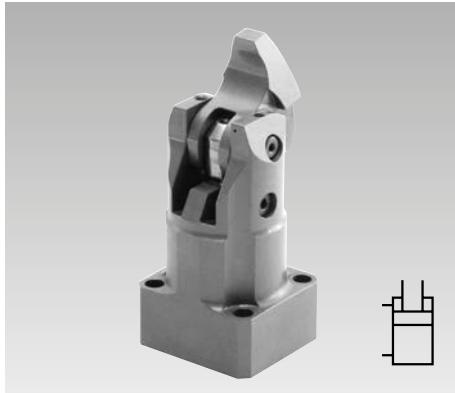




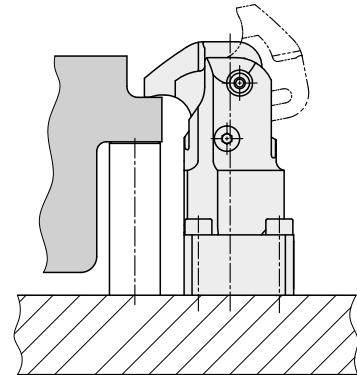
## Compact Clamps

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.

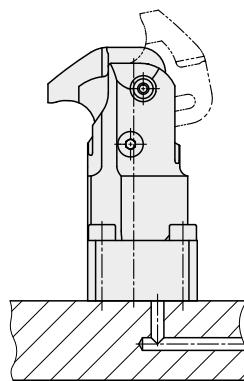
A clamping recess in the workpiece a little bit wider than the clamping lever is sufficient as clamping surface. Typical applications are:

- 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

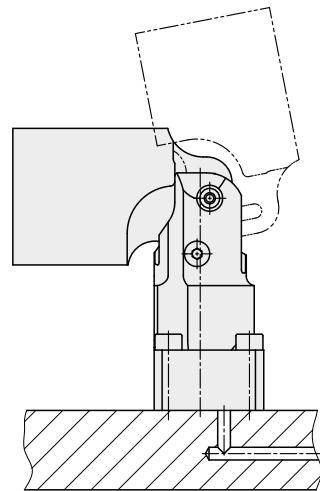
### Installation and connecting possibilities

#### 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 180X2XX

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 180X2XXA

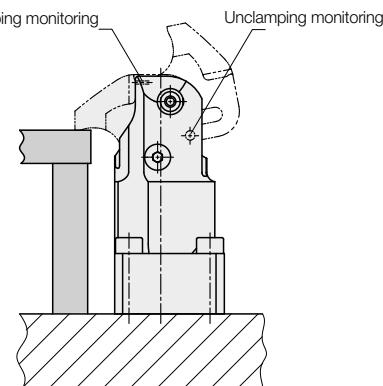
The unclamping monitoring signals:  
"The clamping lever is within the unclamping range, starting approx. 10° before the final position."

#### 3. Without position monitoring 180X2XXB

#### 4. With pneumatic clamping and unclamping monitoring 180X2XXC

Pneumatic position monitoring see page 4

### Pneumatic position monitoring



### Application example



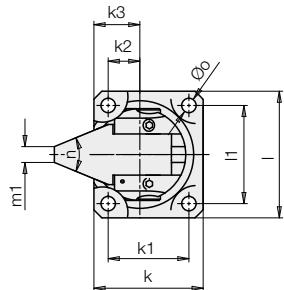
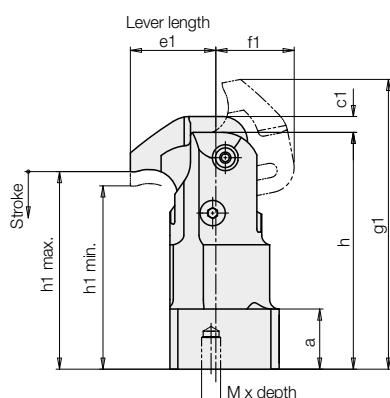
Clamping of a cast part with special clamping lever

### Important notes

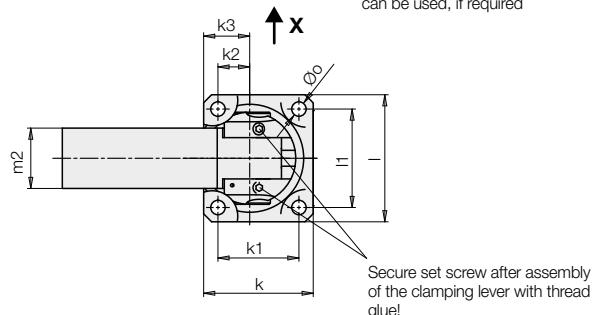
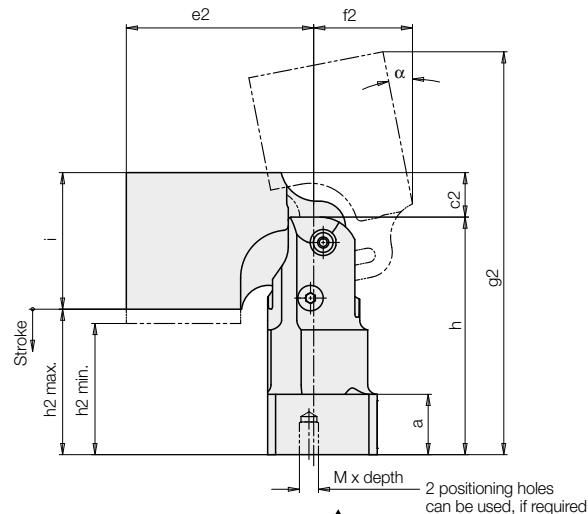
(see page 3)

## Dimensions

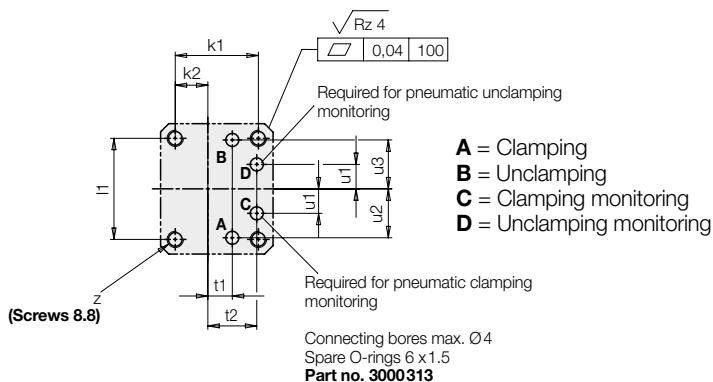
### With cover Short clamping lever



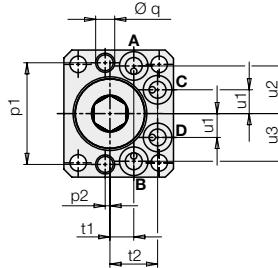
### Long clamping lever (blank)



### Connecting scheme



### View X



### Material

Body: hardened, stainless

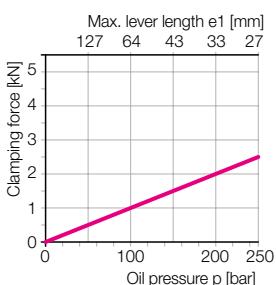
Clamping lever:  
short HRc 48 – 55, stainless  
long (blank) X37CrMoV5-1 hardened  
and tempered HRc 40 and nitrated

Seals: NBR and PUR (max. 80°)

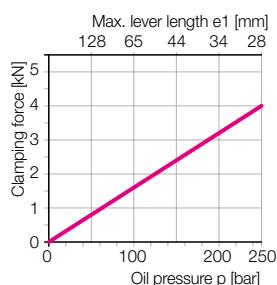
**Pneumatic position monitoring see page 4**

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

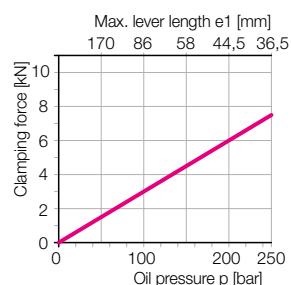
#### Size 1



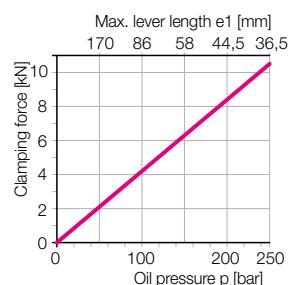
#### Size 2



#### Size 3



#### Size 4



## 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	[cm³]	2.3	3.2	6.4	10.5
Oil volume unclamping	[cm³]	3.6	5.4	10.2	15.7
Max. flow rate	[cm³/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
$\alpha \pm 1$	[°]	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
$\emptyset$ o	[mm]	5.2	6.2	8.2	8.2
p1 $\pm 0.02$	[mm]	32	35	44	48
p2 $\pm 0.1$	[mm]	1.5	0	0	3
$\emptyset$ 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	<b>1801210</b>	<b>1802210</b>	<b>1803210</b>	<b>1804210</b>
Weight, approx.	[kg]	0.46	0.69	1.29
Part no. - long clamping lever (blank)	<b>1801230</b>	<b>1802230</b>	<b>1803230</b>	<b>1804230</b>
Weight, approx.	[kg]	0.74	1.05	1.77

### With pneumatic unclamping monitoring

Part no. (version see above)	<b>18012XXA</b>	<b>18022XXA</b>	<b>18032XXA</b>	<b>18042XXA</b>
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### Without position monitoring

Part no. (version see above)	<b>18012XXB</b>	<b>18022XXB</b>	<b>18032XXB</b>	<b>18042XXB</b>
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### With clamping and unclamping monitoring

Part no. (version see above)	<b>18012XXC</b>	<b>18022XXC</b>	<b>18032XXC</b>	<b>18042XXC</b>
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### Accessories

Part no. - short clamping lever	<b>35481121</b>	<b>35481122</b>	<b>35481123</b>	<b>35481124</b>
Part no. - long clamping lever (blank)	<b>35481071</b>	<b>35481072</b>	<b>35481073</b>	<b>35481074</b>

\* 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.

## 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:

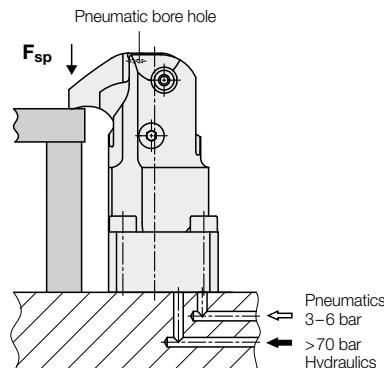
- The clamping lever is in the usable clamping range **and**
- a workpiece is clamped.

### Important note

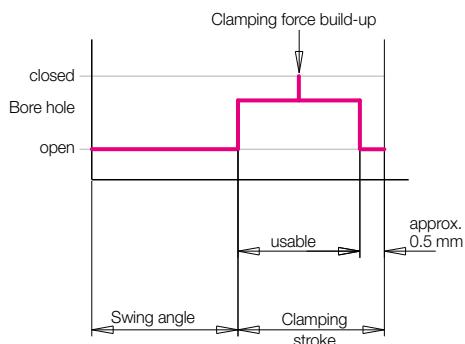
Required minimum pressures for clamping monitoring:

Hydraulics 70 bar  
Pneumatics 3 bar

## Clamping monitoring



## Function chart



### Example for clamping position

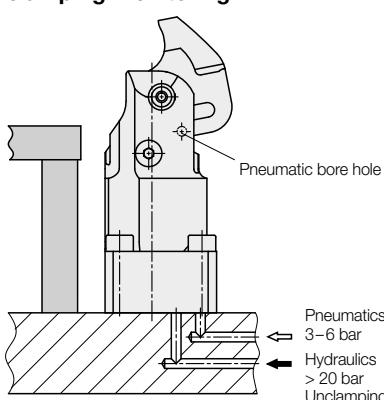
Required switching pressure 4.5 bar  
Pressure drop, if 1 compact clamp is not clamped approx. 2 bar

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

## 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.

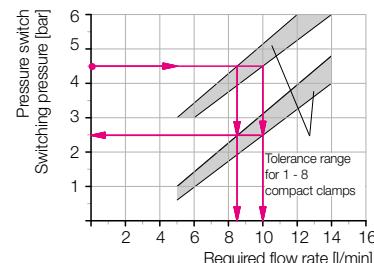
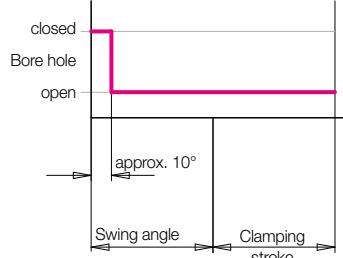
## Unclamping monitoring



### 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.

