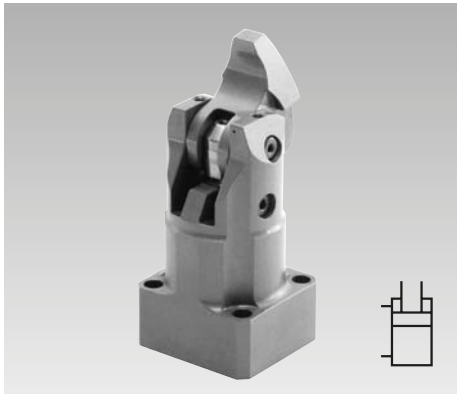




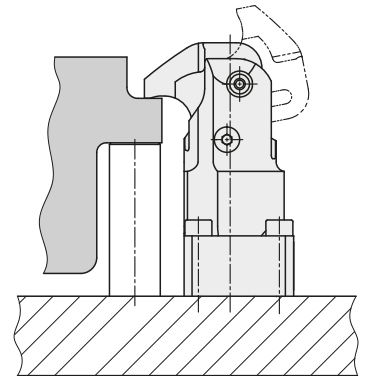
**Compact Clamps**

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 work-piece
- 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.

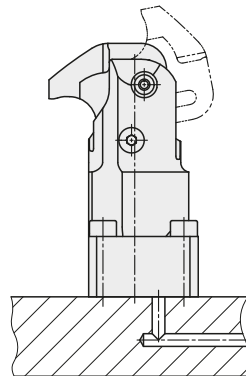
Due to the minimum space required the compact clamp is especially suitable for clamping fixtures with little space for the installation of hydraulic clamping elements.

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

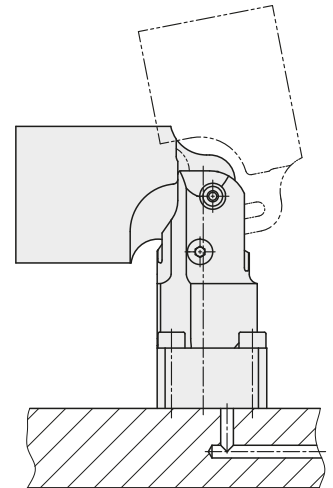
- Rotary indexing fixtures in horizontal and vertical machining centres
- Clamping fixtures for machining of several sides and complete machining
- Multiple clamping fixtures with many workpieces that are closely arranged
- Test systems for motors, gears, etc.
- Assembly lines

**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 (70 bar)."

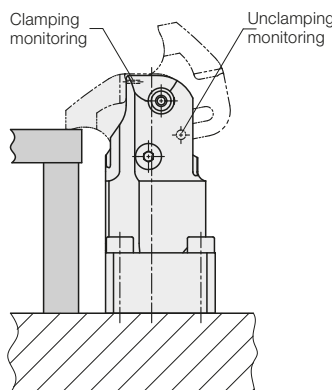
**2. With pneumatic unclamping monitoring 180X-2XXA**

The clamping lever closes a pneumatic bore hole in the unclamping position.

**3. Without position monitoring 180X-2XXB**

**4. With pneumatic clamping and unclamping monitoring 180X-2XXC**

**Pneumatic position monitoring**



**Application example**



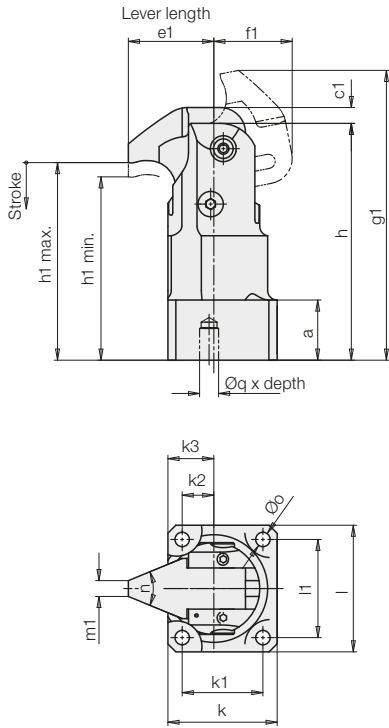
Clamping of a cast part with special clamping lever

**Important notes**

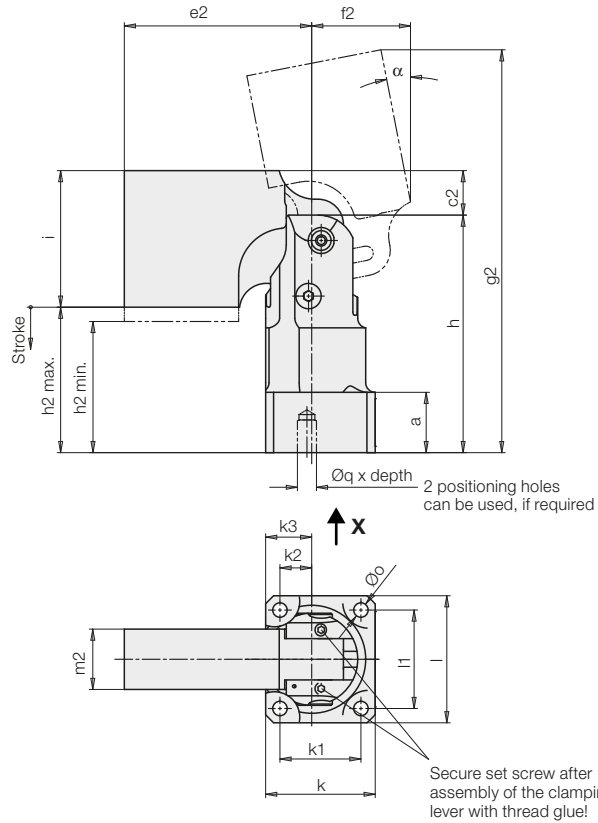
(see page 3)

# Dimensions

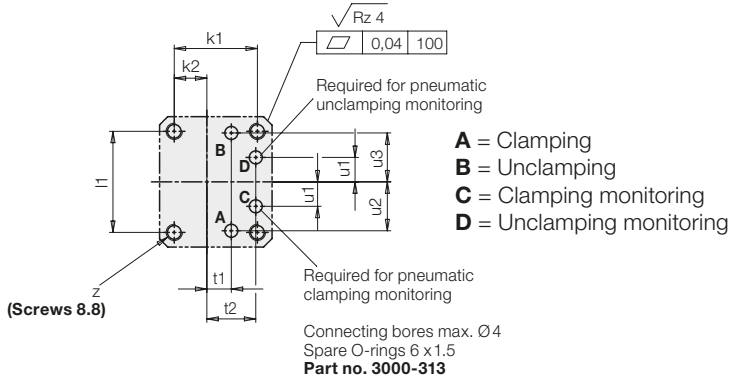
## With cover Short clamping lever



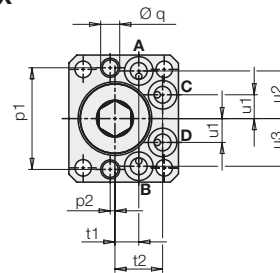
## Long clamping lever (blank)



## Connecting scheme



## View X

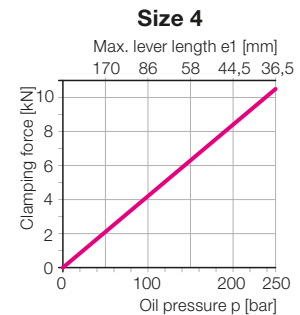
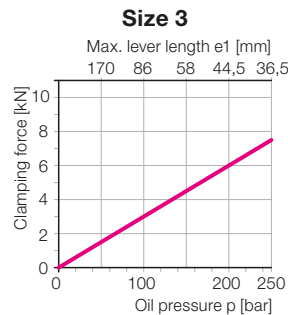
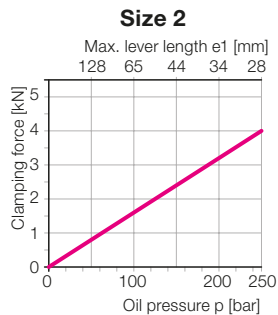
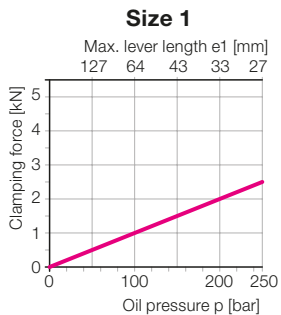


## Material

Body: hardened, stainless  
 Clamping lever:  
 short HRc 48 – 55, stainless  
 long (blank) X37CrMoV5-1 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	7.5	9
Clamping stroke, useable	[mm]	4.5	4.5	7	8.5
Piston Ø	[mm]	18	22	28	33
Piston rod Ø	[mm]	11	14	17	19
Oil volume clamping	[cm <sup>3</sup> ]	0.8	1.2	2.4	5.2
Oil volume unclamping	[cm <sup>3</sup> ]	1.3	1.9	3.8	7.8
Max. flow rate	[cm <sup>3</sup> /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]	4	4	4	4
α ±1	[°]	9.5	10.5	15	16
a	[mm]	19	21	24	24
c1	[mm]	5	5	7.5	9
c2	[mm]	14	12	7.5	9
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]	91.5/92.1	95.1/95.4	115.7	118.2
g2 min./max.*	[mm]	126.8/129.8	130.5/133.8	151.1/152	154.4/155.5
h	[mm]	74.8	80.8	95.4	98.6
h1 max.	[mm]	62.3	64.3	74.9	76.6
h1 min.	[mm]	57.3	59.3	67.4	67.6
h2 max.	[mm]	45.8	46.8	58.4	60.1
h2 min.	[mm]	40.8	41.8	50.9	51.1
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	[°]	45	56	56	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
------------------------------	-----------	-----------	-----------	-----------

### Without position monitoring

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

### With clamping and unclamping monitoring

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

### 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!

Compact clamps must only be used for clamping of workpieces in industrial applications and may only be operated with hydraulic oil. 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 and during clamping a collision with the clamping arm has to be avoided. Remedy: Mount position adaptor.

Due to the relatively small clamping stroke the height of the manifold surface of the compact clamp should be adapted to the workpiece height so that the clamping point is approximately in the centre of the usable clamping stroke.

By doing so a sufficient reserve remains also in the case of larger workpiece tolerances. The compact clamp has to be checked regularly on contamination by swarf and has to be cleaned, if required. In the case of increased swarf formation, the compact clamp must be included into the cleaning process with coolant. 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.

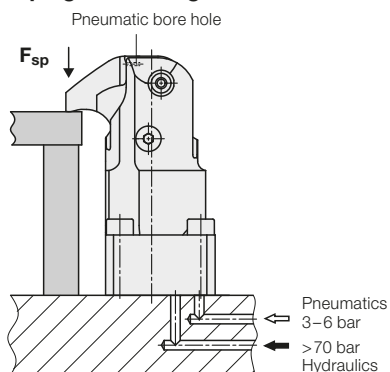
- The clamping lever is in the usable clamping range and
- a workpiece is clamped.

### Important note

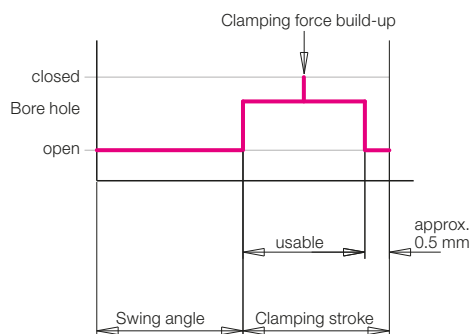
Required minimum pressures for clamping monitoring:

- Hydraulics 70 bar
- Pneumatics 3 bar

## Clamping monitoring



## Function chart

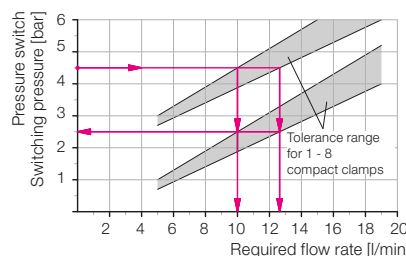


### Example for clamping position

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. -13 l/min  
 (depending on the number of connected compact clamps)

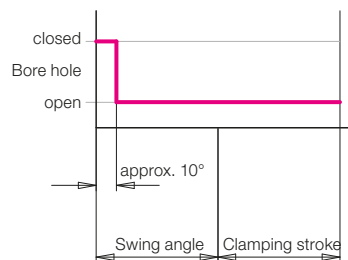
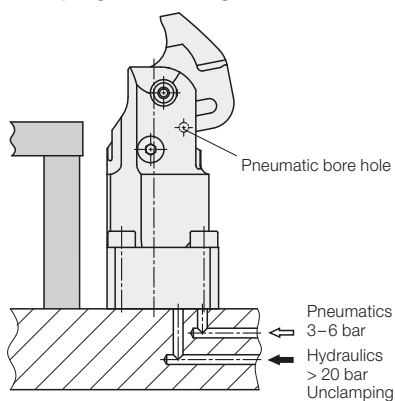


Required flow rate depending on the switching pressure of the pneumatic pressure switch for a pressure drop  $\Delta p$  2 bar

## 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

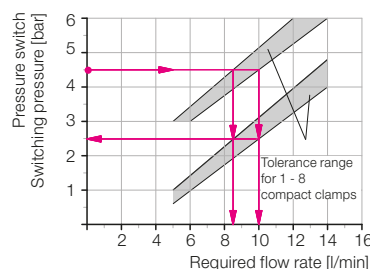


### Example for unclamping position

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  $\Delta p$  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.

