

Swing Clamps without Swing Stroke

top flange, reinforced swing mechanism, position monitoring optional, double acting, max. operating pressure 350 bar



Advantages

- Swing motion without axial stroke
- Swinging in into small recesses
- Compact flange design
- Reinforced swing mechanism Optional position monitoring electrical or pneumatic
- Alternatively pipe thread or drilled channels
- FKM wiper standard

Special features

clamping arm.

Swinging without axial stroke

Reinforced swing mechanism

clamping up to a pressure of 100 bar.

This version can clamp workpieces in reces-

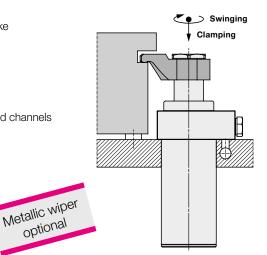
ses that are only insignificantly higher than the

The reinforced swing mechanism without over-

load protection device endures a collision of

the clamping arm with the workpiece during

Metallic wiper optional



Application

Hydraulic swing clamps are used for clamping of workpieces, when it is essential to keep the clamping area free of straps and clamping components for unrestricted workpiece loading and unloading.

Using this version without swing stroke, the clamping arm swings in one level and thereby allows the clamping of workpieces in recesses that are only insignificantly higher than the clamping arm.

Function

The swing clamp without swing stroke is a double-acting pull-type cylinder where a part of the piston stroke is used to swing the piston rod without axial stroke.

Clamping

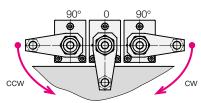
- 1. The piston rod is rotated together with the clamping arm without axial stroke (swing stroke) in the desired direction.
- 2. After swinging in the clamping arm above the clamping point, the linear clamping stroke will be effected.

Unclamping

- 1. The clamping arm is lifted linearly above the clamping point (return stroke).
- 2. The piston rod swings the clamping arm without axial stroke back to the off-position.

Swing direction

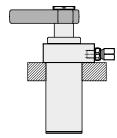
Optionally available with clockwise or counterclockwise swing motion.



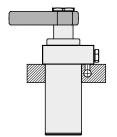
Standard swing angle is 90°

Special swing angles between 20° and 70° are available on request.

Connecting possibilities Pipe thread



Drilled channels



Important notes See page 3.

Accessory - Position monitoring

As an option, the swing clamps are available with an extended switch rod at the cylinder bottom, where a control cam can be fixed to control the clamping and unclamping position. As accessories pneumatic and electrical position monitorings are available.

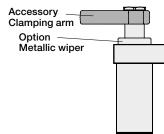
Option - Metallic wiper

The optionally available metallic wiper protects the FKM wiper against mechanical damage.

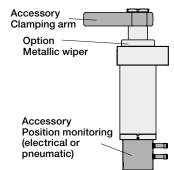
Versions

optional

DH. DM: without switch rod

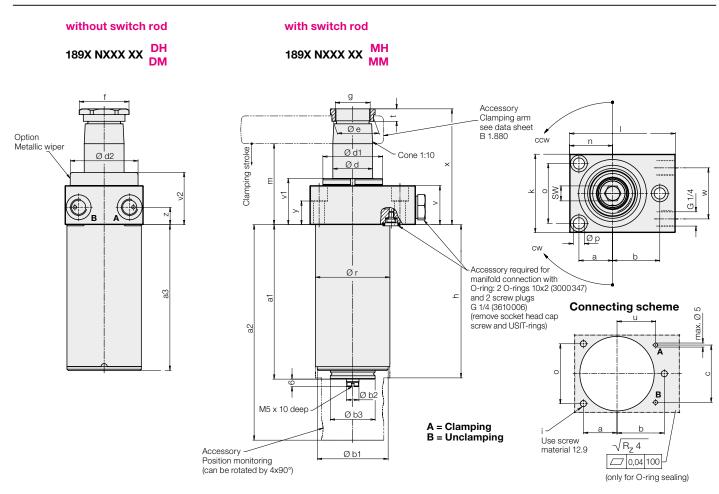


MH, MM: with switch rod

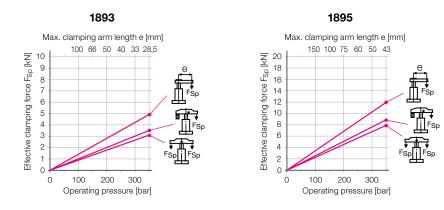


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Dimensions Technical data



Effective clamping force $F_{\mbox{\scriptsize Sp}}$ as a function of the clamping pressure p



2

Dimensions Technical data

Effective clamping stroke [hM] see diagram Clamping stroke [nm] 12 16 2 Operating pressure. min. [bar] 50 50 5 Max. oil flow rate* [cm] 3.5 14.6 26 clamping stroke [cm] 5.6 21.1 7.2 44 Total clamping [cm] 5.6 21.8 40.0 Oli volume for unclamping stroke [cm] 5.9 20.1 39 oftito with switch rod [cm] 8.4 33.4 64 a [mm] 107.5 132.5 175. a1 [mm] 107.5 132.5 175. a2 [mm] 148.5 181.5 230. a3 [mm] 99.5 125.5 168. b [mm] 107.5 132.5 175. a2 [mm] 30 36 33 b [mm] 106.5 131.5 174 b	Size		1893	1895	1896
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Operating pressure, min, [bar] 50 50 55 Max, oil flow rate* [cm³/s] 59 532 56 Oli required for swinging [cm³] 3.5 14.6 26 clamping stroke [cm³] 2.1 7.2 14 Oli volume for unclamping stroke [cm³] 5.6 21.8 400 Oli volume for unclamping stroke [cm³] 3.5 14.6 26 Swinging back [cm³] 3.5 14.6 26 Total unclamping [cm³] 8.4 33.4 64 a [mm] 20 27 33 a1 [mm] 107.5 132.5 175 a2 [mm] 148.5 181.5 230.0 a3 [mm] 148.5 181.5 230.0 a4 3.0 3.8 5 0 b1 [mm] 30 3.8 5 0 b2 [mm] 32.5 33.5 7	Effective clamping force	[kN]		see diagram	
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Max. oil flow rate* [cm ³] 59 532 56 Oil required for swinging [cm ³] 3.5 14.6 26 clamping [cm ³] 2.1 7.2 14 Total clamping [cm ³] 5.6 21.8 40 Oil volume for unclamping stroke [cm ³] 5.5 14.6 266 Oil volume for unclamping stroke [cm ³] 3.5 14.6 266 Oil volume for unclamping [cm ³] 8.4 33.4 64 a [mm] 20 27 32.5 175.5 A2 [mm] 148.5 181.5 230.0 a3 [mm] 10.84 33.4 64 b [mm] 30.0 38 55 0.2 [mm] 148.5 181.5 230.0 a4 [mm] 30 38 46 6 0.2 [mm] 30 36 33 4 0.5 [mm] 32.5 <td>Operating pressure. min.</td> <td>[bar]</td> <td>50</td> <td>50</td> <td>50</td>	Operating pressure. min.	[bar]	50	50	50
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k [mm] 50 63 88 I [mm] 70 85 11 m -1 [mm] 26.5 34.5 48 o [mm] 37 48 66 Ø p [mm] 6.6 9 1 Ø r -0.1 [mm] 44.8 59.8 79 Ø s +1 [mm] 45 60 88 t [mm] 26.5 31 4 v [mm] 26.4 31.4 29 v1 [mm] 31 37 3 v2 [mm] 36 42 4 w [mm] 78 13 10 y [mm] 78 19 1 x [mm] 18 19 1 x [mm] 18 19 1	ĥ	[mm]	106.5	131.5	174.6
I [mm] 70 85 11 m -1 [mm] 55 65 66 n [mm] 26.5 34.5 44 o [mm] 37 48 66 Ø p [mm] 6.6 9 1 Ø r -0.1 [mm] 44.8 59.8 79.9 Ø s +1 [mm] 445 60 88 79.9 Ø s +1 [mm] 45 60 88 79.9 U s +1 [mm] 45.5 31 44 60 88 79.9 70.0	i	[mm]	M 6	M 8	M 10
m -1 [mm] 55 65 66 n [mm] 26.5 34.5 44 o [mm] 37 48 66 Ø p [mm] 6.6 9 1 Ø r -0.1 [mm] 44.8 59.8 79. Ø s +1 [mm] 44.8 59.8 79. Ø s s+1 [mm] 44.8 59.8 79. u [mm] 26.5 31 4 v [mm] 26.4 31.4 29. v1 [mm] 36 42 4 v [mm] 36 42 4 w [mm] 28 41 55 x [mm] 76 93 10 y [mm] 18 19 1 z [mm] 18 19 1 SW [mm] 8 12 1 Part no. 1893 N90R 12XX 1895 N90R 16XX 1896 N90R 20X Swing direction 90° ccw	k	[mm]	50	63	85
n [mm] 26.5 34.5 44 o [mm] 37 48 66 Øp [mm] 6.6 9 17 Ør -0.1 [mm] 44.8 59.8 79 Øs +1 [mm] 45 60 88 t [mm] 9 10 11 u [mm] 26.5 31 44 v [mm] 26.5 31 44 v [mm] 31 37 33 v2 [mm] 36 42 44 w [mm] 33 37 33 v2 [mm] 36 42 44 w [mm] 76 93 100 y [mm] 18 19 11 SW [mm] 18 19 11 z [mm] 14 14 14 SW [mm] 8 12 1 Part no.		[mm]		85	110
o [mm] 37 48 66 Ø p [mm] 6.6 9 1 Ø r -0.1 [mm] 44.8 59.8 79. Ø s +1 [mm] 45 60 88 t [mm] 9 10 1 u [mm] 26.5 31 44 v [mm] 26.4 31.4 29. v1 [mm] 36 42 4 v2 [mm] 36 42 4 w [mm] 76 93 10 y2 [mm] 18 19 1 x [mm] 76 93 10 y2 [mm] 18 19 1 z [mm] 18 19 1 x [mm] 8 12 1 W [mm] 8 12 1 SW [mm] 893 1895	m –1	[mm]	55	65	67
Ø p [mm] 6.6 9 1 Ør -0.1 [mm] 44.8 59.8 79. Ø s +1 [mm] 45 60 88 t [mm] 9 10 1 u [mm] 26.5 31 44 v [mm] 26.4 31.4 29. v1 [mm] 31 37 33 v2 [mm] 36 42 44 w [mm] 36 42 4 v2 [mm] 36 42 4 w [mm] 76 93 10 y [mm] 18 19 1 z [mm] 14 14 1 SW [mm] 8 12 1 Part no. 1893 N90R 12XX 1895 N90R 16XX 1896 N90R20X Swing direction 90° ccw 1893 N90L 12XX 1895 N90L 16XX 1896 N90L20X	n	[mm]	26.5	34.5	47
Ør -0.1 [mm] 44.8 59.8 79. Øs +1 [mm] 45 60 88 t [mm] 9 10 1 u [mm] 26.5 31 44 v [mm] 26.4 31.4 29. v1 [mm] 31 37 33 v2 [mm] 36 42 44 w [mm] 36 42 4 v2 [mm] 36 42 4 w [mm] 76 93 10 y [mm] 18 19 1 z [mm] 18 19 1 SW [mm] 8 12 1 Part no. 1893 N90R 12XX 1895 N90R 16XX 1896 N90R20X Swing direction 90° ccw 1893 N90L 12XX 1895 N90L 16XX 1896 N90L20X		[mm]	37	48	65
Øs +1 [mm] 45 60 88 t [mm] 9 10 1 u [mm] 26.5 31 44 v [mm] 26.4 31.4 29. v1 [mm] 31 37 33 v2 [mm] 36 42 44 w [mm] 36 42 44 x [mm] 76 93 10 y [mm] 18 19 11 z [mm] 14 14 14 SW [mm] 8 12 1 Part no. 1893 N90R 12XX 1895 N90R 16XX 1896 N90R 20X Swing direction 90° ccw 1893 N90L 12XX 1895 N90L 16XX 1896 N90L 20X	Øp	[mm]	6.6		11
t [mm] 9 10 11 u [mm] 26.5 31 44 v [mm] 26.4 31.4 29. v1 [mm] 31 37 33 v2 [mm] 36 42 44 w [mm] 28 41 55 x [mm] 76 93 10 y [mm] 18 19 11 z [mm] 14 14 14 SW [mm] 8 12 1 Part no. Swing direction 90° cw 1893 N90R 12XX 1895 N90R 16XX 1896 N90R 20X Swing direction 90° ccw 1893 N90R 12XX 1895 N90R 16XX 1896 N90R 20X	Ør –0.1	[mm]	44.8	59.8	79.8
u [mm] 26.5 31 44 v [mm] 26.4 31.4 29. v1 [mm] 31 37 33 v2 [mm] 36 42 44 w [mm] 28 41 55 x [mm] 76 93 10 y [mm] 18 19 11 z [mm] 14 14 14 SW [mm] 8 12 1 Part no. Swing direction 90° cw 1893 N90R 12XX 1895 N90R 16XX 1896 N90R 20X Swing direction 90° ccw 1893 N90L 12XX 1895 N90L 16XX 1896 N90L 20X	Øs +1	[mm]	45	60	80
v [mm] 26.4 31.4 29. v1 [mm] 31 37 3 v2 [mm] 36 42 4 w [mm] 28 41 5 x [mm] 76 93 10 y [mm] 18 19 1 z [mm] 14 14 1 SW [mm] 8 12 1 Part no. Swing direction 90° cw 1893 N90R 12XX 1895 N90R 16XX 1896 N90R 20X Swing direction 90° ccw 1893 N90L 12XX 1895 N90L 16XX 1896 N90L 20X	t	[mm]	9	10	11
v1 [mm] 31 37 33 v2 [mm] 36 42 44 w [mm] 28 41 55 x [mm] 76 93 100 y [mm] 18 19 11 z [mm] 14 14 14 SW [mm] 8 12 1 Part no. Swing direction 90° cw 1893 N90R 12XX 1895 N90R 16XX 1896 N90R 20X Swing direction 90° ccw 1893 N90L 12XX 1895 N90L 16XX 1896 N90L 20X	u	[mm]		31	40
v2 [mm] 36 42 4 w [mm] 28 41 55 x [mm] 76 93 10 y [mm] 18 19 1 z [mm] 14 14 1 SW [mm] 8 12 1 Part no. Swing direction 90° cw 1893 N90R 12XX 1895 N90R 16XX 1896 N90R 20X Swing direction 90° ccw 1893 N90L 12XX 1895 N90L 16XX 1896 N90L 20X	V	[mm]	26.4	31.4	29.4
w [mm] 28 41 55 x [mm] 76 93 10 y [mm] 76 93 10 y [mm] 18 19 1 z [mm] 14 14 1 SW [mm] 8 12 1 Part no. Swing direction 90° cw 1893 N90R 12XX 1895 N90R 16XX 1896 N90R 20X Swing direction 90° ccw 1893 N90L 12XX 1895 N90L 16XX 1896 N90L 20X	v1	[mm]	31	37	35
x [mm] 76 93 10 y [mm] 18 19 1 z [mm] 14 14 1 SW [mm] 8 12 1 Part no. Swing direction 90° cw 1893 N90R 12XX 1895 N90R 16XX 1896 N90R 20X Swing direction 90° ccw 1893 N90L 12XX 1895 N90L 16XX 1896 N90L 20X	v2	[mm]	36	42	40
x [mm] 76 93 10 y [mm] 18 19 1 z [mm] 14 14 1 SW [mm] 8 12 1 Part no. Swing direction 90° cw 1893 N90R 12XX 1895 N90R 16XX 1896 N90R 20X Swing direction 90° ccw 1893 N90L 12XX 1895 N90L 16XX 1896 N90L 20X	W	[mm]	28	41	55
y [mm] 18 19 1 z [mm] 14 14 1 SW [mm] 8 12 1 Part no. Swing direction 90° cw 1893 N90R 12XX 1895 N90R 16XX 1896 N90R 20X Swing direction 90° ccw 1893 N90L 12XX 1895 N90L 16XX 1896 N90L 20X	x		76	93	101
z [mm] 14 14 1 SW [mm] 8 12 1 Part no. Swing direction 90° cw 1893 N90R 12XX 1895 N90R 16XX 1896 N90R 20X Swing direction 90° ccw 1893 N90L 12XX 1895 N90L 16XX 1896 N90L 20X	у	[mm]	18		15
SW [mm] 8 12 1 Part no. Swing direction 90° cw 1893 N90R 12XX 1895 N90R 16XX 1896 N90R 20X Swing direction 90° ccw 1893 N90L 12XX 1895 N90L 16XX 1896 N90L 20X					12
Part no. 1893 N90R 12XX 1895 N90R 16XX 1896 N90R 20X Swing direction 90° ccw 1893 N90L 12XX 1895 N90L 16XX 1896 N90L 20X					17
Swing direction 90° cw 1893N90R12XX 1895N90R16XX 1896N90R20X Swing direction 90° ccw 1893N90L12XX 1895N90L16XX 1896N90L20X					
Swing direction 90° ccw 1893 N90L 12XX 1895 N90L 16XX 1896 N90L 20X			1893 N90R 12XX	1895N90B16XX	1896 N90 R 20 X X

XX: Version

DH = without switch rod, without metallic wiper DM = without switch rod, with metallic wiper MH = with switch rod, without metallic wiper MM = with switch rod, with metallic wiper

* Do not use manually-operated pumps, since a continuous flow rate is required.

Clamping arms and other accessoires see data sheet B 1.880.

Important notes

Swing clamps must only be used for clamping of workpieces in industrial applications and may only be operated with hydraulic oil. They can generate very high forces. The workpiece, the fixture or the machine must be in the position to compensate these forces.

In the effective area of piston rod and clamping arm there is the danger of crushing. The manufacturer of the fixture or the machine is obliged to provide effective protection devices.

The swing clamp has no overload protection device. When mounting the clamping arm, the clamping arm or the hexagon socket in the piston have to be backed up for tightening and untightening the fixing nut. During loading and unloading of the fixture and during clamping a collision with the clamping arm has to be avoided.

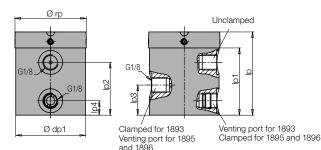
Remedy: Mount position adaptor.

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

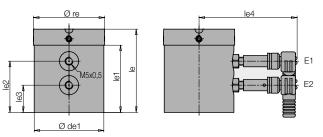
Accessory Position monitoring

Pneumatic position monitoring

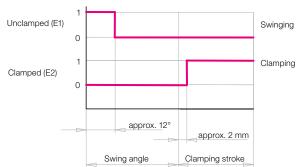
Function chart



Electrical position monitoring



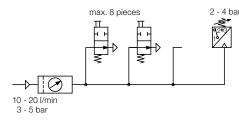
Function chart



Unclamped (P1)	1		Swinging
	0		
Clamped (P2)	1		Clamping
	0		
			_
_		approx. 4°approx. 2 mm	
		Swing angle	

Size		1893	1895	1896
ql	[mm]	52	59	65
ip1	[mm]	42	50	56
lp2	[mm]	33	40	46
Ip3	[mm]	18.8	22.8	23.8
lp4	[mm]	9	9	11
Ørp	[mm]	44.5	59.8	79.8
dp1	[mm]	43.5	50	50
le	[mm]	52	59	65
le1	[mm]	42	50	56
le2	[mm]	32	40	46
le3	[mm]	17	22	22
le4	[mm]	approx. 62	approx. 62	approx. 62
Øre	[mm]	44.5	59.8	79.8
de1	[mm]	43.5	50	50
Part no.				
Pneumatic position monitorir	ng, complete	0353896	0353892	0353903
Electrical position monitoring	1			
- without switch		0353897	0353893	0353902
- with standard switch		0353909	0353908	0353907

Control by pneumatic pressure switch



For the evaluation of the pneumatic pressure built-up standard pneumatic pressure switches can be used. It is possible to control with one pressure switch up to 8 position monitorings connected in series (see circuit diagram).

It has to be considered that process-safe functioning of pneumatic position monitorings is only guaranteed with throttled air and system pressure. The nominal values are indicated below technical data.

Technical data

for pneumatic pressure switches

Port		G 1/8
Nominal diameter	[mm]	2
Max. air pressure	[bar]	10
Range of operating pressure	e [bar]	35
Differential pressure*		
at 3 bar system pressure	[bar]	min. 1,5
Differential pressure*		
at 5 bar system pressure	[bar]	min. 3,5
Air flow**	[l/min]	1020

Pressure drop when controlling the function "Clamped", if one or several position monitorings are not operated.

** For measuring the air flow rate appropriate devices are available. Please contact us.

Delivery

The position monitorings are not delivered mounted at the swing clamp. The body, the signal sleeve and two inductive proximity switches with plug are included in the delivery.

Technical data

for inductive proximity sv	witches	5
Operating voltage UB	[V DC]	10 30
Switching function		interlock
Output		PNP
Body material	Stair	nless steel
Code class as per DIN 4005	50	IP 67
Environmental temperature	[°C]	-25 +70
Connection type		Plug
LED Function display		Yes
Constant current max.	[mA]	150
Nominal switch distance	[mm]	0.8
Short circuit proof		yes
Part no.		3829198

Installation

The control cam can be mounted at the switch rod in $4 \times 90^{\circ}$ position, thus allowing a $4 \times 90^{\circ}$ rotation of the position monitoring. The position monitoring is exactly centered at the swing clamp and is fixed after radial adjustment of the unclamping position with four threaded pins.

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