Swing clamp characteristics

Double acting

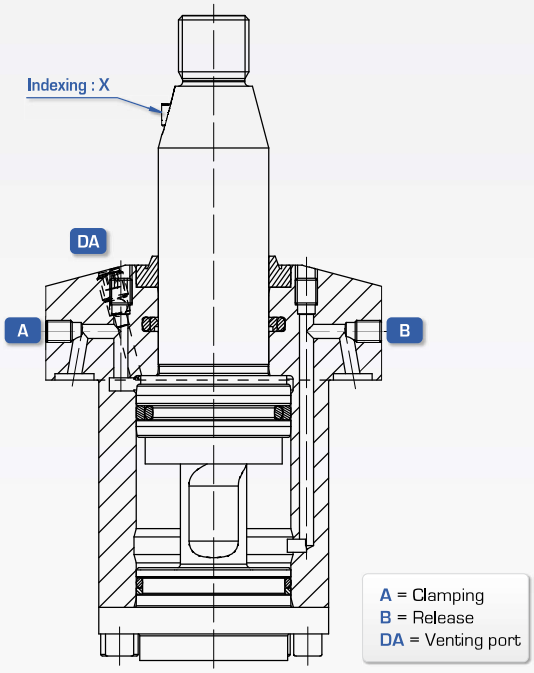
Helical rotation

General points

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

Construction

- all parts are in high-strength steel.
- rod treated anti-seizure and anti-corrosion.
- the body is protected by an anti-corrosion treatment.



Advantages

- **all our swing clamps include venting ports.**
- easy removal of clamping arm.
- **all cylinders include an index on the rod.**

Operations

Clamping phase : Supply at A

During the pressurisation of the cylinder, the piston rod pivits along a helical ramp followed by a linear clamping translation. The total stroke and the linear clamping stroke are indicated on technical data sheet specific to each type of cylinder.

Phase de débridage : Alimentation en B

Supply through the release port item B causes a movement of translation of the rod up, followed by a helical pivoting movement to find the original position.

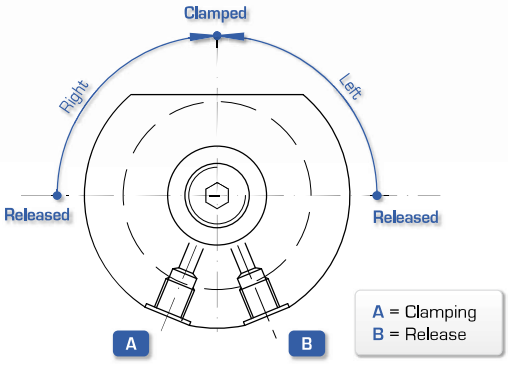
Direction and angle of rotation

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° ± 2°**.

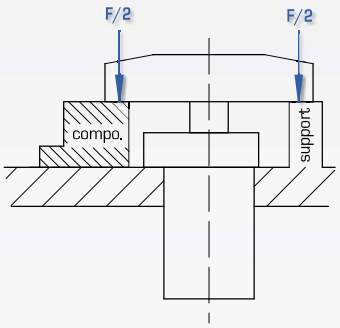


Determination of cylinder characteristics

The maximum forces are given for a pressure of 250 bar. This pressure is only authourised 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.

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 symetric arm allows operation at 250 bar, **but you must use the following formula :**

Force (daN) /2 = **Pressure** (bar) **x Section** (cm^2) ÷ 2

(A in table on page 44)

Examples :

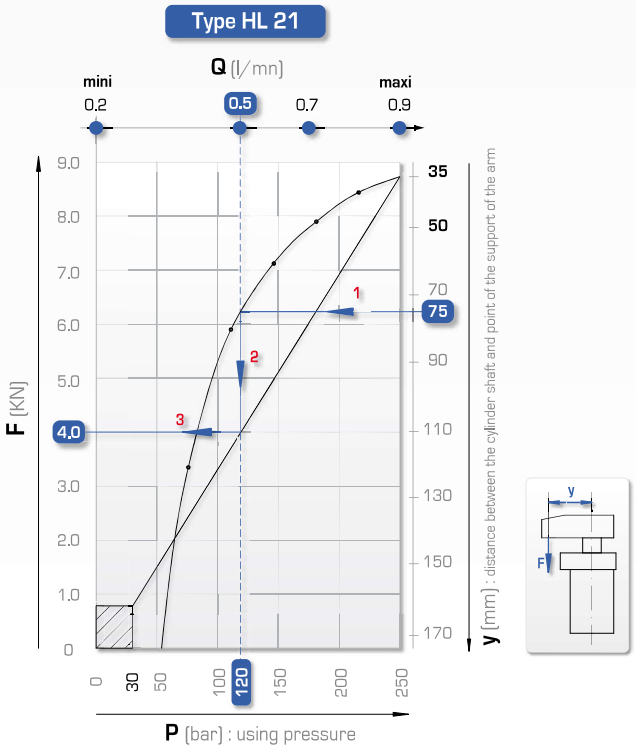
For a double symetric arm and the max force of HL 21 :
F/2 = P x S ÷ 2 = 250 x 4,71 ÷ 2 = 5,8 kN

Example of using diagrams

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

The **maximum force** developed by a **HL21** 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 45



Swing clamp characteristics

Important recommendations
Characteristics

Using pressure

- miniumum : **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	Dir. of rotation	Type	Reference
kN	mm	mm	l/mm	cm³			
8	25	12	0.9	11.06 22.61	right left	HL 21 DX HL 21 GX	191200/050 191200/150
A	B	C	D	E	F		

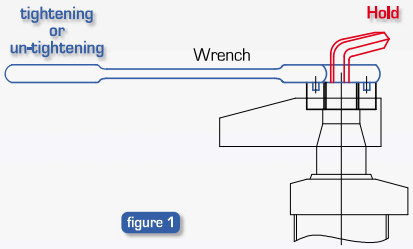


figure 1

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 P5 cylinder drawings or on page 45 for the **HL21** and **HL31** models to specify the max force and pressure as a function of lenght «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 ot 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 adjustable braking device 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 45 which **take the yield into account.**

A = clamping B = release		Unit	P5	HL 12	HL 21	HL 31
Section	A B	cm²	0.98 1.77	3.01 6.15	4.71 9.62	9.45 19.63
Area extend	A B	cm³	1.67 3	6.9 14.1	11.06 22.61	26.95 55.94
Flow	maxi	l / mn	0.2	0.6	0.9	2
Cycle period	A B	s	0.5 1.1	0.7 1.4	0.74 1.5	0.8 1.6
Clamping stroke	maxi mini	mm	4 1	10 3	10 3	13 3
Total stroke		mm	17	23	23.5	28.5

Swing clamp characteristics

Definition of the special arms
Graphs

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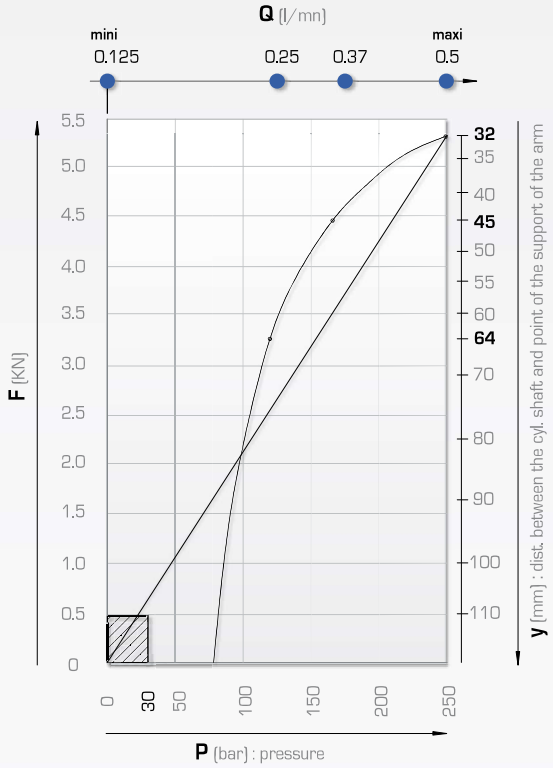
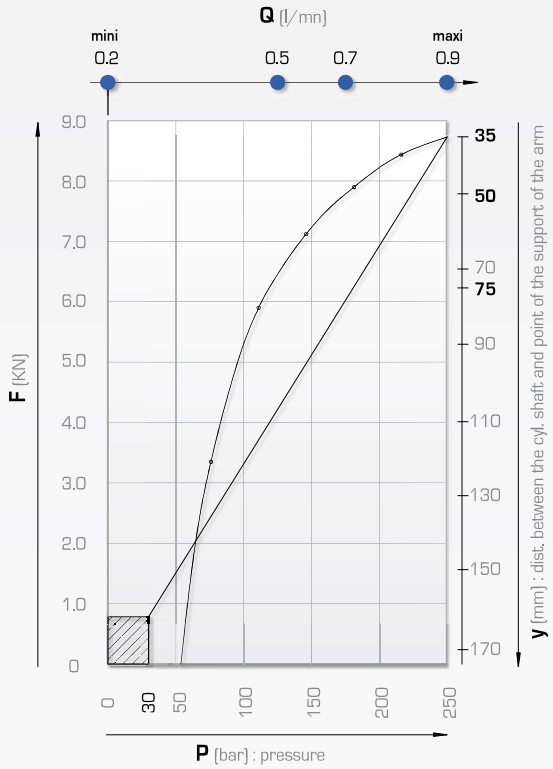
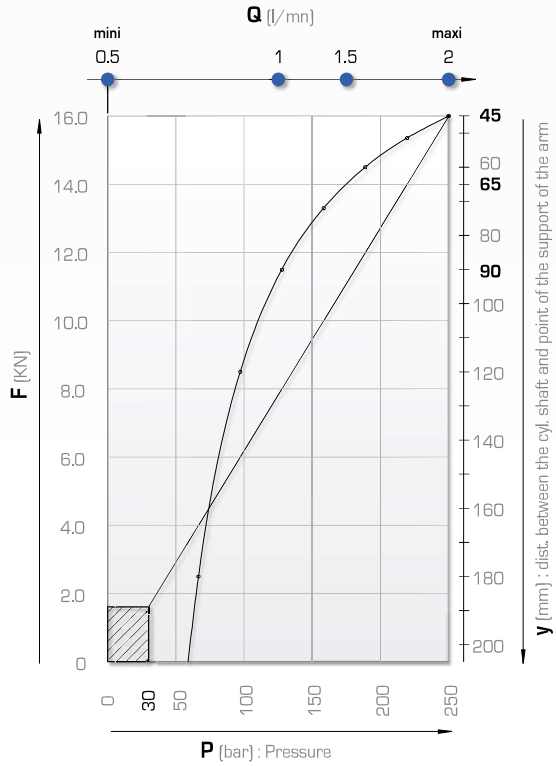
Type HL 12



Type HL 21



Type HL 31



These graphs take the cylinder yield into account

Swing clamp : PL5

Double acting - Helical rotation
Max force at 250 bar : 1.9 kN

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Supply through counter-bores under ring
Fixing using 3 screws on ring

Characteristics

- cylinder body in treated brunished steel
- total stroke : 17 mm
- clamping stroke : 6 mm
- helical rotation left or right 90° ± 2°
- countersink in the arm extension

Options

- custom clamping arm
- rotation 60°, 45° or 0°
- position check
- special dimension
- nozzle on counter-bore ports

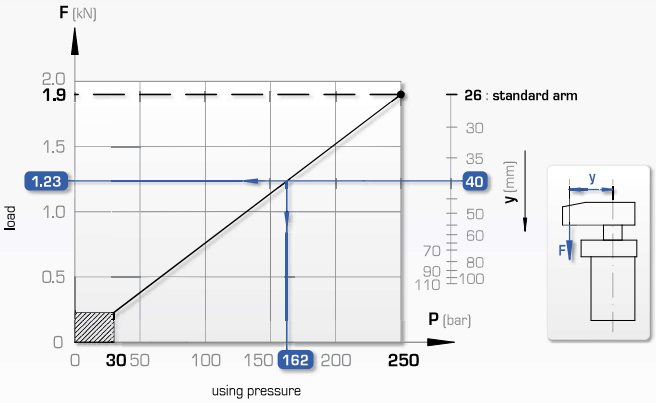
Note

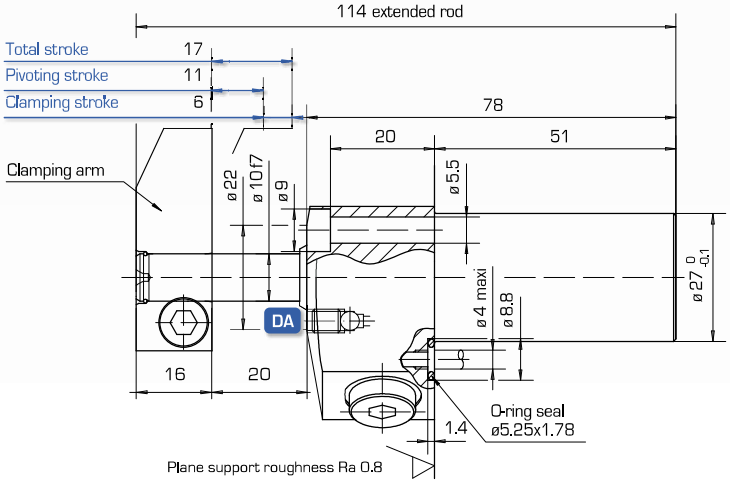
Cylinder are supplied with o-ring seals, plugs (depending on version) and ring.
Seals : or 5.25 x 1.78 NBR

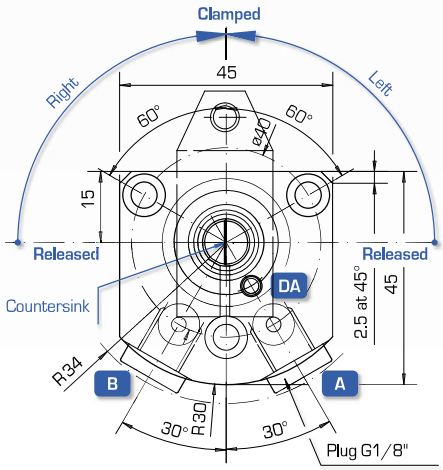
Graphs :

Actual force applied at clamping point taking input/output yield into account.

Example : If y = 40 mm, F maxi = 1.23 kN at 162 bar







F max at 250 bar	Max flow A	Max flow B	Area extend A B	Section A B	Direction of rotation	Type	Order code
kN	l/mn	l/mn	cm³	cm²			
1.9	0.2	0.36	1.67 3	0.98 1.77	right left	PL 5 D PL 5 G	191 169/050 191 169/150

A = Clamping
B = Release
DA = Venting port

Swing clamp : PT5

Double acting - Helical rotation
Max force at 250 bar : 1.9 kN

Supply through G 1/8" tappings
Fixing using 3 screws on ring

Characteristics

- cylinder body in treated brunished steel
- total stroke : 17 mm
- clamping stroke : 6 mm
- helical rotation left or right 90° ± 2°
- countersink in the arm extension

Options

- custom clamping arm
- rotation 60°, 45° or 0°
- position check
- special dimension
- nozzle on counter-bore ports

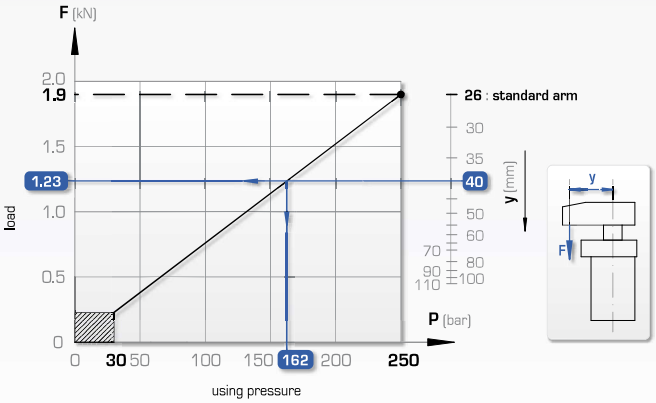
Note

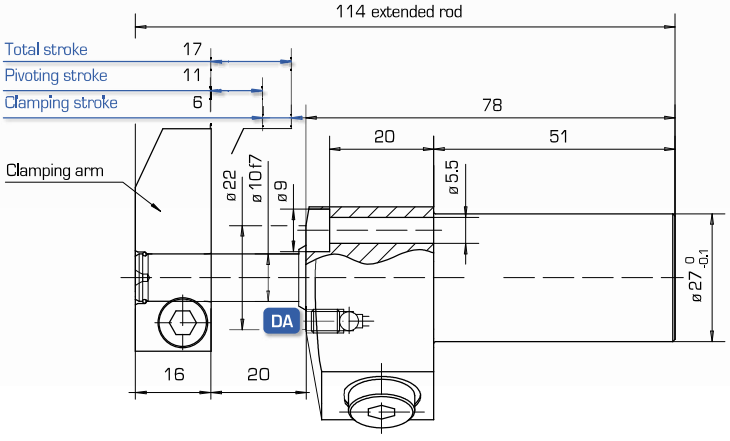
Cylinder are supplied with o-ring seals, plugs (depending on version) and ring.

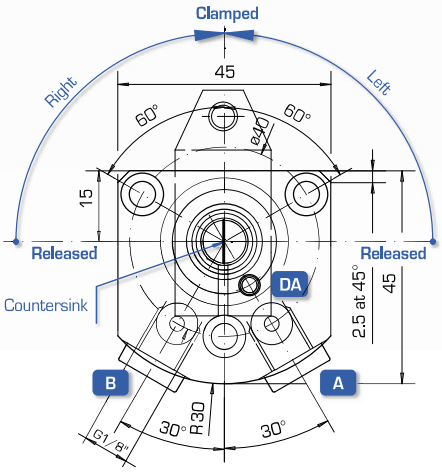
Graphs :

Actual force applied at clamping point taking input/output yield into account.

Example : If y = 40 mm, F maxi = 1.23 kN at 162 bar







F max at 250 bar	Max flow A	Max flow B	Area extend A B	Section A B	Direction of rotation	Type	Order code
kN	l/mn	l/mn	cm³	cm²			
1.9	0.2	0.36	1.67 3	0.98 1.77	right left	PT 5 D PT 5 G	191 170/050 191 170/150

A = Clamping
B = Release
DA = Venting port

Swing clamp : PF5

Double acting - Helical rotation
Max force at 250 bar : 1.9 kN

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Supply through counter-bore under base
Fixing using 4 screws on base plate

Characteristics

- cylinder body in treated brunished steel
- total stroke : 17 mm
- clamping stroke : 6 mm
- helical rotation left or right 90° ± 2°
- countersink in the arm extension

Options

- custom clamping arm
- rotation 60°, 45° or 0°
- position check
- special dimension
- nozzle on counter-bore ports

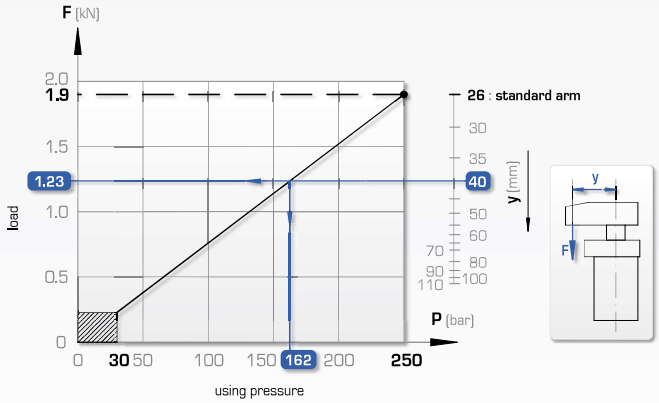
Note

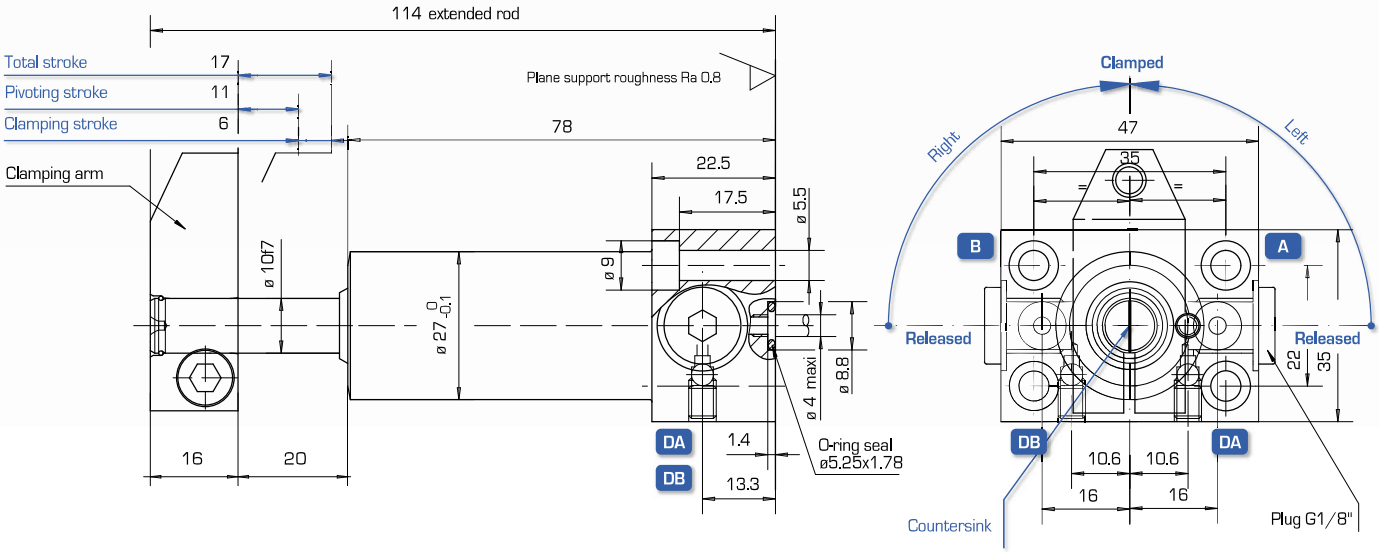
Cylinder are supplied with o-ring seals, plugs (depending on version) and ring.
Seal : or 5.25 x 1.78 NBR and plug G 1/8"

Graphs :

Actual force applied at clamping point taking input/output yield into account.

Example : If y = 40 mm, F maxi = 1.23 kN at 162 bar





F max at 250 bar	Max flow A	Max flow B	Area extend A B	Section A B	Direction of rotation	Type	Order code
kN	l/mn	l/mn	cm^3	cm^2			
1.9	0.2	0.36	1.67 3	0.98 1.77	right left	PF 5 D PF 5 G	191 173/050 191 173/150

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

Swing clamps with helical rotation

Swing clamp : PS5

Double acting - Helical rotation
Max force at 250 bar : 1.9 kN

Supply through G1/8" tapping
Fixing using 4 screws on base plate

Characteristics

- cylinder body in treated brunished steel
- total stroke : 17 mm
- clamping stroke : 6 mm
- helical rotation left or right 90° ± 2°
- countersink in the arm extension

Options

- custom clamping arm
- rotation 60°, 45° or 0°
- position check
- special dimension
- nozzle on counter-bore ports

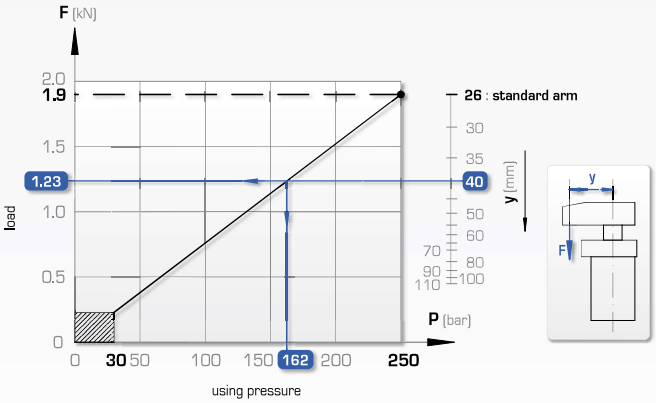
Note

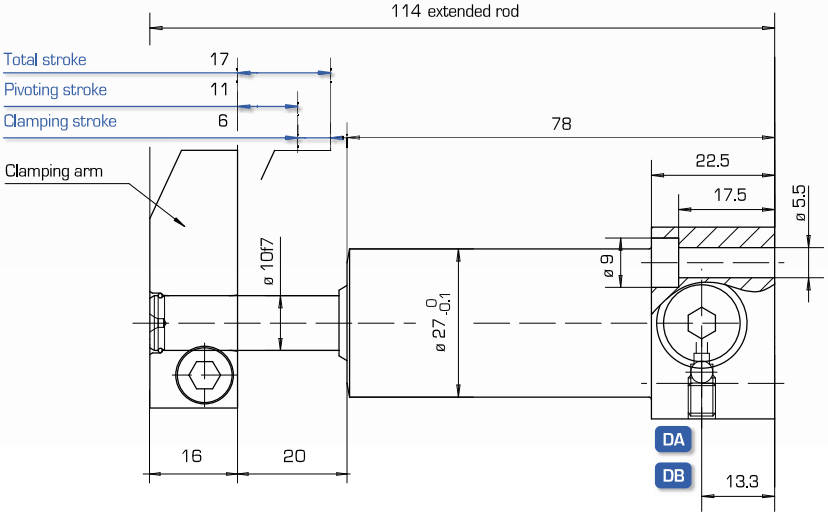
Cylinder are supplied with o-ring seals, plugs (depending on version) and ring.
Seal : or 5.25 x 1.78 NBR and plug G 1/8"

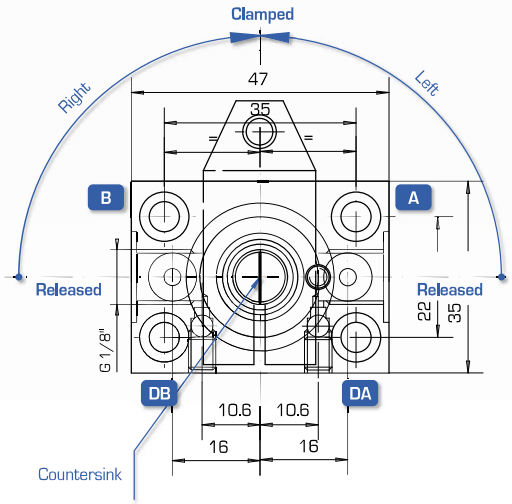
Graphs :

Actual force applied at clamping point taking input/output yield into account.

Example : If y = 40 mm, F maxi = 1.23 kN at 162 bar







F max at 250 bar	Max flow A	Max flow B	Area extend A B	Section A B	Direction of rotation	Type	Order code
kN	l/mn	l/mn	cm³	cm²			
1.9	0.2	0.36	1.67 3	0.98 1.77	right left	PS 5 D PS 5 G	191 174/050 191 174/150

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

Swing clamp : PCV5

Double acting - Helical rotation
Max force at 250 bar : 1.9 kN

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Cartridge with hexagonal flange

Characteristics

- cylinder body in treated brunished steel
- total stroke : 17 mm
- clamping stroke : 6 mm
- helical rotation left or right 90° ± 2°

Options

- custom clamping arm
- rotation 60°, 45° or 0°
- position check
- special dimension

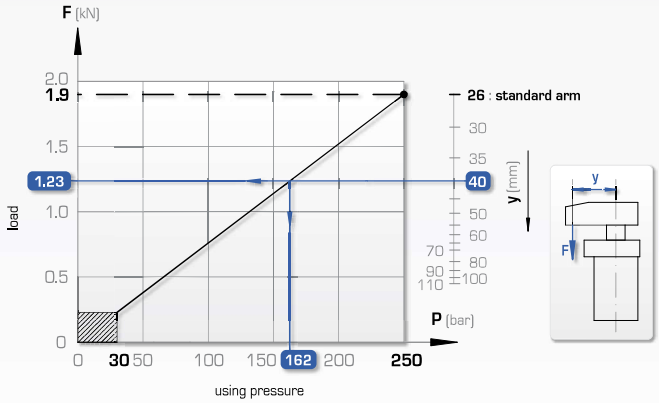
Note

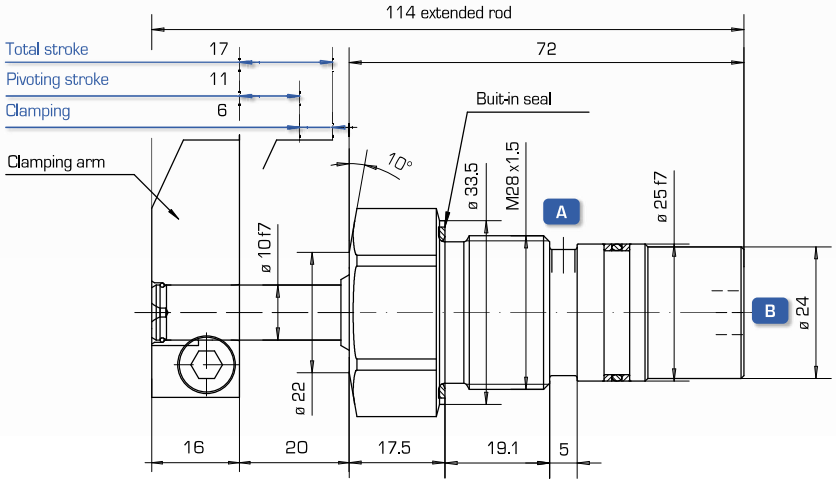
Cylinders are supllied with seals.
Countersink on the rod is not possible.

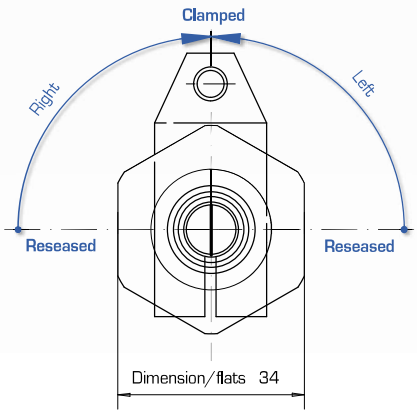
Graphs :

Actual force applied at clamping point taking input/output yield into account.

Example : If y = 40 mm, F maxi = 1.23 kN at 162 bar







Tightening torque for cylinder in housing : Cs=9.1 mdaN

F max at 250 bar	Max flow A	Max flow B	Area extend A B	Section A B	Direction of rotation	Type	Order code
kN	l/mn	l/mn	cm²	cm²			
1.9	0.2	0.36	1.67 3	0.98 1.77	right left	PCV 5 D PCV 5 G	191 175/050 191 175/150

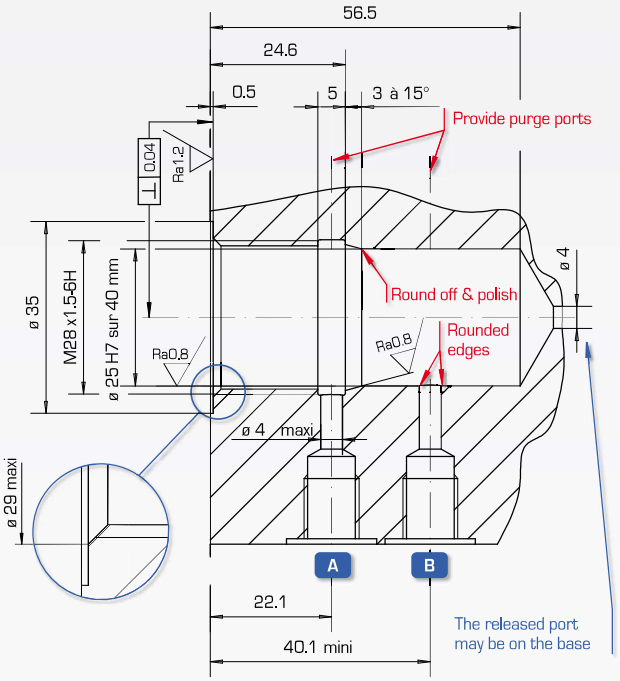
A = Clamping port
B = Release port

Housing machining : see next page

Housing : PCV5

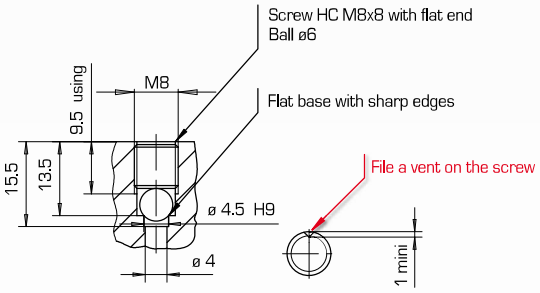
For swing clamp type PCV5
Machining dimensions

Housing machining dimensions



A = Clamping port
B = Release port

Detail of a venting port



Swing clamp : HL 21, HL 21 & HL 31

Double acting with helical groove

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Supply through counter-bore under ring
Fixing using screws

Characteristics

- total stroke = rot. stroke + linear clamping stroke
- helical groove left or right rotation 90°±2°
- venting port on the clamping side (HL12, HL 21, HL 31)
- venting port on the release side (HL 31)
- indexing of the rod
- maximum using pressure : 250 bar

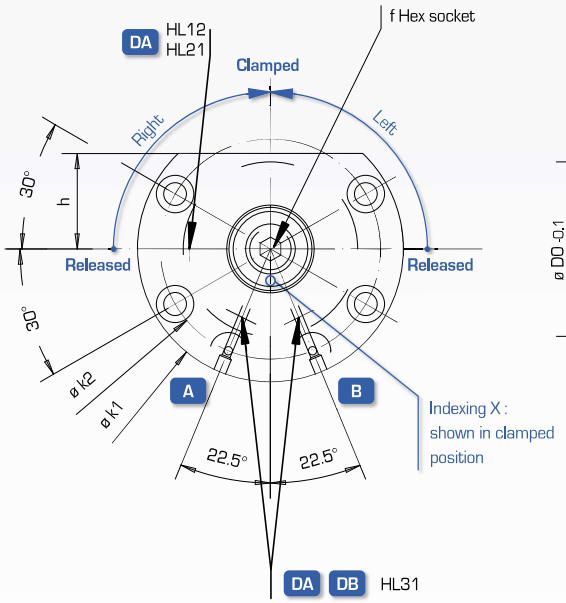
Options

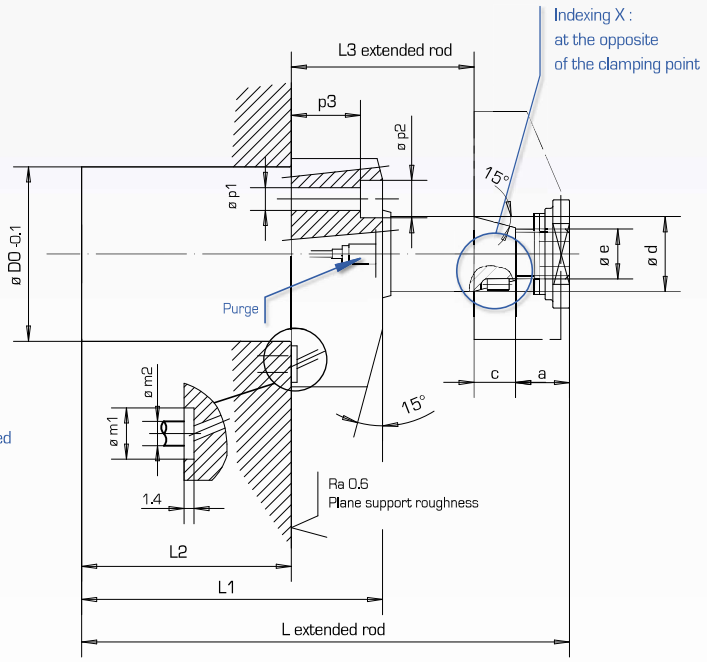
- clamping arms : see accessories heading
- rotation 60°, 45° or 0° on request

Note

Cylinders supplied with o-ring seals, locking nut and lock-washer
(dimensions and tightening torques : see page 72).
Seals on base : 5.28 x 1.78 (HL12, HL 21) 90 NBR
7.65 x 1.78 (HL 31) 90 NBR

A = Clamping port (oil)
B = Release port (oil)
DA = Clamping venting port
DB = Release venting port





Definition of forces as function of clamping arms : see page 45
Important recommendations : see page 44

F max at 250 bar	Rod ød	Clamping stroke	Total stroke	Max flow A	Area extend A B	Dir. of rotation	Type	Order code	Dimensions a	c	øD	e	f key	h	øk1 øk2	L	L1	L2	L3	m1	m2	p1	p2	p3
kN	mm	mm	mm	l/mn	cm³				mm	mm	mm		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
5	20	12	23	0.5	6.9 14.1	right left	HL 12 DX HL 12 GX	191 217/050 191 217/150	14	10	45	M14 x 1.5	5	23	68 56	138.5	88.5	66.5	48	8.8	4	6.5	10.5	8
8	25	12	24	0.9	11.06 22.61	right left	HL 21 DX HL 21 GX	191 200/050 191 200/150	16	14	52	M16 x 1.5	6	28	76 63	146.5	89.5	63.5	53	8.8	4	6.5	10.5	16
16	36	15	29	2	26.95 55.94	right left	HL 31 DX HL 31 GX	192 162/050 192 162/150	18	20	72	M24 x 1.5	10	38	110 90	176	106	78	60	11.1	5	10.5	17	11
8	25	25	37	0.9	17.42 35.59	right left	HL 21 DX C25 HL 21 GX C25	191 210/050 191 210/150	16	14	52	M16 x 1.5	6	28	76 63	175.5	105.5	79.5	66	8.8	4	6.5	10.5	16
16	36	25	39	2	36.85 76.55	right left	HL 31 DX C25 HL 31 GX C25	192 181/050 192 181/150	18	20	72	M24 x 1.5	10	38	110 90	201	121	93	70	11.1	5	10.5	17	11

Swing clamp : HLF 21 & HLF 31

Double acting with helical groove

Supply through counter-bores on base
Fixing using screws

Characteristics

- total stroke = rot. stroke + linear clamping stroke
- helical groove left or right rotation 90°±2°
- venting port on the clamping side (HLF 21 & HLF 31)
- venting port on the release side (HLF 31)
- indexing of the rod
- maximum using pressure : 250 bar

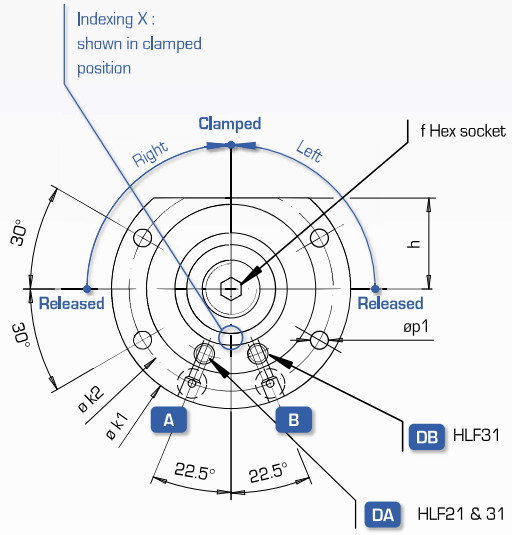
Options

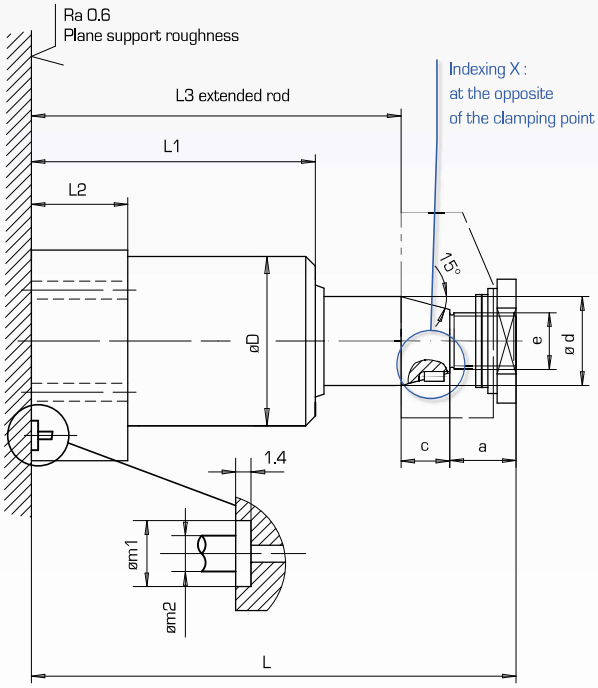
- clamping arms : see accessories heading
- rotation 60°, 45° or 0° on request

Note

Cylinders supplied with o-ring seals, locking nut and lock-washer
(dimensions and tightening torques : see page 72).
Seals on base : 5.28 x 1.78 (HLF 21) 90 NBR
7.65 x 1.78 (HLF 31) 90 NBR

A = Clamping port (oil)
B = Release port (oil)
DA = Clamping venting port
DB = Release venting port





Definition of forces as function of clamping arms : see page 45
Important recommendations : see page 44

F max at 250 bar	Rod ød	Clamping stroke	Total stroke	Max flow A	Area extend A B	Dir. of rotation	Type	Order code	Dimensions a	c	øD	e	f key	h	øk1 øk2	L	L1	L2	L3	m1	m2	p1
kN	mm	mm	mm	l/mn	cm³				mm	mm	mm		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
8	25	12	24	0.9	11.06 22.61	droite gauche	HLF 21 DX HLF 21 GX	191 201/050 191 201/150	16	14	52	M16 x 1.5	6	28	76 63	147	90	32.5	117	8.8	4	6.5
16	36	15	29	2	26.95 55.94	droite gauche	HLF 31 DX HLF 31 GX	192 163/050 192 163/150	18	20	72	M24 x 1.5	10	38	110 90	176.5	106.5	42	138.5	11.1	5	10.5
8	25	25	37	0.9	17.42 35.59	droite gauche	HLF 21 DX C25 HLF 21 GX C25	191 211/050 191 211/150	16	14	52	M16 x 1.5	6	28	76 63	176	106	32.5	146	8.8	4	6.5
16	35	25	39	2	36.85 76.55	droite gauche	HLF 31 DX C25 HLF 31 GX C25	192 182/050 192 182/150	18	20	72	M24 x 1.5	10	38	110 90	201.5	121.5	42	163.5	11.1	5	10.5