ROEMHELD
HILMA ▪ STARK

PRODUCT SOLUTIONS

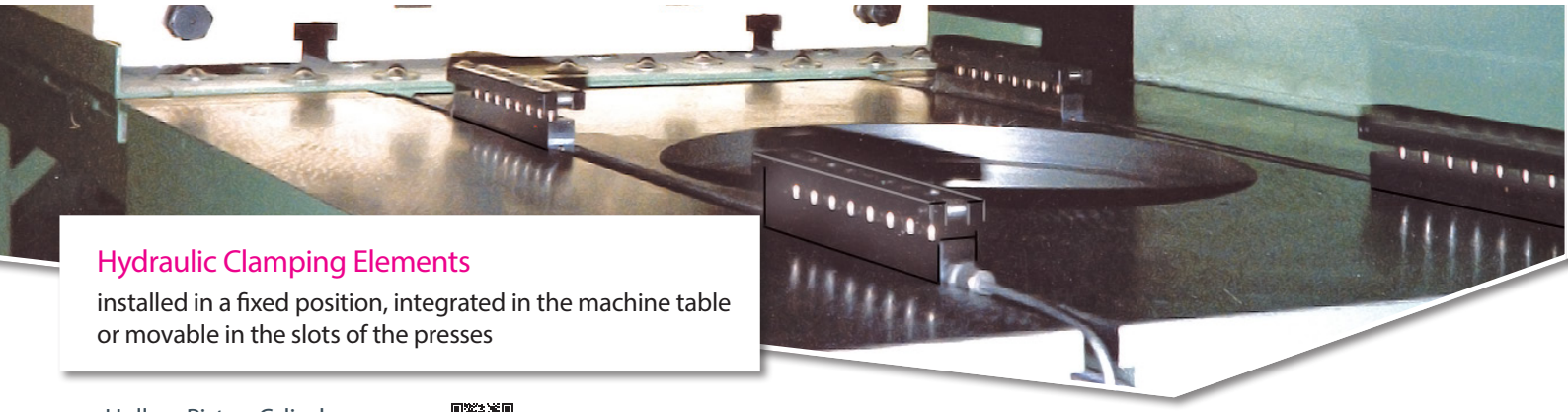
Die Clamping and Handling Systems

Die Clamping Technology

- Hydraulic Clamping Elements
- Electro-mechanical Clamping Elements
- Mechanical Clamping Elements
- Magnetic Clamping Systems
- Grip Rail Couplings
- Hydraulic Power Units

Die Handling Technology

- Roller, Ball and Transport Bars
- Die Changing Carts
- Carrying Consoles
- Rack Systems for Die Storage
- Push-pull Chain Systems
- Rail-guided Die Changing Carts



Hydraulic Clamping Elements

installed in a fixed position, integrated in the machine table or movable in the slots of the presses

Hollow Piston Cylinders

for press bed and ram, single acting

2.1300
without spring return

2.1320
with spring return

3.1403
spring clamping
- hydraulic unclamping

3.2130
hydraulic clamping
and spring unclamping

Spring Clamping Cylinders

which clamp mechanically by Belleville springs

2.1400
with hydraulic return

3.1403
spring clamping
- hydraulic unclamping

Double-T Clamping Bars

hydraulic, for T-slots

2.1832
single acting
with spring return

2.1832
double acting
without carrying rollers

2.1832
double acting
with carrying rollers

Clamping Bars

with press-in or built-in piston

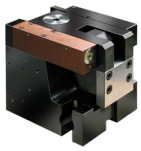
2.2095
single acting
with spring return

2.2096
single acting
with spring return

2.2097
double acting

Block Clamps

with self-locking mechanical lock



2.2480
double acting

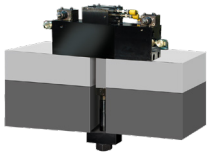
Swing and Pivot Cylinders

hydraulic clamping cylinders with tie rod, which swing or tilt into the clamping position

2.1833
Swivel and Pull Clamps
with 90° swivel angle
and position monitoring

2.2185
Pivot and Pull Clamps

2.2230
Swing Sink Clamps
for exterior clamping



2.2240
Wedge Swing Clamps
with mechanical lock

Wedge Clamps
for tapered clamping edge

2.2401
without and with position monitoring at the side

2.2402
with adjustable position monitoring at the back

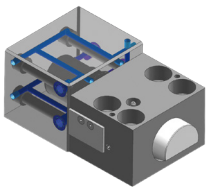
2.2403
with safety step

2.2404
with form-fit safety step and position monitoring

2.2405
with locking bolt

2.2407
with sequence valve control for high temperature ranges

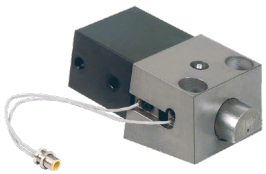
2.2409
with single valve control for individual control



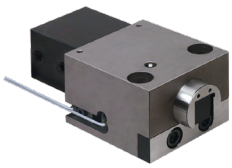
2.2410
with cooling circuit for temperatures up to 250 °C

Wedge Clamps for Flat Clamping Edge

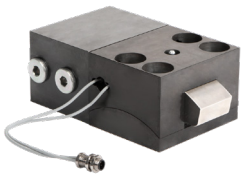
2.2450
clamping with spring force and hydraulic unclamping



2.2451
hydraulic clamping and unclamping



2.2460
hydraulic clamping and unclamping



2.2503
Arch Clamps

Swing Sink Clamps
with 90 ° swing angle

4.2150
Swing Sink Clamps

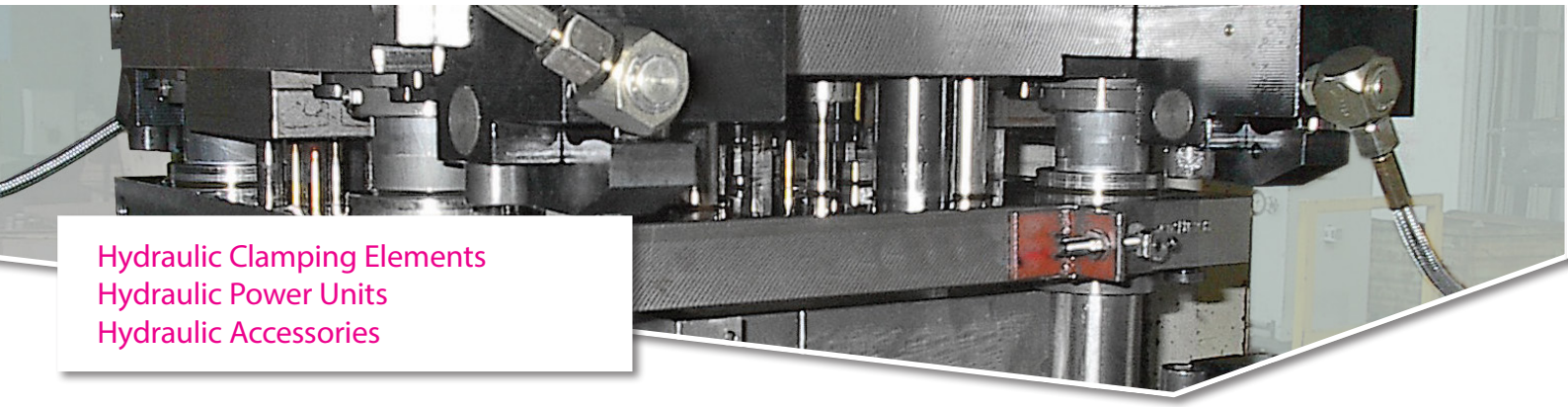
4.2170
Swing Clamps with 90° swing angle

Pull-clamping Elements
hydraulic pull-type cylinders with tie rod

4.2180
Pull-clamping elements

4.2350
Pull Clamps with T-Slot

4.2351
Pull Clamps with T-Slot



Hydraulic Clamping Elements
Hydraulic Power Units
Hydraulic Accessories

Hydraulic Clamping Cylinder for Insertion in T-slots

3.2202
Sliding Clamps
Compact

3.2204
Sliding Clamps
Classic

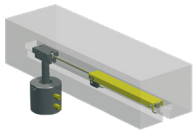
3.2206
Angular Clamps

Built-in Pistons

4.1070
with spring return

Rapid Clamping Systems
automatic shifting units with clamping cylinders

3.2280
Flexline
with push chain



3.2295
with
pneumatic cylinder

RHI-WZ003
Flexline I4.0
with condition monitoring

Grip Rail Couplings
quick clamping system for grip rails on transfer presses

4.2900
hydraulisch, mechanisch,
elektro- oder hydro-mechanisch

RHI-WZ001
coupling and clamping
without energy

Hydraulic Power Units
hydraulic clamping power units and clamping pumps

7.1600
Power Units
500/250/160 bar
0,82/2,1/3,5 l/min

7.1800
Power Units in
Modular Design
30 to 500 bar
0,9 to 12 l/min

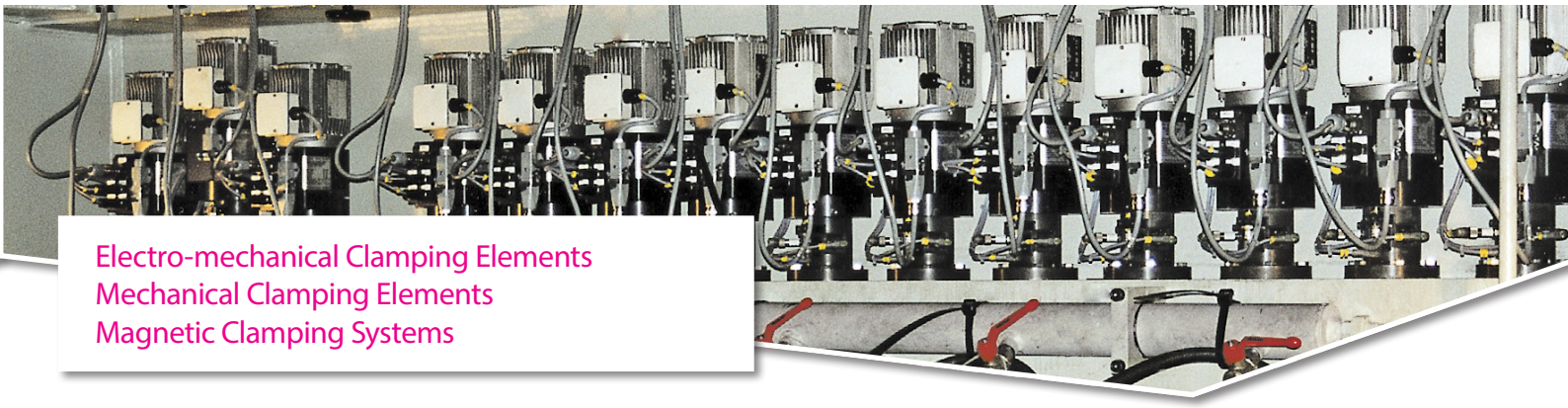
8.800
Hydraulic Clamping
Pump
manually operated
100, 200 and 500 bar

Hydraulic Accessories

11.2800
Fittings and
pipes

11.3800
High-pressure
hoses,
connector blocks
couplings and
plug-in connectors

11.9200
Pressure switches,
valves, pressure gauges
and
hydraulic oil



Electro-mechanical Clamping Elements
Mechanical Clamping Elements
Magnetic Clamping Systems

Electro-mechanical Clamping Elements

5.2620
Tenon-Type Clamps
self-locking
with position monitoring

5.2640
Swivel and Pull Clamps
self-locking
with position monitoring

5.2650
Swing Clamps
with position monitoring

5.2670
Wedge Clamps
for flat or tapered clamping edge

Mechanical Clamping Elements

6.2210
Sliding Clamps
with integral
high-pressure spindle

6.2270
High-Pressure
Spindles, mechanical
with integrated wedge
system

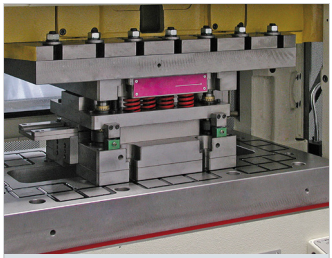
6.2274
Clamping Nuts
mechanical
with through-hole thread,
without clamping force
display

6.2275
Clamping Nuts
mechanical
with blind hole thread,
without clamping force
display

6.2276
Clamping Nuts
mechanical
with through-hole thread
and optional clamping
force display

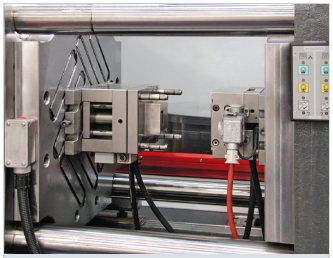
Magnetic Clamping Systems

used in forming machines for sheet metal forming, in injection molding machines, die casting machines, rubber molding presses or mold carriers. Suitable for operating temperatures up to 464 °F (240°C).

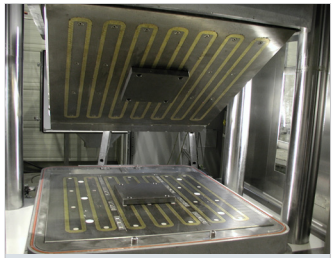


9.1132
M-TECS
for sheet metal forming

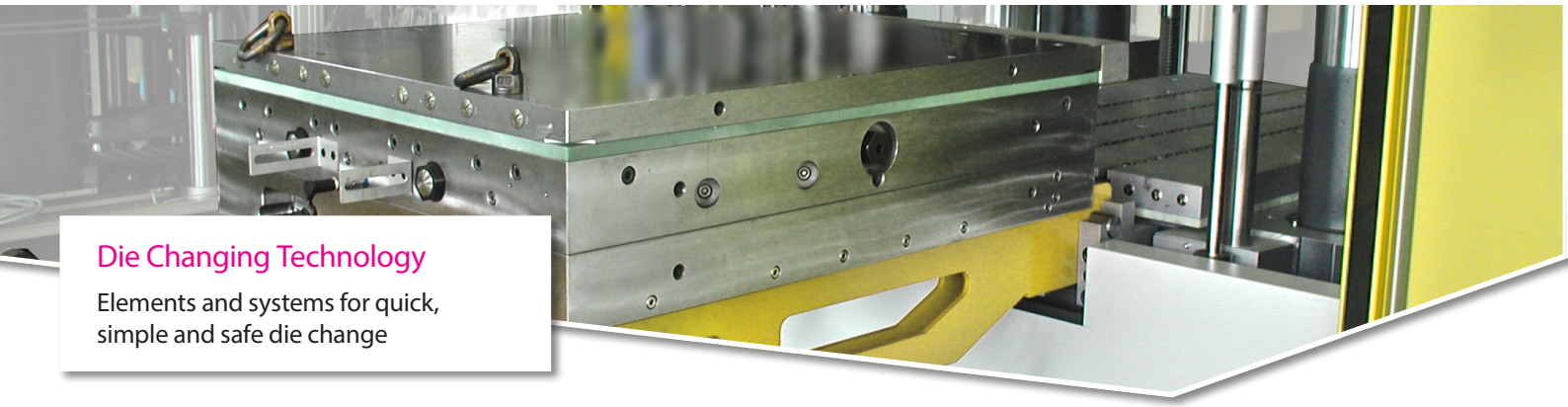
9.1132
M-TECS
for mold carrier systems



9.1134
M-TECS
for injection molding machines



9.1136
M-TECS
for rubber presses
and die casting machines

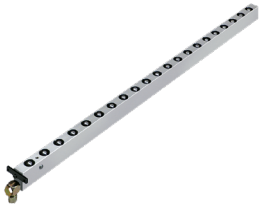
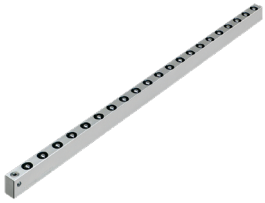


Die Changing Technology

Elements and systems for quick, simple and safe die change

Die Lifters

Roller, Ball and Transport Bars

Roller Bars	Ball Bars	Roller Bars	Ball Bars
			
8.18340 hydraulic with lifting of the bar	8.18341 hydraulic with lifting of the individual balls	8.18342 hydraulic with lifting of the individual rollers	8.18343 mechanical with spring pack

Roller Bars	Roller and Ball Inserts	Roller Conveyors
		
8.18344 mechanical with spring pack	8.18345 mechanical with spring pack	8.18347 mechanical without spring pack

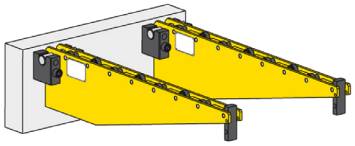
Die Changing Carts

RW 500	RW 1000	RWA 1600	RWA 4000
			
8.8900 manually movable max. 500 kg	8.8901 manually movable max. 1,000 kg	8.8902 with electro-hydraulic lifting platform max. 1,600 kg	8.8905 with electric drive and pull-push chain max. 4,000 kg

Die Carrying and Changing Consoles
Rack Systems for Die Storage
Rail-Guided Die Change System

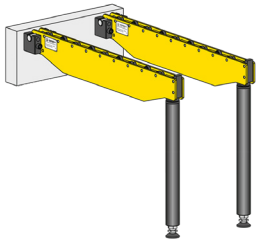
Carrying Consoles

Carrying Consoles



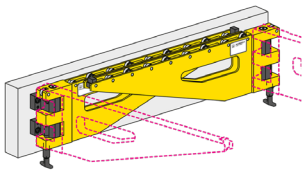
8.18350
hanging, up to 30 kN

Carrying Consoles



8.18351
supported, up to 250 kN

Carrying Consoles



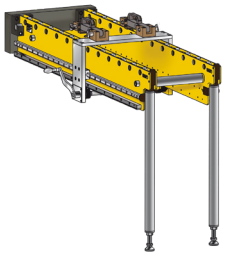
8.18352
swivelling, up to 60 kN

Die Changing Consoles

Die Changing Consoles

8.18353
electrically driven
with push-pull drive
up to 25 tons

Die Changing Consoles



8.18354
manually driven
with crank handle
and transmission gearing
up to 6 tons

Die Changing Consoles

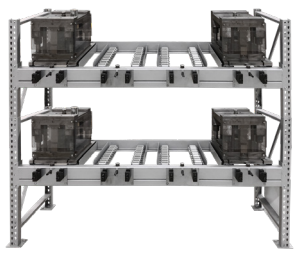
8.18360
electrically driven
with push-pull chain drive
up to 50 tons

Push-pull Chain Drive

8.18360
directly flanged

Rack Systems for Die Storage

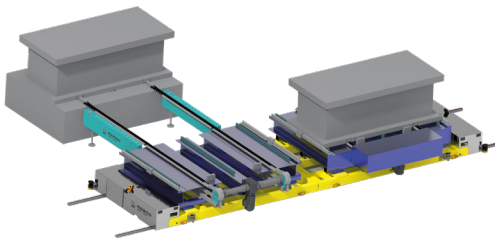
Rack Systems



8.8910
with roller conveyors or ball tables

Rail-Guided Die Changing Systems

RWS, rail-guided



8.8920
with electric drive and
integrated push-pull system
max. 40 tons

ROEMHELD
HILMA ▪ STARK

From Storage to Clamping

Complete solutions for Quick Die Change from a single source!

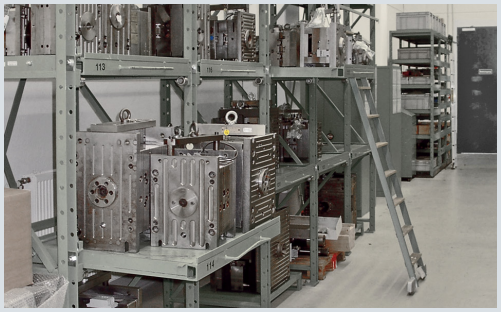
Advantages

- Quick Die Change - Easy and Safe
- Minimized Set-up Times
- Potential for Automated Die Changes
- Enhanced Productivity

STORAGE

RACK SYSTEMS FOR DIE STORAGE

Heavy duty shelving with integrated ball and roller bars



TRANSPORT

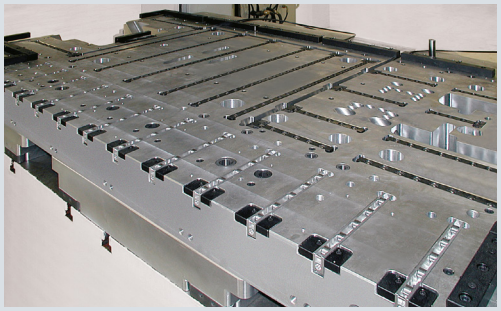
DIE CHANGING CARTS

for the safe handling of heavy dies

INSERTION

CARRYING CONSOLES / ROLLER AND BALL BARS

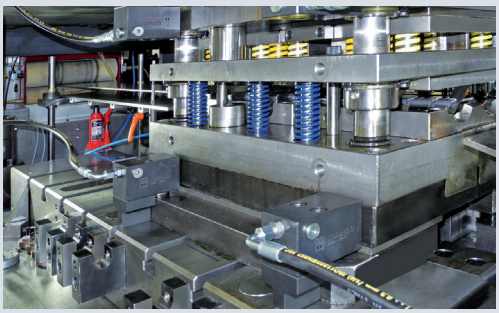
for the movement of dies



POSITIONING AND CLAMPING

DIE CLAMPING SYSTEMS

hydraulic, magnetic, electro-mechanical or mechanical



LET'S COLLABORATE

Collaborate with our Application Engineers in North America on clamping and handling solutions that address your unique challenges and leverage our expertise and capabilities. Let's find a cost-effective solution together. **Start with a free process evaluation >**

ROEMHELD North America

+1 636-386-8022 | 927 Horan Dr., Fenton, MO 63026, USA | roemheld-usa.com

FOLLOW US!

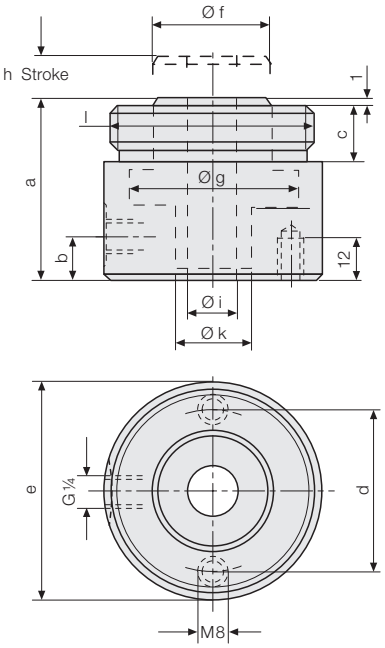
Die Clamping and Changing Systems · 10-23 EN
Subject to modifications.

WZ 2.1300

Hollow Piston Cylinders
single acting without spring return
max. operating pressure 400 bar

Advantages
- Flat and compact design
- Jerkyless piston movement
- Stroke limitation designed for max. operating pressure
- Easy to retrofit
- Ideal force transmission

Description
Installation is possible by insertion, screwing in or manifold mounting in any position. The clamping force is generated by applying hydraulic pressure to the piston, and the piston is returned by external force effect. The piston is provided with a through hole and is hardened and ground. The housing of the hollow piston cylinder is made of high alloy steel, the surface is black oxided.



Application
Hollow piston cylinders are used in connection with tie rods, screws and threaded rods, for clamping and locking dies on presses and machines

Hydraulic power units
see product group 7

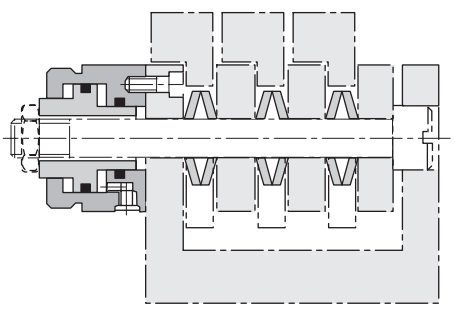
Accessories
see product group 11

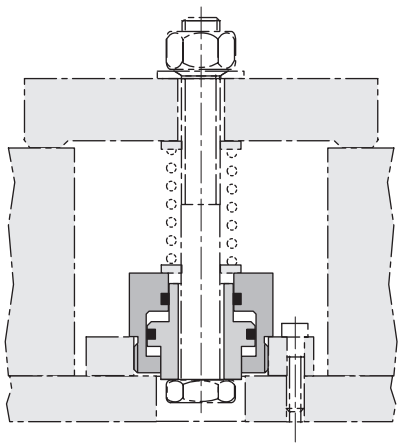
Technical data
Max. operating pressure 400 bar

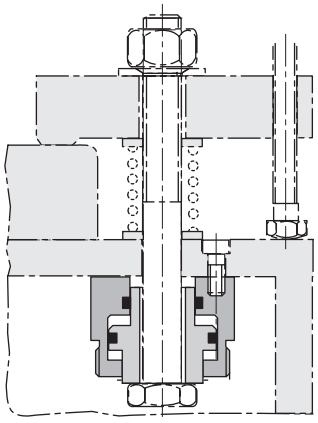
Clamping force at 100 bar	**[kN]**	**8.7**	**13.5**	**21**	**34.3**
Clamping force at 400 bar	**[kN]**	**34.8**	**54**	**84**	**137.2**
Stroke h	[mm]	12	12	15	15
Piston restoring force	[kN]	0.18	0.27	0.42	0.70
Piston area	[cm^2]	8.7	13.5	21	34.3
Oil volume per 1 mm stroke	[cm^3]	0.9	1.4	2.1	3.5
a	[mm]	61	61	72	72
b	[mm]	11	15	18.5	24
c	[mm]	22	22	27.5	27.5
d	[mm]	44	55	68	84
e	[mm]	60	75	93	113
f	[mm]	28	38	54	60
g	[mm]	40	50	63	80
i	[mm]	16.5	20.5	24.5	30.5
k	[mm]	22	28	36	45
l	[mm]	M52 x 1.5	M72 x 1.5	M90 x 2	M110 x 2
Weight	[kg]	1	1.7	3.1	4.6
Part no.		**1303003**	**1305003**	**1307003**	**1309003**

Special versions on request

Application examples

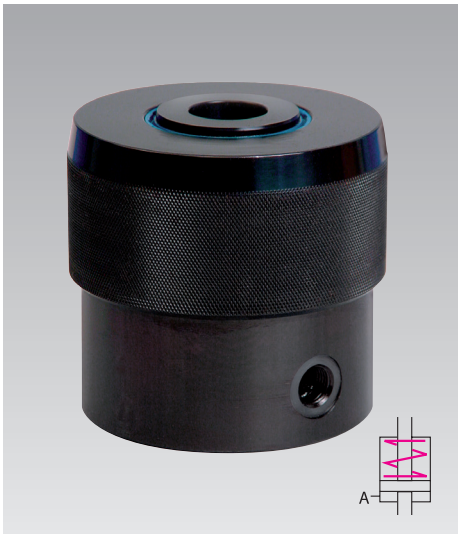






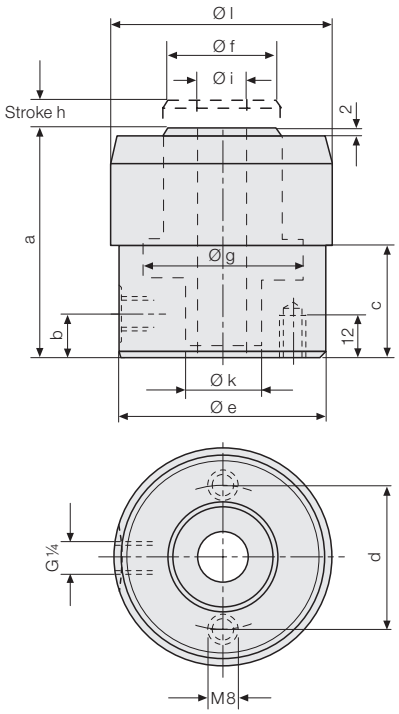
WZ 2.1320

Hollow Piston Cylinders
single acting, with spring return
max. operating pressure 400 bar



Advantages
- Flat and compact design
- Jerkyless piston movement
- Stroke limitation designed for max. operating pressure
- Easy to retrofit
- Ideal force transmission

Description
Installation is possible by insertion or manifold mounting in any position.
The clamping force is generated by applying hydraulic pressure to the piston, and the piston is returned by a spring. The piston is provided with a through hole and is hardened and ground. The housing of the hollow-piston cylinder is made of high alloy steel, the surface is black oxided.



Application
Hollow piston cylinders are used in connection with tie rods, screws and threaded rods, for clamping and locking dies on presses and machines.

Hydraulic power units
see product group 7

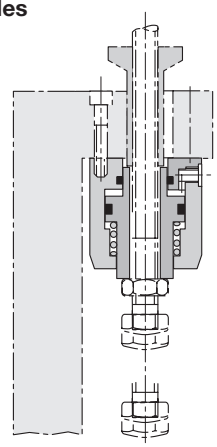
Accessories
see product group 11

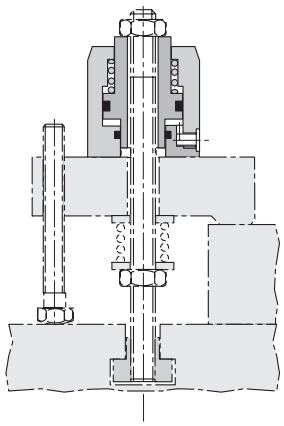
Technical data
Max. operating pressure 400 bar

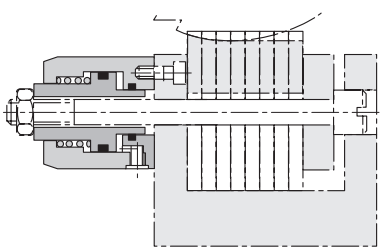
Clamping force at 100 bar	**[kN]**	**8.7**	**13.5**	**21**	**34.3**
Clamping force at 400 bar	**[kN]**	**34.8**	**54**	**84**	**137.2**
Stroke h	[mm]	12	12	15	15
Spring return force	[kN]	0.26	0.36	0.50	0.75
Piston area	[cm^2]	8.7	13.5	21	34.3
Oil volume per 1 mm stroke	[cm^3]	0.9	1.4	2.1	3.5
a	[mm]	76	76	97	97
b	[mm]	11	15	18.5	24
c	[mm]	38	38	41	41
d	[mm]	44	55	68	84
e	[mm]	60	75	93	113
f	[mm]	28	38	45	58
g	[mm]	40	50	63	80
i	[mm]	16.5	20.5	24.5	30.5
k	[mm]	22	28	36	45
l	[mm]	60	80	100	120
Weight	[kg]	1.3	2.2	4.2	6.1
Part no.		**1323003**	**1325003**	**1327003**	**1329003**

Special versions on request

Application examples







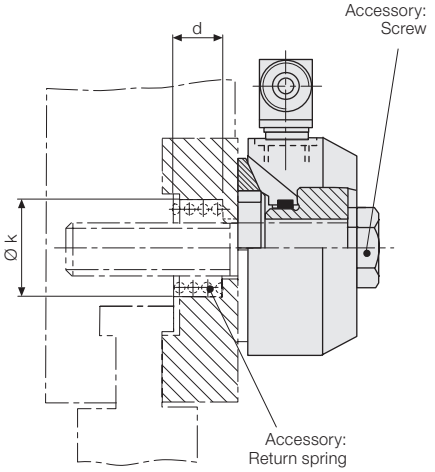
WZ 2.1330

Short-Stroke Hollow Piston Cylinders

single acting, with spring return
max. operating pressure 400 bar

Advantages

- Flat and compact design
- Jerkyless piston movement
- Stroke limitation designed for max. operating pressure
- Easy to retrofit
- Ideal force transmission



Description

The clamping element is particularly suitable for clamping mechanical clamping bars on die bending presses and folding presses.
The clamping force is generated by applying hydraulic pressure to the piston, and the piston is returned by a spring which is installed in the clamping bar. The piston is provided with a through hole and is hardened and ground. For an optimum adaptation to the clamping surface, the hollow piston cylinder can be equipped with a spherical disk.

Application

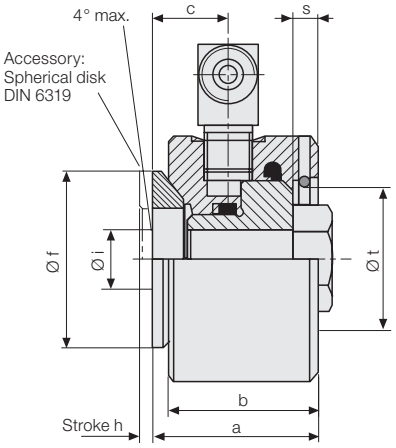
Hollow piston cylinders are used in connection with tie rods, screws and threaded rods, for clamping and locking dies on presses and machines.

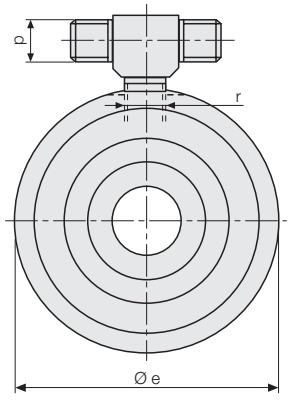
Technical data

Max. operating pressure 400 bar

Clamping force at 100 bar	**[kN]**	**5.5**	**13.5**
Clamping force at 400 bar	**[kN]**	**22**	**54**
For screw		M 12	M 16
Stroke h	[mm]	2.5	3.0
Spring return force	[kN]	0.27	0.67
Piston area	[cm²]	5.5	13.5
Oil volume per 1 mm stroke	[cm³]	0.6	1.4
a	[mm]	33	46
b	[mm]	30.6	41
c	[mm]	15	20
d	[mm]	12	18
Ø e	[mm]	50	80
Ø f	[mm]	36	56
Spherical disk		C 21	C 31
Ø i	[mm]	13	18
Ø k	[mm]	22	30
p		M12 x 1.5	M14 x 1.5
r		G 1/8	G 1/4
s	[mm]	5.2	8.6
Ø t	[mm]	30	48
Weight	[kg]	0.4	1.4
Part no.		**1830011**	**1830012**

Accessories			
Spherical disk	**Part no.**	**5700028**	**5700029**
Return spring	**Part no.**	**5700031**	**5700032**





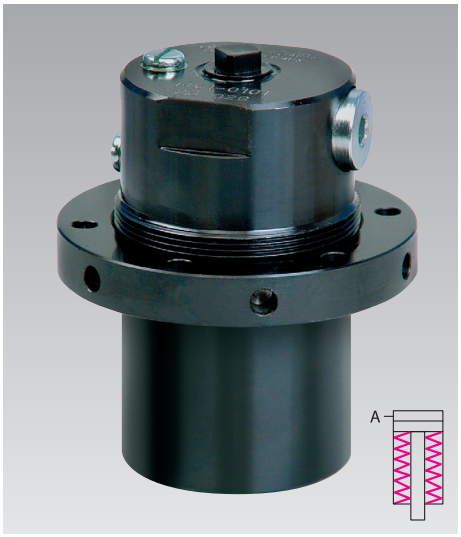
Special versions on request

Hydraulic power units
see product group 7

Accessories
see product group 11

WZ 2.1400

Spring Clamping Cylinders
pulling, with hydraulic return

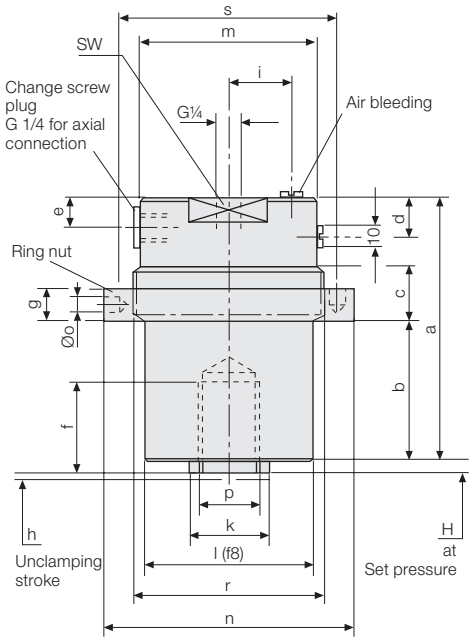


Application
Spring clamping cylinders are used for unpressurised long-term clamping of moveable machine parts, dies, fixtures, pallets and workpieces.

Advantages
- Large choice of clamping forces
- Long service life by low-friction Belleville springs placed between hardened and ground thrust washers
- Piston secured against rotation
- Oil ports radial and axial
- Easy installation

Description
The force of the spring clamping cylinder is mechanically transmitted to the tie rod or the clamping spindle by a pre loaded Belleville spring assembly. The hydraulic connection is only required for unclamping the clamping cylinder.

Adjustment of clamping force, clamping and unclamping
1. Apply set pressure to spring clamping cylinder.
2. Adjust clamping position to be free from play by means of ring nut.
3. Secure ring nut against torsion. If necessary, secure cylinder against sliding.
4. For clamping, reduce set pressure.
5. For unclamping, apply unclamping pressure.
6. Check play of clamping point after approx. 1000 load changes at set pressure. If necessary, retighten ring nut and secure again.



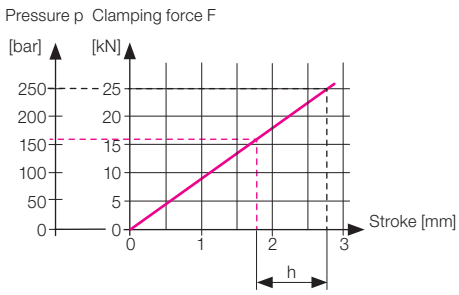
Technical data

Clamping force	[kN]	16	25	40	63	100	160	250	400
at set pressure	[bar]	165	165	185	215	250	230	230	215
Unclamping pressure, h = 0.5 mm	[bar]	210	200	210	235	275	265	250	235
Unclamping pressure, h = 1.0 mm	[bar]	255	235	235	255	315	300	270	255
Max. operating pressure	[bar]	270	250	250	270	320	320	285	270
Oil volume per 1 mm stroke	[cm³]	1.3	2.0	2.9	3.9	5.0	9.5	14.3	25.4
a	[mm]	95	105	120	132	147	170	230	280
b	[mm]	45	50	60	70	80	75	100	130
c	[mm]	20	20	25	25	30	45	55	65
d	[mm]	22	22	22	23	23	33	62	65
e	[mm]	11	11	11	12	12	28	57	62
f	[mm]	24	30	36	45	45	50	60	65
g	[mm]	13	14	14	16	16	18	20	50
i	[mm]	18	20.5	27	32	36	34	38	50
k	[mm]	20	25	30	40	40	50	70	90
l f8	[mm]	55	65	75	85	95	142	170	220
m	[mm]	55	65	75	89	99	137	163	212
n	[mm]	85	95	110	125	140	180	220	270
o	[mm]	6	8	8	8	8	10	10	15
p	[mm]	M 14 x 1.5	M 18 x 1.5	M 22 x 1.5	M 30 x 1.5	M 30 x 1.5	M 38 x 1.5	M 45 x 1.5	M 58 x 2
r	[mm]	M 58 x 1.5	M 68 x 1.5	M 78 x 1.5	M 92 x 1.5	M 102 x 1.5	M 140 x 2	M 168 x 3	M 218 x 4
H	[mm]	4	4	4	6	6	6	6	6
SW	[mm]	50	60	70	80	90	130	-	-
s	[mm]	72	82	94	109	121	165	194	244
Weight	[kg]	1.8	2.6	3.9	5.7	7.8	18.7	36.3	83
Part no.		**1401010**	**1402010**	**1403010**	**1404010**	**1405010**	**1406010**	**1407010**	**814080102**

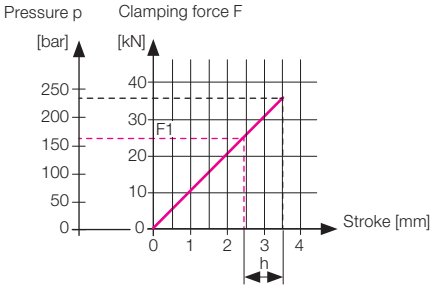
Special versions on request

Force-stroke-pressure diagrams

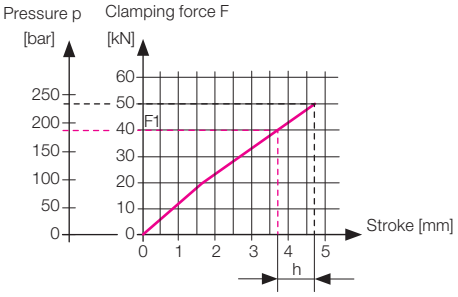
Clamping force 16 kN



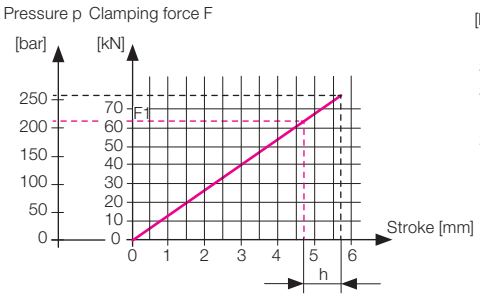
Clamping force 25 kN



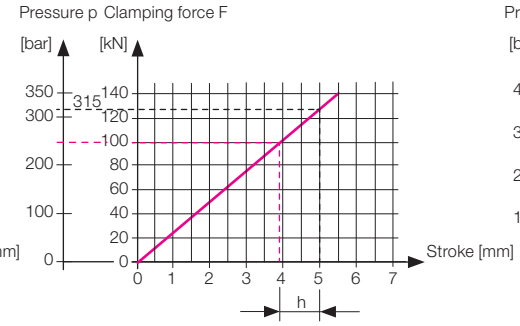
Clamping force 40 kN



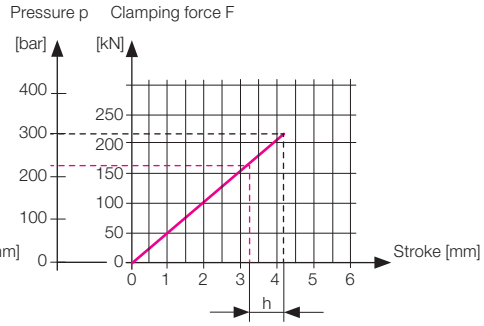
Clamping force 63 kN



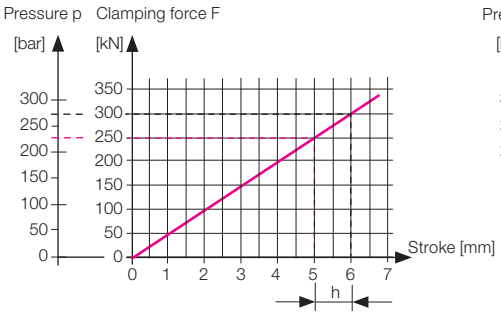
Clamping force 100 kN



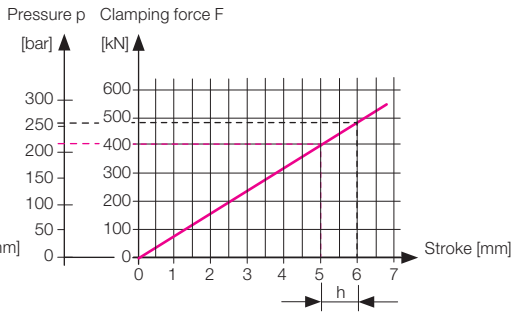
Clamping force 160 kN



Clamping force 250 kN

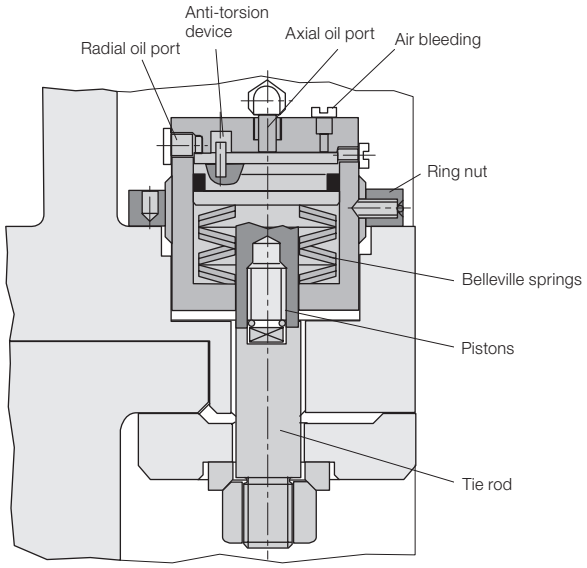


Clamping force 400 kN

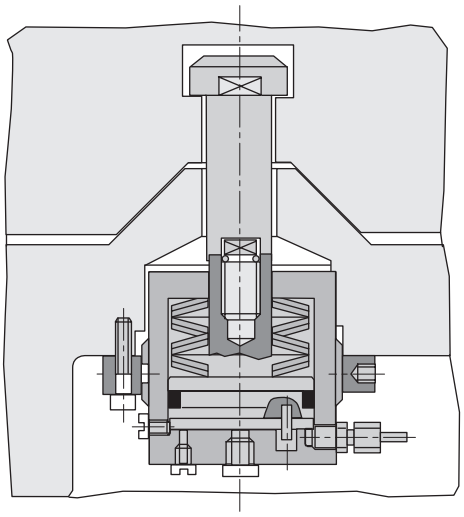


h : Unclamping stroke
- - - - : Unclamping pressure for unclamping stroke h = 1 mm
- - - - : Set pressure

Design



Application example

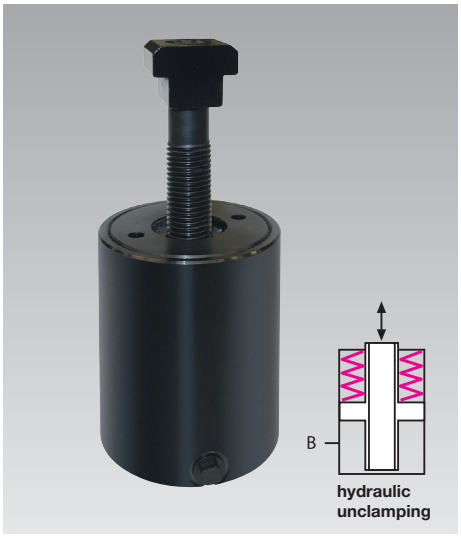


Please contact us in the case of:

- Changed clamping forces
- Unclamping stroke > 1 mm
- Load change > 1/min
- Aggressive media
- Temperatures below – 15 °C or above + 60 °C
- Required limitation of the unclamping stroke
- Special versions

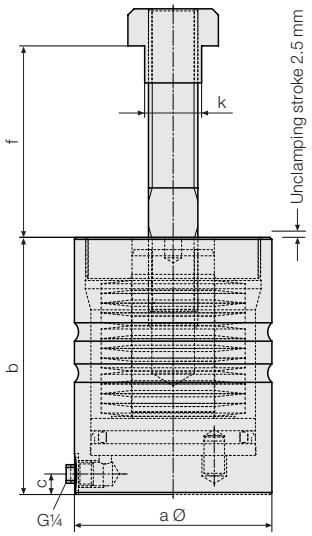
Hollow Piston Cylinders

spring clamping - hydraulic unclamping
single acting, clamping force 50 kN



Advantages

- Hydraulic supply is only required for unclamping, i.e. for a short time
- Ideal force transmission
- Convenient and compact design with gripping surface
- No interfering edges when inserting the dies
- Easy to retrofit
- Easy installation



Application

These hollow piston cylinders are used for unpressurised long-term clamping of dies or fixtures on press beds and rams Thanks to their compact design, they can also be used where the available space is limited

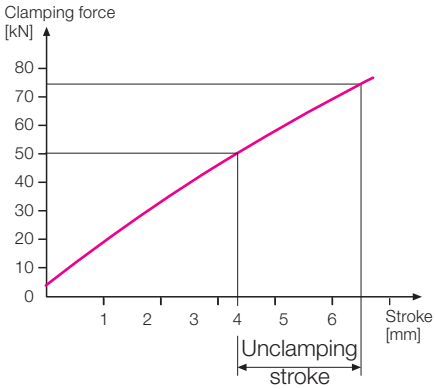
Description

The element is manually placed on the clamping edge of the die.
Unclamping by the application of hydraulic pressure to the piston and clamping by spring force. By means of the T-bolt the die is clamped against the clamping surface of the press ram or bed.

Hollow piston cylinder, complete
adjusted and secured with T-bolt
Please specify dimension "f" when ordering

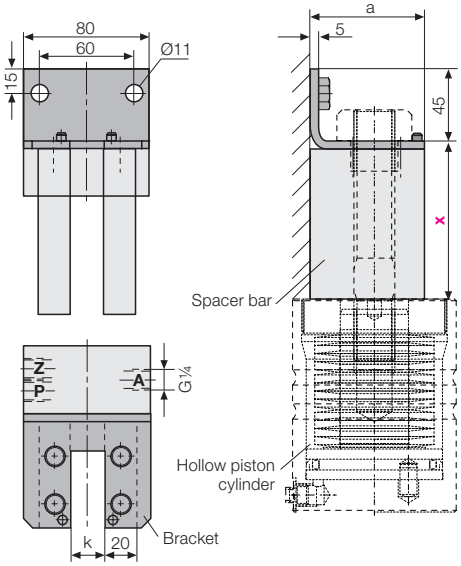
Dimension "f" = die clamping edge
+ web height
+ unclamping stroke

For T-slot	[mm]	22	28
Clamping force	**[kN]**	**50**	**50**
Unclamping pressure	[bar]	175	175
Unclamping stroke	[mm]	2.5	2.5
Oil volume /1 mm stroke	[cm³]	5	5
a	[mm]	96	96
b	[mm]	125	125
c	[mm]	10	10
k	[mm]	22	28
Weight	[kg]	6.8	7.0
Part no.		**8 1403 2200**	**8 1403 2800**



Accessory

Parking station during die change



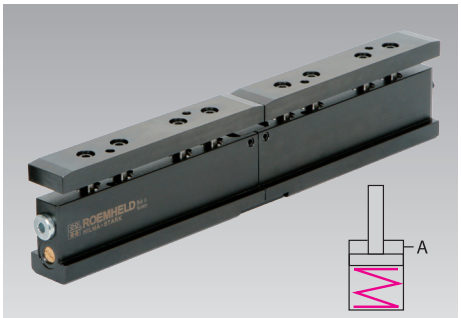
Spacing "x" = "f" – 4 mm

Bracket mounted with spacer bars (without connector block)	**Part no.**	**8 2753 2230**	**8 2753 2830**
T-slot width	k [mm]	22	28
	a [mm]	72	85
Separate bracket	**Part no.**	**2753-220**	**2753-280**

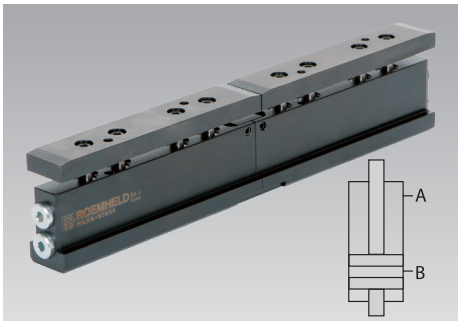
Special designs on request

Double-T Clamping Bars

single or double acting, max. operating pressure 400 bar



single acting, with spring return



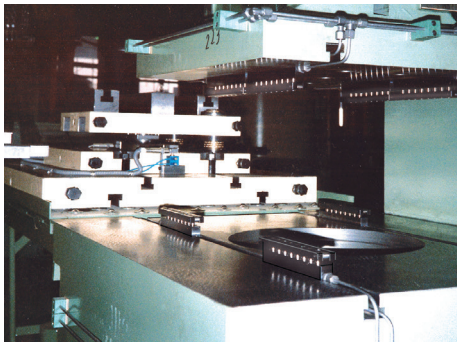
double acting, without carrying rollers

double acting, with carrying rollers

Application

- For clamping of dies on the press bed and press ram
- When the available space is limited

Application example



Double-T clamping bar on press bed and ram

Advantages

- The complete clamping surface can be used
- No collision edges
- Easy and quick retrofit
- Ideal, uniform force transmission

Double-T clamping bar, single acting, with spring return, without carrying rollers

For use in the press ram, but also suitable for the press bed.
Installation of the double-T clamping bar by insertion into the T-slots of the press ram or the press bed in any desired position. The bar is manually secured in position with locking screws in the T-slot.
The double-T design requires T-slots in the die and in the press ram or press bed.
The clamping force is generated by applying hydraulic pressure to the pistons, and unclamping is carried out mechanically by spring return.

Double-T clamping bar, double acting, without carrying rollers

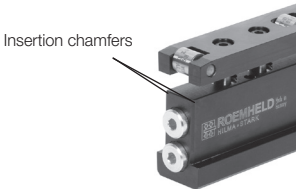
For use in the press ram, but also suitable for the press bed.
Installation of the double-T clamping bar and generation of the clamping force are as described above, but with one additional clamping circuit for unclamping.

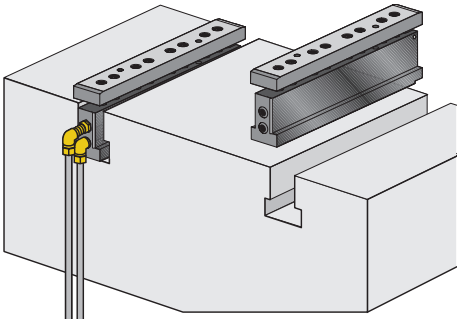
Double-T clamping bar, double acting, with carrying rollers for lifting and clamping

preferably for the use in the press bed.
Installation and function as described above, however equipped with carrying rollers.
A double-acting piston causes the lifting of the carrying rollers and the following clamping of the die by a second clamping circuit. Before clamping is made, the die positioned on the carrying rollers is not in contact with the table plate and can be easily moved and positioned. Lifting, moving, positioning and clamping with one element only.

Insertion chamfer

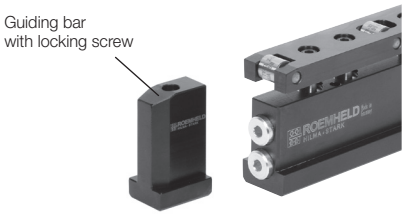
If the dies have a slight lateral offset when loading into the machine, the double-T clamping bars are protected by insertion chamfers at the connection side.





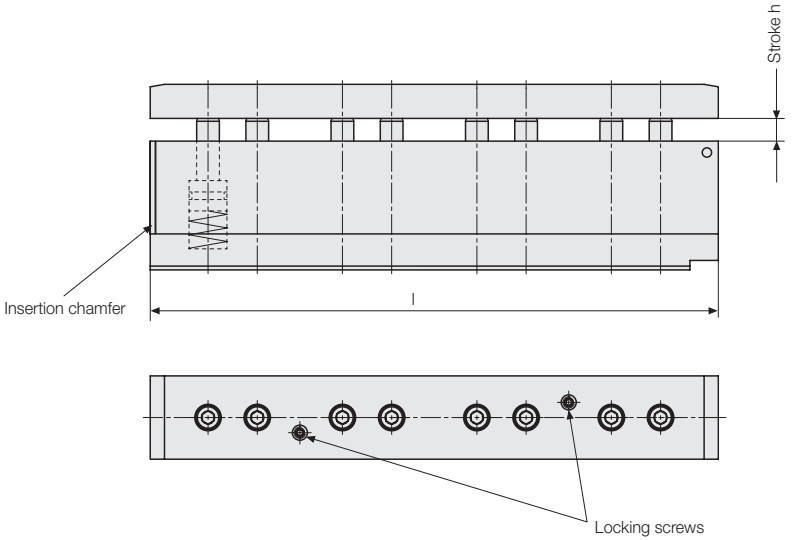
Accessory guiding bar

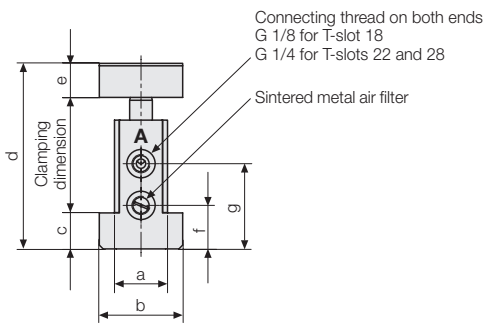
If the die offset is larger (up to 1.5 mm) or the dies are not fed on the connection side of the double-T clamping bars of the machine, we recommend separate guiding bars. They are fastened in the T-slot using clamping bolts. Special guide bar designs are available on request (e.g. with hydraulic ports for the connection side).



Guiding bar	Part no.
for T-slot 18	**718320015**
for T-slot 22	**718320016**
for T-slot 28	**718320017**

Double-T clamping bars
single acting with spring return • without carrying rollers





Slot a	[mm]	18	22	28
b	[mm]	28	35	44
c	[mm]	11.5	15.0	19.0
d min.	[mm]	55	70	89
d max.	[mm]	63	80	101
e	[mm]	11	15	18
g	[mm]	30.5	41.0	46.0
Clamping dimension	[mm]	33.5 +6	41.0 +8	53.0 +10
Stroke h*	[mm]	8	10	12
Max. operating pressure	[bar]	400	400	400

* Reduction of stroke on request

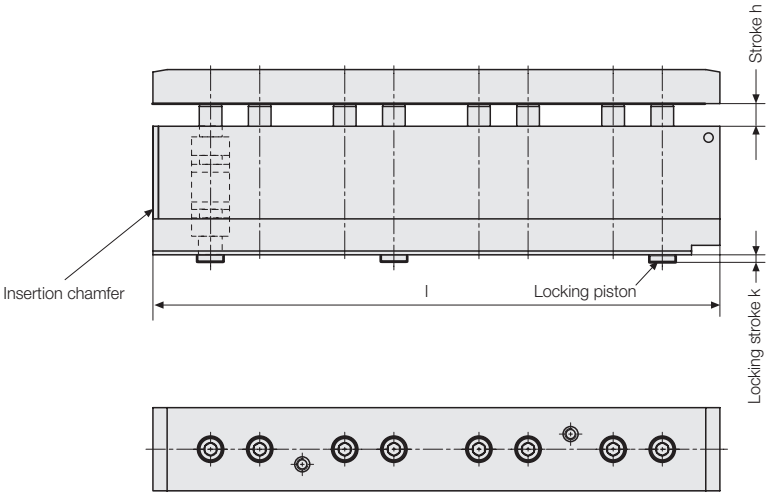
Note

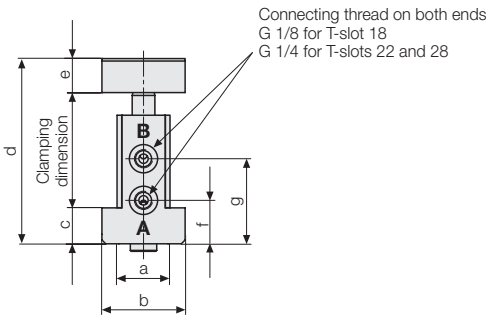
All double-T bars are composed of modular segments. Thus, different lengths can be delivered. When clamping or unclamping, make sure that there is an overlap of >90 % of the segment length.

Segment lengths:
T-slot 18 ≙ 150 mm
T-slot 22 ≙ 300 mm
T-slot 28 ≙ 300 mm

T-slot a [mm]	Length l* [mm]	Clamping force at 400 bar [kN]	Oil volume [cm³] Clamping	Part no.
18	150	16.6	5.7	**8 18321810****
18	300	33.2	11.4	**8 18321812**
18	450	49.8	17.1	**8 18321814**
18	600	66.4	22.8	**8 18321816**
18	750	83.0	28.5	**8 18321818**
22	300	39.2	18.5	**8 18322210****
22	600	78.4	37	**8 18322212**
22	900	117.6	55.5	**8 18322214**
22	1200	156.8	74	**8 18322216**
22	1500	196.0	92.5	**8 18322218**
28	300	64.0	34	**8 18322810****
28	600	128.0	67.9	**8 18322812**
28	900	192.0	101.8	**8 18322814**
28	1200	256.0	135.8	**8 18322816**
28	1500	320.0	169.7	**8 18322818**

* Intermediate lengths and extra-long bars on request
** Connection thread on one end





Slot a	[mm]	18	22	28
b	[mm]	28	35	44
c	[mm]	11.5	15.0	19.0
d min.	[mm]	55	70	89
d max.	[mm]	63	80	101
e	[mm]	11	15	18
f	[mm]	13.5	18.0	23.0
g	[mm]	30.5	41.0	46.0
Clamping dimension	[mm]	33.5+6	41.0+8	53.0+10
Stroke h*	[mm]	8	10	12
Locking stroke k**	[mm]	2.5	3.0	4.0
Max. operating pressure	[bar]	400	400	400

* Reduction of stroke on request
** Locking screw (see double-T bar single-acting) instead of locking piston on request.

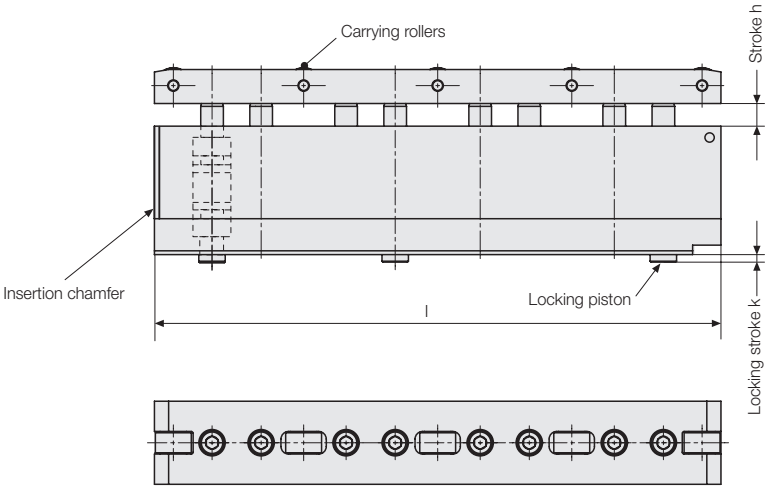
Note

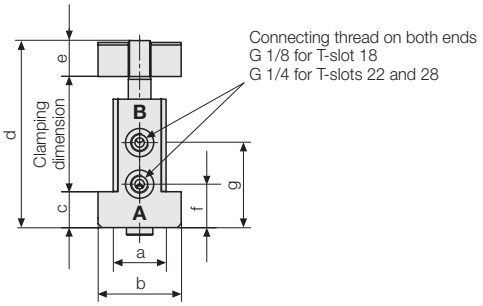
All double-T bars are composed of modular segments. Thus, different lengths can be delivered. When clamping or unclamping, make sure that there is an overlap of >90 % of the segment length.

Segment lengths:
T-slot 18 ≙ 150 mm
T-slot 22 ≙ 300 mm
T-slot 28 ≙ 300 mm

T-slot a [mm]	Length l* [mm]	Clamping force at 400 bar [kN]	Oil volume [cm³] Clamping	Oil volume [cm³] Unclamping	Part no.
18	150	16.6	3.3	5.7	**8 18321820****
18	300	33.2	6.6	11.4	**8 18321822**
18	450	49.8	9.9	17.1	**8 18321824**
18	600	66.4	13.3	22.8	**8 18321826**
18	750	83.0	16.6	28.5	**8 18321828**
22	300	39.2	9.8	18.5	**8 18322220****
22	600	78.4	19.6	37	**8 18322222**
22	900	117.6	29.4	55.5	**8 18322224**
22	1200	156.8	39.2	74	**8 18322226**
22	1500	196.0	49.0	92.5	**8 18322228**
28	300	64.0	19.3	34	**8 18322820****
28	600	128.0	38.6	67.9	**8 18322822**
28	900	192.0	57.9	101.8	**8 18322824**
28	1200	256.0	77.2	135.8	**8 18322826**
28	1500	320.0	96.5	169.7	**8 18322828**

* Intermediate lengths and extra-long bars on request
** Connection thread on one end





Slot a	[mm]	18	22	28
b	[mm]	28	35	44
c	[mm]	11.5	15.0	19.0
d min.	[mm]	56	71	90
d max.	[mm]	64	81	102
e	[mm]	12	16	19
f	[mm]	13.5	18.0	23.0
g	[mm]	30.5	41.0	46.0
Clamping dimension	[mm]	33.5+6	41.0+8	53.0+10
Stroke h*	[mm]	8	10	12
Locking stroke k**	[mm]	2.5	3.0	4.0
Max. operating pressure	[bar]	400	400	400

* Reduction of stroke on request

Note
All double-T bars are composed of modular segments. Thus, different lengths can be delivered. When clamping or unclamping, make sure that there is an overlap of >90 % of the segment length.

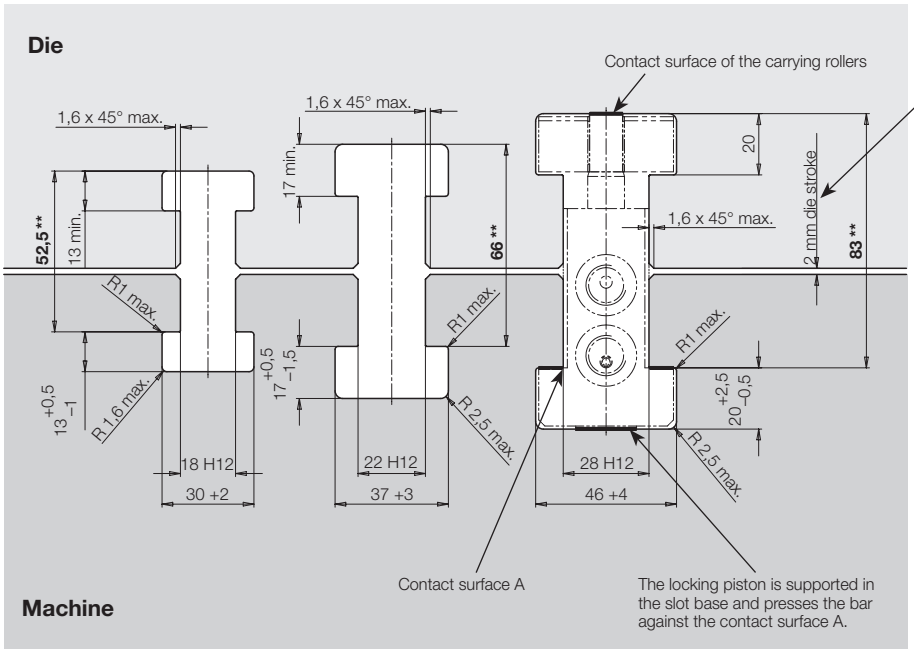
Segment lengths:
T-slot 18 ≙ 150 mm
T-slot 22 ≙ 300 mm
T-slot 28 ≙ 300 mm

T-slot a [mm]	Length l* [mm]	Load at 400 bar [kN]	Clamping force at 400 bar [kN]	Number of carrying rollers	Oil volume [cm³] Clamping	Oil volume [cm³] Unclamping	Part no.
18	150	9	16.6	3	3.3	6.4	**8 1832 1830****
18	300	18	33.2	6	6.6	12.9	**8 1832 1832**
18	450	27	49.8	9	9.9	19.4	**8 1832 1834**
18	600	36	66.4	12	13.3	25.8	**8 1832 1836**
18	750	45	83.0	15	16.6	32.3	**8 1832 1838**
22	300	32	39.2	5	9.8	20.9	**8 1832 2230****
22	600	64	78.4	10	19.6	41.8	**8 1832 2232**
22	900	96	117.6	15	29.4	62.7	**8 1832 2234**
22	1200	128	156.8	20	39.2	83.6	**8 1832 2236**
22	1500	160	196.0	25	49.0	104.5	**8 1832 2238**
28	300	37.5	64.0	5	19.3	40.2	**8 1832 2830****
28	600	75.0	128.0	10	38.6	80.4	**8 1832 2832**
28	900	112.5	192.0	15	57.9	120.6	**8 1832 2834**
28	1200	150.0	256.0	20	77.2	160.8	**8 1832 2836**
28	1500	187.5	320.0	25	96.5	201.0	**8 1832 2838**

* Intermediate lengths and extra-long bars on request
** Connection thread on one end

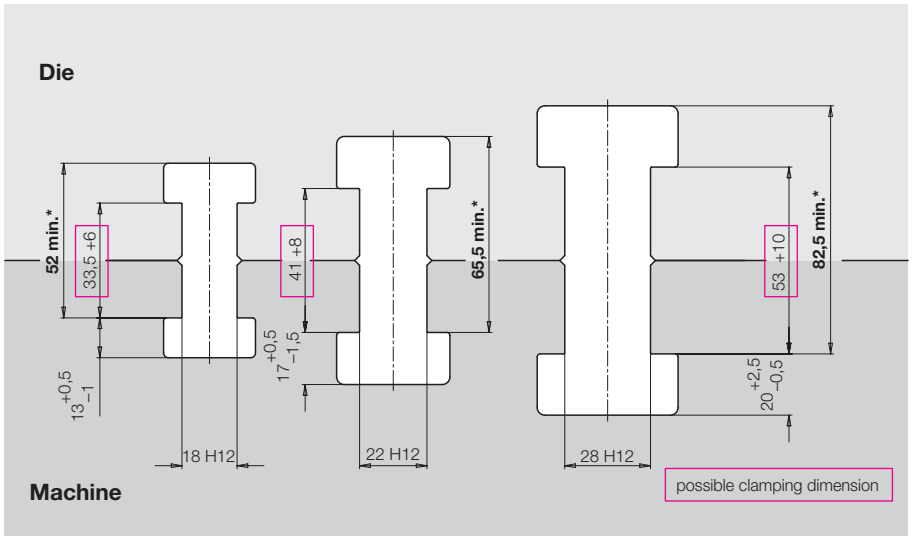
Presentation: Die in lifted mode

(lifted by double-T clamping bars with carrying rollers or external roller or ball bars)



** Dimension of the double-T clamping bars with carrying rollers in lifted or unclamped mode (= d max. – c)

Presentation: Die in clamped mode

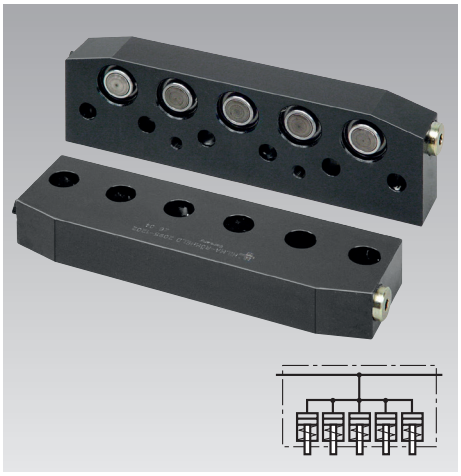


* Minimum slot dimension when using double-T clamping bars without carrying rollers, height in unclamped condition +0,5 mm (= d max. – c + 0.5)

T-slots based on DIN 650

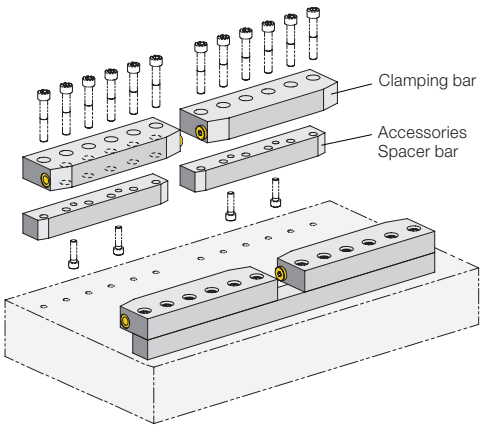
Clamping Bars

single acting with spring return, with press-in or built-in pistons clamping force up to 48 kN, piston stroke 6 or 8 mm



Advantages

- Piston stroke 6 or 8 mm
- Flat and compact design
- Fully resilient stroke limitation
- Easy installation
- Easy to retrofit



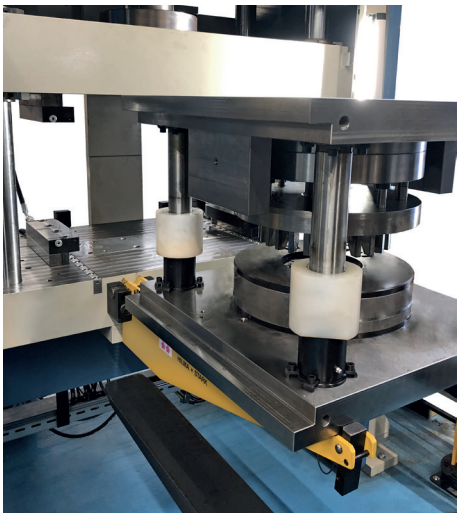
Application

The clamping bars are used permanently installed on press beds and rams, on machines and plants for clamping and locking.

Description

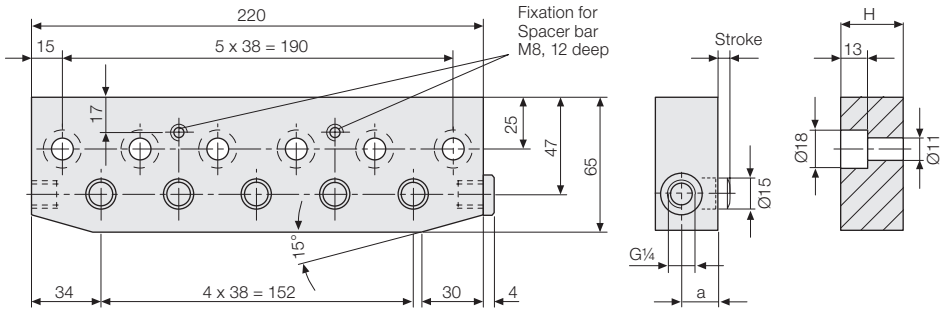
The clamping bar is directly screwed on the press bed or ram using a spacer bar. Clamping is carried out on the die clamping edge by applying hydraulic pressure to the 5 pistons which are arranged side by side with a pressure medium and mechanical unclamping by a spring return. Hydraulic oil is supplied through G 1/4 ports provided on both sides. Flat design with die inlet chamfer. Clamping force up to 48 kN uniformly distributed over 5 pistons.
When using several clamping bars in a row, the elements are interconnected by means of hoses or pipes.

Application example



Clamping bars installed in press bed and ram.
Easy loading of dies by die changing consoles and hydraulic ball bars installed in the T-slots of the press bed.

Dimensions



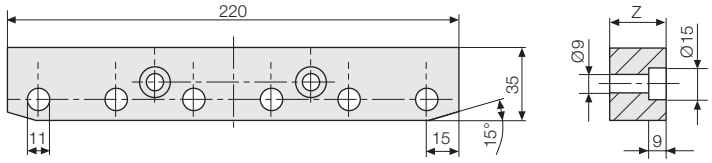
All dimensions in mm

Technical data		Version with press-in pistons	Version B built-in pistons
Clamping force at max. operating pressure	**[kN]**	**35**	**48**
Max. operating pressure	**[bar]**	**400**	**200**
Clamping force at 100 bar	**[kN]**	**8.7**	**24.0**
No. of pistons		5	5
Piston/Piston rod Ø	[mm]	23/15	25/15
Stroke	[mm]	6	8
Clamping bar height H	[mm]	30	40
a	[mm]	18	29
Oil volume	[cm³]	14.7	19.6
Weight	[kg]	2.8	3.5
Part no.		**2095120**	**820960250**

Accessories

Spacer bar

to obtain the required clamping edge height



All dimensions in mm

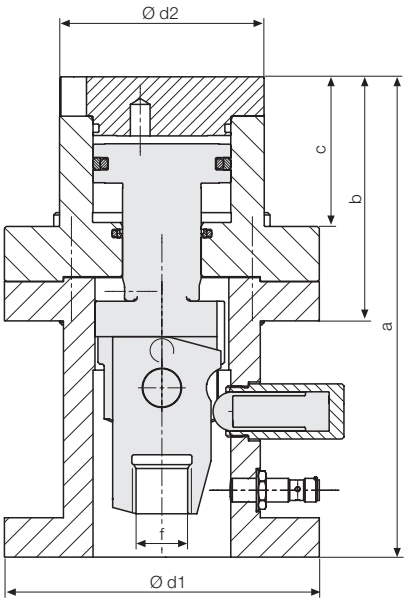
Height Z	[mm]	28	43
for clamping edge	[mm]	25 ±1.5	40 ±1.5
Part no.		**520710040**	**520710071**

Other heights on request

WZ 2.2185

Pivot and Pull Clamps
double acting, max. operating pressure 400 bar

Advantages
- High adaptability to varying clamping edge heights
- High operational safety by position monitoring and automatic motion sequence
- The tie rod can be pivoted, therefore no collision edges
- When inserting the die
- Optimum utilisation of the ram area
- Easy installation
- Very suitable for retrofitting
- Temperature stable up to 85 °C

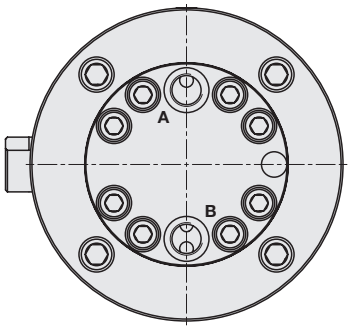


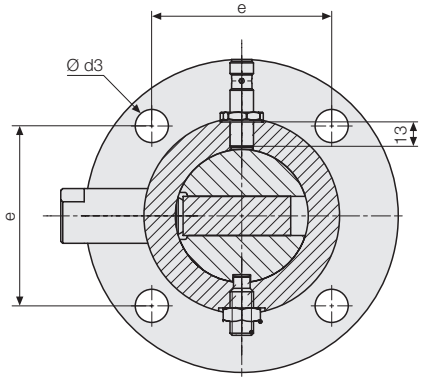
Max. flow rate: 16 cm³

Description
A control mechanism translates the stroke of the double-acting piston into a tilting and lifting movement of the tie rod. For releasing the die, the tie rod pivots by 15°.
The clamping force is transmitted to the clamping point in the axial direction of the tie rod. The clamping and unclamping positions are monitored by inductive proximity switches.
Higher temperatures on request.

Application
Pivot and pull clamps are suitable for automatic clamping of dies on press rams.

Position monitoring		
Rated operating distance S_N	[mm]	2
Ambient temperature T_A	[°C]	–40 … +85
Operating voltage U_B	[VDC]	10 – 30
Constant current	[mA]	200
Switching function		Interlock (PNP)

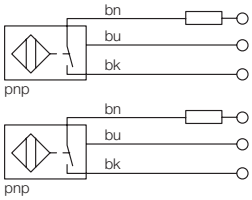




Clamping force at 400 bar*	[kN]	104	160
Clamping stroke max.	[mm]	7	7
Clamping range	[mm]	15 – 22	15 – 22
Total stroke	[mm]	24	26
Swing stroke	[mm]	10	10
Oil volume clamping	[cm³]	52	108
Oil volume unclamping	[cm³]	77	158
a	[mm]	244	348
b	[mm]	124	147
c	[mm]	76	87
d1 Ø	[mm]	160	192
d2 Ø	[mm]	104	126
d3 Ø	[mm]	17	21
e	[mm]	92	114
f	[mm]	M30	M36
Part no.		**821851000**	**821861000**

* Other versions on request

Initial settings



S1 unclamping position (N/O contact)

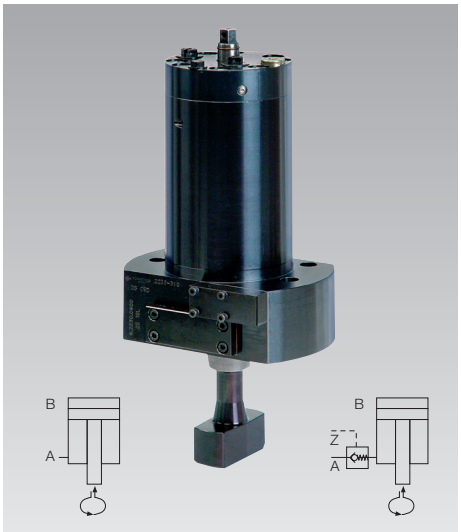
S2 clamping position (N/O contact)

Accessories
10 m connecting cable
for inductive proximity switches
Part no. 5700014

5 m connecting cable angled at 90
Part no. 209750024

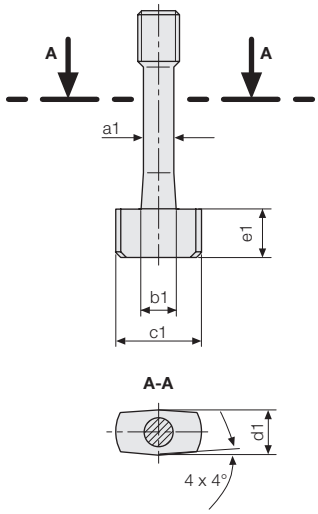
Swing Sink Clamps

double acting for exterior clamping, with 90° swing angle max. operating pressure 400 bar



Advantages

- Suitable for retrofitting
- Ideal force transmission
- Compact design
- High operating safety by position monitoring, manual emergency operation and overload protection
- Suitable for large clamping edge tolerances (±1.5 mm)
- Optimum utilisation of bed and ram surfaces so there are no parts protruding when inserting the die
- Clamping at difficultly accessible points
- Tie rod lengths up to 2000 mm



Application

Swing sink clamps can directly be mounted to the press bed or ram. They are particularly suitable where space is limited.
Temperature range up to max. 70 °C

Description

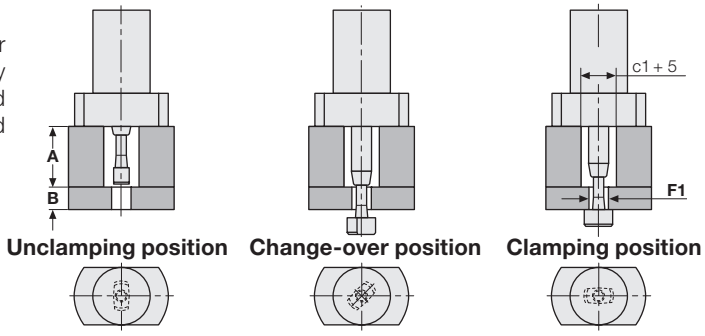
The piston is guided by a control bolt so that during the stroke movement a rotation of 45° is effected.
For clamping, the tie rod is rotated by 90° from the unclamping position and pulled against the clamping surface through the existing clamping slots.

Monitoring of the unclamping, change-over and clamping positions by inductive proximity switches. The swing mechanism is protected by a spring-loaded overload protection and equipped with manual emergency operation.

Dimensions of tie rod

Swing sink clamp		2235XXX				2237XXX		
F1 clamping slot in the die	[mm]	32	40	45	50	45	50	60
a1	[mm]	22	22	22	22	32	32	32
b1	[mm]	28	28	28	28	40	40	40
c1	[mm]	54	62	67	72	77	82	92
d1	[mm]	28	28	28	28	40	40	40
e1	[mm]	30	30	30	30	37	37	37

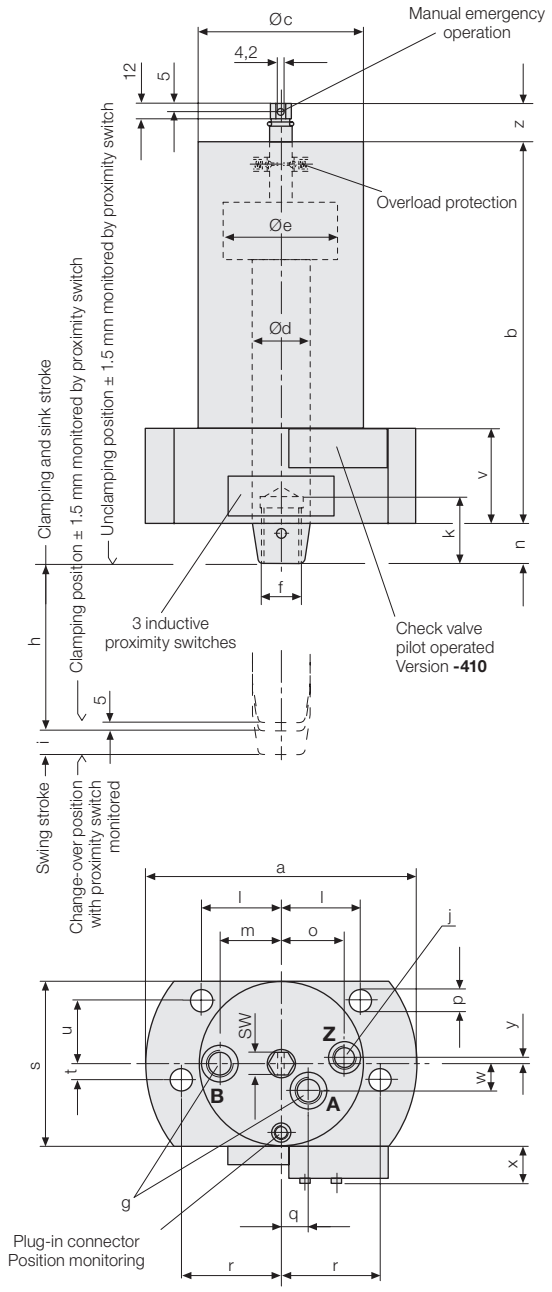
Please specify in your order the dimensions:
A (ram plate), **B** (die clamping edge thickness) and **F1** (clamping slot)



Technical data
Max. operating pressure 400 bar

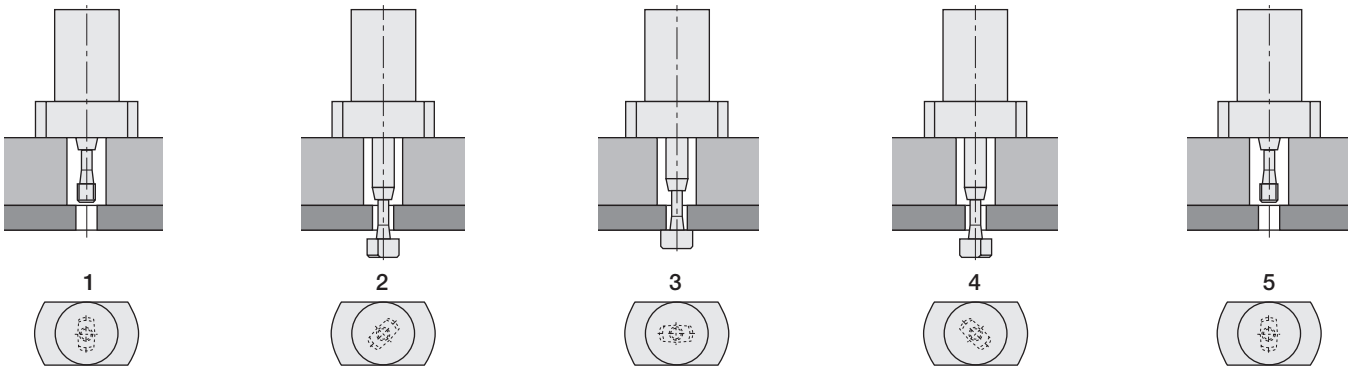
Clamping force at 400 bar	**[kN]**	**104**	**216**
100 bar	[kN]	26	54
Piston Ø e	[mm]	70	100
Rod Ø d	[mm]	40	56
Max. clamping edge height	[mm]	68	68
Swing stroke i	[mm]	15	23
Clamping and sink stroke h	[mm]	105	112
Oil volume clamping	[cm^3]	514	1211
Oil volume unclamping	[cm^3]	388	948
Max. flow rate	[cm^3/s]	50	120
a	[mm]	170	212
b	[mm]	240	270
c	[mm]	104	146
f	[mm]	M27 x 1.5	M36x2
g	[mm]	G ⅜	G ½
j	[mm]	G ¼	G ¼
k	[mm]	42	55
l	[mm]	50	71
m	[mm]	38	57
n	[mm]	25	34
o	[mm]	39.8	62
p	[mm]	14	18
q	[mm]	17.3	27.6
r	[mm]	62.5	84
s	[mm]	104	146
t	[mm]	10	23
u	[mm]	40	50
v	[mm]	60	65
w	[mm]	16.7	27.6
x	[mm]	22.6	22.6
y	[mm]	4.2	0
z	[mm]	24	31
SW	[mm]	14	22
Weight	[kg]	16.5	35
without check valve	**Part no.**	**2235310**	**2237310**
with check valve	**Part no.**	**2235410**	**2237410**

Further sizes and special versions are available on request



Functional description

The piston of the double-acting swing sink clamp is guided by a guide pin in such a manner that during part of the stroke a 45° rotation is carried out just before reaching and just after leaving the piston upper end position. The rotation is always anti-clockwise, no matter whether the piston extends or retracts.



1. Unclamping position
The piston is completely retracted. This permits an easy die change, as no parts project over the bed or ram level.

2. Change-over position
For clamping, pressure is applied to the piston side B. The tie rod passes through the slot of the clamping point and is then rotated by 45°.

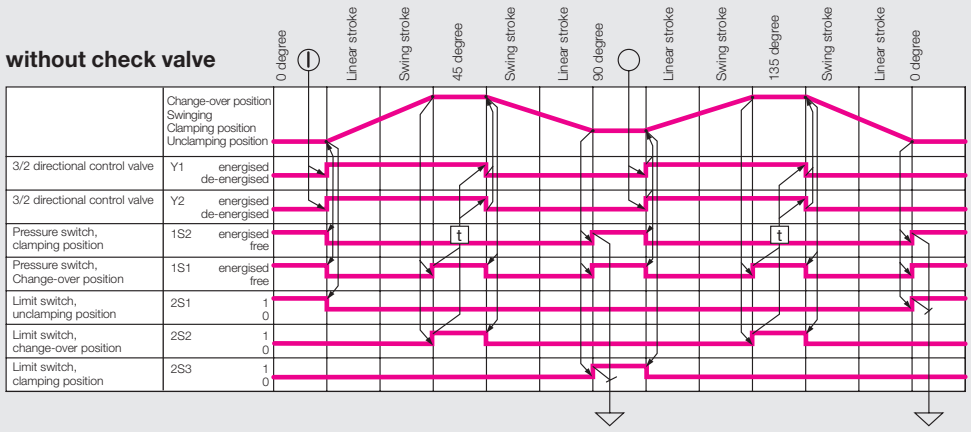
3. Clamping position
Pressure is applied to the piston rod side A. The tie rod makes a further 45° rotation and is now transversely above the clamping point.
The die is clamped
The proximity switch 2S3 monitors this position.

4. Change-over position for unclamping,
pressure is applied to the piston side B. The tie rod is extended and then again rotated by 45°. Proximity switch 2S2 monitors this position.

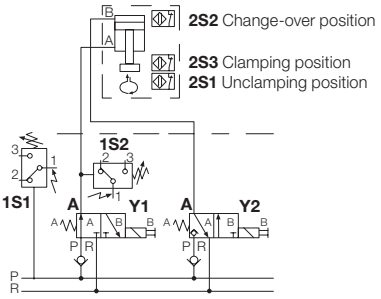
5. Unclamping position
Pressure is applied to the piston rod side A. The tie rod makes a further 45° rotation and passes through the slot of the clamping point as far as the end position. Proximity switch 2S1 monitors this position.
The die is unclamped.

Functional diagrams

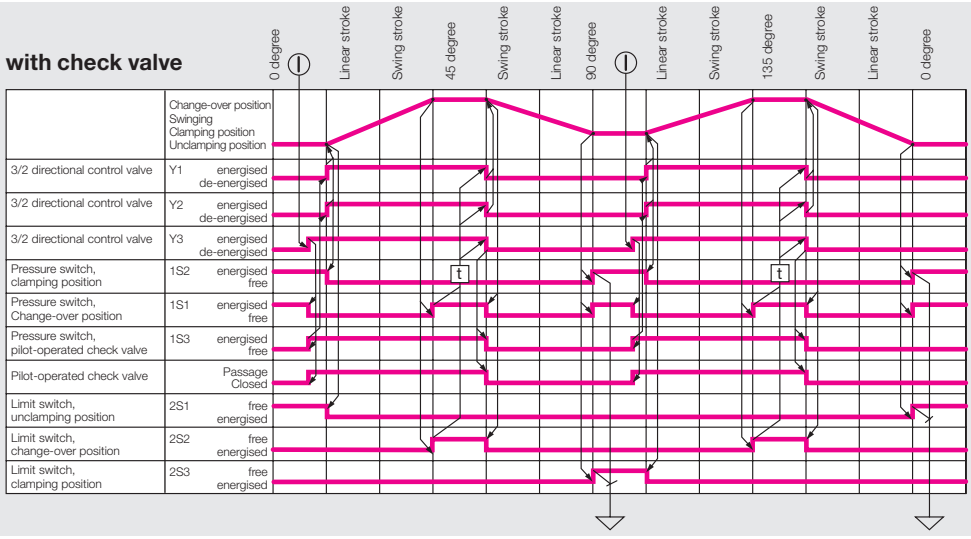
without check valve



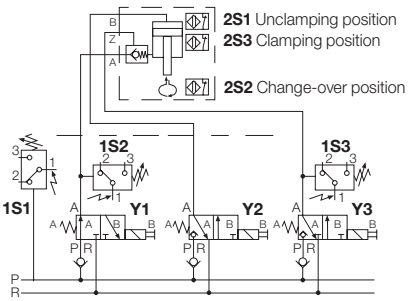
Hydraulic circuit diagram without check valve



with check valve



Hydraulic circuit diagram with check valve



Hydraulic installation

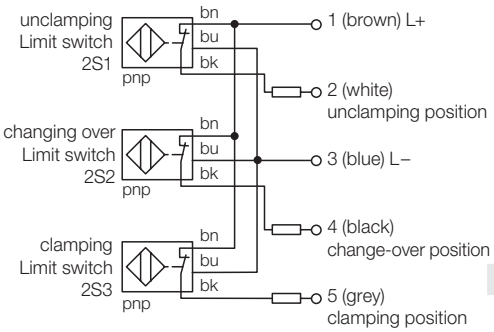
Read the operating manual before starting up.
Adjust the flow rate of the power unit so that clamping and unclamping cycles between 10 and 30 seconds are obtained. In order to prevent the swing mechanism from premature wear, the dynamic pressure at port B should not exceed 50 bar while the tie rods retract through the slot.
Swing sink clamps which are grouped together should be connected to distribution boards, in order to avoid series connection. Use pipes with larger diameter for connection to the power unit.
If in doubt, please send the installation plan to be reviewed.
Provide a pressure gauge connection in every hydraulic circuit for adjustment and to check operating data.
Other parameters and recommendations for hydraulic installation of die clamping systems are given in chapter no. 1 “General information”.

Important note!

The full stroke of the piston must be realised, otherwise the swing mechanism may be damaged.

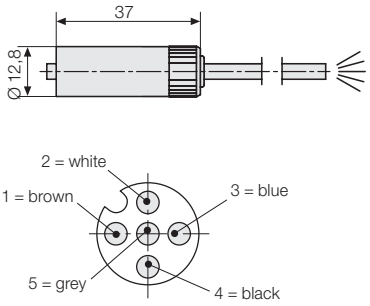
Pin assignment
for three-wire proximity switches

Supply voltage	10 – 30 V DC
Constant current	≤ 100 mA
Type	inductive, break contact pnp



Accessories

5-pole connecting cable with screw coupling



Cable length 5 m	**Part no.**	**5700013**
Cable length 10 m	**Part no.**	**5700014**

Accessories

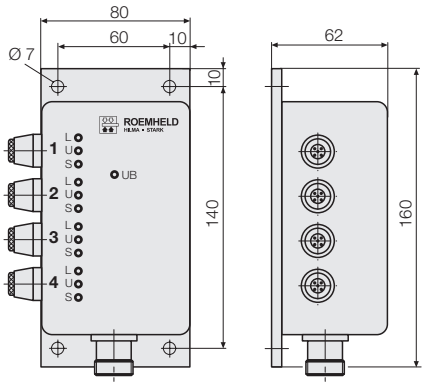
Distribution board with LED display
for the connection of 4 clamps

Display of the unclamping, change-over and clamping position of each clamping element via LED display

Delivery

- 1 distribution board
- 4 5-pole coupling plug
- 1 16-pole coupling plug

Part no. 5700015

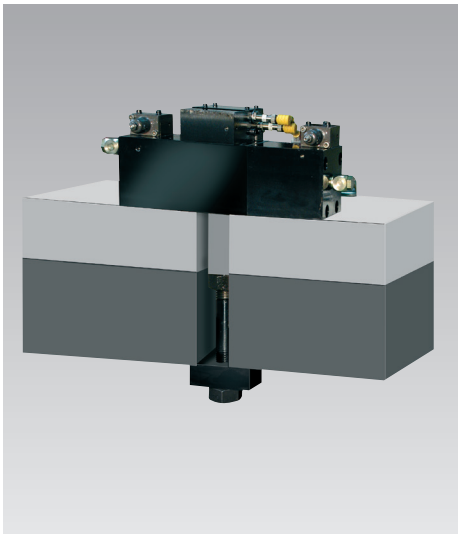


Pin assignment of output plug:

Pin 1 = L+	Pin 9 = 3L		
Pin 2 = L–	Pin 10 = 3U		
Pin 3 = 1L	Pin 11 = 3S	**L = unclamping position**	
Pin 4 = 1U	Pin 12 = 4L	**U = change-over position**	
Pin 5 = 1S	Pin 13 = 4U	**S = clamping position**	
Pin 6 = 2L	Pin 14 = 4S		
Pin 7 = 2U	Pin 15 = free		
Pin 8 = 2S	Pin 16 = free		

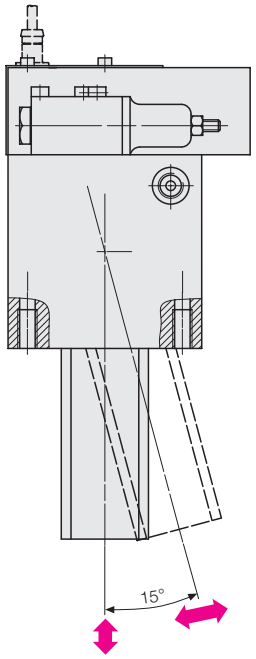
Wedge Swing Clamps with Mechanical Lock

double acting, max. clamping forces 100 kN, clamping stroke up to 9.5 mm



Advantages

- Clamping stroke 9.5 mm, which means high adaptability to varying heights of clamping edges
- High operational safety by
  - mechanical lock
  - position monitoring
  - automatic motion sequence
- Only 2 hydraulic connections
- Very suitable for retrofit



Description

A wedge converts the stroke of the double-acting piston into a stroke of the tie rod. In order to release the die, the tie rod pivots by a maximum of 15°. The swing movement of the tie rod is performed by a separate swing cylinder which is operated by sequence valves. The clamping force is transmitted to the clamping point in the axial direction of the tie rod. The clamping and unclamping positions are monitored by inductive proximity switches. The mechanically-locked wedge prevents unintentional unclamping of the die even if there is a loss of pressure.

The tie rod must be ordered separately.

Temperature range up to max. 70 °C

Application

Double-acting wedge swing clamps are used on press beds and rams. They are especially suitable where space is limited.

Position monitoring

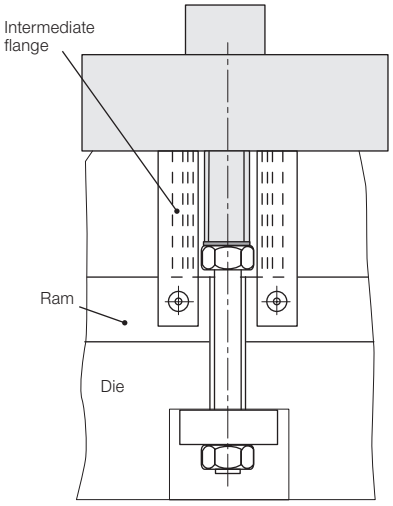
The wedge swing clamp is supplied with proximity switches for monitoring the clamping and unclamping position. The switch for the clamping position only reacts if the tie rod is in a vertical position and within the clamping range. If the clamping element performs the full clamping stroke, the proximity switch is released, and the signal disappears. The proximity switches are installed on the side of the swivel cylinder (see drawing). In case of part no. 4607-000, the proximity switches are installed on the front side of the housing.

Proximity switches

PNP switch
Voltage range 12 – 24 V DC
Nominal operating distance 2 mm
Load: 200 mA
Proximity switch and LED display
Plug with 5 m connecting cable 3 x 0.34

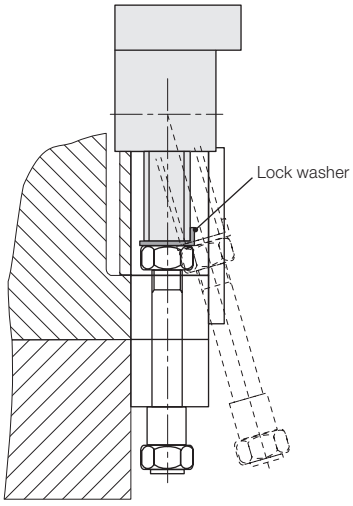
Retrofitting

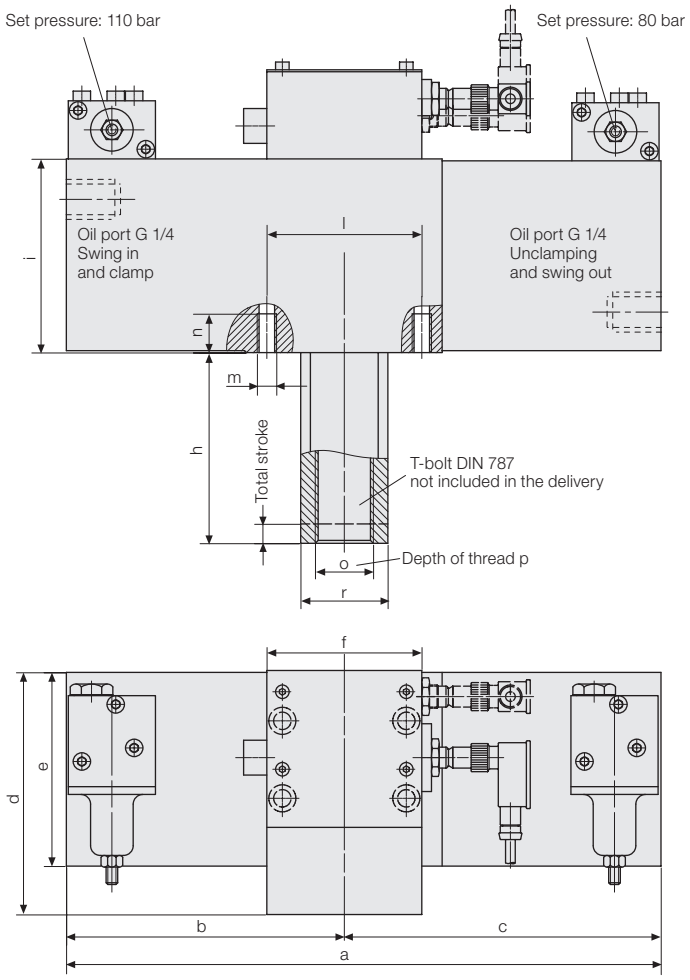
The subsequent installation is possible by using an intermediate flange.

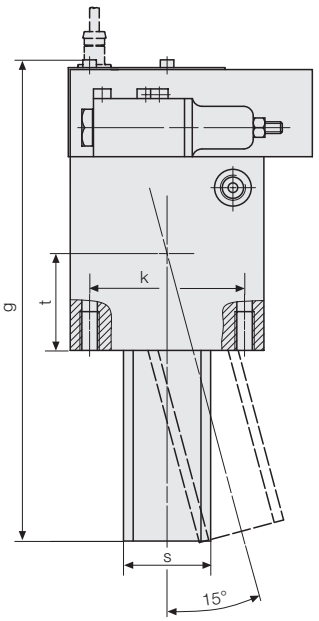


Safety measures

The tie rod is secured with a lock nut. In order to prevent it from loosening, a lock washer should be added.



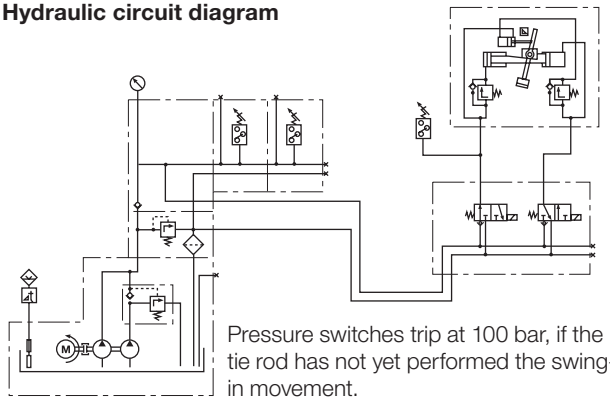




Dimensions

Max. Clamping force	**[kN]**	**50**	**100**
Total stroke	[mm]	8	10
Usable clamping stroke	[mm]	7.5	9.5
Max. oil flow rate	[cm³/s]	70	70
Min. operating pressure	[bar]	150	150
Max. operating pressure	[bar]	240	280
Oil volume clamping	[cm³]	80	101
Oil volume unclamping	[cm³]	82.5	152
a	[mm]	254	307
b	[mm]	120	143.5
c	[mm]	134	163.5
d	[mm]	120.5	125
e	[mm]	80	100
f	[mm]	70	80
g	[mm]	186	248.5
h	[mm]	63	98.5
i	[mm]	80	100
k	[mm]	60	80
l	[mm]	60	80
m	[mm]	M 10	M 10
n	[mm]	15	20
o	[mm]	M 20	M 30
p	[mm]	28	45
r	[mm]	36	45
s	[mm]	40	45
t	[mm]	40	50
Part no.		**4607000**	**4607001**

Hydraulic circuit diagram



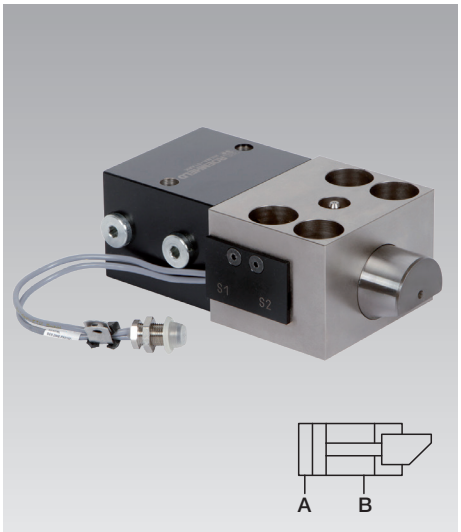
Pressure switches trip at 100 bar, if the tie rod has not yet performed the swing-in movement.

Control port for tie rod operation

As an option, the wedge swing clamp is available with an additional pipe connection for separate control of the swing-in movement of the swivel cylinder. In this case, the integral sequence valve (see drawing, left side) is replaced by a hydraulic oil port. Thus, each element must be connected by three pipes. Combined with a suitable control, this system enables clamping only after all tie rods of the clamping elements have performed the swing-in movement. If 4 or more clamping elements are used, two clamping circuits can be arranged diagonally as an additional safety measure.

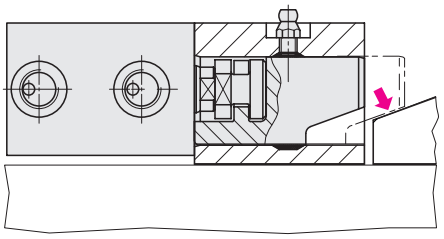
Wedge Clamps for Tapered Clamping Edge

double acting, max. clamping force 25 to 630 kN, without and with position monitoring at the side



Advantages

- Safe clamping of moulds/dies with tapered clamping edge
- High operational safety by position monitoring and automatic motion sequence
- Very sturdy design
- Long service life
- Sizes up to 1250 kN are available on request



Application

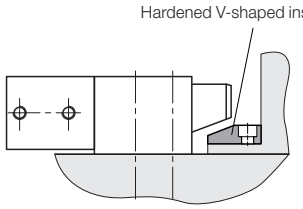
Double-acting wedge clamp for clamping moulds or dies on a press bed or ram or in injection moulding machines, machines and installations.

Description

The wedge clamp consists of a hydraulic block cylinder and a piston guided in a housing. The clamping bolt is provided with 20° bevel to clamp on the tapered clamping surface of the mould/die.
Based on the internal design of the wedge clamp and the 20° bevel of the clamping bolt, the system is providing internal friction.

Retrofitting to wedge clamping

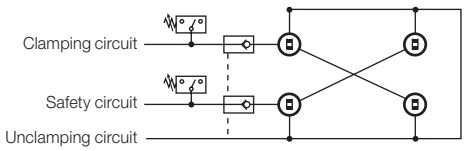
Wedge clamping of existing moulds/dies is possible by retrofitting V-shaped inserts as shown below. Max. hardness 50 HRc



Important notes

In case of incorrect operation of the wedge clamps, the clamping bolt may fully retract into the guide housing and thus cause the upper mould/die falling off the ram.
The greasing intervals (high temperature grease) should be adapted to the existing operating conditions. Please note that greasing of the wedge bolt should only be made with the elements being retracted.
The clamping elements must be protected against dirt, scale, swarf, coolant, etc. by means of a suitable covering.
Moulds or dies clamped by means of wedge clamps are subject to side loads that may be strong enough to displace them. Thus, positioning is required to absorb the side loads. Therefore, location pins or suitable limit stops should be provided to keep the moulds and dies in their correct position.
When using wedge clamps on the press ram, it is recommended that multiple-circuit hydraulic supply of the clamping elements and pilot-controlled check valves are used for securing hydraulic clamping.

Circuit diagram



For safety reasons and in the sense of the machine tool guide lines ML2006/42/EC the hydraulic pressure must be maintained.
When upper moulds/dies are clamped by wedge clamps, they must be secured mechanically when maintenance work is carried out.

Versions

- without position monitoring
  max. temperature: 160 °C
  (300 °C on request)

- with position monitoring at the side
  max. temperature: 100 °C

Position monitoring

The integrated position monitoring is coupled to the clamping bolt in a very space-saving way at the side and signals:

1. **Clamping bolt in unclamping position**
2. **Clamping bolt in clamping position**
3. **Error message when overrunning the clamping position**

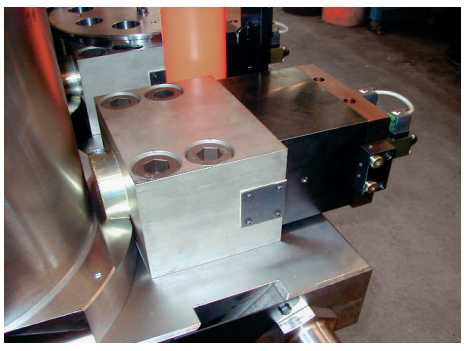
Clamping force

This is the force the clamping element applies to the mould or die. The mould or die is clamped on the fixture plate by means of this force.
The external forces acting on mould or die (e.g. ejecting force or die cushion force) shall not exceed the totality of the elements' clamping force.

Maximum admissible operating force

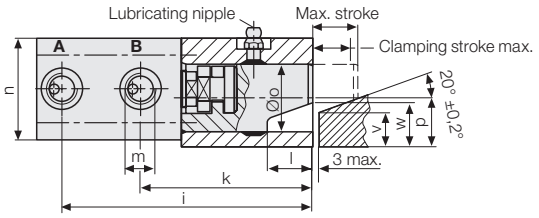
This is the force that can be absorbed by the clamping element and the fastener (screws).
It must be ensured that in cases of emergency, e.g. workpiece jammed in mould or die, the sum total of the elements' operating forces is not exceeded.

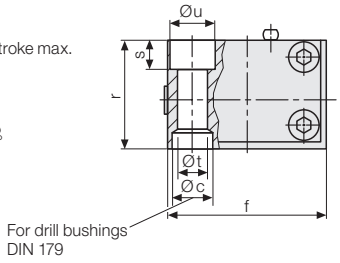
Application example

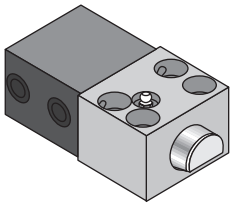


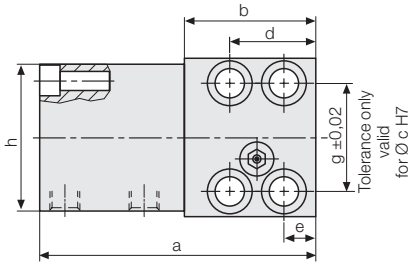
Wedge clamps on a forging press

Wedge clamps
without position monitoring



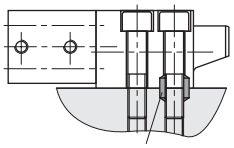






Installation of drill bushings to absorb side loads

The occurring side loads must be absorbed by drill bushings to be inserted into the fixture plate.



Accessories:
Drill bushings

Technical data

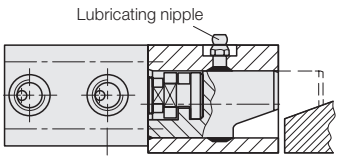
Temperature resistance up to 160 °C

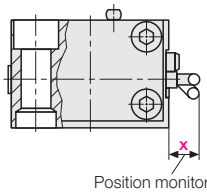
Clamping force max.	**[kN]**	**25***	**50**	**100**	**160**	**250**	**400**	**630**
Max. admissible operating force Screw DIN 912 8.8	[kN]	35	65	130	210	320	520	820
Max. operating pressure	**[bar]**	**350**	**275**	**350**	**350**	**350**	**350**	**350**
Cylinder Ø	[mm]	25	40	50	63	80	100	125
Max. stroke	[mm]	20	25	25	30	32	40	40
Clamping stroke (from/to)	[mm]	15 – 18	18 – 22	19 – 22	23 – 27	24 – 29	30 – 36	30 – 36
Max. oil consumption	[mm]	10	31	49	94	161	314	491
a	[mm]	122	157	190	227	267	310	375
b	[mm]	58	78	100	125	150	180	225
Ø c H7 x depth	[mm]	18/7	26/9	30/11	35/11	48/13	55/16	62/16
d	[mm]	38	46	58	75	78	95	108
e	[mm]	14	16	20	25	26	32	38
f	[mm]	70	95	120	150	200	240	280
g	[mm]	48	65	85	106	140	180	210
h	[mm]	65	85	100	125	160	200	230
i	[mm]	111	146	177	210	246	285	344
k	[mm]	76	102	127	151	184	215	272
l	[mm]	20	25	26	32	40	45	50
m		G 1/4	G 1/4	G 1/4	G 1/2	G 1/2	G 1/2	G 1/2
n	[mm]	45	63	75	95	120	150	180
Ø o	[mm]	30	40	55	70	80	100	125
p	[mm]	21.5	28	37	49	55	75	85
r	[mm]	48	65	80	105	125	160	190
s	[mm]	13	18	20	26	32	38	44
Ø t	[mm]	13	17	21	26	33	39	45
Ø u	[mm]	20	26	32	40	48	57	66
v	[mm]	15	18	25	30	30	50	60
w	[mm]	19.5	23.5	30.5	37	38	60	70
Screw DIN 912-8.8 (4 off)		M 12	M 16	M 20	M 24	M 30	M 36	M 42
Tightening torque	[Nm]	86	210	410	710	1450	2520	4050
Weight	[kg]	2.4	5.8	10.6	21	40	74	125
Part no.		**4604620**	**4604621**	**4604622**	**4604623**	**4604634**	**4604635**	**4604636**

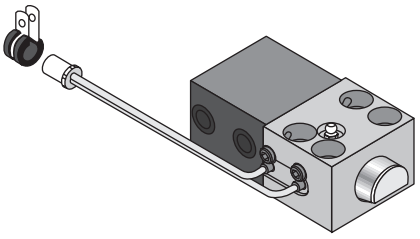
Accessories

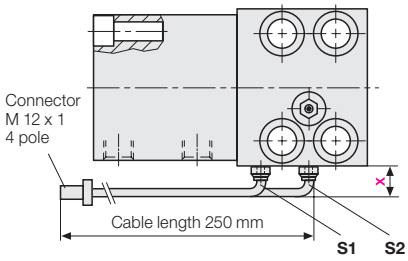
Drill bushings DIN 179	[mm]	12 x 12	17 x 16	21 x 20	26 x 20	32 x 25	38 x 30	44 x 30
Part no.		**3300285**	**3300287**	**3300288**	**3300289**	**3300420**	**3300430**	**3300440**

* lubricating nipples of the version with a clamping force of 25 kN are offset by 9.5 mm and protrude by 5 mm









Description

The proximity switches are installed in the guide housing. They are activated by means of the wedge bolt. The positions of the bolt in off-position or in clamping position are displayed.

S1: Clamping bolt in unclamping position
S2: Clamping bolt in clamping position
S2 is overrun: Clamping bolt in final position (message for no mould/die available or mould/die not clamped)

Special versions with signal up to final bolt position are available on request.

Technical data

Temperature resistance up to 100 °C

Clamping force max.	**[kN]**	**25***	**50**	**100**	**160**	**250**	**400**	**630**
x Position monitoring	[mm]	12	5	0	0	0	0	0
Part no.		**824030500**	**824040500**	**824050500**	**824060500**	**824070500**	**824080500**	**824090500**

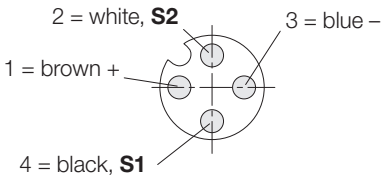
* lubricating nipples of the version with a clamping force of 25 kN are offset by 9.5 mm and protrude by 5 mm

Accessories

Connecting cable with screw coupling

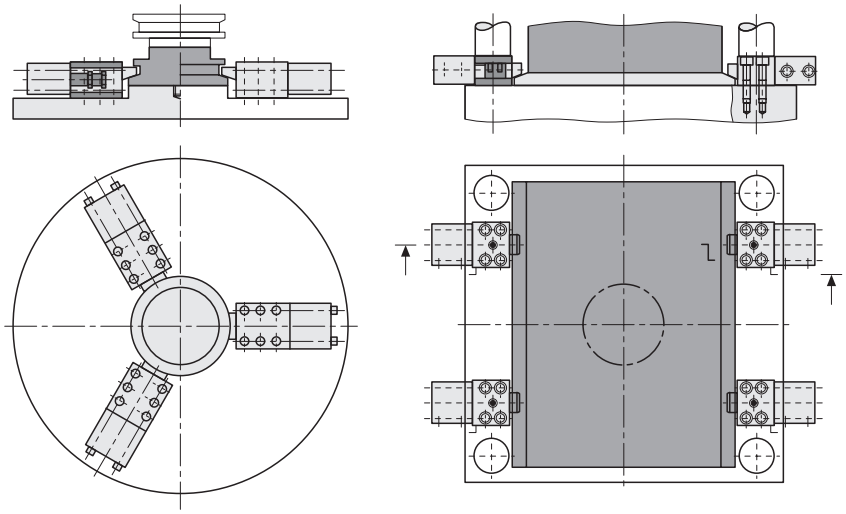
Cable length 5 m **Part no. 5700013**
Cable length 10 m **Part no. 5700014**

Pin assignment 4-pole



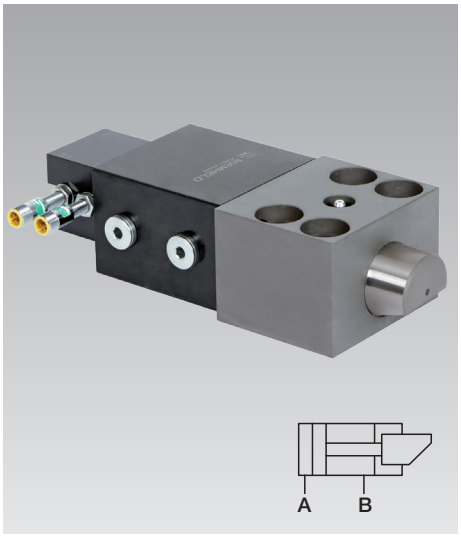
Principle of die or mould clamping

In general, moulds/dies with round geometry are clamped by using three clamping elements for each half, whereas mould/dies with square geometry are clamped by using four clamping elements for each half (see figure).



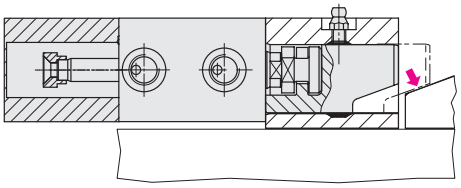
Wedge Clamps for Tapered Clamping Edge

double acting, max. clamping force 25 to 630 kN, with adjustable position monitoring at the back



Advantages

- The clamping range can be flexibly adjusted
- Safe clamping of moulds/dies with tapered clamping edge
- High operational safety by adjustable position monitoring and automatic motion sequence
- Very sturdy design
- High safety standard
- Long service life
- Sizes up to 1250 kN are available on request



Application

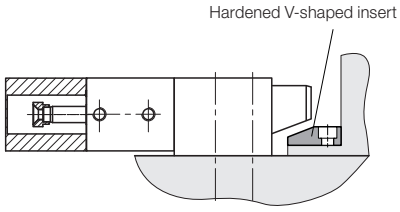
Double-acting wedge clamp for clamping moulds or dies on a press bed or ram or in injection moulding machines, machines and installations.

Description

The wedge clamp consists of a hydraulic block cylinder and a piston guided in a housing. The clamping bolt is provided with 20° bevel to clamp on the tapered clamping surface of the mould/die.
Based on the internal design of the wedge clamp and the 20° bevel of the clamping bolt, the system is providing internal friction.

Retrofitting to wedge clamping

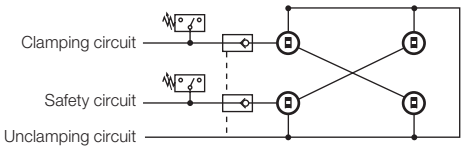
Wedge clamping of existing moulds/dies is possible by retrofitting V-shaped inserts as shown below. Max. hardness 50 HRc



Important notes

In case of incorrect operation of the wedge clamps, the clamping bolt may fully retract into the guide housing and thus cause the upper mould/die falling off the ram.
The greasing intervals (high temperature grease) should be adapted to the existing operating conditions. Please note that greasing of the wedge bolt should only be made with the elements being retracted.
The clamping elements must be protected against dirt, scale, swarf, coolant, etc. by means of a suitable covering.
Moulds or dies clamped by means of wedge clamps are subject to side loads that may be strong enough to displace them. Thus, positioning is required to absorb the side loads. Therefore, location pins or suitable limit stops should be provided to keep the moulds and dies in their correct position.
When using wedge clamps on the press ram, it is recommended that multiple-circuit hydraulic supply of the clamping elements and pilot-controlled check valves are used for securing hydraulic clamping.

Circuit diagram



For safety reasons and in the sense of the machine tool guide lines ML2006/42/ EC the hydraulic pressure must be maintained.
When upper moulds/dies are clamped by wedge clamps, they must be secured mechanically when maintenance work is carried out.

Versions

- with position monitoring at the back
  max. temperature: 80 °C (type A and B)
  max. temperature: 120 °C (type C)

Position monitoring

Inductive proximity switches installed in the flange-mounted housing. The proximity switches are activated by a control cam connected to the piston.
The position monitoring will be screwed on at the cylinder bottom and can also be mounted in a position rotated by 180°.
Different versions are available according to the application conditions.
The integrated position monitoring is coupled to the clamping bolt in a very space-saving way at the back and signals:

1. **Clamping bolt in unclamping position**
2. **Clamping bolt in clamping position**
3. **Error message when overrunning the clamping position**

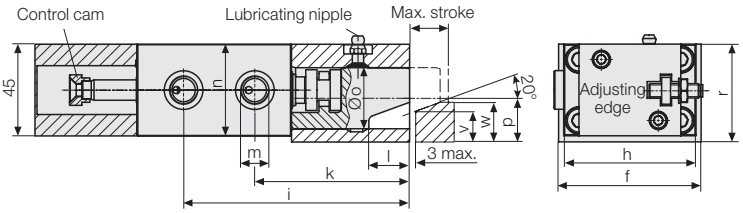
Clamping force

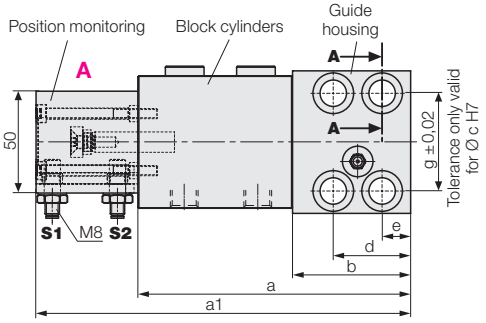
This is the force the clamping element applies to the mould or die. The mould or die is clamped on the fixture plate by means of this force.
The external forces acting on mould or die (e.g. ejecting force or die cushion force) shall not exceed the totality of the elements' clamping force.

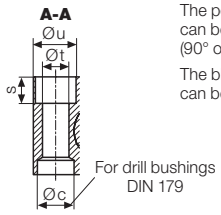
Maximum admissible operating force

This is the force that can be absorbed by the clamping element and the fastener (screws).
It must be ensured that in cases of emergency, e.g. workpiece jammed in mould or die, the sum total of the elements' operating forces is not exceeded.

Wedge clamps
with position monitoring at the back, adjustable

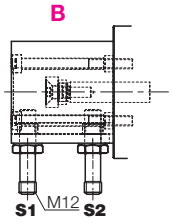


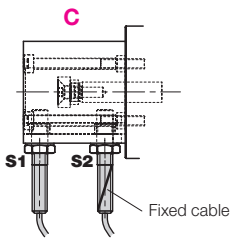




The position monitoring can be rotated by 180°. (90° on request)

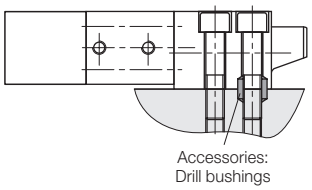
The block cylinder can be rotated by 180°.

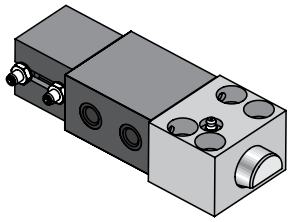




Installation of drill bushings to absorb side loads

The occurring side loads must be absorbed by drill bushings to be inserted into the fixture plate.





The position monitoring is available in 3 variants:

Type A – compact version for connector M8

Type B – sturdy long version for connector M12

Type C – High-temperature version up to 120 °C with attached cable (L = 5 m)

Please indicate the desired type in your order, behind the part no.,
e.g.: **4604670-A**

- **A** = Type A
- **B** = Type B
- **C** = Type C

Technical data

Temperature resistance see page 3

Clamping force max.	**[kN]**	**25***	**50**	**100**	**160**	**250**	**400**	**630**
Max. admissible operating force Screw DIN 912 8.8	[kN]	35	65	130	210	320	520	820
Max. operating pressure	**[bar]**	**350**	**275**	**350**	**350**	**350**	**350**	**350**
Cylinder Ø	[mm]	25	40	50	63	80	100	125
Max. stroke	[mm]	20	25	25	30	32	40	40
Clamping stroke (from/to)	[mm]	15 – 18	18 – 22	19 – 22	23 – 27	24 – 29	30 – 36	30 – 36
a	[mm]	134	168	200	235	270	310	375
a1	[mm]	184	218	250	285	330	370	435
b	[mm]	58	78	100	125	150	180	225
Ø c H7 x depth	[mm]	18/7	26/9	30/11	35/11	48/13	55/16	62/16
d	[mm]	38	46	58	75	78	95	108
e	[mm]	14	16	20	25	26	32	38
f	[mm]	70	95	120	150	200	240	280
g	[mm]	48	65	85	106	140	180	210
h	[mm]	65	85	100	125	160	200	230
i	[mm]	111	146	177	210	246	285	344
k	[mm]	76	102	127	151	184	215	272
l	[mm]	20	25	26	32	40	45	50
m		(4x) G 1/4	(4x) G 1/4	(4x) G 1/4	(4x) G 1/2	(2x) G 1/2	(2x) G 1/2	(2x) G 1/2
n	[mm]	45	63	75	95	120	150	180
Ø o	[mm]	30	40	55	70	80	100	125
p	[mm]	21.5	28	37	49	55	75	85
r	[mm]	48	65	80	105	125	160	190
s	[mm]	13	18	20	26	32	38	44
Ø t	[mm]	13	17	21	26	33	39	45
Ø u	[mm]	20	26	32	40	48	57	66
v	[mm]	15	18	25	30	30	50	60
w	[mm]	19.5	23.5	30.5	37	38	60	70
Screw DIN 912-8.8 (4 off)		M 12	M 16	M 20	M 24	M 30	M 36	M 42
Tightening torque	[Nm]	86	210	410	710	1450	2520	4050
Weight	[kg]	3.0	6.5	11.4	21.7	41	74.7	126
Part no.		**4604670**	**4604671**	**4604672**	**4604673**	**4604674**	**4604675**	**4604676**

Accessories

Drill bushings DIN 179	[mm]	12 x 12	17 x 16	21 x 20	26 x 20	32 x 25	38 x 30	44 x 30
Part no.		**3300285**	**3300287**	**3300288**	**3300289**	**3300420**	**3300430**	**3300440**

* lubricating nipples of the version with a clamping force of 25 kN are offset by 9.5 mm and protrude by 5 mm

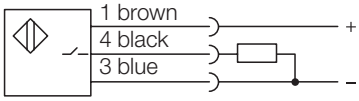
Description

Inductive proximity switches installed in the flange-mounted housing. The proximity switches are activated by a control cam connected to the piston.
The position monitoring will be screwed on at the cylinder bottom and can also be mounted in a position rotated by 180°.
Different types are available according to the application conditions. A control cam is provided at the extended piston rod causing the activation of the proximity switches. Adjustment of the switching position is effected by displacement of the proximity switches in the lateral groove. The proximity switches are switched on in a stroke range of approx. 6 mm by means of the control cam. The minimum distance to the positions to be monitored depends on the switch type and is indicated in the chart.

Message of proximity switches

S1: Clamping bolt in unclamping position
S2: Clamping bolt in clamping position
S2 is overrun: Clamping bolt in final position (message for no mould/die available or mould/die not clamped)

Electric circuit diagram



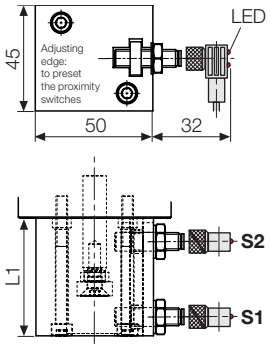
Design

Careful design is required, corresponding application conditions and safety measures have to be planned and guaranteed.

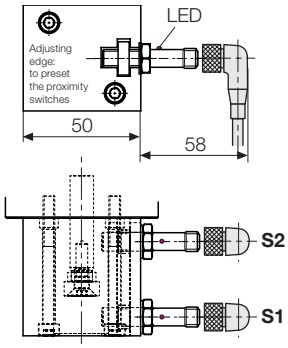
Technical data
for inductive proximity switches

Operating voltage	10 … 30 V DC
Ripple	max. 15 %
Switching function	interlock
Output	PNP
Housing material	steel, corrosion resistant
Code class (DIN 40050)	IP 67

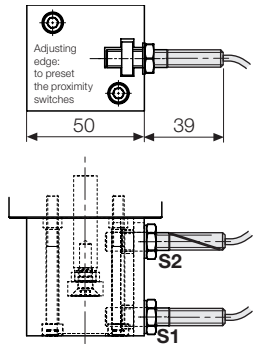
Type A
Compact version M8



Type B
Long version M12



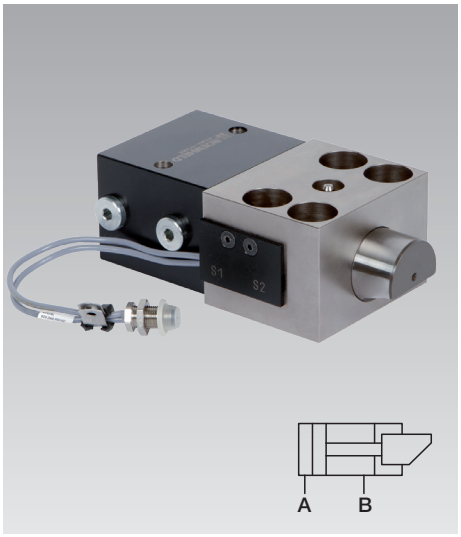
Type C
High ambient temperature



Environmental temperature TA		–25° … +80 °C	–25° … +80 °C	–25° … +120 °C
Min. distance of the switching positions	[mm]	8	13	8
Type of connection		Connector	Connector	Teflon cable 3 x 0.14 mm²
LED function display		in the connector	yes	no
Constant current max.	[mA]	200	200	200 – (from 70 °C) 100
Rated operating distance	[mm]	1.5	1.5	2
Protected against short circuits		yes	yes	no
Connecting cable	[m]	5	5	5
Proximity switches	**Part no.**	**638290980**	**3829077**	**638290870**
Connector with cable	**Part no.**	**3829099**	**209750024**	**firmly connected**
L1 complete (without connector) up to type 4604-673	[mm]	50	50	50
Position monitoring up to a total stroke of 30 mm	**Part no.**	**762820010-A**	**762820010-B**	**762820010-C**
L1 complete (without connector) from type 4604-674	[mm]	60	60	60
Position monitoring up to a total stroke of 50 mm	**Part no.**	**762820011-A**	**762820011-B**	**762820011-C**

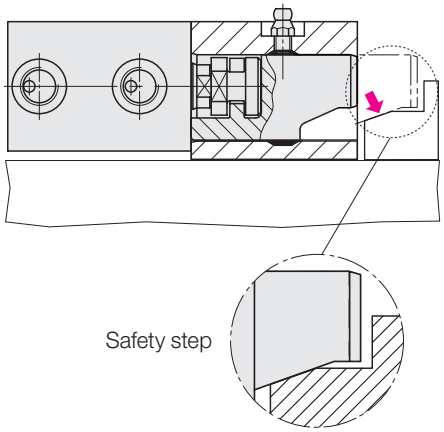
Wedge Clamps for Tapered Clamping Edge

double acting, max. clamping force 25 to 630 kN, with safety step, without and with position monitoring



Advantages

- Safety step for the support of the upper die or mould half when the pressure drops
- Safe clamping of moulds/dies with tapered clamping edge
- High operational safety by position monitoring and automatic motion sequence
- Very sturdy design
- High safety standard
- Long service life
- Sizes up to 1250 kN are available on request



Application

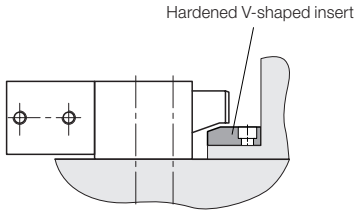
Double-acting wedge clamp with safety step at the clamping bolt for clamping moulds or dies on a press bed or ram or in injection moulding machines, machines and installations.

Description

The wedge clamp consists of a hydraulic block cylinder and a piston guided in a housing. The clamping bolt is provided with 20° bevel to clamp on the tapered clamping surface of the mould/die.
Based on the internal design of the wedge clamp and the 20° bevel of the clamping bolt, the system is providing internal friction.

Retrofitting to wedge clamping

Wedge clamping of existing moulds/dies is possible by retrofitting V-shaped inserts as shown below. Max. hardness 50 HRc



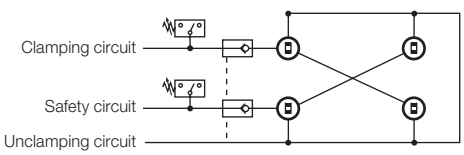
A high level of safety

The clamping bolt of this version has an additional support surface parallel to the clamping edge.
In the case of pressure drop (machine failure or down time) the upper mould/die can be lowered to the safety step and safely held.

Important notes

In case of incorrect operation of the wedge clamps, the clamping bolt may fully retract into the guide housing and thus cause the upper mould/die falling off the ram.
The greasing intervals (high temperature grease) should be adapted to the existing operating conditions. Please note that greasing of the wedge bolt should only be made with the elements being retracted.
The clamping elements must be protected against dirt, scale, swarf, coolant, etc. by means of a suitable covering.
Moulds or dies clamped by means of wedge clamps are subject to side loads that may be strong enough to displace them. Thus, positioning is required to absorb the side loads. Therefore, location pins or suitable limit stops should be provided to keep the moulds and dies in their correct position.
When using wedge clamps on the press ram, it is recommended that multiple-circuit hydraulic supply of the clamping elements and pilot-controlled check valves are used for securing hydraulic clamping.

Circuit diagram



For safety reasons and in the sense of the machine tool guide lines ML2006/42/ EC the hydraulic pressure must be maintained.
When upper moulds/dies are clamped by wedge clamps, they must be secured mechanically when maintenance work is carried out.

Versions

- without position monitoring
  max. temperature: 160 °C
  (300 °C on request)

- with position monitoring at the side
  max. temperature: 100 °C

Position monitoring

The integrated position monitoring is coupled to the clamping bolt in a very space-saving way at the side and signals:

1. **Clamping bolt in unclamping position**
2. **Clamping bolt in clamping position**
3. **Error message when overrunning the clamping position**

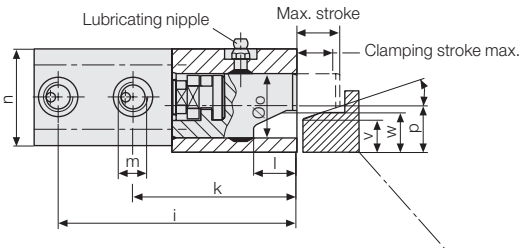
Clamping force

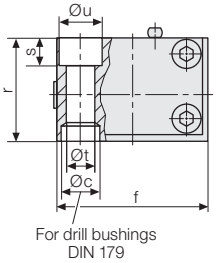
This is the force the clamping element applies to the mould or die. The mould or die is clamped on the fixture plate by means of this force.
The external forces acting on mould or die (e.g. ejecting force or die cushion force) shall not exceed the totality of the elements' clamping force.

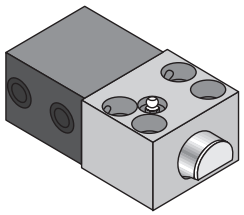
Maximum admissible operating force

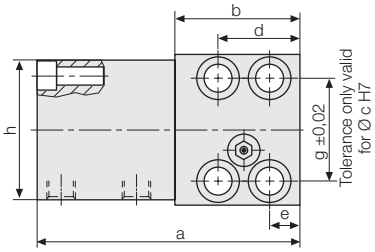
This is the force that can be absorbed by the clamping element and the fastener (screws).
It must be ensured that in cases of emergency, e.g. workpiece jammed in mould or die, the sum total of the elements' operating forces is not exceeded.

Wedge clamps
with safety step

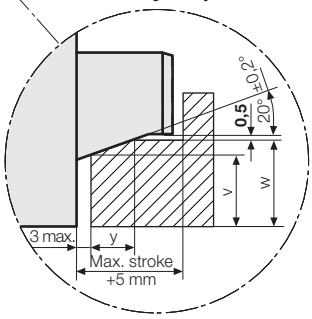






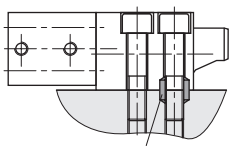


Safety step



Installation of drill bushings to absorb side loads

The occurring side loads must be absorbed by drill bushings to be inserted into the fixture plate.



Accessories:
Drill bushings

Technical data

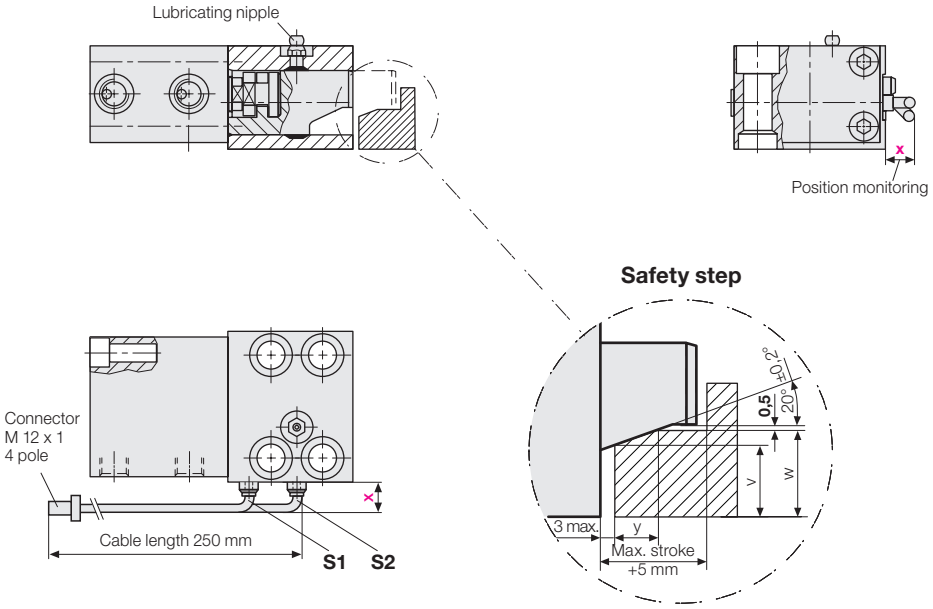
Temperature resistance up to 160 °C

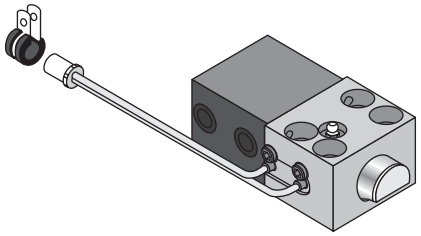
Clamping force max.	**[kN]**	**25***	**50**	**100**	**160**	**250**	**400**	**630**
Max. admissible operating force Screw DIN 912 8.8	[kN]	35	65	130	210	320	520	820
Max. operating pressure	**[bar]**	**350**	**275**	**350**	**350**	**350**	**350**	**350**
Cylinder Ø	[mm]	25	40	50	63	80	100	125
Max. stroke	[mm]	20	25	25	30	32	40	40
Clamping stroke (from/to)	[mm]	15 – 18	18 – 22	19 – 22	23 – 27	24 – 29	30 – 36	30 – 36
Max. oil consumption	[cm^3]	10	31	49	94	161	314	491
a	[mm]	122	157	190	227	267	310	375
b	[mm]	58	78	100	125	150	180	225
Ø c H7 x depth	[mm]	18/7	26/9	30/11	35/11	48/13	55/16	62/16
d	[mm]	38	46	58	75	78	95	108
e	[mm]	14	16	20	25	26	32	38
f	[mm]	70	95	120	150	200	240	280
g	[mm]	48	65	85	106	140	180	210
h	[mm]	65	85	100	125	160	200	230
i	[mm]	111	146	177	210	246	285	344
k	[mm]	76	102	127	151	184	215	272
l	[mm]	20	25	26	32	40	45	50
m		G 1/4	G 1/4	G 1/4	G 1/2	G 1/2	G 1/2	G 1/2
n	[mm]	45	63	75	95	120	150	180
Ø o	[mm]	30	40	55	70	80	100	125
p	[mm]	21,5	28	37	49	55	75	85
r	[mm]	48	65	80	105	125	160	190
s	[mm]	13	18	20	26	32	38	44
Ø t	[mm]	13	17	21	26	33	39	45
Ø u	[mm]	20	26	32	40	48	57	66
v	[mm]	15	18	25	30	30	50	60
w	[mm]	17.5	21.2	28.2	34.7	35.3	57.3	67.3
y	[mm]	7.0	8.7	8.7	12.9	14.6	20.1	20.1
Screw DIN 912-8.8 (4 off)		M 12	M 16	M 20	M 24	M 30	M 36	M 42
Tightening torque	[Nm]	86	210	410	710	1450	2520	4050
Weight	[kg]	2.4	5.8	10.6	21	40	74	125
Part no.		**8240 31000**	**8240 41000**	**8240 51000**	**8240 61000**	**8240 71000**	**8240 81000**	**8240 91000**

Accessories

Drill bushings DIN 179	[mm]	12 x 12	17 x 16	21 x 20	26 x 20	32 x 25	38 x 30	44 x 30
Part no.		**3300285**	**3300287**	**3300288**	**3300289**	**3300420**	**3300430**	**3300440**

* lubricating nipples of the version with a clamping force of 25 kN are offset by 9.5 mm and protrude by 5 mm





Description

In addition to the safety step, proximity switches are installed in the guide housing. They are activated by means of the wedge bolt. The positions of the bolt in off-position or in clamping position are displayed.

S1: Clamping bolt in unclamping position
S2: Clamping bolt in clamping position
S2 is overrun: Clamping bolt in final position (message for no mould/die available or mould/die not clamped)

Special versions with signal up to final bolt position are available on request.

Technical data

Temperature resistance up to 100 °C

Clamping force max.	**[kN]**	**25***	**50**	**100**	**160**	**250**	**400**	**630**
x Position monitoring	[mm]	12	5	0	0	0	0	0
Part no.		**824032000**	**824042000**	**824052000**	**824062000**	**824072000**	**824082000**	**824092000**

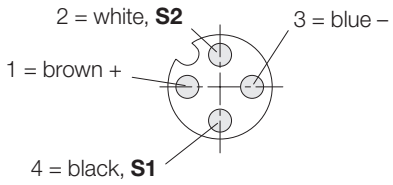
* lubricating nipples of the version with a clamping force of 25 kN are offset by 9.5 mm and protrude by 5 mm

Accessories

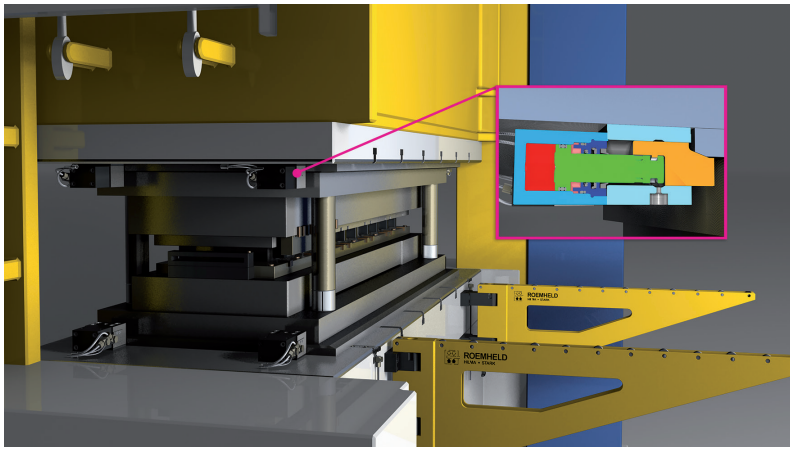
Connecting cable with screw coupling

Cable length 5 m **Part no. 5700013**
Cable length 10 m **Part no. 5700014**

Pin assignment 4-pole



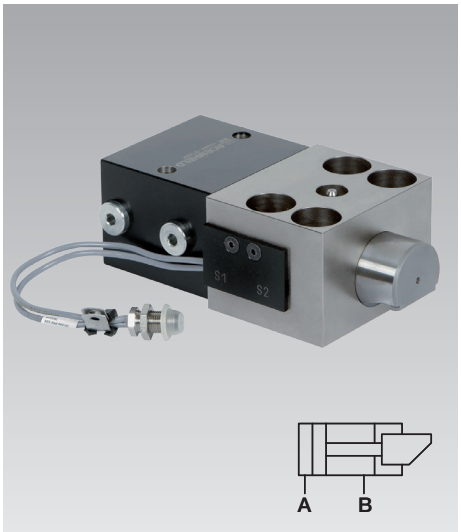
Application example



Wedge clamp with safety step in the press ram

Wedge Clamps for Tapered Clamping Edge

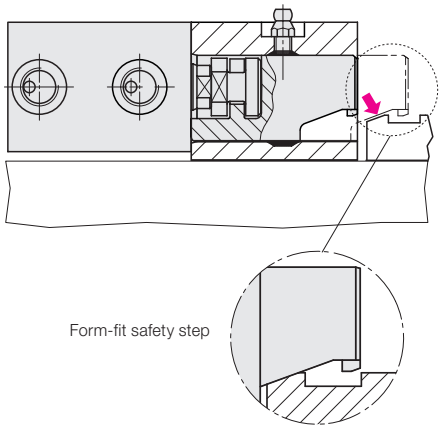
double acting, max. clamping force 50 to 400 kN, with form-fit safety step and position monitoring



Advantages

- Safety step for form-fit holding of dies or moulds when the pressure drops
- Safe clamping of moulds/dies with tapered clamping edge
- High operational safety by position monitoring and automatic motion sequence
- Very sturdy design
- High safety standard
- Long service life
- Patented design

PATENT



Application

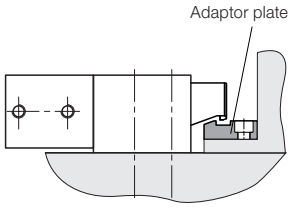
Double-acting wedge clamp with a form-fit safety lug at the clamping bolt for clamping dies on a press bed or ram or for clamping dies in injection moulding machines, machines and installations. Preferably for use on the press ram.

Description

The wedge clamp consists of a hydraulic block cylinder and a piston guided in a housing. The clamping bolt is provided with 20° bevel to clamp on the tapered clamping surface of the mould/die.
Based on the internal design of the wedge clamp and the 20° bevel of the clamping bolt, the system is providing internal friction. This patented design has a form-fit safety step in the form of a lug at the clamping bolt, which has the same shape as the adapter on the mould/die clamping edge. In the case of pressure drop (machine failure or down time) the upper mould/die lowers to the safety step onto the safety lug and is safely held by form fit. The clamping bolt can not be returned to the unclamping position and the upper mould/die is safely held.

Retrofitting to wedge clamping

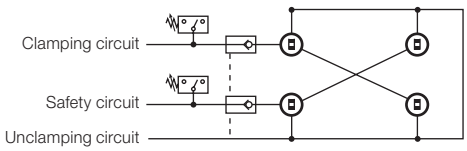
Retrofitting of already available moulds/dies to wedge clamping with form-fit safety step, can be made with adapter plates that are available as accessories (see page 3).



Important notes

The greasing intervals (high temperature grease) should be adapted to the existing operating conditions. Please note that greasing of the wedge bolt should only be made with the elements being retracted.
The clamping elements must be protected against dirt, scale, swarf, coolant, etc. by means of a suitable covering.
Moulds or dies clamped by means of wedge clamps are subject to side loads that may be strong enough to displace them. Thus, positioning is required to absorb the side loads. Therefore, location pins or suitable limit stops should be provided to keep the moulds and dies in their correct position.
When using wedge clamps on the press ram, it is recommended that multiple-circuit hydraulic supply of the clamping elements and pilot-controlled check valves are used for securing hydraulic clamping.

Circuit diagram



For safety reasons and in the sense of the machine tool guide lines ML 2006/42/ EC the hydraulic pressure must be maintained.
When upper moulds/dies are clamped by wedge clamps, they must be secured mechanically when maintenance work is carried out.

Versions

- with position monitoring at the side
  max. temperature: 100 °C

Position monitoring

The integrated position monitoring is coupled to the clamping bolt in a very space-saving way at the side and signals:

1. **Clamping bolt in unclamping position**
2. **Clamping bolt in clamping position**
3. **Error message when overrunning the clamping position**

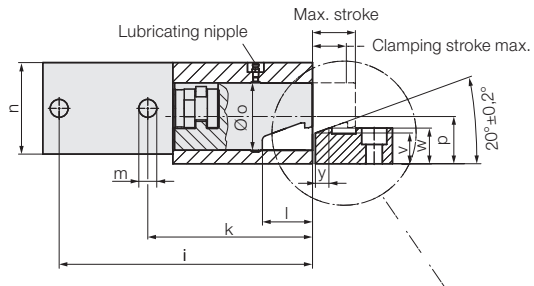
Clamping force

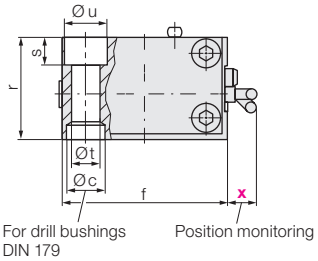
This is the force the clamping element applies to the mould or die. The mould or die is clamped on the fixture plate by means of this force.
The external forces acting on mould or die (e.g. ejecting force or die cushion force) shall not exceed the totality of the elements' clamping force.

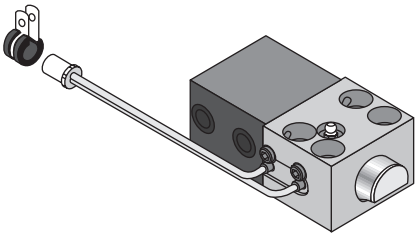
Maximum admissible operating force

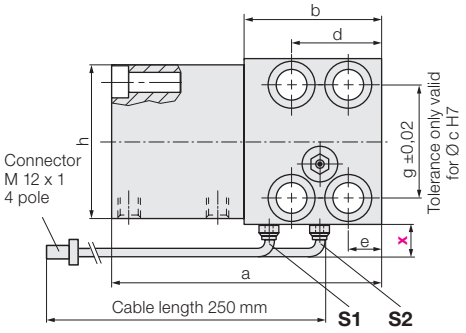
This is the force that can be absorbed by the clamping element and the fastener (screws).
It must be ensured that in cases of emergency, e.g. workpiece jammed in mould or die, the sum total of the elements' operating forces is not exceeded.

Wedge clamps
with form-fit safety step and position monitoring

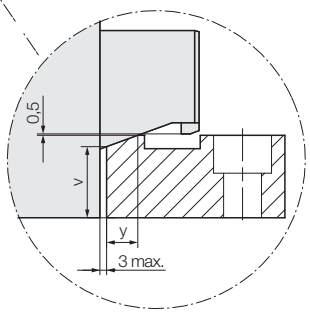






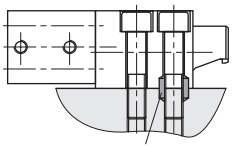


Form-fit safety step



Installation of drill bushings to absorb side loads

The occurring side loads must be absorbed by drill bushings to be inserted into the fixture plate.



Technical data

Temperature resistance up to 100 °C

Clamping force max.	**[kN]**	**50**	**100**	**160**	**250**	**400**
Max. admissible operating force Screw DIN 912 8.8	[kN]	65	130	210	320	520
Max. operating pressure	**[bar]**	**275**	**350**	**350**	**350**	**350**
Cylinder Ø	[mm]	40	50	63	80	100
Max. stroke	[mm]	50	50	63	50	80
Clamping stroke (from/to)	[mm]	40 – 44	40 – 44	44 – 48	45 – 49	66 – 70
Max. oil consumption	[mm]	63	98	196	251	628
a	[mm]	207	235	280	295	380
b	[mm]	103	120	145	160	210
Ø c H7 x depth	[mm]	26/9	30/11	35/11	48/13	55/16
d	[mm]	46	58	75	78	95
e	[mm]	16	20	25	26	32
f	[mm]	95	120	150	200	240
g	[mm]	65	85	106	140	180
h	[mm]	85	100	125	160	200
i	[mm]	196	222	263	274	355
k	[mm]	127	147	171	194	245
l	[mm]	45	45	52	52	75
m		G 1/4	G 1/4	G 1/2	G 1/2	G 1/2
n	[mm]	63	75	95	120	150
Ø o	[mm]	40	55	70	80	100
p	[mm]	28	37	49	55	75
r	[mm]	65	80	105	125	160
s	[mm]	18	20	26	32	38
Ø t	[mm]	17	21	26	33	39
Ø u	[mm]	26	32	40	48	57
v	[mm]	14.9	22.8	31.9	34.5	46.9
w	[mm]	20	29	37	39.6	55.6
x Position monitoring	[mm]	3	3	3	3	3
y	[mm]	14	14	14	14	24
Screw DIN 912-8.8 (4 off)		M16	M20	M24	M30	M36
Tightening torque	[Nm]	210	410	710	1450	2520
Weight	[kg]	8	13.3	25.6	43.7	93.2
Part no. (including proximity switch)		**824046000**	**824056000**	**824066000**	**824076000**	**824086000**

Accessories

Drill bushings DIN 179	[mm]	17 x 16	21 x 20	26 x 20	32 x 25	38 x 30
Part no.		**3300287**	**3300288**	**3300289**	**3300420**	**3300430**

Description

The proximity switches are installed in the guide housing. They are activated by means of the wedge bolt. The positions of the bolt in off-position or in clamping position are displayed.

S1: Clamping bolt in unclamping position

S2: Clamping bolt in clamping position

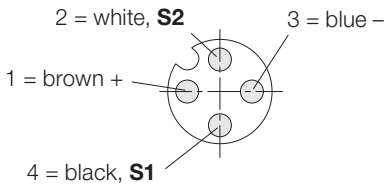
S2 is overrun: Clamping bolt in final position (message for no mould/die available or mould/die not clamped)

Special versions with signal up to final bolt position are available on request.

Connecting cable with screw coupling

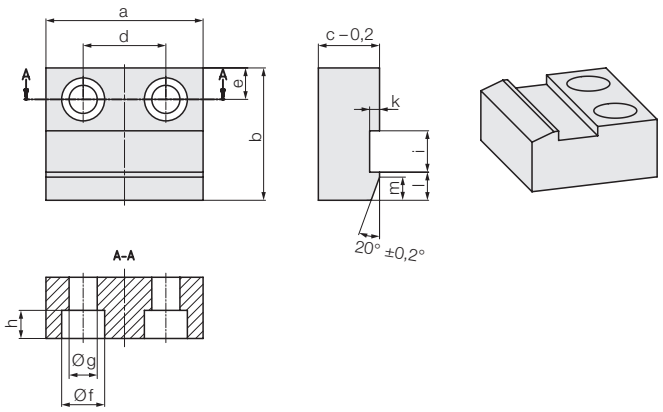
Cable length 5 m **Part no. 5700013**
Cable length 10 m **Part no. 5700014**

Pin assignment 4-pole



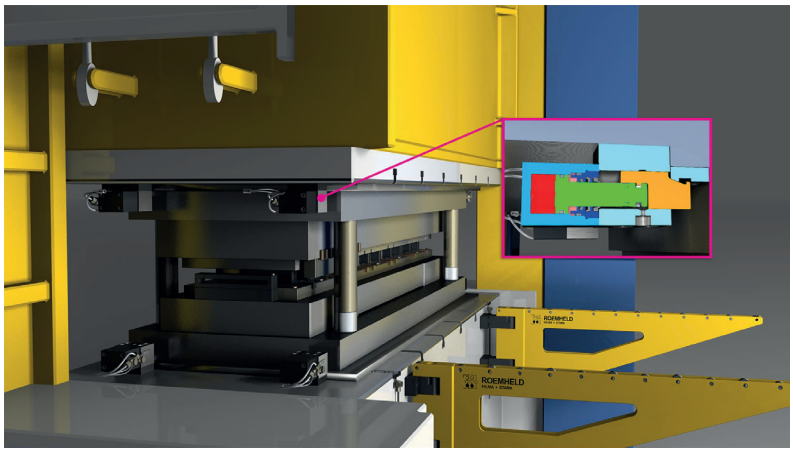
Accessories

Adaptor plates



for wedge clamp		824046000	824056000	824066000	824076000	824086000
a	[mm]	50	80	95	105	130
b	[mm]	55	70	80	80	105
c	[mm]	20	29	37	39.6	55.6
d	[mm]	30	40	50	60	70
e	[mm]	9	16	19	19	20.5
Øf	[mm]	15	20	26	26	26
Øg	[mm]	9	13.5	17	17	17
h	[mm]	8.6	12.6	17	17	17
i	[mm]	20	21	25	27	34
k	[mm]	5	5	6	6	8
l	[mm]	17	17	17	17	30
m	[mm]	14	14	14	14	24
Part no.		**510280073**	**510280074**	**510280065**	**510280066**	**510280067**

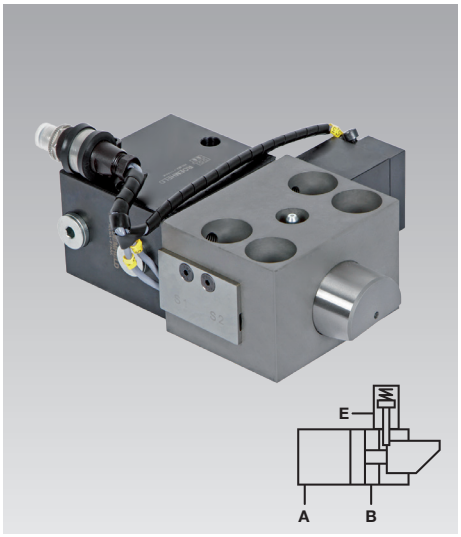
Application example



Wedge clamp with form-fit safety step in the press ram

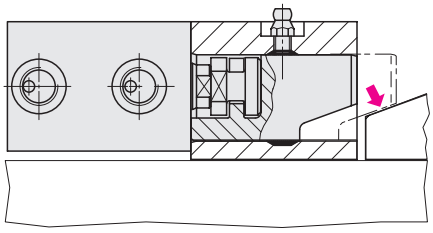
Wedge Clamps for Tapered Clamping Edge

double acting, max. clamping force 25 to 630 kN, with locking bolt, without and with position monitoring at the side



Advantages

- Safe clamping of moulds/dies with tapered clamping edge
- High operational safety by locking bolt and position monitoring at the side
- Very sturdy design
- Additionally increased safety standard
- Long service life



Application

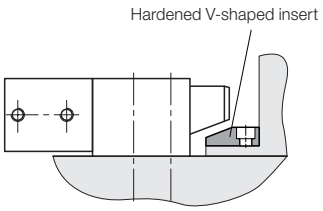
Double-acting wedge clamp for clamping moulds or dies on a press bed or ram or in injection moulding machines, machines and installations.

Description

The wedge clamp consists of a hydraulic block cylinder and a piston guided in a housing. The clamping bolt is provided with 20° bevel to clamp on the tapered clamping surface of the mould/die.
Based on the internal design of the wedge clamp and the 20° bevel of the clamping bolt, the system is providing internal friction.
The clamping bolt of this wedge clamp is secured against retraction with an additional locking cylinder and locking bolt. Leaving the clamping position is only possible by unlocking the locking bolt.

Retrofitting to wedge clamping

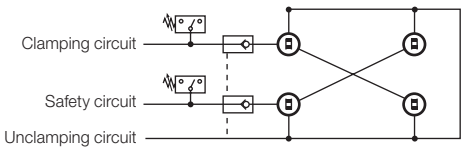
Wedge clamping of existing moulds/dies is possible by retrofitting V-shaped inserts as shown below. Max. hardness 50 HRc



Important notes

The greasing intervals (high temperature grease) should be adapted to the existing operating conditions. Please note that greasing of the wedge bolt should only be made with the elements being retracted.
The clamping elements must be protected against dirt, scale, swarf, coolant, etc. by means of a suitable covering.
Moulds or dies clamped by means of wedge clamps are subject to side loads that may be strong enough to displace them. Thus, positioning is required to absorb the side loads. Therefore, location pins or suitable limit stops should be provided to keep the moulds and dies in their correct position.
When using wedge clamps on the press ram, it is recommended that multiple-circuit hydraulic supply of the clamping elements and pilot-controlled check valves are used for securing hydraulic clamping.

Circuit diagram



For safety reasons and in the sense of the machine tool guide lines ML2006/42/ EC the hydraulic pressure must be maintained.
When upper moulds/dies are clamped by wedge clamps, they must be secured mechanically when maintenance work is carried out.

Versions

- without position monitoring
  max. temperature: 160 °C
  (300 °C on request)

- with position monitoring at the side
  max. temperature: 100 °C

Position monitoring

The integrated position monitoring is coupled to the clamping bolt in a very space-saving way at the side and signals:

1. **Clamping bolt in unclamping position**
2. **Clamping bolt in clamping position**
3. **Error message when overrunning the clamping position**

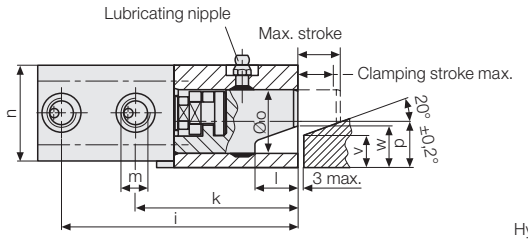
Clamping force

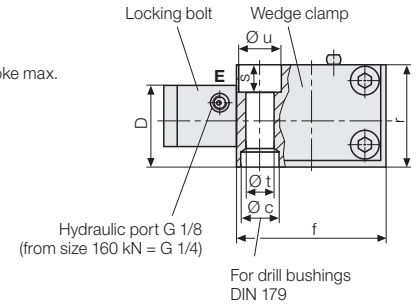
This is the force the clamping element applies to the mould or die. The mould or die is clamped on the fixture plate by means of this force.
The external forces acting on mould or die (e.g. ejecting force or die cushion force) shall not exceed the totality of the elements' clamping force.

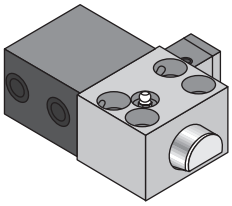
Maximum admissible operating force

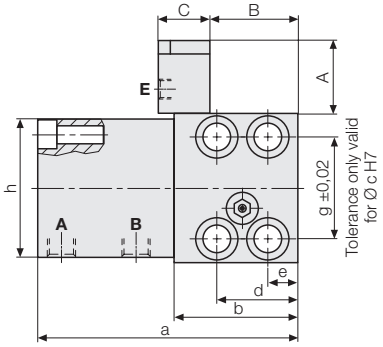
This is the force that can be absorbed by the clamping element and the fastener (screws).
It must be ensured that in cases of emergency, e.g. workpiece jammed in mould or die, the sum total of the elements' operating forces is not exceeded.

Wedge clamps
with locking bolt

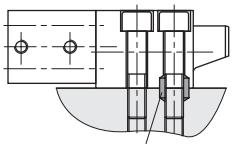








Installation of drill bushings to absorb side loads
The occurring side loads must be absorbed by drill bushings to be inserted into the fixture plate.



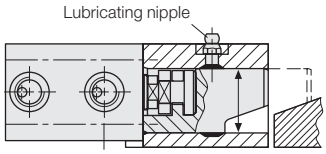
Technical data
Temperature resistance up to 160 °C

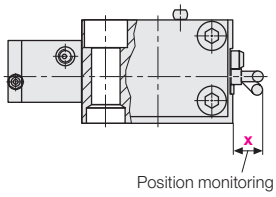
Clamping force max.	**[kN]**	**25***	**50**	**100**	**160**	**250**	**400**	**630**
Max. admissible operating force								
Screw DIN 912 8.8	[kN]	35	65	130	210	320	520	820
Max. operating pressure	**[bar]**	**350**	**275**	**350**	**350**	**350**	**350**	**350**
Cylinder Ø	[mm]	25	40	50	63	80	100	125
Max. stroke	[mm]	20	25	25	30	32	40	40
Clamping stroke (from/to)	[mm]	15 – 18	18 – 22	19 – 22	23 – 27	24 – 29	30 – 36	30 – 36
Oil consumption max. clamping/unlocking	[mm]	10/3	31/3	49/3	94/2.5	161/2.5	314/2.5	491/2.5
a	[mm]	122	157	190	227	267	310	375
b	[mm]	58	78	100	125	150	180	225
Ø c H7 x depth	[mm]	18/7	26/9	30/11	35/11	48/13	55/16	62/16
d	[mm]	38	46	58	75	78	95	108
e	[mm]	14	16	20	25	26	32	38
f	[mm]	70	95	120	150	200	240	280
g	[mm]	48	65	85	106	140	180	210
h	[mm]	65	85	100	125	160	200	230
i	[mm]	111	146	177	210	246	285	344
k	[mm]	76	102	127	151	184	215	272
l	[mm]	20	25	26	32	40	45	50
m		G 1/4	G 1/4	G 1/4	G 1/2	G 1/2	G 1/2	G 1/2
n	[mm]	45	63	75	95	120	150	180
Ø o	[mm]	30	40	55	70	80	100	125
p	[mm]	21.5	28	37	49	55	75	85
r	[mm]	48	65	80	105	125	160	190
s	[mm]	13	18	20	26	32	38	44
Ø t	[mm]	13	17	21	26	33	39	45
Ø u	[mm]	20	26	32	40	48	57	66
v	[mm]	15	18	25	30	30	50	60
w	[mm]	19.5	23.5	30.5	37	38	60	70
A	[mm]	57.5	57.5	57.5	60	60	65	65
B	[mm]	27	44	66	94	119	144.5	189.5
C	[mm]	40	40	40	45	45	40	40
D	[mm]	48	58	67	89	95	110	120
Screw DIN 912-8.8 (4 off)		M 12	M 16	M 20	M 24	M 30	M 36	M 42
Tightening torque	[Nm]	86	210	410	710	1450	2520	4050
Weight	[kg]	3.0	6.5	11.4	21.7	41	74.7	126
Part no.		**824031500**	**824041500**	**824051500**	**824061500**	**824071500**	**824081500**	**824091500**

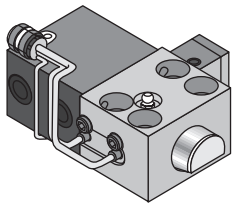
Accessories

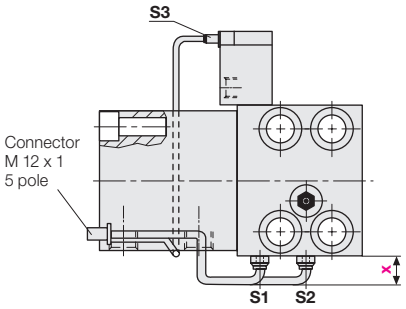
Drill bushings DIN 179	[mm]	12 x 12	17 x 16	21 x 20	26 x 20	32 x 25	38 x 30	44 x 30
Part no.		**3300285**	**3300287**	**3300288**	**3300289**	**3300420**	**3300430**	**3300440**

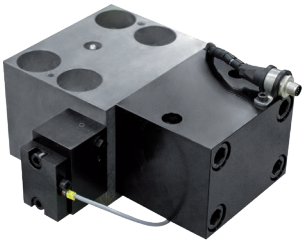
* lubricating nipples of the version with a clamping force of 25 kN are offset by 9.5 mm and protrude by 5 mm











Description

The proximity switches are installed in the guide housing. They are activated by means of the wedge bolt. The positions of the bolt in off-position or in clamping position are displayed.

S1: Clamping bolt in unclamping position
S2: Clamping bolt in clamping position
S2 is overrun: Clamping bolt in final position (message for no mould/die available or mould/die not clamped)
S3: Position monitoring for the locking bolt, position unlocked

Special versions with signal up to final bolt position are available on request.

Technical data

Temperature resistance up to 100 °C

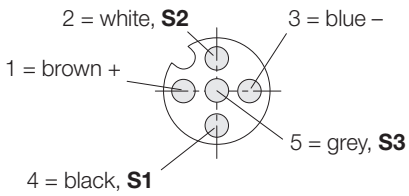
Clamping force max.	**[kN]**	**25***	**50**	**100**	**160**	**250**	**400**	**630**
x Position monitoring	[mm]	12	5	0	0	0	0	0
Part no.		**824033000**	**824043000**	**824053000**	**824063000**	**824073000**	**824083000**	**824093000**

* lubricating nipples of the version with a clamping force of 25 kN are offset by 9.5 mm and protrude by 5 mm

Accessories

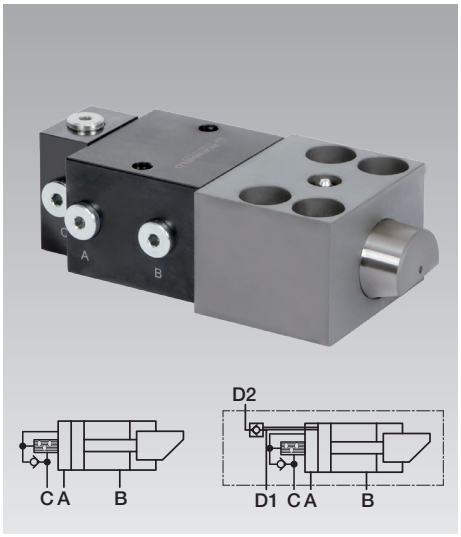
Connecting cable with screw coupling
Cable length 5 m **Part no. 5700013**
Cable length 10 m **Part no. 5700014**

Pin assignment 5-pole



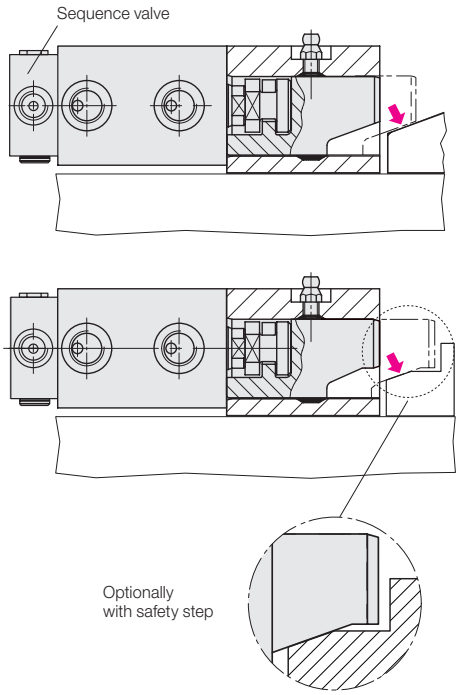
Wedge Clamps for Tapered Clamping Edge

double acting, max. clamping force 25 to 630 kN, with sequence valve control for high temperature ranges



Advantages

- Optional safety step for the support of the upper die or mould half when the pressure drops
- Safe clamping of mouds/dies with tapered clamping edge at high temperatures
- Very sturdy design
- High safety standard
- Hydraulic position monitoring, without electrics
- High operational safety by hydraulic position monitoring and automatic motion sequence of the clamping bolt



Application

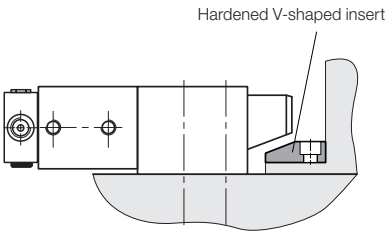
Double-acting wedge clamp with optional safety step at the clamping bolt for clamping moulds or dies on a press bed or ram or in injection moulding machines, machines and installations.

Description

The wedge clamp consists of a hydraulic block cylinder and a piston guided in a housing. The clamping bolt is provided with 20° bevel to clamp on the tapered clamping surface of the die.
Based on the internal design of the wedge clamp and the 20° bevel of the clamping bolt, the system is providing internal friction.
Wedge clamps with hydraulic position monitoring for high temperatures. An additional valve block on the standard wedge clamp enables hydraulic control of the clamping position.
Only after the last wedge clamp has been clamped, the machine control is released by a pressure switch on the pressure generator.

Retrofitting to wedge clamping

Wedge clamping of existing moulds/dies is possible by retrofitting V-shaped inserts as shown below. Max. hardness 50 HRc



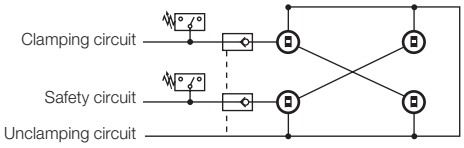
Optional safety step

The clamping bolt of this version has an additional support surface parallel to the clamping edge.
In the case of pressure drop (machine failure or down time) the upper mould/die can be lowered to the safety step and safely held.

Important notes

The greasing intervals (high temperature grease) should be adapted to the existing operating conditions. Please note that greasing of the wedge bolt should only be made with the elements being retracted.
The clamping elements must be protected against dirt, scale, swarf, coolant, etc. by means of a suitable covering.
Moulds or dies clamped by means of wedge clamps are subject to side loads that may be strong enough to displace them. Thus, positioning is required to absorb the side loads. Therefore, location pins or suitable limit stops should be provided to keep the moulds and dies in their correct position.
When using wedge clamps on the press ram, it is recommended that multiple-circuit hydraulic supply of the clamping elements and pilot-controlled check valves are used for securing hydraulic clamping.

Circuit diagram



For safety reasons and in the sense of the machine tool guide lines ML2006/42/EC the hydraulic pressure must be maintained.
When upper moulds/dies are clamped by wedge clamps, they must be secured mechanically when maintenance work is carried out.

Versions

- with hydraulic position monitoring with sequence valve control to monitor the clamping position
  max. temperature: 160 °C
  (300 °C on request)

- with hydraulic position monitoring with double sequence valve control to monitor the clamping and unclamping position
  max. temperature: 160 °C
  (300 °C on request)

Clamping force

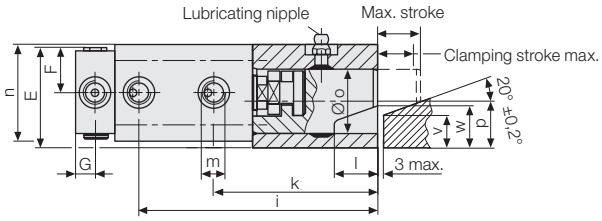
This is the force the clamping element applies to the mould or die. The mould or die is clamped on the fixture plate by means of this force.
The external forces acting on mould or die (e.g. ejecting force or die cushion force) shall not exceed the totality of the elements' clamping force.

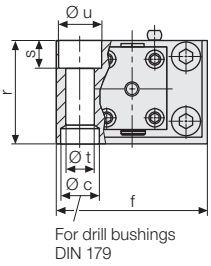
Maximum admissible operating force

This is the force that can be absorbed by the clamping element and the fastener (screws).
It must be ensured that in cases of emergency, e.g. workpiece jammed in mould or die, the sum total of the elements' operating forces is not exceeded.

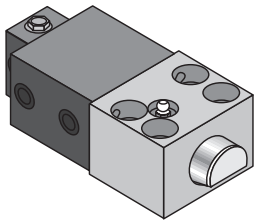
Wedge clamps

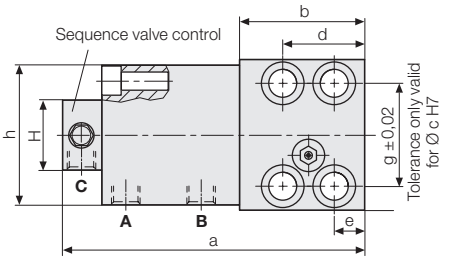
Sequence valve control to monitor the clamping position





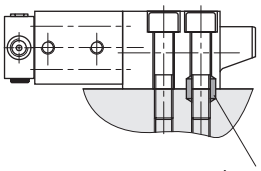
For drill bushings DIN 179



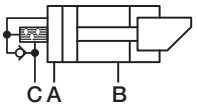


Installation of drill bushings to absorb side loads

The occurring side loads must be absorbed by drill bushings to be inserted into the fixture plate.



Accessories: Drill bushings



A = Hydraulic port clamping
B = Hydraulic port unclamping
C = Hydraulic port sequence valve

Technical data

Temperature resistance up to 160 °C

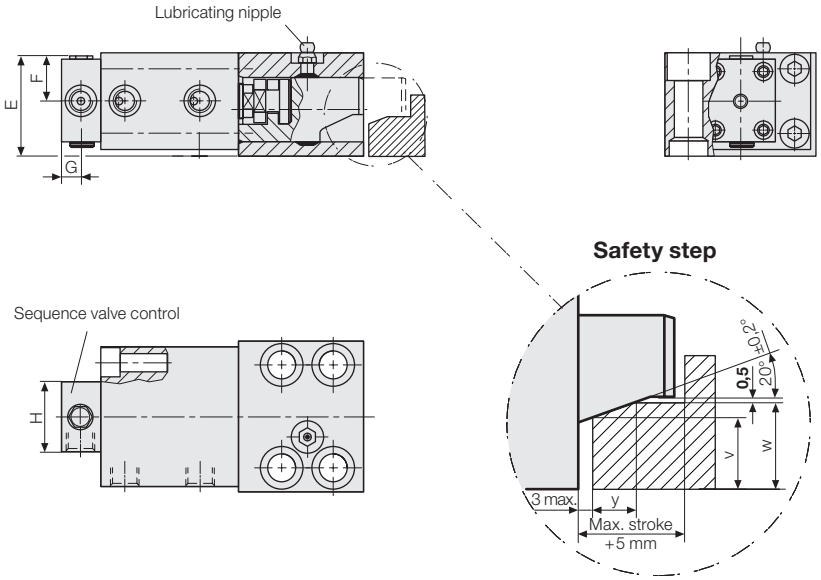
Clamping force max.	**[kN]**	**25***	**50**	**100**	**160**	**250**	**400**	**630**
Max. admissible operating force Screw DIN 912 8.8	[kN]	35	65	130	210	320	520	820
Max. operating pressure	**[bar]**	**350**	**275**	**350**	**350**	**350**	**350**	**350**
Cylinder Ø	[mm]	25	40	50	63	80	100	125
Max. stroke	[mm]	20	25	25	30	32	40	40
Clamping stroke (from/to)	[mm]	15 – 18	18 – 22	19 – 22	23 – 27	24 – 29	30 – 36	30 – 36
Max. oil consumption	[mm]	10	31	49	94	161	314	491
Sequence valve control	[mm]	12	14	14	17	17	22	22
a	[mm]	152	187	220	262	302	345	410
b	[mm]	58	78	100	125	150	180	225
Ø c H7 x depth	[mm]	18/7	26/9	30/11	35/11	48/13	55/16	62/16
d	[mm]	38	46	58	75	78	95	108
e	[mm]	14	16	20	25	26	32	38
f	[mm]	70	95	120	150	200	240	280
g	[mm]	48	65	85	106	140	180	210
h	[mm]	65	85	100	125	160	200	230
i	[mm]	111	146	177	210	246	285	344
k	[mm]	76	102	127	151	184	215	272
l	[mm]	20	25	26	32	40	45	50
m		G 1/4	G 1/4	G 1/4	G 1/2	G 1/2	G 1/2	G 1/2
n	[mm]	45	63	75	95	120	150	180
Ø o	[mm]	30	40	55	70	80	100	125
p	[mm]	21.5	28	37	49	55	75	85
r	[mm]	48	65	80	105	125	160	190
s	[mm]	13	18	20	26	32	38	44
Ø t	[mm]	13	17	21	26	33	39	45
Ø u	[mm]	20	26	32	40	48	57	66
v	[mm]	15	18	25	30	30	50	60
w	[mm]	19.5	23.5	30.5	37	38	60	70
E	[mm]	48	68	75	89	96.5	116.5	131.5
F	[mm]	22.5	31.5	37.5	47.5	60	75	90
G	[mm]	16	14	14	16	16	16	16
H	[mm]	64	48	48	90	90	90	90
Screw DIN 912-8.8 (4 off)		M 12	M 16	M 20	M 24	M 30	M 36	M 42
Tightening torque	[Nm]	86	210	410	710	1450	2520	4050
Weight	[kg]	3.0	6.5	11.4	21.7	41	74.7	126
Part no.		**824032500**	**824042500**	**824052500**	**824062500**	**824072500**	**824082500**	**824092500**

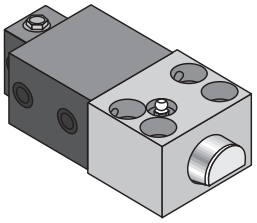
Accessories

Drill bushings DIN 179	[mm]	12 x 12	17 x 16	21 x 20	26 x 20	32 x 25	38 x 30	44 x 30
Part no.		**3300285**	**3300287**	**3300288**	**3300289**	**3300420**	**3300430**	**3300440**

* lubricating nipples of the version with a clamping force of 25 kN are offset by 9.5 mm and protrude by 5 mm

Sequence valve control to monitor the clamping position and safety step





Description

In addition to the sequence valve control, the clamping bolt of this version has an additional support surface parallel to the clamping edge. In the case of pressure drop (machine failure or down time) the upper mould/die can be lowered to the safety step and safely held.

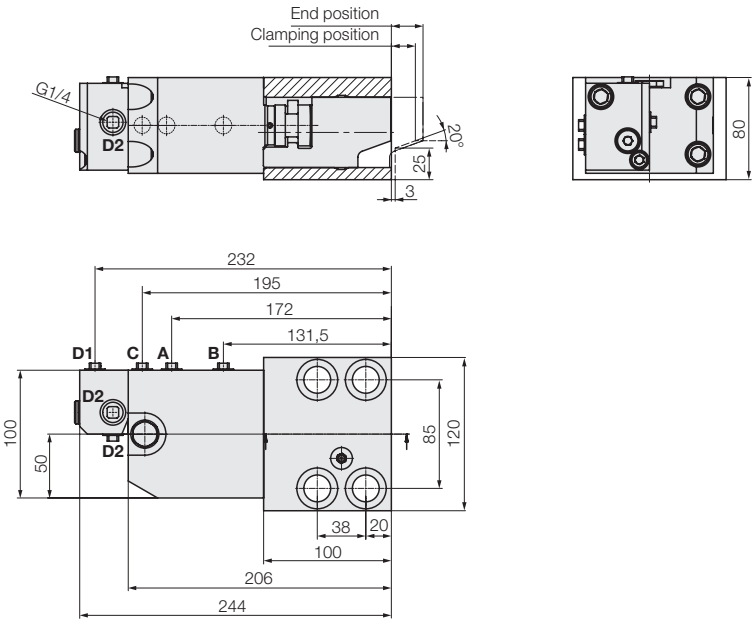
Technical data

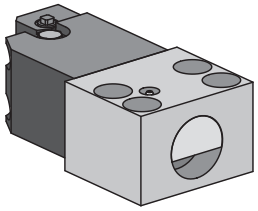
Temperature resistance up to 160 °C

Clamping force max.	**[kN]**	**25***	**50**	**100**	**160**	**250**	**400**	**630**
w	[mm]	17.5	21.2	28.2	34.7	35.3	57.3	67.3
y	[mm]	7.0	8.7	8.7	12.9	14.6	20.1	20.1
Part no.		**824033500**	**824043500**	**824053500**	**824063500**	**824073500**	**824083500**	**824093500**

* lubricating nipples of the version with a clamping force of 25 kN are offset by 9.5 mm and protrude by 5 mm
** high temperatures up to 300 °C on request.

Double sequence valve control to monitor the clamping and unclamping position





Description

The wedge clamp enables the hydraulic control of the clamping and unclamping position. Only after the last wedge clamp has been clamped, the machine control is released by a pressure switch on the pressure generator.

Version with safety step

The version with double sequence valve control is also available with safety step at the clamping bolt on request (description see page 3).

Technical data

Temperature resistance of up to 160°C (higher temperatures on request)

Clamping force max.	**[kN]**	**100***
Max. admissible operating force screws DIN 912 8.8	[kN]	130
Max. operating pressure	**[bar]**	**350**
Cylinder Ø	[mm]	50
Max. stroke	[mm]	25
Clamping stroke (from/to)	[mm]	19 – 22
Sequence valve control	[mm]	13
Screw DIN 912-8.8 (4 off)		M 20
Tightening torque	[Nm]	410
Weight	[kg]	12.5

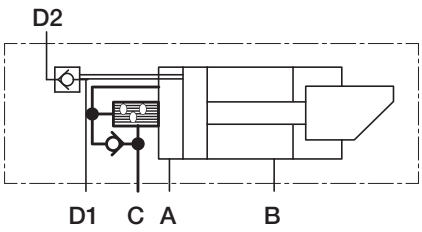
* Other sizes on request

Element in clamping position

Port A pressurized, bolt moves to the clamping position. The oil displaced by the piston movement escapes at port B. The sequence valve opens after approx. 50 % of the total stroke and oil escapes with full pressure at port C.

Element in unclamping position

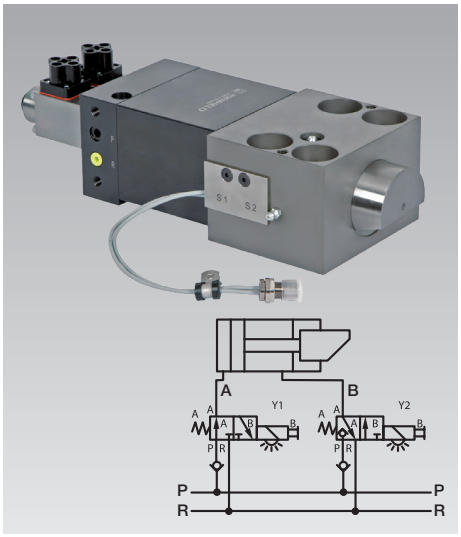
Pressurise port D1, port D2 must remain free of oil. Pressurise port B.
The oil displaced by the piston movement escapes at port A and C. The second sequence valve will be opened maximally 2 mm before the end position of the bolt and oil escapes with full pressure at port D2.



A = Clamping
B = Unclamping
C = To the following element
D = Sequence released to the following element

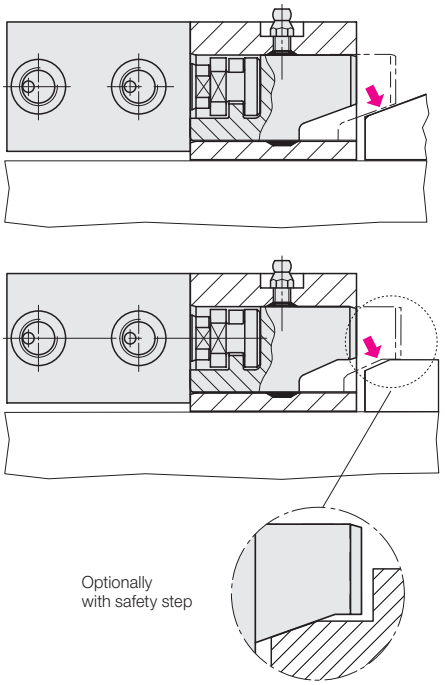
Wedge Clamps for Tapered Clamping Edge

double acting, max. clamping force 100 to 630 kN, with single valve control for individual control



Advantages

- Safe clamping of moulds/dies with tapered clamping edge
- Each element can be individually controlled
- Single moulds/dies can be clamped
- High operational safety by position monitoring, check valves and automatic motion sequence
- Very sturdy design
- Long service life
- Little installation work as a result of a plug-type closed hydraulic circuit
- Suitable for BUS systems



Optionally with safety step

Application

Double-acting wedge clamp with manifold-mounted directional control valves as control valves for the separate control of all clamping elements. For clamping moulds or dies on a press bed or ram or in injection moulding machines, machines and installations.

Technical data

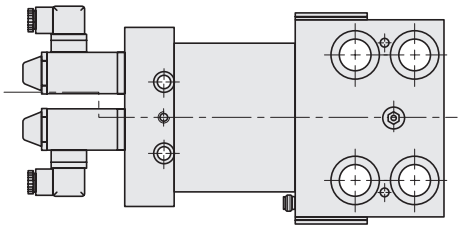
Temperature resistance	[°C]	max. 100
Clamping forces	[kN]	100 – 630
Operating pressure	[bar]	200 – 350
Valve voltage		24 V DC

Dimensions, interfaces and further technical details in the course of the project.

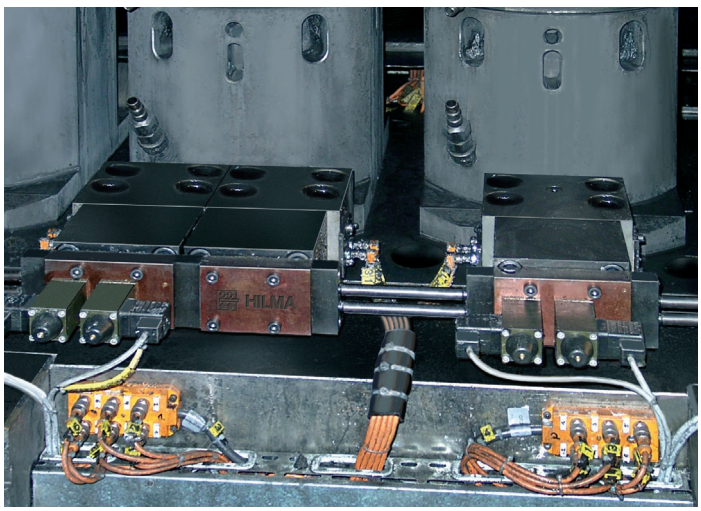
Description

The wedge clamp consists of a hydraulic block cylinder and a piston guided in a housing. The clamping bolt is provided with 20° bevel to clamp on the tapered clamping surface of the mould/die.
Based on the internal design of the wedge clamp and the 20° bevel of the clamping bolt, the system is providing internal friction.

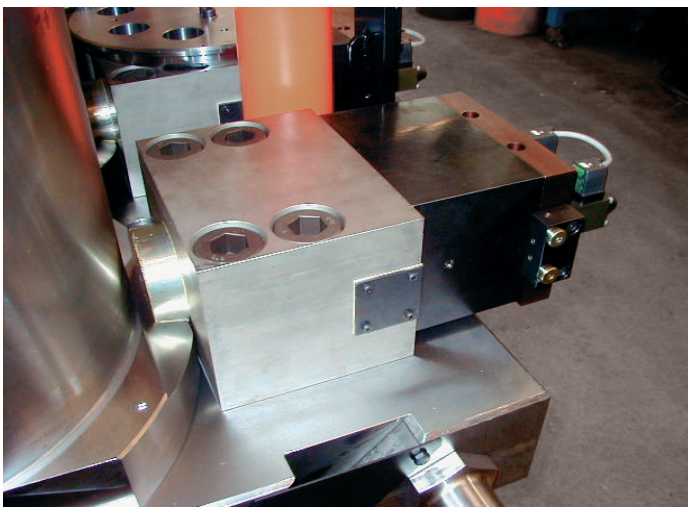
With safety step on request



Application examples



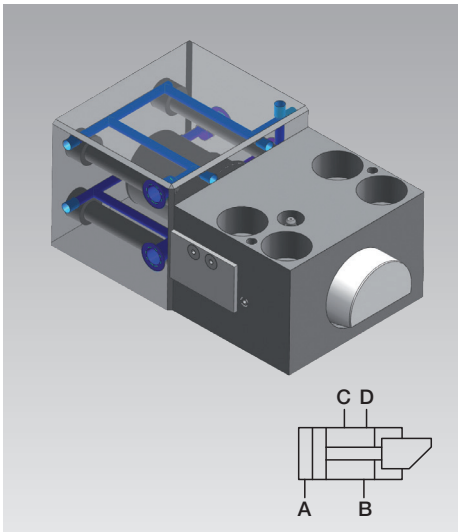
Wedge clamps with directly manifold-mounted directional control valves



Wedge clamps on a forging press

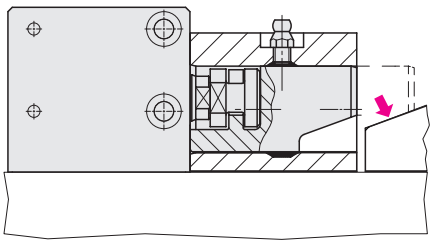
Wedge Clamps for Tapered Clamping Edge

double acting, max. clamping force 100 to 630 kN, with cooling circuit for temperatures up to 250 °C



Advantages

- Safe clamping of moulds/dies with tapered clamping edge
- Temperatures up to 250 °C with integrated cooling circuit
- High operational safety by automatic motion sequence
- Very sturdy design
- High safety standard
- Long service life
- Block cylinders can be retrofitted



Application

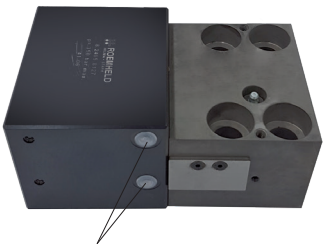
Double-acting wedge clamp for clamping moulds and dies on a press bed or ram or in injection moulding machines, machines and installations.

Description

The wedge clamp consists of a hydraulic block cylinder and a piston guided in a housing. The clamping bolt is provided with 20° bevel to clamp on the tapered clamping surface of the mould/die.
Based on the internal design of the wedge clamp and the 20° bevel of the clamping bolt, the system is providing internal friction.

Cooling circuit

In addition, there is a cooling circuit for oil cooling in the block cylinder. This cooling circuit guarantees a steady temperature at the sealing surfaces of the hydraulic supply.
When dimensioning the cooling circuit, the occurring temperatures and the admissible temperature at the clamping element must be considered.

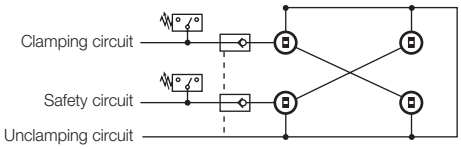


Cooling ports **C** and **D**

Important notes

In case of incorrect operation of the wedge clamps, the clamping bolt may fully retract into the guide housing and thus cause the upper mould/die falling off the ram.
The greasing intervals (high temperature grease) should be adapted to the existing operating conditions. Please note that greasing of the wedge bolt should only be made with the elements being retracted.
The clamping elements must be protected against dirt, scale, swarf, coolant, etc. by means of a suitable covering.
Moulds or dies clamped by means of wedge clamps are subject to side loads that may be strong enough to displace them. Thus, positioning is required to absorb the side loads. Therefore, location pins or suitable limit stops should be provided to keep the moulds and dies in their correct position.
When using wedge clamps on the press ram, it is recommended that multiple-circuit hydraulic supply of the clamping elements and pilot-controlled check valves are used for securing hydraulic clamping.

Circuit diagram



For safety reasons and in the sense of the machine tool guide lines ML2006/42/ EC the hydraulic pressure must be maintained.
When upper dies are clamped by wedge clamps, they must be secured mechanically when maintenance work is carried out.

Versions

- without position monitoring
  max. temperature: 250 °C

Technical data

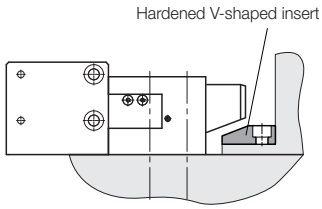
max. clamping force: 100 – 630 kN
max. operating pressure: 350 bar

Dimensions and part numbers

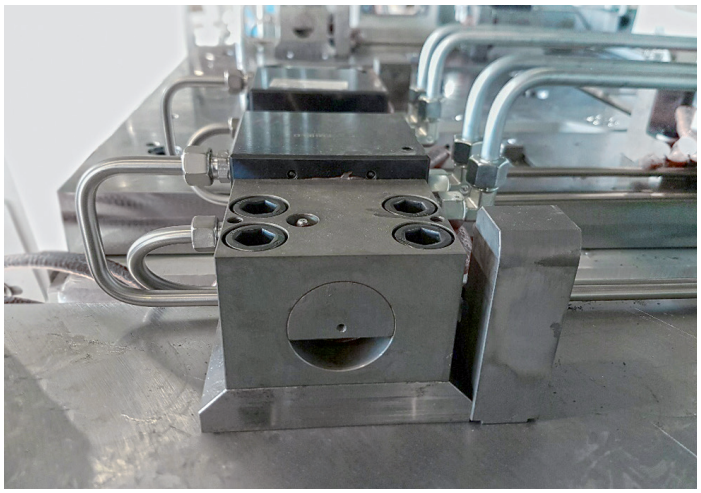
on request

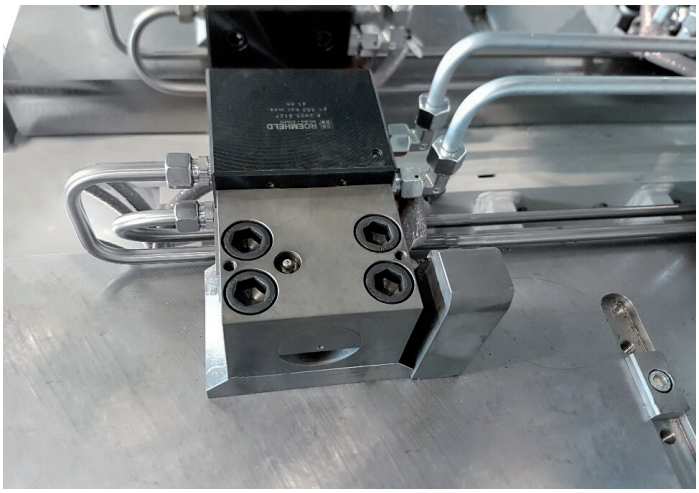
Retrofitting to wedge clamping

Wedge clamping of existing moulds/dies is possible by retrofitting V-shaped inserts as shown below. Max. hardness 50 HRc



Application examples



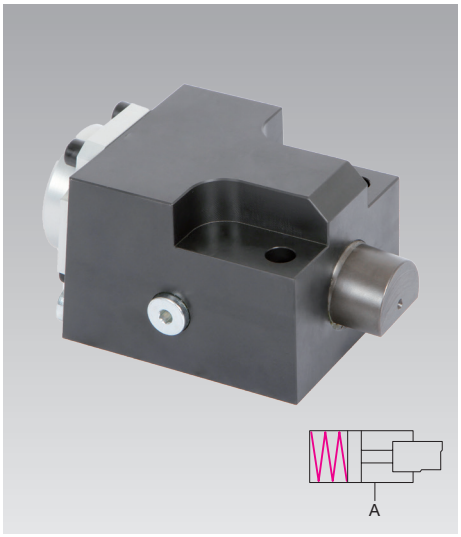


Wedge clamp with hydraulic ports **A+B** at the right and an additional cooling circuit **C+D** at the opposite, left side

Wedge clamp on the press ram

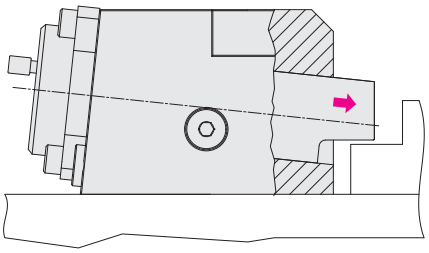
Wedge Clamps for Flat Clamping Edge

single acting, operating force 25 up to 120 kN, clamping with spring force and hydraulic unclamping, without and with position monitoring



Advantages

- Safe clamping of dies with flat clamping edge
- High operating safety due to clamping with spring force as well as inductive and visual position monitoring
- Position monitoring on the left or right side
- Clamping element with self-locking
- Dimensions in accordance with Euromap guidelines
- No clamping edge bevels are required
- Variable clamping edge heights (spacer plates)
- Tolerance of clamping edge height ± 0.15 mm
- The pressure of the machine hydraulics of 160 bar is sufficient for unclamping
- Very sturdy and compact design
- Housing with stainless coating
- Flexible connecting possibilities by 4 hydraulic connections



Application

The single-acting wedge clamps are suitable for safe clamping of moulds and dies with flat clamping edge in injection moulding machines, punches and presses.

Description

The wedge clamps consist of a guide housing with one-piece clamping bolt.
Clamping cycle: the clamping bolt which is inclined by 6° performs an idle stroke and simultaneously a clamping stroke. The clamping bolt is lowered axially onto the clamping edge. The 6° angle, the spring force in the clamping bolt and the frictional engagement at the clamping point create a self-locking connection. The wedge clamp should preferably be used with position monitoring.

Technical data

Max. operating force	[kN]	25 – 120
Clamping force	[kN]	2.4 – 11
Unclamping pressure	[bar]	160
Max. operating pressure	[bar]	200

Maximum operating force

This is the force that can be absorbed by the clamping element and the fastener (screws).

Clamping force

This is the force the clamping element applies to the workpiece. The die or the tool is clamped on the fixture plate by means of this force.

Important notes!

Please observe: in case of incorrect operation of the wedge clamps, the clamping bolt may fully retract into the guide housing and thus cause a die halve falling off.

Versions

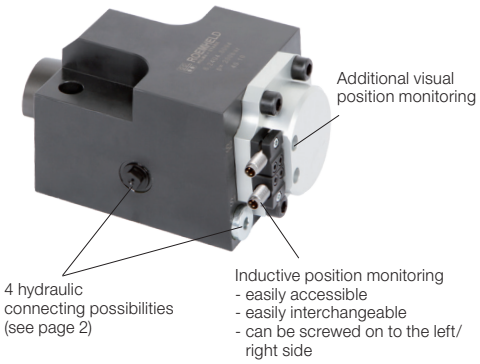
- without position monitoring
  max. temperature: 160 °C
  (250 °C on request)

- with position monitoring
  max. temperature: 80 °C

Position monitoring

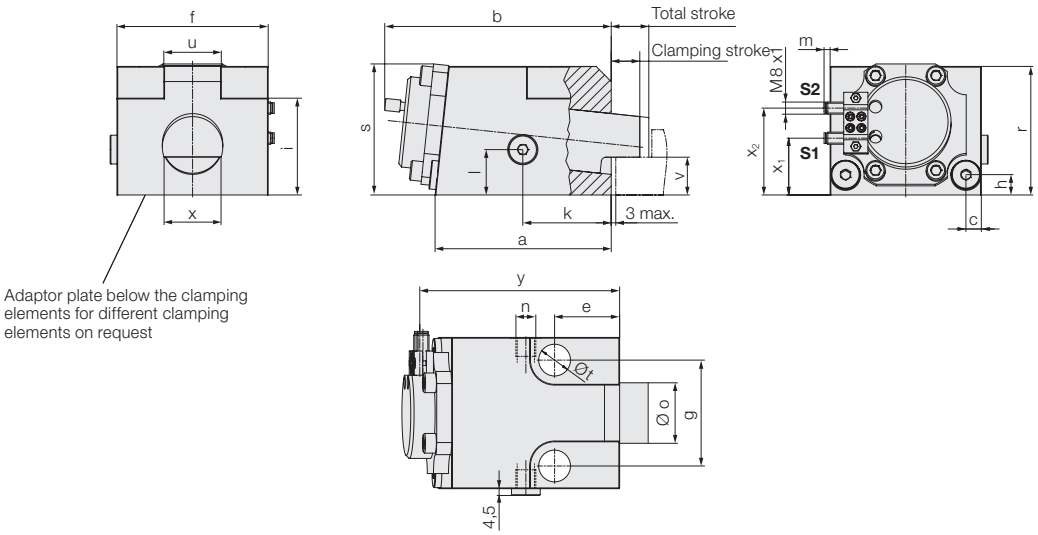
The integrated position monitoring is coupled to the clamping bolt in a space-saving way and signals:

1. **Clamping bolt in unclamping position**
2. **Clamping bolt in clamping position**
3. **Error message when overrunning the clamping position**



Dimensions
Technical data

Wedge clamps
with position monitoring
Clamping bolt with a 6° bevel



Max. admissible operating force	**[kN]**	**25**	**50**	**80**	**120**	**120**
Clamping force by spring	[kN]	2.4	5	5	11	11
Unclamping pressure	[bar]	160	160	160	160	160
Max. operating pressure	[bar]	200	200	200	200	200
Cylinder Ø	[mm]	35	60	60	85	85
Max. oil volume	[cm^3]	14	39	39	90	90
Total stroke	[mm]	20	25	25	40	40
Clamping stroke	[mm]	14	19	19	30	30
a	[mm]	100	120	120	200	200
b	[mm]	131	153	153	245	245
c	[mm]	9	10	10	15	15
e min. / e max.	[mm]	10/37	12/45	15/43	15/77	18/74
f	[mm]	88	100	100	180	180
g (± 0.2 mm) mounting grid as per Euromap	[mm]	35/M12/12.9	70/M16/12.9	70/M20/12.9	140/M20/12.9	140/M24/8.8
Tightening torque	[Nm]	85	220	300	470	550
h	[mm]	13	13.5	13.5	30	30
i	[mm]	–	64	64	94	94
k	[mm]	55	62	62	115	115
l	[mm]	14	30	30	23	23
m	[mm]	–	4	4	–	–
n	[mm]	G 1/8	G 1/4	G 1/4	G 1/4	G 1/4
Ø o	[mm]	18	40	40	65	65
r	[mm]	60	85	85	120	120
s	[mm]	62	87	87	120	120
Ø t	[mm]	13	17	21	21	26
u	[mm]	–	38	38	90	90
v (± 0.15)	[mm]	20	25	25	40	40
x_1/x_2	[mm]	25/47	38/58	38/58	58/84	58/84
y	[mm]	114	132	132	212	212
Weight	[kg]	2.5	6.5	6.5	29	29
Part no.						
without position monitoring up to 160 °C*				**on request**		
with position monitoring up to 80 °C		**824035510**	**824045510**	**824045520**	**824055510**	**824055520**

* Higher temperatures up to 250 °C on request
Different operating forces, clamping edge heights, mounting grids or dimensions of the housing on request

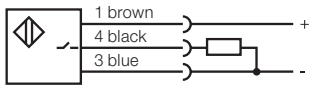
Technical data
for inductive proximity switches

Operating voltage	10 … 30 V DC
Ripple	max. 15 %
Switching function	interlock
Output	PNP
Housing material	steel, corrosion resistant
Code class (DIN 40050)	IP 67
Part no.	**638290980**

Connecting cable with plug

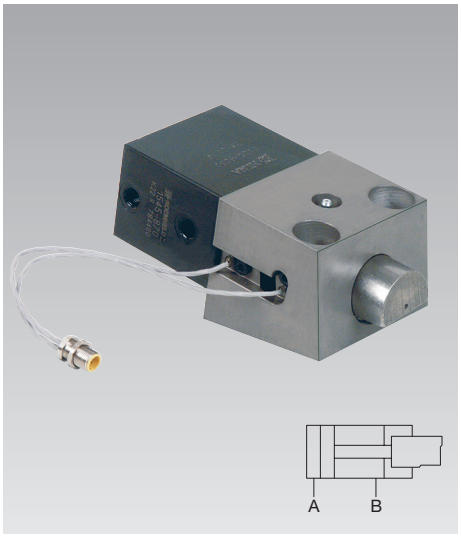
Environmental temperature TA	[°C]	–25 … +80
Min. distance of the switching positions	[mm]	8
Type of connection		Plug
LED function display		in the plug
Constant current max.	[mA]	200
Rated operating distance	[mm]	1.5
Protected against short circuits		yes
Connecting cable with plug, 5 m	**Part no.**	**3829099**
Connecting cable with plug, 10 m	**Part no.**	**3829139**

Electric circuit diagram



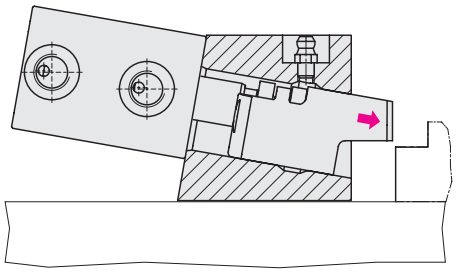
Wedge Clamps for Flat Clamping Edge

double acting, operating force 35 up to 120 kN, hydraulic clamping and unclamping, without and with position monitoring at the side



Advantages

- Safe clamping of dies with flat clamping edge
- Side loads are compensated by drill bushings
- High operational safety by position monitoring and automatic motion sequence
- Very sturdy and compact design
- Well-proven clamping element with high degree of safety and long service life
- Retracting clamping bolt ensures unrestricted mould and die change
- Minimum space requirement due to position monitoring without lateral overhang



Application

Double-acting wedge clamps are particularly suitable for safe clamping of dies with flat clamping edge on a press bed or ram or for clamping dies in injection moulding machines with Euromap mounting grid.

Description

The wedge clamps consist of a hydraulic block cylinder connected with a clamping bolt in a floating manner.
Clamping cycle: the clamping bolt which is inclined by 5° performs an idle stroke and simultaneously a clamping stroke. The clamping bolt is lowered axially onto the clamping edge. The 5° angle of the housing has been determined so that the hydraulic pressure is sufficient for unclamping, despite the frictional engagement on the clamping edge.
Since the clamping force is axially transmitted to the clamping point, only low side loads occur. The wedge clamp is available with or without position monitoring.

Technical data

Max. operating force	[kN]	35–120
Max. clamping pressure	[bar]	50
Unclamping pressure	[bar]	200–350

Maximum operating force

This is the force that can be absorbed by the clamping element and the fastener (screws).

Important notes!

Please observe: in case of incorrect operation of the wedge clamps, the clamping bolt may fully retract into the guide housing and thus cause a die halve falling off.

When using wedge clamps on the press ram or a vertical press, it is recommended that multiple-circuit hydraulic supply of the clamping elements and pilot-controlled check valves are used for securing hydraulic clamping.

The greasing intervals (high-temperature grease) should be scheduled in accordance with the operating conditions (at least once a week). Please note that greasing of the wedge bolts should only be made with the elements being retracted.

Versions

- without position monitoring
  max. temperature: 160 °C
  (300 °C on request)

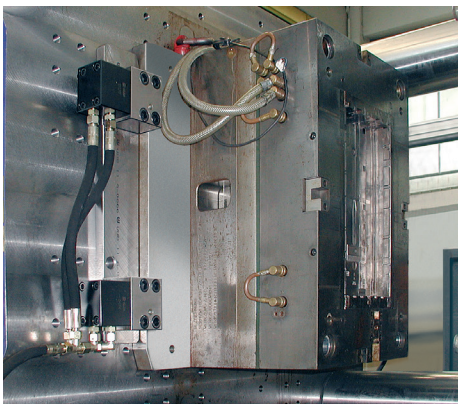
- with position monitoring at the side
  max. temperature: 100 °C

Position monitoring

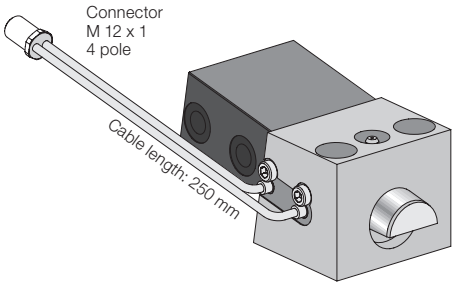
The integrated position monitoring is coupled to the clamping bolt and signals:

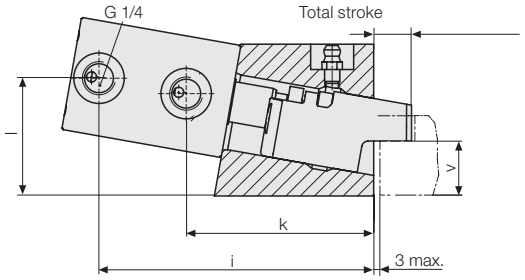
1. **Clamping bolt in unclamping position**
2. **Clamping bolt in clamping position**
3. **Error message when overrunning the clamping position**

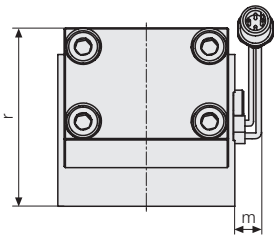
Application example

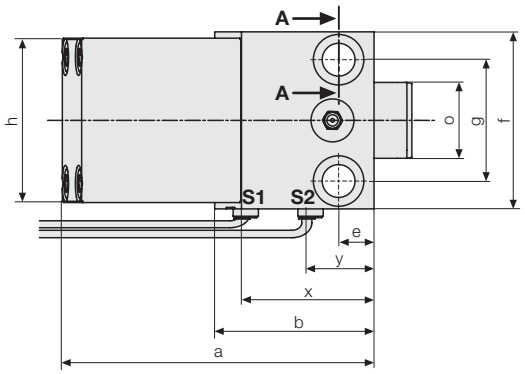


Wedge clamps
with position monitoring (at the side)
Clamping bolt with a 5° bevel

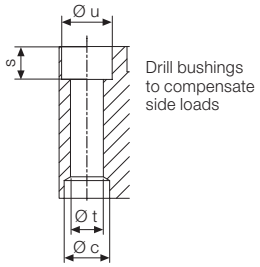








Section A - A



Position monitoring
(see catalogue sheet WZ 2.2460)

Mounting grid		**Standard**			**as per Euromap**		
Max. admissible operating force Screw DIN 912 8.8	**[kN]**	**35**	**60**	**120**	**35**	**60**	**120**
Screw DIN 912 8.8 (4 off)		M12	M16	M20	M12	M16	M20
Clamping pressure max.	[bar]	50	50	50	50	50	50
Unclamping pressure	[bar]	200 – 350	200 – 350	200 – 350	200 – 350	200 – 350	200 – 350
Cylinder Ø	[mm]	25	40	50	25	40	50
Total stroke	[mm]	20	25	25	20	25	25
Max. oil consumption	[mm]	10	32	50	10	32	50
Clamping stroke	[mm]	12	16	17	12	16	17
a	[mm]	123	160	197	123	176	197
Ø c H7 x depth	[mm]	18H7 x 7	26H7 x 9	30H7 x 11	18H7 x 7	26H7 x 9	30H7 x 11
b	[mm]	60	78	109	60	95	109
e	[mm]	14	16	20	15	33	32
f	[mm]	70	95	120	95	100	140
g (± 0.2 mm)	[mm]	48	65	85	70	70	105
h	[mm]	65	85	100	65	85	100
i	[mm]	109	142	180	109	158	180
k	[mm]	75	99	131	75	115	131
l	[mm]	36	50	65	36	50	65
m	[mm]	12	5	0	0	0	0
Ø o	[mm]	30	40	55	30	40	55
r	[mm]	60	81	103	60	81	103
s	[mm]	13	17	20	13	17	20
Ø t	[mm]	13	17	21	13	17	21
Ø u	[mm]	20	26	32	20	26	32
v** (± 0.1)	[mm]	22	25	35	22	25	35
x	[mm]	52	68	100	52	85	100
y	[mm]	27	29	75	27	45	75
Weight	[kg]	2.5	6.0	11.0	2.5	6.0	11.0
Part no.							
without position monitoring up to 160 °C*		**824035020**	**824045020**	**824055020**	**824035030**	**824045030**	**824055030**
with position monitoring up to 100 °C		**824035120**	**824045120**	**824055120**	**824035130**	**824045130**	**824055130**

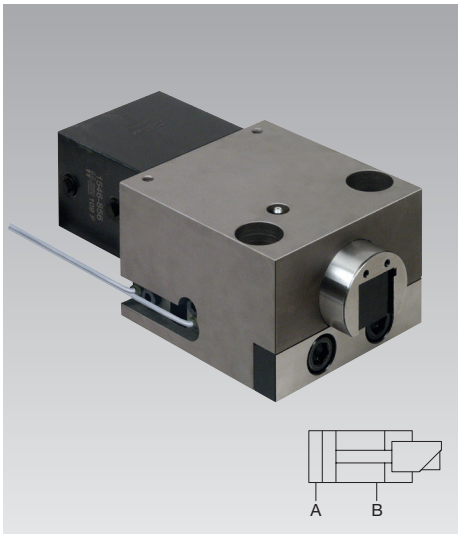
* Higher temperatures up to 300 °C on request, ** clamping edge height As per Euromap Standard on request, tolerance ± 0.1 mm

Accessories						
Drill bushes DIN 179	12 x 12	17 x 16	21 x 20	12 x 12	17 x 16	21 x 20
Part no.	**3300285**	**3300287**	**3300288**	**3300285**	**3300287**	**3300288**

WZ 2.2460

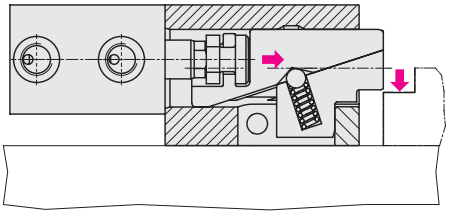
Wedge Clamps for Flat Clamping Edge

double acting, clamping force 25 up to 100 kN, hydraulic clamping and unclamping, without and with position monitoring at the side



Advantages

- Safe clamping of dies with flat clamping edge
- The clamping piston does not retract in the case of pressure drop
- Uniform clamping and unclamping pressure
- High operational safety by position monitoring and automatic motion sequence
- Very sturdy and compact design
- Well-proven clamping element with high degree of safety and long service life
- Retracting clamping bolt ensures unimpeded mould and die change
- Special versions on request
- Minimum space requirement due to position monitoring without lateral overhang



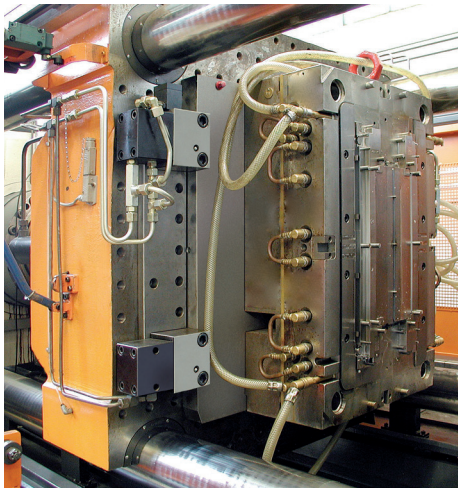
Application

Double-acting wedge clamps are particularly suitable for safe clamping of dies with flat clamping edge on a press bed or ram or for clamping dies in injection moulding machines.

Description

The double acting wedge clamps consist of a hydraulic block cylinder connected with a two-piece mechanical clamping bolt in a floating manner.
Clamping cycle: the clamping bolt with thrust pad first performs an idle stroke. When the inner stop is reached, the clamping bolt is vertically lowered onto the clamping edge.
The 5° angle of the thrust pad has been determined so as to ensure that despite self-locking the hydraulic pressure required for clamping is not higher than the required pressure for unclamping.
Since the clamping force is vertically transmitted to the clamping point, no side loads occur.
The wedge clamp is available with or without position monitoring.

Application example



Technical data

Max. clamping force	[kN]	25 – 100
Max. operating force	[kN]	45 – 145
Max. clamping pressure	[bar]	250
Max. unclamping pressure	[bar]	250

Clamping force

This is the force the clamping element applies to the workpiece. The die or the tool is clamped on the fixture plate by means of this force.

Maximum operating force

This is the force that can be absorbed by the clamping element and the fastener (screws).

Important notes!

In case of incorrect operation of the wedge clamps, the clamping bolt may fully retract into the guide housing and thus cause the upper die falling off the ram.

When using wedge clamps on the press ram, it is recommended that multiple-circuit hydraulic supply of the clamping elements and pilot-controlled check valves are used for securing hydraulic clamping.
The greasing intervals (high-temperature grease) should be scheduled in accordance with the operating conditions (at least once a week). Please note that greasing of the wedge bolts should only be made with the elements being retracted.

Clamping elements with a wedge clamping bolt must be protected against dirt, scale, swarf, coolant, etc. by means of a suitable covering. If penetration of such foreign matters cannot be prevented, this type of element should not be used.

Versions

- without position monitoring
  max. temperature: 160 °C
  (300 °C on request)

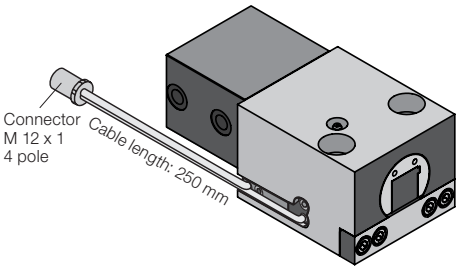
- with position monitoring at the side
  max. temperature: 100 °C

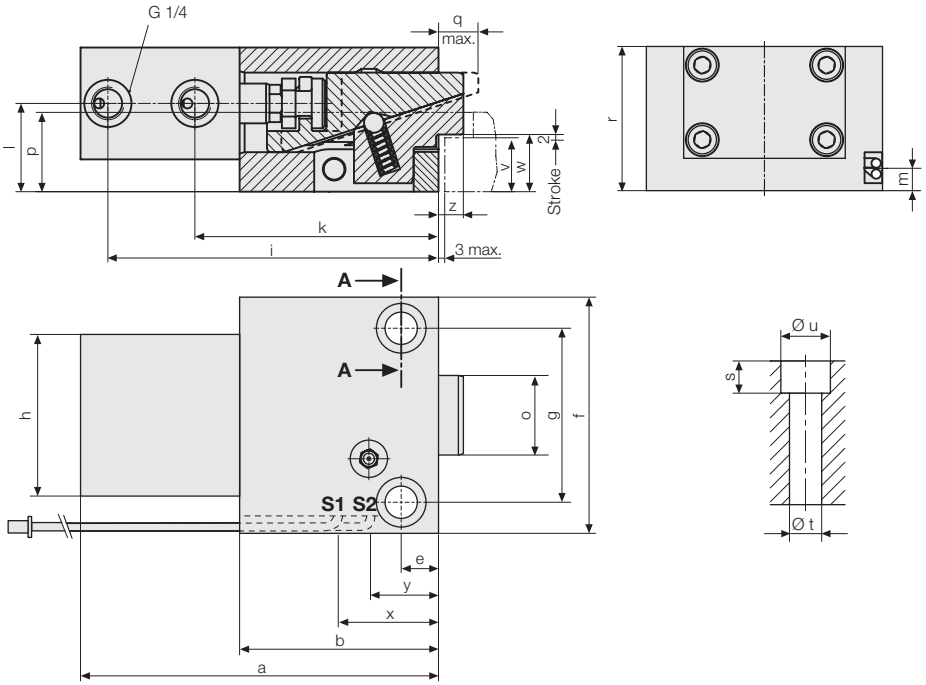
Position monitoring

The integrated position monitoring is coupled to the clamping bolt and the contact bolt and signals:

1. Clamping bolt in unclamping position
2. Clamping bolt in clamping position

Wedge clamps
with position monitoring (at the side)
Clamping bolt for vertical clamping





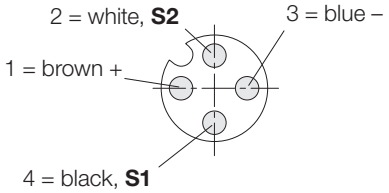
Clamping force max.	**[kN]**	**25**	**50**	**100**
Max. admissible operating force				
Screw DIN 912 8.8	[kN]	35	65	130
Screw DIN 912 12.9	[kN]	45	75	145
Screw DIN 912 (2 off)		M12	M16	M20
Max. operating pressure	**[bar]**	**250**	**250**	**250**
Cylinder Ø	[mm]	25	40	50
Max. stroke	[mm]	2	2	2
Max. oil consumption	[mm]	10	31	49
Clamping stroke	[mm]	1	1	1
a	[mm]	144	196	240
b	[mm]	80	117	150
e	[mm]	15	33	32
f	[mm]	95	100	140
g (± 0,2)	[mm]	70	70	105
h	[mm]	65	85	100
i	[mm]	133	185	227
k	[mm]	98	141	177
l	[mm]	35.5	48.5	62.5
m	[mm]	9	9	17
Ø o	[mm]	32	50	60
p	[mm]	32	43	56
q max.	[mm]	17	24	24
r	[mm]	58	80	100
s	[mm]	13	16	22
Ø t	[mm]	13	17	21
Ø u	[mm]	20	26	32
v** (± 0.3)	[mm]	22	25	35
w	[mm]	23	26	36
x	[mm]	39	65	85
y	[mm]	26	47	50
z	[mm]	10	17	17
Weight	[kg]	4.28	9.55	15.20
Part no.				
without position monitoring up to 160 °C*		**824036800**	**824046810**	**824056820**
with position monitoring up to 100 °C		**824036601**	**824046611**	**824056621**

* Higher temperatures up to 300 °C on request
** clamping edge height as per Euromap Standard on request, tolerance ± 0.3 mm

Position monitoring

Switching function	interlock
Output	PNP
Rated operating distance Sn	1 mm
Ambient temperature T_A	–25 °C… + 100 °C*
Operating voltage U_B	10 … 30 V DC
Residual ripple/supply frequency	≤ 15 % (SS)
Constant current max.	100 mA
Unit power consumption	≤ 10 mA
Voltage drop U_D at I max.	≤ 1.5 V
Output resistance R_A	4.7 kΩ
Housing material	steel, corrosion resistant
Type of connection *2	Plug on the right side
Code class as per DIN 40050	IP 67
Length of cable	250 mm

Pin assignment



Accessories

Connecting cable with screw coupling
Cable length 5 m **Part no. 5700013**
Cable length 10 m **Part no. 5700014**

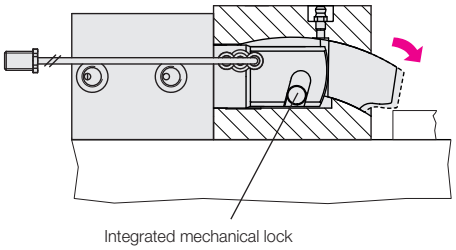
Proximity switch (spare part)
Twin-Set **Part no. 250120073**

Arch Clamps for Flat Clamping Edge

double acting, clamping force 30 to 450 kN, with mechanical lock, without and with position monitoring at the side

Advantages

- Extremely sturdy and process-safe
- Easy to unclamp even after the hardest use
- Integrated lock secures the upper die or mould in the case of pressure loss
- High operational safety by position monitoring and automatic motion sequence
- High sliding properties and corrosion resistance due to special coating process



Application

Double-acting arch clamp with integrated locking bolt for clamping dies or moulds on a press bed and ram in machines and systems, such as die casting and injection moulding machines.

Description

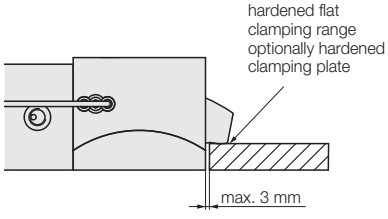
The arch clamp consists of a hydraulic block cylinder and a piston guided in a housing. The arch-shaped clamping bolt clamps the die or mould by placing on the flat clamping edge. Due to the design inside the clamping element, the horizontally-acting force is deflected and hits the clamping surface almost vertically.

Retrofitting to arch clamping

Retrofitting existing moulds/dies to arch clamping is possible by using the pressure bars shown below. Max. hardness 60 HRC

A high level of safety

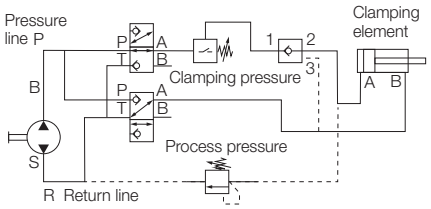
The arch clamp has a mechanical lock which holds the clamping bolt in its clamping position in the case of a pressure drop. The upper die or mould is thus secured against falling down.



Important notes

In case of incorrect operation of the arch clamps, the clamping bolt may fully retract into the guide housing and thus cause the upper mould/die falling off the ram.
The greasing intervals (high temperature grease) should be adapted to the existing operating conditions. Please note that greasing of the clamping bolt should only be made with the elements being retracted.
The clamping elements must be protected against dirt, scale, swarf, coolant, etc. by means of a suitable covering.
Moulds or dies clamped by means of arch clamps are subject to low side loads that may be strong enough to displace them. Thus, positioning is required to absorb the side loads. Therefore, location pins or suitable limit stops should be provided to keep the moulds and dies in their correct position. When using arch clamps on the press ram, it is recommended that multiple-circuit hydraulic supply of the clamping elements and pilot-controlled check valves are used for securing hydraulic clamping.

Circuit diagram



For safety reasons and in the sense of the machine tool guide lines ML2006/42/ EC the hydraulic pressure must be maintained.
When upper moulds/dies are clamped by arch clamps, they must be secured mechanically when maintenance work is carried out.

Versions

- without position monitoring
  max. temperature: 160 °C (250 °C on request)
- with position monitoring at the side
  max. temperature: 100 °C

Position monitoring

The integrated position monitoring is coupled to the clamping bolt in a very space-saving way at the side and signals:

1. Clamping bolt in unclamping position
2. Clamping bolt in clamping position
3. Error message when overrunning the clamping position

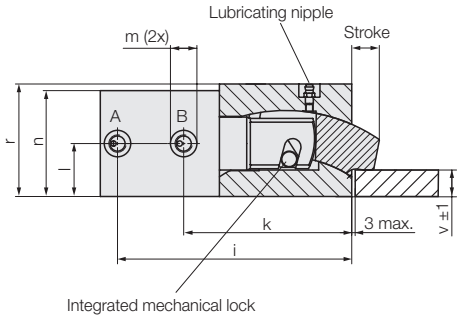
Clamping force

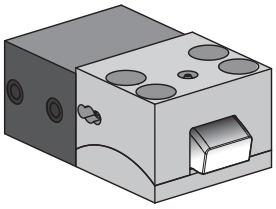
This is the force the clamping element applies to the mould or die. The mould or die is clamped on the fixture plate by means of this force.
The external forces acting on mould or die (e.g. ejecting force or die cushion force) shall not exceed the totality of the elements' clamping force.

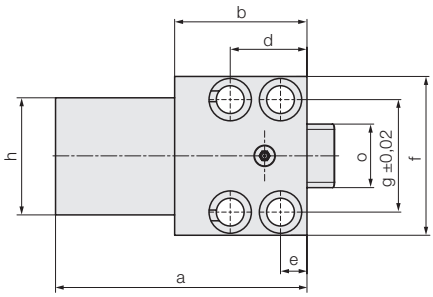
Maximum admissible process force

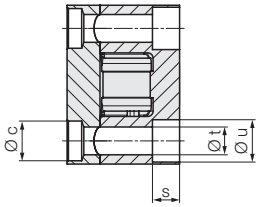
The process force is the max. admissible pressure in the block cylinder. During operation, a compressive force is exerted on the oil cushion in chamber A. As a result, the pressure in the block cylinder exceeds the clamping pressure. This means that the pressure relief valve/safety valve, that limits the pressure in the clamping element, must be adjusted to the process pressure. If the pressure in chamber A rises above the specified process pressure, the pressure relief valve/safety valve should release the excess pressure.

Arch clamps
without position monitoring, with mechanical lock



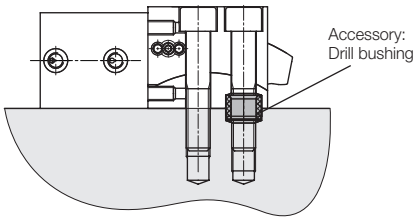






Installation of drill bushings to absorb side loads

Drill bushings for the absorption of side loads must be inserted in the support surface!



Technical data

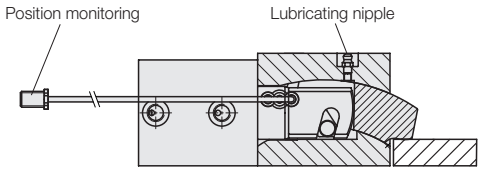
Temperature resistance up to 160 °C

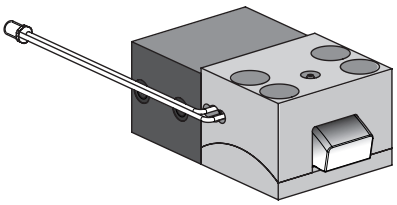
Max. clamping force	**[kN]**	**30***	**50****	**80**	**125**	**200**	**310**	**450**
Max. admissible process force	[kN]	45	65	110	175	275	430	620
Max. clamping pressure	**[bar]**	**200**	**200**	**200**	**200**	**200**	**200**	**200**
Max. unclamping pressure	[bar]	200	200	200	200	200	200	200
Max. process pressure	**[bar]**	**250**	**250**	**275**	**275**	**275**	**275**	**275**
Cylinder Ø	[mm]	40	50	63	80	100	125	150
Max. stroke	[mm]	15	20	25	25	25	30	38
Max. oil consumption	[cm^3]	10	31	90.4	188	384	314	918
a	[mm]	133	161	190	239	290	325	395
b	[mm]	70	84	100	140	160	180	220
Ø c H7 x depth	[mm]	18/7	26/9	30/11	35/11	48/13	55/16	62/16
d	[mm]	37.5	46	58	75	78	95	108
e	[mm]	12.5	16	20	25	26	32	38
f	[mm]	80	98	120	150	198	240	280
g	[mm]	55	65	85	106	140	180	210
h	[mm]	80	98	120	130	160	200	255
i	[mm]	111	146	177	220	270	285	370
k	[mm]	76	102	127	170	195	215	280
m		G 1/4	G 1/4	G 1/4	G 1/2	G 1/2	G 1/2	G 1/2
n	[mm]	56	66	80	100	130	160	195
o	[mm]	32	38	48	55	75	100	120
r	[mm]	61	70	85	105	135	165	195
s	[mm]	12.5	16.5	20.5	24.5	30.5	36.5	42.5
Ø t	[mm]	13	17	21	25	32	37	45
Ø u	[mm]	20	26	32	40	48	57	65
v	[mm]	20	20	20	20	20	40	50
Screw DIN 912-8.8 (4 off)		M 12	M 16	M 20	M 24	M 30	M 36	M 42
Tightening torque	[Nm]	86	210	410	710	1450	2520	4050
Weight	[kg]	2.4	5.8	12.2	21.6	42.1	78	140
Part no.		**8 2503 0000**	**8 2504 0000**	**8 2505 0000**	**8 2506 0000**	**8 2507 0000**	**8 2508 0000**	**8 2509 0000**

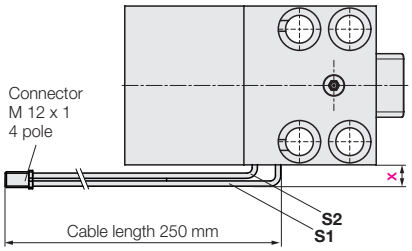
Accessories

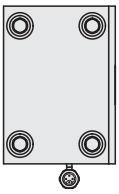
Drill bushings DIN 179	[mm]	12 x 12	17 x 16	21 x 20	26 x 20	32 x 25	38 x 30	44 x 30
Part no.		**3300 285**	**3300 287**	**3300 288**	**3300 289**	**3300 420**	**3300 430**	**3300 440**

* Version with 30 kN clamping pressure: Lubricating nipple protrudes by 9.5 mm
** Version with 50 kN clamping force: Lubricating nipple protrudes by 5 mm
Other sizes available on request.









Description

The proximity switches are installed in the guide housing. They are activated by means of the clamping bolt. The positions of the bolt in off-position or in clamping position are displayed.

S1: Clamping bolt in unclamping position
S2: Clamping bolt in clamping position
S2 is overrun: Clamping bolt in final position (message for no mould/die available or mould/die not clamped)

Special versions with signal up to final bolt position are available on request.

Technical data

Temperature resistance up to 100 °C

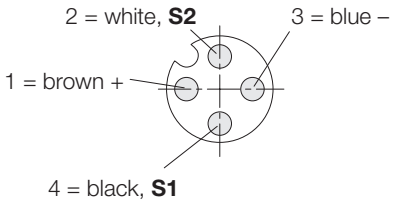
Max. clamping force	**[kN]**	**30***	**50****	**80**	**125**	**200**	**310**	**450**
x Position monitoring	[mm]	12	5	0	0	0	0	0
Part no.		**8250300100**	**8250400100**	**8250500100**	**8250600100**	**8250700100**	**8250800100**	**8250900100**

* Version with 30 kN clamping pressure: Lubricating nipple protrudes by 9.5 mm
** Version with 50 kN clamping force: Lubricating nipple protrudes by 5 mm

Accessories

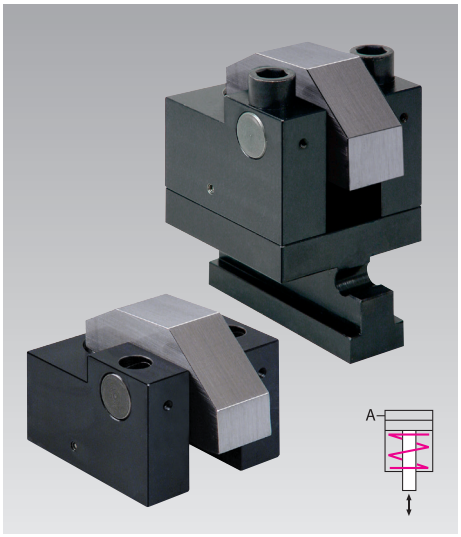
Connecting cable with screw coupling
Cable length 5 m **Part no. 5700013**
Cable length 10 m **Part no. 5700014**

Pin assignment 4-pole



Angular Clamps, Hydraulic

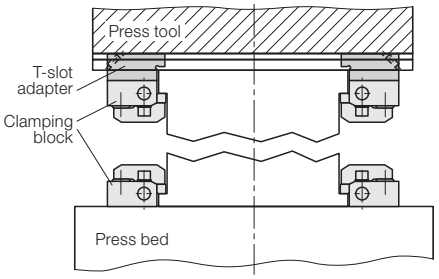
single acting, with spring return
max. operating pressure 400 bar, clamping force from 40 to 110 kN



Advantages

- Optimum force transmission
- Compact design
- Easy mounting
- Suitable for minimum clamping edges
- T-slot 18, 22, 28 and 36 mm are available
- Total stroke 5.5 – 6 mm
- Die standardisation with regard to the width and depth is not required
- Easy to retrofit

Installation option



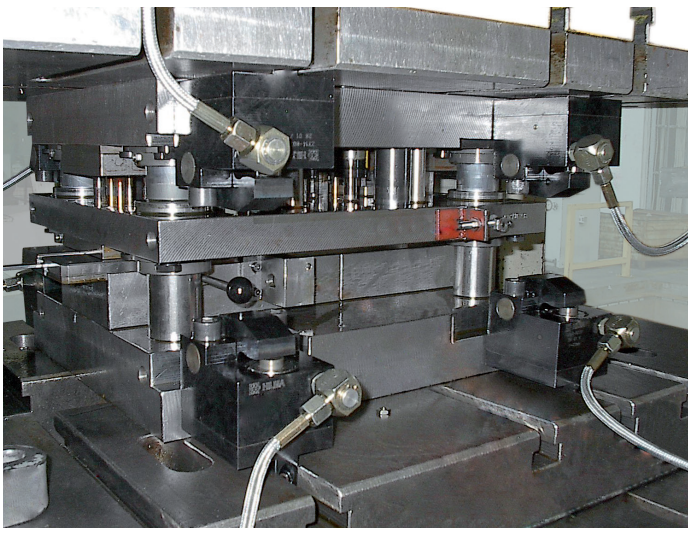
Application

Angular clamps are used for clamping and locking on machines and plants, on press bed and ram.
Due to the manageable and rounded design, angular clamps are especially suitable where space is limited and with small clamping edges.
The use is possible at ambient temperatures up to a maximum of 120 °C.

Description

The angular clamp is manually placed in the T-slots provided in press ram or bed.
Clamping on the die clamping edge by the application of hydraulic pressure to the piston and unclamping by spring force.
The clamping block can also be directly screwed without T-slot adapter and can be ordered separately.

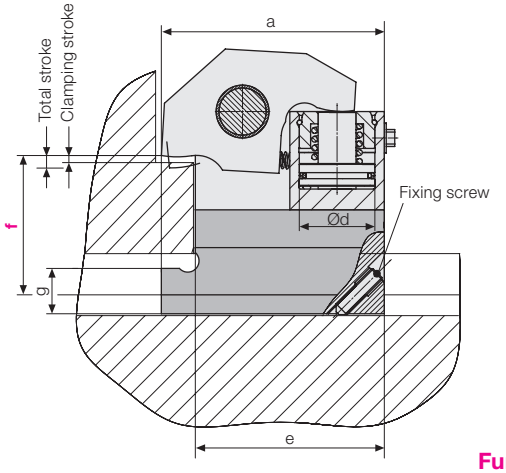
Application examples

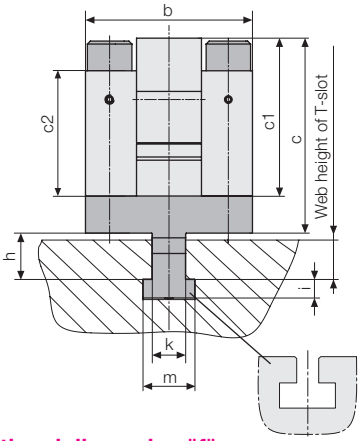


Angular clamp with T-slot adaptor in a high-speed punching press, the clamping force per clamping point is 66 kN

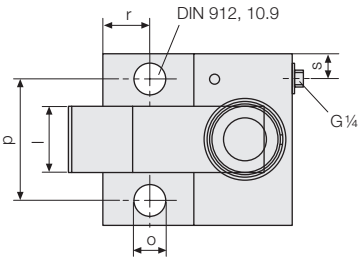
Angular clamp, hydraulic

Angular clamp complete, with T-slot adapter



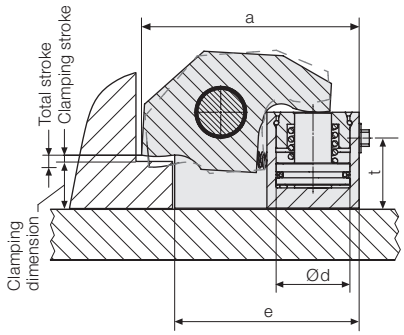


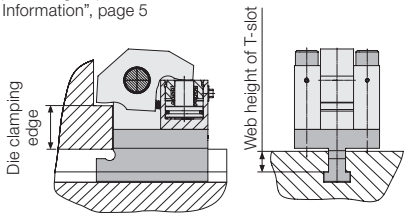
T-slot dimensions as per DIN 650.
See also product group 1
"General Information", page 5



Functional dimension "f":
= clamping stroke
+ die clamping edge
+ web height of T-slot
Please specify when ordering

Clamping block separate, without T-slot adapter





Example of ordering

8 2314 2211 / F110

Angular clamp	**T-slot**	**Functional dimension "f"** [mm]
Clamping force: 66 kN	22 mm	**Please specify when ordering**

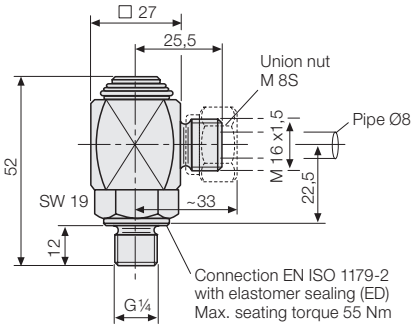
T-slot as per DIN 650	**[mm]**	**18**	**22**	**22**	**28**	**28**	**36**
Clamping force at 400 bar	**[kN]**	**40**	**40**	**66**	**66**	**110**	**110**
Clamping force at 100 bar	**[kN]**	**10**	**10**	**16.5**	**16.5**	**27.5**	**27.5**
Total stroke	[mm]	5.5	5.5	6	6	6	6
Clamping stroke	[mm]	2.5	2.5	3	3	3	3
Clamping dimension	[mm]	±1	±1	±1.5	±1.5	±1.5	±1.5
Oil volume	[cm³]	6.5	6.5	10	10	16	16
Dimension "f" min.	**[mm]**	**61**	**66**	**76**	**83**	**97**	**107**
Dimension "f" max.	**[mm]**	**90**	**95**	**96**	**103**	**157**	**167**
a	[mm]	101	101	118	118	147	147
b	[mm]	75	75	90	90	120	120
c max. (at "f" min.)	[mm]	93	93	106	106	133	133
c1	[mm]	80	80	88	88	108	108
c2	[mm]	62.5	62.5	67.5	67.5	85.0	85.0
d	[mm]	32	32	40	40	50	50
e	[mm]	85	85	100	100	125	125
g	[mm]	24	32	32	42	41	53
h	[mm]	25	30	30	37	37	47
i	[mm]	10	14	14	18	18	23
k	[mm]	18	22	22	28	28	36
l	[mm]	25	25	35	35	55	55
m	[mm]	28	35	35	44	44	54
o	[mm]	12.5	12.5	16.5	16.5	22.0	22.0
p	[mm]	50	50	64	64	90	90
r	[mm]	20	20	25	25	30	30
s	[mm]	13	13	13	13	20	20
t	[mm]	32	32	38	38	45	45
Clamping block with T-slot adapter	**Part no.**	**823121802**	**823122202**	**823142211**	**823142811**	**823152811**	**823153611**
Weight	[kg]	4.0	4.4	6.7	7.4	14.2	15.5
Clamping block, separate	**Part no.**	**823120101**	**823120101**	**823140501**	**823140501**	**823150501**	**823150501**
Clamping dimension	[mm]	20.5 ±1	20.5 ±1	25 ±1.5	25 ±1.5	32 ±1.5	32 ±1.5
Weight	[kg]	2.6	2.6	4.0	4.0	8.6	8.6
Clamping block, separate with position monitoring	**Part no.**	**823120104**		**823140504**			

Please consult us if aggressive spray is used. Max. operating pressure 400 bar, max. operating temperature 120 °C.
Further sizes and special versions are available on request.

Angular rotary coupling (M 8S / G 1/4)

Part no. 9208176

For easier handling when changing dies.
Max. operating pressure 400 bar

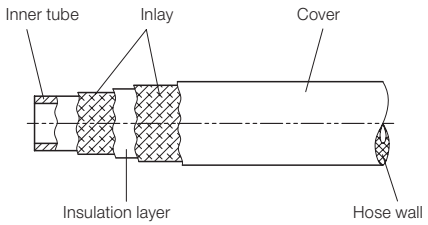


Hydraulic high-pressure hoses

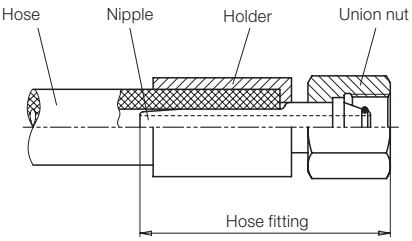
assembled ready for connection
max. operating pressure 250 / 500 bar

High-pressure hoses are used for energy and signal transmission in hydraulic systems. The hose lengths should be generously dimensioned to avoid kinks, abrasion marks, torsion, tensile and compressive stress and unacceptable bending radii.

Hose structure



Hose union

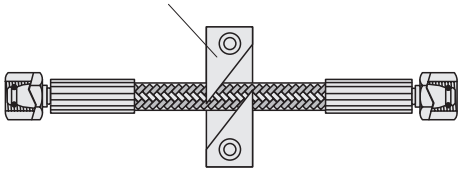


High-pressure hose		**ND**	**4**	**4**	**6.3**	**6**
Max. operating pressure		[bar]	250	500	250	500
Port size			8L	8S	8L	8S
Union nut			m8L (M 14 x 1.5)	m8S (M 16 x 1.5)	m8L (M 14 x 1.5)	m8S (M 16 x 1.5)
SW		[mm]	17	19	17	19
Preferred lengths	L = 500	[mm]	**9375100500**	**9375200500**	**9320600500**	**9370600500**
	1000	[mm]	**9375101000**	**9375201000**	**9320601000**	**9370601000**
	1600	[mm]	**9375101600**	**9375201600**	**9320601600**	**9370601600**
	2500	[mm]	**9375102500**	**9375202500**	**9320602500**	**9370602500**

Other hose connections left / right on request. For further information and technical data, see data sheet WZ 11.3800

Accessory

Hose holder made from Delrin
Part no. 550650003



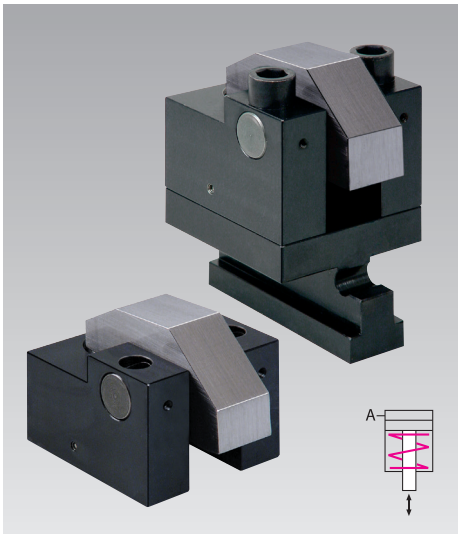
Other accessories

Hydraulic power units
see product group 7

Hydraulic accessories
see product group 11

Angular Clamps, Hydraulic

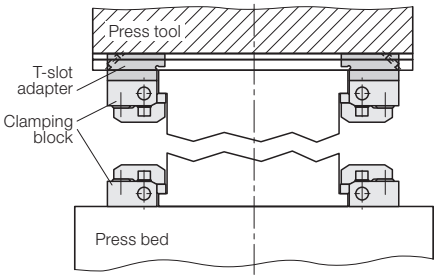
single acting, with spring return
max. operating pressure 400 bar, clamping force from 40 to 110 kN



Advantages

- Optimum force transmission
- Compact design
- Easy mounting
- Suitable for minimum clamping edges
- T-slot 18, 22, 28 and 36 mm are available
- Total stroke 5.5 – 6 mm
- Die standardisation with regard to the width and depth is not required
- Easy to retrofit

Installation option



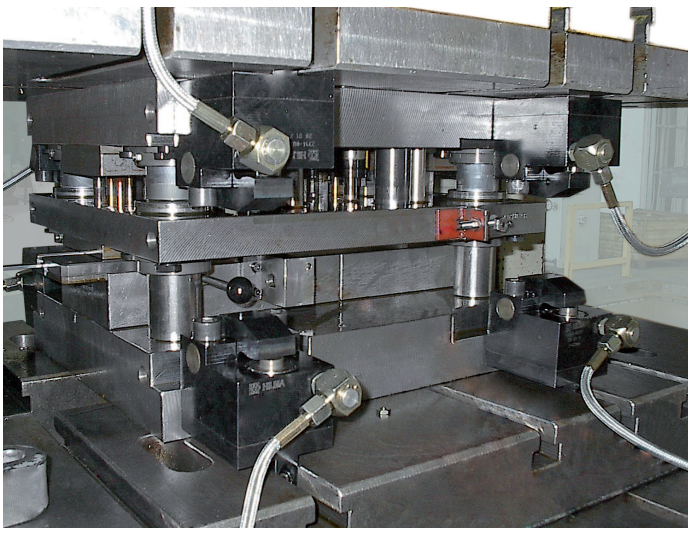
Application

Angular clamps are used for clamping and locking on machines and plants, on press bed and ram.
Due to the manageable and rounded design, angular clamps are especially suitable where space is limited and with small clamping edges.
The use is possible at ambient temperatures up to a maximum of 120 °C.

Description

The angular clamp is manually placed in the T-slots provided in press ram or bed.
Clamping on the die clamping edge by the application of hydraulic pressure to the piston and unclamping by spring force.
The clamping block can also be directly screwed without T-slot adapter and can be ordered separately.

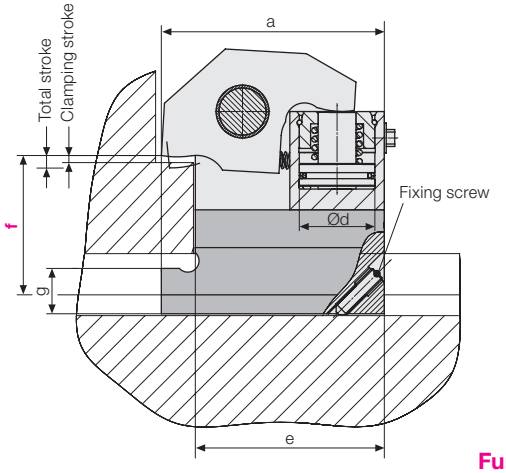
Application examples

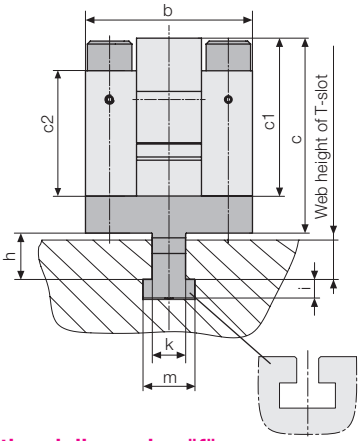


Angular clamp with T-slot adaptor in a high-speed punching press, the clamping force per clamping point is 66 kN

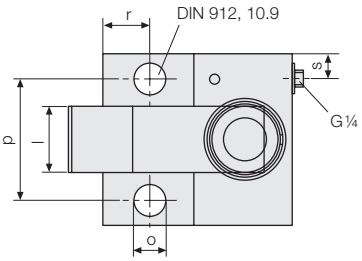
Angular clamp, hydraulic

Angular clamp complete, with T-slot adapter



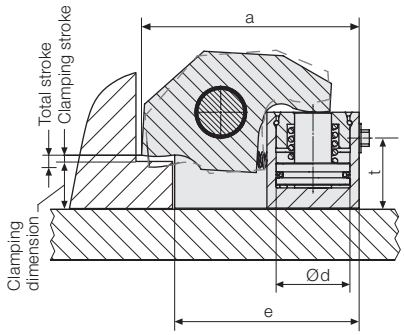


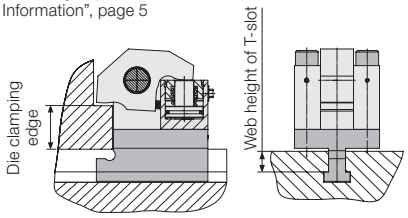
T-slot dimensions as per DIN 650.
See also product group 1
"General Information", page 5



Functional dimension "f":
= clamping stroke
+ die clamping edge
+ web height of T-slot
Please specify when ordering

Clamping block separate, without T-slot adapter





Example of ordering

8 2314 2211 / F110

Angular clamp	**T-slot**	**Functional dimension "f"** [mm]
Clamping force: 66 kN	22 mm	**Please specify when ordering**

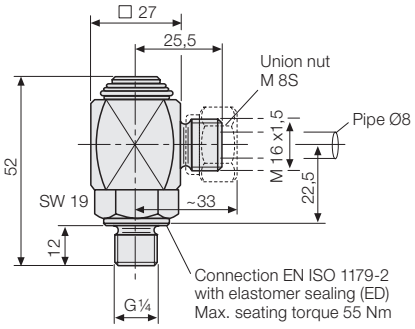
T-slot as per DIN 650	**[mm]**	**18**	**22**	**22**	**28**	**28**	**36**
Clamping force at 400 bar	**[kN]**	**40**	**40**	**66**	**66**	**110**	**110**
Clamping force at 100 bar	**[kN]**	**10**	**10**	**16.5**	**16.5**	**27.5**	**27.5**
Total stroke	[mm]	5.5	5.5	6	6	6	6
Clamping stroke	[mm]	2.5	2.5	3	3	3	3
Clamping dimension	[mm]	±1	±1	±1.5	±1.5	±1.5	±1.5
Oil volume	[cm³]	6.5	6.5	10	10	16	16
Dimension "f" min.	**[mm]**	**61**	**66**	**76**	**83**	**97**	**107**
Dimension "f" max.	**[mm]**	**90**	**95**	**96**	**103**	**157**	**167**
a	[mm]	101	101	118	118	147	147
b	[mm]	75	75	90	90	120	120
c max. (at "f" min.)	[mm]	93	93	106	106	133	133
c1	[mm]	80	80	88	88	108	108
c2	[mm]	62.5	62.5	67.5	67.5	85.0	85.0
d	[mm]	32	32	40	40	50	50
e	[mm]	85	85	100	100	125	125
g	[mm]	24	32	32	42	41	53
h	[mm]	25	30	30	37	37	47
i	[mm]	10	14	14	18	18	23
k	[mm]	18	22	22	28	28	36
l	[mm]	25	25	35	35	55	55
m	[mm]	28	35	35	44	44	54
o	[mm]	12.5	12.5	16.5	16.5	22.0	22.0
p	[mm]	50	50	64	64	90	90
r	[mm]	20	20	25	25	30	30
s	[mm]	13	13	13	13	20	20
t	[mm]	32	32	38	38	45	45
Clamping block with T-slot adapter	**Part no.**	**823121802**	**823122202**	**823142211**	**823142811**	**823152811**	**823153611**
Weight	[kg]	4.0	4.4	6.7	7.4	14.2	15.5
Clamping block, separate	**Part no.**	**823120101**	**823120101**	**823140501**	**823140501**	**823150501**	**823150501**
Clamping dimension	[mm]	20.5 ±1	20.5 ±1	25 ±1.5	25 ±1.5	32 ±1.5	32 ±1.5
Weight	[kg]	2.6	2.6	4.0	4.0	8.6	8.6
Clamping block, separate with position monitoring	**Part no.**	**823120104**		**823140504**			

Please consult us if aggressive spray is used. Max. operating pressure 400 bar, max. operating temperature 120 °C.
Further sizes and special versions are available on request.

Angular rotary coupling (M 8S / G 1/4)

Part no. 9208176

For easier handling when changing dies.
Max. operating pressure 400 bar

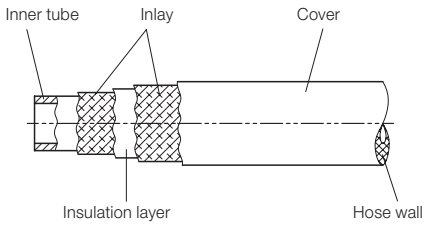


Hydraulic high-pressure hoses

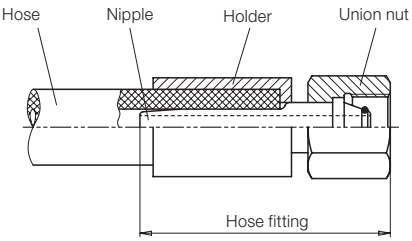
assembled ready for connection
max. operating pressure 250 / 500 bar

High-pressure hoses are used for energy and signal transmission in hydraulic systems. The hose lengths should be generously dimensioned to avoid kinks, abrasion marks, torsion, tensile and compressive stress and unacceptable bending radii.

Hose structure



Hose union

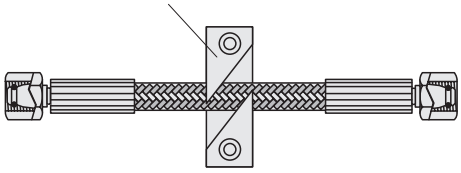


High-pressure hose		**ND**	**4**	**4**	**6.3**	**6**
Max. operating pressure		[bar]	250	500	250	500
Port size			8L	8S	8L	8S
Union nut			m8L (M 14 x 1.5)	m8S (M 16 x 1.5)	m8L (M 14 x 1.5)	m8S (M 16 x 1.5)
SW		[mm]	17	19	17	19
Preferred lengths	L = 500	[mm]	**9375100500**	**9375200500**	**9320600500**	**9370600500**
	1000	[mm]	**9375101000**	**9375201000**	**9320601000**	**9370601000**
	1600	[mm]	**9375101600**	**9375201600**	**9320601600**	**9370601600**
	2500	[mm]	**9375102500**	**9375202500**	**9320602500**	**9370602500**

Other hose connections left / right on request. For further information and technical data, see data sheet WZ 11.3800

Accessory

Hose holder made from Delrin
Part no. 550650003



Other accessories

Hydraulic power units
see product group 7

Hydraulic accessories
see product group 11

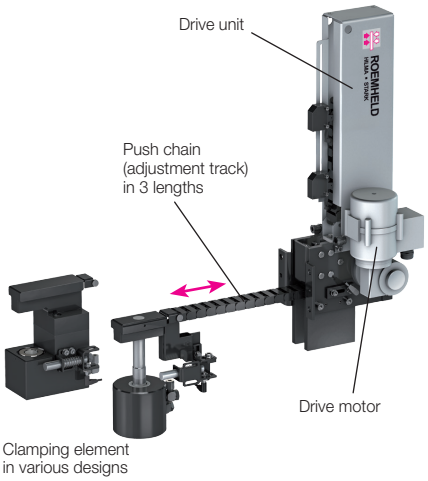
WZ 3.2280

Flexline Rapid Clamping System with Push Chain

Flexible selection of clamping element, T-slot and adjustment track electrically or pneumatically driven

Advantages

- 9 different clamping elements
- 4 different T-slots
- 3 different adjustment tracks
- Electrical or pneumatic drive motor
- Easy to service, easily exchangeable modular assemblies ensure high availability of parts
- Technical design and finished drawing in just a few minutes
- Highly flexible, low-maintenance hydraulic hoses with high burst pressure



Application

Rapid clamping systems are used for the automatic clamping of dies of varying sizes on the press ram.

Description

The electro-mechanical / electrically or pneumatically driven push chain moves the clamping element attached to the rapid clamping system automatically from the parking position to the clamping position at the clamping edge and then back to the parking position.
The T-slot of the machine serves as the guide for the push chain and clamping element. The push chain also serves as the energy chain for accommodating the hydraulic and electric lines of the clamping element.

Versions

Flexline rapid clamping systems can be supplied in the following variants:

- **Clamping elements**
  Hollow piston cylinders, clamping cylinders with locking mechanism, spring clamping cylinders or sliding clamps
- **T-slots** 28, 32 or 36 mm or 1 1/16"
- **Adjustment tracks** (tracks of the clamping element) 660, 820 or 1100 mm
- **Drive motor** electrically or pneumatically driven
- **Optional position monitoring** (adjustable)
  micro switch for “end position” and “intermediate position”
- **Position monitoring of the “die position”** attached on the left or right hand side
- **Chain case** in galvanised design or painted individually at customer’s request
- **Option: design with UL-compliant components**
- **Various Harting connectors** selectable for motor current and monitoring signals
- **Option: socket housing** for assembly to the machine

Technical data

T-slot	**28 mm and 36 mm (DIN 650) / 32 mm (similar to DIN 650) and 1 1/16"**
Adjustment speed	150 mm/s
Option drive motor	Various three-phase motors Technical characteristics see page 2 Pneumatic motor Direct current motor 24 V DC Alternating current motor 120 VAC 60 Hz
Motor connection	Harting connector with 500 mm cable length
Monitoring connection	Harting connector with 500 mm cable length
Monitoring: 1. Parking position 2. Die position Option: 3. “End position” (end of chain) 4. “Intermediate position”	 inductive sensor 24 (10–30) V DC inductive sensor 24 (10–30) V DC micro switch micro switch
Hydraulic connection	8 mm pipe socket with union nut M16x1.5 (500 mm hose length)
Operating temperature	max. 70 °C
Part no.	**8228** (basic version)

Application example

Selection scheme

You can configure the desired product variant yourself. You are provided with a dimension drawing for the selected configuration and can send us your chosen configuration directly for an offer to be prepared.

Clamping element	Dimensions D x L	Clamping force	Operating pressure	Total stroke S	Clamping stroke St	Oil volume clamping/unclamping
○ Hollow piston cylinder, double acting	Ø 95 x 88	104 kN	400 bar	12 mm	8 mm	2.6/2.6 cm^3/mm
○ Hollow piston cylinder, single acting	Ø 90 x 105	104 kN	400 bar	12 mm	8 mm	2.6/ – cm^3/mm
○ Hollow piston cylinder, double acting	Ø 105 x 88	100 kN	245 bar	12 mm	8 mm	4.1/4.1 cm^3/mm
○ Hollow piston cylinder, single acting	Ø 100 x 112	100 kN	245 bar	12 mm	8 mm	4.1/ – cm^3/mm
○ Clamping cylinder, double acting, with locking	Ø 100 x 128	100 kN	100 bar	8 mm	4 mm	31/31 cm^3/mm (22 cm^3 for adjustment stroke 0–3 mm)
○ Spring clamping cylinder, single acting	Ø 120 x 134	100 kN	260 bar	7 mm	1 mm	– /7.9 cm^3/mm
○ Sliding clamp, double acting	80 x 75	78 kN	400 bar	12 mm	8 mm	2/1.5 cm^3/mm
○ Sliding clamp, single acting	80 x 75	78 kN	400 bar	12 mm	8 mm	2 cm^3/mm
○ Double piston sliding clamp, double acting	140 x 70	100 kN	400 bar	23 mm	19 mm	2.5/1.9 cm^3/mm

Slot width a	max. track of the clamping element V
○ 28 mm (DIN 650)	○ 660 mm (H = 574 mm)
○ 32 mm	○ 820 mm (H = 654 mm)
○ 36 mm (DIN 650)	○ 1100 mm (H = 794 mm)
○ 1 1/16" (27 mm)	

Motor ○ on the left ○ on the right ○ at the rear	R			T		
	Motor on the left/on the right/at the rear			Motor on the left/on the right/at the rear		
○ 400 V ±10 %, 50 Hz, 3~ AC [0.37 A, 45 W, ~150 mm/s] (UL compliant)	141 mm	141 mm	81.5 mm	206.5 mm	223.5 mm	340 mm
○ 420–480 V ±10 %, 60 Hz, 3~ AC [0.3-0.37 A, 45 W, ~150 mm/s] (UL compliant)	141 mm	141 mm	81.5 mm	206.5 mm	223.5 mm	340 mm
○ 380 V ±10 %, 50 Hz, 3~ AC [0.34 A, 45 W, ~150 mm/s] (UL compliant)	141 mm	141 mm	81.5 mm	206.5 mm	223.5 mm	340 mm
Option						
○ Pneumatic motor [6 bar, 0.36 m^3/min]	119 mm	119 mm	59 mm	188 mm	206 mm	306 mm
○ Direct current motor 24 V DC [3.6 A, 60 W]	119 mm	119 mm	59 mm	188 mm	206 mm	306 mm
○ Alternating current motor 120 VAC, 60 Hz, 1~ AC [0,89 A, 45 W, ~150 mm/s] (UL compliant)	130 mm	130 mm	70.5 mm	199.5 mm	217 mm	333 mm

Position monitoring	Chain case
○ Die position S2 - on the left	○ galvanised, unlacquered
○ Die position S2 - on the right	○ lacquered RAL XXXX
○ End position S3 + spec. of dimension K	
○ Intermediate position S4 + spec. of dimension Z	

Harting connector for motor and position monitoring

	Pin assignment type 2290
○ Harting HAN modular 3 x 5 ES	
○ Harting HAN 3 HvE / HAN 10 E	○ Harting HAN 3 HvE / HAN 10 E "2290"
○ Harting HAN 6 ES / HAN 10 ES	○ Harting HAN 6 ES / HAN 10 ES "2290"
○ Counterparts included in the delivery (selectable option: yes/no)	

Option

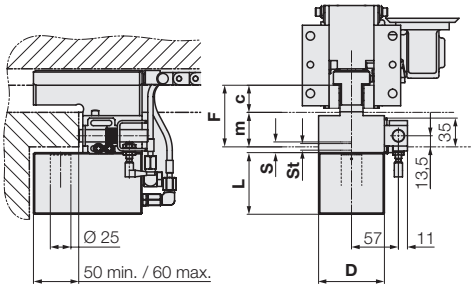
- ○ Harting HAN 10 ES for pneumatic motor
- ○ Harting HAN 10 ES for 24 V DC motor
- ○ Harting HAN 6 ES / HAN 10 ES (for single-phase alternating current motor 115 VAC, 60 Hz)

Clamping dimension Specification of clamping dimension F (±St/2) in [mm]

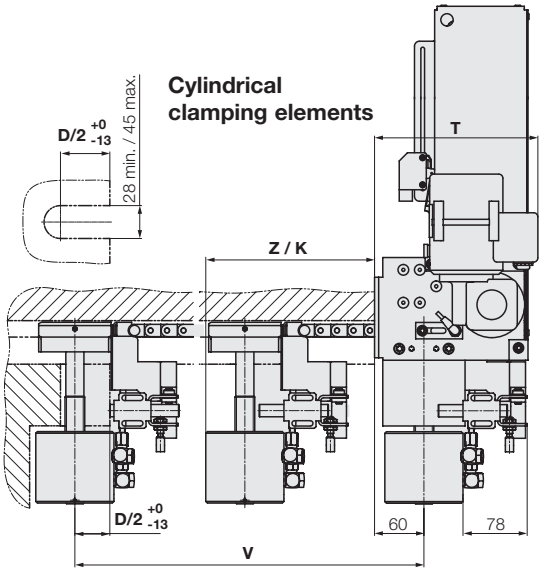
F = mm **F = c + m** (m = die clamping edge, c = web height of T-slot)

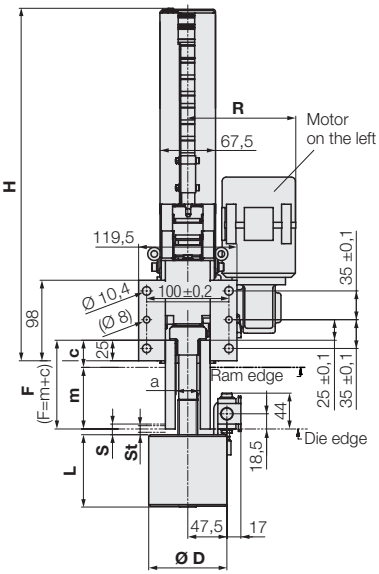
F min. 70 mm, max. 128 mm for hollow piston cylinder
F min. 70 mm, max. 112 mm for spring clamping cylinder and clamping cylinder with locking
F min. 72 mm, max. 128 mm for sliding clamp + T-slot 28 + 1 1/16"
F min. 77 mm, max. 128 mm for sliding clamp + T-slot 32
F min. 82 mm, max. 128 mm for sliding clamp + T-slot 36
F min. 70 mm, max. 128 mm for double piston sliding clamp + T-slot 28 + 1 1/16"
F min. 72 mm, max. 128 mm for double piston sliding clamp + T-slot 32
F min. 72 mm, max. 128 mm for double piston sliding clamp + T-slot 36

Sliding clamps

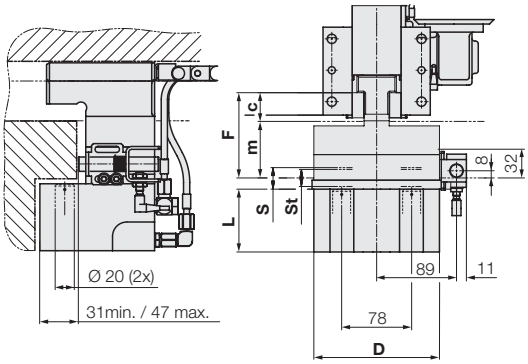


Cylindrical clamping elements



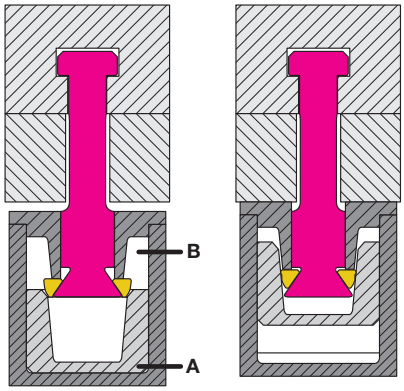


Double piston sliding clamp



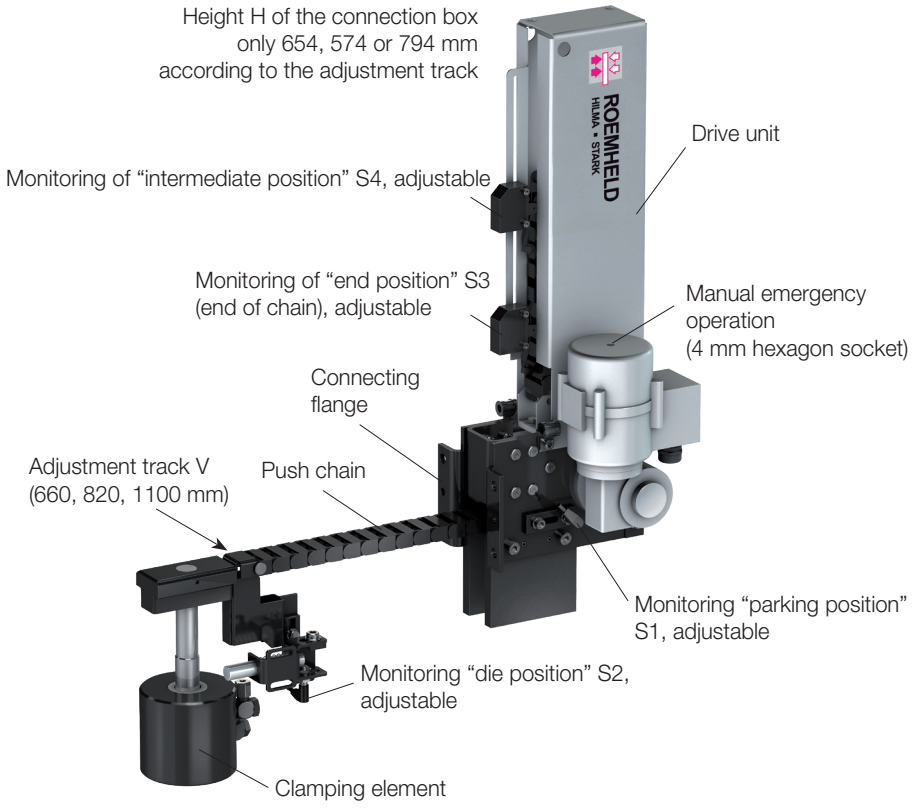
Clamping cylinder, double acting, with locking

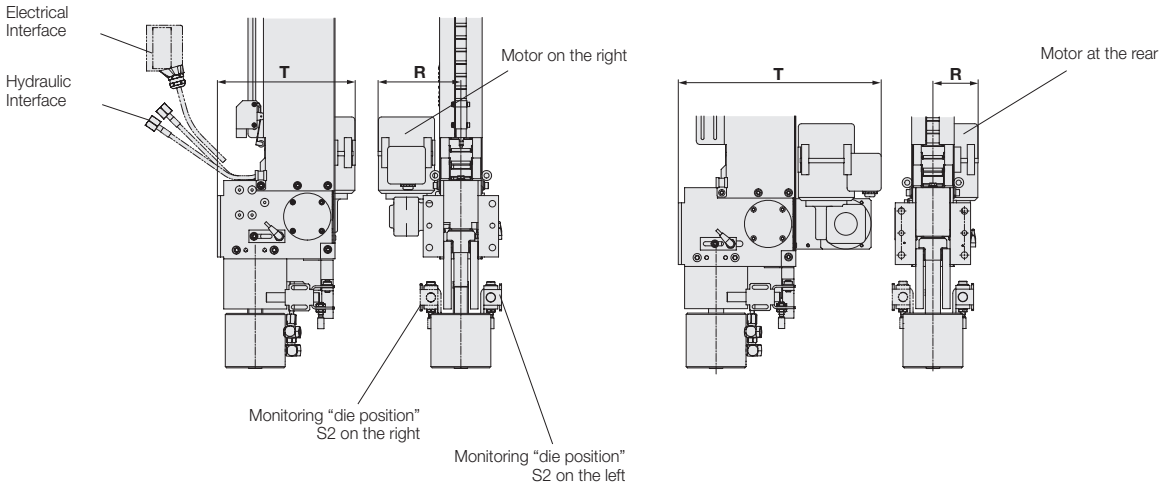
Unclamping position **Clamping position**



Functioning

To clamp, apply pressure to port A.
The clamping element is moved by means of the integrated wedge mechanics to the edge of the die in a rapid adjustment stroke.
After generating clamping force of 100 kN with only 100 bar operating pressure, the clamping position is then mechanically secured in a self-locking manner, so that the clamping force is retained completely, even in the event of pressure loss.
For safety reasons, it is recommended to maintain the hydraulic pressure.
To unclamp, depressurise port A and apply pressure to port B.
The mechanical lock is released and the clamping element moves to the unclamping position.



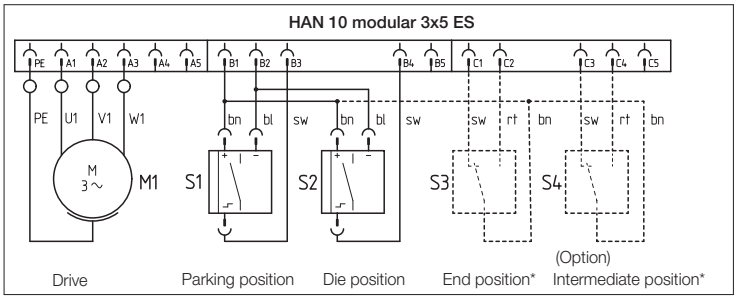


Electrical interface
Harting connector for motor + position monitoring
Pin assignment and connector version see circuit diagram
(special version or without connector on request)

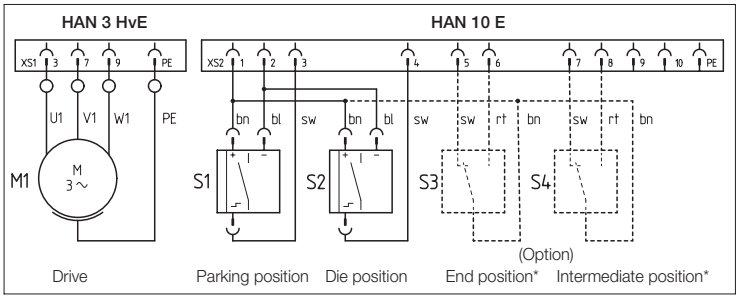
Pneumatic interface (air motor)
Port R to move the clamp forward (to the die)
Port L to move the clamp backward (to the parking station)
Connecting thread G¼ (plug-in connectors included in the delivery)
Operating pressure 6 up to 7 bar
Air supply hose Ø LW 6 mm (external Ø 8 mm)

Hydraulic interface
Port A for clamping
Port B for unclamping
Standard: M16x1.5 union nut
Pipe connection Ø 8 mm

Pin assignment of the Harting connector versions



*) not actuated in * position!



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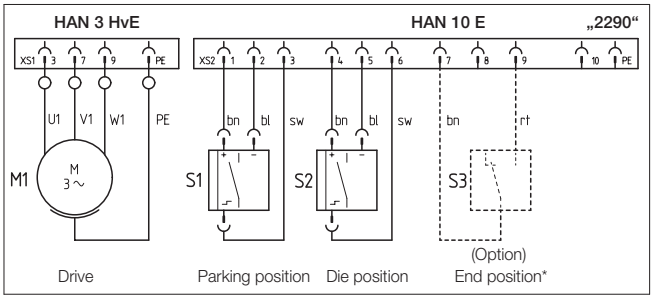

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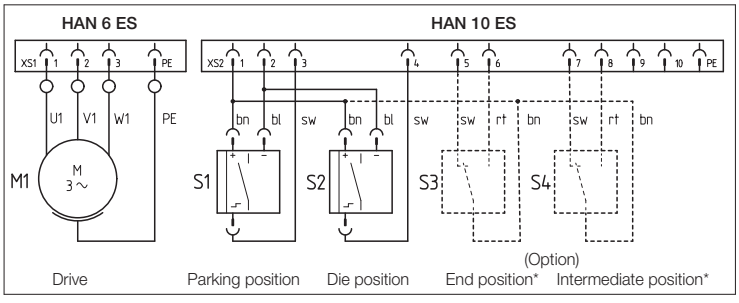

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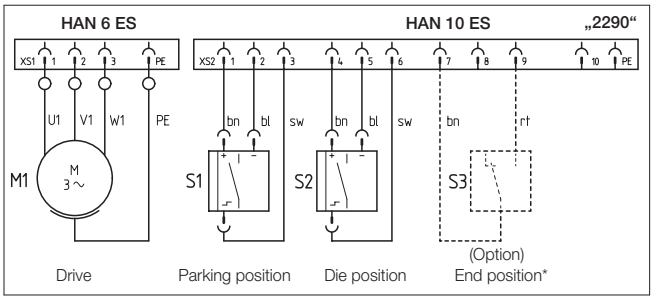
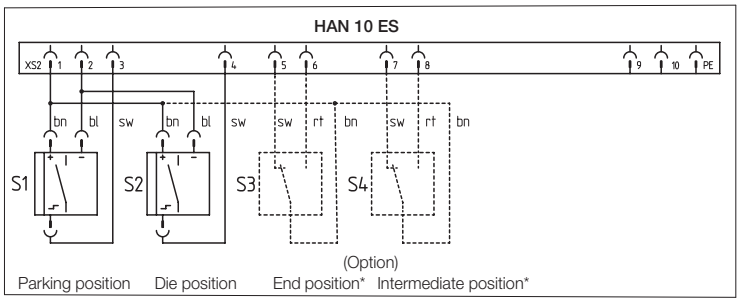


*) not actuated in * position!

Pneumatic motor



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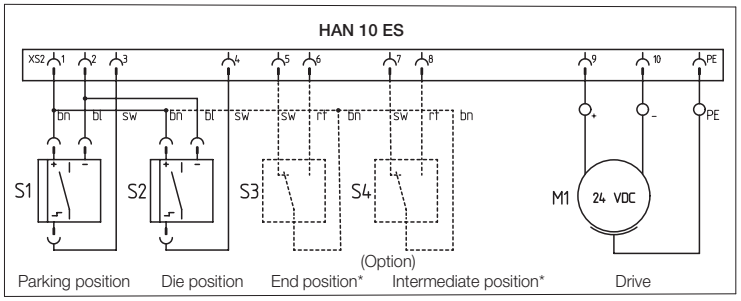
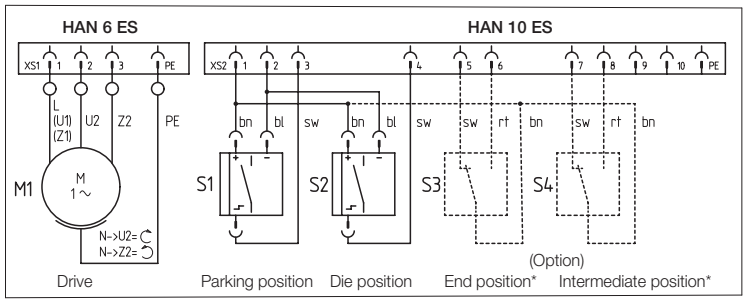
Direct current motor 24 V DC



*) not actuated in * position!

Single-phase alternating current motor 120 V AC 60 Hz



*) not actuated in * position!

Special versions of the rapid clamping system

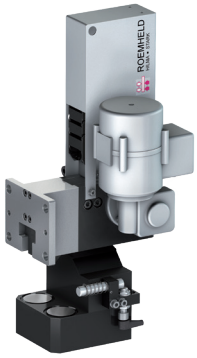
Please contact us if your individual clamping task is not covered by the options available with “Flexline”. In many cases, we will be able to fulfill your requirements with a customised special version which deviates only slightly from the standard design.

Possible special versions:

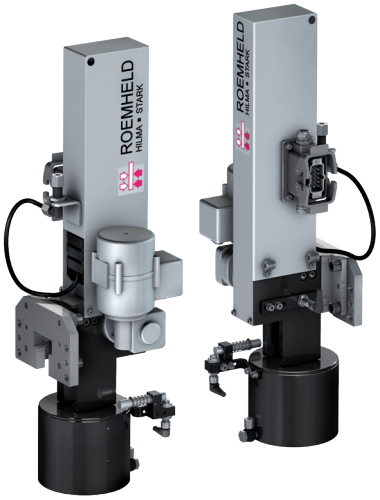
- Clamping solutions for tight spaces
- Special mounting hole pattern
- Different T-slot dimension (e.g. T-slot 22)
- Adapted track V (e.g. > 1100 mm)
- Clamping elements with for example:
  - special clamping force
  - specific operating pressure
  - modified clamping stroke St
  - modified clamping dimension F
  - modified shape
  - different mode of operation
- Other motor voltage or other drive principle
- Special options for electric or hydraulic connections
- Components of certain manufacturers or specifications
- Additional requests and customer-specific requirements ...

Examples of possible special versions

Special sliding clamp with two clamping pistons
- **short track**

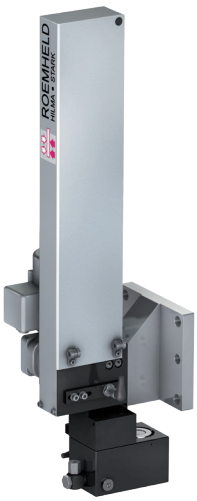


Adaptor plate with special mounting hole pattern
- **special electric and hydraulic connection**



Long track with special low profile chain case
- **additional position monitoring**

Special flange plate with special mounting hole pattern

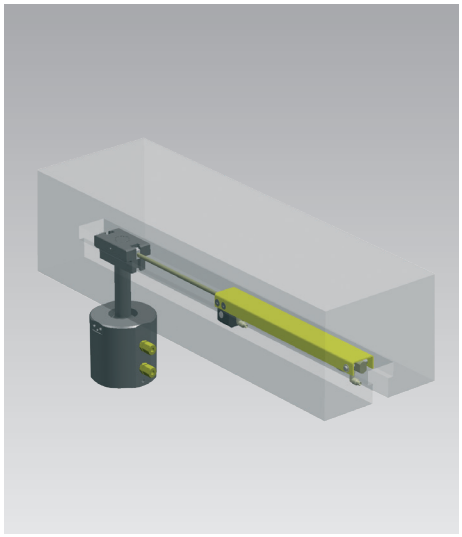


Additional extension bracket with new parking position to overcome major obstruction on the press

WZ 3.2295

Rapid Clamping System with Pneumatic Cylinder

"Pneumatic travelling clamp", max. operating pressure 10 bar
with single and double-acting clamping elements



Advantages

- Robust solution for short distances of travel
- Easy installation using standard clamping elements
- For fixing, no modification to the press ram is required
- Rapid adaptation to various die sizes

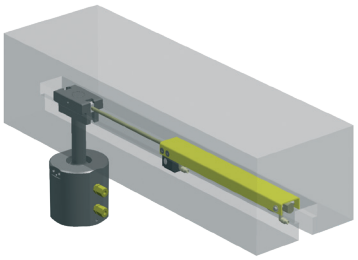
Possible clamping elements:

Hollow piston cylinder, double acting
with a max. clamping force of 115 kN

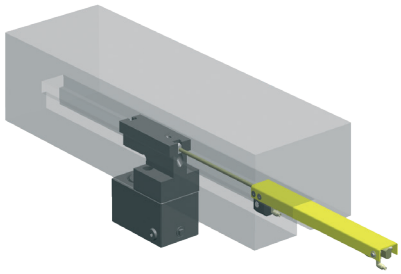
Hollow piston cylinder, single acting
with a max. clamping force of 104 kN

Locking cylinder, double acting
with a max. clamping force of 100 kN

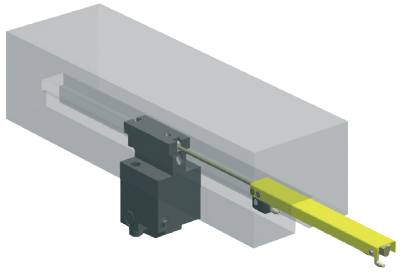
Spring clamping cylinder, single acting
with a max. clamping force of 100 kN



Sliding clamp, single acting
with a max. clamping force of 78 kN



Angular clamp, single acting
with a max. clamping force of 66 kN



Application

The rapid clamping systems "Pneumatic travelling clamp" are used for automatic displacement of standard clamping systems with a pneumatic cylinder for short distances of travel.

Description

The pneumatic positioning drive fits completely into a T-slot as per DIN 650 with a slot width of 28 mm, therefore the positioning cylinder can be positioned upstream or downstream of the clamping element. The positioning drive is fastened in the T-slot using a wedge lock without the need to modify the press ram.
Query of the unclamping and clamping positions is carried out using inductive magnetic sensors on the pneumatic cylinder.

Delivery

- Clamping element
- Pneumatic positioning drive unit including screw fittings for pneumatic connection and position control on the cylinder.
- High-pressure hose and screw fittings for hydraulic connections on the clamping element

Technical data

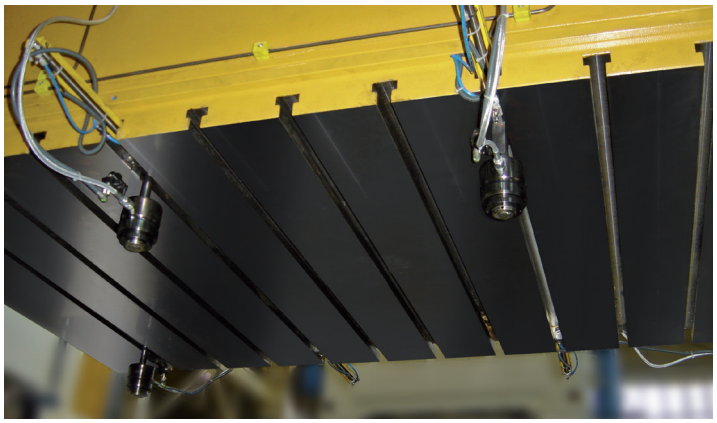
Operating pressure pneumatic	[bar]	min. 6 (max. 10)
Travelling distance	[mm]	200
Temperature range	[°C]	up to 70
Weight of the clamping element: at 6 bar	[kg]	max. 8.5
at 10 bar	[kg]	max. 14

Options

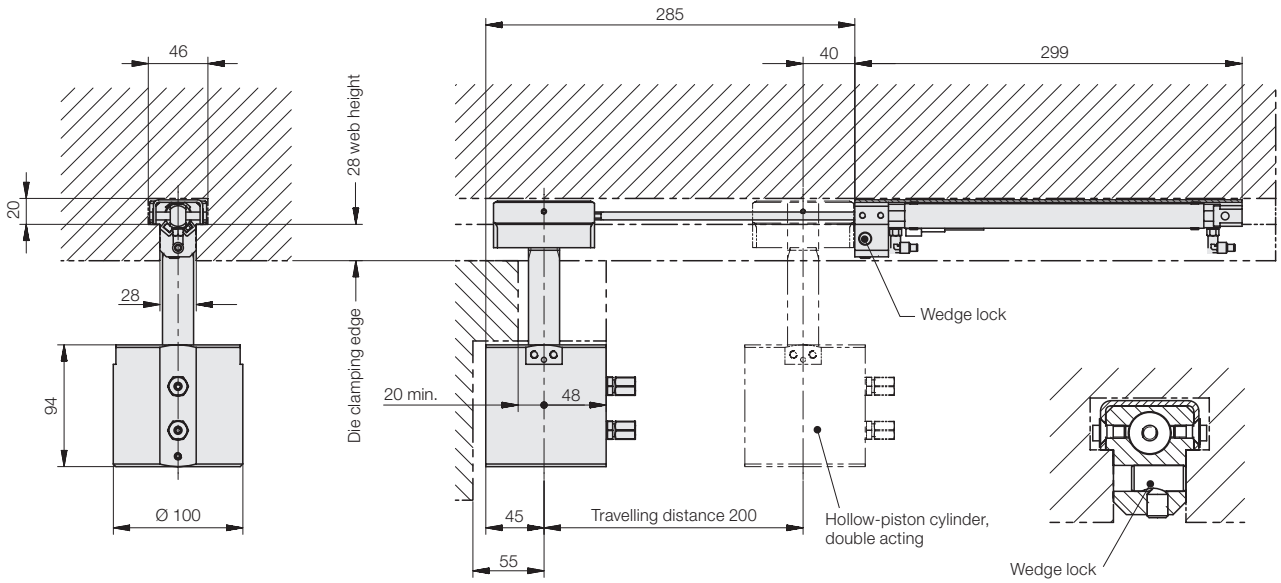
- Parking station (for the unclamping position outside of the press ram)
- Travelling distance up to 400 mm
- Reed contacts instead of inductive magnetic sensors
- Pneumatic flow control valves for adjusting the travelling speed

Other optional extras including adaptation are available upon request.

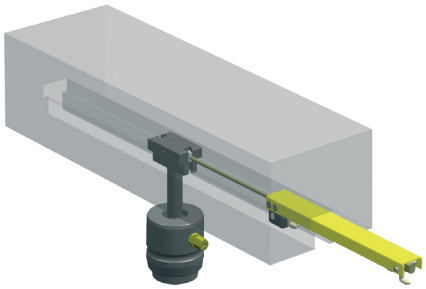
Application example

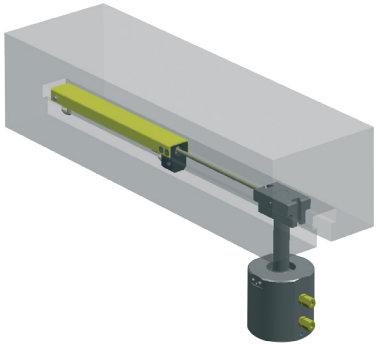


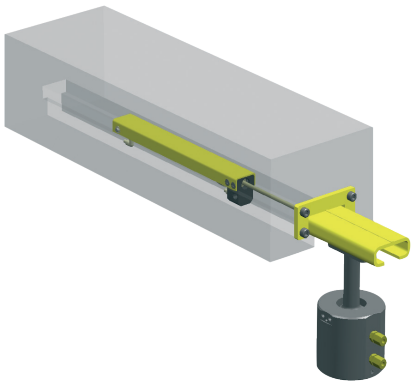
Rapid clamping system with pneumatic cylinder

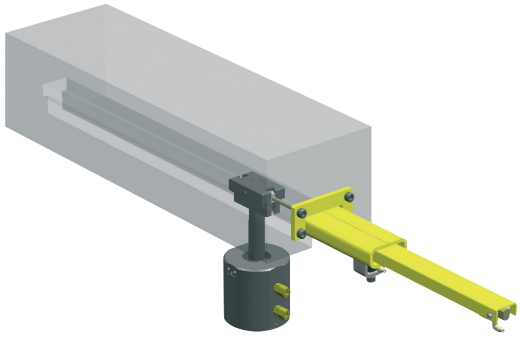


Installation variants





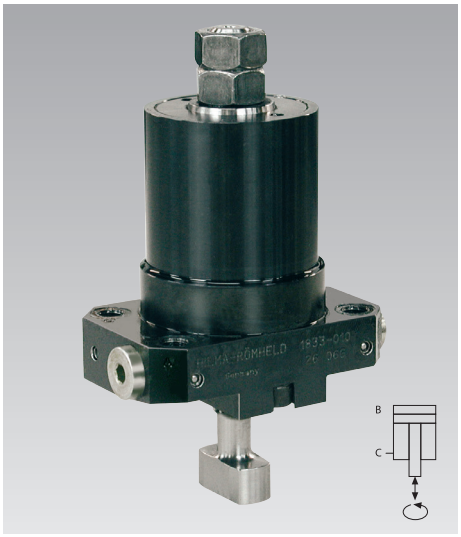




WZ 2.1833

Swivel and Pull Clamps

double acting with 90° swivel angle and position monitoring
max. operating pressure 400 bar



Advantages

- Perfectly suitable for retrofitting
- Ideal force transmission
- Compact design
- Optimum use of ram and bed surfaces
- Clamping at difficultly accessible points

Description

The swivel and pull clamps consist of a hollow piston cylinder and a swivel cylinder.
The tie rod held in the hollow piston cylinder is provided with teeth which engage in the toothed rack of the swivel cylinder. The clamping position is pneumatically monitored.
Optionally, monitoring is also possible by inductive proximity switches.

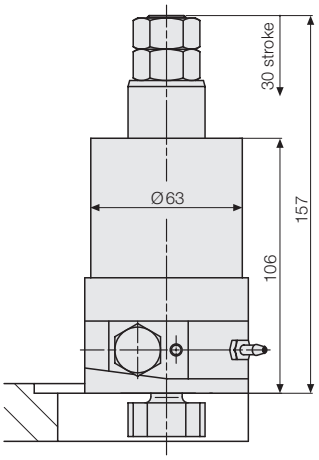
Application

Swivel and pull clamps are used on presses and high-speed punching presses. Thanks to the compact design, they are particularly suitable where space is limited.

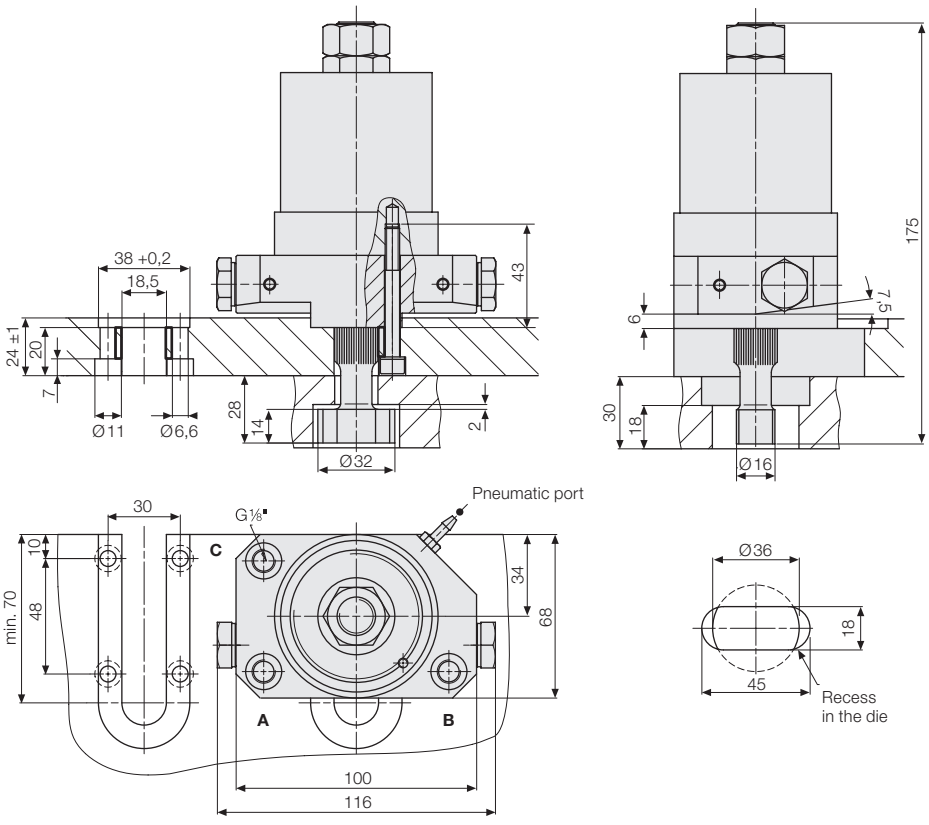
Technical data

Clamping force at 400 bar	**[kN]**	30.4
Max. operating pressure	[bar]	400
Stroke	[mm]	30
Max. flow rate	[cm³/s]	15
Oil volume - retracting	[cm³]	24
Oil volume - extending	[cm³]	15
Weight	[kg]	3.2
with pneumatic position monitoring for the clamping position **Part no.**		**1833010**
with inductive position monitoring **Part no.**		**1833013**

Tie rod retracted
Swivel angle 0°



Tie rod extended by 30 mm
Swivel angle 90°



Ports:

A: Swivelling
B: Extending
C: Retracting/clamping

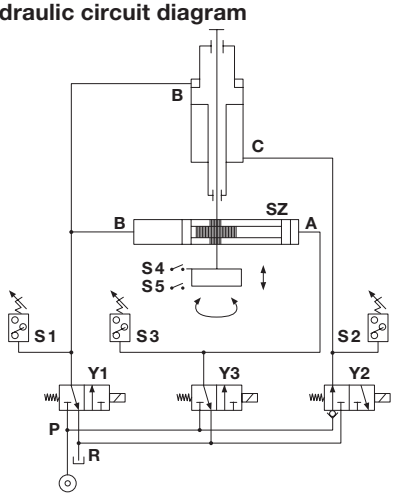
Control

The valve control is shown in the hydraulic circuit diagram. The valves have different initial positions, in order to avoid pressure drop during clamping in case of power failure. This is ensured by the check valve in the P-port of Y2.

Important note!

The P-port of valve Y1 must not be provided with a check valve, as during retraction pressure is applied to the piston from both sides (differential system).
Otherwise, due to the different piston areas, the pressure may be intensified and thus exceed the admissible operating pressure.

Hydraulic circuit diagram



Start up

It is very important to completely bleed all lines. Proceed as follows: adjust a low pressure on the power unit (20 - 50 bar). Start with the most distant swivel and pull clamp, carefully loosen the lock nut and keep the power unit operating until the emerging oil is free from bubbles. Repeat this procedure at each port. After bleeding, retighten all screws. Adjust the defined operating pressure (see hydraulic circuit diagram) on the power unit (see operating manual). Prior to clamping a die, the functional sequence should be checked in accordance with the functional diagram.
Position monitoring, however, can only be checked with the die clamped.

Switching sequence as per functional diagram:

1. Retracted position
   Y1 is energised, Y2 and Y3 are de-energised, pressure is applied to cylinder ports B and C.

2. Extending
   When Y2 is energised, the pressure applied to C drops, the swivel and pull clamp extends

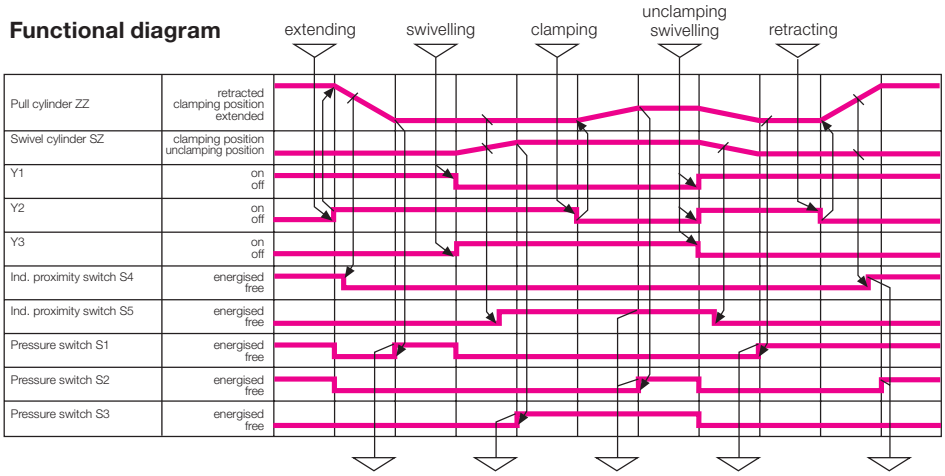
3. Swivelling
   Y1 is de-energised, Y3 is energised, pressure is applied to A only, the clamping bolt swivels by 90°.

4. Clamping
   Y2 is de-energised, pressure is applied to A and C, the element retracts with the clamping bolt swivelled, de-energise Y3

5. Extending, unclamping, swivelling
   Y1 and Y2 are energised, Y3 is de-energised, pressure is applied to B only, the clamping bolt extends and swivels back by 90°

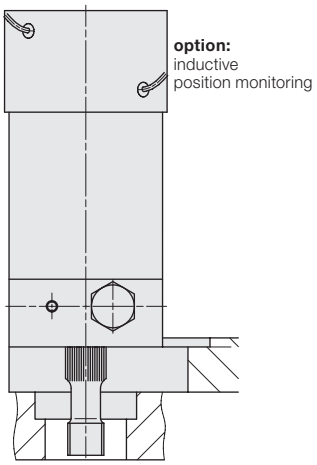
6. Retracting
   Y2 is de-energised, pressure is applied to B and C. Due to the larger piston area of C, the element retracts.

Functional diagram



Position monitoring

By means of the position monitoring system, pneumatic or inductive control of both the clamping and unclamping position is possible. Pneumatic position monitoring is made by a nozzle which is closed in the corresponding position. The position signal is generated by a pneumatic flow switch. Data sheets of the inductive proximity switches will be made available on request.

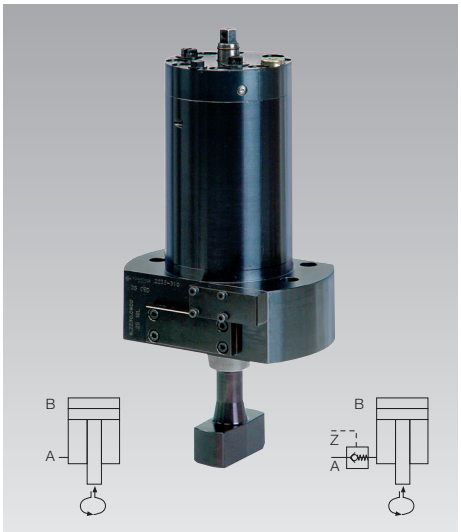


Replacement of the clamping bolt

If it is necessary to remove the clamping bolt, it is very important that re-installation of the replacement part is made in the same toothing position.
The lock nuts have a tightening torque of 210 Nm. Make sure that there is still sufficient axial play for an easy turning of the clamping bolt (0.1 - 0.3 mm).

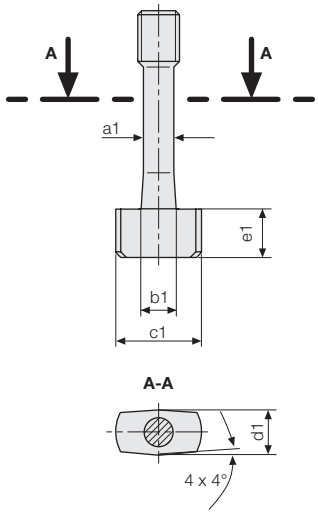
Swing Sink Clamps

double acting for exterior clamping, with 90° swing angle max. operating pressure 400 bar



Advantages

- Suitable for retrofitting
- Ideal force transmission
- Compact design
- High operating safety by position monitoring, manual emergency operation and overload protection
- Suitable for large clamping edge tolerances (±1.5 mm)
- Optimum utilisation of bed and ram surfaces so there are no parts protruding when inserting the die
- Clamping at difficultly accessible points
- Tie rod lengths up to 2000 mm



Application

Swing sink clamps can directly be mounted to the press bed or ram. They are particularly suitable where space is limited.
Temperature range up to max. 70 °C

Description

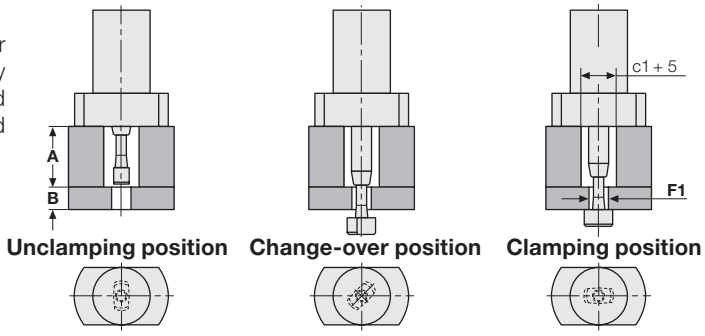
The piston is guided by a control bolt so that during the stroke movement a rotation of 45° is effected.
For clamping, the tie rod is rotated by 90° from the unclamping position and pulled against the clamping surface through the existing clamping slots.

Monitoring of the unclamping, change-over and clamping positions by inductive proximity switches. The swing mechanism is protected by a spring-loaded overload protection and equipped with manual emergency operation.

Dimensions of tie rod

Swing sink clamp		2235XXX				2237XXX		
F1 clamping slot in the die	[mm]	32	40	45	50	45	50	60
a1	[mm]	22	22	22	22	32	32	32
b1	[mm]	28	28	28	28	40	40	40
c1	[mm]	54	62	67	72	77	82	92
d1	[mm]	28	28	28	28	40	40	40
e1	[mm]	30	30	30	30	37	37	37

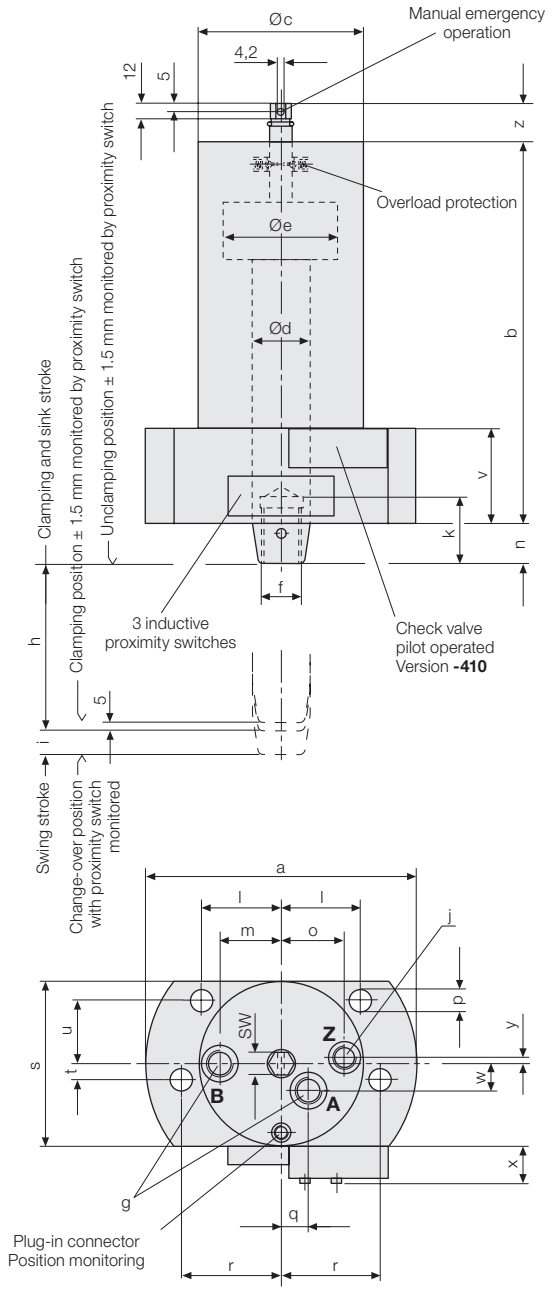
Please specify in your order the dimensions:
A (ram plate), **B** (die clamping edge thickness) and **F1** (clamping slot)



Technical data
Max. operating pressure 400 bar

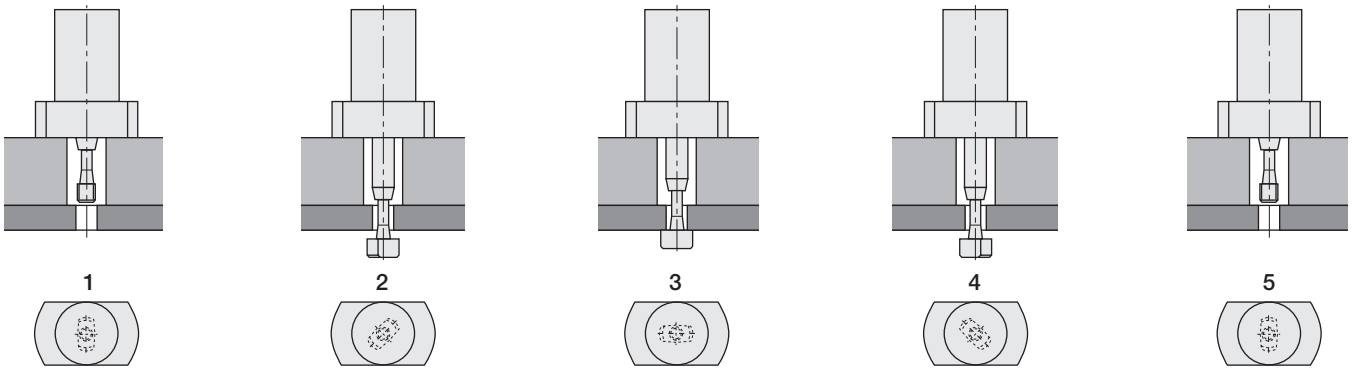
Clamping force at 400 bar	**[kN]**	**104**	**216**
100 bar	[kN]	26	54
Piston Ø e	[mm]	70	100
Rod Ø d	[mm]	40	56
Max. clamping edge height	[mm]	68	68
Swing stroke i	[mm]	15	23
Clamping and sink stroke h	[mm]	105	112
Oil volume clamping	[cm^3]	514	1211
Oil volume unclamping	[cm^3]	388	948
Max. flow rate	[cm^3/s]	50	120
a	[mm]	170	212
b	[mm]	240	270
c	[mm]	104	146
f	[mm]	M27 x 1.5	M36x2
g	[mm]	G ⅜	G ½
j	[mm]	G ¼	G ¼
k	[mm]	42	55
l	[mm]	50	71
m	[mm]	38	57
n	[mm]	25	34
o	[mm]	39.8	62
p	[mm]	14	18
q	[mm]	17.3	27.6
r	[mm]	62.5	84
s	[mm]	104	146
t	[mm]	10	23
u	[mm]	40	50
v	[mm]	60	65
w	[mm]	16.7	27.6
x	[mm]	22.6	22.6
y	[mm]	4.2	0
z	[mm]	24	31
SW	[mm]	14	22
Weight	[kg]	16.5	35
without check valve	**Part no.**	**2235310**	**2237310**
with check valve	**Part no.**	**2235410**	**2237410**

Further sizes and special versions are available on request



Functional description

The piston of the double-acting swing sink clamp is guided by a guide pin in such a manner that during part of the stroke a 45° rotation is carried out just before reaching and just after leaving the piston upper end position. The rotation is always anti-clockwise, no matter whether the piston extends or retracts.



1. Unclamping position
The piston is completely retracted. This permits an easy die change, as no parts project over the bed or ram level.

2. Change-over position
For clamping, pressure is applied to the piston side B. The tie rod passes through the slot of the clamping point and is then rotated by 45°.

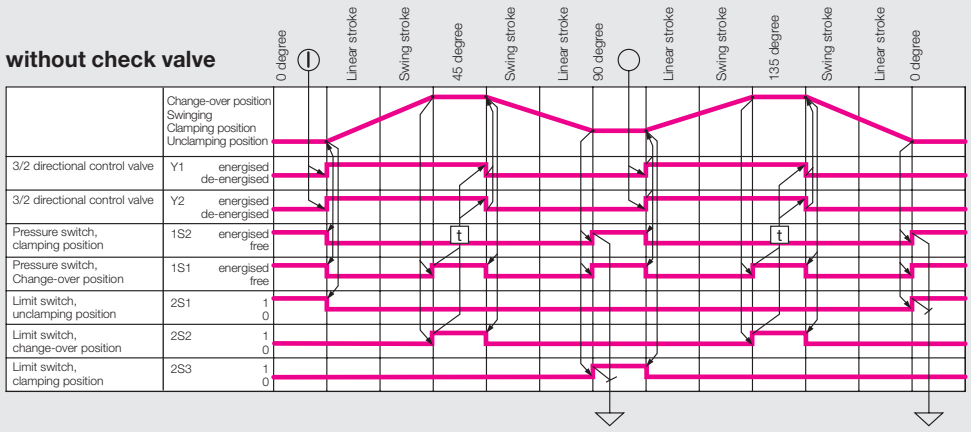
3. Clamping position
Pressure is applied to the piston rod side A. The tie rod makes a further 45° rotation and is now transversely above the clamping point.
The die is clamped
The proximity switch 2S3 monitors this position.

4. Change-over position for unclamping,
pressure is applied to the piston side B. The tie rod is extended and then again rotated by 45°. Proximity switch 2S2 monitors this position.

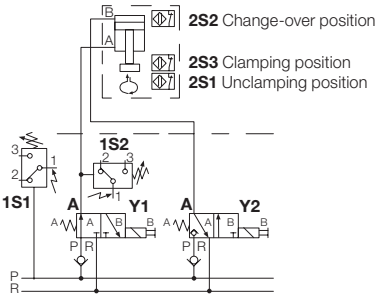
5. Unclamping position
Pressure is applied to the piston rod side A. The tie rod makes a further 45° rotation and passes through the slot of the clamping point as far as the end position. Proximity switch 2S1 monitors this position.
The die is unclamped.

Functional diagrams

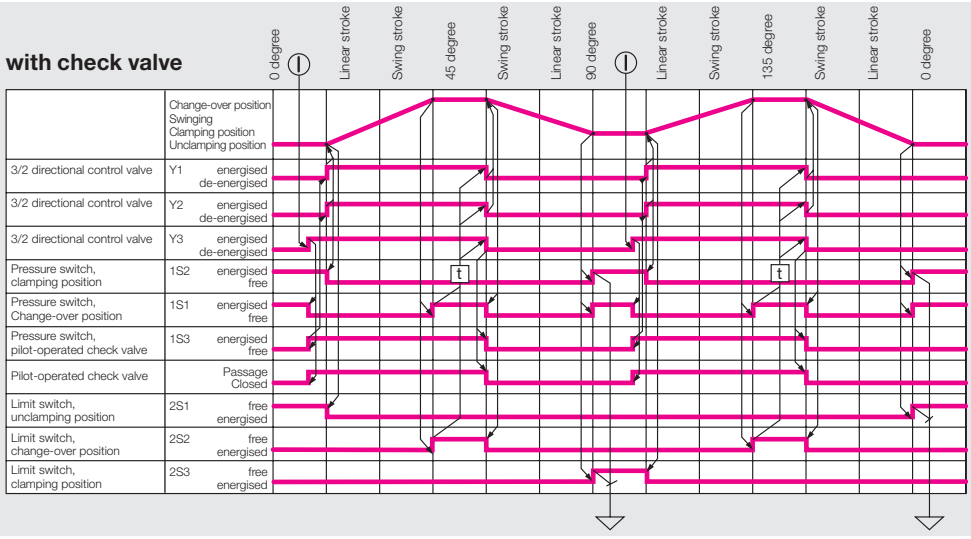
without check valve



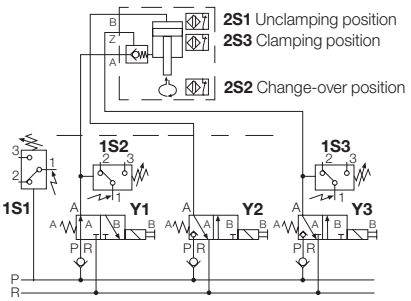
Hydraulic circuit diagram without check valve



with check valve



Hydraulic circuit diagram with check valve



Hydraulic installation

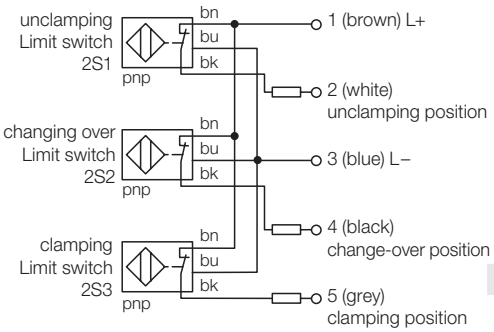
Read the operating manual before starting up.
Adjust the flow rate of the power unit so that clamping and unclamping cycles between 10 and 30 seconds are obtained. In order to prevent the swing mechanism from premature wear, the dynamic pressure at port B should not exceed 50 bar while the tie rods retract through the slot.
Swing sink clamps which are grouped together should be connected to distribution boards, in order to avoid series connection. Use pipes with larger diameter for connection to the power unit.
If in doubt, please send the installation plan to be reviewed.
Provide a pressure gauge connection in every hydraulic circuit for adjustment and to check operating data.
Other parameters and recommendations for hydraulic installation of die clamping systems are given in chapter no. 1 “General information”.

Important note!

The full stroke of the piston must be realised, otherwise the swing mechanism may be damaged.

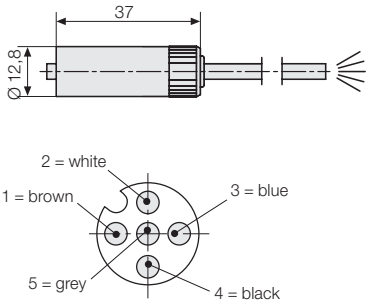
Pin assignment
for three-wire proximity switches

Supply voltage	10 – 30 V DC
Constant current	≤ 100 mA
Type	inductive, break contact pnp



Accessories

5-pole connecting cable with screw coupling



Cable length 5 m	**Part no.**	**5700013**
Cable length 10 m	**Part no.**	**5700014**

Accessories

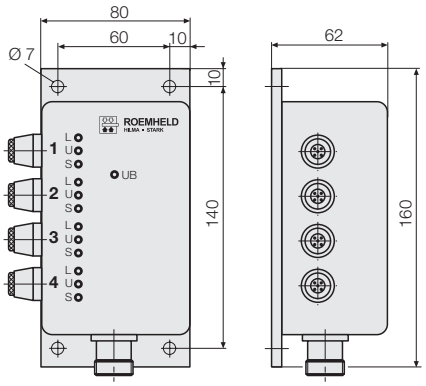
Distribution board with LED display
for the connection of 4 clamps

Display of the unclamping, change-over and clamping position of each clamping element via LED display

Delivery

- 1 distribution board
- 4 5-pole coupling plug
- 1 16-pole coupling plug

Part no. 5700015



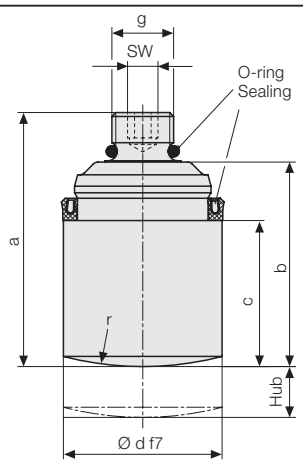
Pin assignment of output plug:

Pin 1 = L+	Pin 9 = 3L		
Pin 2 = L–	Pin 10 = 3U		
Pin 3 = 1L	Pin 11 = 3S	**L = unclamping position**	
Pin 4 = 1U	Pin 12 = 4L	**U = change-over position**	
Pin 5 = 1S	Pin 13 = 4U	**S = clamping position**	
Pin 6 = 2L	Pin 14 = 4S		
Pin 7 = 2U	Pin 15 = free		
Pin 8 = 2S	Pin 16 = free		

WZ 4.1070

Built-in Pistons
single acting, with spring return
max. operating pressure 250 bar

Advantages
- Low built-in height
- Very compact design
- Extremely low overall height, despite return spring and fully utilisable stroke limitation
- Easily exchangeable
- High force density



Technical data
Max. operating pressure 250 bar

Clamping force at 250 bar	[kN]	12.25	20	31.25	48.75
Clamping force at 100 bar	[kN]	4.9	8	12.5	19.5
Spring return force, min.	[N]	130	200	230	400
Piston Ø d	[mm]	25	32	40	50
Stroke	[mm]	8	8	8	12
Total oil volume	[cm³]	4	7	10	24
a	[mm]	40	47	50	75
b	[mm]	32.5	34.5	36	56
c	[mm]	23.5	25	26	43
e	[mm]	11.5	14	19.5	24
f	[mm]	32	42	47	58
g	[mm]	G ⅛	G ¼	G ⅜	G ½
r	[mm]	50	100	150	200
SW	[mm]	4	6	6	8
Tightening torque	[Nm]	10	20	25	30
Weight	[kg]	0.10	0.17	0.28	0.59
Part no.		**1072010**	**1073010**	**1074010**	**1075020**

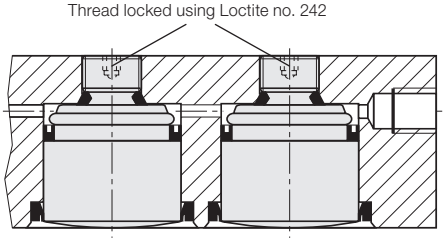
Wiper ring	**Part no.**	**3000838**	**3000710**	**3000649**	**3000484**
Seal kit	**Part no.**	**5700005**	**5700006**	**5700007**	**5700008**
Mounting sleeve	**Part no.**	**5700009**	**5700010**	**5700011**	**5700012**

Application
Built-in pistons are used in bars and blocks for clamping and locking of workpieces and dies. The built-in pistons are particularly suitable for narrow and flat installation spaces due to their compact design.

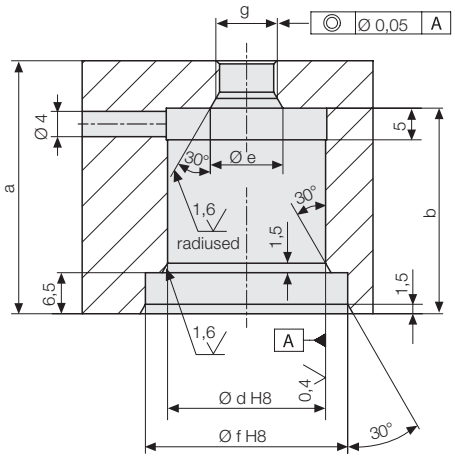
Description
Plunger piston, single acting, with integrated return spring, stroke limitation and fixing screw form a subassembly that cannot be disassembled.
Sealing ring made from PTFE, O-ring as static seal. Piston hardened and ground. On request, a wiper ring is supplied for installation in the housing. Special seals on request.

Important notes
Lateral forces less than 5 % of clamping forces. To ensure perfect operation, the installation dimensions and surface qualities must be strictly observed.
Use Allen key for assembly and disassembly. Replace O-ring after disassembly.
Max. operating temperature 80 °C.
Use Loctite no. 242 to secure thread.

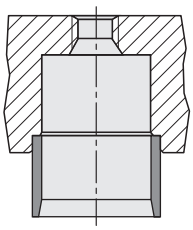
Application example
Built-in piston integrated in a clamping bar



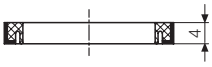
Location hole
Hydraulic oil supply through holes drilled in the base.
Only one oil port is required.



Mounting sleeve
for built-in piston and wiper ring



Wiper ring



Hydraulic power units
see product group 7

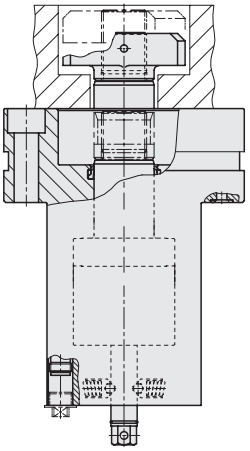
Hydraulic accessories
see product group 11

Swing Sink Clamps

with 90° swing angle, clamping force from 60 to 412 kN double acting, max. operating pressure 400 bar

Advantages

- Ideal force transmission
- Compact design
- Clamping force from 60 up to 412 kN
- High operating safety by position monitoring, manual emergency operation and overload protection
- Suitable for large clamping edge tolerances (± 1.5 mm)
- No colliding edges when inserting the dies
- Optimum use of ram and bed surfaces
- Clamping at difficultly accessible points



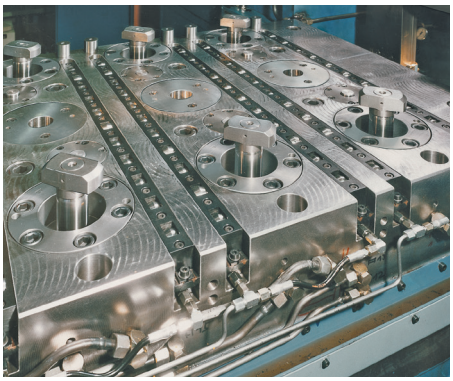
Application

Swing sink clamps are installed in press rams or press beds, in machine tools and plants. Thanks to the compact design, they are particularly suitable where space is limited. Use at ambient temperatures up to max. 70 °C.

Description

Double-acting swing sink clamp with 90° swing angle. The piston is guided by a control bolt so that during the stroke movement a rotation of 45° is effected.
Monitoring of the unclamping, change-over and clamping positions by inductive proximity switches.
The swing mechanism is protected by a spring-loaded overload protection and equipped with manual emergency operation.
Tie rod, piston and swing mechanism are hardened.

Application example

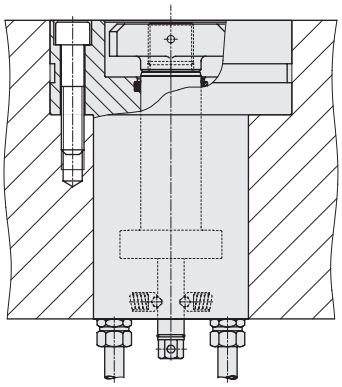


Swing sink clamps in a double-column press
The tie rod is extended (swing position). Die positioning is made by lateral stops. Easy feeding of dies by hydraulic roller bars installed in the T-slots.

Connecting possibilities

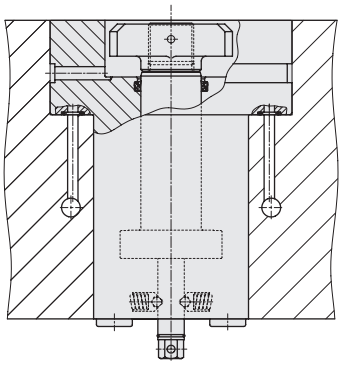
Two alternatives are offered for connecting the swing sink clamps.

Pipe connection



Pipes are recommended in applications where fittings are easily accessible and where pipes do not impede installation and dismantling of the swing sink clamps.

Manifold-mounting connection



Hydraulic oil is fed through the drilled holes in the bed and in the ram. There are no exposed pipes or fittings. The sealing is made by O-rings supplied with the clamping element.
Easy installation, ease of servicing

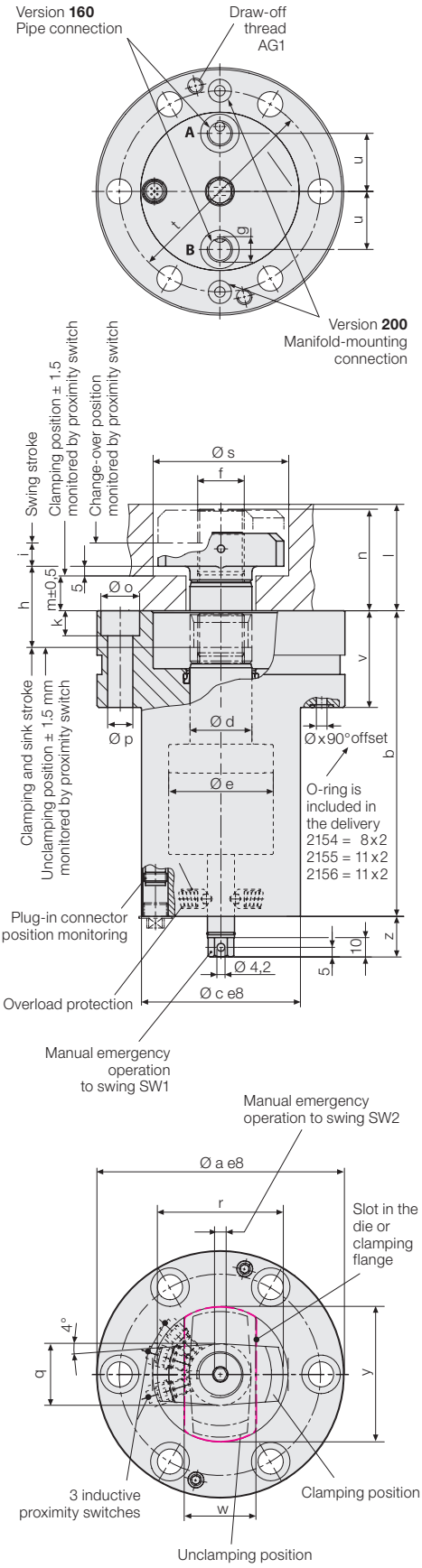
Accessories

Flange as clamping point
for installation in press dies
see page 3

Electrical accessories
see page 5

Hydraulic power units
see product group 7

Hydraulic accessories
see product group 11



Technical data

Max. operating pressure 400 bar

Clamping force at 400 bar	**[kN]**	**60**	**104**	**164**	**256**	**412**
Clamping force at 100 bar	[kN]	15	26	41	64	103
Piston Ø e	[mm]	54	70	88	110	140
Rod Ø d	[mm]	32	40	50	63	80
Swing stroke i	[mm]	12	15	21	25	32
Clamping and sink stroke h	[mm]	42	54	65	75	89
Oil volume clamping	[cm³]	120	256	512	925	1816
Oil volume unclamping	[cm³]	150	318	630	1142	2244
Max. flow rate	[cm³/s]	15	32	63	150	200
a	[mm]	128	160	192	238	292
b	[mm]	158	197	242	301	348
c	[mm]	82	104	126	160	200
f	[mm]	M24x1.5	M30x1.5	M36x1.5	M45x1.5	M58x1.5
g		G 1/4	G 3/8	G 3/8	G 1/2	G 1/2
k	[mm]	13	17	21	25	31
l	[mm]	55	70	87	101	122
m (clamping edge)	[mm]	18	23	28	33	40
n	[mm]	53	68	85	99	120
o	[mm]	20	26	33	40	48
p	[mm]	13	18	22	26	33
q	[mm]	34	42	52	63	80
r	[mm]	65	80	95	110	135
s	[mm]	70	86	103	120	147
t	[mm]	104	130	156	194	240
u	[mm]	30	38	45	60	75
v	[mm]	50	61	72	85	100
w	[mm]	38	47	59	71	88
x	[mm]	5.5	8	8	10	10
y	[mm]	70	86	103	120	147
z	[mm]	21	24	29	32	38
(Manual emergency operation) SW1	[mm]	12	14	19	24	32
(Manual emergency operation) SW2	[mm]	6	8	10	12	14
Draw-off thread AG1		M8	M10	M12	M12	M16
Weight	[kg]	7.4	14.7	25	47	85
with pipe connection **Part no.**		**2154160**	**2155160**	**2156160**	**2157160**	**2158160**
with manifold-mounting connection **Part no.**		**2154200**	**2155200**	**2156200**	**2157200**	**2158200**

Further sizes and special versions are available on request.

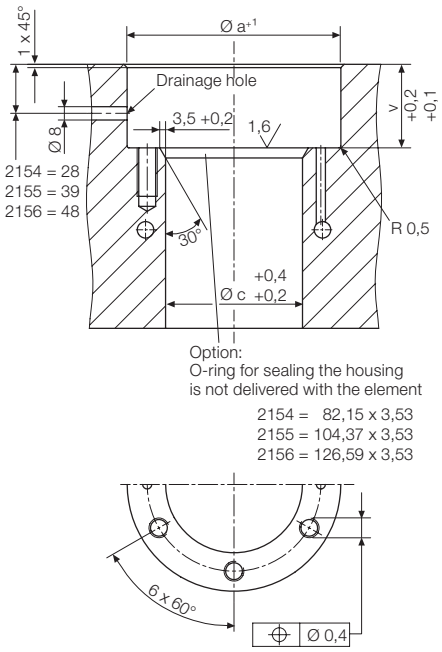
Swing sink clamp
for clamping edge m = 50 mm

Clamping edge m	[mm]	50	50	50
Clamping and sink stroke h	[mm]	74	81	87
b	[mm]	190	224	264
n	[mm]	85	95	107
l	[mm]	87	97	109
Oil volume clamping	[cm³]	222	420	764
Oil volume unclamping	[cm³]	174	342	601
with pipe connection **Part no.**		**821548059**	**821558047**	**821568023**
with manifold-mounting connection **Part no.**		**821548082**	**821558050**	**821568027**

Important note!

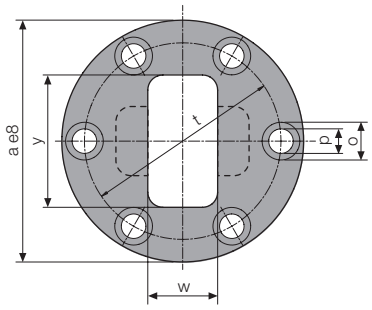
Access to one of the two manual emergency operations SW1 or SW2 is essential.

Mounting hole
for manifold-mounting or pipe connection

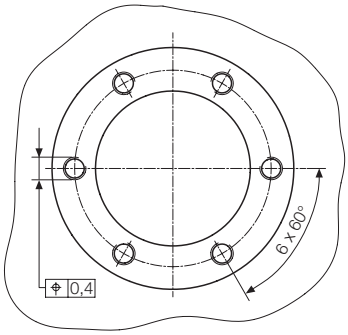


Manifold-mounting connection requires a plain and neat surface. The drainage hole may be drilled in any position provided that spray and separating agent can drain off freely.

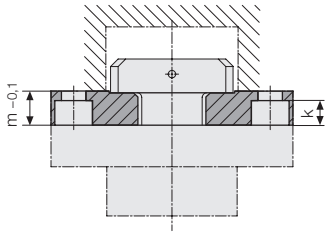
Accessory
Flange as a clamping point
for installation in press dies

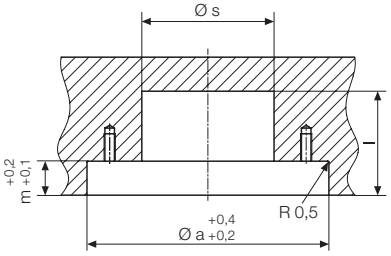


Mounting hole

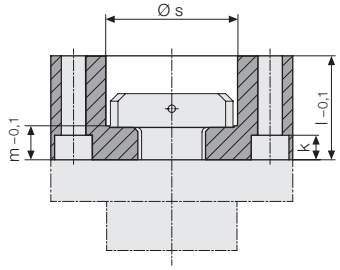


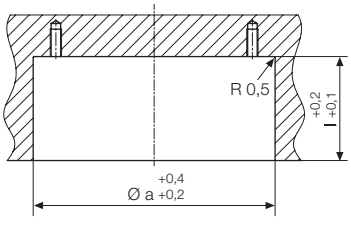
Flange - low





Flange - high





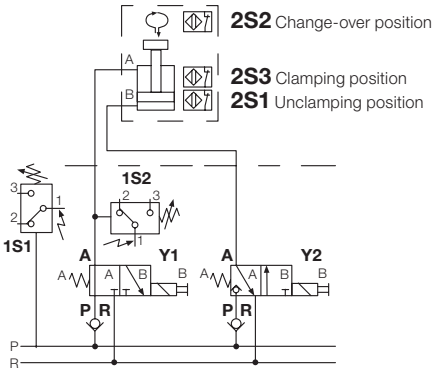
Clamp type		2154160 2154200	2155160 2155200	2156160 2156200
a	[mm]	128	160	192
k	[mm]	13	17	21
l	[mm]	55	70	87
m	[mm]	18	23	28
o	[mm]	20	26	33
p	[mm]	13	18	22
s	[mm]	70+3	86+4	103+5
t	[mm]	104	130	156
w	[mm]	38	47	59
y	[mm]	70	86	103
Flange - low				
Part no.		**5700016**	**5700017**	**5700018**
Flange - high				
Part no.		**5700019**	**5700020**	**5700021**

Clamp type		2157160 2157200	2158160 2158200
a	[mm]	238	292
k	[mm]	24.5	31
l	[mm]	101	122
m	[mm]	33	40
o	[mm]	40	48
p	[mm]	26	33
s	[mm]	130	160
t	[mm]	194	240
w	[mm]	71	88
y	[mm]	120	147
Flange - low			
Part no.		**5700039**	**5700041**
Flange - high			
Part no.		**5700040**	**5700042**

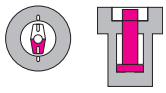
Functional description

The piston of the double-acting swing sink clamp is guided by a guide pin in such a manner that during part of the stroke a 45° rotation is carried out just before reaching and just after leaving the piston upper end position. The rotation is always anti-clockwise, no matter whether the piston extends or retracts.

Hydraulic circuit diagram

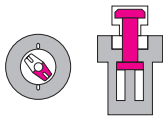


1. Unclamping position



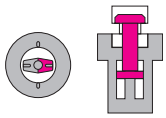
The piston is completely retracted. This permits an easy die change, as no parts project over the bed level. Proximity switch 2 S1 monitors this position.

2. Change-over position for clamping



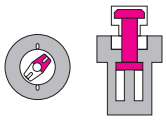
Valves Y1 and Y2 are energised, and pressure is applied to piston side B. The tie rod passes through the slot of the clamping point and is then rotated by 45°.
Proximity switch 2 S2 monitors this position.

3. Clamping position



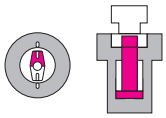
Valves Y1 and Y2 are de-energised, and pressure is applied to piston rod side A. The tie rod makes a further 45° rotation and is now transversely above the clamping point. The die is clamped. Proximity switch 2 S3 monitors this position. After obtaining the clamping pressure, the power unit is switched off by the pressure switch 1 S2.

4. Change-over position for unclamping



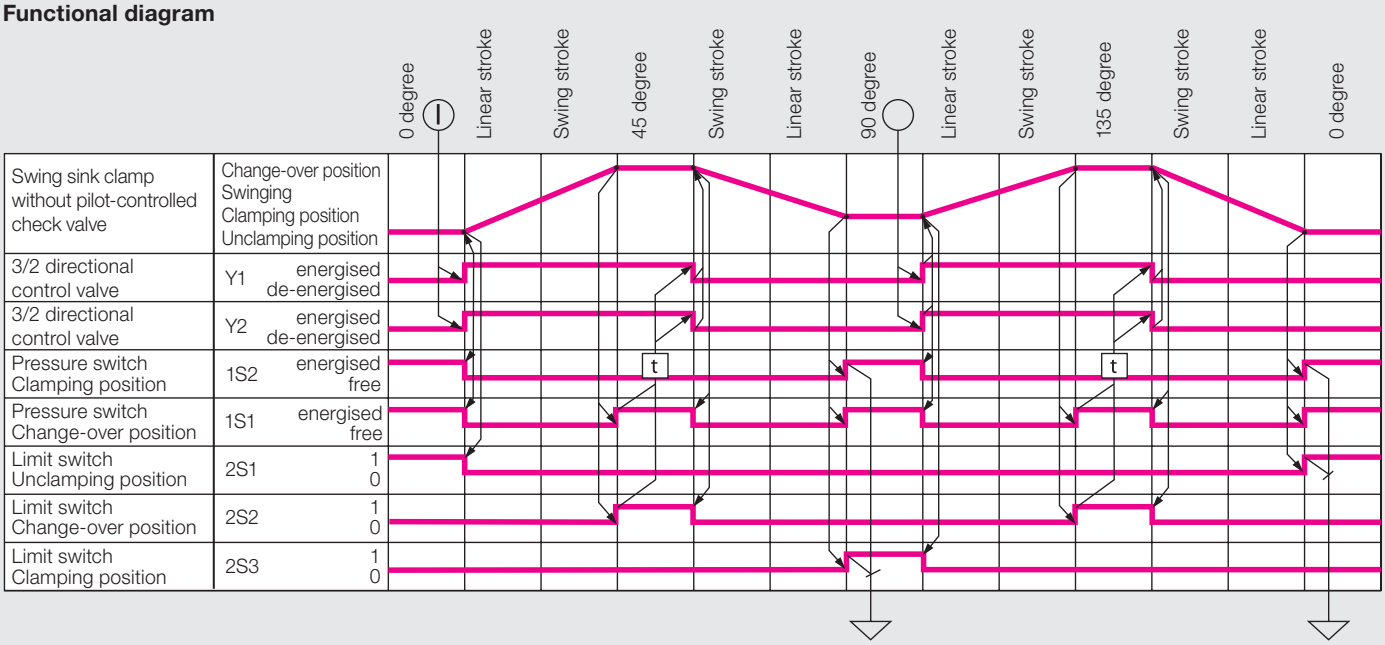
Valves Y1 and Y2 are energised, and pressure is applied to the piston side B. The tie rod is extended and then again rotated by 45°. Proximity switch 2 S2 monitors this position.

5. Unclamping position



Valves Y1 and Y2 are de-energised, and pressure is applied to the piston rod side A. The tie rod makes a further 45° rotation and passes through the slot of the clamping point as far as the end position. Proximity switch 2 S1 monitors this position.
The die is unclamped.

Functional diagram



Hydraulic installation

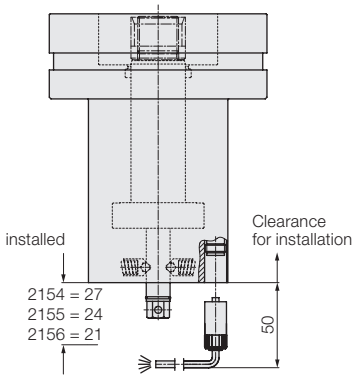
Read the operating manual before starting up.
Adjust the flow rate of the power unit so that clamping and unclamping cycles between 10 and 30 seconds are obtained. In order to prevent the swing mechanism from premature wear, the dynamic pressure at port B should not exceed 50 bar while the tie rods retract through the slot.
Swing sink clamps which are grouped together should be connected to distribution boards, in order to avoid series connection. Use pipes with larger diameter for connection to the power unit.
If in doubt, please send the installation plan to be reviewed.
Provide a pressure gauge connection in every hydraulic circuit for adjustment and to check operating data.
Other parameters and recommendations for hydraulic installation of die clamping systems are given in chapter no. 1 “General information”.

Important note!

The full stroke of the piston must be realised, otherwise the swing mechanism may be damaged.

Electrical installation

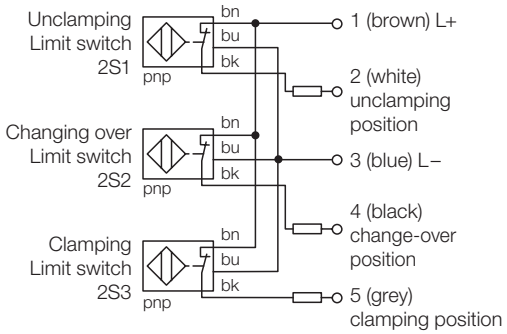
Connection of the monitoring system for clamping and unclamping position



The three proximity switches are connected to the base of the swing sink clamp through a connecting cable with a screw coupling [IP 67]. (The connecting cable is not included in the delivery).
Further installation may be carried out using a distribution board with an LED display.

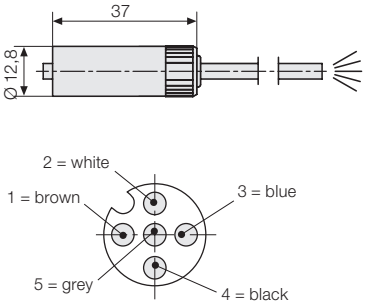
Pin assignment for three-wire proximity switches

Supply voltage	10 – 30 V DC
Constant current	≤ 100 mA
Type	inductive, break contact pnp



Accessories

5-pole connecting cable with screw coupling



Cable length 5 m	**Part no. 5700013**
Cable length 10 m	**Part no. 5700014**

Accessories

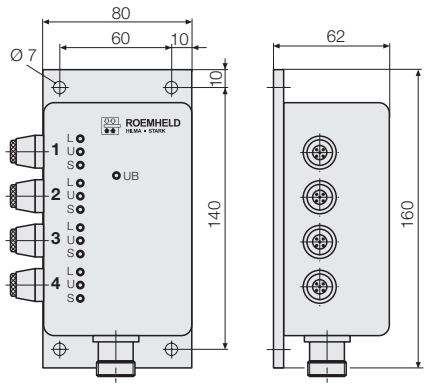
Distribution board with LED display for the connection of 4 clamps

Display of the unclamping, change-over and clamping position of each clamping element via LED display.

Delivery

1 distribution board
4 5-pole coupling plug
1 16-pole coupling plug

Part no. 5700015



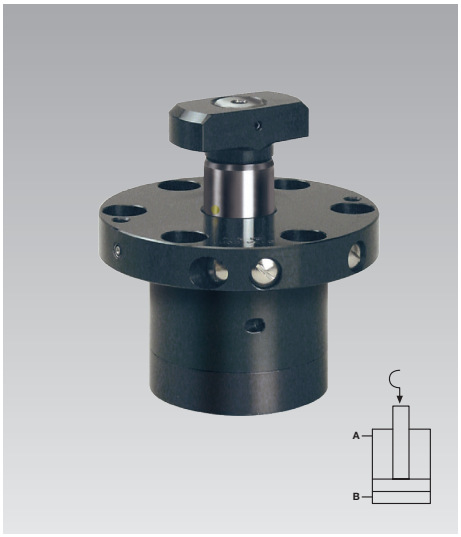
Pin assignment of output plug:

Pin 1 =	L+	Pin 9 =	3L
Pin 2 =	L–	Pin 10 =	3U
Pin 3 =	1L	Pin 11 =	3S
Pin 4 =	1U	Pin 12 =	4L
Pin 5 =	1S	Pin 13 =	4U
Pin 6 =	2L	Pin 14 =	4S
Pin 7 =	2U	Pin 15 =	free
Pin 8 =	2S	Pin 16 =	free

L = unclamping position
U = change-over position
S = clamping position

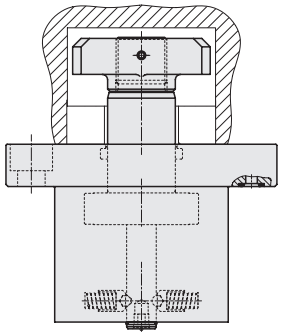
Swing Clamps

with 90° swing angle, clamping force from 60 to 412 kN double acting, max. operating pressure 400 bar



Advantages

- Ideal force transmission
- Compact design
- Clamping force from 60 up to 412 kN
- High operating safety by position monitoring, manual emergency operation and overload protection
- Suitable for large clamping edge tolerances (±1.5 mm)
- No colliding edges when inserting the dies
- Optimum utilisation of the ram area
- Clamping at difficultly accessible points



Application

Swing clamps are installed in press rams or press beds, in machine tools and plants. Thanks to the compact design, they are particularly suitable where space is limited. Use at ambient temperatures up to max. 70 °C

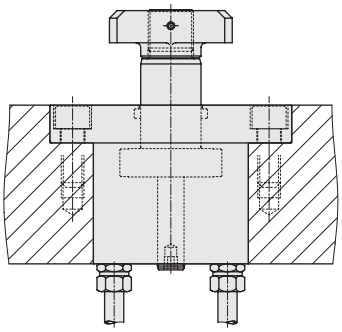
Description

Swing clamp, double acting, with 90° swing angle. Monitoring of the clamping and unclamping position by inductive proximity switches.
The swing mechanism is protected by a spring-loaded overload protection and equipped with manual emergency operation. Tie rod, piston and swing mechanism are hardened. The hydraulic system is protected by a wiper ring.

Connecting possibilities

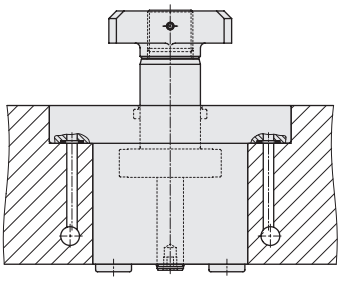
Two alternatives are offered for connecting the swing clamps.

Pipe connection



Pipes are recommended in applications where fittings are easily accessible and where pipes do not impede installation and dismantling of the swing clamps.

Manifold-mounting connection



Hydraulic oil is fed through the drilled holes in the bed and in the ram. There are no exposed pipes or fittings. The sealing is made by O-rings supplied with the clamp.
Easy installation, ease of servicing.

Application example

Use of swing clamps in the press ram. Shown is the die change position, i.e. the ram is in the upper position and the swing clamps are extended.

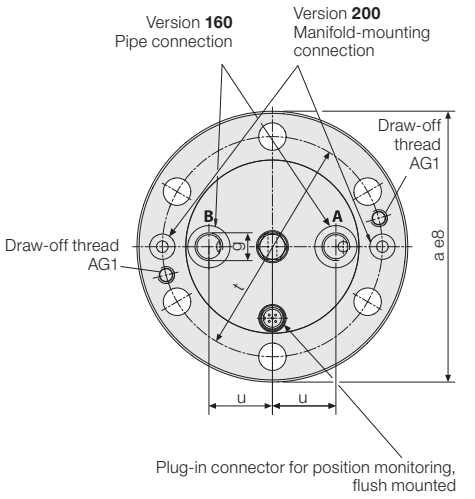
Accessories

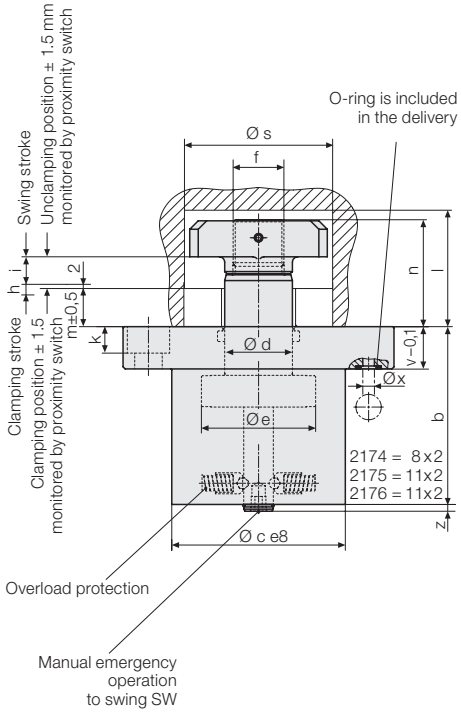
Flange as a clamping point
for installation in press dies
see page 3

Electrical accessories
see page 5

Hydraulic power units
see product group 7

Hydraulic accessories
see product group 11



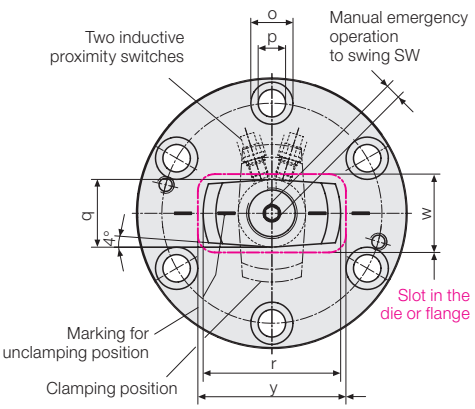


Technical data

Max. operating pressure 400 bar

Clamping force at 400 bar	**[kN]**	**60**	**104**	**164**	**256**	**412**
Clamping force at 100 bar	[kN]	15	26	41	64	103
Piston Ø e	[mm]	54	70	88	110	140
Rod Ø d	[mm]	32	40	50	63	80
Swing stroke i	[mm]	13	18	24	28	35
Clamping and sink stroke h	[mm]	5	6	6	6	6
Oil volume clamping	[cm^3]	22	52	107	192	381
Oil volume unclamping	[cm^3]	34	77	158	286	570
Max. flow rate	[cm^3/s]	10	16	25	75	150
a	[mm]	128	160	192	238	292
b	[mm]	84	104	122	165	182
c	[mm]	82	104	126	160	200
f	[mm]	M24x1.5	M30x1.5	M36x1.5	M45x1.5	M58x1.5
g		G 1/4	G 3/8	G 3/8	G 1/2	G 1/2
k	[mm]	13	17	21	25	31
l	[mm]	55	70	87	101	122
m	[mm]	18	23	28	33	40
n	[mm]	51	68	85	99	120
o	[mm]	20	26	33	40	48
p	[mm]	13	18	22	26	33
q	[mm]	34	42	52	63	80
r	[mm]	65	80	95	110	135
s	[mm]	70	86	103	120	147
t	[mm]	104	130	156	194	240
u	[mm]	30	38	45	60	75
v	[mm]	20	28	35	42	52
w	[mm]	38	47	59	71	88
x	[mm]	5.5	8	8	10	10
y	[mm]	70	86	103	120	147
z	[mm]	4	5	6	14	14
(Manual emergency operation) SW2	[mm]	6	8	10	24	32
Draw-off thread AG1		M8	M10	M12	M12	M16
Weight	[kg]	4.2	8.6	15	34	60
with pipe connection						
Part no.		**2174160**	**2175160**	**2176160**	**2177160**	**2178160**
with manifold-mounting connection						
Part no.		**2174200**	**2175200**	**2176200**	**2177200**	**2178200**

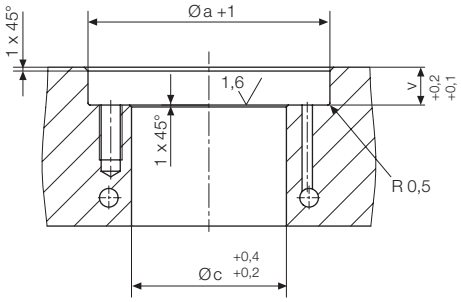
Further sizes and special versions are available on request

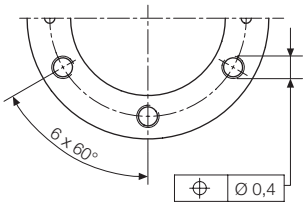


Important note!

Access to one of the two manual emergency operations is essential.

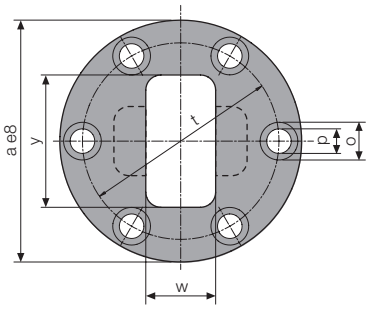
Mounting hole
for manifold-mounting or pipe connection



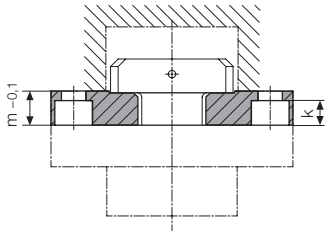


Manifold-mounting connection requires a plain and neat surface.

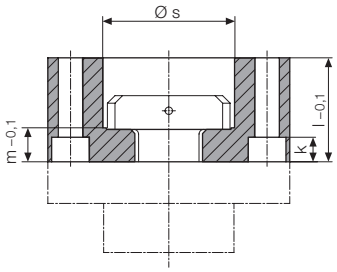
Accessory
Flange as a clamping point
for installation in press dies



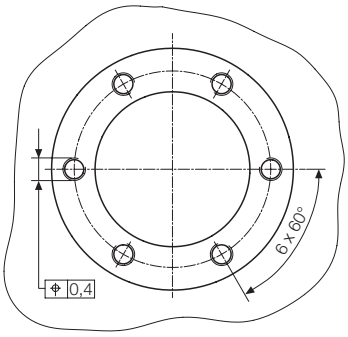
Flange - low

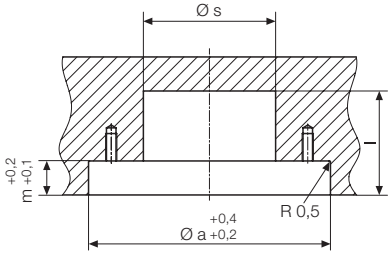


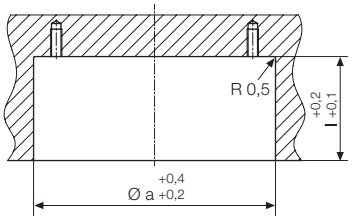
Flange - high



Mounting hole







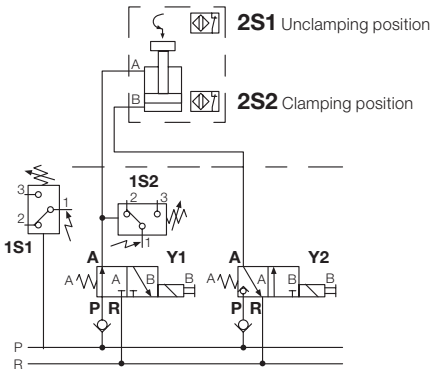
Clamp type		2174160 2174200	2175160 2175200	2176160 2176200
a	[mm]	128	160	192
k	[mm]	13	17	21
l	[mm]	55	70	87
m	[mm]	18	23	28
o	[mm]	20	26	33
p	[mm]	13	18	22
s	[mm]	70+3	86+4	103+5
t	[mm]	104	130	156
w	[mm]	38	47	59
y	[mm]	70	86	103
Flange - low				
Part no.		**5700016**	**5700017**	**5700018**
Flange - high				
Part no.		**5700019**	**5700020**	**5700021**

Clamp type		2177160 2177200	2178160 2178200
a	[mm]	238	292
k	[mm]	24,5	31
l	[mm]	101	122
m	[mm]	33	40
o	[mm]	40	48
p	[mm]	26	33
s	[mm]	130	160
t	[mm]	194	240
w	[mm]	71	88
y	[mm]	120	147
Flange - low			
Part no.		**5700039**	**5700041**
Flange - high			
Part no.		**5700040**	**5700042**

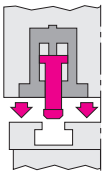
Functional description

Double acting swing clamp, with 90° swing angle. Monitoring of the clamping and unclamping position by inductive proximity switches.
The swing mechanism is protected by a spring-loaded overload protection and equipped with manual emergency operation. Tie rod, piston and swing mechanism are hardened. The hydraulic system is protected by a wiper ring.

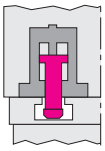
Hydraulic circuit diagram



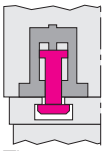
Clamping



1. Push and position the die into the press with the swing clamps in the off-position.



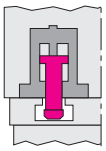
2. Lower the press ram onto the upper part of the die.
The tie rods of the swing clamps will pass through the clamping slots of the upper die.



3. The swing clamps are operated by means of a power unit.
The tie rod rotates by 90° and is then in a transverse position to the clamping point.

The upper die is hydraulically clamped. Once the clamping pressure has been reached the power unit will be switched off by the pressure switch 1S2.
In the case of a pressure drop, the power unit is switched on by the pressure switch and builds up to the required clamping pressure.

Unclamping



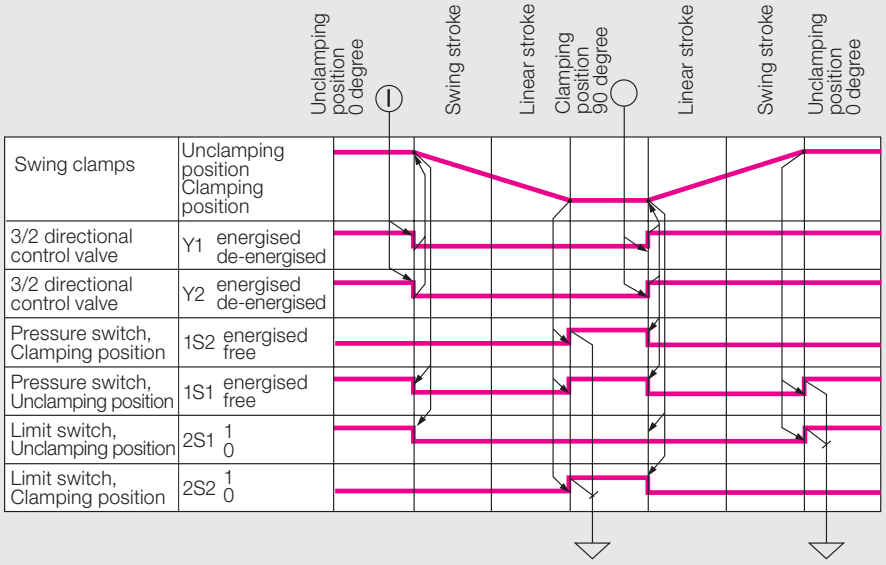
1. Move the dies together and return the swing clamps into the unclamping position by means of energising valves Y1 and Y2.

The tie rod rotates by 90° and can then pass through the clamping slot of the upper die.

2. Move the press ram upwards and take the die out.

The clamping and unclamping positions are monitored by inductive proximity switches.

Functional diagram

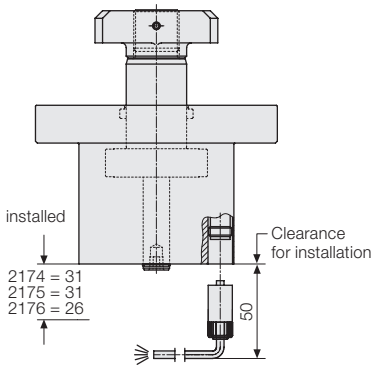


Hydraulic installation

Read the operating manual before starting up.
Adjust the flow rate of the power unit so that clamping and unclamping cycles between 10 and 30 seconds are obtained. In order to prevent the swing mechanism from premature wear, the dynamic pressure at port B should not exceed 50 bar while the tie rods retract through the slot.
Swing clamps which are grouped together should be connected to distribution boards, in order to avoid series connection. Use pipes with larger diameter for connection to the power unit.
If in doubt, please send the installation plan to be reviewed.
Provide a pressure gauge connection in every hydraulic circuit for adjustment and to check operating data.
Other parameters and recommendations for hydraulic installation of die clamping systems are given in chapter no. 1 “General information”.

Electrical installation

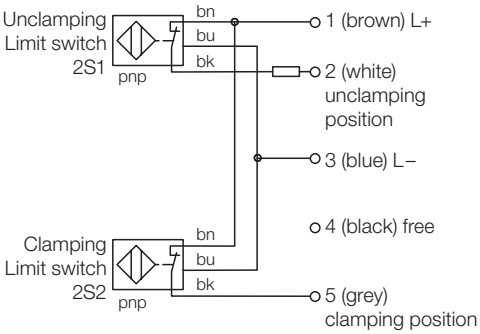
Connection of the monitoring system for clamping and unclamping position



Both proximity switches are connected to the base of the swing clamp through a connecting cable with screw coupling [IP 67].
Please order the connecting cable separately.
Further installation may be carried out using a distribution board with an LED display.

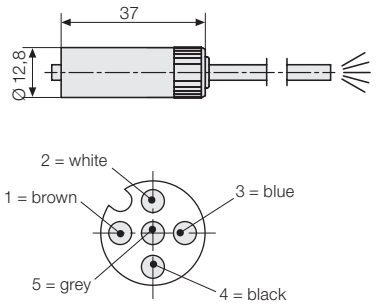
Pin assignment for three-wire proximity switches

Supply voltage	10 – 30 V DC
Constant current	≤ 100 mA
Type	inductive, break contact pnp



Accessories

5-pole connecting cable with screw coupling



Cable length 5 m	**Part no. 5700013**
Cable length 10 m	**Part no. 5700014**

Accessories

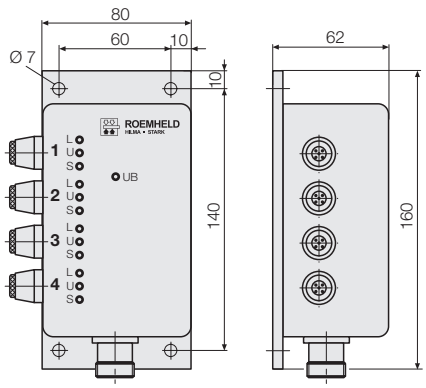
Distribution board with LED display for the connection of 4 clamps

Display of the unclamping, change-over and clamping position of each clamping element via LED display.

Delivery

1 distribution board
4 5-pole coupling plug
1 16-pole coupling plug

Part no. 5700015



Pin assignment of output plug:

Pin 1 = L+
Pin 2 = L–
Pin 3 = 1L
Pin 4 = do not use
Pin 5 = 1S
Pin 6 = 2L
Pin 7 = do not use
Pin 8 = 2S
Pin 9 = 3L
Pin 10 = do not use
Pin 11 = 3S
Pin 12 = 4L
Pin 13 = do not use
Pin 14 = 4S
Pin 15 = free
Pin 16 = free

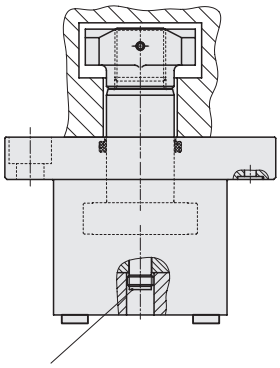
L = unclamping position
U = not assigned
S = clamping position

Pull Clamps

Clamping force from 60 up to 164 kN
double acting, max. operating pressure 400 bar

Advantages

- Ideal force transmission with centrally arranged clamping elements
- Compact design
- High operational safety by position monitoring
- Suitable for large clamping edge tolerances (±1.5 mm)
- No colliding edges when inserting the dies
- Optimum use of bed and ram surfaces
- Clamping at difficultly accessible points



Plug-in connector position monitoring

Application

Double-acting pull clamps for clamping dies on a press bed or press ram. Thanks to the compact design, they are particularly suitable for use in machine tools and plants where space is limited.

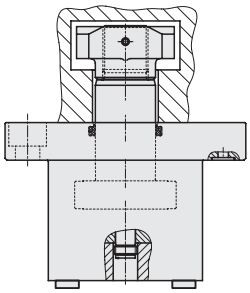
Description

The die must be provided with T-slots for the tie rod. The die must be inserted in the correct position and in parallel with the clamping elements.
Monitoring of the clamping and unclamping position by inductive proximity switches.
Tie rod and piston are hardened and ground.
The hydraulic system is protected against dirt by wiper rings.

Connecting possibilities

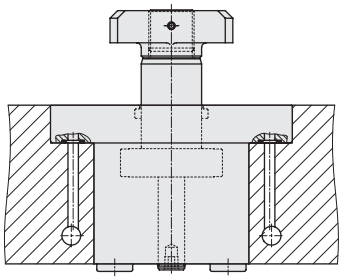
Two alternatives are offered for connecting the pull clamps.

Pipe connection



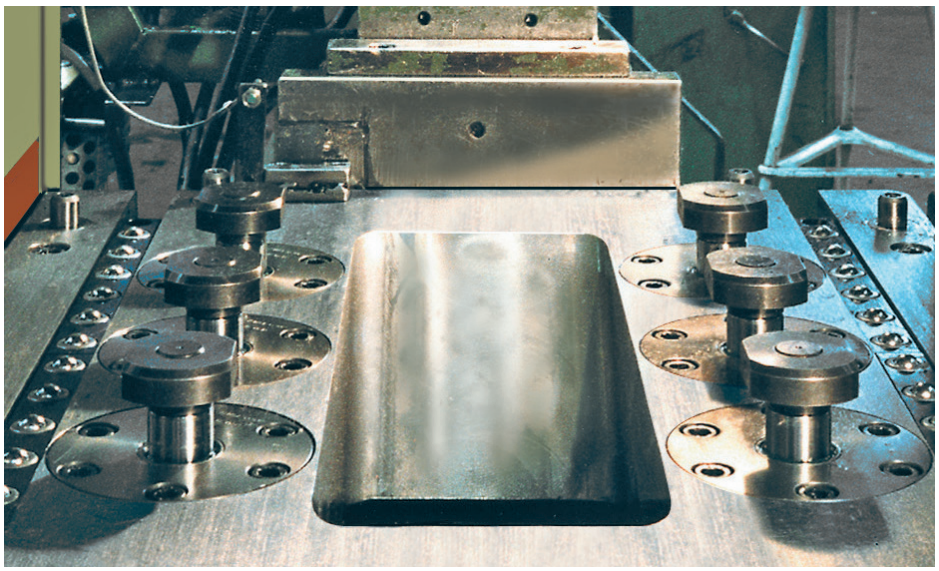
Pipes are recommended in applications where fittings are easily accessible and where pipes do not impede installation and dismantling of the pull clamps.

Manifold-mounting connection

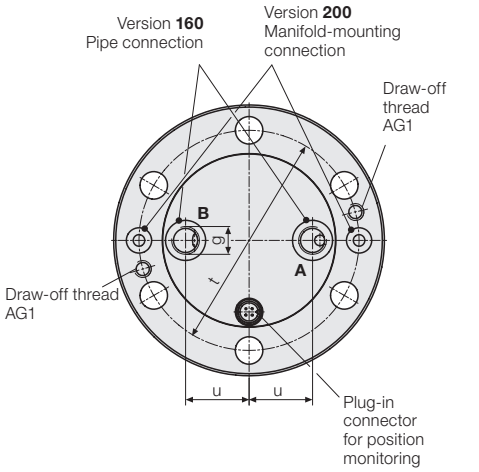


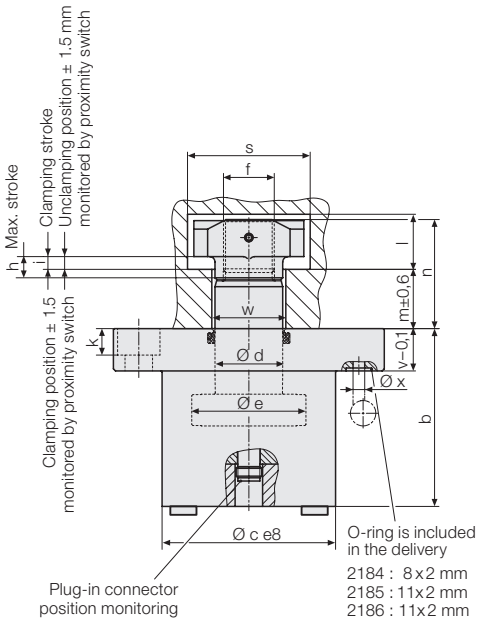
Hydraulic oil is fed through the drilled holes in the bed and in the ram. There are no exposed pipes or fittings. The sealing is made by O-rings supplied with the clamp.
Easy installation, ease of servicing.

Application example



Pull clamps in the press bed of a double-column press.



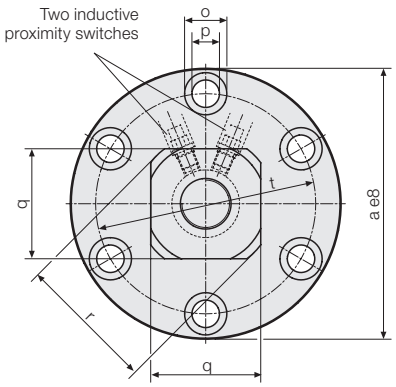


Technical data

Max. operating pressure 400 bar

Pulling force at 400 bar	**[kN]**	**60**	**104**	**164**
Pulling force at 100 bar	[kN]	15	26	41
Piston Ø e	[mm]	54	70	88
Rod Ø d	[mm]	32	40	50
Max. stroke h	[mm]	10	10	10
Oil volume clamping	[cm^3]	10	16	25
Oil volume unclamping	[cm^3]	15	23	37
a	[mm]	128	160	192
b	[mm]	84	104	122
c	[mm]	82	104	126
f	[mm]	M24 x 1.5	M30 x 1.5	M36 x 1.5
g		G ¼	G ⅜	G 3/8
i	[mm]	6	6	6
k	[mm]	13	17	21
l	[mm]	26	35	41
m	[mm]	28	37	48
n	[mm]	51	68	85
o	[mm]	20	26	33
p	[mm]	13	18	22
q	[mm]	□ 52	Ø 74	□ 84
r	[mm]	65	74	95
s	[mm]	58	82	92
t	[mm]	104	130	156
u	[mm]	30	38	45
v	[mm]	20	28	35
w	[mm]	38	48	58
x	[mm]	5.5	7	7
Draw-off thread AG1		M8	M10	M12
Weight	[kg]	4.4	9	15
with pipe connection	**Part no.**	**2184160**	**2185160**	**2186160**
with manifold-mounting connection	**Part no.**	**2184200**	**2185200**	**2186200**

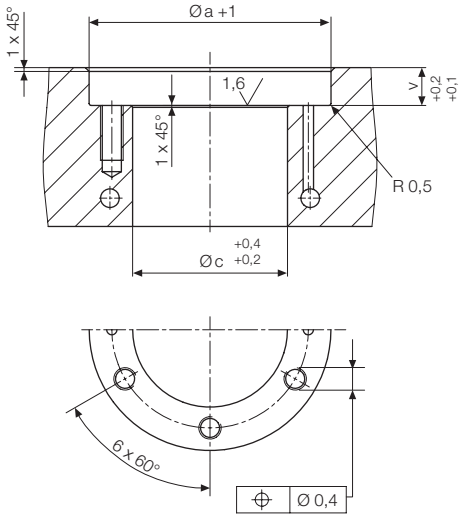
Further sizes and special versions are available on request



Important note!

The piston rod is made of high alloy steel.
In the case of aggressive ambient conditions, a special version is required.

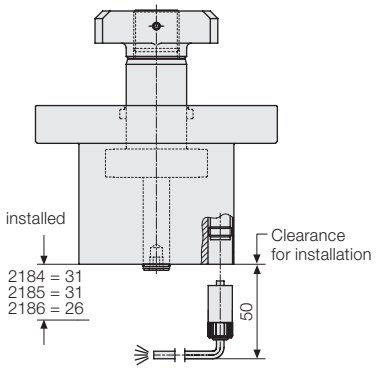
Mounting hole
for manifold-mounting or pipe connection



Manifold-mounting connection requires a plain and neat surface.

Electrical installation

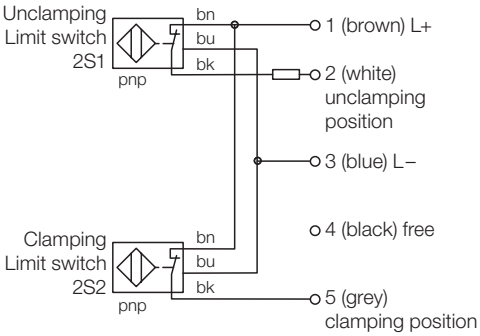
Connection of the monitoring system for clamping and unclamping position



Both proximity switches are connected to the base of the pull clamp through a connecting cable with screw coupling [IP 67].
Please order the connecting cable separately.
Further installation may be carried out using a distribution board with an LED display.

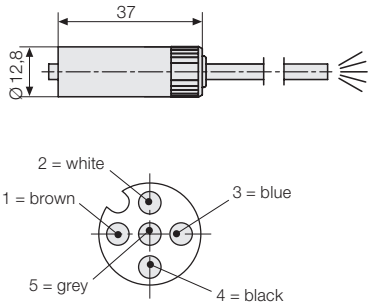
Pin assignment
for three-wire proximity switches

Supply voltage	10 – 30 V DC
Constant current	≤ 100 mA
Type	inductive, break contact pnp



Accessories

5-pole connecting cable with screw coupling



Cable length 5 m	**Part no.**	**5700013**
Cable length 10 m	**Part no.**	**5700014**

Accessories

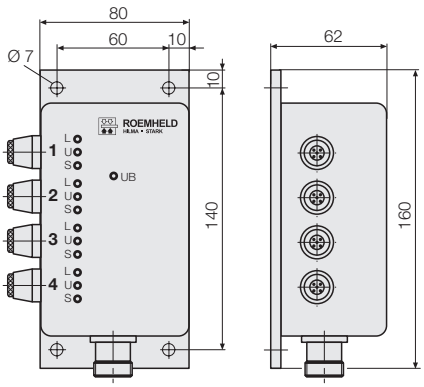
Distribution boards with LED display
for the connection of 4 clamps

Display of the unclamping, change-over and clamping position of each clamping element via LED display.

Delivery

1 distribution board
4 5-pole coupling plug
1 16-pole coupling plug

Part no. 5700015



Pin assignment of output plug:

Pin 1 = L+
Pin 2 = L–
Pin 3 = 1L
Pin 4 = do not use
Pin 5 = 1S
Pin 6 = 2L
Pin 7 = do not use
Pin 8 = 2S
Pin 9 = 3L
Pin 10 = do not use
Pin 11 = 3S
Pin 12 = 4L
Pin 13 = do not use
Pin 14 = 4S
Pin 15 = free
Pin 16 = free

L = unclamping position
U = not assigned
S = clamping position

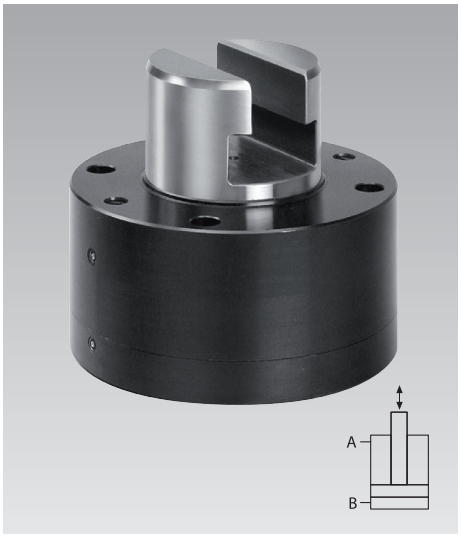
Application example

Clamping of a die changing table with pull clamps

WZ 4.2350

Pull Clamps with T-Slot

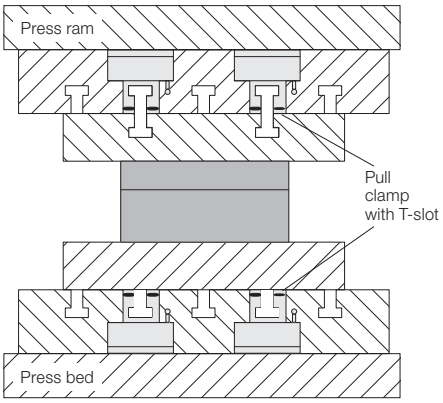
clamping force from 55 to 144 kN
double acting, max. operating pressure 400 bar



Advantages

- Compact design
- Bed and ram can also be used for manual clamping
- Ideal force transmission with centrally arranged clamping elements
- Optimum use of bed and ram surfaces

Die clamping in a press



Ram: clamping of the upper die with double T-slot bars

Bed: clamping of the lower die with firmly mounted T-slot bars

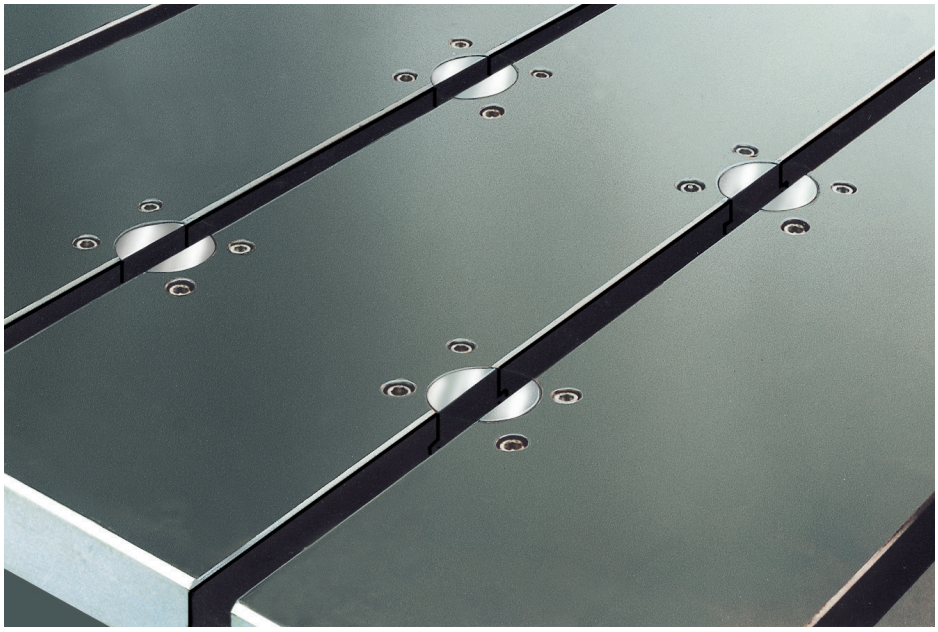
Application

- Installation in press rams
- Installation in press beds
- Integrated in an intermediate plate
- When the available space is limited

Description

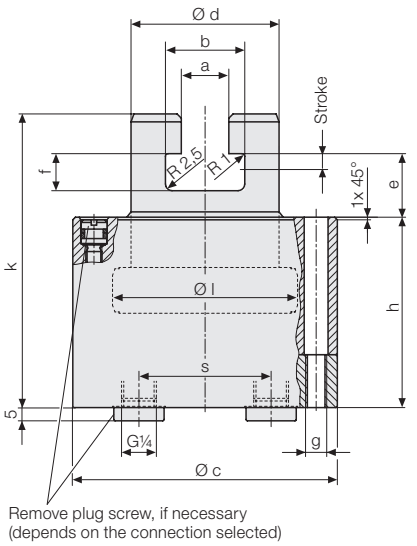
The pull clamp with T-slot facilitates a die standardisation by means of T-slot bars or T-nuts on the die.
The hydraulic oil supply is made either through drilled holes in the bed and the ram or through pipes.
Tie rod and piston are hardened and ground. The hydraulic system is protected against dirt by wiper rings.

Application example



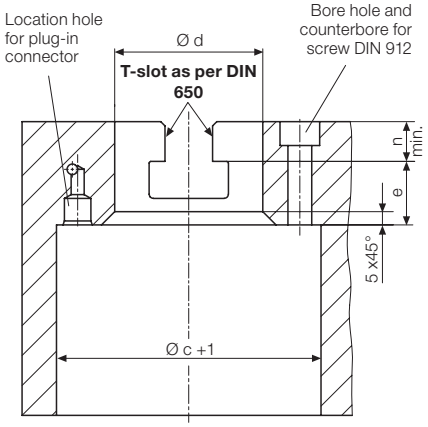
Pull clamps with T-slot installed in a press bed

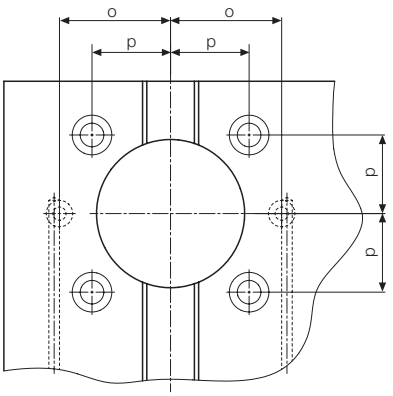
Dimensions



Remove plug screw, if necessary
(depends on the connection selected)

Location hole





Technical data

Max. operating pressure 400 bar

For T-slot as per DIN 650			18	22	28
Clamping force at 400 bar		**[kN]**	**55.2**	**76**	**144**
Clamping force at 100 bar		[kN]	13.8	19	36
Piston Ø l		[mm]	70	80	105
Piston rod Ø d H7/f7		[mm]	56	63	80
Stroke		[mm]	6	6	6
Oil volume	clamping	[cm³]	9	12	22
Oil volume	unclamping	[cm³]	23	30	52
a		[mm]	18	22	28
b		[mm]	30	37	46
c		[mm]	100	115	150
e		[mm]	24	28	32
f		[mm]	14	18	22
g		[mm]	M8	M10	M12
h		[mm]	72	78	78
k		[mm]	111	125	135
n		[mm]	15.5	19.5	25.5
o ± 0.05		[mm]	42	47.5	62.5
p		[mm]	29.7	33.6	44.2
s		[mm]	50	56	70
Weight		[kg]	4.1	5.8	10
Part no.			**2354050**	**2355050**	**2356050**

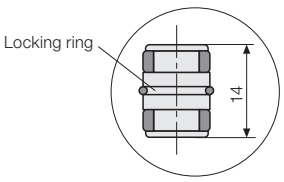
Further sizes and special versions are available on request

Important notes!

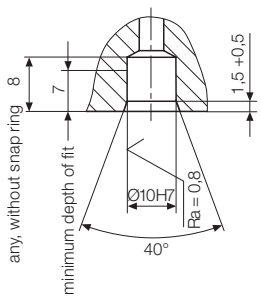
Make sure that the T-slot of the clamping piston is subject to an axial load only.
The T-nut must be in contact over its complete surface. Side loads must be avoided.
In view of the surface ratio of the pull clamps, only check valves having a minimum ratio of 3.5 : 1 may be used for maintaining the clamping force.

Accessories

Plug-in connector
for manifold-mounting connection
Part no. 9210132



Location hole



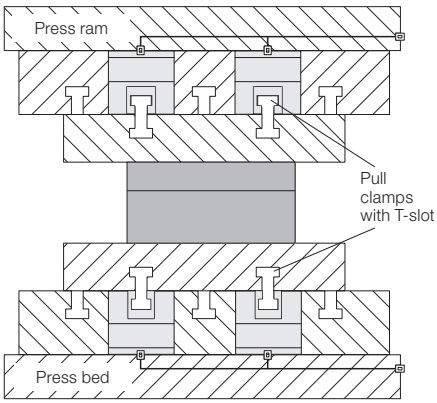
Pull Clamps with T-Slot

clamping force from 55 to 144 kN
double acting, max. operating pressure 400 bar

Advantages

- Installation directly in the bed or in the ram
- Compact design
- Dies are easily adaptable
- Bed and ram can also be used for manual clamping
- Ideal force transmission with centrally arranged clamping elements
- Optimum use of bed and ram surfaces

Die clamping in a press



Ram: clamping of the upper die with double T-slot bars

Bed: clamping of the lower die with firmly mounted T-slot bars

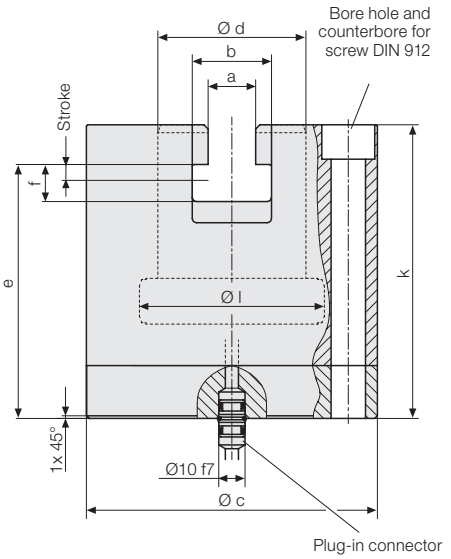
Application

- Installation in press rams
- Installation in press beds
- Integrated in an intermediate plate
- When the available space is limited

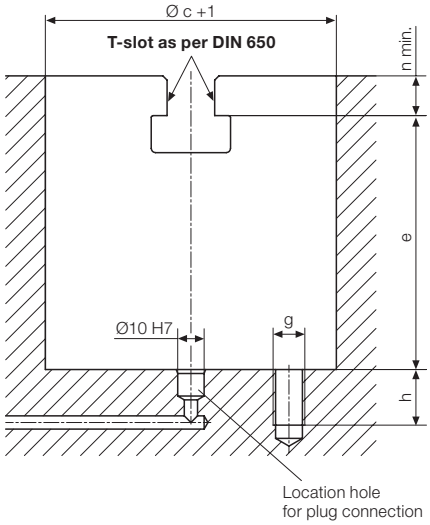
Description

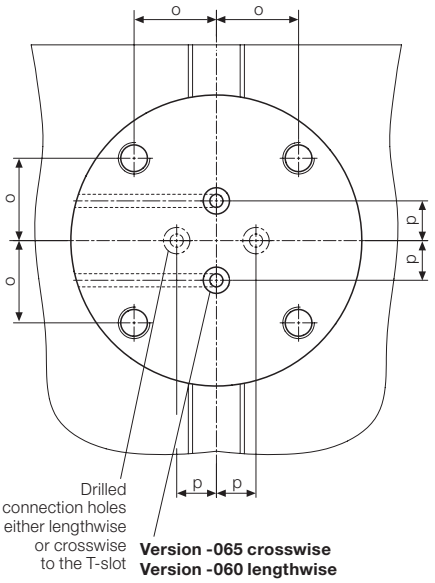
The pull clamp with T-slot facilitates a die standardisation by means of T-slot bars or T-nuts on the die.
The hydraulic oil supply is made either through drilled holes in the bed and the ram or through pipes.
Tie rod and piston are hardened and ground. The hydraulic system is protected against dirt by wiper rings.

Dimensions



Location hole





Technical data

Max. operating pressure 400 bar

For T-slot as per DIN 650		18	22	28
Clamping force at 400 bar	**[kN]**	**55.2**	**76**	**144**
Clamping force at 100 bar	[kN]	13.8	19	36
Piston Ø l	[mm]	70	80	105
Piston rod Ø d H7/f7	[mm]	56	63	80
Stroke	[mm]	6	6	6
Oil volume clamping	[cm³]	9	12	22
Oil volume unclamping	[cm³]	23	30	52
a	[mm]	18	22	28
b	[mm]	30	37	46
c e8	[mm]	110	130	166
e	[mm]	96	106	110
f	[mm]	14	18	22
g	[mm]	M12	M16	M20
h	[mm]	21	23	27
k	[mm]	111	125	135
n	[mm]	15.5	19.5	25.5
o	[mm]	31.1	36.2	46.7
p ± 0.05	[mm]	15	15	15
Weight	[kg]	6.1	9.5	16.6
Connection lengthwise to the T-slot	**Part no.**	**2354060**	**2355060**	**2356060**
Connection crosswise to the T-slot	**Part no.**	**2354065**	**2355065**	**2356065**

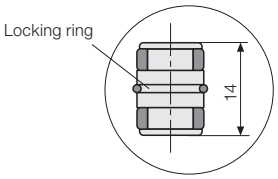
Further sizes and special versions are available on request

Important notes!

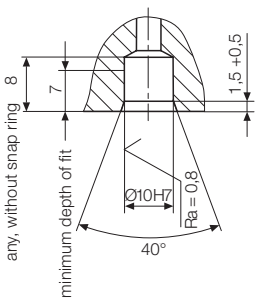
Make sure that the T-slot of the clamping piston is subject to an axial load only. The T-nut must be in contact over its complete surface. Side loads must be avoided.
In view of the surface ratio of the pull clamps, only check valves having a minimum ratio of 3.5 : 1 may be used for maintaining the clamping force.

Plug-in connector for manifold-mounting connection

(included in the delivery)
Part no. 9210132



Location hole



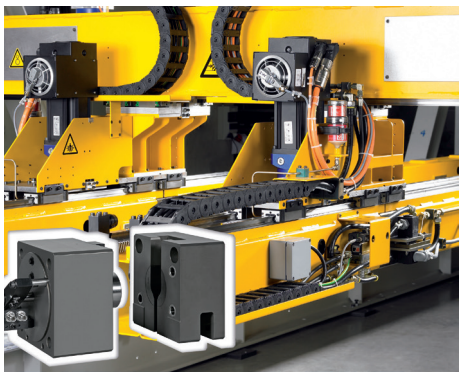
Grip Rail Couplings

Rapid clamping systems for transfer presses hydraulic, mechanical, electro- and hydro-mechanical version

Advantages

- Safe coupling and uncoupling in a few seconds
- Die positions are quickly and accurately reproducible
- High positioning accuracy of ± 0.02 mm
- Easy to retrofit
- No moving parts in the passive part, thus maintenance-free
- Self-locking
- High dynamic rigidity
- Flexible design of the energy couplings as per customer's specification

Application example



3-axis transfer system with hydraulic grip rail coupling (transfer rail coupling)

Application

- Automatic centring, coupling and clamping of grip rails on transfer presses
- The coupling is used whenever the maximum clamping force with high dynamic strength in the smallest space is required

Description

In contrast to conventional systems, the new coupling design is such that all components for positioning, centring and clamping force build-up as well as for position monitoring are integrated into the active part of the coupling which is firmly connected to the press. The passive part of the grip rail coupling does not have any moving parts.
To keep the weight of the coupling low, the housings of both the active and the passive parts are made from hard-coated, high-strength aluminium.

When moving the two halves of the coupling into position (insertion of grip rail), these are pre-centred by guide elements.
Positioning pins on the active part locate into drilled holes in the passive part, thereby centring the coupling and ensuring a high degree of reproducibility. By means of this type of centring a high repeatability is obtained.
The clamping force is built up using a tie rod and maintained in a self-locking manner.
A compact position monitoring system installed in the element is easily adaptable to a bus system and this ensures exact positioning and clamping.

As an option, rapid action couplings for energy, compressed air and hydraulic oil can be designed as per customer's specification.

Coupling - active part

The active part of the grip rail coupling is of a hydraulic, mechanical, electro- or hydro-mechanical design, depending on the required degree of automation.

Coupling - passive part

The passive counterpart is identical for the appropriate size.

Coupling - active part

Coupling - passive part

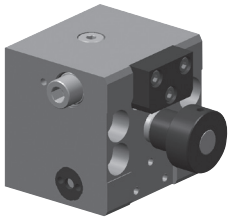
Versions

Version GSH - hydraulic

Version GSM - mechanical

Version GSE - electro-mechanical

Version GSHM - hydro-mechanical



Description

After applying hydraulic pressure, the coupling halves are centred, clamping force is built up and the tie rod is mechanically locked.

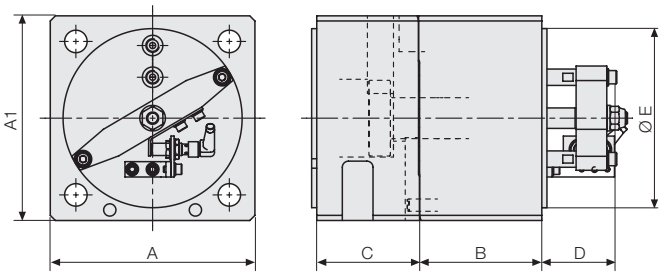
Even in the event of a pressure drop the clamping force is fully maintained by mechanical self-locking.

For safety reasons, we recommend that the hydraulic pressure is maintained.

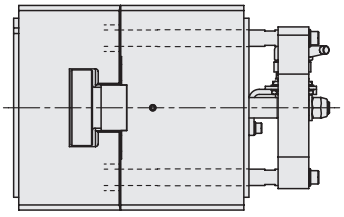
Technical data

Size		GSH60	GSH80	GSH100	GSH130
Clamping force	**[kN]**	**60**	**80**	**100**	**130**
Operating pressure	**[bar]**	**60**	**60**	**60**	**60**
Oil volume clamping	[cm³]	57	76	97	134
Oil volume total stroke	[cm³]	96	128	164	226
A *	[mm]	150 (115)	160	200	250
A1*	[mm]	150 (160)	160	200	250
B *	[mm]	120 (100)	120	120	120
C *	[mm]	80 (100)	80	100	100
D	[mm]	80 (95)	80	84	84
E *	[mm]	100 (–)	145	175	225
Weight	[kg]	20.5 (10.5)	17	27	41
Centring repeatability	[mm]	± 0.02	± 0.02	± 0.02	± 0.02
Adm. horizontal positioning accuracy	[mm]	–1/+3	–1/+3	–1/+3	–1/+3
Adm. axis offset	[mm]	± 2	± 2	± 2	± 2

Further technical details on request or determined in the course of the project.



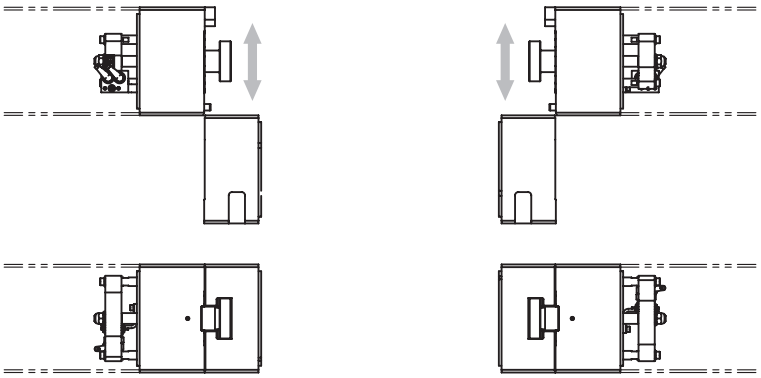
Fastening dimensions on request or according to customer's requirements



*** Important note**

The dimensions are only exemplary for the entire range. Other dimensions, such as 150x150 mm and 160x160 mm or other sizes are also available on request.

Possibilities of positioning and changing



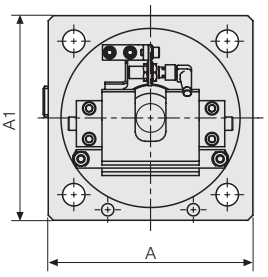
Description

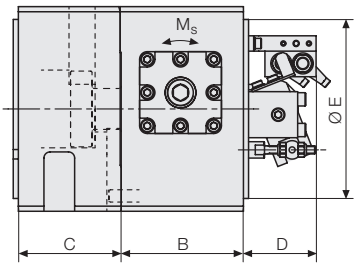
By turning the hexagon socket the positioning pins are extended using a wedge system for centring the coupling halves, and the clamping force is built up. The self-locking wedge system, the high clamping forces and the high dynamic strength are the outstanding features of this clamping element.

Technical data

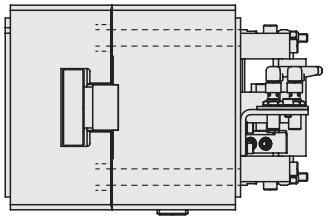
Size		GSM 60	GSM 100
Clamping force	**[kN]**	**60**	**100**
M_S	**[Nm]**	**180**	**300**
A *	[mm]	115	200
A1*	[mm]	160	200
B *	[mm]	100	120
C *	[mm]	80	100
D	[mm]	65	71
E *	[mm]	—	175
Weight	[kg]	12.5	29
Centring repeatability	[mm]	± 0.02	± 0.02
Adm. horizontal positioning accuracy	[mm]	−1/+3	−1/+3
Adm. axis offset	[mm]	± 2	± 2

Further technical details on request or determined in the course of the project.





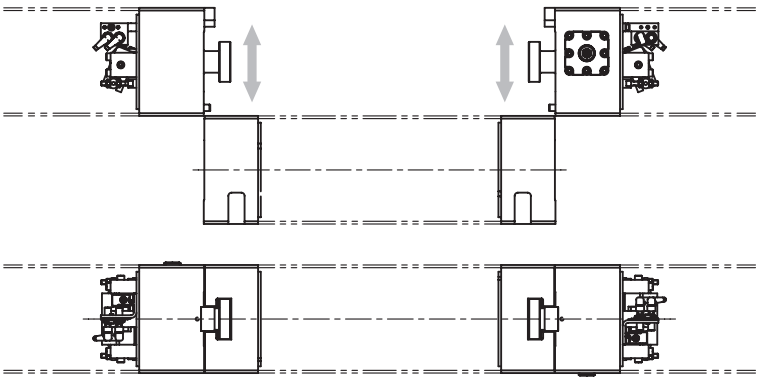
Fastening dimensions on request or according to customer's requirements



*** Important note**

The dimensions are only exemplary for the entire range. Other dimensions, such as 150x150 mm and 160x160 mm or other sizes are also available on request.

Possibilities of positioning and changing



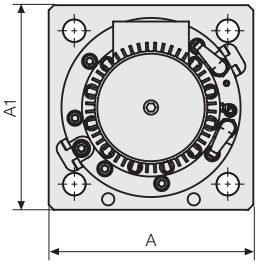
Description

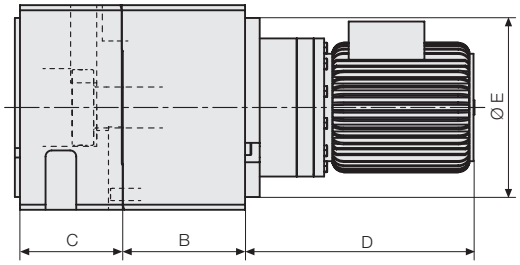
The rotary movement of the drive motor is transmitted to the tie rod and the positioning pins using a flex-spline gear and a spindle drive. The operating principle and the arrangement of the gear, position monitoring and automatic sequence of movement ensure high operational reliability.

Technical data

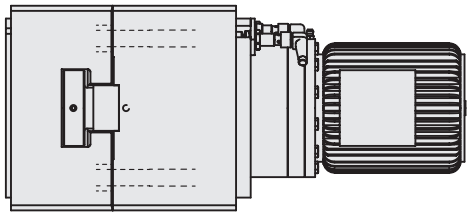
Size		GSE 100
Clamping force	**[kN]**	**100**
Motor rating	**[kW]**	**0.25**
A *	[mm]	200
A1*	[mm]	200
B *	[mm]	120
C *	[mm]	100
D	[mm]	225
E *	[mm]	175
Weight	[kg]	39
Centring repeatability	[mm]	± 0.02
Adm. horizontal positioning accuracy	[mm]	–1/+3
Adm. axis offset	[mm]	± 2

Further technical details on request or determined in the course of the project.





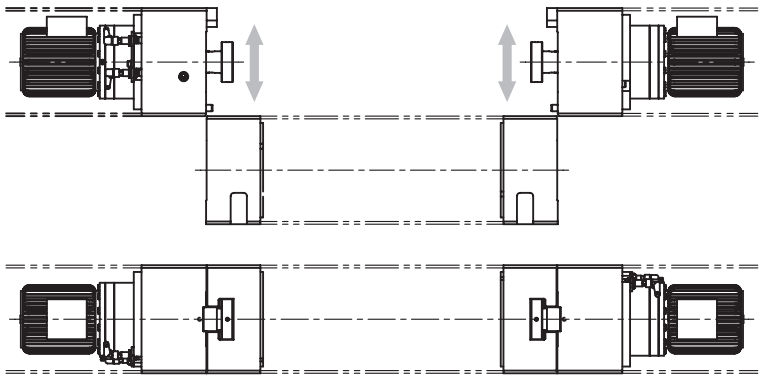
Fastening dimensions on request or according to customer's requirements

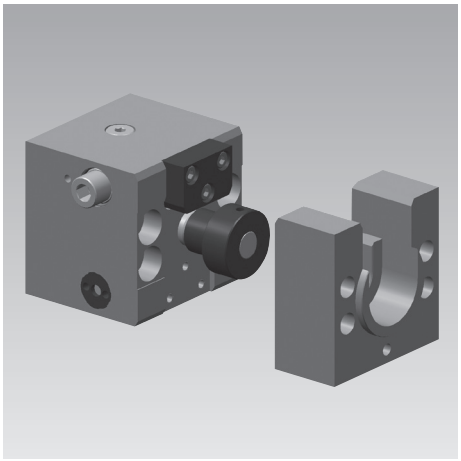


*** Important note**

The dimensions are only exemplary for the entire range. Other dimensions, such as 150 x 150 mm and 160 x 160 mm or other sizes are also available on request.

Possibilities of positioning and changing





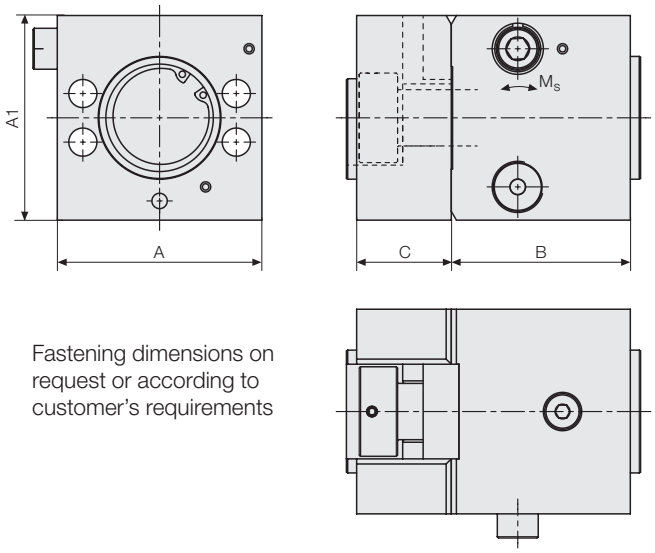
Description

By turning the hexagon socket the integral hydraulic pad is preloaded and transforms a low torque into a high clamping force. An indicator pin indicates that the clamping force has been reached.

Technical data

Size		GSHM 45
Clamping force	**[kN]**	**45**
M_S	**[Nm]**	**15**
A *	[mm]	80
A1*	[mm]	80
B *	[mm]	70
C *	[mm]	37
Weight	[kg]	2
Centring repeatability	[mm]	± 0.15
Adm. horizontal positioning accuracy	[mm]	–1/+2
Adm. axis offset	[mm]	± 2

Further technical details on request or determined in the course of the project.



Fastening dimensions on request or according to customer's requirements

*** Important note**

The dimensions are only exemplary for the entire range. Other dimensions, such as 150x150 mm and 160x160 mm or other sizes are also available on request.

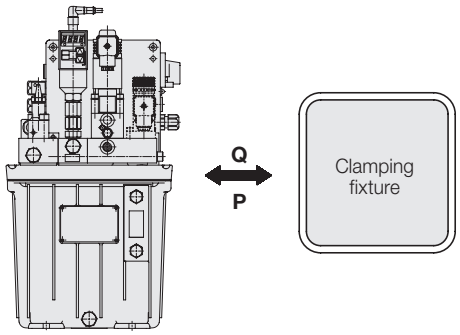
WZ 7.1600

Power units Series D 8.0115

ready for connection*, energy-saving intermittent cycling
max. flow rate 0.82/2.1/3.5 l/min, max. operating pressure 500/250/160 bar

Advantages

- Very compact design
- Energy-saving intermittent cycling
- Many control variants
- Electronic pressure switch
- Digital pressure display
- Quick pressure adjustment by teach-in function
- Electric control optimally adapted
- High-quality leakage-free poppet valves
- Pressure generator also without valves available
- Useful accessory already mounted
- Alternatively manual switch or foot switch
- Ready for connection*



Application

These power units are especially suitable for the operation of small to medium-sized hydraulic clamping fixtures.
Maximally two clamping circuits for single or double-acting cylinders are available, that can be controlled independently of each other.
Thereby also “shuttle machining” is possible, i.e. that during machining of the workpiece in one fixture, workpiece change on the second fixture can be made.

Description

A special feature is the mounting of pump and electric motor in the reservoir. Thus hydraulic and electric control can be arranged in a space-saving way and easily accessible on the reservoir cover. The modular design enables a multitude of control variants.
The radial piston pump is available with three different flow rates and operating pressures.
To allow an energy-saving intermittent cycling only leakage-free poppet valves are used.

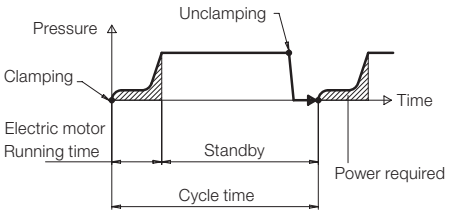
Important notes

These power units are exclusively designed for the industrial use of pressure generators for hydraulic clamping fixtures that allow intermittent cycling (see example).
All connected hydraulic components must be leakage-free and designed for the maximum operating pressure of the power unit.
The power unit supplies very high pressures. The connected clamping cylinders generate very high forces so that there is a permanent danger of crushing in the effective area of the piston rod. The manufacturer of the fixture or the machine is obliged to provide effective protection devices.
Installation, start up and maintenance have to be made according to the supplied operating instructions by authorised experts.

Energy-saving intermittent cycling

The electric motor is only running, as long as hydraulic oil is really required, that means to
- extend and retract the clamping cylinder
- build up the operating pressure

Example
Pressure-time diagram for single-acting clamping cylinders



In this example of a hydraulic clamping fixture the running time of the electric motor corresponds to the clamping time, which is only a few seconds.
In standby mode the power consumption is relatively low (see Electrical data).
Prerequisits are leakage-free clamping elements, valves and accessories.
The pressure control is made by an electronic pressure switch, that switches on the electric motor for a short time in case of a pressure drop.

Safety features

- Operating pressure infinitely adjustable, therefore precisely defined clamping force
- Electronic pressure switch with digital pressure display
- Repeatability ± 1 bar
- Pressure drop max. 10 %
- Hermetically sealed poppet valves
- Screen disks in the valve ports
- No pressure drop in case of power failure (see page 4)
- Control voltage 24 V DC
- Machine tool interlock (optional)
- Oil level and temperature control (optional)

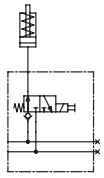
* Delivery

The power units are delivered ready for connection, i.e. after filling of hydraulic oil and connection of the hydraulic and electric lines they are ready for operation.

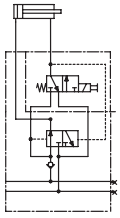
Control variants

1 clamping circuit

single acting

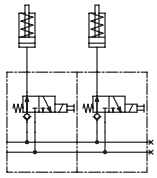


double acting

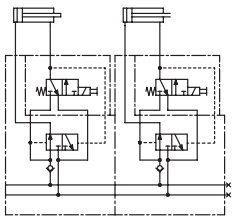


2 clamping circuits

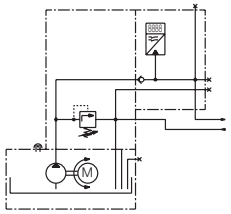
single acting

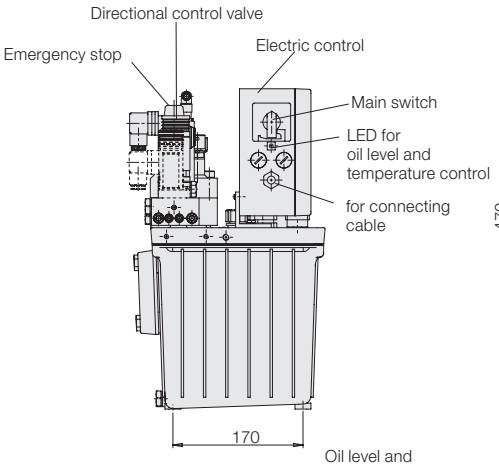


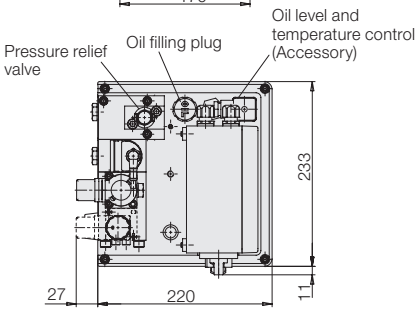
double acting

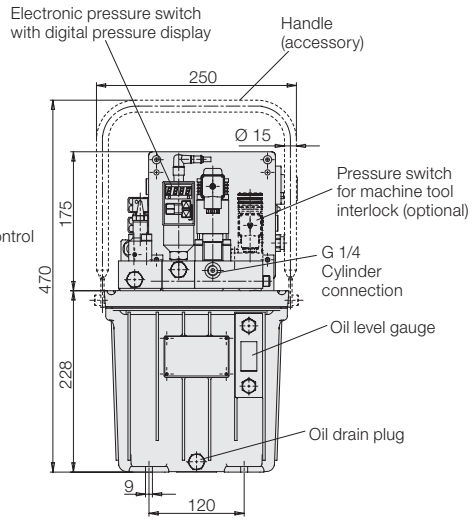


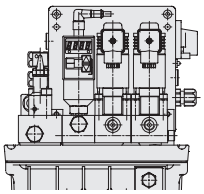
Without valve

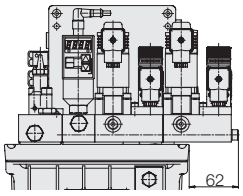


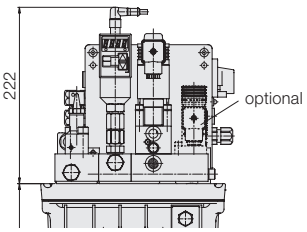


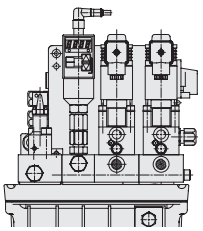


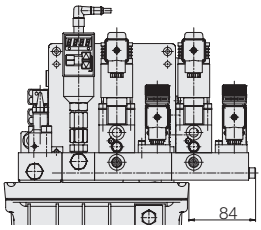


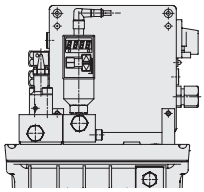












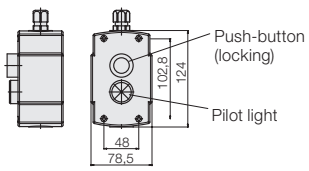
Switch (Clamping-Unclamping)

The power units are alternatively delivered with connected manual or foot switch (see chart). The pilot light in the switch signals:

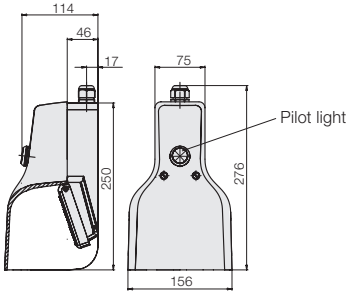
1. Switch in clamping position
2. he adjusted clamping pressure is available

Important note!
This message signals that the clamping pressure is available at the electronic pressure switch of the power unit. The actual pressure of the clamping fixture can only be controlled by an installed pressure switch installed on the fixture (see machine tool interlock).

Manual switch



Foot switch



For start up it is imperative to pay attention to the supplied operating instructions!

Note
Power unit with manual switch for coupling systems see ROEMHELD data sheet F 9.425.

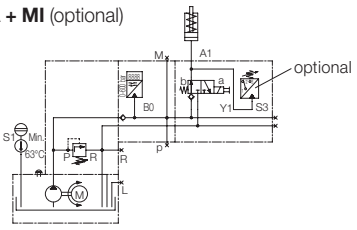
Hydraulic circuit diagrams

SA = Single-acting cylinders

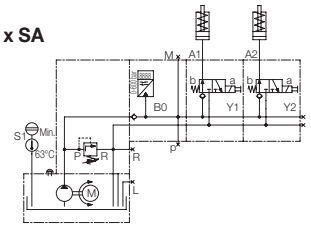
DA = Double-acting cylinders

MI = Machine tool interlock by additional pressure switch

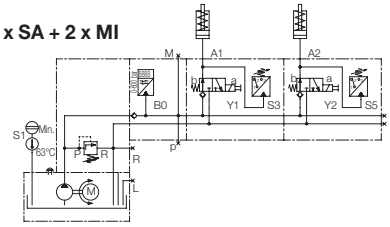
SA + MI (optional)



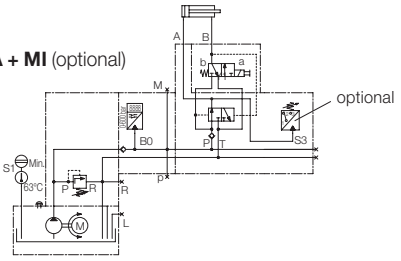
2 x SA



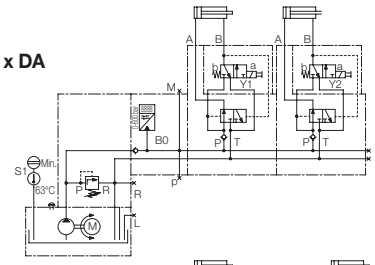
2 x SA + 2 x MI



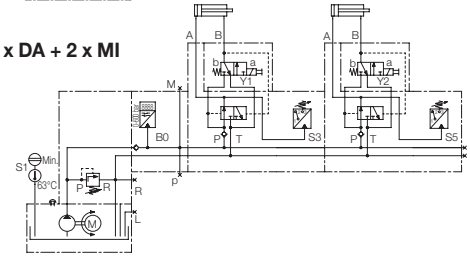
DA + MI (optional)



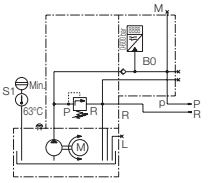
2 x DA

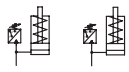
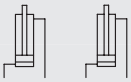
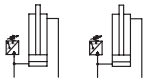


2 x DA + 2 x MI



Without valves



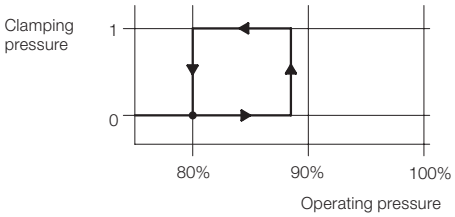
Cylinder type SA / DA without / with Pressure switch MI* (at power unit)	Directional control valve 3/2	4/2	Electric control	Terminal box	Manual switch	Foot switch	without	Flow rate / max. operating pressure 13.67 [cm³/s] 0.82 [l/min] 500 [bar] Part no.	35 2.1 250 Part no.	58.5 3.51 160 Part no.	Weight [kg]
	1		•		1			**8405121**	**8405221**	**8405321**	29.5
	1		•			1		**8405122**	**8405222**	**8405322**	30.5
	1		•				•	**8405131**	**8405231**	**8405331**	28.5
	1			•			•	**8405141**	**8405241**	**8405341**	28
	1		•		1			**8405181**	**8405281**	**8405381**	30.5
	1		•			1		**8405182**	**8405282**	**8405382**	31.5
	1		•				•	**8405187**	**8405287**	**8405387**	29.5
	1			•			•	**8405143**	**8405243**	**8405343**	29
	2		•		2			**8405105**	**8405225**	**8405325**	31.5
	2		•			2		**8405106**	**8405226**	**8405326**	33.5
	2		•				•	**8405113**	**8405233**	**8405333**	29.5
	2			•			•	**8405142**	**8405242**	**8405342**	29
	2		•		2			**8405185**	**8405285**	**8405385**	32.5
	2		•			2		**8405186**	**8405286**	**8405386**	33.5
	2		•				•	**8405189**	**8405289**	**8405389**	31.5
	2			•			•	**8405145**	**8405245**	**8405345**	29
		1	•		1			**8405109**	**8405209**	**8405309**	30
		1	•			1		**8405111**	**8405211**	**8405311**	31
		1	•				•	**8405112**	**8405212**	**8405312**	29
		1		•			•	**8405147**	**8405247**	**8405347**	28.5
		1	•		1			**8405117**	**8405217**	**8405317**	31
		1	•			1		**8405118**	**8405218**	**8405318**	32
		1	•				•	**8405119**	**8405219**	**8405319**	30
		1		•			•	**8405148**	**8405248**	**8405348**	29.5
		2	•		2			**8405107**	**8405207**	**8405307**	32.5
		2	•			2		**8405108**	**8405208**	**8405308**	33.5
		2	•				•	**8405115**	**8405215**	**8405315**	31.5
		2		•			•	**8405146**	**8405246**	**8405346**	31
		2	•		2			**8405137**	**8405237**	**8405337**	34
		2	•			2		**8405138**	**8405238**	**8405338**	35
		2	•				•	**8405139**	**8405239**	**8405339**	33
		2		•			•	**8405140**	**8405240**	**8405340**	33
-	-	-	•				•	**8405110**	**8405210**	**8405310**	27.5

***) Machine tool interlock**

As an option, every clamping circuit is checked by an additional pressure switch, which has to be electrically connected directly to the control of the processing machine.

Messages:

1. Clamping pressure available
   → Workpiece can be machined
2. Clamping pressure dropped below 80 %
   → Stop machining immediately



The switching point must be adjusted to 80% of the adjusted clamping pressure.

Note

If the pressure must be frequently changed, the electronic pressure switch is easier to adjust (identification letter "E").

Handle "B"

With the handle, the power unit can be easily transported by two persons to different places of installation.

Example of ordering

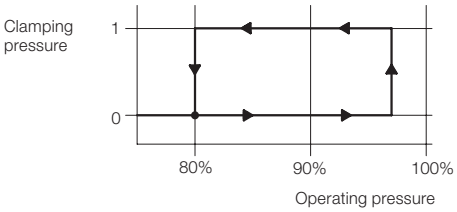
Power unit 8405221 with handle

Part no. 8405221 B

Electronic pressure switch for machine tool interlock "E"

(instead of the mechanical pressure switch)

The lower switching point (80 % of the clamping pressure) of electronic pressure switches is firmly programmed and can be stored in teach mode for every desired clamping pressure by pressing a button.

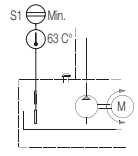


Example of ordering

Power units 8405185 with two electronic pressure switches for machine tool interlock

Part no. 8405185E

Oil level and temperature control "T"



The oil level and temperature control is installed in the reservoir cover and electrically connected to the control box. In case of an error message, the control LED below the main switch is lit.

Possible errors:

1. Oil filling quantity < 2.3 l
   Shortage 0.7 l below the minimum oil level gauge.
   Required refilling quantity min.1.5 l
2. Oil temperature > 63 °C

Important note!

As long as the error message is available the electric motor does no longer start to avoid damages due to overheating. This means that in the case of a pressure drop the pump does not deliver!!!

Recommendation

Above all with automated operation the oil level and temperature control should only be used for machine tool interlock in combination with pressure switches. This is the only way to ensure that during the switch-off of the electric motor the workpiece machining will be interrupted in the case of a pressure drop of more than 20 %.

Example of ordering

Power unit 8405238 with machine tool interlock and oil level and temperature control

Part no. 8405238T

Different combinations

The three options described above are also available in combination. When placing the order please stick to the following sequence :

"T" + "B"	8405 XXX **T B**
"T" + "E"	8405 XXX **T E**
"B" + "E"	8405 XXX **B E**
"T" + "B" + "E"	8405 XXX **T B E**

General data

Design	radial piston pump
Direction of rotation	any
Porting connection	fittings with G1/4 with screw-in plugs form B or E as per DIN 3852
Mounting	3 screws M 8
Mounting position	upright
Environment temperature	+5…+35 °C
Max. oil temperature	+60 °C
Noise level	max. 82 dB(A) (at a distance and height of 1 m above the ground standing on insulation felts)

Hydraulic data

Min. operating pressure		30 bar	
Viscosity range		4…800 mm²/s	
Recommended viscosity range		10…200 mm²/s	
Recommended viscosity class		ISO VG 22 as per DIN 51524	
Recommended hydraulic oil		HLP 22 as per DIN 51524-2 (not suitable for liquids of type HFA, HFB, HFC and HFD	
		Filling quantity	usable quantity
Content of the reservoir	max.	5.0 l	3.2 l
Oil level gauge	max.	3.8 l	2.0 l
	min.	3.0 l	1.2 l
Electrical oil level control		2.3 l	0.5 l

Electrical data

Motor type		2-pole three-phase motor
Rating power		0.75 kW
Rated speed		2830 min-1
Supply voltage		3 ~ 230/400 V ΔY 50 Hz ± 10 %
Nominal current at 400 V		2 A
Power factor cos ϕ		0.82
Standby Power consumption	"Clamped"	5 W
	"Unclamped"	28 - 50 W
Isolation class		B as per VDE 0530
Main switch		with thermal overload protection, can be padlocked
Control Electric motor		circuit breaker, control by pressure switch
Control voltage		24 V DC
3/2 directional control valve		controlled by manual switch or foot switch
Fuses	external	required 3 x 6 A slow
	internal	primary 2 x 4 A slow (5x30mm) seondary 1 x 2 A slow (5x20mm)
Code class		IP 54
Supply line required		4 x 1 mm²
Manual switch		5 x 1 mm² approx. 3m long
Foot switch		4 x 1 mm² approx. 3m long
EMC		tested

Hydraulic control

The hydraulic control is designed for direct manifold mounting without pipes and consists of the following components:

The connecting block with pressure relief valve to adjust the desired operating pressure. The maximum operating pressure (chart page 3) is mechanically limited in the factory.

Series mounting plate with electronic pressure switch and digital pressure display to adjust the switch-off pressure for the electric motor. The adjustment is made in teach-in mode independent of the adjustment of the pressure relief valve.

A pressure drop of approx. 10 % will cause the pump motor to start again.

Series mounting plate with directional control valve for control of single or double-acting cylinders.

Alternative:

Series mounting plate with directional control valve and pressure switch for machine tool interlock (see page 3)

Valves

Only leakage-free poppet valves are used to allow the energy-saving intermittent cycling (see page 1). The electric control is designed for maximally two solenoid valves.

Single-acting cylinders

One 3/2 directional control valve per clamping circuit is directly operated by a manual switch or a foot switch.

Double-acting cylinder

The 4/2 directional control valve is a combination of an electrically and a hydraulically operated 3/2 directional control valve. The control is made by a manual switch or a foot switch.

Operation of two clamping fixtures

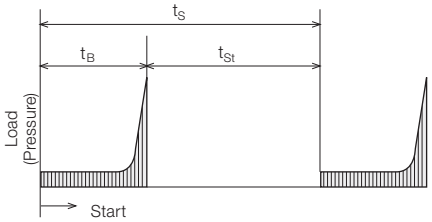
The control enables the operation of two clamping fixtures by means of two manual switches or two foot switches. Prerequisite is the same operating pressure of both fixtures.

Safety in case of power failure

The solenoid valves are de-energized in "clamping position". In the case of power failure this switching position is remained and thereby also the hydraulic pressure in the clamping line. A pressure drop is only to be feared with leaking clamping elements or valves.

Relative duty cycle

These power units are only suitable for intermittent cycling (intermittent cycling S3 as per VDE 0530).



t_B = Running time of the electric motor from start to switching off (clamping time)
t_{St} = Downtime (workpiece machining time)
t_S = Cycle time

The relative duty cycle is

$$\% ED = \frac{t_B}{t_B + t_{St}} \cdot 100 = \frac{t_B}{t_S} \cdot 100$$

Example

Clamping fixture with double-acting cylinders

Clamping tim	t_{B1} = 5s
Unclamping time	t_{B2} = 3s
Workpiece machining time	t_{St1} = 60s
Workpiece changing time	t_{St2} = 12s
Cycle time	t_S = 80s

Relative duty cycle

$$ED = \frac{t_{B1} + t_{B2}}{t_S} \cdot 100 = \frac{5_S + 3_S}{80_S} \cdot 100 = 10\ \%$$

The maximum duty cycle is a function of the motor load. Apart from the load, the motor winding temperature of the submerged motor is in principle dependent on oil temperature and oil level.
With maximum oil level, the complete winding is submerged in oil and optimally cooled.
With decreasing oil surface a part of the winding is in the air. Since air is a poor heat conductor, the winding temperature increases considerably. Therefore the load of the motor must be reduced. The following chart indicates the relative cycle time as a function of the oil level in the reservoir. The maximum oil temperature of 60 °C must not be exceeded (see "Oil level and temperature control").

Maximum relative cycle time [%ED]
(at room temperature 23 °C)

Oil level		8405 1XX	2XX	3XX
maximum	5.0 l	40	25	20
minimum	3.0 l	25	20	16

Maximum running time of the electric motor [s]
(with different oil levels)

Reservoir				
maximum	5.0 l	120 s	91 s	54 s
usable	3.2 l			
Anzeige				
maximum	3.8 l			
usable	2.0 l	120 s	57 s	34 s
Anzeige				
minimal	3.0 l	87 s	34 s	20 s
usable	1.2 l			

WZ 7.1800

Power Units in Modular Design

Operating pressure 30 to 500 bar, flow rate 0.9 to 12 l/min reservoir sizes 11 l, 27 l, 40 l, 63 l

Application

For the operation of hydraulic clamping fixtures and other handling and clamping systems on machine tools.

Description

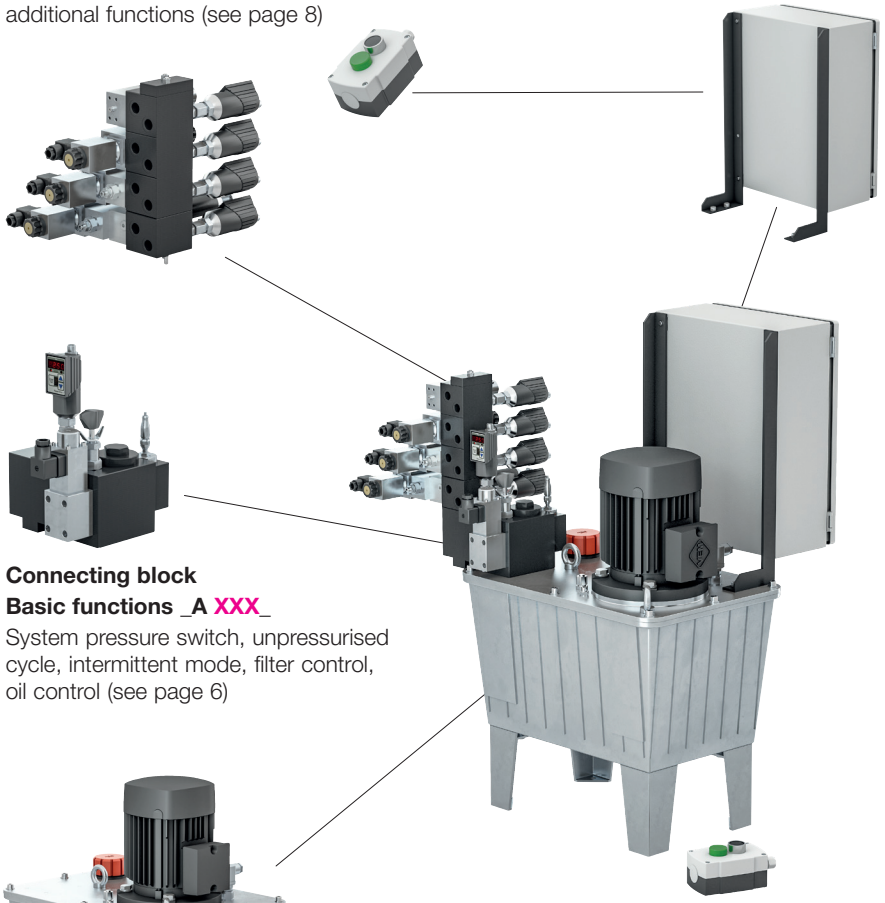
The power units of this series consist of individual modules that are selected depending on the application and are assembled on the basis of a type code to a power unit ready for use.

Modules

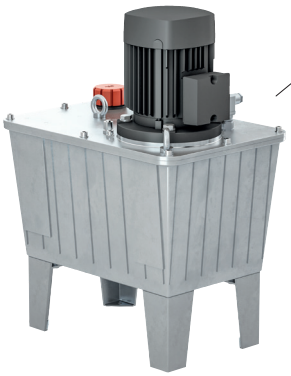
- Power unit (reservoir, pump, motor)
- Connecting block basic functions
- Valve block with up to 4 control circuits
- Electronics

Valve block
Control circuit _V1 XX X XXX SX_ ..._V4
Poppet/spool valves, function triggering, additional functions (see page 8)

Electronics _E X
Electric control, terminal box, (see page 11)



Connecting block
Basic functions _A XXX_
System pressure switch, unpressurised cycle, intermittent mode, filter control, oil control (see page 6)



Basic power unit PM XX
Motor rating 0.75 – 3.0 kW
Reservoir sizes 11, 27, 40, 63 litres
(see page 4)

Characteristics

- for single and double acting cylinders
- continuously adjustable operating pressure
- expandable to up to 8 pressure circuits
- constant flow rate
- wide range of valves
- wide range of hydraulic functions
- energy-saving mode S3 (intermittent mode) or S6 (unpressurised cycle)
- supplied ready for connection

Equipment - Standard

- connecting block with pressure relief valve
- pressure filter 10 µm
- oil level gauge
- oil temperature gauge
- design without piping

Equipment - Options

- electronic system pressure switch with simplified pressure adjustment by teach-in function
- pressure switch for machine tool interlock mechanically or electronically
- electrical oil level control
- electrical temperature control
- return filter
- electrical filter control
- electric control
- terminal box
- foot switch or manual switch
- key-operated switch

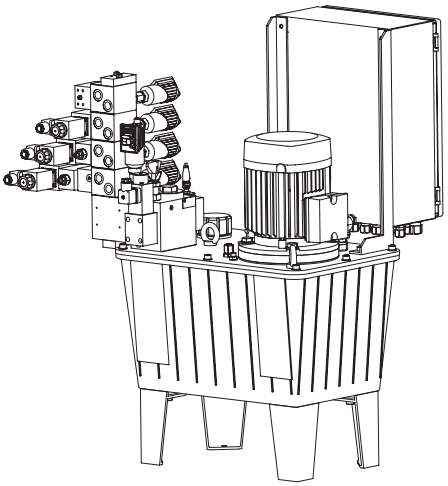
Performance data

p max. [bar]	**Q** [l/min]	**Reservoir** [l]
120	12	27 40 63
160	8.8	27 40 63
160	12	40 63
200	1.5	11 27 40 63
200	3.3	11 27 40 63
200	4.5	11 27 40 63
200	6.2	27 40 63
200	8.8	40 63
350	3.6	27 40 63
350	5.3	40 63
400	2.5	11 27 40 63
450	4.2	40 63
500	0.9	11 27 40 63
500	1.5	11 27 40 63
500	2.6	27 40 63
500	3.7	40 63
500	0.7/5.2	11 27 40 63
500	0.7/8.8	11

Further pump variants and equipments are available on request.

Type code: PMXX_AXXX_V1-XX X XXX SX_V2-XX X XXX SX_V3-XX X XXX SX_V4-XX X XXX SX_EX

- Basic power unit
- Basic functions
- Control circuit 1
- Switch variant
- Control circuit 2
- Switch variant
- Control circuit 3
- Switch variant
- Control circuit 4
- Switch variant
- Electronics



Modular design

By the use of pre-assembled modules, module power units can be flexibly implemented in the short term and in a cost-effective way.
The modular design and numerous design options allow a flexible adaptation to the respective application.

Module power units are particularly suitable as a base to build complex hydraulic controls. A linkable basic block offers the user the possibility to expand the power unit with different function and control elements for the specific application.

Determination of the type code

A type code that results from the used modules is available for the different module components and results in the final part number for the power unit.
To select the correct arrangement, size and performance of the individual components, you will find all parameters and their type code on the following pages.

Safety features

- Precisely defined clamping force by continuously adjustable operating pressure
- Electronic system pressure switch with digital pressure display (option)
- Repeatability ± 1 bar
- Renewed oil supply after a pressure drop of max. 10 %
- Machine tool interlock (option) at a pressure drop of max. 20 %, is automatically updated in case of pressure adjustment
- Oil level and temperature control (option)
- Precise oil temperature display by stick thermometer
- Pressure filter 10 µm in the connecting block
- Screen disks in the ports
- Control voltage 24 V DC
- Pressure maintenance in case of power failure due to hermetically sealed poppet valves
- Overpressure protection of the individual pressure circuits (option)

Important notes:

These power units are exclusively designed for the industrial use of pressure generators for hydraulic fixtures.
All connected hydraulic components must be leakage-free and designed for the maximum operating pressure of the power unit.
The power unit generates very high pressures. The connected cylinders generate very high forces so that there is a permanent danger of crushing in the effective area of the piston rod. The manufacturer of the fixture or the machine is obliged to provide effective protection devices.
Installation, start up and maintenance have to be made according to the operating manual by authorised experts.

Technical data

Designs	
• Gear pump	max. 200 bar
• Piston pump	max. 500 bar
• Pump combination	max. 80 / 500 bar
Type of mounting	foot mounting
Port size	G 1/4, G 3/8 and G 1/2
Direction of rotation (view from above onto the drive shaft)	
• Gear pump	clockwise rotation
• Piston pump	any
• Pump combination	counterclockwise rotation
Mounting position	upright
Usable oil volume	50 % of reservoir volume
Vol. efficiency	η vol = 85–95 %

Electrical characteristics - Motor

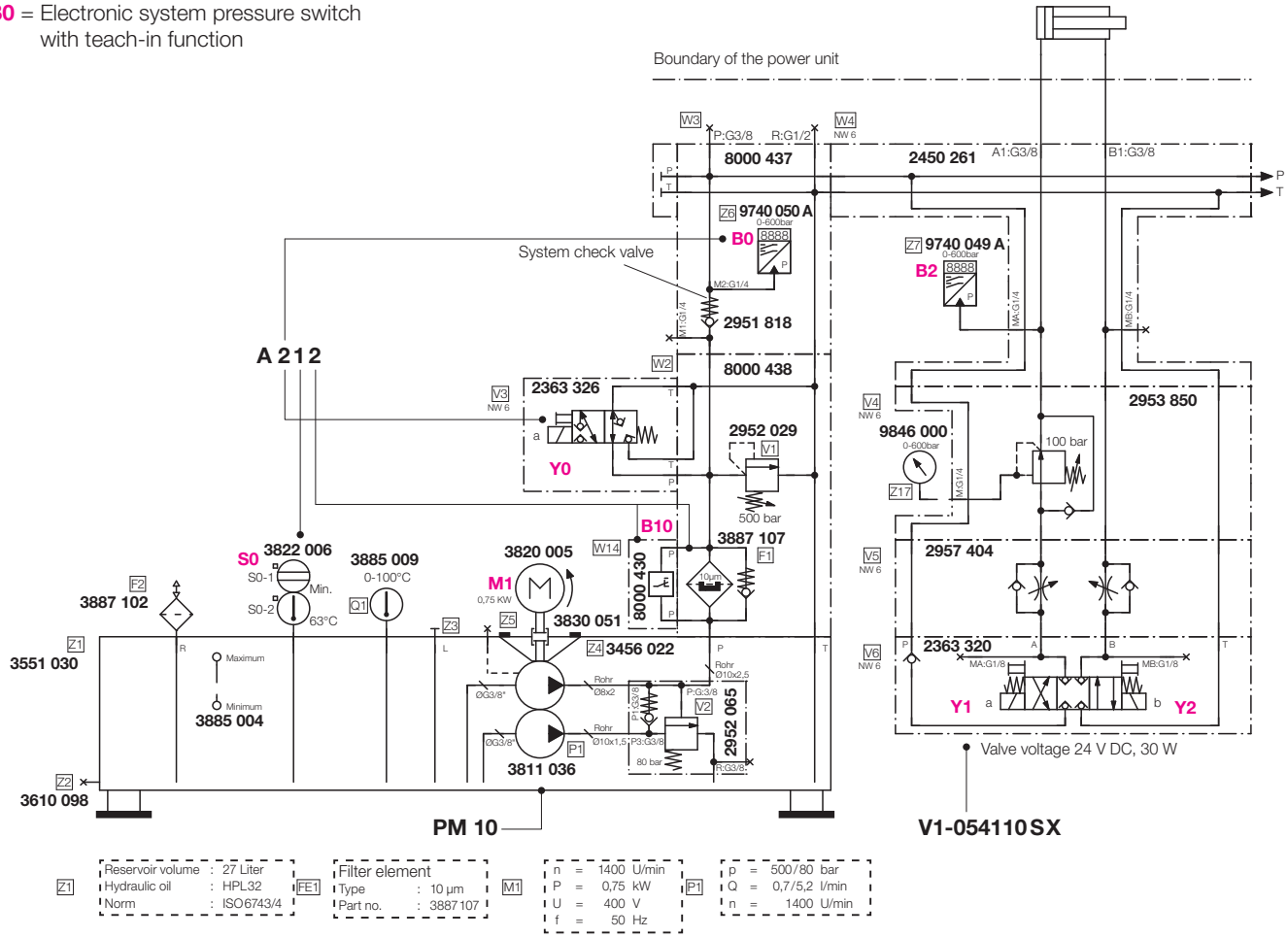
Nominal voltage*	400 V up to 2.2 kW star connection 400 V from 3 kW delta connection
Type	squirrel cage rotor, 4-pole
Voltage type*	three-phase AC voltage, 50 Hz
Code class	IP 55
Max. relative cycle time	depending on the operating pressure specifications for 100 % or 40 % ED see page 4

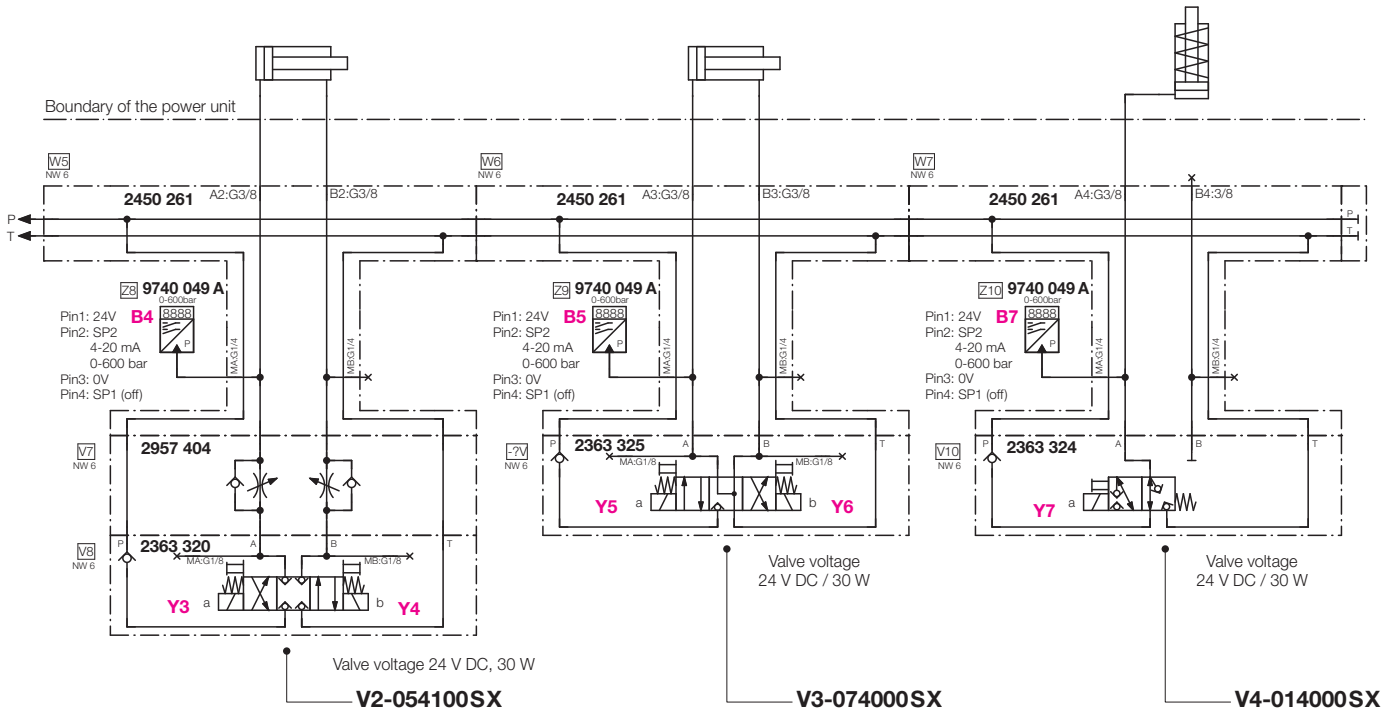
The calculation of the relative duty cycle is based on a cycle time of 10 min. With 40 % ED, e.g. the maximum load within the cycle should not exceed 4 min.
During the remaining time, the motor can carry a load of up to 50 % of the nominal output and should run continuously.

* Other voltages/frequencies as well as special approvals on request.

Hydraulic circuit diagram for example power unit

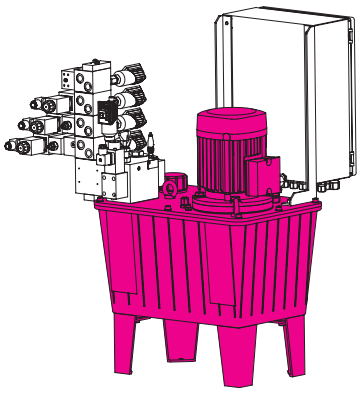
B0 = Electronic system pressure switch with teach-in function





Power units in modular design
Type code for power unit size “PMXX“

Type code: **PMXX**_AXXX_V1-XX X XXX SX_V2-XX X XXX SX_V3-XX X XXX SX_V4-XX X XXX SX_EX



Basic power unit

The basic selection takes place based on operating pressure p and flow rate Q. The size of the reservoir depends on the application conditions (e. g. environmental temperature, cycle time and function)

*** Note**

In case of the two-stage pump (RZ) the gear pump (large flow rate) is switched to unpressurised cycles by the integrated idling control valve as soon as a pressure of 80 bar is exceeded. Up to 80 bar, both flow rates will add up.

4 reservoir sizes: 11 l, 27 l, 40 l, 63 l

5 motor sizes: 0.75 kW, 1.1 kW, 1.5 kW, 2.2 kW, 3.0 kW

15 pump types: 0.9 to 12 l/min flow rate

(gear pump, piston pump and two-stage pump*)

Example:

Reservoir 11 l, max. 200 bar, gear pump 1.5 l/min, 0.75 kW = **PM 01**

Reservoir 27 l, max. 350 bar, piston pump 3.6 l/min, 2.2 kW = **PM 19**

Operating pressure [bar]		**Flow rate**	**Motor rating**	**Reservoir volume**	**Pump type**	**PM XX**
at 100 % ED	**at 40 % ED****	**Q** [l/min]	**P** [kW]	**V** [l]		
425	**500**	0.9	0.75	11	Piston pump	**02**
425	**500**	0.9	0.75	27	Piston pump	**09**
425	**500**	0.9	0.75	40	Piston pump	**21**
425	**500**	0.9	0.75	63	Piston pump	**38**
375	**500**	1.5	1.1	11	Piston pump	**05**
375	**500**	1.5	1.1	27	Piston pump	**12**
375	**500**	1.5	1.1	40	Piston pump	**24**
375	**500**	1.5	1.1	63	Piston pump	**41**
430	**500**	2.6	2.2	27	Piston pump	**18**
430	**500**	2.6	2.2	40	Piston pump	**30**
430	**500**	2.6	2.2	63	Piston pump	**47**
415	**500**	3.7	3.0	40	Piston pump	**34**
415	**500**	3.7	3.0	63	Piston pump	**51**
500	**500**	0.7/5.2*	0.75	11	Two-stage pump	**03**
500	**500**	0.7/8.8*	1.5	11	Two-stage pump	**54**
500	**500**	0.7/5.2*	0.75	27	Two-stage pump	**10**
500	**500**	0.7/5.2*	0.75	40	Two-stage pump	**22**
500	**500**	0.7/5.2*	0.75	63	Two-stage pump	**39**
365	**450**	4.2	3.0	40	Piston pump	**35**
365	**450**	4.2	3.0	63	Piston pump	**52**
310	**400**	2.5	1.5	11	Piston pump	**07**
310	**400**	2.5	1.5	27	Piston pump	**14**
310	**400**	2.5	1.5	40	Piston pump	**26**
310	**400**	2.5	1.5	63	Piston pump	**43**
310	**350**	3.6	2.2	27	Piston pump	**19**
310	**350**	3.6	2.2	40	Piston pump	**31**
310	**350**	3.6	2.2	63	Piston pump	**48**
290	**350**	5.3	3.0	40	Piston pump	**36**
290	**350**	5.3	3.0	63	Piston pump	**53**
200	**200**	1.5	0.75	11	Gear pump	**01**
200	**200**	1.5	0.75	27	Gear pump	**08**
200	**200**	1.5	0.75	40	Gear pump	**20**
200	**200**	1.5	0.75	63	Gear pump	**37**
170	**200**	3.3	1.1	11	Gear pump	**04**
170	**200**	3.3	1.1	27	Gear pump	**11**
170	**200**	3.3	1.1	40	Gear pump	**23**
170	**200**	3.3	1.1	63	Gear pump	**40**
170	**200**	4.5	1.5	11	Gear pump	**06**
170	**200**	4.5	1.5	27	Gear pump	**13**
170	**200**	4.5	1.5	40	Gear pump	**25**
170	**200**	4.5	1.5	63	Gear pump	**42**
180	**200**	6.2	2.2	27	Gear pump	**15**
180	**200**	6.2	2.2	40	Gear pump	**27**
180	**200**	6.2	2.2	63	Gear pump	**44**
175	**200**	8.8	3.0	40	Gear pump	**32**
175	**200**	8.8	3.0	63	Gear pump	**49**
130	**160**	8.8	2.2	27	Gear pump	**16**
130	**160**	8.8	2.2	40	Gear pump	**28**
130	**160**	8.8	2.2	63	Gear pump	**45**
130	**160**	12	3.0	40	Gear pump	**33**
130	**160**	12	3.0	63	Gear pump	**50**
99	**120**	12	2.2	40	Gear pump	**29**
95	**120**	12	2.2	27	Gear pump	**17**
95	**120**	12	2.2	63	Gear pump	**46**

** see page 2 “Electrical characteristics - Motor”

Pumps

Piston pumps	
Type	radial piston pump
Nominal pressure max.	500 bar
Flow rates*	3.6 / 5.3 l/min to 350 bar
	2.5 l/min to 400 bar
	4.2 l/min to 450 bar
	0.9 / 1.5 / 2.6 / 3.7 l/min to 500 bar
Direction of rotation**	any
Speed range	continuous operation 100 ... 2000 1/min, short-time operation up to 2850 1/min
Feature	high-pressure application, harsh operating conditions (e.g. punching / stamping)

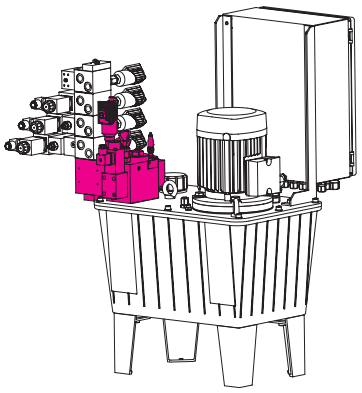
Gear pumps	
Type	2 opposite gears
Nominal pressure max.	200 bar
Flow rates*	1.5 / 3.3 / 4.5 / 6.2 / 8.8 l/min to 200 bar
	12 l/min to 160 bar
Direction of rotation**	clockwise rotation
Speed range	700 ... 3000 1/min
Feature	intermediate-pressure application, high flow rate

Two-stage pump		
Type		radial piston pump and gear pump screwed together
		continuous drive shaft
Nominal pressure max.		500 bar
Flow rate*	up to approx. 80 bar	total flow rate active (gear plus piston pump)
	from approx. 80 bar	only flow rate of piston pump active
Direction of rotation**		counterclockwise rotation
Speed range		700 ... 2000 1/min, in short-time operation up to 2850 1/min
Feature		high flow rate up to approx. 80 bar, high pressure up to 500 bar
Typical application		quickly move large volume consumers and clamp them with high pressure

* at rated speed 1450 1/min
** direction of rotation (view from above onto the drive shaft)

Different flow rates and other pumps are available on request.

Type code: PMXX_**AXXX**_V1-XX X XXX SX_V2-XX X XXX SX_V3-XX X XXX SX_V4-XX X XXX SX_EX



Standard equipment
- Connecting block with pressure relief valve
- System check valve
- Pressure filter 10 µm
- Oil level gauge
- Oil temperature gauge (stick thermometer)
- Filler and reservoir ventilation
- Prepared for additional features

Connecting block basic functions
In addition to the standard equipment, additional features for the basic unit can be selected.

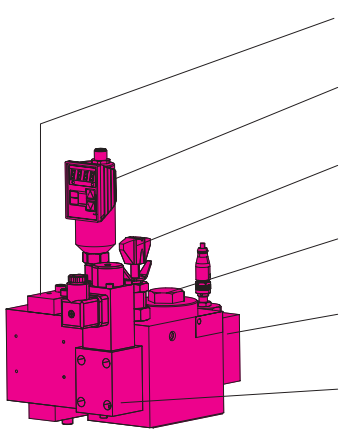
AXXX

with pressure gauge, without system pressure switch, without valve for unpressurised cycle	**0**
with electronic system pressure switch for intermittent cycle	**1**
with electronic system pressure switch and valve for unpressurised cycle, p_{max} = 500 bar	**2**
with electronic system pressure switch and valve for unpressurised cycle, p_{max} = 315 bar	**3**
with pressure gauge, without system pressure switch, with valve for unpressurised cycle, p_{max} = 500 bar	**4**
with pressure gauge, without system pressure switch, with valve for unpressurised cycle, p_{max} = 315 bar	**5**

with visual temperature and oil level display (standard)	**0**
with temperature and oil level control switch and visual temperature and oil level display	**1**

with pressure filter (standard)	**0**
pressure and return filter	**1**
pressure filter with filter control	**2**
pressure filter and return filter with filter control	**3**

Connecting block including pressure filter and pressure relief valve, P port G 3/8, R port G 1/2 and system check valve
(The retrofitting of individual features is possible at any time).



System check valve (standard)

Electronic system pressure switch with teach-in function (option)

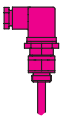
Pressure relief valve (standard)

Pressure filter 10 µm (standard)

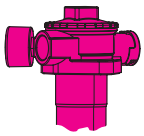
Pressure filter control (option)

Valve for unpressurised cycles (option)

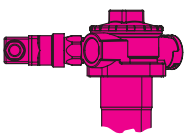
Additional options:



Oil control (oil level / oil temperature)



Return filter 16 µm



Return filter 16 µm with filter control

Note for teach-in function
For teaching, the desired switching as well as reverse switching points are calculated and saved by pressing the Enter/Set key of the system pressure switch. The system is thus set and ready for operation, parameterisation of individual values is not required.

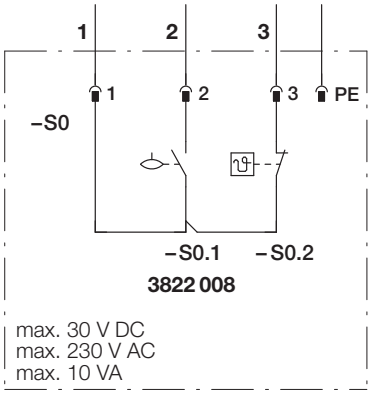
Detailed operating instructions are available on request.

Monitoring functions - Power unit

Oil control (oil temperature too high or oil level too low)

Contact oil temperature	break contact, opens at approx. 63 °C
Contact oil level	make contact, closes when oil above the float
Type of connection	connector, 3-pin as per DIN 43650 Pin 1: common root Pin 2: level Pin 3: temperature
Max. switching voltage	230 VAC
Max. switching current	1 A
Max. contact rating	10 VA
Medium temperature max.	85 °C
Code class	IP 65
For oil reservoir 11 litres	**Part no. 3822008**
For oil reservoir 27 litres	**Part no. 3822006**
For oil reservoir 40 litres	**Part no. 3822048**
For oil reservoir 63 litres	**Part no. 3822005**

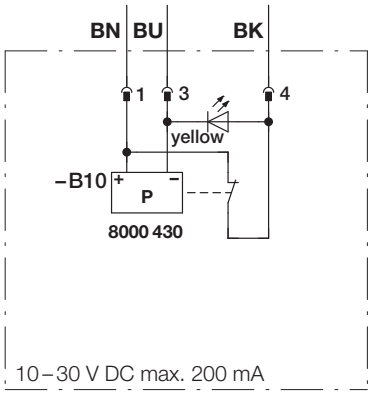
Note: The oil control can be retrofitted.
Several switching points for temperature and/or level on request.



Pressure filter control
Proximity switch with integrated function display

Operating voltage	10…30 VDC
Switching current	200 mA, 24 V DC
Output	break contact, opens in the event of contamination
Connection	connector, M12, 4-pin
Part no.	**8000430**

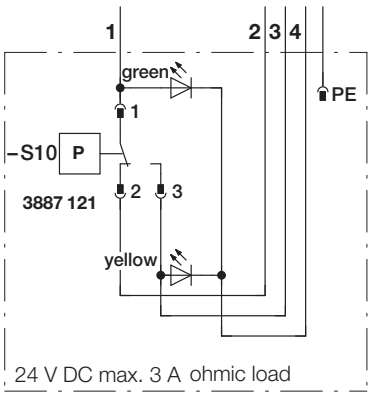
Note: The pressure filter control can be retrofitted.



Return filter control

Operating pressure	0…10 bar
Material	body polyamide, connecting parts steel galvanised, membrane NBR, seal copper
Code class	IP 67
Electrical connection	cable socket DIN 43650 - AF3
	cable diameter 6…8 mm
Max. switching voltage	30 V DC
Max. switching current	0.25 A
Max. contact rating	3 W
Part no.	**3887121**

Note: The return filter control can be retrofitted.



Type code for valve bloc for contro circuits “V1-XX X XXX SX” to “V4-XX X XXX SX”

Type code: PMXX_AXXX_**V1-XX X XXX SX**_V2-XX X XXX SX_V3-XX X XXX SX_V4-XX X XXX SX_EX

The determination of control circuit V2-XX X XXX SX, V3-XX X XXX SX and V4-XX X XXX SX is the same as of control circuit V1-XX X XXX SX.

V1-XX X XXX SX

Control valves

	Function*	
as reserve space	with blind plate	00
3/2 directional poppet valve, 500 bar, without auxiliary energy P→A	1 x single acting	01
3/2 directional poppet valve, 500 bar, without auxiliary energy A→R	1 x single acting	02
3/2 directional poppet valve, 250 bar, without auxiliary energy P→A	1 x single acting	03
3/2 directional poppet valve, 250 bar, without auxiliary energy A→R	1 x single acting	04
4/3 directional poppet valve, 500 bar, without auxiliary energy all connections closed	1 x double acting	05
4/3 directional poppet valve, 250 bar, without auxiliary energy all connections closed	1 x double acting	06
4/3 directional poppet valve, 500 bar, without auxiliary energy A+B→R	1 x double acting	07
4/3 directional poppet valve, 250 bar, without auxiliary energy A+B→R	1 x double acting	08
2 x 3/2 directional poppet valve, 500 bar, without auxiliary energy P→A+B	2 x single acting	09
2 x 3/2 directional poppet valve, 500 bar, without auxiliary energy A+B→R	2 x single acting	10
2 x 3/2 directional poppet valve, 500 bar, without auxiliary energy P→A / B→R	2 x single acting	11
2 x 3/2 directional poppet valve, 250 bar, without auxiliary energy P→A+B	2 x single acting	12
2 x 3/2 directional poppet valve, 250 bar, without auxiliary energy A+B→R	2 x single acting	13
2 x 3/2 directional poppet valve, 250 bar, without auxiliary energy P→A / B→R	2 x single acting	14
2 x 4/2 directional spool valve, 315 bar, without auxiliary energy P→A / B→R	1x double-acting, not leakage-free	15
4/3 directional spool valve, 315 bar, without auxiliary energy all connections closed	1x double-acting, not leakage-free	16
4/3 directional spool valve, 315 bar, without auxiliary energy A+B→R	1x double-acting, not leakage-free	17
4/3 directional spool valve, 315 bar, without auxiliary energy P→R, A+B closed	1x double-acting, not leakage-free	18
4/3 directional spool valve, 315 bar, without auxiliary energy all connections connected	1x double-acting, not leakage-free	19
without mounting plate, P and R closed	without	XX

Pressure switch

without pressure switch for machine tool interlock	0
piston pressure switch in A for machine tool interlock	1
piston pressure switch in B for machine tool interlock	2
one each piston pressure switch in A + B for machine tool interlock	3
electronic pressure switch in A for machine tool interlock	4
electronic pressure switch in B for machine tool interlock	5
one each electronic pressure switch in A + B for machine tool interlock	6

Flow control valves

without flow control valve	0
with flow control valve in A+B, supply throttling, 500 bar	1
with flow control valve in A+B, supply throttling, 315 bar	2

Pressure valves

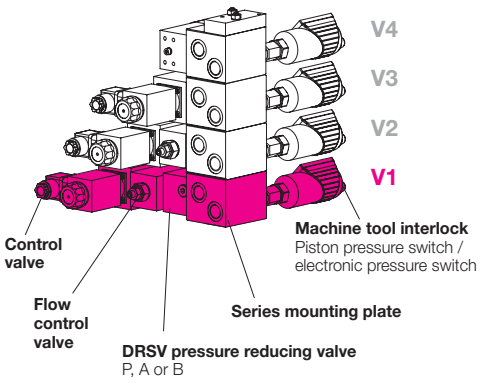
without pressure reducing valve	0
pressure reducing valve in A with pressure display	1
pressure reducing valve and pressure relief valve in A with pressure display	2
pressure reducing valve in P with pressure display	3
pressure reducing valve in P and pressure relief valve in A with pressure display	4
pressure reducing valve in P and pressure relief valve in B with pressure display	5
pressure reducing valve in P and pressure relief valve in A + B with pressure display	6
pressure relief valve in A	7
pressure relief valve in B	8
pressure relief valve in A + B	9

Check valves

without intermediate plate check valves	0
intermediate plate twin check valves in A+B max. 315 bar	1
intermediate plate check valve in A max. 315 bar	2
intermediate plate check valve in B max. 315 bar	3

Switch

without switch	0
hand switch, latching with pilot light green	1
foot switch, latching with pilot light green	2
3-way selector switch, latching with pilot light green	3
key switch, latching with pilot light green	4
2x hand switch, latching with pilot light green	5
2x foot switch, latching with pilot light green	6
2x key switch, latching with pilot light green	7



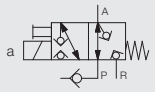
Valve block (max. 4 control circuits V1 – V4)
The equipment of the control circuits is based on the functional requirements of the application. The maximum pressures as well as the design-related differences in poppet and spool valves are to be considered.

Special versions
Switch combinations and special switches are possible on request.
It is also always possible to deviate from the prescribed standard.
For example, more than 4 control circuits can be set up. It is possible to implement additional hydraulic functions.
The electrical control can be designed even more individually up to the installation of programmable logic controllers and touch panels for human-machine communication.

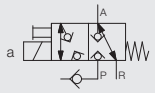
Switching symbols

Control valves

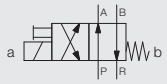
3/2 directional poppet valve
V1-01
V1-03



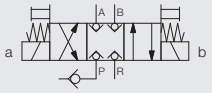
V1-02
V1-04



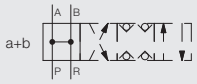
4/2 directional spool valve
V1-15



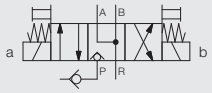
4/3 directional poppet valve
V1-05
V1-06



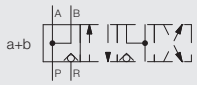
with 4th switching function
Solenoid "a" and "b" operated



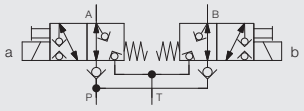
V1-07
V1-08



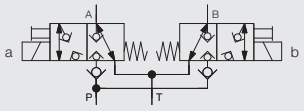
with 4th switching function
Solenoid "a" and "b" operated



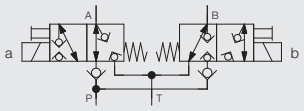
Double 3/2 directional poppet valve
V1-09
V1-12



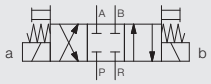
V1-10
V1-13



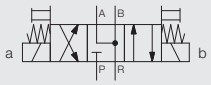
V1-11
V1-14



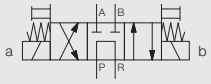
4/3 directional spool valve
V1-16



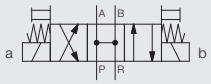
V1-17



V1-18



V1-19



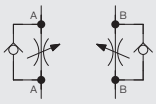
Pressure switch

Piston pressure switch
V1-XX 1
V1-XX 2
V1-XX 3

Electronic pressure switch
V1-XX 4
V1-XX 5
V1-XX 6

Flow control valves

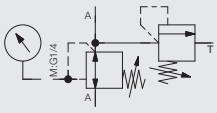
Flow control valve
V1-XX X 1
V1-XX X 2



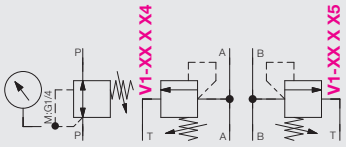
Pressure valves

Pressure reducing valve
V1-XX X X1
V1-XX X X3

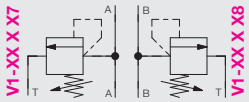
Pressure reducing valve with pressure relief valve
V1-XX X X2



V1-XX X X6

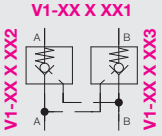


Pressure relief valve
V1-XX X X9



Check valves

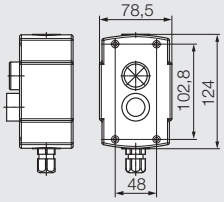
Intermediate plate twin check valve
V1-XX X XX1



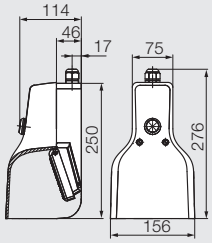
Switch

Connecting cable 3 m, other lengths on request

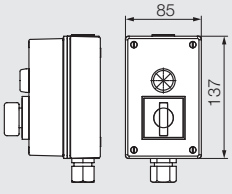
Hand switch
V1-XX X XXX S1



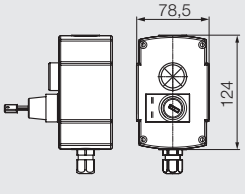
Foot switch
V1-XX X XXX S2



3-way selector switch
V1-XX X XXX S3



Key switch
V1-XX X XXX S4



Types of valves

Poppet valves, hermetically sealed	
Adm. operating pressure	up to 500 bar
Adm. flow rate	up to 20 l/min
Flow direction	in the direction of the arrow as per symbol
Hydraulic oil	HLP 22 as per DIN 51524
Connection	flange for mounting plate assembly
Type of mounting	4 screws M5 (12.9) Tightening torque: 9.3 Nm
Nominal voltage	24 VDC, +5 % / –10 %
Pick-up and holding power	30 W
Make time	60 ms
Brake time	60 ms
Max. cycles	2000 /h
Duty cycle	100 % ED
Code class	IP 65 (IEC 60529)
Connection	cable socket as per DIN EN 175 301-803 and ISO 4400

Spool valves, leakage-afflicted	
Leakage rate	up to 20 ccm/min at 100 bar
Adm. operating pressure	up to 315 bar
Adm. flow rate	up to 80 l/min
Flow direction	in the direction of the arrow as per symbol
Hydraulic oil	HLP 32 or 46 as per DIN 51524
Connection	flange, hole pattern as per DIN 24340, form A CETOP 4.2 – 4.3, ISO 4401 for mounting plate assembly
Type of mounting	4 screws M 5 (10.9) Tightening torque: 8.1 Nm
Nominal voltage	24 VDC, + 10 % / –10 %
Pick-up and holding power	30 W
Make time	20 – 45 ms
Brake time	10 – 25 ms
Max. cycles	15000/h
Duty cycle	100 % ED
Code class	IP 65 as per DIN 40050
Connection	cable socket as per DIN EN 175 301-803 and ISO 4400

Other voltages and/or actuations available on request

Pressure reducing valves		
Max. input pressure	[bar]	500
Adjustable output pressure	[bar]	30 … 380
(other pressure ranges on request)		

Pressure relief valves		
Max. input pressure	[bar]	500
Adjustable reaction pressure	[bar]	50 … 500
(other pressure ranges on request)		

For the protection of pressure reducing valves, additional pressure relief valves are recommended.

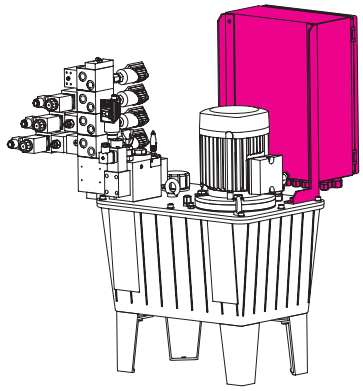
Pressure switch variants

Electronic pressure switches	
Recommended hydraulic oil	HLP 22, 32 and 46 as per DIN 51524
Pressure ranges	0 … 600 bar
Excess pressure [bar]	50 % of the nominal pressure (PN)
Pressure pick-up	Peak-value memory every 2 ms
Operating voltage	12 to 32 V DC (residual ripple < 10 %), protected against reverse polarity
Voltage drop	< 2 V
Current consumption	< 60 mA
Switching outputs	2 x pnp switching, no/nc 250 mA short circuit protection switching output 2 is omitted if current output is parameterised
Delay time	0 to 20 s, switch on and off delay separately adjustable
Range of adjustment switching point	6 to 600 bar
Reverse switching point	5 to 594 bar
Switching frequency	max. 125 Hz
Reproducibility	< ±0.1 % of the final value
Current output	if parameterised, switching output 2 is omitted 0/4 to 20 mA, 20 to 0/4 mA, starting point and final point selectable
Load	max. RL [W] = (Ub – 8V) / 20 mA
Error detection	analogue output in case of line break
Rise time	5 ms (10 % to 90 % of PN)
Damping	0 to 20 s, adjustable
Linearity deviation	max. ± 0.25 % of PN
System pressure display	4 x 7 segment LED display
Display damping	0 to 20 s, adjustable
Switching function display	2x LED red
Operating temperature	–20 °C to +80 °C
Temperature drift	< ±0.2 % / 10 K (–10 °C to +70 °C)
Pressure port	G1/4 A, SW 22
Sensor head material	stainless steel 1.4435
Housing material	PA 6.6, polyester
Code class	IP 65 as per EN 60529
Electric connection	M12 connector 4-pin
As system pressure switch	**Part no. 9740050A*** with teach-in function for easy system pressure adjustment
For machine tool interlock	**Part no. 9740049A***

* Detailed operating instructions available on request

Mechanical pressure switch	
Piston switch	Technical data as per data sheet F 9.732

Type code: PMXX_AXXX_V1-XX X XXX SX_V2-XX X XXX SX_V3-XX X XXX SX_V4-XX X XXX SX_**EX**



Electronics
The function triggering can be realised in various ways.

The following features are available for selection:

- **without electric control, without terminal box**
  connection of the individual components and electric control provided by the customer
- **with terminal box, without electric control**
  connections of the individual components are connected to the terminal strip of the terminal box, the connection will be made to the customer’s electric control
- **with electric control**
  function triggering by customer contacts or selected switches

_E X

without electric control, without terminal box.	**0**
with terminal box	**1**
with electric control and function triggering provided by the customer	**2**
with electric control and function triggering in a common housing	**3**
with electric control and function triggering in individual housings	**4**

U = 3/ N / PE 400 V 50 Hz
Other voltages and frequencies of 1 Ph. 110 V to 3 Ph. 500 V 50/60 Hz on request.
Special approvals on request.

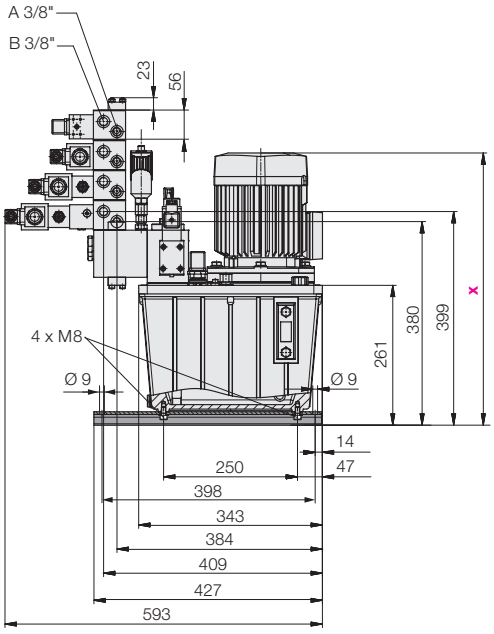
E2 - Function triggering provided by the customer:
Potential free contacts from a customer control.

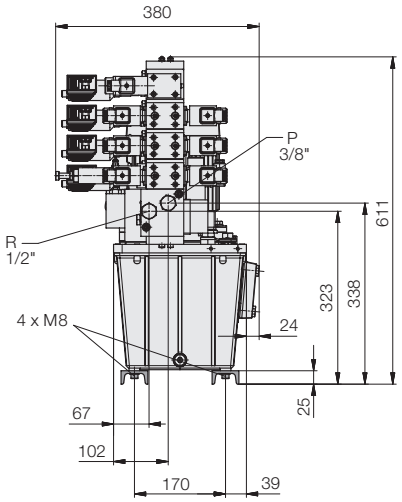
E3 - Function triggering in a common housing:
The selected switches in control circuits are installed in one operating housing and connected to the electrical control.

E4 - Function triggering in individual housings:
The selected switches in the control circuits are designed as shown on page 9 and individually connected to the electric control.

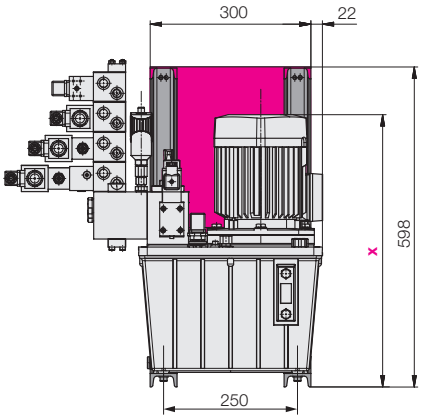
Example power unit 11 litres

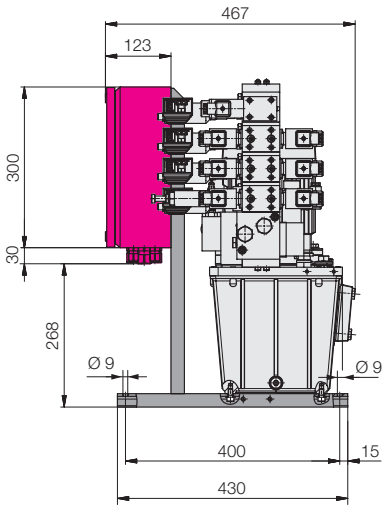
without electronics _E0



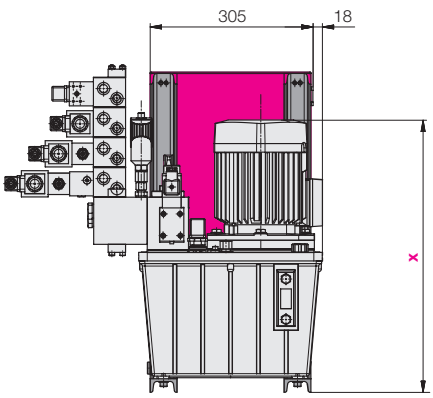


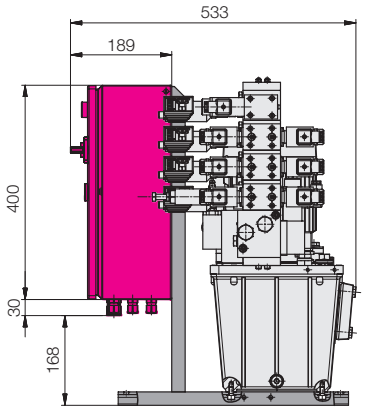
with terminal box _E1





with electric control _E2





Dimensions in mm

Example power unit 11 litres

(Dimensions in mm)

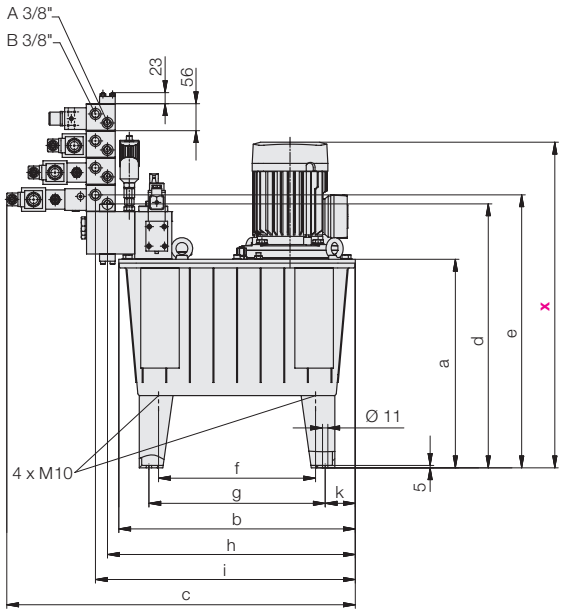
Power unit 11 litres		
Motor 0.75 kW	**x**	493
Motor 1.1 kW	**x**	509
Motor 1.5 kW	**x**	531

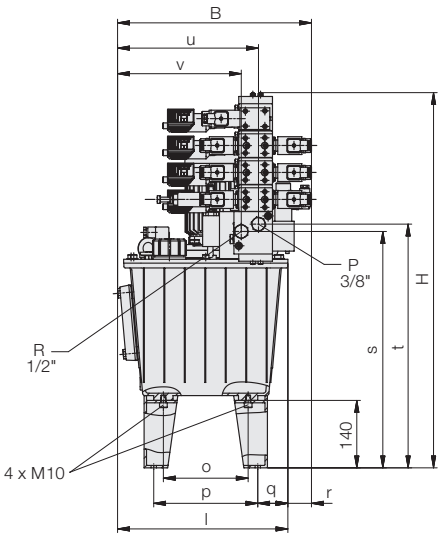
Reservoir volume	Type code for example power unit	Part no.*
11	PM 03_A212_V1-054110S0_V2-054100S0_V3-074000S0_V4-014000S0_E0	8456004
11	PM 03_A212_V1-054110S0_V2-054100S0_V3-074000S0_V4-014000S0_E1	8456003
11	PM 03_A212_V1-054110S1_V2-054100S1_V3-074000S1_V4-014000S1_E2	8456002

* Orders can be placed with the type code or – if available – with the part number.

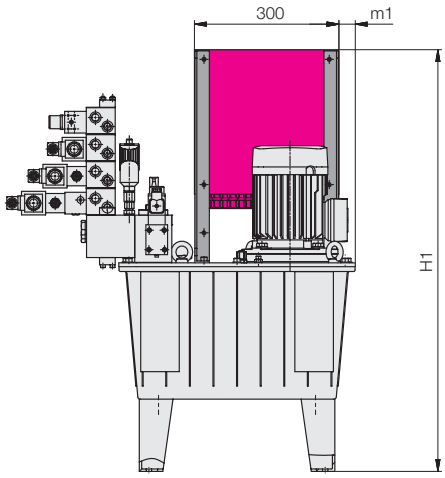
Example power unit 27 / 40 / 63 litres

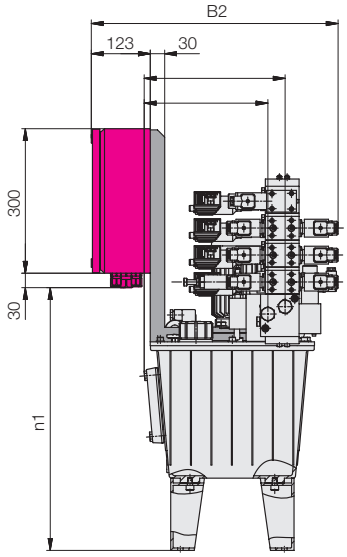
without electronics _E0



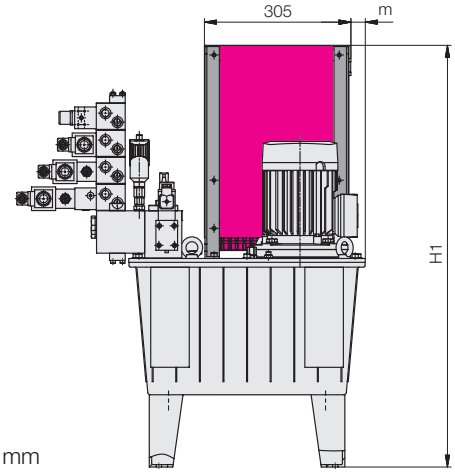


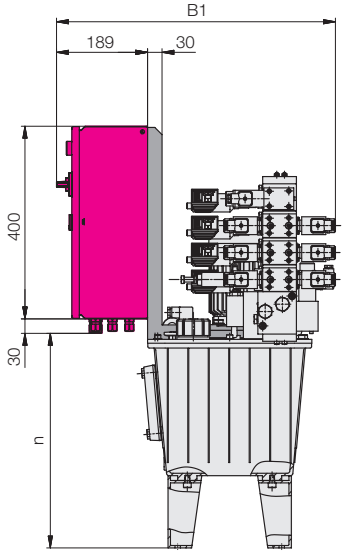
with terminal box _E1





with electric control _E2





Dimensions in mm

Example power unit 27 / 40 / 63 litres

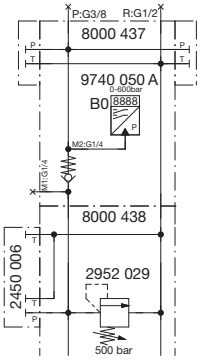
(Dimensions in mm)

Dimension table power unit	27 litres	40 litres	63 litres
Motor 0.75 kW x	661	691	741
Motor 1.1 kW x	677	707	757
Motor 1.5 kW x	699	729	779
Motor 2.2 kW x	727	757	807
Motor 3.0 kW x		784	834
a	433	463	513
b	491	525	615
c	724	758	848
B	403	485	539
B1	579	662	712
B2	513	596	646
d	548	578	628
e	567	597	647
f	326	341	423
g	366	381	463
h	515	549	639
H	779	809	859
H1	876	906	956
i	540	574	664
j	233	233	233
k	63	72	77
l	354	436	490
m	30	41	66
m1	34	45	70
n	446	476	526
n1	546	576	626
o	176	241	283
p	216	281	323
q	63	72	76
r	49	49	49
s	491	521	571
t	506	536	586
u	293	375	429
v	257	339	393

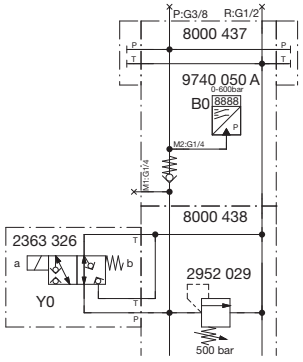
Reservoir volume	Type code for example power unit	Part no.*
27	**PM10_A212_V1-054110S0_V2-054100S0_V3-074000S0_V4-014000S0_E0**	**8457003**
27	**PM10_A212_V1-054110S0_V2-054100S0_V3-074000S0_V4-014000S0_E1**	**8457002**
27	**PM10_A212_V1-054110S1_V2-054100S1_V3-074000S1_V4-014000S1_E2**	**8457001**
40	**PM22_A212_V1-054110S0_V2-054100S0_V3-074000S0_V4-014000S0_E0**	**8458003**
40	**PM22_A212_V1-054110S0_V2-054100S0_V3-074000S0_V4-014000S0_E1**	**8458002**
40	**PM22_A212_V1-054110S1_V2-054100S1_V3-074000S1_V4-014000S1_E2**	**8458001**
63	**PM39_A212_V1-054110S0_V2-054100S0_V3-074000S0_V4-014000S0_E0**	**8459003**
63	**PM39_A212_V1-054110S0_V2-054100S0_V3-074000S0_V4-014000S0_E1**	**8459002**
63	**PM39_A212_V1-054110S1_V2-054100S1_V3-074000S1_V4-014000S1_E2**	**8459001**

* Orders can be placed with the type code or – if available – with the part number.

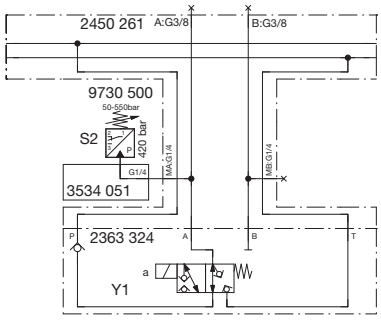
PMXX_A1
intermittent cycle



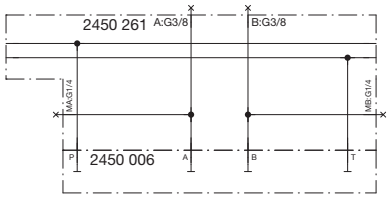
PMXX_A2_...
unpressurised cycle, 500 bar



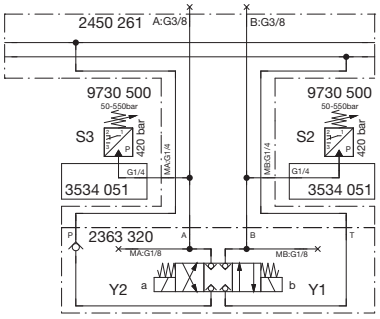
PMXX_AXXX_V1-011000_...
1x single acting, 500 bar with MI in A



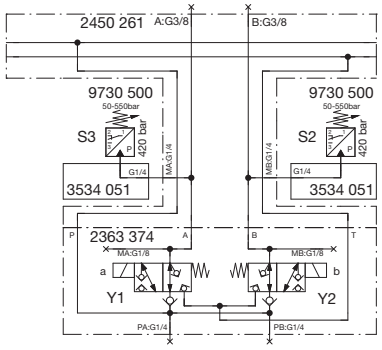
PMXX_AXXX_V1-XXXXXX_V2-000000_...
2nd valve combination as reserve space,
closed with a blind plate for later retrofitting



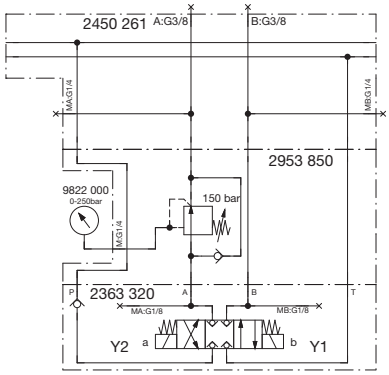
PMXX_AXXX_V1-053000_...
1x double acting, 500 bar
with MI in A+B



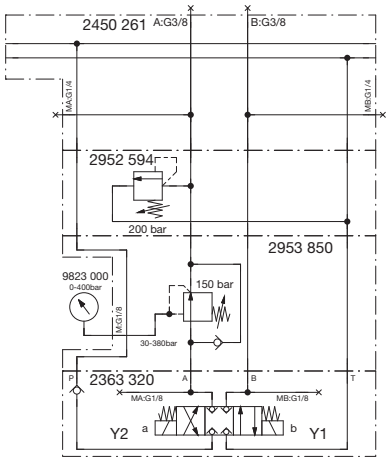
PMXX_AXXX_V1-093000_...
2x single acting, 500 bar
with MI in A+B



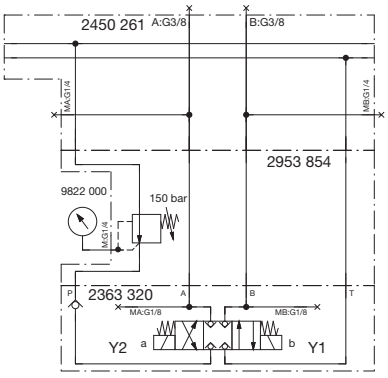
PMXX_AXXX_V1-050010_...
1x double acting, valve 500 bar
pressure reduction in A, 150 bar



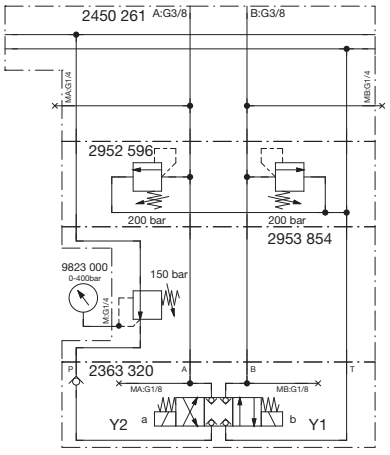
PMXX_AXXX_V1-050020_...
1x double acting, valve 500 bar
pressure reduction in P, 150 bar



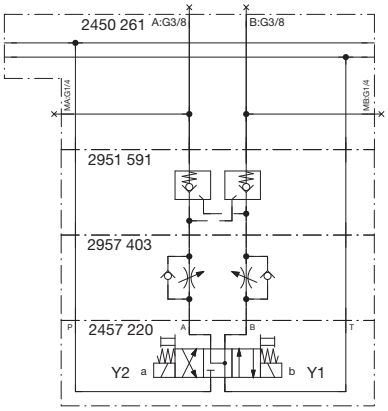
PMXX_AXXX_V1-050030_...
1x double acting, valve 500 bar
pressure reduction in P, 150 bar



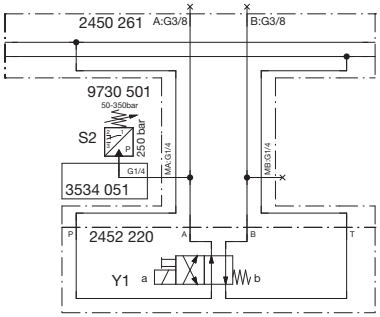
PMXX_AXXX_V1-050060_...
1x double acting, valve 500 bar
pressure reduction in P, 150 bar



PMXX_AXXX_V1-170201_...
1x double acting, 350 bar with
twin flow control check valve and
twin check valve



PMXX_AXXX_V1-151000_...
1x double acting, 315 bar with MI in A
one of the two pressure lines
is always under pressure



WZ 8.800

Hydraulic Pump
manually operated, with overload protection
max. operating pressure 100, 120 and 400 bar

Advantages
- Compact and self-contained design
- Pumping and unclamping or releasing with the same lever
- 3 pressure stages selectable
- Alternatively with overload protection, pressure gauge, hand or foot operation, with holder or base
- Nearly wear-free
- Completely assembled, ready-for-connection unit

Application
Lifting and lowering of dies using roller or ball bars.

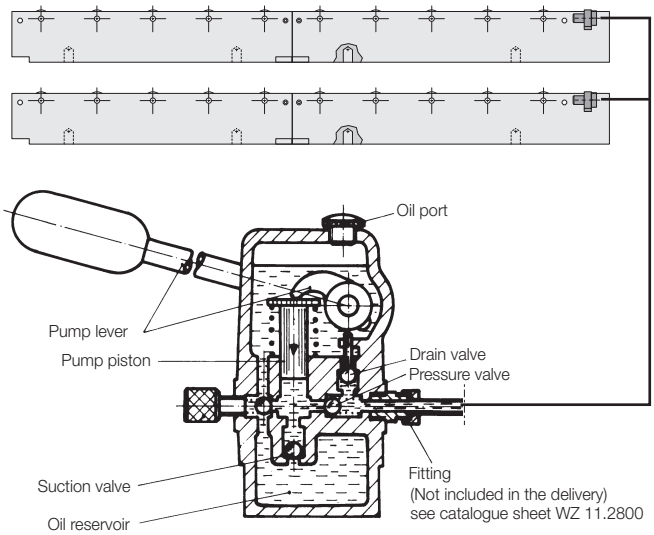
Overload protection
It may happen that the lifted roller or ball bars are overloaded and destroyed by e.g. unintentional closing of the press or excessive die weights.
To protect the ball or roller bars, the hydraulic pump can be supplied with a special pressure relief valve (DBV). In the case of an overload, a valve on the pump opens, the bars are lowered and remain undamaged.

Description
Compact hydraulic pump with hand lever or foot pedal for pumping and releasing.
Due to the metallic seal on the pump piston, the pump is almost wear-free.
The hydraulic pump is delivered completely assembled, including the filling with hydraulic oil HLP32 as a ready-for-connection unit.

In addition to three maximum operating pressures, the following options can be selected:

- Holder for fixing the pump at the press bed or with a base for good stability.
- Pressure gauge to display the pressure reached. Display range 0 to 100 / 120 or 400 bar.
- Adjusted overload protection (DBV) to protect the roller and ball bars against damage.

Principle of a manually-operated hydraulic pump with 2 ball or roller bars



Code for part numbers

8455 PXXX X MX DX BX

Max. operating pressure
100 = 100 bar
120 = 120 bar
400 = 400 bar

Operation
H = Hand lever
F = Foot pedal

Pressure gauge
M1 = with pressure gauge
M0 = without

Overload protection (DBV)
D1 = with DBV
D0 = without

Fixation
BT = Table holder
BS = Base
BF = Flange
B0 = without

Technical data

Max. operating pressure	[bar]	100	120	400
Displacement per stroke	[cm³]	4	4	2
Oil volume, usable	[cm³]	150	150	150
Oil volume	[cm³]	300	300	300
Operating force - hand lever	[N]	250	300	500
Hydraulic connection		G 1/4	G 1/4	G 1/4
Weight	[kg]	7.3	7.3	7.3

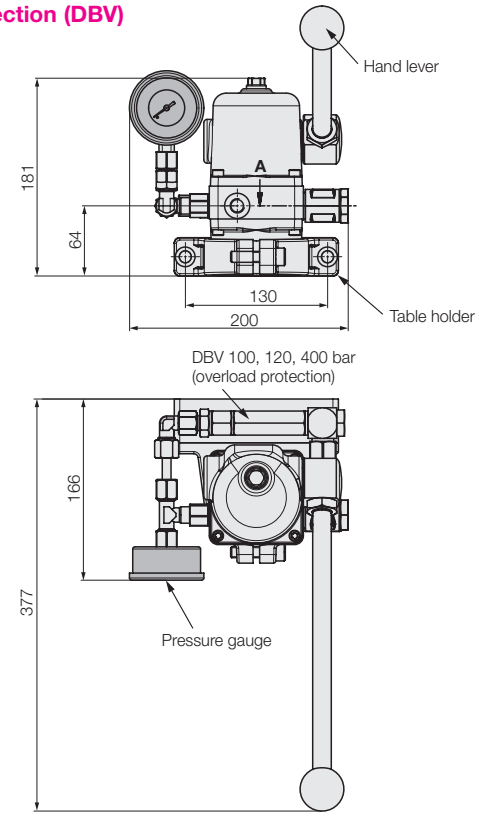
Accessories
To connect the hydraulic pump to the hydraulic elements, a series of connecting components such as hydraulic hoses and fittings are available as accessories (see catalogue sheets WZ 11.2800 and WZ 11.3800).

Application example

Version with foot pedal and base

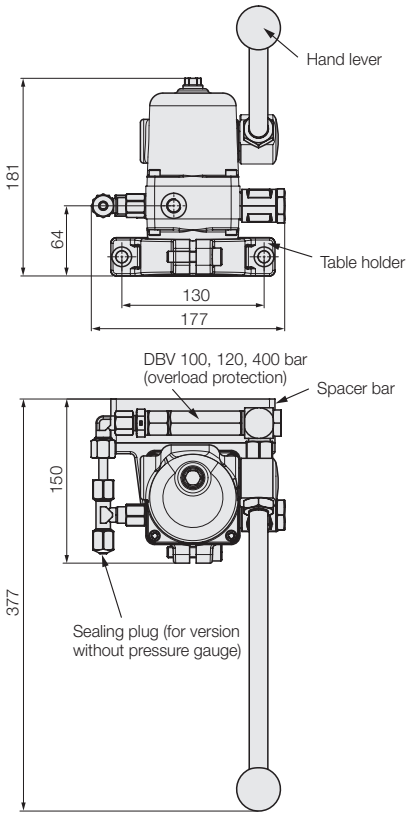
Part no.: 8455 P XXX H M1 D1 BT

– with pressure gauge
– with hand lever
– table holder
– with overload protection (DBV)



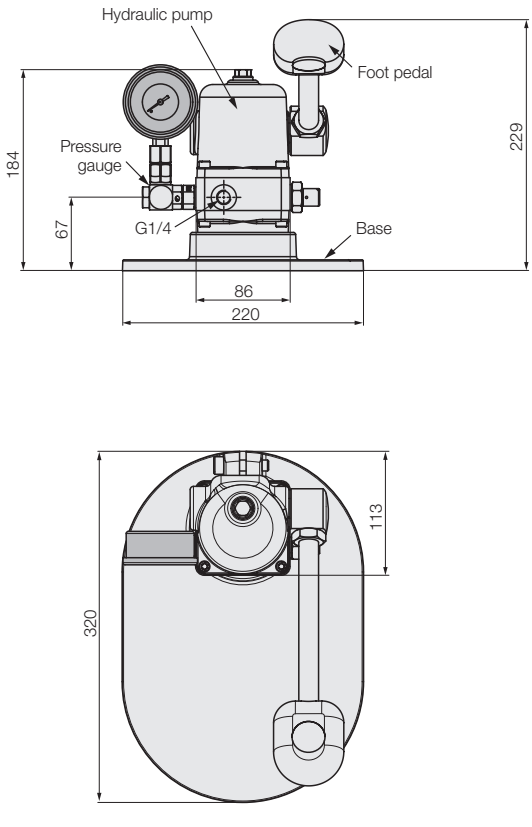
Part no.: 8455 P XXX F M0 D1 BT

– with hand lever
– table holder
– with overload protection (DBV)



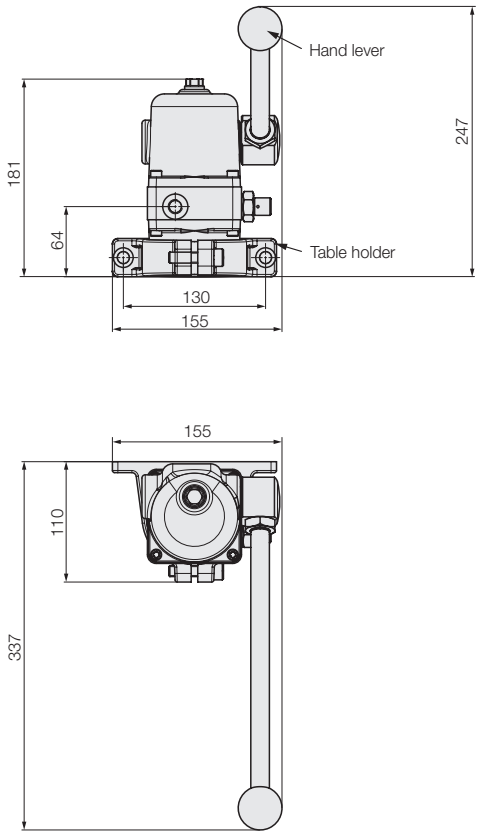
Part no.: 8455 P XXX F M1 D0 BS

– with pressure gauge
– with foot pedal
– base
– without overload protection (DBV)



Part no.: 8455 P XXX H M0 D0 BT

– with hand lever
– table holder
– without overload protection (DBV)

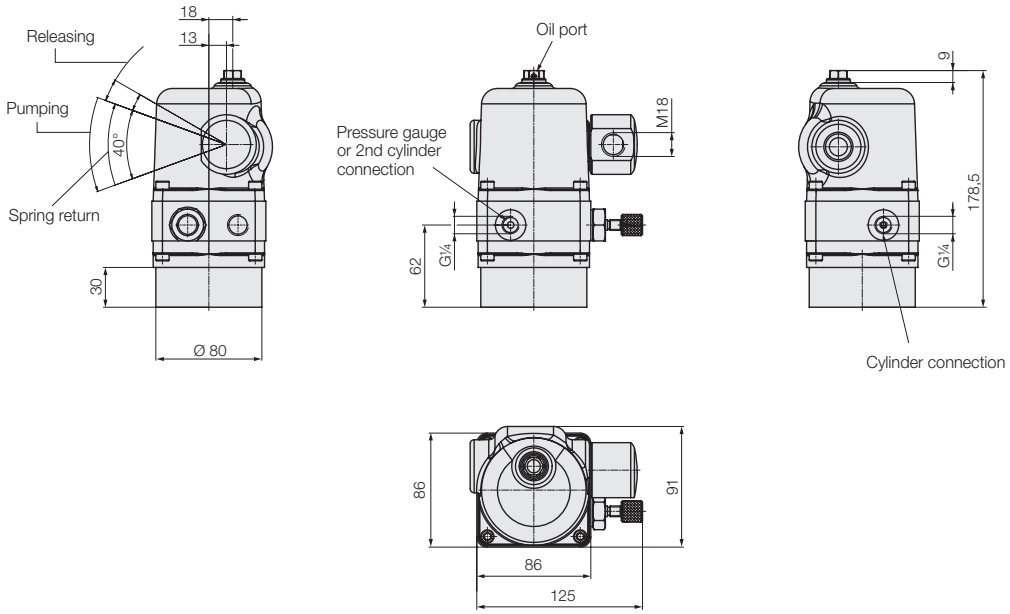


Individual order

On request, the pump components can also be ordered individually and assembled as required.
Please note: Hydraulic pumps with overload protection (DBV) and versions with pressure gauge are not available for individual orders.

Hydraulic pump

Max. operating pressure [bar]	100	120	400
Part no.	**8804813**	**8804812**	**8816813**



Base

Part no. 3533001

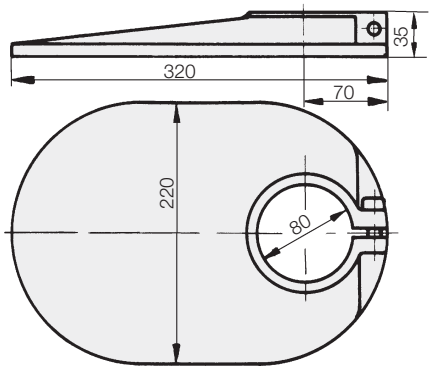
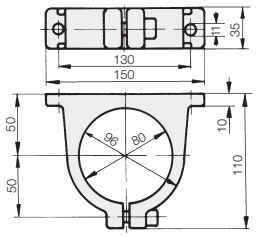


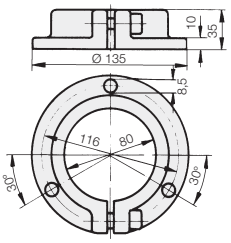
Table holder

Part no. 3533002



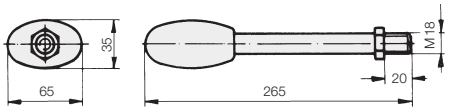
Flange

Part no. 3533003



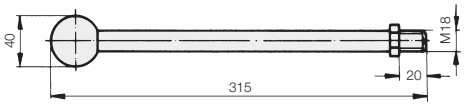
Foot pedal

Part no. 0990102



Hand lever

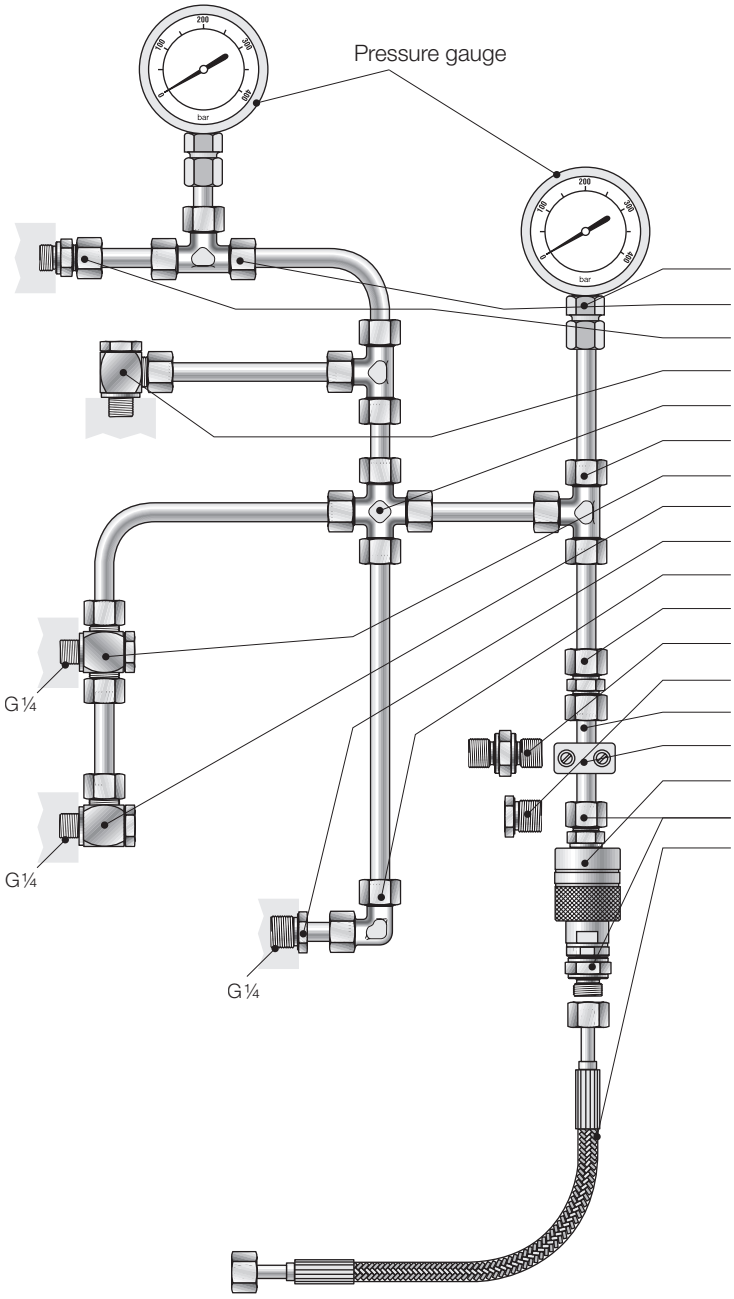
Part no. 0990103



WZ 11.2800

Hydraulic Accessories

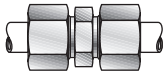
Fittings and pipes
max. operating pressure 400 bar, sealing by sealing ring and sealing cone



Designation	Part no.		
Pressure gauge union	**280050023**		
T-coupling	**280090001**		
Tube male stud coupling	**280010001**		
Swivel banjo coupling	**280290002**	**or**	**9208177**
Cross-type coupling	**280040001**		
T-coupling	**280090001**		
T-swivel coupling	**280070011**		
Swivel banjo coupling	**280290002**	**or**	**9208177**
Stand pipe union	**280060001**		
90° elbow coupling	**280190017**		
Straight coupling	**280160019**		
Double connector	**504910016**		
Screw plug	**109081008**		
Pipe DIN 2391, NBK 8 x 1.5	**340380007**		
Pipe clamp	**211020005**		
Quick disconnect, complete	**9384006**		
Tube male stud coupling	**280010001**		
High-pressure hose ND 4 (see catalogue sheet WZ 11.3800)			
Preferred length 600 mm	**270010131**		
Preferred length 800 mm	**270010133**		
Preferred length 1200 mm	**270010137**		
Preferred length 1600 mm	**270010141**		

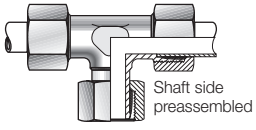
Individual hose lengths by code for part numbers
see catalogue sheet WZ 11.3800

Straight coupling



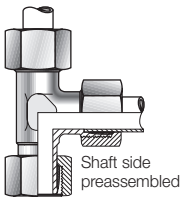
Type	Pipe Ø [mm]	Part no.
G 6-PS	6	**280160018**
G 8-PS	8	**280160019**
G 12-PS	12	**280160021**
G 16-PS	16	**280160023**

T-coupling



Type	Connection	Part no.
EVT 6-PS	M14 x 1.5 mm	**280260008**
EVT 8-PS	M16 x 1.5 mm	**280260009**
EVT 12-PS	M20 x 1.5 mm	**280260003**

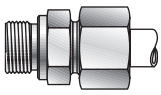
L-coupling



Type	Connection	Part no.
EVL 6-PS	M14 x 1.5 mm	**280140011**
EVL 8-PS	M16 x 1.5 mm	**280140012**
EVL 12-PS	M20 x 1.5 mm	**280140014**

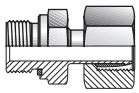
Fittings and pipes
max. operating pressure 400 bar

Tube male stud coupling



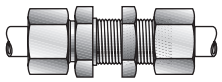
Type	Connection	Part no.
GE 6-PSR	G ¼	**280010004**
GE 8-PSR	G ¼	**280010001**
GE 12-PSR	G ⅜	**280010006**
GE 16-PSR	G ½	**280010007**
GE 6-LR (400 bar)	G ⅛	**280010009**

Stand pipe union



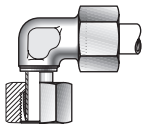
Type	Pipe Ø	Connection	Part no.
EVGE 6-PS	6 mm	G ¼	**280060005**
EVGE 8-PS	8 mm	G ¼	**280060001**
EVGE 12-PS	12 mm	G ⅜	**280060006**
EVGE 16-PS	16 mm	G ½	**280060010**
EVGE 6-LR	6 mm	G ⅛	**280060014**

Straight bulk head fitting



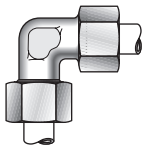
Type	Pipe Ø [mm]	Part no.
SV 6-PS	6	**280030002**
SV 8-PS	8	**280030003**
SV 12-PS	12	**280030005**
G 16-PS	16	**280160023**

90° elbow coupling, adjustable



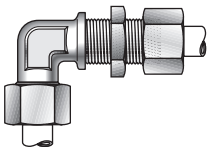
Type	Connection	Part no.
EVW 6-PS	M14 x 1.5 mm	**280130011**
EVW 8-PS	M16 x 1.5 mm	**280130012**
EVW 12-PS	M20 x 1.5 mm	**280130014**

90° elbow coupling



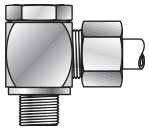
Type	Pipe Ø [mm]	Part no.
W 6-PS	6	**280190016**
W 8-PS	8	**280190017**
W 12-PS	12	**280190019**
W 16-PS	16	**280190021**

90° elbow bulkhead fitting



Type	Pipe Ø [mm]	Part no.
WSV 6-PS	6	**280200006**
WSV 8-PS	8	**280200008**
WSV 12-PS	12	**280200012**

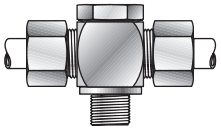
90° swivel banjo coupling



Type	Connection	Part no.
WH 6-PSR	G ¼	**280290001**
WH 6-LR (400 bar)	G ⅛	**280300012**
WH 8-PSR	G ¼	**280290002**
WH 12-PSR	G ⅜	**280290004**
WH 16-PSR	G ½	**280290006**
SVH 8 SR ED*		**9208177**
Angle swivel joint		**9208176**

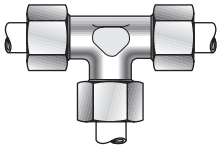
* e. g. for forging applications

T-swivel coupling



Type	Connection	Part no.
TH 6-PSR	G ¼	**280070010**
TH 8-PSR	G ¼	**280070011**
TH 12-PSR	G ⅜	**280070013**
TH 16-PSR	G ½	**280070015**
TH 6-LR	G ⅛	**280070016**

T-coupling



Type	Pipe Ø [mm]	Part no.
T 6-PS	6	**280090002**
T 8-PS	8	**280090001**
T 12-PS	12	**280090005**
T 16-PS	16	**280090006**

Screw plug

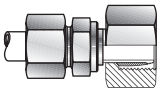
Type	Connection	Part no.
VSTI 1/8 ED	G ⅛	**109081008**
VSTI 1/4 ED	G ¼	**109081009**
VSTI 3/8 ED	G ⅜	**109081010**
VSTI 1/2 ED	G ½	**109081011**
VSTI 1/8 ED FKM	G ⅛	**109082004**
VSTI 1/4 ED FKM	G ¼	**109082005**
VSTI 3/8 ED FKM	G ⅜	**109082006**
VSTI 1/2 ED FKM	G ½	**109082008**

Thread reducing adapter

Type	Part no.
RI 1/4 x 3/8	**126160001**
RI 3/8 x 1/4	**126160012**
RI 3/8 x 1/2	**126160013**
RI 1/2 x 1/4	**126160014**
RI 1/2 x 3/8	**126160015**
RI 1/4 x 1/8	**126160021**
RI 1/8 x 1/4	**126160025**

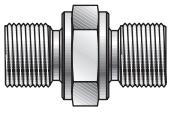
RI = screw-in thread

Reducer with sealing cone



Type	Part no.
RED 8/ 6-PS	**280020004**
RED 12/ 6-PS	**280020008**
RED 12/ 8-PS	**280020010**
RED 16/ 6-PS	**280020014**
RED 16/ 8-PS	**280020015**
RED 16/12-PS	**280020016**

Double connector



Connection	Part no.
G ¼ - G ¼	**504910016**
G ¼ - G ⅜	**504910018**
G ⅜ - G ⅜	**504910022**
G ⅛ - G ¼	**792170013**

Stainless steel pipe

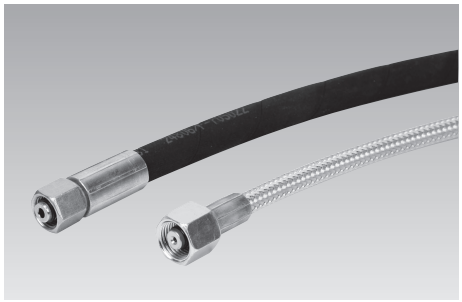
Dimensions [mm]	Part no.
Ø 6 x 1.0	**340381001**
Ø 8 x 1.5	**340381004**
Ø 8 x 2.0	**340381005**

Pipe

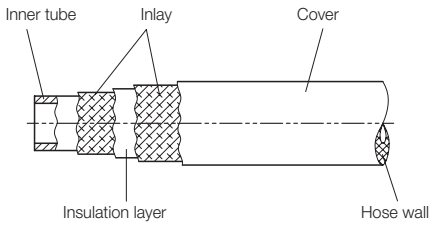
Dimensions [mm]	Part no.
Ø 6 x 1.0	**340380003**
Ø 8 x 1.5	**340380007**
Ø 8 x 2.0	**340380008**
Ø 12 x 2.0	**340380013**
Ø 12 x 2.5	**340380044**
Ø 16 x 3.0	**340380056**

Hydraulic Accessories
High-pressure hoses, connector blocks, couplings and plug-in connectors

Hydraulic high-pressure hoses
assembled ready for connection
max. operating pressure 250 / 500 bar

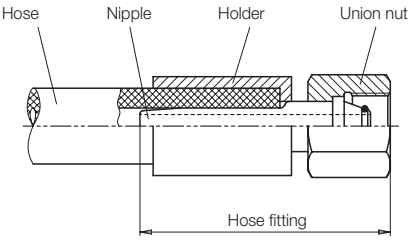


Hose structure



Depending on operating pressure and nominal diameter, high-pressure hoses consist of one or several layers of wire or textile mesh or spiral inlays.

Hose union



After pressing of the hose fittings at both ends the high-pressure hose is ready for connection.

Application
High-pressure hoses are used for energy and signal transmission in hydraulic systems. Especially when connecting movable elements, but also for the connection of hydraulic subassemblies which are not fixed on a common base, e.g. power units and clamping fixtures.

Advantages
- Quadruple safety
- Every desired length available
- Preferred lengths available from stock
- Marking with manufacturing date as per DIN EN
- ND 4 - high-pressure hose in series with wire braiding

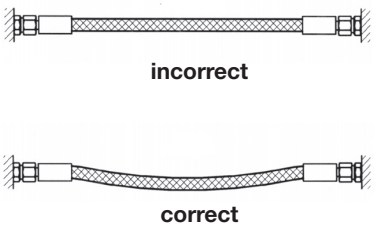
Service life
The application time including storage time should not exceed 6 years, the net storage time 2 years.
High temperatures, frequent motion cycles or high pulse frequencies can reduce the application time.

Maintenance
Before putting into operation and then at least once a year, the high-pressure hoses have to be checked by an expert if they are still leak-proof.

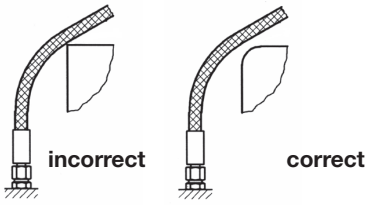
Important notes
Inappropriate installation, use and maintenance can reduce the service life of high-pressure hoses.

Mounting instructions

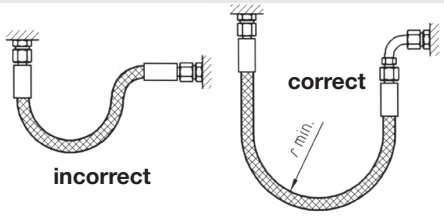
Upsetting or tensile stress

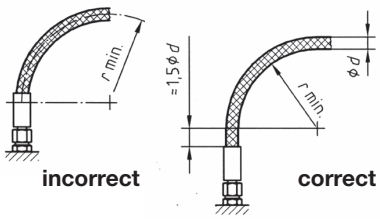


Mechanical damage

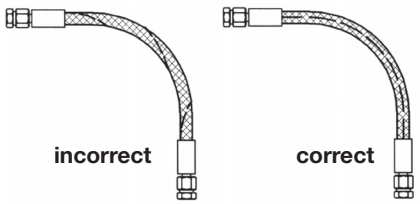


Bending radii

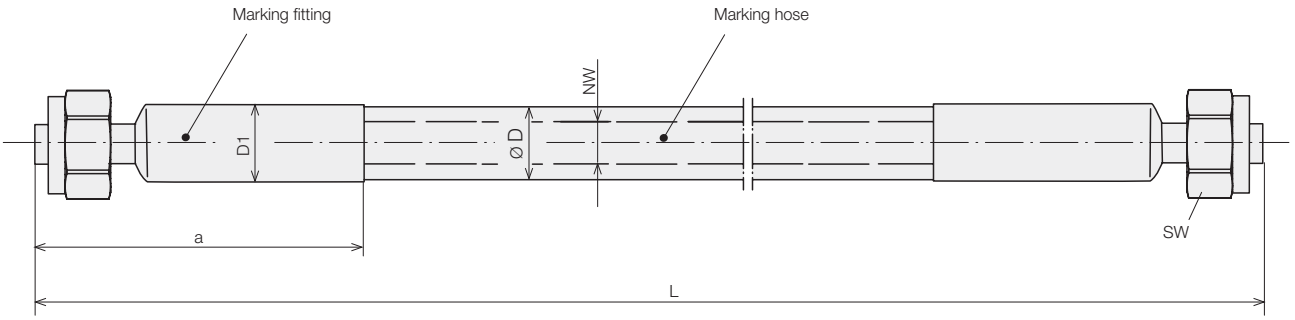




Torsional stress



Dimensions / Technical data



High-pressure hose		ND	4	4	6.3	6
Max. operating pressure		[bar]	250	500	250	500
Port size			8L	8S	8L	8S
Union nut			m8L	m8S	m8L	m8S
SW		[mm]	17	19	17	19
D hose Ø		[mm]	9.5*	9.5*	15	17.5
D1 holder Ø		[mm]	13	13	19	19
Min. bending radius		[mm]	50	50	100	100
Fitting length a		[mm]	42	42	50	52
Minimum length		[mm]	150	150	200	200
specific Increase in volume per bar and meter		$\left[\frac{cm^3}{bar * m}\right]$	0.006	0.006	0.008	0.006
Part no.			**93751 XXXXX**	**93752 XXXXX**	**93206 XXXXX**	**93706 XXXXX**
Preferred lengths	L = 500	[mm]	**93751 00500**	**93752 00500**	**93206 00500**	**93706 00500**
	1000	[mm]	**93751 01000**	**93752 01000**	**93206 01000**	**93706 01000**
	1600	[mm]	**93751 01600**	**93752 01600**	**93206 01600**	**93706 01600**
	2500	[mm]	**93751 02500**	**93752 02500**	**93206 02500**	**93706 02500**

***** with wire braiding

Marking hose

on the hose there is the following marking:

- name or code of the manufacturer
- number of European standard
- type
- nominal diameter
- quarter and the last two figures of the year of manufacture

Marking fitting

On the fitting there is the following marking:

- name or code of the manufacturer
- month of manufacture
- the last two figures of the year of manufacture
- nominal pressure PN of the hose fitting
- part number of the complete hydraulic hose

Important notes!

We deliver only completely pressed high-pressure hoses with mounted union nut. Pipe sockets with removable cutting ring and union nut are no longer allowed.

Code for part numbers

93XXX XXXXX

Hose length L in mm
Gradation: 5 mm
Example: L = 750 mm : **00750**
(Pay attention to the minimum length as per chart)

Nominal diameter, union nut and nominal pressure
751 : ND 4 – m8L – 250 bar
752 : ND 4 – m8S – 500 bar
206 : ND 6.3 – m8L – 250 bar
706 : ND 6 – m8S – 500 bar

Length tolerances as per DIN 20066

Hose length L	Tolerance
≤ 630 mm	+7 / –3 mm
631 – 1250 mm	+12 / –4 mm
1251 – 2500 mm	+20 / –6 mm
2501 – 8000 mm	+1.5 / – 0.5 %
> 8001 mm	+3 / –1 %

Further hose lengths and union nuts are available on request

Code for part numbers

27001 XXXX

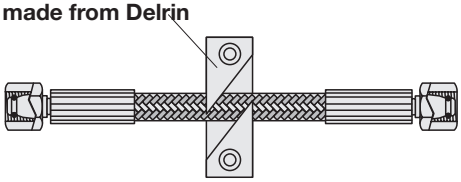
for variable lengths with hose connection on both sides
Union nut M 14 x 1.5 or M 12 x 1.5*

*When selecting hose connection M 12 x 1.5
only max. operating pressure of 250 bar is admissible

Accessory

Hose holder

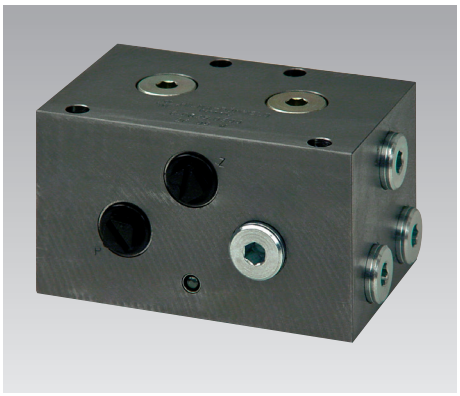
made from Delrin

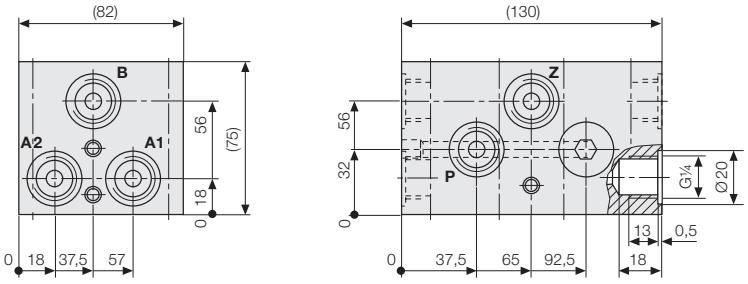


Part no. 550650003

Connecting block

with pilot-operated check valves

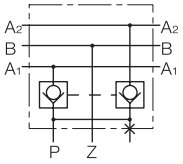




Connecting threads	Part no.
2 x G 3/8 + 6 x G 1/4	**898250290**
8 x G 3/8	**898250300**

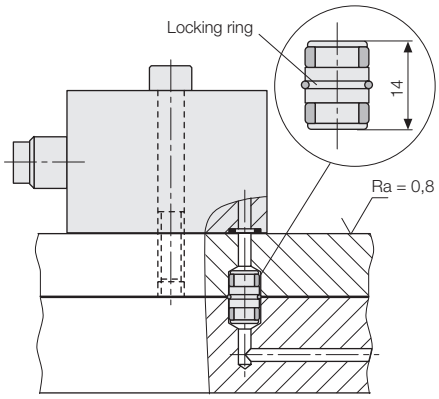
Control pressure = 0.38 x operating pressure + 12

Circuit diagram

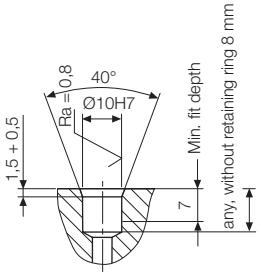


Plug-in connectors for plates and piping boards

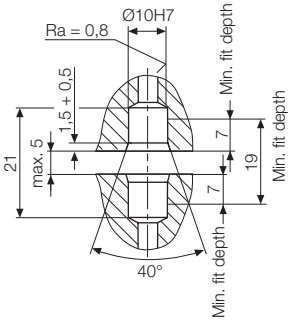
Installation example



Installation dimensions short version



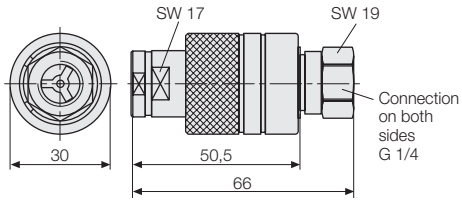
Installation dimensions long version



Length [mm]	Nominal diameter [mm]	Max. operating pressure [bar]	Seal	Part no.
14	5	500	FKM	**9210132**
19	5	500	FKM	**9210127**

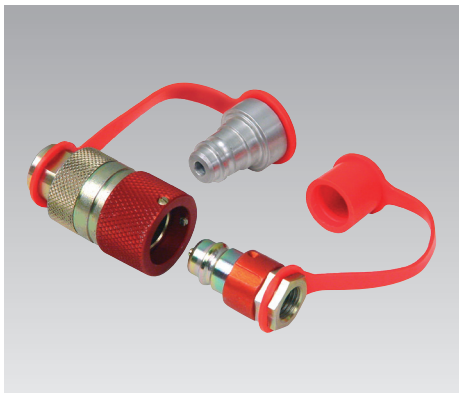
Quick-disconnect couplings

Description
The quick-disconnect couplings are couplings of sturdy design which lock automatically after uncoupling.
Connection and disconnection is made in the unpressurised condition.
The displacement of the sleeve to the corresponding coupling or uncoupling direction enables an easy one-hand operation.

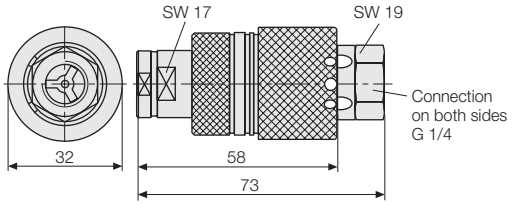


Description	Part no.
Coupling complete	**9384 006**
Coupler	**9384 106**
Nipple	**9384 206**
Dust cap for coupler	**9384 300**
Dust cap for nipple	**9384 400**
Spare seal O-ring	**3001 091**
Spare seal back-up ring	**3000 228**

Coded couplings



Description
In case of more than one coupling port there is the risk of confusion when coupling. Coded couplings are not only marked by colour but additionally by means of a pin inside of the coupling which only fits into the groove of the corresponding nipple. The risk of confusion is thereby eliminated.
The easy handling of the coded Push-Pull couplings allows for a quick and safe finding of the mechanical code.



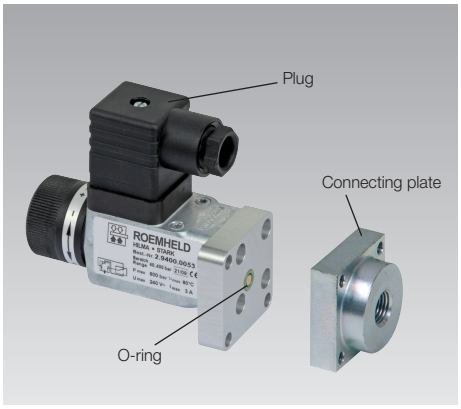
	Part no.	Part no.	Part no.
Coding	Coupling complete	Coupler separate	Nipple separate
black	**9384 715**	**9384 716**	**9384 717**
white*	**9384 725**	**9384 726**	**9384 727**
red	**9384 735**	**9384 736**	**9384 737**
yellow	**9384 745**	**9384 746**	**9384 747**
green	**9384 755**	**9384 756**	**9384 757**
blue	**9384 765**	**9384 766**	**9384 767**

* The white coded nipple is provided with a preloaded valve (VSV) which limits a possible pressure built-up through internal leakages in hydraulic clamping elements to approx. 5 bar. The pre-loaded valve is not effective in coupled mode.

Hydraulic Accessories
Pressure switches, valves, pressure gauges and hydraulic oil

Pressure switches

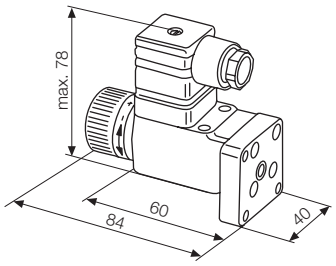
Pressure switch HDS



Description
Mini pressure switch, adjustable as a piston pressure switch

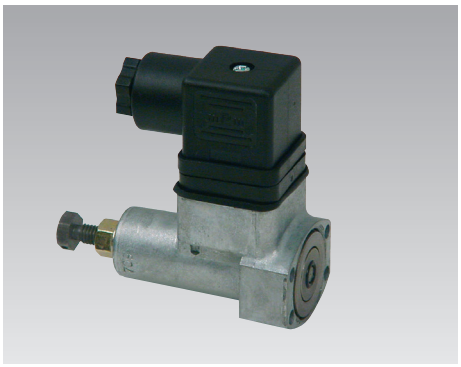
Technical data

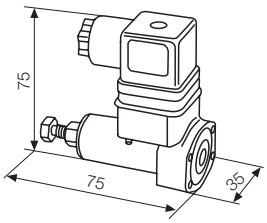
Max. operating pressure	[bar]	400
Temperature range	[°C]	–40 up to +80
Port		DIN ISO 16873



Designation	Adjustment range [bar]	Part no.
HDS-1-120	10 – 120	**2 9400 0051**
HDS-1-250	25 – 250	**2 9400 0052**
HDS-1-400	40 – 400	**2 9400 0053**

Pressure switch DG



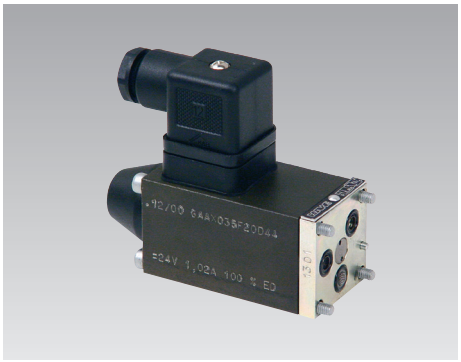


Designation	Adjustment range [bar]	Part no.
DG 33	200 – 600	**2 9400 0019**
DG 34	100 – 350	**2 9400 0020**
DG 35	20 – 210	**2 9400 0021**

Accessories for pressure switches

Connecting plate for pipe connection G 1/4 for HDS	**2 9502 0003**
Plug with double LED and cable 1.5 m	**2 0975 0036**
Plug DIN 43650, plug insert 4 x 90° rotatable	**2 0970 0012**
Spare O-ring Ø 5 x 1.5 mm	**1 9501 0026**

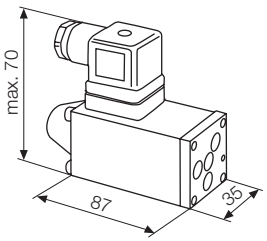
Directional seat valve (WH1)

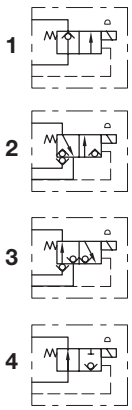


Description
3/2 directional control valve with leak-free and tight ball-type poppet valves. Compact design by integration of the valve components in the magnetic body.
The directional seat valve has an emergency stop.

Technical data

Max. flow rate	[l/min]	8
Max. operating pressure	[bar]	400
Temperature range	[°C]	– 40 up to + 80
Solenoid voltage	[V DC]	24

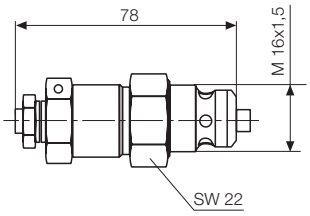




Designation	Flow rate	Circuit diagram	Part no.
WH 1 D	8 l/min	1	**2 9220 6001**
WH 1 N NBVP 16 Z	8 l/min 20 l/min	2	**2 9220 6003** **2 9220 6042**
WH 1 R NBVP 16 Y	8 l/min 20 l/min	3	**2 9220 6004** **2 9220 6043**
WH 1 F	8 l/min	4	**2 9220 6009**
GZ 3-1 A24 G 3-1 A24	as per customer's request		**2 9220 1042** **2 9220 1043**

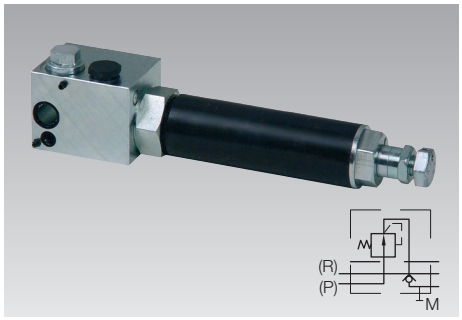
Pressure relief valve

Description
Safety valve to prevent exceeding the maximum admissible pressure and for limiting operating pressures.

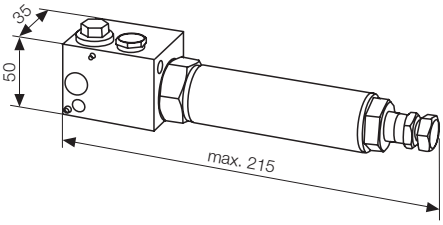


Designation	Flow rate [l/min]	Part no.
CMV 1B - 420	20	**292300114**

Pressure reducing valve



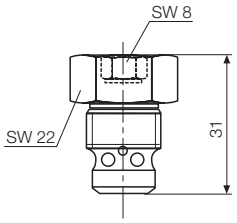
Description
Pressure control valve for keeping the lower output pressure in the secondary circuit constant without affecting the higher pressure in the primary circuit.
Screw-in type valve in combination with connector block.



Designation	Adjustment range [bar]	Part no.
CZ 5/80/5R	15 – 130	**292320023**

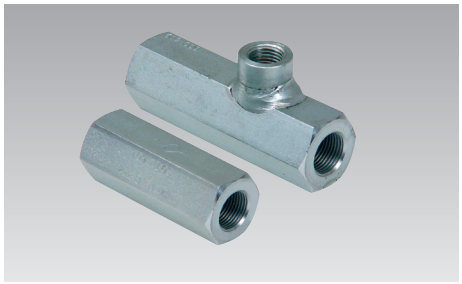
Check valves

Description
Stop valves with free flow in one direction and blocked oil flow in the opposite direction.

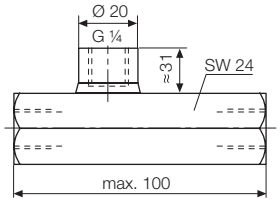


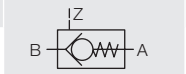
Designation	Port	Part no.
CRK 1	M16 x 1.5	**292500076**

Check valves for pipe installation

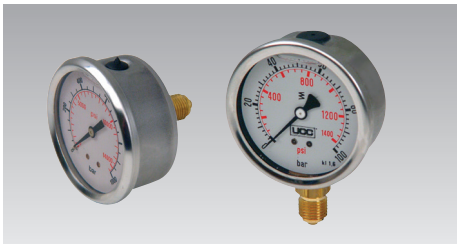


Description
Check valves with one flow direction. Housing made from galvanised steel. Spring-loaded ball-type poppet valve, leakage-free
Pilot-operated by hydraulic pressure
Control pressure = 0.38 x operating pressure + 12



Designation	pilot operated	Port	Graphical symbol	Part no.
B2-1	no	G ¼		**292500008**
B2-2	no	G ⅜		**292500009**
B2-3	no	G ½		**292500010**
RH1	yes	G ¼		**292500047**
RH2	yes	G ⅜		**292500034**

Pressure gauge



Description
Pressure gauge with steel pipe spring and glycerine filling.
Ø 63 mm

Pressure range [bar]	Port	Part no.
0 – 600	G ¼, at the bottom	**13866 0004**
0 – 160	G ¼, at the bottom	**13866 0050**
0 – 600	G ¼, on the back	**13866 0051**

Hydraulic oil

Designation	Temp. range [°C]	Container [l]	Part no.
HLP 32	10 – 50	1	**698950010**
HLP 32	10 – 50	5	**698910010**
HLP 46	20 – 60	1	**698960010**
HLP 46	20 – 60	5	**698970010**

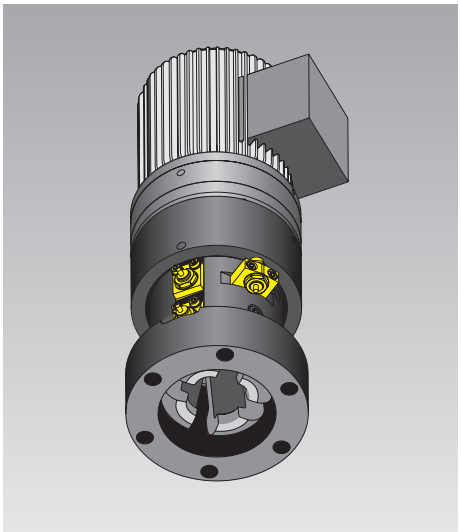
Hydraulic oil Oemeta fire-resistant

Designation	Temp. range [°C]	Part no.
HF-DU	10 – 200	**on request**

(e. g. for the use in forging presses)

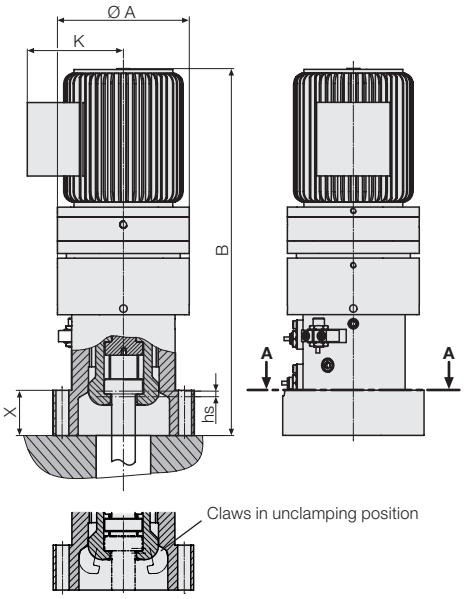
WZ 5.2620

Tenon-Type Clamps
electro-mechanical, self-locking, with position monitoring clamping forces 70 kN



Advantages

- High operational safety by position monitoring and automatic motion sequence
- Central operation of all clamping elements
- Compact and sturdy design
- Resistant to high mechanical loads
- Shock-resistant up to a max. ram acceleration of 12 *g*
- Suitable for retrofit and for installation in original equipment
- No colliding edges when inserting the dies



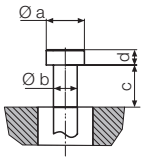
Application

Automatic clamping of dies
- on the press ram
- on blank holders
- at environmental temperatures up to max. 70 °C

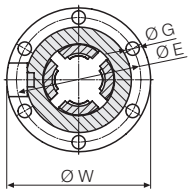
Description

The rotation of the motor is converted into a grip and pull movement of the clamping claws by the flexspline gear and the lead screw.
For clamping, the claws grip the tenon of the clamping point and pull it towards the clamping element.
The clamping force and the clamping and unclamping positions are monitored by inductive proximity switches.
The clamping force is maintained by self-locking.

Geometry of the tenon

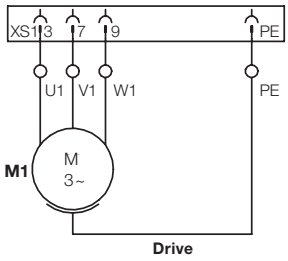


Section A-A

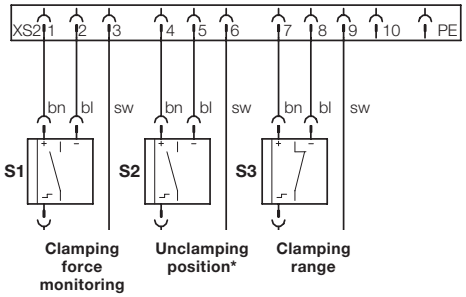


Terminal connections

HAN 3 HvE



HAN 10 E



*) in *-position not actuated (negate signal in the control)

Technical data

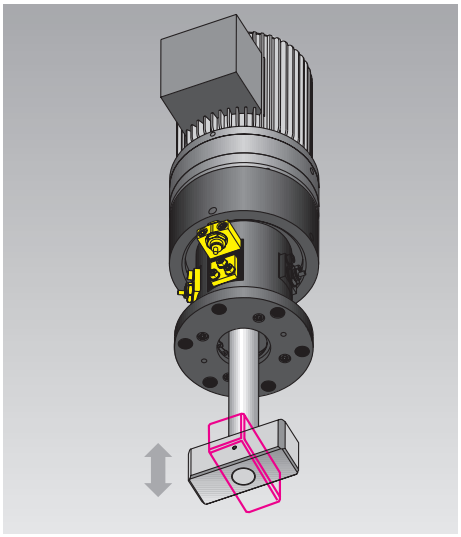
Clamping force	**[kN]**	**70**
Max. static force	[kN]	110
Clamping speed	[mm/s]	3.8
Motor voltage	[V/Hz]	400/50
Motor rating	[kW]	0.55
Nominal current motor	[A]	2.1
a	[mm]	40
b	[mm]	25
c	[mm]	42
d	[mm]	16
A	[mm]	140
B	[mm]	390
E	[mm]	130
G	[mm]	14
Clamping stroke hs	[mm]	5
K	[mm]	102.0
W	[mm]	150
X	[mm]	48
Part no.		**826230101**

Other T-slots, clamping dimensions, clamping forces and motor voltages are available on request.

WZ 5.2640

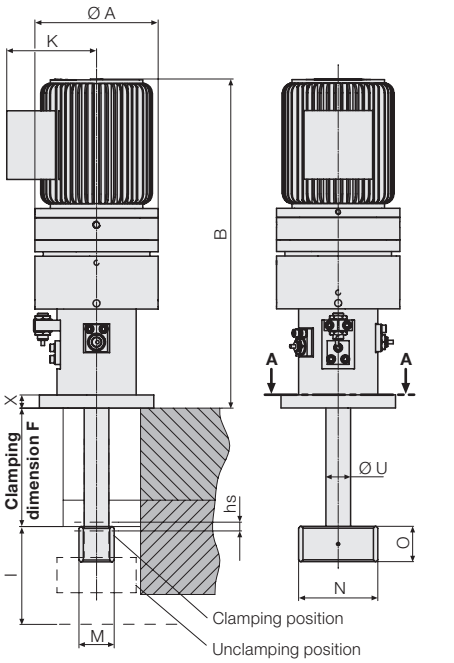
Swivel and Pull Clamps

electro-mechanical, self-locking, with position monitoring, clamping force 70 and 160 kN, clamping stroke up to 15 mm



Advantages

- High adaptability to varying clamping edge heights (clamping stroke up to 15 mm)
- Variable tie rod length
- High operational safety by position monitoring and automatic motion sequence
- Central operation of all clamping elements
- Compact and sturdy design
- Resistant to high mechanical loads
- Shock-resistant up to a max. ram acceleration of 12 *g*
- Suitable for retrofit and for installation in original equipment



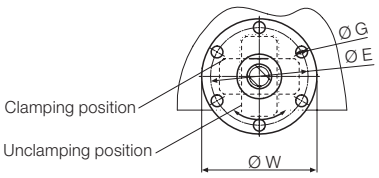
Application

Automatic clamping of dies
- on the press ram
- on blank holders
- at environmental temperatures up to max. 70 °C

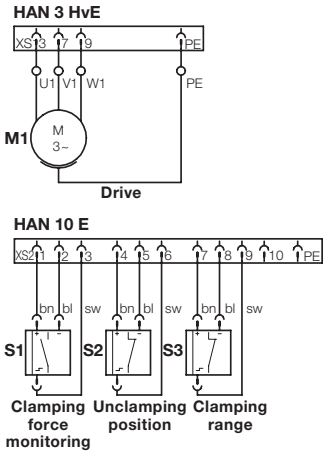
Description

The rotation of the motor is converted into a swivelling movement and a stroke of the tie rod by the flexspline gear and the lead screw.
For clamping, the tie rod is swivelled by 90°, starting at the unclamping position, and pulled towards the clamping position.
The clamping force and the clamping and unclamping positions are monitored by inductive proximity switches.
The clamping force is maintained by self-locking.

Section A-A



Terminal connections

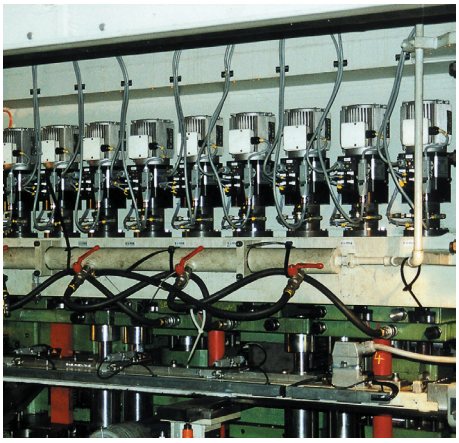


Technical data

Clamping force	[kN]	70	160
Max. static force	[kN]	110	300
Clamping speed	[mm/s]	3.8	4.1
Motor voltage	[V/Hz]	400/50	400/50
Motor rating	[kW]	0.55	1.1
Nominal current motor	[A]	2.1	3.55
A	[mm]	140	195
B	[mm]	374	500
E	[mm]	110	160
G	[mm]	13.5	13.5
Clamping stroke hs	[mm]	10	15
Swivelling stroke	[mm]	25	40
Installation space I	[mm]	90	135
K	[mm]	102.0	112.5
M	[mm]	40	60
N	[mm]	90	90
O	[mm]	40	65
U	[mm]	28	40
W	[mm]	130	180
X	[mm]	15	20
Part no.		**826430101**	**826460101**

Please specify the clamping dimension F when ordering.
Other T-slots, clamping dimensions, clamping forces and motor voltages are available on request.

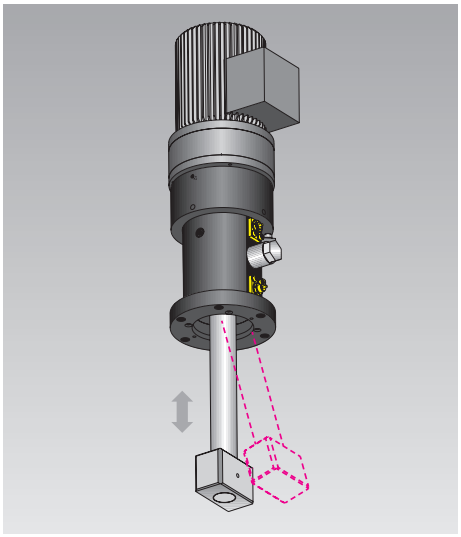
Application example



Electro-mechanical swivel and pull clamps mounted on a double-column press.

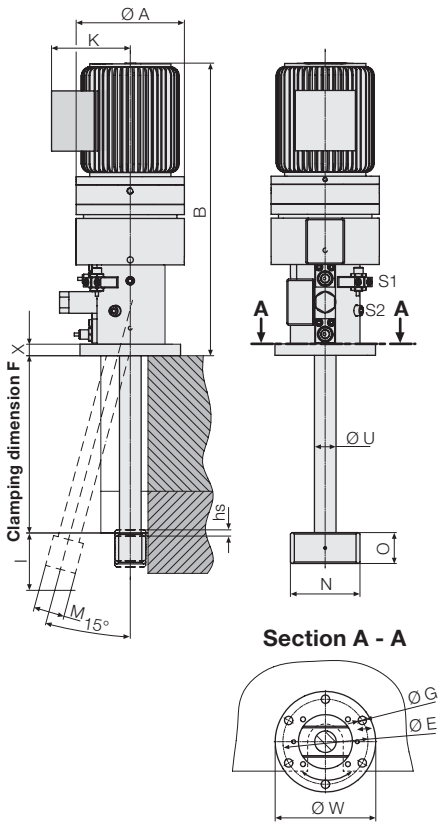
Swing Clamps

electro-mechanical, with position monitoring
clamping force 70, 120 and 160 kN, clamping stroke up to 12 mm



Advantages

- High adaptability to varying clamping edge heights (clamping stroke up to 12 mm)
- Variable tie rod length
- High operational safety by position monitoring and automatic motion sequence
- Central operation of all clamping elements
- Compact and sturdy design
- Resistant to high mechanical loads
- Shock-resistant up to a max. ram acceleration of 12 *g*
- Suitable for retrofit and for installation in original equipment



Section A - A

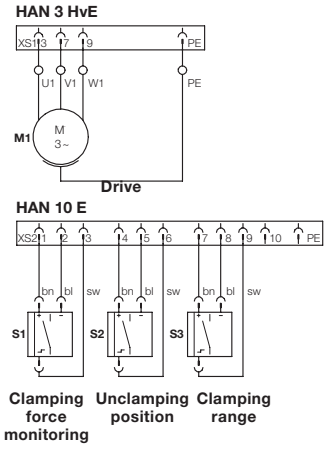
Application

Electro-mechanical swing clamps are suitable for automatic clamping of dies on press rams and blank holders.
The use is possible at ambient temperatures up to a maximum of 70 °C.

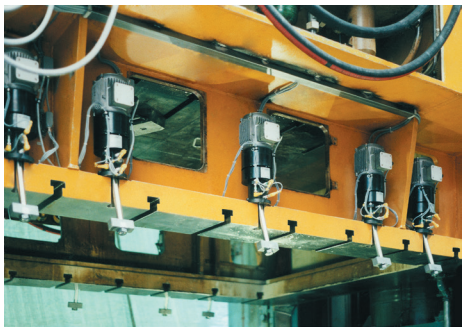
Description

The rotation of the motor is converted into a swinging movement and a stroke of the tie rod by the flexspline gear, the lead screw and the control pin.
The tie rod swings out by max. 15°.
The clamping force is transmitted to the clamping point in the axial direction of the tie rod.
The clamping force and the clamping and unclamping positions are monitored by inductive proximity switches.
The clamping force is maintained by self-locking.

Terminal connections



Application example



Electro-mechanical swing clamps mounted on a double-column press.

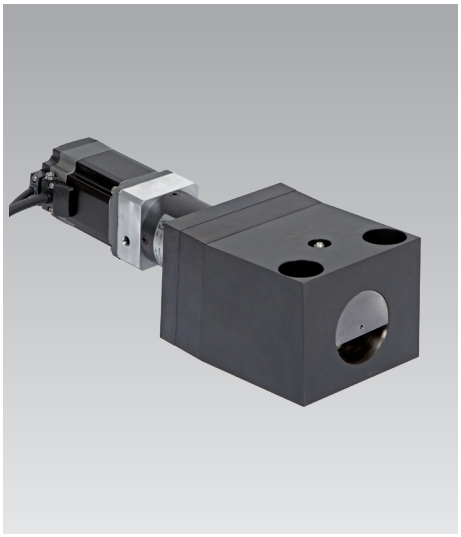
Technical data

Clamping force	[kN]	70	120	160
Max. static force	[kN]	110	200	300
Clamping speed	[mm/s]	3.8	5.7	4.1
Motor voltage	[V/Hz]	400/50	400/50	400/50
Motor rating	[kW]	0.55	1.1	1.1
Nominal current motor	[A]	2.1	3.55	3.55
A	[mm]	140	160	195
B	[mm]	409	522	602
E	[mm]	110	140	160
G	[mm]	11.0	13.5	13.5
Clamping stroke hs	[mm]	11	12	12
Swing stroke	[mm]	8.0	10.5	13.0
Installation space I	[mm]	85	120	125
Clamping dimension min.	[mm]	70	80	110
K	[mm]	102.0	112.5	112.5
M	[mm]	40	50	60
N	[mm]	90	90	90
O	[mm]	40	60	65
U	[mm]	28	40	40
W	[mm]	130	160	180
X	[mm]	42	57	65
Part no.		on demand	**826550101**	**826560101**

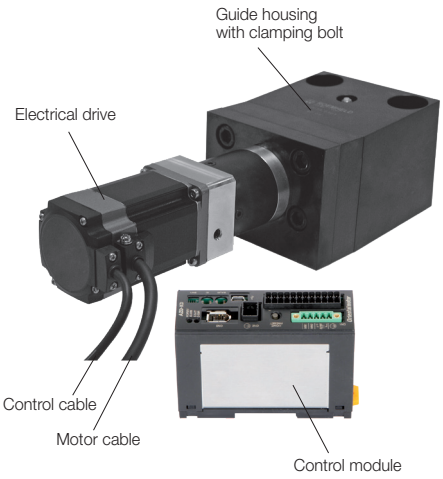
Please specify the clamping dimension F when ordering.
Other clamping dimensions, clamping forces and motor voltages are available on request.

WZ 5.2670

Wedge Clamps for Flat or Tapered Clamping Edge
electro-mechanical, max. operating force 240 kN
self-locking, with position monitoring

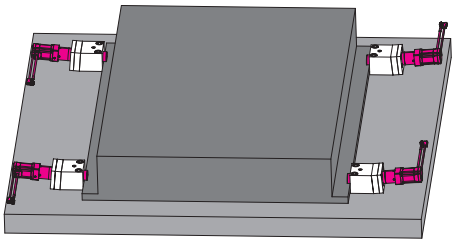


Advantages
- Increased operating safety by mechanical self-locking and monitoring of the clamping position
- Control of the following functions: clamping and unclamping position, clamping force and speed of the clamping bolt
- Compact electro-mechanical force package
- Reclamping on the clamping point of yielding clamping edges possible
- Even in case of power failure, safe and self-locking clamped
- Optimum automation element
- High-quality corrosion protection for drive and housing

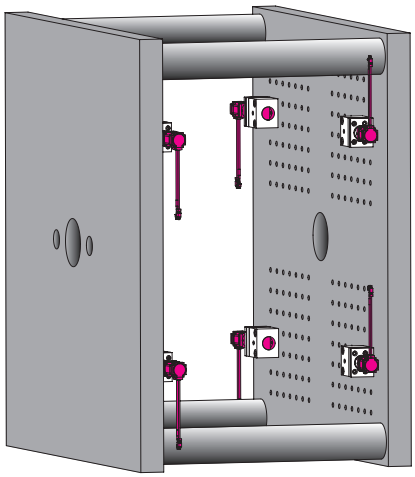


Application
Electro-mechanical wedge clamps are used for hydraulic free clamping of dies on sliding tables, in injection moulding machines and presses on bed and ram.

Application examples



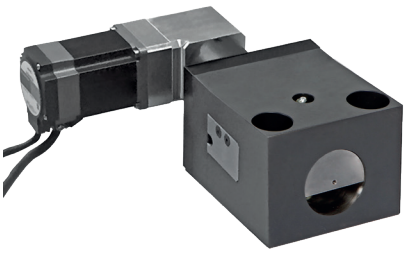
Sliding tables



Injection moulding machines

Description
The clamping bolt of the wedge clamps is operated by a 24 VDC direct current drive via a snail transmission and a spindle stroke transmission.
The self-locking spindle lifting gear stops the drive in case of power failure and maintains it safely in the reached position.
During clamping, the clamping bolt is moved with low inclination onto the flat clamping edge. The clamping bolt is completely retracted in the guide housing in off-position.
The wedge clamp is equipped with an integrated position monitoring. In addition, fault messages can be output.
The wedge clamp is controlled via a control module equipped with different data interfaces.

Version with angular gear
By default, the electrical drive is mounted at the rear of the guide housing.
Alternatively, a version with angular gear is available. (see page 3)



Delivery
- **Wedge clamp with drive**
  Electrical connection:
  - motor cable, firmly connected (L = 280 mm)
  - control cable, firmly connected (L = 280 mm)
  (extension cable: see page 3)
- **Control module**

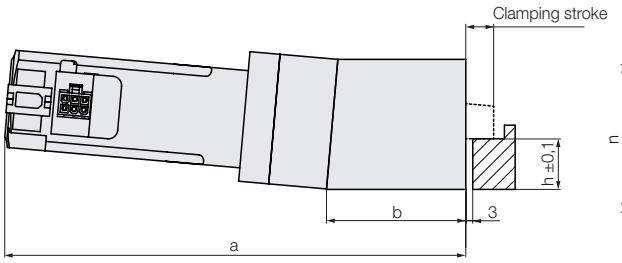
Position monitoring
The position monitoring is integrated in the drive. The following positions are reported on the control module:
- **Clamping bolts in off-position** (retracted)
- **Clamping bolts in clamping position** (extended)

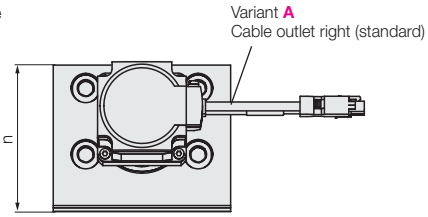
Possible fault messages
- Outside the clamping range
- Cable break
- Current peaks
- Over temperature
- Clamping force is not reached

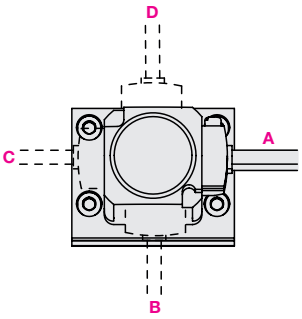
Possible motor variants
24 VDC stepper motors from Oriental are used. Motors from other manufacturers can also be installed on request (such as Siemens or Beckhoff).

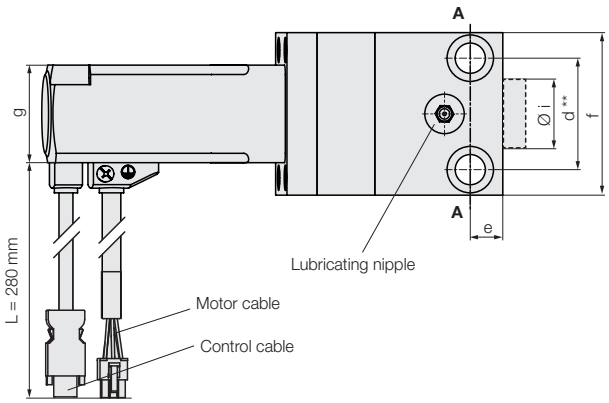
Possible variants
- with 20° clamping bolt
- as pull or push cylinder
- as block cylinder
- as locking element
- as positioning cylinder in the range +/–0.5

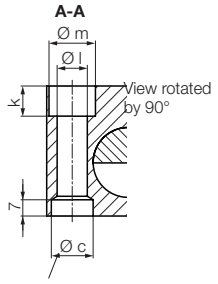
Version for flat clamping edge
without angle drive / cable outlets A B C D











For drill bushing DIN 179
To compensate possible additional side loads from the die

The cable outlets are available in the variants:

A = right
B = bottom
C = left
D = top

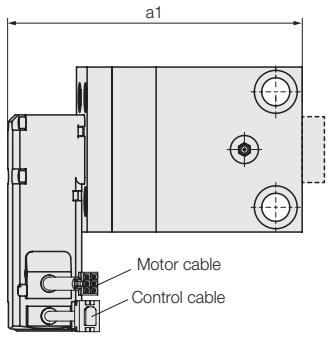
Please add the code letters to the part no.

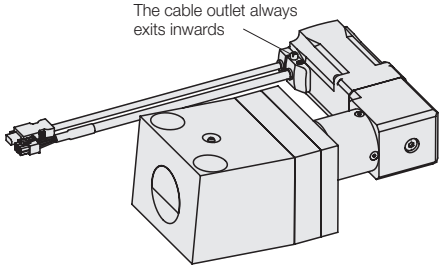
Version for flat clamping edge without angle drive

Adm. operating force for screws 8.8 (DIN 912)	**[kN]**	**35**	**60**	**130**	**190**
Adm. operating force for screws 10.9 (DIN 912)	**[kN]**	**50**	**90**	**160**	**240**
Fastening screw		**M 12**	**M 16**	**M 20**	**M 24**
Total stroke	[mm]	20	25	25	28
Clamping stroke	[mm]	12	16	17	20
Max. temperature	[°C]	70	70	70	70
Clamping force max.	[kN]	10	20	35	35
a	[mm]	199	309	335	350
b	[mm]	60	95	109	125
Ø c H7 x depth	[mm]	18/7	26/9	30/11	35/11
d** (when using drill bushings ± 0.02)	[mm]	48	70	85	105
e	[mm]	14	16	20	25
f	[mm]	70	100	120	150
g	[mm]	55	55	73	73
h (± 0.1)	[mm]	22	25	35	40
Ø i	[mm]	30	40	55	70
k	[mm]	13	17	20	26
Ø l	[mm]	13	17	21	26
Ø m	[mm]	20	26	32	40
n	[mm]	60	78	100	110
Weight	[kg]	3.3	10	15	22
Rated voltage	[V DC]	24	24	24	24
Current for empty running	[A]	1.5	1.5	1.5	1.5
Max. current	[A]	3.8	3.8	3.8	3.8
Code class		IP 54	IP 54	IP 54	IP 54
Lifting speed	[mm/s]	2	2	2	2
Part no. Cable outlet right		**826730101 A**	**826740101 A**	**826750101 A**	**826760101 A**
Cable outlet bottom		**B**	**B**	**B**	**B**
Cable outlet left		**C**	**C**	**C**	**C**
Cable outlet top		**D**	**D**	**D**	**D**

** on request also available with Euromap grid

Accessories				
Drill bushings DIN 179	12 x 12	17 x 16	21 x 20	26 x 20
Part no.	**3300285**	**3300287**	**3300288**	**3300289**



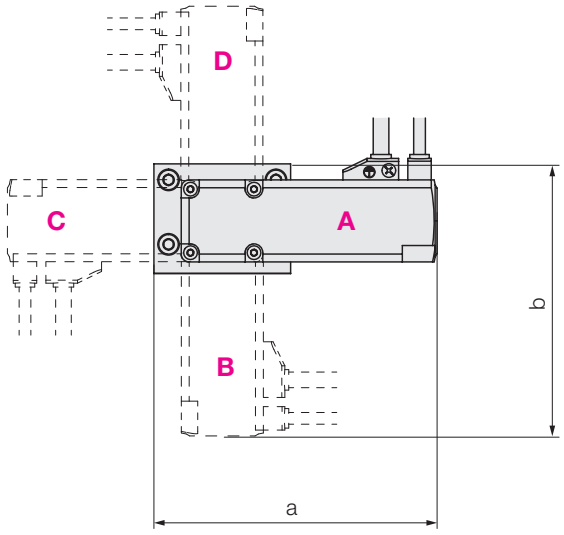


Variant with motor alignment

The motor alignment is available in the variants:

A = right
B = bottom
C = left
D = top

Please add the code letters to the part no.

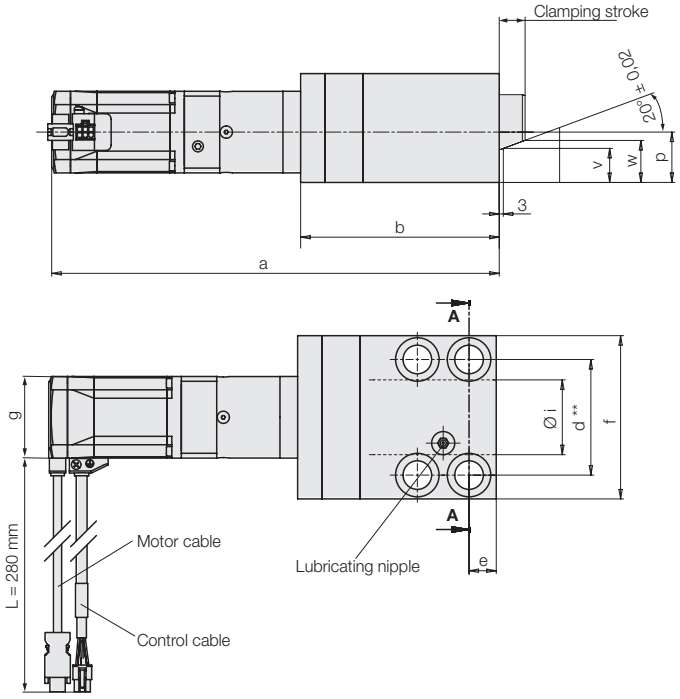


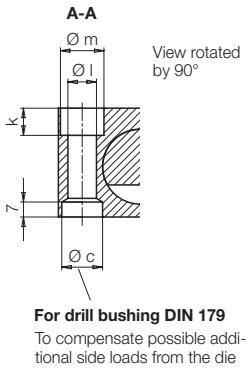
All dimensions in [mm]

Version for flat clamping edge with angle drive

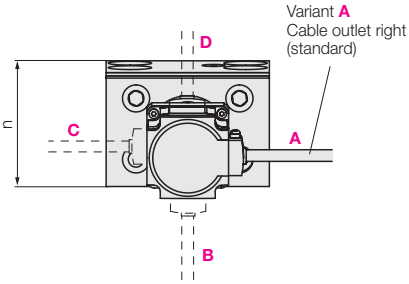
Adm. operating force for screws **8.8** (DIN 912) **[kN]**	**35**	**60**	**130**	**190**
Adm. operating force for screws **10.9** (DIN 912) **[kN]**	**50**	**90**	**160**	**240**
a [mm]	145	194.5	220	235
a1 [mm]	140	233	276	292
b [mm]	137	181	212	216
Clamping force max. [kN]	3.5	20	35	35
Part no. **Motor alignment right**	**8 2673 0201 A**	**8 2674 0201 A**	**8 2675 0201 A**	**8 2676 0201 A**
Motor alignment bottom	**B**	**B**	**B**	**B**
Motor alignment left	**C**	**C**	**C**	**C**
Motor alignment top	**D**	**D**	**D**	**D**

Version for tapered clamping edge
without angle drive / cable outlets A B C D





For drill bushing DIN 179
To compensate possible additional side loads from the die



The cable outlets are available in the variants:

A = right
B = bottom
C = left
D = top

Please add the code letters to the part no.

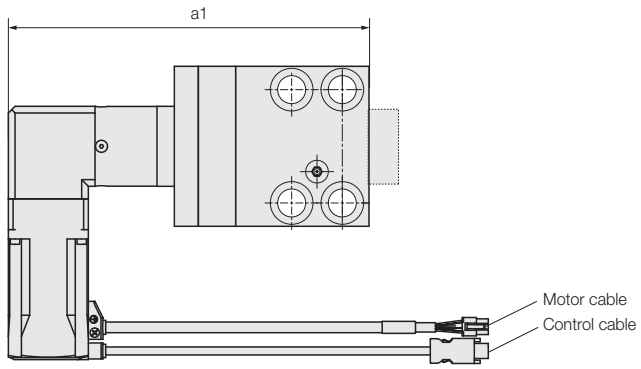
Version for tapered clamping edge without angle drive

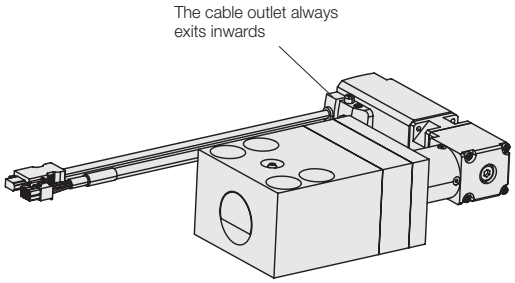
Adm. operating force for screws 8.8 (DIN 912)	**[kN]**	**30**	**50**
Fastening screw		**M 16**	**M 20**
Total stroke	[mm]	25	25
Clamping stroke	[mm]	18 – 22	19 – 22
Max. temperature	[°C]	70	70
Clamping force max.	[kN]	12.5	25
a	[mm]	312	329
b	[mm]	137	146
Ø c H7 x depth	[mm]	26/9	30/11
d** (when using drill bushings ± 0.02)	[mm]	70	85
e/e1	[mm]	16/30	20/38
f	[mm]	100	120
g	[mm]	55	73
h	[mm]	67	80
Ø i	[mm]	40	55
k	[mm]	17	20
Ø l	[mm]	17	21
Ø m	[mm]	26	32
n	[mm]	67	100
p	[mm]	30	37
v (± 0.1)	[mm]	18	25
w	[mm]	23.5	30.5
Weight	[kg]	10	15
Rated voltage	[V DC]	24	24
Current for empty running	[A]	1.5	1.5
Max. current	[A]	3.8	3.8
Code class		IP 54	IP 54
Lifting speed	[mm/s]	2	2
Part no. Cable outlet right		**8 267 40 102 A**	**8 267 50 102 A**
Cable outlet bottom		**B**	**B**
Cable outlet left		**C**	**C**
Cable outlet top		**D**	**D**

** on request also available with Euromap grid

Accessories		
Drill bushings DIN 179	17 x 16	21 x 20
Part no.	**3300 287**	**3300 288**

Version for tapered clamping edge
with angle drive / motor alignment A B C D



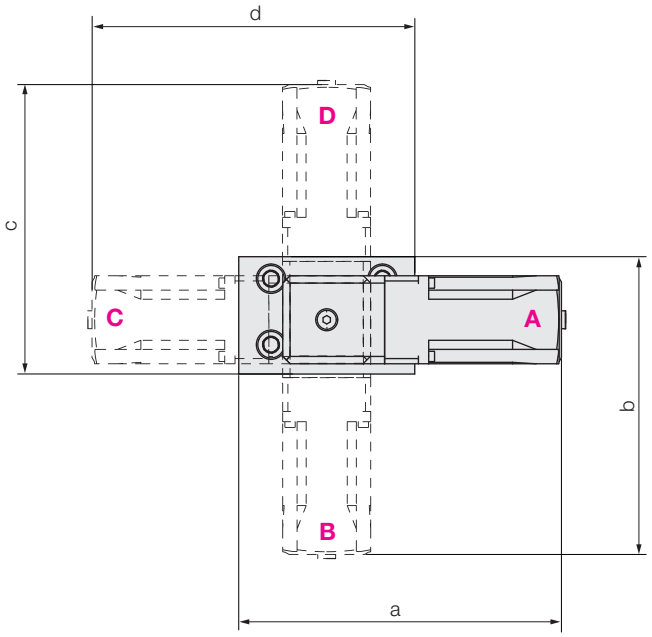


Variant with motor alignment

The motor alignment is available in the variants:

A = right
B = bottom
C = left
D = top

Please add the code letters to the part no.

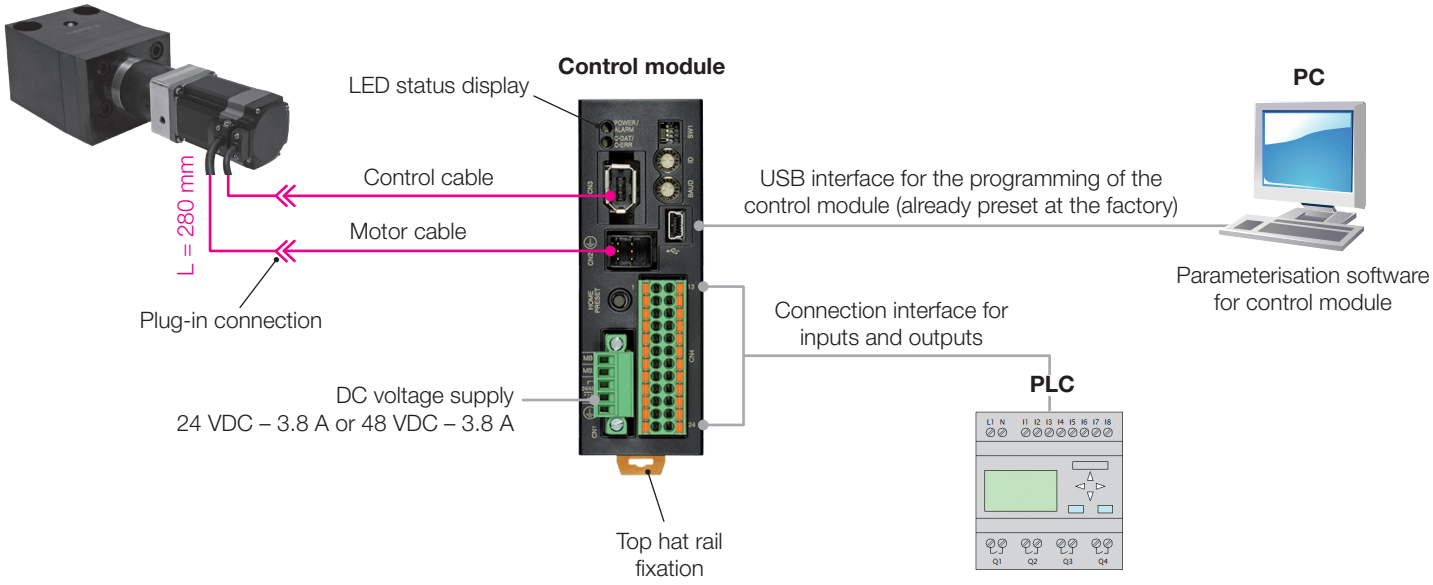


All dimensions in [mm]

Version for tapered clamping edge with angle drive

Adm. operating force for screws 8.8 (DIN 912)	**[kN]**	**30**	**50**
a	[mm]	194.5	220
a1	[mm]	235	270
b	[mm]	181.5	203
c	[mm]	194.5	220
d	[mm]	174.5	197
Clamping force max.	[kN]	12.5	25
Part no. **Motor alignment right**		**8267 0202 A**	**8267 5 0202 A**
Motor alignment bottom		**B**	**B**
Motor alignment left		**C**	**C**
Motor alignment top		**D**	**D**

Wedge clamping element



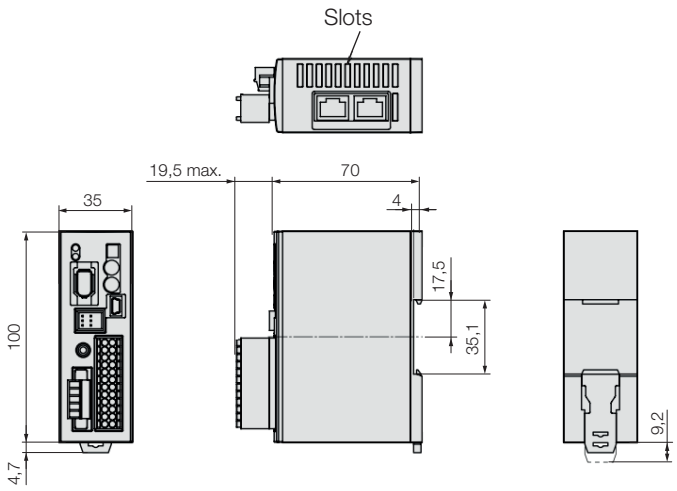
Control module

Weight: 0.15 kg

Accessory for control module

Plug for power supply
electromagnetic brake
MC1.5/5-STF-3.5

Plug for input/
output signals
DFMC1.5/12-ST-3.5



Accessories

Extension cable

Control cable and motor cable as set

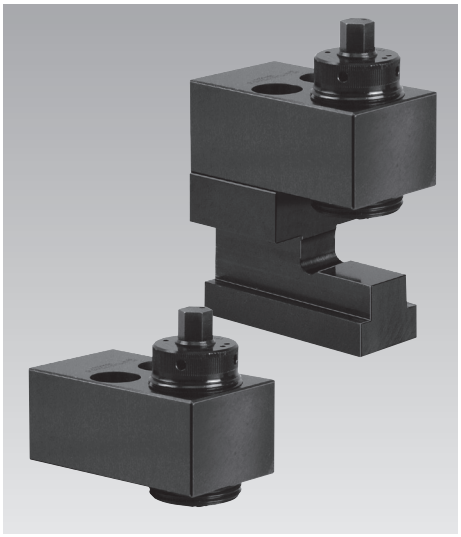
Length of cable	5 m	10 m	15 m	20 m
Part no.	**209750046**	**209750047**	**209750048**	**209750049**

Options

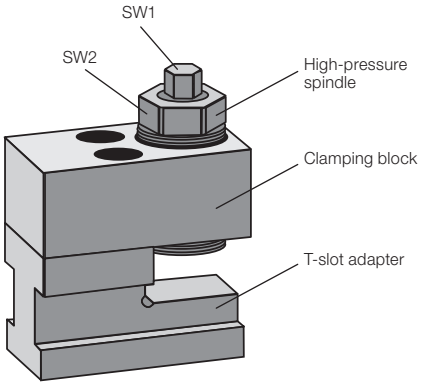
on request

- Electromagnetic brake in the clamping element
- Drive laterally angled with angular gear
- Network-converter for CC-Link 1.1, mechatronics II and III and EtherCAT
- Ethernet/network connector RJ45 as the connection between the control modules

Sliding Clamps, Mechanical
with integral high-pressure spindle clamping force 40 and 80 kN



Advantages
- Easy to retrofit
- Temperature resistance up to 250 °C
- Compact design
- Simple operation
- High clamping force with low torque
- Clamping force 40 kN and 80 kN
- Large clamping edge tolerances are possible
- Self-locking due to patented wedge system
- Die standardisation with regard to the width and depth is not required

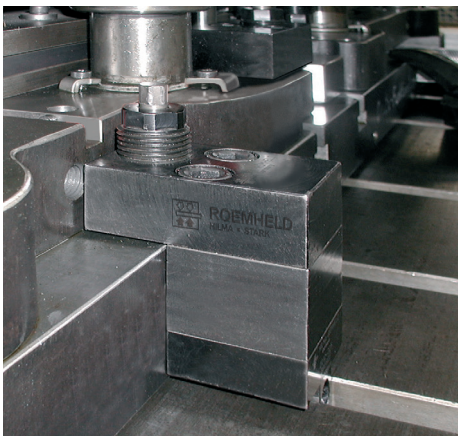


Application
- Clamping and locking of dies on press bed and ram
- On machine tool tables
- When the available space is limited

Description
The sliding clamp is manually placed in the T-slots and screwed against the die clamping edge. Once the high-pressure spindle has been adjusted to suit the height of the clamping edge, the clamping force is built up by turning the hexagon nut (SW 1) in a clockwise direction. The clamping force achieved depends on the set tightening torque of the torque wrench.

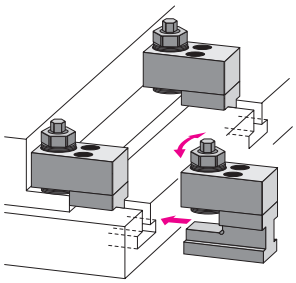
The clamping block can also be directly screwed without T-slot adapter and can be ordered separately. When using the clamping block without T-slot adapter, the high-pressure spindle is to be manually screwed against the clamping edge so that there is no play.

Application example

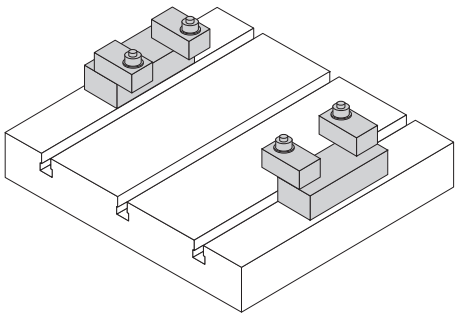


Use of mechanical sliding clamps on a machine table

Installation examples

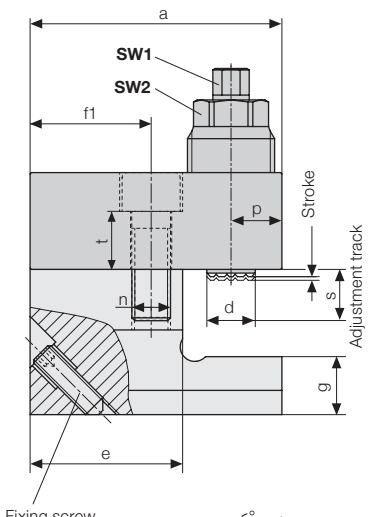


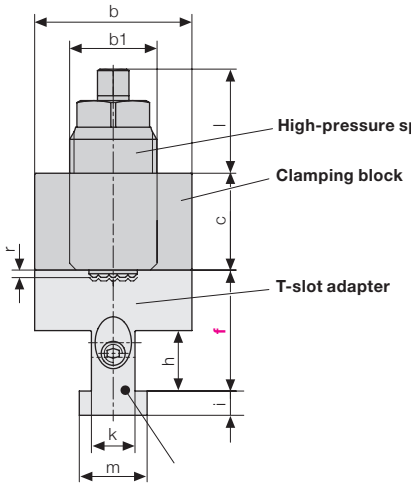
Clamping block with T-slot adapter

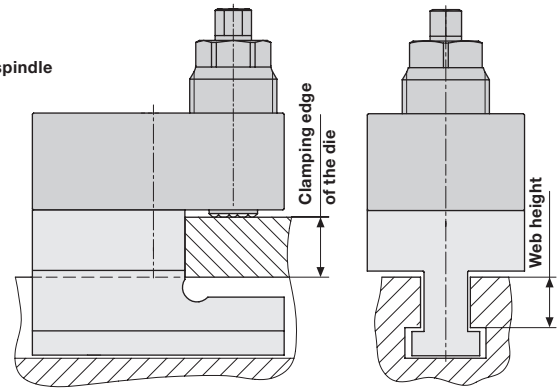


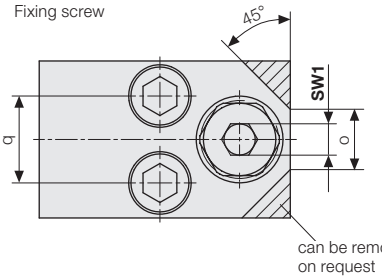
Clamping block with integral high-pressure spindle mounted on spacer bars

Important notes
Before applying the tightening torque, the high-pressure spindle must be screwed against the clamping edge so that there is no play.
If the parts are not rigid, tighten the high-pressure spindle using the hexagon nut SW2 until there is no play.









Functional dimension "f":
= die clamping edge
+ web height of T-slot
+ 4 mm

please specify when ordering

Example of ordering

2212-185/ F80

Sliding clamp
mechanical
T-slot 18 mm
Clamping force 40 kN

Functional dimension "f"
= 80 [in mm]

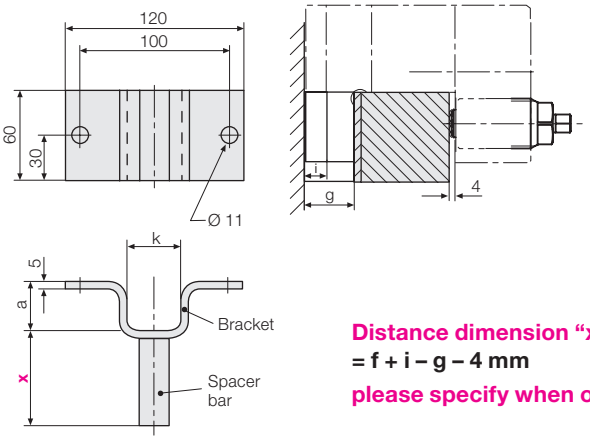
please specify when ordering

Technical data

T-slot as per DIN 650	**[mm]**	**18**	**22**	**28**
Clamping force	**[kN]**	**40**	**40**	**80**
Clamping stroke	[mm]	1.5	1.5	2.2
Max. tightening torque	[Nm]	30	30	70
Max. operating temperature	[°C]	250	250	250
a	[mm]	104	104	126
b	[mm]	65	65	80
b1	[mm]	M 36 x 3	M 36 x 3	M 48 x 3
c	[mm]	40	40	50
d	[mm]	19	19	28
e	[mm]	63	63	72
f min. – max.	[mm]	50 – 106	56 – 106	72 – 131
f1	[mm]	50	50	57
g	[mm]	24	32	42
h	[mm]	25	30	37
i	[mm]	10	14	18
k	[mm]	18	22	28
l	[mm]	50	50	60
m	[mm]	28	35	44
n (screw DIN 912, 10.9)	[mm]	M 16	M 16	M 20
o	[mm]	24	24	30
p	[mm]	21	21	27
q	[mm]	36	36	43
r	[mm]	3	3	3
Max. adjustment track s	[mm]	30	30	35
t	[mm]	24	24	29
SW 1	[mm]	13	13	17
SW 2	[mm]	30	30	41
Clamping block with T-slot adapter				
Weight	[kg]	3.7	4.0	6.5
Part no.		**2212185**	**2212225**	**2213285**
Clamping block, separate				
Weight	[kg]	2.3	2.3	4.0
Part no.		**2212111**	**2212111**	**2213111**

Accessory

Parking station accommodates the sliding clamp during die change



Distance dimension "x"
= f + i – g – 4 mm

please specify when ordering

Part numbers

T-slot as per DIN 650	**[mm]**	**18**	**22**	**28**
a	[mm]	25	33	43
k	[mm]	30	37	46
i	[mm]	10	14	18
g	[mm]	24	32	42
Parking station complete				
with bracket and spacer bar		**827541850**	**827542250**	**827542850**
Bracket separate		**2754180**	**2754220**	**2754280**
Spacer bar separate		**2754500**	**2754500**	**2754500**

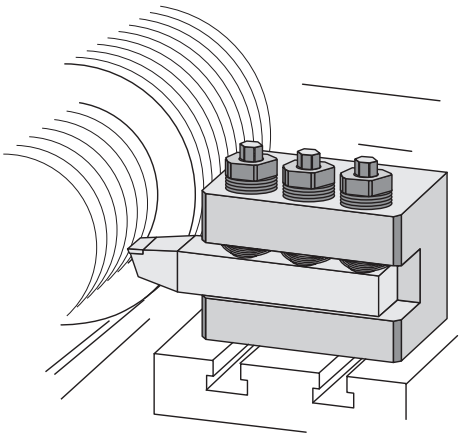
WZ 6.2270

High-Pressure Spindles, Mechanical
with integrated wedge system clamping force 40 to 140 kN

Figure: Section of high-pressure spindle

Advantages

- Easy to retrofit
- Temperature resistance up to 250 °C
- Compact design allows for multiple clamping
- High clamping force with low tightening torque
- Self-locking due to patented wedge system
- Individual use

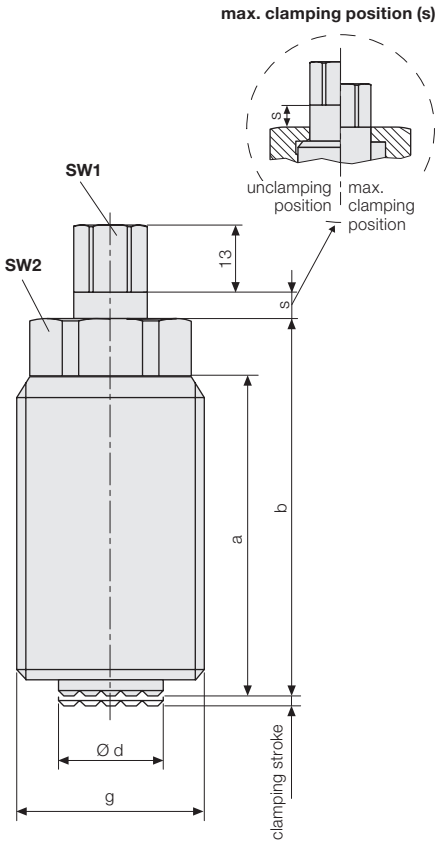


Application

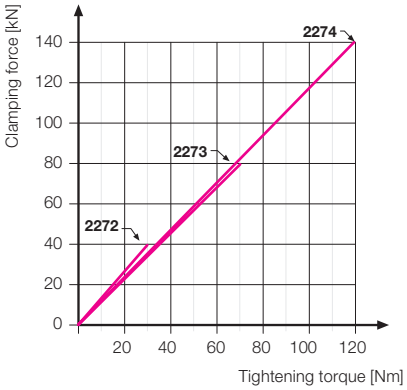
- In bars and blocks
- Clamping and locking of workpieces and dies
- When the available space is limited
- In presses, punching machines and machine tools

Description

Following manual positioning of the high-pressure spindle against the clamping edge, the drive spindle is operated by turning the hexagon nut SW1. Thus, the clamping force is transmitted in axial direction to the clamping point by the wedge system.
The required clamping force is achieved by selecting the appropriate torque on the torque wrench (see force torque diagram). For unclamping, proceed in the reverse order.



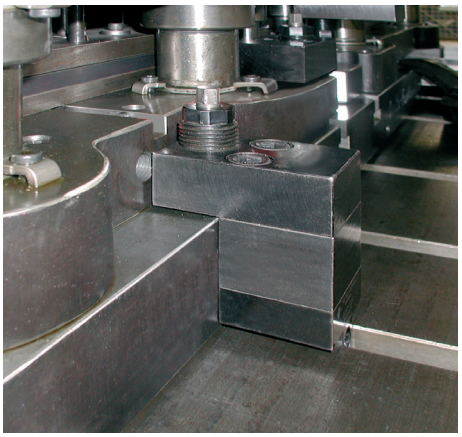
Clamping force/tightening torque diagram



Important note

Before applying the tightening torque, the high-pressure spindle must be screwed against the clamping edge so that there is no play. If the parts are not rigid, tighten the high-pressure spindle using the hexagon nut SW2 until there is no play.
The clamping screws are permanently lubricated and maintenance free in case of normal operating conditions.

Application example



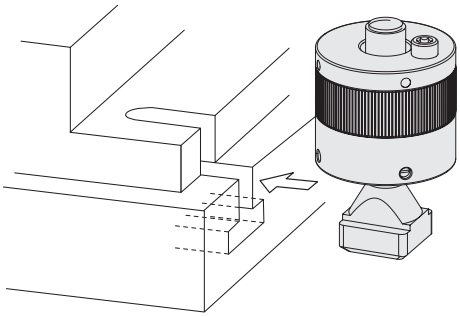
Clamping force	**[kN]**	**40**	**80**	**140**
Clamping stroke	**[mm]**	**1.5**	**2.2**	**2.5**
Max. tightening torque	[Nm]	30	70	120
Max. static load	[kN]	80	160	240
a	[mm]	62	75	90
b	[mm]	73	90	110
Ø d	[mm]	19	28	39
g	[mm]	M36 x 3	M48 x 3	M64 x 4
Monitoring of clamping stroke s	[mm]	5	7.5	8.5
SW 1	[mm]	13	17	19
SW 2	[mm]	30	41	55
Weight	[kg]	0.5	2.0	2.5
Part no.		**2272210**	**2273210**	**2274210**

Other sizes and threads (e.g. inch) are available on request.

Clamping Nuts, Mechanical
with through-hole thread, without clamping force display

Advantages
- Temperature resistance up to 200 °C
- High clamping force with low torque
- Easy to retrofit
- Clamping nut with through-hole thread, therefore high adaptability to varying heights of clamping edges and tolerances
- Easy clamping and unclamping by hand
- Hydraulic-free and maintenance-free clamping
- Maximum force density in the smallest space

Application example

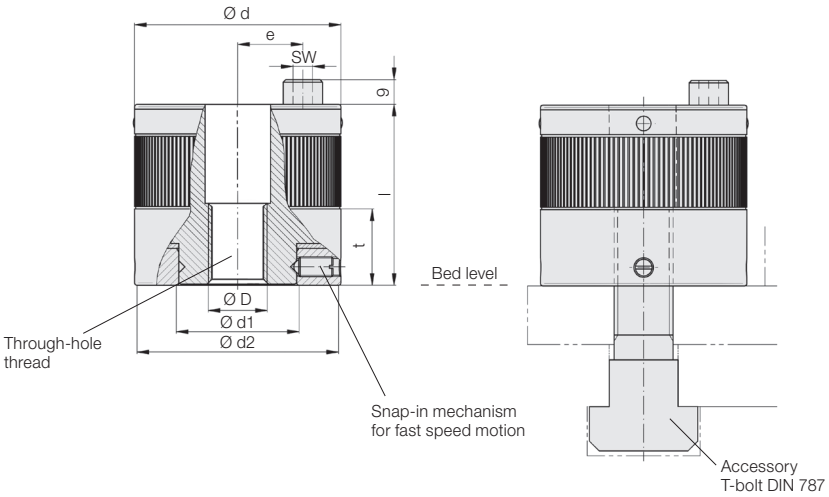


Application
- Clamping and locking of dies on press bed and ram
- When highest clamping force is required in the smallest possible space
- If no hydraulic power unit is available
- Where oil-free clamping is desired

Description
Following manual positioning of the clamping nut against the clamping edge, the integral gear will be operated by turning the hexagon socket. As a result of the gear transmission, the tightening torque is multiplied. To reliably ensure the required clamping force, we recommend using a torque wrench.

Material: free cutting steel, nitrocarburized

Temperature range: –30 °C to +200 °C



Technical data

T-slot DIN 650	[mm]	14	18	22	28	36	42
Clamping force	**[kN]**	**60**	**60**	**60**	**120**	**180**	**180**
Tightening torque	[Nm]	20	35	40	75	100	110
D	[mm]	M12	M16	M20	M24	M30	M36
d	[mm]	74	74	74	84	105	105
d1	[mm]	40	40	40	50	64	64
d2	[mm]	72	72	72	82	103	103
l	[mm]	58	58	58	74	78	78
t	[mm]	23	23	23	32	37	37
SW	[mm]	8	8	8	8	8	8
Clamping nut without T-bolt							
Weight, approx.	[kg]	1.6	1.6	1.6	2.5	3.9	3.8
Part no.		**822750005**	**822750006**	**822750007**	**822760004**	**822770004**	**822770005**
T-bolt, separate		M12x14x200	M16x18x125	M20x22x160	M24x28x160	M30x36x250	M36x42x250
Part no.		**10787 1210***	**10787 1169**	**10787 0211**	**10787 1246**	**10787 0304**	**10787 0308**

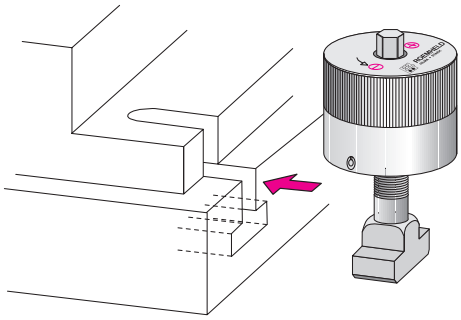
Additional sizes as well as variations in the thread sizes are available on request.
* For T-slot 14 mm, required strength 12.9

WZ 6.2275

Clamping Nuts, Mechanical
with blind hole thread, without clamping force display

Advantages
- Temperature resistance up to 200 °C
- High clamping force with low torque
- Easy to retrofit
- Easy clamping and unclamping by hand
- Hydraulic-free and maintenance-free clamping
- Maximum force density in the smallest space

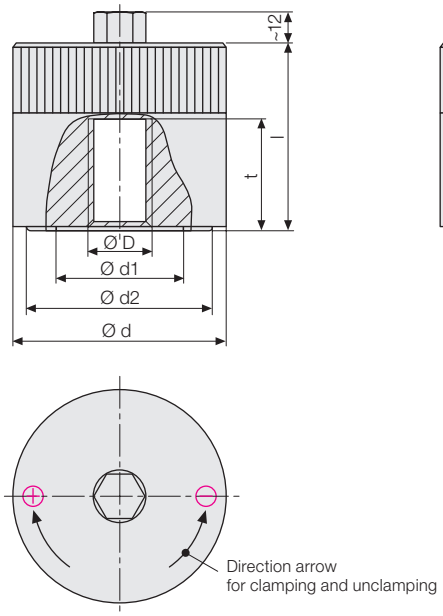
Application example

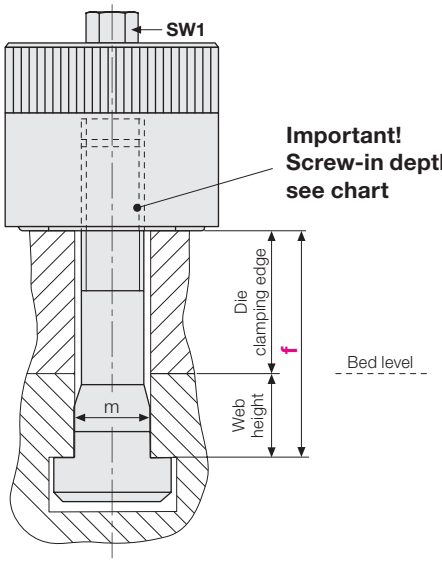


Application
- Clamping and locking of dies on press bed and ram
- When highest clamping force is required in the smallest possible space
- If no hydraulic power unit is available
- Where oil-free clamping is desired

Description
Following manual positioning of the clamping nut against the clamping edge, the integral planetary gear will be operated by turning the hexagon nut.
As a result of the gear transmission, the tightening torque is multiplied. To reliably ensure the required clamping force, we recommend using a torque wrench.

Temperature range: –30 °C to +200 °C





Functional dimension "f":
= die clamping edge
+ web height of T-slot
please specify when ordering

Example of ordering

2275 820 / F80

Clamping nut, mechanical
T-slot 22 mm
Clamping force 60 kN

Functional dimension
"f"= 80 [mm]
please specify when ordering

Technical data

T-slot DIN 650	**[mm]**	**18**	**22**	**28**	**36**	**42**	**42**
Clamping force	**[kN]**	**60**	**60**	**100**	**150**	**150**	**200**
Tightening torque	[Nm]	25	30	45	70	75	90
D	[mm]	M 16	M 20	M 24	M 30	M 36	M 36
d	[mm]	62	62	73	83	83	120
d1	[mm]	32	32	42	52	52	82
d2	[mm]	60	60	71	81	81	118
l	[mm]	50	50	70	75	75	80
t	[mm]	24	24	35	40	40	45
SW 1	[mm]	13	13	15	17	17	19
Min. screw-in depth	[mm]	16	16	25	30	30	35
Max. screw-in depth	[mm]	24	24	35	40	40	45
Clamping nut with T-bolt							
Weight, approx.	[kg]	2.0	2.1	3.2	5.5	6.5	6.5
Part no.		**2275816**	**2275820**	**2276824**	**2277830**	**2277836**	**2278836**
Clamping nut without T-bolt							
Weight, approx.	[kg]	0.9	0.85	1.7	2.2	2.1	4.6
Part no.		**2275716**	**2275720**	**2276724**	**2277730**	**2277736**	**2278736**

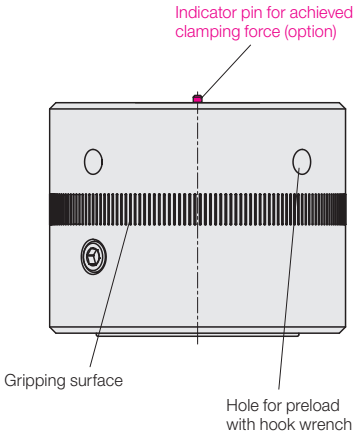
*Additional sizes as well as variations in the thread sizes and T-slot dimensions are available on request.

WZ 6.2276

Clamping Nuts, Hydro-Mechanical
with through-hole thread and optional clamping force display

Advantages

- Temperature resistance up to 120 °C
- Safe clamping with visual clamping force display (as an option)
- High clamping force with low torque
- Easy to retrofit
- Clamping nut with through-hole thread, therefore high adaptability to varying heights of clamping edges and tolerances
- No need for adaptation of the tie rod length
- Easy clamping and unclamping by hand
- Maintenance free
- Maximum force density in the smallest space



Application

- Clamping and locking of dies on press bed and ram
- When highest clamping force is required in the smallest possible space
- If no hydraulic power unit is available

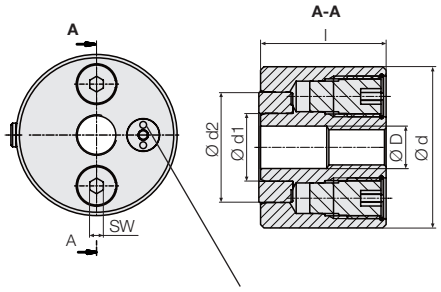
Description

Following manual positioning of the clamping nut against the clamping edge, the integral hydraulic cushion is preloaded by turning the hexagon socket. A low torque is transmitted to a high clamping force.
For the version without clamping force display, use a torque wrench to ensure safe and defined build-up of the clamping force.
In the version with clamping force display, the clamping force indicator pin projects when the clamping force is reached.

Admissible temperature difference ± 20 °C

Temperature resistance up to max. 120 °C.

Clamping nut
with two tightening screws



Projection of the indicator pin of the optical clamping force indicator when the nominal clamping force is reached:

Types 2273 and 2274: 2,0 mm
Types 2275, 2276 and 2277: 2,5 mm

Application example

Technical data

Clamping force	**[kN]**	**15**	**30**	**60**	**100**	**100**	**150**
Max. stroke*	[mm]	2	2	2	2	2	2
Tightening torque	[Nm]	9	9	9	30	30	40
D		M 12	M 16	M 20	M 24	M 30	M 30
d	[mm]	47	56	70	95	108	112
d1	[mm]	20	25	30	40	48	50
d2	[mm]	33	37	50	65	70	80
SW	[mm]	6	6	8	8	8	10
l	[mm]	54	61	71	75	75	90
Weight	[kg]	0.7	1.0	2.0	3.7	4.8	6.1
Clamping nut without T-bolt without clamping force display	**Part no.**	**–**	**–**	**822750001**	**822760001**	**–**	**822770001**
Clamping nut without T-bolt with clamping force display**	**Part no.**	**822730002**	**822740002**	**822750002**	**822760002**	**822760005**	**822770002**

* Stroke at maximum adjustment of tightening screws. Before activating the tightening screws preload nut with hook wrench.
** Torque wrench is not required.

Accessories

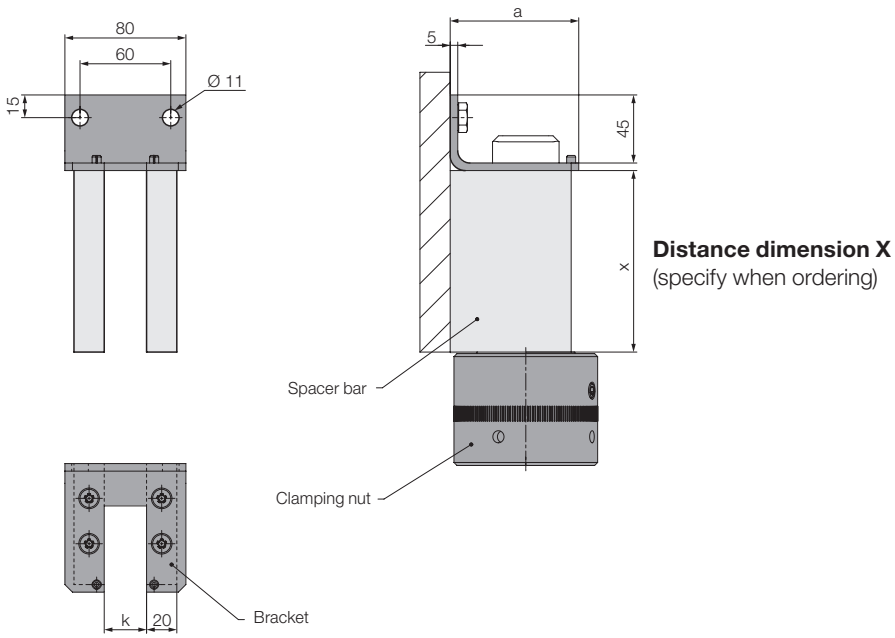
T-bolt, separate

For T-slot	[mm]	14	18	22	28	36
Thread		M12	M16	M20	M24	M30
Length	[mm]	160	160	200	250	250
Property class		8.8	12.9	12.9	12.9	8.8
Weight	[kg]	0.16	0.29	0.58	1.1	1.8
Part no.		**5700142**	**5700022**	**5700023**	**5700024**	**5700048**

Parking station during die change

Bracket mounted with spacer bars (without connecting block)	Part no.	827531430	827531830	827532230	827532830	827533630
T-slot width k	[mm]	14	18	22	28	36
a	[mm]	65	70	72	85	90
Bracket, separate	**Part no.**	**2753140**	**2753180**	**2753220**	**2753280**	**2753360**

Special designs on request



Distance dimension X
(specify when ordering)

Magnetic Clamping Systems M-TECS M
for temperatures up to 80 °C

Advantages
- Standardization of dies no longer required
- High safety by process monitoring
- Clamping of the dies within a few seconds
- Ergonomic handling with ease
- Die clamping also in the heated condition
- No further mounting holes required
- Minimum wear of the dies
- Motion detection of the die
- Die clamping on the complete surface with minimum deformation

Application
Magnetic clamping systems M-TECS M are primarily used for automatic clamping of different dies on sheet metal forming presses and automatic punching machines.

Description
With magnetic clamping systems M-TECS, the dies are magnetically clamped or unclamped at the touch of a button within a few seconds.
Since permanent magnets generate the force of the magnetic clamping plates, electric clamping is only required to magnetize the plates.
The magnetic clamping plates are de-energized in clamped condition and thus absolutely safe in case of power failure.
The complete clamping cycle is monitored by different sensors, thus guaranteeing reliable die clamping.
All M-TECS magnetic clamping systems carry the CE mark.

Scope of system and delivery
Magnetic clamping systems M-TECS M are delivered as complete clamping systems with all required system components. The essential components of a system are:
- two magnetic clamping plates
- electric control in a splash-proof control box
- a manual remote control
- required electrical connection cables

Electric control
see catalogue sheet WZ 9.5660

Customized versions
All M-TECS magnetic clamping systems are customized and manufactured to meet specific requirements.
For example, the size and pole technology of the magnetic clamping plates are selected according to the application and the machine.
Please contact us.

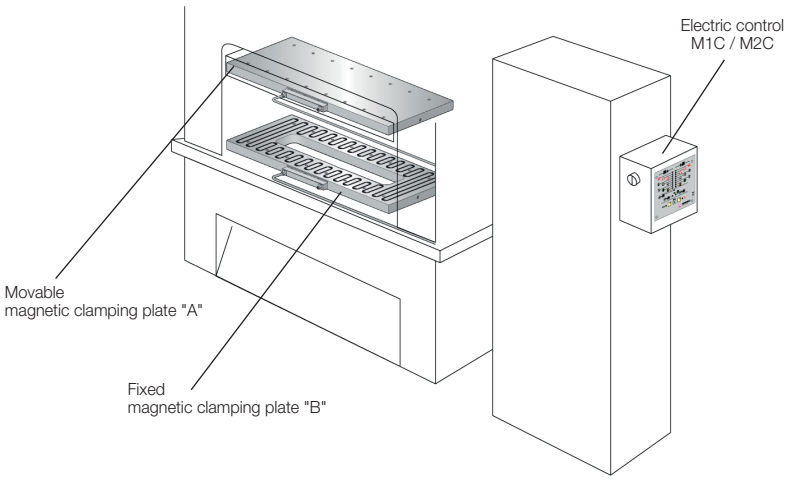
Safeties
- The inductive limit switch checks the form-fit contact of the die and guarantees a clamping without force loss.
- Sensors inside the coils register the slightest die movements due to changes in the magnetic flow between the magnetic clamping plate and the die.
- A temperature sensor in the magnetic clamping plate prevents overheating and thus damage to the system.

Technical basic data

Size of the magnetic clamping plates		customized
Pole technology		square pole
Max. temperature	[°C]	80
Specific magnetic force*	[kg/cm²]	18
Effective magnetic force	[kg/cm²]	5–12
Magnetic penetration depth	[mm]	20
Plate thickness	[mm]	min. 47 (Standard 55)

* force directly on the magnet

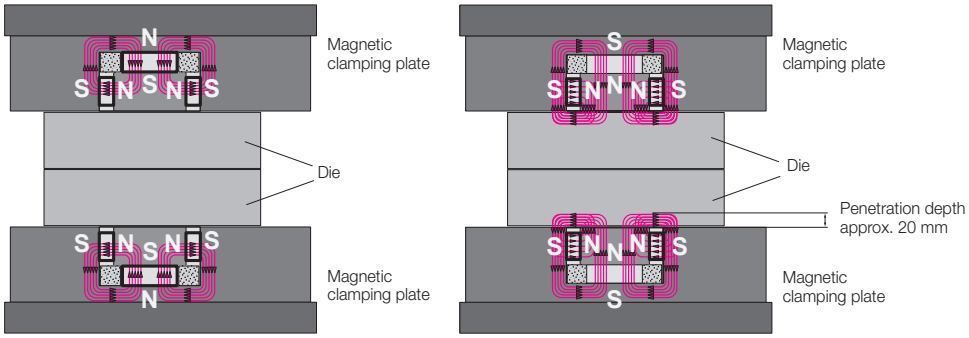
Installation on a sheet metal forming press



Functioning of the magnetic clamping plates

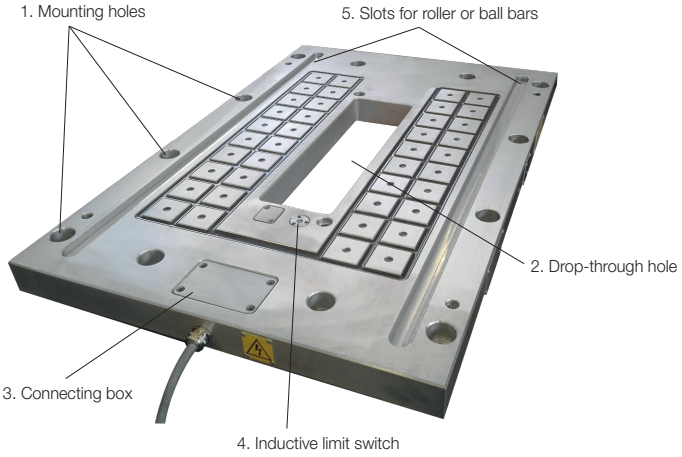
The electro-permanent magnetic clamping system is firmly kept in place even in case of power failure. Power is only required for approx. 1 to 2 seconds to magnetize the system. Then, the clamping system works independently of any power supply. The magnetic clamping force is exclusively generated by the permanent magnets. Only for unclamping the die, electrical energy is required again (for 1 to 2 seconds) to demagnetize the clamping plate. An existing AlNiCo magnet in the core is re-polarised by a current pulse. This magnet affects the magnetic field and relocates it to the interior of the magnetic clamping plate (demagnetized) or approx. 20 mm outside the plate (magnetized).

demagnetized **magnetized**



Structure of the magnetic clamping plates

1. The mounting holes are designed according to the already existing mounting grid in the press bed.
2. An optional drop-through hole for punching waste is provided in the lower magnetic clamping plate as per customer's request.
3. The completely sealed connecting box guarantees permanent access to the wiring of the plate connection.
4. The inductive limit switch checks the perfect contact of the die and then releases the magnetization.
5. Optional slots for roller or ball bars (also part of the ROEMHELD Group product range) can be inserted in the lower magnetic clamping plate to simplify die change.



Further safety equipment in the plate:

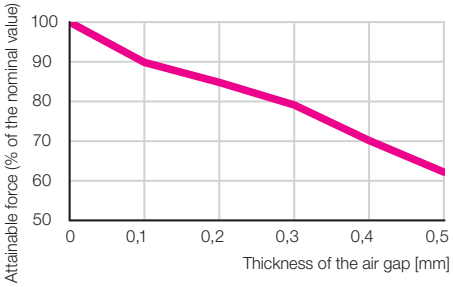
- Sensors inside the coils respond to induction and report the slightest die movements.
- A temperature sensor in the magnetic clamping plate prevents overheating and thus damage to the system.

Accessories

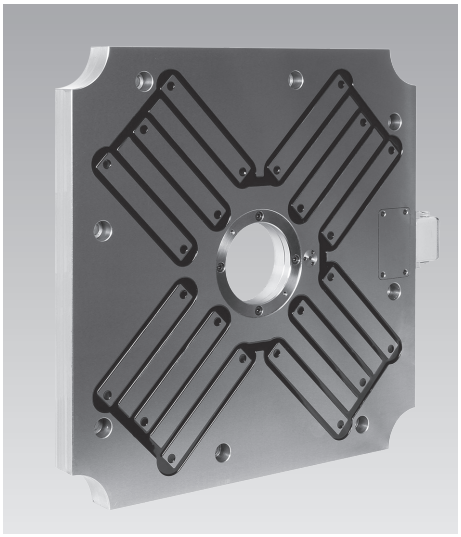
Force sensor "FES"

Force sensor "FES" for measuring the air gap and continuous monitoring and display of the retention force.

Reduction of the clamping force



Magnetic Clamping Systems M-TECS P
for temperatures up to 120 °C



Advantages
- Standardization of moulds no longer required
- High safety by process monitoring
- Clamping of the moulds within a few seconds
- Ergonomic handling with ease
- Mould clamping also in the heated condition
- No further mounting holes required
- Minimum wear of the moulds
- Motion detection of the mould
- Mould clamping on the complete surface with minimum deformation

Application
Magnetic clamping systems M-TECS P are primarily used for automatic clamping of different moulds on injection moulding machines.

Description
With magnetic clamping systems, the moulds are magnetically clamped or unclamped at the touch of a button within a few seconds.
Since permanent magnets generate the force of the magnetic clamping plates, electric clamping is only required to magnetize the plates.
The magnetic clamping plates are de-energized in clamped condition and thus absolutely safe in case of power failure.
The complete clamping cycle is monitored by different sensors, thus guaranteeing reliable mould clamping.
All M-TECS magnetic clamping systems carry the CE mark.

Scope of system and delivery
Magnetic clamping systems M-TECS P are delivered as complete clamping systems with all required system components. The essential components of a system are:
- two magnetic clamping plates
- electric control in a splash-proof control box
- a manual remote control
- required electrical connection cables

Electric control
see catalogue sheet WZ 9.5660

Customized versions
All M-TECS magnetic clamping systems are customized and manufactured to meet specific requirements.
For example, the size and pole technology of the magnetic clamping plates are selected according to the application and the machine.
Please contact us.

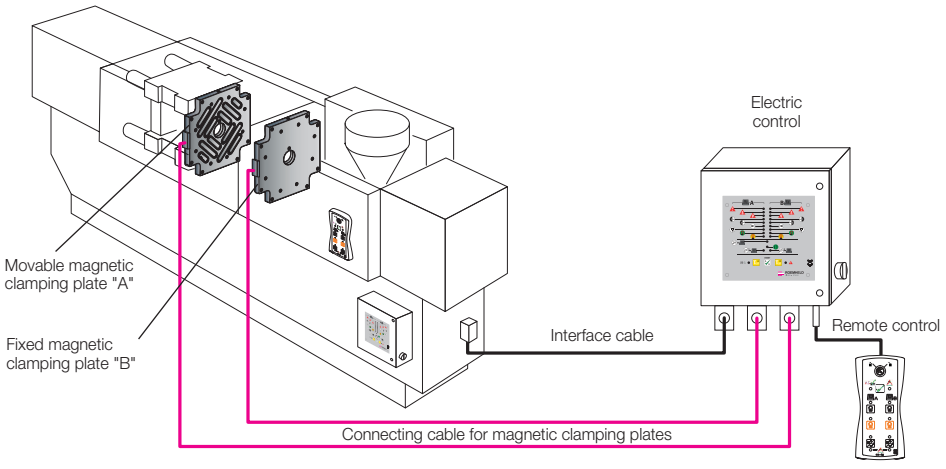
Safeties
- The inductive limit switch checks the form-fit contact of the mould and guarantees a clamping without force loss.
- Sensors inside the coils register the slightest mould movements due to changes in the magnetic flow between the magnetic clamping plate and mould.
- A temperature sensor in the magnetic clamping plate prevents overheating and thus damage to the system.

Technical basic data

Size of the magnetic clamping plates		customized
Pole technology		square pole, long pole or a combination of both (see page 3)
Max. temperature	[°C]	120 (on request up to 240)
Specific magnetic force*	[kg/cm²]	18
Effective magnetic force	[kg/cm²]	5–12
Magnetic penetration depth	[mm]	20
Plate thickness	[mm]	47
Mounting		as per the existing Euromap grid

* force directly on the magnet

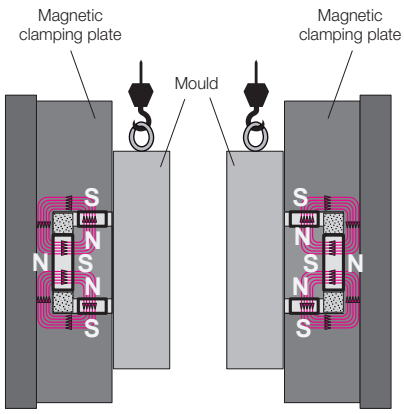
Installation on an injection moulding machine



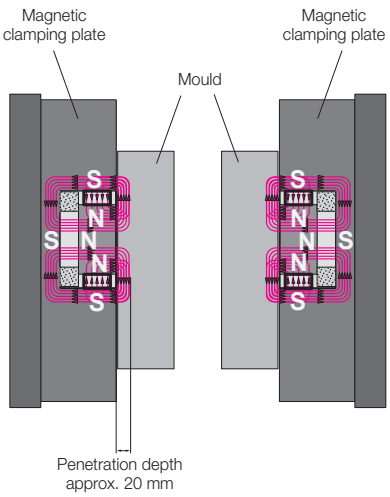
Functioning of the magnetic clamping plates

The electro-permanent magnetic clamping system is firmly kept in place even in the case of a power failure. Power is only required for approx. 1 to 2 seconds to magnetize the system. Then, the clamping system works independently of any power supply. The magnetic clamping force is exclusively generated by the permanent magnets. Only for unclamping the mould, electrical energy is required again (for 1 to 2 seconds) to demagnetize the clamping plate. An existing AlNiCo magnet in the core is re-polarised by a current pulse. This magnet affects the magnetic field and relocates it to the interior of the magnetic clamping plate (demagnetized) or approx. 20 mm outside the plate (magnetized).

demagnetized

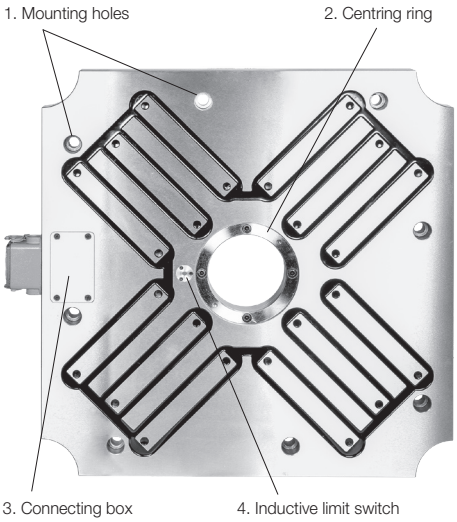


magnetized



Structure of the magnetic clamping plates

1. The mounting holes are completely designed according to the already existing mounting grid as per Euromap. Further bore holes in the machine bed are not required.
2. The centring ring is manufactured as per customer's specifications. An exchangeable centring ring is available as an accessory.
3. The completely sealed connecting box guarantees permanent access to the wiring of the plate connection.
4. The inductive limit switch checks the perfect contact of the mould and then releases the magnetization.



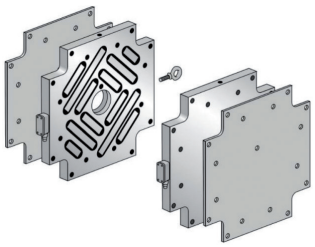
Further safety equipment in the plate:

- Sensors inside the coils respond to induction and report the slightest mould movements.
- A temperature sensor in the magnetic clamping plate prevents overheating and thus damage to the system.

Accessories

Insulation plates

The insulation plates are mounted between the machine bed and the magnetic clamping plates. They enable uniform heat distribution and avoid that the heat passes from the mould to the machine.
The insulation plates are available with a thickness of 6 and 10 mm.
Since the magnetic clamping plates are equipped with firmly mounted insulation plates, this investment is not required for all new moulds.



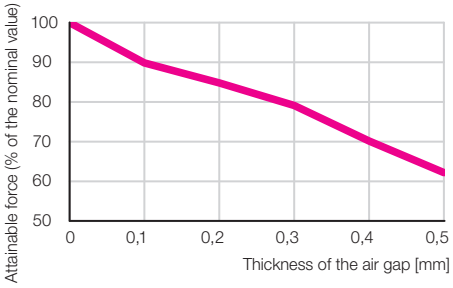
Centring ring

Too many tool changes can wear the centring on the magnetic clamping plate. An exchangeable centring ring guarantees the precise centring of the moulds without exchanging the complete clamping system.

Force sensor "FES"

Force sensor "FES" for measuring the air gap and continuous monitoring and display of the retention force.

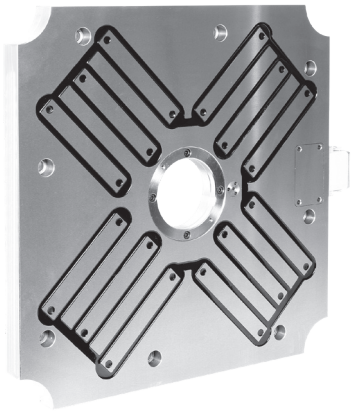
Reduction of the clamping force



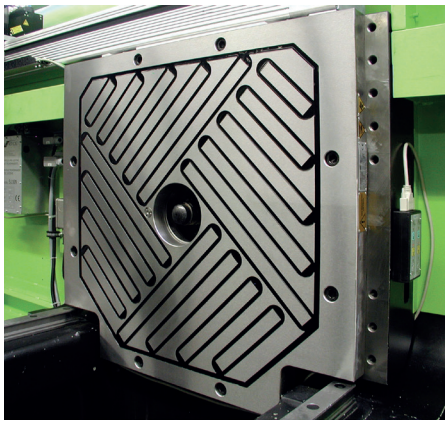
Long pole technology

Long poles are particularly suitable for small and medium-sized machines. Due to the long poles' geometric properties, a flexible arrangement is also possible in the case of many additional holes.

Plate thickness	[mm]	47
Pole size	[mm]	individual

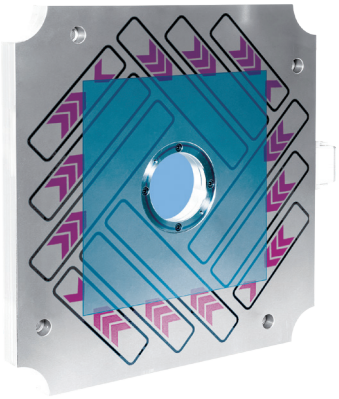


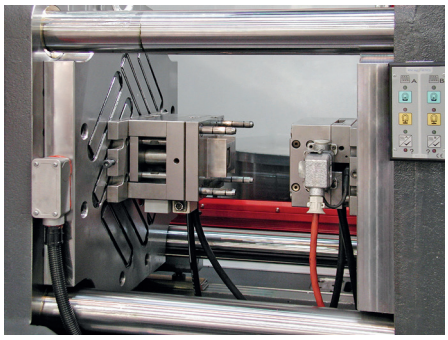
Application examples



Power concentration of the long pole technology

With long pole technology, a sufficiently high retention force is generated without full coverage of the poles. The magnetic field lines of the not-covered pole surface act on the mould in addition to the covered pole surface and enable a safe clamping of smallest moulds.

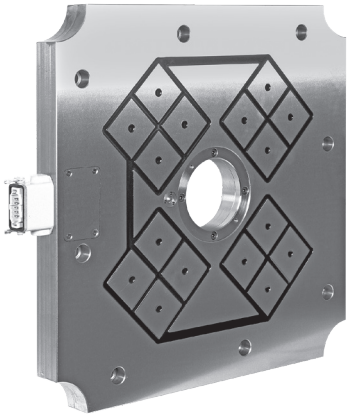


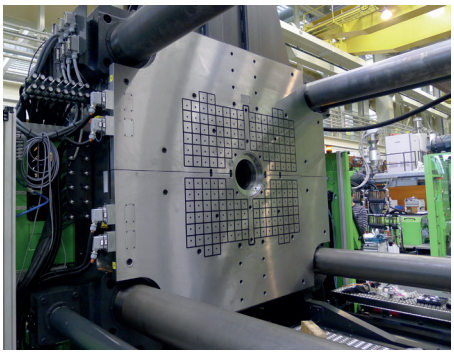


Square pole technology

Square poles are particularly suitable for large machines. With full coverage of the poles, the maximum retention force is obtained.

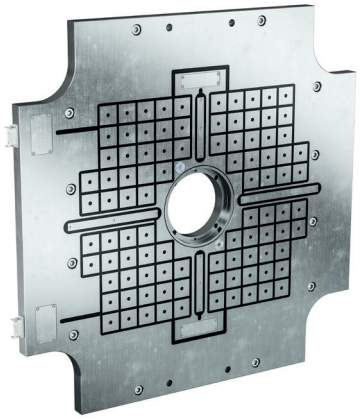
Plate thickness	[mm]	55
Pole size	[mm]	50 x 50 or 70 x 70

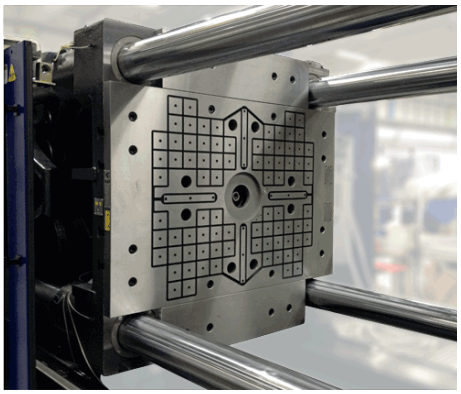




Combination of long and square pole technology

By the combination of long and square poles, Rivi Magnetics clamping systems combine the advantages of both pole technologies.





Magnetic Clamping Systems M-TECS R
for temperatures up to 230 °C

Advantages
- Standardization of moulds no longer required
- High safety by process monitoring
- Clamping of the moulds within a few seconds
- Ergonomic handling with ease
- Mould clamping also in the heated condition
- Minimum wear of the moulds
- Motion detection of the mould
- Mould clamping on the complete surface with minimum deformation

Application
Magnetic clamping systems M-TECS R are primarily used for automatic clamping of different moulds on rubber presses.

Description
With magnetic clamping systems, the moulds are magnetically clamped or unclamped at the touch of a button within a few seconds.
Since permanent magnets generate the force of the magnetic clamping plates, electric clamping is only required to magnetize the plates.
The magnetic clamping plates are de-energized in clamped condition and thus absolutely safe in case of power failure.
The complete clamping cycle is monitored by different sensors, thus guaranteeing reliable mould clamping.
All M-TECS magnetic clamping systems carry the CE mark.

Scope of system and delivery
Magnetic clamping systems M-TECS R are delivered as complete clamping systems with all required system components. The essential components of a system are:
- two magnetic clamping plates
- electric control in a splash-proof control box
- a manual remote control
- required electrical connection cables

Electric control
see catalogue sheet WZ 9.5660

Customized versions
All M-TECS magnetic clamping systems are customized and manufactured to meet specific requirements.
For example, the size and pole arrangement of the magnetic clamping plates are selected according to the application and the machine.
Please contact us.

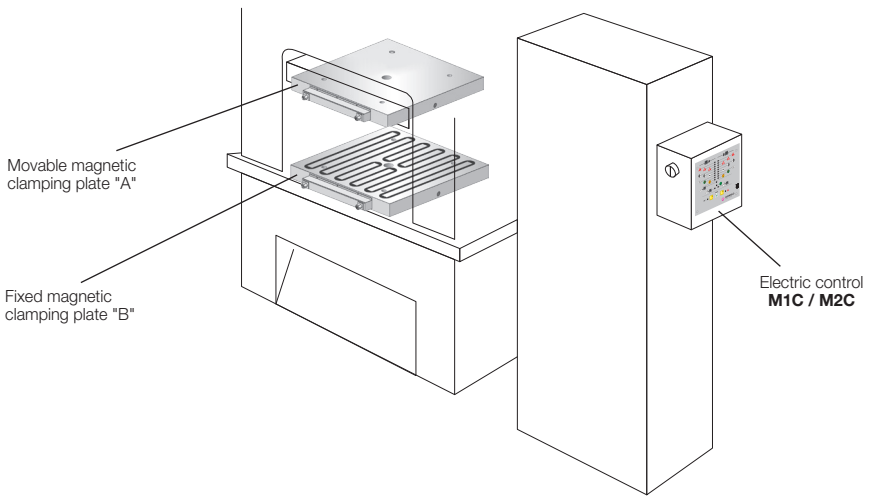
Safeties
- The inductive limit switch checks the form-fit contact of the mould and guarantees a clamping without force loss.
- Sensors inside the coils register the slightest mould movements due to changes in the magnetic flow between the magnetic clamping plate and the mould.
- A temperature sensor in the magnetic clamping plate prevents overheating and thus damage to the system.

Technical basic data

Size of the magnetic clamping plates		customized
Pole technology		long pole
Max. temperature	[°C]	230 (on request up to 240)
Specific magnetic force*	[kg/cm²]	18
Effective magnetic force	[kg/cm²]	5–12
Magnetic penetration depth	[mm]	20
Plate thickness	[mm]	min. 55

* force directly on the magnet

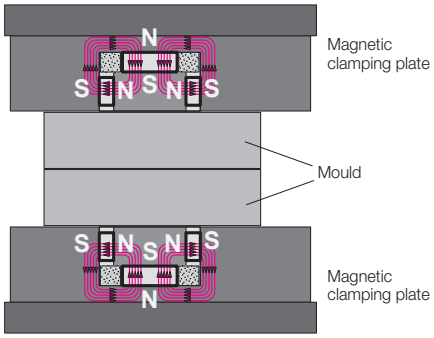
Installation on a rubber press



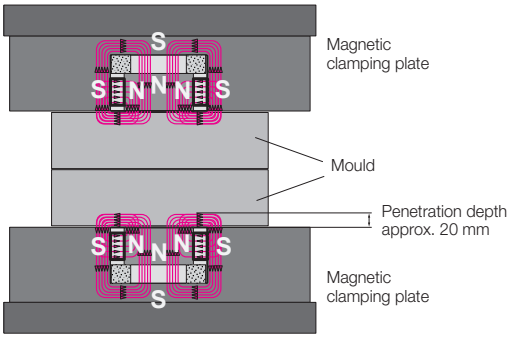
Functioning of the magnetic clamping plates

The electro-permanent magnetic clamping system is firmly kept in place even in the case of a power failure. Power is only required for approx. 1 to 2 seconds to magnetize the system. Then, the clamping system works independently of any power supply. The magnetic clamping force is exclusively generated by the permanent magnets. Only for unclamping the mould, electrical energy is required again (for 1 to 2 seconds) to demagnetize the clamping plate. An existing AlNiCo magnet in the core is reversed in polarity by a current pulse. This magnet affects the magnetic field and relocates it to the interior of the magnetic clamping plate (demagnetized) or approx. 20 mm outside the plate (magnetized).

demagnetized



magnetized



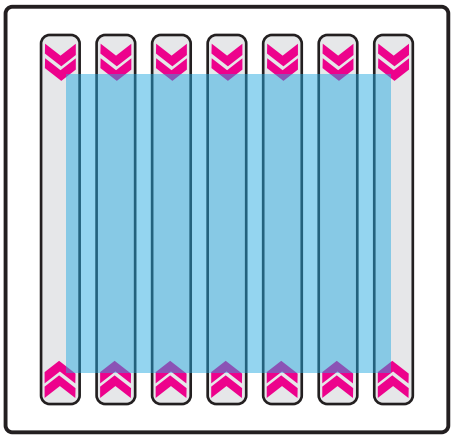
Structure of the magnetic clamping plates

1. The fixing grid is designed as far as possible according to existing drill holes.
2. The mechanical limit switch checks the perfect contact of the mould and then releases the magnetization.
3. Optional slots for roller or ball bars (also part of the ROEMHELD Group product range) can be inserted in the lower magnetic clamping plate to simplify mould change.

Further safety equipment in the plate:

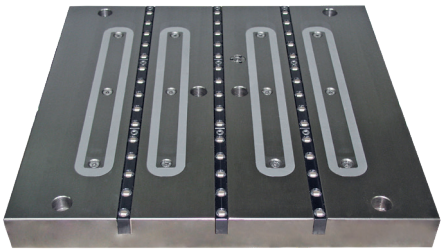
- Sensors inside the coils respond to induction and report the slightest mould movements.
- A temperature sensor in the magnetic clamping plate prevents overheating and thus damage to the system.

Power concentration of long pole technology



The magnetic field lines of the partially covered poles act in addition to the completely covered poles on the mould and enable a safe clamping of the smallest moulds.

Accessories

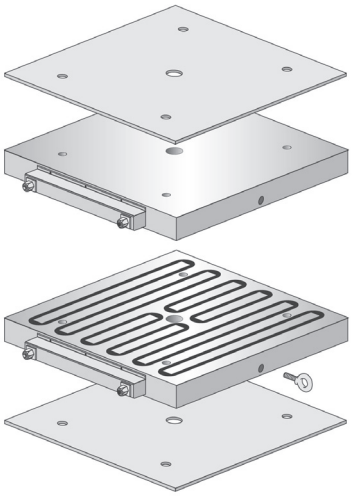


Roller or ball bars

Roller and ball bars in the lower magnetic clamping plate allow easy and trouble-free mould change and prevent damages to the surface.

Heating elements

Integrated heating elements combine heating and clamping in a single process. Changing and clamping moulds in the heated condition are simplified, and the risk of injury is reduced.



Insulation plates

The insulation plates are mounted between the machine bed and the magnetic clamping plates. They enable uniform heat distribution and avoid that the heat passes from the mould to the machine.

Vacuum version

The special sealing of the coils and cable exits is designed for vacuum application in productions with the highest quality requirements.

Elektro-Steuerung M1C und M2C
für Magnet-Spannsysteme M-TECS

Vorteile

- Höchste Sicherheitsstandards (nach EN 201/EN 289)
- Standardisierte Einbindung über Euromap 70-Schnittstelle
- Einfache Fehlerdiagnose durch Softwareauslesung
- Wartungsfreundlich durch austauschbares Master-Modul
- Kompakte Bauform
- Zustandsanzeige auf LED-Panel

Beschreibung

Elektro-Steuerung M1C

Die Elektro-Steuerung M1C wird für Klein- und Mittelmaschinen eingesetzt.

Abmessungen	500 x 500 x 250 mm
Fehler-Display	nicht vorhanden
Anschlüsse	1 bis 2

Elektro-Steuerung M2C

Die Elektro-Steuerung M2C wird für Großmaschinen eingesetzt.
Ein zusätzliches LCD-Display ermöglicht eine schnelle Diagnose durch die Anzeige von Fehlercodes.

Abmessungen	variiert nach Maschinengröße
Fehler-Display	ja
Anschlüsse	1 bis 8

Handfernbedienung

Mit abziehbarem Schlüsselschalter an der Handfernbedienung zum Schutz vor unbefugter Betätigung.

Einbindung in die Maschine

Für die Einbindung des Magnet-Spannsystems in die Maschine gibt es folgende drei Alternativen:

Euromap 70.0 (Vollintegration)

- Zweikanaliges Freigabesignal an die Maschine
- 3 Freigabesignale von der Maschine an das Magnet-Spannsystem
- Ansteuerung über Handfernbedienung mit Schlüsselschalter (im Lieferumfang enthalten)
- Schnittstellenkabel mit Steckerverbindung

Euromap 70.1 (Vollintegration)

- Zweikanaliges Freigabesignal an die Maschine
- 3 Freigabesignale von der Maschine an das Magnet-Spannsystem
- Ansteuerung über Maschinenpanel
- Schnittstellenkabel mit Steckerverbindung

Nachrüst-Schnittstelle (Teilintegration)

- Zweikanaliges Freigabesignal an die Maschine
- ohne Freigabesignale von der Maschine an das Magnet-Spannsystem
- 3-Minuten-Timer als Zeitfenster zum Entmagnetisieren
- Zweiter Schlüsselschalter als Sicherheit zur Freigabe des Magnet-Spannsystems
- Schnittstellenkabel mit Steckerverbindung

Technische Basisdaten

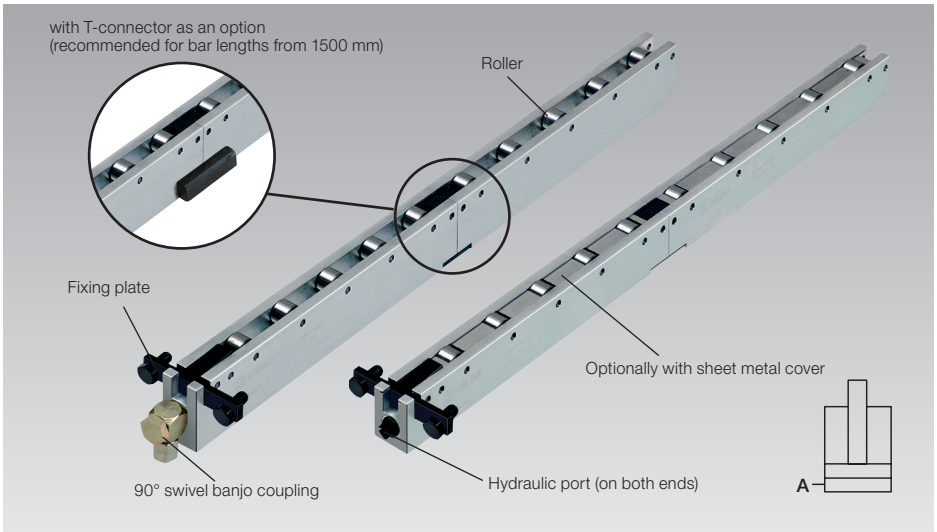
Spannung*	[V]	380 – 480
Frequenz*	[Hz]	50 / 60
Absicherung	[A]	32
Schutzart		IP 54

* nach Kundenwunsch

ROEMHELD
HILMA ▪ STARK

WZ 8.18340

Roller Bars, Hydraulic
with lifting of the bar
max. load 160 kN/m, max. operating pressure 400 bar



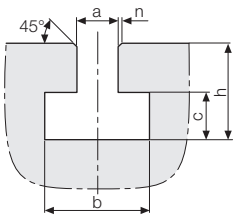
Advantages
- Easy and safe die change
- Hydraulic lifting of the complete bar
- Very high loads
- Lengths up to 2500 mm in 250 mm long segments
- The hydraulic supply is protected inside the slot base
- Easy cleaning of the bars and rollers by open design
- Low weight (version in aluminium)

Application
- In T-slots and rectangular slots of the press bed for easy die change without any problems
- Die change streamlining

Delivery
- Roller bar
- Fixing plate
- 90° swivel banjo coupling

Description
Roller bar with hydraulic lifting of the complete bar for heavy loads and linear movement of the dies.
On the underside of the roller bar, lifting pistons are provided. Pressure is applied to these pistons using hydraulic pressure generators, which lift then the complete roller bar. The die positioned on the roller bars is not in contact with the table top and can be easily moved linearly and positioned.

T-slot tolerances as per DIN 650



a	b	c	h min.	h max.	n max.
22 H12	37^{+3}	16^{+2}	**38**	45	1.6
28 H12	46^{+4}	20^{+2}	**48**	56	1.6
36 H12	56^{+4}	25^{+3}	**61**	71	2.5

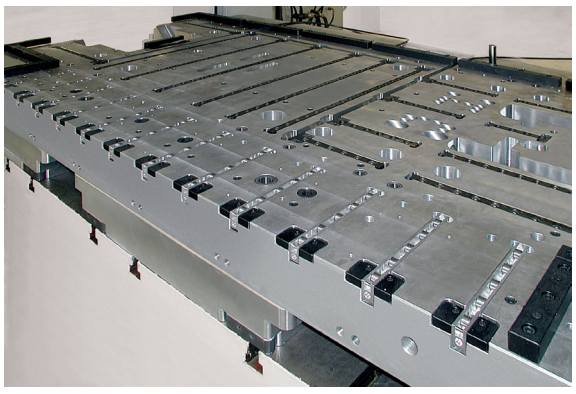
Dimensions in mm
$\mathbf{h_{min.}}$ = minimum dimension as per DIN 650

The height of the roller bars is designed for the dimension $h_{min.}$ of the slot dimension.

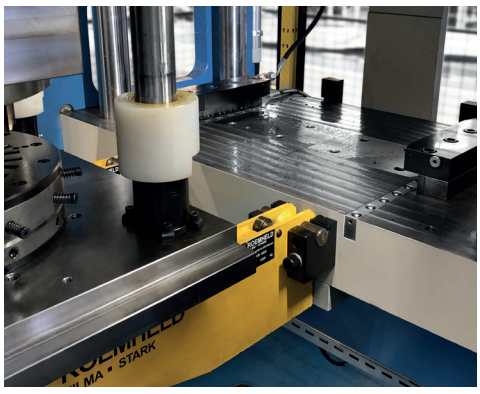
Technical data

Max. operating pressure	[bar]	400
Max. load	[kN/m]	160
Roller spacing	[mm]	50
Material of the bar		aluminium (steel on request)
Fixing of the bar		fixing plate or positioning pin
Standard lengths	[mm]	250 … 2500 consisting of 250 mm long segments
Intermediate lengths	[mm]	shortening of the segments in 50 mm increments

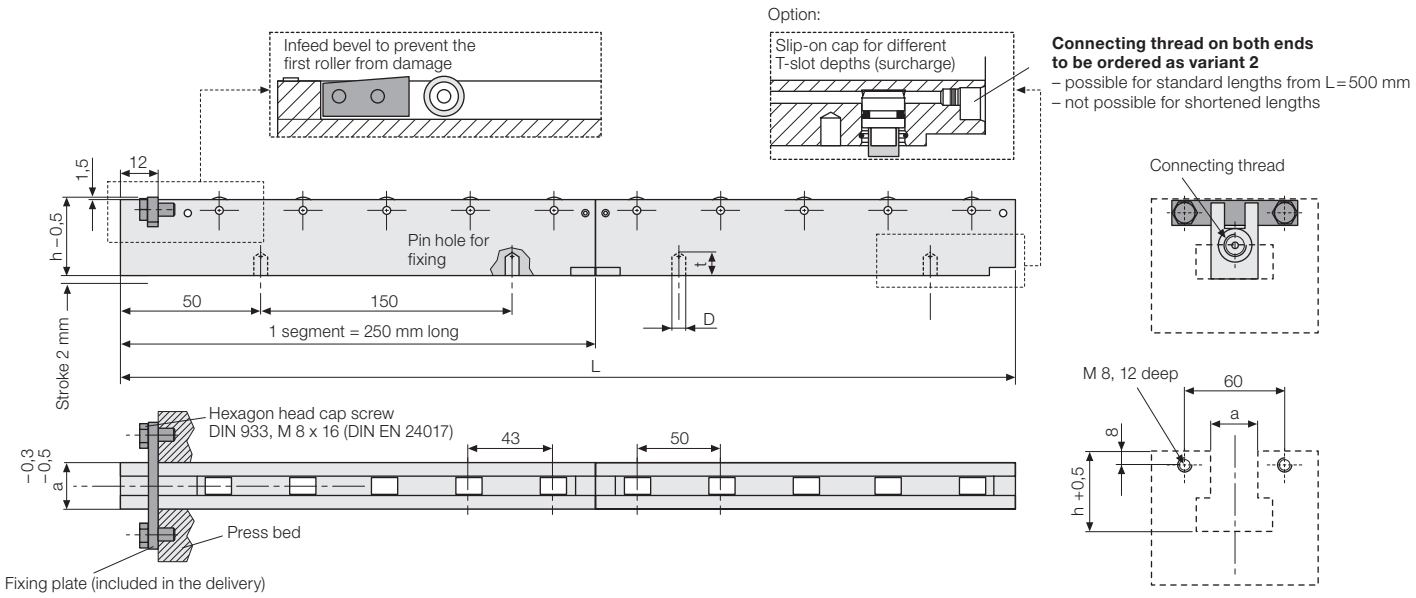
Application example



Roller bars with hydraulic lifting



Clamping bars installed in press bed and ram. Easy feeding of dies by die changing consoles and hydraulic ball bars installed in the T-slots of the press bed.



Technical data

Max. temperature 100 °C

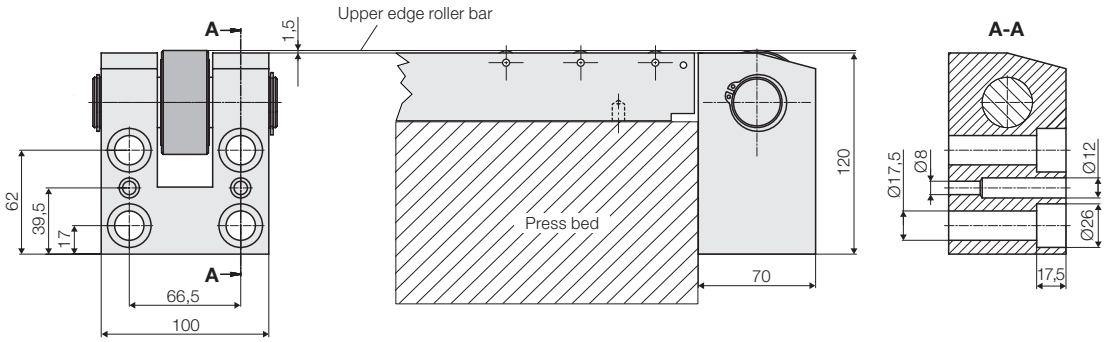
Slot width (a)	**[mm]**	**22**	**28**	**36**
Slot depth (h)	[mm]	38	48	61
Slot depth max. (h)	[mm]	45	56	71
Load/roller	[kN]	6.0	6.4	8.0
Number of rollers/segment (= 250 mm)		5	5	5
Number of pistons/segment (= 250 mm)		5	4	5
Connecting thread		G 1/8	G 1/8	G 1/4
Max. operating pressure	[bar]	400	400	400
Roller Ø x width	[mm]	16 x 12	16 x 12	19 x 12
Stroke	[mm]	2	2	2
Oil volume/segment	[cm³]	1.54	1.60	2.00
D	[mm]	6.5	8.5	8.5
t	[mm]	9	12	12

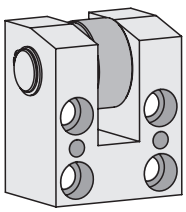
Fixing plate and 90° swivel banjo coupling are included in the delivery.

Accessories

Infeed support

to protect the first rollers





Socket head cap screw DIN 912, M16 x 100
Tightening torque Ma = 120 Nm
Dowel pin DIN 1481 Ø8x40
Part no. 7 18340042

Dimensions in [mm]

Standard lengths

Part no.

for slot width a = 22 mm

Length (L) [mm]	Load [kN] at 400 bar	Part no.
250	30	**818345100**
500	60	**818345110**
750	90	**818345115**
1000	120	**818345120**
1250	150	**818345130**
1500	180	**818345140**
1750	210	**818345150**
2000	240	**818345160**
2250	270	**818345170**
2500	300	**818345180**

for slot width a = 28 mm

Length (L) [mm]	Load [kN] at 400 bar	Part no.
250	32	**818346100**
500	64	**818346110**
750	96	**818346115**
1000	128	**818346120**
1250	160	**818346130**
1500	192	**818346140**
1750	224	**818346150**
2000	256	**818346160**
2250	288	**818346170**
2500	320	**818346180**

for slot width a = 36 mm

Length (L) [mm]	Load [kN] at 400 bar	Part no.
250	40	**818347100**
500	80	**818347110**
750	120	**818347115**
1000	160	**818347120**
1250	200	**818347130**
1500	240	**818347140**
1750	280	**818347150**
2000	320	**818347160**
2250	360	**818347170**
2500	400	**818347180**

Intermediate lengths

Possible intermediate lengths: 300 to 2450 mm. Produced by shortening of the segments in 50 mm increments.

Determination of the carrying force for intermediate lengths

for slot width a = 22 mm

Shortening by [mm]	Carrying force reduction [kN]
50	6
100	12
150	18
200	24

for slot width a = 28 mm

Shortening by [mm]	Carrying force reduction [kN]
50	8
100	16
150	16
200	24

for slot width a = 36 mm

Shortening by [mm]	Carrying force reduction [kN]
50	8
100	16
150	24
200	32

Examples for intermediate lengths of roller bar L = 500 mm

Part no.:

Add the desired length **"LXXX"** in mm to the part number.

for slot width a = 22 mm

Length (L) [mm]	Load [kN] at 400 bar	Example
300	36	**818345110L300**
350	42	**818345110L350**
400	48	**818345110L400**
450	54	**818345110L450**

for slot width a = 28 mm

Length (L) [mm]	Load [kN] at 400 bar	Example
300	40	**818346110L300**
350	48	**818346110L350**
400	48	**818346110L400**
450	56	**818346110L450**

for slot width a = 36 mm

Length (L) [mm]	Load [kN] at 400 bar	Example
300	48	**818347110L300**
350	56	**818347110L350**
400	64	**818347110L400**
450	72	**818347110L450**

Connecting thread on both ends: Variant "2"

– possible for standard lengths from L = 500 mm
– not possible for shortened lengths

Part no.

Add "**-2**" to the part no. of the roller bar.

Example: 818345110-2

Special versions

Sheet metal cover

The roller bars are also available with sheet metal cover between the rollers on request.

T-connector

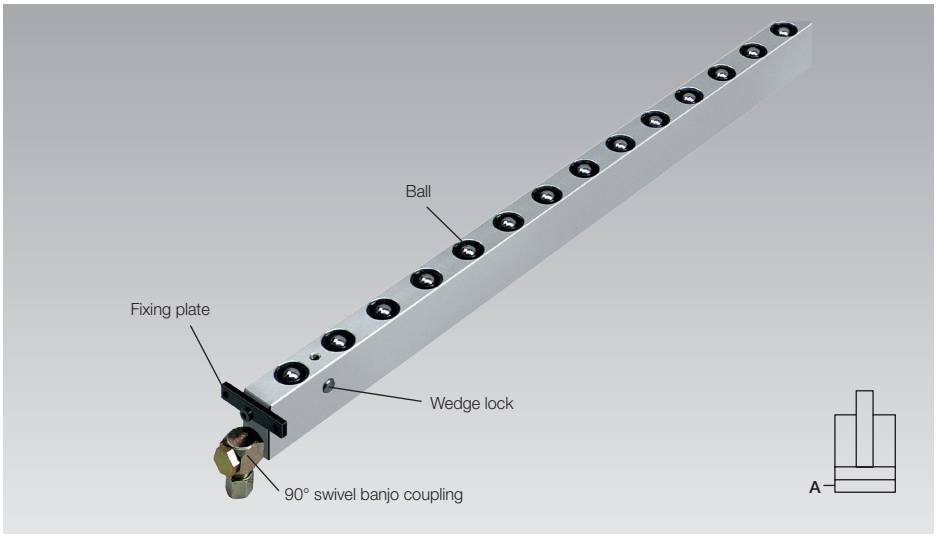
For bar lengths from 1500 mm, it is recommended to equip the individual segments with T-connectors (see figure on page 1). Thus, the roller bars are reinforced and the dimensional stability is increased.

Customised special versions

Different heights, lengths, strokes, roller and piston number per segment, other customised versions as well as inch versions are available on request.

WZ 8.18341

Ball Bars, Hydraulic
with lifting of the individual balls
max. load 70 kN/m, max. operating pressure 100 bar



Advantages
- Easy and safe die change
- Variant program with many selection possibilities
- Hydraulic lifting of each individual ball
- Variable length in a single piece design up to 2900 mm
- Slot depth, ball spacing and bar length configurable for every application
- Low weight (version in aluminium)

Application
- In T-slots and rectangular slots of the press bed for easy die change without any problems
- Die change streamlining

Delivery
- Ball bar
- Fixing plate
- 90° swivel banjo coupling

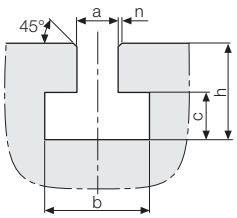
Description
Ball bar with hydraulic lifting of the individual balls for medium loads and flexible horizontal movement of the dies.
Oil pressure is applied to lift each ball insert individually. The die positioned on the ball bars is not in contact with the table top and can be easily moved and positioned.

Technical data

Max. operating pressure	[bar]	100
Max. load	[kN/m]	70
Ball spacing		flexible
Material of the bar		aluminium or steel
Max. temperature	[°C]	with aluminium bars: 100 with steel bars: 250
Fixing of the bar		fixing plate or wedge lock
Max. bar length*	[mm]	variable* up to 2900

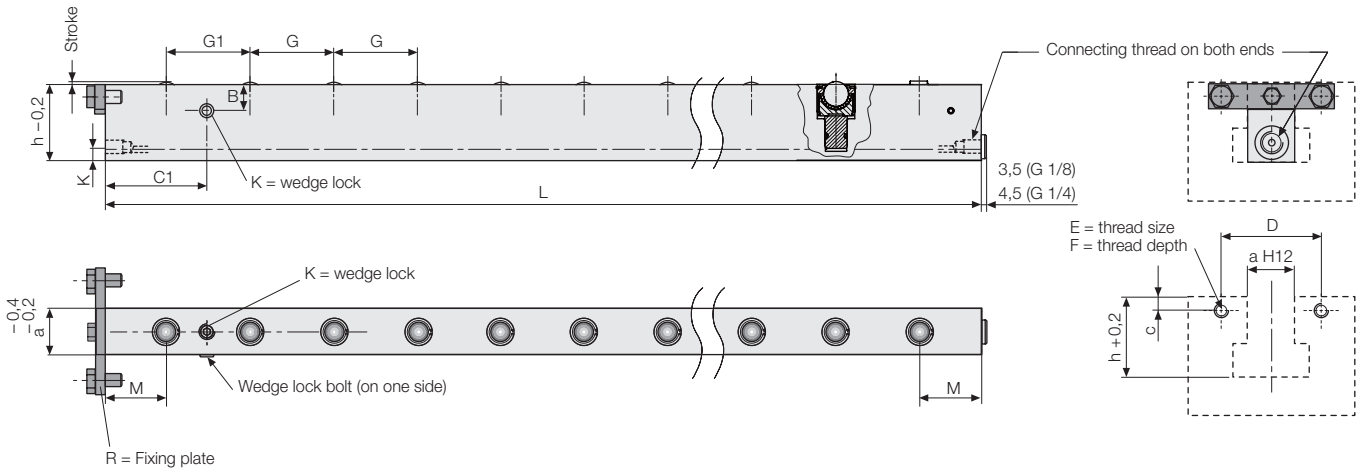
* The minimum bar lengths depends on the ball spacing G with at least 3 balls (see page 2)

T-slot tolerances as per DIN 650



a	b	c	**h min.**	h max.	n max.
18 H12	30^{+2}	12^{+2}	**30**	36	1.6
22 H12	37^{+3}	16^{+2}	**38**	45	1.6
28 H12	46^{+4}	20^{+2}	**48**	56	1.6
36 H12	56^{+4}	25^{+3}	**61**	71	2.5

Dimensions in mm
$\mathbf{h_{min.}}$ = minimum dimension as per DIN 650



Technical data

Slot width (a)	**[mm]**	**18**	**22**	**28**	**36**	**13/16"**	**1 1/16"**
Slot depth min. (h)	[mm]	29.5	37	42	53	29.4	37.4
Slot depth standard (h)	**[mm]**	**30**	**38**	**48**	**61**	**29.4**	**38.9**
Slot depth max.** (h)	[mm]	45	55	60	75	40	58
Ball spacing G min.	[mm]	20	23	28	34	20	23
Ball spacing G1 min.	[mm]	26	32	37	43	26	32
Ball spacing G/G1 standard	**[mm]**	**30**	**40**	**45**	**50**	**30**	**40**
Ball spacing G/G1 max.	[mm]	60	80	90	100	60	80
L min.	[mm]	*)	*)	*)	*)	*)	*)
L max.	[mm]	2900	2900	2900	2900	2900	2900
Stroke	[mm]	1	2	2	2	1	2
Longer stroke	[mm]	–	–	3	3	–	–
Load/ball	[kN]	0.79	1.1	1.5	2.5	0.79	1.1
Connecting thread		G ⅛	G ⅛	G ¼	G ¼	G ⅛	G ¼
Oil volume/ball insert	[cm^3]	0.08	0.23	0.31	0.51	0.08	0.23
B	[mm]	12	16	16	16	12	16
C	[mm]	5	7	9	10	5	7
C1	[mm]	35	46	51	56.5	35	46
D	[mm]	36	40	50	55	36	40
E	[mm]	M5	M5	M6	M6	M5	M5
F	[mm]	8	8	12	12	8	8
K	[mm]	8	8.5	11	11	8	11
M	[mm]	22.5	30	32.5	35	22.5	30

*) L min. depends on the ball spacing G with at least 3 balls
**) only with steel bars
Fixing plate and 90°elbow coupling are included in the delivery.

Product configurator

For the selection and configuration of roller and ball bars, a product configurator is available on our website.
After entering the parameters, the configurator determines the desired roller or ball bars with all technical data and the identification number of the characteristics which are identical with the order number. In addition, a drawing with all dimensions will be provided.

Link to the configurator:
www.roemheld-gruppe.de/productconfigurator/?lang=en

Code for part numbers
Variant program

Ball bars with hydraulic lifting are individually configured and manufactured depending on the application.
Within the limits specified in the measurement chart, the following parameters can be selected based on a code for part numbers:
bar material, slot width, bar lengths, fixation, slot depth, ball spacing and ball orientation.

- **Stroke**
  The ball bar is equipped with standard stroke (1 or 2 mm). For slot width 28 and 36, alternatively a larger stroke of 3 mm is available.

- **Bar material / operating temperature**
  Aluminium or steel can be selected as bar material. For operating temperatures > 100 °C, a steel version is required. Depending on the temperature range, the admissible carrying force of the ball bars is reduced:

  up to 100 °C: 100 % of the carrying force
  > 100 – 150 °C: 95 % of the carrying force
  > 150 – 200 °C: 70 % of the carrying force
  > 200 – 250 °C: 60 % of the carrying force

  e.g. steel up to 200 °C with 70 % of the carrying force

- **Slot width (a)**
  Selection from the table on page 2

  e.g. a = 28 mm

- **Bar lengths (L)**
  Depending on the ball spacing (G) and the parameter (M) results the possible bar length. Indicate the desired length (e.g. bed length) for your ball bar. Please note that a ball bar must be equipped with at least 3 balls.

  e.g. L = 1445 mm

- **Fixation**
  K = wedge lock
  R = fixing plate

  e.g. fixing plate = R

- **Slot depth (h)**
  If the slots in your application are lower than the default value, specify the corresponding dimension (up to h min.)
  For slots which are deeper than the default value, spacer bars can be inserted. For steel versions, specify the corresponding dimension (up to h max.).

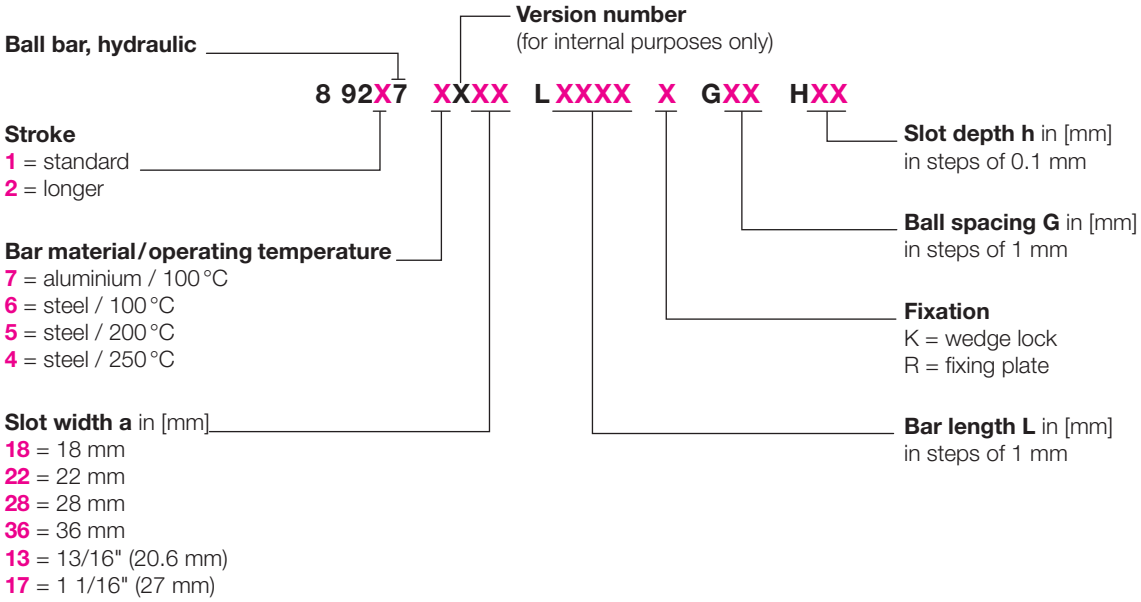
  e.g. h = 43 mm

- **Ball spacing (G) or load of the bar**
  By changing the spacing of the balls, the load of the ball bar can be varied. Please note that the load is indicated for the full length of the bar. Therefore, both the load and the ball spacing must be selected to suit the die weight and the die supporting length.
  Please indicate the desired ball spacing or load of the ball bar, or the maximum die weight and the die dimensions.

Note for the calculation of the bar length
The spacing of the first two balls G1 is limited by the position of the wedge lock.
The following applies: G = G1, however when selecting G < G1 min the spacing G1 will not be reduced below the minimum value.

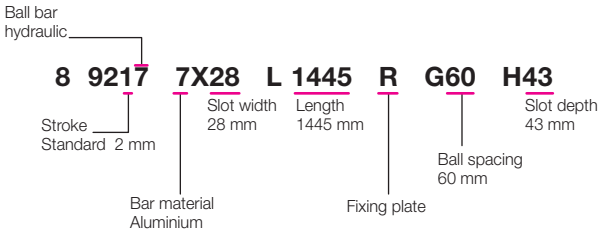
e.g. G = 60 mm
or **load per bar = 36 kN**
or **number of balls = 24**
or **die weight and exterior dimensions**

Code for part numbers
Variant program



Page 4 shows an example of the part numbers for aluminium bars with standard ball spacing “G” and standard slot depth “h”.

Example of ordering



Extract from the possible variants for ball bars
with standard ball spacing “G”, standard slot depth “h” and bar material aluminium

for slot width a = 18 mm

Length (L) [mm]	Load [kN]	Number of balls	Part no.
105	2.3	3	**892177118 L 105 R**
135	3.1	4	**892177118 L 135 R**
165	3.9	5	**892177118 L 165 R**
195	4.7	6	**892177118 L 195 R**
255	6.3	8	**892177118 L 255 R**
315	7.9	10	**892177118 L 315 R**
375	9.4	12	**892177118 L 375 R**
435	11.0	14	**892177118 L 435 R**
495	12.6	16	**892177118 L 495 R**
555	14.2	18	**892177118 L 555 R**
615	15.8	20	**892177118 L 615 R**
675	17.3	22	**892177118 L 675 R**
735	18.9	24	**892177118 L 735 R**
795	20.5	26	**892177118 L 795 R**
855	22.1	28	**892177118 L 855 R**
915	23.7	30	**892177118 L 915 R**
other lengths are possible up to max. 2895			
2895	75.8	96	**892177118 L 2895 R**

for slot width a = 22 mm

Length (L) [mm]	Load [kN]	Number of balls	Part no.
140	3.3	3	**892177122 L 140 R**
180	4.4	4	**892177122 L 180 R**
220	5.5	5	**892177122 L 220 R**
260	6.6	6	**892177122 L 260 R**
340	8.8	8	**892177122 L 340 R**
420	11.0	10	**892177122 L 420 R**
500	13.2	12	**892177122 L 500 R**
580	15.4	14	**892177122 L 580 R**
660	17.6	16	**892177122 L 660 R**
740	19.8	18	**892177122 L 740 R**
780	20.9	19	**892177122 L 780 R**
820	22.0	20	**892177122 L 820 R**
900	24.2	22	**892177122 L 900 R**
980	26.4	24	**892177122 L 980 R**
1060	28.6	26	**892177122 L 1060 R**
1140	30.8	28	**892177122 L 1140 R**
1220	33.0	30	**892177122 L 1220 R**
1300	35.2	32	**892177122 L 1300 R**
other lengths are possible up to max. 2900			
2900	79.2	72	**892177122 L 2940 R**

for slot width a = 28 mm

Length (L) [mm]	Load [kN]	Number of balls	Part no.
155	4.5	3	**892177128 L 155 R**
200	6.0	4	**892177128 L 200 R**
245	7.5	5	**892177128 L 245 R**
290	9.0	6	**892177128 L 290 R**
380	12.0	8	**892177128 L 380 R**
470	15.0	10	**892177128 L 470 R**
560	18.0	12	**892177128 L 560 R**
650	21.0	14	**892177128 L 650 R**
695	22.5	15	**892177128 L 695 R**
740	24.0	16	**892177128 L 740 R**
830	27.0	18	**892177128 L 830 R**
920	30.0	20	**892177128 L 920 R**
965	31.5	21	**892177128 L 965 R**
1010	33.0	22	**892177128 L 1010 R**
1100	36.0	24	**892177128 L 1100 R**
1190	39.0	26	**892177128 L 1190 R**
1280	42.0	28	**892177128 L 1280 R**
other lengths are possible up to max. 2900			
2900	96	64	**892177128 L 2945 R**

for slot width a = 36 mm

Length (L) [mm]	Load [kN]	Number of balls	Part no.
170	7.5	3	**892177136 L 170 R**
220	10.0	4	**892177136 L 220 R**
270	12.5	5	**892177136 L 270 R**
320	15.0	6	**892177136 L 320 R**
420	20.0	8	**892177136 L 420 R**
520	25.0	10	**892177136 L 520 R**
620	30.0	12	**892177136 L 620 R**
720	35.0	14	**892177136 L 720 R**
820	40.0	16	**892177136 L 820 R**
920	45.0	18	**892177136 L 920 R**
1020	50.0	20	**892177136 L 1020 R**
1120	55.0	22	**892177136 L 1120 R**
1220	60.0	24	**892177136 L 1220 R**
1320	65.0	26	**892177136 L 1320 R**
other lengths are possible up to max. 2870			
2870	142.5	57	**892177136 L 2920 R**

for slot width a = 13/16”

Length (L) [mm]	Load [kN]	Number of balls	Part no.
105	2.3	3	**892177113 L 105 R**
135	3.1	4	**892177113 L 135 R**
165	3.9	5	**892177113 L 165 R**
195	4.7	6	**892177113 L 195 R**
255	6.3	8	**892177113 L 255 R**
315	7.9	10	**892177113 L 315 R**
375	9.4	12	**892177113 L 375 R**
435	11.0	14	**892177113 L 435 R**
495	12.6	16	**892177113 L 495 R**
555	14.2	18	**892177113 L 555 R**
615	15.8	20	**892177113 L 615 R**
675	17.3	22	**892177113 L 675 R**
735	18.9	24	**892177113 L 735 R**
795	20.5	26	**892177113 L 795 R**
855	22.1	28	**892177113 L 855 R**
915	23.7	30	**892177113 L 915 R**
other lengths are possible up to max. 2895			
2895	75.8	96	**892177113 L 2925 R**

for slot width a = 1 1/16"

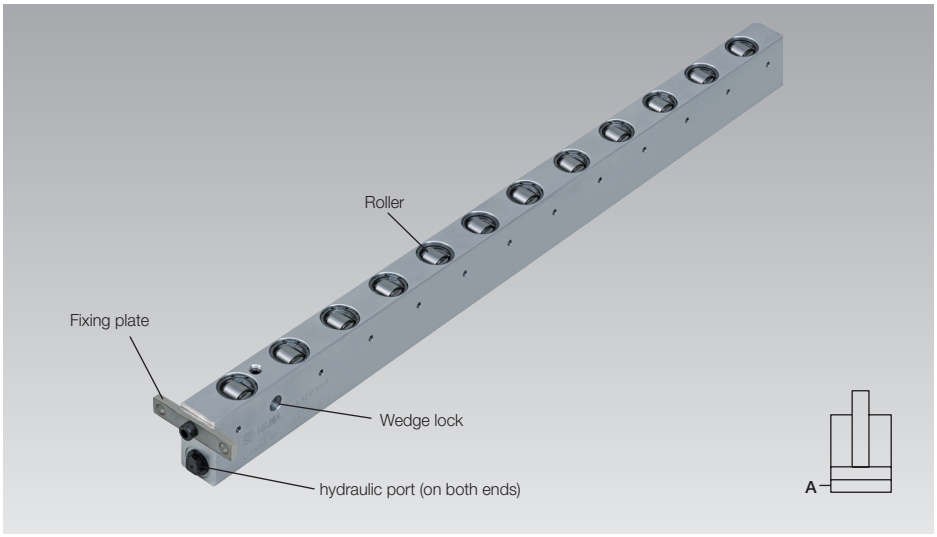
Length (L) [mm]	Load [kN]	Number of balls	Part no.
140	3.3	3	**892177117 L 140 R**
180	4.4	4	**892177117 L 180 R**
220	5.5	5	**892177117 L 220 R**
260	6.6	6	**892177117 L 260 R**
340	8.8	8	**892177117 L 340 R**
420	11.0	10	**892177117 L 420 R**
500	13.2	12	**892177117 L 500 R**
580	15.4	14	**892177117 L 580 R**
660	17.6	16	**892177117 L 660 R**
740	19.8	18	**892177117 L 740 R**
820	22.0	20	**892177117 L 820 R**
900	24.2	22	**892177117 L 900 R**
980	26.4	24	**892177117 L 980 R**
1060	28.6	26	**892177117 L 1060 R**
1140	30.8	28	**892177117 L 1140 R**
1220	33.0	30	**892177117 L 1220 R**
1300	35.2	32	**892177117 L 1300 R**
other lengths are possible up to max. 2900			
2900	79.2	72	**892177117 L 2940 R**

Fixing plate = **R**
Wedge lock = **K**

ROEMHELD
HILMA ▪ STARK

WZ 8.18342

Roller Bars, Hydraulic
with lifting of the individual rollers
max. load 126 kN/m, max. operating pressure 120 bar



Advantages
- Easy and safe die change
- Variant program with many selection possibilities
- Hydraulic lifting of each individual roller
- Variable length in a single piece design up to 2900 mm
- Slot depth, roller spacing and bar length configurable for every application
- Low weight (version in aluminium)

Application
- In T-slots and rectangular slots of the press bed for easy die change without any problems
- Die change streamlining

Delivery
- Roller bar
- Fixing plate
- 90° swivel banjo coupling

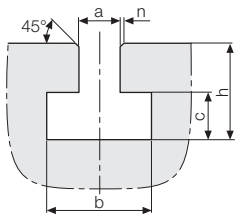
Description
Roller bars with hydraulic lifting of the individual rollers for medium loads and linear movement of the dies.
Contrary to the roller bars as per data sheet WZ 8.18340, the lifting pistons are below each roller. Each roller is lifted individually. The base body remains in its position.
The die positioned on the rollers is not in contact with the table top and can be easily moved linearly and positioned.

Technical data

Max. operating pressure	[bar]	120
Max. load	[kN/m]	126
Roller spacing and orientation		flexible
Material of the bar		aluminium or steel
Max. temperature	[°C]	with aluminium bars: 100 with steel bars: 250
Fixing of the bar		fixing plate or wedge lock
Max. bar length*	[mm]	variable* up to 2900

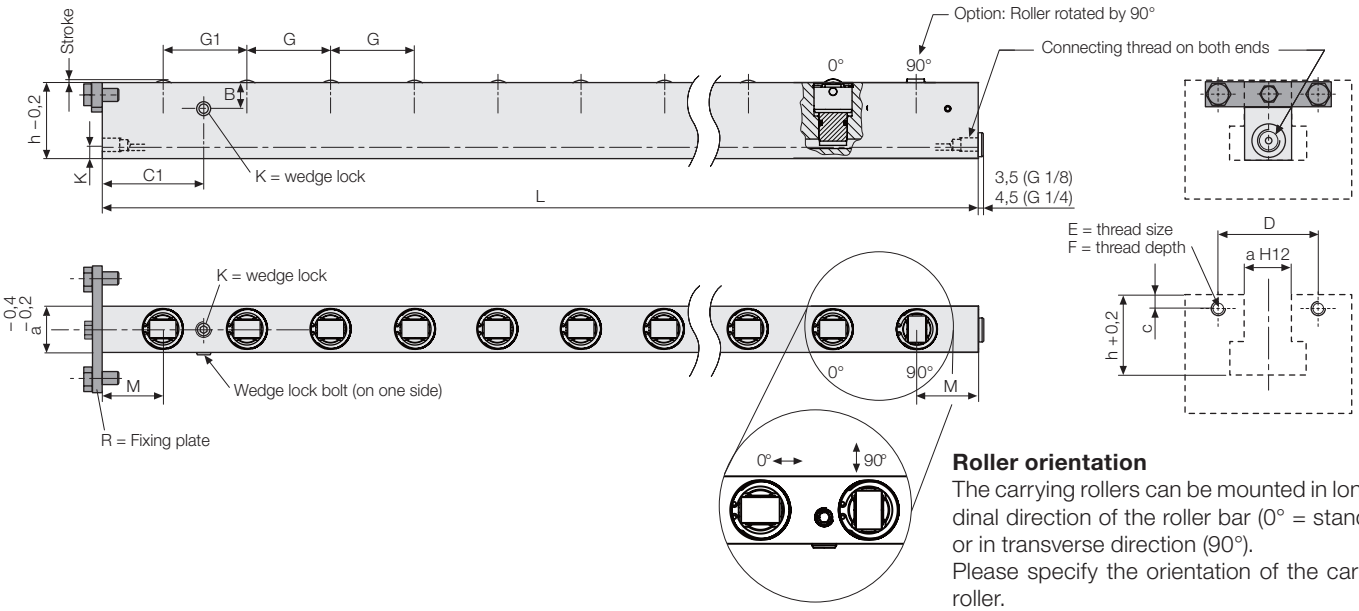
* The minimum bar lengths depends on the roller spacing G with at least 3 rollers (see page 2)

T-slot tolerances as per DIN 650



a	b	c	**h min.**	h max.	n max.
18 H12	30^{+2}	12^{+2}	**30**	36	1.6
22 H12	37^{+3}	16^{+2}	**38**	45	1.6
28 H12	46^{+4}	20^{+2}	**48**	56	1.6
36 H12	56^{+4}	25^{+3}	**61**	71	2.5

Dimensions in mm
$\mathbf{h_{min.}}$ = minimum dimension as per DIN 650



Roller orientation

The carrying rollers can be mounted in longitudinal direction of the roller bar (0° = standard) or in transverse direction (90°).
Please specify the orientation of the carrying roller.
e. g. X = 90°

Technical data

Slot width (a)	**[mm]**	**18**	**22**	**28**	**36**	**13⁄16"**	**1 1⁄16"**
Slot depth min. (h)	[mm]	29.5	37.5	43	54.5	29.4	38
Slot depth standard (h)	**[mm]**	**30**	**38**	**48**	**61**	**29.4**	**38.9**
Slot depth max.** (h)	[mm]	45	55	60	75	40	58
Roller spacing G min.	[mm]	20	23	28	34	20	23
Roller spacing G1 min.	[mm]	26	32	37	43	26	32
Roller spacing G/G1 standard	**[mm]**	**30**	**40**	**45**	**50**	**30**	**40**
Roller spacing G/G1 max.	[mm]	60	80	90	100	60	80
L min.	[mm]	*)	*)	*)	*)	*)	*)
L max.	[mm]	2900	2900	2900	2900	2900	2900
Stroke	[mm]	1	2	2	2	1	2
Longer stroke	[mm]	–	–	3	3	–	–
Load/roller	[kN]	1.14	1.85	3.0	4.5	1.14	1.85
Connecting thread		G ⅛	G ⅛	G ¼	G ¼	G ⅛	G ¼
Oil volume/roller insert	[cm^3]	0.10	0.31	0.51	0.76	0.10	0.31
B	[mm]	12	16	16	16	12	16
C	[mm]	5	7	9	10	5	7
C1	[mm]	35	46	51	56.5	35	46
D	[mm]	36	40	50	55	36	40
E	[mm]	M5	M5	M6	M6	M5	M5
F	[mm]	8	8	12	12	8	8
K	[mm]	8	8.5	11	11	8	11
M	[mm]	22.5	30	32.5	35	22.5	30

*) L min. depends on the roller spacing G with at least 3 rollers
**) only with steel bars
Fixing plate and 90°elbow coupling are included in the delivery.

Product configurator

For the selection and configuration of roller and ball bars, a product configurator is available on our website.
After entering the parameters, the configurator determines the desired roller or ball bars with all technical data and the identification number of the characteristics which are identical with the order number. In addition, a drawing with all dimensions will be provided.

Link to the configurator:
www.roemheld-gruppe.de/productconfigurator/?lang=en

Code for part numbers
Variant program

Roller bars with hydraulic lifting are individually configured and manufactured depending on the application.
Within the limits specified in the measurement chart, the following parameters can be selected based on a code for part numbers:
bar material, slot width, bar lengths, fixation, slot depth, roller spacing and roller orientation.

- **Stroke**
  The roller bar is equipped with standard stroke (1 or 2 mm). For slot width 28 and 36, alternatively a larger stroke of 3 mm is available.

- **Bar material / operating temperature**
  Aluminium or steel can be selected as bar material. For operating temperatures > 100 °C, a steel version is required. Depending on the temperature range, the admissible carrying force of the roller bars is reduced:

  up to 100 °C: 100 % of the carrying force
  > 100 – 150 °C: 95 % of the carrying force
  > 150 – 200 °C: 70 % of the carrying force
  > 200 – 250 °C: 60 % of the carrying force

  e.g. steel up to 200 °C with 70 % of the carrying force

- **Slot width (a)**
  Selection from the table on page 2

  e. g. a = 28 mm

- **Bar lengths (L)**
  Depending on the roller spacing (G) and the parameter (M) results the possible bar length. Indicate the desired length (e.g. bed length) for your roller bar. Please note that a roller bar must be equipped with at least 3 rollers.

  e.g. L = 1445 mm

- **Fixation**
  K = wedge lock
  R = fixing plate

  e.g. fixing plate = R

- **Roller spacing (G) or load of the bar**
  By changing the spacing of the rollers, the load of the roller bar can be varied. Please note that the load is indicated for the full length of the bar. Therefore, both the load and the roller spacing must be selected to suit the die weight and the die supporting length.
  Please indicate the desired roller spacing or load of the ball bar, or the maximum die weight and the die dimensions.

Note for the calculation of the bar length
The spacing of the first two rollers G1 is limited by the position of the wedge lock.
The following applies: G = G1, however when selecting G < G1 min the spacing G1 will not be reduced below the minimum value.

e.g. G = 60 mm

or **load per bar = 72 kN**
or **number of rollers = 24**
or **die weight and exterior dimensions**

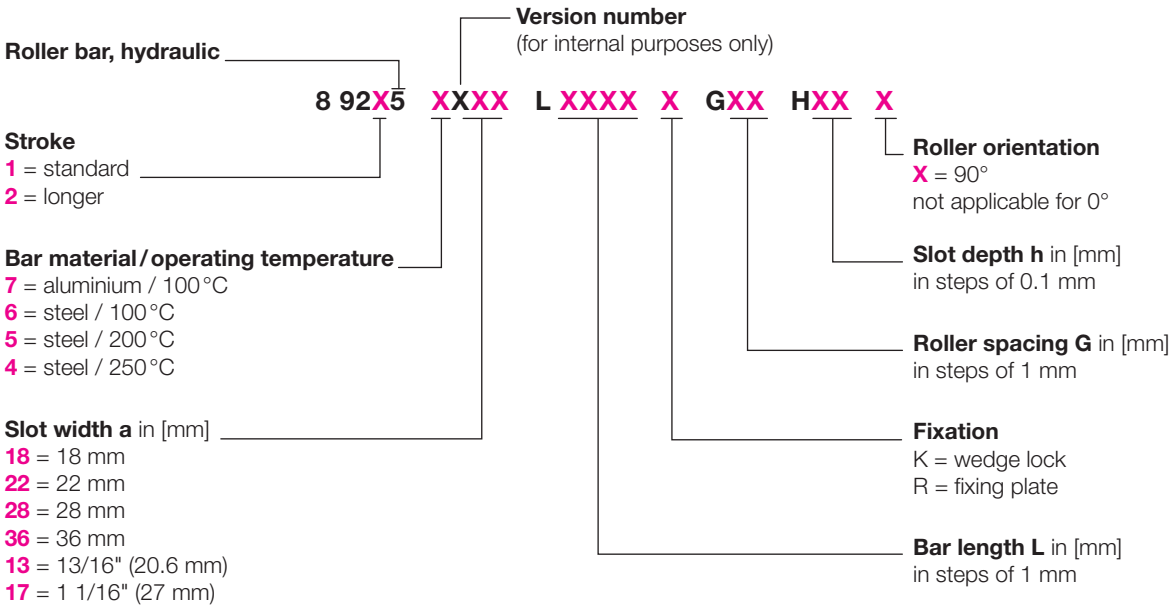
- **Slot depth (h)**
  If the slots in your application are lower than the default value, specify the corresponding dimension (up to h min.) For slots which are deeper than the default value, spacer bars can be inserted. For steel versions, specify the corresponding dimension (up to h max.).

  e.g. h = 43 mm

- **Roller orientation**
  The carrying rollers can be mounted in longitudinal direction of the roller bar (0° = standard) or in transverse direction (90°).
  Please specify the orientation of the carrying roller.

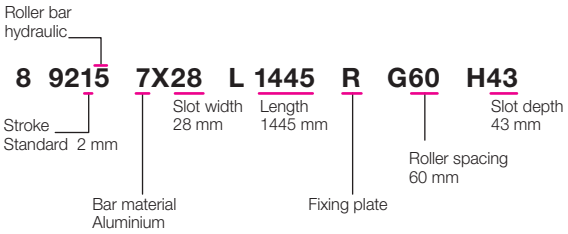
  e. g. X = 90°

Code for part numbers
Variant program



Page 4 shows an example of the part numbers for aluminium bars with standard roller spacing “G” and standard slot depth “h”.

Example of ordering



Extract from the possible variants for roller bars
with standard roller spacing “G”, standard slot depth “h” and bar material aluminium

for slot width a = 18 mm

Length (L) [mm]	Load [kN]	Number of rollers	Part no.
105	3.4	3	**892157018 L 105 R**
135	4.5	4	**892157018 L 135 R**
165	5.7	5	**892157018 L 165 R**
195	6.8	6	**892157018 L 195 R**
255	9.1	8	**892157018 L 255 R**
315	11.4	10	**892157018 L 315 R**
375	13.6	12	**892157018 L 375 R**
435	15.9	14	**892157018 L 435 R**
495	18.2	16	**892157018 L 495 R**
555	20.5	18	**892157018 L 555 R**
615	22.8	20	**892157018 L 615 R**
675	25.0	22	**892157018 L 675 R**
735	27.3	24	**892157018 L 735 R**
795	29.6	26	**892157018 L 795 R**
855	31.9	28	**892157018 L 855 R**
915	34.2	30	**892157018 L 915 R**
975	36.4	32	**892157018 L 975 R**
other lengths are possible up to max. 2895			
2895	109.4	96	**892157018 L 2895 R**

for slot width a = 22 mm

Length (L) [mm]	Load [kN]	Number of rollers	Part no.
140	5.5	3	**892157022 L 140 R**
180	7.4	4	**892157022 L 180 R**
220	9.2	5	**892157022 L 220 R**
260	11.1	6	**892157022 L 260 R**
340	14.8	8	**892157022 L 340 R**
420	18.5	10	**892157022 L 420 R**
500	22.2	12	**892157022 L 500 R**
580	25.9	14	**892157022 L 580 R**
660	29.6	16	**892157022 L 660 R**
740	33.3	18	**892157022 L 740 R**
820	37.0	20	**892157022 L 820 R**
900	40.7	22	**892157022 L 900 R**
980	44.4	24	**892157022 L 980 R**
1060	48.1	26	**892157022 L 1060 R**
1140	51.8	28	**892157022 L 1140 R**
1220	55.5	30	**892157022 L 1220 R**
1300	59.2	32	**892157022 L 1300 R**
1380	62.9	34	**892157022 L 1380 R**
other lengths are possible up to max. 2900			
2900	133.2	72	**892157022 L 2900 R**

for slot width a = 28 mm

Length (L) [mm]	Load [kN]	Number of rollers	Part no.
155	9	3	**892157028 L 155 R**
200	12	4	**892157028 L 200 R**
245	15	5	**892157028 L 245 R**
290	18	6	**892157028 L 290 R**
380	24	8	**892157028 L 380 R**
470	30	10	**892157028 L 470 R**
560	36	12	**892157028 L 560 R**
650	42	14	**892157028 L 650 R**
740	48	16	**892157028 L 740 R**
830	54	18	**892157028 L 830 R**
920	60	20	**892157028 L 920 R**
1010	66	22	**892157028 L 1010 R**
1100	72	24	**892157028 L 1100 R**
1190	78	26	**892157028 L 1190 R**
1280	84	28	**892157028 L 1280 R**
1370	90	30	**892157028 L 1370 R**
other lengths are possible up to max. 2900			
2900	192	64	**892157028 L 2900 R**

for slot width a = 36 mm

Length (L) [mm]	Load [kN]	Number of rollers	Part no.
170	13.5	3	**892157036 L 170 R**
220	18	4	**892157036 L 220 R**
270	22.5	5	**892157036 L 270 R**
320	27	6	**892157036 L 320 R**
420	36	8	**892157036 L 420 R**
520	45	10	**892157036 L 520 R**
620	54	12	**892157036 L 620 R**
720	63	14	**892157036 L 720 R**
820	72	16	**892157036 L 820 R**
920	81	18	**892157036 L 920 R**
1020	90	20	**892157036 L 1020 R**
1120	99	22	**892157036 L 1120 R**
1220	108	24	**892157036 L 1220 R**
1320	117	26	**892157036 L 1320 R**
1420	126	28	**892157036 L 1420 R**
other lengths are possible up to max. 2870			
2870	256.5	57	**892157036 L 2870 R**

for slot width a = 13/16”

Length (L) [mm]	Load [kN]	Number of rollers	Part no.
105	3.4	3	**892157013 L 105 R**
135	4.5	4	**892157013 L 135 R**
165	5.7	5	**892157013 L 165 R**
195	6.8	6	**892157013 L 195 R**
255	9.1	8	**892157013 L 255 R**
315	11.4	10	**892157013 L 315 R**
375	13.6	12	**892157013 L 375 R**
435	15.9	14	**892157013 L 435 R**
495	18.2	16	**892157013 L 495 R**
555	20.5	18	**892157013 L 555 R**
615	22.8	20	**892157013 L 615 R**
675	25.0	22	**892157013 L 675 R**
735	27.3	24	**892157013 L 735 R**
795	29.6	26	**892157013 L 795 R**
855	31.9	28	**892157013 L 855 R**
915	34.2	30	**892157013 L 915 R**
975	36.4	32	**892157013 L 975 R**
other lengths are possible up to max. 2895			
2895	109.4	96	**892157013 L 2895 R**

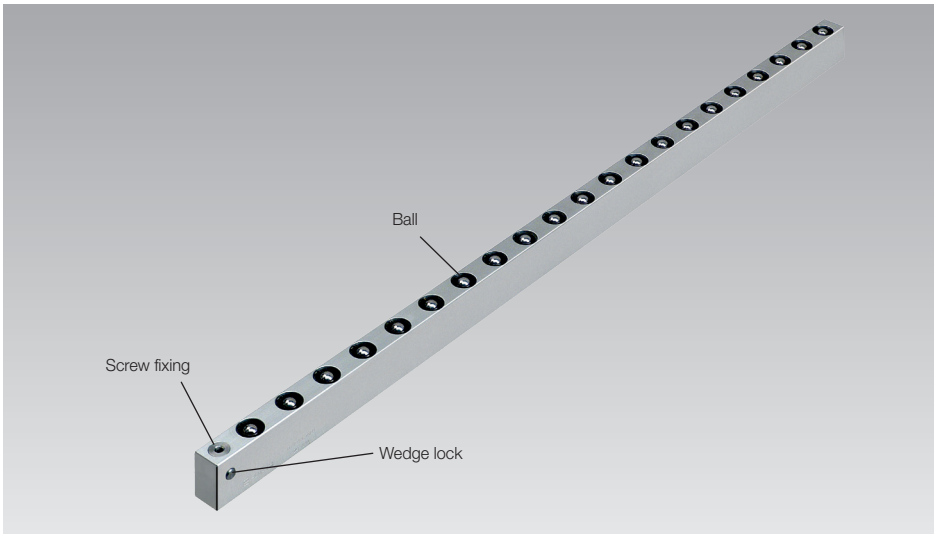
for slot width a = 1 1/16"

Length (L) [mm]	Load [kN]	Number of rollers	Part no.
140	5.5	3	**892157017 L 140 R**
180	7.4	4	**892157017 L 180 R**
220	9.2	5	**892157017 L 220 R**
260	11.1	6	**892157017 L 260 R**
340	14.8	8	**892157017 L 340 R**
420	18.5	10	**892157017 L 420 R**
500	22.2	12	**892157017 L 500 R**
580	25.9	14	**892157017 L 580 R**
660	29.6	16	**892157017 L 660 R**
740	33.3	18	**892157017 L 740 R**
820	37.0	20	**892157017 L 820 R**
900	40.7	22	**892157017 L 900 R**
980	44.4	24	**892157017 L 980 R**
1060	48.1	26	**892157017 L 1060 R**
1140	51.8	28	**892157017 L 1140 R**
1220	55.5	30	**892157017 L 1220 R**
1300	59.2	32	**892157017 L 1300 R**
1380	62.9	34	**892157017 L 1380 R**
other lengths are possible up to max. 2900			
2900	133.2	72	**892157017 L 2900 R**

Fixing plate = **R**
Wedge lock = **K**

WZ 8.18343

Ball Bars, Mechanical
with spring pack
loads up to 27 kN/m



Advantages
- Easy and safe die change
- No hydraulic supply required
- Variant program with many selection possibilities
- Variable length in a single piece design up to 2900 mm
- Slot depth, ball spacing and bar length configurable for every application
- Low weight (version in aluminium)

Application
- In T-slots and rectangular slots of the press bed for easy die change without any problems
- Die change streamlining

Delivery
- Ball bar
- Wedge lock (option)

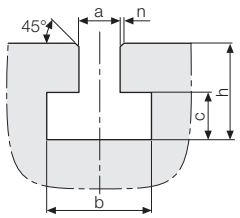
Description
Ball bar with spring pack for light loads and flexible horizontal movement of the dies. When preloaded, the balls project over the bed level by up to 2 mm. When the die is clamped, the balls are pressed into the bar body against the spring force until they are flush with the bed level.

Technical data

Max. load	[kN/m]	27
Ball spacing		flexible
Material of the bar		aluminium or steel
Max. temperature	[°C]	with aluminium bars: 100 with steel bars: 250
Fixing of the bar		Screw fixing or wedge lock
Max. bar length*	[mm]	variable* up to 2900

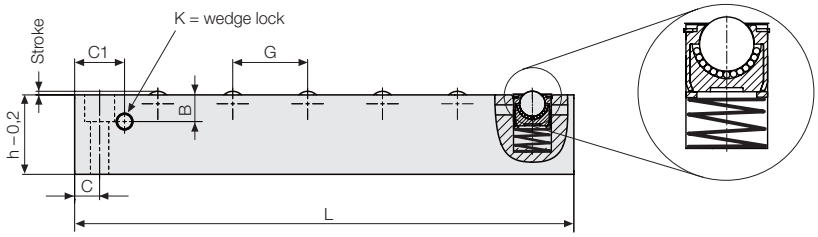
* The minimum bar lengths depends on the ball spacing G with at least 3 balls (see page 2)

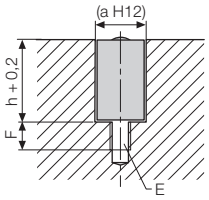
T-slot tolerances as per DIN 650

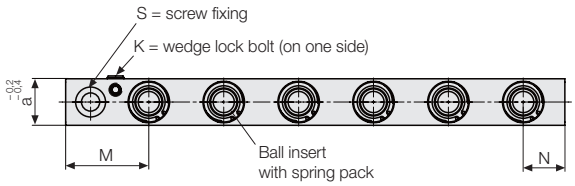


a	b	c	h min.	h max.	n max.
14 H12	23^{+2}	9^{+2}	**23**	28	1,6
18 H12	30^{+2}	12^{+2}	**30**	36	1,6
22 H12	37^{+3}	16^{+2}	**38**	45	1,6
28 H12	46^{+4}	20^{+2}	**48**	56	1,6
36 H12	56^{+4}	25^{+3}	**61**	71	2,5

Dimensions in mm
$\mathbf{h_{min.}}$ = minimum dimension as per DIN 650







Technical data

Slot width (a)	**[mm]**	**18**	**22**	**28**	**36**	**13⁄16"**	**1 1⁄16"**
Slot depth min. (h)	[mm]	25	31	35	46	25	31
Slot depth standard (h)	**[mm]**	**30**	**38**	**48**	**61**	**29.4**	**38.9**
Slot depth max.** (h)	[mm]	45	55	60	75	40	58
Ball spacing G min.	[mm]	20	23	28	34	20	23
Ball spacing G standard	**[mm]**	**30**	**40**	**45**	**50**	**30**	**40**
Ball spacing G max.	[mm]	60	80	90	100	60	80
L min.	[mm]	*)	*)	*)	*)	*)	*)
L max.	[mm]	2900	2900	2900	2900	2900	2900
Stroke	[mm]	1	2	2	2	1	2
Load/ball	[kN]	0.22	0.42	0.63	1.00	0.22	0.42
B	[mm]	12	16	16	16	12	16
C	[mm]	10	12.5	15	20	10	12.5
C1	[mm]	10	24.5	30	35	10	24.5
E	[mm]	M6	M8	M10	M10	M6	M8
F	[mm]	11	13	15	15	11	13
M	[mm]	27.5	40	50	57.5	27.5	40
N	[mm]	12.5	15	25	27.5	12.5	15

*) L min. depends on the ball spacing G with at least 3 balls
**) only with steel bars

Product configurator

For the selection and configuration of roller and ball bars, a product configurator is available on our website.
After entering the parameters, the configurator determines the desired roller or ball bars with all technical data and the identification number of the characteristics which are identical with the order number. In addition, a drawing with all dimensions will be provided.

Link to the configurator:
www.roemheld-gruppe.de/productconfigurator/?lang=en

Code for part numbers
Variant program

Ball bars with spring pack are individually configured and manufactured depending on the application.
Within the limits specified in the measurement chart, the following parameters can be selected based on a code for part numbers:
bar material, slot width, bar lengths, fixation, slot depth and ball spacing.

- **Bar material / operating temperature**

Aluminium or steel can be selected as bar material. For operating temperatures >100 °C, a steel version is required. Depending on the temperature range, the admissible carrying force of the ball bars is reduced:

up to 100 °C: 100 % of the carrying force
>100 – 150 °C: 95 % of the carrying force
>150 – 200 °C: 70 % of the carrying force
>200 – 250 °C: 60 % of the carrying force

e.g. steel up to 200 °C with 70 % of the carrying force

- **Slot width (a)**

Selection from the table on page 2

e. g. a = 36 mm

- **Bar lengths (L)**

Depending on the ball spacing (G) and the parameter (M) results the possible bar length. Indicate the desired length (e.g. bed length) for your ball bar. Please note that a ball bar must be equipped with at least 3 balls.

e.g. L = 1380 mm

- **Fixation**

K = wedge lock
S = screw fixing

e.g. screw fxing = S

- **Ball spacing (G) or load of the bar**

By changing the spacing of the balls, the load of the ball bar can be varied. Please note that the load is indicated for the full length of the bar. Therefore, both the load and the ball spacing must be selected to suit the die weight and the die supporting length.
Please indicate the desired ball spacing or load of the ball bar, or the maximum die weight and the die dimensions.

e.g. G = 35 mm

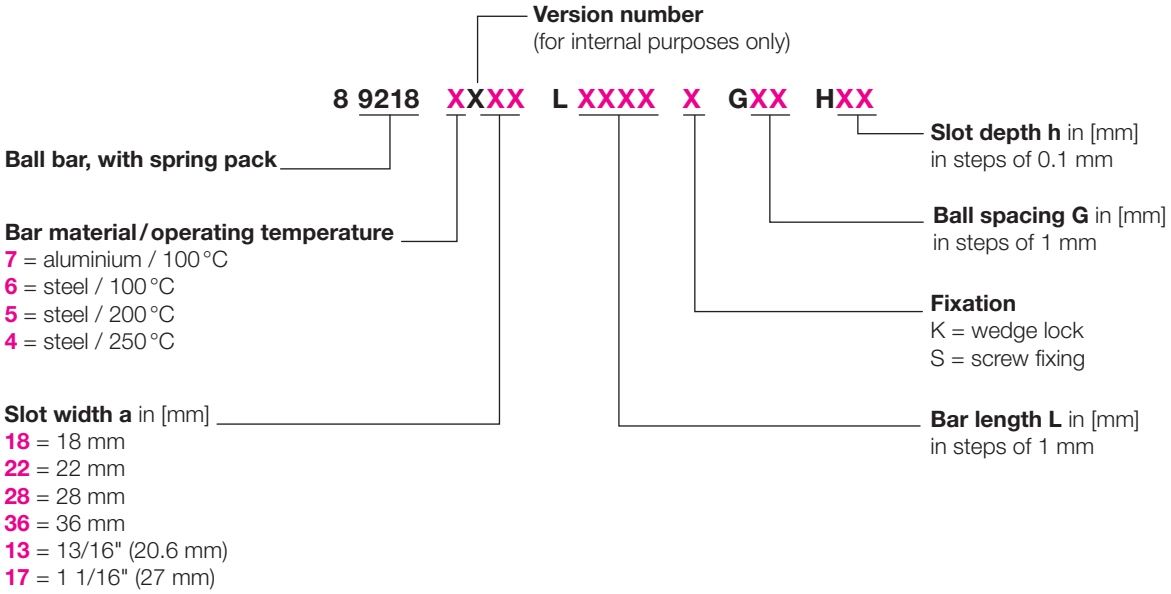
or **load per bar = 38 kN**
or **number of balls = 38**
or **die weight and exterior dimensions**

- **Slot depth (h)**

If the slots in your application are lower than the default value, specify the corresponding dimension (up to h min.) For slots which are deeper than the default value, spacer bars can be inserted. For steel versions, specify the corresponding dimension (up to h max.).

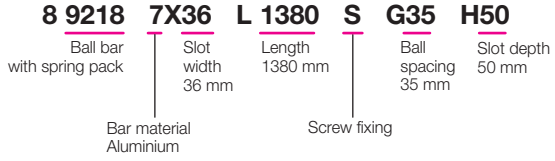
e.g. h = 50 mm

Code for part numbers
Variant program



Page 4 shows an example of the part numbers for aluminium bars with standard ball spacing “G” and standard slot depth “h”.

Example of ordering



Extract from the possible variants for ball bars
with standard ball spacing “G”, standard slot depth “h” and bar material aluminium

for slot width a = 18 mm

Length (L) [mm]	Load [kN]	Number of balls	Part no.
100	0.6	3	**892187218 L 100 S**
130	0.8	4	**892187218 L 130 S**
160	1.1	5	**892187218 L 160 S**
190	1.3	6	**892187218 L 190 S**
250	1.7	8	**892187218 L 250 S**
310	2.2	10	**892187218 L 310 S**
370	2.6	12	**892187218 L 370 S**
430	3	14	**892187218 L 430 S**
490	3.5	16	**892187218 L 490 S**
550	3.9	18	**892187218 L 550 S**
610	4.4	20	**892187218 L 610 S**
670	4.8	22	**892187218 L 670 S**
730	5.2	24	**892187218 L 730 S**
other lengths are possible up to max. 2890			
2890	21.1	96	**892187218 L 2890 S**

for slot width a = 22 mm

Length (L) [mm]	Load [kN]	Number of balls	Part no.
135	1.2	3	**892187222 L 135 S**
175	1.6	4	**892187222 L 175 S**
215	2.1	5	**892187222 L 215 S**
255	2.5	6	**892187222 L 255 S**
335	3.3	8	**892187222 L 335 S**
415	4.2	10	**892187222 L 415 S**
495	5	12	**892187222 L 495 S**
575	5.8	14	**892187222 L 575 S**
655	6.7	16	**892187222 L 655 S**
735	7.5	18	**892187222 L 735 S**
815	8.4	20	**892187222 L 815 S**
895	9.2	22	**892187222 L 895 S**
975	10	24	**892187222 L 975 S**
1055	10.9	26	**892187222 L 1055 S**
1135	11.7	28	**892187222 L 1135 S**
1215	12.6	30	**892187222 L 1215 S**
1295	13.4	32	**892187222 L 1295 S**
other lengths are possible up to max. 2895			
2895	30.2	72	**892187222 L 2895 S**

for slot width a = 28 mm

Length (L) [mm]	Load [kN]	Number of balls	Part no.
165	1.8	3	**892187228 L 165 S**
210	2.5	4	**892187228 L 210 S**
255	3.1	5	**892187228 L 255 S**
300	3.7	6	**892187228 L 300 S**
390	5	8	**892187228 L 390 S**
480	6.3	10	**892187228 L 480 S**
570	7.5	12	**892187228 L 570 S**
660	8.8	14	**892187228 L 660 S**
750	10	16	**892187228 L 750 S**
840	11.3	18	**892187228 L 840 S**
930	12.6	20	**892187228 L 930 S**
1020	13.8	22	**892187228 L 1020 S**
other lengths are possible up to max. 2865			
2865	39.6	63	**892187228 L 2865 S**

for slot width a = 36 mm

Length (L) [mm]	Load [kN]	Number of balls	Part no.
185	3	3	**892187236 L 185 S**
235	4	4	**892187236 L 235 S**
285	5	5	**892187236 L 285 S**
335	6	6	**892187236 L 335 S**
435	8	8	**892187236 L 435 S**
535	10	10	**892187236 L 535 S**
635	12	12	**892187236 L 635 S**
735	14	14	**892187236 L 735 S**
835	16	16	**892187236 L 835 S**
935	18	18	**892187236 L 935 S**
1035	20	20	**892187236 L 1035 S**
1135	22	22	**892187236 L 1135 S**
other lengths are possible up to max. 2885			
2885	57	57	**892187236 L 2985 S**

for slot width a = 13/16”

Length (L) [mm]	Load [kN]	Number of balls	Part no.
100	0.6	3	**892187213 L 100 S**
130	0.8	4	**892187213 L 130 S**
160	1.1	5	**892187213 L 160 S**
190	1.3	6	**892187213 L 190 S**
250	1.7	8	**892187213 L 250 S**
310	2.2	10	**892187213 L 310 S**
370	2.6	12	**892187213 L 370 S**
430	3	14	**892187213 L 430 S**
490	3.5	16	**892187213 L 490 S**
550	3.9	18	**892187213 L 550 S**
610	4.4	20	**892187213 L 610 S**
670	4.8	22	**892187213 L 670 S**
730	5.2	24	**892187213 L 730 S**
other lengths are possible up to max. 2890			
2890	21.1	96	**892187213 L 2890 S**

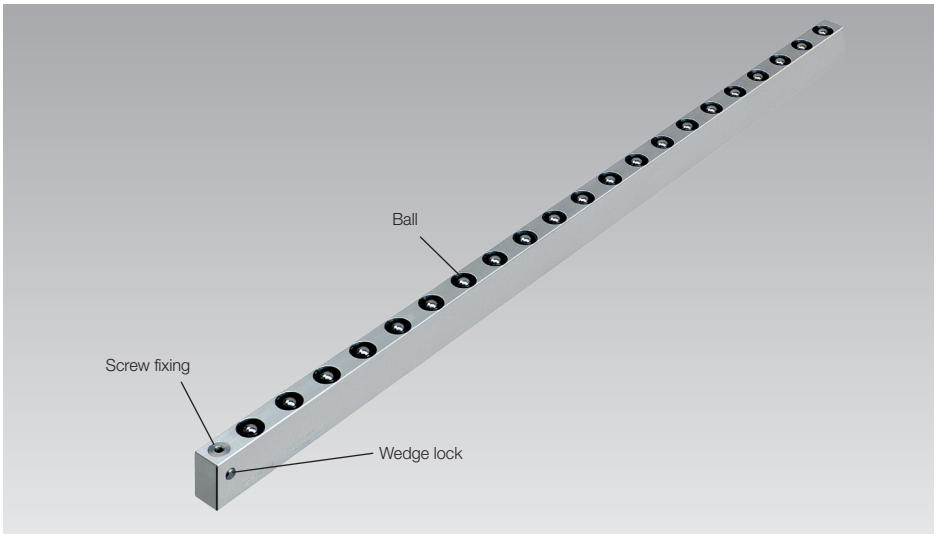
for slot width a = 1 1/16"

Length (L) [mm]	Load [kN]	Number of balls	Part no.
135	1.2	3	**892187217 L 135 S**
175	1.6	4	**892187217 L 175 S**
215	2.1	5	**892187217 L 215 S**
255	2.5	6	**892187217 L 255 S**
335	3.3	8	**892187217 L 335 S**
415	4.2	10	**892187217 L 415 S**
495	5	12	**892187217 L 495 S**
575	5.8	14	**892187217 L 575 S**
655	6.7	16	**892187217 L 655 S**
735	7.5	18	**892187217 L 735 S**
815	8.4	20	**892187217 L 815 S**
895	9.2	22	**892187217 L 895 S**
975	10	24	**892187217 L 975 S**
1055	10.9	26	**892187217 L 1055 S**
1135	11.7	28	**892187217 L 1135 S**
1215	12.6	30	**892187217 L 1215 S**
1295	13.4	32	**892187217 L 1295 S**
other lengths are possible up to max. 2895			
2895	30.2	72	**892187217 L 2895 S**

Screw fixing = **S**
Wedge lock = **K**

WZ 8.18343

Ball Bars, Mechanical
with spring pack
loads up to 27 kN/m



Advantages
- Easy and safe die change
- No hydraulic supply required
- Variant program with many selection possibilities
- Variable length in a single piece design up to 2900 mm
- Slot depth, ball spacing and bar length configurable for every application
- Low weight (version in aluminium)

Application
- In T-slots and rectangular slots of the press bed for easy die change without any problems
- Die change streamlining

Delivery
- Ball bar
- Wedge lock (option)

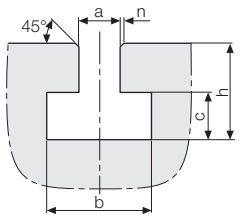
Description
Ball bar with spring pack for light loads and flexible horizontal movement of the dies. When preloaded, the balls project over the bed level by up to 2 mm. When the die is clamped, the balls are pressed into the bar body against the spring force until they are flush with the bed level.

Technical data

Max. load	[kN/m]	27
Ball spacing		flexible
Material of the bar		aluminium or steel
Max. temperature	[°C]	with aluminium bars: 100 with steel bars: 250
Fixing of the bar		Screw fixing or wedge lock
Max. bar length*	[mm]	variable* up to 2900

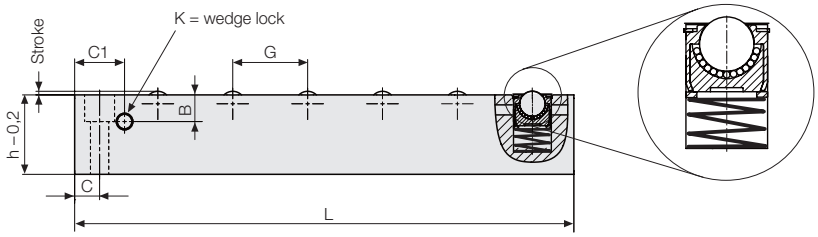
* The minimum bar lengths depends on the ball spacing G with at least 3 balls (see page 2)

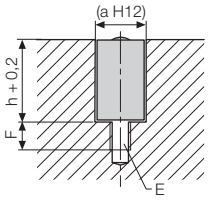
T-slot tolerances as per DIN 650

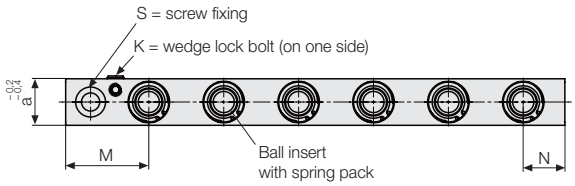


a	b	c	h min.	h max.	n max.
14 H12	23^{+2}	9^{+2}	**23**	28	1,6
18 H12	30^{+2}	12^{+2}	**30**	36	1,6
22 H12	37^{+3}	16^{+2}	**38**	45	1,6
28 H12	46^{+4}	20^{+2}	**48**	56	1,6
36 H12	56^{+4}	25^{+3}	**61**	71	2,5

Dimensions in mm
$\mathbf{h_{min.}}$ = minimum dimension as per DIN 650







Technical data

Slot width (a)	**[mm]**	**18**	**22**	**28**	**36**	**13⁄16"**	**1 1⁄16"**
Slot depth min. (h)	[mm]	25	31	35	46	25	31
Slot depth standard (h)	**[mm]**	**30**	**38**	**48**	**61**	**29.4**	**38.9**
Slot depth max.** (h)	[mm]	45	55	60	75	40	58
Ball spacing G min.	[mm]	20	23	28	34	20	23
Ball spacing G standard	**[mm]**	**30**	**40**	**45**	**50**	**30**	**40**
Ball spacing G max.	[mm]	60	80	90	100	60	80
L min.	[mm]	*)	*)	*)	*)	*)	*)
L max.	[mm]	2900	2900	2900	2900	2900	2900
Stroke	[mm]	1	2	2	2	1	2
Load/ball	[kN]	0.22	0.42	0.63	1.00	0.22	0.42
B	[mm]	12	16	16	16	12	16
C	[mm]	10	12.5	15	20	10	12.5
C1	[mm]	10	24.5	30	35	10	24.5
E	[mm]	M6	M8	M10	M10	M6	M8
F	[mm]	11	13	15	15	11	13
M	[mm]	27.5	40	50	57.5	27.5	40
N	[mm]	12.5	15	25	27.5	12.5	15

*) L min. depends on the ball spacing G with at least 3 balls
**) only with steel bars

Product configurator

For the selection and configuration of roller and ball bars, a product configurator is available on our website.
After entering the parameters, the configurator determines the desired roller or ball bars with all technical data and the identification number of the characteristics which are identical with the order number. In addition, a drawing with all dimensions will be provided.

Link to the configurator:
www.roemheld-gruppe.de/productconfigurator/?lang=en

Code for part numbers
Variant program

Ball bars with spring pack are individually configured and manufactured depending on the application.
Within the limits specified in the measurement chart, the following parameters can be selected based on a code for part numbers:
bar material, slot width, bar lengths, fixation, slot depth and ball spacing.

- **Bar material / operating temperature**

Aluminium or steel can be selected as bar material. For operating temperatures >100 °C, a steel version is required. Depending on the temperature range, the admissible carrying force of the ball bars is reduced:

up to 100 °C: 100 % of the carrying force
>100 – 150 °C: 95 % of the carrying force
>150 – 200 °C: 70 % of the carrying force
>200 – 250 °C: 60 % of the carrying force

e.g. steel up to 200 °C with 70 % of the carrying force

- **Slot width (a)**

Selection from the table on page 2

e. g. a = 36 mm

- **Bar lengths (L)**

Depending on the ball spacing (G) and the parameter (M) results the possible bar length. Indicate the desired length (e.g. bed length) for your ball bar. Please note that a ball bar must be equipped with at least 3 balls.

e.g. L = 1380 mm

- **Fixation**

K = wedge lock
S = screw fixing

e.g. screw fxing = S

- **Ball spacing (G) or load of the bar**

By changing the spacing of the balls, the load of the ball bar can be varied. Please note that the load is indicated for the full length of the bar. Therefore, both the load and the ball spacing must be selected to suit the die weight and the die supporting length.
Please indicate the desired ball spacing or load of the ball bar, or the maximum die weight and the die dimensions.

e.g. G = 35 mm

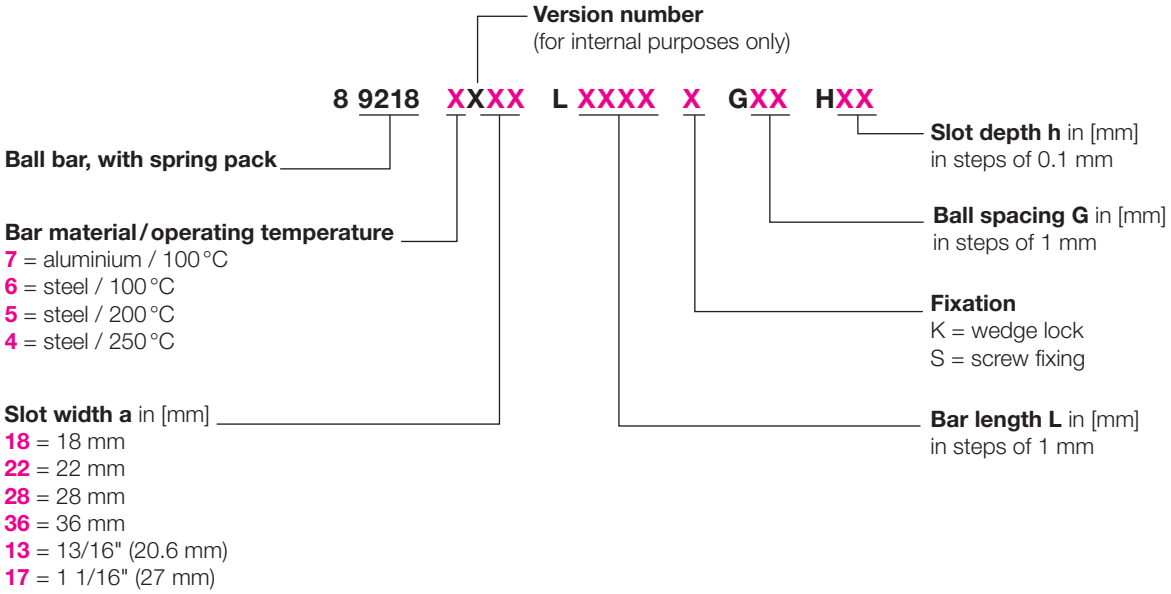
or **load per bar = 38 kN**
or **number of balls = 38**
or **die weight and exterior dimensions**

- **Slot depth (h)**

If the slots in your application are lower than the default value, specify the corresponding dimension (up to h min.) For slots which are deeper than the default value, spacer bars can be inserted. For steel versions, specify the corresponding dimension (up to h max.).

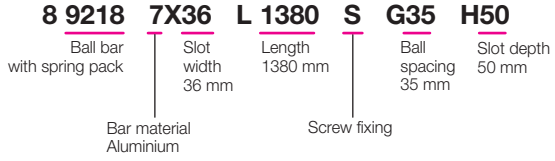
e.g. h = 50 mm

Code for part numbers
Variant program



Page 4 shows an example of the part numbers for aluminium bars with standard ball spacing “G” and standard slot depth “h”.

Example of ordering



Extract from the possible variants for ball bars
with standard ball spacing “G”, standard slot depth “h” and bar material aluminium

for slot width a = 18 mm

Length (L) [mm]	Load [kN]	Number of balls	Part no.
100	0.6	3	**892187218 L 100 S**
130	0.8	4	**892187218 L 130 S**
160	1.1	5	**892187218 L 160 S**
190	1.3	6	**892187218 L 190 S**
250	1.7	8	**892187218 L 250 S**
310	2.2	10	**892187218 L 310 S**
370	2.6	12	**892187218 L 370 S**
430	3	14	**892187218 L 430 S**
490	3.5	16	**892187218 L 490 S**
550	3.9	18	**892187218 L 550 S**
610	4.4	20	**892187218 L 610 S**
670	4.8	22	**892187218 L 670 S**
730	5.2	24	**892187218 L 730 S**
other lengths are possible up to max. 2890			
2890	21.1	96	**892187218 L 2890 S**

for slot width a = 22 mm

Length (L) [mm]	Load [kN]	Number of balls	Part no.
135	1.2	3	**892187222 L 135 S**
175	1.6	4	**892187222 L 175 S**
215	2.1	5	**892187222 L 215 S**
255	2.5	6	**892187222 L 255 S**
335	3.3	8	**892187222 L 335 S**
415	4.2	10	**892187222 L 415 S**
495	5	12	**892187222 L 495 S**
575	5.8	14	**892187222 L 575 S**
655	6.7	16	**892187222 L 655 S**
735	7.5	18	**892187222 L 735 S**
815	8.4	20	**892187222 L 815 S**
895	9.2	22	**892187222 L 895 S**
975	10	24	**892187222 L 975 S**
1055	10.9	26	**892187222 L 1055 S**
1135	11.7	28	**892187222 L 1135 S**
1215	12.6	30	**892187222 L 1215 S**
1295	13.4	32	**892187222 L 1295 S**
other lengths are possible up to max. 2895			
2895	30.2	72	**892187222 L 2895 S**

for slot width a = 28 mm

Length (L) [mm]	Load [kN]	Number of balls	Part no.
165	1.8	3	**892187228 L 165 S**
210	2.5	4	**892187228 L 210 S**
255	3.1	5	**892187228 L 255 S**
300	3.7	6	**892187228 L 300 S**
390	5	8	**892187228 L 390 S**
480	6.3	10	**892187228 L 480 S**
570	7.5	12	**892187228 L 570 S**
660	8.8	14	**892187228 L 660 S**
750	10	16	**892187228 L 750 S**
840	11.3	18	**892187228 L 840 S**
930	12.6	20	**892187228 L 930 S**
1020	13.8	22	**892187228 L 1020 S**
other lengths are possible up to max. 2865			
2865	39.6	63	**892187228 L 2865 S**

for slot width a = 36 mm

Length (L) [mm]	Load [kN]	Number of balls	Part no.
185	3	3	**892187236 L 185 S**
235	4	4	**892187236 L 235 S**
285	5	5	**892187236 L 285 S**
335	6	6	**892187236 L 335 S**
435	8	8	**892187236 L 435 S**
535	10	10	**892187236 L 535 S**
635	12	12	**892187236 L 635 S**
735	14	14	**892187236 L 735 S**
835	16	16	**892187236 L 835 S**
935	18	18	**892187236 L 935 S**
1035	20	20	**892187236 L 1035 S**
1135	22	22	**892187236 L 1135 S**
other lengths are possible up to max. 2885			
2885	57	57	**892187236 L 2985 S**

for slot width a = 13/16”

Length (L) [mm]	Load [kN]	Number of balls	Part no.
100	0.6	3	**892187213 L 100 S**
130	0.8	4	**892187213 L 130 S**
160	1.1	5	**892187213 L 160 S**
190	1.3	6	**892187213 L 190 S**
250	1.7	8	**892187213 L 250 S**
310	2.2	10	**892187213 L 310 S**
370	2.6	12	**892187213 L 370 S**
430	3	14	**892187213 L 430 S**
490	3.5	16	**892187213 L 490 S**
550	3.9	18	**892187213 L 550 S**
610	4.4	20	**892187213 L 610 S**
670	4.8	22	**892187213 L 670 S**
730	5.2	24	**892187213 L 730 S**
other lengths are possible up to max. 2890			
2890	21.1	96	**892187213 L 2890 S**

for slot width a = 1 1/16"

Length (L) [mm]	Load [kN]	Number of balls	Part no.
135	1.2	3	**892187217 L 135 S**
175	1.6	4	**892187217 L 175 S**
215	2.1	5	**892187217 L 215 S**
255	2.5	6	**892187217 L 255 S**
335	3.3	8	**892187217 L 335 S**
415	4.2	10	**892187217 L 415 S**
495	5	12	**892187217 L 495 S**
575	5.8	14	**892187217 L 575 S**
655	6.7	16	**892187217 L 655 S**
735	7.5	18	**892187217 L 735 S**
815	8.4	20	**892187217 L 815 S**
895	9.2	22	**892187217 L 895 S**
975	10	24	**892187217 L 975 S**
1055	10.9	26	**892187217 L 1055 S**
1135	11.7	28	**892187217 L 1135 S**
1215	12.6	30	**892187217 L 1215 S**
1295	13.4	32	**892187217 L 1295 S**
other lengths are possible up to max. 2895			
2895	30.2	72	**892187217 L 2895 S**

Screw fixing = **S**
Wedge lock = **K**

ROEMHELD
HILMA ▪ STARK

WZ 8.18345

Roller and Ball inserts, Mechanical
with spring pack
max. load 2.4 kN

Application
For installation in individual bore holes in press beds without T-slots.

Description
When preloaded, the rollers or balls project over the bed level by up to 3 mm. When the die is clamped, the balls are pressed into the bar body against the spring force until they are flush with the bed level.

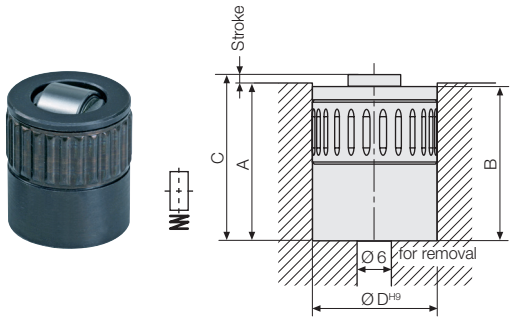
Advantages
- Easy and safe die change
- For installation in beds/tables without T-slots
- Versions without and with flange

Important note
Provide a hole or cut-out for disassembly if a through hole from below is not possible

Operating temperature
The permissible load capacity of the roller/ball inserts is reduced depending on the temperature range:

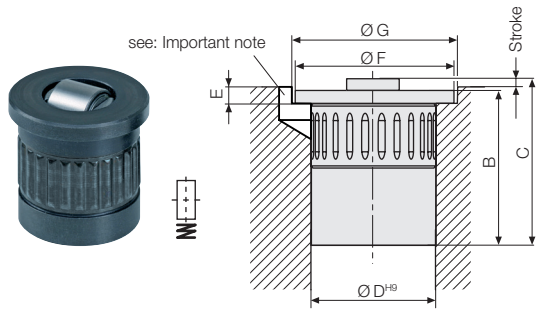
up to 100 °C: 100 % Load
>100 – 150 °C: 95 % Load
>150 – 200 °C: 70 % Load
>200 – 250 °C: 60 % Load

Roller insert without flange



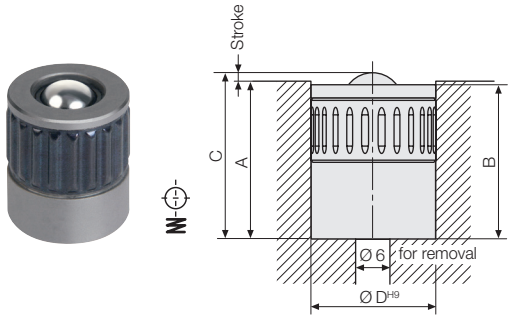
Load	[N]	600	900	1400	2400
Stroke*	**[mm]**	**1.5**	**2.0**	**2.0**	**2.0**
A	[mm]	30.0 +0.1	32.0 +0.1	43.5 +0.1	52.5 +0.1
B	[mm]	29.9	31.9	43.4	52.4
C	[mm]	31.5	34.0	45.5	54.5
Ø D	[mm]	20	24	30	40
Version up to 100 °C		**812100605**	**812100611**	**812100618**	**812100622**
Version up to 250 °C		**on demand**	**812108020**	**on demand**	**on demand**

Roller insert with flange



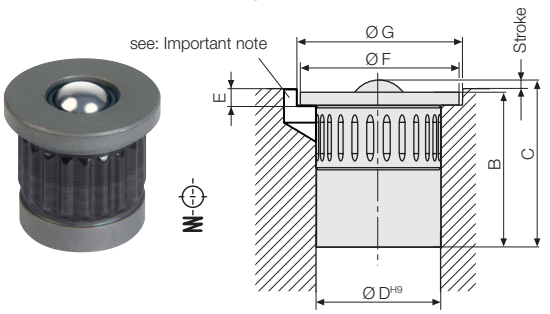
Load	[N]	600	900	1400	2400
Stroke*	**[mm]**	**1.5**	**2.0**	**2.0**	**2.0**
B	[mm]	29.9 +0.1	31.9 +0.1	43.4 +0.1	52.4 +0.1
C	[mm]	31.5	34.0	45.5	54.5
Ø D	[mm]	20	24	30	40
E	[mm]	3.5 +0.1	3.5 +0.1	4.5 +0.1	5.5 +0.1
Ø F	[mm]	24.5	29.5	34.5	47.5
Ø G	[mm]	25 +0.2	30 +0.2	35 +0.2	48 +0.2
Version up to 100 °C		**812100606**	**812100612**	**812100619**	**812100623**
Version up to 250 °C		**on demand**	**812108005**	**on demand**	**on demand**

Ball insert without flange



Load	[N]	200	400	600	1000
Stroke*	**[mm]**	**1.5**	**1.5**	**2.0**	**3.0**
A	[mm]	24.0 +0.1	28.5 +0.1	34.0 +0.1	45.0 +0.1
B	[mm]	23.6	28.5	34.0	44.8
C	[mm]	25.5	30.0	36.0	48.0
Ø D	[mm]	20	24	30	40
Version up to 100 °C		**812100005**	**812100011**	**812100018**	**812100022**
Version up to 250 °C		**on demand**	**812108022**	**812108038**	**812108034**

Ball insert with flange



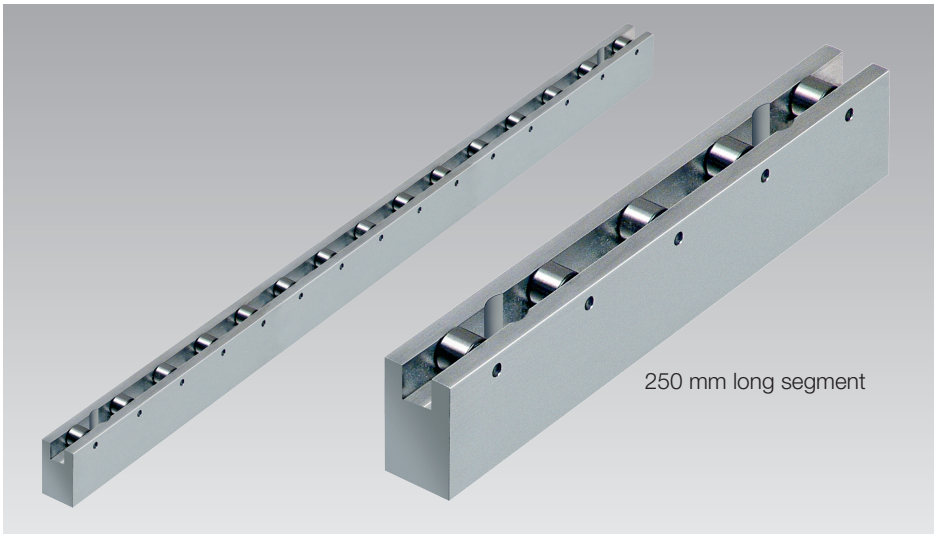
Load	[N]	200	400	600	1000
Stroke*	**[mm]**	**1.5**	**1.5**	**2.0**	**2.0**
B	[mm]	23.5	28.5	34.0	44.0
C	[mm]	25.2	30.2	36.0	46.0
Ø D	[mm]	20	24	30	40
E	[mm]	3.5 +0.1	4.0 +0.1	4.5 +0.1	5.6 +0.1
Ø F	[mm]	24.5	29.5	34.5	47.5
Ø G	[mm]	25 +0.2	30 +0.2	35 +0.2	48 +0.2
Version up to 100 °C		**812100006**	**812100012**	**812100019**	**812100023**
Version up to 250 °C		**on demand**	**812108030**	**812108031**	**812108013**

* Special stroke on request

ROEMHELD
HILMA ▪ STARK

WZ 8.18347

Roller Conveyors, Mechanical
without spring pack, without lifting of the rollers
max. load 156 kN/m

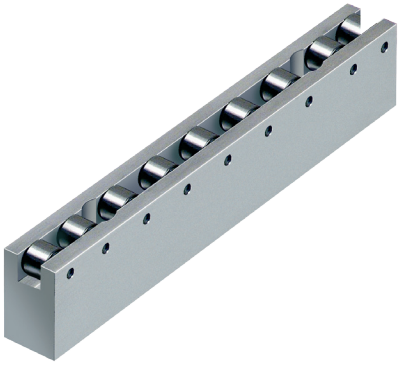


Advantages
- Universal use
- Simple and sturdy design
- Any length up to 2500 mm is possible using modular segments

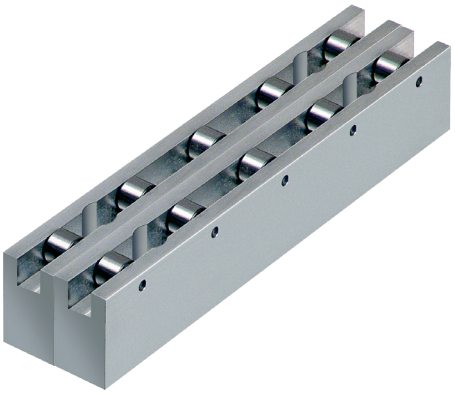
Application
- In T-slots and rectangular slots of the press bed for easy die change without any problems
- Die change streamlining

Description
These universal roller conveyors have been developed for easy and safe conveying of heavy dies. All roller conveyors are manufactured in segments of 250 mm to which further segments can be added until the desired length is obtained.
The base bodies of the roller conveyors are made of a high-strength and robust aluminium alloy.
The roller bars are fixed through mounting holes provided in the segments.

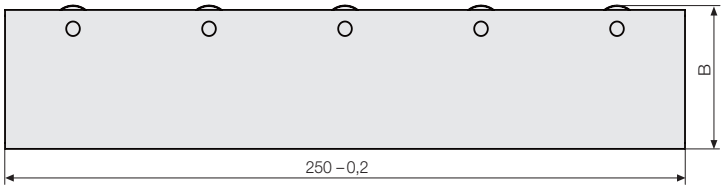
Special versions
- Overall lengths of max. 2900 mm in a single-piece design
- Increased load by a closer arrangement of the rollers

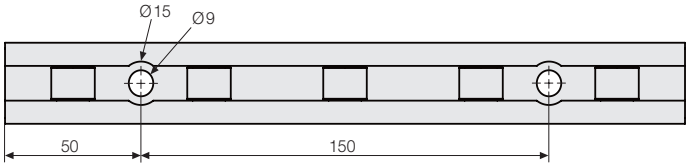


- Increased load by package design



Dimensions / Technical data





Bar width A	[mm]	22	28	36
Load / segment	**[kN]**	**32**	**32**	**39**
Load / m	[kN]	128	128	156
Segment length	[mm]	250	250	250
Load / roller	[kN]	6.4	6.4	8.0
Roller Ø x width	[mm]	16 x 12	16 x 12	19 x 12
B	[mm]	39.5	49.5	62.5
C	[mm]	23	33	43
Part no.		**8 1834 5000**	**8 1834 6000**	**8 1834 7000**

WZ 8.8900

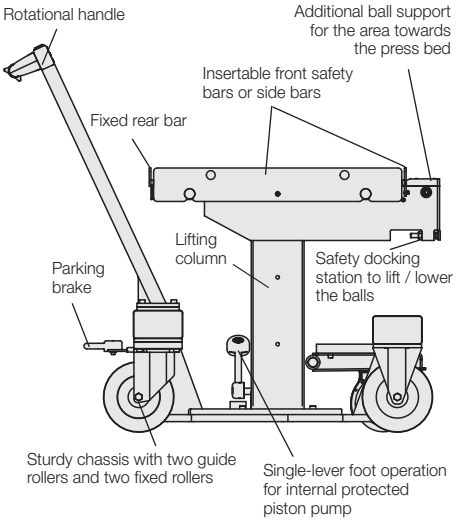
Die Changing Cart RW

manually movable, with optional auxiliary drive with safety docking station, max. load capacity 500 kg

Figure RW with auxiliary drive

Advantages

- Time-saving die change
- Material gentle transport
- Highest safety by automatic docking station and anti-slip protection
- Easy movement by optional battery driven auxiliary drive
- Sturdy and scratch-proof ball table with hard-anodized surface
- Documentation and design in compliance with CE standards
- Exact positioning
- Exact height adjustment by precision lowering
- Improved ergonomics for the user
- Protection against falling down of dies by inserted and secured front bar and side bars
- Safe positioning of the cart by pedal parking brake



Application

Die changing carts RW facilitate the handling of medium-weight dies and enable dies weighing up to 500 kg to be safely transported in an easy and time saving way.
All cart types are especially designed for pressing and punching dies as well as for injection and casting moulds.

Description

Die changing carts RW are manually moved. For easier movement, the front axle can optionally be equipped with a battery driven auxiliary drive.
The die changing table is equipped with ball inserts which facilitate the manual insertion of the dies. During the transport, the ball inserts are lowered and the die is protected against movement. In addition, the die is secured against falling down by safety bars at all sides of the die changing table.
The die changing table can be adjusted in height by a hydraulic lifting column with single-lever foot operation.
For transport, the centre of gravity of the load must be positioned in the centre of the cart and the lifting columns must be completely lowered.

Safety docking station

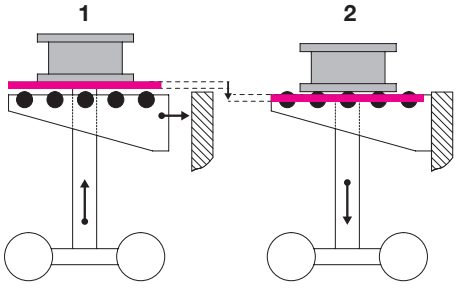
During the transport of the die, the balls are always lowered and the die is protected against movement. Lifting of the ball inserts is made by successful docking to the press bed. The die weight is supported at the press bed.

1. Transport

- Lifting column extended
- Ball inserts lowered
- Die on table plate

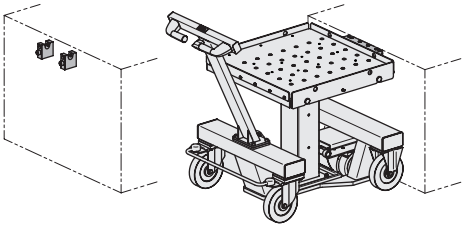
2. Docking

- Lifting column lowered
- Ball inserts lifted
- Die on ball inserts



Version with safety docking station and ball table

Docking situation

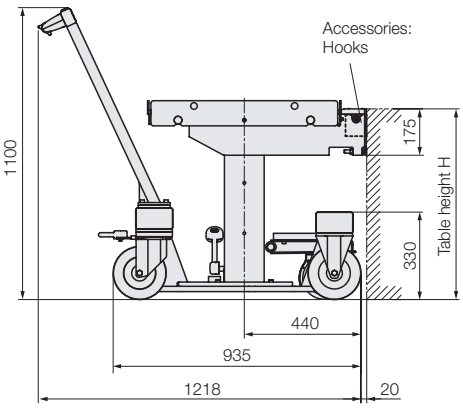


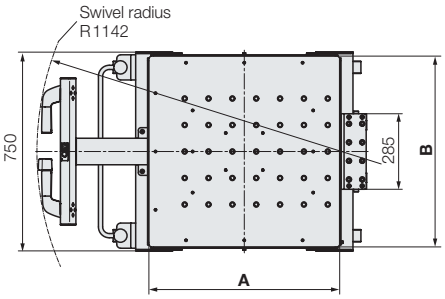
Versions

The die changing cart RWA is available in 2 table sizes and 5 stroke ranges.
Every version can optionally be equipped with an auxiliary drive.

Option - auxiliary drive

All elements of the auxiliary drive are integrated in the front axle: the electric motor including gear, long-life batteries with high energy density and a power control for optimum control of the motor.
The rotational handle consists of two solid handles, speed and direction of the drive can be controlled by means of a lever at the right handle.
An integrated level compensation ensures an optimum contact pressure of the drive wheel on the hall floor.
A covering protects the drive against shocks and splash water. The high drive torque of the electric motor (17 Nm / 20 da N) facilitates considerably the movement of the changing cart.





Technical data

Max. load capacity: 500 kg

Table sizes

Version		1	2
Length A x width B	**[mm]**	**720 x 720**	**720 x 450**

Lifting range

Version		1	2	3	4	5
Total stroke	**[mm]**	**200**	**300**	**400**	**500**	**600**
Usable stroke	[mm]	140	240	340	440	540
Min. table height H	[mm]	540	620	720	820	920
Max. table height H	[mm]	680	860	1060	1260	1460

Technical data auxiliary drive

Running performance	[km]	2 with full load (5 with average load)
Displacement speed	[km/h]	3
Charging time (approx. 90 %)	[h]	1.5 to 3 (depending on the battery charger)
Battery		24 V DC, Ni-MH, 140 Wh (6 Ah)

Part numbers

Table size [mm]	**Total stroke** [mm]	**Auxiliary drive**	**Part numbers**
720 x 720	200	without	**889130100**
720 x 720	300	without	**889130101**
720 x 720	400	without	**889130102**
720 x 720	500	without	**889130112**
720 x 720	600	without	**889130113**
720 x 450	200	without	**889130103**
720 x 450	300	without	**889130104**
720 x 450	400	without	**889130105**
720 x 450	500	without	**889130114**
720 x 450	600	without	**889130115**
720 x 720	200	with	**889130106X**
720 x 720	300	with	**889130107X**
720 x 720	400	with	**889130108X**
720 x 720	500	with	**889130116X**
720 x 720	600	with	**889130117X**
720 x 450	200	with	**889130109X**
720 x 450	300	with	**889130110X**
720 x 450	400	with	**889130111X**
720 x 450	500	with	**889130118X**
720 x 450	600	with	**889130119X**

Selection battery charger
Standard 1.8 A = **S**
Quick 4.0 A = **Q**

Delivery

One set (2 off) of hooks is included in the delivery of the die changing cart; the hooks can also be ordered as an accessory.
The versions with auxiliary drive are delivered with a battery charger. You can choose between between **type S** or **type Q**. Both battery charges can be ordered as an accessory.

Accessories

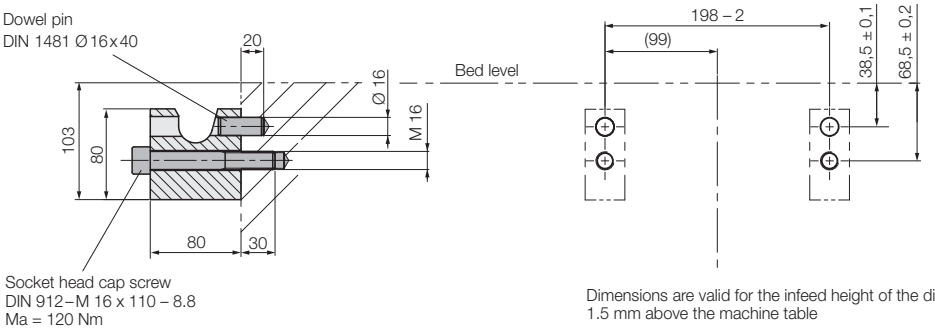
Battery chargers

Type S = Standard 1.8 A
100…230 VAC, 50/60 Hz
Charging time 3 h (approx. 90 %)
Part no. 789130013

Type Q = Quick battery charger 4,0 A
100…230 VAC, 50/60 Hz
Charging time 1.5 h (approx. 90 %)
Part no. 789130015

Hooks (1 set = 2 off)

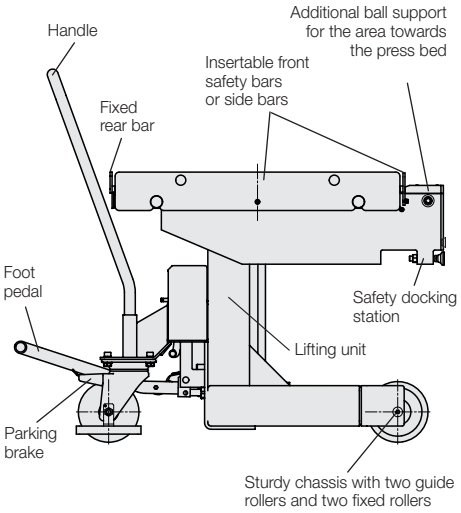
to position and lock the die changing cart
Part no. 789130001



WZ 8.8901

Die Changing Cart RW
manually movable, with safety docking station
max. load capacity 1,000 kg

Advantages
- Time-saving die change
- Material gentle transport
- Highest safety by automatic docking station and anti-slip protection
- Sturdy and scratch-proof ball table with hard-anodized surface
- Documentation and design in compliance with CE standards
- Exact positioning
- Exact height adjustment by precision lowering
- Improved ergonomics for the user
- Protection against falling down of dies by inserted and secured front bar and side bars
- Safe positioning of the cart by pedal parking brake



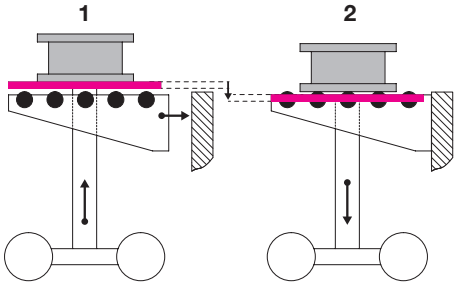
Application
Die changing carts RW facilitate the handling of heavy dies and enable dies weighing up to 1000 kg to be safely transported in an easy and time saving way.
All cart types are especially designed for pressing and punching dies as well as for injection and casting moulds.

Description
Die changing carts RW are manually moved.
The die changing table is equipped with ball inserts which facilitate the manual insertion of the dies. During the transport, the ball inserts are lowered and the die is protected against movement. In addition, the die is secured against falling down by safety bars at all sides of the die changing table.
The die changing table can be adjusted in height by means of a pedal-operated lifting unit. Precision lowering is effected by a pedal – additional precision lowering for lowering the lifting unit with millimetre accuracy.
For transport, the centre of gravity of the load must be positioned in the centre of the cart and the lifting columns must be completely lowered.

Safety docking station
During the transport of the die, the balls are always lowered and the die is protected against movement. Lifting of the ball inserts is made by successful docking to the press bed. The die weight is supported at the press table.

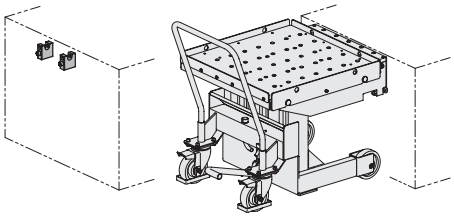
1. Transport
- Lifting unit extended
- Ball inserts lowered
- Die on table plate

2. Docking
- Lifting unit lowered
- Ball inserts lifted
- Die on ball inserts



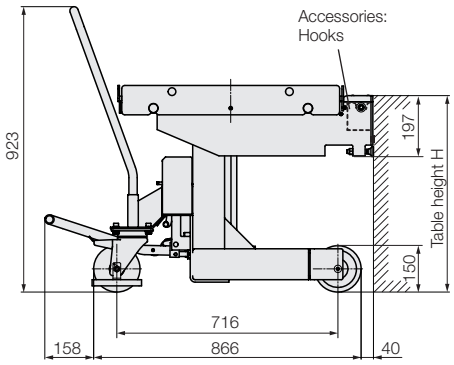
Version with safety docking station and ball table

Docking situation



Version
Table size:	720 x 720 mm
Usable stroke:	635 mm

Precision lowering
for lowering of the lifting unit with millimetre accuracy by pedal.



Technical data

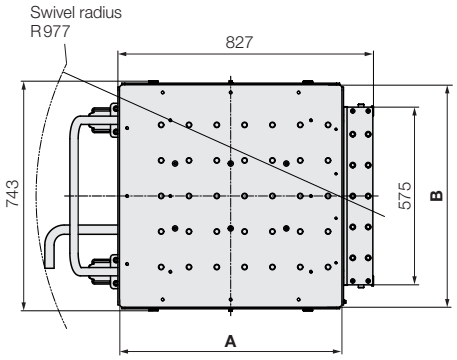
Max. load capacity: 1000 kg

Lifting range

Total stroke	[mm]	700
Usable stroke	[mm]	635
Min. table height H	[mm]	650
Max. table height H	[mm]	1285

Table size* [mm]		Total stroke [mm]	Auxiliary drive**	Part number
A	B			
720	720	700	without	**8891310 00**

* other table sizes on request
** with auxiliary drive on request

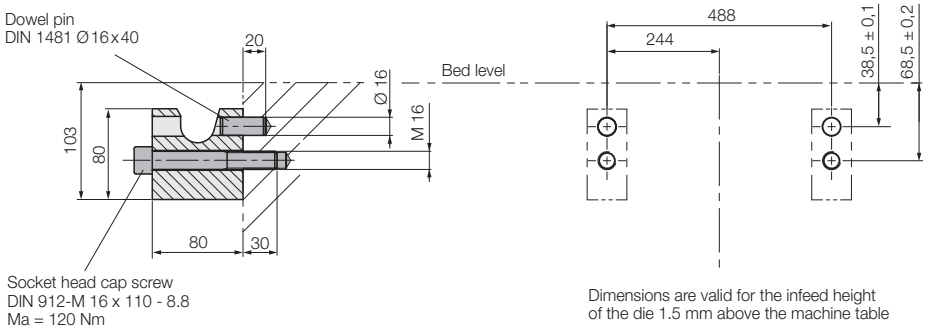


Delivery

One set (2 off) of hooks is included in the delivery of the die changing cart; the hooks can also be ordered as an accessory.

Accessories

Hooks (1 set = 2 off)
to position and lock the die changing cart
Part no. 7 89130001



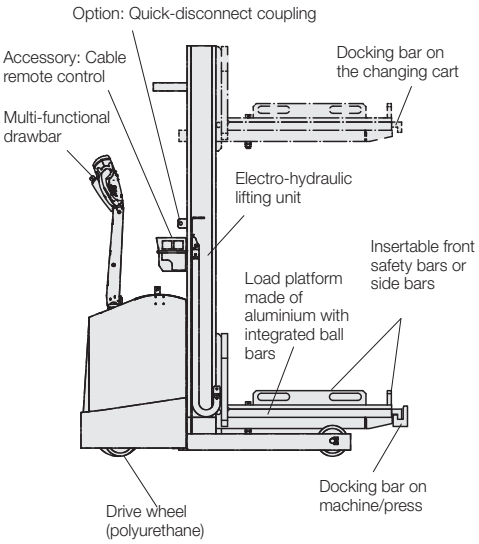
All dimensions in [mm]

Die Changing Carts RWA with Electric Drive

with electro-hydraulic lifting platform, die changing table and hydraulic ball bars, max. load capacity 1600 kg

Advantages

- Safe and gentle die transport of heavy dies
- Time-saving die change
- Integrated die changing table with hydraulic ball bars
- High safety by docking bars and lowerable ball bars
- Protection against falling down of dies by inserted and secured side bars
- Simple and central operation with multi-functional drawbar
- Multi-function display on the drawbar
- Robust vehicle technology
- Modular design with standard drive



Application

The die changing cart RWA is used for the transport and the change of pressing and punching dies as well as injection and casting moulds up to a weight of 1600 kg.

Description

The die changing cart RWA is an electrically driven walking and lifting cart, especially equipped for the transport and the change of dies.
The electro-hydraulic lifting platform is designed as die changing table with integrated hydraulic ball bars, which facilitate the manual insertion of the dies onto the press table.
During the transport, the balls are always lowered and the die is protected against movement.
A safety circuit ensures that the die changing cart can only be displaced with lowered ball bars.
In addition, the die is secured on the lifting platform by insertable front safety bars or side bars.
For the transfer of the die to the press, the lifting platform is equipped with a protrusion.

Versions

The die changing cart RWA is available with 4, 6 or 8 ball bars and with different table sizes.

Power supply

The power supply of the electric drive, the lifting platform and the ball bars is made via an installed battery 24 V DC with 240 Ah.
This battery can be completely charged with the battery charger included in the delivery within 12 hours.
Automatic slow driving at low battery status as well as automatic lift cutout in the case of further discharge.
The maximum running performance is approximately 3 hours at full load.

Option

Die chancing cart with quick-disconnect coupling for external ball or roller bars

The die changing cart RWA can optionally be equipped with an additional hydraulic control circuit with quick-disconnect coupling for the operation of the hydraulic ball and roller bars in the press table.
The operating pressure is 80 bar.

Quick-disconnect coupling

Operation

The operation of the die changing cart RWA is completely made at the multi-functional drawbar.

- Rotary switch
  for continuous and sensitive driving (speed control)
- Toggle switch
  for reduced speed 2.0 km/h
- Push-button
  for driving with reduced speed and vertical drawbar position
- Steering (by drawbar)
- Slide switch
  for sensitive lifting and lowering of the lifting platform
- Push-button
  for lifting/lowering of the balls (as an option)
- Signal horn and key switch
- Main current safety switch (EMERGENCY STOP)

Multi-functional display

for display of
- battery status and operating hours
- maintenance intervals and error messages

Versions as per customer's request

- Roller bars instead off ball bars
- Ball or roller distance
- Dimensions of the lifting platform
- Radio remote control

Please contact us.

Accessories

see page 3

Technical data		
Max. die weight	[kg]	1600
Platform size	[mm]	1150 x 800*
Lifting range	[mm]	250 – 1650
Stroke of the ball bars	[mm]	2
Max. lifting force / bar	[kN]	8.8
Load capacity at the load centre of gravity 400/ 600 mm	[kg]	1600 / 600
Ball spacing	[mm]	76
Max. driving speed	[km/h]	5
Running performance		approx. 3 h at full load
Empty weight	[kg]	1200

* Individual platform sizes and ball distances on request

Scope of supply:

- Changing cart with built-in battery
- Battery charger
- Lifting platform
- 4, 6 or 8 installed ball bars
- Insertable side and front bars
- Battery filling system Aquamatic
  Filling station with electric pump for fast filling of the batteries with water.

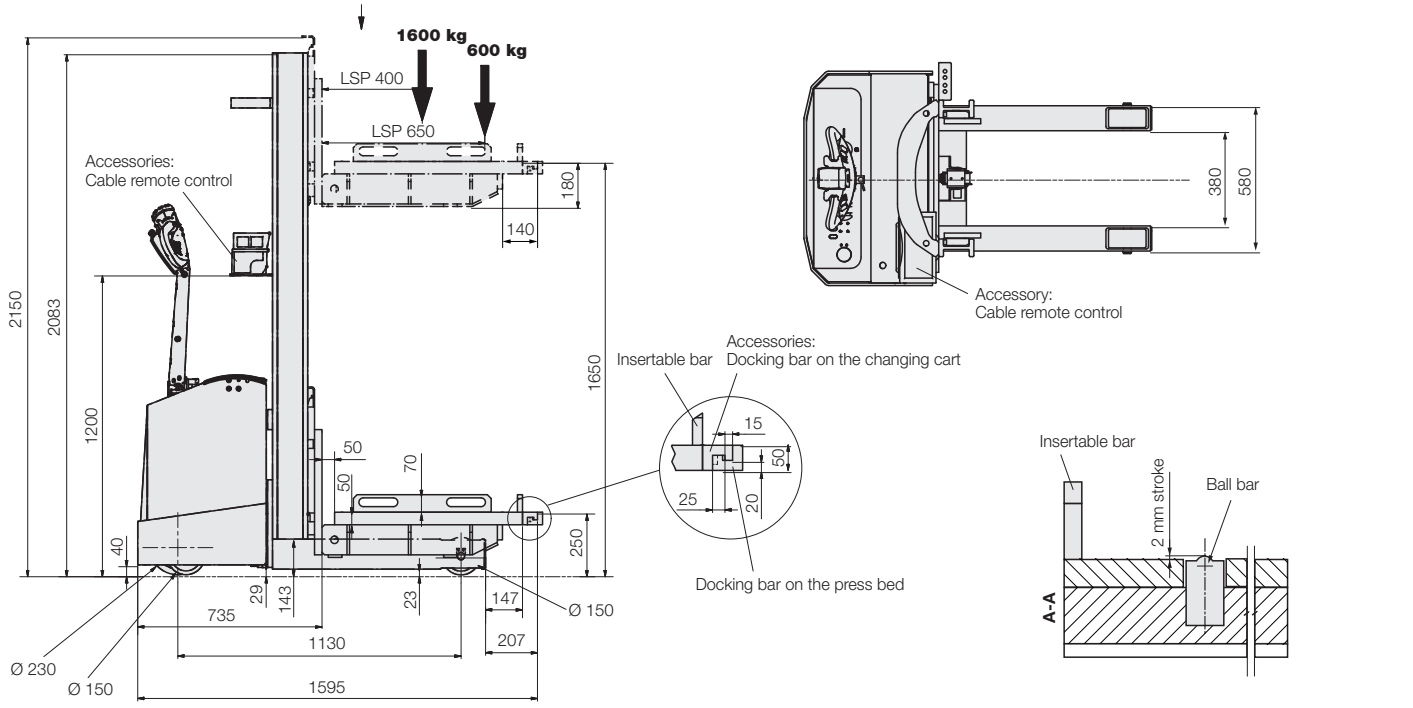
Further accessories and options in addition to the standard scope of delivery see page 3.

Type	RWA 1600/4	RWA 1600/6	RWA 1600/8
Number of ball bars (each 744 mm long)	4	6	8
Part no.	**88913 1600**	**88913 1610**	**88913 1620**

Die changing cart with quick-disconnect coupling

Part no.	**88913 1601**	**88913 1611**	**88913 1621**

Dimensions

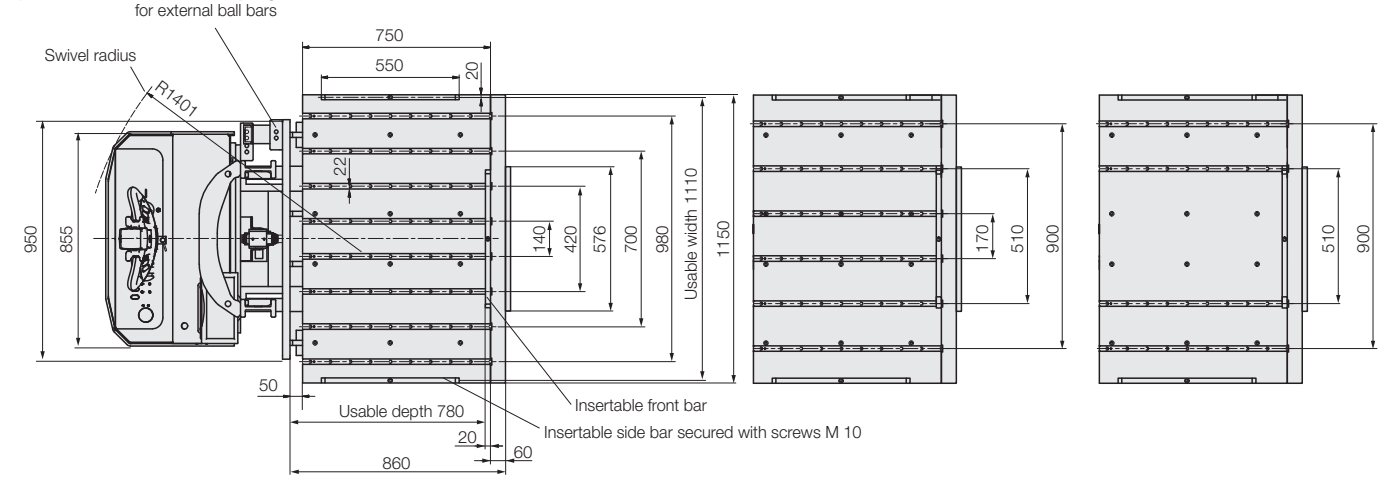


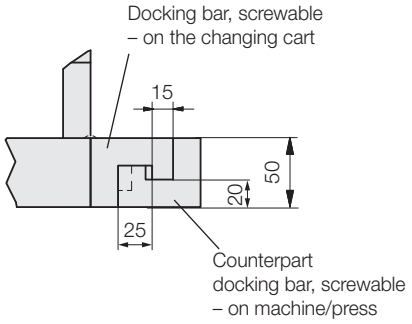
Option: Quick-disconnect coupling for external ball bars

RWA 1600 with 8 hydraulic ball bars

Plate thickness with 6 hydraulic ball bars

Plate thickness with 4 hydraulic ball bars

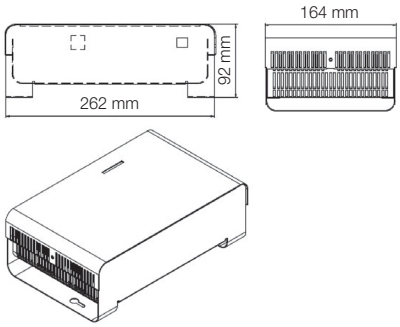


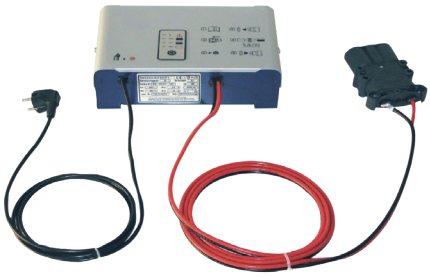


Docking bars
To obtain the exact insertion height at the press table, the lifting platform and the press table can be provided with docking bars.

Docking bars
for fixing at the changing cart, L = 1150 mm
Part no. 889130022

Docking bars
for fixing at the machine, L = 576 mm
Part no. 889130023





Extra battery charger E 230 G*
Charging time: 12 h
Code class: IP 21
Part no. 889130025

* USA version on request

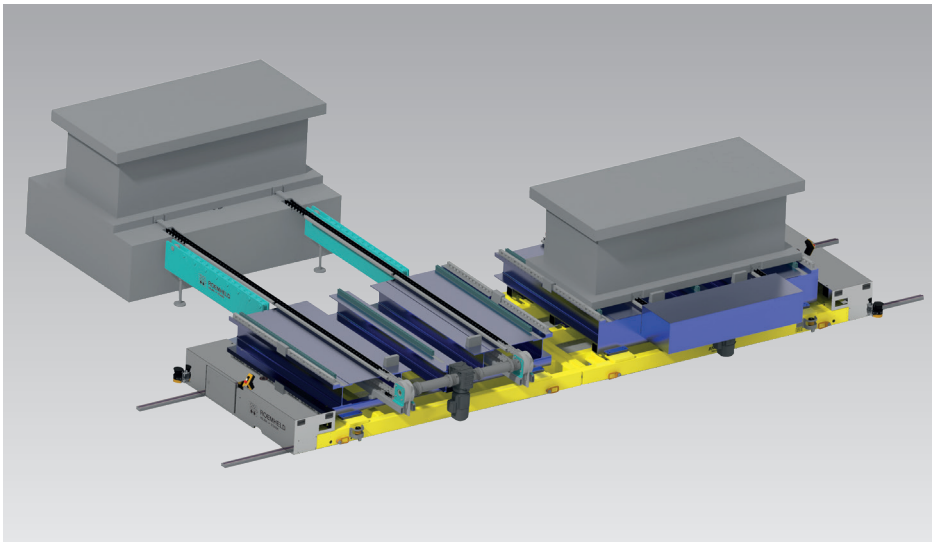
Cable remote control
with the functions:
- lifting/lowering
- driving: forwards/backwards
- emergency stop

(Mounting position see drawing on page 2)

Part no. 889130026

Die Changing Cart RWS, rail-guided

With electric drive and integrated push-pull system
Load of up to 40 t



Advantages

- Safe and gentle transport and changing of the heaviest dies
- Linking of several presses with only one changing table
- The press is free and can manufacture until the moment the die is changed
- Die changing cart with integrated lifting bars and push-pull system
- Simple and central operation of the cart with a remote control

Advantages over automated guided vehicles

- Low energy consumption
- High precision up to ±0.3 mm
- Small space requirements
- High availability
- Minimal floor requirements

Application

The die changing cart RWS is used for the transport and the change of pressing and punching dies as well as injection and casting moulds up to a weight of 40 t.

Description

The RWS die changing cart is rail-guided, electrically driven and equipped with a special pull-push system in chain design or with a linear actuator.
The changing platform has stable roller rails to facilitate the insertion of the dies onto the press table.
The cart runs on special round rails with extremely low rolling resistance. They offer precise guidance and are insensitive to dirt.
A safety circuit ensures that only the cart in the changing position can move the pull-push system.
To transfer the die to the press, additional consoles are provided to compensate the distance between the press table and the die changing cart.
The RWS die changing cart can link several presses together for a die change, moving back and forth from one press to the next. Standardisation is not necessary. Different die sizes can be easily changed with one system using a standardised base plate. Semi-automatic and fully automatic die changes are possible thanks to the control system that is integrated in the cart and precise positioning. The complete system is rounded out by a variety of clamping technology solutions in the press.

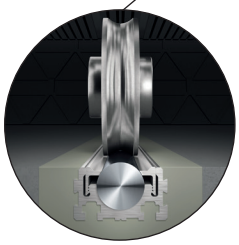
Delivery

- Die changing carts in the series small up to 15 t, medium up to 25 t and large up to 40 t single die weight (with base plate), travel speed up to 10 m/min
- Integrated control via hand control bottle
- Push-pull system
- Rollers for round rails
- Semi-automatic positioning and manual / mechanical ground staking for locking with simultaneous safety switching
- Power supply via cable drum integrated in the cart

Options

- Tandem or single cart
- Radio remote control
- Integration into the press control system
- Additional safety devices
- Fully automatic system for die change

Basic cart system



Round rails for minimal rolling resistance

Transport cart, movable on round rails

Technical data

Minimal transfer height	[mm]	500
Displacement speeds		
Pull-push chain	[m/min]	2.0
Changing carts	[m/min]	10

Tolerances for installed round rails

Tolerance for track on the entire length of rails	[mm]	±0.5
Tolerance of levelness (height) on 5 m length of the line	[mm]	±1.0
Length tolerance for 3 m length of rails	[mm]	– 1

Recommended floor condition

- Min. thickness of concrete slab: 200 mm
- Min. concrete strength class: C25/30, industrial floor
- ±5 mm tolerance on 5 m length in the line area

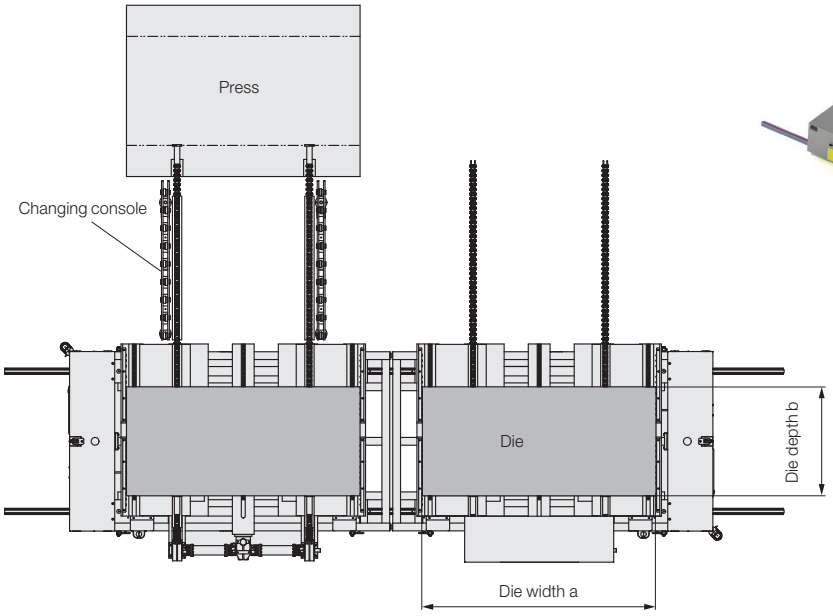
Control

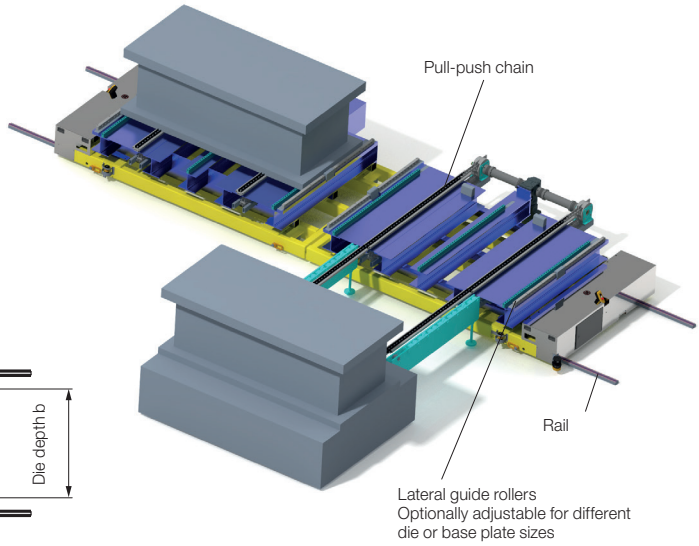
One control unit (tandem with one control unit) is installed in each cart. It is operated using a cabled remote control.

Control functions in dead man operation with automatic creep speed:

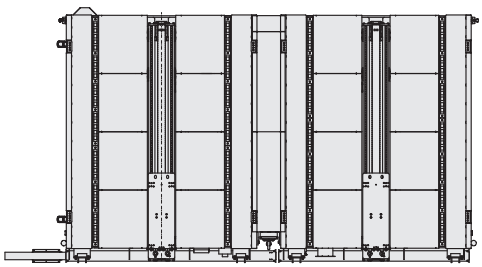
- Movement of the changing cart left/right
- Movement of the push-pull device forward/ backward

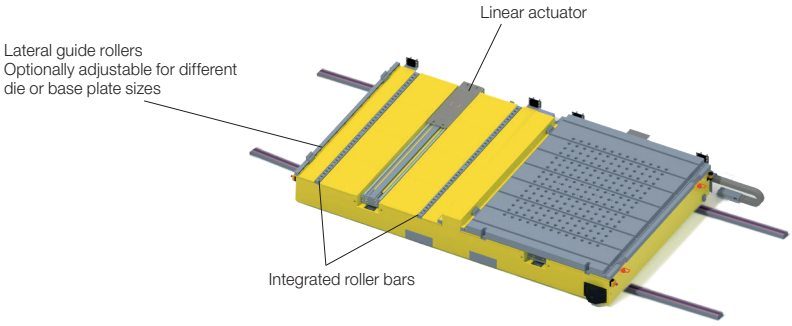
Die changing cart RWS with pull-push chain for die insertion

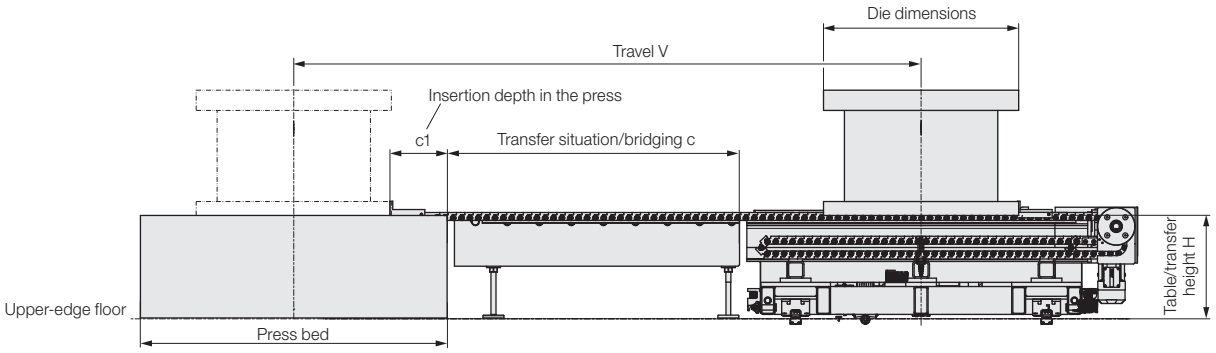




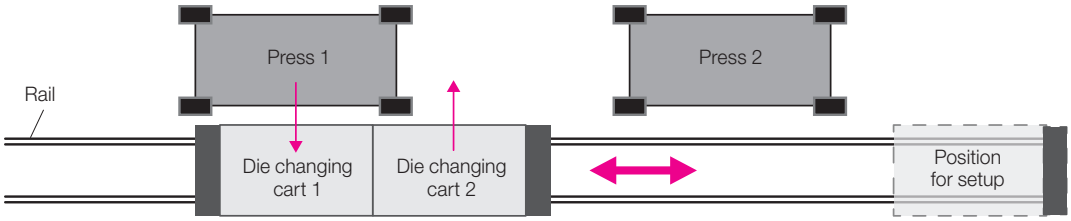
Die changing cart RWS with linear actuator for die insertion



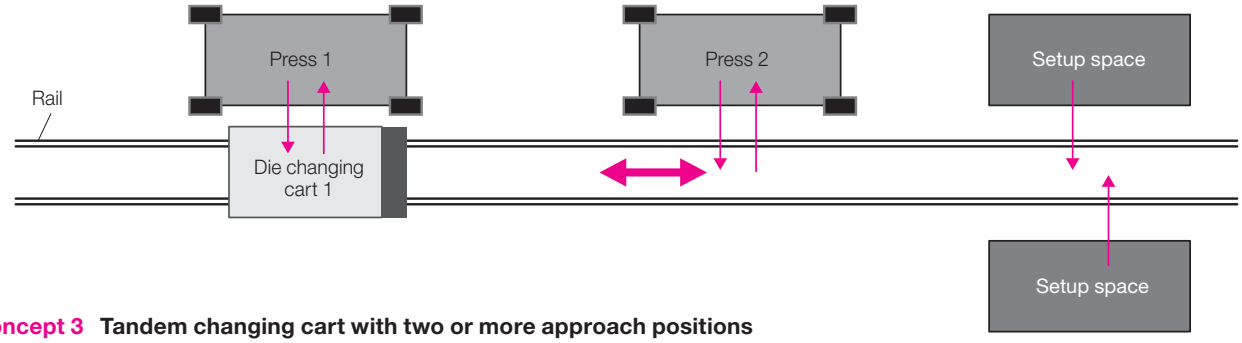




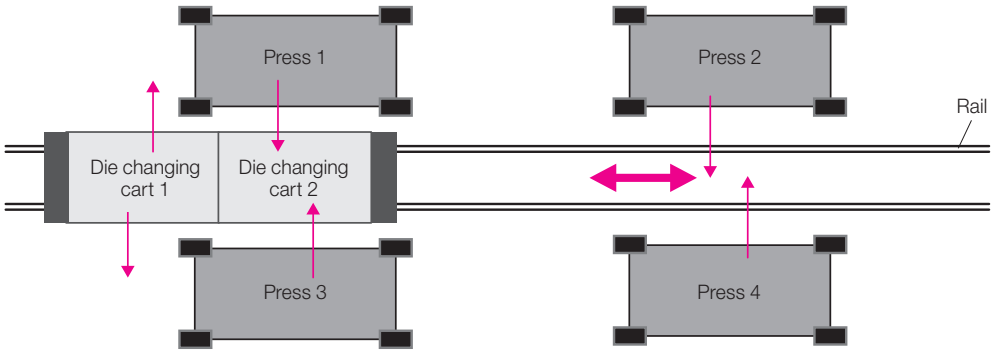
Concept 1 **Tandem changing carts with two or more approach positions**
Preliminary setup in separate position



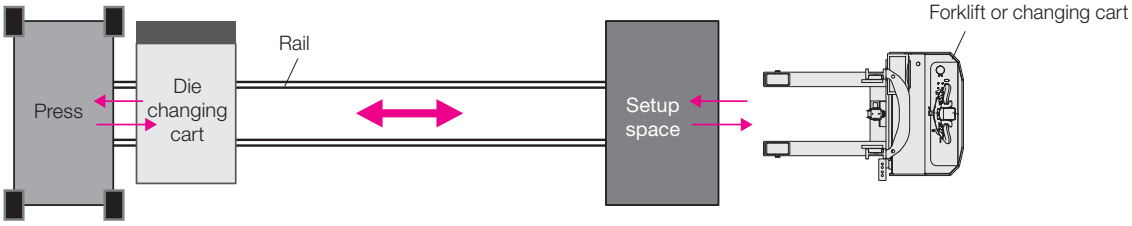
Concept 2 **Single changing cart with two or more approach positions**
With optional setup space



Concept 3 **Tandem changing cart with two or more approach positions**
For use on opposite presses with equal spacing
The push-pull system travels in two directions.



Concept 4 **Single changing cart with rotated travel axis**
With or without setup space



ROEMHELD
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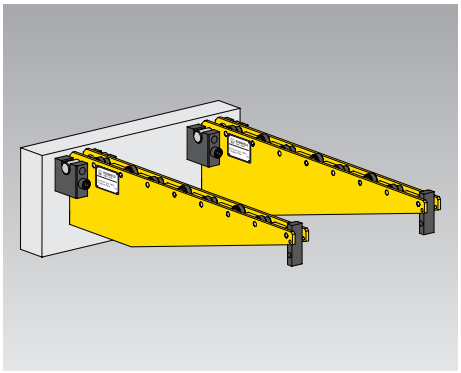
WZ 8.18350

Carrying Consoles, Hanging
for easy and efficient die change on the press bed
load per pair 5 to 30 kN

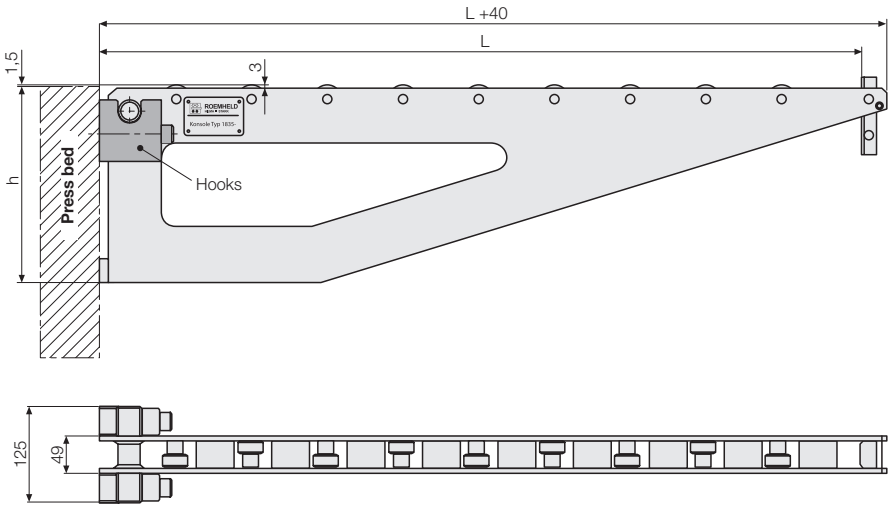


Advantages
- Safe handling of heavy dies with ease
- Less downtime by easy and efficient die change
- High-quality, shock-resistant coating
- High load

Application
Carrying consoles allow a safe, effort and time-saving change of heavy dies on the press bed.

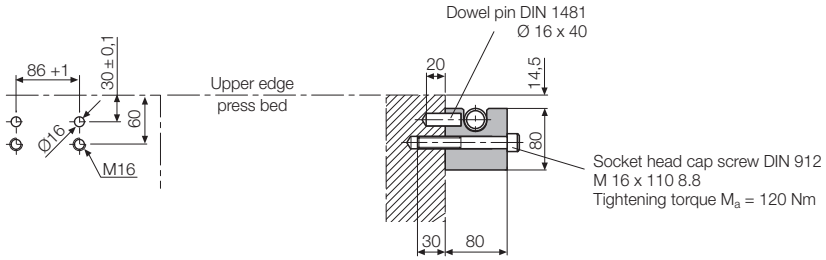
Description
The carrying consoles are hung in the hooks on the die changing side of the press. The hooks are supplied with the consoles. The consoles are used as a pair. Their size must be selected to suit the highest die weight.

The die is loaded onto the consoles using a crane or a forklift truck. The carrying rollers consist of high-strength hardened needle bearings. The end stop can be bypassed in one direction.
The surface is provided with a shock-resistant coating in RAL1004, golden yellow.



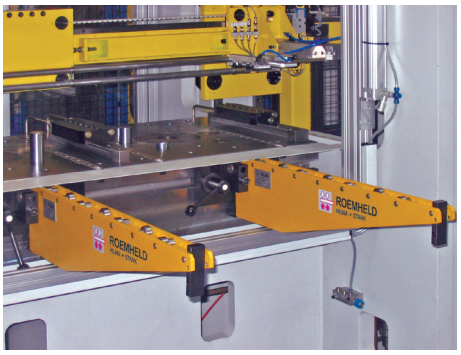
Delivery
2 carrying consoles (pair)
1 set of hooks (4 off)

Hole pattern for hooks



Accessories
Hooks
Hanging consoles may be used for several presses. In this case, an additional set of hooks is required and can be ordered as an accessory or replacement (1 set = 4 off).
Part no. 7 18350007

Customised carrying consoles
as e.g. sliding carrying consoles are available on request.

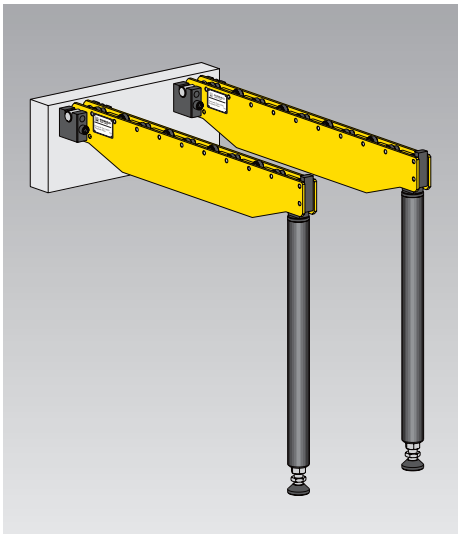

Hanging, sliding carrying consoles

Technical data

Load (pair) [kN]	Support length L [mm]	Height h [mm]	Weight (pair) [kg]	**Part no.** (pair)
5	500	120	23	**8 18350001**
10	500	150	26	**8 18350002**
10	800	180	40	**8 18350003**
10	1000	250	48	**8 18350104**
20	800	250	40	**8 18350105**
20	1000	300	57	**8 18350006**
20	1250	350	80	**8 18350107**
30	800	400	60	**8 18350008**
30	1000	450	74	**8 18350009**
30	1250	500	107	**8 18350010**

WZ 8.18351

Carrying Consoles, Supported
for easy and efficient die change on the press bed
load per pair 20 to 250 kN



Advantages
- Safe handling of heavy dies with ease
- Less downtime by easy and efficient die change
- High-quality, shock-resistant coating
- High load

Application
Carrying consoles allow a safe, effort and time-saving change of heavy dies on the press bed.

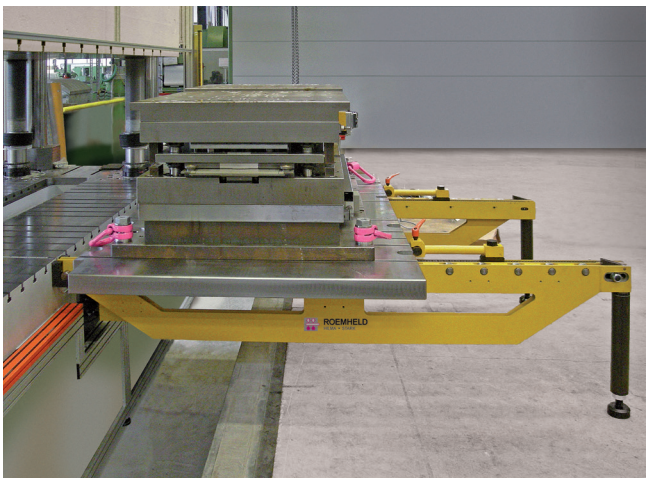
Delivery
2 carrying consoles (pair)
1 set of hooks (4 off)
2 supporting feet

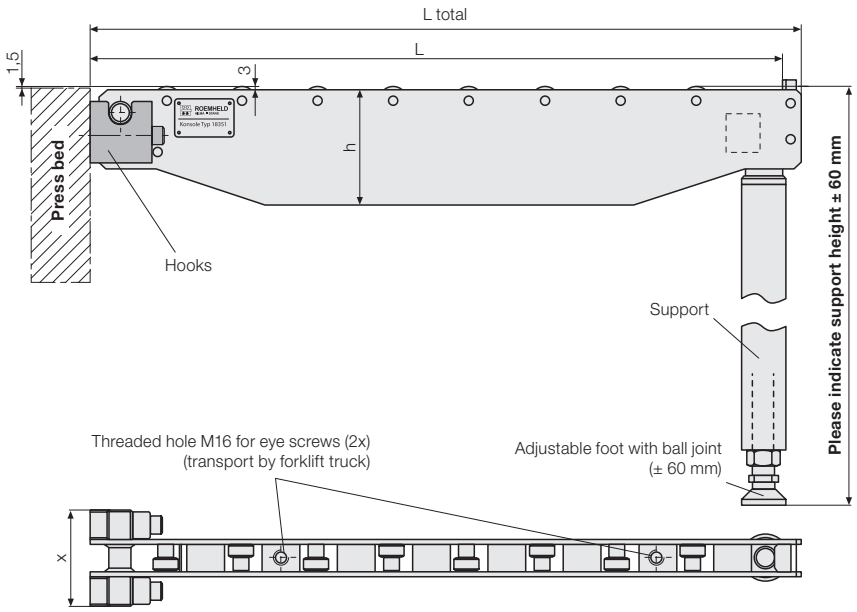
Description
The carrying consoles are hung in the hooks on the die changing side of the press. The hooks are supplied with the consoles. The consoles are used as a pair. Their size must be selected to suit the highest die weight. In order to cope with heavy and large dies, the console is provided with an additional support.
To compensate the unevenness on the floor, the supports are designed as adjustable supports with a ball-and-socket joint. The support height may be changed subsequently by ± 60 mm.

The die is loaded onto the consoles using a crane or a forklift truck. The carrying rollers consist of high-strength hardened needle bearings. The end stop can be bypassed in one direction.
The surface is provided with a shock-resistant coating in RAL1004, golden yellow.

Accessories
Hooks
Hanging consoles may be used for several presses. In this case, an additional set of hooks is required and can be ordered as an accessory or replacement. (1 set = 4 off)

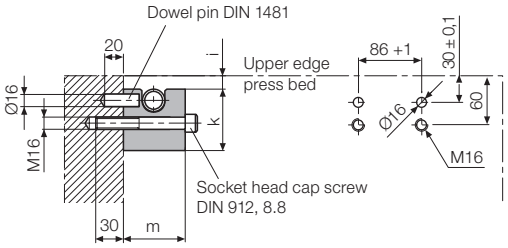
Load [kN]	Part no.
20 – 40	**7 18350007**
60 – 100	**7 18350021**
160 – 250	**7 18350022**

Application example




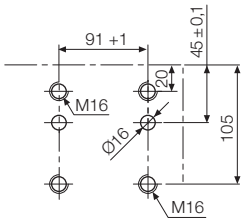
Hole pattern for hooks

Console 20 – 40 kN



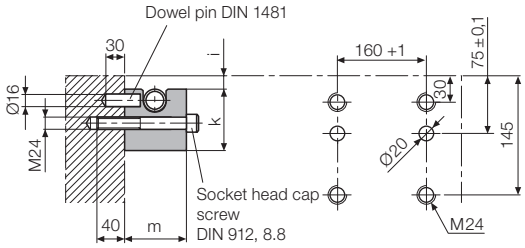
Socket head cap screws DIN 912
M16 x 110
Tightening torque Ma = 120 Nm
Dowel pin DIN 1481 Ø16 x 40

Console 60 – 100 kN



Socket head cap screws DIN 912
M16 x 50 and M16 x 110
Tightening torque Ma = 120 Nm
Dowel pin DIN 1481 Ø16 x 50

Console 160 – 250 kN



Socket head cap screws DIN 912
M24 x 70 and M24 x 160
Tightening torque Ma = 250 Nm
Dowel pin DIN 1481 Ø20 x 80

Technical data

Load (pair) [kN]	Support length L [mm]	L total [mm]	Dimensions [mm] h	i	k	m	x	Weight (pair) [kg]	**Part no.** (pair)
20	1000	1040	150	14.5	80	80	125	65	**8 18353001**
20	1250	1290	180	14.5	80	80	125	100	**8 18353102**
20	1600	1640	200	14.5	80	80	125	116	**8 18353003**
40	1000	1040	200	14.5	80	80	125	80	**8 18353204**
40	1250	1290	200	14.5	80	80	125	90	**8 18353205**
40	1600	1640	225	14.5	80	80	125	110	**8 18353206**
60	1000	1030	200	5	115	100	131	85	**8 18353209**
60	1250	1280	220	5	115	100	131	100	**8 18353210**
60	1600	1630	240	5	115	100	131	125	**8 18353211**
60	2000	2030	270	5	115	100	131	150	**8 18353212**
100	1250	1280	250	5	115	100	131	115	**8 18353213**
100	1600	1630	280	5	115	100	131	140	**8 18353214**
100	2000	2030	320	5	115	100	131	175	**8 18353215**
160	1600	1685	260	5	170	150	216	390	**8 18353216**
160	2000	2085	260	5	170	150	216	475	**8 18353217**
160	2500	2585	280	5	170	150	216	605	**8 18353218**
250	2500	2585	360	5	170	150	216	615	**8 18353220**

Delivery
2 carrying consoles (pair)
1 set of hooks (4 off)
2 supporting feet

Please specify the exact support height when ordering.

Example of ordering:
8 18353001, support height 1000 mm
Console 1000 mm long
max. 20 kN
Support height 1000 mm

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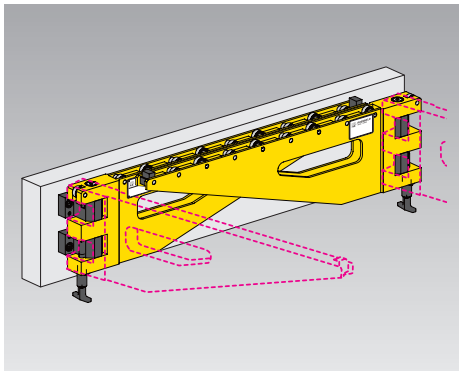
WZ 8.18352

Carrying Consoles, Swivelling to the Left and Right
for easy and efficient die change on the press bed
load per pair 10 to 60 kN



Advantages
- Safe handling of heavy dies with ease
- Less downtime by easy and efficient die change
- High-quality, shock-resistant coating
- High load
- Low space requirement due to swivelling carrying consoles

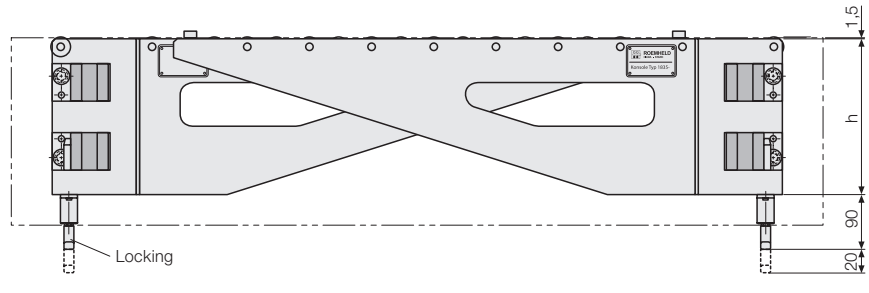
Application
Carrying consoles allow a safe, effort and time-saving change or transport of heavy dies.

Description
This console is permanently fixed to the press bed and can be swivelled into the die changing position.
This type is particularly recommended when the available space in front of the press bed is limited, or if removal and intermediate storage of the console is not possible or wanted.

The die is loaded onto the consoles using a crane or a forklift truck.
The carrying rollers consist of high-strength hardened needle bearings. The end stop can be bypassed in one direction.
The surface is provided with a shock-resistant coating in RAL1004, golden yellow.

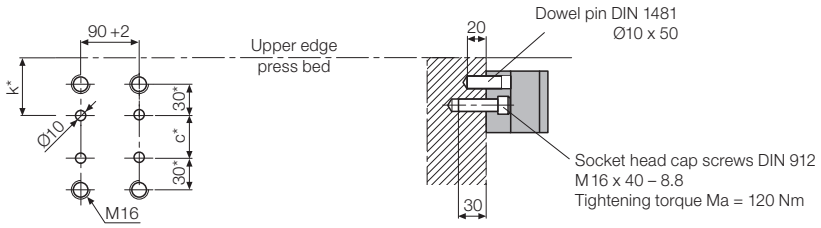
Swivelling carrying consoles are supplied in pairs with pre-mounted holders, ready for connection.
Special designs and double-swivel carrying consoles are available on request.

Delivery
2 carrying consoles (left and right side)
4 holders (pre-mounted)



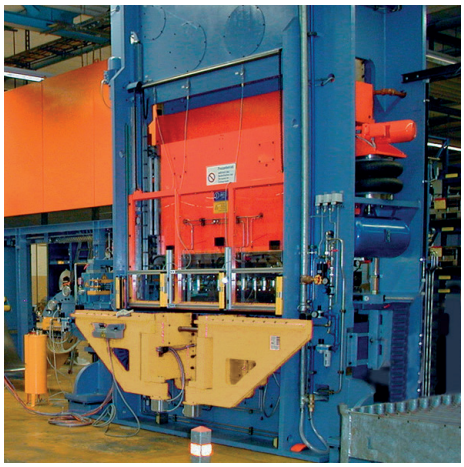
The carrying consoles can be swivelled to the left and right

Hole pattern for holders



* Tolerance: ±0.1 mm

Application example



Swivelling carrying consoles on a press

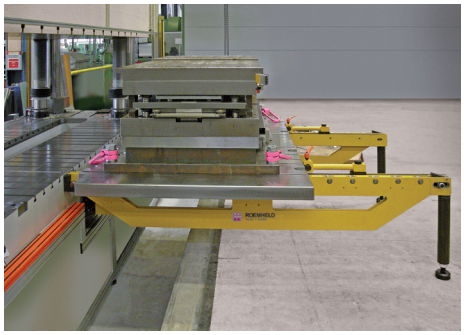
Technical data

Load (pair) [kN]	Support length L [mm]	Dimensions [mm] c ±0.1	g	h	i	k ±0.1	Weight (pair) [kg]	Part no. (pair)
10	500	20	550	200	125	91.5	46	**8 1835 1001**
10	1000	70	1050	250	125	91.5	74	**8 1835 1002**
20	1000	120	1050	300	125	91.5	85	**8 1835 1003**
20	1250	170	1300	350	125	91.5	108	**8 1835 1004**
40	1000	210	1050	450	130	121.5	130	**8 1835 1105**
40	1250	260	1300	500	130	121.5	160	**8 1835 1106**
60	1000	310	1050	550	130	121.5	165	**8 1835 1107**
60	1250	460	1300	700	130	121.5	230	**8 1835 1108**

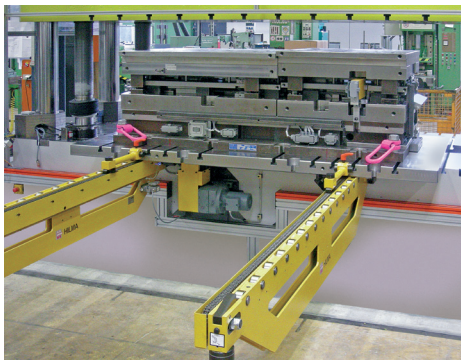
Die Changing Consoles, Electrically Driven
with rack and pinion drive, die weight up to 25 t

Advantages
- Safe handling of heavy dies with ease
- Less downtime by easy and efficient die change
- Small batch sizes can be easily realized
- High load
- Easy handling
- Easy insertion of the dies, either manually or automatically, with roller or ball bars
- Individual system with integration of the press possible
- Flexible use at several presses

Application examples



Die changing console with drive



Die changing console with drive

Die changing console with drive and side loading of the press.

Application
Die changing system directly adapted to the press for effort and time-saving change of heavy dies.
The drive system has been developed on the basis of standard die changing consoles and can be easily installed as it requires only little space. Thus, it is very suitable for both retrofitting and new constructions.

Description
The die changing system with special push-pull drive makes handling of dies easier and ensures effort and time-saving change of dies with a maximum weight of 25 tons in places difficult to access.
(Higher loads on request)

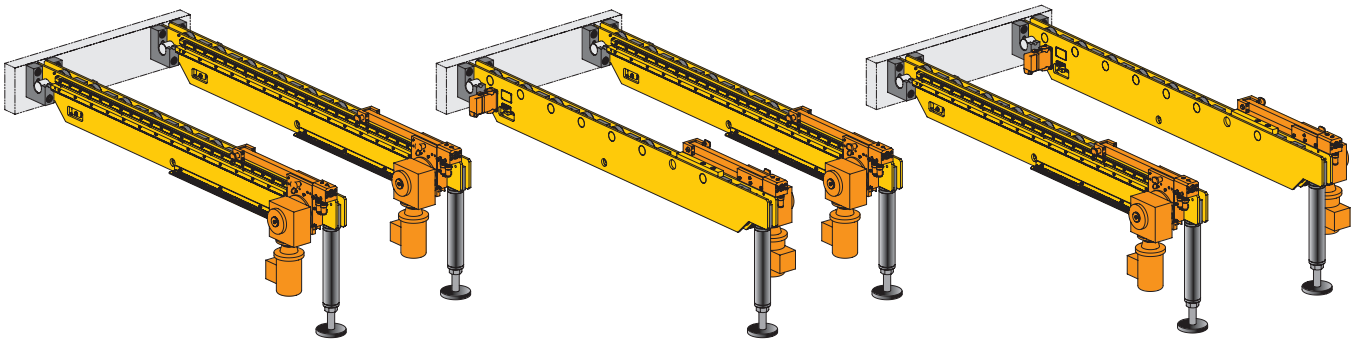
Roller and ball bars in the T-slots of the bed provide for easy insertion of the die. Individual solutions including automatic die changing and integration in the press are possible.

Dimensioning and further technical details in the course of the project. Please contact us!

Function
The drive unit and the carrying console are hung in hooks provided on the press for this purpose and then locked. The die is deposited on the consoles using a crane or a forklift truck. After the die has been deposited, it can be connected to the push-pull docking device of the changing station.
The integral chain drive system allows the user automatic die loading and positioning, just by depressing a push-button on a separate remote control pendant.

During a die change, the press bed is free, i.e. the push and pull elements do not project over the press bed. Also the rear side of the press is completely free. This changing station is suitable for almost any press, can be easily removed and is easy to handle.

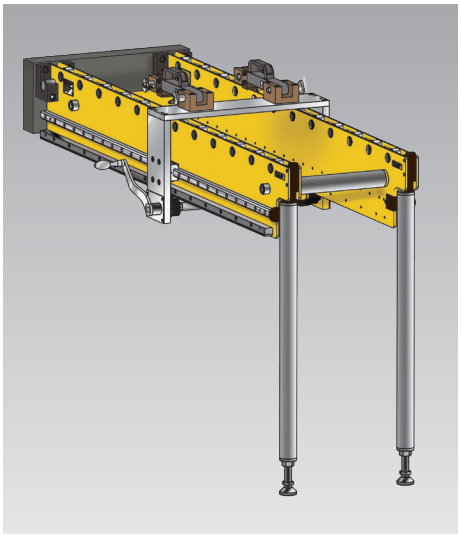
Variants of the die changing console
Various variants with two driven, synchronized drive consoles and with drive motor at left/right side.
The length of the console, adaptor and loads are flexibly selectable.



WZ 8.18354

Die Changing Consoles, Manually Driven

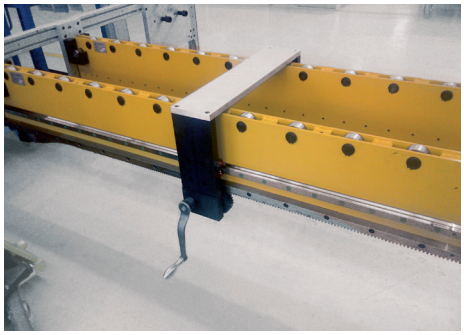
for easy and efficient die change on the press bed
crank handle and transmission gearing, die weight of up to 6 tons



Advantages

- Safe handling of heavy dies with ease
- Less downtime by easy and efficient die change
- Easy handling
- Easy manual insertion of the dies with roller or ball bars in the press bed
- Increased safety for the operator
- Low-cost alternative to an electric drive

Application examples



Die changing console with drive

Die changing console with drive

Application

Die changing system directly adapted to the press for effort and time-saving change of heavy dies.
The drive system has been developed on the basis of standard die changing consoles and can be easily installed as it requires only little space. Thus, it is very suitable for both retrofitting and new constructions.

Description

This die changing console with crank handle and transmission gearing makes handling of dies easier and ensures an effort and time-saving change of dies with a maximum weight of 6 tons in places difficult to access.
(Higher loads on request)

Roller and ball bars in the T-slots of the bed provide for easy insertion of the die. Individual solutions including automatic die changing and integration in the press are possible.

Delivery

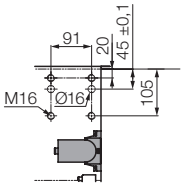
2 carrying consoles (pair)
1 set of hooks (4 off)
2 supporting feet
1 set of hooks (2 off)

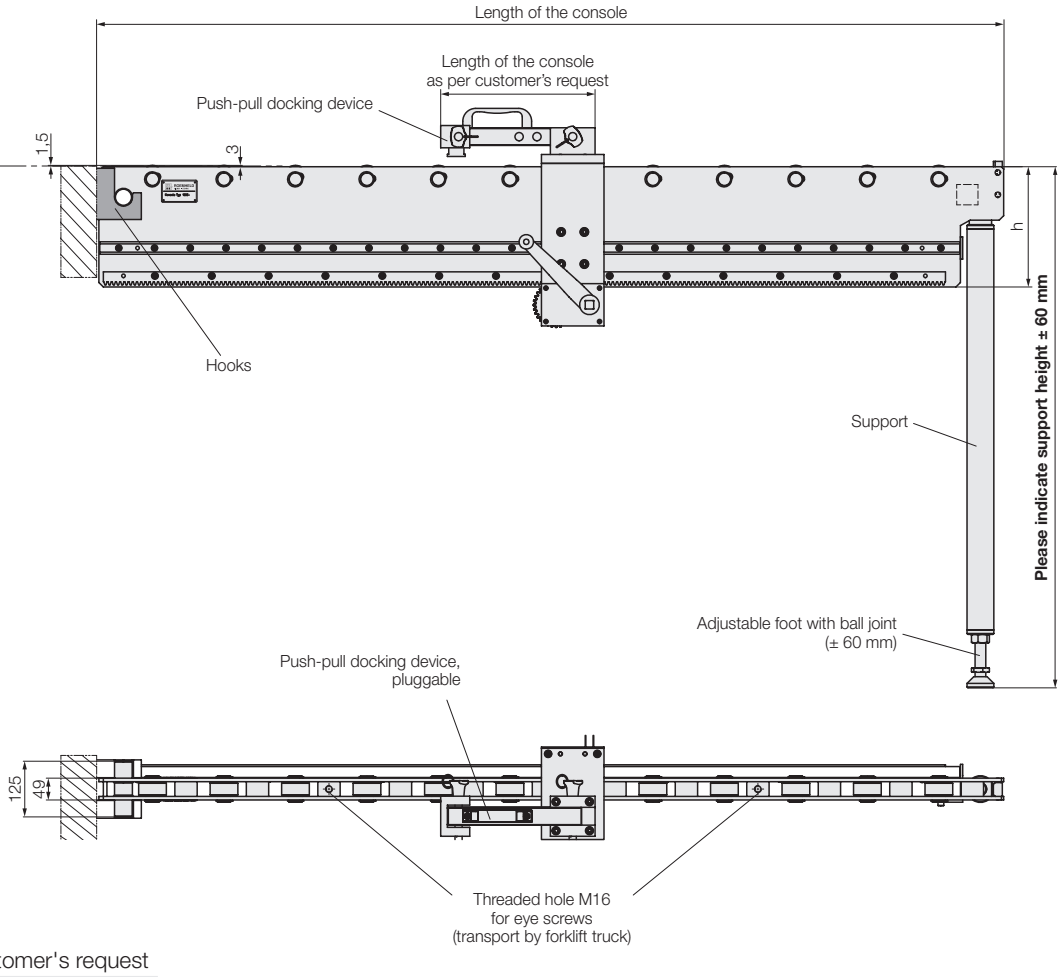
Function

The drive console is hung in hooks provided on the press for this purpose and then locked. The die is deposited on the consoles using a crane or a forklift truck.
After the die has been deposited, it can be connected to the push-pull docking device of the changing station.
A crank handle at the side allows the user a safe and effortless insertion and positioning of the die.

During a die change, the press bed is free, i.e. the push and pull elements do not project over the press bed. Also the rear side of the press is completely free. This changing station is suitable for almost any press, can be easily removed and is easy to handle.

Hole pattern for holders

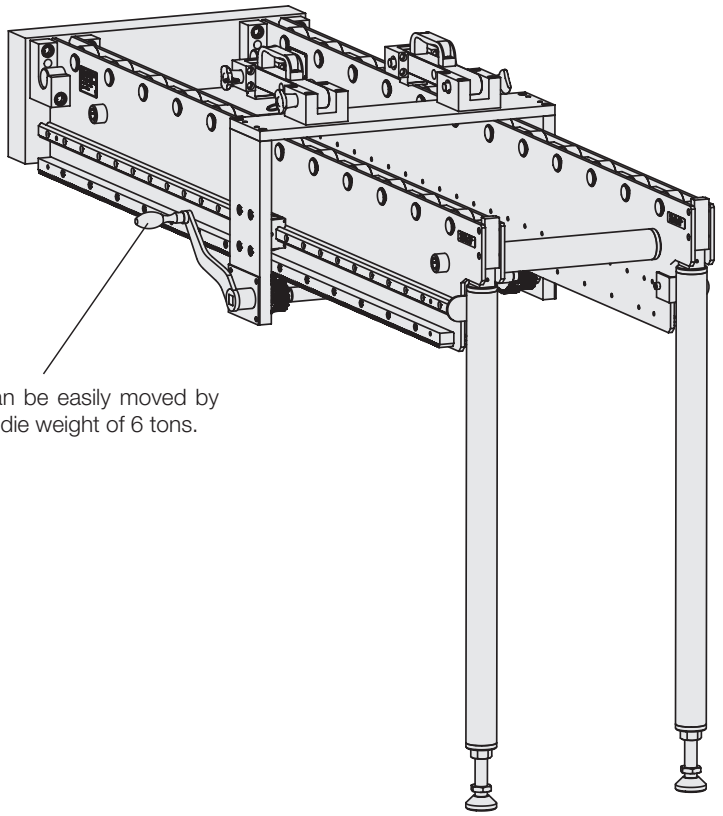




Technical data

Length of the console	as per customer's request
Support height	as per customer's request
Die weight	up to 6 tons

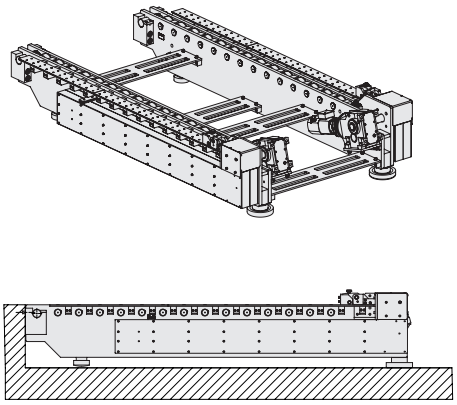
Dimensioning and further technical details in the course of the project.



Crank handle can be easily moved by one hand with a die weight of 6 tons.

Die Changing Consoles, Electrically Driven
with push chain drive, die weight up to 50 tons

Advantages
- Lowest support heights possible
- High load and push force
- Easy insertion of the dies with push chain drive, semi- or fully automatic via roller or ball bars
- Precise positioning and approach of stops with rotary encoder possible
- Insertion of the die to the end position in the press
- Individual system with integration in the press control possible
- Flexible use at several presses
- Customised special solutions for a tailor-made changing system



Console unit with low support height

Application
The push-chain console, designed based on standard die change consoles, is easy and space-saving to install and suitable for retrofitting and new installations.
Depending on the customer's individual requirements, different automation levels can be realised with integration into the press control.

Description
The main components of the die changing console are the manually movable carrying console and an electric push-chain drive.
The die changing station with special push-chain drive makes the handling of dies easier and ensures effort and time-saving change of dies with a maximum weight of 50 tons in places difficult to access.
(Higher loads on request)

Roller and ball bars in the T-slots of the press bed allow easy handling when moving the dies. The carrying console is also equipped with a hydraulic lifting column with a foot lever for easy docking into the hooks. Steering rollers allow easy transport of the complete system from one installation to the next.
Tandem die changes are also possible to optimise set-up times.

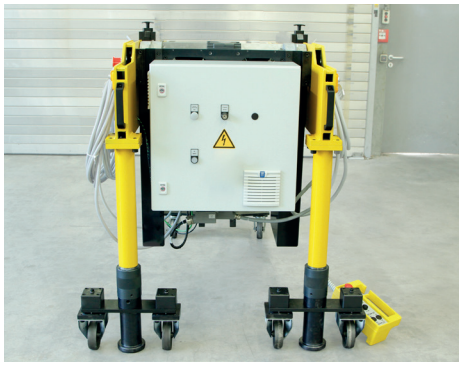
Dimensioning and further technical details in the course of the project
Please contact us!

Function
The drive unit and carrying console are hung in hooks manually on the die-changing side of the press and locked in place; no further machining of the machine table is necessary for the use!
The die is deposited on the consoles using a crane or a forklift truck.
Depending on the customer's requirements, the die is coupled to the push chain of the changing unit with a customised die adapter.

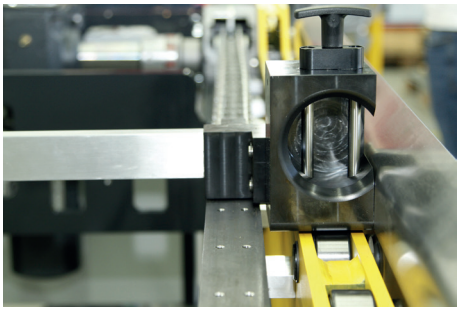
The integral chain drive system allows the user automatic die loading and positioning by depressing a push-button on a separate remote control pendant.
Sensors and stops can be integrated into the control system.

The press bed remains free during the changing process, i.e., the push-pull elements do not project over the press bed.
Also, the rear side of the press is completely free. This changing unit is suitable for almost any press, can be easily removed and is easy to handle.

View of pull-push chain and die adapter

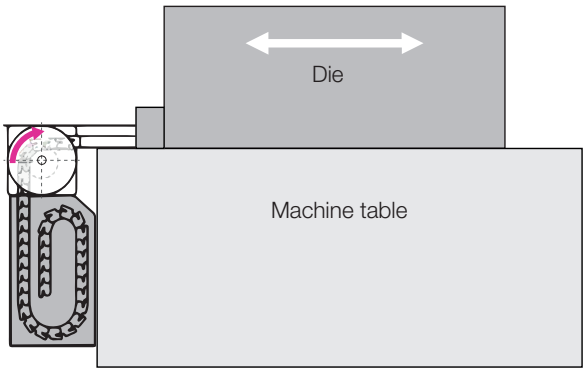


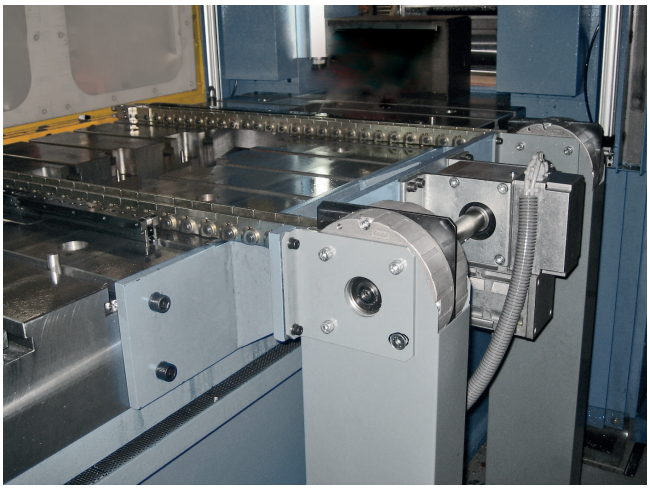
Option: The control is directly mounted to the console, console and control can be completely removed.



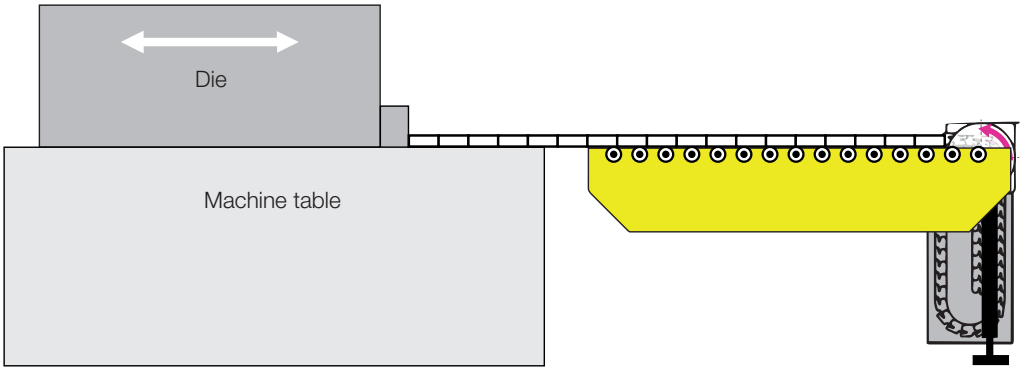
Push-pull docking device, customised

Push chain direct system

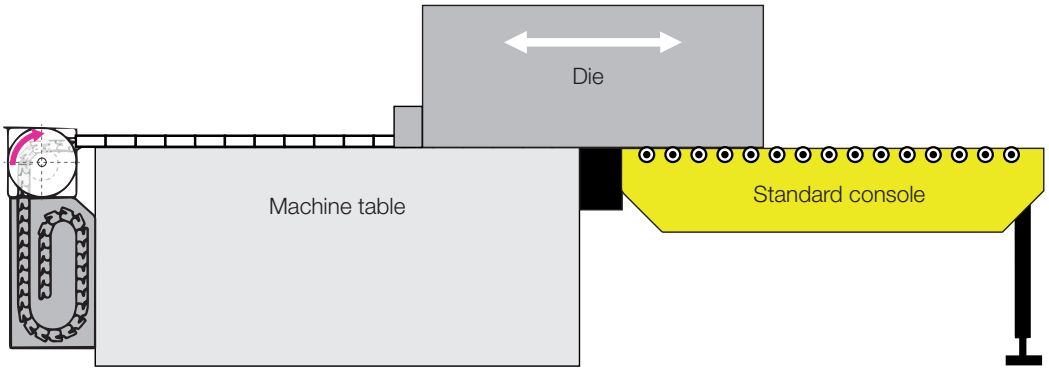




Push-chain console



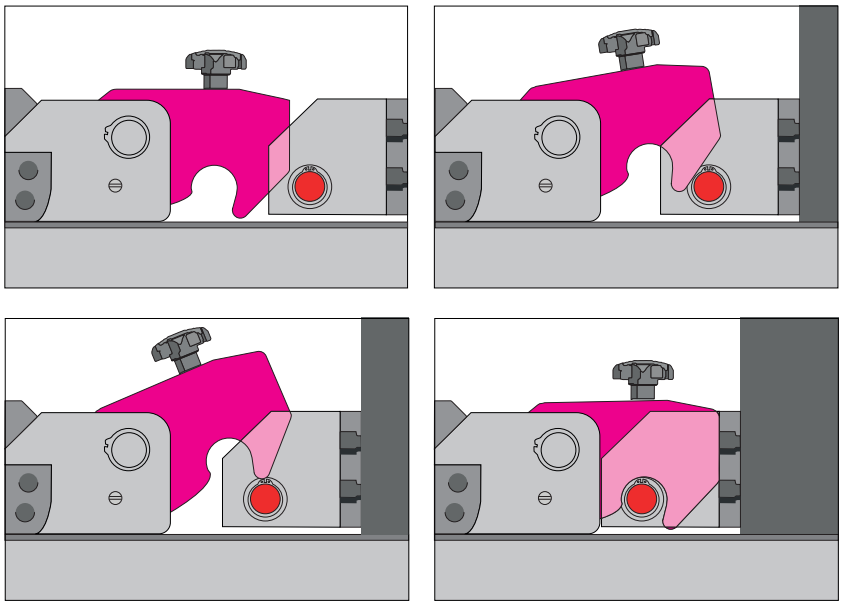
Push chain direct system with console



Die adapter

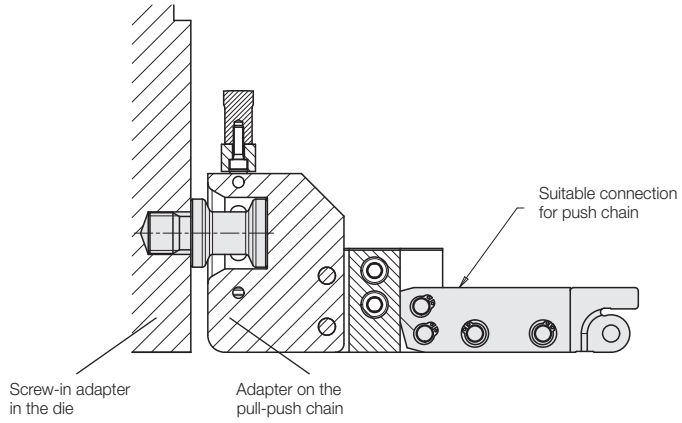
Standard:

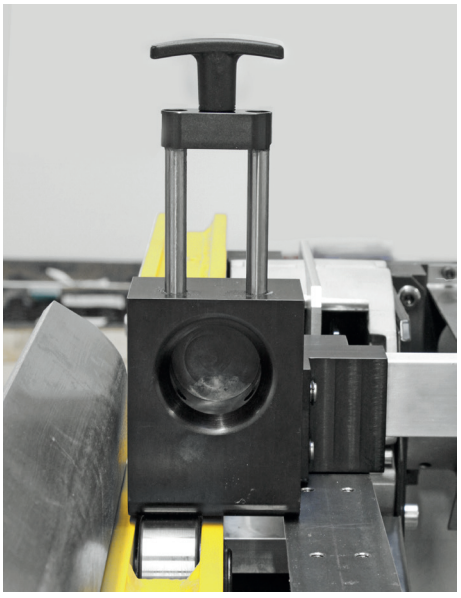
- Couples the die automatically
- Uncoupling by hand



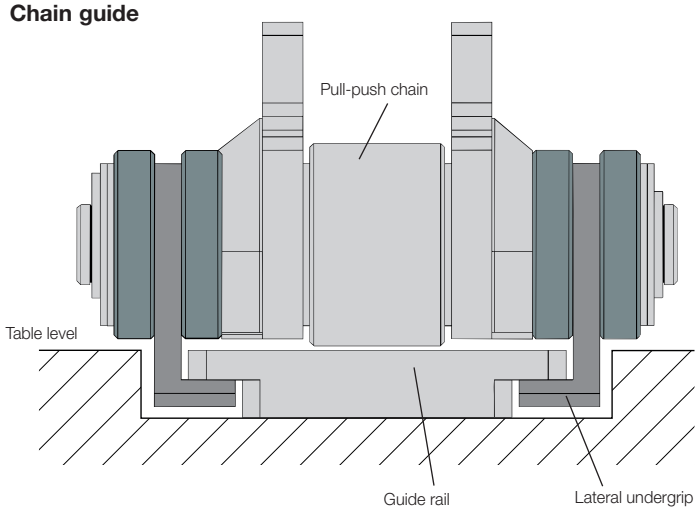
Die adapter

customised





Chain guide



Easy to retrofit claw guides are used as standard. The table level is maintained and the chain runs on the guide

Chain guide

A chain guide is necessary to realise long chain strokes and to prevent a lateral break-out of the push chain.
Avoid side loads acting on the push chain.
The maximum force of the pull-push chain is possible with a guide also over longer distances.
The running surface of the push chain must be at table level. The length to which a push chain can be loaded without a guide depends on the friction factor, the die weight and the push length.

Design of a pull-push chain system

The following parameters are required for the design of a pull-push chain system:

Die weight [kN]

Friction factor (rolling friction or sliding friction ; 7% when using ball/roller bars)

Table height [mm]

Displacement length / stroke of chain [mm]

Guide (**A** = die guided **B** = push chain guided)

Displacement speed (standard = 33 mm/s)

Cycle number [cycles/day]

Special operating conditions (please describe: e.g. dirt, temperature ...)

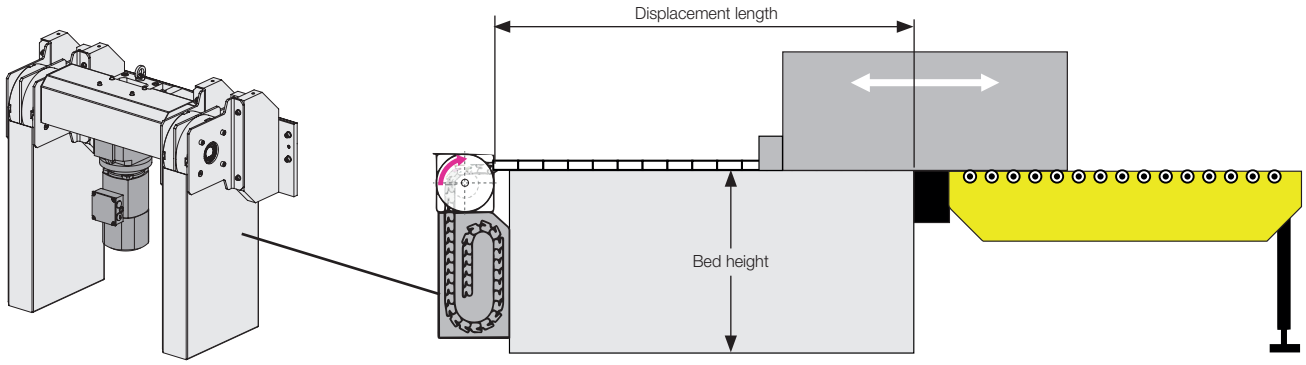
Sketch or drawing of the press bed (show interfering objects in sketch)

Position control above (**D** = absolute value rotary encoder **N** = incremental value - cam switch)

Control (yes/no)

Construction (1, 2 or 3)

1 = two push chains, left and right, **motor arranged laterally** (one motor per push chain)
2 = two push chains, left and right, **motor arranged in the middle**
3 = special versions see attached sketch



Option: Control

Delivery with or without control (option)

The pull-push chain can be controlled via an existing machine control.
However, we also offer a separate control as an option.
For an optimal design of the pull-push chain, we recommend the following minimum control requirements:

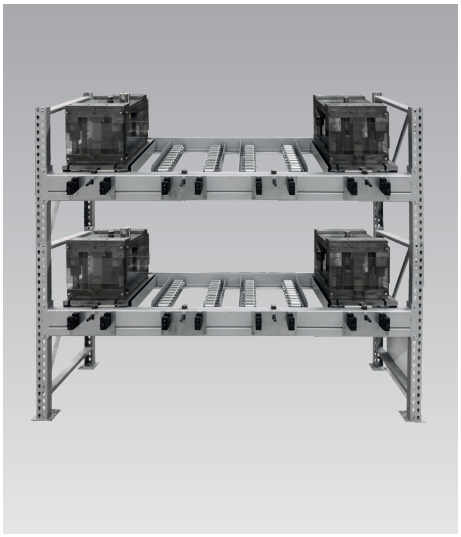
- Integration in the emergency stop circuit (terminal strip)
- Two speeds: creep speed/normal speed with frequency converter for precise positioning

- Change-over switch: forward / reverse, emergency stop button
- Wired remote control with two-hand operation
- LED display FAILURE for temperature switch motor or overload protection

Our recommendations for possible options are:

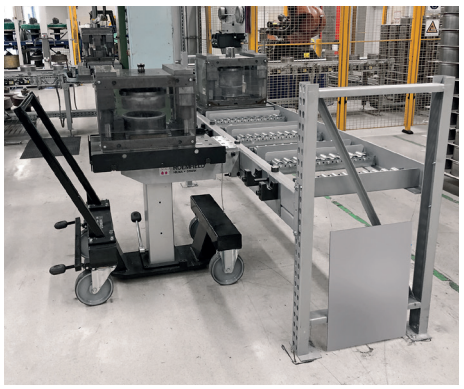
- A start ramp for a smooth motor start and positioning with millimetre accuracy
- Interface and signal processing in the press control:
  - Query of the chain and die end positions by rotary encoder or cam switch
  - Press in setting mode, top dead centre and ball bars lifted

Rack Systems for Die Storage
for safe and efficient die change



Advantages
- Safe, force-saving and wear-free die storage
- Time-saving die change
- High level of safety due to docking station and semi-automatic, secured front bars or safety bolts as fall protection on the front side
- Optimum transfer height into the rack system and changing carts
- Optimised for ROEMHELD die changing carts

Application examples



Die changing cart RW 500
with semi-automatic docking hooks and safety bolts

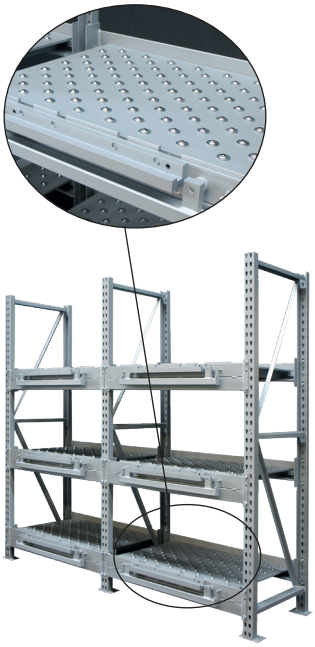
Application
Rack systems with special roller conveyors or ball tables enable the user to change heavy dies safely, with less effort and in less time.
Mounted docking hooks or bars on the rack system enable precise positioning and safe docking. An additional mechanical safety bolt or bar is automatically activated after docking to prevent dies from rolling out unintentionally after they have been stored.

Design and further technical details in the project and according to customer-specific requirements.
Please contact us!

Description
The die changing cart is hooked into the docking hooks or front bar at the front of the rack.
The safety bar or bolt is only lowered by successfully docking to the front of the rack.
The table on the die changing cart is equipped with ball inserts or ball bars that facilitate manual or semi-automatic die insertion. The rack system can be equipped with roller conveyors or ball tables.
When the die changing cart leaves the docking hooks, safety bars or bolts on the rack system are activated and the die is secured against falling out.

Die changing cart RWA 4000
with docking bar and pull-push chain

Die transport with die changing cart of type RW 500 to RWA 4000



Rack with ball table
and docking bar

Rack with roller conveyors
and docking bar

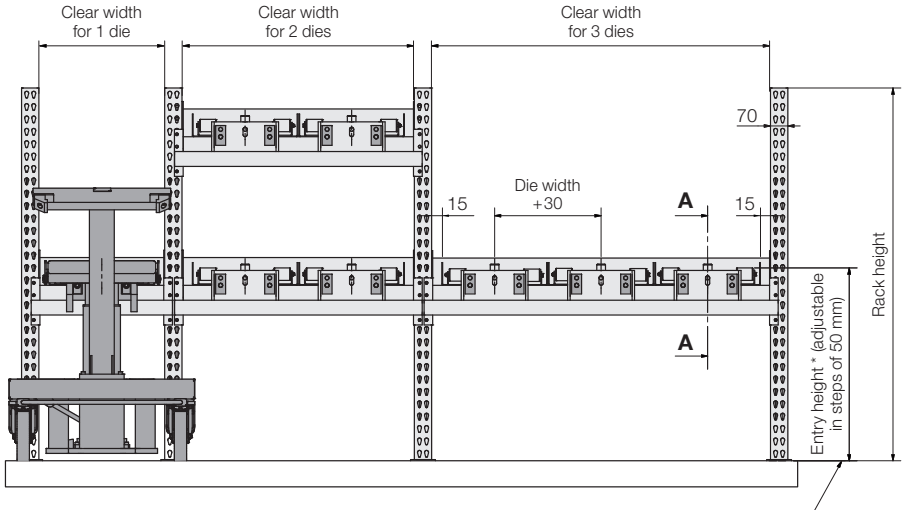
Version for die changing cart RW 500

Rack system with roller conveyors or ball table. Suitable docking system for a die changing cart size RW 500 for die weights up to 500 kg.

On the rack with docking hooks, mechanical lock and end stop at the back

Die changing cart RW 500

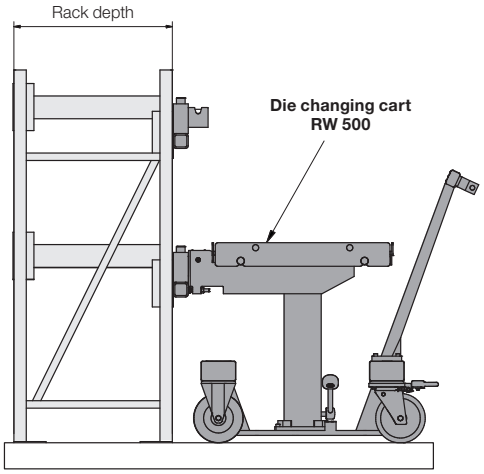
see catalogue sheet WZ 8.8900

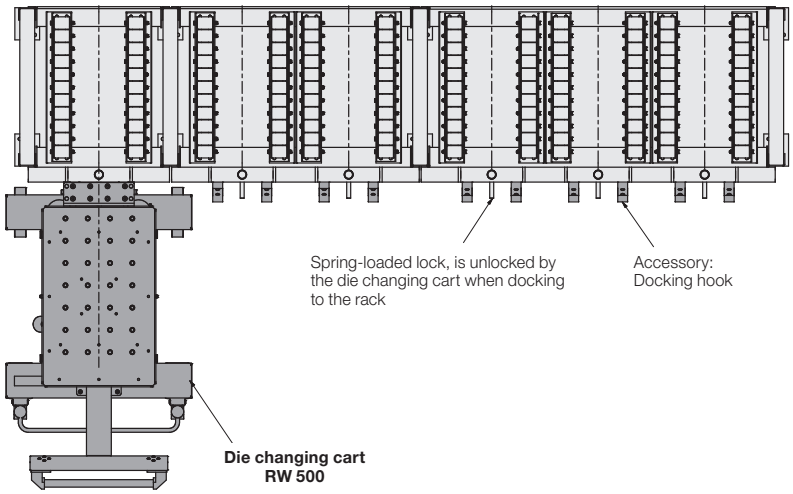


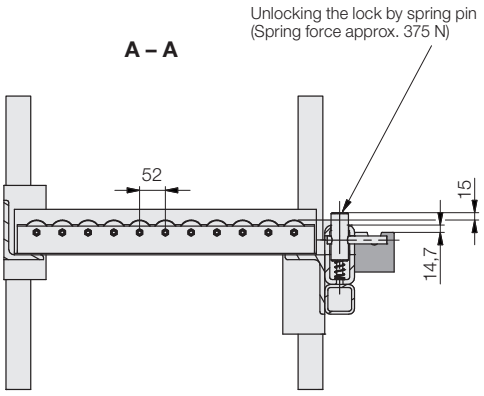
Minimum distance of the dies: 285 mm (on the table)

Max. possible entry heights into the rack depending on the stroke (see catalogue sheet WZ 8.8900)

* Min. entry height
200 mm Stroke = 578,5 mm
300 mm Stroke = 678,5 mm
400 mm Strióke = 778,5 mm

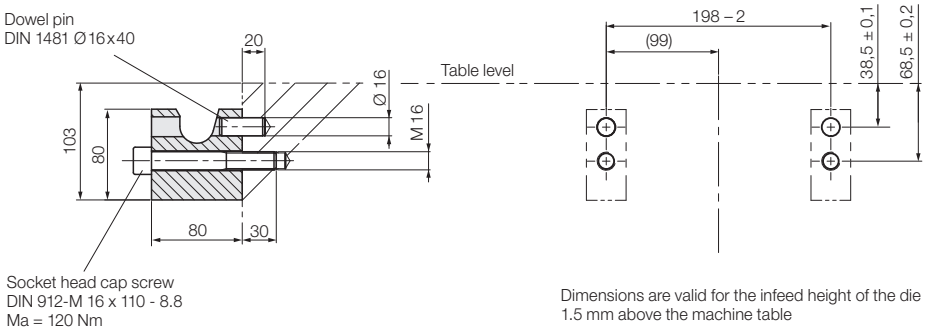






Accessory

Docking hooks (1 set = 2 off)
to position and lock the die changing cart
Part no. 789130001



Dimensions are valid for the infeed height of the die 1.5 mm above the machine table

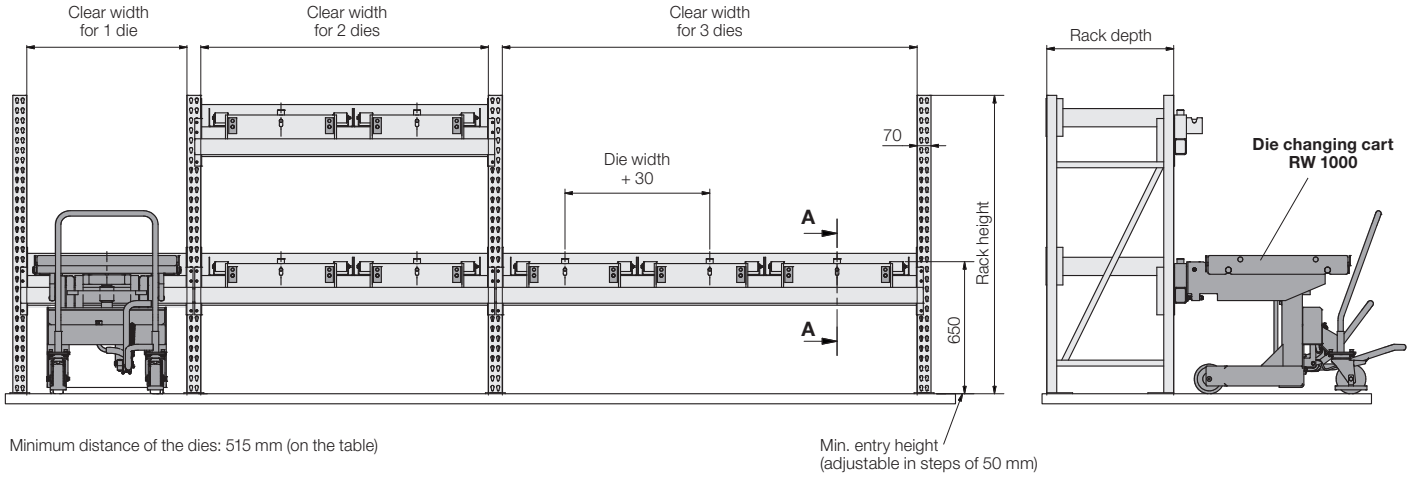
Version for die changing cart RW 1000

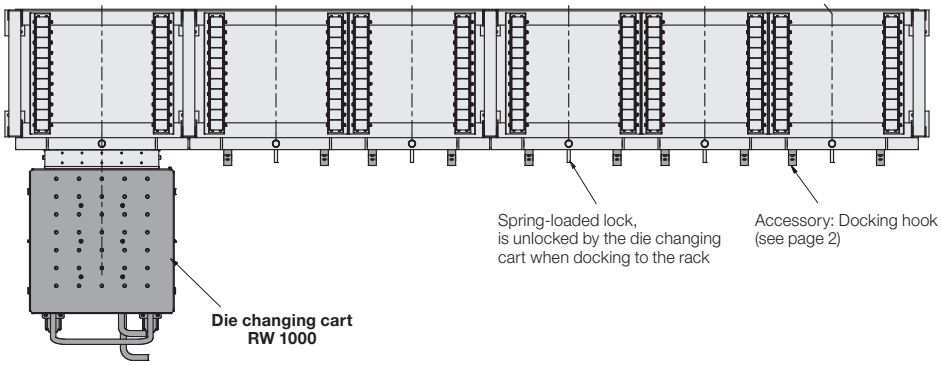
Rack system with roller conveyors or ball table. Suitable docking system for a die changing cart size RW 1000 for die weights up to 1,000 kg.

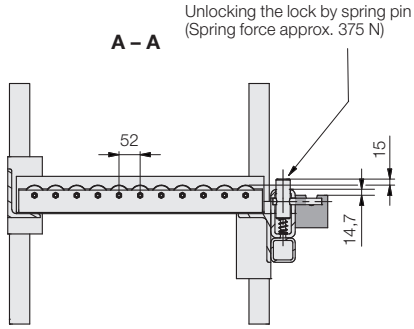
On the rack with docking hooks, mechanical lock and end stop at the back. The field widths, the rack depths and the number of roller conveyors are supplied according to the customer's dies.

Die changing cart RW 1000

see catalogue sheet WZ 8.8901

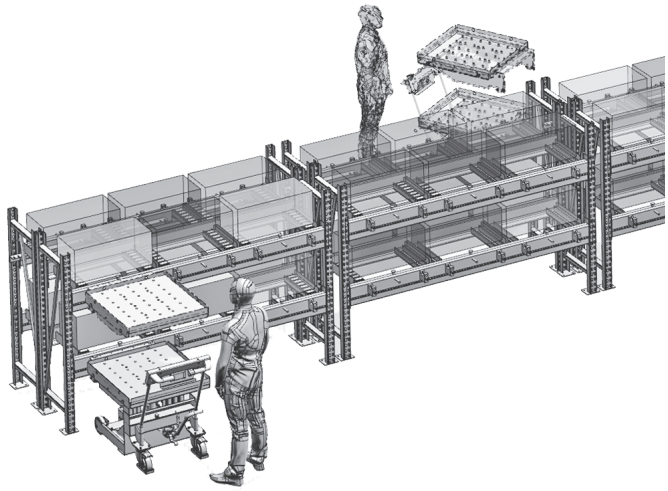






All dimensions in [mm]

Representation of different assembly options and entry heights



Version for die changing cart RWA 1600 and RWA 4000

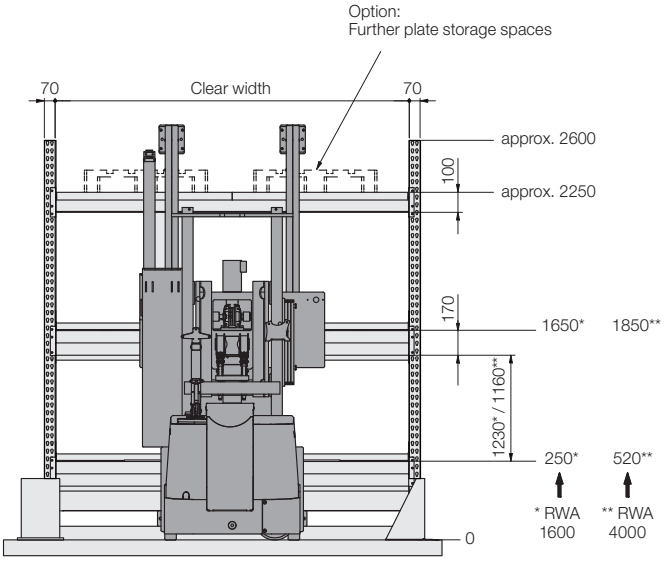
Rack system with roller conveyors. Suitable docking system for a die changing cart size RWA 1600 or 4000 for die weights up to 4,000 kg.
On the rack with docking bar, mechanical lock and end stop at the back Option with support plates for using a pull-push chain from the changing cart.
The field widths, the rack depths and the number of roller conveyors are supplied according to the customer's dies.

Die changing cart RWA 1600

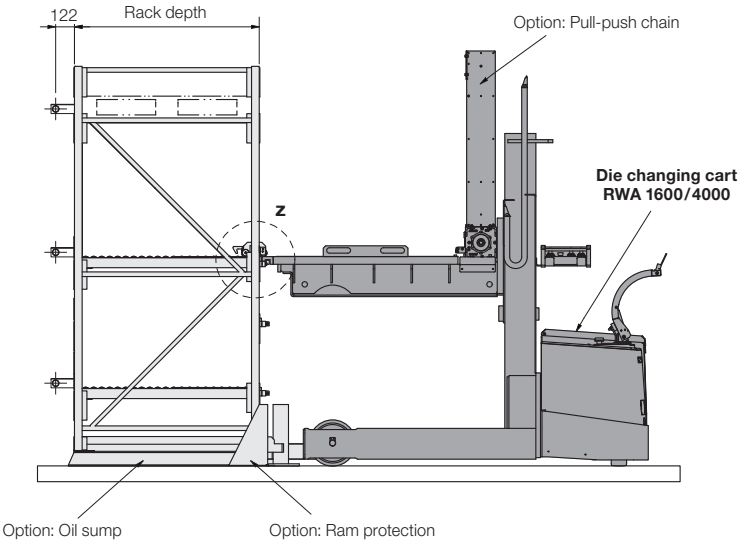
see catalogue sheet WZ 8.8902

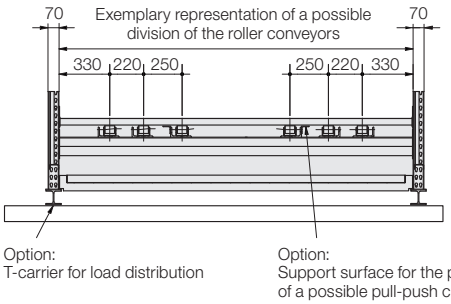
Die changing cart RWA 4000

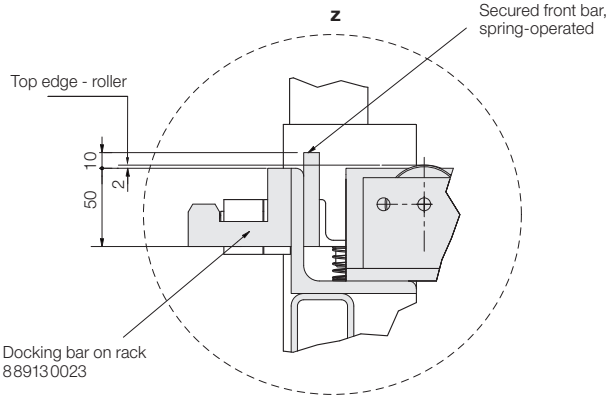
Max. load capacity 4,000 kg on request



* Min. entry height when using RWA 1600 = 250 mm
** Min. entry height when using RWA 4000 = 520 mm







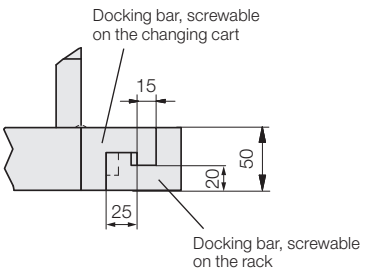
Accessories

Docking bars

The lifting platform and rack system must be provided with a docking bar to obtain the exact insertion height at the rack.

Docking bars
for fixing on the changing cart
L = 1,150 mm
Part no. 889130022

Docking bars
for fixing on the rack
L = 576 mm
Part no. 889130023

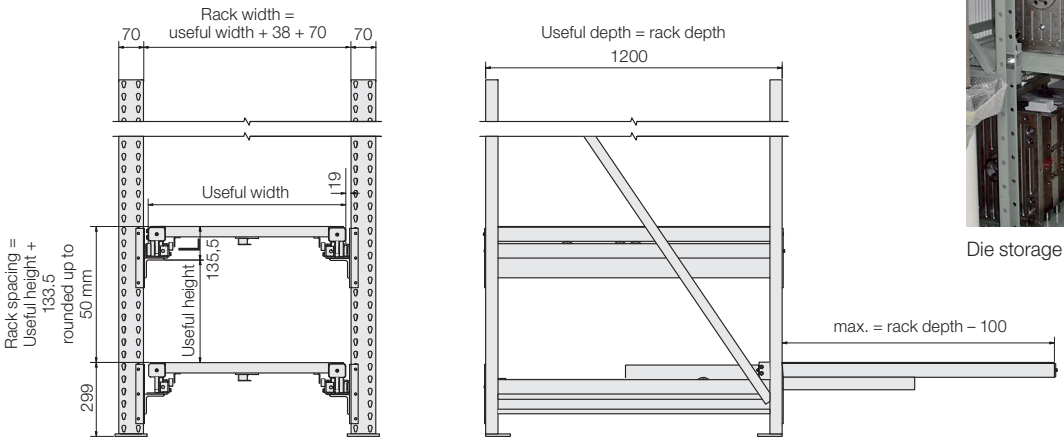


Heavy-duty pull-out

The heavy-duty pull-outs are roller guided and suitable for loads up to 1,500 kg for partial pull-outs or 1,200 kg for full pull-outs.
Individual dies can be removed safely and user-friendly from the top of the rack using a crane and transported to a transfer station for a die change.

Heavy-duty pull-outs are supplied with individual locks. Usually, these are fitted one-sided on the left.
Different profile thicknesses are used depending on the load capacity and pull-out depth.
The dimensions are determined as per the customer's specifications.

Die storage with full extension



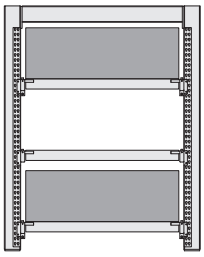
System with rolling racks

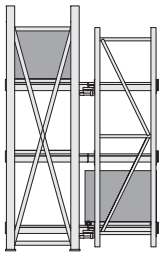
Heavy dies (up to 3,000 kg manually, larger load capacities with electric drives) can be conveniently stored on the rolling racks from above using a crane or forklift.
The side guides can be rigidly attached. In confined spaces, e.g. on roadways, the side guides can also be folded onto the rolling rack systems.

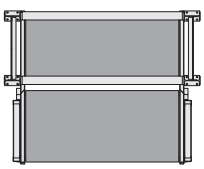
Depending on the requirements, the rack level can be fitted with smooth sheet metal covering, with edges as an oil sump at any height on one or more sides, with centring corners, centring rails or as a grating.

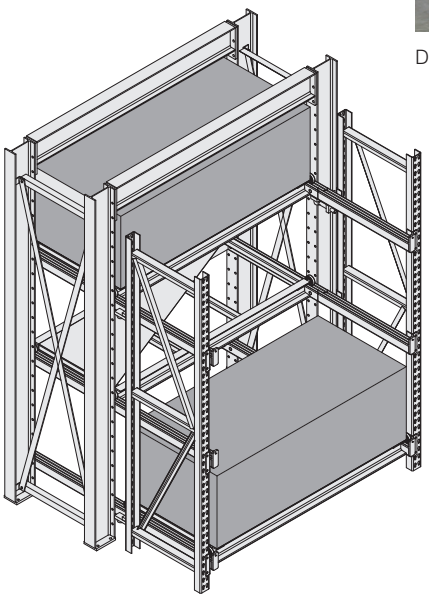
Die storage with laterally retractable side guides

Rack extended

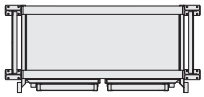






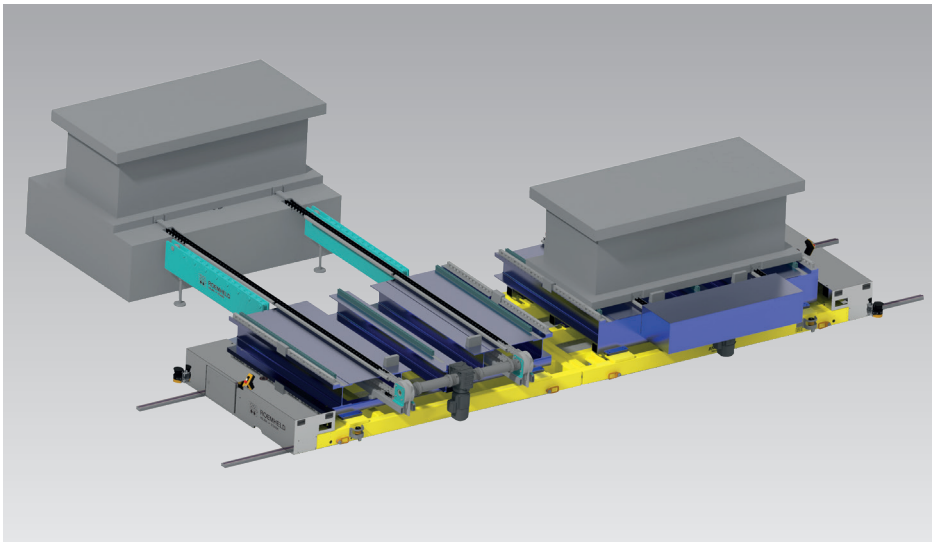


Rack retracted (top view)



Die Changing Cart RWS, rail-guided

With electric drive and integrated push-pull system
Load of up to 40 t



Advantages

- Safe and gentle transport and changing of the heaviest dies
- Linking of several presses with only one changing table
- The press is free and can manufacture until the moment the die is changed
- Die changing cart with integrated lifting bars and push-pull system
- Simple and central operation of the cart with a remote control

Advantages over automated guided vehicles

- Low energy consumption
- High precision up to ±0.3 mm
- Small space requirements
- High availability
- Minimal floor requirements

Application

The die changing cart RWS is used for the transport and the change of pressing and punching dies as well as injection and casting moulds up to a weight of 40 t.

Description

The RWS die changing cart is rail-guided, electrically driven and equipped with a special pull-push system in chain design or with a linear actuator.
The changing platform has stable roller rails to facilitate the insertion of the dies onto the press table.
The cart runs on special round rails with extremely low rolling resistance. They offer precise guidance and are insensitive to dirt.
A safety circuit ensures that only the cart in the changing position can move the pull-push system.
To transfer the die to the press, additional consoles are provided to compensate the distance between the press table and the die changing cart.
The RWS die changing cart can link several presses together for a die change, moving back and forth from one press to the next. Standardisation is not necessary. Different die sizes can be easily changed with one system using a standardised base plate. Semi-automatic and fully automatic die changes are possible thanks to the control system that is integrated in the cart and precise positioning. The complete system is rounded out by a variety of clamping technology solutions in the press.

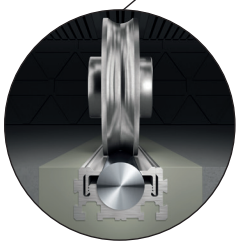
Delivery

- Die changing carts in the series small up to 15 t, medium up to 25 t and large up to 40 t single die weight (with base plate), travel speed up to 10 m/min
- Integrated control via hand control bottle
- Push-pull system
- Rollers for round rails
- Semi-automatic positioning and manual / mechanical ground staking for locking with simultaneous safety switching
- Power supply via cable drum integrated in the cart

Options

- Tandem or single cart
- Radio remote control
- Integration into the press control system
- Additional safety devices
- Fully automatic system for die change

Basic cart system



Round rails for minimal rolling resistance

Transport cart, movable on round rails

Technical data

Minimal transfer height	[mm]	500
Displacement speeds		
Pull-push chain	[m/min]	2.0
Changing carts	[m/min]	10

Tolerances for installed round rails

Tolerance for track on the entire length of rails	[mm]	±0.5
Tolerance of levelness (height) on 5 m length of the line	[mm]	±1.0
Length tolerance for 3 m length of rails	[mm]	– 1

Recommended floor condition

- Min. thickness of concrete slab: 200 mm
- Min. concrete strength class: C25/30, industrial floor
- ±5 mm tolerance on 5 m length in the line area

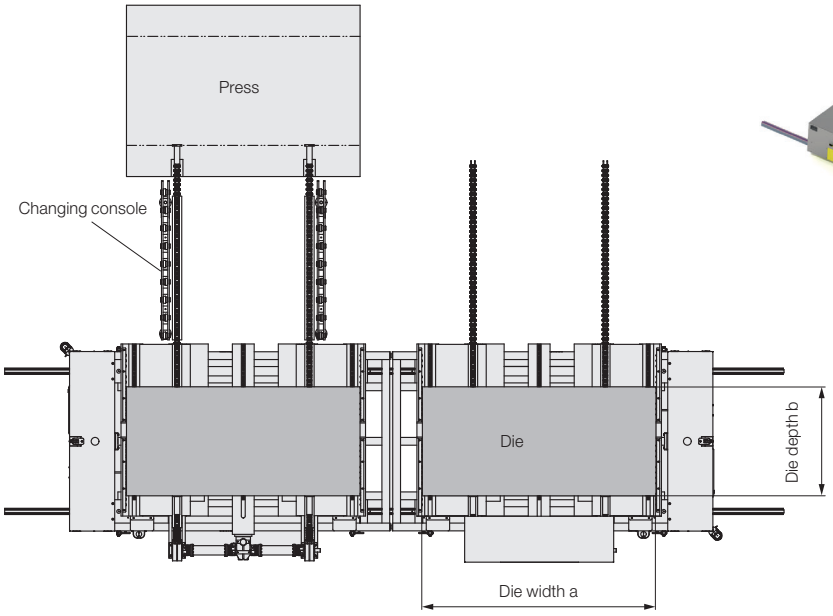
Control

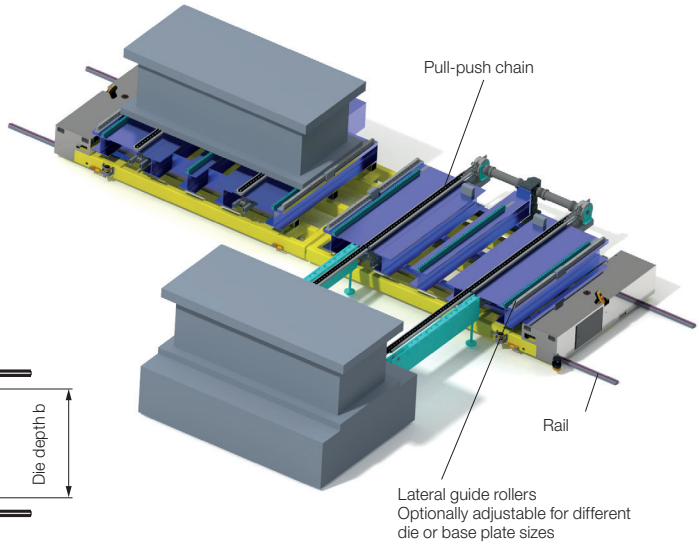
One control unit (tandem with one control unit) is installed in each cart. It is operated using a cabled remote control.

Control functions in dead man operation with automatic creep speed:

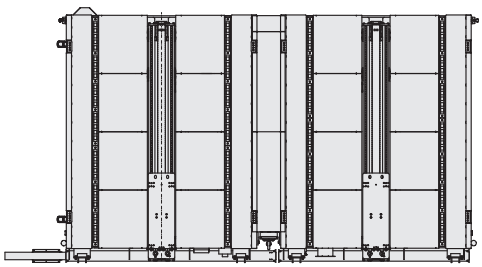
- Movement of the changing cart left/right
- Movement of the push-pull device forward/ backward

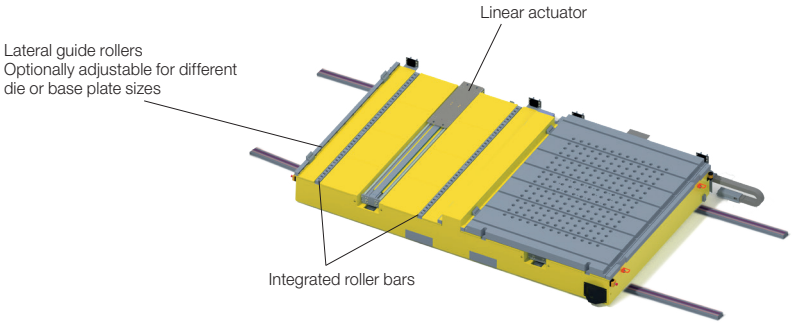
Die changing cart RWS with pull-push chain for die insertion

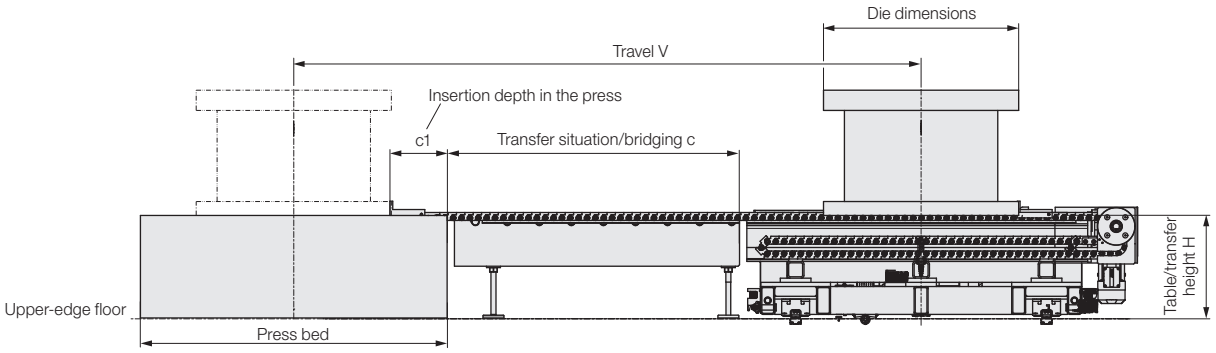




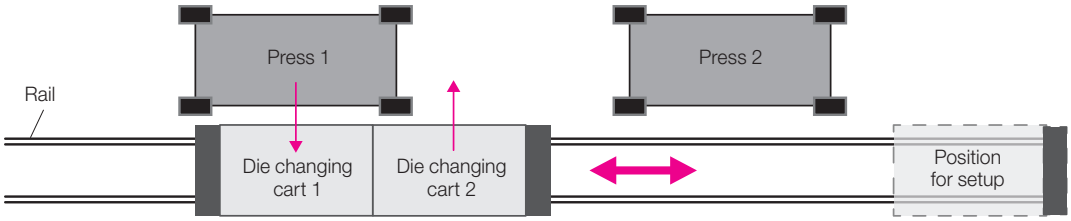
Die changing cart RWS with linear actuator for die insertion



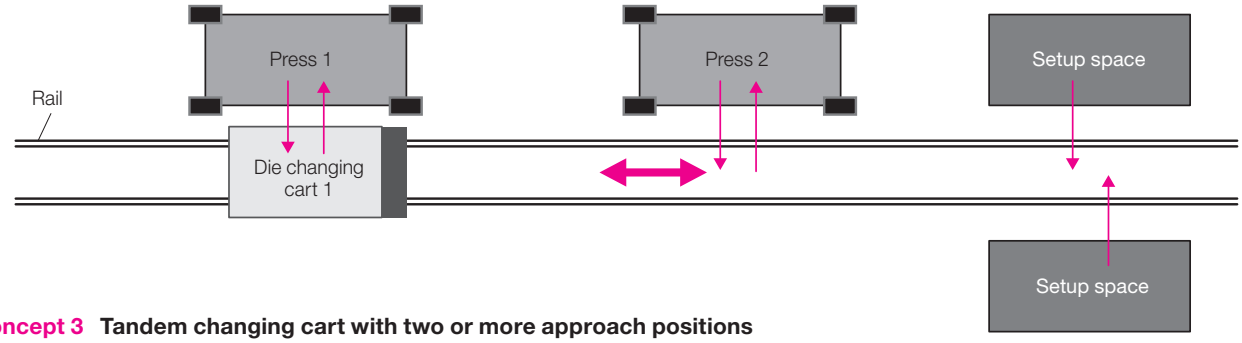




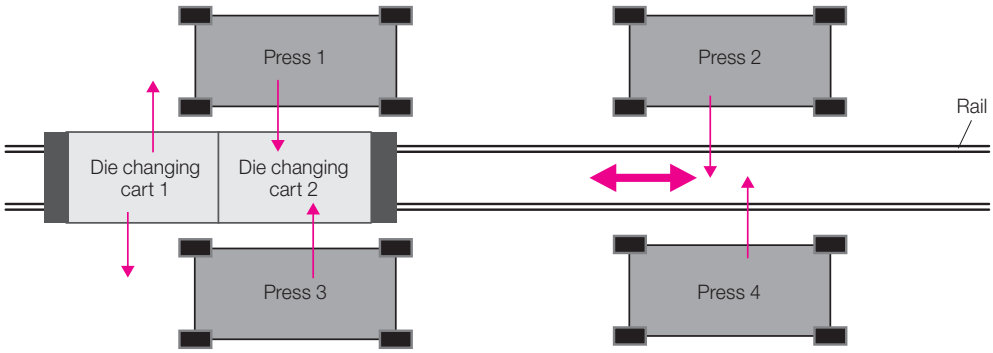
Concept 1 **Tandem changing carts with two or more approach positions**
Preliminary setup in separate position



Concept 2 **Single changing cart with two or more approach positions**
With optional setup space



Concept 3 **Tandem changing cart with two or more approach positions**
For use on opposite presses with equal spacing
The push-pull system travels in two directions.



Concept 4 **Single changing cart with rotated travel axis**
With or without setup space