

Toolroom Lathe Operator's Addendum

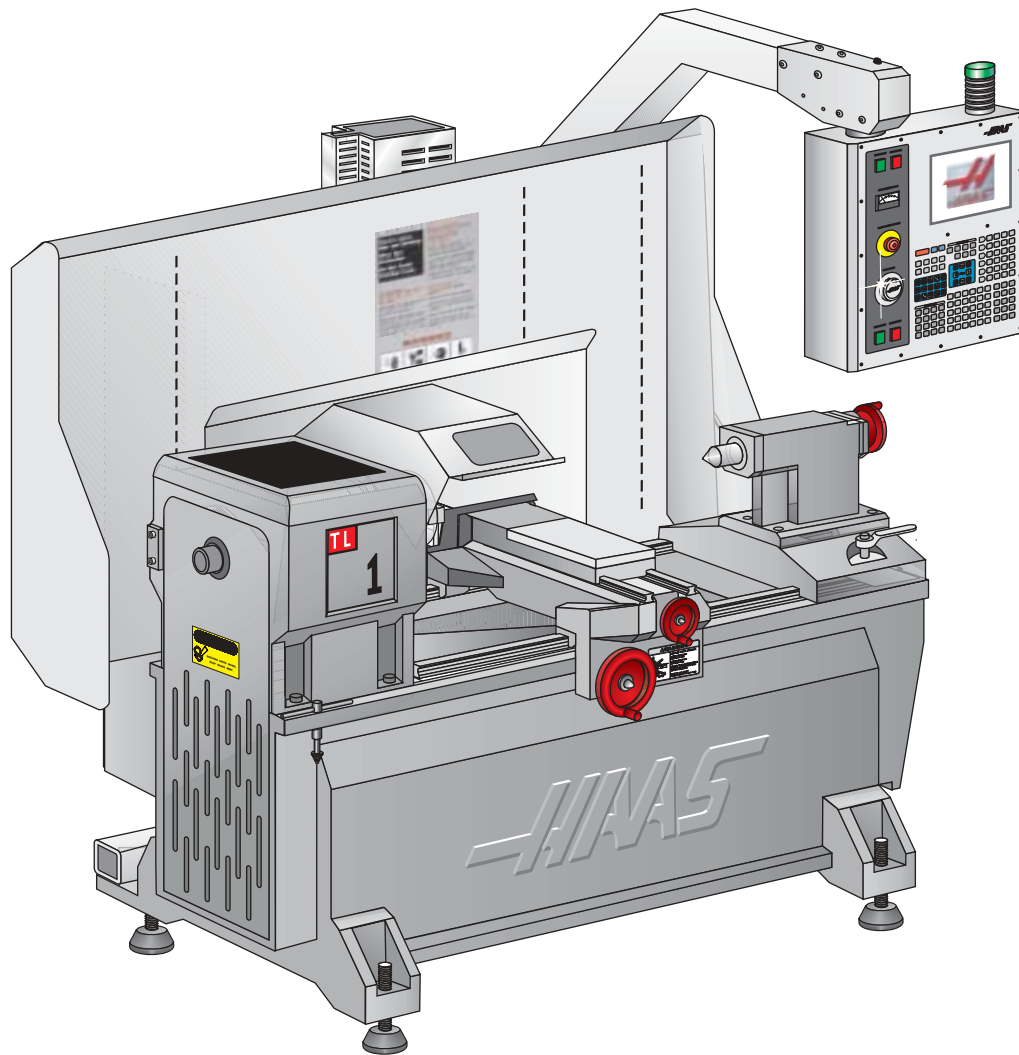


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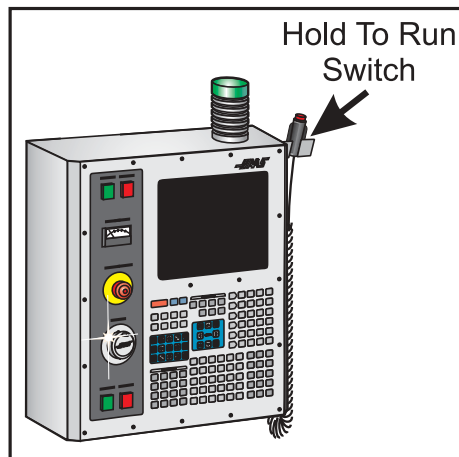
1. WARRANTY

All new HAAS Toolroom Lathes are warranted exclusively by the Haas Automation's ("Manufacturer") limited warranty against defects in material and workmanship for a period of six (6) months from the date of purchase, which is the date that a machine is installed at the end user. See the Warranty section of the SL-Series Operator's Manual for further warranty information.

2. SAFETY

Read and Follow all Safety Warnings – Familiarize yourself with the Safety section of the Operator's Manual. Be aware of the other people around you in the shop; flying chips can seriously injure people, who may not be a safe distance away. Always wear safety glasses. Initial cuts/setups should be cut at a slower speed to reduce the possibility of tool or machine damage. As with any open frame lathe, chip screens are highly recommended.

The Toolroom Lathe is equipped with a hand held safety switch. The button must be pressed any time automatic machining is taking place. Releasing the switch will cause the spindle and axes motion to stop. In order to resume automatic machining, the button and Cycle Start must be pressed (it is not necessary to hold down the Cycle Start switch).



Workholding Safety

The care and safety issues of the workholder's manufacturer must be followed to ensure a safe working environment and to avoid damaging the machine.

Cleaning and maintenance should be done often. Inspect the equipment for improper wear, cracks or missing pieces. Do not operate if any of these are found.

Do not start the lathe until it is set up properly. Interference between the workholding equipment and the lathe will cause damage to both.

Use the correct chuck size; do not allow the chuck jaws to protrude past the chuck body.

Use additional support if turning long parts

Remove the chuck wrench before starting the machine.

Do not modify workholding equipment.

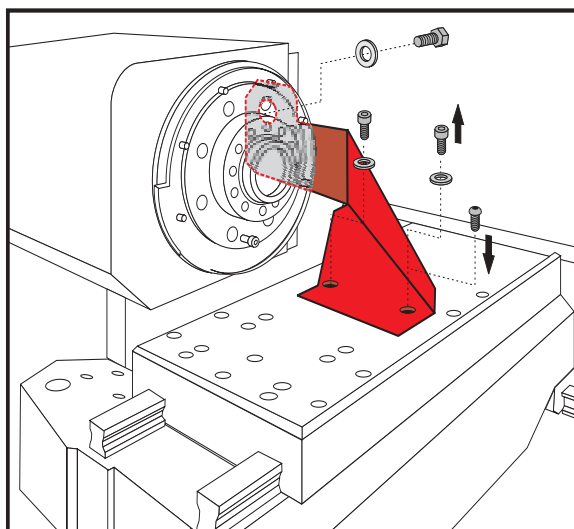
Never exceed the maximum speed of the chuck.

Additional safety issues are outlined in the SL-Series Operator's manual.

3. INSTALLATION

SHIPPING BRACKET REMOVAL

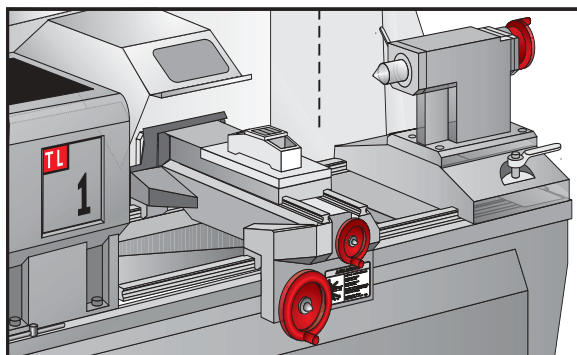
1. Remove the one (1) hex head that mount the shipping bracket to the spindle head, and the two (2) bolts that mount the shipping bracket to the table.
2. After removing the shipping bracket, replace the two (2) bolts removed from the table with the button head screws provided.



LEVELING

Please read through entire sequence before starting.

1. Position the cross-slide close to the chuck (this is how the machine was shipped), and place a machinist's level on the cross-slide, parallel to the X-axis.



2. Run the Z-axis left to right and level the machine by adjusting leveling screws. Verify that each leveling screw requires approximately the same torque to turn. This will ensure proper loading. Once completed tighten the lock nuts on the levelling screws.

ELECTRICITY REQUIREMENTS

IMPORTANT! REFER TO LOCAL CODE REQUIREMENTS BEFORE WIRING MACHINES.

ALL MACHINES REQUIRE:

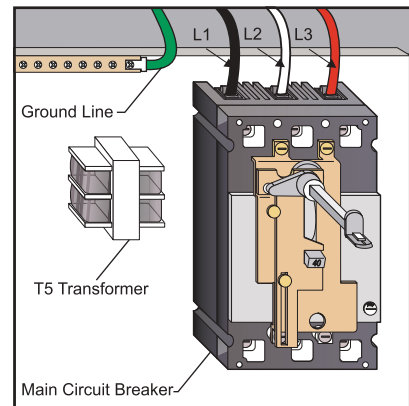
The power source must be grounded

Frequency range is 47-66 Hz

Line voltage that does not fluctuate more than +/-5%

Harmonic distortion is not to exceed 10% of the total RMS voltage

	Voltage Requirements
Input Voltage	208 3PH / 240V 1PH $\pm 10\%$
Power Supply Breaker	40 AMP
Haas Circuit Breaker	40 AMP
If service run from elec. panel is less than 100' use:	1PH - 8 GA WIRE / 3PH - 10 GA WIRE
If service run from elec. panel is more than 100' use:	1PH - 6 GA WIRE / 3PH - 8 GA WIRE



WARNING!

A separate earth ground wire of the same conductor size as the input power is required to be connected to the chassis of the machine. This ground wire is required for operator safety and for proper operation. This ground must be supplied from the main plant ground at the service entrance, and should be routed in the same conduit as the input power to the machine. A local cold water pipe, or ground rod adjacent to the machine cannot be used for this purpose.

The maximum voltage leg-to-leg or leg-to-ground should not exceed 260 volts.

Connecting the Toolroom Lathe to Power

The lathe can be powered from either 3 Phase 208 Wye Power (Neutral Grounded) or Single Phase 240V. In either case, a separate ground wire of the same size as the main conductors must be provided in the power cable.

1. With the main circuit breaker in the OFF position (rotate the shaft that connects to the breaker counterclockwise), connect the power lines to the top terminals of the main circuit breaker. Connect the separate ground line to the ground bus to the left of the circuit breaker.

NOTE: For Single Phase operation, only terminals L1 and L3 of the circuit breaker are used.

CAUTION! Make sure that the main circuit breaker is in the OFF position BEFORE changing the following transformer connections.

2. T5 is the small transformer mounted on the power supply assembly next to the main circuit breaker. This transformer has two input connectors that allow it to be connected to either 240V or 200V. If the incoming power is 220-250 VRMS, use the 240V connection. If the incoming power is 187-219 VRMS, use the 200V connection. Failure to use the correct input connector will result in either overheating of the main contactor or failure to reliably engage the main contactor.
3. The main power transformer is located at the bottom-right corner of the control cabinet. It also has two different input connections located at terminal board TB2. If the incoming power is 187-215 VRMS, connect wire 74 to the 208V position (center). If the incoming power is 216-250 VRMS, connect wire 74 to the 240V position (left).
4. Turn the main circuit breaker to the ON position. Pressing the Power-On button on the control panel. Verify that the fault indicator on the 320V Power Supply displays the number "1" (a normal power-up sequence). Verify the DC bus voltage on pins 6 & 7 are approximately 335VDC if powered from 240V, or closer to 290V if powered from 208V. If the voltage is not at least 260VDC, call the Service Department.
5. Turn the main circuit breaker OFF by rotating its shaft counterclockwise. Close the door, lock the latches and turn the power back on.

4. OPERATION

The Toolroom Lathe includes features aimed at the machinist who is used to a manually positioned lathe. These features implement the familiar slide and carriage stops, while giving full CNC capabilities. Haas Automation has added new features to the CNC control, to help the user develop automatic programs as well as ease the operation of manual mode.

At power up the Toolroom Lathe screen is displayed. This screen shows the X and Z position of the lathe as well as the spindle speed.

To navigate through the menus, use the left and right arrow keys. To select the menu press Write/Enter. Some menus have sub-menus, which again use the left and right arrow keys and Enter to select a sub-menu. Use the arrow keys to navigate through the variables. Key in a variable using the number pad and press Write/Enter. To exit the menu press Cancel.

To change to full CNC mode press any of the Display keys, except Offset. Press Handle Jog to return to the Toolroom Lathe menus.

A program entered through the Toolroom Lathe screens is also accessible in MDI mode (full CNC).

POWER UP

The lathe is powered up by pressing the "Power On" button. If necessary manually jog the lathe away from the workpiece. If equipped with an optional tailstock, unclamp it and move it to the farthest position from the chuck and retract the quill. Press "Power Up / Restart" and the lathe will automatically find home.

Note: Manually jog the X-axis towards the operator and the Z-axis away from the spindle, before pressing Power Up/Restart. This will save time when the machine automatically finds home.

OPTIONAL TAILSTOCK

Operation

Loosen both clamps at the base of the tailstock casting. The tailstock base is positioned manually, then secured in place using the two clamps. The hand wheel on the rear of the casting is then used to drive the quill in and out.

The tailstock has a #4 Morse taper which will accept a variety of tooling.

Caution: Be aware of the position of the tailstock and the programmed path of the tool.

FULL CNC

A complete list of G-Codes is described in the Operator's manual and includes examples to demonstrate the use of the G-codes.

SOFT STOPS

Soft Stops are available for both X and Z axes. These limits are always active while in jog mode, however they are not active during automatic cycles.

Note: A good machining practice is to set the soft stops at a point that will not allow the tool to hit the chuck. To do so, manually jog the tool towards the spindle. When it is at the closest safe distance, select the Z axis and press "Alter". This will use the current position of the Z axis as a stop. Repeat the process for the X-axis.

MANUAL MODE

Select Manual Mode by moving the highlighted tab to “Manual Mode” and press Write/Enter.

X and Z Axes

This mode is used to position the cutting tool using the hand wheels or the pendant jog handle. When the lathe is initially power up the handwheels position the cutting tools and “XZ MAN” is displayed at the bottom of the pendant screen. To change position control to the pendant jog handle, press the Shift key and X+ or X- to control the X-axis or the Shift key and Z+ or Z- to control the Z-axis. To return to hand wheel control, press the Shift key and X+, X-, Z+ or Z- again.

Note: The sequence of using “Shift” and selecting an axes will work on most screens.

Spindle

The spindle is commanded by entering a value for the spindle speed and pressing either the FWD or REV buttons. The spindle speed override keys (+/- 10%) can be used to adjust the commanded speed. This also works on most screens.

MACHINE POSITION

The upper left hand display, shows the coordinates of the machine. There are four coordinate modes, which can be scrolled through using the Page Up and Page Down buttons. These are:

Operator Display – This display is for the operator/setup person to use as desired, and is not used by the control for any positioning functions. In JOG mode, and with this display selected (Operator), select an axis (press X- or X+ for the X-axis or Z- or Z+ for the Z-axis). Then press the ORIGIN button to set the display to zero. This display will then show position relative to this newly reset zero position.

Work Display – This display shows how far the tool is away from the **X** and **Z** zero of the programmed part. On power up, it will display the value in work offset G54 automatically. The machine uses this coordinate system to run the part.

Machine Display – This display is the machine coordinate system that is automatically set on power up and the first ZERO RET. It cannot be changed by the operator or any work coordinate systems, and will always show the distance from machine zero.

Distance To Go – This display is an incremental display that shows the travel distance remaining before the axes stop, during a programmed movement.

TOOL OFFSETS

Tool Offset

Tool offsets are described in detail in the Operator’s manual. See the “Tool Nose Compensation” section within the “Programming” Tab for specific instructions on Radius, Radius Wear, Taper, and Tip.

Tool – The current tool number.

X Offset – The X axis offset for the current tool.

X Wear – The amount of tool wear, in the X axis for the current tool.

Z Offset – The Z axis offset for the current tool.

Z Wear – The amount of tool wear, in the Z axis for the current tool.

Radius** – The tip radius of the current tool.

Radius Wear – The amount of wear in the radius.

Taper – Compensation value for part deflection.

Tip** – Tool tip direction will be a value of 0-9.

Note: Tool offsets are required for running full G-code programs; they are not required by any of the single feature part programs.

**Must be entered to use Cutter Compensation; See the Operator’s manual for information on Cutter Compensation.

SEMI-AUTOMATIC MODE

This mode performs dual axis movement using a single handwheel. The active handwheel will be highlighted on the screen display. This feature is limited to cuts that can be performed with a single tool pass. Large radii and chamfers must be programmed in Multi-Pass mode.

Chamfer

The Chamfer mode is used to cut both I.D. and O.D. chamfers in a workpiece. Use the arrow keys to move through the variables, enter a value and then press "Write/Enter". Once the values have all been entered the display will show the chamfer to be cut against the model.

ID Chamfer – Press the upper left arrow key to activate.

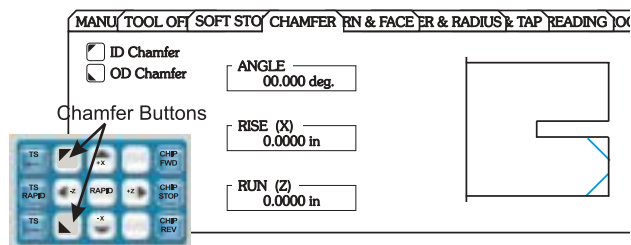
OD Chamfer – Press the lower left arrow key to activate.

Angle – The value entered will set the angle for the chamfer

Rise (X) – The rise (change in X) for an OD taper.

Run (Z) – The run (change in Z) for an OD taper.

To start the spindle, enter a value and press either spindle FWD or REV.



Note: I.D chamfers and tapers are at right angles to the O.D. chamfer or taper.

AUTOMATIC MODE

On each of the following interactive screens the user will be asked to enter data needed to complete common machining tasks. When all the data has been entered, pressing “Cycle Start” will begin the machining process.

The following is an example of an Automatic Mode screen and the definitions of the variables that will need to be entered.

Turn and Face - Feed

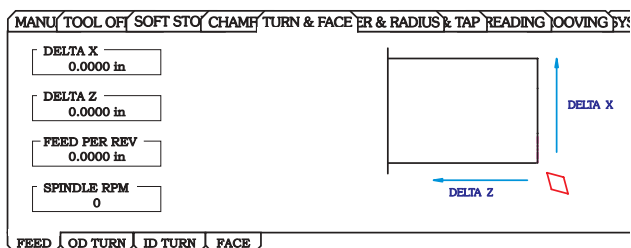
Delta X – X-axis distance for incremental move.

Delta Z – Z-axis distance for incremental move.

***Feed Per Rev.** – The distance the tool will move for each revolution of the spindle.

***Spindle RPM** – Commanded spindle speed.

*Mandatory Values



Programming Notes

Tapping Requires the Rigid Tap Option

Advanced Users

Some operations (for example, Threading) may need additional settings may need to be modified to create the required groove. These setting numbers are: 22, 28, 72, 73, 86, 95, 96, 99. See the definitions of the setting in the Operator's Manual.

In Graphics mode the tool paths are inverted; off centerline cuts show the tool approaching from the top of the screen. The control interprets the values and displays them as a customary CNC lathe, which has the tool on the other side of the part.

SYSTEM MODE

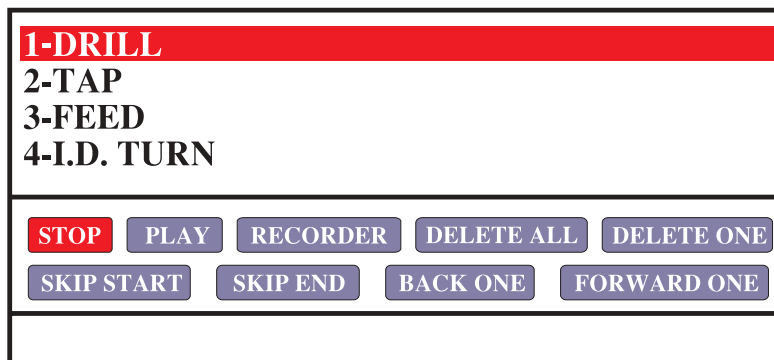
The System Mode screens are set up to show the user current alarms, an alarm history, an alarm viewer and write display messages. In addition the “Recorder” feature is in this group.

TOOLROOM LATHE RECORDER

Introduction

The Player/Recorder is used to create programs for multi-feature parts by combining part programs created using single feature automatic part programming

The recorder screen has a number of commands that are highlighted using the left and right arrow keys.



Sample after features have been recorded

These commands are:

Stop – Stops the recording.

Play – Starts the playback, starting with the highlighted process. The lathe will not start until Cycle Start is pressed.

Record – Begins recording the functions and entered data.

Delete All – Deletes all the recorded processes.

Delete One – Delete a single queued process. **Note that it will only delete the last process within the play list.**

If a process is not last, you will have to delete all the processes that occur after it until you get to the one you need.

Pressing the “Delete” key will delete the last process too.

Skip Start – Rewinds program to the first process. Pressing “Home” will return to the first process in the list as well.

Skip End – Forwards the program to the last process. Pressing “End” will skip to the end of the processes list as well.

Back One – Steps backwards through the processes. Pressing the up arrow on the keypad will do the same.

Forward One – Steps forwards through the processes. Pressing the down arrow on the keypad will do the same.

The operator can scroll through the commands using the up and down arrow keys.

Operation

Enter the Toolroom lathe screens, by pressing “Handle Jog”. Use the left and right arrows key to highlight the “System” tab and Press “Enter”. Use the left and right arrow keys to highlight the “Recorder” tab and press “Enter”.

Additionally, the Recorder mode can be entered quickly by pressing F4 from any Toolroom Lathe Intuitive Turning System screen. F4 will toggle the Recorder mode on and off.

Creating a Part Program

To develop a part program, set the Recorder/Player to “Record”, exit the System mode and enter the mode for the first process. Notice that when the control is in “Record” mode a blinking red “Recording” will display in the upper left.

Note: This feature will not record Semi-Automatic moves.

Set up the machining process, enter the values and press “Cycle Start”. The Toolroom Lathe will run the program and cut the first feature. Once finished, repeat the previous steps for the remaining part features. Note: Once Cycle Start is pushed, the operation is recorded, even if the operation is not completed.

Once all the machining processes are entered, return to the Recorder/Player (or press F4 to bring up the Recorder), highlight “Stop” and press “Enter” (or press F4), this stops the recording session.

You will notice that there is now a list of processes in the recorder window. These can be edited from this page using the other Recorder/Player buttons. An alternative for editing the operations is to execute the operation, then enter MDI mode. MDI mode reveals the machine code and can be edited there.

Running a Part

Load a part, go to the Recorder/Player mode, highlight “Play” and press “Enter”; this initiates the Player. Pressing the Cycle Start button will start the recorded machining process. The Player will start on the highlighted line in the queue. **Warning: The lathe will start, once Cycle Start is pressed.** The consecutive operations will execute, if desired, but Cycle Start must be pressed for each operation to continue. **Warning:** The operator must change tools, if required, prior to pressing Cycle Start for the next operation.

The program features can be verified by opening the Recorder/Player menu, highlight “Play”, and press “Enter”. Enter MDI mode, then press the “Graphics” key. This graphics display allows the user to view each operation prior to live cutting.

From the MDI mode, it is also possible to create a new G-code program in memory by placing the cursor at the top line, type Onnnnnn (the letter “O” followed by a program number), then press the “Alter” button. This will create a new program in memory. This is useful for editing, backup etc.

Editing the Processes

You can remove processes by deleting them one at a time, by highlighting “Delete One” and pressing enter, or removing the whole list, by highlighting “Delete All” and pressing “Enter”. Use the arrows keys to scroll within the list.

The other editing buttons, Skip Start, Skip End, Back One and Forward One, can be used to start the part program at a specific place. The operator can add operations anytime by pressing the F4 key (to enter the Recorder/Player mode and executing a new operation).

OTHER SYSTEM TABS

The “Alarms” tab, displays any current alarms. If an alarm is displayed, correct the problem press Reset and the Toolroom Lathe will continue.

The “Alarm History” tab will display the previous alarms. The arrow keys are used to scroll through the alarms.

The “Alarm Viewer” tab allows the user to enter an alarm number and once “Enter” is pressed the control will give the definition.

The “Messages” tab allows the user to leave a message to the next operator, or reminders for themselves. Messages are entered at the lower left of the screen. Press Enter to set the text in the message window. Use the arrow keys to navigate between the lines. The Delete key will delete the entire line the cursor is on.

5. MAINTENANCE

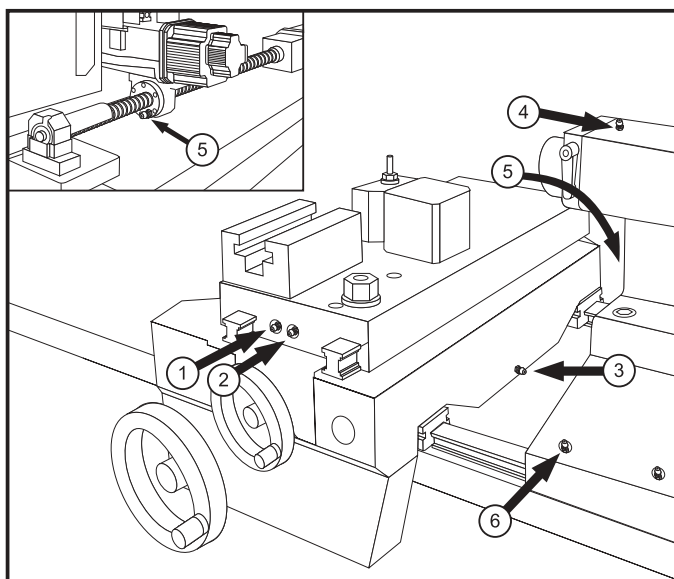
The linear guides and ball screws are manually lubricated. There is a grease fitting on the Z axis saddle which is plumbed to lubricate the four trucks. The Z-axis ball screw is lubricated through a grease fitting on the ball nut. This is accessible from the left side of the machine. The Z-axis rack should be lubricated with light oil to prevent rust.

2 grease fittings are located on the X-axis cross-slide. 1 is for the ball screw and the other is plumbed to the four trucks.

The optional tail-stock has one grease fitting on it to lubricate the quill.

To insure proper lubrication the X and Z axes should be cycled daily and lubricated weekly, using a general-purpose lithium grease.

Lubricate with a grease gun until visible grease comes out of the ball-nut and linear guide trucks.



1. X-axis cross-slide trucks
2. X-axis cross-slide ball screw
3. Z-axis saddle trucks
4. Tail-stock screw
5. Z-axis saddle ball screw
6. Tailstock Base; four places

The spindle is grease packed and needs no routine maintenance.