



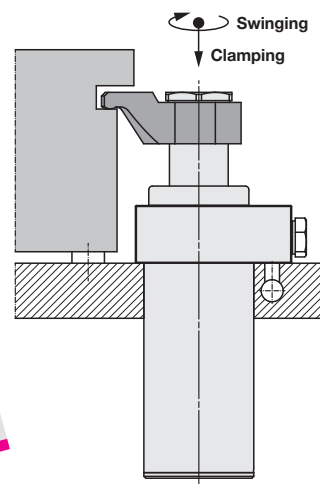
**Swing Clamps without Swing Stroke**

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
- Standard FKM wiper
- Metallic wiper optional



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**

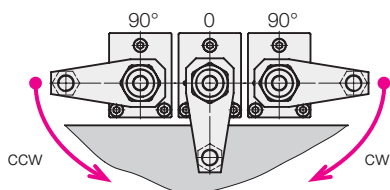
1. The piston rod is rotated together with the clamping arm without axial stroke (swing stroke) in the desired direction.
2. After swinging in the clamping arm above the clamping point, the linear clamping stroke will be effected.

**Unclamping**

1. For the linear return stroke, the clamping arm is lifted from the clamping point.
2. The piston rod swings the clamping arm without axial stroke back to the off-position.

**Swing direction**

Optionally available with clockwise or counter-clockwise swing motion.



**Standard swing angle is 90°**

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

**Special features**

**Swinging without axial stroke**

This version can clamp workpieces in recesses that are only insignificantly higher than the clamping arm.

**Reinforced swing mechanism**

The reinforced swing mechanism without overload protection device endures a collision of the clamping arm with the workpiece during clamping up to a pressure of 100 bar.

**Accessory - Position monitoring**

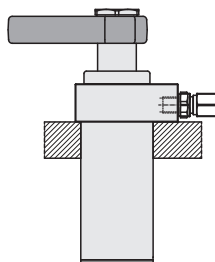
As an option, the swing clamps are available with an extended switch rod at the cylinder bottom. Here a control cam can be fixed to control the clamping and unclamping position. As accessories pneumatic and electrical position monitorings are available.

**Option - Metallic wiper**

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

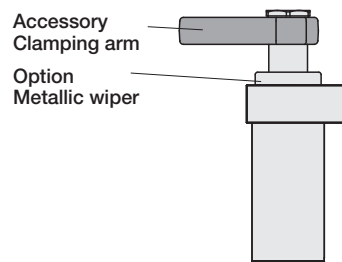
**Connecting possibilities**

**Pipe thread**

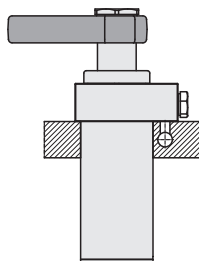


**Versions**

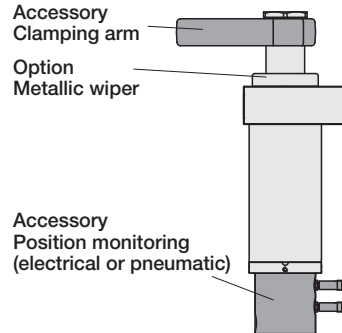
**DH, DM: without switch rod**



**Drilled channels**



**MH, MM: with switch rod**



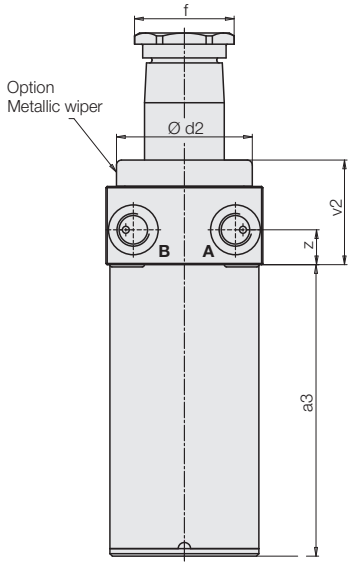
**Important notes**

See page 3.

# Dimensions Technical data

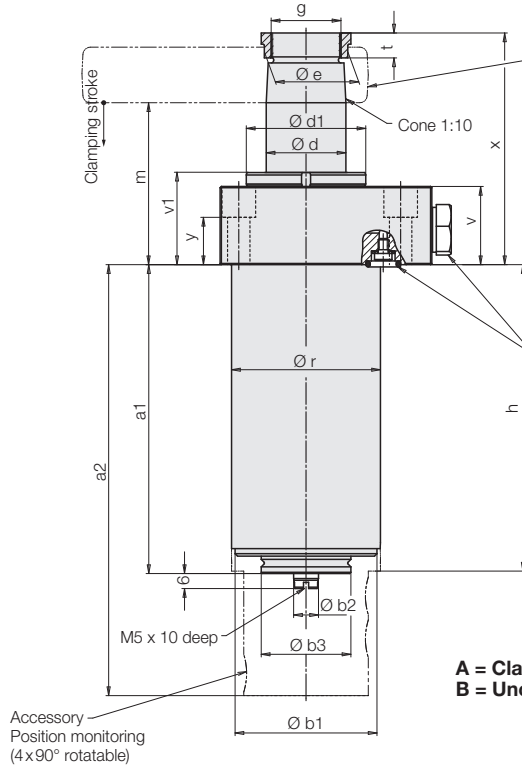
without switch rod

189X NXXX XX **DH**  
**DM**

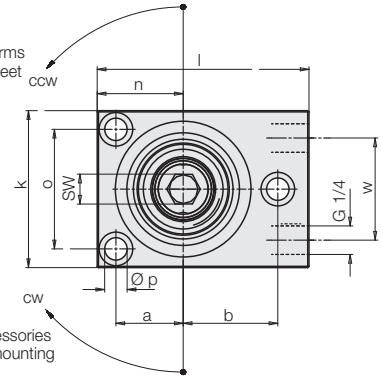


with switch rod

189X NXXX XX **MH**  
**MM**

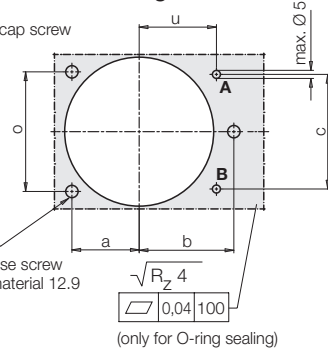


Accessory Clamping arms see data sheet B 1.880



Required accessories for manifold-mounting connection:  
2 O-rings 10x2 (3000347)  
and 2 screw plugs  
G 1/4 (3610006)  
(remove socket head cap screw and USIT-rings)

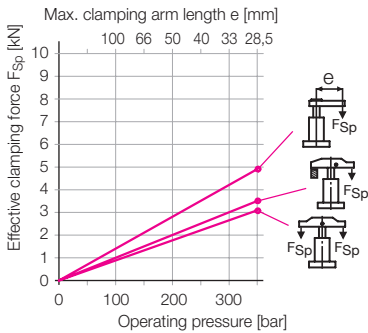
### Connecting scheme



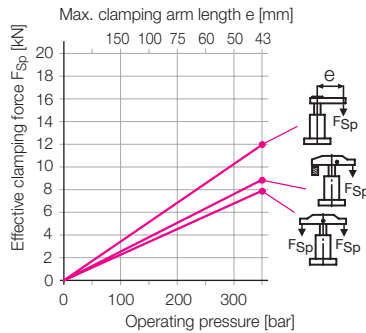
**A = Clamping**  
**B = Unclamping**

## Effective clamping force $F_{Sp}$ as a function of the operating pressure $p$

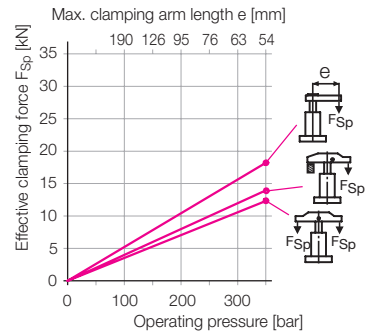
1893



1895



1896



## Dimensions Technical data

Size		1893	1895	1896
Max. force to pull at 350 bar	[kN]	6.1	15.8	24.7
Effective clamping force	[kN]		see diagram	
Clamping stroke	[mm]	12	16	20
Min. operating pressure	[bar]	50	50	50
Max. oil flow rate*	[cm <sup>3</sup> /s]	5...9	5...32	5...60
Oil required for swinging	[cm <sup>3</sup> ]	3.5	14.6	26.7
clamping stroke	[cm <sup>3</sup> ]	2.1	7.2	14.1
Total clamping	[cm <sup>3</sup> ]	5.6	21.8	40.8
Oil volume for unclamping stroke	[cm <sup>3</sup> ]	5.9	20.1	39.3
ditto with switch rod	[cm <sup>3</sup> ]	4.9	18.8	37.7
swinging back	[cm <sup>3</sup> ]	3.5	14.6	26.7
Total unclamping	[cm <sup>3</sup> ]	9.4	34.7	66
ditto with switch rod	[cm <sup>3</sup> ]	8.4	33.4	64.4
a	[mm]	20	27	37
a1	[mm]	107.5	132.5	175.6
a2	[mm]	148.5	181.5	230.6
a3	[mm]	99.5	125.5	168.6
b	[mm]	30	38	50
Ø b1	[mm]	41.8	57	77
Ø b2 f7	[mm]	10	10	10
Ø b3 f7	[mm]	30	36	36
c	[mm]	32	46	62
Ø d	[mm]	20	32	40
Ø d1	[mm]	38	48	60
Ø d2	[mm]	43	54.5	75
Ø e	[mm]	23.5	33.5	45
f	[mm]	30	40	55
g	[mm]	M 18x1.5	M 28x1.5	M 35x1.5
h	[mm]	106.5	131.5	174.6
i	[mm]	M 6	M 8	M 10
k	[mm]	50	63	85
l	[mm]	70	85	110
m -1	[mm]	55	65	67
n	[mm]	26.5	34.5	47
o	[mm]	37	48	65
Ø p	[mm]	6.6	9	11
Ø r -0.1	[mm]	44.8	59.8	79.8
Ø s +1	[mm]	45	60	80
t	[mm]	9	10	11
u	[mm]	26.5	31	40
v	[mm]	26.4	31.4	29.4
v1	[mm]	31	37	35
v2	[mm]	36	42	40
w	[mm]	28	41	55
x	[mm]	76	93	101
y	[mm]	18	19	15
z	[mm]	14	14	12
SW	[mm]	8	12	17

### Part no.

Swing direction 90° cw	<b>1893 N90R 12XX</b>	<b>1895 N90R 16XX</b>	<b>1896 N90R 20XX</b>
Swing direction 90° ccw	<b>1893 N90L 12XX</b>	<b>1895 N90L 16XX</b>	<b>1896 N90L 20XX</b>

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

### 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 as a continuous flow is required.

Clamping arms and other accessories 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.

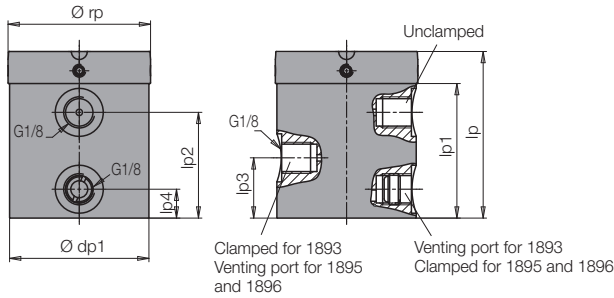
The manufacturer of the fixture or the machine is obliged to provide effective protection devices.

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.

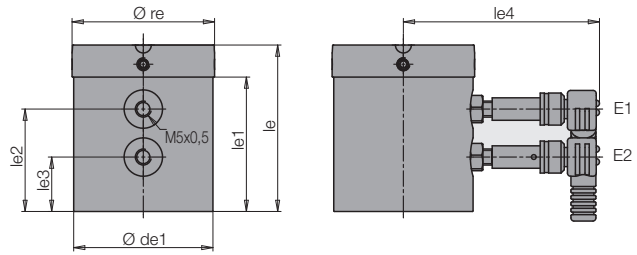
Remedy: Mount position adaptor.  
 Operating conditions, tolerances and other data see data sheet A 0.100.

# Accessories Position monitoring

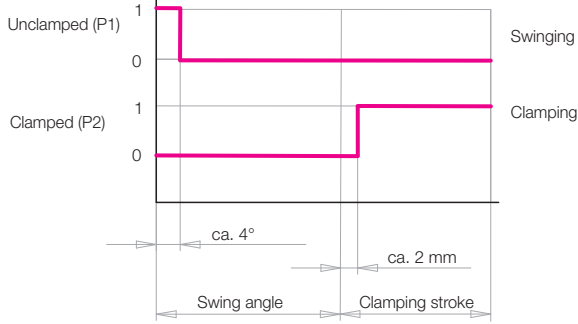
## Pneumatic position monitoring



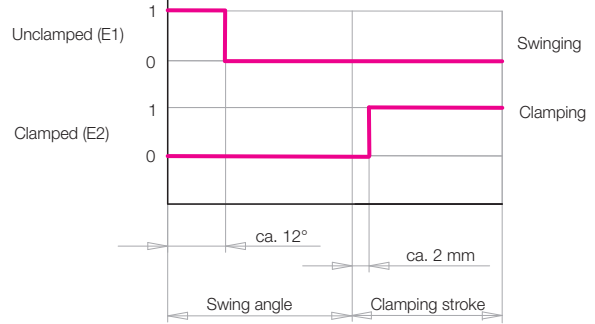
## Electrical position monitoring



### Function chart

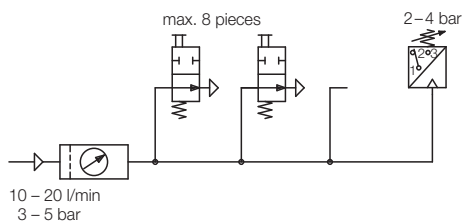


### Function chart



Size		1893	1895	1896
lp	[mm]	52	59	65
lp1	[mm]	42	50	56
lp2	[mm]	33	40	46
lp3	[mm]	18.8	22.8	23.8
lp4	[mm]	9	9	11
Ø rp	[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
Ø re	[mm]	44.5	59.8	79.8
de1	[mm]	43.5	50	50
<b>Part no.</b>				
Pneumatic position monitoring, complete		<b>0353896</b>	<b>0353892</b>	<b>0353903</b>
Electrical position monitoring				
- without switch		<b>0353897</b>	<b>0353893</b>	<b>0353902</b>
- with standard switch		<b>0353909</b>	<b>0353908</b>	<b>0353907</b>

## Monitoring by pneumatic pressure switch



For the evaluation of the pneumatic pressure build-up, standard pneumatic pressure switches can be used. It is possible to monitor 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 characteristics.

### Technical data for pneumatic pressure switches

Port		G 1/8
Nominal diameter	[mm]	2
Max. air pressure	[bar]	10
Range of operating pressure	[bar]	3...5
Differential pressure* at 3 bar system pressure	[bar]	min. 1.5
Differential pressure* at 5 bar system pressure	[bar]	min. 3.5
Air flow rate**	[l/min]	10...20

\* 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 switches

Operating voltage UB	10...30 VDC
Switching function	interlock
Output	PNP
Material of housing	steel, corrosion resistant
Protection as per DIN 40050	IP 67
Ambient temperature	-25...+70 °C
Type of connection	Plug S49 M8x1
LED function display	yes
Constant current max.	100 mA
Rated operating distance	0.8 mm
Protected against short circuits	yes
<b>Part no.</b>	<b>3829 198</b>
<b>Right angle plug with cable 5 m</b>	<b>3829 099</b>

### Installation

The control cam can be mounted at the switch rod in 4 x 90° position, thus allowing a 4 x 90° rotation of the position monitoring. The position monitoring is exactly centred at the swing clamp and is fixed after radial adjustment of the unclamping position with four threaded pins.