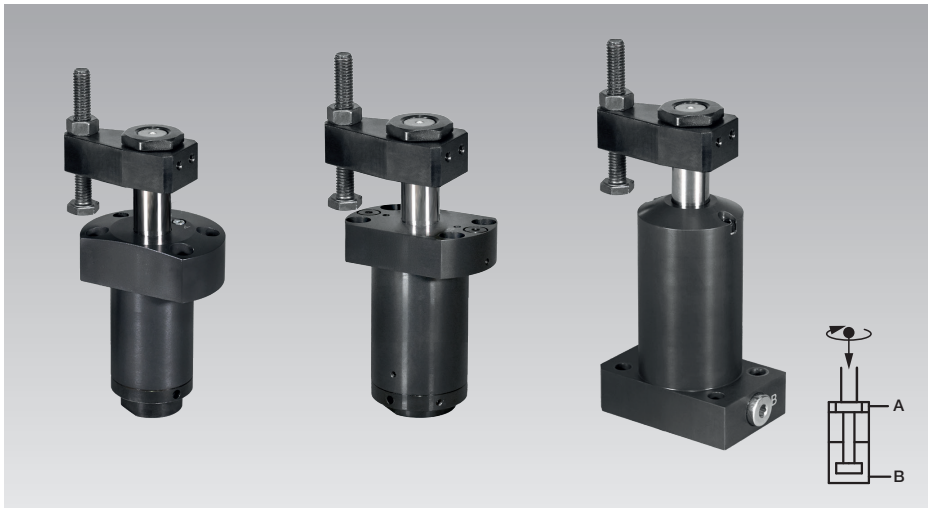
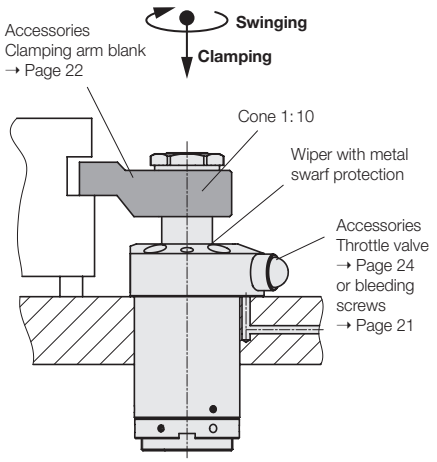
New flanged versions
and optionally with bleeding screws

Swing Clamps without Swing Stroke

Top flange/bottom flange, reinforced swing mechanism, double acting, max. operating pressure 250 bar





Advantages

- Compact design partially recessible
- Compact design
- Extremely short clamping and unclamping times
- Swinging in into narrow recesses
- Wiper with metal swarf protection

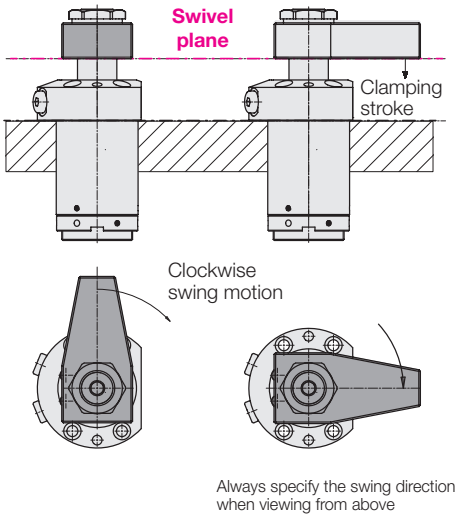
Special features

- Reinforced swing mechanism
- Connections for pipe threads and drilled channels
- Radial anti-rotation device in the clamping stroke
- Indexing of clamping arm for repeatable alignment

Function

In this version without axial swing stroke, the clamping arm swivels in one plane and does not make any axial movement when swivelled.

Swinging without axial swing stroke



Always specify the swing direction when viewing from above

Versions

- Top and bottom flange type
- 3 sizes
- Clamping arm seat with cone 1:10, pendulum eye or fork head
- 2 clamping strokes per size
- Right, left, or without swing motion
- Swing angle 0°, 15° to 75° and 90°
- Angle of clamping position selectable for pendulum eye or fork head

See code for part numbers → Page 23

Seals

NBR = nitrile butadiene rubber
FKM seals on request

Accessories

- Clamping arm blank → Page 22
- Throttle valve → Page 24

Application

Hydraulic swing clamps are used for clamping workpieces when it is essential to keep the clamping points free for unrestricted fixture loading and unloading.

Reinforced swing mechanism

The reinforced swing mechanism ensures that the angle position of the clamping arm remains the same even if a slight collision with the workpiece during loading and unloading or during clamping occurs.

Behaviour during collision

If a collision while swinging from “unclamped” to “clamped” occurs, the swing clamp in the current swing position moves axially in the “clamping” direction without continuing to swing. This must be taken into account in the risk assessment and collision analysis.
During the unclamping process, the swing clamp returns to its correct starting position.

Radial anti-rotation device in the clamping stroke

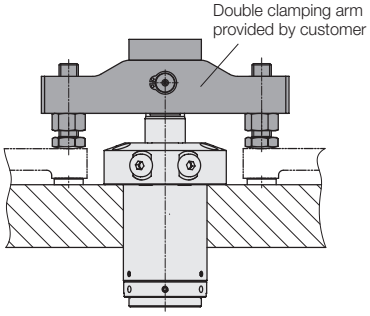
With swivelling clamping devices, workpieces can also be machined overhead.
In the event of a sudden drop in clamping pressure, the radial anti-rotation device prevents the clamping arm from swivelling back.
The workpiece is then no longer clamped. However, a sensible arrangement of several swing clamps and workpiece positioning aids can prevent the workpiece from falling out of the fixture (see also the note in the operating manual).

Note on trouble-free operation

To prevent overloads caused by excessive oil flow rates during actuation (→ page 21), flow control valves (→ page 24) or other suitable measures should be used. This applies in particular when a large number of swing clamps are actuated via one supply line.

Double clamping arm

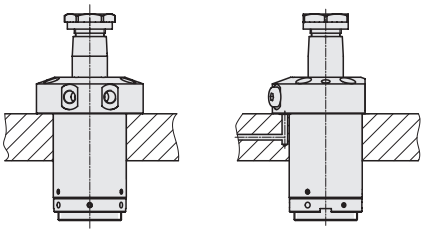
This allows space-saving clamping of workpieces in multiple clamping fixtures.
Piston rods with pendulum eyes and fork heads are available so that optimally fitting double clamping arms can be attached.
For a newly designed double clamping arm, the moment of inertia must be determined to calculate the admissible flow rate using the formula on page 21.



Operating conditions, tolerances and other data, see data sheet A 0.100

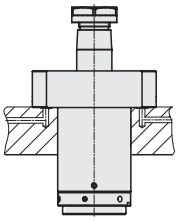
Connecting types

Top flange
Pipe thread and drilled channels
→ Page 3

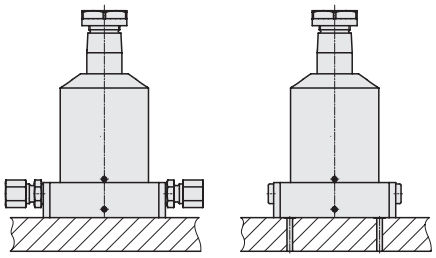


Top flange, 2x flattened

→ Page 5



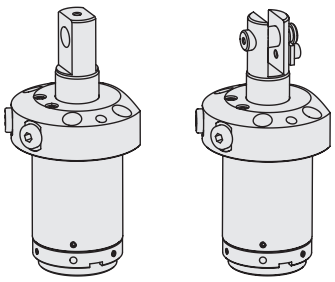
Bottom flange
Pipe thread and drilled channels
→ Page 7



Other versions: clamping arm seat

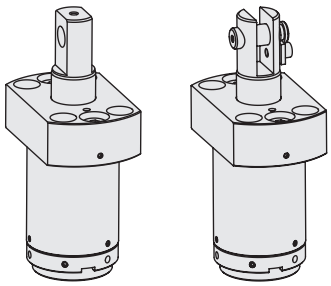
Top flange
Pendulum eye
→ Page 9

Fork head
→ Page 15



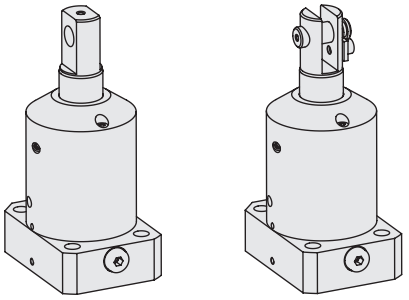
Top flange, 2x flattened
Pendulum eye
→ Page 11

Fork head
→ Page 17



Bottom flange
Pendulum eye
→ Page 13

Fork head
→ Page 19



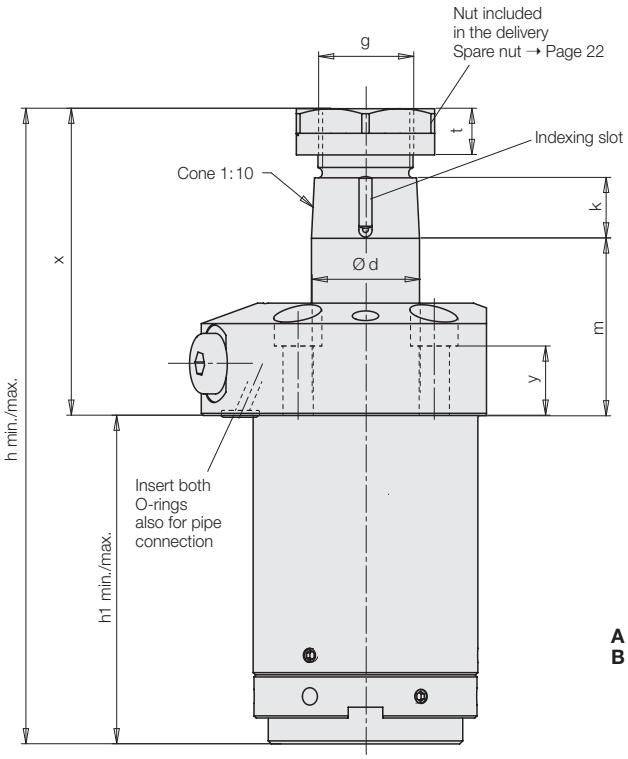
Technical characteristics

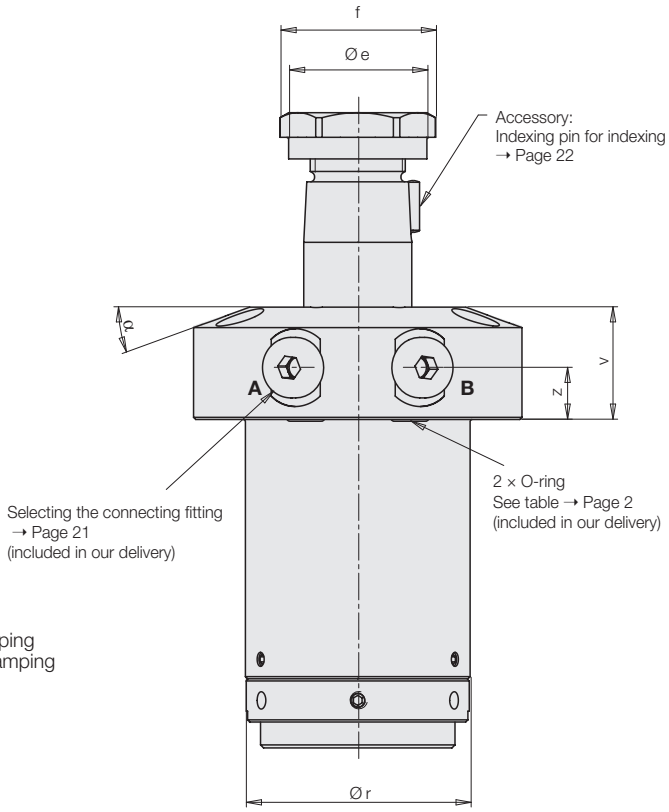
Size		**1**		**2**		**3**	
Piston/piston rod Ø	**[mm]**	**23/16**		**36/25**		**50/36**	
Clamping stroke	**[mm]**	**8**	**15**	**12**	**25**	**12**	**25**
Pulling force at 250 bar	**[kN]**	**5.3**		**13.1**		**23.6**	
Min. operating pressure	[bar]	20		20		20	
Piston ring area	[cm^2]	2.14		5.27		9.46	
Oil volume / clamping stroke mm	[cm^3]	0.21		0.53		0.95	
Oil volume / return stroke mm	[cm^3]	0.42		1.02		1.96	
Oil volume swinging 90°	[cm^3]	3.14		10.69		24.34	
Oil volume swinging 75°	[cm^3]	2.08		7.03		17.29	
Oil volume swinging 0°	[cm^3]	0.00		0.00		0.00	
Oil volume swing reduction between 75° and 15° in 5° increments	[cm^3]	0.12		0.38		1.01	
Spare O-ring	[mm]	6 × 1.5		6 × 1.5		8 × 1.5	
Part no. NBR		**3000313**		**3000313**		**3000343**	

Max. operating pressure depending on the clamping arm length e → Page 21

Operating conditions, tolerances and other data, see data sheet A 0.100

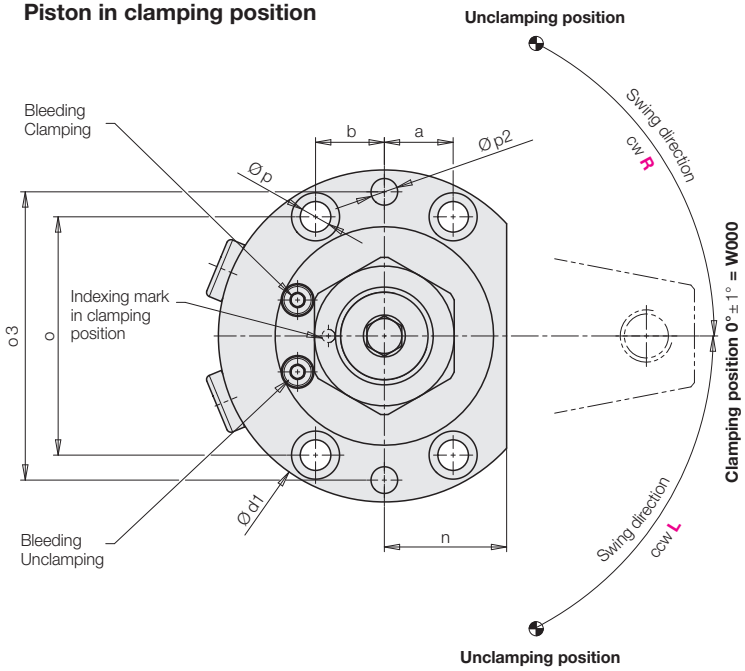
Unclamping position



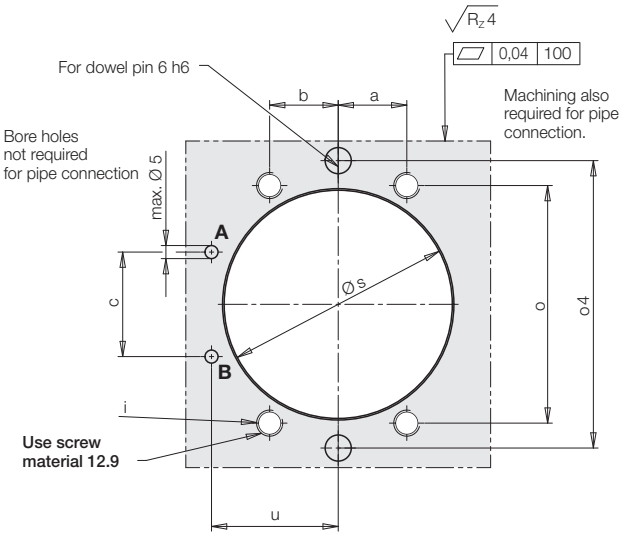


A = Clamping
B = Unclamping

Piston in clamping position



Connecting scheme



Clamping position

Angle of clamping position **W** = 0° (**W000**)
No other clamping position can be selected for the cone version.
The indexing mark is always opposite at 180°.

Swing angle

A swing angle of 0°, 15° to 75° in 5° increments, and 90° can be selected.
Tolerance of swing angle ±3° in unclamping position

Code for part numbers and examples → Page 23

Operating conditions, tolerances and other data, see data sheet A 0.100

Clamping Arm Seat with Cone 1:10 • Top Flange
Dimensions and Technical Data

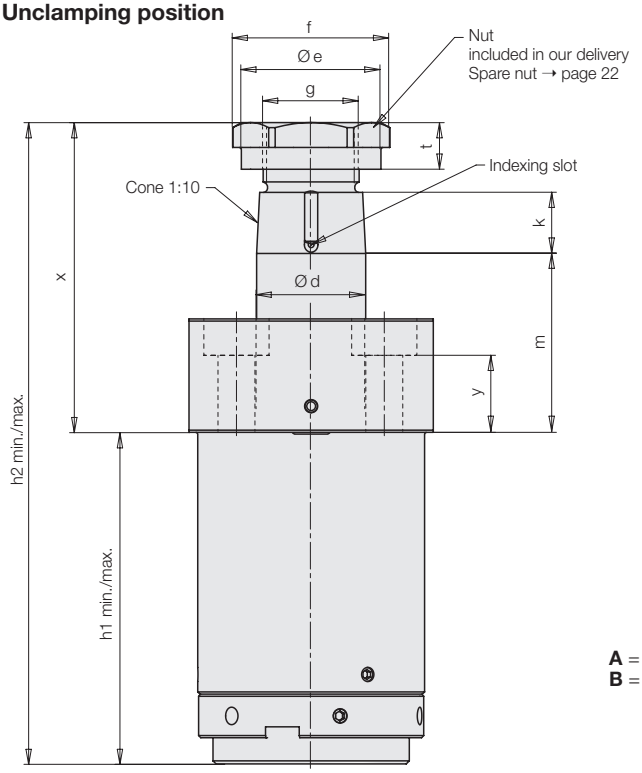
Size		1		2		3	
Piston/piston rod Ø	**[mm]**	**23/16**		**36/25**		**50/36**	
Clamping stroke	[mm]	8	15	12	25	12	25
Pulling force at 250 bar	[kN]	5.3		13.1		23.6	
Min. operating pressure	[bar]	20		20		20	
Piston ring area	[cm²]	2.14		5.27		9.46	
Oil volume / clamping stroke mm	[cm³/mm]	0.21		0.53		0.95	
Oil volume / return stroke mm	[cm³/mm]	0.42		1.02		1.96	
Oil volume swinging at 90°	[cm³]	3.14		10.69		24.34	
Oil volume swinging at 75°	[cm³]	2.08		7.03		17.29	
Oil volume swinging 0°	[cm³]	0		0		0	
Oil volume swing reduction below 75° to 15° in 5° increments	[cm³]	0.12		0.38		1.01	
Max. flow rate	[l/min]	Diagrams see page 21					
Min. swing times	[s]	Diagrams see page 21					
a	[mm]	11.75		15.75		22.5	
b	[mm]	11.75		15.75		22.5	
c	[mm]	18		24		34.5	
Ø d	[mm]	16		25		36	
Ød1	[mm]	62		76		110	
Øe	[mm]	19		32		46	
f	[mm]	27		36		53.1	
g	[mm]	M14 × 1.5		M22 × 1.5		M30 × 1.5	
h min.	[mm]	115.5	136.5	146	185	187	226
h max.	[mm]	116	137	147	186	188	227
h1 min.	[mm]	60.5	74.5	75	101	104	130
h1 max.	[mm]	61	75	76	102	105	131
i	[mm]	M5		M6		M10	
k	[mm]	13.5		14		20	
m +0.7 −0.3	[mm]	32.5	39.5	41	54	45	58
n	[mm]	19		28		38	
o	[mm]	40.7		54.56		77.94	
o3 ± 0.05	[mm]	54		66		96	
o4 ±0.03	[mm]	54		66		96	
Øp	[mm]	5.8		7		12	
Øp2 M8	[mm]	6.1 × 8 deep		6.1 × 8 deep		6.1 × 8 deep	
Ør	[mm]	36		52		72	
Øs ±0.2	[mm]	36.4		52.4		72.4	
t	[mm]	7.5		10.7		12	
u	[mm]	21.7		29.1		41.5	
v	[mm]	22		26		28	
x	[mm]	55	62	71	84	83	96
y	[mm]	13		16		11	
z	[mm]	10		12		11	
Weight, approx.	[kg]	0.8	0.9	1.9	2.3	4.6	5.4
Flange bevel α	[°]	10		20		15	
SW	[mm]	24		32		46	

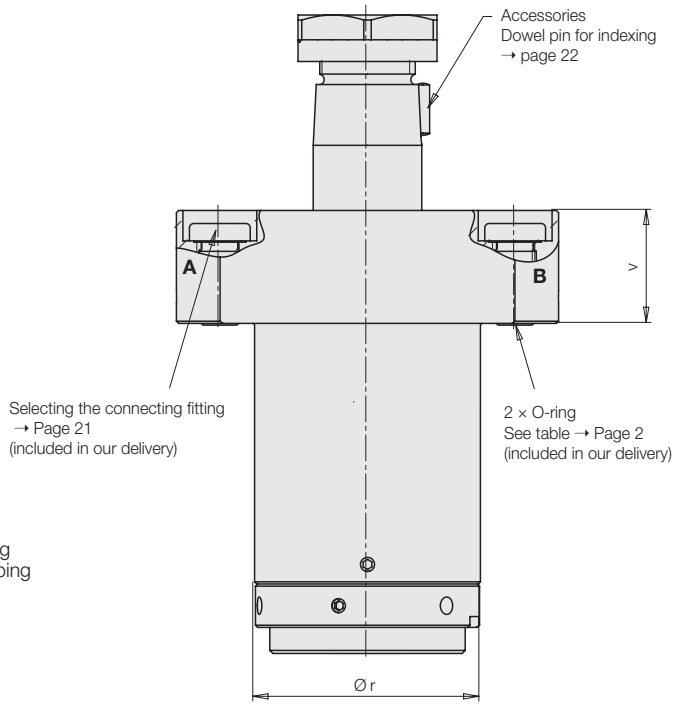
Effective clamping force and admissible clamping arm length e → Page 21

Operating conditions, tolerances and other data, see data sheet A 0.100

Clamping Arm Seat with Cone 1:10
Top Flange – flattened on both Sides

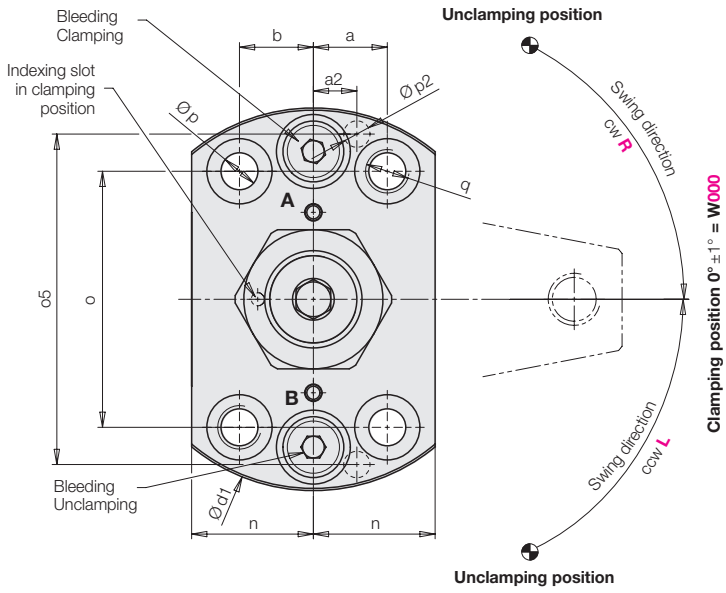
Unclamping position



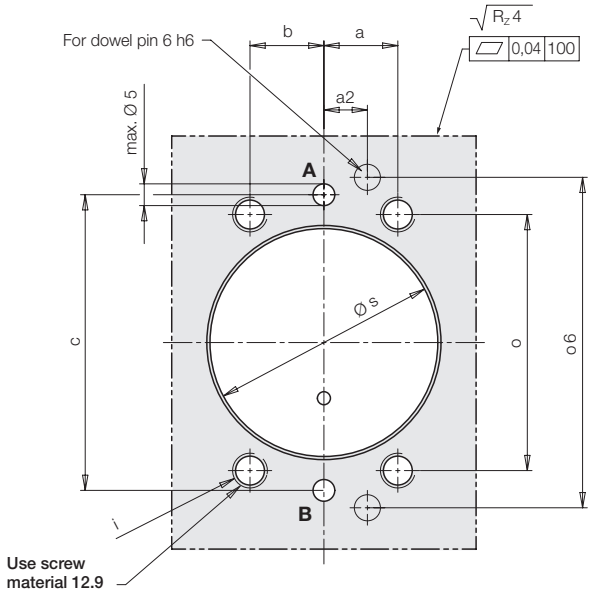


A = Clamping
B = Unclamping

Piston in clamping position



Connecting scheme



Clamping position

Angle of clamping position **W** = 0° (**W000**)
No other clamping position can be selected for the cone version.
The indexing mark is always opposite at 180°.

Swing angle

A swing angle of 0°, 15° to 75° in 5° increments, and 90° can be selected.
Tolerance of swing angle ±3° in unclamping position

Code for part numbers and examples → Page 23

Operating conditions, tolerances and other data, see data sheet A 0.100

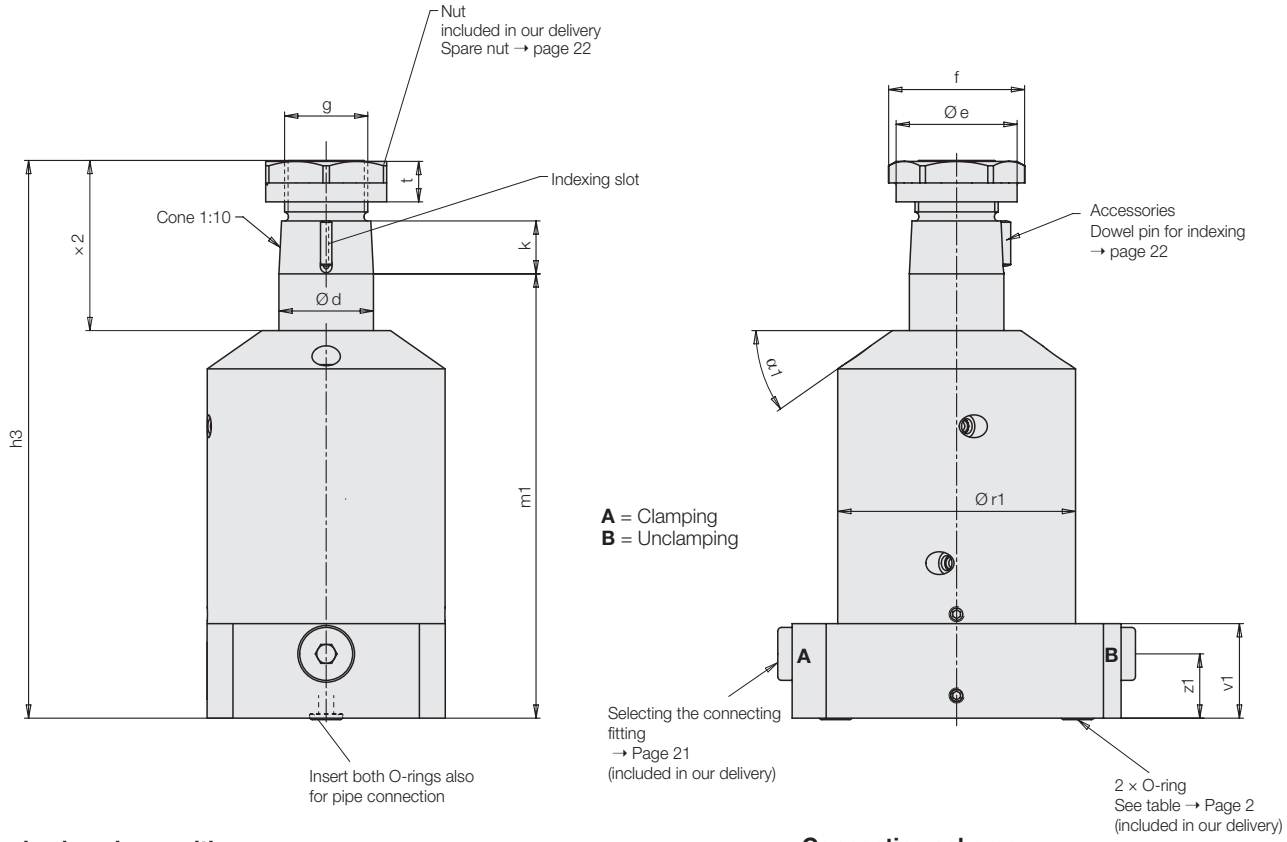
Clamping Arm Seat with Cone 1:10 • Top Flange – flattened on both Sides
Dimensions and Technical Data

Size		1		2		3	
Piston/piston rod Ø	**[mm]**	**23/16**		**36/25**		**50/36**	
Clamping stroke	[mm]	8	15	12	25	12	25
Pulling force at 250 bar	[kN]	5.3		13.1		23.6	
Min. operating pressure	[bar]	20		20		20	
Piston ring area	[cm²]	2.14		5.27		9.46	
Oil volume / clamping stroke mm	[cm³/mm]	0.21		0.53		0.95	
Oil volume / return stroke mm	[cm³/mm]	0.42		1.02		1.96	
Oil volume swinging at 90°	[cm³]	3.14		10.69		24.34	
Oil volume swinging at 75°	[cm³]	2.08		7.03		17.29	
Oil volume swinging 0°	[cm³]	0		0		0	
Oil volume swing reduction below 75° to 15° in 5° increments	[cm³]	0.12		0.38		1.01	
Max. flow rate	[l/min]	Diagrams see page 21					
Min. swing times	[s]	Diagrams see page 21					
Weight, approx.	[kg]	0.8	0.9	2.0	2.3	4.6	5.3
a	[mm]	14.3		17		22.5	
a2 ±0.05	[mm]	9		10		12	
b	[mm]	14.3		17		22.5	
c	[mm]	47		68		90	
Ø d	[mm]	16		25		36	
Ø d1	[mm]	70		88		110	
Ø e	[mm]	19		32		46	
f	[mm]	27		36		53.1	
g	[mm]	M14 × 1.5		M22 × 1.5		M30 × 1.5	
h1 min.	[mm]	58.5	72.5	75	101	104	130
h1 max.	[mm]	59	73	76	102	105	131
h min.	[mm]	115.5	136.5	146	185	187	226
h max.	[mm]	116	137	147	186	188	227
i	[mm]	M5	M5	M8	M8	M10	M10
k	[mm]	13.5		14		20	
m +0.7 –0.3	[mm]	34.5	41.5	41	54	45	58
n	[mm]	20		28		38	
o	[mm]	45.8		58.9		77.9	
o5 ±0.05	[mm]	58		76		96	
o6 ±0.03	[mm]	58		76		96	
Ø p	[mm]	5.8		8.5		10.5	
Ø p2 M8	[mm]	6.1 × 8 deep		6.1 × 8 deep		6.1 × 8 deep	
q	(mm)	M6		M10		M12	
Ø r	[mm]	36		52		72	
Ø s ±0.2	[mm]	36.4		52.4		72.4	
t	[mm]	7.5		10.7		12	
v	[mm]	24		26		28	
x	[mm]	57	64	71	84	83	96
y	[mm]	15		17.5		11	

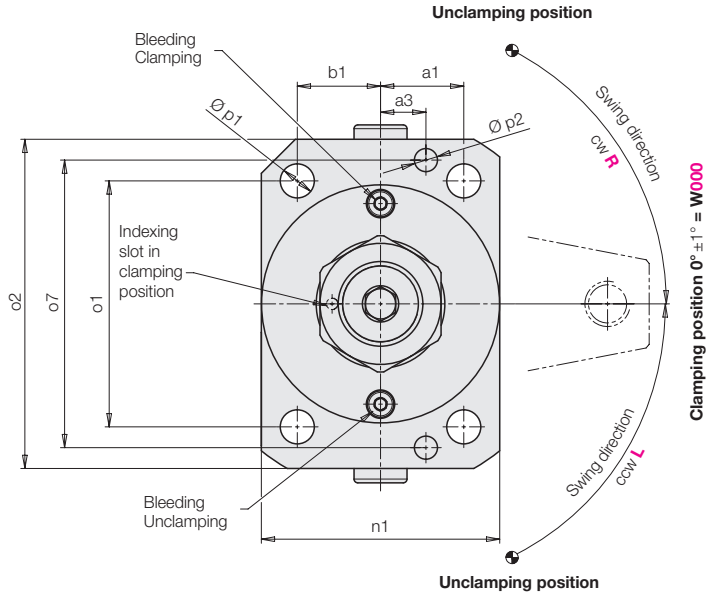
Effective clamping force and admissible clamping arm length e → Page 21

Operating conditions, tolerances and other data, see data sheet A 0.100

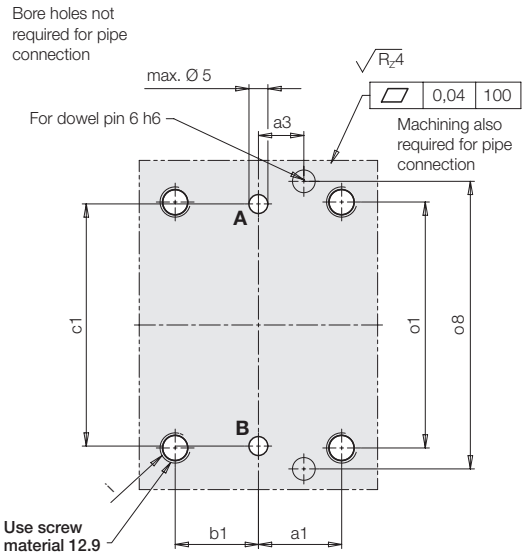
Unclamping position



Piston in clamping position



Connecting scheme



Clamping position

Angle of clamping position **W** = 0° (**W000**)
No other clamping position can be selected for the cone version.
The indexing mark is always opposite at 180°.

Swing angle

A swing angle of 0°, 15° to 75° in 5° increments, and 90° can be selected.
Tolerance of swing angle ±3° in unclamping position

Code for part numbers and examples → Page 23

Operating conditions, tolerances and other data, see data sheet A 0.100

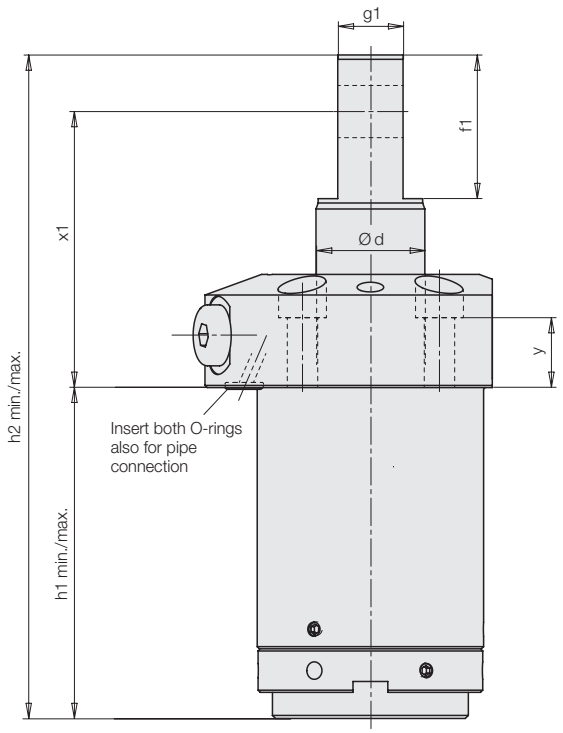
Clamping Arm Seat with Cone 1:10 • Bottom Flange
Dimensions and Technical Data

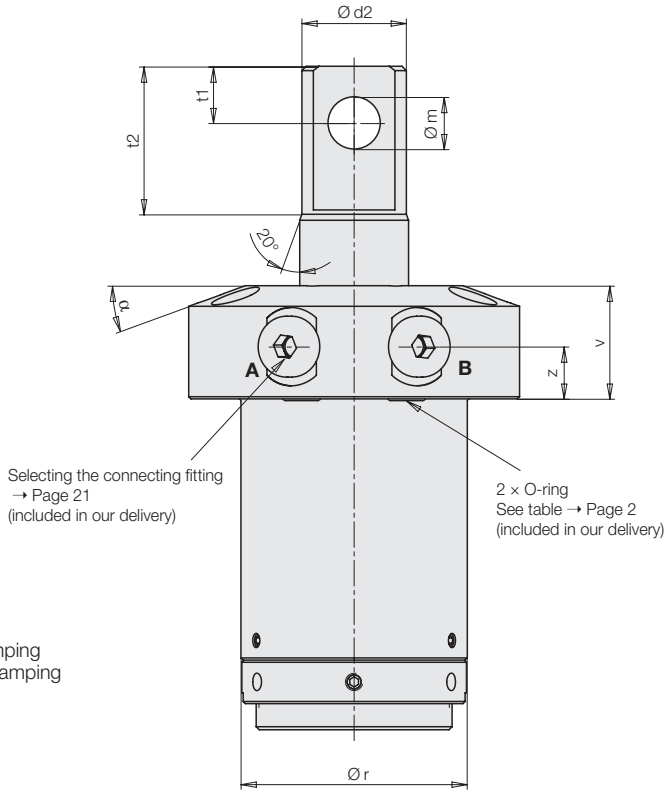
Size		1		2		3	
Piston/piston rod Ø	[mm]	**23/16**		**36/25**		**50/36**	
Clamping stroke	[mm]	8	15	12	25	12	25
Pulling force at 250 bar	[kN]	5.3		13.1		23.6	
Min. operating pressure	[bar]	20		20		20	
Piston ring area	[cm^2]	2.14		5.27		9.46	
Oil volume / clamping stroke mm	[cm^3/mm]	0.21		0.53		0.95	
Oil volume / return stroke mm	[cm^3/mm]	0.42		1.02		1.96	
Oil volume swinging at 90°	[cm^3]	3.14		10.69		24.34	
Oil volume swinging at 75°	[cm^3]	2.08		7.03		17.29	
Oil volume swinging 0°	[cm^3]	0		0		0	
Oil volume swing reduction below 75° to 15° in 5° increments	[cm^3]	0.12		0.38		1.01	
Max. flow rate	[l/min]			Diagrams see page 21			
Min. swing times	[s]			Diagrams see page 21			
a1	[mm]	15		22		30	
a3 ±0.05	[mm]	10		12		15	
b1	[mm]	15		22		30	
c1	[mm]	48		64		86	
Ø d	[mm]	16		25		36	
Ø e	[mm]	19		32		46	
f	[mm]	27		36		53.1	
g	[mm]	M14 × 1.5		M22 × 1.5		M30 × 1.5	
h3	[mm]	117.1	138.1	147.5	186.5	188.7	227.7
i	[mm]	M6		M8		M12	
k	[mm]	13.5		14		20	
m1 +0.4 −0.1	[mm]	94.6	115.6	117.5	156.5	150.7	189.7
n1	[mm]	45		63		80	
o1	[mm]	50		65		86	
o2	[mm]	70		87		108	
o7 ±0.05	[mm]	61.4		76		96	
o8 ±0.03	[mm]	61.4		76		96	
Ø p1	[mm]	7		9		13	
Ø p2 M8	[mm]	6.1 × 8 deep		6.1 × 8 deep		6.1 × 8 deep	
Ø r1 −0.2	[mm]	44.9		62.9		79.8	
t	[mm]	7.5		10.7		12	
v1	[mm]	20		25		27.5	
x2	[mm]	33	40	45	58	55	68
z1	[mm]	11		17		17.5	
Weight, approx.	[kg]	1.18	1.35	2.7	3.27	5.65	6.55
Flange bevel α1	[°]	25		35		25	

Effective clamping force and admissible clamping arm length e → Page 21

Operating conditions, tolerances and other data, see data sheet A 0.100

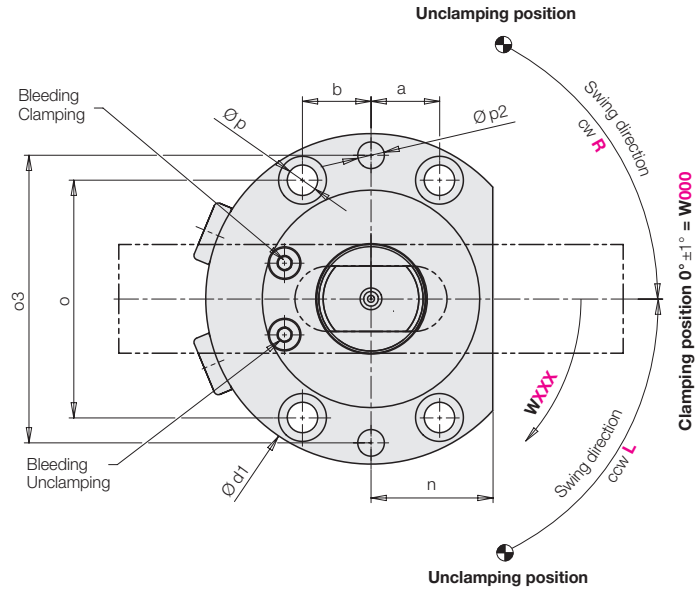
Unclamping position



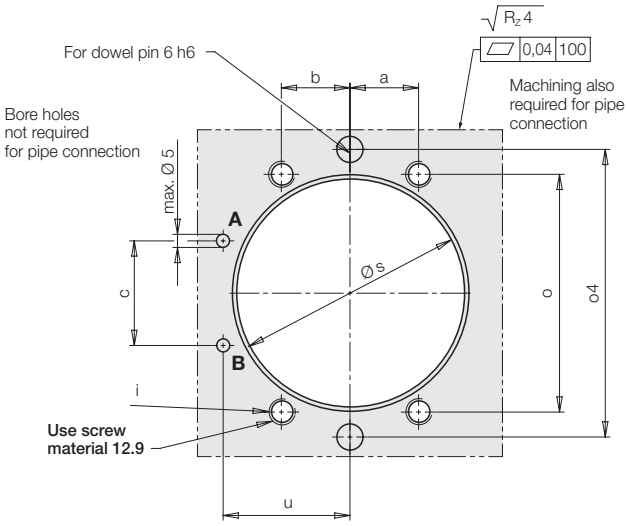


A = Clamping
B = Unclamping

Piston in clamping position



Connecting scheme



Clamping position

The angle of clamping position W can be selected between 0° and 175° in 5° increments (**W000 … W175**).

Swing angle

A swing angle of 0°, 15° to 75° in 5° increments, and 90° can be selected.
Tolerance of swing angle ±3° in unclamping position

Code for part numbers and examples → Page 23

Operating conditions, tolerances and other data, see data sheet A 0.100

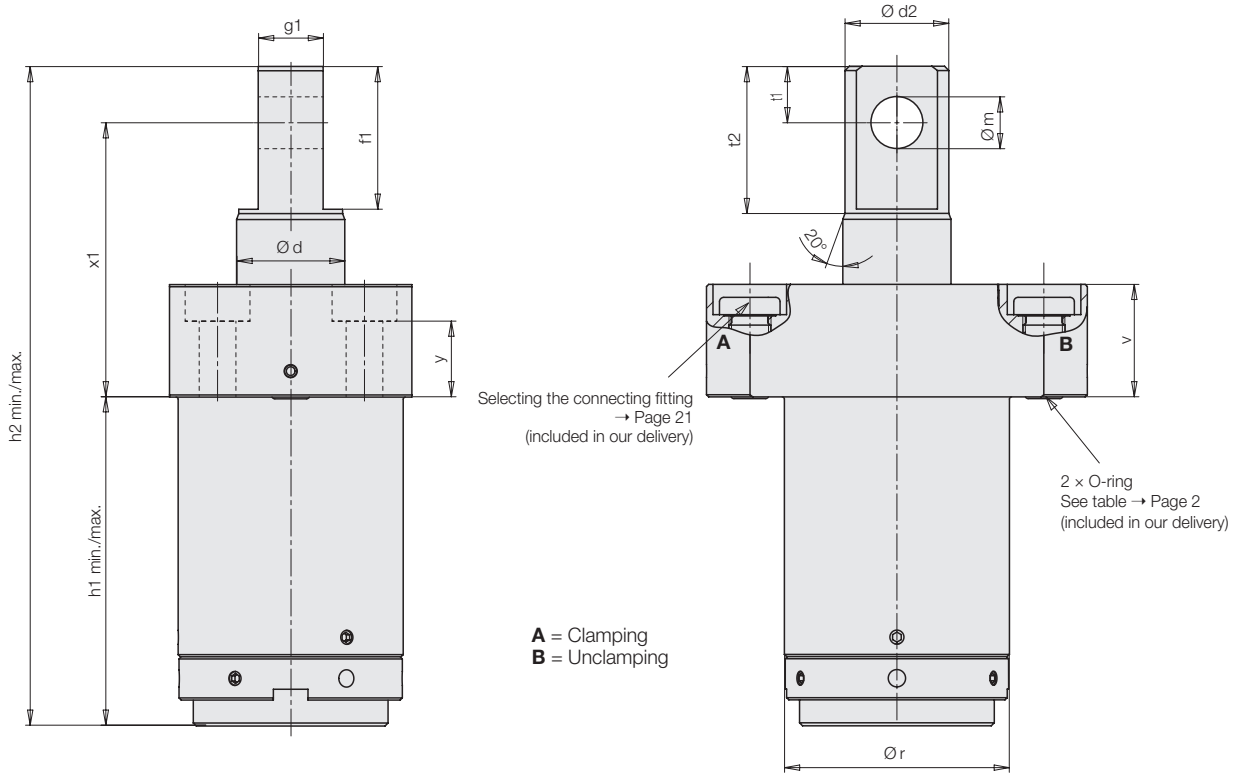
Clamping Arm Seat with Pendulum Eye • Top Flange
Dimensions and Technical Data

Size		1		2		3	
Piston/piston rod Ø	**[mm]**	**23/16**		**36/25**		**50/36**	
Clamping stroke	[mm]	8	15	12	25	12	25
Pulling force at 250 bar	[kN]	5.3		13.1		23.6	
Min. operating pressure	[bar]	20	20	20	20	20	20
Piston ring area	[cm^2]	2.14		5.27		9.46	
Oil volume / clamping stroke mm	[cm^3/mm]	0.21		0.53		0.95	
Oil volume / return stroke mm	[cm^3/mm]	0.42		1.02		1.96	
Oil volume swinging at 90°	[cm^3]	3.14		10.69		24.34	
Oil volume swinging at 75°	[cm^3]	2.08		7.03		17.29	
Oil volume swinging 0°	[cm^3]	0		0		0	
Oil volume swing reduction below 75° to 15° in 5° increments	[cm^3]	0.12		0.38		1.01	
Max. flow rate	[l/min]			Diagrams see page 21			
Min. swing times	[s]			Diagrams see page 21			
a	[mm]	11.75		15.75		22.5	
b	[mm]	11.75		15.75		22.5	
c	[mm]	18		24		34.5	
Ø d	[mm]	16		25		36	
Ø d1	[mm]	62		76		110	
Ø d2	[mm]	15.5		24		34	
f1	[mm]	23		33		50	
g1 f7	[mm]	10		15		25	
h1 min.	[mm]	60.5	74.5	75	101	104	130
h1 max.	[mm]	61	75	76	102	105	131
h2 min.	[mm]	117.5	138.5	151.4	190.4	202	241
h2 max.	[mm]	118	139	152.4	191.4	203	242
i	[mm]	M5		M6		M10	
Ø m H7/g6		8		12		16	
n	[mm]	19		28		38	
o	[mm]	40.7		54.56		77.94	
o3 ±0.05	[mm]	54		66		96	
o4 ±0.03	[mm]	54		66		96	
Ø p	[mm]	5.8		7		12	
Ø p2 M8	[mm]	6.1 × 8 deep		6.1 × 8 deep		6.1 × 8 deep	
Ø r	[mm]	36		52		72	
Ø s ±0.2	[mm]	36.4		52.4		72.4	
t1	[mm]	10		13		20	
t2	[mm]	24		34		50.5	
u	[mm]	21.7		29.1		41.5	
v	[mm]	22		26		28	
x1 +0.7 −0.6	[mm]	47	54	63.4	76.4	78	91
y	[mm]	13		16		11	
z	[mm]	10		12		11	
Weight, approx.	[kg]	0.8	0.9	1.9	2.3	4.6	5.4
Flange bevel α	[°]	10		20		15	

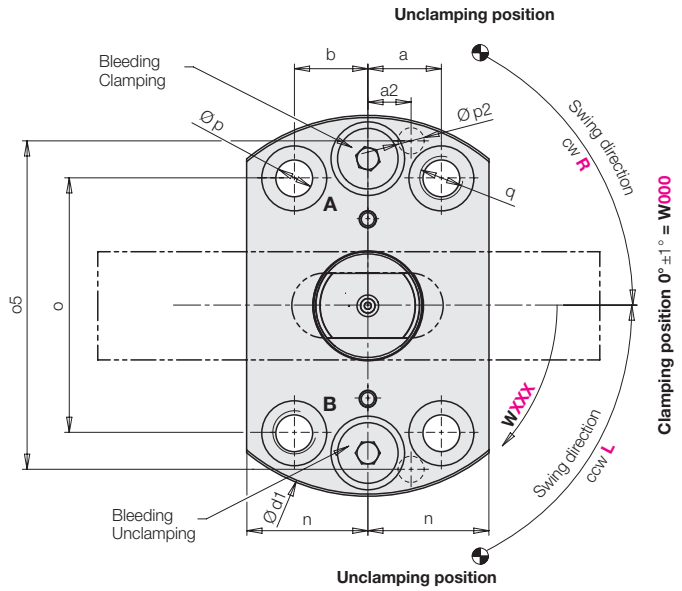
Effective clamping force and admissible clamping arm length e → Page 21

Operating conditions, tolerances and other data, see data sheet A 0.100

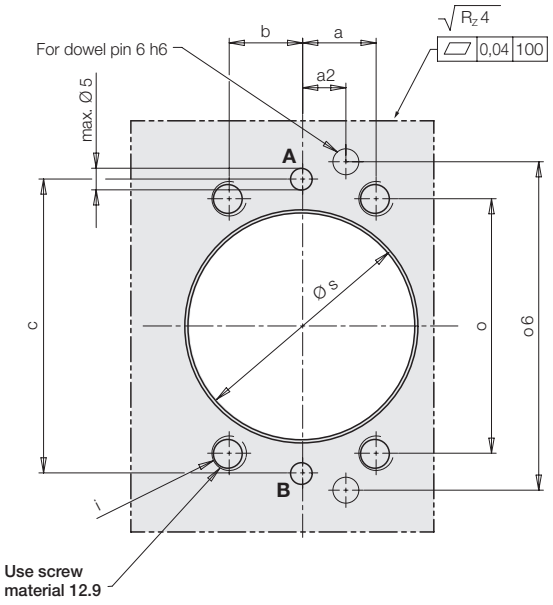
Unclamping position



Piston in clamping position



Connecting scheme



Clamping position

The angle of clamping position W can be selected between 0° and 175° in 5° increments (**W000 … W175**).

Swing angle

A swing angle of 0°, 15° to 75° in 5° increments, and 90° can be selected.
Tolerance of swing angle ±3° in unclamping position

Code for part numbers and examples → Page 23

Operating conditions, tolerances and other data, see data sheet A 0.100

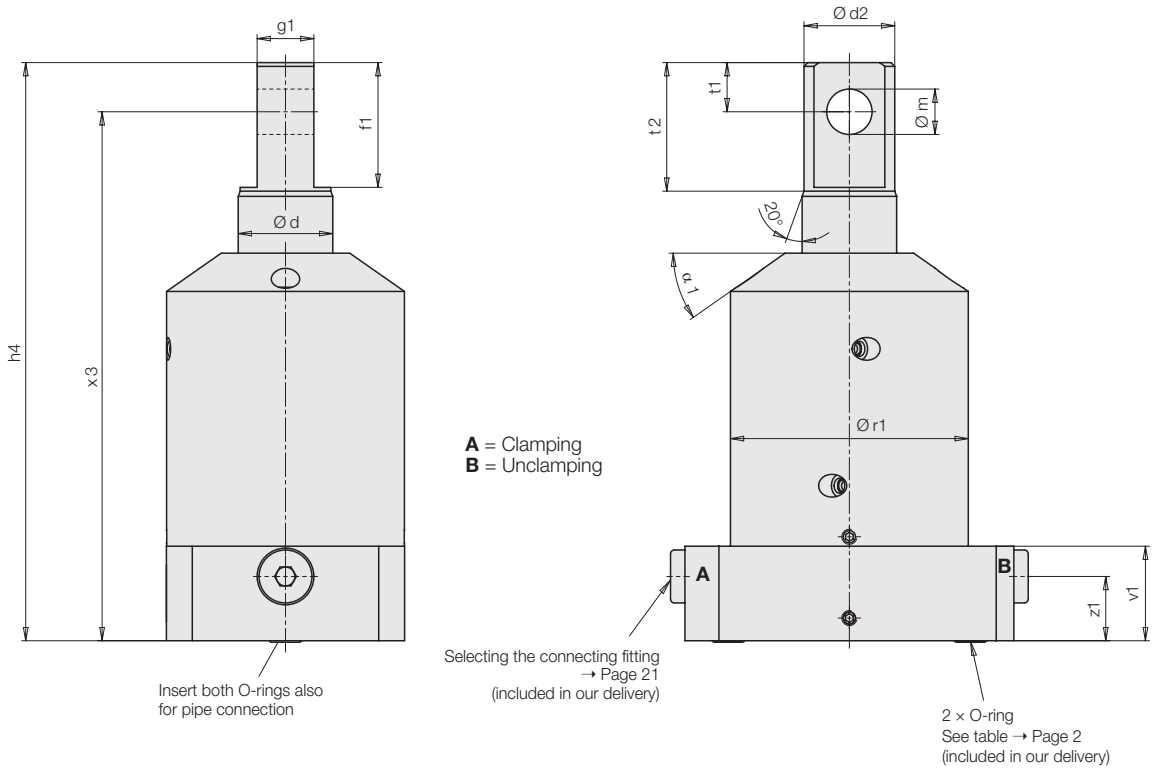
Clamping Arm Seat with Pendulum Eye • Top Flange – 2x flattened
Dimensions and Technical Data

Size		1		2		3	
Piston/piston rod Ø	**[mm]**	**23/16**		**36/25**		**50/36**	
Clamping stroke	[mm]	8	15	12	25	12	25
Pulling force at 250 bar	[kN]	5.3		13.1		23.6	
Min. operating pressure	[bar]	20	20	20	20	20	20
Piston ring area	[cm^2]	2.14		5.27		9.46	
Oil volume / clamping stroke mm	[cm^3/mm]	0.21		0.53		0.95	
Oil volume / return stroke mm	[cm^3/mm]	0.42		1.02		1.96	
Oil volume swinging at 90°	[cm^3]	3.14		10.69		24.34	
Oil volume swinging at 75°	[cm^3]	2.08		7.03		17.29	
Oil volume swinging 0°	[cm^3]	0		0		0	
Oil volume swing reduction below 75° to 15° in 5° increments	[cm^3]	0.12		0.38		1.01	
Max. flow rate	[l/min]			Diagrams see page 21			
Min. swing times	[s]			Diagrams see page 21			
a	[mm]	14.3		17		22.5	
a2 ±0.05	[mm]	9		10		12	
b	[mm]	14.3		17		22.5	
c	[mm]	47		68		90	
Ø d	[mm]	16		25		36	
Ø d1	[mm]	70		88		110	
Ø d2	[mm]	15.5		24		34	
f1	[mm]	23		33		50	
g1 f7		10		15		25	
h1 min.	[mm]	58.5	72.5	75	101	104	130
h1 max.	[mm]	59	73	76	102	105	131
h2 min.	[mm]	117.5	138.5	151.4	190.4	202	241
h2 max.	[mm]	118	139	152.4	191.4	203	242
i	[mm]	M5	M5	M8	M8	M10	M10
Ø m H7/g6		8		12		16	
n	[mm]	20		28		38	
o	[mm]	45.8		58.9		77.9	
o5 ±0.05	[mm]	58		76		96	
o6 ±0.03	[mm]	58		76		96	
Ø p	[mm]	5.8		8.5		10.5	
Ø p2 M8	[mm]	6.1 × 8 deep		6.1 × 8 deep		6.1 × 8 deep	
q		M6		M10		M12	
Ø r	[mm]	36		52		72	
Ø s ±0.2	[mm]	36.4		52.4		72.4	
t1	[mm]	10		13		20	
t2	[mm]	24		34		50.5	
v	[mm]	24		26		28	
x1 +0.7 –0.6	[mm]	49	56	63.4	76.4	78	91
y	[mm]	15		17.5		11	
Weight, approx.	[kg]	0.8	0.9	1.9	2.3	4.5	5.2

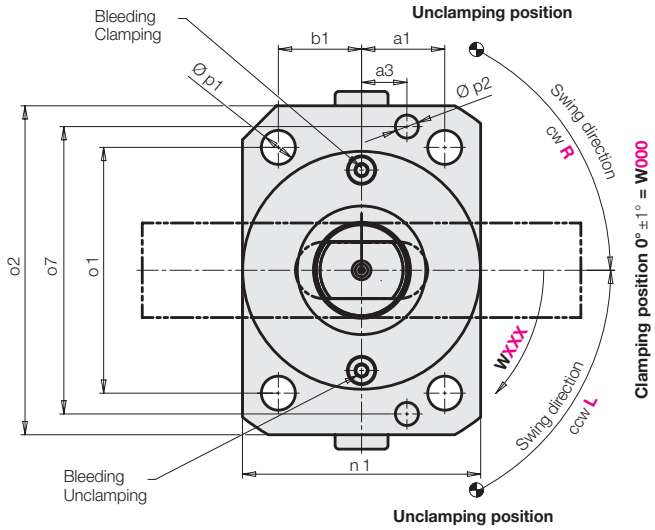
Effective clamping force F as a function of the operating pressure p → Page 21

Operating conditions, tolerances and other data, see data sheet A 0.100

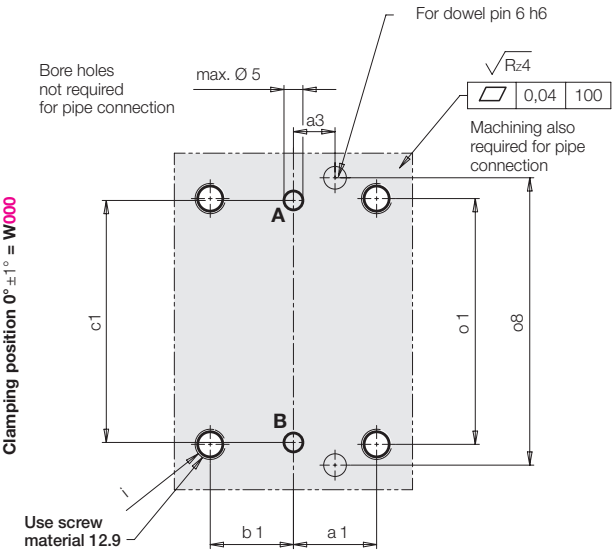
Unclamping position



Piston in clamping position



Connecting scheme



Clamping position

The angle of clamping position W can be selected between 0° and 175° in 5° increments (**W000 … W175**).

Swing angle

A swing angle of 0°, 15° to 75° in 5° increments, and 90° can be selected.
Tolerance of swing angle ±3° in unclamping position

Code for part numbers and examples → Page 23

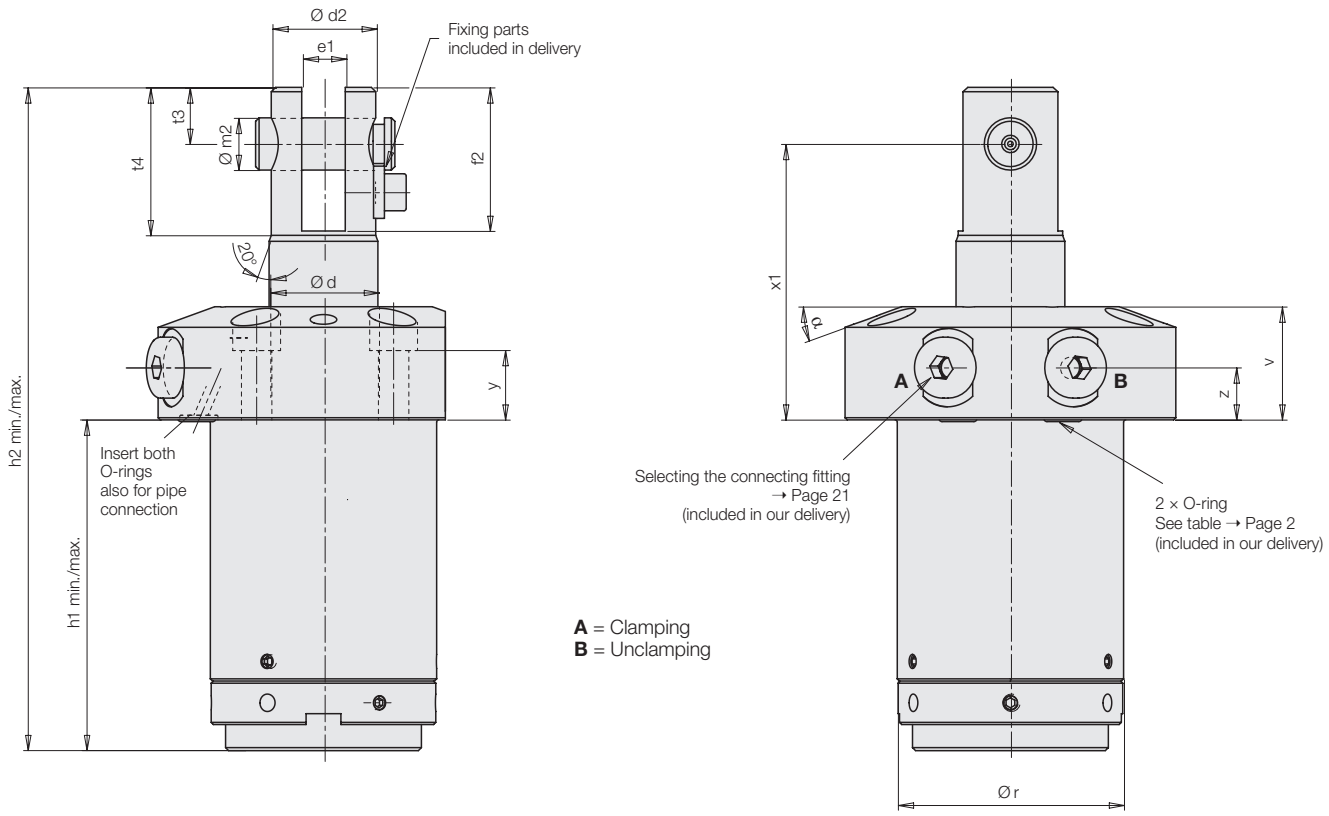
Operating conditions, tolerances and other data, see data sheet A 0.100

Size		1		2		3	
Piston/piston rod Ø	**[mm]**	**23/16**		**36/25**		**50/36**	
Clamping stroke	[mm]	8	15	12	25	12	25
Pulling force at 250 bar	[kN]	5.3		13.1		23.6	
Min. operating pressure	[bar]	20	20	20	20	20	20
Piston ring area	[cm^2]	2.14		5.27		9.46	
Oil volume / clamping stroke mm	[cm^3/mm]	0.21		0.53		0.95	
Oil volume / return stroke mm	[cm^3/mm]	0.42		1.02		1.96	
Oil volume swinging at 90°	[cm^3]	3.14		10.69		24.34	
Oil volume swinging at 75°	[cm^3]	2.08		7.03		17.29	
Oil volume swinging 0°	[cm^3]	0		0		0	
Oil volume swing reduction below 75° to 15° in 5° increments	[cm^3]	0.12		0.38		1.01	
Max. flow rate	[l/min]			Diagrams see page 21			
Min. swing times	[s]			Diagrams see page 21			
a1	[mm]	15		22		30	
a3 ±0.05	[mm]	10		12		15	
b1	[mm]	15		22		30	
c1	[mm]	48		64		86	
Ød	[mm]	16		25		36	
Ød2	[mm]	15.5		24		34	
f1	[mm]	23		33		50	
h4	[mm]	119.1	140.1	152.9	191.9	203.7	242.7
i	[mm]	M6		M8		M12	
Øm H7/g6		8		12		16	
n1	[mm]	45		63		80	
o1	[mm]	50		65		86	
o2	[mm]	70		87		108	
o7 ±0.05	[mm]	61.4		76		96	
o8 ±0.03	[mm]	61.4		76		96	
Øp1	[mm]	7		9		13	
Øp2 M8	[mm]	6.1 × 8 deep		6.1 × 8 deep		6.1 × 8 deep	
Ør1 –0.2	[mm]	44.9		62.9		79.8	
t1	[mm]	10		13		20	
t2	[mm]	24		34		50.5	
v1	[mm]	20		25		27.5	
x3 ±0.4	[mm]	109.1	130.1	139.9	178.9	183.7	222.7
z1	[mm]	11		17		17.5	
Weight, approx.	[kg]	1.17	1.33	2.65	3.24	5.58	6.5
Flange bevel α1	[°]	25		35		25	

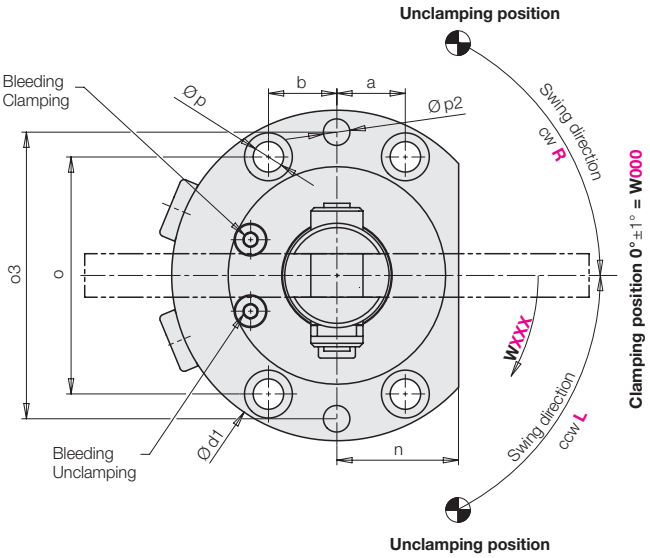
Effective clamping force F as a function of the operating pressure p → Page 21

Operating conditions, tolerances and other data, see data sheet A 0.100

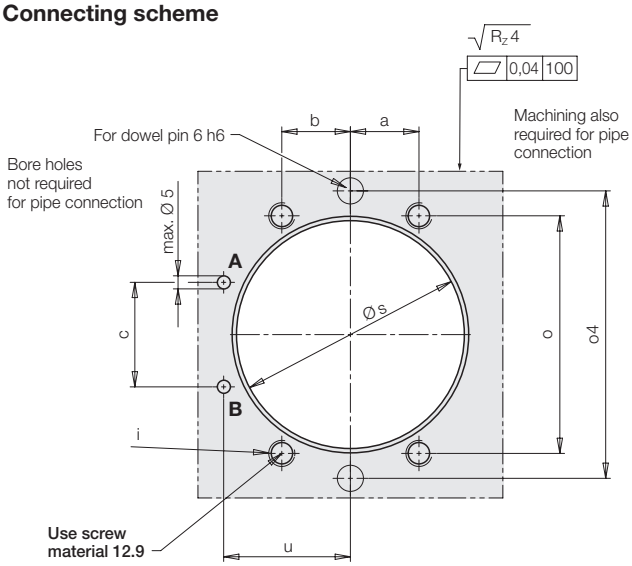
Unclamping position



Piston in clamping position



Connecting scheme



Clamping position

The angle of clamping position **W** can be selected between 0° and 175° in 5° increments (**W000 … W175**).

Swing angle

A swing angle of 0°, 15° to 75° in 5° increments, and 90° can be selected.
Tolerance of swing angle ±3° in unclamping position

Code for part numbers and examples → Page 23

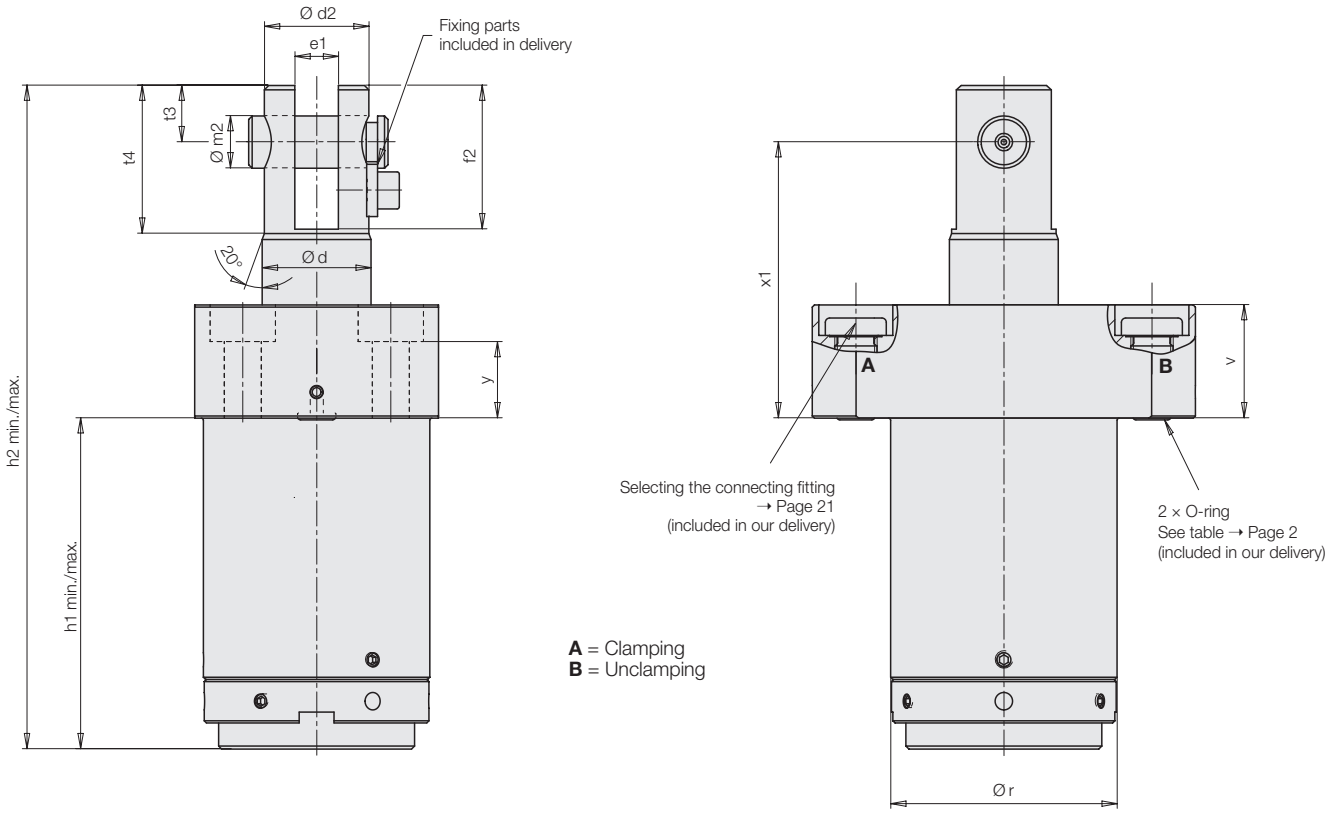
Operating conditions, tolerances and other data, see data sheet A 0.100

Size		1		2		3	
Piston/piston rod Ø	**[mm]**	**23/16**		**36/25**		**50/36**	
Clamping stroke	[mm]	8	15	12	25	12	25
Pulling force at 250 bar	[kN]	5.3		13.1		23.6	
Min. operating pressure	[bar]	20	20	20	20	20	20
Piston ring area	[cm^2]	2.14		5.27		9.46	
Oil volume / clamping stroke mm	[cm^3/mm]	0.21		0.53		0.95	
Oil volume / return stroke mm	[cm^3/mm]	0.42		1.02		1.96	
Oil volume swinging at 90°	[cm^3]	3.14		10.69		24.34	
Oil volume swinging at 75°	[cm^3]	2.08		7.03		17.29	
Oil volume swinging 0°	[cm^3]	0		0		0	
Oil volume swing reduction below 75° to 15° in 5° increments	[cm^3]	0.12		0.38		1.01	
Max. flow rate	[l/min]			Diagrams see page 21			
Min. swing times	[s]			Diagrams see page 21			
a	[mm]	11.75		15.75		22.5	
b	[mm]	11.75		15.75		22.5	
c	[mm]	18		24		34.5	
Ø d	[mm]	16		25		36	
Ø d1	[mm]	62		76		110	
Ø d2	[mm]	15.5		24		34	
f1	[mm]	23		33		50	
h1 min.	[mm]	60.5	74.5	75	101	104	130
h1 max.	[mm]	61	75	76	102	105	131
h2 min.	[mm]	117.5	138.5	151.4	190.4	202	241
h2 max.	[mm]	118	139	152.4	191.4	203	242
i	[mm]	M5		M6		M10	
Øm H7/g6		8		12		16	
n	[mm]	19		28		38	
o	[mm]	40.7		54.56		77.94	
o3 ±0.05	[mm]	54		66		96	
o4 ±0.03	[mm]	54		66		96	
Ø p	[mm]	5.8		7		12	
Ø p2 M8	[mm]	6.1 × 8 deep		6.1 × 8 deep		6.1 × 8 deep	
Ø r	[mm]	36		52		72	
Ø s ±0.2	[mm]	36.4		52.4		72.4	
t1	[mm]	10		13		20	
t2	[mm]	24		34		50.5	
u	[mm]	21.7		29.1		41.5	
v	[mm]	22		26		28	
x1 +0.7 −0.6	[mm]	47	54	63.4	76.4	78	91
y	[mm]	13		16		11	
z	[mm]	10		12		11	
Weight, approx.	[kg]	0.8	0.9	1.9	2.3	4.6	5.4
Flange bevel α	[°]	10		20		15	

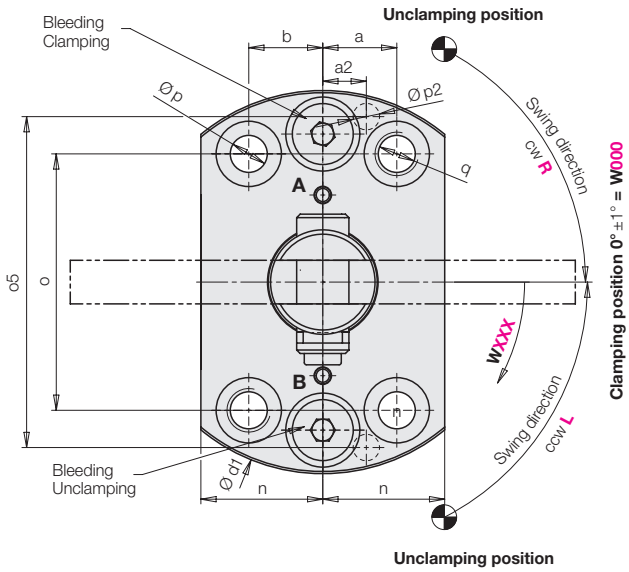
Effective clamping force F as a function of the operating pressure p → Page 21

Operating conditions, tolerances and other data, see data sheet A 0.100

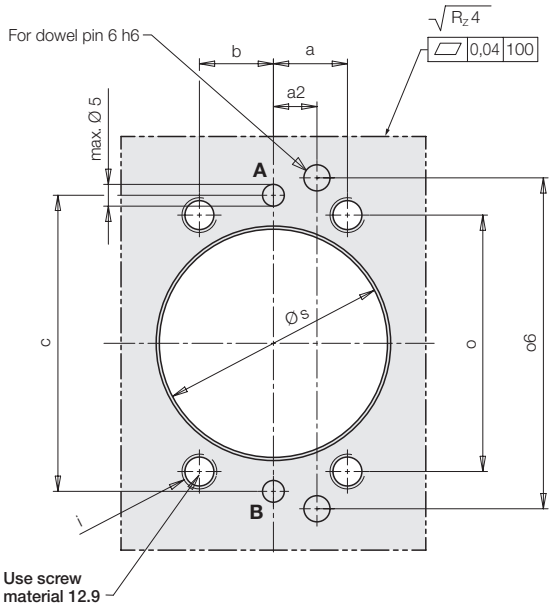
Unclamping position



Piston in clamping position



Connecting scheme



Clamping position

The angle of clamping position **W** can be selected between 0° and 175° in 5° increments (**W000 … W175**).

Swing angle

A swing angle of 0°, 15° to 75° in 5° increments, and 90° can be selected.
Tolerance of swing angle ±3° in unclamping position

Code for part numbers and examples → Page 23

Operating conditions, tolerances and other data, see data sheet A 0.100

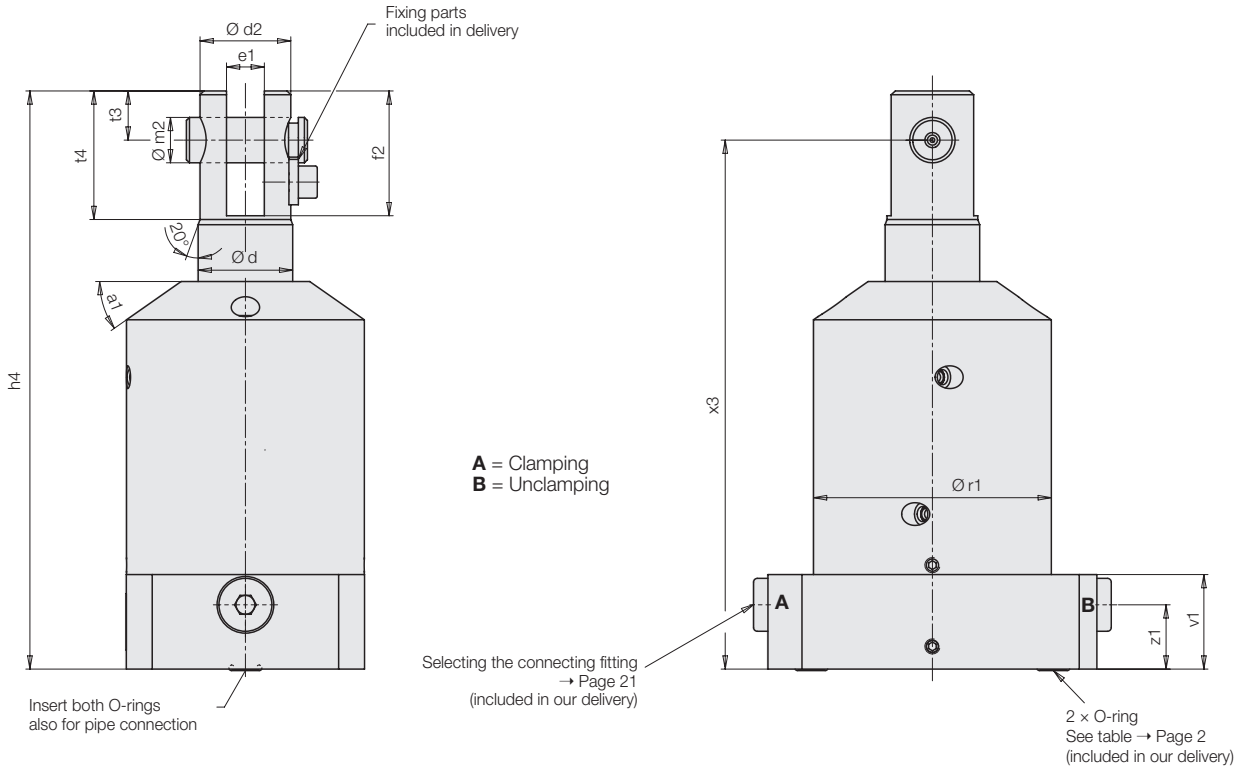
Clamping Arm Seat with Fork Head • Top Flange – 2x flattened
Dimensions and Technical Data

Size		1		2		3	
Piston/piston rod Ø	[mm]	**23/16**		**36/25**		**50/36**	
Clamping stroke	[mm]	8	15	12	25	12	25
Pulling force at 250 bar	[kN]	5.3		13.1		23.6	
Min. operating pressure	[bar]	20	20	20	20	20	20
Piston ring area	[cm^2]	2.14		5.27		9.46	
Oil volume / clamping stroke mm	[cm^3/mm]	0.21		0.53		0.95	
Oil volume / return stroke mm	[cm^3/mm]	0.42		1.02		1.96	
Oil volume swinging at 90°	[cm^3]	3.14		10.69		24.34	
Oil volume swinging at 75°	[cm^3]	2.08		7.03		17.29	
Oil volume swinging 0°	[cm^3]	0		0		0	
Oil volume swing reduction below 75° to 15° in 5° increments	[cm^3]	0.12		0.38		1.01	
Max. flow rate	[l/min]			Diagrams see page 21			
Min. swing times	[s]			Diagrams see page 21			
a	[mm]	14.3		17		22.5	
a2 ±0.05	[mm]	9		10		12	
b	[mm]	14.3		17		22.5	
c	[mm]	47		68		90	
Ø d	[mm]	16		25		36	
Ø d1	[mm]	70		88		110	
Ø d2	[mm]	15.5		24		34	
e1 +0.1	[mm]	6.01		10.01		12.01	
f2	[mm]	23.5		33		50	
h1 min.	[mm]	58.5	72.5	75	101	104	130
h1 max.	[mm]	59	73	76	102	105	131
h2 min.	[mm]	117.5	138.5	151.4	190.4	202	241
h2 max.	[mm]	118	139	152.4	191.4	203	242
i	[mm]	M5		M8		M10	
Øm H7/g6		8		12		16	
n	[mm]	20		28		38	
o	[mm]	45.8		58.9		77.9	
o5 ±0.05	[mm]	58		76		96	
o6 ±0.03	[mm]	58		76		96	
Ø p	[mm]	5.8		8.5		10.5	
Ø p2 M8	[mm]	6.1 × 8 deep		6.1 × 8 deep		6.1 × 8 deep	
q	[mm]	M6		M10		M12	
Ø r	[mm]	36		52		72	
Ø s ±0.2	[mm]	36.4		52.4		72.4	
t1	[mm]	10		13		20	
t2	[mm]	24		34		50.5	
v	[mm]	24		26		28	
x1 +0.7 –0.6	[mm]	49	56	63.4	76.4	78	91
y	[mm]	15		17.5		11	
Weight, approx.	[kg]	0.8	0.9	1.9	2.3	4.5	5.2

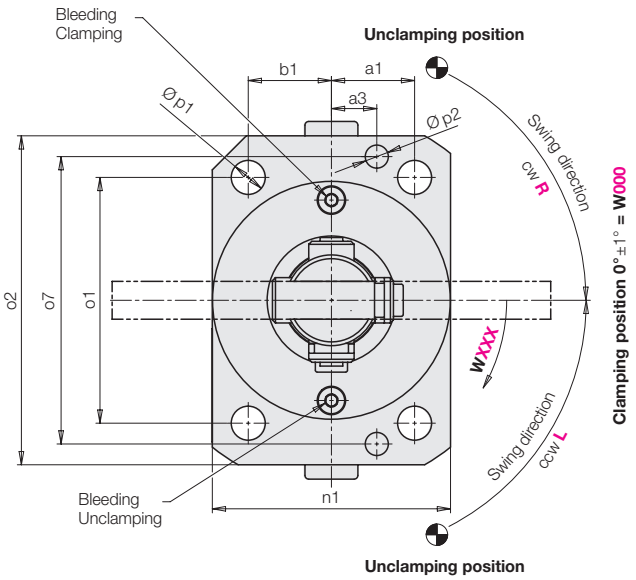
Effective clamping force F as a function of the operating pressure p → Page 21

Operating conditions, tolerances and other data, see data sheet A 0.100

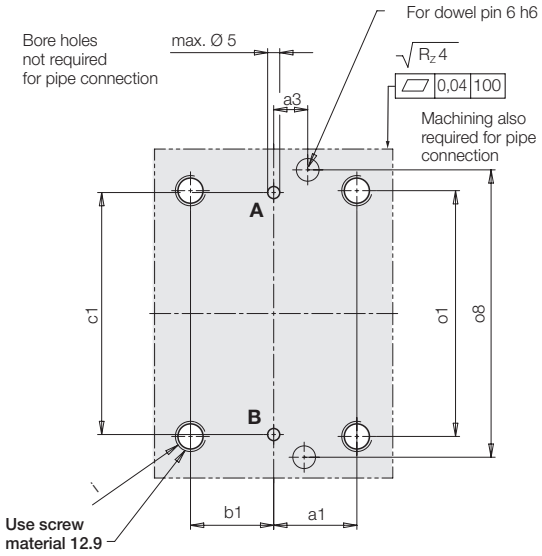
Unclamping position



Piston in clamping position



Connecting scheme



Clamping position

The angle of clamping position **W** can be selected between 0° and 175° in 5° increments (**W000 … W175**).

Swing angle

A swing angle of 0°, 15° to 75° in 5° increments, and 90° can be selected.
Tolerance of swing angle ±3° in unclamping position

Code for part numbers and examples → Page 23

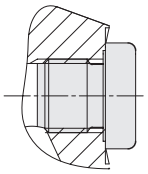
Operating conditions, tolerances and other data, see data sheet A 0.100

Size		1		2		3	
Piston/piston rod Ø	**[mm]**	**23/16**		**36/25**		**50/36**	
Clamping stroke	[mm]	8	15	12	25	12	25
Pulling force at 250 bar	[kN]	5.3		13.1		23.6	
Min. operating pressure	[bar]	20	20	20	20	20	20
Piston ring area	[cm^2]	2.14		5.27		9.46	
Oil volume / clamping stroke mm	[cm^3/mm]	0.21		0.53		0.95	
Oil volume / return stroke mm	[cm^3/mm]	0.42		1.02		1.96	
Oil volume swinging at 90°	[cm^3]	3.14		10.69		24.34	
Oil volume swinging at 75°	[cm^3]	2.08		7.03		17.29	
Oil volume swinging 0°	[cm^3]	0		0		0	
Oil volume swing reduction below 75° to 15° in 5° increments	[cm^3]	0.12		0.38		1.01	
Max. flow rate	[l/min]			Diagrams see page 21			
Min. swing times	[s]			Diagrams see page 21			
a1	[mm]	15		22		30	
a3 ±0.05	[mm]	10		12		15	
b1	[mm]	15		22		30	
c1	[mm]	48		64		86	
Ød	[mm]	16		25		36	
Ød2	[mm]	15.5		24		34	
f1	[mm]	23		33		50	
h4	[mm]	119.1	140.1	152.9	191.9	203.7	242.7
i	[mm]	M6		M8		M12	
Øm H7/g6		8		12		16	
n1	[mm]	45		63		80	
o1	[mm]	50		65		86	
o2	[mm]	70		87		108	
o7 ±0.05	[mm]	61.4		76		96	
o8 ±0.03	[mm]	61.4		76		96	
Øp1	[mm]	7		9		13	
Øp2 M8	[mm]	6.1×8 deep		6.1×8 deep		6.1×8 deep	
Ør1 –0.2	[mm]	44.9		62.9		79.8	
t1	[mm]	10		13		20	
t2	[mm]	24		34		50.5	
v1	[mm]	20		25		27.5	
x3 ±0.4	[mm]	109.1	130.1	139.9	178.9	183.7	222.7
z1	[mm]	11		17		17.5	
Weight, approx.	[kg]	1.17	1.33	2.65	3.24	5.58	6.5
Flange bevel α1	[°]	25		35		25	

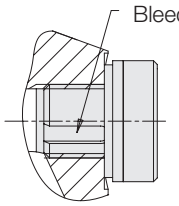
Effective clamping force F as a function of the operating pressure p → Page 21

Operating conditions, tolerances and other data, see data sheet A 0.100

Screw plug with sealing ring D

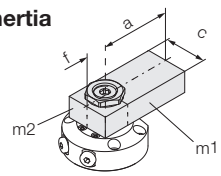


Bleeding screw with KDS sealing ring K

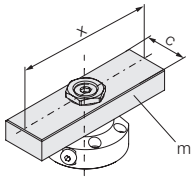


Moment of inertia J_L of clamping arm and effective clamping force F

Moment of inertia



Weight m [kg]
Dimensions a, f, c, x [mm]

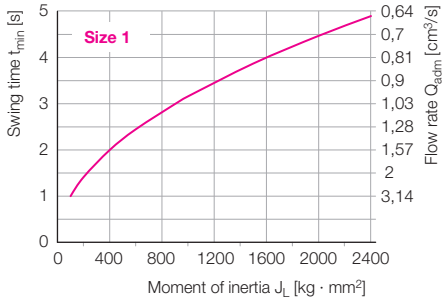


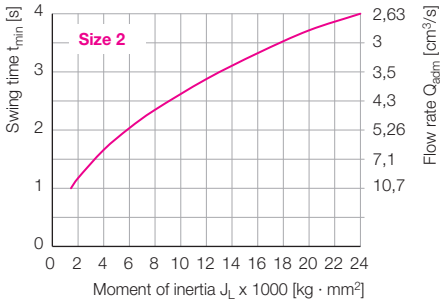
$$J_L = m1 \frac{4a^2 + c^2}{12} + m2 \frac{4f^2 + c^2}{12} \quad [kg \cdot mm^2]$$

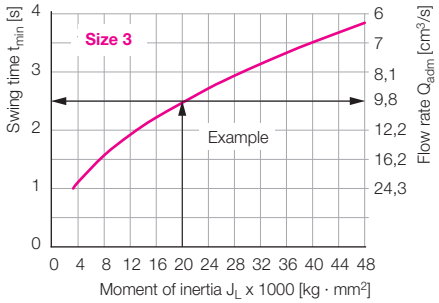
$$J_L = m \frac{x^2 + c^2}{12} \quad [kg \cdot mm^2]$$

Min. swing time and admissible flow rate dependent on the moment of inertia of the clamping arm

Illustrations apply to swivel angle 15° or greater



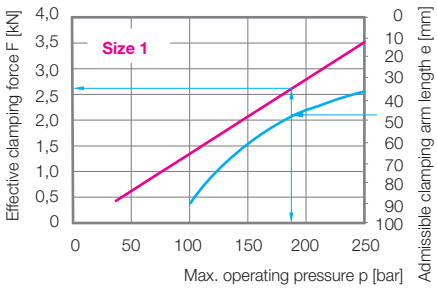


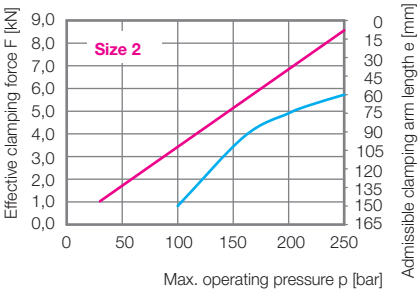


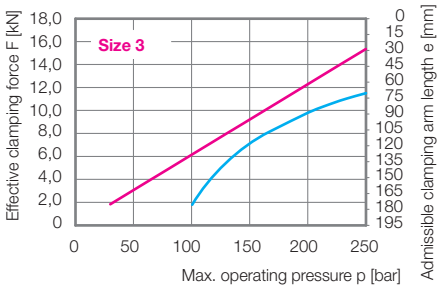
Max. operating pressure depending on the clamping arm length e

Example: J_L = 20,000 kg · mm²
→ t_{min} = 2.5 s → Q_{adm} 9.8 cm³/s

Effective clamping force F and admissible clamping arm length e



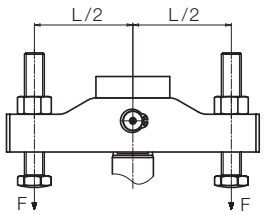


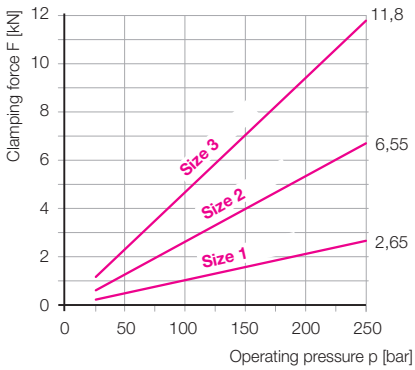


Effective clamping force
Admissible clamping arm length

Example:
Clamping arm length 47 mm, max. operating pressure 187 bar, effective clamping force 2.6 kN

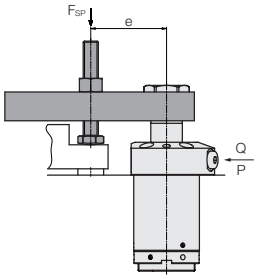
Effective clamping force F as a function of the operating pressure p

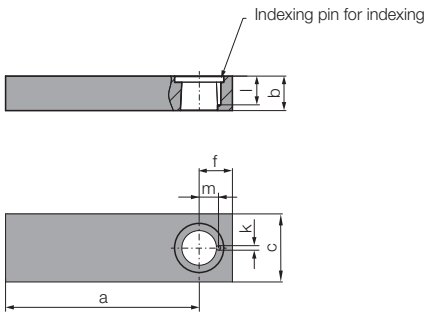


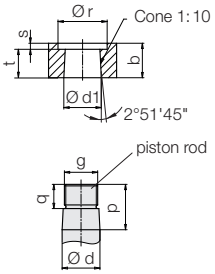


Operating conditions, tolerances and other data, see data sheet A 0.100

Clamping arm blank for swing clamps







The cone seat is part of the clamping arm blank with the required precision. Adapting to the workpiece clamping points is achieved by

- Shortening to the required clamping arm length
- A thread for a hardened contact bolt, which can also be adjustable
- Bevelling on the sides and top/bottom for better swarf flow and to reduce the mass moment of inertia

Moment of inertia of the clamping arm

To prevent the swing mechanism from overload, the swing speed must be reduced by throttling the flow rate depending on the moment of inertia of the clamping arm in use (see Accessory Throttle valve → page 24).

Diagram of swing time

This is based on a short standard clamping arm with a moment of inertia J_e and a swivel time of 1 second.

Calculation of the 90° swing time:

$$t_{min} = 1\ s * \sqrt{\frac{J_L}{J_e}} \geq 1\ s \qquad [s]$$

Calculation of the admissible flow rate:

$$Q_{adm} = Q_e * \sqrt{\frac{J_e}{J_L}} \leq Q_e \qquad [cm^3/s]$$

Q_e = max. flow rate for the standard clamping arm according to table [cm^3/s]

J_e = moment of inertia of the standard clamping arm according to table [$kg \cdot mm^2$]

J_L = moment of inertia of the desired clamping arm [$kg \cdot mm^2$]

Type		**BG1** (V1SA ADX)	**BG2** (V1SA ALX)	**BG3** (V1SA ARX)
a	[mm]	90	150	175
b	[mm]	17	22.8	29.5
c	[mm]	28	45	60
Ø d f7	[mm]	16	25	36
Ød1 –0.05 / –0.1	[mm]	16	25	36
e max. at 250 bar	[mm]	35	60	70
f	[mm]	16	22	30
g	[mm]	M14 × 1.5	M22 x 1.5	M30 x 1.5
Ø k +0.05	[mm]	3	3	4
l +0.5	[mm]	9.5	18	18
m ±0.05	[mm]	7.8	12.8	17.5
p	[mm]	22.5	30	38
q	[mm]	9	16	18
Ø r	[mm]	20	32.5	47
s	[mm]	2.5	4	4
t	[mm]	14.5	18.8	25.5
Weight	[kg]	0.37	1.29	2.6
Moment of inertia of J_e	[$kg \cdot mm^2$]	936	9,292	25,694
Part no.				
Clamping arm blank		**3548 4215**	**3548 4216**	**3548 4217**
Spare nut		**3527 092**	**3527 129**	**3527 126**
Tightening torque	[Nm]	16	50	110
Dowel pin		**3301 281**	**3301 708**	**3300 195**
	[mm]	Ø3x6	Ø3x12	Ø4x12
Short standard clamping arm				
Max. flow rate Q_e	[cm^3/s]	3.14	10.69	24.34
Moment of inertia of J_e	[$kg \cdot mm^2$]	100	1,450	3,250
Min. swing time	[s]	1	1	1

Operating conditions, tolerances and other data, see data sheet A 0.100

V1S A A - X X X 5 - X X X X - H X X X - W X X X - 0 N E X

Size
D = Size 1 (Ø23/16 – 5.3 kN)
L = Size 2 (Ø36/25 – 13.1 kN)
R = Size 3 (Ø50/36 – 23.6 kN)

Design
B = Top flange with O-ring and pipe thread
A = Top flange, 2x flattened with O-ring from below
G = Bottom flange with O-ring and pipe thread

Clamping arm seat
K = Cone 1:10 → Pages 3–8
P = Pendulum eye → Pages 9–14
G = Fork head → Pages 15–20

Swing direction
R = clockwise
L = counterclockwise
0 = without swing motion

Swing angle
015 = 15°
020 = 20°
025 = 25°
030 = 30°
035 = 35°
040 = 40°
045 = 45°
050 = 50°
055 = 55°
060 = 60°
065 = 65°
070 = 70°
075 = 75°
090 = 90°
000 = 0° (without swing motion)

Connecting fitting
D = screw plug with sealing ring
K = bleeding screw with KDS sealing ring

Angle of clamping position W
For cone 1:10
000 = 0°
For pendulum eye and fork head
000 to **175** = 0° to 175°
in graduation of 5°

Clamping stroke
For size 1 (D)
008 = 8 mm
015 = 15 mm
For sizes 2 and 3 (L and R)
012 = 12 mm
025 = 25 mm
Clamping stroke limit upon request

Ordering example 1

Size 2	= **L**
Top flange	= **B**
Cone 1:10	= **K**
Cw swing motion	= **R**
Swing angle 75°	= **075**
Clamping stroke: 12 mm	= **012**
Clamping position 0°	= **000**
Screw plug	= **D**

Part no.
V1SAA-LBK5-R075-H012-W000-0NED

Ordering example 2

Size 1	= **D**
Bottom flange	= **G**
Pendulum eye	= **P**
Cw swing motion	= **R**
Swing angle 75°	= **075**
Clamping stroke: 8 mm	= **008**
Clamping position 30°	= **030**
Screw plug	= **D**

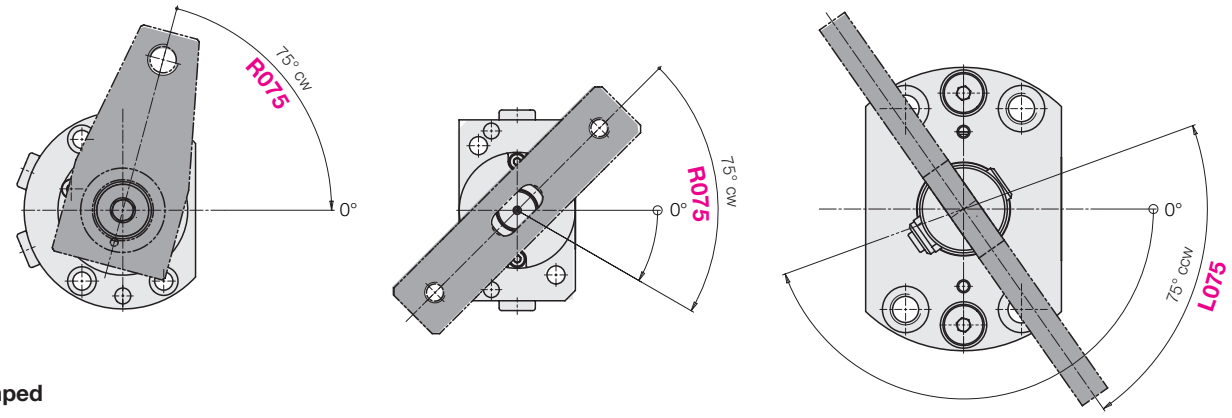
Part no.
V1SAA-DGP5-R075-H008-W030-0NED

Ordering example 3

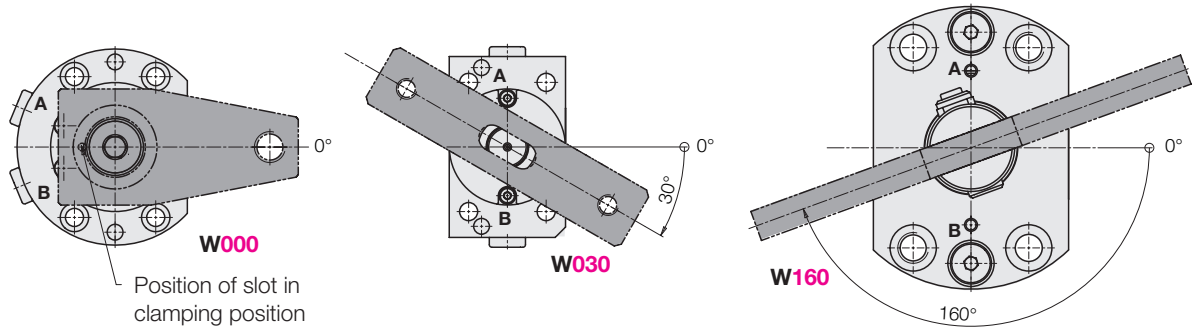
Size 3	= **R**
Top flange, 2x flattened	= **A**
Fork head	= **G**
Ccw swing motion	= **L**
Swing angle 75°	= **075**
Clamping stroke: 25 mm	= **025**
Clamping position 160°	= **160**
Bleeding screw	= **K**

Part no.
V1SAA-RAG5-L075-H025-W160-0NEK

Unclamped



Clamped



Operating conditions, tolerances and other data, see data sheet A 0.100

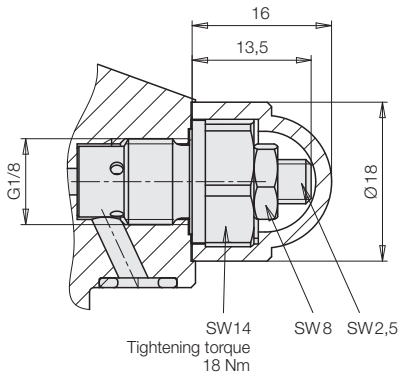
Application

These throttle valves are used
- in order to reduce the swing speed of the clamping arm
- in order to improve the synchronism of several swing clamps

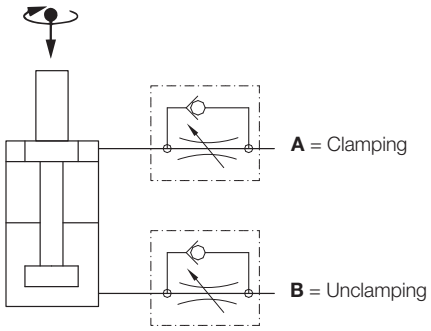
Important notes

This application is only possible when using drilled ducts as connections because the throttle valves are screwed into the existing G1/8 pipe connections.
In the case of strong throttling, increasing back pressure upstream of the throttle valve can trigger premature switching of pressure switches and sequence valves.

Dimensions



Hydraulic symbols



Weight 0.025 kg

Part no. 2957209

Operating conditions, tolerances and other data, see data sheet A 0.100