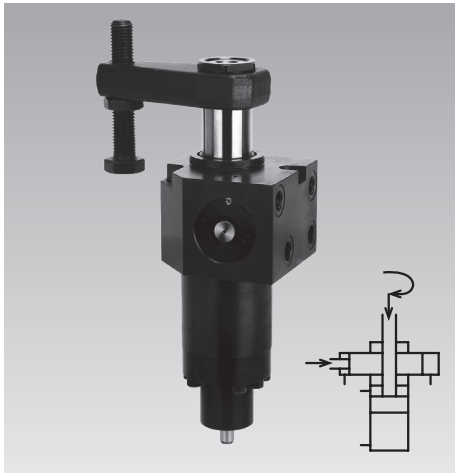




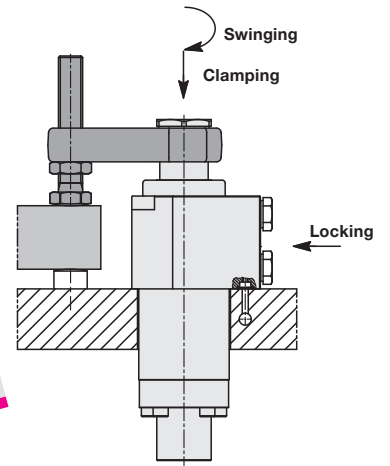
**Swing Clamp with Piston Rod Locking**

Top flange, reinforced swing mechanism, position monitoring optional, double acting, max. operating pressure 250 bar



**Advantages**

- High process safety
- Self-locking patented piston rod locking
- Reinforced swing mechanism
- Optional position monitoring electrical or pneumatic
- Compact design
- Alternatively pipe thread or drilled channels
- Standard FKM wiper
- 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.

The version with piston rod locking maintains the clamping force also after a pressure drop.

This series is particularly suited for

- Pallet changing systems
- Transfer lines
- Workpiece change with handling systems
- Automatic manufacturing systems
- Assembly lines
- Test systems for motors, gears, axis ...

**Function**

The hydraulic swing clamp is a pull-type cylinder where a part of the total stroke is used to swing the piston. The piston rod locking is made by a separately-controlled double-acting wedge-shaped piston.

Clamping: 1. Swinging and clamping  
2. Locking

Unclamping: 1. Release locking  
2. Unclamping and swinging back

**Self-locking**

The wedge-shaped piston is designed as a self-locking piston so that the swing clamp can be depressurised after clamping. The previously generated clamping force will be maintained. Conditions: Before depressurising, the locking pressure must be available at least for 3 seconds.

**Control and important notes**

See page 4.

**Special features**

**Self-locking piston rod locking**

The patented piston rod locking is made by friction locking by a separately-controllable double-acting wedge-shaped piston with self-locking. In the case of a pressure drop or complete pressure reduction, the clamping force will be maintained.

**Reinforced swing mechanism**

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

**Accessory - Position monitoring**

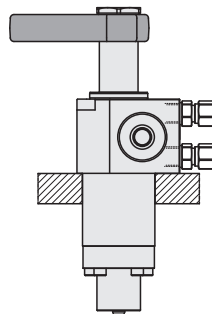
As an option, the swing clamps are available with an extended switch rod at the cylinder bottom. Here a control cam can be fixed to control the clamping and unclamping position. As accessories pneumatic and electrical position monitorings are available.

**Option: metallic wiper**

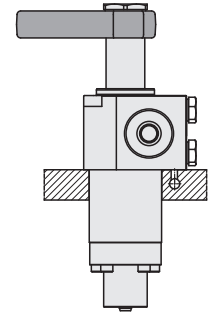
The optionally available metallic wiper protects the FKM wiper against mechanical damage.

**Connecting possibilities**

**Pipe thread**

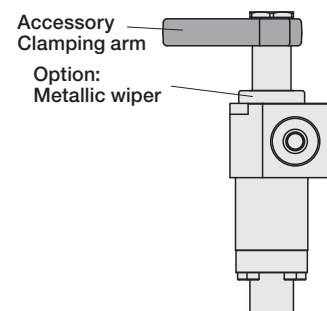


**Drilled channels**

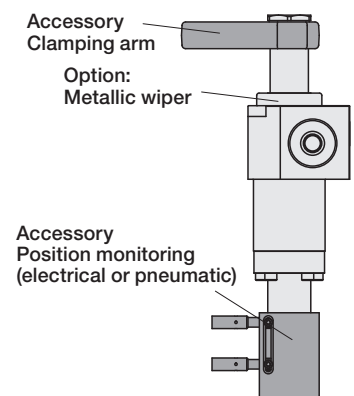


**Versions**

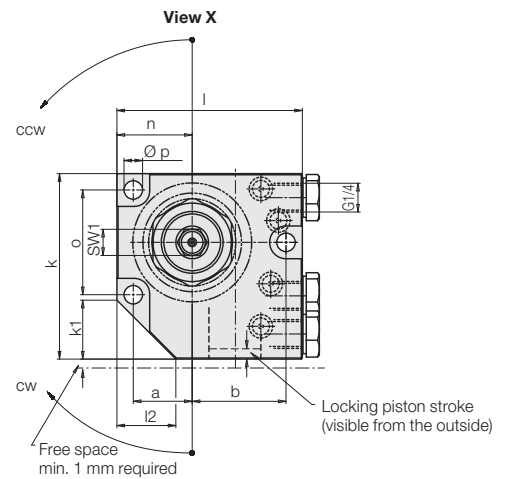
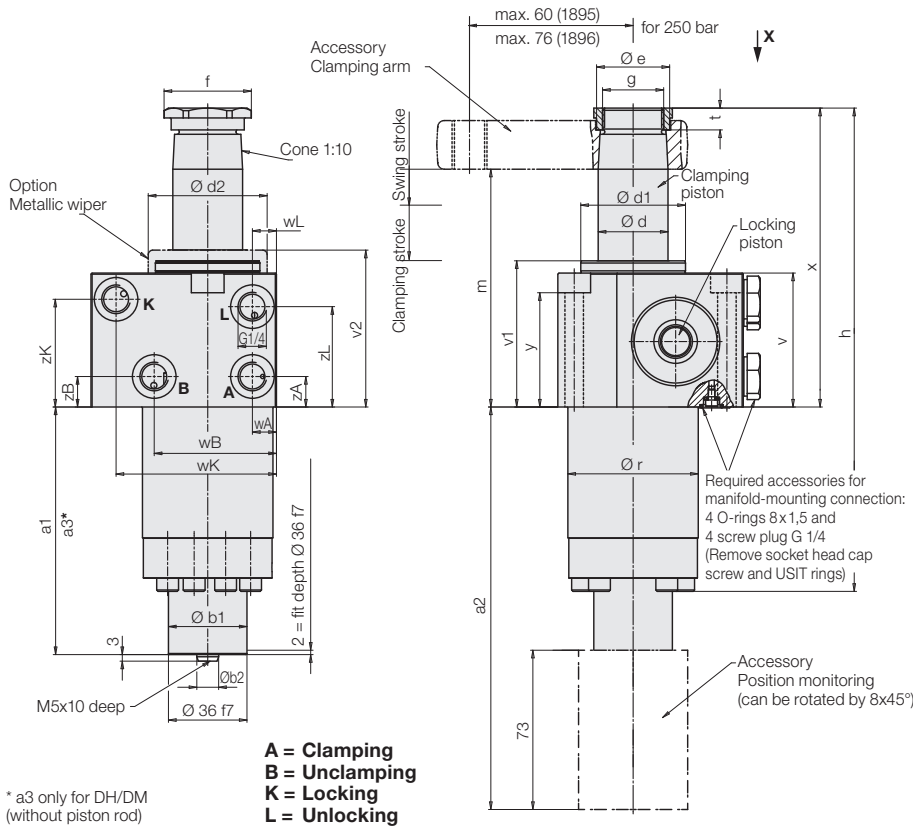
**KDH, KDM: without switch rod**



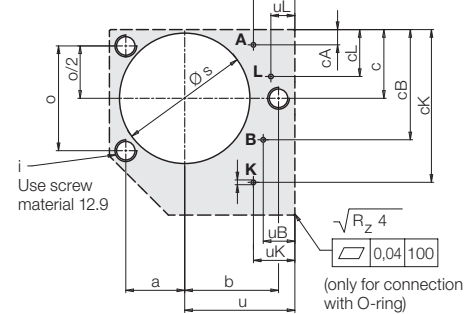
**KMH, KMM: with switch rod**



# Dimensions Position monitoring

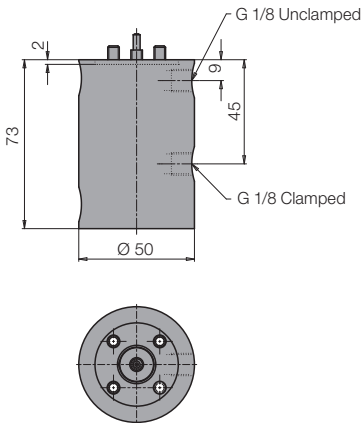


### Connecting scheme

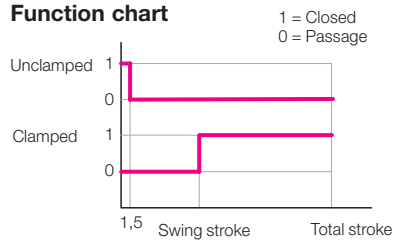


Ports A, B, K, L: max. Ø 6 mm

### Accessory - Position monitoring Pneumatic position monitoring

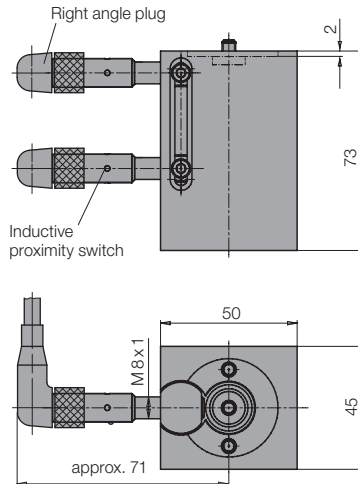


### Function chart

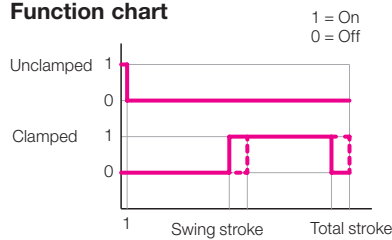


| Part no. | for 1895       | for 1896       |
|----------|----------------|----------------|
|          | <b>0353808</b> | <b>0353809</b> |

### Electrical position monitoring



### Function chart



| Part no.               | for 1895       | for 1896       |
|------------------------|----------------|----------------|
| without switch         | <b>0353815</b> | <b>0353813</b> |
| with standard switches | <b>0353814</b> | <b>0353811</b> |

### Technical data for proximity switches

|                                  |                 |
|----------------------------------|-----------------|
| Operating 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 type                  | Plug            |
| Length of cable                  | 5 m             |
| LED Function display             | Yes             |
| Protected against short circuits | Yes             |

### Delivery

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

| Part no.         | O-ring (spare part) |
|------------------|---------------------|
| Proximity switch | <b>3829077</b>      |
| Right angle plug | <b>3829088</b>      |

Further proximity switches see data sheet B 1.552

For the evaluation of the pneumatic position monitoring we recommend a differential pressure switch, which allows a parallel connection of max. 8 swing clamps.

## Dimensions Technical data

|                                   |                      |                                    |                                    |
|-----------------------------------|----------------------|------------------------------------|------------------------------------|
| Max. force to pull at 250 bar     | [kN]                 | 11.3                               | 17.6                               |
| Effective clamping force          | [kN]                 | see diagram                        |                                    |
| Clamping stroke                   | [mm]                 | 22                                 | 20                                 |
| Swing stroke                      | [mm]                 | 13                                 | 16                                 |
| Total stroke                      | [mm]                 | 35 <sup>+0.4</sup> <sub>-0.3</sub> | 36 <sup>+0.3</sup> <sub>-0.2</sub> |
| Min. operating pressure           | [bar]                | 30                                 | 30                                 |
| Max. flow rate                    | [cm <sup>3</sup> /s] | 20                                 | 36                                 |
| Oil volume/max. stroke            | [cm <sup>3</sup> ]   | 18.4                               | 29.8                               |
| Oil volume/max. return stroke     | [cm <sup>3</sup> ]   | 44.4                               | 72.9                               |
| a                                 | [mm]                 | 27                                 | 37                                 |
| a1 only MH/MM                     | [mm]                 | 113.5                              | 129                                |
| a2                                | [mm]                 | 184.5                              | 200                                |
| a3* only DH/DM                    | [mm]                 | 103.5                              | 116                                |
| b                                 | [mm]                 | 43                                 | 55                                 |
| Ø b1                              | [mm]                 | 36                                 | 45                                 |
| Ø b2 f7                           | [mm]                 | 10                                 | 12                                 |
| c                                 | [mm]                 | 31.5                               | 40.5                               |
| cA                                | [mm]                 | 7                                  | 9.5                                |
| cB                                | [mm]                 | 50.5                               | 72                                 |
| cK                                | [mm]                 | 70                                 | 89.5                               |
| cL                                | [mm]                 | 21.5                               | 25                                 |
| Ø d                               | [mm]                 | 32                                 | 40                                 |
| Ø d1                              | [mm]                 | 48                                 | 60                                 |
| Ø d2                              | [mm]                 | 54.5                               | 75                                 |
| Ø e                               | [mm]                 | 33.5                               | 45                                 |
| f                                 | [mm]                 | 40                                 | 55                                 |
| g                                 | [mm]                 | M28x1.5                            | M35x1.5                            |
| h                                 | [mm]                 | 221.5                              | 253.8                              |
| i                                 | [mm]                 | M 8                                | M 10                               |
| k                                 | [mm]                 | 85                                 | 110                                |
| k1                                | [mm]                 | 27                                 | 35                                 |
| l                                 | [mm]                 | 85                                 | 110                                |
| l2                                | [mm]                 | 27                                 | 35                                 |
| m ±1                              | [mm]                 | 109.4                              | 117.9                              |
| n                                 | [mm]                 | 34.5                               | 47                                 |
| o                                 | [mm]                 | 48                                 | 65                                 |
| Ø p                               | [mm]                 | 8.5                                | 10.5                               |
| Ø r -0.1                          | [mm]                 | 59.8                               | 79.8                               |
| Ø s +1                            | [mm]                 | 60                                 | 80                                 |
| t                                 | [mm]                 | 10                                 | 11                                 |
| u                                 | [mm]                 | 50.5                               | 63                                 |
| uA                                | [mm]                 | 19                                 | 23                                 |
| uB                                | [mm]                 | 14.5                               | 12.5                               |
| uK                                | [mm]                 | 19                                 | 21                                 |
| uL                                | [mm]                 | 11                                 | 12.5                               |
| v                                 | [mm]                 | 61.4                               | 66.4                               |
| v1                                | [mm]                 | 67                                 | 72                                 |
| v2                                | [mm]                 | 71.9                               | 76.9                               |
| wA                                | [mm]                 | 11                                 | 13                                 |
| wB                                | [mm]                 | 56                                 | 66.5                               |
| wK                                | [mm]                 | 66                                 | 89.5                               |
| wL                                | [mm]                 | 11                                 | 13                                 |
| x <sup>+0.6</sup> <sub>-0.5</sub> | [mm]                 | 137                                | 151                                |
| x max.*                           | [mm]                 | 139                                | 153.6                              |
| y                                 | [mm]                 | 52.4                               | 55.4                               |
| zA                                | [mm]                 | 14                                 | 12                                 |
| zB                                | [mm]                 | 14                                 | 55.5                               |
| zK                                | [mm]                 | 50.4                               | 55.5                               |
| zL                                | [mm]                 | 46                                 | 41                                 |
| SW1                               | [mm]                 | 12                                 | 17                                 |

### Part no.

### Part no.

|                               |                     |                     |
|-------------------------------|---------------------|---------------------|
| Clockwise rotation 90°        | <b>1895304KXX35</b> | <b>1896304KXX36</b> |
| Counterclockwise rotation 90° | <b>1895404KXX35</b> | <b>1896404KXX36</b> |
| 0 degree                      | <b>1895444KXX35</b> | <b>1896444KXX36</b> |

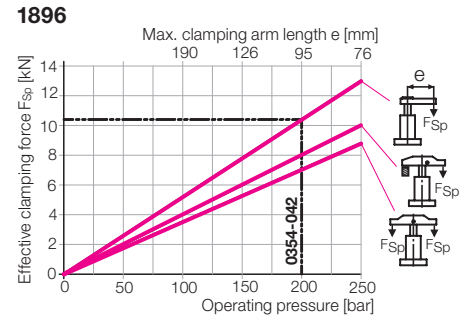
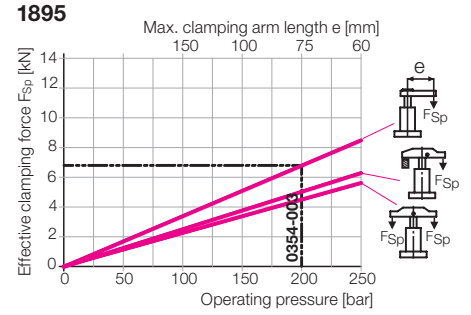
\* Upper edge nut

**XX: Version**      **DH/DM** = without/with metallic wiper without switch rod  
**MH/MM** = without/with metallic wiper with switch rod

### Accessory

|                                       | Part no.             | Part no.              |
|---------------------------------------|----------------------|-----------------------|
| Metallic wiper, complete (spare part) | <b>0341 100</b>      | <b>0341 101</b>       |
| O-ring 8x1.5                          | <b>3000343</b>       | <b>3000343</b>        |
| Screw plug G 1/4                      | <b>3300821</b>       | <b>3300821</b>        |
| Spare nut / tightening torque         | <b>3527015/90 Nm</b> | <b>3527048/160 Nm</b> |

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



### Important note

The clamping force diagrams are only valid, if "clamping" and "locking" are controlled separately (see page 4).

Clamping arms, accessories and special clamping arms see data sheet B 1.881.

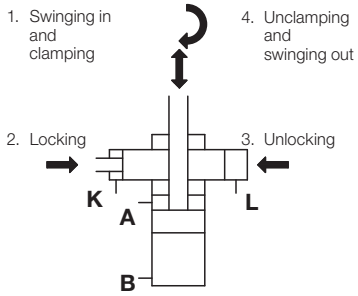
### Key for available angles of rotation

| Angle of rotation ( $\pm 1^\circ$ ) | Part no.            |
|-------------------------------------|---------------------|
| 90°                                 | <b>189XX04KXXXX</b> |
| 60°                                 | <b>189XX24KXXXX</b> |
| 45°                                 | <b>189XX34KXXXX</b> |

# Function flow • Function chart

## Hydraulic control • Important notes

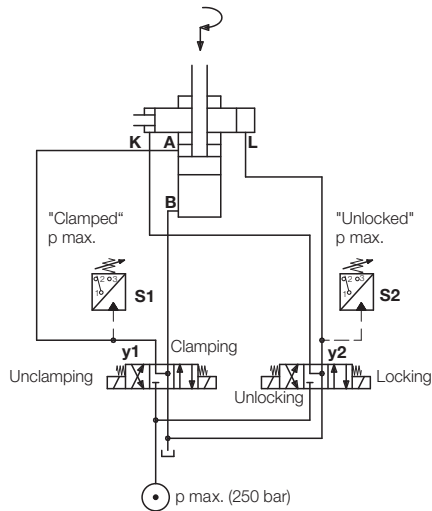
### Function sequence



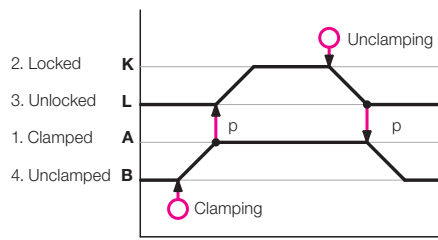
### Hydraulic control

The control is effected by two separate double-acting switching circuits.

### Sequence control by pressure switches



### Function chart



### 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 un-tightening 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.

### Switching sequence

#### 1. Starting position

y1 and y2 de-energised or  
y1 "Unclamping"; y2 "Unlocking"

#### 2. Clamping

→ 1. y1 "Clamping"; y2 de-energised  
→ 2. S1 = p max → y2 "Locking"

#### 3. Depressurise (as required)

Before depressurising, the locking pressure must be available at least for 3 seconds.  
→ y1 and y2 de-energised

#### 4. Unclamping

→ 1. y2 "Unlocking"  
→ 2. S2 = p max → y1 "Unclamping"