



HAAS SERVICE AND OPERATOR MANUAL ARCHIVE

Servo Bar 300 Operators Manual 96-0013 RevE English June 2002

- This content is for illustrative purposes.
- Historic machine Service Manuals are posted here to provide information for Haas machine owners.
- Publications are intended for use only with machines built at the time of original publication.
- As machine designs change the content of these publications can become obsolete.
- You should not do mechanical or electrical machine repairs or service procedures unless you are qualified and knowledgeable about the processes.
- Only authorized personnel with the proper training and certification should do many repair procedures.

**WARNING: Some mechanical and electrical service procedures can be extremely dangerous or life-threatening.
Know your skill level and abilities.**

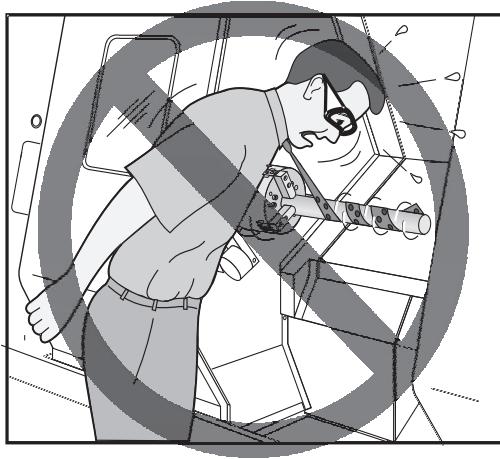
All information herein is provided as a courtesy for Haas machine owners for reference and illustrative purposes only. Haas Automation cannot be held responsible for repairs you perform. Only those services and repairs that are provided by authorized Haas Factory Outlet distributors are guaranteed.

Only an authorized Haas Factory Outlet distributor should service or repair a Haas machine that is protected by the original factory warranty. Servicing by any other party automatically voids the factory warranty.



HAAS SAFETY PROCEDURES

THINK SAFETY!



DON'T GET CAUGHT UP IN YOUR WORK

All milling and turning machines contain hazards from rotating parts, belts and pulleys, high voltage electricity, noise, and compressed air. When using CNC machines and their components, basic safety precautions must always be followed to reduce the risk of personal injury and mechanical damage.

Important – This machine is to be operated only by trained personnel in accordance with the Operator's Manual, safety decals, safety procedures and instructions for safe machine operation.



READ BEFORE OPERATING THIS MACHINE:

- ◆ Only authorized personnel should work on this machine. Untrained personnel present a hazard to themselves and the machine, and improper operation will void the warranty.
- ◆ Use appropriate eye and ear protection while operating the machine. ANSI approved impact safety goggles and OSHA approved ear protection are recommended to reduce the risks of sight damage and hearing loss.
- ◆ Do not operate the machine unless the doors are closed and the door interlocks are functioning properly. Rotating cutting tools can cause severe injury. When a program is running, the mill table and spindle head can move rapidly at any time in any direction.
- ◆ The Emergency Stop button is the large, circular red switch located on the Control Panel. Pressing the Emergency Stop button will instantly stop all motion of the machine, the servo motors, the tool changer, and the coolant pump. Use the Emergency Stop button only in emergencies to avoid crashing the machine.
- ◆ The electrical panel should be closed and the key and latches on the control cabinet should be secured at all times except during installation and service. At those times, only qualified electricians should have access to the panel. When the main circuit breaker is on, there is high voltage throughout the electrical panel (including the circuit boards and logic circuits) and some components operate at high temperatures. Therefore, extreme caution is required. Once the machine is installed, the control cabinet must be locked and the key available only to qualified service personnel.
- ◆ Consult your local safety codes and regulations before operating the machine. Contact your dealer anytime safety issues need to be addressed.
- ◆ DO NOT modify or alter this equipment in any way. If modifications are necessary, all such requests must be handled by Haas Automation, Inc. Any modification or alteration of any Haas Milling or Turning Center could lead to personal injury and/or mechanical damage and will void your warranty.
- ◆ It is the shop owner's responsibility to make sure that everyone who is involved in installing and operating the machine is thoroughly acquainted with the installation, operation, and safety instructions provided with the machine BEFORE they perform any actual work. The ultimate responsibility for safety rests with the shop owner and the individuals who work with the machine.
- ◆ **This machine can cause bodily injury.**
- ◆ **Do not operate with the door open.**
- ◆ **Do not operate without proper training.**
- ◆ **Always wear safety goggles.**
- ◆ **The machine is automatically controlled and may start at any time.**
- ◆ **The electrical power must meet the specifications in this manual. Attempting to run the machine from any other source can cause severe damage and will void the warranty.**
- ◆ **Do not press POWER UP/RESTART on the control panel until after the installation is complete.**
- ◆ **Do not attempt to operate the machine before all of the installation instructions have been completed.**
- ◆ **Never service the machine with the power connected.**
- ◆ **Improperly clamped parts machine at high feeds/feed may be ejected and puncture the safety door. Machining oversized or marginally clamped parts is not safe.**
- ◆ **Windows must be replaced if damaged or severely scratched - Replace damaged windows immediately.**
- ◆ **The spindle head can drop without notice. Personnel must avoid the area directly under the spindle head.**
- ◆ **Do not reset a circuit breaker until the reason for the fault is investigated. Only Haas-trained service personnel should troubleshoot and repair the equipment.**



♦ **Follow these guidelines while performing jobs on the machine:**

Normal operation - Keep the door closed and guards in place, while machine is operating.

Part loading and unloading – An operator opens the door or guard, completes task, closes door or guard before pressing cycle start (starting automatic motion).

Tool loading or unloading – A machinist enters the machining area to load or unload tools. Exit the area completely before automatic movement is commanded (for example, next tool, ATC/Turret FWD/REV).

Machining job set-up – Press emergency stop before adding or removing machine fixtures.

Maintenance / Machine Cleaner– Press emergency stop or power off the machine before entering enclosure.

Do not enter the machining area anytime the machine is in motion; severe injury or death may result.

Unattended Operation

Fully enclosed Haas CNC machines are designed to operate unattended; however, your machining process may not be safe to operate unmonitored.

As it is the shop owner's responsibility to set up the machines safely and use best practice machining techniques, it is also their responsibility to manage the progress of these methods. The machining process must be monitored to prevent damage if a hazardous condition occurs.

For example, if there is the risk of fire due to the material machined, then an appropriate fire suppression system must be installed to reduce the risk of harm to personnel, equipment and the building. A suitable specialist must be contacted to install monitoring tools before machines are allowed to run unattended.

It is especially important to select monitoring equipment that can immediately perform an appropriate action without human intervention to prevent an accident, should a problem be detected.

MODIFICATIONS TO THE MACHINE

DO NOT modify or alter this equipment in any way. If modifications are necessary, all such requests must be handled by Haas Automation, Inc. Any modification or alteration of any Haas machining center could lead to personal injury and/or mechanical damage and will void your warranty.



SAFETY DECALS

To help ensure that CNC tool dangers are quickly communicated and understood, hazard symbol decals are placed on Haas Machines in locations where hazards exist. If decals become damaged or worn, or if additional decals are needed to emphasize a particular safety point, contact your dealer or the Haas factory.

Never alter or remove any safety decal or symbol.

Each hazard is defined and explained on the general safety decal, located at the front of the machine. Particular locations of hazards are marked with warning symbols. Review and understand the four parts of each safety warning, explained below, and familiarize yourself with the symbols on the following pages.

NEVER OPERATE THIS MACHINE WITH THE DOORS OPEN





MILL WARNING DECALS

DANGER



Electrocution hazard.
Death by electric shock can occur.
Turn off and lock out system power before servicing.



Automatic Machine may start at any time.
Injury or death could be caused by untrained operator.
Read and understand operator's manual and safety signs before using this machine.



Risk of serious physical injury. Machine cannot protect from toxins.
Coolant mist, fine particles, chips, and fumes can be dangerous.
Follow specific material manufacturer's material safety data and warnings.



Risk of serious bodily injury.
The enclosure may not stop every type of projectile.
Double-check job set up before beginning any machining operations.
Always follow safe machining practices. Do not operate with doors or windows open or guards removed.



Risk of fire and explosion.
Machine is not designed to resist or contain blasts or fire.
Do not machine explosive or flammable materials or coolants.
Refer to specific material manufacturer's material safety data and warnings.



Risk of bodily injury.
Serious cuts, abrasions, and physical injury may result from slips and falls.
Avoid using the machine in wet, damp, or poorly lit areas.



Severe injury can occur.
Moving parts can entangle, trap, and cut. Sharp tools or chips can cut skin easily.
Ensure the machine is not in automatic operation before reaching inside.



Risk of eye and ear injury.
Flying debris into unprotected eyes can cause loss of sight.
Noise levels can exceed 70 dBA.
Must wear safety glasses and hearing protection when operating or in the area of machine.

Safety windows may become brittle and lose effectiveness when exposed to machine coolants and oils over time. If signs of discoloration, crazing, or cracking are found, replace immediately. Safety windows should be replaced every two years.

WARNING



Severe injury can occur.
Moving parts can entangle and trap.
Always secure loose clothing and long hair.



Risk of serious bodily injury.
Follow safe clamping practices. Inadequately clamped parts can be thrown with deadly force.
Securely clamp workpieces and fixtures.



Impact hazard.
Machine components can crush and cut.
Do not handle any part of the machine during automatic operation.
Always keep clear of moving parts.

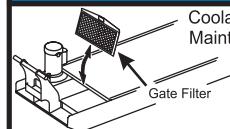


Moving parts can crush.
The tool changer will move in and crush your hand.
Never place your hand on the spindle and press ATC FWD, ATC REV, NEXT TOOL, or cause a tool change cycle.

- Do not allow untrained personnel to operate this machine.
- Do not alter or modify machine in any way.
- Do not operate this machine with worn or damaged components.
- No user serviceable parts inside. Machine must be repaired or serviced by authorized service technicians only.

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NOTICE



Coolant Tank Maintenance
Gate Filter

Clean the filter screen weekly.

Remove the coolant tank cover and clean out any sediment inside the tank weekly.

Do not use plain water, permanent corrosion damage will result. Rust inhibiting coolant is required.

Do not use toxic or flammable liquids as a coolant.



LATHE WARNING DECALS

DANGER



Electrocution hazard.
Death by electric shock can occur.
Turn off and lock out system power before servicing.



Automatic Machine may start at any time.
Injury or death could be caused by untrained operator.
Read and understand operator's manual and safety signs before using this machine.



Risk of serious physical injury. Machine cannot protect from toxins.
Coolant mist, fine particles, chips, and fumes can be dangerous.
Follow specific material manufacturer's material safety data and warnings.



Risk of serious bodily injury.
The enclosure may not stop every type of projectile.
Double-check job set up before beginning any machining operations.
Always follow safe machining practices. Do not operate with doors or windows open or guards removed.



Risk of fire and explosion.
Machine is not designed to resist or contain blasts or fire.
Do not machine explosive or flammable materials or coolants.
Refer to specific material manufacturer's material safety data and warnings.



Risk of bodily injury.
Serious cuts, abrasions, and physical injury may result from slips and falls.
Avoid using the machine in wet, damp, or poorly lit areas.



Severe injury can occur.
Moving parts can entangle, trap, and cut. Sharp tools or chips can cut skin easily.
Ensure the machine is not in automatic operation before reaching inside.



Risk of eye and ear injury.
Flying debris into unprotected eyes can cause loss of sight.
Noise levels can exceed 70 dBA.
Must wear safety glasses and hearing protection when operating or in the area of machine.

Safety windows may become brittle and lose effectiveness when exposed to machine coolants and oils over time. If signs of discoloration, crazing, or cracking are found, replace immediately. Safety windows should be replaced every two years.

WARNING



Severe injury can occur.
Moving parts can entangle and trap.
Always secure loose clothing and long hair.



Risk of serious bodily injury and impact hazard.
Unsupported bar can whip with deadly results.



Risk of serious bodily injury.
Inadequately clamped parts can be thrown with deadly force.
High RPM reduces chuck clamping force.
Do not machine using an unsafe setup or exceed rated chuck RPM.



Do not extend barstock past end of drawtube without adequate support.
Do not apply excessive machining forces, doing so can dislodge the bar from support.
Do not allow the carriage or tool to strike the steady rest or tailstock; the part may come loose.
Do not over tighten steady rest.

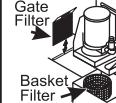


Moving parts can cut.
Sharp tools can cut skin easily.
Do not handle any part of the machine during automatic operation.
Do not touch rotating work pieces.



- Do not allow untrained personnel to operate this machine.
- Restrict access to open frame lathes.
- Use steady rest or tailstock to support long bars and always follow safe machining practices.
- Do not alter or modify machine in any way.
- Do not operate this machine with worn or damaged components.
- Machine must be repaired or serviced by authorized technicians only.

NOTICE



Clean the filter screen weekly.

Remove the coolant tank cover and clean out any sediment inside the tank weekly.

Do not use plain water, permanent corrosion damage will result. Rust inhibiting coolant is required.

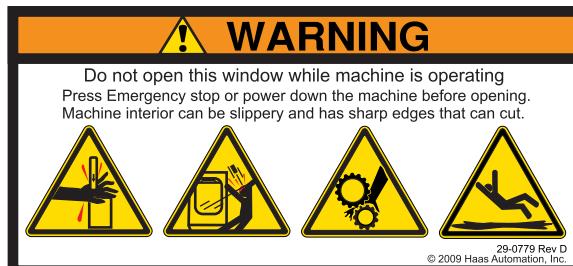
Do not use toxic or flammable liquids as a coolant.

29-0765 Rev F
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OTHER SAFETY DECALS

Other decals may be found on your machine, depending on the model and options installed:





1.0 SERVO BAR

1.1 OVERVIEW

WARNING!

Read the entire addendum before attempting to install or operate the Servo Bar 300. Serious injury or damage could result from not following proper procedures.

This Operator's Manual is to be used in conjunction with the Haas SL-Series Operator's Manual. This manual provides information on Barfeeder installation, programming and operation. Information provided (e.g., Macro Variables and G Codes) is in addition to what is currently in the SL-Series Operator's Manual.

The Servo Bar 300 is a servo driven Barfeeder designed specifically for the Haas SL-Series. It can be used with the HL Series models also. It features a heavy-duty yet compact design and can handle barstock from 1/4" to 3-1/8" diameter and up to 60" in length. Setup and operation is quick and easy using the single-point height adjustment handle and a few G-Codes. The Barfeeder is fully integrated with the Haas CNC Control and can be programmed to count either the number of bars used, parts made, or length of bar run.

**1.2 OPERATION OVERVIEW**

Main components of the Barfeeder are the transfer tray, bar load assembly and bar feed assembly (Refer to Figure 1.0). The adjustable charging tray, located at the rear of the machine, is capable of storing a single layer of 60" long bars up to 30" wide. The bar load assembly consists of cam driven lifting forks spaced across the length of the transfer tray, which load bars from the charging tray to the transfer tray (Refer to Figure 1.0). The bar feed assembly consists of a bar load finger, which pushes the bar into the lathe, and the bar feed push rod, which feeds the bar through the lathe.

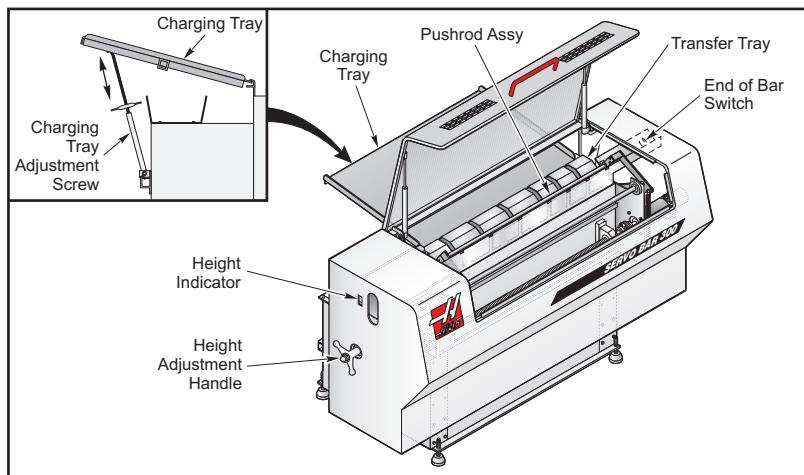


Figure 1.0 The HAAS Barfeeder

A spindle liner must be installed in the lathe spindle and the transfer tray must be aligned to it before the machine is ready for operation. Once a barfeed (G105) is called, the loading forks pick up a bar from the charging tray and place it onto the transfer tray (Refer to Figure 1.1 and 1.2). The bar load finger then pushes the bar until it trips the End of Bar Switch (Refer to Figure 1.0). This position of the bar load finger is used to calculate the current bar length and position. The bar load finger then pushes to the end of its travel and retracts. Then the bar feed push rod moves into position and feeds the bar into the lathe to a programmed position. That position is set by macro variable #3101 Initial Barfeed Increment (established during initial setup). Once the push rod comes to a complete stop, the chuck clamps and the push rod retracts a programmed amount. The barstock is then ready to be machined. The Barfeeder will continue operation until it has fed the number of bars or parts or length of barstock programmed.

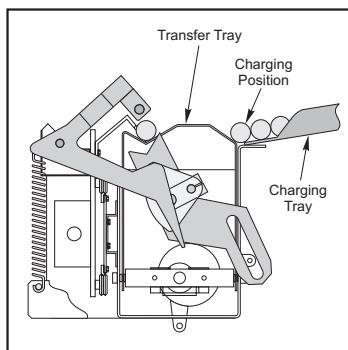


Figure 1.1 Transport assembly

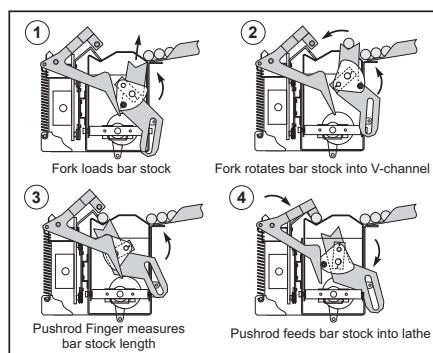


Figure 1.2 Barfeeder operation



When using a collet chuck, it **must** be a pull back chuck, any other type will result in inaccuracies. A 3-jaw chuck can be used with the bar feeder, but any chuck that does not pull the stock back against the push rod can cause inaccuracies.

Parameter 249 (Delay after chuck is clamped) has been set to values which match the size of the lathe that it will be attached to (i.e. 1000 for a SL-20, 2000 for a SL-30 and 3000 for a SL-40). Time the closing of the chuck and set the parameter 249 to reflect this time. A value of 1000 equals 1 second. If it takes 1.5 seconds for the chuck to close then set parameter 249 to a value of 2000 to ensure the chuck is closed before the pushrod pulls back.

If the collet or chuck is changed for a different one or the bar feeder is moved, then G105 Q4 and G105 Q2 procedures must be repeated to reset the reference position.

The end of bar remnant must be collected to same way the parts are. Remove the remnant by hand or if using the parts catcher, program it to collect the remnant. Discharge tubes or auger pans that have remnants pushed through them will not be covered under the warranty.

GENERAL REQUIREMENTS

Operating Temperature Range	41°F to 104°F (5 to 40°C)
Storage Temperature Range	-4°F to 158°F (-20 to 70°C)
Ambient Humidity:	less than 90% relative humidity, non-condensing
Altitude:	0-7000 ft.

**1.3 USAGE RECOMMENDATIONS****MAINTENANCE**

- Grease the barfeed push rod and bushing frequently to assure smooth operation.
- Grease the barfeed vee roller tracks and ballscrew along their length on a regular basis.
- Grease the rotation control shaft frequently.
- Clean the transfer tray. Do not allow buildup of debris.

BARFEEDER

- Successful barfeeding requires a smooth bar path. Any sharp corner in the bar path must be removed. Sharp corners may cause feeding problems.
- Collets and chucks should have lead-in corners chamfered.
- Leading end of bar should be chamfered.
- When manufacturing custom liners or small bar discs use a generous lead in chamfer.
- Check for obstructions in bar path after any mishaps.
- Liner must be centered in the spindle and be just large enough to allow the bar to pass through freely.
- Bar should not extend past the end of the liner when machining.
- Bar should be wiped clean before placing on charging tray.
- Do not use bent or irregular stock.
- Use a drawback collet or chuck. Push rod must contact bar during clamping. If push rod is not in contact during clamping length variation will occur.
- End of bar that contacts pushrod must be cut at 90° and face of protrusions or length variation will occur.
- Elevate the charging tray just enough for the bar to feed. Too much height will cause bar overrun and the possibility of multiple bars being transferred.
- All bars loaded from the charging tray should be at least 10" long.
- When feeding large diameter heavy material bar length should not exceed 36".
- Short bars should be placed on the charging tray close to the lathe.
- 3/8" push rod, when used, must be withdrawn from the liner before the spindle reaches speed.

SUGGESTIONS FOR RUNNING HEX STOCK

- When the charging tray and height adjustment are correct, the bar will usually be placed in the transfer tray at the same orientation.
- The bar lead end should have flats beveled at a 30° degree angle.
- Collets lead in corners should be beveled.
- Set spindle orient option to align the collet flats bar with loaded bar flats.
- When running 5/8" and smaller hex stock the first two spindle liner wafers should be hex shaped and be oriented with the collet.

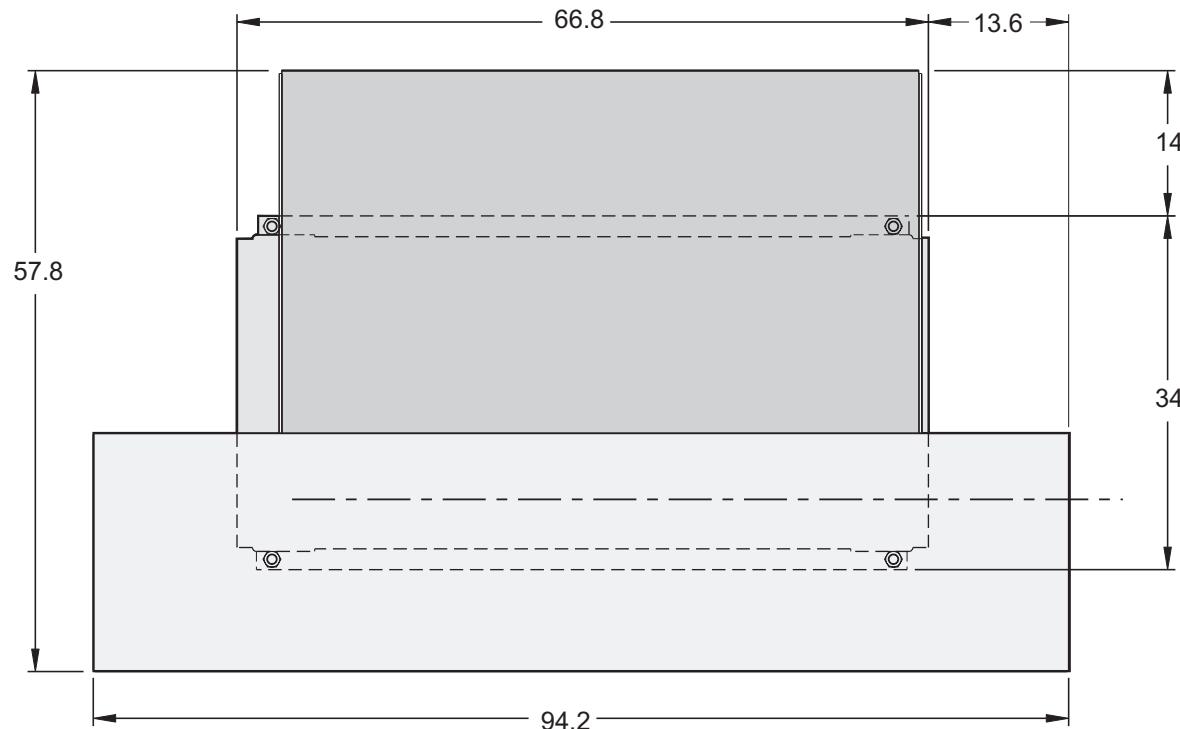
**2.0 INSTALLATION**

NOTE: Spindle liner guide should be installed prior to setting the Barfeeder in place. Refer to liner guide installation section.
Parameters 240/244 must be set or the Barfeeder will not operate. The values must match those on the Inspection Report.

Tools Required:

Test Bar 1" O.D. x 12" L.
3/16" Hex Socket Head Wrench
Red-i Grease
Way Lube

3/4" Wrench
Pallet Jack (2000lbs. capacity)

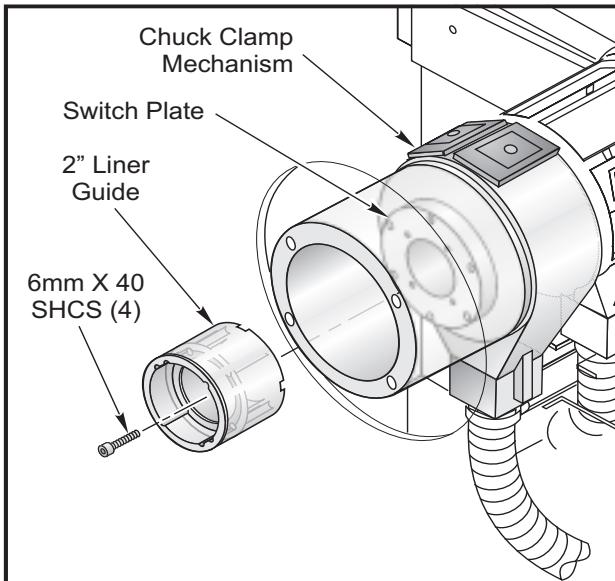
2.1 BARFEEDER FOOTPRINT

**2.2 LINER GUIDE INSTALLATION**

The spindle liner guide is attached to the back of the chuck clamp mechanism switch plate using metric socket head cap screws with "LOCTITE 242" liquid thread lock applied. Spindle liner guide is available in two sizes depending on spindle through hole size:

2" guide kit (part# LGK200) or 2.5" guide kit (part# LGK250).

Liner guide kits are installed at the Haas factory for all lathes ordered with the Servo Bar 300 option.

**2" and 2 1/2" guide kit installation**

LINER318, contains the liners and liner guide used on SL30 big bore option only. The Guide is a long tube that slides into the spindle draw tube and is installed as follows:

1. Apply grease to liner guide O-rings.
2. Slide the liner guide into the back of clamp mechanism until the back liner O-ring is seated in the switch plate. The rear most O-ring seats in LMC clamps, the other seats in Kitagawa clamps.
3. Install two liner retainer clamps 180 degrees apart with metric socket head cap screws and liquid thread locker.
4. Install the coolant dam.

To remove, or replace liner 318 with the bar 300 in place, proceed as follow.

1. Remove $\frac{3}{4}$ " push rod 20-6482, and the left end push rod guide.
2. Lower transfer table to lowest position.
3. Lift right end of the bar feeder, and slide the leveling pads to the side.
4. Lower barfeeder so that leveling screws are on the floor.
5. Remove or install 318 liner.
6. Reverse process for reassembly.



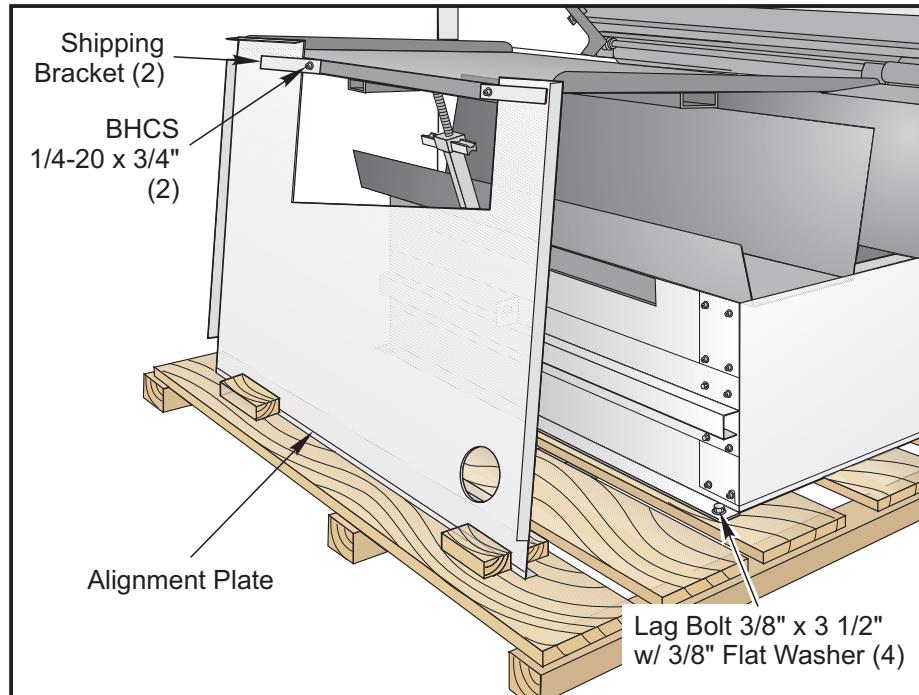
2.3 UNCRATING

NOTE: Unless you are certain that you will not be shipping the machine, the crate and packing materials should be stored for reuse. Be careful not to damage the crate and the other packing materials.

1. Pry off the clips that hold the crate together and remove the side panels.

CAUTION! The side panels are heavy — be careful that they do not drop on your feet or tip over on you.

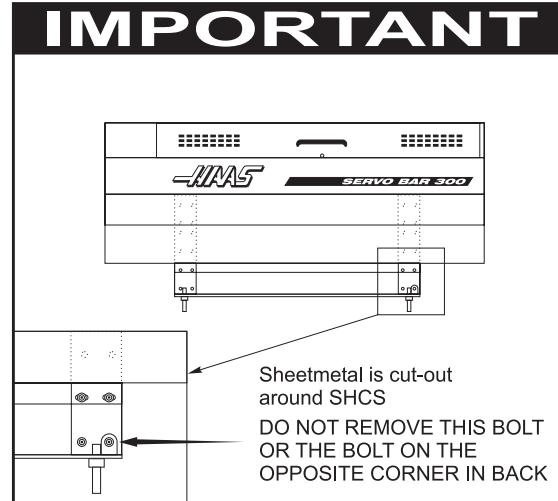
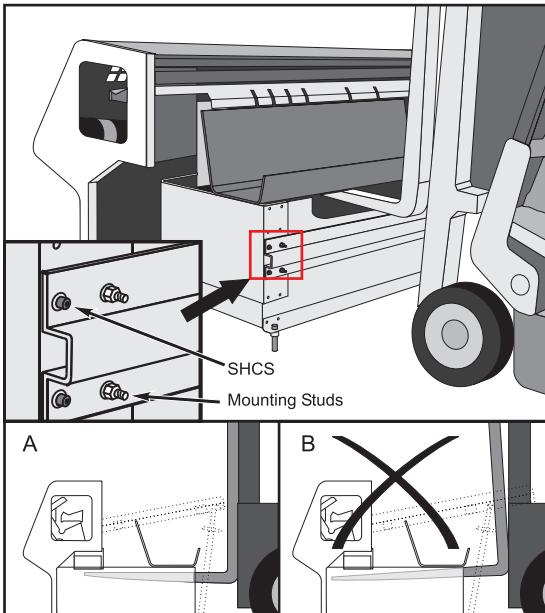
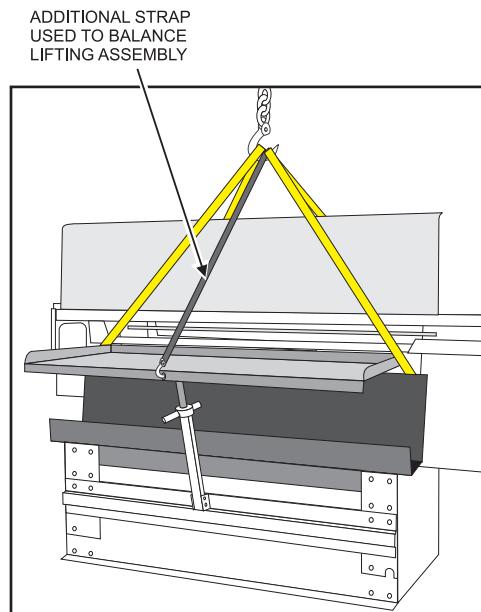
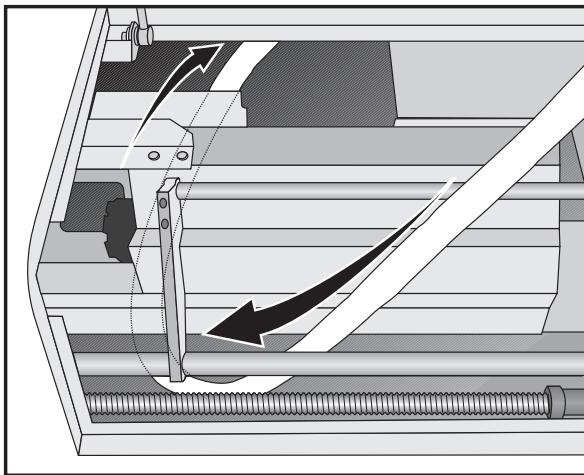
2. Remove the plastic cover.
3. Unbolt the alignment plate and the shipping brackets from the charging table.
4. Remove the four lag bolts holding the base to the pallet.
5. Lift the machine off of the pallet.



**2.3 BARFEEDER HEIGHT ADJUSTMENT****Using a Forklift**

A simple way of quickly adjusting the height of the Haas barfeeder is with the use of a forklift.

From the back of the barfeeder, position the forks under the bar feeding mechanism. Be careful not to lift from the storage tray, see the following picture. Look through the end sheetmetal to properly position the forks.
Caution: Damage to the front sheet metal will occur if the forks are inserted too far.

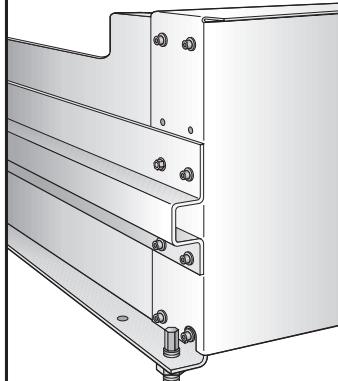
**Using Lifting Cables**

Support the weight of the barfeeder with the forklift or cables. Remove all the SHCS at each corner of the base, except for the lower outside bolts on the front legs (see first illustration on page one). Raise the barfeeder to the desired height, and replace the bolts (See the following illustration). Note that the studs on the rear of the barfeeder are to fasten the base and rear support bracket together. These are not to be removed.



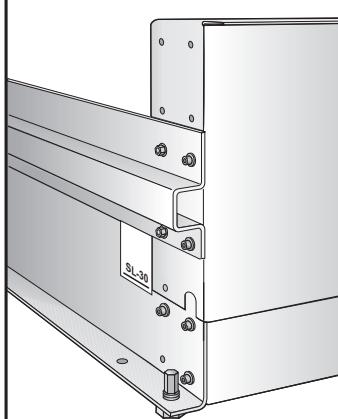
The following illustrations show the three height positions of the bar feeder with relation to specific machines:

SL-10
SL-20
Mini Lathe



In this position the barfeeder will align with the following machines, note that this is the shipping configuration of the barfeeder: Mini-Lathe, SL-10, SL-20, SL-20B, SL-20 5K, SL-20 7K, and TL-15.

SL-30

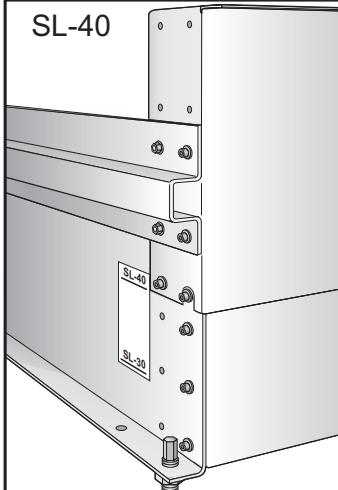


Position the height of the barfeeder here for the following machines: SL-30, SL-30 3K, and SL-30B

The barfeeder is at the correct height when the bottom of the sheetmetal is at the "SL-30" line of the sticker.

Note: The sticker is not in view when the barfeeder is in the shipping configuration.

SL-40



Position the barfeeder as shown in the illustration for the following machines: SL-40 and SL-40B

The barfeeder is at the correct height when the bottom of the sheetmetal is at the "SL-40" line of the sticker.

Note: The sticker is not in view when the barfeeder is in the shipping configuration.

**2.4 BARFEEDER POSITIONING**

The alignment plate is used to position the Barfeeder.

1. Loosen and raise the left rear leveling screw of the lathe 1/2" above the leveling pad.
2. Position the appropriate slot (see Figure 2.1) of the alignment plate around the front left leveling screw of the lathe. Rotate the alignment plate around the front left screw until the appropriate rear alignment plate hole is aligned under the left rear leveling screw of the lathe.
3. Tighten the left rear leveling screw of the lathe against its leveling pad.
4. Position leveling pads under the appropriate holes (see Figure 2.2) on the left side of the alignment plate.
5. Lift the Barfeeder with a pallet jack or forklift and position the right side leveling screws centered over the appropriate holes and leveling pads under the alignment plate.
6. Position leveling pads centered under the left side leveling screws and lower the Barfeeder.

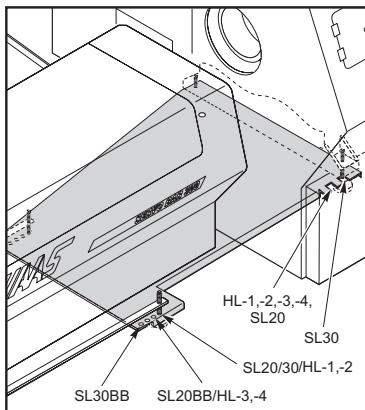


Figure 2.1 Barfeeder alignment plate to lathe

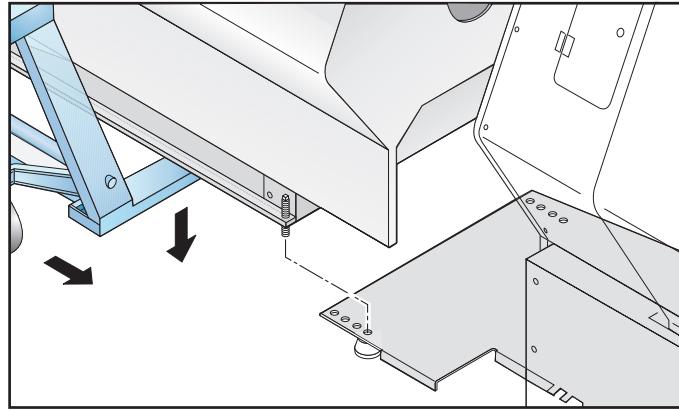
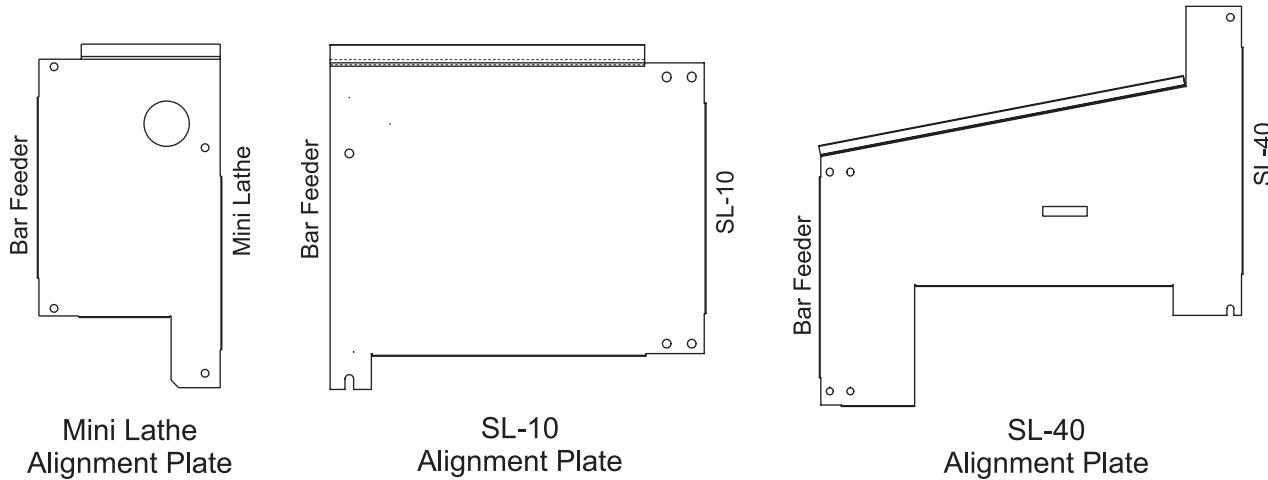


Figure 2.2 Connecting Barfeeder to lathe with alignment plate

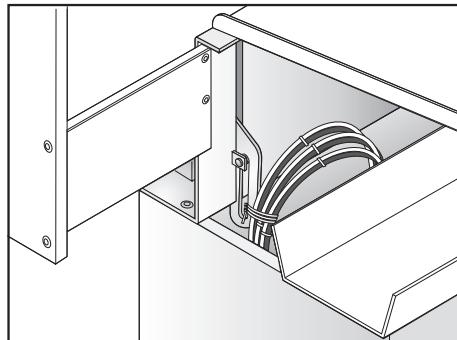


Above are three other alignment plates as needed for their respective machines. Pictured in figures 2.1 and 2.2 is the alignment plate for the SL-20 and SL-30.

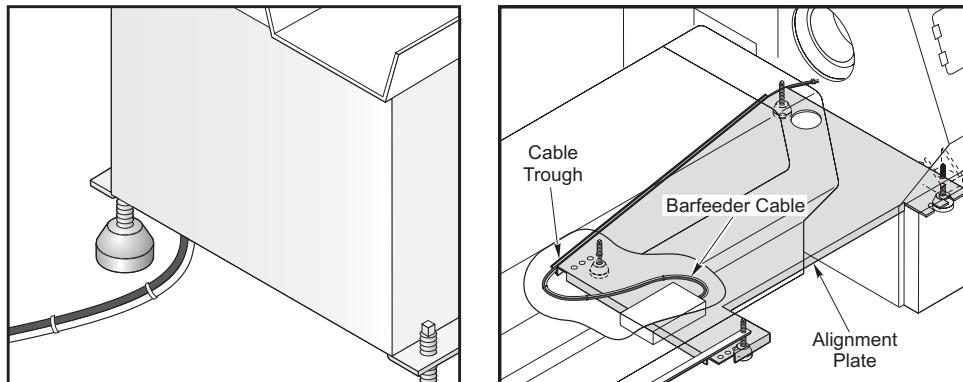
**2.5 BARFEEDER ELECTRICAL CONNECTIONS****WARNING!**

Barfeeder cables must be routed correctly to avoid damage

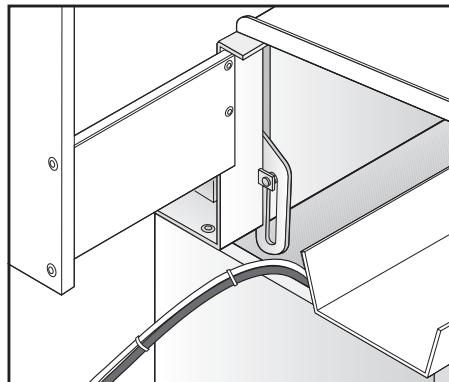
1. Cut the cable ties holding the Barfeeder cables to the bracket.



2. Route cables under the machine and through the trough in the alignment plate as shown below:



CAUTION! Routing cables over the side of the machine (as shown below) will result in pinched or broken cables.



Do Not route cables as shown.



3. Connect the amphenol connector (**Brush motor** barfeeders have a serial plug also) from the Barfeeder to the auxiliary ports of the lathe control (Refer to Figure 2.3). Power up the lathe.
4. **Barfeeders with Brush motors:** Verify that Parameters 240/244 are set correctly. The values should match those found on the inside of the barfeeder. Verify that parameter 209 common switch 2 AUX JOG NACC is set to 1.

Barfeeders with Brushless motors: Verify that parameters 395 409 and 415 are set to the values found on the inside of the barfeeder. Ensure that Parameter 315 bit 7 is set to 1.

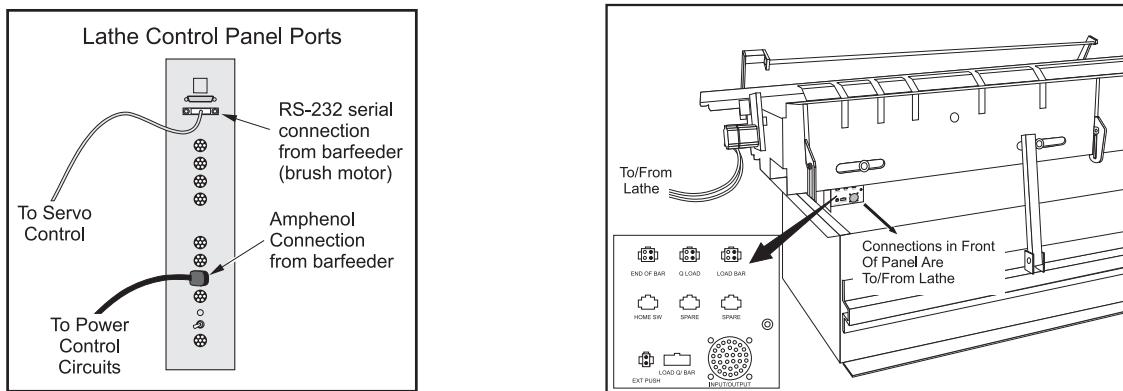


Figure 2.3 Barfeeder and lathe connections

2.6 BARFEEDER LEVELING

1. Open the door of the Barfeeder. Command G105 Q7 to set the push rod in the down position. Press V on the keyboard then the handle jog mode button to enable push rod movement.
2. Use the jog handle to move the push rod towards the spindle until it just enters the spindle liner. Measure the vertical alignment of the push rod centerline to the centerline of the spindle liner. Adjust the leveling screws of the Barfeeder until the push rod is vertically aligned with the spindle.
3. Measure the horizontal alignment of the push rod centerline to the centerline of the spindle liner. Adjust the fore/aft positioning of the Barfeeder until the push rod is horizontally aligned with the spindle.
4. Jog the push rod until it is flush with the spindle face. Manually lift the push rod vertically to spindle center and check only for horizontal alignment.
5. Once the push rod is aligned at both ends of travel command G105 Q6 to return the push rod to its home position.

**2.7 ESTABLISH END OF BAR POSITION**

1. Place the 12" gauge bar supplied with the machine in the charging tray against the side closest to the lathe.
2. In MDI mode on the lathe control enter G105 Q5 and press cycle start. The Barfeeder will load the bar and push it up to actuate the end of bar switch then stop.
3. Remove the gauge bar and begin setup procedures.

If the 12" gauge bar is unavailable, a substitute bar may be used provided parameter 325, Standard Bar Length, is reset to the new bar length. To do this measure the new bar length, multiply it by 10000 and enter the number as the new parameter value. The default value is 120000.

3.0 SETUP

All Haas Servo Bar units are supplied with a "Universal" Liner system. All standard SL/TL series turning centers utilize a drawtube/hydraulic actuator system and no liner will be used for maximum bar capacity.

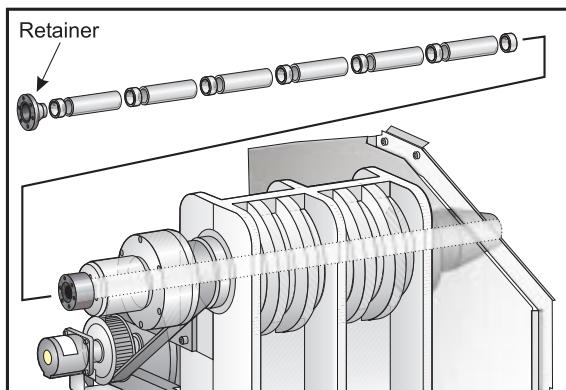
The type of stock and the size of turning center will decide whether a **universal** liner or a specific size **steel tube** liner is used.

The Haas barfeeder can utilize a number of different spindle liners in order to machine a variety of shapes and sizes of barstock.

The Spindle Liner Guide must be installed prior to barfeeder installation, where applicable. Liner Guide mounting screws must be installed with Loctite 242.

MINI LATHE LINER

Liner 5C .25" to 1" (6.35-25.4)

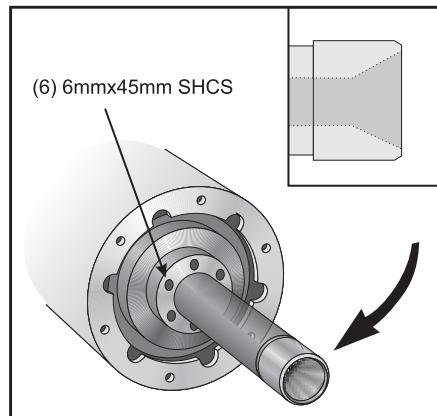


Pucks must be bored to the size of the raw material. Assemble pucks and spacers in the drawtube, starting and ending with a puck. The retainer is fastened to the end of the drawtube using the (3) 10-32 x 3/4 SHCS included in the kit.

SL10, SL-20 7K SPINDLE LINER

Liner 5 .25" to 1" (6.35-25.4mm)

Liner 6 .25" to 1.5" (6.35-38.1mm)



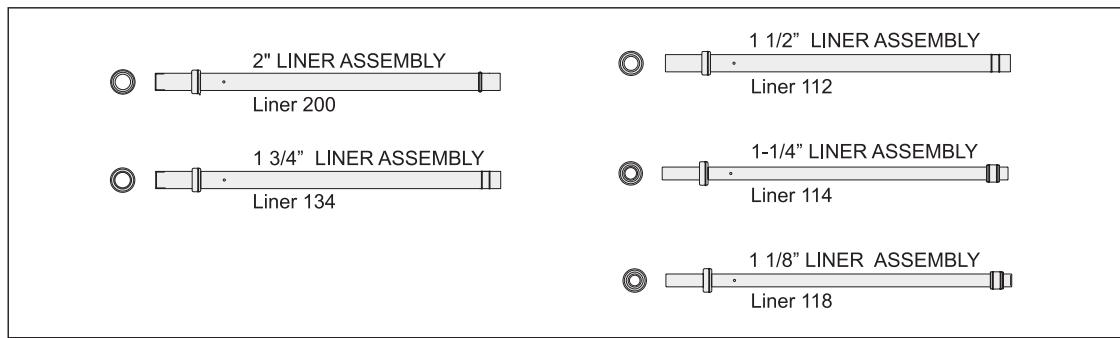
When the Barfeeder is attached to an SL-10 or SL-20 with the 7K Spindle option, a universal liner tube must be installed in the spindle drawtube using (6) SHCS. Unscrew the retainer from the liner tube end to install pucks and spacers. Pucks must be bored to the size of the raw material.


SL-20, SL-30 LINER INSTALLATION

Standard **steel tube** type barfeeder liners are available as follows:

Haas P/N	Size (mm)	Lathe Model
Liner118	1.125 (28.6)	SL-20, SL-20B, SL-30
Liner114	1.25" (31.8)	SL-20, SL-20B, SL-30
Liner112	1.5" (38)	SL-20, SL-20B, SL-30
Liner134	1.75" (44.5)	SL-20, SL-20B, SL-30
Liner200	2" (50.8)	SL-20B, SL-30

Note: The Bar Feeder system for SL-20, TL-15 and SL-30 turning centers, is supplied with a LGK 200 or LGK250 LGK 300 liner guide kit. These kits are required in order to use the steel liners 100 through 200.



CAUTION! Spindle liner must match the bar stock size or damage to the Barfeeder and spindle will occur.

NOTE: The spindle liner must have an inside diameter approximately 1/16" larger than the outside diameter of the turning stock that will be used in the machining operation.

1. Lower the transfer table using the height adjustment handle on the left side of the enclosure.
2. Apply grease to spindle liner O-rings.
3. For 2 1/2" bore machines remove the O-ring on the chuck end of the liner and slide the liner spacer over the O-ring groove.
4. Slide spindle liner into the back of spindle until the back liner O-ring is seated in the liner guide and the liner O-ring collar is flush with the liner guide.

**BAR-PULLING WITH THE SL-20, TL-15 AND SL-30**

Bar-pulling requires the use of spindle liners (universal or specific type) and a Liner Guide Kit (LGK 200 or LGK 250 or LGK 300) unless the maximum bar diameter is being used for a particular drawtube. These liner guides are designed for the **steel-tube** style of spindle liners, Liner 100 through Liner 200. (See note above for model)

The Liner Guide Kits are aluminum adaptors which support the spindle liners and ensure that the bars can be pulled accurately through the spindle. Not using these kits and liners will result in damage to the spindle bore and/or improper gripping within the chuck jaws.

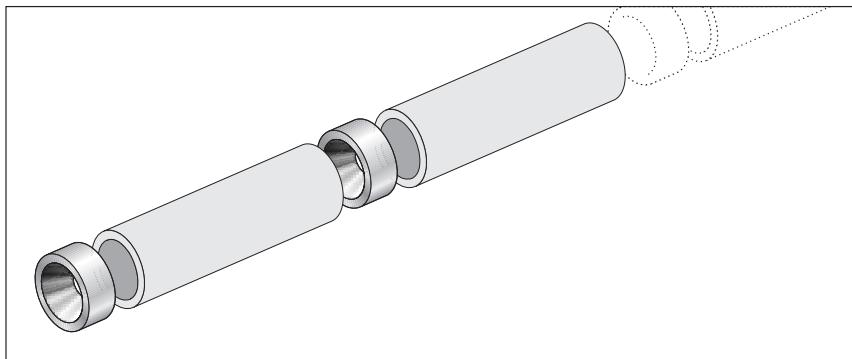
SL-20, SL-30 UNIVERSAL LINER ASSEMBLY**Universal Liner Assembly**

Universal liners consists of an insert holder, an insert retainer and a one piece liner insert or disc and spacer assembly. They are assembled as follows:

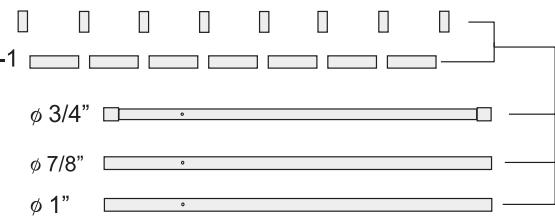
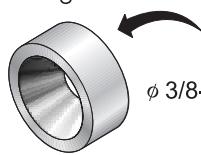
1. Remove the insert retainer. Unscrew the end of the insert retainer, the end closest to the larger flange is the only one that will unscrew.
2. Insert one of the two types of universal liners:
 - A. **The one piece liner.** Insert the one-piece liner such that the 1/4" hole, on the outside of the tube, aligns with the hole in the liner retainer. This allows coolant to drain properly.
 - B. **The alternating liner bushings and spacers.** Always start and finish with a bushing. The bushing can be drilled out as required for the incoming stock. Bushing can be purchased in sets.
3. Reinstall the end of the insert retainer. Then follow the "Liner Installation" instructions described previously.

More specific **universal** liners are available for the following lathes:

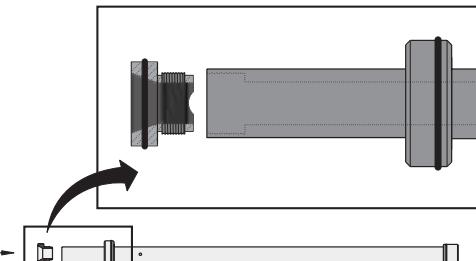
<u>Haas P/N</u>	<u>Size (mm)</u>	<u>Lathe Model</u>
Liner 5	.25" to 1" (6.35-25.4)	SL-20 with 7k option
Liner 6	.25" to 1.5" (6.35-38.1)	SL-10
Liner 100	.25" to 1" (6.35-25.4)	SL-20, SL-20 Big Bore, SL-30 with 2 1/2 draw tube
Liner 300	.25" to 3" (6.35-76)	SL-30 with 3" draw tube
Liner 318	.75" to 3.125" (19-79.4)	SL-30 Big Bore, SL-40



Universal Liner
Bushing



CHOOSE ONE GROUP FOR SIZE DESIRED.



1/4"-1" SPINDLE LINER ASSEMBLY

*Drill 1/4" diameter hole through the Spindle Liner Assembly, using the hole in the liner as a guide.



SETUP

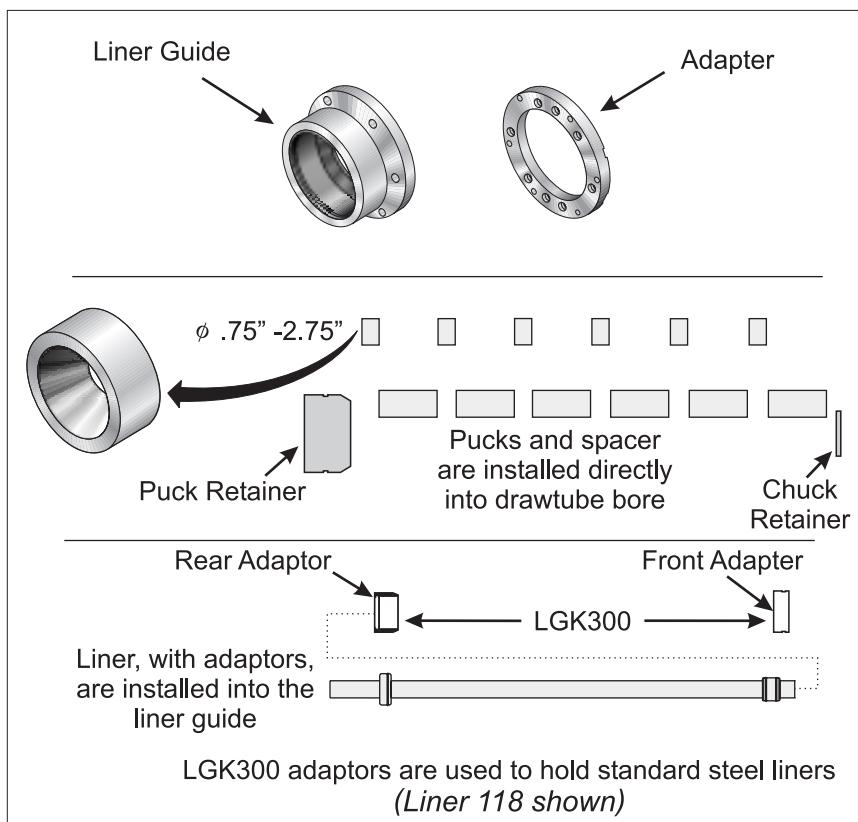
SERVO BAR 300

OPERATOR'S MANUAL

June 2002

LINER 300 INSTALLATION

When the barfeeder is attached to an SL-30 with a 3" ID drawtube shaft (machines built after Feb. 2002), an adaptor and guide must be attached to the spindle switch plate. Use M6x30 SHCS to secure the adaptor to the switch plate. Use 1/4 x 3/4 SHCS to secure the liner guide to the adaptor. This setup will accept bars from 2 3/4" to 3" in diameter. For smaller bars a retainer must be installed on the chuck, using M6x20 SHCS. Pucks and spacers are installed in the draw tube and are held in place by the puck retainer and O-ring. Pucks must be bored to the size of the raw material. Small diameter bars (2" and smaller) longer than 42" are not recommended for this liner configuration (pucks and spacers). However, long, small diameter bars can be machined using the optional liner guide adaptor (LGK300). This kit can be purchased, through the Haas Service Department, which will allow the use of liner 100 through Liner 200, which must be purchased separately (LGK300 and Liner 100-200 require liner 300). The 100-200 series of liners will properly support these small and/or long bars.



Optional Parts

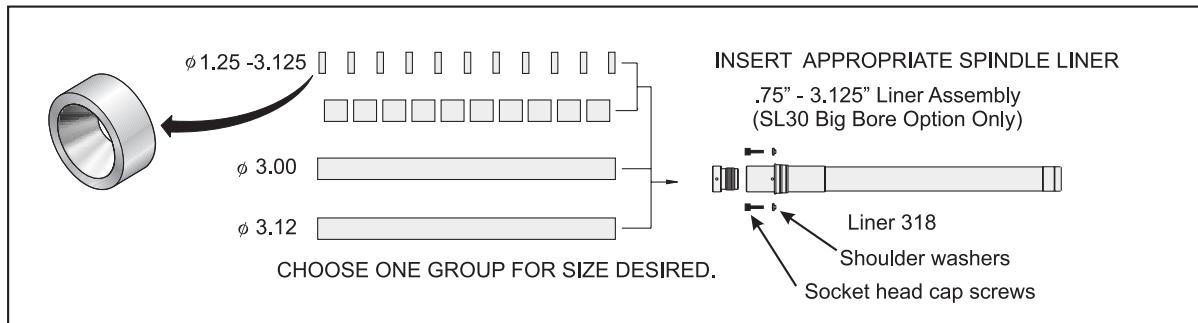
LGK300 – Liner Adaptor

Liner 100 – .25 -1.00 (6.35-25.4mm)	Liner 112 – 1.5" (38mm)
Liner 114 – 1.25" (31.8mm)	Liner 118 – 1.125" (28.6mm)
Liner 134 – 1.75" (44.5mm)	Liner 200 – 2" (50.8mm)



LINER 318

When the barfeeder is attached to an SL-30 Big Bore or an SL-40, a universal liner tube must be installed in the spindle drawtube using M6x20mm bolts and shoulder washers. Unscrew the retainer from the liner tube end to install the single piece liners or pucks and spacers. Pucks must be bored to the size of the raw material.



DISK KITS

Additional Disk Kits, for the previous liners, are available from Haas Automation. Each kit contains parts to make multiple sets of liners (each the same size or various different sizes).

Haas Part Number	Turning Center	Description	Number of disks per liner	Number of possible liners
UDK5	SL-20	24-piece disk blank kit (Fits Liner 5)	8	3
UDK6	SL-10	24-piece disk blank kit (Fits Liner 6)	8	3
UDK8	SL-20 Big Bore, SL-30	24-piece disk blank kit (Fits Liner 100)	8	3
UDK10	SL-30 with 3" spindle	18-piece disk blank kit (Fits Liner 300)	6	3
UDK15	SL-30 Big Bore, SL-40	33-piece disk blank kit (Fits Liner 318)	11	3
UDKML	Mini-Lathe	20-piece disk blank kit (Fits Liner 5C)	4	5

TRANSFER TRAY ADJUSTMENT

Anytime different diameter barstock is used in the machining process the spindle liner must be changed and the transfer tray must be adjusted to it. The transfer table should be adjusted to position a loaded shaft in alignment with the center of the spindle liner.

1. Use the height adjustment handle to lower the transfer tray in order to insert the appropriate spindle liner into the rear of the spindle. Refer to Figure 3.1.
2. Place a bar in the transfer tray and raise the tray to align the shaft to the spindle liner. Reference the height indicator flag on the left of the Barfeeder and visually check alignment. Refer to Figure 3.1.

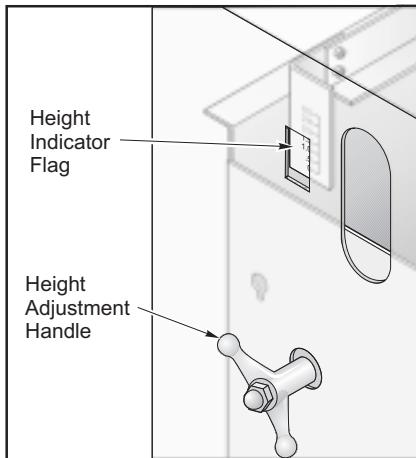


Figure 3.1 Height indicator flag and handle adjustment reference

3. Verify that the chuck is set for the loaded shaft diameter.
4. With the chuck unclamped and the spindle stopped slide the bar onto the spindle liner and chuck by hand and check for any misalignment, binding or interference. See Figure 3.2 below.
5. Remove the bar and place it in the charging tray.

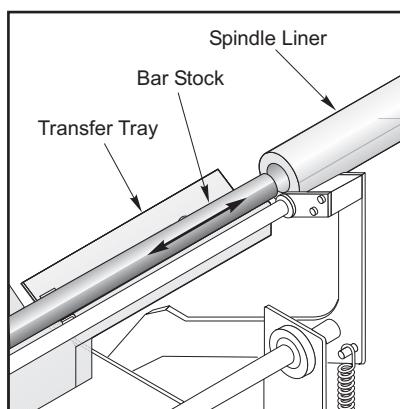


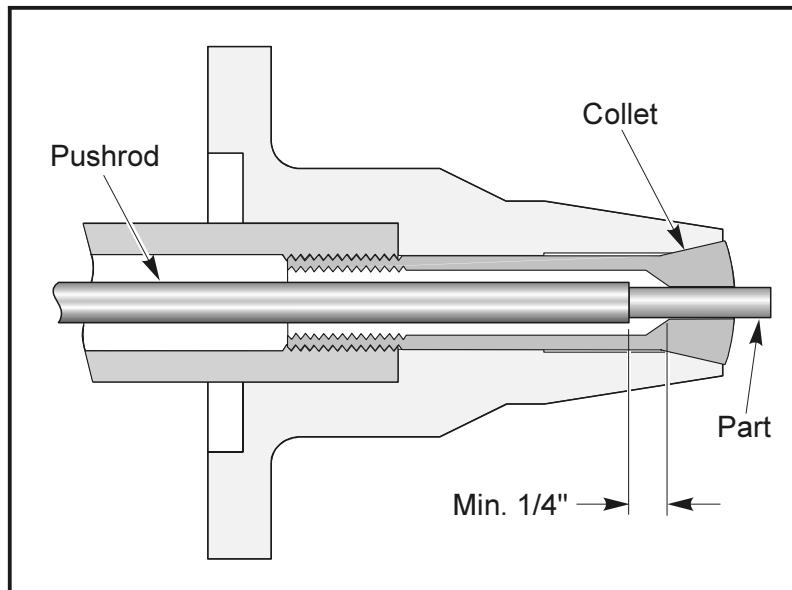
Figure 3.2 Barfeeder alignment check


CHARGING TRAY HEIGHT ADJUSTMENTS

The charging tray holds the supply of bar stock to be loaded onto the transfer tray. An adjustable handle is located underneath the tray and is used to adjust the tray angle. The angle to set the tray is determined by the size and number of bars used.

1. Turn the adjustment handle under the charging tray clockwise to raise the feed angle or counter-clockwise to lower the feed angle. For most round stock, the angle should be set to 5° above horizontal.
2. Load the supply of bar stock onto the charging tray. Run G105 Q9 and G105 Q8 to observe the Barfeeder operation. Adjust the tray angle as necessary.

NOTE: If the bar stock rolls onto the transfer tray or the bars roll down too quickly, lower the feed angle.

BARFEEDER PUSHROD CLEARANCE


CAUTION: When pushing a length of material into/through the chuck, ensure that the pushrod maintains 1/4" of clearance between it and the bore taper. 1/4" of clearance is necessary to ensure the pushrod does not become jammed in the bore taper.

Macro variable #3102 MIN CLAMPING LENGTH should be set to the minimum length necessary for clamping, plus 1/4".

**3.1 REFERENCE POSITION SETUP**

There are three Barfeeder macro variables that must have values entered for the setup methods to operate as described. To enter values press the current commands button on the lathe control. Press the page up or down buttons to get to the screen labeled HAAS SERVO BAR. Press the up or down arrow keys to highlight the variable to be entered. Enter the value with the keyboard and press "Write".

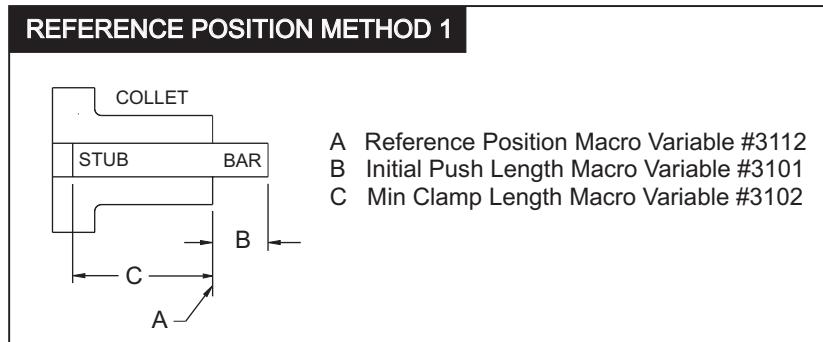
#3100	PART LENGTH + CUTOFF	Finished part length plus face clean up allowance plus parting tool width
#3101	INITIAL PUSH LENGTH	The distance past the reference point each new bar will be pushed to when loaded
#3102	MIN CLAMPING LENGTH	Depends upon bar diameter, part length and initial push length

Macro variable #3112 REFERENCE POSITION is established during setup by machine programs and is not entered by the operator. Once the reference position is set it remains the same for any other bar diameter or part length. It only needs to be reset if the Barfeeder is moved or if it must be changed to fit a new collet or chuck setup.

There are two methods for setting reference positions. The first uses a known position, such as the chuck or collet face as the reference position. The second sets the reference position by subtracting macro Variable #3100 Part Length + Cutoff from current bar face position. Before beginning any method check for proper spindle liner size, bar clamp adjustments and transfer tray alignment.

REFERENCE POSITION SETUP METHOD 1

1. Enter a value for macro variable #3101 Initial Push Length.
2. Enter a value for macro variable #3102 Min Clamping Length which is the length, in the chuck, required to support the Initial Push Length and/or Part Length + Cutoff.
3. Place a bar on the charging tray.
4. In MDI mode enter G105 Q4 and press cycle start. The machine will load the bar and push it into the lathe so the lead end is approximately 4" away from the cutting area.
5. Press RESET button to enable bar feed handle jog.
6. Use the jog handle to push the bar up to the face of the chuck or collet that will be used as the reference point.
7. Clamp the bar.
8. In MDI mode enter G105 Q2 and press cycle start. The machine will enter the bar position in variable #3112 (reference position), unclamp the bar, push it out the amount set in variable #3101 (Initial Push Length) and reclamp.



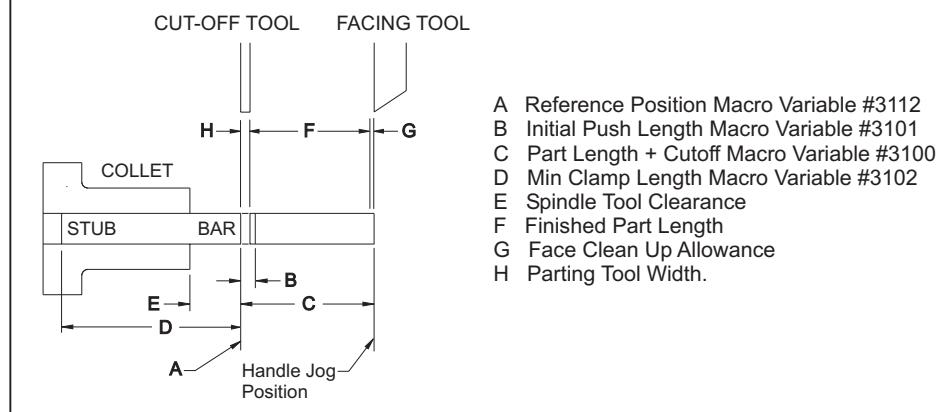
NOTE: The reference may be set a measured distance away from the chuck face. If used that distance must be recorded because it is used to restore operation after any unscheduled program stop.


REFERENCE POSITION SETUP METHOD 2

1. Enter a value for macro variable #3101 Initial Push Length.
2. Enter a value for macro variable #3102 Min Clamping Length which is the length, in the chuck, required to support the Initial Push Length and/or Part Length + Cutoff.
3. Place a bar on the charging tray.
4. In MDI mode enter G105 Q4 and press cycle start. The machine will load the bar and push it into the lathe so the lead end is approximately 4" away from the cutting area.
5. Press RESET button to enable bar feed handle jog.
6. Use the jog handle to push the bar up out to the position where the part program can be started.
7. Clamp the bar.
8. In MDI mode enter G105 Q3 and press cycle start. The machine will calculate the position entered in variable #3112 (reference position) by subtracting the amount set in variable #3100 (Part Length + Cutoff) form the end of the bar position.

WARNING

The bar will not move when this command is executed. If executed more than once it will move the reference position farther away from the bar face and possibly out of the clamping area. If the bar is not clamped when the spindle is started severe damage will occur.

REFERENCE POSITION METHOD 2


**3.2 QUICK START OPERATIONS GUIDE FOR THE SERVO BAR 300**

For more detailed instructions on getting started, refer to 3.1 Setup Procedures.

1. Install correct spindle liner for the bar size being run.
2. Adjust the transfer table to proper height. (Bar must slide from transfer table into liner.)
3. Load barstock on to storage tray. (Bar length must be a minimum 2.25 x the distance from the end of the transfer tray to the start of the liner bore and not less than 10" long).
4. Press Curnt Comds, page down to the servo bar page.
5. Enter the part length + cutoff, initial push length and the minimum clamping length.
6. Enter G105 Q4 while in MDI mode. Press cycle start. Bar will be loaded, measured and pushed through the liner to within 4" of the collet or chuck face.
7. Press reset and handle jog the end of bar to the reference position. Close chuck.
8. Enter G105 Q2 if using Method 1, or enter G105 Q3 if using Method 2, while in MDI mode.
9. Barfeeder is ready for operation. Write a cutting program that has the G105 command at the end of the program.

BARFEED RECOVERY

1. Handle jog the V-axis until the bar is up to the reference position. Bar must be in contact with the end of the push rod.
2. In MDI mode enter G105 Q1. This resets the end-of-bar position and pushes the bar out to its initial push out length.



4.0 PROGRAMMING

4.1 G Code Description

G105 [In.nnnn] [Jn.nnnn] [Kn.nnnn] [Pnnnnn] [Rn.nnnn]

In.nnnn	Optional Initial Push Length (macro variable #3101) Override (variable #3101 if 'I' is not commanded)
Jn.nnnn	Optional Part Length + Cutoff (macro variable #3100) Override (variable #3100 if 'J' is not commanded)
Kn.nnnn	Optional Min Clamping Length (macro variable #3102) Override. (variable #3102 if 'K' is not commanded)
Pnnnnn	Optional subprogram
Rn.nnnn	Optional spindle orientation for new bar

I,J,K are overrides to the macro variable values listed on the Current Commands Page. The control uses override values for the command line they are in only, the values stored in the Current Commands Page are not modified.

During normal operation a G105 should be placed at the beginning or end of the part program depending on the setup method chosen. This mode will perform one of the following operations depending on the current bar length and the value for MINIMUM CLAMPING LENGTH (#3102 or K) added to PART LENGTH + CUTOFF (#3100 or J).

If the bar length is greater than the MINIMUM CLAMPING LENGTH plus PART LENGTH + CUTOFF, when G105 is commanded, the following actions will occur:

1. If a P value is on the same line the subprogram is run.
2. The spindle is stopped.
3. The chuck is unclamped.
4. The bar is pushed out the distance in PART LENGTH + CUTOFF or J Value if on the same line.
5. The chuck is clamped and the program continues.

If the bar length is less than the MINIMUM CLAMPING LENGTH plus PART LENGTH + CUTOFF, when G105 is commanded, the following actions will occur:

1. If a P value is on the same line, the subprogram is run.
2. The spindle is stopped.
3. The chuck is unclamped and the push rod moved to the unloaded position.
4. If a R value is on the same line, the spindle is oriented.
5. A new bar will be loaded and pushed out the distance in INITIAL PUSH LENGTH (#3101) or I Value, if on the same line, or REFERENCE POSITION (#3112), IF INITIAL PUSH LENGTH or I = 0.
6. The chuck will clamp.
7. If a P value is on the same line, the subprogram is run again, then the program continues.

Under some conditions the system may halt at the end of the bar feed and display the message "CHECK BAR POSITION". The operator must verify the current bar position is correct then press cycle start to restart the program.

**4.2 Q Mode List**

Q0	NORMAL BAR FEED	
Q1	SET BAR LENGTH	
Q2	SET REFERENCE POSITION	(Used in combination with Q4 only)
Q3	SET ALT REFERENCE POSITION	
Q4	JOG TO REFERENCE POSITION	
Q5	SET EOB POSITION	
Q6	UNLOAD PUSH ROD	
Q7	LOAD PUSH ROD	
Q8	UNLOAD BAR STOCK	
Q9	LOAD BAR STOCK	
Q10	LOAD BAR STOCK WITH MEASURE	(For Maintenance use only)
Q11	BUMP LOAD PUSHROD DIR	(For Maintenance use only)
Q12	BUMP LOAD BAR STOCK DIR	(For Maintenance use only)



4.3 Q MODE DESCRIPTIONS

Q modes are used for setup, recovery and maintenance. They are used in MDI mode only and must always be preceded by G105.

G105 or G105 Q0 NORMAL BAR FEED

Used for commanding bar feeds in MDI mode. See G code description for operation.

G105 Q1 SET BAR LENGTH

Used to reset bar length stored in control. Press V key then handle jog button on the control. Use the jog handle to push the bar up to the reference position set during bar feed position setup. Run G105 Q1 and the current bar length will be recalculated.

NOTE: The push rod must be in contact with the bar when setting bar length. If the bar is pushed out too far the operator can jog the push rod back, push the bar against it by hand then jog it up to the reference point.

G105 Q2 [I] SET REFERENCE POSITION THEN INITIAL PUSH

Sets the reference position (position A in reference position setup method 1) then unclamps and pushes bar out the distance in INITIAL PUSH LENGTH (#3101) or I Value, if on the same line, then reclamps and runs subprogram PXXXXX if specified. **This command can only be used after running G105 Q4.**

NOTE: The push rod must be in contact with the bar when setting reference position. If the bar is pushed out too far the operator can jog the push rod back, push the bar against it by hand then jog it up to the reference point.

The reference position only needs to be reset if you change chuck jaws or move the Barfeeder relative to the lathe.

This position is stored with macro variable #3112 so be sure to save and restore your macro variables when updating system software.

G105 Q3 SET REFERENCE POSITION FROM BAR FACE

Sets the reference position (position A in reference position setup method 2) by subtracting macro Variable #3100 Part Length + Cutoff from current bar face position then runs subprogram PXXXXX if specified. See G105 Q2 description for other considerations. **This command can only be used after running G105 Q4.**

WARNING

The bar will not move when this command is executed. If executed more than once it will move the reference position farther away from the bar face and possibly out of the clamping area. If the bar is not clamped when the spindle is started severe damage will occur.

G105 Q4 [R] JOG TO REFERENCE POSITION

When executed a new bar is loaded, measured and pushed through the spindle and halted just before the chuck face. Pushing the reset button, switches the control to V axis Handle Jog, mode and the user can jog the bar to the reference position.

G105 Q5 SET EOB POSITION

Used to set end of bar switch position used in determining bar lengths. This value is stored in macro variable #3111 and only needs to be reset if the macro variable is lost. See "Establish End of Bar Position" section of installation instructions for reset procedure.

**105 Q6 UNLOAD PUSH ROD**

Unloads the push rod.

G105 Q7 LOAD PUSH ROD

Loads the push rod.

G105 Q8 UNLOAD BAR

Unloads a bar from the transfer tray and places it in the charging tray.

G105 Q9 LOAD BAR

Loads a bar from the charging tray and places it in the transfer tray.

G105 Q10 LOAD BAR WITH MEASURE

Loads a bar from the charging tray and places it in the transfer tray and measures it. Used to check end of bar switch position. Place a bar of known length in the storage tray. Execute G105 Q10 then compare the value macro variable #3110 from the Barfeeder current commands page to the bar length.

G105 Q11 BUMP LOAD PUSH ROD DIRECTION

Bumps bar transfer mechanism towards the charging tray. Used for assembly access only.

G105 Q12 BUMP LOAD BAR DIRECTION

Bumps bar transfer mechanism away from the charging tray. Used for assembly access only.



4.4 SAMPLE PROGRAMS FOR THE SERVO BAR 300

There are two recommended methods for programming the Barfeeder. The first is for use with part programs that contain internal face cleanup and part cutoff sections. The second is for use with part programs that use a subprogram for face cleanup or part cutoff.

If the subprogram calls for a parting tool, the face cleanup allowance should be wider than the parting tool. The PXXXXX can be used to call a facing tool, for minimum material loss, provided the part cut off sequence appears in the part program before the G105 command.

When PXXXXX appears on the same line as a G105 command that subprogram will be run twice at each bar change. Once on the loaded bar then again after the new bar has been loaded and pushed out.

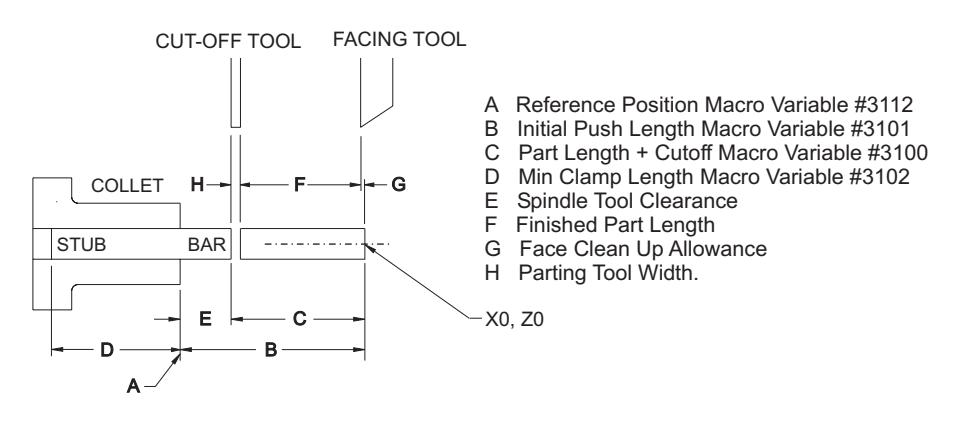
METHOD 1

In the following example the material used is 2 inch diameter solid stock and the finish part is one inch long. The parts are cutoff with a .125 inch wide parting tool. The spindle tool clearance is .875 inches.

1. Enter 1.125 for macro variable #3100 Part Length + Cutoff.
2. Enter 2.0 for macro variable #3101 Initial Push Length. This method uses the value of macro Variable #3100 Part Length + Cutoff added to Spindle Tool Clearance.
3. Enter 1.0 for macro variable #3102 Min Clamping Length.
4. Place a bar on the charging tray.
5. In MDI mode enter G105 and press cycle start. The machine will load the bar and push it into the lathe and push it out the amount set in variable #3101 (Initial Push Length) then clamp.
6. Set tool offsets.
7. Select program, press memory mode button then cycle start.

NOTE: For part programs that have a bar feed command at the beginning it must be bypassed for the first part run after this procedure. Do not use a PXXXX (part off subprogram) on the same line as the G105 command. It will cause a blank part to be cut off the bar at each bar change.

PROGRAMMING METHOD 1





G54
T200 (1/8 PART OFF TOOL)
G96S550M3
G0X2.1Z.1T202M8
Z-1.125 (1 inch finish part length plus the tool width)
G1X-.05F.005
G0X2.1Z.1
G28
G105
M30

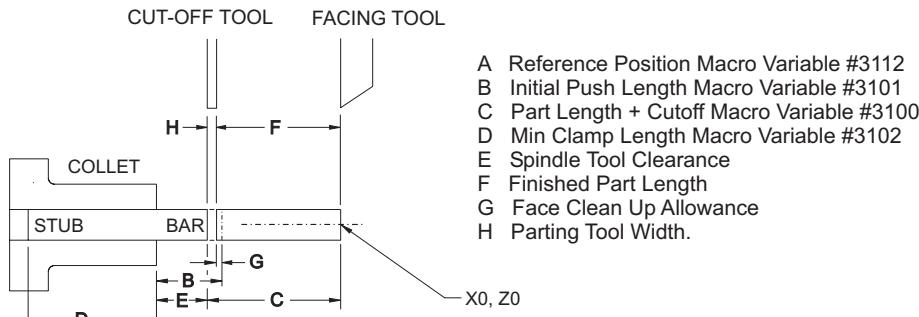
I2.0 J1.125 K1.0 (I=initial push length J = part length + cutoff K = min clamping length) could be added to the G105 line to make the program function regardless of values stored in macro variables 3101, 3100 and 3102.

METHOD 2

In the following example the material used is 2 inch diameter solid stock and the finish part is 1" long 1.98" diameter with a .09" chamfer on leading edge. The parts are cutoff with a .125" wide parting tool. The spindle tool clearance is .875". Each bar loaded will have the end parted off square before its first part is made.

1. Enter 1.125 for macro variable #3100 Part Length + Cutoff.
2. Enter 1.05 for macro variable #3101 Initial Push Length. This method uses the parting tool width and a 0.05 face cleanup allowance width added to Spindle Tool Clearance.
3. Enter 1.0 for macro variable #3102 Min Clamping Length.
4. Place a bar on the charging tray.
5. In MDI mode enter G105 P500 and press cycle start. The machine will load the bar and push it into the lathe and push it out the amount set in variable #3101 (Initial Push Length) then clamp, run the subprogram, unclamp, push it out the amount set in variable #3100 (Part Length + Cutoff), then stop.
6. Set tool offsets.
7. Select program, press memory mode button then cycle start.

NOTE: For part programs that have a bar feed command at the beginning it must be bypassed for the first part run after this procedure.

PROGRAMMING METHOD 2



PART PROGRAM
 G54
 T101 (O.D. TURNING TOOL)
 G0X2.1Z.1M8
 G96S550M3
 X1.8
 G1Z0F.01
 X1.98Z-.09
 Z-1.15
 X2.1
 G28
 G105 P500
 M30

SUBPROGRAM O500
 G54
 T202 (.125 WIDE PARTING TOOL)
 G0X2.1Z-1.125M8
 G96S550M3
 G1X-.05F.01
 G28
 M99

COUNTER

The Barfeeder is fully integrated with the Haas CNC Control and can be programmed to count either the number of bars used, parts made or length of bar run. A non-zero value set in MAX # PARTS (macro variable #3103), MAX # BARS (macro variable #3104), or MAX LENGTH TO RUN (macro variable #3105) determines the active counting modes. If more than one has a nonzero value, The first value reached will stop the machine. To stop the machine after a chosen number of parts are made go to the Barfeeder current commands page and set CURRENT NUMBER OF PARTS RUN (macro variable #3106) to zero. Then set MAX # PARTS (macro variable #3103) to the chosen quantity.

NOTE: The counter is incremented at each G105 command. If G105 is at the beginning of the program the counter will be incremented before the part is finished. If G105 is at the end of the program the counter will be incremented after each part is finished.

To stop the machine after a chosen number of bars are machined go to the Barfeeder current commands page and set CURRENT NUMBER OF BARS RUN (macro variable #3107) to zero. Then set MAX # BARS (macro variable #3104) to the chosen quantity.

NOTE: The counter is incremented as each bar is loaded.

To stop the machine after a chosen length of bar is machined go to the Barfeeder current commands page and set CURRENT LENGTH RUN (macro variable #3108) to zero. Then set MAX LENGTH TO RUN (macro variable #3105) to the chosen length.

NOTE: The counter is incremented by the amount of push out at each G105 command. The amount is either the initial push length (macro variable #3101) after a bar is loaded or the part length + cutoff (macro variable #3100) at each following bar feed.

To make the CURRENT LENGTH RUN count only material used to make parts, the reference position (macro variable #3112) must be set to the position where the end of the bar is after a finished part is cutoff. Then INITIAL PUSH LENGTH (macro variable #3101) must be set equal to PART LENGTH + CUTOFF (macro variable #3100). Use reference position setup method 1.

MACHINING SHORT BARS

When machining short bars the cycle time required to load a new bar can be reduced by changing the value of macro variable #3109 LENGTH OF LONGEST BAR. To operate properly all of the bars in the charging tray must be pushed against the side closest to the lathe. Add a buffer distance to the length of the longest bar in the tray and enter that value in macro variable #3109 on the Barfeeder current command page. This will cause the bar load finger to rapid up to the buffer position before slowing down to measure the bar length.

**MACHINING SMALL DIAMETER BARS**

The Barfeeder comes with two different size push rods: a 3/4 inch and a 3/8 inch. The 3/8 inch is used for all round stock material less than 0.8 inch in diameter. The 3/4 inch is used for material 0.8 inches in diameter and larger.

CHANGING THE PUSH ROD**Removal:**

1. Power down the machine.
2. Loosen the socket head clamp bolt on the rotation control arm. Refer to Figure 4.1.
3. Remove the two socket head bolts from the push rod control bracket located on the control arm positioner. Refer to Figure 4.2. Slide the bracket to the left and the push rod to the right until it comes out of the clamp bracket.

Installation:

1. Slide the push rod control bracket over the push rod.
2. Slide the push rod into the clamp on the rotation control arm.
3. Attach the pushrod control bracket to the control arm positioner with the two socket head bolts, do not tighten.
4. Tighten the clamp bolt on the rotation control arm.
5. Press V on the keyboard then the handle jog mode button to enable push rod movement. Use the jog handle to move the push rod towards the spindle until it just enters the spindle liner. Center the pushrod to the liner and tighten the control bracket bolts.
6. When using the universal liner, slowly handle jog the push rod up to the spindle to check for obstructions.

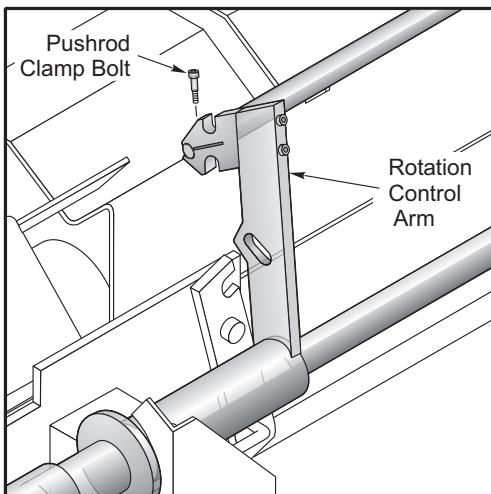


Figure 4.1 Pushrod control arm and rotation control arm

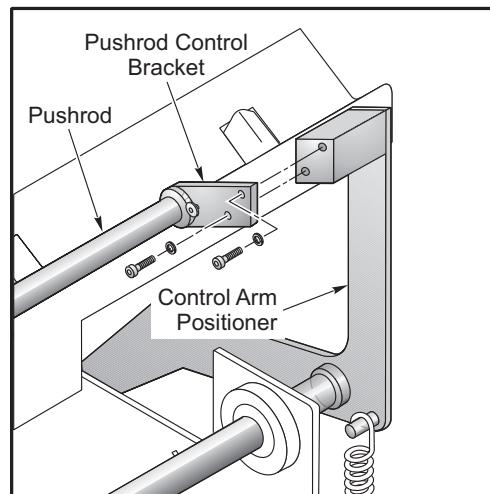


Figure 4.2 Pushrod control bushing attachment

WARNING

The 3/8" diameter push rod must be retracted out of the spindle liner before the spindle is started. Failure to do so will result in damage to the push rod and spindle liner.



The machine can be programmed to retract the push rod out of the liner after each bar feed by changing the value of macro variable #3113 MIN RETRACT POSITION. To determine the value to enter, switch the control to MDI mode and enter G105 Q7 then press cycle start. This will load the push rod. Measure the distance between the end of the push rod and the spindle liner. Subtract a buffer distance (1/2") and enter the remainder in macro variable #3113 on the Barfeeder current commands page. Next MDI command G105 Q6 to unload the push rod. As a final check MDI command G105 Q0 to load the first bar and insure that the push rod retracts to the programmed position.

BAR HOLD-DOWN BRACKET

Feeding small diameter bars (up to an inch in diameter) may require installation of the hold-down bracket if the bar does not actuate the bar-length switch. Install the bracket as pictured below:

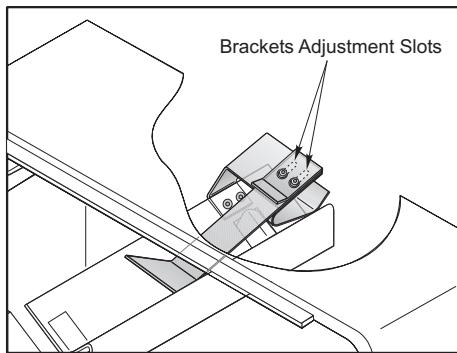
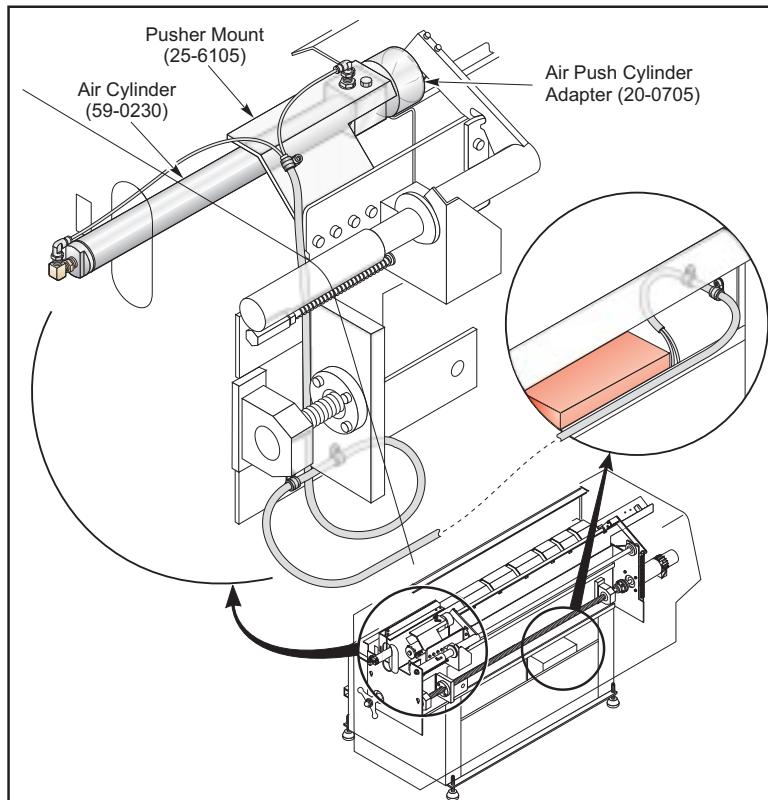


Figure 4.3 Small bar hold down bracket

**BARFEED EXTENDED PUSH FUNCTION**

This feature requires an additional pusher rod mounted on the barfeeder trolley (for barfeeders with the 1-foot extension option.) When the hardware is installed, the control will cause the pusher to extend each time the trolley clears the track and reaches the right-most side. The control will cause the pusher to retract when the trolley moves back home. This can be seen each time the G105 command is used for normal operation.





5.0 BARFEEDER ALARMS

Alarm number and text:	Possible causes and recovery methods
423 SERVO BAR EOB SWITCH POS. UNKNOWN	Perform procedures in Establish End of Bar Position section of setup instructions.
425 SERVO BAR LENGTH UNKNOWN	Both the bar length and reference position are unknown. Unload bar, Run G105 Q6 to unload pushrod. Perform procedures in Bar Feed Position Setup section of setup 2. Route cables under the machine and through the trough in the alignment plate instructions.
426 SERVO BAR ILLEGAL CODE	G105 (feed bar) commanded with an illegal code on block. Legal codes are I,J,K,P,Q,R.
428 SERVO BAR SWITCH FAILURE	One of the switches controlling the Barfeeder failed.
440 SERVO BAR MAX PARTS REACHED	Job Complete. Reset Current # Parts Run on Servo bar current commands page.
441 SERVO BAR MAX BARS REACHED	Job Complete. Reset Current # Bars Run on Servo bar current commands page.
442 SERVO BAR MAX LENGTH REACHED	Job Complete. Reset Current Length Run in Current Commands page.
443 SERVO BAR ALREADY NESTED	An Illegal G105 Pnnn was found in cutoff subprogram.
445 SERVO BAR FAULT	Servo bar program error.
446 SERVO BAR TOO LONG	The bar that was just loaded is longer than the Length of Longest Bar as displayed in the Servo bar Current Commands page. The system was unable to accurately measure it.
447 SERVO BAR IN WAY	The end of bar switch was depressed and a load or unload bar was commanded. Remove the bar.
448 SERVO BAR OUT OF BARS	Add more bars.
449 SERVO BAR CUTTER COMP NOT ALLOWED	G105 cannot be executed while cutter compensation is invoked.
452 SERVO BAR GEAR MOTOR TIME-OUT	The motor which loads the bars and the push rod did not complete its motion in the allowed time. Check for jammed bars. Check parameter 318 for appropriate value.

**6.0 MACRO VARIABLES**

NO.	DISPLAY NAME	USAGE
#3100	PART LENGTH + CUTOFF	Bar feed increment (Length of bar pushed out each G105 after bar is loaded). Finished part length + cutoff length + face cleanup allowance.
#3101	INITIAL PUSH LENGTH	Initial bar feed length (Length of a bar pushed out, past reference position, when loaded).
#3102	MIN CLAMPING LENGTH	Minimum length for clamping (Length of bar required to support length pushed past chuck or collet face).
#3103	MAX # PARTS	Maximum number of parts.
#3104	MAX # BARS	Maximum number of bars.
#3105	MAX LENGTH TO RUN	Maximum length to run.
#3106	CURRENT # PARTS RUN	Part counter.
#3107	CURRENT # BARS RUN	Bar counter.
#3108	CURRENT LENGTH RUN	Length counter.
#3109	LENGTH OF LONGEST BAR	Length of the longest bar (set to 48 if unknown). Setting the length close to the size of the bar stock allows faster measurement of shorter bars. This length must be longer than the bar stock being used.
#3113	MIN RETRACT POSITION	Min retract position. Must be set to make sure the 3/8" pushrod is pulled out of the liner after each push. This should also be set when using the 3/4" pushrod. This will prevent any sag in the pushrod from causing it to contact the inside of the liner when the pushrod is extended far enough into the liner. To adjust macro variable 3113: 1. Turn on the spindle 2. Jog the pushrod into the liner until it starts to hit then back it out about one inch. 3. Take the distance for V and enter in macro 3113.

Read Only

#3110	CURRENT BAR LENGTH	Current bar length.
#3111	NOT DISPLAYED	End of bar switch position.
#3112	NOT DISPLAYED	Reference position established during setup. Point initial push length is measured from.



7.0 PARAMETERS

DEFAULT VALUES

209 COMMON SWITCH 2 AUX JOG NACC	1
	Does not allow accumulation on auxiliary axis jogs. If the jog handle is moved rapidly the auxiliary axis will not develop extremely large lags.
240 1STAUX MAX TRAVEL	641000 to 649000
	Max forward travel from home switch.
244 1STAUX MIN TRAVEL	-19000 to -11000
	Min travel from home switch.
315 bit 7 BRLESS BF	0 or 1
	This parameter bit supports the brushless bar feeder. When it is set to 1, it indicates that a brushless bar feeder is present.
316 MEASURE BAR RATE	25000
	Measurement of incremental bar advance Set to 1000 when in metric mode.
317 MEASURE BAR INCREMENT	10000
	Rate at which bar is measured.
318 GEAR MOTOR TIME-OUT	2000
	TIME-OUT value for gear motor operations.
319 MAX RETRACT POSITION	500,000
	Max V axis position when retracted.
320 MIN RETRACT DIST	2500
	Minimum space between bar and push rod when retracted.
321 PUSH ROD ZERO POSITION	0
	V axis position for load/ unload bar
322 GEAR MOTOR BUMP TIME	200
	Gear motor run time for bump and internal functions.
323 PUSH RATE	100000
	Rate at which last 1/4" of feed is performed.
324 GEAR MOTOR SETTLE	25
	Minimum dwell time for reverse gear motor direction.
325 STANDARD BAR LENGTH	120000
	Length of bar for G105 Q5 120000 = 12.0000".
602 CHUCK FACE DISTANCE	(See following table)
	This parameter supports the brushless bar feeder. When executing G105 Q4, a new bar is loaded, measured and pushed through the spindle and halted just before the chuck face. This parameter specifies the distance (in 1/10000 inch) that should be left between the bar and the chuck face. It should be set as follows:
	Mini-Lathe 440000
	SL-10 500000
	SL-20 540000
	SL-30 540000
	SL-30BB 650000
	SL-40 650000
	TL-15 540000

**8.0 TECHNICAL REFERENCE****CURRENT COMMAND DISPLAY**

HAAS SERVO BAR

3100	PART LENGTH + CUTOFF:	0.0000in
3101	INITIAL PUSH LENGTH:	0.0000in
3102	MIN CLAMPING LENGTH:	0.0000in
3103	MAX # PARTS RUN:	0
3104	MAX # BARS RUN:	0
3105	MAX LENGTH TO RUN:	0.0000in
3106	CURRENT # PARTS RUN:	0
	CURRENT # BARS RUN:	0
3108	CURRENT LENGTH RUN:	0.0000in
3109	LENGTH OF LONGEST BAR:	0.0000in
3110	CURRENT BAR LENGTH:	0.0000in
3113	MIN RETRACT POSITION:	0.0000in

3107

SETTINGS

Number	Name	Value
38	Aux Axis Number	1

DIAGNOSTIC DATA

SERVO BAR BUSY:

Load push rod switch:	0
Load bar switch:	0
End of bar switch:	0

Gear motor load bar direction:	0
Gear motor load push rod direction:	0

EOB SWITCH POSITION:	0.0000in
PUSHROD REFERENCE POSITION:	0.0000in

DISCRETE INPUTS**INPUT**

BF Sp Lck /SB EOB
BF EOB /SB LB SW

BF Flt / SB PR SW

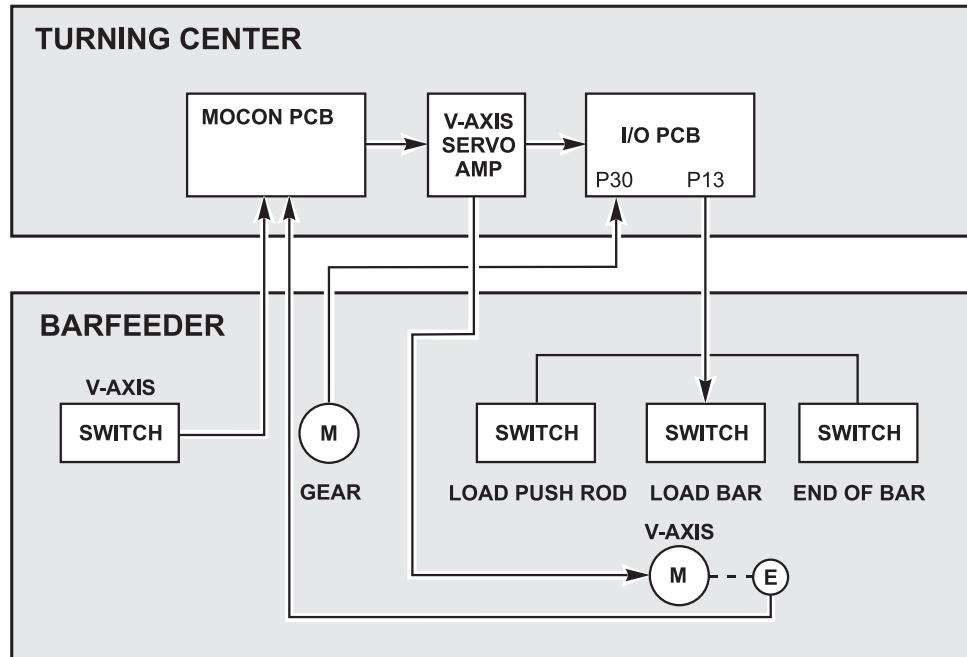
SB Motor LoadPR
SB Motor Loadbar

DESCRIPTION

Barfeeder Spindle Interlock / Haas Servo Bar End of Bar Switch.
Non Haas Barfeeder interface end of bar or Haas Servo Bar Load Bar Switch.

Non Haas Barfeeder Fault Switch or Haas Servo Bar Load Push Rod Switch.

SERVO BAR gear motor load push bar.
SERVO BAR gear motor load bar.

**ELECTRICAL SCHEMATICS****Figure 8.1 Barfeeder Interconnect Schematic**

**9.0 MAINTENANCE**

CAUTION! POWER OFF machine before performing any maintenance or service tasks.

LUBRICATION

The linear rail and pushrod require regular lubrication. Lubricate the linear rail approximately once a month (or whenever it is dry). Lubricate the pushrod during installation (or whenever it is dry).

Linear Rail Lubrication

Use a spray-on lubricant to lubricate the linear rail.

Pushrod Lubrication

Use light oil to lubricate the pushrod, spread the oil on the pushrod and the pushrod bushing. Jog the pushrod back and forth to spread the oil.

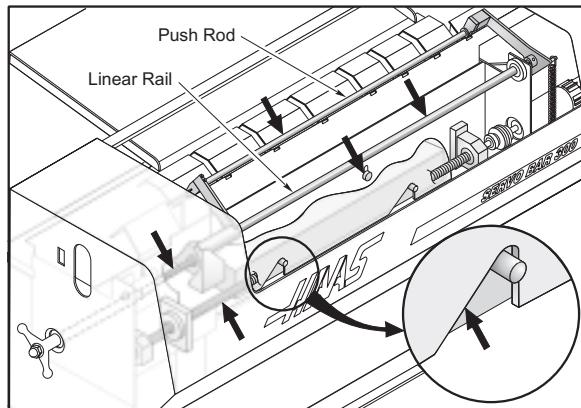
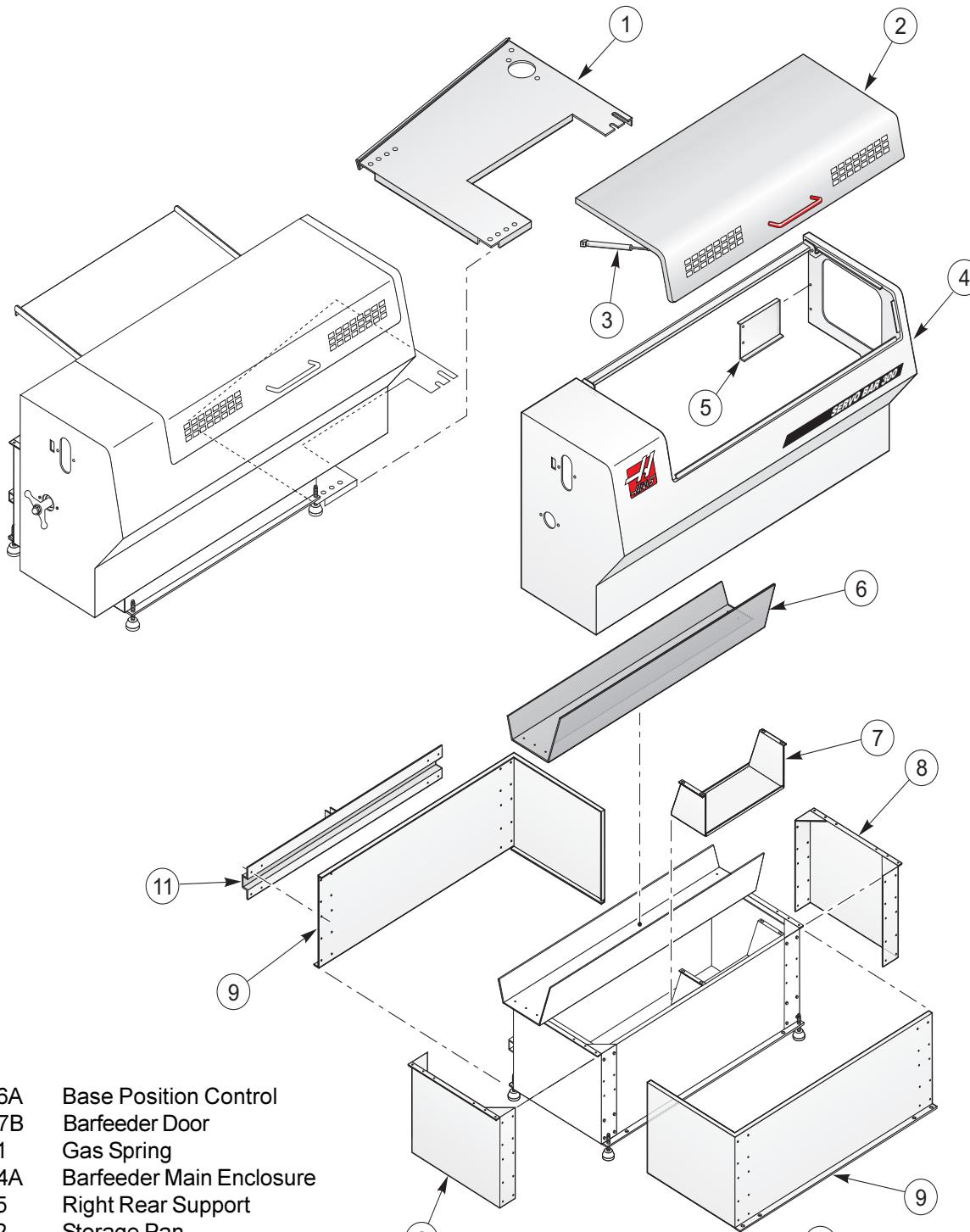
NOTE: Lubricate points as shown in Figure 9.1 when servicing Barfeeder.

Figure 9.1 Arrows indicate lubrication points.



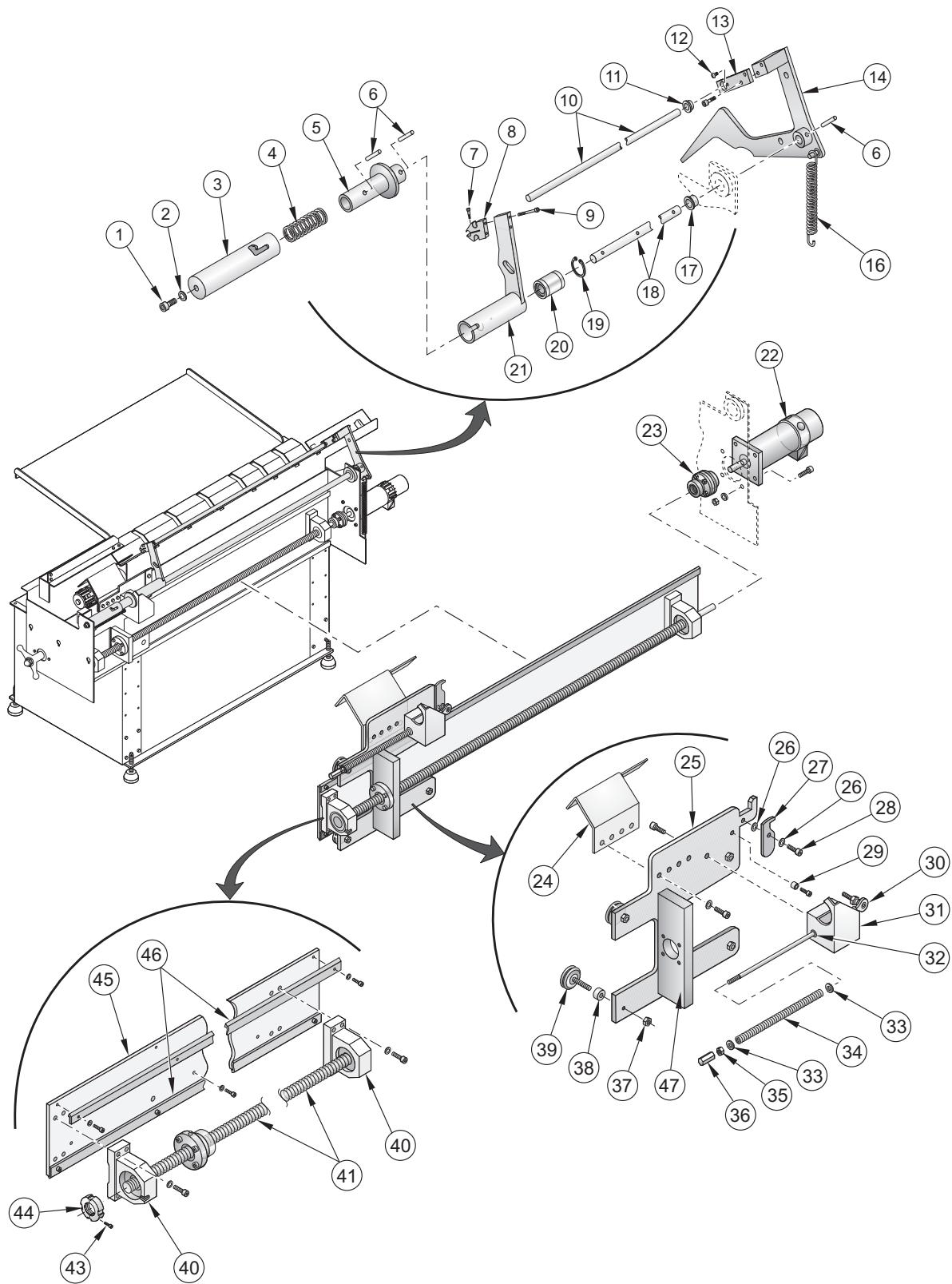
Barfeeder Sheetmetal and Parts List



- | | | |
|----|----------|--------------------------|
| 1 | 25-6516A | Base Position Control |
| 2 | 25-6537B | Barfeeder Door |
| 3 | 59-0101 | Gas Spring |
| 4 | 25-6534A | Barfeeder Main Enclosure |
| 5 | 25-0165 | Right Rear Support |
| 6 | 25-6542 | Storage Pan |
| 7 | 25-6526 | Control Tray |
| 8 | 25-6538 | Adjusting End Supports |
| 9 | 25-6539 | Bottom Bar Base |
| 10 | 44-0004 | Leveling Screw |
| 11 | 25-6540 | Charging Table Beam |



Barfeeder External Parts

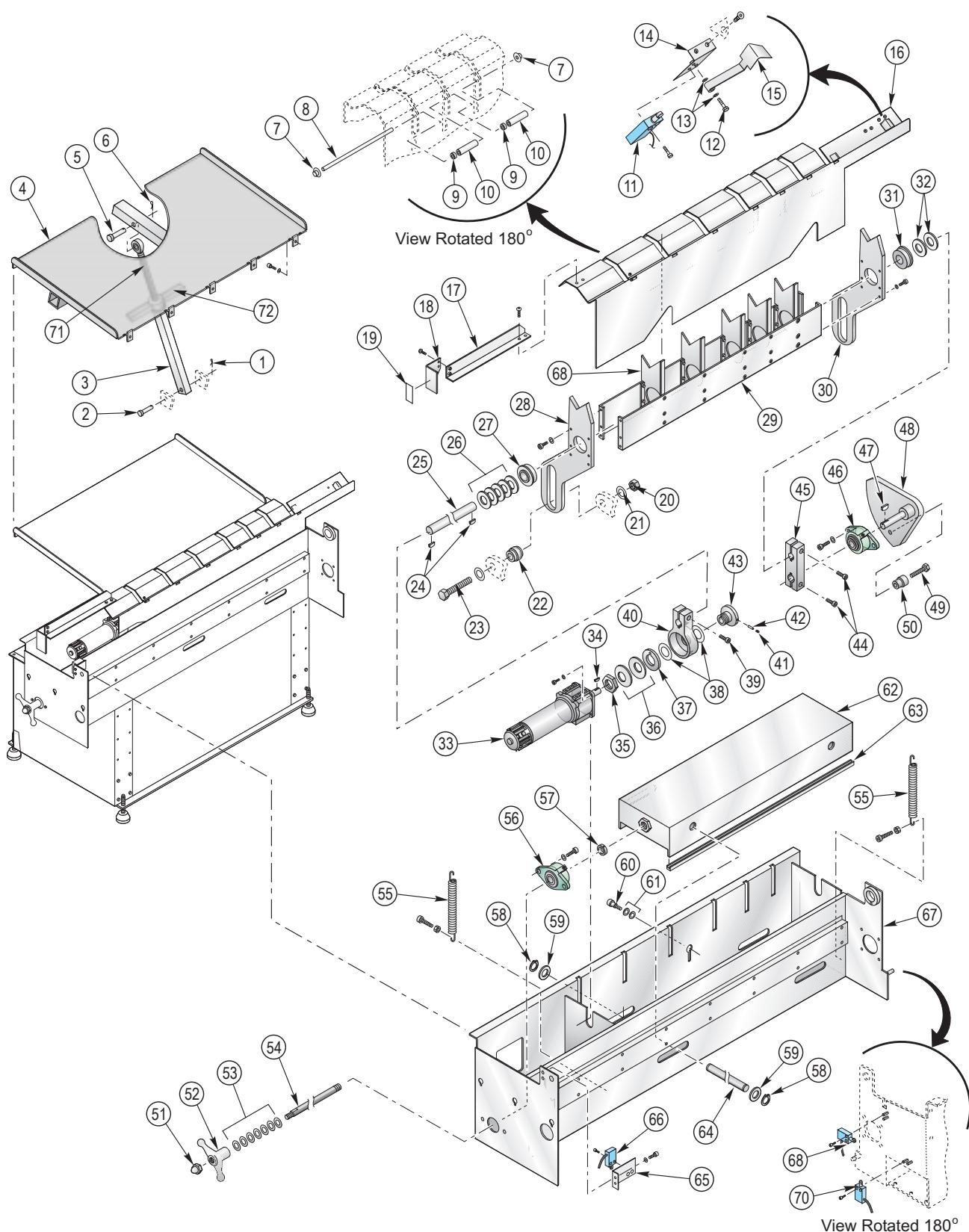


Barfeeder External Parts List

1	Retaining Bolt	
2	20-6478	Ballscrew Bearing
3	20-6480	Rotation Control Push Rod
4	59-3024	Spring 1.5 X 6
5	20-6481	J-Slot Control Bushing
6	48-1657	Dowel Pin 5/8 X 1-1/2
7	49-1015	Shoulder Bolt 1/4 X 1/2
8	20-6483	Push Rod Connector
9	Retaining Bolt	
10	20-6484	Push Rod
11	20-0357	Flange Bushing 3/4 in.
12	Bolt	
13	20-6032	Push Control Bushing 3/4 in.
14	20-6485	Control Arm Positioner
15	Removed	
16	59-3026	Spring 1-1/8 X 8.5 X .148
17	20-0356	Flange Bushing 1 in.
18	20-6023	Rotational Control Shaft
19	56-0007	Retaining Ring 1-9/16 in.
20	51-1016	Linear Bearing 1 in.
21	20-6482	Pusher Control Arm
22	62-2501	Servo Motor
23	30-1220P	Coupling Assembly
24	25-6520	Bar Pusher Finger
25	22-6501	Base Bar Carriage
26	Washer	
27	25-6521	Latch Pusher Bar
28	Bolt	
29	Spacer	
30	59-6701	5/16 Ball Joint w/Stud
31	25-6522	Fork Activator Bar
32	25-6502	Latch Linkage Rod Bar
33	54-0054	Flange Bushing 5/16 in.
34	59-3027	Spring 1/2 X 10
35	Nut	
36	58-1750	Coupling Nut 5/16-24
37	Nut	
38	Spacer	
39	54-0030	Guide Wheel
40	30-0153	Support Bearing Assembly (2)
41	24-0007	Ballscrew Assembly
42	Removed	
43	51-2012	Clamp Bolt For (44)
44	51-2012	Bearing Locknut TCN-04-F
45	25-6525	Rail Mounting Plate
46	22-6505	Barfeeder V-Rail
47	20-6478	Ballscrew Bearing



Barfeeder Internal Parts





Barfeeder Internal Parts List

1	49-1203	Cotter Pin 1/8 X 1	52	59-0102	Clamp Handle 3/4-10
2	49-1201	Clevis Pin 3/4 X 3	53	45-0004	Flat Washer 3/4 in. (2)
3	22-6503	Support Stand	54	20-6026A	Height Adjusting Screw
4	25-6541	Charging Table	55	59-0110	Spring 6 X 27/32 X .106 (2)
5	49-1202	Clevis Pin 1 X 6	56	51-1015	Flange Bearing 3/4 in.
6	49-1203	Cotter Pin 1/8 X 1	57	54-0057	Shaft Collar 3/4 in.
7	46-0011	Nut 1/4 Cap Push	58	Snap Ring (4)	
8	20-0341	Transfer Table Retainer Shaft	59	Washer (4)	
9	22-9256	Bushing Extractor (2)	60	Shoulder Bolt	
10	58-1982	Tubing Urethane 3/8 OD X 1/4 ID (2)	61	Plastic Washer (2)	
11	32-2036	Limit Switch (End of Bar)	62	25-6549A	Height Adjusting Box
12	49-1019	Shoulder Bolt 1/4 X 1	63	59-7200	Grommet Material .125
13	Washer (2)		64	20-6490A	Box Cross Rollers (2)
14	25-6528	Bar End Mounting	65	25-0338	Bracket (Home Switch)
15	25-6529	Bar End Switch Paddle	66	32-2039	Limit Switch (Trolley Home)
16	25-6527A	Bar Transfer Table	67	25-6523B	Main Frame
17	25-6546	Height Indicator Support Bracket	68	25-6531	Motion Control
18	25-6547	Height Indicator Flag	69	32-2038	Limit Switch (Load Q)
19	29-0051	Height Gauge Decal	70	32-2037	Limit Switch (Load Bar)
20	Nut		71	22-6025	Acme Adjusting Screw 1 in.
21	Washer		72	49-1020	Acme Wing Nut 1-5
22	54-0010	Cam Follower			
23	Bolt				
24	Key				
25	20-6487	Shaft Lifting Arm			
26	Washer (5)				
27	51-1017	Bearing			
28	25-6530	Motion Control Lift Arm			
29	25-6532	Motion Control Torque Box			
30	25-6530	Motion Control Lift Arm			
31	51-1017	Bearing			
32	Washer (2)				
33	32-0011	Shuttle Motor Assembly			
34	Key				
35	20-0216	Nut (Slip Clutch)			
36	55-0010	Spring Washer (2)			
37	22-7477	Pressure Plate			
38	Plastic Washer (2)				
39	20-6486	Clamp Bolt for (40)			
40	20-6486	Motor End Clutch Linkage			
41	Setscrew				
42	Dowel Pin				
43	20-0215	Hub Slip Clutch			
44	20-6533 (2)	Clamp Bolt for (45)			
45	20-6533	Cam End Lift Linkage			
46	51-1015	Flange Bearing 3/4 in.			
47	Key				
48	20-6488	Cam Shaft Assembly			
49	Bolt				
50	54-0010	Cam Follower with 22-7034 Spacer			
51	46-0010	Cap Nut 3/4-10			