



Swing Clamps with Reinforced Swing Mechanism

**bottom flange, position monitoring optional,
pendulum eye/fork head, max. operating pressure 500/160 bar**



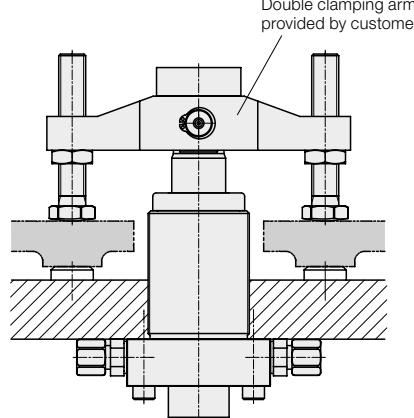
Advantages

- Introduction of clamping force without side loads
- Compact design
- Double clamping arm facilitates multiple clamping of similar workpieces
- Pendulum eye for high clamping forces
- Fork head for simple clamping arms
- Alternatively pipe thread or drilled channels
- Reinforced swing mechanism
- FKM wiper standard
- Available with position monitoring

Connecting possibilities

- Pipe thread
- Drilled channels

Function



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.

The version with pendulum eye or fork head allows simultaneous clamping of two workpieces with half clamping force.

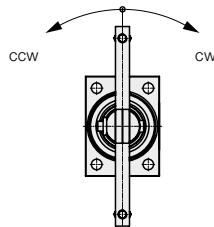
Function

The hydraulic swing clamp is a double-acting pull-type cylinder where a part of the total stroke is used to swing the piston.

Direction of rotation

The swing clamps are available with clockwise or counterclockwise swing motion.

Off-position is the extended piston position.



Process safety

To improve the process safety when using heavy double clamping arms the swing mechanism has been reinforced and an overload protection device has not been realised. During clamping the reinforced swing mechanism endures a collision of the clamping arm with the workpiece up to a pressure of 100 bar. All versions are also available with a switch rod at the cylinder bottom. The control cams are mounted at this rod to control the clamping and unclamping position with limit switches or pneumatically.

Adaptable position monitorings for inductive or pneumatic control are available as accessory (page 4).

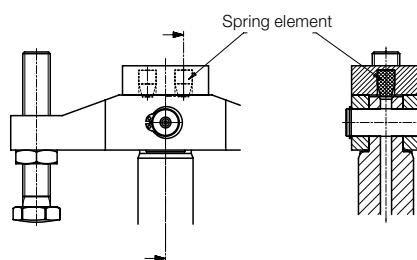
Description

The piston end of this swing clamp is designed as pendulum eye or fork head. By means of a double clamping arm 2 workpieces can be clamped at the same time.

For both versions a springy element is required in order to maintain the double clamping arm in the unclamped position in horizontal position.

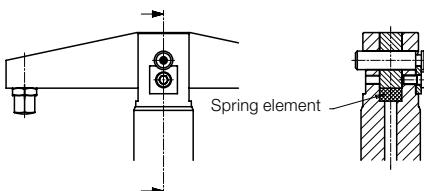
Pendulum eye

The sturdy pendulum eye can transmit high clamping forces up to a max. operating pressure of 500 bar. The double clamping arm has to be dimensioned according to the load.



Fork head

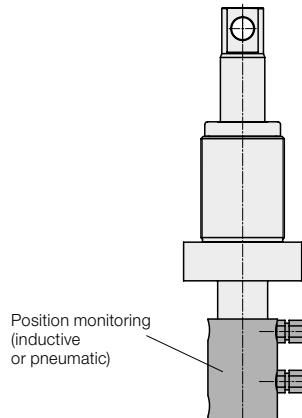
The fork head allows a max. operating pressure of 160 bar. Advantageous is the fact that relatively simple clamping arms can be manufactured from flat materials.



Option: metal wiper

The optionally available metallic wiper protects the FKM wiper against mechanical damage due to big or hot swarf.

Swing clamp with optional position monitoring (accessory)



Important notes

Danger of injury

Hydraulic clamping elements generate high clamping forces. Considerable injuries can be caused to fingers in the effective area of the double clamping arm.

Remedy: mount protection devices.

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

Clamping arm

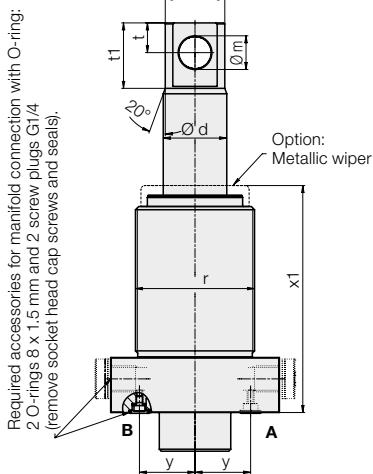
Due to the missing overload protection device a collision with the clamping arm during loading and unloading of the fixture must be avoided. Remedy: mount position adaptor.

The double clamping arm in clamping position should preferably be at right angles to the piston axis to avoid overload of the spring element. Both contact bolts must only contact the workpiece after completion of the swing stroke.

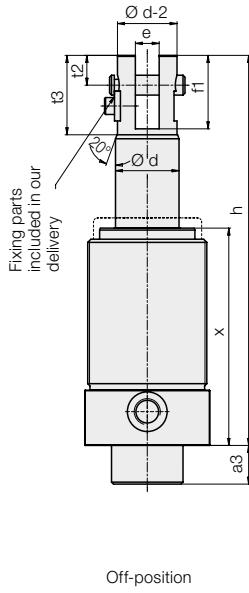
Please consider: For a newly designed double clamping arm, the moment of inertia must be determined to calculate the admissible flow rate using the formula on page 3.

Dimensions
Part no.

Pendulum eye 189X137X (500 bar)
without switch rod



Fork head 189X157X (160 bar)

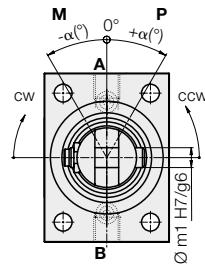
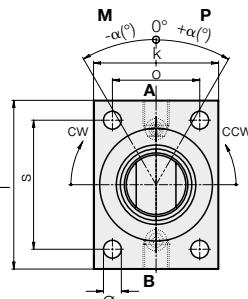
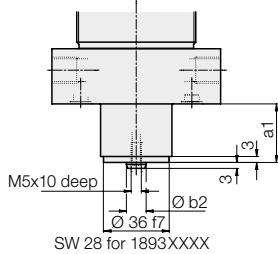


A = Clamping
B = Unclamping

Off-position

Off-position

With switch rod 189X1X6X



Accessory: position monitoring see page 4.

Part no.

1 8 9 X 1 X X X X X X X X

Piston rod Ø d

3 = 20 mm

5 = 32 mm

3 = Pendulum eye

5 = Fork head

6 = with switch rod

7 = without switch rod

M = Metallic wiper, mounted

Angle a for off-position

00 up to 90: 0° up to max. 90°
(graduation of 5°)

P (Plus) = + α see dimensional drawing

M (Minus) = - α

0 = α = 0°

0 = 90° clockwise swing motion

1 = 90° counterclockwise swing motion

2 = 75° clockwise swing motion

3 = 75° counterclockwise swing motion

4 = 60° clockwise swing motion

5 = 60° counterclockwise swing motion

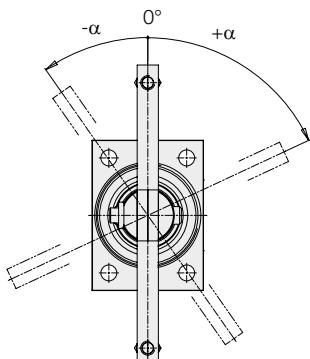
6 = 45° clockwise swing motion

7 = 45° counterclockwise swing motion

8 = 30° clockwise swing motion

9 = 30° counterclockwise swing motion

Swing angle $\pm 1^\circ$



1. Example of ordering

Piston rod diameter = 20 mm,
pendulum eye,
without switch rod,
swing angle 90° clockwise,
off-position 0°,
metallic wiper mounted
Part no.: 1893 1370000M

2. Example of ordering

Piston rod diameter = 32 mm,
fork head,
with switch rod,
swing angle 60° counterclockwise,
off-position -30°,
metallic wiper mounted
Part no.: 1895 1565 M30M

		1893	1895	
Clamping stroke	[mm]	25	22	
Swing stroke	[mm]	9	13	
Total stroke	[mm]	34	35	
Operating pressure, min.	[bar]	30	30	
Adm. flow rate for moment of inertia	[cm ³ /s] [kgm ²]	8 0.00032	20 0.002295	
Effective piston area				
Clamping	[cm ²]	1.76	4.52	
Unclamping	[cm ²]	4.9	12.56	
Oil volume/stroke	[cm ³]	6	15.8	
Oil to return	[cm ³]	16.7	44	
a1	[mm]	10	29.5	
a3	[mm]	-	19.5	
Ø b1 -0.1	[mm]	-	36	
Ø b2 f7	[mm]	10	10	
Ø d	[mm]	20	32	
e + 0.1	[mm]	8	12	
f	[mm]	20	32	
f1	[mm]	26	37	
g f7	[mm]	12	20	
h	[mm]	188.5	196.5	
k	[mm]	45	63	
l	[mm]	90	85	
Ø m H7	[mm]	10	16	
Ø m1 H7	[mm]	6	10	
o	[mm]	30	44	
Ø p	[mm]	6.5	9	
r	[mm]	M45x1.5	M60x1.5	
s	[mm]	50	65	
t	[mm]	9	15	
t1	[mm]	21	33	
t2	[mm]	10	15	
t3	[mm]	29	40	
x	[mm]	115.5	109.5	
x1	[mm]	120.5	114.5	
y	[mm]	29.5	28	

Accessories

Metallic wiper, complete (customer assembly)	0341 107	0341 100
O-Ring 8 x 1.5	3000 343	3000 343
Screw plug G 1/4	3610 264	3610 264

Admissible flow rate

The admissible flow rate indicated in the chart applies to the use of double clamping arms whose moment of inertia does not exceed the chart value.

The clamping time is thus approx. 0.8 seconds and the unclamping time approx. 2 seconds.

For new clamping arms with a different moment of inertia, the admissible flow rate can be calculated using the following formula:

$$Q_2 = Q_1 \times \sqrt{\frac{J_1}{J_2}} \quad [\text{cm}^3/\text{s}]$$

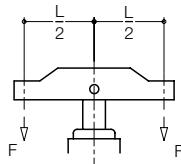
Q_1 = Adm. flow rate (chart value)

Q_2 = Adm. flow rate with the moment of inertia of the new clamping arm J_2

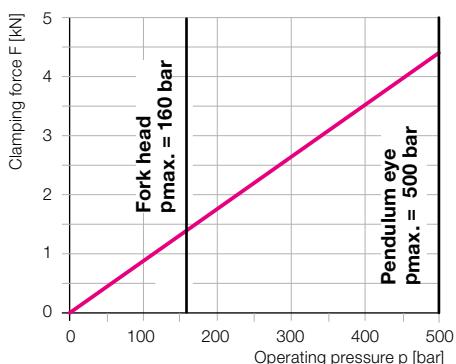
J_1 = Moment of inertia (chart value)

J_2 = Moment of inertia of the new clamping arm

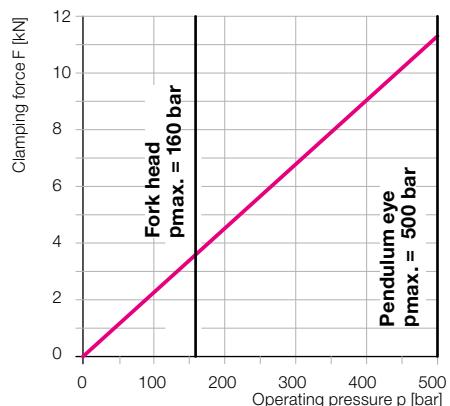
Clamping force F as a function of the operating pressure p



1893 1XXXX



1895 1XXXX

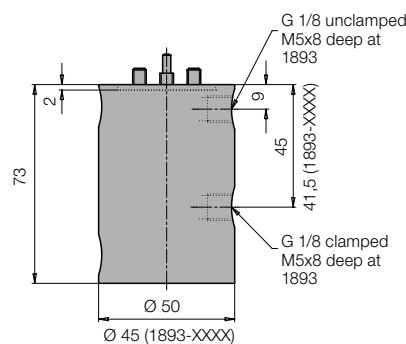


Accessory - Position Monitorings

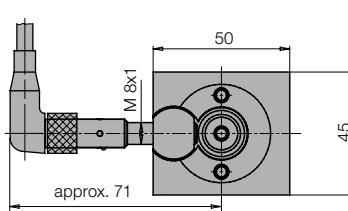
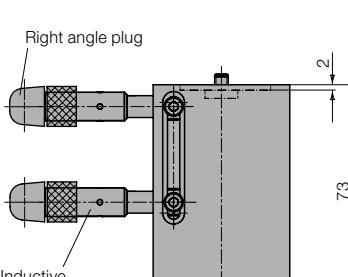
Delivery

The position monitorings are not delivered mounted at the swing clamp.
Fixing screws and signal sleeve are included in the delivery.
Electrical position monitorings are delivered with 2 inductive proximity switches and 2 right angle plugs.
The housings can be mounted rotated by 2x180° (1893) or 8x45°.

Pneumatic position monitoring



Electrical position monitoring



for 1893

Part no.

0353867

for 1895

0353808

for 1893

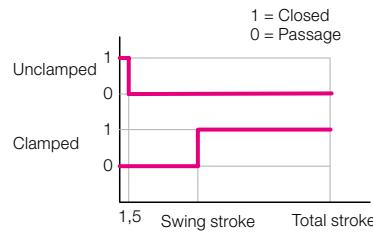
Part no.

0353868

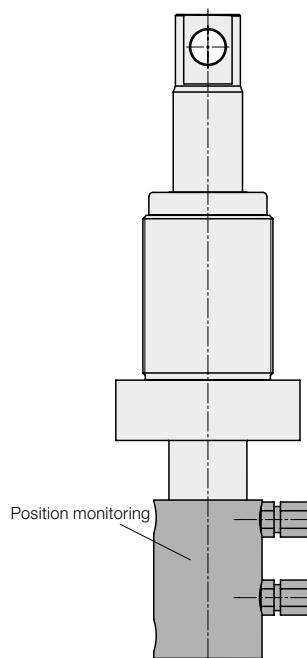
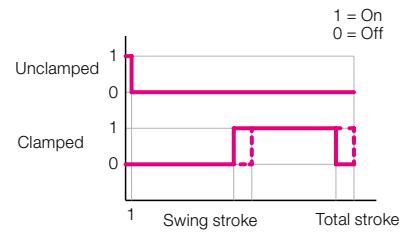
for 1895

0353814

Function chart



Function chart



Technical data for proximity switches

Voltage	10...30 V DC
Residual ripple max.	15 %
Constant current max.	200 mA
Switching function	interlock
Output	PNP
Body material	stainless steel
Code class	IP 67
Environmental temperature	-25...+70°C
Connection	Plug
Length of cable	5 m
LED function display	Yes
Protected against short circuits	Yes