



TENDO Silver
Flexible. Fast. Economical.

Hand in hand for tomorrow

TENDO Silver provides a budget-friendly entry into the world of hydraulic expansion technology, offering the best price/performance ratio in direct clamping. Nine interfaces make the TENDO Silver a process-reliable and precise clamping device with standardized outside contour according to DIN 69882-7.

Optionally suitable for HSC machining, as well as drilling, reaming, milling, and thread machining



Advantages – Your benefits

- + High level of flexibility**
Clamping of different diameters, flexible by means of direct clamping $\varnothing 6 - \varnothing 32$, or the combined use of slotted or coolant-proof intermediate sleeves
- + Micron-precise tool change within seconds without peripheral equipment**
Time saving through reduction of set-up time and no investment and energy costs due to additional clamping devices
- + Excellent vibration damping**
Micro-blowouts are prevented, optimal workpiece surfaces, machine spindle protection, increased tool service life resulting in a reduction of costs
- + All commercially available tool shank types can be clamped**
Form A: with smooth cylindrical shank, shank form A in accordance with DIN 1835 and DIN 6535 HA Form AB: with flat face and cylindrical shank with pulling face, shank form B in accordance with DIN 1835 and DIN 6535 HB Form B: with lateral pulling faces, shank form B in accordance with DIN 1835 Form E: with inclined clamping face, shank form E in accordance with DIN 1835 and DIN 6535 HE
- + Fine-balanced by default**
Suitable for high speeds with a balancing grade of G2.5 at 25,000 RPM
- + Permanent run-out and repeat accuracy < 0.003 mm**
Even cutting action, increased tool service life, and reduced costs for regrinding or buying new tools
- + Exact length preadjustment**
Length adjustment in the range of 0.01 mm accuracy, with adjustment travel of 10 mm
- + Comprehensive compatibility**
Can be ideally combined with TRIBOS SVL tool extensions
- + Dirt grooves for reliable torque transmission**
Dry clamping surfaces, by displacement of oil, grease or lubricant residues into the dirt groove

Functions

TENDO in detail



- 1 Clamping screw**
The clamping screw is used to actuate the clamping piston. Clamp the clamping screw to dead stop using an Allen key. A torque wrench is not needed.
- 2 Clamping piston**
The clamping piston compresses the hydraulic fluid into the oil chamber system.
- 3 Sealing element**
Special sealing for leakage-free clamping.
- 4 Expansion sleeve**
The expansion sleeve evenly expands against the tool shank. This clamping process first centers the tool shank before fully clamping it over the whole surface.
- 5 Chamber system**
When the chamber system is filled with hydraulic fluid, it has a damping effect on the clamped tool.
- 6 Base body**
The machine-side interface is located on the base body.
- 7 Tool**
The tool is centrally clamped to the center axis
– highest run-out and repeat accuracy of < 0.003 mm.

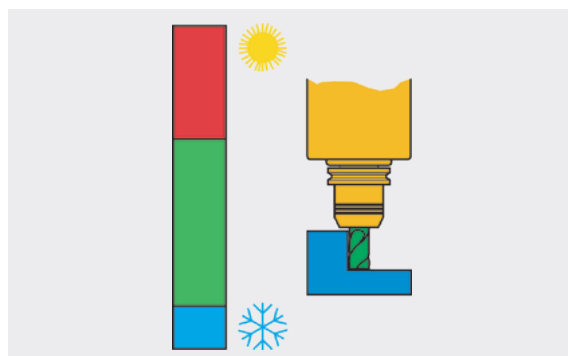
Clamping force test

The clamping force in the clamping system can be tested at any time in a matter of seconds by using a test shaft.



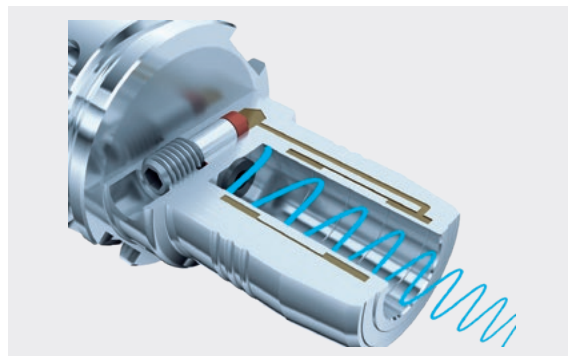
Optimum temperature range

All technical data in the catalog applies to a normal temperature range between 20 – 25°C. The optimum operating temperature range is between 20 and 50 °C. Higher temperature ranges are possible upon request.



Excellent vibration damping

Micro-blowouts on the cutting edge of the tool are prevented, thus achieving optimum workpiece surfaces. The spindle performance will be enhanced, the tool service life is considerably increased and costs reduced.



High flexibility due to the use of intermediate sleeves

The application of slotted or coolant-proof intermediate sleeves enables clamping of different tool diameters using the same toolholder. This is why a toolholder can be used flexibly within the clamping range.

The run-out accuracy of the intermediate sleeve is ≤ 0.003 mm.



Dirt grooves for reliable torque transmission

The enormous clamping pressure of the TENDO hydraulic expansion toolholder creates a displacement of oil, grease, or lubricant residues into the dirt groove. This results in the clamping face remaining dry and reliable torque transmission is guaranteed.



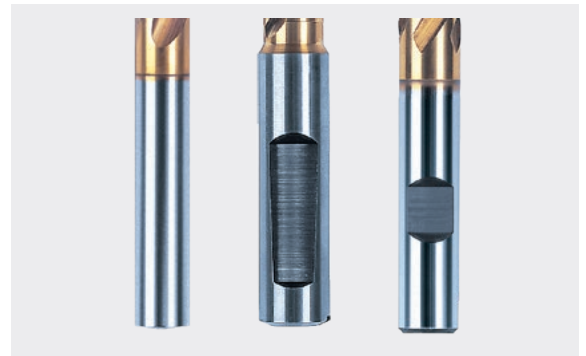
All commercially available tool shank types can be clamped

Form A: with smooth cylindrical shank, shank form A in accordance with DIN 1835 and DIN 6535 HA

Form AB: with flat face and cylindrical shank with pulling face, shank form B in accordance with DIN 1835 and DIN 6535 HB

Form B: with lateral pulling faces, shank form B in accordance with DIN 1835

Form E: with inclined clamping face, shank form E in accordance with DIN 1835 and DIN 6535 HE



Dirt resistance for a long-lasting functional reliability

The completely enclosed TENDO system prevents the penetration of dirt, chips, coolants, and grease. The clamping range is not damaged, functionality and perfect tool clamping system remain fully preserved. TENDO hydraulic expansion toolholders are low-maintenance and enjoy a long service life.



Micron-precise tool change within seconds without peripheral equipment

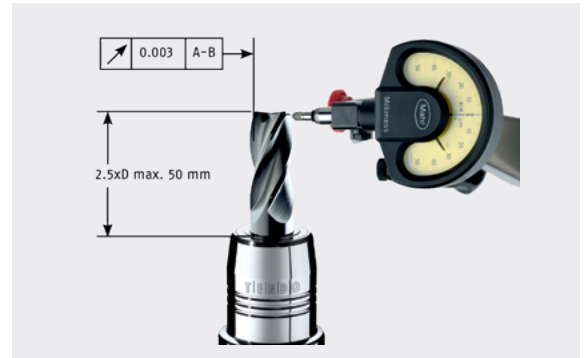
With a few simple actions, the tool can be changed quickly and process reliably. Time savings due to reduced set-up times and no investment costs for additional clamping devices.



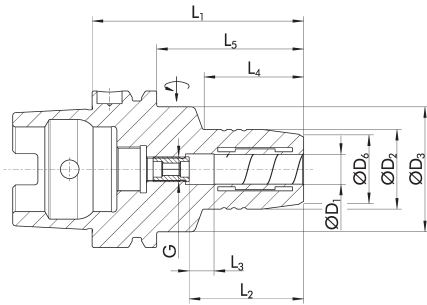
TENDO Silver
Hydraulic expansion toolholder

Run-out and repeat accuracy

Highest, permanent run-out and repeat accuracy of < 0.003 mm ensure an even cutting action. This minimizes wear to the cutting edges of the tool, increases tool service life considerably, and reduces the costs incurred for regrinding or buying new tools.



TENDO Silver HSK-A 50



Run-out accuracy
< 0.003 mm*



Balancing grade
G2.5 at 25,000 RPM*



Short set-up time



Data carrier hole
available



Internal cooling
up to 80 bar

Technical data

ID	D1 [mm]	D2 [mm]	D3 [mm]	D6 [mm]	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	L5 [mm]	G	Mmin [Nm]	Weight [kg]	
1533547	6	26	40.25	21.65	70	37	10	28	44.05	M5	16	0.6	9205650
1533548	8	28	40.25	23.65	70	37	10	28	44.05	M6	23	0.6	9205650
1533549	10	30	40.25	25.65	75	41	10	34	49.05	M8x1	45	0.6	9205650
1533550	12	32	40.25	27.65	85	46	10	44	59.05	M10x1	90	0.7	9205650
1608715	14	34	40.25	29.65	85	46	10	44	59.05	M10x1	110	0.73	9205650
1533551	16	38	40.25	33.65	90	49	10	47	64.05	M10x1	185	0.8	9205650
1608716	18	40		35.65	90	49	10	64.05		M10x1	240	0.85	9205650
1533553	20	42		37.65	90	50.5	10	64.05		M10x1	330	0.9	9205650

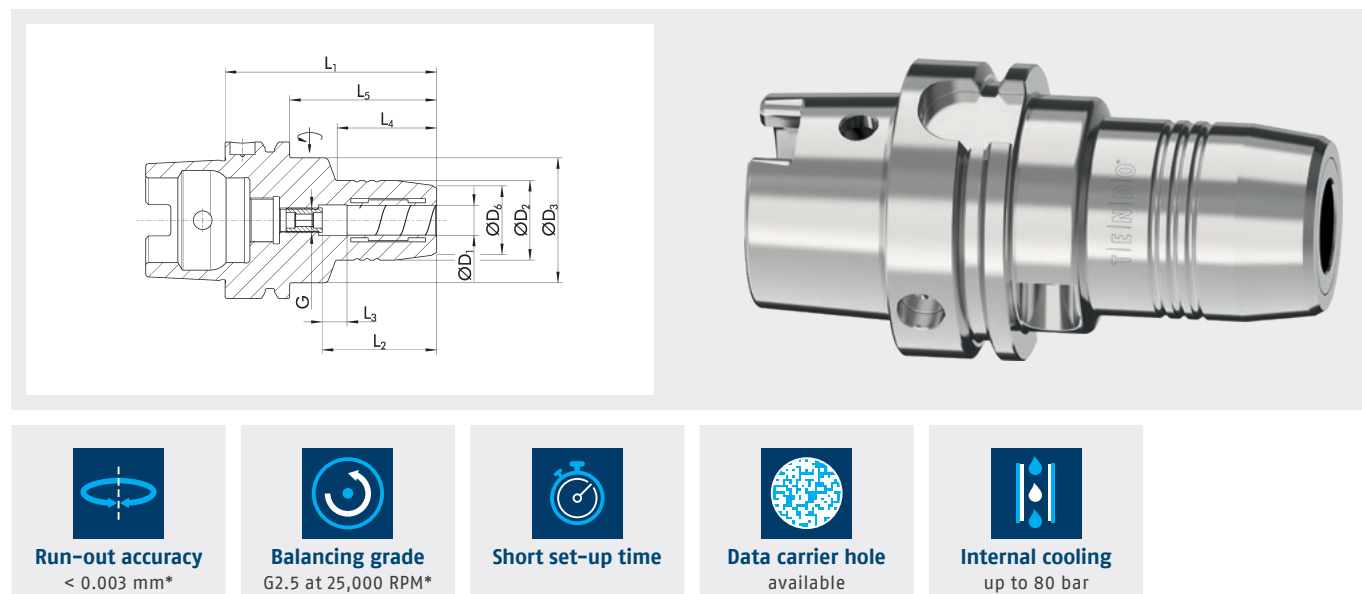
*Run-out accuracy: at 2.5 x D

*Balancing grade: or Umax < 1 gmm

Additional sizes and customized designs are available upon request

Additional shank diameters can be clamped using intermediate sleeves

TENDO Silver HSK-A 63



Technical data

ID	D1 [mm]	D2 [mm]	D3 [mm]	D6 [mm]	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	L5 [mm]	G	Mmin [Nm]	Weight [kg]	
1360923	6	26	50	22	70	37	10	24	44	M5	16	1	9205650
1360924	8	28	50	24	70	37	10	25	44	M6	23	1	9205650
1360925	10	30	50	26	80	41	10	35	54	M8x1	45	1	9205650
1360926	12	32	50	28	85	46	10	40	59	M10x1	90	1	9205650
1360927	14	34	50	30	85	46	10	40	59	M10x1	110	1.1	9205650
1360928	16	38	50	34	90	49	10	46	64	M12x1	185	1.2	9205650
1360929	18	40	50	36	90	49	10	47	64	M12x1	240	1.2	9205650
1360930	20	42	50	38	90	51	10	48	64	M16x1	330	1.2	9205650
1360931	25	57		53	120	57	10	94		M16x1	400	2.1	9205660
1360932	32	62		58	125	61	10	99		M16x1	650	2.3	9205660

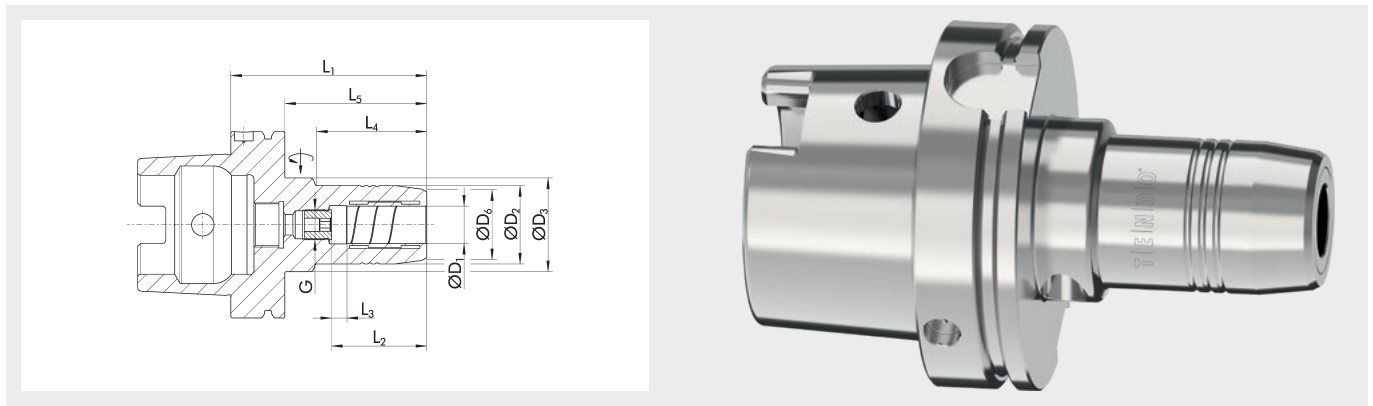
*Run-out accuracy: at 2.5 x D

*Balancing grade: or Umax < 1 gmm

Additional sizes and customized designs are available upon request

Additional shank diameters can be clamped using intermediate sleeves

TENDO Silver HSK-A 100



Run-out accuracy
< 0.003 mm*



Balancing grade
G2.5 at 25,000 RPM*



Short set-up time



Data carrier hole
available



Internal cooling
up to 80 bar

Technical data

ID	D1 [mm]	D2 [mm]	D3 [mm]	D6 [mm]	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	L5 [mm]	G	Mmin [Nm]	Weight [kg]	
1434533	6	26	50	22	75	37	10	26	46	M5	16	2.3	9205650
1434534	8	28	50	24	75	37	10	26	46	M6	23	2.3	9205650
1434535	10	30	50	26	90	41	10	42	61	M8x1	45	2.4	9205650
1434536	12	32	50	28	95	46	10	47	66	M10x1	90	2.4	9205650
1434538	14	34	50	30	95	46	10	47	66	M10x1	110	2.4	9205650
1434545	16	38	50	34	100	49	10	53	71	M12x1	185	2.5	9205650
1434546	18	40	50	36	100	49	10	53	71	M12x1	240	2.6	9205650
1434547	20	42	50	38	105	51	10	59	76	M16x1	330	2.6	9205650
1434548	25	57	63	53	110	57	10	62	81	M16x1	400	3.3	9205660
1434549	32	64	75	60	110	61	10	62	81	M16x1	650	3.6	9205660

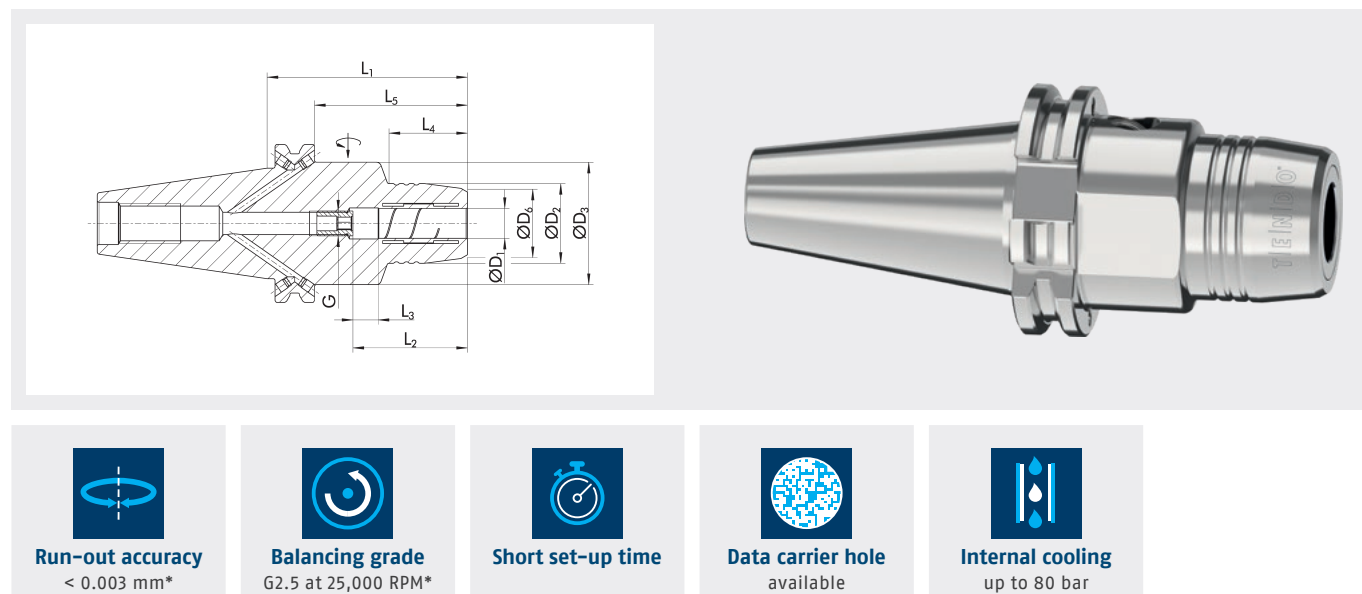
*Run-out accuracy: at 2.5 x D

*Balancing grade: or Umax < 1 gmm

Additional sizes and customized designs are available upon request

Additional shank diameters can be clamped using intermediate sleeves

TENDO Silver SK 40



Technical data

ID	D1 [mm]	D2 [mm]	D3 [mm]	D6 [mm]	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	L5 [mm]	G	Mmin [Nm]	Weight [kg]	
1462652	6	26	49.25	22	80.5	37	10	29.5	61.4	M5	26	1.3	9205650
1462653	8	28	49.25	24	80.5	37	10	30	61.4	M6	23	1.3	9205650
1462654	10	30	49.25	26	80.5	41	10	31	61.4	M8x1	45	1.3	9205650
1462655	12	32	49.25	28	80.5	46	10	31.5	61.4	M10x1	90	1.3	9205650
1462656	16	38	49.25	34	80.5	49	10	33	61.4	M12x1	185	1.4	9205650
1467135	18	40	49.25	36	80.5	49	10	33	61.4	M12x1	240	1.4	9205650
1462657	20	42	49.25	38	80.5	51	10	34	61.4	M16x1	330	1.4	9205650
1467969	25	55	65.95	53	80.5	57	10	22	61.4	M16x1	400	1.8	9205660
1462658	32	63	72.95	60	80.5	61	10	25.5	61.4	M16x1	650	1.8	9205660

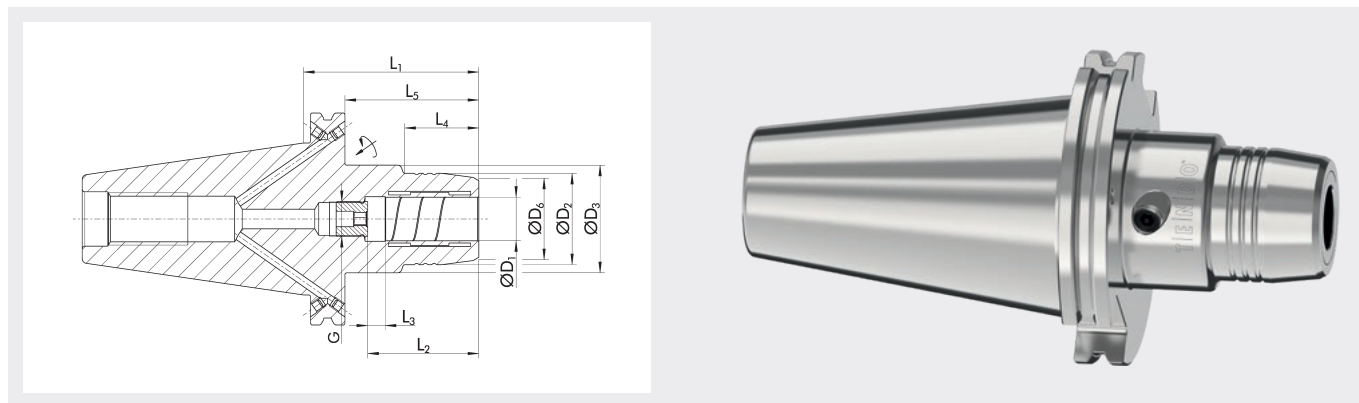
*Run-out accuracy: at 2.5 x D

*Balancing grade: or Umax < 1 gmm

Additional sizes and customized designs are available upon request

Additional shank diameters can be clamped using intermediate sleeves

TENDO Silver SK 50



Run-out accuracy
< 0.003 mm*



Balancing grade
G2.5 at 25,000 RPM*



Short set-up time



Data carrier hole
available



Internal cooling
up to 80 bar

Technical data

ID	D1 [mm]	D2 [mm]	D3 [mm]	D6 [mm]	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	L5 [mm]	G	Mmin [Nm]	Weight [kg]	
1462671	12	32	49.25	28	80.5	46	10	31.5	61.45	M10x1	90	3.2	9205650
1462672	16	38	49.25	34	80.5	49	10	33	61.45	M12x1	185	3.2	9205650
1462673	20	42	49.25	38	80.5	51	10	34	61.45	M16x1	330	3.2	9205650
1462674	32	64	70.25	60	103.2	61	10	62.5	84.15	M16x1	650	4.3	9205660

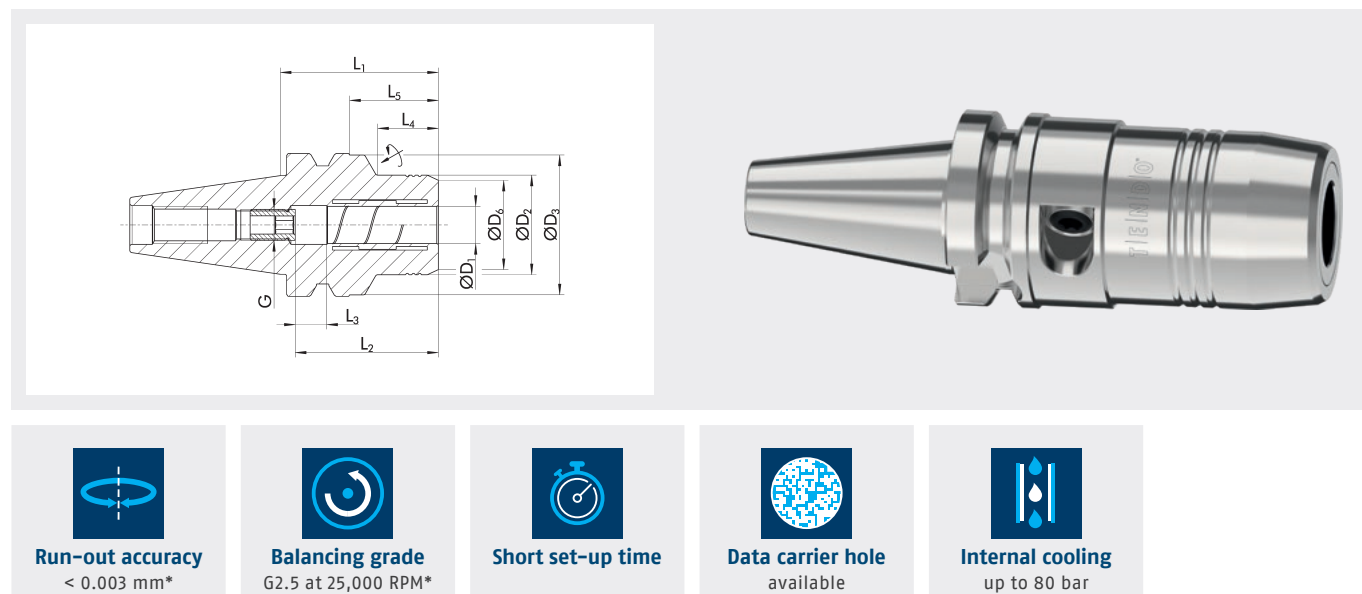
*Run-out accuracy: at 2.5 x D

*Balancing grade: or Umax < 1 gmm

Additional sizes and customized designs are available upon request

Additional shank diameters can be clamped using intermediate sleeves

TENDO Silver JIS-BT 30



Run-out accuracy
< 0.003 mm*



Balancing grade
G2.5 at 25,000 RPM*



Short set-up time



Data carrier hole
available



Internal cooling
up to 80 bar

Technical data

ID	D1 [mm]	D2 [mm]	D3 [mm]	D6 [mm]	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	L5 [mm]	G	Mmin [Nm]	Weight [kg]	
1429241	6	26	46	22.8	55	37	10	17.8		M5	16	0.6	9205640
1429242	8	28	46	24.8	55	37	10	18.4		M6	23	0.6	9205640
1429243	10	30	46	26.8	55	41	10	19		M8x1	45	0.6	9205640
1429244	12	32	46	28.8	55	46	10	19.5		M10x1	90	0.6	9205640
1429245	16	38	45	34.7	90	49	10	50	68	M12x1	185	0.9	9205650
1429246	20	42	45	37.7	90	51	10	50	68	M8x1	330	0.9	9205650

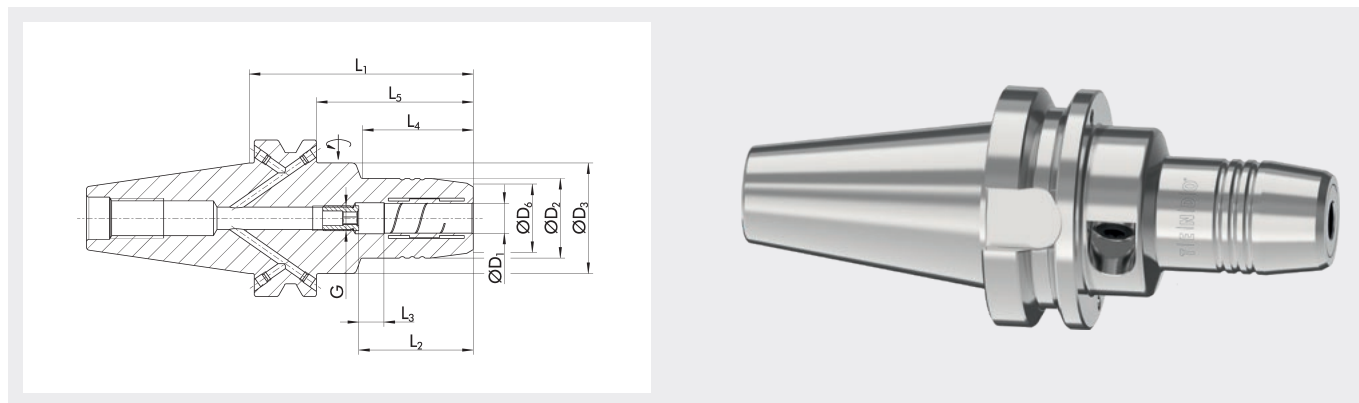
*Run-out accuracy: at 2.5 x D

*Balancing grade: or Umax < 1 gmm

Additional sizes and customized designs are available upon request

Additional shank diameters can be clamped using intermediate sleeves

TENDO Silver JIS-BT 40



Run-out accuracy
< 0.003 mm*



Balancing grade
G2.5 at 25,000 RPM*



Short set-up time



Data carrier hole
available



Internal cooling
up to 80 bar

Technical data

ID	D1 [mm]	D2 [mm]	D3 [mm]	D6 [mm]	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	L5 [mm]	G	Mmin [Nm]	Weight [kg]	
1417054	6	26	44.5	22	90	37	10	43	63	M5	16	1.3	9205650
1417055	8	28	44.5	24	90	37	10	44.5	63	M6	23	1.4	9205650
1417056	10	30	44.5	26	90	41	10	44.5	63	M8x1	45	1.4	9205650
1417057	12	32	44.5	28	90	46	10	44.5	63	M10x1	90	1.4	9205650
1417058	16	38	44.5	34	90	49	10	47.5	63	M12x1	185	1.4	9205650
1417060	20	42	44.5	38	90	51	10	47.5	63	M16x1	330	1.5	9205650
1417062	32	62		59	100	61	10	73		M16x1	650	2.2	9205660

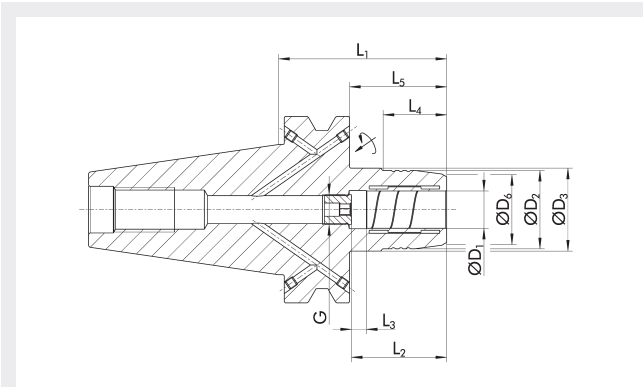
*Run-out accuracy: at 2.5 x D

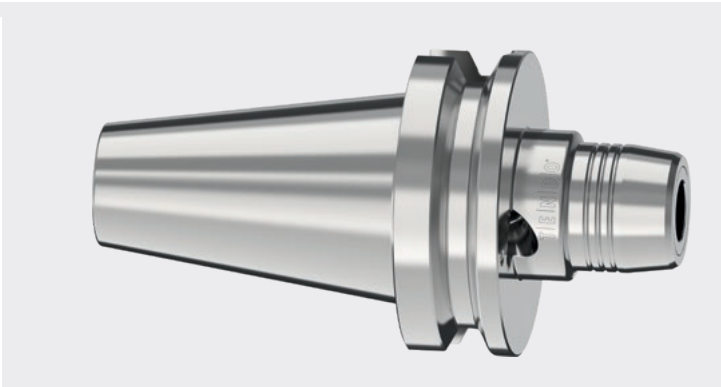
*Balancing grade: or Umax < 1 gmm

Additional sizes and customized designs are available upon request

Additional shank diameters can be clamped using intermediate sleeves

TENDO Silver JIS-BT 50







Run-out accuracy
< 0.003 mm*



Balancing grade
G2.5 at 25,000 RPM*



Short set-up time



Data carrier hole
available



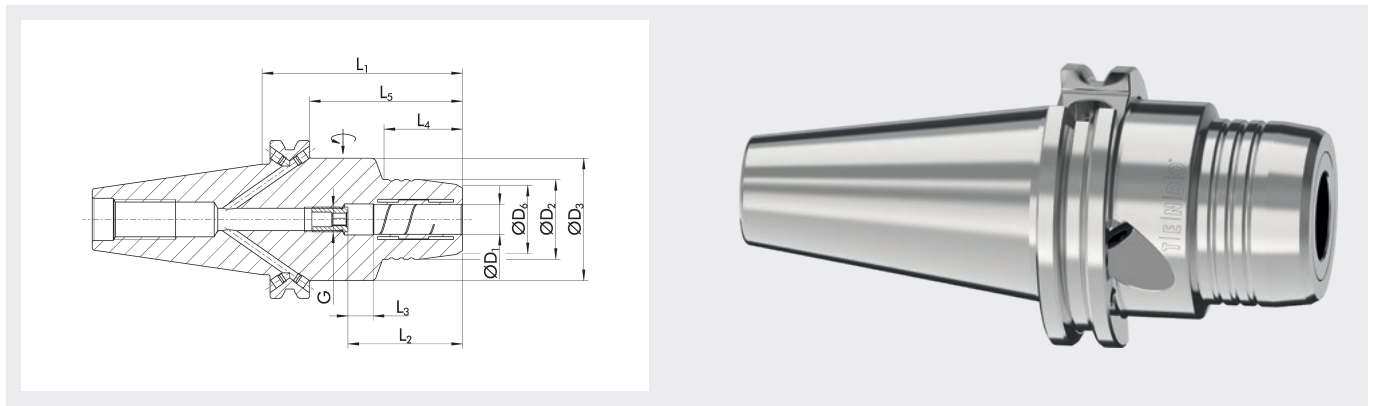
Internal cooling
up to 80 bar

Technical data

ID	D1 [mm]	D2 [mm]	D3 [mm]	D6 [mm]	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	L5 [mm]	G	Mmin [Nm]	Weight [kg]	
1503296	12	32	49.25	28	90	46	10	31.5	52	M10x1	90	4	9205650
1503297	20	42	49.25	38	90	51	10	34	52	M16x1	330	4	9205650
1503299	32	64	70.25	60	120	61	10	62.5	82	M16x1	650	5.1	9205660

*Run-out accuracy: at 2.5 x D
*Balancing grade: or Umax < 1 gmm
Additional sizes and customized designs are available upon request
Additional shank diameters can be clamped using intermediate sleeves

TENDO Silver CAT 40



Run-out accuracy
< 0.003 mm*



Balancing grade
G2.5 at 25,000 RPM*



Short set-up time



Data carrier hole
available



Internal cooling
up to 80 bar

Technical data

ID	D1 [mm]	D2 [mm]	D3 [mm]	D6 [mm]	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	L5 [mm]	G	Mmin [Nm]	Weight [kg]	
1479973	6	26	44.45	23	63.5	37	10	24	44.45	M5	16	1.1	9205650
1479975	8	28	49	25.3	63.5	37	10	25	44.45	M5	23	1.1	9205650
1479977	10	30	49	26.7	63.5	41	10	27	44.45	M5	45	1.1	9205650
1479978	12	32	49	28.9	63.5	46	10	26	44.45	M10x1	90	1.1	9205650
1479979	14	34	49	30.6	63.5	46	10	26	44.45	M10x1	110	1.1	9205650
1479980	16	38	49	34.9	63.5	49	10	27	44.45	M10x1	185	1.2	9205650
1479981	20	49.25		38	64.5	51	10	45.45		M10x1	520	1.3	9205650

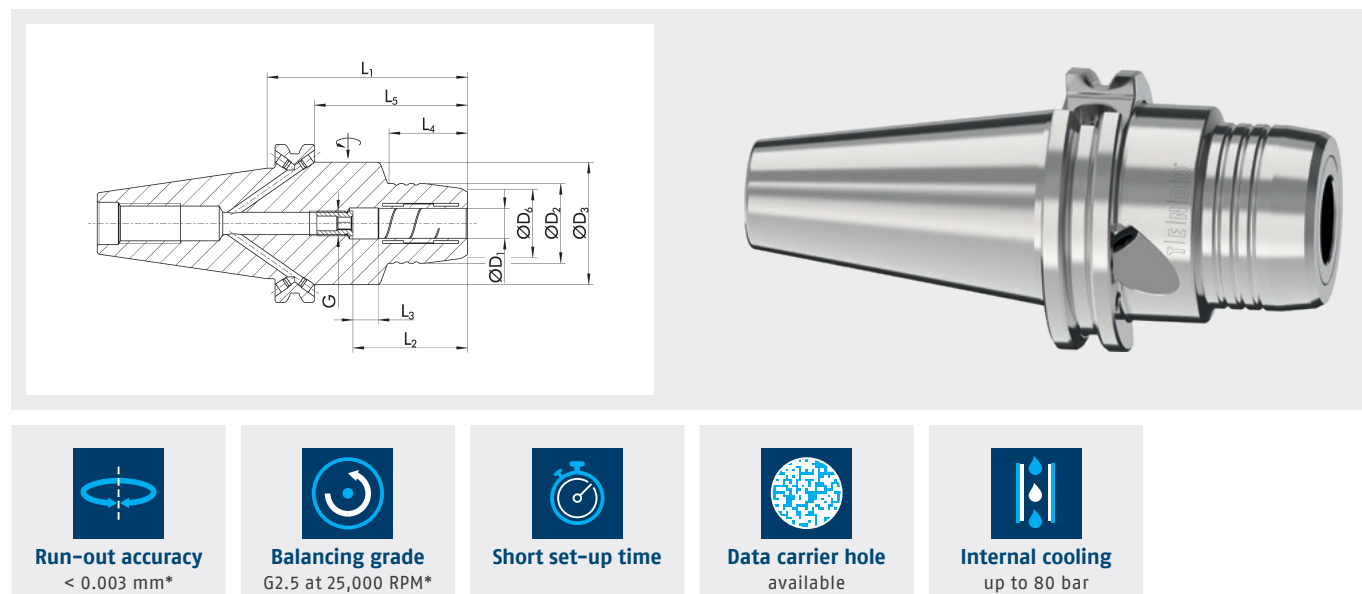
*Run-out accuracy: at 2.5 x D

*Balancing grade: or Umax < 1 gmm

Additional sizes and customized designs are available upon request

Additional shank diameters can be clamped using intermediate sleeves

TENDO Silver CAT 40



Technical data

ID	D1 [Inch]	D2 [mm]	D3 [mm]	D6 [mm]	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	L5 [mm]	G	Mmin [Nm]	Weight [kg]	
1436816	1/4"	26	44.45	23	63.5	37	10	24.56	44.45	M5	17	1.1	9205650
1436817	3/8"	30	49	26.7	63.5	41	10	27	44.45	M5	45	1.1	9205650
1436818	1/2"	32	49	29.55	63.5	46	10	24	44.45	M10x1	95	1.1	9205650
1436819	5/8"	38	49	34.9	63.5	49	10	27	44.45	M10x1	185	1.2	9205650
1436820	3/4"	49.25		38	64.5	51	10	45.45		M10x1	520	1.3	9205650

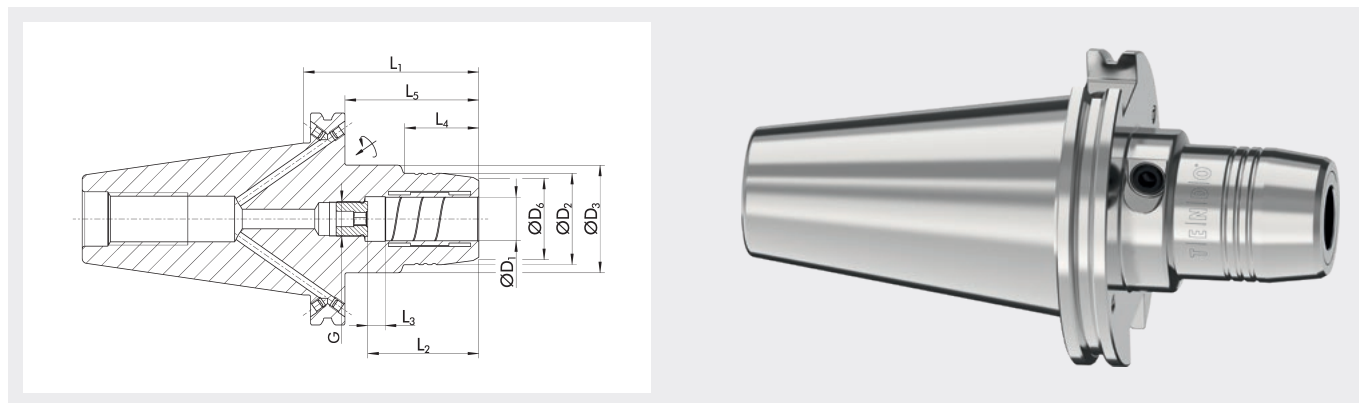
*Run-out accuracy: at 2.5 x D

*Balancing grade: or Umax < 1 gmm

Additional sizes and customized designs are available upon request

Additional shank diameters can be clamped using intermediate sleeves

TENDO Silver CAT 50



Run-out accuracy
< 0.003 mm*



Balancing grade
G2.5 at 25,000 RPM*



Short set-up time



Data carrier hole
available



Internal cooling
up to 80 bar

Technical data

ID	D1 [mm]	D2 [mm]	D3 [mm]	D6 [mm]	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	L5 [mm]	G	Mmin [Nm]	Weight [kg]	
1503305	12	32	49	27.3	81	46	10	40	61.95	M10x1	90	3.1	9205650
1503313	20	42	51	37.3	81	51	10	46	61.95	M10x1	330	3.2	9205650
1503314	25	48	63.5	43.3	81	57	10	38.5	61.95	M10x1	400	3.4	9205660
1503315	32	72		58.5	81	61	10		61.95	M10x1	900	3.9	9205660

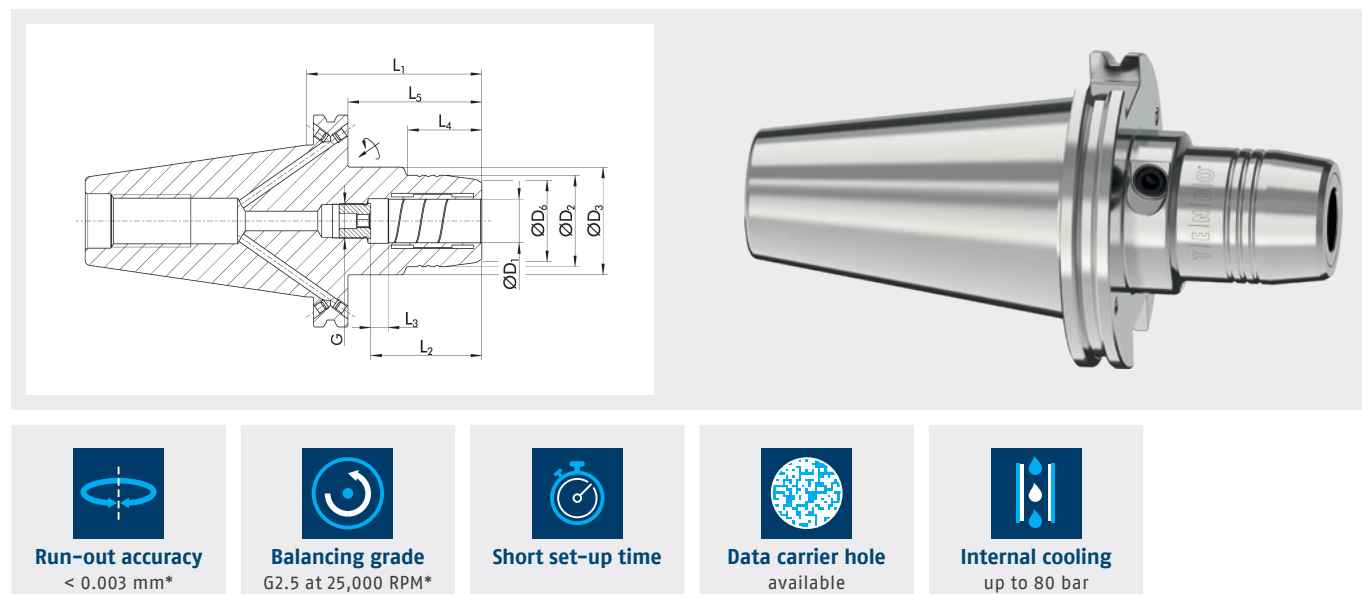
*Run-out accuracy: at 2.5 x D

*Balancing grade: or Umax < 1 gmm

Additional sizes and customized designs are available upon request

Additional shank diameters can be clamped using intermediate sleeves

TENDO Silver CAT 50



Technical data

ID	D1 [Inch]	D2 [mm]	D3 [mm]	D6 [mm]	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	L5 [mm]	G	Mmin [Nm]	Weight [kg]	
1593814	1/2"	32	44.45	27.7	81	46	10	31.5	61.95	M10x1	95	3.1	9205650
1593815	3/4"	44.45	49	38.9	81	51	10	43.17	61.95	M10x1	310	3.2	9205650
1593817	1"	48	63.5	43.3	81	57	10	38.5	61.95	M10x1	400	3.4	9205660
1503316	1 1/4"	72		58.5	81	61	10		61.95	M10x1	900	3.9	9205660

*Run-out accuracy: at 2.5 x D

*Balancing grade: or Umax < 1 gmm

Additional sizes and customized designs are available upon request

Additional shank diameters can be clamped using intermediate sleeves



SCHUNK SE & Co. KG

Spanntechnik

Greiftechnik

Automatisierungstechnik

Bahnhofstr. 106 - 134

D-74348 Lauffen/Neckar

Tel. +49-7133-103-0

Fax +49-7133-103-2399

CMS@de.schunk.com

schunk.com