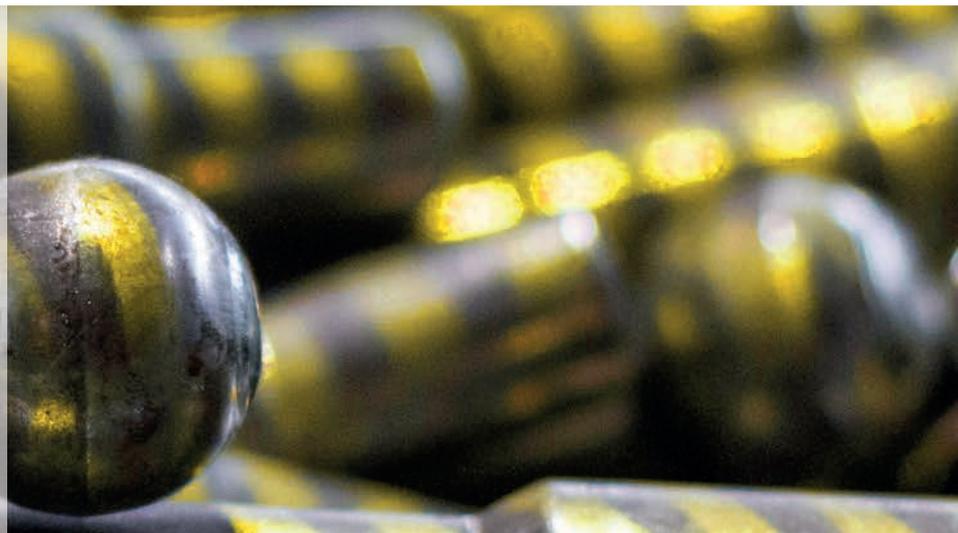
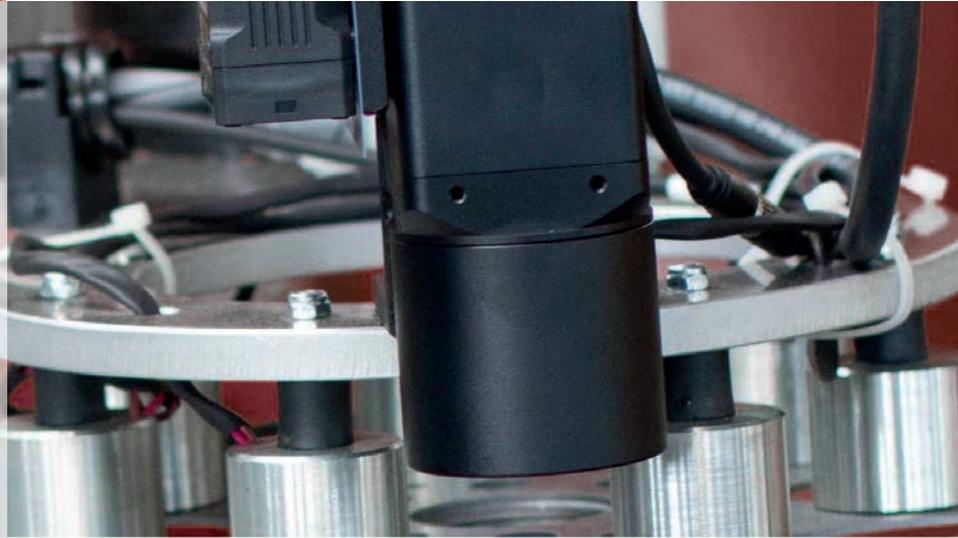




Anlagenbau & Fördertechnik GmbH



 **Robots**



**Your partner for innovative plant construction, conveyor technology and automation**



# About us

## → Ulrich Rotte GmbH

Founded in 1994, our extensive product portfolio now offers our customers a range of attractive benefits. Fully automated production facilities and special developments in the field of robotics are the fundamental strengths of our company. Come and meet our team of dedicated developers and design engineers, who have a passion for design and creativity.

We ask you the right questions and supply customised solutions for the

- Automobile industry
- Solar industry
- Robotics
- Rubber processing industry
- Wood processing industry
- Technical laminates
- Measuring systems
- White goods
- Tool machines
- Iron and steel dealers
- Lighting industry
- Plastics
- ...

Thanks to our team of highly motivated and qualified technical professionals, we are able to offer our customers worldwide support and service – dedicated, unbiased, fast and flexible. We also provide on-site training courses, enabling your staff to learn new skills and make the most of your new plant.

We are also your specialist partner for special plant construction, particularly in the solar industry. Learn more about our skills and expertise on the following pages.

Yours sincerely,



Ulrich Rotte





# Degrees of mobility

## ➔ Flexibility

For us in special plant construction, robots are a highly flexible, three-dimensional handling and transporting component in addition to the various logistics and conveying systems. They extend our comprehensive range of special plant construction solutions.

Ulrich Rotte GmbH integrates robot solutions if the required degrees of mobility with traditional linear systems and rotary axes can no longer be achieved with conveying lines or hoisting units.

The advantages of robots as a solution for complex, individual types of task lie in the economic viability of their performance, the flexibility available and in the scope for being able to react to existing or anticipated product variety.

- 6 axes create any 3D space curves
- Movement sequences can be freely programmed for the many different tasks
- Can be reconfigured for supplementary and new projects
- Can be combined with supplementary functionalities, Degrees of mobility, actuators, sensors, tools



# Effective Production

## ➔ Rationalisation

Rationalisation of production is an essential competition factor as well as the actual implementation of production processes. Rationalisation is performed by the automated succession of repetitive tasks in the actual process and/or the workpiece logistics.

With our robot-supported production systems we ensure

- short, constant cycle times
- automated repetitive tasks
- repeat accuracy
- reproducibility in the production process

**Rationalisation through robot systems**



## Fast ➔ Product Change

With the ever more diversifying product ranges in the manufacturing sector, focus is increasingly on small batch sizes of a large number of different products. Quick throughput rates with a high level of automation only come completely into play if the amount of work involved and downtimes when changing products can also be reduced to a minimum. Programmed process and movement sequences, combined with systems for changing grippers or tools, enable products to be changed at the push of a button if necessary.

With our system solutions you will manufacture economically with

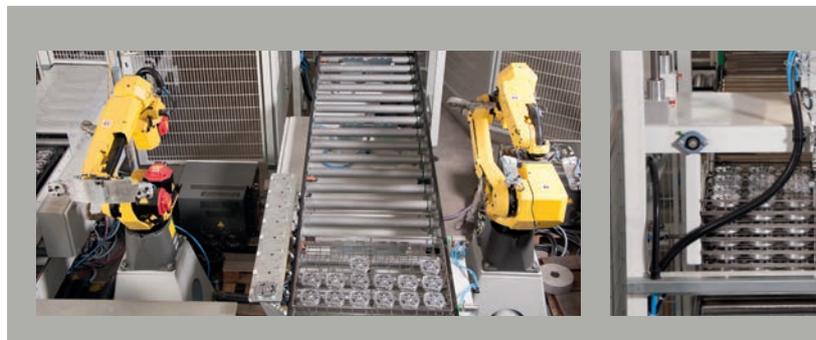
- a wide product range
- many different batch sizes, even small ones
- switching the movement sequence by push-button programme selection
- switching the sensors or grippers by automatically operating change systems as a product change or also as a tool change



# Automated ➔ Loading

Our customers' production profile spans many different industries and manufacturing processes. These all need the unfinished or semi-finished parts to be inserted into workpiece holders in operating and test processes.

- Automated supply of production processes
- Milling automation
- Turning lathe automation
- Charging heating sections
- Loading into measuring and test processes
- Stocking workpiece carriers in accordance with individual loading plans
- Removing from stacks
- Combining with transport systems



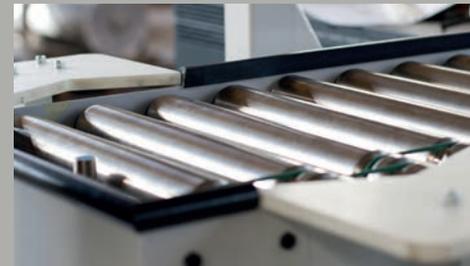
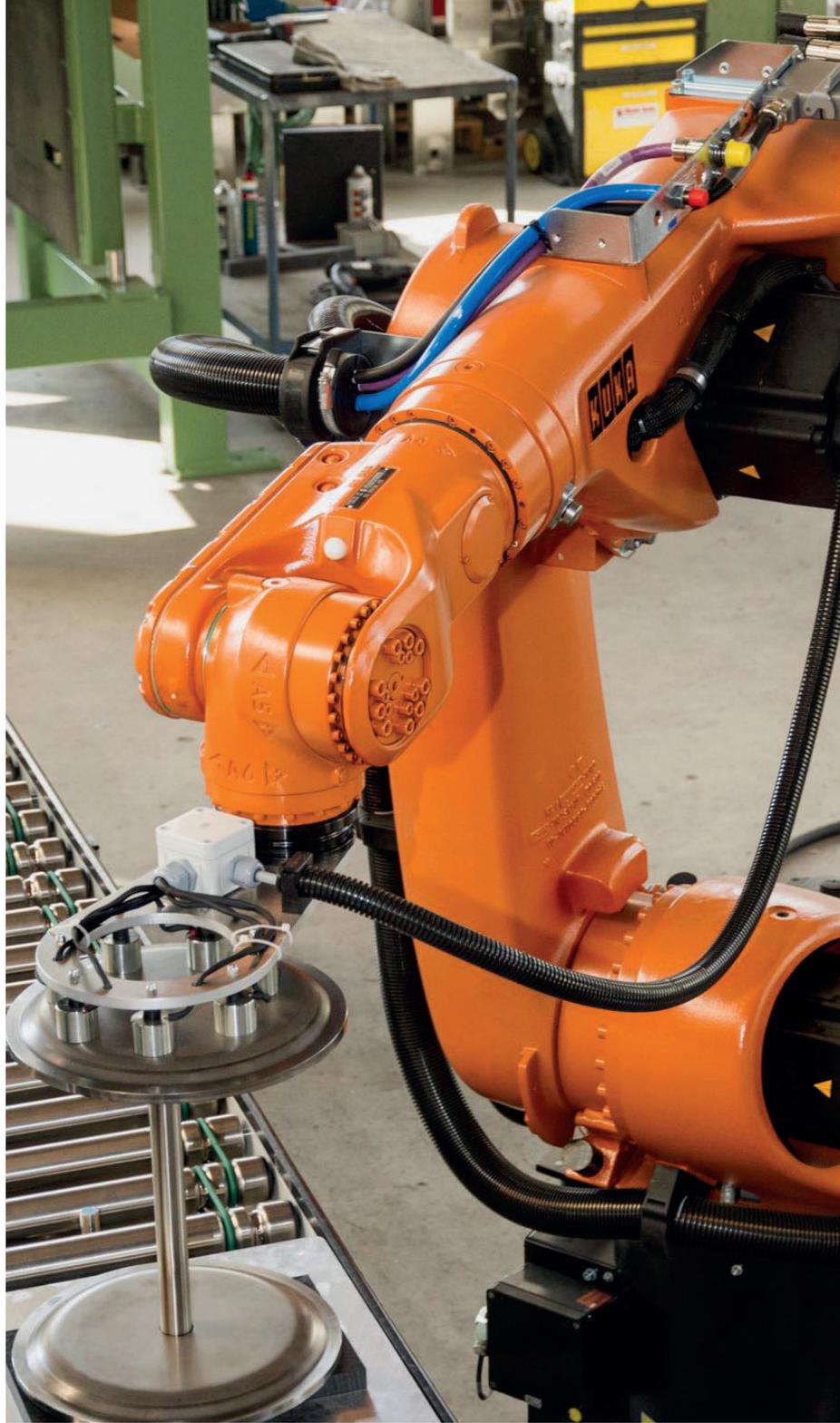
**Rationalisation through robot systems**

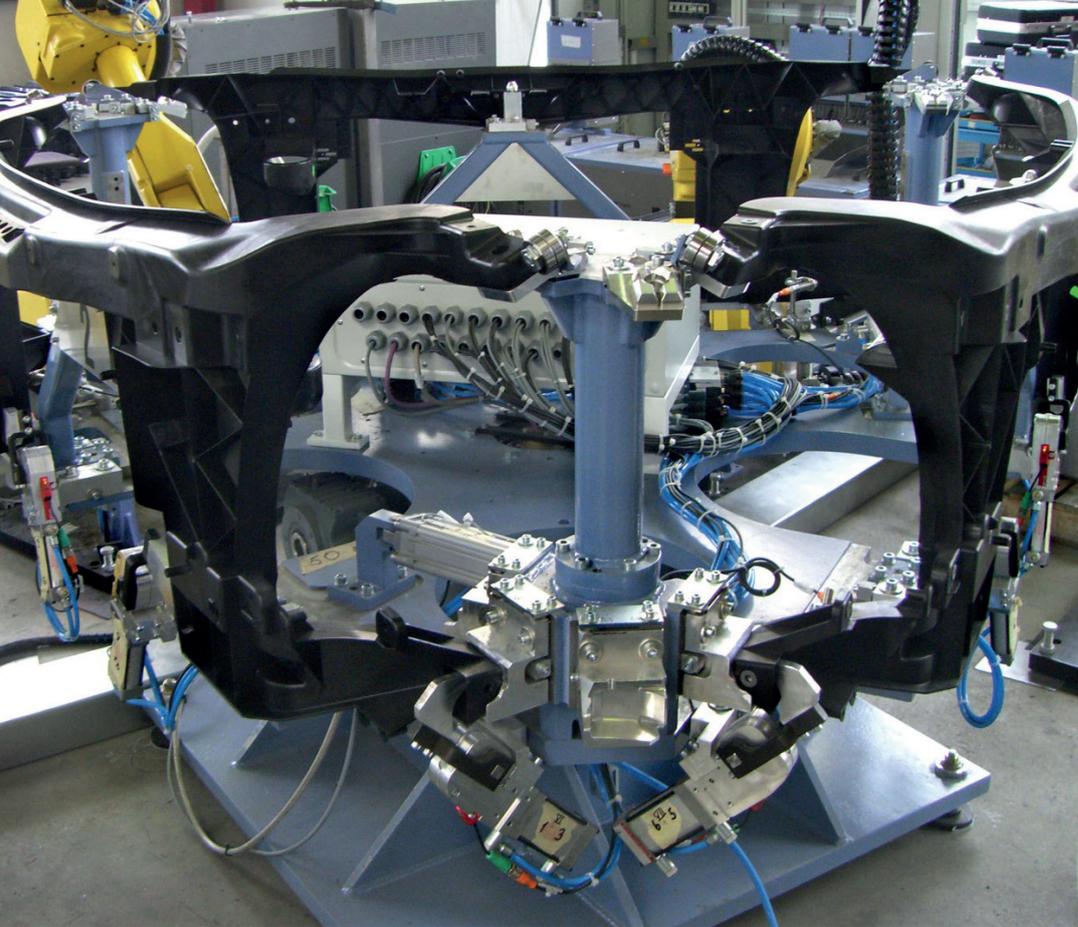
# Loading ➔ Packaging

Not only supplying the processing steps but also conveying onwards and finally packing rounds part handling off. With flexible robot technology we can load and pack by replacing personnel by a 6 axis helper. Here the required packing scheme or stacking sequences in the packaging unit can be started up and also bulky, large or heavy parts can be moved to their transporting racks.

We are also pleased to support our customers with the automated configuration of picking points and jigs in order to be able to use potential robot-supported packaging in the best possible way.

- Storage of finished workpieces in product packaging
- Complying with/ implementing product-specific packaging plans
- Stacking
- Mounting on transport racks
- Designing jigs so that they are suitable for automation





# Process reliability

## ➔ Fitting

Many fitting processes in series production require strength, endurance, precision and documentation. With this requirement profile people are quickly coming up to the limits of their capabilities and process reliability.

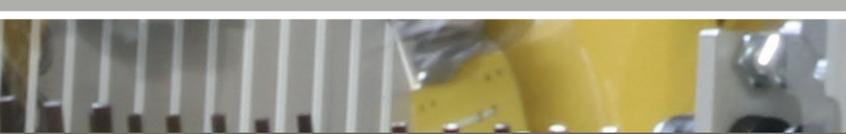
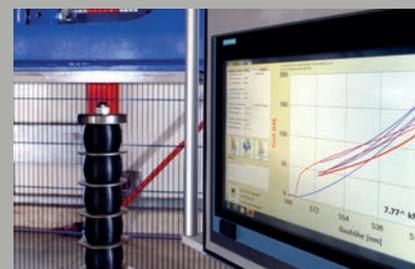
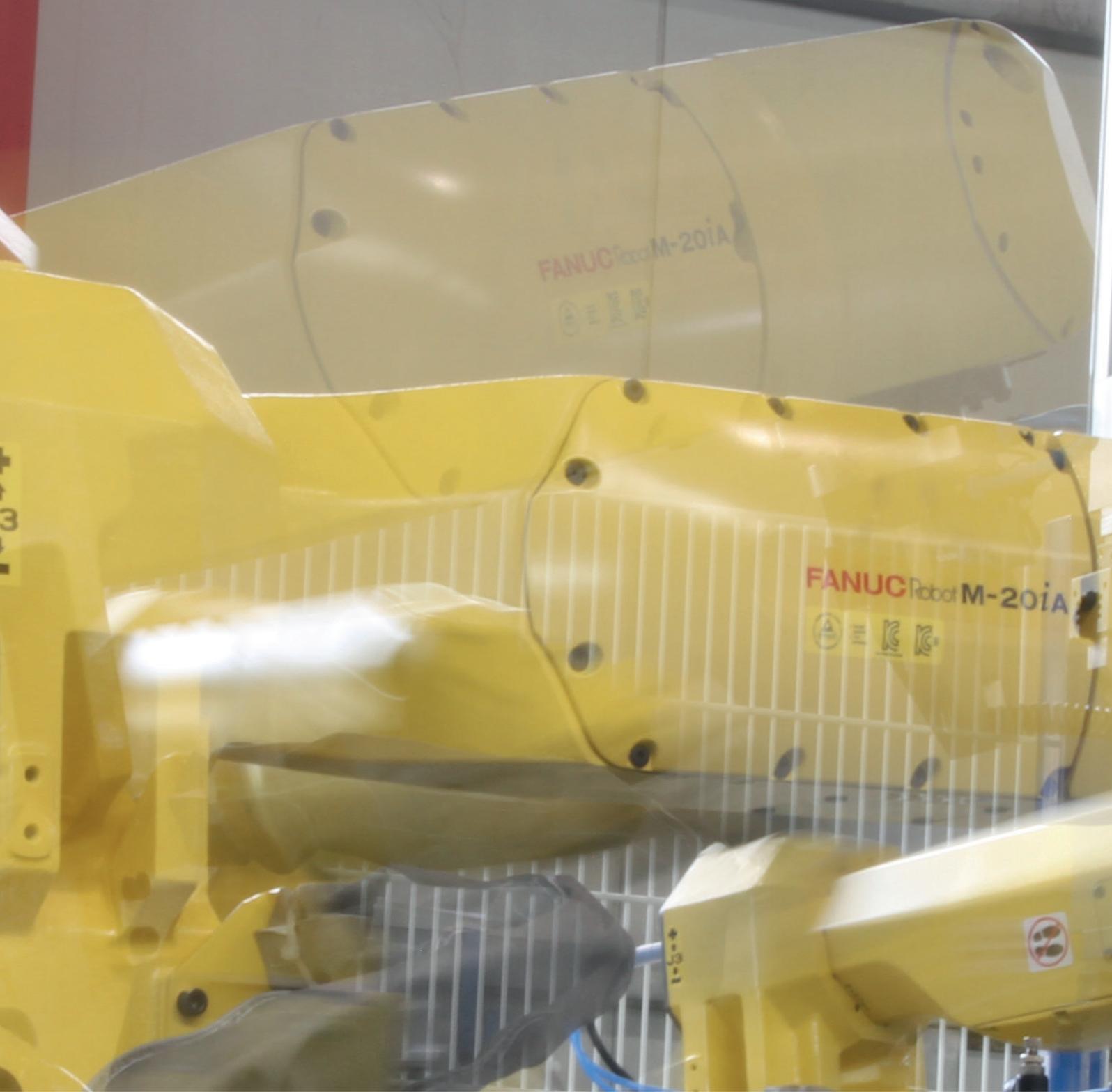
Robot-supported automation

- provides advantages when supplying fitting processes
- makes fitting processes possible with changing work content and jigs with changeover systems
- is supported by timing tables to further transport to the fitting stations and transport systems with jigs

Because of their high levels of freedom, robot-supported installations enable, for example, the heating of flexible workpieces on fixing tools with heat treatment and then unstacking.

Also the increasing need for documentation of the fitting activities performed or the process parameters applied here is made easier by robot-supported automation.

**Rationalisation through robot systems**





# Individual ➔ Grippers

Gripping systems differ depending on the tasks and product specification.

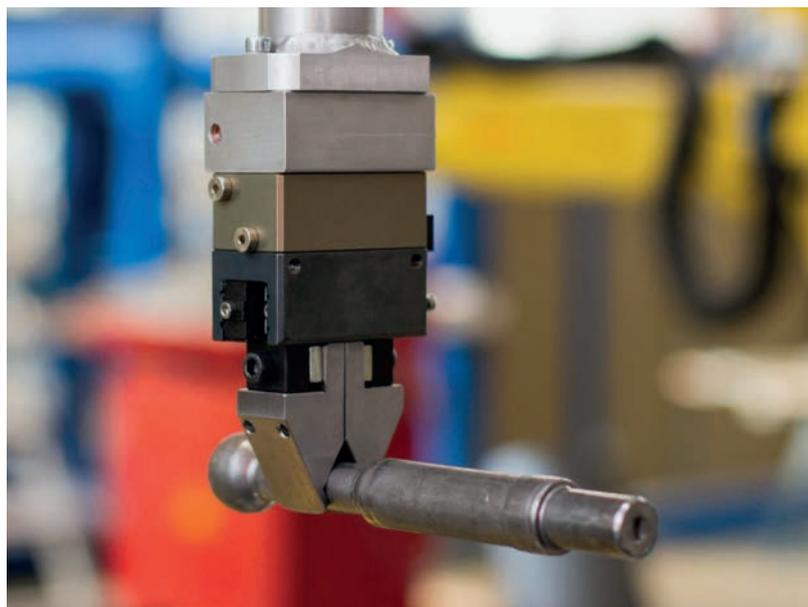
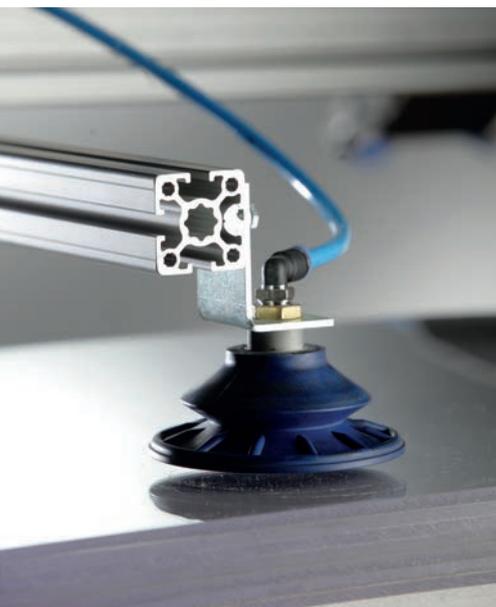
**Vacuum grippers** for panes of glass, wooden boards, metal blocks or plate, for 3D sheet contours, thermo-forming sheets with large surface components without starting points for positive locking, with two-dimensionally unstable parts, with no possibility of changing grip, only accessible on one side.

**Finger grippers** for form-fitted and also friction-resistant jigs.

**Magnetic grippers** for flexible gripping of magnetic workpieces from different product families or a production sequence in different production steps.

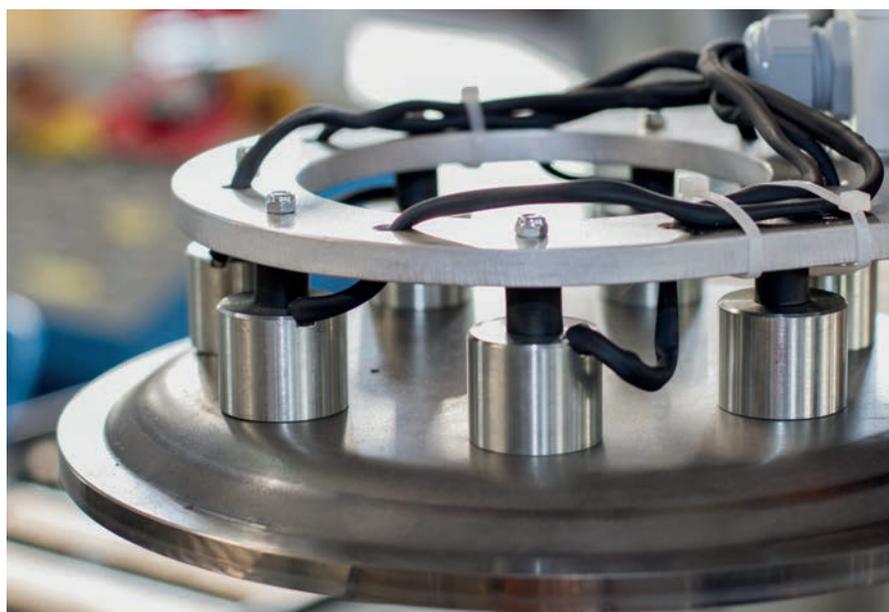
**Stationary interim storage grippers** as interim storage, for changing grip, as a second hand with its own movement sequence if a second robot cannot be used sensibly

**Gripper systems with tolerance balance** are used if joining processes are to be performed via lead-in chamfers, an exact height position cannot be guaranteed or determined, component positions when gripping are determined by sensors or when it is more important to handle the component carefully than for the position to be exact.





**Gripping with position detection** allows the locating of workpieces with camera technology, position-specific gripping with no prior alignment, detection and selection of the workpieces to be gripped in accordance with quality features or in accordance with product type features.





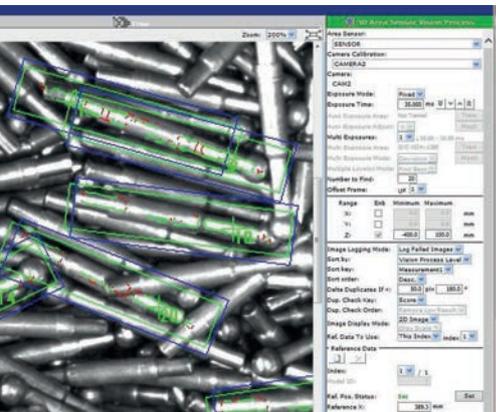
# 3D → Bin Picking

Many of the bulk goods prepared in industrial production are available as unsorted bulk material. Prefabrication processes transfer their production to pallet cages or system boxes in a form that is unwieldy for traditional automation.

Our current answer to this is called „The grip in the box“ or also bin picking. The challenging task arising from this is that bulk goods are in the pallet cage with an unsorted three-dimensional position of the workpieces.

We use 3D camera technology with fringe projection and object detection to identify the gripping position. These pictures are evaluated in accordance with different assessment standards and provide the robot with the 3D gripping position and the order of the detected workpieces.

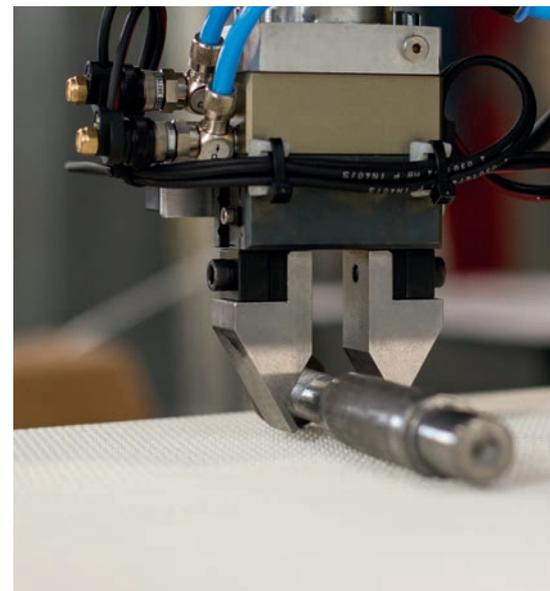
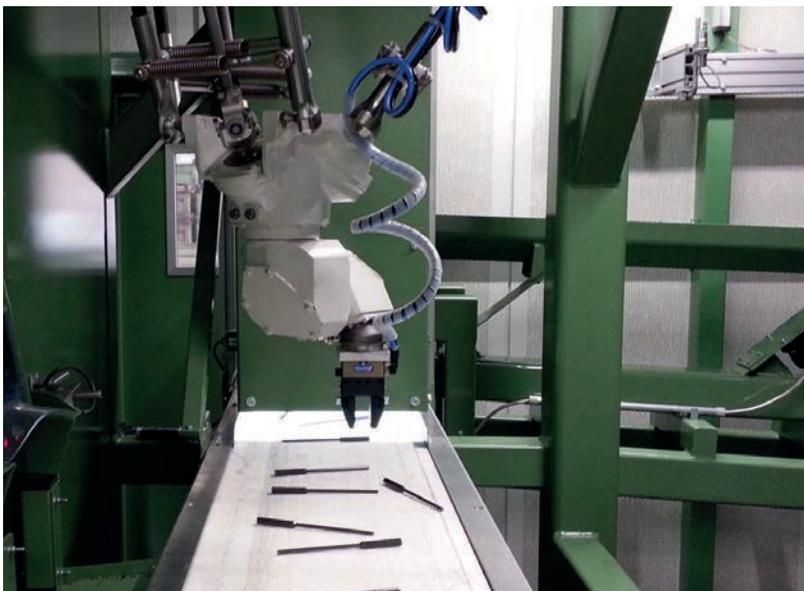
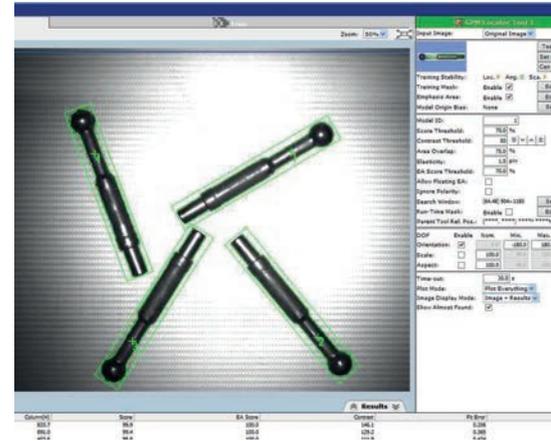
Depending on the further processing requirements, we check the parts that have been removed from the grippers for position and quality in a downstream visual process. This check of the gripper results is used to safeguard the process when supplying subsequent processes. Out of tolerance gripper results lead to rejection or returning to bulk goods.

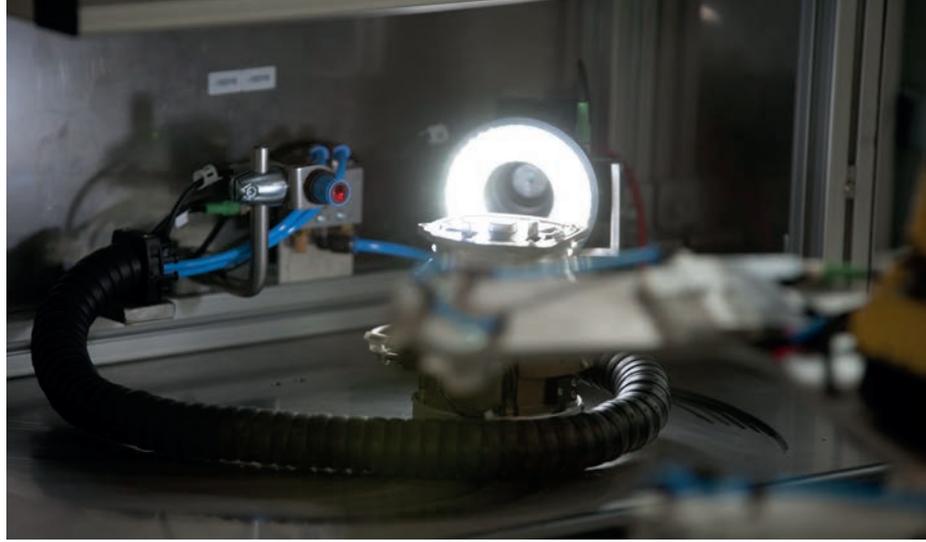
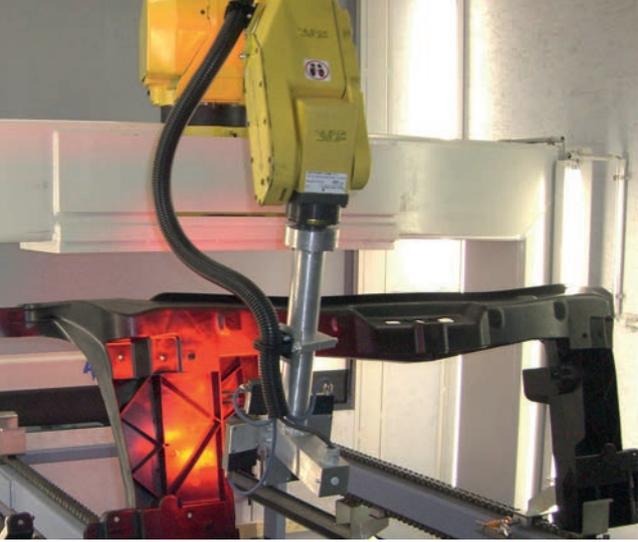


# 2D Line Tracking

We grip workpieces with any orientation in the plane in a line tracking procedure by the running conveyor belt. The 2D vision system locates the position and orientation. The measuring system installed on the conveyor enables the robot to access the part accurately in the conveying movement. In this way extremely short cycle times can be achieved in the isolation process and correctly positioned part preparation.

- Flexible application and adaptation with different similar workpieces
- Fast individual isolation
- 2D camera system with application-specific lighting
- Simple, clear incorporation of new products
- Precisely positioned gripping by the running conveyor with position monitoring
- Rejection of incorrect or undetected parts with or without resubmission
- Configuration and supply of the feed lines and further processing





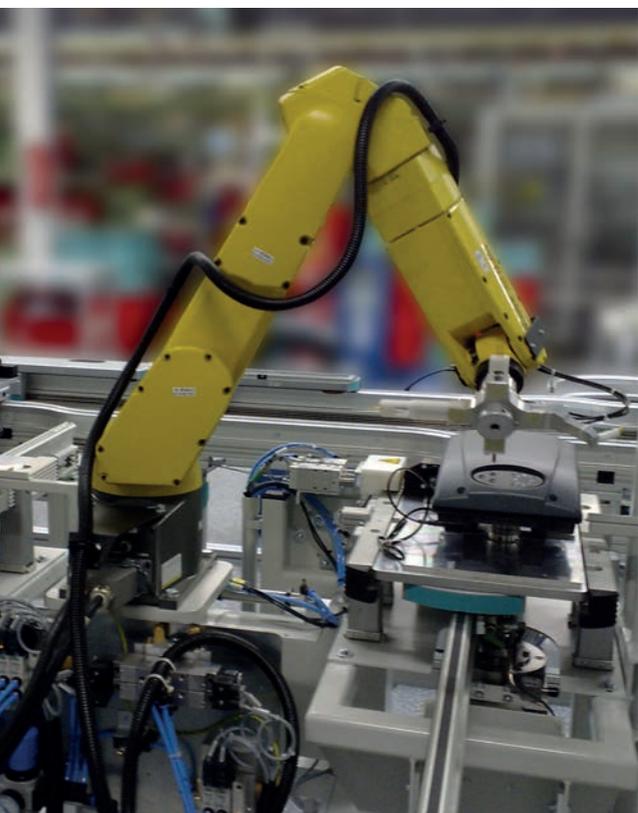
## Automated ➔ Quality Assurance

Checking the raw parts before finishing by sample detection, position detection, measuring and presence check increases production quality and production efficiency.

Before further processing the question is constantly posed: do the prepared raw parts meet the minimum requirements for further processing, have the preliminary processes been successful, is there transport damage and does this exclude constructive further processing, can the workpiece be gripped or tensioned at all, what part type is it and how should we proceed further with it?

The following systems that we use and configure supply the answers to this.

- Vision systems for detecting objects, whether stationary or as a mobile, robot-managed component check
- Precision optical measuring systems to measure processed workpieces with geometric testing, checking surface properties and final monitoring of definable tolerance limits in accordance with the requirements profile
- Bar code labelling with subsequent scanning check resulting in clear allocation and traceability of production parameters.
- Automated test procedures by robot-supported pressing of buttons and contacting with individual production sequence with type recognition in order to call up and apply the corresponding test procedure with the relevant button and plug components. 100% check to ensure that the process has been performed reliably.



**Rationalisation through robot systems**



## Our range of services ...

### ➔ **Control unit construction and programming**

Individual plant concepts, clever transport logistics and sophisticated testing technology demand structured control procedures with transparent program structures.

Our control planners and programmers plan and create the necessary control units according to the requirements profile and country-specific guidelines. Based on the required functional sequences, we program and visualize your plant concept, including all the necessary interfaces to adjacent or integrated sections, such as your computer systems.

Remote access to our control units ensures quick and effective international support even after installation and commissioning.



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