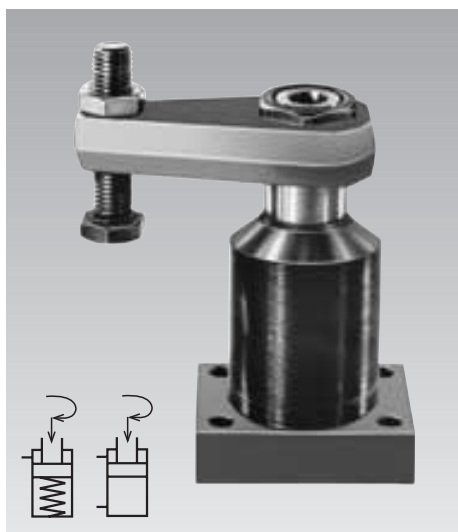


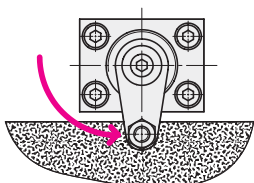


Swing Clamp with overload protection device max. operating pressure 500 bar



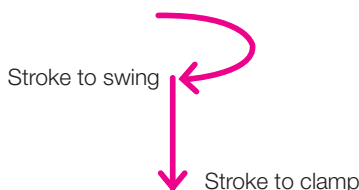
Application

These swing clamps are used when it is required to keep the fixture workpiece area free of straps and clamping components for unrestricted workpiece loading and unloading.



Function

This hydraulic clamping element is a pull-type cylinder where a part of the total stroke is used to swing the piston.



Overload protection device

An integrated mechanical overload protection device prevents damage to the swing mechanism when striking an object within the 90° rotation, clamping or unclamping alike, or in case of incorrect mounting of the clamping arm.

Versions

Single and double-acting as well as counter- and clockwise versions are available. The double-acting type is to be preferred for more elaborated fixtures and when sequential time and position controls are used.

Mounts into throughhole with flange nuts for the threaded type. The flange type can be bolted directly to machine tables or base plates. This type is also available with O-ring seal.

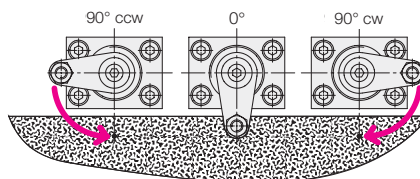
All units are equipped with piston rod wipers.

For the single-acting type a vent port is threaded to make a fitting and hose connection possible.

The units are available in four standard sizes, and for each size five versions of standard clamping arms are available (see accessories, page 4). Mounting of these clamping arms at any angle within 360°.

Direction of rotation

The units are available with clockwise and counterclockwise rotation or without rotation (0°).



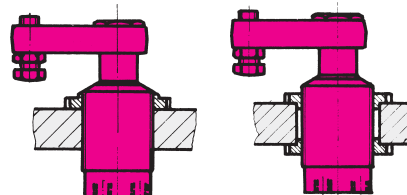
Standard angles of rotation are 45°, 60°, and 90° ±2°.

Special angles on request. Other variants, as e.g. versions with metallic wiper on request.

0°-Version

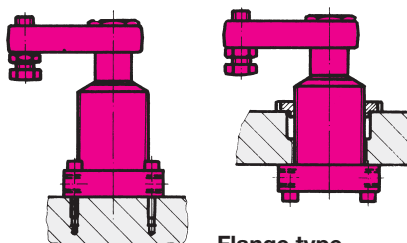
Use as pure pull-type cylinder with a piston which is secured against torsion and which allows eccentric load as per clamping force diagram.

Mounting possibilities



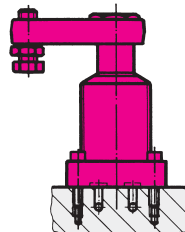
Threaded type

Porting: from below



Flange type

Porting: sideways



Flange type with O-ring seal

Materials

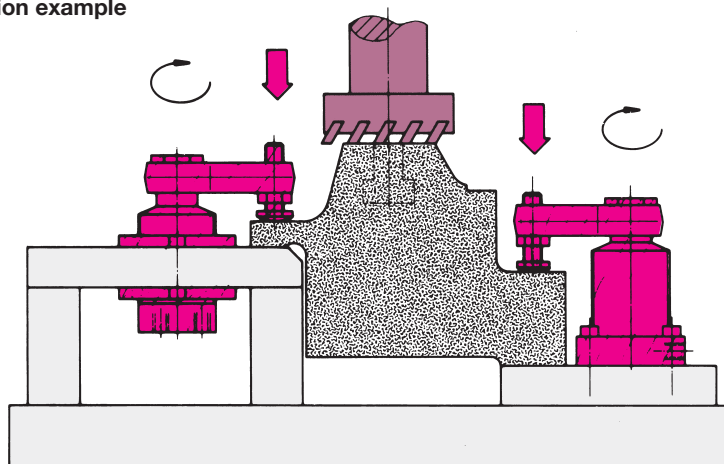
By nitrating piston and housing, wear is reduced and protection against corrosion increased.

Piston material: High alloy steel
Cylinder body: Free-cutting steel

Important notes

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

Application example





Single acting

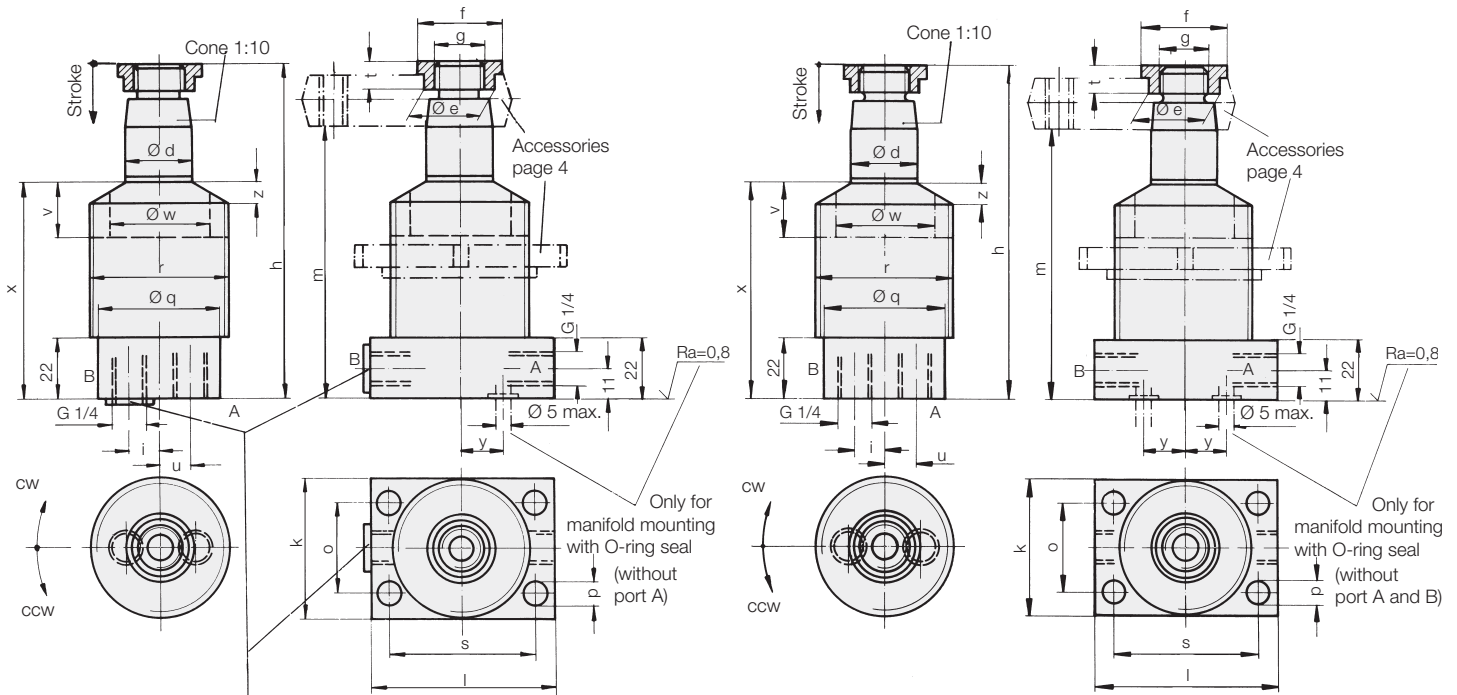
Double acting

Threaded type

Flange type

Threaded type

Flange type

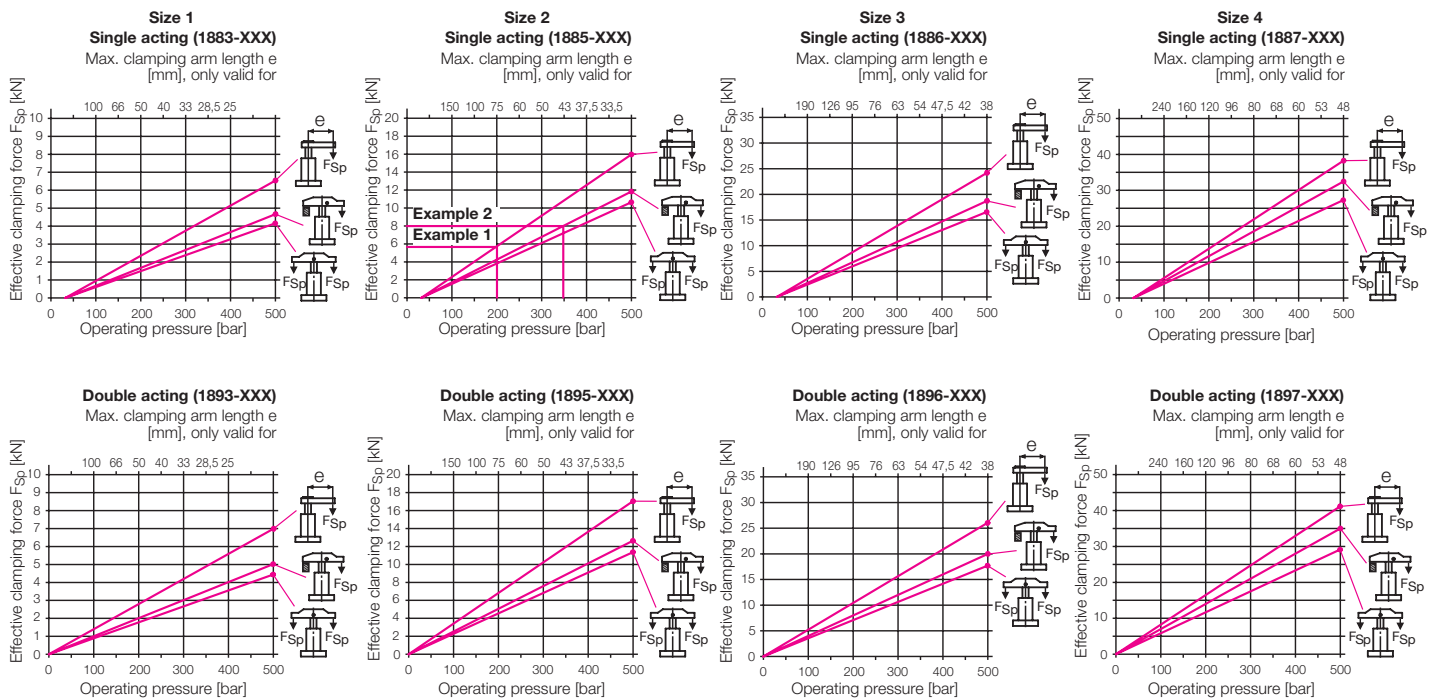


A = Clamping
B = Vent port

Vent plug with sintered metal air filter. If the possibility exists to draw liquid through this vent, a vent hose has to be connected. (See data sheet A 0.110).

A = Clamping
B = Unclamping

Effective clamping force F_{Sp} as a function of max. operating pressure p



Important notes

The clamping force of single-acting swing clamps is reduced by the opposite-directed spring return force. For this reason the clamping force is slightly lower than that of double-acting swing clamps.

Example 1: 1885-104 single acting. An operating pressure p of 200 bar in connection with standard clamping arm 0354-003 of arm length $L = 75$ mm results in an effective clamping force F_{Sp} of 5.8 kN.

Example 2: 1885-104 single acting. For a desired effective clamping force F_{Sp} of 8 kN and use of a swing clamp 1885-002 with a standard clamping strap 0354-002 an operating pressure p of 345 bar is required.



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Swing clamp with overload protection device
max. operating pressure 500 bar

	Size 1			Size 2			Size 3			Size 4		
Stroke to clamp [mm]	11	25	50	14	25	50	15	25	50	15	25	50
Stroke to swing [mm]	7	9	9	8	10	10	11	11	11	9	12	12
Total stroke [mm]	18	34	59	22	35	60	26	36	61	24	37	62
Operating pressure to swing, min. [bar]	30	30	30	30	30	30	30	30	30	30	30	30
Max. oil flow rate* [cm ³ /s]	3.2	3.2	3.2	10	10	10	18.4	18.4	18.4	27.7	27.7	27.7
Oil to clamp [cm ³]	3.2	6	10.5	10	16	27.2	18.4	25.5	43.2	27.7	43	72
Oil to return [cm ³]	8.8	17	29	27.7	44	76	51	71	120	74.8	116	194
Ø d [mm]	20	20	20	32	32	32	40	40	40	50	50	50
Ø e [mm]	23.5	23.5	23.5	33.5	33.5	33.5	45	45	45	55.5	55.5	55.5
f [mm]	30	30	30	40	40	40	55	55	55	68	68	68
g [mm]	M 18x1.5	M 18x1.5	M 18x1.5	M 28x1.5	M 28x1.5	M 28x1.5	M 35x1.5	M 35x1.5	M 35x1.5	M 45x1.5	M 45x1.5	M 45x1.5
h [mm]	126.5	158.5	208.5	147.5	173.5	223.5	172	192	242	182	208	258
i [mm]	12	12	12	12.5	12.5	12.5	19	19	19	25.5	25.5	25.5
k [mm]	45	45	45	63	63	63	80	80	80	90	90	90
l [mm]	65	65	65	85	85	85	100	100	100	115	115	115
m [mm]	105.5-1	137.5-1	187.5-1	119.5-1	145.5-1	195.5-1	138	158	208	142-10	168-10	218-10
o [mm]	30	30	30	44	44	44	60	60	60	68	68	68
p [mm]	6.5	6.5	6.5	8.5	8.5	8.5	13.5	13.5	13.5	16	16	16
Ø q [mm]	43	43	43	58	58	58	77	77	77	88	88	88
r [mm]	M 45x1.5	M 45x1.5	M 45x1.5	M 60x1.5	M 60x1.5	M 60x1.5	M 80x2	M 80x2	M 80x2	M 90x2	M 90x2	M 90x2
s [mm]	50	50	50	65	65	65	80	80	80	90	90	90
t [mm]	9	9	9	10	10	10	11	11	11	12	12	12
u [mm]	12	12	12	19.5	19.5	19.5	26.5	26.5	26.5	34	34	34
v [mm]	20	20	20	20	20	20	30	30	30	40	40	40
Ø w [mm]	32	32	32	50	50	50	60	60	60	70	70	70
x [mm]	84.5	100.5	125.5	94.5	107.5	132.5	110	120	145	116	129	154
y [mm]	15	15	15	28	28	28	31	31	31	37.5	37.5	37.5
z [mm]	5	5	5	6	6	6	6	6	6	9	9	9
Declutch moment of overload protection [Nm]	3.5	3.5	3.5	11	11	11	17	17	17	30	30	30

◇ for clamping strap
0354-004 m + 3 mm

Single acting 90°

Part-no.												
Flange type												
Clockwise rotation	1883-104			1885-104			1886-104			1887-104		
Counterclockwise rotation	1883-204			1885-204			1886-204			1887-204		
0-degree	1883-244			1885-244			1886-244			1887-244		
Threaded type												
Clockwise rotation	1883-304			1885-304			1886-304			1887-304		
Counterclockwise rotation	1883-404			1885-404			1886-404			1887-404		
0-degree	1883-444			1885-444			1886-444			1887-444		
Flange type for manifold mounting with O-ring seal												
Clockwise rotation	1883-504			1885-504			1886-504			1887-504		
Counterclockwise rotation	1883-604			1885-604			1886-604			1887-604		
0-degree	1883-644			1885-644			1886-644			1887-644		

Double acting 90°

Part-no.												
Flange type												
Clockwise rotation	1893-104	1893-108	1893-109	1895-104	1895-108	1895-109	1896-104	1896-108	1896-109	1897-104	1897-108	1897-109
Counterclockwise rotation	1893-204	1893-208	1893-209	1895-204	1895-208	1895-209	1896-204	1896-208	1896-209	1897-204	1897-208	1897-209
0-degree	1893-244	1893-248	1893-249	1895-244	1895-248	1895-249	1896-244	1896-248	1896-249	1897-244	1897-248	1897-249
Threaded Type												
Clockwise rotation	1893-304	1893-308	1893-309	1895-304	1895-308	1895-309	1896-304	1896-308	1896-309	1897-304	1897-308	1897-309
Counterclockwise rotation	1893-404	1893-408	1893-409	1895-404	1895-408	1895-409	1896-404	1896-408	1896-409	1897-404	1897-408	1897-409
0-degree	1893-444	1893-448	1893-449	1895-444	1895-448	1895-449	1896-444	1896-448	1896-449	1897-444	1897-448	1897-449
Flange type for manifold mounting with O-ring seal												
Clockwise rotation	1893-504	1893-508	1893-509	1895-504	1895-508	1895-509	1896-504	1896-508	1896-509	1897-504	1897-508	1897-509
Counterclockwise rotation	1893-604	1893-608	1893-609	1895-604	1895-608	1895-609	1896-604	1896-608	1896-609	1897-604	1897-608	1897-609
0-degree	1893-644	1893-648	1893-649	1895-644	1895-648	1895-649	1896-644	1896-648	1896-649	1897-644	1897-648	1897-649
Spare O-ring 8x1.5	3000-343											

Code numbers of variable angle of rotation

Angle of rotation	Part-no.
90°	18XX-X0X
60°	18XX-X2X
45°	18XX-X3X

* Max. oil flow rate

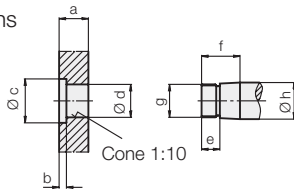
In case of the maximum oil flow rate as per chart the shortest possible clamping time is 1 second. If the flow rate of the pump divided by the number of swing clamps is higher than the indicated value in the chart, the flow rate has to be throttled to avoid snapping out of the overload protection device. In the case that the mounting position is not vertical and/or heavy clamping arms are used, the flow rate has to be further reduced, if required. Throttling has to be made in the oil supply line to the swing clamp to rule out a possible pressure intensification. Use only flow control check valves which allow oil return from the swing clamps without any impediments, as e.g. the flow-control swivel banjo coupling 9208-129 on page C 2.9501. During unclamping the maximum oil flow rate can be 2.8 higher than the indicated value in the chart, because the piston area is correspondingly bigger.



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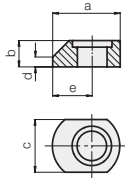
Accessories for swing clamp with overload protection device

Dimensions for special clamping arms



Swing clamp	a	b	Øc	Ød ^{+0.10} _{-0.05}	e	f	g	Øh _{f7}
18X3-XXX	16	4	24	19.8	10	21	M 18x1.5	20
18X5-XXX	23	5	34	31.8	12	28	M 28x1.5	32
18X6-XXX	28	5	46	39.8	12	34	M 35x1.5	40
18X7-XXX	34	6	56	49.8	13	40	M 45x1.5	50

Clamping arm, max. 500 bar

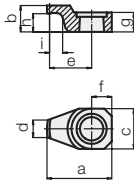


Swing clamp	a	b	c	d	e	Weight [kg]	Part-no.
18X3-XXX	41	16	32	6	25	0.08	3548-159
18X5-XXX	61	23	48	6	37	0.23	3548-165
18X6-XXX	76	28	60	11	45	0.50	3548-304
18X7-XXX	90	34	78	14	52	0.88	3548-163

Note: This clamping arm can be used only, if housing will be machined according to dimensions v and w of pages 2 or 3 respectively.

Material: 42CrMo4

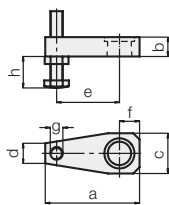
Clamping arm max. 300 bar



Swing clamp	a	b	c	d	e	f	g	h	i	Weight [kg]	Part-no.
18X3-XXX	51.5	21	32	14	33.5	16	15.5	14.5	7	0.11	3548-238
18X5-XXX	76	28	46	25	50	23	22.5	19	7	0.30	3548-236
18X6-XXX	100	34	66	39	64	33	28	23	7	0.84	3548-301
18X7-XXX	123	40	75	39	82.5	37.5	34	27	8	1.30	3548-302

Material: 42CrMo4

Clamping arm assembly, complete max. 200 bar



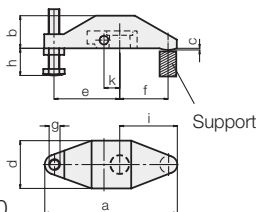
with thread
without thread

Swing clamp	a	b	c	d	e	f	g	h max.	h min.	Weight [kg]	Part-no.
18X3-XXX	75	16	32	16	50	16	M10	64	6	0.2	0354-001
18X5-XXX	115	23	48	22	75	25	M16	79	9	0.7	0354-003
18X6-XXX	140	28	60	28	95	30	M16	79	9	2.0	0354-042
18X7-XXX	178	34	78	40	120	40	M20	98	12	2.55	0354-005

Swing clamp	a	b	c	d	f	Weight [kg]	Part-no.
18X3-XXX	75	16	32	16	16	0.18	3921-016
18X5-XXX	115	23	48	22	25	0.65	3921-017
18X6-XXX	140	28	60	28	30	1.85	3921-021
18X7-XXX	178	34	78	40	40	2.3	3921-018

Material: 42CrMo4

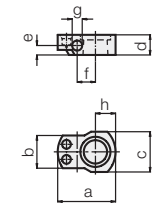
Clamping strap assembly, complete, with carrier, max. 500 bar



Swing clamp	a	b	c	d	e	f	g	h max.	h min.	i	k	Weight [kg]	Part-no.
18X3-XXX	122	30	1.5	44	60	45	M10	64	6	53	14.5	0.57	0354-000
18X5-XXX	185	45	2	58.5	83	75	M16	79	9	87	21	1.58	0354-002
18X6-XXX	203	54	2.5	82	92	82	M16	79	9	95	28	3.45	0354-041
18X7-XXX	223	59	2.5	98	100	90	M20	98	12	105	33	4.75	0354-004

Material: GGG-40

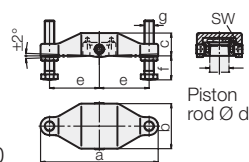
Carrier for special clamping strap



Swing clamp	a ±0.1	b	c	d	e	f	g ^{H7}	h	Weight [kg]	Part-no.
18X3-XXX	46	26	32	16	7.5	14.5	8	16	0.08	3542-093
18X5-XXX	59	32	40	23	13	21	10	22	0.16	3542-094
18X6-XXX	82	44.5	58	28	17	28	12	34	0.5	3542-132
18X7-XXX	90	56	68	34	21	33	14	36	0.65	3542-096

Material: C 45

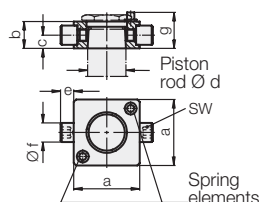
Double clamping arm assembly, complete, with carrier max. 500 bar



Swing clamp	a	b	c	Ød	e	f min.	f max.	g	SW	Weight [kg]	Part-no.
18X3-XXX	138	59	28.5	20	60	10	64	M 10	5	0.83	0354-131
18X5-XXX	196	75	38	32	83	15	79	M 16	8	2.11	0354-132
18X6-XXX	216	85	47	40	92	15	79	M 16	8	3.17	0354-133
18X7-XXX	236	105	56	50	100	19	98	M 20	8	5.24	0354-134

Material: GGG-40

Carrier, complete with threaded bolt and spring clamping elements

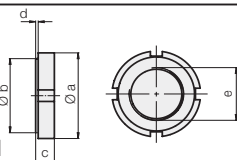


Swing clamp	a	b	c	Ød	e	Øf ⁶	g*	SW	Part-no.
18X3-XXX	43	16	7.5	20	9	10	21.5	5	0354-141
18X5-XXX	55	23	11	32	11	16	29	8	0354-142
18X6-XXX	63	28	15	40	12	18	35	8	0354-143
18X7-XXX	77	34	17	50	15	20	41	8	0354-144

* Stop surface for spring elements

Material: C 45

Flanged nut



Swing clamp	Øa	Øb _{-0.2}	c	d	e	Part-no.
18X3-XXX	68	52	12	3	M 45x1.5	3527-020
18X5-XXX	90	68	13	4	M 60x1.5	3527-021
18X6-XXX	115	90	16	5	M 80x2	3527-049
18X7-XXX	130	100	16	5	M 90x2	3527-022

Material: Free cutting steel