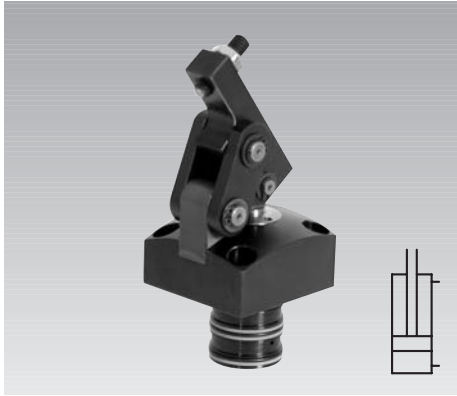


## Hinge Clamps with metallic wiper and optional position monitoring double acting, max. operating pressure 250 bar



### Application

The hinge clamp is a low-cost hydraulic clamping element with many installation and connecting possibilities.

If the clamping lever is completely retracted, unimpeded loading and unloading of the fixture can be effected. A clamping recess in the workpiece a little bit wider than the clamping lever is sufficient as clamping surface.

The special kinematics allow clamping nearly without side loads of workpieces which are very sensitive against deformation.

### Description

When pressurising the element, the piston moves upwards and swivels the clamping lever over the hinges forwards and at the same time downwards onto the workpiece. The piston force is deviated by 180° and is available as clamping force with virtually no loss of efficiency.

If the level of the clamping surface is exactly on height  $h$  (see page 2), no side loads are introduced into the workpiece. The bodies are recessible in the fixture up to the flange.

Alternatively intermediate plates are available for height adjustment.

All versions are optionally available with extended piston rod and with inductive or pneumatic position monitoring.

### Important notes

Hydraulic clamping elements generate big forces. Considerable injuries can be caused to fingers during clamping and unclamping in the effective area of the clamping arm.

Remedy: Protection device with electrical locking.

The hinge clamp has to be checked now and then on contamination by swarf and has to be cleaned, if required.

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

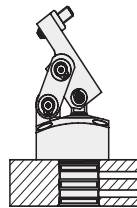
### Advantages

- Compact design
- Body partially recessible
- Oil supply alternatively via fitting connections or drilled channels
- Unimpeded loading and unloading of the fixture
- Clamping lever can be swivelled into small recesses
- Clamping possible without side loads
- Long clamping lever adaptable to the workpiece
- Lever mechanism easy to clean
- Standard metallic wiper
- Standard FKM seals
- Inductive or pneumatic control of the clamping position and the clamping range optional

### Installation and connecting possibilities

#### Cartridge-type version

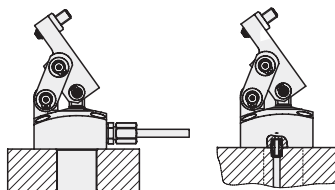
for horizontally-drilled channels



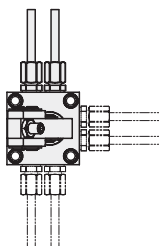
#### Fitting connection at the back / Pressure oil connector

Fitting connection,  
at the back

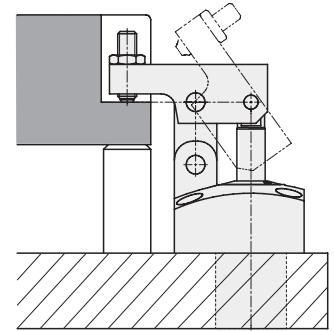
for vertically  
drilled channels



#### Fitting connections at 3 sides



### Function



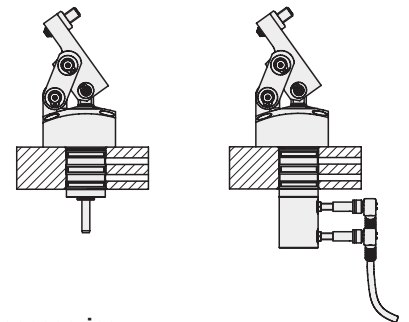
### Option

#### Extended piston rod

for all versions available

without  
position monitoring

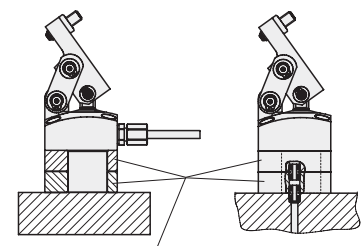
with  
position monitoring



### Accessories

#### Intermediate plates

for all versions with fitting connections

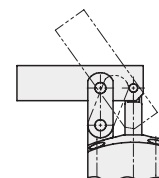


Intermediate plates

### Option

#### Long clamping lever

available for all versions.



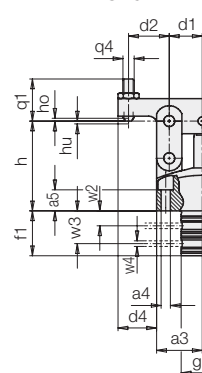
Alternatively all versions are also available without clamping lever.



### Cartridge-type version

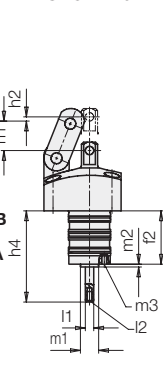
Clamping lever with swivel contact bolt

#### 1825-X11



Without clamping lever extended piston rod

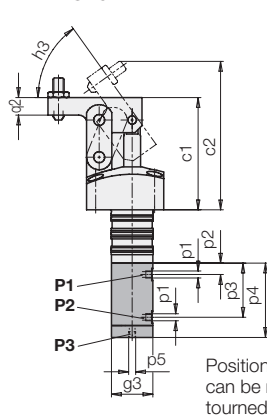
#### 1825-X20



### Optionally

with pneumatic position monitoring

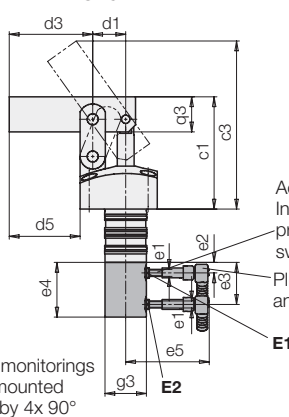
#### 1825-X21P



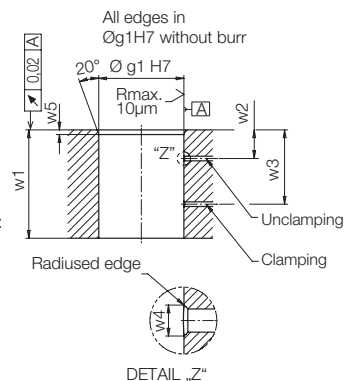
### Optionally

with inductive position monitoring and long clamping lever

#### 1825-X22E



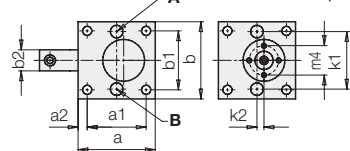
### Location hole for cartridge-type version



### Fitting connection at the back / pressure oil connector

Clamping lever with swivel contact

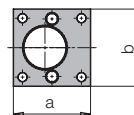
Without clamping lever extended piston rod bolt



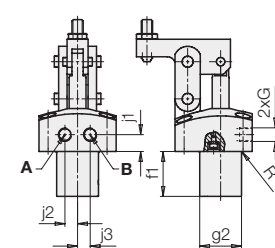
- A** = Clamping
- B** = Unclamping
- E1** = Clamping range, inductive
- E2** = Unclamped, inductive
- P1** = Clamping range, pneum.
- P2** = Unclamped, pneum.
- P3** = Exhaust air, pneum. position monitoring

### Accessory:

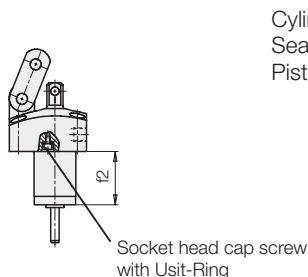
Intermediate plates for versions with fitting connections



#### 1825-X31



#### 1825-X40

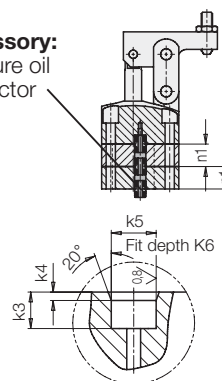


### Material

- Cylinder body: steel
- Sealings: FKM
- Piston: high alloy steel

### Accessory:

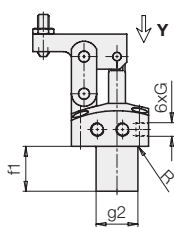
Pressure oil connector



### Fitting connections at 3 sides

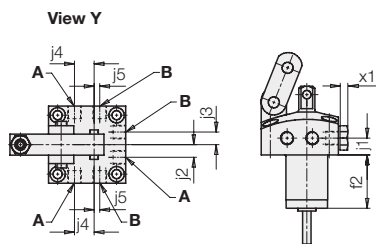
#### 1825-X51

Clamping lever with swivel contact bolt



#### 1825-X60

without clamping lever extended piston rod

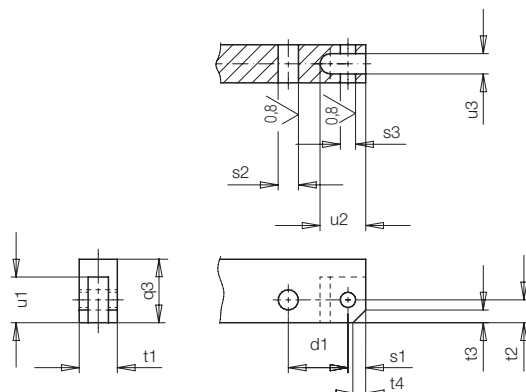


For oil supply through pressure oil connectors, these bore holes have to be provided in the base plate

Required accessory when using pressure oil connectors: 2x plugs or 2x screw plugs (see page 4)

### Connecting dimensions for self-manufactured clamping levers

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

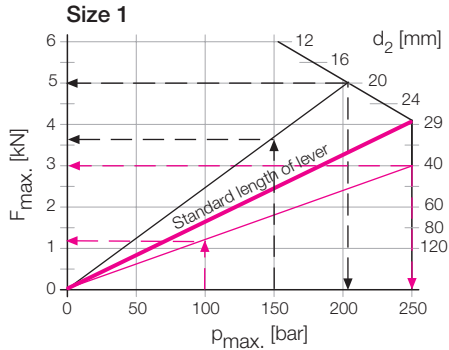




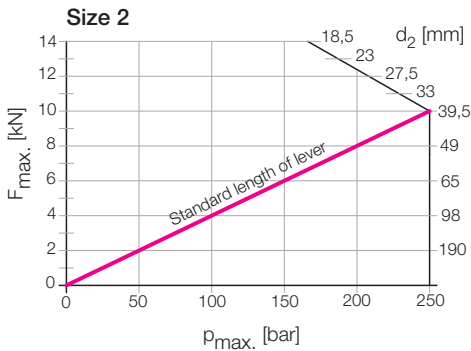
Size		1	2	3
Clamping force at length of clamping lever d2 and 250 bar	[kN]	4.0	10.0	14.2
Clamping force at length of clamping lever d2 and 250 bar with extended piston rod	[kN]	3.4	9.4	13.7
Oil volume clamping	[cm <sup>3</sup> ]	4.8	16.9	31.1
Oil volume clamping with extended piston rod	[cm <sup>3</sup> ]	4.1	16.0	30.0
Oil volume unclamping	[cm <sup>3</sup> ]	2.1	10.0	19.0
Max. oil flow rate	[cm <sup>3</sup> /s]	15.7	24.5	24.5
a	[mm]	55	70	85
a1	[mm]	42	56	69
a2	[mm]	6.5	7	8
a3	[mm]	32.5	46	52
a4	[mm]	4 x Ø 6.6	4 x Ø 9	4 x Ø 11
a5	[mm]	15	18	21.5
b	[mm]	55	70	85
b1	[mm]	42	56	69
b2	[mm]	15	20	25
c1	[mm]	80	116	143
c2	[mm]	106	150	185
c3	[mm]	120	171	208
d1	[mm]	23.5	33	37
d2	[mm]	29	39.5	49
d3	[mm]	59.5	81.5	98
d4	[mm]	27.5	37.5	47.5
d5	[mm]	50.5	68.5	83
e1		M5 x 0.5	M5 x 0.5	M5 x 0.5
e2	[mm]	7.5	9.7	11.6
e3	[mm]	30	41.9	46
e4	[mm]	39	49	55
e5	[mm]	approx. 60	approx. 60	approx. 60
f1	[mm]	32	43	44.5
f2	[mm]	38	49	50.5
G		G 1/8	G 1/8	G 1/4
Max. size of connecting fitting (see data sheet F 9.300)		6 L	8 S	10 L
g1	[mm]	Ø 30 f7	Ø 42 f7	Ø 52 f7
g2	[mm]	Ø 29.8	Ø 41.8	Ø 51.8
g3	[mm]	Ø 29.5	Ø 39	Ø 39
h	[mm]	64	92.5	113
ho	[mm]	2	2.7	3.5
hu	[mm]	2	2.7	3.5
h1	[mm]	21	30	33.5
h2	[mm]	3	4.5	5.2
h3	[°]	54.5	55.5	56
h4	[mm]	65	86.5	93
j1	[mm]	12	16	17
j2	[mm]	9	13.5	15.5
j3	[mm]	9	13.5	15.5
j4	[mm]	14	20	25
j5	[mm]	4	2	6
k1	[mm]	41 ±0.02	55 ±0.02	68 ±0.02
k2	[mm]	5 ±0.05	0 ±0.05	0 ±0.05
k3	[mm]	6.5	6.5	6.5
k4	[mm]	1.5	1.5	1.5
k5	[mm]	Ø 8 H7	Ø 8 H7	Ø 8 H7
k6	[mm]	5.5	5.5	5.5
l1	[mm]	Ø 6 f7	Ø 6 f7	Ø 6 f7
l2		M4 x 7.5 deep	M4 x 7.5 deep	M4 x 7.5 deep
m1	[mm]	Ø 13 f7	Ø 13 f7	Ø 13 f7
m2	[mm]	2	2	2
m3		M4 x 6 deep	M4 x 6 deep	M4 x 6 deep
m4	[mm]	21	27	27
n1	[mm]	16	21.5	22.5
p1	[mm]	M5	M5	M5
p2	[mm]	8.5	10.6	12.3
p3	[mm]	38.6	50.9	55.1
p4	[mm]	53	73	77
p5		M5	G1/4	G1/4
q1	[mm]	30	40	50
q2	[mm]	12.5	20	25
q3	[mm]	25	40	50
q4		M8	M12	M16
R	[mm]	0.8	0.8	1
w1	[mm]	min. 31.5	min. 41.5	min. 43.5
w2	[mm]	10.6	14.3	14.8
w3	[mm]	23.4	30.7	31.9
w4	[mm]	max. Ø 4	max. Ø 5.5	max. Ø 5.5
w5	[mm]	2.5 - 0.5	2.5 - 0.5	2.5 - 0.5
x1	[mm]	7	7	8



### Clamping force $F_{max}$ as a function of the length of the clamping lever $d_2$ and maximum operating pressure $p_{max}$ .



Clamping force with extended piston rod =  $0.86 \times F$



Clamping force with extended piston rod =  $0.94 \times F$

**Example 1:**

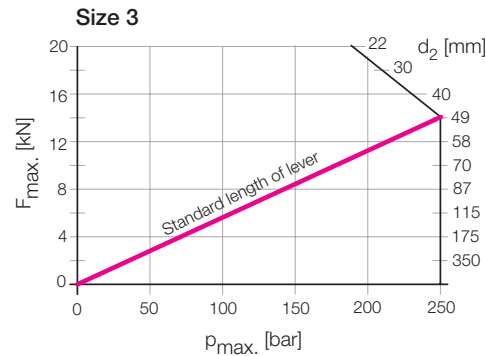
Given: Length of clamping lever  $d_2 = 40 \text{ mm}$   
Operating pressure  $p = 100 \text{ bar}$   
Clamping force  $F$   
As per diagram:  $F_{max} = 3 \text{ kN}$   
 $p_{max} = 250 \text{ bar}$

Solution: Clamping force  $F = F_{max} \frac{p}{p_{max}} = 3 \text{ kN} \frac{100 \text{ bar}}{250 \text{ bar}} = 1.2 \text{ kN}$

**Example 2:**

Given: Length of clamping lever  $d_2 = 20 \text{ mm}$   
Operating pressure  $p = 150 \text{ bar}$   
Clamping force  $F$   
As per diagram:  $F_{max} = 5 \text{ kN}$   
 $p_{max} = 210 \text{ bar}$

Solution: Clamping force  $F = F_{max} \frac{p}{p_{max}} = 5 \text{ kN} \frac{150 \text{ bar}}{210 \text{ bar}} = 3.57 \text{ kN}$



Clamping force with extended piston rod =  $0.96 \times F$

**Code for part numbers**

- 1825 - X X X X**
- 1 = Size 1
  - 2 = Size 2
  - 3 = Size 3
- Basic type**
- 1 = cartridge-type version
  - 2 = cartridge-type version with extended piston rod \*)
  - 3 = fitting connection at the back / pressure oil connector
  - 4 = fitting connection at the back / pressure oil connector with extended piston rod \*)
  - 5 = fitting connections at 3 sides
  - 6 = fitting connection at 3 sides with extended piston rod \*)
- 0 = without clamping lever
  - 1 = clamping lever with swivel contact bolt
  - 2 = long clamping lever, unmachined
- Material: steel
- \*) Condition for mounted position monitoring (addition: E or P)
- E = mounted position monitoring, inductive (without proximity switch)
  - P = mounted position monitoring, pneumatic

**Accessories - part numbers**

Size	1	2	3
Intermediate plate (not for cartridge-type version)	3456-449	3456-468	3456-489
Pressure oil connector	9210-145	9210-145	9210-145
Plug, flush screwable with hexagon socket	0361-986	0361-986	0361-987
Screw plug with hexagon head	3610-008	3610-008	3610-006
Pneumatic position monitoring, complete **)	0353-845	0353-853	0353-855
Inductive position monitoring, (without inductive proximity switch **)	0353-846	0353-854	0353-856
Inductive proximity switch	3829-198	3829-198	3829-198
Plug and cable for inductive proximity switch	3829-099	3829-099	3829-099

**Technical characteristics for inductive proximity switches 3829-198**

Operating voltage $U_B$	10 ... 30 V DC
Switching function	Interlock
Output	PNP
Body material	Stainless steel
Protection as per DIN 40050	IP 67
Environmental temperature	-25 ... +70 °C
Connection	Connector/Plug
LED Function display	yes
Constant current max.	150 mA
Rated operating distance	0.8 mm
Protected against short circuits	yes

\*\*) Only mountable at 1825-X4X