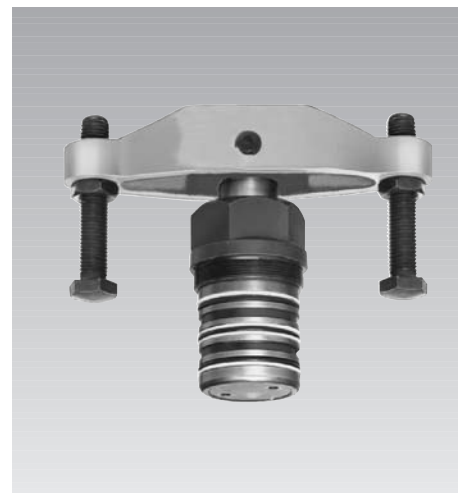
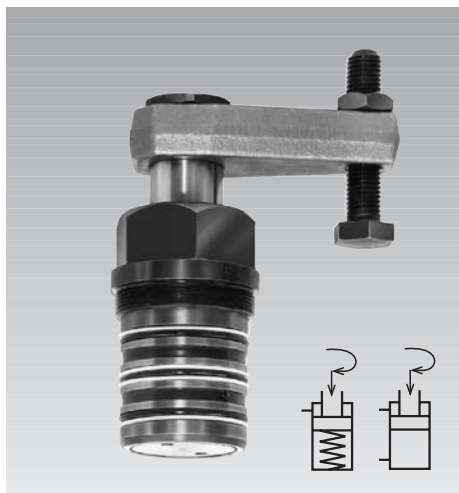




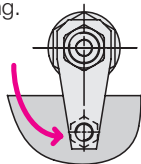
## Swing Clamps with Overload Protection Device

threaded-body type, single and double acting,  
 max. operating pressure 500 bar



### Application

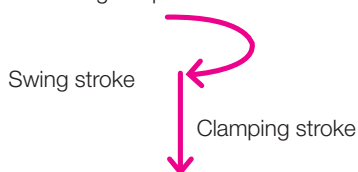
Hydraulic swing clamps are used for clamping of workpieces when it is essential to keep the clamping area free of straps and clamping components for unrestrained workpiece loading and unloading.



Clamping arms and strap type clamps are fastened to the piston rod by means of a taper shank and socket connection.

### 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.

Metallic wiper  
 optional

### Option: metallic wiper

In addition to the FKM wiper all double-acting swing clamps can be equipped with a metallic wiper.

Part-no.: Add only letter "M" to the part number of the swing clamp without metallic wiper.

### Example of ordering:

Swing clamp 1893-101  
 with metallic wiper: **1893-101M**

### Version

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

All units are equipped with piston rod wipers.

### Materials

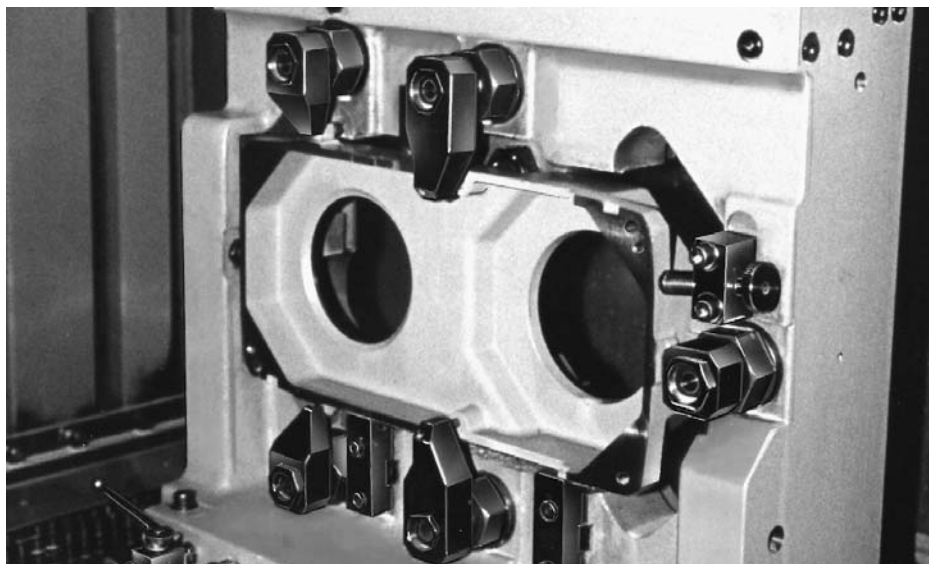
By nitrating piston and housing, wear is reduced and protection against corrosion increased.

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

### Important notes

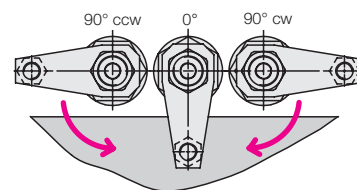
Operating conditions, tolerances and other data see data sheet A 0.100.  
 It is absolutely necessary to follow the instructions for venting of the spring area on data sheet A 0.110.

### Application example



### Swing direction

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



### Standard swing angles are 45°, 60°, and 90° ± 2°.

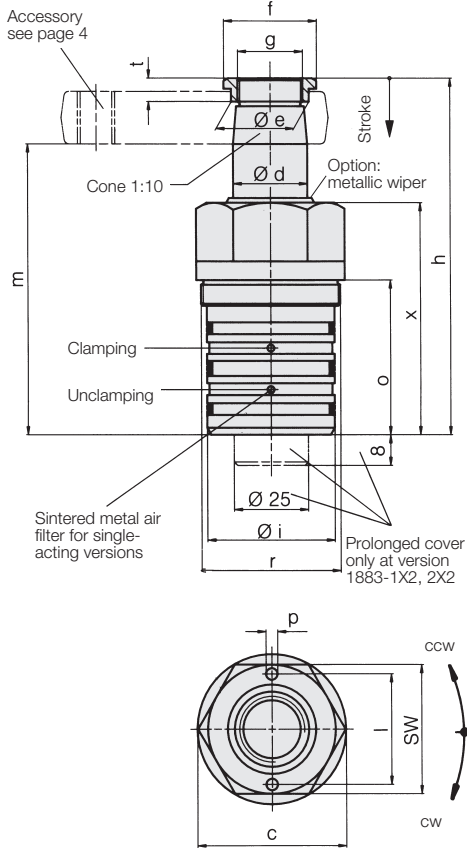
Special angles on request.

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

### 0°-Version

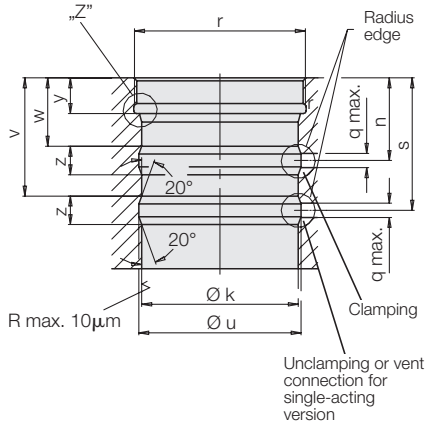
Use as pure pull-type cylinder with a piston which is secured against torsion and which allows eccentric load as per clamping force diagram.

## Dimensions Technical Data



Oil volume / stroke	[cm <sup>3</sup> ]	3.2	10.0	27.7
Oil volume / return stroke	[cm <sup>3</sup> ]	8.8	27.7	74.8
Total stroke	[mm]	18	22	24
Swing stroke	[mm]	7	8	9
Clamping stroke	[mm]	11	14	15
Operating pressure to swing min.	[bar]	30	30	30
<b>Max. oil flow rate</b>	[cm <sup>3</sup> /s]	3.2	10.0	27.7
c	[mm]	52	64	100
Ø d	[mm]	20	32	50
Ø e	[mm]	23.5	33.5	55.5
f	[mm]	30	40	68
g	[mm]	M 18x1.5	M 28x1.5	M 45x1.5
h	[mm]	112	152	182
Ø i f7	[mm]	42	55	85
Ø k H7	[mm]	42	55	85
l	[mm]	-	-	80
m	[mm]	91-1	124-1	142-1 (145-1)◇
n	[mm]	24	29	41
o	[mm]	53	66	96
Ø p/deep	[mm]	-	-	8/9
Ø q max.	[mm]	5	5	6
r	[mm]	M 45x1.5	M 60x1.5	M 90x2
s	[mm]	41	46,5	64
t	[mm]	9	10	12
Ø u	[mm]	44	57	87
v	[mm]	37	41,5	59
w	[mm]	20	24	36
x	[mm]	70	99	116
y	[mm]	10,5	12,5	20,5
z	[mm]	8	10	10
SW	[mm]	46	55	95

### Manifold mounting hole



### Part-no., single acting

Swing direction cw	<b>1883-102</b>	<b>1885-102</b>	<b>1887-102</b>
Swing direction ccw	<b>1883-202</b>	<b>1885-202</b>	<b>1887-202</b>

### Part-no., double acting

Clockwise rotation	<b>1893-101</b>	<b>1895-101</b>	<b>1897-101</b>
Counterclockwise rotation	<b>1893-201</b>	<b>1895-201</b>	<b>1897-201</b>

Seal kit for external seals	<b>0131-524</b>	<b>0131-526</b>	<b>0131-528</b>
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### Other swing angles

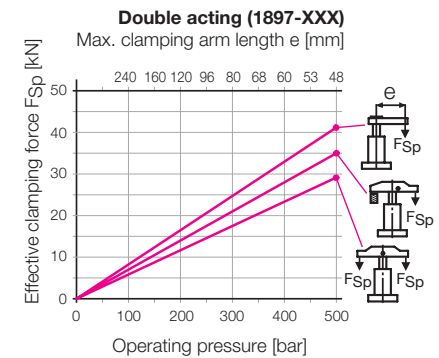
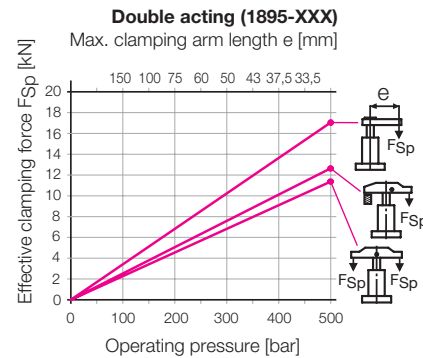
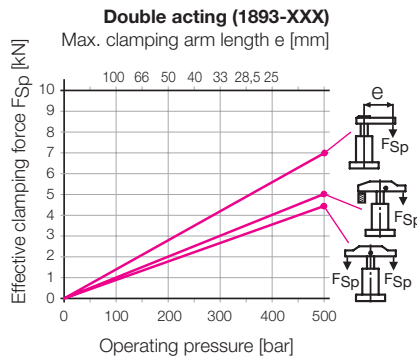
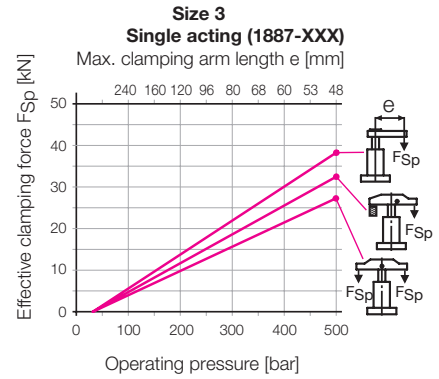
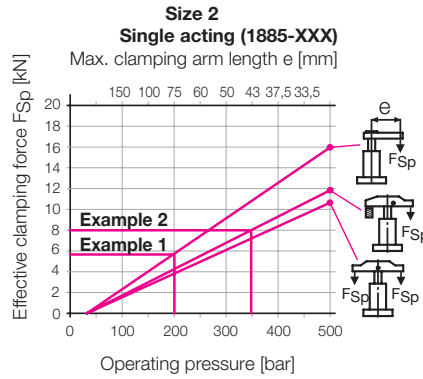
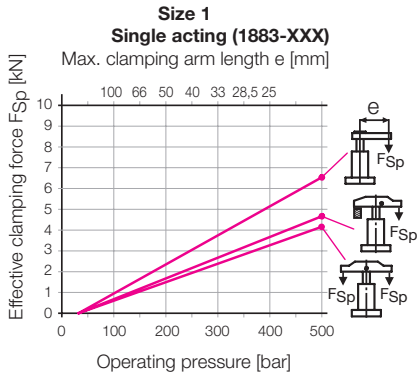
Swing angle	Part-no.
90°	18XX-X0X
60°	18XX-X2X
45°	18XX-X3X
0°	18XX-14X

◇ (145-1) for clamping arm 0354-004

\* See page 3:  
Max. oil flow rate

**Option metallic wiper**  
for double-acting swing clamps  
**partn-no.: 189X-XXXM**

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



Note:

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:** 1885-102 single acting. An operating pressure  $p$  of 200 bar in connection with standard clamping arm 0354-003 of max. arm length  $L = 75$  mm results in an effective clamping force  $F_{Sp}$  of 5.8 kN.

**Example 2:** 1885-102 single acting. For a desired effective clamping force  $F_{Sp}$  of 8 kN and use of a swing clamp 1885-102 with a standard clamping strap 0354-002 an operating pressure  $p$  of 345 bar is required.

Important notes

1. Danger of injury

Hydraulic clamping elements can generate considerable forces. Due to the 90° swing motion, the exact clamping and unclamping position cannot be determined in advance. Considerable injuries can be caused to fingers in the effective area of the clamping arm. Remedy: protection device with electrical locking.

2. Maximum 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.

3. Unimpeded swing motion

The swing motion must not be impeded and the clamping arm may only contact the workpiece after completion of the swing stroke.

4. Clamping arm assembly

In case of this threaded-body type the clamping arm can only be fixed, after firm screwing in of the housing, since the final position cannot be determined in advance. When tightening and untightening the fixing screw, the clamping arm has to be backed up to avoid the introduction of moments to the piston rod.

5. Adjustment of contact bolt

The contact bolt may only contact the workpiece after completion of the swing motion. When tightening and untightening the fixing screw, the clamping arm has to be backed up (see 4.).

6. Special clamping arms

When using special clamping arms with other lengths, the corresponding operating pressures as shown in the clamping force diagram must not be exceeded. If longer clamping

arms will be used, not only the operating pressure but also the flow rate have to be reduced (see 2.).

7. Venting of spring area

The spring area of single-acting swing clamps has to be vented to avoid problems in functioning. A sintered metal air filter avoids penetration of contaminations. If there is a possibility that cutting lubricants and coolants penetrate through the sintered metal air filter into the cylinder's interior, a vent hose has to be connected and be placed in a protected position (see data sheet A 0.110).

8. Bleeding

Air in the oil prolongs the clamping time considerably and leads to function problems. Therefore bleeding has to be effected during start up. The threaded-body swing clamp has no possibility for bleeding at the element itself. Remedy: plug the oil channels in the fixture body at the end. If required, loosen the plugs carefully and pump at low oil pressure until bubblefree oil comes out. Retighten the plugs.

