

Swing clamp with planar rotation



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Swing clamps characteristics

Double acting
Rotation in the plane

General points

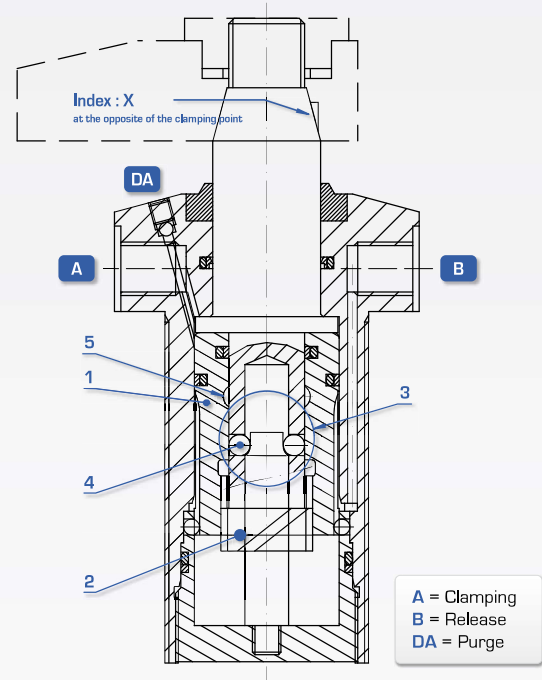
The swing clamps can clear the working area to facilitate components loading and un-loading operations. Designed for self-controlled systems, they reduce non-productive time.

The **rotation in the plane**, an exclusive system, reduces the space required for the movement.

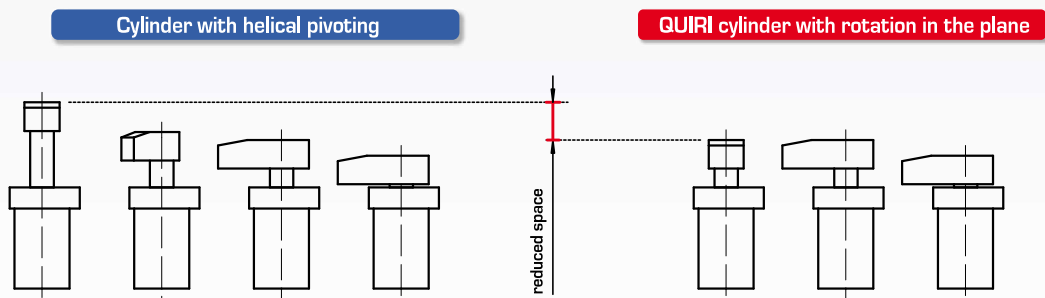
The design of this cylinder ensures optimum allocation of internal efforts, increasing longevity and reliability.

Construction

- all parts are in high-strength steel.
- rod treated anti-seizure and anti-corrosion.
- the body is protected by an anti-corrosion treatment.
- **all our swing clamps include venting port.**
- damage is avoided in the event of impeded rotation.
- no translation during pivoting therefore reduced rod seal wear.
- easy removal of clamping arm.
- **all cylinders include an index on the rod.**



Special features of the system



The swing clamp rod rotates in a plane, thus allowing the clamping arm to move in restricted space. This rotation phase is followed by translation for clamping.

Both chambers of the double acting cylinder are continually full of oil, which means that the system is unaffected by external contamination.

Operations

Clamping phase : Supply at A

During the pressurisation of the cylinder, the piston item [1], which includes helical gear teeth, performs a translation movement downwards, transformed into rotation at the rod item [2] through the reversible nut-screw system : this is the spinning top principle.

During this rotation, the rod item [2] pivots on ball bearing item [4] (rotation in the plane).

Once the rotation is completed, the balls item [4] retract into the groove item [5] and release the lock on translation movement, allowing the rod to freely move through its downwards travel : **the balls are not subject to any forces during clamping.** The piston transmits the force to the rod through a plane-to-plane contact.

Release phase : Supply at B

Supplying the return port B causes a translation movement of the rod item [2] upwards, followed by a rotation movement in a plane in order to return to its initial position.

Swing clamps characteristics

Direction and angle of rotation Determination of cylinder characteristics

Direction and angle of rotation

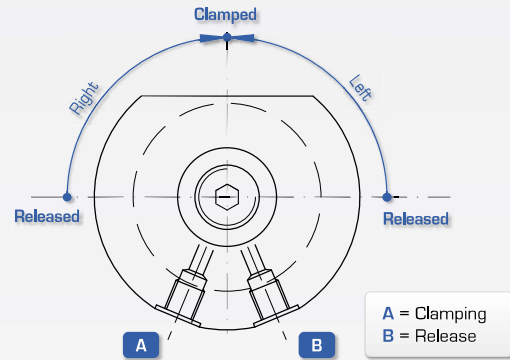
The direction of rotation is indicated from the initial «unclamped» position with the rod extended to the «clamped» position with the rod retracted, rod viewed from top.

Right = clockwise direction

Left = anti-clockwise direction

Standard angle of rotation : $90^\circ \pm 2^\circ$.

All angle of rotation values between 0° and 90° are available on request.

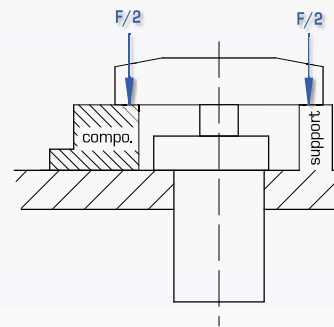


Determination of cylinder characteristics

The maximum forces are given for a pressure of 250 bar. This pressure is only authorised if the shortest of the three available standard arms is used.

The max force (therefore the max pressure) decreases proportionally with the length of the arm : please see graphs on page 21.

The max flow also decreases with the inertia of the arm ; refer to the values indicated in the graphs for standard arms. Please contact if you need special arms.



Maximum pressure / Standard clamping arm	
Maximum pressure	Type of arm
bar	
250	Short arm BC
175	Medium arm BM
125	Long arm BL

Minimum using pressure : 30 bar

The use of a double symmetric arm allows operation at 250 bar, **but you must use the following formula :**

$$\text{Force (daN)} / 2 = \text{Pressure (bar)} \times \text{Section (cm}^2) \div 2$$

(**A** in table on page 20)

Examples :

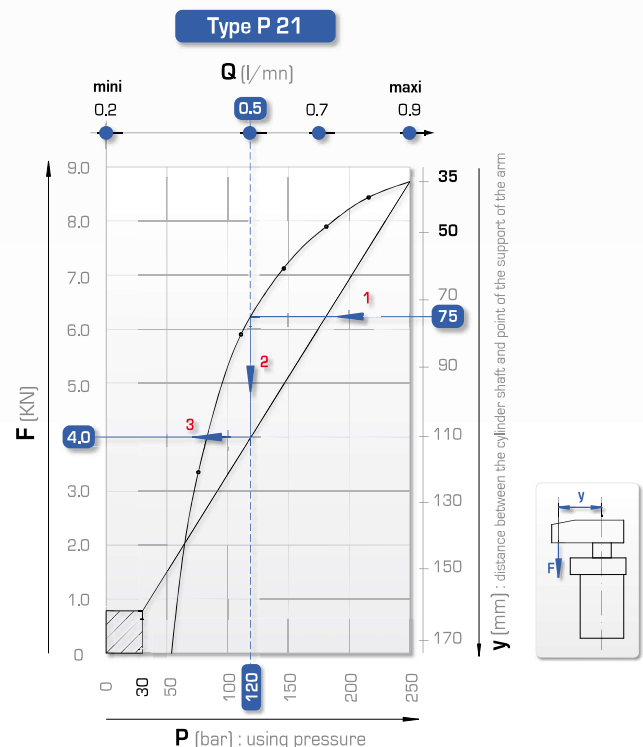
$$\begin{aligned} \text{P11 : } F/2 &= P \times 2.36 \div 2 & \text{P31 : } F/2 &= P \times 9.45 \div 2 \\ \text{P21 : } F/2 &= P \times 4.71 \div 2 & \text{P41 : } F/2 &= P \times 14.12 \div 2 \end{aligned}$$

Example of using diagrams

The diagram on the right indicates the maximum force developed by the cylinder and the max pressure for the type of arm used : **BC**, **BM**, or **BL**. They also indicate the limit values of Q flow.

The **maximum force** developed by a **P21** type cylinder with a **BL 21 75 mm** long arm is **4 kN** at **120 bar** with **maximum Q flow of 0.5l/mn** per cylinder.

For the determination of special arm characteristics, please use the graphs on page 21



Swing clamps with planar rotation

Input pressure

- minimum : **30 bar**
- maximum : **250 bar** with short arms (see graphs)

Maximum temperature

- **70°C**
- for temperatures higher than 70°C please contact us

Important recommendations

F max at 250 bar	Rod ød	Stroke	Max flow A	Swept volume A B	Direction of rotation	Type	Reference
kN	mm	mm	l/mm	cm ³			
4	18	8	0.4	5,30 7,40	right left	P 11 DX P 11 GX	191157/050 191157/150
A	B	C	D	E	F		

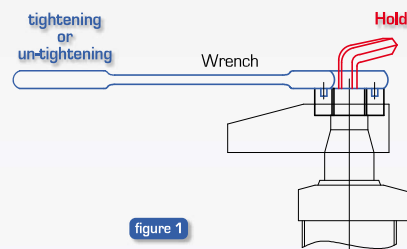


figure 1

- A** This value allows an initial approach to be made in selecting cylinder. Always ensure that you refer to the diagram of forces present on the cylinder page to specify the max force and pressure as a function of length «y» for the arm.
- B** The rod has a conical end and is threaded for fixing the clamping arm with braking. When locking the nut, **the rod must be prevented from rotating** in order not to transmit the tightening torque to the internal mechanism.
There are two way of doing this :
 - restrain the rod using a hex wrench (see [figure 1](#))
 - maintain the rod in the vice
- C** The indicated value corresponds to the max stroke of the cylinder. For clamping a component, the useful stroke is between the minimum and the maximum values indicated in the table of characteristics below.
- D** The max recommended flow will vary with the type of cylinder and inertia of the clamping arm. Refer to the table and if possible provide a nozzle or flow control valve in the distribution circuit. The flow must be multiplied by the number of cylinders operating at the same time : **ensure that minimum flows are observed.**
- E** This is the volume of oil displaced during total stroke.
- F** Direction of rotation of the rod from the unclamped position to the clamped one. Rod viewed from above.

Characteristics

Please see opposite table.

WARNING

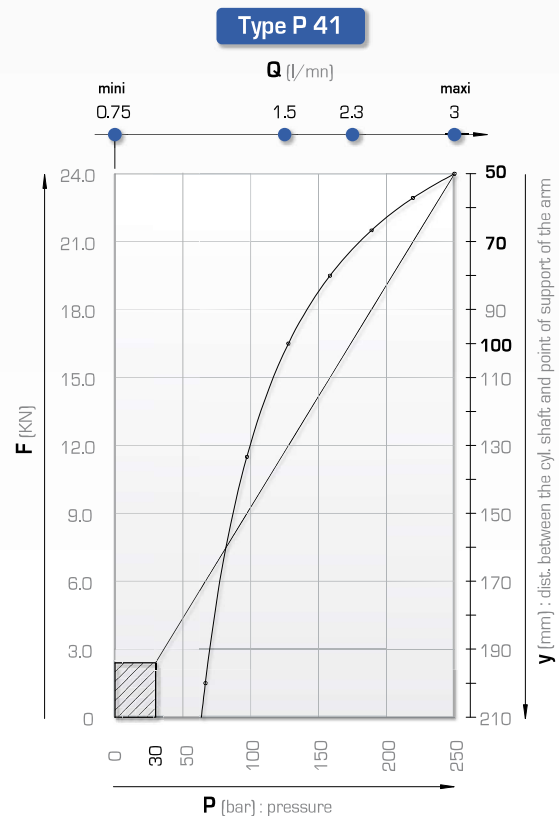
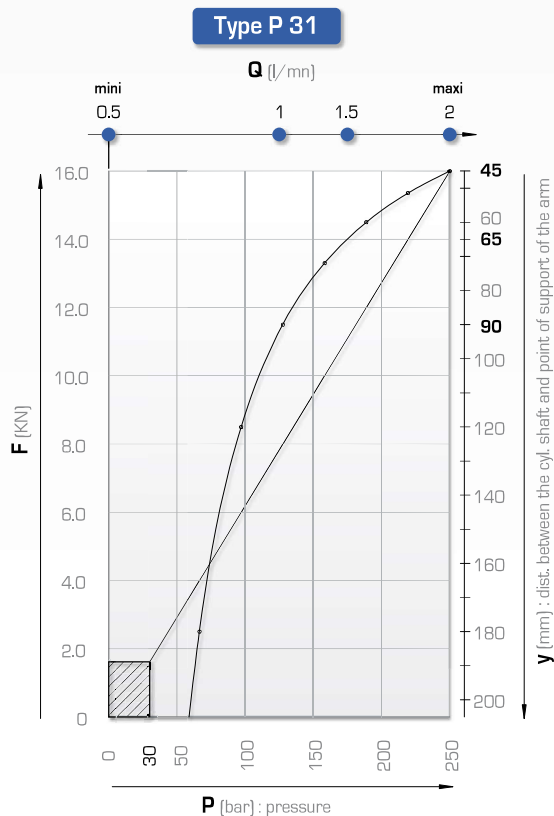
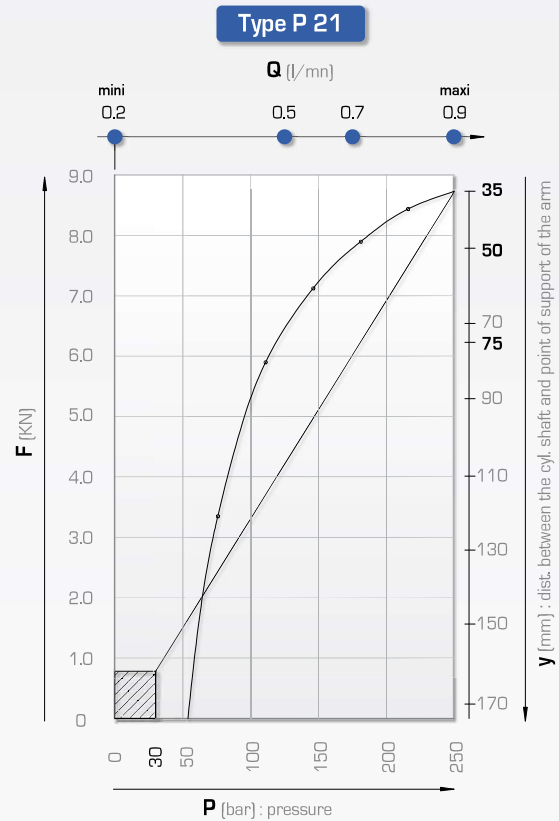
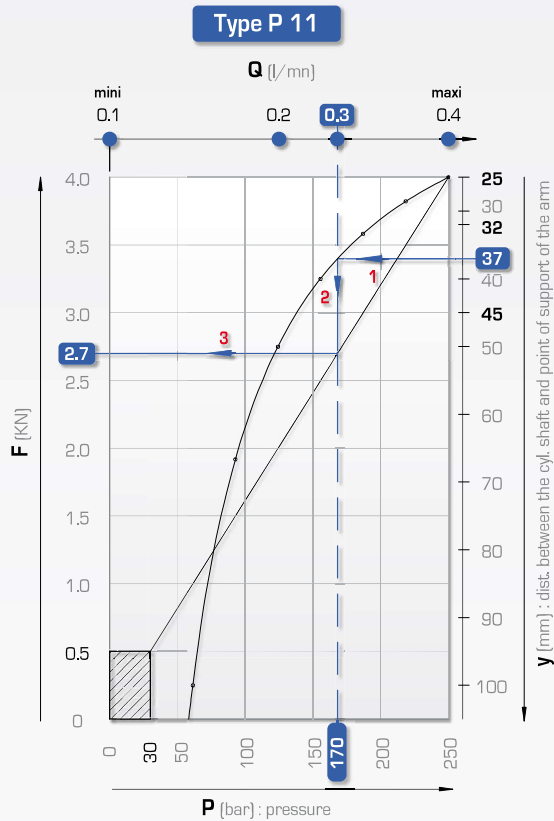
Opposite table is given for information purpose.

To determine actual forces, please use the graphs located on page 21 which **take the yield into account.**

		A = clamping B = release	Unit	P11	P21	P31	P41
Section	A		cm ²	2,36	4,71	9,45	14,42
	B			4,91	9,62	19,63	28,27
Oil volume	A		cm ³	5,3	15	41	74
	B			7,4	21	53	88
Flow	maxi		l/ mn	0,4	0,9	2	3
Cycle period	A		s	0,75	1	1,2	1,5
	B			1,1	1,4	1,6	1,8
Stroke	maxi		mm	6	10	10	10
	mini			2	3	3	3

Swing clamps characteristics

Definition of the special arms Graphs



These graphs take the cylinder yield into account

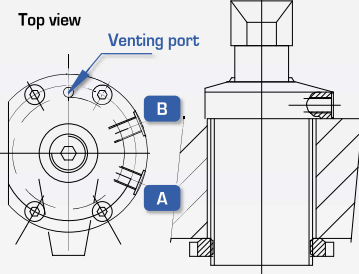
Swing clamps
with planar rotation

Examples of mounting

Double acting swing clamp - 250 bar
Types **P**, **PT**, **PBF**, **PF**, **PL**, **PS**, **PLF**, **PBF**, **PCB** and **PCV**

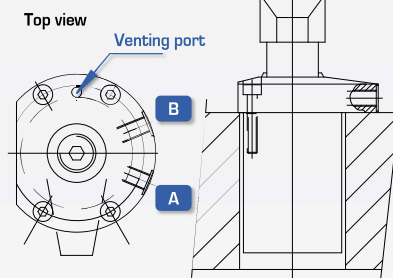
Type P

Fixing : nuts on body
Supply : threads



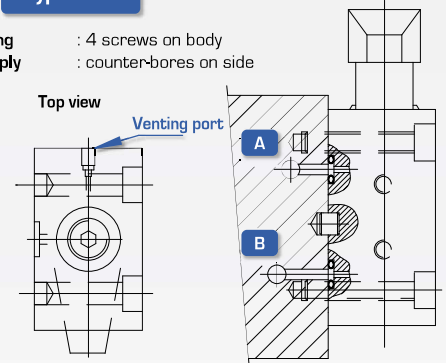
Type PT

Fixing : 4 screws on head
Supply : through treads



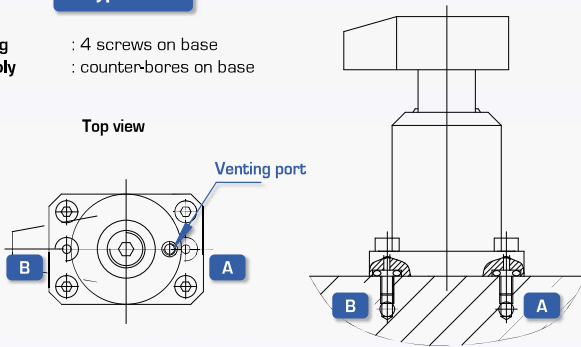
Type PBF

Fixing : 4 screws on body
Supply : counter-bores on side



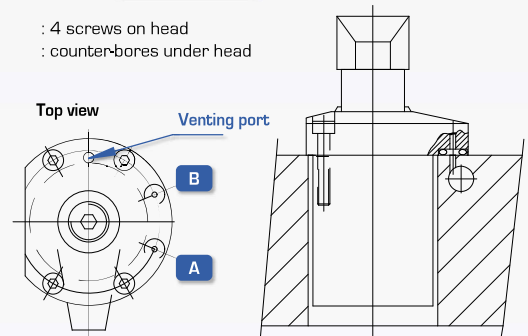
Type PF

Fixing : 4 screws on base
Supply : counter-bores on base



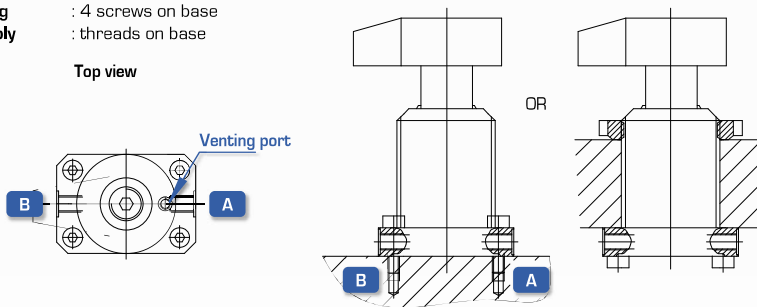
Type PL

Fixing : 4 screws on head
Supply : counter-bores under head



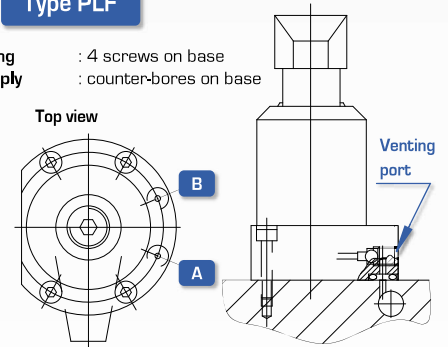
Type PS

Fixing : 4 screws on base
Supply : threads on base



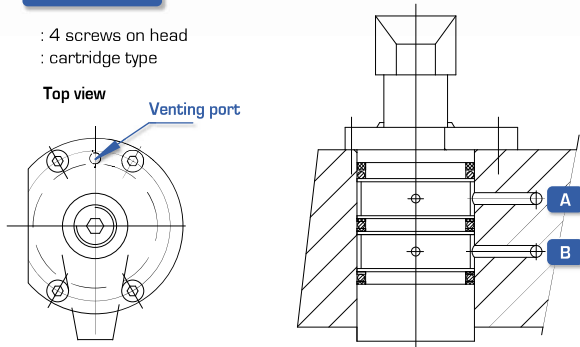
Type PLF

Fixing : 4 screws on base
Supply : counter-bores on base



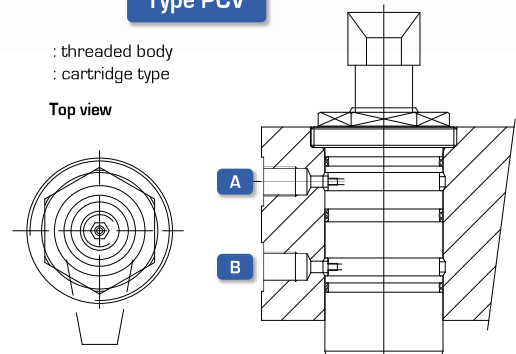
Type PCB

Fixing : 4 screws on head
Supply : cartridge type



Type PCV

Fixing : threaded body
Supply : cartridge type



Swing clamp : P

Double acting - Rotation in a plane
Max force at 250 bar : 4 to 24 kN



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Threaded body
Supply through threads
Fixing using nut on body

Characteristics

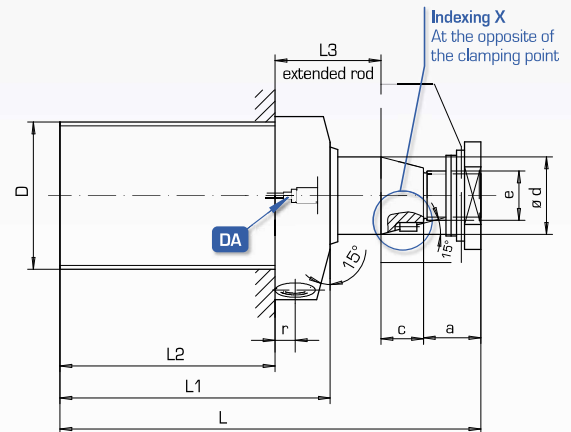
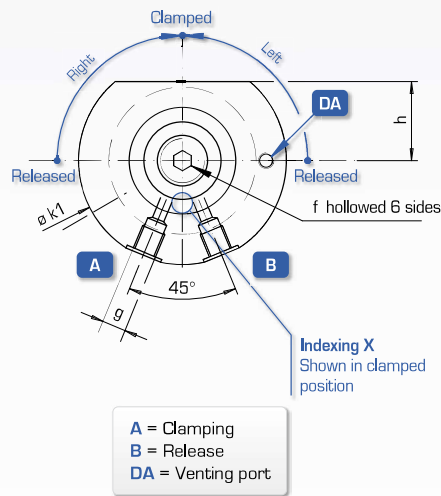
- rotation in a plane left or right $90^\circ \pm 2^\circ$
- index on the rod
- venting ports
- for machining of indexing on the clamping arm see pages 69 to 71

Options

- clamping arm : see accessories heading
- rotation 60° , 45° or 0° on request

Note

Cylinders are supplied with locking nut and lock washer [dimensions and torques : see page 72].



Definition of forces as function of clamping arm : see page 21

Important recommendations : see page 20

NON-INDEXED : the pin may be removed using a pin punch

F max at 250 bar	Rod ød	Stroke	Max flow A	Area extend A B	Dir. of rotation	Type	Order code	Dimensions													
								a	c	D	e	f key	g	h	øk1	L	L1	L2	L3	r	
kN	mm	mm	l/mn	cm ³				mm	mm			mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
4	18	8	0.4	5,3 7.4	right left	P 11 DX P 11 GX	191 157/050 191 157/150	13	10	M36 x 1.5	M12 x 1.5	5	G1/8"	20	58	121	88	66	32	8	
8	25	12	0.9	15 21	right left	P 21 DX P 21 GX	191 057/050 191 057/150	16	14	M52 x 1.5	M16 x 1.5	6	G1/4"	28	76	152	107	81	41	11	
16	36	12	2	41 53	right left	P 31 DX P 31 GX	191 077/050 191 077/150	18	20	M72 x 2	M24 x 1.5	10	G1/4"	38	110	195	142	114	43	11	
24	42	12	3	74 88	right left	P 41 DX P 41 GX	191 058/050 191 058/150	20	22	M85 x 2	M30 x 1.5	12	G1/4"	45	125	218	161	131	45	12	

Swing clamps with planar rotation

Swing clamp : PT

Double acting - Rotation in a plane
Max force at 250 bar : 4 to 24 kN

Supply through threads

Fixing by 4 screws on head ring

Characteristics

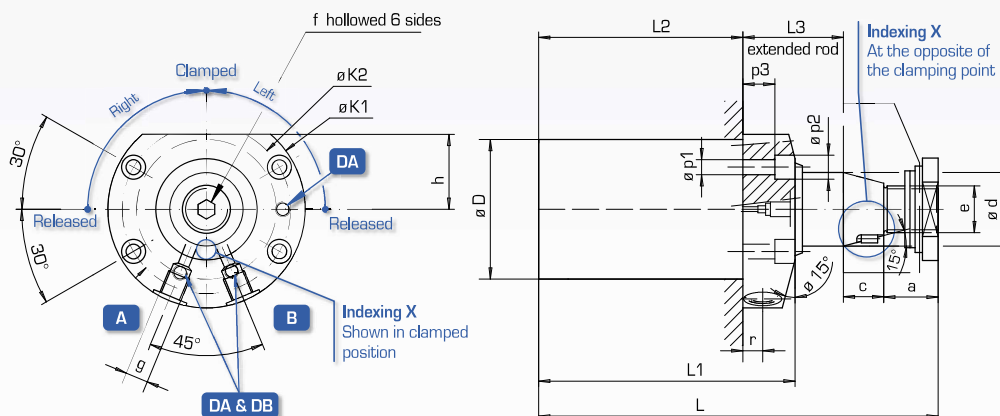
- rotation in a plane left or right $90^\circ \pm 2^\circ$
- index on the rod
- venting ports
- for machining of indexing on the clamping arm
see pages 69 to 71

Options

- clamping arm : see accessories heading
- rotation 60° , 45° or 0° on request

Note

Cylinders are supplied with locking nut and lock washer
[dimensions and torques : see page 72].



A = Clamping
B = Release
DA = Clamping venting ports for PT11 & PT21
DA & DB = Venting ports for PT31 & PT41

Definition of forces as function of clamping arm : see page 21

Important recommendations : see page 20

NON-INDEXED : the pin may be removed using a pin punch

F max at 250 bar	Rod ød	Stroke	Max flow A	Area extend A B	Dir. of rotation	Type	Order code	Dimensions																		
								a	c	øD 0 -0,2	e	f	g	h	øk1 øk2	L	L1	L2	L3	p1	p2	p3	r			
kN	mm	mm	l/mn	cm ³				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
4	18	8	0.4	5,3 7.4	right left	PT 11 DX PT 11 GX	191 167/050 191 167/150	13	10	36	M12 x 1.5	5	G1/8"	20	58 47	121	88	66	32	5.5	9	13	8			
8	25	12	0.9	15 21	right left	PT 21 DX PT 21 GX	191 134/050 191 134/150	16	14	52	M16 x 1.5	6	G1/4"	28	76 63	152	107	81	41	6.5	10.5	16	11			
16	36	12	2	41 53	right left	PT 31 DX PT 31 GX	192 116/150 192 116/150	18	20	72	M24 x 1.5	10	G1/4"	38	110 90	195	142	114	43	10.5	17	11	11			
24	42	12	3	74 88	right left	PT 41 DX PT 41 GX	192 117/050 192 117/150	20	22	85	M30 x 1.5	12	G1/4"	45	125 105	218	161	131	45	10.5	17	12	12			

Swing clamp : PF



Double acting - Rotation in a plane
Max force at 250 bar : 4 to 24 kN

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Supply through counter-bores under base Fixing using 4 screws on the rectangular base

Characteristics

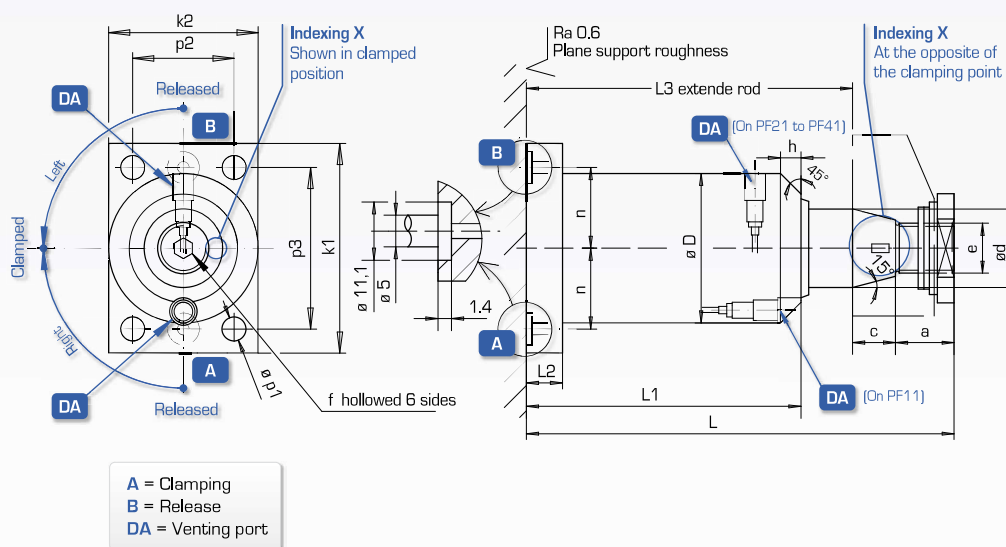
- rotation in a plane left or right $90^{\circ} \pm 2^{\circ}$
- index on the rod
- venting ports
- standard and long strokes
- for machining of indexing on the clamping arm see pages 69 to 71

Options

- nozzle on counter-bores port
- clamping arm : see accessories heading
- rotation 60° , 45° or 0° on request

Note

Cylinders are supplied with locking nut and lock washer (dimensions and torques : see page 72).
Seals : or 7,65 x 1,78 90 NBR



Definition of forces as function of clamping arm : see page 21

Important recommendations : see page 20

NON-INDEXED : the pin may be removed using a pin punch

F max at 250 bar	Rod ød	Stroke	Max flow A	Area extend A B	Dir. of rota- tion	Type	Order code	Dimensions																
								a	c	øD	e	f	h	k1 k2	L	L1	L2	L3	n	p1	p2	p3		
kN	mm	mm	l/mn	cm³				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
4	18	8	0.4	5.3	right	PF 11 DX	191 159/050	13	10	45	M12 x 1.5	5	6	65	121	88	22	98	24	6.5	30	50		
				7.4	left	PF 11 GX	191 159/150																	
		15	7.3	right	PF 11 DX C15	191 178/050																		
			10.9	left	PF 11 GX C15	191 178/150																		
8	25	12	0.9	15	right	PF 21 DX	191 063/060	16	14	60	M16 x 1.5	6	8	85	152	107	22	122	32	8.5	44	65		
				21	left	PF 21 GX	191 063/160																	
		25	20.2	right	PF 21 DX C25	191 179/050																		
			32.5	left	PF 21 GX C25	191 179/150																		
16	36	12	2	41	right	PF 31 DX	191 078/050	18	20	80	M24 x 1.5	10	12	110	195	142	25	157	43	13	60	86		
				53	left	PF 31 GX	191 078/150																	
		25	52.3	right	PF 31 DX C25	192 127/050																		
			77.7	left	PF 31 GX C25	192 127/150																		
24	42	12	3	74	right	PF 41 DX	191 064/050	20	22	95	M30 x 1.5	12	16	120	218	161	25	176	50	15	70	96		
				88	left	PF 41 GX	191 064/150																	

Swing clamps with planar rotation

Swing clamp : PS

Double acting - Rotation in a plane
Max force at 250 bar : 4 to 24 kN

Threaded body

Supply through threads on base

Fixing using screws on rectangular base or nut on the body

Characteristics

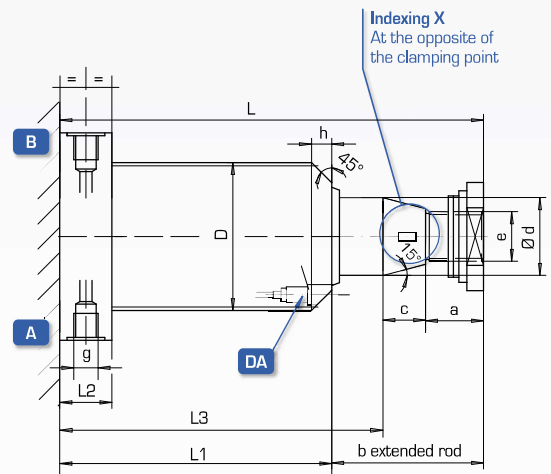
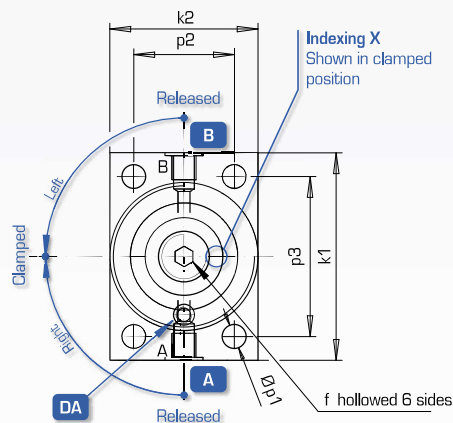
- rotation in a plane left or right $90^\circ \pm 2^\circ$
- index on the rod
- venting ports
- for machining of indexing on the clamping arm see pages 69 to 71

Options

- clamping arm : see accessories heading
- rotation 60° , 45° or 0° on request

Note

Cylinders are supplied with locking nut and lock washer [dimensions and torques : see page 72].



A = Clamping
B = Released
DA = Venting port

Definition of forces as function of clamping arm : see page 21

Important recommendations : see page 20

NON-INDEXED : the pin may be removed using a pin punch

F max at 250 bar	Rod ød	Stroke	Max flow A	Area extend A B	Dir. of rotation	Type	Order code	Dimensions																	
								a	c	D	e	f key	g	h	L	L1	L2	L3	k1 k2	p1	p2	p3			
kN	mm	mm	l/mn	cm ³				mm	mm			mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		
4	18	8	0.4	5.3 7.4	right left	PS 11 DX PS 11 GX	191 158/050 191 158/150	13	10	M45 x 1.5	M12 x 1.5	5	G1/8"	6	121	88	22	98	65 45	6.5	30	50			
8	25	12	0.9	15 21	right left	PS 21 DX PS 21 GX	191 148/050 191 148/150	16	14	M60 x 1.5	M16 x 1.5	6	G1/4"	8	152	107	22	122	83 63	8.5	44	65			
16	36	12	2	41 53	right left	PS 31 DX PS 31 GX	192 118/050 192 118/150	18	20	M80 x 2	M24 x 1.5	10	G1/4"	12	195	142	25	157	110 80	13	60	86			
24	42	12	3	74 88	right left	PS 41 DX PS 41 GX	192 119/050 192 119/150	20	22	M95 x 2	M30 x 1.5	12	G1/4"	16	218	161	25	176	120 95	15	70	96			

Swing clamp : PL

Double acting - Rotation in a plane
Max force at 250 bar : 4 to 24 kN



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Supply through counter-bores under ring
Fixing using screw on ring

Characteristics

- rotation in a plane left or right $90^\circ \pm 2^\circ$
- index on the rod
- venting ports
- standard and long strokes
- for machining of indexing on the clamping arm see pages 69 to 71

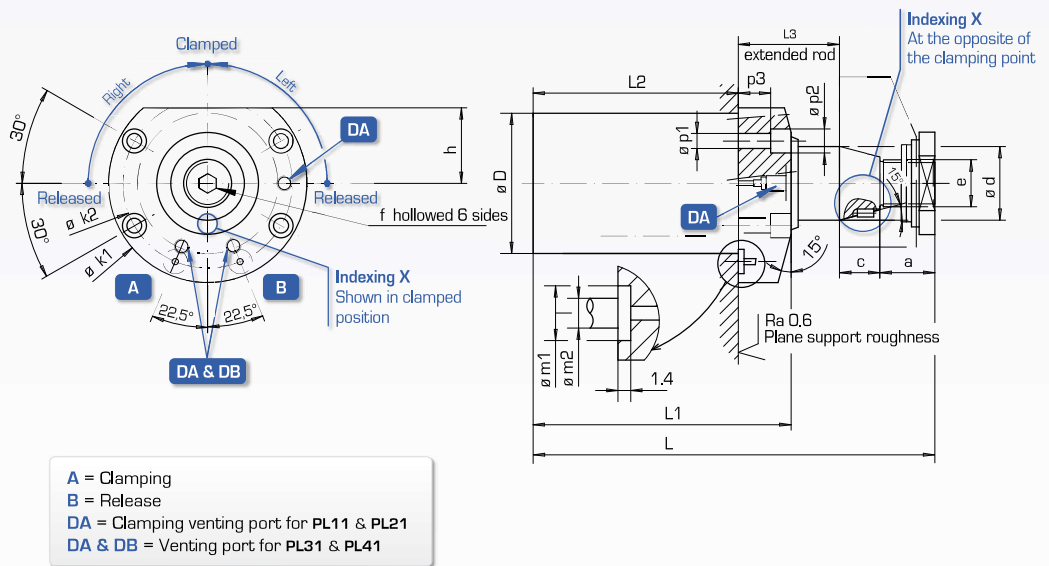
Options

- nozzle on counter-bores port
- clamping arm : see accessories heading
- rotation 60° , 45° or 0° on request

Note

Cylinders are supplied with o-ring seals, locking nut and lock-washer [dimensions and torques : see page 72].

Seals : or 5,28 x 1,78 for PL11 and PL21 90 NBR
or 7,65 x 1,78 for PL31 and PL41 90 NBR



Definition of forces as function of clamping arm : see page 21

Important recommendations : see page 20

NON-INDEXED : the pin may be removed using a pin punch

F max at 250 bar	Rod ϕd	Stroke	Max flow A	Area extend A B	Dir. of rota- tion	Type	Order code	Dimensions															
								a	c	ϕD 0 -0,2	e	f	h	$\phi k1$ $\phi k2$	L	L1	L2	L3	m1 m2	p1	p2	p3	
kN	mm	mm	l/mn	cm ³				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
4	18	8	0.4	5.3	droite	PL 11 DX	191 163/050	13	10	36	M12 x 1.5	5	20	58	121	88	66	32	8.8	5.5	9	13	
				7.4	gauche	PL 11 GX	191 163/150							47	142	102	80	39	4				
		7.3		droite	PL 11 DX C15	191 176/050																	
		10.9		gauche	PL 11 GX C15	191 176/150																	
8	25	12	0.9	15	droite	PL 21 DX	191 074/050	16	14	52	M16 x 1.5	6	28	76	152	107	81	41	8.8	6.5	10.5	16	
				21	gauche	PL 21 GX	191 074/150							63	189	133	107	54	4				
		20.2		droite	PL 21 DX C25	191 177/050																	
		32.5		gauche	PL 21 GX C25	191 177/150																	
16	36	12	2	41	droite	PL 31 DX	191 076/050	18	20	72	M24 x 1.5	10	38	110	195	142	114	43	11.1	10.5	17	11	
				53	gauche	PL 31 GX	191 076/150							90	234	168	140	56	5				
		52.3		droite	PL 31 DX C25	192 060/050																	
		77.7		gauche	PL 31 GX C25	192 060/150																	
24	42	12	3	74	droite	PL 41 DX	191 075/050	20	22	85	M30 x 1.5	12	45	125	218	161	131	45	11.1	10.5	17	12	
				88	gauche	PL 41 GX	191 075/150							105	257	187	157	58	5				
		74		droite	PL 41 DX C25	192 124/050																	
		88		gauche	PL 41 GX C25	192 124/150																	

Swing clamps with planar rotation

Swing clamp : PLF

Double acting - Rotation in a plane
Max force at 250 bar : 4 to 24 kN

Supply through counter-bore on base
Fixing using screws

Characteristics

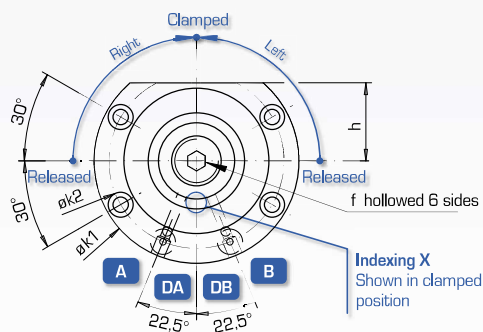
- rotation in a plane left or right $90^\circ \pm 2^\circ$
- index on the rod
- venting ports
- for machining of indexing on the clamping arm see pages 69 to 71

Options

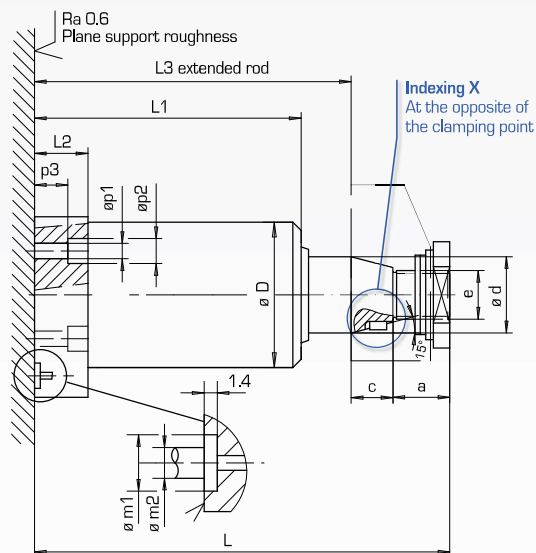
- nozzle on counter-bores port
- clamping arm : see accessories heading
- rotation 60° , 45° or 0° on request

Note

Cylinders are supplied with o-ring seals, locking nut and lock-washer (dimensions and torques : see page 72).
Seals : or 5,28 x 1,78 for PLF11 and PLF21 90 NBR
or 7,65 x 1,78 for PLF31 and PLF41 90 NBR



- A = Clamping
- B = Release
- DA = Clamping venting port
- DB = Release venting port



Definition of forces as function of clamping arm : see page 21

Important recommendations : see page 20

NON-INDEXED : the pin may be removed using a pin punch

F max at 250 bar	Rod ød	Stroke	Max flow A	Area extend A B	Dir. of rotation	Type	Order code	a	c	øD 0 -0.2	e	f	h	Dimensions																	
														øk1 øk2	L	L1	L2	L3	m1	m2	p1	p2	p3								
kN	mm	mm	l/mn	cm ³				mm	mm	mm		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm			
4	18	8	0.4	5.3 7.4	right left	PLF 11 DX PLF 11 GX	191 166/050 191 166/150	13	10	36	M12 x 1.5	5	20	58 47	121	88	40	98	8.8	4	5.5	9	35								
8	25	12	0.9	15 21	right left	PLF 21 DX PLF 21 GX	191 115/050 191 115/150	16	14	52	M16 x 1.5	6	28	76 63	152	107	50	122	8.8	4	6.5	10.5	44								
16	36	12	2	41 53	right left	PLF 31 DX PLF 31 GX	192 063/050 192 063/150	18	20	72	M24 x 1.5	10	38	110 90	195	142	58	157	11.1	5	10.5	17	48								
24	42	12	3	74 88	right left	PLF 41 DX PLF 41 GX	192 064/050 192 064/150	20	22	85	M30 x 1.5	12	45	125 105	218	161	65	176	11.1	5	10.5	17	55								

Swing clamp : PBF

Double acting - Rotation in a plane
Max force at 250 bar : 4 to 24 kN



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Flanged block

Supply through conter-bores on side

Fixing using 4 screw on the body

Characteristics

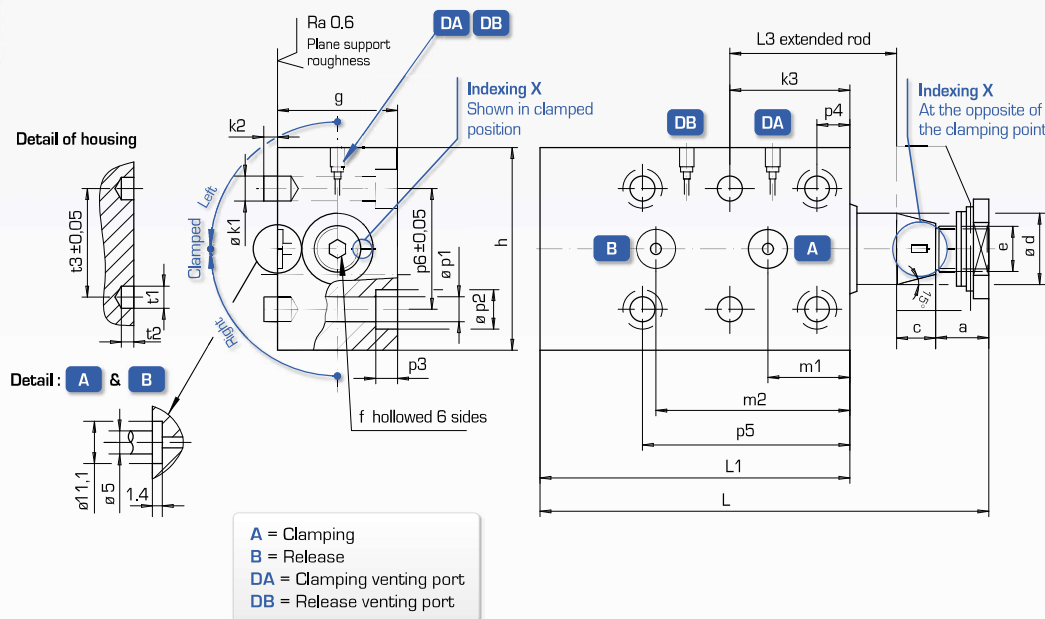
- rotation in a plane left or right $90^\circ \pm 2^\circ$
- index on the rod
- venting ports
- for machining of indexing on the clamping arm see pages 69 to 71

Options

- nozzle on counter-bores port
- clamping arm : see accessories heading
- rotation 60° , 45° or 0° on request

Note

Cylinders are supplied with o-ring seals, locking nut and lock-washer [dimensions and torques : see page 72].
Seals : or 7,65 x 1,78 90 NBR



Definition of forces as function of clamping arm : see page 21

Important recommendations : see page 20

NON-INDEXED : the pin may be removed using a pin punch

F max at 250 bar	Rod ød	Stroke	Max flow A	Area extend A B	Dir. of rotation	Type	Order code	Dimensions																
								a	c	e	f	g	h	øk1	L	L1	L3	m1	m2	p1	p4	t1		
kN	mm	mm	l/mn	cm ³				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
4	18	8	0.4	5.3	right	PBF 11 DX	191 162/050	13	10	M12 x 1.5	5	36	60	8	121	88	48.5	24.5	59	6.5	10	8		
					left	PBF 11 GX	191 162/150							38.5						6.5	45	45		
8	25	12	0.9	15	right	PBF 21 DX	191 072/050	16	14	M16 x 1.5	6	52	75	10	152	107	59.5	28	68.5	8.5	12	10		
					left	PBF 21 GX	191 072/150							44.5						8	77	58		
16	36	12	2	41	right	PBF 31 DX	191 079/050	18	20	M24 x 1.5	10	72	96	14	195	142	75	34	94	10.5	15	14		
					left	PBF 31 GX	191 079/150							7						17	105	7		
24	42	12	3	74	right	PBF 41 DX	191 081/050	20	22	M30 x 1.5	12	85	116	16	218	161	85	40	107	13	20	16		
					left	PBF 41 GX	191 081/150							8						20	120	8		
				88										70						13	92	92		

Swing clamps with planar rotation

Swing clamp : **PCB**

Double acting - Rotation in a plane
Max force at 250 bar : 4 to 24 kN

Cartridge type supply

Fixing using 4 screw on ring

Characteristics

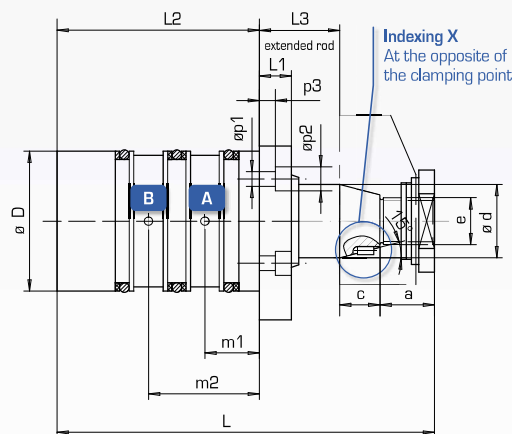
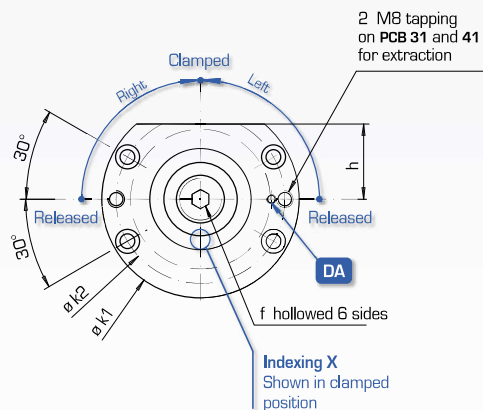
- rotation in a plane left or right $90^\circ \pm 2^\circ$
- index on the rod
- venting ports
- for machining of indexing on the clamping arm
see pages 69 to 71

Options

- clamping arm : see accessories heading
- rotation 60° , 45° or 0° on request

Note

Cylinders are supplied with seals, locking nut and lock-washer
[dimensions and torques : see page 72].



A = Clamping
B = Release
DA = Clamping venting port only for PCB 31 and PCB 41 cylinders

■ Housing machining dimensions : see page 31

■ Definition of forces as function of clamping arm : see page 21

■ Important recommendations : see page 20

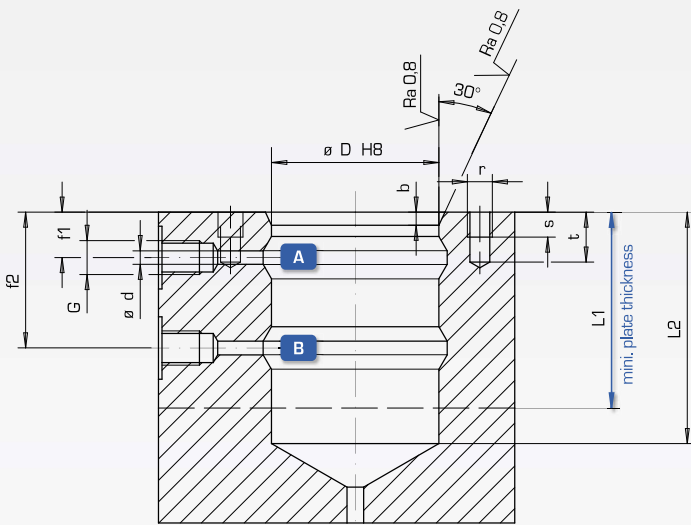
■ NON-INDEXED : the pin may be removed using a pin punch

F max at 250 bar	Rod ød	Stroke	Max flow A	Area extend A B	Dir. of rota- tion	Type	Order code	Dimensions																
								a	c	øD	e	f	h	øk1 øk2	L	L1	L2	L3	m1	m2	p1	p2	p3	
kN	mm	mm	l/mn	cm ³				mm	mm	mm		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
4	18	8	0.4	5,3 7,4	right left	PCB 11 DX PCB 11 GX	191 161/050 191 161/150	13	10	36	M12 x 1.5	5	20	58 47	121	10,5	77,5	20,5	14	49	5,5	9	5,5	
8	25	12	0.9	15 21	right left	PCB 21 DX PCB 21 GX	191 069/050 191 069/150	16	14	52	M16 x 1.5	6	28	76 63	152	12	95	27	16	56	6,5	10,5	6	
16	36	12	2	41 53	right left	PCB 31 DX PCB 31 GX	191 080/050 191 080/150	18	20	72	M24 x 1.5	10	38	110 90	195	18	124	33	17	77	10,5	17	8	
24	42	12	3	74 88	right left	PCB 41 DX PCB 41 GX	191 070/050 191 070/150	20	22	85	M30 x 1.5	12	45	125 105	218	18	143	33	22	88	10,5	17	8	

Housing : PCB

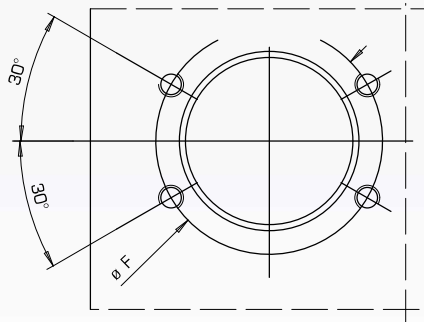
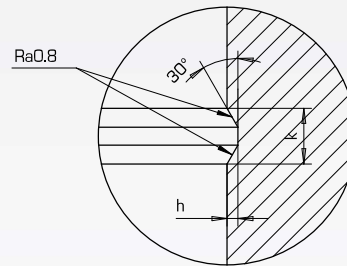
For PCB swing clamp cartridges
Machining dimensions - Example

Housing machining dimensions



Vent ports allow air to be expelled during fitting of the cylinder

Detail of groove



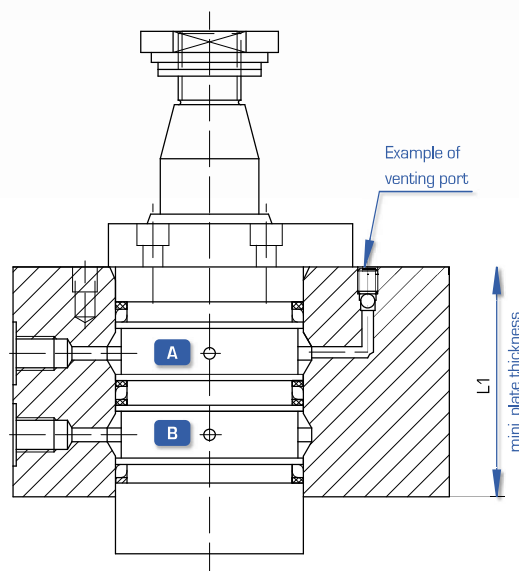
A = Clamping
B = Release

IMPORTANT :

Allow for venting ports at highest points of assemblies
General tolerances Js13
Round off and polish sharp angles

Type	Dimensions													
	øD HB	b	L1 mini	L2 mini	ød	øF	f1	f2	G	h mini	k	r	s	t
PCB 11	36	2	62	79	3	47	14	48.75	G1/4"	0.5	4	M5	8	10
PCB 21	52	3	70	97	4	63	16	56	G1/4"	1	6	M6	10	12
PCB 31	72	3	95	126	5	90	17	77	G1/4"	1	8	M10	14	17
PCB 41	85	4	106	145	5	105	22	88	G1/4"	1.25	10	M10	14	17

Example : Fitting through a plate



Swing clamps with planar rotation

Swing clamp : PCV

Double acting - Rotation in a plane
Max force at 250 bar : 4 to 8 kN

Cartridge type supply

Fixing using the threaded body

Characteristics

- rotation in a plane left or right $90^\circ \pm 2^\circ$

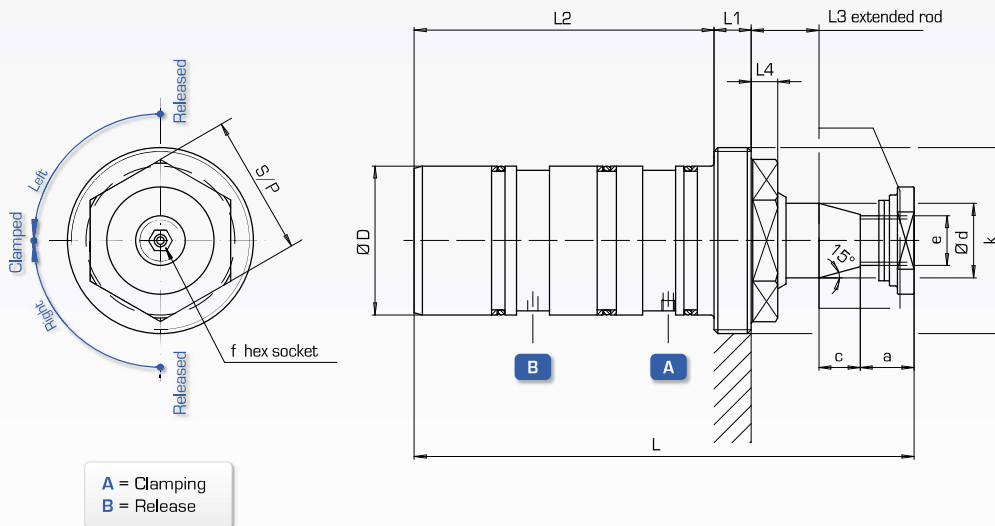
Options

- clamping arm : see accessories heading
- rotation 60° , 45° or 0° on request

Note

Cylinders are supplied with seals, locking nut and lock-washer [dimensions and torques : see page 72].

Indexing of the arm on the rod is not possible.



A = Clamping
B = Release

Housing machining dimensions : see page 33

Definition of forces as function of clamping arm : see page 21

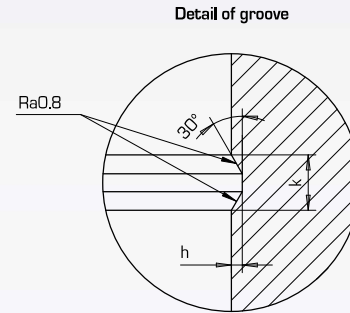
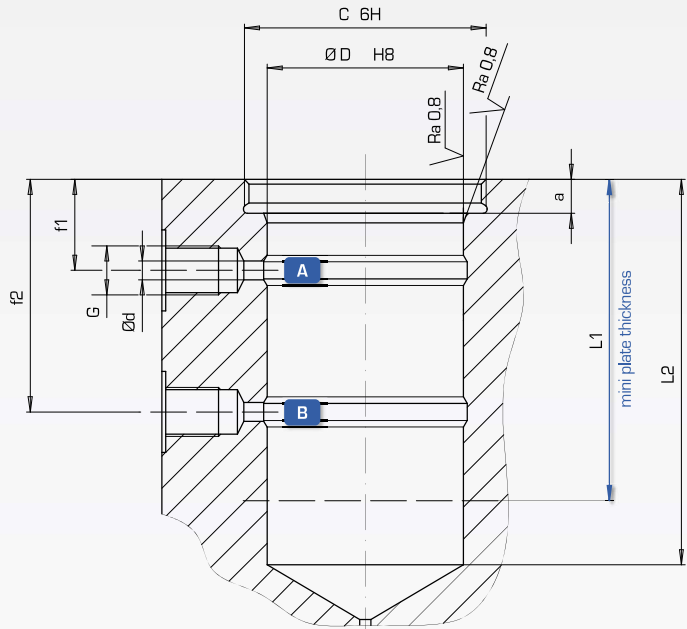
Important recommendations : see page 20

F max at 250 bar	Rod ød	Stroke	Max flow A	Area extend A B	Dir. of rotation	Type	Order code	Dimensions												
								a	c	øD	e	f key	k	L	L1	L2	L3	L4	S/P	
kN	mm	mm	l/mn	cm ²				mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
4	18	8	0.4	5.3 7.4	right left	PCV 11 D PCV 11 G	191 160/000 191 160/100	13	10	36	M12 x 1.5	5	M45 x 1.5 -6g	121	9	72.6	16.4	6.4	34	
8	25	12	0.9	15 21	right left	PCV 21 D PCV 21 G	191 066/000 191 066/100	16	14	52	M16 x 1.5	6	M64 x 2 -6g	152	9	91.6	21.4	6.4	50	

Housing : PCV

For PCV swing clamp cartridges
Machining dimensions - Example

Housing machining dimensions



Vent ports allow air to be expelled during fitting of the cylinder

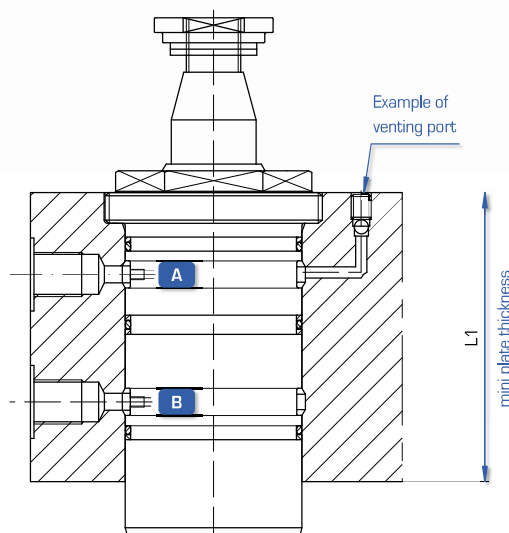
A = Clamping
B = Release

IMPORTANT :

Allow for venting ports at highest points of assemblies
General tolerances Js13
Round off and polish sharp angles

Type	Dimensions										
	øD H8	C H6	L1 mini	L2 mini	ød	a	f1	f2	G	h mini	k
PCB 11	36	M45 x 1.5	66	83	3	9	20.1	52.85	G1/4"	1	8
PCB 21	52	M64 x 2	78	102	5	9	23.1	61.6	G1/4"	1	8

Example : Fitting through a plate



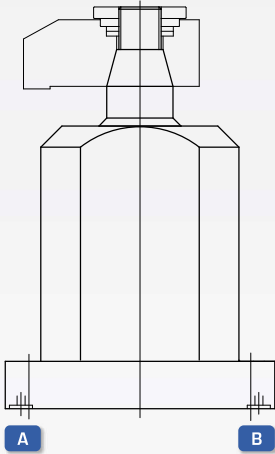
Swing clamps with planar rotation

Examples of assembly : P_26

Double acting swing clamps - 100 bar

Types **PS**, **PL**, **PF**, **PT** and **PLS**

Type PF 26

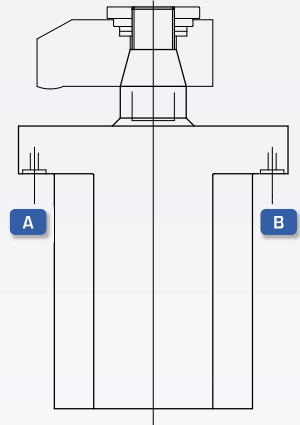


Fixing :
4 screws on base

Supply :
Counter-bores under rectangular base

See page : 37

Type PL 26

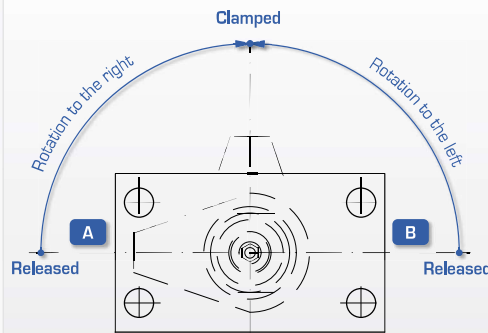


Fixing :
4 screws

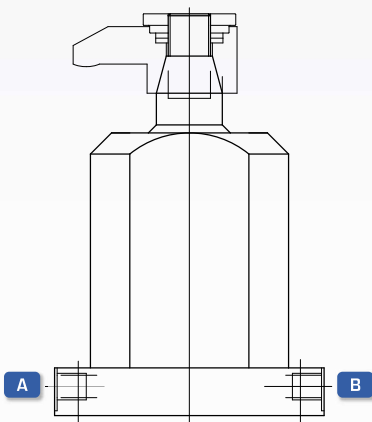
Supply :
Counter-bores under ring

See page : 35

Layout drawing
common to models P_26



Type PS 26

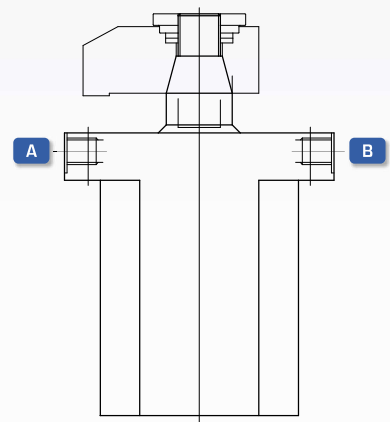


Fixing :
4 screws on base

Supply :
Threads on rectangular base

See page : 38

Type PT 26

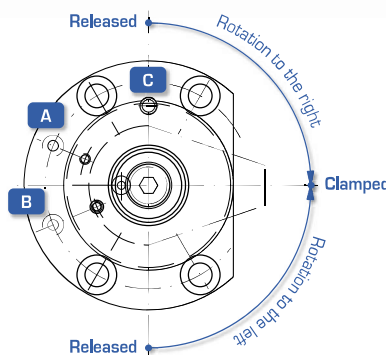
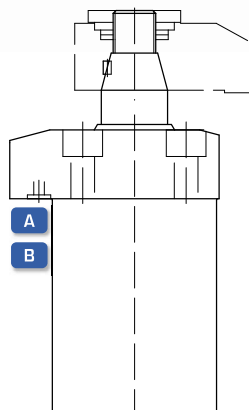


Fixing :
4 screws

Supply :
Threads on ring side

See page : 36

Type PLS 26



Fixing :
4 vis

Supply :
Counter-bores under ring

See page : 39

Swing clamp : PL 26

Double acting - Rotation in a plane
Max force at 100 bar : 8 kN



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Supply through counter-bores under head Fixing using screws

Definition

These cylinders are used when the pressure available is limited to 100 bar and for restricted dimensions.
At 100 bar, the PF26 develops 7.7 kN that is more than the P31 (6kN) which is of larger volume.

Options

- custom clamping arm
- rotation 60°, 45° or 0° on request
- X indexing of the rod (see page 73)

Characteristics

- rod treated to prevent seizure and corrosion
- rotation in plane left or right 90°±2°
- stroke 12 mm
- **Body and base are treated against corrosion. Cylinders may be immersed in water for example for cast components pressurisation applications.**

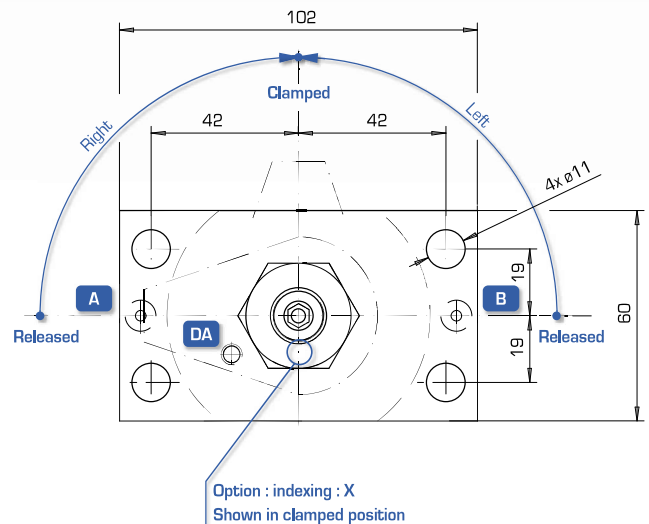
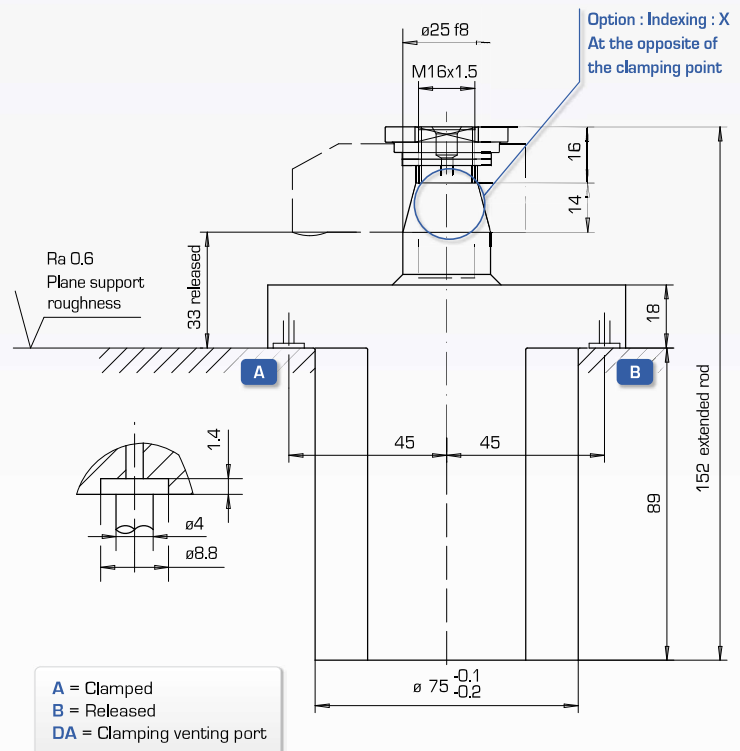
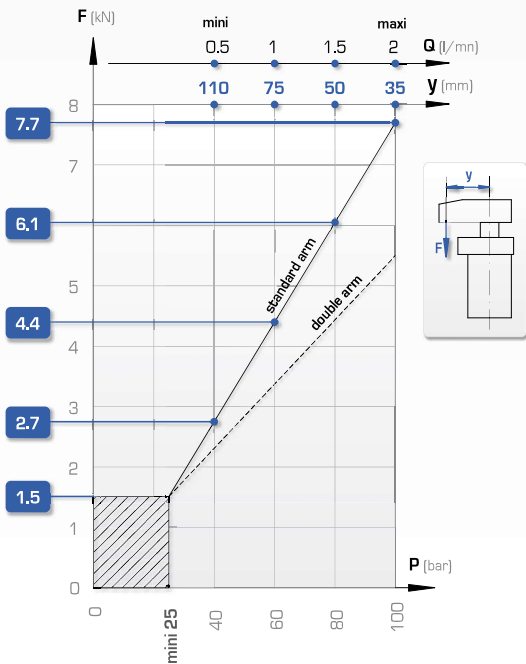
Note

Cylinders are supplied with seals, locking nut and lock-washer (dimensions and torques : see page 72).
Seals : or 5,28 x 1,78



GRAPHS :

For recommendations : see page 18



Direction of rotation	Type	Order code	Indexing
right	PL 26 D	191 131/000	NO
left	PL 26 G	191 131/100	
right	PL 26 D X	191 131/050	YES
left	PL 26 G X	191 131/150	

Swing clamps with planar rotation

Swing clamp : PT 26

Double acting - Rotation in a plane
Max force at 100 bar : 8 kN

Supply by tapping on head Fixing using screw

Definition

These cylinders are used when pressure available is limited to 100 bar and for restricted dimensions.
At 100 bar, the PT26 develops 7.7 kN that is more than the P31 (6kN) which is of larger volume.

Options

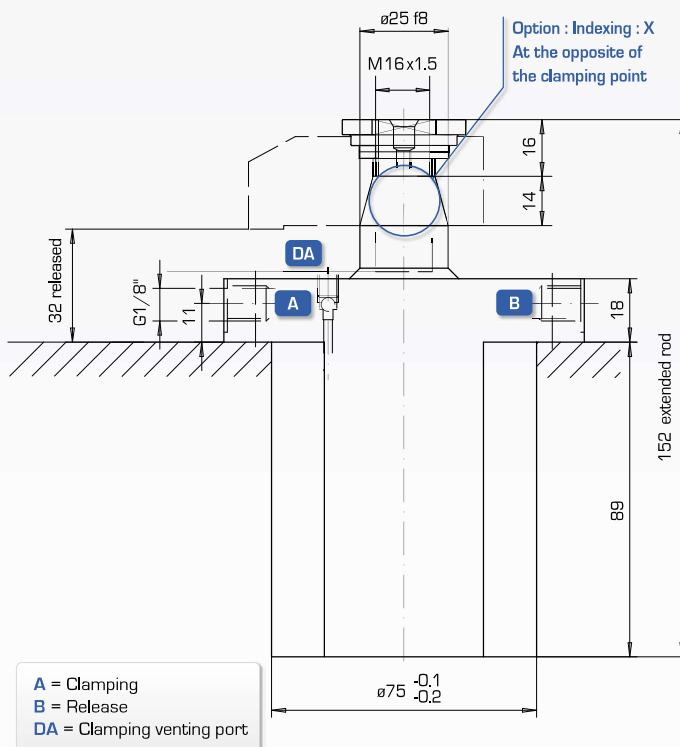
- custom clamping arm
- rotation 60°, 45° or 0° on request
- X indexing of the rod (see page 73)

Characteristics

- rod treated to prevent seizure and corrosion
- rotation in plane left or right 90°±2°
- stroke 12 mm
- **Body and base are treated against corrosion. Cylinders may be immersed in water for example for cast components pressurisation applications.**

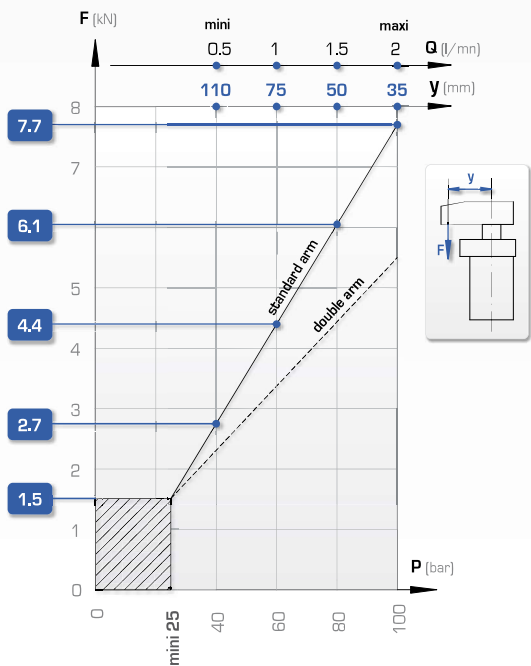
Note

Cylinders are supplied with seals, locking nut and lock-washer (dimensions and torques : see page 72).
Seals : or 5,28 x 1,78

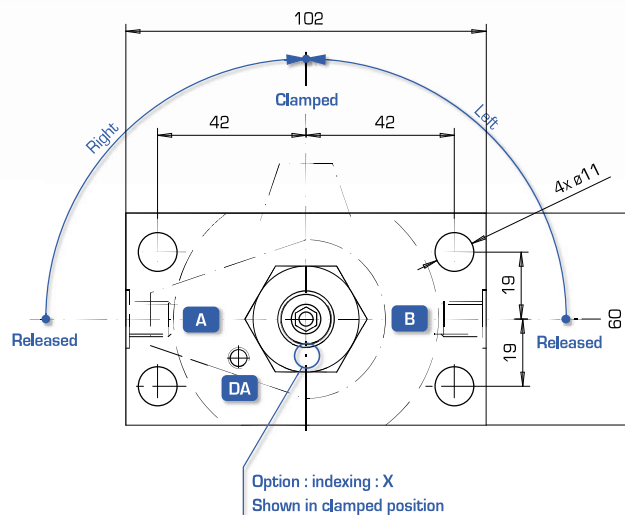


GRAPHS :

For recommendations : see page 18



Direction of rotation	Type	Order code	Indexing
right	PT 26 D	191 083/000	NO
left	PT 26 G	191 083/100	
right	PT 26 D X	191 083/050	YES
left	PT 26 G X	191 083/150	



Swing clamp : PF 26

Double acting - Rotation in a plane
Max force at 100 bar : 8 kN

Supply through counter-bores under base Fixing using screws on base

Definition

These cylinders are used when pressure available is limited to 100 bar and for restricted dimensions.
At 100 bar, the PF26 develops 7.7 kN that is more than the P31 (6kN) which is of larger volume.

Options

- custom clamping arm
- rotation 60°, 45° or 0° on request
- X indexing of the rod (see page 73)



Characteristics

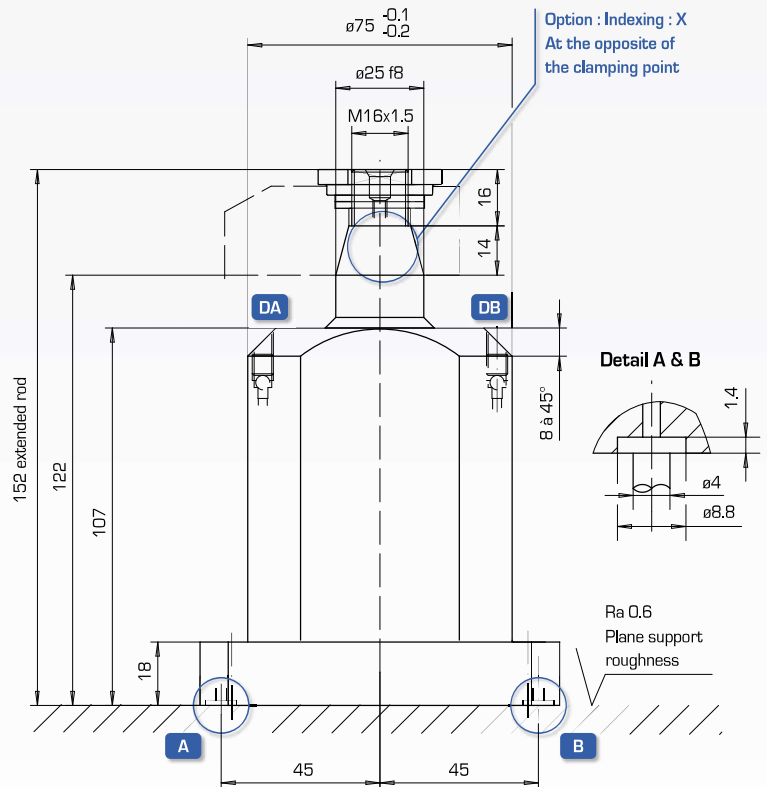
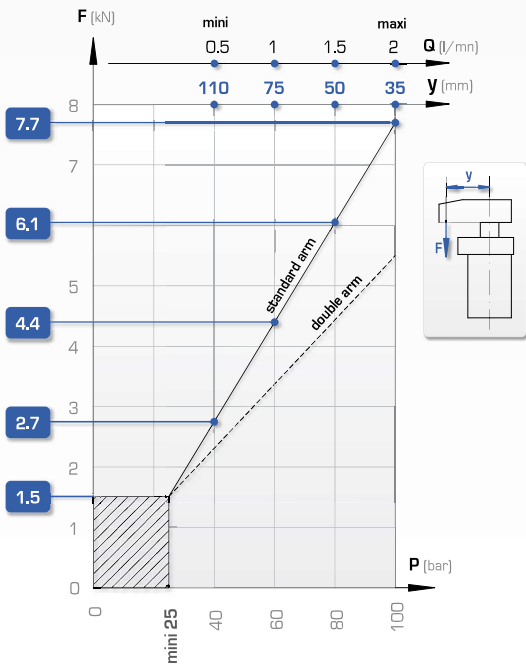
- rod treated to prevent seizure and corrosion
- rotation in plane left or right 90°±2°
- stroke 12 mm
- **Body and base are treated against corrosion. Cylinders may be immersed in water for example for cast components pressurisation applications.**

Note

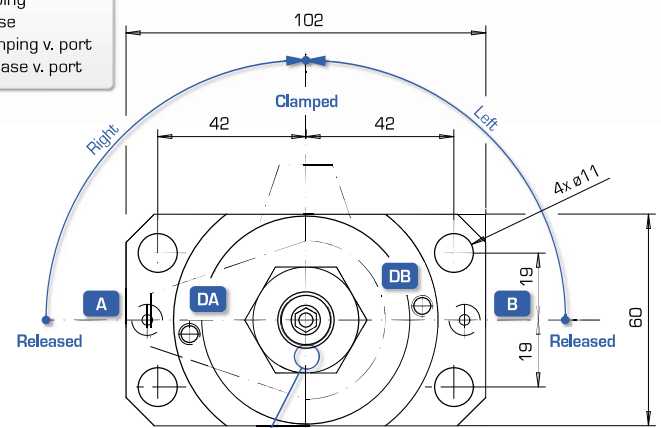
Cylinders are supplied with seals, locking nut and lock-washer (dimensions and torques : see page 72).
Seals : or 5,28 x 1,78

GRAPHS :

For recommendations : see page 18



A = Clamping
B = Release
DA = Clamping v. port
DB = Release v. port



Direction of rotation	Type	Order code	Indexing
right	PF 26 D	191 130/000	NO
left	PF 26 G	191 130/100	
right	PF 26 D X	191 130/050	YES
left	PF 26 G X	191 130/150	

Swing clamps with planar rotation

Swing clamp : PS 26

Double acting - Rotation in a plane
Max force at 100 bar : 8 kN

Fixing using screw on base Supply through tapping on rectangular base

Definition

These cylinders are used when pressure available is limited to 100 bar and for restricted dimensions.
At 100 bar, the PS26 develops 7.7 kN that is more than the P31 (6kN) which is of larger volume.

Options

- custom clamping arm
- rotation 60°, 45° or 0° on request
- X indexing of the rod (see page 73)



Characteristics

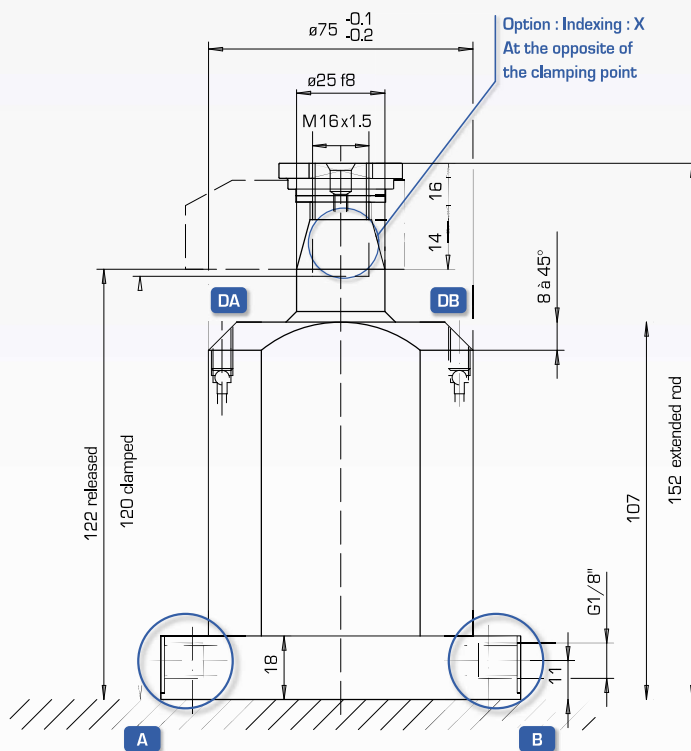
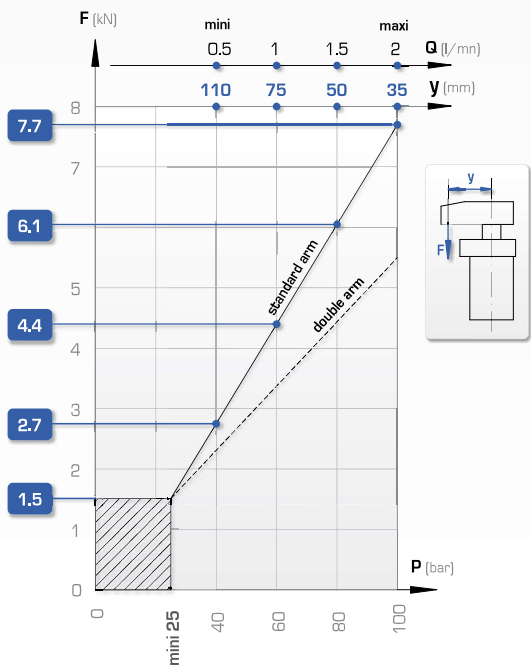
- rod treated to prevent seizure and corrosion
- rotation in plane left or right 90°±2°
- stroke 12 mm
- **Body and base are treated against corrosion. Cylinders may be immersed in water for example for cast components pressurisation applications.**

Note

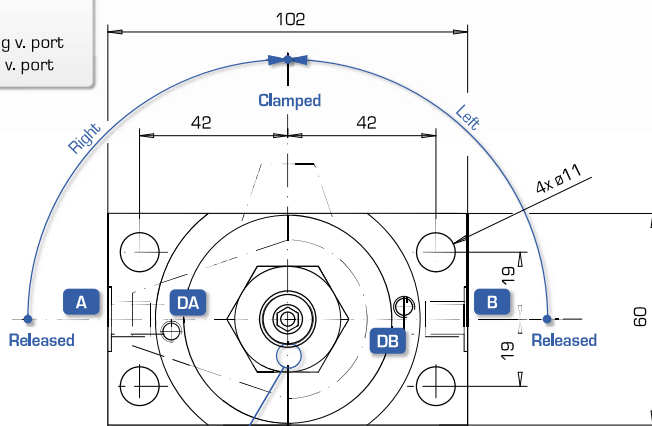
Cylinders are supplied with seals, locking nut and lock-washer (dimensions and torques : see page 72).
Seals : or 5,28 x 1,78

GRAPHS :

For recommendations : see page 18



A = Clamping
B = Released
DA = Clamping v. port
DB = Release v. port



Direction of rotation	Type	Order code	Indexing
right	PS 26 D	191 082/000	NO
left	PS 26 G	191 082/100	
right	PS 26 D X	191 082/050	YES
left	PS 26 G X	191 082/150	

Swing clamp : PLS 26 X

Double acting - Rotation in a plane
Max force at 100 bar : 8 kN



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Supply through counter-bores under ring Fixing using screws

Definition

These cylinders are used when pressure available is limited to 100 bar and for restricted dimensions.
At 100 bar, the PLS26 develops 7.7 kN that is more than the P31 (6kN) which is of larger volume.

Options

- custom clamping arm
- rotation 60°, 45° or 0° on request
- **version for immersion is treated against corrosion**
- **X** indexing of the rod (see page 73)

Characteristics

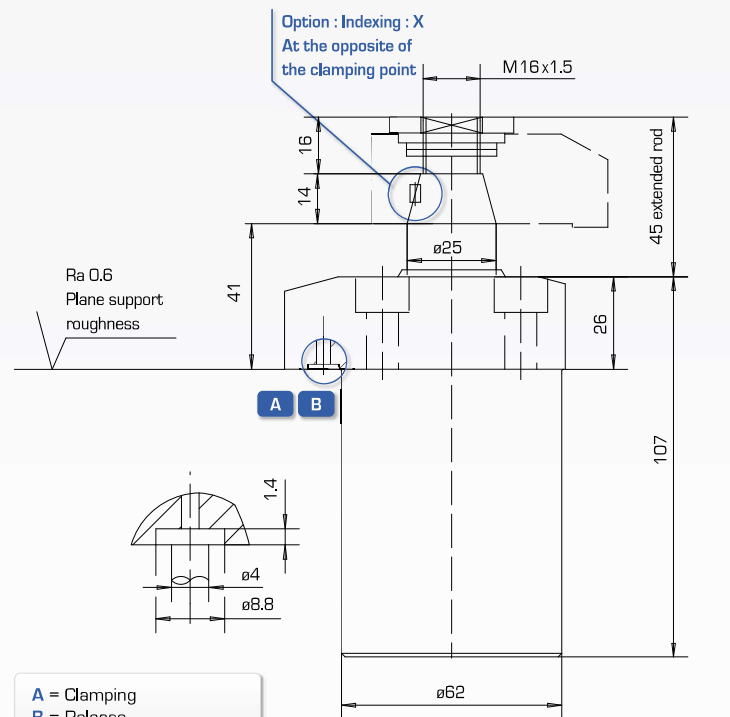
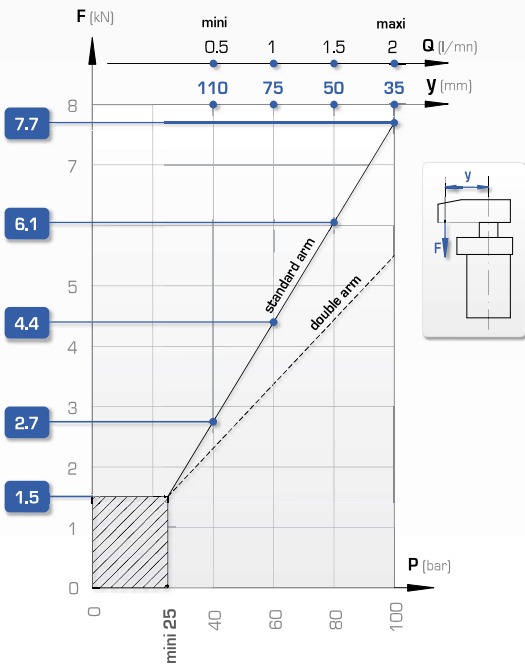
- rod treated to prevent seizure and corrosion
- rotation in plane left or right 90°±2°
- stroke 12 mm
- **Body and base are treated against corrosion. Cylinders may be immersed in water for example for cast components pressurisation applications.**

Note

Cylinders are supplied with seals, locking nut and lock-washer (dimensions and torques : see page 72).
Seals : or 5,28 x 1,78

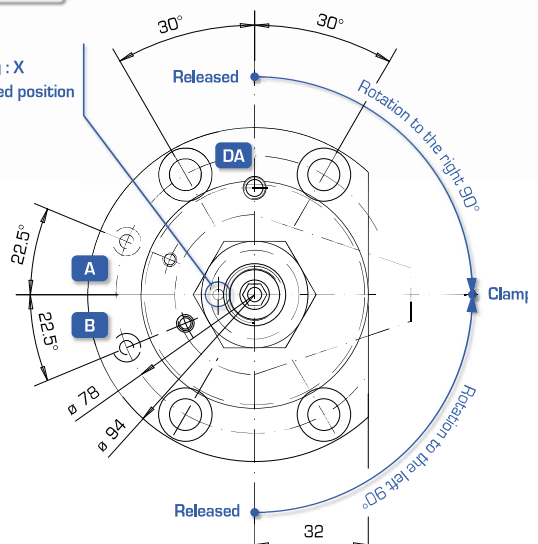
GRAPHS :

For recommendations : see page 18



A = Clamping
B = Release
DA = Clamping venting port

Option : indexing : X
Shown in clamped position



Direction of rotation	Type	Order code	Indexing
right	PLS 26 D X	191 112/050	YES
left	PLS 26 G X	191 112/150	

Swing clamps with planar rotation