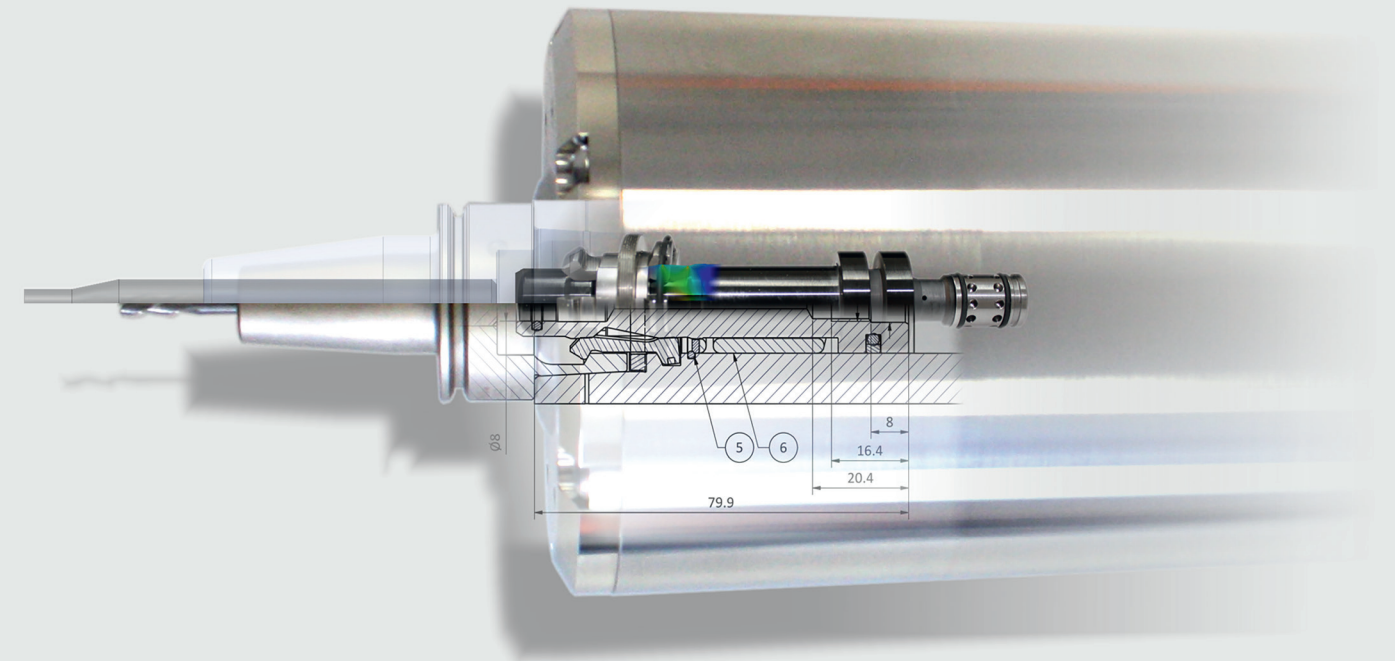




SLH-x (Spring-less HSK tool clamping units)



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Levicron

The development, manufacturing, and sales of motor spindle solutions with non-contact bearing technologies for ultra-precision and CNC machining are Levicron’s core businesses.

At Levicron, bespoke proven analytical methods and simulation tools for structural analysis and fluid dynamics complement sound practical experience of spindle development and production. Together with the first-ever aerostatic tool spindle comprising an industrial taper interface (HSK) and full CNC functionality, products from Levicron are now used for CNC-machine precision parts with optical surface finish all around the world.

Our requirements for our products and those of our customers prevent the use of off-the-shelf components. 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, encoder and tool clamping solutions.

A vertical manufacturing integration of more than 90 % incorporates CNC turning, -milling, -diamond machining, -cylindrical/ bore grinding, -wire cut EDM, and bespoke machining solutions. You can find all our sophisticated production tests and dynamic balancing methods under one roof.

The quality, speed, and accuracy of Levicron spindles and the requirements coming from the applications are used to make 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 solutions have been made available for our customers as off-the-shelf items.

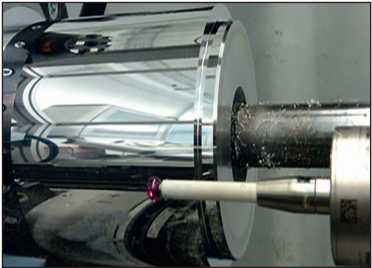
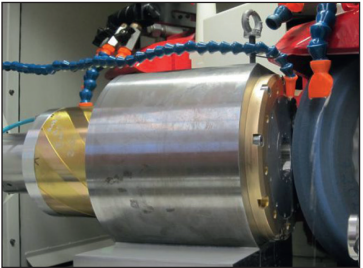
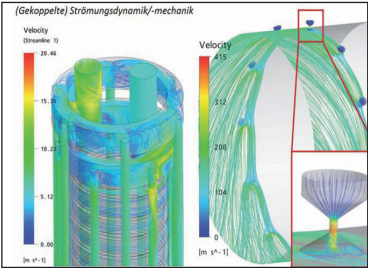
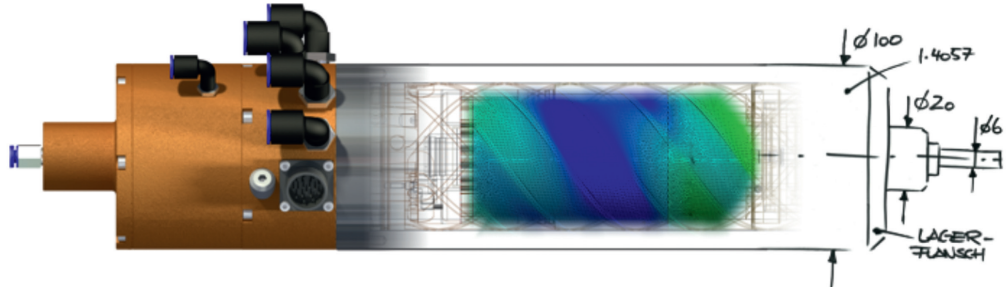
Although Levicron had to reinvent the wheel more than once, our customers can confirm that our wheels run smoother and faster than others. As a result, tool and work-holding spindle solutions for turning, milling, and grinding can provide the customer with unique thermal stability and robustness at shaft dynamics, errors in shaft motion, and speeds that have not been available so far.



SLH-x
Self-Locking Tool Clamping System

Levicron

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



SLH-x

Integral spring-less, self-locking tool clamping system for hollow-taper-shank tools (HSK, DIN 69893)

Description

Manufacturers of tool spindles know the problems with spring-based, automatic taper clamping systems, extremely long and complex designs. Unsteady unbalance values, shaft dynamics, fatiguing disk springs, variable clamping/ release positions, and very high effort in case of service are also problematic. Even the promising approaches of self-locking taper clamping systems appear complex and hide completely different problems.

The juxtaposition of taper or wedge connections results in strongly varying clamping and release positions and tribological changes due to the high surface pressures, with sometimes dangerous changes in clamping force or operating functions. According to the current state of the art, taper clamping systems are generally operated with aconventional clamping set followed by a locking unit, which aggravates clamping stroke changes.

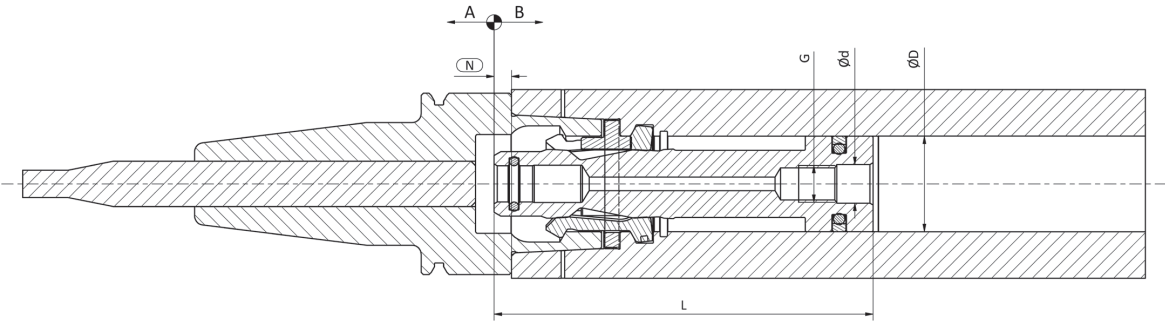
Our newly developed springless clamping system (**SLH-x**) for **hollow shank taper tools (HSK)** with optional aerostatic rotary feed-through is based on monolithic preloaded self-locking. Here, the clamping set takes over both the HSK tool’s clamping and the preloaded, safe self-locking. Due to the numerically optimized design, the self-locked retraction of the tool holder takes place in a controlled manner even at the highest speeds and with less than a 5% force difference from the static case.

The advantages of using the application

- Constant clamping and release position as well as the clamping force itself (over 2 million changes)
- Constant unbalance values and thus significantly improved shaft dynamics
- Particularly suitable for machining optical components
- Higher speed stability, significantly reduced susceptibility to faults, freedom from maintenance, and more excellent operational reliability

The benefits for the spindle designer

- Reduction of the number of components to a minimum
- Ultra-compact design
- Removal (service) without removing the shaft
- Non-rotating push-pull rod (standard)
- Reduction of ejection forces by 60% to protect shaft bearings
- Optional integrated aerostatic rotating union (all except HSK-25)



Data Sheet SLH-x

		HSK-E20	HSK-E25	HSK-E32	HSK-E40	HSK-E63
Interface	[-/-]	DIN 69893-5	DIN 69893-5	DIN 69893-5	DIN 69893-5	DIN 69893-5
Max. Speed	[rpm]	150,000	90,000	80,000	60,000	40,000
Operating Force, Clamping	[N]	400	700	900	2,100	6,000
Operating Force, Release	[N]	≥ 400	≥ 800	≥ 1,000	≥ 2,000	≥ 6,500
Pull-in Force	[N]	1,900 - 2,500	3,500 - 5,000	6,500 - 8,000	7,500 - 10,000	23,000 - 35,000
Nominal Clamping Position (N)	[mm]	2.5	3	4	3.85	2.2
Eject Travel (A) from (N)	[mm]	2.7	3.1	4.2	4.3	8.0
Travel from (N) without Tool (B)	[mm]	1.7	1.8	1.8	3.1	4.5
Bore Diameter (D)	[mm]	10.5 H4	13.3 H4	16.8 H4	21 H4	33 H4
Overall Length (L)	[mm]	45	54	69	83.7	136
Connection Thread (G)	[-/-]	M5x0.5H LH	M6x0.75 6H LH	M6x16H LH	M8x1 6H LH	M10x1.5 6H LH
Guide Bore Diameter (d)	[mm]	5.2 H5	6.3 H5	6.4 H5	8.5 H5	10.5 H5
Rotary Feedthrough	[-/-]	No	No	No	Yes	Yes