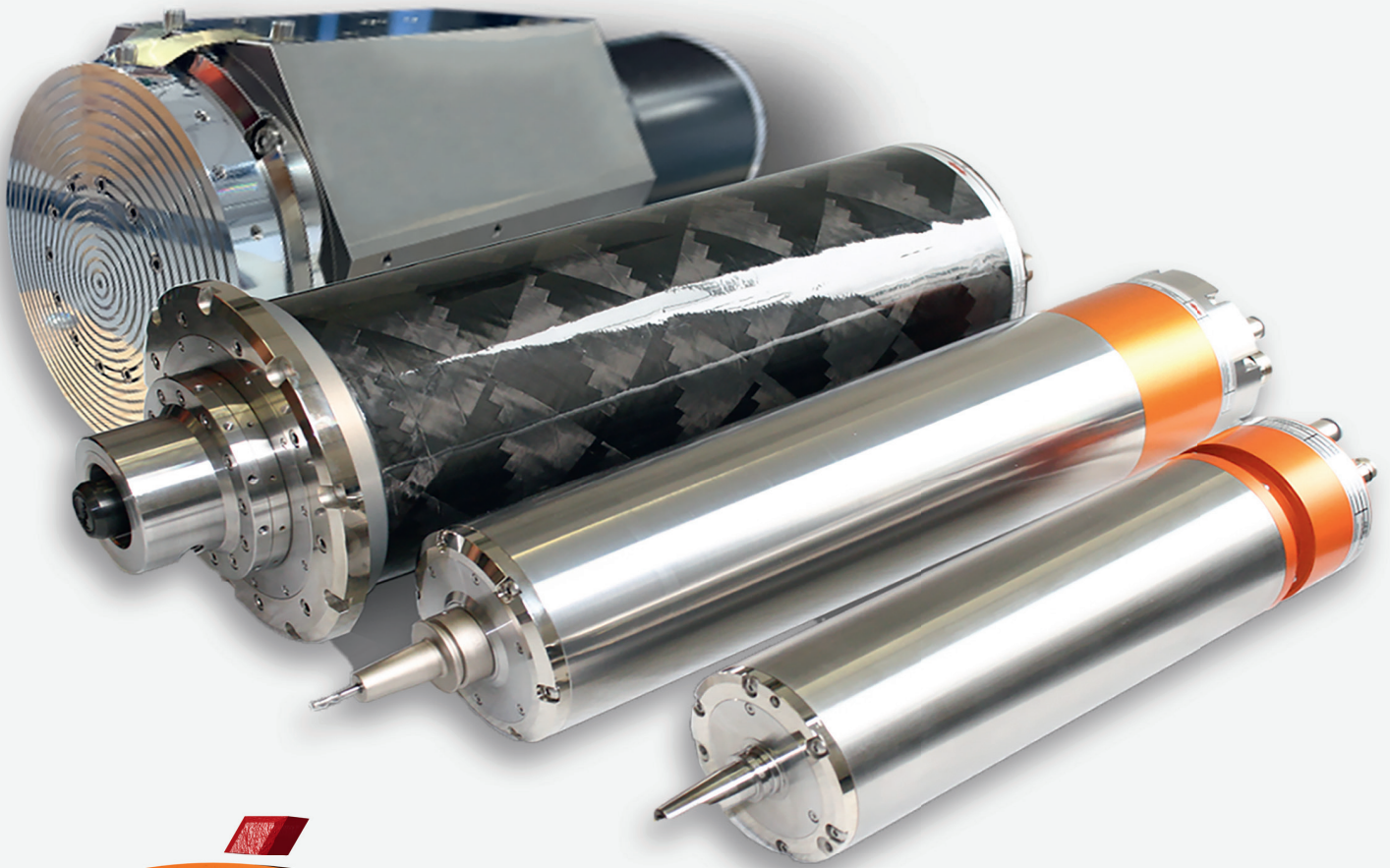


PRODUCT CATALOG



Levicron GmbH

Innovative manufacturer of ultra-precise tool and workpiece motor spindles
for milling, grinding, drilling, and turning applications.



Company profile

Levicron GmbH is a leading developer, manufacturer and distributor of non-contact ultra-precision air-bearing motor spindles for micro precision and ultra-precision machining applications. Dr. Ralf Dupont founded Levicron in 2010 in Kaiserslautern, and it has been established as a world-leading industrial company in ultra-precise motor spindle solutions ever since.

Our expertise is not only based on decades of practical experience in spindle design but also on using innovative calculation models, simulations, and test methods in structural analysis and fluid dynamics.

As a pioneer in CNC machining spindles with aerostatic bearings, industrial tool interfaces (HSK), and full CNC functionality, Levicron has globally set standards. Our products not only meet the highest demands of our customers in CNC and Ultra-precision machining, but we are also committed to exceeding them. We use patented bearing technologies, spring-less HSK clamping systems and in-house developed motor and encoder systems to make sure our spindles always represent the cutting edge of spindle technology. With a vertical manufacturing integration of more than 90%, including CNC turning, milling, external cylindrical grinding, internal grinding, diamond machining, and wire EDM, we have gained exceptional control of any aspect of the manufacturing process. In addition to our spindle products, we bespoke machining solutions, test benches, test methods, and balancing techniques in-house.

Our customers' demands on speed, accuracy, and quality require tailor-made partial solutions that other manufacturers can only offer to a certain extent. Besides our spindle solutions, we also provide components such as bearing systems, rotary encoders, electric motors, and HSK tool holders with unique properties.

This approach makes sure our customers receive superior spindle solutions for turning, milling, or grinding applications. With superior spindle dynamics, lowest spindle errors, exceptionally high stiffness values, and a broad speed range, we don't just set standards - we define them.



Our Solutions

- ➔ Patented bearing technology for exceptionally **low spindle errors**, **minimized air consumption**, and **high stiffness values**
- ➔ **Improved robustness and precision** thanks to **higher rigidity and load capacity** than conventional air-bearing spindle solutions
- ➔ **Optimized motor solutions & reduced power losses** for dynamically thermal-enhanced operations over the entire speed range
- ➔ Customized and in-house developed **rotary encoder systems** for sublime position control, signal adjustment, and reliability
- ➔ **Ultra-precision HSK tool holders according to DIN-69893** for automatic tool changes with under 200 nm repeatability and, for example, a balanced quality of **G 0.3 mm/s at 60,000 rpm** (HSK-E 25)
- ➔ **Spring-less patented HSK clamping units** to improve spring-based systems regarding repeatability, stability, size, and reliability
- ➔ **Innovative calculation, simulation, optimization, and manufacturing technologies**, as well as decades of experience with non-contact bearing systems

Your Advantages

- ✓ **Higher speed possible** (with U/ASD-H20A (HSK-E 20) up to 150,000 rpm)
- ✓ **Lowest synchronous and asynchronous errors** according to DIN ISO 230-07
- ✓ **Wear-free and stable continuous operation at maximum speed**
- ✓ **Short ramp times and no warm-up or re-lubrication cycle** for an immediate machine operation up to 75,000 rpm/s
- ✓ **A minimum optimized axial shaft growth & soak time across the entire speed range** (< 0.8 µm with ASD-Px in less than 10 min)
- ✓ **Oil, grease, and contactless operation**, as well as **short repair times** through the use of complexity-reduced methods already in the modular design of the spindle
- ✓ **No axial retention system is required when changing ejecting tools** to protect the bearings from being damaged by the eject load, and there is **no need for ESD protection measures**

Ultra-precise tool motor spindles



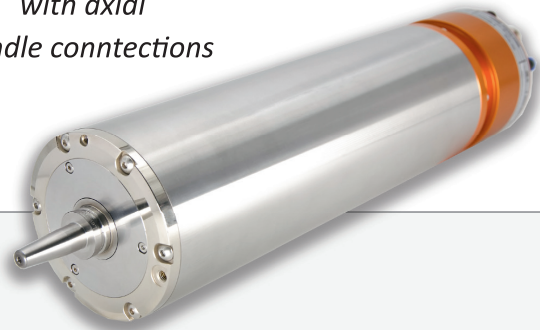
*with radial and axial
spindle connections*

High-pressure Aerostatic tool motor spindle with
HSK-E32 interface

UASD-H32/ UASD-H32A

Pages 5 - 8

*with axial
spindle connections*

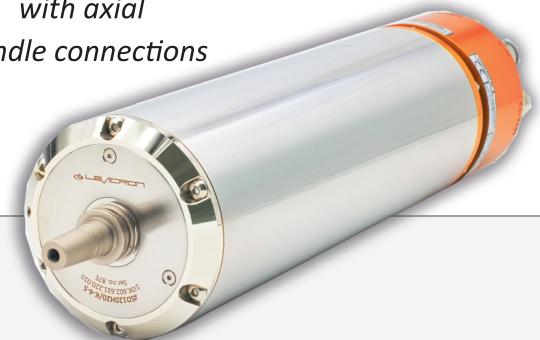


Aerostatic tool motor spindle with
HSK-E 25 interface (High-pressure optional)

ASD-H25A/ UASD-H25A

Pages 9 - 12

*with axial
spindle connections*



Aerostatic tool motor spindle
with **HSK-E 20 interface** (High-pressure optional)

ASD-H20A/ UASD-H20A

Pages 17 - 20

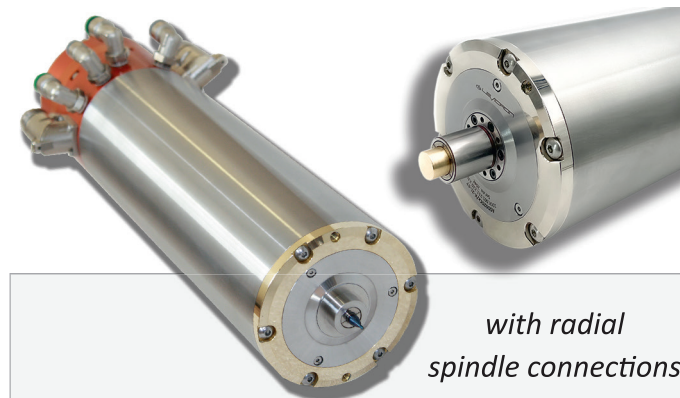
*with radial
spindle connections*



Aerostatic tool motor spindle with
HSK-E 25 interface (High-pressure optional)

ASD-H25/ UASD-H25

Pages 13 - 16



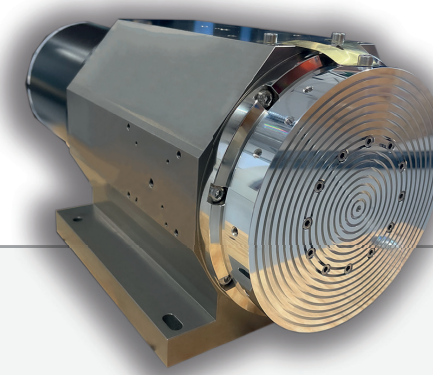
*with radial
spindle connections*

Aerostatic tool motor spindle with **auto collet tool
clamping**
(High-pressure optional)

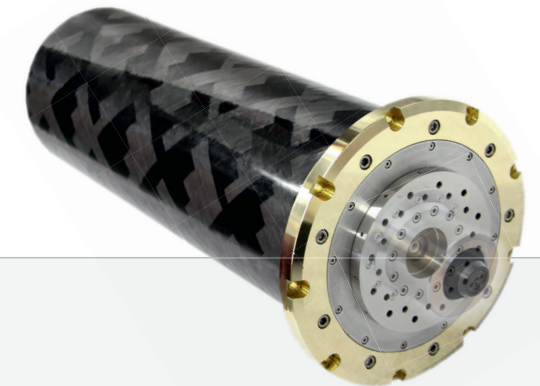
U/ASD-Cx/ ASD-CLT

Pages 21 - 24

Ultra-precise workpiece and tool motor spindle ASD-Px



as a **workpiece spindle** with various options

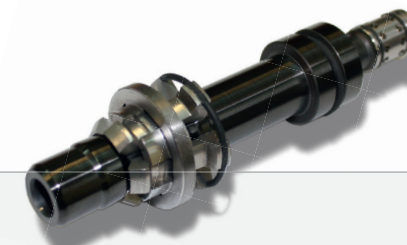


as a tool spindle with **HSK-C 63 interface**

ASD-Px/ ASD-PH63M

Pages 25 - 28

Ultra-precise tool clamping and spindle analysis and testing systems



HSK clamping system according
to DIN 69893-5

SLH-x

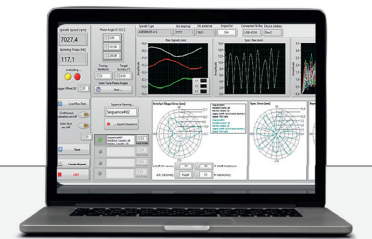
Pages 29 - 30



Tool holder according
to DIN 69893-5

UTS-x

Pages 31 - 32



Spindle analysis and testing system

ShakesBear

Pages 33 - 34



"more than 90% of the value chain takes place in-house"

Due to our extremely precise component and assembly accuracy, a purely supplier-based business model is unsuitable. For this reason, in addition to product development, we have firmly integrated special manufacturing technologies for producing shaft and bearing components into our company. These technologies and internal production are essential when manufacturing ultra-precise spindle solutions.

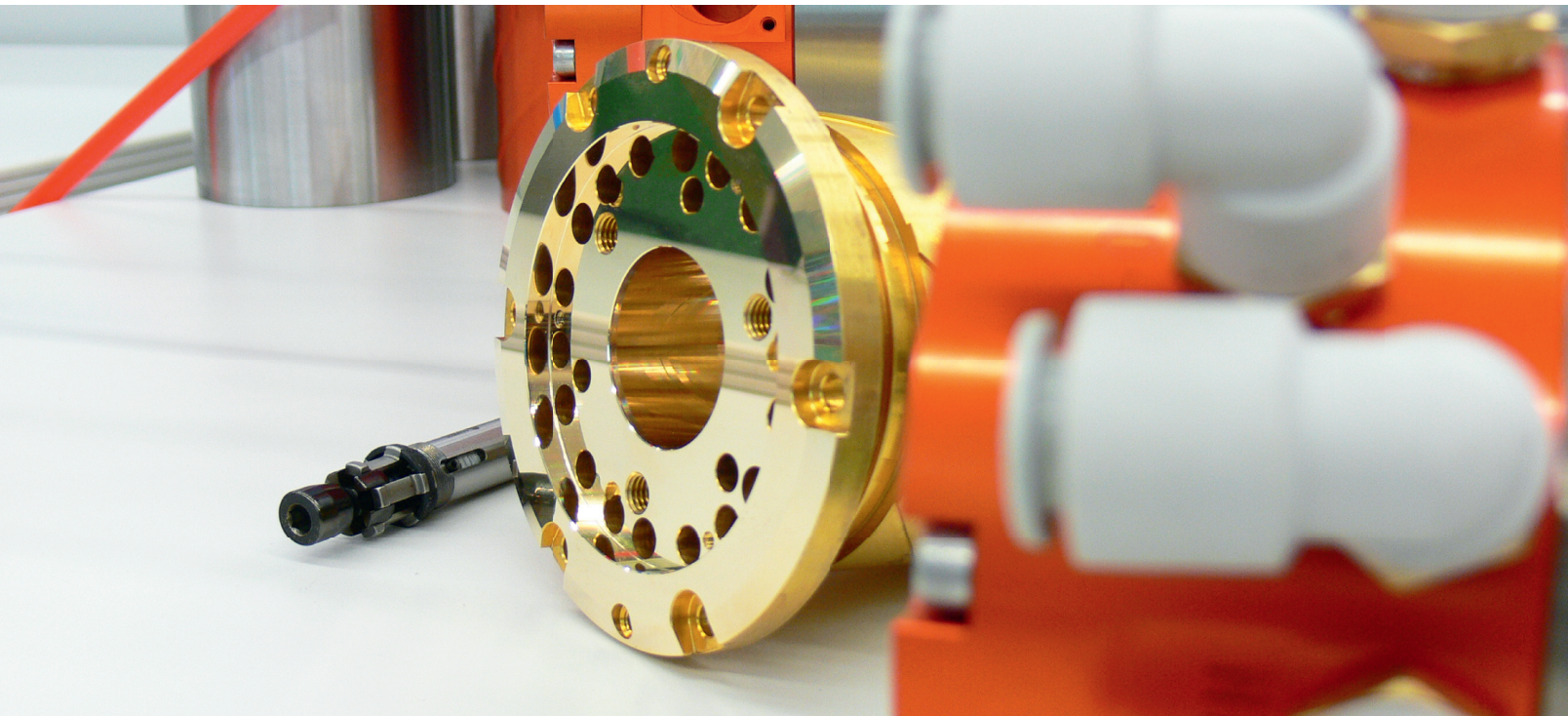
From the outset, we consciously decided to develop, manufacture, test, and sell more than 90% of our products in-house. Our goal is to ensure that our products' unique selling points not only meet but exceed our customers' requirements. In addition to our products, we also offer all the components and services required to operate or integrate a machining spindle into tools or special machines.

Through our in-house production, we ensure better control and management of production quantities while ensuring the first-class quality of our products. Unique solutions and upgrades to existing systems and machines are also integral to our corporate philosophy.



UASD-H32/ UASD-H32A

High-pressure aerostatic tool motor spindle with HSK-E 32 interface (SLH-32)



General information at a glance

Tool interface	Automatic spring-less HSK-E 32 tool interface (SLH-32)
Housing diameter	Ø 100 mm
Available speeds	0 - 60.000 rpm; 0 - 80.000 rpm
Motor options	max. 400V - High performance, 0.7 Nm S1
	max. 200V - High performance, 0.7 Nm S1
	max. 400V - Iron-less 0.33 Nm S1
	max. 200V - Iron-less, 0.33 Nm S1
Angular position control	1 VSS SinCos, 80 lines, with reference
Tool change system	Pneumatic, 3 bit clamping status monitoring, taper cleaning air
Spindle cooling	Thin-film liquid cooling
Bearing system	Aerostatic (ASD-H32/A), 6 - 10 bar *)
	High-pressure aerostatic (UASD-H32/A), 20 - 30 bar
Accuracy, dynamics	Dynamic tool run-out < 0,8 µm **)
	Shaft Error in motion < 35 nm
Spindle connections	UASD-H32A: axially outgoing
	UASD-H32: radially outgoing

*) only with approval
**) when using the UTS-32 tool holder series

Values of: May 2024

About

Based on our numerous successes with high-pressure aerostatic technology, we have driven forward the development of our **UASD-H32/A** on the basis of our proven UASD-H25 and UASD-H25A. The models differ only in their interface and are technically identical. As with all our spindle solutions with a HSK interface, the **UASD-H32/A** also uses our proven, spring-less tool clamping system SLH-x in the size and shape of **HSK-E 32**. This means that machine manufacturers who prefer a size 32 interface can now use our tool spindle.

These spindles not only combine the speed and smooth running of aerostatic spindle systems, but also enable higher chip removal rates thanks to the increased load capacity and rigidity. The integrated permanent magnet synchronous motor is designed such as the overload limit of the motor is just below that of the bearing system, thus ensuring comfortable protection of the bearing system.



Higher chip removal rates due to the higher load capacity and rigidity



High speeds for micro-machining up to 80,000 rpm



With an automatic and spring-less HSK-E 32 tool interface (SLH-32)

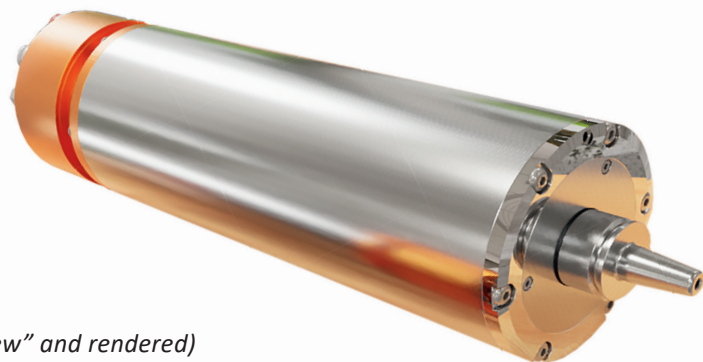


High-Pressure Aerostatic Bearing System (UASD-H32A)

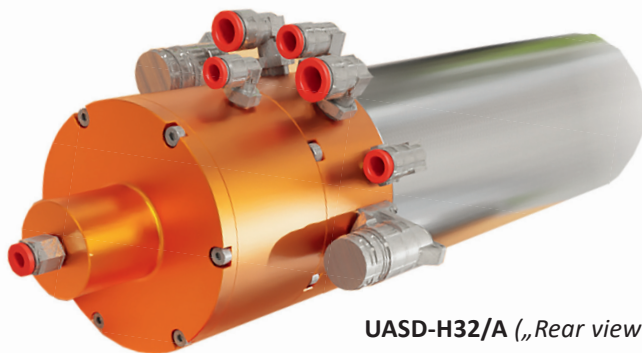
ASD-H32A & UASD-H32A in comparison *)		ASD060H32A	UASD060H32A **)
Tool interface	[-/-]	HSK-E 32 (SLH-32)	HSK-E 32 (SLH-32)
Bearing air supply pressure	[bar]	6-10	20-30
Available speed	[rpm]	0 - 60,000	0 - 60,000
Radial load capacity at the spindle nose	[N]	330	900
Axial load capacity at the spindle nose	[N]	650	1,300
Static radial zero point stiffness at the spindle nose	[N/ µm]	41	83
Static axial zero point stiffness at the spindle nose	[N/ µm]	60	75
Static air consumption	[l/ min]	50	120
Dynamic tool run-out ***)	[µm]	< 0.4	< 0.5
Shaft Error in motion ***)	[nm]	< 23	< 30

*) ASD-H25A= aerostatic; UASD-H32A= high-pressure aerostatic
**) all values at 20 bar bearing feed pressure (gauge pressure)
***) when using the UTS-32 tool holder series

Values of: May 2024



UASD-H32/A (“front view” and rendered)



UASD-H32/A („Rear view“ and rendered)

Data sheet UASD-H32/A (speeds up to 60,000 rpm)

UASD060H32 (radial) UASD060H32A (axial)

General	Housing diameter	[mm]	100	100
	Length over all	[mm]	470	408
	Weight	[kg]	16	16
	Available Speed	[rpm]	0 - 60,000	0 - 60,000
	Tool interface	[-]	HSK-E 32 (SLH-32)	HSK-E 32 (SLH-32)
	Tool clamp status monitoring	[-]	3 bit digital	3 bit digital
Motor option, „High performance“, max. 400V	Motor type	[-]	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1	[Nm]	0.7	0.7
	Number of poles	[-]	2	2
	max. Phase voltage	[V]	270	270
	Rated current	[A]	10	10
	Peak current	[A]	20	20
Motor option, „High performance“, max. 200V	Shaft power	[kVA]	4.3	4.3
	Motor type	[-]	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1	[Nm]	0.7	0.7
	Number of poles	[-]	2	2
	max. Phase voltage	[V]	170	170
	Rated current	[A]	18	18
Motor option, „Iron-less“, max. 400V	Peak current	[A]	36	36
	Shaft power	[kVA]	4.2	4.2
	Motor type	[-]	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1	[Nm]	0.33	0.33
	Number of poles	[-]	2	2
	max. Phase voltage	[V]	260	260
Motor option, „Iron-less“, max. 200V	Rated current	[A]	5	5
	Peak current	[A]	11	11
	Shaft power	[kVA]	2.1	2.1
	Motor type	[-]	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1	[Nm]	0.33	0.33
	Number of poles	[-]	2	2
Rotary encoder	max. Phase voltage	[V]	160	160
	Rated current	[A]	9	9
	Peak current	[A]	18	18
	Shaft power	[kVA]	2.1	2.1
Bearing system	Encoder type	[-]	incremental	incremental
	Periods	[-]	80	80
	Signal A/B	[-]	SinCos, 1 VSS	SinCos, 1 VSS
	Zero flag	[-]	yes (digital/ analog)	yes (digital/ analog)
Stability and precision	Bearing supply pressure	[bar]	20 - 30	20 - 30
	Air cleanliness, ISO 8573	[-]	3 or better	3 or better
	Dew point at supply pressure	[°C]	3	3
	Radial zero point stiffness at the spindle nose, static	[N/μm]	> 70	> 70
	Radial load capacity at the spindle nose, static	[N]	> 900	> 900
	Axial zero point stiffness at the spindle nose, static	[N/μm]	> 80	> 80
	Axial load capacity at the spindle nose, static	[N]	> 1,300	> 1,300
	Taper run-out TIR	[nm]	< 100	< 100
	Shaft Error in motion	[nm]	< 30	< 30
	Dynamic tool run-out *)	[μm]	< 0.7	< 0.7
	Spindle soak time	[min]	< 3	< 3
	Axial shaft growth	[μm]	< 3	< 3

all values at 20 bar bearing feed pressure (gauge pressure) | *) when using the tool holder series UTS-32

Values of: May 2024

Data sheet UASD-H32/A (speeds up to 80,000 rpm)

UASD080H32 (radial) UASD080H32A (axial)

General	Housing diameter	[mm]	100	100
	Length over all	[mm]	470	408
	Weight	[kg]	16	16
	Available Speed	[rpm]	0 - 80,000	0 - 80,000
	Tool interface	[-]	HSK-E 32 (SLH-32)	HSK-E 32 (SLH-32)
	Tool clamp status monitoring	[-]	3 bit digital	3 bit digital
Motor option, „High performance“, max. 400V	Motor type	[-]	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1	[Nm]	0.7	0.7
	Number of poles	[-]	2	2
	max. Phase voltage	[V]	370	370
	Rated current	[A]	10	10
	Peak current	[A]	20	20
Motor option, „High performance“, max. 200V	Shaft power	[kVA]	5.8	5.8
	Motor type	[-]	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1	[Nm]	0.7	0.7
	Number of poles	[-]	2	2
	max. Phase voltage	[V]	205	205
	Rated current	[A]	18	18
Motor option, „Iron-less“, max. 400V	Peak current	[A]	36	36
	Shaft power	[kVA]	5.6	5.6
	Motor type	[-]	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1	[Nm]	0.33	0.33
	Number of poles	[-]	2	2
	max. Phase voltage	[V]	330	330
Motor option, „Iron-less“, max. 200V	Rated current	[A]	5	5
	Peak current	[A]	11	11
	Shaft power	[kVA]	2.8	2.8
	Motor type	[-]	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1	[Nm]	0.33	0.33
	Number of poles	[-]	2	2
Rotary encoder	max. Phase voltage	[V]	180	180
	Rated current	[A]	9	9
	Peak current	[A]	18	18
	Shaft power	[kVA]	2.8	2.8
Bearing system	Encoder type	[-]	incremental	incremental
	Periods	[-]	80	80
	Signal A/B	[-]	SinCos, 1VSS	SinCos, 1VSS
	Zero flag	[-]	yes (digital/ analog)	yes (digital/ analog)
Stability and precision	Bearing supply pressure	[bar]	20-30	20-30
	Air cleanliness, ISO 8573	[-]	3 or better	3 or better
	Dew point at supply pressure	[°C]	3	3
	Radial zero point stiffness at the spindle nose, static	[N/μm]	> 60	> 60
	Radial load capacity at the spindle nose, static	[N]	> 800	> 800
	Axial zero point stiffness at the spindle nose, static	[N/μm]	> 70	> 70
	Axial load capacity at the spindle nose, static	[N]	> 1,200	> 1,200
	Taper run-out TIR	[nm]	< 100	< 100
	Shaft Error in motion	[nm]	< 35	< 35
	Dynamic tool run-out *)	[μm]	< 1	< 1
	Spindle soak time	[min]	< 3	< 3
	Axial shaft growth	[μm]	< 5	< 5

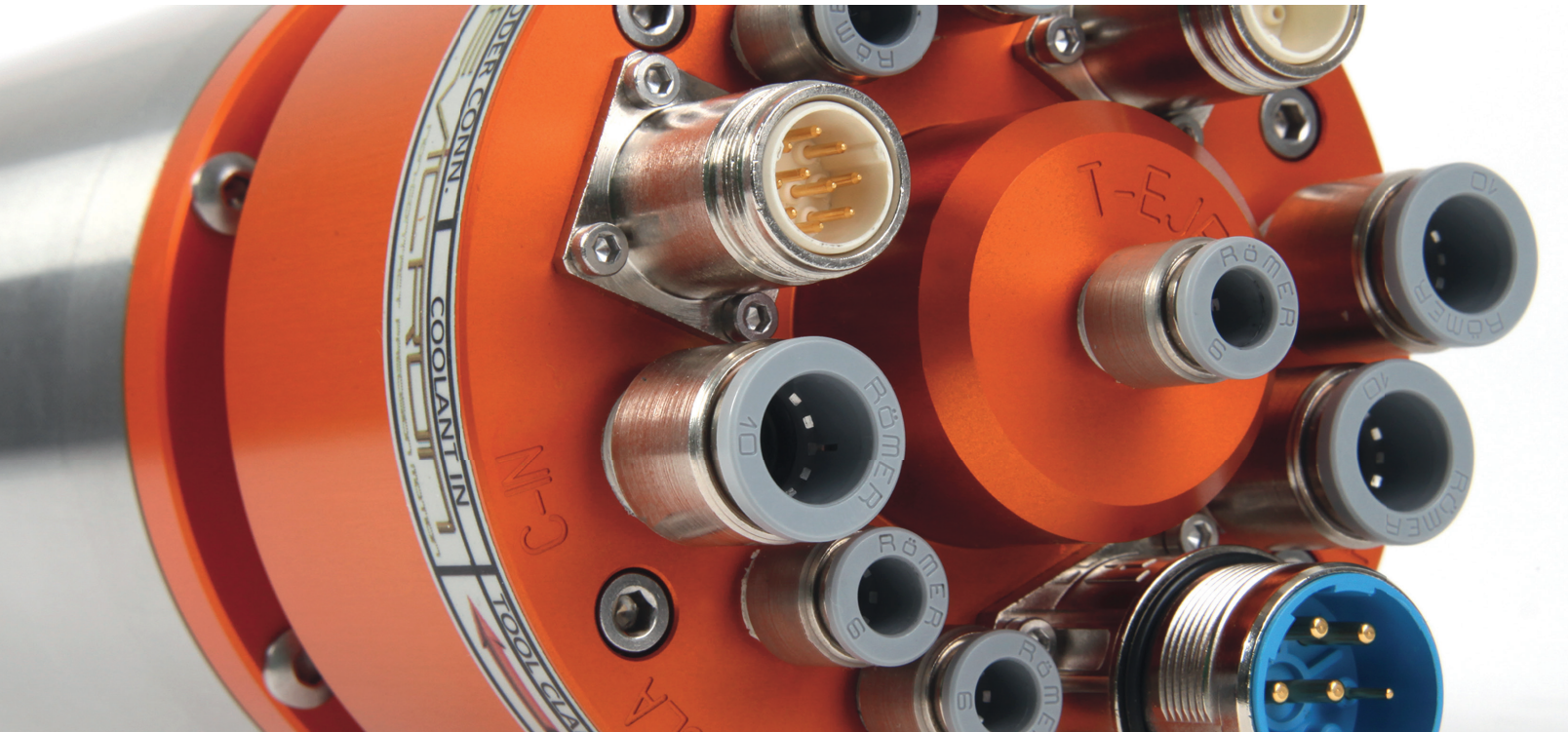
all values at 20 bar bearing feed pressure (gauge pressure) | *) when using the tool holder series UTS-32

Values of: May 2024



ASD-H25A/ UASD-H25A (with axial (A) outgoing spindle connections)

(High-pressure) aerostaic tool motor spindle with HSK-E 25 interface (SLH-25)



General information at a glance

Tool interface	Automatic spring-less HSK-E 25 tool interface (SLH-25)
Housing diameter	Ø 100 mm
Available speeds	0 - 60,000 rpm; 0 - 80,000 rpm; 0 - 90,000 rpm
Motor options	max. 400V - High performance, 0.7 Nm S1
	max. 200V - High performance, 0.7 Nm S1
	max. 400V - Iron-less, 0.33 Nm S1
	max. 200V - Iron-less, 0.33 Nm S1
Angular position control	1 VSS SinCos, 80 lines, zero flag
Tool change system	Pneumatic, 3 bit clamping status monitoring, taper cleaning air
Spindle cooling	Thin-film liquid cooling
Bearing system	Aerostatic (ASD-H25A), 6-10 bar
	High-Pressure Aerostatic (UASD-H25A), 20-30 bar
Accuracy, dynamics	Dynamic tool run-out < 0.5 µm *)
	Shaft Error in motion < 30 nm
Spindle connections	Axially outgoing (Dmax 100 mm)

*) when using the tool holder series UTS-25

Values of: May 2024

About

Our ASD-H25A (aerostatic) and UASD-H25A (high-pressure aerostatic) models meet all the requirements for high-quality spindles for producing optical-quality surfaces with maximum precision. They combine robustness and functionality for multi-axis CNC machining at high speeds for micromachining and minimal spindle errors in accordance with DIN ISO 230-7, which are crucial for the machining of optical components. Our spindles are characterized by a high-resolution rotary encoder and extremely efficient thin-film liquid cooling. In addition, they offer monitoring of the clamping status and a standardized housing diameter of 100 mm (h5). For CNC machining, they are also available with our hybrid bearing system, which significantly increases overload and collision safety and is suitable for tools up to a diameter of 4 mm.

For users in precision machining, this results in unprecedented accuracy, thermal stability and the ability to machine optical surfaces in milling and grinding applications. In ultra-precision machining, the high chip removal – together with an automated tool change – enables a significant increase in productivity and automation.



High speeds for micro-machining
up to 90,000 rpm



Minimal spindle errors for the
machining of optical components



With an automatic and spring-less
HSK-E 25 tool interface (SLH-25)

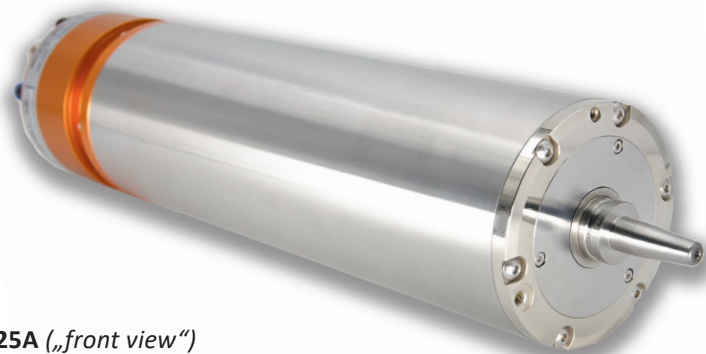


High-Pressure Aerostatic Bearing System (UASD-H25A)

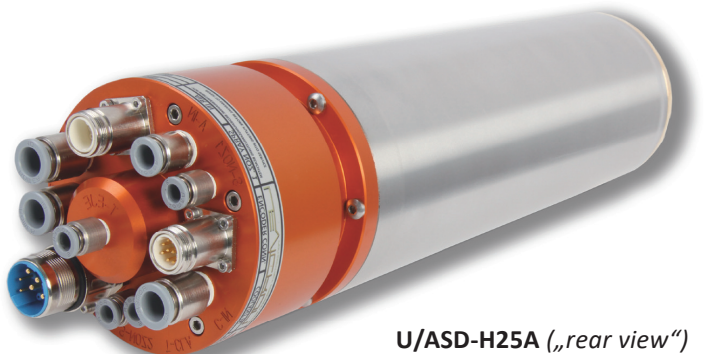
ASD-H25A & UASD-H25A in comparison *)		ASD060H25A	UASD060H25A **)
Bearing air supply pressure	[bar]	6-10	20-30
Available speed	[rpm]	0 - 60,000	0 - 60,000
Radial load capacity at the spindle nose	[N]	330	900
Axial load capacity at the spindle nose	[N]	650	1,300
Static radial zero point stiffness at the spindle nose	[N/ µm]	41	83
Static axial zero point stiffness at the spindle nose	[N/ µm]	60	75
Static air consumption	[l/ min]	50	120
Dynamic tool run-out ***)	[µm]	< 0.4	< 0.3
Shaft Error in motion ***)	[nm]	< 23	< 28

*) ASD-H25A= aerostatic; UASD-H25A= high-pressure aerostatic
**) all values at 20 bar bearing feed pressure (gauge pressure)
***) when using the UTS-25 tool holder series

Values of: May 2024



U/ASD-H25A („front view“)



U/ASD-H25A („rear view“)

Data Sheet ASD-H25A (Aerostatic)

		ASD060H25A	ASD080H25A	ASD090H25A
General	Housing diameter [mm]	100	100	100
	Length over all [mm]	408	408	408
	Weight [kg]	16	16	16
	Available Speeds [rpm]	0 - 60,000	0 - 80,000	0 - 90,000
	Tool interface [-]	HSK-E 25 (SLH-25)	HSK-E 25 (SLH-25)	HSK-E 25 (SLH-25)
	Tool clamp status monitoring [-]	3 bit digital	3 bit digital	3 bit digital
Motor option „High performance“, max. 400V	Motor type [-]	3 phases, synchronous	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1 [Nm]	0.7	0.7	0.7
	Number of poles [-]	2	2	2
	max. Phase voltage [V]	270	370	410
	Rated current [A]	10	10	10
	Peak current [A]	20	20	20
Motor option „High performance“, max. 200V	Shaft power [kVA]	4.3	5.8	6.5
	Motor type [-]	3 phases, synchronous	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1 [Nm]	0.7	0.7	0.7
	Number of poles [-]	2	2	2
	max. Phase voltage [V]	170	205	235
	Rated current [A]	18	18	18
Motor option “Iron-less”, max. 400V	Peak current [A]	36	36	36
	Shaft power [kVA]	4.2	5.6	6.3
	Motor type [-]	3 phases, synchronous	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1 [Nm]	0.33	0.33	0.33
	Number of poles [-]	2	2	2
	max. Phase voltage [V]	260	330	380
Motor option “Iron-less”, max. 200V	Rated current [A]	5	5	5
	Peak current [A]	11	11	11
	Shaft power [kVA]	2.1	2.8	3
	Motor type [-]	3 phases, synchronous	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1 [Nm]	0.33	0.33	0.33
	Number of poles [-]	2	2	2
Rotary encoder	max. Phase voltage [V]	160	180	208
	Rated current [A]	9	9	9
	Peak current [A]	18	18	18
	Shaft power [kVA]	2.1	2.8	3
Bearing system	Encoder type [-]	incremental	incremental	incremental
	Periods [-]	80	80	80
	Signal A/B [-]	SinCos, 1 VSS	SinCos, 1 VSS	SinCos, 1 VSS
	Zero flag [-]	yes (digital/ analog)	yes (digital/ analog)	yes (digital/ analog)
Stability and precision	Bearing supply pressure [bar]	6-10	6-10	6-10
	Air cleanliness, ISO 8573 [-]	3 or better	3 or better	3 or better
	Radial zero point stiffness at the spindle nose, static [N/μm]	> 40	> 25	> 20
	Radial load capacity at the spindle nose, static [N]	> 330	> 300	> 280
	Axial zero point stiffness at the spindle nose, static [N/μm]	> 60	> 40	> 30
	Axial load capacity at the spindle nose, static [N]	> 600	> 550	> 500
Stability and precision	Taper run-out TIR [nm]	< 100	< 100	< 100
	Shaft Error in motion [nm]	< 30	< 35	< 45
	Dynamic tool run-out *) [μm]	< 0.5	< 1	< 1.2
	Spindle soak time [min]	< 3	< 3	< 3
	Axial shaft growth [μm]	< 3	< 5	< 6

all values at 6 bar bearing feed pressure (gauge pressure)
*) when using the UTS-25 tool holder series

Values of: May 2024

Data Sheet UASD-H25A (High-Pressure Aerostatic)

		UASD060H25A	UASD080H25A	UASD090H25A
General	Housing diameter [mm]	100	100	100
	Length over all [mm]	408	408	408
	Weight [kg]	16	16	16
	Available Speeds [rpm]	0 - 60,000	0 - 80,000	0 - 90,000
	Tool interface [-]	HSK-E 25 (SLH-25)	HSK-E 25 (SLH-25)	HSK-E 25 (SLH-25)
	Tool clamp status monitoring [-]	3 bit digital	3 bit digital	3 bit digital
Motor option „High performance“, max. 400V	Motor type [-]	3 phases, synchronous	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1 [Nm]	0.7	0.7	0.7
	Number of poles [-]	2	2	2
	max. Phase voltage [V]	270	370	410
	Rated current [A]	10	10	10
	Peak current [A]	20	20	20
Motor option „High performance“, max. 200V	Shaft power [kVA]	4.3	5.8	6.5
	Motor type [-]	3 phases, synchronous	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1 [Nm]	0.7	0.7	0.7
	Number of poles [-]	2	2	2
	max. Phase voltage [V]	170	205	235
	Rated current [A]	18	18	18
Motor option “Iron-less”, max. 400V	Peak current [A]	36	36	36
	Shaft power [kVA]	4.2	5.6	6.3
	Motor type [-]	3 phases, synchronous	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1 [Nm]	0.33	0.33	0.33
	Number of poles [-]	2	2	2
	max. Phase voltage [V]	260	330	380
Motor option “Iron-less”, max. 200V	Rated current [A]	5	5	5
	Peak current [A]	11	11	11
	Shaft power [kVA]	2.1	2.8	3
	Motor type [-]	3 phases, synchronous	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1 [Nm]	0.33	0.33	0.33
	Number of poles [-]	2	2	2
Rotary encoder	max. Phase voltage [V]	160	180	208
	Rated current [A]	9	9	9
	Peak current [A]	18	18	18
	Shaft power [kVA]	2.1	2.8	3
Bearing system	Encoder type [-]	incremental	incremental	incremental
	Periods [-]	80	80	80
	Signal A/B [-]	SinCos, 1 VSS	SinCos, 1 VSS	SinCos, 1 VSS
	Zero flag [-]	yes (digital/ analog)	yes (digital/ analog)	yes (digital/ analog)
Stability and precision	Bearing supply pressure [bar]	20-30	20-30	20-30
	Air cleanliness, ISO 8573 [-]	3 or better	3 or better	3 or better
	Radial zero point stiffness at the spindle nose, static [N/μm]	> 70	> 50	> 35
	Radial load capacity at the spindle nose, static [N]	> 900	> 800	> 750
	Axial zero point stiffness at the spindle nose, static [N/μm]	> 70	> 60	> 50
	Axial load capacity at the spindle nose, static [N]	> 1,300	> 1,200	> 1,100
Stability and precision	Taper run-out TIR [nm]	< 100	< 100	< 100
	Shaft Error in motion [nm]	< 35	< 40	< 50
	Dynamic tool run-out *) [μm]	< 0.5	< 1	< 1.2
	Spindle soak time [min]	< 3	< 3	< 3
	Axial shaft growth [μm]	< 3	< 5	< 6

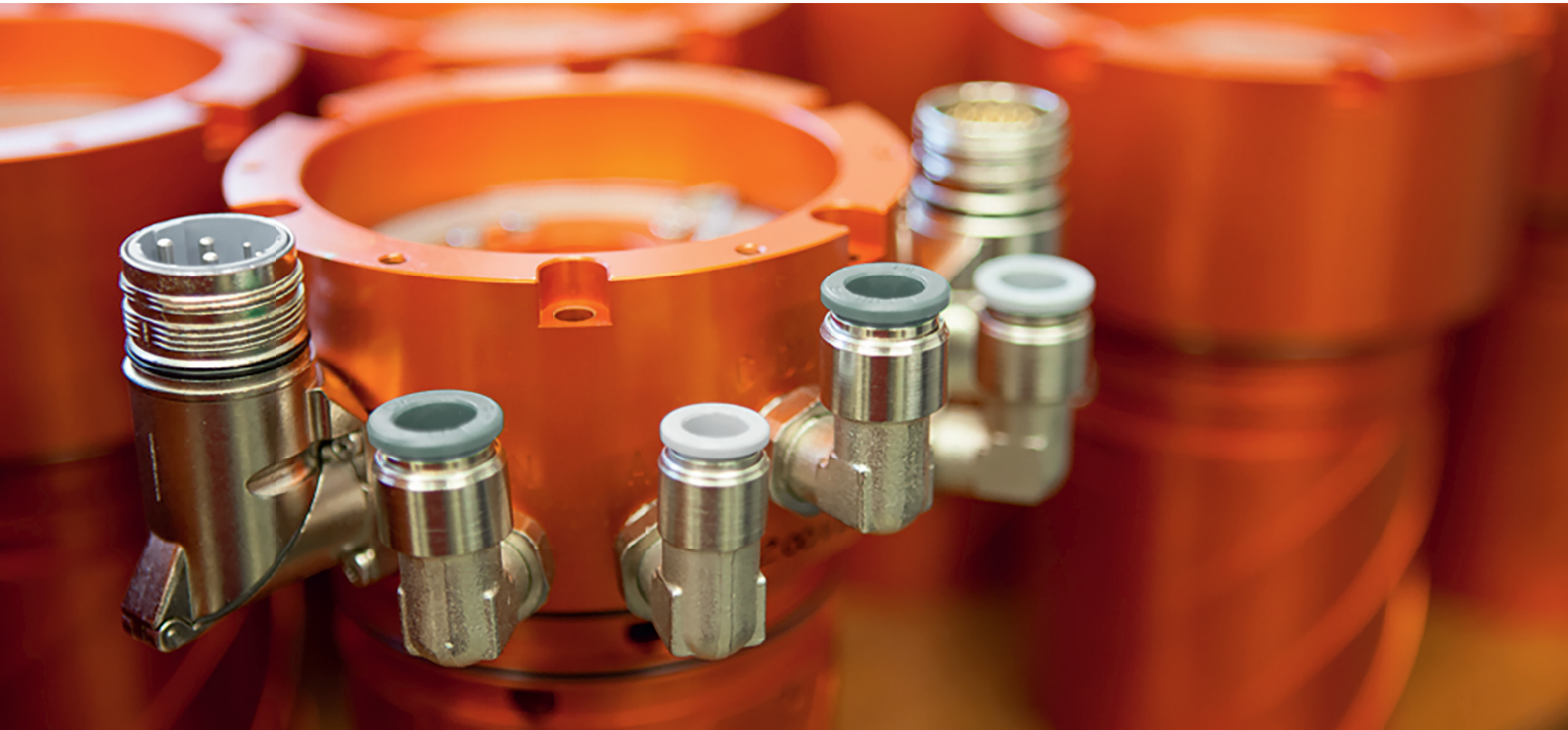
all values at 20 bar bearing feed pressure (gauge pressure)
*) when using the UTS-25 tool holder series

Values of: May 2024



ASD-H25/ UASD-H25 (with radially outgoing spindle connections)

(High-pressure) aerostatic tool motor spindle with HSK-E 25 interface (SLH-25)



General information at a glance

Tool interface	Automatic spring-less HSK-E 25 tool interface (SLH-25)
Housing diameter	Ø 100 mm
Available speeds	0 - 60,000 rpm; 0 - 80,000 rpm; 0 - 90,000 rpm
Motor options	max. 400V - High performance, 0.7 Nm S1
	max. 200V - High performance, 0.7 Nm S1
	max. 400V - Iron-less, 0.33 Nm S1
	max. 200V - Iron-less, 0.33 Nm S1
Angular position control	1 VSS SinCos, 80 lines, with reference
Tool change system	Pneumatic, 3 bit clamping status monitoring, taper cleaning air
Spindle cooling	Thin-film liquid cooling
Bearing system	Aerostatic (ASD-H25), 6-10 bar
	High-pressure Aerostatic (UASD-H25), 20-30 bar
Accuracy, dynamics	Dynamic tool run-out < 0.5 µm *)
	Shaft Error in motion < 30 nm
Spindle connections	Radially outgoing (Dmax 100 mm)

*) when using the tool holder series UTS-25

Values of: May 2024

About

Our ASD-H25 (aerostatic) and UASD-H25 (high-pressure aerostatic) models meet all the requirements for high-quality spindles used to produce optical-quality surfaces with the highest precision. They combine robustness and functionality for multi-axis CNC machining at high speeds for micro-machining, along with minimal spindle errors according to DIN ISO 230-7—critical for machining optical components. Our spindles feature a high-resolution rotary encoder and highly efficient thin-film liquid cooling. Additionally, they offer clamping state monitoring and a standardized housing diameter of 100 mm (h5). For CNC machining, they are also available with our hybrid bearing system, which significantly increases overload and collision safety and is suitable for tools up to 4 mm in diameter.

For users in precision machining, this results in unprecedented accuracy, thermal stability, and the ability to process optical surfaces in both milling and grinding applications. In ultra-precision machining, the high material removal rates, combined with an automated tool change, significantly boost productivity and automation.



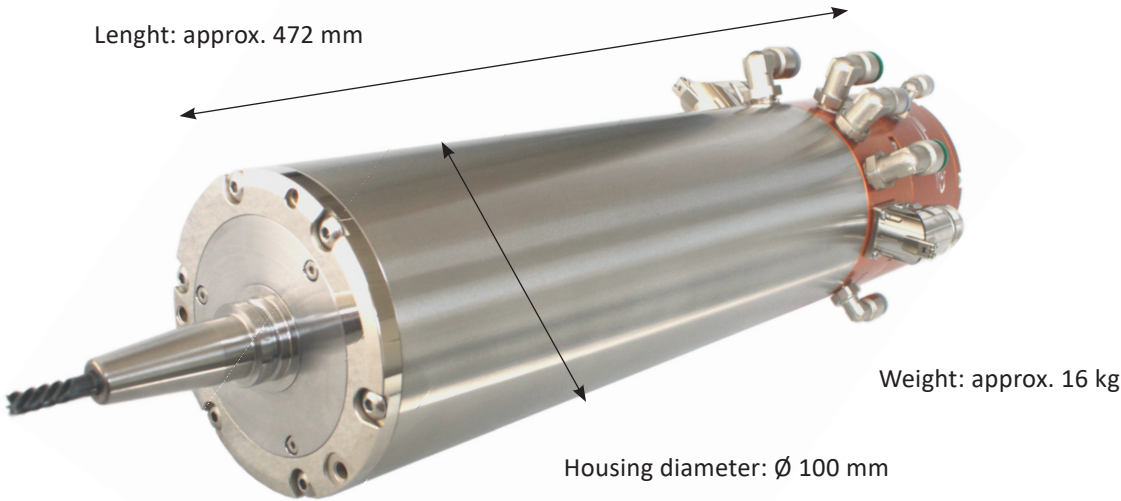
High speeds for micro-machining
up to 90,000 rpm



Minimal spindle errors for the
machining of optical components



With an automatic and spring-less
HSK-E 25 tool interface (SLH-25)

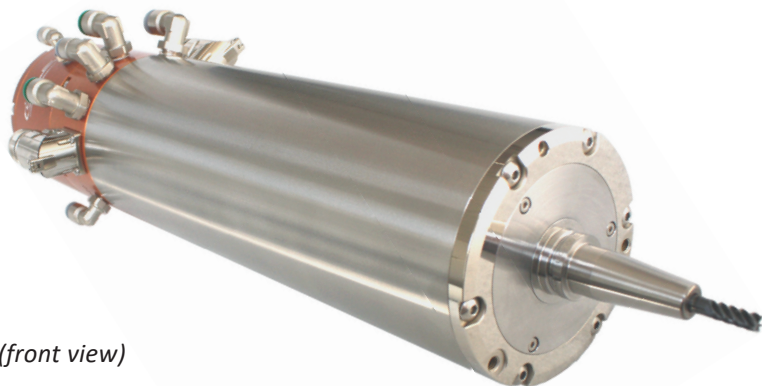


High-Pressure Aerostatic Bearing System (UASD-H25)

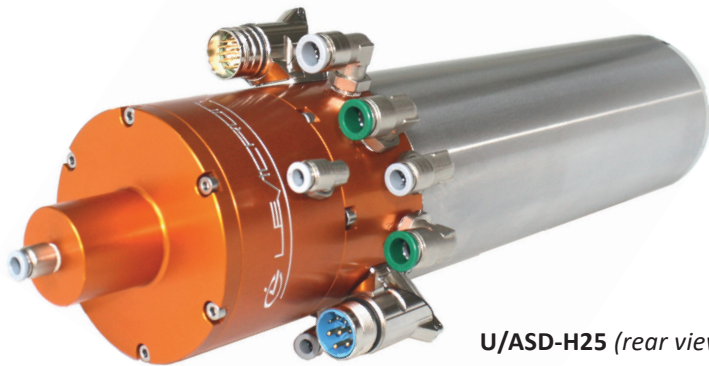
ASD-H25 & UASD-H25 in comparison *)		ASD060H25	UASD060H25 **)
Bearing air supply pressure	[bar]	6-10	20-30
Available speed	[rpm]	0 - 60,000	0 - 60,000
Radial load capacity at the spindle nose	[N]	330	900
Axial load capacity at the spindle nose	[N]	650	1,300
Static radial zero point stiffness at the spindle nose	[N/ µm]	41	83
Static axial zero point stiffness at the spindle nose	[N/ µm]	60	75
Static air consumption	[l/ min]	50	120
Dynamic tool run-out ***)	[µm]	< 0.4	< 0.3
Shaft Error in motion ***)	[nm]	< 23	< 28

*) ASD-H25= aerostatic; UASD-H25= high-pressure aerostatic
**) all values at 20 bar bearing feed pressure (gauge pressure)
***) when using the UTS-25 tool holder series

Values of: May 2024



U/ASD-H25 (front view)



U/ASD-H25 (rear view)

Data sheet ASD-H25 (Aerostatic)

		ASD060H25	ASD080H25	ASD090H25
General	Housing diameter	[mm]	100	100
	Length over all	[mm]	472	472
	Weight	[kg]	16	16
	Available Speeds	[rpm]	0 - 60,000	0 - 80,000
	Tool interface	[-]	HSK-E 25 (SLH-25)	HSK-E 25 (SLH-25)
	Tool clamp status monitoring	[-]	3 bit digital	3 bit digital
Motor option „High performance“, max. 400V	Motor type	[-]	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1	[Nm]	0.7	0.7
	Number of poles	[-]	2	2
	max. Phase voltage	[V]	270	370
	Rated current	[A]	10	10
	Peak current	[A]	20	20
Motor option „High performance“, max. 200V	Shaft power	[kVA]	4.3	5.8
	Motor type	[-]	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1	[Nm]	0.7	0.7
	Number of poles	[-]	2	2
	max. Phase voltage	[V]	170	205
	Rated current	[A]	18	18
Motor option “Iron-less“, max. 400V	Peak current	[A]	36	36
	Shaft power	[kVA]	4.2	5.6
	Motor type	[-]	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1	[Nm]	0.33	0.33
	Number of poles	[-]	2	2
	max. Phase voltage	[V]	260	330
Motor option “Iron-less“, max. 200V	Rated current	[A]	5	5
	Peak current	[A]	11	11
	Shaft power	[kVA]	2.1	2.8
	Motor type	[-]	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1	[Nm]	0.33	0.33
	Number of poles	[-]	2	2
Rotary encoder	max. Phase voltage	[V]	160	180
	Rated current	[A]	9	9
	Peak current	[A]	18	18
	Shaft power	[kVA]	2.1	2.8
Bearing system	Encoder type	[-]	incremental	incremental
	Periods	[-]	80	80
	Signal A/B	[-]	SinCos, 1 VSS	SinCos, 1 VSS
	Zero flag	[-]	yes (digital/ analog)	yes (digital/ analog)
Stability and precision	Bearing supply pressure	[bar]	6-10	6-10
	Air cleanliness, ISO 8573	[-]	3 or better	3 or better
	Radial zero point stiffness at the spindle nose, static	[N/μm]	> 40	> 25
	Radial load capacity at the spindle nose, static	[N]	> 330	> 300
	Axial zero point stiffness at the spindle nose, static	[N/μm]	> 60	> 40
	Axial load capacity at the spindle nose, static	[N]	> 600	> 550
Stability and precision	Taper run-out TIR	[nm]	< 100	< 100
	Shaft Error in motion	[nm]	< 30	< 35
	Dynamic tool run-out *)	[μm]	< 0.5	< 1
	Spindle soak time	[min]	< 3	< 3
	Axial shaft growth	[μm]	< 3	< 5

all values at 6 bar bearing feed pressure (gauge pressure)
*) when using the UTS-25 tool holder series

Values of: May 2024

Data sheet UASD-H25 (High-Pressure Aerostatic)

		UASD060H25	UASD080H25	UASD090H25
General	Housing diameter	[mm]	100	100
	Length over all	[mm]	472	472
	Weight	[kg]	16	16
	Available Speeds	[rpm]	0 - 60,000	0 - 80,000
	Tool interface	[-]	HSK-E 25 (SLH-25)	HSK-E 25 (SLH-25)
	Tool clamp status monitoring	[-]	3 bit digital	3 bit digital
Motor option „High performance“, max. 400V.	Motor type	[-]	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1	[Nm]	0.7	0.7
	Number of poles	[-]	2	2
	max. Phase voltage	[V]	270	370
	Rated current	[A]	10	10
	Peak current	[A]	20	20
Motor option „High performance“, max. 200V.	Shaft power	[kVA]	4.3	5.8
	Motor type	[-]	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1	[Nm]	0.7	0.7
	Number of poles	[-]	2	2
	max. Phase voltage	[V]	170	205
	Rated current	[A]	18	18
Motor option “Iron-less“, max. 400V.	Peak current	[A]	36	36
	Shaft power	[kVA]	4.2	5.6
	Motor type	[-]	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1	[Nm]	0.33	0.33
	Number of poles	[-]	2	2
	max. Phase voltage	[V]	260	330
Motor option “Iron-less“, max. 200V.	Rated current	[A]	5	5
	Peak current	[A]	11	11
	Shaft power	[kVA]	2.1	2.8
	Motor type	[-]	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1	[Nm]	0.33	0.33
	Number of poles	[-]	2	2
Rotary encoder	max. Phase voltage	[V]	160	180
	Rated current	[A]	9	9
	Peak current	[A]	18	18
	Shaft power	[kVA]	2.1	2.8
Bearing system	Encoder type	[-]	incremental	incremental
	Periods	[-]	80	80
	Signal A/B	[-]	SinCos, 1 VSS	SinCos, 1 VSS
	Zero flag	[-]	yes (digital/ analog)	yes (digital/ analog)
Stability and precision	Bearing supply pressure	[bar]	20-30	20-30
	Air cleanliness, ISO 8573	[-]	3 or better	3 or better
	Radial zero point stiffness at the spindle nose, static	[N/μm]	> 70	> 50
	Radial load capacity at the spindle nose, static	[N]	> 900	> 800
	Axial zero point stiffness at the spindle nose, static	[N/μm]	> 70	> 60
	Axial load capacity at the spindle nose, static	[N]	> 1,300	> 1,200
Stability and precision	Taper run-out TIR	[nm]	< 100	< 100
	Shaft Error in motion	[nm]	< 35	< 40
	Dynamic tool run-out *)	[μm]	< 0.5	< 1
	Spindle soak time	[min]	< 3	< 3
	Axial shaft growth	[μm]	< 3	< 5

all values at 20 bar bearing feed pressure (gauge pressure)
*) when using the UTS-25 tool holder series

Values of: May 2024



ASD-H20A/ UASD-H20A

(High-pressure) aerostatically tool motor spindle with HSK-E 20 interface (SLH-20)



General information at a glance

Tool interface	Automatic spring-less HSK-E 20 tool interface (SLH-20)
Housing diameter	Ø 80 mm
Available speeds	0 - 120,000 rpm; 0 - 150,000 rpm
Motor options	max. 400V - High performance, 0.22 Nm S1 (option)
	max. 200V - High performance, 0.22 Nm S1
	max. 200V - Iron-less, 0.13 Nm S1
Angular Position control	1 VSS SinCos, 60 lines, with reference
Tool change system	Pneumatic, 3 bit tool clamp status monitoring; cone cleaning air
Spindle cooling	Thin-film liquid cooling
Bearing system	Aerostatic (ASD-H20A), 6-10 bar
	High-pressure aerostatic (UASD-H20A), 20-30 bar
Accuracy, dynamics	Dynamic tool run-out < 1 µm *)
	Shaft Error in motion < 40/ 45 nm
Axial shaft growth	< 1 µm; < 3 minutes **)
Spindle connections	Axially outgoing (Dmax 80 mm)

*) when using the UTS-20 tool holder series
**) from cold/standstill to 120,000 rpm warmed through

Values of: May 2024

About

Our **U/ASD-H20A** tool spindle combines the highest speeds, precision, stability, and automation. It was specifically developed to meet the long-awaited requirements for producing integral semiconductor and optoelectronic components, significantly boosting performance and efficiency. Like the larger „UASD-H25A“ model, this new spindle model is also available with our high-pressure aerostatic technology (**UASD-H20A**), which increases triples the load capacity and robustness, especially at low speeds and with larger tools.

By using our spring-less, patented HSK clamping system SLH-x in size **HSK-E 20**, consistent optimization of the shaft dynamics, and highly efficient and symmetrical thin-film liquid cooling, our **U/ASD-H20A** offers exceptional dynamic and thermal stability compared to other solutions. In addition, it enables highly dynamic machining of micro and integral electronic components (electronic packaging).



High speeds of up to 150,000 rpm for fully automated machining

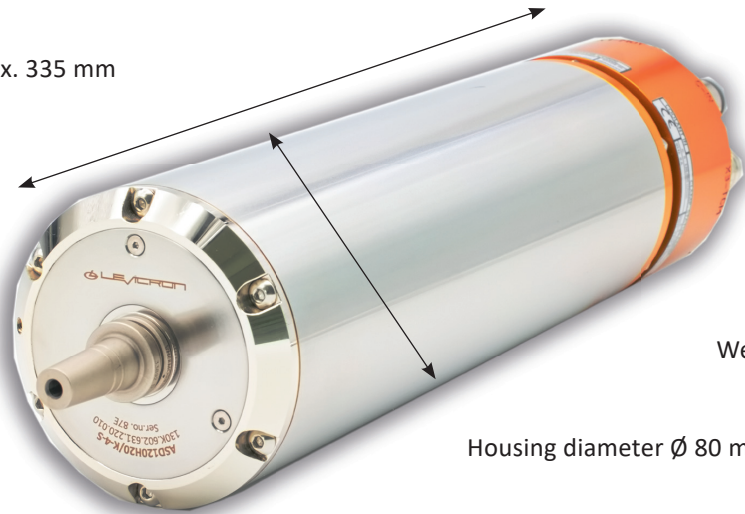


Particularly suitable for the production of integral semiconductor components



With an automatic and spring-less **HSK-E 20 tool interface (SLH-20)**

Lenght: approx. 335 mm



Weight: approx. 8 kg

Housing diameter Ø 80 mm

High-Pressure Aerostatic Bearing System (UASD-H20A)

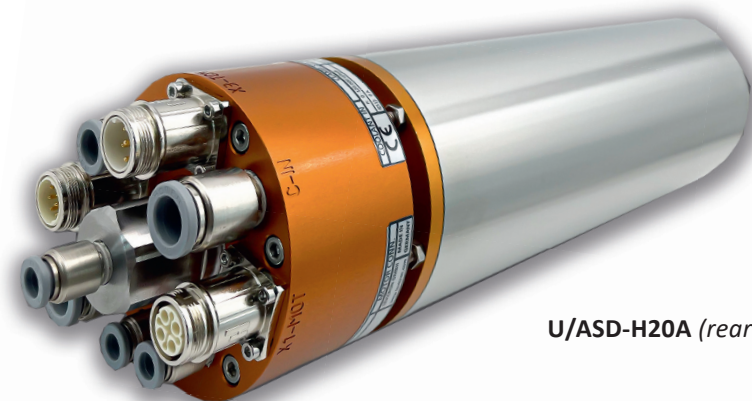
ASD-H20A & UASD-H20A in comparison *)		ASD120H20A	UASD120H20A **)
Bearing air supply pressure	[bar]	6-10	20-30
Available speed	[rpm]	0 - 120,000	0 - 120,000
Radial load capacity at the spindle nose	[N]	190	580
Axial load capacity at the spindle nose	[N]	240	650
Static radial zero point stiffness at the spindle nose	[N/ µm]	20	38
Static axial zero point stiffness at the spindle nose	[N/ µm]	25	45
Static air consumption	[l/min]	40	73
Dynamic tool run-out ***)	[µm]	< 1	< 1
Shaft Error in motion ***)	[nm]	< 40	< 45

*) ASD-H20A= aerostatic; UASD-H20A= high-pressure aerostatic
**) all values at 20 bar bearing feed pressure (gauge pressure)
***) when using the UTS-20 tool holder series

Values of: May 2024



U/ASD-H20A (front view)



U/ASD-H20A (rear view)

Data Sheet ASD-H20A (Aerostatic)

		ASD120H20A	ASD150H20A
General	Housing diameter [mm]	80	80
	Length over all [mm]	335	335
	Weight [kg]	8.1	8.1
	Available Speeds [rpm]	0 - 120,000	0 - 150,000
	Tool interface [-]	HSK-E 20 (SLH-20)	HSK-E 20 (SLH-20)
	Tool clamp status monitoring [-]	3 bit digital	3 bit digital
Motor option „High performance“, max. 400V (option)	Motor type [-]	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1 [Nm]	0.22	0.22
	Number of poles [-]	2	2
	max. Phase voltage [V]	300	380
	Rated current [A]	5	5
	Peak current [A]	10	10
Motor option “High performance”, max. 200V	Shaft power [kVA]	2.5	2.8
	Motor type [-]	3 phases, synchronous *)	3 phases, synchronous
	Constant torque, S1 [Nm]	0.22	0.22
	Number of poles [-]	2	2
	max. Phase voltage [V]	165	190
	Rated current [A]	9.5	9.5
Motor option “Iron-less”, max. 200V	Peak current [A]	19	19
	Shaft power [kVA]	2.5	2.8
	Motor type [-]	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1 [Nm]	0.13	0.13
	Number of poles [-]	2	2
	max. Phase voltage [V]	170	195
Rotary encoder	Rated current [A]	5	5
	Peak current [A]	10	10
	Shaft power [kVA]	1.6	1.9
	Encoder type [-]	incremental	incremental
Bearing system	Periods [-]	60	60
	Signal A/B [-]	SinCos, 1 VSS	SinCos, 1 VSS
	Zero flag [-]	yes (digital/ analog)	yes (digital/ analog)
	Bearing supply pressure [bar]	6-10	6-10
Stability and precision	Air cleanliness, ISO 8573 [-]	3 or better	3 or better
	Radial zero point stiffness at the spindle nose, static [N/μm]	> 20	> 16
	Radial load capacity at the spindle nose, static [N]	> 190	160 - 200
	Axial zero point stiffness at the spindle nose, static [N/μm]	> 25	> 21
	Axial load capacity at the spindle nose, static [N]	> 240	> 230
	Taper run-out TIR [nm]	< 100	< 100
	Shaft Error in motion [nm]	< 40	< 50
	Dynamic tool run-out **) [μm]	< 1	< 1.3
	Spindle soak time [min]	< 3	< 4
	Axial shaft growth [μm]	< 3	< 4

all values at 6 bar bearing feed pressure (gauge pressure)
*) only with field-weakened converter operation
**) when using the UTS-20 tool holder series

Values of: May 2024

Data sheet UASD-H20A (High-Pressure Aerostatic)

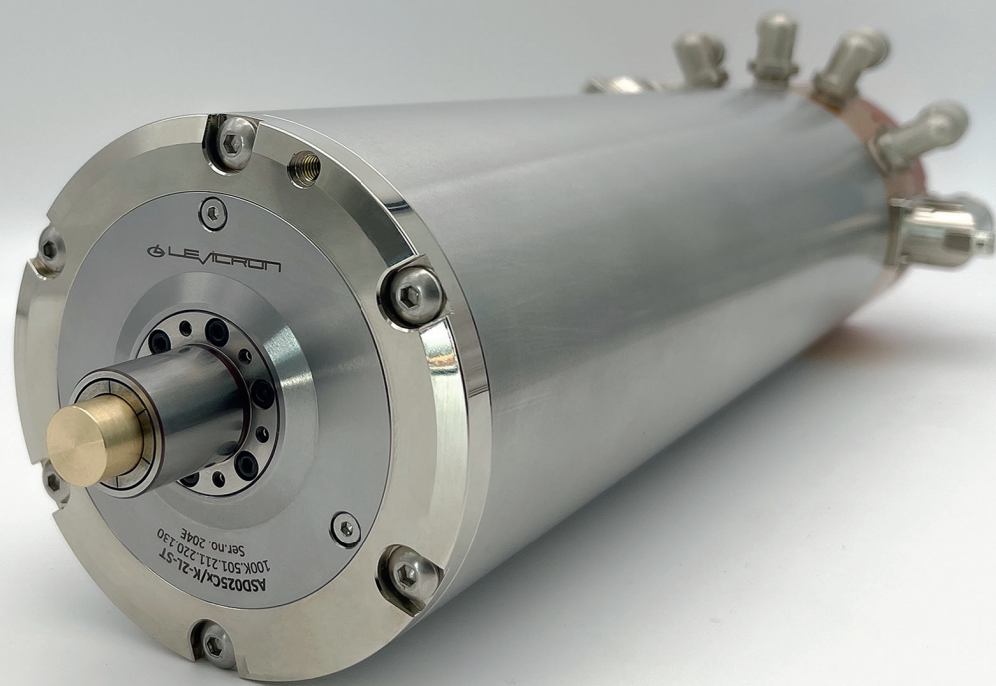
		UASD120H20A	UASD150H20A
General	Housing diameter [mm]	80	80
	Length over all [mm]	335	335
	Weight [kg]	8.1	8.1
	Available Speeds [rpm]	0 - 120,000	0 - 150,000
	Tool interface [-]	HSK-E 20 (SLH-20)	HSK-E 20 (SLH-20)
	Tool clamp status monitoring [-]	3 bit digital	3 bit digital
Motor option „High performance“, max. 400V (option)	Motor type [-]	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1 [Nm]	0.22	0.22
	Number of poles [-]	2	2
	max. Phase voltage [V]	300	380
	Rated current [A]	5	5
	Peak current [A]	10	10
Motor option “High performance”, max. 200V	Shaft power [kVA]	2.5	2.8
	Motor type [-]	3 phases, synchronous *)	3 phases, synchronous
	Constant torque, S1 [Nm]	0.22	0.22
	Number of poles [-]	2	2
	max. Phase voltage [V]	165	190
	Rated current [A]	9.5	9.5
Motor option “Iron-less”, max. 200V	Peak current [A]	19	19
	Shaft power [kVA]	2.5	2.8
	Motor type [-]	3 phases, synchronous	3 phases, synchronous
	Constant torque, S1 [Nm]	0.13	0.13
	Number of poles [-]	2	2
	max. Phase voltage [V]	170	195
Rotary encoder	Rated current [A]	5	5
	Peak current [A]	10	10
	Shaft power [kVA]	1.6	1.9
	Encoder type [-]	incremental	incremental
Bearing system	Periods [-]	60	60
	Signal A/B [-]	SinCos, 1 VSS	SinCos, 1 VSS
	Zero flag [-]	yes (digital/ analog)	yes (digital/ analog)
	Bearing supply pressure [bar]	20-30	20-30
Stability and precision	Air cleanliness, ISO 8573 [-]	3 or better	3 or better
	Radial zero point stiffness at the spindle nose, static [N/μm]	> 38	> 24
	Radial load capacity at the spindle nose, static [N]	> 580	280-310
	Axial zero point stiffness at the spindle nose, static [N/μm]	> 45	> 30
	Axial load capacity at the spindle nose, static [N]	> 650	> 630
	Taper run-out TIR [nm]	< 100	< 100
	Shaft Error in motion [nm]	< 45	< 55
	Dynamic tool run-out **) [μm]	< 1	< 1.3
	Spindle soak time [min]	< 3	< 4
	Axial shaft growth [μm]	< 3	< 4

all values at 6 bar bearing feed pressure (gauge pressure)
*) only with field-weakened converter operation
**) when using the UTS-20 tool holder series

Values of: May 2024

ASD-Cx/ UASD-Cx & ASD-CLT (Specification)

(High-pressure) aerostatically mounted tool motor spindle with pneumatically operated collet system



General information at a glance

Tool interface	Automatic direct tool shank clamping (precision collet), pneumatically operated
Available Tool clamping diameters	U/ASD-Cx: 1/4", 1/8" (Inch), 6 mm, 4 mm and 3 mm (metric)
	ASD-CLT: 1/2" (Inch) and 13 mm (metric)
Housing diameter	Ø 100 mm
Available speeds	0 - 60.000 rpm; 0 - 80.000 rpm; 0 - 100.000 rpm (U/ASD-Cx)
	0 - 25.000 rpm (ASD-CLT)
Motor options	max. 400V - High performance, 0,7 Nm S1
	max. 200V - High performance, 0,7 Nm S1
	max. 400V - Iron-less, 0,33 Nm S1
	max. 200V - Iron-less 0,33 Nm S1
Angular position control	1 VSS SinCos, 80 lines, with reference
Tool change system	Pneumatic, taper cleaning air
Spindle cooling	Thin-film liquid cooling
Bearing system	Aerostatic (ASD-Cx), 6-10 bar
	High-pressure Aerostatic (UASD-Cx), 20-30 bar
Accuracy, dynamics	Static tool run-out < 0,5 µm
	Shaft Error in motion < 30 nm (U/ASD-Cx); < 20 nm (ASD-CLT)
Spindle connections	Radially outgoing

Values of: May 2024

About

Our **U/ASD-Cx** (x = tool shank diameter) features a self-developed, automatic precision collet system, which, unlike our other spindle solutions, enables exceptionally high speeds of up to 100,000 rpm. Combined with an extremely precise tool clamping system that guarantees tool runout deviations of less than 0.5 µm TIR, this spindle ensures outstanding machining quality and the highest precision. The spindle combines the ultra-precise characteristics required for generating optical surfaces with the robustness and functionality of modern tool spindles for precision machining. In addition to our self-developed high-resolution rotary encoder, efficient thin-film liquid cooling, and a steel housing with a standardized diameter, our system offers flexibility, exceptional thermal stability, and high material removal rates thanks to its rigidity and load-bearing capacity.

With the **U/ASD-Cx**, users benefit from unprecedented precision, thermal stability, and the ability to process optical surfaces in both milling and grinding applications for ultra-precision machining and CNC operations.

Note: By default, our U/ASD-Cx comes equipped with a collet system. Upon customer request, the installed collet can be swapped for one with a different clamping diameter. The following sizes are available: 6 mm, 4 mm, 3 mm, 1/8", and 1/4".

Contact lens processing

Based on our proven design, our U/ASD-Cx is now also available for clamping 1/2" shafts (**ASD-CLT**) to hold workpieces that are required for processing contact lenses, for example.



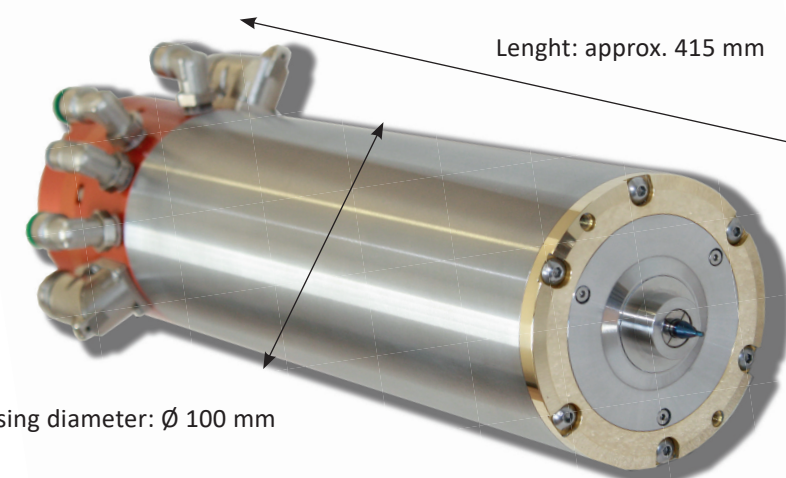
High speeds for the production of optical surfaces up to 100,000 rpm



Minimal spindle errors for the processing of optical components



With an **automatic precision collet system**



Length: approx. 415 mm

Housing diameter: Ø 100 mm

Weight: approx. 16 kg

High-Pressure Aerostatic Bearing System (UASD-Cx)

ASD-Cx and UASD-Cx in comparison *)

		ASD060Cx	UASD060Cx **)
Bearing air supply pressure	[bar]	6-10	20-30
Available speed	[rpm]	0 - 60,000	0 - 60,000
Radial load capacity at the spindle nose	[N]	330	900
Axial load capacity at the spindle nose	[N]	650	1,300
Static radial zero point stiffness at the spindle nose	[N/ µm]	41	83
Static axial zero point stiffness at the spindle nose	[N/ µm]	60	75
Static air consumption	[l/ min]	50	90
Dynamic tool run-out ***)	[µm]	< 0.4	< 0.3
Shaft Error in motion ***)	[nm]	< 23	< 28

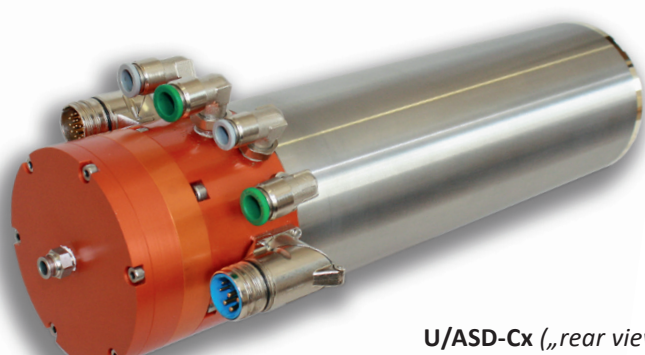
*) ASD-Cx= aerostatic; UASD-Cx= high-pressure aerostatic

**) all values at 20 bar bearing feed pressure (gauge pressure)

Values of: May 2024



ASD-CLT („front view“)



U/ASD-Cx („rear view“)

Data Sheet ASD-Cx (Aerostatic)

		ASD060Cx	ASD080Cx	ASD0100Cx
General	Housing diameter [mm]	100	100	100
	Lenght over all [mm]	415	415	415
	Weight [kg]	16	16	16
	Available Speeds [rpm]	0 - 60,000	0 - 80,000	0 - 100,000
Motor option „High performance“, max. 400V	Motor type [-]	3 phases, synchronous	3 phases, synchronous	3 phases, synchronous*)
	Constant torque, S1 [Nm]	0.7	0.7	0.7
	Number of poles [-]	2	2	2
	max. Phase voltage [V]	270	370	440
	Rated current [A]	10	10	10
	Peak current [A]	20	20	20
	Shaft power [kVA]	4.3	5.8	7.1
Motor option „High performance“, max. 200V	Motor type [-]	3 phases, synchronous	3 phases, synchronous	3 phases, synchronous*)
	Constant torque, S1 [Nm]	0.7	0.7	0.7
	Number of poles [-]	2	2	2
	max. Phase voltage [V]	170	205	265
	Rated current [A]	18	18	18
	Peak current [A]	36	36	36
Motor option „Iron-less“, max. 400V	Motor type [-]	3 phases, synchronous	3 phases, synchronous	3 phases, synchronous*)
	Constant torque, S1 [Nm]	0.33	0.33	0.33
	Number of poles [-]	2	2	2
	max. Phase voltage [V]	260	330	415
	Rated current [A]	5	5	5
	Peak current [A]	11	11	11
Motor option „Iron-less“, max. 200V	Motor type [-]	3 phases, synchronous	3 phases, synchronous	3 phases, synchronous*)
	Constant torque, S1 [Nm]	0.33	0.33	0.33
	Number of poles [-]	2	2	2
	max. Phase voltage [V]	160	180	240
	Rated current [A]	9	9	9
	Peak current [A]	18	18	18
Rotary encoder	Encoder type [-]	incremental	incremental	incremental
	Periods [-]	80	80	80
	Signal A/B [-]	SinCos, 1 VSS	SinCos, 1 VSS	SinCos, 1 VSS
	Zero flag [-]	yes (digital/ analog)	yes (digital/ analog)	yes (digital/ analog)
Bearing system	Bearing supply pressure [bar]	6-10	6-10	6-10
	Air cleanliness, ISO 8573 [-]	3 or better	3 or better	3 or better
	Radial zero point stiffness at the spindle nose, static [N/μm]	> 40	> 30	> 18
	Radial load capacity at the spindle nose, static [N]	> 330	> 300	> 270
	Axial zero point stiffness at the spindle nose, static [N/μm]	> 60	> 40	> 25
	Axial load capacity at the spindle nose, static [N]	> 600	> 550	> 500
Stability and precision	Taper runout TIR [nm]	< 100	< 100	< 100
	Shaft Error in motion [nm]	< 30	< 35	< 50
	Dynamic tool run-out *) [μm]	< 0.5	< 0.8	< 1.3
	Spindle soak time [min]	< 3	< 3	< 3
	Axial shaft growth [μm]	< 3	< 5	< 7

all values at 6 bar bearing supply pressure (gauge pressure)

*) only for field-weakened converter operation

Values of: May 2024

Data Sheet UASD-Cx (High-pressure Aerostatic)

		UASD060Cx	UASD080Cx	UASD0100Cx
General	Housing diameter [mm]	100	100	100
	Lenght over all [mm]	415	415	415
	Weight [kg]	16	16	16
	Available Speeds [rpm]	0 - 60,000	0 - 80,000	0 - 100,000
Motor option „High performance“, max. 400V	Motor type [-]	3 phases, synchronous	3 phases, synchronous	3 phases, synchronous*)
	Constant torque, S1 [Nm]	0.7	0.7	0.7
	Number of poles [-]	2	2	2
	max. Phase voltage [V]	270	370	440
	Rated current [A]	10	10	10
	Peak current [A]	20	20	20
	Shaft power [kVA]	4.3	5.8	7.1
Motor option „High performance“, max. 200V	Motor type [-]	3 phases, synchronous	3 phases, synchronous	3 phases, synchronous*)
	Constant torque, S1 [Nm]	0.7	0.7	0.7
	Number of poles [-]	2	2	2
	max. Phase voltage [V]	170	205	265
	Rated current [A]	18	18	18
	Peak current [A]	36	36	36
Motor option „Iron-less“, max. 400V	Motor type [-]	3 phases, synchronous	3 phases, synchronous	3 phases, synchronous*)
	Constant torque, S1 [Nm]	0.33	0.33	0.33
	Number of poles [-]	2	2	2
	max. Phase voltage [V]	260	330	415
	Rated current [A]	5	5	5
	Peak current [A]	11	11	11
Motor option „Iron-less“, max. 200V	Motor type [-]	3 phases, synchronous	3 phases, synchronous	3 phases, synchronous*)
	Constant torque, S1 [Nm]	0.33	0.33	0.33
	Number of poles [-]	2	2	2
	max. Phase voltage [V]	160	180	240
	Rated current [A]	9	9	9
	Peak current [A]	18	18	18
Rotary encoder	Encoder type [-]	incremental	incremental	incremental
	Periods [-]	80	80	80
	Signal A/B [-]	SinCos, 1 VSS	SinCos, 1 VSS	SinCos, 1 VSS
	Zero flag [-]	yes (digital/ analog)	yes (digital/ analog)	yes (digital/ analog)
Bearing system	Bearing supply pressure [bar]	20-30	20-30	20-30
	Air cleanliness, ISO 8573 [-]	3 or better	3 or better	3 or better
	Radial zero point stiffness at the spindle nose, static [N/μm]	> 70	> 50	> 35
	Radial load capacity at the spindle nose, static [N]	> 900	> 800	> 750
	Axial zero point stiffness at the spindle nose, static [N/μm]	> 75	> 70	> 60
	Axial load capacity at the spindle nose, static [N]	> 1,300	> 1,200	> 1,100
Stability and precision	Taper run-out TIR [nm]	< 100	< 100	< 100
	Shaft Error in motion [nm]	< 35	< 40	< 55
	Dynamic tool runout *) [μm]	< 0.5	< 0.8	< 1.3
	Spindle soak time [min]	< 3	< 3	< 3
	Axial shaft growth [μm]	< 3	< 5	< 7

all values at 20 bar bearing supply pressure (gauge pressure)

*) only for field-weakened converter operation

Values of: May 2024



ASD-Px (with HSK-C 63 option)

Ultra-precise aerostatic workpiece spindle for turning, fly cutting and positioning



General information at a glance

Work-holding interface	Ground faceplate, Ø 120 mm
Housing diameter	Ø 175 mm
Available speeds	0 - 10.000 rpm (option: 12.000 rpm) *)
Housing options	1. Carbon fibre sleeve
	2. Flanged steel housing
	3. Steel horizontal mount
Workpiece clamping/ fixture options **)	4. Zero point chuck (Erowa ER-047777)
	5. Vacuum disk with pin (Ø 150/ 200 mm)
	6. Vacuum chuck (Ø 150/ 200 mm)
	7. HSK-C 63 (function of a tool motor spindle)
Motor	Permanent magnet synchronous, 6-poles, 3 phases
Constant motor torque, High performance option (CNC)	13.5 Nm
Constant motor torque, Iron-less option (Ultraprecision)	6.5 Nm
Bearing system	Aerostatic (ASD-Px), 6-10 bar ***)
Rotary encoder	Axis operation: 11,840 Lines optical 1 VSS SinCos with zero flag
	Alternatives, absolute: BiSS-C, FANUC, Mitsubishi-2/4, DRIVE-CLiQ
	Spindle operation: 253 Lines GMR 1VSS SinCos with zero flag
Medium feedthrough ****)	Vacuum, compressed air, oil air (option: for cutting fluid, max. 80 bar)

*) other speeds on request; **) individual connection after consultation

) High-pressure aerostatic (20-30 bar) on request; other medium feedthrough on request *)

Values of: May 2024

About

Our ultra-precise, load-bearing **ASD-Px** workpiece spindle is used to hold, position, and/or rotate workpieces during machining, typically in turning, milling, and grinding machines. It combines the highest precision with a rotational accuracy (error motion) of less than 15 nm and market-leading spindle stiffness and load capacities in its class. The symmetrical design and efficient thin-film liquid cooling not only keep shaft growth below 1 µm and warm-up time under 8 minutes, but also ensure high performance and reliability. In addition, it is equipped with a unique synchronous motor technology with air gap winding.

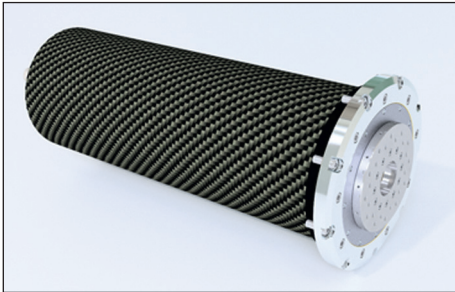
The **ASD-Px** offers a comprehensive spindle solution for workpiece rotation and positioning in ultra-precise machining. It is suitable for machining large workpieces at low speeds and small workpieces at high speeds. It also enables precise orientation in axis positioning mode.

The chuck interface of the **ASD-Px** consists of a precision-ground faceplate with a diameter of 120 mm and a standardized bolt circle pattern. Customer-specific and commercially available rotary workpiece clamping devices can be attached to this interface.

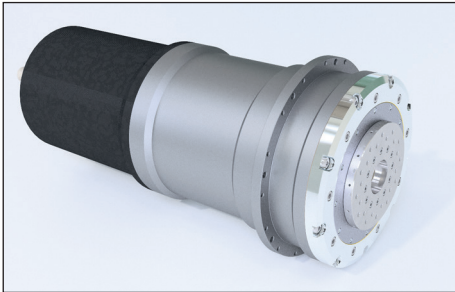
The following is an overview of all options:

Housing options

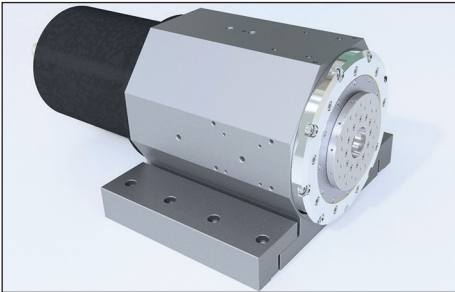
1. Carbon fibre sleeve



2. Flanged steel housing

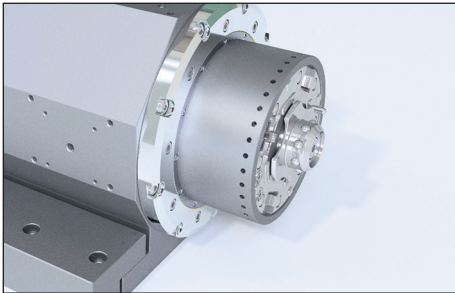


3. Steel horizontal mount

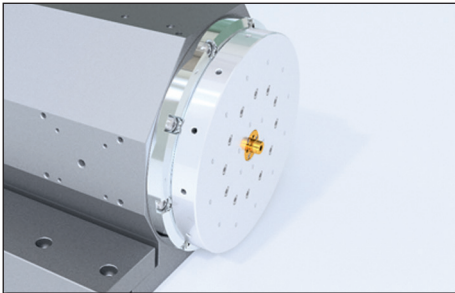


Workpiece clamping/ fixture options

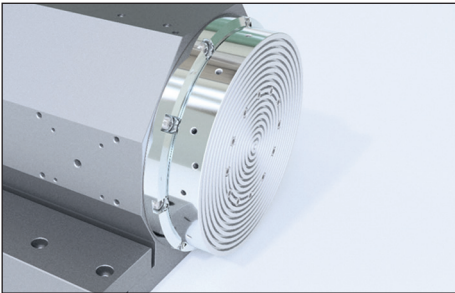
4. Zero point chuck



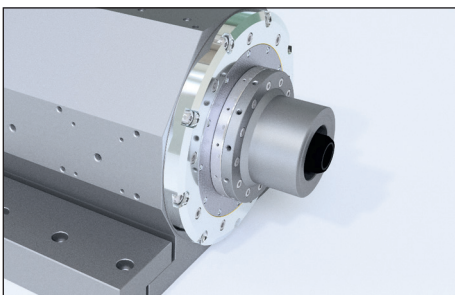
5. Vacuum disk with pin



6. Vacuum chuck



7. HSK-C 63



ASD-Px as tool spindle: **ASD-PH63M**

One possible clamping option for our ASD-Px is a manual HSK-C 63 interface, which turns our workpiece spindle into a tool spindle and acts as a grinding spindle, especially for producing glass lenses. It is named our **ASD-PH63M**. With a high-performance motor option with a constant torque of 13.5 Nm and high rotational fidelity, the spindle is even better suited for this purpose.

When in use, the **ASD-PH63M** spindle significantly reduces the so-called 'sub-surface' damage to the substrate that typically occurs during the grinding process and the subsequent polishing time. The slim cartridge design, a testament to the versatility of our product, allows for use in horizontal and vertical machining centers with a closed headstock.

ASD-Px/ ASD-PH63M at a glance

Speeds: 0 - 10,000 rpm (12,000 rpm optional)
Radial load capacity: > 1,800 N
Axial load capacity: > 2,200 N
Radial stiffness: > 180 N/ μ m
Axial stiffness: > 230 N/ μ m
Motor type: Permanentmagnet-Synchron
Motor torque: 6,5 Nm (S1, 100%) (16 Nm optional)
Positioning accuracy: < 5 "
Shaft error in motion: < 15 nm

at 6 bar supply pressure

500 mm

Ø 175 mm

Ø 214,5 mm

Housing options

- Carbon fiber housing
- Steel housing with flange
- Horizontale Stahlhalterung

Patentierte
Lagertechnologie

Clamping options:

- Zero point chuck
- Vacuum disk
- Vacuum chuck
- **HSK-C 63 (manually)**

High-resolution optical 1 VSS encoder with
11,840 line count or 26-bit absolute encoder
with BISS-C, DRIVE-CLiQ, Panasonic protocol

1 VSS GMR encoder with line count 253

Dynamically optimized synchronous drive with air
gap winding and 6.5 Nm torque (S1), optionally with
slotted stator and 14 Nm (S1)

Vacuum and compressed air rotary feedthrough
(Internal tool cooling with HSK-63 option)

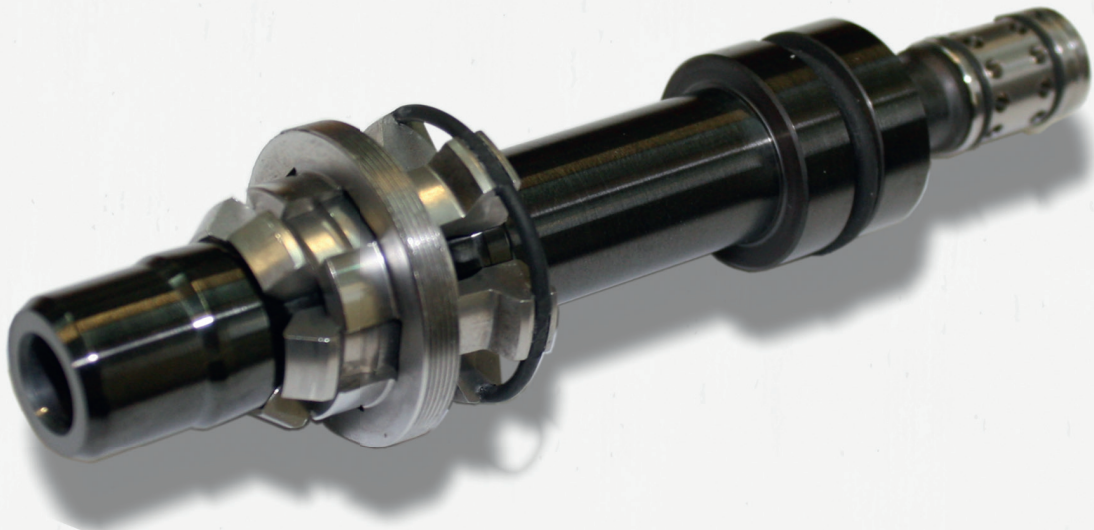
Highly effective thin-film liquid cooling

Cartridge design for closed headstocks, optionally with
water-cooled spindle block for mounting



HSK clamping system - SLH-x

Self-locking spring-less clamping units for HSK toolings (HSK-E 20; HSK-E 25; HSK-E 32; HSK-E 40 and HSK-E 63)



About

Since then, conventional spring-based HSK clamping systems have suffered from several problems related to size, reliability, consistency, and influence on spindle dynamics.

Problems with conventional, spring-based HSK clamping systems:

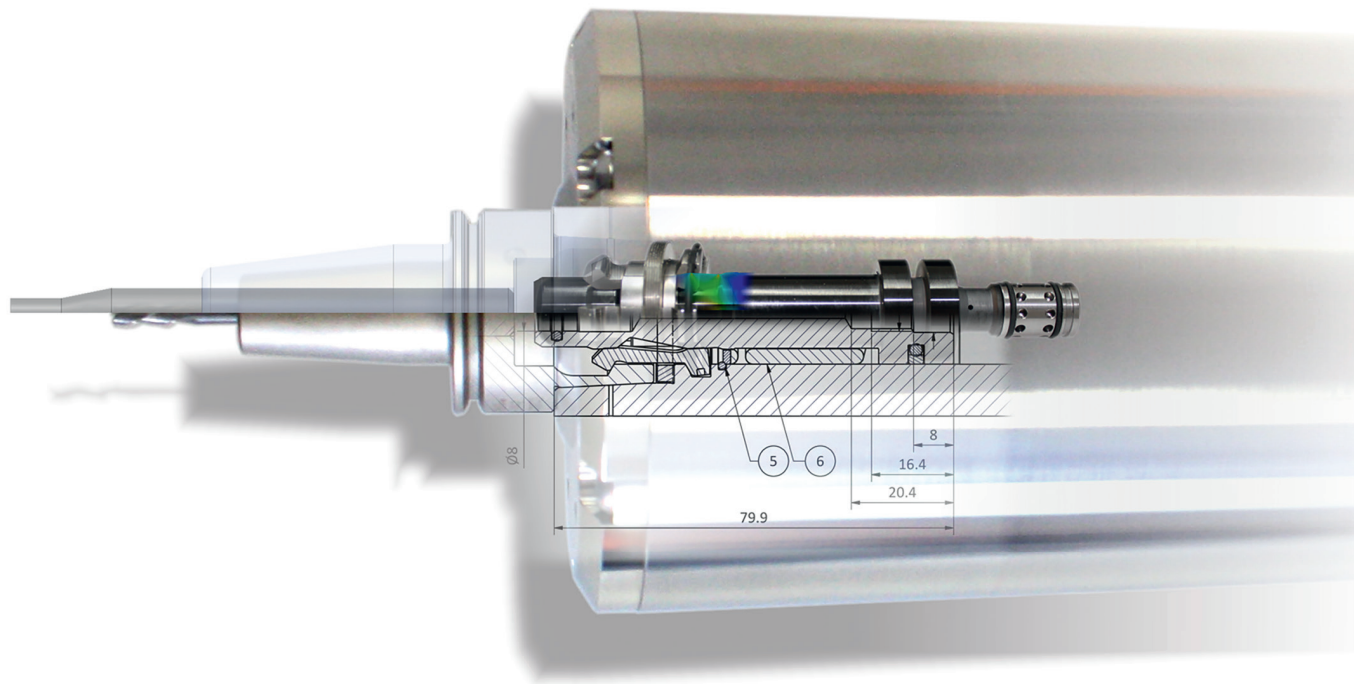
- Large in size and complex constructions
- Inconsistent behavior over time concerning clamping position, pull-in force and shaft imbalance
- Damaged or fatigued disc-springs

To overcome these problems, we have developed our self-locking spring-less clamping system (SLH-x) for the hollow shank taper (HSK) interface. It is based on the principle of monolithically preloaded self-locking. This advanced technology makes it possible to securely and reliably hold the tool in the spindle while ensuring precise and stable clamping at a consistent position and significantly low imbalances. The clamping holds the HSK tool holder firmly and provides preloaded self-locking, which offers additional safety and stability.

By cutting numerous components compared to spring-based systems, our SLH-x is significantly more robust and compact than spring-based systems. Due to its size, it can even be used in low-height rotary tables or robots.

Your advantages with our SLH-x clamping system

The advantages for the end-user	The advantages for the spindle manufacturer
<ul style="list-style-type: none">Consistent clamping and release position and clamping force even over 2 million tool change cyclesConsistent balancing quality and outstanding shaft dynamicsParticularly suitable for tool spindles for machining optical componentsGreatly increased speed stabilityGreatly improved reliabilityMaintenance-free	<ul style="list-style-type: none">Reduction in the number of components to a minimumUltra-compact design with a simple & robust designThe shaft can be extracted without removing the clamping systemNon-rotating push-pull rod possibleCompared to spring-based systems, 70% reduced eject force to protect the shaft bearings



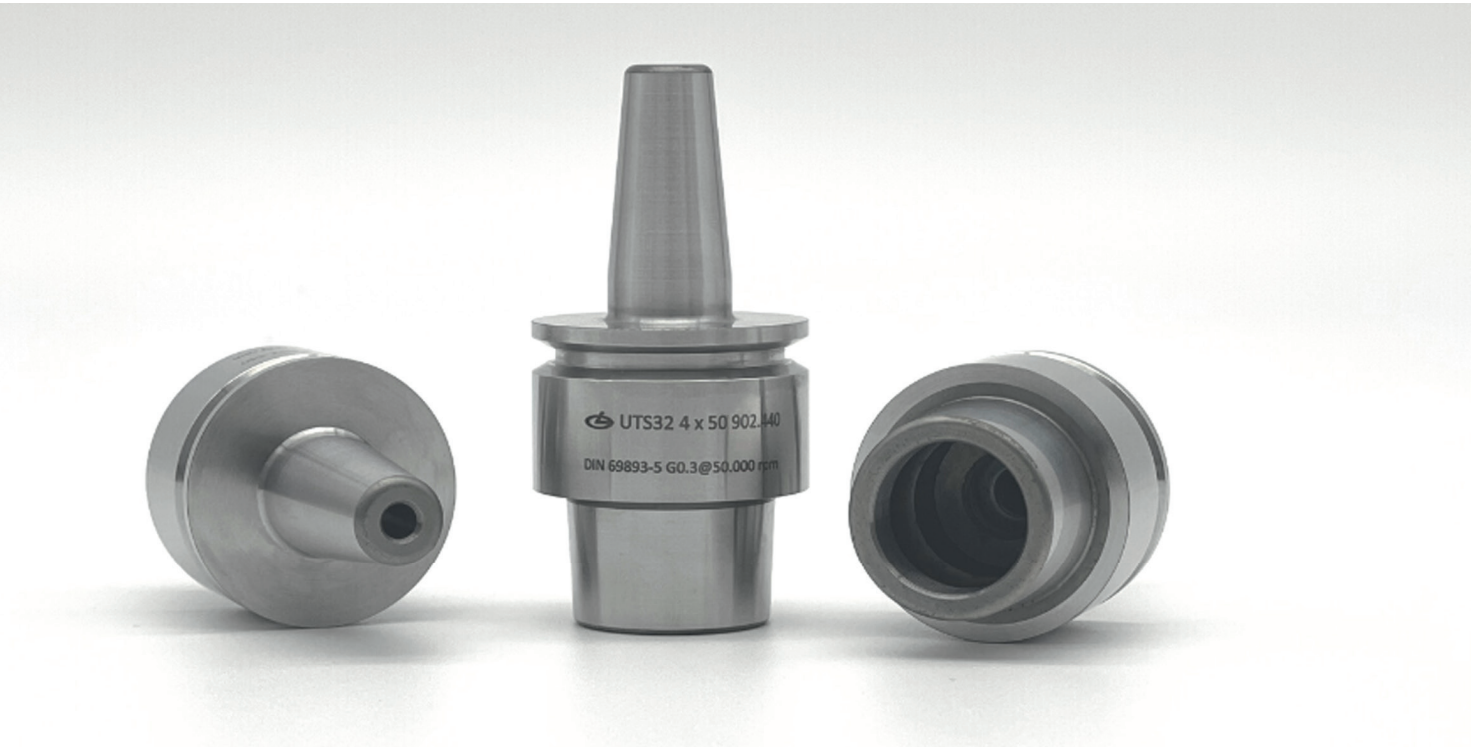
Data Sheet SLH-x

		SLH-20 HSK-E 20	SLH-25 HSK-E 25	SLH-32 HSK-E 32	SLH-40 HSK-E 40	SLH-63 HSK-E 63
Tool 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, releasing	[N]	≥ 400	≥ 800	≥ 1,000	≥ 2,000	≥ 6,500
Pull-in force at the interface	[N]	1,900 - 2,500	3,500 - 5,000	6,500 - 8,000	7,500 - 10,000	23,000 - 35,000
Nominal clamping position	[mm]	2.5	3	4	3.9	2.2
Nominal clamping stroke	[mm]	2.7	3.1	4.2	4.3	8,0
Additional clamping path of nominal clamping stroke without tool	[mm]	1.7	1.8	1.8	3.1	4.5
The diameter of the shaft bore	[mm]	10.5 H4	13.3 H4	16.8 H4	21 H4	33 H4
Overall length	[mm]	45	54	69	83.7	136
Connection thread	[-/-]	M5x0.5 5H LH	M6x0.75 6H LH	M6x1 6H LH	M8x1 6H LH	M10x1.5 6H LH
Guide bore diameter	[mm]	5.2 H5	6.3 H5	6.4 H5	8.5 H5	10.5 H5
Rotary feedthrough (optional)	[-/-]	No	No	No	Yes	Yes

Values of: May 2024

Tool holder - UTS-x

Ultra-precise tool holders with HSK interface according to DIN 69893 (HSK-20, HSK-25, HSK-32 and HSK-40)



About

Precise, dynamic, and stable tool clamping is essential for ultra-precise machining. According to DIN 69893, standard tool holders are only partially suitable for our tool spindles with the HSK interface. Most of them also do not meet the specified unbalance values. It's crucial to note that even the industry standard of G2.5 mm/s could significantly affect the results, making this a pressing issue that needs to be addressed. For this reason, we were forced early on to develop our **UTS-x** tool holder series by using highly specialized manufacturing technologies and innovative balancing methods.

Our **UTS-x** enabled us to realize an ultra-precision tool clamping with HSK interface according to DIN 69893 for the first time, which achieves a tool concentricity of 0.8 µm and a balanced quality of G 0.3 mm/s at 60,000 rpm.

General information at a glance

Interface/ Compliance DIN	HSK-E 20, HSK-E 25,HSK-E 32 and HSK-E 40 according to DIN 69893-E
Clamping technology	Thermal shrinking
Available clamping diameters, metric	8 mm, 6 mm, 4 mm und 3 mm
Available clamping diameters, inch	1/4", 1/8"
Guaranteed tool run-out*)	< 0.8 µm
Guaranteed balancing quality *)	< G0,3 mm/s at 60,000 rpm
Repeatability *)	< 0.2 µm

*) when using the Levicon tool spindle U/ASD-H25/A

Values of: May 2024

Overview of our unique tool holders

In addition, we offer customized tool holders with the spindle interface HSK-E 25, which is specially designed to accommodate fly-cutting discs or grinding discs.



Grinding wheel holder

for small to medium grinding wheel diameters



Flycutting-holder

for medium to large fly cutter discs



Shrink holder, radially adjustable

for mounting according to DIN-69893 for shrinking tools of different diameters, with radial alignment and balancing option

Data Sheet UTS-x

Order number	HSK	d1 (for h5)	d2, mm	d3, mm	L, mm	l, mm
UTS-20 (HSK-E 20)						
905.211	HSK-E 20, DIN 69893	3	7	11	35	15.5
905.212	HSK-E 20, DIN 69893	1/8"	7	11	35	15.5
905.213	HSK-E 20, DIN 69893	4	8	12	35	15.5
UTS-25 (HSK-E 25)						
901.857 *)	HSK-E 25, DIN 69893	8	15	22	55	45
901.6A0 *)	HSK-E 25, DIN 69893	6	12.5	18.6	80	34.5
901.655	HSK-E 25, DIN 69893	6	12.5	18.6	55	34.5
901.4A0 *)	HSK-E 25, DIN 69893	4	10	15.2	80	30
901.444	HSK-E 25, DIN 69893	4	10	15.2	50	30
901.233	HSK-E 25, DIN 69893	3	9	13.5	45	26
901.755	HSK-E 25, DIN 69893	1/4" (6,375)	12.5	18.6	55	34.5
901.333	HSK-E 25, DIN 69893	1/8" (3,175)	9	13.5	45	26
UTS-32 (HSK-E 32)						
902.230	HSK-E 32, DIN 69893	3	7.7	11.2	45	12
902.440	HSK-E 32, DIN 69893	4	10.2	14.4	50	18
902.4A0 *)	HSK-E 32, DIN 69893	4	10.2	17	80	18
901-650	HSK-E 32, DIN 69893	6	15.2	19.4	55	25
902.880 *)	HSK-E 32, DIN 69893	8	20	25	80	34
UTS-40 (HSK-E 40)						
903.8A6	HSK-E 40, DIN 69893	8	12.5	18.6	80	34.5
903.655	HSK-E 40, DIN 69893	6	10	15.2	55	30
903.444	HSK-E 40, DIN 69893	4	9	13.5	45	26

*) Special design, only on request

Values of: May 2024



UTS-25
Tool Holder



ShakesBear

Two spindle analysis and testing systems with different modules and functions are available



About

Since no suitable technology was available on the market to qualify our spindle products on a nanometer level at speeds up to 100,000 rpm, we developed our ShakesBear system early in our spindle history. The same applies to measuring, testing, verifying, and optimizing spindle dynamics and thermal behavior.

In 2020, we merged all our test and measurement methods into a single system, including a technical and database ERP system to keep track of all spindles in our production and record those that left our facility. Because of its unique and comprehensive features on the international market, it has been developed as a product and has become a global standard. Due to the different hardware requirements, two systems - “Hamlet” and “Othello” - both use the same “ShakesBear” software but differ in terms of the available modules. The modern, user-friendly software is continuously maintained and developed internally in Levicon to meet internal or external requirements. The user can be sure to get a well-proven tool from an experienced manufacturer of ultra-precise spindle solutions used daily.



Customized spindle and machine databases



Comprehensive spindle and machine dynamics analysis like dynamic tool runout, axial shaft growth, resonance maps, reports, and raw data storage (ShakesBear, Othello)



Unique spindle error analysis according to ISO 230-7 on a nanometer level and for speeds of up to 80,000 rpm (ShakesBear, Hamlet)

Available systems

ShakesBear, Hamlet (incl. 3 modules)
up to 80,000 rpm

ShakesBear, Othello (incl. 6 modules)
up to 100,000 rpm

General information at a glance

		ShakesBear, Hamlet	ShakesBear, Othello
General	Power supply	240 VAC	240 VAC
	Integrated PC, touchscreen	n.a.	optional
	USB 2.0 (or higher) connection	Yes	Yes
Analog-to-digital converter	Digital resolution	16 bit	16 bit
	Number of channels	8	8
	Evaluation	differential	differential
	Sampling rate per channel	1,25 MS/s	250 ks/s
	Analog signal	+/- 10V	+/- 10V
Distance sensing	Measuring principle	capacitive	capacitive
	Working distance	50 µm	50 µm
	Measuring resolution	1,7 nm	1,7 nm
	Sampling frequency	100 kHz	100 kHz
	Number of sensors	4	1
Vibration sensing	Measuring principle	n.a.	Piezo Sensor
	Cut-off rate	n.a.	18 kHz
	Sensitivity	n.a.	1 V/g
	Number of sensors	0	1 (2 optional)
Software modules *)	Number of modules	3	6
	1. Multi-sensor spindle Error-Analysis, ISO 230-7 radial and axial	X	n.a.
	2. Dynamic tool run-out and spindle vibrations over speed	n.a.	X
	3. 2-Channel FFT with peak hold (impulse response)	n.a.	X
	4. Resonance speed maps/ Machine resonance maps	n.a.	X
	5. Axial shaft growth, temperature & speed over time	n.a.	X
	6. Spindle and machine database	X	X
	7. 4-Channel Drag-Pointer Dial Gauge	X	X

*) Specific information on request

Values of: May 2024

„ShakesBear, Hamlet“ is one of our leading spindle analysis and testing systems. It was specially developed to measure, report, and store spindle errors by DIN ISO 230-7 (Error-Motion) in rotating systems.

The automatic separation of the spindle synchronous and artefact shape errors includes a unique technical feature that saves the time required for a reversal measurement and provides outstanding reliability and repeatability. The system gives verified results with sub-nanometer accuracy at speeds up to 80,000 rpm.

A spindle-error measurement requires sophisticated hardware and software. Our spindle analysis system includes both. It is integrated into a portable housing that can be connected to a PC and the sensors. The same applies to all amplifiers, conditioners, and electric supplies.

- ➔ Multi-sensor spindle Error-Analysis, ISO 230-7 radial & axial
- ➔ Spindle and machine database
- ➔ 4-Channel Drag-Pointer Dial Gauge

„ShakesBear, Othello“ is a testing system primarily developed for spindle manufacturers or OEMs who frequently change spindles in their machines to record dynamic variables such as tool runout, thermal expansion, and resonance maps. The spindles can be used as a vibration source, and a vibration spectrum can be read at any point in the machining system to create a resonance map of the machine.

The testing system is highly flexible and can be equipped with integrated operating and computing units like the Raspberry Pi and a touchscreen. All required amplifiers, filters, and driver units are integrated into one housing, enabling the sensors to connect easily.

- ➔ Dynamic tool runout and spindle vibrations over speed
- ➔ 2-Channel FFT with peak hold (impulse response)
- ➔ Resonance speed maps/ Machine resonance maps
- ➔ Axial shaft growth, temperature & speed over time
- ➔ Spindle and machine database
- ➔ 4-Channel Drag-Pointer Dial Gauge



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