
Compact stacking – big advantage

LPC palletizing cell

Palletizing cells for stacking work pieces can be used locally wherever you need a buffer. They can be utilized at the load end or the unload end the line. Also at any machine or additional piece of equipment such as a CMM.

LIEBHERR

Automation systems



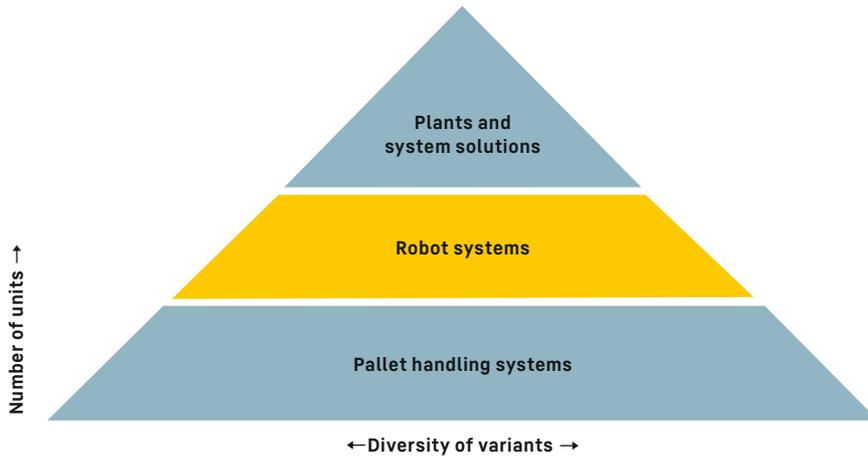
LPC palletizing cell

Liebherr offers a wide range of automation systems for modern, high-efficiency manufacturing. These solutions help to reduce production costs and enable a flexible response to changes in the market: systems can be expanded later, helping to maximize production capacity or supplement functions. Our focus is on ensuring that our products are cost-effective, user-friendly, high-quality and reliable, with great flexibility.

As a system provider, we make use of our broad product portfolio, consisting of gantry robots, pallet handling and conveyor systems, and robot cells and technological solutions.

We combine these products intelligently to form flexible manufacturing cells, systems or lines for small and large projects, from one unit through to mass production.





Our product areas for diverse requirements

A wide variety of different production concepts can be implemented using the Liebherr palletizing cell. They can be used in manufacturing islands for loading individual machines, in cell systems with blank and finished part storage systems, or as a decoupling module in a manufacturing line. The LPC blocks the process sequence, creating buffer times and reducing employee workload. Standardized transport containers with basket technology help to streamline logistics. Work pieces remain in a wire basket or work piece carrier along the entire material flow. This standardizes the interface between the machine and automation device, providing considerable potential for cost reduction.

Economy

The common goal of Liebherr and its customers is to get the best out of the manufacturing process. This succeeds when the efficiency of the machining centers is high. Hand-loaded or semi-automatic machines only meet this requirement to a limited extent. The machine runtime can be increased significantly by automating the system with a Liebherr palletizing cell.

Stacking in wire baskets allows work pieces to be kept in stock. All that the operator needs to do is remove empty basket stacks and supply blanks. Multiple machines can thus be operated with minimum effort. With the time saved in this way, qualified employees can concentrate on setup tasks or tool adjustments, for example.

Flexibility

Thanks to the modular platform system, palletizing cells from Liebherr are particularly flexible. This means the best solution can be found for any automation task. The palletizing cell can be used simply as a means for loading blank or finished parts for cells or lines. Mixed operation using blanks and finished parts is also possible. This allows individual machines to be automated. Configurable options form the basis for each production scenario.

User-friendliness

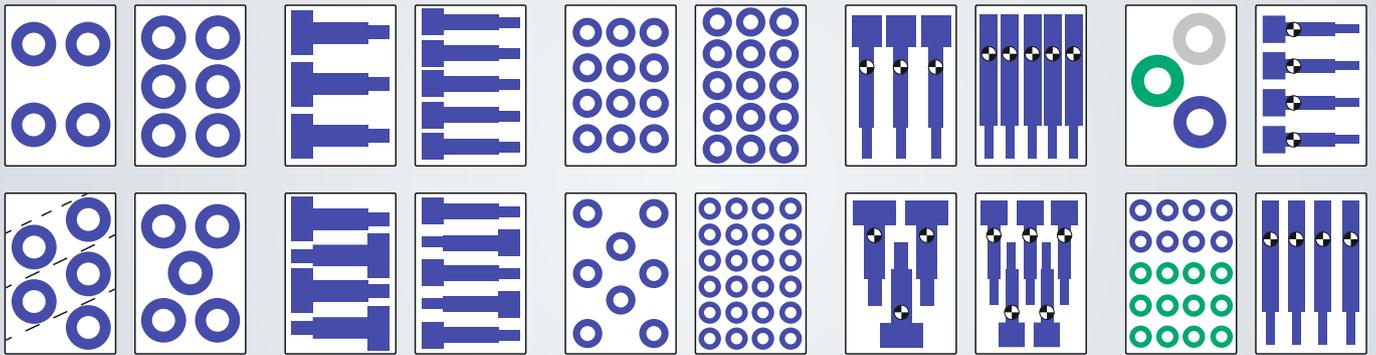
The palletizing cell can be operated intuitively thanks to the clear user interface with visualizations. The intelligent control system supports the user during retooling for a new workpiece and simplifies monitoring of machining processes. This results in short retooling times and quick production start-up.

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 reliability and long product life.

The quality management system of the overall manufacturing process at Liebherr-Verzahntechnik GmbH is certified in accordance with DIN EN ISO 9001:2008 and VDA 6.4. Moreover, many years of experience and state-of-the-art technologies flow into product development.

This high standard means that our automation systems guarantee high availability and part quality for the end customer.



Part arrangement in basket for different work pieces

A user-friendly concept simplifies handling of the palletizing cell in production mode, which in turn heightens acceptance among users. Not only that, it also has a decisive influence on the reduction of auxiliary process times. The clear way in which processes are displayed and simple, time-optimized retooling of the LPC helps to minimize auxiliary process times. This results in significant increases in efficiency above and beyond the optimization of machining operations.

Simple and fast retooling

Long setup times are a thing of the past. Instead, Liebherr specifies interactive tooling processes for the palletizing cell. The operator selects a part arrangement in the basket, with just the workpiece dimensions needing to be entered. Liebherr software then automatically calculates the necessary axis positions. So-called teach-in processes are thus reduced to a minimum and retooling is simple and fast.

Visualization of processes

The user interface displays the processes within the palletizing cell. Each current status is shown by means of graphics. Examples of these are the number and position of the blanks and finished parts, the gauge parts ejected via the SPC station, and the status of the workpieces in the optional special stations, such as a centrifuge.

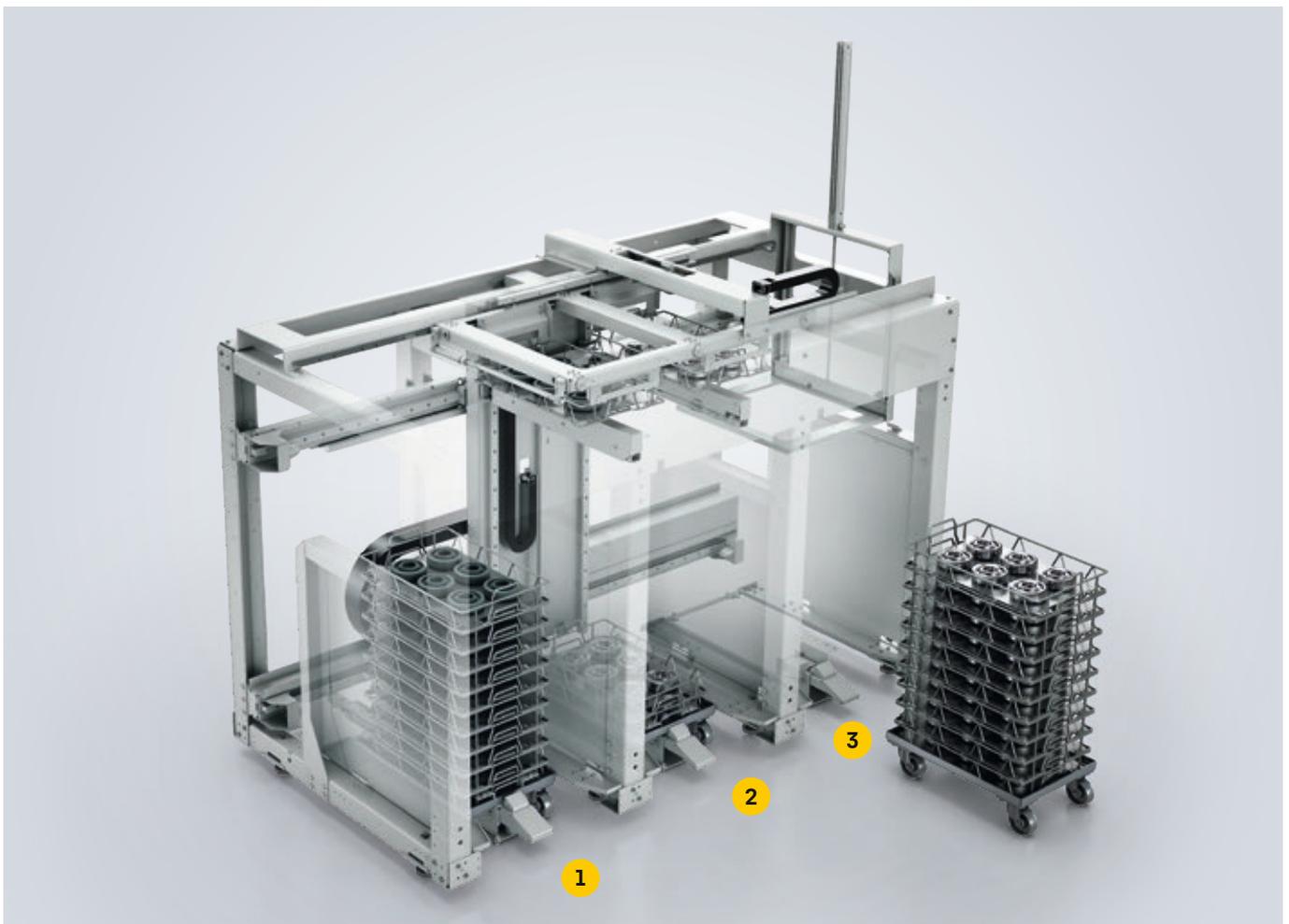
Combined handling of blanks and finished parts

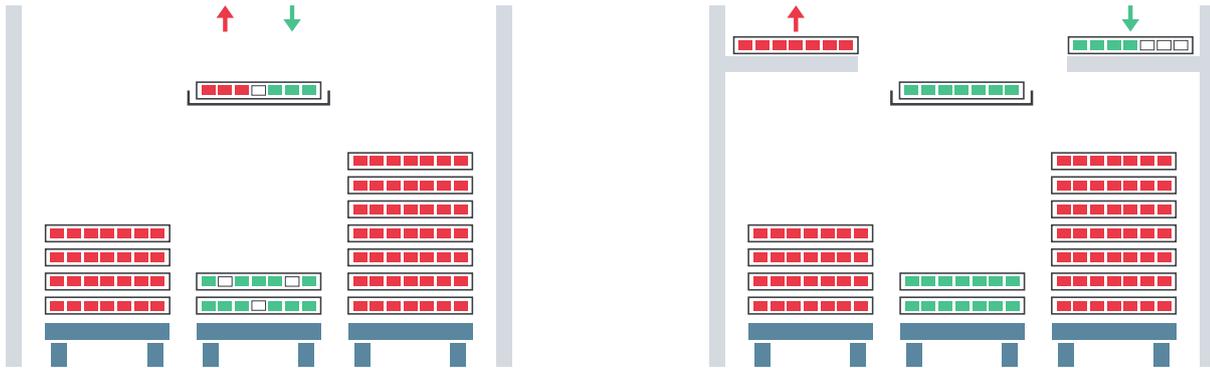
A palletizing cell with three stations that can be used to store blanks, finished parts or transport containers depending on the production mode, forms the basis for the modular system. The Liebherr LPC is designed to handle wire mesh bins, pallets or plastic boxes in standard dimensions. Depending on the range of parts, baskets up to 300 mm in height can be used for a stacking height of up to 1350 mm. A sliding door allows stacks of finished parts to be safely exchanged during the machining process, i.e. without the need for machine standstill.

With combined handling of blanks and finished parts in a palletizing cell, the first and third stations are equipped with blank baskets, the second station with finished part baskets. A basket gripper removes a transport container

with blanks from stacking area 1 and places this at a transfer position for the robot. Here, the machine is loaded with blanks while the finished parts are received and put back in the basket. As soon as the basket is filled with finished parts, it is moved to stacking area 2.

Once all of the transport containers from stacking area 1 have been processed, the cell is then fed from stacking area 3, where blanks are also stored, and stacks the finished parts in stacking area 1, which is now empty. The stack of finished parts from stacking area 2 is removed and exchanged for a new stack of blanks during the machining process.





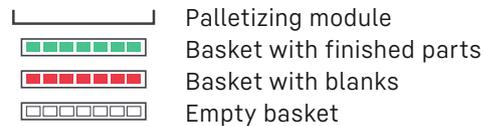
Simultaneous handling of blanks and finished parts

The palletizing cell is fed with blanks loaded as part of a process. The finished parts can be removed as a stack of finished parts. This configuration is used to automate individual machines.

One station feeds new blanks, another is used as a “work-place” for the handling device. The robot removes blanks from the lifted wire basket and loads the finished parts into the same basket. As the loading and unloading of parts is never perfectly synchronized for reasons relating to the process, the transport container has empty slots.

Homogeneous handling of blanks and finished parts

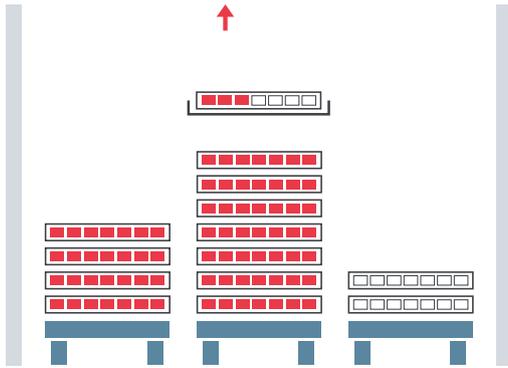
In order to prevent gaps in the stack of finished parts, intermediate storage areas can be added. A basket for blanks is then located in one storage area and a transport container for finished parts in the other. This allows homogeneous removal and supply.



Loading individual machines using a palletizing cell – how it benefits you :

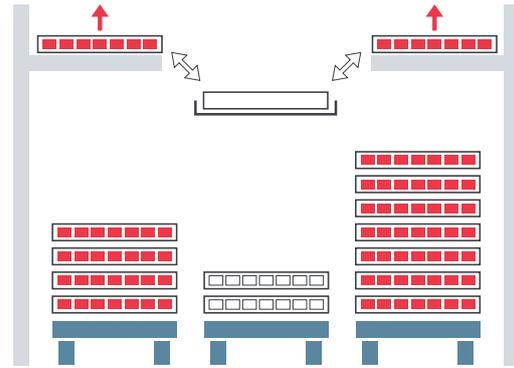
- Loading machine tools for turning, gear cutting and grinding
- No need for a permanent operator of the machine tool: unmanned manufacturing, parts storage system with a buffer function
- Large stock of parts from stacking work pieces, resulting in a high degree of manufacturing autonomy
- Three-unit cell allows machines to be loaded continuously while baskets or stacks are being exchanged
- Storage in baskets protects work pieces
- Integration of other customer-specific additional operations possible (e.g. measuring, deburring, cleaning)
- Compact design requiring little space

Separate handling of blanks and finished parts



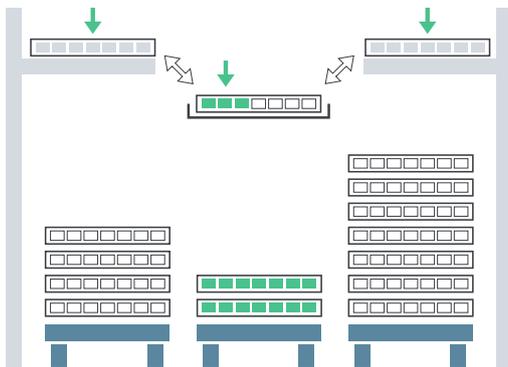
Feeding of blanks

The palletizing cell is fed blanks that have been loaded as part of a process, for example a cell system with blank and finished part storage systems. One station feeds new blanks, one station is used as a “workplace” for the palletizing module, which lifts the wire baskets and moves them to the robot’s working area. The emptied wire baskets are stored for removal in the last station.



Feeding of blanks using intermediate storage areas

Instead of removing components directly from the palletizing module, wire baskets containing the blanks are positioned at deposit places. This is recommended for processes with very short cycle times: a basket with new blanks is always ready and waiting to be loaded. The robot or machine need not wait for the palletizing module.



Finished parts removal

The palletizing cell is fed empty transport containers for removing components from the process. The robot stacks finished parts in the empty containers. When a stack is full, the finished parts can be removed. When cycle times are short, intermediate storage areas can be added, in a similar way to the process for feeding blanks..

Palletizing cell in manufacturing systems – how it benefits you :

- The palletizing cell can be configured as a feed module, stacking module or decoupling module in material chains
- Mechanics and software can be adjusted in modular fashion to individual logistics and manufacturing processes
- Buffer effect for stabilizing production and preventing idling or machine standstill



Transport dolly



Basket



Intermediate storage area



SPC station



Centrifuge

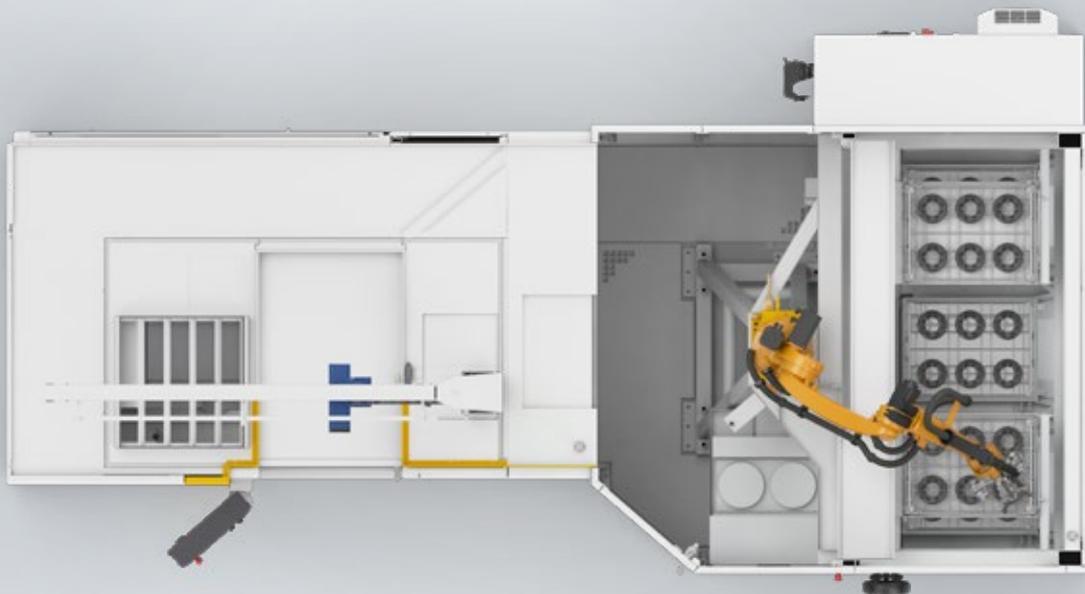


Gripper

Transport dollies and baskets form the basis for feeding the palletizing cell. Very short cycle times and homogeneous stacking can be realized using intermediate storage areas.

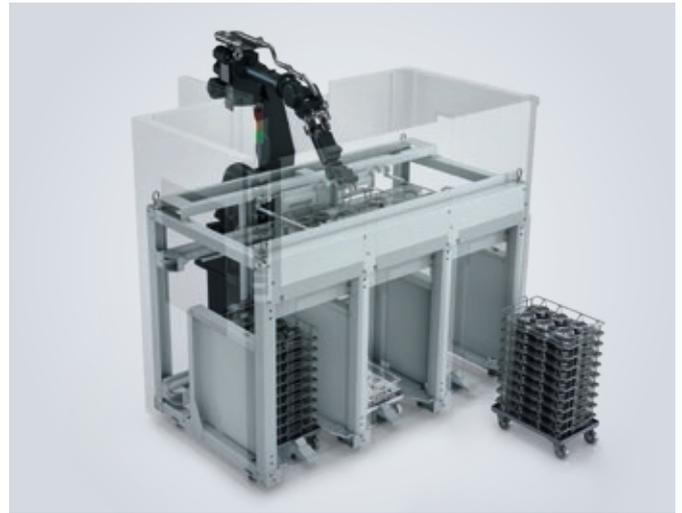
Additional functions may be integrated, such as cleaning, handling of gauge and master parts, identification and labeling, and a reversing device or orientation stations.

Examples and types of layouts





Palletizing module with three stations



Palletizing module with a robot as handling device

The Liebherr palletizing cell has been developed for various different applications and can be used in a variety of ways. Basket emptying and loading strategies have been developed together with users and thoroughly tested. Thanks to standardized interfaces between palletizing module, handling device and machine, the cell can be quickly configured according to your requirements.

Once the workpiece carriers have been loaded, there is no need for any further manual handling of the parts. The initial loading of transport containers can also be automated in combination with robot vision solutions from Liebherr.

		Basket size 400mm	Basket size 600mm
Transport container dimensions	mm	400 x 600	600 x 800
Transport container height	mm	60 ... 200	60 ... 300
Transport container max. Weight	kg	75 kg	120 kg
Transport container type		Baskets, workpiece carriers, plastic pallets	
Max. Stacking height, incl. transport dolly	mm	1,200	1,350
Drive systems		NC	NC
Control cabinet		Integrated	Integrated
Handling device		Robots	Robots



Video: Flexible production networking
<https://www.youtube.com/watch?v=RBi5EZcz0r8&list=PLC5481F2D19BB6A5F&index=12>

System competence at a glance

Liebherr offers solutions for various different types of manufacturing, from cell to line.

Pallet handling systems

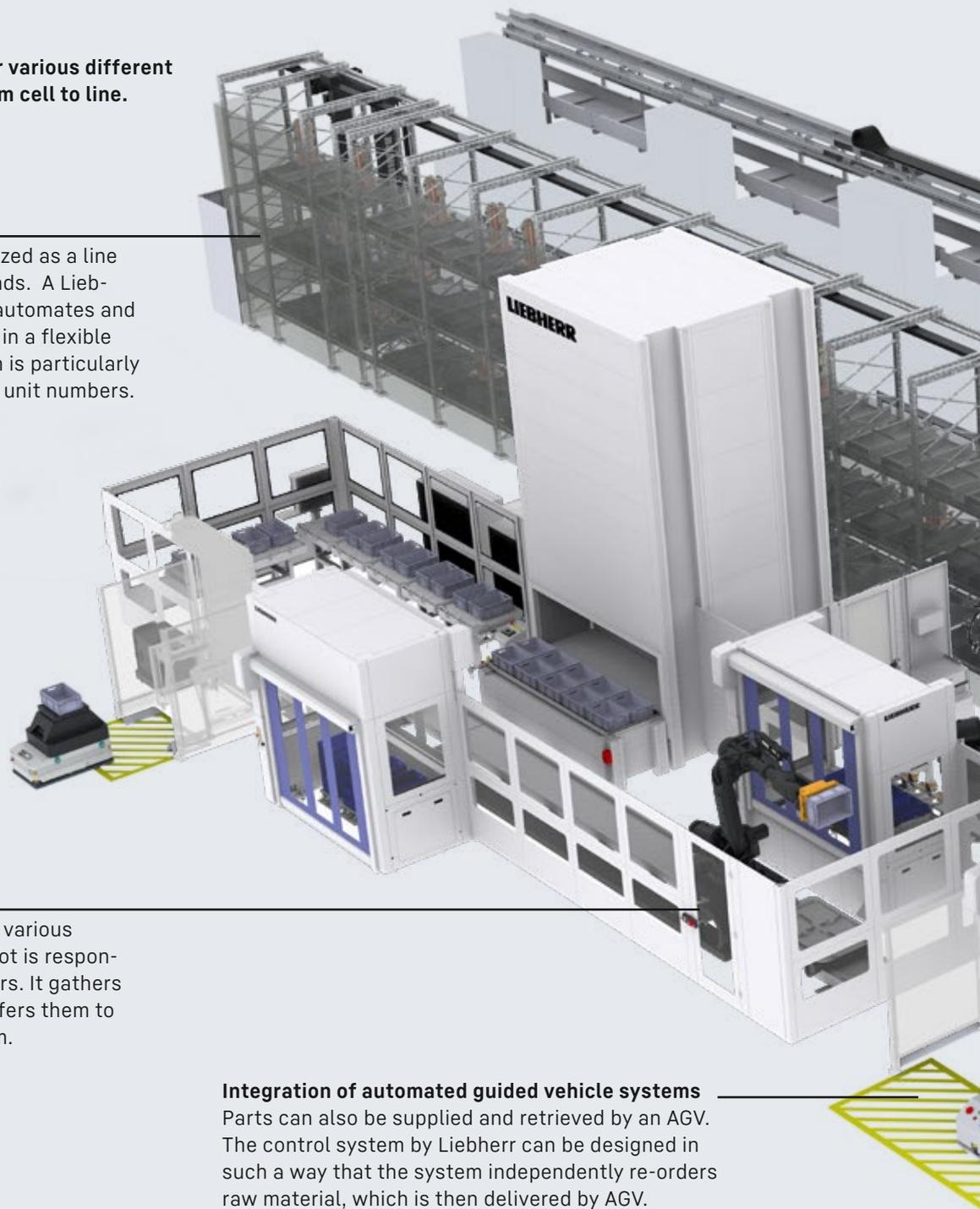
Manufacturing can be organized as a line or in production cells or islands. A Liebherr pallet handling system automates and interlinks machining centers in a flexible manufacturing system which is particularly suitable for small to medium unit numbers.

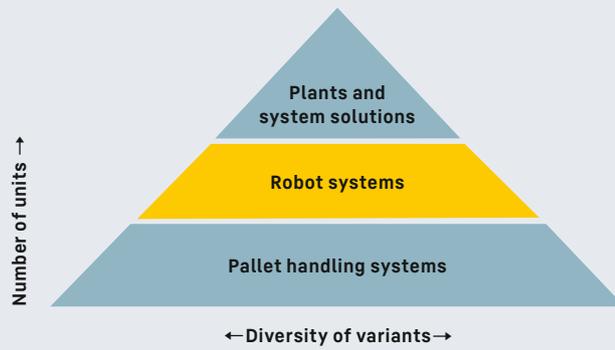
Flexible cells

Liebherr integrates robots in various ways. In this system, the robot is responsible for commissioning orders. It gathers work pieces and either transfers them to a buffer store or rejects them.

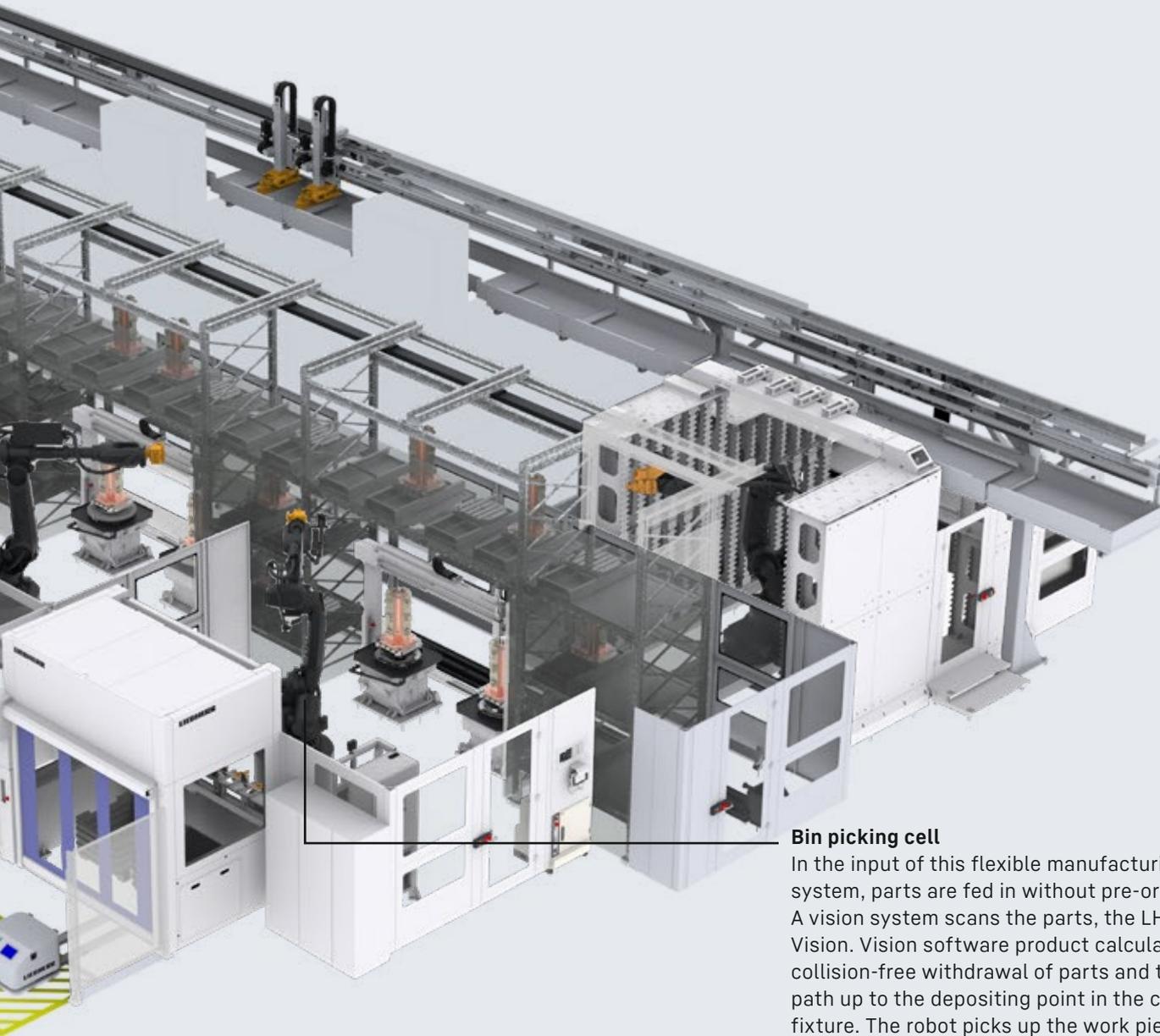
Integration of automated guided vehicle systems

Parts can also be supplied and retrieved by an AGV. The control system by Liebherr can be designed in such a way that the system independently re-orders raw material, which is then delivered by AGV.





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Bin picking cell

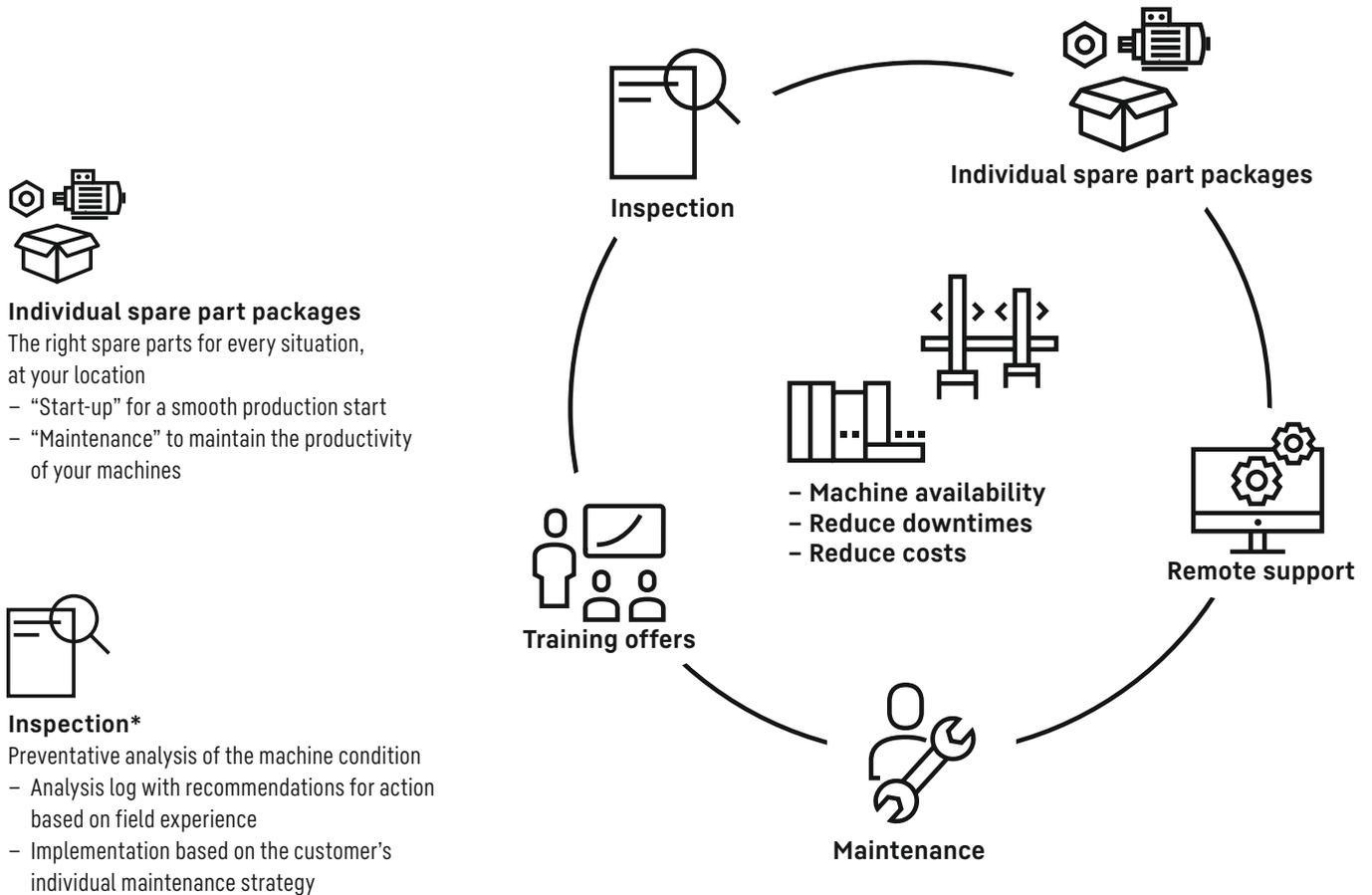
In the input of this flexible manufacturing system, parts are fed in without pre-orientation. A vision system scans the parts, the LHRobotics. Vision. Vision software product calculates a collision-free withdrawal of parts and the robot path up to the depositing point in the clamping fixture. The robot picks up the work pieces and sets them up on pallets which are fed into the pallet handling system. Machines could also be directly loaded in the same way.

Service over the entire life cycle



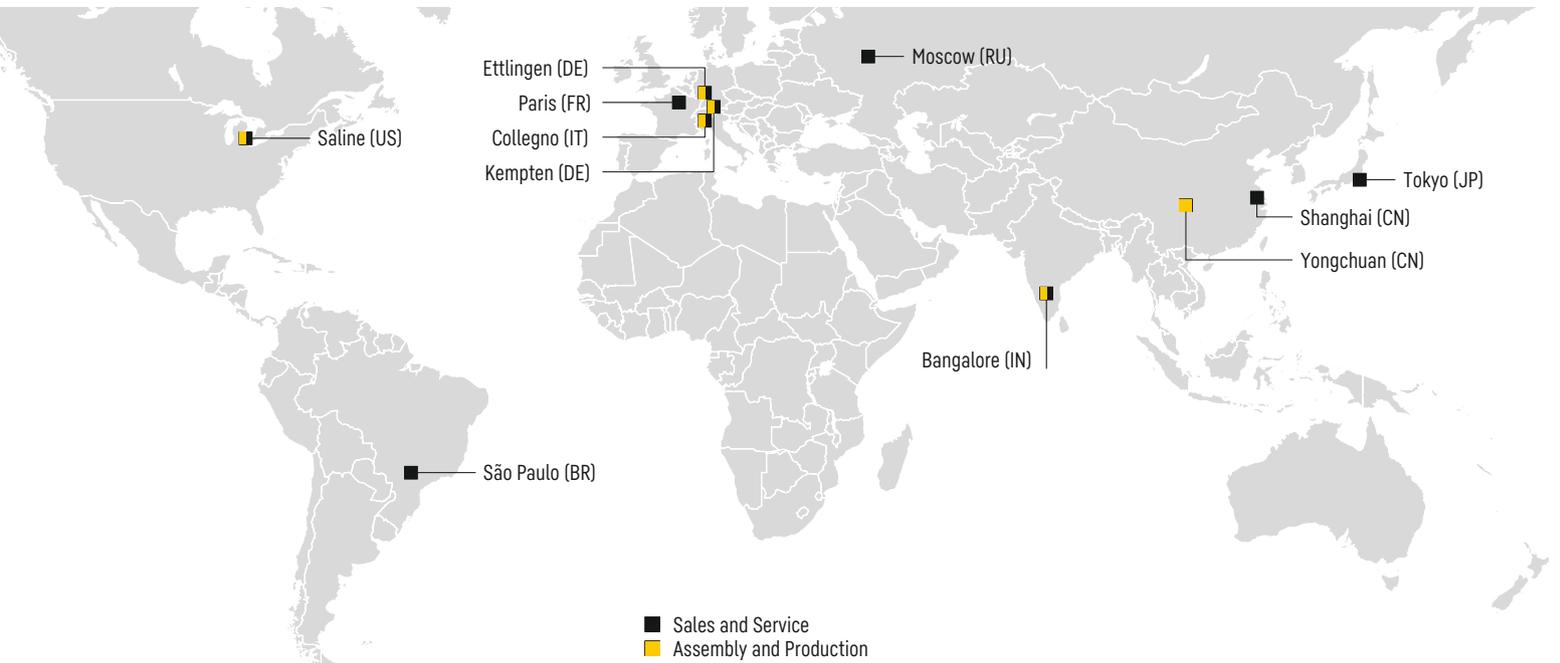
Worldwide presence and spare parts availability

With our main location in Kempten, Germany and global offices and service points, we guarantee a very fast response time which enables us to dispatch a service engineer to the customer location immediately if necessary. Our range of services includes inspections, training, individual spare part packages, remote support and maintenance or conversion of systems.



*individually or as part of the contract

Your solution provider



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