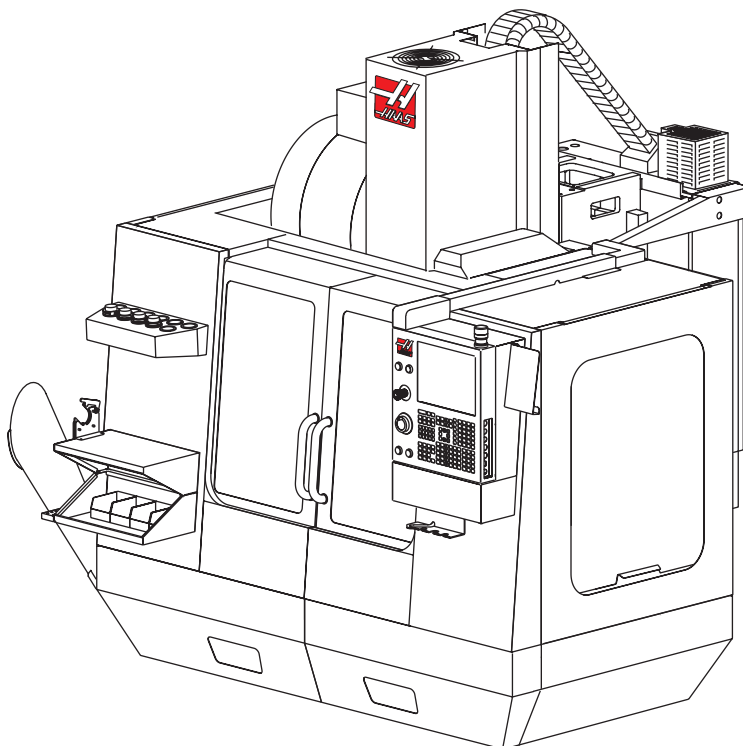




VERTICAL MILL INSTALLATION INSTRUCTIONS



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))



ELECTRICAL REQUIREMENTS

	Machine Model	Selection	HP	Continuous Kva (Peak)	Machine Breaker		Voltage range or fixed tap	Recommended Service		XFRMR KIT		
					P/N	(Amps)		(Amps)	Wire AWG			
Office Mills	OM-1A / -2A	30K-20T	5	4(7)	61-7328	20	195-254	30	10			
Tool Room Mills	TM-1/2 TM-3	4K-BELT/6K-BELT ----- High Volt USA only	7.5	9(14)	61-7312	40	195-250	50	8	EXTRN480C		
		High Volt Non USA			61-7319	15	366-425	20	12	32-0551		
		Region HE/CE/China/India/Russia										
	TM-1P/-2P TM-3P	6K-BELT ----- High Volt USA only	7.5	9(14)	61-7312	40	195-250	50	8	EXTRN480C		
		High Volt Non USA			61-7319	15	366-425	20	12	32-0551		
		Region HE/CE/China/India/Russia										
MiniMill VMCs	Mini Mill	6K-BELT ----- High Volt USA only	7.5	9(14)	61-7312	40	195-250	50	8	EXTRN480C		
		High Volt Non USA			61-7319	15	366-425	20	12	32-0551		
		Region HE/CE/China/India/Russia										
	MiniMill2	6K-BELT ----- High Volt USA only	7.5	9(14)	61-7312	40	195-250	50	8	EXTRN480C		
					High Volt Non USA	61-7319	15	366-425	20	12	32-0551	
					Region HE / CE/China/India/Russia							
		W/SMTC-24 ----- High Volt USA only	7.5	9(14)	61-7312	40	195-250	50	8	INTRN		
					High Volt Non USA	61-7315	20	366-425	30	10	32-05221	
					Region HE/CE/China/India/Russia							
	Super MiniMill Super MiniMill2	10K-BELT ----- High Volt USA only	15	14(20)	61-7312	40	195-260	50	8	INTRN		
					High Volt Non USA	61-7315	20	354-488	30	10	32-05221	
					Region HE/CE/China/India/Russia							
40- Taper Standard VMCs	VF-1/-2 VF-1YT/-2YT VF-3/-4 VF-3YT VF-3APC/-4APC	8K-GB 10K-GB 15K-BELT ----- High Volt USA only	20	14(20)	61-7312	40	195-260	50	8			
		High Volt Non USA			61-7315	20	354-488	30	10	INTRN		
		Region HE/CE/China/India/Russia								32-05221		
		8K-INLINE/10K-INLINE ----- High Volt USA only + (INLINE)			30	28(40)	61-7314	80	195-260	100	4	32-15500
		High Volt Non USA + (INLINE)					61-7317	40	354-488	50	8	EXTRN480A
		Region HE/CE/China/India/Russia+(INLINE)										32-05500
	VF-5/-5XT VF-6 VF-7 VF-8 VF-9 VF-10 VF-11 VF-12 VF-2TR VF-5TR VF-6TR	8K-GB 10K-GB 15K-BELT ----- High Volt USA only	20	14(20)	61-7312	40	195-260	50	8			
					High Volt Non USA	61-7315	20	354-488	30	10	INTRN	
					Region HE/CE/China/India/Russia						32-05221	
		8K-INLINE/10K-INLINE ----- High Volt USA only + (INLINE)	30	28(40)	61-7314	80	195-260	100	4	32-15500		
					High Volt Non USA + (INLINE)						EXTRN480A	
					High Volt Non USA + (INLINE)	61-7317	40	354-488	50	8	32-05500	
		Region HE/CE/China/India/Russia+(INLINE)										



	Machine Model	Selection	HP	Continuous Kva (Peak)	Machine Breaker		Voltage range or fixed tap	Recommended Service		XFRMR KIT
					P/N	(Amps)		(Amps)	Wire AWG	
50-Taper Standard VMCs	VF-3YT/-5/-5XT	7.5K-50T	30	28(40)	61-7314	80	195-260	100	4	EXTRN480A
	VF-6/-7	10K-50T-GB								
	VF-5TR	High Volt USA only								
	VF-6TR	High Volt Non USA			61-7317	40	354-488	50	8	
	VF-8/-9	Region HE/CE/China/India/Russia								
	VF-10/-12	10K-INLINE								
VF-11	High Volt USA only + (10KINLINE)	61-7326A	150	195-260	200	1/0	EXTRN480B			
	Region HE/CE/China/India/Russia + (10KINLINE)						32-5820F & NEED TO BUY EXTERNAL TRANSFORMER LOCALLY			
Large Capacity VMCs	VS-1	7.5K-50T	30	28(40)	61-7324	100	195-260	125	2	EXTRN480A
	VS-3	10K-50T-GB								
		High Volt USA only			61-7317	40	354-488	50	8	
		High Volt Non USA								
	Region HE/CE/China/India/Russia						32-5500			
5-Axis VMCs	VR-8	15K-BELT	30	28(40)	61-7314	80	195-260	100	4	EXTRN480A
	VR-11B	High Volt USA only								
		High Volt Non USA			61-7317	40	354-488	50	8	
		Region HE/CE/China/India/Russia								
Super Speed VMCs	VF-2SS VF-2SSYT	12K-40T-IN	30	28(40)	61-7314	80	195-260	100	4	EXTRN480A
	VF-6SS VF-3SSYT	High Volt USA only								
	VF-3SS/-4SS/-5SS	High Volt Non USA			61-7317	40	354-488	50	8	
	VF-3SSAPC/-4SSAPC	Region HE/CE/China/India/Russia								
	SR-100	24K-30T	8.9	9(14)	61-7329	40	195-254	50	8	
		Region HE/CE/China/India/Russia								
Gantry	GR-510	10K-BELT	15	14(20)	61-7312	40	195-260	50	8	INTRN
	GR-712	High Volt USA only								
		High Volt Non USA			61-7315	20	354-488	30	10	
		Region HE/CE/China/India/Russia								
		5K-BELT								
		High Volt USA only	61-7312	40	195-260	50	8	INTRN		
	High Volt Non USA									
	Region HE/CE/China/India/Russia									
		High Volt Non USA	20	14(20)	61-7315	20	354-488	30	10	32-05221
		Region HE/CE/China/India/Russia								
Mold machines	VM-2	12K-40T-IN	30	28(40)	61-7314	80	195-260	100	4	EXTRN480A
	VM-3	High Volt USA only								
	VM-6	High Volt Non USA			61-7317	40	354-488	50	8	
	Region HE/CE/China/India/Russia									
Mill Drill Center	MDC-500	15K-BELT	20	14(20)	61-7312	40	195-260	50	8	32-5800F
		High Volt USA only								
		High Volt Non USA			61-7315	20	354-488	30	10	
		Region HE/CE/China/India/Russia								
		8K-INLINE/10K-INLINE								
		High Volt USA only + (INLINE)	61-7314	80	195-260	100	4	32-15500		
	High Volt Non USA + (INLINE)									
	Region HE/CE/China/India/Russia+(INLINE)									
		High Volt Non USA + (INLINE)	30	28(40)	61-7317	40	354-488	50	8	EXTRN480A
		Region HE/CE/China/India/Russia+(INLINE)								32-05500



	Machine Model	Selection	HP	Continuous Kva (Peak)	Machine Breaker		Voltage range or fixed tap	Recommended Service		XFRMR KIT	
					P/N	(Amps)		(Amps)	Wire AWG		
Drill/Tap Center	DT-1	15K-30T	15	28(40)	61-7314	80	195-260	100	4	EXTRN480A	
		High Volt USA only									
		High Volt Non USA Region HE/CE/China/India/Russia			61-7317	40	354-488	50	8	32-5500	
EC & ES	EC-300 EC-400 EC-400PP EC-500	8K-40T	20	14(20)	61-7312	40	195-260	50	8	INTRN	
		High Volt USA only									
		High Volt Non USA Region HE/CE/China/India/Russia			61-7315	20	354-488	30	10	32-05221	
	EC-1600 EC-1600YZT	12K-40T-IN	30	28(40)	61-7314	80	195-260	100	4	32-15500 EXTRN480A	
		High Volt USA only									
		High Volt Non USA Region HE/CE/China/India/Russia			61-7317	40	354-488	50	8	32-05500	
	ES-5-T ES-5-4AX ES-5-4T ES-5-TR	6K-50T 10K-50T-GB	30	28(40)	61-7314	80	195-260	100	4	EXTRN480A	
		High Volt USA only									
		High Volt Non USA Region HE/CE/China/India/Russia			61-7317	40	354-488	50	8	32-05500	
	ES-5-T ES-5-4AX ES-5-4T ES-5-TR	8K-40T	20	14(20)	61-7312	40	195-260	50	8	INTRN	
		High Volt USA only									
		High Volt Non USA Region HE/CE/China/India/Russia			61-7315	20	354-488	30	10	32-05221	
	HS	HS-3/-4/-6/-7 HS-3R/-4R/-6R/-7R	12K-40T-IN	30	28(40)	61-7314	80	195-260	100	4	32-15500 EXTRN480A
		High Volt USA only									
		High Volt Non USA Region HE/CE/China/India/Russia	61-7317			40	354-488	50	8	32-05500	
HS	HS-3/-4/-6/-7 HS-3R/-4R/-6R/-7R	5K-50T	30	28(40)	61-7324	100	195-260	125	2	EXTRN480A	
	High Volt USA only										
	NOTE: For open frame CE/HE machines see ES-0336 Region HE/CE/China/India/Russia	61-7317			40	354-488	50	8	32-05500		



	Machine Model	Selection	HP	Continuous Kva (Peak)	Machine Breaker		Voltage range or fixed tap	Recommended Service		XFRMR KIT			
					P/N	(Amps)		(Amps)	Wire AWG				
Tool Room CNC TURNING CENTER	TL-1	2K-A2-5	7.5	9(14)	61-7312	40	195-250	50	8	EXTRN480C			
		High Volt USA only											
		High Volt Non USA				61-7319	15	366-425	20	12	32-0551		
		Region HE/CE/China/India/Russia											
		HSTL-1			7.5	9(14)	61-7312	40	195-250	50	8	EXTRN480C	
		High Volt USA only											
	High Volt Non USA		61-7319	15			366-425	20	12	32-0551			
	Region HE/CE/China/India/Russia												
	TL-2	2K-A2-6	HSTL-2	10			9(14)	61-7312	40	195-250	50	8	EXTRN480C
	High Volt USA only												
	High Volt Non USA					61-7319		15	366-425	20	12	32-0551	
	Region HE/CE/China/India/Russia												
	TL-3	1.8K-A2-6	High Volt USA only	18	14(20)	61-7312	40	195-260	50	8	INTRN		
											High Volt Non USA		
						Region HE/CE/China/India/Russia		61-7315	20	354-488	30	10	32-05221
		HSTL-3	High Volt USA only	30	28(40)	61-7314	80	195-260	100	4	32-15500		
											High Volt Non USA		
	Region HE/CE/China/India/Russia		61-7317	40	354-488	50	8	32-05500					
	TL-3B	0.65K-A2-15	High Volt USA only	30	28(40)	61-7314	80	195-260	100	4	32-15500		
											High Volt Non USA		
						Region HE/CE/China/India/Russia		61-7317	40	354-488	50	8	32-05500
TL-3W	1.8K-A2-6	High Volt USA only	30	28(40)	61-7314	80	195-260	100	4	32-15500			
										High Volt Non USA			
					Region HE/CE/China/India/Russia		61-7317	40	354-488	50	8	32-05500	
TL-4	0.5K-A1-20	High Volt USA only	55	37(68)	61-7326A	150	195-260	200	1/0	EXTRN480B			
										Region HE/CE/China/India/Russia			



	Region HE/CE/China/India/Russia									
ST-20 ST-20Y	4K-A2-6	20	14(20)	61-7312	40	195-260	50	8		
	High Volt USA only									
	High Volt Non USA			61-7315	20	354-488	30	10		
	Region HE/CE/China/India/Russia									
ST-20SS ST-20SSY	3.4K-A2-6 BB-20	30	28(40)	61-7314	80	195-260	100	4	---	
	High Volt USA only								E	
	High Volt Non USA			61-7317	40	354-488	50	8		
	Region HE/CE/China/India/Russia									
ST-30 ST-30Y	5K-A2-6	30	28(40)	61-7314	80	195-260	100	4	---	
	High Volt USA only								E	
	High Volt Non USA			61-7317	40	354-488	50	8		
	Region HE/CE/China/India/Russia									
ST-30 ST-30Y	3.4K-A2-6 GEARBOX	30	28(40)	61-7314	80	195-260	100	4		
	High Volt USA only									---
	High Volt Non USA			61-7317	40	354-488	50	8		E
	Region HE/CE/China/India/Russia									
	2.4K-A2-8 BB-30	40	28(40)	61-7314	80	195-260	100	4		
	High Volt USA only									---
	High Volt Non USA			61-7317	40	354-488	50	8		E
	Region HE/CE/China/India/Russia									
ST-30SS ST-30SSY	4.8K-A2-6	30	28(40)	61-7314	80	195-260	100	4		
	High Volt USA only									---
	High Volt Non USA			61-7317	40	354-488	50	8		E
	Region HE/CE/China/India/Russia									
ST-40 ST-40L	2.4K-A2-8 BB-40	40	28(40)	61-7314	80	195-260	100	4		
	High Volt USA only									---
	High Volt Non USA			61-7317	40	354-488	50	8		E
	Region HE/CE/China/India/Russia									
	XP XP + BB	55	37(68)							
	High Volt USA only			61-7326A	150	195-260	200	1/0		---
	Region HE/CE/China/India/Russia									E
										32-5 EXTE
DS-30 DS-30Y	4K-A2-6-2.0"	30	28(40)	61-7314	80	195-260	100	4		
	High Volt USA only									---
	High Volt Non USA			61-7317	40	354-488	50	8		E
	Region HE/CE/China/India/Russia									
DS-30SS	4.8K-A2-6-2.0"	30	28(40)	61-7314	80	195-260	100	4		
	High Volt USA only									---



	Machine Model	Selection	HP	Continuous Kva (Peak)	Machine Breaker		Voltage range or fixed tap	Recommended Service		XFRMR KIT	
					P/N	(Amps)		(Amps)	Wire AWG		
TURNING CENTER CNC CONTINUED	SL-10	6K-15HP-A2-5	15	14(20)	61-7312	40	195-260	50	8	INTRN 32-05221	
		BB-10									
		High Volt USA only									
		High Volt Non USA									
	Region HE/CE/China/India/Russia										
	SL-20 / TL-15 SL-20L	4K-20HP-A2-6	7K	20	14(20)	61-7312	40	195-260	50	8	INTRN 32-05221
			High Volt USA only								
			High Volt Non USA								
			Region HE/CE/China/India/Russia								
		5K	High Volt USA only	30	28(40)	61-7314	80	195-260	100	4	32-15500 EXTRN480A
			High Volt Non USA								
			Region HE/CE/China/India/Russia								
			BB-20								
	SL-40L	2.4K-40HP-A2-8	BB-40	40	28(40)	61-7314	80	195-260	100	4	EXTRN480A 32-05500
			High Volt USA only								
High Volt Non USA											
Region HE/CE/China/India/Russia											
XP	XP + BB	55	37(68)	61-7326A	150	195-260	200	1/0	EXTRN480B 32-5620P & NEED TO BUY EXTERNAL TRANSFORMER LOCALLY		
	High Volt USA only										
	Region HE/CE/China/India/Russia										
	Region HE/CE/China/India/Russia										
SUB SPINDLE	DS-30 DS-30Y	4K-30HP-A2-6-2.0"	30	28(40)	61-7314	80	195-260	100	4	EXTRN480A 32-05500	
		High Volt USA only									
		High Volt Non USA									
	Region HE/CE/China/India/Russia										
	DS-30SS DS-30SSY	4.8K-30HP-A2-6-2.0"	30	28(40)	61-7314	80	195-260	100	4	EXTRN480A 32-05500	
		High Volt USA only									
		High Volt Non USA									
	Region HE/CE/China/India/Russia										
	SL-30 / TL-25	3.4K-30HP-A2-6	BB-30	30	28(40)	61-7314	80	195-260	100	4	EXTRN480A 32-05500
			High Volt USA only								
High Volt Non USA											
Region HE/CE/China/India/Russia											
OFFICE LATHE	OL-1	6K-7.5HP-A2-5	5	4(7)	61-7328	20	195-254	30	10		

Acceptable Voltage Ranges

208 VAC 1-phase (Office Models)	195-245 VAC RMS 50-60 Hz
208 VAC 3-phase (Mini Mill/Mini Lathe/Toolroom Mills/Toolroom Lathes 1-3)	195-245 VAC RMS 50-60 Hz
230 VAC 3-phase (15/20/30/40 hp machines)	195-260 VAC RMS 50-60 Hz
240 VAC 1-phase (Mini Mill/Toolroom Mills/Toolroom Lathes)	224-250 VAC RMS 50-60 Hz
480 VAC 3-phase (Internal Transformer, 15/20 hp machines)	354-488 VAC RMS 50-60Hz
480 VAC 3-phase (External Transformer)	420-510 VAC RMS 60Hz

While the standard internal transformers all accept either 50 or 60 Hz power, the external transformers are designed to operate only on 480 VAC 60 Hz power. For this reason, there are internal HV options available for 400 VAC 50 Hz applications. These internal HV options use a non-isolated internal transformer (isolation not required because of 4-wire grounded power used in 50 Hz applications). They can only be used on 400 VAC power.

7.5 to 20 hp (5.6 to 14.9 kW) machines:	Voltage range 366-425 VAC RMS	50-60Hz
30/40/55 hp (22.4 to 30 kW) machines:	Voltage range 354-428 VAC RMS	50-60Hz



Certification

All Haas CNC machine tools carry the *ETL Listed* mark, certifying that they conform to NFPA 79 Electrical Standards for Industrial Machinery, and the Canadian equivalent, CAN/CSA C22.2 No. 73.

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 and MDC Series	85psi	1/2"

VF and VM series machines require 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")	Test indicator (0.0005)
1 1/8" hex wrench or ratchet	Two 3/4" hex wrenches (open-end/box and ratchet)
1 1/2" wrench	Claw hammer
Allen Wrenches	(VR models) 9/16 hex wrench
(VR models) 12" Adjustable 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	7,300	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.

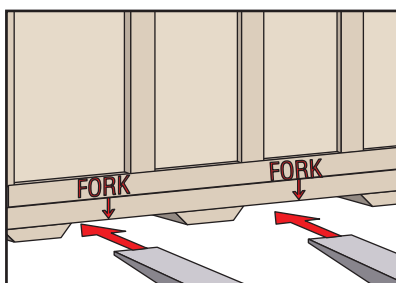


MATERIALS REQUIRED

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.



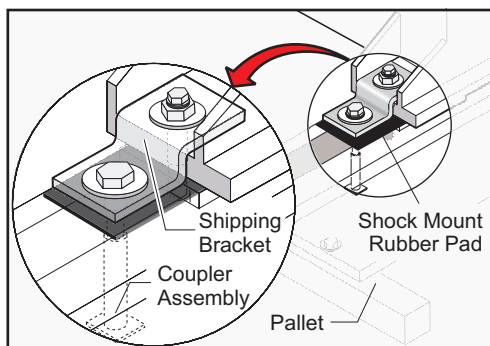
CAUTION! The fork positions are marked on the crate. (Also, note that there are three skids at each side of the pallet. The heavy part of the machine [the back] is positioned over the two skids that are closest together.) If the fork positions are ignored, the retaining bolts could be sheared off by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

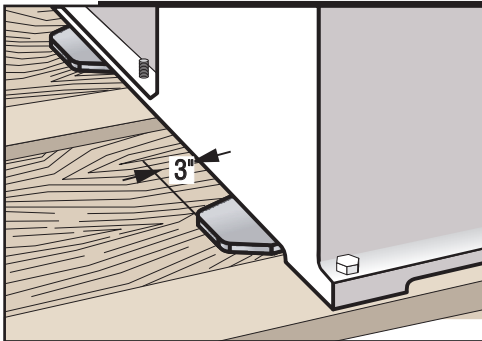
CAUTION! Do not lift the machine any farther than necessary off the floor when moving it, and move as slowly and cautiously as possible. Dropping the machine, even from a height of a few inches, can cause injury, result in expensive repairs, and void the warranty.

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.

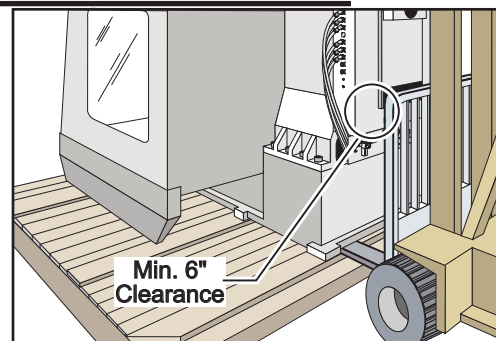
VF 3-11 and VR-11: Lift from the **BACK** of the machine with a forklift. Follow the machine weight and fork length specifications described earlier. There must be approximately 6" clearance between the forklift and the back of the machine.

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.

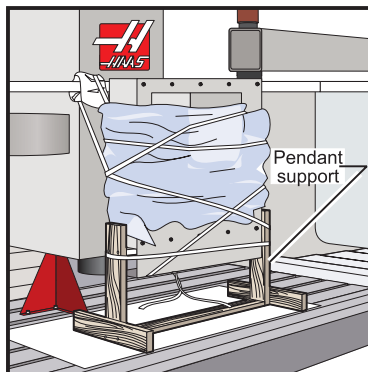


VF 1 and 2



VF 3 through 11

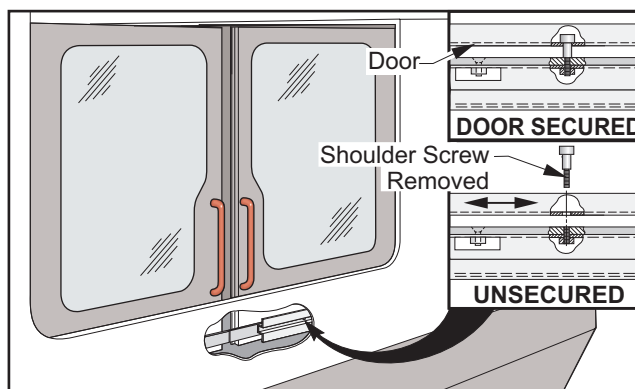
1. Lift the machine clear of the pallet.
2. Thread the leveling screws through the casting until they extend about an inch out of the bottom of the machine. If a screw is excessively hard to turn, remove it, dress the threads in the hole with a 1-14 UNC tap, and inspect the screw. If the screw has dings, 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.

SHIPPING BOLTS - DOORS (VF/VM/VR)

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

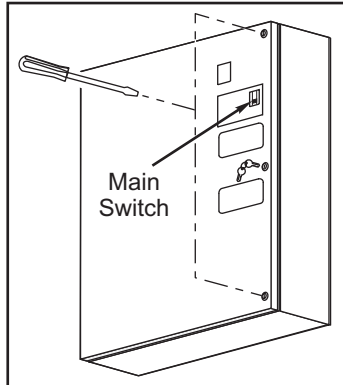


INITIAL SETUP

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.

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

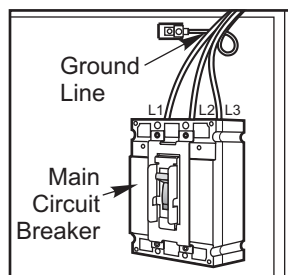
ELECTRICAL CONNECTIONS

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).

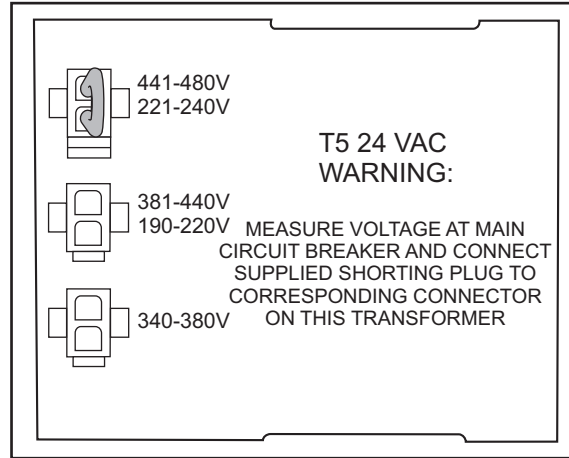
NOTE: Wide voltage fluctuations are common in many industrial areas; you need to know the minimum and maximum voltage which will be supplied to the machine while it is in operation. The U.S. National Electrical Code specifies that machines should operate with a variation of +5% to -5% around an average 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.

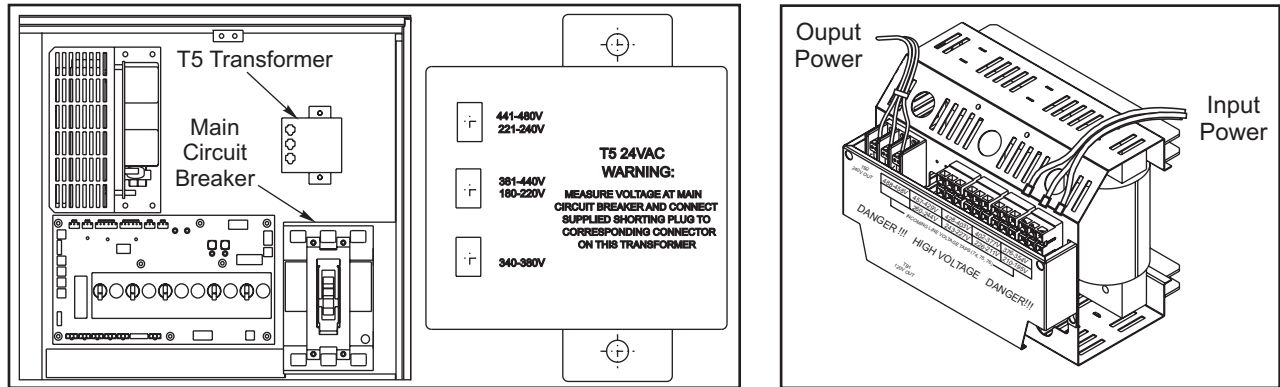
3. Check the connections on the transformer at the bottom-right corner of the rear cabinet. The three black wires labeled 74, 75, and 76 must be moved to the terminal block triple which corresponds to the average voltage measured in Step 2 above. There are four positions for the input power for the 260-volt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



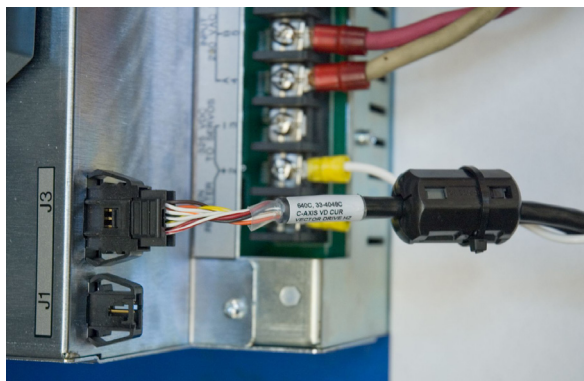
Warning!

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.

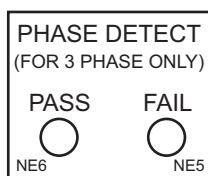
6. After the power is on, measure the voltage across the bottom terminals on the main circuit breaker. It should be the same as the measurements where the input power connects to the main circuit breaker. If there are any problems, check the wiring.

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)

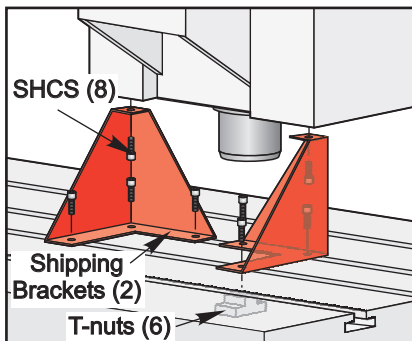
MACHINE POWER ON

Remove Shipping Brackets

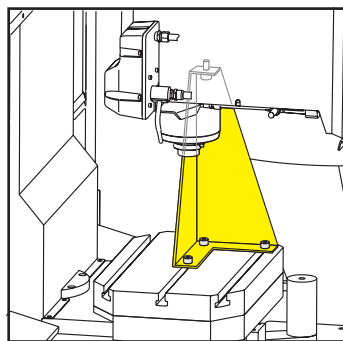
CAUTION! DO NOT press POWER UP/RESTART on the control panel while the shipping brackets are under the spindle. Also, do not press the X, Y, or Z buttons or the jog handle while the shipping brackets are located under the spindle.

Spindle Head Shipping Bracket

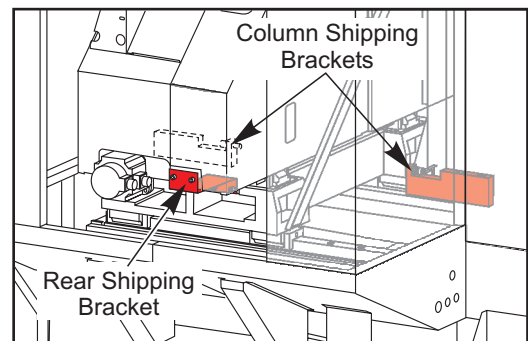
Loosen the four SHCS (three screws are in the table, and one is in the spindle head) holding each shipping bracket under the spindle head, and remove the two brackets.



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

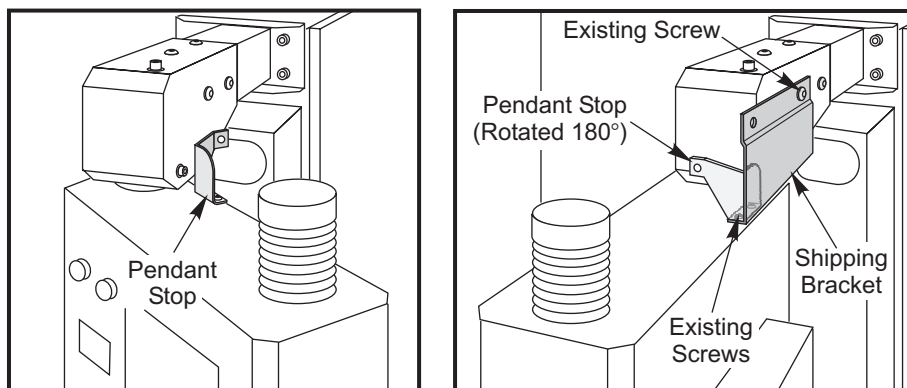
The operator doors are secured, top and bottom, with blocks. Remove the bolt that secures each block.

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.

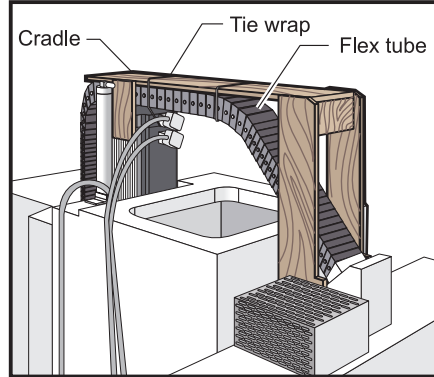
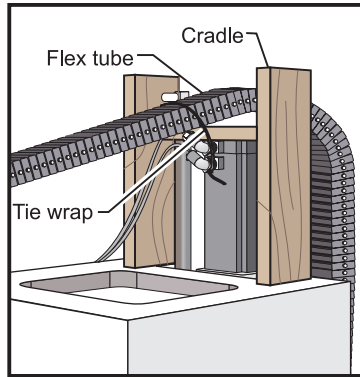


POWER ON

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 / MESSAGES 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

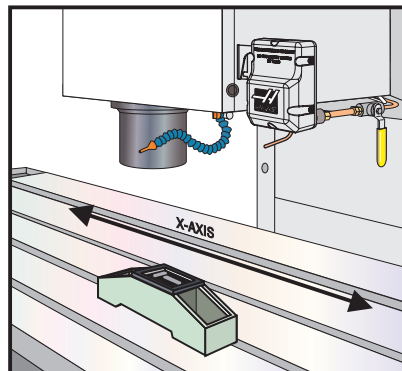
VF/VM/VR SERIES LEVELING OVERVIEW

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.



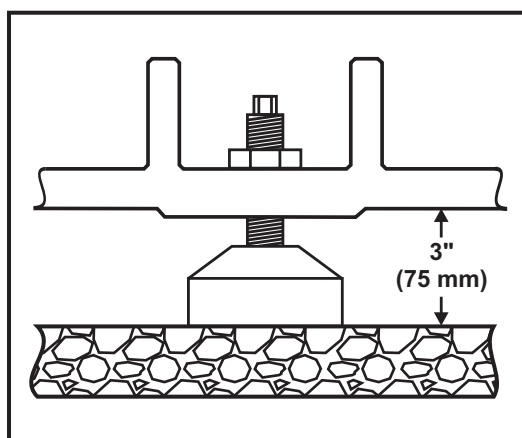


Use a precision bubble level with each division equal to **0.0005** inch per **10** inches, or **.05** mm per meter, or **10** seconds per division. Before starting, check the accuracy of your level. Set it on the table on the X axis and record the reading. Then turn it **180°** and the reading should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

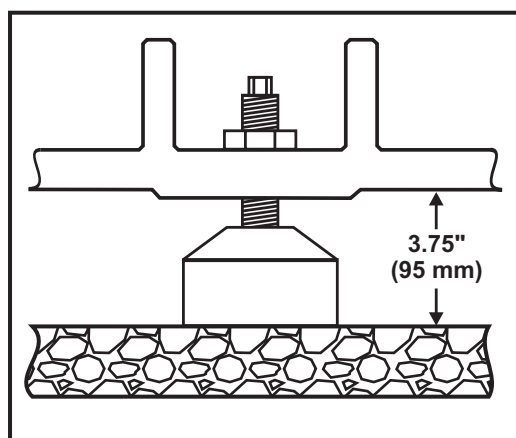
Rough Leveling

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 $2\frac{1}{2}$ " 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.



Floor to Base Gap (14-2462)



Floor to Base Gap (14-2010)

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.

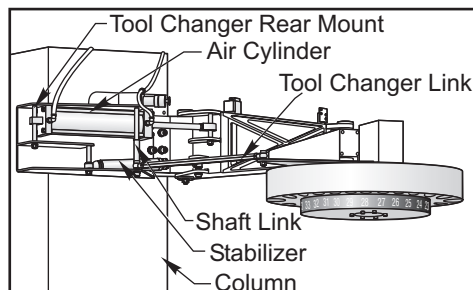
12. Place a **0.0005** test indicator in the spindle and sweep a **10" diameter** circle on the table (see the Machine Inspection Report in the manual for the results of this test at the factory). Grease the dimple in each of the two remaining pads, locate them under the middle leveling screws, and use 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.

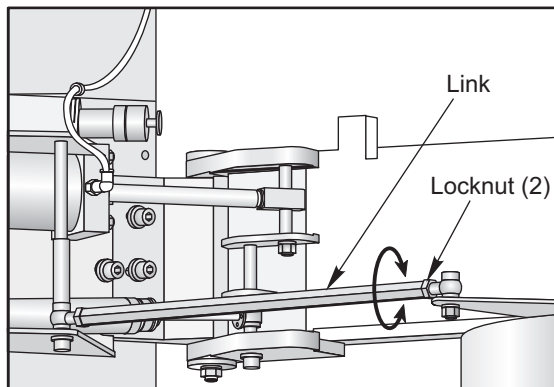
TOOL CHANGER ALIGNMENT (VR SERIES)

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.

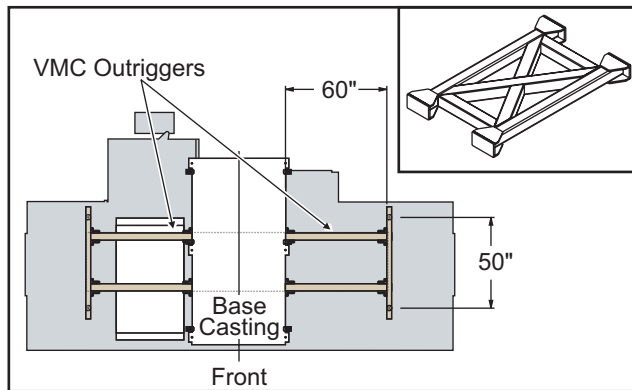


5. Loosen the locknut at each end of the tool changer link. Note that one is a left-hand thread and one is a right-hand thread. Once the locknuts are loose, rotate the link clockwise, and then counterclockwise until resistance is felt in each direction. Rotate the link to the center of the area in which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

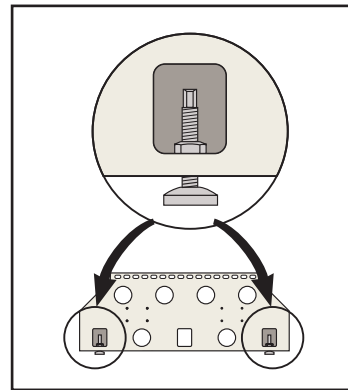


OUTRIGGER LEVELING PROCEDURES

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



Outrigger Locations

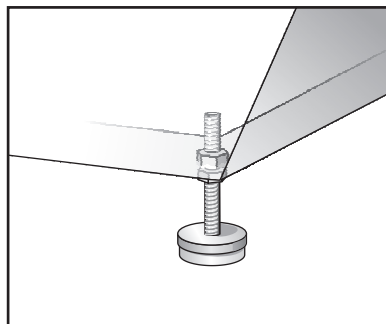


Outrigger Leveling Screw Locations

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.

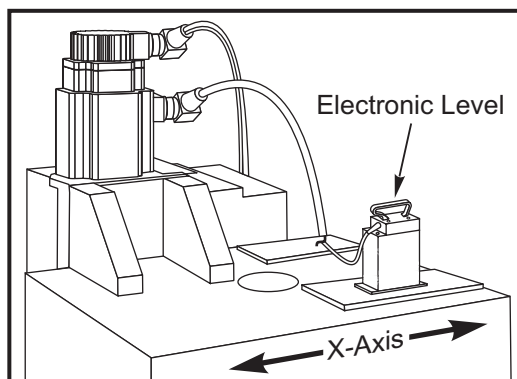
NOTE: Many factors can affect a machine's ability to remain level — the rigidity of the floor, the stability of the support under the floor, trains or trucks passing nearby, seismic activity, and so on. Therefore, until experience shows how often re-leveling is required, check the machine's level frequently 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 $\pm .0005$ ".

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

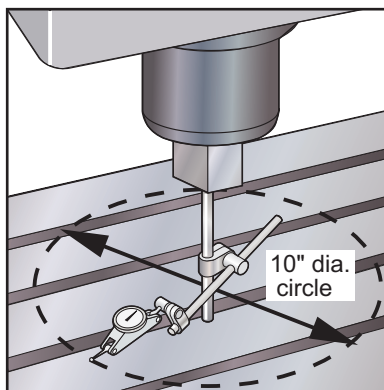
Place a **0.0005** test indicator in the spindle and sweep a **10" diameter** circle on the table (see the Machine Inspection Report in the manual for the results of this test at the factory). Grease the dimple in each of the two remaining pads, locate them under the middle leveling screws, and use these 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.

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

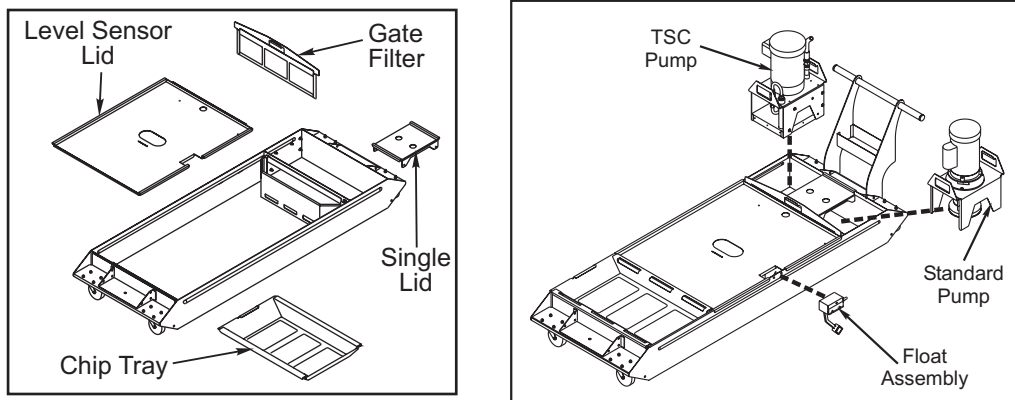
COOLANT TANK INSTALLATION

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.

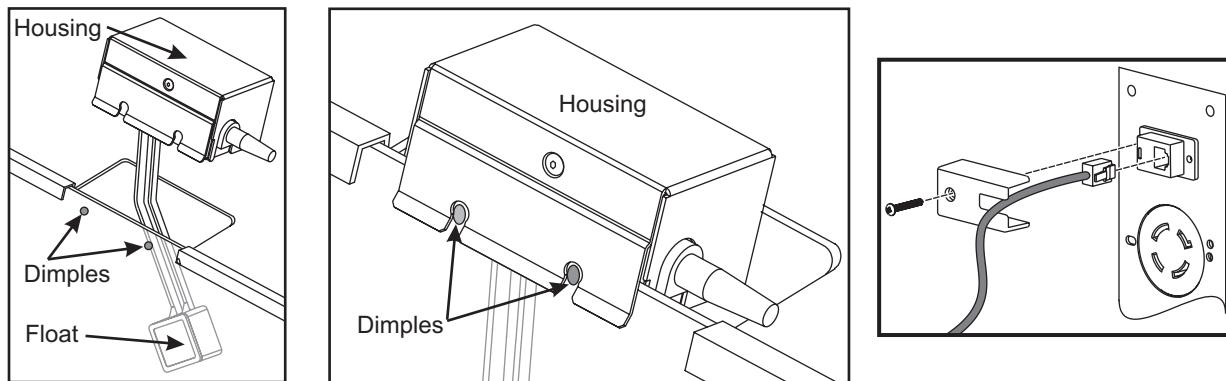
3. Orient the pump(s) and lower into the coolant tank as shown. Place supplied cover as shown. When not using a TSC pump, install a double lid in place of the single lid (see illustration).
4. Position the coolant tank under the left side of the machine.



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 not installed depending on the machine configuration.

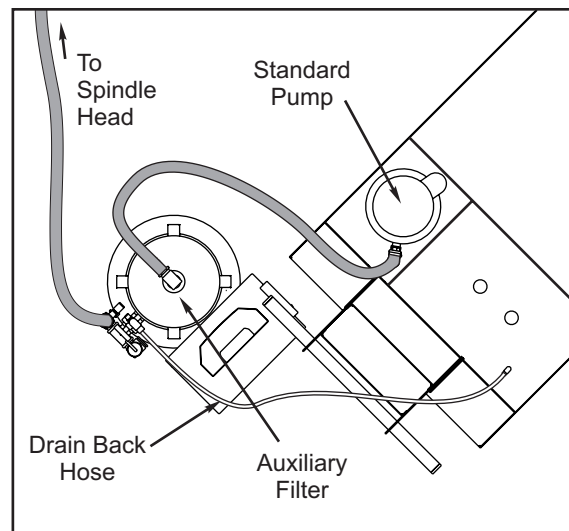
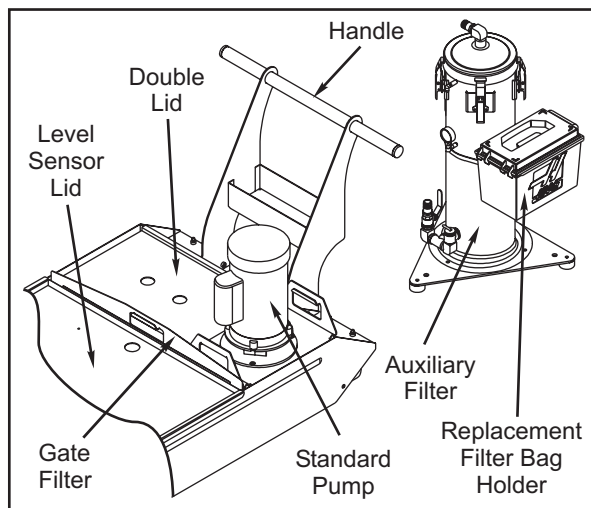
If the separator is not in place, install the assembly to the nipple on the base casting. Install the aluminum tube to the fitting on the back of the separator.

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



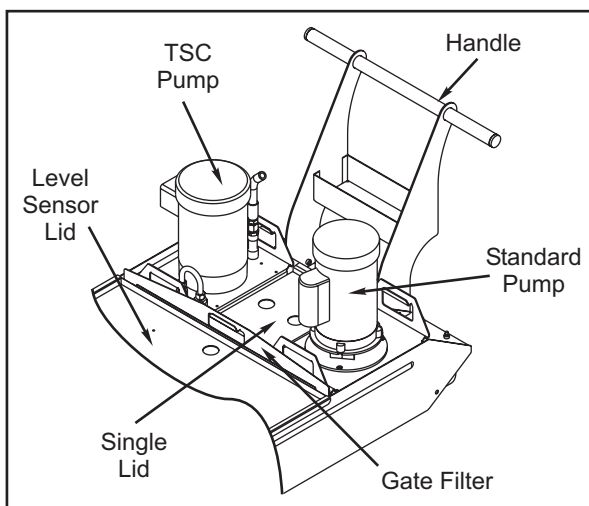
VF Series Machines Shown

Installation

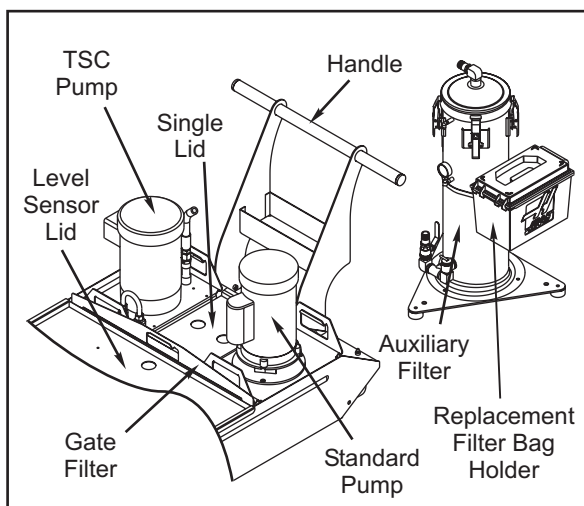
1. Place the Auxiliary Filter system next to the coolant tank of the machine.
2. Connect the output of the Standard Coolant pump to the input of the Auxiliary Filter.
3. Connect the Auxiliary Filter output hose to the coolant hose of the machine.
4. The Auxiliary Filter tank must be filled with coolant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



Optional Auxiliary Filter for TSC300 System

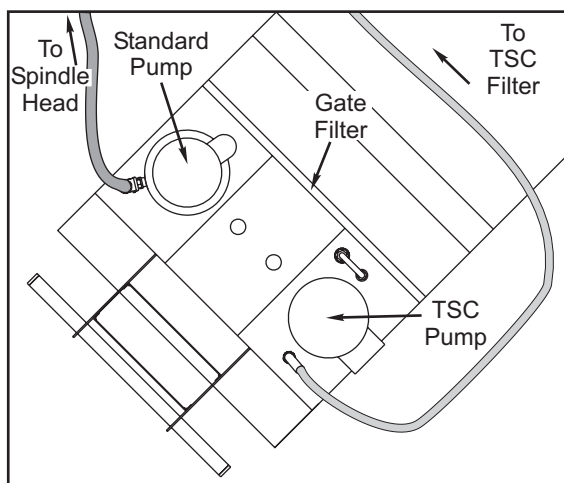


Standard TSC300 Setup



Optional TSC300 Auxiliary Filter Setup

TSC300 System

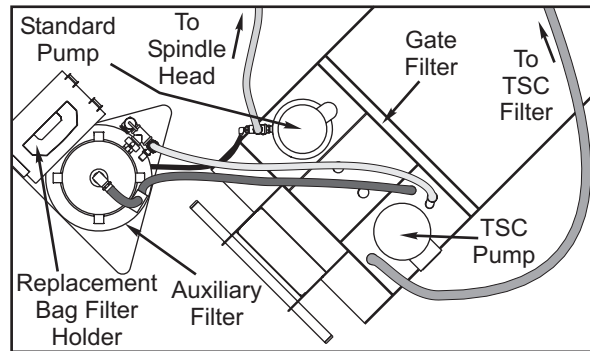


Standard Filtration Setup

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.



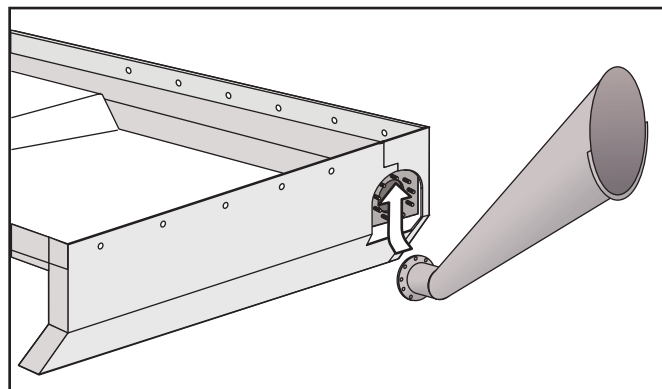
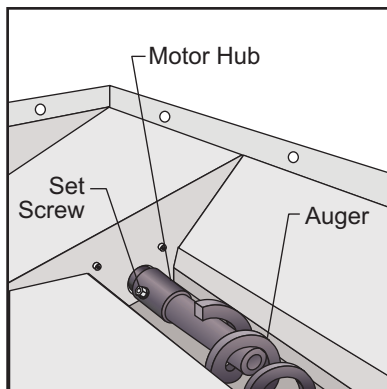
TSC300 System with Auxiliary Filter



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.



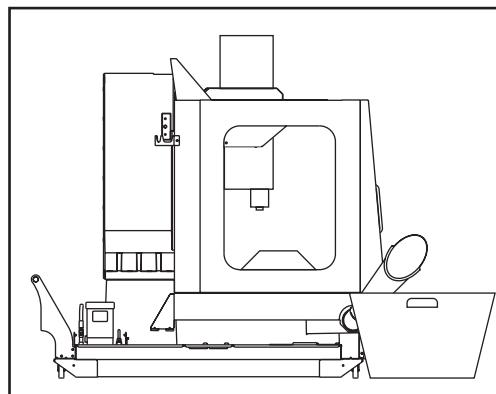
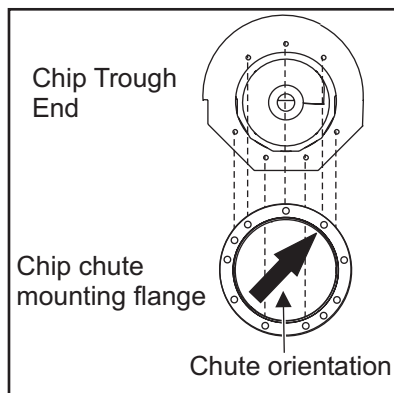
2. Slide the auger into the discharge tube opening and then slip the opposite end onto the motor hub. Fasten it to the motor hub with the 5/16-18 x 2½" bolt.
3. Install the gasket and slide the discharge tube up and onto the studs. Attach the eight nuts with locking washers and tighten uniformly.
4. After machine start-up, check auger 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.



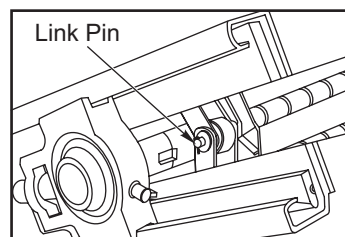
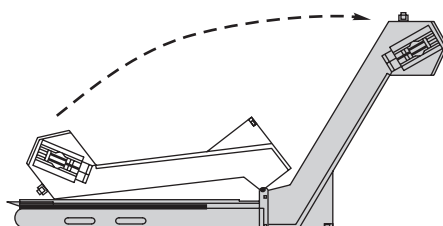
Rotate the chip chute mounting flange one bolt hole toward the front of the machine. Refer to the following illustrations to verify correct orientation. Secure the chute with the provided bolts.



MDC-500 CHIP CONVEYOR INSTALLATION

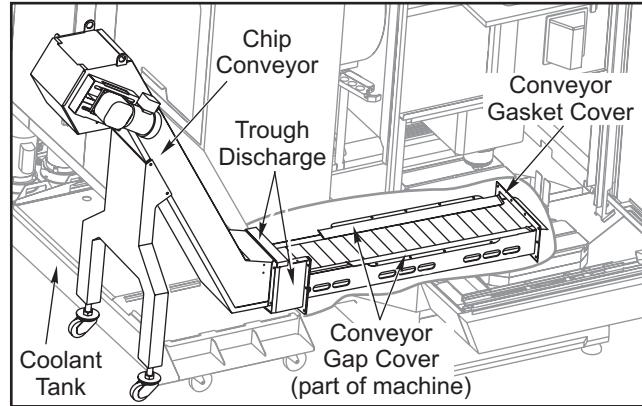
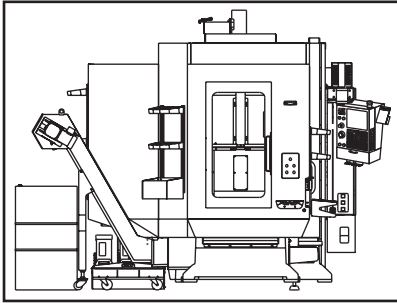
Unpacking

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.

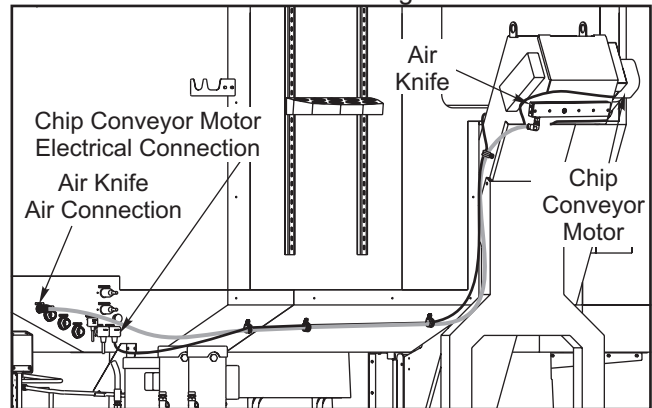
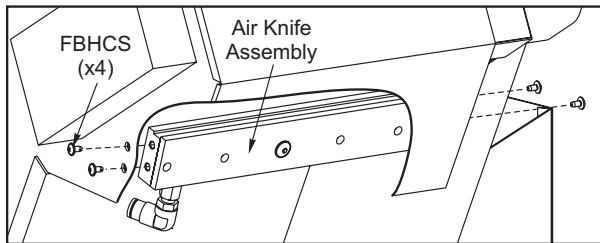


Installation

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.



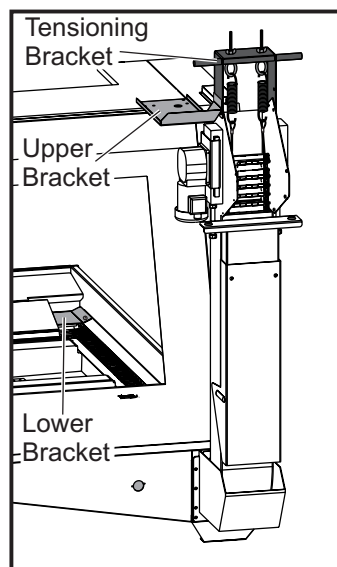
4. Re-install the conveyor gap covers to the conveyor pickup area inside the machine.
5. Install Air Knife into the head of the Chip Conveyor. Use the four supplied flanged button head cap screws to install the air knife in the head of the chip conveyor as shown. Install hose to the fitting on the air knife.



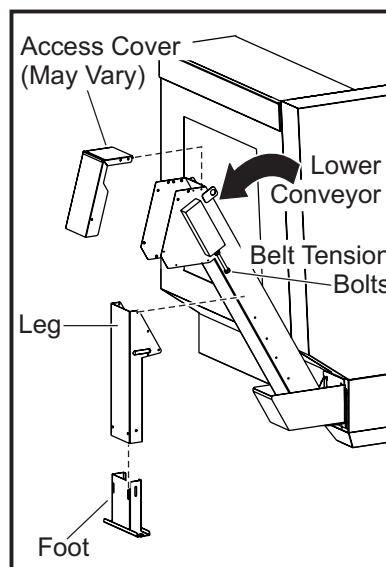
Chip Conveyor Air and Electrical Connections

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 drop 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 Shipping Bracket

1. Remove the lower bracket connecting the conveyor to the pan inside the machine.
2. Replace the two hex head bolts in the conveyor, using care not to cross thread the rivnuts in the conveyor.

Remove the Upper Shipping Bracket

1. Support the conveyor while you remove the screws that attach the upper bracket to the enclosure roof.
2. Carefully lower the conveyor into its 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 BEFORE OPERATION

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



1. If the access cover came installed on the conveyor head, remove it (or open the cover if it is hinged).
2. Tighten the belt tensioning bolts 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 bolts, inspect belt deflection through the access cover (refer to the belt tensioning decal affixed to the conveyor). Belt tension is correct when deflection is 1/4" to 3/8".
4. Apply the jamnut on each tensioning bolt to lock it in place.

COMPLETING SETUP

All necessary mounting hardware is included with the conveyor, in a box 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.

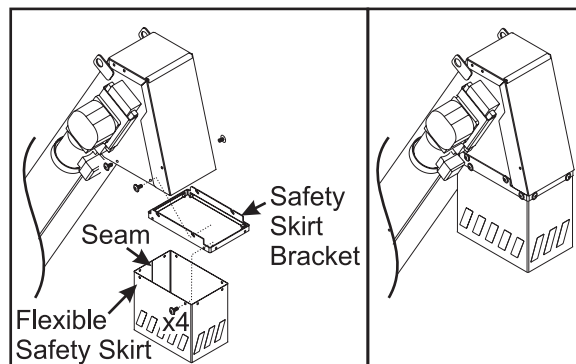
The conveyor leg stabilizes the conveyor when it is pulled out of the machine for cleaning. It is not necessary during normal operation.

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 Access Cover

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

Assemble and Install the Safety Skirt

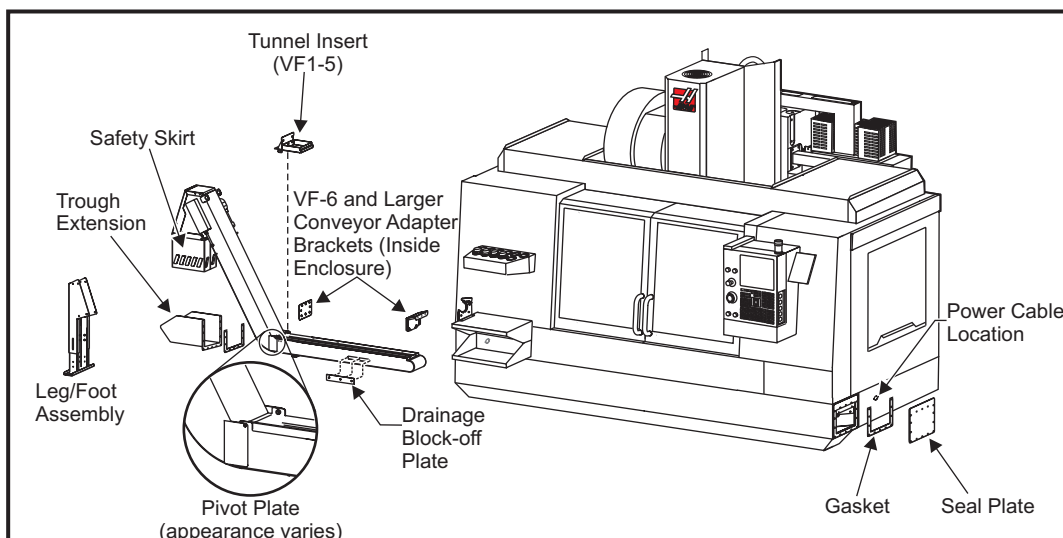


1. Mount the skirt to the bracket. The seam in the skirt faces the conveyor as shown.
2. Mount the bracket to the conveyor.

Connect Power

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

SWITCHING CONVEYOR EXIT POSITION



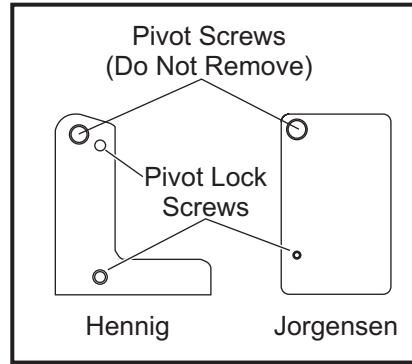
Multi-Auger Chip Conveyor Exploded View

Mills equipped with conveyors ship with the conveyor installed so that the lift section of the conveyor exits the machine on the left-hand side. If desired, you can switch the conveyor location to exit on the right-hand side of the enclosure.

NOTE: You will need two new conveyor trough gaskets to complete this procedure. New machines include spares, or order 57-11635 (VF-3/4/5) or 57-0250A (VF-6 and up) if you need replacement gaskets.

Disassembly

1. If there is coolant in the enclosure base pan and conveyor trough, allow it to drain before beginning this procedure.
2. Disconnect the conveyor power cable from the outlet at the side of the machine.
3. Detach the conveyor power outlet from the machine enclosure and route it to the other side of the machine. Use the same screws to attach the outlet end to the enclosure.
4. Remove the safety skirt assembly from the end of the conveyor.
5. Remove the trough extension from the machine enclosure. Use a pan to catch any coolant that remains in the trough. Remove the gasket from the trough extension mounting flange; carefully scrape away any remaining gasket material.
6. Remove the screws from the bracket attaching the conveyor to the outside of the machine enclosure.



Pivot Lock Plates

7. Install 1/4-20 x 1" screws into the pivot plate at the base of the conveyor to lock the conveyor's lift section in place.
8. Loosen the hex head screws holding the conveyor wings at each side of the conveyor, and let the wings slide inward or remove them.
9. **VF-6 and larger only:** Remove the two brackets at either end of the conveyor that adapt the enclosure interior to the conveyor.
10. Remove the seal plate from the right side of the enclosure at the other end of the conveyor trough. Remove the gasket and scrape away any remaining gasket material from the plate.

Removing the Conveyor

1. Support the lift section of the conveyor using a suitable lifting device through the eyehooks on the upper casing.
2. Pull the conveyor most of the way out of the machine. Except in VF-6 and larger machines, make sure the tunnel insert (box-shaped part behind the adapter bracket) stays in place.
3. Remove the drainage block-off plate from the side of the conveyor near the end and attach it to the opposite side of the conveyor casing.

NOTE: Failure to move the block-off plate will cause coolant to collect in the machine.

4. Support the other end of the conveyor as it comes out of the machine.
5. Use a mild solvent to clean the trough extension and seal plate gasket surfaces. Install new gaskets to these parts. Trim the trough extension gasket from the open top of the extension.

Reinstallation and Verification

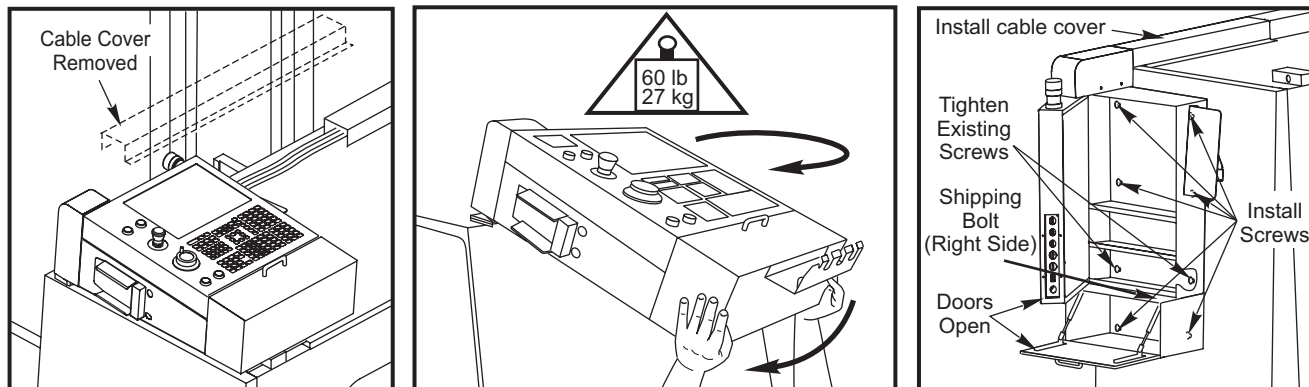
1. Move the conveyor to the right side of the machine and re-assemble the conveyor assembly and enclosure parts. Make sure of the following:
 - A. The gaskets are in place on the seal plate and trough extension parts.
 - B. The conveyor wings are put back in place and secured with the hex head screws.
 - C. (VF-6 only) The adapter brackets are installed at each end of the conveyor.
2. Install the safety skirt.
3. Make sure the conveyor works correctly, and check for coolant leaks.



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.

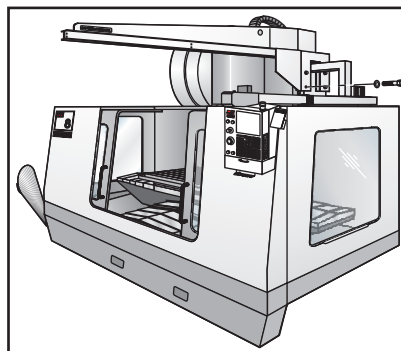
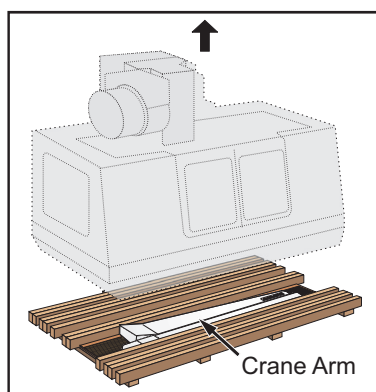


1. Remove the shipping bracket and packing material from the assembly and pivot the Thin Pendant Assembly left and swing it down, allowing cabinet keyholes to locate onto mounting screws on the front panel. Unscrew the cable cover, slide it forward into position, and secure it to the top of the machine.
2. Remove the shipping bolt (accessed through the glove box), open the pendant and install and tighten all fasteners.

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!

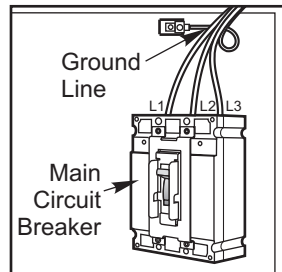
The TSC pump is three phase and must be phased correctly!
Improper phasing will damage the TSC pump and void the warranty.

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.

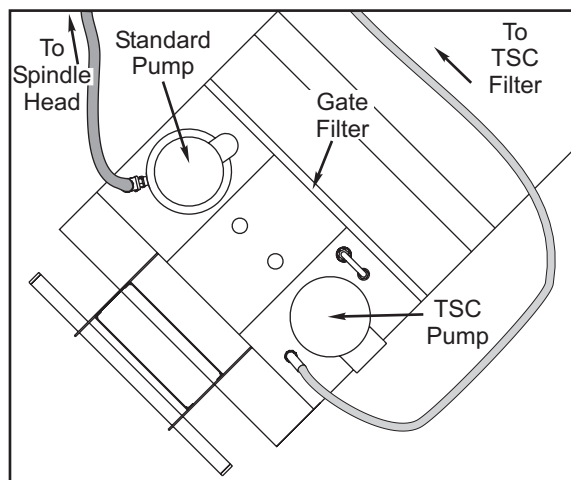
3. If the machine is improperly phased perform the following procedure:
 - a. Turn off the power to the input side (top) of the main circuit breaker. Measure the Voltage!
 - b. Exchange any two wires at the input side (top) of the main circuit breaker as shown.
 - c. Close the control box. Return to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



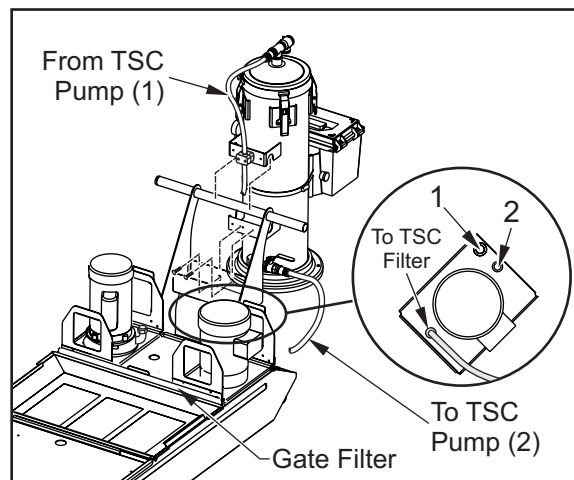
OPTIONAL AUXILIARY FILTER FOR TSC SYSTEM

Installation

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



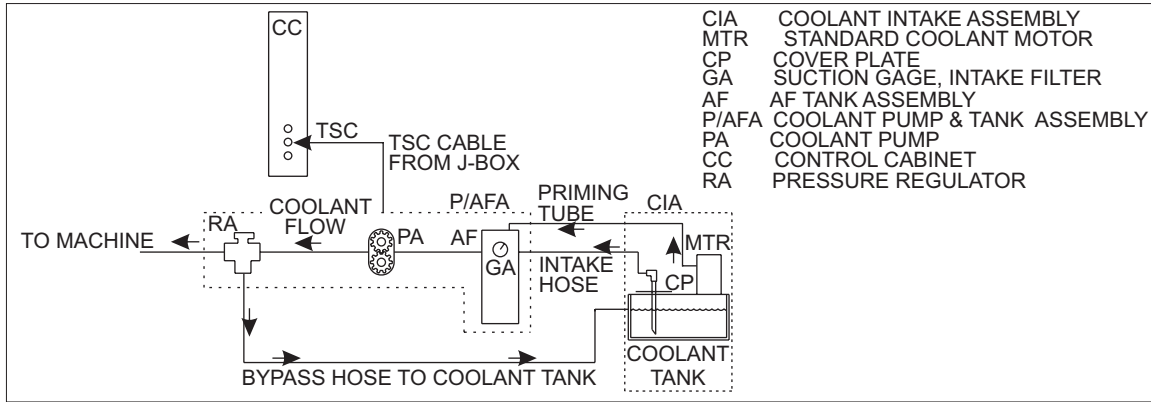
Standard Filtration Setup



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.

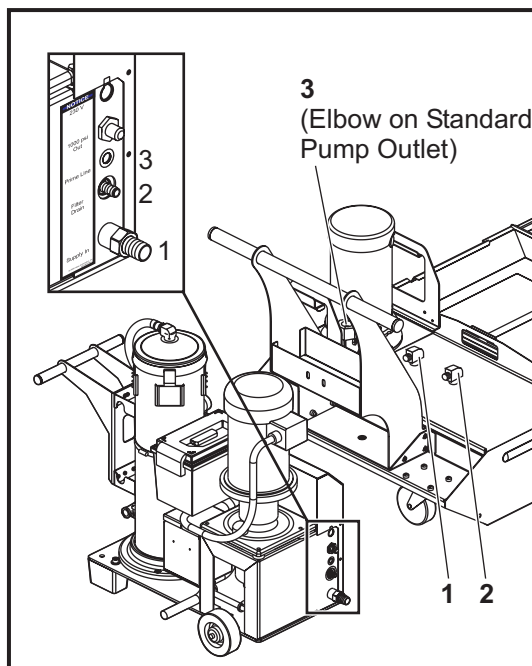


1. Connect the power cable for the pump assembly to an external source in order to power the motor. Note that the CNC control does not provide power to the pump motor. Customer supplied external power must be supplied at the time of installation. The power required is 208-230 volt 3-phase 50/60Hz, and 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

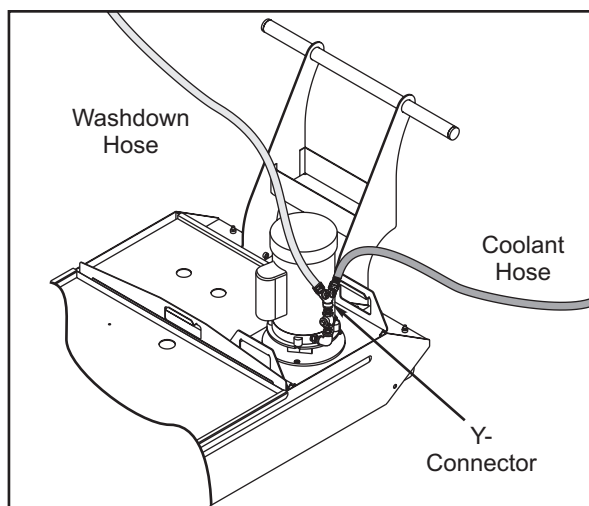
Before doing any maintenance to the 1000psi system, disconnect the power source; unplug it from the power supply.

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.



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.;

N1000
S7500M3;
G04 P30.;

N2000
S10000M3;
G04 P30.;



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

S500 M3;
G04 P150.;
M99;

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

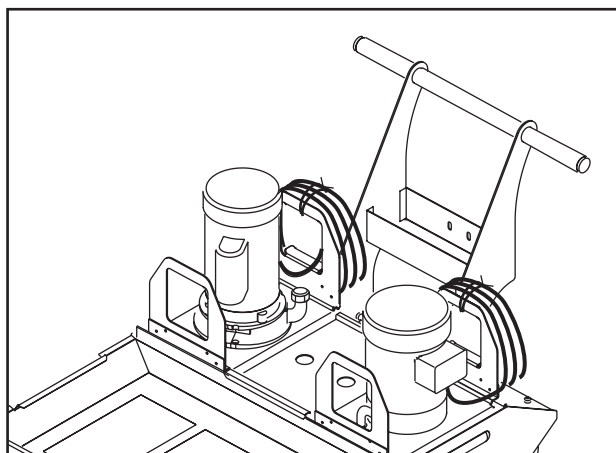
All spindles which have been idle for more than 4 days must be thermally cycled prior to operation above 6,000 RPM. This will prevent possible overheating of the spindle due to settling of lubrication. A 20-minute warm-up program has been supplied with the machine, which will bring the spindle up to 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.





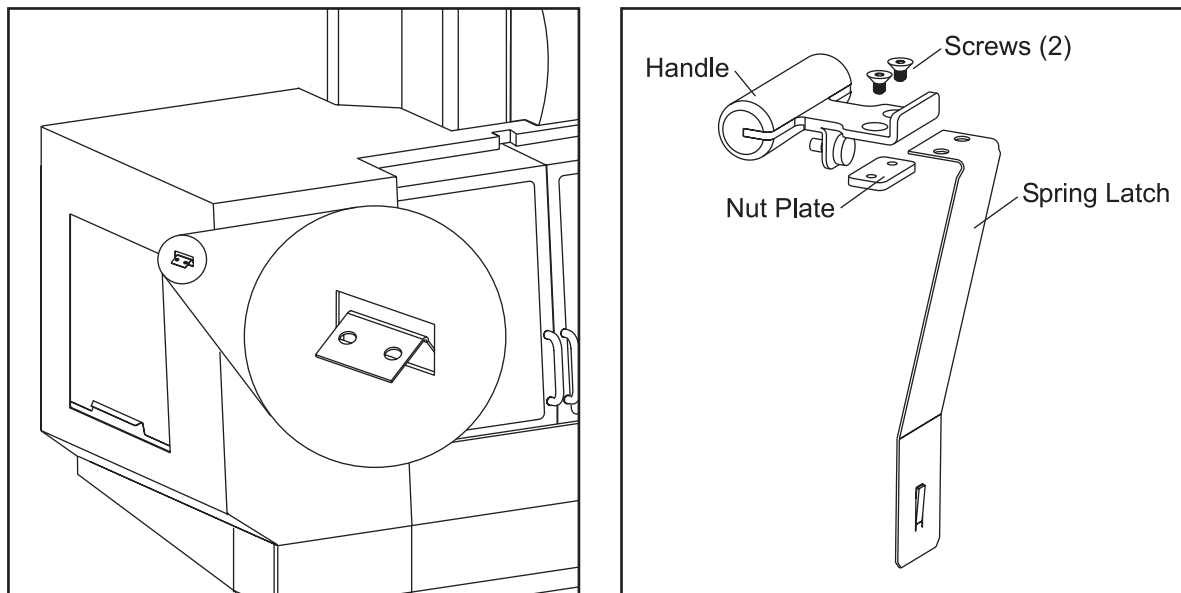
- Loop cables individually, being careful to not force the cable into too sharp a bend and tie-wrap the loop. The cable bend radius should not be less than 4 times the diameter of the cable.
- Place the loop in the cable out of sight, hidden by the machine sheet metal, if possible.
- Do NOT allow the 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.

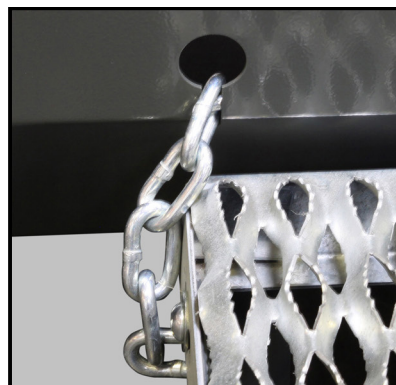


WARNING: Observe the 450-lb (204 kg) weight limit on the work platform, and understand that this limit includes the weight of the operator(s) standing on the platform and any objects they carry. Overloading the platform can lead to injury.



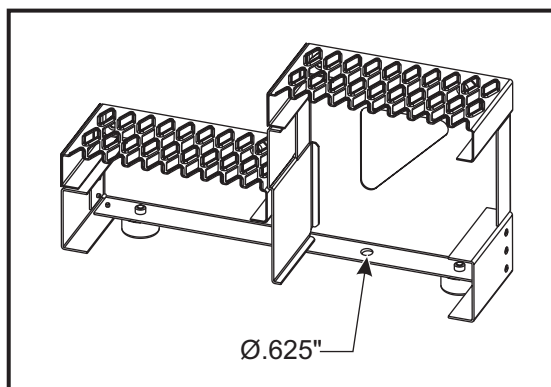
INSTALLATION

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 $\text{Ø}.625$ " 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.