



VICES

EDITION 8.1

RÖHM
driven by technology



RKE 125



IDEAL FOR STATIONARY USE

The stationary power clamping devices from RÖHM are predestined for stationary, centric clamping of round and angular workpieces on milling machines or machining centers or for the rational clamping in automated work sequences.



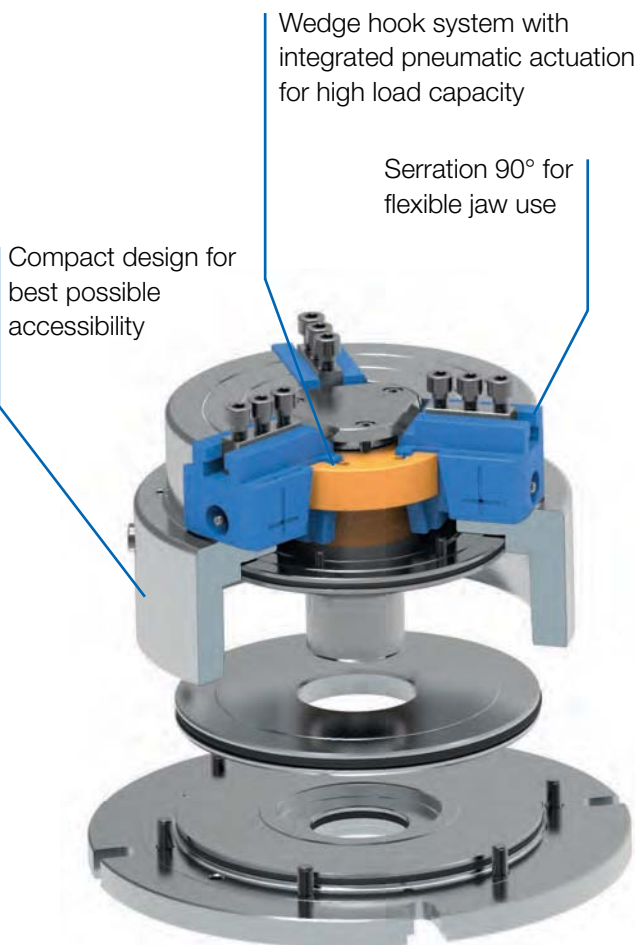
Stationary application

STATIONARY POWER CLAMPING DEVICES

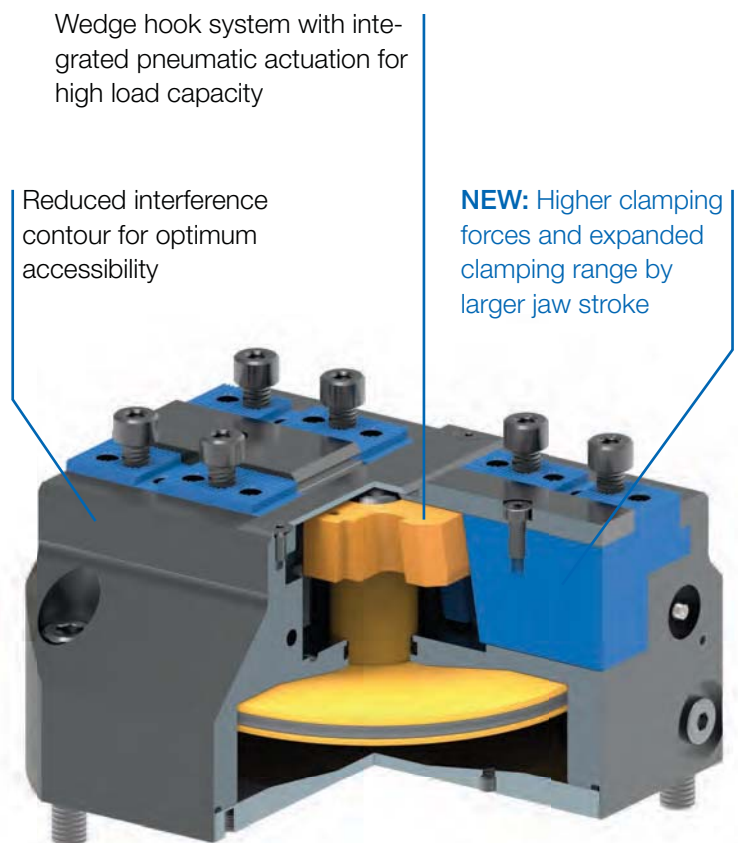
Stationary power clamping devices are characterized by many product advantages, which are essential for stationary, centric clamping on milling machines or machining centers or for the rational clamping in automated work sequences: Compact design for best possible work area utilization, high repeatability and constant clamping force at the same pressure, as well as maximum flexibility thanks to the centric clamping of round and angular workpieces.

ADVANTAGES AT A GLANCE

- ⌚ High efficiency thanks to automated and fast clamping in stationary use
- ⌚ Wedge hook system for high load capacity and clamping precision
- ⌚ Flexible use thanks to centric clamping of angular and round components



Stationary power chuck SSP



Pneumatically-operated centering vice KZS-P

KZS-P



APPLICATION

Optimally suited for use in 3-, 4- and 5-axis machining centers as well as on all common zero-point clamping systems

TYPE

Pneumatically actuated centering vice in standard design. Optionally with inductive sensors. 2-jaws version.

CUSTOMER BENEFITS

- ⊕ Jaw stroke expanded by up to 20% for a larger clamping range
- ⊕ Highest clamping forces of up to 55 kN, optimal results and process reliability through precision wedge hook system
- ⊕ Optimized lubrication system for constantly high clamping forces
- ⊕ Compact design with reduced interfering contours for optimum workpiece accessibility, ideal working space utilization and optimum chip flow
- ⊕ Sturdy and low-backlash jaw guides for high repeatability

TECHNICAL FEATURES

- Jaws with cross tenon and serration

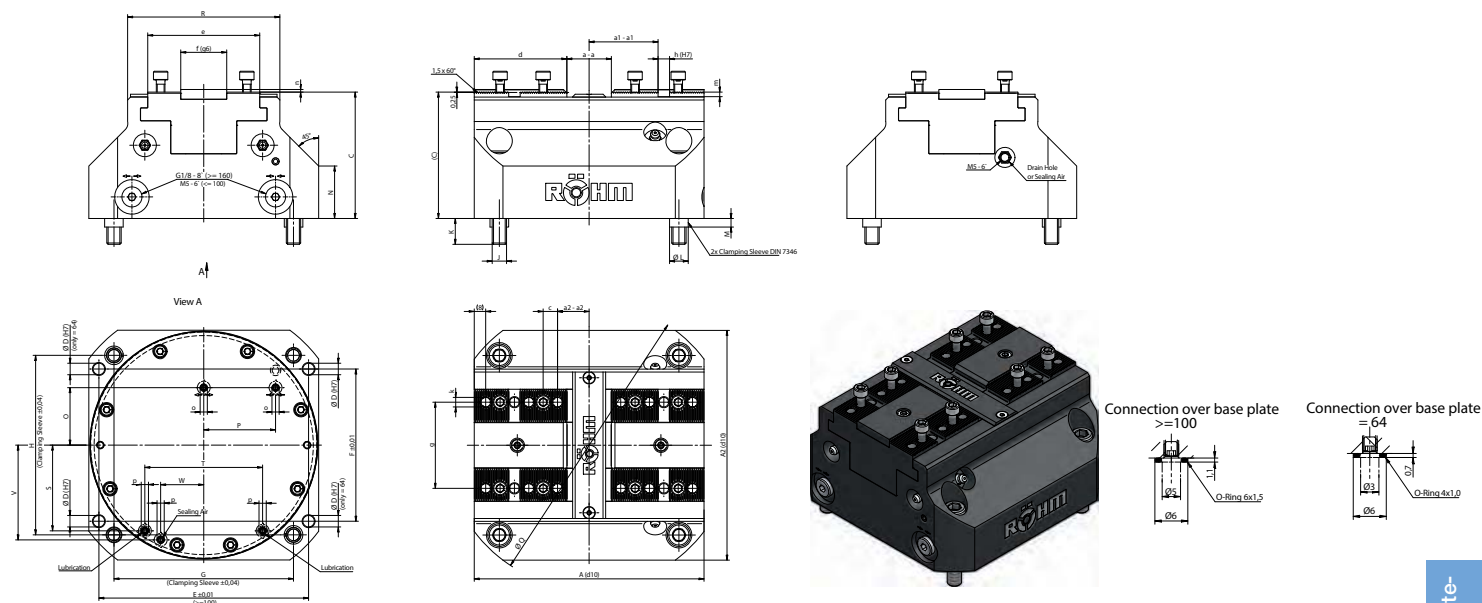
KZS-P = power-operated, centering, vice, pneumatically



The power-operated centering vices are also available with integrated stroke sensor, which serves for clamping control and ensures optimum process monitoring and thus optimal process reliability.



KZS-P


Power-operated centering vice **KZS-P** (standard jaw stroke), basic jaws with serration 1.5 x 60° and cross-tenon interface

Item No.	181480	181482	181486	181490	181494
Item no. with inductive sensors	181580 ▲	181582 ▲	181586 ▲	181590 ▲	181594 ▲
Size	KZS-P 64	KZS-P 100	KZS-P 160	KZS-P 200	KZS-P 250
A1 mm	64	100	160	200	250
Jaw stroke B mm	2.3	2.3	3.5	4.8	6
C mm	50.7	69.2	82.2	90.2	98.2
D H7 mm	4 - 7.5T	6 - 12T	8 - 14T	8 - 14T	10 - 20T
E±0.01 mm	36	90	146	184	230
F±0.01 mm	56	64	106	146	154
G±0.04 mm	50	80	125	160	200
H±0.04 mm	50	80	125	160	200
J mm	M6	M8	M10	M10	M12
K mm	12	15	18	18	20
L mm	8	11	13	13	16
M mm	4	4.5	6	6	6
N mm	26.2	34.8	31.5	34.2	35.7 (50°)
O mm	17	32	40	50	64
P mm	17	29.5	50	65	75
Q mm	84	130	200	250	310
R mm	45	68	106	140	166
S mm	21.1	34.5	59.7	72.5	92.6
T mm	33.6	55	82	110	139.6
V mm	-27.5	44	74	87.7	110.8
W mm	0	25.5	32	48	60
a mm	12.8 - 17.4	20.4 - 25	24 - 31	34.4 - 44	34 - 46
a1 mm	12.9 - 15.2	25.7 - 28	44.5 - 48	53.2 - 58	55 - 61
a2 mm	9.9 - 12.2	14.7 - 17	18.5 - 22	32 - 27.2	24 - 30
b mm	4.8	5	8	8	11
c mm	5	7	10	10	12
d mm	23.3	37.5	64.5	78	102
e mm	30	47	78	102	125
f ⁹⁶ mm	14	20	32	40	50
g mm	24	35	60	80	90
h ¹⁷ mm	4	6	8	8	10
k	M4 - 7T	M6 - 9T	M8 - 12T	M8 - 16T	M10 - 19T
k1	4	5	6	7	8
m mm	2.7	2.7	3.2	3.2	4
n mm	1.8	1.8	1.8	2.3	2.3
o mm	M3	M4	M5	M6	M6
p mm	M3	M4	M5	M5	M5
Max. operating pressure bar	9	9	9	9	6
Max. total clamping force kN	4.56	18	45	52	55
Weight kg	1.15	3.6	10.3	18.5	30.4
Cylinder volume (double stroke) cm³	38	180	600	900	1760
Closing time s	0.1	0.25	0.5	0.6	1.1
Clamping repeatability mm	0.01	0.01	0.02	0.03	0.03

KZS-PG - large jaw stroke



APPLICATION

Optimally suited for use in 3-, 4- and 5-axis machining centers as well as on all common zero-point clamping systems

TYPE

Pneumatically actuated centering vice with large jaw stroke.
Optionally with inductive sensors. 2-jaws version.

CUSTOMER BENEFITS

- ③ Jaw stroke expanded by up to 20% for a larger clamping range
- ③ Highest clamping forces of up to 55 kN, optimal results and process reliability through precision wedge hook system
- ③ Optimized lubrication system for constantly high clamping forces
- ③ Compact design with reduced interfering contours for optimum workpiece accessibility, ideal working space utilization and optimum chip flow
- ③ Sturdy and low-backlash jaw guides for high repeatability

TECHNICAL FEATURES

- Jaws with cross tenon and serration

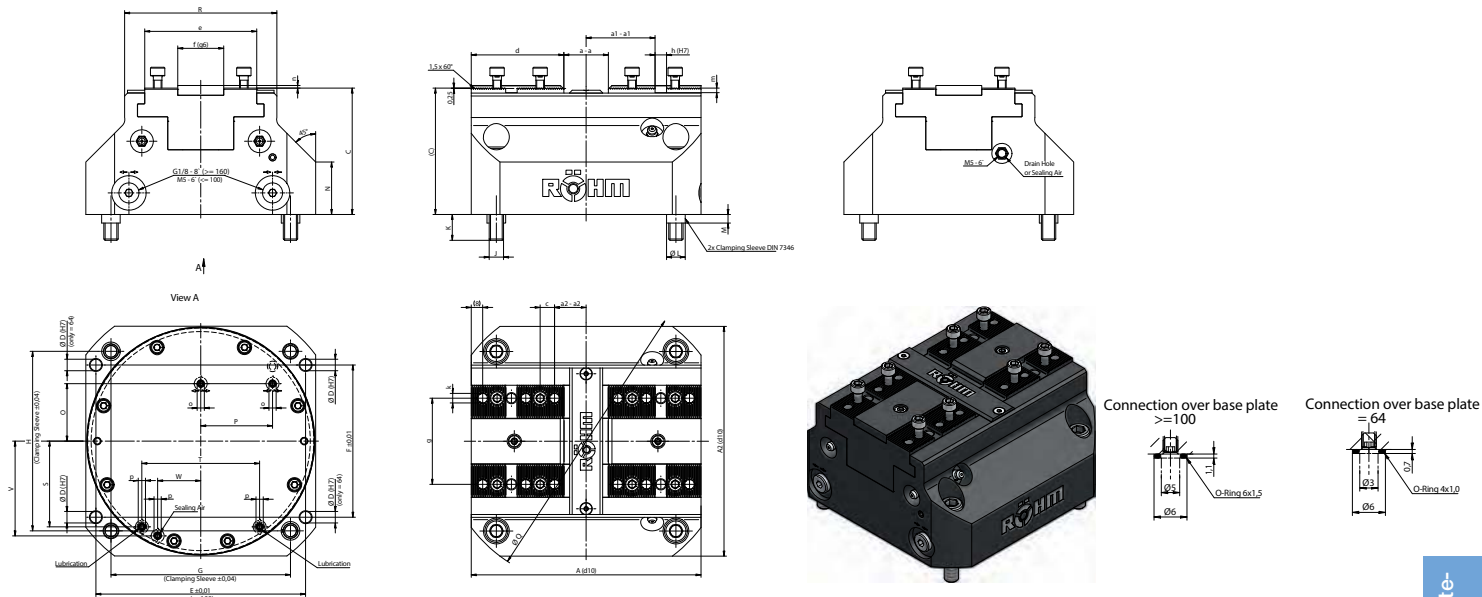
KZS-PG = power-operated, centering, vice, pneumatically, large jaw stroke



The power-operated centering vices are also available with integrated stroke sensor, which serves for clamping control and ensures optimum process monitoring and thus optimal process reliability.



KZS-PG - large jaw stroke



Power-operated centering vice **KZS-PG (large jaw stroke)**, basic jaws with **serration 1.5 x 60°** and **cross-tenon interface**

Item No.	181483	181487	181491	181495
Item no. with inductive sensors	181583 ▲	181587 ▲	181591 ▲	181595 ▲
Size	KZS-PG 100	KZS-PG 160	KZS-PG 200	KZS-PG 250
A1 mm	100	160	200	250
Jaw stroke B mm	7	9.5	12.1	17.6
C mm	69.2	82.2	90.2	98.2
D H7 mm	6 - 12T	8 - 14T	8 - 14T	10 - 20T
E±0.01 mm	90	146	184	230
F±0.01 mm	64	106	146	154
G±0.04 mm	80	125	160	200
H±0.04 mm	80	125	160	200
J mm	M8	M10	M10	M12
K mm	15	18	18	20
L mm	11	13	13	16
M mm	4.5	6	6	6
N mm	34.8	31.5	34.2	35.7 (50°)
O mm	32	40	50	64
P mm	29.5	50	65	75
Q mm	130	200	250	310
R mm	68	106	140	166
S mm	34.5	59.7	72.5	92.6
T mm	55	82	110	139.6
V mm	44	74	87.7	110.8
W mm	25.5	32	48	60
a mm	20.2 - 33	25 - 44	32 - 56.2	41 - 76.2
a1 mm	25.5 - 32.5	44.8 - 54.3	54.5 - 66.6	51.5 - 69.1
a2 mm	14.5 - 21.5	18.8 - 28.3	28.5 - 40.6	32.5 - 50.1
b mm	7.5	11.2	11.5	15
c mm	7	10	10	12
d mm	40.5	67.5	81	99
e mm	47	78	102	125
f ⁶ mm	20	32	40	50
g mm	35	60	80	90
h ^{H7} mm	6	8	8	10
k	M6 - 9T	M8 - 12T	M8 - 16T	M10 - 19T
k1	5	6	7	7
m mm	2.7	3.2	3.2	4
n mm	1.8	1.8	2.3	2.3
o mm	M4	M5	M6	M6
p mm	M4	M5	M5	M5
Max. operating pressure bar	9	9	9	6
Max. total clamping force kN	8	20	24	21
Weight kg	3.65	10.5	18.9	30.4
Cylinder volume (double stroke) cm³	180	600	900	1760
Closing time s	0.25	0.5	0.6	1.1
Clamping repeatability mm	0.01	0.02	0.03	0.03

Jaws KZS-P / KZS-PG

C 21

Soft top jaws, 2-jaw set, can be hardened serration 60° - material: 16MnCr5



Item no.	Size	Jaw length mm	Jaw height mm	Jaw width mm
166138	64	25	20	34
166140	100	42	25	55
166142	160	60	40	80
166144	200	75	45	100
166146	250	90	50	125

C 21

Soft top jaws, 2-jaw set tongue and groove, high design, material: 16MnCr5



Item no.	Size	Jaw length mm	Jaw height mm	Jaw width mm
166126	64	28,5	35	34
166128	100	47	48	55
166130	160	76	77,5	80
166132	200	96	85	100
166134	250	120	100	125

Jaws KZS-P / KZS-PG

Accessories KZS-P / KZS-PG

C15

Grease F91 for vices, for lubrication and conservation of chucking power



Item no.	Design	Contents
777021 ▲	Cartridge	0,4 kg

C15

Grease gun DIN1283



Item no.	Connection	Contents of delivery
329093	M10x1	150 mm nozzle tube bent, needlepoint mouthpiece, top mouthpiece, 300 mm high pressure hose with 4 jaw hydraulics cross mouthpiece

KZS-H



APPLICATION

Optimally suited for use in 3-, 4- and 5-axis machining centers as well as on all common zero-point clamping systems

TYPE

Hydraulically actuated centering vice in standard design.
Optionally with inductive sensors. 2-jaws version.

CUSTOMER BENEFITS

- ⊕ Jaw stroke expanded by up to 20% for a larger clamping range
- ⊕ Highest clamping forces of up to 55 kN, optimal results and process reliability through precision wedge hook system
- ⊕ Optimized lubrication system for constantly high clamping forces
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- ⊕ Sturdy and low-backlash jaw guides for high repeatability

TECHNICAL FEATURES

- Jaws with cross tenon and serration

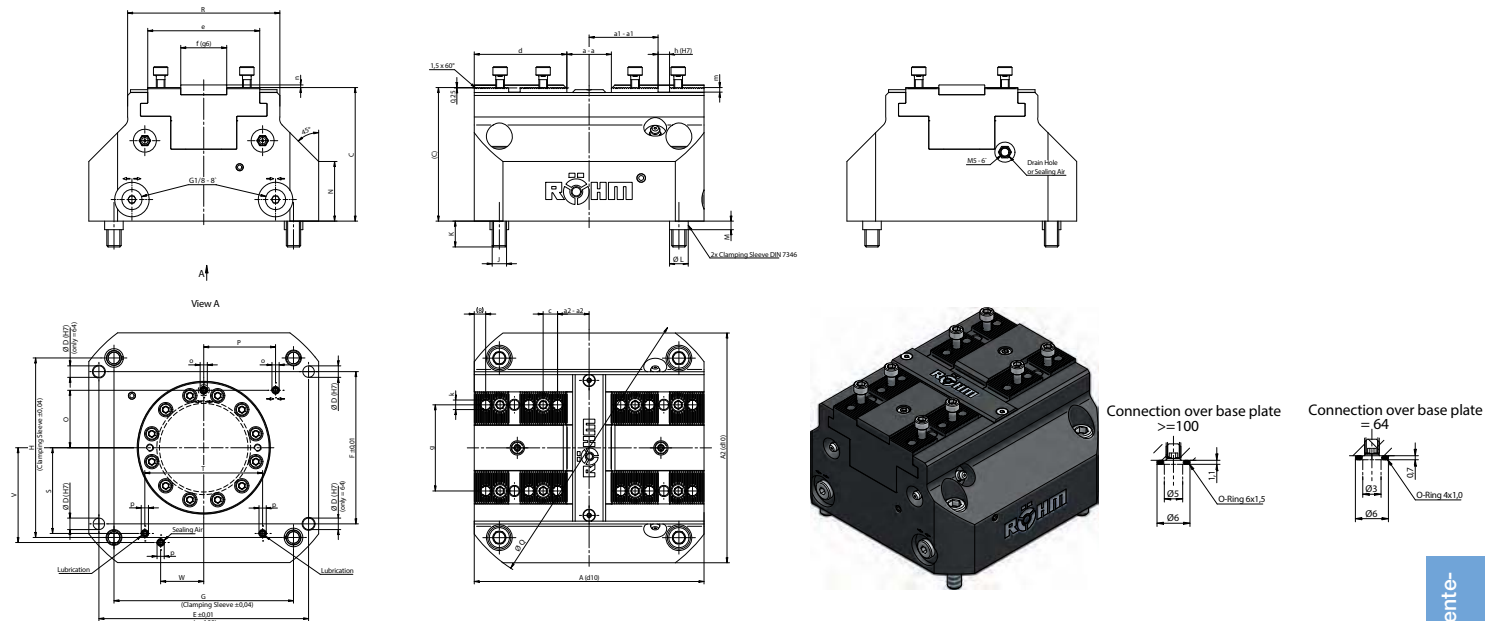
KZS-H = power-operated, centering, vice, hydraulically



The power-operated centering vices are also available with integrated stroke sensor, which serves for clamping control and ensures optimum process monitoring and thus optimal process reliability.



KZS-H



Power-operated centering vice KZS-H (standard jaw stroke), basic jaws with serration 1.5 x 60° and cross-tenon interface

Item No.	181481	181484	181488
Item no. with inductive sensors	181581 ▲	181584 ▲	181588 ▲
Size	KZS-H 64	KZS-H 100	KZS-H 160
A1 mm	64	100	160
Jaw stroke B mm	2.3	2.3	3.5
C mm	55.7	74.2	87.2
D H7 mm	4 - 7.5T	6 - 12T	8 - 14T
E±0.01 mm	36	90	146
F±0.01 mm	56	64	106
G±0.04 mm	50	80	125
H±0.04 mm	50	80	125
J mm	M6	M8	M10
K mm	12	15	18
L mm	8	11	13
M mm	4	4.5	6
N mm	31.2	39.8	36.5
O mm	17	32	40
P mm	17	29.5	50
Q mm	84	130	200
R mm	45	68	106
S mm	21.1	34.5	59.7
T mm	33.6	55	82
V mm	-27.5	44	74
W mm	0	25.5	32
a mm	12.8 - 17.4	20.4 - 25	24 - 31
a1 mm	12.9 - 15.2	25.7 - 28	44.5 - 48
a2 mm	9.9 - 12.2	14.7 - 17	18.5 - 22
b mm	4.8	5	8
c mm	5	7	10
d mm	23.3	37.5	64.5
e mm	30	47	78
f ⁹⁵ mm	14	20	32
g mm	24	35	60
h ¹⁷ mm	4	6	8
k	M4 - 7T	M6 - 9T	M8 - 12T
k1	4	5	6
m mm	2.7	2.7	3.2
n mm	1.8	1.8	1.8
o mm	M3	M4	M5
p mm	M3	M4	M5
Max. operating pressure bar	60	60	60
Max. total clamping force kN	4.5	18	45
Weight kg	1.45	4.55	13.3
Cylinder volume (double stroke) cm ³	7	30	100
Closing time s	0.4	1.1	1.6
Clamping repeatability mm	0.01	0.01	0.02

KZS-HG - large jaw stroke



APPLICATION

Optimally suited for use in 3-, 4- and 5-axis machining centers as well as on all common zero-point clamping systems

TYPE

Hydraulically actuated centering vice with large jaw stroke.
Optionally with inductive sensors. 2-jaws version.

CUSTOMER BENEFITS

- ③ Jaw stroke expanded by up to 20% for a larger clamping range
- ③ Highest clamping forces of up to 55 kN, optimal results and process reliability through precision wedge hook system
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TECHNICAL FEATURES

- Jaws with cross tenon and serration

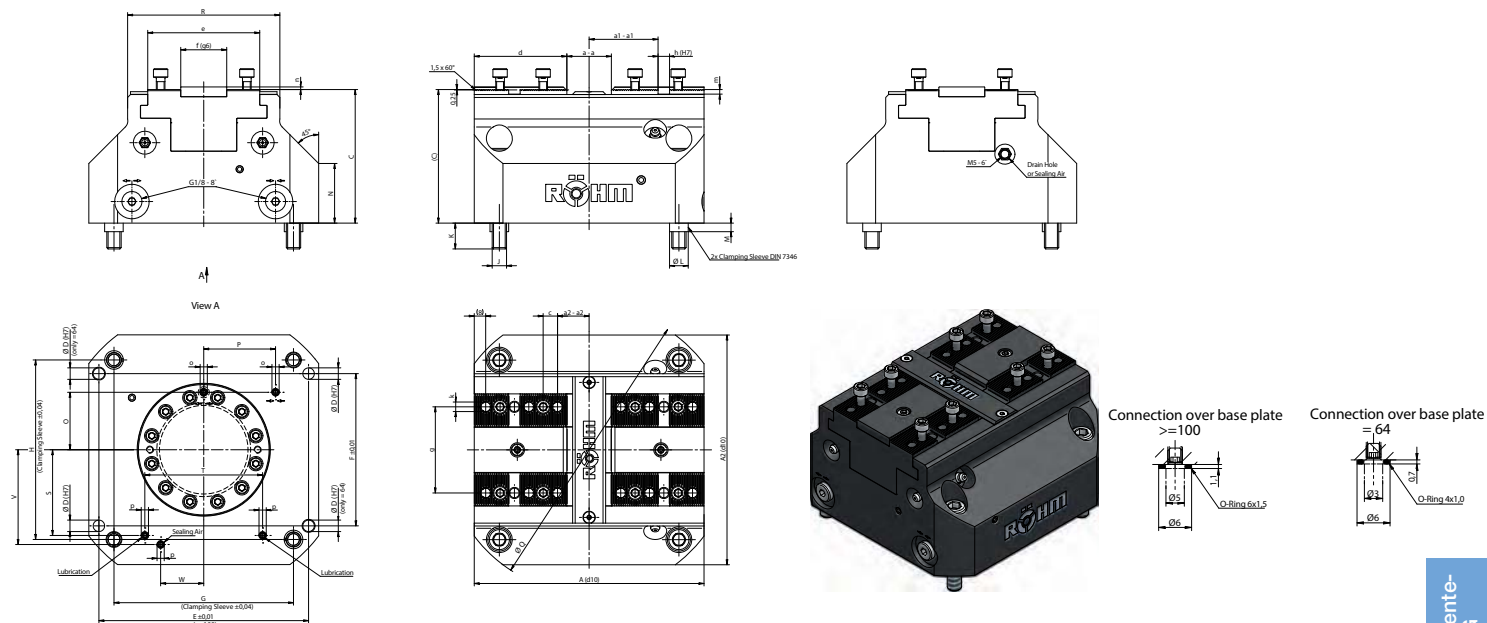
KZS-HG = power-operated, centering, vice, hydraulically, large jaw stroke



The power-operated centering vices are also available with integrated stroke sensor, which serves for clamping control and ensures optimum process monitoring and thus optimal process reliability.



KZS-HG - large jaw stroke



Power-operated centering vice **KZS-HG (large jaw stroke)**, basic jaws with **serration 1.5 x 60°** and **cross-tenon interface**

Item No.	181485	181489	181493	181497
Item no. with inductive sensors	181585 ▲	181589 ▲	181593 ▲	181597 ▲
Size	KZS-HG 100	KZS-HG 160	KZS-HG 200	KZS-HG 250
A1 mm	100	160	200	250
Jaw stroke B mm	7	9.5	12.1	17.6
C mm	74.2	87.2	95.2	103.2
D H7 mm	6 - 12T	8 - 14T	8 - 14T	10 - 20T
E±0.01 mm	90	146	184	180
F±0.01 mm	64	106	146	200
G±0.04 mm	80	125	160	180
H±0.04 mm	80	125	160	200
J mm	M8	M10	M10	M12
K mm	15	18	18	20
L mm	11	13	13	16
M mm	4.5	6	6	6
N mm	39.8	36.5	39.2	57.5 (50°)
O mm	32	40	50	80
P mm	29.5	50	65	45
Q mm	130	200	250	310
R mm	68	106	140	166
S mm	34.5	59.7	72.5	50
T mm	55	82	110	140
V mm	44	74	87.7	70
W mm	25.5	32	48	50
a mm	20.2 - 33	25 - 44	32 - 56.2	41 - 76.2
a1 mm	25.5 - 32.5	44.8 - 54.3	54.5 - 66.6	51.5 - 69.1
a2 mm	14.5 - 21.5	18.8 - 28.3	28.5 - 40.6	32.5 - 50.1
b mm	7.5	11.2	11.5	15
c mm	7	10	10	12
d mm	40.5	67.5	81	99
e mm	47	78	102	125
f ⁹⁶ mm	20	32	40	50
g mm	35	60	80	90
h ¹¹⁷ mm	6	8	8	10
k	M6 - 9T	M8 - 12T	M8 - 16T	M10 - 19T
k1	5	6	7	7
m mm	2.7	3.2	3.2	4
n mm	1.8	1.8	2.3	2.3
o mm	M4	M5	M6	M6
p mm	M4	M5	M5	M5
Max. operating pressure bar	120	120	60	60
Max. total clamping force kN	16	40	50	50
Weight kg	4.65	13.5	22.9	35.2
Cylinder volume (double stroke) cm³	30	100	300	420
Closing time s	1.1	1.6	2.1	3
Clamping repeatability mm	0.01	0.02	0.03	0.03

Jaws KZS-H / KZS-HG

C 21

Soft top jaws, 2-jaw set, can be hardened serration 60° - material: 16MnCr5



Item no.	Size	Jaw length mm	Jaw height mm	Jaw width mm
166138	64	25	20	34
166140	100	42	25	55
166142	160	60	40	80
166144	200	75	45	100
166146	250	90	50	125

C 21

Soft top jaws, 2-jaw set tongue and groove, high design, material: 16MnCr5



Item no.	Size	Jaw length mm	Jaw height mm	Jaw width mm
166126	64	28,5	35	34
166128	100	47	48	55
166130	160	76	77,5	80
166132	200	96	85	100
166134	250	120	100	125

Jaws KZS-H / KZS-HG

Accessories KZS-H / KZS-HG

C15

Grease F91 for vices, for lubrication and conservation of chucking power



Item no.	Design	Contents
777021 ▲	Cartridge	0,4 kg

C15

Grease gun DIN1283



Item no.	Connection	Contents of delivery
329093	M10x1	150 mm nozzle tube bent, needlepoint mouthpiece, top mouthpiece, 300 mm high pressure hose with 4 jaw hydraulics cross mouthpiece



APPLICATION

For stationary centric clamping of workpieces on milling machines or machining centers.

TYPE

Clamping system consisting of a 3-jaw chuck, including an integrated pneumatic cylinder.
Serration 90°.

CUSTOMER BENEFITS

- ⊕ Compact design
- ⊕ Large variety of applications is possible by using different clamping jaws
- ⊕ Centric clamping of round and angular workpieces
- ⊕ High repeatability thanks to sturdy chuck construction and constant clamping force at same pressure
- ⊕ Purge air connection possible to prevent contamination

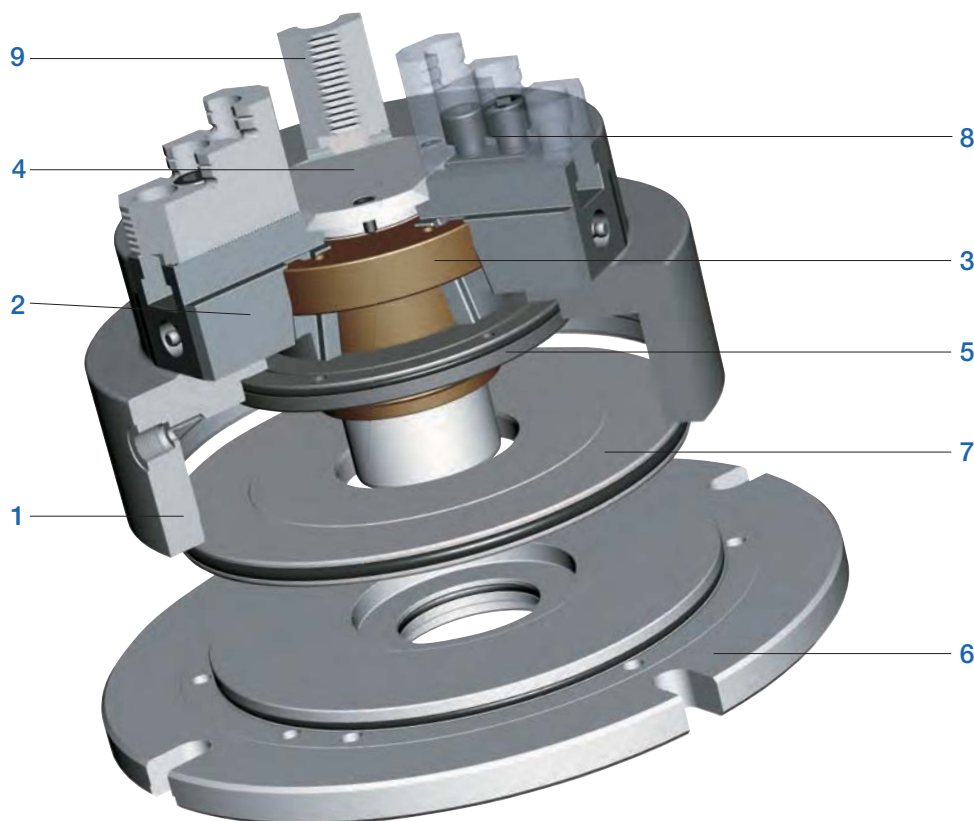
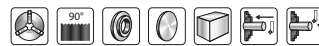
TECHNICAL FEATURES

- Wedge hook system with pneumatic actuation
- Clamping force can be regulated by changing the pressure

Note:

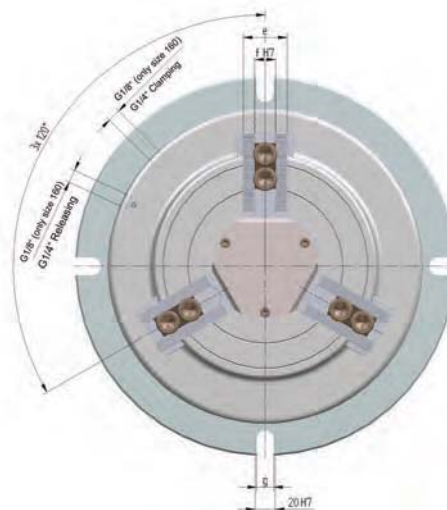
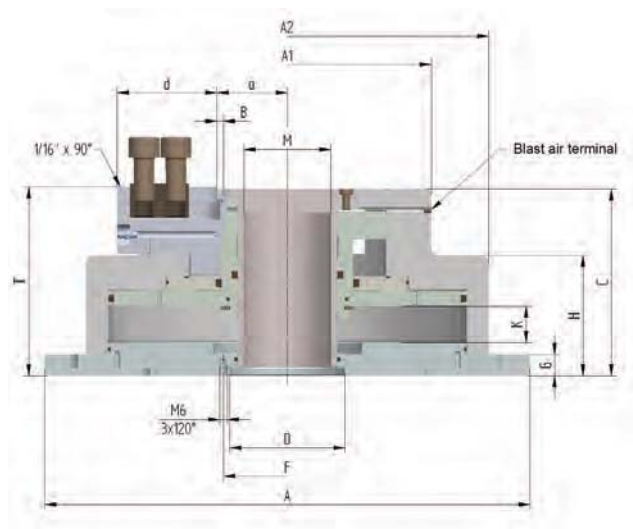
Hydraulic actuation on request

SSP = stationary, power chuck, pneumatically



Components:

1. Body
2. Base jaw
3. Piston
4. Protective bushing
5. Intermediate disc
6. Mount
7. Piston disc
8. T-nut
9. Top jaws



C 15
Stationary power chucks SSP, air operated 3-jaw chucks, without through-hole, serration 1/16" x 90°

Item no.	161505	161506 ▲	161507 ▲	161508
Size	160	200	250	315
Number of jaws	3	3	3	3
A mm	260	320	380	415
A1 mm	178	205	255	320
A2 mm	210	255	315	350
Jaw travel B mm	4,2	4,2	5	5
C mm	130,5	134	146	156,5
Mount D ^{H6}	55	70	90	110
D	M8	M12	M16	M16
F mm	65	80	100	120
G mm	15	17	17	21,5
H mm	84,5	86	94	104,5
Wedge stroke K mm	24	23,8	28,4	28,4
Possible through-hole M mm	38	52	68	90
T mm	131,5	135,5	147,5	158
U	M8	M12	M16	M16
a min.	31,8	41,2	50	61,5
a max.	36	45,4	55	66,5
c mm	15	19	25	25
d mm	54,5	62	78	99
e mm	32	36	44	44
f ^{H7} mm	12	17	21	21
g mm	13	17	17	17
Piston area cm ²	209	323	532	654
Min. operating pressure bar	2	2	2	2
Max. operating pressure bar	8	8	8	8
Max. total clamping force at working pressure - External clamping kN	36 (at 6 bar)	55 (at 6 bar)	90 (at 6 bar)	111 (at 6 bar)
Max. total clamping force at working pressure - Internal clamping kN	38 (at 6 bar)	60 (at 5 bar)	96 (at 6 bar)	118 (at 6 bar)
Weight without jaws approx. kg	25	34	54	65

Jaws SSP

C 21

Reversible top jaws, 3-jaw set, hardened serration 90° - material: 16MnCr5



Item no.	Size	Jaw length mm	Jaw height mm	Jaw width mm	Serration
046404	160	56	37,5	26	1/16"x 90°
118522	200	75	49	36	1/16"x 90°
046414	250/315	103,5	58	50	1/16"x 90°

Additionally or later applied, hardened jaws must be ground out in the chuck.

C 21

Soft top jaws, 3-jaw set, can be hardened serration 90° - material: 16MnCr5



Item no.	Size	Jaw length mm	Jaw height mm	Jaw width mm	Serration
046403	160	55	38	26,5	1/16"x 90°
133153	200	75	53	36,5	1/16"x 90°
133154	250	95	54,5	45	1/16"x 90°

C 21

Claw-type jaws, 1 piece, hardened serration 90° - width of the groove 12



Item no.	Size	Jaw length mm	Jaw height mm	Claw length mm	Serration
144320	160	66	38	52	1/16"x 90°
144321	160	56	38	34	1/16"x 90°
144322	160	66	38	25	1/16"x 90°

C 21

Claw-type jaws, 1 piece, hardened serration 90° - width of the groove 17



Item no.	Size	Jaw length mm	Jaw height mm	Claw length mm	Serration
137031	200	67	45	53	1/16"x 90°
137032	200	65	45	46	1/16"x 90°
137039	200	55	45	40	1/16"x 90°
137034	200	50	45	31	1/16"x 90°
137035	200	55	45	27	1/16"x 90°
137036	200	65	45	19	1/16"x 90°
137037	200	65	45	26	1/16"x 90°
137038	200	55	45	24	1/16"x 90°
137033	200	55	45	39	1/16"x 90°

C 21

Claw-type jaws, 1 piece, hardened serration 90° - width of the groove 21

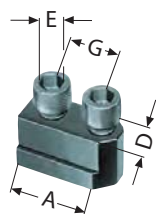


Item no.	Size	Jaw length mm	Jaw height mm	Claw length mm	Serration
137041	250/315	95	50	80	1/16"x 90°
137042	250/315	75	50	60	1/16"x 90°
137043	250/315	60	50	43	1/16"x 90°
137044	250/315	70	50	37	1/16"x 90°
137045	250/315	95	50	25	1/16"x 90°
137046	250/315	80	50	30	1/16"x 90°

Accessories SSP

C 15

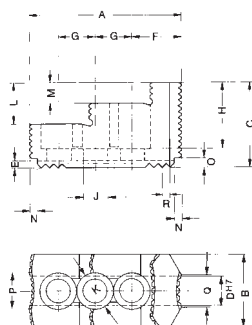
Extended T-nuts With screw



Item no.	Chuck Size	Con- tents of delivery	D mm	E	G mm
1305178▲	160	piece	12	M8x25	2x15
1305179	200	piece	17	M12x30	19
1305180▲	250/315	piece	21	M16x35	25

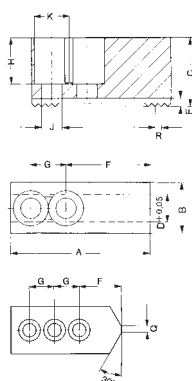
Jaw dimensions SSP

Reversible top jaws UB,
hardened, serration 90°



Chuck size	160	200	250/315
Type	538-02	538-04	538-05
Item no. 3-jaw set	046404	118522	046414
A	56	75	103,5
B	26	36	50
C	37,5	49	58
DH7	12	17	21
E	3,5	5	5
F	14	21,5	33,5
G	15	19	25
H	29	37,5	45
J	8,4	13	17
K	13,5	19	25
L	20	24	28
M	10	12	14
N	4	6	6
O	4	7,5	6,5
P	5	18	24,5
Q	5	7	22,5
R	1/16"x90°	1/16"x90°	1/16"x90°
Weight/jaw kg	0,170	0,460	1,130

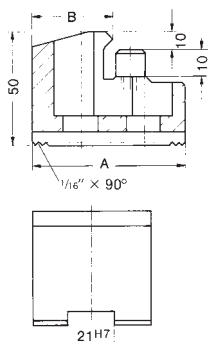
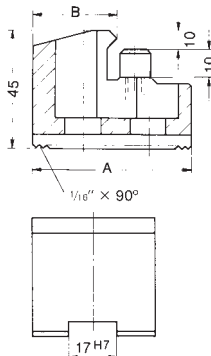
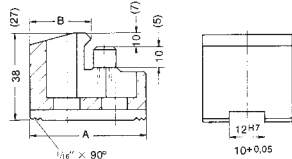
Soft top jaws AB,
Serration 90°



Chuck size	160	200	250/315
Type	538-02	538-03	538-05
Item no. 3-jaw set	046403	133152	133154
A	55	66,7	95
B	26,5	36,5	45
C	38	53	54,5
D	12	17	21
E	3,5	5	5
F	31	36	55
G	15	19	25
H	28	43	42,5
J	8,4	13	17
K	13,5	19	25
Q	-	-	-
R	1/16"x90°	1/16"x90°	1/16"x90°
Weight/jaw kg	0,330	0,700	1,400

Jaw dimensions und chucking capacities SSP

Claw type jaws KB, Serration 90°

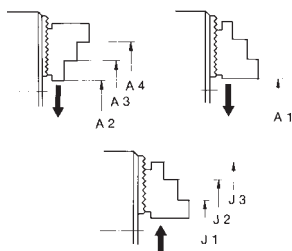


Größe	A	B	160
Item no. piece			Chuckling capacities external
144320	66	52	56-102
144321	56	34	96-152
144322	66	25	138-184
			Chuckling capacities internal
144322	66	25	70-116
144321	56	34	112-200
144320	66	52	152-198

Größe	A	B	200
Item no. piece			Chuckling capacities external
137031	67	53	66-104
137032	65	46	80-118
137039	55	40	106-144
137034	50	31	130-148
137035	55	27	126-164
			Chuckling capacities internal
137036	65	19	82-120
137037	65	26	92-130
137038	55	24	110-148
137035	55	27	132-170
137034	50	31	148-184
137039	55	40	134-190
137033	55	39	164-202
137032	65	46	178-216

Größe	A	B	250	315
Item no. piece				Chuckling capacities external
137041	95	80	54-112	78-186
137042	75	60	94-152	118-226
137043	60	43	128-186	152-260
137044	70	37	158-216	182-290
137045	95	25	238-280	262-330
				Chuckling capacities internal
137045	95	25	72-130	96-204
137046	80	30	110-168	134-242
137044	70	37	152-210	176-284
137043	60	43	182-240	206-314
137042	75	60	216-274	-

Chuckling capacities with reversible top jaws UB



Chuck size		160	200	250	315
with reversible jaws	Type	538-02	538-04	538-05	538-05
	Jaw position				
External chucking	A1	28-80	30-115	20-128	41-194
	A2	32-84	44-128	46-154	67-220
	A3	82-132	101-185	128-238	150-303
	A4	118-168	152-236	210-318	231-384
Internal chucking	J1	64-116	80-165	70-188	91-244
	J2	96-148	130-214	146-255	168-320
	J3	140-192	182-266	225-334	246-400