

Liebherr Automation Systems

Solution provider for automated battery pack assembly



LIEBHERR



Liebherr Automation Systems

Liebherr offers a wide range of automation systems that enable modern high-efficiency manufacturing. Liebherr Automation Systems deliver systems throughout the world worth €65 million per year. 90% of the deliveries are made to

manufacturing firms outside the Liebherr group. The export share is 75%. The emphasis here is on economy, ease of use, quality, and reliability in combination with a high degree of flexibility.

Economy

The key to cost-effective manufacturing is an optimum supply to the machines connected to the system. The focus here is on keeping the total cost of ownership (TCO) of the system as low as possible to rapidly amortize the capital investment (ROI).

Flexibility

Liebherr attaches great importance to modular design, scalability, and networking of components. Thanks to the modular platform system, automation solutions from Liebherr are particularly flexible and versatile. Standardized interfaces allow the separate modules to be individually configured to customer-specific systems. In this way, it is possible to design scalable, partially automated systems for small-batch numbers or fully automated lines for large-volume production. As Liebherr produces a large proportion of its components in-house, we are able to implement customer-specific requirements quickly and expertly.

User-friendliness

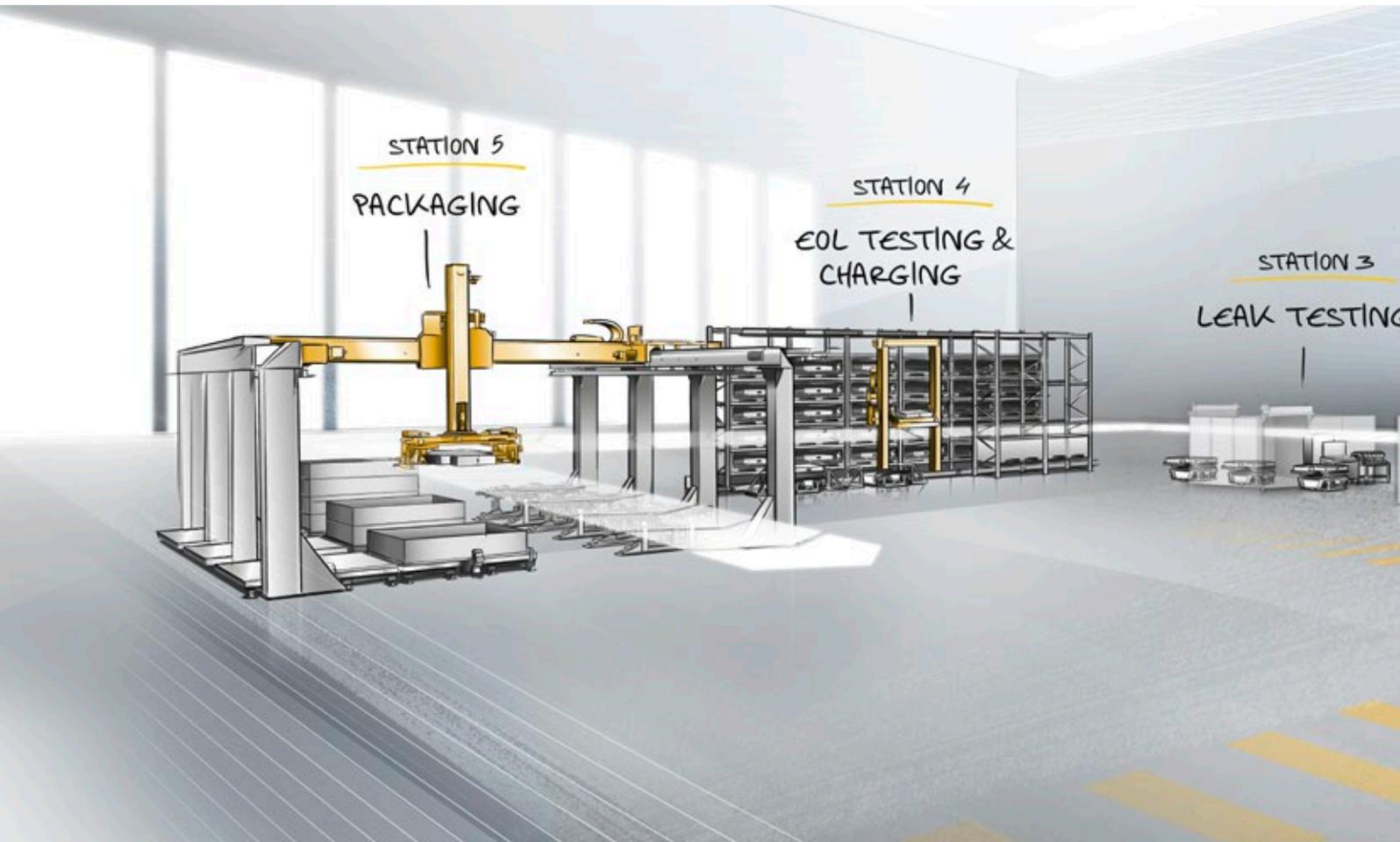
An optimum working environment provides the basis for a smooth manufacturing process. Layout planning for Liebherr systems takes into account the optimum utilization of available space, the optimum flow and supply of parts, and maximum accessibility to machines and plants.

Quality and reliability

Quality is the ultimate priority at Liebherr. Every production stage is consistently monitored in order to achieve optimum results at all times and to ensure the reliability and long product life.

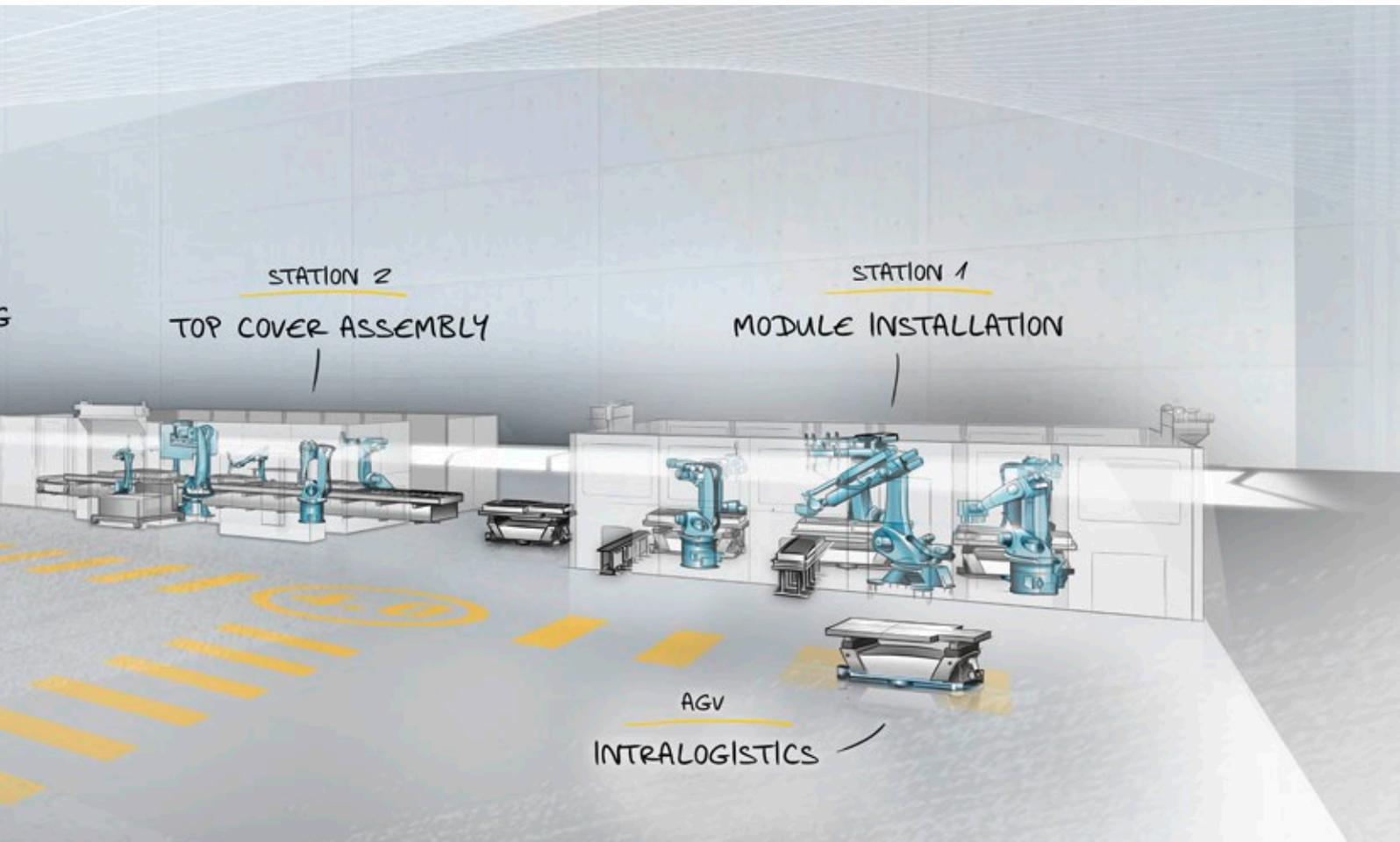
The Liebherr-Verzahntechnik GmbH quality management system is certified in accordance with ISO 9001:2015, ISO 14001:2015 and ISO 45001:2018.

Modular solutions for automated battery pack assembly



Liebherr embraces technological change and is the right partner for the automated assembly of battery packs for vehicles with electric drives. We draw on decades of experience in automating large batch production in the automobile industry. We apply this knowledge and experience when drawing up concepts and planning layouts. Liebherr systems are renowned for their high availability, efficiency, and reliability. We also offer this standard of quality in battery pack assembly.

Our services include comprehensive project management from the ordering process to design, right up to final acceptance of the overall system. We are also there to help after production is complete. Our worldwide service network guarantees a quick response and supply of replacement parts to ensure the system operates smoothly.

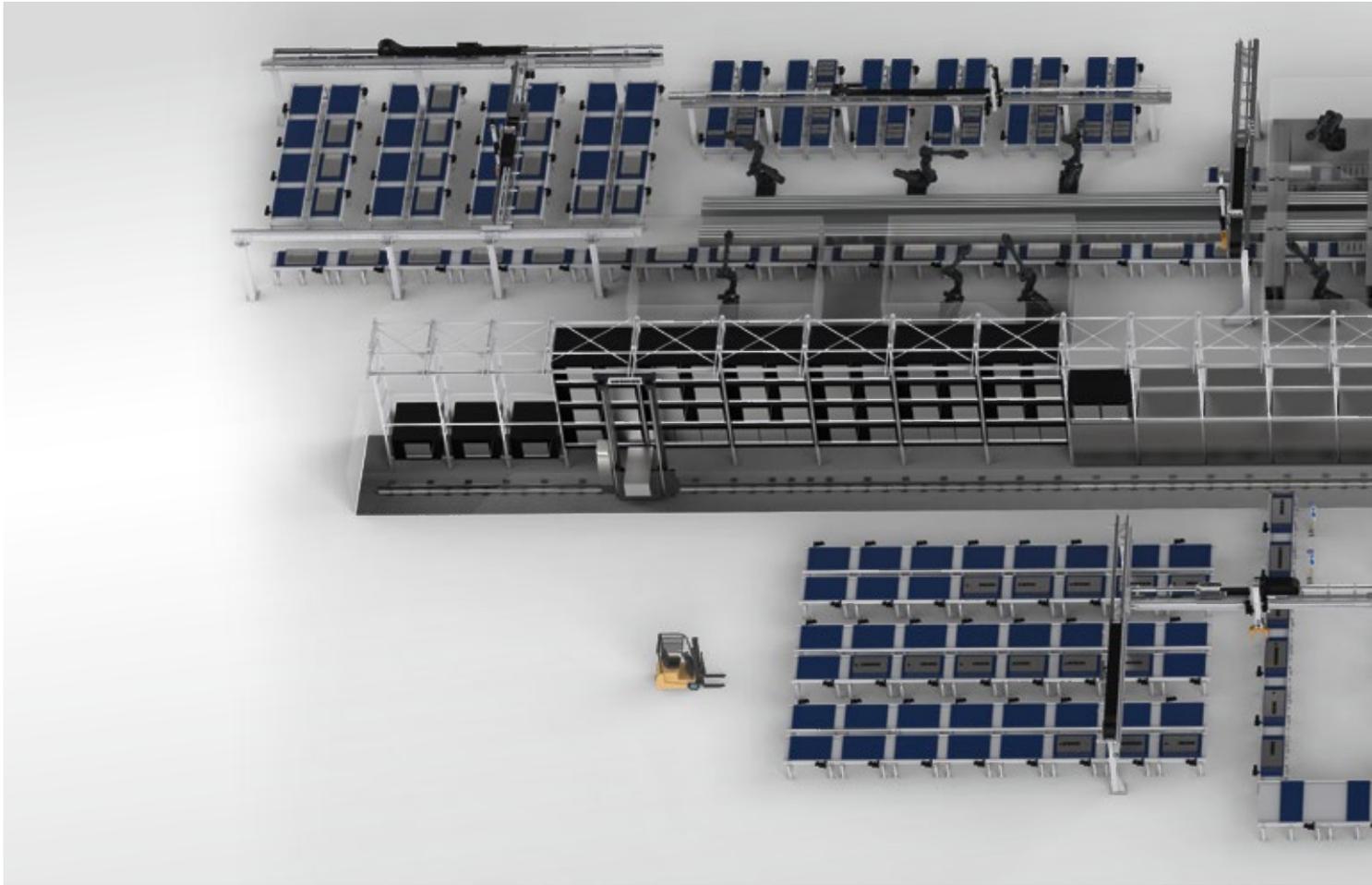


Liebherr provides modular solutions for battery pack assembly – from individual process stations through to fully automated turnkey systems.

An entire modular product system is available to users: space-saving linear gantries that are suitable for easy handling of heavy weights can be specifically combined with industrial robotics that take over more complex handling and process tasks. Further flexible solutions such as automated guided vehicles (AGV) can also be integrated.

As a solution provider, Liebherr integrates all required processes into the production concept.

Turnkey systems



From flexible small-batch manufacturing through to fully automated large-volume production, Liebherr offers the right solution for any requirement. Liebherr attaches great importance to the modular design, scalability, and networking of components. Liebherr is an experienced partner when it comes to topics such as interfaces, parallel processes,

reproducibility, emergency strategies, and availability and tracking of parts. Thanks to simultaneous engineering, offline simulation of systems, and virtual commissioning, project processing times are reduced significantly, helping ensure that the customer's production will start on schedule.



Highlights at a glance

- **Flexibility:** turnkey solutions from small-batch manufacturing through to mass production
- **Scalable product kits:** heavy-duty handling systems, linear gantries, industrial robotics, storage solutions, intralogistics, control system
- **System capability:** integration of product-specific processes
- **Process reliability:** fast cycle times, minimum footprint

Electromobility competence center



In the Liebherr Automation Systems Tech Center, we can test all the necessary processes in battery pack assembly using real customer workpieces to validate their potential for

automation. This enables us to identify potential problems at an early stage in the project and take suitable measures to ensure that processes can be automated in series operation.

Software



Additional software enhances process reliability

Complex manufacturing systems require a universal, intelligently conceived system. With the Liebherr Manufacturing System (LMS 4.0), Liebherr offers user-friendly software that safeguards process reliability on a production or assembly line. The LMS 4.0 is able to temporarily record parts tracking, as well as save specific data, and make this available to all system users. The system offers a range of assessments and can be deployed, for example, to monitor correct adherence to the production process.

With enhancements such as the new “Production Monitoring App” and “Info Board App”, it is easier than ever to track process sequences on mobile devices and interfaces.

Project management



As a system supplier, Liebherr is responsible for all aspects of project planning, including system specification and interface clarification with subcontractors. Each project is assigned a project manager, who acts as the central point of contact and is responsible for the entire order processing. With modern ERP and project management systems, we guarantee smooth project processing.

Control books, interface specifications, and system descriptions are created in collaboration with the customer to ensure compliance with the applicable laws, standards, and

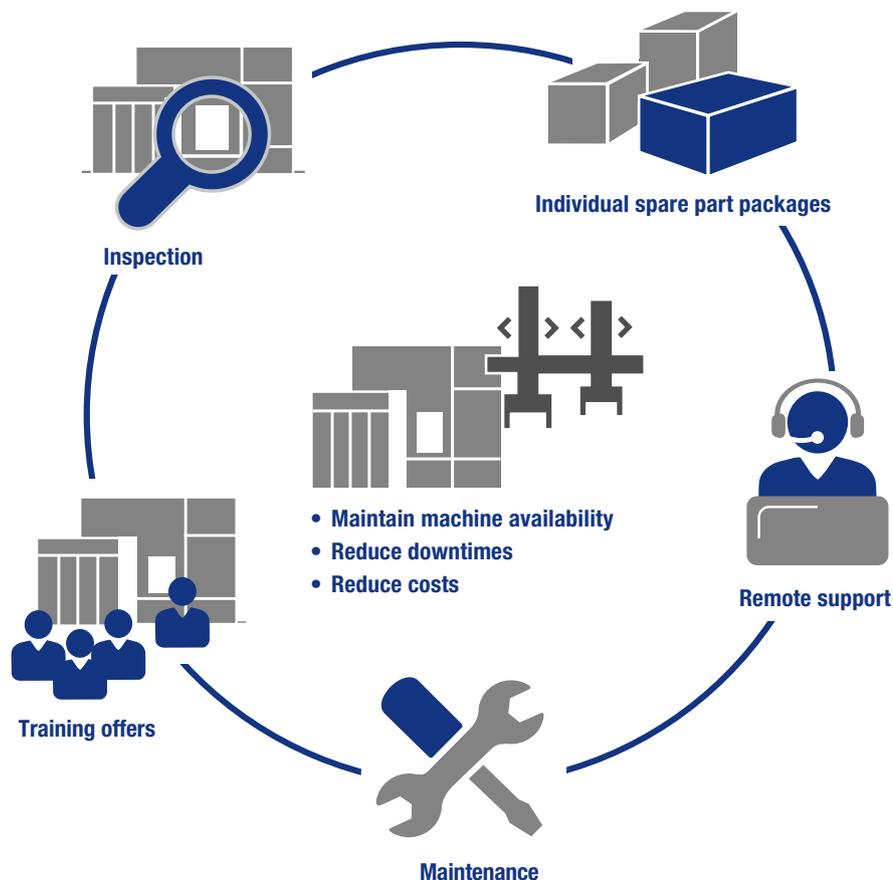
guidelines. The content of these documents provides the design specifications for all the manufacturers and suppliers involved. The control book describes the control architecture of the Liebherr automation systems, taking the customer specifications into account. The interface specification describes the interface between the Liebherr automation systems and the connected machines. The system description describes the individual functions and processes in the Liebherr automation systems within the manufacturing line. In this way, Liebherr is able to take on responsibility for the overall system's CE conformity.

Service over the entire life cycle

Worldwide presence and spare parts availability

Worldwide presence and spare parts availability With our main location in Kempton, Germany and global offices and service support points, we guarantee very fast response times allowing us to dispatch a service engineer to the

customer location immediately if necessary. Our range of services includes inspections, training offers, Individual spare part packages, remote support, and maintenance or conversion of systems.



Individual spare part packages

The right spare parts for every situation, at your location

- “Start-up” for a smooth production start
- “Maintenance” to maintain the productivity of your machines

Inspection*

Preventative analysis of the machine condition

- Analysis log with recommendations for action based on field experience
- Implementation based on the customer’s individual maintenance strategy

Maintenance*

Safeguarding machine availability

- Analysis log with recommendations for action based on field experience
- Replacement of standard wear parts
- Professional testing of individual machine parts

Training offers

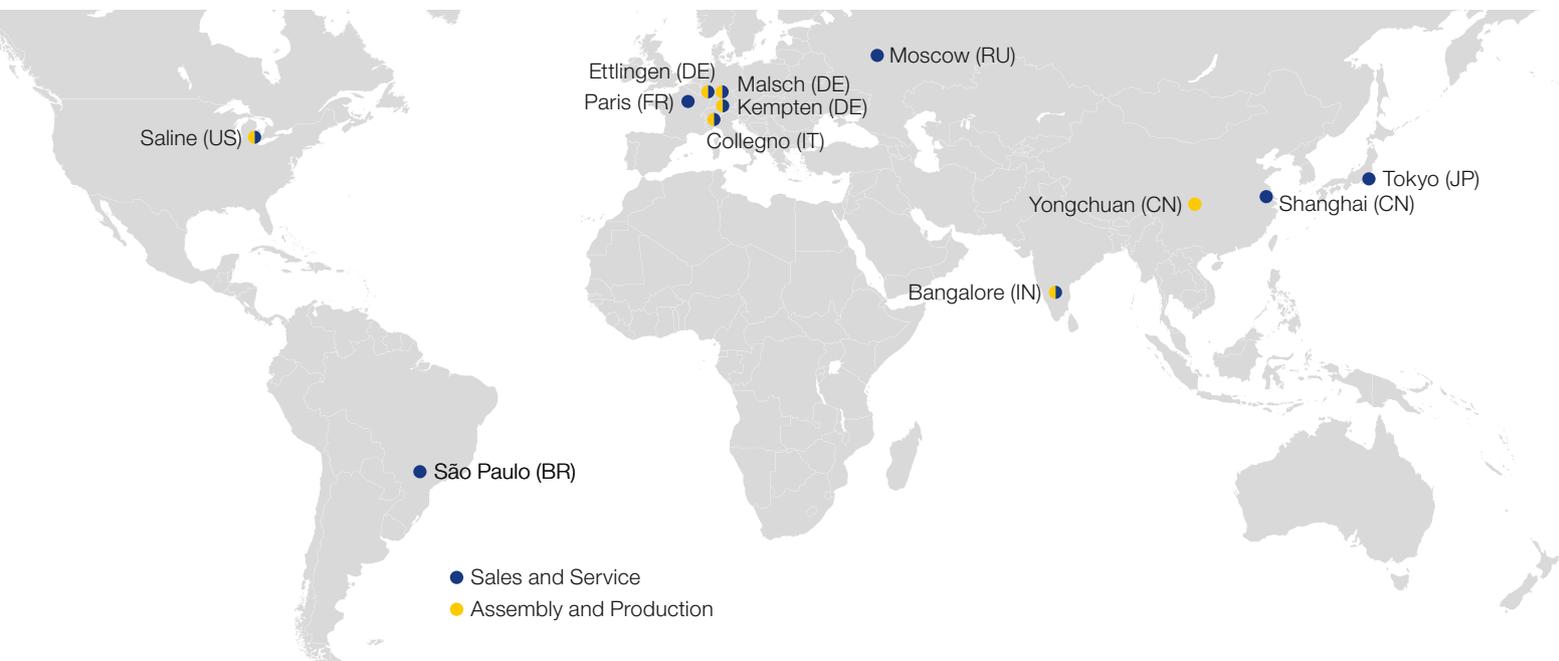
- Effective technical training for operators, maintenance personnel, planners
- Attachment of workpieces, processing start and error detection
 - Electronics/mechanics, part exchange, inspection records
 - Application expertise

Remote support*

- Fast and uncomplicated assistance by remote access in case of malfunctions
- Function tests and troubleshooting
 - Rectification of software problems by remote maintenance
 - Support for mechanical challenges provided by Liebherr experts

* individually or as part of

Your solution provider



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