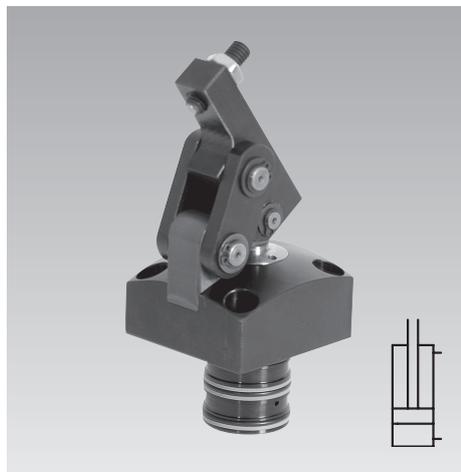




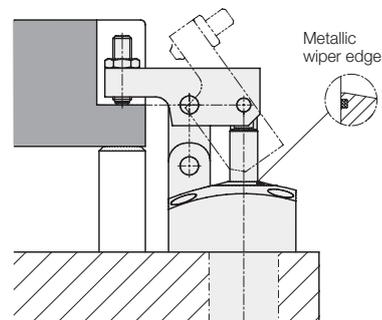
**Hinge clamp**

with metallic wiper edge and optional position monitoring,  
double acting, max. operating pressure 250 bar



**Advantages**

- Compact design, partially recessible
- Clamping possible without side loads
- Standard metallic wiper edge
- FKM seals as standard



**Special features**

- Lever mechanism easy to clean
- Inductive or pneumatic monitoring possible

**Materials**

Body: C 45 + C black oxide  
Seals: FKM  
Clamping lever: C 45 + C  
Piston: High alloy steel

**Function**

The piston force is deviated via sophisticated kinematics by 180° and is available as clamping force with virtually no loss of efficiency. If the level of the clamping surface is exactly at height h (see page 2), no side loads are channelled into the workpiece.

**Versions**

- 4 sizes

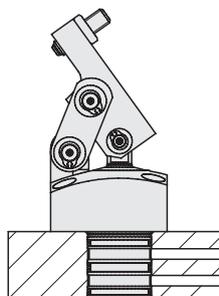
**Accessories**

- Intermediate plates
- Long clamping lever
- Add-on parts for inductive or pneumatic monitoring on request

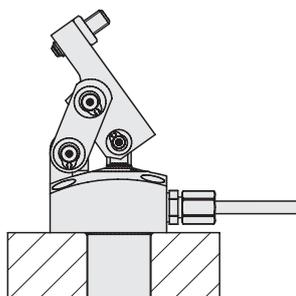
**Installation and connecting possibilities**

**Cartridge type**

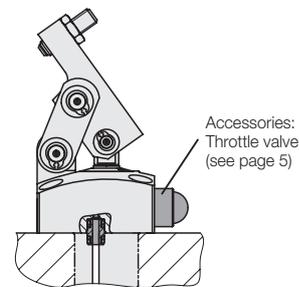
For horizontally-drilled channels



**Pipe thread**

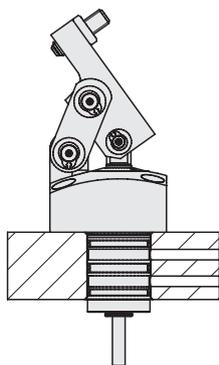


**For vertically-drilled channels**

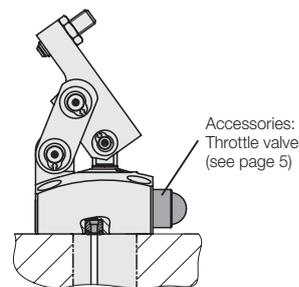
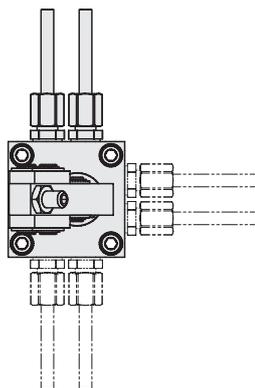


Oil supply by plug-type connectors

**With extended piston rod**



**Possible from 3 sides**

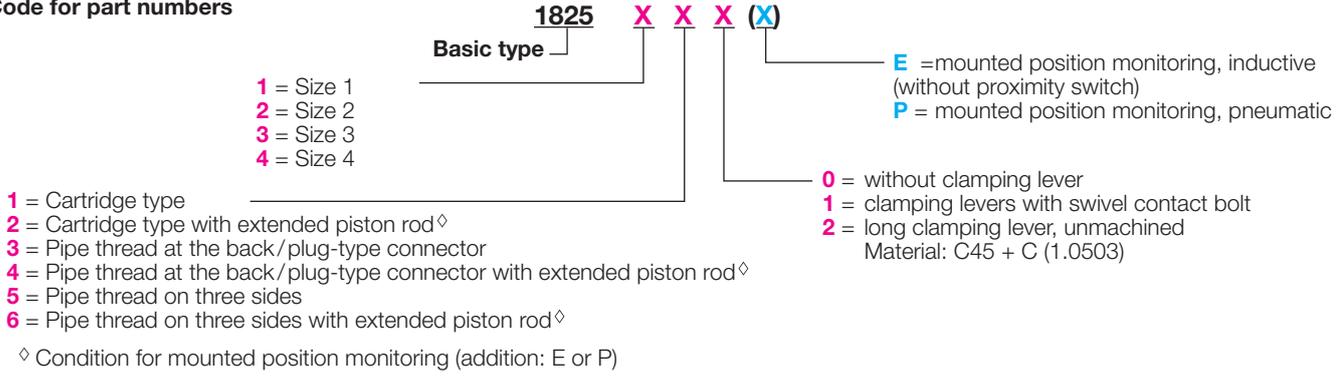


Oil supply by bushing for manifold connection  
(for precision-machined support surface)

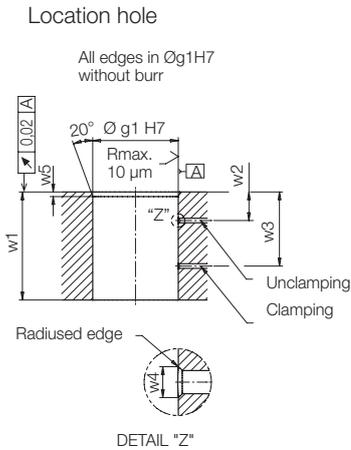
Operating conditions, tolerances and other data see data sheet A 0.100.

# Code for part numbers Accessories • Technical data

## Code for part numbers

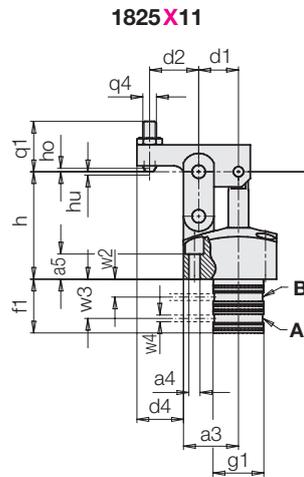


## Cartridge type

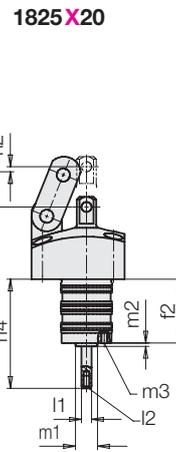


## Examples

Clamping lever with swivel contact bolt



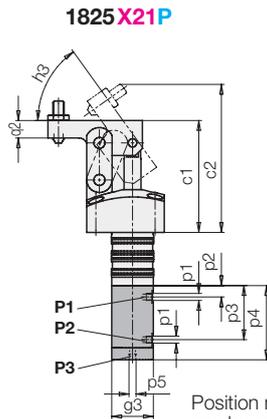
Without clamping lever and extended piston rod



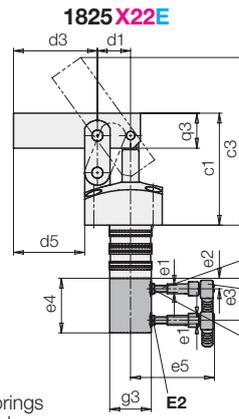
**A** = Clamping  
**B** = Unclamping

## Optional on request

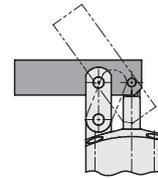
With pneumatic position monitoring



with inductive position monitoring / long clamping lever



Long clamping lever available for all versions



Alternatively all versions are also available without clamping lever.

- E1** = Clamping range, inductive
- E2** = Unclamped, inductive
- P1** = Clamping range, pneumatic
- P2** = Unclamped, pneumatic
- P3** = Outlet air, pneumatic position monitoring

Position monitorings can be mounted rotated by  $4 \times 90^\circ$

- Accessories:  
 Inductive proximity switch  
 Plug and cable  
**E1**

## Accessories for size

	1	2	3	4
Pneumatic position monitoring, complete *)	<b>0353 845</b>	<b>0353 853</b>	<b>0353 855</b>	<b>0353 962</b>
Weight [kg]	0.18	0.42	0.46	0.74
Inductive position monitoring, (without inductive proximity switches) *)	<b>0353 846</b>	<b>0353 854</b>	<b>0353 856</b>	<b>0353 963</b>
Weight [kg]	0.26	0.62	0.65	0.58
Inductive proximity switch	<b>3829 198</b>	<b>3829 198</b>	<b>3829 198</b>	<b>3829 198</b>
Right angle plug with cable 5 m for inductive proximity switch	<b>3829 099</b>	<b>3829 099</b>	<b>3829 099</b>	<b>3829 099</b>

## On request

\*) Mountable only for versions with extended piston rod (**1825 X2X, -X4X, -X6X**)

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

## Technical characteristics for inductive proximity switches 3829 198

Operating voltage UB	10 ... 30 V DC
Switching function	Interlock
Output	PNP
Housing material	Steel, corrosion resistant
Protection as per DIN 40050	IP 67
Ambient temperature	-25 ... +70 °C
Type of connection	Plug S49 M8 x 1
LED function display	Yes
Constant current max.	100 mA
Rated operating distance	0.8 mm
Protected against short circuits	Yes

# Code for part numbers Accessories • Technical data

## Code for part numbers

1825 X X X  
Basic type

- 1 = Size 1
- 2 = Size 2
- 3 = Size 3
- 4 = Size 4

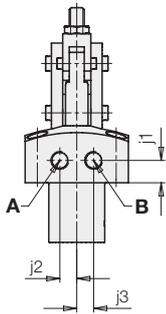
- 1 = Cartridge type
- 2 = Cartridge type with extended piston rod ◊
- 3 = Pipe thread at the back / plug-type connector
- 4 = Pipe thread at the back / plug-type connector with extended piston rod ◊
- 5 = Pipe thread on three sides
- 6 = Pipe thread on three sides with extended piston rod ◊

- 0 = without clamping lever
  - 1 = clamping levers with swivel contact bolt
  - 2 = long clamping lever, unmachined
- Material: C45 + C (1.0503)

### Pipe thread at the rear / plug-type connector

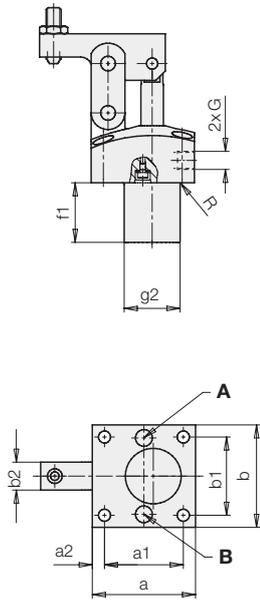
Clamping lever with swivel contact bolt

1825 X31



Without clamping lever extended piston rod

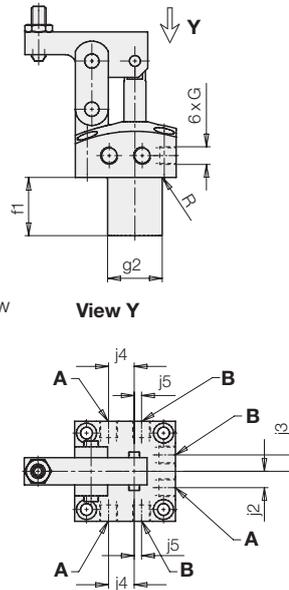
1825 X40



### Pipe thread on three sides

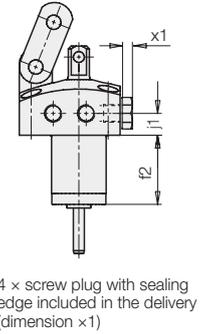
Clamping lever with swivel contact bolt

1825 X51



Without clamping lever extended piston rod

1825 X60



4 x screw plug with sealing edge included in the delivery (dimension x1)

A = Clamping  
B = Unclamping

### Accessories for size

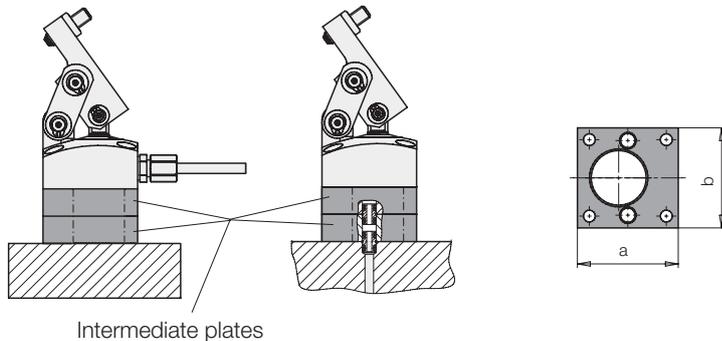
	1	2	3	4
Plugs, flush screwable with hexagon socket	0361986	0361986	0361987	0361987
Screw plug with hexagon head	3610047	3610047	3300821	3300821

### Optional on request

#### Accessories

#### Intermediate plates

for all versions with pipe thread



Intermediate plates

### Accessories for size

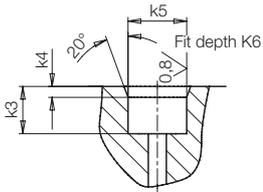
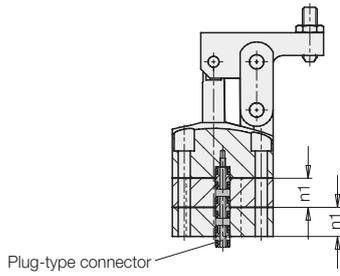
	1	2	3	4
Intermediate plate (not for cartridge-type version)	3456449	3456468	3456489	3456534

On request

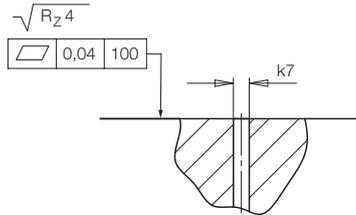
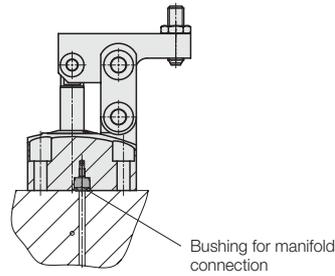
Operating conditions, tolerances and other data see data sheet A 0.100.

# Accessories Technical data

## Plug-type connector



## Bushing for manifold connection

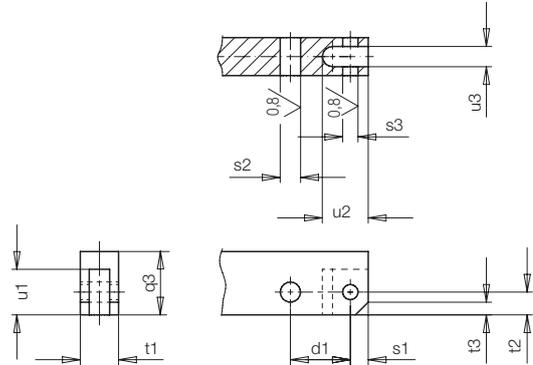


For oil supply through plug-type connectors, these bore holes have to be provided in the base plate.  
 Required accessory when using plug-type connectors:  
 2 x sealing plug or 2 x screw plug (see page 3)

Accessories for size	1	2	3	4
Plug-type connector	9210 145	9210 145	9210 145	9210 132
Bushing for manifold connection	9210 166	9210 166	9210 166	9210 167

## Connecting dimensions for self-manufactured clamping levers

Size	1	2	3	4
d1 [mm]	23.5	33	37	43.5
q3 [mm]	25	40	50	55
s1 [mm]	7	10.5	13	16.5
s2 [mm]	Ø8 H7	Ø12 H7	Ø15 H7	Ø18 H7
s3 [mm]	Ø6 H7	Ø9 H7	Ø12 H7	Ø14 H7
t1 [mm]	15 -0.1	20 -0.1	25 -0.1	30 -0.1
t2 [mm]	9	16.5	20	20
t3 [mm]	5	8	12	12
t4 [mm]	5	8	32	32
u1 [mm]	18	27.5	35.5	40
u2 [mm]	18	24	31	40
u3 [mm]	8.1 +0.1	10 +0.1	13 +0.1	18 +0.2



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

## Accessories Technical data

### Accessory throttle valve

Throttle valves are used

- in order to reduce the actuation speed of the clamping arm
- in order to improve the synchronism of several hinge clamps

This application is only possible for connection through vertically drilled channels.

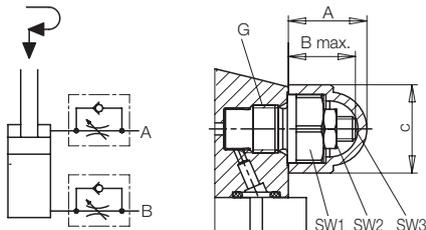
### Important note

If throttling is too strong, the back pressure can trigger premature switching of pressure switches and sequence valves.

### Hinge clamp

Size		1+2	3+4
A	[mm]	16	21
B max.	[mm]	13.5	17.5
C	[mm]	18	23.6
G		G 1/8	G 1/4
SW1	[mm]	14	19
Tightening torque	[Nm]	18	35
SW2	[mm]	8	8
SW3	[mm]	2.5	2.5
Weight	[kg]	0.025	0.036
<b>Part no.</b>		<b>2957 209</b>	<b>2957 210</b>

### Hydraulic symbol

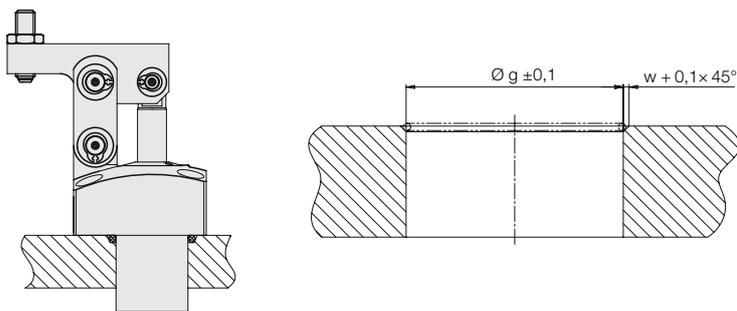


### Sealing for holder

If a seal for the holder/basic fixture is necessary, we recommend use of an O-ring.

### Note

Any reworking of the hinge clamp is not permitted!



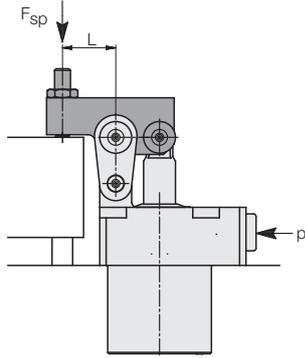
Size	1	2	3	4
Bore hole $g \pm 0.1$	30	42	52	65
Chamfer $w + 0.1 \times 45^\circ$	2.4	2.4	2.4	2.4
Recommendation O-ring	28.3 × 1.78	41 × 1.78	50.52 × 1.78	63.22 × 1.78

## Technical data Dimensions

Size			1	2	3	4
Clamping force at clamping lever length d2 and 250 bar	[kN]		3.8	9.7	14.4	21.5
Clamping force at clamping lever length d2 and 250 bar	[kN]		3.3	9.1	13.9	21
Oil volume, clamping	[cm <sup>3</sup> ]		4.8	16.9	31.1	61.6
Oil volume, clamping	[cm <sup>3</sup> ]		4.1	16.0	30.0	60.2
Oil volume, unclamping	[cm <sup>3</sup> ]		2.1	10.0	19.0	37.5
Admissible flow rate	[cm <sup>3</sup> /s]		15.7	24.5	24.5	55
a	[mm]		55	70	85	100
a1	[mm]		42	56	69	81
a2	[mm]		6.5	7	8	9.5
a3	[mm]		32.5	46	52	60
a4	[mm]		4 × Ø 6.6	4 × Ø 9	4 × Ø 11	4 × Ø 13.5
a5	[mm]		15	18	21.5	30
b	[mm]		55	70	85	100
b1	[mm]		42	56	69	81
b2	[mm]		15	20	25	30
c1	[mm]		80	116	143	163
c2	[mm]		106	150	185	208
c3	[mm]		120	171	208	238.8
d1	[mm]		23.5	33	37	43.5
d2	[mm]		29	39.5	49	60.5
d3	[mm]		59.5	81.5	98	114
d4	[mm]		27.5	37.5	47.5	57.5
d5	[mm]		50.5	68.5	83	97.5
e1			M5×0.5	M5×0.5	M5×0.5	M5×0.5
e2	[mm]		7.5	9.7	11.6	14.5
e3	[mm]		30	41.9	46	58.3
e4	[mm]		39	49	55	68.5
e5	[mm]		approx. 60	approx. 60	approx. 60	approx. 60
f1	[mm]		32	43	44.5	52.5
f2	[mm]		38	49	50.5	58.5
G			G1/8	G1/8	G1/4	G1/4
Max. size of connecting fitting			6 L	8 S	10 L	10L
g1	[mm]		Ø 30 f7	Ø 42 f7	Ø 52 f7	Ø 65 f7
g2	[mm]		Ø 29.8	Ø 41.8	Ø 51.8	Ø 64.8
g3	[mm]		Ø 29.5	Ø 39	Ø 39	Ø 39
h ideal clamping point	[mm]		64	92.5	113	128
ho upper end of the clamping range	[mm]		2	2.7	3.5	4.5
hu lower end of the clamping range	[mm]		2	2.7	3.5	4.5
h1 piston stroke up to ideal clamping point	[mm]		21	30	33.5	41.5
h2 piston stroke up to the end of the clamping stroke	[mm]		3	4.5	5.2	7.5
h3	[°]		54.5	55.5	56	58.2
h4	[mm]		65	86.5	93	111
j1	[mm]		12	16	17	20
j2	[mm]		9	13.5	15.5	22
j3	[mm]		9	13.5	15.5	22
j4	[mm]		14	20	25	32
j5	[mm]		4	2	6	12
k1	[mm]		41 ± 0.02	55 ± 0.02	68 ± 0.02	80 ± 0.02
k2	[mm]		5 ± 0.05	0 ± 0.05	0 ± 0.05	0 ± 0.05
k3	[mm]		6.5	6.5	6.5	8
k4	[mm]		1.5	1.5	1.5	1.5
k5	[mm]		Ø 8 H7	Ø 8 H7	Ø 8 H7	Ø 10 H7
k6	[mm]		5.5	5.5	5.5	7
k7	[mm]		3	3	3	4
l1	[mm]		Ø 6 f7	Ø 6 f7	Ø 6 f7	Ø 6 f7
l2			M4×7.5 deep	M4×7.5 deep	M4×7.5 deep	M4×7.5 deep
m1	[mm]		Ø 13 f7	Ø 13 f7	Ø 13 f7	Ø 13 f7
m2	[mm]		2	2	2	2
m3			M4×6 deep	M4×6 deep	M4×6 deep	M4×6 deep
m4	[mm]		21	27	27	27
n1	[mm]		16	21.5	22.5	26.5
p1			M5	M5	M5	M5
p2	[mm]		8.5	10.6	12.3	15.2
p3	[mm]		38.6	50.9	55.1	66.5
p4	[mm]		53	73	77	84
p5			M5	G1/4	G1/4	G1/4
q1	[mm]		30	40	50	50
q2	[mm]		12.5	20	25	28
q3	[mm]		25	40	50	55
q4			M8	M12	M16	M16
R	[mm]		0.3	0.3	0.3	0.3
w1	[mm]		min. 31.5	min. 41.5	min. 43.5	51.5
w2	[mm]		10.6	14.3	14.8	18
w3	[mm]		23.4	30.7	31.9	37.5
w4	[mm]		max. Ø 4	max. Ø 5.5	max. Ø 5.5	max. Ø 5.5
w5	[mm]		2.5 – 0.5	2.5 – 0.5	2.5 – 0.5	2.5 – 0.5
x1	[mm]		7	7	8	8
Weight approx.	[kg]	<b>1825 XX0</b>	1.0	2.3	3.8	6.1
	[kg]	<b>1825 XX1</b>	1.1	2.7	4.6	7.3
	[kg]	<b>1825 XX2</b>	1.2	3.0	5.1	8.1

# Calculations • Clamping force diagrams Code for part numbers • Accessories

## Calculations



1. Length L of clamping lever is known

1.1 Admissible operating pressure

$$p_{adm} = \frac{B}{\frac{C}{L} + 1} \leq 250 \text{ bar} \quad [\text{bar}]$$

1.2 Effective clamping force

$$p_{adm} > 250 \text{ bar} \rightarrow F_{sp} = \frac{A}{L} * 250 \quad [\text{kN}]$$

$$p_{adm} < 250 \text{ bar} \rightarrow F_{sp} = \frac{A}{L} * p_{adm} \quad [\text{kN}]$$

2. Min. clamping lever length

$$L_{min.} = \frac{C}{\frac{B}{p} - 1} \quad [\text{mm}]$$

L, L<sub>min</sub> = length of clamping lever [mm]

p, p<sub>adm</sub> = operating pressure [bar]

A, B, C, = constants as per chart

## Constant

	18251	18252	18253	18254
A	0.449	1.54	2.827	5.193
A*	0.386	1.45	2.728	5.076
B	442.45	448.42	429.34	429.75
B*	514.86	475.83	444.98	420.08
C	22.325	31.35	35.15	43.5

A\*, B\* for version with switch rod

### Example 1: Hinge clamp 1825 111

Operating pressure 200 bar

Standard clamping lever L = 29 mm

#### Effective clamping force

$$F_{Sp} = \frac{A}{L} * p = \frac{0.449}{29} * 200 = 3.1 \text{ kN}$$

### Example 2: Hinge clamp 1825 110

Operating pressure 200 bar

#### Min. clamping lever length

$$L_{min} = \frac{C}{\frac{B}{p} - 1} = \frac{22.325}{\frac{442.45}{200} - 1} = 18.4 \text{ mm}$$

#### Effective clamping force

$$F_{Sp} = \frac{A}{L} * p = \frac{0.449}{18.4} * 200 = 4.9 \text{ kN}$$

### Example 3: Hinge clamp 1825210

Special clamping lever L = 30 mm

#### Admissible operating pressure

$$p_{adm} = \frac{B}{\frac{C}{L} + 1} = \frac{448.42}{\frac{31.35}{30} + 1} = 219 \text{ bar}$$

#### Effective clamping force

$$F_{Sp} = \frac{A}{L} * p_{adm} = \frac{1.54}{30} * 219 = 11.25 \text{ kN}$$

### Example 4: Hinge clamp 1825310

Special clamping lever L = 118 mm

#### Admissible operating pressure

$$p_{adm} = \frac{B}{\frac{C}{L} + 1} = \frac{429.34}{\frac{35.15}{118} + 1} = 330.8 > 250 \text{ bar}$$

#### Effective clamping force

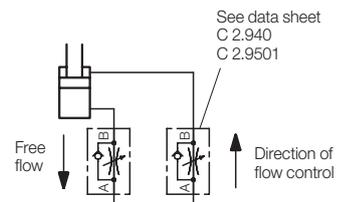
The max. operating pressure is 250 bar, thus

$$F_{Sp} = \frac{A}{L} * 250 = \frac{2.827}{118} * 250 = 6 \text{ kN}$$

## Important note

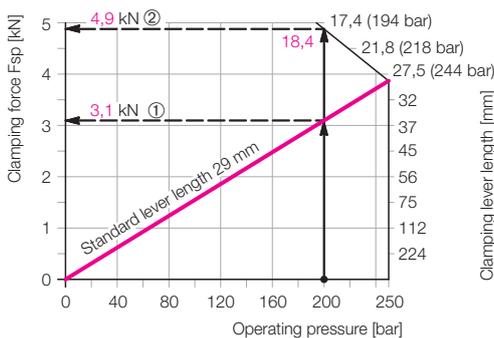
Longer special clamping levers have a greater weight. Therefore the flow rate has to be considerably reduced to avoid damage of the mechanics in the stroke end positions.

A flow rate throttling always has to be effected in the supply line to the hinge clamp.

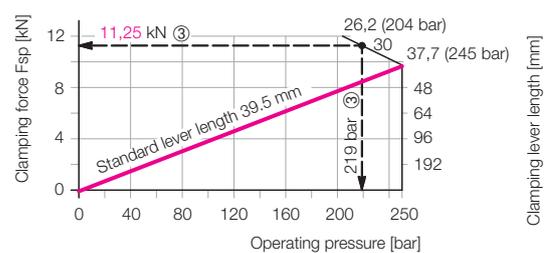


## Clamping force diagrams

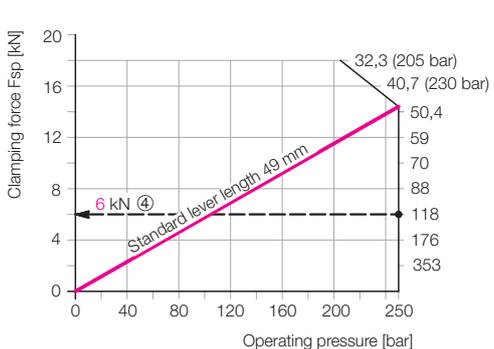
### Size 1



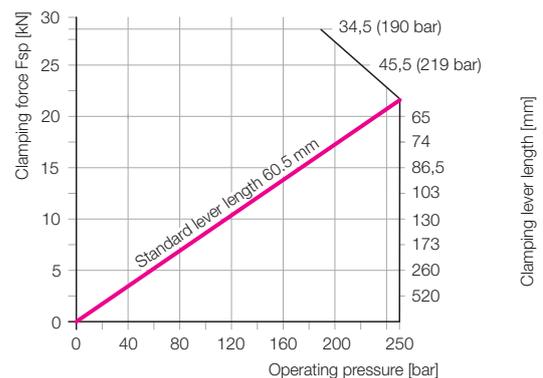
### Size 2



### Size 3



### Size 4



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