**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.

Due to the sturdy swing mechanism these swing clamps are particularly suited for:

- Automatic manufacturing systems
- Clamping fixtures with workpiece loading via handling systems
- Transfer lines
- Test systems for motors, gears and axes
- Assembly lines
- Special machine tools

**Description**

The hydraulic swing clamp is a pull-type cylinder where a part of the total stroke is used to swing the piston. The favourable area ratio (piston/piston rod) allows high clamping forces already at relatively low oil pressures.

For high flow rates the swing speed is limited by an orifice in the clamping port. Thus, uniform clamping of several swing clamps is also possible when oil supply is effected through a common bore.

Due to the sturdy swing mechanism the angle position of the clamping arm remains the same after a slight collision with the workpiece during loading or unloading. Also a collision during the clamping process is not critical.

**Version without bottom cover**

Focusing on a short length, the bottom cover had been omitted. The piston contacts the bottom of the cartridge-type hole.

**Advantages**

- 4 sizes available
- Short version without bottom cover
- Minimum flange dimensions
- High clamping force at low pressures
- Sturdy swing mechanism
- Insensitive against high flow rates
- Indexing of the clamping arm in a specified position is possible
- Special swing angle easily realizable
- Standard FKM wiper
- Metallic wiper optional
- Mounting position: any

**Swing direction**

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

The swing angle can be limited by the insertion of distance plates (see page 2).

**Wiper system**

The standard FKM wiper has a high chemical resistance against most cooling and cutting fluids. The optional metallic wiper protects the FKM wiper against mechanical damage due to big or hot swarf. It consists of a radially floating wiping disk and a retaining disk. The metallic wiper can be delivered already mounted ("M") or as an accessory for retrofitting (see page 4).

**Position monitoring as accessory**

Clamping arm complete with angle bracket (page 4). Pneumatic position monitoring (page 5).

**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 or 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.
**Dimensions**

**Accessories**

Nut included in the delivery. Spare nut see page 4. For indexing a pin 3mmx6 (3301281) can be inserted. (Not included in the delivery).

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**Swing angle**

1. **Swing angle 90° (standard)**
   - Part no.
     - 90° cw 184X F090 RXX
     - 90° ccw 184X F090 LXX
     - 0° 184X F000 0XX

2. **Swing angle \( \alpha < 90° \)**
   - \( \alpha = 15° \) to 75° in gradation of 5°
   - By insertion of a distance plate the return stroke of the piston is reduced and thus the swing angle is reduced.
   - Clamping stroke and clamping position remain the same. The swing stroke and the dimensions h, m and x are reduced by y:
     - \( y = (90° - \alpha) \times k \) (k see chart page 3)
   - **Example:**
     - Swing clamp 1845 F090L30
     - Desired swing angle 45° ccw
     - Part no. 1845 F045L30
   - Shortening:
     - \( y = (90° - \alpha) \times 0.12 \text{ mm/°} = 5.4 \text{ mm} \)

3. **Swing angle > 90°**
   - Available on request!
Technical data

<table>
<thead>
<tr>
<th>Max. pulling force [kN]</th>
<th>7.5</th>
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<td>Effective clamping force [kN]</td>
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<td>Clamping stroke [mm]</td>
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<td>Swing stroke [mm]</td>
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<td>Total stroke +0.4/-0.3 [mm]</td>
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<tr>
<td>Min. operating pressure [bar]</td>
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<td>Max. flow rate Clamping [cm³/s]</td>
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<td>14</td>
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<td>Unclamping [cm³/s]</td>
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<td>28</td>
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<td>Effective clamping force [kN]</td>
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<td>20</td>
<td>28</td>
<td>60</td>
<td>110</td>
</tr>
</tbody>
</table>

Effective clamping force with accessory clamping arm as a function of the oil pressure

Part no.
- Clockwise rotation 90°: 1843 F090 R23 M, 1844 F090 R24 M, 1845 F090 R30 M, 1846 F090 R36 M
- Counterclockwise rotation 90°: 1843 F090 L23 M, 1844 F090 L24 M, 1845 F090 L30 M, 1846 F090 L36 M
- 0 degree: 1843 F000 023 M, 1844 F000 024 M, 1845 F000 030 M, 1846 F000 036 M

Effective clamping force for other lengths see page 4.

Römheld GmbH
Actual issue see www.roemheld-group.com

Subject to modifications
Clamping arm, max. 350 bar

Special clamping arm
1. Connecting dimensions

2. Admissible flow rate Q*

In the chart on page 3, the admissible flow rates for clamping and unclamping with the clamping arms (accessories) are specified. Longer special clamping arms have a higher torque of inertia. To avoid an overload of the swing mechanism, the flow rate has to be reduced:

2.1 Moments of inertia are known

\[ Q_s = Q \times \sqrt{\frac{J}{J_s}} \text{ cm}^3/\text{s} \]

\[ Q_s = \text{Flow rate with special clamping arm} \]
\[ Q = \text{Flow rate as per chart (page 3)} \]
\[ J_s = \text{Moment of inertia of the clamping arm (accessory) with contact bolt (chart)} \]
\[ J = \text{Moment of inertia special clamping arm} \]

* Only for vertical mounting position!

Swing clamps

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<tr>
<th>Part no.</th>
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<td>3548 661</td>
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<td>Moment of inertia of J [kgm²]</td>
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<td>0354 158</td>
<td>0354 159</td>
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<td>30</td>
<td>42</td>
<td>90</td>
</tr>
</tbody>
</table>

Special clamping arm

2.2 Moments of inertia not known

This simplified calculation is only applicable for clamping arms of the above shape.

Example:
Swing clamps 1843
L = 70 mm
e = 35 mm as per above chart
Q = 10 cm³/s (as per chart page 3)

1. Extension factor \( x \) = \( \frac{L}{e} = \frac{70}{35} = 2 \)
2. Flow rate factor as per diagram \( y = 0.35 \)
3. Max. flow rate \( Q = y \times Q_s = 0.35 \times 10 \text{ cm}^3/\text{s} = 3.5 \text{ cm}^3/\text{s} \)
4. Min. clamping time as per diagram \( \approx 1.4 \text{ s} \)
Application

The pneumatic position monitoring signals the following conditions by closing two bore holes:

Clamping arm in clamping position and piston in clamping area

By the pressure increase in the pneumatic line an electro-pneumatic pressure switch or a differential pressure switch can be actuated. These electrical switching devices are integrated in the electric control so that on the clamping fixture no electricity is required.

Description

The control bolt is fitted with small clearance into the housing and is maintained by spring force in the off-position. All components are made of stainless steel. The pneumatic is preferably supplied and removed through drilled channels; this offers an optimum swarf protection. Optionally, also pneumatic hoses NW2 can be connected.

Monitoring by pneumatic pressure switch

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

Switching range 2 ÷ 9 mm

Part no. 0353921

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.

Port A closed.

E = Input
A = Output

Connecting scheme

2 connecting bores max. Ø 2.8

Pneumatic port

Drilled channels

The position monitoring is fixed to the above connecting scheme with inserted O-rings. With the indicated distance dimensions the position monitoring is directly located at the flange of the swing clamp and has thus the correct distance for the operation of the clamping arm.

Hose connection

Remove the plugs M3 and screw-in the insertion nipple fitting M5 (accessory). The O-rings remain inserted for sealing at the flange-mounting surface.

Important notes

When adjusting the control cam it has to be considered that the control bolt will only be operated after completion of the swing stroke. Within the clamping range the control bolt should have a stroke reserve of approx. 1 mm also for idle strokes (without workpiece) to avoid mechanical damage.

Throttling of the flow rate

A flow rate throttling always has to be effected in the supply line to the swing clamp. This avoids a pressure intensification and thereby pressures exceeding 350 bar.