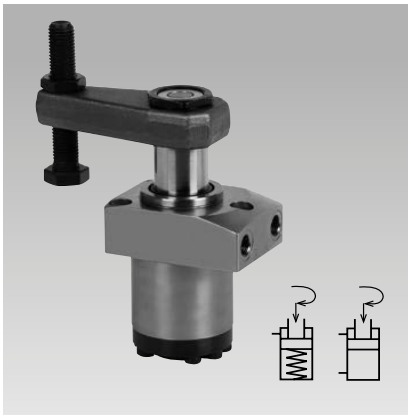
ROEMHELD
HILMA ▪ STARK

Issue 11-18 E

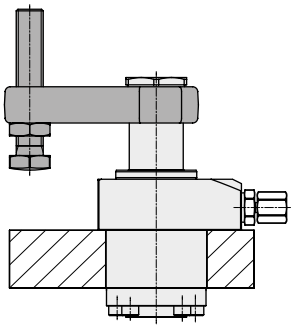
B 1.880

Swing Clamps with Overload Protection Device
top flange, single and double acting,
max. operating pressure 500 bar

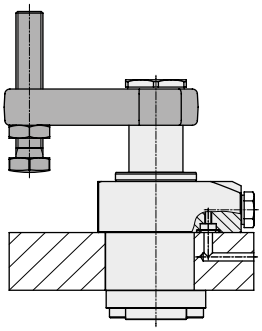


Hydraulic connecting possibilities

Pipe thread



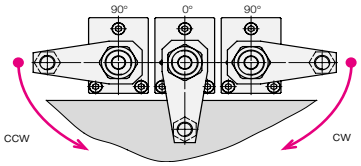
Manifold mounting with O-ring sealing



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
This hydraulic clamping element is a pull-type cylinder where a part of the total stroke is used to swing the piston.

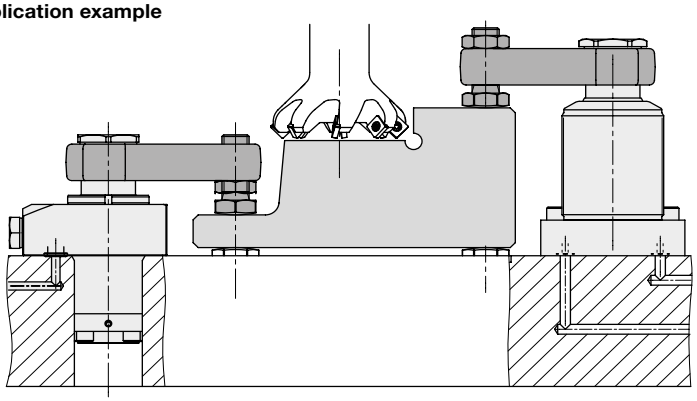
Swing direction
The units are available with clockwise and counterclockwise swing motion or without swing motion (0°). Starting from the off-position.



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.

Application example



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

Material
By nitrating wear is reduced and protection against corrosion increased.

Piston material:	High alloy steel
Cylinder body:	High alloy steel
Seals:	NBR
Wiper:	FKM

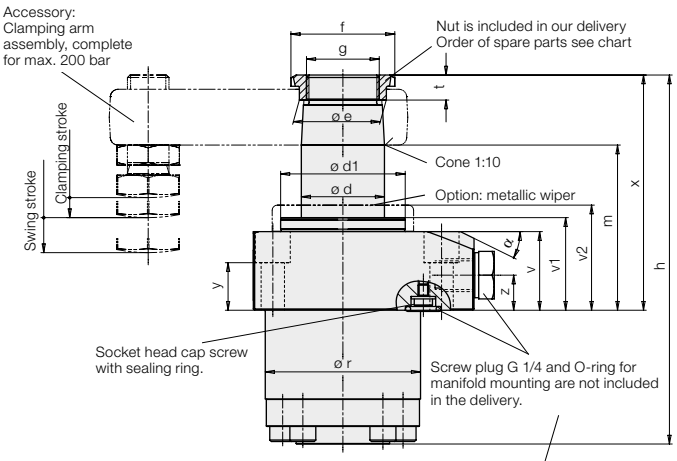
Note!
Operating conditions, tolerances and other data see data sheet A 0.100.

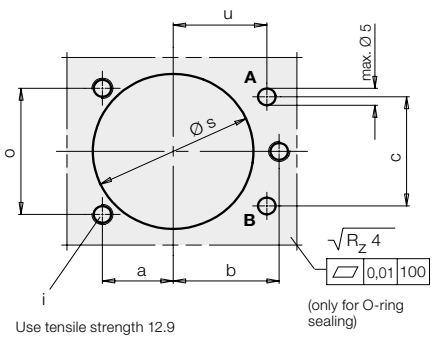
When using single-acting swing clamps, it is absolutely necessary to follow the instructions for venting of the spring area on data sheet G 0.110.

Further notes see Page 3.

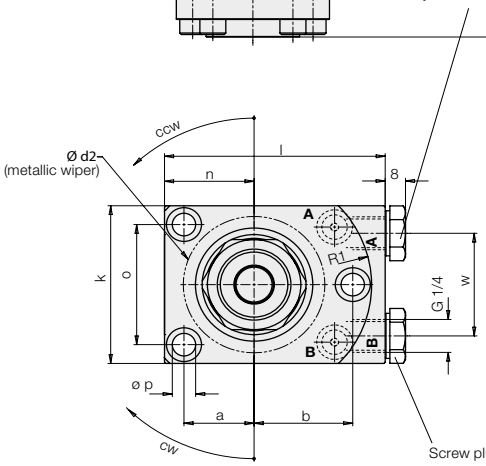
Option: metallic wiper
These swing clamps are also delivered with mounted metallic wiper that protect the subjacent FKM wiper against swarf (see page 2 and 3).

Dimensions
Technical Data





A: Clamping
B: Venting (single acting)
B: Unclamping (double acting)



The swing clamps will be delivered ready for the connection of pipes.

Manifold mounting (drilled channels)

Single acting

Screw in 1 screw plug G 1/4 (part no. 3610264) in port A and remove socket head cap screw with sealing ring. Insert 1 O-ring 10x2 (part no. 3000347) in the counterbore.

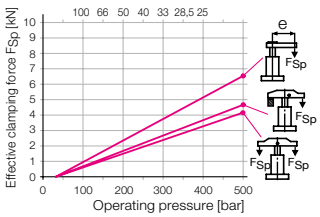
If venting of the spring area at port B shall also be effected through drilled channels: Replace screw plug with air filter by screw plug G 1/4. Remove socket head cap screw with sealing ring and insert O-ring 10x2 (part no. 3000347) in counterbore.

Double acting

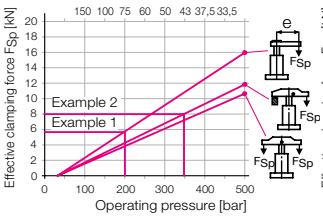
Screw in 2 plugs G 1/4 (part no. 3610264).
Remove 2 socket head cap screws with sealing ring.
Insert 2 O-rings 10x2 (part no. 3000347) in the counterbore.

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

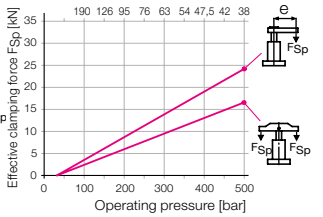
Size 1
Single acting (1883XXX)
Max. clamping arm length e [mm]



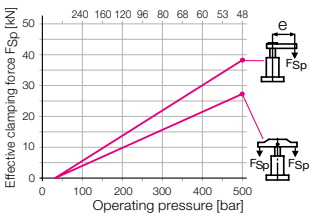
Size 2
Single acting (1885XXX)
Max. clamping arm length e [mm]



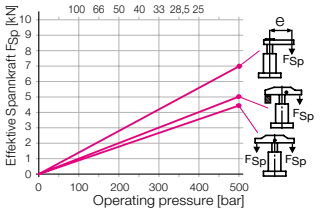
Size 3
Single acting (1886XXX)
Max. clamping arm length e [mm]



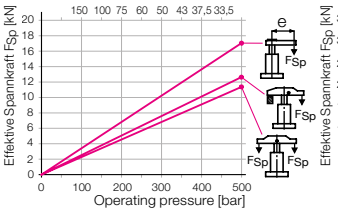
Size 4
Single acting (1887XXX)
Max. clamping arm length e [mm]



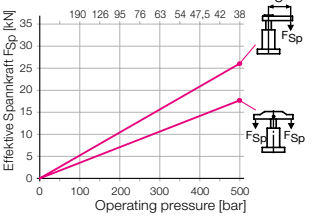
Double acting (1893XXX)
Max. clamping arm length e [mm]



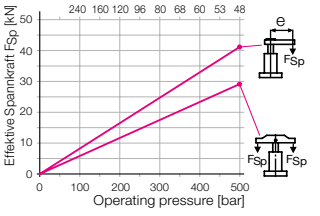
Double acting (1895XXX)
Max. clamping arm length e [mm]



Double acting (1896XXX)
Max. clamping arm length e [mm]



Double acting (1897XXX)
Max. clamping arm length e [mm]



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 103 single acting.
An operating pressure p of 200 bar in connection with standard clamping arm 0354003 of max. arm length L = 75 mm results in an effective clamping force F_{Sp} of 5.8 kN.

Example 2: 1885 103 single acting.
For a desired effective clamping force F_{Sp} of 8 kN and use of a swing clamp 1885 103 with a standard clamping strap 0354002 an operating pressure p of 345 bar is required.

Dimensions
Technical Data

		Size 1			Size 2			Size 3			Size 4		
Clamping stroke	[mm]	11	25	50	14	25	50	15	25	50	15	25	50
Swing stroke	[mm]	7	9	9	8	10	10	11	11	11	9	12	12
Total stroke	[mm]	18	34	59	22	35	60	26	36	61	24	37	62
Operating pressure to swing min.	[bar]	30	30	30	30	30	30	30	30	30	30	30	30
Max. oil flow rate	[cm³/s]	3,2	3,2	3,2	10	10	10	18,4	18,4	18,4	27,7	27,7	27,7
Oil volume / stroke	[cm³]	3,2	6	10,5	10	16	27,2	18,4	25,5	43,2	27,7	43	72
Oil volume /return strok	[cm³]	8,8	17	29	27,7	44	76	51	71	120	75	116	194
α	[°]	12	12	12	27	27	27	26	26	26	25	25	25
a	[mm]	20	20	20	27	27	27	37	37	37	42	42	42
b	[mm]	30	30	30	38	38	38	50	50	50	55	55	55
c	[mm]	32	32	32	46	46	46	62	62	62	75	75	75
Ø d	[mm]	20	20	20	32	32	32	40	40	40	50	50	50
Ø d1	[mm]	38	38	38	48	48	48	60	60	60	70	70	70
Ø d2	[mm]	42	42	42	54,5	54,5	54,5	75	75	75	87	87	87
Ø e	[mm]	23,5	23,5	23,5	33,5	33,5	33,5	45	45	45	55,5	55,5	55,5
f	[mm]	30	30	30	40	40	40	55	55	55	68	68	68
g	[mm]	M 18x1,5	M 18x1,5	M 18x1,5	M 28x1,5	M 28x1,5	M 28x1,5	M 35x1,5	M 35x1,5	M 35x1,5	M 45x1,5	M 45x1,5	M 45x1,5
h	[mm]	126,5	158,5	208,5	147,5	173,5	223,5	172	192	242	182	208	258
i	[mm]	M 6	M 6	M 6	M 8	M 8	M 8	M 10	M 10	M 10	M 12	M 12	M 12
k	[mm]	50	50	50	63	63	63	85	85	85	95	95	95
l	[mm]	70	70	70	85	85	85	110	110	110	125	125	125
m –1	[mm]	57	73	98	66	79	104	70	80	105	69	82	107
n	[mm]	26,5	26,5	26,5	34,5	34,5	34,5	47	47	47	55	55	55
o	[mm]	37	37	37	48	48	48	65	65	65	72	72	72
Ø p	[mm]	6,6	6,6	6,6	9	9	9	11	11	11	14	14	14
Ø r ± 0,1	[mm]	44,8	44,8	44,8	59,8	59,8	59,8	79,8	79,8	79,8	89,8	89,8	89,8
R1	[mm]	36	36	36	45,3	45,3	45,3	59,5	59,5	59,5	66	66	66
Ø s +1	[mm]	45	45	45	60	60	60	80	80	80	90	90	90
t	[mm]	9	9	9	10	10	10	11	11	11	12	12	12
u	[mm]	26,5	26,5	26,5	31	31	31	40	40	40	45	45	45
v	[mm]	26,4	26,4	26,4	31,4	31,4	31,4	29,4	29,4	29,4	29,4	29,4	29,4
v1	[mm]	31	31	31	37	37	37	35	35	35	35	35	35
v2	[mm]	36	36	36	42	42	42	40	40	40	40	40	40
w	[mm]	28	28	28	41	41	41	55	55	55	70	70	70
x	[mm]	78	94	119	94	107	132	104	114	139	109	122	147
y	[mm]	18	18	18	19	19	19	15	15	15	14	14	14
z	[mm]	14	14	14	14	14	14	12	12	12	12	12	12
Declutch moment of overload protection	[Nm]	3,5	3,5	3,5	11	11	11	17	17	17	22/30**	22/30**	22/30**
Single acting 90°													
Part no.													
Swing direction cw		**1883103**			**1885103**			**1886103**			**1887103**		
Swing direction ccw		**1883203**			**1885203**			**1886203**			**1887203**		
0-degree		**1883243**			**1885243**			**1886243**			**1887243**		
Double acting 90°													
Part-no													
Swing direction cw		**1893103**	**1893303**	**1893503**	**1895103**	**1895303**	**1895503**	**1896103**	**1896303**	**1896503**	**1897103**	**1897303**	**1897503**
Swing direction ccw		**1893203**	**1893403**	**1893603**	**1895203**	**1895403**	**1895603**	**1896203**	**1896403**	**1896603**	**1897203**	**1897403**	**1897603**
0-degree		**1893243**	**1893443**	**1893643**	**1895243**	**1895443**	**1895643**	**1896243**	**1896443**	**1896643**	**1897243**	**1897443**	**1897643**
Metallic wiper complete (spare part)		**0341107**			**0341100**			**0341101**			**0341102**		
Spare nut		**3527014**			**3527015**			**3527048**			**3527016**		

** single acting/double acting

Code numbers for available swing angles

Swing angles	Part no.
90°	**18XXX0X**
60°	**18XXX2X**
45°	**18XXX3X**

	Part no.
Spare O-ring 10x2	**3000347**
Plug G 1/4	**3610264**

Option metallic wiper
for double-acting swing clamps
Part no.: 189XXXXM

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. Admissible oil flow rate
In case of the admissible oil flow rate as per table 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 any overload and thereby high wear. 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.

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
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.).

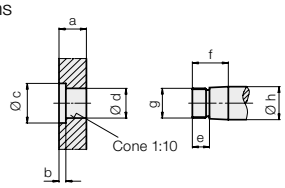
6. Special clamping arms
When using special clamping arms with other lengths, the corresponding operating pressures as shown in the clamping force diagram must not be exceeded. If longer clamping arms will be used, not only the operating pressure but also the flow rate have to be reduced (see 2.).

7. Venting of spring area
The spring area of single-acting swing clamps has to be vented to avoid function problems. 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 G 0.110).

8. Bleeding
Air in the oil prolongs the clamping time considerably and leads to function troubles. Therefore bleeding has to be effected during start up.
8.1 Pipe thread
Loosen carefully the union nut of the pipe at low oil pressure and pump until bubblefree oil comes out. Retigthen the union nut.
8.2 Flange with O-ring sealing for manifold mounting
Loosen carefully the plug G 1/4 at low oil pressure and pump until bubblefree oil comes out. Retigthen the plug.

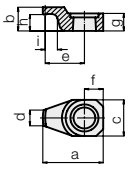
Accessories

Dimensions for special clamping arms



Swing clamp	a	b	Ø c	Ø d +0,10 +0,05	e	f	g	Ø h f7
18X3XXX	16	4	24	19,8	10	21	M 18x1,5	20
18X5XXX	23	5	34	31,8	12	28	M 28x1,5	32
18X6XXX	28	5	46	39,8	12	34	M 35x1,5	40
18X7XXX	34	6	56	49,8	13	40	M 45x1,5	50

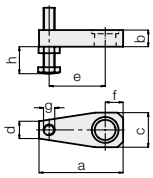
Clamping arm, max. 300 bar



Material: 42CrMo4

Swing clamp	a	b	c	d	e	f	g	h	i	Weight [kg]	Part no.
18X3XXX	51,5	21	32	14	33,5	16	15,5	14,5	7	0,11	**3548238**
18X5XXX	76	28	46	25	50	23	22,5	19	7	0,3	**3548236**
18X6XXX	100	34	66	39	64	33	28	23	7	0,84	**3548301**
18X7XXX	123	40	75	39	82,5	37,5	34	27	8	1,3	**3548302**

Clamping arm assembly, complete, max. 200 bar



Material: 42CrMo4

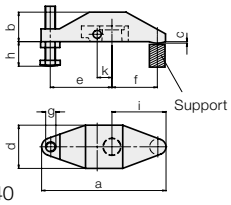
with thread

Swing clamp	a	b	c	d	e	f	g	h max.	h min.	Weight [kg]	Part no.
18X3XXX	75	16	32	16	50	16	M10	64	6	0,2	**0354001**
18X5XXX	115	23	48	22	75	25	M16	79	9	0,7	**0354003**
18X6XXX	140	28	60	28	95	30	M16	79	9	2,0	**0354042**
18X7XXX	178	34	78	40	120	40	M20	98	12	2,55	**0354005**

without thread

Swing clamp	a	b	c	d	f	Weight [kg]	Part no.
18X3XXX	75	16	32	16	16	0,18	**3921016**
18X5XXX	115	23	48	22	25	0,65	**3921017**
18X6XXX	140	28	60	28	30	1,85	**3921021**
18X7XXX	178	34	78	40	40	2,3	**3921018**

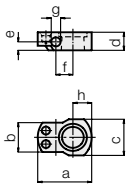
Clamping strap assembly, complete, with carrier, max. 500 bar



Material: GGG-40

Swing clamp	a	b	c	d	e	f	g	h max.	h min.	i	k	Weight [kg]	Part no.
18X3XXX	122	30	1,5	44	60	45	M10	64	6	53	14,5	0,57	**0354000**
18X5XXX	185	45	2	58,5	83	75	M16	79	9	87	21	1,58	**0354002**

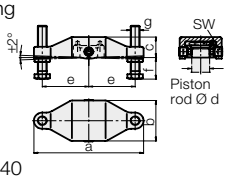
Carrier for special clamping strap



Material: 42CrMo4

Swing clamp	a	b	c	d	e	f	g^{H7}	h	Weight [kg]	Part no.
18X3XXX	46	26	32	16	7,5	14,5	8	16	0,08	**3542093**
18X5XXX	59	32	40	23	13	21	10	22	0,16	**3542094**
18X6XXX	82	44,5	58	28	17	28	12	34	0,5	**3542132**
18X7XXX	90	56	68	34	21	33	14	36	0,65	**3542096**

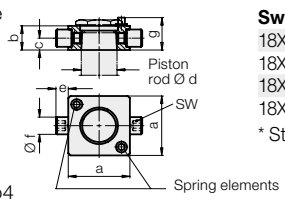
Double clamping arm assembly, complete, with carrier, max. 500 bar



Material: GGG-40

Swing clamp	a	b	c	Ø d	e	f min.	f max.	g	SW	Weight [kg]	Part no.
18X3XXX	138	59	28,5	20	60	10	64	M 10	5	0,83	**0354131**
18X5XXX	196	75	38	32	83	15	79	M 16	8	2,11	**0354132**
18X6XXX	216	85	47	40	92	15	79	M 16	8	3,17	**0354133**
18X7XXX	236	105	56	50	100	19	98	M 20	8	5,24	**0354134**

Carrier, complete with threaded bolt and spring clamping elements



Material: 42CrMo4

Swing clamp	a±0,1	b	c	Ø d	e	Øf g6	g*	SW	Part no.
18X3XXX	43	16	7,5	20	9	10	21,5	5	**0354141**
18X5XXX	55	23	11	32	11	16	29	8	**0354142**
18X6XXX	63	28	15	40	12	18	35	8	**0354143**
18X7XXX	77	34	17	50	15	20	41	8	**0354144**

* Stop surface for spring elements