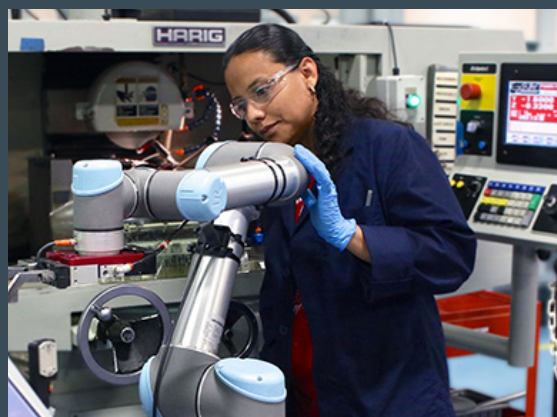


# Collaborative robots and machine tending

Automation that benefits shops and workers



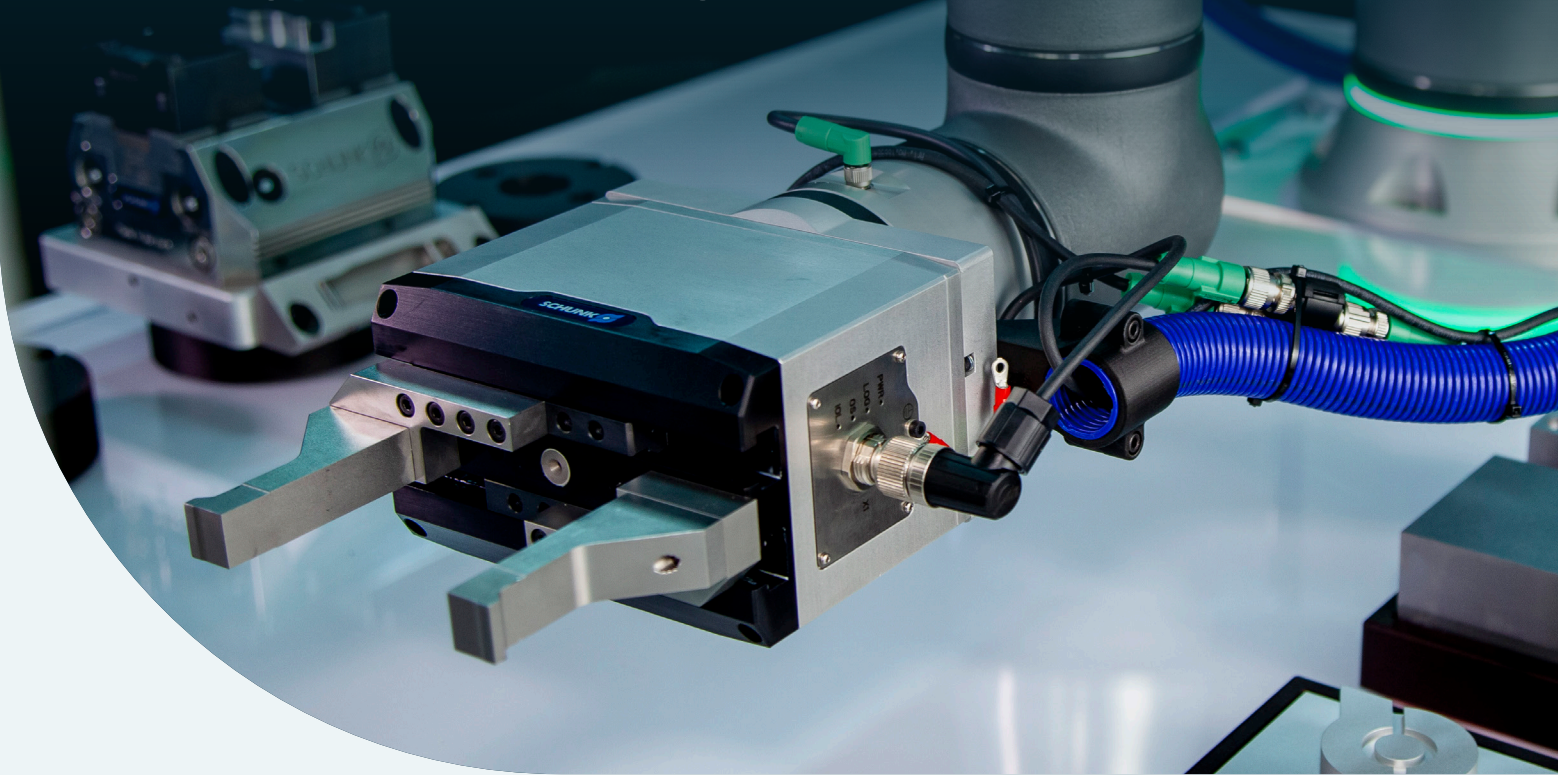


## Cobots balance the need for productivity and flexibility in machine shops, helping to free up valuable personnel, increase capacity, and breathe new life into idle equipment.

Improved productivity has long been the goal most sought after by manufacturers adopting automation. Starting with the flood of traditional robots into large automotive factories, most major industries have now invested in rigid automation systems that succeed in pumping out high volume part runs with little to no product mix. Two researchers on MIT's Work of the Future task force point out one consequence of this strategy – that [“what a company gains from \[traditional\] automation in productivity it tends to lose in process flexibility.”](#)

The task force advocates for positive-sum automation that doesn't compromise flexibility for productivity. Researchers Armstrong and Shah propose that successful automation strategies depend on technologies that empower front line workers to program & operate robots, to identify what processes should be automated, and to be the center of metrics measuring success.

# Cobots are ideally suited to automate the loading and unloading of machined parts.



Universal Robots pioneered the first commercially viable collaborative robots with this balance in mind. UR cobots feature small footprints, advanced safety protocols, and “low-code” interfaces that Armstrong and Shah describe as “assisting a line employee in configuring and troubleshooting a robot.” Collaborative robots are ideally suited for monotonous, low-value tasks like loading and unloading machined parts, which is repetitive even in high-mix machine shops. Whether they’re working press brakes, CNCs, injection mold machines, or others, machine tending cobots deliver:

**Productivity:** Collaborative robots can significantly increase machine uptime by operating consistently through a shift and workday. Skilled machinists can set up their cobot and machine tool, then leave the system running to pursue higher value tasks throughout the shop.

**Flexibility:** Collaborative robots can be programmed to automate multiple parts and processes, which makes them ideal for small batch and high-mix production environments. This means that manufacturers can quickly switch between different parts and machines without having to reconfigure their production lines.

**Quality:** Cobots bring robotic precision and repeatability to part loading. UR Cobots can even directly interface with many CNC controllers, synchronizing with vises, chucks, other workholding devices, and automatic doors to reduce or eliminate scrap.

These fundamental benefits often combine to form more positive outcomes. Automating CNC machines with collaborative robots can help manufacturers achieve greater efficiency, safety, flexibility, and cost savings in their manufacturing processes.

# Balancing high-wage jobs and a fast-growing business: Go Fast Campers

At [Go Fast Campers](#) in Bozeman, Montana, a line of four UR5 cobots are fully integrated with Haas CNC machines, offering 22 hours of productivity per day, including 6 hours of unmanned, lights-out manufacturing. The robots all use the same robot program, so that any cell can run any of the company's parts in any volume to meet each day's assembly requirements.

The UR5 cobots' flexibility and ease of integration and programming mean GFC can run 20 to 25 jobs across four machining centers each day, with changeovers taking only 10 to 15 minutes. The machine cells produce just the quantities needed for that day—whether that's 15 or 500 pieces.

Go Fast Campers manufactures 174 unique parts—from bolts to connectors to hinges—for its customized pop-up truck campers. All of the parts start as raw pieces of aerospace-grade aluminum billet material that is cut into seven different standard stock sizes and loaded on trays at the four cobot-manned machining cells. Each robot uses the same program, only requiring simple inputs from the operator to define which part is being manufactured. The robot then picks a piece, sets it in a re-grip station so it can find the part's center, and loads it into the machine. The machine mills the first operation, the robot flips the part to machine the second operation, the part is ejected out of the vise, and a retractor arm pulls the parts into a wash bin, ready for subsequent processes.

**“ These automation tools, you usually only see them in these giant businesses, and I think they actually have the most power for small businesses. Automation is a really powerful tool to allow for a much bigger diversity of products and perspectives.**

Wiley Davis  
CEO and co-founder, Go Fast Campers





## Boosting CNC machine production by 600%: Raymath

“Customers want to have fewer suppliers,” says Greg LeFevre, CEO and President at Ohio metal fabricator [Raymath](#). “So instead of a hundred suppliers, they would like to have ten that can do more. We wanted to satisfy those needs.” LeFevre knew automation would be key to meeting Raymath’s expanded productivity goals, but his experience was in high-volume, low-mix manufacturing: “It was very easy to automate when you make millions of a specific part. Moving into the fab-shop, sheet metal-type business, we’re now looking at a large number of different parts, but in much smaller volumes,” he explains. Because traditional automation doesn’t lend itself to high-mix, low-volume, Raymath needed a much more flexible approach.

Raymath turned to UR for its machine tending automation needs, adding the [UR cobot-based ProFeeder](#) machining cells from ProCobots to its two 3- and 5-axis Hurco CNC machines.

“We get 24 hours of machining time where we’ve never been able to get that before,” LeFevre states. That lights-out processing gives Raymath more than a 600% productivity boost in machining, getting double the hours with the same number of workers. This is especially important when workers—especially for third shift work—are in short supply.

Raymath can now take on business the company never had the manpower and the ability to do before. “Now that we can meet all of customers’ needs, they are less like to go to a competitor who might also gain future business. It’s extremely valuable,” says LeFevre.

“ The programming itself is straightforward. The robot has a general path that it follows to take the part into the machine. All you’re teaching it is from that point to the vise and where to place the part in the vise.

[Larry Dare](#)  
CNC machining supervisor, Raymath

# How to decide if cobot machine tending is right for your business

When considering whether cobot machine tending is right for their business, manufacturers should take the following steps:

1

## Identify projects

List out the entire production process to identify tasks that are repetitive, dangerous, or require a high level of precision. These are the types of tasks that are suitable for automation with cobots.



2

## Assess paths to deployment

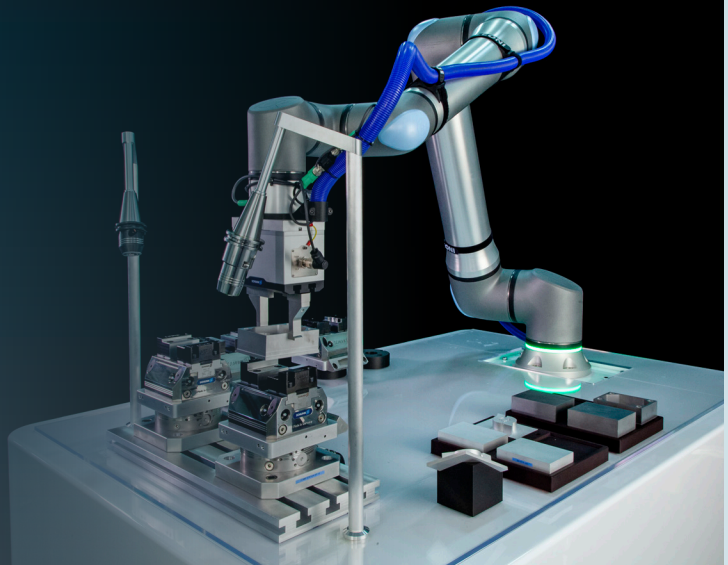
Manufacturers should evaluate the peripheral tools, programming, and installation considerations for their project, and decide what level of support will reduce time and complexity to reach full production. Partnerships from value-add distributors, to OEM system builders, to systems integrators, are all working to automate machine tending smoothly for manufacturers of all sizes.

# How to decide if cobot machine tending is right for your business

3

## Compare cobot capabilities

Manufacturers should assess the hardware and software capabilities of multiple cobot suppliers to determine what product configurations can perform the required tasks. They should consider factors such as payload capacity, reach, repeatability, and speed, among many others.

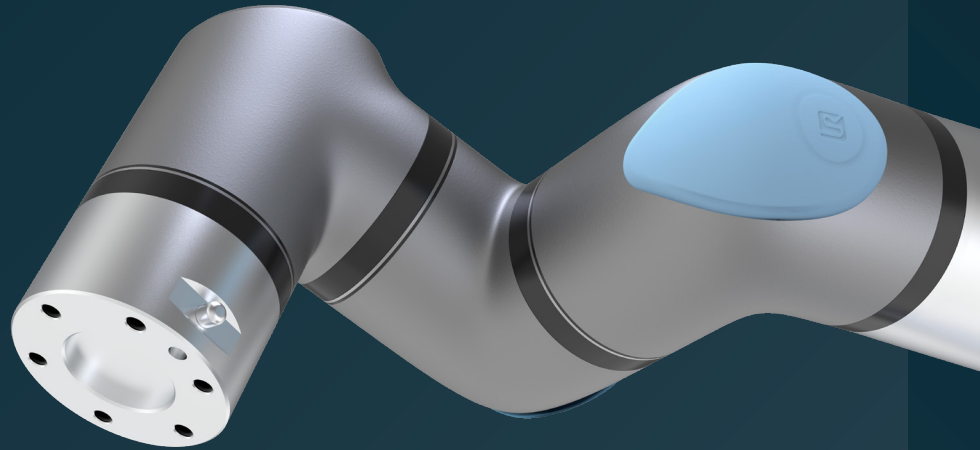


4

## Evaluate benefits

Beyond justifying automation investments, Armstrong and Shah “consider the measures of success for human teams to be the most important: Does the automated system make them better at their work? Are team members performing at a higher level than they did previously? Can they apply their skills more creatively? Does the availability of automation technology allow teams to do things that they could not have done otherwise?”





## How to get help from Universal Robots

Whether a business needs help tending a CNC, press brake, injection molding machine, or 3D printers, cobots help increase productivity, improve quality, and address the labor shortage by allowing employees to focus on more skilled and valuable tasks. Not only does collaborative automation improve the bottom line, but fulfills MIT's vision "in which automated systems make humans more capable and more vital at work."

Let Universal Robots demonstrate how cobots can multiply workforce productivity, increase customer value, and offer a fast ROI. Contact [ur.na@universal-robots.com](mailto:ur.na@universal-robots.com) to identify projects where cobots can deliver value in under 12 months. In most cases, our technology can be implemented and fully operational within 30 days of purchase order submission.



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