

*life*hone  
Precision Honing Machines

 Gehring



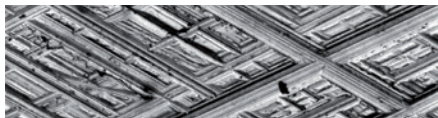
 Advanced Honing Technology

## Advanced honing technology

In the recent years honing has become a worldwide leading high performance process. There is hardly anyone in the entire metal working industry who wants to go without the performance advantage we offer. Honing is a precision stock removal process for practically all materials.

The goals of honing are:

- to reach diameter tolerances in the range of  $\mu\text{m}$
- improve form and position
- optimize the tribological characteristics



*Cross hatch*

Due to the increasing demand for friction-optimized sliding surfaces, the demands on the honing process increases. We as Gehring confront these challenges every day. We are confident to have developed the right solutions for our customers and their future needs! We are the only company worldwide that can offer honing technology for all applications from one source. Try us - we look forward to it!



*Hydraulic sleeve*

## lifhone – high precision technology in an exclusive design

Small bore diameters often place different demands on the production technology as large ones. Problems such as an unfavorable length/diameter relationship between the bore can be addressed.

Due to the customer requirements we have continuously improved our lifhone machines. The modular design has been adapted to market requirements and the existing modules have been optimized further. The result: quality, affordable machines, shorter delivery times and functionally developed components.

Whether constructed as a multi-spindle transfer solution for mass production, or as single-spindle design for small batches - highly accurate parts with honing diameters up to 90 mm can be processed optimally with the appropriate machine. Characterized by ease of use and high performance, you will find the right solution for your requirements and process conditions.



*Injection pump component*

## Your advantages:

- High accuracy and precision
- High efficiency of the lifhone honing units
- Easy operation thanks to the program assistant
- Exclusive design combined with innovative technology
- Modular configuration options for individual technical variations
- Optimal configuration through standardized assemblies
- Stroke drive available with linear motor or ball screw
- Expert knowledge for the optimum process and machine design
- Complete system from one source (machine, fixture, tools, abrasives)



*Connecting rod*



*Gear wheel*

## Easy operation and optimal configuration options

Depending on customer requirements and the product spectrum to be finished, the machine is equipped with matching honing units.

The Gehring honing control allows for precision controlled stroke speeds and reversal precisions.

Optionally, the stroke is executed via a ball screw or a linear motor.

The user-friendly and clear graphic interface of the Gehring operator panel (GOP) as well as the program

assistant eases machine operation. After entering a few relevant parameters about the component, material and tool, the process and stock removal can be defined, and honing can be started once the tool has been positioned.

The stroke position and all other relevant parameters for machining the component are automatically calculated.

The bore diameter and the conicity will be determined by a pneumatic

gauging system and graphically presented on the screen of the Gehring operator panel. Depending on customer request, in-process as well as pre and post gauging systems can be installed.

To remove little burrs on edges, grooves or cross holes, it is possible to integrate a brushing process. In addition, a centrifugal or blow off station can be integrated to remove coolant from the part.



Gehring Operator Panel



Gauging station



Honing unit

Technical data		L 200	L 630
Stroke length	mm	200	600
Honing diameter	mm	0,6 - 12	3 - 90
Spindle drive		Servomotor	Servomotor
RPM, max	1/min	6000	4500
Torque	Nm	15	60
Stroke drive		Linear motor	Ball screw
Stroke speed, max	m/min	60	40
Stroke acceleration, max	m/s <sup>2</sup>	25	25

Subject to technical changes and variations in design and configuration.

## A complete package for perfect results

The super finishing of high-precision components depends on the perfect coordination of all influencing factors to the honing process such as the honing tool, abrasives, fixtures, feeding and gauging systems. All of these elements must be perfectly matched to one another to achieve an optimal result. We supply you with the complete package from the abrasives to the machine, so that you always receive the perfect solution for your application.

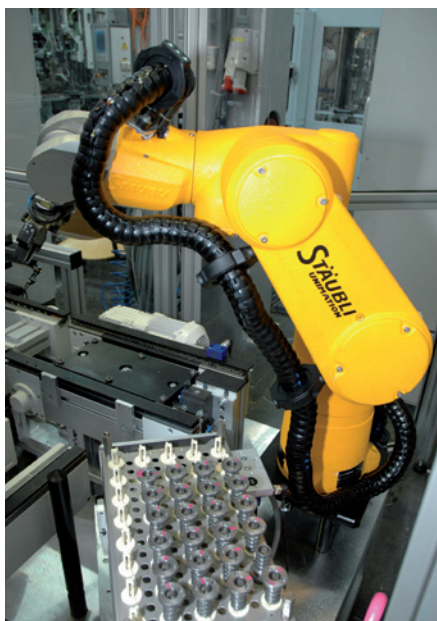
The L series honing tool is especially designed for honing high-precision bores with a diameter range of 3-15 mm. The tool joint and base are assembled by means of "thermal shrinkage". This joint features high

concentric accuracy ( $\leq 5 \mu\text{m}$ ) as well as the capability to transfer high torque and axial forces. Our tooling system for the lifhone series also offers another feature. From a diameter range of 5mm and larger, we can offer you tools with an active honing stone retraction. The benefits are obvious. By eliminating the retraction bushing for abrasives, the tooling design gets shorter and so the stability increases. In addition, the contact of the bore wall during expansion of the tool is avoided, thus increasing the quality.

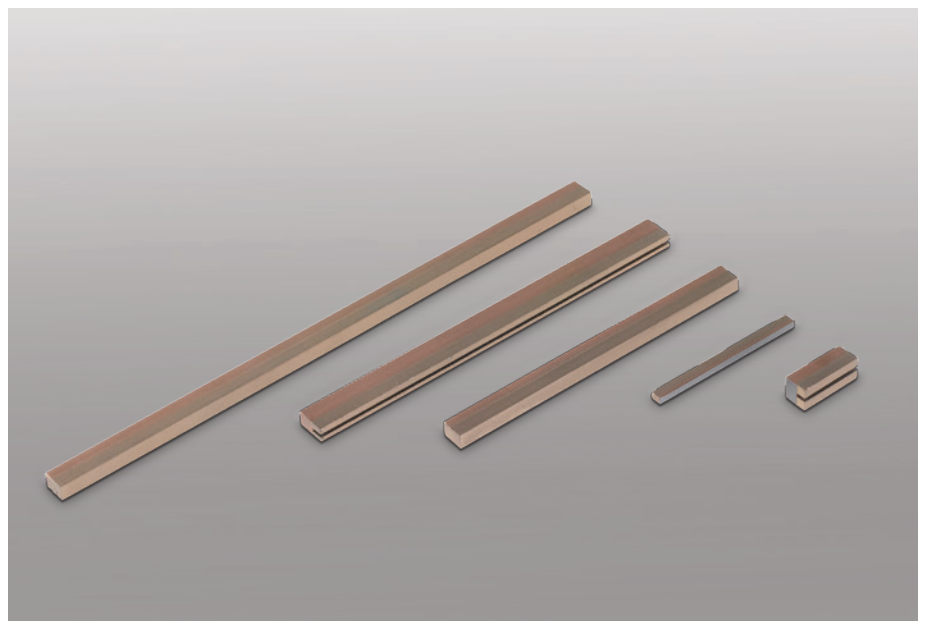
Besides tools and abrasives, we offer you various automation concepts - Automatic loading or unloading with robot or gantry are possible.



*Honing tool L series*



*Automation/Robot*



*Abrasives*

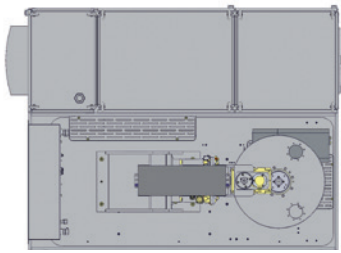
# liphone machines with rotary transport



## Flexible 1-spindle honing center

The single-spindle version of liphone series is impressive with its compact design and small footprint. Depending on the machining task

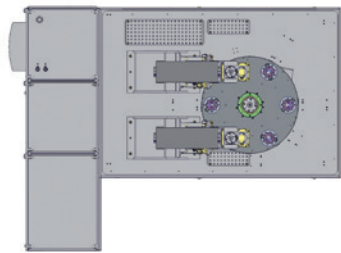
and the batch size, this type of machine can be equipped with a fixed or rotary table and up to 4 stations.



## Flexible 2-spindle honing center

This version can be equipped with 1 or 2 honing units. In general, rotary tables with 3 to 8 stations are installed. These stations can also be used for measuring or secondary

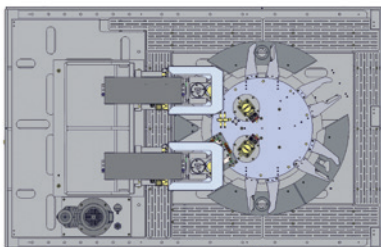
processes. Compared to the single-spindle honing center, this version is 60 cm wider. The two spindles allow for a two-stage honing process.



## Honing center for gears

Our two-spindle configuration machine has become the standard solution for gear honing on the market. The integrated gripper

transport offers the possibility to cycle gears with different diameters. Furthermore, the user only needs one fixture below the two spindles.

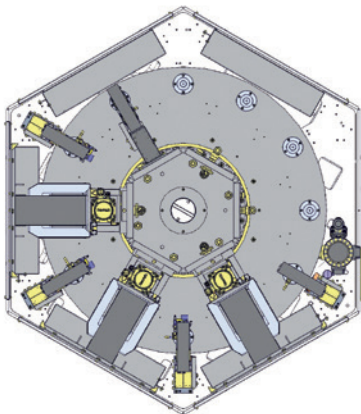


Technical data	1-spindle honing center	2-spindle honing center	Honing center for gears
Required space (W x D x H) mm	1400 x 2150 x 3500	2000 x 2900 x 3500	2000 x 2500 x 3500
Weight, net kg	3500	3650	3800
Application samples	injection pump components, housing, hydraulic components		especially designed for gear wheels

Subject to technical changes and variations in design and configuration.



### Honing center with inner column and rotary table



The Gehring honing center with inner column construction combines modern design with optimized accessibility. The rotary table placement around the inner column guarantees quick access to the processing stations, a good overview and a quick and easy changeover. The maintenance panels on each individual station facilitate maintenance.

Alternatively equipped with a six or eight sided inner column you can fix up to 7 honing spindles. With this we can assure short cycle times and multistep processes. Pre and post

gauging stations are fixed on the opposite side to optimize the interior space use in the best way possible. Another advantage is the compact design and the resulting reduced space requirement in your facility. The Gehring Operator Panel can be rotated around the machine so that it is easily visible from any location, thus ensuring optimum flexibility and ease of use.

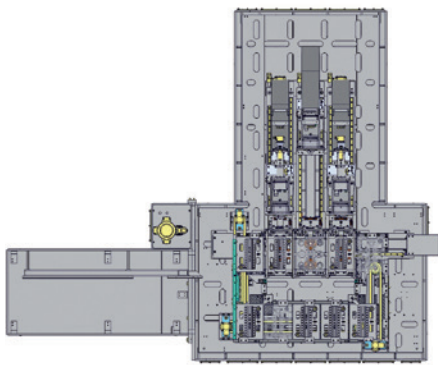
In addition, the operation of the machine is simplified through the user-friendly interface of the Gehring Operator Panel (GOP) and the program assistant.

### Technical data

Required space (W x D x H)	mm	2100 x 2400 x 3600
Weight, net	kg	3500
Application samples		gear wheel, pinion gear, injection pump components, housing, hydraulic components

*Subject to technical changes and variations in design and configuration.*

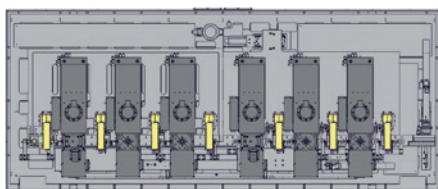
# Honing center with inner column and rotary table



## Horizontal honing machine for pinion gears

Our three-spindle lifehone series for pinion gear processing has already proven itself in the market and has become the standard solution. The main difference compared to the other lifehone machines is the horizontal honing of the workpieces.

The machine is loaded via an handling system from the pallet. In general, the number of workpieces per pallet is between 5 to 10 pinion gears. The advantage of pallet method is the shortened processing time per workpiece.



## Multispindle transfer honing machine

The lifehone transfer design is usually recommended for solutions with four or more spindles. Depending upon the desired cycle time and the honing process, the machine is designed

with the proper number of spindles. This design is also suitable when different bore diameters must be processed on one workpiece.

Technical data		honoring machine for pinion gears	transfer honing machine
Required space (W x D x H)	mm	400 x 1800 x 2900	2300 x 3450 x 2400
Weight, net	kg	3650	3800
Application samples		especially designed for pinion gears	connecting rod

*Subject to technical changes and variations in design and configuration.*

## Worldwide Presence

With our presence on three continents and a total of seven subsidiaries, we are very well-positioned and primed for the increasing globalization of the world economy.

Our representatives worldwide stand competently by your side and are your direct contacts in the market.

We are on the spot for you and provide the ideal solution for all honing applications.

