



Program summary

SWING CLAMPS

up to operating pressures of 500 bar

single and double acting

7 different body types

**maximum clamping force
from 0.6 to 41 kN**

**maximum clamping stroke
from 7 to 50 mm**

**overload protection device
reinforced swing mechanism**

**position monitoring
metallic wiper**





Program summary SWING CLAMPS

Body type	Flange at the bottom										Block		
Hydraulic connection	Pipe thread					Drilled channels					Pipe thread Drilled channels		
Overload protection device	-	●				-	-				●		
Reinforced or sturdy swing mechanism	●*	-				●	●				-		
Data sheet ● double acting ● single acting	B 1.849 B 1.8491		B 1.881 B 1.881			B 1.8811 -			B 1.8812 -		B 1.890 -		
Max. operating pressure	350 bar		500 bar			500 bar			500/160 bar (2)		500 bar		
Position monitoring	-												
Seat of clamping arm	cone		cone			cone			pendulum eye/ fork head		cone		
Sealings / Wiper	NBR / FKM												
Max. operating temperature	+ 100°C												
Metallic wiper	-		○*			○			○		-		
Approx. value clamping time for the shortest stroke	0.25 s		1 s			0.75 s			0.75 s		1 s		
Piston rod diameter	10 mm	20	32	40	50 mm	32	40	50 mm	20	32 mm	20	32	50 mm
Piston diameter	14 mm	25	40	50	63 mm	40	50	63 mm	25	40 mm	25	40	63 mm
Max. clamping force (1)	2.2 kN	2.8	6.8	10.5	16.5 kN	6.8	10.5	16.5 kN	4.4/1.4	11.2/3.6 kN (2)(3)	2.8	6.8	16.5 kN
Clamping stroke for double-acting version	8 mm	11	14	15	15 mm	22	20	20 mm	25	22 mm	7	8	11 mm
		25	25	25	25 mm								
		50	50	50	50 mm								
Max. flow rate for clamping	5 $\frac{\text{cm}^3}{\text{s}}$	3	10	18	28 $\frac{\text{cm}^3}{\text{s}}$	20	36	55 $\frac{\text{cm}^3}{\text{s}}$	8	20 $\frac{\text{cm}^3}{\text{s}}$	3	10	28 $\frac{\text{cm}^3}{\text{s}}$

Legend: ● Series production
○ Option
- not available
* only for double-acting version

- (1) with the pictured one-sided series clamping arm with contact bolt; with shorter clamping arms or double clamping arms considerably higher clamping forces can be obtained (maximum 41 kN)
- (2) version with pendulum eye 500 bar / fork head 160 bar
- (3) at max. operating pressure and double clamping arm per side
- (4) only for double-acting version with O-ring sealing
- (5) standard version with metallic wiper edge

Flange at the top										Thread				Screw on			
Pipe thread					Drilled channels					Pipe thread				Pipe thread			
-	●				-	-				●	●			●			
●*	-				●	●				-	-			-			
B 1.849 B 1.8491	B 1.880 B 1.880				B 1.8801 -	B 1.8802 -				B 1.881 B 1.881	B 1.883 B 1.883			- B 1.885			
350 bar	500 bar				500 bar	500/160 bar (2)				500 bar	500 bar			500 bar			
-	-				○	○				-	-			-			
cone	cone				cone	pendulum eye / fork head				cone	cone			cone			
NBR / FKM	NBR / FKM				NBR / FKM	NBR / FKM				NBR / FKM	NBR / FKM			NBR / FKM			
+ 100°C	+ 100°C				+ 100°C	+ 100°C				+ 100°C	+ 100°C			+ 100°C			
○ (4)	○*				○	○				○*	-			-			
0.25 s	1 s				0.75 s	0.75 s				1 s	1 s			1 s			
10 mm	20	32	40	50 mm	32	40	50 mm	20	32 mm	20	32	40	50 mm	20 mm	20	32	50 mm
14 mm	25	40	50	63 mm	40	50	63 mm	25	40 mm	25	40	50	63 mm	23 mm	25	40	63 mm
2.2 kN	2.8	6.8	10.5	16.5 kN	6.8	10.5	16.5 kN	4.4/1.4	11.2/3.6 kN (2)(3)	2.8	6.8	10.8	16.5 kN	3.6 kN	2.3	5.8	14 kN
8 mm	11	14	15	15 mm	22	20	20 mm	25	22 mm	11	14	15	15 mm	7 mm	7	8	11 mm
	25	25	25	25 mm						25	25	25	25 mm				
	50	50	50	50 mm						50	50	50	50 mm				
5 $\frac{\text{cm}^3}{\text{s}}$	3	10	18	28 $\frac{\text{cm}^3}{\text{s}}$	20	36	55 $\frac{\text{cm}^3}{\text{s}}$	8	20 $\frac{\text{cm}^3}{\text{s}}$	3	10	18	28 $\frac{\text{cm}^3}{\text{s}}$	1.5 $\frac{\text{cm}^3}{\text{s}}$	3	10	28 $\frac{\text{cm}^3}{\text{s}}$

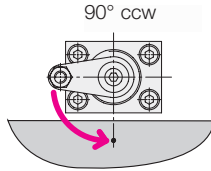


Threaded-body							Cartridge						
Drilled channels							Drilled channels						
-	-	●	●	-	-	-	●	-	-	-	-	-	
●	●*	-	-	●	-	●	-	-	-	-	-	●	
B 1.848 -	B 1.849 B 1.8491	B 1.891 B 1.891	B 1.892 B 1.892	B 1.8921 -	B 1.8803 -	B 1.852 -							
150 bar	350 bar	500 bar	500 bar	500 bar	500 bar	350 bar							
-	-	-	-	○	-	○							
cylindrical	cone	cone	cone	cone	cone	cone							
FKM	NBR / FKM	NBR / FKM	NBR / FKM	NBR / FKM	NBR / FKM	NBR / FKM							
+ 150°C	+ 100°C	+ 100°C	+ 100°C	+ 100°C	+ 100°C	+ 100°C							
(5)	○*	-	○*	○	○	○							
0.2 s	0.25 s	1 s	1 s	0.75 s	1 s	0.2 s							
6 mm	10 mm	20 mm	20 32 50 mm	32 50 mm	20 32 40 50 mm	16 20 mm							
10 mm	14 mm	23 mm	25 40 50 mm	40 63 mm	25 40 50 63 mm	23 28 mm							
0.6 kN	2.2 kN	4.0 kN	2.8 6.8 16.5 kN	6.8 16.5 kN	2.8 6.8 10.5 16.5 kN	4.5 6 kN							
8 mm	8 mm	7 mm	11 14 15 mm	22 20 mm	11 14 15 15 mm 25 25 mm	12 12 mm							
6 $\frac{\text{cm}^3}{\text{s}}$	5 $\frac{\text{cm}^3}{\text{s}}$	1.5 $\frac{\text{cm}^3}{\text{s}}$	3 10 28 $\frac{\text{cm}^3}{\text{s}}$	20 55 $\frac{\text{cm}^3}{\text{s}}$	3 10 18 28 $\frac{\text{cm}^3}{\text{s}}$	10 14 $\frac{\text{cm}^3}{\text{s}}$							



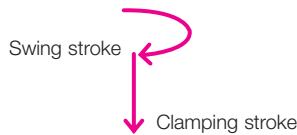
Application

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.



Function

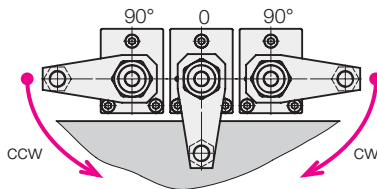
A swing clamp is a pull-type cylinder where a part of the total stroke is used to swing the piston (swing stroke) and the screwed on clamping arm.



Swing direction

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

The „swing direction clockwise“ describes the clockwise rotation of the piston starting from the extended position (off-position). Swing direction counterclockwise is accordingly effected by counterclockwise rotation.



Standard swing angles

are 45°, 60° and 90° see below. Special angles on request.

Code numbers for available swing angles

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

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.

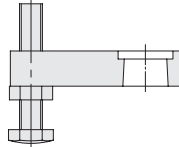
Tolerance of the swing angle

is $\pm 2^\circ$, if not otherwise indicated. For swing clamps with reinforced swing mechanism the tolerance is always $\pm 1^\circ$.

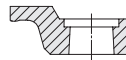
Accessory - Clamping arms

As accessory different clamping arms are available. Material 42CrMo4

- One-sided clamping arm with contact bolt max. operating pressure 200 bar



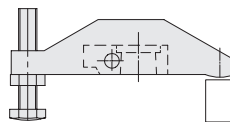
- One-sided short, cranked clamping arm max. operating pressure 300 bar



Accessory - Clamping strap

The design of the clamping strap is asymmetric. The bearing pin is mounted on the side of the carrier. Thereby an asymmetric lever ratio is generated that provides a higher clamping force, max. operating pressure 500 bar.

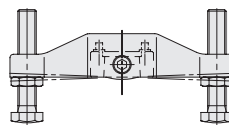
The second support point of the clamping strap on the right is not used for clamping but only for support.



Accessory - Double clamping arm

The double clamping arm is designed symmetrically. A carrier provides the connection to the piston. Thereby 2 workpieces can be clamped at the same time, the pulling force of the piston is reduced by half, max. operating pressure 500 bar.

Two pressure springs keep the double clamping arm in horizontal position.



Seat of clamping arm

For mounting of clamping arms or clamping straps a cone seat is provided normally at the piston of the swing clamp. The cone ratio is 1:10. This seat is the same for all types of one size.

Mounting of clamping arms

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 and thereby any deterioration of the swing mechanism.

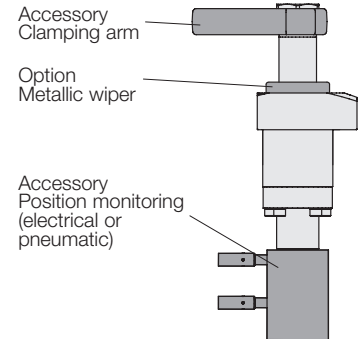
Adjustment of contact bolt

The contact bolt must only touch the workpiece after complete realisation of the swing motion. When tightening and untightening the lock nut, the clamping arm has to be backed up.

Accessory - Position monitoring

Position monitorings are available as accessory for swing clamps with reinforced swing mechanism.

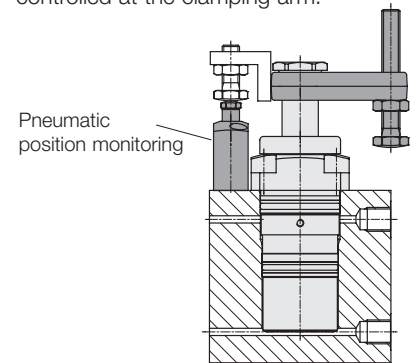
The positions „Unclamped“ and „Clamped“ are acknowledged.



Position monitoring is operated by an „extended rod“. This rod protrudes at the bottom of the swing clamp and is hydraulically sealed. It forms one unit together with the helix rod and allows a pneumatic or electrical monitoring of the piston position outside the swarf area.

With the pneumatic position monitoring the positions can be controlled by pressure switches or differential pressure switches. In the case of electrical position monitorings the controls are effected by inductive proximity switches.

An alternative control offers the pneumatic position monitoring as per data sheet B 1.852. The position „Clamped“ is directly controlled at the clamping arm.



Option - Metallic wiper

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

The metallic wiper protects the FKM wiper against mechanical damage, e.g. by hot swarf or high coolant pressure.

The wiper consists of a radially floating wiping disk and a retaining disk which will be pressed onto the existing collar.



Material

Piston material

High alloy steel, nitrated or chromium-plated

Cylinder body material

Casehardening steel, nitrated

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

Sealing materials

- NBR = nitrile-butadiene rubber
Trade name e.g.: Perbunan
Operating temperature: -30 up to +100°C
- FKM = fluor caoutchouc
Trade name e.g.: VITON®
Operating temperature: -20 up to +150°C

Maximum operating pressure

For one-sided clamping arms the maximum admissible operating pressure depends on the length of the clamping arm. The values are indicated in the diagrams on the corresponding data sheets.
If a double clamping arm or a clamping strap is used, the complete operating pressure can be used.

Admissible oil flow rate

The admissible flow rate has to be kept to avoid overload, increased wear and malfunctions of the swing clamp.
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 valves which allow oil return from the swing clamp without any impediments.
During unclamping the admissible oil flow rate can obtain a higher value, since the piston area is correspondingly bigger.

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.

Overload protection device

In swing clamps with overload protection device the swing mechanism is protected against damages due to a collision of the clamping arm for example with the workpiece. Snapping out of the overload protection device stops the swing motion of the clamping arm. However the complete stroke of the swing clamp will be effected.

If the overload protection device snapped out, the swing clamp has to be moved back to the off-position and the piston with the clamping arm has to be snapped in by hand. The swing clamps without overload protection device and with reinforced swing mechanism maintain their angular position of the clamping arm during loading and unloading, even in case of a slight collision with the clamping arm. The reinforced swing mechanism endures a collision of the clamping arm with the workpiece during clamping up to a pressure of 100 bar.

Less critical are the weight of the clamping arm or an increased swing speed.

Danger of injury

Hydraulic clamping elements can generate considerable forces. Due to the 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.

Dimension tolerances

Dimensions without tolerance data correspond to the general tolerances in accordance with DIN ISO 2768 -mH.

Fittings

Fittings suitable for the Whitworth G tube thread correspond to DIN 2353, screwed plug type B according to DIN 3852 Sheet 2 (with sealing edge or soft seal).

Important: No additional sealing materials, such as Teflon ribbon, must be used!

Leakage rate

ROEMHELD swing clamps do not leak oil when static.

During displacement of the piston a residual lubricating film will be tolerated with regard to the life of sealings and guides. Admissible leakage rates for 1,000 double strokes and hydraulic oil HLP 22 are:

- up to 32 mm piston diameter: < 0.30 cm³
- from 40 mm piston diameter: < 0.60 cm³

Bleeding

Air in the oil prolongs the clamping time considerably and leads to function troubles. Therefore bleeding has to be effected during start up.

Venting of the spring area of single-acting swing clamps

If there is a possibility that aggressive 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.

For further notes and provisions see data sheet A 0.100.

Römhheld GmbH
Friedrichshütte
Römhheldstraße 1-5
35321 Laubach, Germany
Tel.: +49 (0) 6405/89-0
Fax: +49 (0) 6405/89-211
E-mail: info@roemheld.de
www.roemheld.com