

**LEVIACRON**  
NON-CONTACT PRECISION MOTION

**SLH-x (spring-less HSK tool clamping units)**



## Levicron

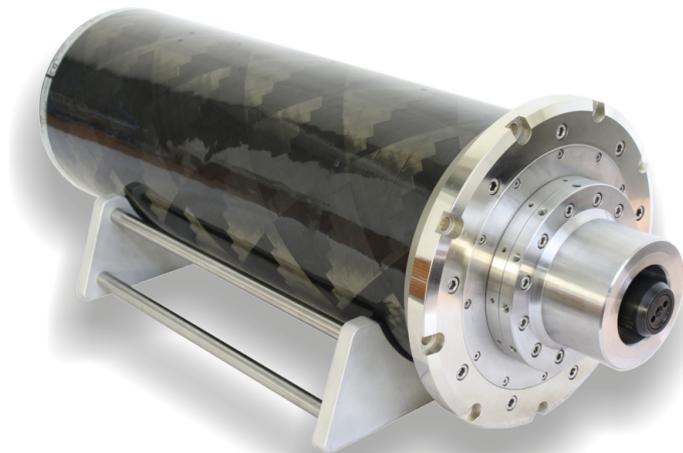
Development, manufacture and sales of motor spindle solutions with non-contact bearing technologies for ultra-precision and CNC machining is Levicron's core business. At Levicron bespoke analytical proven methods and simulation tools for structural analysis and fluid dynamics complement sound practical experiences in the field of spindle development and production.

Being the first ever provider of aerostatic tool spindles with industrial tool interfaces (HSK) and full CNC functionality, products from Levicron are being used all around the world to reliably machine precision parts with an optical surface finish.

Our demands of our products and those from our customers prevent the use of off-the-shelf components within the build. Therefore not only the patented bearing technology and patent-pending spring-free HSK taper clamping systems can be found in our motor spindles, but also in-house developed motor and encoder solutions. A vertical manufacturing integration of more than 90 % incorporates CNC turning, - milling, - diamond machining, - cylindrical /bore grinding and bespoke machining solutions. Along with our production sophisticated test and dynamic balancing methods can all be found under one roof.

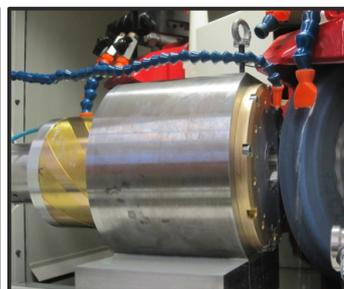
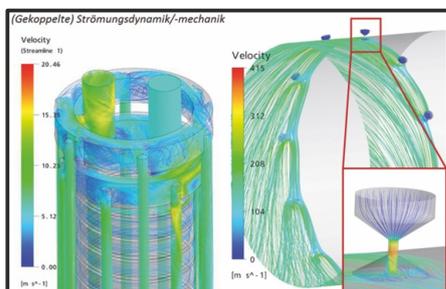
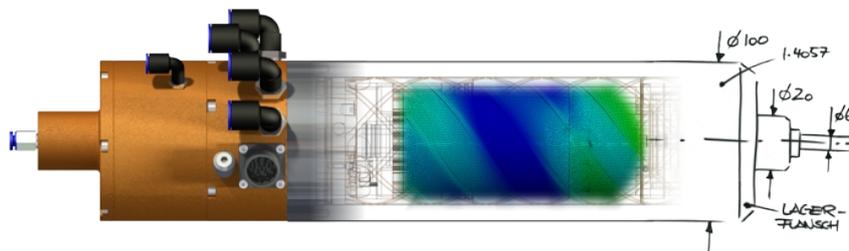
The quality, speed and accuracy of Levicron spindle's and the requirements for the applications they are used in have made it necessary to develop bespoke encoder and motor solutions as well as solutions for HSK tool clamping, HSK tool holding and others. Because of their unique performance and functionality some of these solutions have been made available for our customers as off-the-shelf items. Although Levicron had to re-invented the wheel more than once our customers can confirm that our wheels run better and faster than others.

As a result, tool and work-holding spindle solutions for turning, milling and grinding are offered that provide a unique thermal stability and robustness at shaft dynamics, errors in shaft motion and speeds which were previously not available for the user.



## Levicron

*All in house developed and manufactured Ultra Precision Technology for CNC Machining*



# SLH-x

Patent-pending integral HSK clamping units,  
the spring-less simplicity for automatic HSK clamping

Tool spindle manufacturers know of all of the problems that come with a spring-based taper clamping system – a complex and stacked design, combined with inconsistent balancing and shaft dynamics, spring-fatigue, inconsistent clamping position and pull-in forces at excessive servicing.

Existing self-locking clamping systems on the other hand appear to be too complex and show quite different problems. Due to the serial combination of taper connections these systems have not only to cover a broad travel range, but also suffer from changes in clamping position and pull-in force due to non-predictable changes in tribological conditions. Self-locking taper clamping system according to the current state of the art also use a self-locking unit connected to a standard clamping unit which can be used with other clamping systems. This again affects the already large change in clamping position and tribological conditions.

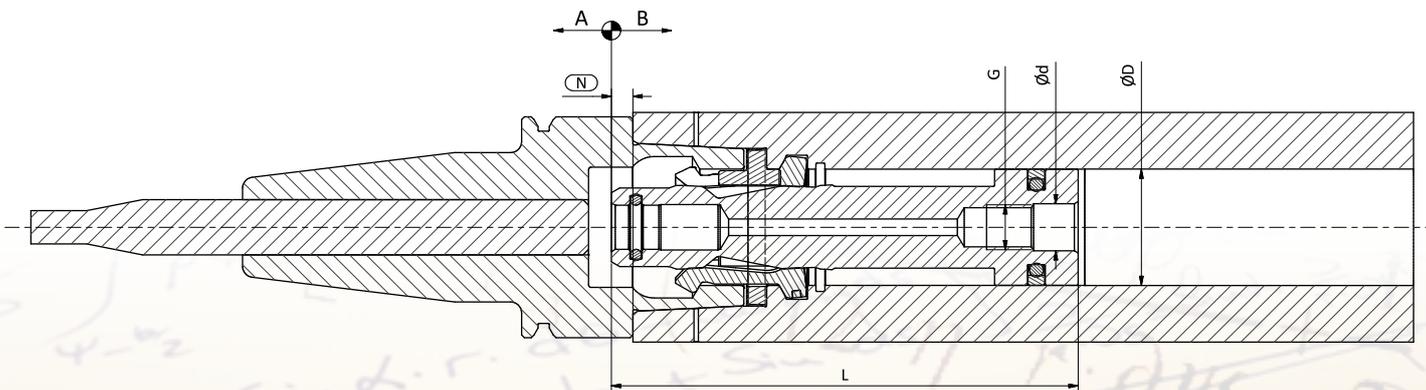
Our patented spring-less automatic clamping system for Hollow-Taper-Shank (HSK) tools with optional aerostatic rotary feedthrough is based on the principle of a monolithic pre-loaded self-locking. For this the clamping and the locking unit used with other spring-less clamping systems are combined and reduced to only one single unit of a very simplistic design that covers the clamping as well as the self-locking. Due to an intensive FEA design optimization the change pull-in force to the tool holder from standstill to high-speed is less than 5%.

### Benefits for your machining application:

- Consistent clamping force and positions even over two million tool change cycles
- Consistent and excellent shaft balancing and dynamics
- Especially for spindle solutions that are meant to machine optical components
- Higher spindle speeds and increased productivity

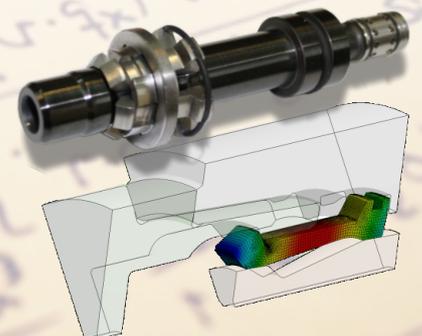
### Benefits for the spindle designer and manufacturer:

- Number of parts involved reduced to the minimum
- Ultra compact, simple and light design
- clamping system removable (service) from shaft without removing the shaft from the spindle
- Non-rotating drawbar (standard)
- Forces to eject a tool reduced by 60% (to protect the spindle bearings from overload)
- Optional aerostatic rotary feedthrough (not available for SLH-25)



## Data Sheet, SLH-x

HSK type		HSK-E25	HSK-E40
Operating Force, Clamping	[N]	700	2,100
Operating Force, Unclamping	[N]	> 500	> 1,400
Pull-In Force	[N]	2,500 - 5,000	7,500 - 10,000
Nominal Clamping Position (N)	[mm]	3.05	3.85
Eject Travel (A) from (N)	[mm]	3.15	4.3
Travel from (N) without Tool (B)	[mm]	1.8	3
Bore Diameter (D)	[mm]	21	13.3
Overall Length (L)	[mm]	83.7	54
Connection Thread (G)	[-/-]	M8x1 6H LH	M6x0.75 6H LH
Guide Bore Diameter (d)	[mm]	8.5 H5	6.3 H5



SLH-x unit and coupled FEA simulation with multiple non-linear contacts



Levicron GmbH | Sauerwiesen 6  
67661 Kaiserslautern, Germany

Phone: +49 (0) 6031 - 66800 - 0 | <http://levicron.com> | E-mail: [info@levicron.com](mailto:info@levicron.com)