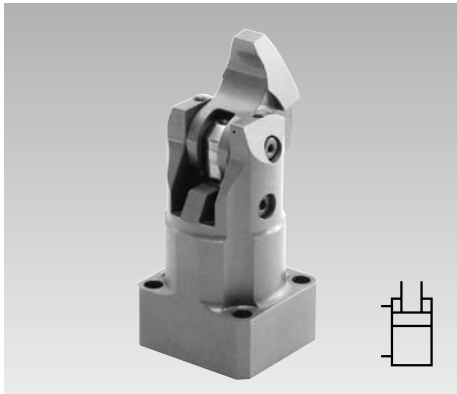




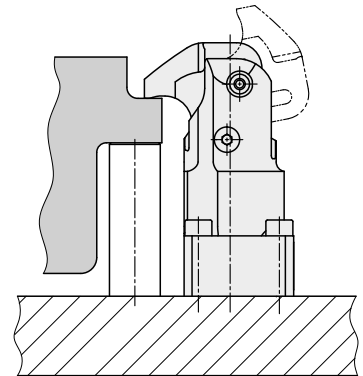
Compact Clamps

Manifold-mounting type, pneumatic position monitoring optional, double acting, max. operating pressure 250 bar



Advantages

- Minimum dimensions
- Mounting without pipes
- Metallic wiper edge for piston rod
- Clamping lever can be swivelled into small recesses
- Workpiece clamping without any side loads
- Unimpeded loading and unloading of the clamping fixture
- Long clamping lever adaptable to the workpiece
- Mounting position: any



Application

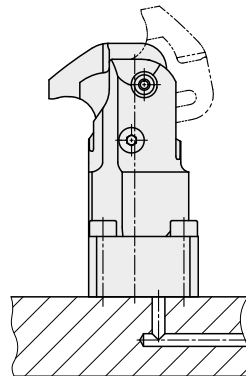
Compact clamps are designed for application in hydraulic clamping fixtures where oil supply is effected through drilled channels in the fixture body. Due to the minimum space required the compact clamp is especially suitable for clamping fixtures with little space for the installation of hydraulic clamping elements.

A clamping recess in the workpiece a little bit wider than the clamping lever is sufficient as clamping surface. Typical applications are:

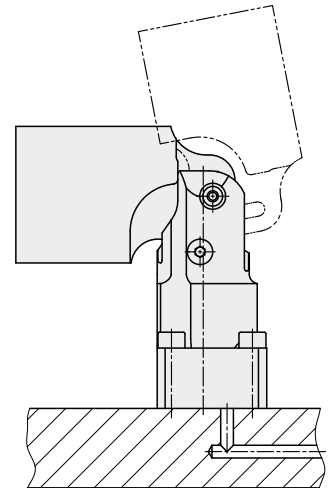
- Rotary indexing fixtures in horizontal and vertical machining centres
- Clamping fixtures for machining of several sides and complete machining
- Multiple clamping fixtures with many workpieces that are closely arranged
- Test systems for motors, gears, etc.
- Assembly lines

Installation and connecting possibilities

Drilled channels with short clamping lever



with long clamping lever (blank)



Description

The hydraulic compact clamp is a double-acting pull-type cylinder where a part of the linear stroke is used to swing the clamping lever onto the workpiece.

Available versions

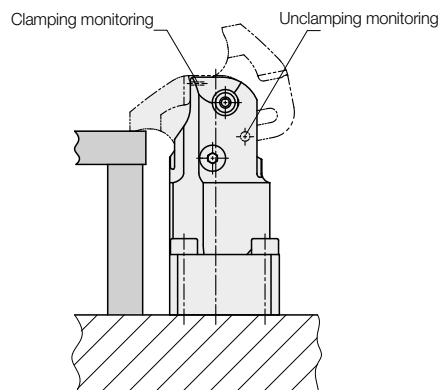
1. **With pneumatic clamping monitoring** **180X-2XX**
 The clamping monitoring signals:
 "The clamping lever is within the usable clamping range and the workpiece is clamped with minimum clamping force (min. 70 bar)."
2. **With pneumatic unclamping monitoring** **180X-2XXA**
 The unclamping monitoring signals:
 "The clamping lever is within the unclamping range, starting approx. 10° before the final position."
3. **Without position monitoring** **180X-2XXB**
4. **With pneumatic clamping and unclamping monitoring** **180X-2XXC**

Pneumatic position monitoring see page 4

Important notes

(see page 3)

Pneumatic position monitoring



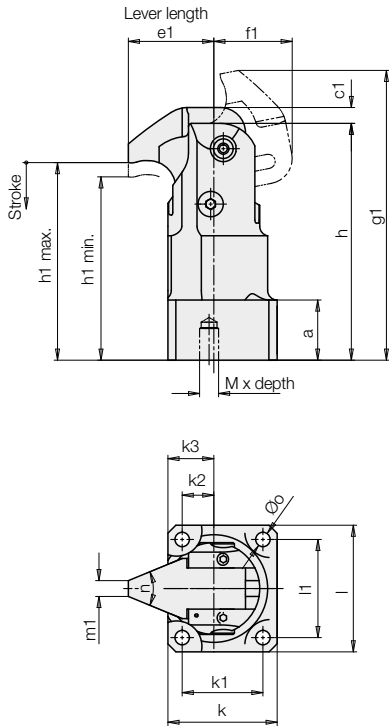
Application example



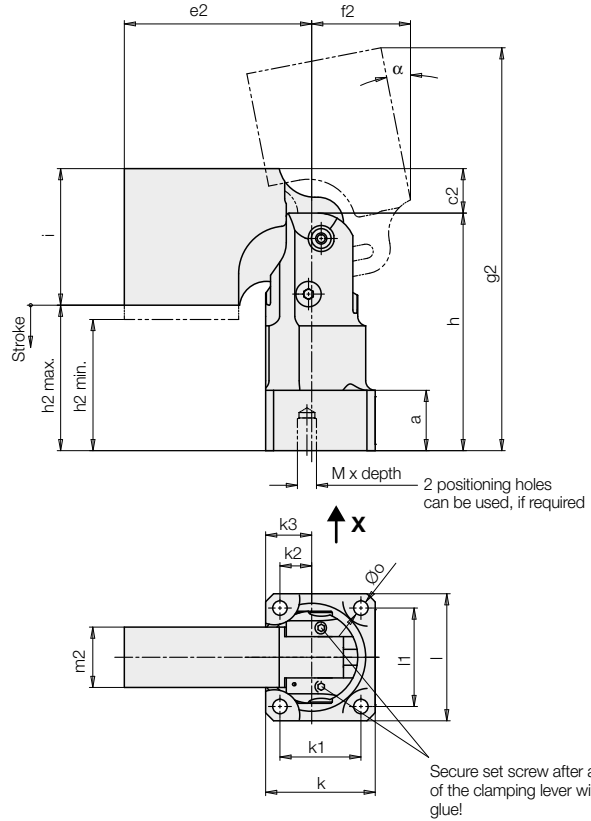
Clamping of a cast part with special clamping lever

Dimensions

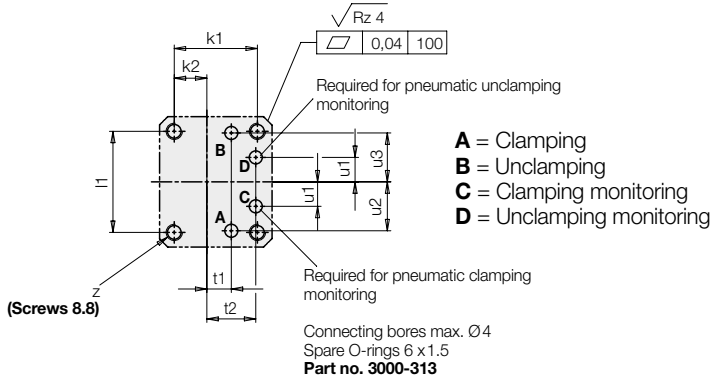
With cover Short clamping lever



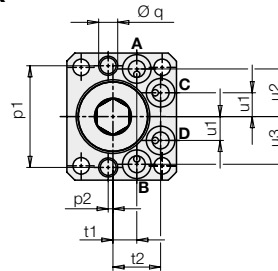
Long clamping lever (blank)



Connecting scheme



View X

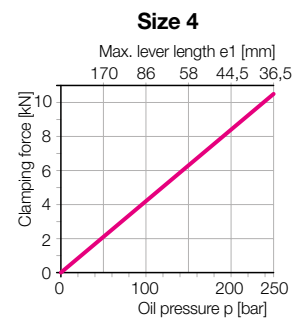
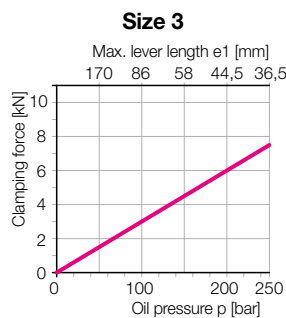
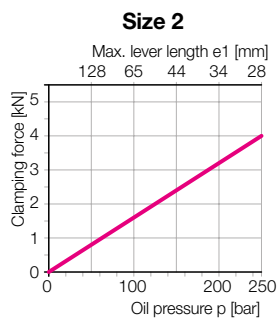
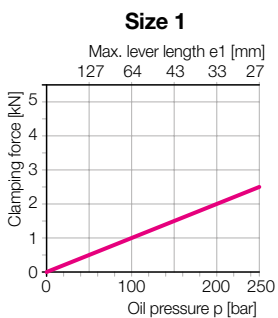


Material

Body: hardened, stainless
 Clamping lever:
 short HRc 48 – 55, stainless
 long (blank) X37 Cr Mo V5-1 hardened and tempered
 HRc 40 and nitrated
 Seals: NBR and PUR (max. 80°)

Pneumatic position monitoring see page 4

Effective clamping force and max. lever length e1 as a function of the operating pressure p



Technical data Dimensions

Size		1	2	3	4
Clamping force at 250 bar and short clamping lever	[kN]	2.5	4.0	7.5	10.5
Max. stroke	[mm]	5	5	7	8.5
Clamping stroke, usable	[mm]	4.5	4.5	6.5	8
Piston Ø:	[mm]	18	22	28	33
Piston rod Ø	[mm]	11	14	17	19
Oil volume clamping	[cm ³]	2.3	3.2	6.4	10.5
Oil volume unclamping	[cm ³]	3.6	5.4	10.2	15.7
Max. flow rate	[cm ³ /s]	4	5.5	11	25
Min. operating pressure without clamping monitoring	[bar]	20	20	20	20
with clamping monitoring	[bar]	70	70	70	70
Min. air pressure	[bar]	3	3	3	3
α ±1	[°]	13.5	10.5	15	16
a	[mm]	19	21	24	24
c1	[mm]	5	5	7	8.5
c2	[mm]	14	12	7	8.5
e1	[mm]	27	28	36.5	36.5
e2	[mm]	59	60	67.5	67.5
f1	[mm]	25	26	32	35
f2	[mm]	32	31	32	35
g1 min./max.*	[mm]	91.9/92.5	95.1/95.4	115.9	117.5
g2 min./max.*	[mm]	128.3/129.8	130.5/133.8	150.9/152	153.6/155.6
h	[mm]	74.8	80.8	95.4	98.6
h1 max.	[mm]	62.3	64.3	74.4	76.1
h1 min.	[mm]	57.8	59.8	67.9	68.1
h2 max.	[mm]	45.8	46.8	57.9	59.6
h2 min.	[mm]	41.3	42.3	51.4	51.6
i	[mm]	43	46	44.5	47.5
k	[mm]	34.5	41.5	52	54
k1	[mm]	25.5	31.5	38	41
k2	[mm]	10	14	16	18
k3	[mm]	14.5	19	23	24.5
l	[mm]	40	45	58	59
l1	[mm]	31	35	44	46
m1	[mm]	5	6	8	8
m2	[mm]	19	24	32	35
n	[°]	47.2	55.8	56.1	62
Ø o	[mm]	5.2	6.2	8.2	8.2
p1 ±0.02	[mm]	32	35	44	48
p2 ±0.1	[mm]	1.5	0	0	3
Ø q +0.05 x depth	[mm]	6x9	6x9	8x17	8x17
t1	[mm]	7.5	8.5	10	11
t2	[mm]	15	16.7	21.5	21.2
u1	[mm]	7.5	9.2	12.5	13.5
u2	[mm]	15	16.8	20	23
u3	[mm]	15	16.8	20	22
z	[mm]	M5	M6	M8	M8

With pneumatic clamping monitoring

Part no. - short clamping lever	1801-210	1802-210	1803-210	1804-210
Weight, approx.	[kg] 0.46	0.69	1.29	1.42
Part no. - long clamping lever (blank)	1801-230	1802-230	1803-230	1804-230
Weight, approx.	[kg] 0.74	1.05	1.77	1.93

With pneumatic unclamping monitoring

Part no. (version see above)	1801-2XXA	1802-2XXA	1803-2XXA	1804-2XXA
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Without position monitoring

Part no. (version see above)	1801-2XXB	1802-2XXB	1803-2XXB	1804-2XXB
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With clamping and unclamping monitoring

Part no. (version see above)	1801-2XXC	1802-2XXC	1803-2XXC	1804-2XXC
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Accessories

Part no. - short clamping lever	3548-1121	3548-1122	3548-1123	3548-1124
Part no. - long clamping lever (blank)	3548-1071	3548-1072	3548-1073	3548-1074

* min. = height in unclamping position as presented. max. = max. height for swing in

Important notes!

The compact clamps are designed exclusively for clamping of workpieces in industrial applications. Hydraulic clamping elements can generate considerable forces. The workpiece, the fixture or the machine must be in the position to compensate these forces.

In the effective area of the piston rod and the clamping arm there is the danger of crushing. The manufacturer of the fixture or the machine

is obliged to provide effective protection devices. During loading and unloading of the fixture a collision with the clamping lever has to be avoided. Remedy: Mount position adaptor.

The height of the manifold surface of the compact clamp should be selected so that the clamping point is approximately in the centre of the usable clamping stroke.

The compact clamp has to be checked regularly

on contamination by swarf and has to be cleaned. For dry machining, minimum quantity lubrication and in case of accumulation of very small swarf or particles, regular disassembly, cleaning and lubrication of the lever mechanism as per operating manual is required.

Operating conditions, tolerances and other data see data sheet A 0.100 and A 0.130.

Pneumatic position monitoring

1. Pneumatic clamping monitoring

In the clamping area, the clamping lever slides downwards at two hardened surfaces of the body. In one of the surfaces there is the bore hole for the pneumatic clamping monitoring.

The clamping lever overruns the bore hole, but does not completely close it. Only when the workpiece is really clamped, the clamping lever supports itself on the sliding surface and the bore hole will be firmly closed.

The clamping monitoring signals:

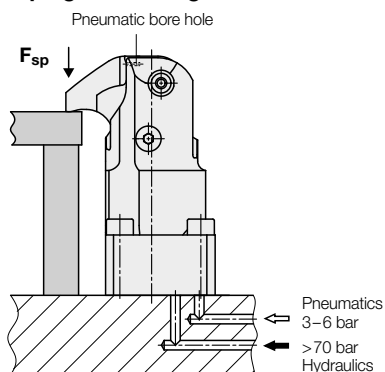
- The clamping lever is in the usable clamping range and
- a workpiece is clamped.

Important note

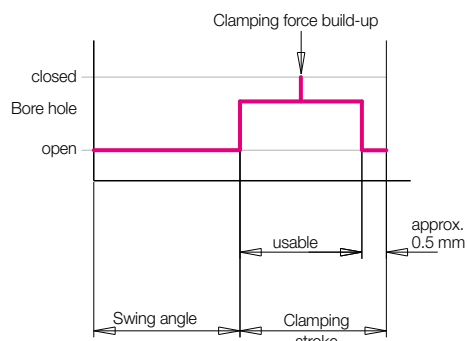
Required minimum pressures for clamping monitoring:

- Hydraulics 70 bar
- Pneumatics 3 bar

Clamping monitoring



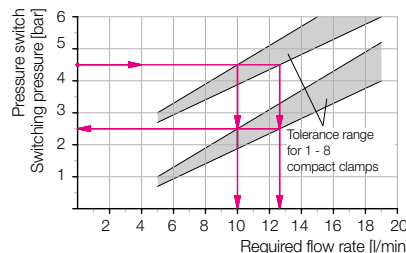
Function chart



Example for clamping position

Required switching pressure 4.5 bar
 Pressure drop, if 1 compact clamp is not clamped approx. 2 bar

As per diagram:
 Required flow rate approx. 10–13 l/min
 (depending on the number of connected compact clamps)

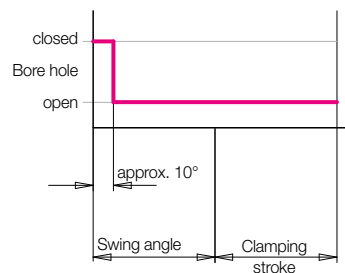
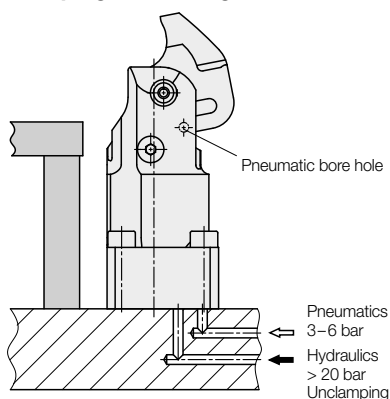


Required flow rate depending on the switching pressure of the pneumatic pressure switch for a pressure drop Δp 2 bar

2. Pneumatic unclamping monitoring

A disk which is pre-stressed by a spring element is mounted at the side of the clamping lever. This disk closes a pneumatic bore hole in unclamping position.

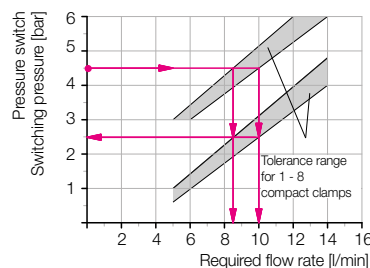
Unclamping monitoring



Example for unclamping position

Required switching pressure 4.5 bar
 Pressure drop, if 1 compact clamp is not unclamped approx. 2 bar

As per diagram:
 Required flow rate approx. 8,5–10 l/min
 (depending on the number of connected compact clamps)



Required flow rate depending on the switching pressure of the pneumatic pressure switch for a pressure drop Δp 2 bar

Monitoring by pneumatic pressure switch

For the evaluation of the pneumatic pressure increase, standard pneumatic pressure switches can be used.

With one pressure switch up to 8 compact clamps can be controlled.

Important note

Pneumatic position monitorings are only process-safe, when air pressure and air volume are precisely adjusted.

For measuring of the air volume, appropriate devices are available. Please contact us.

