VERTICAL MILL INSTALLATION INSTRUCTIONS

Machine Requirements

Machine footprints and operating dimensions are available in the brochure and the anchoring addendum

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: 20% – 95% relative humidity, non-condensing
Altitude: 0-6000 ft. (Do not operate machine in explosive atmospheres (explosive vapors and /or particulate matter)

Electricity Requirements

IMPORTANT! REFER TO LOCAL CODE REQUIREMENTS BEFORE WIRING MACHINES.
ALL MACHINES REQUIRE:
Line voltage that does not fluctuate more than ± 5%

VS / VR Series:
Three-phase, 50 or 60Hz power supply

VF / VM / MDC-500 Series:
AC input power is three phase Delta or Wye power, except that the power source must be grounded (e.g. leg or center leg for delta, neutral for Wye)
Frequency range of 47-66 Hz
Harmonic distortion not to exceed 10% of the total RMS voltage

20-15 HP System **STANDARD VF, and 10K**	Voltage Requirements (195-260V)	High-Voltage Requirements (354-488V)
Power Supply 1	50 AMP	25 AMP
Haas Circuit Breaker	40 AMP	20 AMP
If service run from elec. panel is less than 100' use:	8 GA. WIRE	12 GA. WIRE
If service run from elec. panel is more than 100' use:	6 GA. WIRE	10 GA. WIRE

40-30 HP System **50 TAPER, HT10K(40T), VM, SS mills**	Voltage Requirements (195-260V)	High-Voltage Requirements[2] (354-488V)
Power Supply1	100 AMP	50 AMP
Haas Circuit Breaker	80 AMP	40 AMP
If service run from elec.panel is less than 100' use:	4 GA. WIRE	8 GA. WIRE
If service run from elec. panel is more than 100' use:	2 GA. WIRE	6 GA. WIRE

40-30 HP System **VS Series**	Voltage Requirements (195-260V)	High-Voltage Requirements (354-488V)
Power Supply	125 AMP	**Must use an external transformer**
Haas Circuit Breaker	100 AMP	
If service run from ele.panel is less than 100' use:	2 GA. WIRE	
If service run from ele. panel is more than 100' use:	0 GA. WIRE	

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

Input power to the machine must be grounded. For wye power, the neutral must be grounded. For delta power, a central leg ground or one leg ground should be used. The machine will not function properly on ungrounded power. (This is not a factor with the External 480V Option.)

The rated horsepower of the machine may not be achieved if the imbalance of the incoming voltage is beyond an acceptable limit. The machine may function properly, yet may not deliver the advertised power. This is noticed more often when using phase converters. A phase converter should only be used if all other methods cannot be used.

The maximum leg-to-leg or leg-to-ground voltage should not exceed 260 volts, or 504 volts for high-voltage machines with the Internal High Voltage Option.

[1] The current requirements shown in the table reflect the circuit breaker size internal to the machine. This breaker has an extremely slow trip time. It may be necessary to size the external service breaker up by 20-25%, as indicated by “power supply”, for proper operation.

[2] The high-voltage requirements shown reflect the Internal 400V configuration which is standard on European machines. Domestic and all other users must use the External 480V option.

Air Requirements

Machine Type	Main Air Regulator	Input Air Line Hose Size
40-Taper VF-1 through VF-11, VM	85psi	3/8”
50-Taper VF-1 through VF-11	85psi	1/2”
VR, VS and MDC Series	85psi	1/2”

The VF, VM and VS series machines requires a minimum of 100 psi at 4 scfm (VR-11 requires a minimum of 100 PSI at 9scfm) at the input to the pressure regulator on the back of the machine. This should be supplied by at least a two-horsepower compressor, with a minimum 20-gallon tank, that turns on when the pressure drops to 100 psi.

NOTE: Add 2 scfm to the above minimum air requirements if the operator will be using the air nozzle during pneumatic operations.

The recommended method of attaching the air hose is to the barb fitting at the back of the machine with a hose clamp. If a quick coupler is desired, use a 3/8" for 40 taper machines, or a 1/2" for 50 taper machines and machines with the side mount tool changer option.

Excessive oil and water in the air supply will cause the machine to malfunction. The air filter/regulator has an automatic bowl dump that should be empty before starting the machine. This must be checked for proper operation monthly. Also, excessive contaminants in the air line may clog the dump valve and cause oil and/or water to pass into the machine.

NOTE: The nipple between the air filter/regulator and the oil lubricator reservoir tank is for the optional rotary table. DO NOT use this as a connection for an auxiliary air line. Auxiliary connections should be made on the left side of the air filter/regulator.

WARNING!

WHEN THE MACHINE IS OPERATING AND THE PRESSURE GAUGE (ON THE MACHINE REGULATOR) DROPS BY MORE THAN 10 PSI DURING TOOL CHANGES, INSUFFICIENT AIR IS BEING SUPPLIED TO THE MACHINE.

Installation Tools Required

Precision bubble level (0.0005 inch per 10")
1 1/8" hex wrench or ratchet
1 1/2" wrench
Allen Wrenches
(**VR** models) 12” Adjustable Wrench

Test indicator (0.0005)
Two 3/4" hex wrenches (open-end/box and ratchet)
Claw hammer
(VR models) 9/16 hex wrench

Forklift with the following specifications:

	VF-1	VF-2	VF-3	VF-4	VF-5/40	VF-5/50	VF-6	VF-7	VF-8	VF-9	VF-10	VF-11
Machine Weight	**7,100**	**8,000**	**12,500**	**13,300**	**14,600**	**16,100**	**21,000**	**23,000**	**24,000**	**25,000**	**28,000**	**29,400**
Fork Length	**8'**	**8'**	**8'**	**8'**	**8'**	**8'**	**8'**	**8'**	**8'**	**8'**	**8'**	**8'**

* The forklift must be capable of lifting at least this weight.

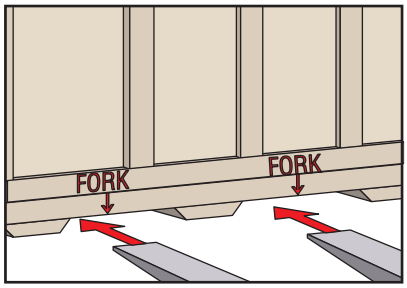
VR: Forklift must be capable of lifting at least 35, 000 lbs, with forks at least 8’ long.
VS: Forklift must be capable of lifting more than 40,000 lbs, with forks at least 8’ long by 6’ wide.

Materials Required

Wire and air hose or piping as specified in the Service Requirements section,
A small amount of grease,
Way lube for the lubricator (Vactra #2).
Coolant (water-soluble synthetic, or cutting oil)

Moving the Crate

CAUTION! THE VMC CRATE CAN ONLY BE MOVED WITH A FORKLIFT.



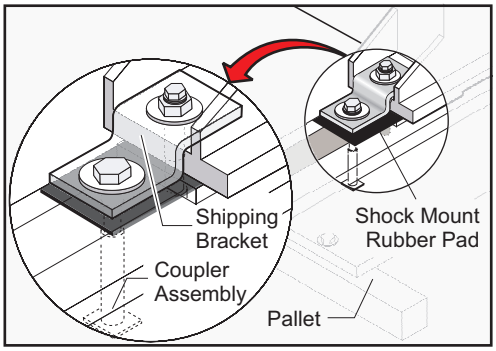
CAUTION! The fork positions are marked on the crate. (Also, note that there are three skids at each side of the pallet. The heavy part of the machine [the back] is positioned over the two skids that are closest together.) If the fork positions are ignored, the retaining bolts could be sheared off by the forks or the machine could tip over when it is picked up.

Unpacking the Mill

1. Remove plastic cover.

> **CAUTION!** Do not put pressure on the top of the machine as you remove the plastic.

2. Remove the coolant tank and the cleats that held it in place.



3. Unbolt the shipping brackets.

4. Remove the nuts on the leveling screws holding the shipping bracket to the base casting. Remove the shipping brackets.

5. Lift the machine off the pallet.

Setting in Place

Keep in mind when moving the **VF, VM,** and **VR** models, much of its weight is concentrated in the column at the back. When lifting these mills from the side, it is important that the forks of the forklift be positioned as close to the back of the machine as possible without being on the pads.

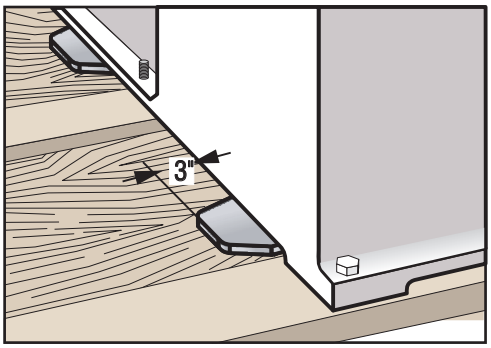
> **CAUTION!** Do not lift the machine any farther than necessary off the floor when moving it, and move as slowly and cautiously as possible. Dropping the machine, even from a height of a few inches, can cause injury, result in expensive repairs, and void the warranty.

VF 1-2 and VM-2: The only acceptable way to move this mill is to pick it up from the **SIDE** with a forklift. Follow the machine weight and fork length specifications described earlier. The forks must be set as far apart as possible without being on the pads. The forks must be positioned all the way to the back of the VMC and they must extend at least 3" past the far side of the machine base. Also, there must be about approximately 6" clearance between the forklift and the side of the machine.

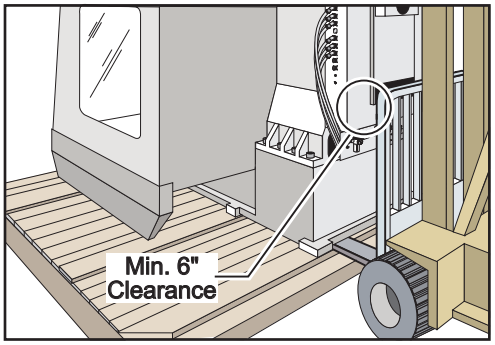
VF 3-11 and VR-11: Lift from the **BACK** of the machine with a forklift. Follow the machine weight and fork length specifications described earlier. There must be approximately 6" clearance between the forklift and the back of the machine.

Attempting to move the machine any other way may void the warranty.

> **CAUTION!** When lifting the machine with a forklift, be careful not to damage the sheet metal aprons with the forks.



VF 1 and 2

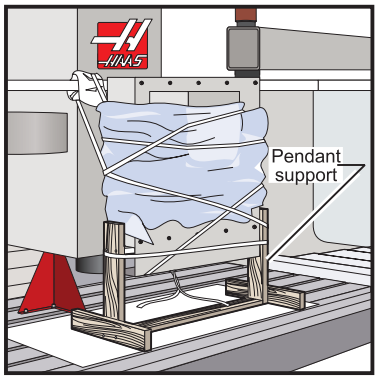


VF 3 through 11

1. Lift the machine clear of the pallet.

2. Thread the leveling screws through the casting until they extend about an inch out of the bottom of the machine. If a screw is excessively hard to turn, remove it, dress the threads in the hole with a 1-14 UNC tap, and inspect the screw. If the screw has dings, dress the threads with a 60° V file. (You must have good control over these screws because they are used to precision level the machine.)

3. Move the machine to where it will be located. Grease the dimple in each leveling pad and locate them under the leveling screws at the four corners. Then lower the machine.



4. Remove all banding and packing material around the control panel and the doors.

5. On the VF-6/8 and VR series, remove the pendant support.

6. Remove the control arm shipping brace. On the VF-3/4, swing the control arm into position and bolt it to the support on the top front of the machine enclosure. On the VF-6/8, swing control arm to the proper position.

Setting the Machine in Place (VS)

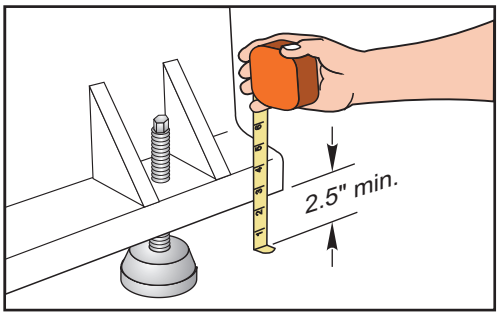
Ensure the anchoring preparations are in accordance with the anchoring instructions prior to setting the machine in place.

1. Prepare the table base for mating
   - Remove the X-axis auger and auger trough
   - Stone and clean thoroughly the mating flange surface. This is an extremely important step that must be well and properly done before the bases are moved into position with respect to each other. **(Failure to properly prepare the surfaces and preserve their cleanliness may require separation of the main components for corrective action).**
   - Clean the holes in the table base.
   - Ensure the air/electrical/oil lines and connectors are bundled and safely away from the mating surfaces.

2. Prepare the column base for mating

- Stone and clean thoroughly the mating flange surface. This is an extremely important step that must be well and properly done before the bases are moved into position with respect to each other. **(Failure to properly prepare the surfaces and preserve their cleanliness may require separation of the main components for corrective action).**
- Check the thread of each hole in the column base, ensure there is no damage.
- Ensure the air/electrical/oil lines and connectors are safely away from the mating surfaces.

3. Place the table base assembly in position. Rough level by measuring from the floor to the bottom of the base (very close to 2.5 inches). Each of the leveling screws and pads should be in place at this time and it is advisable to take the measurement at each leveling screw location for best results. This will ensure that the final leveling procedure will go more quickly **and that the coolant tank will properly fit beneath the coolant discharge.** Loosely screw the jam nuts onto the leveling screws.



4. Place the column base assembly in position. When placing the column base in position with respect to the table base, it is important that the two mating flanges be as parallel as possible (vertically and horizontally). Be certain that each of the screws are actually engaged in the threads, and that when the column base is in place and the mating surfaces are in contact that each screw is free to rotate. Rough level by measuring from the floor to the bottom of the base (very close to 2.5 inches). Each of the leveling screws and pads should be in place at this time and it is advisable to take the measurement at each leveling screw location for best results. This will ensure that the final leveling procedure will go more quickly. After rough leveling, fully tighten the connecting screws to be sure the mating surfaces are in full contact, and then loosen them all approximately 3 full turns. Be certain that the connecting screws are still free to rotate (do not leave the connecting bolts tight at this time because the machine still must be final leveled and squared).

Grating Platform

Large vertical machines (VF-6 through 11) have a small platform located on either side of the Y-axis waycover to provide a safe support for an operator should it be necessary to enter the enclosure.

The platform supports are preinstalled in domestic machines.

Export machines do not have the platform supports installed to allow for lifting. The two supports and required bolts are shipped inside the machine enclosure. After the machine is set in place, install the platform supports in the countersunk holes (3 each) on either side of the Y-Axis waycover using the supplied bolts.

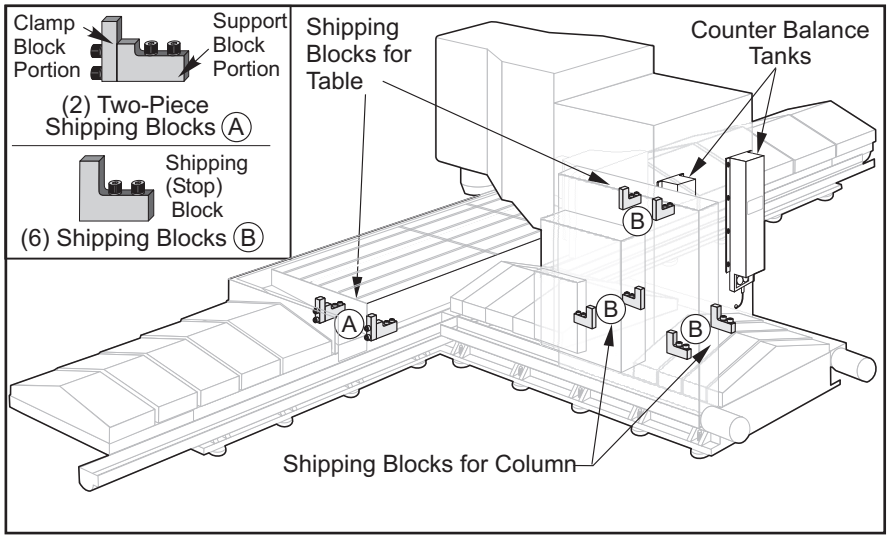
Work Platform

Large vertical machines (VF-6 through 11) have a moveable work platform that can be placed in front of the machine for operator access. The platform is wrapped and shipped attached to the pallet alongside the machine. When the machine is in place, set the work platform on its legs in front of the machine enclosure.

Unblocking the Machine

CAUTION! Before unblocking machine ensure that counterbalance cylinder charging hose is attached to nitrogen tank and nitrogen tank is fully charged to 1250psi.

The counterbalance cylinders have been removed (for overhead clearance during shipping), and they must be reinstalled and recharged with dry nitrogen prior to enabling the Z-axis. The table is secured for shipping by means of blocks that are bolted to the table base. The column is secured for shipping by means of blocks that are bolted to the column base. The spindle head is secured for shipping and a cover has been placed over the Y-axis ballscrew and that cover **must be removed.**



Y-axis Ballscrew Cover

Remove the cover from around the Y-axis ballscrew. There are two parts to the cover, a long section above the ballnut and a short section below the ballnut. Be certain to completely remove the cover from the ballscrew to prevent contamination after the Y-axis is later enabled. Inspect the ballscrew for any contamination that may have gotten through the dust cover during shipping and remove if necessary.

Installing the Hydraulic Counterbalance System

The hydraulic counterbalance system has been discharged of nitrogen (but contains the correct volume of fluid) and the hydraulic counterbalance cylinders have been removed from the column for overhead clearance in the shipping configuration. The hoses have been disconnected from the hydraulic cylinders and plugged. The hydraulic cylinders have been placed in the Y-axis auger trough for shipping. The two shoulder screws that secure each of the hydraulic cylinders to the top of the column have been stored by tightening them into the threads on the cylinder mounting surface on top of the column. The Z-axis has been disabled for reasons of safety when initially powering up the machine.

1. Remove the counterbalance cylinders from the auger trough and unwrap them.

2. Remove the flat washer and two jam nuts from the end of the rod.

3. Remove the two shoulder screws from the threads in the mounting surface on top of the column.

4. Remove the plug from the port of the cylinder and fully extend the cylinder rod.

5. Insert the counterbalance cylinder down through the top of the column and feed the end of the rod through the mating hole in the back of the spindle head.

6. Place the flat washer on the rod and thread both nuts onto the end of the rod. Before jamming the nuts together, be certain they are both high enough to allow the insertion of the cotter pin into the hole on the end of the cylinder rod. When the nuts are in place, jam the nuts together. Insert the cotter pin into the hole on the end of the rod. Repeat for the remaining hydraulic cylinder.

7. Insert and tighten the hydraulic hose fitting (use teflon tape on the fitting) in the port of the counterbalance cylinder.

8. Orient the cylinder so the hose will be away from the spindle head during operation and tighten the shoulder screws.

9. Remove the cap plug on the end of the hydraulic hose and connect it to the fitting (use teflon tape) that is now in the port of the cylinder.

10. Charge the counterbalance system using dry nitrogen to about 1300 psi (measure at the bottom of travel of the axis). Use all appropriate safety precautions and a supply bottle of adequate volume. Each bottle that is to be charged is a 90 cubic foot bottle.

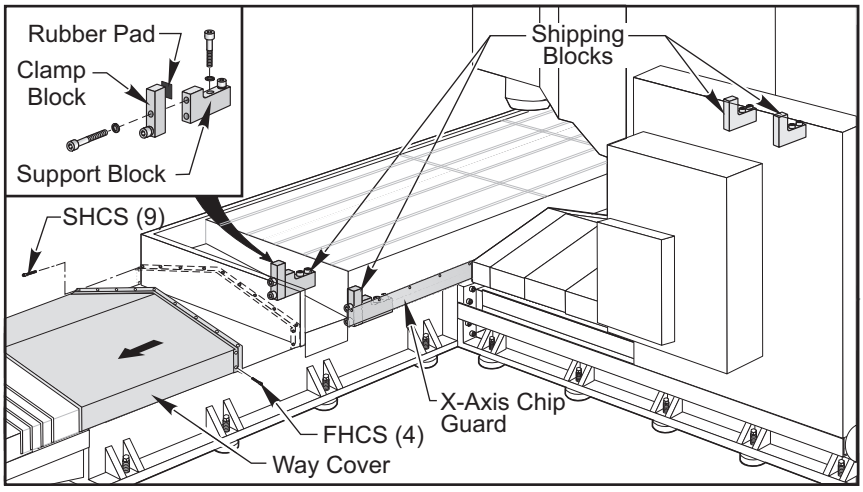
11. Power up the machine and enable the Z-axis.

12. Check the operation of the Z-axis limit switch in diagnostics

13. Zero return the Z-axis only. The final pressure of the system at the top of travel should be slightly more than 1250 psi. After the axis has established zero, E-stop and note whether the axis has a tendency to slowly fall. This should be monitored in the position page of the display as well as a visual determination. If the axis falls at all, the counterbalance pressure should be slightly increased until the head cannot move downward from the top of travel in a servo off condition. Take care not to overcharge the system, an overcharge could cause the spindle head to move upward when in an E-stop condition at the bottom of travel.

Unblocking the Table

The table is held in place for shipping by means of blocks that are screwed into the table base. There is one block on each end of the table. These blocks must be removed before normal operation of the X-axis is possible. To access the shipping blocks, both X-axis way covers need to be fully retracted from the table. The X-axis has been disabled in parameters for reasons of safety on power up of the machine.



1. Disconnect both X-axis way covers from the table and fully retract the way covers.

2. Remove the front and rear X-axis chip guards to ease access to the underside of the table (if necessary).

3. Remove the blocks from the table base to prevent any inadvertent damage.

WARNING!

BE CERTAIN THE MACHINE IS POWERED OFF WHEN CONNECTING OR DISCONNECTING SERVO MOTOR CABLES.

4. Uncoil the X-axis servo motor cable and connect to the motor. Do not attempt to route the cable to the final configuration at this time, but go directly from the control to the motor. This will provide power to the motor so the machine can be jogged in the X direction without zero return.

5. After the X-axis motor cable is connected, power the machine up and enable only the X-axis at this time.

6. Enable jog without zero return (setting 53) and move the table toward the home position taking extreme care that the X-axis cable does not get pinched between the table and any obstruction. Also be aware that there may be cables on the underside of the table that could be damaged while jogging in the shipping configuration.

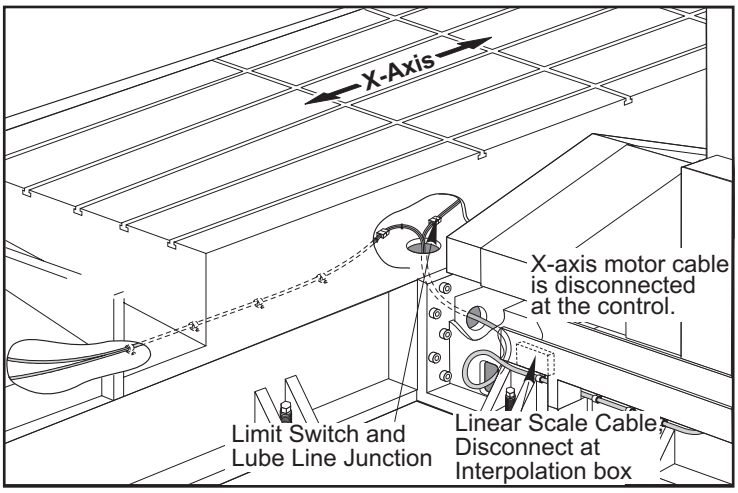
7. When the table is moved just far enough to allow access to the two single piece shipping blocks, stop jogging the table and remove the two single piece shipping blocks completely from the table base.

8. Handle jog the table back to allow access to the support part of the two piece shipping blocks and remove them completely from the table base.

9. Continue jogging the X-axis far enough to allow access to the cable access hole.

10. Power the machine down. Disconnect the X-axis cable.

11. Route the table base cables and lines through the cable access hole. a) Route the X-axis motor and encoder cable and connect. b) Route the X-axis limit switch cable to the lube air panel. c) Route the oil line connector from the column base and connect with the oil line in the table base.



12. Power up the machine and check the X-axis limit switch operation in diagnostics.

13. Zero return the X-axis

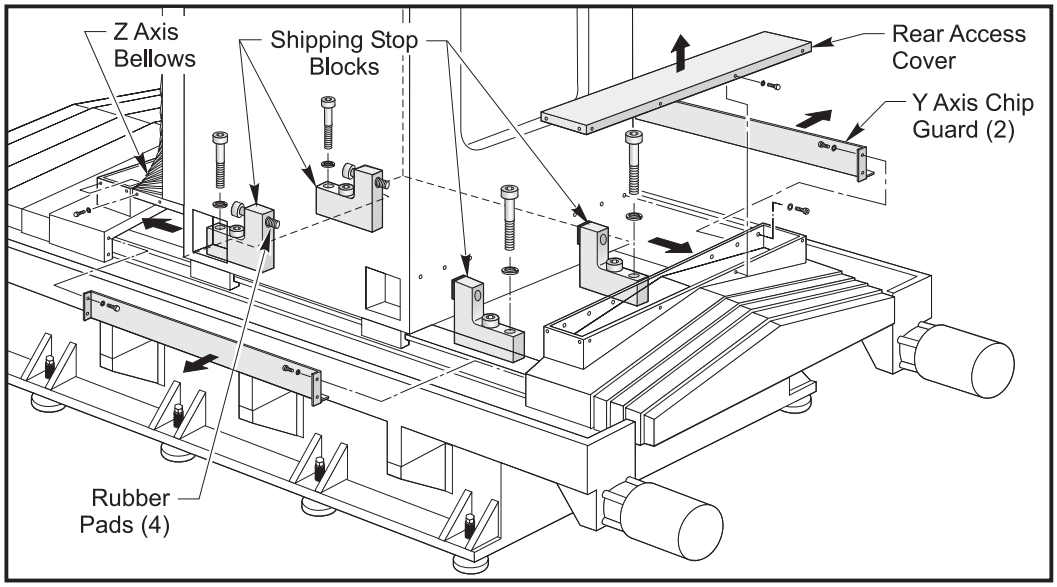
14. Check cable clearances under the table for the full X-axis travel and secure where necessary.

15. Reinstall the front and rear X-axis chip guards

16. Reinstall both X-axis way covers

Unblocking the Column

The column is held in place for shipping by means of blocks that are screwed into the column base. There are two blocks in the front and two blocks in the rear of the column. These blocks must be removed before normal operation of the Y-axis is possible. To access the shipping blocks, both Y-axis way covers need to be fully retracted from the column. When the front Y-axis way cover is disconnected from the column, the lower Z-axis bellows will need to be properly supported. For that reason, the counterbalance must be charged prior to the removal of the shipping blocks in the column base, permitting the spindle head to be safely raised. The Y-axis has been disabled in parameters for reasons of safety on power up of the machine.



1. Disconnect the rear Y-axis way cover from the column and fully retract.

2. Remove the two shipping blocks and hardware completely from the column base.

3. Raise the spindle head to the full up position to allow the lower Z-axis bellows to be collapsed upward.

4. Disconnect the lower Z-axis bellows from the front Y-axis way cover and block up to permit access to the screws that attach the Y-axis way cover to the column. Disconnect the front Y-axis way cover from the column and fully retract taking care to not allow the Z-axis bellows to fall. When the way cover is retracted far enough, block the Z-axis bellows up and then continue to collapse the Y-axis way cover until it is fully retracted.

5. Enable the Y-axis in parameters but do not zero return

6. While ensuring the Z-axis bellows do not fall, handle jog (without zero return) the Y-axis toward the rear of the machine until access to the bolts holding the forward shipping blocks are accessible.

7. Block the Z-axis bellows up and remove the shipping blocks completely from the column base.

8. Check that the Y-axis cables are properly routed and the cable guide is securely attached to the base.

9. Check the operation of the Y-axis limit switch in diagnostics

10. Zero return the Y-axis.

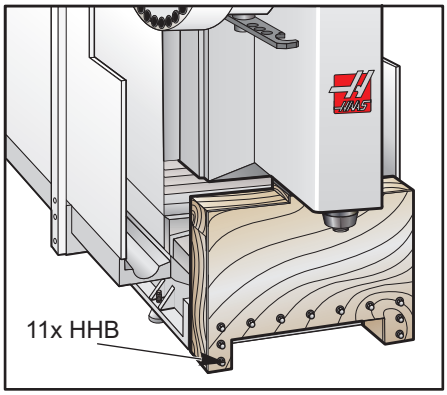
Shipping Bracket

1. Charge the hydraulic counterbalance system. See “Installing the Hydraulic Counterbalance System” section.

2. Power up the machine and raise the Z-axis to relieve pressure from the shipping bracket. Do not home any axis at this time.

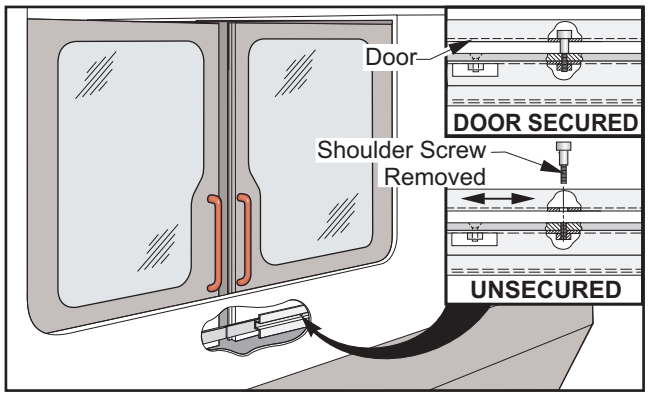
3. Remove the bolts securing the shipping bracket to the column base.

4. Clean the mating surface of the column base prior to mating the column to the table.



Shipping Bolts - Doors (VF/VM/VR)

Remove and discard shipping bolt from the inside **both** doors



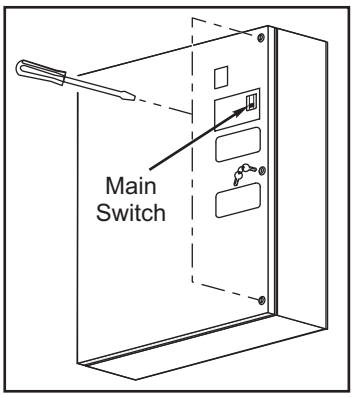
Initial Setup

WARNING!

AT THIS POINT, THERE SHOULD BE NO ELECTRICAL CONNECTION TO THE MACHINE. ELECTRICAL PANEL MUST BE CLOSED AND SECURED. WHEN MAIN SWITCH 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, EXERCISE EXTREME CAUTION WHEN WORKING IN THE PANEL.

1. Set the main switch at the upper right of the electrical panel on the back of the machine to OFF.

2. Using a screwdriver, unlock the two latches on the panel door, unlock the cabinet with the key, and open the door.



3. Take sufficient time to check all the components and connectors associated with the circuit boards. With the power off, push on them gently to make sure that they are seated in their sockets. Look for any cables that have become disconnected, look for any signs of damage and loose parts in the bottom of the panel box. If there are any signs that the machine was mishandled, call the factory before proceeding.

Installation of Pendant (VS series only)

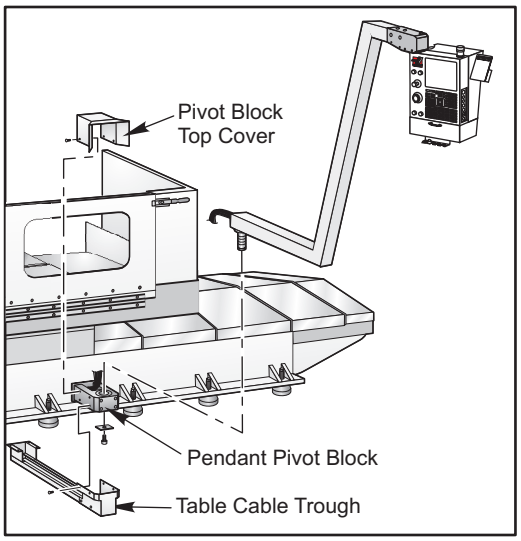
CAUTION! Use proper lifting equipment and techniques when performing the following steps.

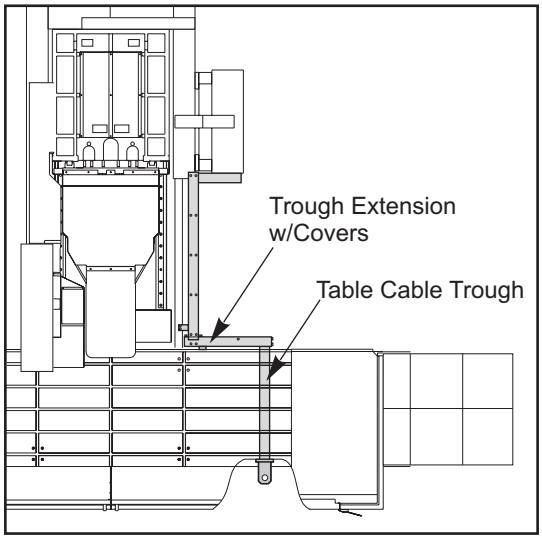
1. Unpack and remove the pendant from its shipping crate. Remove the small retaining plate bolted to the bottom of the pivot of the pendant.

2. Position the pendant so that the pivot point is near the pendant pivot block already bolted to the table casting. Ensure the pendant wiring is moved out of the way and will not interfere in fitting the pendant pivot to the pendant pivot block.

3. Insert the pendant pivot into the pendant pivot block. Secure the pendant using the plate and hardware removed in Step 1.

NOTE: When inserting the pendant pivot into the pendant pivot block, make sure the pendant arm is perpendicular to the table, as shown in the figure.





4. Place the table cable trough on the floor. Arrange the pendant wiring through the pendant pivot block and into the trough. Slide the trough under the mill table.

5. Move to the opposite side of the table (chip auger side). Remove the 1/4-20 BHCS from the trough cover and remove the cover. Cut the cable ties and unroll the control cabinet wiring into the trough.

6. Attach trough extension to the flange of the table bed. Route the cables from the table cable trough up into the trough extension. Connect the cable ends from the pendant to the cable ends from the control cabinet.

7. When the proper cable connections have been made, attach all the trough covers to the trough assembly using 1/4-20 BHCS.

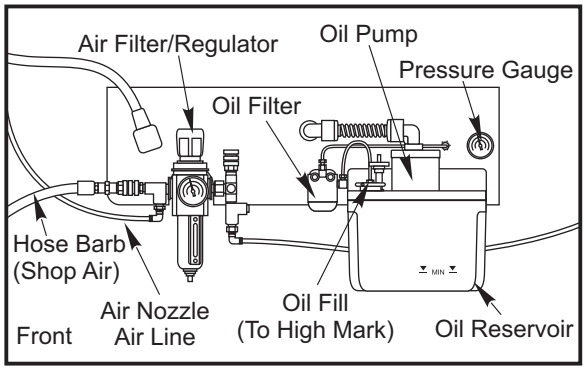
8. Attach the table cable trough to the table and secure with 1/4-20 BHCS.

9. Move to the pendant side of the table. Attach the table cable trough to the bottom of the pendant pivot block using 1/4-20 BHCS.

10. Attach the pivot block top cover to the pendant pivot block. Secure with 1/4-20 BHCS.

Air Connection

CAUTION! Working with the air service required for a mill can be hazardous. Make sure that pressure has been removed from the air line before connecting/ disconnect it from the machine, or servicing parts of the air system.



1. When the machine leaves the factory, the air filter is empty, and the lubricator reservoir tank is full. However, they should be checked and serviced if required before compressed air is supplied to the machine.

2. With the pressure off in the air line, connect the air supply to the hose barb next to the air filter/ regulator. If the fitting supplied is not compatible, replace it.

3. Start the compressor; set it between 100 and 150 psi. Set the regulator on the machine to 85 to 90 psi.

4. Prime the lubricator to make sure it is working. To prime the lubrication system, pull up on the handle on top of the reservoir tank.

CAUTION! NEVER push down on the primer handle. It gradually returns to the down position by itself, and the corresponding pressure increase can be seen on the pressure gauge.

NOTE: Depending on the position of the cam that drives it, the lubrication system may not activate until a few minutes after the machine is started. However, if there is a problem with the system, an alarm will stop the machine.

5. Verify spindle air pressure using the gauge located behind the Air Regulator panel. Most machines should show 17 psi. Adjust if necessary. VF machines equipped with a 15K spindle must have the regulator set to 20 psi.

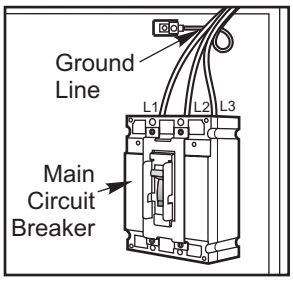
Electrical Connections

NOTE: The machine must have air pressure at the air gauge, or a “Low Air Pressure” alarm will be present on power-up.

CAUTION! Working with the electrical services required for the mill are extremely hazardous. The electrical power must be off and steps must be taken to ensure that it will not be turned on while you are working with it. In most cases this means turning off a circuit breaker in a panel and then locking the panel door. However, if this is not the case or are not sure how to do this, check with the appropriate personnel or obtain the necessary help before continuing.

WARNING!

KEEP THE ELECTRICAL PANEL CLOSED AND THE LATCHES ON THE DOOR SECURED AT ALL TIMES EXCEPT DURING INSTALLATION AND SERVICE. AT THOSE TIMES, ONLY QUALIFIED ELECTRICIANS MAY 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.



1. Hook up the three power lines to the terminals on top of the main circuit breaker at the upper right of the electrical panel. Connect the separate ground line to the ground bus to the left of the terminals.

NOTE: Make sure that the service wires actually go into the terminal-block clamps. (It is easy to miss the clamp and tighten the screw. A poor connection will cause the machine to run intermittently or have other problems, such as servo overloads.) To check, simply pull on the wires after the screws are tightened.

2. After the line voltage is connected to the machine, make sure that the main circuit breaker (at top right of rear cabinet) is OFF. Turn ON the power at the source. Use a digital voltmeter and appropriate safety procedures, to measure the voltage between all three pair phases at the main circuit breaker and write down the readings. The voltage must be between 195 and 260 volts (360 and 480 volts for high-voltage option).

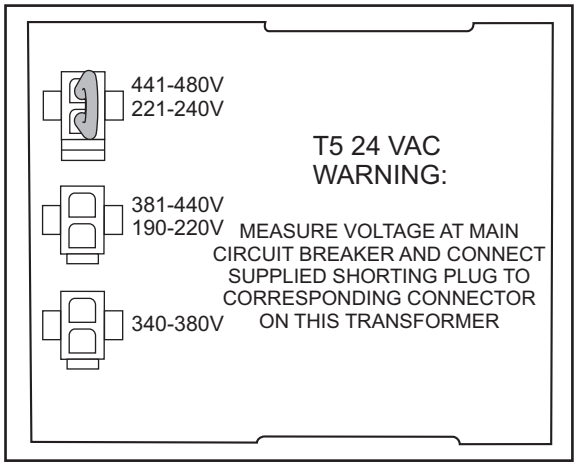
NOTE: Wide voltage fluctuations are common in many industrial areas; you need to know the minimum and maximum voltage which will be supplied to the machine while it is in operation. The U.S. National Electrical Code specifies that machines should operate with a variation of +5% to -5% around an average supply voltage. If problems with the line voltage occur, or low line voltage is suspected, an external transformer may be required. If you suspect voltage problems, the voltage should be checked every hour or two during a typical day to make sure that it does not fluctuate more than +5% or -5% from an average.

CAUTION! Make sure that the main circuit breaker is set to OFF and the power is off at your supply panel BEFORE you change the transformer connections. Make sure that all three black wires are moved to the correct terminal block and that they are tight.

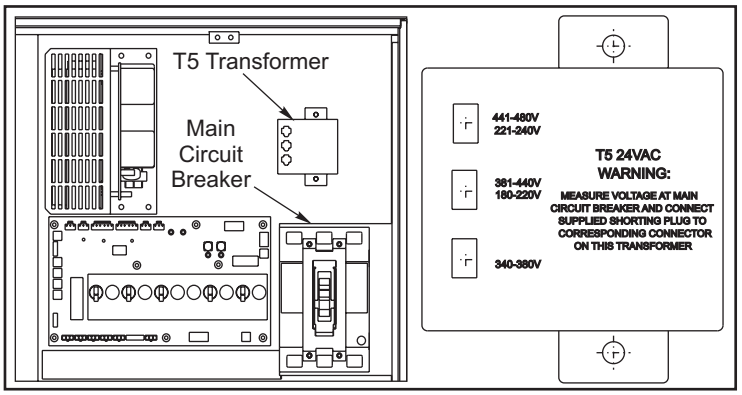
3. Check the connections on the transformer at the bottom-right corner of the rear cabinet. The three black wires labeled 74, 75, and 76 must be moved to the terminal block triple which corresponds to the average voltage measured in Step 2 above. There are four positions for the input power for the 260-volt transformer and five positions for the 480-volt transformer. The labels showing the input voltage range for each terminal position are as shown in the following illustrations.

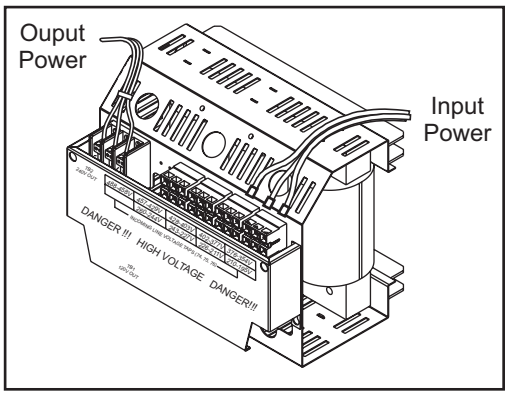
4. Transformer T5 supplies 24VAC used to power the main contactor. There are two versions of this transformer for use on 240 and 400V machines (32-0964B and 32-0965B, respectively). The 240V transformer has two input connectors located about two inches from the transformer, which allow it to be connected to either 240V or 200V. Users that have 220V-240V RMS input power should use the connector labeled 240V, while users with 190-220V input power should used the connector labeled 200V. Users with the External High Voltage Option should use the 240V connector if they have 420V-510V 60Hz power or the 200V connector if they have 50Hz power. Failure to use the correct input connector will result in either overheating of the main contactor or failure to reliably engage the main contactor.

The 480V transformer has three input connectors, labeled 360V, 400V and 480V. Users with 340-380V 50Hz power should use the 360V connector while users with 380-440V 50Hz power should use the 400V connector. The 480V connector is not currently used.



5. Set the main circuit breaker to ON. Check for evidence of problems, such as the smell of overheating components or smoke. If such problems are indicated, immediately set the main circuit breaker to OFF and call the factory before proceeding.





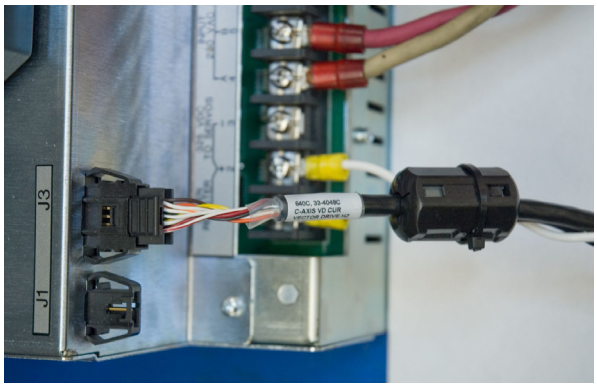
Warning!

THE THROUGH THE SPINDLE COOLANT (TSC) PUMP IS A THREE-PHASE PUMP AND MUST BE PHASED CORRECTLY! IMPROPER PHASING WILL CAUSE DAMAGE TO THE TSC PUMP AND VOID THE WARRANTY. REFER TO THE TSC START-UP SECTION IF YOUR MACHINE IS EQUIPPED WITH TSC.

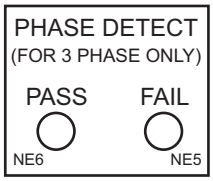
6. After the power is on, measure the voltage across the bottom terminals on the main circuit breaker. It should be the same as the measurements where the input power connects to the main circuit breaker. If there are any problems, check the wiring.

7. Apply power to the control by pressing the Power-On switch on the front panel. Check the high voltage buss on the Vector Drive (pin 2 with respect to pin 3 on the terminal bus at the bottom of the drive). It must be between 310 and 360 volts. If the voltage is outside these limits, turn off the power and recheck steps 2 and 3. If the voltage is still outside these limits, call the factory. Next, check the DC voltage displayed in the second page of the Diagnostic data on the display. It is labeled DC BUS. Verify that the displayed voltage matches the voltage measured at pins 2 and 3 of the Vector Drive ± 7 VDC.

If the displayed voltage exceeds the measured voltage by 12 volts or more, install a ferrite EMI filter (65-1452) to the current command cable near its connection to the vector drive. Secure with a cable tie (See photo). Recheck voltage.



8. Electrical power must be phased properly to avoid damage to your equipment. The Power Supply Assembly PC board incorporates a “Phase Detect” circuit with neon indicators, shown below. When the orange neon is lit (NE5), the phasing is incorrect. If the green neon is lit (NE6), the phasing is correct. If both neon indicators are lit, then you have a loose wire; check the connections. Adjust phasing by swapping L1 and L2 of the incoming power lines at the main circuit breaker.



WARNING!

All power must be turned off at the source prior to adjusting phasing.

9. Turn off the power, close the door, lock the latches, and turn the power back on.

10. Remove the key from the control cabinet and give it to the shop manager.

Installation Procedure for External 480V Transformer

Introduction

The external transformer adds to overall machine reliability and performance; however it does require extra wiring and a place to locate it. The external transformer provides electrostatically shielded isolation. This type of transformer acts to isolate all common mode line transients and improve EMI conducted emissions.

The external transformer has a 45 KVA rating. It is a 480V 60Hz only transformer.

Installation

The transformer should be located as close to the machine as possible. The input and output wiring of the transformer should conform to the local electrical codes and should be performed by a licensed electrician. The following is for guidance only, and should not be construed to alter the requirements of local regulations.

The input wire should not be smaller than 6 AWG for the 45KVA transformer. Cable that runs longer than 100" will require at least one size larger wire. The output wire size should be 4 AWG.

The transformer is 480V to 240V isolation transformers with delta-wound primary and secondary windings. The primary windings offer 7 tap positions, 2 above and 4 below the nominal input voltage of 480V.

The primary side should be wired as follows:

Input Voltage Range	Tap
493-510	1 (504)
481-492	2 (492)
469-480	3 (480)
457-468	4 (468)
445-456	5 (456)
433-444	6 (444)
420-432	7 (432)

This should produce a voltage on the secondary side of 234-243 V RMS L-L. Verify this and readjust the taps as required. At the machine, connect the cables at the input of the internal 230V transformer to the 227-243V taps. Apply power to the machine and verify that the DC voltage between pins 2 and 3 of the Vector Drive (2nd and 3rd pins from the left) is 329-345VDC. If not, return to the 480V isolation transformer and readjust the taps as required. Do not use the taps on the internal 230V transformer to adjust the voltage.

50Hz Installations

The external transformers are 60Hz rated, and cannot be used at 50Hz without derating the input voltage. For these applications, tap the internal 230V transformer on the lowest setting (195-210V RMS). The external transformer should be tapped according to the following table. If these tap settings do not produce a DC bus voltage between pins 2 and 3 on the Vector Drive between 320 and 345VDC, readjust the taps on the external transformer as required. Do not move the taps on the internal transformer from the lowest position.

Input Voltage Range	Tap
423-440	1 (504)
412-422	2 (492)
401-411	3 (480)
391-400	4 (468)
381-390	5 (456)
371-380	6 (444)
355-370	7 (432)

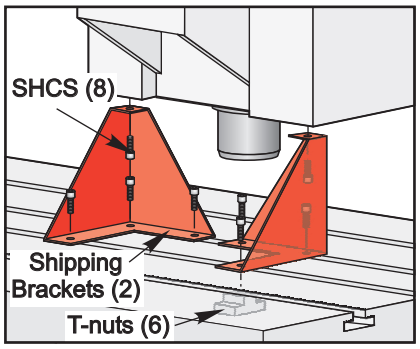
Machine Power On

Remove Shipping Brackets

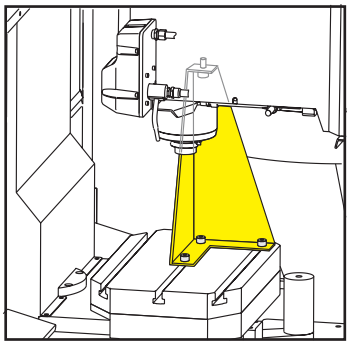
CAUTION! **DO NOT** press POWER UP/RESTART on the control panel while the shipping brackets are under the spindle. Also, do not press the X, Y, or Z buttons or the jog handle while the shipping brackets are located under the spindle.

Spindle Head Shipping Bracket

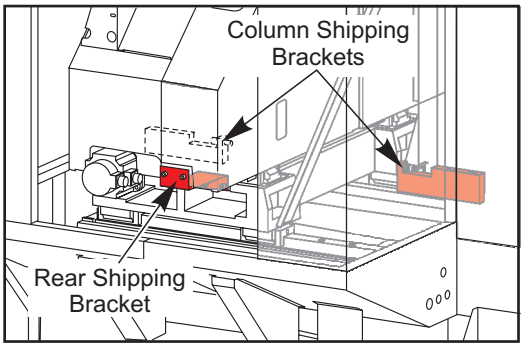
Loosen the four SHCS (three screws are in the table, and one is in the spindle head) holding each shipping bracket under the spindle head, and remove the two brackets.



VF 1-11 Shipping Bracket



Mill Drill Shipping Bracket



Machine Shown with Rear Cover Removed

Additional Shipping Brackets (MDC only)

VF-11 and VR-11 Door Shipping Brackets

The operator doors are secured, top and bottom, with blocks. Remove the bolt that secures each block.

Mill Drill Rear Shipping Bracket Removal

1. Remove the screws that secure the rear panel.

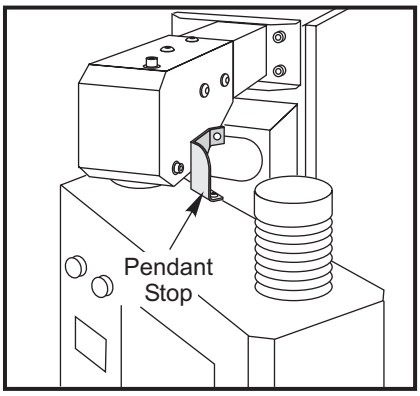
2. Remove the four screws that hold the shipping bracket to the spindle and saddle castings.

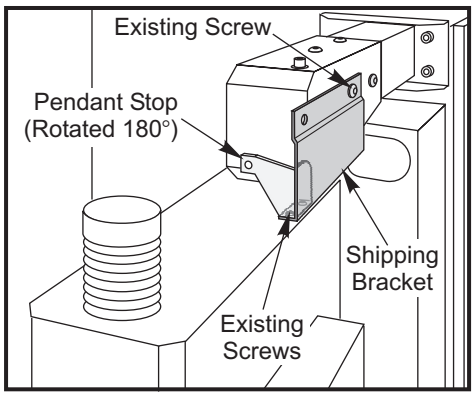
3. Remove the rear shipping bracket and two column shipping brackets (there are three bolts in each one) and replace the rear panel.

MDC Pendant Arm Shipping Bracket Removal

1. Remove the pendant shipping bracket, there are three screws holding it in place.

2. Replace the pendant stop; orient it as shown in the illustration. Use the screws removed from the shipping bracket.





Power On

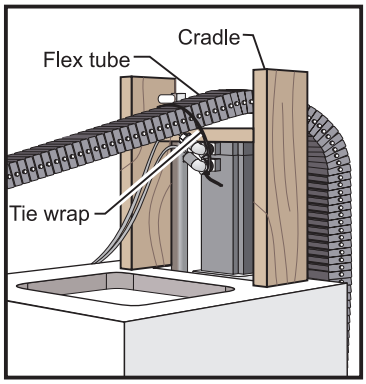
1. With the main switch on the electrical panel set to ON, press and release POWER ON at the upper left of the control panel. You will hear a click in the back of the machine and the fans will energize. After a few seconds, the display will appear on the screen.

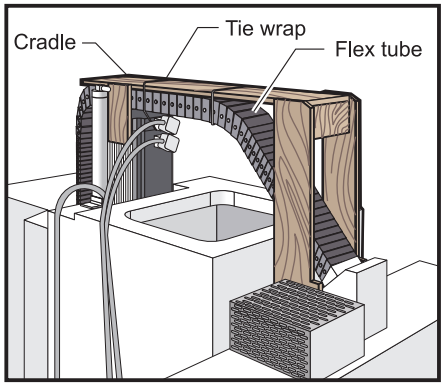
2. Press and release SETNG/GRAPH. Page down to the last page (press and release PAGE DOWN several times). Cursor to Setting 53, JOG W/O ZERO RETURN (with the cursor down key). Press and release the cursor right key and then press and release the WRITE key to turn this setting on. Turning on JOG W/O ZERO RETURN bypasses the zero return interlock.

3. Press and release the RESET button twice, or until there are no alarms, to turn the servos on. (The message “ALARM” appears at the lower right of the screen if any alarms are in effect.)

NOTE: If any alarms are present and cannot be cleared with the RESET button, press and release the ALARM / MESGS button for more information on the alarms. If you are unable to clear the alarms, write down the alarm numbers and call the factory.

4. Press and release the HANDLE JOG button and check the screen for the “JOGGING Z AXIS HANDLE .001” message. If the message does not read .001, press and release the .001 button next to the HANDLE JOG button. If the "JOGGING__" message shows the X- or Y-axis instead of Z, press and release the +Z button. Verify that the head will travel SLOWLY (not more than 0.001 inch per impulse — the ".001" part of the Z-axis message). Jog the Z-axis to the top of its travel. For the VF-1/2/3/4, jog the Z-axis to the top of its travel, and remove the flex tube cradle as shown.





NOTE: The upper numbers on the buttons next to HANDLE JOG are for the jog handle use, and the lower numbers are for the jog speed in inches per minute when using the JOG buttons on the keypad.

5. Once the Z-axis is working correctly (it operates smoothly and there are no strange noises, etc.), make sure that all alarms are clear — check for the "ALARM" message at the lower right of the screen. Next, close the doors and press and release the ZERO RETURN button followed by the AUTO ALL AXES button. The Z-axis moves up slowly. After it has reached its home position, the X- and Y-axes move to their home positions.

IMPORTANT! To verify correct hydraulic counterbalance pressure, jog the head to the top and bottom of its travel, and ensure the tank pressures match those printed below and on the tanks.

	VF-3/4	VF-6-11	VF-6/7/10 w/50T Spindle	VF-8/9/11 w/50T Spindle	VF-5 w/40T Spindle	VF-5 w/50T Spindle	VR	VS
Machine at Top of Travel	1150 psi	750 psi	1150 psi	1550 psi	875 psi	1100 psi	1800 psi	1250 psi

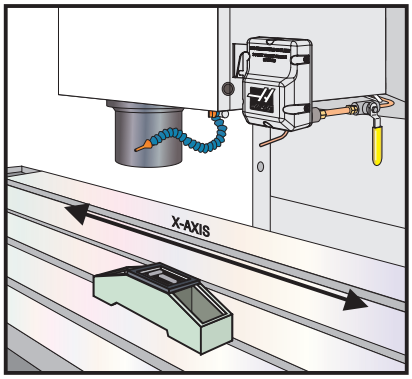
VF/VM//VR Series Leveling Overview

Leveling of the machine is required to obtain the correct right angle geometry of the VMC's X, Y, and Z axes. Incorrect level will result in out-of-round circle milling and incorrect linear interpolation.

Leveling is done in two steps without removing covers: rough leveling ensures the machine is level for coolant and oil drainage, and fine leveling for axis geometry. Finally, the spindle sweep is checked.

NOTE: Many factors can affect a machine's ability to remain level — the rigidity of the floor, the stability of the support under the floor, trains or trucks passing nearby, seismic activity, and so on. Therefore, until your experience shows how often re-leveling is required, you should check the machine's level frequently after it is installed.

Wiring connections to power the machine must be made before the Leveling Procedure can be followed.

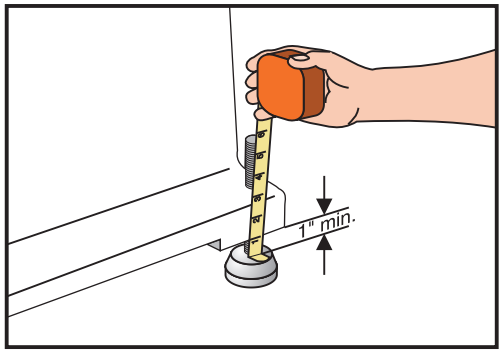


Use a precision bubble level with each division equal to **0.0005** inch per **10** inches, or **.05** mm per meter, or **10** seconds per division. Before starting, check the accuracy of your level. Set it on the table on the X axis and record the reading. Then turn it **180°** and the reading should be the same. If it is not, the level is out of calibration and should be adjusted before you continue.

Rough Leveling

NOTE: For the VF-1/2, it may be necessary to pull the coolant tank toward the back of the machine to access the leveling screws.

1. Screw the four leveling screws at the corners through the base until the base is 2½" to 3" above the floor. That translates into a minimum of one inch of the leveling screw extending from the bottom of the machine or one inch between the pads and casting. Turn each screw until tension is about the same as on the other screws (same effort to turn each screw). Screw jam nuts onto the leveling screws, but do not tighten down.



2. Install the two center leveling screws, ensuring that they do not touch the floor. Screw the jam nuts onto the leveling screws, but do not tighten them down.

3. Use Handle Jog set for 0.01 on the X and Y axes for the leveling procedure. This provides a good rate of travel as you manually move the table.

4. Using the jog handle, center the table under the spindle. You do not need to move the table while rough-leveling the machine.

5. Place the level parallel to the Y axis (side to side) on the table and observe the bubble. If the bubble is centered, the table is level on this axis. If the bubble is off to the left of the level, it means that the left side of the table is high. And, conversely, if the bubble is off to the right, it means that the right side of the table is high. Adjust the two front leveling screws until the level reads +/- 0.0005”.

6. Rotate the level head so that it is parallel to the X-axis. Adjust the right front and rear leveling screws until the level reads +/-0.0005.

NOTE: Make sure that the bubble has steadied before you take the reading.

7. Turn the screws on the low side of the machine clockwise (screw them in) a little at a time and check the level until the bubble is centered.

NOTE: In most cases it is better to raise a side or corner than it is to lower it — when you lower a machine there is a greater risk of running out of adjustment.

8. Repeat the previous steps with the level on the Y axis (front to back).

9. Continue this process until the machine is level on both axes.

NOTE: If the level is off on both axes, it indicates that one corner of the machine is high or low.

10. As the process continues, the leveling screws are turned in smaller increments — 1/4 turn, 1/8 turn, and smaller. Also, as the machine is leveled, make sure that the tension continues to be equal on the screws at all four corners.

NOTE: The following procedure for fine-leveling the machine must be performed exactly as noted to ensure the machine will meet all quality standards for machining operations. Failure to follow these guidelines will prevent the machine from being truly leveled and result in poor machining finishes.

Fine Leveling

11. With the table centered, place the bubble level in the center of the table parallel to the Y-axis. Using the jog handle, move the Y-axis, stopping at the front, middle, and back of the travels. The objective is to adjust the level to make the Y-axis guides parallel. The bubble level must indicate the same reading at each position (front, middle, back). Adjust the front leveling screws as necessary. To check for Y-axis roll, position the level perpendicular to the Y-axis and jog to each end of travel. If necessary, adjust the front right or left leveling screw. To check the X-axis, jog axis to each end of travel and tighten the middle leveling screws against the leveling pads. Verify X-axis roll by placing level parallel with the Y-axis, jog X-axis to each end of travel. Repeat the above steps until there is no perceptible X or Y-axis roll.

The following procedure is simply a check of machine level. If it does not meet specifications, then you must repeat this operation. Do not adjust the middle screws at this point.

Refer to the Machine Inspection Report that accompanies your machine. Check your results with those of the report under the Table Travel Flatness verification. By duplicating these results, you will obtain the same alignment specifications that were achieved at the factory.

12. Place a **0.0005** test indicator in the spindle and sweep a **10" diameter** circle on the table (see the Machine Inspection Report in the manual for the results of this test at the factory). Grease the dimple in each of the two remaining pads, locate them under the middle leveling screws, and use these screws to compensate for any error. If there is no error, tighten the screws evenly until they contact the pads.

When fine leveling is completed, tighten the jam nuts on the leveling screws.

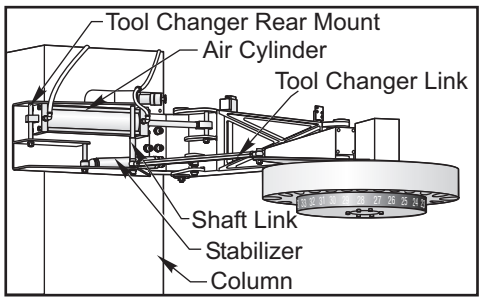
Tool Changer Assembly (VR Series)

CAUTION! Use extreme caution when installing the tool changer. Since the machine has not been leveled yet, the tool changer may swing and cause serious injury or machine damage.

1. Remove the tool changer components from their shipping crate.

2. **IMPORTANT!** Remove the shipping bracket from the tool changer to the column (2 SHCS). Remove the tool changer enclosure from inside the machine (18 BHCS).

3. Remove the 1/2"-13 x 1 1/4" SHCS that mounts the tool changer link to the column.



Tool Changer Assembly.

4. Hoist the tool changer rear mount into place and mount it with six 1/2"-13 x 1 1/4" SHCS, two 1/2"-13 x 3" SHCS, and two spacers.

5. Carefully swing the tool changer into place. Attach the air cylinder rod with the 5/8"-11 x 7" SHCS. Attach the stabilizer rod with the 1/2 x 5" SHCS.

6. Mount the tool changer link to the rear mount with two 1/2"-13 x 1 1/4" and the shaft link.

7. Connect the air lines (2) at each end of the air cylinder. **IMPORTANT!** The air line from the bottom fitting of the lube/air panel connects to the rear fitting on the air cylinder. The air line from the top fitting of the lube/air panel connects to the front fitting on the air cylinder.

8. Hoist the tool changer enclosure into place, so that it protrudes from the rear of the machine. Attach it with the 18 BHCS. Attach the bracket from the column to the tool changer enclosure with 6 BHCS.

Tool Changer Alignment (VR Series)

This procedure will align the tool changer to the spindle in the Y-axis.

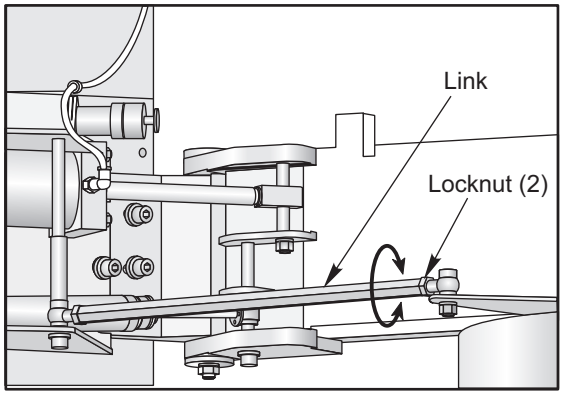
1. Zero Return All Axes. Place cardboard on the table for protection.

2. Place a tool in the spindle. Press the ORIENT SPINDLE key. Ensure there is no tool in the tool changer pocket facing the spindle. Press Emergency Stop.

3. Swing the tool changer into the tool change position by hand. Mark the top of the tool changer link with paint to establish an initial position.

NOTE: Ensure the spindle does not spin. When E-Stop is pressed, the spindle is free to rotate, and may lose its orientation.

4. Check the tool changer pocket position in relation to the tool in the spindle. If the tool changer is misaligned in the Y-axis, continue with this procedure. If the tool changer is misaligned in the X-axis, contact the Service Department at Haas Automation.



5. Loosen the locknut at each end of the tool changer link. Note that one is a left-hand thread and one is a right-hand thread. Once the locknuts are loose, rotate the link clockwise, and then counterclockwise until resistance is felt in each direction. Rotate the link to the center of the area in which the link turns freely.

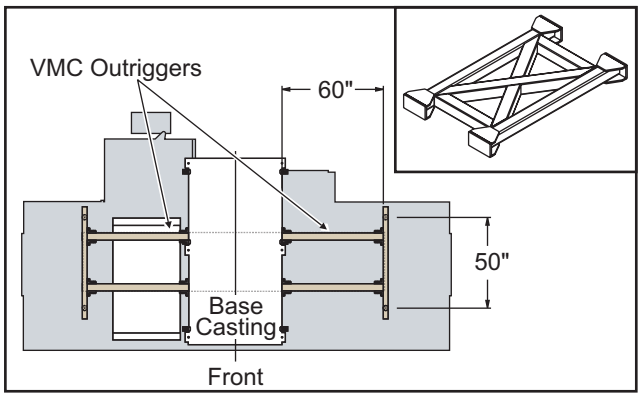
6. Tighten the locknuts at each end, while holding the link in place with a wrench.

7. Push the tool changer away from the spindle. Zero Return All Axes, and the tool changer should move back to the HOME (out of the work envelope) position.

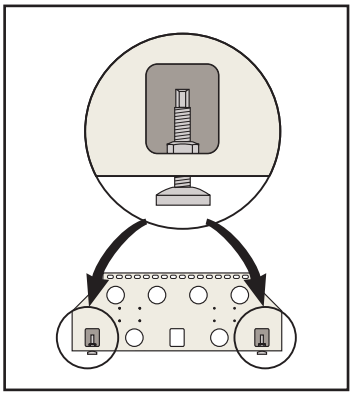
8. Run a number of tool changes, and ensure they are performed smoothly. If not, perform this procedure again.

Outrigger Leveling Procedures

NOTE: Not all mills are equipped with outriggers. The standard mill leveling procedures must be completed before starting this section.



Outrigger Locations



Outrigger Leveling Screw Locations

1. Locate the leveling pads underneath the outrigger leveling screws. Grease the dimples and keep the screws at least 1/4" above the pads.

2. Place a level in the center of the table and parallel to the X-axis.

3. Jog the Y-axis back (toward the column) to max travel.

4. Starting from either the left or right of the machine, jog the table to the max X travel and over the rear outrigger leveling screw. **DO NOT MOVE THE LEVEL.**

5. Tighten the leveling screw onto the rear pad, which will raise the table and zero the level. Over-tightening the outrigger leveling screws will result in poor machine performance.

6. Jog the Y-axis forward to max travel and repeat step 5.

7. Jog the X-axis to max travel over the other outrigger, and repeat the leveling process.

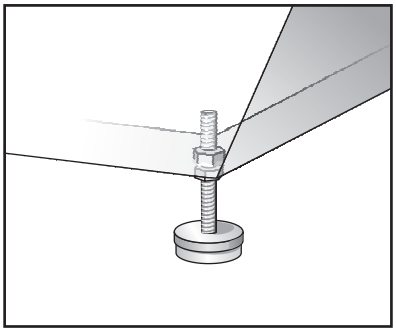
8. Check level through full X and Y axes ranges of travel.

Sheetmetal Support Pads

1. Screw the support pads down to the floor.

2. Turn them an additional 1/4 turn once they have come in contact with the floor. Additional tightening of the pads against the floor may affect the level of the machine.

3. Lock in place with the jam nut.



CAUTION! To avoid damaging the sheetmetal when moving or shipping the machine, fully retract the support pads.

Leveling the MDC-500

Leveling of the machine is required to obtain the correct right angle geometry of the machine's X, Y, and Z axes. Incorrect level will result in out-of-round circle milling and incorrect linear interpolation.

Leveling is done in two steps: rough leveling to ensure the machine is level for coolant and oil drainage, and fine leveling for axes' geometry. Finally, the spindle sweep is checked.

NOTE: Many factors can affect a machine's ability to remain level — the rigidity of the floor, the stability of the support under the floor, trains or trucks passing nearby, seismic activity, and so on. Therefore, until experience shows how often re-leveling is required, check the machine's level frequently after it is installed.

Use a precision or electronic bubble level with each division equal to 0.0005 inch per 10 inches, or .05 mm per meter, or 10 seconds per division. Before starting, check level accuracy. Set it on the table on the X-axis and record the reading, then turn it 180°. The reading should be the same. If not, the level is out of calibration and should be adjusted before continuing.

Verify the four corner feet are supporting the machine and screw leveling screws at the corners through the base until the it is 3" to 3 1/2" above the floor. Verify the coolant tank slides under the machine base with 1/4" to 1/2" of clearance. That translates into a minimum of 1 3/4" of the leveling screw extending out of the machine base bottom, or one inch between pads and casting. Turn each screw until tension is about the same as the other screws. Screw the jam nuts onto the four (4) leveling screws, but do not tighten them down.

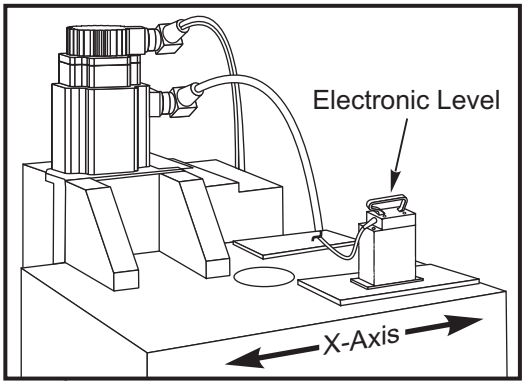
Verify Column Level

1. Clean the column of the machine and the precision level of all debris.

2. Place the level on the machined surface on top of the column parallel to the Y-axis.

3. Jog the X-axis from one side to the other and note the reading from one end of travel to the other. The maximum allowable deviation is 0.0003".

4. Rotate the level so it is parallel to X-axis. Jog the X-axis from one side to the other and note the reading from one end of travel to the other. The maximum allowable deviation is 0.0003".



MDC-500

Rough Level

1. Center all machine travels (X, Y, Z).

2. Loosen the right front leveling screw so there is at least 1/4" between the tip of the leveling screw and the leveling pad. The two middle screws should not be touching the floor or the leveling pads.

3. Position the level on the top of the column, parallel to X-axis. Adjust the right-front and right-rear leveling screws until the level reads +/-.0005".

4. Position the level on the top of the column, parallel to Y-axis. Adjust the two front leveling screws to read +/-.0005".

Fine Level

During fine leveling, place the level on the top of the column and note the position of the bubble. To achieve proper machine geometry, follow the instructions below and adjust the leveling feet as described so there is no perceptible movement of the bubble position.

1. Position the level parallel to the Y-axis. Jog the Y-axis to each end of its travel. If necessary, adjust the front leveling screws evenly.

2. Verify Y-axis roll: Position the level perpendicular to the Y-axis and note the reading, then jog the Y-axis to each end of its travel. If necessary, adjust the right-front or left-front leveling screw.

3. Jog the X-axis to each end of its travel and tighten the middle leveling screws against the leveling pads.

4. Verify X-axis roll: Position the level parallel to the Y-axis and note the reading, then jog the X-axis to each end of its travel.

5. Repeat the axis roll verification as necessary until no roll is perceptible in either the X- or Y-axis.

Spindle Sweep

Place a **0.0005** test indicator in the spindle and sweep a **10" diameter** circle on the table (see the Machine Inspection Report in the manual for the results of this test at the factory). Grease the dimple in each of the two remaining pads, locate them under the middle leveling screws, and use these screws to compensate for any error. If there is no error, tighten the screws evenly until they contact the pads.

When fine leveling is completed, tighten the jam nuts on the leveling screws.

VS Series Leveling Overview

Leveling of the machine is required to obtain the correct right angle geometry of the mill's X, Y, and Z axes. Incorrect level will result in out-of-round circle milling and incorrect linear interpolation. Leveling is done in two steps: **rough leveling** to ensure the machine is level for coolant and oil drainage, and **fine leveling** for axis geometry. Finally, the spindle sweep is checked.

Many factors can affect a machine's ability to remain level — rigidity of the floor, stability of the support under the floor, trains or trucks passing nearby, seismic activity, and so on. Therefore, until your experience shows how often re-leveling is required, you should check the machine's level frequently after it is installed.

Wiring connections to power the machine must be made before the Levelling Procedure can be followed.

It is our recommendation that the machine be anchored in place for best and most consistent results while in use. The anchoring bolts (in accordance with the anchoring instructions Haas document ES0095) should be installed prior to the machine being set in place.

The X-axis auger trough must be removed before mating the column base to the table base. The auger trough will remain off the table base until the leveling and squaring procedures are completed. It is recommended that the table base be removed from the truck and set in place before the column base to better accommodate removal of the auger trough and keep the installation process moving smoothly.

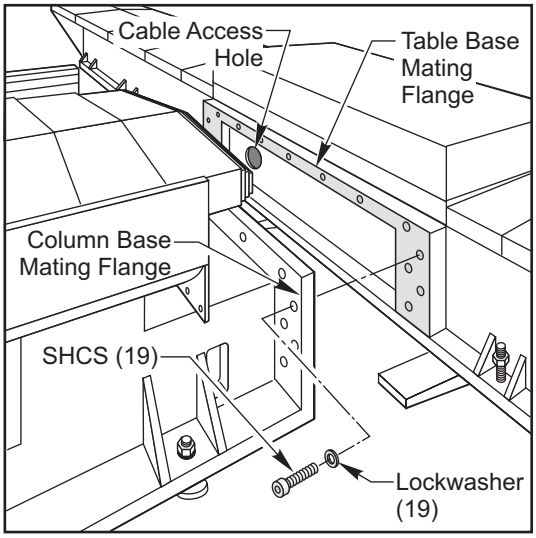
The installation process is further aided if, when each base is set in place, a very rough leveling procedure is done. The ideal distance from the floor to the bottom of the two bases is 2.5” (64mm). The use of a machinist scale or small gauge blocks will expedite the process. While all leveling screws and leveling pads are in place measure from the floor to the bottom of each base until the distance is very close to the 2.5” (64mm) height. This will accomplish two things: First, that the machine is set to the proper height to receive the coolant tank and, second, that the machine will be much closer to level than without having done this procedure.

The installation procedure follows the general outline below (a more detailed explanation follows). Depending on the available space and equipment it may be simpler to place the column base assembly before the table base assembly. This outline considers that it is easier to place the table base assembly first.
Regardless of which assembly is placed first, adhere to the concepts of this general outline:

- Remove the table base assembly from the truck and set in place
- Remove the X-axis auger trough and rough level the table base
- Stone and clean the table base mating flange
- Remove the column base assembly from the truck
- Stone and clean the column base mating flange
- Move the column base to mate with the table base
- Be certain that all connecting bolts are in place but not tightened
- Attach the Pendant and Pendant Arm Support Assembly to the front of the table base
- Run Pendant electrical wires under the table and connect them in the wire covers on the back of the table
- Rough level the column base assembly
- Remove the dust covers from the column assembly
- Install the counterbalance cylinder and charge the system
- Remove shipping blocks from the table base assembly
- Connect all air/electrical/oil lines between the two assemblies
- Remove shipping blocks from the column base assembly
- Power up the control
- Fine level the table base assembly
- Fine level/square the column base assembly
- Fully tighten the connecting bolts and adjust fine level/square
- Fully check machine geometry
- Replace the X-axis auger trough
- Install the coolant supply system
- Check all motors for rotation/phasing

Machine Leveling and Geometry Check (VS)

At this point the machine is completely unblocked and all axes are enabled.



The following criteria should have already been met at this point:
• The machine correctly placed with respect to the anchoring points.
• The very rough leveling has taken place, ensuring that the bottom of the two bases are very close to 2 ½ inches off the floor.
• The mating flanges of the two bases have been pulled into contact.
• The screws that connect the two bases have been backed off and can rotate freely.

Overview of Leveling the Machine

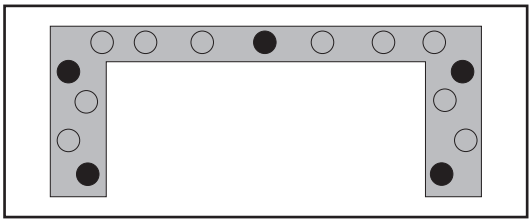
When leveling the machine the best results are achieved when the entire machine is leveled with respect to the earth. For the table that means that over the entire travel of the X-axis the table is level to earth in the direction across the table and along the length of the table. The same concept applies to the column base, but a slight modification may occur when checking perpendicularity of the Z-axis to the X-Y plane of the machine.

Leveling and squaring the machine is an iterative process where a change of level in one part of the machine affects the geometry in another part of the machine. The process is begun by establishing a known level datum plane that is the table surface in the center of travel, and all subsequent geometry is with respect to that plane.

The general profile of the process of leveling and squaring the machine is as follows:
• The table base will be leveled to earth
• The column base will be leveled to earth
• The X-Y axes will be checked for perpendicularity
• The table will be swept for parallel to the X-Y plane of the machine
• The Z axis will be adjusted for perpendicularity to the Y axis
• The Z axis will be adjusted for perpendicularity to the X axis
• The mating flange will be completely tightened
• Final leveling, squaring, and anchoring
• Geometry check

Establishing the Table as the Datum Surface

1. Remove all but five of the mating flange connecting screws. The five that should be left in position are the four that are in the corners of the mating flange and the one that is in the center of the top of the mating flange. Be sure that the five remaining screws are able to rotate freely, indicating that no binding will occur by changing the level of the table base. (The freedom of these screws is important to the process, and they should be checked frequently since, if they bind, the leveling process associated with the column base could alter the table base level). If the screws do begin to bind, the column base should be raised or lowered accordingly to free the screws, while maintaining full face contact of the mating flange surface.

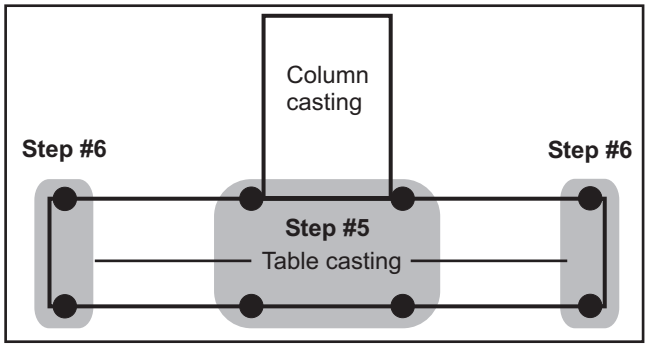


2. Zero return all axes

3. Move the X-axis so the position is 75 inches, which is the midpoint of X-axis travel.

4. Place two levels at right angles to each other as close as possible to the center of the table. One will show the level across the width of the table and the other will show the level along the length of the table.

5. Focus on leveling the table only in this X-axis position to establish a primary datum for the machine. Adjust only the four leveling screws indicated (the two on the table base closest to the column base, and the two immediately on the other side of the table base). No other leveling screws on the table base should be in contact with the leveling pads at this time.



6. When the table level is close to zero in both directions, the four very end leveling screws may be brought down to touch the leveling pads.

7. Continue to level the table base until both levels on the table read zero.

Leveling the Column Base

1. Check that the mating flange screws are still free to turn so the following steps do not affect the level of the table base primary datum.

2. Allow only the four leveling screws on the corners on the column base are to be in contact with the leveling pads at this time.

3. With column at approximately center of travel, lay one granite parallel across linear guides as close to the table as possible and another granite parallel across linear guides as near the rear of machine as possible.

4. Place a level on each parallel and adjust the level of the column from side to side.

5. Check the freedom of the mating flange screws to be certain there is no binding. Raise or lower the column base as necessary to free screws.

6. On the guide nearest the control, place one level on the linear guide in front of the column and one level on the linear guide to the rear of the column. Adjust the level of the machine in the direction of Y-axis travel. Move the levels to the opposite linear guide and complete the process.

Repeat steps 3-6 until the column base is level. Be certain throughout the process that the mating flange screws are free to rotate. A binding of the screws will mean that the column base will have to be raised or lowered as necessary and the leveling process of the column base will need to be repeated.

7. When the column base is level to earth in both directions, the six center leveling screws should be lowered to touch the leveling pads.

8. Remove the granite parallels from the column base.

Checking the Level of the Column Base

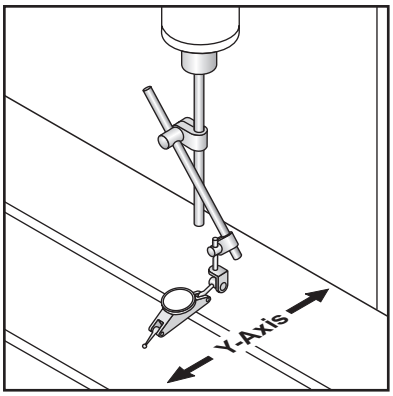
1. Handle jog the column to the rear.

2. Place a single level on the top of the spindle head parallel with the X-axis of the machine. It is very unlikely that this surface will read zero, do not expect it to. Note the reading that is present.

3. While monitoring the level, move column fully forward and check for a change in the level reading. If there is no change, the column base has no twist. If there is a twist in the base, this must be corrected.

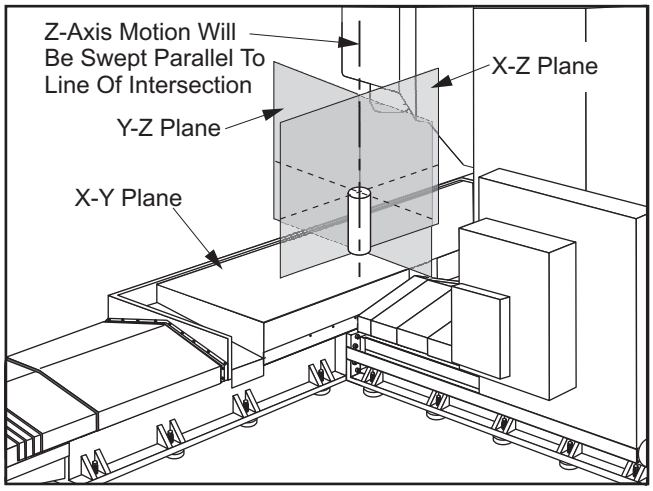
4. Place an indicator in the special tool and touch off on the table surface. Sweep the table in the Y-axis direction only, to determine, and correct column base flatness in the Y-axis direction. This is a very sensitive measurement method and corrections to this level should be made in conservative steps.

NOTE: Corrections that are made in this check of the column base level require a repeat of the basic leveling procedure and a recheck of the level be done.



Sweeping the Z-Axis

Before continuing to the final attachment of the column base to the table base the Z-axis needs to be swept. Until now we have assumed that the geometry of the column is perfectly perpendicular to the plane of the column base, but that may not be close enough to maintain the required machine geometry.



Sweeping the Z-axis is accomplished using a cylinder square, which will verify that the line of Z-axis motion is perpendicular to the X-Y plane described by the Y-axis motion and the X-axis motion. The X-Y plane, as defined by the leveling process, should be equivalent in the squaring function as the parallel plane described by the surface of the table. The Z-axis line of motion will be checked by comparing it to the line of intersection of the X-Z plane and the Y-Z plane. By assuring that each of these planes are perpendicular to the X-Y plane within specification, the machine geometry will be preserved.

Final Connection of the Column Base to the Table Base

1. Completely remove the front Y-axis way cover from the machine.

2. Remove the front Y-axis way cover bottom cover and the way cover support bars to allow access for properly tightening of the connecting screws.

3. Before inserting and tightening all the connecting screws, recheck the table level to be certain that the leveling process of the column base did not affect table level.

4. Tighten the connecting screws with lock washers in place and loctite on the screws.

Geometry Check After Mating the Two Bases

Before continuing two fundamental geometry checks need to be made. The first is the perpendicularity of the X-axis to the Y-axis, and the second is to verify the sweep of the Z-axis.

1. X-axis to Y-axis sweep is accomplished using a granite square. Set zero by sweeping the Y-axis on one side of the square, and then to verify that the motion of the X-axis is perpendicular by sweeping the adjacent side of the square. If the X and Y axes are out of tolerance, there almost certainly is contamination or damage between the mating flange surfaces that is creating this error. The assembly will have to be disassembled, the surfaces re-stoned and cleaned, and the entire leveling/squaring process repeated to this point.

2. Verify the sweep of the Z-axis by repeating the previous section (“Sweeping the Z-Axis”).

Fine Leveling the Machine

Now that the preliminary leveling is done and the bases are securely mated, the machine can be treated as a unit with confidence that the geometry will be maintained as long as adequate control is maintained in the fine leveling process. The process begins with loading the remainder of the leveling screws very lightly and working into an equally loaded situation that does not affect the geometry already achieved.

The column base is affected first, and is fine leveled with respect to the table at the middle of travel.

CAUTION! Do not rush the leveling process. Any drastic attempt to fine level the column base will be propagated to the table base assembly and may not be correctable if not addressed early in the process.

The table base is more complicated to fine level, and small steps will be taken to preserve the level to earth established at the middle of travel. The first step of the process will be to begin to load the leveling screws over the length of the base. The second step will be to begin to pull the overall length into earth level. The third step will be to fully pull the base into level.

1. Begin with the column base assembly. Place the level on the spindle head parallel to the Y-axis and run the column through the range of travel. If no deviation in the reading exists, the column base is flat in the direction of the Y-axis. Move the level to each linear guide surface in front of the column. If the readings are zero, the column is flat to earth in the direction of the Y-axis. Power up the control. Place the level on the spindle head parallel to the X-axis. Run the column through the range of travel. If no deviation in the reading exists, the column base has no twist. Place the granite parallels across the linear guide surfaces in front and behind the column. Place the levels on the granite. If the readings are zero, the column base is flat to earth in the X-direction.

2. Move the levels to the table and place them as close to the center as possible. One level should be parallel to the X-axis and one level should be perpendicular to the X-axis. If the readings are still zero, then the table at the center of travel is still level to earth.

3. If any deviations exist, they need to be corrected at this time. If the deviations are very small, the mating flange of the two bases does not need to be unscrewed. If the deviations are very large, attempting to correct the level may induce a large stress in the assembly that will not allow earth level to be fully achieved. It is important for the geometry of the machine that earth level be achieved.

The table at center of travel is now known to be at earth level and the column base is also at earth level. The process of extending that level over the travel of the X-axis may now begin by starting to load the remainder of the leveling screws.

4. Lower the remainder of the table base leveling screws to touch off on the leveling pads below.

5. Move the table toward zero so the levels are in line with the next set of leveling screws after the primary leveling screws. Make a very slight correction to the leveling screws if the level deviates from zero.

NOTE: Attempting to compensate for all of the deviation at any single position may compound an otherwise small error. Do not try to final level the table base in a single pass over the travel of the X-axis.

6. Continue moving the table toward zero, stopping at each instance where the levels are in line with the leveling screws. Make small adjustments that **begin** to correct the deviation from earth level. When the end of travel is reached, the leveling screws on the end of the table base can be slightly adjusted.

7. Return the table to the center of travel. Verify that earth level still applies to the table at that position. If it does not, it must be attained again before continuing. **Only the leveling screws that have been previously adjusted should be used. Do not alter the position of the four primary leveling screws at this time.**

8. Move the table in the same increments as before but in the direction away from zero. Repeat the very slight adjustment procedure, beginning to make a correction in the table, level to earth.

9. Move the table back to the center of travel and verify that the primary earth zero has not been affected. If earth zero does not exist at the center of travel, make the correction now.

The load of the table base assembly is now being shared over all of the leveling screws. The table at the center of travel is at earth zero, and the column base is at earth zero.

Fine Leveling of the Table Base

Using the same process as loading the leveling screws, move the table over to line up levels with leveling screws and begin to make very moderate adjustments toward earth zero. Continue process to end of travel as before, then return to center of travel and verify earth zero. Move from center of travel the other direction and repeat the procedure until the table is at earth zero over the entire travel of the X-axis.

Verify that the Y-axis has not been affected by the leveling procedure of the X-axis. If it has, use the steps described previously to make the necessary correction and then verify that the X-axis is still correct.

Do not try to hurry this process. This is a careful, repetitive, process that relies on modest adjustments for each step along the way. If too large an adjustment is attempted, the geometry will fail and it may not be possible to determine the corrective action and the bases may have to be disconnected to rectify the situation.

When fine leveling is completed, tighten the jam nuts on the leveling screws.

Sweeping the Table

The sweep of the table should be little more than a verification of the leveling process. Using the special tool for mounting the indicator, first verify that the table is within specification as the Y-axis is moved. Then, for several Y-axis positions where the indicator is on the table surface, run the X-axis from end to end and verify that it is also within specification.

Geometry Check

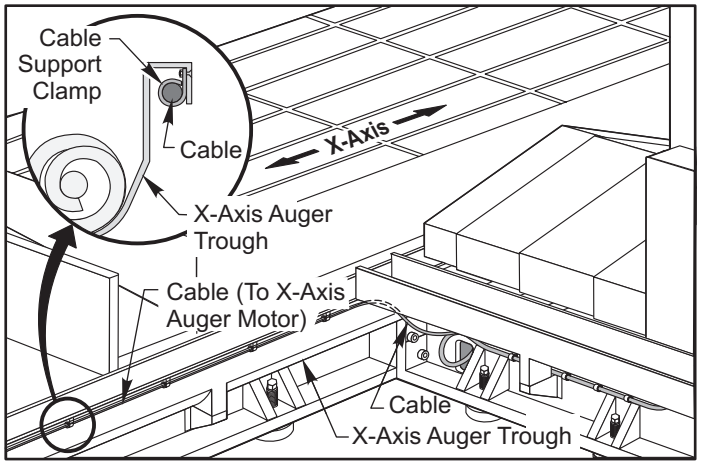
The final step of the leveling and squaring process is to verify the overall machine geometry with respect to the individual geometric inspection report of the machine. Every point of inspection must be verified to be within the tolerances specified for the machine.

Completing the Installation

1. Replace all sheet metal removed paying particular attention to sealing any component mating surface potentially exposed to coolant flow.

2. Install the table gutter fence.

3. Install and verify operation of the tool changer (see the section on tool changer installation and alignment for the specific toolchanger). Verify all machine functions.

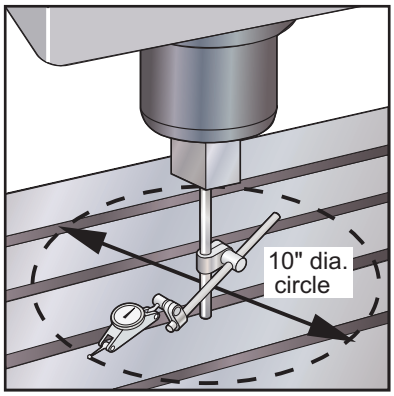


Spindle Sweep

NOTE: The machine must be properly leveled for the spindle sweep adjustment to be accurate; no more than .0002” twist on the Y-axis (vert mill).

1. To check spindle sweep, place a .0005” indicator on a suitable holder, place on spindle nose and jog the Z-axis in the negative (-) direction enough so that you can adjust the indicator to sweep a 5" radius from the center of X- and Y-axis travel. Slowly jog Z-axis in the negative (-) direction to zero out indicator.

2. Establish a reference point (indicator zero), sweep the three remaining points and record the reading.



Spindle Sweep Area

Coolant Tank Installation

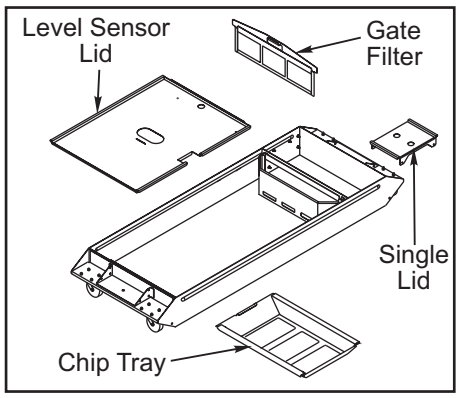
1. The coolant pump(s) is packed inside the machine enclosure for shipping.

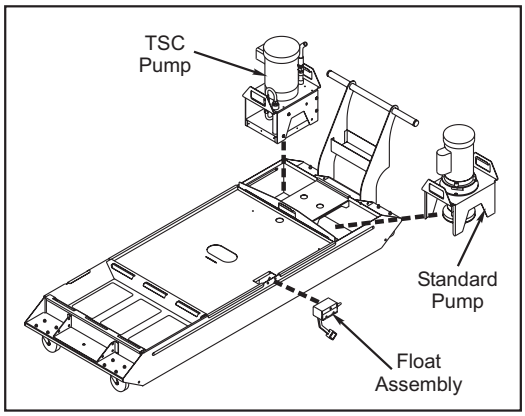
2. Remove the handle from under the coolant tank lid. Remove the packing material and use the supplied hardware to attach the handle to the tank.

NOTE: Do not fill the coolant tank before removing the handle from under the lid.

3. Orient the pump(s) and lower into the coolant tank as shown. Place supplied cover as shown. When not using a TSC pump, install a double lid in place of the single lid (see illustration).

4. Position the coolant tank under the left side of the machine.

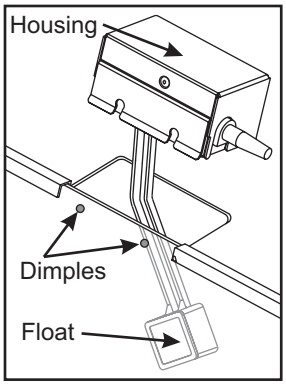


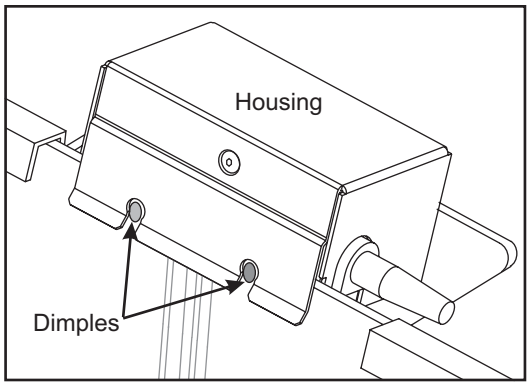


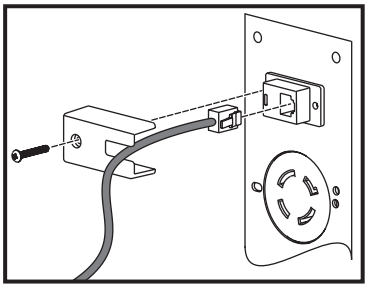
55-Gallon Coolant Tank Shown

NOTE: It is important that the coolant tank is in place before leveling the machine to ensure adequate clearance between the bottom of the discharge tube and the tank.

5. The Coolant Level Float Assembly is shipped in a separate box. It consists of a housing, float and cable. Install the Coolant Level Float Assembly by lowering the float through the tank lid, line up the slots in the housing with the dimples on the side of the tank and press down so the float assembly clips onto the tank. **95-Gallon coolant tank** - The float can be mounted on either the edge of the coolant tank or the center.







6. Insert a plastic push wire mount into the hole in the tank lid, then route the cable to the coolant pump(s). Tie wrap the coolant float cable to other cables, when available, when routing from the coolant tank.

7. Connect the cable to the Coolant Level Gauge (CLG for VF 1-5 machines) plug. Remove the cover from the RJ-12 style connector, plug in the coolant level sensor cable, and replace the cover. Locations:
   VF 1-5: CLG on left side of control cabinet.
   VF 6-11, VR: Sheet metal on lower back of column.
   VS: Bulkhead on back of X-axis table.
   MDC: Rear sheet metal below tool changer.

8. Select the Current Commands screen on the operator's pendant and move the float up and down to ensure that the display reflects a corresponding change in the coolant level.

9. Connect the main coolant line (3/4" O.D.) to the standard pump. Connect the standard pump power line to the outlet on the right side of the electrical panel.

10. If machine includes Through the Spindle Coolant option (TSC), attach the 3/4" (for VF/VM Series) or 1/2" (for VR and VS series) O.D. coolant line to the TSC pump.

11. Fill coolant tank with water-based coolant only. **Do not use mineral cutting oils, they will damage rubber components throughout the machine and void the warranty.**

NOTE: Before operating the coolant system, ensure the machine drain is positioned halfway over pull out chip tray.

Oil/Coolant Separator

The oil/coolant separator may be shipped installed or no installed depending on the machine configuration.

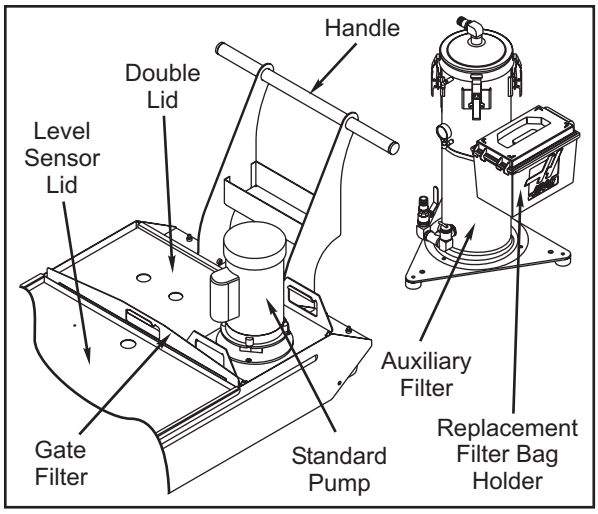
If the separator is not in place, install the assembly to the nipple on the base casting. Install the aluminum tube to the fitting on the back of the separator.

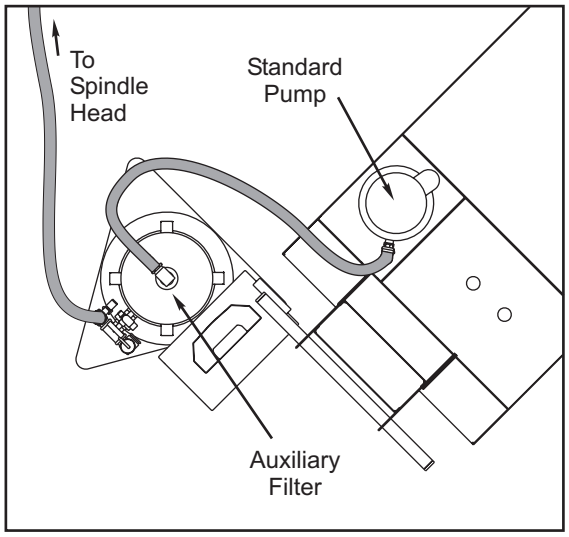
Once installed, check the level of the separator (use the built-in bubble level) and tighten the jam nut.

NOTE: Never reuse waste oil from the Oil/Coolant Separator; dispose of properly.

Auxiliary Filter

Standard Coolant Systems



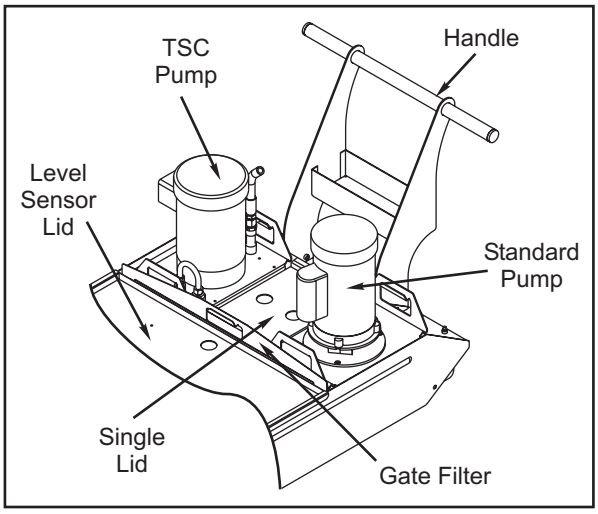


VF Series Machines Shown

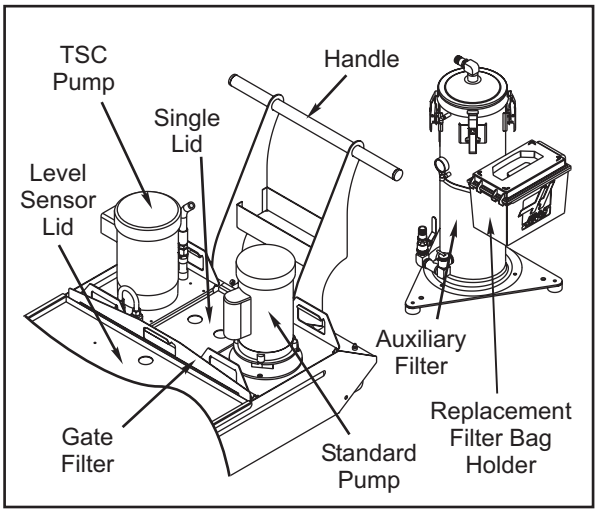
Installation

1. Place the Auxiliary Filter system next to the coolant tank of the machine.
2. Connect the output of the Standard Coolant pump to the input of the Auxiliary Filter.
3. Connect the Auxiliary Filter output hose to the coolant hose of the machine.
4. The Auxiliary Filter tank must be filled with coolant before use.

Optional Auxiliary Filter for TSC300 System

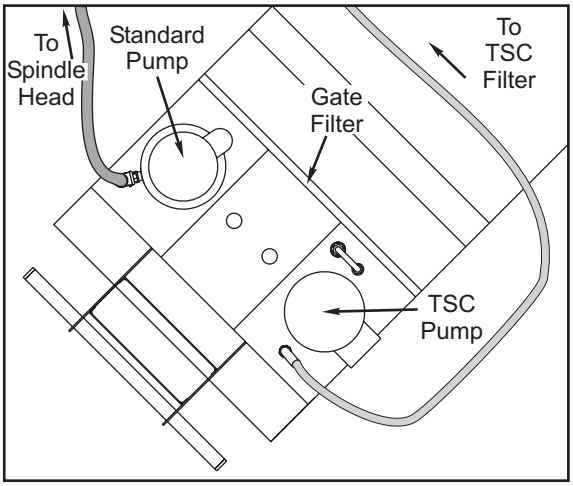


Standard TSC300 Setup



Optional TSC300 Auxiliary Filter Setup

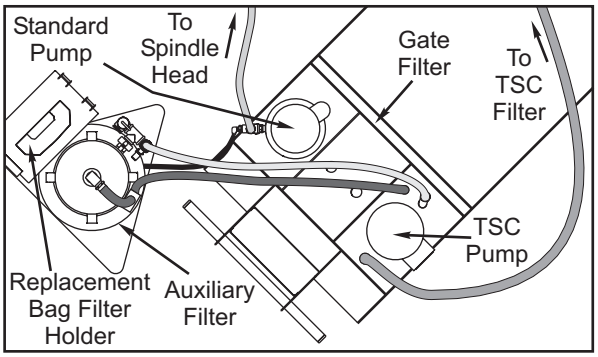
TSC300 System



Standard Filtration Setup

1. Connect the coolant hose from the machine's head to the hose connection on the Standard Coolant Pump.
2. Connect the hose attached to the TSC Coolant Pump Assembly to the TSC Filter Assembly.

TSC300 System with Auxiliary Filter



1. Connect the hose attached to the machine's head to the hose connection on the Standard Coolant Pump.

2. Separate the hose coming from the top of the Auxiliary Filter from the hose coming from the bottom. They have been connected together for shipping.

3. Attach Auxiliary Filter male connector (top hose) to female connector on TSC Coolant Pump Assembly.

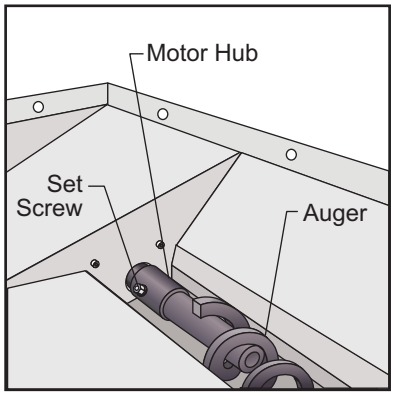
4. Attach the Auxiliary Filter female connector (bottom hose) to the short hose with the male connector on the TSC Coolant Pump Assembly.

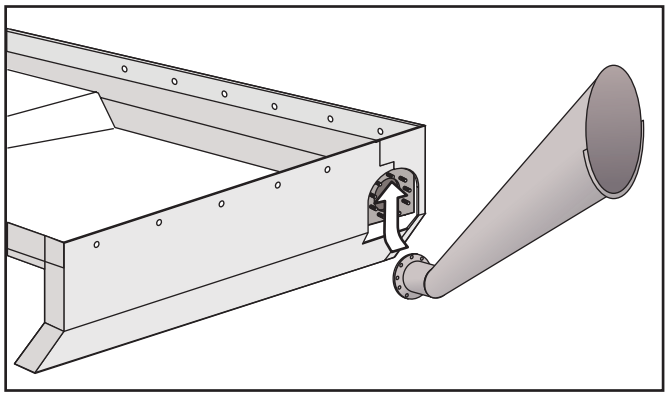
5. Connect the plastic tubing (tied to the Auxiliary Filter) from the small elbow fitting on the top of the Auxiliary Filter to the small elbow fitting on the Standard Coolant Pump hose connector.

6. Connect the hose attached to the TSC Coolant Pump Assembly to the TSC Filter Assembly.

Chip Auger Installation

1. Unpack the auger and discharge tube.





2. Slide the auger into the discharge tube opening and then slip the opposite end onto the motor hub. Fasten it to the motor hub with the 5/16-18 x 2½" bolt.

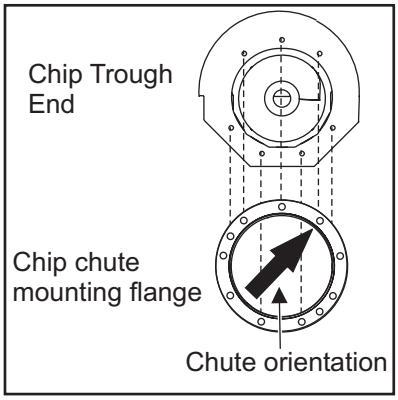
3. Install the gasket and slide the discharge tube up and onto the studs. Attach the eight nuts with locking washers and tighten uniformly.

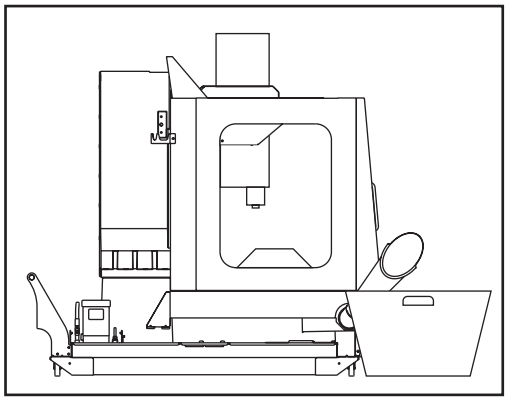
4. After machine start-up, check auager operation to ensure the direction of rotation will move the chips toward the discharge tube. If the auger is turning so that the chips are not being moved toward the discharge tube, change the bit switch in "REV CONVEYOR" from 1 to 0 or 0 to 1 to establish a new forward direction.

VF-1/2 with 95-Gallon Coolant Tank

"Clock" the chip chute in a VF-1 or VF-2 with a 95-gallon coolant tank to accommodate a chip container.

Rotate the chip chute mounting flange one bolt hole toward the front of the machine. Refer to the following illustrations to verify correct orientation. Secure the chute with the provided bolts.





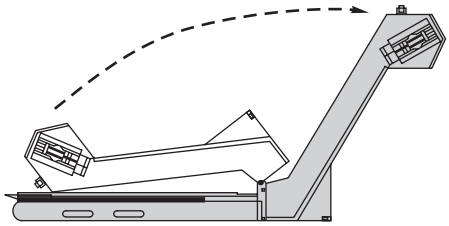
MDC-500 Chip Conveyor Installation

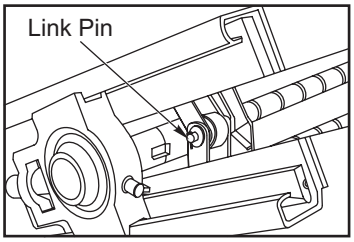
Unpacking

1. Inspect the container for damage, open the container, and cut the bands holding the conveyor in place. Install the feet, leaving approximately 4" of thread for proper height.

2. Unfold the conveyor, feeding the belt into the head as the conveyor unfolds. Do not pinch the belt with the conveyor body. Once unfolded, the belt should hang out the end. Install the bolts at the hinge to lock the conveyor body in place.

3. Take slack from conveyor belt until belt hangs about 6" out. Align links and install the link pin. Install washer and cotter pin to lock the pin in position. Set the belt tension adjustment screws to approximately 2 3/4" (70mm). Install conveyor motor and ensure all four of the motor bolts are tight. Install the sheet metal covers.



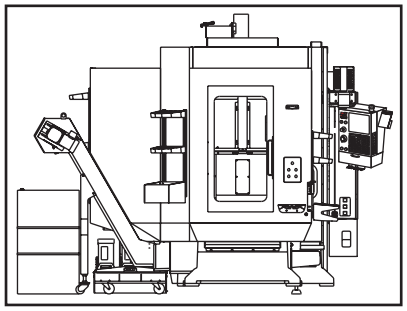


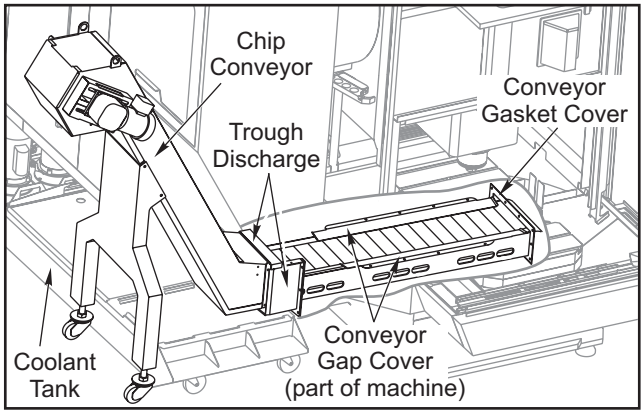
Installation

1. Remove the conveyor gap covers from the conveyor pickup area inside the machine.

2. Attach a lift to the hoist loops, raise the conveyor and reorient the caster wheels in the operating position.

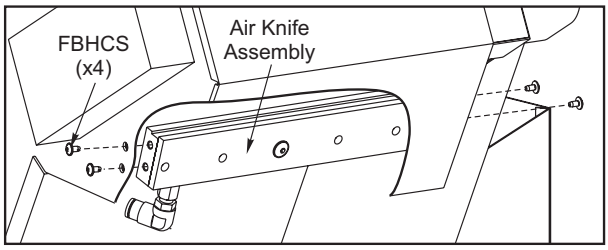
3. Slide the conveyor into the discharge opening. Adjust caster wheel height to properly support the conveyor. The illustration shows sheet metal and components removed for clarity.

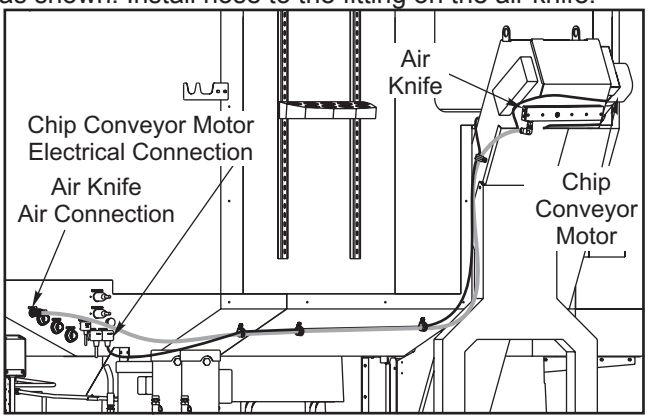




4. Re-install the conveyor gap covers to the conveyor pickup area inside the machine.

5. Install Air Knife into the head of the Chip Conveyor. Use the four supplied flanged button head cap screws to install the air knife in the head of the chip conveyor as shown. Install hose to the fitting on the air knife.

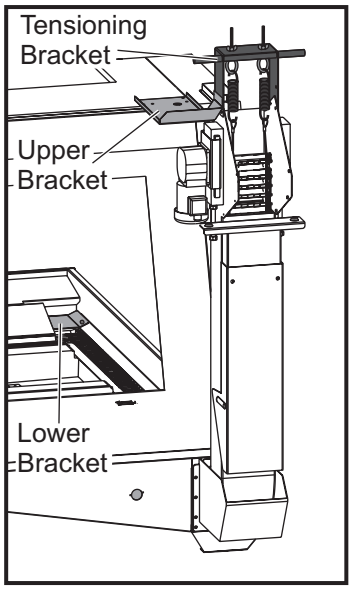




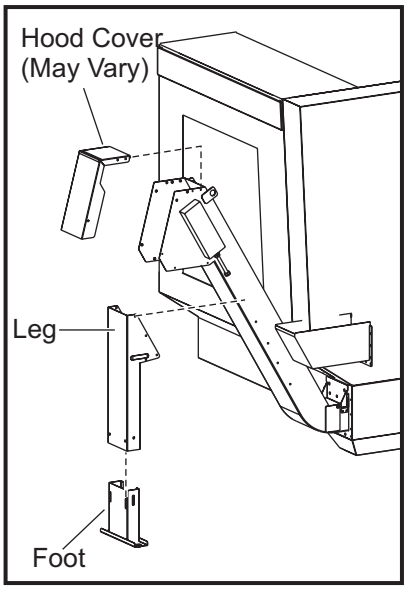
Chip Conveyor Air and Electrical Connections

6. Route the chip conveyor motor cable and the air knife air hose along the side on the chip conveyor and along the mill (above the coolant tank) to the sub-panel and connect to the plugs. Insert cable guides in available holes in the sheetmetal for neatness. Do not let the electrical cables droop into the coolant tank.

Multi-Auger Chip Conveyor (MACC) Setup



MACC Shipping Brackets



MACC Assembly

Unblocking

Two brackets secure the chip conveyor for shipping: a lower bracket inside the machine enclosure at the end of the conveyor, and an upper bracket on the roof of the machine. There may also be a bracket at the conveyor head that maintains tension on the conveyor belt during shipping.

Remove the Lower Bracket

1. Remove the two hex head bolts that attach the lower bracket to the wings on either side of the conveyor.
2. Remove the three SHCS that attach the bracket to the inside of the machine.
3. Replace the hex head bolts in the conveyor, using care not to strip the rivnuts in the conveyor.

Remove the Upper Bracket

1. Hold the conveyor while you remove the screws that attach the upper bracket to the enclosure roof.
2. Carefully lower the conveyor lift section into operating position.
3. Replace the screws in the enclosure roof.

Remove the Tensioning Bracket (If Installed)

Some conveyor models ship with a tensioning bracket attached to the conveyor head that uses springs to keep the belt under tension in shipping position.

1. Loosen the wing nuts at the top of the bracket to loosen and remove the tensioning springs and cable loops.
2. Remove the tensioning bracket from the conveyor head.

Adjust Belt Tension

Removing the tension bracket causes slack in the conveyor belt. You must adjust the belt tension before operating the conveyor.

1. Remove the conveyor lift section access cover from the conveyor head. Depending on the conveyor manufacturer, this cover may have already been removed for shipping.
2. Tighten the belt tensioning screws at either side of the conveyor head to adjust the belt drive shaft and remove slack from the belt.

NOTE: Keep the drive shaft perpendicular to belt travel while adjusting the belt.

3. At intervals while you adjust the belt tensioning screws, inspect belt deflection at the center of the belt in the lift section of the conveyor. The belt is correctly tensioned when deflection is approximately 3/8”.
4. Apply the jamnut on each tensioning screw to lock it in place.
5. Install the access cover.

Completing Setup

All necessary mounting hardware is included with the conveyor, in a bag tied to the conveyor or found inside the machine enclosure.

Install the Conveyor Leg/Foot

If the conveyor leg is not shipped attached to the conveyor, you will find it packed inside the machine enclosure.

1. Install the conveyor leg using the top three threaded holes in the sides of the conveyor.
2. Allow the foot to drop to the floor, then install and tighten the screws and nuts to lock the foot in place.

Install the Hood Cover

Depending on the conveyor manufacturer, the conveyor head may have either a hinged or a bolt-on hood. Use the supplied hardware to install the supplied hood.

Assemble and Install the Safety Skirt

1. Test-fit the skirt bracket to the conveyor to determine the “back” of the bracket (the end closest to the conveyor lift section). The ends of the skirt should meet at the center of the back of the bracket when assembled.
2. Remove the nut plates from the skirt bracket.
3. Install the skirt to the bracket, starting and ending at the center of the back of the bracket. Secure the skirt with the nut plates.
4. Install the skirt/bracket assembly to the discharge area of the chip conveyor using four 1/4-20 screws.

Connect Power

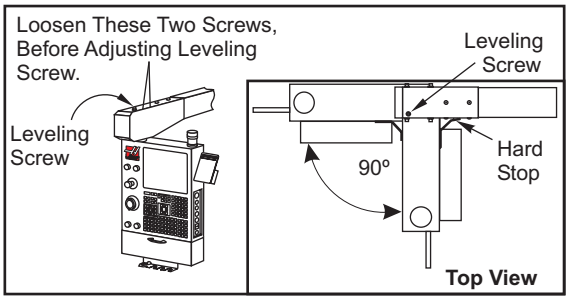
1. Connect the conveyor power twist-lock plug into the receptacle at the side of the machine.

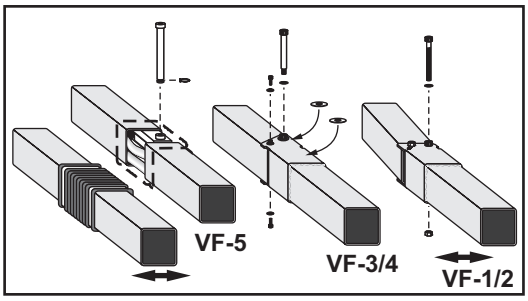
Pendant Leveling

On VF1/5 machines, make sure hinge screw is installed and tight before leveling the pendant.

Pendant leveling feature allows the angle of the pendant to be adjusted during installation.

1. Rotate the pendant as shown for proper leveling.





2. Loosen the two (2) screws on the end cap before adjusting the leveling screw.

3. Use a wrench on the leveling screw to change the angle of the pendant.

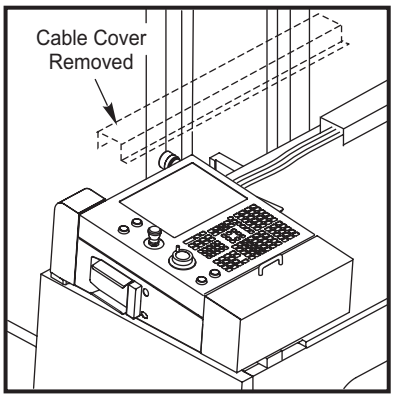
4. Tighten the two (2) screws on the end cap once the pendant is level.

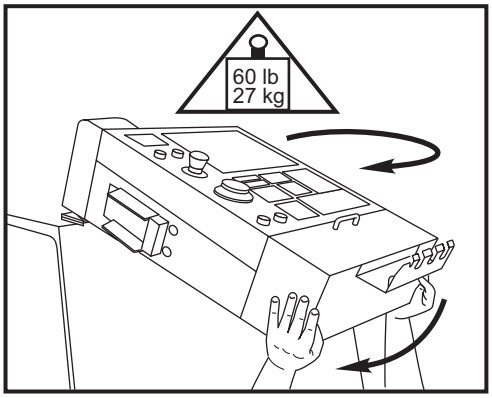
5. Rotate the pendant 90° forward and check the level again. Repeat the procedure if necessary.

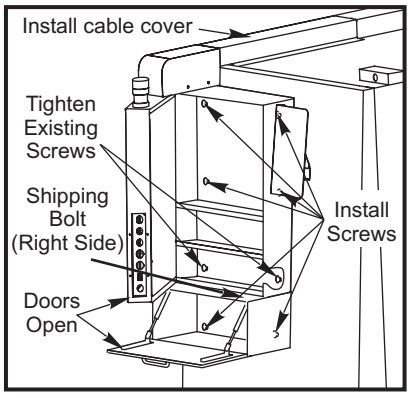
Thin Pendant Installation

Mill

The Thin Pendant assembly is positioned on top of the mill when shipped. Foam padding is wrapped around the assembly, which is held to the machine with a shipping bracket. The cable cover is slid back toward the rear of the mill and secured with two screws, to provide room for the assembly to rest on top of the mill.







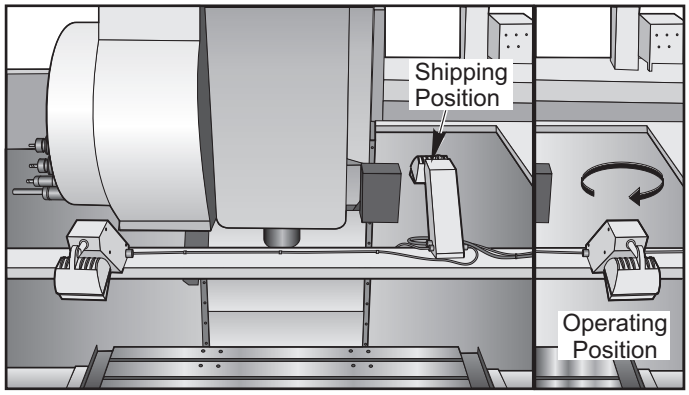
1. Remove the shipping bracket and packing material from the assembly and pivot the Thin Pendant Assembly left and swing it down, allowing cabinet keyholes to locate onto mounting screws on the front panel. Unscrew the cable cover, slide it forward into position, and secure it to the top of the machine.

2. Remove the shipping bolt (accessed through the glove box), open the pendant and install and tighten all fasteners.

High Intensity Lighting

To properly orient the High Intensity Lighting on a VF-6/10, perform the following procedure.

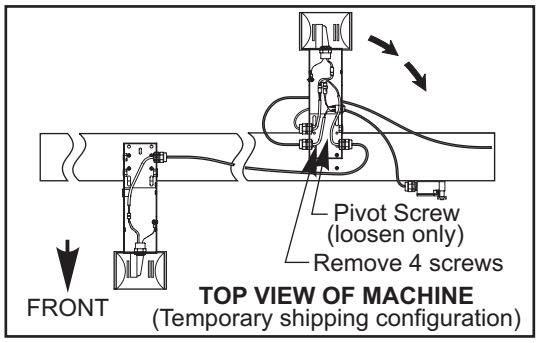
For shipping purposes, the right High Intensity Light assembly has been rotated 180° as shown:

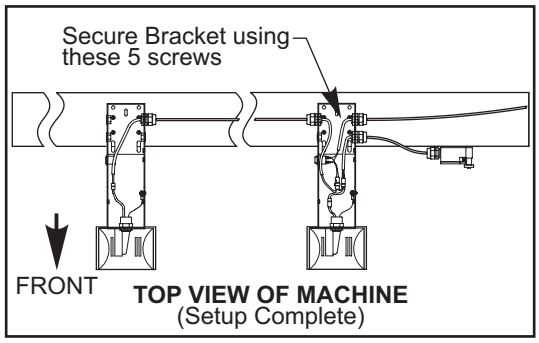


After the machine is installed, the High Intensity Lighting option must be reconfigured from its shipping position. To do this, perform the following steps on the right light assembly.

1. Remove the BHCS securing the cover to the light arm. Remove the cover.

2. Remove the two BHCS securing High Intensity Light assembly to header bar. Loosen (not remove) center pivot screw. Remove the two BHCS from threaded holes in header bar. Rotate light assembly 180°. Line up holes in light assembly with threaded holes in header bar. Insert removed BHCS and tighten all five screws.





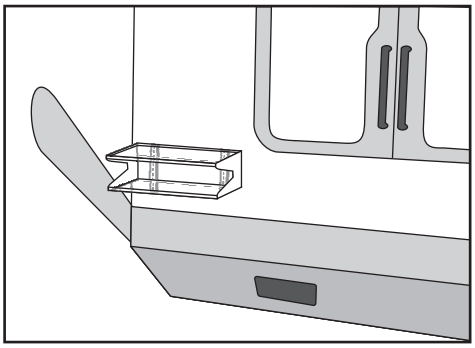
3. Take up any slack in the power cables. Tighten the strain-relief nuts.

4. Attach High Intensity Light cover to back of the light assembly and secure with screws removed in step 1.

Accessory Table

The Accessory Table is wrapped and shipped in the machine.

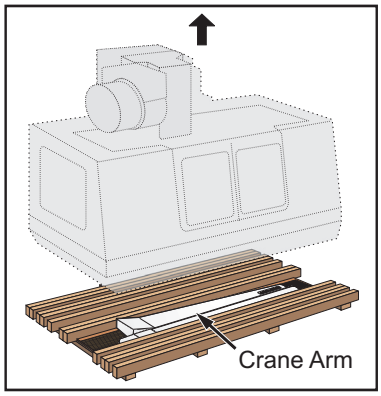
Unwrap and install the table in the provided mounting brackets on the front of the machine.

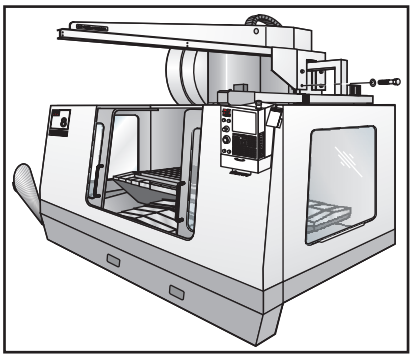


Crane Arm Installation

NOTE: The Crane Arm is optional on VF 6-11 machines.

Important: Crane Arm is secured to the pallet, under the machine. Do not discard the pallet or packing material until the crane arm has been removed.





Installation Procedure

1. Remove the Crane Arm from the shipping base.

2. Lift the Crane Arm into position. There is a hole in the Crane Arm specifically for lifting.

3. Secure the Crane Arm to the right side of the column using the four (4) bolts and washers provided. Make sure all of the cables are guided through the opening on the crane between the mounting bolts. Do not allow them to become pinched between the Crane Arm and the column when mounting.

NOTE: The Crane Arm capacity is 1000 lbs, and does not include lift chain device or trolley.

Through the Spindle Coolant (TSC) System

Warning!

The TSC pump is three phase and must be phased correctly!
Improper phasing will damage the TSC pump and void the warranty.

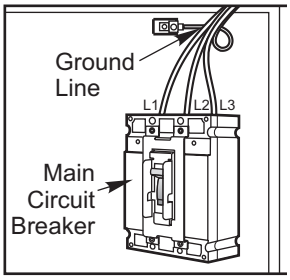
1. Fill the coolant tank with coolant and connect all hoses and power cords. Zero Return the machine.

2. Press the MDI button and turn on TSC by pressing the AUX CLNT button. Quickly go to the back of the machine and check if the TSC pump motor is turning and pushing coolant through the clear intake hose. If it is, the machine is properly phased. If not immediately stop the pump by pressing the RESET button. Check that the intake hose connection is tight, the connection must be tight for the pump to prime itself. If the motor is not turning, check that the power cords are connected and the circuit breaker inside the control box is on.

The TSC pump will not pump if it is rotating backwards. The motor rotation should be clockwise when viewed from the fan end.

CAUTION: Running The TSC pump dry for more than 60 seconds can cause serious damage to the pump.

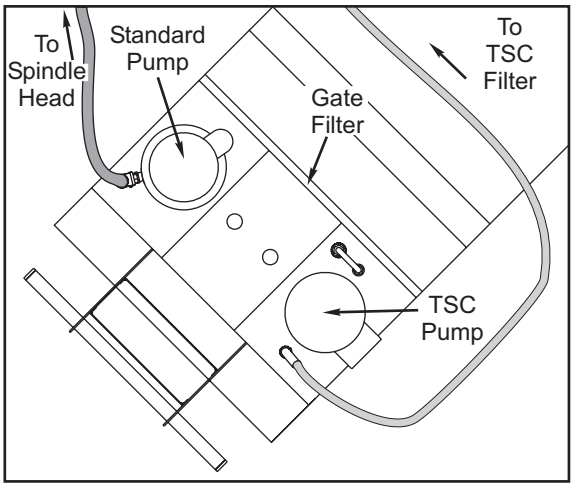
3. If the machine is improperly phased perform the following procedure:
   a. Turn off the power to the input side (top) of the main circuit breaker. Measure the Voltage!
   b. Exchange any two wires at the input side (top) of the main circuit breaker as shown.
   c. Close the control box. Return to Step 2 and test for proper phasing.

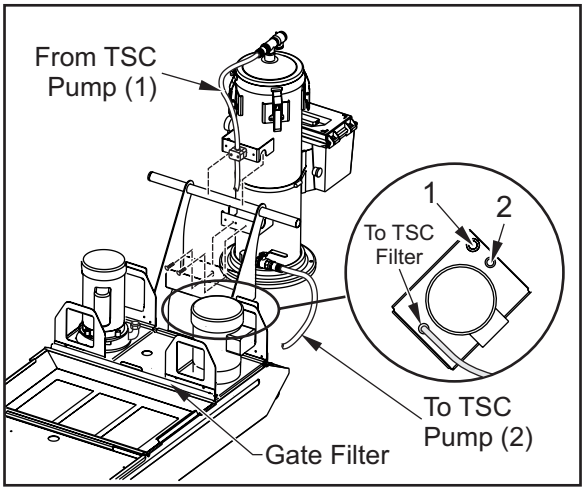


Optional Auxiliary Filter for TSC System

Installation

1. Hang the auxiliary filter assembly from the coolant tank handle and secure it with two 1/4-20 screws as shown.





Standard Filtration Setup

2. Connect the hose attached to the spindle head to the hose connection on the Standard Coolant Pump.

3. Separate the hoses coming from the Auxiliary Filter. They have been connected together for shipping.

4. Attach the Auxiliary Filter male connector (top hose) to female connector on the TSC Coolant Pump Assembly (Items labeled “1” in the previous illustration).

5. Attach the Auxiliary Filter female connector (bottom hose) to the short hose with the male connector on the TSC Coolant Pump Assembly (Items labeled “2” in the previous illustration).

6. Connect the plastic tubing (shipped tied to the Auxiliary Filter) from the small elbow fitting on the top of the Auxiliary Filter to the small elbow fitting on the Standard Coolant Pump hose connector.

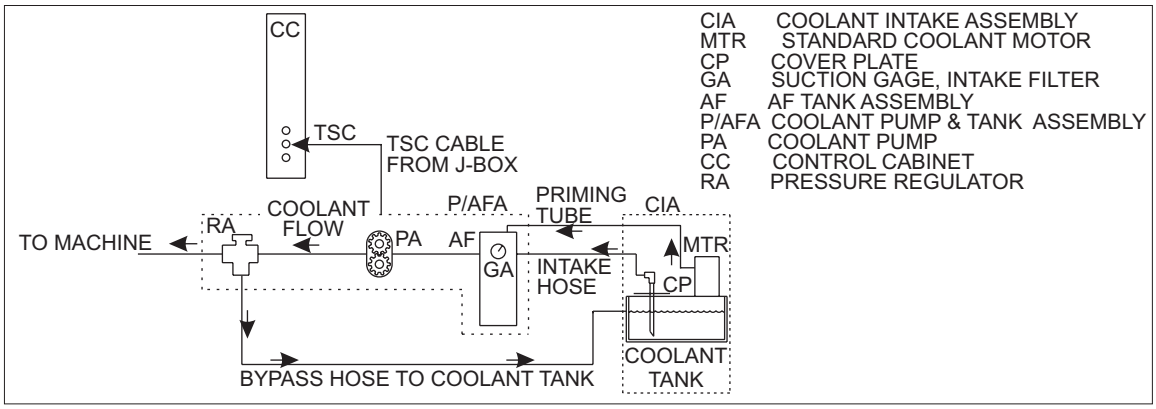
7. Connect the hose attached to the TSC Coolant Pump Assembly to the TSC Filter Assembly.

8. Check that the filter lid is securely closed.

9. Run the primary coolant system for ten minutes to prime the bag filter housing before using the TSC system.

1000 Psi Through the Spindle Coolant Installation

Place the 1000psi TSC assembly next to the coolant tank behind the machine with the hose connections facing the back of the machine. Use the following coolant schematic as an aid for hose routing.



1. Connect the power cable for the pump assembly to an external source in order to power the motor. Note that the CNC control does not provide power to the pump motor. Customer supplied external power must be supplied at the time of installation. The power required is 208-230 volt 3-phase 50/60Hz, and have a 20-amp circuit breaker. The pump assembly is pre-wired with a NEMA L15-20 plug.

The pump assembly can also use an alternate power source, these are:
240-230V 50/60HZ @ 20A or 480V 50/60HZ @ 10A

To power the pump assembly from an alternate source, first replace the plug at the end of the cable with an appropriate plug for the voltage being used. Then, rewire the pump motor according to the directions on the side of the motor.

2. Plug the TSC cable from TSC junction box (J-box) to the TSC amphenol port on the side of the control cabinet.

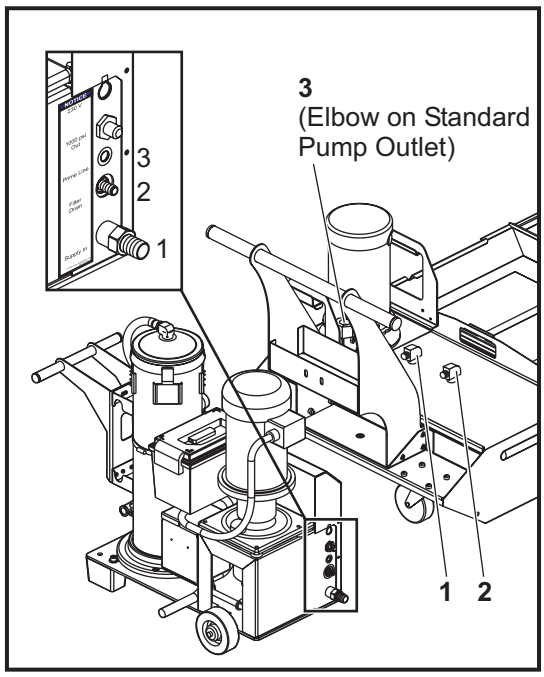
3. Connect the hose attached to the coolant connection on the spindle head to the hose connection on the Standard Coolant Pump.

4. Connect the hose attached to the TSC input on the machine's head to the connector labeled "1000 psi Out" on the TSC1000 connector panel (located on the side opposite the handle).

5. Attach the supply hose from the coolant tank lid to the connector labeled "Supply In" on the TSC1000 connector panel (items labeled "1" in the following illustration).

6. Connect the filter drain line from the coolant tank lid to the connector labeled "Filter Drain" on the TSC1000 connector panel (items labeled "2" in the following illustration).

7. Connect the plastic tubing (ships tied to the Auxiliary Filter) from the connector labeled "Prime Line" on the TSC1000 connector panel to the small elbow fitting on the Standard Coolant Pump hose connector (items labeled "3" in the following illustration).



TSC1000 / HPC1000 Setup

Initial Start-Up

Before using the 1000psi system the auxiliary filter must be primed. There are two ways to do this. The first is to run the standard coolant pump for 5 minutes. This will fill the auxiliary tank, through the priming hose.

The second method is to attach the wash down hose to the standard coolant pump. Turn on the standard coolant system (press "MDI", then "Coolant"). It may be necessary to turn the valve(s) on the standard coolant pump to divert coolant to the hose. Open the auxiliary filter tank cover and use the wash down hose to fill the auxiliary filter with coolant. Replace the auxiliary tank cover and tighten securely.

NOTE: To ensure the TSC pump does not lose its priming, a 1/4" nylon hose is connected between the standard coolant pump and the auxiliary filter to maintain the coolant level in the filter tank.Pressure Regulator Adjustment

The pressure regulator has been set at 1000psi and tested at the factory. No further adjustment is required. However, to change the pressure, loosen the regulator jam nut. Turn the adjusting bolt clockwise to increase the pressure or counter clockwise to decrease the pressure. (Note, the system does not need to be on to change pressure) Tighten the regulator nut once the pressure has been set.

Replacement of Filter Bags

Change the filter bag when the filter gauge indicator displays a vacuum level of -5 in. Hg or more. Do not allow the suction to exceed -10 in. Hg or pump damage may occur. HAAS recommends using 25-micron rated filter bags. Replacement bags can be purchased from local filter suppliers or from HAAS (Part No. 93-9130). Finer micron rating bags can be used.

Maintenance

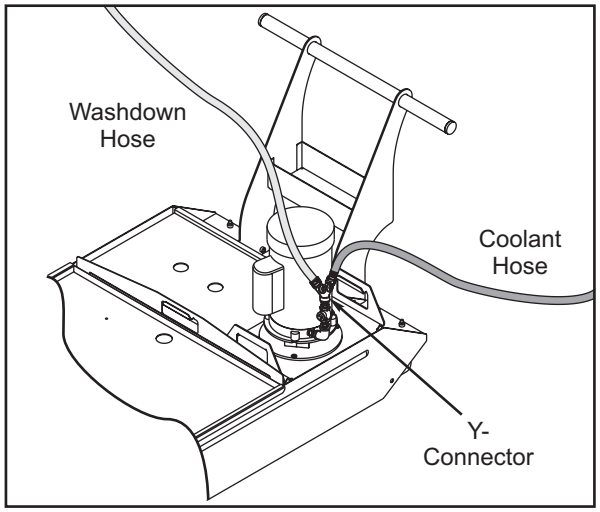
Before doing any maintenance to the 1000psi system, disconnect the power source; unplug it from the power supply.

Check the oil level on a daily basis. If the oil is low, add oil through the fill cap on the reservoir. Fill the reservoir about 25% full with synthetic 5W30 oil.

Washdown Hose Installation

The Tote Kit supplied contains a Washdown Hose Kit. This includes one Hose, one Nozzle, two (2) Hose Washers, and one “Y” connector. The nozzle should have a washer tied on to the handle.

1. Detach the washer from the nozzle handle, and insert it into the connecting end of the nozzle.
2. Insert one of the hose washers in the female end of the hose. The other washer is a spare.
3. Attach the nozzle to the male end of the hose.
4. Detach the Coolant hose from the coolant pump.
5. Attach the “Y” connector to the coolant pump where the Coolant hose was.
6. Attach the Coolant hose to one of the “Y” outlets and the Washdown hose to the other.



Servo Control Bracket Installation (Optional)

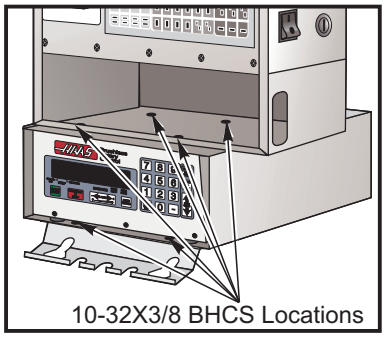
1. Remove tool holder bracket from pendant shelf.

2. Use the tool holder bracket screws to attach the Servo Control bracket to front pemnuts of the pendant shelf. Use a scribe to mark the location of the two holes to drill. Remove the bracket and drill two ¼" (0.25) holes through the pendant shelf in the middle of the scribed circles. Reinstall the Servo Control pendant bracket to pendant shelf using four 10-32 X 3/8 button head cap screws.

3. Attach the tool holder bracket to the Servo Control pendant bracket with the remaining screws.

4. Remove rear servo control rubber feet and screws. Slide servo control into the bracket from the back. Position the control so the rear baseplate threaded holes line up with the holes in the bracket. Reinstall the screws into the servo control baseplate, through the bracket, without the rubber feet.

5. Mount the table or indexer to the mill table. Route the cables over the mill sheet metal enclosure. Make sure the cables do not limit the table travels. Attach the cables to the control box; control must be powered off.



Installed Servo Control Bracket

Spindle Run-in

CAUTION! The spindle run-in program must be run before the spindle can be run above 1000 rpm. Failure to run this program can result in spindle over heating and failure.

Before running the spindle, a spindle run-in must be performed. A program has been supplied with the machine which will slowly run the spindle up to speed (approx. 2 hrs). This will purge out any oil which may have settled at the nose of the spindle due to long idle time. The program is # O02021 Spindle Run-In and will be used for all spindle types and rpms. Adjust spindle speed override depending on maximum spindle speed of the machine: Set override at 50% for 5,000 RPM machines; at 100% for 7,500 and 10,000 rpm machines; and at 150% for 15,000 rpm machines. For machines equipped with a 50 taper spindle, run spindle speed override at 50%.

```
N100
S750M3
G04 P600.;
S2500M3;
G04 P600.;
S5000M3;
G04 P900.;
N200
M97 P1000 L15
M97 P2000 L15
M30;
```

```
N1000
S7500M3;
G04 P30.;
S500 M3;
G04 P150.;
M99;
```

```
N2000
S10000M3;
G04 P30.;
S500M3;
G04 P150.;
M99;
%
```

The HSK 63A Faemat spindle requires a toolholder in the spindle and the chiller to be set at 20°C while the spindle is running.

The spindle should be checked periodically for spindle temperature rise. If the temperature rises above 150°F, start the program from the beginning. If the temperature rises above 150°F again, contact your dealer.

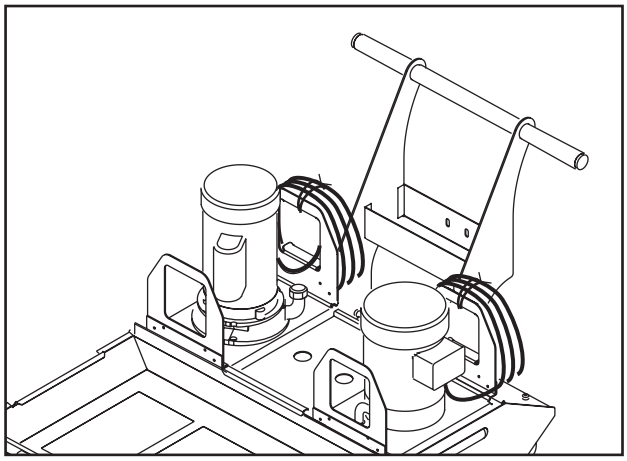
Spindle Warm-Up Program

All spindles which have been idle for more than 4 days must be thermally cycled prior to operation above 6,000 RPM. This will prevent possible overheating of the spindle due to settling of lubrication. A 20-minute warm-up program has been supplied with the machine, which will bring the spindle up to speed slowly and allow the spindle to thermally stabilize. This program may also be used daily for spindle warm-up prior to high-speed use. The program number is O02020 (Spindle Warm-Up).

```
O02020 (Spindle Warm-Up)
S500M3;
G04 P200.;
S1000M3;
G04 P200.;
S2500M3;
G04 P200.;
S5000M3;
G04 P200.;
S7500M3;
G04 P200.;
S10000M3;
G04 P200.;
M30;
```

Cable Handling/Storage

Complete the machine installation by looping and storing the extra lengths of electrical cables. Use the following techniques when dealing with excessive cable length.



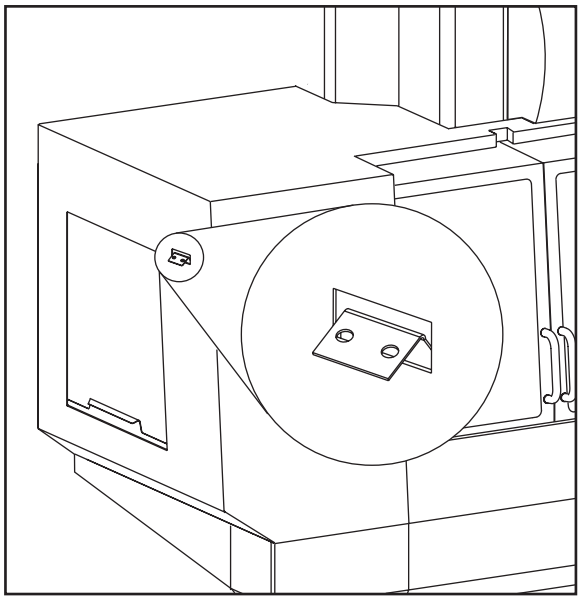
- Loop cables individually, being careful to not force the cable into too sharp a bend and tie-wrap the loop. The cable bend radius should not be less than 4 times the diameter of the cable.
- Place the loop in the cable out of sight, hidden by the machine sheet metal, if possible.
- Do NOT allow the cables to rest on the floor.
- Do NOT coil a cable around another piece of machinery (such as a pump motor).

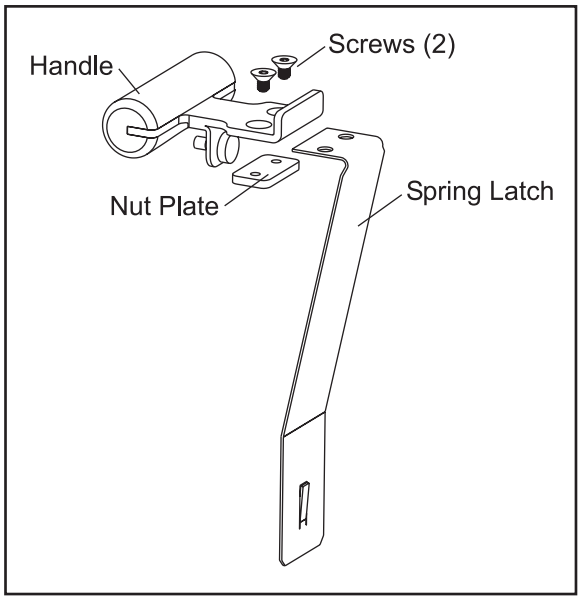
Access Window Latch Assembly

The mill is shipped with the handle for both of the side window latches removed.

Assemble the latch as shown in the figure. Note: Do not raise window to assemble handle to latch.

The handle is fastened to the latch with two screws and a nut plate





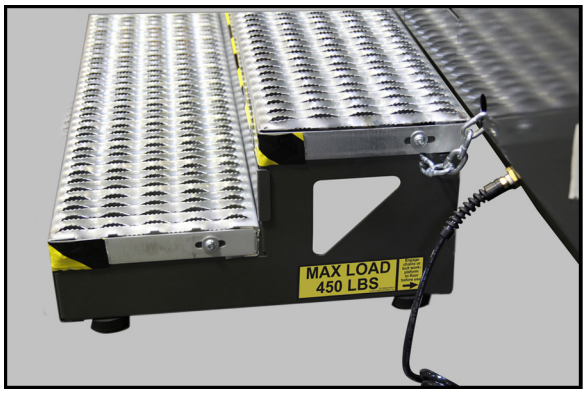
Work Platform Installation

Large vertical and horizontal mills include work platforms to be installed in front of the machine and secured with chains or by bolting to the floor.

WARNING: Observe the 450-lb (204 kg) weight limit on the work platform, and understand that this limit includes the weight of the operator(s) standing on the platform and any objects they carry. Overloading the platform can lead to injury.

Installation

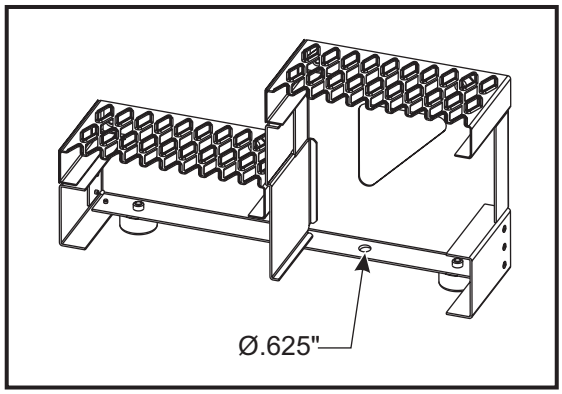
1. Place the platform in front of the machine, centered between the keyholes in the enclosure and as close as possible to the machine.



2. Push chain links through the top of each keyhole until the last possible link passes through to remove as much slack as possible from the chain.

3. Allow the first link out of the hole to settle into the bottom of the keyhole to engage the chain and secure the platform in place.

Floor Anchoring (Optional)



The work platform can also be anchored to the floor.

1. Through the triangular access hole on either side of the platform, check for a Ø.625" hole in the flange on the inside bottom of the higher step. If your platform assembly does not include this hole, drill one in the approximate location shown in the illustration.

2. Use 1/2" concrete lag screws or other anchoring hardware to secure the platform to the floor.