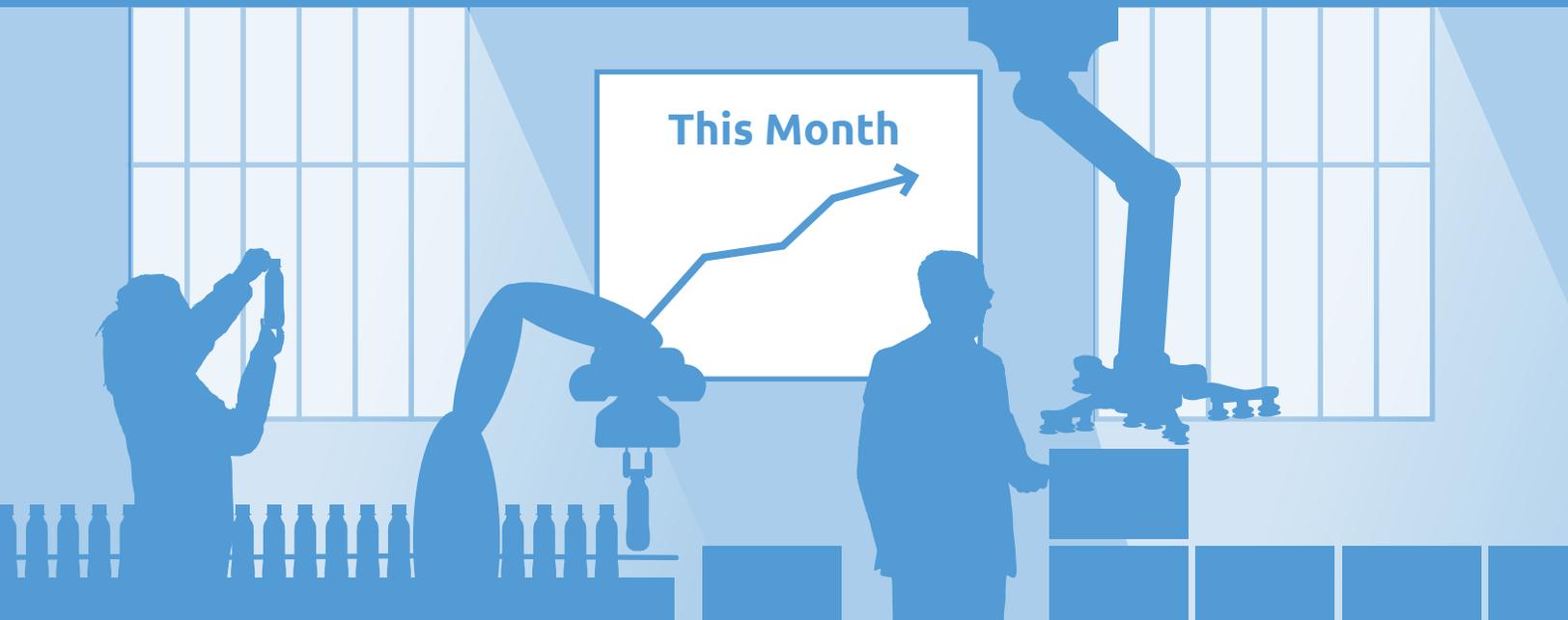




How to Grow Your Business with **Collaborative Automation**



ROBOT OPTIMIZATION GUIDE

Optimize flexibility, output, and quality for any application



Today's EoAT is the key to optimizing your processes and growing your business with greater flexibility, higher output, and improved quality.

COLLABORATIVE AUTOMATION LEVELS THE PLAYING FIELD

Collaborative robot arms (“cobots”) have leveled the playing field for small and mid-sized manufacturers. For decades, large manufacturers have had the advantage of automation, using traditional industrial robots. But these large, expensive, and complex robots are designed for high volumes and unchanging production processes—unlike the low-volume/high-mix production that is typical for smaller manufacturers.

Collaborative automation has become a versatile, cost-effective, and user-friendly technology that allows businesses of almost any size (and any level of technical expertise) to increase productivity, improve quality, and respond more nimbly to changing customer demands.

But while cobots have become easier to buy and implement, they're only part of the equation.

The robot itself can't do any work without end-of-arm tooling (EoAT) such as grippers, sensors, and other automation peripherals.

With new EoAT technology advances, small and mid-sized manufacturers can now automate even more processes, including those that require the delicacy and precision of human fingers along with the repeatability and productivity of a robot.

WHAT'S CHANGED TO MAKE EOAT SO IMPORTANT?

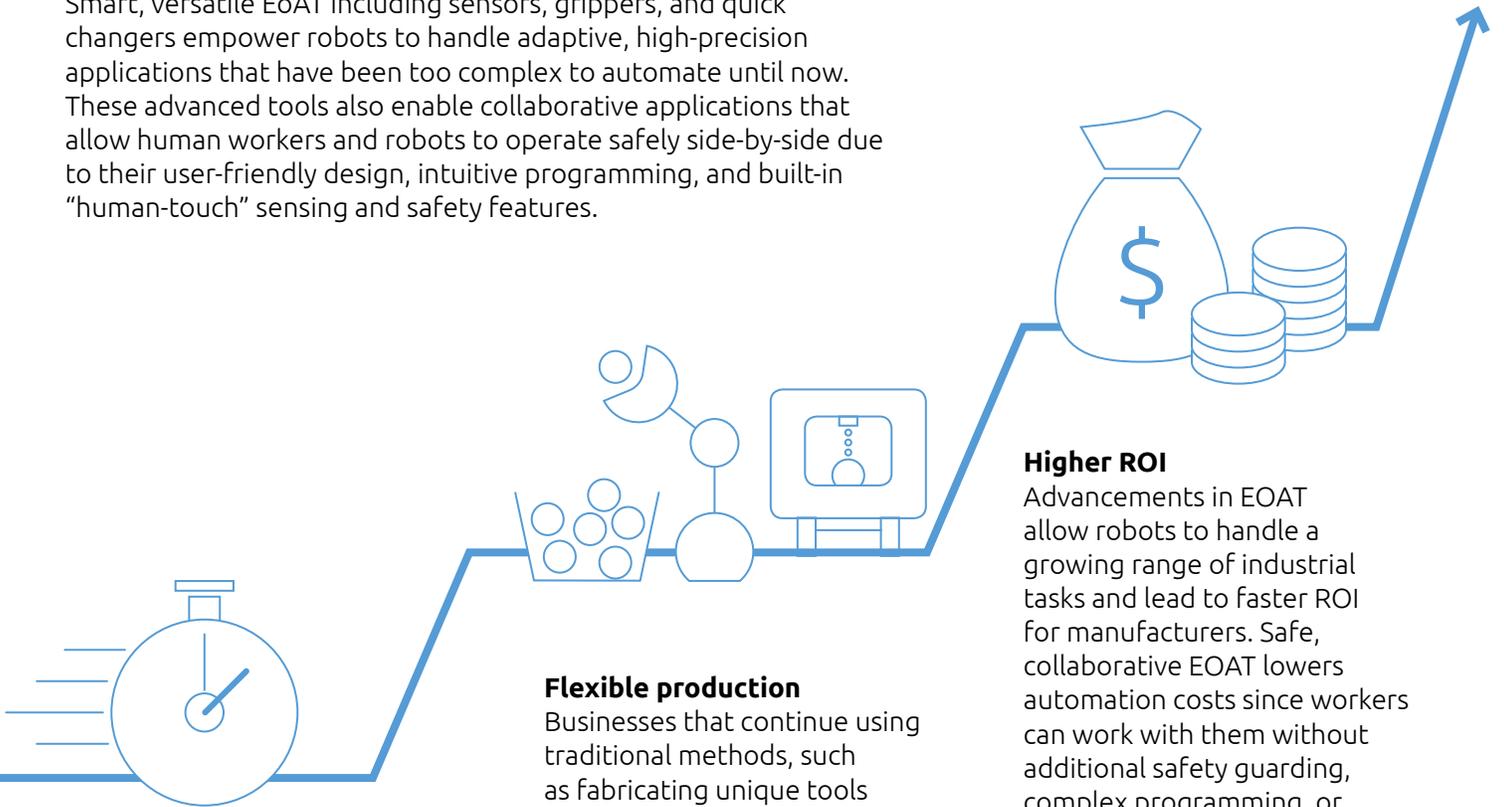
As collaborative automation has matured, the importance of the EoAT decision has grown. The differences between traditional and collaborative applications highlight the critical EoAT decisions that will impact your automation—and business—success.

THE IMPACT OF EOAT ON TRADITIONAL VS COLLABORATIVE APPLICATIONS

| Traditional Applications | Collaborative Applications | EoAT Need |
|---|--|---|
| <p>Big batches, little variability Ideal for large companies that manufacture high volumes of the same products for long periods</p> | <p>Low-volume, high-mix Designed for low-volume, high-mix production, where the robot is often redeployed for new processes</p> | <p>Flexible, quick-change tooling to eliminate downtime between various processes</p> |
| <p>Complex deployment Requires extensive programming skills and takes days or weeks to set up</p> | <p>Fast and easy deployment Easy to deploy with simple programming that even inexperienced users can set up within minutes</p> | <p>Tooling that is fast and easy to program and deploy</p> |
| <p>Requires constancy Programmed for unchanging environment and the same movement with minimal need to adapt</p> | <p>Adapts to environment Flexible to adapt to changing environment and workpieces to be handled</p> | <p>Tools that easily adapt to varying sizes, shapes, and conditions of workpieces and the environment</p> |
| <p>Not safe without guarding Typically requires safety guarding to keep human workers out of the robot's work cell</p> | <p>Collaborative and safe After risk assessment, humans can work alongside robot in collaborative applications</p> | <p>Safe, collaboratively designed tools that simplify interaction with humans</p> |
| <p>Focus on the robot Repeats the same actions for years, with unchanging tool that is integrated for a specific process</p> | <p>Focus on the EoAT As robot arm becomes a commodity, focus shifts to EoAT to increase robot utilization</p> | <p>Flexible tooling that can be used for multiple processes</p> |
| <p>Big investment, longer ROI Expensive robots, system integration, and operator training requires large upfront investment and takes longer for ROI</p> | <p>Lower upfront cost, faster ROI Competitive pricing, in-house integration, and ease-of-use minimize up-front costs and speed integration, uptime, and ROI</p> | <p>Cost-effective tooling that speeds integration and reduces need for additional equipment</p> |

BUSINESS BENEFITS OF COLLABORATIVE EOAT

Smart, versatile EoAT including sensors, grippers, and quick changers empower robots to handle adaptive, high-precision applications that have been too complex to automate until now. These advanced tools also enable collaborative applications that allow human workers and robots to operate safely side-by-side due to their user-friendly design, intuitive programming, and built-in “human-touch” sensing and safety features.



Reduced deployment time
Collaborative technologies are designed for easy programming, even for operators without any robotics experience. That allows small manufacturers to take control of their automation plans, experimenting and integrating new applications independently as new needs arise. Employees—even those with no technical background—quickly learn how to use the robot and adapt the tooling for new, more efficient processes with minimal downtime between changes.

Flexible production
Businesses that continue using traditional methods, such as fabricating unique tools for specific manufacturing tasks, are at a significant disadvantage because of the high cost and inflexible nature of this approach. In comparison, flexible, application-focused EoAT can be easily deployed to handle different shapes, sizes, materials, and processes. These flexible, highly versatile tools can be seamlessly integrated into multiple production environments.

Higher ROI
Advancements in EOAT allow robots to handle a growing range of industrial tasks and lead to faster ROI for manufacturers. Safe, collaborative EOAT lowers automation costs since workers can work with them without additional safety guarding, complex programming, or installation costs. The tools are flexible and easily deployed, so operators can quickly switch between multiple tasks with minimal need for additional programming or tool swapping. And the tools allow robots to complete tasks with greater precision and reliability than human operators, so they can operate around the clock and dramatically increase production.

THE IMPACT OF ADVANCED EOAT ON COLLABORATIVE APPLICATIONS

OPTIMIZE

SURFACE FINISHING

Surface finishing such as polishing, deburring, or sanding requires a delicate touch. Every surface has small variations so in order to achieve an even finish, the sander or polisher must meet the surface with a constant force and move with an even speed.

The addition of a 6-axis force/torque sensor lets the EoAT follow any contour while maintaining a constant force for the perfect result. This makes it ideal for applications such as cars, stainless steel sinks, furniture, and appliances, as well as machined parts that need a polished surface. Built-in force-control software allows operators to record the path with their hand rather than programming every waypoint separately, making polishing or deburring easy and allowing the robot to adjust to the surface automatically for a perfectly polished finish.

Recommended EoAT: HEX force/torque sensor

- ✓ Delicate touch
- ✓ Adapts to uneven surfaces
- ✓ Constant force and speed
- ✓ Consistent quality
- ✓ Force-control software for easy setup



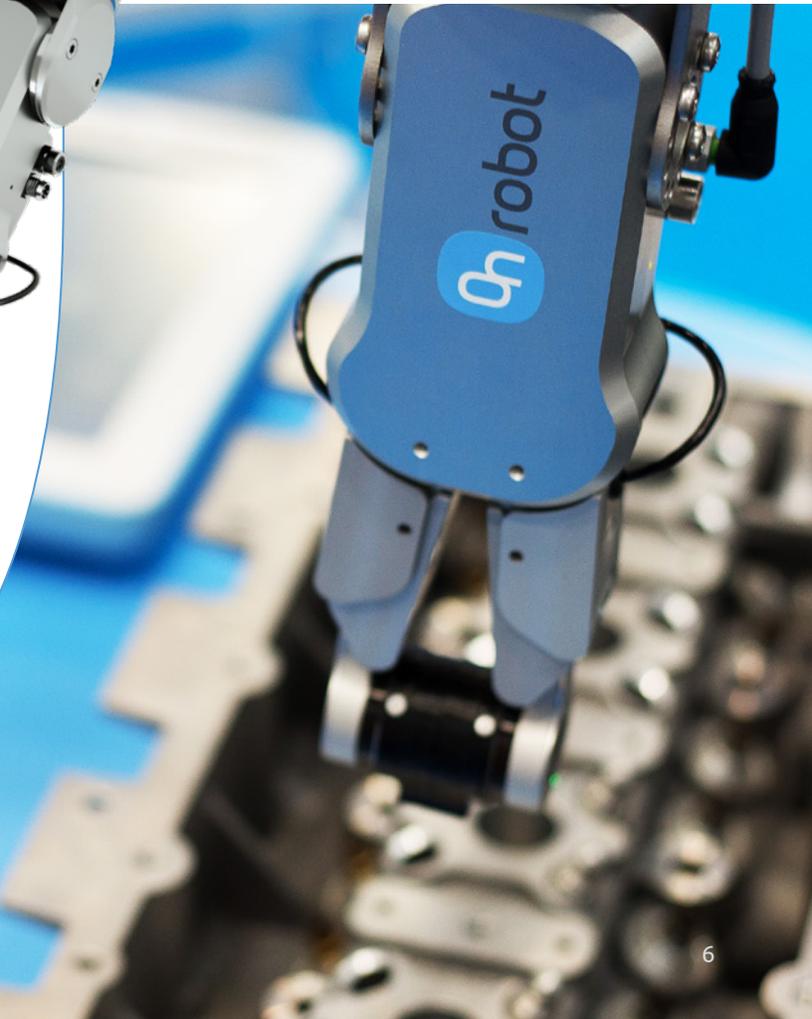
THE IMPACT OF ADVANCED EOAT ON COLLABORATIVE APPLICATIONS

OPTIMIZE ASSEMBLY

Recommended EoAT:
HEX force/torque sensor,
RG2-FT gripper, RG2/6 grippers

- ✓ Precise insertion
- ✓ Easy orientation
- ✓ Force-control software for easy setup

Many assembly operations require the robot to locate items and grip them precisely, often handling small parts of various shapes and sizes. With the right EoAT and force-control software, the robot can be easily programmed to align the object with a hole, place parts precisely, and find the right orientation while assembling parts. This provides a fast and robust solution for precision fitting, and allows orientation of the objects to be automatically corrected.



THE IMPACT OF ADVANCED EOAT ON COLLABORATIVE APPLICATIONS

OPTIMIZE

PICK & PLACE

Requirements for pick and place applications have become much more sophisticated, which is driving the need for advanced EoAT. Applications may require sensitivity akin to human fingertips, the efficiency of dual grippers, the flexibility to grab objects of differing sizes and materials, or the ability to grasp items without leaving a mark.

Recommended EoAT:

RG2-FT grippers, RG2/RG6 grippers, Gecko gripper, VG10 gripper

- ✓ Extend senses similar to human hand
- ✓ Ability to handle different sizes and shapes
- ✓ Ability to position objects
- ✓ No-mark grip, even on flat or porous objects

A gripper gives you precision handling hour after hour and it never gets tired. Our grippers are easy to install and program and fit a wide range of cobots and light industrial robotic arms.



THE IMPACT OF ADVANCED EOAT ON COLLABORATIVE APPLICATIONS

OPTIMIZE

MACHINE TENDING

Machine tending requires repetitive motion and a high level of consistency, even after hours of work. Automating machine tending improves worker safety and frees them for higher-level tasks. It can also increase productivity and allow production to continue after normal work hours, for greater output and business flexibility. A dual gripper can significantly decrease cycle times as it is able to handle two objects and actions simultaneously.

Recommended EoAT: RG2/RG6 dual gripper

- ✓ Dual gripping for higher ROI
- ✓ Ability to handle different sizes and shapes at one time



THE IMPACT OF ADVANCED EOAT ON COLLABORATIVE APPLICATIONS

OPTIMIZE

PACKAGING & PALLETIZING

Packaging and palletizing applications have become far more efficient with EoAT that can precisely palletize two different shapes and sizes of boxes at the same time. New electric vacuum grippers eliminate the need for an external air supply and hoses, easing the integration, reducing costs, and producing less noise and dust. Stacking and packaging tasks that require a human sense of touch can be automated quickly and easily.

Recommended EoAT:

RG2/RG6 grippers, VG10 gripper

- ✓ Ability to handle different sizes and shapes
- ✓ Ability to find the position of the object
- ✓ Stacking/destacking with easy programming



THE IMPACT OF ADVANCED EOAT ON COLLABORATIVE APPLICATIONS

OPTIMIZE

QUALITY TESTING & INSPECTION

Laboratories are often small and space is at a premium, so a small collaborative robot can be a great solution along with EoAT that ensures precision and consistency. Grippers with programmable force can easily handle blood test samples or other delicate operations, reducing the need for operators for monotonous manual tasks and improving consistency and quality. Force sensitivity allows the robot to safely hand items to a technician for inspection, with a human-like hand-off.

Recommended EoAT:

HEX force/torque sensor

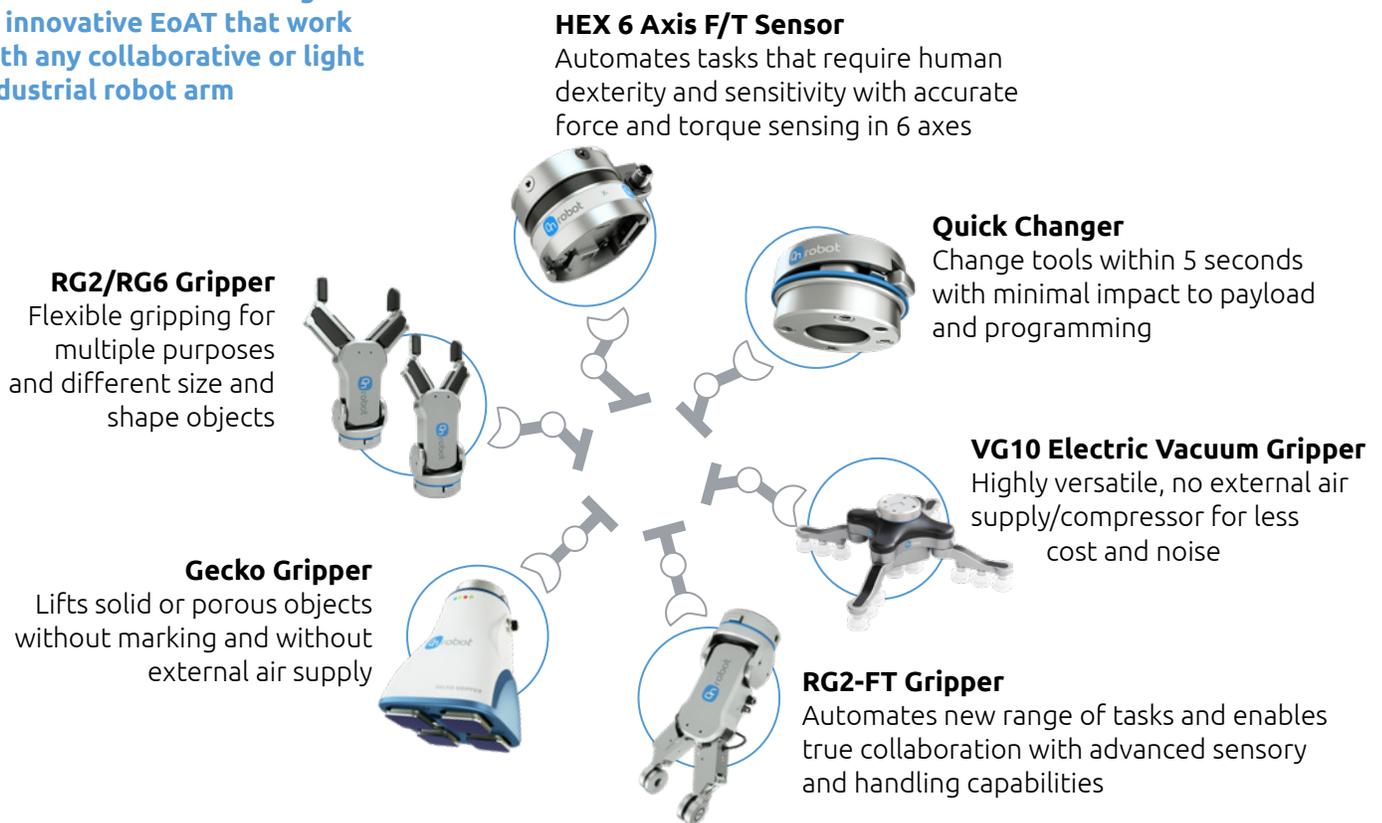
- ✔ Ensures constant quality
- ✔ Maintains constant force
- ✔ Enables safe collaboration with human operators



HOW TO OPTIMIZE COLLABORATIVE APPLICATIONS WITH THE RIGHT EOAT

Cobots and light industrial robots are now being used in a wider range of applications than ever because of advances in end effectors that provide greater value in more environments. Along with handling variations in product size, weight, and shape, EOAT also enables robots to accommodate several processes at once. As robot arms become commoditized, the choice of cobot becomes less important than the choice of EoAT.

OnRobot offers a full range of innovative EoAT that work with any collaborative or light industrial robot arm



EoAT: The Next Frontier for Collaborative Robotic Innovation

“The innovation that is occurring in the field of end effectors is the next frontier for collaborative robotic innovation. As collaborative robotic arms move towards commoditization, the innovation occurring around the end-of-arm tooling will enable organizations to deploy robotic technology in new ways.”

John Santagate, Research Director for Commercial Service Robotics at IDC

GET YOUR GAME-CHANGING ADVANTAGE

Innovative end-of-arm tooling changes the game for collaborative automation. Find out how you can gain new advantages for your specific application.

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REQUEST A
QUOTE
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PRODUCTS



About OnRobot

OnRobot provides innovative plug & produce end-of-arm tools that help manufacturers take full advantage of collaborative automation: ease of use, cost-effectiveness, and safety alongside human workers. OnRobot tools work with any collaborative or light industrial robot arm and are available through a worldwide network of over **100 distributors** in more than **40 countries**.



For more information visit: www.onrobot.com
Or contact us: sales@onrobot.com