Haas Automation Inc.
www.HaasCNC.com

PRE-INSTALLATION INFORMATION

AFFIX DEALER INFORMATION LABEL HERE

ES0332 Rev AK 6/10

Contents

PRE-INSTALLATION CHECKLIST

DEALER RESPONSIBILITY

1. Ensure the customer is provided with the correct electrical and air requirements.

2. Verify that the correct anchoring kit has been shipped from the Haas factory.

3. Verify that the customer has drilled and set the anchors for both the machine and the side-mount tool changer, if applicable. The machine anchors must be set in accordance with the Installation Guide instructions (do not set the tool changer anchors until the tool changer is installed).

4. Tell the customer the date the machine will be shipped from the factory and the date it is expected to arrive at his facility.

5. Inform the Haas Automation Service Coordinator of the date and time of installation agreed to by the customer and riggers. Please notify Haas at least 3 weeks prior to the installation date to allow time for travel arrangements to be made and tools to be shipped.

6. Schedule a dealer service technician to be on site for the duration of the installation.

7. Provide enough dry nitrogen to fully charge the counterbalance system. The HS-3(R)/4(R)/6(R)/7(R) require 250 cu ft. The VS-1/3 require 500 cu ft.

CUSTOMER RESPONSIBILITY

1. Ensure a proper machine foundation is present and fully cured by the scheduled time of installation (see “Site Preparation” section for details). Anchor holes must be drilled and the anchors set before machine arrives. For HS-3/4/6 & 7 series, **Do not** set the tool changer anchors until the tool changer is installed.

2. Ensure that all the electrical and air requirements are met.

3. Inspect and verify that all of the anchors and related hardware were received (refer to anchoring instructions, Haas document ES0095).

4. Schedule the installation date and time with the riggers and notify the dealer of the schedule.

Before your new Haas machine arrives, you should review the machine dimensions and site requirements, and prepare your shop for the machine delivery.

When your machine is on site and positioned, you need to supply electricity and air to the machine. Once this is accomplished, a Haas service technician can finalize your machine installation.

Please contact your Haas Factory Outlet (HFO) Customer Advocate when you have completed all of the requirements for final installation. We will then schedule a Haas service technician to complete your machine installation process. The Factory Technicians need to be present to ensure no damage is done to the machine during the rigging process and to supervise the placement of the machine.

If after reading the guide, you have any questions or you are unsure in any way what is required, please contact the Haas Automation Service Department at (805) 278-1800.

Foundation Requirements

Machines must be set on a solid, sound and stable, steel bar-reinforced concrete slab poured directly on the grade. In general, the 6" (152mm) concrete floor of industrial buildings is suitable for machine placement.

Before the machine arrives it will be necessary to have the foundation poured and fully cured. It may also be necessary to install the anchors. Refer to the anchoring instructions, Haas document # ES-0095, for details.

For HS 3-7(including R), EC-1600-3000, VS, VR, and GR series machines, when cutting metal, anchor holes must be drilled and set before machine arrives. Tool changer anchor holes must be drilled before the machine is set in place. However, do not pour epoxy for the tool changer until the tool changer is in place. Anchoring all other machines is optional. If opting for optional anchoring, contact the Haas Service Department (800-331-6746) prior to machine delivery for foundation requirements, the correct anchoring kit (if not included with the machine) and complete anchoring instructions.

Avoid placing the machine across two different slabs; they may shift and affect the geometry of the machine. Avoid slabs with vibrating machinery nearby; the vibration may affect performance. Do not place the machine on unstable surfaces such as asphalt, brick, wood or dirt.

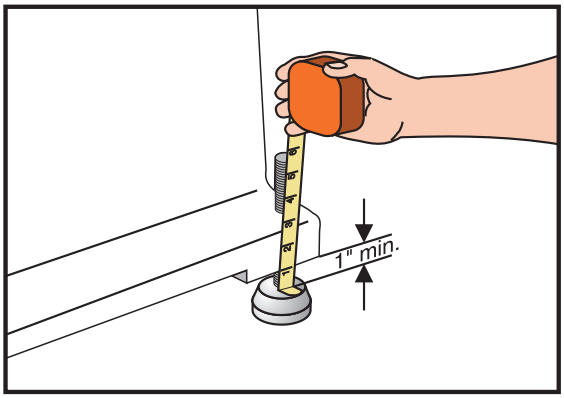
Check with your building engineer if you are placing the machine on floors other than the ground level.

Machine Placement

Access to the electrical control cabinet needs to be available at all times. A minimum of three (3) feet (.91 meter) of space is required between the control cabinet and any obstacle. It is recommended to have this unobstructed area (3 feet) (.91 meter) surrounding the machine for ease of daily operations.

A forklift will be needed to safely move the machine. For the HS, VS and VR machines it is necessary to schedule capable riggers with the proper equipment for lifting up to 40,000 lb. (1814kg). The weights of the machines are listed in their respective sections towards the end of this manual.

Additionally, a Tote Kit is included with each machine which includes the leveling pads the machine is to be placed upon. To set up for initial leveling the leveling screws should extend one inch from the bottom of the base casting.



Chip Conveyor Placement

A machine equipped with a chip conveyor requires room in which to install the conveyor and to remove it (once installed) for maintenance. The following table lists the minimum install/remove length requirements for machines equipped with chip conveyors.

Lathes

SL-10	SL-20	SL-20L	SL-30	SL-30L	SL-40	SL-40L
78.7" (1999mm)	99.4" (2525mm)	126.7" (3218mm)	119.6" (3038mm)	156.6" (3978mm)	145" (3683mm)	183" (4648mm)

Mills

EC-300/MDC-500/ES-5	EC-400/EC-400PP	EC-500	EC-550	EC-630
102" (2589mm)	112.5" (2856mm)	126.5" (3213mm)	156.5" (3988mm)	78.5" (1994mm)

Preparation For Installation Day

Have qualified personnel ensure that the machine is properly grounded, then connect the specified power to the machine (see electrical requirements in the following sections).

You should complete the air supply connection to the machine (see air requirements in the following sections).

Final leveling will be completed by an HFO service technician at the time of installation.

Electrical Power Requirements

Pk Pwr (Hp)	Continuous kVA (Peak)	Model	Options	Machine Breaker (Amps)	Voltage range or fixed tap	Recommended Service Amps	Wire AWG
Vertical Mils							
8	4 (7)	**OM 1A, 2A**		20	195 - 254	30	10
38	28 (40)	**DT-1**		80	195 - 260	100	4
38	28 (40)	HE	HV XFMR KIT 40HP	40	354 - 488	50	8
38	28 (40)		INTRNB	40	354 - 488	50	8
10	9 (14)	**MM**		40	195 - 250	50	8
10	9 (14)	HE		15	366 - 425	20	12
10	9 (14)	**MM HAM/HIVOLT**		15	366 - 425	20	12
10	9 (14)	**MM2**		40	195 - 250	50	8
10	9 (14)		HV + SMNT TC	20	366 - 425	30	10
10	9 (14)	HE		15	366 - 425	20	12
10	9 (14)		HE + SMNT TC	20	366 - 425	30	10
20	14 (20)	**SMM/SMM2**		40	195 - 260	50	8
20	14 (20)		INTRN	20	354 - 488	30	10
20	14 (20)	HE	HV XFMR KIT 20HP	20	354 - 488	30	10
20	14 (20)	**VF 40T (incl. TR, YT)**		40	195 - 260	50	8
20	14 (20)		GB 7500RPM	40	195 - 260	50	8
40	28 (40)		HT10K-1	80	195 - 260	100	4
20	14 (20)		INTRN	20	354 - 488	30	10
20	14 (20)		INTRN + GB 7500RPM	20	354 - 488	30	10
20	14 (20)	HE (base)	HV XFMR KIT 20HP	20	354 - 488	30	10
20	14 (20)		HV XFMR KIT 20HP + GB 7500RPM	20	354 - 488	30	10
40	28 (40)		HT10K-1 (HE)	40	354 - 488	50	8
40	28 (40)	**40 Taper SuperSpeed (incl. YT)**		80	195 - 260	100	4
40	28 (40)	HE	HV XFMR KIT 40HP	40	354 - 488	50	8
40	28 (40)	**VM Series**		80	195 - 260	100	4
40	28 (40)	HE (base)	HV XFMR KIT 40HP	40	354 - 488	50	8
40	28 (40)	**VF 50T (incl. TR and YT)**		80	195 - 260	100	4
40	28 (40)	HE	HV XFMR KIT 40HP	40	354 - 488	50	8
60	37(68)		10K In-Line	40	354-488	50	8
10	9 (14)	**TM-1/2, TM-1P, TM-3**		40	195 - 250	50	8
10	9 (14)	HE		15	366 - 425	20	12
40	28 (40)	**VR Series**		80	195 - 260	100	4
40	28 (40)	HE (base)	HV XFMR KIT 40HP	40	354 - 488	50	8
20	14 (20)	**MDC-500**		40	195 - 260	50	8
20	14 (20)		INTRN	20	354 - 488	30	10
20	14 (20)	HE	HV XFMR KIT 20HP	20	354 - 488	30	10
20	14 (20)	**GR Series**		40	195 - 260	50	8
20	14 (20)		5K-GR	40	195 - 260	50	8
20	14 (20)		INTRN	20	354 - 488	30	10
20	14 (20)		INTRN + 5K-GR	20	354 - 488	30	10
20	14 (20)	HE	HV XFMR KIT 20HP	20	354 - 488	30	10
20	14 (20)		HV XFMR KIT 20HP + 5K-GR	20	354 - 488	30	10
10	9 (14)	**SR-100**		40	195 - 254	50	8
40	28 (40)	**VS-1/3**		100	195 - 260	125	2
40	28 (40)	HE (base)	HV XFMR KIT 40HP	40	354 - 488	50	8
Horizontal Mills							
20	14 (20)	**EC-300, 400(incl PP), 500**		40	195 - 260	50	8
40	28 (40)		COMP 12K SPNDL	80	195 - 260	100	4
20	14 (20)		INTRN	20	354 - 488	30	10
20	14 (20)	HE (base)	HV XFMR KIT 20HP	20	354 - 488	30	10
40	28 (40)		COMP 12K SPNDL HE	40	354 - 488	50	8
40	28 (40)	**EC-550**		80	195 - 260	100	4
40	28 (40)		HV XFMR KIT 40HP	40	354 - 488	50	8
40	28 (40)		INTRNB	40	354 - 488	50	8
60	37 (68)		10KINLINE	150	195 - 260	200	1/0
40	28 (40)	**EC-630**		80	195 - 260	100	4
40	28 (40)	HE (base)	HV XFMR KIT 40HP	40	354 - 488	50	8
40	28 (40)	**EC 1600/2000/3000**		80	195 - 260	100	4
40	28 (40)	HE (base)	HV XFMR KIT 40HP	40	354 - 488	50	8
20	14 (20)	**ES-5**		40	195 - 260	50	8
40	28 (40)		COMP 12K SPNDL	80	195 - 260	100	4
20	14 (20)		INTRN	20	354 - 488	30	10
20	14 (20)	HE (base)	HV XFMR KIT 20HP	20	354 - 488	30	10
40	28 (40)		COMP 12K SPNDL HE	40	354 - 488	50	8
40	28 (40)	**HS-3/4/6/7**		100	195 - 260	125	2
40	28 (40)	HE (base)	HV XFMR KIT 40HP	40	354 - 488	50	8

Pk Pwr (Hp)	Continuous kVA (Peak)	Model	Options	Machine Breaker (Amps)	Voltage range or fixed tap	Recommended Service Amps	Wire AWG
Turning Centers							
4.4	4 (7)	**OL-1**		20	195 - 254	30	10
10	9 (14)	**GT-10**		40	195 - 250	50	8
10	9 (14)		INTRN	20	366 - 425	30	10
10	9 (14)	HE		15	366 - 425	20	12
20	14 (20)	**GT-20**		40	195 - 260	50	8
20	14 (20)		INTRN	20	354 - 488	30	10
20	14 (20)	HE	HV XFMR KIT 20HP	20	354 - 488	30	10
20	14 (20)	**SL-10**		40	195 - 260	50	8
20	14 (20)		INTRN	20	354 - 488	30	10
20	14 (20)	HE	HV XFMR KIT 20HP	20	354 - 488	30	10
20	14 (20)	**SL-20/TL-15 (incl Longbed)**		40	195 - 260	50	8
40	28 (40)		COMP 5K	80	195 - 260	100	4
40	28 (40)		COMP BB20	80	195 - 260	100	4
20	14 (20)		INTRN	20	354 - 488	30	10
20	14 (20)	HE (base)	HV XFMR KIT 20HP COMP 7K	20	354 - 488	30	10
40	28 (40)		HV XFMR KIT 40HP COMP 5K HE	40	354 - 488	50	8
40	28 (40)		HV XFMR KIT 40HP COMP BB20	40	354 - 488	50	8
40	28 (40)	**SL-30/TL-25 (incl Longbeds)**		80	195 - 260	100	4
40	28 (40)	HE	HV XFMR KIT 40HP	40	354 - 488	50	8
40	28 (40)	**SL-40 (incl Longbeds)**		80	195 - 260	100	4
60	37 (68)		XP40	150	195 - 260	200	1/0
60	37 (68)		XP40 BB	150	195 - 260	200	1/0
40	28 (40)	HE (base)	HV XFMR KIT 40HP	40	354 - 488	50	8
20	14 (20)	**ST-20**		40	195 - 260	50	8
20	14 (20)		INTRN	20	354 - 488	30	10
40	28 (40)	**SS-20**		80	195 - 260	100	4
40	28 (40)		HV XFMR KIT 40HP COMP 5K HE	40	354 - 488	50	8
40	28 (40)		HV XFMR KIT 40HP COMP BB20	40	354 - 488	50	8
40	28 (40)	**SS-30, ST-30**		80	195 - 260	100	4
40	28 (40)		HV XFMR KIT 40HP	40	354 - 488	50	8
40	28 (40)		INTRNB	40	354 - 488	50	8
10	9 (14)	**TL-1, 2**		40	195 - 250	50	8
10	9 (14)		HSTL-1	40	195 - 250	50	8
10	9 (14)	HE		15	366 - 425	20	12
20	14 (20)	**TL-3**		40	195 - 260	50	8
40	28 (40)		COMP HTL3	80	195 - 260	100	4
20	14 (20)		INTRN	20	354 - 488	30	10
20	14 (20)	HE (base)	HV XFMR KIT 20HP	20	354 - 488	30	10
40	28 (40)		COMP HTL3 HE	40	354 - 488	50	8
40	28 (40)	**TL-3B/3W**		80	195 - 260	100	4
40	28 (40)		INTRNB	40	354 - 488	50	8
40	28 (40)	HE (base)	HV XFMR KIT 40HP	40	354 - 488	50	8
40	28 (40)		INTRN	40	354 - 488	50	8
60	37 (68)	**TL-4**		150	195 - 260	200	1/0

Wire Size (Gauge) Requirements

For 7.5 HP std voltage systems: less than 100' (30.48 meters) of wire, use 10 AWG (if high voltage use 12 AWG and an internal transformer); greater than 100' use 8 AWG (if high voltage use 10 AWG).

For 15- to 20-HP std voltage systems: less than 100' (30.48 meters) of wire, use 8 AWG (if high voltage use 12 AWG wire); greater than 100' use 6 AWG (if high voltage use 10 AWG).

For 30- to 40-HP std voltage systems: less than 100' (30.48m) of wire, use 4 AWG; greater than 100' use 2 AWG.

These are recommended minimum wire diameters (maximum AWG number). Always consult local electrical codes.

AC Input Power

• Most domestic machines require three-phase power, which may be either wye or delta type. The power source must be grounded: leg or center leg for delta; neutral for wye.

• A separate earth ground is required for three-phase power. Conduit type ground will not be sufficient.

• All phases must be balanced, and voltages must be within ±10%.

• Low-voltage power (208 or 240 VAC) can be set up on the standard machine.

• High-voltage power (480 VAC) requires a high-voltage option to be purchased with the machine.

• The exact supply voltage will be matched at the time of installation by the service technician, who will adjust the internal transformer taps.

• Some machines alternately allow single-phase power to be utilized (see previous page). In these instances, the supplied power must be 240 VAC ±6%.

WARNING!

A separate earth ground wire of the same conductor size as the input power must be connected to the chassis of the machine. This ground wire is required for operator safety and proper operation. This ground must be supplied from the main plant ground. A local cold-water pipe or ground rod cannot be used to supply this ground.

The current requirements shown reflect the circuit-breaker size internal to the machine. This breaker has an extremely slow trip-time. It may be necessary to increase the external service breaker size by 20-25% for proper operation. (See electrical requirements in this document.)

External 480 VAC (High Voltage) Transformer Option

The external transformer adds to the overall reliability and performance of the machine; however, it also requires extra wiring and floor space. The external transformer provides electrostatically shielded isolation. This type of transformer acts to isolate all common-mode line transients and reduce EMI conducted emissions.

When the high-voltage (HV) option is ordered, machines with 7.5 hp systems will get 15 kVA external transformers. Machines with 20-hp systems will get an internal isolation transformer, and machines with 30- or 40-hp systems will get a 45-kVA external transformer (see chart on previous page). The 55 hp option for SL-40 lathes requires a 75 kVA external transformer.

The external 480 VAC auxiliary transformer is floor-mounted. Please allow extra clearance for the transformer next to the machine. The transformer needs to be placed as close to the control cabinet as possible. The models and dimensions are listed in the following table.

Transformer	Height	Width	Depth
15 kVA	23" (584mm)	19" (483mm)	13.5" (343mm)
45 kVA	30" (762mm)	25" (635mm)	20" (508mm)
75 kVA	34" (867mm)	28" (711mm)	22" (559mm)

External 480 VAC (High Voltage) Transformer Installation

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

The input wire should not be smaller than 6 AWG for the 45-kVA transformer. Cable longer than 100' (30.48 meters) requires at least one size larger-diameter wire (one size smaller AWG number).

The transformer is a 480 VAC to 240 VAC isolation transformer with delta-wound primary and secondary windings. The primary windings offer 7 tap positions, 2 above and 4 below the nominal input voltage of 480 VAC. The output wire for the external transformer should conform to the following:

Machine	480 VAC Input Cable	240 VAC Output Cable
Office Machines		12 AWG
TM and TL 1&2 (3 PH), MM (3 PH), GT-10 (3 PH)		10 AWG
VF Series (40T), EC-300/400/500 (8K), SL-10 (6K & BB), SL-20 (7K), TL-15 (7K), GR Series, SR-100, TM and TL 1&2 (1 PH), TL-3, MM (1 PH), GT-10 (1 PH), GT-20, SMM,	12 AWG	8 AWG
VF Series (50T & HT10K), VM, SS Mills, EC-300/400/500 (12K), EC550, EC-630/1600/2000/3000, SL-20 (5K & BB), SL-30 (& BB), SL-40L, SL-40 (30-40 HP& BB), ST-20/30, TL-15 (5K & BB), TL-25, TL-3B, TL-3HT, TL-3W, DT-1	8 AWG	4 AWG
VS, HS-3/4/6/7	8 AWG	2 AWG
SL-40 (55 HP& BB), SL-40XP, TL-4		0 AWG

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.

Compressed Air Requirements

Air Pressure

Haas CNC machines require a minimum air pressure of 100 psi (6.90 bar) at the input to the pressure regulator on the back of the machine.

The required input air line size is 1/2" ID (12.7mm) for most machines. The exceptions are the 40-taper VF-1 thru VF-11 machines, which require a 3/8" ID (9.5mm) air line.

The recommended method for attaching the air hose is directly to the barb fitting on the back of the machine, secured with a hose clamp. If a quick coupler is desired, use a 3/8" (9.5mm) coupler for the 3/8" air hose, or a 1/2" (12.7mm) coupler for the 1/2" air hose.

NOTE: Auxiliary connections must be made on the input (unregulated) side of the air filter/regulator.

Air Flow (minimum requirements)

All VF, VM, MM, GR, TM, VR, VS models require 4 scfm (1.89 liters per second). For mills equipped with the auto air gun option, 10 scfm (4.72 liters/sec.) will be required for the machine. The auto air gun consumes an additional 6 scfm (2.83 liters/sec.).

Office models - OM: 1 scfm at 40-70 psi, OL: 2 scfm at 45 psi. All EC, HS, and MDC models: 9 scfm (4.25 liters per second). All SL, GT and TL models: 4 scfm

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

The air requirements should be supplied by at least a 2-HP compressor with a minimum 20-gallon tank. Remember, In order to operate the machine properly if the air nozzle is used during pneumatic operations, the air flow will need to be increased as outlined in the previous note.

NOTE: For multiple machine installations, there is a 2-HP requirement per machine (i.e., an installation of 5 machines requires a 10-HP compressor).

Use copper pipe; galvanized piping or steel will rust and clog the orifices in the regulators.

Machine Lubricant & Coolant Capacities

Vertical Mills (Toolroom machines are grease lubricated and require general purpose lithium grease)

Way Lube	Capacity	Lubricant Type
	80oz (2.4 liters)	Mobil Vactra No. 2 or DTE25 (except TMs)*
Transmission (if equipped)		
40 Taper	51oz (1.5 liter)	Castrol Hyspin AWS 46
50 Taper	34oz (1 liter)	Mobil SHC 625
Coolant		
OM	13 gal (49 liters)	All - Water-soluble synthetic-oil based or
VF 1-5, VM-2/3, MDC-500	55 gal (208 liters) (95 gal opt.)	Synthetic -based coolant/lubricant †
VF 6-11, VM-6, VR, VS, GR Series	95 gal (360 liters)	**No flammable liquids!**
MiniMill	24 gal (91 liters)	
Cam Boxes		
SS	2 gal (7.5 Liters)	Mobil SHC 630
40/50 Taper	2 gal (7.5 Liters)	Castrol Alpha SP 320

Horizontal Mills

Way Lube	Capacity	Lubricant Type
	64-80oz (1.9-2.4 liters) (depending on pump style)	Mobil Vactra No. 2 or DTE25
Transmission (if equipped)		
40 Taper	34oz (1 liter)	Mobil SHC 625
50 Taper	85oz (2.5 liters)	Mobil SHC 625
Coolant		
EC-300	55 gal (208 Liters)	All - Water-soluble synthetic-oil based or
EC-400	80 gal (303 liters)	synthetic -based coolant/lubricant †
EC-500/550	95 gal (360 liters)	**No flammable liquids!**
EC-630	160 gal (606 liters)	
EC-1600/2000/3000 incl/Chip Conv	95 gal (360 liters)	
HS Series	95 gal (360 liters)	

Turning Centers (Toolroom machines are grease lubricated and require general purpose lithium grease)

Way Lube	Capacity	Lubricant Type
	80oz (2.4 liters)	Mobil Vactra No. 2 DTE25 (except TL-1/2/3)*
Transmission (if equipped)		
	76oz (2.25 liters)	Mobil SHC 625
Coolant		
SL-10/GT Series	15 gal (57 Liters)	All - Water-soluble synthetic-oil based or
SL-20, SL-20L, TL-15	40 gal (151 liters)	synthetic -based coolant/lubricant †
SL-30, SL-30L, TL-25	50 gal (189 liters)	**No flammable liquids!**
SL-40, SL-40L	77 gal (291 liters)	
TL-4	100 gal (379 liters)	

Minimal Lubrication System: DTE25 is used for the spindle lube and Mobil XHP 220 is used for the linear guides and ballscrews.

* Toolroom machines are grease-lubricated and require general-purpose lithium grease.

† Mineral cutting oils will damage rubber components throughout the machine. The use of coolants with extremely low lubricity can damage the TSC coolant tip and pump. Do not use pure water as a coolant; machine components will rust.

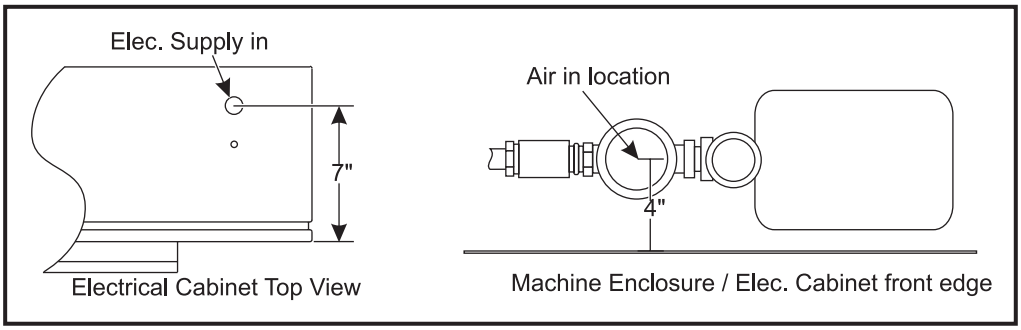
NOTE: A minimum clearance of 36 inches (914mm) is required around all machine.

NOTE: The operating dimensions are the maximum dimensions of the machine during operation, with the spindle head at its highest point, the control at its most forward position and the discharge tube, if equipped, installed.

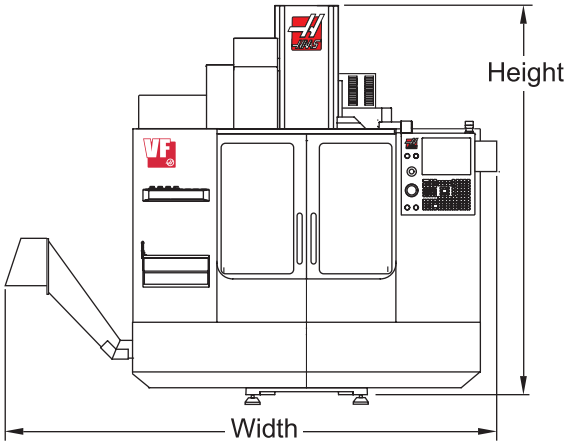
The optional 480V external transformer may require additional floor space. See electrical requirements for details.

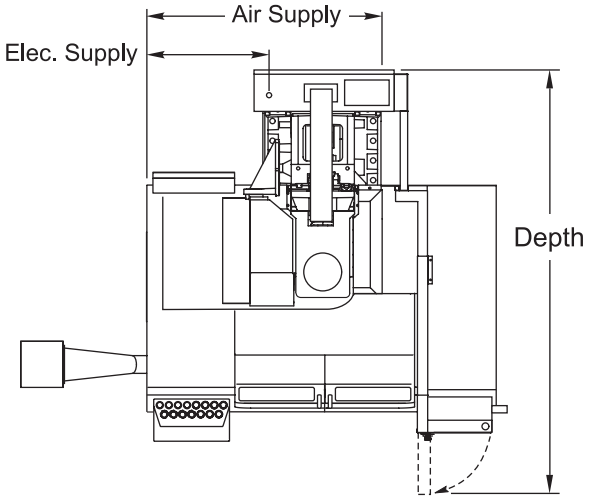
Electric / Air supply measurements are included to help determine the necessary lengths of electrical cable and air hose from their respective shop supplies to the machine. Electric supply measurements are taken from the point at the top of the electrical cabinet where the electric cable enters to the nearest vertical edge of the machine. Air supply measurements are taken from the point at which air connects to the machine to the same edge as the electrical measurement.

When determining necessary lengths for electrical cable and air hose, include the depth measurements shown in the following diagrams:



VF / VM / VR Series Operating Dimensions





Machine	Height (in/mm)	Width (in/mm)	Depth (in/mm)	Elec. (in/mm)	Air (in/mm)	Weight (lb/kg)
VF-1	105 / 2667	125 / 3175	98 / 2489	28 / 711	57 / 1448	7100 / 3221
VF-1YT	105 / 2667	125 / 3175	109 / 2769	28 / 711	57 / 1448	7400 / 3357
VF-2(SS,TR)	105 / 2667	125 / 3175	98 / 2489	28 / 711	57 / 1448	7300 / 3311
VF-2YT(SS)	105 / 2667	125 / 3175	109 / 2769	28 / 711	57 / 1448	7500 / 3402
VF-3(SS)	118 / 2997	153 / 3887	105 / 2667	83 / 2109	107 / 2718	12500 / 5670
VF-3YT(SS)	118 / 3023	153 / 3887	106 / 2692	83 / 2109	107 / 2718	14000 / 6350
VF-3YT/50	130 / 3200	153 / 3887	106 / 2692	83 / 2109	107 / 1718	15900 / 7212
VF-4(SS)	118 / 2997	153 / 3887	105 / 2667	83 / 2109	107 / 2718	13300 / 6033
VF-5(SS,TR)	119 / 3023	158 / 3887	107 / 2718	94 / 2388	118 / 2997	14600 / 6623
VF-5XT	119 / 3023	158 / 3887	142 / 3607	94 / 2388	118 / 2997	15150 / 6849
VF-5/50(TR)	130 / 3200	158 / 3887	107 / 2718	94 / 2388	118 / 2997	16100 / 7303.
VF-6(SS,TR)	119 / 3150	188 / 4775	122 / 3099	120 / 3048	138 / 1505	21000 / 9526
VF-7	120 / 3048	191 / 4851	122 / 3099	118 / 2998	139 / 3531	23000 / 10433
VF-8	127 / 3226	188 / 4775	139 / 3530	120 / 3048	138 / 3505	24000 / 10887
VF-9	124 / 3150	191 / 4851	139 / 3530	118 / 2998	139 / 3531	25000 / 11340
VF-10	124 / 3150	257 / 6528	122 / 3099	155 / 3937	184 / 4674	28000 / 12701
VF-11	124 / 3150	257 / 6528	139 / 3530	155 / 3937	184 / 4674	29400 / 13336
VF-12	128 / 3251	330 / 8382	122 / 3099	204 / 5182	233 / 5918	30650 / 13902
VM-2	105 / 2667	125 / 3175	109 / 2769	28 / 711	57 / 1448	7500 / 3402
VM-3	153 / 3886	153 / 3887	138 / 3505	83 / 2109	89 / 2261	14000 / 6350
VM-6	119 / 3023	188 / 4775	122 / 3099	120 / 3048	138 / 1505	21000 / 9526
VR-8	124 / 3150	178 / 4521	169 / 4293	120 / 3048	138 / 1505	27100 / 12293
VR-11B	124 / 3150	257 / 6528	169 / 4293	155 / 3937	184 / 4674	32500/ 14742

VF-6 to VF-12 50-Taper VMCs: Add 14" (356mm) to the machine height and 1500 lbs (680 kg) to machine weight.

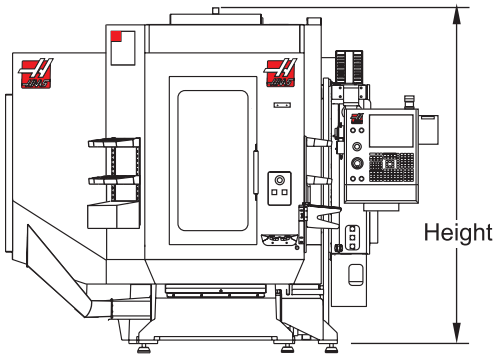
TR mills: Add 1500lb (680kg)

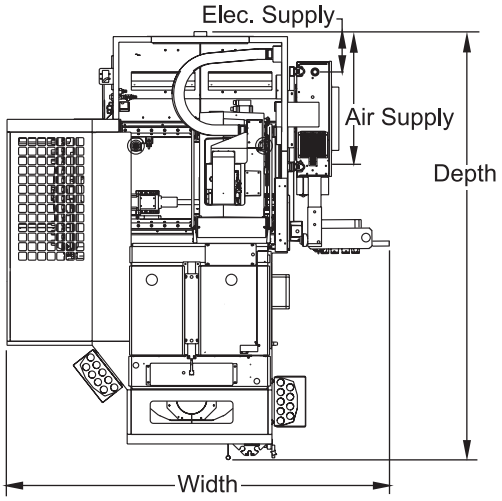
NOTE: Add 75" (1905mm) to the width of the VF-3 and VF-4 if equipped with an Automatic Pallet Changer (APC option).

NOTE: VMCs may be lifted with the aid of cables and a crane. Cable Lift Instructions, Haas document ES-0246, describes these details.

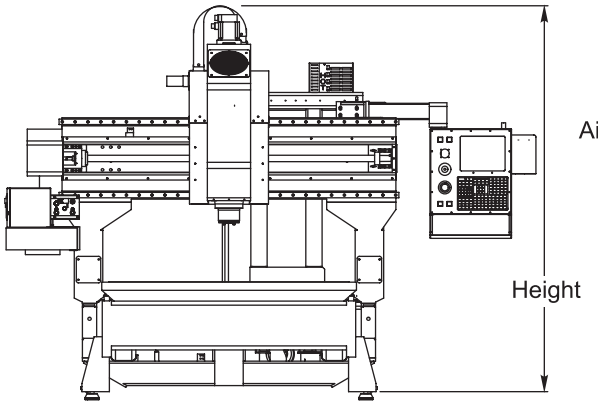
Mill Drill (MDC-500) Operating Dimensions

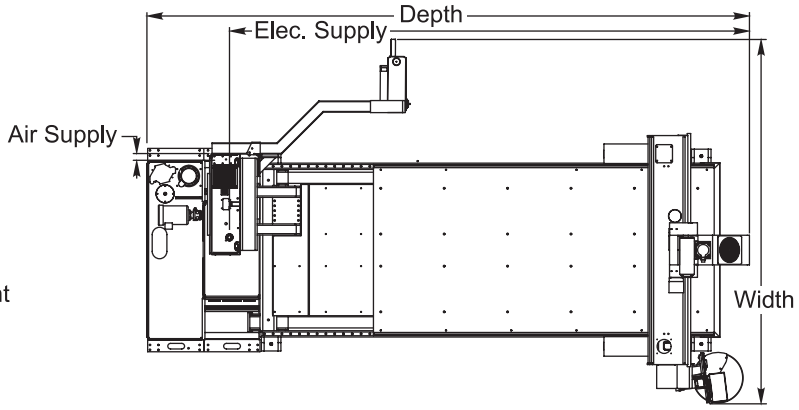
Height (in/mm)	114 / 2896
Width (in/mm)	120 / 3048
Depth (in/mm)	135 / 3429
Electric (in/mm)	11 / 279
Air (in/mm)	43 / 1092
Weight (lb/Kg)	14,000 / 6,350





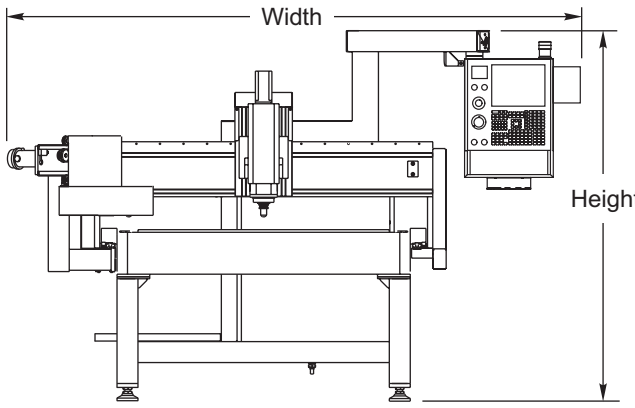
GR Series Operating Dimensions

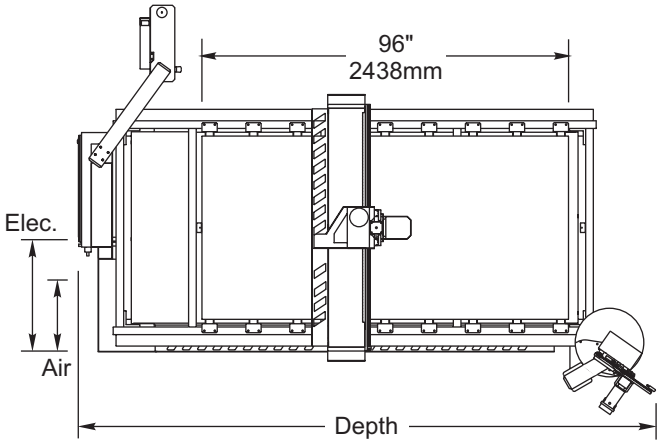




Machine	Height (in/mm)	Width (in/mm)	Depth (in/mm)	Elec. (in/mm)	Air (in/mm)	Weight (lb/kg)
GR-408	108 / 2743	123 / 3124	188 / 4775	39 / 991	39 / 991	10,000 / 4,536
GR-510	99 / 2515	137 / 3480	216 / 5486	33 / 838	0	15,000 / 6,804
GR-512	99 / 2515	137 / 3480	240 / 6096	33 / 838	0	18,000 / 8,165
GR-710	99 / 2515	164 / 4166	216/ 5486	33 / 838	0	16,500 / 7,484
GR-712	99 / 2515	164 / 4166	240 / 6096	33 / 838	0	19,500 / 8,845

SR Series Operating Dimensions



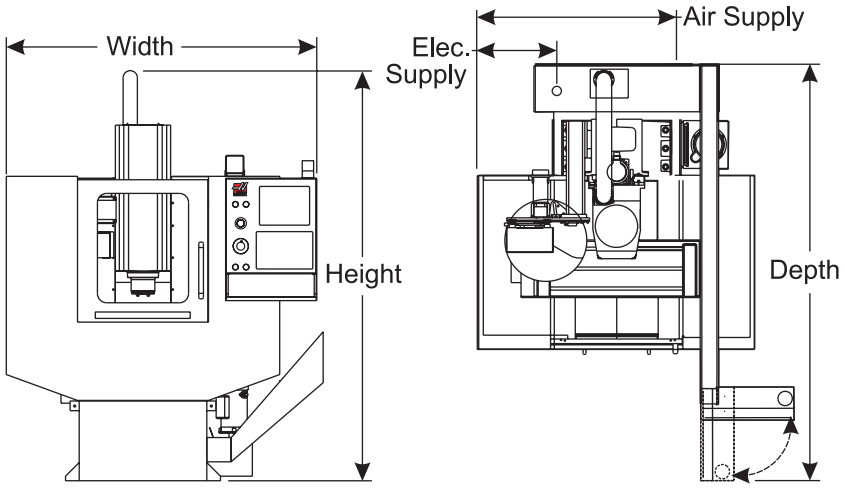


Machine	Height (in/mm)	Width (in/mm)	Depth (in/mm)	Elec. (in/mm)	Air (in/mm)	Weight (lb/kg)
SR-100	69 / 1753	118 / 2997	159 / 1499	29 / 737	20 / 508	2,800 / 1,272
SR-200	71 / 1803	142 / 3607	207 / 5258	29 / 737	20 / 508	3,200 / 1,455

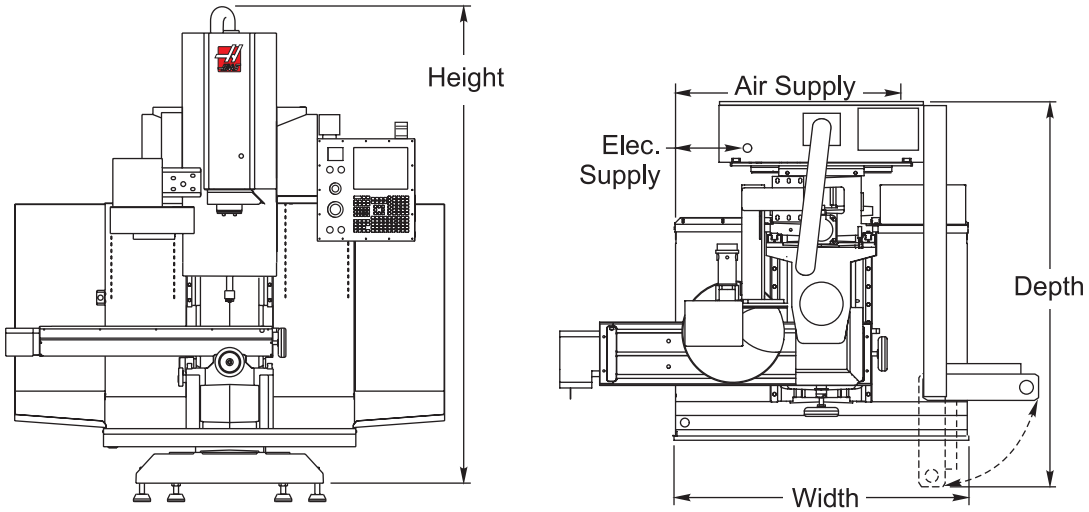
Mini Mills Operating Dimensions

	MM/SMM	MM2/SMM2
Height (in/mm)	98 / 2489	99 / 2515
Width (in/mm)	70 / 1778	82 / 2083
Depth (in/mm)	98 / 2489	93 / 2362
Electric (in/mm)	12 / 305	24 / 607
Air (in/mm)	36 / 915	48 / 1219
Weight (lb/Kg)	3400 / 1542	4000 / 1814

NOTE: A fully opened operator's door increases the width by 10" (254mm).



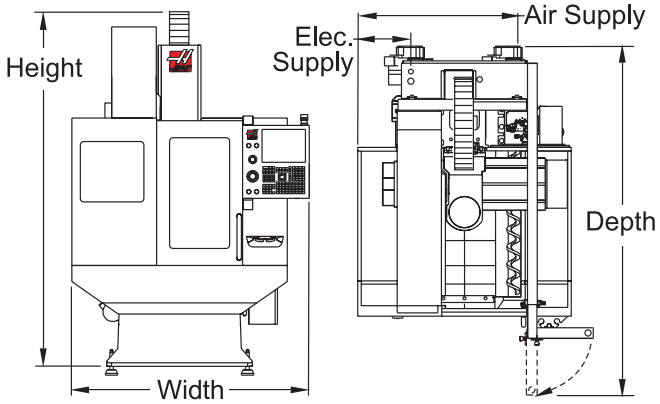
Toolroom Mills Operating Dimensions



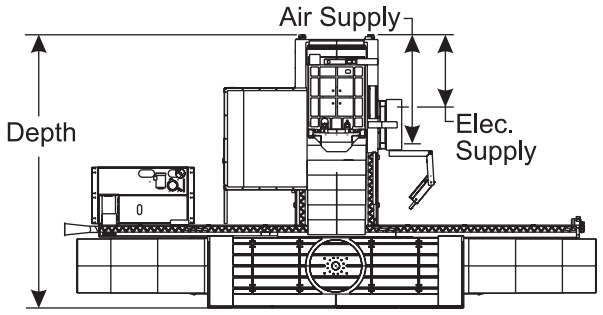
Machine	Height (in/mm)	Width (in/mm)	Depth (in/mm)	Elec. (in/mm)	Air (in/mm)	Weight (lb/kg)
TM-1	106 / 2692	86 / 2184	68 / 1727	11 / 279	9 / 229	2900 / 1315
TM-1P	106 / 2692	96 / 2438	86 / 2184	33 / 838	31 / 787	3850 / 1746
TM-2	103 / 2616	106 / 2692	69 / 1752	16 / 406	14 / 355	4950 / 2245
TM-3	103 / 2616	106 / 2692	87 / 2210	36 / 914	61 / 1549	4950 / 2245
TM-3P	103 / 2616	137 / 3480	107 / 2718	36 / 914	61 / 1549	5900 / 2676

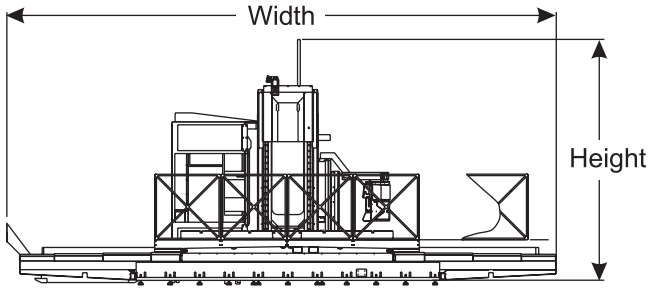
DT-1 Operating Dimensions

Height (in/mm)	100 / 2540
Width (in/mm)	71 / 1803
Depth (in/mm)	99 / 2515
Electric (in/mm)	14 / 356
Air (in/mm)	43 / 1092
Weight (lb/Kg)	4200 / 1905



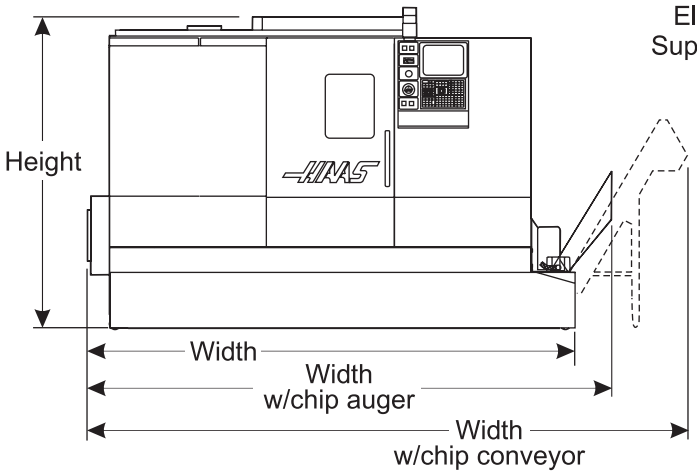
Large HS & VS Series Operating Dimensions

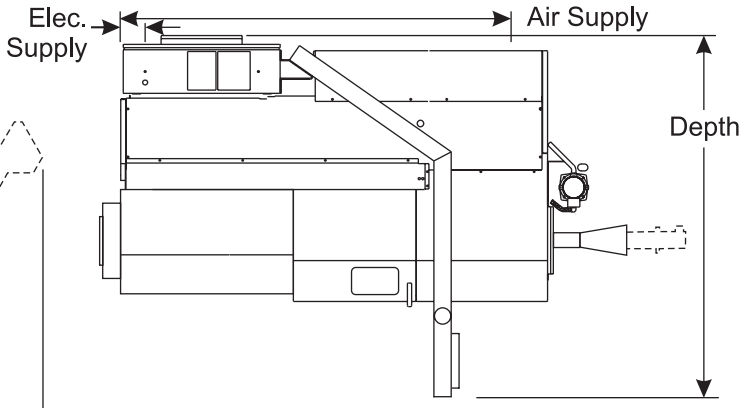




	HS 3/3R	HS 4/4R	HS 6/6R	HS 7/7R	VS-1	VS-3
Height (in/mm)	153 / 3886	169 / 4293	153 / 3886	169 / 4293	153 / 3886	167 / 4242
Width (in/mm)	378 / 9601	378 / 9601	264 / 6706	264 / 6706	264 / 6706	377 / 9576
Depth (in/mm)	194 / 4928	194 / 4298	194 / 4298	194 / 4298	253 / 6426	259 / 6579
Elec. (in/mm)	48 / 1219	48 / 1219	48 / 1219	48 / 1219	48 / 1219	48 / 1219
Air (in/mm)	79 / 2007	79 / 2007	79 / 2007	79 / 2007	79 / 2007	79 / 2007
Weight (lb/kg)	62,000/28,123	63,000/28,576	47,000/21,319	48,000/21,773	47,000/21,319	62,000/28,123

SL Series Operating Dimensions





Machine	Height (in/mm)	Width (in/mm)	Depth (in/mm)	Elec. (in/mm)	Air (in/mm)	Weight (lb/kg)
SL-10	69 / 1753	84 / 2134	55 / 1397	3/76	3/76	5,500 / 2,495
SL-20/TL-15	72 / 1829	104 / 2642	90 / 2286	3/76	85/2159	9,000 / 4,082
SL-20L	70 / 1778	134 / 3404	87 / 2210	10/254	115/2021	12,000 / 5,443
SL-30/TL-25	74 / 1880	126 / 3200	83 / 2108	3/76	109 / 2768	16,000 / 7,255
SL-30L	83 / 2108	167 / 4242	111 / 2819	26/660	118 / 2997	20,000 / 9,072
SL-40	89 / 2261	165 / 4191	117 / 2972	14/355	137 / 3479	25,000/ 11,340
SL-40L	89 / 2261	234 / 5944	125 / 3175	32/812	136 / 3454	31,000/ 14,062

		SL-10	SL-20/TL-15	SL-20L	SL-30/TL-25	SL-30L	SL-40	SL-40L
w/auger chute	(in)	92	127	159	150	181	190	234
	(mm)	2337	3226	4039	3810	4597	4826	5944
w/chip conveyor	(in)	n/a	138	178	162	193	193	252
	(mm)	n/a	3505	4521	4115	4902	4902	6401

SL Series (Continued)

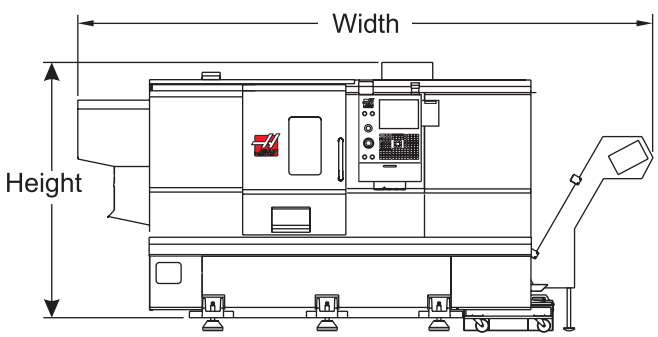
Add 102" (2591 mm) to the width of the lathe to include an Automatic Bar Feeder.
Add 46" (1168 mm) to the width of the lathe to include an Automatic Parts Loader (SL-20APL).

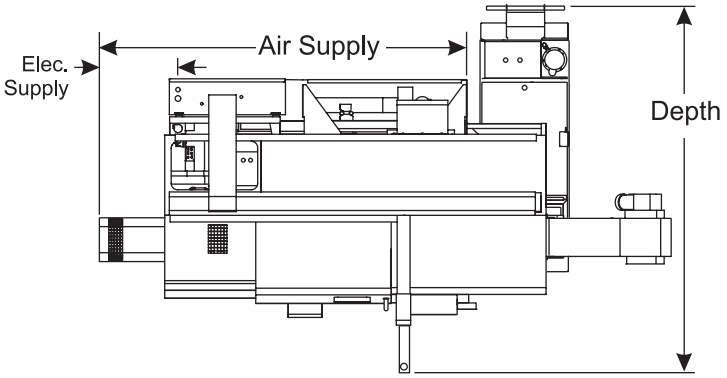
The operating dimensions are the maximum dimensions of the machine during operation, with the control at its most forward position.

The optional 480V external transformer may require additional floor space. See electrical requirements for details.

NOTE: Lathes may be lifted with the aid of cables and a crane. Cable Lift Instructions, Haas document ES-0356, describes these details.

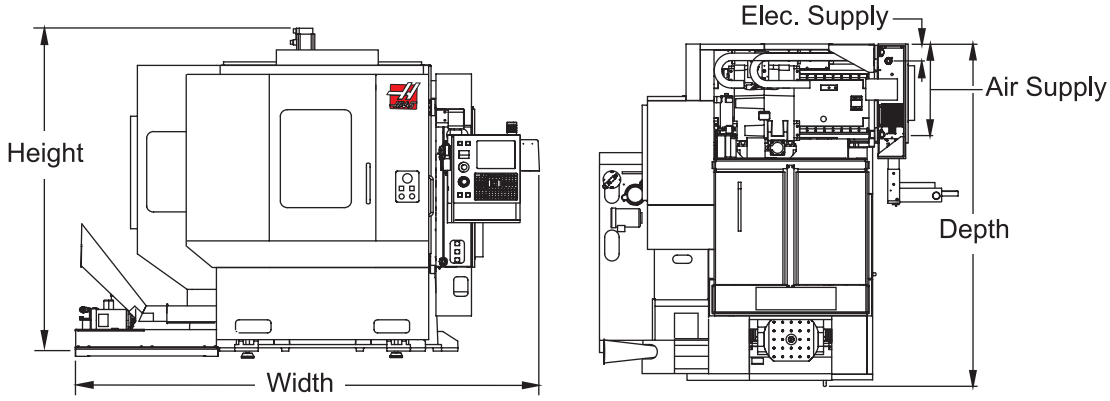
ST Series (including SS) Operating Dimensions





	ST-20	ST-20SS	ST-30	ST-30SS
Height (in/mm)	74 / 188	74 / 188	84 / 21134	84 / 2134
Width (in/mm)	156 / 3962	143 / 3632	175 / 4445	165 / 4191
Depth (in/mm)	82 / 2082	82 / 2082	92 / 2337	92 / 2337
Elec. (in/mm)	16 / 41	16 / 406	16 / 406	16 / 406
Air (in/mm)	121 / 3073	121 / 3073	103 / 2616	103 / 2616
Weight (lb/kg)	9000 / 4082	9000 / 4082	13200 / 5988	13300 / 6033

EC/ES Series Operating Dimensions

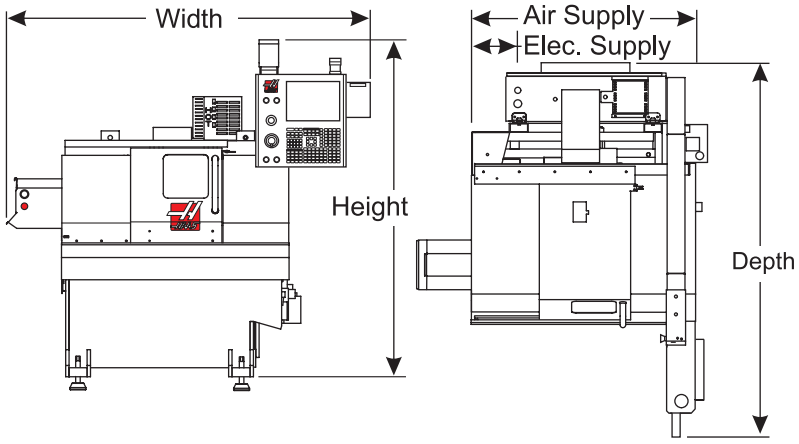


	EC-300	EC-400	EC-400PP	EC-500	EC-550
Height (in/mm)	98 / 2489	104 / 2642	104 / 2642	104 / 2642	134 / 3404
Width (in/mm)	122 / 3099	156 / 3962	151 / 3835	169 / 4293	177 / 4496
Depth (in/mm)	135 / 3429	134 / 3404	225 / 5715	178 / 4521	216 / 5486
Elec. (in/mm)	11 / 279	8 / 203	8 / 203	3 / 76	16 / 406
Air (in/mm)	43 / 1092	40 / 1016	40 / 1016	35 / 889	48 / 1219
Weight (lb/kg)	16,000 / 7,257	21,140 / 9,589	30,080 / 13,644	24,000 / 10,886	46160 / 20938

	EC-630	EC-1600	EC-2000	EC-3000	ES-5
Height (in/mm)	140 / 3556	119 / 3023	119 / 3023	119 / 3023	92 / 2337
Width (in/mm)	162 / 4115	173 / 4394	195 / 4953	266 / 6756	154 / 3912
Depth (in/mm)	298 / 7569	143 / 3632	143 / 3632	143 / 3632	150 / 3810
Elec. (in/mm)	11 / 279	6 / 152	6 / 152	6 / 152	11 / 279
Air (in/mm)	34 / 864	34 / 864	34 / 864	34 / 864	43 / 1092
Weight (lb/kg)	52,000 / 23,587	30,500 / 13,835	32,500 / 14,742	35,500 / 16,103	14,000 / 6350

Maximum dimensions of the machine during operation, with the control at its most forward position.

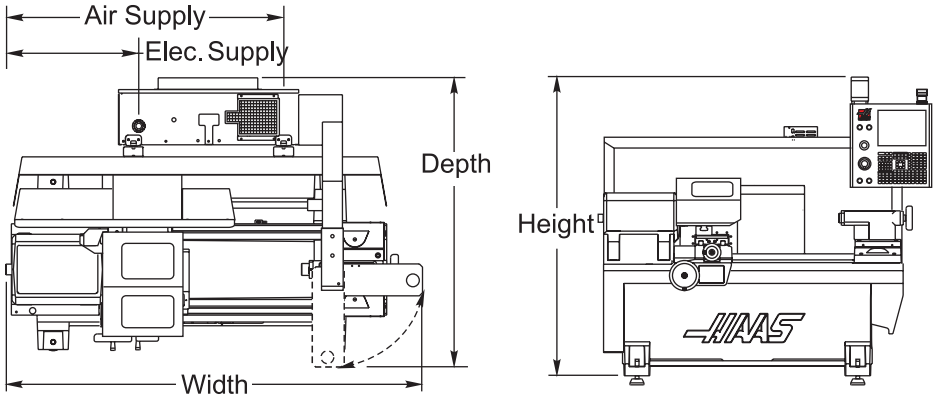
GT Machines Operating Dimensions



	GT-10	GT-20
Height (in/mm)	75 / 1905	75 / 1905
Width (in/mm)	82 / 2083	96 / 2438
Depth (in/mm)	85 / 2159	73 / 1854
Elec. (in/mm)	10 / 254	3 / 76
Air (in/mm)	36 / 914	63 / 1600
Weight (lb/kg)	5,000 / 2,268	6,020 / 2,731

Maximum dimensions of the machine during operation, with the control at its most forward position.

TL Series Operating Dimensions



	TL-1	TL-2	TL-3	TL-3B	TL-3W	TL-4
Height (in/mm)	77 / 1956	79 / 2007	80 /2032	79 / 2007	79 / 2007	85 / 2159
Width (in/mm)	81 / 2057	104 / 2642	121 / 3073	120 / 3048	121 / 3073	228 / 5791
Depth (in/mm)	68 / 1727	78 / 1981	82 / 2083	85 / 2159	92 / 2337	154 / 3912
Elec. (in/mm)	26 / 660	25 / 635	53 / 1346	35 / 889	21 / 533	95 / 2413
Air (in/mm)	68 / 1727	65 / 1651	78 / 1981	97 / 2463	65 / 1651	125 / 3175
Weight (lb/kg)	4,000 / 1,814	4,600 / 2,086	6,500 / 2,948	7,000 / 3,204	6,750 / 3,062	25880 / 11739

Maximum dimensions of the machines during operation, with the control at its most forward position.

Important Notes about Machine Installation

Once the machine is installed and incoming voltage is wired to the main circuit breaker, a service technician will adjust the internal transformer taps to match the incoming voltage exactly. This procedure is outlined in the Operator's manual. Machines installed with an external transformer may require additional steps to correctly set the voltage. The steps needed are described in the following paragraph:

External High Voltage Transformer Installation

Verify the transformer has been initially installed properly before final wiring to the machine (see the Electrical Power Requirements section). At the machine, connect the input of the internal 230 VAC transformer to the 227-243 VAC 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 329-345 VDC. If not, return to the 480 VAC isolation transformer and readjust the taps as required. Do not use the internal 230 VAC transformer to adjust the voltage.

Insufficient Air Supply

When the machine is operating, if the pressure reading on the machine's regulator drops by more than 10 psi (.69 bar) during a tool change, the air supply volume is insufficient. A number of variables can cause this (i.e., compressor output, hose diameter, restrictions caused by fittings, etc.); refer to the Compressed Air Requirements section for the proper requirements and installation techniques.

Peak Performance

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