



Haas Automation, Inc.

Toolroom Lathe

Next Generation Control
Operator's Manual Supplement
96-0112
Revision AH
December 2018
English
Original Instructions

Haas Automation Inc.
2800 Sturgis Road
Oxnard, CA 93030-8933
U.S.A. | HaasCNC.com

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Haas Automation, Inc.

Covering Haas Automation, Inc. CNC Equipment

Effective September 1, 2010

Haas Automation Inc. ("Haas" or "Manufacturer") provides a limited warranty on all new mills, turning centers, and rotary machines (collectively, "CNC Machines") and their components (except those listed below under Limits and Exclusions of Warranty) ("Components") that are manufactured by Haas and sold by Haas or its authorized distributors as set forth in this Certificate. The warranty set forth in this Certificate is a limited warranty, it is the only warranty by Manufacturer, and is subject to the terms and conditions of this Certificate.

Limited Warranty Coverage

Each CNC Machine and its Components (collectively, "Haas Products") are warranted by Manufacturer against defects in material and workmanship. This warranty is provided only to an end-user of the CNC Machine (a "Customer"). The period of this limited warranty is one (1) year. The warranty period commences on the date the CNC Machine is installed at the Customer's facility. Customer may purchase an extension of the warranty period from an authorized Haas distributor (a "Warranty Extension"), any time during the first year of ownership.

Repair or Replacement Only

Manufacturer's sole liability, and Customer's exclusive remedy under this warranty, with respect to any and all Haas products, shall be limited to repairing or replacing, at the discretion of the Manufacturer, the defective Haas product.

Disclaimer of Warranty

This warranty is Manufacturer's sole and exclusive warranty, and is in lieu of all other warranties of whatever kind or nature, express or implied, written or oral, including, but not limited to, any implied warranty of merchantability, implied warranty of fitness for a particular purpose, or other warranty of quality or performance or noninfringement. All such other warranties of whatever kind are hereby disclaimed by Manufacturer and waived by Customer.

Limits and Exclusions of Warranty

Components subject to wear during normal use and over time, including, but not limited to, paint, window finish and condition, light bulbs, seals, wipers, gaskets, chip removal system (e.g., augers, chip chutes), belts, filters, door rollers, tool changer fingers, etc., are excluded from this warranty. Manufacturer's specified maintenance procedures must be adhered to and recorded in order to maintain this warranty. This warranty is void if Manufacturer determines that (i) any Haas Product was subjected to mishandling, misuse, abuse, neglect, accident, improper installation, improper maintenance, improper storage, or improper operation or application, including the use of improper coolants or other fluids, (ii) any Haas Product was improperly repaired or serviced by Customer, an unauthorized service technician, or other unauthorized person, (iii) Customer or any person makes or attempts to make any modification to any Haas Product without the prior written authorization of Manufacturer, and/or (iv) any Haas Product was used for any non-commercial use (such as personal or household use). This warranty does not cover damage or defect due to an external influence or matters beyond the reasonable control of Manufacturer, including, but not limited to, theft, vandalism, fire, weather condition (such as rain, flood, wind, lightning, or earthquake), or acts of war or terrorism.

Without limiting the generality of any of the exclusions or limitations described in this Certificate, this warranty does not include any warranty that any Haas Product will meet any person's production specifications or other requirements, or that operation of any Haas Product will be uninterrupted or error-free. Manufacturer assumes no responsibility with respect to the use of any Haas Product by any person, and Manufacturer shall not incur any liability to any person for any failure in design, production, operation, performance, or otherwise of any Haas Product, other than repair or replacement of same as set forth in the warranty above.

Limitation of Liability and Damages

Manufacturer will not be liable to Customer or any other person for any compensatory, incidental, consequential, punitive, special, or other damage or claim, whether in an action in contract, tort, or other legal or equitable theory, arising out of or related to any Haas product, other products or services provided by Manufacturer or an authorized distributor, service technician, or other authorized representative of Manufacturer (collectively, "authorized representative"), or the failure of parts or products made by using any Haas Product, even if Manufacturer or any authorized representative has been advised of the possibility of such damages, which damage or claim includes, but is not limited to, loss of profits, lost data, lost products, loss of revenue, loss of use, cost of down time, business good will, any damage to equipment, premises, or other property of any person, and any damage that may be caused by a malfunction of any Haas product. All such damages and claims are disclaimed by Manufacturer and waived by Customer. Manufacturer's sole liability, and Customer's exclusive remedy, for damages and claims for any cause whatsoever shall be limited to repair or replacement, at the discretion of Manufacturer, of the defective Haas Product as provided in this warranty.

Customer has accepted the limitations and restrictions set forth in this Certificate, including, but not limited to, the restriction on its right to recover damages, as part of its bargain with Manufacturer or its Authorized Representative. Customer realizes and acknowledges that the price of the Haas Products would be higher if Manufacturer were required to be responsible for damages and claims beyond the scope of this warranty.

Entire Agreement

This Certificate supersedes any and all other agreements, promises, representations, or warranties, either oral or in writing, between the parties or by Manufacturer with respect to subject matter of this Certificate, and contains all of the covenants and agreements between the parties or by Manufacturer with respect to such subject matter. Manufacturer hereby expressly rejects any other agreements, promises, representations, or warranties, either oral or in writing, that are in addition to or inconsistent with any term or condition of this Certificate. No term or condition set forth in this Certificate may be modified or amended, unless by a written agreement signed by both Manufacturer and Customer. Notwithstanding the foregoing, Manufacturer will honor a Warranty Extension only to the extent that it extends the applicable warranty period.

Transferability

This warranty is transferable from the original Customer to another party if the CNC Machine is sold via private sale before the end of the warranty period, provided that written notice thereof is provided to Manufacturer and this warranty is not void at the time of transfer. The transferee of this warranty will be subject to all terms and conditions of this Certificate.

Miscellaneous

This warranty shall be governed by the laws of the State of California without application of rules on conflicts of laws. Any and all disputes arising from this warranty shall be resolved in a court of competent jurisdiction located in Ventura County, Los Angeles County, or Orange County, California. Any term or provision of this Certificate that is invalid or unenforceable in any situation in any jurisdiction shall not affect the validity or enforceability of the remaining terms and provisions hereof, or the validity or enforceability of the offending term or provision in any other situation or in any other jurisdiction.

Customer Feedback

If you have concerns or questions regarding this Operator's Manual, please contact us on our website, www.HaasCNC.com. Use the "Contact Us" link and send your comments to the Customer Advocate.

Join Haas owners online and be a part of the greater CNC community at these sites:



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Customer Satisfaction Policy

Dear Haas Customer,

Your complete satisfaction and goodwill are of the utmost importance to both Haas Automation, Inc. and the Haas distributor (HFO) where you purchased your equipment. Normally, your HFO will rapidly resolve any concerns you have about your sales transaction or the operation of your equipment.

However, if your concerns are not resolved to your complete satisfaction, and you have discussed your concerns with a member of the HFO's management, the General Manager, or the HFO's owner directly, please do the following:

Contact Haas Automation's Customer Service Advocate at 805-988-6980. So that we may resolve your concerns as quickly as possible, please have the following information available when you call:

- Your company name, address, and phone number
- The machine model and serial number
- The HFO name, and the name of your latest contact at the HFO
- The nature of your concern

If you wish to write Haas Automation, please use this address:

Haas Automation, Inc. U.S.A.
2800 Sturgis Road
Oxnard CA 93030
Att: Customer Satisfaction Manager
email: customerservice@HaasCNC.com

Once you contact the Haas Automation Customer Service Center, we will make every effort to work directly with you and your HFO to quickly resolve your concerns. At Haas Automation, we know that a good Customer-Distributor-Manufacturer relationship will help ensure continued success for all concerned.

International:

Haas Automation, Europe
Mercuriusstraat 28, B-1930
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email: customerservice@HaasCNC.com

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No. 96 Yi Wei Road 67,
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Shanghai 200131 P.R.C.
email: customerservice@HaasCNC.com

Declaration of Conformity

Product: CNC Lathes (Turning Centers)*

*Including all options factory- or field-installed by a certified Haas Factory Outlet (HFO)

Manufactured By: Haas Automation, Inc.

2800 Sturgis Road, Oxnard CA 93030

805-278-1800

We declare, in sole responsibility, that the above-listed products, to which this declaration refers, comply with the regulations as outlined in the CE directive for Machining Centers:

- Machinery Directive 2006 / 42 / EC
- Electromagnetic Compatibility Directive 2014 / 30 / EU
- Low Voltage Directive 2014 / 35 / EU
- Additional Standards:
 - EN 60204-1:2006 / A1:2009
 - EN 614-1:2006+A1:2009
 - EN 894-1:1997+A1:2008
 - CEN 13849-1:2015

RoHS2: COMPLIANT (2011/65/EU) by Exemption per producer documentation.

Exempt by:

- a) Large scale stationary industrial tool.
- b) Lead as an alloying element in steel, aluminum, and copper.
- c) Cadmium and its compounds in electrical contacts.

Person authorized to compile technical file:

Jens Thing

Address:

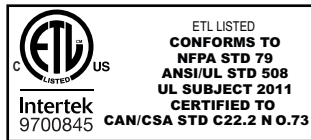
Haas Automation Europe
Mercuriusstraat 28
B-1930 Zaventem
Belgium

USA: Haas Automation certifies this machine to be in compliance with the OSHA and ANSI design and manufacturing standards listed below. Operation of this machine will be compliant with the below-listed standards only as long as the owner and operator continue to follow the operation, maintenance, and training requirements of these standards.

- *OSHA 1910.212 - General Requirements for All Machines*
- *ANSI B11.5-1984 (R1994) Lathes*
- *ANSI B11.19-2003 Performance Criteria for Safeguarding*
- *ANSI B11.22-2002 Safety Requirements for Turning Centers and Automatic Numerically Controlled Turning Machines*
- *ANSI B11.TR3-2000 Risk Assessment and Risk Reduction - A Guideline to Estimate, Evaluate, and Reduce Risks Associated with Machine Tools*

CANADA: As the original equipment manufacturer, we declare that the listed products comply with regulations as outlined in the Pre-Start Health and Safety Reviews Section 7 of Regulation 851 of the Occupational Health and Safety Act Regulations for Industrial Establishments for machine guarding provisions and standards.

Further, this document satisfies the notice-in-writing provision for exemption from Pre-Start inspection for the listed machinery as outlined in the Ontario Health and Safety Guidelines, PSR Guidelines dated April 2001. The PSR Guidelines allow that notice in writing from the original equipment manufacturer declaring conformity to applicable standards is acceptable for the exemption from Pre-Start Health and Safety Review.



All Haas CNC machine tools carry the ETL Listed mark, certifying that they conform to the NFPA 79 Electrical Standard for Industrial Machinery and the Canadian equivalent, CAN/CSA C22.2 No. 73. The ETL Listed and cETL Listed marks are awarded to products that have successfully undergone testing by Intertek Testing Services (ITS), an alternative to Underwriters' Laboratories.



Haas Automation has been assessed for conformance with the provisions set forth by ISO 9001: 2015. Scope of Registration: Design and Manufacture of CNC Machines Tools and Accessories, Sheet Metal Fabrication. The conditions for maintaining this certificate of registration are set forth in ISA's Registration Policies 5.1. This registration is granted subject to the organization maintaining compliance to the noted standard. The validity of this certificate is dependent upon ongoing surveillance audits.

Original Instructions

User's Operator Manual and other Online Resources

This manual is the operation and programming manual that applies to all Haas Lathes.

An English language version of this manual is supplied to all customers and is marked **"Original Instructions"**.

For many other areas of the world, there is a translation of this manual marked **"Translation of Original Instructions"**.

This manual contains an unsigned version of the EU required **"Declaration Of Conformity"**. European customers are provided a signed English version of the Declaration of Conformity with Model Name and Serial Number.

Besides this manual, there is a tremendous amount of additional information online at: www.haascnc.com under the OWNERS section.

Both this manual and the translations of this manual are available online for machines up to approximately 15 years old.

The CNC control of your machine also contains all of this manual in many languages and can be found by passing the **[HELP]** button.

Many machine models come with manual supplement that is also available online.

All machine options also have additional information online.

Maintenance and service information is available online.

The online **"Installation Guide"** contains information and check list for Air & Electrical requirements, Optional Mist Extractor, Shipping Dimensions, weight, Lifting Instructions, foundation and placement, etc.

Guidance on proper coolant and Coolant Maintenance is located in the Operators Manual and Online.

Air and Pneumatic diagrams are located on the inside of the lubrication panel door and CNC control door.

Lubrication, grease, oil and hydraulic fluid types are listed on a decal on the machine's lubrication panel.





How to Use This Manual

To get the maximum benefit of your new Haas machine, read this manual thoroughly and refer to it often. The content of this manual is also available on your machine control under the HELP function.

IMPORTANT: Before you operate the machine, read and understand the Operator's Manual Safety chapter.

Declaration of Warnings

Throughout this manual, important statements are set off from the main text with an icon and an associated signal word: "Danger," "Warning," "Caution," or "Note." The icon and signal word indicate the severity of the condition or situation. Be sure to read these statements and take special care to follow the instructions.

Description	Example
Danger means that there is a condition or situation that will cause death or severe injury if you do not follow the instructions given.	 <i>DANGER:</i> No step. Risk of electrocution, bodily injury, or machine damage. Do not climb or stand on this area.
Warning means that there is a condition or situation that will cause moderate injury if you do not follow the instructions given.	 <i>WARNING:</i> Never put your hands between the tool changer and the spindle head.
Caution means that minor injury or machine damage could occur if you do not follow the instructions given. You may also have to start a procedure over if you do not follow the instructions in a caution statement.	 <i>CAUTION:</i> Power down the machine before you do maintenance tasks.
Note means that the text gives additional information, clarification, or helpful hints .	 <i>NOTE:</i> Follow these guidelines if the machine is equipped with the optional extended Z-clearance table.

Text Conventions Used in this Manual

Description	Text Example
Code Block text gives program examples.	G00 G90 G54 X0. Y0. ;
A Control Button Reference gives the name of a control key or button that you are to press.	Press [CYCLE START] .
A File Path describes a sequence of file system directories.	<i>Service > Documents and Software >...</i>
A Mode Reference describes a machine mode.	MDI
A Screen Element describes an object on the machine's display that you interact with.	Select the SYSTEM tab.
System Output describes text that the machine control displays in response to your actions.	PROGRAM END
User Input describes text that you should enter into the machine control.	G04 P1. ;
Variable n indicates a range of non-negative integers from 0 to 9.	Dnn represents D00 through D99.

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Chapter 1: Safety

1.1 General Safety Notes

**CAUTION:**

Only authorized and trained personnel may operate this equipment. You must always act in accordance with the Operator's manual, safety decals, safety procedures, and instructions for safe machine operation. Untrained personnel present a hazard to themselves and the machine.

IMPORTANT:

Do not operate this machine until you have read all warnings, cautions, and instructions.

**CAUTION:**

The sample programs in this manual have been tested for accuracy, but they are for illustrative purposes only. The programs do not define tools, offsets, or materials. They do not describe workholding or other fixturing. If you choose to run a sample program on your machine, do so in Graphics mode. Always follow safe machining practices when you run an unfamiliar program.

All CNC machines contain hazards from rotating work, loosely clamped parts, belts and pulleys, high voltage electricity, noise, and compressed air. You must always follow basic safety precautions to reduce the risk of personal injury and mechanical damage.

The work area must be adequately illuminated to allow clear view and safe operation of the machine. This includes the operator work area and all areas of the machine that might be accessed during maintenance or cleaning. Adequate illumination is the responsibility of the user.

Cutting tools, workholding, workpiece and coolant are beyond the scope and control of Haas Automation, Inc. Each of these potential hazards associated with it (sharp edges, heavy lifting considerations, chemical composition, etc) and it is the responsibility of the user to take appropriate action (PPE, training, etc).

Cleaning of the machine is required during normal use and prior to maintenance or repair. Optional equipment is available to aid cleaning such as washdown hoses, chip conveyors and chip augers. Safe use of this equipment requires training and might require appropriate PPE and is the responsibility of the user.

This operator's manual is intended as a reference guide and is not to be the sole source of training. Complete operator training is available from the authorized Haas distributor.

1.1.1 Summary of Types of Operation for Haas Automation Machine Tools

Haas CNC Lathes are intended for cutting and shaping of metals and other hard materials. They are general purpose in nature and a list of all of those materials and types of cutting would never be complete. Almost all cutting and shaping is performed by a rotating part clamped in a chuck. The tools are held on a turret. Some cutting operations require liquid coolant. That coolant is also an option depending on the type of cutting.

Operations of Haas Lathes are separated into three areas. They are: Operations, Maintenance, and Service. Operations and Maintenance are intended to be performed by a trained and qualified machine operator. This Operator's Manual contains some of the information necessary to operate the machine. All other machine operations are to be considered Service. Service is only to be performed by specially trained service personnel.

Operation of this machine consists of the following:

1. Machine Setup
 - Machine setup is done to initially set up the tools, offsets, and fixtures required to perform a repetitive function that later is called machine operation. Some machine setup functions can be done with the door open but are limited to "hold to run".
2. Machine operating in Automatic Mode
 - Automatic operation is initiated with Cycle-Start and can only be done with the doors closed.
3. Operator loading and unloading of materials (parts)
 - Parts loading and unloading is what precedes and follows an automatic operation. This must be done with the doors open and all machine automatic motion is stopped when the door is open.
4. Operator loading and unloading of cutting tools
 - Tool loading and unloading is done less often than setup. It is often required when a tool has become worn and must be replaced.

Maintenance only consists of the following:

1. Adding and maintaining condition of coolant
 - Adding coolant and maintaining coolant concentration is required at regular intervals. This is a normal operator function and is either done from a safe location outside of the work enclosure or with the doors open and the machine stopped.

2. Adding lubricants

- Adding lubricants for spindle and axes is required at regular intervals. These are often months or years in length. This is a normal operator function and is always done from a safe location outside of the work enclosure.

3. Cleaning chips out of the machine

- Cleaning out of chips is required at intervals dictated by the type of machining performed. This is a normal operator function. It is performed with the doors open and all of the machine operation is stopped.

Service only consists of the following:

1. Repairing of a machine that is not operating correctly

- Any machine that is not operating correctly requires service by factory trained personnel. This is never an operator function. It is not considered maintenance. Installation and service instructions are provided separately from the Operator's Manual.

2. Machine moving, unpacking, and installation

- Haas machines are shipped to a user's location almost ready to operate. They still require a trained service person to complete the installation. Installation and service instructions are provided separately from the Operator's Manual.

3. Machine packing

- Machine packing for shipment requires the same packing material supplied by Haas in the original shipment. Packing requires a trained service person to complete the installation. Shipping instructions are provided separately from the Operator's Manual.

4. Decommission, dismantle and disposal

- Machine is not expected to be disassembled for shipment; it can be moved in its entirety in the same manner in which it was installed. Machine can be returned to the manufacturer's distributor for disposal; manufacturer accepts any/all components for recycling per Directive 2002/96/EC.

5. End-of-life disposal

- End-of-life disposal must conform to the laws and regulations in the region the machine is located. This is a jointly the responsibility of the owner and seller of the machine. The risk analysis does not address this phase.

1.1.2 Read Before Operating



DANGER:

*Do not enter the machining area any time the machine is in motion, or at any time that machine motion is possible. Severe injury or death may result. Motion is possible when the power is on and the machine is not in **[EMERGENCY STOP]**.*

Basic safety:

- This machine can cause severe bodily injury.
- This machine is automatically controlled and may start at any time.
- Consult your local safety codes and regulations before you operate the machine. Contact your dealer if you have questions about safety issues.
- It is the machine owner's responsibility to make sure that everyone who is involved in installing and operating the machine is fully acquainted with the operation and safety instructions provided with the machine, BEFORE they work with the machine. The ultimate responsibility for safety rests with the machine owner and the individuals who work with the machine.
- Use appropriate eye and ear protection when you operate the machine.
- Use appropriate gloves to remove processed material and to clean the machine.
- Replace windows immediately if they are damaged or severely scratched.

Electrical safety:

- The electrical power must meet the required specifications. Attempting to run the machine from any other source can cause severe damage and will void the warranty.
- 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, with the key available only to qualified service personnel.
- Do not reset a circuit breaker until the reason for the fault is investigated and understood. Only Haas-trained service personnel should troubleshoot and repair Haas equipment.
- Do not press **[POWER UP]** on the control pendant before the machine is fully installed.

Operation Safety:

- Do not operate the machine unless the doors are closed and the door interlocks are functioning correctly.

- Check for damaged parts and tools before you operate the machine. Any part or tool that is damaged should be properly repaired or replaced by authorized personnel. Do not operate the machine if any component does not appear to be functioning correctly.
- When a program runs, the tool turret can move rapidly at any time.
- Improperly clamped parts machined at high speeds/feeds may be ejected and puncture the enclosure. It is not safe to machine oversized or marginally clamped parts.

Release of person trapped in the machine:

- No person should ever be located inside the machine during operation.
- In the unlikely event that a person is trapped inside the machine the emergency stop button should be immediately be depressed and the person removed.
- If the person is pinched or entangled the machine should be powered off; then the machine axes can be moved by use of a large external force in the direction required to free the person.

Recover from a jam or blockage:

- Of the chip conveyor - Follow the cleaning instructions on the Work on Your Haas (go to www.haascnc.com click on the OWNERS link). If necessary, close the doors and reverse the conveyor so the jammed part or material is accessible, and remove. Use lifting equipment or get assistance for lifting heavy and awkward parts.
- Of a tool and material/part - Close the doors, press **[RESET]** to clear and displayed alarms. Jog the axis so the tool and material are clear.
- If the alarms do not reset or you are unable to clear a blockage, contact your Haas Factory Outlet (HFO) for assistance.

Follow these guidelines when you work with the machine:

- Normal operation - Keep the door closed and guards in place (for non-enclosed machines) while the machine operates.
- Part loading and unloading – An operator opens the door, completes the task, closes the door, and then presses **[CYCLE START]** (starting automatic motion).
- Machining job set-up – When set-up is complete, turn the set-up key to lock out set-mode and remove the key.
- Maintenance / Machine Cleaner– Press **[EMERGENCY STOP]** or **[POWER OFF]** on the machine before you enter the enclosure.
- 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]**, **[TURRET FWD]**, **[TURRET REV]**).

Chuck safety:



DANGER:

Improperly clamped parts or oversized parts may be ejected with deadly force.

- Do not exceed the chuck's rated speed. Higher speeds reduce chuck clamping force.
- Unsupported barstock must not extend outside the drawtube.
- Grease the chuck weekly. Follow the chuck manufacturer's instructions for regular service.
- Chuck jaws must not protrude beyond the diameter of the chuck.
- Do not machine parts larger than the chuck.
- Follow all of the chuck manufacturer's warnings regarding the chuck and workholding procedures.
- Hydraulic pressure must be set correctly to securely hold the work piece without distortion.
- Improperly clamped parts at high velocity may puncture the safety door. You must reduce the spindle speed to protect the operator when performing dangerous operations (e.g. turning oversized or marginally clamped parts).

Periodic maintenance of machine safety features:

- Inspect door interlock mechanism for proper fit and function.
- Inspect safety windows and enclosure for damage or leaks.
- Verify all enclosure panels are in place.

Door Safety Interlock maintenance:

- Inspect the door interlock, verify the door interlock key is not bent, misaligned, and that all fasteners are installed.
- Inspect the door interlock itself for any signs of obstruction or misalignment.
- Immediately replace any components of the Door Safety Interlock system that do not meet this criteria.

Door Safety Interlock testing:

- With the machine in run mode, close the machine door, run the spindle at 100 RPM, pull the door and verify the door does not open.

Machine Enclosure and Safety Glass maintenance and testing:

Routine Maintenance:

- Visually inspect the enclosure and safety glass for any signs of distortion, breakage or other damage.
- Replace the Lexan windows after 7 years or if they are damaged or severely scratched.

- Keep all safety glass and machine windows clean to allow proper viewing of the machine during operations.
- A daily visual inspection of the machine enclosure to verify all panels are in place should be performed.

Testing of machine enclosure:

- No testing of the machine enclosure is necessary.

1.1.3 Machine Environmental Limits

This table list the environmental limits for safe operation:

T1.1: Environmental Limits (Indoor Use Only)

	Minimum	Maximum
Operating Temperature	41 °F (5.0 °C)	122 °F (50.0 °C)
Storage Temperature	-4 °F (-20.0 °C)	158 °F (70.0 °C)
Ambient Humidity	20% relative, non-condensing	90% relative, non-condensing
Altitude	Sea Level	6,000 ft. (1,829 m)



CAUTION:

Do not operate the machine in explosive atmospheres (explosive vapors and/ or particulate matter).

1.1.4 Machine Noise Limits



CAUTION:

Take precautions to prevent hearing damage from machine/machining noise. Wear ear protection, change your application (tooling, spindle speed, axis speed, fixturing, programmed path) to reduce noise, or restrict access to machine area during cutting.

Typical noise levels at the operator's position during normal operation are as follows:

- **A-Weighted** sound pressure level measurements will be 69.4dB or lower.
- **C-Weighted** instantaneous sound pressure levels will be 78.0dB or lower.
- **LwA** (sound power level A-weighted) will be 75.0dB or lower.



NOTE:

Actual noise levels while cutting material are greatly affected by the user's choice of material, cutting tools, speeds and feeds, workholding and other factors. These factors are application specific and are controlled by the user, not Haas Automation Inc.

1.2 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 machine safely and use best practice machining techniques, it is also the owner's responsibility to manage the progress of these methods. You must monitor your machining process to prevent damage, injury, or loss of life if a hazardous condition occurs.

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

It is especially important to select monitoring equipment that can immediately detect a problem and perform an appropriate action without human intervention.

1.3 Door Rules - Run / Setup Mode

All Haas CNC machines are equipped with locks on the operator doors and a key switch on the side of the control pendant to lock and unlock setup mode. Generally, setup mode status (locked or unlocked) affects how the machine operates when the doors are opened.

Setup mode should be locked out (the keyswitch in the vertical, locked position) at most times. In Run and in Setup mode, the enclosure doors are locked closed during CNC program execution, spindle rotation or axis movement. The doors automatically unlock when the machine is not in cycle. Many machine functions are unavailable with the door open.

When unlocked, setup mode allows a skilled machinist more access to the machine to set up jobs. In this mode, machine behavior is dependent on whether the doors are opened or closed. The following charts summarize the modes and allowed functions.



NOTE:

All these conditions follow assuming that the door is open and stays open before, during and the actions occur.

T1.2: Lathe - Run/Setup Mode Restrictions

Machine Function	RUN Mode	SETUP Mode
Advance, Retract, Rapid Tailstock Motion	Not allowed.	Not allowed.
Air Blast On	Not allowed.	Not allowed.
Axis Jog using the Pendant Handle Jog	Not allowed.	Allowed.
Axis Jog using the RJH Handle Jog	Not allowed.	Allowed.
Axis Jog using the RJH shuttle knob	Not allowed.	Not allowed.
Axis Jog using E-Handwheel Jogging	Not allowed.	Allowed.
Axis Feed using E-Handwheel Rocker Switches	Not allowed.	Not allowed.
Axis Rapid using E-Handwheel Rocker Switches	Not allowed.	Not allowed.

Machine Function	RUN Mode	SETUP Mode
Axis Rapid using Home G28 or Second Home	Not allowed.	Not allowed.
Axis Zero Return	Not allowed.	Not allowed.
Bar Feeder Set-up actions	Not allowed.	Not allowed.
Bar Pusher Set-up actions	Not allowed.	Not allowed.
Chip Conveyor [CHIP FWD / REV]	Not allowed.	Not allowed.
Chuck Clamp and Unclamp	Allowed	Allowed
[COOLANT] button on the pendant	Not allowed.	Allowed.
[COOLANT] button on the RJH.	Not allowed.	Allowed.
C-Axis Disengaged	Allowed	Allowed
C-Axis Engaged	Not allowed.	Not allowed.
High Pressure Coolant (HPC) On	Not allowed.	Not allowed.
Jog the Spindle	Not allowed.	Not allowed.
Orient Spindle	Not allowed.	Not allowed.
Previous Tool (RJH)	Not allowed.	Not allowed.
Retract, Extend Parts Catcher	Not allowed.	Not allowed.
Retract, Extend Probe Arm	Not allowed.	Not allowed.
Run a program, [CYCLE START] button on the pendant	Not allowed.	Not allowed.
Run a program [CYCLE START] button on the RJH	Not allowed.	Not allowed.
Spindle [FWD] / [REV] button on the pendant.	Not allowed.	Not allowed.

Machine Function	RUN Mode	SETUP Mode
Spindle [FWD] / [REV] on the RJH.	Not allowed.	Not allowed.
Tool Change [ATC FWD] / [ATC REV] .	Not allowed.	Not allowed.

**DANGER:**

Do not attempt to override safety features. Doing so makes the machine unsafe and voids the warranty.

1.3.1 Robot Cells

A machine in a robot cell is allowed to run a program while the door is open, regardless of the position of the Run-Setup key. While the door is open, the spindle speed is limited to the lower of the factory RPM limit or Setting 292, Door Open Spindle Speed Limit. If the door is opened while the spindle RPM is above the limit, the spindle will decelerate to the limit RPM. Closing the door removes the limit and the programmed RPM is restored.

This open-door condition is allowed only while a robot communicates with the CNC machine. Typically, an interface between the robot and the CNC machine addresses the safety of both machines.

Robot cell setup is beyond the scope of this manual. Work with a robot-cell integrator and your HFO to correctly set up a safe robot cell.

1.3.2 Mist Extraction / Enclosure Evacuation

The Mills (except CM and GR models) have a provision installed that will allow for a mist extractor to be attached to the machine. It is entirely up to the owner/operator to determine if and what type of mist extractor is best suited for the application. The owner/operator assumes all responsibility for the installation of the mist extraction system.

1.4 Modifications to the Machine

Haas Automation, Inc. is not responsible for damage caused by modifications you make to your Haas machine(s) with parts or kits not manufactured or sold by Haas Automation, Inc. The use of such parts or kits may void your warranty.

Some parts or kits manufactured or sold by Haas Automation, Inc. are considered user-installable. If you choose to install these parts or kits yourself, be sure to completely read the accompanying installation instructions. Make sure you understand the procedure, and how to do it safely, before you begin. If you have any doubts about your ability to complete the procedure, contact your Haas Factory Outlet (HFO) for assistance.

1.5 Improper Coolants

Coolant is an important part of many machining operations. When it is correctly used and maintained, coolant can improve part finish, lengthen tool life, and protect machine components from rust and other damage. Improper coolants, however, can cause significant damage to your machine.

Such damage can void your warranty, but it can also introduce hazardous conditions to your shop. For example, coolant leaks through damaged seals could create a slipping hazard.

Improper coolant use includes, but is not limited to, these points:

- Do not use plain water. This causes machine components to rust.
- Do not use flammable coolants.
- Do not use straight or “neat” mineral-oil products. These products cause damage to rubber seals and tubing throughout the machine. If you use a minimum-quantity lubrication system for near-dry machining, use only the recommended oils.

Machine coolant must be water-soluble, synthetic oil-based or synthetic-based coolant or lubricant.



NOTE:

Be sure to maintain your coolant mixture to keep the coolant concentrate at acceptable levels. Improperly maintained coolant mixtures can allow machine components to rust. Rust damage is not covered by your warranty.

Ask your HFO or your coolant dealer if you have questions about the specific coolant that you plan to use.

1.6 Safety Decals

The Haas factory puts decals on your machine to quickly communicate possible hazards. If decals become damaged or worn, or if you need additional decals to emphasize a particular safety point, contact your Haas Factory Outlet (HFO).



NOTE:

Never alter or remove any safety decal or symbol.

Be sure to familiarize yourself with the symbols on the safety decals. The symbols are designed to quickly tell you the type of information they give:

- Yellow Triangle - Describes a hazard.
- Red Circle with Slash-Through - Describes a prohibited action.

- Green Circle - Describes a recommended action.
- Black Circle - Gives information about machine or accessory operation.

F1.1: Example Safety Decal Symbols: [1] Hazard Description, [2] Prohibited Action, [3] Recommended Action.








1.6.1 Decal Symbols Reference






This section gives explanations and clarifications for the safety symbols you will see on your machine.

T1.3: Hazard Symbols – Yellow Triangles

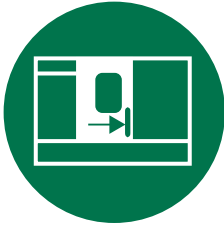


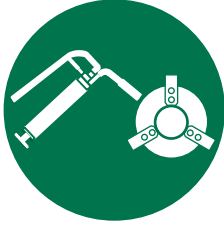
Symbol	Description
	<p>Moving parts can entangle, trap, crush, and cut. Keep all parts of your body away from machine parts when they move, or whenever motion is possible. Motion is possible when the power is on and the machine is not in [EMERGENCY STOP]. Secure loose clothing, hair, etc. Remember that automatically controlled devices can start at any time.</p>
	<p>Do not extend unsupported bar stock out the rear of the drawtube. Unsupported bar can bend and “whip”. A whipping bar can cause severe injury or death.</p>

Symbol	Description
	<p>The Regen is used by the spindle drive to dissipate excess power and will get hot. Always use care around the Regen.</p>
	<p>There are high voltage components on the machine that can cause electrical shock. Always use care around high voltage components.</p>
	<p>Machining operations can create hazardous chips, dust or mist. This is function of the materials being cut, the metalworking fluid and cutting tools used and the machining speeds/feeds. It is up to the owner/operator of the machine to determine if personal protective equipment such as safety goggles or a respirator is required and also if a mist extraction system is needed. All enclosed models have a provision for connecting a mist extraction system. Always read and understand the Safety Data Sheets (SDS) for the workpiece material, the cutting tools and the metalworking fluid.</p>
	<p>Always securely clamp workpieces in the chuck or collet. Properly fasten chuck jaws.</p>
	<p>Secure loose clothing, hair, jewelry, etc. Do not wear gloves around rotating machine components. You can be pulled into the machine, resulting in severe injury or death. Automatic motion is possible when the power is on and the machine is not in [EMERGENCY STOP].</p>

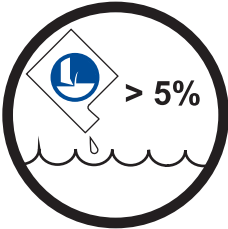
T1.4: Prohibited Action Symbols – Red Circles with Slash-Through

Symbol	Description
	Do not enter the machine enclosure when the machine is capable of automatic motion. When you must enter the enclosure to complete tasks, press [EMERGENCY STOP] or power off the machine. Put a safety tag on the control pendant to alert other people that you are inside the machine, and that they must not turn on or operate the machine.
	Do not machine ceramics.
	Do not use chuck jaw extensions. Do not extend chuck jaws beyond the chuck face.
	Keep your hands and body away from the area between the tailstock and workholding when automatic motion is possible.
	Do not use pure water as coolant. This will cause machine components to rust. Always use a rust-inhibitive coolant concentrate with water.

T1.5: Recommended Action Symbols – Green Circles

Symbol	Description
	Keep the machine doors closed.
	Always wear safety glasses or goggles when you are near a machine. Airborne debris can cause eye damage. Always wear hearing protection when you are near a machine. Machine noise can exceed 70 dBA.
	Read and understand the operator's manual and other instructions included with your machine.
	Grease and maintain the chuck regularly. Follow the manufacturer's instructions.

T1.6: Informational Symbols – Black Circles

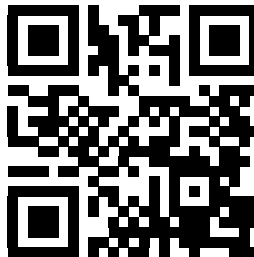
Symbol	Description
	<p>Maintain the recommended coolant concentration.</p> <p>A “lean” coolant mixture (less concentrated than recommended) may not effectively prevent machine components from rusting.</p> <p>A “rich” coolant mixture (more concentrated than recommended) wastes coolant concentrate without further benefit over the recommended concentration.</p>

1.6.2 Other Safety Information

You may find other decals on your machine, depending on the model and options installed. Be sure to read and understand these decals.

1.6.3 More Information Online

For updated and supplemental information, including tips, tricks, maintenance procedures, and more, visit the Haas Service page at www.HaasCNC.com. You can also scan the code below with your mobile device to go directly to the Haas Service page:



Chapter 2: Introduction

2.1 Toolroom Lathe Features

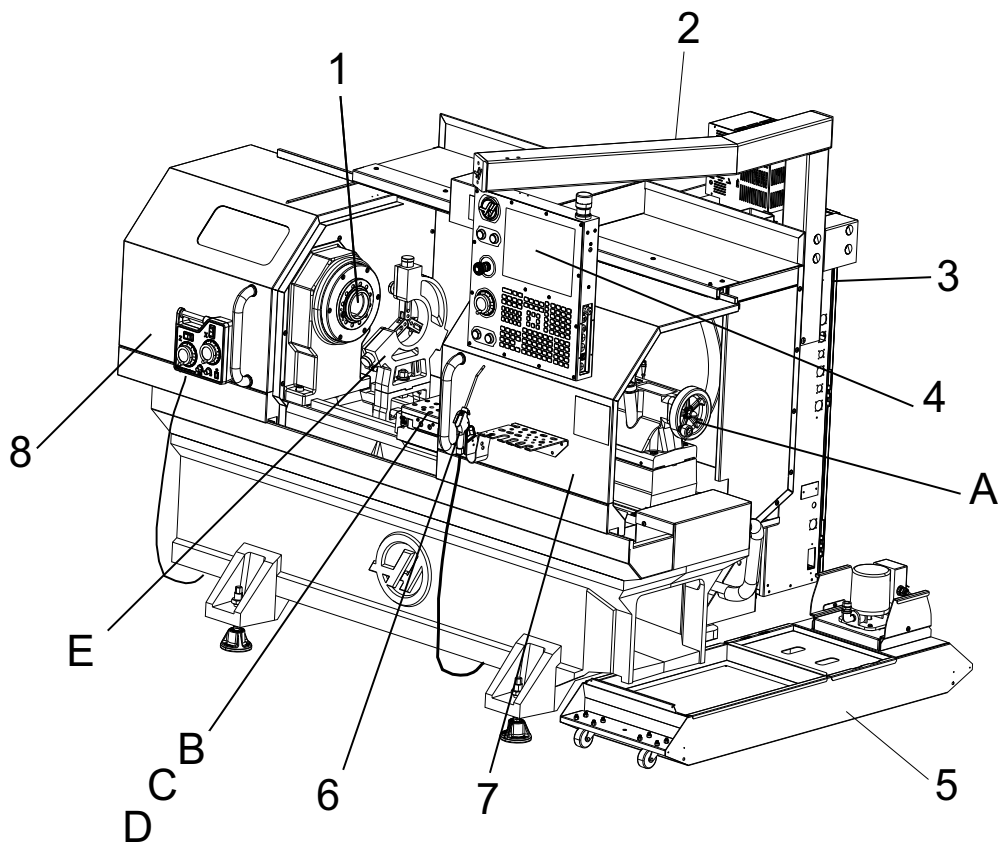
The following figures show some of the standard and optional features of your Haas lathe.



NOTE:

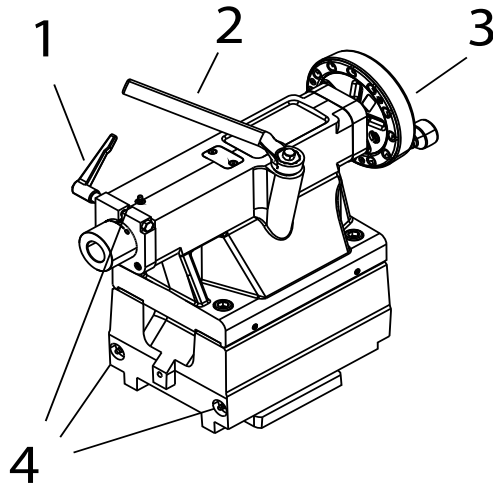
These figures are representative only; your machine's appearance may vary depending on the model and installed options.

F2.1: Toolroom Lathe Features (TL-1 shown front view)

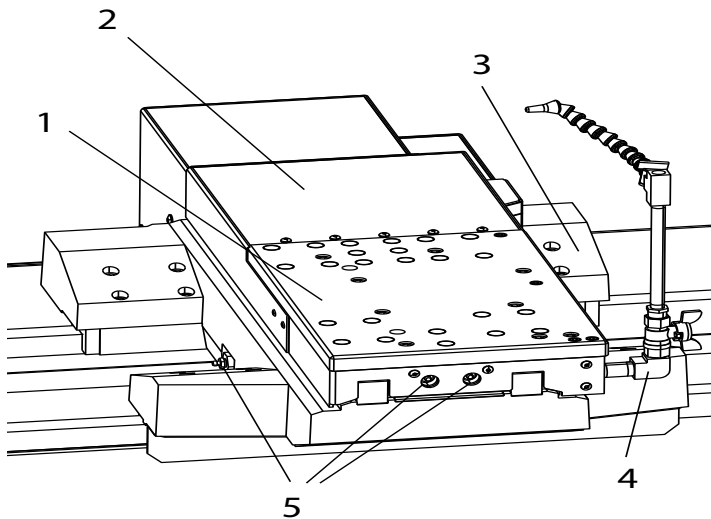


- 1. Spindle/Chuck
- 2. Main Circuit Breaker
- 3. Control Cabinet
- 4. Control Pendant
- 5. Coolant Pump Kit (optional)
- 6. Air Nozzle
- 7. Right Door

- 8. Left Door
- 9. eHandwheel
- A. Tailstock (optional)
- B. Cross-Side
- C. TT-4 Turret (optional, not shown)
- D. ATT8 Turret (optional, not shown)
- E. Steady Rest (optional)

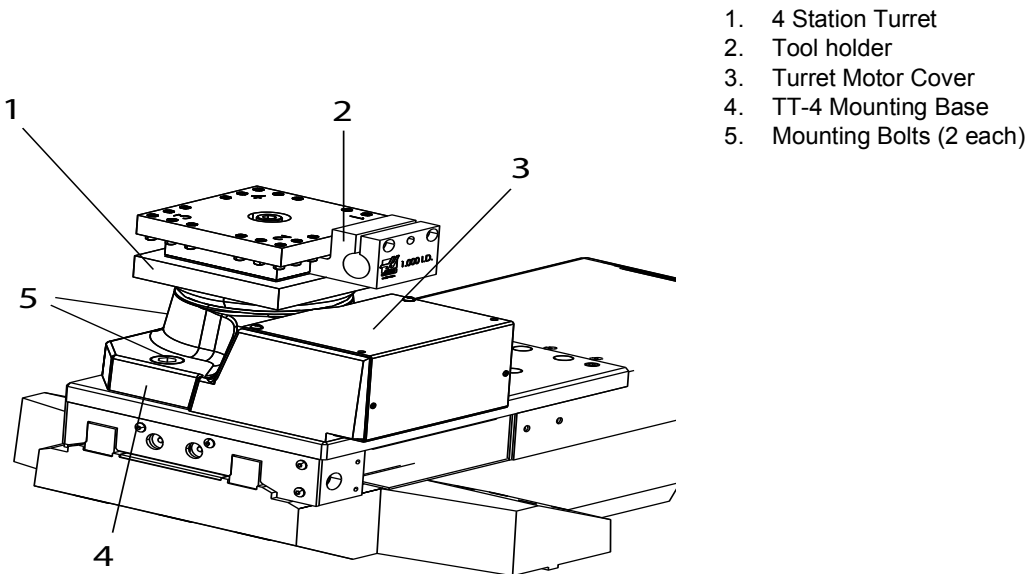
F2.2: Detail A - Tailstock (TL-1)

1. Quill Clamp Lock
2. Quill Adjustment Wheel
3. Base Lock Wrench
4. Grease Fittings (3 each)

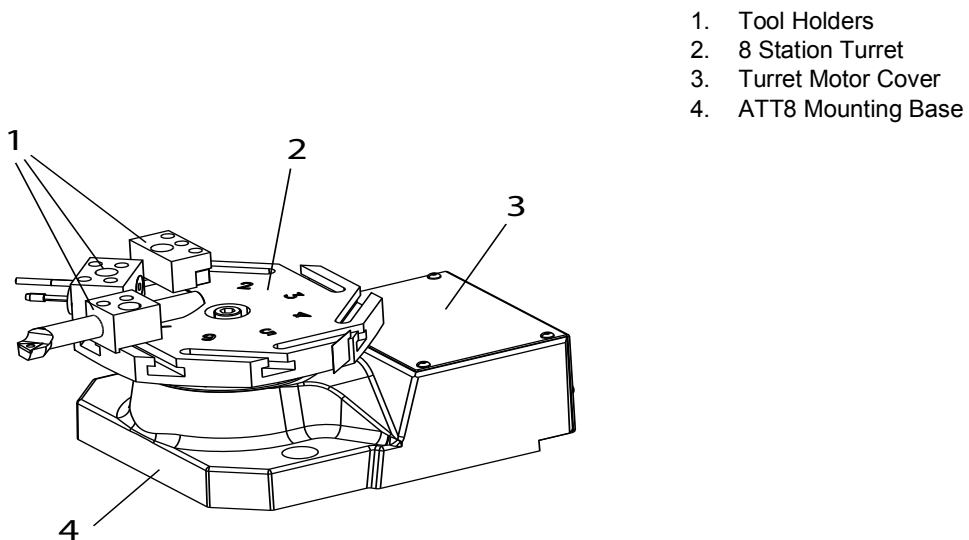
F2.3: Detail B - Cross-Slide (TL-1/2)

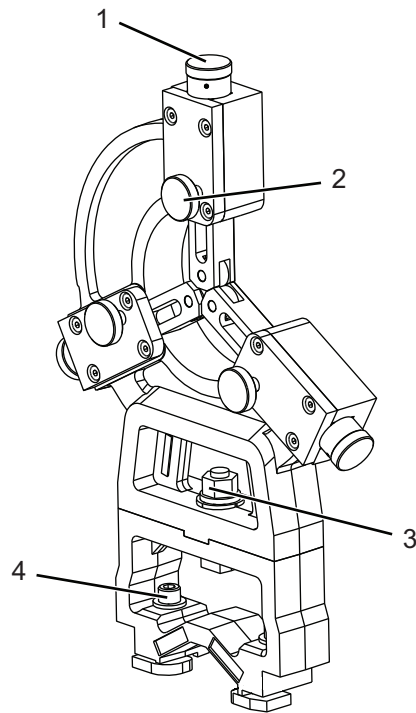
1. Cross-Slide Mounting Plate
2. Cross-Slide, X Axis
3. Table Saddle, Z Axis
4. Coolant Supply Block
5. Grease Fittings

F2.4: Detail C - TT-4 Turret (TL-1/2)



F2.5: Detail D- ATT8 Turret (TL-1/2)



F2.6: Detail E- Steady Rest (TL-1/2)

1. Roller Adjustment (3 locations)
2. Roller Lock (3 locations)
3. Standoff Locking Nut
4. Guide Rail Locking Nuts (2 locations)

Chapter 3: Operation

3.1 Introduction

You will find the majority of the information on how to operate your Toolroom Lathe in the Lathe Operator's Manual. Operational differences are described in the following sections:

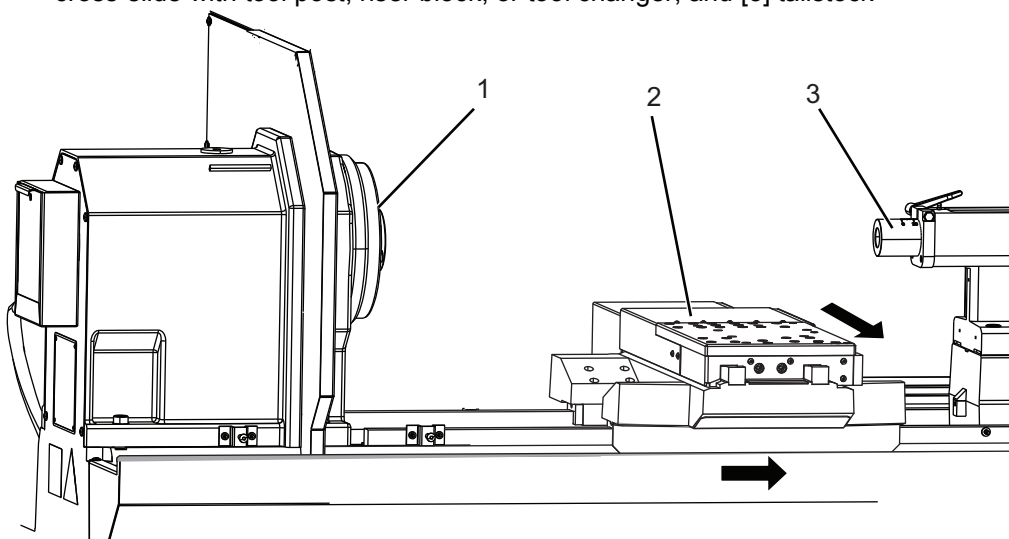
- Machine Power-On
- eHandwheels
- Tailstock Operation
- TT4 / ATT8 Turret Operation
- Steady Rest Operation

3.2 Machine Power-On

Follow this procedure to turn on a Toolroom Lathe for the first time.

Before you do this procedure, remove all shipping brackets and steady rest if equipped from the machine. Make sure that possible crash areas, such as the spindle, cross-slide, and tailstock, are clear.

F3.1: Power-Up Cross-slide Home Movement and Possible Crash Areas: [1] spindle, [2] cross-slide with tool post, riser block, or tool changer, and [3] tailstock



1. Press and hold **[POWER ON]** until you see the Haas logo on the screen. After a self-test and boot sequence, the display shows the startup screen. The startup screen gives basic instructions to start the machine. Press **[CANCEL]** to dismiss the screen. You can also press **[F1]** to disable it.

2. Turn **[EMERGENCY STOP]** clockwise to reset it.
3. Press **[RESET]** to clear the startup alarms. If you cannot clear an alarm, the machine may need service. Contact your Haas Factory Outlet (HFO) for assistance.
4. Close the doors.



WARNING:

*Before you do the next step, remember that automatic motion begins immediately when you press **[POWER UP]**. Make sure the motion path is clear. If equipped, the steady rest cannot be installed between the cross slide and tailstock during the zero return procedure. Stay away from the spindle, cross-slide, and tailstock.*

5. Press **[POWER UP]**.

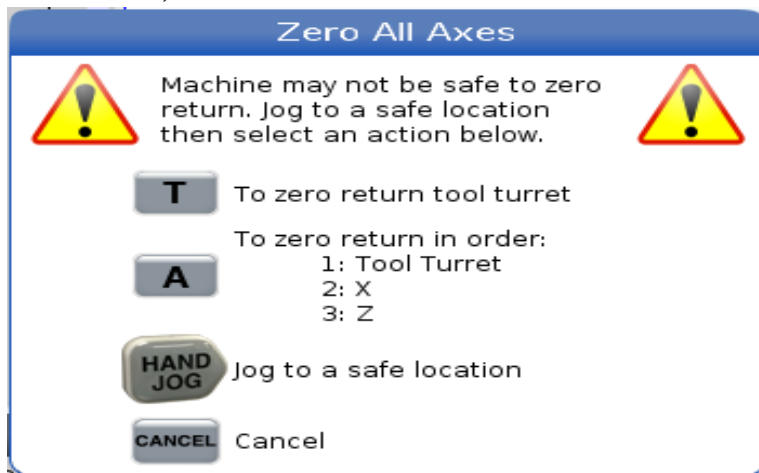


The axes move slowly until the machine finds the home switch for each axis. This establishes the machine home position. A flashing message, *INSTALL TOOL 1 PRESS CYCLE START*, prompts you to install tool 1 and press **[CYCLE START]**.



NOTE:

Some options, such as TT-4 or ATT8, disable the Power Up function. In this case, the zero return menu will be used to home the machine:



6. Check clearance before moving each axis.
 - a) If needed, push **[HANDLE JOG]** and move axes to a safe position. Remove tools if necessary. If the eHandwheel is installed the pendant jog wheel is only used to scroll through the control. You must use the eHandwheel to jog the axes if installed.
 - b) Zero return each axis separately. Press **[T]**, and only the tool changer will find home.
 - c) Press **[A]**, and the Tool Turret will find home first then X and last the Z-axis.

The control is now in **OPERATION:MEM** mode.

3.3 Manual Mode

The Toolroom Lathe can run in manual mode without being homed.

When in manual mode the machine will not read offsets, programs, or any G & M-codes. Travel limits are not active so use caution when moving the axis.

F3.2: Power-Up menu

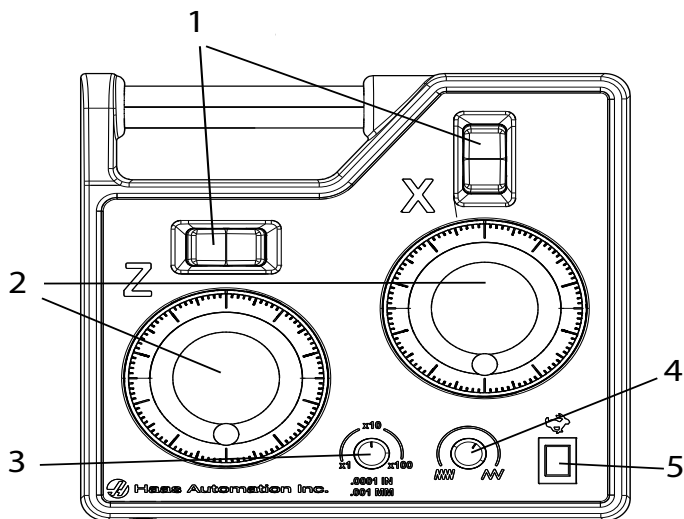
1. Setting325 Enable Manual Mode must be set to ON.
2. Press **[HAND JOG]** to enter the handle jog mode.
3. Use the eHandwheel to jog the axis.
4. To turn on the spindle, use the numeric keypad to enter an RPM value and press **[FWD]** or **[REV]**.
5. With the spindle running the Power Feed rocker switches will be active.
6. If the optional TT-4 or ATT-8 tool changer is installed, In MDI mode, press **[TURRET FWD]** or **[TURRET REV]** to change tools. Make sure there is enough clearance around the tool changer before changing tools.

3.4 eHandwheel

Follow these procedures to use the eHandwheel option.

Before you use the eHandwheel, make sure that possible crash areas, such as the spindle, cross-slide, and tailstock, are clear.

F3.3: eHandwheel overview: [1] Power Feed, [2] Handle Jog, [3] Jog Increment, [4] Power Feed Rate, and [5] Rapid Feed.



NOTE:

When the eHandwheel is installed the pendent jog wheel will only scroll through the control page. It cannot be used to jog the machine.



NOTE:

Feed Rocker switches only work when the spindle is turning or while Rapid Feed is pressed.

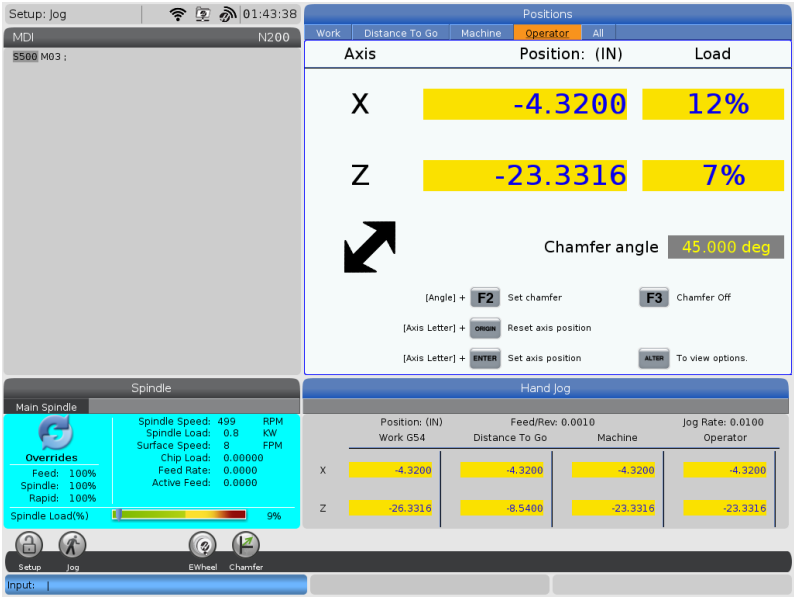
Jog Behavior: The eHandwheel on the new TL's with the Next Generation Control is setup to jog similarly to a manual lathe. This is different than how the older TL's with the Classic Haas Control are set up. The table below shows the differences. If you want your TL with the Next Generation Control to function the same as your older TL with the Classic Haas Control, you can have your local Haas Factory Outlet invert Parameter 1.177 AXIS JOG DIRECTION INVERTED.

	Standard Manual Lathe	TL with the Classic Haas Control	TL with the Next Generation Control
Turn the X-Axis jog handle	CW	CW	CW
The numbers on the handle	Increase	Increase	Increase
The movement relative to the operator	Moves Away	Moves towards	Moves away
The movement in terms of positive display	N/A	Numbers increase	Numbers decrease
The movement in terms of part size	Part gets smaller	Part gets bigger	Part gets smaller
Turret location	Close side of part	Close side of part	Close side of part

Axis Jog: Select the Jog Increment [3] then use the X or Z axis jog wheels [2] to position the axes.

Rapid Feed: Hold the Rapid Feed button [5] and press the desired Power Feed rocker switch [1].

Jog Chamfer: Use the Jog Wheels [2] to jog the tool to the starting point. While in the operator tab in handle jog mode, press **[F3]** to enable the chamfer option. The chamfer icon will appear on the screen.



Enter a number value and press **[F2]** to set the chamfer angle.

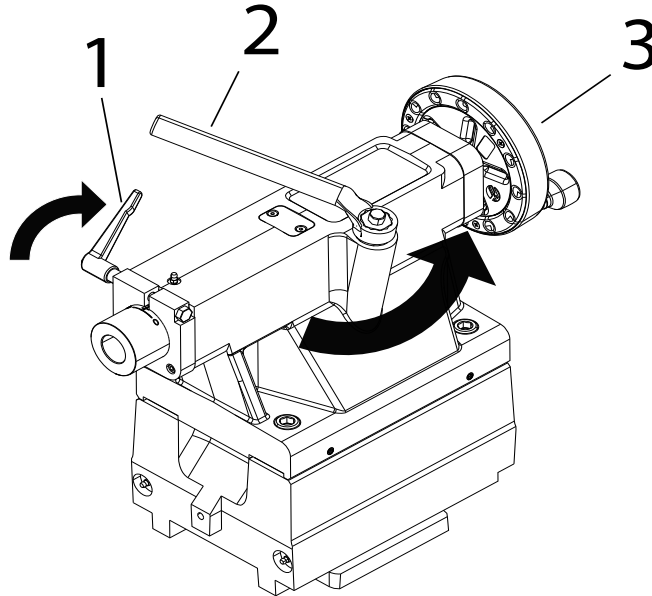
Use the Power Feed rocker switches [1] to jog in or out of a chamfer.

Press **[F3]** to exit chamfer mode.

3.5 Position TL-1/2 Tailstock

The tailstock is optional on all toolroom lathes.

F3.4: TL-1/2 Tailstock [1] Quill Clamp Lock, [2] Base Lock Wrench [3] Quill Adjustment Wheel,

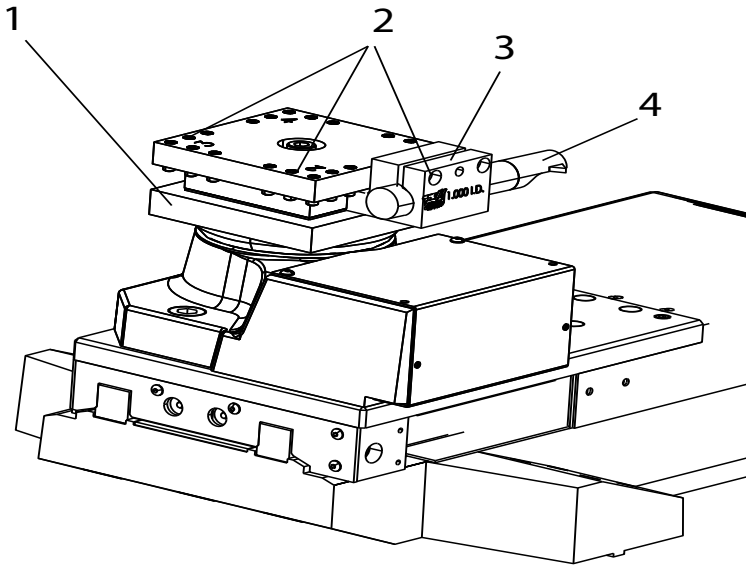


To operate the tailstock:

1. Loosen the clamp bolt at the base of the tailstock casting with the Base Lock Wrench [2]. Move the wrench counterclockwise to loosen.
2. Position the tailstock base manually, then tighten the clamp bolt at the base of the tailstock casting with the Base Lock Wrench [2]. Move the wrench clockwise to lock.
3. To drive the quill in and out, rotate the quill clamp lock [1] away from the spindle and rotate the hand wheel on the rear of the casting [2] counterclockwise and clockwise. The TL-1/2 tailstock has a #4 Morse taper (MT4).

3.6 TT-4 Turret Operation

F3.5: TT-4 Turret Detail: [1] turret, [2] tool-retention screws, [3] tool holder, [4] tool.



To set up the TT-4 turret:

1. Loosen the tool-retention screws [2]. Put the tool [4] into the tool holder [3] and tighten the tool-retention screws [2].



CAUTION:

There is a clearance of 0.25" (6 mm) between the bottom of the lower TT-4 plate [1] and the top of the servo-motor cover. Do not use a tool that extends below the top of the servo-motor cover. Use a boring-bar holder [3] of the type shown.

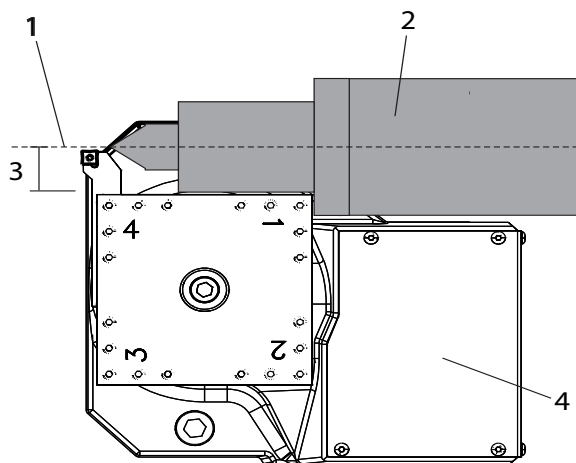


CAUTION:

If you use the air gun to remove chips and coolant from the turret, do not blow air into the ring cover at the base of the turret. Compressed air can force chips and coolant into the mechanism. This damages the unit.

2. In the following figure, make sure the tailstock [2] has sufficient clearance around the servo motor cover. To prevent interference between the tailstock and the servo-motor cover, extend the tool holder farther out of the turret.

F3.6: TT-4 Turret and Servo-motor Cover Clearance: [1] Tailstock centerline, [2] Tailstock, [3] Clearance, [4] Servo-motor Cover



3. Make sure the clearance [3] between the tailstock centerline [1] and the edge of the servo-motor cover [4] and the turret is more than 1.78" (45 mm).

3.6.1 TT-4 Operational Test

Use this program to test the tool changer:

1. Enter the following code:

```
%
T1 ;
T2 ;
T3 ;
T4 ;
T3 ;
T2 ;
M99 ;
;
;
;
%
```

**NOTE:**

Use T-address codes to operate the tool changer. For example, T303 rotates the tool changer to the number 3 tool position, and uses offset 3. Add the T-address code to the program like the other lines of code. Refer to the Lathe Operator's manual for more information on the T-codes and tool offsets.

2. Press **[CYCLE START]**.

3.6.2 TT-4 Tool Change Recovery

To recover the tool changer from an incomplete tool change:

1. Press **[MDI DNC]**.

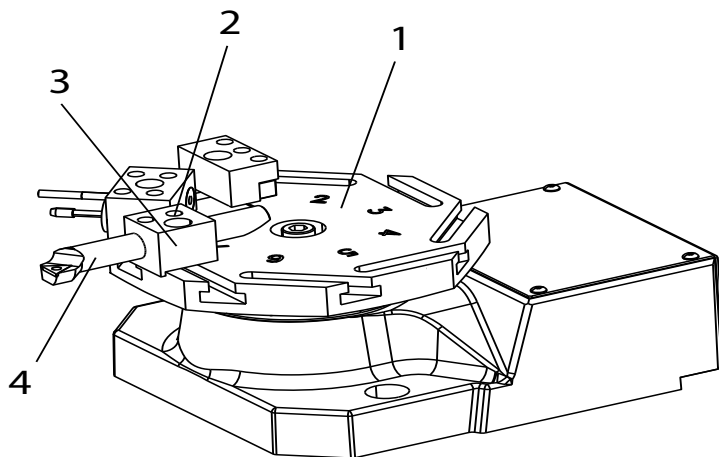
**CAUTION:**

*The tool changer moves rapidly when you push **[TURRET FWD]** or **[TURRET REV]**. To prevent injury, give the turret sufficient clearance.*

2. Press **[TURRET FWD]** or **[TURRET REV]**.

3.7 ATT8 Turret Operation

F3.7: ATT8 Turret Detail: [1] Turret, [2] tool-retention screws, [3] tool holder, [4] tool,



NOTE:

The ATT8 has a 1/2 inch turning tool height from the top of the turret.

To set up the ATT8 turret:

1. Loosen the tool-retention screws [2].
2. Put the tool [4] into the tool holder [3] and tighten the tool-retention screws [2].



CAUTION:

It is not recommended to use the ATT8 tool changer on a machine with the tailstock option.



CAUTION:

If you use the air gun to remove chips and coolant from the turret, do not blow air into the ring cover at the base of the turret. Compressed air can force chips and coolant into the mechanism. This damages the unit.

3.7.1 ATT8 Operational Test

Use this program to test the tool changer:

1. Enter the following code:

```
%  
T1 ;  
T2 ;  
T3 ;  
T4 ;  
T5 ;  
T6 ;  
T7 ;  
T8 ;  
T7 ;  
T6 ;  
T5 ;  
T4 ;  
T3 ;  
T2 ;  
M99 ;  
;  
;  
;  
%
```



NOTE:

Use T-address codes to operate the tool changer. For example, T303 rotates the tool changer to the number 3 tool position, and uses offset 3. Add the T-address code to the program like the other lines of code. Refer to the Lathe Operator's manual for more information on the T-codes and tool offsets.

2. Press [CYCLE START].

3.7.2 ATT8 Tool Change Recovery

To recover the tool changer from an incomplete tool change:

1. Press **[MDI]**.



CAUTION: *The tool changer moves rapidly when you push **[TURRET FWD]** or **[TURRET REV]**. To prevent injury, give the turret sufficient clearance.*

2. Press **[TURRET FWD]** or **[TURRET REV]**.

3.8 TL Steady Rest Operation

The steady rest provides increased support for long- or narrow-shaft operations. Manually position the steady rest along the Z-Axis travel and lock it in place with the clamp bolts. It can be used with the tailstock option.



CAUTION: *Do not home the Z Axis until you have removed the steady rest out of its shipping position. The Z-Axis cannot be homed if the steady rest is between the cross slide and the tailstock. The carriage can collide with the steady rest and damage both components.*

1. If you have not moved the steady rest out of its shipping position, use a lift to move the steady rest from its shipping position between the cross-slide and the tailstock to its operational position between the chuck and the cross-slide.



CAUTION: *Make sure to use a lift that is rated for the weight of the steady rest.*

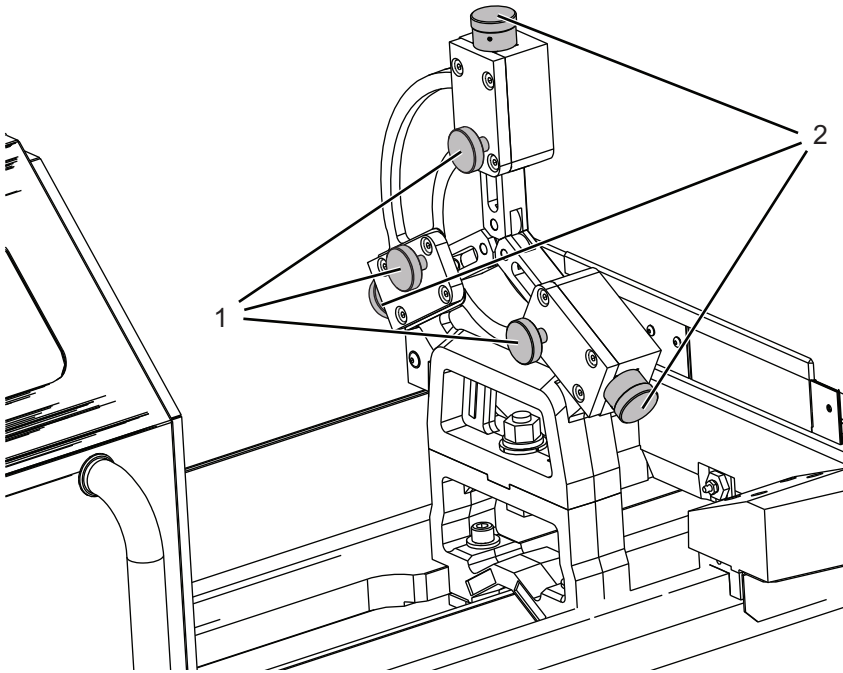
2. Tighten the clamps at the base of the steady rest.

3.8.1 C-Type Steady Rest Operation

To operate the C-type steady rest:

1. Turn the roller lock screws [1] to loosen the rollers.

F3.8: C-type Steady Rest



2. Retract the rollers by turning the adjustment screws [2].
3. Clamp the workpiece into the chuck.
4. If a tailstock is to be used, engage the tailstock live center and engage the tailstock brake.
5. Turn the steady rest roller adjustment screws [2] to move the rollers against the workpiece.
6. Tighten the roller lock screws [1] to secure the rollers in place.



NOTE:

Haas recommends that you do not place material with a rough finish in the steady rest. The steady rest holds more securely on a workpiece with a smooth surface.

7. Place a dial indicator on a Z-Axis linear guide and position the indicator tip near the outside edge of the workpiece.
8. Turn the workpiece by hand and check for deflection in the part.
9. Adjust and tighten the steady rest rollers as necessary.

Chapter 4: Maintenance

4.1 Introduction

Regular maintenance is important to make sure that your machine has a long and productive life with minimal downtime. The most common maintenance tasks are simple and you can do them yourself. You can also ask your HFO about their comprehensive preventive maintenance program for complex maintenance tasks.

4.2 Toolroom Lathe Lubrication

The linear guides, ball screws, optional tailstock, and optional steady rest are manually lubricated. Grease fittings provide lubrication to the Z-Axis saddle, four trucks, and ball screw, as well as, the X-Axis cross-slide, four trucks, and ball screw.

Manually lubricate the optional tailstock. Three grease fittings on the quill and two rails provide lubrication points. Manually lubricate the rail mounting-points on the optional steady rest.

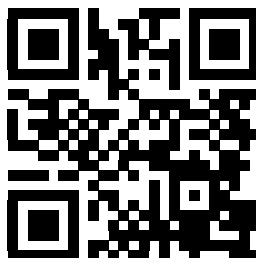
Cycle the X-and Z-Axes daily and lubricate them weekly to ensure proper lubrication.

Manually lubricate the chuck or work holding every eight hours of operation to ensure proper lubrication.

The current maintenance schedule and recommended type of lubricant is found in the Haas Resource Center on the Haas website diy.haascnc.com

4.3 More Information Online

For updated and supplemental information, including tips, tricks, maintenance procedures, and more, visit the Haas Service page at www.HaasCNC.com. You can also scan the code below with your mobile device to go directly to the Haas Service page:



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