Robot Programming Made Easy

Traditionally, programming industrial robots to perform complex coating tasks has required in-depth programming knowledge and specialized expertise. This is a significant hurdle for small and medium-sized companies in particular when it comes to using robots in coating. New technologies and solutions not only promise to simplify processes, but also to increase productivity and flexibility.

The demand for efficient, precise and automated coating processes in industry is constantly increasing. These tasks are increasingly being performed by robots that are designed and equipped for this purpose.
Reiter develops and integrates innovative solutions that make it possible to create coating programs without extensive robot programming knowledge. Depending on the task, the solution can be an Easy Teach configurator, the hand-held Easy Teach mimic system, or a 3D scanner solution for automatic position correction, component recognition and automatic program generation.

Compare the programming options for coating robots

When it comes to automating the coating process, robot programming plays an important role in efficiency, precision and flexibility. Various programming methods offer different advantages and disadvantages, which can vary depending on the application and the general conditions. Reiter Surface Technology has drawn up a comparison that highlights five main programming approaches for robots: classic teaching, offline programming, the EasyTeach configurator with measuring system, Easy Teach Mimic and automatic path generation.

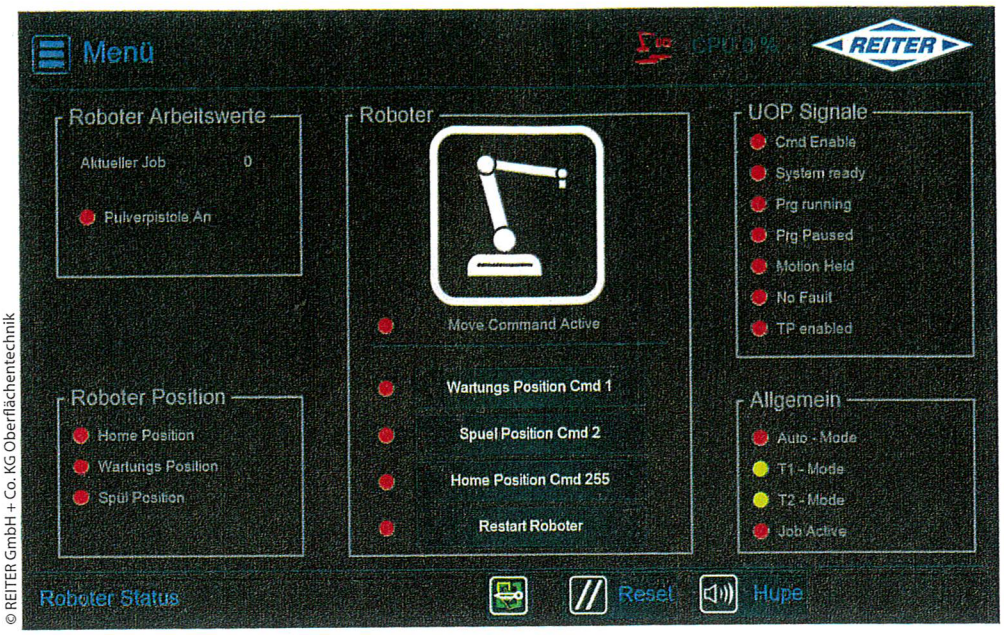
Comparing these methods in terms of possible uses, applications and prior knowledge serves as a basis for selecting the optimal solution.
Since the classic teach procedure, offline programming and automatic path generation require in-depth robot programming knowledge, Reiter has developed tools and solutions to simplify these complex procedures. This simplifies processes and increases productivity and efficiency.

Configurators

Reiter develops customized Easy Teach configurators for applications with a

Process	Easy to use	Robot programming experience	Offline programming experience	Creating path programs	Components	Price
Teachen	no	yes	no	Depending on experience	all	Training costs
Offline programming	no	yes	yes	Depending on experience	all	Offline software/ hardware, training costs
Automatic path generation	no	yes		online	No complex components	Measuring system, soft-/hardware (evaluation)
EasyTeach Configurator + Measuring system	yes	no	no	fast	Component group with uniform geometry	Configurator, adaption, measuring system
EasyTeach-Mimic	yes	no	no	fast		Soft-/hardware, instruction

This table provides an overview of five different programming methods.



The robot status is visible in the configurator.

high variance of workpieces but similar geometry. The robot programs can be easily created via a visualization with the input of relevant data such as diameter, height and length. The configurator converts the input data directly into a customized robot motion program. This solution is suitable for workpieces with simpler geometric surfaces. Examples of solutions that have been implemented include pans, wafers, drive shafts, urns, doors, bicycle rims and many more.

The robot control is combined with a controller: In the basic version, operation is via the teach pendant, but a separate screen can optionally be used. The movement programs and spray parameters can be managed easily and clearly. Thanks

This system can be used to program robots for coating by manually demonstrating the process.

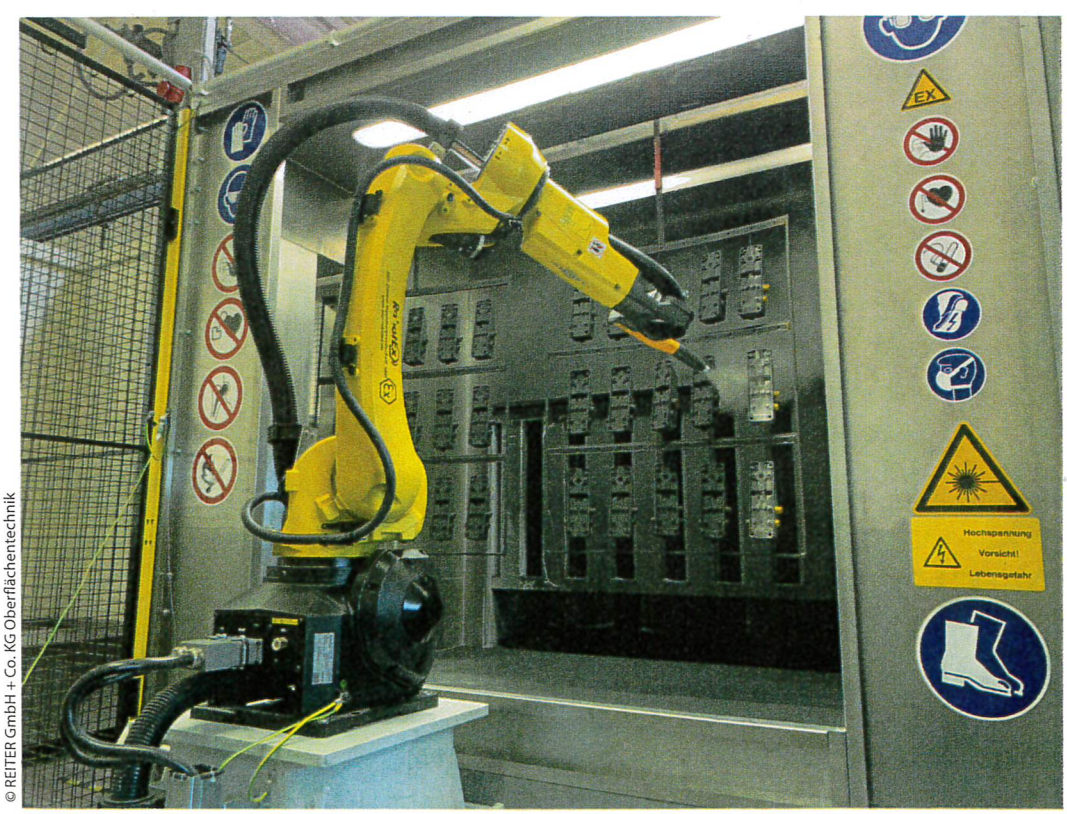
to open communication, it is possible to control or connect further components. Remote control also enables online support and service.

An additional plus is the reciprocator control – the robot can be operated as a reciprocator using Easy Teach. The parameters for return points, up/down/speed/gun position (gun angle), etc. are simply entered on the screen. This simple setting of the coating parameters without having to create a robot program makes the tool ideal for small series workpieces.

The Easy Teach configurator can also be combined with an inline workpiece measurement system. In this case, the robot motion program is automatically adapted to the measured workpiece dimensions.

Programming by demonstration

With the Easy Teach-Mimic system, a sample workpiece is first coated using a



Fanuc robot with Gema powder gun.

hand spray gun equipped with a sensor. The sequence of movements performed by the hand spray gun during coating is recorded and then repeated by the robot in the production process. The simple recording, transmission and replication of movements allows users to automate their workflows without having to deal with complex code. The intuitive user interface greatly simplifies the programming process and enables faster adaptation to changing requirements. This makes automation easier than before and enables companies to increase efficiency and reduce costs.
In particular, users who coat small to medium series, even with complex geometries, benefit from this solution.

Automatic program generation / 3D component measurement

Before entering the spray booth, the parts to be coated are measured three-dimensionally. Based on these measured values, a digital twin is generated, for which a robot motion program is then calculated. If 3D models are already available, the 3D scans can be replaced by them.
Before the calculated motion program is transmitted to the painting robot, a simulation is carried out to ensure that the motion program is within range and that no singularities occur.
The three-dimensional component measurement enables companies to precisely measure one or more components even when they are on a moving conveyor belt. A parts verification is then carried out by comparing the component with a stored 3D model in a matter of seconds. The parts verification checks whether the correct component has been hung up and thus whether the correct motion program for this part is being followed. In addition, a position detection is carried out for each component. The stored robot movement program is adapted to the detected position. This ensures consistent coating results even if the components are hanging at an angle. With the help of this technology, the otherwise very high requirements regarding the consistent positioning of parts in robot systems can be significantly reduced.

Conclusion

There are many ways to program robots. However, advanced technologies also make it possible to create coating programs quickly and easily. In addition, customized, application-specific solutions offer an efficient alternative. //

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