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# EMO highlights

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Gear technology, gear cutting tools, measuring technology, and automation systems

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# LIEBHERR

**Gear technology and automation systems**

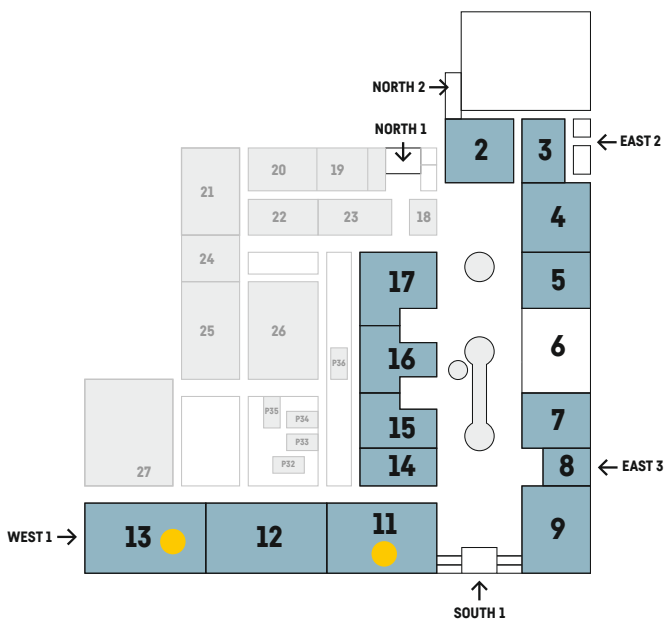


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# EMO – the world’s leading trade fair for metal machining



**Liebherr-Verzahntechnik GmbH**  
Gear technology  
Hall 11, booth F37

**Liebherr-Verzahntechnik GmbH**  
Automation systems  
Hall 13, booth B62



# LGG 300/380/500 generating gear grinding machine



## **Sustainably saving resources in generating grinding**

The LGG series combines the three technologies of generating, profile and internal grinding in one machine. Thanks to this technological diversity, Liebherr offers the universal user maximum benefit and a secure investment for the future. The machine can be configured for the individual application. This can be done, for example, by an external automation system using a plastic chain conveyor or robot automation.

The LGG is also the most powerful generating gear grinding machine in its class on the market. With the GH 320 CB gear skiving head, workpieces up to module 14 mm can be very economically machined to excellent quality. The extended travel ranges allow the machining of long shafts and at the same time improve the internal grinding of deep workpieces.

There is a clear trend towards saving resources and sustainable manufacturing. With the centrifugal device integrated in the machine, gears and shafts weighing up to 100 kg can now be spun, so that even workpieces with shapes that pick-up liquid come out of the gear grinding machine almost drip-free. This means that transfer of oil to outside of the machine can be reduced to a minimum, especially for large workpieces. The result is a safe and clean working environment with significant potential for savings in oil consumption and subsequent machining steps such as workpiece cleaning.

## **Highlights**

- Generating grinding, profile grinding, and internal grinding in one machine
- Topological generating grinding and profile grinding
- Generating grinding of workpieces up to module 14 mm
- New, more powerful machine table for higher speeds
- Centrifugal device integrated in the machine for drip-free workpieces
- Extended travel ranges for machining long shafts and for internal grinding

## New dimensions – LK 500 gear skiving machine



The unique LK 300/500 gear skiving machine combines maximum productivity with high flexibility. The Skiving<sup>3</sup> concept includes the machine, the technology and the optimally designed tools, guaranteeing a complete process solution for the customer.

The second-generation gear skiving machine is characterized by high rigidity (machine bed, flat guides, spindle rigidity), which means that longer tool holders can also be used. This enables collision-critical internal gears to be produced reliably and in high quality. The tailstock also makes the machine ideal for shaft machining. Chamfering is optimally integrated into the machine with the revised ChamferCut and FlexChamfer unit.

Liebherr helps you individually select the gear cutting tools. Intensive technology development and extensive tests at customers underpin the know-how of our experts. The specific tool development and production is carried out by Liebherr internally. Conical and cylindrical tools can be used.

### Highlights

- Fast machining times
- High-performance spindle with internal cooling lubricant feed
- Integrated automation system
- Tool changer integrated in the machine
- Roughing and finishing tools
- Machining cluster gears in one workpiece clamping operation
- Simultaneous gear skiving and chamfering in one machine
- Process-optimized tool design and production

# Digitalization solutions



## Customized digitalization solutions for your requirements

With a combination of data profiles, protocols and the LHWeb-Platform, Liebherr provides an infrastructure for the acquisition, transmission, storage, processing, provision and display of machine, operating and production data. In the basic app LHMachine-Info, users can see the live status of their machine tools at a glance and observe changes in real time. The LHSignalInfo app visualizes the recorded signals, taking into account all measuring points and their exact time stamp.

The LHReportInfo app visualizes and analyzes the performance of the machine and generates reports and evaluations from the machine data – a decisive step toward more productivity.



# Gear cutting tools



## Holistic technological competence with Skiving<sup>3</sup>

The success of gear skiving lies in the significantly higher efficiency and productivity of this process compared with shaping and the considerably higher flexibility and lower investment compared with broaching.

Liebherr knows the entire process of gear skiving profoundly. We have combined all of our expertise concerning tool design, machines, and technology of gear skiving in the Skiving<sup>3</sup> technology package. Very high accuracy in tool production, coupled with optimal tool design, guarantees an excellent gear quality and long tool life. Liebherr guarantees the reliability of its manufacturing process at the highest quality level.

The gear skiving tools are available in tapered and cylindrical form and can be optionally manufactured from powder-metallurgical high-speed steel (PM-HSS) or full carbide.

The combination of axial crossing angle, cutting speed, feeding, and other kinematic parameters make the method very flexible: Particularly for internal gears in medium batch sizes and external gears with an interfering contour, gear skiving is an additional “ace up your sleeve” in the gear cutting range.

## Highlights

- Optimal tool design
- Best quality: High level of accuracy and long tool life
- Short delivery times and process support

## Tools and clamping device catalog: one-stop shopping and record delivery times.



Immerse yourself in the world of efficient manufacturing with our tool and clamping device catalog! In just a few clicks, our online catalog gives you solutions which will optimize and accelerate your production processes. From the SECLA clamping fixture or our stock tools and hob arbors to the innovative CUTHOL tool holder, we provide you with all you need in one convenient location.

- **Fast delivery times:** We know how valuable your time is. This is why we make sure that all products in our catalog are delivered quickly, sparing you unnecessary delays in your production.
- **Flexibility:** Every manufacturing process is unique. Our catalog offers you a wide variety of solutions that can be individually adapted to your specific requirements, thus increasing your productivity. If you don't find what you're looking for, we offer customized product solutions.
- **One-stop shopping:** With our comprehensive catalog, you can equip your entire operation and find any tool you require in one convenient location. This not only means huge time savings, but also guarantees seamless integration in your production processes.



# Measuring machine WGT 400



## **Are you looking for a solution to ensure quality and increase productivity in gear manufacturing?**

The four-axis measuring instruments of the WGT series have high-precision mechanics and electronics, which are controlled by smart and user-friendly software. They meet all accuracy requirements regarding gear measurement and comply with VDI guideline VDI/VDE 2613, group 1.

In addition to the gear inspection machine options available as standard, customer-specific solutions are also available, such as adjusting the travel range on the Z-axis, longer tailstocks to accommodate long shafts, and rotary tables adapted to the payload. An automatic sensor changing system ensures uninterrupted measurement of the workpieces and also offers the highest levels of convenience for the user.

The extensive software features make the machines suitable for measuring all types of gears, such as spur gears, bevel gears, worms, worm gears, shafts, gear cutting tools, and other rotationally symmetrical parts.

### **Highlights**

- Highest precision provided by granite guides and air cushioning
- Low operating costs due to contactless guides and reliable probes as well as inexpensive spare parts
- Flexible for all types of gears
- User-friendly interface and ergonomic design
- Manufacturer-neutral GDE interface for data transmission to production machines
- Highest precision provided by the new roughness sensor

## PHS Allround pallet handling system



### **Automation system for machine tools from batch size 1**

The Liebherr PHS Allround pallet handling system typically interlinks up to four machines and increases productivity – just like all Liebherr pallet handling systems.

The modular system can be individually configured and expanded at any time if required. The possibility of the frontal arrangement of machines, additional units, and shelves offers maximum flexibility in the system design.

Innovative options such as the double loader and front access set new standards in this product segment. The front access allows individual machines to be decoupled from the system, while the remaining machines continue to produce without restriction in Automatic Mode.

The double loader reduces the time needed for a workpiece change and thus maximizes its productivity – or it increases its flexibility by using different pick-up forks for different pallet sizes.

### **Highlights**

- Double loaders as a more cost-effective alternative to machine trains with pallet changers
- Integration of different machine sizes in one system
- Three sizes for transport loads from 800 to 3,000 kg
- Very narrow telescopic unit combined with large stroke allows any machine to be loaded
- Can be combined with additional technologies such as automated setup and tool handling systems for even more productivity

## Bin picking solutions with LHRobotics.Vision



### From the technology package to the turnkey robot cell

Liebherr supplies automation systems for automated raw parts input and finished parts removal in production facilities and possesses extensive system and software competence for position and object recognition with 2D and 3D camera systems.

With the LHRobotics.Vision technology package, Liebherr is making this industrial application expertise available to a broad range of users of robot integrations, to withdraw unsorted components from deep bins with process reliability. As a manufacturer of bin picking robot cells, Liebherr knows the challenges of the application and, with the aid of artificial intelligence has simplified the software so much that it can be intuitively used by anyone.

The technology packages consist of a 3D image recognition system and the LHRobotics.Vision software for object identification and selection, collision-free withdrawal of parts, and robot path planning up to the depositing point.

A special feature is the optional simulation tool LHRobotics.Vision Sim. This enables the user to test and optimize the processes in a completely virtual manner, without expensive hardware investment.

### Highlights

- LHRobotics.Vision - Software for object identification and collision-free withdrawal of parts
- Open sensor and robot interface: a single bin picking software for all applications
- LHRobotics.Vision Sim - Virtually simulate bin picking
- Available as a software package or turnkey robot cell
- Version with artificial intelligence for optimum part detection

## E-mobility – battery pack assembly



### **Turnkey systems for automated assembly of battery packs for electric vehicles.**

With many years of experience in automated large-scale production in the automotive sector, Liebherr can draw on proven expertise.

As a specialist in heavy-duty automation, Liebherr offers a modular product system that is ideally suited for battery pack assembly. Conveyor systems, linear gantries, industrial robots, storage solutions, intralogistics concepts and process stations can be individually combined to form a complete system. The degree of automation, cycle times and productivity are adapted to the specific customer requirements.

The holistic approach encompasses standardization of interfaces and integration of sub suppliers, consideration of parallel processes, implementation of emergency and failure strategies, as well as guaranteeing parts availability and traceability. Liebherr offers comprehensive and flexible project management as a general contractor.

Our services range from flexible small batch to fully automated large-scale production.

Transport:	first-class machine and plant linking solutions
Assembly:	reliable dispensing, screwing and assembly processes
Inspection:	leak testing, electrical testing, process monitoring

# Liebherr Industrial Services



## Thinking about tomorrow today?

With our cutting-edge technology and expertise, we offer a comprehensive portfolio of products and services which allow us to detect and correct problems early – both remotely or on-site. Our tailor-made approach enables us to offer solutions that are both cost-effective and perfectly adapted to your individual production needs. Place yourself in our capable and experienced hands and increase the service life of your machines while enjoying the highest levels of safety and product quality.

## Highlights

- Remote Service – fast response and zero travel time
- Digital Fingerprint – cost-effective machine diagnostics
- Cost reduction through preventative maintenance
- Predictable maintenance budgets with contract option
- Liebherr Academy – learn from the pros



## Discover our world of digital services



MyLiebherr is your entry point into the world of Liebherr services. With the Liebherr customer portal, you can take advantage of comprehensive services and additional benefits anywhere in the world. Thanks to single-sign on, you only have to log in once to access any services and apps you require.

The intuitive and well-designed user interface makes navigating the portal easy right from the start. Simplified processes give you an easy overview, allowing you to accomplish your tasks quickly and efficiently.

### **With MyLiebherr, you can...**

- Access all available documents, such as spare parts and service documentation or general instructions for your machines.
- Check prices and availability of spare parts.
- Quickly and conveniently order spare parts, consumables, service fluids and accessories.
- Easily contact your service partner.
- Consult and edit your customer data, authorizations and business relationships.
- Request status updates for all orders, whether you've placed them in the MyLiebherr Shop, by telephone or via e-mail.
- And much more!

### **Enjoy discovering our services!**



Registrate here



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