **ACTIVE TOOL**—indicates the active tool turret position upon completion of a successful Turret Reference/Calibration process.
TMM Series Turret Diagnostics Position Sensor Status

The following table shows which Position fields are active for each turret position:

Refer to the following table to see which Position Sensors match each Turret Position.

<table>
<thead>
<tr>
<th>Turret Position</th>
<th>Active Tool</th>
<th>Position Sensor Bit Status 12 Station</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>1, 2</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
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<td>4, 8</td>
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</tbody>
</table>

Table 5–2. Position Sensor Bit Status

When the turret is in the proper position and ready to operate in other modes, the following Input Status fields will have green indicators:

- TURRET CLAMPED
- TURRET IN-POSITION
- POSITION BITs as appropriate according to the Position Sensor Status
- SP ORIENT COMPLETE

TMM Series Turret Diagnostics Softkeys

When a Turret Diagnostics softkey is pressed, the Start Cycle button flashes. The Turret Diagnostics softkeys perform these functions after the Start Cycle button is pressed, activating the selected function:

- ORIENT LT SPINDLE $F1$—signals the turret to index to the Orient Position. Upon completion of the operation, the SP ORIENT COMPLETE indicator turns green.

- REFERENCE TURRET $F2$—signals the turret to index to Station 1. Upon completion of the operation, the TURRET CLAMPED, TURRET IN-POSITION, TURRET POSITION BIT1 indicators turn green.

⚠️ The turret must be referenced prior to exiting the Turret Diagnostics screen.
• **CLAMP TURRET** $F3$—signals the turret to clamp by enabling the CLAMP TURRET Output. Upon completion of the operation, this state is indicated by both the Input TURRET CLAMPED and the Output CLAMP TURRET indicators turning green.

• **UNCLAMP TURRET** $F4$—signals the turret to unclamp by enabling the UNCLAMP TURRET Output. Upon completion of the operation, this state is indicated by both the Input TURRET UNCLAMPED and the Output UNCLAMP TURRET fields turning green.

• **INDEX TURRET FORWARD** $F5$—increments the turret by one position. The appropriate Position Sensors turn green.

  The turret must be Unclamped before executing this command.

• **INDEX TURRET REVERSE** $F6$—decrements the turret by one position. The appropriate Position Sensors turn green.

  The turret must be Unclamped before executing this command.

When the turret is unclamped and the Tool Change/Turret Index routine is not running, the axes systems are immediately placed in a Feed Hold condition, prohibiting all axis motion. When Feed Hold is active, you cannot move the Turret using the +/- Console Jog keys.

To clear the Feed Hold condition and allow movement of the turret with the +/- Console Jog keys,

1. Press the **Feed Hold** button, putting it in the down/latched position.
2. Press the **Feed Hold** button again to release it and put it back in the up/unlatched position. The button’s light turns off, indicating the Feed Hold condition has been cleared.

• **ACTIVATE TIMED FAULT BYPASS** $F7$—activates a timed bypass, lasting two minutes, to allow you to jog axes when the turret is not at Home position. Following the timed delay, the machine returns to a protected mode.
**TMX Series Machines**

The following Turret Diagnostics screen appears for Two-Axis Programmable Tailstock (TMX series) machines:

![TMX Turret Diagnostics Screen](image)

**Figure 5–11. TMX Series Turret Diagnostics screens**

Machines equipped with CE interlocks require two people to complete some procedures. In addition, machines equipped with CE interlocks require the guard doors to be closed in order to power on the machine.

**TMX Turret Diagnostics Fields**

Simulated indicator lights will display green when inputs or outputs are active and red when inactive. The fields on the Turret Diagnostics screen are defined as follows:

**TMX Series Output Command Fields**

The **Start Cycle** button must be pressed for the corresponding softkey to activate the output. The softkeys allow the turret to be moved one step at a time.

- **CLAMP TURRET**—verifies the Clamp Turret command has been enabled and the output to clamp the turret is active when the indicator is green.
- **UNCLAMP TURRET**—verifies the Unclamp Turret command has been enabled and the output to clamp the turret is active when the indicator is green.
- **JOG KEY STATUS**—verifies the Jog Keys on the console have been activated for manually jogging the turret command has been enabled when the indicator is green.
TMX Series Input Status Fields

- **TURRET REFERENCE SWITCH**—verifies the turret is in position to activate the reference switch which is used to calibrate the turret to Station #1 when the indicator is active (green).

- **TURRET CLAMPED**—verifies the turret is clamped when the indicator is active (green).

  You must execute a Turret Reference cycle prior to leaving the diagnostic screen to ensure the turret is in the proper position.

- **TURRET UNCLAMPED**—verifies the turret is unclamped when the indicator is active (green) and the turret is not in proper position and is not ready to operate in other modes unless this indicator is inactive (red).

Turret Motor Load Meter

The Turret Motor Load Meter shows the motor load percentage for the servo-driven turret. The range of values that will be displayed is +/- 200%. As the motor load increases, the meter changes from blue to green to yellow to red.

*TMX Series Turret Diagnostics Softkeys*

When a Turret Diagnostics softkey is pressed, the **Start Cycle** button flashes.

The Turret Diagnostics softkeys perform these functions after the **Start Cycle** button is pressed, activating the selected function:

- **REFERENCE TURRET** *F2*—signals the turret to index to Station #1. Upon completion of the operation, the Input TURRET REFERENCE SWITCH indicator turns green and the turret clamps.

  The turret must be referenced prior to exiting the Turret Diagnostics screen.

- **CLAMP TURRET** *F3*—signals the turret to clamp by enabling the CLAMP TURRET Output. Upon completion of the operation, this state is indicated by both the Input TURRET CLAMPED and the Output CLAMP TURRET indicators turning green.

- **UNCLAMP TURRET** *F4*—signals the turret to unclamp by enabling the UNCLAMP TURRET Output. Upon completion of the operation, this state is indicated by both the Input TURRET UNCLAMPED and the Output UNCLAMP TURRET indicators turning green and the Feed Hold button is activated and lights.

- **INDEX TURRET FORWARD** *F5*—increments the turret forward by one position.

  The turret must be Unclamped before executing this command.
• **INDEX TURRET REVERSE** *F6*—increments the turret backward by one position.

⚠️ The turret must be Unclamped before executing this command.

• **TOGGLE JOG KEYS** *F7*—toggles the Jog console keys - (minus) and + (plus) On and Off. Use this feature in conjunction with the override dials to move the turret one step at a time. When active the JOG KEY STATUS Output indicator turns green.

When the turret is in the proper position and ready to operate in other modes, the following Inputs will have active indicators (green):

• **TURRET REFERENCE SWITCH**

• **TURRET CLAMPED**

⚠️ When the turret is unclamped and the Tool Change/Turret Index routine is not running, the axes systems are immediately placed in a Feed Hold condition, prohibiting all axis motion. When Feed Hold is active, you cannot move the Turret using the +/- Console Jog keys.

To clear the Feed Hold condition and allow movement of the turret with the +/- Console Jog keys,

1. Select the Toggle Jog Keys *F7* softkey on the Turret Diagnostics softkey menu. The Jog Key Status output indicator turns green.
2. Press the **Feed Hold** button, putting it in the down/latched position.
3. Press the **Feed Hold** button again to release it and put it back in the up/unlatched position. The button’s light turns off, indicating the Feed Hold condition has been cleared.
4. Jog the turret using the +/- Console Jog keys.
**TMX MY and TMX MYS Series Machines**

The following Turret Diagnostics screen appears for Live-Tooling and Y-Axis Motion (TMX MY) and Live-Tooling, Y-Axis Motion, and Sub-spindle (TMX MYS) Series machines:

![Figure 5–12. TMX MY Series Turret Diagnostics screens](image)

Machines equipped with CE interlocks require two people to complete some procedures. In addition, machines equipped with CE interlocks require the guard doors to be closed in order to power on the machine.

**TMX MY and TMX MYS Turret Diagnostics Fields**

Simulated indicator lights will display green when inputs or outputs are active and red when inactive. The fields on the Turret Diagnostics screen are defined as follows:

**TMX MY and TMX MYS Series Output Command Fields**

The **Start Cycle** button must be pressed for the corresponding softkey to activate the output. The softkeys allow the turret to be moved one step at a time.

- **CLAMP TURRET**—verifies the Clamp Turret command has been enabled and the output to clamp the turret is active when the indicator is green.
- **UNCLAMP TURRET**—verifies the Unclamp Turret command has been enabled and the output to clamp the turret is active when the indicator is green.
- **JOG KEY STATUS**—verifies the command to activate the Jog Keys on the console for manually jogging the turret has been enabled when the indicator is green.
TMX MY and TMX MYS Series Input Status Fields

- **TURRET REFERENCE SWITCH**—verifies the turret is in position to activate the reference switch which is used to calibrate the turret to Station #1 when the indicator is active (green).

- **TURRET CLAMPED / SPINDLE ENGAGED**—verifies the turret is clamped when the indicator is active (green).

  You must execute a Turret Reference cycle prior to leaving the diagnostic screen to ensure the turret is in the proper position.

- **TURRET UNCLAMPED / SPINDLE DISENGAGED**—verifies the turret is unclamped when the indicator is active (green) and the turret is not in proper position and is not ready to operate in other modes unless this indicator is inactive (red). Refer to *Turret Overload Clutch and Tool Disc Rotation, on page 5 - 44* or *Tool Disc Rotation Spline Driver Alignment, on page 5 - 45* for information about clearing this condition.

- **LIVE TOOL DRIVER ENGAGED**—verifies the live tool driver is engaged when the indicator is active (green) and in the proper position and ready to operate in other modes.

- **LIVE TOOL DRIVER DISENGAGED**—verifies the live tool driver is disengaged when the indicator is active (green), and is not in proper position and is not ready to operate in other modes unless this indicator is inactive (red). Refer to *Turret Overload Clutch and Tool Disc Rotation, on page 5 - 44* or *Tool Disc Rotation Spline Driver Alignment, on page 5 - 45* for information about clearing this condition.

- **TURRET OVERLOAD CLUTCH OK**—verifies the turret overload clutch is properly engaged to allow driving of the turret or live-tooling spindle when the indicator is active (green). In the event of excessive load, the overload clutch will trip. This indicator will become inactive (red), and it will not be possible to execute other turret functions until the clutch is re-engaged. Refer to *Turret Overload Clutch and Live Tool, on page 5 - 43* for information about clearing this condition.

- **LIVE TOOL SPINDLE ORIENTED**—verifies the live tool spindle is oriented when the indicator is active (green) and in the proper position and ready to operate in other modes.

**Turret Motor Load Meter**

The Turret Motor Load Meter shows the motor load percentage for the servo-driven turret. The range of values that will be displayed is +/- 200%. As the motor load increases, the meter changes from blue to green to yellow to red.
**TMX MY and TMX MYS Series Turret Diagnostics Softkeys**

When a Turret Diagnostics softkey is pressed, the **Start Cycle** button flashes.

The Turret Diagnostics softkeys perform these functions after the **Start Cycle** button is pressed, activating the selected function:

- **ORIENT LT SPINDLE** *F1*—signals the live-tooling spindle to rotate to the 0° Orient Position. Upon completion of the operation, the LIVE TOOL SPINDLE ORIENTED indicator turns green.

- **REFERENCE TURRET** *F2*—signals the turret to index to Station 1. Upon completion of the operation, the Input TURRET REFERENCE SWITCH indicator turns green and the turret clamps.

   The turret must be referenced prior to exiting the Turret Diagnostics screen.

- **CLAMP TURRET** *F3*—signals the turret to clamp by enabling the CLAMP TURRET Output. Upon completion of the operation, this state is indicated by both the Input TURRET CLAMPED and the Output CLAMP TURRET indicators turning green.

- **UNCLAMP TURRET** *F4*—signals the turret to unclamp by enabling the UNCLAMP TURRET Output. Upon completion of the operation, this state is indicated by both the Input TURRET UNCLAMPED and the Output UNCLAMP TURRET indicators turning green and the Feed Hold button is activated and lights.

- **INDEX TURRET FORWARD** *F5*—increments the turret forward by one position.

   The turret must be Unclamped before executing this command.

- **INDEX TURRET REVERSE** *F6*—increments the turret backward by one position.

   The turret must be Unclamped before executing this command.

- **TOGGLE JOG KEYS** *F7*—toggles the Jog console keys - (minus) and + (plus) On and Off. Use this feature in conjunction with the override dials to move the turret one step at a time. When active the JOG KEY STATUS Output indicator turns green.
When the turret is in the proper position and ready to operate in other modes, the following Inputs will have active indicators (green):

- **TURRET REFERENCE SWITCH**
- **TURRET CLAMPED**

When the turret is unclamped and the Tool Change/Turret Index routine is not running, the axes systems are immediately placed in a Feed Hold condition, prohibiting all axis motion. When Feed Hold is active, you cannot move the Turret using the +/- Console Jog keys.

To clear the Feed Hold condition and allow movement of the turret with the +/- Console Jog keys,

1. Select the Toggle Jog Keys F7 softkey on the Turret Diagnostics softkey menu. The Jog Key Status output indicator turns green.
2. Press the Feed Hold button, putting it in the down/latched position.
3. Press the Feed Hold button again to release it and put it back in the up/unlatched position. The button’s light turns off, indicating the Feed Hold condition has been cleared.
4. Jog the turret using the +/- Console Jog keys.

**Lube Diagnostics**

The Lube Diagnostics screen shows the status of the lubrication system. Input fields display the current status of lubrication level and pressure. Output fields display the current status of the lube pump and manual lubrication. Simulated indicator lights will display green when inputs or outputs are active and red when inactive.

In addition, the **Lube Cycle Interval** and the **Lube On Time** values are displayed.

1. From the Manual mode screen, select the Diagnostics F3 softkey.
2. Select the LUBE F2 softkey to access the Lube Diagnostics screen
3. Select the MANUAL LUBE F1 softkey for performing manual lubrication. When this softkey is selected, the Manual Lube Active indicator light displays green to show the command is active and the manual lubrication is occurring.

The optional Steady Rest device uses a separate Lubrication system. To perform Steady Rest Lubrication Diagnostics and check the lubrication level, pressure, pump state, and perform manual lubrication, please refer to *Steady Rest Lubrication Diagnostics, on page 5 - 47*.
Axis Limit Switches

To view the Motor Load Percentages for each axis for TMX, TMX MY, and TMX MYS series machines,

1. From the Manual mode screen, select the Diagnostics F3 softkey.
2. Select the AXIS LIMIT SWITCHES F3 softkey to access the Axis Limit Switches screen.

- CALIBRATE MACHINE F1—establishes absolute zero for each axis on the turning center. See Calibrate the Machine, on page 5-3 for more information.

CE Diagnostics

To enable the Safety Override mode, access the CE Diagnostics screen as follows:

1. From the Manual mode screen, select the Diagnostics F3 softkey.
2. Select the CE Diagnostics F4 softkey. The following screen appears:

![CE Status & Diagnostics Screen](image)

Figure 5-13. CE Status & Diagnostics Screen

The fields on the CE Diagnostics screen are defined as follows:

- **CE Configuration**—displays CE logic configuration. Enabled or disabled in Integrator Support Services.
- **Door Lock Status**—displays status of all doors with CE safety circuit switches Unlocked or Locked. The Door Switch Status must be Closed when the Door Lock Status is Locked.
- **Door Switch Status**—displays status as Closed or Open. The switch must be Closed when the Door Lock Status is Locked.
• **Limited Manual Operations**—displays status as Disabled or Enabled. Status is Enabled after entering an access code and holding the Enable console button. Enabled allows limited safe motion with the doors open. Refer to *Manual Safety Override Mode, on page 5 - 41* for details.

• **EIR Relay State**—displays status as Disabled or Enabled. This indicates the status of the emergency safety interlock relay; when enabled all safety conditions are met that will allow you to power on the machine.

*Entering the Access Code*

A numeric access code is required to enable Limited Manual Operations. The default code set at the factory is 1234. You can change this access code. Refer to *Changing an Existing Access Code, on page 5 - 41* for details.

Follow these steps to enter the access code:

1. Select the **Enter Access Code** F1 softkey. A pop-up message appears prompting you to enter the 4-digit Access code.

2. Enter a 4-digit numeric code. Asterisks (*) appear representing each entered digit.

   ⇨ It is not possible to use a non-numeric key.

3. Press the Enter key or select the OK screen button. When the code is successfully entered a pop-up message box appears to verify the entry was successful. The **Limited Manual Operations** field shows Enabled.

The following actions will disable or reset the Limited Operations access and will require that you re-enter the access code:

- Pressing the **Manual** console key.
- Pressing the **Auto** console key.
- Pressing the **Emergency Stop** button.
- Turning off Control power.
- Turning off Machine power.
Changing an Existing Access Code

The initial setup of the Access Code from the factory is 1234. Keep a record of this Access code. To change an existing access code, follow these steps:

1. Select the **Change Access Code F2** softkey. A pop-up window appears for you to update the code.
2. Enter the current numeric code and press the Enter key to move to the next field.
3. Enter the new code. A pop-up message appears asking you to re-enter the code for confirmation.
   - If the new code is not re-entered, the code is not changed.
   - Valid codes are any 4 digit combination ranging from 1000 to 9999.
4. Press the Enter key or select the OK screen button to change the access code. When the new code is verified, the code changes and a message appears for confirmation.

Manual Safety Override Mode

For machines with CE safety circuit switches enabled, the Manual Safety Override mode allows the enclosure doors to be opened when the system is in Manual mode so the operator or supervisor can perform limited manual machine operations.

While the doors are open, manual jog feed is restricted. The jog feed is limited to 2 meters per minute, or approximately 80 inches per minute, with manual safety override enabled. No jogging is permitted with manual safety override disabled.

Manual operations that cannot be started with the doors open, regardless of manual safety override mode, are:

- Calibrate Machine
- Coolant Functions (except for Washdown Gun)
- Chip Removal (Chip Conveyor [if equipped] is automatically set to OFF if running when the door is opened. The operator must turn the Chip Conveyor On after the door is closed to resume operation.)
- Part Catcher Retract Motion (if equipped)
- Tool Probing where the Live spindle is required to run (if both are equipped)
- Steady Rest Advance/Clamp Motion (if equipped)
When the Manual Safety Override mode is enabled, it remains enabled until either:

- The **Manual** console key is pressed.
- The **Auto** console key is pressed.
- The **Emergency Stop** button is pressed.
- Control power is turned off.
- Machine power is turned off.

A fault will disable the Manual Safety Override mode also.

If you try to jog the axes with the doors open without enabling the manual safety override mode, a prompt appears to indicate that you must enter the access code and press and hold the **Enable** button to enable jog. Refer to *Entering the Access Code, on page 5 - 40* for details.

**Input/Output Diagnostics**

Select the **INPUT/OUTPUT DIAGNOSTICS** F5 softkey to access the Input - Output Diagnostics screen. The screen contains the following fields, depending upon the machine configuration, with simulated indicator lights that display green when inputs or outputs are active and red when inactive:

- **System Air Pressure Switch**
- **Main Chuck Hyd Pressure Switch**
- **Tailstock Hyd Pressure Switch**
- **Sub-Spn Hyd Chuck Pressure Switch** (TMX MYS only)
- **Cabinet Temperature**—displays an approximate current temperature for the electrical cabinet for machines configured with the Mini-ITX Platform.

These softkeys are available on the Input - Output Diagnostics screen:

- **INPUT STATUS** F1—opens a read-only window with input diagnostic information allowing you to view the status of digital inputs in the control system. The window contains a list of the names and PLC states of the digital inputs. Use the slider bar on the right-hand side of the window to scroll and view the entire list.

  The color of the digital I/O point names and PLC states reflect the actual device state: Black = 0; Red = non-zero. The PLC states indicate what the PLC sees as the state. When the PLC sees High state, the value is 1. When the PLC sees Low state, the value is 0. In the sample windows below, all I/O points are Black and show 0s for the PLC States.

- **OUTPUT STATUS** F2—opens a read-only window with output diagnostic information allowing you to view the status of digital outputs in the control system. The window contains a list of the names and PLC states of the digital outputs. Use the slider bar on the right-hand side of the window to scroll and view the entire list.
The color of the digital I/O point names and PLC states reflect the actual device state: Black = 0; Red = non-zero. The PLC states indicate what setting the PLC uses for output. When the PLC sets the output to High state, the value is 1. When the PLC sets the output to Low state, the value is 0. In the sample windows below, all I/O points are Black and show 0s for the PLC States.

Figure 5–14. Input and Output Status windows

Manual Turret Operation for TMX MY and TMX MYS Series Machines

Following are procedures to move the TMX MY and TMX MYS turret in some instances.

⚠️ Machines equipped with CE interlocks require two people to complete some procedures. In addition, machines equipped with CE interlocks require the guard doors to be closed in order to power on the machine.

Turret Overload Clutch and Live Tool

If the Turret Overload Clutch between the motor and turret is tripped while using live tooling, the **Turret Overload Clutch OK** Input signal on the Turret Diagnostics screen will become inactive (red), and a message appears in the Status bar. To clear this condition,

1. Turn control power ON.
   a. Press the **Manual** button.
   b. Press the **Power On** button. The Start Cycle button flashes.

   The system begins processing information about the servos as soon as the button begins flashing. When this processing is complete, a prompt message appears on the screen for you to press the Start Cycle button.

   c. Press the **Start Cycle** button to enable the servos.

2. Select the **Diagnostics** F3 softkey from the Manual screen.

3. Select the **Turret Diagnostics** F1 softkey to view the Turret Diagnostics screen with Input and Output signals.

4. Rotate the live tool using an appropriate spanner wrench until the clutch re-engages. The **Turret Overload Clutch OK** Input signal is active (green) and the message clears from the screen.
Turret Overload Clutch and Tool Disc Rotation

If the Turret Overload Clutch between the motor and turret is tripped during tool disc rotation, the **Turret Overload Clutch OK** Input signal on the Turret Diagnostics screen will become inactive (red), and a message appears in the Status bar. To clear this condition,

1. Remove all live-tool holders from the tool disc.
2. Press the **Emergency Stop** button.
3. Press the **Manual** button.
4. Press the **Power On** button. The Start Cycle button flashes.
5. Press the **Start Cycle** button to enable the servos.
6. Select the **Diagnostics F3** softkey from the Manual screen.
7. Select the **Turret Diagnostics F1** softkey.
8. Select the **Unclamp Turret F4** softkey.

⚠️ The Turret Unclamped/Spindle Disengaged and Live Tool Driver Disengaged Input signals are active (green).

9. Use two hands to manually rotate the tool disc until the Turret Overload Clutch re-engages. When the clutch is engaged, it is not possible to manually rotate the turret. The **Turret Overload Clutch OK** Input signal is active (green).
10. Select the **Toggle Jog Keys F7** softkey.
11. Turn the **Jog Feed Override** dial to 10%. The console Jog Feed keys are active for jogging the turret when the **Jog Key Status Output** signal is active (green).

⚠️ It is not possible to use the console jog wheel for jogging the turret. If the console jog wheel is activated, the Turret Jog is automatically disabled and the Jog Key Status Output signal is inactive (red).

12. Press the **Feed Hold** button twice (2 presses) to release the motion hold state.
13. Place a machinists’ level on top of the turret.
14. Rotate the turret tool disc using the + or - console Jog Feed keys until the disc is level.
15. Remove the level and select the **Clamp Turret F3** softkey.
16. Select the **Reference the Turret F2** softkey. The turret returns to normal state, the **Turret Overload Clutch OK** Input signal is active (green), and the message clears from the screen.
Tool Disc Rotation Spline Driver Alignment

If the Emergency Stop is pressed or power is lost during turret indexing, the tool disc can become misaligned to the spline driver. A message appears in the Status bar.

1. Remove all live-tool holders and tool cover plugs from the tool disc, allowing you to see inside the tool disc.
2. Open the enclosure doors and check the tool disc and spline driver alignment. If the alignment is off, proceed.
3. Press the Emergency Stop button.
4. Press the Manual button.
5. Press the Power On button.
6. Press the Start Cycle button to enable the servos. The Start Cycle button flashes.
7. Select the Diagnostics F3 softkey from the Manual screen.
8. Select the Turret Diagnostics F1 softkey.
9. Select the Unclamp Turret F4 softkey.

⚠️ The Turret Unclamped/Spindle Disengaged and Live Tool Driver Disengaged Input signals are active (green).

10. Select the Toggle Jog Keys F7 softkey.
11. Turn the Jog Feed Override dial to 10%. The console Jog Feed keys are active for jogging the turret when the Jog Key Status Output signal is active (green).

⚠️ It is not possible to use the console jog wheel for jogging the turret. If the console jog wheel is activated, the Turret Jog is automatically disabled and the Jog Key Status Output signal is inactive (red).

12. Press the Feed Hold button twice (2 presses) to release the motion hold state.
13. Place a machinists’ level on top of the turret.
14. Rotate the turret tool disc using the + or - console Jog Feed keys until the top surface is level.
15. Remove the level.
16. Ensure the spline driver sleeve is aligned close to the 3:00 position.

![Spline Driver Sleeve alignment](image)

*Figure 5–15. Spline Driver Sleeve alignment*

17. Select the **Clamp Turret F3** softkey.

18. Select the **Reference the Turret F2** softkey. The turret returns to normal state and the message clears from the screen.
Accessory Operations

Access settings for Accessory Operations options such as Chip Conveyor, Tailstock, Parts Catcher, Tool Setter, Auto Door, Steady Rest, Parts Conveyor, Oil Skimmer, Mist Collector, and Chuck Coolant with the Accessory Operations F4 softkey. This menu provides active softkeys for each installed option.

- Refer to Options, on page 1 - 1 in WinMax Lathe Options for programming information about these optional accessory operations.
- Refer to the Turning Center Maintenance and Safety Manual for information about maintenance for the Accessory Operations.

Steady Rest Lubrication Diagnostics

The optional Steady Rest device uses a separate Lubrication system. To perform Steady Rest Lubrication Diagnostics and check the lubrication level, pressure, pump state, and perform manual lubrication,

1. From the Manual screen, select the Select the Accessory Options F4 softkey.
2. Select the Steady Rest F6 softkey.
3. Select the Steady Rest Lube Diagnostics F5 softkey. This screen appears:

![Steady Rest Lube Diagnostics screen](image)

*Figure 5–16. Steady Rest Lube Diagnostics screen*
Steady Rest Lube Diagnostics Fields

Simulated indicator lights will display green when inputs or outputs are active and red when inactive. The fields on the Steady Rest Lube Diagnostics screen are defined as follows:

Output Command fields

- LUBE PUMP ON—displays green to indicate the Lube Pump is active.
- MANUAL LUBE ACTIVE—displays green when the Manual Lube F1 softkey is selected for performing a manual lubrication.

Input Command fields

- LUBE LEVEL OK—displays green to indicate the lubrication level is satisfactory.
- LUBE PRESSURE LOW—displays green to indicate the lubrication pressure is low.

In addition, the Lube Cycle Interval and Lube On Time are displayed.

Chuck Operations

To access chuck operations,

1. Press the Manual console key to access the Manual screen.
2. Select the CHUCK OPERATIONS F5 softkey to access the Chuck softkey menu.

![Figure 5–17. TMX Chuck Operations softkeys](image-url)
The Chuck Operations softkeys for TM, TMM, TMX, and TMX MY series machines are defined as follows:

- **CLOSE CHUCK F1**—closes the main spindle chuck and displays CLOSED for the chuck state.
  - The jaws will move outward for the Internal chucking type.
  - The jaws will move inward for the External chucking type.

⚠️ The machine will only run in Auto mode when the chuck is closed.

- **OPEN CHUCK F2**—opens the main chuck and displays OPEN for the chuck state.
  - The jaws will move inward for the Internal chucking type.
  - The jaws will move outward for the External chucking type.

- **CHUCKING TYPE EXTERNAL F3**—sets the chuck type to External. The External chuck type holds stock on the outside of the stock, or externally.

- **CHUCKING TYPE INTERNAL F4**—sets the chuck type to Internal. The Internal chuck type holds stock on the inside of the stock or internally.

  Refer to the chuck’s operator’s manual and the *Turning Center Maintenance and Safety* manual for hydraulic pressure recommendations.

- **CHUCKING TYPE COLLET F5**—sets the chuck type to Collet. The Collet holds bar-feed material. This softkey selection is only available if you purchase the optional Collet Chuck. Refer to WinMax Lathe Options, *Collet Chuck, on page 5 - 1* for information about the Collet Chuck.

- **MORE F7**—accesses a second Chuck Operations softkey menu with the following softkeys. This softkey and menu are available for TMM, TMX MY, and TMX MYS series machines.

- **FOOTSWITCH TOGGLE MODE F1**—sets the footswitch to modal operation. Once a selection is made with the CLOSE CHUCK F1 or OPEN CHUCK F2 softkey, the chuck output changes to that state and stays on until another chuck selection is made. When this softkey is selected, TOGGLE appears in the Footswitch Mode field.

- **FOOTSWITCH HOLD-OPEN MODE F2**—sets the footswitch to remain open as long as the footswitch is depressed. When the footswitch is released, the chuck closes again. When this softkey is selected, HOLD-OPEN appears in the Footswitch Mode field. This functionality allows you to open the chuck slightly while setting the part in the chuck.

- **HOLDING CLAMP ON F5**—turns on the main spindle clamp. This softkey is available for TMM, TMX, TMX MY, and TMX MYS series machines.

- **HOLDING CLAMP OFF F6**—turns off the main spindle clamp. This softkey is available for TMM, TMX, TMX MY, and TMX MYS series machines.

- **BOTH CLAMPS OFF F6**—turns off the main spindle clamp and the live-tooling spindle clamp. This softkey is available with TMM series machines.

- **EXIT F8**—returns to the first Chuck Operations softkey menu, which also contains an EXIT F8 softkey to return to the Manual screen’s main menu.
The Chuck Operations softkeys for TMX MYS series machines are defined as follows:

![Image of TMX MYS Manual screen Chuck Operations]

**Figure 5–18. TMX MYS Manual screen Chuck Operations**

TMX MYS series machines use a SUB CHUCK OPERATIONS ➔ F6 softkey and a MAIN CHUCK OPERATIONS ➔ F6 softkey on the first Chuck Operations softkey menu to switch between settings for the main spindle and the sub-spindle on the first and second Chuck Operations softkey menus.

- **CHUCK CLOSE MAIN F1 or CHUCK CLOSE SUB F1**—closes the main spindle chuck or sub-spindle chuck and displays CLOSED for the chuck state.
  - The jaws will move outward for the Internal chucking type.
  - The jaws will move inward for the External chucking type.

⚠️ The machine will only run in Auto mode when the chuck is closed.

- **CHUCK OPEN MAIN F2 or CHUCK OPEN SUB F2**—opens the main spindle chuck or sub-spindle chuck and displays OPEN for the chuck state.
  - The jaws will move inward for the Internal chucking type.
  - The jaws will move outward for the External chucking type.

- **CHUCKING TYPE EXTERNAL - MAIN F3 or CHUCKING TYPE EXTERNAL - SUB F3**—sets the main spindle chuck or sub-spindle chuck type to External. The External chuck type holds stock on the outside of the stock, or externally.

- **CHUCKING TYPE INTERNAL- MAIN F4 or CHUCKING TYPE INTERNAL - SUB F4**—sets the main spindle chuck or sub-spindle chuck type to Internal. The Internal chuck type holds stock on the inside of the stock or internally.

Refer to the chuck’s operator’s manual and the *Turning Center Maintenance and Safety* manual for hydraulic pressure recommendations.
• **CHUCKING TYPE COLLET - MAIN** *F5* or **CHUCKING TYPE COLLET - SUB**—sets the main spindle chuck or sub-spindle chuck type to Collet. The Collet holds bar-feed material. This softkey selection is only available if you purchase the optional Collet Chuck. Refer to WinMax Lathe Options, *Collet Chuck*, on page 5 - 1 for information about the Collet Chuck.

• **SUB CHUCK OPERATIONS** *F6*—changes and applies all Chuck Operations softkeys to sub-spindle operations. This softkey toggles between the MAIN CHUCK OPERATIONS *F6* softkey. This softkey only appears for TMX MYS series machines.

• **MAIN CHUCK OPERATIONS** *F6*—changes and applies all Chuck Operations softkeys to main spindle operations. This softkey toggles between the SUB CHUCK OPERATIONS *F6* softkey. This softkey only appears for TMX MYS series machines.

• **MORE** *F7*—accesses a second Chuck Operations softkey menu with the following softkeys.

  • **FOOTSWITCH TOGGLE MODE** *F1*—sets the footswitch to modal operation. Once a selection is made with the CLOSE CHUCK *F1* or OPEN CHUCK *F2* softkey, the chuck output changes to that state and stays on until another chuck selection is made. When this softkey is selected, TOGGLE appears in the Footswitch Mode field.

  • **FOOTSWITCH HOLD-OPEN MODE** *F2*—sets the footswitch to remain open as long as the footswitch is depressed. When the footswitch is released, the chuck closes again. When this softkey is selected, HOLD-OPEN appears in the Footswitch Mode field. This functionality allows you to open the chuck slightly while setting the part in the chuck.

  • **HOLDING CLAMP ON - MAIN** *F5* or **HOLDING CLAMP ON - SUB**—turns on the main spindle clamp. TMX, TMX MY, TMX MYS

  • **HOLDING CLAMP OFF - MAIN** *F6* or **HOLDING CLAMP OFF - SUB**—turns off the main spindle clamp. TMX, TMX MY, TMX MYS

• **EXIT** *F8*—returns to the first Chuck Operations softkey menu, which also contains an EXIT F8 softkey to return to the Manual screen’s main softkey menu.
Auto Mode Operation

Press the **Auto** console key to activate Auto Mode and access the Auto Prep screen and set up the part program to be run on the machine. The part program name that will be executed appears on this screen. There are also fields for identifying the blocks to execute in the part program and number of cycles to be run. This screen also provides access to the RUN PROGRAM F8 softkey described in *Running a Program*, on page 5 - 62.

Here is an Auto (Conversational) screen, which appears with the file name for the part program to be executed showing in the Part Program field:

![Figure 5–19. Auto (Conversational) screen](image)

Here is an Auto (NC) screen, which appears with the file name for the part program to be executed showing in the Part Program field:

![Figure 5–20. Auto (NC) screen](image)
Auto (Conversational) Screen Fields

These fields are available on the Auto (Conversational) screen:

- **PART PROGRAM**—contains the file name for the part program to be executed.

- **START BLOCK** and **END BLOCK**—identify the program’s first and last data blocks to be run. Start Block defaults to 1; End Block defaults to the last block number in the program. If you want to execute only a certain portion of the conversational part program, enter the first and last block number in these fields. For example, if you want to run blocks 5 through 10 only, enter 5 in the Start Block field and 10 in the End Block field.

When the Start Block or End Block are changed from the default to run a partial program, the control maintains the values entered in the Start Block and End Block fields after the program is run.

Verification Graphics is affected by the Start Block and End Block selections.

The **Start Cycle** button flashes and a pop-up message appears on the screen listing the range of blocks that will be run if the **Start Cycle** button is pressed.

- Select **OK** to clear the pop-up message.
- If you want to re-run the partial program using the Start and End Blocks that were set previously, press the flashing **Start Cycle** button.
- If you don’t want to run the partial program again, or if you are finished with the program, press the **Manual** console key to escape from Auto Mode.
- If you want to run the entire program, press the **Manual** console key followed by the **Auto** console key to return to the Auto screen with the Start and End Blocks reset to 1 and the last block number.

If the Start Block follows any work offset change, Change Part Setup data block, or Change Parameter data block, the control processes that information prior to starting the program at the Start Block.

For NC Programs, the Start and End Blocks are not displayed.
• **CYCLES TO RUN**—identifies the number of cycles to run. A cycle consists of the Start Block to the End Block of a part program. This tells the control to repeat running the program the number of times identified in this field. This field is not available on the Auto (NC) screen.

• **CYCLES COMPLETED**—identifies the number of cycles that have been run. When Cycles Completed equals Cycles to Run, the program stops. This entry is backed up by the control when changed and restored during initialization when WinMax is rebooted.

💡 You can set this field to any number and the control will count up from that number. This process can help if you have already run a certain number of parts. If you have run 200 parts, you can enter 200 in the field and watch the number of parts increase by the total entered in Cycles to Run. You can keep track of the total number of parts as they are completed.

• **PREVIOUS CYCLE TIME**—displays the length of time required to complete the previous program or cycle. This field is not available on the Auto (NC) screen.
Auto Run Screen Softkeys

The Auto Run screen appears after selecting the Run Program F8 softkey on the Auto (Conversational) or Auto (NC) screen, showing the program status and machine operation as the part runs in the selected cycle. When the screen initially opens, it contains the softkeys for performing the functions defined below.

Operate the Optional Chip Conveyor

The Chip Conveyor softkeys are active on the Auto Run screen when the optional chip conveyor is installed. Please refer to WinMax Lathe Options Chip Conveyor, on page 4 - 1 for details about this option.

Monitor the NC Codes

To view NC code as an NC program runs, select the NC MONITOR F5 softkey on the Auto Run screen. A pop-up window containing the current NC code appears on the screen.

Adjust the Tool Position

To adjust the tool position as a result of wear, you can access the Tool Wear Offset screen from the Auto Run screen. Select the TOOL WEAR OFFSETS F6 softkey. Refer to Tool Wear Offsets, on page 4 - 74 for details about the Tool Wear Offsets screen.

Adjust the Auto Run Graphics

To adjust the Wireframe graphics that appear on the Auto Run screen, use the ZOOM/PAN F7 softkey to access the graphics softkey menus. Refer to Verifying Part Programs—Graphics, on page 4 - 86 for more details about these menu selections.

Adjust the Realtime Graphics Settings

To adjust the Realtime Graphics Settings that appear on the Auto Run screen graphics, select these softkeys: Zoom/Pan, Setup, Graphics Settings F3 softkey. Refer to Verifying Part Programs—Graphics, on page 4 - 86 for details about the fields on this screen.

Turn the Worklight On or Off

Use the TOGGLE WORKLIGHT F8 softkey on the Auto Run screen to set the enclosure worklight On or Off.

Auto Run Screen Fields

The fields on the Auto Run screen appear based upon your machine configuration. Please refer to the appropriate section listed below for information about the fields for your machine type.

- TM Series Auto Run Fields ................................. 5 - 56
- TMM Series Auto Run Fields ............................... 5 - 57
- TMX Series Auto Run Fields ............................... 5 - 58
- TMX MY Series Auto Run Fields ........................... 5 - 59
- TMX MYS Series Auto Run Fields .......................... 5 - 60
TM Series Auto Run Fields

The fields on the Two-Axis (TM Series) machines are defined as follows:

- **MACHINE X** and **Z**—displays the current positions of the axes relative to absolute zero for the machine.
- **PART X** and **Z**—displays the current positions of the axes relative to part zero for the part.
- **DTG X** and **Z**—indicates the Distance To Go for axes as each programmed data block runs.
- **CONVEYOR**—displays On or Off. On appears when the option is turned on; Off appears when the option is turned off or the option is not installed.
- **TOOL/STA**—displays the current active tool and turret station information based on selections in Tool Setup. Refer to Turning Tool Setup Fields, on page 4 - 20 for details.
- **TOOL OFFSET**—displays the current tool information based on selections in Tool Setup. Refer to Turning Tool Setup Fields, on page 4 - 20 for details.
- **WORK OFFSET**—displays the current tool information based on selections in Tool Setup. Refer to Turning Tool Setup Fields, on page 4 - 20 for details.
- **SPINDLE RPM**—displays the current spindle speed based on selections in Tool Setup. Refer to Turning Tool Setup Fields, on page 4 - 20 for details.
- **CSS**—displays Off or On based on CSS selection in Tool Setup. Refer to Turning Tool Setup Fields, on page 4 - 20 for details.
- **FEED**—displays the current feedrate based on selections in Tool Setup. Refer to Turning Tool Setup Fields, on page 4 - 20 for details.
- **F (%)**—displays the current Feedrate Per Minute percentage set with the Axis Feed Rate override knob.
- **R (%)**—displays the current Rapid Traverse Feedrate percentage set with the Rapid override knob.
- **S (%)**—displays the current spindle RPM percentage set with the Spindle Speed override knob.
- **Block Number**—displays the number of the data block being executed.
- **Cycle Time**—indicates the amount of time a program takes to run one cycle.
- **Cycles Completed**—identifies the number of cycles in the program that have been completed. The counter counts up to the value indicated in Cycles to Run. Cycles Completed defaults to the entry set on the Auto screen.
- **Cycles Remaining**—identifies the number of cycles remaining to run continuously. The Start Cycle button flashes between cycles requiring the operator press it to start each cycle. The counter counts down to 0. Cycles Remaining defaults to the value in Cycles to Run minus the number of completed cycles.
- **Spindle Load Meter**—shows a color bar representing the power required on the spindle by the cut, graduating from green to yellow to red as horsepower increases to maximum (red).
The center left area of the screen graphically displays tool motion. Use the **ZOOM/PAN F7** softkey to access the graphics softkey menu to adjust the graphic. Refer to *Verifying Part Programs—Graphics, on page 4 - 86* for more details about these menu selections.

**TMM Series Auto Run Fields**

The fields on the Live-Tooling (TMM Series) machines are defined as follows:

- **MACHINE X, Z, and C**—displays the current positions of the axes relative to absolute zero for the machine.
- **PART X Z, and C**—displays the current positions of the axes relative to part zero for the part.
- **DTG X Z, and C**—indicates the Distance To Go for axes as each programmed data block runs.
- **CONVEYOR**—displays On or Off. On appears when the option is turned on; Off appears when the option is turned off or the option is not installed.
- **TOOL/STA**—displays the current active tool and turret station information based on selections in Tool Setup. Refer to *Turning Tool Setup Fields, on page 4 - 20* for details.
- **TOOL OFFSET**—displays the current tool information based on selections in Tool Setup. Refer to *Turning Tool Setup Fields, on page 4 - 20* for details.
- **WORK OFFSET**—displays the current tool information based on selections in Tool Setup. Refer to *Turning Tool Setup Fields, on page 4 - 20* for details.
- **S1 RPM**—displays the current main spindle speed based on selections in Tool Setup. Refer to *Turning Tool Setup Fields, on page 4 - 20* for details.
- **S2 RPM**—displays the current live-tooling spindle speed based on selections in Tool Setup. Refer to *Turning Tool Setup Fields, on page 4 - 20* for details.
- **FEED**—displays the current feedrate based on selections in Tool Setup. Refer to *Turning Tool Setup Fields, on page 4 - 20* for details.
- **F (%)**—displays the current Feedrate Per Minute percentage set with the Axis Feed Rate override knob.
- **R (%)**—displays the current Rapid Traverse Feedrate percentage set with the Rapid override knob.
- **S1 (%)**—displays the current main spindle RPM percentage set with the Spindle 1 Speed override knob.
- **CSS**—displays Off or On based on CSS selection in Tool Setup. Refer to *Turning Tool Setup Fields, on page 4 - 20* for details
- **S2 (%)**—displays the current live-tooling spindle RPM percentage set with the Spindle 2 Speed override knob
- **Block Number**—displays the number of the data block being executed.
- **Cycle Time**—indicates the amount of time a program takes to run one cycle.
- **Cycles Completed**—identifies the number of cycles in the program that have been completed. The counter counts up to the value indicated in Cycles to Run. Cycles Completed defaults to the entry set on the Auto screen.
- **Cycles Remaining**—identifies the number of cycles remaining to run continuously. The **Start Cycle** button flashes between cycles requiring the operator press it to start each cycle. The counter counts down to 0. Cycles Remaining defaults to the value in Cycles to Run minus the number of completed cycles.

- **Spindle Load Meters**—two meters show a color bar representing the power required on the main spindle and the live-tooling spindle by the cut, graduating from green to yellow to red as horsepower increases to maximum (red).

- The center left area of the screen graphically displays tool motion. Use the **ZOOM/PAN F7** softkey to access the graphics softkey menu to adjust the graphic. Refer to **Verifying Part Programs—Graphics, on page 4 - 86** for more details about these menu selections.

**TMX Series Auto Run Fields**

The fields on the Two-Axis Programmable Tailstock (TMX Series) machines are defined as follows:

- **MACHINE X, Z, and W**—displays the current positions of the axes relative to absolute zero for the machine.

- **PART X, Z, and W**—displays the current positions of the axes relative to part zero for the part.

- **DTG X, Z, and W**—indicates the Distance To Go for axes as each programmed data block runs.

- **CONVEYOR**—displays On or Off. On appears when the option is turned on; Off appears when the option is turned off or the option is not installed.

- **F (%)**—displays the current Feedrate Per Minute percentage set with the Axis Feed Rate override knob.

- **TOOL/STA**—displays the current active tool and turret station information based on selections in Tool Setup. Refer to **Turning Tool Setup Fields, on page 4 - 20** for details.

- **R (%)**—displays the current Rapid Traverse Feedrate percentage set with the Rapid override knob.

- **TOOL OFFSET**—displays the current tool information based on selections in Tool Setup. Refer to **Turning Tool Setup Fields, on page 4 - 20** for details.

- **CSS**—displays Off or On based on CSS selection in Tool Setup. Refer to **Turning Tool Setup Fields, on page 4 - 20** for details.

- **WORK OFFSET**—display the current tool information based on selections in Tool Setup. Refer to **Turning Tool Setup Fields, on page 4 - 20** for details.

- **S1% and RPM**—displays the current spindle speed percentage for the main spindle and spindle revolutions per minute. The % setting is made with the Spindle Speed override knob. The RPM is based on selections in Tool Setup. Refer to **Turning Tool Setup Fields, on page 4 - 20** for details.

- **TAILSTOCK**—displays Retracted, Advanced, or Unknown based on selections made in the Manual screen. Refer to **Manual Mode Operation, on page 5 - 7** for details.
• **FEED**—displays the current feedrate based on selections in Tool Setup. Refer to *Turning Tool Setup Fields, on page 4 - 20* for details.
• **Block**—displays the number of the data block being executed.
• **Cycle**—indicates the amount of time a program takes to run one cycle.
• **CMPL/REM**—identifies the following information about the cycles:
  • **CMPL** identifies the number of cycles in the program that have been completed. The counter counts up to the value indicated in Cycles to Run. Cycles Completed defaults to the entry set on the Auto screen.
  • **REM** identifies the number of cycles remaining to run continuously. The **Start Cycle** button flashes between cycles requiring the operator press it to start each cycle. The counter counts down to 0. Cycles Remaining defaults to the value in Cycles to Run minus the number of completed cycles.
• **Spindle Load Meter**—shows a color bar representing the power required on the spindle by the cut, graduating from green to yellow to red as horsepower increases to maximum (red).
• The center left area of the screen graphically displays tool motion. Use the **ZOOM/PAN** F7 softkey to access the graphics softkey menu to adjust the graphic. Refer to *Verifying Part Programs—Graphics, on page 4 - 86* for more details about these menu selections.

**TMX MY Series Auto Run Fields**

The fields on the Live-Tooling and Y-Axis Motion (TMX Series) machines are defined as follows:

• **MACHINE X, Y, Z, W and C**—displays the current positions of the axes relative to absolute zero for the machine.
• **PART X, Y, Z, W and C**—displays the current positions of the axes relative to part zero for the part.
• **DTG X, Y, Z, W and C**—indicates the Distance To Go for axes as each programmed data block runs.
• **CONVEYOR**—displays On or Off. On appears when the option is turned on; Off appears when the option is turned off or the option is not installed.
• **F (%)**—displays the current Feedrate Per Minute percentage set with the Axis Feed Rate override knob.
• **TOOL/STA**—displays the current active tool and turret station information based on selections in Tool Setup. Refer to *Turning Tool Setup Fields, on page 4 - 20* for details.
• **R (%)**—displays the current Rapid Traverse Feedrate percentage set with the Rapid override knob.
• **TOOL OFFSET**—displays the current tool information based on selections in Tool Setup. Refer to *Turning Tool Setup Fields, on page 4 - 20* for details.
• **CSS**—displays Off or On based on CSS selection in Tool Setup. Refer to *Turning Tool Setup Fields, on page 4 - 20* for details.
• **WORK OFFSET**—display the current tool information based on selections in Tool Setup. Refer to *Turning Tool Setup Fields*, on page 4 - 20 for details.

• **S1% and RPM**—displays the current spindle speed percentage for the main spindle and spindle revolutions per minute. The % setting is made with the Spindle 1 Speed override knob. The RPM is based on selections in Tool Setup. Refer to *Turning Tool Setup Fields*, on page 4 - 20 for details.

• **S2% and RPM**—displays the current spindle speed percentage for the live tooling spindle and spindle revolutions per minute. The % setting is made with the Spindle 2 Speed override knob. The RPM is based on selections in Tool Setup. Refer to *Turning Tool Setup Fields*, on page 4 - 20 for details.

• **TAILSTOCK**—displays Retracted, Advanced, or Unknown based on selections made in the Manual screen. Refer to *Manual Mode Operation*, on page 5 - 7 for details.

• **FEED**—displays the current feedrate based on selections in Tool Setup. Refer to *Turning Tool Setup Fields*, on page 4 - 20 for details.

• **Block**—displays the number of the data block being executed.

• **Cycle**—indicates the amount of time a program takes to run one cycle.

• **CMPL/REM**—identifies the following information about the cycles:
  • **CMPL** identifies the number of cycles in the program that have been completed. The counter counts up to the value indicated in Cycles to Run. Cycles Completed defaults to the entry set on the Auto screen.
  • **REM** identifies the number of cycles remaining to run continuously. The **Start Cycle** button flashes between cycles requiring the operator press it to start each cycle. The counter counts down to 0. Cycles Remaining defaults to the value in Cycles to Run minus the number of completed cycles.

• **Spindle Load Meters**—two meters show color bars representing the power required on both spindles by the cut, graduating from green to yellow to red as horsepower increases to maximum (red). (Which one is main and which one is live-tooling?)

• The center left area of the screen graphically displays tool motion. Use the **ZOOM/PAN F7** softkey to access the graphics softkey menu to adjust the graphic. Refer to *Verifying Part Programs—Graphics*, on page 4 - 86 for more details about these menu selections.

**TMX MYS Series Auto Run Fields**

The fields on the Live-Tooling, Y-Axis Motion, Sub-spindle (TMX MYS Series) machines are defined as follows:

• **MACHINE X, Y, Z, W and C**—displays the current positions of the axes relative to absolute zero for the machine.

• **PART X, Y, Z, W and C**—displays the current positions of the axes relative to part zero for the part.

• **DTG X, Y, Z, W and C**—indicates the Distance To Go for axes as each programmed data block runs.

• **CONVEYOR**—displays On or Off. On appears when the option is turned on; Off appears when the option is turned off or the option is not installed.
• **F (%)**—displays the current Feedrate Per Minute percentage set with the Axis Feed Rate override knob.

• **TOOL/STA**—displays the current active tool and turret station information based on selections in Tool Setup. Refer to *Turning Tool Setup Fields, on page 4 - 20* for details.

• **R (%)**—displays the current Rapid Traverse Feedrate percentage set with the Rapid override knob.

• **TOOL OFFSET**—displays the current tool information based on selections in Tool Setup. Refer to *Turning Tool Setup Fields, on page 4 - 20* for details.

• **CSS**—displays Off or On based on CSS selection in Tool Setup. Refer to *Turning Tool Setup Fields, on page 4 - 20* for details.

• **WORK OFFSET**—displays the current tool information based on selections in Tool Setup. Refer to *Turning Tool Setup Fields, on page 4 - 20* for details.

• **S1% and RPM**—displays the current spindle speed percentage for the main spindle and spindle revolutions per minute. The % setting is made with the S1 Speed override knob. The RPM is based on selections in Tool Setup. Refer to *Turning Tool Setup Fields, on page 4 - 20* for details.

• **S2% and RPM**—displays the current spindle speed percentage for the live tooling spindle and spindle revolutions per minute. The % setting is made with the Spindle 1 Speed override knob. The RPM is based on selections in Tool Setup. Refer to *Turning Tool Setup Fields, on page 4 - 20* for details.

• **S3% and RPM**—displays the current spindle speed percentage for the sub-spindle and spindle revolutions per minute. The % setting is made with the S3 Speed override knob. The RPM is based on selections in Tool Setup. Refer to *Turning Tool Setup Fields, on page 4 - 20* for details.

• **FEED**—displays the current feedrate based on selections in Tool Setup. Refer to *Turning Tool Setup Fields, on page 4 - 20* for details.

• **Block**—displays the number of the data block being executed.

• **Cycle**—indicates the amount of time a program takes to run one cycle.

• **CMPL/REM**—identifies the following information about the cycles:
  - **CMPL** identifies the number of cycles in the program that have been completed. The counter counts up to the value indicated in Cycles to Run. Cycles Completed defaults to the entry set on the Auto screen.
  - **REM** identifies the number of cycles remaining to run continuously. The **Start Cycle** button flashes between cycles requiring the operator press it to start each cycle. The counter counts down to 0. Cycles Remaining defaults to the value in Cycles to Run minus the number of completed cycles.

• **Spindle Load Meters**—three meters show color bars representing the power required on all spindles by the cut, graduating from green to yellow to red as horsepower increases to maximum (red).

• The center left area of the screen graphically displays tool motion. Use the **ZOOM/PAN F7** softkey to access the graphics softkey menu to adjust the graphic. Refer to *Verifying Part Programs—Graphics, on page 4 - 86* for more details about these menu selections.
Running a Program

When a program has been verified using the Wireframe or optional Verification Graphics, you can set the machine to automatically run a program. This section describes the steps for starting and stopping automatic operation.

Here are things to consider prior to running a program:

- Doors must be closed to start a program and must remain closed while the program is running.
- Doors may be opened when the program is complete. If the machine is equipped with locking door switches, you can only open the doors after all motion has stopped and the coolant is off.
- Doors can be opened at a Position Stop Block or M00/M01 command, but must be closed prior to pressing **Start Cycle** to resume the program.
- In **Interrupt** mode, doors are allowed to be opened after all axes, spindle, and turret operations are stopped. The doors must be closed prior to pressing the **Auto** console key. Then press the **Start Cycle** console key to resume the program.
- If a chuck is open when **Auto** is pressed, a pop-up message appears telling the operator of the condition.
  - The operator must exit the message and close the chuck prior to pressing Auto to run the program. The message will appear and the user must acknowledge the message by selecting the OK screen button, but the message being present does not inhibit or prohibit the Cycle from starting.
  - If the program is run with the chuck open, the control will initiate an Emergency Stop condition if a spindle is commanded to move in RPM mode or as the C-axis while the chuck is open.
- If the machine is equipped with the Bar Feed option, the spindle can run at a speed up to 300 RPM with the chuck open when feeding bar from a bar feeding unit. The M20 code must be used to open the chuck for bar feed.
- The chuck can be opened using the appropriate M Code even if the chuck is rotating. The bypass remains active until the M Code to close the chuck is executed or if the operating mode is changed (for example, from Auto to Manual Mode).
  - M231 - Bypass Chuck Open Interlock - Main Spindle
  - M241 - Bypass Chuck Open Interlock - Sub-spindle

Please refer to the Operation Requirements chapter of the *Turning Centers Maintenance and Safety Manual* for more information.
Automatic Machine Operation

To run a program following machine calibration,

1. Select the Auto console key to display the Auto (Conversational) or Auto (NC) screen.
   
   During execution of the part program, you can switch between Auto and Single Block operations by pressing the corresponding console key.

2. Select the RUN PROGRAM F8 softkey on the Auto (Conversational) or (NC) screen to initiate program execution and display monitoring information. The Start Cycle button and the yellow beacon above the control flash.

3. Press the Start Cycle button to run the program. The program runs.

   For TMX MY and TMX MY machines, the spindle stops at tool change between turning operations.

Run the Program Block by Block

To run a program in Single Block mode following machine calibration,

1. Press the Single console key. The Start Cycle button and yellow beacon above the control flash.

2. Press the Start Cycle button. The program runs, but the machine stops the axes at the end of each NC motion or action that is generated for the Conversational block.

3. Press the flashing Start Cycle button to resume with the next block.

   - In Conversational Programming the machine halts (with the spindle running) after each NC motion or action that is generated for the Conversational block.
   - For NC Programming, the machine halts with the spindle running after each NC block is executed.
Stop Automatic Machine Operation

Automatic machine operations include axes feed, spindle motion, and coolant flow. To stop an automatic machine operation, attempt to do so when the tool is not in contact with the stock. There are several methods to use to stop automatic operations:

- Press the **Stop Cycle** button which stops axes and spindle motion simultaneously, disables coolant, and aborts the program. The Auto screen remains displayed when a program is aborted. The button lights and remains illuminated until another mode key is pressed.

- Press the **Feed Hold** console button to stop axis motion. The spindle remains on. Press the **Feed Hold** console button again to release the Feed Hold and resume machine operation.

  After Feed Hold is pressed the first time, you may select the appropriate Spindle console key or the Manual console key to stop the spindle and abort the program.

  - Select one of these console keys in the Spindle console key group to stop the spindle and abort the program. These console keys appear based on machine configuration:
    - TM and TMX series machines have **On** and **Off** Spindle console keys. Press the **Off** console key to stop spindle motion and disable coolant.
    - TMM and TMX MY series machines have **S1** and **S2** Spindle console keys. Press **S1** to turn the Main spindle Off. Press **S2** to turn the Live-tooling spindle Off. The coolant is also disabled for each spindle.
    - TMX MYS series machines have **S1**, **S2**, **S3**, and **S-Synch** Spindle console keys. Press **S1** to turn the Main spindle Off. Press **S2** to turn the Live-tooling spindle Off. Press **S3** to turn the Sub-spindle Off. The coolant is also disabled for each spindle.

    **S-Synch** is only active in Manual mode and is used to un-synch the Main and Sub-spindle if they are in the synchronized state and the S-Synch LED is on. The S-Synch key does not abort the program.

- Press the **Manual** console key in the Machine Mode console key group to stop machine operation and abort the program.

- Press the **Interrupt** console key to stop the axis feed, spindle, and coolant. The axes stop in place and cannot be jogged. The enclosure doors can be opened. Press the **Auto** console key to resume operation. To abort the Interrupt and the program, press the **Manual** console key.

- Press the **Opt Stop** (Optional Stop) console key before running a program containing a Position block with an Optional Program Stop, Stop Before or After Tool Changes, or an M01 Optional Stop to perform a controlled stop of automatic machine operations. The axes cannot be jogged. The enclosure doors can be opened. Press the flashing **Start Cycle** button to resume.

  If a Position block with an Optional Program Stop, Stop Before or After Tool Changes, or an M01 Optional Stop are programmed and the Opt Stop key is not pressed, the program does not stop automatically until reaching the end of the program.

- Press the **Emergency Stop** button.
Shut Down the Control and Machine

To shut down the machine quickly, press the **Emergency Stop** button. The red beacon above the control lights up and the Emergency Stop icon appears in the status bar on the screen. Lube and hydraulic pump operation is disabled. Servo and spindle amp are disabled. With the Emergency Stop enabled, you cannot move the machine or run a program in Auto mode.

To release the **Emergency Stop** button, twist and release the button.

⇒ Emergency Stop shut down is not recommended while the machine is in motion, except in an emergency situation.

Always perform Control Power off before performing Machine Power off. Refer to *Control Power, on page 5 - 3* for information about restoring Control Power on. For information about shutting down the control, please refer to *Shutdown Control, on page 2 - 26* and *Restart Control, on page 2 - 26*.

It is recommended to place the machine in the Emergency Stop condition when the machine will not be in use for a period of time. In a non-emergency situation, it is recommended that the turret be in a position away from the spindle, workpiece, or other internal fixtures.

For an orderly shut down of the control and machine, follow these steps:

1. Press the **Manual** console key.
2. Select the MANUAL FUNCTION SETUP F2 softkey on the Manual screen.
3. Select the HOME F6 softkey.
4. Select the HOME ALL F7 softkey to place all axes in home position.
5. Press the **Emergency Stop** button.
6. Perform the Control Shutdown to remove control power, save all open programs based upon the last time AutoSave was performed for each open program, and complete an orderly shutdown of the control. Follow these steps:
   a. Press the **Menu** key followed by the **Utility Screen** softkey to access the Utilities screen and softkey menu.
   b. Select the SHUTDOWN CONTROL F6 softkey to access the Shutdown Control command. A pop-up message appears: “Are you sure you want to shut down the control?”
   c. Select Yes or No. When Yes is selected, the Shutdown Control command is performed.
7. Shut off power to the machine by turning Off the Main Disconnect Switch located on the back of the machine on the electrical cabinet.

⇒ If the machine will not be used for several days, it is recommended to turn off machine power at the main power switch.
Record of Changes

11.01 v546 December 2017
Revised by: H. Arle
Approved by: D. Skrzypczak

Changes
Updates to Graphics for Max5 UI.

704-0115-111, May 2013
Revised by: K. Gross
Approved by: D. Skrzypczak May 2013

Changes
Updates based on changes through v09.02.34 software.
Updated Tool Setup, Live-Tool Orientation to include statement for orientation when using Sub-spindle on TMX MYS machines.
Added information to consider before running a program.
Removed “3D” from content and index where it described Wireframe or Verification Graphics.

704-0115-110, January 2013
Revised by: K. Gross
Approved by: D. Skrzypczak January 2013

Changes
Updates based on changes through v09.02.11 software.
Updated Program Edit Lockout:
• Full protection enabled: cannot modify the Auto screen Cycles Completed value.
• Partial Edit Lockout mode enabled: changing tool feeds and speeds does not update conversational programs.
704-0115-109, October 2012

Revised by: K. Gross

Approved by: K.Van Blaircum, D. Skrzypczak October 2012

Changes
704-0115-109: Updates based on changes through v09.00.43 software. Among those changes:
Added WinMax Interface Environment section.
Added Utilities, System Configuration, Software Options screen.
Added Utilities, User Preferences, Edit Lockout information.
Added quick toggle between two languages.
Added Live-tool Spindle RPM in Tool Setup.

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Revised by: K. Gross

Approved by: D. Skrzypczak March 2012

Changes
704-0115-108: Updates based on changes through v8.1.3.48 software.

704-0115-107, December 2011

Revised by: K. Gross

Approved by: D. Skrzypczak, J.Mulkey, G.Traicoff, K.Van Blaircum December 2011

Changes
704-0115-107: Updates based on changes through v8.1.2.30 software.
Set cross-references between books.
Added ScreenPath condition and paragraph tag.

704-0115-106, April 2011

Revised by: K. Gross

Approved by: D. Skrzypczak, J.Mulkey, G.Traicoff, K.Van Blaircum April 2011

Changes
704-0115-106: Updates based on changes through v8.1.2.18 software.
704-0115-105, June 2010, ECN 16538

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Approved by: D. Skrzypczak, J. Mulkey, G. Traicoff, B. Turner, K. Van Blircum June 2010

Changes

704-0115-105: Updates based on changes through v8.1.1 software.

704-0115-104, April 2009, ECN 16508

Revised by: K. Gross

Approved by: D. Skrzypczak, J. Mulkey, C. Thale, G. Traicoff April 2009

Changes

704-0115-104 rC: Updates based on changes through v2.02.05 software. Moved Turret Diagnostics section from Maintenance and Safety manual to this manual, Machine Operation Basics section. April 2009
704-0115-104 rB: Updates based on changes through v2.02.03 software. Jan. 2009
704-0115-104 rA: Updates based on changes through v2.02.02 software. Added information to front matter about On-screen Help and accessing the On-screen Help in PDF format. Nov. 2008.

704-0115-103, June 2008, ECN 16508

Revised by: K. Gross

Approved by: D. Skrzypczak, C. Thale, G. Traicoff, June 2008

Changes

Updates based on changes through v2.02 software.

704-0115-102, October 2007, ECN 16334

Revised by: K. Gross


Changes

Updates based on v1.1, v1.2, and v2.0 software and the introduction of the Live Tooling (TMM Series) machine.
704-0115-101, 28 April 2005, ECN 15866

Revised by: K. Gross

Approved by: D. Bobeck, D. Skrzypczak, C. Thale, 4 March 2005

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### Utilities

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### Warmdown Gun

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### Warmup the Machine and Spindle

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### W-Axis

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### W Offset

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