A close-up photograph of a yellow FANUC LR Mate 200iD 7L robot arm. The arm is positioned over a complex metal workpiece. The robot's body is bright yellow, and the workpiece is a dark, metallic grey. The background is a blurred industrial setting.

The Haas Guide to Automation:  
**ROBOTS**

Everything you'll need to consider  
when adding a Haas Robot  
Package to your CNC.





Your Guide to Automation

# WHY AUTOMATE?

## Benefits you may not be aware of:

The answer is obvious to us, but if you're still not sure if automation is right for you, here are some solid reasons to make the move:

### RELIABILITY

Automation systems don't take coffee breaks, lunch breaks, or sick days, and they'll work nights, weekends, and holidays without complaint – or overtime.

### LIGHTS-OUT OPERATION

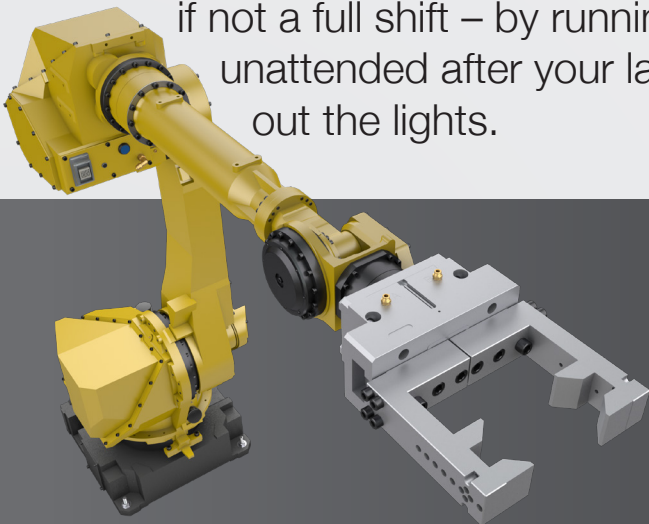
Gain at least a partial shift of production – if not a full shift – by running your machines unattended after your last shift has turned out the lights.

### MORE PRODUCTIVE OPERATORS

Run your machines unattended during normal shifts to free operators to perform higher-skilled tasks, or operate multiple machines.

### ROI/PROFITABILITY

Running just 4 extra hours per day with a Haas automation system, can generate enough output to pay for your investment in less than a year. After that, the added production equals higher profits.



**This Automation Guide on Robots isn't about replacing people, it's about making the people who work in your shop more productive. It's about being able to offer higher wages to a more skilled workforce. It's about making more chips, and we all know that more chips equals more money. It's time to GET AUTOMATED!**



Your Guide to Automation

# CHOOSING AUTOMATION

**Automating your machine shop has never been easier.**

Whether you're using a bar feeder on your lathe, or one of the new Haas Robot Packages, we've made the set up process hassle-free, and simple enough for even the smallest machine shop to be up and running in no time.



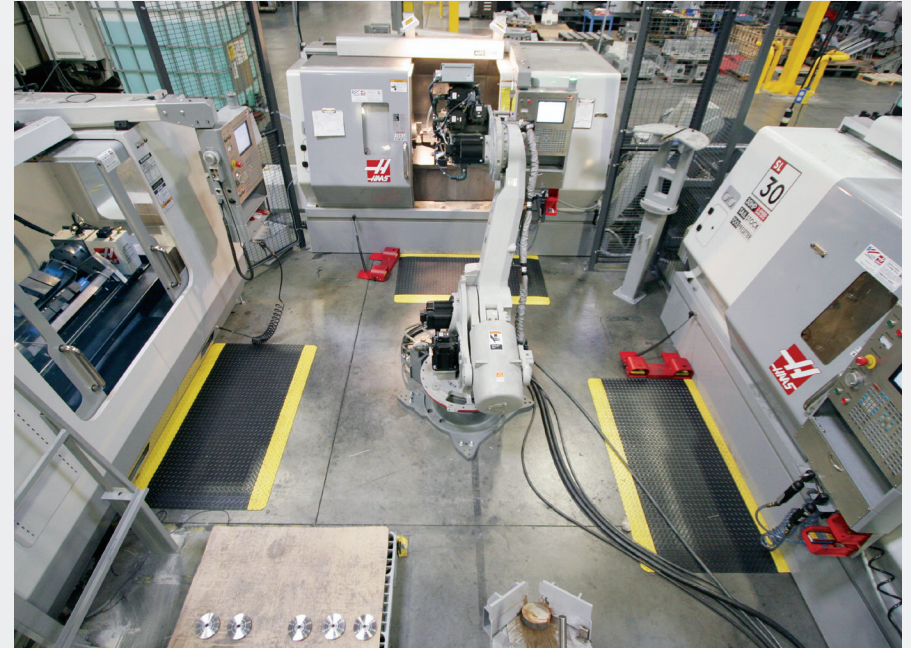
As simple as we've made this process, there are still some things you need to keep in mind along the way. This guide should help ensure that all your boxes are checked, in order to make the move to automation as easy as possible.





Adding a robot-tended CNC machine to your business is a great choice. Once you make that decision, ***the details make the difference.*** In this instance, the details fall into some distinct categories, such as:

- Machine Options
- Robot Options
- Tooling
- Workholding
- Material Handling



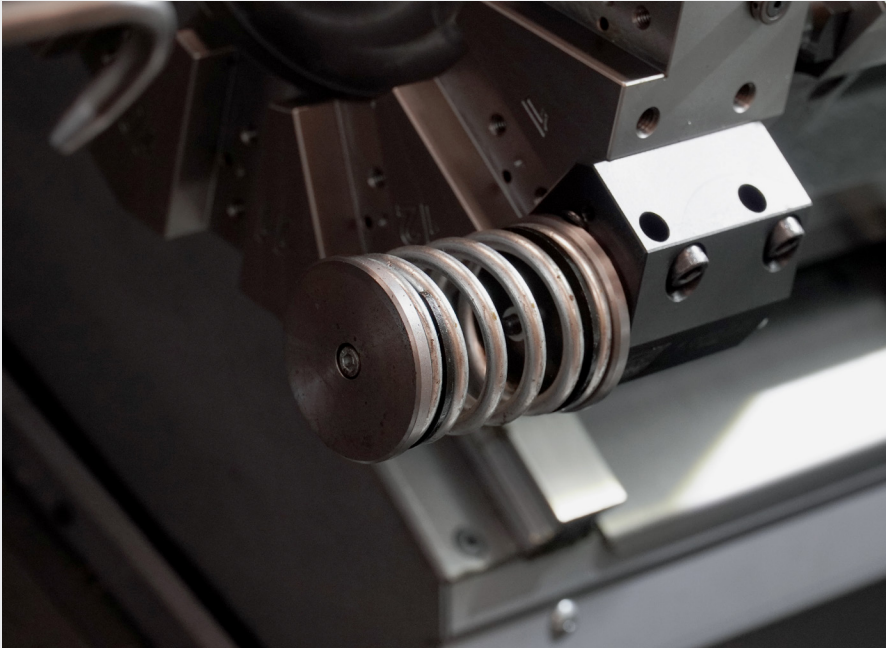
In this Haas How-to-Guide, we will cover each of these topics in detail, so you can experience the full benefits of taking this next step in automation. When Haas started using robots to load machines in our factory, we learned some hard lessons. The biggest takeaway was that ***“the operator hides a lot of sins.”*** Sins, in this case, refer to chip build-up issues, ensuring the raw part is loaded correctly every time, managing the coolant level/concentration, and so on. As you move to a fully automated process, you need that process to be very robust, and able to run for hours without human intervention.





Your Guide to Automation

# ROBOTS



This means your tooling and programming need to produce good, consistent chips, so you can get those chips off the part and out of the machine reliably. Your coolant needs to be monitored and adjusted, to ensure consistency in the process. Probing needs to be employed to ensure part tolerances are maintained. And tools should be probed to check for wear and breakage. Parts need to be loaded into the workholding consistently. You get the idea. ***Consistency in a process is what you need to achieve.***



A robot system from Haas has the advantage of not only being a fully integrated solution, but also being highly flexible, with a wide selection of available machine options – from standard options, like increased spindle speeds and tool changer capacity, to more detail-orientated options, like PulseJet lubrication or HaasConnect remote machine monitoring. These ***details really do make the difference*** between a modest productivity gain, and flat out revolutionizing your manufacturing process.

The Haas Guide to Automation

# ROBOTS



# MACHINE MODEL



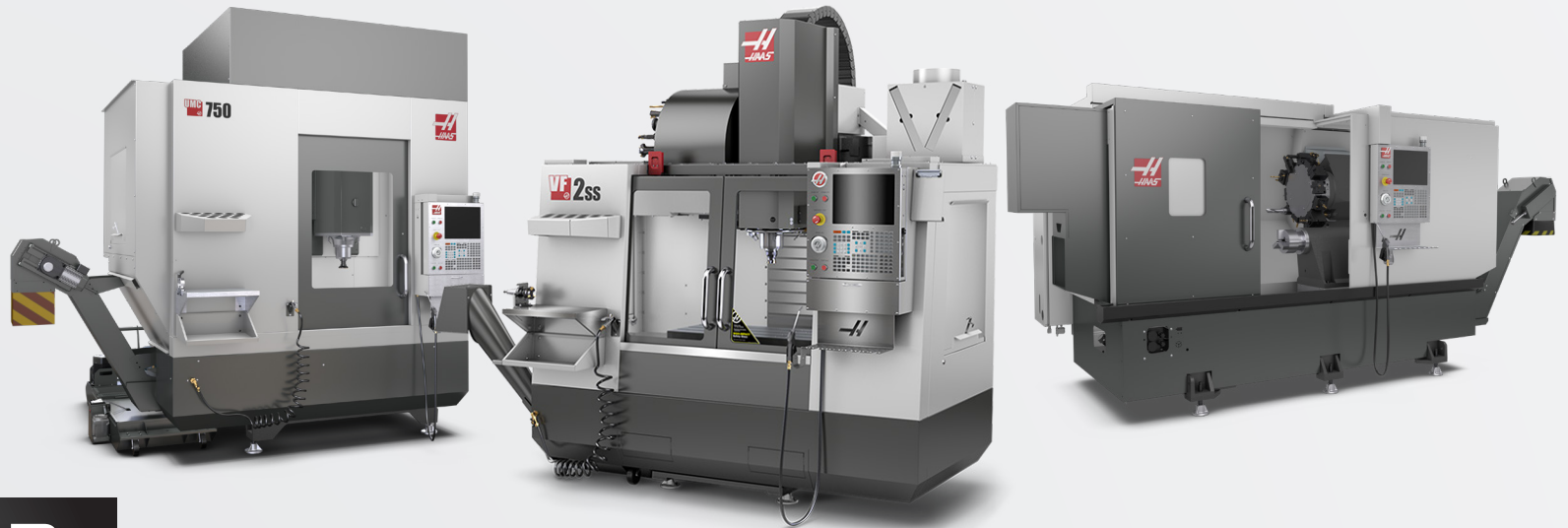


Your Guide to Automation

# ROBOTS

## MACHINE MODEL

Choose a machine that gives you the most possibilities for future expansion.



### TECH TIP

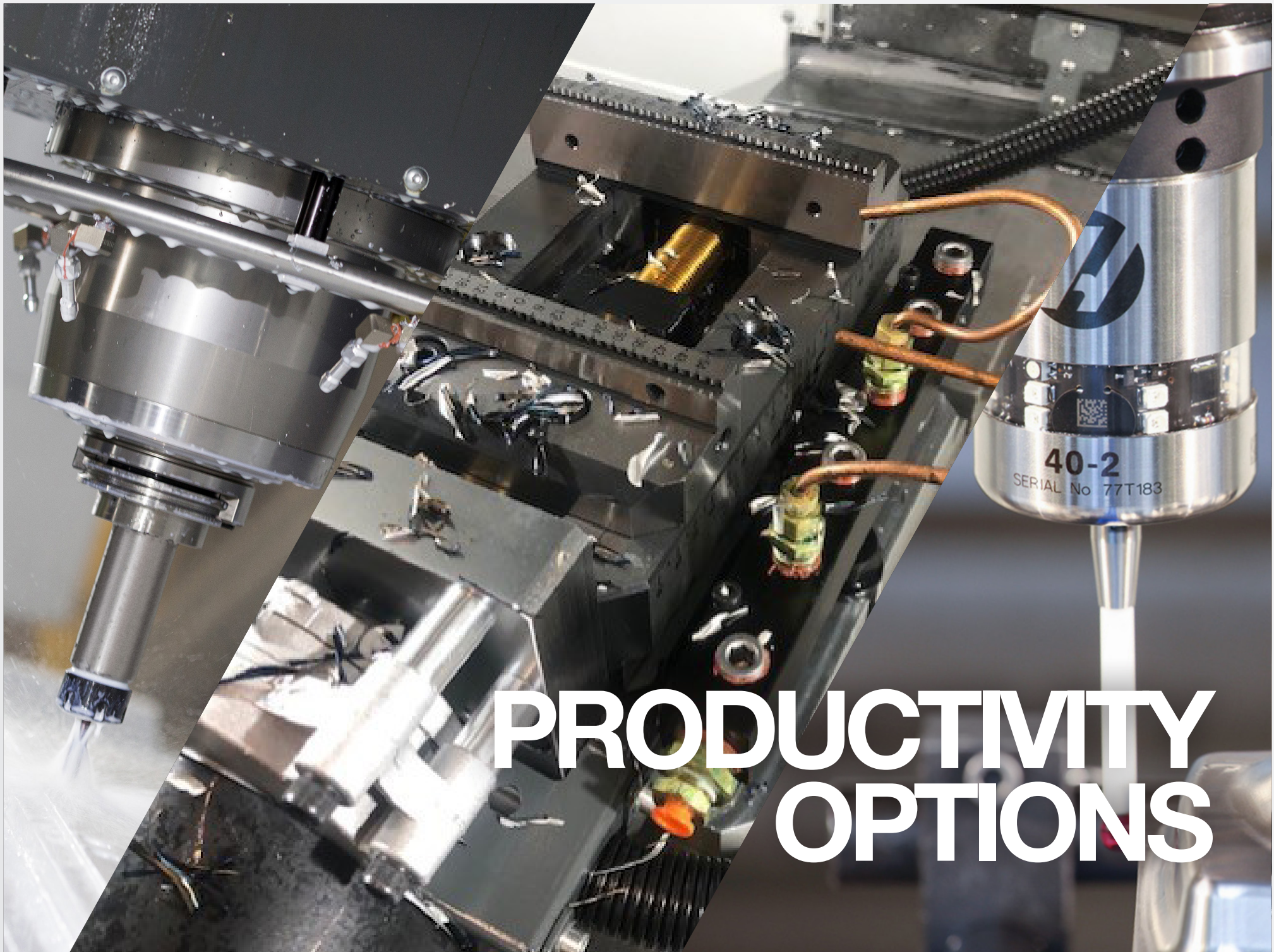
**10% RULE:** If you find yourself planning to run parts that are within 10% of the maximum capacity of a machine, consider stepping up to the next size machine.

#### MILL

Consider getting the largest table possible, to maximize the available workspace. Even if the robot will only be loading a 6" vise, consider the expansion to multiple vises, or removing the vise and using the full table capacity for a non-robot-tended job.

#### LATHE

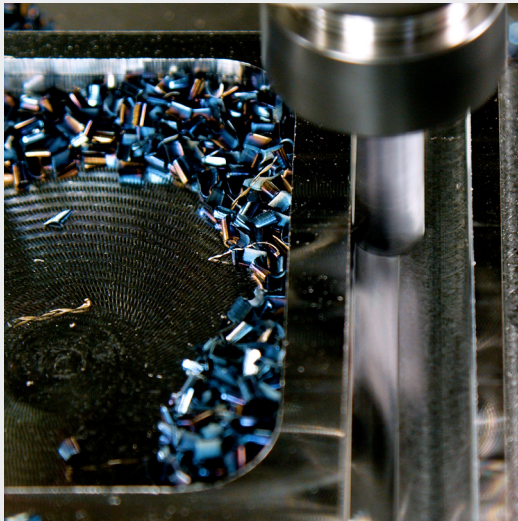
A Y-axis lathe is a must. Even if you don't have parts requiring a Y-axis, or if you think you only need live tooling on a standard two-axis lathe, upgrade to the Y-axis. This not only increases the flexibility of the machine and eliminates operations, it also will increase the resale value of the machine.



40-2  
SERIAL No 77T183

# PRODUCTIVITY OPTIONS





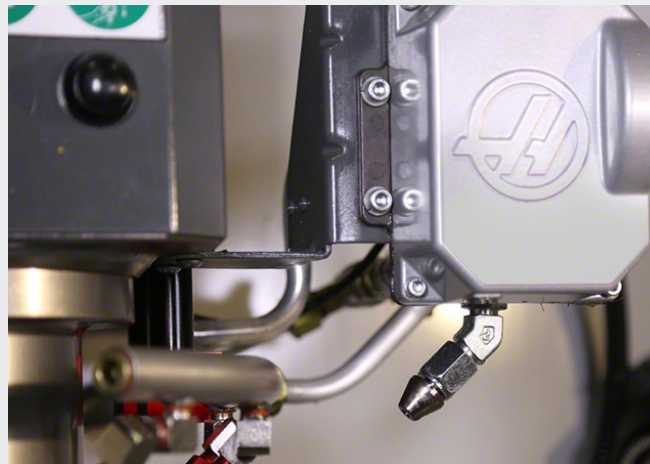
### CHIP MANAGEMENT

Chips are one of the biggest issues that can hinder the full automation of a robot cell. The goal here is twofold: get chips off your part/workholding, and then get the chips out of the machine.

#### Getting chips off the part / workholding

After machining the part, and prior to pick up by the robot grippers, you can use the various coolant or air systems available on the Haas machine to blast chips away from the part. Activate the coolant or air, and move the table around under the stream of fluid to remove chips from the finished part.

#### Specific Coolant-Based Options to Consider:



• **P-Cool (mills)** – tried and true, the Haas programmable coolant nozzle allows you to adjust the aim of a flood coolant nozzle via the part program. Normally, it's adjusted for different length tools, but it can also be moved to a specific position to blast coolant onto the part to remove chips.



• **Through-Spindle Coolant (mills)** – this can be used to clear chips by running coolant through a TSC tool, or for a strong blast of coolant, use TSC with no tool in the spindle. This really allows you to blast chips from deep pockets.



Lathes have an advantage over mills in that chips more easily fall directly into the conveyor belt and are moved out of the machine. *(Most of the options listed here apply to mills.)*



### CHIP MANAGEMENT (continued)

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- **High-Pressure Flood Coolant (mills)** – simply put, this is a higher pressure, gear-driven pump in place of the standard impeller pump. The much higher coolant pressures and flow rates really help get chips out of the way.



- **High-Pressure Coolant (lathes)** – this option adds a gear-driven, high-pressure pump to the coolant delivery through the turret. Great for removing chips, due to the high pressure and flow rates.

## TECH TIP

### WHY USE AIR?

Air-based options not only clear chips from the part, but also blow off the coolant, reducing carryout. Air is also great for parts not suitable for coolant.





### CHIP MANAGEMENT (continued)

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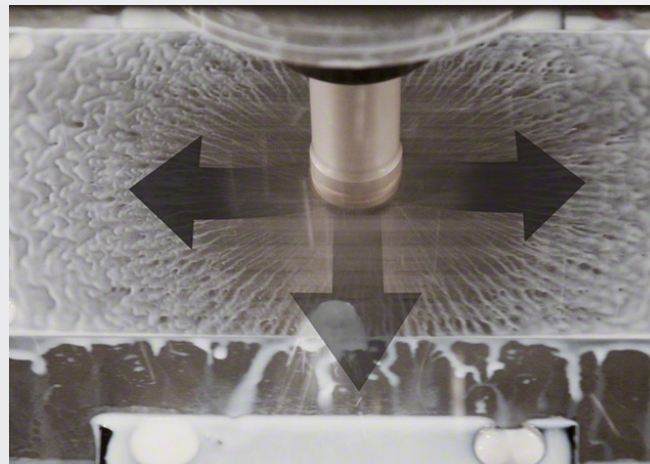
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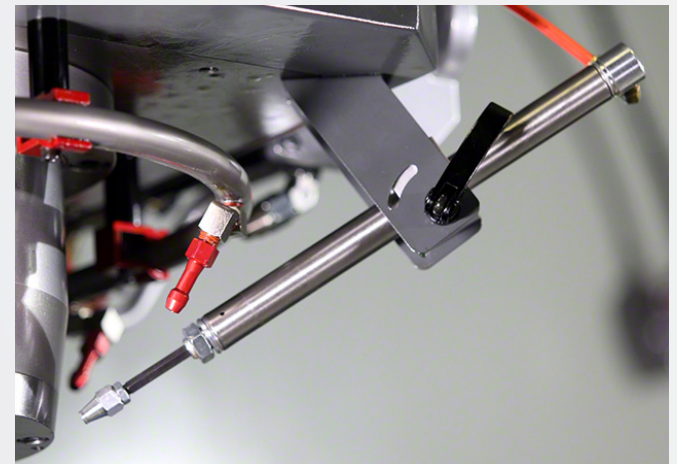
#### Specific Air-Based Options to Consider:



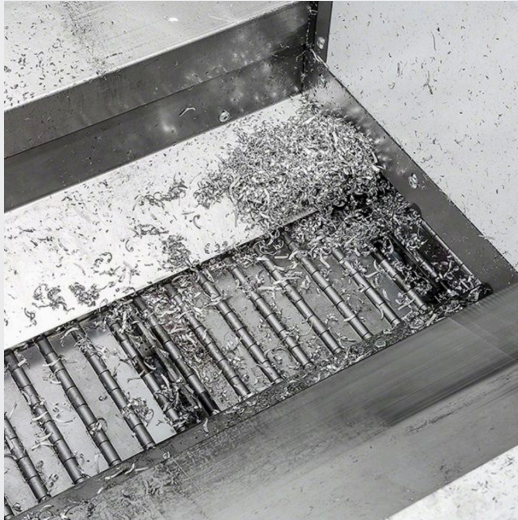
**CHIP FANS** are perfect for clearing chips and coolant from parts and fixtures in automated setups. Simply load the fan into the tool changer, and let the machine do the cleaning.



- **Through-Tool Air Blast (mills)** – this is an add-on to the through-spindle coolant system that allows you to deliver a blast of air through the tool, rather than coolant. This delivers air through the spindle taper. Great for parts that are not suitable to run with coolant.



- **Auto Air Gun (mills)** – a programmable nozzle that can shoot a blast of high-pressure air across the part from the side. Manually adjustable.



## CHIP MANAGEMENT (continued)

### Getting chips out of the machine

Chip augers or conveyors will get chips out of the machine; but first, the chips need to get into the evacuation path. Most chips find their way there through the designed-in chip flow of the machine, but some chips, particularly aluminum, can build up in certain spots. The coolant-based options discussed previously can be used, in some cases, to flush built-up chips into the evacuation path. Additionally, you can add your own pump and plumbing to direct coolant to locations in the enclosure that experience chip build-up.



- **Chip Lift (mills)** – this option is great for applications where a high volume of chips are produced quickly, and you want to get the chips into a large barrel. This option takes chips discharged from the chip auger chute, and lifts them to the height of a 55-gallon barrel. This greatly reduces efforts to move a large quantity of chips away from the machine.



- **Chip Conveyor (lathe)** – this is the only chip-removal system available for lathes, so the decision here is simple – get a conveyor.

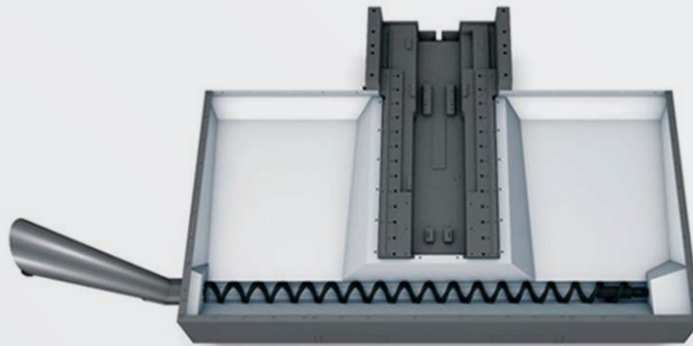




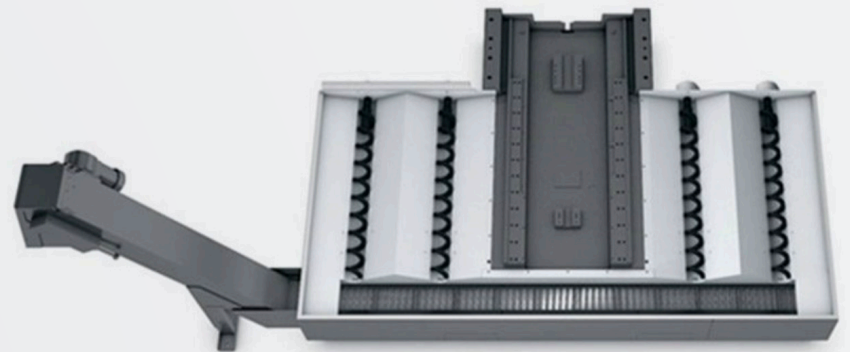
### CHIP MANAGEMENT (continued)

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• **Chip Auger (mills)** – the minimum level of chip removal. A very effective solution.



• **Multi-Auger (mills)** – for our VF-1 to VF-6 mills, we offer a multi-auger system. This adds side augers that push chips down to the cross auger or conveyor, helping reduce chip build-up even further than just a standard cross auger. On VF-3 to VF-6 mills, the front cross auger is replaced with a belt-type chip conveyor, which discharges chips at the height of a 55-gallon barrel.

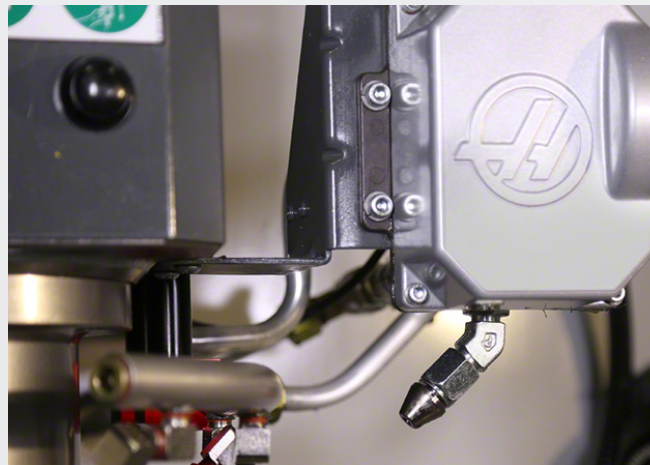


## COOLANT MANAGEMENT

There are two primary goals with coolant: supplying coolant to the cutting area, and maintaining the coolant effectiveness.

### Coolant Supply

All Haas machines have a great flood coolant system, but for automation, you need to ensure you have a consistent and repeatable process. We covered coolant options in the previous section, as they relate to chip removal. Below are some quick notes on coolant options as they relate to coolant delivery.



- **P-Cool (mills)** – a programmable nozzle that provides an adjustable delivery point for flood coolant. Absolutely necessary for ensuring the delivery of coolant to the cutting zone, as the tool lengths vary from one tool to the next. This is a key element of creating a consistent, reliable process.



- **Through-Spindle Coolant (mills)** – There is rarely a part machined that doesn't have some sort of a hole in it. TSC simply makes drilling holes faster, less expensive, and more consistent. The consistency and long tool life possible with TSC and carbide drills make this another must-have for automation.

- **High-Pressure Flood Coolant (mills)** – more coolant means a more consistent process. That is our goal here, so this coolant pump definitely helps with that.





## COOLANT MANAGEMENT

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- **High-Pressure Coolant (lathes)** – again, provides great coolant flow, especially if you are performing deep boring or drilling operations. Ensures chips are flushed from the workpiece, and into the conveyor.



- **95-Gallon Tank** – to ensure proper coolant flow and volume, a big reservoir (tank) is necessary. This larger capacity coolant tank ensures there is adequate supply.



## COOLANT MANAGEMENT

### Coolant Maintenance

Often overlooked in the machining process is the actual maintenance of the coolant itself. If not properly maintained, in terms of coolant level, concentration, and cleanliness, the consistency of the process can suffer very quickly.



- **Mist Condenser** – aeration of the coolant is a big cause of coolant loss and concentration issues. Haas has engineered a mist condenser system that collects the coolant mist generated by the machining process, and recirculates it back into the machine. During the recirculation process, the mist condenses back into liquid coolant, and drains back into the machine.



- **Oil Skimmer** – cutting oils and way grease can cause an unnecessary breakdown of coolant. Haas has designed an oil skimmer that fits right into the factory coolant tank.

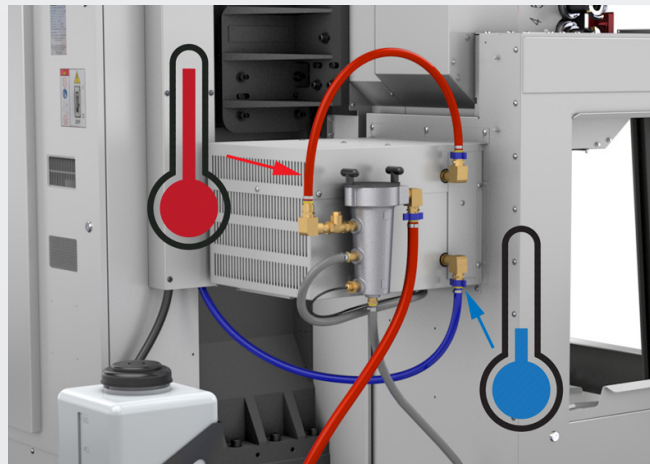




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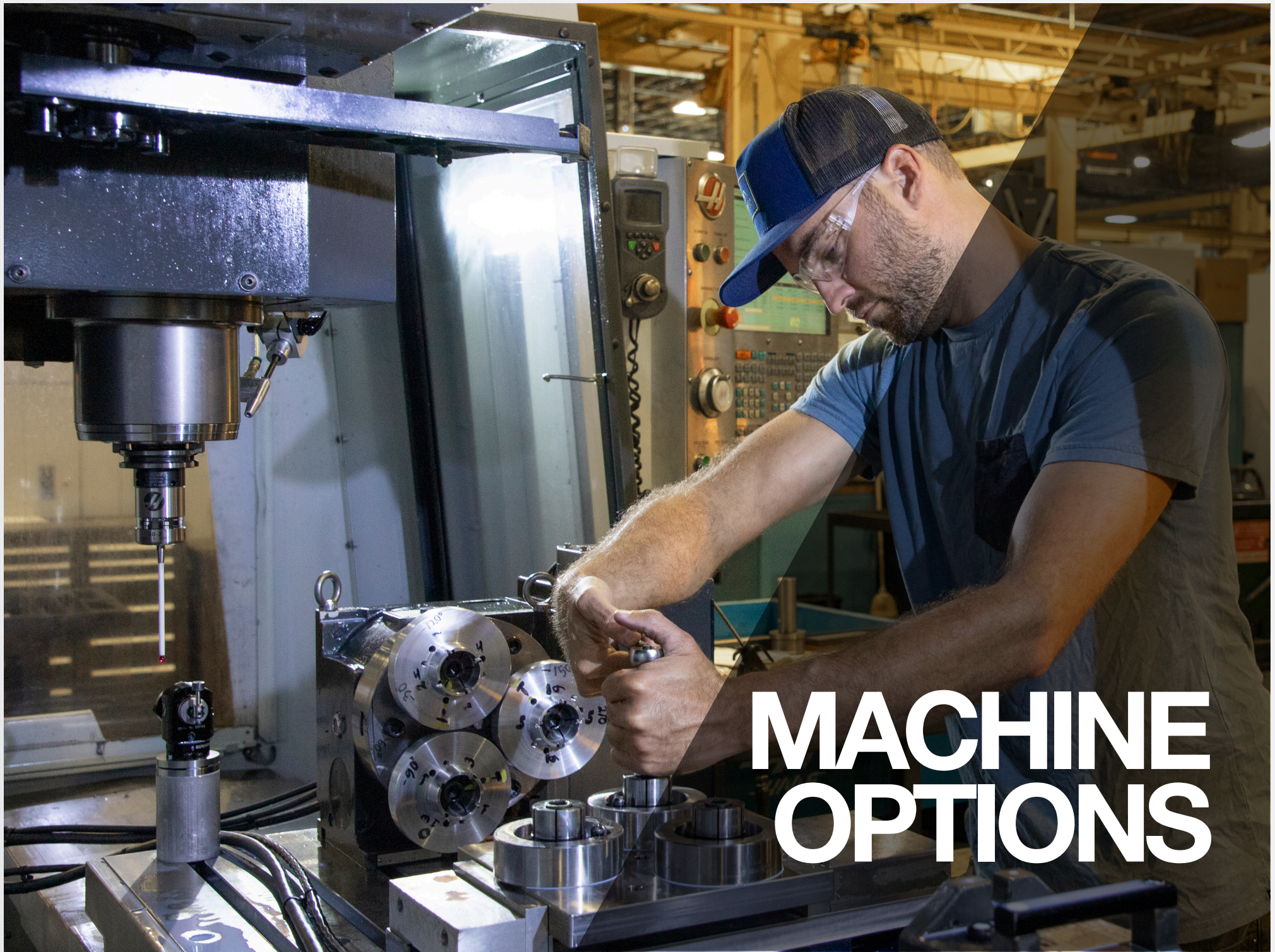


- **Coolant Chiller** – certain machining processes put a lot of heat into the coolant. Maintaining a stable, consistent coolant temperature contributes to a stable process.



- **Coolant Refill** – you bring power and air to the machine, so why not bring water to the machine, as well, and keep your coolant at the correct concentration and level? This option will automatically mix your coolant concentrate with the supplied water, right at the tank – all controlled directly from the Haas control.





**MACHINE  
OPTIONS**





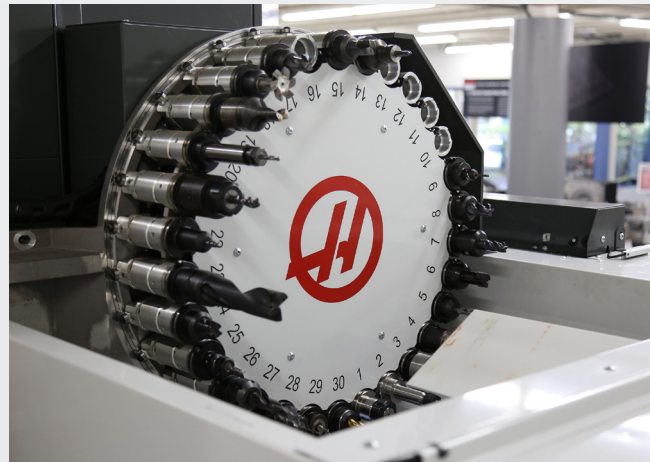
When considering machine options, your exact needs and plans will dictate which spindle, tool changer, and other machine options should be added to the machine. Following are options you should consider that have benefits for an automated process.

## TOOL CAPACITY

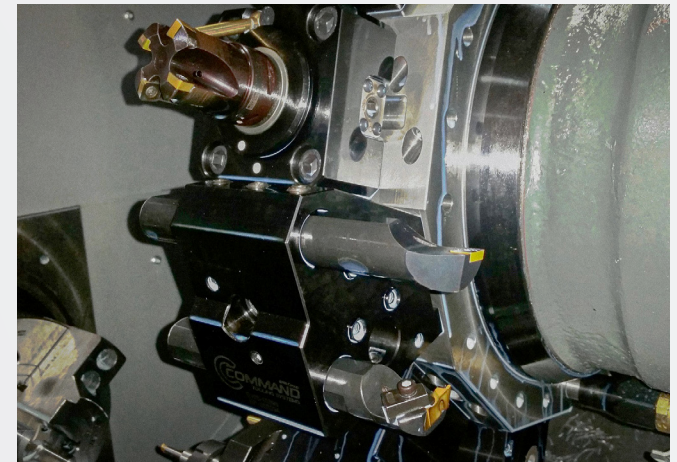
### TECH TIP

#### BUILT-IN TOOL MANAGEMENT:

Tool management features built into the Haas control allow you to set up tool groups and backup tooling for unattended operation.



- **Tool Changer (mills)** – capacity is key here. While you may only have needs now for a few tools, future expansion in your robot cell may require more tools. Using Haas' built-in tool group management, you can program backup tools to provide longer unattended operation.

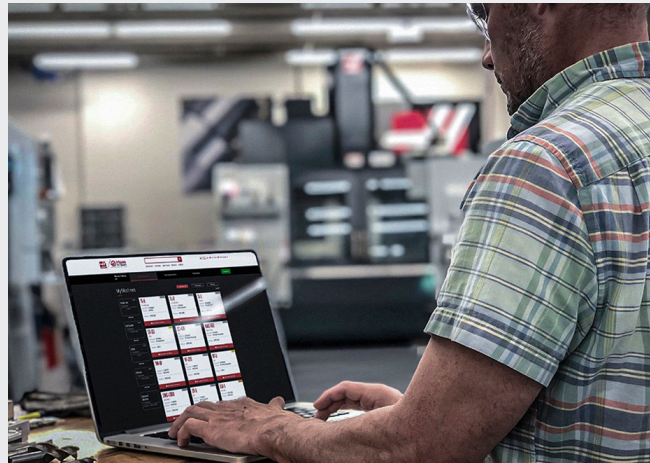


- **24-Station Turret (lathes)** – as with a side-mount tool changer, capacity is key. A 24-station turret will double the available tool capacity on a lathe.



When considering machine options, your exact needs and plans will dictate which spindle, tool changer, and other machine options should be added to the machine. Following are options you should consider that have benefits for an automated process.

### IN-PROCESS MONITORING



- **HaasConnect** – standard on all Haas machines, HaasConnect gives you real-time machine status monitoring, either through the HaasConnect App or email notifications. Again, another item to help give you peace of mind while the machine is running.



- **WiFi Camera** – the goal of automation is to remove the need to have a person near the machine while it's in operation. The Haas WiFi Camera allows you to monitor the machine remotely, from anywhere you have an internet connection. This helps give peace of mind, by providing a visual status of the machine.

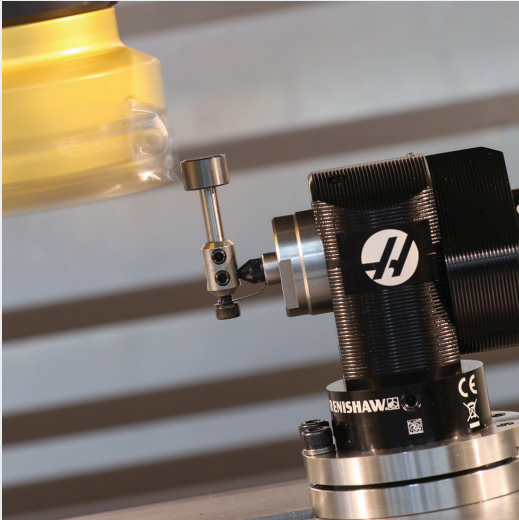




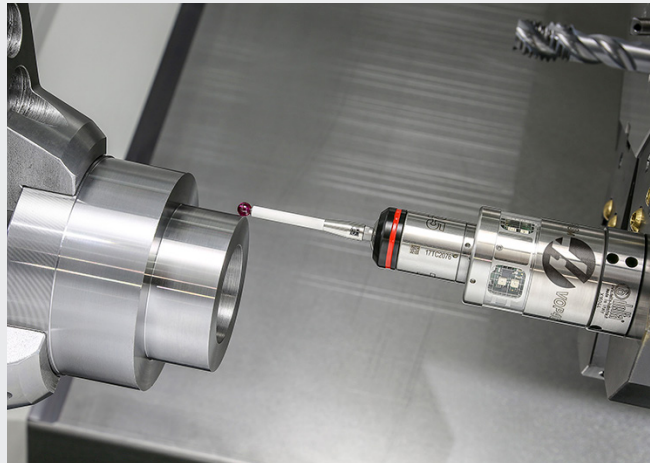
Your Guide to Automation

# ROBOTS

## MACHINE OPTIONS (continued)



When considering machine options, your exact needs and plans will dictate which spindle, tool changer, and other machine options should be added to the machine. Following are options you should consider that have benefits for an automated process.



- **Probing** – without a doubt, the most necessary machine option for an automated robot cell. The ability to check for workpiece loading, perform in-process inspection, and detect broken tools is key to a solid automated process.



While the Haas Robot Packages provide everything you need to run an automated process, there are some options we offer that allow for further customization of your process.

## TECH TIP

### REMOTE MONITORING:

With HaasConnect and the MyHaas mobile app, you can keep track of the operating status of your Haas machines. The MyHaas app is free, and available for download in the Apple App Store and the Google Play Store.



- **All Haas Robot Packages** include a single gripper standard. We do offer a dual-gripper option, which allows you to bring a raw part to load into the machine when retrieving a finished part. This allows for decreased cycle times, and more flexibility in process set up.

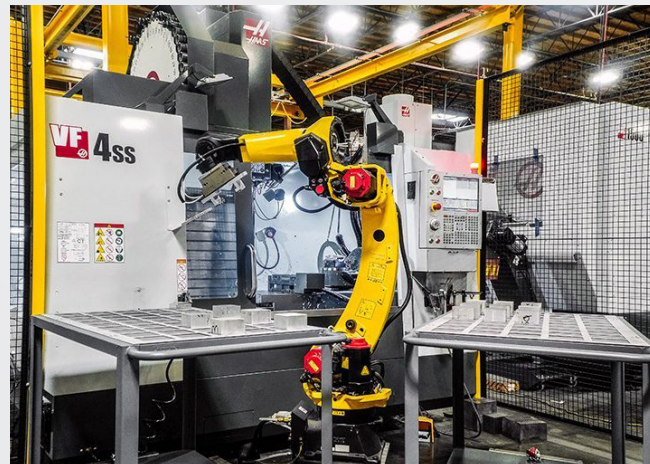


- **Re-Grip Station** – some processes require the “flipping” of a part. To accomplish, this we offer an optional re-grip station. This provides a platform on which to place a part, and allows the robot to re-grip the part from underneath, effectively “flipping” the part.

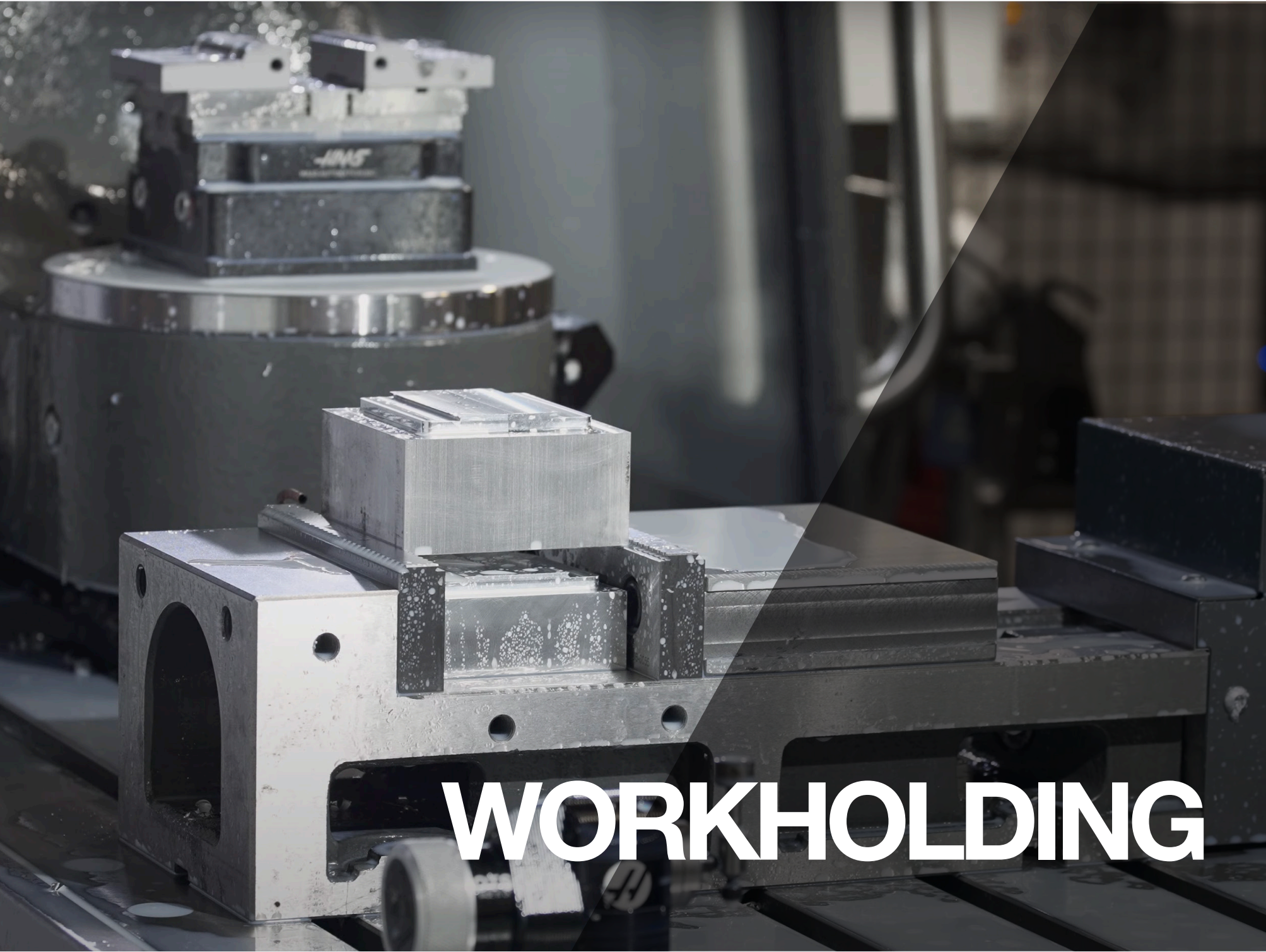




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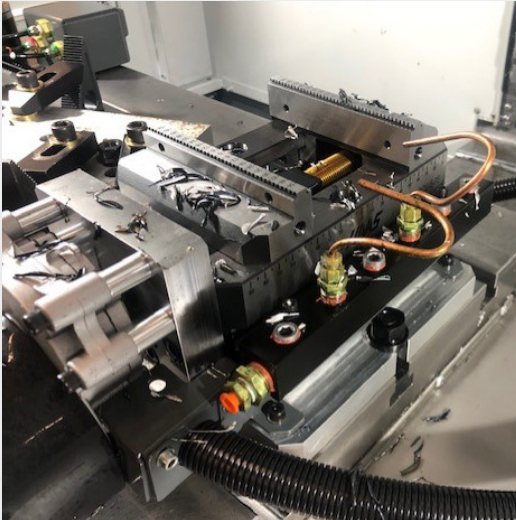


- **Additional Material Carts** – for the Haas Robot Package-2, we offer a second material cart to complement the included standard material cart. This can be used to double the amount of raw material presented to the machine, or as a drop-off point for completed parts.



# WORKHOLDING





**ELECTRIC VISE**

## Workholding

For lathes, workholding is simple; the standard power chuck handles this easily. Fully integrated with the machine, the chuck becomes the easiest workholding solution. For mills, there are a number of things to consider:

### Workholding types:

**AIR** – easy set up, but lowest grip force available. Pressure regulation sets grip force.

**ELECTRIC** – easy set up, programmable for clamp force, moderate grip force.

**HYDRAULIC** – highest grip force, but only available on UMCs.

**3RD-PARTY SYSTEMS** – If using a 3rd-party system, the 8M option will be required. This will allow you to program the I/O for activating the workholding, and receiving confirmation that the workholding operation is complete.



**AIR VISE**






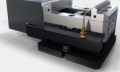



**HYDRAULIC VISE**

## Tooling

Your choice of tooling can have the biggest influence on chip control. Tooling dictates the size and style of chips produced. One major advantage of an automated process is the gain in unattended runtime. Typically, this time is during breaks and lunch, or when no one is in the shop at all. Since this can be considered “added free time,” it can be beneficial to reduce the aggressiveness of the machining to ensure a longer, more stable tool life. What’s the advantage to pushing a shell mill hard, only to have it fail, and lose a few hours of runtime? Backing off 10% on cutting parameters may gain more uptime in the long run.

## HAAS VISE OPTIONS & CONFIGURATIONS

MACHINE MODEL	Air Vises			Hydraulic Vise 8.0	Electric Vises		
	75 MM	100 MM	150 MM		4.0	5.0	6.0
UMC							
UMC		✓ 2	✓ 2	✓ 3			
DT/DM	✓ 1	✓ 1	✓ 1		✓ 4	✓ 4	✓ 4
MM/SMM	✓ 1	✓ 1	✓ 1			✓ 4	
VF-1/2	✓ 1	✓ 1	✓ 1		✓ 4	✓ 4	✓ 4
VF-3/4/5	✓ 1	✓ 1	✓ 1		✓ 4	✓ 4	✓ 4
VF-6/7/8/9	✓ 1	✓ 1	✓ 1		✓ 4	✓ 4	✓ 4
TRT210	✓						
TRT310		✓					
<b>MAX CLAMP FORCE</b>	<b>2,000 (lb) 8,896 (N)</b>	<b>3,300 (lb) 14,680 (N)</b>	<b>6,750 (lb) 30,030 (N)</b>	<b>5,750 (lb) 25,580 (N)</b>	<b>4,000 (lb) 17,790 (N)</b>	<b>2,000 (lb) 8,896 (N)</b>	<b>4,500 (lb) 20,020 (N)</b>

Vises are only available to order with machines, but additional jaws and other vise accessories are available through HaasTooling.com.


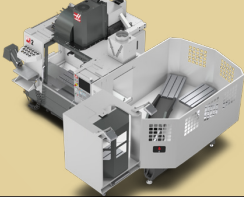

1) Programmable Air REQUIRED 2) Air Vise Ready REQUIRED 3) Hydraulic Vise Ready option REQUIRED 4) Electric Vise Ready option REQUIRED





Your Guide to Automation

# OPTIONS AND CONFIGURATIONS

MACHINE MODEL	Robot Solutions			Auto Parts Loader	Pallet Pool	Bar Feeder
	Package 1 7 KG Capacity	Package 2 25 KG Capacity	Package 3 50 KG Capacity			
VF-1/VF-2	✓	✓		✓	✓ ††	
VF-3 - VF-5		✓	✓			
VF-6+			✓			
VC-400					✓	
UMC-500		✓		✓	✓	
UMC-750		✓			✓	
UMC-1000		✓			✓	
UMC-1250					✓	
ST-10 - ST-15	✓ *			✓ †		✓
ST-20 - ST-28	✓ *	✓ *		✓		✓
ST-30 - ST-35		✓ *	✓ *			✓
DS-30Y						✓
EC-400					✓	

Configurations subject to change without notice. Availability may vary by region. \*Including long-bed models. †Y-axis models only. ††VF-2YT models only.