HOME OF CLAMPING



2023/2024
HYDRAULIC CLAMPING SYSTEMS

WE GENERATE EXCITEMENT.

Since the foundation of the company in 1890 until today the goal has remained the same: the highest quality in products and services. Nevertheless, the circumstances, tasks and challenges have changed, of course. By focussing on our core areas of expertise, we have long set new standards for innovative clamping technology - driven by our own development, the greatest possible flexibility and passion for individual solutions.

All this is only possible with committed and contented employees. Respectful interaction with others, personal development and measures for the wellbeing of each individual are therefore values that matter to us.



Company Management:
Wolfgang Balle, Johannes Maier (CEO), Jürgen Förster

OUR COMPANY HISTORY

1890 Company founded as a lock manufacturer by Andreas Maier.

1920 Product range extended to include spanners.

1928 Production line assembly of FELLBACH LOCKS.

1951 Introduces clamping elements and diversifies into workpiece and tool clamping technology.

1965 Toggle clamps extend the AMF product range, AMF catalogues are now printed in ten languages.

1975 Further specialisation into hydraulic clamping technology.

1982 Clamping and fixture systems round off AMF's clamping expertise.

1996 AMF team organisation in all sectors of the business, Quality management with certification to ISO 9001.

2001 AMF Service Guarantee for all products.

2004 Introduction of the ZPS zero-point clamping system.

2007 The magnetic clamping technology extends the AMF product range.

2009 Development and marketing of AMF Vacuum clamping technology.

2012 LOW-COST AUTOMATION gripping, clamping, marking and cleaning.

2014 AMF presents the most extensive product range of automation solution in zero-point clamping technology.

2017 Wireless sensoring systems extend the expertise into Industry 4.0 and blends seamlessly into the AMF product range.

PLEDGES THAT COUNT IN EVERYDAY LIFE

For this reason, we have a few principles that we follow by conviction and which always apply..

INDIVIDUAL DEVELOPMENT

Even if the product you need does not even exist yet, we will find the right solution with you: from special designs to new developments, everything is possible.

WARRANTY

If, despite our high quality standard, there is a complaint, this is dealt with quickly and unbureaucratically, even beyond the warranty period.

HIGHEST QUALITY STANDARDS

Careful manufacturing based on tradition since 1890, and naturally with a modern quality management system according to ISO 9001 for many years.

SHORT DELIVERY TIME

With over 5,000 articles in our warehouse, you can expect your order to be dispatched on the same day.

COMPETENT SERVICE FROM EXPERTS

Your local retail partner or the specialists in our team will find the right solution for every task.

MADE IN GERMANY

Our entire product range is developed and manufactured exclusively by our employees in Germany.

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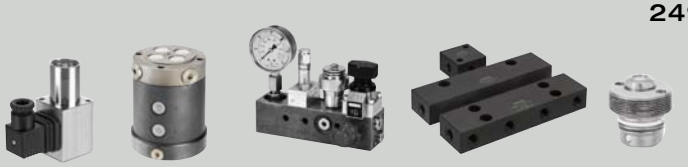
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Our innovations and highlights at a glance

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VERTICAL CLAMP MINI
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New size!



CLAMPING ARM
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New size!

SUPPORT ELEMENT, FLANGE DESIGN WITH BACKPRESSURE QUERY
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NEW!



SUPPORT ELEMENT, THREADED DESIGN WITH BACKPRESSURE QUERY
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NEW!

AUTOMATIC COUPLING NIPPLE, THREADED DESIGN
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NEW!

SUPPORT ELEMENT, BASE-FLANGE-MOUNTING
No. 6964H, page 208

NEW!



SUPPORT ELEMENT, CARTRIDGE FLANGE
No. 6964H, page 214-215
New sizes!

NEW!

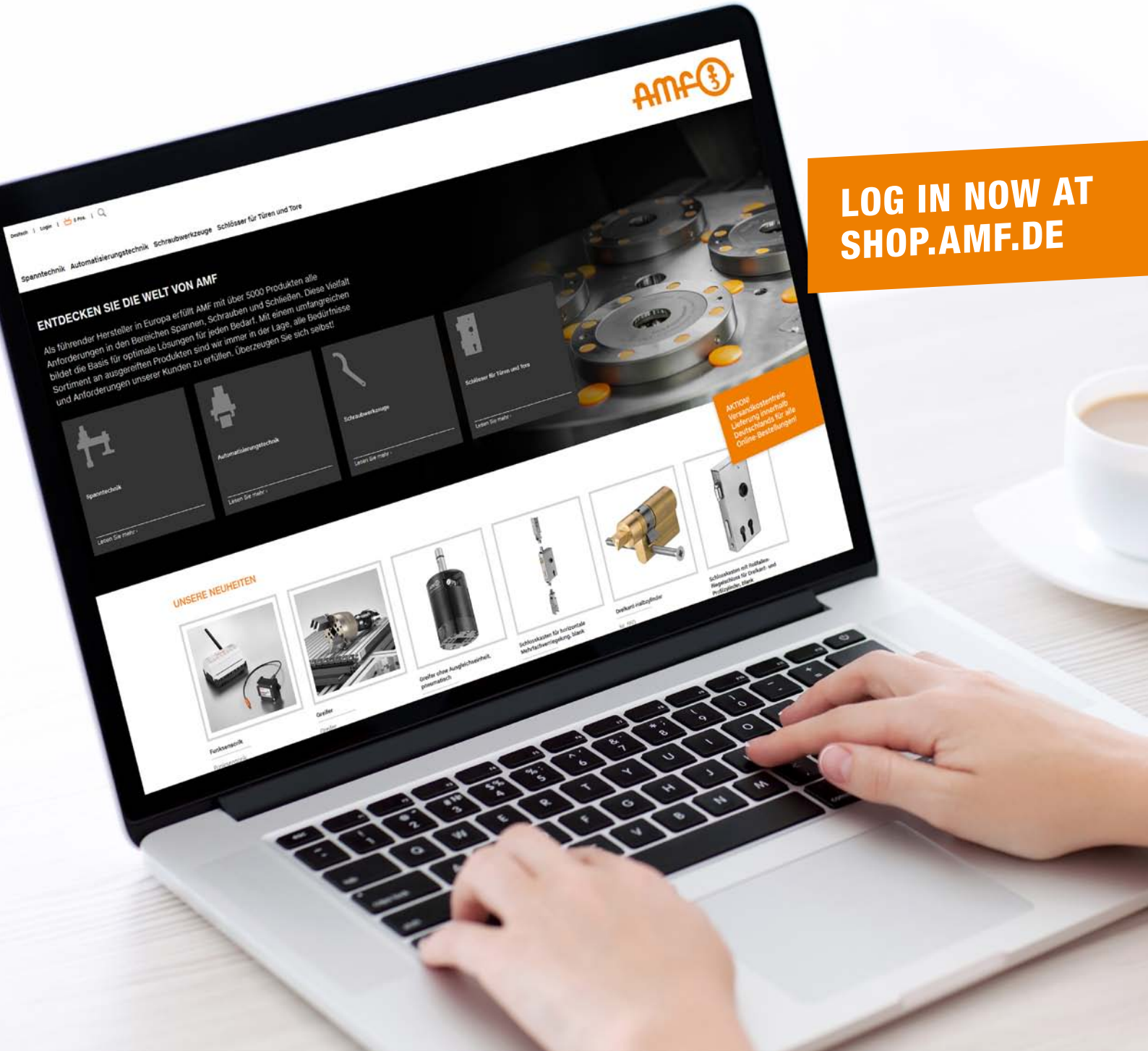
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RECOMMENDATIONS AND PARAMETERS OF OIL-HYDRAULIC DEVICES AND PLANTS.

GENERAL:

All parameters are published in accordance with the DIN regulations.

OIL RECOMMENDATION:

Oil temperature (°C)	designation to DIN 51 524	viscosity to DIN ISO 3448
0–40	HL, HLP 22 or HLPD 22	ISO VG 22
10–50	HL, HLP 32 or HLPD 32	ISO VG 32

CLAMPING ELEMENTS:

Pressure range:

At continuous pressures below 80 bar, this must be stated on ordering as a different seal combination may need to be selected.

Ambient temperature:

-10°C to +60°C

Thermal expansion:

If thermal expansion is prevented in a hydraulic system, the pressure rises by about 10 bar per 1 °C temperature increase. Such conditions require overpressure protection.

Seals:

> O-rings made of NBR or PU
> Supporting rings made of PTFE
> Flange seals made of PTFE, NBR, PU or Cu
> Glydring made of PTFE or PU
> Scraper ring made of PU or NBR

At higher ambient temperatures, clamping elements have to be equipped with heat-resistant seals (Viton® or similar). These are available upon request.

Mounting position:

As desired, unless otherwise specified.

Piston radial force:

The piston radial force must never exceed 5% of the nominal cylinder force.

Stroke speed:

0.01 – 0.5 m/s (for swing clamps, always observe the specifications!).

Leakage rate:

Dynamic = up to 32 mm piston dia.:
< 0.3 cm^3 per 1000 double strokes and 10 mm stroke (HLP 22)
from 40 mm piston dia.:
< 0.6 cm^3 per 1000 double strokes and 10 mm stroke (HLP 22)
Static = no leakage rate

FOR YOUR SAFETY:

To avoid injuries, a maximum distance of 4 mm (in accordance with DIN EN ISO 13857, part 1) between workpiece and clamping element must not be exceeded.

To ensure safe clamping, clamping elements must be positioned in such a way that a residual stroke remains in the clamping cylinder after clamping.

HOSE CONNECTIONS:

When using high-pressure hoses, the following must be observed:
> maximum operating pressure
> bending radius
> tightening torque of cap nut
> dynamic or static use
> environmental influences
> the date for the permissible duration of use

PIPES:

Seamless steel pipe, phosphatised and oiled, dia. 8x2 mm, in accordance with DIN EN 10305. Pipes must be kept as short as possible, especially when used with single-action cylinders. Pipe bends must be made to the largest possible radius.

CONNECTING THREADS:

Whitworth pipe thread, X-type threaded bore in accordance with DIN 3852, page 2. Seal by means of sealing edge. Do not use Teflon tape or additional sealing compound.

STATIC PRESSURE IN HYDRAULIC SYSTEM:

Cylinders, valves or lines and couplings create internal friction. An oil pressure of approx. 2 bar is required to overcome this static pressure. For single-acting cylinders with return springs, the static pressure must be reduced by keeping the supply line as short as possible and using piston rods with the smallest possible mass. Max. permissible back pressure for unclamping must not be exceeded. The counter-pressure in the return flow should not exceed 0.5 bar.

For double-acting elements, static pressures increases when load is applied to the rod side. Parts of the relatively large oil volume on the piston side cannot drain quickly enough. Static pressure does usually not affect the clamping elements.

COMMISSIONING AND MAINTENANCE:

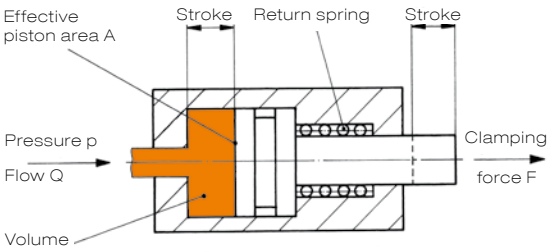
> Use only clean hydraulic oil of the specified type.
> Observe all instructions and information provided in mounting instructions before commissioning!
> Vent the hydraulic system at low operating pressure at the highest point until the fluid is free of bubbles.

Hydraulic directional valves are very sensitive to soiling and contamination. Contamination and soiling of the pressure medium must be avoided. An oil change every six months is recommended. The oil level in the pressure generator must be checked regularly.

Subject to technical alterations.

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HYDRAULIC PARAMETERS, UNITS AND FORMULA SYMBOLS:



TECHNICAL EQUATIONS:

Clamping force: $F\ (N) = 10 \times A\ (cm^2) \times p\ (bar)$

Required operating pressure: $p\ (bar) = \frac{0{,}1 \times F\ (N)}{A\ (cm^2)}$

Oil volume per cylinder: $V\ (cm^3) = 0{,}1 \times A\ (cm^2) \times \text{stroke}\ (mm)$

Clamping time: $t\ (s) = 1 + \frac{A\ (cm^2) \times \text{stroke}\ (mm) \times n\ (\text{no's of cyl.})}{Q\ (l/min.) \times 167}$

The units used in this catalogue for physical quantities are in accordance with DIN 1301.

Symbol	Unit	Description	Unit	Conversion
F	N	Force	Newton	1 N ≈ 0,1 kp 1 kN ≈ 100 kp
p	bar Pa	Pressure	bar Pascal	1 bar =10 N/cm² ≈ 1 atm. = 10^5 N/m² 1 Pa = 1 N/m²
A	cm^2	Effective piston area	-	1 m^2 = 10^4 cm^2
V	cm^3	Volume	-	1 dm^3 = 1000 cm^3 = 1l (Liter)
t	s	Time	second	-
Q	$\frac{l}{min}$	Oil-flow rate	-	$1\ \frac{l}{min} = 16{,}67\ \frac{cm^3}{s}$

CLAMPING FORCE OF BOLTS:

For hydraulic clamping, the fatigue strength of the bolts is considered to obtain a high number of strokes. The testing force or yield strength must only be utilized for low numbers of strokes.

Clamping bolts					Hydraulic cylinders								
Thread	Pitch [mm]	Nominal cross-section As [mm²]	Testing force for bolt grade 8.8 [kN]	Permissible load for continuous operation [kN]	Nominal cylinder size 2	5	8	12	20	32	50	70	125
M 6	1,00	20,1	11,6	4,3									
M 8	1,25	36,6	21,2	8,0									
M 10	1,50	58,0	33,7	12,5									
M 12	1,75	84,3	48,9	18,3									
M 14	2,00	115,0	66,7	25,0									
M 16	2,00	157,0	91,0	34,0									
M 18	2,50	192,0	115,0	43,0									
M 20	2,50	245,0	147,0	55,0									
M 24	3,00	253,0	212,0	79,5									
M 27	3,00	459,0	275,0	103,0									
M 30	3,50	561,0	337,0	126,0									

NOMINAL CYLINDER SIZES:

The nominal cylinder sizes are intended to facilitate cylinder selection: These sizes correspond to the clamping force in kN, related to the maximum operating pressure in each case (usually 400 bar) and the effective piston area.

Nominal cylinder size	Piston dia. [mm]	Piston area [cm²]	Clamping force F en kN 100 bar	250 bar	350 bar	400 bar	500 bar
2,0	8,0	0,5	0,50	1,25	1,75	2,0	2,5
2,4	9,0	0,7	0,68	1,70	2,40	-	-
4,4	12,5	1,3	1,25	3,10	4,40	-	-
5,0	12,0	1,1	1,10	2,80	3,80	4,4	5,5
5,9	14,7	1,7	1,70	4,20	5,90	-	-
6,6	15,5	1,9	1,90	4,70	6,60	-	-
8,0	16,0	2,0	2,00	5,00	7,00	8,0	10,0
10,1	19,0	2,9	2,88	7,20	10,1	-	-
12,0	20,0	3,1	3,00	7,50	10,9	12,0	15,0
14,0	22,0	4,0	4,00	10,0	14,0	-	-
17,5	25,0	5,0	5,00	12,7	17,5	-	-
17,8	25,0	5,1	5,08	12,7	17,8	-	-
20,0	25,0	4,9	5,00	12,5	17,2	20,0	24,5
32,0	32,0	8,0	8,00	20,0	28,0	32,0	40,0
39,9	38,0	11,4	11,4	28,5	39,9	-	-
50,0	40,0	12,5	12,5	31,0	43,8	50,0	62,5
63,0	45,0	15,9	15,9	39,1	55,6	63,6	79,5
70,0	48,0	18,0	18,0	45,0	63,0	72,0	90,0
78,0	50,0	19,6	19,6	49,0	68,6	78,4	98,0
94,0	55,0	23,7	23,7	59,2	83,0	94,8	118,5
125,0	63,0	31,1	31,1	78,0	108,8	124,0	155,5

Subject to technical alterations.

CONVERSION FACTORS:

Pressure:	MPa	bar	PSI
1 MPa	1	10	145,04
1 bar	0,1	1	14,504
1 PSI	0,00689	0,0689	1

MPa = Megapascal **PSI** = lb/sq. inch

Temperature:	K	°C	°F
K	1	°C x + 273,15	(°F-459,67) x 5/9
°C	K - 273,15	1	(°F - 32) x 5/9
°F	K x 9/5 + 459,67	°C x 9/5 +32	1

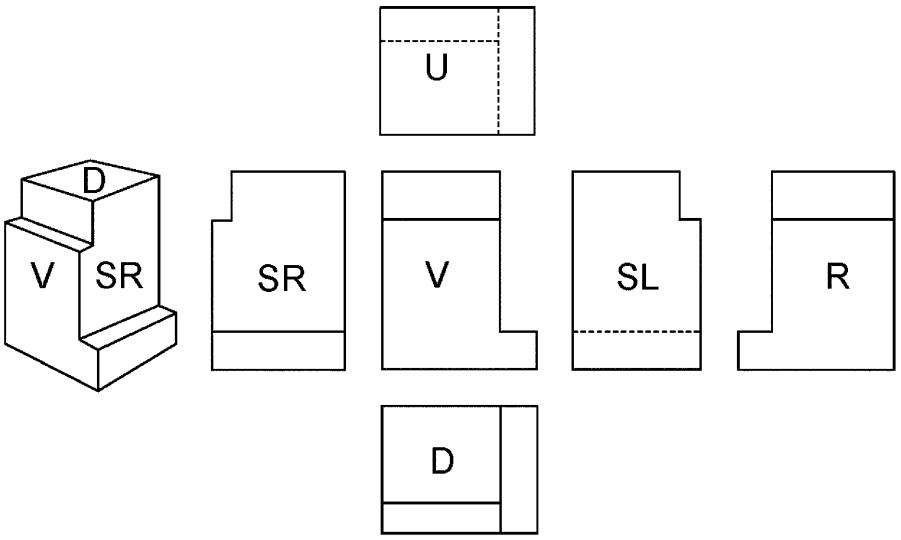
K = Kelvin **°C** = degree Celsius **°F** = degree Fahrenheit

Length:	mm	inch
1 inch	25,399	1
1 mm	1	0,0393

IMPORTANT INFORMATION ABOUT OUR INSTALLATION DRAWINGS.

ALL INSTALLATION DRAWINGS IN THIS CATALOGUE ARE IN FIRST-ANGLE PROJECTION (DIN)!

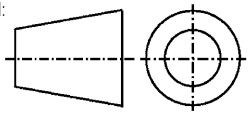
FIRST-ANGLE PROJECTION (DIN)



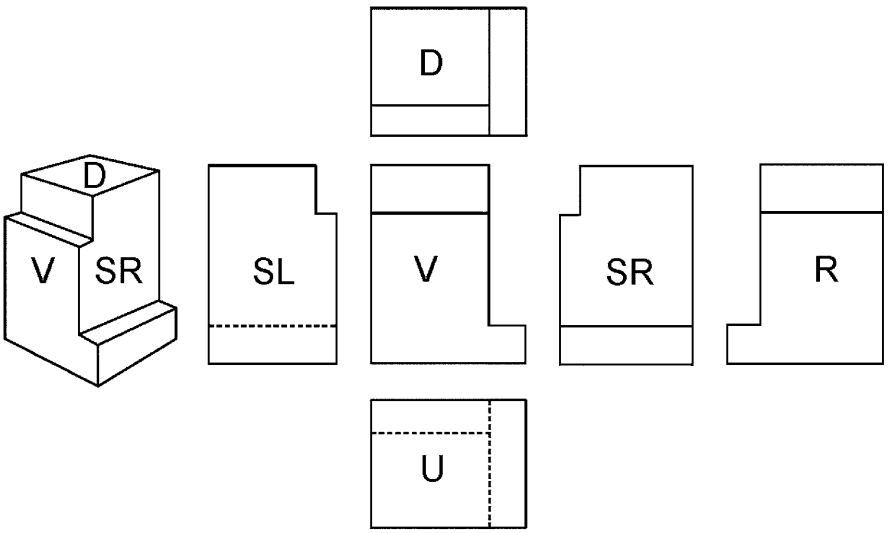
Location of other views in relation to front elevation, V:

D	Plan view	below V
SL	Side elevation from left	to the right of V
SR	Side elevation from right	to the left of V
U	Bottom view	above V
R	Rear view	to the left or right of V

Symbol:



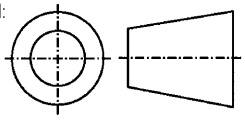
THIRD-ANGLE PROJECTION (ANSI / USA)



Location of other views in relation to front elevation, V:

D	Plan view	above V
SL	Side elevation from left	to the left of V
SR	Side elevation from right	to the right of V
U	Bottom view	below V
R	Rear view	to the left or right of V

Symbol:



Subject to technical alterations.

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PRESSURE GENERATORS: THE OPTIMAL SOLUTION FOR ANY APPLICATON

- > easy to use
- > ready for connection
- > ready for operation
- > variety of options
- > compact design
- > single and double-acting variants
- > modular design of pump
- > various valve combinations
- > available with and without electric controller
- > external control optional
- > continuous pressure control by adjustment spindle
- > valves in the de-energised condition in locked position
- > ecological operation
- > electric motors conform to efficiency classes of 2017

PRODUCT OVERVIEW:

Type	single acting	double acting	Max. operating pressure [bar]	Clamping circuits	Output flow	Effective oil volume [l]
6901	●	–	350	1	2,1 cm³ / rotation	0,026
6902	●	–	700	1	20 cm³ / 1 cm³ / stroke	0,3
6902	●	–	700	1	20 cm³ / 2 cm³ / stroke	1,0
6904	●	●	500	1	0,85 l/min.	2,1
6906	●	●	160	1 - 5	2,5 l/min.	4,0
6906	●	●	400	1 - 5	2,5 l/min.	4,0
6906N	●	●	160	1 - 4	2,5 l/min.	4,0
6906N	●	●	400	1 - 4	2,5 l/min.	4,0

PRODUCT EXAMPLES:

NO. 6902



> 1 clamping circuit
> no pressure adjustment

NO. 6904-25



> 1 clamping circuit
> automatic pressure-adjustment

NO. 6906



> 1 to 5 clamping circuits
> automatic pressure-adjustment

No. 6901

Screw Pump

block version and built-in version,
max. operating pressure 350 bar.

Order no.	Article no.	max. operating pressure [bar]	stroke volume per rev. [cm³]	stroke volume total [cm³]	Md max. [Nm]	Weight [g]
67819	6901-10	350	2,1	26	50	1524
67835	6901-20	350	2,1	26	50	689



6901-10



6901-20

Design:

Housing from steel, hardened and burnished. Threaded spindle hardened and burnished. Screw pump no. 6901-20 is supplied with 2 grooved nuts. Oil supply via threaded port.

Application:

The screw pump is particularily suitable to operate small clamping fixtures.

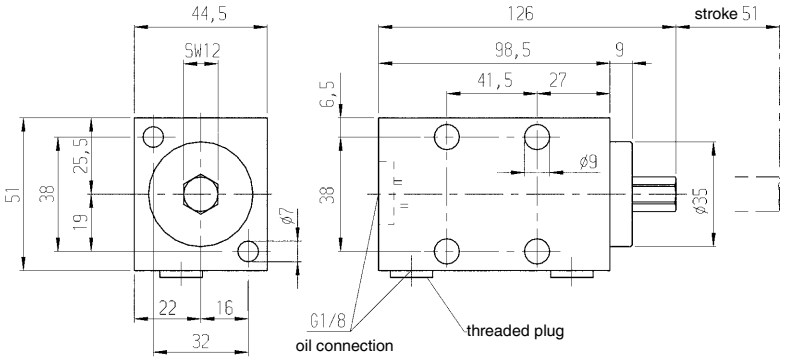
Note:

For an enclosed circuit the following has to be considered: The hydraulic clamping elements connected to the screw pump have to be hermetically tight. Due to possible leakage of the clamping cylinders during stroke movement and the compressibility of oil (1% at 140 bar), the stroke volume of the screw pump shall be used up to 70% only. The compressibility is being increased considerabely by air content in the oil. Therefore the hydraulic system has to be carefully purged of air. An air bleed screw at the highest position is a necessity. After returing the spindle of the pump, oil must be refilled at this spot. No air pocket should arise in the hydraulic system, which cannot be purged. A precise pressure control is possible by a manometer only. An electric pressure switch enables a pressure monitoring too. A pressure limiting valve is not suitable. Operating the threaded spindle by a torque wrench is possible. However the pressure should also be checked by a gauge. For the built-in version the mounting torque has to be observed.

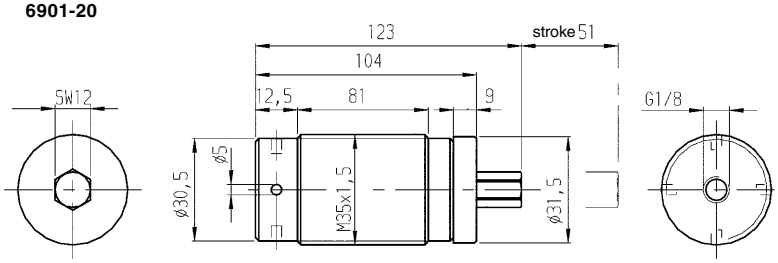
Clamping pressure in relation to torque:

Torque [Nm]	Clamping pressure [bar]
13,5	70
27,0	140
34,0	205
40,5	275
47,5	350

6901-10



6901-20



CAD

Subject to technical alterations.

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No. 6902

Hand Pump

max. operating pressure 1st stage 50 bar,
max. operating pressure 2nd stage 700 bar.



Order no.	Article no.	Displacement per stroke 1st stage [cm³]	Displacement per stroke 2nd stage [cm³]	Q usable [cm³]	max. hand lever force [N]	A	B	Weight [Kg]
61937	6902-7	20	1	300	350	320	275	6,0
61945	6902-8	20	2	1000	320	620	575	8,1

Design:

Lightweight two-speed hand-pump. Low hand force required at max. operating pressure. Pump housing from malleable cast iron, oil reservoir from aluminium. With pressure relief valve, factory set at max. pressure of 700 bar. Hand pump complete with oil fill. Oil supply via threaded port.

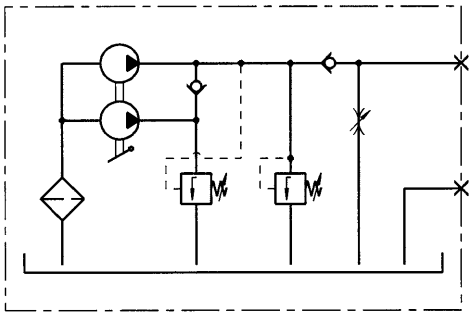
Application:

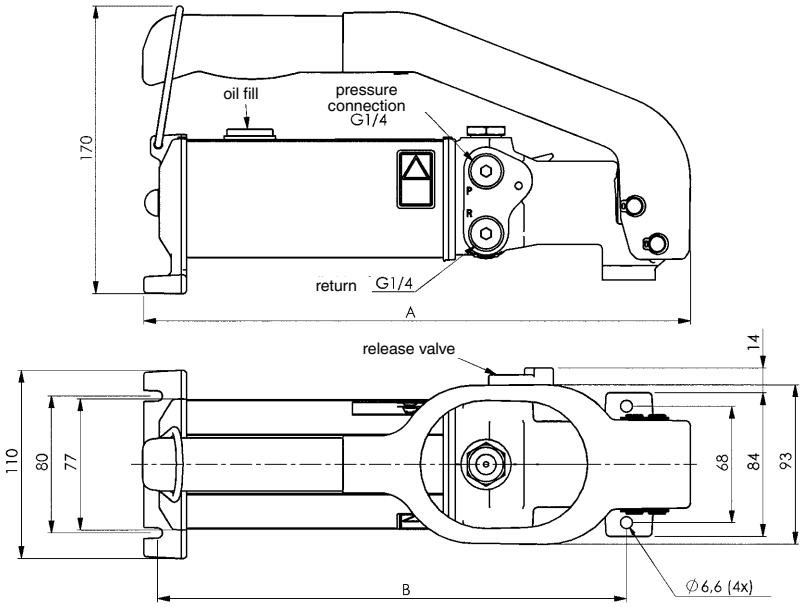
Typical applications for the hand-pump are e.g. small clamping fixtures with irregular use, testing fixtures or for repair jobs. Please note, in case of a pressure drop the hand-pump is not capable of automatically maintaining system pressure.

Note:

Can be operated in horizontal position or vertical position with head facing downwards. Before putting in to operation open combined reservoir vent-and-relief cap. Care for proper air bleeding of connected hydraulic components. Special pumps for different fluids and pressure ratings are available upon request.

Hydraulic diagram:





Subject to technical alterations.

No. 6903

Hydraulic intensifier

Temperature -40 - +120°C



Order no.	Article no.	Rato i	max. operating pressure ND [bar]	max. operating pressure HD [bar]	Q max. ND [l/min]	Q max. HD [l/min]	Weight [g]
452060	6903-20-15	1,5	200	300	8	1,0	1000
320184	6903-20-20	2,0	200	400	12	2,0	1000
275198	6903-20-32	3,2	200	640	15	2,5	1000
320192	6903-20-40	4,0	200	800	14	2,0	1000
291526	6903-20-50	5,0	160	800	14	1,6	1000
320200	6903-20-66	6,6	120	800	13	1,3	1000

ND = low pressure side, HD = high pressure side

Design:

Steel housing galvanized and chrome plated, piston and valve seat from steel. Oil supply via threaded port.

Application:

Hydraulic intensifier are used to pressurise hydraulic clamping fixtures and assembly devices. The low pressure of the tooling machine's hydraulic system will be converted into a higher operating pressure according to the ratio. Input pressure and output pressure are proportional. The output pressure can be adjusted by the input pressure.

Features:

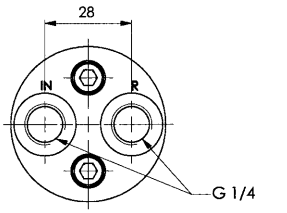
The most important functions are shown in the hydraulic circuit diagram. Oil is guided through directional valve CV to input IN and flows unimpeded through check valves KV1, KV2 and DV and into high pressure area H.
In these conditions the pressure intensifier achieves a maximum flow rate with rapid forwards motion. Once input pressure IN is achieved in high-pressure area H, valves KV1, KV2 and DV close. The output pressure is built up by oscillating pump unit OP. The unit switches itself off automatically when the output pressure is achieved in high-pressure area H. In case of pressure loss in the high-pressure area due to consumption or loss of oil, pump unit OP starts automatically in order to maintain the output pressure.
Pressure can be relieved from the high pressure area via the directly controlled valve DV.

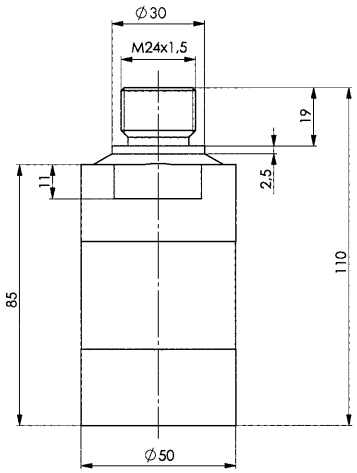
Note:

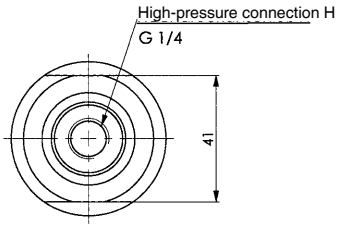
The hydraulic oil must be filtered with mesh size not larger than nominally 10 µm, 19/16 according ISO 4406. If the intensifier will be used for applications where the oil supply is disengaged, a leakage free pilot controlled check valve should be installed between high pressure output H and the cylinder. Please consider the min. control pressure for releasing. The design of the intensifier allows a certain leakage between the ports IN and R. This has to be considered in uncoupled operations.

On request:

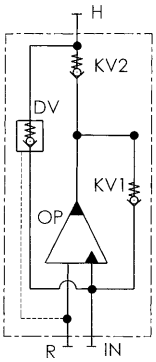
Manifold mounting and other sizes available on request.



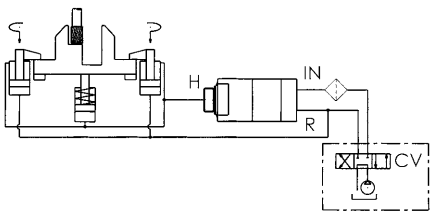


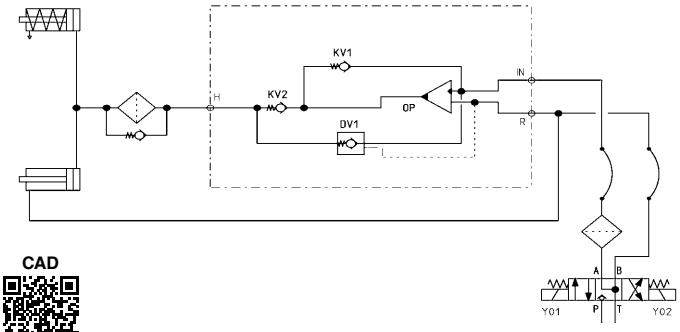


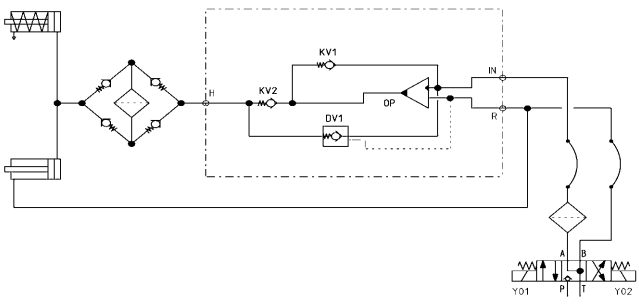
Hydraulic diagram:



Application examples:







CAD

Subject to technical alterations.

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No. 6903

Hydraulic pressure booster

For O-ring connection,
max. operating pressure in outlet 500 bar,
min. operating pressure in inlet 20 bar

Order no.	Article no.	NG	Rato i	max. operating pressure ND [bar]	max. operating pressure HD [bar]	Q max. ND [l/min]	Q max. HD [l/min]	Weight [g]
328682	6903-30-15	6	1,5	200	300	8	1,0	2360
328708	6903-30-20	6	2,0	200	400	12	2,0	2360
328807	6903-30-28	6	2,8	178	500	15	2,2	2360
328727	6903-30-32	6	3,2	150	500	15	2,5	2360
328740	6903-30-40	6	4,0	125	500	14	2,0	2360
328765	6903-30-50	6	5,0	100	500	14	1,6	2360
328781	6903-30-66	6	6,6	75	500	13	1,3	2360



Design:

Steel housing galvanized and chrome plated, piston and valve seat from steel. Oil supply via oil channel in fixture body.

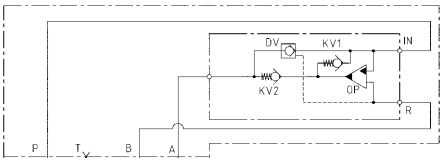
Application:

Hydraulic pressure boosters are used in clamping fixtures and assembly fixtures. The low pressure of the tooling machine's hydraulic system is converted into a higher operating pressure according to the transmission ratio. Input pressure and output pressure are proportional. The output pressure can be adjusted by the input pressure.

Features:

The most important functions are shown in the hydraulic circuit diagram. Oil is routed via the directional control valve to the IN connection and then then flows unhindered through non-return valves KV1 and KV2, as well as through non-return valve DV in the high-pressure range A.
Under these conditions, a maximum flow through the pressure booster is achieved and a fast forward movement is generated. If input pressure IN is reached in the high-pressure area, valves KV1, KV2 and PV close. The output pressure is built up by oscillating pump unit OP. The unit switches off automatically when the final pressure has been reached in the high-pressure area A. In case of a pressure drop in the high-pressure area due to oil consumption or oil loss, pump unit OP will start automatically in order to maintain the final pressure.
The pressure in the high-pressure area can be relieved via the the directly actuated pressure valve.

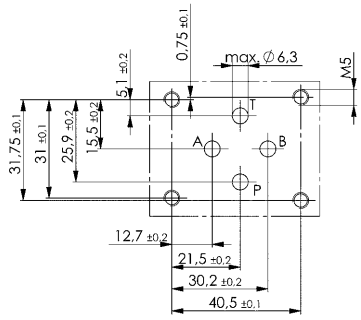
Hydraulic diagram:



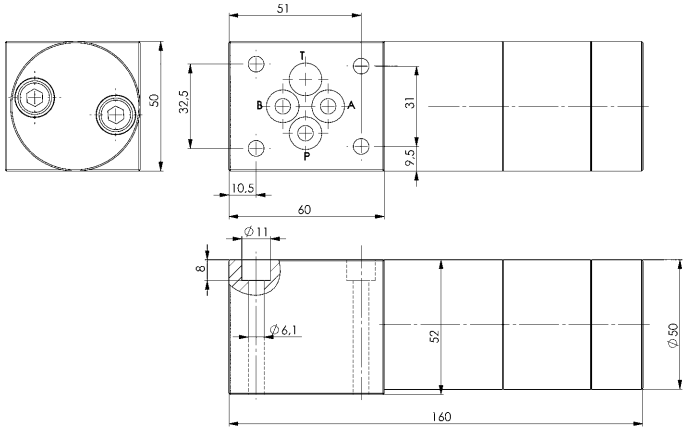
Note:

The hydraulic oil is to be filtered to a max. nominal filter mesh of 10 µm, max. 19/16 to ISO 4406. When installing in systems in which the supply is decoupled from the pressure booster, a leak oil-free, releasable non-return valve should be installed on the high-pressure side. It must be noted that the pilot ratio of the valve must be greater than the transmission ratio of the pressure booster. The structure of the pressure booster permits a certain leakage between the IN and R connections, which must be taken into account in decoupled installations.

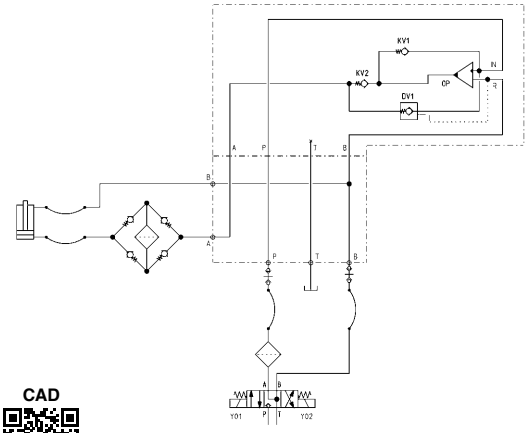
Hole pattern shape A nominal size 6:

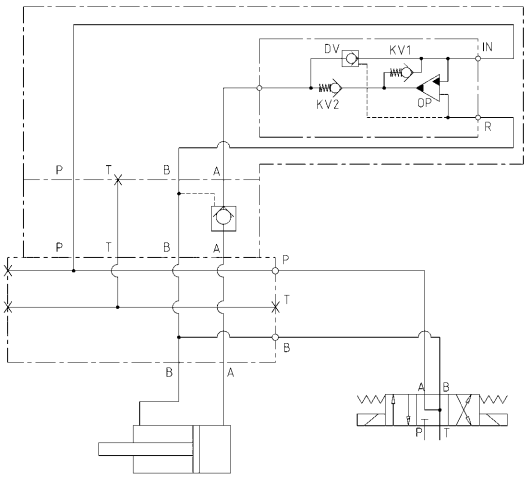


As seen in direction of the plate.



Application examples:





CAD

Subject to technical alterations.

No. 6904-20

Air-Hydraulic Pump

max. operating pressure 500 bar.

Order no.	Article no.	Pneum. pressure min. [bar]	Pneum. pressure max. [bar]	Oil capacity usable horizontal [l]	Oil capacity usable vertical [l]	Q max. [cm³/min]	Weight [Kg]
69435	6904-20	2,8	10,0	2,1	1,5	1400	6,3



Design:

Compact compressed air operated hydraulic pump for single acting circuits. Robust plastic tank. The motor is protected against contamination by an air filter at the inlet and an internal oil filter. Safety valve to prevent overpressure and sound absorbers are fitted. Oil supply via threaded port.

Application:

The air-hydraulic pump can be used for small hydraulic clamping and assembly equipment. The air-hydraulic pump is designed for single acting cylinders.

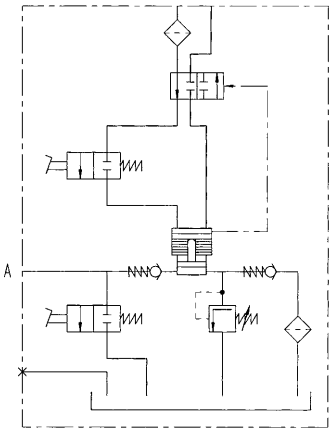
Features:

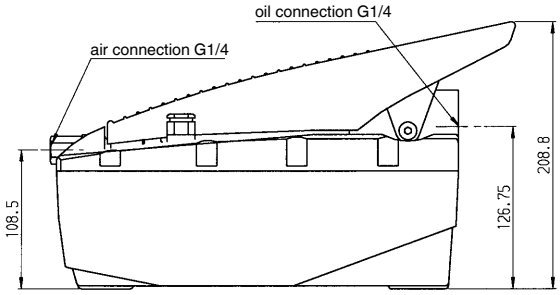
The large air/oil intensification ratio allows for high hydraulic pressures even with small air pressure. Low weight allows for mobile application. The pump can be mounted horizontally or vertically.

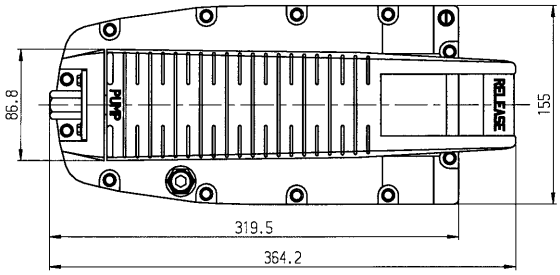
Note:

Optionally, pumps with other operating pressures are available upon request. Please observe proper venting of the single acting system.
All tolerances other than specified refer to DINISO 2768 mittel (medium).

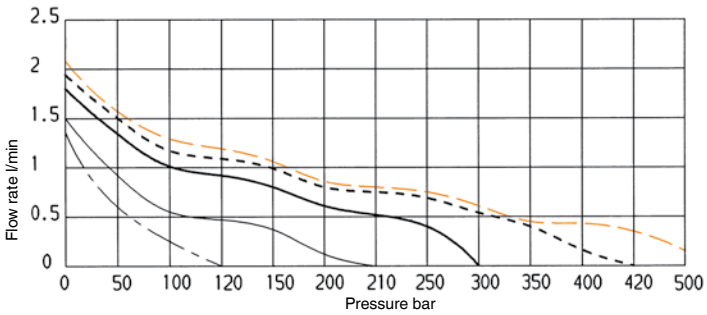
Hydraulic diagram:







Pressure/flow diagram:



Air pressure:

= 2,8 bar
= 4,1 bar
= 5,6 bar
= 6,9 bar
= 8,3 bar

Subject to technical alterations.

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No. 6904-25

Air-Hydraulic Pump

max. operating pressure 500 bar.



Order no.	Article no.	Pneum. pressure min. [bar]	Pneum. pressure max. [bar]	Oil capacity usable horizontal [l]	Oil capacity usable vertical [l]	Q max. [cm³/min]	Weight [Kg]
69450	6904-25	2,8	10,0	2,1	1,5	1400	6,3

Design:

Compact compressed air operated hydraulic pump for double acting circuits. Robust plastic tank. The motor is protected against contamination by an air filter at the inlet and an internal oil filter. Safety valve to prevent overpressure and sound absorbers are fitted. Oil supply via threaded port.

Application:

The air-hydraulic pump can be used as drive element for small hydraulic and assembly equipment. Safety is guaranteed by automatic pressure compensation. The air-hydraulic pump is designed for the assembly of valves with connection diagram CETOP 03, i.e. with the option to control single or double acting cylinders. The changeover can be made manually, pneumatically or electrically.

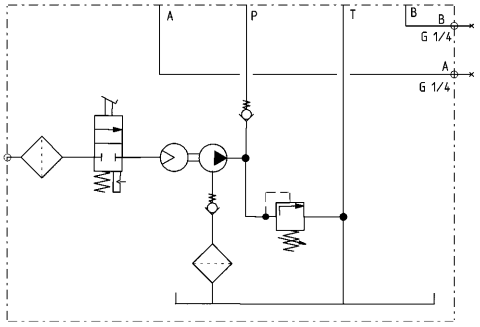
Features:

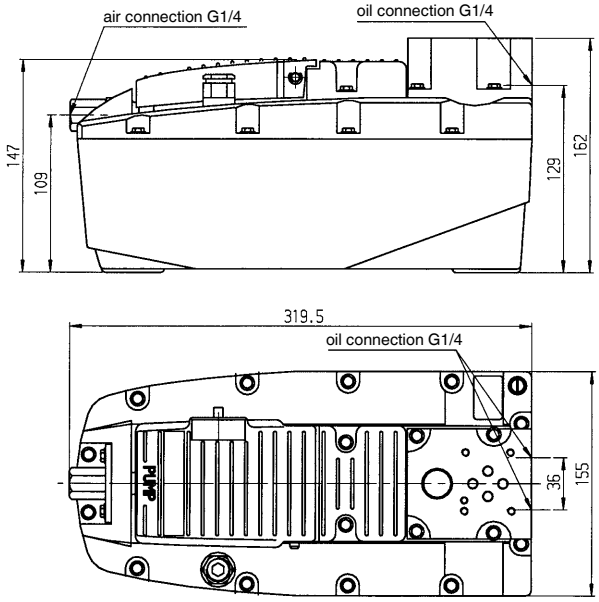
The large air/oil intensification ratio allows for high hydraulic pressures even with small air pressure. Low weight allows for mobile application. The pump can be mounted horizontally or vertically.

Note:

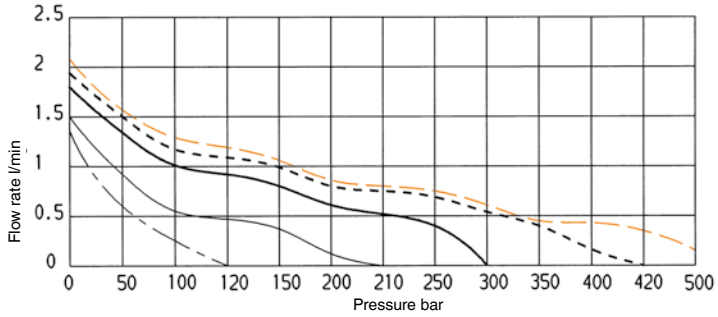
Optionally, pumps with other operating pressures are available upon request. Please observe proper venting of the single acting system. All tolerances other than specified refer to DINISO 2768 mittel (medium).

Hydraulic diagram:





Pressure/flow diagram:



Air pressure:

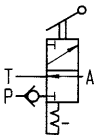
= 2,8 bar
= 4,1 bar
= 5,6 bar
= 6,9 bar
= 8,3 bar

Subject to technical alterations.

No. 6904-50

Seat Valve 3/2

max. operating pressure 500 bar,
min. operating pressure 10 bar.





Order no.	Article no.	NG	Q [l/min]	Weight [g]
271031	6904-50	6	12	444

Design:

Design: Seat valve
Type of actuation: manual

Application:

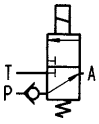
For single acting cylinders. CETOP 3 adaptation.

CAD

No. 6904-52

Seat Valve 3/2

max. operating pressure 500 bar,
min. operating pressure 10 bar.





Order no.	Article no.	NG	U [V DC]	Q [l/min]	Weight [g]
259242	6904-52	6	24	12	740

Design:

Design: Seat valve
Type of actuation: electric

Application:

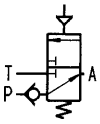
For single acting cylinders. CETOP 3 adaptation.

CAD

No. 6904-54

Seat Valve 3/2

max. operating pressure 500 bar,
min. operating pressure 10 bar.





Order no.	Article no.	NG	Q [l/min]	Weight [g]
267427	6904-54	6	12	459

Design:

Design: Seat valve
Type of actuation: pneumatic

Application:

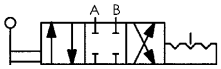
For single acting cylinders. CETOP 3 adaptation.

CAD

No. 6904-59

Directional valve 4/3

max. operating pressure 700 bar,
min. operating pressure 10 bar.





Order no.	Article no.	NG	Q [l/min]	Weight [g]
563516	6904-59-01	6	30	380

Design:

Design: Piston valve
Type of actuation: manual

Application:

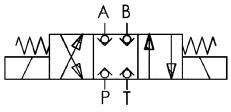
For double acting cylinders. CETOP 3 adaptation.

CAD

No. 6911A-07-01

Seat Valve, 4/3-Way

for O-ring joint,
max. operating pressure 400 bar,
min. operating pressure 10 bar.





Order no.	Article no.	NG	Q [l/min]	OR-1 O-ring Order No.	Viscosity [cSt]	U [V DC]	Weight [g]
322065	6911A-07-01	6	20	493478	10-500	24	2356

Application:

For double acting cylinders. CETOP 3 adaptation.

Note:

Further information can be found under Accessories/Valves.

CAD

No. 6904-90

Air filter and pressure regulator



Order no.	Article no.	Air connection	Weight [g]
258236	6904-90	G 1/4	740

Application:

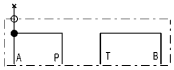
For Air-Hydraulic Pump 6904-20 or -25.

Subject to technical alterations.

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No. 6906-20-33

Diverter plate



CAD

Order no.	Article no.	L x W x H	Connection	O-ring Order No.	Weight [g]
325332	6906-20-33	60 x 41 x30	1 x G1/4	493478	525



Design:

Steel, TEM-deburred and phosphated. With O-rings. CETOP 03 hole pattern.

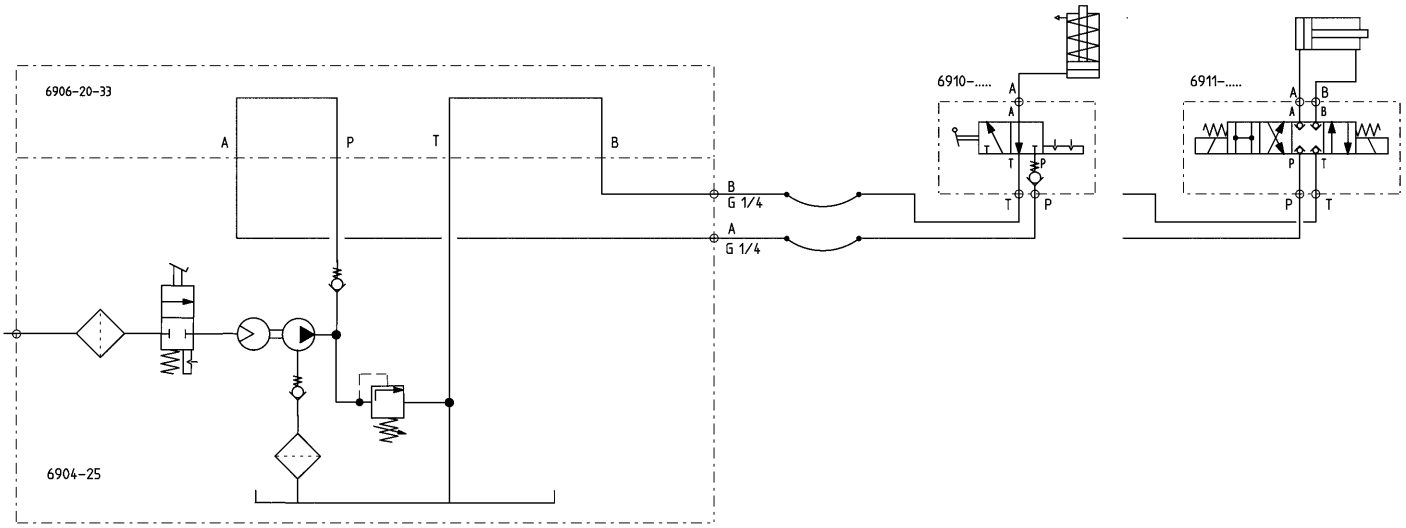
Application:

Facilitates use of the air hydraulic pump 6904-25 without additional valve attachment.

Note:

The fastening bolts ISO 4762-M5x30 order no. 338244 for fastening without a pressure regulating valve and the fastening bolts ISO 4762-M5x70 order no. 49349 for fastening with a pressure control valve are not supplied as standard.

Application example:



Subject to technical alterations.

No. 6906

Pump unit

with pressure relief valve
and electronic pressure switch,
single- and double-acting,
max. operating pressure 200 bar.



Order no.	Article no.	Clamping circuits	Q [l/min]	Valve type	Matching control unit	Electric control	Pressure switch	Weight [Kg]
327726	6906-61660	1	2,5	4/3	-	-	-	53
327742	6906-61661	1	2,5	4/3	6906B-2-1	●	-	61
327635	6906-61661-BZH	1	2,5	4/3	6906BZH-2	●	2	61
327650	6906-62660	2	2,5	4/3	-	-	-	56
327676	6906-62661	2	2,5	4/3	6906B-3-2	●	-	64

Design:

Compact, plug-in pump unit, ready for electric and hydraulic operation. Complete with: pressure limiting valve and pressure switch, solenoid valve, pressure gauge, float switch with temperature monitoring, oil fill, electrical control with main switch, indicator lamps and flange sockets. Electrical connection, complete with CEKON connector, pressure filter with filter mesh of 25µm. Oil supply via threaded port.

Application:

These pump units are mainly used as drive and control elements for single- and double-acting clamping devices.

Operation type:

Control panel for one and two clamping circuits. Two-hand control panel for only one clamping circuit.

Features:

The radial piston pump is driven via an alternating current standard motor with the energy efficiency class IE3. The motor is protected against overload by a motor protection switch and a thermoelement. Pressure setting and pressure monitoring are accomplished via a pressure limiting valve (DBV) and an electronic pressure switch (EDS). The value set at the pressure limiting valve is stored with the Mode button on the pressure switch. This simultaneously sets the preprogrammed switch-off and switch-back point.

- High safety standard through the use of 4/3-way seat valves!
- No unwanted traversing movements. In the event of a loss of power or contact problems, the valve returns to the hermetically sealed centre position.
- Easy activation of external machine controllers (e.g. PLC).

The pump unit works in intermittent mode. In the event of a loss of pressure, the pump is subsequently automatically switched by the pressure switch. In the event of a lack of oil or an increase in oil temperature, the built-in floating switch with temperature monitoring switches the pump off and the fault lamp on the electrical controller lights up.

Note:

Ensure that the ventilation is working properly when connecting the elements. In the event of a loss of pressure, subsequent pumping must not exceed a maximum of 2 times per minute. The pump unit must not be allowed to run continuously.

Options:

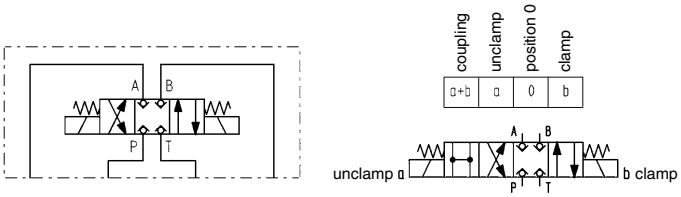
Clamping circuits: For up to 5 clamping circuits, there is an electrical controller. For more than 5 clamping circuits, there is no electrical controller.
Valve combination: Pressure reduction and clamping pressure monitoring in certain clamping circuits. Pressure reduction for all subsequent clamping circuits. Pressure filter with filter mesh 10µm or 40 µm. Throttle valves for specified clamping circuits.

On request:

Directional valves with other function diagrams on request.
Three to five clamping circuits on request.

Hydraulic diagrams:

Energizing both valve magnets creates a switching position that links all 4 connections to each other. A depressurised state is created that allows easy coupling.



4/3-directional seat valve for single and double-acting consumers

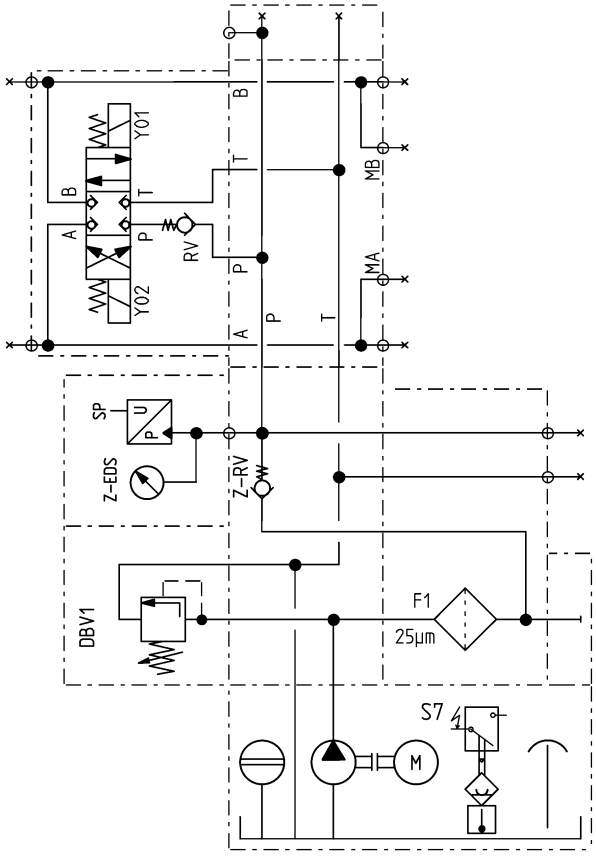
CAD

Subject to technical alterations.

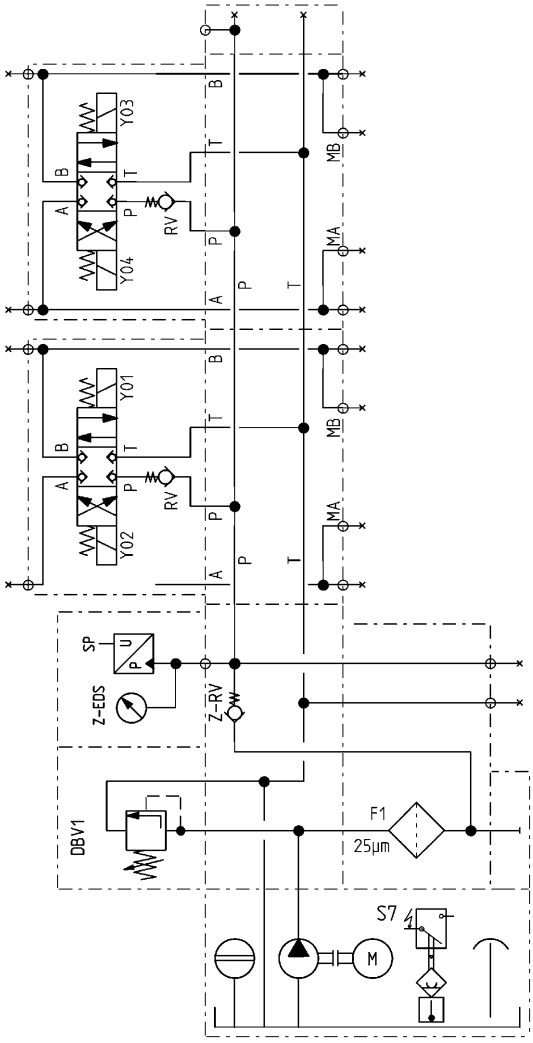
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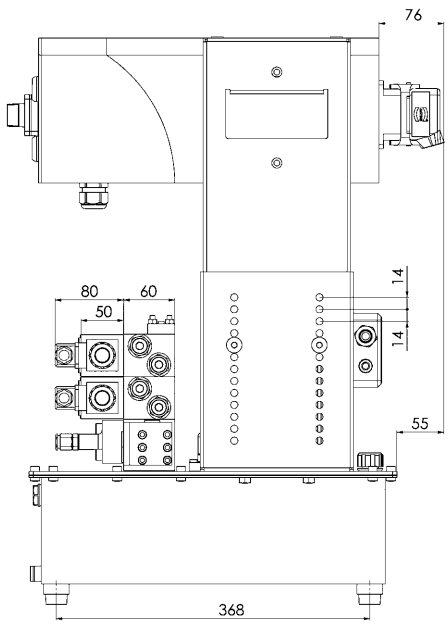
Hydraulic diagrams with DBV and EDS:

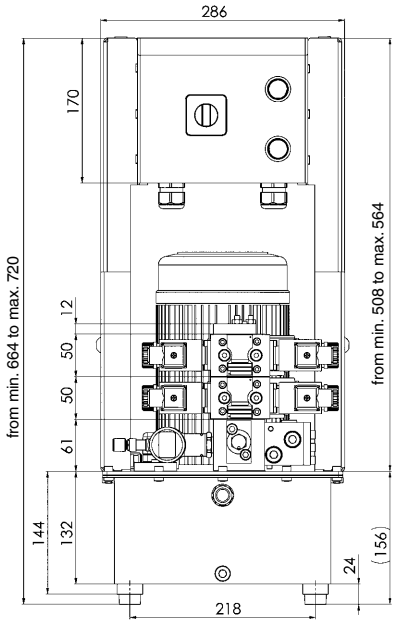
1 clamping circuit, double acting

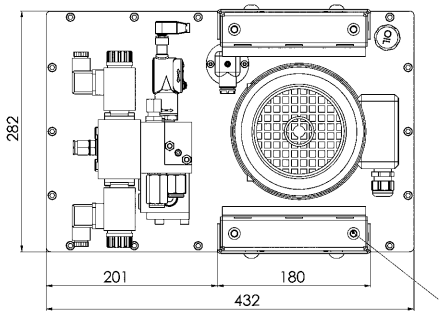


2 clamping circuits, double acting









M8 thread for lifting devices

Subject to technical alterations.

No. 6906

Pump unit

with pressure relief valve
and electronic pressure switch,
single- and double-acting,
max. operating pressure 400 bar.



Order no.	Article no.	Clamping circuits	Q [l/min]	Valve type	Matching control unit	Electric control	Pressure switch	Weight [Kg]
322214	6906-61610	1	2,5	4/3	-	-	-	53
325951	6906-61611	1	2,5	4/3	6906B-2-1	●	-	61
325969	6906-61611-BZH	1	2,5	4/3	6906BZH-2	●	2	61
322230	6906-62610	2	2,5	4/3	-	-	-	56
325977	6906-62611	2	2,5	4/3	6906B-3-2	●	-	64

Design:

Compact, plug-in pump unit, ready for electric and hydraulic operation. Complete with: pressure limiting valve and pressure switch, solenoid valve, pressure gauge, float switch with temperature monitoring, oil fill, electrical control with main switch, indicator lamps and flange sockets. Electrical connection, complete with CEKON connector, pressure filter with filter mesh of 25µm. Oil supply via threaded port.

Application:

These pump units are mainly used as drive and control elements for single- and double-acting clamping devices.

Operation type:

Control panel for one and two clamping circuits. Two-hand control panel for only one clamping circuit.

Features:

The radial piston pump is driven via an alternating current standard motor with the energy efficiency class IE3. The motor is protected against overload by a motor protection switch and a thermoelement. Pressure setting and pressure monitoring are accomplished via a pressure limiting valve (DBV) and an electronic pressure switch (EDS). The value set at the pressure limiting valve is stored with the Mode button on the pressure switch. This simultaneously sets the preprogrammed switch-off and switch-back point.

- High safety standard through the use of 4/3-way seat valves!
- No unwanted traversing movements. In the event of a loss of power or contact problems, the valve returns to the hermetically sealed centre position.
- Easy activation of external machine controllers (e.g. PLC).

The pump unit works in intermittent mode. In the event of a loss of pressure, the pump is subsequently automatically switched by the pressure switch. In the event of a lack of oil or an increase in oil temperature, the built-in floating switch with temperature monitoring switches the pump off and the fault lamp on the electrical controller lights up.

Note:

Ensure that the ventilation is working properly when connecting the elements. In the event of a loss of pressure, subsequent pumping must not exceed a maximum of 2 times per minute. The pump unit must not be allowed to run continuously.

Options:

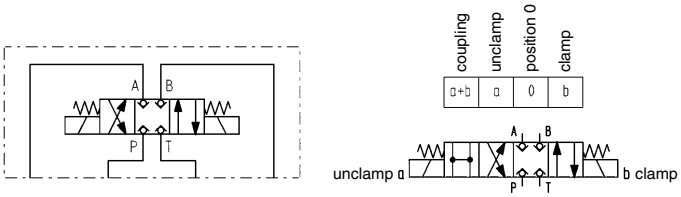
Clamping circuits: For up to 5 clamping circuits, there is an electrical controller. For more than 5 clamping circuits, there is no electrical controller.
Valve combination: Pressure reduction and clamping pressure monitoring in certain clamping circuits. Pressure reduction for all subsequent clamping circuits. Pressure filter with filter mesh 10µm or 40 µm. Throttle valves for specified clamping circuits.

On request:

Directional valves with other function diagrams on request.
Three to five clamping circuits on request.

Hydraulic diagrams:

Energizing both valve magnets creates a switching position that links all 4 connections to each other. A depressurised state is created that allows easy coupling.



4/3-directional seat valve for single and double-acting consumers

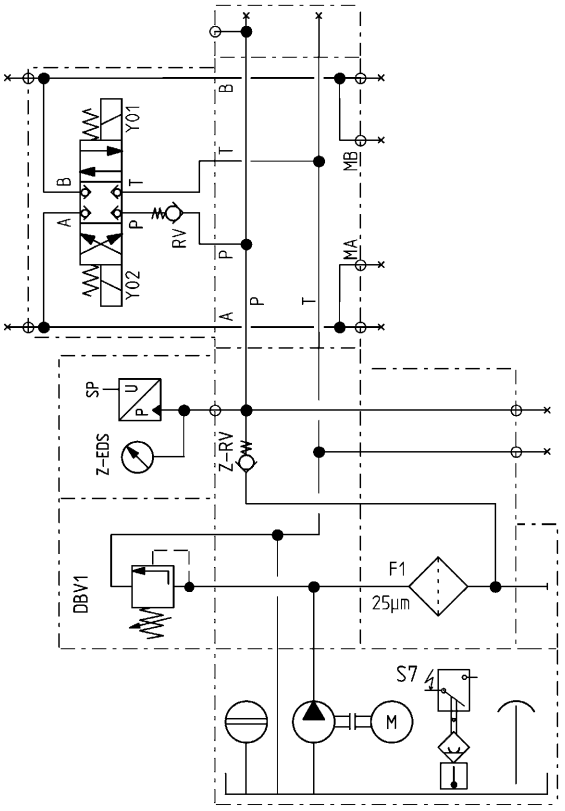
CAD

Subject to technical alterations.

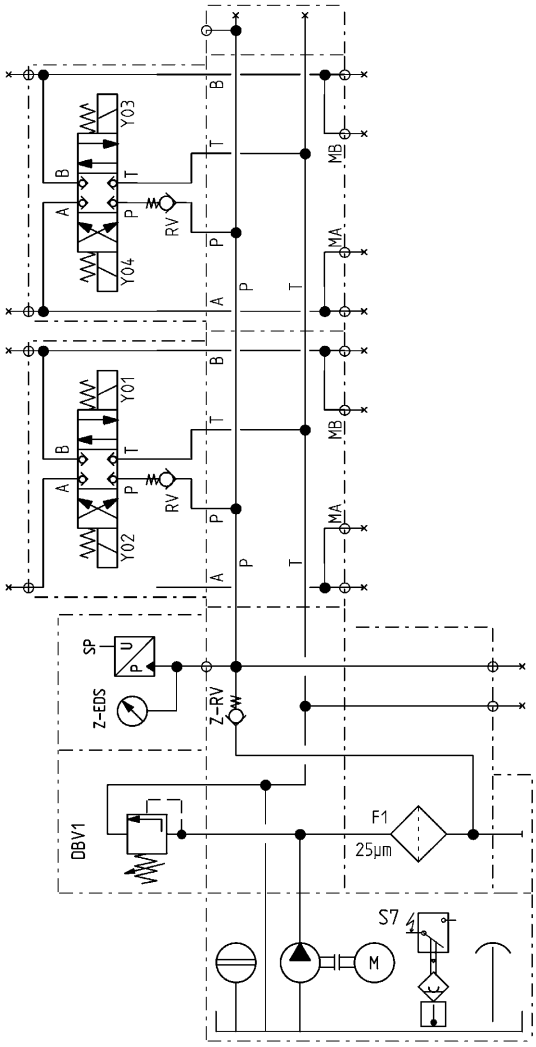
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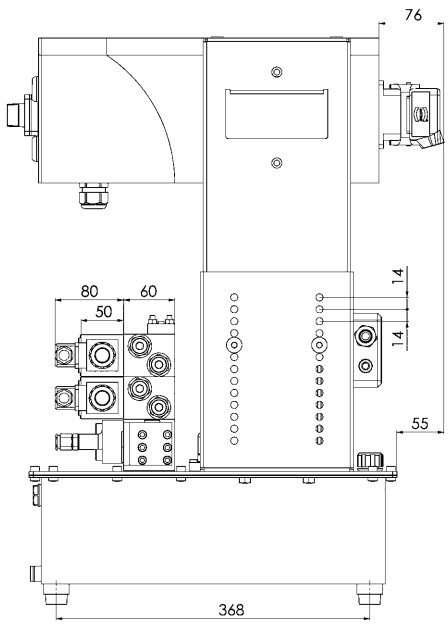
Hydraulic diagrams with DBV and EDS:

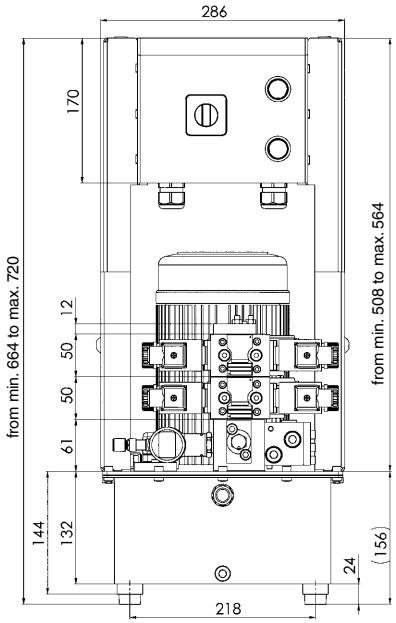
1 clamping circuit, double acting

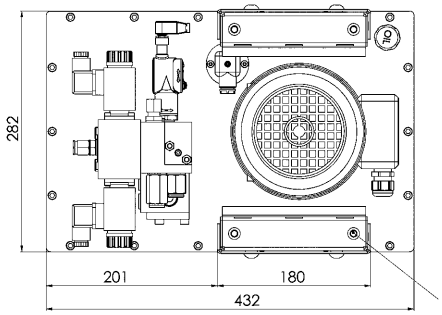


2 clamping circuits, double acting









M8 thread for lifting devices

Subject to technical alterations.

Pump unit No. 6906, 1 and 2 clamping circuits

Hydraulic specifications:

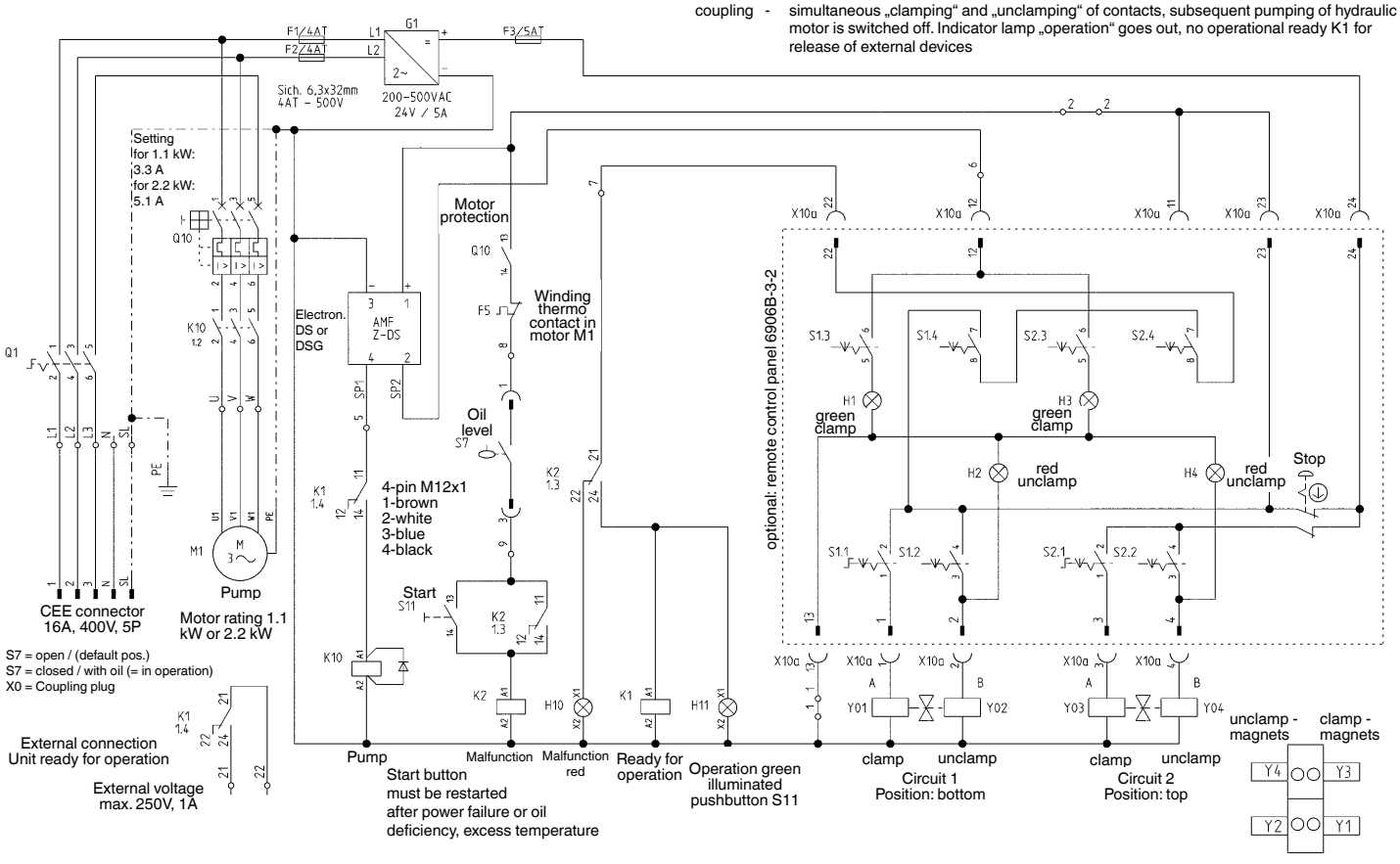
Max. operating pressure	200 bar / 400 bar
Oil capacity, reservoir	10 litres
Oil capacity, usable	4 litres
Oil-flow rate	2,5 l/min.
Valve types	4/3 seat valve
No. of hydraulic circuits	1 or 2
Hydraulic connection	pipe fitting G1/4
Noise level	max. 70 dB(A)
Ambient temp. range	–10° C to + 35° C
Position of use	upright
Pump design	radial-piston pump with 3 pistons
Load cycle	max. 500/h
Fluid	hydraulic oils HLP and HLPD according to DIN 51524 part 2
Oil recommendation	HLP 22 and HLPD 22 or HLP 32 and HLPD 32
Viscosity	ISO VG 22 and 32 DIN ISO 3448

Electrical specifications:

Nominal voltage	400 V/50 Hz three-phase
Control voltage	24 V DC
Valve voltage	24 V DC
Motor speed	2900 1/min.
Direction of rotation	any
Motor rating	1,1 kW
Motor type	three-phase standard motor
Nominal current	3 A
Fuse, supply line	16 A slow-blow
Fuse, control circuit	2 A primary, 8 A secondary
Electrical connection	Ölflex 100; 5«1,5 mm² 3 m with CEE connector 16 A 6 h
Protection class	IP 54
Duty cycle	max. 50 % intermittent operation

Wiring circuit of pump unit with 2 clamping circuits, remote control

coupling - simultaneous „clamping“ and „unclamping“ of contacts, subsequent pumping of hydraulic motor is switched off. Indicator lamp „operation“ goes out, no operational ready K1 for release of external devices



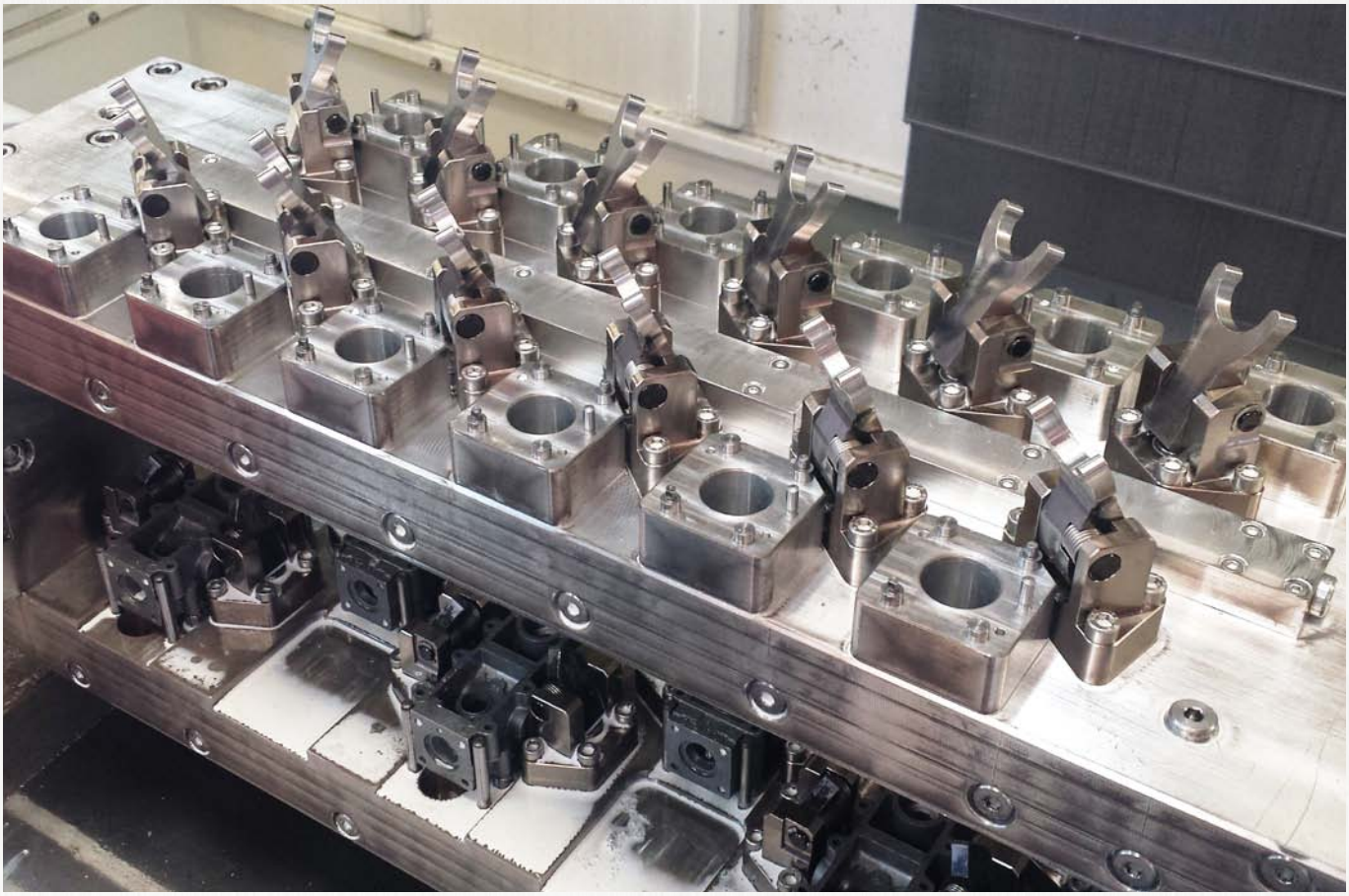
To increase safe handling of the clamped parts, the unit ready for operation and a clamping pressure query should be integrated with the processing machine.

Subject to technical alterations.

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Subject to technical alterations.

No. 6906N

Pump unit

With pressure limiting valve and electronic pressure switches, double-acting.



Order no.	Article no.	Clamping circuits	Q [l/min]	Valve type	Matching control unit	Electric control	max. operating pressure [bar]	Weight [Kg]
328930	6906N-61666	1	2,5	4/3	6906B-2-1	●	200	61
328955	6906N-61616	1	2,5	4/3	6906B-2-1	●	400	61

Design:

Compact, plug-in energy-saving pump unit, ready for electric and hydraulic operation. Complete with: pressure limiting valve and pressure switch, solenoid valve, pressure gauge, float switch with temperature monitoring, oil fill, electrical control with main switch, indicator lamps and flange sockets. Electrical connection, complete with CEKON connector, pressure filter with filter mesh of 25µm. Oil supply via threaded port.

Application:

This pump unit is used predominantly as a drive and control element for single and double-acting clamping fixtures.

Control method:

For connection of 1-circuit control console no. 6906B-2-1 order no. 324723

Features:

The radial piston pump is driven via an alternating current standard motor with the energy efficiency class IE3. The motor is protected against overload by a motor protection switch and a thermoelement. The pressure is set via a pressure limiting valve (PLV) and centralised electronic pressure switch (EPS). The pressure is set via the electronic pressure switch (EPS) in the A and B channel. They sit directly in the directional control valve. These EPS control the directional control valve in the working or zero position and output signals for switching the pump motor on and off.

- Reduced power consumption and lower temperature rise
- No heat influence on the oil column in the distributors and loads
- No hazard to components due to excessive rise in pressure
- No risk of injury from hand contact
- No drop in magnetic force
- Prolonged service life of the magnets

The pump unit works in intermittent mode. If pressure drops in the A- or B-channel, the pump is automatically switched on afterward by the electronic pressure switch EDS. In case of low oil level or an increase in oil temperature, the built-in floating switch with temperature monitoring switches the pump off and the fault lamp on the electrical controller comes on.

Note:

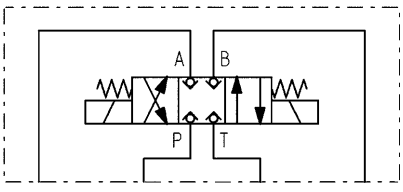
Ensure correct bleeding when connecting elements. In the event of a loss of pressure, subsequent pumping must not exceed a maximum of 2 times per minute. The pump unit must not run continuously.

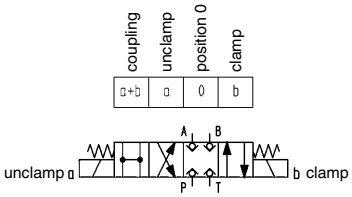
On request:

Two, three and four clamping circuits on request.

Hydraulic diagrams:

Energizing both valve magnets creates a switching position that links all 4 connections to each other. A depressurised state is created that allows easy coupling.





4/3-directional seat valve for double-acting consumers

Subject to technical alterations.

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Pump unit No. 6906N

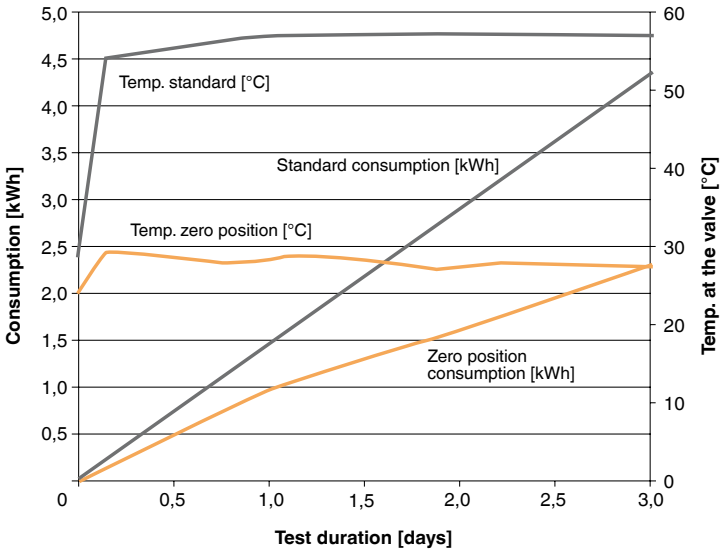
Hydraulic specifications:

Max. operating pressure	200 bar / 400 bar
Oil capacity, reservoir	10 litres
Oil capacity, usable	4 litres
Oil-flow rate	2,5 l/min.
Valve types	4/3 seat valve
No. of hydraulic circuits	1
Hydraulic connection	pipe fitting G1/4
Noise level	max. 70 dB(A)
Ambient temp. range	–10° C to + 35° C
Position of use	upright
Pump design	radial-piston pump with 3 pistons
Load cycle	max. 500/h
Fluid	hydraulic oils HLP and HLPD according to DIN 51524 part 2
Oil recommendation	HLP 22 and HLPD 22 or HLP 32 and HLPD 32
Viscosity	ISO VG 22 and 32 DIN ISO 3448

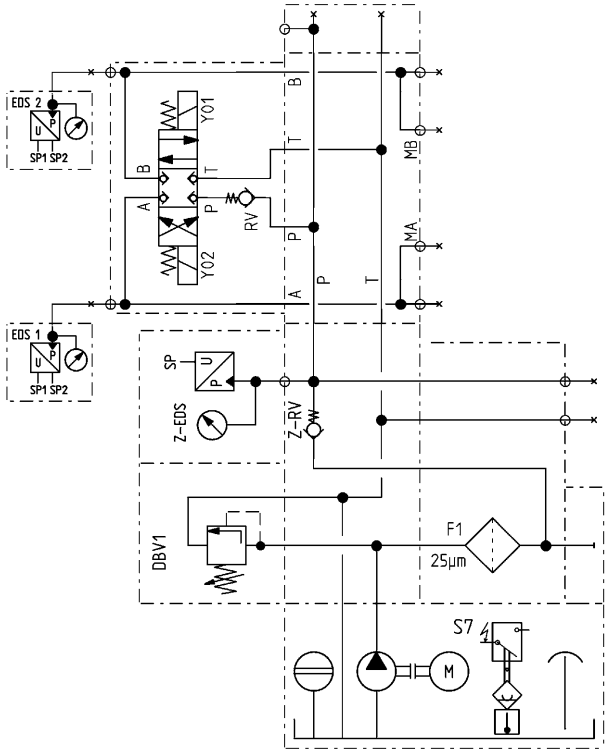
Electrical specifications:

Nominal voltage	400 V/50 Hz three-phase
Control voltage	24 V DC
Valve voltage	24 V DC
Motor speed	2900 1/min.
Direction of rotation	any
Motor rating	1,1 kW
Motor type	three-phase standard motor
Nominal current	3 A
Fuse, supply line	16 A slow-blow
Fuse, control circuit	2 A primary, 8 A secondary
Electrical connection	Ölflex 100; 5«1,5 mm² 3 m with CEE connector 16 A 6
Protection class	IP 54
Duty cycle	max. 50 % intermittent operation

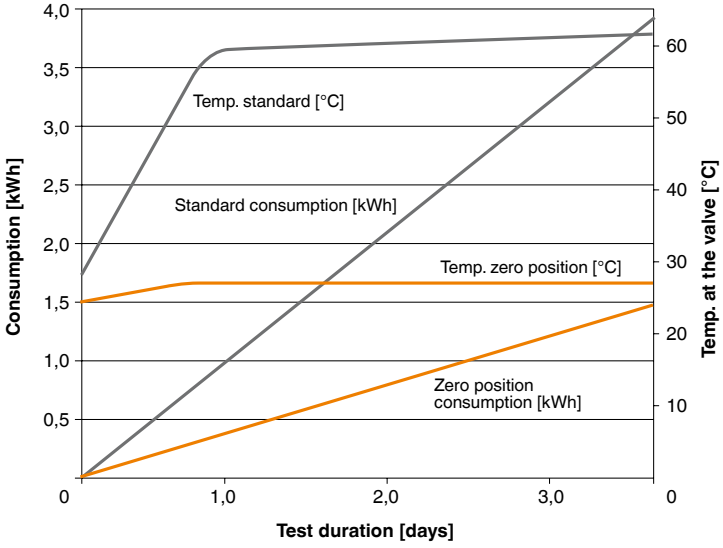
Cycle time 3 min.:



Hydraulic diagram:



Cycle time 10 min.:



Subject to technical alterations.

No. 6906

Pump unit

with pressure-control device (DSG),
single- and double-acting,
max. operating pressure 400 bar.



Order no.	Article no.	Clamping circuits	Q [l/min]	Valve type	Matching control unit	Electric control	Pressure switch	Weight [Kg]
324590	6906-61620	1	2,5	4/3	-	-	-	53
326033	6906-61621	1	2,5	4/3	6906B-2-1	●	-	61
326041	6906-61621-BZH	1	2,5	4/3	6906BZH-2	●	2	61
324616	6906-62620	2	2,5	4/3	-	-	-	56
326058	6906-62621	2	2,5	4/3	6906B-3-2	●	-	64

Design:

Compact, plug-in pump unit, ready for electric and hydraulic operation. Complete with: Pressure-control device, solenoid valve, pressure gauge, floating switch with temperature monitoring, oil filling, electrical control with main switch, indicator lamps and flange sockets. Electrical connection, complete with CEKON connector, pressure filter with filter mesh of 25µm. Oil supply via threaded port.

Application:

These pump units are mainly used as drive and control elements for single- and double-acting clamping devices.

Operation type:

Control panel for one and two clamping circuits. Two-hand control panel for only one clamping circuit.

Features:

The radial piston pump is driven via an alternating current standard motor to energy efficiency class IE3. The motor is protected against overload by a motor protection switch and a thermocouple. Pressure setting and pressure monitoring are made via a pressure control device. The pressure control device combines the pressure limiting valve (PLV) and the pressure switch (PS) in a single device. The pressure is continuously adjustable over the entire pressure range by means of an adjustment sleeve. The point for restarting is about 10-15% below the switch-off point.
- High safety standard through the use of 4/3-directional seat valves!
- No unwanted travel movements. In the event of a loss of power or contact problems, the valve returns to the hermetically sealed centre position.
- Easy actuation by external machine controllers (e.g. PLC).

The pump unit works intermittently. In the event of a loss of pressure, the pump is subsequently automatically switched by the pressure control device. In case of low oil level or an increase in oil temperature, the built-in floating switch with temperature monitoring switches the pump off and the fault lamp on the electrical controller comes on.

Note:

Ensure that the ventilation is working properly when connecting the elements. In the event of a loss of pressure, subsequent pumping must not exceed a maximum of 2 times per minute. The pump unit must not be allowed to run continuously.

Options:

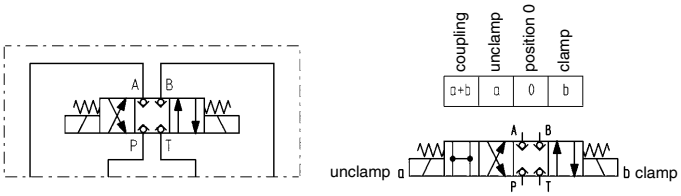
Clamping circuits: For up to 5 clamping circuits, there is an electrical controller. For more than 5 clamping circuits, there is no electrical controller.
Valve combination: Pressure reduction and clamping pressure monitoring in certain clamping circuits. Pressure reduction for all subsequent clamping circuits. Pressure filter with filter mesh 10µm or 40 µm. Throttle valves for specified clamping circuits.

On request:

Directional valves with other function diagrams on request.
Three to five clamping circuits on request.

Hydraulic diagrams:

Energizing both valve magnets creates a switching position that links all 4 connections to each other. A depressurised state is created that allows easy coupling.



4/3-directional seat valve for single and double-acting consumers

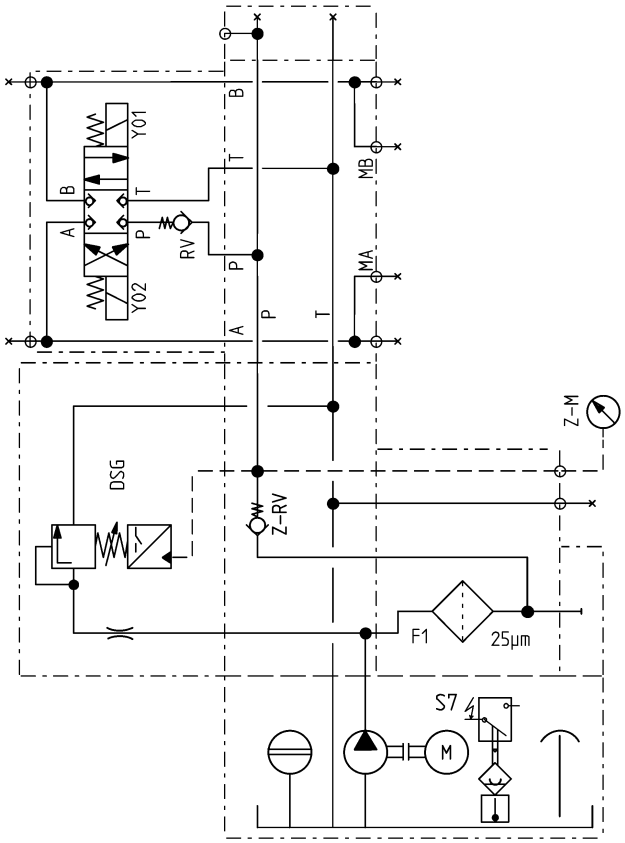
CAD

Subject to technical alterations.

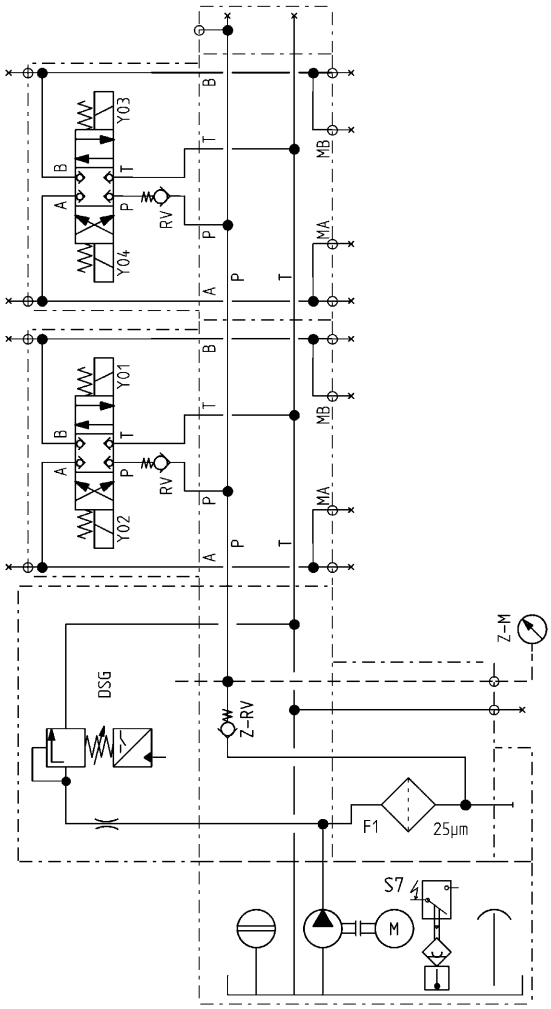
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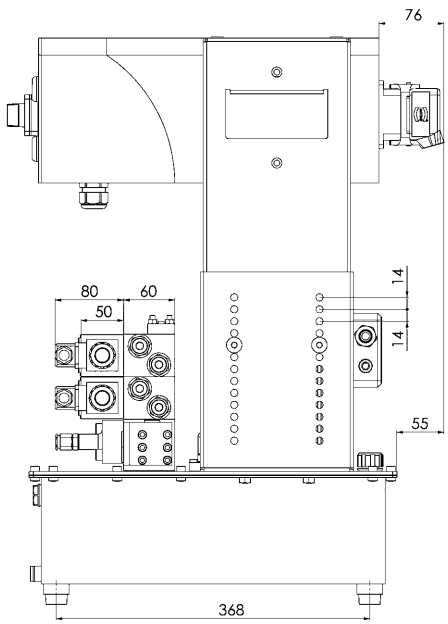
Hydraulic diagrams with DSG:

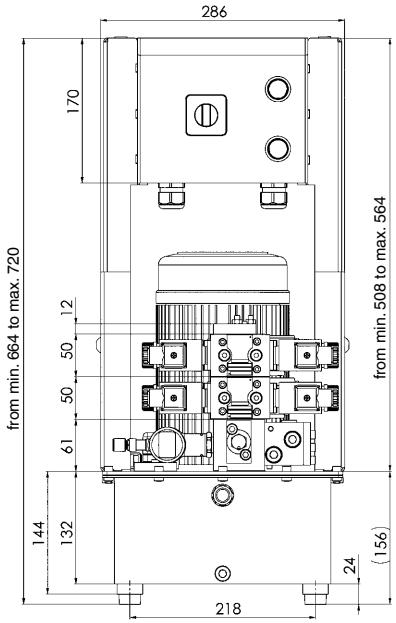
1 clamping circuit, double acting

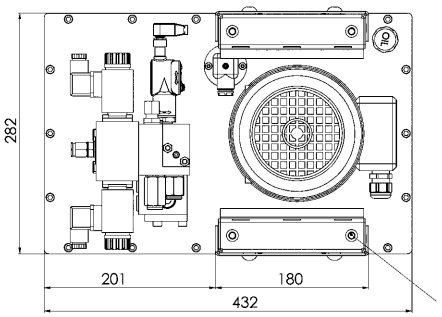


2 clamping circuits, double acting









M8 thread for lifting devices

Subject to technical alterations.

Pump unit No. 6906, 1 and 2 clamping circuits

Hydraulic specifications:

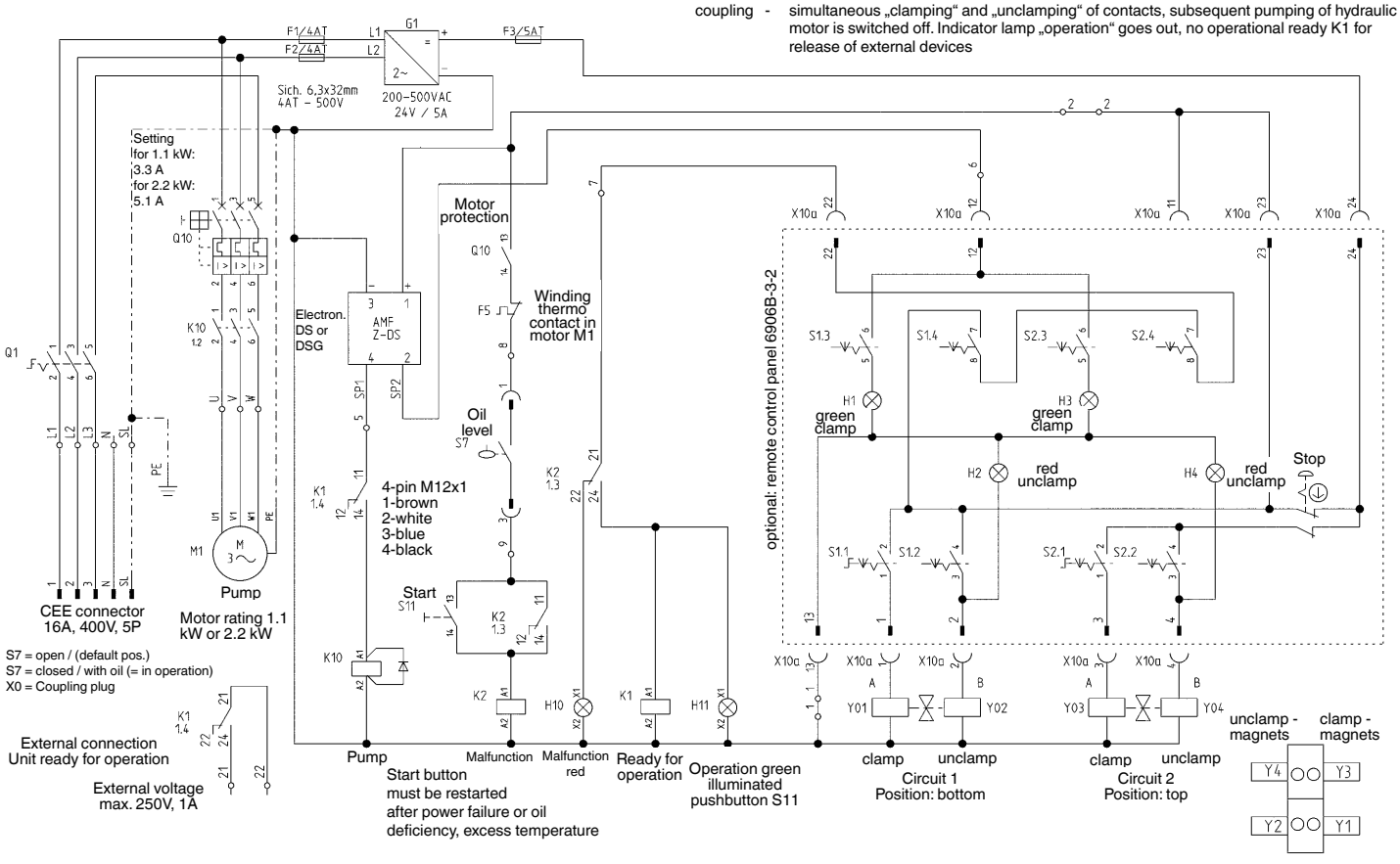
Max. operating pressure	400 bar
Oil capacity, reservoir	10 litres
Oil capacity, usable	4 litres
Oil-flow rate	2,5 l/min.
Valve types	4/3 seat valve
No. of hydraulic circuits	1 or 2
Hydraulic connection	pipe fitting G1/4
Noise level	max. 70 dB(A)
Ambient temp. range	–10° C to + 35° C
Position of use	upright
Pump design	radial-piston pump with 3 pistons
Load cycle	max. 500/h
Fluid	hydraulic oils HLP and HLPD according to DIN 51524 part 2
Oil recommendation	HLP 22 and HLPD 22 or HLP 32 and HLPD 32
Viscosity	ISO VG 22 and 32 DIN ISO 3448

Electrical specifications:

Nominal voltage	400 V/50 Hz three-phase
Control voltage	24 V DC
Valve voltage	24 V DC
Motor speed	2900 1/min.
Direction of rotation	any
Motor rating	1,1 kW
Motor type	three-phase standard motor
Nominal current	3 A
Fuse, supply line	16 A slow-blow
Fuse, control circuit	2 A primary, 8 A secondary
Electrical connection	Ölflex 100; 5«1,5 mm² 3 m with CEE connector 16 A 6 h
Protection class	IP 54
Duty cycle	max. 50 % intermittent operation

Wiring circuit of pump unit with 2 clamping circuits, remote control

coupling - simultaneous „clamping“ and „unclamping“ of contacts, subsequent pumping of hydraulic motor is switched off. Indicator lamp „operation“ goes out, no operational ready K1 for release of external devices



To increase safe handling of the clamped parts, the unit ready for operation and a clamping pressure query should be integrated with the processing machine.

Subject to technical alterations.

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MODULAR PUMP UNIT NO. 6906

POSSIBLE VERSIONS OF PUMP UNITS:

Tank volume: 10,0 litres

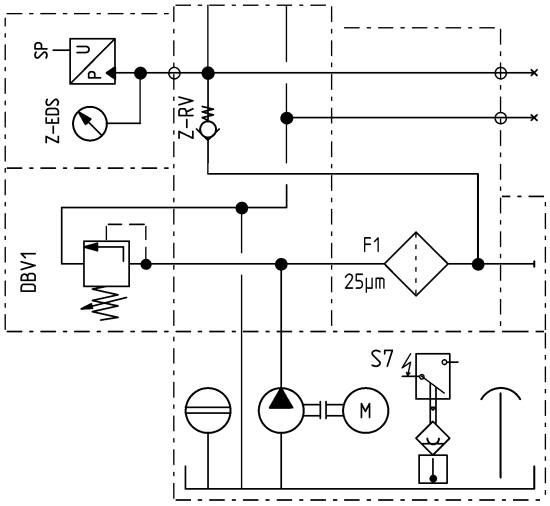
Oil capacity, usable: 4,0 litres

Oil-flow rate: 2,5 l/min. or 5,0 l/min.

Clamping circuits: Up to 5 clamping circuits including electrical control. For more than 5 clamping circuits without electrical control

Further options:

- Two-hand remote-control panel (only for pump units with 1 clamping circuit)
- Pressure-control device for stepless pressure adjustment by a single spindle
- Valve combinations with pressure-control and throttle valves



RKP 2,5 : Q = 2,5 l/min, n = 2900 U/min.
Tank volume 10 l, P = 1,1 kW

BASE UNIT



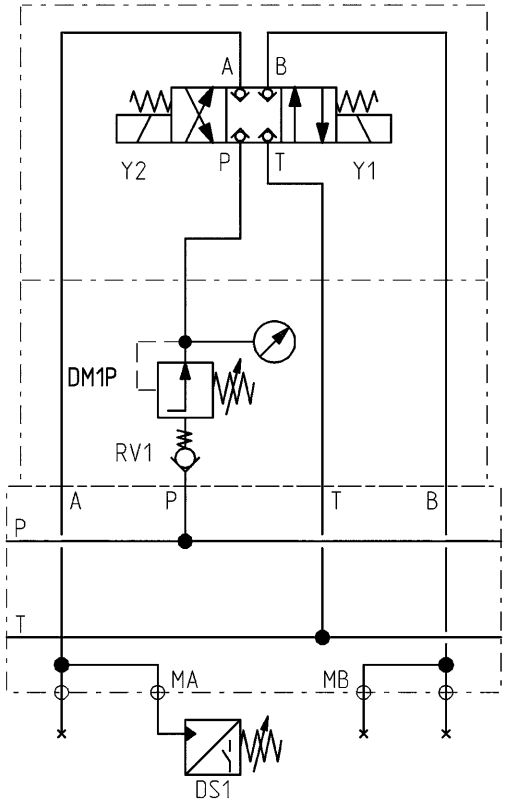
... WITH VALVES



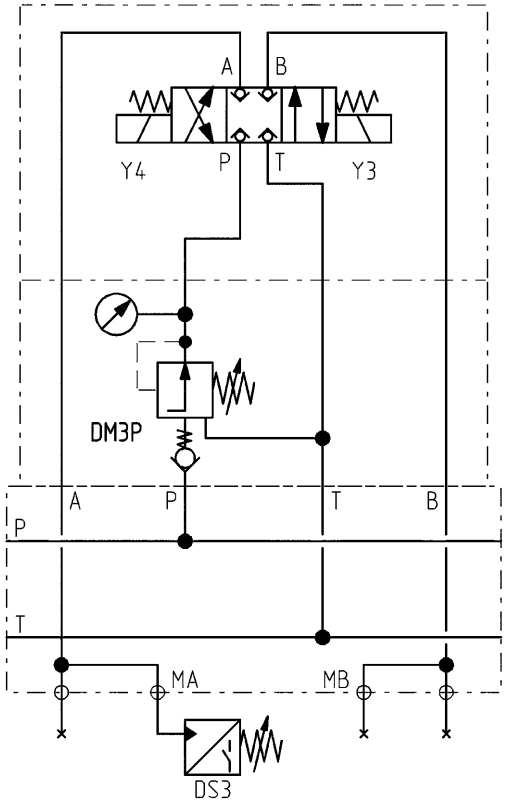
... WITH VALVES AND CONTROLLER



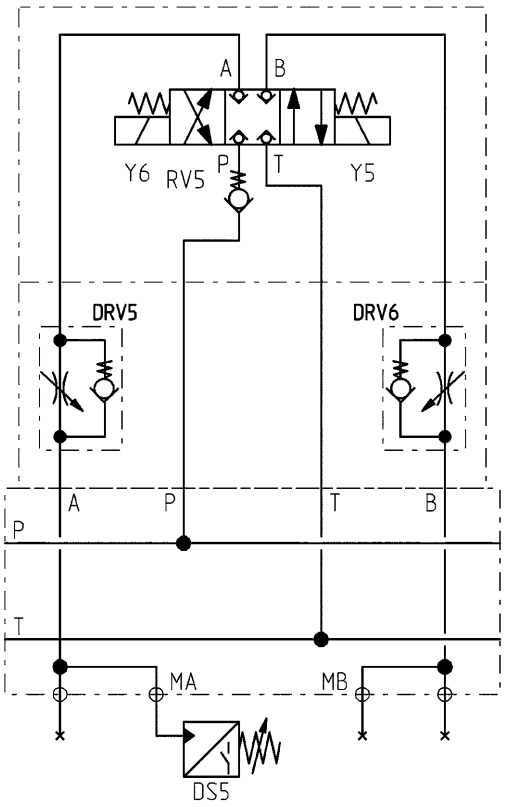
Spacer plates - pressure-control valve
Control function in P



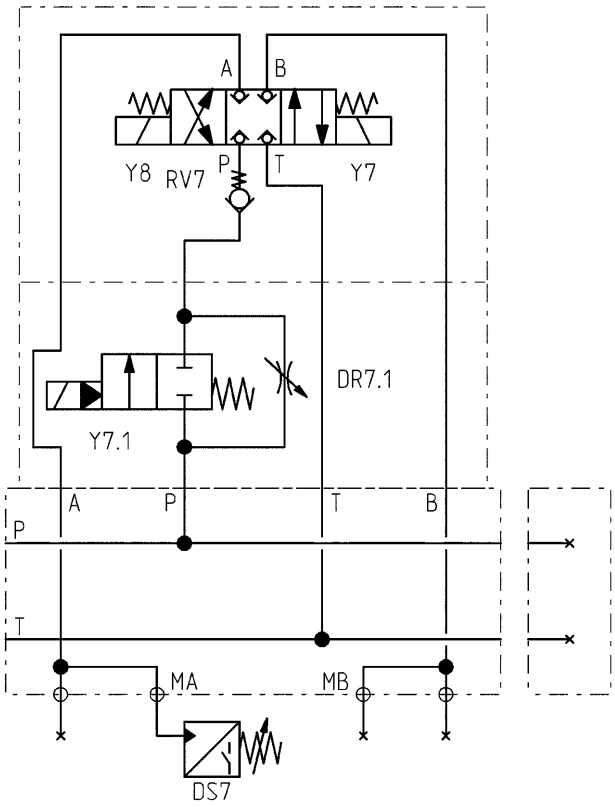
Spacer plates - 3-way pressure-control valve
Control function in P



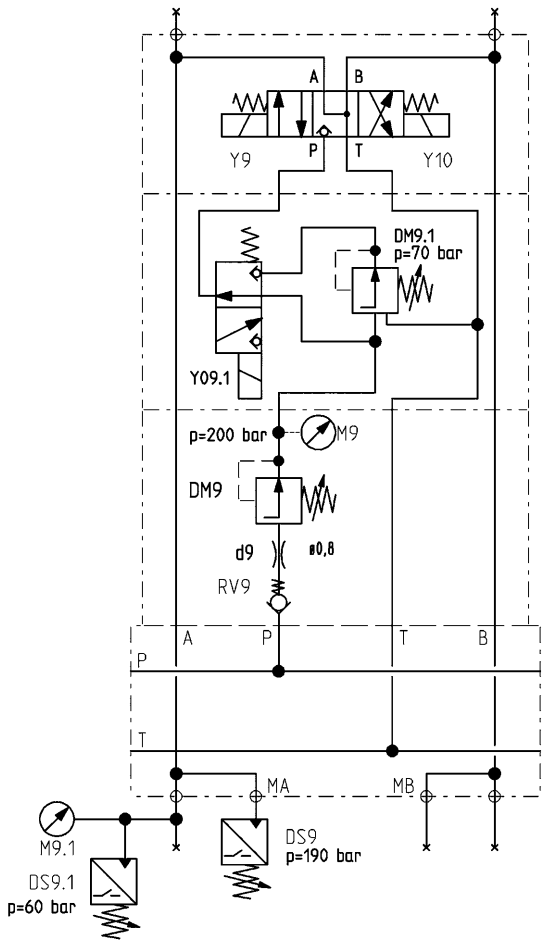
Spacer plates - twin-type
throttle check valve



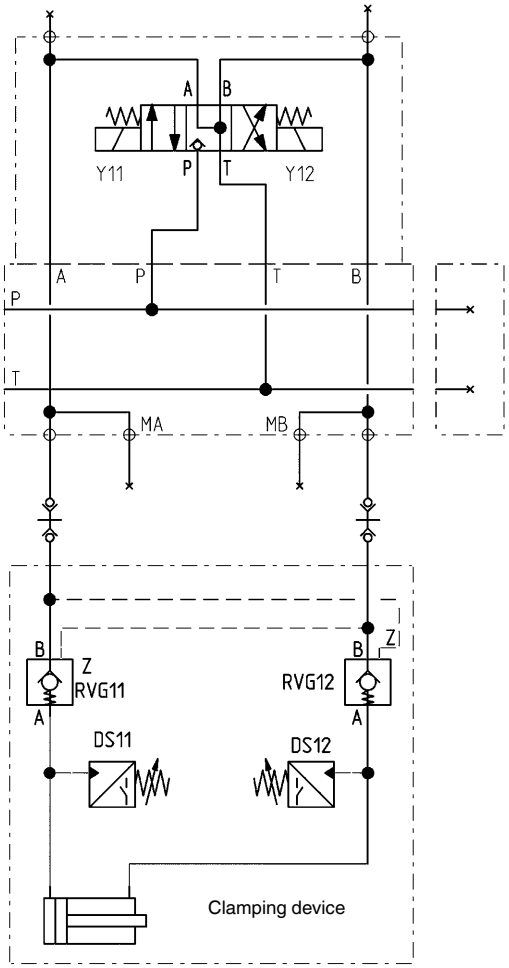
Spacer plate with connectable throttle
Function in P



Combination of directional valve zero position, in which A, B and T are connected, plus pressure control in P with two pressure levels in one circuit.

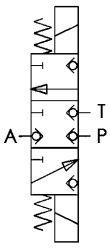


Combination of directional valve zero position, in which A, B and T are connected, plus unlockable check valves at the consumer.

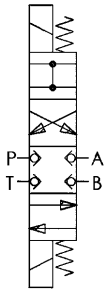


SPECIAL VALVES AVAILABLE ON REQUEST

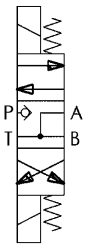
6910A-07-02



6911A-07-01



6911A-07-02



No. 6906BS-1

Coupling Plug

with pin



Order no.	Article no.	Control voltage	Number of poles	Weight [g]
60772	6906BS-1	24 V =	24	122

Design:

Aluminium die-case housing. In locked position - protection class IP65.

Application:

Connection to the machine side as replacement part for control panel or for external control of pump unit.

No. 6906BS-2

Coupling Plug

with bush



Order no.	Article no.	Control voltage	Number of poles	Weight [g]
61895	6906BS-2	24 V =	24	122

Design:

Aluminium die-case housing. In locked position - protection class IP65.

Application:

Connection to the unit side for external querying of pressure.

No. 6906BS-3

Surface-mounted housing

with pin



Order no.	Article no.	Control voltage	Number of poles	Weight [g]
66118	6906BS-3	24 V =	24	145

Design:

Aluminium die-case housing. In locked position - protection class IP65.

Application:

Connection to the unit side for external querying of pressure.

No. 6906BS-4

Surface-mounted housing

with bush



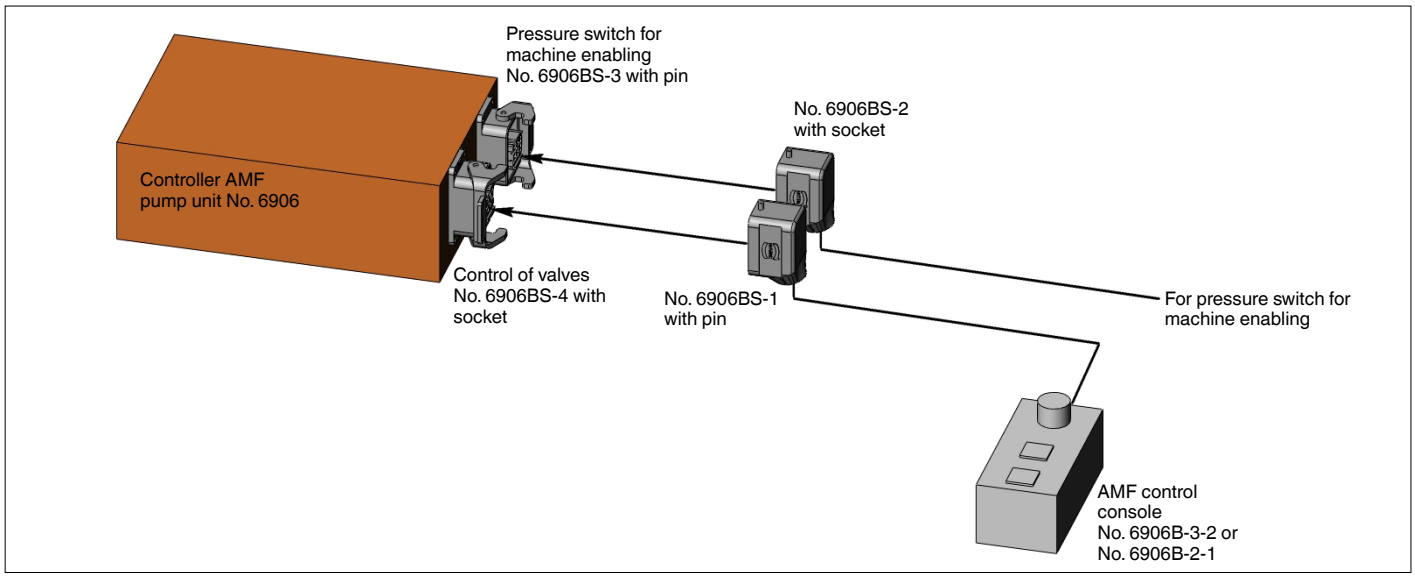
Order no.	Article no.	Control voltage	Number of poles	Weight [g]
66126	6906BS-4	24 V =	24	145

Design:

Aluminium die-case housing. In locked position - protection class IP65.

Application:

Connection to the machine side as replacement part for pump unit.



Subject to technical alterations.

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No. 6906B-2-1

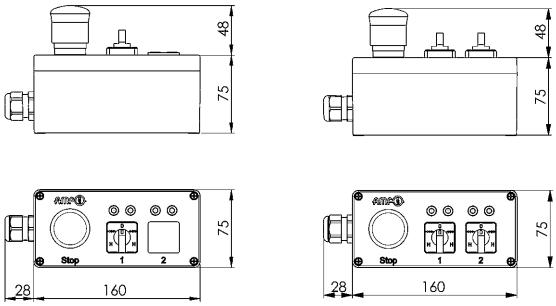
1-circuit remote control (rotary switch)

No. 6906B-3-2

2-circuit remote control (rotary switch)



6906B-2-1 6906B-3-2



Order no.	Article no.	Control voltage	Number of poles	Cable length [m]	Weight [g]
324723	6906B-2-1	24 V =	24	5	1660
323394	6906B-3-2	24 V =	24	5	1660

Design:

Compact polyester housing with control elements, cable and coupling plug. Protection class IP65.

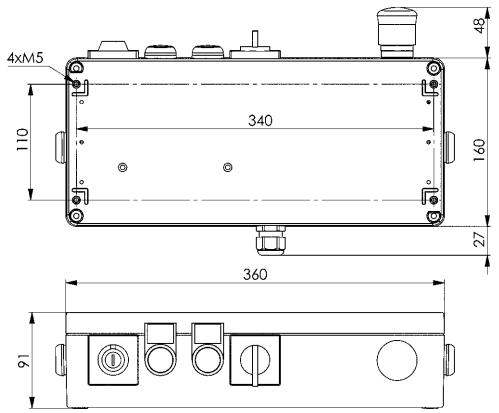
Application:

The control panel has a selector switch „coupling-clamping-0-unclamping-coupling“ for each clamping circuit , and a black STOP mushroom push button for stopping the pump and valves. During clamping and unclamping the corresponding valve is switched. In switch position 0, the valve is spring loaded and returns to the zero position (mostly locked zero position). In the coupling position both magnets are switched at the same time. The pump is switched off. In addition, the „Operation“ indicator lights on the unit go out and the readiness for external machine enabling is switched off. In external machine enabling, the signal „ready for operation“ and one pressure switch on each of the clamping points to be monitored should be integrated.

No. 6906BZH-2

Two-hand safety operator panel





Order no.	Article no.	Control voltage	Cable length [m]	Weight [g]
324426	6906BZH-2	24 V =	5	4840

Design:

Compact cast aluminium housing with control elements, cable and coupling plug.

Application:

The two-handed safety operating panel may be used only in combination with the pump units from Andreas Maier GmbH & Co. KG. It is suitable for the units with the following order numbers: 327635, 325969 or 326041.
The two-handed safety operating panel controls fixtures (cylinders, etc.) on which hazardous extension and retraction movements (strokes ≥ 4 mm) can occur.
The following fluidic system requirements must be met for the operating panel function:
- 4/3-way valve with hermetically sealed zero position.
Alternatively, the combination of a 4/3-way valve, in which A, B and T are connected and P locked in the zero position, with at least one controlled check valve for the dangerous consumer line, or a controlled twin check valve, is possible.
- Pressure switch in channels A and B
To convert an existing unit to two-handed operation, please contact Andreas Maier GmbH & Co. KG.

Mounting:

Plug the cable with the plug into the remote control connector of the pump unit. Set the pressure switch to operate at about 75% of the pressure in the clamping circuit. The M5 threads can be used for external fastening from below.

Operation:

Key switch for turning on and switching to zero position and coupling position. Rotary switch for selecting the following functions - clamping, unclamping and zero position. Two-hand switch for initiating movements. Stop switch for fast switch-off in case of danger. Indicator lights signal the control status.

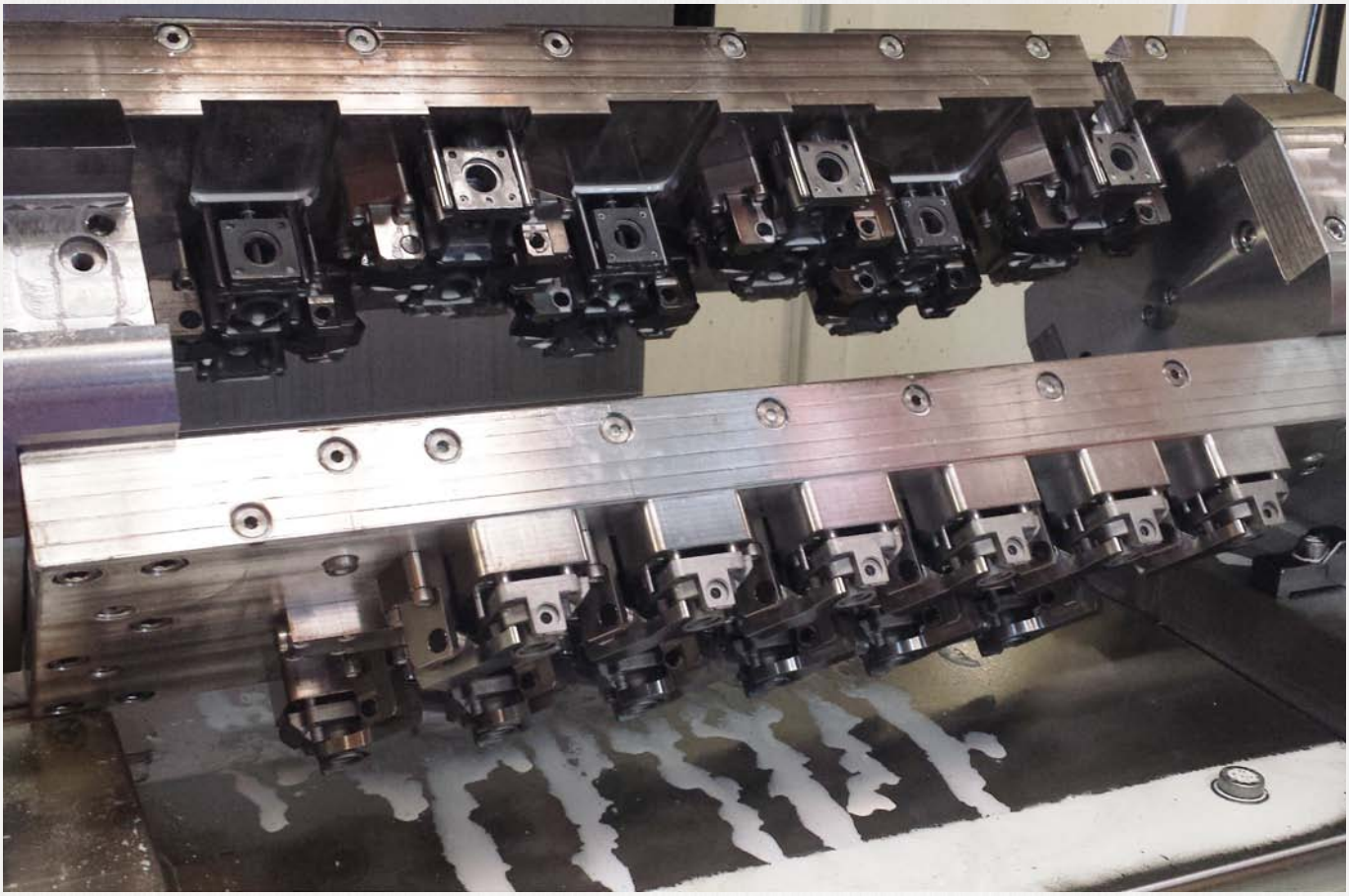
General:

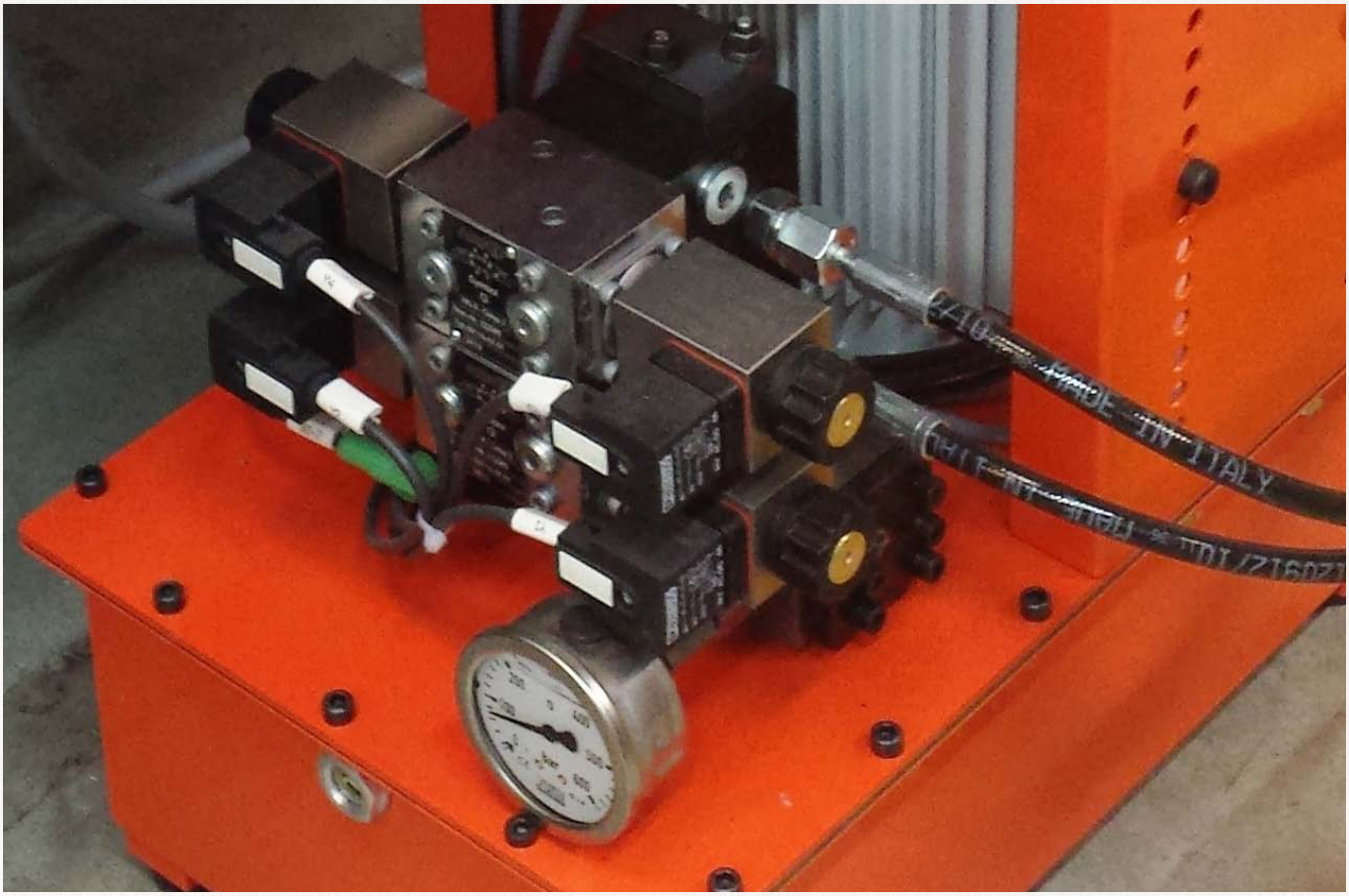
Re-clamping required following an electrical voltage outage and after the power supply is restored. With pump unit no. 6906, the solenoid on the directional valve remains energised after self-locking.

Note:

Each user of the two-handed safety control panel must determine the necessary performance level of the respective safety function by his own risk assessment and must ensure that this is also complied with.

Subject to technical alterations.





Subject to technical alterations.

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HOLLOW-ROD CYLINDER FOR MULTIPLE USE IN MANUFACTURING PROCESSES

- clamping force up to 188 kN
- operating pressure up to 500 bar
- hollow-piston rod with through-hole, with or without internal thread
- particularly suitable to convert existing mechanical fixtures into hydraulically operated fixtures
- for push- and pull operation
- single and double-acting variants
- wipers to protect against contamination

At continuous pressures below 80 bar, this must be stated on ordering as a different seal combination may need to be selected.

PRODUCT OVERVIEW:

Type	Clamping force [kN]	Pull force [kN]	Clamping stroke [mm]	No. of models	Operating mode
6920	20 - 125	20 - 125	8 - 20	5	single acting
6920G	20 - 125	20 - 125	8 - 20	5	single acting
6920D	18 - 188	14 - 153	10 - 25	6	double acting
6921	71 - 101	71 - 101	6 - 10	2	single acting
6935	20 - 53	20 - 53	6,5 - 12,5	3	single acting
6935D	20 - 53	20 - 53	6,5 - 12,5	3	double acting

PRODUCT EXAMPLES:

NO. 6920



- clamping force: 20 - 125 kN
- cylinder housing: without external thread

NO. 6920D



- clamping force: 18 - 188 kN
- cylinder housing: with external thread

NO. 6935D

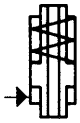


- clamping force: 20 - 53 kN
- cylinder housing: without external thread

No. 6920

Hollow Rod Cylinder

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





CAD

Order no.	Article no.	push-pull force at 100 bar [kN]	push-pull force at 400 bar [kN]	Stroke H [mm]	Vol. [cm³]	effective piston area [cm²]	Spring force min. [N]	Weight [g]
64998	6920-20	5,0	20	8	4	4,9	200	930
63016	6920-32	8,0	32	10	8	8,0	350	1730
65011	6920-50	12,5	50	12	15	12,8	540	1650
63057	6920-80	20,0	80	15	30	20,0	750	3850
65003	6920-125	32,0	125	20	64	32,8	1120	6250

Design:

Cylinder barrel from steel, burnished. Piston and piston rod case hardened and ground. Built-in return spring. With sintered bronze filter. 2 wipers and vent screw. Oil supply via threaded port.

Application:

Particularly suitable for retrofitting existing fixtures for hydraulic actuation. When workpieces are clamped onto a machine tool table, the hollow rod cylinder can be fitted over the clamp bolt instead of the nut. The hollow rod cylinders can be used for push or pull applications.

Features:

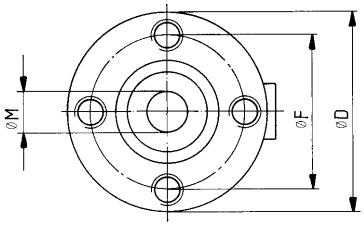
Completely sealed against contamination and chips by means of sinter metal breather and two wipers. Piston can be moved to its end stop. Oil connection at both ends, thus easy lining up in series.

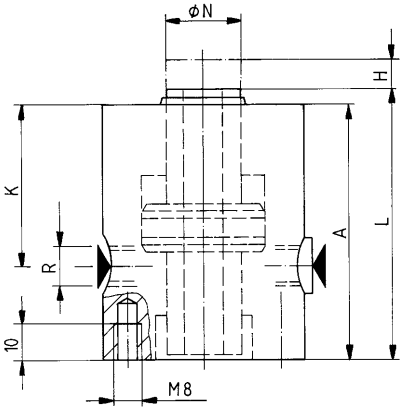
Note:

Cylinders are designed for use in combination with tempered bolts, material grade 8.8, e. g. DIN 787 and DIN 6379. Bolts matching the hole are recommended.
For single acting cylinders there is risk of sucking in coolant during the return stroke. In this case the cylinders have to be protected against the direct effect of coolant. The sinter metal breather should be protected.

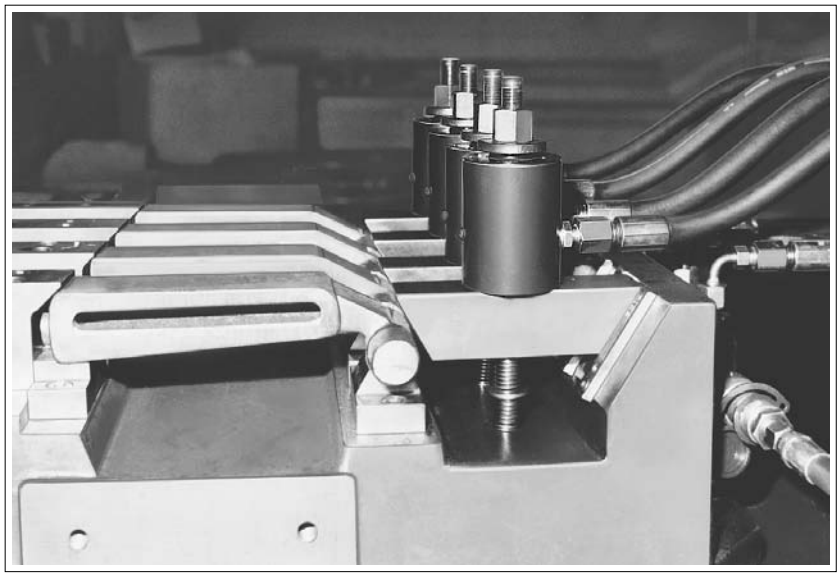
Dimensions:

Order no.	Article no.	Piston dia. [mm]	A	dia. D	dia. F	K	L	dia. M	dia. N	R
64998	6920-20	32	80	52	40	56,0	82	12,5	20	G1/8
63016	6920-32	40	90	60	44	60,5	94	14,5	24	G1/8
65011	6920-50	48	101	70	50	71,5	103	18,5	26	G1/8
63057	6920-80	60	115	80	60	87,0	119	22,5	32	G1/4
65003	6920-125	75	149	100	75	108,0	151	27,5	38	G1/4





Hollow rod cylinder no. 6920-50 in milling device for link lever.



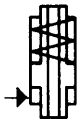
Subject to technical alterations.

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No. 6920G

Hollow Rod Cylinder with internal thread

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





CAD

Order no.	Article no.	push-pull force at 100 bar [kN]	push-pull force at 400 bar [kN]	Stroke H [mm]	Vol. [cm³]	effective piston area [cm²]	Spring force min. [N]	Weight [g]
65318	6920G-20	5,0	20	8	4	4,9	200	1000
63032	6920G-32	8,0	32	10	8	8,0	350	1750
65334	6920G-50	12,5	50	12	15	12,8	540	1700
63073	6920G-80	20,0	80	15	30	20,0	750	3900
65359	6920G-125	32,0	125	20	64	32,8	1120	6400

Design:

Cylinder barrel from steel, burnished. Piston and piston rod case hardened and ground. Built-in return spring. Built-in sintered bronze filter. 2 wipers and vent screw. Oil supply via threaded port.

Application:

Particularly suitable for retrofitting existing fixtures for hydraulic actuation. When workpieces are clamped onto a machine tool table, the hollow rod cylinder can be fitted over the clamp bolt instead of the nut. The hollow rod cylinders can be used for push or pull applications.

Features:

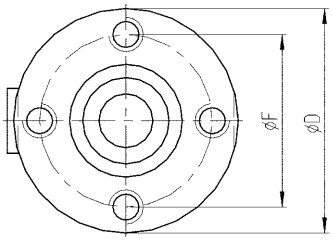
Completely sealed against contamination and chips by means of sinter metal breather and two wipers. Piston can be moved to its end stop. Oil connection at both ends, thus easy lining up in series.

Note:

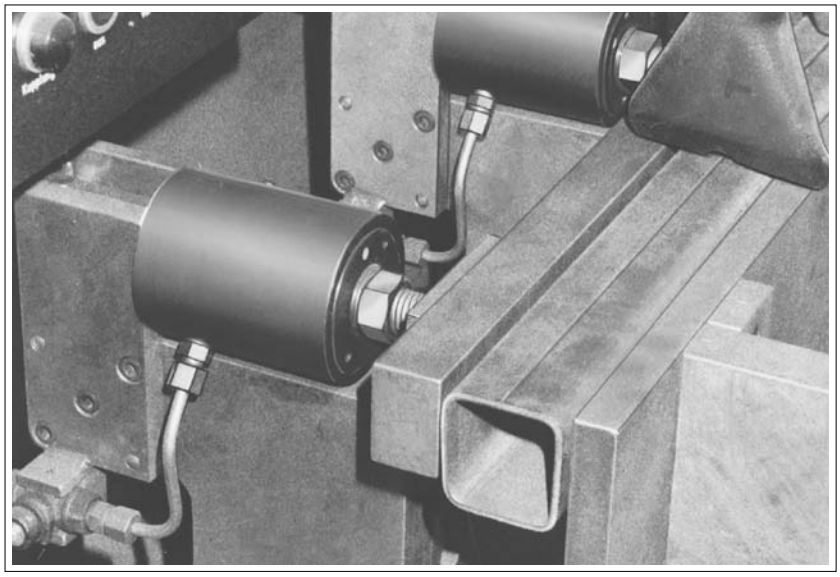
Cylinder size 20 to 50 are designed for use in combination with tempered bolts, material grade 8.8. For size 80 and 125 bolts of material grade 12.9 must be used.
For single acting cylinders there is risk of sucking in coolant during the return stroke. In this case the cylinders have to be protected against the direct effect of coolant. The built in sinter metal breather should be protected.

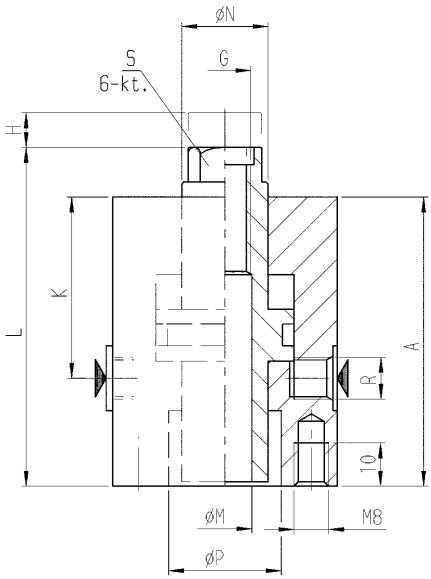
Dimensions:

Order no.	Article no.	Piston dia. [mm]	A	dia. D	dia. F	K	L	dia. M	dia. N	R	dia. P	G x depth	S
65318	6920G-20	32	80	52	40	56,0	90,0	12,5	20	G1/8	27	M12x29	17
63032	6920G-32	40	90	60	44	60,5	101,5	14,5	24	G1/8	30	M14x30	19
65334	6920G-50	48	101	70	50	71,5	113,0	16,5	26	G1/8	35	M16x39	22
63073	6920G-80	60	115	80	60	87,0	132,5	18,5	32	G1/4	38	M18x38	27
65359	6920G-125	75	149	100	75	108,0	163,0	20,5	38	G1/4	49	M20x47	32



Hollow rod cylinder no. 6920G-125 in powder welding system for clamping of U-profile panels.



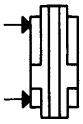


Subject to technical alterations.

No. 6920D

Hollow Rod Cylinder

double acting,
max. operating pressure 500 bar.





CAD

Order no.	Article no.	push-pull force VH 100 bar [kN]	push-pull force VH at 500 bar [kN]	push-pull force RH at 100 bar [kN]	push-pull force RH at 500 bar [kN]	Stroke H [mm]	Vol. VH [cm³]	Vol. RH [cm³]	effektive piston area VH [cm²]	effective piston area RH [cm²]	Weight [g]
62794	6920D-15-001	3,77	18,85	2,89	14,45	10	3,77	2,89	3,77	2,89	850
62836	6920D-24-001	6,03	30,15	4,90	24,50	10	6,03	4,90	6,03	4,90	1100
62844	6920D-38-001	9,42	47,10	7,65	38,25	16	15,10	12,20	9,42	7,65	1650
62851	6920D-59-001	14,72	73,60	11,59	57,95	16	23,50	18,50	14,72	11,59	2000
62869	6920D-92-001	23,12	115,60	18,60	93,00	20	46,20	37,20	23,12	18,60	3050
62877	6920D-150-001	37,68	188,40	30,63	153,15	25	94,20	76,50	37,68	30,63	5350

VH = work stroke, RH = back stroke

Design:

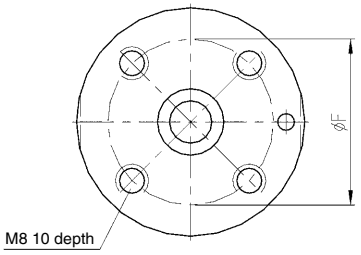
Cylinder barrel from steel, burnished. Piston case hardened and ground. Piston rod is supplied as standard with HC threads. If a piston rod with internal thread is desired, a HELI-COIL insert (diameter x1.5) is screwed into the HC thread. Oil supply via threaded port.

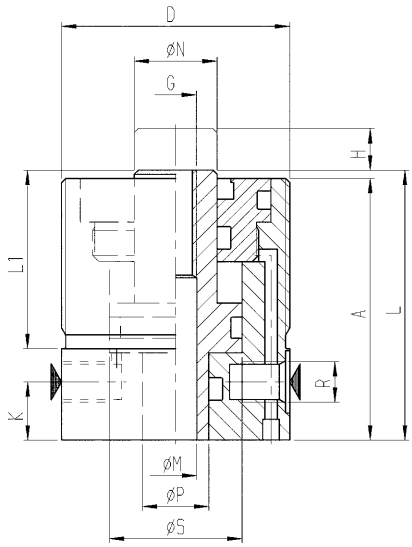
Application:

Particularly suitable for retrofitting existing fixtures for hydraulic actuation. When workpieces are clamped onto a machine tool table, the hollow rod cylinder can be fitted over the clamp bolt instead of the nut. The hollow rod cylinders can be used for push or pull applications.

Note:

Cylinders are designed for use in combination with tempered bolts, material grade 12.9 (e.g. DIN 787). Threaded body provides a wide range of adjustability. Suitable flange nuts DIN 70852.





Dimensions:

Order no.	Article no.	A	D x depth	dia. F	G	K	L	L1	dia. M	dia. N	dia. P	R	dia. S
62794	6920D-15-001	59	M50x1,5	35	HCM 8	11	60	36	8,2	16	12	G1/8	25
62836	6920D-24-001	64	M55x1,5	40	HCM 10	12	65	41	10,2	20	16	G1/4	32
62844	6920D-38-001	72	M65x1,5	45	HCM 12	14	73	45	12,2	25	20	G1/4	40
62851	6920D-59-001	78	M70x1,5	50	HCM 16	14	79	50	16,2	32	25	G1/4	50
62869	6920D-92-001	95	M80x2,0	60	HCM 20	18	96	60	20,2	40	32	G1/4	63
62877	6920D-150-001	109	M100x2,0	75	HCM 27	22	110	65	27,2	50	40	G1/4	80

HELI-COIL thread insert

Accessories



Order no.	Thread insert x length	for cylinder size	Weight [g]
67538	M 8x12	6920D-15-001	1
67546	M10x15	6920D-24-001	3
67595	M12x18	6920D-38-001	4
67603	M16x24	6920D-59-001	9
67611	M20x30	6920D-92-001	19
67629	M27x40,5	6920D-150-001	43

Note:

The HELI-COIL thread insert can be installed using a manual or automatic installation tool. The driving pin is used only for installation, and must subsequently be removed using a special pin-breaker. Without the HELI-COIL insert the piston through-hole has the value of the gap ØM (see dimensions table).

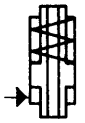
Subject to technical alterations.

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No. 6921

Hollow Rod Cylinder

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





CAD

Order no.	Article no.	push-pull force at 100 bar [kN]	push-pull force at 400 bar [kN]	Stroke H [mm]	Vol. [cm³]	effective piston area [cm²]	Spring force min. [N]	Weight [g]
63768	6921-70x6	17,8	71	6	11	18,5	700	1675
63149	6921-100x10	24,4	101	10	26	25,9	1500	4800

Design:

Cylinder barrel from steel, burnished. Piston and piston rod case hardened and ground. Retraction by disc springs. 1 wiper. Piston rod with internal thread and two flats (size 70 x 6) or hexagon (size 100 x 10). Built-in sintered bronze filter. Oil supply via threaded port.

Application:

When workpieces are clamped onto a machine tool table, the hollow rod cylinder can be screwed onto the clamp bolt and be joined to the clamp by the two threads in the body. Also suitable for holding and clamping devices directly on a machine tool table. The hollow rod cylinder is designed for use in combination with tempered bolts of material grade 8.8 for size 100x10 and material grade 12.9 for the size 70x6. In case bolts of material grade 8.8 and grade 10.9 are used the pressure has to be reduced for size 70x6 for continuous operation (see diagramme).

Features:

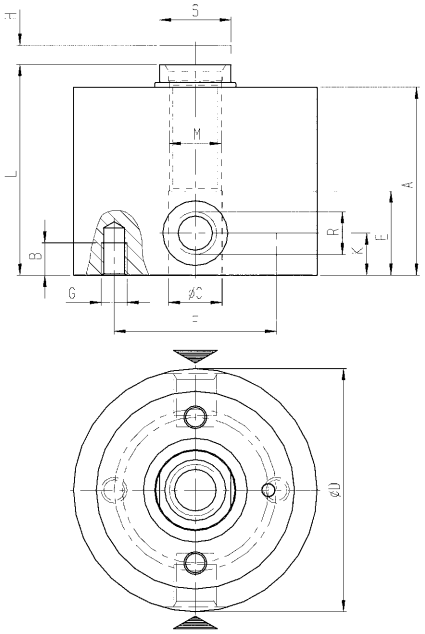
Protected against contamination and chips by a wiper. High forces in a small design.

Note:

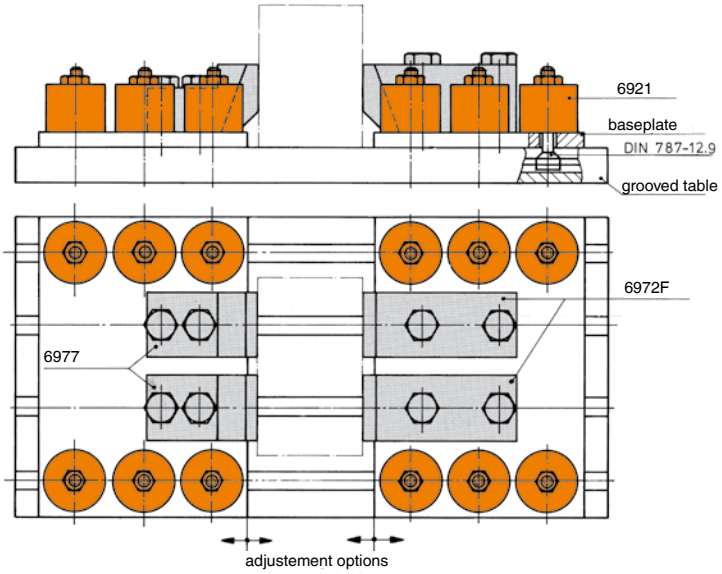
For single acting cylinders there is risk of sucking in coolant during the return stroke. In this case the cylinders have to be protected against the direct effect of coolant. The built in sinter metal breather should be protected.

Dimensions:

Order no.	Article no.	Piston dia. [mm]	A	B	dia. C	dia. D	E	F	G	K	L	M	R	S
63768	6921-70x6	55	58	10	16,5	75	26	50	M8	13	65	M16	G1/4	SW22
63149	6921-100x10	70	85	10	25,0	100	56	70	M10	16	97	M24	G1/4	SW36

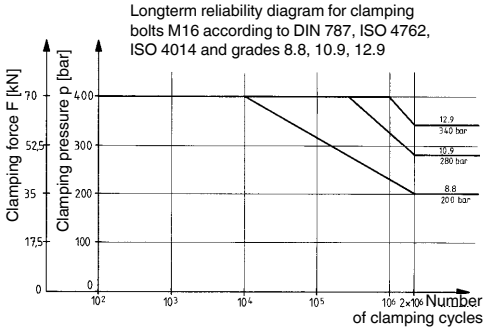


Application example:



The shown hydraulic clamping device shows casts of several sizes that are clamped by hydraulic pull-down clamp no. 6972F and pull-down counterpart no. 6977. To obtain an efficient means of adjustment, 2 base plates are each equipped with 6 hydraulic nuts no. 6921 which are connected to the grooved table via bolts for T-nut according to DIN 787. The adjustment of the base plate and the clamping of the workpiece can be performed independently by a pump unit with 2 clamping circuits.

Diagram for size 70x6:

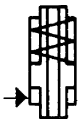


Subject to technical alterations.

No. 6935

Hollow Rod Cylinder with internal thread

Single acting, with spring return,
max. operating pressure 350 bar.





CAD

Order no.	Article no.	push-pull force VH 100 bar [kN]	push-pull force VH 350 bar [kN]	Stoke B [mm]	Vol. [cm³]	effective piston area [cm²]	Weight [g]
67850	6935-20	5,8	20,6	6,5	3,8	5,9	572
67876	6935-30	8,4	29,7	9,5	8,1	8,5	940
67892	6935-53	15,2	53,2	12,5	19,3	15,2	1837

VH = work stroke, RH = back stroke

Design:

Cylinder barrel from steel, hardened and burnished. Piston and piston rod case hardened and ground. Piston rod with through-hole and internal thread. Wiper at piston rod. Return spring from stainless steel. Oil supply via threaded port.

Application:

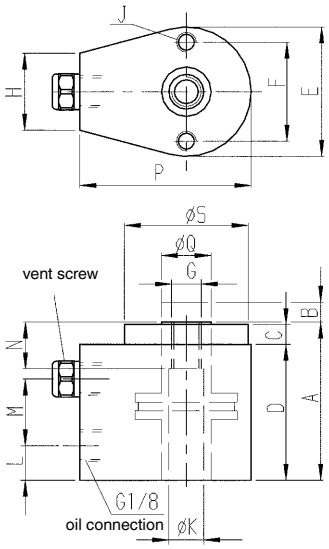
Particularely suitable to retrofit existing mechanical fixtures for hydraulic actuation. The hollow cylinder can be operated as push or pull cylinder. Universal cylinder for clamping, pushing, locking and punching.

Features:

Clamping cylinder with tapped piston rod. Tapped piston rod ends allow the use of custom end attachments.

Note:

For single acting cylinders there is the risk of succing in coolant through the breather port. Therefore, the sinter metal breather has to be protected e.g. by cover plates from direct access of coolant. The system has to be completely vented thoroughly during installation.



Dimensions:

Order no.	Article no.	A	C	D	E	F	G	H	J x depth	dia. K	L	M	N	P	dia. Q	dia. S
67850	6935-20	51,0	7,0	43,5	41,5	32	M10	28,5	M6x6	10,5	12	20,5	15	55	16,0	39,5
67876	6935-30	63,5	7,0	56,5	49,5	36	M12	24,5	M8x8	13,5	18	25,5	15	62	19,0	47,5
67892	6935-53	76,0	9,5	66,0	64,5	50	M16	25,0	M10x13	16,5	23	30,0	18	76	25,5	63,5

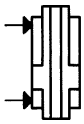
Subject to technical alterations.

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No. 6935D

Hollow Rod Cylinder with internal thread

Double-acting,
max. operating pressure 350 bar.





CAD

Order no.	Article no.	push-pull force VH 100 bar [kN]	push-pull force VH 350 bar [kN]	push-pull force RH at 100 bar [kN]	push-pull force RH at 350 bar [kN]	Stoke B [mm]	Vol. [cm^3]	effective piston area [cm^2]	Weight [g]
67918	6935D-20	5,8	20,6	5,8	20,6	6,5	3,8	5,9	572
67934	6935D-30	8,4	29,7	8,4	29,7	9,5	8,1	8,5	940
67959	6935D-53	15,2	53,2	15,2	53,2	12,5	19,3	15,2	1837

VH = work stroke, RH = back stroke

Design:

Cylinder barrel from steel, hardened and burnished. Piston and piston rod case hardened and ground. Piston rod with through-hole and internal thread. Wiper at piston rod. Return spring from stainless steel. Oil supply via threaded port.

Application:

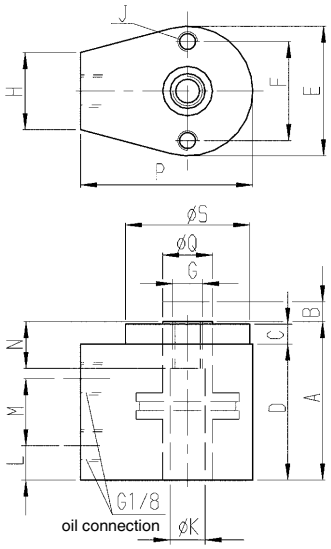
Particularely suitable to retrofit existing mechanical fixtures for hydraulic actuation. The hollow cylinder can be operated as push or pull cylinder. Universal cylinder for clamping, pushing, locking and punching.

Features:

Clamping cylinder with tapped piston rod. Tapped piston rod ends allow the use of custom end attachments.

Note:

For single acting cylinders there is the risk of succing in coolant through the breather port. Therefore, the sinter metal breather has to be protected e.g. by cover plates from direct access of coolant. The system has to be completely vented thoroughly during installation.



Dimensions:

Order no.	Article no.	A	C	D	E	F	G	H	J x depth	dia. K	L	M	N	P	dia. Q	dia. S
67918	6935D-20	51,0	7,0	43,5	41,5	32	M10	28,5	M6x6	10,5	12	20,5	15	55	16,0	39,5
67934	6935D-30	63,5	7,0	56,5	49,5	36	M12	24,5	M8x8	13,5	18	25,5	15	62	19,0	47,5
67959	6935D-53	76,0	9,5	66,0	64,5	50	M16	25,0	M10x13	16,5	23	30,0	18	76	25,5	63,5

Subject to technical alterations.

6918-3
09/09
Pmax. 500bar
6918-5
08/09
Pmax. 500bar
psi
bar
AMF

BUILT-IN CYLINDERS FOR UNIVERSAL USE

- clamping force up to 70 kN
- operating pressure up to 400 bar
- piston with and without internal thread
- for push- and pull operation
- quick adjustment, secured using standard grooved nuts
- single and double-acting variants
- wipers to protect against contamination

At continuous pressures below 80 bar, this must be stated on ordering as a different seal combination may need to be selected.

PRODUCT OVERVIEW:

Type	Clamping force [kN]	Clamping stroke [mm]	No. of models	Operating mode
6924	4,5 - 70	6 - 15	7	single acting
6925	4,4 - 39,9	6,5 - 32	11	single acting
6925D	17,8 - 39,9	25,5 - 51	4	double acting

PRODUCT EXAMPLES:

NO. 6924



- clamping force: 4,5 - 70 kN
- cylinder housing: with fine thread

NO. 6925



- clamping force: 4,4 - 39,9 kN
- cylinder housing: nitrided, with fine thread

NO. 6925D

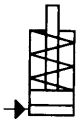


- clamping force: 17,8 - 39,9 kN
- cylinder housing: nitrided, with fine thread

No. 6924

Built-In Cylinder

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





CAD

Order no.	Article no.	Push force at 100 bar [kN]	Push force at 400 bar [kN]	Stroke H [mm]	Vol. [cm³]	Piston dia. [mm]	Piston area [cm²]	Spring force min. [N]	Weight [g]
63024	6924-05	1,1	4,5	6	0,66	12	1,1	45	300
63099	6924-08	2,0	8,0	6	1,20	16	2,0	60	270
63115	6924-12	3,0	12,0	8	2,50	20	3,1	95	480
63131	6924-20	5,0	20,0	8	4,00	25	4,9	205	500
63164	6924-32	8,0	32,0	10	8,00	32	8,0	340	850
63156	6924-50	12,5	50,0	12	15,00	40	12,5	400	1450
63180	6924-70	17,5	70,0	15	27,00	48	18,0	650	2050

Design:

Cylinder from steel, burnished. Piston and piston rod case hardened and ground. Built-in return spring, sintered bronze breather. Wiper at piston rod. Cylinder barrel with metric fine thread for locknuts to DIN 70852. Oil supply via threaded port.

Application:

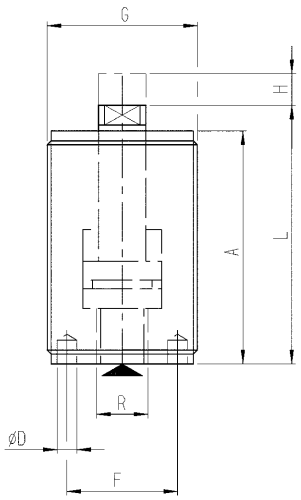
Suitable for converting mechanical to hydraulic clamping devices. The built-in cylinder is inserted in through holes and counter screwed at both ends with grooved nuts. General-purpose clamping element for clamping, pushing, pressing, riveting and punching.

Features:

The metric thread extending over the whole length of the cylinder permits with its two flange nuts DIN 70852 lengthwise adjustment over a large range and fast positioning in the requiredby by two flange nuts. Fast attachment of fixture elements and thrust pieces the piston thread.

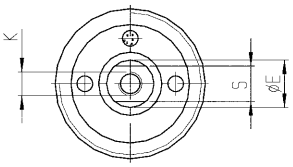
Note:

For single acting cylinder types there is a risk of sucking coolant liquid at the return stroke. In this case the cylinder has to be protected against the direct effect of coolant. The built in sinter metal breather should be protected.



Dimensions:

Order no.	Article no.	A	dia. D	dia. E	F	G	K x depth	L	S	R
63024	6924-05	50,0	4	8	20	M30x1,5	M4x10	56,0	6	G1/8
63099	6924-08	46,5	4	10	20	M32x1,5	M5x12	52,5	8	G1/8
63115	6924-12	59,0	5	12	28	M38x1,5	M6x14	65,5	9	G1/4
63131	6924-20	63,5	4	12	25	M40x1,5	M8x20	70,5	10	G1/4
63164	6924-32	72,0	4	16	30	M48x1,5	M10x25	81,0	13	G1/4
63156	6924-50	80,0	5	20	35	M60x1,5	M12x28	89,0	17	G1/4
63180	6924-70	93,0	6	25	44	M70x1,5	M16x35	105,0	22	G1/4

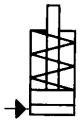


Subject to technical alterations.

No. 6925

Built-In Cylinder

Single acting, with spring return,
max. operating pressure 350 bar.





6925-04



6925-10

CAD

Order no.	Article no.	Push force at 100 bar [kN]	Push force at 350 bar [kN]	Stroke C [mm]	Vol. [cm³]	Piston area [cm²]	Weight [g]
67975	6925-04-1	1,25	4,4	9,5	1,2	1,3	73
67991	6925-04-2	1,25	4,4	19,0	2,5	1,3	91
68015	6925-04-3	1,25	4,4	32,0	4,1	1,3	118
68031	6925-10-1	2,88	10,1	6,5	1,8	2,9	200
67801	6925-10-2	2,88	10,1	19,0	5,5	2,9	210
67827	6925-10-3	2,88	10,1	32,0	9,2	2,9	254

Design:

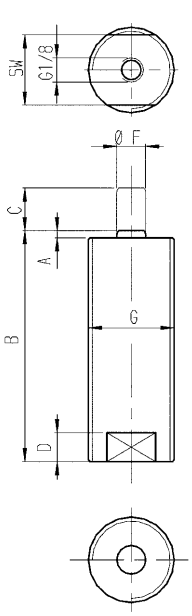
Cylinder barrel from steel, hardened and burnished. Piston and piston rod case hardened and ground. Piston rod with internal thread. Wiper at piston rod. Cylinder barrel with metric fine thread for locknut to DIN 70852. Return spring from stainless steel. Oil supply via threaded port.

Application:

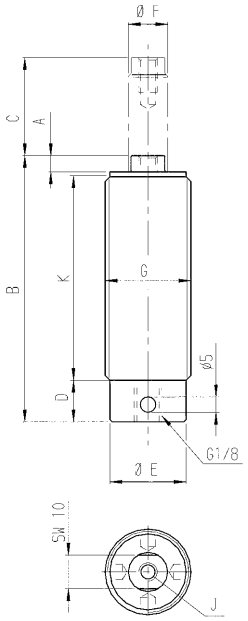
Suitable to convert mechanical fixtures into hydraulic operated. The built-in cylinder can easily be mounted and adjusted into fixture walls by grooved nuts. Universal cylinder for clamping, pushing, locking and rivetting.

Features:

The metric thread extending over the whole length of the cylinder permits with its two flange nuts DIN 70852 lengthwise adjustment over a large range. Tapped piston rod end allows the use of individual contact bolts.



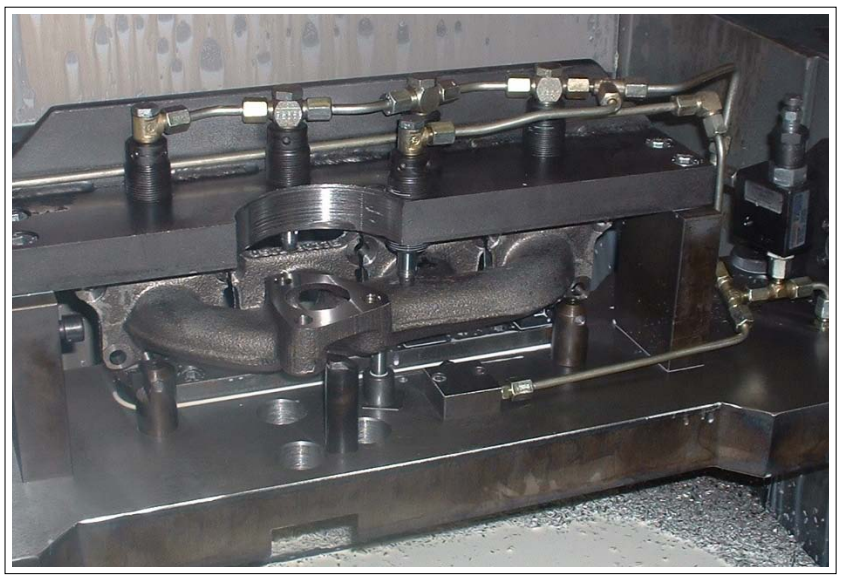
6925-04



6925-10

Dimensions:

Order no.	Article no.	A	B	D	dia. E	dia. F	G	J x depth	K	SW
67975	6925-04-1	1,5	51,0	6,5	-	6,5	M20x1,5	-	-	16
67991	6925-04-2	1,5	65,5	6,5	-	6,5	M20x1,5	-	-	16
68015	6925-04-3	1,5	83,0	6,5	-	6,5	M20x1,5	-	-	16
68031	6925-10-1	6,5	55,5	12,5	24,5	12,5	M28x1,5	M6x11	35,5	-
67801	6925-10-2	6,5	68,5	12,5	24,5	12,5	M28x1,5	M6x11	48,0	-
67827	6925-10-3	5,0	86,0	12,5	24,5	12,5	M28x1,5	M6x11	67,0	-

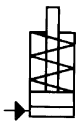


Subject to technical alterations.

No. 6925

Built-In Cylinder

Single acting, with spring return,
max. operating pressure 350 bar.





CAD

Order no.	Article no.	Compressive force Vh at 100 bar [kN]	Compressive force Vh at 350 bar [kN]	Stroke C [mm]	Vol. VH [cm^3]	Piston area VH [cm^2]	Weight [g]
67843	6925-18-1	5,08	17,8	12,5	6,4	5,1	304
67868	6925-18-2	5,08	17,8	25,5	13,0	5,1	354
67884	6925-18-3	5,08	17,8	51,0	26,0	5,1	463
67900	6925-40-1	11,40	39,9	12,5	14,2	11,4	644
67926	6925-40-2	11,40	39,9	25,5	29,0	11,4	744

VH = work stroke, RH = back stroke

Design:

Cylinder barrel from steel, hardened and burnished. Piston and piston rod case hardened and ground. Piston rod with internal thread. Wiper at piston rod. Cylinder barrel with metric fine thread for locknut to DIN 70852. Oil supply via threaded port.

Application:

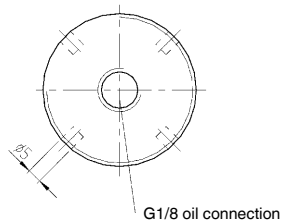
Suitable to convert mechanical fixtures into hydraulic operated. The built-in cylinder can easily be mounted and adjusted into fixture walls by flange nuts. Universal cylinder for clamping, pushing, locking, rivetting and punching.

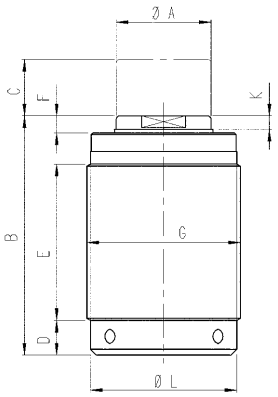
Features:

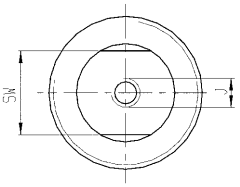
The metric thread extending over the whole length of the cylinder permits with its two flange nuts DIN 70852 lengthwise adjustment over a large range. Tapped piston rod end allows the use of individual contact bolts.

Note:

The system has to be completely vented during installation.







Dimensions:

Order no.	Article no.	dia. A	B	D	E	F	G	SW	J x depth	K	dia. L
67843	6925-18-1	20,1	68,0	12,5	39,5	8	M35x1,5	17	M8x11	6,5	30,5
67868	6925-18-2	20,1	80,5	12,5	52,5	8	M35x1,5	17	M8x11	6,5	30,5
67884	6925-18-3	20,1	109,0	12,5	81,0	8	M35x1,5	17	M8x11	6,5	30,5
67900	6925-40-1	28,2	70,0	12,5	39,5	10	M48x1,5	25	M12x13	9,0	45,0
67926	6925-40-2	28,2	83,0	12,5	52,5	10	M48x1,5	25	M12x13	9,0	45,0

Subject to technical alterations.

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No. 6925D

Built-In Cylinder

Double-acting,
max. operating pressure 350 bar.





CAD

Order no.	Article no.	Compressive force Vh at 100 bar [kN]	Compressive force Vh at 350 bar [kN]	Compressive force RH at 100 bar [kN]	Compressive force RH at 350 bar [kN]	Stroke C [mm]	Vol. VH [cm³]	Vol. RH [cm³]	Piston area VH [cm²]	Piston area RH [cm²]	Weight [g]
67942	6925D-18-1	5,08	17,8	1,6	5,9	25,5	13,0	4,4	5,1	1,7	762
67967	6925D-18-2	5,08	17,8	1,6	5,9	51,0	26,0	8,8	5,1	1,7	1061
67983	6925D-40-1	11,40	39,9	5,0	17,5	25,5	29,0	12,7	11,4	5,0	1379
68007	6925D-40-2	11,40	39,9	5,0	17,5	51,0	58,1	25,5	11,4	5,0	1869

VH = work stroke, RH = back stroke

Design:

Cylinder barrel from steel, hardened and burnished. Piston and piston rod case hardened and ground. Piston rod with internal thread. Wiper at piston rod. Cylinder barrel with metric fine thread for locknut to DIN 70852. Oil supply via threaded port.

Application:

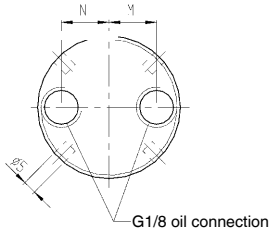
Suitable to convert mechanical fixtures into hydraulic operated. The built-in cylinder can easily be mounted and adjusted into fixture walls by flange nuts. Universal cylinder for clamping, pushing, locking, rivetting and punching.

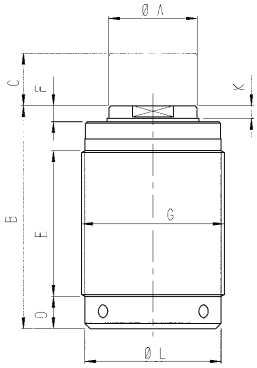
Features:

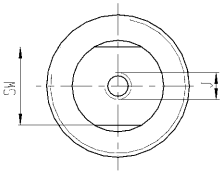
The metric thread extending over the whole length of the cylinder permits with its two flange nuts DIN 70852 lengthwise adjustment over a large range. Tapped piston rod end allows the use of individual contact bolts.

Note:

The system has to be completely vented during installation.







Dimensions:

Order no.	Article no.	dia. A	B	D	E	F	G	SW	J x depth	K	dia. L	M	N
67942	6925D-18-1	20,1	80,5	12,5	52,5	8	M48x1,5	17	M8x11	6,5	45,0	14,0	14
67967	6925D-18-2	20,1	109,0	12,5	81,0	8	M48x1,5	17	M8x11	6,5	45,0	14,0	14
67983	6925D-40-1	28,2	82,0	12,5	52,5	10	M65x1,5	25	M12x13	9,0	60,5	20,5	11
68007	6925D-40-2	28,2	111,0	12,5	81,0	10	M65x1,5	25	M12x13	9,0	60,5	20,5	11

Subject to technical alterations.

DIN 70852

Flange Nut

CAD



Order no.	Article no.	dia. A	B	dia. D	E	F	G	No's grooves	Weight [g]
63974	70852-M20	27	6	32	5,5	2,3	M20x1,5	4	19
63784	70852-M28	36	7	42	6,5	2,8	M28x1,5	4	35
63792	70852-M30	38	7	44	6,5	2,8	M30x1,5	4	36
63800	70852-M32	41	8	48	7,0	3,3	M32x1,5	4	52
63818	70852-M35	43	8	50	7,0	3,3	M35x1,5	4	51
63826	70852-M38	47	8	54	7,0	3,3	M38x1,5	4	60
63834	70852-M40	49	8	56	7,0	3,3	M40x1,5	4	62
63842	70852-M48	57	8	65	8,0	3,8	M48x1,5	6	75
63859	70852-M50	60	8	68	8,0	3,8	M50x1,5	6	84
63867	70852-M52	62	8	70	8,0	3,8	M52x1,5	6	87
63875	70852-M55	67	8	75	8,0	3,8	M55x1,5	6	100
63883	70852-M58 *	71	9	80	11,0	4,3	M58x1,5	6	140
63891	70852-M60	71	9	80	11,0	4,3	M60x1,5	6	130
63909	70852-M65	76	9	85	11,0	4,3	M65x1,5	6	130
63917	70852-M70	81	9	90	11,0	4,3	M70x1,5	6	140
63925	70852-M80 *	91	10	100	11,0	4,3	M80x2,0	6	180
267062	70852-M85 *	99	10	108	11,0	4,3	M85x2,0	6	239
63933	70852-M100 *	116	10	125	11,0	4,3	M100x2,0	6	299

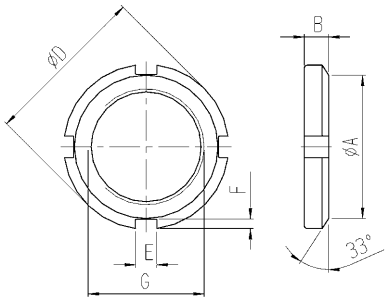
* not to DIN

Design:

Steel, zinc-plated.

Application:

The flange nuts hold cylinders in the required position.





Subject to technical alterations.

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THREADED CYLINDERS – SPACE-SAVINGS AND EASY TO INSTALL

> clamping force up to 40 kN
> operating pressure up to 500 bar
> piston with and without internal thread
> wipers to protect against contamination
> oil supply via fixture body
> single and double-acting variants

At continuous pressures below 80 bar, this must be stated on ordering as a different seal combination may need to be selected.

PRODUCT OVERVIEW:

Type	Clamping force [kN]	Clamping stroke [mm]	No. of models	Operating mode
6929	2,5 - 40,0	5 - 20	8	single acting
6930	5,5 - 40,0	10 - 20	5	single acting
6930D	4,5 - 50,2	12 - 40	6	double acting
6932	2,5 - 24,5	4 - 12	5	single acting
6933	5,5 - 40,0	8 - 12	5	single acting
6934	2,4 - 17,5	5 - 19	5	single acting

PRODUCT EXAMPLES:

NO. 6930



> clamping force: 5,5 - 40 kN
> cylinder housing: with fine thread

NO. 6932



> clamping force: 2,5 - 24,5 kN
> cylinder housing: with fine thread

NO. 6934

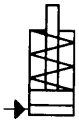


> clamping force: 2,4 - 17,5 kN
> cylinder housing: nitrided, with fine thread

No. 6929-03

Threaded Cylinder for tube connection, with spherical piston rod

single acting, spring return,
max. operating pressure 500 bar,
min. operating pressure 25 bar.





CAD

Order no.	Article no.	Push force at 100 bar [kN]	Push force at 500 bar [kN]	Vol. [cm³]	Stroke H [mm]	Piston dia. [mm]	Piston area [cm²]	Spring force min. [N]	Weight [g]
60111	6929-03x10	0,5	2,5	0,5	10	8	0,5	24	80

Design:

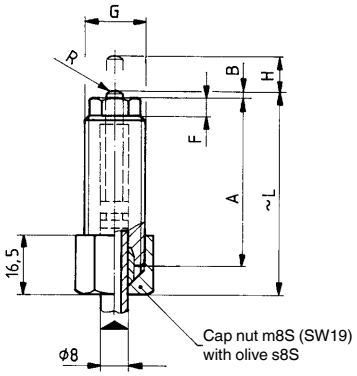
Cylinder barrel from steel, burnished. Piston and piston rod case hardened and ground. Wiper at piston rod, union nut with cutting ring.
Oil supply via threaded port.

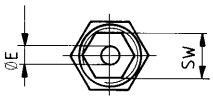
Features:

Hoses or tubes can be directly screwed onto the threaded cylinders.

Note:

Pistons of these cylinders must not be loaded in retracted position. Care for protection against aggressive lubricants and coolants. As the cylinder has no stop for the tube, the preassembly of the cutting ring has to be effected by means of a hardened pre-mounting tool. Due to the construction size, an internal stop for the piston is not possible. Therefore, please do not operate the threaded cylinder without workpiece, as the spring could be damaged or its spring force could be reduced.

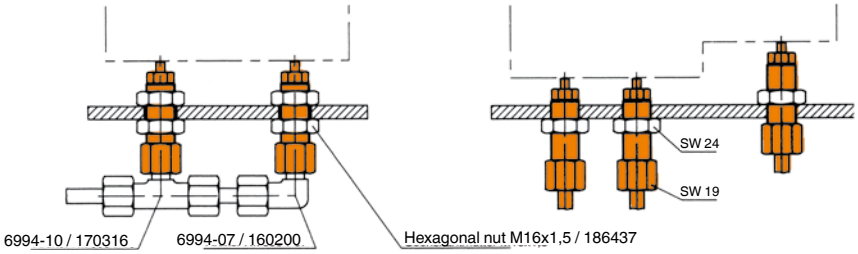




Dimensions:

Order no.	Article no.	A	B	dia. E	F	G	~L	R	SW
60111	6929-03x10	48	1	5	6	M16x1,5	57	6	13

Application examples:



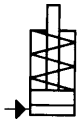
Subject to technical alterations.

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No. 6929

Threaded Cylinder bottom sealing, with spherical piston rod

single acting, spring return,
max. operating pressure 500 bar,
min. operating pressure 25 bar.





CAD

Order no.	Article no.	Push force at 100 bar [kN]	Push force at 500 bar [kN]	Stroke H [mm]	Vol. [cm³]	Piston dia. [mm]	Piston area [cm²]	Md max. [Nm]	Spring force min. [N]	Weight [g]
60095	6929-02x05	0,5	2,5	5	0,25	8	0,5	10	24	15
60103	6929-02x10	0,5	2,5	10	0,50	8	0,5	10	24	25
60046	6929-05	1,1	5,5	10	1,10	12	1,1	40	45	80
60053	6929-08	2,0	10,0	12	2,40	16	2,0	50	70	140
60061	6929-12	3,0	15,5	15	4,70	20	3,1	60	105	220
60079	6929-20	4,9	24,5	16	7,80	25	4,9	80	145	390
60087	6929-32	8,0	40,0	20	16,00	32	8,0	225	270	930

Design:

Cylinder barrel from steel, burnished. Piston and piston rod case hardened and ground. Wiper at piston rod, with plastic seal for bottom sealing of the cylinder. For no. 6929-02x05 and 6929-02 x 10 sealing with Cu-ring. Oil supply via oil channel in fixture body.

Application:

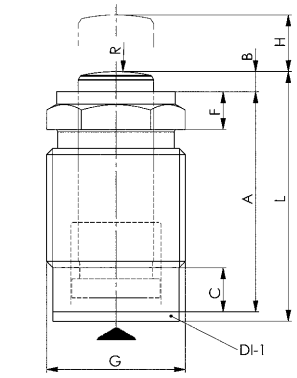
These threaded cylinders can be used in all types of clamping fixtures. Ideal for pressure bars for tolerance compensation in multiple-workpiece clamping fixtures, and for positioning, holding or ejecting, and clamping workpieces.

Features:

Small dimensions, can be installed closely spaced side-by-side. The cylinders can be screwed into the fixture body up to the hexagon.

Note:

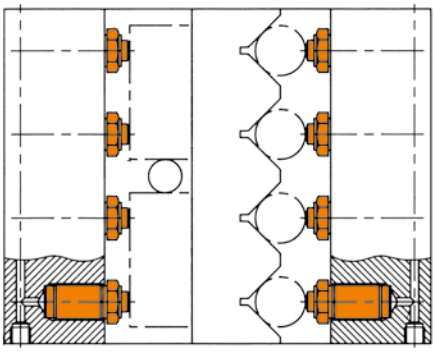
Pistons of these cylinders must not be loaded in retracted position. Care for protection against aggressive lubricants and coolants. The sealing surface of the mounting hole to the thread must be at a right angle and even. For sizes 02x05 and 02x10, a internal stop for the piston is not possible due to the construction size. Therefore, do not operate the threaded cylinder without workpiece, as the spring could be damaged or its spring force could be reduced.

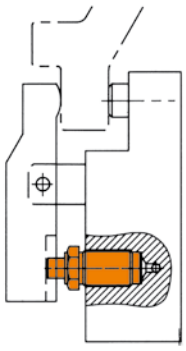


Dimensions:

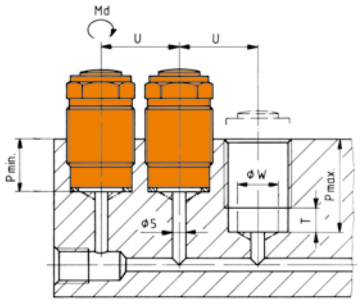
Order no.	Article no.	A	B	C	dia. E	F	G	L	P min.	P max.	R	SW1	T max.	U min.	dia. W max.	DI-1 Seal Order No.
60095	6929-02x05	27,0	1,0	4	5	4	M12x1,5	29,0	12	23	6	11	-	15	-	120105
60103	6929-02x10	40,0	1,0	4	5	4	M12x1,5	42,0	12	36	6	11	-	15	-	120105
60046	6929-05	35,0	2,0	7	12	6	M22x1,5	38,5	16	29	25	19	8	25	12	182162
60053	6929-08	43,0	2,0	8	16	9	M26x1,5	46,5	20	34	35	24	9	30	16	182170
60061	6929-12	53,0	2,0	8	20	10	M30x1,5	56,5	24	43	50	30	9	38	20	182188
60079	6929-20	55,5	2,5	11	25	12	M38x1,5	60,0	28	44	70	36	11	45	25	182196
60087	6929-32	82,5	2,5	12	32	15	M48x1,5	87,5	42	68	100	46	13	57	30	182204

Application examples:





Installation dimensions:

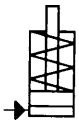


Subject to technical alterations.

No. 6930

Threaded Cylinder bottom sealing, piston rod with internal thread

single acting, spring return,
max. operating pressure 500 bar,
min. operating pressure 25 bar.





CAD

Order no.	Article no.	Push force at 100 bar [kN]	Push force at 500 bar [kN]	Stroke H [mm]	Vol. [cm³]	Piston dia. [mm]	Piston area [cm²]	Md max. [Nm]	Spring force min. [N]	Weight [g]
60129	6930-05	1,1	5,5	10	1,1	12	1,1	40	45	80
60137	6930-08	2,0	10,0	12	2,4	16	2,0	50	70	140
60145	6930-12	3,0	15,5	15	4,7	20	3,1	60	105	230
60152	6930-20	4,9	24,5	16	7,8	25	4,9	80	145	410
60160	6930-32	8,0	40,0	20	16,0	32	8,0	225	270	970

Design:

Cylinder barrel from steel, burnished. Piston and piston rod case hardened and ground. Wiper at piston rod, with plastic seal for bottom sealing of the cylinder. Oil supply via oil channel in fixture body.

Application:

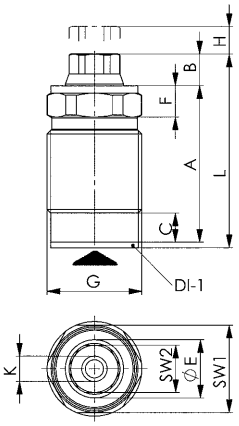
These threaded cylinders can be used in all types of clamping fixtures. Ideal for pressure bars for tolerance compensation in multiple-workpiece clamping fixtures, and for positioning, holding or ejecting, and clamping workpieces.

Features:

Small dimensions, can be installed closely spaced side-by-side. The cylinders can be screwed into the fixture body up to the hexagon.

Note:

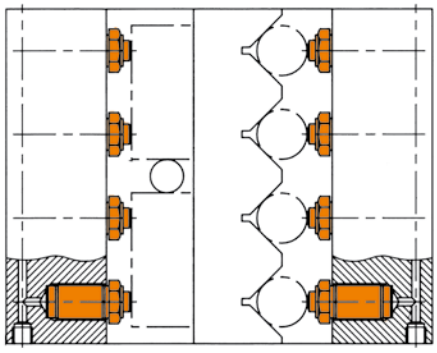
Pistons of these cylinders must not be loaded in retracted position. Care for protection against aggressive lubricants and coolants. The sealing surface of the mounting hole to the thread must be at a right angle and even.

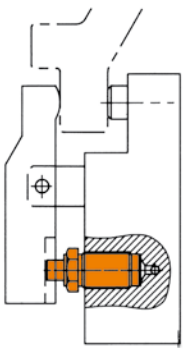


Dimensions:

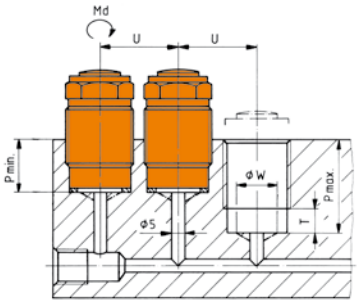
Order no.	Article no.	A	B	C	dia. E	F	G	K x depth	L	P min.	P max.	SW1	SW2	T max.	U min.	dia. W max.	DI-1 Seal Order No.
60129	6930-05	35,0	9,0	7	12	6	M22x1,5	M6x6	45,5	16	29	19	10	8	25	12	182162
60137	6930-08	43,0	8,5	8	16	9	M26x1,5	M6x6	53,0	20	34	24	13	9	30	16	182170
60145	6930-12	53,0	11,5	8	20	10	M30x1,5	M8x8	66,0	24	43	30	17	9	38	20	182188
60152	6930-20	55,5	11,5	11	25	12	M38x1,5	M8x8	69,0	28	44	36	19	11	45	25	182196
60160	6930-32	82,5	13,5	12	32	15	M48x1,5	M12x12	98,5	42	68	46	24	13	57	30	182204

Application examples:





Installation dimensions:



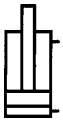
Subject to technical alterations.

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No. 6930D

Threaded Cylinder

double-acting,
max. working pressure 400 bar,
min. operating pressure 25 bar.





CAD

Order no.	Article no.	Push force at 100 bar [kN]	Push force at 400 bar [kN]	Pull force at 100 bar [kN]	Pull force at 400 bar [kN]	Stroke H ±1 [mm]	Vol. push [cm³]	Vol. pull [cm³]	Piston area push [cm²]	Piston area pull [cm²]	Md [Nm]	Weight [g]
320507	6930D-05	1,1	4,5	0,6	2,5	12	1,4	0,8	1,1	0,6	44	107
320515	6930D-08	2,0	8,0	1,2	4,9	16	3,2	2,0	2,0	1,2	77	186
320523	6930D-12	3,1	12,5	2,0	8,0	20	6,3	4,0	3,1	2,0	154	270
320531	6930D-20	4,9	19,6	2,9	11,6	25	12,3	7,3	4,9	2,9	301	519
320549	6930D-32	8,0	32,1	4,9	19,6	32	25,7	15,7	8,0	4,9	594	920
320556	6930D-50	12,5	50,2	7,6	30,6	40	50,2	30,6	12,5	7,7	1115	1639

Design:

Cylinder housing from hardened steel, burnished. Piston tempered, ground, nitrided, and treated with a corrosion-resistant coating. Oil supply via oil channel in fixture body.

Application:

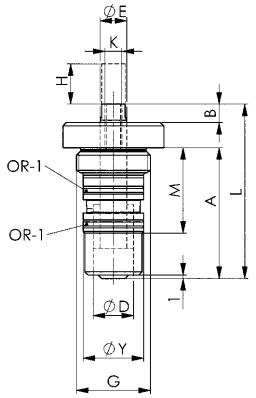
These threaded cylinders can be used in all types of clamping fixtures. Ideal for pressure bars for tolerance compensation in multiple-workpiece clamping fixtures, and for positioning, holding or ejecting, and clamping workpieces. Can be used extending or retracting.

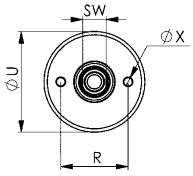
Features:

The O-rings are smaller than the diameter of the screw-in thread. This reduces the risk of damage to the seal during the installation process.
Two-piece body makes it easier to change the piston-rod seal. Housing seals against the surface of the hole sleeve. For sizes 05 and 08, there is additional sealing between the housing head and the fixture body.
Small dimensions, can be installed closely spaced side-by-side. The cylinder must be screwed into the fixture body up to its flange.

Note:

Maximum speed of operation 0.5 m/s
Can be supplied on request for higher pressures and temperatures.

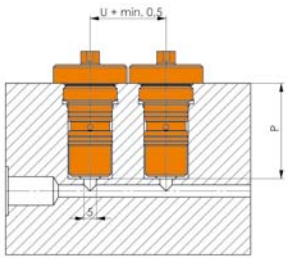




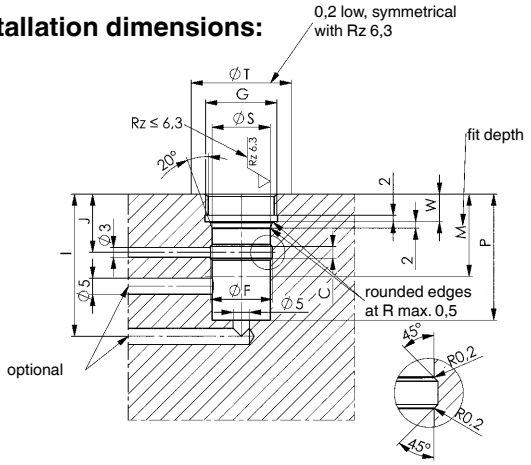
Dimensions:

Order no.	Article no.	A	B	C	dia. D	dia. E F7	F	G	I	J	K x depth	L ±1	M +1	P ±0,2	R	dia. S H7	min. dia. T	dia. U	W ±0,2	dia. X	dia. Y f7	SW	OR-1 O-ring Order No.
320507	6930D-05	39	5,5	3,6	12	8	19,2	M22x1,5	44	18,0	M5x11	52	25,5	39	20	18	31	30	8,5	2,5	18	7	321141
320515	6930D-08	48	6,0	4,0	16	10	23,0	M26x1,5	53	19,0	M6x14	65	30,0	48	25	22	33	31	8,5	2,5	22	8	321240
320523	6930D-12	53	7,0	4,0	20	12	29,2	M32x1,5	62	20,0	M8x14	67	31,5	53	30	28	38	37	10,5	4,2	28	10	320952
320531	6930D-20	65	7,0	4,4	25	16	35,8	M40x1,5	72	25,0	M10x18	82	39,0	65	35	35	45	44	13,5	5,2	35	13	321018
320549	6930D-32	72	10,0	4,4	32	20	44,8	M50x1,5	79	28,0	M12x18	94	44,0	72	42	44	55	54	15,5	6,2	44	17	321091
320556	6930D-50	86	12,0	5,2	40	25	56,2	M60x1,5	94	30,5	M16x28	112	47,0	86	50	55	66	65	19,0	6,2	55	22	321174

Application example:



Installation dimensions:

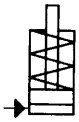


Subject to technical alterations.

No. 6932

Threaded Cylinder with spherical piston rod

single acting, spring return,
max. operating pressure 500 bar.





CAD

Order no.	Article no.	Push force at 100 bar [kN]	Push force at 500 bar [kN]	Stroke H [mm]	Vol. [cm³]	Piston area [cm²]	Md max. [Nm]	Spring force min. [N]	Weight [g]
60178	6932-02	0,5	2,5	4	0,20	0,5	80	25	50
60186	6932-05	1,1	5,5	4	0,45	1,1	90	35	80
60194	6932-08	2,0	10,0	6	1,20	2,0	110	65	130
60202	6932-12	3,0	15,0	8	2,50	3,1	120	100	300
60210	6932-20	5,0	24,5	12	5,90	4,9	130	155	470

Design:

Cylinder barrel from steel, burnished with hex nut. Piston and piston rod case hardened and ground. Wiper at piston rod. Built-in return spring. Sintered bronze breather. Attachment with standard fine thread. Sealing by sealing edge, see „Notes“. Oil supply via oil channel in fixture body.

Application:

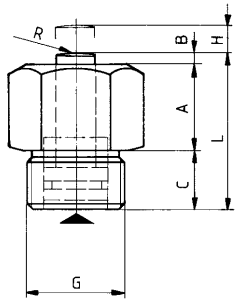
Ideal for clamping bars for tolerance compensation in multiple fixtures and for positioning, clamping or discharging workpieces.

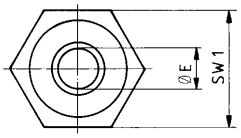
Features:

Small dimensions, can be installed closely spaced side-by-side. The cylinders must be screwed into the fixture body up to the hexagon.

Note:

The screw-in cylinders cannot be loaded in the retracted position. For single acting cylinder types, there is a risk of sucking in liquid. The cylinders must be protected against direct penetration of cutting and cooling liquids. The built-in sintered bronze filter should be protected by appropriate arrangement or by a cover. Sealing by sealing edge. For the locating hole, the sealing surface must be at right angles to the thread, flat and not hardened.

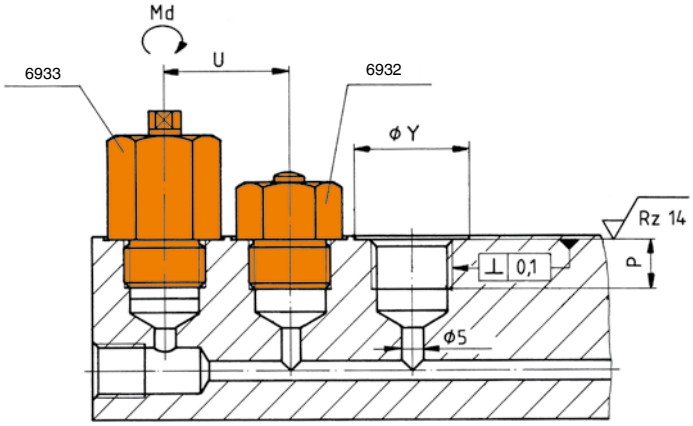




Dimensions:

Order no.	Article no.	Piston dia. [mm]	A	B	C	dia. E	G	L	P +1	R	SW1	U min.	dia. Y
60178	6932-02	8	14	1	12	5	M16x1,5	27	12	10	19	24	23
60186	6932-05	12	14	1	12	8	M20x1,5	27	12	28	24	30	29
60194	6932-08	16	21	2	14	10	M24x1,5	37	14	30	27	34	33
60202	6932-12	20	27	2	18	12	M30x1,5	47	18	36	36	44	43
60210	6932-20	25	33	2	21	16	M36x1,5	56	21	50	41	50	49

Installation dimensions:



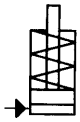
Subject to technical alterations.

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No. 6933

Threaded Cylinder, piston rod with internal thread

single acting, spring return,
max. operating pressure 500 bar.





CAD

Order no.	Article no.	Push force at 100 bar [kN]	Push force at 500 bar [kN]	Stroke H [mm]	Vol. [cm³]	Piston dia. [mm]	Piston area [cm²]	Md max. [Nm]	Spring force min. [N]	Weight [g]
60004	6933-05	1,1	5,5	8	0,9	12	1,1	90	35	120
60012	6933-08	2,0	10,0	10	2,0	16	2,0	110	70	200
60020	6933-12	3,0	15,0	10	3,1	20	3,1	120	115	370
60038	6933-20	5,0	24,5	12	5,9	25	4,9	130	160	510
61176	6933-32	8,0	40,0	12	9,6	32	8,0	150	240	750

Design:

Cylinder barrel from steel, burnished with hex nut. Piston and piston rod case hardened and ground. Wiper at piston rod. Built-in return spring. Sintered bronze breather. Attachment with standard fine thread. Sealing by sealing edge, see „Notes“. Oil supply via oil channel in fixture body.

Application:

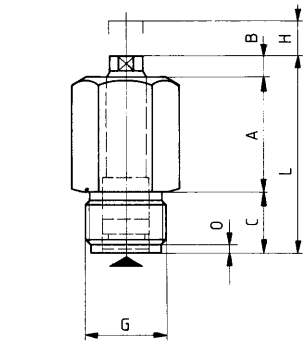
Ideal for clamping bars for tolerance compensation in multiple fixtures and for positioning, clamping or discharging workpieces.

Features:

Small dimensions, can be installed closely spaced side-by-side. The cylinders must be screwed into the fixture body up to the hexagon.

Note:

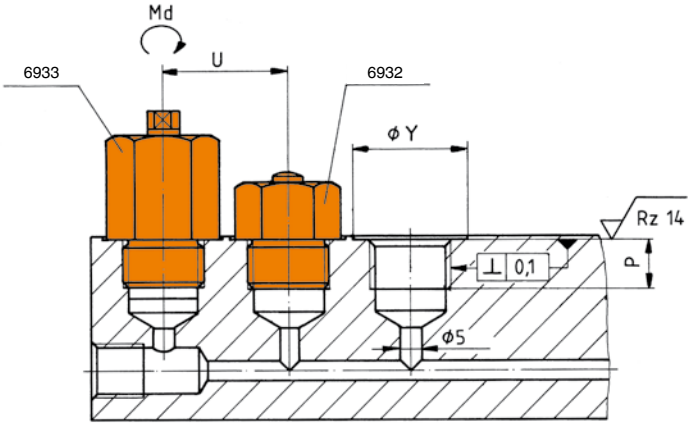
The screw-in cylinders cannot be loaded in the retracted position. For single acting cylinder types, there is a risk of sucking in liquid. The cylinders must be protected against direct penetration of cutting and cooling liquids. The built-in sintered bronze filter should be protected by appropriate arrangement or by a cover. Sealing by sealing edge. For the locating hole, the sealing surface must be at right angles to the thread, flat and not hardened.



Dimensions:

Order no.	Article no.	A	B	C	dia. E	G	K x depth	L	O	P +1	SW1	SW2	U min.	dia. Y
60004	6933-05	25	6	15	8	M20x1,5	M4x10	46	3	12	24	6	30	29
60012	6933-08	34	6	18	10	M24x1,5	M5x12	58	3	15	27	8	34	33
60020	6933-12	34	6	21	12	M30x1,5	M6x14	61	3	18	36	9	44	43
60038	6933-20	35	8	23	16	M36x1,5	M8x17	66	3	20	41	13	50	49
61176	6933-32	35	9	25	16	M42x1,5	M8x17	69	3	22	50	13	61	60

Installation dimensions:

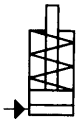


Subject to technical alterations.

No. 6934

Threaded Cylinder bottom sealing

Single acting, with spring return,
max. operating pressure 350 bar.





CAD

Order no.	Article no.	Push force at 100 bar [kN]	Push force at 350 bar [kN]	Stroke C [mm]	Vol. [cm³]	Piston area [cm²]	Md CU seal [Nm]	Md Plastic seal [Nm]	Weight [g]
68312	6934-02	0,68	2,4	5,0	0,3	0,7	40	20	27
68338	6934-04	1,25	4,4	6,5	0,8	1,3	54	30	54
68353	6934-10-1	2,88	10,1	9,5	2,7	2,9	68	35	95
68379	6934-10-2	2,88	10,1	19,0	5,5	2,9	68	35	191
68395	6934-17	5,00	17,5	8,0	4,0	5,1	50	50	159

Design:

Cylinder barrel from steel, hardened and burnished. Piston and piston rod case hardened and ground. Piston rod spherical or with internal thread. Wiper at piston rod. Return spring from stainless steel. Oil supply via oil channel in fixture body.

Application:

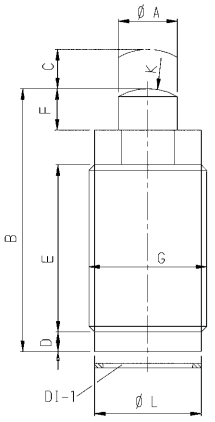
Threaded cylinders are designed for space saving installation at fixtures. Universal clamping cylinder for clamping, pushing, locking and positioning.

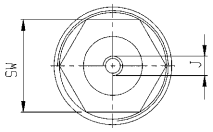
Features:

Small dimensions, can be installed closely spaced side-by-side.

Note:

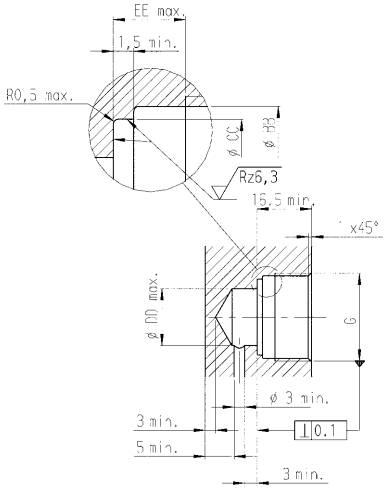
The cylinders must not be loaded in retracted position. The cylinders must be protected against direct access of lubricants and coolant. The system has to be completely vented during installation.





Dimensions:

Order no.	Article no.	dia. A	B	D	E	F	G	SW	J x depth	K	dia. L	DI-1 Cu seal Order No.	DI-1 Plastic seal Order No.
68312	6934-02	4,5	28,0	5	17,5	0,5	M16x1,5	13	-	6,5	13,5	554568	554567
68338	6934-04	6,5	37,0	5	25,0	1,5	M20x1,5	16	-	6,5	16,5	554570	554569
68353	6934-10-1	12,5	34,5	8	15,5	1,5	M28x1,5	22	-	19,0	23,0	554572	554571
68379	6934-10-2	12,5	61,5	8	15,5	1,5	M28x1,5	22	M6x11,0	-	23,0	554572	554571
68395	6934-17	16,0	37,5	8	19,0	2,5	M35x1,5	27	M6x12,5	-	31,0	-	554573



Installation dimensions:

Order no.	Article no.	G	ØBB ±0.15	ØCC ±0.13	dia. DD	EE
68312	6934-02	M16x1,5	14,5	13,8	8,0	4
68338	6934-04	M20x1,5	18,5	16,8	9,5	4
68353	6934-10-1	M28x1,5	26,5	23,4	16,0	7
68379	6934-10-2	M28x1,5	26,5	23,4	16,0	7
68395	6934-17	M35x1,5	33,5	31,2	22,0	7

Subject to technical alterations.

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BLOCK CYLINDERS FOR VARIOUS DESIGN APPLICATIONS

- piston with internal thread
- for push- and pull operation
- with longitudinal and cross bores and perpendicular support groove
- wipers to protect against contamination
- single and double-acting variants
- oil supply via o-ring
- oil supply via threaded port

At continuous pressures below 80 bar, this must be stated on ordering as a different seal combination may need to be selected.

PRODUCT OVERVIEW:

Type	Clamping force [kN]	Pull force [kN]	Clamping stroke [mm]	Max. operating pressure [bar]	No. of models	Operating mode
6926	10 - 155,5	-	8 - 25	500	28	single acting
6926D	10 - 251,5	6 - 153	16 - 100	500	111	double acting
6936	10,1 - 39,9	-	6,5 - 51	350	7	single acting
6936D	10,1 - 39,9	5,6 - 17,5	6,5 - 51	350	8	double acting

PRODUCT EXAMPLES:

NO. 6926



- clamping force: 10 - 155,5 kN
- two mounting versions
- two strokes

NO. 6926D



- clamping force: 10 - 251,5 kN
- two mounting versions
- three strokes

NO. 6936D

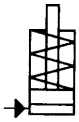


- clamping force: 10,1 - 39,9 kN
- two mounting versions
- three strokes

No. 6926

Block Cylinder

single acting, spring return,
max. operating pressure 500 bar.





CAD

Order no.	Article no.	Push force at 100 bar [kN]	Push force at 500 bar [kN]	Stroke H [mm]	Vol. [cm³]	Piston dia. [mm]	Piston area [cm²]	Spring force min. [N]	Weight [g]
63354	6926-8-001	2,0	10,0	8	1,6	16	2,0	50	840
63362	6926-8-002	2,0	10,0	20	4,0	16	2,0	50	1370
63370	6926-12-001	3,1	15,5	8	2,4	20	3,1	70	920
63388	6926-12-002	3,1	15,5	20	6,2	20	3,1	70	1420
63396	6926-20-001	5,0	25,0	8	4,0	25	5,0	140	1250
63404	6926-20-002	5,0	25,0	20	10,0	25	5,0	140	1870
63412	6926-32-001	8,0	40,0	10	8,0	32	8,0	195	2060
63420	6926-32-002	8,0	40,0	20	16,0	32	8,0	195	2740
63438	6926-50-001	12,5	62,5	10	12,5	40	12,5	270	2830
63446	6926-50-002	12,5	62,5	20	25,0	40	12,5	270	3730
63453	6926-78-001	19,6	98,0	12	23,5	50	19,6	410	4430
63461	6926-78-002	19,6	98,0	20	39,2	50	19,6	410	5670
63479	6926-125-001	31,3	155,5	12	37,3	63	31,1	430	9500
63487	6926-125-002	31,3	155,5	25	77,75	63	31,1	430	9540

Design:

Cylinder barrel from steel, burnished. Piston and piston rod case hardened and ground. Wiper at piston rod. Piston rod with internal thread. Oil supply via threaded port.

Features:

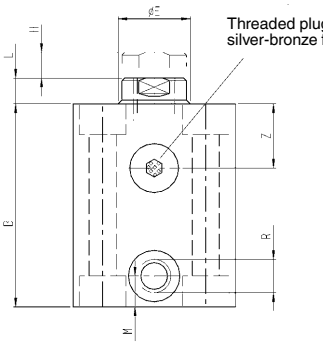
Universal mounting by means of mounting holes. Each cylinder size is available with two different strokes.

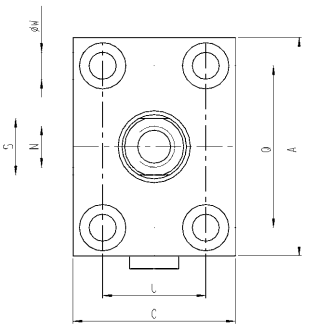
Note:

Maximum traversing speed 0.5 m/s.
For single acting cylinder types there is a risk of sucking coolant at the return stroke. In this case the sinter metal breather shall be piped to a clean, protected area. Screws of strength class 12.9 must be used for fastening.
Untoleranced dimensions are to DIN ISO 2768 medium.

On request:

Special sizes are available on request.





Dimensions:

Order no.	Article no.	A	B	C	dia. E	L	M	N x depth	Q	R	S	U	dia. W	Z
63354	6926-8-001	60	56	35	10	6	11	M6x12	40	G1/4	8	22	6,5	17
63362	6926-8-002	60	91	35	10	6	11	M6x12	40	G1/4	8	22	6,5	17
63370	6926-12-001	60	61	35	14	7	11	M8x15	40	G1/4	10	22	6,5	17
63388	6926-12-002	60	95	35	14	7	11	M8x15	40	G1/4	10	22	6,5	17
63396	6926-20-001	65	64	45	16	7	11	M10x15	50	G1/4	13	30	8,5	18
63404	6926-20-002	65	94	45	16	7	11	M10x15	50	G1/4	13	30	8,5	18
63412	6926-32-001	75	75	55	20	10	11	M12x15	55	G1/4	17	35	10,5	22
63420	6926-32-002	75	100	55	20	10	11	M12x15	55	G1/4	17	35	10,5	22
63438	6926-50-001	85	79	63	25	10	11	M16x25	63	G1/4	22	40	10,5	24
63446	6926-50-002	85	104	63	25	10	11	M16x25	63	G1/4	22	40	10,5	24
63453	6926-78-001	100	90	75	32	10	13	M20x30	76	G1/4	27	45	13,0	27
63461	6926-78-002	100	115	75	32	10	13	M20x30	76	G1/4	27	45	13,0	27
63479	6926-125-001	125	102	95	40	14	17	M27x40	95	G1/4	36	65	17,0	26
63487	6926-125-002	125	122	95	40	14	17	M27x40	95	G1/4	36	65	17,0	26

Subject to technical alterations.

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No. 6926

Block Cylinder

single acting, spring return,
max. operating pressure 500 bar.

CAD





Order no.	Article no.	Push force at 100 bar [kN]	Push force at 500 bar [kN]	Stroke H [mm]	Vol. [cm^3]	Piston dia. [mm]	Piston area [cm^2]	Spring force min. [N]	Weight [g]
63511	6926-8-003	2,0	10,0	8	1,6	16	2,0	50	900
63529	6926-8-004	2,0	10,0	20	4,0	16	2,0	50	1450
63537	6926-12-003	3,1	15,5	8	2,4	20	3,1	70	980
63545	6926-12-004	3,1	15,5	20	6,2	20	3,1	70	1520
63552	6926-20-003	5,0	25,0	8	4,0	25	5,0	140	1370
63560	6926-20-004	5,0	25,0	20	10,0	25	5,0	140	2030
63578	6926-32-003	8,0	40,0	10	8,0	32	8,0	195	2270
63586	6926-32-004	8,0	40,0	20	16,0	32	8,0	195	3010
63594	6926-50-003	12,5	62,5	10	12,5	40	12,5	270	3040
63602	6926-50-004	12,5	62,5	20	25,0	40	12,5	270	4010
63610	6926-78-003	19,6	98,0	12	23,5	50	19,6	410	4760
63628	6926-78-004	19,6	98,0	20	39,2	50	19,6	410	6080
63636	6926-125-003	31,1	155,5	12	37,3	63	31,1	430	8720
63644	6926-125-004	31,1	155,5	25	77,75	63	31,1	430	10520

Design:

Cylinder barrel from steel, burnished. Piston and piston rod case hardened and ground. Wiper at piston rod. Piston rod with internal thread. Oil supply via threaded port.

Features:

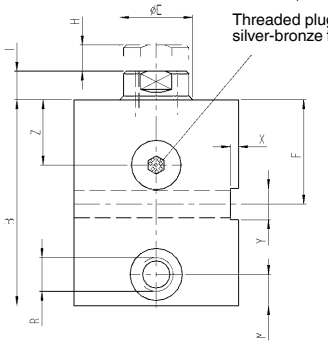
Universal mounting to fixtures by means of mounting holes. Each cylinder size is available with two different strokes.

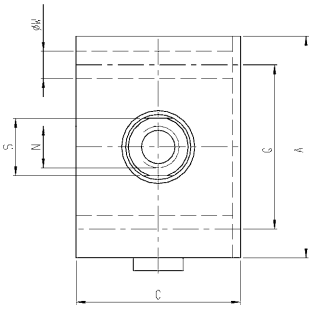
Note:

Maximum traversing speed 0.5 m/s.
For single acting cylinder types there is a risk of sucking coolant at the return stroke. In this case the sinter metal breather shall be piped to a clean, protected area. For applications above 160 bar operating pressure, cylinders must be tenon-blocked at slot or being backed up at cylinder body. Screws of strength class 12.9 must be used for fastening.
Untoleranced dimensions are to DIN ISO 2768 medium.

On request:

Special sizes are available on request.





Dimensions:

Order no.	Article no.	A	B	C	dia. E	F	L	M	N x depth	Q	R	S	dia. W	X	Y	Z
63511	6926-8-003	60	56	35	10	30	6	11	M6x12	40	G1/4	8	6,5	2	8	17
63529	6926-8-004	60	91	35	10	30	6	11	M6x12	40	G1/4	8	6,5	2	8	17
63537	6926-12-003	60	61	35	14	30	7	11	M8x15	40	G1/4	10	6,5	2	8	17
63545	6926-12-004	60	95	35	14	30	7	11	M8x15	40	G1/4	10	6,5	2	8	17
63552	6926-20-003	65	64	45	16	33	7	11	M10x15	50	G1/4	13	8,5	2	10	18
63560	6926-20-004	65	94	45	16	33	7	11	M10x15	50	G1/4	13	8,5	2	10	18
63578	6926-32-003	75	75	55	20	38	10	11	M12x15	55	G1/4	17	10,5	3	12	22
63586	6926-32-004	75	100	55	20	38	10	11	M12x15	55	G1/4	17	10,5	3	12	22
63594	6926-50-003	85	79	63	25	40	10	11	M16x25	63	G1/4	22	10,5	3	12	24
63602	6926-50-004	85	104	63	25	40	10	11	M16x25	63	G1/4	22	10,5	3	12	24
63610	6926-78-003	100	90	75	32	44	10	13	M20x30	76	G1/4	27	13,0	5	16	27
63628	6926-78-004	100	115	75	32	44	10	13	M20x30	76	G1/4	27	13,0	5	16	27
63636	6926-125-003	125	102	95	40	50	14	17	M27x40	95	G1/4	36	17,0	5	20	26
63644	6926-125-004	125	122	95	40	50	14	17	M27x40	95	G1/4	36	17,0	5	20	26

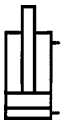
Subject to technical alterations.

No. 6926D

Block Cylinder

double acting,
max. operating pressure 500 bar,
min. operating pressure 25 bar.

CAD





Order no.	Article no.	Push force at 100 bar [kN]	Push force at 500 bar [kN]	Pull force at 100 bar [kN]	Pull force at 500 bar [kN]	Stroke H [mm]	Vol. push [cm^3]	Vol. pull [cm^3]	Piston dia. [mm]	Weight [g]
62034	6926D-8-001	2,0	10,0	1,2	6,0	16	3,2	1,9	16	820
62042	6926D-8-002	2,0	10,0	1,2	6,0	50	10,0	6,0	16	1330
295410	6926D-8-200	2,0	10,0	1,2	6,0	100	20,0	12,0	16	2200
62117	6926D-12-001	3,1	15,5	1,6	8,0	16	5,0	2,6	20	880
62133	6926D-12-002	3,1	15,5	1,6	8,0	50	15,5	8,0	20	1380
295436	6926D-12-200	3,1	15,5	1,6	8,0	100	31,0	20,0	20	2300
62174	6926D-20-001	5,0	25,0	2,9	14,5	20	9,8	5,8	25	1220
62182	6926D-20-002	5,0	25,0	2,9	14,5	50	25,0	14,5	25	1800
295451	6926D-20-200	5,0	25,0	2,9	14,5	100	50,0	29,0	25	3100
62257	6926D-32-001	8,0	40,0	4,9	24,5	25	20,0	12,2	32	1990
62323	6926D-32-002	8,0	40,0	4,9	24,5	50	40,0	24,5	32	2630
295477	6926D-32-200	8,0	40,0	4,9	24,5	100	80,0	49,0	32	4500
62398	6926D-50-001	12,5	62,5	7,6	38,0	25	31,4	19,1	40	2760
62406	6926D-50-002	12,5	62,5	7,6	38,0	50	62,5	38,0	40	3590
283184	6926D-50-200	12,5	62,5	7,6	38,0	100	125,0	76,0	40	5800
62554	6926D-78-001	19,6	98,0	11,6	58,0	25	49,0	29,0	50	4380
62562	6926D-78-002	19,6	98,0	11,6	58,0	50	98,0	58,0	50	5520
294637	6926D-78-200	19,6	98,0	11,6	58,0	100	196,0	116,0	50	8500
62596	6926D-125-001	31,1	155,5	18,6	93,0	30	93,5	55,8	63	7900
62604	6926D-125-002	31,1	155,5	18,6	93,0	50	155,5	93,0	63	9280
295535	6926D-125-200	31,1	155,0	18,6	93,0	100	311,0	186,0	63	14500
295550	6926D-200-001	50,3	251,5	30,6	153,0	32	160,0	98,0	80	15000
295360	6926D-200-002	50,3	251,5	30,6	153,0	80	402,0	245,0	80	21000
295592	6926D-200-200	50,3	251,5	30,6	153,0	100	503,0	305,0	80	24000

Design:

Cylinder barrel from steel, burnished. Piston and piston rod case hardened and ground. Tandem sealing and wiper at piston rod. Piston rod with internal thread. Oil supply via threaded port.

Features:

Universal mounting to fixtures through fastening holes. Each cylinder size is available with three different strokes.

Note:

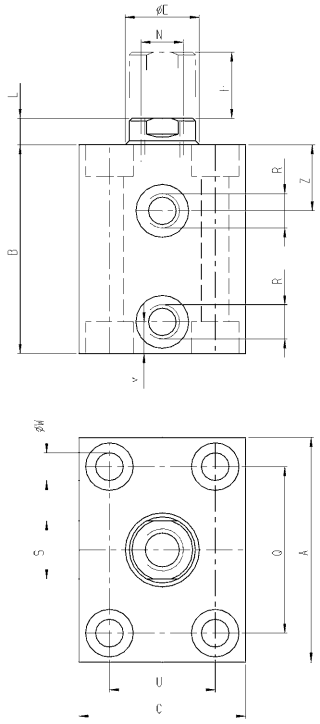
Maximum traversing speed 0.5 m/s.
Screws of strength class 12.9 must be used for fastening. Untoleranced dimensions are to DIN ISO 2768 medium.

On request:

Special sizes are available on request.

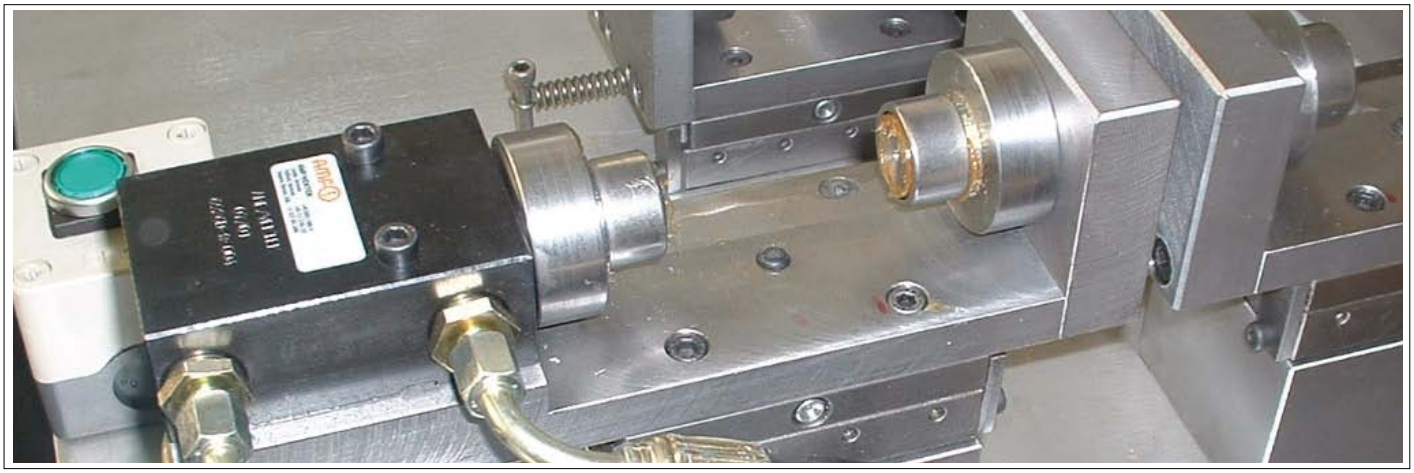
Subject to technical alterations.

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Dimensions:

Order no.	Article no.	A	B	C	dia. E	L	M	N x depth	Q	R	S	U	dia. W	Z
62034	6926D-8-001	60	56	35	10	6	11	M6x12	40	G1/4	8	22	6,5	16,5
62042	6926D-8-002	60	91	35	10	6	11	M6x12	40	G1/4	8	22	6,5	16,5
295410	6926D-8-200	60	144	35	10	6	11	M6x12	40	G1/4	8	22	6,5	16,5
62117	6926D-12-001	60	61	35	14	7	11	M8x15	40	G1/4	10	22	6,5	17,0
62133	6926D-12-002	60	95	35	14	7	11	M8x15	40	G1/4	10	22	6,5	17,0
295436	6926D-12-200	60	148	35	14	7	11	M8x15	40	G1/4	10	22	6,5	17,0
62174	6926D-20-001	65	64	45	16	7	11	M10x15	50	G1/4	13	30	8,5	18,0
62182	6926D-20-002	65	94	45	16	7	11	M10x15	50	G1/4	13	30	8,5	18,0
295451	6926D-20-200	65	144	45	16	7	11	M10x15	50	G1/4	13	30	8,5	18,0
62257	6926D-32-001	75	75	55	20	10	11	M12x15	55	G1/4	17	35	10,5	22,0
62323	6926D-32-002	75	100	55	20	10	11	M12x15	55	G1/4	17	35	10,5	22,0
295477	6926D-32-200	75	150	55	20	10	11	M12x15	55	G1/4	17	35	10,5	22,0
62398	6926D-50-001	85	79	63	25	10	11	M16x25	63	G1/4	22	40	10,5	24,0
62406	6926D-50-002	85	104	63	25	10	11	M16x25	63	G1/4	22	40	10,5	24,0
283184	6926D-50-200	85	154	63	25	10	11	M16x25	63	G1/4	22	40	10,5	24,0
62554	6926D-78-001	100	90	75	32	10	13	M20x30	76	G1/4	27	45	13,0	27,0
62562	6926D-78-002	100	115	75	32	10	13	M20x30	76	G1/4	27	45	13,0	27,0
294637	6926D-78-200	100	165	75	32	10	13	M20x30	76	G1/4	27	45	13,0	27,0
62596	6926D-125-001	125	102	95	40	14	17	M27x40	95	G1/4	36	65	17,0	26,0
62604	6926D-125-002	125	122	95	40	14	17	M27x40	95	G1/4	36	65	17,0	26,0
295535	6926D-125-200	125	172	95	40	14	17	M27x40	95	G1/2	36	65	17,0	26,0
295550	6926D-200-001	160	117	120	50	14	21	M30x40	120	G1/2	46	80	21,0	34,0
295360	6926D-200-002	160	165	120	50	14	21	M30x40	120	G1/2	46	80	21,0	34,0
295592	6926D-200-200	160	185	120	50	14	21	M30x40	120	G1/2	46	80	21,0	34,0



Subject to technical alterations.

No. 6926D

Block Cylinder

double acting,
max. operating pressure 500 bar,
min. operating pressure 25 bar.

CAD



Order no.	Article no.	Push force at 100 bar [kN]	Push force at 500 bar [kN]	Pull force at 100 bar [kN]	Pull force at 500 bar [kN]	Stroke H [mm]	Vol. push [cm^3]	Vol. pull [cm^3]	Piston dia. [mm]	Weight [g]
62067	6926D-8-003	2,0	10,0	1,2	6,0	16	3,2	1,9	16	880
62091	6926D-8-004	2,0	10,0	1,2	6,0	50	10,0	6,0	16	1420
295618	6926D-8-400	2,0	10,0	1,2	6,0	100	20,0	12,0	16	2200
62158	6926D-12-003	3,1	15,5	1,6	8,0	16	5,0	3,2	20	950
62166	6926D-12-004	3,1	15,5	1,6	8,0	50	15,5	10,0	20	1470
295626	6926D-12-400	3,1	15,5	1,6	8,0	100	31,0	20,0	20	2300
62190	6926D-20-003	5,0	25,0	2,9	14,5	20	9,8	5,8	25	1340
62208	6926D-20-004	5,0	25,0	2,9	14,5	50	25,0	14,5	25	1980
295634	6926D-20-400	5,0	25,0	2,9	14,5	100	50,0	29,0	25	3100
62372	6926D-32-003	8,0	40,0	4,9	24,5	25	20,0	12,2	32	2200
62380	6926D-32-004	8,0	40,0	4,9	24,5	50	40,0	24,5	32	2910
295642	6926D-32-400	8,0	40,0	4,9	24,5	100	80,0	49,0	32	4500
62455	6926D-50-003	12,5	62,5	7,6	38,0	25	31,4	19,1	40	2970
62463	6926D-50-004	12,5	62,5	7,6	38,0	50	62,5	38,0	40	3860
295246	6926D-50-400	12,5	62,5	7,6	38,0	100	125,0	76,0	40	5800
62570	6926D-78-003	19,6	98,0	11,6	58,0	25	49,0	29,0	50	4700
62588	6926D-78-004	19,6	98,0	11,6	58,0	50	98,0	58,0	50	5940
295667	6926D-78-400	19,6	98,0	11,6	58,0	100	196,0	116,0	50	8500
62653	6926D-125-003	31,1	155,5	18,6	93,0	30	93,5	55,8	63	8440
62786	6926D-125-004	31,1	155,5	18,6	93,0	50	155,5	93,0	63	10010
295675	6926D-125-400	31,1	155,0	18,6	93,0	100	311,0	186,0	63	14500
295683	6926D-200-003	50,3	251,5	30,6	153,0	32	160,0	98,0	80	15000
295691	6926D-200-004	50,3	251,5	30,6	153,0	80	402,0	245,0	80	21000
295709	6926D-200-400	50,3	251,5	30,6	153,0	100	503,0	305,0	80	24000

Design:

Cylinder barrel from steel, hardened and burnished. Piston and piston rod case hardened and ground. Tandem sealing and wiper at piston rod. Piston rod with internal thread. Oil supply via threaded port.

Features:

Universal mounting to fixtures through fastening holes. Each cylinder size is available with three different strokes.

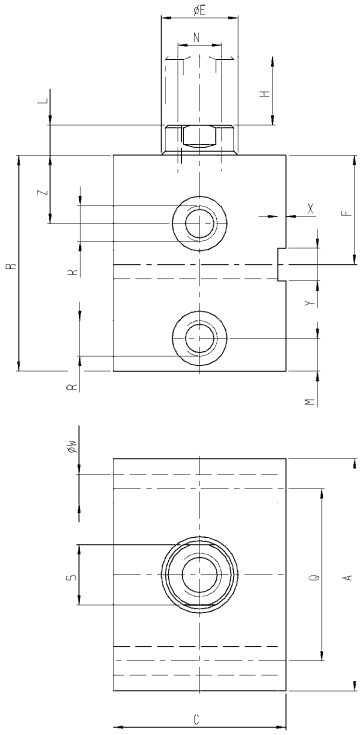
Note:

Maximum traversing speed 0.5 m/s.
The block cylinders are designed with slots for keys. For applications above 160 bar operating pressure, cylinders must be tenon-blocked at slot or backed up at cylinder base. Screws of strength class 12.9 must be used for fastening. Untoleranced dimensions are to DIN ISO 2768 medium.

On request:

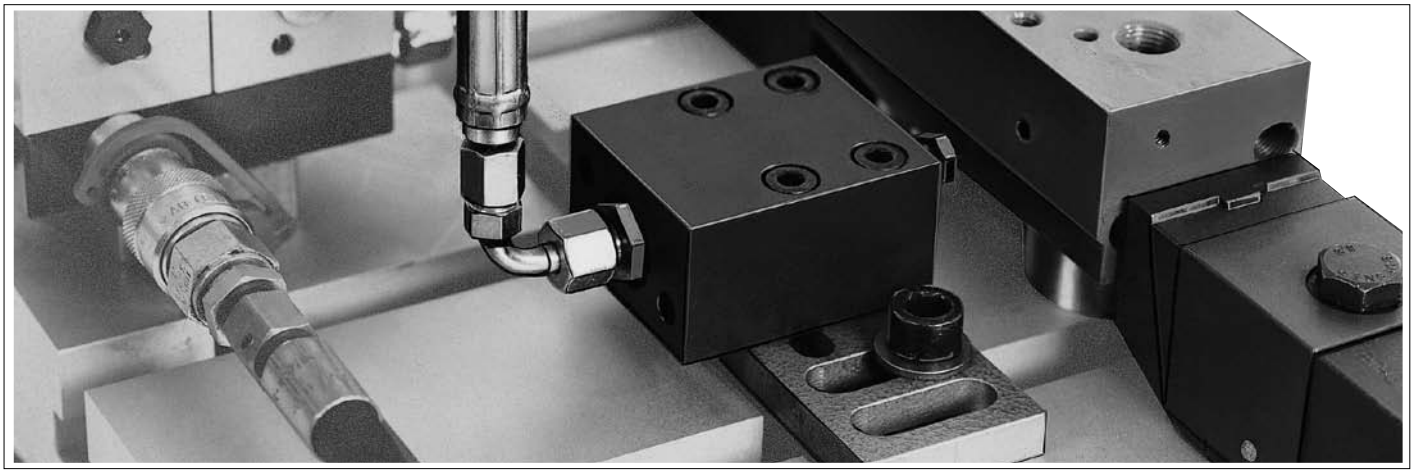
Special sizes are available on request.

Subject to technical alterations.



Dimensions:

Order no.	Article no.	A	B	C	dia. E	F	L	M	N x depth	Q	R	S	dia. W	X	Y	Z
62067	6926D-8-003	60	56	35	10	30	6	11	M6x12	40	G1/4	8	6,5	2	8	16,5
62091	6926D-8-004	60	91	35	10	30	6	11	M6x12	40	G1/4	8	6,5	2	8	16,5
295618	6926D-8-400	60	144	35	10	30	6	11	M6x12	40	G1/4	8	6,5	2	8	16,5
62158	6926D-12-003	60	61	35	14	30	7	11	M8x15	40	G1/4	10	6,5	2	8	17,0
62166	6926D-12-004	60	95	35	14	30	7	11	M8x15	40	G1/4	10	6,5	2	8	17,0
295626	6926D-12-400	60	148	35	14	30	7	11	M8x15	40	G1/4	10	6,5	2	8	17,0
62190	6926D-20-003	65	64	45	16	33	7	11	M10x15	50	G1/4	13	8,5	2	10	18,0
62208	6926D-20-004	65	94	45	16	33	7	11	M10x15	50	G1/4	13	8,5	2	10	18,0
295634	6926D-20-400	65	144	45	16	33	7	11	M10x15	50	G1/4	13	8,5	2	10	18,0
62372	6926D-32-003	75	75	55	20	38	10	11	M12x15	55	G1/4	17	10,5	3	12	22,0
62380	6926D-32-004	75	100	55	20	38	10	11	M12x15	55	G1/4	17	10,5	3	12	22,0
295642	6926D-32-400	75	150	55	20	38	10	11	M12x15	55	G1/4	17	10,5	3	12	22,0
62455	6926D-50-003	85	79	63	25	40	10	11	M16x25	63	G1/4	22	10,5	3	12	24,0
62463	6926D-50-004	85	104	63	25	40	10	11	M16x25	63	G1/4	22	10,5	3	12	24,0
295246	6926D-50-400	85	154	63	25	40	10	11	M16x25	63	G1/4	22	10,5	3	12	24,0
62570	6926D-78-003	100	90	75	32	44	10	13	M20x30	76	G1/4	27	13,0	5	16	27,0
62588	6926D-78-004	100	115	75	32	44	10	13	M20x30	76	G1/4	27	13,0	5	16	27,0
295667	6926D-78-400	100	165	75	32	44	10	13	M20x30	76	G1/4	27	13,0	5	16	27,0
62653	6926D-125-003	125	102	95	40	50	14	17	M27x40	95	G1/4	36	17,0	5	20	26,0
62786	6926D-125-004	125	122	95	40	50	14	17	M27x40	95	G1/4	36	17,0	5	20	26,0
295675	6926D-125-400	125	172	95	40	50	14	17	M27x40	95	G1/2	36	17,0	5	20	26,0
295683	6926D-200-003	160	117	120	50	60	14	21	M30x40	120	G1/2	46	21,0	7	24	34,0
295691	6926D-200-004	160	165	120	50	60	14	21	M30x40	120	G1/2	46	21,0	7	24	34,0
295709	6926D-200-400	160	185	120	50	60	14	21	M30x40	120	G1/2	46	21,0	7	24	34,0

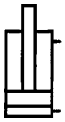


Subject to technical alterations.

No. 6926D

Block cylinder with O-ring connection on side

double acting,
max. operating pressure 500 bar,
min. operating pressure 25 bar.



CAD



Order no.	Article no.	Push force at 100 bar [kN]	Push force at 500 bar [kN]	Pull force at 100 bar [kN]	Pull force at 500 bar [kN]	Stroke H [mm]	Vol. push [cm^3]	Vol. pull [cm^3]	Piston dia. [mm]	Weight [g]
476895	6926D-8-10	2,0	10,0	1,2	6,0	16	3,2	1,9	16	880
328435	6926D-8-11	2,0	10,0	1,2	6,0	50	10,0	6,0	16	1420
328146	6926D-8-15	2,0	10,0	1,2	6,0	100	20,0	12,0	16	2200
328310	6926D-12-10	3,1	15,5	1,6	8,0	16	5,0	3,2	20	950
487900	6926D-12-11	3,1	15,5	1,6	8,0	50	15,5	10,0	20	1470
328161	6926D-12-15	3,1	15,5	1,6	8,0	100	31,0	20,0	20	2300
330332	6926D-20-10	5,0	25,0	2,9	14,5	20	9,8	5,8	25	1340
319491	6926D-20-11	5,0	25,0	2,9	14,5	50	25,0	14,5	25	1980
328336	6926D-20-15	5,0	25,0	2,9	14,5	100	50,0	29,0	25	3100
278903	6926D-32-10	8,0	40,0	4,9	24,5	25	20,0	12,2	32	2200
443143	6926D-32-11	8,0	40,0	4,9	24,5	50	40,0	24,5	32	2910
485458	6926D-32-15	8,0	40,0	4,9	24,5	100	80,0	49,0	32	4500
441964	6926D-50-10	12,5	62,5	7,6	38,0	25	31,4	19,1	40	2970
455279	6926D-50-11	12,5	62,5	7,6	38,0	50	62,5	38,0	40	3860
349654	6926D-50-15	12,5	62,5	7,6	38,0	100	125,0	76,0	40	5800
328351	6926D-78-10	19,6	98,0	11,6	58,0	25	49,0	29,0	50	4700
328187	6926D-78-11	19,6	98,0	11,6	58,0	50	98,0	58,0	50	5940
328203	6926D-78-15	19,6	98,0	11,6	58,0	100	196,0	116,0	50	8500
328229	6926D-125-10	31,1	155,5	18,6	93,0	30	93,5	55,8	63	8440
328245	6926D-125-11	31,1	155,5	18,6	93,0	63	196,0	117,0	63	11041
328260	6926D-125-15	31,1	155,5	18,6	93,0	100	311,0	186,0	63	14500

Design:

Cylinder barrel from steel, burnished
Piston and piston rod case hardened and ground. Tandem sealing and wiper at piston rod. Piston rod with internal thread. Oil supply via oil channel in fixture body.

Features:

Universal mounting to fixtures through fastening holes.
Each cylinder size is available with three different strokes.

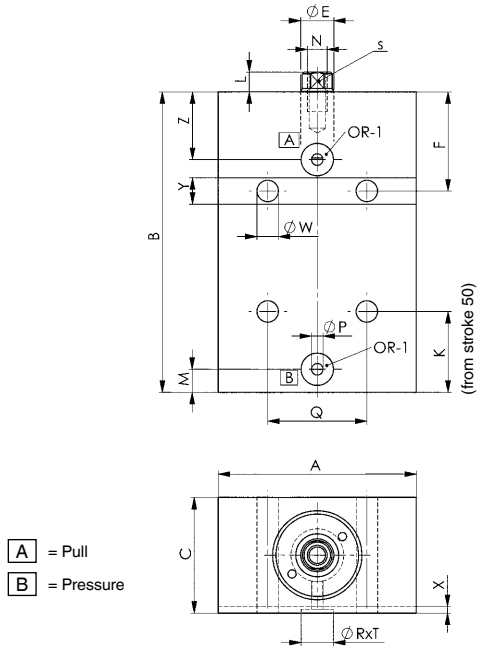
Note:

Maximum traversing speed 0.5 m/s.
The block cylinders are designed with slots for keys. For applications above 160 bar operating pressure, cylinders must be tenon-blocked at slot or being backed up at cylinder base. Screws of strength classes 12.9 must be used for fastening.
Untoleranced dimensions are to DIN ISO 2768 medium.

On request:

Special sizes are available on request.

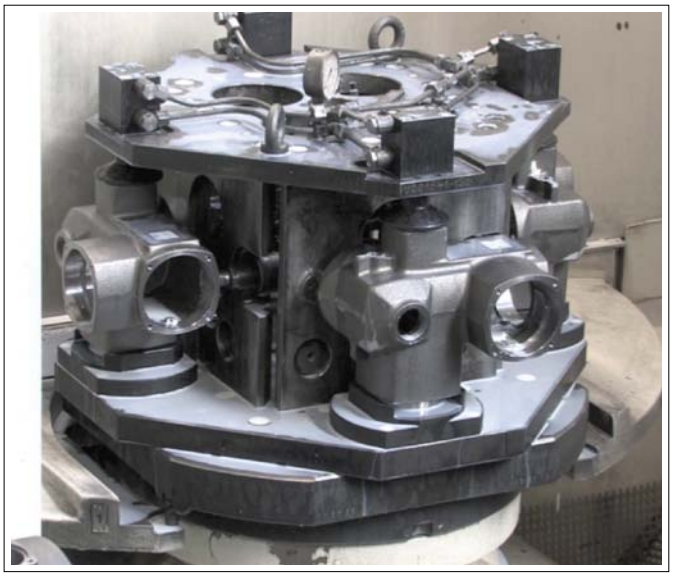
Subject to technical alterations.



Dimensions:

Order no.	Article no.	A	B	C	dia. E	F	K	L	M	N x depth	dia. P	Q	ØR x T	S	dia. W	X	Y	Z	OR-1 O-ring Order No.
476895	6926D-8-10	60	56	35	10	30	-	6	7,0	M6x12	3,5	30	9,8x1,1	8	6,5	2	8	20,5	537969
328435	6926D-8-11	60	91	35	10	30	24,5	6	7,0	M6x12	3,5	30	9,8x1,1	8	6,5	2	8	20,5	537969
328146	6926D-8-15	60	144	35	10	30	24,5	6	7,0	M6x12	3,5	30	9,8x1,1	8	6,5	2	8	20,5	537969
328310	6926D-12-10	60	61	35	14	30	-	7	7,5	M8x15	3,5	40	9,8x1,1	10	6,5	2	8	20,5	537969
487900	6926D-12-11	60	95	35	14	30	26,0	7	7,5	M8x15	3,5	40	9,8x1,1	10	6,5	2	8	20,5	537969
328161	6926D-12-15	60	148	35	14	30	26,0	7	7,5	M8x15	3,5	40	9,8x1,1	10	6,5	2	8	20,5	537969
330332	6926D-20-10	65	64	45	16	33	-	7	7,5	M10x15	4,0	50	9,8x1,1	13	8,5	2	10	21,0	537969
319491	6926D-20-11	65	94	45	16	33	26,0	7	7,5	M10x15	4,0	50	9,8x1,1	13	8,5	2	10	21,0	537969
328336	6926D-20-15	65	144	45	16	33	26,0	7	7,5	M10x15	4,0	50	9,8x1,1	13	8,5	2	10	21,0	537969
278903	6926D-32-10	75	75	55	20	38	-	10	10,0	M12x15	5,0	55	9,8x1,1	17	10,5	3	12	25,0	537969
443143	6926D-32-11	75	100	55	20	38	27,0	10	10,0	M12x15	5,0	55	9,8x1,1	17	10,5	3	12	25,0	537969
485458	6926D-32-15	75	150	55	20	38	27,0	10	10,0	M12x15	5,0	55	9,8x1,1	17	10,5	3	12	25,0	537969
441964	6926D-50-10	85	79	63	25	40	-	10	10,0	M16x25	6,0	63	9,8x1,1	22	10,5	3	12	27,0	537969
455279	6926D-50-11	85	104	63	25	40	27,0	10	10,0	M16x25	6,0	63	9,8x1,1	22	10,5	3	12	27,0	537969
349654	6926D-50-15	85	154	63	25	40	27,0	10	10,0	M16x25	6,0	63	9,8x1,1	22	10,5	3	12	27,0	537969
328351	6926D-78-10	100	90	75	32	44	-	10	13,0	M20x30	6,0	76	10,8x1,1	27	13,0	5	16	29,5	161554
328187	6926D-78-11	100	115	75	32	44	30,0	10	13,0	M20x30	6,0	76	10,8x1,1	27	13,0	5	16	29,5	161554
328203	6926D-78-15	100	165	75	32	44	30,0	10	13,0	M20x30	6,0	76	10,8x1,1	27	13,0	5	16	29,5	161554
328229	6926D-125-10	125	102	95	40	50	-	14	16,0	M27x40	8,0	95	13,8x1,5	36	17,0	5	20	32,0	492264
328245	6926D-125-11	125	135	95	40	50	41,0	14	16,0	M27x40	8,0	95	13,8x1,5	36	17,0	5	20	32,0	492264
328260	6926D-125-15	125	172	95	40	50	41,0	14	16,0	M27x40	8,0	95	13,8x1,5	36	17,0	5	20	32,0	492264





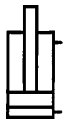
Subject to technical alterations.

No. 6926D

Block cylinder with O-ring connection on base

double acting,
max. operating pressure 500 bar,
min. operating pressure 25 bar.

CAD





Order no.	Article no.	Push force at 100 bar [kN]	Push force at 500 bar [kN]	Pull force at 100 bar [kN]	Pull force at 500 bar [kN]	Stroke H [mm]	Vol. push [cm^3]	Vol. pull [cm^3]	Piston dia. [mm]	Weight [g]
454793	6926D-8-20	2,0	10,0	1,2	6,0	16	3,2	1,9	16	820
328286	6926D-8-21	2,0	10,0	1,2	6,0	50	10,0	6,0	16	1330
328302	6926D-8-25	2,0	10,0	1,2	6,0	100	20,0	12,0	16	2200
298521	6926D-12-20	3,1	15,5	1,6	8,0	16	5,0	3,2	20	880
328377	6926D-12-21	3,1	15,5	1,6	8,0	50	15,5	10,0	20	1380
328328	6926D-12-25	3,1	15,5	1,6	8,0	100	31,0	20,0	20	2300
330522	6926D-20-20	5,0	25,0	2,9	14,5	20	9,8	5,8	25	1220
298513	6926D-20-21	5,0	25,0	2,9	14,5	50	25,0	14,5	25	1800
328344	6926D-20-25	5,0	25,0	2,9	14,5	100	50,0	29,0	25	3100
442319	6926D-32-20	8,0	40,0	4,9	24,5	25	20,0	12,2	32	1990
298497	6926D-32-21	8,0	40,0	4,9	24,5	50	40,0	24,5	32	2630
328369	6926D-32-25	8,0	40,0	4,9	24,5	100	80,0	49,0	32	4500
319517	6926D-50-20	12,5	62,5	7,6	38,0	25	31,4	19,1	40	2760
298307	6926D-50-21	12,5	62,5	7,6	38,0	50	62,5	38,0	40	3590
328385	6926D-50-25	12,5	62,5	7,6	38,0	100	125,0	76,0	40	5800
294884	6926D-78-20	19,6	98,0	11,6	58,0	25	49,0	29,0	50	4380
328401	6926D-78-21	19,6	98,0	11,6	58,0	50	98,0	58,0	50	5520
328427	6926D-78-25	19,6	98,0	11,6	58,0	100	196,0	116,0	50	8500
328443	6926D-125-20	31,1	155,5	18,6	93,0	30	93,5	55,8	63	7900
328468	6926D-125-21	31,1	155,5	18,6	93,0	63	196,0	117,0	63	9280
328138	6926D-125-25	31,1	155,5	18,6	93,0	100	311,0	186,0	63	14500

Design:

Cylinder barrel from steel, burnished
Piston and piston rod case hardened and ground. Tandem sealing and wiper at piston rod. Piston rod with internal thread. Oil supply via oil channel in fixture body.

Features:

Universal mounting to fixtures through fastening holes.
Each cylinder size is available with three different strokes.

Note:

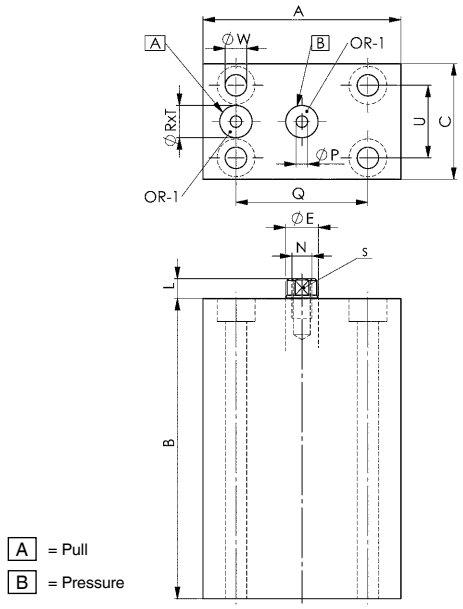
Maximum traversing speed 0.5 m/s.
Screws of strength classes 12.9 must be used for fastening.
Untoleranced dimensions are to DIN ISO 2768 medium.

On request:

Special sizes are available on request.

Subject to technical alterations.

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A = Pull
B = Pressure

Dimensions:

Order no.	Article no.	A	B	C	dia. E	L	N x depth	dia. P	Q	ØR x T	S	U	dia. W	OR-1 O-ring Order No.
454793	6926D-8-20	60	56	35	10	6	M6x12	3,5	40	9,8x1,1	8	22	6,5	537969
328286	6926D-8-21	60	91	35	10	6	M6x12	3,5	40	9,8x1,1	8	22	6,5	537969
328302	6926D-8-25	60	144	35	10	6	M6x12	3,5	40	9,8x1,1	8	22	6,5	537969
298521	6926D-12-20	60	61	35	14	7	M8x15	3,5	40	9,8x1,1	10	22	6,5	537969
328377	6926D-12-21	60	95	35	14	7	M8x15	3,5	40	9,8x1,1	10	22	6,5	537969
328328	6926D-12-25	60	148	35	14	7	M8x15	3,5	40	9,8x1,1	10	22	6,5	537969
330522	6926D-20-20	65	64	45	16	7	M10x15	4,0	50	9,8x1,1	13	30	8,5	537969
298513	6926D-20-21	65	94	45	16	7	M10x15	4,0	50	9,8x1,1	13	30	8,5	537969
328344	6926D-20-25	65	144	45	16	7	M10x15	4,0	50	9,8x1,1	13	30	8,5	537969
442319	6926D-32-20	75	75	55	20	10	M12x15	5,0	55	9,8x1,1	17	35	10,5	537969
298497	6926D-32-21	75	100	55	20	10	M12x15	5,0	55	9,8x1,1	17	35	10,5	537969
328369	6926D-32-25	75	150	55	20	10	M12x15	5,0	55	9,8x1,1	17	35	10,5	537969
319517	6926D-50-20	85	79	63	25	10	M16x25	6,0	63	9,8x1,1	22	40	10,5	537969
298307	6926D-50-21	85	104	63	25	10	M16x25	6,0	63	9,8x1,1	22	40	10,5	537969
328385	6926D-50-25	85	154	63	25	10	M16x25	6,0	63	9,8x1,1	22	40	10,5	537969
294884	6926D-78-20	100	90	75	32	10	M20x30	6,0	76	10,8x1,1	27	45	13,0	161554
328401	6926D-78-21	100	115	75	32	10	M20x30	6,0	76	10,8x1,1	27	45	13,0	161554
328427	6926D-78-25	100	165	75	32	10	M20x30	6,0	76	10,8x1,1	27	45	13,0	161554
328443	6926D-125-20	125	102	95	40	14	M27x40	8,0	95	13,8x1,5	36	65	17,0	492264
328468	6926D-125-21	125	135	95	40	14	M27x40	8,0	95	13,8x1,5	36	65	17,0	492264
328138	6926D-125-25	125	172	95	40	14	M27x40	8,0	95	13,8x1,5	36	65	17,0	492264



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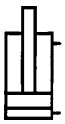
Subject to technical alterations.

No. 6926D

CAD

Block cylinder with O-ring connection on rod side

double acting,
max. operating pressure 500 bar,
min. operating pressure 25 bar.





Order no.	Article no.	Push force at 100 bar [kN]	Push force at 500 bar [kN]	Pull force at 100 bar [kN]	Pull force at 500 bar [kN]	Stroke H [mm]	Vol. push [cm^3]	Vol. pull [cm^3]	Piston dia. [mm]	Weight [g]
349696	6926D-8-30	2,0	10,0	1,2	6,0	16	3,2	1,9	16	820
477554	6926D-8-31	2,0	10,0	1,2	6,0	50	10,0	6,0	16	1330
328153	6926D-8-35	2,0	10,0	1,2	6,0	100	20,0	12,0	16	2200
461434	6926D-12-30	3,1	15,5	1,6	8,0	16	5,0	3,2	20	880
328393	6926D-12-31	3,1	15,5	1,6	8,0	50	15,5	10,0	20	1380
328179	6926D-12-35	3,1	15,5	1,6	8,0	100	31,0	20,0	20	2300
299487	6926D-20-30	5,0	25,0	2,9	14,5	20	9,8	5,8	25	1220
347575	6926D-20-31	5,0	25,0	2,9	14,5	50	25,0	14,5	25	1800
328195	6926D-20-35	5,0	25,0	2,9	14,5	100	50,0	29,0	25	3100
299339	6926D-32-30	8,0	40,0	4,9	24,5	25	20,0	12,2	32	1990
452821	6926D-32-31	8,0	40,0	4,9	24,5	50	40,0	24,5	32	2630
454975	6926D-32-35	8,0	40,0	4,9	24,5	100	80,0	49,0	32	4500
456160	6926D-50-30	12,5	62,5	7,6	38,0	25	31,4	19,1	40	2760
328419	6926D-50-31	12,5	62,5	7,6	38,0	50	62,5	38,0	40	3590
328211	6926D-50-35	12,5	62,5	7,6	38,0	100	125,0	76,0	40	5800
489567	6926D-78-30	19,6	98,0	11,6	58,0	25	49,0	29,0	50	4380
334847	6926D-78-31	19,6	98,0	11,6	58,0	50	98,0	58,0	50	5520
328237	6926D-78-35	19,6	98,0	11,6	58,0	100	196,0	116,0	50	8500
328252	6926D-125-30	31,1	155,5	18,6	93,0	30	93,5	55,8	63	7900
328278	6926D-125-31	31,1	155,5	18,6	93,0	63	196,0	117,0	63	9280
328294	6926D-125-35	31,1	155,5	18,6	93,0	100	311,0	186,0	63	14500

Design:

Cylinder barrel from steel, burnished
Piston and piston rod case hardened and ground. Tandem sealing and wiper at piston rod. Piston rod with internal thread. Oil supply via oil channel in fixture body.

Features:

Universal mounting to fixtures through fastening holes.
Each cylinder size is available with three different strokes.

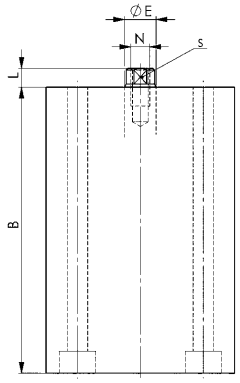
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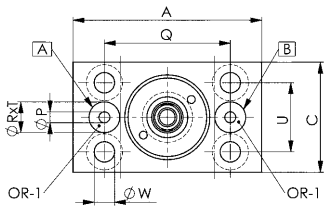
Maximum traversing speed 0.5 m/s.
Screws of strength classes 12.9 must be used for fastening.
Untoleranced dimensions are to DIN ISO 2768 medium.

On request:

Special sizes are available on request.

Subject to technical alterations.





A = Pull
B = Pressure

Dimensions:

Order no.	Article no.	A	B	C	dia. E	L	N x depth	dia. P	Q	ØR x T	S	U	dia. W	OR-1 O-ring Order No.
349696	6926D-8-30	60	56	35	10	6	M6x12	3,5	40	9,8x1,1	8	22	6,5	537969
477554	6926D-8-31	60	91	35	10	6	M6x12	3,5	40	9,8x1,1	8	22	6,5	537969
328153	6926D-8-35	60	144	35	10	6	M6x12	3,5	40	9,8x1,1	8	22	6,5	537969
461434	6926D-12-30	60	61	35	14	7	M8x15	3,5	40	9,8x1,1	10	22	6,5	537969
328393	6926D-12-31	60	95	35	14	7	M8x15	3,5	40	9,8x1,1	10	22	6,5	537969
328179	6926D-12-35	60	148	35	14	7	M8x15	3,5	40	9,8x1,1	10	22	6,5	537969
299487	6926D-20-30	65	64	45	16	7	M10x15	4,0	50	9,8x1,1	13	30	8,5	537969
347575	6926D-20-31	65	94	45	16	7	M10x15	4,0	50	9,8x1,1	13	30	8,5	537969
328195	6926D-20-35	65	144	45	16	7	M10x15	4,0	50	9,8x1,1	13	30	8,5	537969
299339	6926D-32-30	75	75	55	20	10	M12x15	5,0	55	9,8x1,1	17	35	10,5	537969
452821	6926D-32-31	75	100	55	20	10	M12x15	5,0	55	9,8x1,1	17	35	10,5	537969
454975	6926D-32-35	75	150	55	20	10	M12x15	5,0	55	9,8x1,1	17	35	10,5	537969
456160	6926D-50-30	85	79	63	25	10	M16x25	6,0	63	9,8x1,1	22	40	10,5	537969
328419	6926D-50-31	85	104	63	25	10	M16x25	6,0	63	9,8x1,1	22	40	10,5	537969
328211	6926D-50-35	85	154	63	25	10	M16x25	6,0	63	9,8x1,1	22	40	10,5	537969
489567	6926D-78-30	100	90	75	32	10	M20x30	6,0	76	10,8x1,1	27	45	13,0	161554
334847	6926D-78-31	100	115	75	32	10	M20x30	6,0	76	10,8x1,1	27	45	13,0	161554
328237	6926D-78-35	100	165	75	32	10	M20x30	6,0	76	10,8x1,1	27	45	13,0	161554
328252	6926D-125-30	125	102	95	40	14	M27x40	8,0	95	13,8x1,5	36	65	17,0	492264
328278	6926D-125-31	125	135	95	40	14	M27x40	8,0	95	13,8x1,5	36	65	17,0	492264
328294	6926D-125-35	125	172	95	40	14	M27x40	8,0	95	13,8x1,5	36	65	17,0	492264

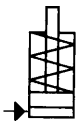


Subject to technical alterations.

No. 6936

Block Cylinder

Single acting, with spring return,
max. operating pressure 350 bar.





CAD

Order no.	Article no.	Push force at 100 bar [kN]	Push force at 350 bar [kN]	Stoke B [mm]	Vol. [cm³]	Piston area [cm²]	Weight [g]
68023	6936-10-1	2,88	10,1	6,5	1,9	2,9	463
68049	6936-10-2	2,88	10,1	19,0	5,7	2,9	653
68056	6936-18-1	5,08	17,8	12,5	6,5	5,1	880
68072	6936-18-2	5,08	17,8	25,5	13,0	5,1	1061
68098	6936-18-3	5,08	17,8	51,0	26,0	5,1	1442
68114	6936-40-1	11,40	39,9	12,5	14,5	11,4	1270
68130	6936-40-2	11,40	39,9	25,5	29,0	11,4	1506

Design:

Hardened and burnished steel cylinder barrels. Piston and piston rod case hardened and ground. Piston rod with internal thread. Wiper at piston rod. Return spring from stainless steel. Oil supply via threaded port.

Application:

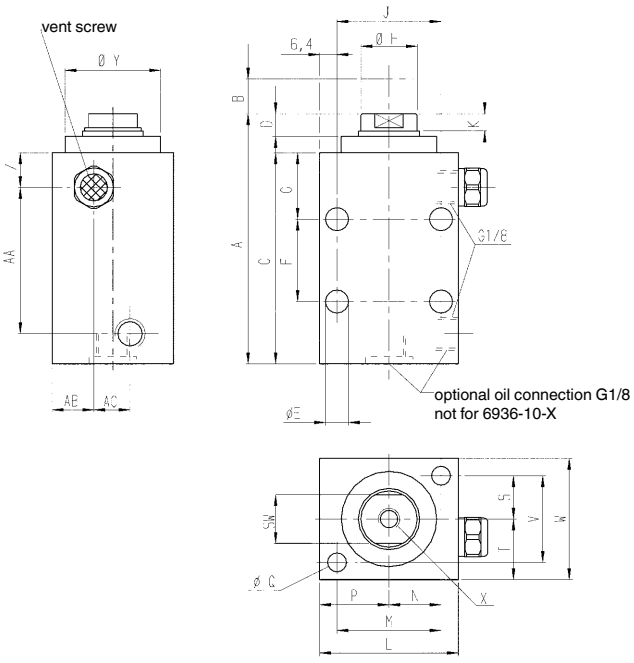
Universal mounting. Universal block cylinder for e.g. clamping, pushing, locking, rivetting.

Features:

Different strokes are available for each cylinder size. Every model is furnished with parallel and perpendicular mounting holes. Tapped piston rod ends allow the use of custom end attachments.

Note:

For single-acting cylinders, there is a risk of coolant being sucked through the breather port. In such cases the breather port has to be moved to a clean protected area via a connection line. When placing into operation, ensure that all air is bled from the system. For applications above 100 bar operating pressure, the cylinders must be supported by the cross bores at the cylinder body when fastening. Screws of strength class 12.9 must be used for fastening.



Dimensions:

Order no.	Article no.	A	C	D	dia. E	F	G	dia. H	J	K	L	M	N	P	dia. Q	S	SW	T	V	W	X x depth	dia. Y	Z	AA	AB	AC
68023	6936-10-1	60,0	46,5	7,5	7	-	23,5	12,2	33,5	5,5	51,0	33,5	16,5	23,0	7	8,0	11	14,0	16,0	28,5	M6x11	27,0	9,5	28,0	9,5	-
68049	6936-10-2	79,0	66,0	7,5	7	-	23,5	12,2	33,5	5,5	51,0	33,5	16,5	23,0	7	8,0	11	14,0	16,0	28,5	M6x11	27,0	9,5	47,0	9,5	-
68056	6936-18-1	71,0	57,0	8,0	9	-	26,5	20,1	38,0	6,5	51,0	38,0	19,0	25,5	7	16,0	17	22,0	32,0	44,5	M8x11	35,0	12,5	28,5	8,0	14,5
68072	6936-18-2	84,0	69,5	8,0	9	-	26,5	20,1	38,0	6,5	51,0	38,0	19,0	25,5	7	16,0	17	22,0	32,0	44,5	M8x11	35,0	12,5	41,0	8,0	14,5
68098	6936-18-3	112,5	98,5	8,0	9	41	26,5	20,1	38,0	6,5	51,0	38,0	19,0	25,5	7	16,0	17	22,0	32,0	44,5	M8x11	35,0	12,5	70,0	8,0	14,5
68114	6936-40-1	73,0	57,0	10,0	9	-	26,5	28,2	51,0	9,0	63,5	48,0	24,0	31,5	9	17,5	25	25,5	35,5	51,0	M12x13	44,5	12,5	28,5	8,0	17,5
68130	6936-40-2	86,0	69,5	10,0	9	-	26,5	28,2	51,0	9,0	63,5	48,0	24,0	31,5	9	17,5	25	25,5	35,5	51,0	M12x13	44,5	12,5	41,0	8,0	17,5

Subject to technical alterations.

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No. 6936D

Block Cylinder

double acting,
max. operating pressure 350 bar.





CAD

Order no.	Article no.	Push force at 100 bar [kN]	Push force at 350 bar [kN]	Pull force at 100 bar [kN]	Pull force at 350 bar [kN]	Stoke B [mm]	Vol. VH [cm³]	Piston area VH [cm²]	Piston area RH [cm²]	Weight [g]
68155	6936D-10-1	2,9	10,1	1,6	5,6	6,5	1,9	2,9	1,6	467
68171	6936D-10-2	2,9	10,1	1,6	5,6	19,0	5,7	2,9	1,6	644
68197	6936D-18-1	5,1	17,8	1,7	6,0	12,5	6,5	5,1	1,7	463
68213	6936D-18-2	5,1	17,8	1,7	6,0	25,5	13,0	5,1	1,7	1030
68239	6936D-18-3	5,1	17,8	1,7	6,0	51,0	26,0	5,1	1,7	1397
68254	6936D-40-1	11,4	39,9	5,0	17,5	12,5	14,5	11,4	5,0	1225
68270	6936D-40-2	11,4	39,9	5,0	17,5	25,5	29,0	11,4	5,0	1447
68296	6936D-40-3	11,4	39,9	5,0	17,5	51,0	58,0	11,4	5,0	1851

VH = work stroke, RH = back stroke

Design:

Cylinder housing made of steel, hardened and blued. Piston and piston rod with internal thread, case-hardened and ground. Wiper at piston rod prevents from contamination.

Application:

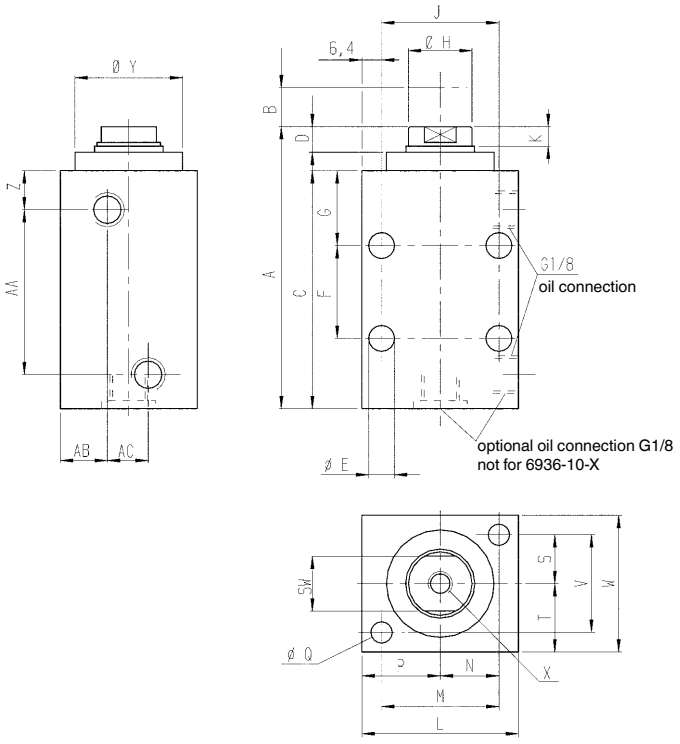
Universal mounting to equipment using mounting holes. Universal element clamping, pressurising, riveting and punching.

Features:

Different strokes are available for each cylinder size. Every model is furnished with parallel and perpendicular mounting holes. Tapped piston rod ends allow the use of custom end attachments.

Note:

When placing into operation, ensure that all air is bled from the system. For applications above 100 bar operating pressure, the cylinders must be supported by the cross bores at the cylinder body when fastening. Screws of strength class 12.9 must be used for fastening.



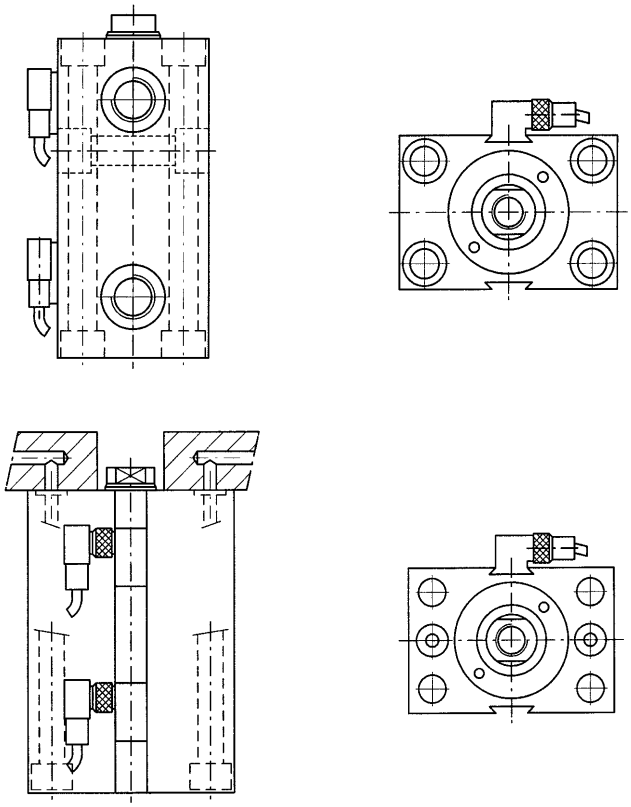
Dimensions:

Order no.	Article no.	A	C	D	dia. E	F	G	dia. H	J	K	L	M	N	P	dia. Q	S	SW	T	V	W	X x depth	dia. Y	Z	AA	AB	AC
68155	6936D-10-1	60,0	46,5	7,5	7	-	23,5	12,2	33,5	5,5	51,0	33,5	16,5	23,0	7	8,0	11	14,0	16,0	28,5	M6x11	27,0	9,5	28,0	9,5	-
68171	6936D-10-2	79,0	66,0	7,5	7	-	23,5	12,2	33,5	5,5	51,0	33,5	16,5	23,0	7	8,0	11	14,0	16,0	28,5	M6x11	27,0	9,5	47,0	9,5	-
68197	6936D-18-1	71,0	57,0	8,0	9	-	26,5	20,1	38,0	6,5	51,0	38,0	19,0	25,5	7	16,0	17	22,0	32,0	44,5	M8x11	35,0	12,5	28,5	8,0	14,5
68213	6936D-18-2	84,0	69,5	8,0	9	-	26,5	20,1	38,0	6,5	51,0	38,0	19,0	25,5	7	16,0	17	22,0	32,0	44,5	M8x11	35,0	12,5	41,0	8,0	14,5
68239	6936D-18-3	112,5	98,5	8,0	9	41	26,5	20,1	38,0	6,5	51,0	38,0	19,0	25,5	7	16,0	17	22,0	32,0	44,5	M8x11	35,0	12,5	70,0	8,0	14,5
68254	6936D-40-1	73,0	57,0	10,0	9	-	26,5	28,2	51,0	9,0	63,5	48,0	24,0	31,5	9	17,5	25	25,5	35,5	51,0	M12x13	44,5	12,5	28,5	8,0	17,5
68270	6936D-40-2	86,0	69,5	10,0	9	-	26,5	28,2	51,0	9,0	63,5	48,0	24,0	31,5	9	17,5	25	25,5	35,5	51,0	M12x13	44,5	12,5	41,0	8,0	17,5
68296	6936D-40-3	114,5	98,5	10,0	9	41	26,5	28,2	51,0	9,0	63,5	48,0	24,0	31,5	9	17,5	25	25,5	35,5	51,0	M12x13	44,5	12,5	70,0	8,0	17,5

Subject to technical alterations.

Available upon request. Block cylinders with O-ring- or threaded connection as special variant, double-acting, aluminium housing. With individually-adjustable magnetic sensors for position monitoring, and transverse or axial mounting holes. Block cylinders with double crosswise slot.

Block cylinders with position monitoring are used for clamping and releasing tasks and in automatic plant and production operations where they must be integrated into a cycle. The current piston position is detected by magnetic sensors which are mounted in an axial slot for easy adjustment.



DESIGN:

350 bar max. operating pressure.

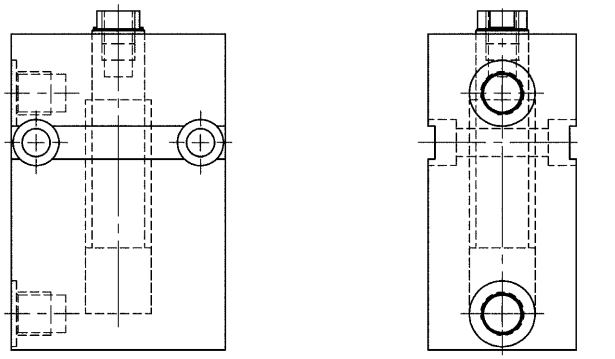
16 to 200 mm stroke.

Cylinder barrel made from aluminium.

Piston case hardened and ground.

Compact size.

Individual connections and mountings are possible.



DESIGN:

500 bar max. operating pressure.

16 to 200 mm stroke.

Cylinder barrel made from steel, burnished.

Piston case hardened and ground.

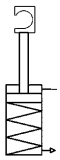
Dimensions like standard version 6926D with crosswise slot.

Oil supply via threaded port.

No. 6926Z

Hook ends, hydraulic

max. operating pressure 400 bar.





Order no.	Article no.	Slot	G	Stroke H [mm]	R	max. possible clamping force [kN]	Weight [g]
325373	6926Z-12	14, 16, 18	M12	20	G1/4	13	1430
325399	6926Z-16	18, 20, 22, 24	M16	30	G1/4	39	3650
326959	6926ZL-16	18, 20, 22, 24	M16	40	G1/4	39	3950

Design:

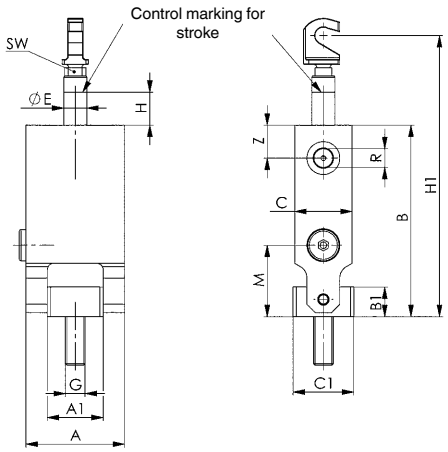
Cylinder barrel from steel, burnished. Piston and piston rod case hardened and ground. Wiper at piston rod. Piston rod with internal thread. Oil supply via threaded port.

Application:

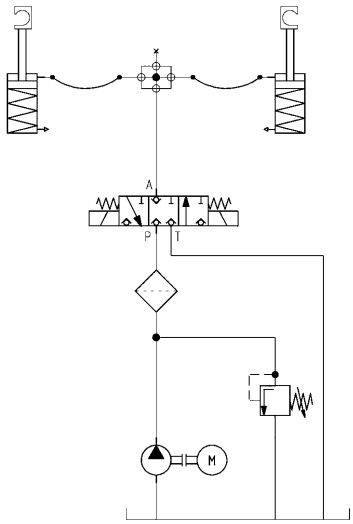
For tensioning primarily cylindrical parts - on both the machine table and clamping plates. The chain length and clamping force are preset on the counter catch using knurled nuts. The hook end is then placed under hydraulic pressure to tension the chain. The control marking on the piston rod marks the max. stroke and shows how far the hydraulic cylinder has been run out.

Advantage:

Even pressure distribution reduces workpiece deformation.

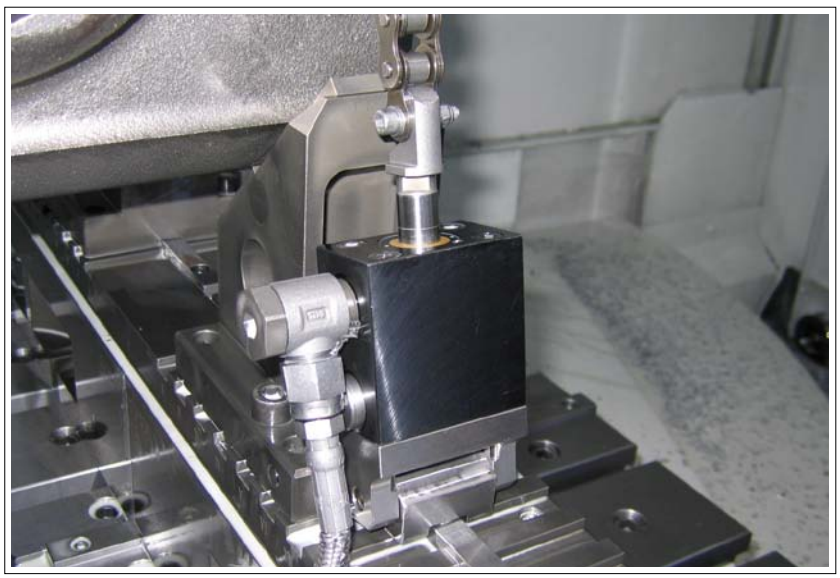


Hydraulic diagram:



Dimensions:

Order no.	Article no.	A	A1	B	B1	C	C1	dia. E	H1	M	SW	Z
325373	6926Z-12	60	34	116,5	18	35	37	14	151,5 - 171,5	43,5	10	20
325399	6926Z-16	75	44	154,0	25	55	37	20	188,0 - 218,0	54,0	17	25
326959	6926ZL-16	75	44	164,0	25	55	37	20	198,0 - 238,0	54,0	17	25



CAD

Subject to technical alterations.

No. 6540

Chain clamping set

Hook ends and counter catches tempered. Chain made of tempered steel. Please order fixture for T-slots 6541 separately.
Consisting of:
- hook end
- protection set for clamp chain
- counter catch
- 4 roller chains
87601: 492 mm (2x), 238 mm (1x), 15.9 mm (1x)
87627: 991 mm (1x), 229 mm (1x), 483 mm (1x), 25.4 mm (1x)
- 4 locking links with split pins for connecting
- 6 snap-in plastic elements (for workpiece protection)

Order no.	Slot	Screw G	max. permissible torque [Nm]	max. possible clamping force [kN]	Weight [g]
87601	14, 16, 18	M12	45	15	2628
87627	18, 20, 22, 24	M16	90	40	7640

Application:

Mainly used for clamping cylindrical parts, such as valve bodies, flanges, pump housings, pistons etc. this device can be used both on machine tables and on clamping pallets. Initial selection of the chain length and setting clamping force is carried out at the take-up unit by turning the knurled nut. Finally, the torque necessary to generate clamping force is applied to the tensioning hook. Plastic pressure pads can be inserted in the chain links to protect the workpiece surface.

Advantage:

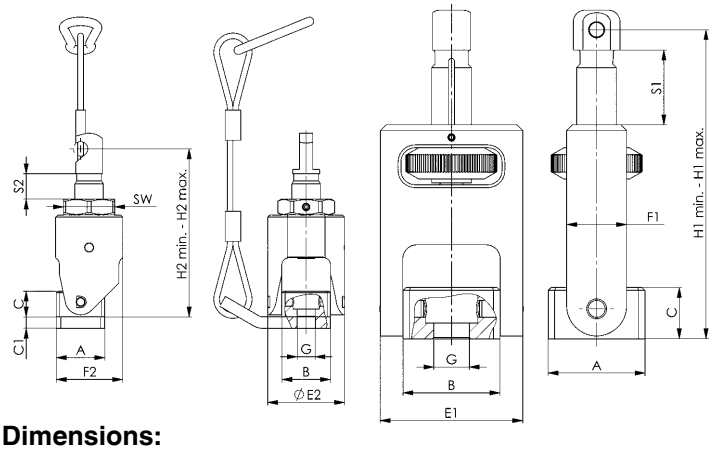
- Uniform pressure distribution reduces workpiece deformation.
- Workpiece can be protected by plastic pressure pads inserted in the chain links.
- Large range of adjustment (tensioning stroke) at take-up unit and tensioning hook.

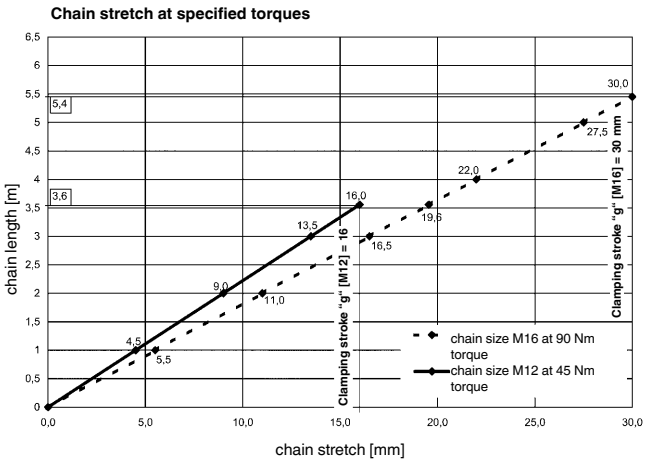
Note:

For larger clamping tasks, the clamping hooks, counterholders and clamping chains of size 20 and 24 are used.



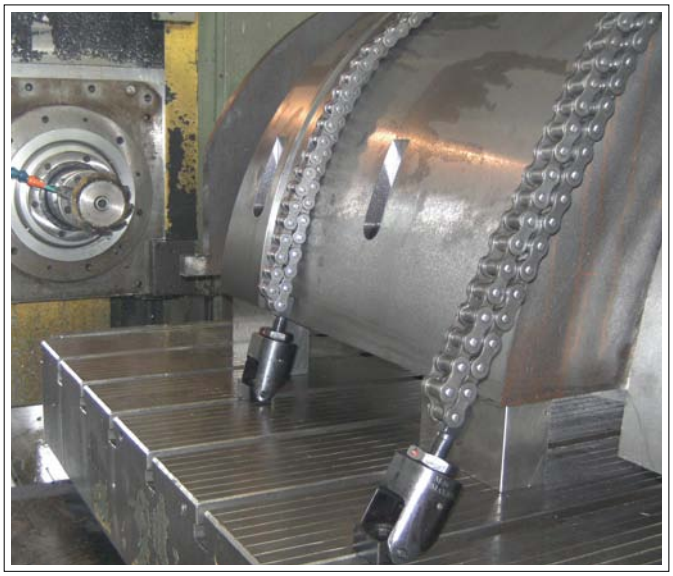
CAD

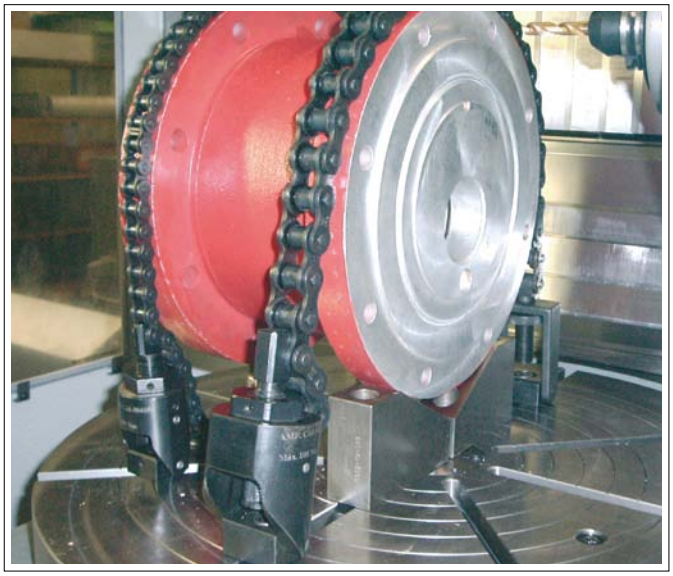




Dimensions:

Order no.	A	B	C	C1	E1	F1	H1 min.	H1 max.	Clamping stroke S1	E2	F2	H2 min.	H2 max.	Clamping stroke S2	SW
87601	34	34	18	8	50	21	83	108	25	54	46,5	100	118	18	36
87627	37	44	25	10	64	29	110	146	36	70	61,5	122	153	31	46





Subject to technical alterations.

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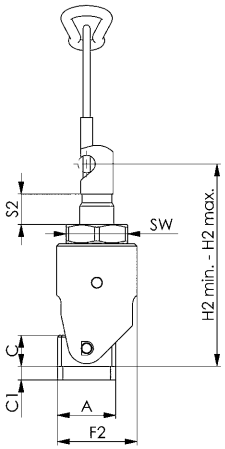
No. 6540H

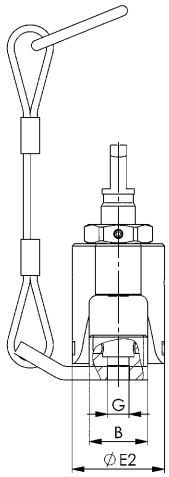
Hook end, mechanical

incl. protection set no. 6540KS

Order no.	Size	Slot	G	max. permissible torque [Nm]	max. possible clamping force [kN]	SW	Weight [g]
374934	12	14, 16, 18	M12	45	15	36	853
374959	16	18, 20, 22, 24	M16	90	40	46	1902
376517	20	22-28	M20	190	75	65	6037
376533	24	28-36	M24	300	120	65	6040







CAD

Dimensions:

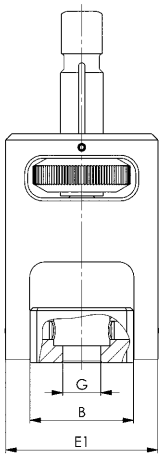
Order no.	Size	A	B	C	C1	E2	F2	H2 min.	H2 max.	Clamping stroke S2
374934	12	34	34	18	8	54	47	100	118	18
374959	16	37	44	25	10	70	62	122	153	31
376517	20	58	64	41	10	98	86	195	250	55
376533	24	58	64	41	10	98	86	199	260	61

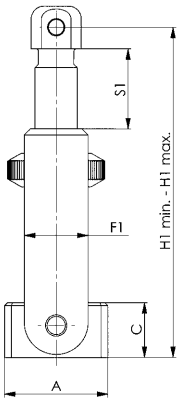
No. 6540G

Counter catch

Order no.	Size	Slot	G	S1 Stroke	max. possible clamping force [kN]	Weight [g]
374710	12	14, 16, 18	M12	25,0	15	553
374728	16	18, 20, 22, 24	M16	36,0	40	1235
376657	20	22-28	M20	43,5	75	4088
376632	24	28-36	M24	43,0	120	4145







CAD

Dimensions:

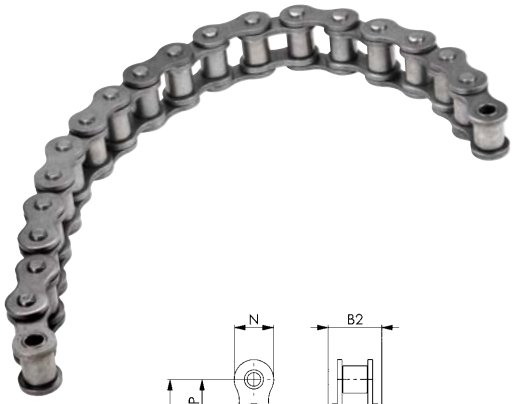
Order no.	Size	A	B	C	E1	F1	H1 min.	H1 max.
374710	12	34	34	18	50	21	83	108,0
374728	16	37	44	25	64	29	110	146,0
376657	20	58	64	41	91	48	162	205,5
376632	24	58	64	41	91	48	166	209,0

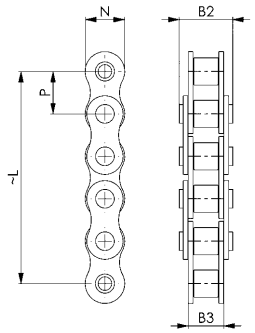
Subject to technical alterations.

No. 6540K

Roller chain

Single roller chain DIN 8187. ISO R 606 B, ST 37-2.
Surface: plain.





Order no.	Size	Nominal size	L	B2	B3	N	P	max. possible clamping force [kN]	Weight [g]
374736	12	125	111	20	13	15	15,875	15	114
374744	12	250	238	20	13	15	15,875	15	228
374751	12	500	492	20	13	15	15,875	15	455
374769	12	1000	1000	20	13	15	15,875	15	910
374777	16	125	127	23	25	21	25,400	40	335
374785	16	250	229	23	25	21	25,400	40	670
374793	16	500	483	23	25	21	25,400	40	1340
374801	16	1000	991	23	25	21	25,400	40	2680
376673	20	1000	984	44	29	26	31,750	75	3720
376699	20	1500	1492	44	29	26	31,750	75	5580
376715	20	2000	2000	44	29	26	31,750	75	7440
376723	24	1000	1028	54	38	33	38,100	120	7050
376749	24	1500	1485	54	38	33	38,100	120	10575
376764	24	2000	2019	54	38	33	38,100	120	14100

Application:

The individual chain lengths can be joined as required using the connecting links (No. 6540V). The chain can be shortened to any length as required.

Advantage:

- Chain can be extended or shortened to the required length with ease
- both sides usable with counter catches or hook ends
- resistant to temperature influences and soiling
- chains are tensioned to minimise elongation.

On request:

Customised lengths available!

No. 6540KS

Clamp chain protection set

Completely pre-assembled.



Order no.	Size	Max. clamping force to be secured [kN]	Weight [g]
376111	12	15	280
376129	16	40	350
376491	20	75	1313
376558	24	120	1313

Application:

To use the clamp chain safely, the protection set is simply screwed below the hook end or the counterholder. Then, using the supplied connecting link, the protection set is fastened above the hook end or counterholder. This prevents the clamp chain from snapping uncontrolledly if the hook end or counterholder breaks.

Advantage:

- Easy mounting of the protection set
- Safe handling of the clamp chain
- Improved work safety.

Note:

If the protection set is damaged, the entire set must be replaced.

No. 6540F

Spring cotter pin

Packaging unit: 10 pcs.



Order no.	Size	Packaging unit [St]	Weight [g]
374835	12	10	0,5
374843	16	10	1,0
376822	20	10	2,2
376848	24	10	6,5

Subject to technical alterations.

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No. 6540V

Connecting links with spring cotter pin



CAD

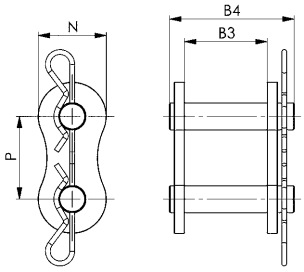
Order no.	Size	B3	B4	N	P	max. possible clamping force [kN]	Weight [g]
374819	**12**	13	22	14	15,875	15	15
374827	**16**	25	39	21	25,400	40	67
376780	**20**	29	44	26	31,750	75	113
376806	**24**	38	59	33	38,100	120	274

Application:

The connecting links are used for joining two chains together.

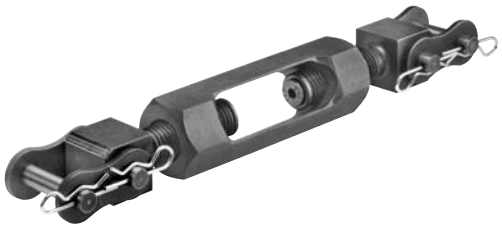
Advantage:

Chains simple and quick to combine and replace.



No. 6540VS

Turnbuckle



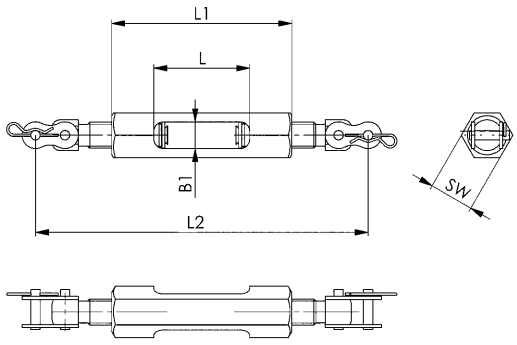
Order no.	Size	L	L1	L2	B1	SW	max. possible clamping force [kN]	Weight [g]
376459	**12**	52	97	111 - 147	14	24	15	240
376616	**16**	66	126	151 - 203	20	30	40	720
551514	**20**	100	180	206 - 270	31	50	75	2222
551515	**24**	105	180	214 - 284	31	50	120	3517

Application:

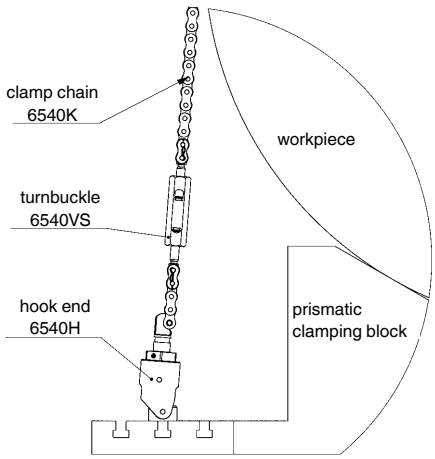
The turnbuckle is clamped between the chains using two locking links. The chain is pretensioned through turning, and the play (caused by lengthening of the chain) is removed.

Advantage:

- Optimal application of pretensioning with use of long clamping chains (3 m or longer)
- Counteracting chain stretching for long chains



CAD



No. 6540S

Protective elements

for workpiece protection.
Packaging unit: 6 pcs.



Order no.	Size	Packaging unit [St]	Weight [g]
374850	**12**	6	3
374868	**16**	6	5
376574	**20**	6	10
376590	**24**	6	16

Application:

The protective elements are pushed into the gaps between the chain links.

Advantage:

The workpiece surface is protected.

Subject to technical alterations.

No. 6540P

Angle block, 120°

Tempered and burnished.



Order no.	Size	2R	B	B2	F1	F2	G	H2	H3	H4	L	L1	L2	L3	L4	dia. S	dia. S1	Weight [g]
375568	**12**	80	47	20	27	67	M6	80	35	5,5	118	19	59	42	-	13,5	20	3230
375584	**16**	100	47	20	33	33	M6	100	44	5,5	148	24	74	44	-	17,5	26	3960
35121	**20**	270	78	20	91	161	M6	250	102	5,5	360	45	100	44	160	22,0	33	32455
35162	**24**	270	78	20	91	161	M6	250	102	5,5	360	45	100	44	160	26,0	40	31760

Advantage:

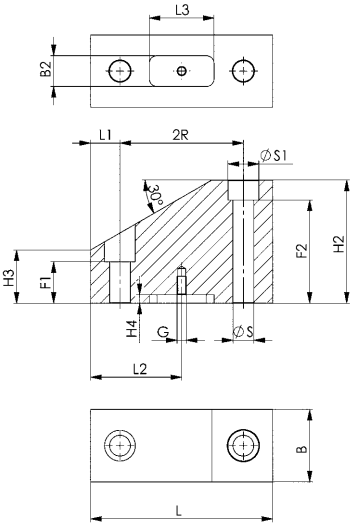
Optimised use of the clamp chain thanks to flexible positioning of the clamping prisms in the machine table groove.

Note:

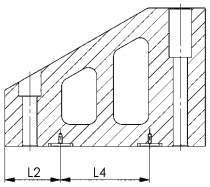
The use of a flat T-nut no. 6322A or no. 6322B enables the clamping prisms to be precisely positioned in the machine table groove.

On request:

Special versions are available on request.

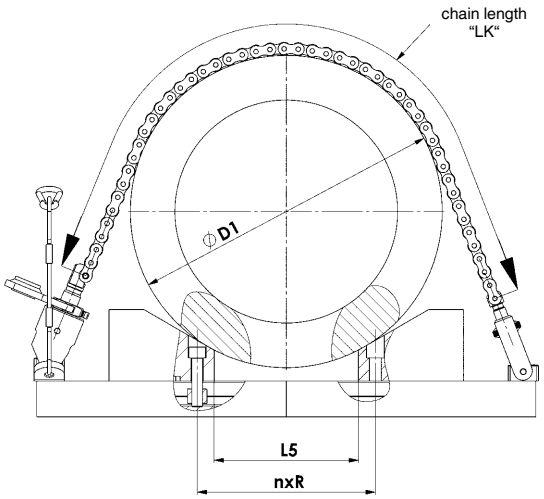


M12 - M16



M20 - M24

CAD



Order no.	n x R [m] Clearance of angle blocks	Ø D1 [mm]	Chain length LK [mm] (x) = Number of links	L5
375568	1 x 40 = 40	190 - 280	413 (26) - 635 (40)	2
	2 x 40 = 80	250 - 360	540 (34) - 826 (52)	42
	3 x 40 = 120	270 - 440	603 (38) - 1048 (66)	82
	4 x 40 = 160	300 - 520	635 (40) - 1238 (78)	122
	5 x 40 = 200	350 - 600	762 (48) - 1429 (90)	162
	6 x 40 = 240	430 - 680	953 (60) 1619 (102)	202
	7 x 40 = 280	510 - 760	1143 (72) - 1810 (114)	242
	8 x 40 = 320	620 - 840	1397 (88) - 2000 (126)	282
	9 x 40 = 360	760 - 920	1778 (112) - 2191 (138)	322
	10 x 40 = 400	920 - 1000	2191 (138) - 2413 (152)	362
375584	1 x 50 = 50	250 - 370	559 (22) - 864 (34)	2
	2 x 50 = 100	320 - 470	711 (28) - 1118 (44)	52
	3 x 50 = 150	320 - 570	711 (28) - 1372 (54)	102
	4 x 50 = 200	320 - 670	711 (28) - 1575 (62)	152
	5 x 50 = 250	430 - 770	965 (38) - 1829 (72)	202
	6 x 50 = 300	530 - 870	1168 (46) - 2083 (82)	252
	7 x 50 = 350	630 - 970	1422 (56) - 2337 (92)	302
	8 x 50 = 400	760 - 1070	1727 (68) - 2591 (102)	352
	9 x 50 = 450	960 - 1170	2235 (88) - 1794 (110)	402
	10 x 50 = 500	1160 - 1270	2743 (108) - 3048 (120)	452
35121	3 x 135 = 405	1200 - 1550	2889 (91) - 3842 (121)	315
	5 x 135 = 675	1550 - 2100	3683 (116) - 5175 (163)	585
	7 x 135 = 945	2100 - 2500	5017 (158) - 6096 (192)	855
35162	3 x 135 = 405	1200 - 1550	2324 (61) - 3848 (101)	315
	5 x 135 = 675	1550 - 2100	3657 (96) - 5143 (135)	858
	7 x 135 = 945	2100 - 2500	5029 (132) - 6096 (160)	855

Subject to technical alterations.

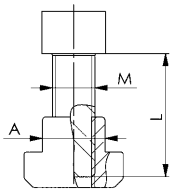
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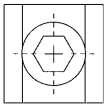
No. 6541

Mounting kit

For attaching the chain clamping set no. 6540 on the subplate, composed of nut for T-nut, resembling DIN 508, and screw complying with ISO 4762, class 8.8.







CAD

Order no.	A	L	M	Weight [g]
84251	14	25	M12	60
84269	16	30	M12	80
84277	18	30	M12	105
84285	18	30	M16	115
84293	20	35	M16	170
84343	22	40	M16	240
84350	24	45	M16	335
376483	14	35 *	M12	88
376509	16	40 *	M12	114
376525	18	40 *	M12	141
376541	18	45 *	M16	189
376566	20	50 *	M16	248
376582	22	50 *	M16	305
376608	24	55 *	M16	407

* For use of the protection set no. 6540KS

Note:

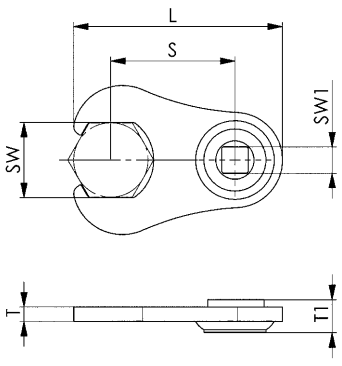
Mounting kit for the sizes 20 and 24 available on request.

No. 902Md

Open ring spanner with torque-wrench fitting

Fits hook end 6540H.
(AMF chain clamping set 6540)
For hexagon clamping nuts.
Drive 1/2" square socket with ball-engagement groove.
Special steel, hardened and zinc-plated.





SW36 / SW46

Order no.	SW	L	S	SW1 [inch]	T	T1	Weight [g]
52514	36	101	60	1/2	7	16	255
52522	46	108	60	1/2	8	16	340

Advantage:

Ideally adapted for the controlled actuation of the hook end 6540-12 and 6540-16 of the chain clamping set.

Note:

The set value for the torque wrench is dependant on insertion dimension „S".
The operating manual provided with your torque wrench contains the requisite information and calculation formulae.

On request:

SW 65 fits clip no. 6540H - size M20/M24 available on request.

Subject to technical alterations.





Subject to technical alterations.

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PUSH-PULL CYLINDERS, FOR INDIVIDUAL CLAMPING APPLICATION

- pull force 2,2 to 40 kN
- operating pressure 350 bar
- guided or unguided piston rod
- hardened and chrome-plated piston rod
- nitrided and burnished body
- oil supply via threaded port and/or o-ring-sealed ports

At continuous pressures below 80 bar, this must be stated on ordering as a different seal combination may need to be selected.

PRODUCT OVERVIEW:

Type	Clamping stroke [mm]	Pull force [kN]	No. of models	Operating mode
6927B	25,5 - 51,0	5,9 - 17,5	4	single acting
6951KZ/KZP	14,5 - 30,0	2,2 - 40,0	8	single or double acting
6951FZ/FZP	14,5 - 30,0	2,2 - 40,0	8	single or double acting
6951GZ	14,5 - 51,0	2,2 - 13,9	8	single acting

PRODUCT EXAMPLES:

NO. 6927B



- pull force: 5,9 - 17,5 kN
- connection type: threaded port

NO. 6951KZP



- pull force: 2,2 - 40 kN
- connection type: o-ring or threaded port

NO. 6951FZP

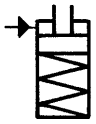


- pull force: 2,2 - 40 kN
- connection type: o-ring or threaded port

No. 6927B

Pull Cylinder, block type

Single acting, with spring return,
max. operating pressure 350 bar.



CAD



Order no.	Article no.	Pull force at 350 bar [kN]	Stoke B [mm]	Vol. pull [cm³]	Piston area pull [cm²]	Weight [g]
68064	6927B-06-1	5,9	25,5	4,4	1,7	1075
68080	6927B-06-2	5,9	51,0	8,8	1,7	1433
68106	6927B-18-1	17,5	25,5	12,7	5,0	1483
68122	6927B-18-2	17,5	51,0	25,4	5,0	1905

Design:

Cylinder barrel from steel, hardened and burnished. Piston rod hardened and chrome plated. Piston rod with internal thread. Wiper at piston rod. Oil supply via threaded port.

Application:

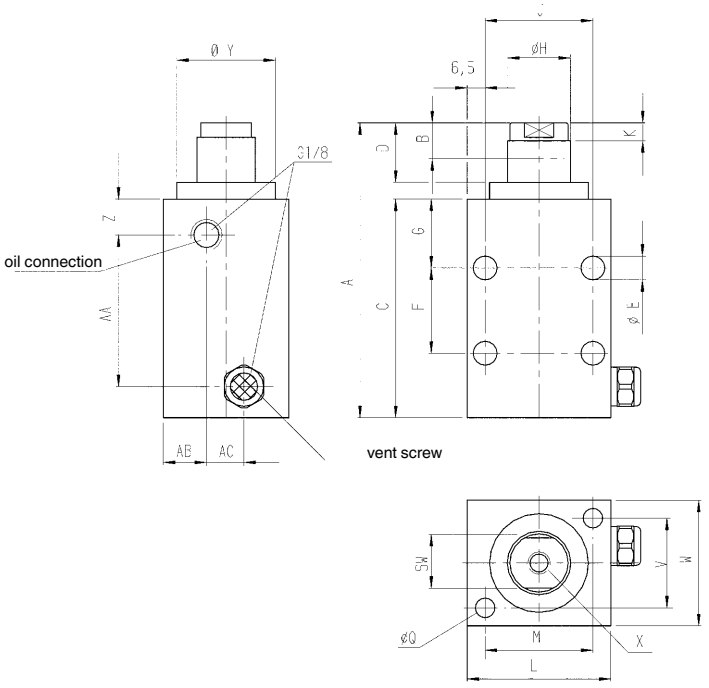
Universal pull cylinder for various applications.

Features:

Piston rod not guided. Tapped piston rod ends allow the use of custom end attachments. Clamping bars can be attached like the swivel clamps. Cylinder body with longitudinal and crosswise mounting holes.

Note:

For single acting cylinders there is risk of sucking in coolant through the breather port. In such cases the breather port has to be piped to a clean protected area. The system has to be completely vented during installation.

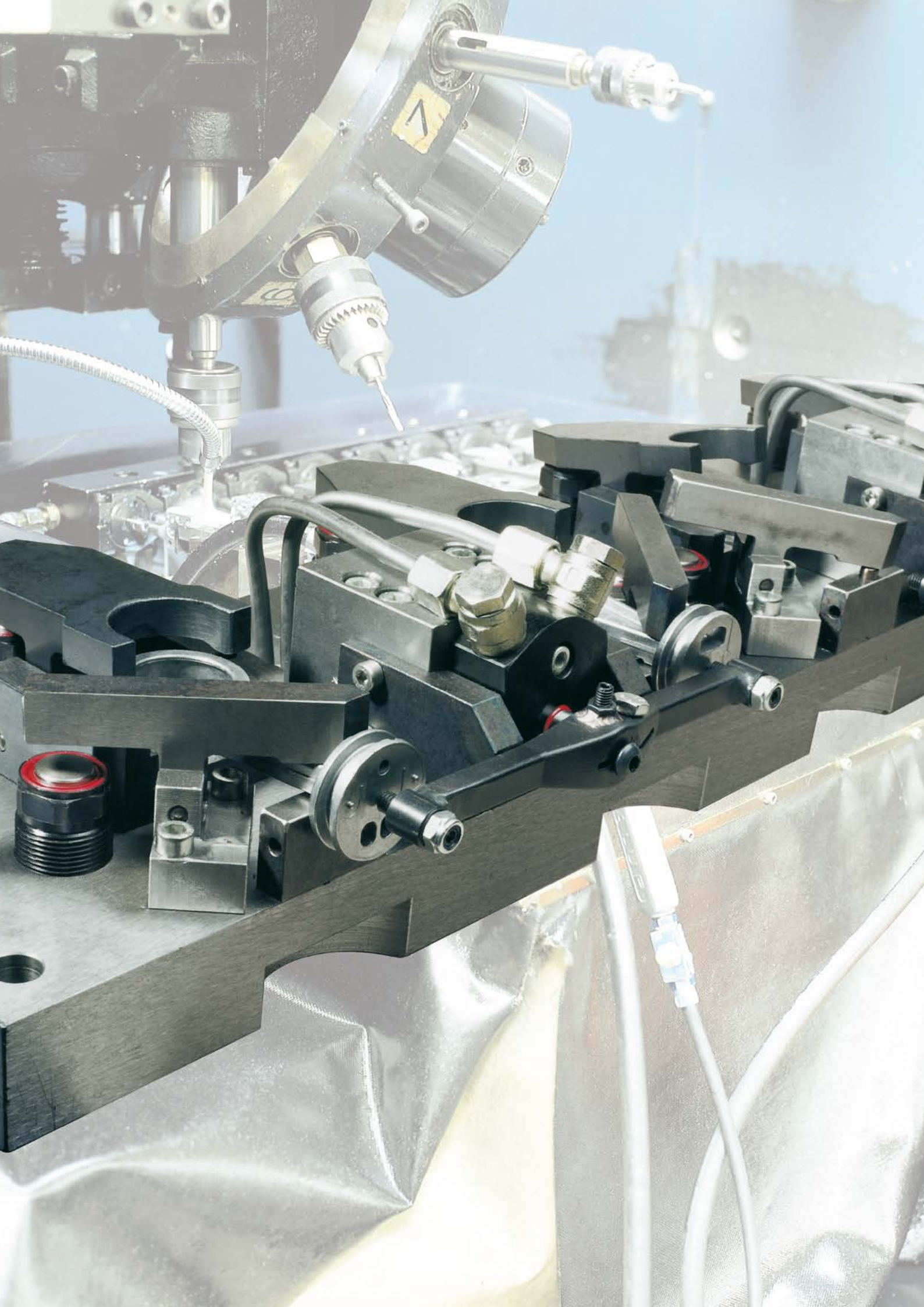


Dimensions:

Order no.	Article no.	A	C	D	dia. E	F	G	dia. H	J	K	L	M	dia. Q	SW	V	W	X x depth	dia. Y	Z	AA	AB	AC
68064	6927B-06-1	109,0	69,5	33,5	8,7	-	26,5	20,64	38	6,5	51,0	38	7	17	31,5	44,5	M8x11	35,0	12,5	41	8	14,5
68080	6927B-06-2	163,5	98,5	59,0	8,7	41,3	26,5	20,64	38	6,5	51,0	38	7	17	31,5	44,5	M8x11	35,0	12,5	70	8	14,5
68106	6927B-18-1	111,0	69,5	35,5	8,7	-	26,5	28,58	51	9,0	63,5	48	9	25	35,5	51,0	M12x13	44,5	12,5	41	8	17,5
68122	6927B-18-2	165,0	98,5	61,0	8,7	41,3	26,5	28,58	51	9,0	63,5	48	9	25	35,5	51,0	M12x13	44,5	12,5	70	8	17,5

Subject to technical alterations.

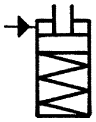
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No. 6951KZ

Pull Cylinder, top-flange-mounting, with guided piston rod

Single-acting, with spring return,
max. operating pressure 350 bar,
min. operating pressure 52 bar.





CAD

Order no.	Article no.	Pull force at 350 bar [kN]	Stroke [mm]	Vol. pull [cm³]	Q max. [l/min]	Weight [g]
66498	6951KZ-02-10	2,2	14,5	0,92	0,165	372
66530	6951KZP-05-10	6,6	20,0	3,82	0,40	903
66571	6951KZP-11-10	13,9	29,5	11,90	1,64	1520

Design:

Cylinder barrel from steel, hardened and burnished. Piston rod case hardened and chrome plated. Piston rod with internal thread and clamping arm positioning. O-ring for flange seal. Wiper at piston rod. Return spring from stainless steel. Oil supply via threaded connection or oil channel in the fixture body.

Application:

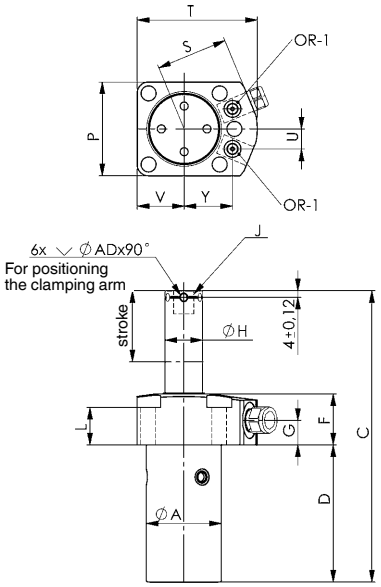
Universal Push-Pull Cylinder for various applications.

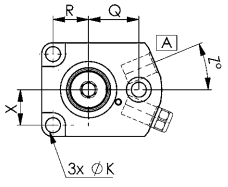
Features:

Each cylinder size is available for single or double-acting operation. Various thrust pieces can be attached in the tapped piston rod ends. Clamps can be attached, as with the swing clamps.

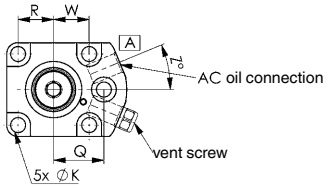
Note:

The piston is guided, therefore, the max. permissable oil flow rate Q max. must be observed in order to protect the mechanism. No force must be introduced at the piston when mounting accessory. For single acting cylinders there is risk of sucking in coolant through the breather port. In such cases the breather port has to be piped to a clean protected area. The system has to be completely vented during installation.





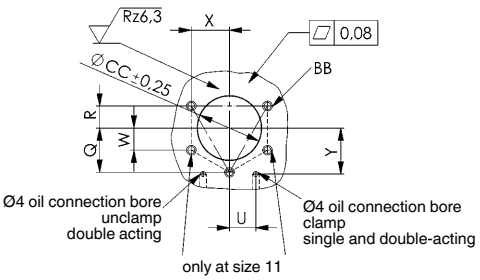
size 02, 05



size 11

A = clamp

Drilling template device:



Dimensions:

Order no.	Article no.	dia. A	C	D	F	G	dia. H	J x depth	dia. K	L	P	Q	R	S	T	U	V	W	X	Y	Z°	AC	ØAD	BB	dia. CC	OR-1 O-ring Order No.
66498	6951KZ-02-10	25,2	101,5	44,0	26	13,0	11,13	M6 x 7	6	18,0	45,0	20,0	10,0	31,0	47	10,5	15,5	-	17,3	18,2	30,0	G1/8	3,2	M5	26	183608
66530	6951KZP-05-10	36,3	134,0	64,5	27	13,0	15,88	M10 x 12	7	19,0	57,0	25,0	12,5	33,5	54	20,5	19,0	-	21,7	14,4	30,0	G1/8	4,8	M6	37	183608
66571	6951KZP-11-10	44,2	172,0	81,0	30	14,5	22,23	M12 x 13	9	22,1	55,5	29,7	21,0	42,0	71	11,8	27,5	21	21,0	28,6	22,5	G1/4	4,8	M8	45	183608

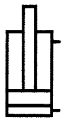
Subject to technical alterations.

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No. 6951KZ

Push-Pull Cylinder, top-flange-mounting, with guided piston rod

Double-acting,
max. operating pressure 350 bar,
min. operating pressure 35 bar.





CAD

Order no.	Article no.	Push force at 350 bar [kN]	Pull force at 350 bar [kN]	Stroke [mm]	Vol. push [cm³]	Vol. pull [cm³]	Q max. [l/min]	Weight [g]
66514	6951KZ-02-20	5,6	2,2	14,5	2,3	0,92	0,165	372
66555	6951KZP-05-20	13,5	6,6	20,0	7,8	3,82	0,40	903
66597	6951KZP-11-20	27,7	13,9	29,5	23,0	11,90	1,64	1520

Design:

Cylinder barrel from steel, hardened and burnished. Piston rod case hardened and chrome plated. Piston rod with internal thread and clamping arm positioning. O-ring for flange seal. Wiper at piston rod. Oil supply via threaded port or oil channel in fixture body.

Application:

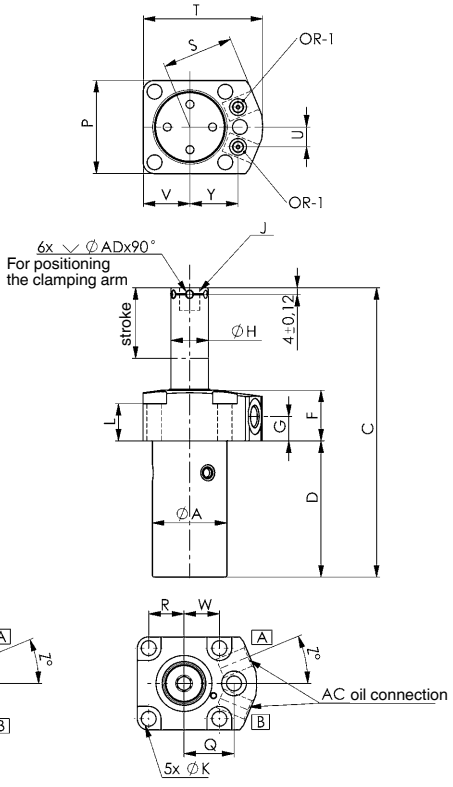
Universal Push-Pull Cylinder for various applications.

Features:

Each cylinder size is available for single or double-acting operation. Various thrust pieces can be attached in the tapped piston rod ends. Clamps can be attached, as with the swing clamps.

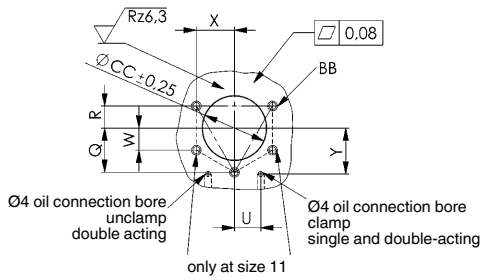
Note:

The piston stoke is guided, respect Q max. volume flow. When mounting accessories at the piston, no force may be applied to the piston. When placing into operation, ensure that all air is bled from the system.



A = clamp
B = unclamp

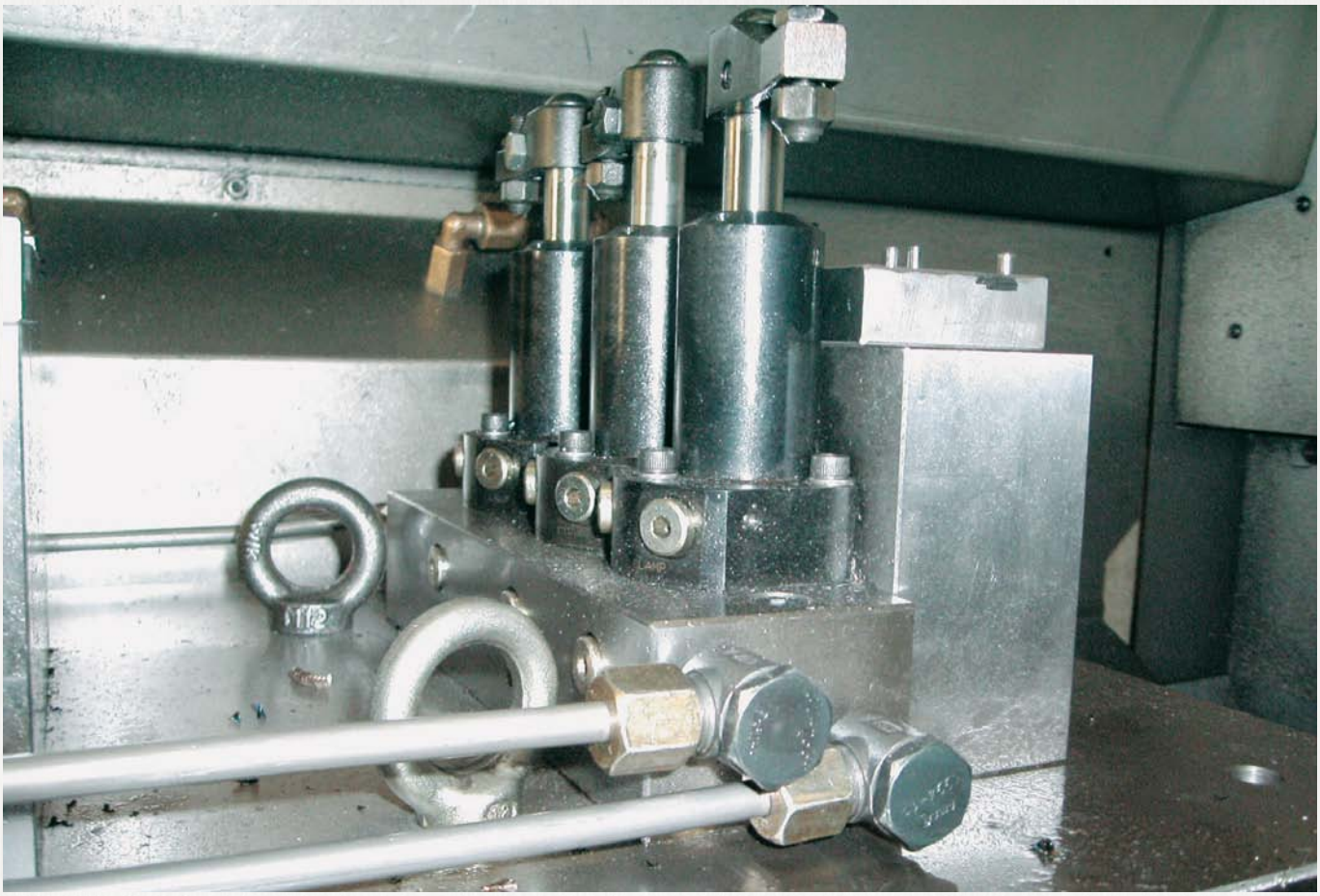
Drilling template device:



Dimensions:

Order no.	Article no.	dia. A	C	D	F	G	dia. H	J x depth	dia. K	L	P	Q	R	S	T	U	V	W	X	Y	Z°	AC	ØAD	BB	dia. CC	OR-1 O-ring Order No.
66514	6951KZ-02-20	25,2	101,5	44,0	26	13,0	11,13	M6 x 7	6	18,0	45,0	20,0	10,0	31,0	47	10,5	15,5	-	17,3	18,2	30,0	G1/8	3,2	M5	26	183608
66555	6951KZP-05-20	36,3	134,0	64,5	27	13,0	15,88	M10 x 12	7	19,0	57,0	25,0	12,5	33,5	54	20,5	19,0	-	21,7	14,4	30,0	G1/8	4,8	M6	37	183608
66597	6951KZP-11-20	44,2	172,0	81,0	30	14,5	22,23	M12 x 13	9	22,1	55,5	29,7	21,0	42,0	71	11,8	27,5	21	21,0	28,6	22,5	G1/4	4,8	M8	45	183608

Subject to technical alterations.





Subject to technical alterations.

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No. 6951KZP

Push-Pull Cylinder, top-flange-mounting, with guided piston rod

double acting,
max. operating pressure 350 bar,
min. operating pressure 35 bar.





CAD

Order no.	Article no.	Push force at 350 bar [kN]	Pull force at 350 bar [kN]	Stroke [mm]	Vol. push [cm³]	Vol. pull [cm³]	Q max. [l/min]	Weight [g]
327106	6951KZP-22-20	54	26	28	43,3	21,2	2,5	2590
327098	6951KZP-33-20	80	40	30	68,4	34,3	2,5	4355

Design:

Cylinder barrel from steel, hardened and burnished. Piston rod hardened and chrome plated. Piston rod with internal thread. O-ring for flange seal. Wiper at piston rod. Oil supply via threaded connection or oil channel in the fixture body.

Application:

Universal Push-Pull Cylinder for various applications.

Features:

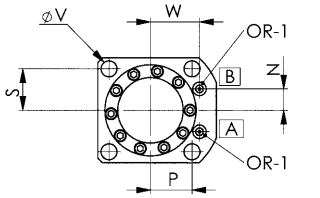
Various thrust pieces can be attached in the tapped piston rod ends. Clamps can be attached, as with the swing clamps.

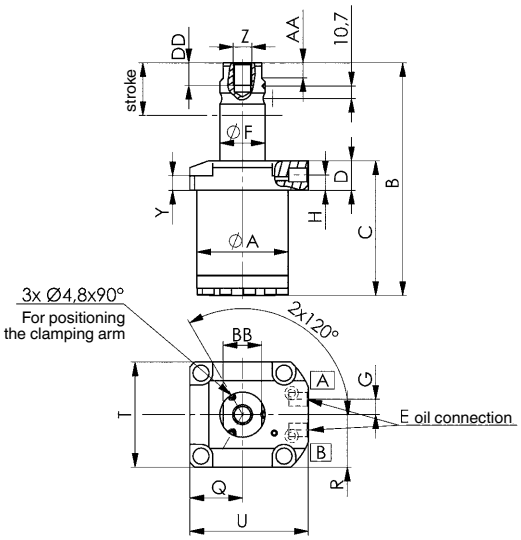
Advantage:

- Increase in the number of balls and slots to 3 to achieve a higher positioning accuracy and repetition accuracy. Also prolongs service life.
- More precise guidance
- contact force of balls into groove increased, thus guaranteeing highly-precise guidance over a long period of us.
- V-profile of the ball running groove guarantees a deeper ball run in the groove wall than at the groove edge.
- New materials for prolonging the service life of piston rod and guide.

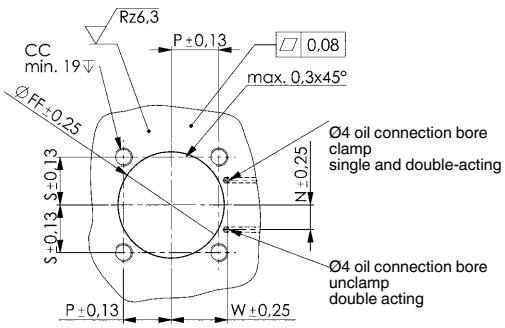
Note:

The piston is guided, therefore, the max. permissable oil flow rate Q max must be observed in order to protect the mechanism. No force must be introduced at the piston when mounting accessory. The system has to be completely vented during installation.
To control the oil feed, the throttle/check valve no. 6916-12-04 can be optionally used.





Drilling template device:



A = Pull
B = Pressure

Dimensions:

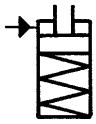
Order no.	Article no.	dia. A	B	C	D	E	dia. F	G	H	N	P	Q	R	S	T	U	dia. V	W	Y	Z	AA	BB	CC	DD	dia. FF	OR-1 O-ring Order No.
327106	6951KZP-22-20	62,8	185,5	104,5	25	G1/4	31,74	13	13	14,5	27,4	35,5	35,5	27,4	71	85,5	10,7	35,1	13,0	M16	12,5	26,5	M10	19	63,4	183608
327098	6951KZP-33-20	77,0	196,5	114,0	25	G1/4	38,09	13	13	18,1	35,1	44,5	44,5	35,1	89	100,0	13,5	41,4	12,5	M16	12,5	32,5	M12	19	77,6	183608

Subject to technical alterations.

No. 6951FZ

Pull Cylinder, base-flange-mounting, with guided piston rod

Single-acting, with spring return,
max. operating pressure 350 bar,
min. operating pressure 52 bar.





CAD

Order no.	Article no.	Pull force at 350 bar [kN]	Stroke [mm]	Vol. pull [cm³]	Q max. [l/min]	Weight [g]
66480	6951FZ-02-10	2,2	14,5	0,92	0,165	463
66522	6951FZP-05-10	6,6	20,0	3,82	0,400	1150
66563	6951FZP-11-10	13,9	29,5	11,90	1,640	2050

Design:

Cylinder barrel from steel, hardened and burnished. Piston rod case hardened and chrome plated. Piston rod with internal thread and clamping arm positioning. O-ring for flange seal. Wiper at piston rod. Return spring from stainless steel. Oil supply via threaded connection or oil channel in the fixture body.

Application:

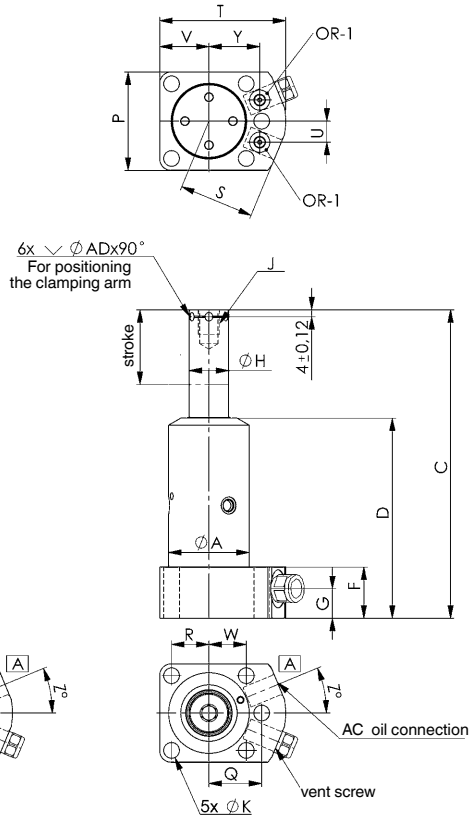
Universal Push-Pull Cylinder for various applications.

Features:

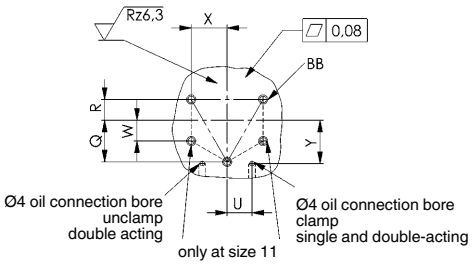
Each cylinder size is available for single or double-acting operation. Various thrust pieces can be attached in the tapped piston rod ends. Clamps can be attached, as with the swing clamps.

Note:

The piston is guided, therefore, the max. permissable oil flow rate Q max. must be observed in order to protect the mechanism. No force must be introduced at the piston when mounting accessory. For single acting cylinders there is risk of sucking in coolant through the breather port. In such cases the breather port has to be piped to a clean protected area. The system has to be completely vented during installation.



Drilling template device:



Dimensions:

Order no.	Article no.	dia. A	C	D	F	G	dia. H	J x depth	dia. K	P	Q	R	S	T	U	V	W	X	Y	Z°	AC	ØAD	BB	OR-1 O-ring Order No.
66480	6951FZ-02-10	26,5	103	71,0	26,5	13,5	11,13	M6 x 7	6	45,0	20,0	10,0	31,0	47	10,5	15,5	-	17,3	18,2	30,0	G1/8	3,2	M5	183608
66522	6951FZP-05-10	38,0	135	92,5	25,0	15,0	15,88	M10 x 12	7	57,0	25,0	12,5	33,5	54	20,5	19,0	-	21,7	14,3	30,0	G1/8	4,8	M6	183608
66563	6951FZP-11-10	45,5	173	112,5	28,5	16,5	22,23	M12 x 13	9	55,5	29,7	21,0	42,0	71	11,9	27,5	21	21,0	28,6	22,5	G1/4	4,8	M8	183608

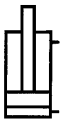
Subject to technical alterations.

ANDREAS MAIER GmbH & Co. KG · Phone: +49 711 5766-196 · Web: www.amf.de

No. 6951FZ

Push-Pull Cylinder, base-flange-mounting, with guided piston rod

Double-acting,
max. operating pressure 350 bar,
min. operating pressure 35 bar.





CAD

Order no.	Article no.	Push force at 350 bar [kN]	Pull force at 350 bar [kN]	Stroke [mm]	Vol. push [cm³]	Vol. pull [cm³]	Q max. [l/min]	Weight [g]
66506	6951FZ-02-20	5,6	2,2	14,5	2,3	0,92	0,165	463
66548	6951FZP-05-20	13,5	6,6	20,0	7,8	3,82	0,400	1150
66589	6951FZP-11-20	27,7	13,9	29,5	23,0	11,90	1,640	2050

Design:

Cylinder barrel from steel, hardened and burnished. Piston rod case hardened and chrome plated. Piston rod with internal thread and clamping arm positioning. O-ring for flange seal. Wiper at piston rod. Oil supply via threaded connection or oil channel in the fixture body.

Application:

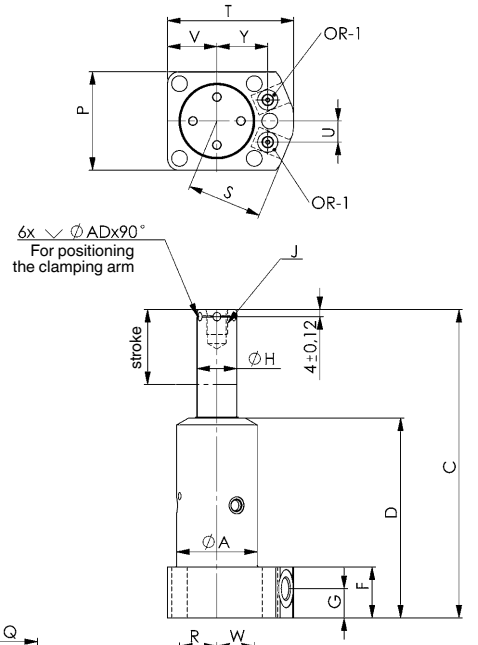
Universal Push-Pull Cylinder for various applications.

Features:

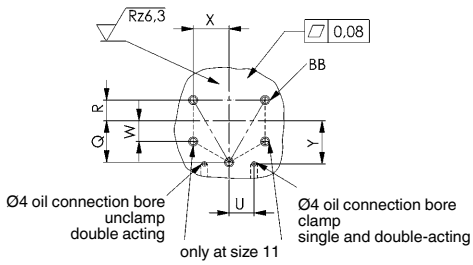
Each cylinder size is available for single or double-acting operation. Various thrust pieces can be attached in the tapped piston rod ends. Clamps can be attached, as with the swing clamps.

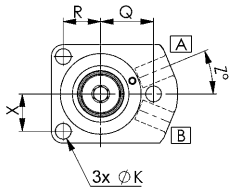
Note:

The piston stoke is guided, respect Q max. volume flow. When mounting accessories at the piston, no force may be applied to the piston. When placing into operation, ensure that all air is bled from the system.

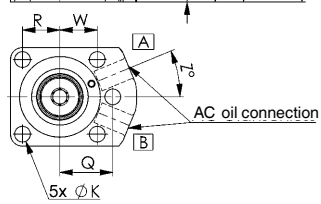


Drilling template device:





size 02, 05



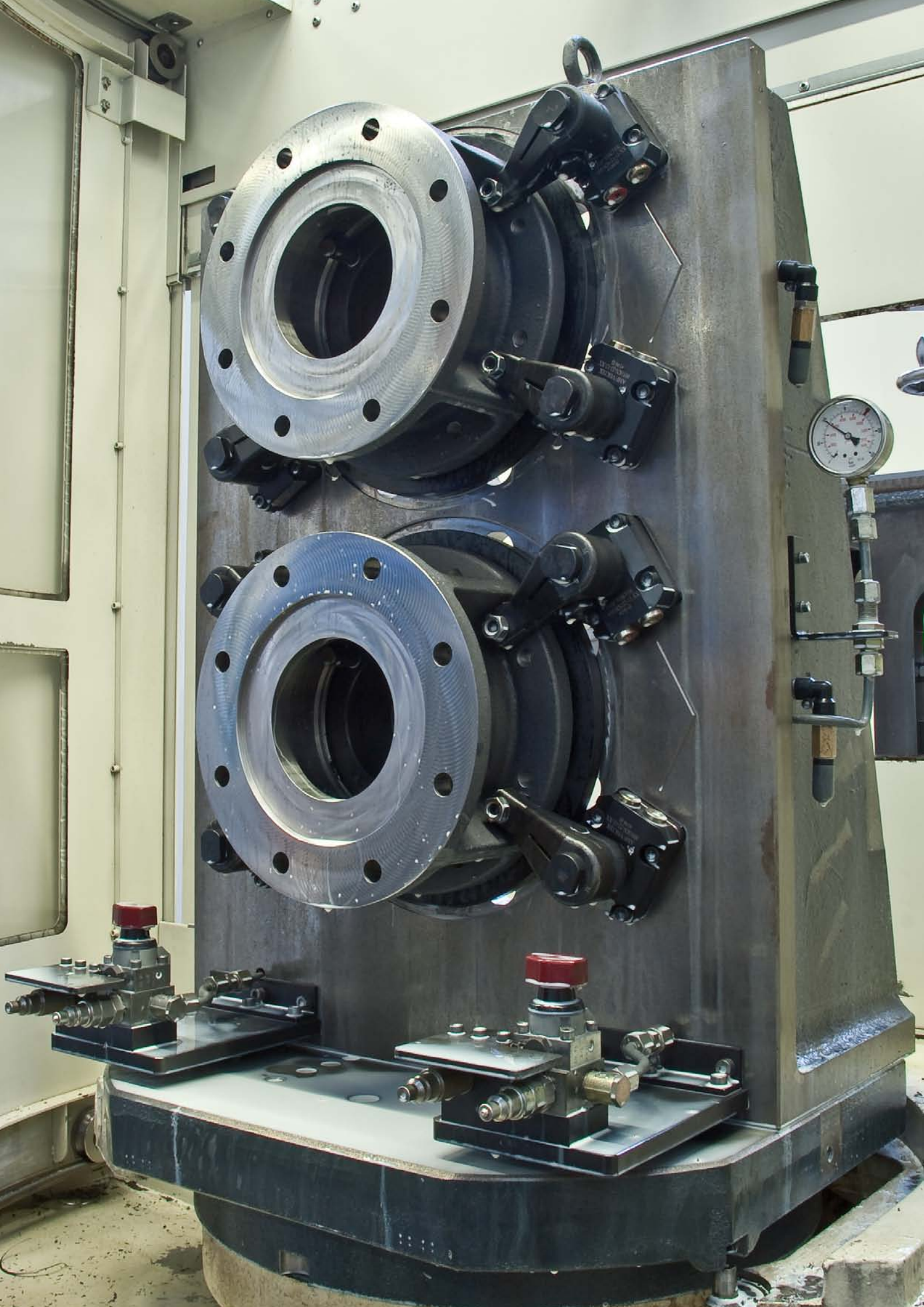
size 11

A = clamp
B = unclamp

Dimensions:

Order no.	Article no.	dia. A	C	D	F	G	dia. H	J x depth	dia. K	P	Q	R	S	T	U	V	W	X	Y	Z°	AC	ØAD	BB	OR-1 O-ring Order No.
66506	6951FZ-02-20	26,5	103	71,0	26,5	13,5	11,13	M6 x 7	6	45,0	20,0	10,0	31,0	47	10,5	15,5	-	17,3	18,2	30,0	G1/8	3,2	M5	183608
66548	6951FZP-05-20	38,0	135	92,5	25,0	15,0	15,88	M10 x 12	7	57,0	25,0	12,5	33,5	54	20,5	19,0	-	21,7	14,3	30,0	G1/8	4,8	M6	183608
66589	6951FZP-11-20	45,5	173	112,5	28,5	16,5	22,23	M12 x 13	9	55,5	29,7	21,0	42,0	71	11,9	27,5	21	21,0	28,6	22,5	G1/4	4,8	M8	183608

Subject to technical alterations.



No. 6951FZP

Push-Pull Cylinder, base-flange-mounting, with guided piston rod

double acting,
max. operating pressure 350 bar,
min. operating pressure 35 bar.





CAD

Order no.	Article no.	Push force at 350 bar [kN]	Pull force at 350 bar [kN]	Stroke [mm]	Vol. push [cm³]	Vol. pull [cm³]	Q max. [l/min]	Weight [g]
327114	6951FZP-22-20	54	26	28	43,0	21,2	2,5	3070
327122	6951FZP-33-20	80	40	30	68,6	34,3	2,5	4854

Design:

Cylinder barrel from steel, hardened and burnished. Piston rod case hardened and chrome plated. Piston rod with internal thread. O-ring for flange seal. Wiper at piston rod. Oil supply via threaded connection or oil channel in the fixture body.

Application:

Universal Push-Pull Cylinder for various applications.

Features:

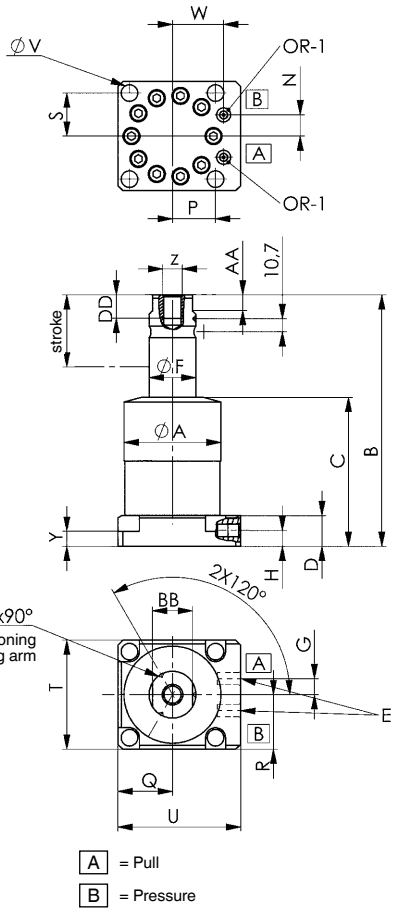
Various thrust pieces can be attached in the tapped piston rod ends. Clamps can be attached, as with the swing clamps.

Advantage:

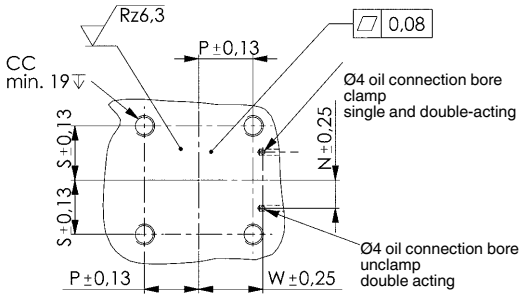
- Increase in the number of balls and slots to 3 to achieve a higher positioning accuracy and repetition accuracy. Also prolongs service life.
- More precise guidance
- contact force of balls into groove increased, thus guaranteeing highly-precise guidance over a long period of us.
- V-profile of the ball running groove guarantees a deeper ball run in the groove wall than at the groove edge.
- New materials for prolonging the service life of piston rod and guide.

Note:

The piston is guided, therefore, the max. permissable oil flow rate Q max must be observed in order to protect the mechanism. No force must be introduced at the piston when mounting accessory. The system has to be completely vented during installation.
To control the oil feed, the throttle/check valve no. 6916-12-04 can be optionally used.



Drilling template device:



Dimensions:

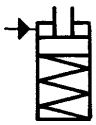
Order no.	Article no.	dia. A	B	C	D	E	dia. F	G	H	N	P	Q	R	S	T	U	dia. V	W	Y	Z	AA	BB	CC	DD	OR-1 O-ring Order No.
327114	6951FZP-22-20	62,8	194	112,0	25	G1/4	31,74	13	12,5	14,5	27,4	35,5	35,5	27,4	71	85,5	10,7	35,1	13,0	M16	12,5	26,5	M10	19	183608
327122	6951FZP-33-20	79,0	205	121,5	25	G1/4	38,09	13	13,0	18,1	35,1	44,5	44,5	35,1	89	100,0	13,5	41,4	12,5	M16	12,5	32,5	M12	19	183608

Subject to technical alterations.

No. 6951GZ

Pull Cylinder, thread-flange-mounting, with guided piston rod

Single-acting, with spring return,
max. operating pressure 350 bar,
min. operating pressure 52 bar.





CAD

Order no.	Article no.	Pull force at 350 bar [kN]	Stroke [mm]	Vol. pull [cm³]	Q max. [l/min]	Weight [g]
66605	6951GZ-02-10	2,2	14,5	0,92	0,165	308
66670	6951GZ-05-10	6,6	20,0	3,82	0,400	771
66712	6951GZ-11-10	13,9	29,5	11,90	1,640	1424

Design:

Cylinder barrel from steel, hardened and burnished. Piston rod case hardened and chrome plated. Piston rod with internal thread and clamping arm positioning. Wiper at piston rod. Return spring from stainless steel. Oil supply via threaded port.

Application:

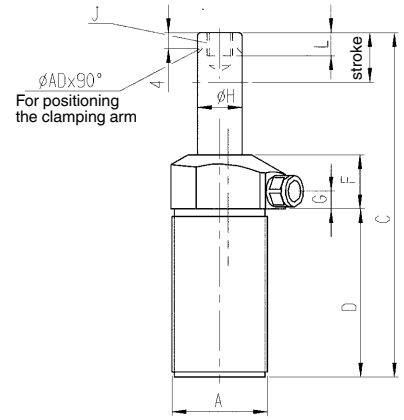
Universal Push-Pull Cylinder for various applications.

Features:

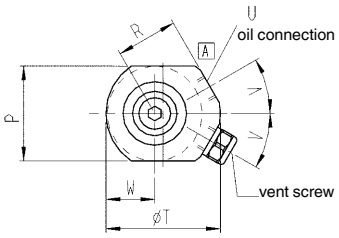
Each model is available for single or double acting operation. The internal thread at piston rod allows mounting of attachments like clamping arms and set screws.

Note:

The piston is guided, therefore, the max. permissable oil flow rate Q max. must be observed in order to protect the mechanism. No force must be introduced at the piston when mounting accessory. For single acting cylinders there is risk of sucking in coolant through the breather port. In such cases the breather port has to be piped to a clean protected area. The system has to be completely vented during installation. Suitable flange nuts DIN 70852.



A = Pull



Dimensions:

Order no.	Article no.	A	C	D	F	G	dia. H	J x depth	L	P	R	dia. T	U	V	W	ØAD
66605	6951GZ-02-10	M28x1,5	102,0	44	25,5	13	11,13	M6 x 7	7	32,0	20,5	38,0	G1/8	25°	14,0	3,2
66670	6951GZ-05-10	M38x1,5	134,0	60	31,0	13	15,88	M10 x 12	12	38,0	26,0	47,5	G1/8	35°	19,5	4,8
66712	6951GZ-11-10	M48x1,5	172,0	79	32,0	13	22,23	M12 x 13	13	47,5	31,5	60,0	G1/4	30°	25,5	4,8

Subject to technical alterations.

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No. 6951GZ

CAD

Push-Pull Cylinder, thread-flange-mounting, with guided piston rod

Double-acting,
max. operating pressure 350 bar,
min. operating pressure 35 bar.





Order no.	Article no.	Push force at 350 bar [kN]	Pull force at 350 bar [kN]	Stroke [mm]	Vol. push [cm³]	Vol. pull [cm³]	Q max. [l/min]	Weight [g]
66613	6951GZ-02-20	5,6	2,2	14,5	2,3	0,92	0,165	300
66696	6951GZ-05-20	13,5	6,6	20,0	7,8	3,82	0,400	744
66795	6951GZ-05-200	13,5	6,6	31,0	11,9	5,90	0,400	850
66738	6951GZ-11-20	27,7	13,9	29,5	23,0	11,90	1,640	1379
66928	6951GZ-11-200	27,7	13,9	51,0	40,0	20,50	1,640	1941

Design:

Cylinder barrel from steel, hardened and burnished. Piston rod case hardened and chrome plated. Piston rod with internal thread and clamping arm positioning. Wiper at piston rod. Oil supply via threaded port.

Application:

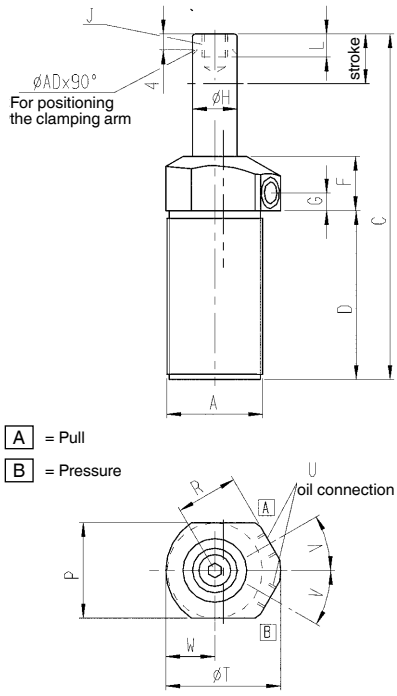
Universal Push-Pull Cylinder for various applications.

Features:

Each model is available for single or double acting operation. The internal thread at piston rod allows mounting of attachments like clamping arms and set screws.

Note:

The piston is guided, therefore, the max. permissable oil flow rate Q max. must be observed in order to protect the mechanism. No force must be introduced at the piston when mounting accessory. For single acting cylinders there is risk of sucking in coolant through the breather port. In such cases the breather port has to be piped to a clean protected area. The system has to be completely vented during installation. Suitable flange nuts DIN 70852.



Dimensions:

Order no.	Article no.	A	C	D	F	G	dia. H	J x depth	L	P	R	dia. T	U	V	W	ØAD
66613	6951GZ-02-20	M28x1,5	102,0	44	25,5	13,0	11,13	M6 x 7	7	32,0	20,5	38,0	G1/8	25°	14,0	3,2
66696	6951GZ-05-20	M38x1,5	134,0	60	31,0	13,0	15,88	M10 x 12	12	38,0	26,0	47,5	G1/8	35°	19,5	4,8
66795	6951GZ-05-200	M38x1,5	167,0	86	27,5	9,5	15,88	M10 x 12	12	38,0	26,0	47,5	G1/8	35°	19,5	4,8
66738	6951GZ-11-20	M48x1,5	172,0	79	32,0	13,0	22,23	M12 x 13	13	47,5	31,5	60,0	G1/4	30°	25,5	4,8
66928	6951GZ-11-200	M48x1,5	235,5	124	29,5	10,5	22,23	M12 x 13	13	47,5	31,5	60,0	G1/4	30°	25,5	4,8

Subject to technical alterations.

SWING CLAMPS – THE SOLUTION FOR COST-EFFECTIVE HYDRAULIC CLAMPING OF WORKPIECES!

DESIGN:

Burnished body, hardened and ground piston rod. Swing clamps are delivered without clamping arm.

APPLICATION:

Swing clamps are used in fixtures of all kinds, especially in applications where workpieces must be freely accessible and loaded from above. Workpieces with complex geometries can be clamped using special clamping arms (available upon request).

FEATURES:

Design variants: > **thread flange**

The swing motion is realized by a patented ball-guide mechanism. Standard swivel angle is 90°.

The tolerance of pivot angle measures ± 3°. The repetition accuracy of the pivot position measures ± 1.5°.

The newly designed clamping-arm mount prevents the induction of forces into the swing mechanism during assembly.

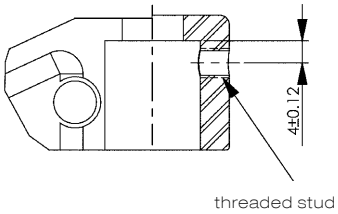
IMPORTANT NOTE:

Clamping arm length, max. permissible flow rate Q max. and clamping arm weight must be observed! In case of a larger flow rates, a throttle/check valve must be connected upstream.

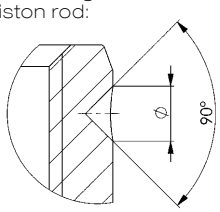
The motion of the swing clamp must not be obstructed. Clamping must only be done in the vertical stroke area.

POSITIONING:

Positioning hole for clamp arm 6951G:

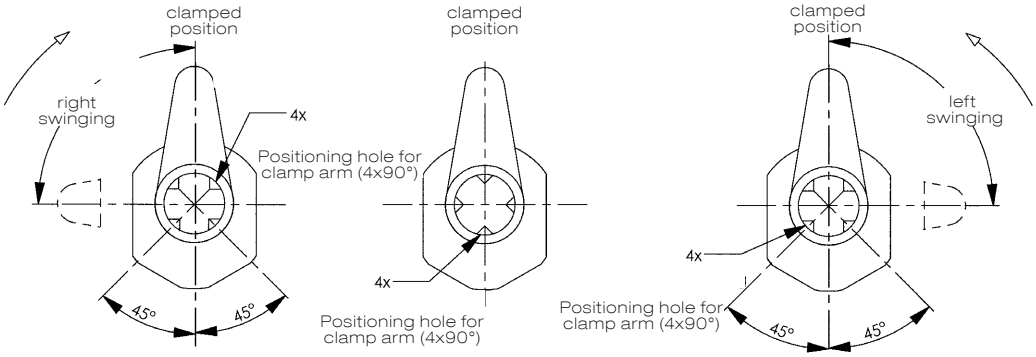


Positioning bore at the piston rod:



SWING DIRECTIONS:

Positioning hole for clamp arm:



CODE OF TYPES:

Type 11 = single acting, right swinging
Type 12 = single acting, left swinging

Type 21 = double acting, right swinging
Type 22 = double acting, left swinging

Type 210 = double acting, right swinging, extended stroke
Type 220 = double acting, left swinging, extended stroke

CLAMPING TIME AND Q OF THE SWING CLAMP 6951G

	Clamp arm, Standard		Clamp arm, long	
Swing clamp clamping force [kN]	min. allowed clamping time [sec.]	Q max. [l/min.]	min. allowed clamping time [sec.]	Q max. [l/min.]
2	0,4	0,138	0,9	0,061
5	0,6	0,382	1,2	0,191
11	0,6	1,19	1,4	0,51

Subject to technical alterations.

SWING CLAMPS FOR DEMANDING CLAMPING APPLICATIONS

- clamping force 2 to 11 kN
- operating pressure 350 bar
- easy change of swing direction (version 2 - 11 kN)
- hardened piston rod
- nitrited body
- oil supply via threaded port
- optimal size-to-clamping-force ratio

At continuous pressures below 80 bar, this must be stated on ordering as a different seal combination may need to be selected.

PRODUCT OVERVIEW:

Type	Clamping force [kN]	Clamping stroke [mm]	Total stroke [mm]	Threaded flange	Operating mode
6951G	2	6,0	14,5	●	single or double acting
6951G	5	8,0 19,0	20,0 31,0	●	single or double acting
6951G	11	13,0 34,0	29,5 51,0	●	single or double acting

PRODUCT EXAMPLES:

NO. 6951G



- piston tensile force: 2,2 - 13,9 kN
- connection type: threaded port

NO. 6951G



- piston tensile force: 2,2 - 13,9 kN
- connection type: threaded port

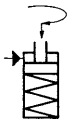
No. 6951G

Swing Clamp, thread-flange-mounting

Single-acting, with spring return,
max. operating pressure 350 bar,
min. operating pressure 52 bar.



CAD



Order no.	Article no.	Clamping force at 350 bar* [kN]	Clamping stroke M [mm]	Total stroke N [mm]	Vol. [cm³]	effective piston area [cm²]	Q max. [l/min]	Weight [g]
68619	6951G-02-11	2	6	14,5	0,92	0,63	0,165	308
68635	6951G-02-12	2	6	14,5	0,92	0,63	0,165	308
68692	6951G-05-11	5	8	20,0	3,82	1,90	0,400	771
68718	6951G-05-12	5	8	20,0	3,82	1,90	0,400	771
68429	6951G-11-11	11	13	29,5	11,90	4,04	1,640	1424
68445	6951G-11-12	11	13	29,5	11,90	4,04	1,640	1424

Ending of item no.: -11 = single-action, right-pivoting / -12 = single-action, left-pivoting
* details with clamp arm, standard

Design:

Cylinder barrel made of steel, hardened and burnished. Piston rod case hardened and chrome plated. Piston rod with internal thread and clamp arm positioning. Wiper at the piston rod. Return spring from stainless steel. Clamp arm not supplied as standard. Oil supply via threaded port.

Application:

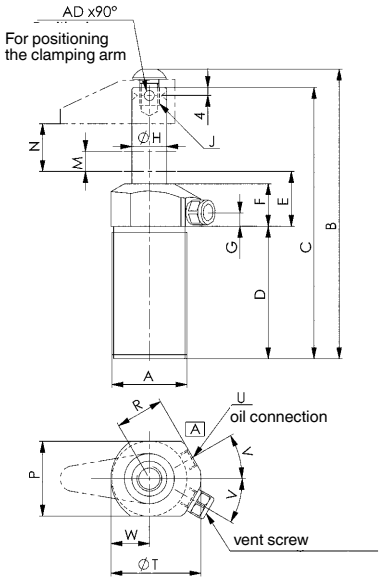
Swing clamps are used particularly in fixtures in which the workpiece must be freely accessible and placed from above. Workpieces with difficult shapes can also be clamped using special clamp arms (available on request).

Features:

Each cylinder size is available for single or double-acting operation. The swing motion employs a patented ball guide mechanism.

Note:

The piston is guided, and so the max. permissable oil flow rate Q max. as well as the clamping arm length and weight must be observed. When mounting accessories at the piston, no force may be applied to the piston. For single-acting cylinders, there is risk of sucking in coolant through the breather port. In such cases the breather port has to be moved to a clean protected area via a connection line. When installing, ensure that all air is bled from the system. Grooved nuts DIN 70852 can also be used for attachment.
Other swivel angles are available on request.



A = clamp

Dimensions:

Order no.	Article no.	A	B	C	D	E	F	G	dia. H	J x depth	P	R	dia. T	U	V	W	AD
68619	6951G-02-11	M28x1,5	108,0	102,0	44,0	30,5	25,5	13	11,13	M6 x 7	32,0	20,5	38,0	G1/8	25°	14,0	3,2
68635	6951G-02-12	M28x1,5	108,0	102,0	44,0	30,5	25,5	13	11,13	M6 x 7	32,0	20,5	38,0	G1/8	25°	14,0	3,2
68692	6951G-05-11	M38x1,5	143,0	134,0	60,0	36,0	31,0	13	15,88	M10 x 12	38,0	26,0	47,5	G1/8	35°	19,5	4,8
68718	6951G-05-12	M38x1,5	143,0	134,0	60,0	36,0	31,0	13	15,88	M10 x 12	38,0	26,0	47,5	G1/8	35°	19,5	4,8
68429	6951G-11-11	M48x1,5	185,0	172,0	79,0	38,0	32,0	13	22,23	M12 x 13	47,5	31,5	60,0	G1/4	30°	25,5	4,8
68445	6951G-11-12	M48x1,5	185,0	172,0	79,0	38,0	32,0	13	22,23	M12 x 13	47,5	31,5	60,0	G1/4	30°	25,5	4,8

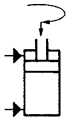
Subject to technical alterations.

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No. 6951G

Swing Clamp, thread-flange-mounting

Double-acting,
max. operating pressure 350 bar,
min. operating pressure 35 bar.





CAD

Order no.	Article no.	Clamping force at 350 bar Sp* [kN]	Clamping force at 350 bar Lo* [kN]	Clamping stroke M [mm]	Total stroke N [mm]	Vol. Sp [cm³]	Vol. Lo [cm³]	eff. piston area Sp [cm²]	eff. piston area Lo [cm²]	Q max. [l/min]	Weight [g]
68650	6951G-02-21	2	5,6	6	14,5	0,92	2,3	0,63	1,60	0,165	300
68676	6951G-02-22	2	5,6	6	14,5	0,92	2,3	0,63	1,60	0,165	300
68734	6951G-05-21	5	13,5	8	20,0	3,82	7,8	1,90	3,88	0,400	744
68759	6951G-05-22	5	13,5	8	20,0	3,82	7,8	1,90	3,88	0,400	744
68452	6951G-05-210	5	13,5	19	31,0	5,90	11,9	1,90	3,88	0,400	850
68478	6951G-05-220	5	13,5	19	31,0	5,90	11,9	1,90	3,88	0,400	850
68460	6951G-11-21	11	27,7	13	29,5	11,90	23,0	4,04	7,92	1,640	1379
68486	6951G-11-22	11	27,7	13	29,5	11,90	23,0	4,04	7,92	1,640	1379
68502	6951G-11-210	11	27,7	34	51,0	20,50	40,0	4,04	7,92	1,640	1941
68627	6951G-11-220	11	27,7	34	51,0	20,50	40,0	4,04	7,92	1,640	1941

Cl = clamping, Rel = release, ending of item no.: -21 = dual-action, right-pivoting / -22 = dual-action, left-pivoting / -210 = dual-action, right-pivoting, long clamping stroke / -220 = dual-action, left-pivoting, long clamping stroke
* details with clamp arm, standard

Design:

Cylinder barrel made of steel, hardened and burnished. Piston rod case hardened and chrome plated. Piston rod with internal thread and clamp arm positioning. Wiper at the piston rod. Clamp arm not supplied as standard. Oil supply via threaded port.

Application:

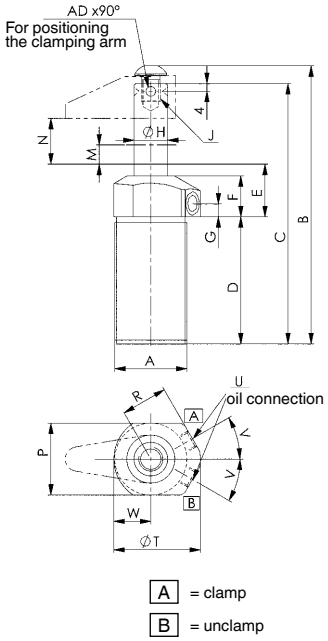
Swing clamps are used particularly in fixtures in which the workpiece must be freely accessible and placed from above. Workpieces with difficult shapes can also be clamped using special clamp arms (available on request).

Features:

Each cylinder size is available for single or double-acting operation. The swing motion employs a patented ball guide mechanism.

Note:

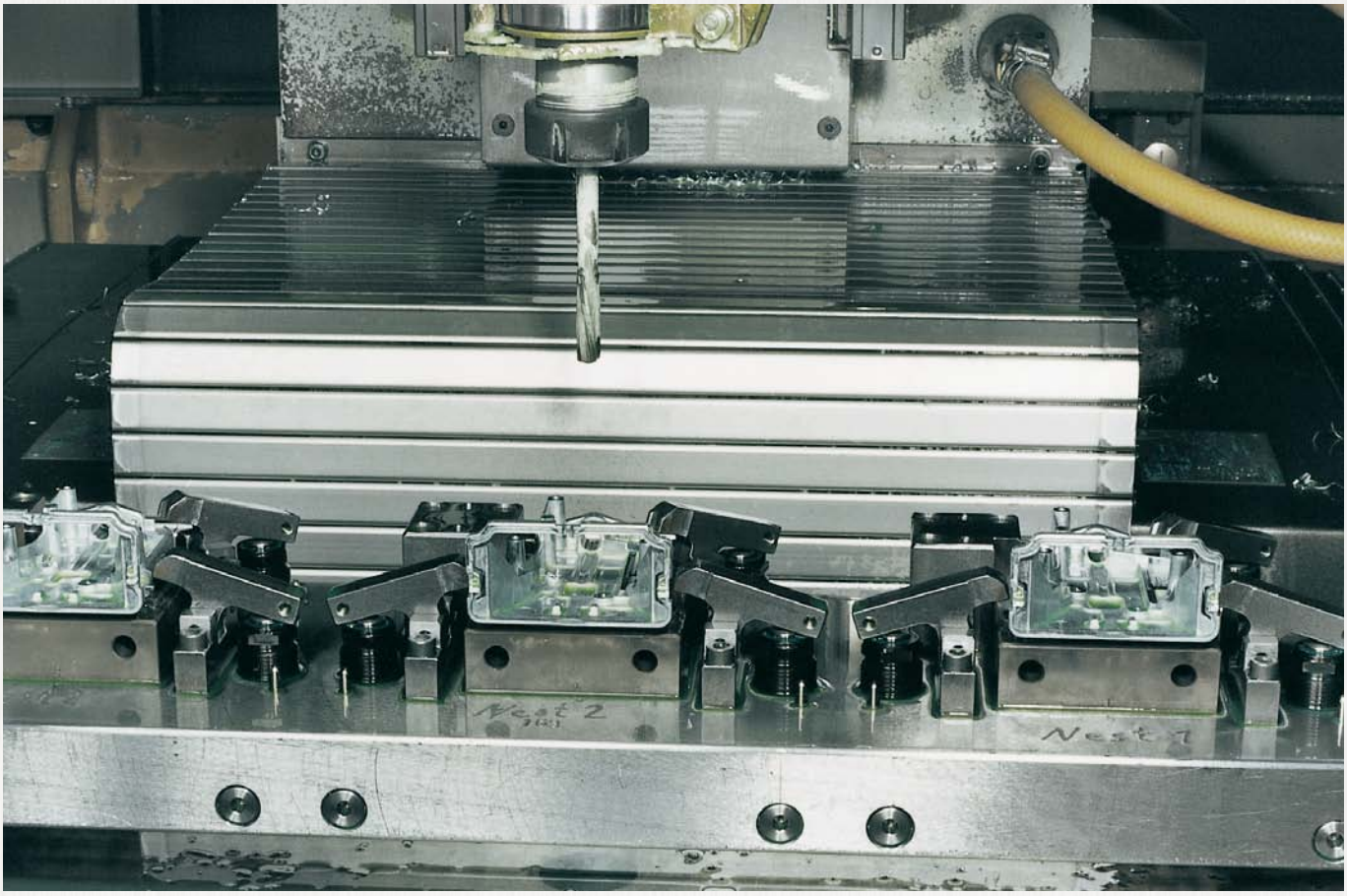
The piston stoke is guided, respect Q max. volume flow. Clamping arm length and clamping arm weight must be strictly observed. No force may be applied to the piston when mounting accessories to it. When placing into operation, ensure that all air is bled from the system. Grooved nuts DIN 70852 can also be used for attachment.
Other swivel angles are available on request.

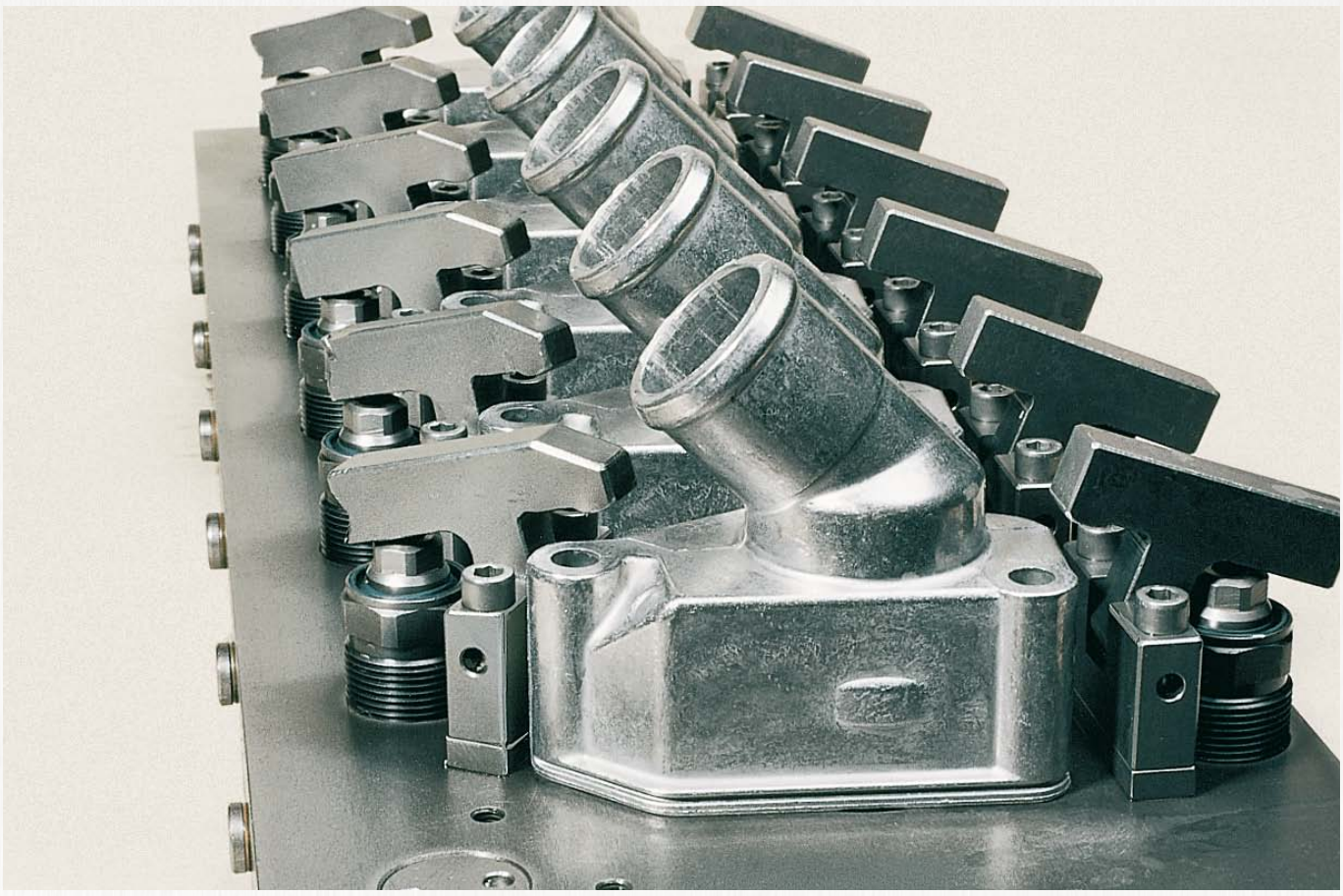


Dimensions:

Order no.	Article no.	A	B	C	D	E	F	G	dia. H	J x depth	P	R	dia. T	U	V	W	AD
68650	6951G-02-21	M28x1,5	108,0	102,0	44,0	30,5	25,5	13	11,13	M6 x 7	32,0	20,5	38,0	G1/8	25°	14,0	3,2
68676	6951G-02-22	M28x1,5	108,0	102,0	44,0	30,5	25,5	13	11,13	M6 x 7	32,0	20,5	38,0	G1/8	25°	14,0	3,2
68734	6951G-05-21	M38x1,5	143,0	134,0	60,0	36,0	31,0	13	15,88	M10 x 12	38,0	26,0	47,5	G1/8	35°	19,5	4,8
68759	6951G-05-22	M38x1,5	143,0	134,0	60,0	36,0	31,0	13	15,88	M10 x 12	38,0	26,0	47,5	G1/8	35°	19,5	4,8
68452	6951G-05-210	M38x1,5	176,5	167,0	82,5	35,5	31,0	13	15,88	M10 x 12	38,0	26,0	47,5	G1/8	35°	19,5	4,8
68478	6951G-05-220	M38x1,5	176,5	167,0	82,5	35,5	31,0	13	15,88	M10 x 12	38,0	26,0	47,5	G1/8	35°	19,5	4,8
68460	6951G-11-21	M48x1,5	185,0	172,0	79,0	38,0	32,0	13	22,23	M12 x 13	47,5	31,5	60,0	G1/4	30°	25,5	4,8
68486	6951G-11-22	M48x1,5	185,0	172,0	79,0	38,0	32,0	13	22,23	M12 x 13	47,5	31,5	60,0	G1/4	30°	25,5	4,8
68502	6951G-11-210	M48x1,5	249,0	235,5	121,5	38,0	32,0	13	22,23	M12 x 13	47,5	31,5	60,0	G1/4	30°	25,5	4,8
68627	6951G-11-220	M48x1,5	249,0	235,5	121,5	38,0	32,0	13	22,23	M12 x 13	47,5	31,5	60,0	G1/4	30°	25,5	4,8

Subject to technical alterations.





Subject to technical alterations.

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SWING CLAMPS FOR DEMANDING CLAMPING APPLICATIONS

> clamping force 2,0 bis 33 kN
> operating pressure 350 bar
> precise swivel angle of 90°
> hardened piston rod
> nitrited body
> oil supply via threaded port and/or o-ring-sealed ports
> optimal size-to-clamping-force ratio
> position-repeatable clamping arm mounting

At continuous pressures below 80 bar, this must be stated on ordering as a different seal combination may need to be selected.

PRODUCT OVERVIEW:

Type	Clamping force [kN]	Clamping stroke [mm]	Total stroke [mm]	Top flange	Base flange	Cartridge flange	Plug-in mounting	Operating mode
6952EP	2	6,0	14,5	-	-	●	-	double acting
6952CP	6 - 15	12 - 15	23 - 30	-	-	-	●	double acting
6951FP 6951KP	2,0	5,5	14,5	●	●	-	-	single or double acting
6951FP 6951KP	4,9	8,0 19,0	20,0 31,0	●	●	-	-	single or double acting
6951FP 6951KP	11,6	13,0 34,0	29,5 51,0	●	●	-	-	single or double acting
6951FP 6951KP	22,0	14,5 34,0	28,0 51,0	●	●	-	-	single or double acting double acting
6951FP 6951KP	33,0	16,0 32,0	30,0 46,0	●	●	-	-	single or double acting double acting

PRODUCT EXAMPLES:

NO. 6952EP



> piston tensile force: 2,0 kN
> connection type: drilled oil channels

NO. 6952CP



> piston tensile force: 6,0 - 15 kN
> connection type: drilled oil channels

NO. 6951FP AND 6951KP



> piston tensile force: 2,0 - 33 kN
> connection type: o-ring or threaded port

SWING CLAMPS – THE SOLUTION FOR COST-EFFECTIVE HYDRAULIC CLAMPING OF WORKPIECES!

DESIGN:

Burnished body, hardened and ground piston rod. Swing clamps are delivered without clamping arm.

APPLICATION:

Swing clamps are used in fixtures of all kinds, especially in applications where workpieces must be freely accessible and loaded from above. Workpieces with complex geometries can be clamped using special clamping arms (available upon request).

FEATURES:

Design variants: > **top flange** > **base flange** > **cartridge flange** > **plug-in mounting**

Top and base-flange models accommodate O-ring as well as threaded hydraulic connections.

There are also designs for drilled oil channels. The swing motion is realized by a rigid 3-way ball-guide mechanism.

Standard swivel angle is 90°. The tolerance of pivot angle measures ± 3°. The repetition accuracy of the pivot position measures ± 1.5°.

The newly designed clamping-arm mount prevents the induction of forces into the swing mechanism during assembly.

IMPORTANT NOTE:

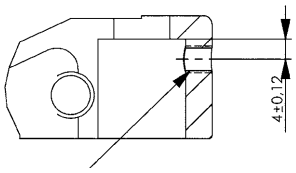
Clamping arm length, max. permissible flow rate Q max. and clamping arm weight must be observed! In case of a larger flow rates, a throttle/check valve must be connected upstream.

The motion of the swing clamp must not be obstructed. Clamping must only be done in the vertical stroke area.



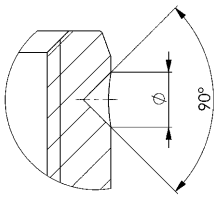
POSITIONING:

Positioning hole for clamp arm:



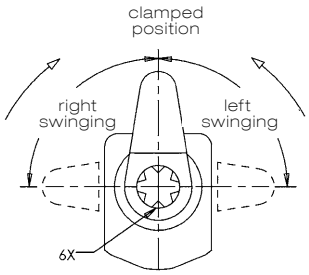
threaded stud

Positioning bore at the piston rod:



SWING DIRECTIONS:

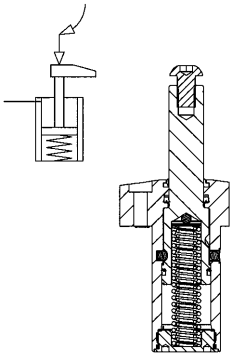
Positioning hole for clamp arm:



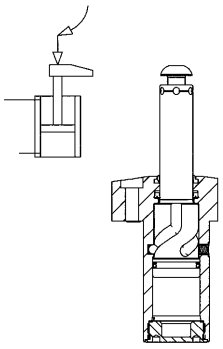
Positioning hole for clamp arm (6x60°)

DESIGN:

single acting cylinder

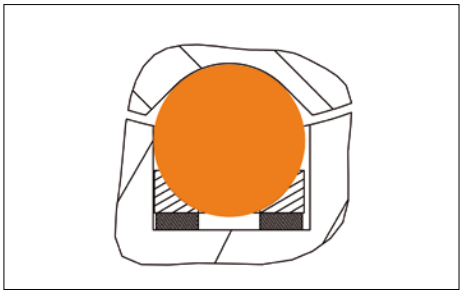


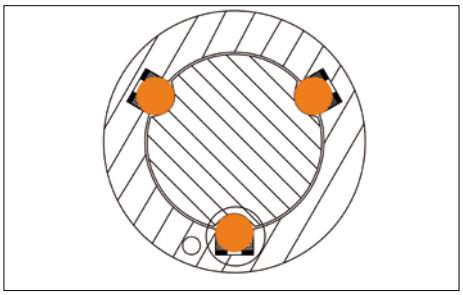
double acting cylinder



BENEFITS:

- Increase in the number of balls and grooves to 3 to achieve a higher positioning accuracy and repetition accuracy. This also extends the service life.
- Precise swivel angle of 90°.
- Increases pressing force of the balls in the swivel slot, which ensures a very precise swivel angle over a long period of use.
- Improved radius transition from straight to swivel stroke.
- The simple-acting models receive a stronger spring force to ensure a better return stroke.
- In addition, all models receive a position-repeatable clamping arm mounting.
- New materials for extending the service life of piston rod and swivel mechanism.





CODE OF TYPES:

Type 11 = single acting, right swinging
Type 12 = single acting, left swinging
Type 21 = double acting, right swinging
Type 22 = double acting, left swinging

CLAMPING TIME AND Q OF THE SWING CLAMPS 6952EP, 6952CP, 6951FP, 6951KP

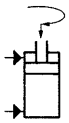
	Clamp arm, standard		Clamp arm, long		
Swing clamp clamping force [kN]	min. allowed clamping time [sec.]	Q max. [l/min.]	min. allowed clamping time [sec.]	Q max. [l/min.]	Clamping arm lenght [mm]
2,0	0,20	0,276	0,50	0,1100	82,5
4,9	0,30	0,764	0,70	0,327	136,5
6,0	0,35	1,000	1,10	0,300	136,0
8,0	0,32	1,300	1,18	0,470	145,0
11,6	0,40	1,785	0,80	0,893	162,0
15,0	0,49	2,500	1,36	1,250	160,0



No. 6952EP

Swing clamp, cartridge flange, precision design

double acting,
max. operating pressure 350 bar,
min. operating pressure 40 bar.





CAD

Order no.	Article no.	Clamping force at 350 bar Sp* [kN]	Vol. Sp [cm³]	Vol. Lo [cm³]	eff. piston area Sp [cm²]	eff. piston area Lo [cm²]	Md max. [Nm]	Clamping stroke M [mm]	Total stroke N [mm]	Q max. * [l/min]	Weight [g]
554491	6952EP-02-21	2	0,92	2,46	0,63	1,7	100	6	14,5	0,165	370
554492	6952EP-02-22	2	0,92	2,46	0,63	1,7	100	6	14,5	0,165	370

Cl = clamping, Rel = release, ending of item no.: -21 = dual-action, right-pivoting / -22 = dual-action, left-pivoting
* details with clamp arm, standard

Design:

Cylinder barrel from steel, hardened and burnished. Piston rod case hardened and chrome plated. Piston rod with internal thread. Wiper at piston rod. Supply scope does not include clamping arm. Oil supply via oil channel in fixture body.

Application:

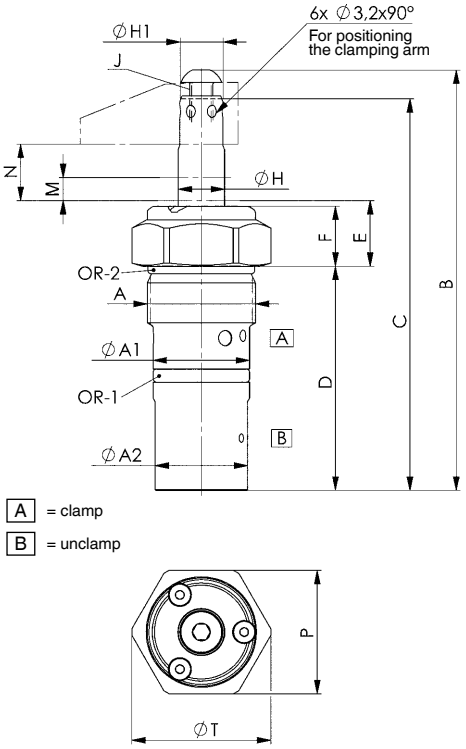
The swing clamp is used particularly in fixtures in which the workpieces must be freely accessible and placed from above. Workpieces with dedicated shapes can also be clamped using special clamp arms (available on request).

Features:

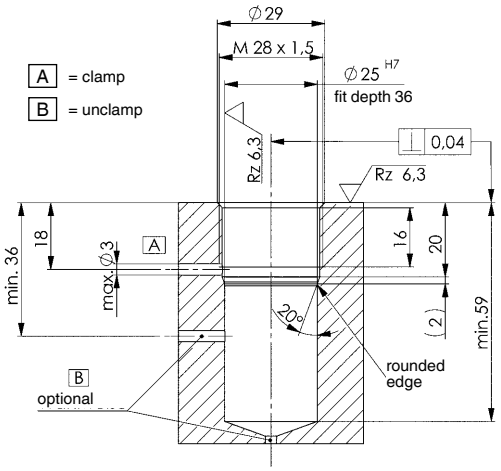
The swing motion is executed via three ball guides, thereby increasing positioning accuracy, repeat accuracy and service life.

Note:

The piston stoke is executed with spheres, so volume flow Q max. must be complied with. Clamping arm length and clamping arm weight must be strictly observed. No force may be applied to the piston when mounting accessories to it. When placing into operation, ensure that all air is bled from the system.



Installation dimensions:

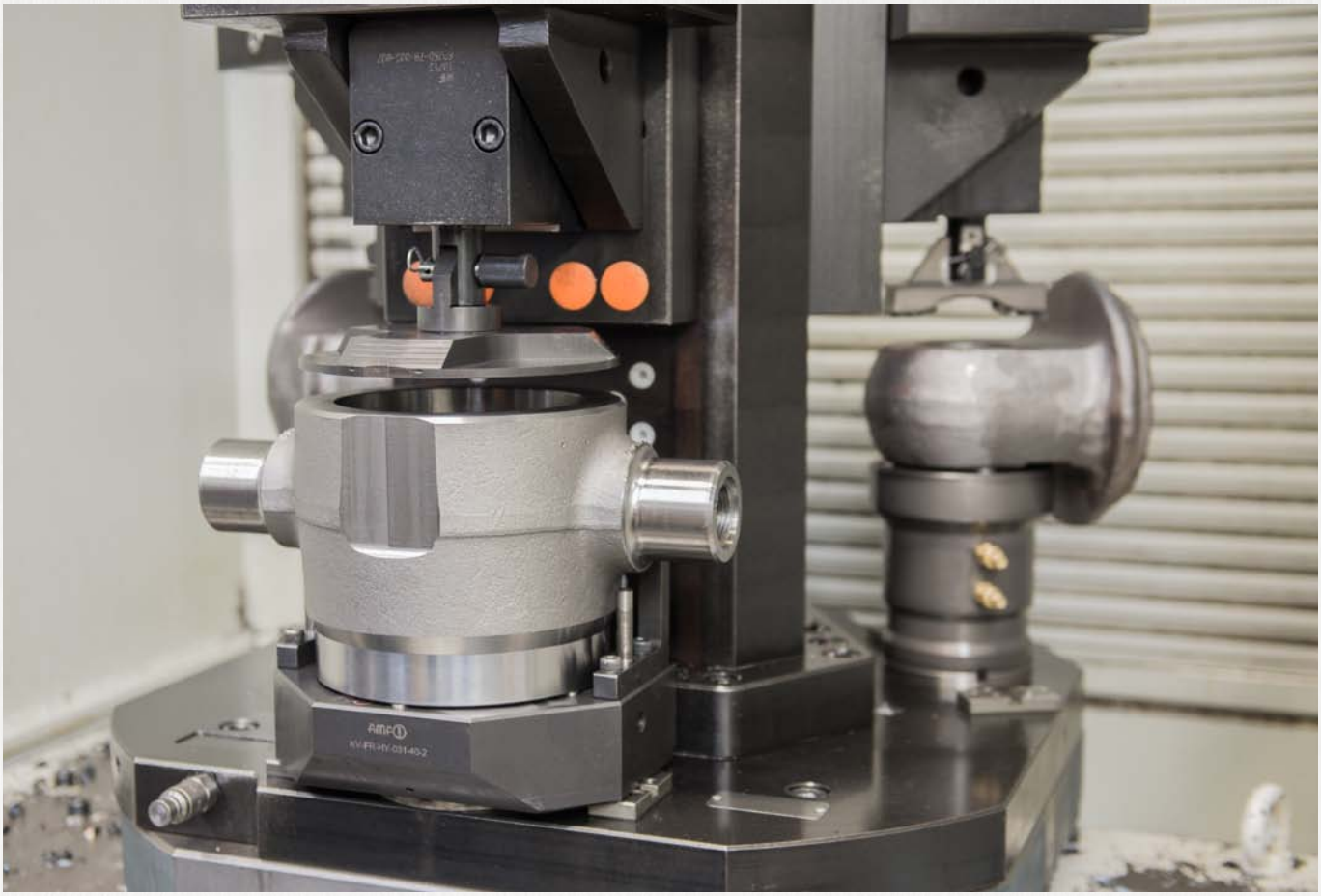


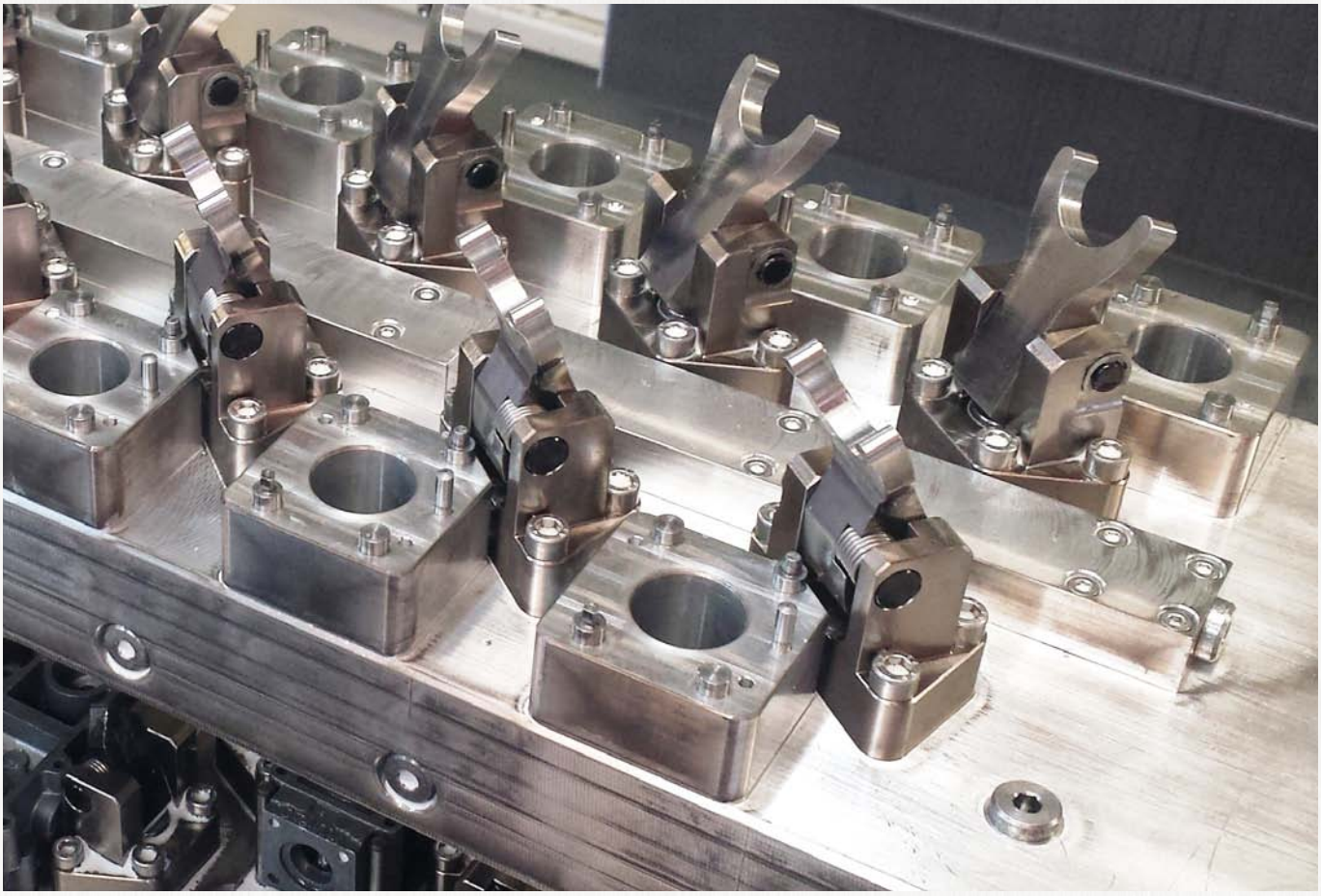
Dimensions:

Order no.	Article no.	A	dia. A1	dia. A2	B	C	D	E	F	dia. H	dia. H1	J	P	dia. T	OR-1 O-ring Order No.	OR-2 O-ring Order No.
554491	6952EP-02-21	M28x1,5	25 f7	24	108,5	101,5	58	17	15,5	12	11,13	M6	SW32	36	409664	321166
554492	6952EP-02-22	M28x1,5	25 f7	24	108,5	101,5	58	17	15,5	12	11,13	M6	SW32	36	409664	321166

Subject to technical alterations.

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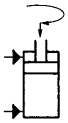


Subject to technical alterations.

No. 6952CP

Swing clamp, plug-in mounting

Double-acting,
max. operating pressure 350 bar,
min. operating pressure 40 bar.





CAD

Order no.	Article no.	Clamping force at 350 bar Sp* [kN]	Clamping stroke M [mm]	Total stroke N [mm]	Vol. Sp [cm³]	Vol. Lo [cm³]	eff. piston area Sp [cm²]	eff. piston area Lo [cm²]	min. permitted clamping time * [s]	Q max. * [l/min]	Piston mass moment of inertia JK [kgm²]	Weight [g]
556954	6952CP-06-21	6,0	12	23	5,7	10,3	2,51	4,52	0,35	0,7	0,000012193	725
556955	6952CP-06-22	6,0	12	23	5,7	10,3	2,51	4,52	0,35	0,7	0,000012193	725
556956	6952CP-08-21	8,0	12	24	7,2	14,7	3,01	6,15	0,32	1,0	0,000025865	1200
556957	6952CP-08-22	8,0	12	24	7,2	14,7	3,01	6,15	0,32	1,0	0,000025865	1200
556958	6952CP-15-21	15,0	15	30	15,8	30,5	5,27	10,17	0,49	2,0	0,000088178	2150
556959	6952CP-15-22	15,0	15	30	15,8	30,5	5,27	10,17	0,49	2,0	0,000088178	2150

Cl = clamping, Rel = release, ending of item no.: -21 = dual-action, right-pivoting / -22 = dual-action, left-pivoting
* details with clamp arm, standard

Design:

Cylinder barrel made of steel, hardened and burnished. Piston rod hardened. Piston rod with internal thread and clamp arm positioning. Wiper at the piston rod. Clamp arm not supplied as standard. Oil supply via oil channel in fixture body.

Application:

The swivel clamp is used in fixtures in which the workpiece must be freely accessible and inserted from above. Even workpieces with difficult shapes can be clamped using special clamp arms (available on request).

Features:

The swing motion is executed via three ball guides, thereby increasing positioning accuracy, repeat accuracy and service life.

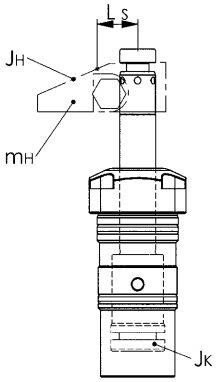
Note:

The piston stoke is executed with spheres, so volume flow Q max. must be complied with. Clamping arm length and clamping arm weight must be strictly observed.
No force may be applied to the piston when mounting accessories to it. To equalise height differences on the workpiece, the vertical clamping path must be 50% of the clamping stroke. When placing into operation, ensure that all air is bled from the system. To control the oil feed, the throttle/check valve no. 6916-12-01 can be optionally used with G1/8 and 6916-12-04 with G1/4 . Other swivel angles are available on request.

Formula to determine the total mass moment of inertia and the volume flow:
total mass moment of inertia Jges. [kgm²]
Clamp arm mass moment of inertia JH [kgm²]
Piston mass moment of inertia JK [kgm²]
Clamp arm load mH [kg]
Centre of gravity distance Ls [m]
Jges. = JK + JH + mH x Ls² [kgm²]

Volume flow Qmax. [cm³/s]
Volume clamp Vol.sp [cm³]
Minimum permitted clamp time tmin. [s]
Qmax. = Vol.sp / tmin. [cm³/s]

Suitable clamp arms are 6951-XX.



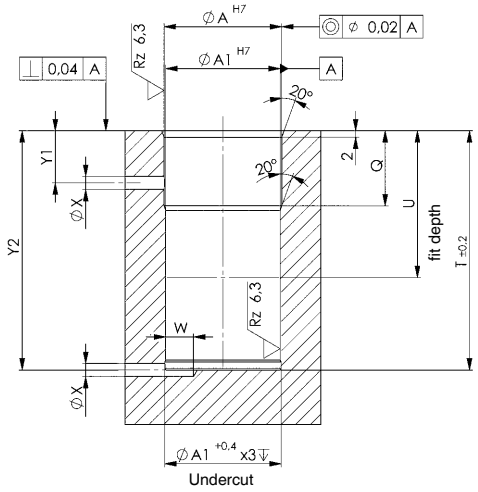
Subject to technical alterations.

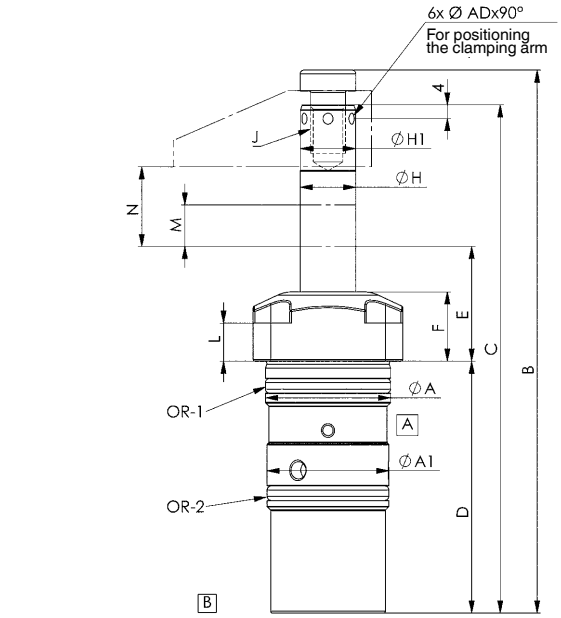
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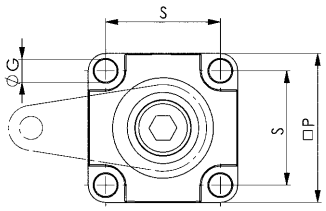
Dimensions:

Order no.	Article no.	dia. A	dia. A1	B	C	D	E	F	dia. G	dia. H	dia. H1	J x depth	L	M	N	P	Q	U	S	T	W	dia. X	Y1	Y2	ØAD	OR-1 O-ring Order No.	OR-2 O-ring Order No.
556954	6952CP-06-21	36	35	156,7	146,7	72,7	33,0	20	6,6	16	15,88	M10 x 14	11	12	23	43	23	45	33	73,3	8	4	16 - 20	45 - 73,3	3,2	321018	321018
556955	6952CP-06-22	36	35	156,7	146,7	72,7	33,0	20	6,6	16	15,88	M10 x 14	11	12	23	43	23	45	33	73,3	8	4	16 - 20	45 - 73,3	3,2	321018	321018
556956	6952CP-08-21	44	42	168,4	157,4	77,7	33,7	23	8,5	20	20,0	M10 x 14	10	12	24	54	27	50	40	78,3	9	4	16 - 24	53 - 78,3	4,8	409748	557639
556957	6952CP-08-22	44	42	168,4	157,4	77,7	33,7	23	8,5	20	20,0	M10 x 14	10	12	24	54	27	50	40	78,3	9	4	16 - 24	53 - 78,3	4,8	409748	557639
556958	6952CP-15-21	55	52	204,2	189,2	88,5	40,2	28	10,5	25	25,0	M12 x 14	14	15	30	67	25	53	50	89,3	10	4	16 - 22	56 - 89,3	4,8	321174	557640
556959	6952CP-15-22	55	52	204,2	189,2	88,5	40,2	28	10,5	25	25,0	M12 x 14	14	15	30	67	25	53	50	89,3	10	4	16 - 22	56 - 89,3	4,8	321174	557640

Installation dimensions:





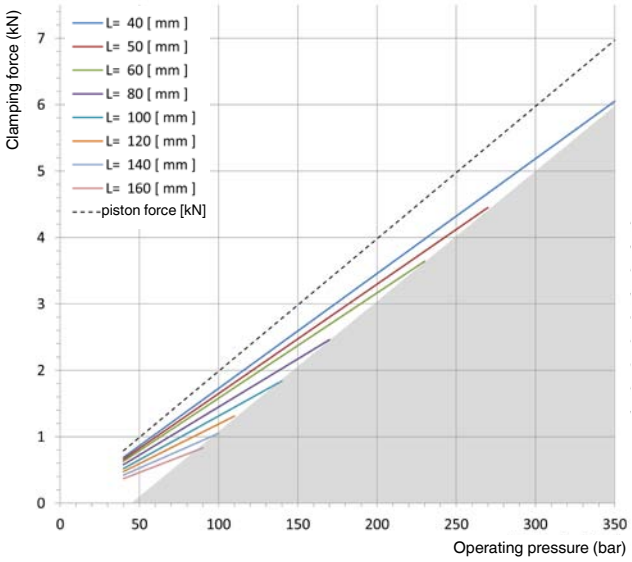


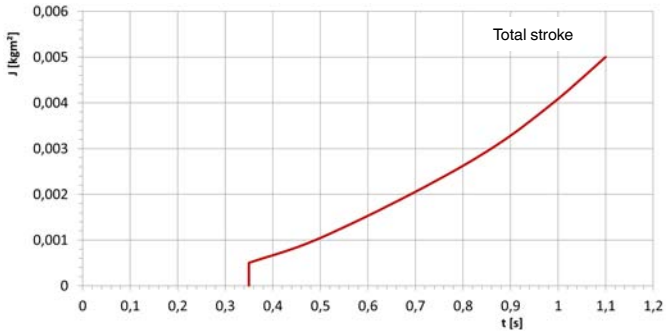
A = clamp
B = unclamp

Subject to technical alterations.

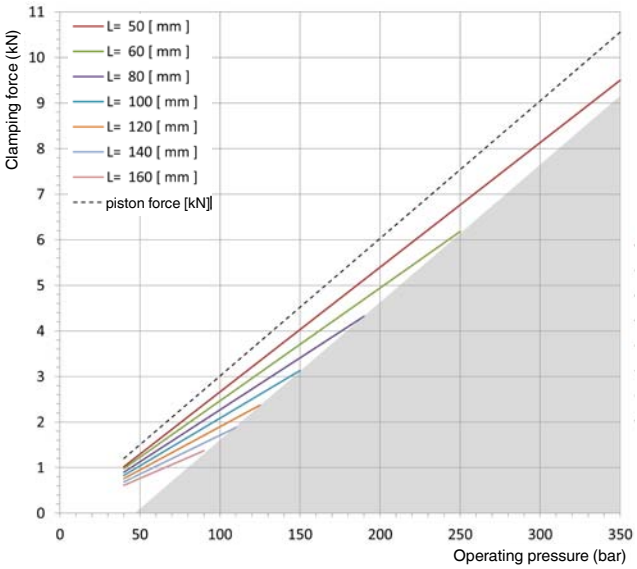
Diagrams

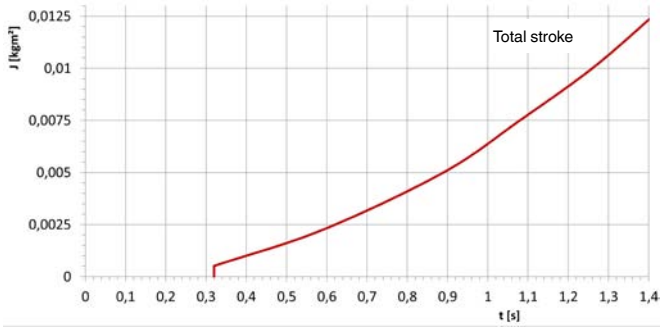
6952CP-06



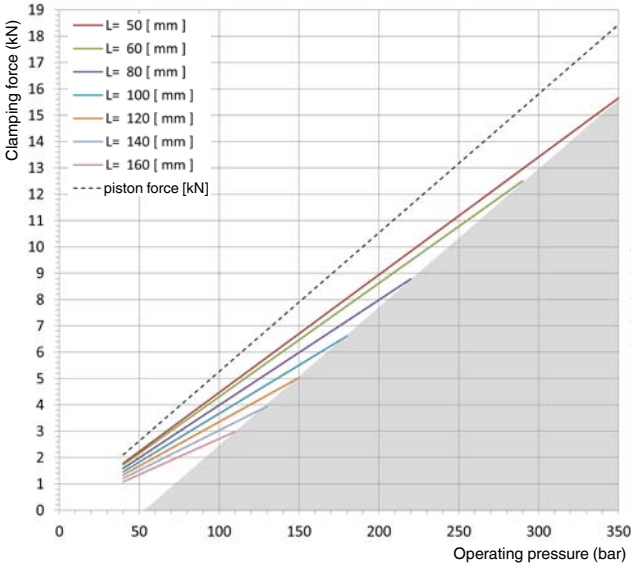


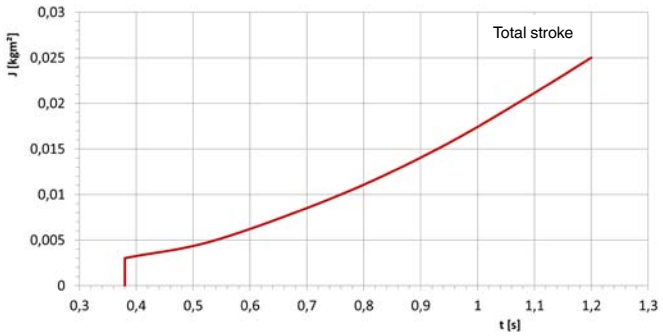
6952CP-08





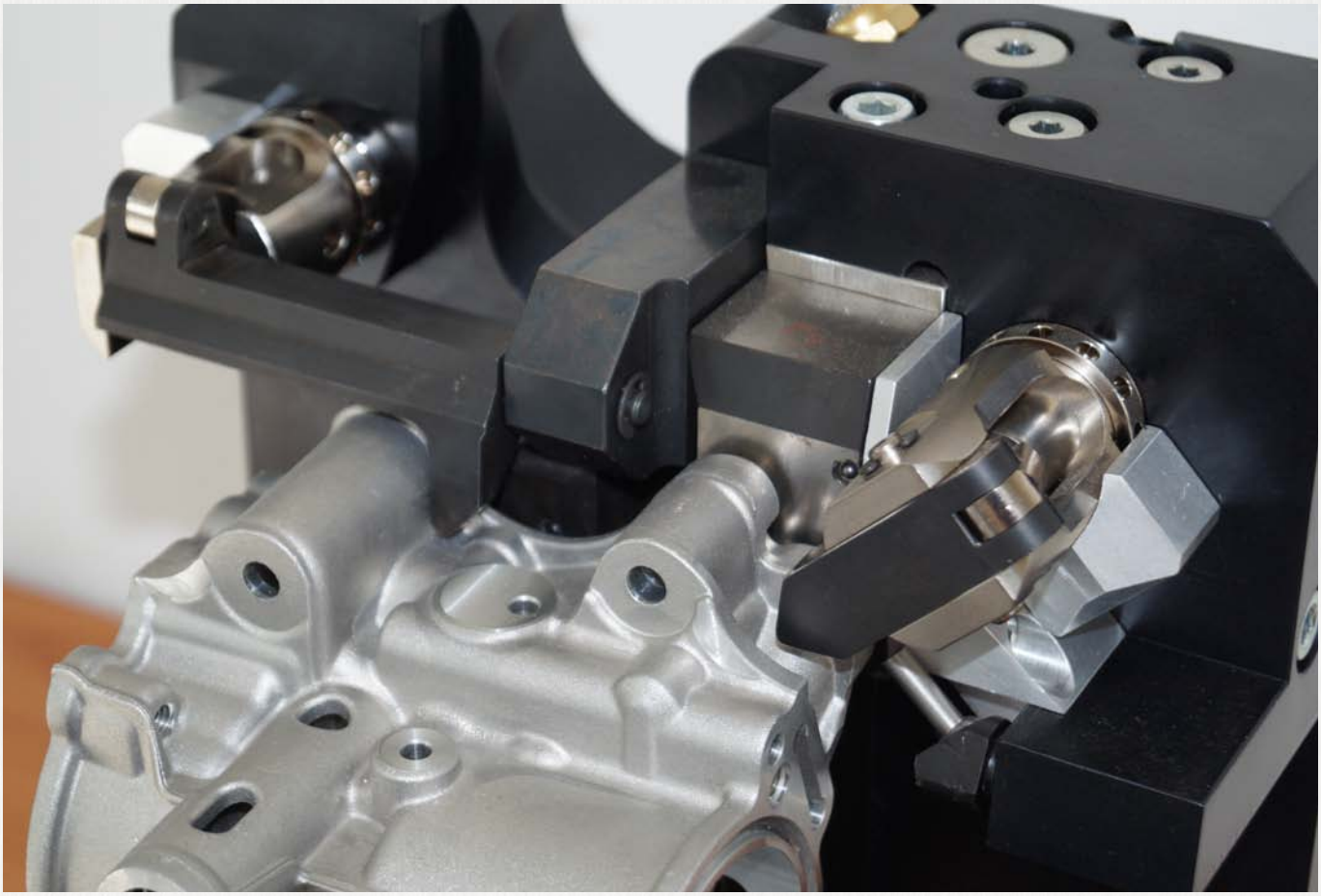
6952CP-15





Subject to technical alterations.

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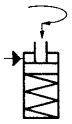


Subject to technical alterations.

No. 6951KP

Swing clamp, top-flange-mounting, precision design

Single-acting, with spring return,
max. operating pressure 350 bar,
min. operating pressure 52 bar.





CAD

Order no.	Article no.	Clamping force at 350 bar* [kN]	Clamping stroke M [mm]	Total stroke N [mm]	Vol. [cm^3]	effective piston area [cm^2]	Q max. * [l/min]	Weight [g]
327734	6951KP-02-11	2,0	5,5	14,0	0,92	0,63	0,276	372
327759	6951KP-02-12	2,0	5,5	14,0	0,92	0,63	0,276	372
327767	6951KP-05-11	4,9	8,0	20,0	3,82	1,90	0,764	903
327783	6951KP-05-12	4,9	8,0	20,0	3,82	1,90	0,764	903
327809	6951KP-11-11	11,6	13,0	29,5	11,90	4,04	1,785	1520
327825	6951KP-11-12	11,6	13,0	29,5	11,90	4,04	1,785	1520

Ending of item no.: -11 = single-action, right-pivoting / -12 = single-action, left-pivoting
* details with clamp arm, standard

Design:

Cylinder barrel made of steel, hardened and burnished. Piston rod case hardened and chrome plated.
Piston rod with internal thread and clamp arm positioning. O-ring for flange seal.
Wiper on the piston rod. Return spring from stainless steel. Clamp arm not supplied as standard.
Oil supply via threaded connection or oil channel in the fixture body.

Application:

The swivel clamp is used in fixtures in which the workpiece must be freely accessible and inserted from above. Even workpieces with difficult shapes can be clamped using special clamp arms (available on request).

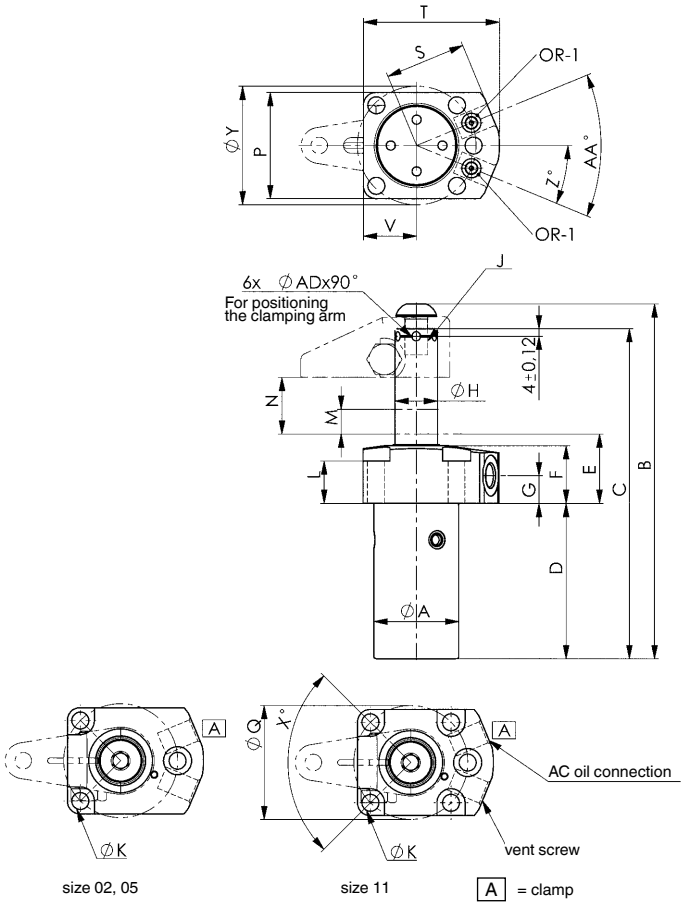
Features:

The swing motion is executed via three ball guides, thereby increasing positioning accuracy, repeat accuracy and service life.

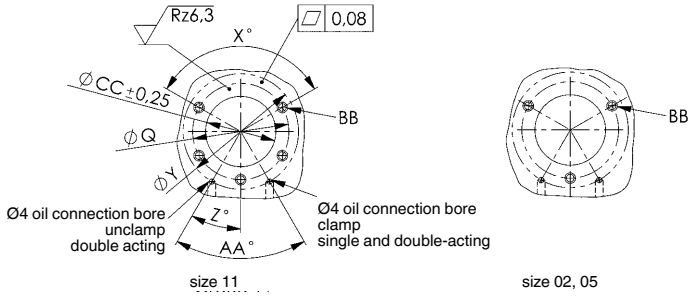
Note:

The piston stoke is executed with spheres, so volume flow Q max. must be complied with. Clamping arm length and clamping arm weight must be strictly observed. No force may be applied to the piston when mounting accessories to it. To equalise height differences on the workpiece, the vertical clamping path must be 50% of the clamping stroke. For single-acting cylinders, there is a risk of coolant being sucked through the breather port. In such cases the breather port has to be moved to a clean protected area via a connection line. When placing into operation, ensure that all air is bled from the system. To control the oil feed, the throttle/check valve no. 6916-12-01 can be optionally used with G1/8 and 6916-12-04 with G1/4 . **To achieve a controlled clamping sequence, there is the option of screwing the sequence valve 6918-XX-XXX directly into the threaded connection.** Other swivel angles are available on request.

Subject to technical alterations.



Drilling template device:



Dimensions:

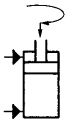
Order no.	Article no.	dia. A	B	C	D	E	F	G	dia. H	J x depth	dia. K	L	M	N	P	dia. Q	S	T	V	X°	dia. Y	Z°	AA°	AC	ØAD	BB	dia. CC	OR-1 O-ring Order No.
327734	6951KP-02-11	25,2	108	101,5	44,0	31,0	26	13,0	11,13	M6x7	6	18,0	5,5	14,0	45,0	40,0	31,0	47	15,5	120	42	30,0	60	G1/8	3,2	M5	25,5	183608
327759	6951KP-02-12	25,2	108	101,5	44,0	31,0	26	13,0	11,13	M6x7	6	18,0	5,5	14,0	45,0	40,0	31,0	47	15,5	120	42	30,0	60	G1/8	3,2	M5	25,5	183608
327767	6951KP-05-11	36,3	143	134,0	64,5	31,5	27	13,0	15,88	M10x12	7	17,8	8,0	20,0	57,0	50,0	33,5	54	19,0	120	50	55,0	110	G1/8	4,8	M6	36,6	183608
327783	6951KP-05-12	36,3	143	134,0	64,5	31,5	27	13,0	15,88	M10x12	7	17,8	8,0	20,0	57,0	50,0	33,5	54	19,0	120	50	55,0	110	G1/8	4,8	M6	36,6	183608
327809	6951KP-11-11	44,2	185	172,0	81,0	36,0	30	14,5	22,23	M12x13	9	22,1	13,0	29,5	55,5	59,5	42,0	71	27,5	90	62	22,5	45	G1/4	4,8	M8	44,5	173096
327825	6951KP-11-12	44,2	185	172,0	81,0	36,0	30	14,5	22,23	M12x13	9	22,1	13,0	29,5	55,5	59,5	42,0	71	27,5	90	62	22,5	45	G1/4	4,8	M8	44,5	173096

Subject to technical alterations.

No. 6951KP

Swing clamp, top-flange-mounting, precision design

Double-acting,
max. operating pressure 350 bar,
min. operating pressure 35 bar.





CAD

Order no.	Article no.	Clamping force at 350 bar Sp* [kN]	Clamping force at 350 bar Lo* [kN]	Clamping stroke M [mm]	Total stroke N [mm]	Vol. Sp [cm^3]	Vol. Lo [cm^3]	eff. piston area Sp [cm^2]	eff. piston area Lo [cm^2]	Q max. * [l/min]	Weight [g]
327841	6951KP-02-21	2,0	5,1	5,5	14,0	0,92	2,3	0,63	1,60	0,276	358
327866	6951KP-02-22	2,0	5,1	5,5	14,0	0,92	2,3	0,63	1,60	0,276	358
327882	6951KP-05-21	4,9	10,0	8,0	20,0	3,82	7,8	1,90	3,88	0,764	871
327908	6951KP-05-22	4,9	10,0	8,0	20,0	3,82	7,8	1,90	3,88	0,764	871
562237	6951KP-05-210	4,9	10,0	19,0	31,0	5,90	11,96	1,90	3,88	0,764	1114
562238	6951KP-05-220	4,9	10,0	19,0	31,0	5,90	11,96	1,90	3,88	0,764	1114
327924	6951KP-11-21	11,6	18,2	13,0	29,5	11,90	23,0	4,04	7,92	1,785	1465
327940	6951KP-11-22	11,6	18,2	13,0	29,5	11,90	23,0	4,04	7,92	1,785	1465
562239	6951KP-11-210	11,6	18,2	34,0	51,0	20,48	40,15	4,04	7,92	1,785	2223
562240	6951KP-11-220	11,6	18,2	34,0	51,0	20,48	40,15	4,04	7,92	1,785	2223

Cl = clamping, Rel = release, ending of item no.: -21 = dual-action, right-pivoting / -22 = dual-action, left-pivoting / -210 = dual-action, right-pivoting, long clamping stroke / -220 = dual-action, left-pivoting, long clamping stroke
* details with clamp arm, standard

Design:

Cylinder barrel made of steel, hardened and burnished. Piston rod case hardened and chrome plated.
Piston rod with internal thread and clamp arm positioning. O-ring for flange seal.
Wiper on the piston rod. Clamp arm not supplied as standard. Oil supply via threaded connection or oil channel in the fixture body.

Application:

The swivel clamp is used in fixtures in which the workpiece must be freely accessible and inserted from above. Even workpieces with difficult shapes can be clamped using special clamp arms (available on request).

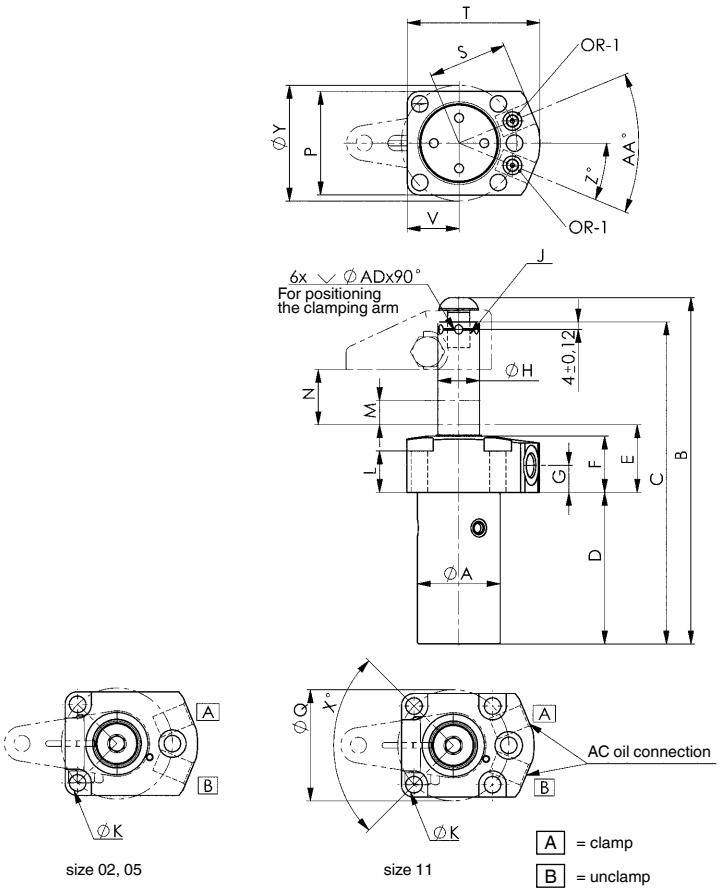
Features:

The swing motion is executed via three ball guides, thereby increasing positioning accuracy, repeat accuracy and service life.

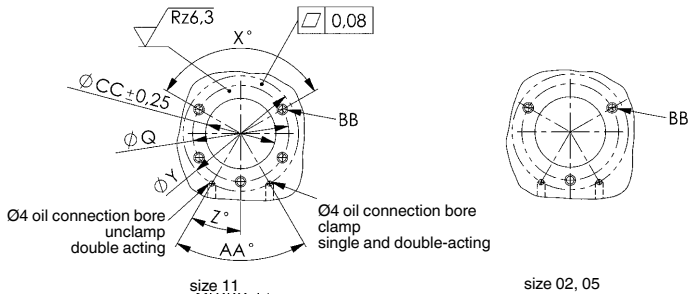
Note:

The piston stoke is executed with spheres, so volume flow Q max. must be complied with. Clamping arm length and clamping arm weight must be strictly observed.
No force may be applied to the piston when mounting accessories to it. To equalise height differences on the workpiece, the vertical clamping path must be 50% of the clamping stroke. When placing into operation, ensure that all air is bled from the system. To control the oil feed, the throttle/check valve no. 6916-12-01 can be optionally used with G1/8 and 6916-12-04 with G1/4 . **To achieve a controlled clamping sequence, there is the option of screwing the sequence valve 6918-XX-XXX directly into the threaded connection.** Other swivel angles are available on request.

Subject to technical alterations.



Drilling template device:



Dimensions:

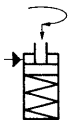
Order no.	Article no.	dia. A	B	C	D	E	F	G	dia. H	J x depth	dia. K	L	M	N	P	dia. Q	S	T	V	X°	dia. Y	Z°	AA°	AC	BB	ØAD	dia. CC	OR-1 O-ring Order No.
327841	6951KP-02-21	25,2	108	101,5	44,0	31,0	26	13,0	11,13	M6x7	6	18,0	5,5	14,0	45,0	40,0	31,0	47	15,5	120	42	30,0	60	G1/8	M5	3,2	25,5	183608
327866	6951KP-02-22	25,2	108	101,5	44,0	31,0	26	13,0	11,13	M6x7	6	18,0	5,5	14,0	45,0	40,0	31,0	47	15,5	120	42	30,0	60	G1/8	M5	3,2	25,5	183608
327882	6951KP-05-21	36,3	143	134,0	64,5	31,5	27	13,0	15,88	M10x12	7	17,8	8,0	20,0	57,0	50,0	33,5	54	19,0	120	50	55,0	110	G1/8	M6	4,8	36,5	183608
327908	6951KP-05-22	36,3	143	134,0	64,5	31,5	27	13,0	15,88	M10x12	7	17,8	8,0	20,0	57,0	50,0	33,5	54	19,0	120	50	55,0	110	G1/8	M6	4,8	36,5	183608
562237	6951KP-05-210	36,3	177	167,0	86,5	31,5	27	13,0	15,88	M10x12	7	19,0	19,0	31,0	57,0	50,0	33,5	54	19,0	120	50	55,0	110	G1/8	M6	4,8	36,5	183608
562238	6951KP-05-220	36,3	177	167,0	86,5	31,5	27	13,0	15,88	M10x12	7	19,0	19,0	31,0	57,0	50,0	33,5	54	19,0	120	50	55,0	110	G1/8	M6	4,8	36,5	183608
327924	6951KP-11-21	44,2	185	172,0	81,0	36,0	30	14,5	22,23	M12x13	9	22,1	13,0	29,5	55,5	59,4	42,0	71	27,5	90	62	22,5	45	G1/4	M8	4,8	44,5	173096
327940	6951KP-11-22	44,2	185	172,0	81,0	36,0	30	14,5	22,23	M12x13	9	22,1	13,0	29,5	55,5	59,4	42,0	71	27,5	90	62	22,5	45	G1/4	M8	4,8	44,5	173096
562239	6951KP-11-210	47,4	249	236,0	123,5	36,0	30	14,5	22,23	M12x13	9	22,1	34,0	51,0	55,5	59,4	42,0	71	27,5	120	62	22,5	45	G1/4	M8	4,8	44,5	173096
562240	6951KP-11-220	47,4	249	236,0	123,5	36,0	30	14,5	22,23	M12x13	9	22,1	34,0	51,0	55,5	59,4	42,0	71	27,5	120	62	22,5	45	G1/4	M8	4,8	44,5	173096

Subject to technical alterations.

No. 6951FP

Swing clamp, base-flange-mounting, precision design

Single-acting, with spring return,
max. operating pressure 350 bar,
min. operating pressure 52 bar.





CAD

Order no.	Article no.	Clamping force at 350 bar* [kN]	Clamping stroke M [mm]	Total stroke N [mm]	Vol. [cm^3]	effective piston area [cm^2]	Q max. * [l/min]	Weight [g]
327775	6951FP-02-11	2,0	5,5	14,0	0,92	0,63	0,276	372
327791	6951FP-02-12	2,0	5,5	14,0	0,92	0,63	0,276	372
327817	6951FP-05-11	4,9	8,0	20,0	3,82	1,90	0,764	903
327833	6951FP-05-12	4,9	8,0	20,0	3,82	1,90	0,764	903
327858	6951FP-11-11	11,6	13,0	29,5	11,90	4,04	1,785	1520
327874	6951FP-11-12	11,6	13,0	29,5	11,90	4,04	1,785	1520

Ending of item no.: -11 = single-action, right-pivoting / -12 = single-action, left-pivoting
* details with clamp arm, standard

Design:

Cylinder barrel made of steel, hardened and burnished. Piston rod case hardened and chrome plated.
Piston rod with internal thread and clamp arm positioning. O-ring for flange seal.
Wiper on the piston rod. Return spring from stainless steel. Clamp arm not supplied as standard.
Oil supply via threaded connection or oil channel in the fixture body.

Application:

The swivel clamp is used in fixtures in which the workpiece must be freely accessible and inserted from above. Even workpieces with difficult shapes can be clamped using special clamp arms (available on request).

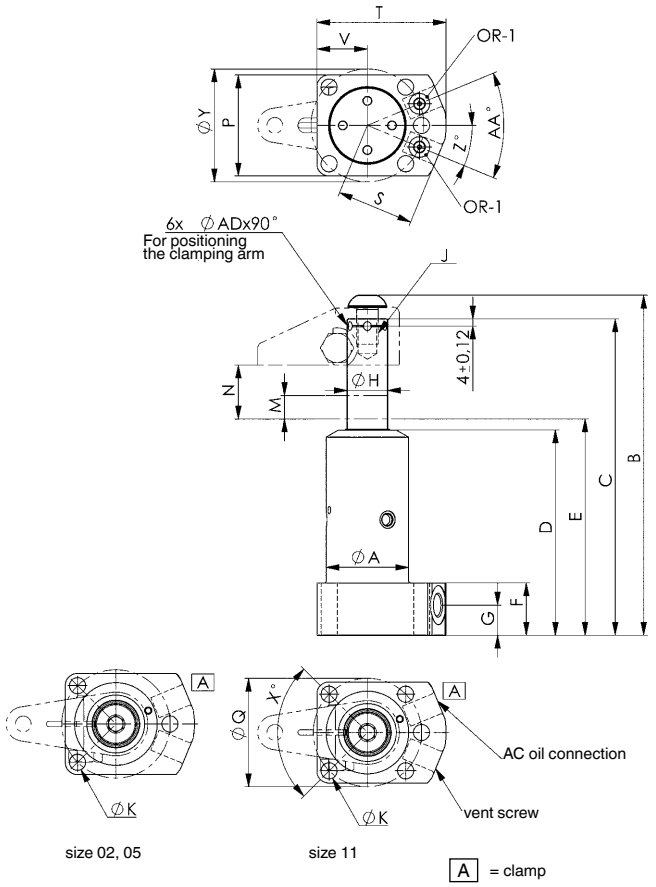
Features:

The swing motion is executed via three ball guides, thereby increasing positioning accuracy, repeat accuracy and service life.

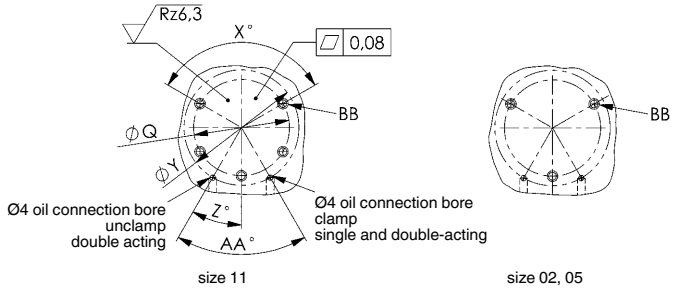
Note:

The piston stoke is executed with spheres, so volume flow Q max. must be complied with. Clamping arm length and clamping arm weight must be strictly observed.
No force may be applied to the piston when mounting accessories to it. To equalise height differences on the workpiece, the vertical clamping path must be 50% of the clamping stroke. For single-acting cylinders, there is a risk of coolant being sucked through the breather port. In such cases the breather port has to be moved to a clean protected area via a connection line. When placing into operation, ensure that all air is bled from the system. To control the oil feed, the throttle/check valve no. 6916- 12 can be optionally used. **To achieve a controlled clamping sequence, there is the option of screwing the sequence valve 6918-XX-XXX directly into the threaded connection.** Other swivel angles are available on request.

Subject to technical alterations.



Drilling template device:



Dimensions:

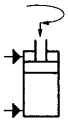
Order no.	Article no.	dia. A	B	C	D	E	F	G	dia. H	J x depth	dia. K	M	N	P	dia. Q	S	T	V	X°	dia. Y	Z°	AA°	AC	ØAD	BB	OR-1 O-ring Order No.
327775	6951FP-02-11	26,5	109,5	103,0	71,0	76,0	26,5	13,5	11,13	M6x7	6	5,5	14,0	45	40,0	31,0	47	15,5	120	42	30,0	60	G1/8	3,2	M5	183608
327791	6951FP-02-12	26,5	109,5	103,0	71,0	76,0	26,5	13,5	11,13	M6x7	6	5,5	14,0	45	40,0	31,0	47	15,5	120	42	30,0	60	G1/8	3,2	M5	183608
327817	6951FP-05-11	38,0	145,0	135,5	92,5	97,5	25,0	15,0	15,88	M10x12	7	8,0	20,0	57	50,0	33,5	54	19,0	120	50	55,0	110	G1/8	4,8	M6	183608
327833	6951FP-05-12	38,0	145,0	135,5	92,5	97,5	25,0	15,0	15,88	M10x12	7	8,0	20,0	57	50,0	33,5	54	19,0	120	50	55,0	110	G1/8	4,8	M6	183608
327858	6951FP-11-11	45,5	186,5	173,5	112,5	118,5	28,5	16,5	22,23	M12x13	9	13,0	29,5	55	59,4	42,0	71	27,5	90	62	22,5	45	G1/4	4,8	M8	183608
327874	6951FP-11-12	45,5	186,5	173,5	112,5	118,5	28,5	16,5	22,23	M12x13	9	13,0	29,5	55	59,4	42,0	71	27,5	90	62	22,5	45	G1/4	4,8	M8	183608

Subject to technical alterations.

No. 6951FP

Swing clamp, base-flange-mounting, precision design

Double-acting,
max. operating pressure 350 bar,
min. operating pressure 35 bar.





CAD

Order no.	Article no.	Clamping force at 350 bar Sp* [kN]	Clamping force at 350 bar Lo* [kN]	Clamping stroke M [mm]	Total stroke N [mm]	Vol. Sp [cm^3]	Vol. Lo [cm^3]	eff. piston area Sp [cm^2]	eff. piston area Lo [cm^2]	Q max. * [l/min]	Weight [g]
327890	6951FP-02-21	2,0	5,1	5,5	14,0	0,92	2,3	0,63	1,60	0,276	358
327916	6951FP-02-22	2,0	5,1	5,5	14,0	0,92	2,3	0,63	1,60	0,276	358
327932	6951FP-05-21	4,9	10,0	8,0	20,0	3,82	7,8	1,90	3,88	0,764	871
327957	6951FP-05-22	4,9	10,0	8,0	20,0	3,82	7,8	1,90	3,88	0,764	871
562241	6951FP-05-210	4,9	10,0	19,0	31,0	3,82	7,8	1,90	3,88	0,764	1265
562242	6951FP-05-220	4,9	10,0	19,0	31,0	3,82	7,8	1,90	3,88	0,764	1265
327973	6951FP-11-21	11,6	18,2	13,0	29,5	11,90	23,0	4,04	7,92	1,785	1465
327999	6951FP-11-22	11,6	18,2	13,0	29,5	11,90	23,0	4,04	7,92	1,785	1465
562243	6951FP-11-210	11,6	18,2	34,0	51,0	11,90	23,0	4,04	7,92	1,785	2495
562244	6951FP-11-220	11,6	18,2	34,0	51,0	11,90	23,0	4,04	7,92	1,785	2495

Cl = clamping, Rel = release, ending of item no.: -21 = dual-action, right-pivoting / -22 = dual-action, left-pivoting / -210 = dual-action, right-pivoting, long clamping stroke / -220 = dual-action, left-pivoting, long clamping stroke
* details with clamp arm, standard

Design:

Cylinder barrel made of steel, hardened and burnished. Piston rod case hardened and chrome plated.
Piston rod with internal thread and clamp arm positioning. O-ring for flange seal.
Wiper on the piston rod. Clamp arm not supplied as standard. Oil supply via threaded connection or oil channel in the fixture body.

Application:

The swivel clamp is used in fixtures in which the workpiece must be freely accessible and inserted from above. Even workpieces with difficult shapes can be clamped using special clamp arms (available on request).

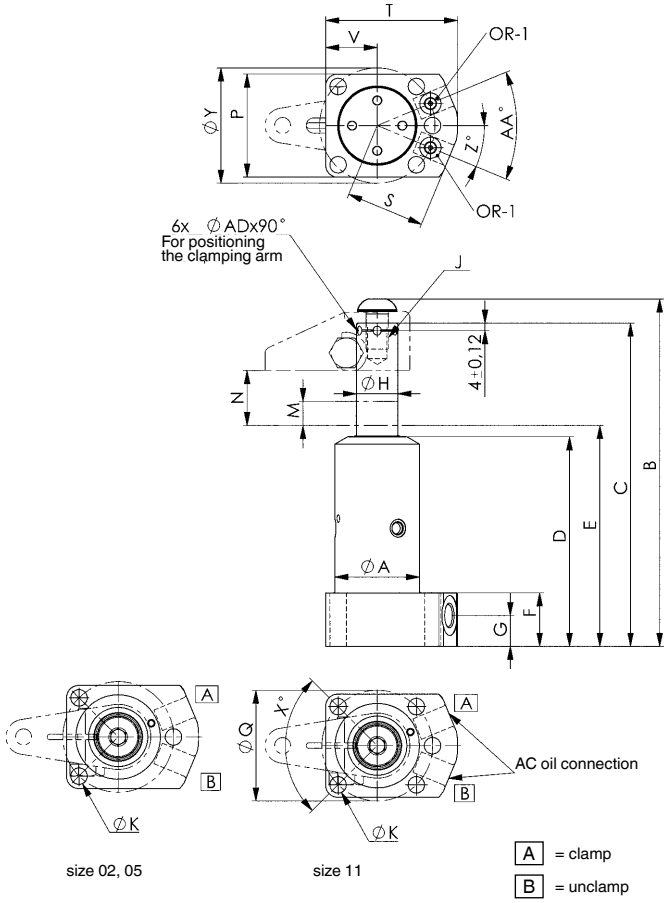
Features:

The swing motion is executed via three ball guides, thereby increasing positioning accuracy, repeat accuracy and service life.

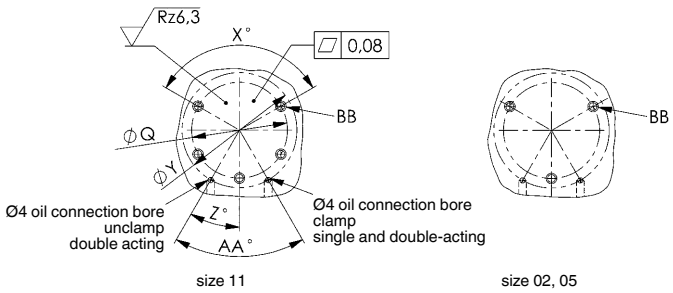
Note:

The piston stoke is executed with spheres, so volume flow Q max. must be complied with. Clamping arm length and clamping arm weight must be strictly observed.
No force may be applied to the piston when mounting accessories to it. To equalise height differences on the workpiece, the vertical clamping path must be 50% of the clamping stroke. When placing into operation, ensure that all air is bled from the system. To control the oil feed, the throttle/check valve no. 6916- 12 can be used as an option. **To achieve a controlled clamping sequence, there is the option of screwing the sequence valve 6918-XX-XXX directly into the threaded connection.**
Other swivel angles are available on request.

Subject to technical alterations.



Drilling template device:



Dimensions:

Order no.	Article no.	dia. A	B	C	D	E	F	G	dia. H	J x depth	dia. K	M	N	P	dia. Q	S	T	V	X°	dia. Y	Z°	AA°	AC	ØAD	BB	OR-1 O-ring Order No.
327890	6951FP-02-21	26,5	109,5	103,0	71,0	76,0	26,5	13,5	11,13	M6x7	6	5,5	14,0	45	40,0	31,0	47	15,5	120	42	30,0	60	G1/8	3,2	M5	183608
327916	6951FP-02-22	26,5	109,5	103,0	71,0	76,0	26,5	13,5	11,13	M6x7	6	5,5	14,0	45	40,0	31,0	47	15,5	120	42	30,0	60	G1/8	3,2	M5	183608
327932	6951FP-05-21	38,0	145,0	135,5	92,5	97,5	25,0	15,0	15,88	M10x12	7	8,0	20,0	57	50,0	33,5	54	19,0	120	50	55,0	110	G1/8	4,8	M6	183608
327957	6951FP-05-22	38,0	145,0	135,5	92,5	97,5	25,0	15,0	15,88	M10x12	7	8,0	20,0	57	50,0	33,5	54	19,0	120	50	55,0	110	G1/8	4,8	M6	183608
562241	6951FP-05-210	38,0	178,0	168,5	115,0	119,5	25,0	15,0	15,88	M10x12	7	19,0	31,0	57	50,0	33,5	54	19,0	120	50	55,0	110	G1/8	4,8	M6	183608
562242	6951FP-05-220	38,0	178,0	168,5	115,0	119,5	25,0	15,0	15,88	M10x12	7	19,0	31,0	57	50,0	33,5	54	19,0	120	50	55,0	110	G1/8	4,8	M6	183608
327973	6951FP-11-21	45,5	186,5	173,5	112,5	118,5	28,5	16,5	22,23	M12x13	9	13,0	29,5	55	59,4	42,0	71	27,5	90	62	22,5	45	G1/4	4,8	M8	183608
327999	6951FP-11-22	45,5	186,5	173,5	112,5	118,5	28,5	16,5	22,23	M12x13	9	13,0	29,5	55	59,4	42,0	71	27,5	90	62	22,5	45	G1/4	4,8	M8	183608
562243	6951FP-11-210	47,5	250,0	237,0	155,0	161,0	28,5	16,5	22,23	M12x13	9	34,0	51,0	58,5	63,0	42,0	72,5	29,0	90	62	22,5	45	G1/4	4,8	M8	183608
562244	6951FP-11-220	47,5	250,0	237,0	155,0	161,0	28,5	16,5	22,23	M12x13	9	34,0	51,0	58,5	63,0	42,0	72,5	29,0	90	62	22,5	45	G1/4	4,8	M8	183608

Subject to technical alterations.

No. 6951

Swing Clamp Arm, standard

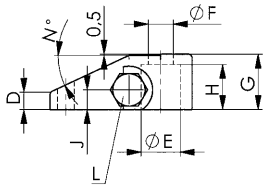
CAD



Order no.	Article no.	A	C	D	dia. E	dia. F	G	H	J	K	L	N	P	R	Weight [g]
68973	6951-02-27	27	4,5	6,5	11,13 +0,05	7,0	15,0	12,5	7,0	9,5	M6x1,00	22°	M6x1,00	9,5	44
559217	6951-04-47	47	8,0	9,0	18,00 ±0,02	10,5	27,0	22,0	8,0	14,7	M6x1,25	23,5°	M8x1,25	14,5	212
68999	6951-05-38	38	6,5	7,5	15,89 +0,05	10,5	21,0	18,0	8,0	12,7	M8x1,25	25°	M8x1,25	12,5	109
556974	6951-08-47	47	8,0	9,0	20,00 ±0,02	10,5	27,0	22,0	8,0	14,7	M6x1,25	23,5°	M8x1,25	14,5	212
69070	6951-11-51	51	9,5	12,0	22,24 +0,05	13,5	32,0	25,5	9,5	16,6	M10x1,25	25°	M10x1,50	17,5	299
556975	6951-15-50	50	11,0	17,0	25,00 ±0,02	12,5	38,5	30,5	11,5	23,2	M12x1,75	23,5°	M10x1,50	17,5	411

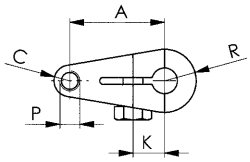
Design:

Tempered and blued steel.



Application:

For all swing clamps
order no. 68973 for sizes 6951xx-02-xx, 6952EP-02-xx
order no. 559217 for sizes 6941KP-04-xx
order no. 68999 for sizes 6951xx-05-xx, 6952CP-06-xx, 6941KP-03-xx
order no. 556974 for sizes 6952CP-08-xx
order no. 69070 for sizes 6951xx-11-xx, 6941KP-05-xx
order no. 556975 for sizes 6952CP-15-xx, 6941KP-09-xx



Note:

Clamping pressure, flow volume and clamping arm weight must be observed. Special versions available on request.

No. 6951

Swing Clamp Arm, upreach

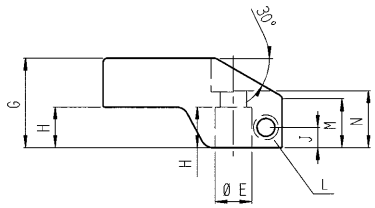
CAD



Order no.	Article no.	A	B	C	D	dia. E	dia. F	G	H	J	K	L	M	N	P	Weight [g]
69112	6951-02-32	32,0	19,0	5,0	5,0	11,13 +0,05	7,0	25,5	12,5	6,5	9,5	M6x1,00	12,5	16	16	87
69138	6951-05-44	44,5	25,5	6,5	6,5	15,89 +0,05	10,5	35,0	18,0	8,0	12,5	M8x1,25	19,0	22	19	209
69153	6951-11-63	63,5	35,0	9,5	9,5	22,24 +0,05	13,5	51,0	25,5	9,5	16,5	M10x1,25	26,5	32	26	590

Design:

Tempered and blued steel.

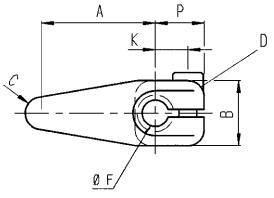


Application:

For all swing clamps
order no. 69112 for sizes 6951xx-02-xx, 6952EP-02-xx
order no. 69138 for sizes 6951xx-05-xx, 6952CP-06-xx, 6941KP-03-xx
order no. 69153 for sizes 6951xx-11-xx, 6941KP-05-xx

Note:

Clamping pressure, flow volume and clamping arm weight must be observed. Special versions available on request.



Subject to technical alterations.

No. 6951

Swing Clamp Arm, long

CAD



Order no.	Article no.	A	B	C	D	dia. E	dia. F	G	H	J	K	L	N	R	Weight [g]
69229	6951-02-82	82,5	26,0	10,5	8,1	11,13 +0,05	7,0	15,2	12,5	7,0	9,5	M6x1,00	22	9,5	73
69245	6951-05-136	136,5	33,0	14,5	12,5	15,89 +0,05	10,5	22,0	18,0	8,0	12,7	M8x1,25	25	12,5	240
69260	6951-11-162	162,0	50,5	19,0	15,2	22,24 +0,05	13,5	31,1	25,5	9,5	16,6	M10x1,25	25	17,5	553

Design:

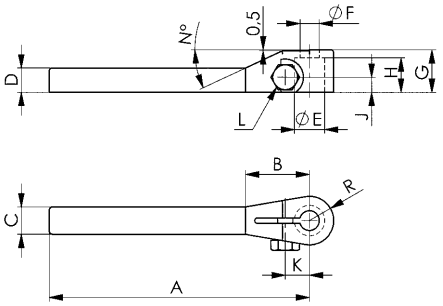
Tempered and blued steel.

Application:

For all swing clamps
order no. 69229 for sizes 6951xx-02-xx, 6952EP-02-xx
order no. 69245 for sizes 6951xx-05-xx, 6952CP-06-xx, 6941KP-03-xx
order no. 69260 for sizes 6951xx-11-xx, 6941KP-05-xx
Clamp arm can be shortened for your application.

Note:

Clamping pressure, flow volume and clamping arm weight must be observed. Special versions available on request.



No. 6951

Swing Clamp Arm, double ended

CAD



Order no.	Article no.	2A	B	C	D	dia. E	dia. F	G	H	J	K	L	N	R	Weight [g]
69252	6951-02-140	140	26,0	10,5	8,1	11,13 +0,05	7,0	15,2	12,5	7,0	9,5	M6x1,00	22	9,5	118
69278	6951-05-222	222	33,0	14,5	12,1	15,89 +0,05	10,5	21,6	18,0	8,0	12,7	M8x1,25	25	12,5	354
69294	6951-11-272	272	50,5	19,0	15,2	22,24 +0,05	13,5	31,1	25,5	9,5	16,6	M10x1,25	25	17,5	801

Design:

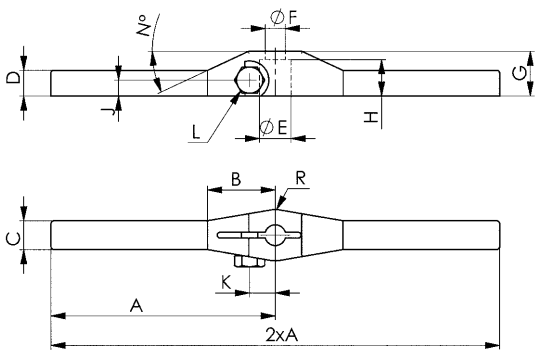
Tempered and blued steel.

Application:

For all swing clamps
order no. 69252 for sizes 6951xx-02-xx, 6952EP-02-xx
order no. 69278 for sizes 6951xx-05-xx, 6952CP-06-xx, 6941KP-03-xx
order no. 69294 for sizes 6951xx-11-xx, 6941KP-05-xx
Clamp arm can be shortened for your application.

Note:

Clamping pressure, flow volume and clamping arm weight must be observed. It is also essential that clamping or support heights in either side are identical. Special versions available on request.



Subject to technical alterations.

No. 6951WN

Swing Clamp arm, double-ended

pivoted

CAD



Order no.	Article no.	2A	B	C	D	dia. E	F	G	H	J	dia. K	L	M	N	W max.	Weight [g]
320457	6951WN-02-100	100	39	11	8	11,2	13	9	24	21,0	6	13,5	M4	M6	6°	150
320465	6951WN-05-150	150	52	16	12	15,9	19	15	35	31,0	8	19,5	M6	M10	6°	440
320473	6951WN-11-180	180	74	19	16	22,3	28	19	40	38,0	12	25,0	M6	M12	6°	880

Design:

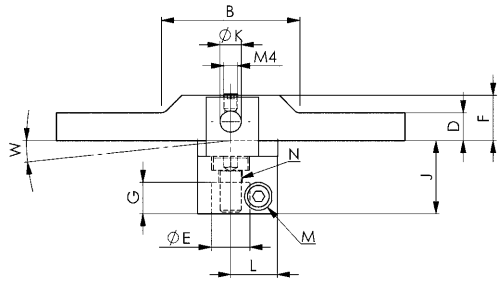
Steel, blued. Clamping arm tempered.

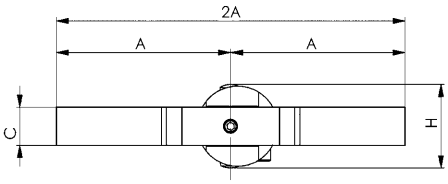
Application:

For all swing clamps
order no. 320457 for sizes 6951xx-02-xx, 6952EP-02-xx
order no. 320465 for sizes 6951xx-05-xx, 6952CP-06-xx, 6941KP-03-xx
order no. 320473 for sizes 6951xx-11-xx, 6941KP-05-xx
Used for clamping two workpieces with different heights.

Note:

Clamping pressure and maximum tilt angle (W) must not be exceeded. Special versions are available on request.

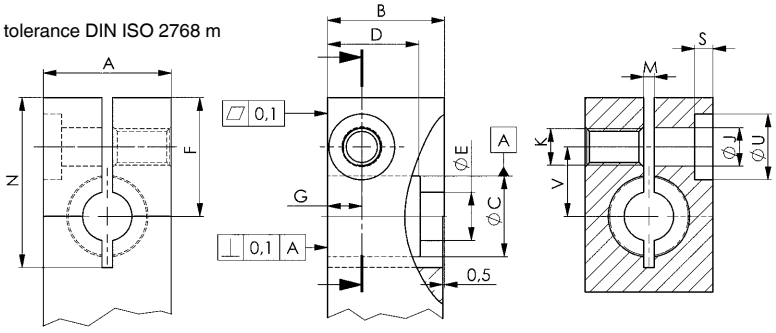




No. 6951

Dimensions for proprietary manufacturing of clamping arms

tolerance DIN ISO 2768 m



Important note:

Lever lengths and lever weights (see no. 6951-xx above) must be observed!

Dimensions table (proprietary manufacture):

for size	A	B	ØC	D	ØE	F	G	ØJ	K	M	N	S	ØU	V
6952EP-02	19,0	16,0	11,151 +0,05	12,70	7,0	22,5	7,0	6,4	M6	2,4	30,0	2	11	9,5
6951XX-02	19,0	16,0	11,151 +0,05	12,70	7,0	22,5	7,0	6,4	M6	2,4	30,0	2	11	9,5
6952CP-06	25,5	22,0	15,913 +0,05	18,03	11,0	27,5	8,8	8,5	M8	2,9	38,5	5	15	17,0
6951XX-05	25,5	22,0	15,913 +0,05	18,03	11,0	27,5	8,8	8,5	M8	2,9	38,5	5	15	17,0
6952CP-08	29,0	27,0	20,000 +0,02	22,00	11,0	31,5	8,0	8,5	M8	2,9	43,5	5	15	18,2
6951XX-11	35,0	32,0	22,263 +0,05	25,40	13,5	32,5	12,0	10,5	M10	2,9	46,5	5	18	19,0
6952CP-15	35,0	38,5	25,000 +0,02	30,50	12,5	42,5	11,0	12,5	M12	2,9	52,5	4	18	23,2

Subject to technical alterations.

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Subject to technical alterations.

SWING CLAMPS – THE SOLUTION FOR COST-EFFECTIVE HYDRAULIC CLAMPING OF WORKPIECES!

DESIGN:

Burnished body, hardened and ground piston rod. Swing clamps are delivered without clamping arm.

APPLICATION:

Swing clamps are used in fixtures of all kinds, especially in applications where workpieces must be freely accessible and loaded from above. Workpieces with complex geometries can be clamped using special clamping arms (available upon request).

FEATURES:

Design variants: > **top flange** > **base flange**

Top and base-flange models accommodate O-ring as well as threaded hydraulic connections.

The swing motion is realized by a rigid 3-way ball-guide mechanism. Standard swivel angle is 90°.

The tolerance of pivot angle measures ± 3°. The repetition accuracy of the pivot position measures ± 1.5°.

The newly designed clamping-arm mount prevents the induction of forces into the swing mechanism during assembly.

IMPORTANT NOTE:

Clamping arm length, max. permissible flow rate Q max. and clamping arm weight must be observed!

In case of a larger flow rates, a throttle/check valve must be connected upstream.

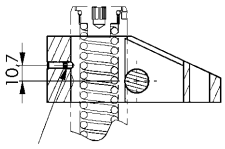
The motion of the swing clamp must not be obstructed. Clamping must only be done in the vertical stroke area.



POSITIONING:

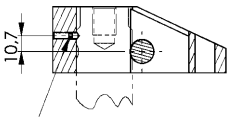
Positioning hole for clamp arm:

single acting cylinder



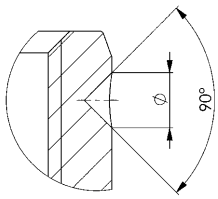
threaded stud

double acting cylinder



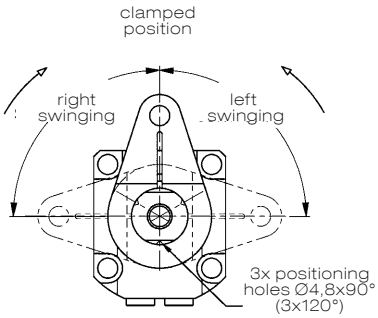
threaded stud

Positioning bore at the piston rod:



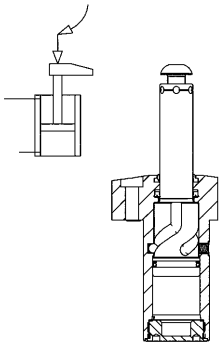
SWING DIRECTIONS:

Positioning hole for clamp arm:



DESIGN:

double acting cylinder

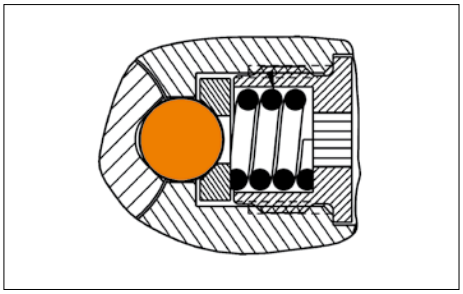


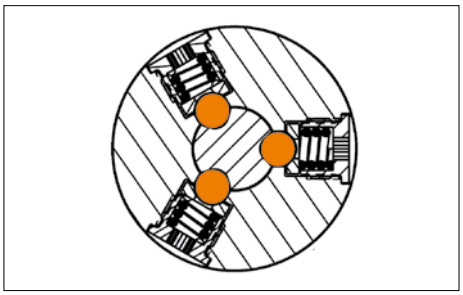
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BENEFITS:

- Increase in the number of balls and grooves to 3 to achieve a higher positioning accuracy and repetition accuracy. This also extends the service life.
- Precise swivel angle of 90°.
- Increases pressing force of the balls in the swivel slot, which ensures a very precise swivel angle over a long period of use.
- V-profile of the ball running groove ensures a deeper ball run in the slot wall than on the slot edge.
- Improved radius transition from straight to swivel stroke.
- The simple-acting models receive a stronger spring force to ensure a better return stroke.
- In addition, all models receive a position-repeatable clamping arm mounting.
- New materials for extending the service life of piston rod and swivel mechanism.



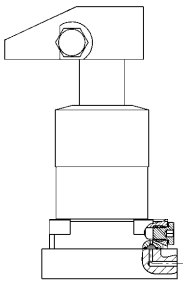


CODE OF TYPES:

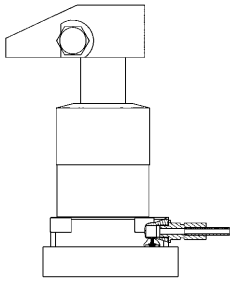
Type 21 = double acting, right swinging
Type 22 = double acting, left swinging
Type 210 = double acting, right swinging, extended stroke
Type 220 = double acting, left swinging, extended stroke

CONNECTION OPTIONS:

- o-ring connection



- threaded connection



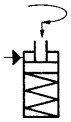
CLAMPING TIME AND Q OF THE SWING CLAMP 6951KP AND FP

	Clamp arm, standard		Clamp arm, long	
Swing clamp clamping force [kN]	min. allowed clamping time [sec.]	Q max. [l/min.]	min. allowed clamping time [sec.]	Q max. [l/min.]
22,0	0,5	2,544	1,0	1,272
33,0	0,5	4,116	1,0	2,058

No. 6951KP

Swing clamp, top-flange-mounting, precision design

Single-acting, with spring return,
max. operating pressure 350 bar,
min. operating pressure 52 bar.





CAD

Order no.	Article no.	Clamping force at 350 bar* [kN]	Clamping stroke K [mm]	Total stroke L [mm]	Oil capacity [cm³]	effective piston area [cm²]	Q max. * [l/min]	Weight [g]
327155	6951KP-22-11	22	14,5	28	21,2	7,6	2,544	2550
327163	6951KP-22-12	22	14,5	28	21,2	7,6	2,544	2550
327171	6951KP-33-11	33	16,0	30	34,3	11,4	4,116	3992
327189	6951KP-33-12	33	16,0	30	34,3	11,4	4,116	3992

Ending of item no.: -11 = single-action, right-pivoting / -12 = single-action, left-pivoting
* details with clamp arm, standard

Design:

Cylinder barrel from steel, hardened and burnished. Piston rod hardened and chrome plated. Wiper at piston rod. Return spring from stainless steel. Supply scope does not include clamping arm. Oil supply via threaded connection or oil channel in the fixture body.

Application:

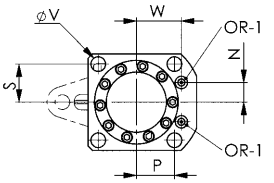
The swing clamp is used particularly in fixtures in which the workpiecesmust be freely accessible and placed from above. Workpieces with difficult shapes can also be clamped using special clamp arms (available on request).

Features:

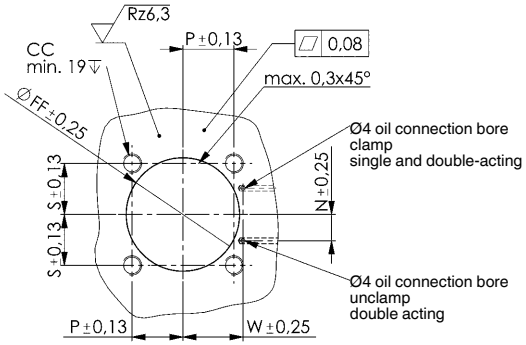
The swing motion is executed via three ball guides, thereby increasing positioning accuracy, repeat accuracy and service life.

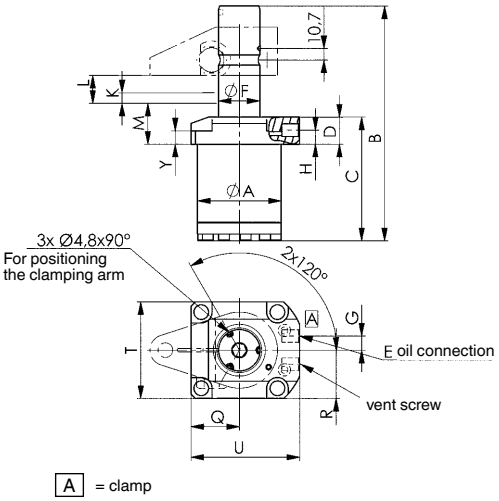
Note:

The piston stoke is guided, respect Q max. volume flow. Clamping arm length and clamping arm weight must be strictly observed. No force may be applied to the piston when mounting accessories to it. For single-acting cylinders, there is a risk of coolant being sucked through the breather port. In such cases the breather port has to be moved to a clean protected area via a connection line. When placing into operation, ensure that all air is bled from the system.
To control the oil feed, the throttle/check valve no. 6916-12-04 can be optionally used. **To achieve a controlled clamping sequence, there is the option of screwing the sequence valve 6918-XX-XXX directly into the threaded connection.** Other swivel angles are available on request.



Drilling template device:





A = clamp

Dimensions:

Order no.	Article no.	dia. A	B	C	D	E	dia. F	G	H	K	L	M	N	P	Q	R	S	T	U	dia. V	W	Y	CC	dia. FF	OR-1 O-ring Order No.
327155	6951KP-22-11	62,8	196,0	104,5	25	G1/4	31,74	13	13	14,5	28	33,5	14,5	27,4	35,5	35,5	27,4	71	85,5	10,7	35,1	13,0	M10	63,4	183608
327163	6951KP-22-12	62,8	196,0	104,5	25	G1/4	31,74	13	13	14,5	28	33,5	14,5	27,4	35,5	35,5	27,4	71	85,5	10,7	35,1	13,0	M10	63,4	183608
327171	6951KP-33-11	77,0	216,5	114,0	25	G1/4	38,09	13	13	16,0	30	33,5	18,1	35,1	44,5	44,5	35,1	89	100,0	13,5	41,4	12,5	M12	77,6	183608
327189	6951KP-33-12	77,0	216,5	114,0	25	G1/4	38,09	13	13	16,0	30	33,5	18,1	35,1	44,5	44,5	35,1	89	100,0	13,5	41,4	12,5	M12	77,6	183608

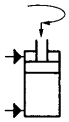
Subject to technical alterations.

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No. 6951KP

Swing clamp, top-flange-mounting, precision design

double acting,
max. operating pressure 350 bar,
min. operating pressure 35 bar.





CAD

Order no.	Article no.	Clamping force at 350 bar Sp* [kN]	Clamping force at 350 bar Lo* [kN]	Clamping stroke K [mm]	Total stroke L [mm]	Vol. Sp [cm³]	Vol. Lo [cm³]	eff. piston area Sp [cm²]	eff. piston area Lo [cm²]	Q max. * [l/min]	Weight [g]
327197	6951KP-22-21	22	54	14,5	28,0	21,2	43,3	7,6	15,5	2,544	2590
327205	6951KP-22-22	22	54	14,5	28,0	21,2	43,3	7,6	15,5	2,544	2590
327213	6951KP-22-210**	22	54	32,0	45,5	34,9	71,3	7,6	15,5	2,544	2948
327221	6951KP-22-220**	22	54	32,0	45,5	34,9	71,3	7,6	15,5	2,544	2948
327239	6951KP-33-21	33	80	16,0	30,0	34,3	68,4	11,4	22,8	4,116	4355
327247	6951KP-33-22	33	80	16,0	30,0	34,3	68,4	11,4	22,8	4,116	4355
327254	6951KP-33-210**	33	80	32,0	46,0	52,6	105,0	11,4	22,8	4,116	4881
327262	6951KP-33-220**	33	80	32,0	46,0	52,6	105,0	11,4	22,8	4,116	4881

Cl = clamping, Rel = release, ending of item no.: -21 = dual-action, right-pivoting / -22 = dual-action, left-pivoting / -210 = dual-action, right-pivoting, long clamping stroke / -220 = dual-action, left-pivoting, long clamping stroke * details with clamp arm, standard, ** Not available ex-stock!

Design:

Hardened and burnished steel cylinder barrels. Piston rod hardened and chrome plated. Wiper at piston rod. Supply scope does not include clamping arm. Oil supply via threaded connection or oil channel in the fixture body.

Application:

The swing clamp is used particularly in fixtures in which the workpiecesmust be freely accessible and placed from above. Workpieces with difficult shapes can also be clamped using special clamp arms (available on request).

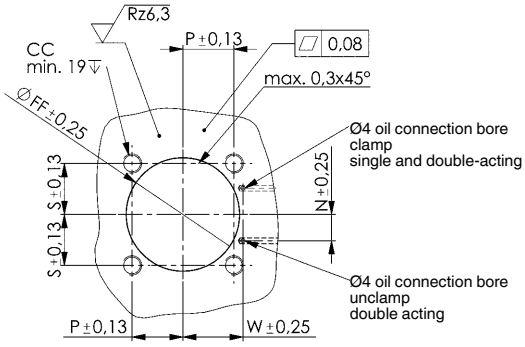
Features:

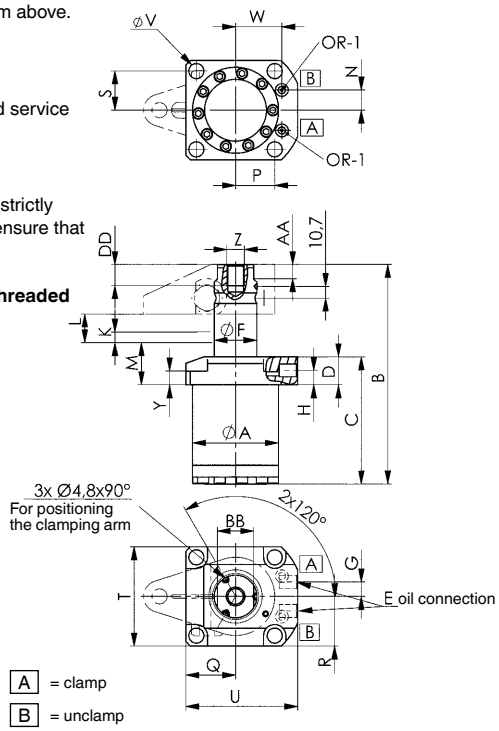
The swing motion is executed via three ball guides, thereby increasing positioning accuracy, repeat accuracy and service life.

Note:

The piston stoke is guided, respect Q max. volume flow. Clamping arm length and clamping arm weight must be strictly observed. No force may be applied to the piston when mounting accessories to it. When placing into operation, ensure that all air is bled from the system.
To control the oil feed, the throttle/check valve no. 6916-12-04 can be optionally used. **To achieve a controlled clamping sequence, there is the option of screwing the sequence valve 6918-XX-XXX directly into the threaded connection.** Other swivel angles are available on request.

Drilling template device:





Dimensions:

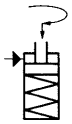
Order no.	Article no.	dia. A	B	C	D	E	dia. F	G	H	K	L	M	N	P	Q	R	S	T	U	dia. V	W	Y	Z	AA	BB	CC	DD	dia. FF	OR-1 O-ring Order No.
327197	6951KP-22-21	62,8	185,5	104,5	25	G1/4	31,74	13	13	14,5	28,0	33,5	14,5	27,4	35,5	35,5	27,4	71	85,5	10,7	35,1	13,0	M16	12,5	26,5	M10	19	63,4	183608
327205	6951KP-22-22	62,8	185,5	104,5	25	G1/4	31,74	13	13	14,5	28,0	33,5	14,5	27,4	35,5	35,5	27,4	71	85,5	10,7	35,1	13,0	M16	12,5	26,5	M10	19	63,4	183608
327213	6951KP-22-210**	62,8	220,5	122,0	25	G1/4	31,74	13	13	32,0	45,5	33,0	14,5	27,4	35,5	35,5	27,4	71	85,5	10,7	35,1	13,0	M16	12,5	26,5	M10	19	63,4	183608
327221	6951KP-22-220**	62,8	220,5	122,0	25	G1/4	31,74	13	13	32,0	45,5	33,0	14,5	27,4	35,5	35,5	27,4	71	85,5	10,7	35,1	13,0	M16	12,5	26,5	M10	19	63,4	183608
327239	6951KP-33-21	77,0	196,5	114,0	25	G1/4	38,09	13	13	16,0	30,0	33,5	18,1	35,1	44,5	44,5	35,1	89	100,0	13,5	41,4	12,5	M16	12,5	32,5	M12	19	77,6	183608
327247	6951KP-33-22	77,0	196,5	114,0	25	G1/4	38,09	13	13	16,0	30,0	33,5	18,1	35,1	44,5	44,5	35,1	89	100,0	13,5	41,4	12,5	M16	12,5	32,5	M12	19	77,6	183608
327254	6951KP-33-210**	77,0	228,5	130,0	25	G1/4	38,09	13	13	32,0	46,0	33,5	18,1	35,1	44,5	44,5	35,1	89	100,0	13,5	41,4	12,5	M16	12,5	32,5	M12	19	77,6	183608
327262	6951KP-33-220**	77,0	228,5	130,0	25	G1/4	38,09	13	13	32,0	46,0	33,5	18,1	35,1	44,5	44,5	35,1	89	100,0	13,5	41,4	12,5	M16	12,5	32,5	M12	19	77,6	183608

Subject to technical alterations.

No. 6951FP

Swing clamp, base-flange-mounting, precision design

Single-acting,, with spring return,
max. operating pressure 350 bar,
min. operating pressure 52 bar.





CAD

Order no.	Article no.	Clamping force at 350 bar* [kN]	Clamping stroke K [mm]	Total stroke L [mm]	Oil capacity [cm³]	effective piston area [cm²]	Q max. * [l/min]	Weight [g]
327270	6951FP-22-11	22	14,5	28	21,2	7,6	2,544	3030
327288	6951FP-22-12	22	14,5	28	21,2	7,6	2,544	3030
327296	6951FP-33-11	33	16,0	30	34,3	11,4	4,116	4854
327304	6951FP-33-12	33	16,0	30	34,3	11,4	4,116	4854

Ending of item no.: -11 = single-action, right-pivoting / -12 = single-action, left-pivoting
* details with clamp arm, standard

Design:

Cylinder barrel from steel, hardened and burnished. Piston rod hardened and chrome plated. Wiper at piston rod. Return spring from stainless steel. Supply scope does not include clamping arm. Oil supply via threaded connection or oil channel in the fixture body.

Application:

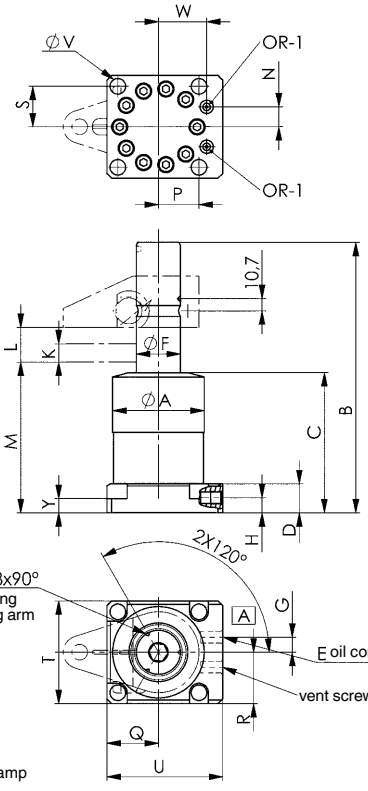
The swing clamp is used particularly in fixtures in which the workpiecesmust be freely accessible and placed from above. Workpieces with difficult shapes can also be clamped using special clamp arms (available on request).

Features:

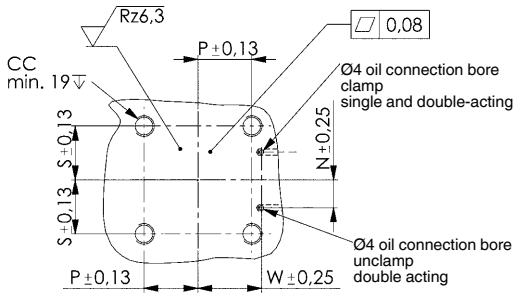
The swing motion is executed via three ball guides, thereby increasing positioning accuracy, repeat accuracy and service life.

Note:

The piston stoke is guided, respect Q max. volume flow. Clamping arm length and clamping arm weight must be strictly observed. No force may be applied to the piston when mounting accessories to it. For single-acting cylinders, there is a risk of coolant being sucked through the breather port. In such cases the breather port has to be moved to a clean protected area via a connection line. When placing into operation, ensure that all air is bled from the system.
To control the oil feed, the throttle/check valve no. 6916-12-04 can be optionally used. **To achieve a controlled clamping sequence, there is the option of screwing the sequence valve 6918-XX-XXX directly into the threaded connection.** Other swivel angles are available on request.



Drilling template device:



Dimensions:

Order no.	Article no.	dia. A	B	C	D	E	dia. F	G	H	K	L	M	N	P	Q	R	S	T	U	dia. V	W	Y	CC	OR-1 O-ring Order No.
327270	6951FP-22-11	62,8	204,0	112,0	25	G1/4	31,74	13	12,5	14,5	28	121,0	14,5	27,4	35,5	35,5	27,4	71	85,5	10,7	35,1	13,0	M10	183608
327288	6951FP-22-12	62,8	204,0	112,0	25	G1/4	31,74	13	12,5	14,5	28	121,0	14,5	27,4	35,5	35,5	27,4	71	85,5	10,7	35,1	13,0	M10	183608
327296	6951FP-33-11	79,0	224,5	121,5	25	G1/4	38,09	13	13,0	16,0	30	130,5	18,1	35,1	44,5	44,5	35,1	89	100,0	13,5	41,4	12,5	M12	183608
327304	6951FP-33-12	79,0	224,5	121,5	25	G1/4	38,09	13	13,0	16,0	30	130,5	18,1	35,1	44,5	44,5	35,1	89	100,0	13,5	41,4	12,5	M12	183608

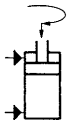
Subject to technical alterations.

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No. 6951FP

Swing clamp, base-flange-mounting, precision design

double acting,
max. operating pressure 350 bar,
min. operating pressure 35 bar.





CAD

Order no.	Article no.	Clamping force at 350 bar Sp* [kN]	Clamping force at 350 bar Lo* [kN]	Clamping stroke K [mm]	Total stroke L [mm]	Vol. Sp [cm³]	Vol. Lo [cm³]	eff. piston area Sp [cm²]	eff. piston area Lo [cm²]	Q max. * [l/min]	Weight [g]
327312	6951FP-22-21	22	54	14,5	28	21,2	43,3	7,6	15,5	2,544	3070
327320	6951FP-22-22	22	54	14,5	28	21,2	43,3	7,6	15,5	2,544	3070
327338	6951FP-33-21	33	80	16,0	30	34,3	68,4	11,4	22,8	4,116	4854
327346	6951FP-33-22	33	80	16,0	30	34,3	68,4	11,4	22,8	4,116	4854

Cl = clamping, Rel = release, ending of item no.: -21 = dual-action, right-pivoting / -22 = dual-action, left-pivoting
* details with clamp arm, standard

Design:

Cylinder barrel from steel, hardened and burnished. Piston rod case hardened and chrome plated. Wiper at piston rod. Supply scope does not include clamping arm. Oil supply via threaded connection or oil channel in the fixture body.

Application:

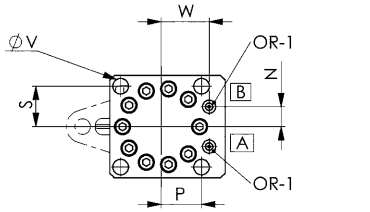
The swing clamp is used particularly in fixtures in which the workpiecesmust be freely accessible and placed from above. Workpieces with difficult shapes can also be clamped using special clamp arms (available on request).

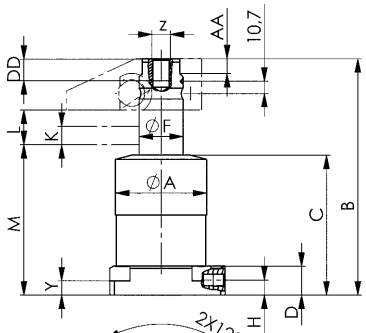
Features:

The swing motion is executed via three ball guides, thereby increasing positioning accuracy, repeat accuracy and service life.

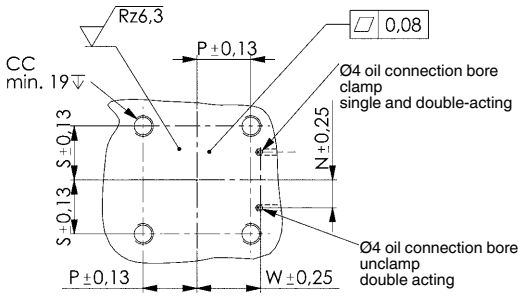
Note:

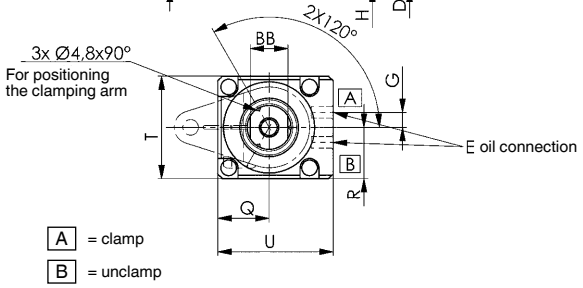
The piston stoke is guided, respect Q max. volume flow. Clamping arm length and clamping arm weight must be strictly observed. No force may be applied to the piston when mounting accessories to it. When placing into operation, ensure that all air is bled from the system.
To control the oil feed, the throttle/check valve no. 6916-12-04 can be optionally used. **To achieve a controlled clamping sequence, there is the option of screwing the sequence valve 6918-XX-XXX directly into the threaded connection.** Other swivel angles are available on request.





Drilling template device:





Dimensions:

Order no.	Article no.	dia. A	B	C	D	E	dia. F	G	H	K	L	M	N	P	Q	R	S	T	U	dia. V	W	Y	Z	AA	BB	CC	DD	OR-1 O-ring Order No.
327312	6951FP-22-21	62,8	194	112,0	25	G1/4	31,74	13	12,5	14,5	28	121,0	14,5	27,4	35,5	35,5	27,4	71	85,5	10,7	35,1	13,0	M16	12,5	26,5	M10	19	183608
327320	6951FP-22-22	62,8	194	112,0	25	G1/4	31,74	13	12,5	14,5	28	121,0	14,5	27,4	35,5	35,5	27,4	71	85,5	10,7	35,1	13,0	M16	12,5	26,5	M10	19	183608
327338	6951FP-33-21	79,0	205	121,5	25	G1/4	38,09	13	13,0	16,0	30	130,5	18,1	35,1	44,5	44,5	35,1	89	100,0	13,5	41,4	12,5	M16	12,5	32,5	M12	19	183608
327346	6951FP-33-22	79,0	205	121,5	25	G1/4	38,09	13	13,0	16,0	30	130,5	18,1	35,1	44,5	44,5	35,1	89	100,0	13,5	41,4	12,5	M16	12,5	32,5	M12	19	183608

Subject to technical alterations.

No. 6951N

Swing Clamp Arm, standard

CAD



Order no.	Article no.	A	C	D	dia. E	G	H	J	K	L	N	P	R	Weight [g]
69146	6951N-22-63	63,5	14,5	15,4	31,75 +0,05	43,8	0,5	12,5	22,5	M16x1,5	25°	M12	25,5	801
60848	6951N-33-68	68,0	14,2	16,4	38,11 +0,05	44,5	-	14,2	25,6	M16x1,5	25°	M16	35,0	1134

Design:

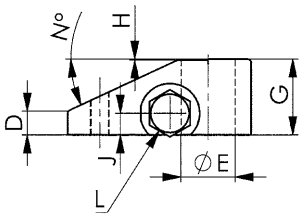
Tempered and blued steel.

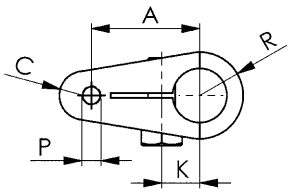
Application:

For swing clamps
order no. 69146 for sizes 6951xx-22-xx, 6941KP-11-xx
order no. 60848 for sizes 6951xx-33-xx

Note:

Clamping pressure, flow volume and clamping arm weight must be observed. Special versions available on request.





No. 6951N

Swing Clamp Arm, upreach

CAD



Order no.	Article no.	A	B	C	D	dia. E	F	G	H	J	K	L	M	N	Weight [g]
69500	6951N-22-76	76	51	14,5	14,5	31,75 +0,05	70,0	36,5	13,5	22,5	M16x1,5	38	44,5	38,0	1580
61879	6951N-33-81	81	70	14,3	14,3	38,11 +0,05	76,2	39,6	13,5	25,6	M16x1,5	45	44,5	41,3	2313

Design:

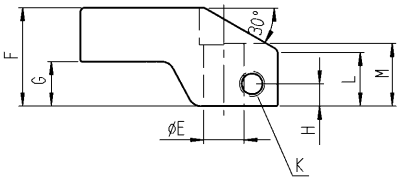
Tempered and blued steel.

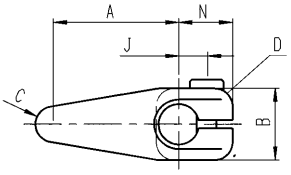
Application:

For swing clamps
order no. 69500 for sizes 6951xx-22-xx, 6941KP-11-xx
order no. 61879 for sizes 6951xx-33-xx

Note:

Clamping pressure, flow volume and clamping arm weight must be observed. Special versions available on request.





Subject to technical alterations.

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No. 6951N

Swing Clamp Arm, long

CAD



Order no.	Article no.	A	B	C	D	dia. E	G	J	K	L	M	N	R	Weight [g]
69161	6951N-22-165	165,0	71,1	28,5	18,4	31,75 +0,05	43,8	12,5	22,5	M16x1,5	71,1	25°	25,5	1161
60855	6951N-33-180	180,3	68,3	30,2	33,8	38,11 +0,05	44,5	14,2	25,6	M16x1,5	44,9	25°	35,0	1996

Design:

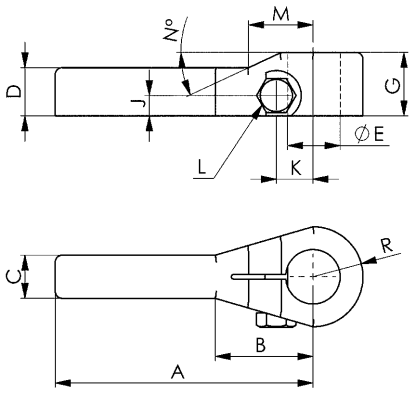
Tempered and blued steel.

Application:

For swing clamps
order no. 69161 for sizes 6951xx-22-xx, 6941KP-11-xx
order no. 60855 for sizes 6951xx-33-xx

Note:

Clamping pressure, flow volume and clamping arm weight must be observed. Clamp arms can be shortened where necessary. Special versions available on request.



No. 6951N

Swing Clamp Arm, double ended

CAD



Order no.	Article no.	A	2A	B	C	D	dia. E	G	J	K	L	N	R	Weight [g]
69526	6951N-22-280	140,0	280,0	70,5	28,5	18,4	31,75 +0,05	43,8	12,5	22,5	M16x1,5	25°	25,5	1869
60863	6951N-33-360	180,3	360,7	44,6	30,2	33,8	38,11 +0,05	44,5	14,2	25,6	M16x1,5	25°	35,0	3311

Design:

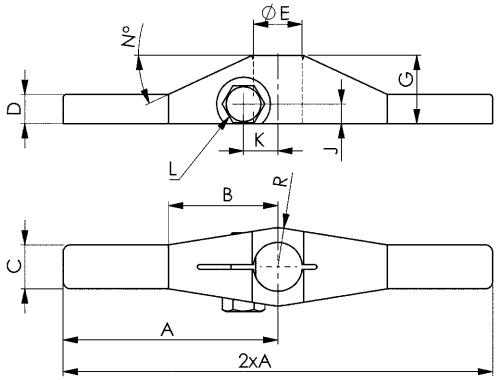
Tempered and blued steel.

Application:

For swing clamps
order no. 69526 for sizes 6951xx-22-xx, 6941KP-11-xx
order no. 60863 for sizes 6951xx-33-xx

Note:

Clamping pressure, flow volume and clamping arm weight must be observed. Clamp arms can be shortened where necessary. It is also essential that clamping or support heights in either side are identical. Special versions available on request.



Subject to technical alterations.

No. 6951WN

Swing Clamp arm, double-ended

pivoted



CAD

Order no.	Article no.	2A	B	C	D	dia. E	F	G	H	J	dia. K	L	M	W max.	Weight [g]
320481	6951WN-22-200	200	107	25	20	31,8	35	10	55	57,5	16	30,5	M8	6°	1800
320499	6951WN-33-250	250	125	33	22	38,2	38	10	65	64,5	20	36,0	M10	6°	3100

Design:

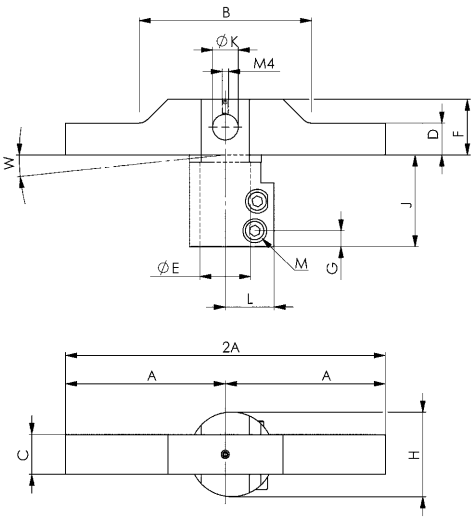
Steel, blued. Clamping arm tempered.

Application:

For all swing clamps
order no. 320481 for sizes 6951xx-22-xx
order no. 320499 for sizes 6951xx-33-xx
Used for clamping two workpieces with different heights.

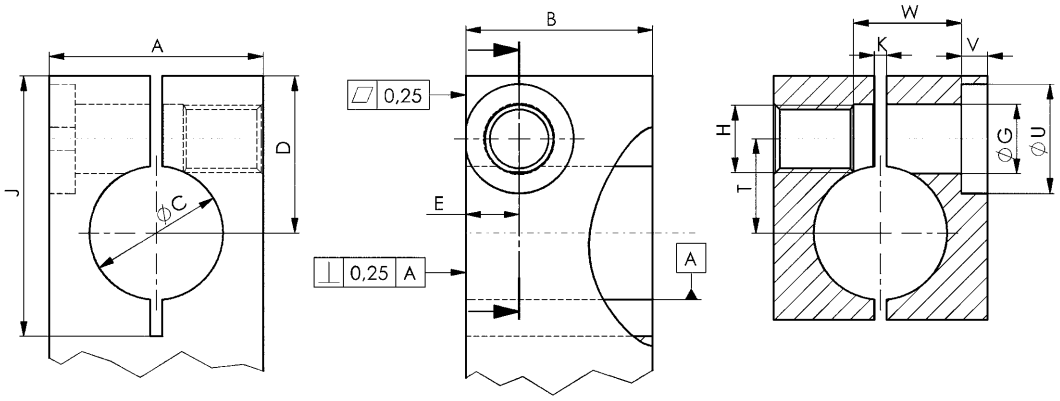
Note:

Clamping pressure and maximum tilt angle (W) must not be exceeded. Special versions are available on request.



No. 6951

Dimensions for proprietary manufacturing of clamping arms



tolerance DIN ISO 2768 m

Important note:

Lever lengths and lever weights must be observed!

Dimensions table (proprietary manufacture):

for size	A	B	ØC +0,025	D	E	ØG	H	J	K	T	U	V	W
-22	51	44,5	31,775	37,4	12,5	16,5	M16x1,50-6H	59	2,93	22,4	26	6,2	25,7
-33	70	44,5	38,138	40,4	14,2	16,5	M16x1,50-6H	65	3,23	25,5	26	9,6	35,5

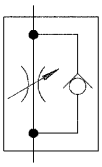
Subject to technical alterations.

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No. 6916-12

Throttle/Check Valve

cartridge flange
max. operating pressure 350 bar.





Order no.	Article no.	A max.	C	D	dia. E	SW	Md max. [Nm]	Q max. [l/min]	G	Weight [g]
326579	6916-12-01	20,7	11,1	15,16	15,9	14	27	5,7	G1/8	47
326611	6916-12-04	20,9	11,2	18,72	21,0	19	47	5,7	G1/4	47

Design:

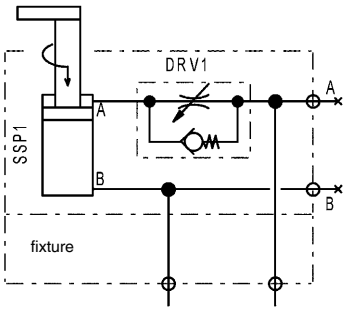
Housing made of steel, hardened and blued. Compact size.

Application:

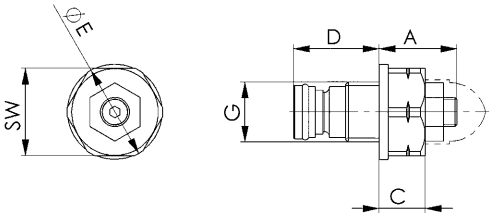
For single and double-acting loads. The traversing speed can be set by controlling the flow.

Note:

The screw-in throttle check valve is screwed into the installation bore.
The upstream pressure relief valve in the hydraulic control guarantees to drain the surplus volume.
The throttle check valves should preferably be used for feed control.
Return flow control poses the risk of excess pressure.



CAD

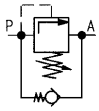


No. 6918-XX-XXX

Sequence valve, threaded design

Max. operating pressure 350 bar.

CAD





Order no.	Article no.	Setting pressure set at factory [bar]	Setting range at A [bar]	L max.	B	C	dia. E	F	G	SW	SW1	SW2	Md max. [Nm]	Md 1 max. [Nm]	Q max. [l/min]	Weight [g]
562224	6918-30-50	50	20 - 60	28,0	15,16	20,3	17,5	5,6	G1/8	16	14	4	16	7	3,8	37
562225	6918-30-100	100	35 - 150	28,0	15,16	20,3	17,5	5,6	G1/8	16	14	4	16	7	3,8	37
562226	6918-30-200	200	125 - 275	31,7	15,16	24,0	17,5	5,6	G1/8	16	14	4	16	7	3,8	45
562227	6918-40-50	50	20 - 55	34,5	18,72	27,4	21,0	5,0	G1/4	19	17	4	27	7	3,8	68
562228	6918-40-100	100	35 - 150	34,5	18,72	27,4	21,0	5,0	G1/4	19	17	4	27	7	3,8	72
562229	6918-40-200	200	125 - 275	31,8	18,72	24,6	21,0	5,0	G1/4	19	17	4	27	7	3,8	72

Design:

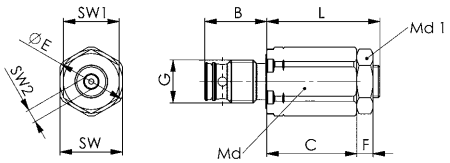
Housing from steel, hardened and burnished.

Application:

The sequence valve is used in cases where another consumer is connected to the circuit after a set pressure has been reached. The sequence valve ensures a controlled clamping sequence. Once a defined pressure is reached, another hydraulic circuit is opened.

Note:

The sequence valve can be screwed directly into the threaded connection for the swing clamp top flange and base flange types 6951KP, 6951FP, 6941KP and link clamp 6942KK, and with support elements for flange design 6964H and 6964HS. The oil must be supplied via the O-ring connection. The sequence valve can be screwed directly into fixtures as well.



Subject to technical alterations.

Size 02				
Clamping arm length	mm	27	51	76
Max. clamping pressure	bar	350	183	122
Clamping force	kN	2	0,8	0,44
Output flow	l/min.	0,276	0,19	0,11
Max. clamping arm weight **	g	204		
Spring force*	N	70		

* single acting version

** With 6951/6952EP: For information to use heavier clamp arms, please consult with AMF.

Size 05				
Clamping arm length	mm	38	76	127
Max. clamping pressure	bar	350	176	107
Clamping force	kN	4,9	2,2	0,88
Output flow	l/min.	0,764	0,57	0,327
Max. clamping arm weight **	g	363		
Spring force*	N	200		

* single acting version

** With 6951: For information to use heavier clamp arms, please consult with AMF.

Size 11				
Clamping arm length	mm	51	101,5	152
Max. clamping pressure	bar	350	177	119
Clamping force	kN	11,6	5,1	3,0
Output flow	l/min.	1,785	1,32	0,893
Max. clamping arm weight **	g	544		
Spring force*	N	308		

* single acting version

** With 6951: For information to use heavier clamp arms, please consult with AMF.

Size 22				
Clamping arm length	mm	63,5	101,5	152
Max. clamping pressure	bar	350	214	147
Clamping force	kN	22,2	12,0	7,1
Output flow	l/min.	2,544	1,99	1,272
Max. clamping arm weight **	g	1724		
Spring force*	N	562		

* single acting version

** With 6951: For information to use heavier clamp arms, please consult with AMF.

Size 33				
Clamping arm length	mm	68	101,5	178
Max. clamping pressure	bar	350	233	133
Clamping force	kN	33,4	22,2	12
Output flow	l/min.	4,116	3,48	2,058
Max. clamping arm weight **	g	3402		
Spring force*	N	1063		

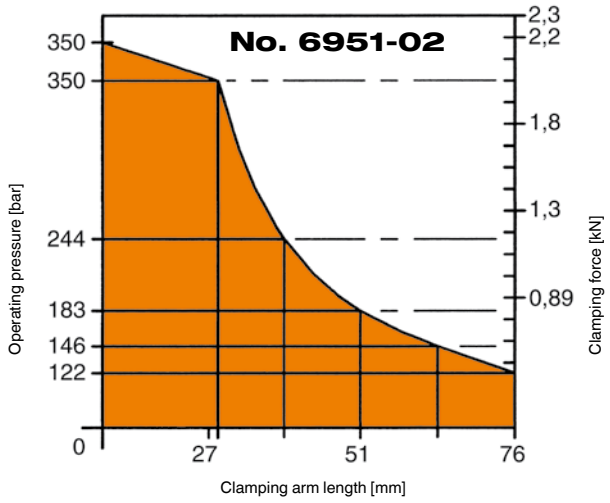
* single acting version

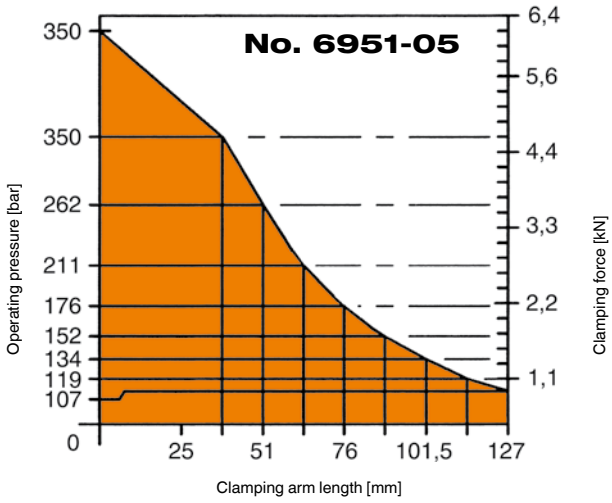
** With 6951: For information to use heavier clamp arms, please consult with AMF.

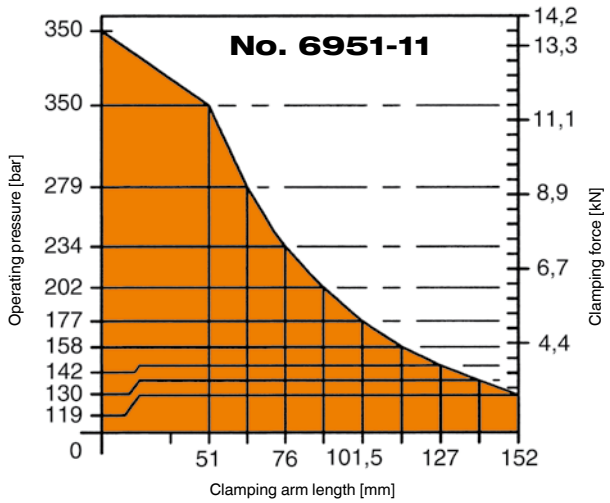
Subject to technical alterations.

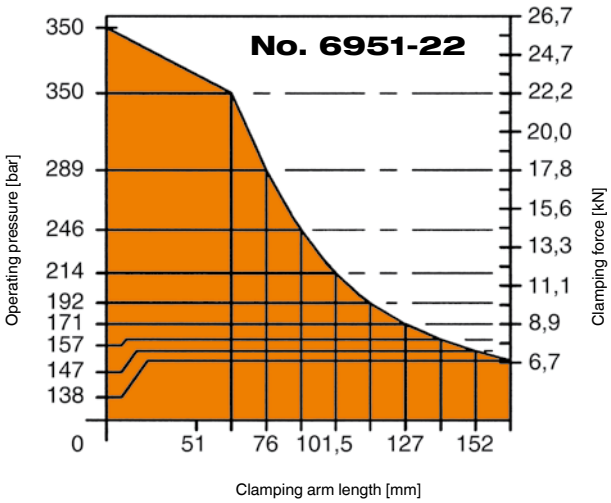
DIAGRAM DESCRIPTION:

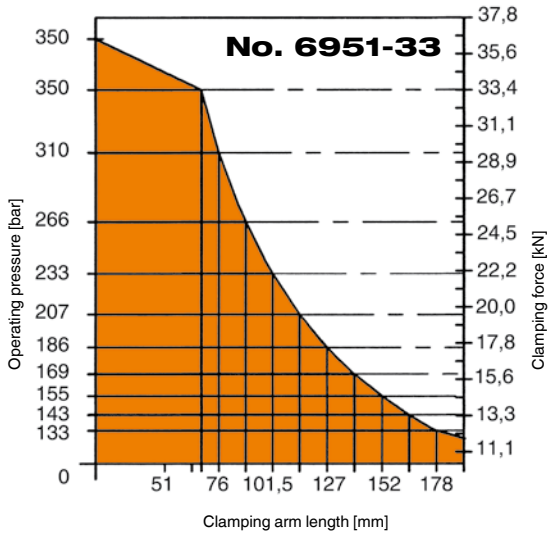
The diagrams show the maximum operating pressure in relation to the clamping arm length and the resulting clamping force.



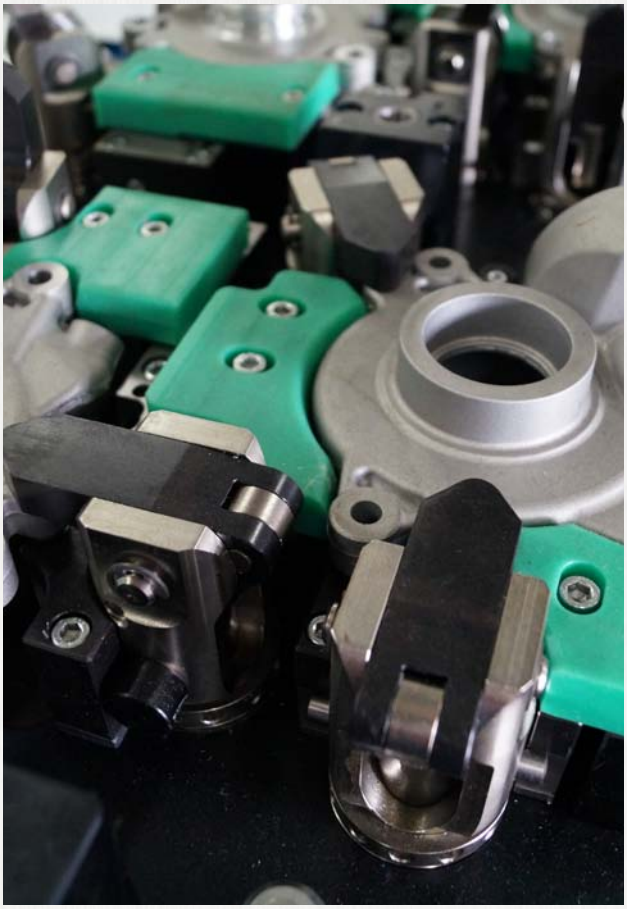




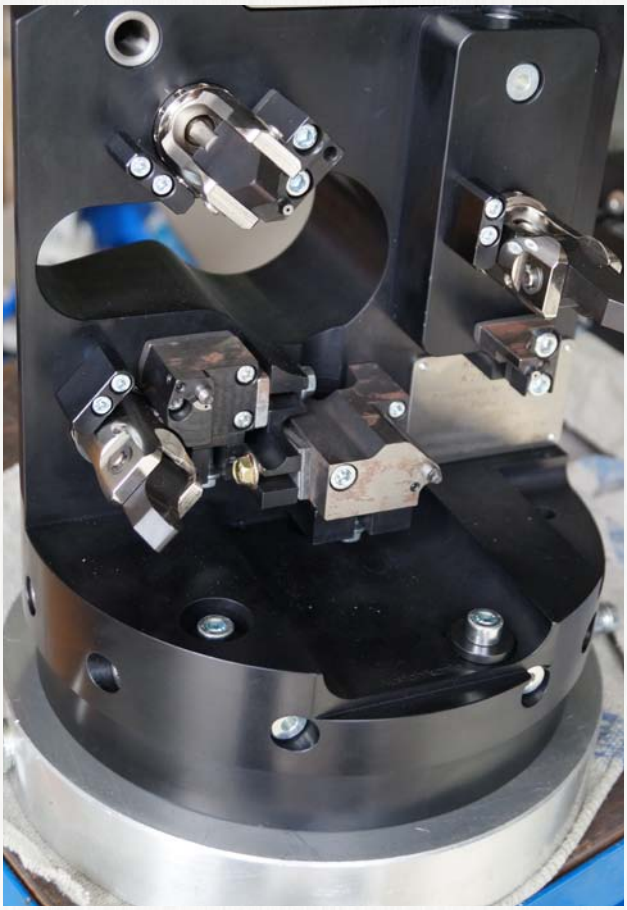


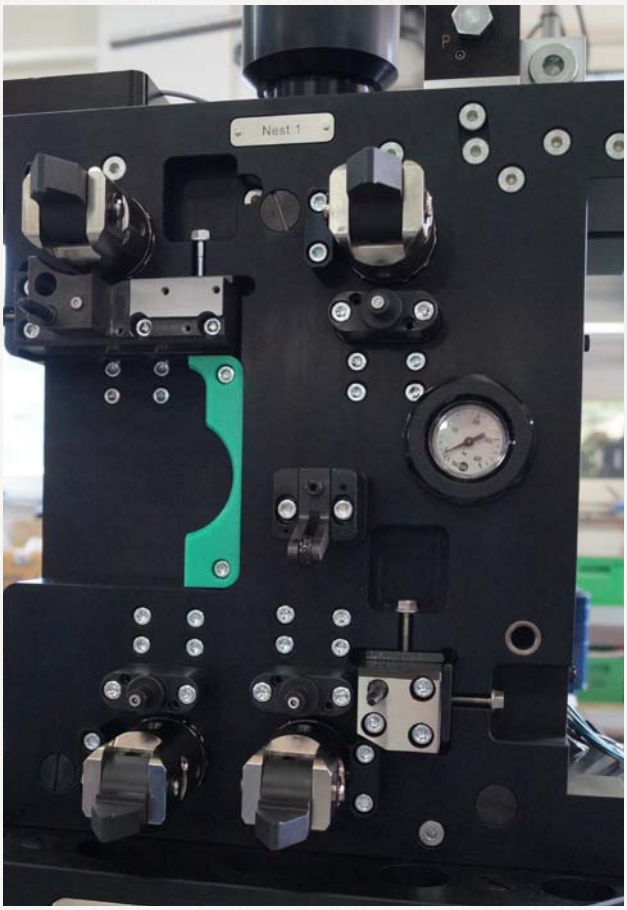


Subject to technical alterations.









Subject to technical alterations.

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VERTICAL CLAMPS AND VERTICAL CLAMPS WITH LINEAR STROKE FOR DEMANDING TASKS

VERTICAL CLAMP

> cartridge flange
> piston force up to 49 kN
> operating pressure 250 bar
> 90° aperture angle
> oil supply via oil channel in fixture body

VERTICAL CLAMP

> piston force up to 20,1 kN
> operating pressure up to 350 bar
> oil supply via oil channel in fixture body

VERTICAL CLAMP WITH LINEAR STROKE

> hydraulic force up to 9,8 kN
> operating pressure 250 bar
> oil supply via oil channel in fixture body

PRODUCT OVERVIEW:

Type	Hydraulic force, piston force [kN]	No. of models	Max. operating pressure [bar]	Operating mode
6958E	7,8 - 49,0	3	250	double acting
6958SU/ST	7,0	1	350	single acting
6958AU/AT	5,0 - 20,0	4	250	single acting
6958DU/DT	2,8 - 20,1	5	250	double acting
6958CK	2,5 - 13,3	2	250	double acting
6958C	3,1 - 9,8	3	250	double acting

PRODUCT EXAMPLES:

NO. 6958E



> piston force: 7,8 - 49,0 kN

NO. 6958DT



> piston force: 2,8 - 20,1 kN

NO. 6958C

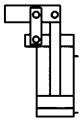


> hydraulic force: 3,1 - 9,8 kN

No. 6958E-XX

Vertical clamp, cartridge flange

Double-acting,
max. operating pressure 250 bar,
min. operating pressure 15 bar





CAD

Order no.	Article no.	Piston force F5 at 100 bar [kN]	Piston force F5 at 250 bar [kN]	Vol. Sp [cm³]	Vol. Lo [cm³]	Piston dia. [mm]	eff. piston area Sp [cm²]	eff. piston area Lo [cm²]	Weight [g]
328013	6958E-20	3,1	7,8	6,6	2,3	20	3,1	1,10	350
328039	6958E-30	7,0	17,5	22,6	7,8	30	7,0	2,54	1100
562196	6958E-50	19,6	49,0	93,3	37,1	50	19,6	7,8	3850

Sp = clamp, Lo = unclamp

Design:

Housing made of steel, outer surface nickel-coated, piston rod hardened. Clamp arm not included.
Housing with two holes for connection of anti-twist protection.
One cylinder pin for anti-rotation device is enclosed loose. Oil supply via oil channel in fixture body.

Application:

Vertical clamp is especially suited for clamping fixtures in which oil is supplied through conduits drilled in the fixture body. Insert for clamping fixtures with limited space. Installation of the vertical clamp can be adjusted 360°.

Features:

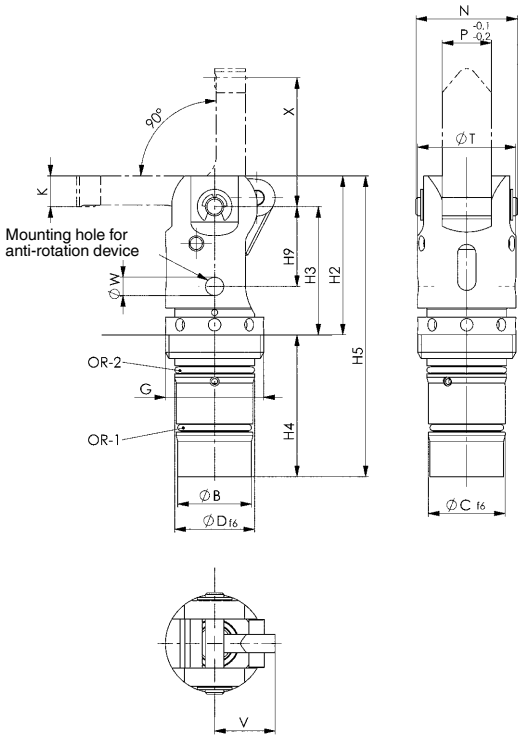
Large clamping force in the smallest installation space. Clamping lever opens 90°, resulting in easy loading or removal of the workpieces, manually or by robots.

Note:

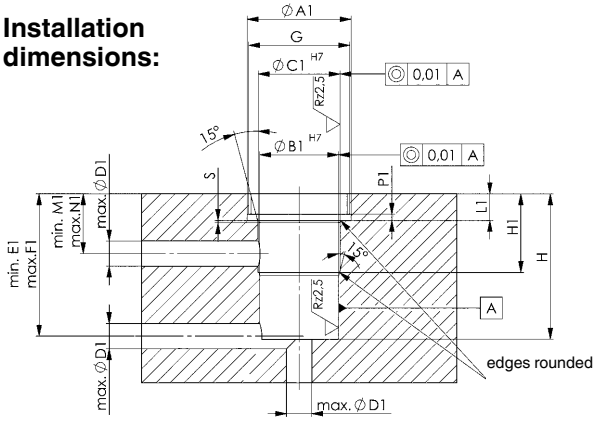
The insertion bevels for the seals must not have any sharp transitions.
Mill the thread up to the flat. Lubricate housing for mounting.
For installation, use hook spanner for size 20 = order no. 54916 and for size 30 = order no. 54940 and for size 50 = order no 54973.

On request:

Other sizes available on request.



Installation dimensions:



Dimensions:

Order no.	Article no.	dia. B	dia. C	dia. D	G	H2	H3	H4	H5	H9	N	P	K	dia. T	V	dia. W
328013	6958E-20	24	25	26	M32x1,5	51,8	41,8	46,2	98	26	33,0	22	10	32	19,69	6
328039	6958E-30	36	37	38	M48x1,5	77,0	62,0	69,0	146	38	49,5	32	15	48	29,54	8
562196	6958E-50	58	59	60	M72x2,0	116,0	93,0	99,0	215	57	73,0	40	23	72	48,43	12

Installation dimensions:

Order no.	Article no.	dia. A1	B1 H7	dia. C1 H7	dia. D1	min. E1	max. F1	G	H	H1	L1	min. M1	max. N1	P1	S	OR-1 O-ring Order No.	OR-2 O-ring Order No.
328013	6958E-20	33	25	26	8	45,2	47,2	M32x1,5	46,2	25	8,5	19,0	21,0	2,0	0,7	554575	554576
328039	6958E-30	49	37	38	10	68,0	70,0	M48x1,5	69,0	35	12,0	27,5	29,5	2,5	0,6	554577	554578
562196	6958E-50	73	59	60	12	97,0	101,0	M72x2,0	99,0	55,1	16,0	34,5	38,5	2,5	1,0	562535	562535

Subject to technical alterations.

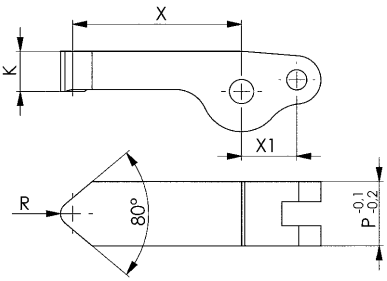
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No. 6958E-XX-0X

Clamping arm out of steel

CAD





Order no.	Article no.	Clamping force at 100 bar [kN]	Clamping force at 250 bar [kN]	X	X1*	K	P	R	Weight [g]
328054	6958E-20-00-01	1,38	3,46	28	13,7	10	16	3	66
328070	6958E-20-00-02	1,11	2,72	35	13,7	10	16	3	74
328096	6958E-20-00-03	0,92	2,30	42	13,7	10	16	3	82
328062	6858E-30-00-01	3,19	7,96	41	20,5	15	24	5	215
328088	6958E-30-00-02	2,56	6,40	51	20,5	15	24	5	242
328104	6958E-30-00-03	2,14	5,35	61	20,5	15	24	5	270
562252	6958E-50-00-01	9,25	23,13	64	33,5	23	40	6	844
562253	6958E-50-00-02	7,50	18,74	79	33,5	23	40	6	950
562254	6958E-50-00-03	6,30	15,75	94	33,5	23	40	6	1056

*X1 = Lever length at 90°

Design:

Case-hardening steel, case-hardened.

Application:

For vertical clamps 6958E.

Note:

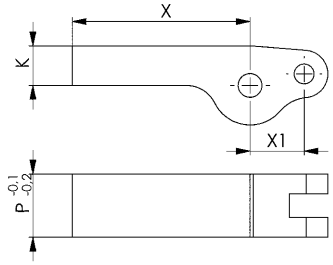
Clamping pressure, leverage, flow volume and clamp arm weight must always be observed.

No. 6958ER-XX-00

Clamping arm blank from steel

CAD





Order no.	Article no.	X	X1*	K	P	Weight [g]
328112	6958E-20-00	45	13,7	10	16	88
328120	6958E-30-00	66	20,5	15	24	287
562250	6958E-50-00	100	33,5	23	40	1130

*X1 = Lever length at 90°

Design:

Case-hardened steel, unhardened.

Application:

For vertical clamps 6958E.

Note:

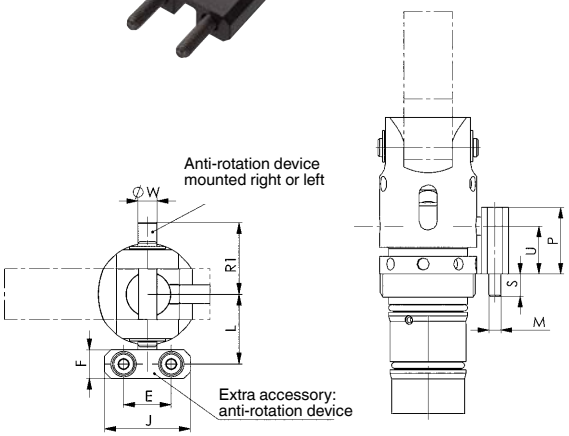
Clamping pressure, leverage, flow volume and clamp arm weight must always be observed.

No. 6958E-XX-00-00

Anti-rotation device

CAD





Order no.	Article no.	E	F	J	L	M	P	S	U	R1	dia. W	Weight [g]
328963	6958E-20-00-00	15	9	27	22,0	M4	22	7	15,8	22,5	6	40
328989	6958E-30-00-00	25	15	40	31,5	M6	32	10	24,0	33,0	8	145
562251	6958E-50-00-00	32	20	50	49,0	M8	46	12,6	36,0	50,0	12	130

Design:

Made of aluminium, black anodised.



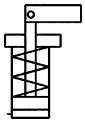


Subject to technical alterations.

No. 6958Sx-16

Vertical Clamp

Single-acting, with spring return,
max. operating pressure 350 bar,
min. operating pressure 40 bar.



Order no.	Article no.	Piston force at 100 bar [kN]	Piston force at 350 bar [kN]	Vol. [cm^3]	Piston dia. [mm]	Piston area [cm^2]	OR-1 O-ring Order No.	Weight [g]
322248	6958SU-16	2,0	7,0	1,9	16	2	334821	280
322255	6958ST-16	2,0	7,0	1,9	16	2	334821	290

Design:

Cylinder body from steel, burnished. Piston rod nitrided. Wiper at piston rod. Built-in return spring. Supply scope includes clamping lever pin, but not clamping lever. Oil supply via oil channel in fixture body.

Application:

This vertical clamp can be used for clamping in cavities or in very tight spaces.

Features:

Small dimensions, can be installed closely spaced side-by-side. The clamping levers can be exchanged easily in the installed position.

Note:

Screws according to ISO4762 M6, strength class 12.9, lightly oiled, tightening torque Md = 18 Nm not supplied as standard.
During unclamping, the vertical clamp allows **a max. dynamic pressure of 3 bar**, which must be strictly taken into account when using control valves.

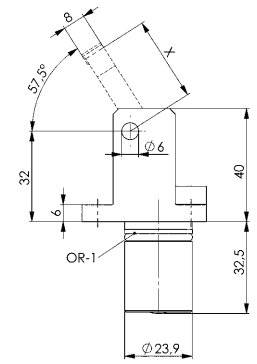


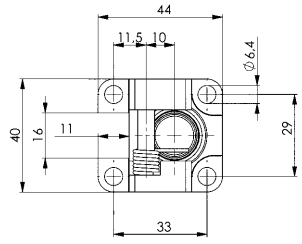
6958SU-16 / 322248



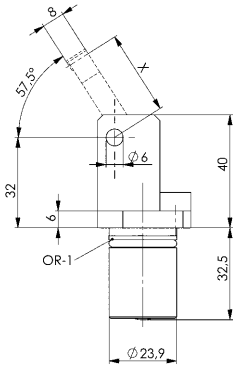
6958ST-16 / 322255

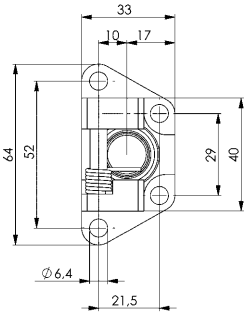
6958SU-16 / 322248



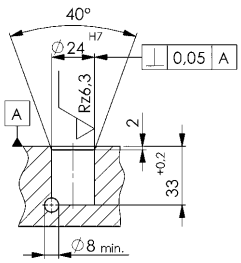


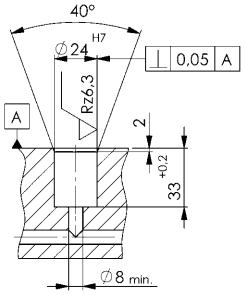
6958ST-16 / 322255





Installation dimensions:





CAD

Subject to technical alterations.

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No. 6958S-16

Clamping arm out of steel

Order no.	Article no.	X	X1*	Clamping force at 100 bar [kN]	Clamping force at 250 bar [kN]	Clamping force at 350 bar [kN]	Weight [g]
320218	6958S-16-00-01	12	12	2,0	5,0	7,0	52
320234	6958S-16-00-02	18	12	1,3	3,3	4,6	60
320259	6958S-16-00-03	24	12	1,0	2,5	3,5	66
320275	6958S-16-00-04	30	12	0,8	2,0	2,8	72
322438	6958S-16-00-05**	-	12	-	-	-	74

* X1 = level length at 90°
**Clamp arm blank, unhardened



Design:

Case-hardening steel, case-hardened.

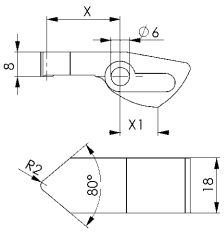
Application:

For vertical clamp 6958SU-16 and 6958ST-16.

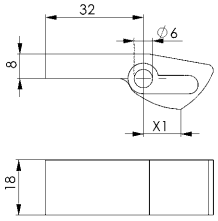
Note:

Clamping pressure, leverage, flow volume and clamp arm weight must always be observed.

Clamping arm



Clamping arm blank



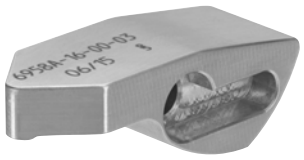
CAD

No. 6958A-16

Clamping arm out of aluminium

Order no.	Article no.	X	X1*	Clamping force at 100 bar [kN]	Weight [g]
320242	6958A-16-00-02	18	12	1,3	21
320267	6958A-16-00-03	24	12	1,0	23
320283	6958A-16-00-04	30	12	0,8	25
322453	6958A-16-00-05**	-	12	-	26

* X1 = level length at 90°
** Clamp arm blank



Design:

Aluminium.

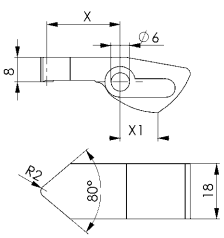
Application:

For vertical clamp 6958SU-16 and 6958ST-16.

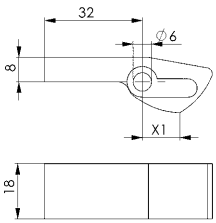
Note:

Clamping pressure, leverage, flow volume and clamp arm weight must always be observed.
Max. operating pressure 100 bar.

Clamping arm



Clamping arm blank



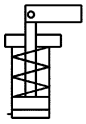
CAD

Subject to technical alterations.

No. 6958AU

Vertical Clamp

Single-acting, with spring return,
max. operating pressure 250 bar,
min. operating pressure 40 bar.





CAD

Order no.	Article no.	Piston force at 100 bar [kN]	Piston force at 250 bar [kN]	Vol. [cm³]	Piston dia. [mm]	effective piston area [cm²]	Md max. [Nm]	Weight [g]
322404	6958AU-16	2	5	1,9	16	2,0	18	220
322446	6958AU-20	3	8	4,0	20	3,1	43	357
322487	6958AU-25	4	12	6,7	25	4,9	84	576
322529	6958AU-32	8	20	14,4	32	8,0	145	926

Design:

Cylinder body from steel, chemically nickel-plated. Piston rod nitrided. Wiper at piston rod. Built-in return spring. Supply scope includes clamping lever pin, but not clamping lever. Oil supply via oil channel in fixture body.

Application:

This vertical clamp can be used for clamping in cavities or in very tight spaces.

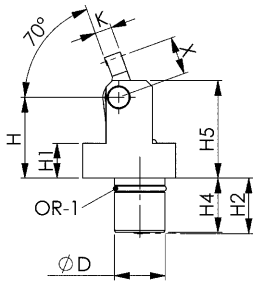
Features:

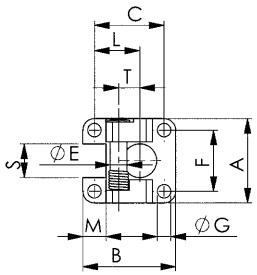
Small dimensions, can be installed closely spaced side-by-side. The clamping levers can be exchanged easily in the installed position.

Note:

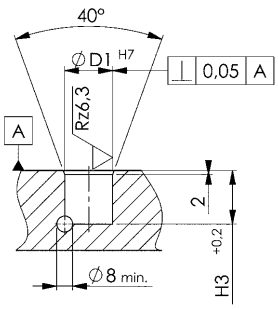
Screws according to ISO 4762, strength class 12.9, lightly oiled, are not supplied as standard.

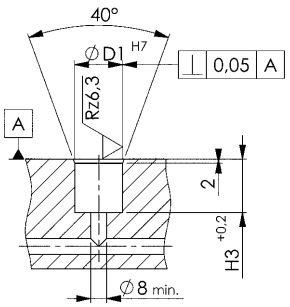
During unclamping, the vertical clamp allows **a max. dynamic pressure of 3 bar**, which must be strictly taken into account when using control valves. Important: Please note the cross-section of the supply line.

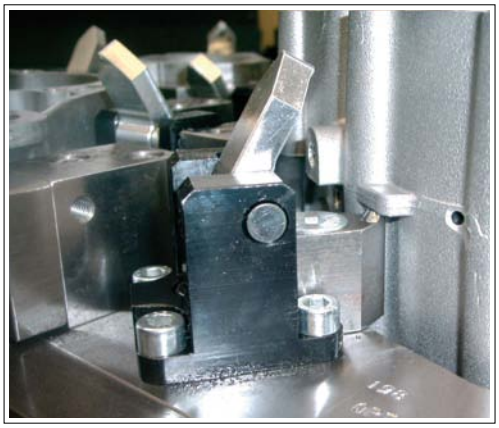




Installation dimensions:







Dimensions:

Order no.	Article no.	A	B	C	dia. D	dia. D1 H7	L	F	dia. G	H	H1	H2	H3	H4	H5	T	M	dia. E	S	K	OR-1 O-ring Order No.
322404	6958AU-16	40	44	33	24	24	21,5	29	6,4	38,3	16,5	26,3	26,8	25,8	46,3	10	11	8	16	8	195347
322446	6958AU-20	46	53	40	30	30	26,0	33	8,5	49,0	20,3	32,7	34,0	-	59,0	11	13	10	20	10	195842
322487	6958AU-25	55	67	51	35	35	32,0	39	10,5	51,0	21,2	34,6	37,0	-	62,0	13	16	12	23	11	195909
322529	6958AU-32	66	76	58	42	42	36,0	48	12,5	60,0	24,1	56,7	59,5	-	76,0	15	18	15	30	16	195925

Dimension X, see clamping lever

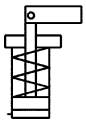
Subject to technical alterations.

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No. 6958AT

Vertical Clamp

Single-acting, with spring return,
max. operating pressure 250 bar,
min. operating pressure 40 bar.





CAD

Order no.	Article no.	Piston force at 100 bar [kN]	Piston force at 250 bar [kN]	Vol. [cm^3]	Piston dia. [mm]	effective piston area [cm^2]	Md max. [Nm]	Weight [g]
322420	6958AT-16	2	5	1,9	16	2,0	18	237
322461	6958AT-20	3	8	4,0	20	3,1	43	392
322503	6958AT-25	4	12	6,7	25	4,9	84	640
322545	6958AT-32	8	20	14,4	32	8,0	145	1014

Design:

Cylinder body made of steel, chemically nickel-plated. Piston rod nitrided. Wiper at piston rod. Built-in return spring. Scope of supply includes clamp arm pin, but clamp arm not included.

Application:

This vertical clamp can be used for clamping in cavities or in very tight spaces.

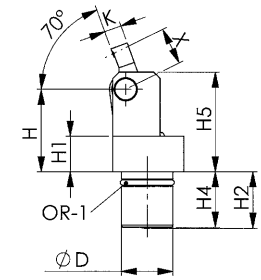
Features:

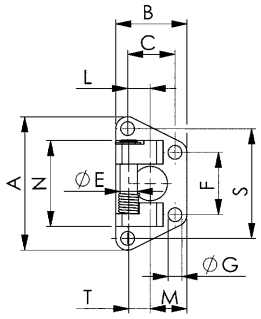
Small dimensions, can be installed closely spaced side-by-side. The clamping arms can be exchanged easily in the installed position.

Note:

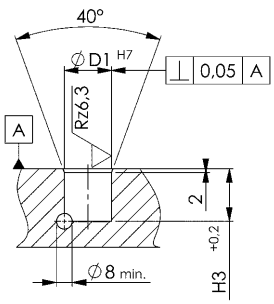
Screws according to ISO 4762, strength class 12.9, lightly oiled, are not supplied as standard.

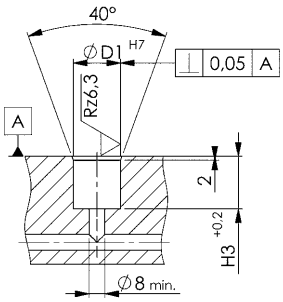
During unclamping, the vertical clamp allows **a max. dynamic pressure of 3 bar**, which must be strictly taken into account when using control valves. Important: Please note the cross-section of the supply line.

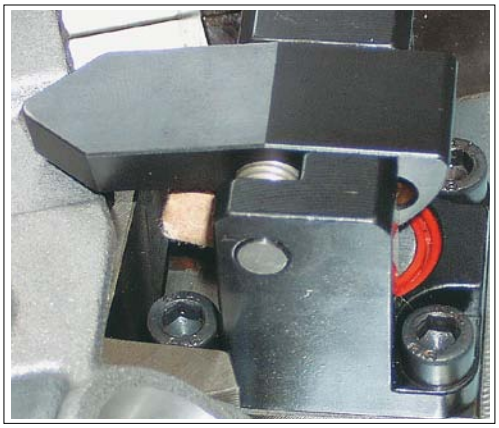




Installation dimensions:







Dimensions:

Order no.	Article no.	A	B	C	dia. D	dia. D1 H7	L	F	dia. G	H	H1	H2	H3	H4	H5	T	M	N	dia. E	S	K	OR-1 O-ring Order No.
322420	6958AT-16	62	33	22	24	24	10,5	29	6,4	38,3	16,5	26,3	26,8	25,8	46,3	10	17,0	40	8	51	8	195347
322461	6958AT-20	72	40	27	30	30	13,0	33	8,5	49,0	20,3	32,7	34,0	-	59,0	11	20,5	46	10	59	10	195842
322503	6958AT-25	87	51	35	35	35	16,0	39	10,5	51,0	21,2	34,6	37,0	-	62,0	13	27,0	55	12	71	11	195909
322545	6958AT-32	102	58	40	42	42	18,0	48	12,5	60,0	24,1	56,7	59,5	-	76,0	15	31,0	66	15	84	16	195925

Dimension X, see clamping lever

Subject to technical alterations.

No. 6958S

Clamping arm out of steel



Order no.	Article no.	dia. E	R	K	P	X	X1*	Clamping force at 100 bar [kN]	Clamping force at 250 bar [kN]	Weight [g]
324186	6958S-16-01-02	8	2	8	18	18	12	1,3	3,3	60
324178	6958S-16-01-03	8	2	8	18	24	12	1,0	2,5	66
324194	6958S-16-01-04	8	2	8	18	30	12	0,8	2,0	72
322495	6958S-20-00-02	10	2	10	22	18	12	2,0	5,2	114
322511	6958S-20-00-03	10	2	10	22	24	12	1,5	3,9	125
322537	6958S-20-00-04	10	2	10	22	30	12	1,2	3,1	135
322693	6958S-25-00-02	12	4	11	27	24	16	2,6	8,2	171
322719	6958S-25-00-03	12	4	11	27	32	16	2,0	6,1	191
322735	6958S-25-00-04	12	4	11	27	40	16	1,6	4,9	211
322891	6958S-32-00-02	15	4	16	34	30	20	5,3	13,3	375
322917	6958S-32-00-03	15	4	16	34	40	20	4,0	10,0	417
322933	6958S-32-00-04	15	4	16	34	50	20	3,2	8,0	457

* X1 = level length at 90°

Design:

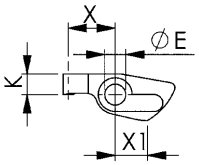
Case-hardening steel, case-hardened.

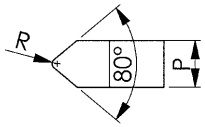
Application:

For vertical clamp 6958AU and 6958AT.

Note:

Clamping pressure, leverage, flow volume and clamp arm weight must always be observed.





CAD

No. 6958S

Clamping arm blank from steel



Order no.	Article no.	dia. E	R	K	P	X	X1*	Weight [g]
324418	6958S-16-01-05	8	2	8	18	32	12	74
322552	6958S-20-00-05	10	2	10	22	32	12	141
322750	6958S-25-00-05	12	4	11	27	44	16	217
322958	6958S-32-00-05	15	4	16	34	54	20	476

* X1 = level length at 90°

Design:

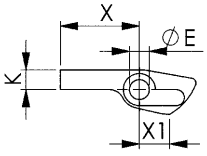
Case-hardened steel, unhardened.

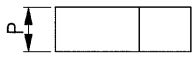
Application:

For vertical clamp 6958AU and 6958AT.

Note:

Clamping pressure, leverage, flow volume and clamp arm weight must always be observed.





CAD

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No. 6958A

Clamping arm out of aluminium



Order no.	Article no.	dia. E	R	K	P	X	X1*	Clamping force at 100 bar [kN]	Weight [g]
324434	6958A-16-01-02	8	2	8	18	18	12	1,3	21
324459	6958A-16-01-03	8	2	8	18	24	12	1,0	23
324475	6958A-16-01-04	8	2	8	18	30	12	0,8	25
322594	6958A-20-00-02	10	2	10	22	18	12	2,0	40
322610	6958A-20-00-03	10	2	10	22	24	12	1,5	43
322636	6958A-20-00-04	10	2	10	22	30	12	1,2	47
322792	6958A-25-00-02	12	4	11	27	24	16	2,6	59
322818	6958A-25-00-03	12	4	11	27	32	16	2,0	66
322834	6958A-25-00-04	12	4	11	27	40	16	1,6	73
322990	6958A-32-00-02	15	4	16	34	30	20	5,3	130
323014	6958A-32-00-03	15	4	16	34	40	20	4,0	144
323030	6958A-32-00-04	15	4	16	34	50	20	3,2	158

* X1 = level length at 90°

Design:

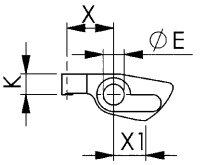
Aluminium.

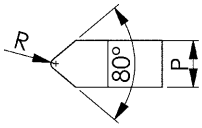
Application:

For vertical clamp 6958AU and 6958AT.

Note:

Clamping pressure, leverage, flow volume and clamp arm weight must always be observed. Max. operating pressure 100 bar.





CAD

No. 6958A

Clamping arm blank from aluminium



Order no.	Article no.	dia. E	K	P	X	X1*	Weight [g]
324483	6958A-16-01-05	8	8	18	32	12	26
322651	6958A-20-00-05	10	10	22	32	12	49
322859	6958A-25-00-05	12	11	27	44	16	75
323055	6958A-32-00-05	15	16	34	54	20	165

* X1 = level length at 90°

Design:

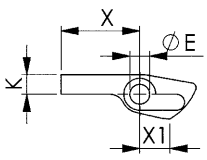
Aluminium.

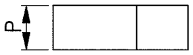
Application:

For vertical clamp 6958AU and 6958AT.

Note:

Clamping pressure, leverage, flow volume and clamp arm weight must always be observed. Max. operating pressure 100 bar.





CAD

Subject to technical alterations.

No. 6958AU

Surface-mounted block

with O-ring connection and threaded connection



Order no.	Article no.	A	A1	B	B1	C	C1	dia. D1	L	OR-1 O-ring Order No.	Weight [g]
322560	6958AU-16-10-01	40	29	44	33	17,0	11,5	6,5	50	321646	145
322586	6958AU-20-10-01	46	33	53	40	20,5	14,0	8,5	57	321646	229
322602	6958AU-25-10-01	55	39	67	51	27,0	19,0	10,5	60	321646	379
322628	6958AU-32-10-01	66	48	76	58	31,0	22,0	12,5	82	321646	653

Design:

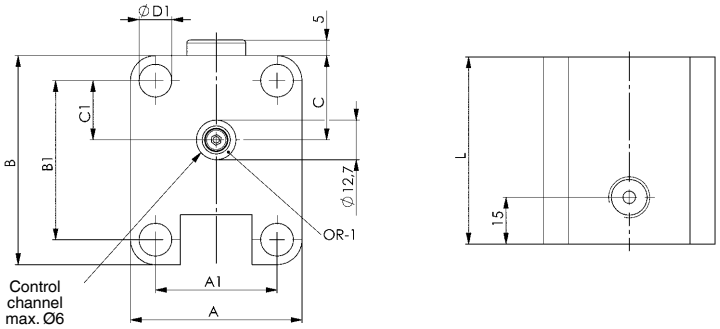
Made of aluminium, red anodised.
Supply scope includes O-ring dia.9x2, threaded plugs and fastening screws.

Application:

The surface-mounted block with O-ring connection from below and threaded connection can be flanged into the fixture as an adapter over the control channel without restriction for the cylindrical part of the vertical clamp or where the control oil supply to the vertical clamp has to be routed via external lines.

Note:

The flange surface on the fixture must be even, and must have a surface finish of Rz 6.3 in the area of the O-ring sealing surface. Other lengths are available on request.



CAD

No. 6958AT

Surface-mounted block

with O-ring connection and threaded connection



Order no.	Article no.	A	A1	A2	B	B1	C	C1	dia. D1	L	OR-1 O-ring Order No.	Weight [g]
323089	6958AT-16-10-01	62	29	51	33	22	17,0	11,5	6,5	50	321646	161
323105	6958AT-20-10-01	72	33	59	40	27	20,5	14,0	8,5	57	321646	263
323121	6958AT-25-10-01	87	39	71	51	35	27,0	19,0	10,5	60	321646	437
323147	6958AT-32-10-01	102	48	84	58	40	31,0	22,0	12,5	82	321646	756

Design:

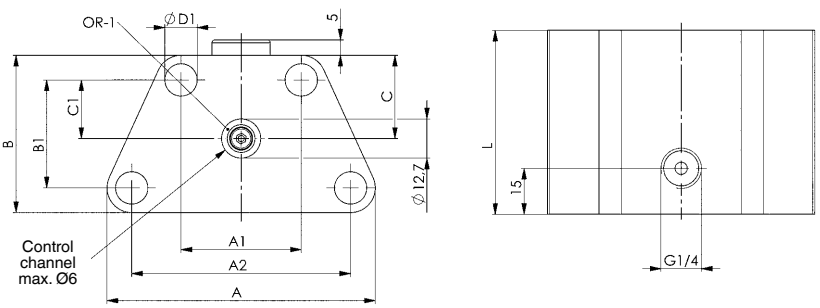
Made of aluminium, red anodised.
Supply scope includes O-ring dia.9x2, threaded plugs and fastening screws.

Application:

The surface-mounted block with O-ring connection from below and threaded connection can be flanged into the fixture as an adapter over the control channel without restriction for the cylindrical part of the vertical clamp or where the control oil supply to the vertical clamp has to be routed via external lines

Note:

The flange surface on the fixture must be even, and must have a surface finish of Rz 6.3 in the area of the O-ring sealing surface. Other lengths are available on request.

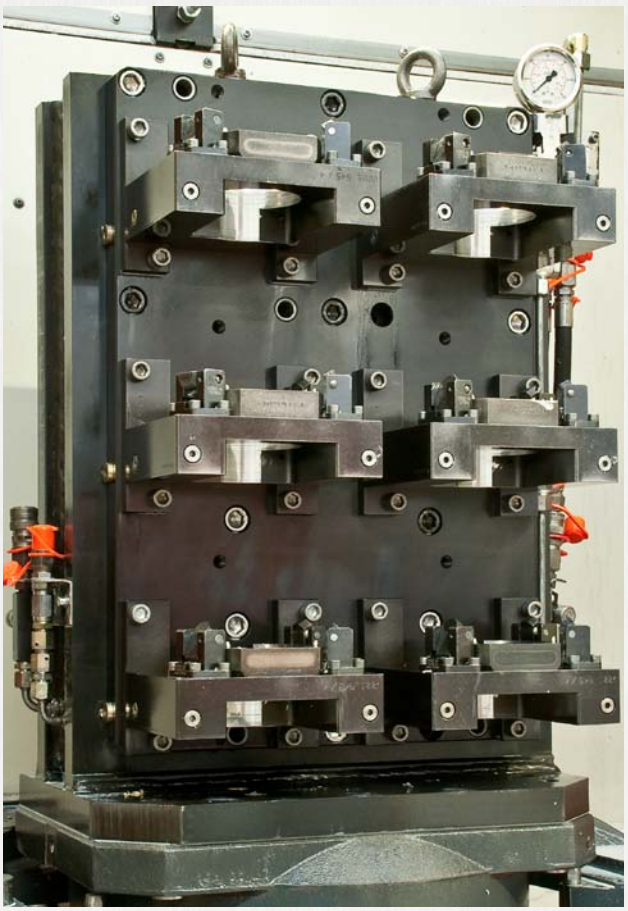


CAD

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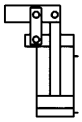


Subject to technical alterations.

No. 6958DU

Vertical Clamp

Double-acting,
max. working pressure 250 bar,
min. operating pressure 25 bar.





CAD

Order no.	Article no.	Clamping force F1 at 100 bar [kN]	Clamping force F1 at 250 bar [kN]	Piston force F5 at 100 bar [kN]	Piston force F5 at 250 bar [kN]	Vol. Sp [cm^3]	Vol. Lo [cm^3]	eff. piston area Sp [cm^2]	eff. piston area Lo [cm^2]	Md max. [Nm]	Q max. [l/min]	Weight [g]
326272	6958DU-16	1,3	3,3	2,0	5,0	2,0	1,2	2,0	1,2	7,5	0,5	334
326314	6958DU-20	2,1	5,2	3,1	7,8	3,8	2,4	3,1	2,0	15,0	0,8	624
326371	6958DU-25	3,2	8,2	4,9	12,2	6,9	4,1	4,9	2,9	27,0	1,2	906
327536	6958DU-32	5,3	13,4	8,0	20,1	13,7	8,3	8,0	4,9	47,0	2,0	1920

Sp = clamp, Lo = unclamp

Design:

Hydraulic cylinder as a drop-in cartridge. Top mounting with four cylinder screws (resistance min. 10.9); these are supplied as standard. All components are made of hardened steel, tempered and burnished. Piston and pivot bolts are made from tempered steel, hardened and nitrided. Metal wiper to protect the dirt wiper is integrated into the housing. Compressed air nozzle for pneumatic clamping control. Pivot bolts, tensioning straps and compressed air nozzle are supplied as standard, but not clamping arms. Oil supply via oil channel in fixture body.

Application:

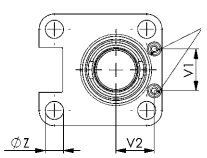
The double-acting vertical clamp is highly suited to clamping in clamping pockets. For clearly defined return movements.

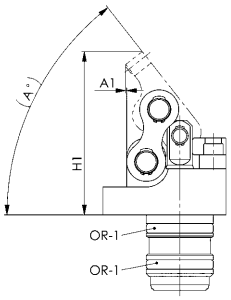
Features:

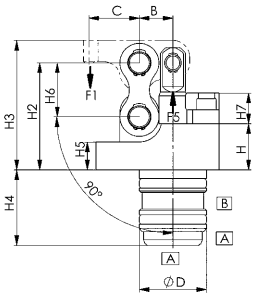
Small dimensions. Allows close side-by-side positioning. Clamping levers easy to change with built-in vertical clamp. The horizontal centre axis at the clamping lever and the pressure point on the workpiece lie in one plane. This prevents relative movement on the workpiece. To protect the O-rings sitting radially on the clamp, the cross channels at the installation hole must be rotated freely and equipped with insertion lead-ins. If the vertical clamp is closed, the compressed air that previously streamed out freely is blocked in the compressed air nozzle. The resulting back pressure can be used for clamping control with the help of a signal converter.

Note:

The signal converter is not included in the supply scope.
The lever ratio B to C is 1 to 1.5 for the standard levers!
In preparing the blank levers, deviations that cause a higher clamping force are permitted only in exceptional cases.

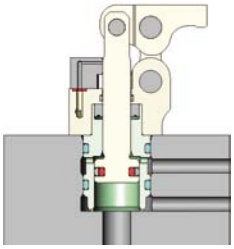




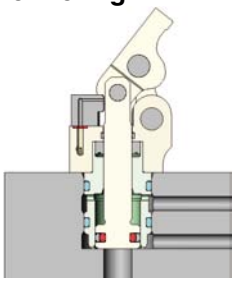


A = clamp
B = unclamp

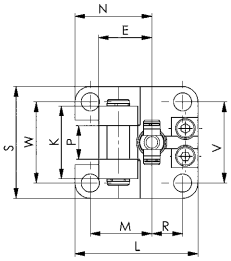
Dynamic pressure monitoring:



closed: clamped



open: unclamped



Dimensions:

Order no.	Article no.	A	A1	B	C	E	dia. D	H	H1	H2	H3	H4	H5	H6	H7	K	L	M	N	P	R	S	V	V1	V2	W	ØZ	OR-1 O-ring Order No.
326272	6958DU-16	51,9	0,40	12	18,0	19,0	24	16,5	58,4	38,3	46,3	27,0	10	19,3	11	26	44	22	27,5	12	11	40	29	15	13,7	29	6,5	497461
326314	6958DU-20	54,0	1,25	14	21,0	23,0	30	20,3	73,2	49,0	59,0	34,0	10	25,0	16	32	53	26	32,5	16	14	46	33	15	17,5	33	8,5	490342
326371	6958DU-25	51,2	0,70	17	25,5	27,5	35	21,0	79,4	51,0	62,0	37,0	10	27,0	16	39	67	32	40,0	20	19	55	39	15	21,0	39	10,5	321018
327536	6958DU-32	53,4	-1,0	20	30,0	33,0	42	24,0	97,1	63,0	76,0	59,5	11	35,0	18	50	76	36	45,0	26	22	66	48	15	24,0	48	12,5	409748

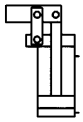
Subject to technical alterations.

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No. 6958DT

Vertical Clamp

Double-acting,
max. working pressure 250 bar,
min. operating pressure 25 bar.





CAD

Order no.	Article no.	Clamping force F1 at 100 bar [kN]	Clamping force F1 at 250 bar [kN]	Piston force F5 at 100 bar [kN]	Piston force F5 at 250 bar [kN]	Vol. Sp [cm³]	Vol. Lo [cm³]	eff. piston area Sp [cm²]	eff. piston area Lo [cm²]	Md max. [Nm]	Q max. [l/min]	Weight [g]
553427	6958DT-12	0,7	1,8	1,1	2,8	0,9	0,5	1,1	0,6	2,7	0,3	175
326231	6958DT-16	1,3	3,3	2,0	5,0	2,0	1,2	2,0	1,2	7,5	0,5	365
326298	6958DT-20	2,1	5,2	3,1	7,8	3,8	2,4	3,1	2,0	15,0	0,8	386
326397	6958DT-25	3,2	8,2	4,9	12,2	6,9	4,1	4,9	2,9	27,0	1,2	1015
327510	6958DT-32	5,3	13,4	8,0	20,1	13,7	8,3	8,0	4,9	47,0	2,0	1970

Sp = clamp, Lo = unclamp

Design:

Hydraulic cylinder as a drop-in cartridge. Top mounting with four cylinder screws (resistance min. 10.9); these are supplied as standard. All components are made from hardened, tempered and burnished steel. Piston and pivot bolts are made from tempered steel, hardened and nitrided. Metal wiper to protect the dirt wiper is integrated into the housing. Compressed air nozzle for pneumatic clamping control. Pivot bolts, tensioning straps and compressed air nozzle are supplied as standard, but not clamping arms. Oil supply via oil channel in fixture body.

Application:

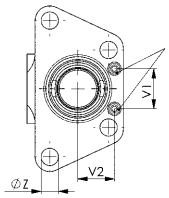
The double-acting vertical clamp is highly suited to clamping in clamping pockets. For clearly defined return movements.

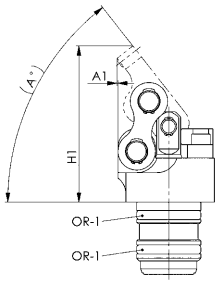
Features:

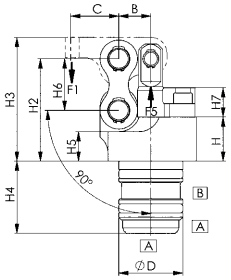
Small dimensions. Allows close side-by-side positioning. Clamping levers easy to change with built-in vertical clamp. The horizontal centre axis at the clamping lever and the pressure point on the workpiece lie in one plane. This prevents relative movement on the workpiece. To protect the O-rings sitting radially on the clamp, the cross channels at the installation hole must be rotated freely and equipped with insertion lead-ins. If the vertical clamp is closed, the compressed air that previously streamed out freely is blocked in the compressed air nozzle. The resulting back pressure can be used for clamping control with the help of a signal converter.

Note:

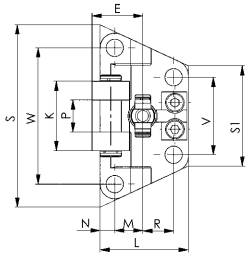
The signal converter is not included in the supply scope.
The lever ratio B to C is 1 to 1.5 for the standard levers!
In preparing the blank levers, deviations that cause a higher clamping force are permitted only in exceptional cases.



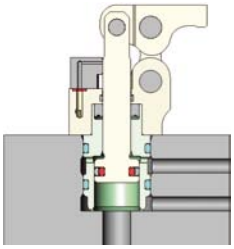




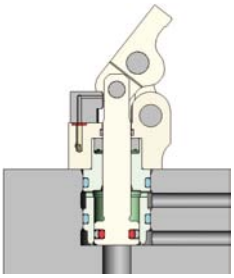
A = clamp
B = unclamp



Dynamic pressure monitoring:



closed: clamped



open: unclamped

Dimensions:

Order no.	Article no.	A	A1	B	C	E	dia. D	H	H1	H2	H3	H4	H5	H6	H7	K	L	M	N	P	R	S	S1	V	V1	V2	W	ØZ	OR-1 O-ring Order No.
553427	6958DT-12	49,5	0,13	10	15,0	17,0	18	13,5	47,7	31,0	38,0	22,0	7	16,0	12,2	20	28,5	10,0	4,5	10	8,5	50,1	23,55	20	7	11,4	36	4,5	409953
326231	6958DT-16	51,9	0,40	12	18,0	19,0	24	16,5	58,4	38,3	46,3	27,0	11	19,3	11	26	33	10,5	5,5	12	11,5	68,3	37,49	29	15	13,7	51	6,5	497461
326298	6958DT-20	54,0	1,25	14	21,0	23,0	30	20,3	73,2	49,0	59,0	34,0	14	25,0	16	32	40	13,0	6,0	16	14,0	78,9	41,60	33	15	17,5	59	8,5	490342
326397	6958DT-25	51,2	0,70	17	25,5	27,5	35	21,0	79,4	51,0	62,0	37,0	12	27,0	16	39	51	16,0	8,0	20	19,0	96,1	48,55	39	15	21,0	71	10,5	321018
327510	6958DT-32	53,4	-1,0	20	30,0	33,0	42	24,0	97,1	63,0	76,0	59,5	13	35,0	18	50	58	18,0	9,0	26	22,0	112,25	58,16	48	15	24,0	84	12,5	409748

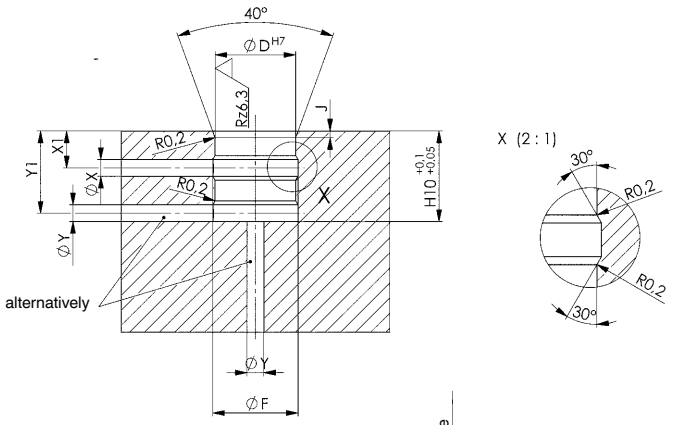
Subject to technical alterations.

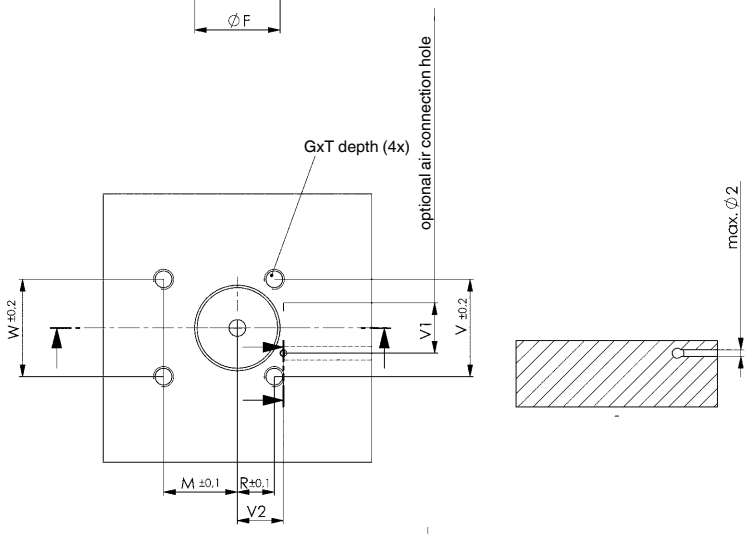
Installation dimensions:

Order no.	Article no.	dia. D H7	dia. F	G x T	H10	J	M	R	V	V1	V2	W	dia. X	X1	dia. Y	Y1
326272	6958DU-16	24	25,4	M6x15	27,0	2,0	22	11	29	15	13,7	29	5	11	5	24,5
326314	6958DU-20	30	31,4	M8x16	34,0	2,0	26	14	33	15	17,5	33	5	13	5	31,5
326371	6958DU-25	35	36,4	M10x20	37,0	2,0	32	19	39	15	21,0	39	5	14	5	34,5
327536	6958DU-32	42	43,4	M12x20	59,5	2,5	36	22	48	15	24,0	48	6	18	6	56,5

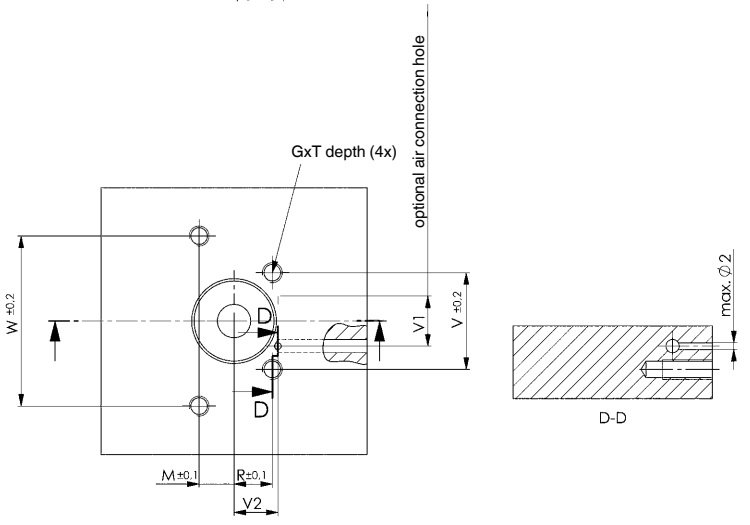
Order no.	Article no.	dia. D H7	dia. F	G x T	H10	J	M	R	V	V1	V2	W	dia. X	X1	dia. Y	Y1
553427	6958DT-12	18	19,4	M4x8	22,0	0,5	10,0	8,5	20	7	11,4	36	4	8	4	20,0
326231	6958DT-16	24	25,4	M6x15	27,0	2,0	10,5	11,5	29	15	13,7	51	5	11	5	24,5
326298	6958DT-20	30	31,4	M8x16	34,0	2,0	13,0	14,0	33	15	17,5	59	5	13	5	31,5
326397	6958DT-25	35	36,4	M10x20	37,0	2,0	16,0	19,0	39	15	21,0	71	5	14	5	34,5
327510	6958DT-32	42	43,4	M12x20	59,5	2,5	18,0	22,0	48	15	24,0	84	6	18	6	56,5

6958DU





6958DT



Subject to technical alterations.

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No. 6958D-xx-04

Clamping arm



CAD

Order no.	Article no.	Clamping force F1 at 100 bar [kN]	Clamping force F1 at 250 bar [kN]	B	C	dia. D	dia. E	G	K	L	N	N1	P	R	R1	Weight [g]
553428	6958D-12-04	0,7	1,8	10	15,0	6	4	90	7	30,5	5,0	3,4	10	1,5	4,0	19
326215	6958D-16-04	1,3	3,3	12	18,0	8	6	90	8	38,0	5,0	4,5	12	2,0	5,0	31
326322	6958D-20-04	2,1	5,2	14	21,0	10	7	80	10	44,5	4,5	7,0	16	2,5	7,5	60
326413	6958D-25-04	2,6	8,2	17	25,5	12	9	80	11	53,5	7,0	7,0	20	3,0	7,5	94
327551	6958D-32-04	5,3	13,4	20	30,0	15	11	80	13	64,0	8,0	7,5	26	4,0	8,0	178

Design:

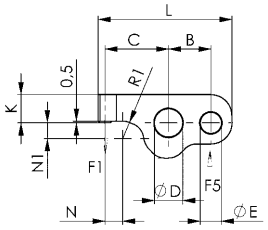
Hardened, tempered and burnished steel.

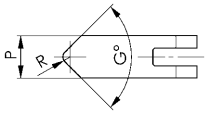
Application:

For vertical clamp 6958DU and 6958DT.

Note:

Clamping pressure, leverage, flow volume and clamp arm weight must always be observed.





No. 6958DR

Clamping arm, blank



CAD

Order no.	Article no.	B	C	dia. D	dia. E	K	L	N	N1	P	R1	Weight [g]
553429	6958DR-12-04	10	26	6	4	7	40	16	3,6	10	4,0	25
326256	6958DR-16-04	12	32	8	6	8	50	20,0	5,0	12	5,0	42
326348	6958DR-20-04	14	40	10	7	10	61	23,5	7,5	16	7,5	86
326439	6958DR-25-04	17	50	12	9	11	75	31,5	7,5	20	7,5	140
327577	6958DR-32-04	20	58	15	11	13	88	36,0	8,0	26	8,0	258

Design:

Hardened, tempered and burnished steel.

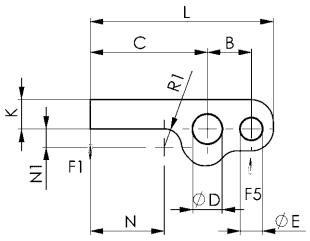
Application:

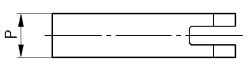
For vertical clamp 6958DU and 6958DT.

Note:

Clamping pressure, leverage, flow volume and clamp arm weight must always be observed.

Formula to determine the clamping force F1:
Clamping force = F1 [kN], piston force = F5 [kN],
operating lever = B [mm], load lever = C [mm]
F1 = F5 x B / C





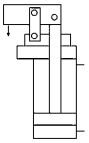


Subject to technical alterations.

No. 6958CK

Vertical clamp MINI

Double-acting,
max. operating pressure 250 bar,
min. operating pressure 35 bar.



CAD



Order no.	Article no.	Clamping force F1 at 100 bar* [kN]	Clamping force F1 at 250 bar* [kN]	Piston force F5 at 100 bar [kN]	Piston force F5 at 250 bar [kN]	Vol. Sp [cm^3]	Vol. Lo [cm^3]	eff. piston area Sp [cm^2]	Md [Nm]	Q max. ** [l/min]	Weight [g]
562236	6958CK-16	1,36	3,4	2,54	6,36	2,75	1,53	2,545	5,8	0,5	333
563316	6958CK-20	2,90	6,9	5,31	13,25	6,89	4,60	5,309	9,1	0,5	580

Cl = clamping, Uncl = unclamp
* Specifications with clamping arm, standard

Design:

Housing, piston, piston crown made of tempered steel, tempered and nitrided, visible components, burnished.
Two brass wipers integrated on the joint head. Connections for pneumatic monitoring of the clamping arm position.
Supplied as standard with 4 x cylinder screws (strength 12.9) and clamping arm. Oil supply via oil channel in fixture body.

Application:

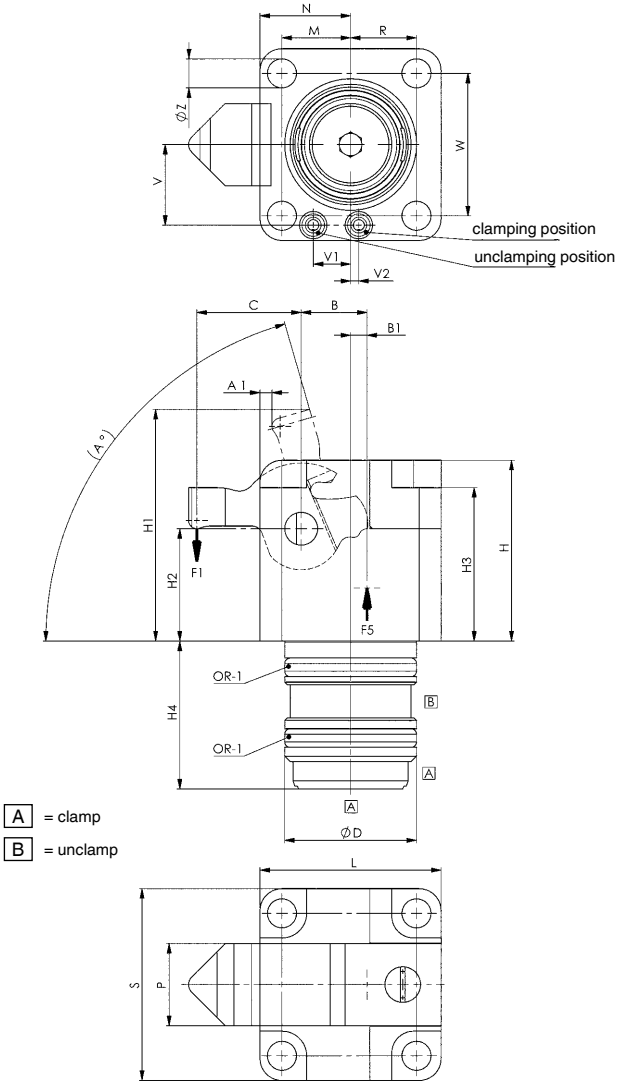
The MINI vertical clamp is preferred for use in devices with little installation space. Through the oil supply in the fixture body, a very close array of the clamping elements is possible. The clamping arm position can be monitored pneumatically in the release and clamping position. Workpieces can be installed or removed automatically with handling devices.

Features:

The double-acting MINI vertical clamp permits a clearly defined movement of the clamp arm. The horizontal centre axis at the clamping lever and the pressure point on the workpiece lie in one plane. The pneumatic monitoring of the clamp arm position enables use in automatic production processes. The mechanism of the clamp is encapsulated by brass wipers, thereby ensuring very good protection against dirt.

Note:

Collision of the workpiece with the clamping arm must be avoided during loading and unloading of the clamp. Soiling at the vertical clamp must be considered or avoided through inclusion in the cleaning process. The lever ratio and operating pressure must be observed when using special clamping levers.



Dimensions:

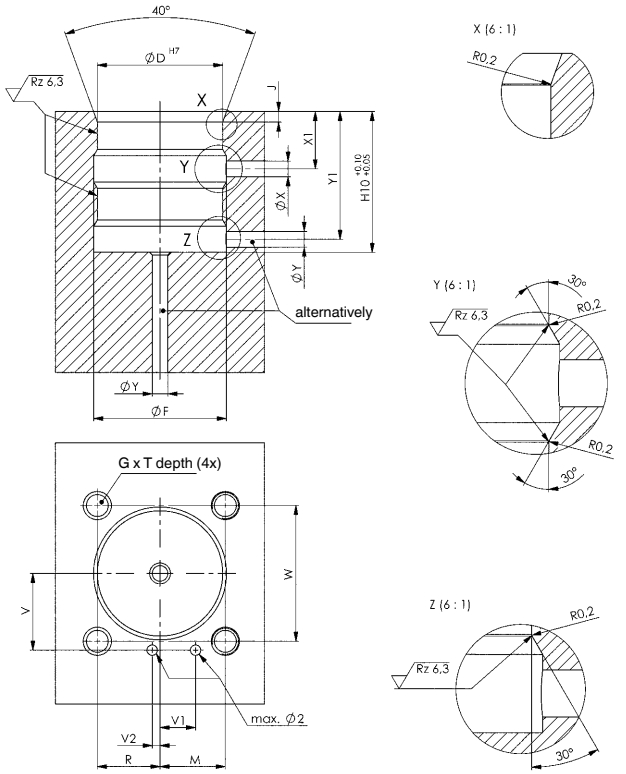
Order no.	Article no.	A°	A1	B	B1	C	ØD f7	H	H1	H2	H3	H4	L	M	N	P	R	S	V	V1	V2	W	ØZ	OR-1 O-ring Order No.
562236	6958CK-16	73,0	2,1	12	3	19	24	33	42,3	20,5	28	27	33	12,5	16,5	15	12	35	14,7	6,8	1,5	26	5,3	497461
563316	6958CK-20	67,6	0,8	14	4	25	33	35	49,1	21,0	29	40	40	15,0	20,0	17	15	40	15,0	9,0	9,0	30	6,2	497487

Subject to technical alterations.

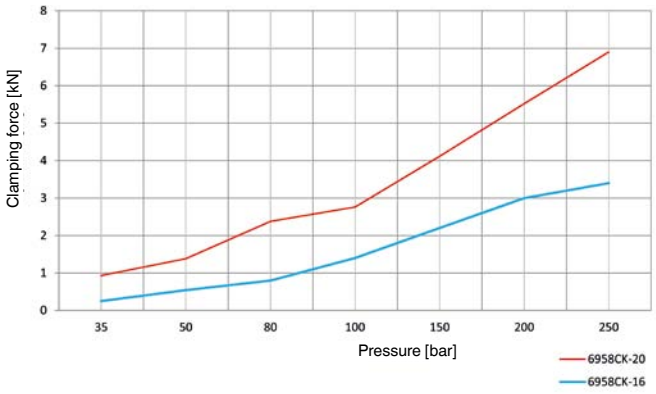
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Installation dimensions:

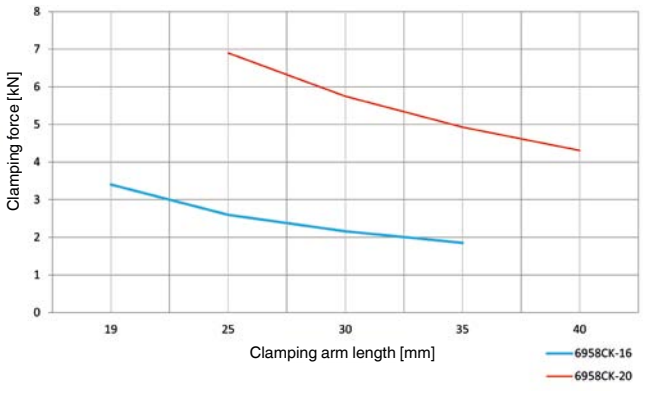
Order no.	Article no.	dia. D H7	dia. F	G x T	J	H10	M	R	V	V1	V2	X1	Y1	dia. X	dia. Y
562236	6958CK-16	24	25,4	M5 x 10	2,09	27	12,5	12	14,7	6,8	1,5	11	24,5	3	3
563316	6958CK-20	33	34,0	M6 x 12	2,35	40	15,0	15	15,0	9,0	9,0	13	50,0	3	3



Clamping force vertical clamp MINI 6958CK-XX (Clamping arm standard)



Clamping force vertical clamp MINI 6958CK-XX-04 (Clamping arm blank)



Subject to technical alterations.

No. 6958CK-XX-04

Clamping arm

CAD

Order no.	Article no.	B	B1	C	G°	K	L	N	P	R	R1	Weight [g]
562272	6958CK-16-04	12	3	19	90	7,5	32,7	10	15	2	2	34
567477	6958CK-20-04	14	4	25	90	9,5	40,8	15	17	2	2,7	54



Design:

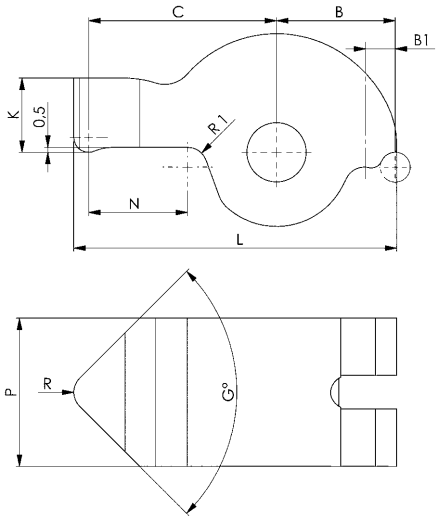
Heat treated and burnished steel.

Application:

For MINI vertical clamp 6958CK.

Note:

Clamping pressure, leverage, flow volume and clamp arm weight must always be observed.

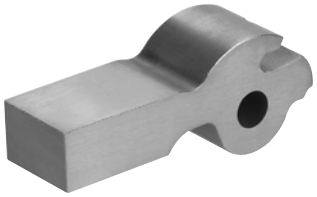


No. 6958CKR-XX-04

Clamping arm blank

CAD

Order no.	Article no.	B	B1	C	dia. D H7	J	K	L	N	P	R	R1	Weight [g]
562277	6958CKR-16-04	12	3	35	6	2,5	10	47,2	26	15	6	2	56
567005	6958CKR-20-04	14	4	40	9	1,6	11	54,3	30	17	7	3	78



Design:

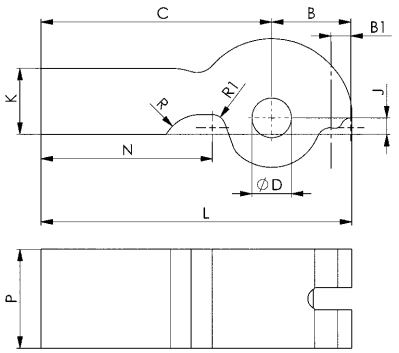
Heat treated and burnished steel.

Application:

For MINI vertical clamp 6958CK.

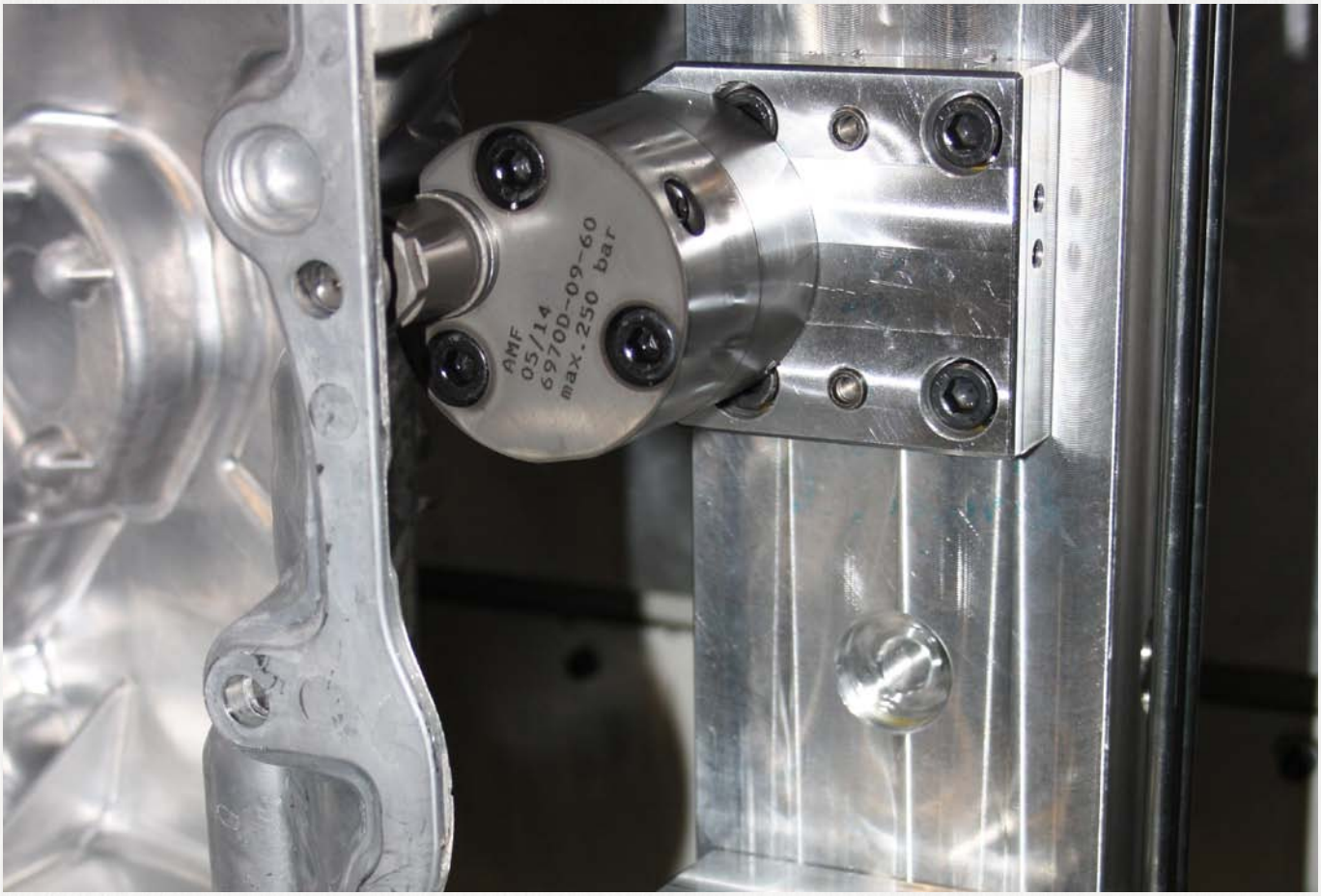
Note:

Clamping pressure, leverage, flow volume and clamp arm weight must always be observed.



Subject to technical alterations.

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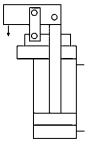


Subject to technical alterations.

No. 6958C-XX-1

Vertical clamp with linear stroke

Double-acting,
max. operating pressure 250 bar,
min. operating pressure 40 bar.





CAD

Order no.	Article no.	Clamping force at 250 bar Sp* [kN]	Clamping stroke H [mm]	Vol. Sp [cm³]	eff. piston area Sp [cm²]	Md [Nm]	Q max. * [l/min]	Weight [g]
561039	6958C-03-1	2,8	5	4,12	4,4	7,0	0,5	486
561040	6958C-04-1	5,0	6	6,82	6,82	13,0	0,9	744
556978	6958C-07-1	8,3	7	10,83	38,2	15	1,5	1200

Cl = clamping
* Specifications with clamping arm, standard

Design:

Hydraulic clamp as drop-in cartridge with hardened running socket, which can be screwed into the fixture. Top mounting with four cylinder screws (resistance min. 12.9); these are supplied as standard. All components are made from hardened, tempered and burnished steel. Piston and pivot bolts are made from tempered steel, hardened and nitrided. Metal wiper to protect the dirt wiper is integrated into the housing. Compressed air nozzle for pneumatic clamping control. Pivot bolts, tensioning straps and compressed air nozzle are supplied as standard, but not clamping arms. Oil supply via oil channel in fixture body.

Application:

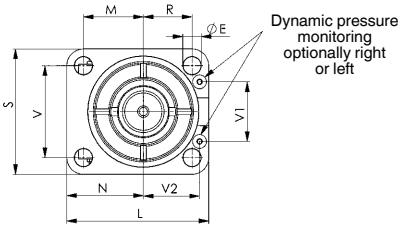
The double-acting vertical clamp is preferred for use in hydraulic fixtures in which there is very little installation space for a hydraulic clamping element. For complex workpieces, a small area is sufficient to clamp the workpiece. Through the oil supply in the fixture body, a very close array of the clamping elements is possible. Pneumatic release control permits monitoring of the clamp arm. Workpieces can be installed or removed automatically with handling devices.

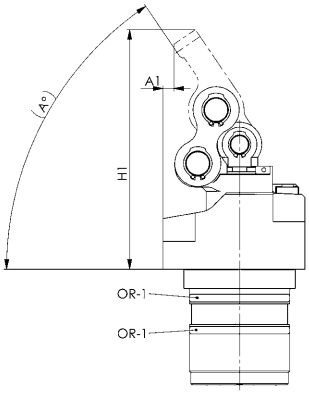
Features:

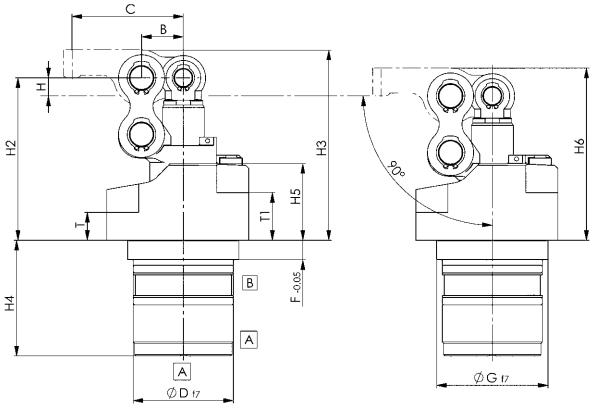
The double-acting vertical clamp permits a clearly defined movement of the clamp arm. After the rotary movement of the clamping arm, there follows a linear clamping stroke on the workpiece, which can compensate for large workpiece tolerances. There is no relative movement on the workpiece during its clamping. Very small dimensions, so workpieces can be installed closely spaced side-by-side. Due to the pneumatic release control, the clamp is used optimally in automated sequences.

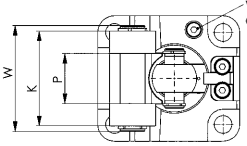
Note:

Collision of the workpiece with the clamping arm must be avoided during loading and unloading of the clamping fixture. When designing the clamping fixture, the clamping position must be laid approximately in the middle of the clamping stroke in order to have enough reserve for workpiece tolerances. Soiling at the vertical clamp must be considered or avoided through inclusion in the cleaning process. The signal converter is not supplied as standard. The lever ratio must be observed when using special clamping levers.



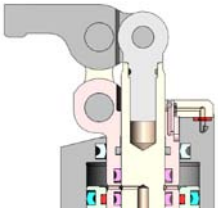




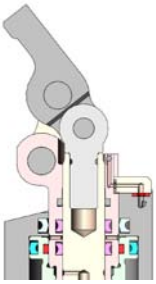


A = clamp
B = unclamp

Dynamic pressure monitoring:



closed: clamped



open: unclamped

Dimensions:

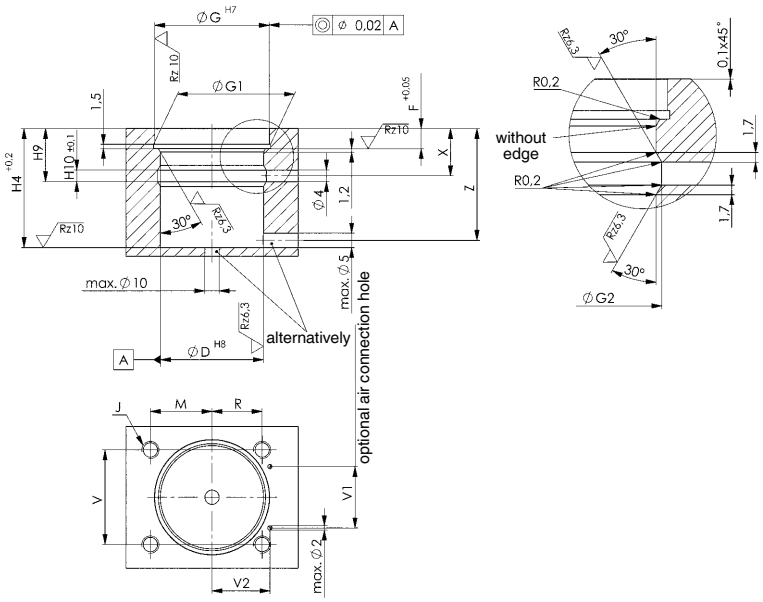
Order no.	Article no.	A°	A1	B	C	ØD f7	dia. E	F -0.05	ØG f7	H	H1	H2	H3	H4	H5	H6	K	L	M	N	P	R	S	T	T1	V	V1	V2	W	OR-1 O-ring Order No.
561039	6958C-03-1	52	0,5	12	35	29	6,1	7	33	6	80,0	54,30	63,3	36,0	27,5	57,3	29	42	17,4	22,5	15	14,4	39	10	18,0	28,5	18,4	16,6	33	564372
561040	6958C-04-1	56	3,4	15	40	36	6,4	7	40	6	86,0	58,30	68,3	41,5	27,5	62,3	34	51	21,5	27,5	18	17,5	45	10	17,1	33,0	21,4	20,2	38	564371
556978	6958C-07-1	53	4,0	18	48	40	8,4	7	48	7	93,5	66,75	75,0	44,5	29,5	68,0	36	62	24,5	32,5	20	21,5	56	10	15,9	40,0	26,0	25,0	40	555939

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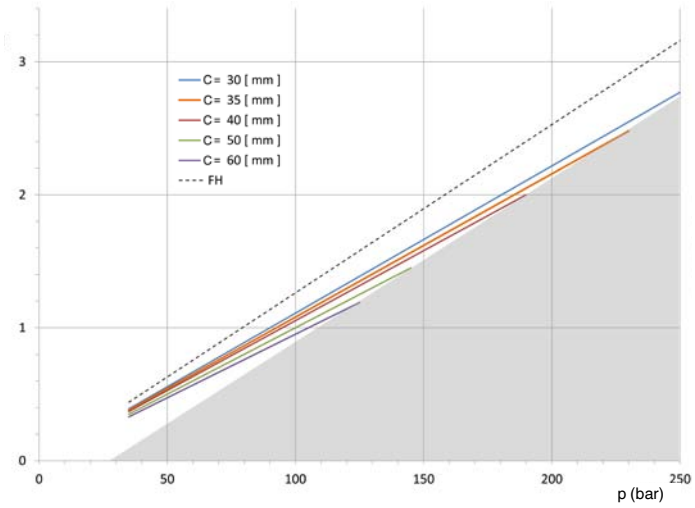
Installation dimensions:

Order no.	Article no.	dia. D H8	ØG H7	ØG1	ØG2	H4	H9	H10 ±0.1	J x depth	M	R	V	V1	V2	F +0.05	X	Z
561039	6958C-03-1	29	33	34,0	31	36,0	18,5	4	M5 x 15	17,4	14,4	28,5	18,4	16,6	7	16,5	33,5
561040	6958C-04-1	36	40	40,8	38	41,5	18,5	4	M6 x 15	21,5	17,5	33,0	21,4	20,2	7	16,5	39,0
556978	6958C-07-1	40	48	48,6	44	44,5	21,0	6	M8 x 15	24,5	21,5	40,0	26,0	25,0	7	18,0	42,0



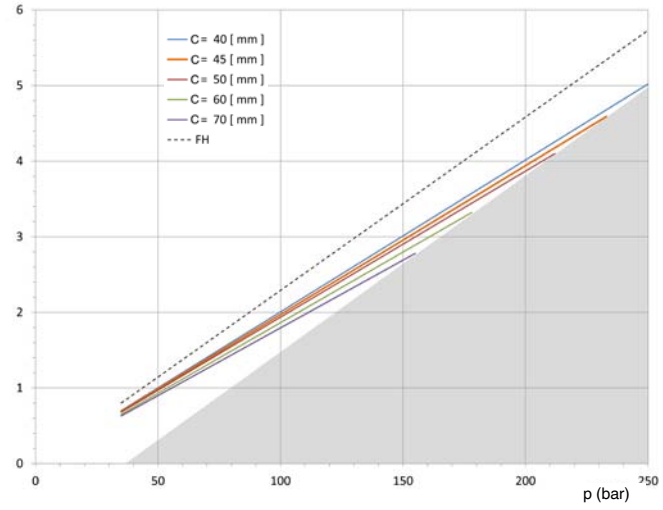
6958C-03-1

Fsp (kN)



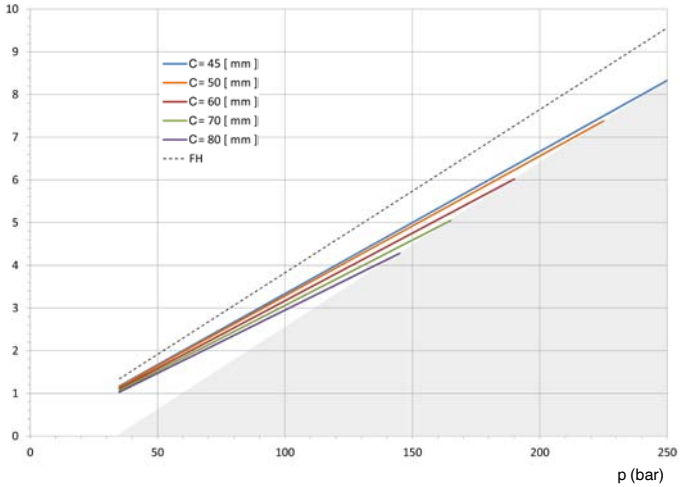
6958C-04-1

Fsp (kN)



6958C-07-1

Fsp (kN)



Subject to technical alterations.

No. 6958C-XX-04

Clamping arm

CAD

Order no.	Article no.	B	C	G°	K	L	N	P	R	R1	Weight [g]
556980	6958C-03-04	12	35	80	9	44,5	9,5	15	3	5	42
556981	6958C-04-04	15	40	80	10	50,5	10,5	18	3	5	64
556982	6958C-07-04	18	45	80	11	56,5	11,5	20	3	5	83



Design:

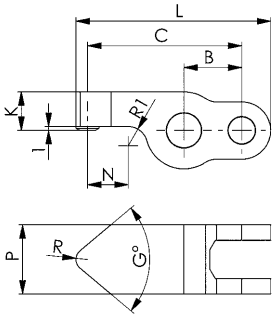
Hardened, tempered and burnished steel.

Application:

For vertical clamp with linear stroke 6958C.

Note:

Clamping pressure, leverage, flow volume and clamp arm weight must always be observed.



No. 6958CR-XX-04

Clamping arm, blank

CAD

Order no.	Article no.	B	C	G	J	L	P	Weight [g]
556984	6958CR-03-04	12	50	18	9	56,5	15	92
556985	6958CR-04-04	15	60	20	10	67,5	18	147
556986	6958CR-07-04	18	67	22	11	75,5	20	195



Design:

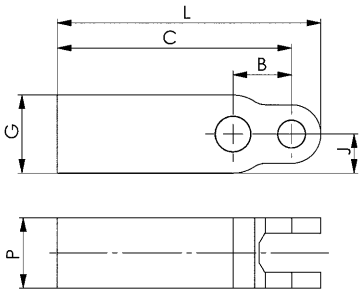
Hardened, tempered and burnished steel.

Application:

For vertical clamp with linear stroke 6958C.

Note:

Clamping pressure, leverage, flow volume and clamp arm weight must always be observed.



Subject to technical alterations.

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LINK CLAMPS FOR DEMANDING TASKS

LINK CLAMP

> piston force up to 20,1 kN
> operating pressure 250 bar
> 90° aperture angle
> oil supply via oil channel in fixture body

LINK CLAMP

> piston force up to 44,0 kN
> operating pressure 350 bar
> oil supply via threaded port and/or o-ring-sealed ports

PRODUCT OVERVIEW:

Type	Piston force [kN]	No. of models	Max. operating pressure [bar]	Operating mode
6959C	2,8 - 20,1	5	250	double acting
6959KL	7,0 - 44,0	5	350	double acting
6959KB	7,0 - 28,1	4	350	double acting

PRODUCT EXAMPLES:

NO. 6959C



> piston force: 2,8 - 20,1 kN

NO. 6959KL



> piston force: 7,0 - 44,0 kN

NO. 6959KB

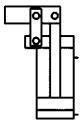


> piston force: 7,0 - 28,1 kN

No. 6959C

Link clamp

double-acting
max. operating pressure 250 bar,
min. operating pressure 25 bar.





CAD

Order no.	Article no.	Clamping force F1 at 100 bar* [kN]	Clamping force F1 at 250 bar* [kN]	Piston force F5 at 100 bar [kN]	Piston force F5 at 250 bar [kN]	Vol. Sp [cm³]	Vol. Lo [cm³]	eff. piston area Sp [cm²]	eff. piston area Lo [cm²]	Md max. [Nm]	Weight [g]
325563	6959C-12	0,7	1,7	1,1	2,8	1,7	0,9	1,1	0,6	2,4	188
325019	6959C-16	1,2	3,1	2,0	5,0	3,2	1,4	2,0	0,9	3,6	350
324905	6959C-20	1,9	4,9	3,1	7,8	6,0	2,6	3,1	1,4	10,0	590
324657	6959C-25	3,2	8,0	4,9	12,2	10,3	3,7	4,9	1,8	21,0	1155
325589	6959C-32	5,2	12,9	8,0	20,1	21,7	9,5	8,0	3,5	43,0	2125

Sp = clamp, Lo = unclamp
* Clamping force when using standard clamping lever

Design:

Hydraulic cylinder as a drop-in cartridge. Top mounting with four cylinder screws (resistance min. 10.9), these are included in the supply scope. All components from hardened, tempered and burnished steel. Piston rod and hinge pins from hardened steel, tempered and nitrided. Additional bronze wiper for piston rod protection. Supply scope includes hinge pins and tension plates, but not clamping levers. Oil supply via oil channel in fixture body.

Application:

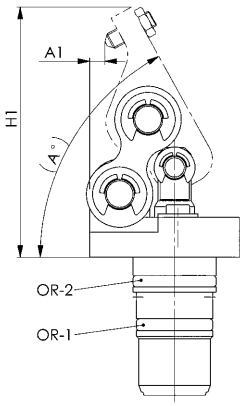
The double-acting link clamp is highly suited to clamping in clamping pockets.

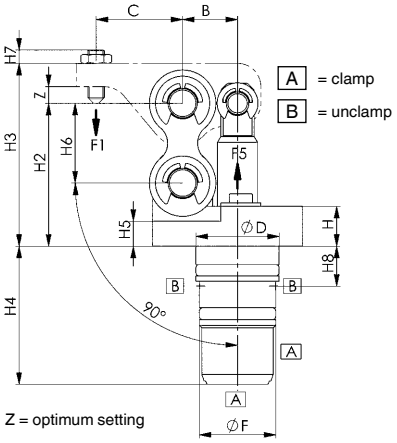
Features:

Small dimensions. Allows close side-by-side positioning. Clamping levers easy to change with link clamps mounted. The clamping lever centre axis and the pressure point on the workpiece are always in one plane at (Z). This prevents relative movement on the workpiece. The integrated cartridge is stepped. This prevents the radial O-rings from becoming damaged as they are installed in or removed from the cross channels.

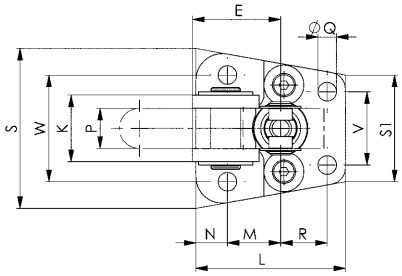
Note:

With standard levers, the ratio of B to C is 1 to 1.5.
In preparing the blank lever, deviations that cause a higher clamping force F1 are permitted only in exceptional cases.





A = clamp
B = unclamp



Dimensions:

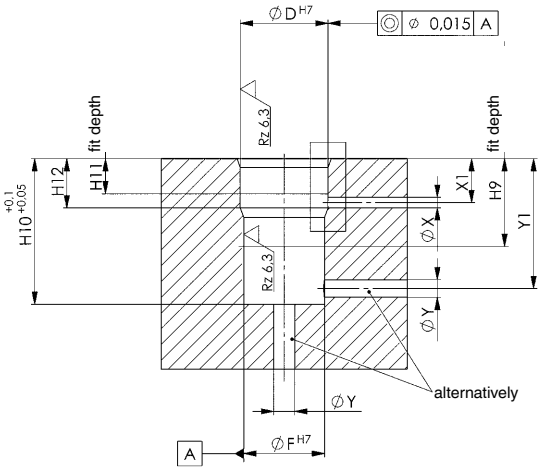
Order no.	Article no.	A	A1	B	C	dia. D	E	dia. F	H	H1	H2	H3	H4	H5	H6	H7	H8	K	L	M	N	P	R	dia. Q	S	S1	V	W	Z	OR-1 O-ring Order No.	OR-2 O-ring Order No.
325563	6959C-12	60,0°	3,0	13,5	22	20	21,0	17	10,0	58,9	33	41,5	34,0	5,5	18	3,5	11,5	16	37,5	15,0	6,0	10	12,0	4,6	42	28	18	29	4	409953	339572
325019	6959C-16	61,0°	5,6	16,5	26	25	26,5	23	12,0	75,2	43	55,0	41,5	7,5	24	4,0	12,0	20	45,0	16,0	9,5	12	14,0	5,6	48	32	22	32	4	407148	409664
324905	6959C-20	60,8°	5,5	19,5	31	30	30,5	28	14,5	84,8	47	60,0	50,0	9,0	26	7,0	16,5	27	51,5	21,0	9,5	15	16,0	6,5	56	38	28	42	5	321570	490342
324657	6959C-25	54,3°	1,0	24,0	37	38	37,5	35	16,0	106,4	61	76,0	52,5	11,5	34	5,0	17,0	34	65,0	30,5	7,0	20	20,5	8,5	72	46	34	54	5	321018	492728
325589	6959C-32	53,9°	4,2	30,0	45	47	47,5	45	16,0	131,0	75	92,0	62,5	11,5	44	13,0	17,3	42	82,0	38,5	9,0	24	25,5	10,5	87	56	40	65	5	321190	321190

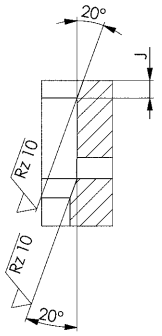
Subject to technical alterations.

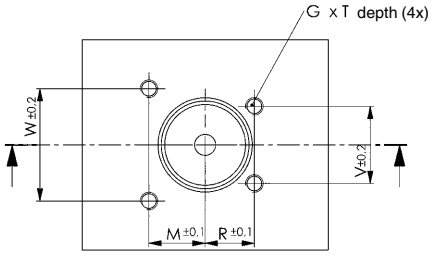
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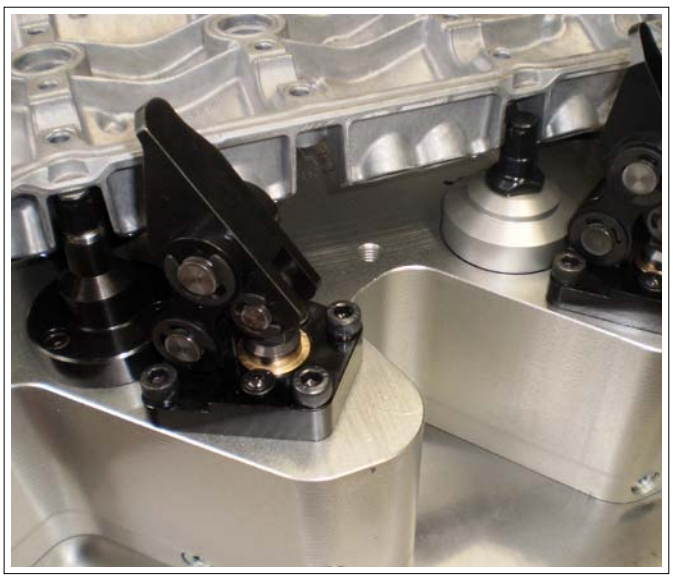
Installation dimensions:

Order no.	Article no.	dia. D H7	dia. F H7	G x T	H9	H10	H11	H12	J	M	R	V	W	dia. X	X1	dia. Y	Y1
325563	6959C-12	20	17	M4x12	25	34,0	10	14	2,5	15,0	12,0	18	29	4	11,0-12	6	28-31
325019	6959C-16	25	23	M5x10	25	41,5	10	14	2,5	16,0	14,0	22	32	4	11,5-12	6	27-38
324905	6959C-20	30	28	M6x13	36	50,0	14	20	3,3	21,0	16,0	28	42	4	15,0-18	6	38-47
324657	6959C-25	38	35	M8x16	38	52,5	14	20	2,5	30,5	20,5	34	54	4	13,0-18	6	39-49
325589	6959C-32	47	45	M10x22	46,5	62,5	15	21	2,5	38,5	25,5	40	65	4	13,0-19	6	48-59









Subject to technical alterations.

No. 6959C-xx-30

Clamping arm, standard



CAD

Order no.	Article no.	Clamping force F1 at 100 bar [kN]	Clamping force F1 at 250 bar [kN]	B	C	dia. D	dia. E	G	H	K	L	N	O x T	H7	P	R	SW1	SW2	Weight [g]
325522	6959C-12-30	0,67	1,7	13,5	22	7	5	50°	4,5	8,5	45,5	20,8	M4 x 12	3,5	10	5,0	7	2,0	35
325225	6959C-16-30	1,2	3,1	16,5	26	9	7	50°	7,0	12,0	55,5	26,7	M5 x 16	4,0	12	6,0	8	2,5	70
325233	6959C-20-30	1,9	4,9	19,5	31	10	8	50°	8,0	13,0	65,0	32,4	M6 x 20	7,0	15	7,5	10	3,0	106
325464	6959C-25-30	3,1	7,9	24,0	37	13	10	45°	10,0	15,0	80,0	37,0	M8 x 20	5,0	20	6,0	13	4,0	222
325274	6959C-32-30	5,2	12,9	30,0	45	17	13	45°	12,0	17,0	100,0	50,0	M10 x 30	13,0	24	2x8	17	5,0	395

Design:

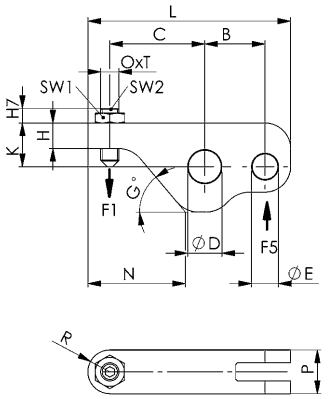
Tempered steel, tempered and burnished. Delivery with set screw ISO 4027 hardness class 45H.

Application:

For link clamp 6959C.

Note:

Clamping pressure, leverage, flow volume and clamp arm weight must always be observed.



No. 6959CR-xx-04

Clamping arm, blank



CAD

Order no.	Article no.	B	C	dia. D	dia. E	G	K	L	N	P	Weight [g]
325548	6959CR-12-04	13,5	34,0	7	5	50°	8,5	53,0	30,5	10	41
325035	6959CR-16-04	16,5	42,5	9	7	50°	12,0	66,0	37,2	12	85
324996	6959CR-20-04	19,5	50,0	10	8	50°	13,0	77,5	45,0	15	134
325506	6959CR-25-04	24,0	63,5	13	10	45°	15,0	98,0	57,0	20	272
325258	6959CR-32-04	30,0	76,0	17	13	45°	17,0	120,0	70,0	24	464

Design:

Hardened, tempered and burnished steel.

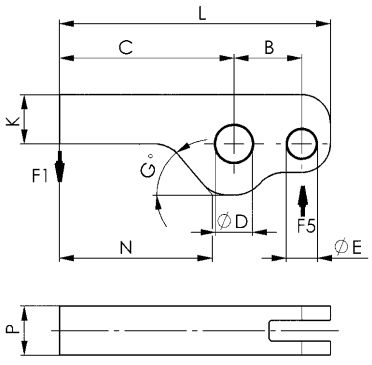
Application:

For link clamp 6959C.

Note:

Clamping pressure, leverage, flow volume and clamp arm weight must always be observed.

Formula to determine the clamping force F1:
Clamping force = F1 [kN], piston force = F5 [kN], operating lever = B [mm], load lever = C [mm]
F1 = F5 x B / C



Subject to technical alterations.

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No. 6959C-xx-15-01

Surface-mounted block

with O-ring and threaded connection



CAD

Order no.	Article no.	Screws for each size	A	B	C	dia. D	E	F	G	H	K	L	M	N	O	P	R	S	T	dia. U	dia. W	OR-1 O-ring Order No.	Weight [g]
325290	6959C-12-15-01	2x M4x70, 2x M4x65	39,1	50,0	6,0	4,5	27	21,0	G1/8	29	4	50	25	11,5	18	12,0	2,5	1,0	23,0	6	6	321646	505
324632	6959C-16-15-01	2x M5x75, 2x M5x70	44,9	60,0	9,5	5,5	30	25,5	G1/4	32	5	54	30	11,0	22	15,5	3,0	1,0	26,5	6	6	321646	750
324640	6959C-20-15-01	2x M6x85, 2x M6x80	53,0	68,5	9,5	7,0	37	30,5	G1/4	42	5	60	30	13,0	28	20,0	5,0	0,0	32,0	6	6	321646	1100
325480	6959C-25-15-01	2x M8x95, 2x M8x90	69,0	78,0	7,0	8,5	51	37,5	G1/4	54	5	65	31	15,0	34	27,0	8,0	5,0	41,0	6	6	321646	1685
325316	6959C-32-15-01	2x M10x105, 2x M10x110	87,0	92,5	9,0	10,5	64	47,5	G1/4	65	5	75	38	17,5	40	32,5	-	-	52,0	6	6	321646	3050

Design:

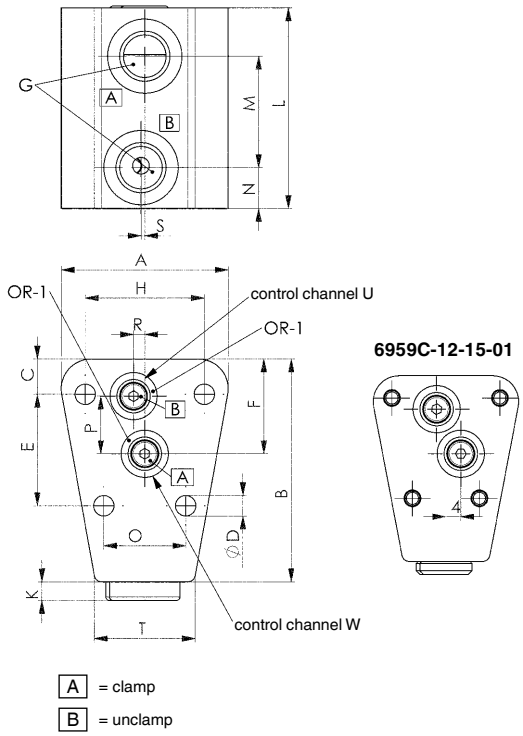
Steel, burnished.
Supply scope includes O-ring dia.9x2, threaded plugs and fastening screws.

Application:

The surface-mounted block can be flange-mounted as an adapter via the control channels in the fixture. It can also be arranged on the fixture and used there when the control oil supply has to be routed to the link clamps via external lines.

Note:

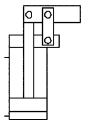
The flange surface on the fixture must be even for using the O-ring connection and must have a surface finish of Rz 6.3 around the O-ring sealing surface. The flange surface on the fixture must be even for using the threaded connections.
Other lengths available on request.



No. 6959KL

Link Clamp

double-acting
max. operating pressure 350 bar,
min. operating pressure 25 bar.





CAD

Order no.	Article no.	Clamping force at 100 bar * [kN]	Clamping force at 350 bar* [kN]	Piston force at 100 bar [kN]	Piston force at 350 bar [kN]	Stroke [mm]	Vol. Sp [cm³]	Vol. Lo [cm³]	eff. piston area Sp [cm²]	eff. piston area Lo [cm²]	Md max. [Nm]	Piston rod dia. [mm]	Piston dia. [mm]	Q max. [l/min]	Weight [g]
321695	6959KL-160	1,5	5,4	2,0	7,0	17,0	7,4	1,5	2,0	0,9	6,3	12	16	0,50	755
322057	6959KL-200	2,4	8,4	3,1	11,0	23,0	7,2	3,2	3,1	1,4	12,0	15	20	0,78	1876
321711	6959KL-250	3,8	13,2	4,9	17,2	26,5	13,0	6,3	4,9	2,4	25,0	18	25	1,24	2390
322032	6959KL-320	6,2	21,6	8,0	28,1	34,0	27,3	10,7	8,0	3,1	50,0	25	32	2,02	5320
322040	6959KL-400	9,7	33,8	12,6	44,0	43,0	54,0	27,6	12,6	6,4	95,0	28	40	3,18	8820

Cl = clamping, Uncl = unclamp
* Specifications with clamping arm, standard

Design:

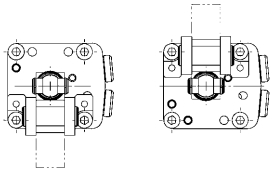
Cylinder housing from hardened steel, tempered. Top mounting with four cylinder screws (resistance min. 12.9), these are included in the supply scope. Pistons and bolts from from hardened steel, tempered, ground and nitrided. All parts nickel plated.
Supply scope includes hinge pins and tension plates, but not clamping levers. Oil supply via threaded port or oil channel in fixture body.

Application:

The lever-type clamping fixture is used in clamping devices where workpieces need to be freely accessible and must be placed in from above. Particularly well suited for clamping in clamping pockets. Good corrosion resistance and high surface hardness (approx. 615 HV) is provided by chemical nickel plating (specifications MIL-C-2607 AE, ASTM B733 and AMS 2404D).

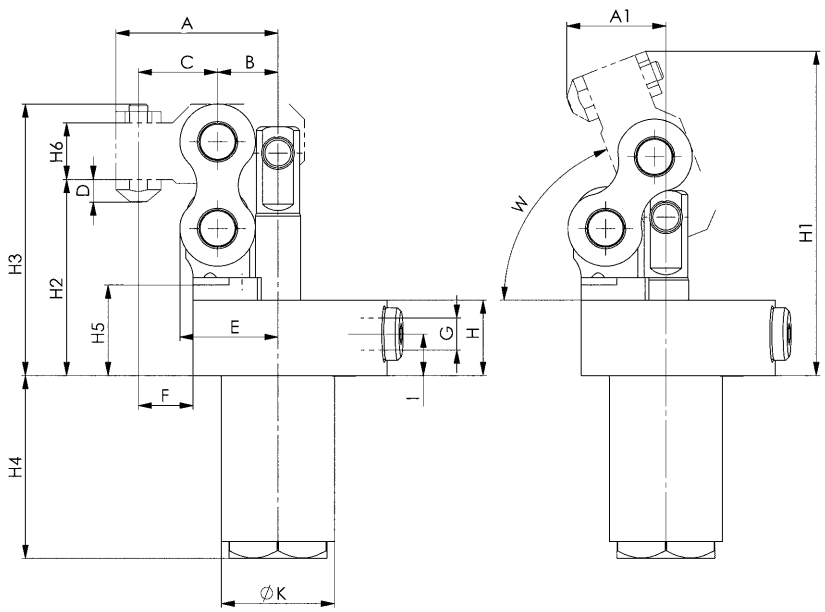
Features:

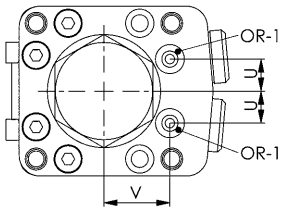
Top flange version, lever mechanism can be turned in the range of 180º in 90º steps. Special designs are possible.

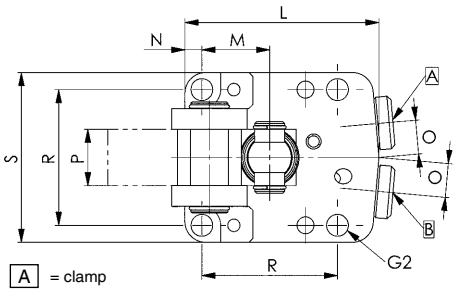


Note:

Proximity switch and electrical pressure-point monitoring can be supplied on request.







A = clamp
B = unclamp

Dimensions:

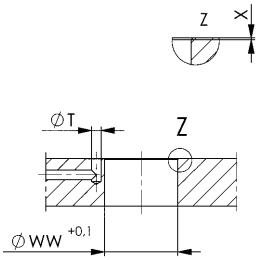
Order no.	Article no.	A	A1	B	C	D	E	F	G	H	H1	H2	H3	H4	H5	H6	I	dia. K	L	M	N	P	O	R	S	W	ØG2	U	V	OR-1 O-ring Order No.
321695	6959KL-160	43,0	26,3	16,0	21,0	6,0	26,0	14,5	G1/8	20	86,0	52	72	48,5	24	15	11,0	30	51,5	18	4,5	15	9	36	45	68,6°	5,8	8,5	17,5	161802
322057	6959KL-200	56,5	33,0	21,0	27,5	6,0	35,0	13,5	G1/4	26	120,5	72	103	61,5	34	25	14,0	38	70,0	27	8,0	20	14	54	70	74,4°	6,5	15,0	21,5	321646
321711	6959KL-250	63,5	40,3	24,0	31,5	8,0	40,0	18,5	G1/4	27	129,3	75	110	65,0	37	27	14,0	42	74,0	30	7,0	24	14	60	74	73,7°	8,5	16,0	23,5	321646
322032	6959KL-320	82,0	51,0	32,0	42,0	8,0	52,0	24,0	G1/4	35	167,5	103	145	81,5	47	27	15,0	52	100,0	39	11,0	30	14	78	100	70,5°	10,5	16,0	30,0	321646
322040	6959KL-400	101,0	61,5	39,5	51,5	8,0	65,5	28,5	G1/4	35	193,0	113	169	94,5	50	27	17,5	63	125,0	50	12,5	35	18	100	125	72,2°	12,5	18,0	38,0	321646

Subject to technical alterations.

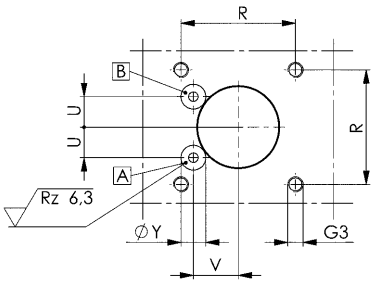
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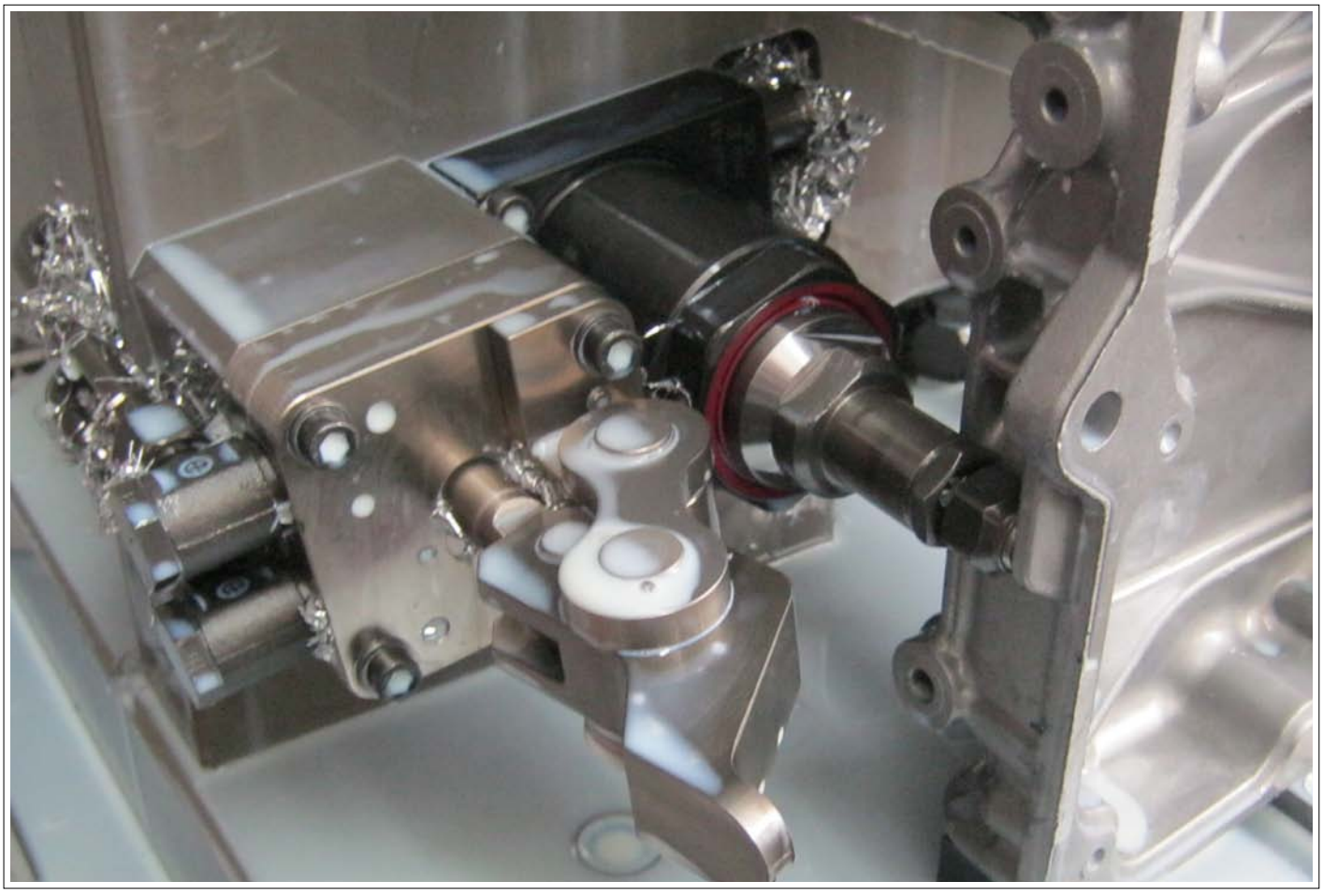
Installation dimensions:

Order no.	Article no.	G3 x depth	R ±0,2	dia. T	U	V	ØWW +0.1	X	dia. Y x max. depth
321695	6959KL-160	M5 x 11	36	3,0	8,5	17,5	30,2	0,2 x 45°	7,8 x 0,1
322057	6959KL-200	M6 x 18	54	5,0	15,0	21,5	38,2	0,2 x 45°	12,7 x 0,1
321711	6959KL-250	M8 x 16	60	5,0	16,0	23,5	42,2	0,2 x 45°	12,7 x 0,1
322032	6959KL-320	M10x16	78	5,0	16,0	30,0	52,2	0,2 x 45°	12,7 x 0,1
322040	6959KL-400	M12x18	100	5,6	18,0	38,0	63,2	0,2 x 45°	12,7 x 0,1









Subject to technical alterations.

No. 6959KL-xx-30

Clamping arm, standard

CAD



Order no.	Article no.	Clamping force F1 at 100 bar [kN]	Clamping force F1 at 350 bar [kN]	B	C	dia. D	dia. E	H	H1	H2	H3	H4	H5	K	L	P	SW1	SW2	Weight [g]
325241	6959KL-16-30	1,5	5,4	16,0	21,0	10	8	21	15	2	8	3	5	21	50	15	11	11	65
325266	6959KL-20-30	2,4	8,4	21,0	27,5	14	10	31	25	6	15	3	5	31	68	20	11	11	203
325282	6959KL-25-30	3,8	13,2	24,0	31,5	16	12	35	27	6	17	3	8	35	76	24	11	13	286
325308	6959KL-32-30	6,2	21,6	32,0	42,0	20	16	42	27	6	19	3	15	35	95	30	11	13	522
325324	6959KL-40-30	9,7	33,8	39,5	51,5	26	20	52	27	10	27	3	25	35	117	35	11	17	867

Design:

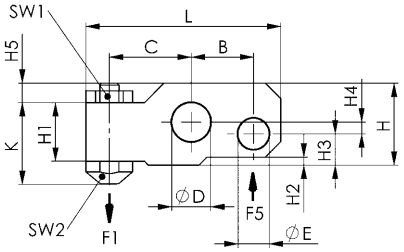
Hardened, tempered and nickel-plated steel. Scope of supply includes pressure screw.

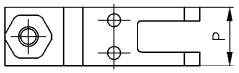
Application:

For link clamp 6959KL.

Note:

Clamping pressure, leverage, flow volume and clamp arm weight must always be observed.





No. 6959KR-xx-04

Clamping arm, blank

CAD



Order no.	Article no.	B	C	dia. D	dia. E	K	H2	H3	H4	L	P	Weight [g]
400267	6959KR-16-04	16,0	34	10	8	21	2	8	3	57,0	15	104
401299	6959KR-20-04	21,0	42	14	10	31	6	15	3	74,5	20	261
400283	6959KR-25-04	24,0	48	16	12	35	6	17	3	84,5	24	399
400309	6959KR-32-04	32,0	64	20	16	42	6	19	3	109,0	30	778
400325	6959KR-40-04	39,5	79	26	20	52	10	27	3	134,5	35	1372

Design:

Hardened, tempered and burnished steel.

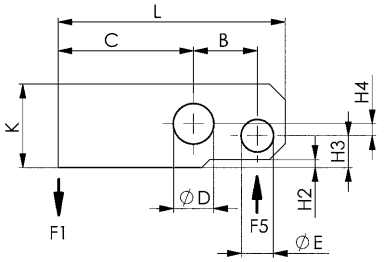
Application:

For link clamp 6959KL and 6959KB.

Note:

Clamping pressure, leverage, flow volume and clamp arm weight must always be observed.

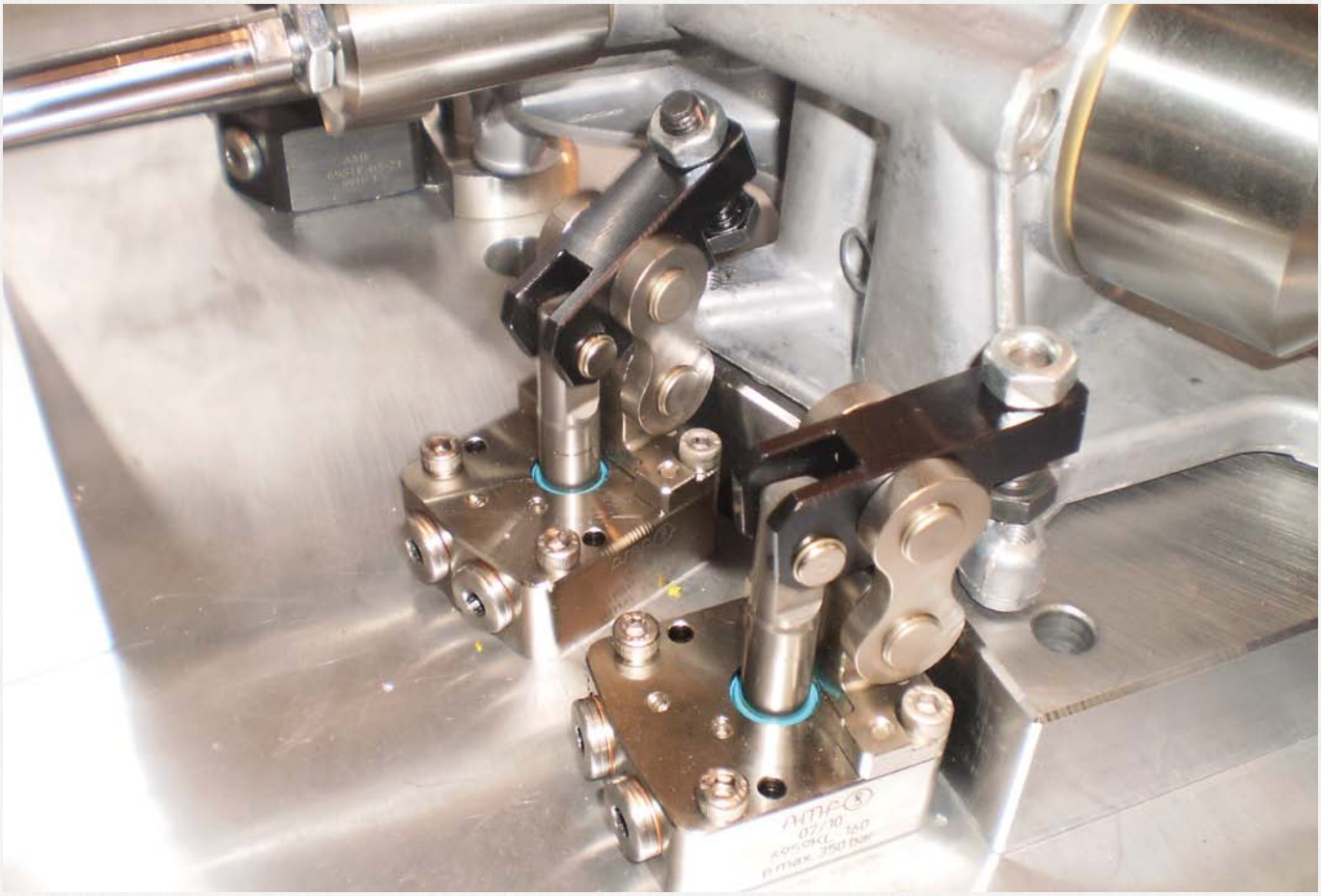
Formula to determine the clamping force F1:
Clamping force = F1 [kN], piston force = F5 [kN], operating lever = B [mm], load lever = C [mm]
F1 = F5 x B / C

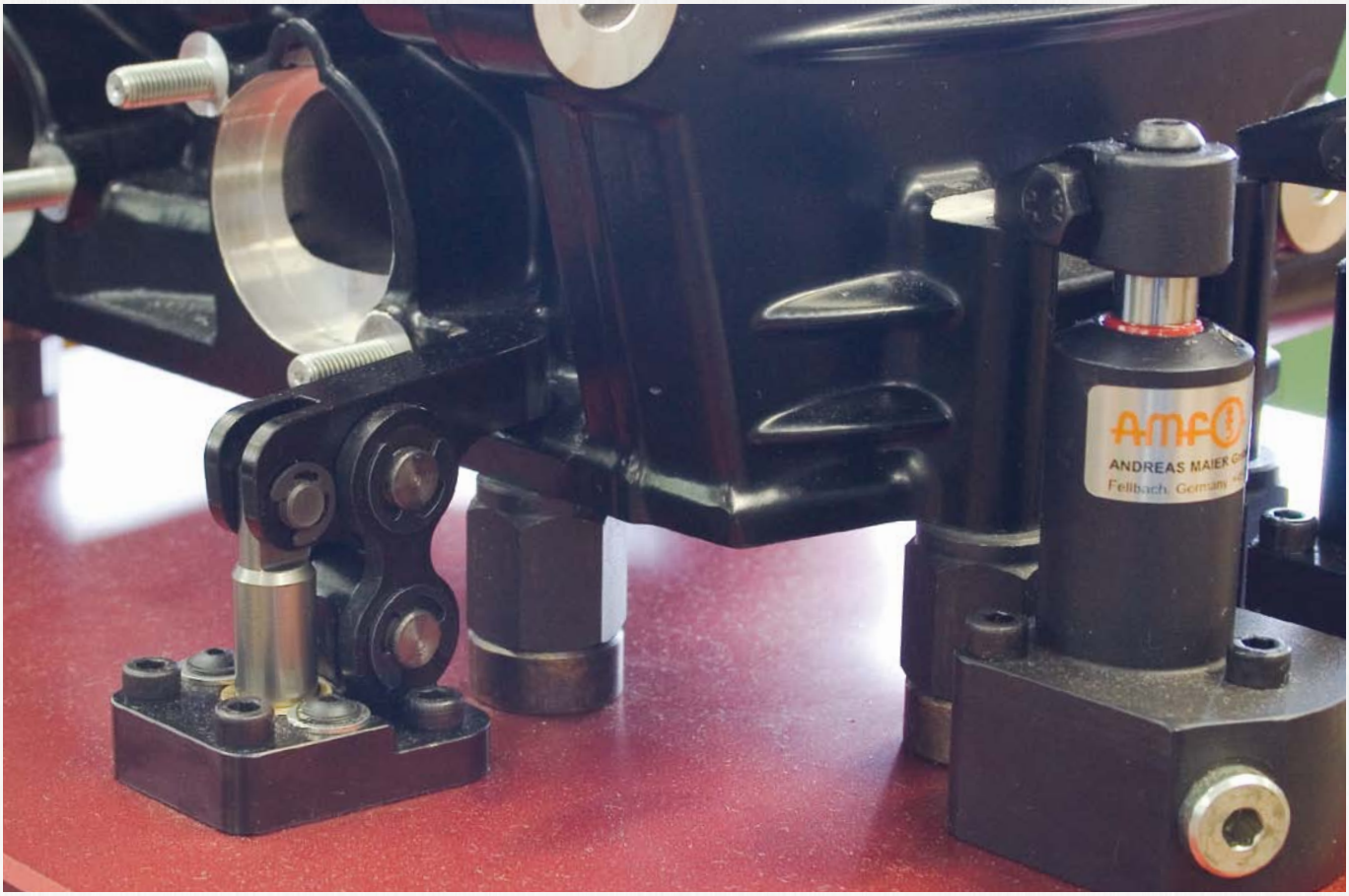




Subject to technical alterations.

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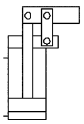


Subject to technical alterations.

No. 6959KB

Link Clamp

double-acting
max. operating pressure 350 bar,
min. operating pressure 25 bar.





CAD

Order no.	Article no.	Clamping force at 100 bar * [kN]	Clamping force at 350 bar* [kN]	Piston force at 100 bar [kN]	Piston force at 350 bar [kN]	Stroke [mm]	Vol. Sp [cm³]	Vol. Lo [cm³]	eff. piston area Sp [cm²]	eff. piston area Lo [cm²]	Md max. [Nm]	Piston rod dia. [mm]	Piston dia. [mm]	Q max. [l/min]	Weight [g]
554667	6959KB-16	1,5	5,4	2,0	7,0	17,0	7,4	1,5	2,0	0,9	6,3	12	16	0,50	755
554668	6959KB-20	2,4	8,4	3,1	11,0	23,0	7,2	3,2	3,1	1,4	12,0	15	20	0,78	1876
554669	6959KB-25	3,8	13,2	4,9	17,2	26,5	13,0	6,3	4,9	2,4	25,0	18	25	1,24	2390
554670	6959KB-32	6,2	21,6	8,0	28,1	34,0	27,3	10,7	8,0	3,1	50,0	25	32	2,02	5320

Cl = clamping, Uncl = unclamp
* Specifications with clamping arm, standard

Design:

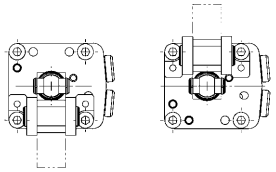
Cylinder housing made from tempered steel, tempered and burnished. Top mounting with four cylinder screws (resistance min. 12.9), these are supplied as standard.
Pistons and bolts from from hardened steel, tempered, ground and nitrided.
Hinge pins and tension plates are supplied as standard, but not clamping levers. Oil supply via threaded port or oil channel in fixture body.

Application:

Link clamps are used in clamping fixtures in which workpieces must be freely accessible and loaded from above. Particularly suitable for clamping in clamping pockets.

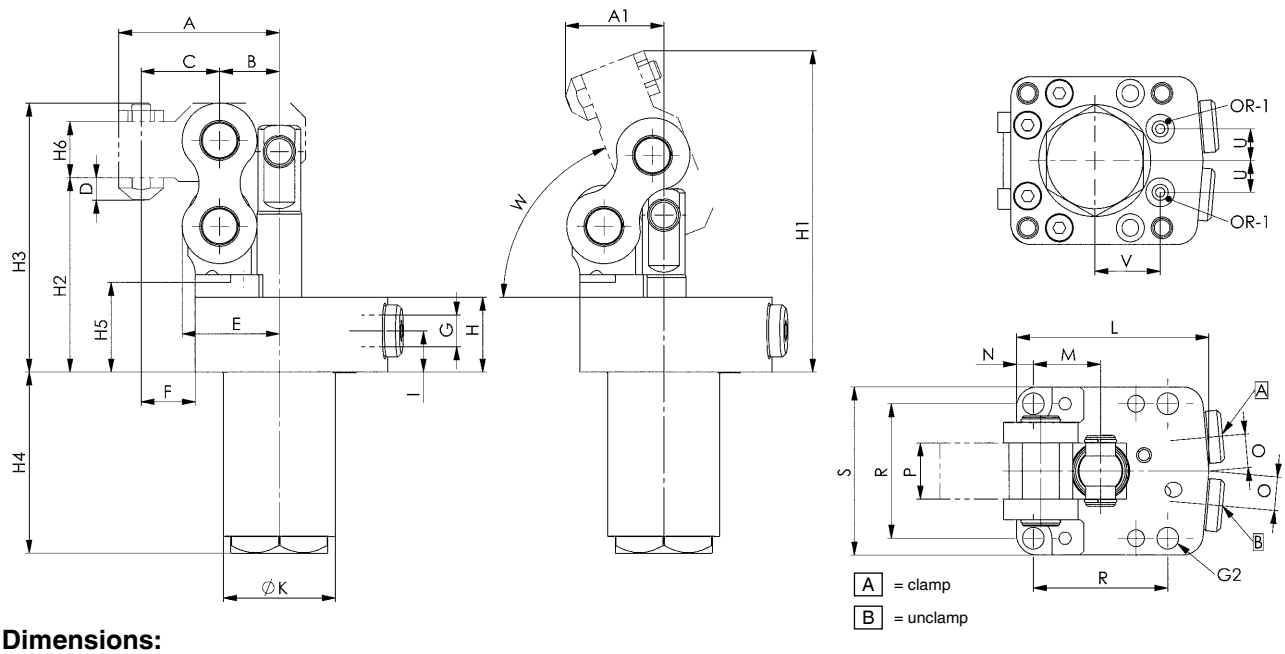
Features:

Top flange version, lever mechanism can be turned in the range of 180º in 90º steps. Special designs are possible.



Note:

Proximity switch and electrical pressure-point monitoring can be supplied on request.



Dimensions:

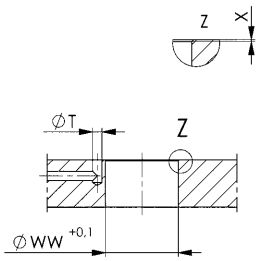
Order no.	Article no.	A	A1	B	C	D	E	F	G	H	H1	H2	H3	H4	H5	H6	I	dia. K	L	M	N	P	O	R	S	W	ØG2	U	V	OR-1 O-ring Order No.
554667	6959KB-16	43,0	26,3	16,0	21,0	6,0	26,0	14,5	G1/8	20	86,0	52	72	48,5	24	15	11,0	30	51,5	18	4,5	15	9	36	45	68,6°	5,8	8,5	17,5	161802
554668	6959KB-20	56,5	33,0	21,0	27,5	6,0	35,0	13,5	G1/4	26	120,5	72	103	61,5	34	25	14,0	38	70,0	27	8,0	20	14	54	70	74,4°	6,5	15,0	21,5	321646
554669	6959KB-25	63,5	40,3	24,0	31,5	8,0	40,0	18,5	G1/4	27	129,3	75	110	65,0	37	27	14,0	42	74,0	30	7,0	24	14	60	74	73,7°	8,5	16,0	23,5	321646
554670	6959KB-32	82,0	51,0	32,0	42,0	8,0	52,0	24,0	G1/4	35	167,5	103	145	81,5	47	27	15,0	52	100,0	39	11,0	30	14	78	100	70,5°	10,5	16,0	30,0	321646

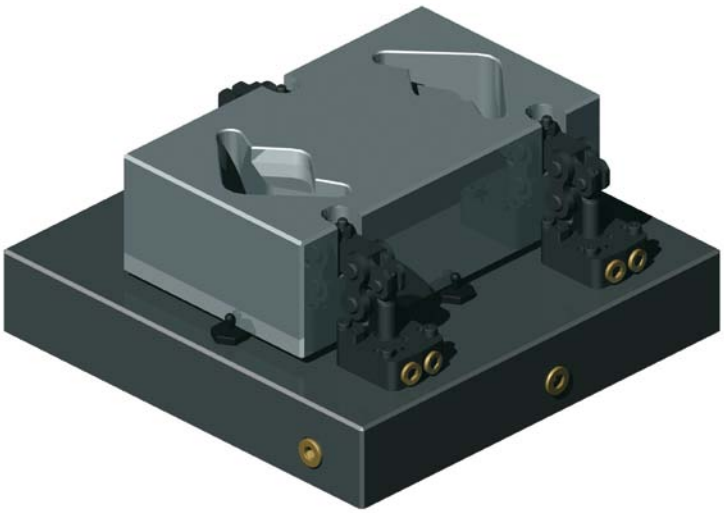
Subject to technical alterations.

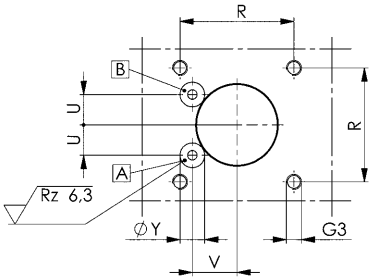
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Installation dimensions:

Order no.	Article no.	G3 x depth	R ±0,2	dia. T	U	V	ØWW +0.1	X	dia. Y x max. depth
554667	6959KB-16	M5 x 11	36	3,0	8,5	17,5	30,2	0,2 x 45°	7,8 x 0,1
554668	6959KB-20	M6 x 18	54	5,0	15,0	21,5	38,2	0,2 x 45°	12,7 x 0,1
554669	6959KB-25	M8 x 16	60	5,0	16,0	23,5	42,2	0,2 x 45°	12,7 x 0,1
554670	6959KB-32	M10 x 16	78	5,0	16,0	30,0	52,2	0,2 x 45°	12,7 x 0,1









Subject to technical alterations.

No. 6959KB-xx-30

Clamping arm, standard



CAD

Order no.	Article no.	Clamping force F1 at 100 bar [kN]	Clamping force F1 at 350 bar [kN]	B	C	dia. D	dia. E	H	H1	H2	H3	H4	H5	K	L	P	SW1	SW2	Weight [g]
554671	6959KB-16-30	1,5	5,4	16,0	21,0	10	8	21	15	2	8	3	5	21	50	15	11	11	65
554673	6959KB-20-30	2,4	8,4	21,0	27,5	14	10	31	25	6	15	3	5	31	68	20	11	11	203
554674	6959KB-25-30	3,8	13,2	24,0	31,5	16	12	35	27	6	17	3	8	35	76	24	11	13	286
554675	6959KB-32-30	6,2	21,6	32,0	42,0	20	16	42	27	6	19	3	15	35	95	30	11	13	522

Design:

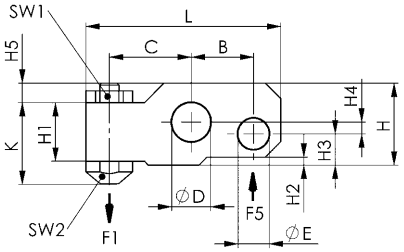
Tempered steel, tempered and burnished. Scope of supply includes pressure screw.

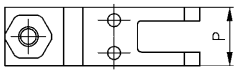
Application:

For link clamp 6959KB.

Note:

Clamping pressure, leverage, flow volume and clamp arm weight must always be observed.





No. 6959KR-xx-04

Clamping arm, blank



CAD

Order no.	Article no.	B	C	dia. D	dia. E	K	H2	H3	H4	L	P	Weight [g]
400267	6959KR-16-04	16,0	34	10	8	21	2	8	3	57,0	15	104
401299	6959KR-20-04	21,0	42	14	10	31	6	15	3	74,5	20	261
400283	6959KR-25-04	24,0	48	16	12	35	6	17	3	84,5	24	399
400309	6959KR-32-04	32,0	64	20	16	42	6	19	3	109,0	30	778
400325	6959KR-40-04	39,5	79	26	20	52	10	27	3	134,5	35	1372

Design:

Hardened, tempered and burnished steel.

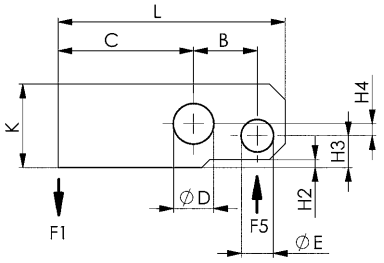
Application:

For link clamp 6959KL and 6959KB.

Note:

Clamping pressure, leverage, flow volume and clamp arm weight must always be observed.

Formula to determine the clamping force F1:
Clamping force = F1 [kN], piston force = F5 [kN], operating lever = B [mm], load lever = C [mm]
F1 = F5 x B / C





Subject to technical alterations.

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TOGGLE JOINT CLAMP FOR UNIVERSAL USE

- operating pressure 250 bar
- hardened and chrome-plated piston rod
- heat-treated bolts
- PTFE bearings
- safe clamping or locking by clamp moving beyond deadcentre
- oil supply via threaded port

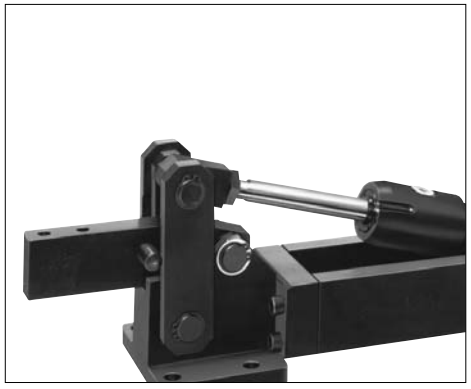
At continuous pressures below 80 bar, this must be stated on ordering as a different seal combination may need to be selected.

PRODUCT OVERVIEW:

Type	Clamping height [mm]	Clamping force [kN]	No. of models	Operating mode
6960C	57 - 86	6 - 22,7	3	double acting

PRODUCT EXAMPLE:

NO. 6960C

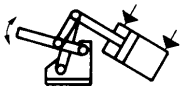


- clamping force: 6 - 22,7 kN
- connection type: threaded port
- available upon request

No. 6960C

Toggle joint clamp, hydraulic

double acting,
max. operating pressure 250 bar.





CAD

Order no.	Article no.	Clamping force* F1=F3 [kN]	Clamping force* F2=F5 [kN]	Clamping force* F5 [kN]	p max. [bar]	pD max. ** [bar]	Cylinder stroke [mm]	Piston area A1 [cm²]	Piston ring-surface A2 [cm²]	Oil capacity forward [cm²]	Oil capacity backward [cm²]	Weight [g]
66647	6960C-4	6	9	3	100	250	80	3,14	2,0	25	15	5400
66654	6960C-6	12	18	5	100	250	90	4,90	2,9	44	26	9600
66662	6960C-8	18	27	8	100	250	120	8,00	4,9	96	59	18900

* at p max. or pD max.
** pD = pressure during differential switching

Design:

Hardened steel, burnished, with hydraulic cylinder mounted ready for connection to standard double circuit (see circuit Fig. 1) or differential circuit (see circuit Fig. 2). Oil supply via threaded port.

Application:

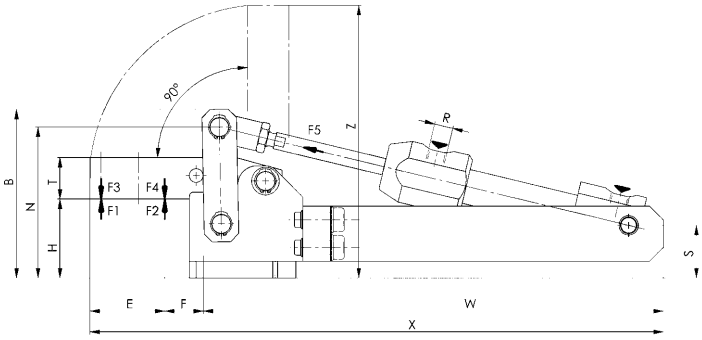
The clamp is particularly suitable for use in transfer and special-purpose machines. Any thrust pieces can be attached to the sturdy holding arm. With the differential circuit (see Fig. 2 below) the differential piston area A2 of the cylinder is directly connected to P of the pressure generator, while the full piston area is connected by a 3/2-way seat valve.

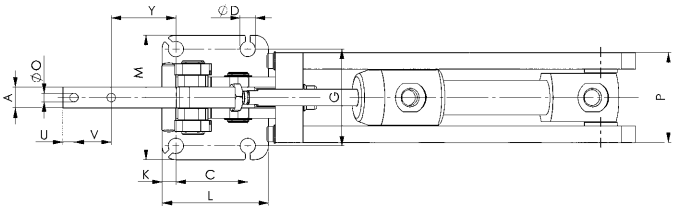
Features:

The clamp, of machine quality, is maintenance-free thanks to its tempered and ground shafts which run in Teflon bearings. As a result of the hydraulic cylinder operation the possible clamping force is the same as the permissible holding force. The large aperture enables unhindered workpiece handling.

Note:

Please urgently observe the maximum pressure values in the table above.





Dimensions:

Order no.	Article no.	Piston dia. [mm]	Piston rod dia. [mm]	A	B	C	dia. D	E	F	G	H	K	L	M	N	dia. O	P	R	S	T	U	V	W	X	Y	Z
66647	6960C-4	20	12	15	122	52	11	54	20	70	57	10,0	77,0	90	109	6,2	65	G1/4	38	30	8	27	308,0	415,0	47,0	197
66654	6960C-6	25	16	20	147	55	11	60	21	83	61	11,0	85,0	105	129	8,2	81	G1/4	41	40	12	26	353,0	466,5	52,5	216
66662	6960C-8	32	20	30	196	80	13	95	22	111	86	12,5	112,5	136	176	13,2	94	G1/4	46	60	18	40	423,5	576,0	69,5	309

Hydraulic diagrams:

Switching position a = clamp
Switching position b = unclamp

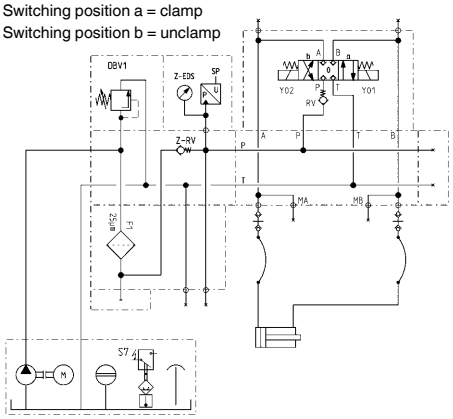


fig. 1

Switching position 0 = clamp with differential switching
Switching position a = unclamp

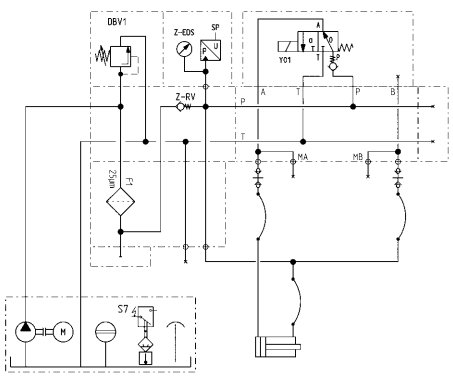


fig. 2

Subject to technical alterations.

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HYDRAULIC BORE CLAMPS FOR 5-SIDE MACHINING

- clamping force up to 31 kN
- operating pressure up to 350 bar
- internal clamping
- oil supply via threaded port or oil channel in the fixture body

PRODUCT OVERVIEW:

Type	Clamping force [kN]	Bore hole diameter [mm]	No. of models	Oil connection	Operating mode
6970	4,0 - 31,0	8,8 - 25,9	17	thread/o-ring	single acting
6970-xx-50	3,5 - 11,5	6,8 - 14,7	8	thread/o-ring	single acting
6970D	5,0	5,9 - 10,8	8	o-ring	double acting
6970D	9,5	10,9 - 16,8	6	o-ring	double acting
6970CD MINI	2,76	5,2 - 7,7	4	o-ring	double acting
6970CD MAXI	4,1 - 7,5	7,8 - 13,8	6	o-ring	double acting

PRODUCT EXAMPLES:

NO. 6970



> clamping force: 4 - 31 kN

NO. 6970D



> clamping force: 5,0 - 9,5 kN

NO. 6970CD



> clamping force: 2,76 - 5,0 kN

No. 6970

Bore clamp, hydraulic, centric

Single-acting, with spring return,
max. operating pressure 350 bar,
min. operating pressure 30 bar.
lateral compensation per clamp ± 0.25 mm.







Order no.	Article no.	Clamping force vertical [kN]	Clamping rim height min. [mm]	Permissible horizontal force [kN]	Radial force of sleeve segments [kN]	dia. K [mm]	L	Weight [g]
63651	6970-09	4	6	1,2	12	8,8-9,7	10	2600
60293	6970-10	4	6	1,2	12	9,8-10,7	10	2600
60301	6970-11	10	8	3,0	30	10,8-11,9	15	2600
60319	6970-12	10	8	3,0	30	12,0-12,9	15	2600
63677	6970-13	10	8	3,0	30	13,0-13,9	15	2600
60418	6970-14	10	8	3,0	30	14,0-14,9	15	2600
60434	6970-15	26	9	7,7	77	15,0-15,9	17	2800
60525	6970-16	26	9	7,7	77	16,0-16,9	17	2800
60426	6970-17	26	9	7,7	77	17,0-17,9	17	2800
63693	6970-18	26	9	7,7	77	18,0-18,9	17	2800
60616	6970-19	26	9	7,7	77	19,0-19,9	17	2800
60715	6970-20	31	10	9,2	92	20,0-20,9	17	2900
60723	6970-21	31	10	9,2	92	21,0-21,9	17	2900
63719	6970-22	31	10	9,2	92	22,0-22,9	17	2900
60731	6970-23	31	10	9,2	92	23,0-23,9	17	2900
60376	6970-24	31	10	9,2	92	24,0-24,9	17	2900
60384	6970-25	31	10	9,2	92	25,0-25,9	17	2900

Design:

The actuating piston is single-acting. Cylinder body, clamping segments and tensioning bolts from hardened steel, gas-nitrided. Four-part clamping segments are externally serrated.
A Ø 8 H7 centring hole located on the underside for positioning the clamping element. Two fastening screws are included in the supply scope. Oil supply via threaded connection or oil channel in the fixture body.

Application:

The hydraulic bore clamp is preferred for use on workpieces with complex external geometries that must be clamped for machining.
After the clamping segments are applied to single-attachment clamping holes with low depth, a safe 5-sided processing can be performed without difficulty.
Workpieces can be installed or removed automatically with handling devices.

Features:

The tension bolt has the shape of a four-sided pyramid at the coupling point to the clamping sleeve. The clamping sleeve segments have this shape also, thus ensuring contact on the entire surface in every position of the tension bolt.
This facilitates a high clamping force and ensures very low wear.
Elastic rings hold the clamping segments together and seal them against entry of chips. Depending on the material, the external serration is pressed into the clamping hole with more or less force, thus permitting the required positive fit. The built-in plate springs achieve a maximum pull-down stroke of approx. 0.2 mm.

The tension bolt has a pyramid shape for improved pre-centring of workpieces.

The bore clamp is also the contact surface for the workpiece.
The workpiece contact surface is hard-metal coated (µ 0.3), thereby significantly increasing the displacement force.

The eccentric arrangement of the clamping elements is especially suited for clamping workpieces with circumferential contact edge, such as gear and engine housings, oil pans and similar workpieces.

Note:

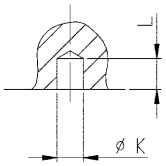
The lateral force when inserting the workpiece must not exceed the „lateral force“ table value. The radial force must be observed.

Please check with us for clamping hardened workpieces or those from GG / GGG.

On request:

Bore clamps for other hole diameters available upon request.

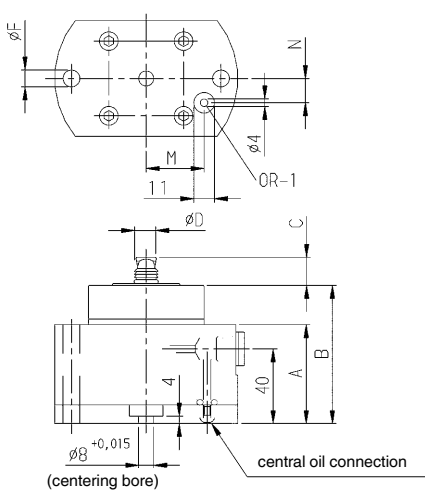
Clamping hole in workpiece:

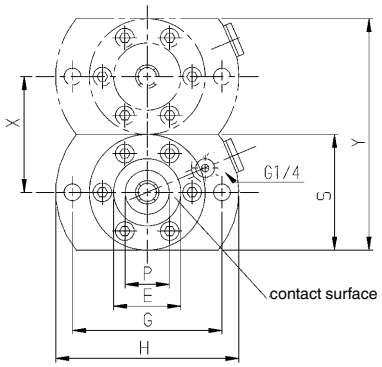


CAD

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Dimensions:

Order no.	Article no.	Expansion of sleeve [mm]	Piston dia. [mm]	Vol. [cm³]	Side load (unclamped) [N]	A	B ±0.01	C	dia. D	E	dia. F	G	H	M	N	P	S	X ±0.5	Y	OR-1 O-ring Order No.
63651	6970-09	1,4	28	0,5	50	53	75	9,5	8,5	36	9	80	98	31	13	15	62	62	124	260448
60293	6970-10	1,4	28	0,5	50	53	75	9,5	9,5	36	9	80	98	31	13	15	62	62	124	260448
60301	6970-11	1,7	32	1,6	150	53	75	14	10,5	36	9	80	98	31	13	19	62	62	124	260448
60319	6970-12	1,7	32	1,6	150	53	75	14	11,5	36	9	80	98	31	13	19	62	62	124	260448
63677	6970-13	1,7	32	1,6	150	53	75	14	12,5	36	9	80	98	31	13	19	62	62	124	260448
60418	6970-14	1,7	32	1,6	150	53	75	14	13,5	36	9	80	98	31	13	19	62	62	124	260448
60434	6970-15	1,7	40	3,8	200	53	75	16	14,5	36	13	90	115	35	15	24	62	62	124	260448
60525	6970-16	1,7	40	3,8	200	53	75	16	15,5	36	13	90	115	35	15	24	62	62	124	260448
60426	6970-17	1,7	40	3,8	200	53	75	16	16,5	36	13	90	115	35	15	24	62	62	124	260448
63693	6970-18	1,7	40	3,8	200	53	75	16	17,5	36	13	90	115	35	15	24	62	62	124	260448
60616	6970-19	1,7	40	3,8	200	53	75	16	18,5	36	13	90	115	35	15	24	62	62	124	260448
60715	6970-20	1,7	42	4,4	300	53	75	16	19,5	36	13	90	115	35	15	28	62	62	124	260448
60723	6970-21	1,7	42	4,4	300	53	75	16	20,5	36	13	90	115	35	15	28	62	62	124	260448
63719	6970-22	1,7	42	4,4	300	53	75	16	21,5	36	13	90	115	35	15	28	62	62	124	260448
60731	6970-23	1,7	42	4,4	300	53	75	16	22,5	36	13	90	115	35	15	32	62	62	124	260448
60376	6970-24	1,7	42	4,4	300	53	75	16	23,5	36	13	90	115	35	15	32	62	62	124	260448
60384	6970-25	1,7	42	4,4	300	53	75	16	24,5	36	13	90	115	35	15	32	62	62	124	260448



Subject to technical alterations.

No. 6970

Bore clamp, hydraulic, eccentric

Single-acting, with spring return,
max. operating pressure 150 bar,
min. operating pressure 30 bar.
lateral compensation per clamp ± 0.25 mm.







Order no.	Article no.	Clamping force vertical [kN]	Clamping rim height min. [mm]	dia. K [mm]	L	Weight [g]
63669	6970-07-50	3,5	6	6,8-7,7	10	2600
60798	6970-08-50	3,5	6	7,8-8,7	10	2600
63685	6970-09-50	5,3	7	8,8-9,7	10	2600
60814	6970-10-50	5,3	7	9,8-10,7	10	2800
63701	6970-11-50	8,5	8	10,8-11,7	13	2800
60830	6970-12-50	8,5	8	11,8-12,7	13	2800
63727	6970-13-50	11,5	9	12,8-13,7	13	2900
60822	6970-14-50	11,5	9	13,8-14,7	13	2900

Design:

The actuating piston is single-acting. Cylinder body, clamping segments and tensioning bolts are from hardened steel, gas-nitrided. Four-part clamping segments are externally serrated.
A Ø 8 H7 centring hole located on the underside for positioning the clamping element. Three fastening screws are included in the supply scope. Oil supply via threaded connection or oil channel in the fixture body.

Application:

The hydraulic bore clamp is preferred for use on workpieces with complex external geometries that must be clamped for machining.
After the clamping segments engage into clamping holes attached on one side with low depth, reliable 5-sided machining does not present a problem.
Workpieces can be installed or removed automatically with handling devices.

Features:

The tension bolt has the shape of a four-sided pyramid at the coupling point to the clamping sleeve. The clamping sleeve segments have this shape also, thus ensuring contact on the entire surface in every position of the tension bolt.
This facilitates a high clamping force and ensures very low wear.
Elastic rings hold the clamping segments together and seal them against entry of chips. Depending on the material, the external serration is pressed into the clamping hole with more or less force, thus permitting the required positive fit. The built-in plate springs achieve a maximum pull-down stroke of approx. 0.2 mm.

The tension bolt has a pyramid shape for improved pre-centring of workpieces.

The bore clamp is also a contact surface for the workpiece. The workpiece contact surface is hard-metal coated (µ 0.3), thereby significantly increasing the displacement force.

The eccentric arrangement of the clamping elements is especially suited for clamping workpieces with circumferential contact edge, such as gear and engine housings, oil pans and similar workpieces.

Note:

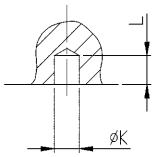
The lateral force when inserting the workpiece must not exceed the „lateral force“ table value. The radial force must be observed.

Please check with us for clamping hardened workpieces or those from GG / GGG.

On request:

Bore clamps for other hole diameters available upon request.

Clamping hole in workpiece:

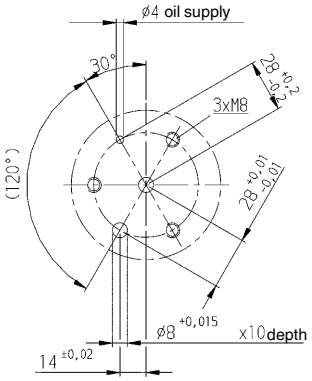


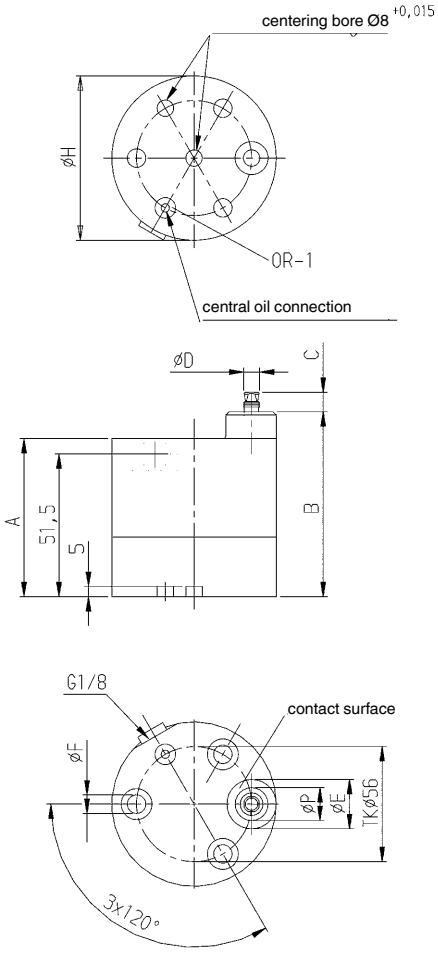
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Drilling template device:





Dimensions:

Order no.	Article no.	Permissible horizontal force [kN]	Radial force of sleeve segments [kN]	Expansion of sleeve [mm]	Piston dia. [mm]	Vol. [cm³]	Side load (unclamped) [N]	A	B ±0.01	C	D	dia. E	dia. F	dia. H	dia. P	OR-1 O-ring Order No.
63669	6970-07-50	1,0	10	1,4	18	1,0	50	59	75	9,5	6,6	24	9	80	15	260448
60798	6970-08-50	1,0	10	1,4	18	1,0	50	59	75	9,5	7,5	24	9	80	15	260448
63685	6970-09-50	1,5	15	1,4	22	1,5	80	59	75	9,5	8,5	24	9	80	15	260448
60814	6970-10-50	1,5	15	1,4	22	1,5	80	59	75	9,5	9,5	24	9	80	15	260448
63701	6970-11-50	2,5	25	1,4	28	2,5	120	59	75	12	10,5	24	9	80	19	260448
60830	6970-12-50	2,5	25	1,4	28	2,5	120	59	75	12	11,5	24	9	80	19	260448
63727	6970-13-50	3,5	35	1,4	32	3,2	150	59	75	12	12,5	24	9	80	19	260448
60822	6970-14-50	3,5	35	1,4	32	3,2	150	59	75	12	13,5	24	9	80	19	260448



Subject to technical alterations.

No. 6970D

Bore clamp, hydraulic, eccentric

double acting,
max. operating pressure 250 bar,
min. operating pressure 40 bar.
Lateral compensation per clamp ± 0,25 mm.







Order no.	Article no.	Clamping force vertical [kN]	Clamping rim height min. for Al-alloy [mm]	dia. K [mm]	L	Weight [g]
323410	6970D-06-60	5,0	7	5,9 - 6,3	9	1000
324384	6970D-065-60	5,0	7	6,4 - 6,8	9	1000
323436	6970D-07-60	5,0	7	6,9 - 7,3	9	1000
324400	6970D-075-60	5,0	7	7,4 - 7,8	9	1000
323444	6970D-08-60	5,0	8	7,9 - 8,3	9	1000
324392	6970D-085-60	5,0	8	8,4 - 8,8	10	1000
323469	6970D-09-60	5,0	8	8,9 - 9,8	10	1000
323485	6970D-10-60	5,0	8	9,9 - 10,8	10	1000

Design:

The actuating piston is double-acting. Cylinder body, clamping segments and tensioning bolts are from hardened steel, gas-nitrided. Two-part clamping segments are externally serrated. A Ø 8 H7 centring hole located on the underside for positioning the clamping elements. Supply scope includes three fastening screws. Oil supply via oil channel in fixture body.

Application:

The hydraulic bore clamp is preferred for use on workpieces with complex external geometries that must be clamped for machining.
After the clamping segments engage into clamping holes attached on one side with low depth, reliable 5-sided machining does not present a problem.
Workpieces can be installed or removed automatically with handling devices.

Features:

Two clamping segments are spread in parallel, thus ensuring contact on the entire surface in every position of the tension bolt. This facilitates a high clamping power and ensures very low wear. Elastic rings hold the clamping segments together and seal them against entry of chips. Depending on the material, the external serration is pressed into the clamping hole with more or less force, thus permitting the required positive fit. The built-in plate springs achieve a max. pull-down stroke of approx. 0.2 mm during clamping.

The integrated air connection is used for cleaning the clamping control. With a suction volume flow meter, the volume flow is measured in the unclamped and clamped state of the workpiece. The difference is used for clamping control. The max. operating pressure should not exceed 6 bar here.

The holding bolts are sword-shaped for better pre-centring of the workpieces. The complete clamping-segment / tension bolt unit can be turned so that an optimal force flow towards the workpiece centre can be set and locked. By setting the clamping elements, overloading of the clamping hole (spreading force) with low clamping rim is avoided.

The drill clamp is simultaneously a contact surface for the workpiece.
The workpiece contact surface is hard-metal coated (µ 0.3), which markedly increases the displacement force.

The eccentric arrangement of the clamping elements is especially suited for clamping workpieces with circumferential contact edge, such as gear and engine housings, oil pans and similar workpieces.

Note:

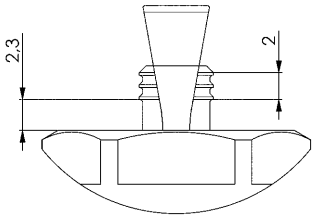
The lateral force when inserting the workpiece must not exceed the „lateral force“ table value. The radial force must be observed.

Please check with us for clamping hardened workpieces or those from GG / GGG.

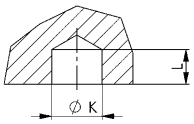
On request:

Drill clamps for other hole diameters available upon request.

A blow-out for cleaning the support or support control (pressure query) for blind holes is available on request.



Clamping hole in workpiece:

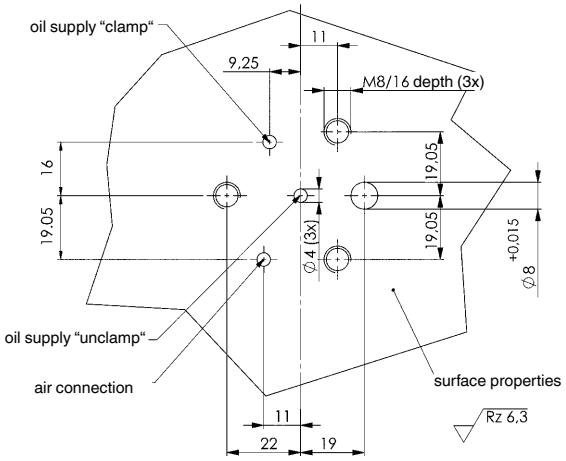


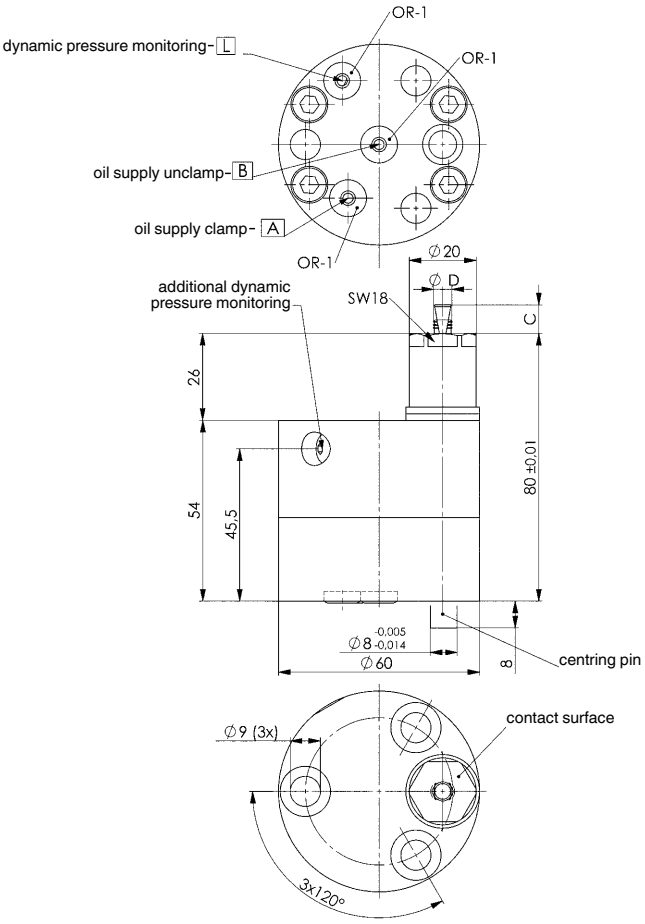
CAD

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Drilling template device:





Dimensions:

Order no.	Article no.	Permissible horizontal force [kN]	Radial force of sleeve segments [kN]	Expansion of sleeve [mm]	Clamping piston diameter [mm]	Vol. Sp [cm³]	Vol. Lo [cm³]	Side load (unclamped) [N]	C	dia. D	OR-1 O-ring Order No.
323410	6970D-06-60	1,5	14	1,5	16	0,9	0,5	30	9,5	5,6	260448
324384	6970D-065-60	1,5	14	1,5	16	0,9	0,5	30	9,5	6,1	260448
323436	6970D-07-60	1,5	14	1,5	16	0,9	0,5	40	9,5	6,6	260448
324400	6970D-075-60	1,5	14	1,5	16	0,9	0,5	40	9,5	7,1	260448
323444	6970D-08-60	1,5	14	1,5	16	0,9	0,5	50	9,5	7,6	260448
324392	6970D-085-60	1,5	14	1,5	16	0,9	0,5	50	9,5	8,1	260448
323469	6970D-09-60	1,5	14	1,5	16	0,9	0,5	80	9,5	8,6	260448
323485	6970D-10-60	1,5	14	1,5	16	0,9	0,5	80	9,5	9,6	260448



Subject to technical alterations.

No. 6970D

Bore clamp, hydraulic, eccentric

double acting,
max. operating pressure 250 bar,
min. operating pressure 40 bar.
Lateral compensation per clamp ± 0,25 mm.







Order no.	Article no.	Clamping force vertical [kN]	Clamping rim height min. for Al-alloy [mm]	dia. K [mm]	L	Weight [g]
323501	6970D-11-60	9,5	9	10,9 - 11,8	11	2000
323527	6970D-12-60	9,5	9	11,9 - 12,8	11	2000
323543	6970D-13-60	9,5	9	12,9 - 13,8	11	2000
323568	6970D-14-60	9,5	10	13,9 - 14,8	11	2100
323584	6970D-15-60	9,5	10	14,9 - 15,8	11	2100
323600	6970D-16-60	9,5	10	15,9 - 16,8	11	2100

Design:

The actuating piston is double-acting. Cylinder body, clamping segments and tensioning bolts are from hardened steel, gas-nitrided. Two-part clamping segments are externally serrated. A Ø 8 H7 centring hole located on the underside for positioning the clamping elements. Supply scope includes three fastening screws. Oil supply via oil channel in fixture body.

Application:

The hydraulic bore clamp is preferred for use on workpieces with complex external geometries that must be clamped for machining.
After the clamping segments engage into clamping holes attached on one side with low depth, reliable 5-sided machining does not present a problem.
Workpieces can be installed or removed automatically with handling devices.

Features:

Two clamping segments are spread in parallel, thus ensuring contact on the entire surface in every position of the tension bolt. This facilitates a high clamping power and ensures very low wear. Elastic rings hold the clamping segments together and seal them against entry of chips. Depending on the material, the external serration is pressed into the clamping hole with more or less force, thus permitting the required positive fit. The built-in plate springs achieve a max. pull-down stroke of approx. 0.2 mm during clamping.

The integrated air connection is used for cleaning the clamping control. With a suction volume flow meter, the volume flow is measured in the unclamped and clamped state of the workpiece. The difference is used for clamping control. The max. operating pressure should not exceed 6 bar here.

The holding bolts are sword-shaped for better pre-centring of the workpieces. The complete clamping-segment / tension bolt unit can be turned so that an optimal force flow towards the workpiece centre can be set and locked. Overloading of the clamping hole (spreading force) with low clamping rim is avoided by setting the clamping elements.

The drill clamp is simultaneously the contact surface for the workpiece.
The workpiece contact surface is hard-metal coated (µ 0.3), which markedly increases the displacement force.

The eccentric arrangement of the clamping elements is especially suited for clamping workpieces with circumferential contact edge, such as gear and engine housings, oil pans and similar workpieces.

Note:

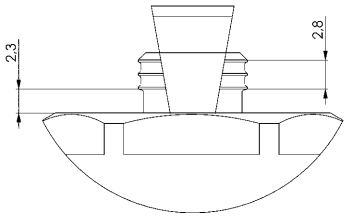
The lateral force when inserting the workpiece must not exceed the „lateral force“ table value. The radial force must be observed.

Please check with us for clamping hardened workpieces or those from GG / GGG.

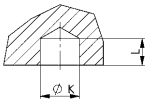
On request:

Drill clamps for other hole diameters available upon request.

A blow-out for cleaning the support or support control (pressure query) for blind holes is available on request.



Clamping hole in workpiece:

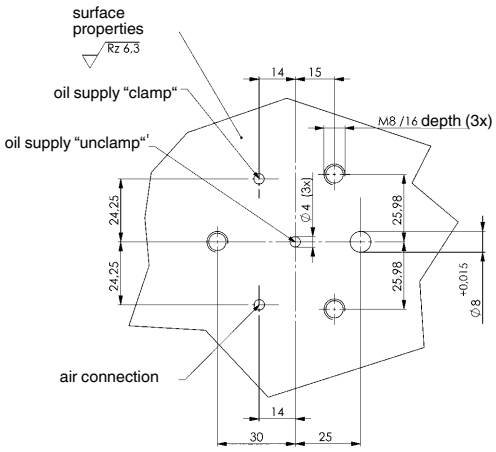


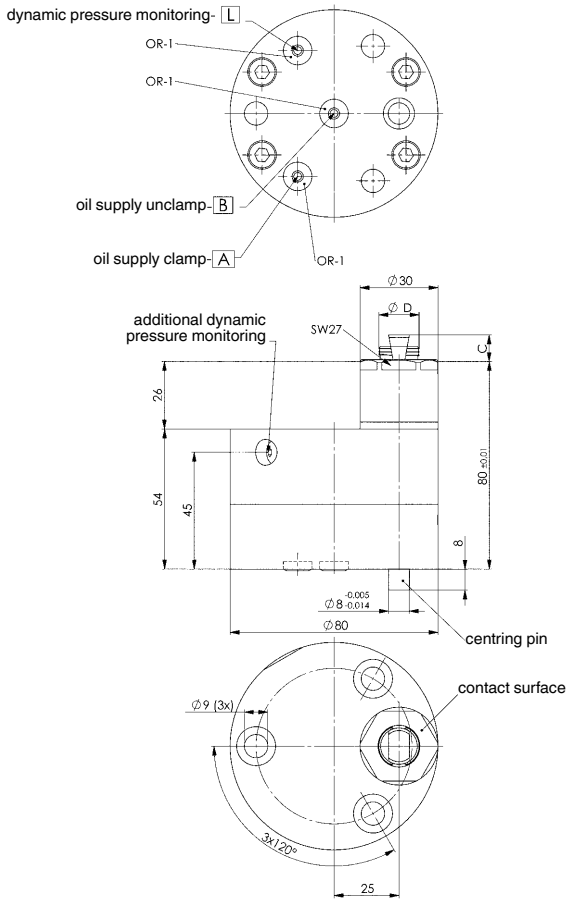
CAD

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Drilling template device:





Dimensions:

Order no.	Article no.	Permissible horizontal force [kN]	Radial force of sleeve segments [kN]	Expansion of sleeve [mm]	Clamping piston diameter [mm]	Vol. Sp [cm^3]	Vol. Lo [cm^3]	Side load (unclamped) [N]	C	dia. D	OR-1 O-ring Order No.
323501	6970D-11-60	2,8	27	1,5	22	1,7	0,5	100	10,5	10,6	260448
323527	6970D-12-60	2,8	27	1,5	22	1,7	0,5	110	10,5	11,6	260448
323543	6970D-13-60	2,8	27	1,5	22	1,7	0,5	130	10,5	12,6	260448
323568	6970D-14-60	2,8	27	1,5	22	1,7	0,5	160	10,5	13,6	260448
323584	6970D-15-60	2,8	27	1,5	22	1,7	0,5	200	10,5	14,6	260448
323600	6970D-16-60	2,8	27	1,5	22	1,7	0,5	250	10,5	15,6	260448

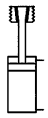


Subject to technical alterations.

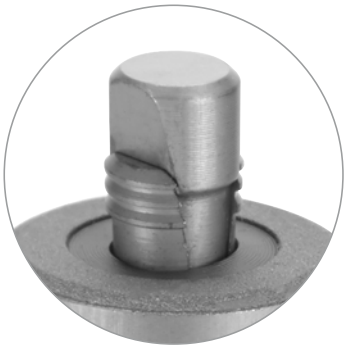
No. 6970CD

Bore clamp MINI, hydraulic, centric

Double-acting,
max. operating pressure, see table,
min. operating pressure 40 bar,
lateral compensation per clamp ±0.2 mm.







Order no.	Article no.	Clamping force vertical at 100 bar [kN]	Clamping force vertical at 150 bar [kN]	Clamping rim height min. for Al-alloy [mm]	dia. K	L	Md [Nm]	max. operating pressure [bar]	Weight [g]
556561	6970CD-055	2,76	-	5	5,2 - 5,9	8,5	3,7	100	273
556562	6970CD-06	2,76	4,1	5	6,0 - 6,7	8,5	3,7	150	274
556563	6970CD-065	2,76	4,1	5	6,6 - 7,2	8,5	3,7	150	274
556564	6970CD-07	2,76	4,1	5	7,0 - 7,7	8,5	3,7	150	275

Design:

The actuating piston is double-acting. Body, clamping segments and tension bolts are made of nitrided tempered steel. Two-part clamping segments are externally interlocked. Four fastening screws are supplied as standard. Oil supply via oil channel in fixture body.

Application:

The hydraulic bore clamp is preferred for use on workpieces with complex external geometries that must be clamped for machining. After the clamping segments are applied to single-attachment clamping holes with low depth, a secure 5-sided processing can be performed without difficulty. Workpieces can be installed or removed automatically with handling devices.

Features:

Two clamping segments are spread in parallel, thus ensuring contact on the entire surface in every position of the tension bolt. This facilitates a high clamping power and ensures very low wear. Elastic rings hold the clamping segments together and seal them against entry of chips. Depending on the material, the external serration is pressed into the clamping hole with more or less force, thus permitting the required positive fit. The built-in plate springs achieve a max. pull-down stroke of approx. 0.2 mm during clamping. The integrated air connection L1 is used for cleaning the clamping area. This blow-off can also be used as a mount check for blind holes.

The integrated air connection is used for cleaning the clamping control. With a suction volume flow meter, the volume flow is measured in the unclamped and clamped state of the workpiece. The difference is used for clamping control. The max. operating pressure should not exceed 6 bar here.

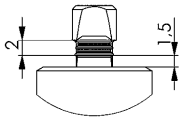
The tension bolts are sword-shaped for better pre-positioning of the workpieces. The complete clamping-segment / tension bolt unit can be turned 90° so that an optimal force flow towards the workpiece centre can be set and locked. By setting the clamping elements, overloading of the clamping hole (spreading force) with low clamping rim is avoided. The drill clamp is also a contact surface for the workpiece. The workpiece contact surface is hard-metal coated (μ =0.3), which markedly increases the displacement force.

Note:

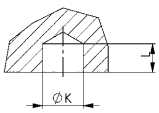
The lateral force when inserting the workpiece must not exceed the “lateral force” table value. The radial force must be observed.
Please contact us if clamping hardened or cast workpieces.

On request:

Bore clamps for other hole diameters available upon request.



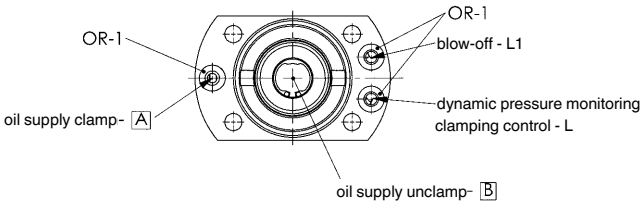
Clamping hole in workpiece:

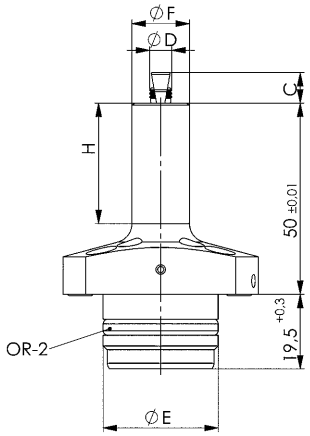


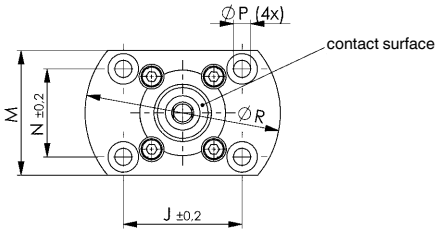
CAD

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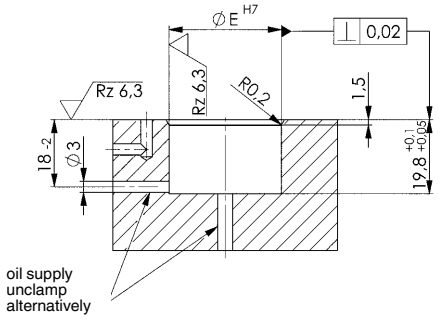


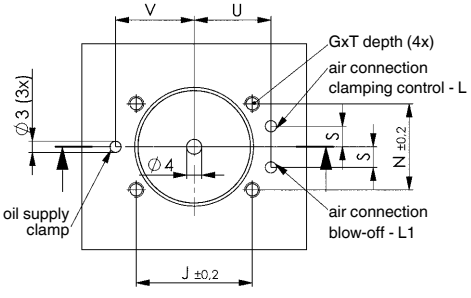




Dimensions:

Order no.	Article no.	Displacement force horizontal at 100 bar [kN]	Displacement force horizontal at 150 bar [kN]	Clamping sleeve radial force at 100 bar [kN]	Clamping sleeve radial force at 150 bar [kN]	Vol. Sp [cm³]	Vol. Lo [cm³]	C	dia. D	dia. E	dia. F	H	J	M	N	P	R	OR-1 O-ring Order No.	OR-2 O-ring Order No.
556561	6970CD-055	0,83	-	7,85	-	1,1	1,26	8	5,0	30	15	31,5	31	32,6	23	4,5	51	176164	490342
556562	6970CD-06	0,83	1,23	7,85	11,78	1,1	1,26	8	5,8	30	15	31,5	31	32,6	23	4,5	51	176164	490342
556563	6970CD-065	0,83	1,23	7,85	11,78	1,1	1,26	8	6,3	30	15	31,5	31	32,6	23	4,5	51	176164	490342
556564	6970CD-07	0,83	1,23	7,85	11,78	1,1	1,26	8	6,8	30	15	31,5	31	32,6	23	4,5	51	176164	490342





Installation dimensions:

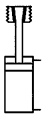
Order no.	Article no.	ØE H7	G	S	T	U	V
556561	6970CD-055	30	M4	5,5	8	20,5	21
556562	6970CD-06	30	M4	5,5	8	20,5	21
556563	6970CD-065	30	M4	5,5	8	20,5	21
556564	6970CD-07	30	M4	5,5	8	20,5	21

Subject to technical alterations.

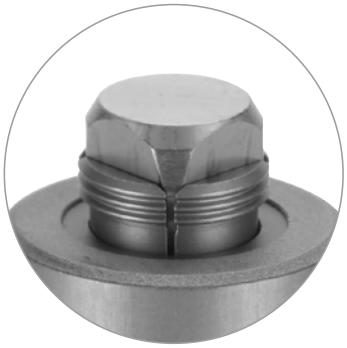
No. 6970CD

Bore clamp MAXI, hydraulic, centric

Double-acting,
max. operating pressure 150 bar,
min. operating pressure 40 bar,
lateral compensation per clamp ±0.25 mm.







Order no.	Article no.	Clamping force vertical at 100 bar [kN]	Clamping force vertical at 150 bar [kN]	Clamping rim height min. for Al-alloy [mm]	dia. K	L	Md [Nm]	Weight [g]
556565	6970CD-08	2,76	4,1	5	7,8 - 8,6	9	3,7	298
556566	6970CD-09	4,4	6,6	6	8,7 - 9,6	9	7,2	413
556567	6970CD-10	4,4	6,6	6	9,7 - 10,7	9	7,2	413
556568	6970CD-11	5,0	7,5	8	10,8 - 11,8	9	10,0	530
556569	6970CD-12	5,0	7,5	8	11,9 - 12,8	9	10,0	532
556570	6970CD-13	5,0	7,5	8	12,9 - 13,8	9	10,0	535

Design:

The actuating piston is double-acting. Body, clamping segments and tension bolts are made of nitrided tempered steel. Four-part clamping segments are externally interlocked. Four fastening screws are supplied as standard. Oil supply via oil channel in fixture body.

Application:

The hydraulic bore clamp is preferred for use on workpieces with complex external geometries that must be clamped for machining. After the clamping segments are applied to single-attachment clamping holes with low depth, a secure 5-sided processing can be performed without difficulty. Workpieces can be installed or removed automatically with handling devices.

Features:

The tension bolt has the shape of a four-sided pyramid at the coupling point to the clamping sleeve. The clamping sleeve segments have this shape also, thus ensuring the sleeve segments have contact on the entire surface in every position of the tension bolt. This facilitates a high clamping power and ensures very low wear. Elastic rings hold the clamping segments together and seal them against entry of chips. Depending on the material, the external serration is pressed into the clamping hole with more or less force, thus permitting the required positive fit. The built-in plate springs achieve a max. pull-down stroke of approx. 0.2 mm during clamping. The integrated air connection L1 is used for cleaning the clamping area. This blow-off can also be used as a mount check for blind holes.

The integrated air connection is used for cleaning the clamping control. With a suction volume flow meter, the volume flow is measured in the unclamped and clamped state of the workpiece. The difference is used for clamping control. The max. operating pressure should not exceed 6 bar here.

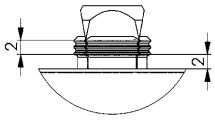
The tension bolt has a pyramid shape for better pre-positioning of the workpieces. The drill clamp is also a contact surface for the workpiece. The workpiece contact surface is hard-metal coated (μ =0.3), which markedly increases the displacement force.

Note:

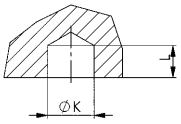
The lateral force when inserting the workpiece must not exceed the “lateral force” table value. The radial force must be observed.
Please contact us if clamping hardened or cast workpieces.

On request:

Bore clamps for other hole diameters available upon request.



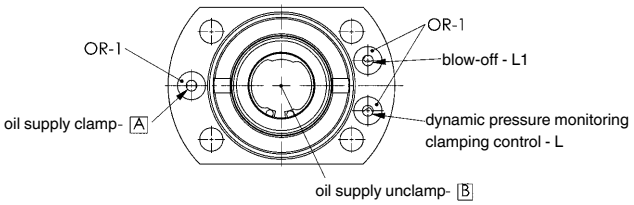
Clamping hole in workpiece:

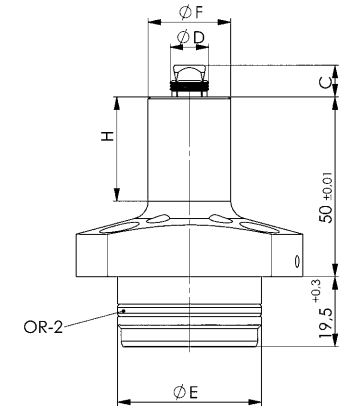


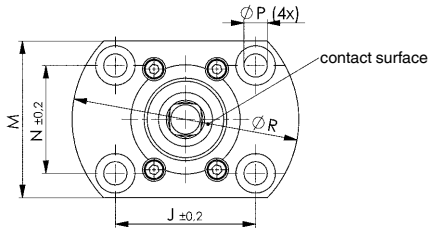
CAD

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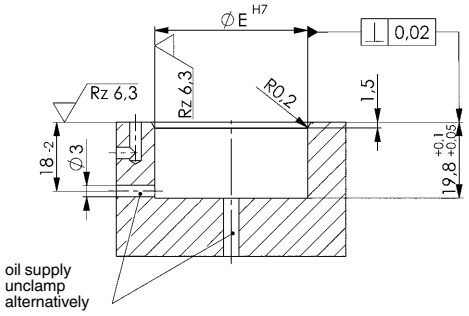






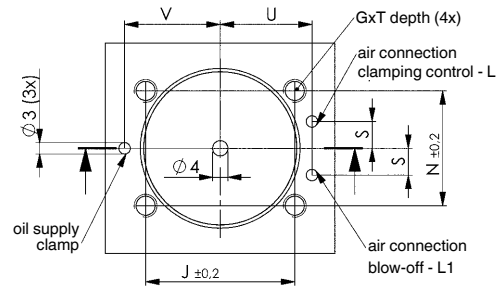
Dimensions:

Order no.	Article no.	Displacement force horizontal at 100 bar [kN]	Displacement force horizontal at 150 bar [kN]	Clamping sleeve radial force at 100 bar [kN]	Clamping sleeve radial force at 150 bar [kN]	Vol. Sp [cm³]	Vol. Lo [cm³]	C	dia. D	dia. E	dia. F	H	J	M	N	P	R	OR-1 O-ring Order No.	OR-2 O-ring Order No.
556565	6970CD-08	0,83	1,23	7,85	11,78	1,10	1,26	8,5	7,6	30	18	31,5	31	32,6	23	4,5	51	176164	490342
556566	6970CD-09	1,32	1,98	12,47	18,71	1,76	1,96	8,8	8,6	37	20	31,5	38	39,6	29	5,5	60	161802	492728
556567	6970CD-10	1,32	1,98	12,47	18,71	1,76	1,96	8,8	9,6	37	20	31,5	38	39,6	29	5,5	60	161802	492728
556568	6970CD-11	1,51	2,26	14,26	21,39	2,01	2,46	8,8	10,7	40	23	29,0	39	43,6	30	6,5	63	161802	321117
556569	6970CD-12	1,51	2,26	14,26	21,39	2,01	2,46	8,8	11,7	40	23	29,0	39	43,6	30	6,5	63	161802	321117
556570	6970CD-13	1,51	2,26	14,26	21,39	2,01	2,46	8,8	12,7	40	23	29,0	39	43,6	30	6,5	63	161802	321117



Installation dimensions:

Order no.	Article no.	ØE H7	G	S	T	U	V
556565	6970CD-08	30	M4	5,5	8	20,5	21
556566	6970CD-09	37	M5	7,0	10	24	25
556567	6970CD-10	37	M5	7,0	10	24	25
556568	6970CD-11	40	M6	7,0	12	24	25
556569	6970CD-12	40	M6	7,0	12	24	25
556570	6970CD-13	40	M6	7,0	12	24	25



Subject to technical alterations.





Subject to technical alterations.

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PULL-DOWN CLAMPS AND SIDE CLAMPING ELEMENTS WITHOUT PULL-DOWN ACTION FOR OPTIMAL 3-SIDED MACHINING

PULL-DOWN CLAMP

> clamping force up to 50 kN (single acting),
> clamping force up to 32 kN (double acting)
> operating pressure up to 400 bar
> independent of clamping and pull-down stroke
> oil supply via threaded port or oil channel in the fixture body

SIDE CLAMPING ELEMENT

> clamping force up to 27,5 kN
> operating pressure up to 250 bar
> lateral clamping without pull-down action
> oil supply through oil channels in the fixture body

At continuous pressures below 80 bar, this must be stated on ordering as a different seal combination may need to be selected.

PRODUCT OVERVIEW:

Type	Operating pressure [bar]	Clamping force [kN]	Clamping stroke [mm]	No. of models	Oil connection	Operating mode
6972F	400	4,5 - 50,0	5 - 12	4	thread/o-ring	single acting
6972D	400	12,0 - 32,0	8 - 12	3	thread/o-ring	double acting
6973	350	8,9	5	2	thread/o-ring	single acting
6978CDA	250	27,5	3	1	o-ring	double acting
6978CD	250	27,5	3	1	o-ring	double acting

PRODUCT EXAMPLES:

NO. 6972D



> clamping force: 4,5 - 32 kN
> lateral clamping with pull-down action

NO. 6973



> clamping force: 8,9 kN
> lateral clamping with pull-down action

NO. 6978CDA



> clamping force: 27,5 kN
> lateral clamping without pull-down action

No. 6972F

Pull-Down Clamp, hydraulic

single acting, spring return,
max. operating pressure 400 bar,
min. operating pressure 40 bar.





Order no.	Article no.	Clamping force at 400 bar [kN]	Stroke H [mm]	Piston dia. [mm]	Vol. [cm³]	Md max. [Nm]	Spring force min. [N]	Weight [g]
66951	6972F-05	4,5	5	12	0,57	21	60	670
66969	6972F-20	20,0	8	25	4	72	160	2500
66977	6972F-32	32,0	10	32	8	180	210	4700
66985	6972F-50	50,0	12	40	15	350	340	8800

Design:

Cylinder body from hardened steel, burnished. Piston case hardened and ground. Exchangeable jaws. Standard version with serrated and hardened jaws. Complete with 2 fastening screws to ISO, built-in return spring. All oil channels are sealed. Oil supply via threaded connection or oil channel in the fixture body.

Application:

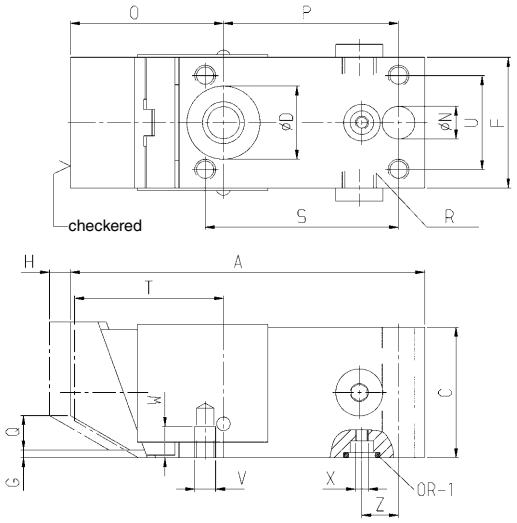
Pull-down clamps are used whenever clamping is possible only laterally and the workpiece nevertheless has to be held firmly on the machine tool table. The hydraulic principle enables high pressing and pull-down forces. Mounting by two bolts from above or by four bolts from the bottom.

Features:

Horizontal and vertical movement is independent of each other (no locked coupling) giving a true pull-down effect. No raising of the clamping jaw, because the clamping bolt is right behind the jaw. Suitable for incorporation in fixtures. New design of jaw connection with rubber buffer ensures sliding without any play.

Note:

The maximum pull-down stroke of the jaw must not exceed dimension G. Do not overtighten the fastening screws! Observe max. tightening torque Md. The oil channel can be sealed from below. High variability by oil connection on two sides and bottom oil channel. Jaw and hydraulic piston are connected by a joint to prevent the induction of bending forces into the piston, thus increasing the element's service life.
Pull-down force = approx. 1/3 the applicable clamp force
The hole ØD can be used for additional support or positioning.



Dimensions:

Order no.	Article no.	~A	C	F	G	H	dia. N	O ±0.5	P	Q	R	S	T	U	V	W	X	Z	Screw (2 pieces)	ØD +0.05 x depth	OR-1 O-ring Order No.
66951	6972F-05	100,0	30	30	2	5	8,5	39,0	53	3	G1/8	59	38,0	22	M5	6	M3	13,0	M8x45	-	156067
66969	6972F-20	135,0	50	50	3	8	12,5	58,0	67	14	G1/4	74	57,0	36	M8	12	M5	14,0	M12x80	28,00 x 6	114405
66977	6972F-32	149,5	65	65	3	10	16,5	63,5	72	17	G1/4	83	62,5	47	M10	16	M5	17,5	M16x100	32,02 x 6	114405
66985	6972F-50	180,0	80	80	3	12	20,5	71,0	93	19	G1/4	104	70,0	60	M12	25	M5	21,0	M20x120	40,02 x 8	114405

CAD

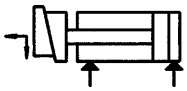
Subject to technical alterations.

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No. 6972D

Pull-Down Clamp, hydraulic

double acting,
max. operating pressure 400 bar.





Order no.	Article no.	Clamping force at 400 bar Sp* [kN]	Clamping force at 400 bar Lo* [kN]	Stroke H [mm]	Piston dia. [mm]	Vol. Sp [cm³]	Vol. Lo [cm³]	Md max. [Nm]	Weight [g]
320150	6972D-12	12	4,5	8	20	2,5	0,9	17	1500
320168	6972D-20	20	9,6	10	25	4,9	2,5	25	2900
320614	6972D-32	32	12,5	12	32	9,7	4,0	46	4900

Sp = clamp, Lo = unclamp

Design:

Cylinder body from hardened steel, burnished. Piston case hardened and ground. Exchangeable jaws. Standard version with serrated and hardened jaws. Complete with 4 fastening screws to ISO, O-ring and oil plugs, particle wiper at clamping bolt. Oil supply via threaded connection or oil channel in the fixture body.

Application:

Pull-down clamps are used whenever clamping is possible only laterally and the workpiece nevertheless has to be held firmly on the fixture body. The hydraulic principle facilitates high pressing and pull-down forces. This clamp can be used on fixture bodies with manifold-type oil supply. Fastening is facilitated from above by four screws.

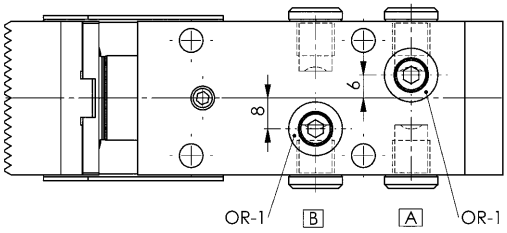
Features:

Quick and safe return movement, independent of the line lengths or the numbers of elements in the circuit. Independent horizontal and vertical movement (no locked coupling), giving a true pull-down effect. Lifting of the clamping jaw is prevented by the location of the clamping bolt right behind the jaw. Suitable for incorporation in fixtures. New design of jaw connection with rubber buffer ensures a sliding without any play.

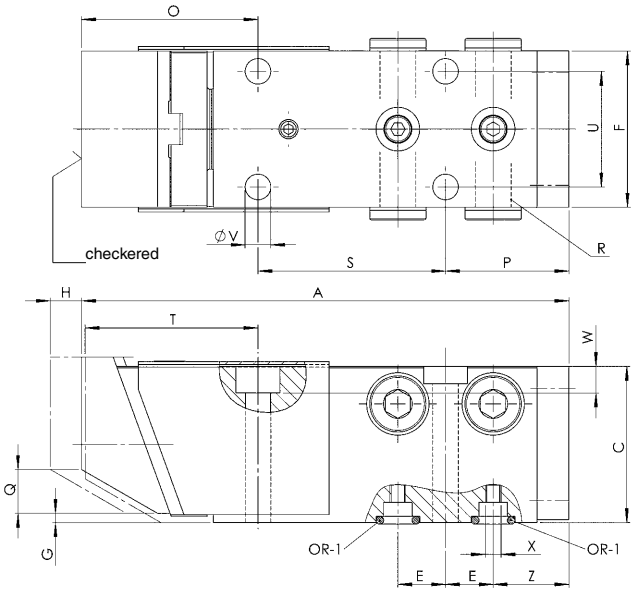
Note:

The maximum pull-down stroke of the jaw must not exceed dimension G. Do not overtighten the mounting fasteners! The maximum permissible torque must not be exceeded. The bottom oil channel is plugged by a sealing washer and a ISO 4762 - M 5x10 bolt. Minimum operating pressure is 40 bar. High variability by oil connection on two sides and bottom oil channel. Jaw and hydraulic piston are connected by a joint to prevent the induction of bending forces into the piston, thus increasing the element's service life. Pull-down force is equal to approx. 1/3 of the corresponding clamping force.

6972D-12



6972D-20, 6972D-32



Dimensions:

Order no.	Article no.	~A	C	E	F	G	H	O ±0.5	P	Q	R	S	T	U ±0,1	dia. V	W	X	Z	Screw (4 pieces)	OR-1 O-ring Order No.
320150	6972D-12	122	40	12,50	40	2	8	40,5	36,5	8,5	G1/8	45	39,5	30	6,2	7,0	M5	24,0	M6x50	114405
320168	6972D-20	156	50	15,25	50	3	10	56,5	39,5	14,0	G1/4	60	55,5	37	8,2	8,5	M5	24,3	M8x60	114405
320614	6972D-32	167	65	15,25	65	3	12	64,0	42,8	17,0	G1/4	60	63,0	48	10,2	10,5	M5	27,5	M10x75	114405

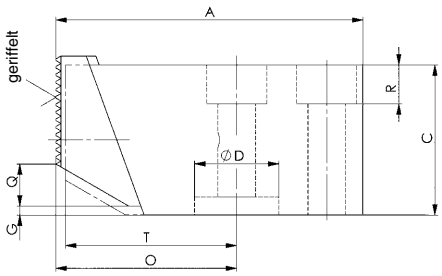
CAD

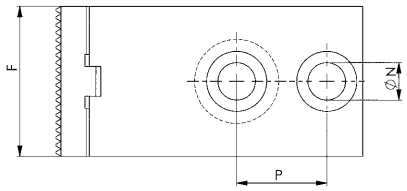
Subject to technical alterations.

No. 6977

Pull-Down Counter-Hold, mechanical







Order no.	Article no.	Holding force [kN]	Screw (2 pieces)	Weight [g]
67371	6977-05	4,5	M8x35	550
67512	6977-20	20	M12x65	1550
67421	6977-32	32	M16x80	3000
67520	6977-50	50	M20x100	5200

Design:

Cylinder body made of tempering steel, blued. Exchangeable jaws. Standard version with serrated and hardened jaw. Jaw exchangeable. Complete with two mounting bolts (ISO).

Application:

Purely a counter-hold when using a hydraulic or mechanical pull-down clamp. The workpiece is pulled down onto the machine table by the horizontal force that is applied.

Features:

The smooth clamping jaw moves always against the machine tool table surface, i.e. the stop position is always the same. Clamping on slotted table possible lengthwise and crosswise. No raising of the clamping jaw, because the clamping bolt is right behind the jaw. Suitable for incorporation in fixtures. New design of jaws connection with rubber buffer ensures sliding without any play.

Note:

The maximum pull-down stroke of the jaw must not exceed dimension G. The hole ØD can be used for additional support or positioning.

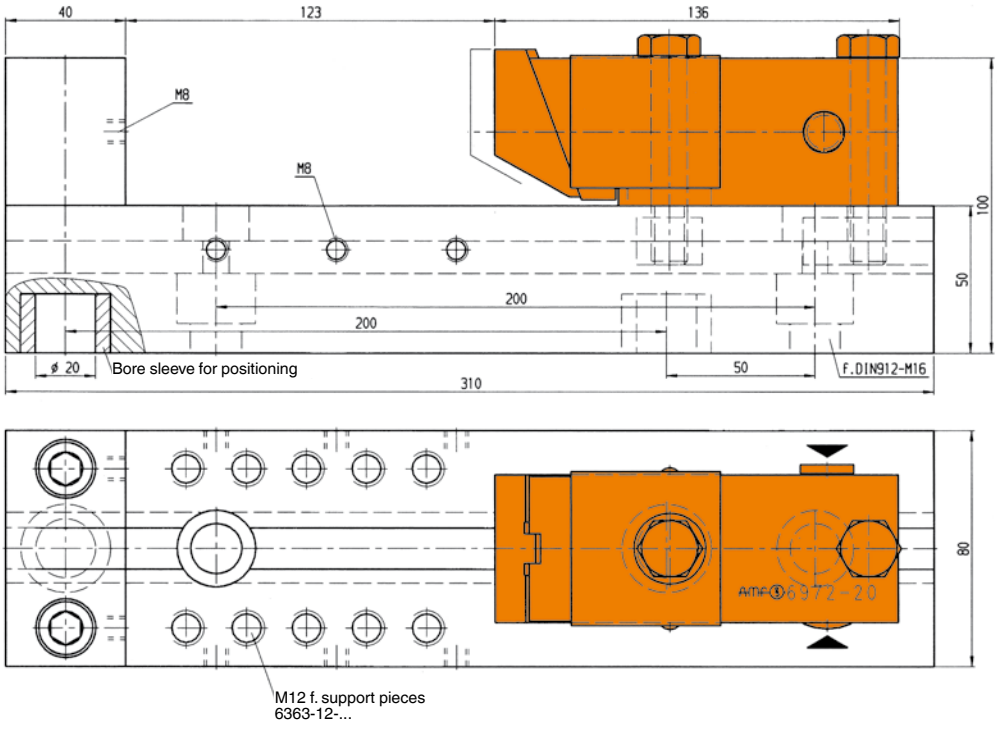
CAD

Dimensions:

Order no.	Article no.	~A	C	ØD +0.05 x depth	F	G	dia. N	O ±0.5	P	Q	R	T
67371	6977-05	79	30	-	30	2	8,5	42	26	3	8	41
67512	6977-20	102	50	28,02 x 6	50	3	12,5	60	30	14	13	59
67421	6977-32	114	65	32,02 x 6	65	3	16,5	62	37	17	18	61
67520	6977-50	133	80	40,02 x 8	80	3	20,5	68	46	19	23	67

Application example:

Pull-down clamp No. 6972F-20 as vice.



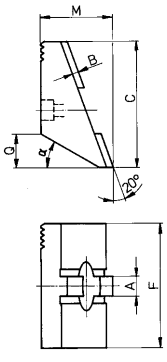
Subject to technical alterations.

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No. 6972G

Clamping Jaws, serrated





CAD

Order no.	Article no.	A	B	C	F	M	Q	α	Weight [g]
67025	6972G-05	6	2,7	29,5	30	22,0	3,0	15°	75
320887	6972G-12	10	2,5	40,0	40	23,0	8,5	30°	126
67165	6972G-20	10	3,0	50,0	50	31,5	14,0	30°	260
67256	6972G-32	10	3,0	65,0	65	37,0	17,0	30°	505
67322	6972G-50	10	3,0	80,0	80	39,5	19,0	30°	825

Design:

Tempering steel, hardened and tempered, with serrated clamping surface.

Application:

For all workpieces with normal clamping faces.

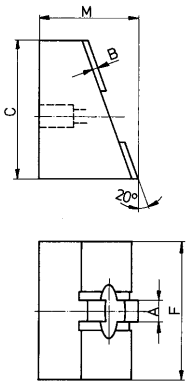
Note:

This clamping jaw is part of the standard equipment of pull-down clamps No. 6972D, 6972F and counter-hold 6977.

No. 6972W

Clamping Jaws, soft





CAD

Order no.	Article no.	A	B	C	F	M	Weight [g]
67017	6972W-05	6	2,7	29,5	30	32,0	145
320903	6972W-12	10	2,5	40,0	40	33,0	277
67173	6972W-20	10	3,0	50,0	50	41,5	525
67264	6972W-32	10	3,0	65,0	65	52,0	1000
67330	6972W-50	10	3,0	80,0	80	59,5	1550

Design:

Tempering steel, unhardened, with smooth clamping surface.

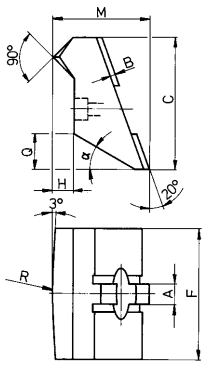
Application:

These clamping jaws can be shaped into any clamping form or ground flush for sensitive workpieces.

No. 6972GR

Clamping Jaws, with clamping edge





CAD

Order no.	Article no.	A	B	C	F	H	M	Q	R	α	Weight [g]
67009	6972GR-05	6	2,7	29,5	30	5,0	27,0	3,0	300	15°	85
321620	6972GR-12	10	2,5	40,0	40	6,5	29,5	8,5	200	30°	147
67181	6972GR-20	10	3,0	50,0	50	8,0	39,5	14,0	200	30°	300
67272	6972GR-32	10	3,0	65,0	65	10,0	47,0	17,0	300	30°	600
67348	6972GR-50	10	3,0	80,0	80	12,0	51,0	19,0	300	30°	940

Design:

Tempering steel, case-hardened and tempered, with bombed clamping surface.

Application:

Clamping jaws are particularly suitable for workpieces with hard and very uneven surfaces.

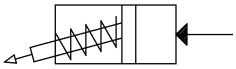


Subject to technical alterations.

No. 6973

Pull-Down Clamp

single acting, with spring return,
max. operating pressure 350 bar.





Order no.	Article no.	Clamping force horizontal at 350 bar [kN]	Clamping force vertical at 350 bar [kN]	Stroke [mm]	Piston area [cm²]	Vol. [cm³]	Md max. [Nm]	OR-1 O-ring Order No.	Weight [g]
66787	6973-09-1	8,9	2,2	5	2,9	1,4	11	-	481
66803	6973-09-2	8,9	2,2	5	2,9	1,4	11	550266	399

Design:

Cylinder barrel from steel, hardened and burnished. Piston rod case hardened and ground. Hardened clamping jaw. Return spring from stainless steel. Oil supply via threaded connection or oil channel in the fixture body.

Application:

Universal Edge Clamp for various applications.

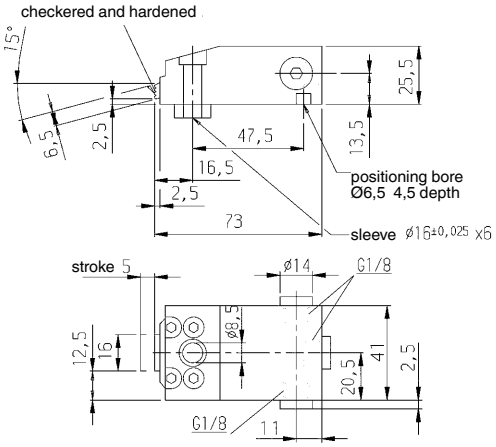
Features:

Small unit offering large clamping force.

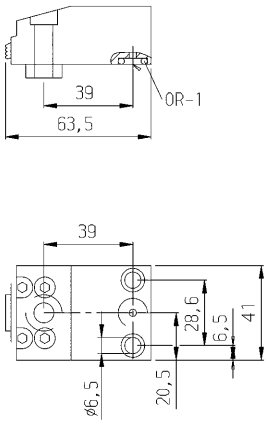
Note:

When placing into operation, ensure that all air is bled from the system.
The surface quality of No. 6973-09-2 must be Rz 6.3 at the mating flange surface.

6973-09-1



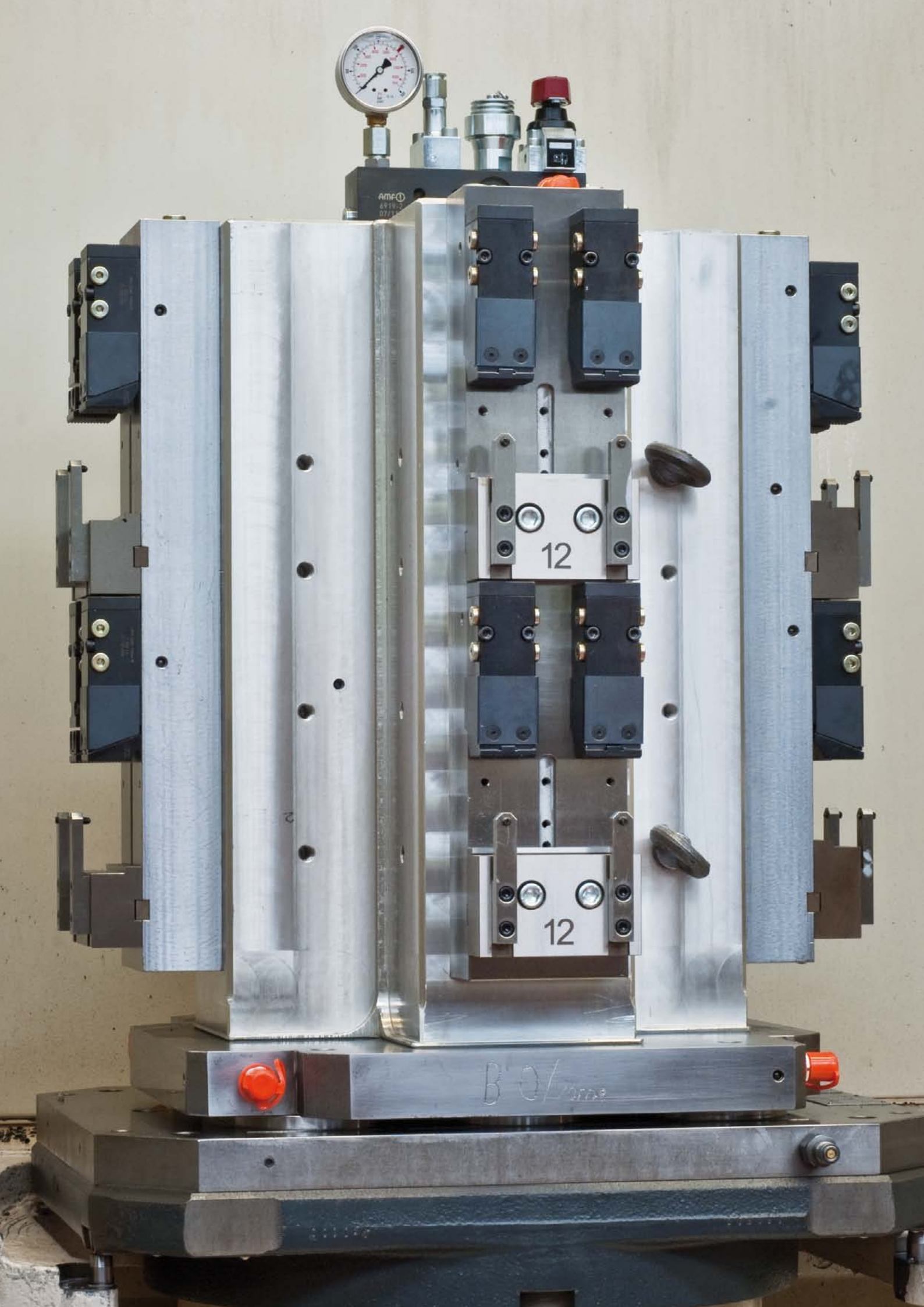
6973-09-2



CAD

Subject to technical alterations.

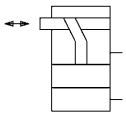
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12
12

No. 6978CD

Side clamping element without support

Double-acting,
max. operating pressure 250 bar,
min. operating pressure 30 bar.





Order no.	Article no.	Clamping force at 150 bar [kN]	Clamping force at 250 bar [kN]	Stroke	OR-1 O-ring Order No.	OR-2 O-ring Order No.	Weight [g]
562198	6978CD-28	16,5	27,5	3	562537	173096	1510

Design:

Housing made of steel, burnished. Tension slide hardened. Integrated flow rate restrictor, grooved clamping jaw. Oil supply via oil channel in fixture body.

Application:

For clamping workpieces in a linear direction. Compact design. The workpiece can be clamped sensitively thanks to the adjustable flow rate restrictor.

Features:

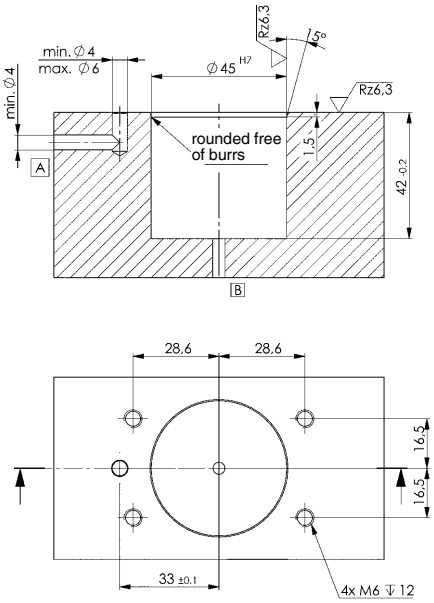
High flexibility through individually designed and exchangeable clamping jaws.

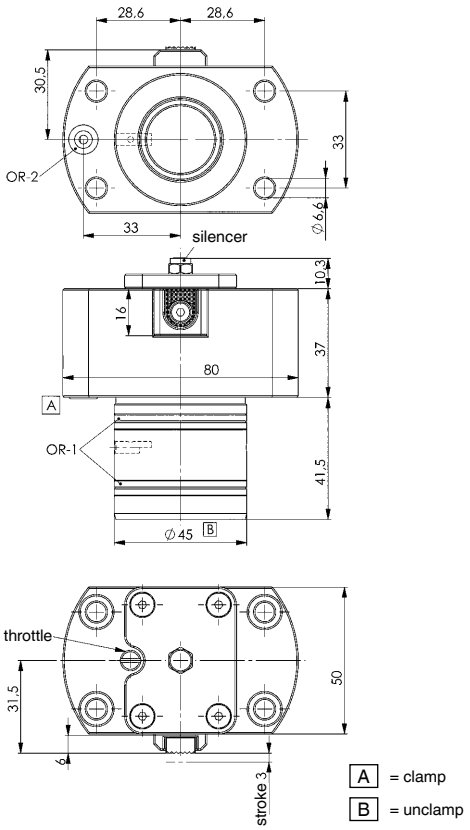
Note:

The installation hole must be free of burrs. Seals and housings must be greased during installation. Avoid chips from gathering via oil channels.

Installation dimensions:

(with throttle function)





CAD

Subject to technical alterations.

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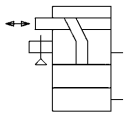
No. 6978CDA

Side clamping element with support

Double-acting,
max. operating pressure 250 bar,
min. operating pressure 30 bar.

CAD

Order no.	Article no.	Clamping force at 150 bar [kN]	Clamping force at 250 bar [kN]	Stroke	OR-1 O-ring Order No.	OR-2 O-ring Order No.	Weight [g]
562197	6978CDA-28	16,5	27,5	3	562537	562534	1250





Design:

Housing made of steel, burnished. Tension slide hardened. Alignment by cylinder pin. Integrated support control and grooved clamping jaw. Oil supply via oil channel in fixture body.

Application:

For clamping workpieces in a linear direction. Compact design thanks to integrated support and support control. A pneumatic support control is included as standard, which can be connected if required. The support height can be adjusted to the workpiece height by means of shims.

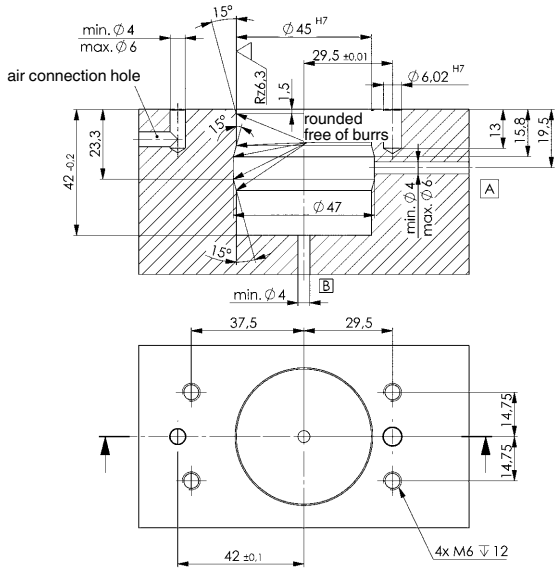
Features:

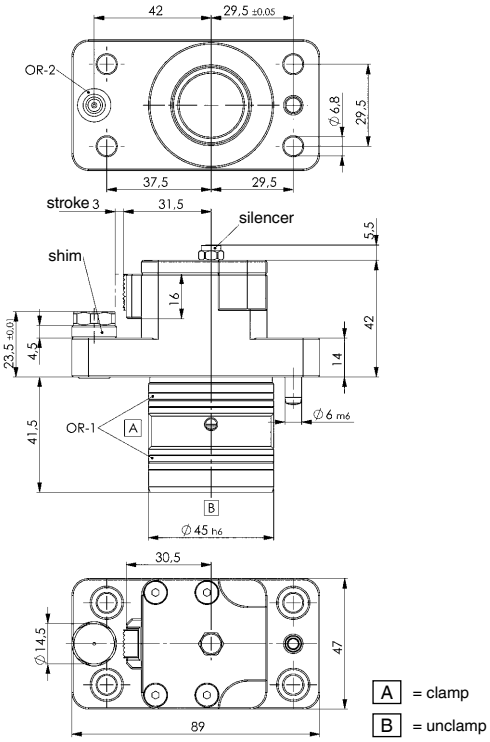
High flexibility through individually designed and exchangeable clamping jaws.

Note:

The installation hole must be free of burrs. Seals and housings must be greased during installation. Avoid chips from gathering via oil channels.

Installation dimensions:



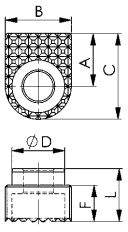


No. 6978CDA-28-06

Clamping jaw, serrated

CAD





Order no.	Article no.	A	B	C	dia. D	F	L	Weight [g]
562201	6978CDA-28-06	8	10	13	8	5,5	8	4

Design:

Tempered steel, hardened and tempered, serrated clamping surface, with bolt.

Application:

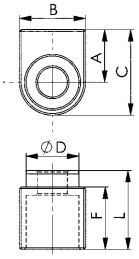
For all workpieces with normal clamping faces.

No. 6978CDAR-28-06

Clamping jaws blank, smooth

CAD





Order no.	Article no.	A	B	C	dia. D	F	L	Weight [g]
562202	6978CDAR-28-06	8	10	13	8	9,5	12	6,5

Design:

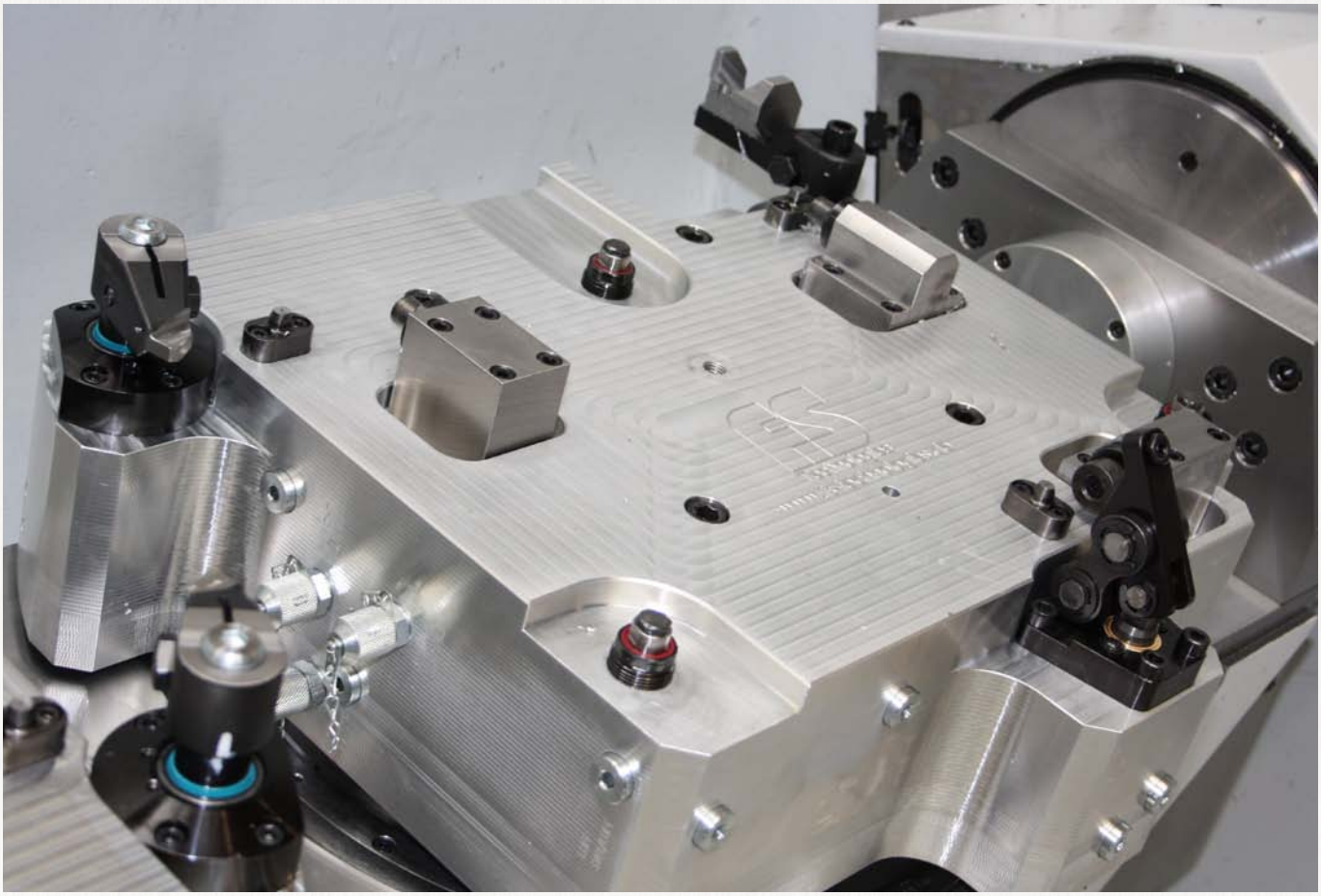
Tempered steel, unhardened, with smooth clamping surface, with bolt.

Application:

These clamping jaws can be shaped into any clamping form or ground flush for sensitive workpieces.

Subject to technical alterations.





Subject to technical alterations.

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CENTRING CLAMPS WITH TWO OR THREE CLAMPING POINTS

> clamping force up to 28 kN
> operating pressure up to 350 bar
> centring in holes
> clamping in holes
> oil supply via oil channels in fixture body or via threaded port with connector plate

PRODUCT OVERVIEW:

Type	Clamping force [kN]	Clamping stroke [mm]	Clamping points	No. of models	Operating mode
6974-20XX - MINI	14	3	2	9	double acting
6974-30XX - MINI	14	3	3	9	double acting
6974-20XX - MAXI	11,2 - 28	4 - 6,9	2	9	double acting
6974-30XX - MAXI	11,2 - 28	4 - 6,9	3	9	double acting

PRODUCT EXAMPLES:

NO. 6974 - MINI



> clamping and centring in holes

NO. 6974 - MAXI



> clamping and centring in holes

NO. 6974-XXXX



> for o-ring connection
> for threaded connection

Subject to technical alterations.

No. 6974

Centring clamp MINI with two clamping points

Double-acting,
max. operating pressure 350 bar,
min. operating pressure 10 bar.

CAD



Order no.	Article no.	Clamping force at 100 bar * [kN]	Clamping force at 350 bar* [kN]	Clamping points	Clamping Ø N -1	Stroke H [mm]	Repeatability [mm]	Q max. [l/min]	Weight [g]
329243	6974-2025	4,0	14,0	2	25-29	3,0	±0,02	1,0	440
329284	6974-2028	4,0	14,0	2	28-32	3,0	±0,02	1,0	447
329326	6974-2032	4,0	14,0	2	32-36	3,0	±0,02	1,0	456
329052	6974-2036	4,0	14,0	2	36-40	3,0	±0,02	1,0	574
329094	6974-2039	4,0	14,0	2	39-43	3,0	±0,02	1,0	590
329136	6974-2042	4,0	14,0	2	42-46	3,0	±0,02	1,0	604
329169	6974-2045	4,0	14,0	2	45-49	3,0	±0,02	1,0	620
329177	6974-2048	4,0	14,0	2	48-52	3,0	±0,02	1,0	635
329201	6974-2051	4,0	14,0	2	51-55	3,0	±0,02	1,0	652

* The clamping force is distributed centrally over the 2 clamping points.

Design:

Double-acting centring clamp with two clamping points.
All components from high-grade hardened and nitrided steel. Oil supply via oil channel in fixture body.

Application:

For centring and clamping workpieces with machined or cast holes, cutouts or penetrations.
Element screwed directly onto the fixture body, sealed with O-ring.

Features:

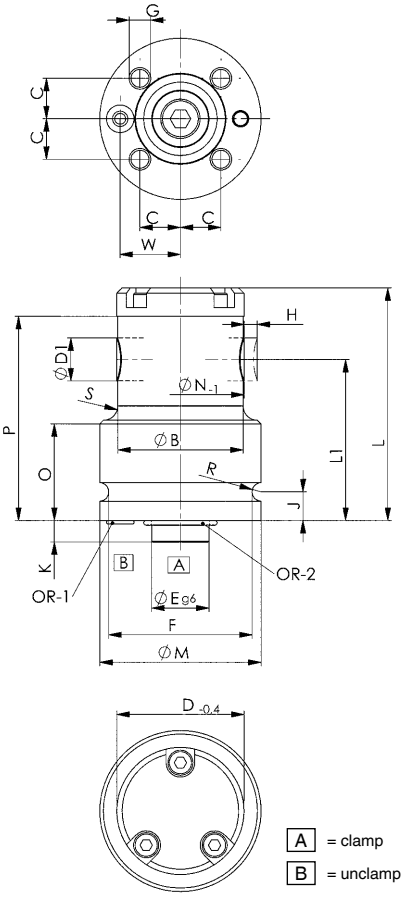
The centring clamp is fastened from below; oil is supplied through drilled channels in the fixture body.
If the centring clamp is fastened from above and oil supplied through conduits drilled in the fixture body, a connection plate for O-ring connection is needed.
If the centring clamp is fastened from above and oil supplied through pipes, a connection plate for pipe connection is needed.

Note:

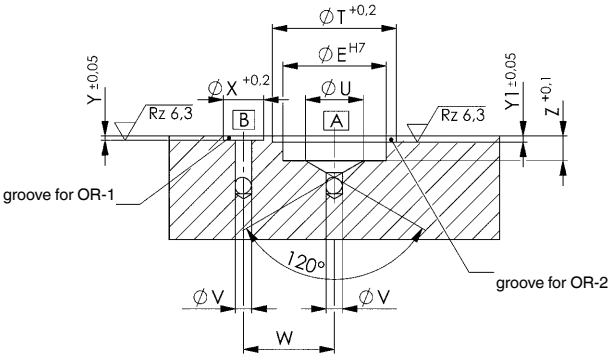
The practical combination of 2-point and 3-point elements can avoid over-determined clamping states. Unsuitable for use on lathes.

On request:

Other sizes available on request.



Installation dimensions:



Dimensions:

Order no.	Article no.	dia. B	C	dia. D -0,4	Bolt Ø D1 [mm]	dia. E g6/h7	F	G	J	K	L	L1	dia. M	O	P	R	S	dia. T	dia. U	dia. V	W	dia. X	Y	Y1	Z	OR-1 O-ring Order No.	OR-2 O-ring Order No.
329243	6974-2025	24	11,3	24,5	12	16	40	M6x12	8	6	66,5	45	45	27	62,5	2,6	4,0	20,5	8	3	16,8	7,7	1,1	1,3	6	409508	537985
329284	6974-2028	24	11,3	27,5	12	16	40	M6x12	8	6	66,5	45	45	27	62,5	2,6	4,0	20,5	8	3	16,8	7,7	1,1	1,3	6	409508	537985
329326	6974-2032	24	11,3	31,5	12	16	40	M6x12	8	6	66,5	45	45	27	62,5	2,6	4,0	20,5	8	3	16,8	7,7	1,1	1,3	6	409508	537985
329052	6974-2036	35	11,3	35,5	12	16	40	M6x12	8	6	65,0	45	45	27	57,0	2,6	4,0	20,5	8	3	16,8	7,7	1,1	1,3	6	409508	537985
329094	6974-2039	35	11,3	38,5	12	16	40	M6x12	8	6	65,0	45	45	27	57,0	2,6	4,0	20,5	8	3	16,8	7,7	1,1	1,3	6	409508	537985
329136	6974-2042	35	11,3	41,5	12	16	40	M6x12	8	6	65,0	45	45	27	57,0	2,6	4,0	20,5	8	3	16,8	7,7	1,1	1,3	6	409508	537985
329169	6974-2045	35	11,3	44,5	12	16	40	M6x12	8	6	65,0	45	45	27	57,0	2,6	4,0	20,5	8	3	16,8	7,7	1,1	1,3	6	409508	537985
329177	6974-2048	35	11,3	47,5	12	16	40	M6x12	8	6	65,0	45	45	27	57,0	2,6	4,0	20,5	8	3	16,8	7,7	1,1	1,3	6	409508	537985
329201	6974-2051	35	11,3	50,5	12	16	40	M6x12	8	6	65,0	45	45	27	57,0	2,6	4,0	20,5	8	3	16,8	7,7	1,1	1,3	6	409508	537985

Subject to technical alterations.

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No. 6974

Centring clamp MINI with three clamping points

Double-acting,
max. operating pressure 350 bar,
min. operating pressure 10 bar.

CAD



Order no.	Article no.	Clamping force at 100 bar * [kN]	Clamping force at 350 bar* [kN]	Clamping points	Clamping Ø N -1	Stroke H [mm]	Repeatability [mm]	Q max. [l/min]	Weight [g]
329268	6974-3025	4,0	14,0	3	25-29	3,0	±0,02	1,0	441
329300	6974-3028	4,0	14,0	3	28-32	3,0	±0,02	1,0	449
329342	6974-3032	4,0	14,0	3	32-36	3,0	±0,02	1,0	460
329078	6974-3036	4,0	14,0	3	36-40	3,0	±0,02	1,0	575
329110	6974-3039	4,0	14,0	3	39-43	3,0	±0,02	1,0	591
329151	6974-3042	4,0	14,0	3	42-46	3,0	±0,02	1,0	607
329185	6974-3045	4,0	14,0	3	45-49	3,0	±0,02	1,0	624
329193	6974-3048	4,0	14,0	3	48-52	3,0	±0,02	1,0	641
329227	6974-3051	4,0	14,0	3	51-55	3,0	±0,02	1,0	660

* The clamping force is distributed centrally over the 3 clamping points.

Design:

Double-acting centring clamp with three clamping points.
All components from high-grade hardened and nitrided steel. Oil supply via oil channel in fixture body.

Application:

For centring and clamping workpieces with machined or cast holes, cutouts or penetrations.
Element screwed directly onto the fixture body, sealed with O-ring.

Features:

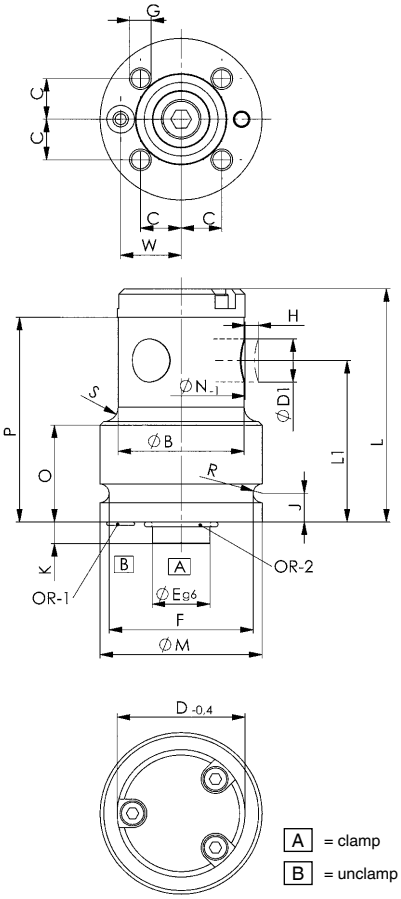
If the centring clamp is fastened from below, oil is supplied through conduits drilled in the fixture body.
If the centring clamp is fastened from above and oil supplied through conduits drilled in the fixture body, a connection plate for O-ring connection is needed.
If the centring clamp is fastened from above and oil supplied through pipes, a connection plate for pipe connection is needed.

Note:

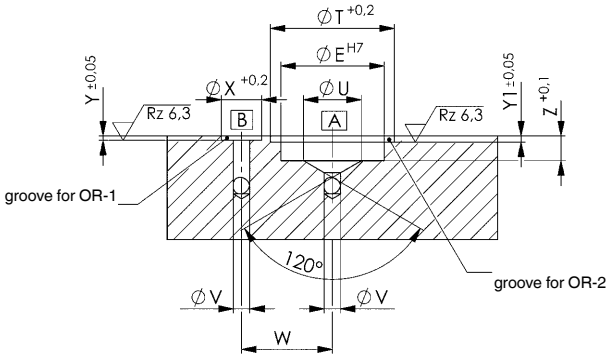
The practical combination of 2-point and 3-point elements can avoid over-determined clamping states. Unsuitable for use on lathes.

On request:

Other sizes available on request.



Installation dimensions:



Dimensions:

Order no.	Article no.	dia. B	C	dia. D -0,4	Bolt Ø D1 [mm]	dia. E g6/h7	F	G	J	K	L	L1	dia. M	O	P	R	S	dia. T	dia. U	dia. V	W	dia. X	Y	Y1	Z	OR-1 O-ring Order No.	OR-2 O-ring Order No.
329268	6974-3025	24	11,3	24,5	12	16	40	M6x12	8	6	66,5	45	45	27	62,5	2,6	4,0	20,5	8	3	16,8	7,7	1,1	1,3	6	409508	537985
329300	6974-3028	24	11,3	27,5	12	16	40	M6x12	8	6	66,5	45	45	27	62,5	2,6	4,0	20,5	8	3	16,8	7,7	1,1	1,3	6	409508	537985
329342	6974-3032	24	11,3	31,5	12	16	40	M6x12	8	6	66,5	45	45	27	62,5	2,6	4,0	20,5	8	3	16,8	7,7	1,1	1,3	6	409508	537985
329078	6974-3036	35	11,3	35,5	12	16	40	M6x12	8	6	65,0	45	45	27	57,0	2,6	4,0	20,5	8	3	16,8	7,7	1,1	1,3	6	409508	537985
329110	6974-3039	35	11,3	38,5	12	16	40	M6x12	8	6	65,0	45	45	27	57,0	2,6	4,0	20,5	8	3	16,8	7,7	1,1	1,3	6	409508	537985
329151	6974-3042	35	11,3	41,5	12	16	40	M6x12	8	6	65,0	45	45	27	57,0	2,6	4,0	20,5	8	3	16,8	7,7	1,1	1,3	6	409508	537985
329185	6974-3045	35	11,3	44,5	12	16	40	M6x12	8	6	65,0	45	45	27	57,0	2,6	4,0	20,5	8	3	16,8	7,7	1,1	1,3	6	409508	537985
329193	6974-3048	35	11,3	47,5	12	16	40	M6x12	8	6	65,0	45	45	27	57,0	2,6	4,0	20,5	8	3	16,8	7,7	1,1	1,3	6	409508	537985
329227	6974-3051	35	11,3	50,5	12	16	40	M6x12	8	6	65,0	45	45	27	57,0	2,6	4,0	20,5	8	3	16,8	7,7	1,1	1,3	6	409508	537985

Subject to technical alterations.

Centring clamp with two clamping points

No. 6974

Centring clamp MAXI with two clamping points

Double-acting,
max. operating pressure 350 bar,
min. operating pressure 10 bar.

CAD





Order no.	Article no.	Clamping force at 100 bar * [kN]	Clamping force at 350 bar* [kN]	Clamping points	Clamping Ø N -1	Stroke H [mm]	Repeatability [mm]	Q max. [l/min]	Weight [g]
328799	6974-2054	3,2	11,2	2	54-62	4,0	±0,02	1,0	1754
328831	6974-2061	3,2	11,2	2	61-69	4,0	±0,02	1,0	1754
328864	6974-2068	3,2	11,2	2	68-76	4,0	±0,02	1,0	1754
327619	6974-2076	5,0	17,5	2	76-84	5,2	±0,02	1,5	1754
328872	6974-2083	5,0	17,5	2	83-91	5,2	±0,02	1,5	1754
328914	6974-2090	5,0	17,5	2	90-98	5,2	±0,02	1,5	1754
329029	6974-2098	8,0	28,0	2	98-109	6,9	±0,02	2,0	3434
329060	6974-2109	8,0	28,0	2	109-120	6,9	±0,02	2,0	3597
329102	6974-2119	8,0	28,0	2	119-130	6,9	±0,02	2,0	3761

* The clamping force is distributed centrally over the 2 clamping points.

Design:

Double-acting centring clamp with two clamping points.
All components from high-grade hardened and nitrided steel. Oil supply via oil channel in fixture body.

Application:

For centring and clamping workpieces with machined or cast holes, cutouts or penetrations.
Element screwed directly onto the fixture body, sealed with O-ring.

Features:

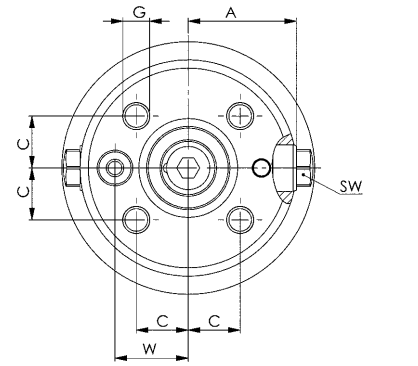
The centring clamp is fastened from below; oil is supplied through drilled channels in the fixture body.
If the centring clamp is fastened from above and oil supplied through conduits drilled in the fixture body, a connection plate for O-ring connection is needed.
If the centring clamp is fastened from above and oil supplied through pipes, a connection plate for pipe connection is needed. Pressure pieces are replaceable.

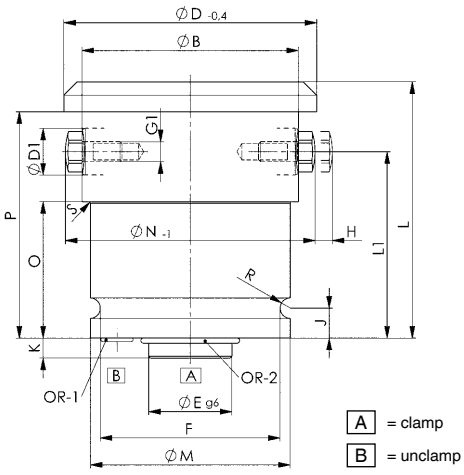
Note:

The practical combination of 2-point and 3-point elements can avoid over-determined clamping states. Unsuitable for use on lathes.

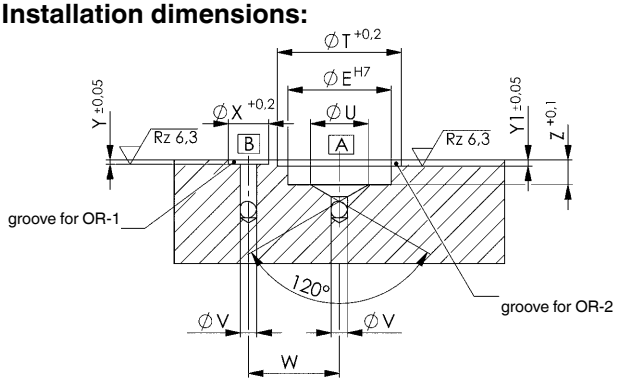
On request:

Other sizes available on request.





Installation dimensions:



Dimensions:

Order no.	Article no.	A	dia. B	C	dia. D -0,4	Bolt Ø D1 [mm]	dia. E g6/h7	F	G	G1	J	K	L	L1	dia. M	O	P	R	S	SW	dia. T	dia. U	dia. V	W	dia. X	Y	Y1	Z	OR-1 O-ring Order No.	OR-2 O-ring Order No.
328799	6974-2054	22,9	45	11,3	53,9	12	16	40	M6x12	M6	8	6	65,0	45	45	0	57,0	2,6	0	10	20,5	8	3	16,8	7,7	1,1	1,3	6	409508	537985
328831	6974-2061	22,9	45	11,3	60,9	12	16	40	M6x12	M6	8	6	65,0	45	45	0	57,0	2,6	0	10	20,5	8	3	16,8	7,7	1,1	1,3	6	409508	537985
328864	6974-2068	22,9	45	11,3	67,9	12	16	40	M6x12	M6	8	6	65,0	45	45	0	57,0	2,6	0	10	20,5	8	3	16,8	7,7	1,1	1,3	6	409508	537985
327619	6974-2076	32,5	65	15,6	75,9	14	25	54	M8x16	M6	9	6	77,0	56	60	41	68,0	3,1	0,5	11	30,0	14	4	22,0	9,8	1,1	1,5	6	537969	321265
328872	6974-2083	32,5	65	15,6	82,9	14	25	54	M8x16	M6	9	6	77,0	56	60	41	68,0	3,1	0,5	11	30,0	14	4	22,0	9,8	1,1	1,5	6	537969	321265
328914	6974-2090	32,5	65	15,6	89,9	14	25	54	M8x16	M6	9	6	77,0	56	60	41	68,0	3,1	0,5	11	30,0	14	4	22,0	9,8	1,1	1,5	6	537969	321265
329029	6974-2098	42,5	85	19,1	97,9	18	32	67	M10x20	M8	10	6	91,0	64	74	47	80,0	3,6	2,5	13	36,6	16	5	27,0	10,8	1,1	1,3	6	542464	542308
329060	6974-2109	42,5	85	19,1	108,9	18	32	67	M10x20	M8	10	6	91,0	64	74	47	80,0	3,6	2,5	13	36,6	16	5	27,0	10,8	1,1	1,3	6	542464	542308
329102	6974-2119	42,5	85	19,1	118,9	18	32	67	M10x20	M8	10	6	91,0	64	74	47	80,0	3,6	2,5	13	36,6	16	5	27,0	10,8	1,1	1,3	6	542464	542308

Subject to technical alterations.

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No. 6974

Centring clamp MAXI with three clamping points

Double-acting,
max. operating pressure 350 bar,
min. operating pressure 10 bar.





CAD

Order no.	Article no.	Clamping force at 100 bar * [kN]	Clamping force at 350 bar* [kN]	Clamping points	Clamping Ø N -1	Stroke H [mm]	Repeatability [mm]	Q max. [l/min]	Weight [g]
328773	6974-3054	3,2	11,2	3	54-62	4,0	±0,02	1,0	1754
328815	6974-3061	3,2	11,2	3	61-69	4,0	±0,02	1,0	1754
328849	6974-3068	3,2	11,2	3	68-76	4,0	±0,02	1,0	1754
327593	6974-3076	5,0	17,5	3	76-84	5,2	±0,02	1,5	1754
328856	6974-3083	5,0	17,5	3	83-91	5,2	±0,02	1,5	1754
328898	6974-3090	5,0	17,5	3	90-98	5,2	±0,02	1,5	1754
329003	6974-3098	8,0	28,0	3	98-109	6,9	±0,02	2,0	3432
329045	6974-3109	8,0	28,0	3	109-120	6,9	±0,02	2,0	3603
329086	6974-3119	8,0	28,0	3	119-130	6,9	±0,02	2,0	3773

* The clamping force is distributed centrally over the 3 clamping points.

Design:

Double-acting centring clamp with three clamping points.
All components from high-grade hardened and nitrided steel. Oil supply via oil channel in fixture body.

Application:

For centring and clamping workpieces with machined or cast holes, cutouts or penetrations.
Element screwed directly onto the fixture body, sealed with O-ring.

Features:

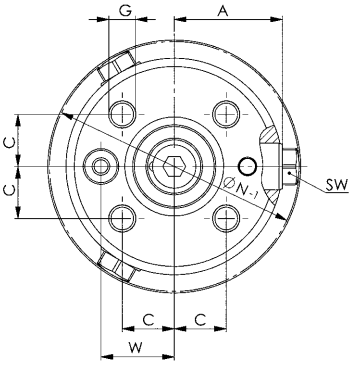
If the centring clamp is fastened from below, oil is supplied through conduits drilled in the fixture body.
If the centring clamp is fastened from above and oil supplied through conduits drilled in the fixture body, a connection plate for O-ring connection is needed.
If the centring clamp is fastened from above and oil supplied through pipes, a connection plate for pipe connection is needed. Pressure pieces are replaceable.

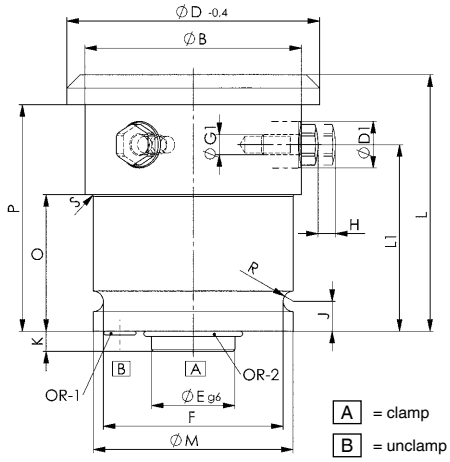
Note:

The practical combination of 2-point and 3-point elements can avoid over-determined clamping states. Unsuitable for use on lathes.

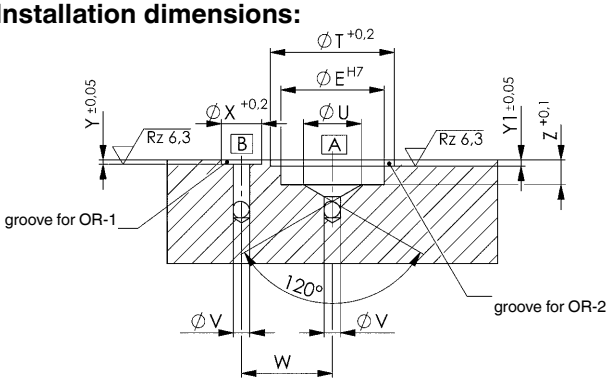
On request:

Other sizes available on request.





Installation dimensions:



Dimensions:

Order no.	Article no.	A	dia. B	C	dia. D -0,4	Bolt Ø D1 [mm]	dia. E g6/h7	F	G	G1	J	K	L	L1	dia. M	O	P	R	S	SW	dia. T	dia. U	dia. V	W	dia. X	Y	Y1	Z	OR-1 O-ring Order No.	OR-2 O-ring Order No.
328773	6974-3054	22,9	45	11,3	53,9	12	16	40	M6x12	M6	8	6	65,0	45	45	0	57,0	2,6	0	10	20,5	8	3	16,8	7,7	1,1	1,3	6	409508	537985
328815	6974-3061	22,9	45	11,3	60,9	12	16	40	M6x12	M6	8	6	65,0	45	45	0	57,0	2,6	0	10	20,5	8	3	16,8	7,7	1,1	1,3	6	409508	537985
328849	6974-3068	22,9	45	11,3	67,9	12	16	40	M6x12	M6	8	6	65,0	45	45	0	57,0	2,6	0	10	20,5	8	3	16,8	7,7	1,1	1,3	6	409508	537985
327593	6974-3076	32,5	65	15,6	75,9	14	25	54	M8x16	M6	9	6	77,0	56	60	41	68,0	3,1	0,5	11	30,0	14	4	22,0	9,8	1,1	1,5	6	537969	321265
328856	6974-3083	32,5	65	15,6	82,9	14	25	54	M8x16	M6	9	6	77,0	56	60	41	68,0	3,1	0,5	11	30,0	14	4	22,0	9,8	1,1	1,5	6	537969	321265
328898	6974-3090	32,5	65	15,6	89,9	14	25	54	M8x16	M6	9	6	77,0	56	60	41	68,0	3,1	0,5	11	30,0	14	4	22,0	9,8	1,1	1,5	6	537969	321265
329003	6974-3098	42,5	85	19,1	97,9	18	32	67	M10x20	M8	10	6	91,0	64	74	47	80,0	3,6	2,5	13	36,6	16	5	27	10,8	1,1	1,3	6	542464	542308
329045	6974-3109	42,5	85	19,1	108,9	18	32	67	M10x20	M8	10	6	91,0	64	74	47	80,0	3,6	2,5	13	36,6	16	5	27	10,8	1,1	1,3	6	542464	542308
329086	6974-3119	42,5	85	19,1	118,9	18	32	67	M10x20	M8	10	6	91,0	64	74	47	80,0	3,6	2,5	13	36,6	16	5	27	10,8	1,1	1,3	6	542464	542308

Subject to technical alterations.

No. 6974-XXXX-1

Connection plate for centring clamp

for O-ring connection

Order no.	Article no.	ØAh7 [mm]	B	dia. C	dia. D	E	F	Screw (4 pieces)	Weight [g]
328971	6974-5476-1	68	15	6,6	3	24,2	14,0	M6x16	370
328997	6974-7698-1	88	17	9,0	4	32,0	18,5	M8x20	680
329128	6974-98130-1	110	20	11,0	5	39,8	23,0	M10x25	1271



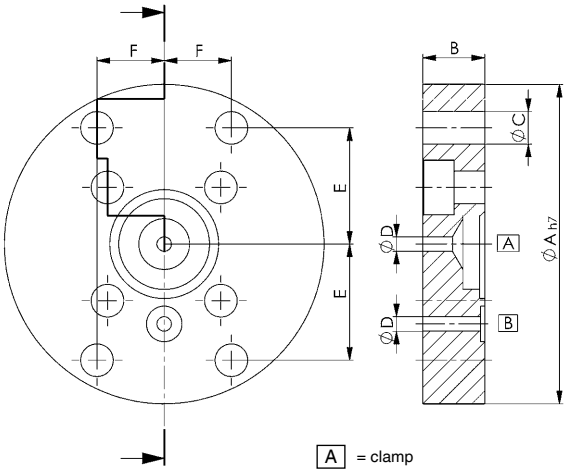
CAD

Design:

Tempering steel, TEM-deburred and phosphatised.

Application:

If the centring clamp is fastened from above and oil is supplied through conduits drilled in the fixture body.
Order no. 328971 for items 6974-X054; 6974-X061 and 6974-X068
Order no. 328997 for items 6974-X076; 6974-X083 and 6974-X090
Order no. 329128 for items 6974-X098; 6974-X109 and 6974-X119



No. 6974-XXXX-2

Connection plate for centring clamp

for pipeline connection

Order no.	Article no.	ØAh7 [mm]	B	dia. C	dia. D	E	F	Screw (4 pieces)	Weight [g]
329011	6974-5476-2	68	30	6,6	G1/4	24,2	14,0	M6x35	725
329037	6974-7698-2	88	30	9,0	G1/4	32,0	18,5	M8x35	1210
329144	6974-98130-2	110	30	11,0	G1/4	39,8	23,0	M10x35	1909



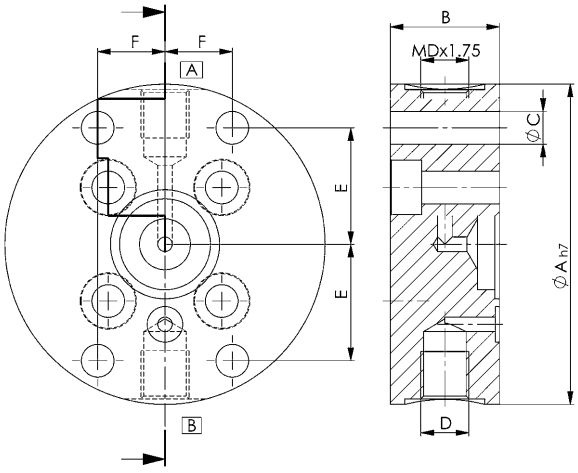
CAD

Design:

Tempering steel, TEM-deburred and phosphatised.

Application:

If the centring clamp is fastened from above and oil is supplied through pipes.
Order no. 329011 for items 6974-X054; 6974-X061 and 6974-X068
Order no. 329037 for items 6974-X076; 6974-X083 and 6974-X090
Order no. 329144 for items 6974-X098; 6974-X109 and 6974-X119



Subject to technical alterations.

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SUPPORT ELEMENTS FOR STRESS-FREE CLAMPING AND LOW-VIBRATION MACHINING

- supporting force up to 55,6 kN
- observe safety factor for supporting force
- operating pressure up to 400 bar
- piston with internal thread
- wipers to protect against contamination
- oil supply via oil channel in the fixture body, threaded connection or an O-ring connection on the underside
- various design variants:
  - block version
  - installation version
  - screw-in version
  - flange version
- also available with dynamic pressure monitoring

PRODUCT OVERVIEW:

Type	Supporting force [kN]	Supporting stroke [mm]	Positioning	No. of models	Operating mode
6961F/L	8,0 - 20,0	6,0 - 10,0	spring/air	6	single acting
6962F/L	8,0 - 20,0	6,0 - 10,0	spring/air	6	single acting
6964F/L	4,4 - 55,6	6,5 - 19,0	spring/air	12	single acting
6964H	4,4 - 35,6	6,5 - 15,8	hydraulic	19	single acting
6964HS	8,9 - 17,8	6,5 - 12,5	hydraulic	4	single acting

PRODUCT EXAMPLES:

NO. 6961F



- supporting force: 8 - 20 kN
- three design variants

NO. 6964H



- supporting force: 4,4 - 35,6 kN
- two design variants

NO. 6964HS



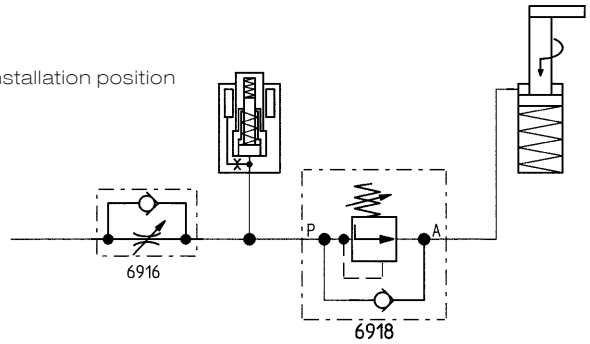
- supporting force: 8,9 - 17,8 kN
- two design variants

SUPPORT ELEMENTS –
TECHNICAL INFORMATION

OPERATING PRESSURE:
To achieve a guaranteed clamping function, the min. operating pressure must not be fallen below.
The highest clamping force is achieved at max. operating pressure.

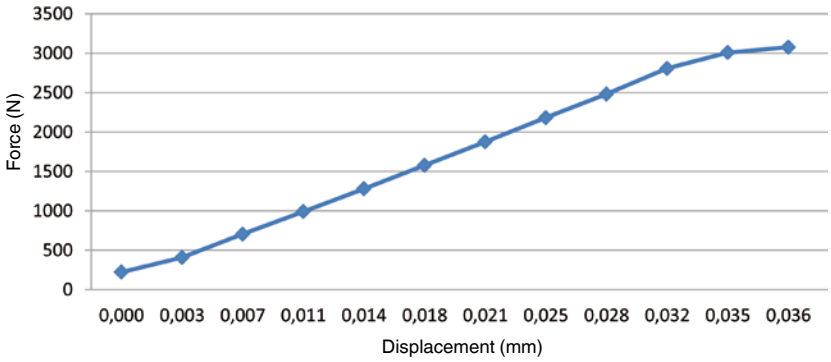
CONTACT FORCE:
The spring-loaded contact force is at its greatest at a min. distance between the installation position and workpiece.

SHEAR FORCES:
Support elements only absorb forces in axial direction of the piston:.
If shear forces occur, the thin-walled clamping sleeve will be deformed.
The function of the support element can no longer be guaranteed.



VOLUME FLOW:
The permissible volume flow must not be exceeded. The permitted volume flow can be controlled with a throttle/check valve. If the volume flow is too high, the oil pressure increases so quickly that the anchor is clamped before it is on the workpiece. If several support elements are used, the permissible volume flow is the total of the individually permissible volume flows.

ELASTIC CHANGE IN LENGTH:
Just like any steel component, the support elements also have an elastic behaviour.
During heavy loading, a setting behaviour occurs.



VENTING:
Support elements only need a very small oil volume. Since the hydraulic oil in the connection line hardly moves, careful venting is necessary. Air in the oil can prolong the clamping time considerably.
If venting is not carried out properly, a diesel effect may occur and destroy the element. Always vent at low pressure.

DIESEL EFFECT:
If petroleum containing air bubbles is compressed very quickly, the bubbles will be heated so strongly that a self-ignition of the air/gas mixture could occur. As a result, a very high pressure and temperature increase occurs locally, which could also damage seals as well as cause accelerated ageing of the oil.

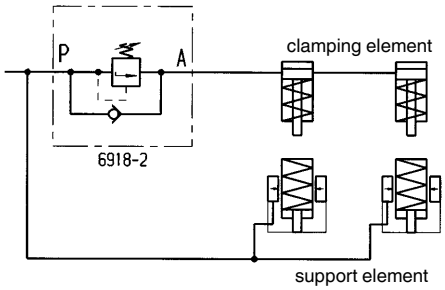


SPRING SPACE VENTILATION:
The free loading and venting of the spring spaces must be ensured.
The pressure connection must be protected or arrayed properly so no coolant is taken in.
Failure to observe this can lead to malfunctions.

COOLANT AND SHAVINGS:
Support elements should normally be protected against shavings and cooling water.

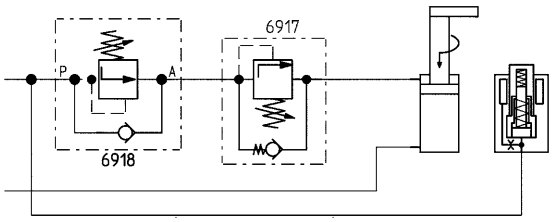
CONTROLLING THE CLAMPING SEQUENCE:

The sequence of supports and clamps must be controlled time-dependent or pressure-dependent. This can be performed by sequence valves 6918, 6918-XX-XXX or by sequence valve 6918-80-10.



PRESSURE REDUCTION OF THE CLAMPING ELEMENTS:

The pressure in the clamping circuit is reduced with a pressure control seat valve 6917.



SUPPORTING FORCE:

The permissible loading force of support elements must always be regulated so that the clamping force of the clamping elements used and the static and dynamic machining forces can be absorbed safely. Permissible loading force minus clamping force minus safety reserve results in the possible machining force.

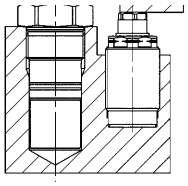
If the total number of occuring forces exceeds the permissible loading force, the anchor of the support element will be pressed backwards thereby damaging the support element.

The supporting force should always be at least twice as high as the clamping force.

COMBINATIONS OF SUPPORT ELEMENT WITH SWING CLAMP

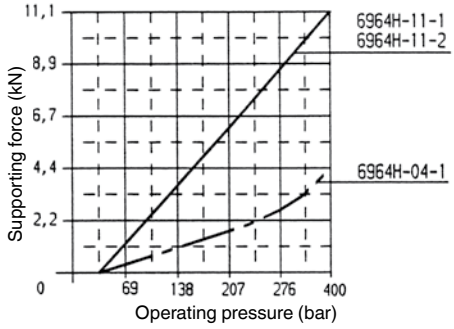
Example of support element 6964H-04-1 and swing clamp 6952E-02-21

	min. operating pressure [bar]	max. operating pressure [bar]	max. supporting force [kN]	max. clamping force [kN]
support element	50	350	4,4	-
swing clamp	40	350	-	2,0



POSSIBLE MACHINING FORCE AT 350 BAR:

perm. loading force	=	4,4 kN
minus clamping force	=	2,0 kN
arithmetic machining force	≤	2,4 kN
perm. machining force max.	≤	2,0 kN



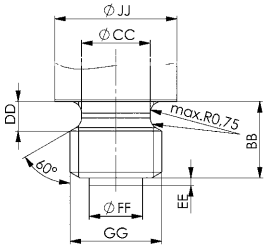
NOTE:

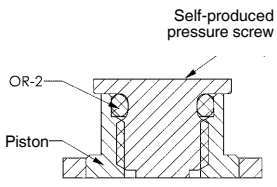
The permissible supporting forces in the diagram are static. Vibrations occuring during the machining could be far higher. For these cases, a large reserve must be included.

SET SCREWS:

Support elements must never be operated without set screws, since penetrating dirt and cooling water impair the function. Most support elements are fitted with a set screw as standard.

When using special set screws, make sure that the set screws are tempered and designed slightly ball-shaped. Set screws with a tip or fluting should not be used. Special set screws can jeopardise the function of return stroke of the support pin and the spring-loaded system. During in-house production, please manufacture according to our specifications.

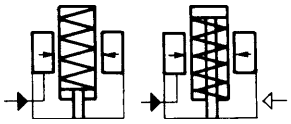




No. 6961F/L

Support Element, block type

spring advanced or air advancing,
max. operating pressure 400 bar,
min. operating pressure 50 bar.





Order no.	Article no.	Contact force F1* [N]	Support force F2 [kN]	Stroke H [mm]	Vol. [cm^3]	Piston area [cm^2]	Weight [g]
65250	6961F-08	20-32	8	6	5,5	2,00	1100
65268	6961F-12	32-41	12	8	8,0	3,14	1800
65276	6961F-20	40-72	20	10	13,0	4,90	3100
65284	6961L-08	170	8	6	5,5	2,00	1100
65292	6961L-12	270	12	8	8,0	3,14	1800
65300	6961L-20	440	20	10	13,0	4,90	3100

*Article No. 6961F-**: Contact force F1 dependent on spring pretensioning and setting travel.
Article No. 6961L-**: Contact force F1 depedent on air pressure at max. 10 bar.

Design:

Cylinder body from steel, burnished. Support pin case hardened and ground. Internal locking sleeve system Kostyrka. Special wiper prevents contamination. Support pin with internal thread. Home position retracted or extended, depending on function. Internal parts from stainless steel. Oil supply via threaded connection or oil channel in the fixture body.

Application:

Support element no. 6961F-**: Plunger extended, spring adjustable contact force.
Support element no. 6961L-**: Plunger retracted, pneumatic advance spring return.
These spring or pneumatic advancing hydraulic support elements provide additional support to avoid vibration or deflection during machining. Even large workpiece tolerances can be compensated (castings). Fitted directly below a clamping point they prevent distortion of the workpiece. The support elements can be matched with clamping cylinders of same nominal size into one circuit. To prevent the support plunger from possible slackening during a clamping procedure, it is advisible to connect a sequence valve (no. 6918-2) to control the support elements. Due to this fact, the support element is locked before the clamping procedure can be activated (fig. 1). Being used as an additional support to prevent from bending and vibration, the element should be preceded by a sequence valve (no. 6918-2) in order to ensure supporting before clamping. In case the clamping force is higher than the support force, the clamping force has to be reduced by using a pressure recluding valve no. 6917 (fig. 2).

Features:

High resilience due to high operating pressure, matched to the forces of the clamping cylinder row. Smooth contacting of the workpiece by adjustable spring or pneumatic pressure. Universal use in each position.
Easy attachment of thrust pieces in the piston rod thread.

Note:

For spring advanced types, there is risk of sucking in coolant! To avoid this, a breather hose has to be connected to the pneumatic port and moved to a protected area. Support pin must be protected against the entry of dirt and splash water by fitting a set screw or plug. The support elements must be properly vented! The vent port must always be on top. Failure to do so can cause destruction of the clamping element by the escaping diesel.

The supporting force should be matched to the clamping force in order to absorb machining forces.
The supporting force should always be at least twice as high as the clamping force.

Hydraulic diagrams:

fig 1

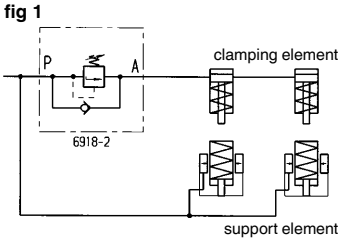
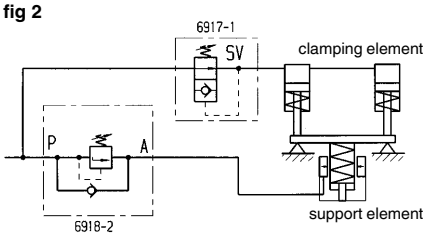


fig 2



CAD

Subject to technical alterations.

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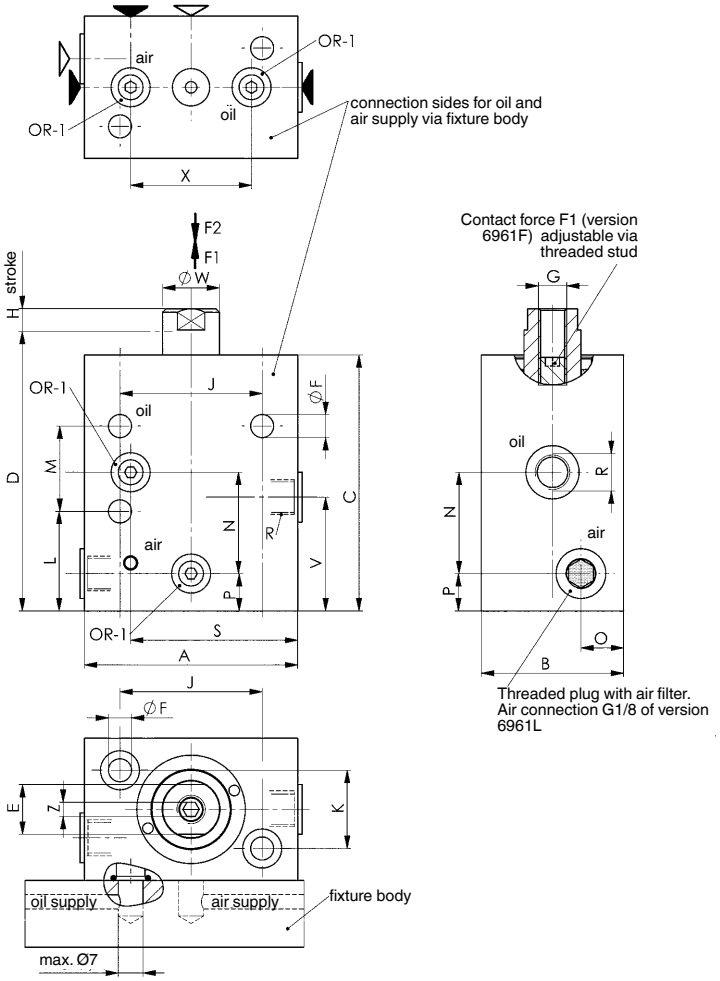
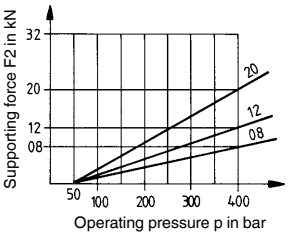


Diagram:



0.004 mm/kN elastic change in length under load

Dimensions:

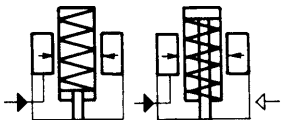
Order no.	Article no.	A	B	C	D	E	dia. F	G	J	K	L	M	N	O	P	R	S	V	dia. W	X	Z	OR-1 O-ring Order No.
65250	6961F-08	60	40	72	79,0	SW14	6,5	M8	40	22	28	24	28,5	12	10,5	G1/8	47	32	16	34	SW4	161554
65268	6961F-12	70	50	86	93,5	SW17	8,5	M10	50	30	32	32	33,5	16	12,5	G1/8	56	36	20	42	SW5	161554
65276	6961F-20	80	60	104	113,5	SW22	10,5	M12	60	40	33	40	40,0	20	14,0	G1/8	62	39	25	44	SW6	161554
65284	6961L-08	60	40	72	79,0	SW14	6,5	M8	40	22	28	24	28,5	12	10,5	G1/8	47	32	16	34	SW4	161554
65292	6961L-12	70	50	86	93,5	SW17	8,5	M10	50	30	32	32	33,5	16	12,5	G1/8	56	36	20	42	SW5	161554
65300	6961L-20	80	60	104	113,5	SW22	10,5	M12	60	40	33	40	40,0	20	14,0	G1/8	62	39	25	44	SW6	161554

Subject to technical alterations.

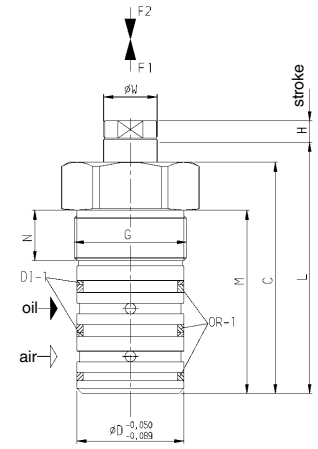
No. 6962F/L

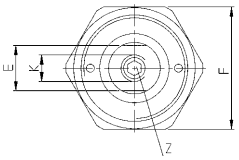
Support Element, cartridge flange

spring advanced or air advancing,
max. operating pressure 400 bar,
min. operating pressure 50 bar.









Contact force F1 (version 6962F) adjustable via threaded stud

CAD

Order no.	Article no.	Contact force F1* [N]	Support force F2 [kN]	Stroke H [mm]	Vol. [cm³]	Piston area [cm²]	Weight [g]
65052	6962F-08	20-32	8	6	5,5	2,00	500
65078	6962F-12	32-41	12	8	8,0	3,14	700
65094	6962F-20	40-72	20	10	13,0	4,90	1100
65060	6962L-08	170	8	6	5,5	2,00	500
65086	6962L-12	270	12	8	8,0	3,14	700
65102	6962L-20	440	20	10	13,0	4,90	1100

*Article No. 6962F-**: Contact force F1 dependent on spring pretensioning and setting travel.
Article No. 6962L-**: Contact force F1 depedent on air pressure at max. 10 bar.

Design:

Cylinder body from steel, burnished. Support pin case hardened and ground. Internal locking sleeve system Kostyrka. Special wiper prevents contamination. Support pin with internal thread. Home position retracted or extended, depending on function. Internal parts from stainless steel. Oil supply via oil channel in fixture body.

Application:

Support element no. 6962F-**: Plunger extended, spring adjustable contact force.
Support element no. 6962L-**: Plunger retracted, pneumatic advance spring return.
These spring or pneumatic advancing hydraulic support elements provide additional support to avoid vibration or deflection during machining. Even large workpiece tolerances can be compensated (castings). Fitted directly below a clamping point they prevent distortion of the workpiece. The support elements can be matched with clamping cylinders of same nominal size into one circuit. To prevent the support plunger from possible slackening during a clamping procedure, it is advisible to connect a sequence valve (no. 6918-2) to control the support elements. Due to this fact, the support element is locked before the clamping procedure can be activated (fig. 1, page 96). Being used as an additional support to prevent from bending and vibration, the element should be preceded by a sequence valve (no. 6918-2) in order to ensure supporting before clamping. In case the clamping force is higher than the support force, the clamping force has to be reduced by using a pressure recluding valve no. 6917.

Features:

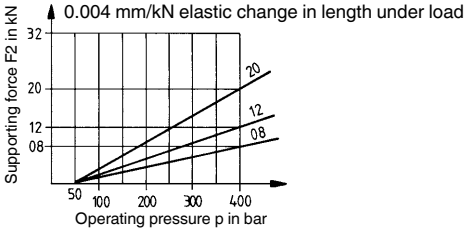
High resilience due to high operating pressure, matched to the forces of the clamping cylinder row. Smooth contacting of the workpiece by adjustable spring or pneumatic pressure. The threaded type allows the supporting element to be accommodated in fixtures in a space-saving manner. Easy attachment of thrust pieces and/or thrust bolts in the piston rod thread.

Note:

For spring advanced types, there is risk of sucking in coolant! To avoid this, a breather hose has to be connected to the pneumatic port and moved to a protected area. Support pin must be protected against the entry of dirt and splash water by fitting a set screw or plug. The support elements must be properly vented! The vent port must always be on top. Failure to do so can cause destruction of the clamping element by the escaping diesel.

The supporting force should be matched to the clamping force in order to absorb machining forces.
The supporting force should always be at least twice as high as the clamping force.

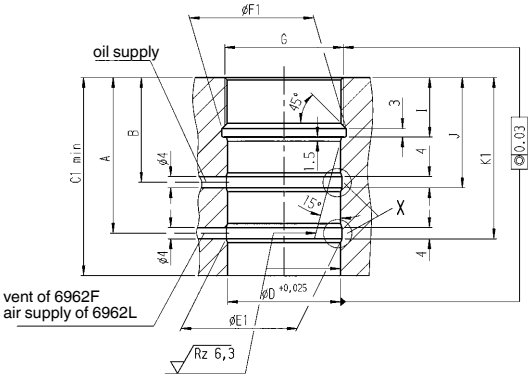
Diagram:



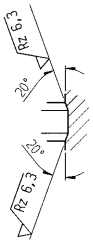
Dimensions:

Order no.	Article no.	C	dia. D	E	F	G	K	L	M	N	dia. W	Z
65052	6962F-08	74	36	SW14	SW41	M38x1,5	M 8	81,0	57	12,5	16	SW4
65078	6962F-12	87	40	SW17	SW46	M42x1,5	M10	94,5	69	19,0	20	SW5
65094	6962F-20	104	45	SW22	SW50	M48x1,5	M12	113,5	85	22,0	25	SW6
65060	6962L-08	74	36	SW14	SW41	M38x1,5	M8	81,0	57	12,5	16	SW4
65086	6962L-12	87	40	SW17	SW46	M42x1,5	M10	94,5	69	19,0	20	SW5
65102	6962L-20	104	45	SW22	SW50	M48x1,5	M12	113,5	85	22,0	25	SW6

Installation dimensions:



detail X



Installation dimensions:

Order no.	Article no.	A	B	C1 min.	dia. D H7	dia. E1	dia. F1	G	I	J	K1	OR-1 O-ring Order No.	DI-1 Seal Order No.
65052	6962F-08	44,5	27,5	58	36	37	40	M38x1,5	14,5	29,5	46,5	110254	136192
65078	6962F-12	55,0	37,0	70	40	41	44	M42x1,5	21,0	39,0	57,0	173047	136200
65094	6962F-20	71,0	48,0	86	45	46	50	M48x1,5	24,0	50,0	73,0	136218	136226
65060	6962L-08	44,5	27,5	58	36	37	40	M38x1,5	14,5	29,5	46,5	110254	136192
65086	6962L-12	55,0	37,0	70	40	41	44	M42x1,5	21,0	39,0	57,0	173047	136200
65102	6962L-20	71,0	48,0	86	45	46	50	M48x1,5	24,0	50,0	73,0	136218	136226

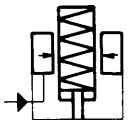
Subject to technical alterations.

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No. 6964F

Support Element, base-flange-mounting

Normally extended. Spring advanced, max. operating pressure 350 bar, min. operating pressure 50 bar.





CAD

Order no.	Article no.	Contact force F1 [N]	Support force at 350 bar [kN]	Stroke C [mm]	Vol. [cm³]	Weight [g]
66852	6964F-04-2	4,5 - 9,0	4,4	6,5	0,16	281
66878	6964F-11-2	9,0 - 26,5	11,0	9,5	0,33	660
66894	6964F-33	40 - 80	33,4	12,5	1,64	2019
66910	6964F-55	49 - 71	55,6	19,0	4,26	4291

Design:

Cylinder body from steel, hardened. Support pin with internal thread case hardened and ground. Wiper to protect against dirt and cooling water. Internal parts from stainless steel. Oil supply via threaded port.

Application:

The support element is used as an extra support to prevent sagging and vibration of a workpiece.

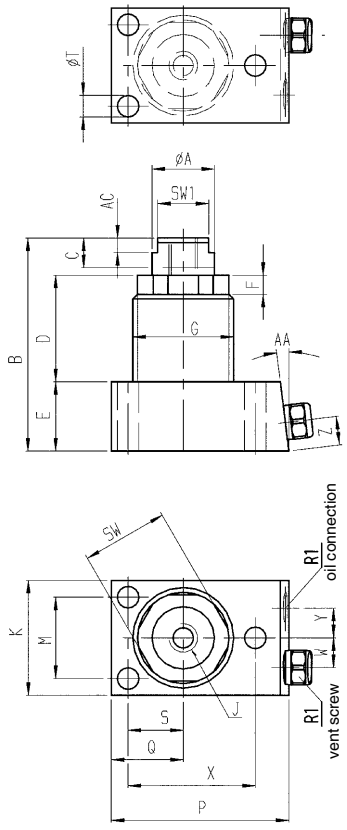
Features:

Element with high load capacity and low height. Spring extension: the plunger is normally extended. Variable spring setting permits sensitive adjustment of contact force.

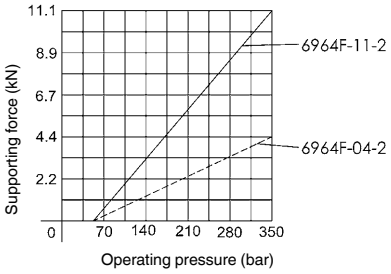
Note:

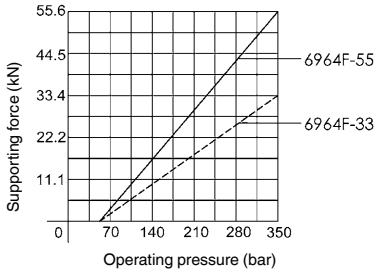
Support pin must be protected against the entry of dirt and splash water by fitting a set screw or plug. When placing into operation, ensure that all air is bled from the system. Failure to do so can cause destruction of the clamping element by the escaping diesel effect.

The supporting force should be matched to the clamping force in order to absorb machining forces.
The supporting force should always be at least twice as high as the clamping force.



Diagrams:





0.004 mm/kN elastic change in length under load

Dimensions:

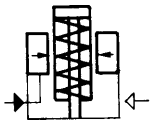
Order no.	Article no.	dia. A	B	D	E	F	G	SW	SW1	J x depth	K	M	P	Q	R1	S	dia. T	W	X	Y	Z	AA	AC
66852	6964F-04-2	16,0	56,0	25,0	24,0	5,5	M26x1,5	23	-	M8x7,5	33,5	24,5	44,5	17,5	G1/8	13,0	5,5	9	31,0	9	8,5	7°	-
66878	6964F-11-2	20,5	70,5	33,0	25,0	6,5	M35x1,5	30	-	M10x11,5	41,5	30,0	59,0	24,0	G1/8	18,0	7,0	10	43,0	10	8,5	7°	-
66894	6964F-33	38,0	111,0	68,5	25,0	12,5	Ø 57	50	28,5	M12x15	63,5	52,5	76,0	31,5	G1/8	26,0	7,0	16	61,0	16	10,3	-	4
66910	6964F-55	51,0	133,0	76,0	31,5	12,5	Ø 76	70	41,5	M16x20	89,0	73,0	97,0	44,5	G1/8	36,5	9,0	24	81,5	24	10,3	-	4

Subject to technical alterations.

No. 6964L

Support Element, base-flange-mounting

Normally retracted. Air advanced, max. operating pressure 350 bar, min. operating pressure 50 bar.





CAD

Order no.	Article no.	Contact force F1 [N]	Support force at 350 bar [kN]	Stroke C [mm]	Vol. [cm³]	Weight [g]
66936	6964L-04-2	17,5*	4,4	6,5	0,16	255
66621	6964L-11-2	35,5*	11,0	9,5	0,33	665
66688	6964L-33	89,0*	33,4	12,5	1,64	2023
66704	6964L-55	253,3*	55,6	19,0	4,26	4300

* Contact force with max. 1.7 bar air pressure.

Design:

Cylinder body from steel, hardened. Support pin with internal thread case hardened and ground. Wiper to protect against dirt and cooling water. Internal parts from stainless steel. Oil supply via threaded port.

Application:

The support element is used as an extra support to prevent sagging and vibration of a workpiece.

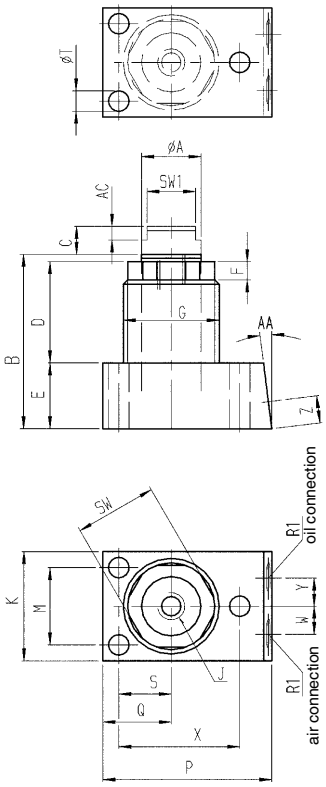
Features:

Element with high load capacity and low height. Pneumatic: the plunger is normally retracted. Sensitive adjustment of contact force by varying the air pressure.

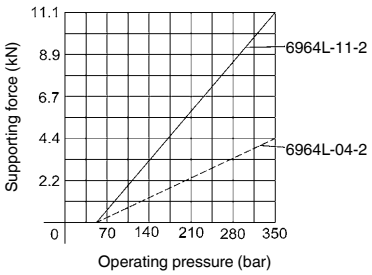
Note:

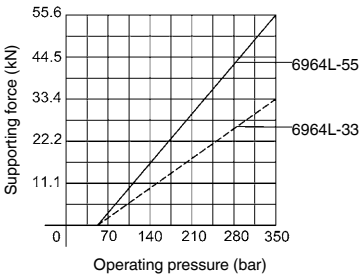
Support pin must be protected against the entry of dirt and splash water by fitting a set screw or plug. When placing into operation, ensure that all air is bled from the system. Failure to do so can cause destruction of the clamping element by the escaping diesel effect.

The supporting force should be matched to the clamping force in order to absorb machining forces.
The supporting force should always be at least twice as high as the clamping force.



Diagrams:





0.004 mm/kN elastic change in length under load

Dimensions:

Order no.	Article no.	dia. A	B	D	E	F	G	SW	SW1	J x depth	K	M	P	Q	R1	S	dia. T	W	X	Y	Z	AA	AC
66936	6964L-04-2	16,0	49,5	25,0	24,0	5,5	M26x1,5	23	-	M6x7,5	33,5	24,5	44,5	17,5	G1/8	13,0	5,5	9	31,0	9	8,5	7°	-
66621	6964L-11-2	20,5	61	33,0	25,0	6,5	M35x1,5	30	-	M8x6,0	41,0	30,0	59,0	24,0	G1/8	18,0	7,0	10	43,0	10	8,5	7°	-
66688	6964L-33	38,0	98	68,5	25,0	12,5	Ø 57	50	28,5	M12x15,0	63,5	52,5	76,0	31,5	G1/8	26,0	7,0	16	61,0	16	10,3	-	4
66704	6964L-55	51,0	114	76,0	31,5	12,5	Ø 76	70	41,5	M16x20,0	89,0	73,0	97,0	44,5	G1/8	36,5	9,0	24	81,5	24	10,3	-	4

Subject to technical alterations.

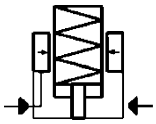
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No. 6964H

CAD

Support Element, base-flange-mounting

Normally retracted. Hydraulic advanced. Spring force for contact, max. operating pressure 350 bar,
min. operating pressure 50 bar.





Order no.	Article no.	Contact force F1 [N]	Support force at 350 bar [kN]	Stroke C [mm]	Q max. [l/min]	Vol. [cm³]	Weight [g]
66746	6964H-11-2	13,5-44,5	11	6,5	2,13	3,0	845
325878	6964H-17-3	26,5 - 53,5	17	12,5	2,13	10,5	1920

Design:

Cylinder body from steel, hardened. Support pin with internal thread case hardened and ground. Wiper to protect against dirt and cooling water. Internal parts from stainless steel. Oil supply via threaded port.

Application:

The support element is used as an extra support to prevent sagging and vibration of a workpiece.

Features:

Element with high load capacity and low height. Hydraulic and spring: the plunger is normally retracted. When pressure is applied, the support pin advances with a weak spring-applied force to contact the workpiece. The spring force varies with the stroke. As the hydraulic pressure rises, the support plunger is hydraulically clamped. When the pressure is released, the support plunger returns to the retracted position. Very high repeatability ensures optimum production quality.

Note:

Support pin must be protected against the entry of dirt and splash water by fitting a set screw or plug. When placing into operation, ensure that all air is bled from the system. Failure to do so can cause destruction of the clamping element by the escaping diesel effect.

The supporting force should be matched to the clamping force in order to absorb machining forces.
The supporting force should always be at least twice as high as the clamping force.

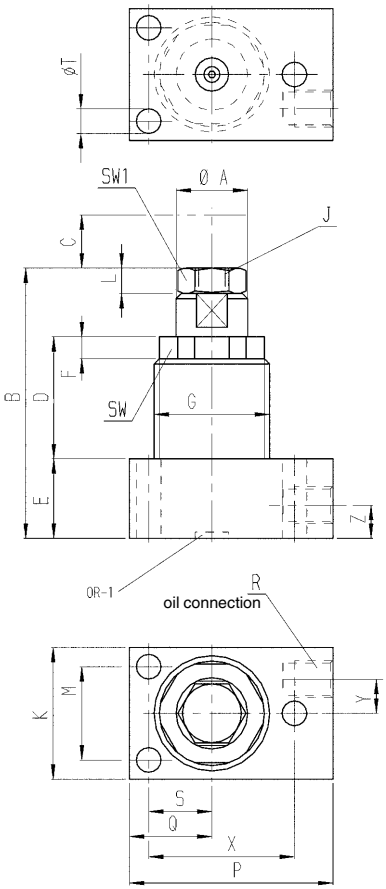
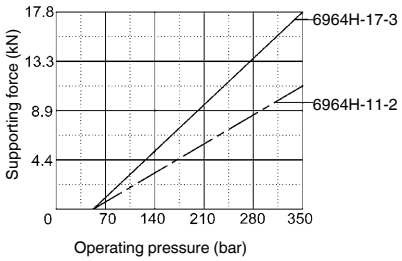
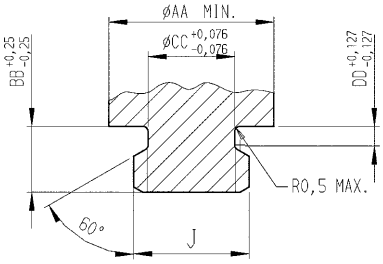


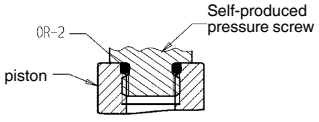
Diagram:



0.004 mm/kN elastic change in length under load

Production dimensions with self-production of the clamping screw for support element:





Dimensions:

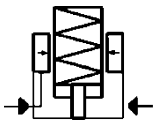
Order no.	Article no.	dia. A	B	D	E	F	G	SW	SW1	J x depth	K	L	M	P	Q	R	S	dia. T	X	Y	Z	ØAA	BB	dia. CC	DD	OR-1 O-ring Order No.	OR-2 O-ring Order No.
66746	6964H-11-2	20,5	82,5	34	31,5	9,0	M35x1,5	30	19	M12x6,5	41,5	5	30,2	58,5	24,0	G1/8	18,3	7,1	43,1	10,5	10,5	14,1	6,35	9,91	1,78	330803	335422
325878	6964H-17-3	38,0	82,5	40	25,0	12,5	M60x1,5	54	19	M12x6,5	73,0	5	52,4	81,0	36,5	G1/8	26,2	7,1	62,6	16,0	10,5	14,1	6,35	9,91	1,78	330803	335422

Subject to technical alterations.

No. 6964H

Support Element, base-flange-mounting

Normally retracted. Hydraulic advanced. Spring force for contact, max. operating pressure 350 bar,
min. operating pressure 50 bar.



NEW!



Order no.	Article no.	Contact force F1 [N]	Support force at 350 bar [kN]	Stroke C [mm]	Q max. [l/min]	Vol. [cm³]	Weight [g]
567067	6964H-09-5	4,4 - 26,7	8,9	6,5	2,13	0,8	320
567068	6964H-09-50	4,4 - 26,7	8,9	12,5	2,13	1,1	327
567069	6964H-18-5	13,5 - 44,5	17,8	6,5	2,13	3,3	595
567070	6964H-18-50	13,5 - 44,5	17,8	12,5	2,13	3,7	607
567071	6964H-36-5	18,0 - 57,8	35,6	15,8	2,13	9,34	1275

Design:

Cylinder body from steel, hardened. Support pin with internal thread case hardened and ground. Wiper to protect against dirt and cooling water. Internal parts from stainless steel. Oil supply through threaded connection or an O-ring connection on the underside.

Application:

The support element is used as an extra support to prevent sagging and vibration of a workpiece.

Features:

Element with high load capacity and low height. Oil pressure: The plunger is retracted in the normal position. When pressure is applied, the support pin advances with a weak spring-applied force against the inserted workpiece. The spring force varies with the pin stroke. As the hydraulic pressure rises, the support pin is hydraulically clamped. When the pressure is released, the support pin returns to the normal position. Very high repeatability ensures optimum production quality. The basic body can be removed for direct installation of the screw-in cartridge.

Note:

Support pin must be protected against the entry of dirt and splash water by fitting a set screw or plug. When placing into operation, ensure that all air is bled from the system. Failure to do so can cause destruction of the clamping element by the escaping diesel effect.
Connections P1, P2 and the O-ring connection are all connected. Each can be used as an oil connection. **To achieve a controlled clamping sequence, there is the option of screwing the sequence valve 6918-XX-XXX directly into threaded connection P1.** The surface finish of the O-ring connection must be Rz 6.3 and flatness must be 0.08.

To be able to absorb machining forces, the supporting force should be matched to the clamping force.
The supporting force should always be at least twice as high as the clamping force.

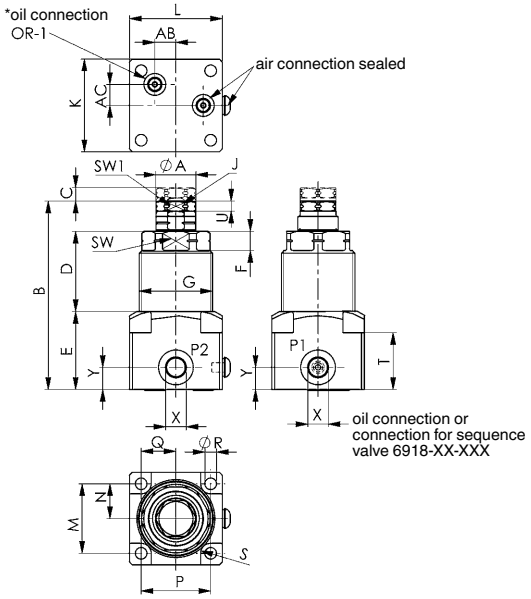
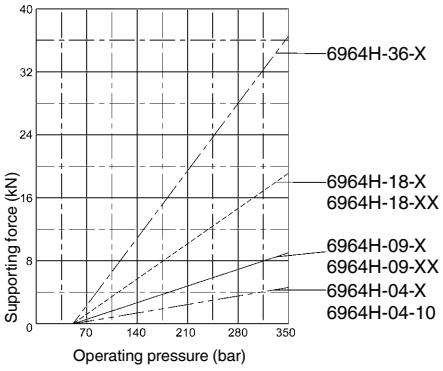
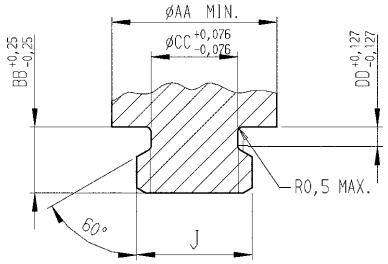
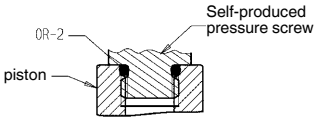


Diagram:



Production dimensions with self-production of the clamping screw for support element:





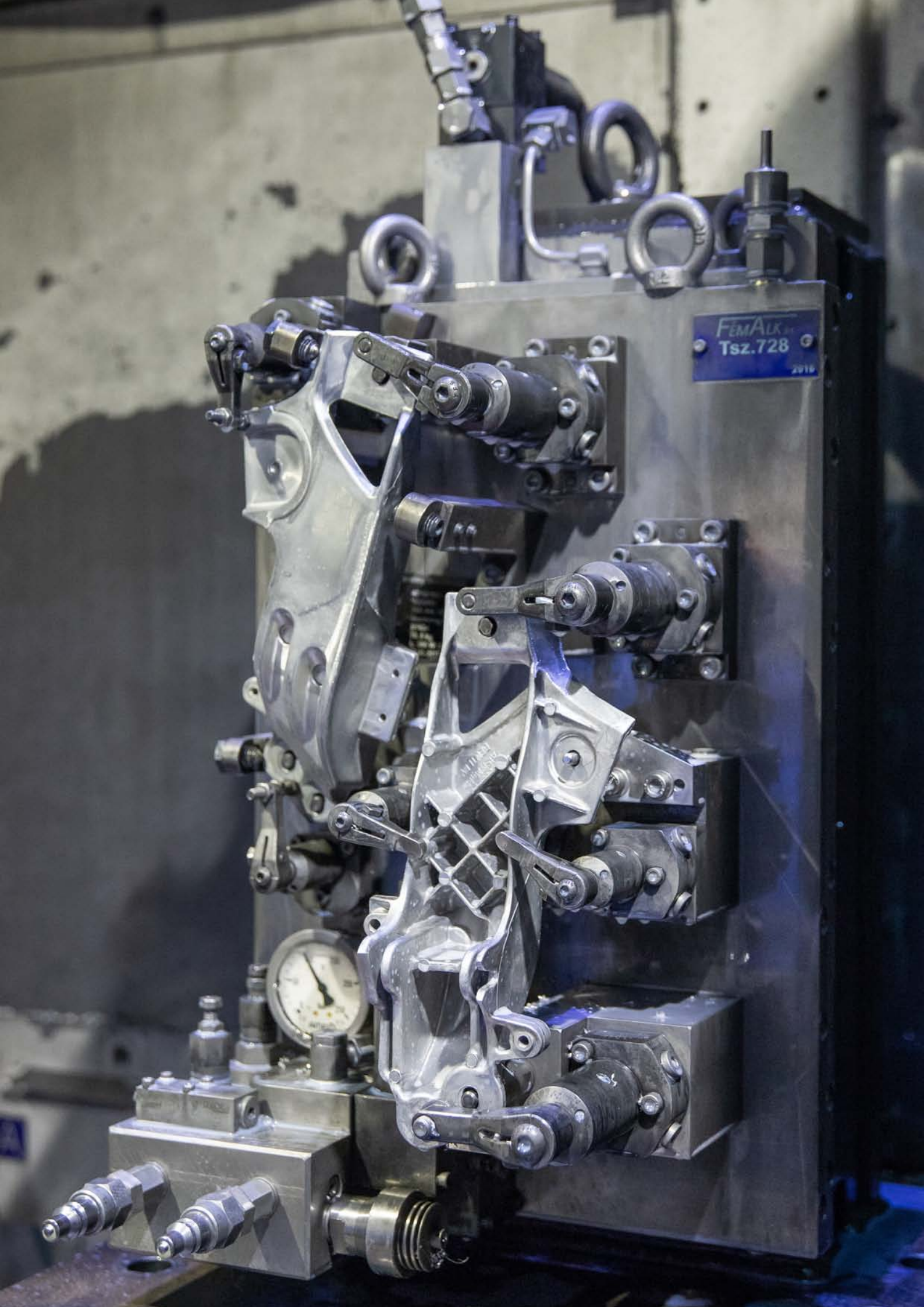
CAD

Dimensions:

Order no.	Article no.	dia. A	B	D	E	F	G	J x depth	K	L	M	N	P	Q	R	S	T	U	SW	SW1	X	Y	ØAA	AC	AB	BB	dia. CC	DD	OR-1 O-ring Order No.	OR-2 O-ring Order No.
567067	6964H-09-5	14,3	71,2	23,7	37	5,3	M26 x 1,5	M8 x 5,0	36	36	27	13,5	27	13,5	4,5	4,0	28	3,6	23	13	G1/8	10,5	9,75	7	7	5,0	6,05	1,19	567112	181289
567068	6964H-09-50	14,3	83,9	35,4	37	5,3	M26 x 1,5	M10 x 5,0	36	36	27	13,5	27	13,5	4,5	4,0	28	3,6	23	13	G1/8	10,5	11,43	7	7	5,0	7,67	1,19	567112	183608
567069	6964H-18-5	19,0	89,5	38,1	37	9,3	M35 x 1,5	M12 x 6,5	44	44	33	16,5	33	16,5	5,5	4,7	27	4,8	30	17	G1/8	10,5	14,1	10	10	6,35	9,91	1,78	567112	335422
567070	6964H-18-50	19,0	102,1	47,9	37	9,3	M35 x 1,5	M12 x 6,5	44	44	33	16,5	33	16,5	5,5	4,7	27	4,8	30	17	G1/8	10,5	14,1	10	10	6,35	9,91	1,78	567112	335422
567071	6964H-36-5	25,4	118,6	61,7	37	10,2	M45 x 1,5	M15x1 x 8	55	55	44	22,0	44	22,0	5,5	4,7	27	7,9	38	21	G1/8	10,5	-	10	10	-	-	-	567112	-

Subject to technical alterations.

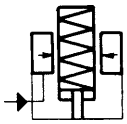
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FémAlk
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2016

No. 6964F

Support Element, cartridge flange

Normally extended. Spring advanced,
max. operating pressure 350 bar,
min. operating pressure 50 bar.





CAD

Order no.	Article no.	Contact force F1 [N]	Support force at 350 bar [kN]	Stroke C [mm]	Vol. [cm³]	Md max. [Nm]	Weight [g]
165092	6964F-04-1	4,5-9,0	4,4	6,5	0,16	40,5	160
165100	6964F-11-1	9,0-26,5	11,0	9,5	0,33	40,5	320

Design:

Cylinder body from steel, hardened. Support pin with internal thread case hardened and ground. Wiper to protect against dirt and cooling water. Internal parts from stainless steel. Oil supply via oil channel in fixture body.

Application:

The support element is used as an extra support to prevent sagging and vibration of a workpiece.

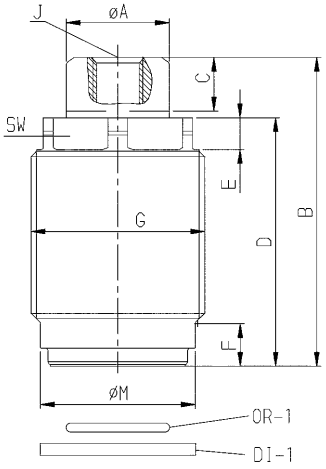
Features:

Element with high load capacity and low height. Spring extension: the plunger is normally extended. Variable spring setting permits sensitive adjustment of contact force.

Note:

Support pin must be protected against the entry of dirt and splash water by fitting a set screw or plug. When placing into operation, ensure that all air is bled from the system. Failure to do so can cause destruction of the clamping element by the escaping diesel effect.

The supporting force should be matched to the clamping force in order to absorb machining forces.
The supporting force should always be at least twice as high as the clamping force.



Dimensions:

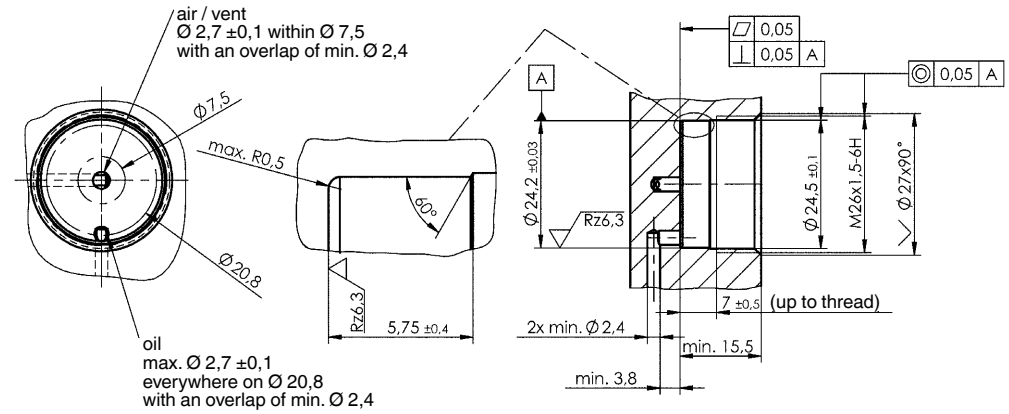
Order no.	Article no.	dia. A	B	D	E	F	G	J x depth	dia. M	SW	OR-1 O-ring Order No.	DI-1 Seal Order No.
165092	6964F-04-1	16,0	47,5	40,5	5,5	7,5	M26 x1,5	M8x7,5	24	23	479550	346270
165100	6964F-11-1	20,5	62,0	49,5	6,5	8,5	M35 x 1,5	M10x11,5	31	30	479618	550211

Subject to technical alterations.

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Installation dimensions:

6964F-04-1



6964F-11-1

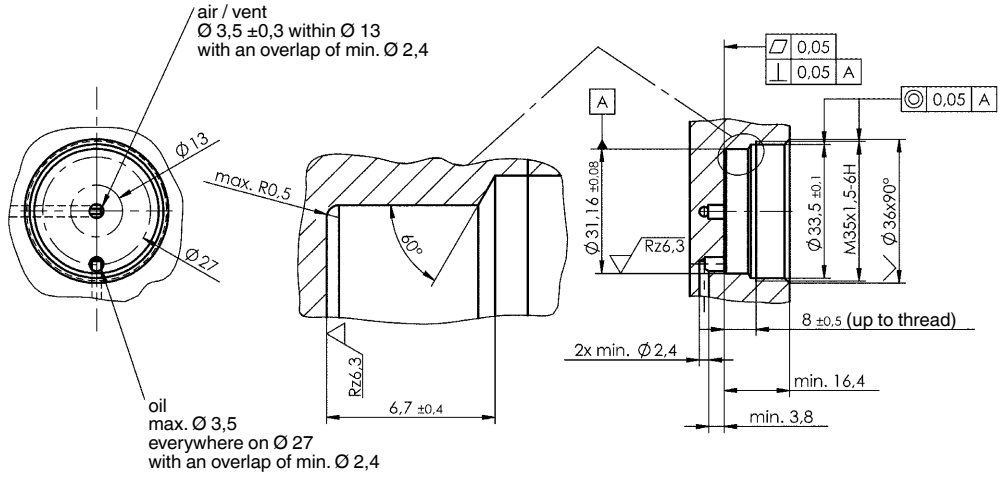
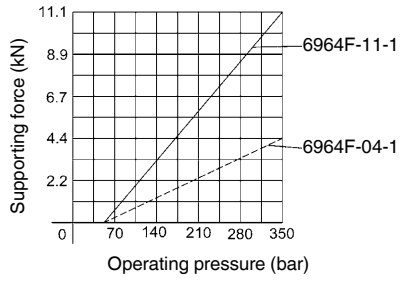


Diagram:

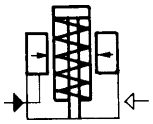


0.004 mm/kN elastic change in length under load

No. 6964L

Support Element, cartridge flange

Normally retracted. Air advanced,
max. operating pressure 350 bar,
min. operating pressure 50 bar.





CAD

Order no.	Article no.	Contact force F1 [N]	Support force at 350 bar [kN]	Stroke C [mm]	Vol. [cm³]	Md max. [Nm]	Weight [g]
165167	6964L-04-1	17,5*	4,4	6,5	0,16	40,5	150
165183	6964L-11-1	35,5*	11,0	9,5	0,33	40,5	340

* Contact force with max. 1.7 bar air pressure.

Design:

Cylinder body from steel, hardened. Support pin with internal thread case hardened and ground. Wiper to protect against dirt and cooling water. Internal parts from stainless steel. Oil supply via oil channel in fixture body.

Application:

The support element is used as an extra support to prevent sagging and vibration of a workpiece.

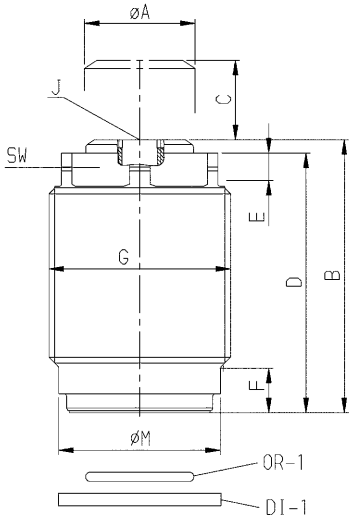
Features:

Element with high load capacity and low height. Pneumatic: the plunger is normally retracted. Sensitive adjustment of contact force by varying the air pressure.

Note:

Support pin must be protected against the entry of dirt and splash water by fitting a set screw or plug. When placing into operation, ensure that all air is bled from the system. Failure to do so can cause destruction of the clamping element by the escaping diesel effect.

The supporting force should be matched to the clamping force in order to absorb machining forces.
The supporting force should always be at least twice as high as the clamping force.



Dimensions:

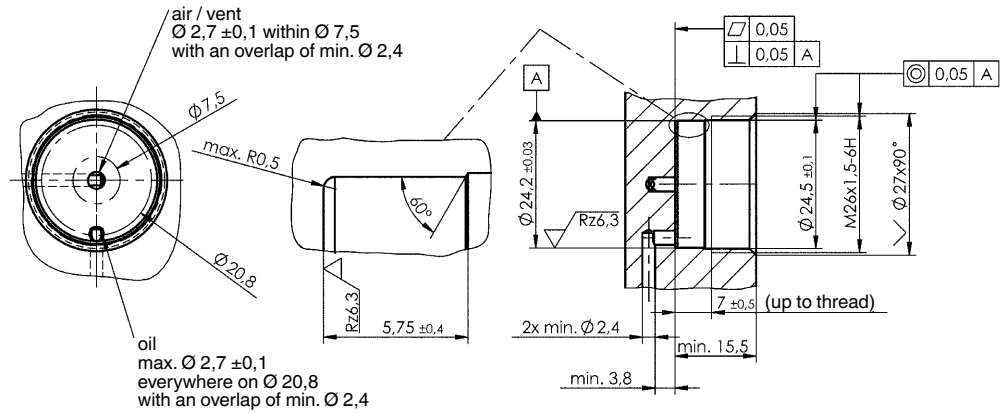
Order no.	Article no.	dia. A	B	D	E	F	G	J x depth	dia. M	SW	OR-1 O-ring Order No.	DI-1 Seal Order No.
165167	6964L-04-1	16,0	41,0	40,5	5,5	7,5	M26x1,5	M6x7,5	24	23	479550	346270
165183	6964L-11-1	20,5	52,5	49,5	6,5	8,5	M35x1,5	M8x6,0	31	30	479618	550211

Subject to technical alterations.

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Installation dimensions:

6964L-04-1



6964L-11-1

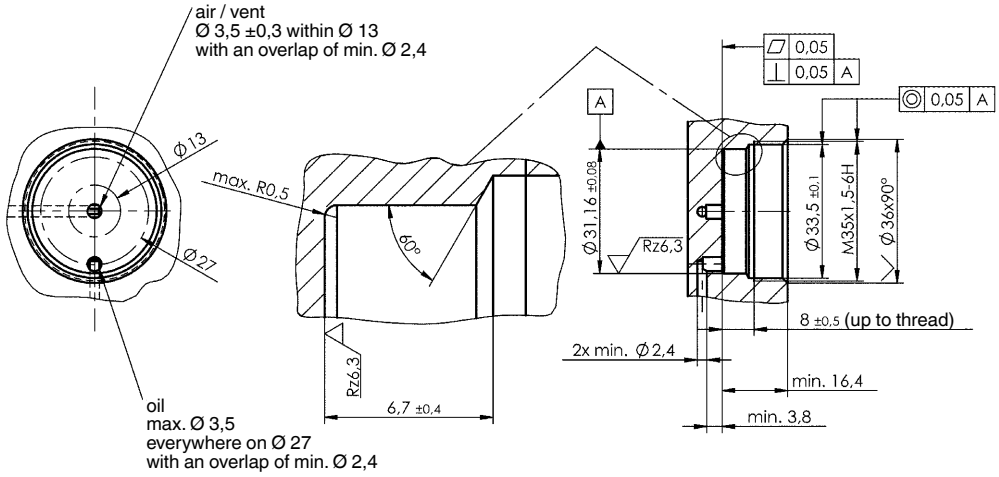
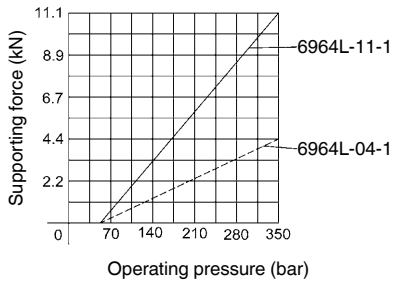


Diagram:

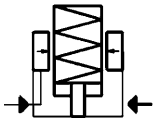


0.004 mm/kN elastic change in length under load

No. 6964H

Support Element, cartridge flange

Normally retracted. Hydraulic advanced.
Spring force for contact,
max. operating pressure 350 bar,
min. operating pressure 50 bar.





Order no.	Article no.	Contact force F1 [N]	Support force at 350 bar [kN]	Stroke C [mm]	G	Q max. [l/min]	Vol. [cm³]	Md max. [Nm]	Weight [g]
NEW! 567060	6964H-04-2	4,4-26,7	4,4	6,5	M20x1,5	2,13	1,3	28,0	55
165225	6964H-04-1	4,4-26,7	4,4	6,5	M26x1,5	2,13	1,3	40,5	180
562248	6964H-04-10	4,4-26,7	6,2	12,5	M26x1,5	2,13	1,5	40,5	187
NEW! 567061	6964H-09-1	4,4-26,7	8,9	6,5	M26x1,5	2,13	0,8	50	141
NEW! 567062	6964H-09-10	4,4-26,7	8,9	12,5	M26x1,5	2,13	1,1	50	173
NEW! 567063	6964H-09-11	4,4-26,7	8,9	12,5	M30x1,5	2,13	1,1	50	200
66720	6964H-11-1	13,5-44,5	11,0	6,5	M35x1,5	2,13	2,0	54,0	380
562249	6964H-11-10	13,5-44,5	13,4	12,5	M35x1,5	2,13	2,3	54,0	417
NEW! 567064	6964H-18-1	13,5-44,5	17,8	6,5	M35x1,5	2,13	3,3	70	281
NEW! 567065	6964H-18-10	13,5-44,5	17,8	12,5	M35x1,5	2,13	3,7	70	340
NEW! 567066	6964H-36-1	18,0-57,8	35,6	15,8	M45x1,5	2,13	9,34	140	750
165241	6964H-17-1	27,0-53,0	17,0	12,5	M60x1,5	2,13	9,7	136,0	1150

Design:

Cylinder body from steel, hardened. Support pin with internal thread case hardened and ground. Wiper to protect against dirt and cooling water. Internal parts from stainless steel. Oil supply via oil channel in fixture body.

Application:

The support element is used as an extra support to prevent sagging and vibration of a workpiece.

Features:

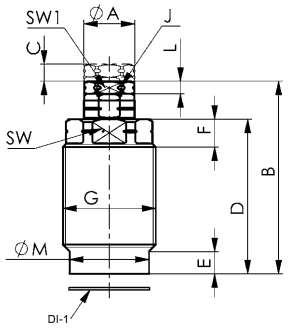
Element with high load capacity and low height. Hydraulic and spring: the plunger is normally retracted. When pressure is applied, the support pin advances with a weak spring-applied force to contact the workpiece. The spring force varies with the stroke. As the hydraulic pressure rises, the support pin is hydraulically clamped. When the pressure is released, the support pin returns to the retracted position. Very high repeatability ensures optimum production quality.

Note:

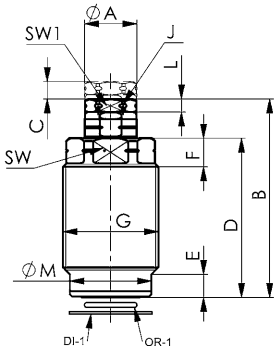
Support pin must be protected against the entry of dirt and splash water by fitting a set screw or plug. When placing into operation, ensure that all air is bled from the system. Failure to do so can cause destruction of the clamping element by the escaping diesel effect.

The supporting force should be matched to the clamping force in order to absorb machining forces.
The supporting force should always be at least twice as high as the clamping force.

6964H-04-1, -04-10, -11, -17



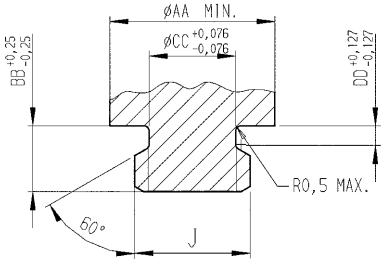
6964H-04-2, -09, -18, -36

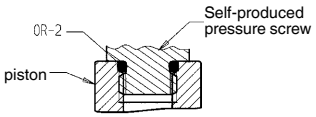


Only use seal for replacement of 6964H-04-1/-10 or 6964H-11-1/-10

Use O-ring for 6964H-04-2, 6964H-09, 6964H-18 and 6964H-36

Production dimensions with self-production of the clamping screw for support element:





CAD

Dimensions:

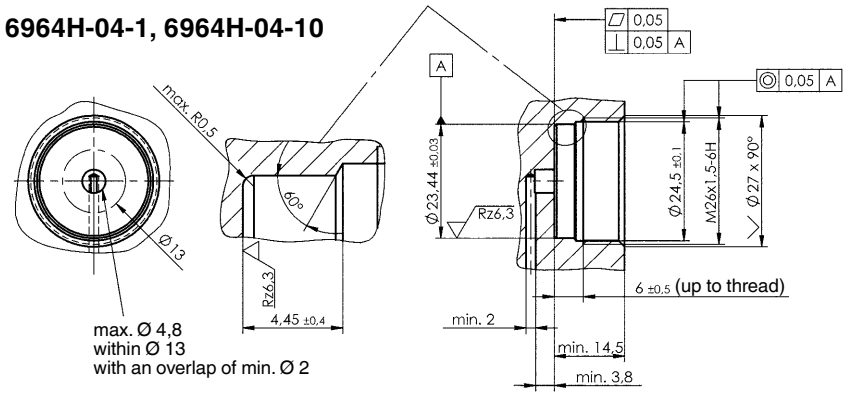
Order no.	Article no.	dia. A	B	D	E	F	G	J x depth	L	dia. M	SW	SW1	ØAA	BB	dia. CC	DD	OR-1 O-ring Order No.	OR-2 O-ring Order No.	DI-1 Seal Order No.
567060	6964H-04-2	9,5	41,3	33,6	3,2	5,3	M20x1,5	M6x3,5	2,8	18,1	18	7	-	-	-	-	567113	-	-
165225	6964H-04-1	16,0	53,5	42,5	7,0	5,5	M26x1,5	M8x5,0	3,5	23,3	23	13	9,75	5,00	6,05	1,19	-	181289	550124
562248	6964H-04-10	16,0	66,5	55,5	7,0	5,5	M26x1,5	M10x5,0	3,5	23,3	23	13	11,43	5,00	7,67	1,19	-	183608	550124
567061	6964H-09-1	14,3	54,2	43,7	6,3	5,5	M26x1,5	M8x5,0	3,6	23,3	23	13	9,75	5,00	6,05	1,19	567114	181289	550124
567062	6964H-09-10	14,3	66,9	55,4	6,3	5,5	M26x1,5	M10x5,0	3,6	23,3	23	13	11,43	5,00	7,67	1,19	567114	183608	550124
567063	6964H-09-11	14,3	66,9	55,4	5,0	5,5	M30x1,5	M10x5,0	3,6	23,3	23	13	11,43	5,00	7,67	1,19	567114	183608	-
66720	6964H-11-1	20,5	72,0	55,0	9,5	9,0	M35x1,5	M12x6,5	5,0	29,7	30	19	14,10	6,35	9,91	1,78	-	335422	550125
562249	6964H-11-10	20,5	84,5	68,0	9,5	9,0	M35x1,5	M12x6,5	5,0	29,7	30	19	14,10	6,35	9,91	1,78	-	335422	550125
567064	6964H-18-1	19,0	72,5	58,1	8,5	9,3	M35x1,5	M12x6,5	4,8	29,7	30	17	14,10	6,35	9,91	1,78	567115	335442	550125
567065	6964H-18-10	19,0	85,2	67,9	8,5	9,3	M35x1,5	M12x6,5	4,8	29,7	30	17	14,10	6,35	9,91	1,78	567115	335442	550125
567066	6964H-36-1	25,4	101,6	81,7	8,5	10,2	M45x1,5	M15x1 x 8	7,9	42,9	38	21	-	-	-	-	567116	-	-
165241	6964H-17-1	38,0	72,5	55,0	6,5	12,5	M60x1,5	M12x6,5	5,0	54,8	54	19	14,10	6,35	9,91	1,78	-	335422	474445

Subject to technical alterations.

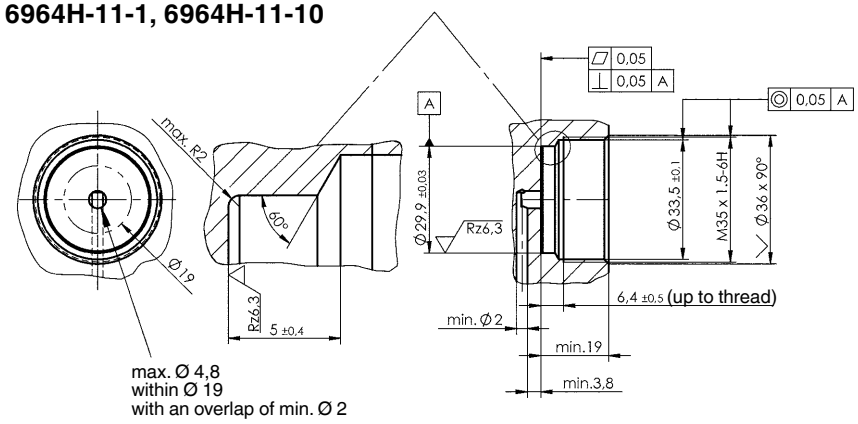
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Installation dimensions:

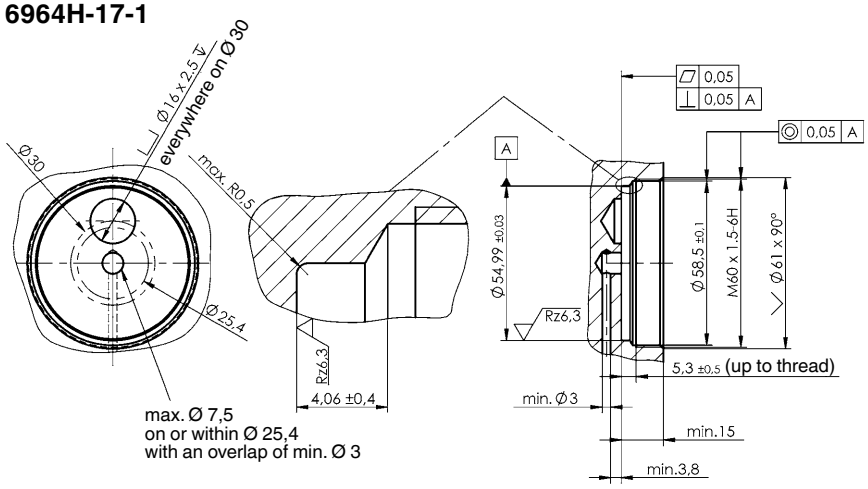
6964H-04-1, 6964H-04-10



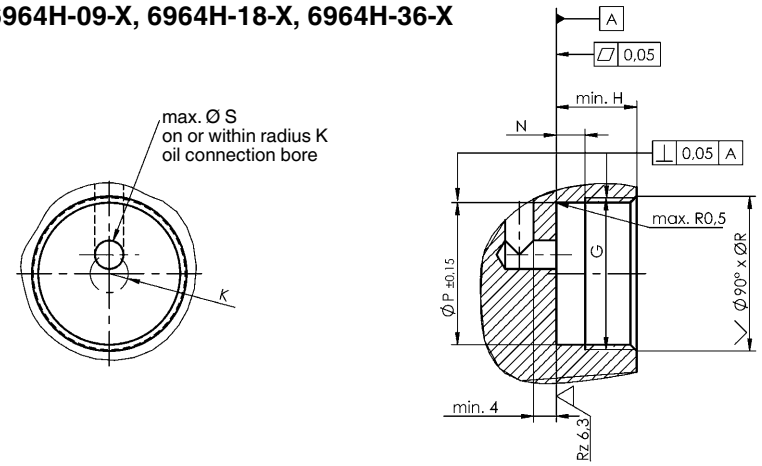
6964H-11-1, 6964H-11-10



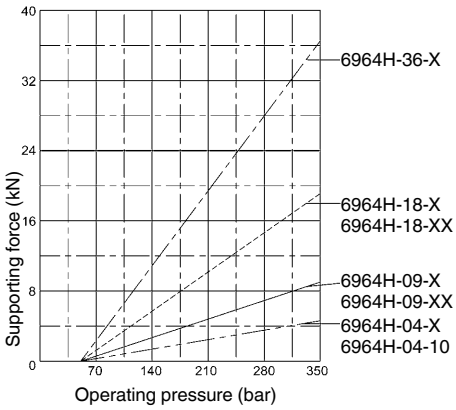
6964H-17-1



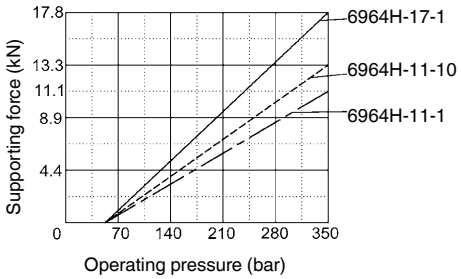
6964H-09-X, 6964H-18-X, 6964H-36-X



Diagrams:



0.004 mm/kN elastic change in length under load



Order no.	Article no.	G	H	K	N	dia. P	ØR	dia. S
567060	6964H-04-2	M20x1,5	10,0	2,0	2,8	18,5	21	3,0
567061	6964H-09-1	M26x1,5	13,5	3,2	4,3	24,5	27	5,0
567063	6964H-09-11	M30x1,5	13,5	3,2	4,3	28,5	31	5,0
567064	6964H-18-1	M35x1,5	21,5	4,7	6,6	33,5	36	5,0
567066	6964H-36-1	M45x1,5	25,4	7,5	7,3	33,5	46	6,3

Subject to technical alterations.

No. 6964H-xx-20

Splash protection



Order no.	Article no.	Weight [g]
326520	6964H-04-20	6
326546	6964H-11-20	12
326561	6964H-17-20	33

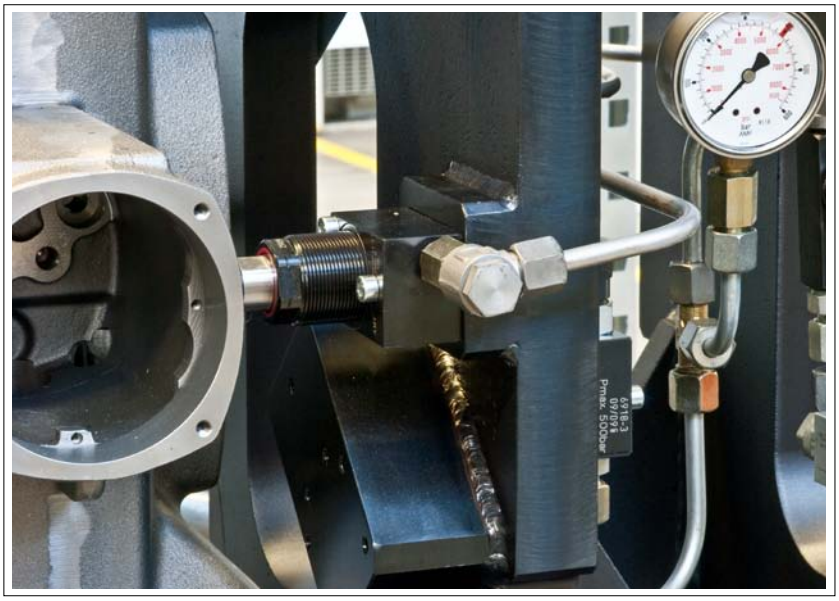
Application:

For protection against entry of chips and splash water.

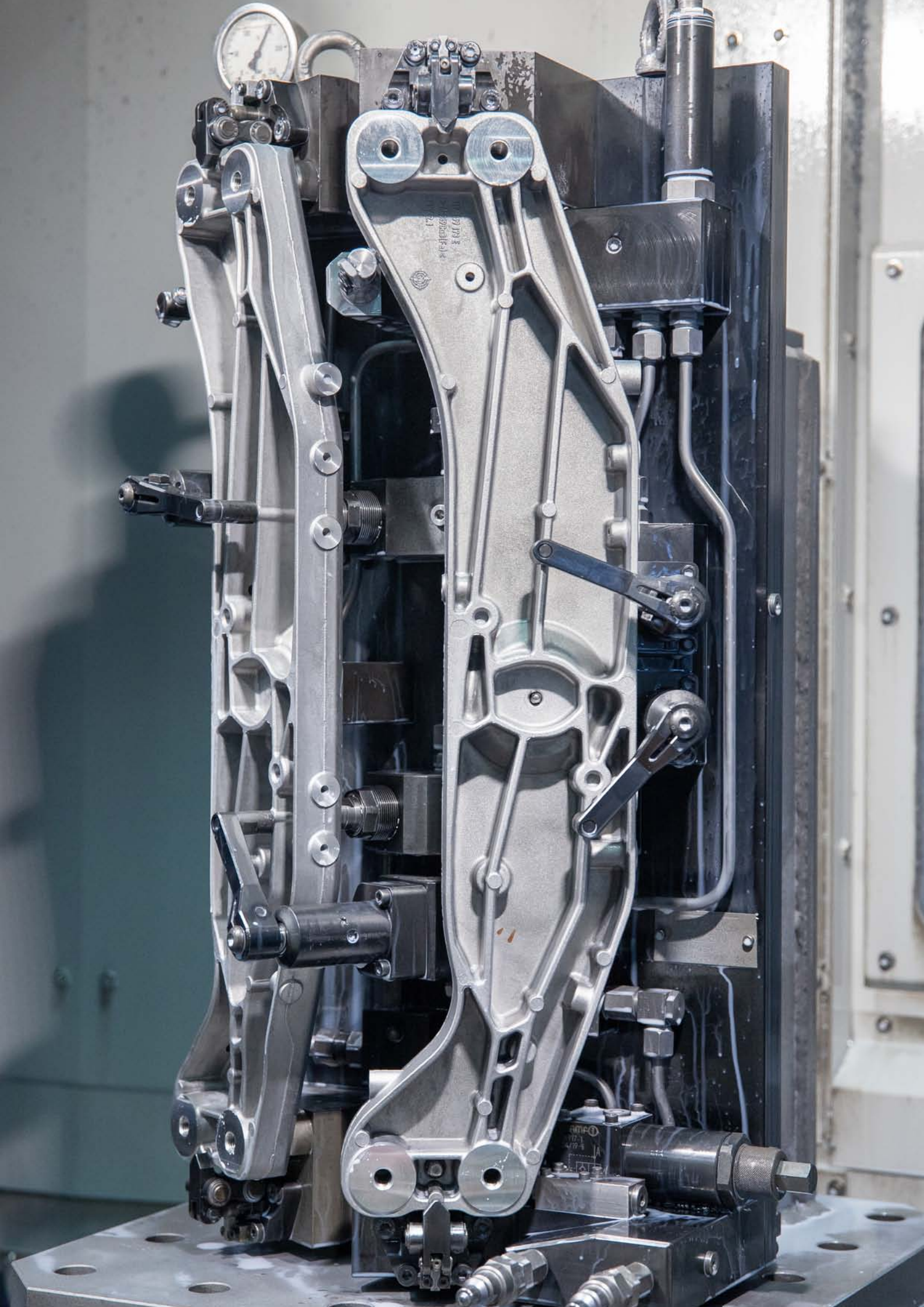
Note:

Use only for hydraulic support element. Observe mounting position!
Not suitable for the support elements with backpressure query 6964HS.





CAD



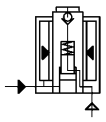
No. 6964HS-XX-1

Support element, threaded design with dynamic pressure monitoring

Normally retracted. Hydraulic advanced.
Application with spring force,
max. operating pressure 350 bar,
min. operating pressure 50 bar.

CAD

Order no.	Article no.	Contact force F1 [N]	Support force at 350 bar [kN]	Stroke C [mm]	Q max. [l/min]	Vol. [cm³]	Md max. [Nm]	Weight [g]
567072	6964HS-09-1	4,4 - 26,7	8,9	6,5	2,13	0,8	50	150
567073	6964HS-09-10	4,4 - 26,7	8,9	12,5	2,13	1,1	50	157
567074	6964HS-18-1	13,5 - 44,5	17,8	6,5	2,13	3,3	70	290
567075	6964HS-18-10	13,5 - 44,5	17,8	12,5	2,13	3,7	70	327





NEW!

Design:

Cylinder body from steel, hardened. Support pin with internal thread case hardened and ground. Wiper to protect against dirt and cooling water. Internal parts from stainless steel. Oil supply via threaded port.

Application:

The support element is used as an extra support to prevent sagging and vibration of a workpiece. Also confirms the presence of a workpiece, also on uneven surfaces such as castings.

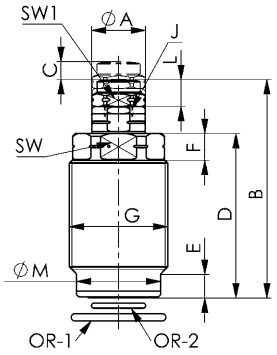
Features:

The piston is retracted into its basic position while an air flow passes through the support element. When pressure is applied, the support pin advances with a weak spring-applied force against the inserted workpiece. This closes the integrated air valve to indicate that the workpiece is present and is in contact. The maximum air operating pressure is 1 bar. Then the support pin is clamped hydraulically. When the pressure is released, the support pin returns to the normal position. Very high repeatability ensures optimum production quality. Element with high load capacity and low height.

Note:

Support pin must be protected against the entry of dirt and splash water by fitting a set screw or plug. When placing into operation, ensure that all air is bled from the system. Failure to do so can cause destruction of the clamping element by the escaping diesel effect.

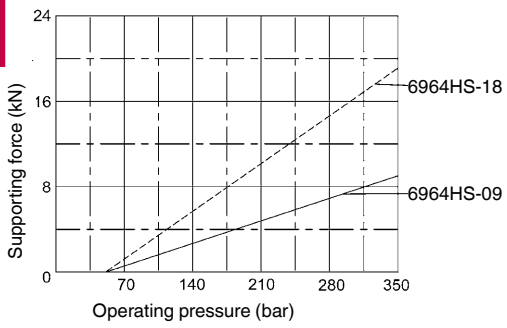
To be able to absorb machining forces, the supporting force should be matched to the clamping force.
The supporting force should always be at least twice as high as the clamping force.

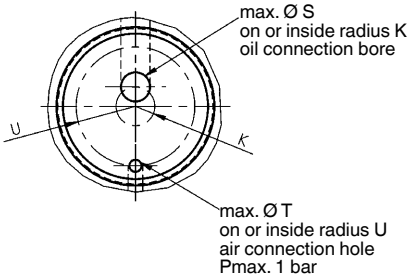


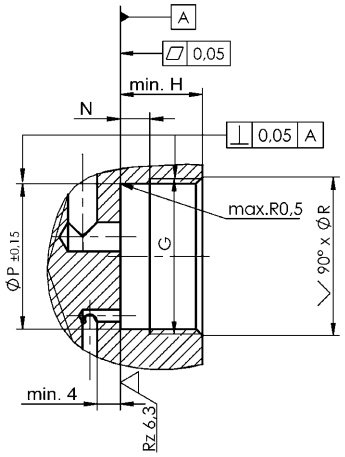
Installation dimensions:

Order no.	Article no.	G	H	K	N	dia. P	ØR	dia. S	dia. T	U
567072	6964HS-09-1	M26 x 1,5	13,5	3,2	4,3	24,5	27	5	2	9,8
567073	6964HS-09-10	M26 x 1,5	13,5	3,2	4,3	24,5	27	5	2	9,8
567074	6964HS-18-1	M35 x 1,5	21,5	4,7	6,6	33,5	36	5	3	12,0
567075	6964HS-18-10	M35 x 1,5	21,5	4,7	6,6	33,5	36	5	3	12,0

Diagram:







Dimensions:

Order no.	Article no.	dia. A	B	D	E	F	G	J x depth	L	dia. M	SW	SW1	OR-1 O-ring Order No.	OR-2 O-ring Order No.
567072	6964HS-09-1	14,3	57,8	43,7	6,3	5,5	M26 x 1,5	M8 x 5	7,1	23,3	23	11	567117	567114
567073	6964HS-09-10	14,3	70,6	55,4	6,3	5,5	M26 x 1,5	M10 x 5	7,1	23,3	23	11	567117	567114
567074	6964HS-18-1	19,0	77,2	58,1	8,5	9,3	M35 x 1,5	M12 x 6,5	9,5	29,7	30	17	567118	567115
567075	6964HS-18-10	19,0	89,7	67,9	8,5	9,3	M35 x 1,5	M12 x 6,5	9,5	29,7	30	17	567118	567115

Subject to technical alterations.

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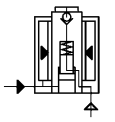
No. 6964HS-XX-5

Support element, flange design with dynamic pressure monitoring

Normally retracted. Hydraulic advanced.
Application with spring force,
max. operating pressure 350 bar,
min. operating pressure 50 bar.

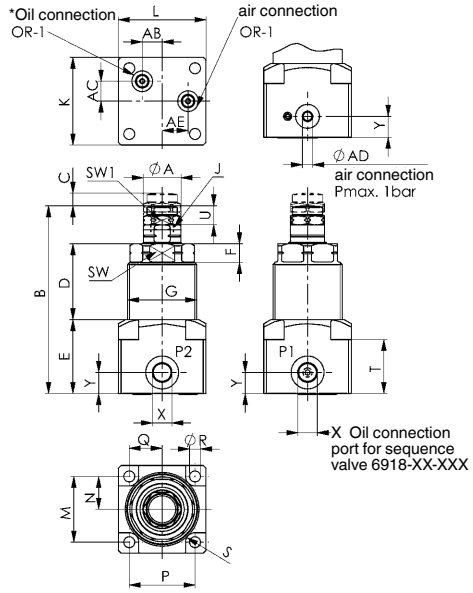
CAD

Order no.	Article no.	Contact force F1 [N]	Support force at 350 bar [kN]	Stroke C [mm]	Q max. [l/min]	Vol. [cm³]	Md max. [Nm]	Weight [g]
567076	6964HS-09-5	4,4 - 26,7	8,9	6,5	2,13	0,8	50	320
567077	6964HS-09-50	4,4 - 26,7	8,9	12,5	2,13	1,1	50	327
567078	6964HS-18-5	13,5 - 44,5	17,8	6,5	2,13	3,3	70	595
567079	6964HS-18-50	13,5 - 44,5	17,8	12,5	2,13	3,7	70	607



NEW!





Design:

Cylinder body from steel, hardened. Support pin with internal thread case hardened and ground. Wiper to protect against dirt and cooling water. Internal parts from stainless steel. Oil supply through threaded connection or an O-ring connection on the underside.

Application:

The support element is used as an extra support to prevent sagging and vibration of a workpiece. Also confirms the presence of a workpiece, also on uneven surfaces such as castings.

Features:

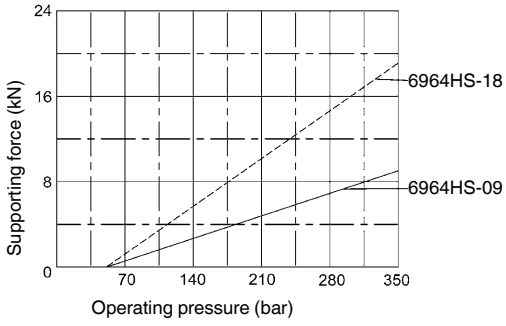
The piston is retracted into its basic position while an air flow passes through the support element. When pressure is applied, the support pin advances with a weak spring-applied force against the inserted workpiece. This closes the integrated air valve to indicate that the workpiece is present and is in contact. The maximum air operating pressure is 1 bar. Then the support pin is clamped hydraulically. When the pressure is released, the support pin returns to the normal position. Very high repeatability ensures optimum production quality. Element with high load capacity and low height. The basic body can be removed for direct installation of the screw-in cartridge.

Note:

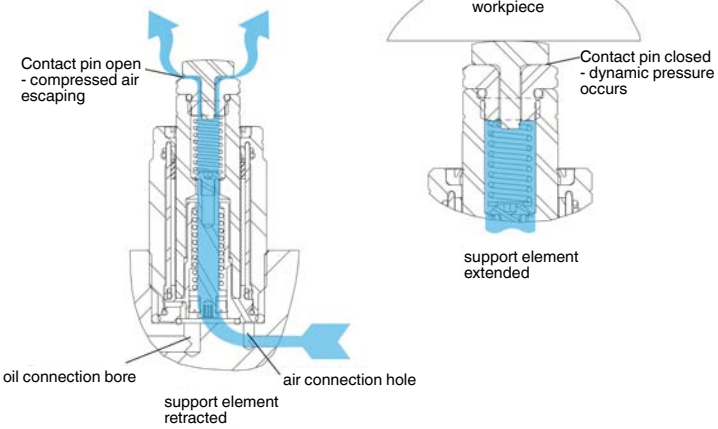
Support pin must be protected against the entry of dirt and splash water by fitting a set screw or plug. When placing into operation, ensure that all air is bled from the system. Failure to do so can cause destruction of the clamping element by the escaping diesel effect.
Connections P1, P2 and the O-ring connection are all connected and each can be used as an oil connection. **To achieve a controlled clamping sequence, there is the option of screwing the sequence valve 6918-XX-XXX directly into threaded connection P1.** The surface finish of the O-ring connection must be Rz 6.3 and flatness must be 0.08.

To be able to absorb machining forces, the supporting force should be matched to the clamping force.
The supporting force should always be at least twice as high as the clamping force.

Diagram:



Dynamic pressure monitoring:



Dimensions:

Order no.	Article no.	dia. A	B	D	E	F	G	J x depth	K	L	M	N	P	Q	R	S	T	U	X	Y	AB	AC	AD	AE	SW	SW1	OR-1 O-ring Order No.
567076	6964HS-09-5	14,3	74,8	23,7	37	5,3	M26 x 1,5	M8 x 5	36	36	27	13,5	27	13,5	4,5	4,0	28	7,1	G1/8	10,5	7	7	M5	9	23	11	567112
567077	6964HS-09-50	14,3	87,5	35,4	37	5,3	M26 x 1,5	M10 x 5	36	36	27	13,5	27	13,5	4,5	4,0	28	7,1	G1/8	10,5	7	7	M5	9	23	11	567112
567078	6964HS-18-5	19,0	94,2	38,1	37	9,3	M35 x 1,5	M12 x 6,5	44	44	33	16,5	33	16,5	5,5	4,7	27	9,5	G1/8	10,5	10	10	M5	13	30	17	567112
567079	6964HS-18-50	19,0	106,8	47,9	37	9,3	M35 x 1,5	M12 x 6,5	44	44	33	16,5	33	16,5	5,5	4,7	27	9,5	G1/8	10,5	10	10	M5	13	30	17	567112

Subject to technical alterations.





Subject to technical alterations.

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CLAMPING ELEMENTS FOR STRESS-FREE CLAMPING AND LOW-VIBRATION MACHINING

COUNTER BALANCERS

> clamping force 2,0 kN
> clamping stroke 12 mm
> counterbalance stroke 3 mm

COMPENSATING COLLET

> clamping force 2,5 kN
> gripping force 0,5 kN / per piston
> counterbalance stroke 3,75 mm

CLAMPING TONGS

> holding force 0,78 kN
> piston force 1,25 kN
> clamping range 2 - 10 mm

CLAMPING TONGS

> holding force 6,7 kN
> piston force 7,8 kN
> clamping range up to 10 mm

PRODUCT OVERVIEW:

Type	Operating pressure [bar]	Clamping force [kN]	Piston force [kN]	Gripping force [kN]	Holding force [kN]	No. of models	Operating mode
6965-08	100	2,0	2,0	3,0	0,5	1	single acting
6965-10	250	2,5	2,8	5,0	0,34	1	single acting
6966-01	250	-	1,25	-	0,78	1	single acting
6966D-07	250	-	7,8	-	6,7	1	double acting

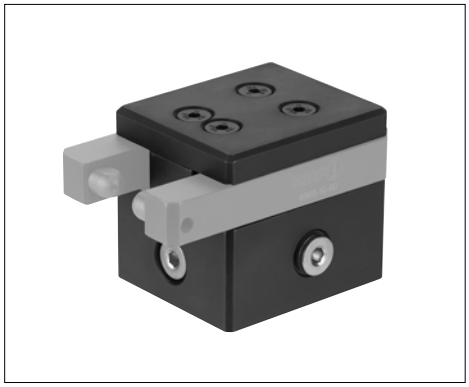
PRODUCT EXAMPLES:

NO. 6965-08



> holding force: 0,5 kN
> clamping stroke: 12,0 mm

NO. 6965-10



> holding force: 0,3 kN
> clamping stroke: 7,5 mm

NO. 6966-01

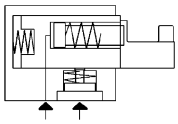


> holding force: 0,78 kN
> clamping range: 2 - 10 mm

No. 6965

Hydraulic Compensating Clamp

Single acting, with spring return,
max. operating pressure 100 bar.





CAD

Order no.	Article no.	max. clamping force [kN]	max. locking force [kN]	max. piston force [kN]	Holding force [kN]	Clamping stroke [mm]	Compensating stroke [mm]	Pin dia.	OR-1 O-ring Order No.	Weight [g]
320333	6965-08-00	2	3	2	0,5	12	3	16,0*	550265	1675
320341	6965-08-01	2	3	2	0,5	12	3	5,5	550265	1675
320358	6965-08-02	2	3	2	0,5	12	3	8,5	550265	1675

* Clamping bolt blank not hardened

Design:

Housing from steel, burnished. Piston from case-hardened steel, hardened and ground. Complete with four fixing screws M6 x 70 and O-ring for flange seal. Oil supply via threaded connection or oil channel in the fixture body.

Application:

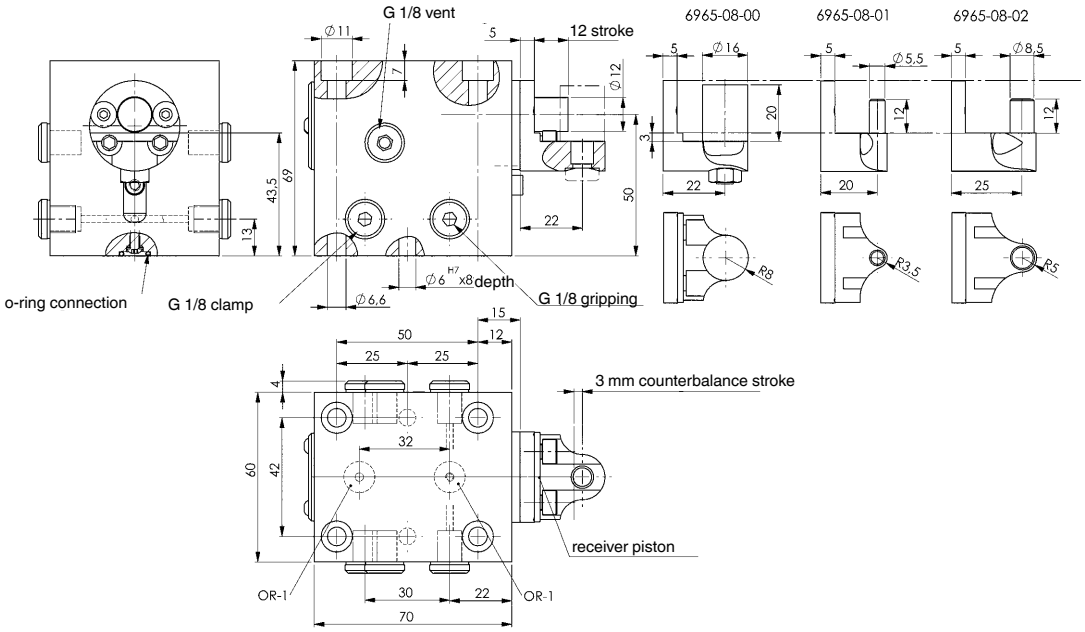
The Hydraulic Compensating Clamp is employed in fixtures for the distortion-free, floating clamping and support of workpieces. It is possible to use several Hydraulic Compensating Clamps without distorting a workpiece.

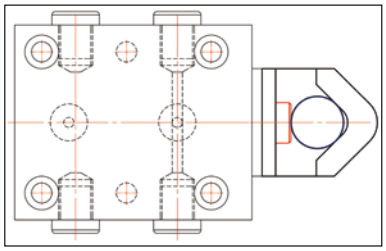
Features:

The floating piston has a compensating stroke of 3 mm, thereby also permitting the clamping of workpieces with large shape deviations or differing and inaccurate drill hole tolerances. Immediately after the clamping process, the support piston is clamped, specifically in a clamped position, via a sequence valve! The workpiece holder on the adjustable clamp is easy to change and is therefore simply and quickly adapted to the various workpiece contours.

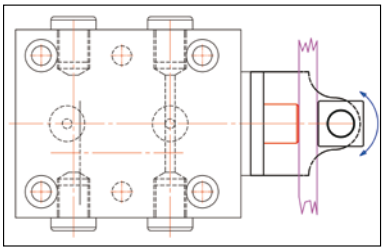
Note:

Please do not operate a Hydraulic Compensating Clamp without a workpiece in place; doing so can damage the return spring or cause it to set and lose force.
For single acting cylinders there is risk of sucking in coolant through the breather port. In such cases the breather port has to be piped to a clean protected area. The system has to be completely vented during installation.

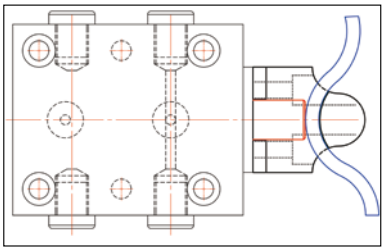




Clamping of workpiece with mouled lugs.



Clamping at heat fin.



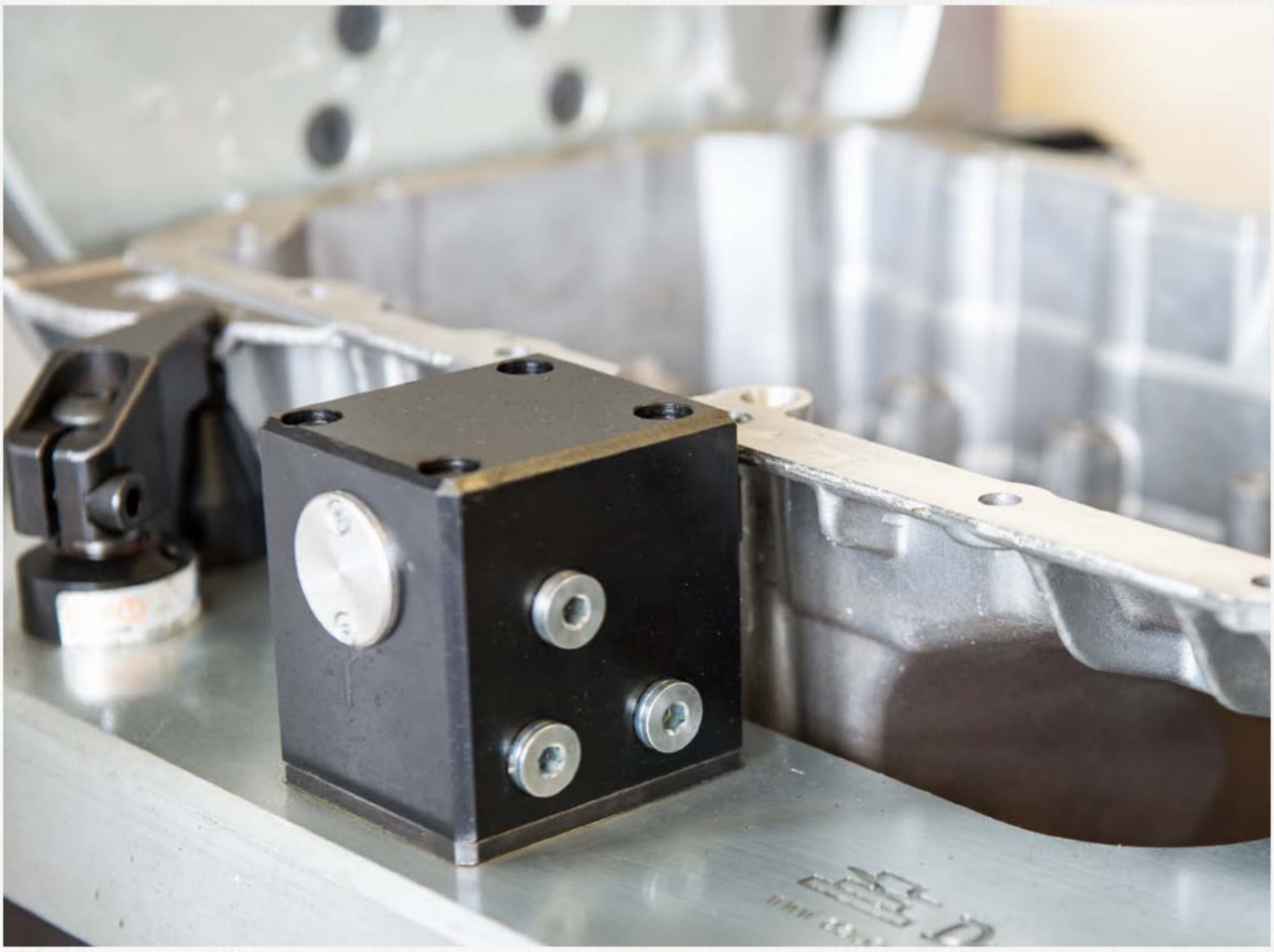
Clamping to CAD-data geometry.

Subject to technical alterations.

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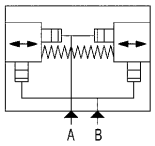
Subject to technical alterations.

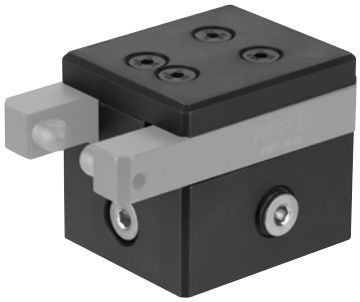
No. 6965-10

CAD

Compensating collet

Single-acting, with spring return,
max. operating pressure 250 bar,
min. operating pressure 30 bar.





Order no.	Article no.	max. clamping force [kN]	max. locking force [kN]	max. piston force [kN]	Holding force [kN]	Clamping stroke [mm]	Compensating stroke [mm]	Workpiece clamping range [mm]	G	OR-1 O-ring Order No.	Weight [g]
562219	6965-10	2,5	5	2,8	0,34	7,5	3,75	2,5 - 8,5	G1/8	550265	1900

Design:

Housing made of steel, burnished. Complete with four fastening bolts and O-ring for flange seal. Oil supply via threaded connection or oil channel in the fixture body. Clamping lever standard is not supplied as standard.

Application:

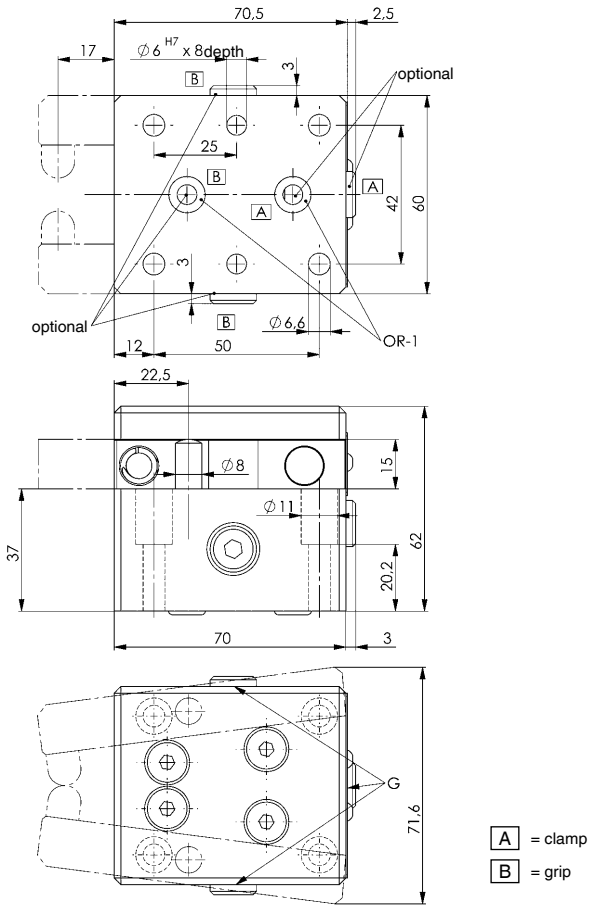
The compensating collet is used in clamping devices to clamp or hold workpieces floating and distortion-free. Several compensating collets can be used without distorting the workpiece.

Features:

The clamp arms mounted axially above the pivot point each have a counterbalance stroke. This allows workpieces with large deviations in shape and position to be clamped on the clamping surface in the stroke direction. The workpieces are supplied by application of pressure first at connection A „clamping“, by placing the clamping lever onto the workpiece and then to clamp the clamping lever distortion-free in position by means of connection B „clamping“. The clamping sequence can also be implemented by means of a sequence valve 6918-80-10 or sequence valve 6918-XX. The clamping levers are changeable. Compression pieces are available on request.

Note:

Before operating the compensating collet, the workpiece must be clamped to prevent it from moving.



Subject to technical alterations.

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No. 6965-10-00

Clamping lever, standard

CAD

Order no.	Article no.	max. operating pressure [bar]	Clamping force at 100 bar [kN]	B	L	G	Weight [g]
562220	6965-10-00	250	0,68	15	93	M5	309



Design:

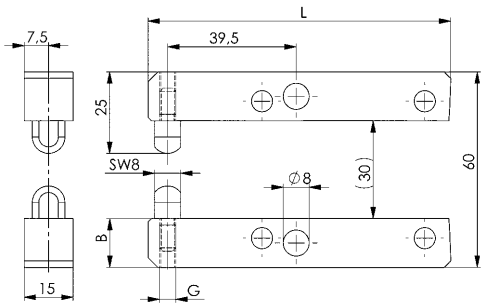
Clamping lever made of tempered steel, burnished, in two parts. Thrust piece made of tempered steel, nitrided. Thrust piece changeable.

Application:

Clamping lever for compensating collet 6965-10.

Note:

Always observe clamping pressure



No. 6965-10-03

Clamping lever, cranked

CAD

Order no.	Article no.	max. operating pressure [bar]	Clamping force at 100 bar [kN]	A	B	L	G	Weight [g]
562221	6965-10-03	250	0,68	40	15	93	M5	407



Design:

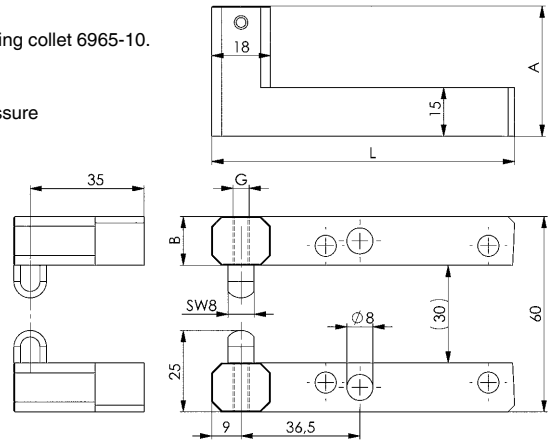
Clamping lever made of tempered steel, burnished, in two parts. Thrust piece made of tempered steel, nitrided. Thrust piece changeable.

Application:

Clamping lever for compensating collet 6965-10.

Note:

Always observe clamping pressure



No. 6965-10-09

Clamping lever blank

CAD

Order no.	Article no.	max. operating pressure [bar]	Clamping force at 100 bar [kN]	A	B	L	Weight [g]
562222	6965-10-09	250	0,68	29,5	15	95	377



Design:

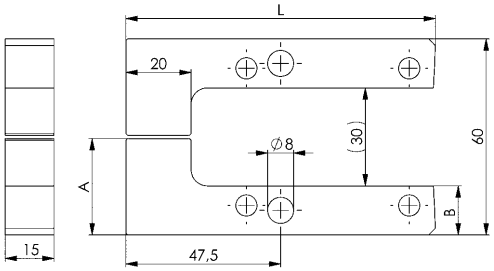
Clamping lever made of tempered steel, burnished, in two parts.

Application:

Clamping lever for compensating collet 6965-10.

Note:

Always observe clamping pressure

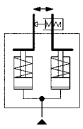


Subject to technical alterations.

No. 6966

Clamping tongs

Single-acting,
max. operating pressure 250 bar,
min. operating pressure 30 bar.





CAD

Order no.	Article no.	Holding force at 250 bar [kN]	Piston force at 250 bar [kN]	Stroke H min. [mm]	Stroke H max. [mm]	Clamping range S [mm]	Md [Nm]	OR-1 O-ring Order No.	Weight [g]
562215	6966-01	0,78	1,25	1,8	14	2 - 10	10	466334	1423

Design:

Housing made of steel, burnished. Steel clamping lever, case-hardened. The clamping levers are driven by two single-acting threaded cylinders. Oil supply via oil channel in fixture body. Supplied as standard with oil feed brake and four fastening bolts M6 x 70. A filter insert with an O-ring is integrated in the supply.

Application:

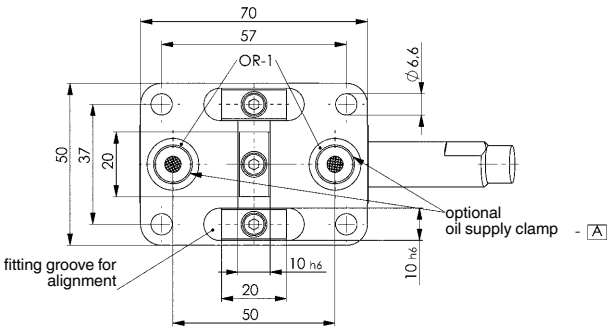
The clamping tongs prevent vibrations on the workpiece during machining. The clamping tongs are suitable for holding the workpieces but not for positioning them,

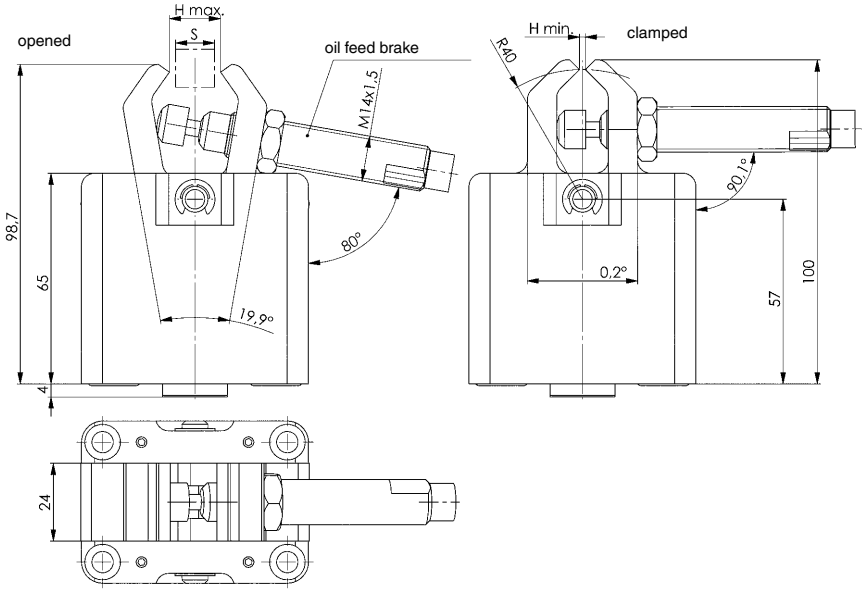
Features:

The clamping tongs hold the workpiece without clamping it. A wide range of clamping forms can be implemented with the clamping lever blank.

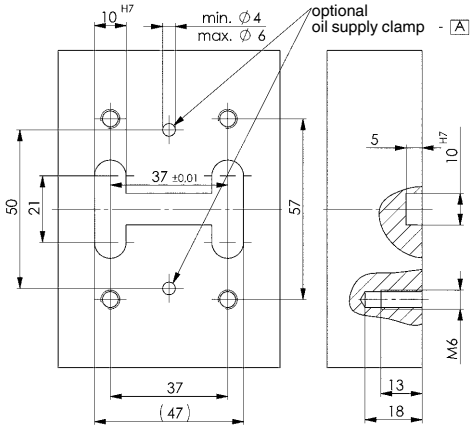
Note:

Resetting of the clamping levers by the oil feed brake. Resetting is also possible via a spring, which is not supplied as standard.



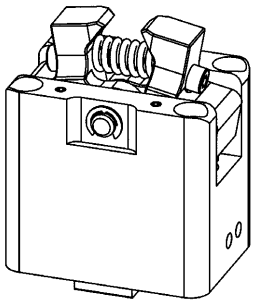


Drilling template device:



Application example:

(with spring advance return)



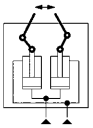
Subject to technical alterations.

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No. 6966D

Clamping tongs

Double-acting,
max. operating pressure 250 bar,
min. operating pressure 30 bar.





CAD

Order no.	Article no.	Holding force F at 250 bar * [kN]	Piston force at 250 bar [kN]	Clamping range up to [mm]	OR-1 O-ring Order No.	Md [Nm]	Weight [g]
562217	6966D-07	6,7	7,8	10	298778	25	3350

* Holding force specification for lever length 0

Design:

Housing made of steel, burnished. Clamp lever holder made of case-hardened steel. The clamping lever holder is driven by two piston rods installed in the housing. Oil supply via oil channels in fixture body. Supplied as standard with four fastening bolts M8 x 80 and two Viton moulded seals for the fastening bolt holder.

Application:

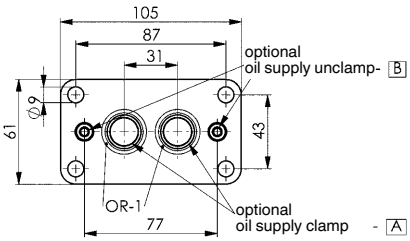
The clamping tongs prevent vibrations on the workpiece during machining. The clamping tongs are suitable for compensating and holding the workpieces but not for positioning them, with a repetition accuracy of 0.02 to 0.03 mm.

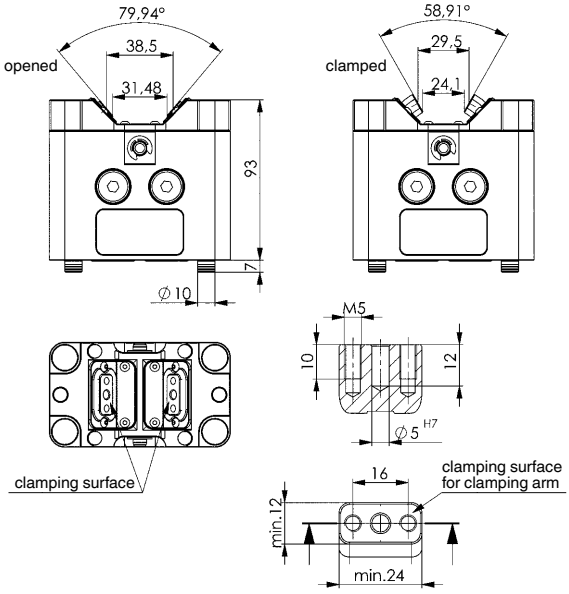
Features:

The clamping tongs hold the workpiece without clamping it.

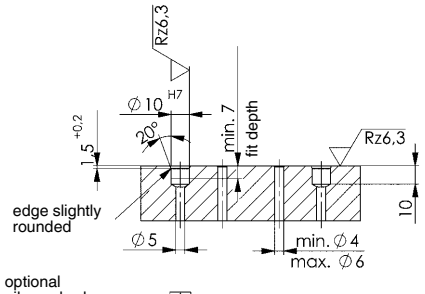
Note:

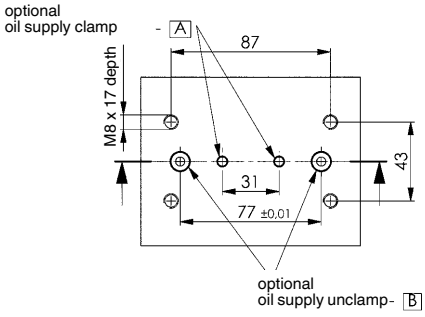
The clamping levers can be designed individually, these are not supplied as standard.



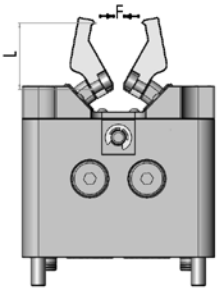


Drilling template device:





Application example:



Holding force table for different lever lengths:

Operating pressure	bar	100					
Lever length L	mm	0	20	40	60	80	100
Holding force horizontal F	kN	2,49	1,49	1,05	0,82	0,68	0,57
Operating pressure	bar	200					
Holding force horizontal F	kN	4,97	2,96	2,11	1,69	1,35	1,15

Subject to technical alterations.

No. 6966R

Clamping lever blank

CAD

Order no.	Article no.	Span H max. [mm]	A	B	C	E	Weight [g]
562216	6966R-01-00	8	61	24	15	52	559



Design:

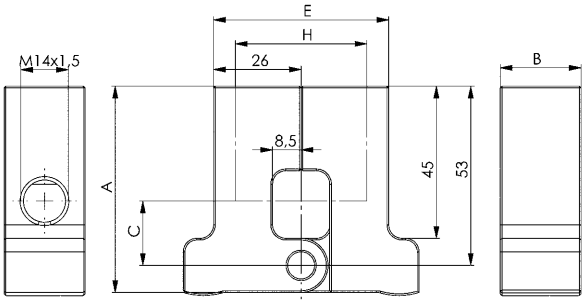
Case-hardened steel, burnished.

Application:

For clamping tongs 6966-01. The clamping lever blank can be adjusted according to the shape of the workpiece.

Note:

The span H can be increased as required, but it must be noted that shear forces of more than 8 mm can occur!

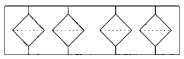


No. 6966DF

Filter plate

CAD

Order no.	Article no.	max. pressure range [bar]	Filteration [µm]	OR-1 O-ring Order No.	Weight [g]
562218	6966DF-07-100	250	100	466334	320





Design:

Filter plate and filter sleeve made of aluminium, black anodised.
Filter plates made of metal mesh.

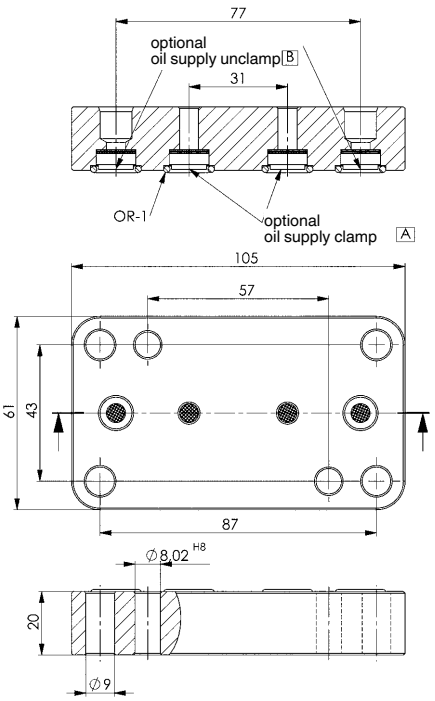
Application:

Used to protect the 6966D-07 clamp from contamination in clamping devices

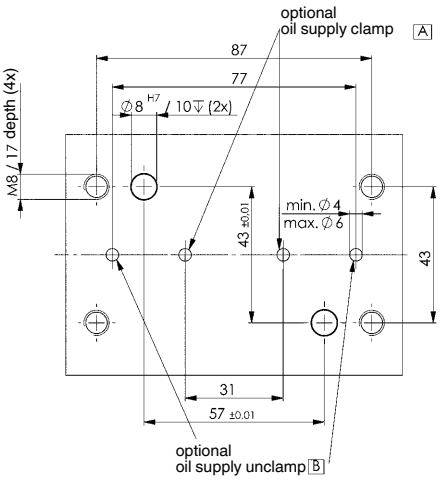
Note:

If a finer strainer is required, this can be easily replaced.
The finer the filter selected, the greater the flow resistance.

Replacement filter:
Filter, plug-in design 25 µm, order no. 562203
Filter, plug-in design 40 µm, order no. 562204
Filter, plug-in design 100 µm, order no. 562205



Drilling template device:



Subject to technical alterations.

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LOW PRESSURE CLAMPING TECHNOLOGY

LOW PRESSURE SWING CLAMPS LINK CLAMPS FOR DEMANDING TASKS

SWING CLAMPS

> piston force bis 13,2 kN
> operating pressure 100 bar
> position-repeatable clamping arm mounting
> oil supply via threaded port and/or O-ring-sealed ports

LINK CLAMPS

> piston force bis 25,5 kN
> operating pressure 100 bar
> oil supply via threaded port and/or O-ring-sealed ports

PRODUCT OVERVIEW:

Type	Piston force [kN]	Stroke [mm]	Max. operating pressure [bar]	No. of models	Operating mode
6941KP	4,1 - 13,2	10,7 - 16,5	100	5	double acting
6942KK-**	4,9 - 25,5	-	100	5	double acting
6942KK-**L	4,9 - 25,5	-	100	5	double acting
6942KK-**R	4,9 - 25,5	-	100	5	double acting

PRODUCT EXAMPLES:

NO. 6941KP



> piston force: 4,1 - 13,2 kN

NO. 6942KK

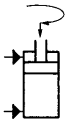


> piston force: 4,9 - 25,5 kN

No. 6941KP

Swing clamp, top-flange-mounting

Double-acting,
max. operating pressure 100 bar,
min. operating pressure 20 bar.



CAD



Order no.	Article no.	Clamping force at 100 bar Sp* [kN]	Clamping stroke M [mm]	Total stroke N [mm]	Vol. Sp [cm³]	Vol. Lo [cm³]	eff. piston area Sp [cm²]	eff. piston area Lo [cm²]	min. permitted clamping time * [s]	Q max. * [l/min]	Piston mass moment of inertia JK [kgm²]	Weight [g]
556960	6941KP-03-21	3,3	5,4	10,7	4,8	6,4	4,1	6,2	0,44	0,65	0,000006146	642
556961	6941KP-03-22	3,3	5,4	10,7	4,8	6,4	4,1	6,2	0,44	0,65	0,000006146	642
556962	6941KP-04-21	4,5	5,4	13,0	7,3	10,6	5,5	8,0	0,36	1,2	0,000011573	830
556963	6941KP-04-22	4,5	5,4	13,0	7,3	10,6	5,5	8,0	0,36	1,2	0,000011573	830
556964	6941KP-05-21	5,5	6,2	13,7	9,3	13,8	6,8	11,9	0,34	1,6	0,000029315	1284
556965	6941KP-05-22	5,5	6,2	13,7	9,3	13,8	6,8	11,9	0,34	1,6	0,000029315	1284
556966	6941KP-09-21	9,4	5,5	15,4	16,9	24,5	11,0	16,0	0,34	2,9	0,000055671	1778
556967	6941KP-09-22	9,4	5,5	15,4	16,9	24,5	11,0	16,0	0,34	2,9	0,000055671	1778
556968	6941KP-11-21	11,0	7,5	16,5	21,8	35,0	13,2	21,3	0,32	4,0	0,000137759	2805
556969	6941KP-11-22	11,0	7,5	16,5	21,8	35,0	13,2	21,3	0,32	4,0	0,000137759	2805

Cl = clamping, Rel = release, ending of item no.: -21 = dual-action, right-pivoting / -22 = dual-action, left-pivoting
* details with clamp arm, standard (6951)

Design:

Cylinder barrel made of steel, hardened and burnished. Piston rod nitrided. Piston rod with internal thread. O-ring for flange seal. Wiper at the piston rod. Clamp arm not supplied as standard. Oil supply via threaded connection or oil channel in the fixture body.

Application:

The swivel clamp is used in fixtures in which the workpiece must be freely accessible and inserted from above. Even workpieces with difficult shapes can be clamped using special clamp arms (available on request).

Features:

The swing motion is executed via three ball guides, thereby increasing positioning accuracy, repeat accuracy and service life.

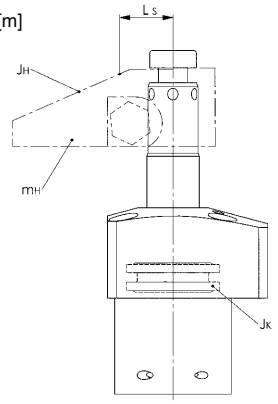
Note:

The piston stoke is executed with spheres, so volume flow Q max. must be complied with. Clamping arm length and clamping arm weight must be strictly observed.
No force may be applied to the piston when mounting accessories to it. To equalise height differences on the workpiece, the vertical clamping path must be 50% of the clamping stroke. When placing into operation, ensure that all air is bled from the system.
To throttle the oil feed, the throttle/check valve no. 6916-12-01 for G1/8 can optionally be used. **To achieve a controlled clamping sequence, there is the option of screwing the sequence valve 6918-XX-XXX directly into the threaded connection.** Other swivel angles are available on request.

Formula to determine the total mass moment of inertia and the volume flow:
total mass moment of inertia Jtotal. [kgm²]
Clamp arm mass moment of inertia JH [kgm²]
Piston mass moment of inertia JK [kgm²]
Clamp arm load mH [kg] Centre of gravity distance Ls [m]
Jtotal. = JK + JH + mH x Ls² [kgm²]

Volume flow Qmax. [cm³/s]
Volume clamp Vol.cl [cm³]
Minimum permitted clamp time tmin. [s]
Qmax. = Vol.sp / tmin. [cm³/s]

Suitable clamp arms are 6951-XX.



Subject to technical alterations.

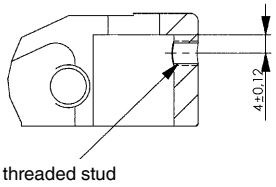
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Code of types:

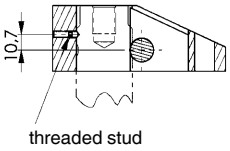
Type 21 = double acting, right swinging
Type 22 = double acting, left swinging

Positioning:

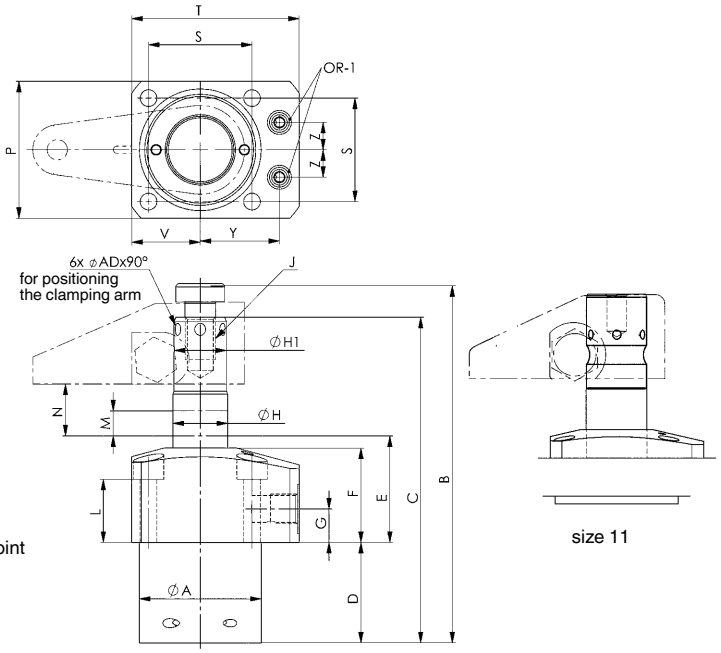
Positioning hole for clamp arm:



size 03 - 09

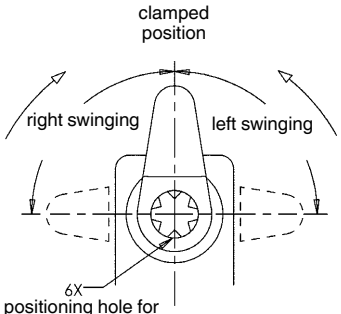


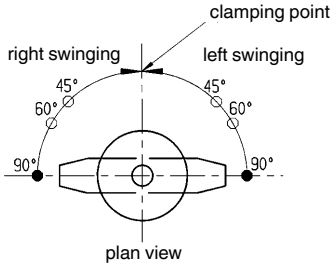
size 11



size 11

Swing directions:





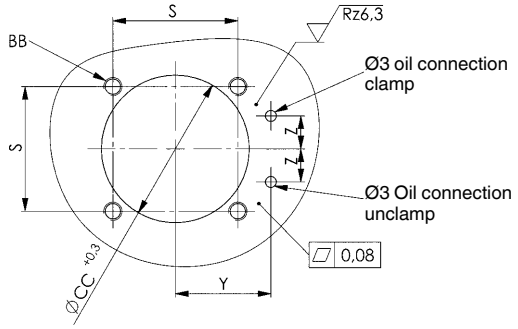
● = Standard type
⊙ = Special type

A = clamp
B = unclamp

Dimensions:

Order no.	Article no.	dia. A	B	C	D	E	F	G	dia. H	dia. H1	J x depth	dia. K	L	M	N	P	S	T	V	Y	Z	AC	ØAD	OR-1 O-ring Order No.
556960	6941KP-03-21	36	104,5	95,2	28	38,5	29,5	11,5	16	15,88	M10 x 14	4,5	20,5	5,4	10,7	40	31,4	52,5	22,0	23,5	8,5	G1/8	4,8	457499
556961	6941KP-03-22	36	104,5	95,2	28	38,5	29,5	11,5	16	15,88	M10 x 14	4,5	20,5	5,4	10,7	40	31,4	52,5	22,0	23,5	8,5	G1/8	4,8	457499
556962	6941KP-04-21	40	117,5	107,0	33	39,0	31,0	11,0	18	-	M10 x 14	5,5	20,7	5,4	13,0	45	34,0	55,0	22,5	26,0	9,0	G1/8	4,8	457499
556963	6941KP-04-22	40	117,5	107,0	33	39,0	31,0	11,0	18	-	M10 x 14	5,5	20,7	5,4	13,0	45	34,0	55,0	22,5	26,0	9,0	G1/8	4,8	457499
556964	6941KP-05-21	48	130,0	117,0	33	45,0	36,5	13,0	24	22,23	M12 x 14	5,5	26,5	5,3	13,7	51	40,0	61,0	25,5	30,0	11,0	G1/8	4,8	457499
556965	6941KP-05-22	48	130,0	117,0	33	45,0	36,5	13,0	24	22,23	M12 x 14	5,5	26,5	5,3	13,7	51	40,0	61,0	25,5	30,0	11,0	G1/8	4,8	457499
556966	6941KP-09-21	55	149,4	134,4	39,5	49,0	36,0	12,0	25	-	M12 x 14	6,6	24,2	5,5	15,4	60	47,0	69,0	30,0	33,5	12,0	G1/8	4,8	457499
556967	6941KP-09-22	55	149,4	134,4	39,5	49,0	36,0	12,0	25	-	M12 x 14	6,6	24,2	5,5	15,4	60	47,0	69,0	30,0	33,5	12,0	G1/8	4,8	457499
556968	6941KP-11-21	65	155,0	155,0	44,5	49,3	39,0	13,0	32	31,79	M12 x 14	6,6	25,6	5,5	16,5	70	55,0	81,0	35,0	39,5	15,0	G1/4	4,8	493478
556969	6941KP-11-22	65	155,0	155,0	44,5	49,3	39,0	13,0	32	31,79	M12 x 14	6,6	25,6	5,5	16,5	70	55,0	81,0	35,0	39,5	15,0	G1/4	4,8	493478

Drilling template device:

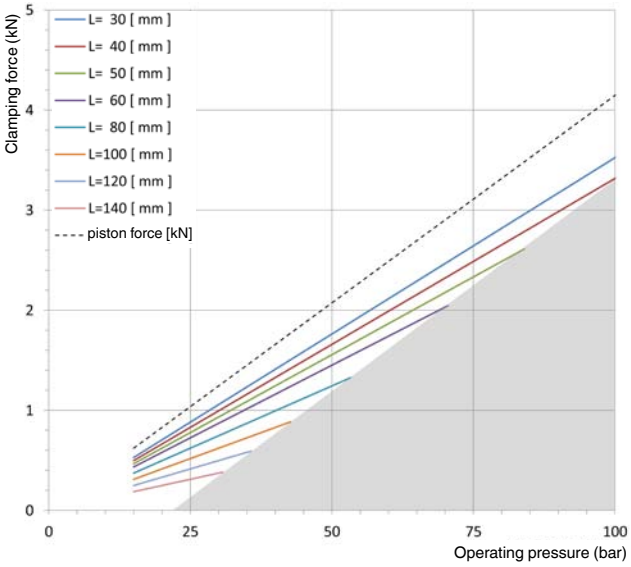


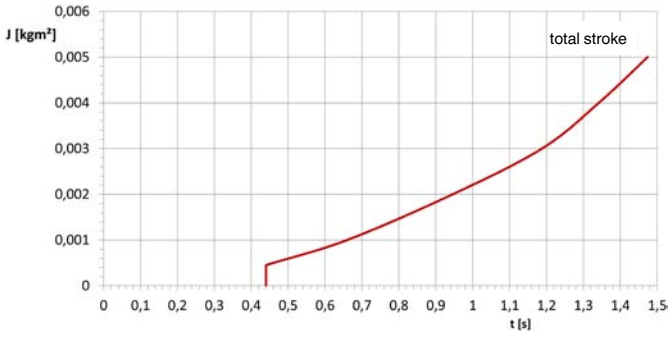
Order no.	Article no.	S	Z	BB	ØCC +0.3	Y
556960	6941KP-03-21	31,4	8,5	M4	36,5	23,5
556961	6941KP-03-22	31,4	8,5	M4	36,5	23,5
556962	6941KP-04-21	34,0	9,0	M5	40,5	26,0
556963	6941KP-04-22	34,0	9,0	M5	40,5	26,0
556964	6941KP-05-21	40,0	11,0	M5	48,5	30,0
556965	6941KP-05-22	40,0	11,0	M5	48,5	30,0
556966	6941KP-09-21	47,0	12,0	M6	55,5	33,5
556967	6941KP-09-22	47,0	12,0	M6	55,5	33,5
556968	6941KP-11-21	55,0	15,0	M6	65,5	39,5
556969	6941KP-11-22	55,0	15,0	M6	65,5	39,5

Subject to technical alterations.

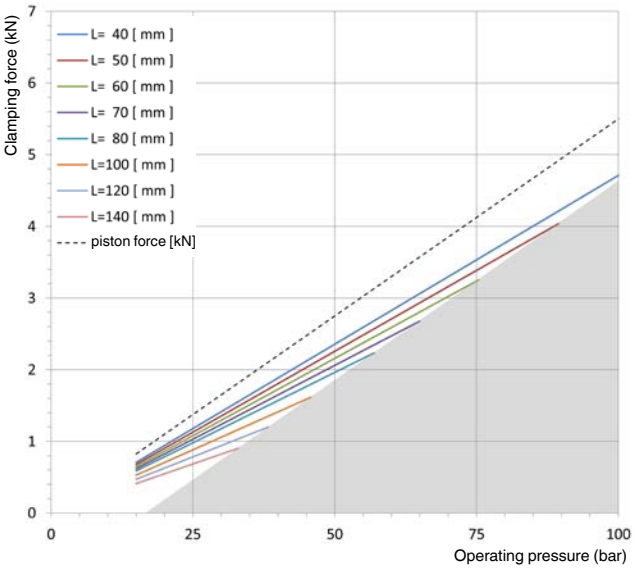
Diagrams:

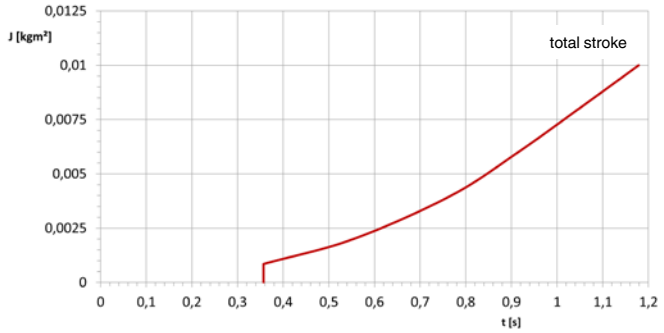
6941KP-03



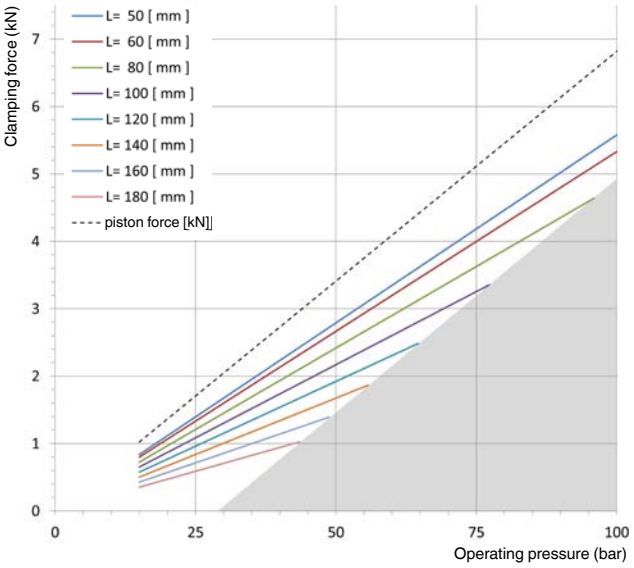


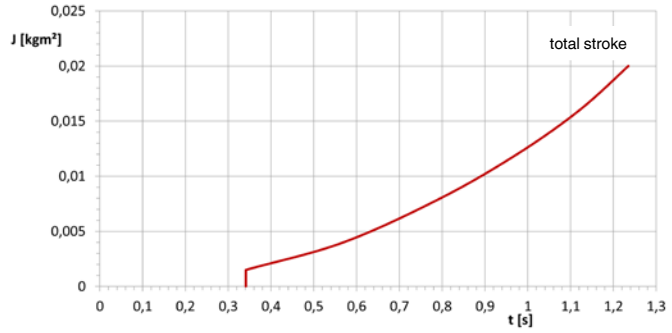
6941KP-04





6941KP-05

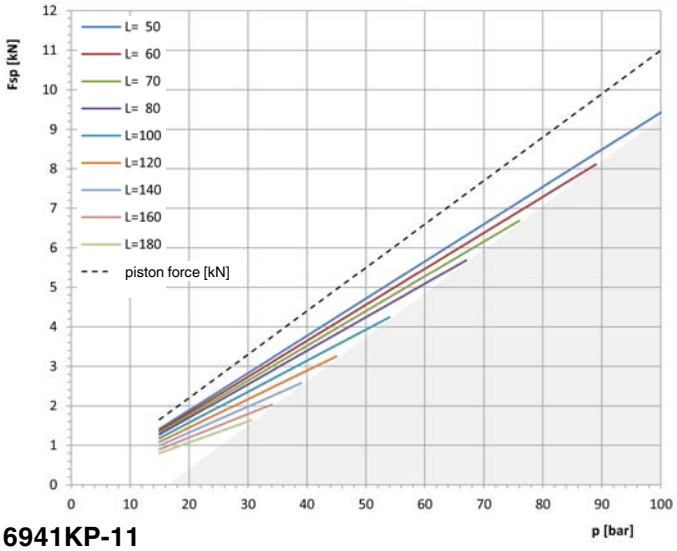


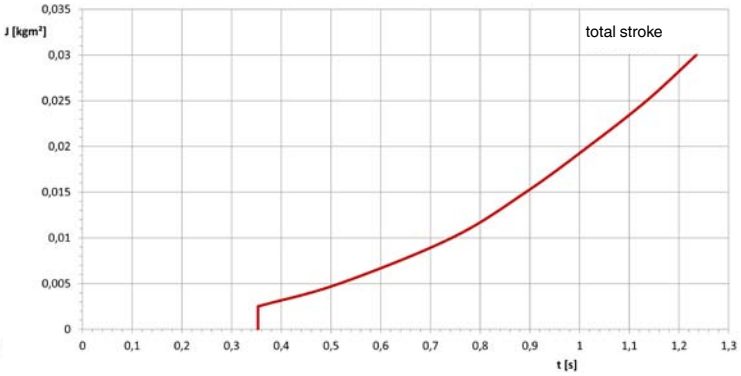


Subject to technical alterations.

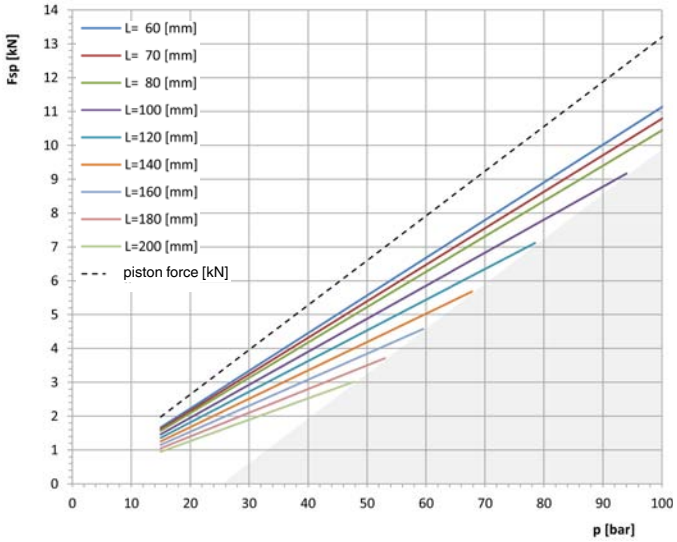
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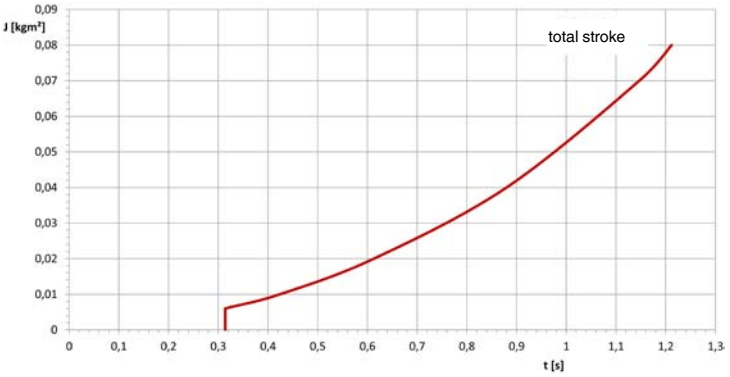
6941KP-09





6941KP-11





No. 6941

Dimensions for proprietary manufacturing of clamping arms

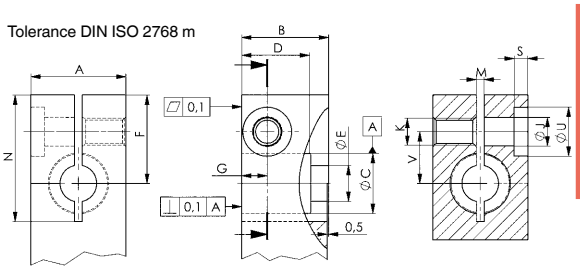
Important note:

Lever lengths and lever weights must be observed!

Dimensions table (proprietary manufacture):

for size	A	B	ØC	D	ØE	F	G	ØJ	K	M	N	S	ØU	V
6941KP-04	29,0	27,0	18,000 +0,02	22,00	11,0	31,5	8,0	8,5	M8	2,9	43,5	5	15	18,2
6941KP-03	25,5	22,0	15,913 +0,05	18,03	11,0	27,5	8,8	8,5	M8	2,9	38,5	5	15	17,0
6941KP-05	35,0	32,0	22,263 +0,05	25,40	13,5	32,5	12,0	10,5	M10	2,9	46,5	5	18	19,0
6941KP-09	35,0	38,5	25,000 +0,02	30,50	12,5	42,5	11,0	12,5	M12	2,9	52,5	4	18	23,2

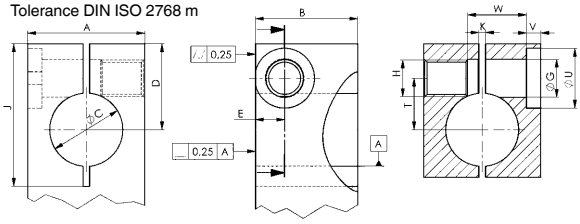
Tolerance DIN ISO 2768 m



Dimensions table (proprietary manufacture):

for size	A	B	ØC +0,0025	D	E	ØG	H	J	K	T	U	V	W
6941KP-11	51,0	44,5	31,775	37,4	12,5	16,5	M16 x 1,50-6H	59	2,93	22,4	26	6,2	25,7

Tolerance DIN ISO 2768 m

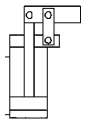


Subject to technical alterations.

No. 6942KK

Link clamp

double acting,
max. operating pressure 100 bar,
min. operating pressure 15 bar.



CAD



Order no.	Article no.	Clamping force at 100 bar [kN]	Piston force at 100 bar [kN]	Clamping stroke [mm]	Total stroke [mm]	Extra stroke [mm]	Vol. Sp [cm³]	Vol. Lo [cm³]	eff. piston area Sp [cm²]	eff. piston area Lo [cm²]	Md max. [Nm]	Weight [g]
327486	6942KK-25	3,2	4,9	17,5	19,0	1,5	8,6	6,6	4,9	3,8	6,0	752
328484	6942KK-32	5,3	8,0	22,5	24,0	1,5	16,5	13,3	8,0	6,5	7,6	1098
328492	6942KK-38	7,5	11,3	24,5	26,0	1,5	27,8	22,9	11,3	9,3	11,0	1549
328583	6942KK-45	10,5	15,9	28,0	29,5	1,5	44,5	35,8	15,9	12,8	13,0	2362
552012	6942KK-56	17,0	25,5	33,0	34,5	1,5	84,2	71,7	25,5	21,7	28,0	3565

Sp = clamp, Lo = unclamp

Design:

Cylinder housing made of steel. Piston and pivot bolts are made from tempered steel, hardened and nitrided. Metal wiper to protect the dirt wiper is integrated into the housing. Supply scope includes hinge pins, tension plates, fastening screws but not clamping levers. The threaded connections are suitable for restrictor check valves no. 6916-12-XX. **To achieve a controlled clamping sequence, there is the option of screwing the sequence valve 6918-XX-XXX directly into the threaded connection.** Oil supply via threaded connection or oil channel in the fixture body.

Application:

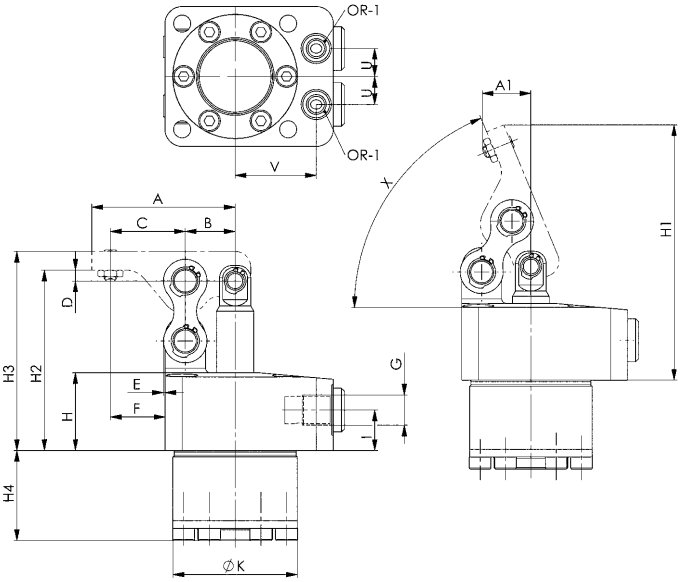
Link clamps are used in clamping fixtures in which workpieces must be freely accessible and loaded from above. Particularly suitable for clamping in clamping pockets.

Features:

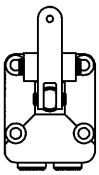
Top flange version, the horizontal centre axis at the standard lever and the pressure point on the workpiece lie in one plane. This prevents relative movement on the workpiece.

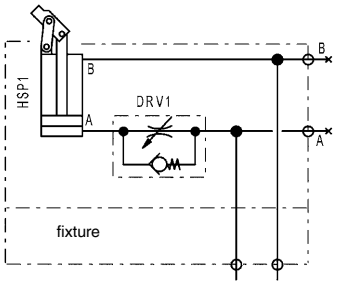
Note:

Maximum travel speed 0.5 m/s. The volumetric flow can be regulated via a restrictor check valve
The B to C leverage on the clamping levers is 1 to 1.5!
In the design of blank levers, deviations which lead to higher clamping forces are permitted only in exceptional cases. For sizes 32 and 45, screws with strength class 12.9 must be used.



Installation direction of the clamping arm:





Dimensions:

Order no.	Article no.	A	A1	B	C	D	E	F	G	H	H1	H2	H3	H4	I	dia. K	L	M	N	P	O	R	S	U	V	X	ØG2	OR-1 O-ring Order No.
327486	6942KK-25	46,00	15,8	16,0	24,0	3,5	0,5	17,5	G1/8	25	83	58,0	64,0	29,0	13	39,9	54	17,0	5,5	12,0	18	34	45	9	26,0	67,5	5,5	161810
328484	6942KK-32	53,25	13,7	18,5	28,0	3,5	2,0	21,0	G1/8	28	95	66,5	74,5	32,0	13	47,9	61	20,0	5,5	13,5	22	40	51	11	30,0	76,8	5,5	161810
328492	6942KK-38	60,50	16,0	21,0	31,5	3,0	1,5	22,5	G1/8	28	106	72,0	81,0	37,0	13	54,9	69	23,5	6,5	16,0	24	47	60	12	33,5	72,9	6,8	161810
328583	6942KK-45	71,00	18,7	24,5	37,0	3,0	2,5	26,5	G1/4	30	124	82,0	96,0	43,5	14	64,9	81	27,5	7,5	19,0	30	55	70	15	39,5	72,9	6,8	161810
552012	6942KK-56	86,00	30,2	30,0	45,0	3,0	2,5	32,5	G1/4	35	140	89,0	105,0	47,0	14	74,9	94,5	31,5	11,0	22,0	32	63	85	16	45,0	67,5	8,7	161810

Subject to technical alterations.

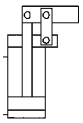
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No. 6942KK-**L

CAD

Link clamp

double acting, clamp arm left,
max. operating pressure 100 bar,
min. operating pressure 15 bar.





Order no.	Article no.	Clamping force at 100 bar [kN]	Piston force at 100 bar [kN]	Clamping stroke [mm]	Total stroke [mm]	Extra stroke [mm]	Vol. Sp [cm³]	Vol. Lo [cm³]	eff. piston area Sp [cm²]	eff. piston area Lo [cm²]	Md max. [Nm]	Weight [g]
327569	6942KK-25L	3,2	4,9	17,5	19,0	1,5	8,6	6,6	4,9	3,8	6,0	752
328500	6942KK-32L	5,3	8,0	22,5	24,0	1,5	16,5	13,3	8,0	6,5	7,6	1098
328518	6942KK-38L	7,5	11,3	24,5	26,0	1,5	27,8	22,9	11,3	9,3	11,0	1549
328609	6942KK-45L	10,5	15,9	28,0	29,5	1,5	44,5	35,8	15,9	12,8	13,0	2362
552014	6942KK-56L	17,0	25,5	33,0	34,5	1,5	84,2	71,7	25,5	21,7	28,0	3565

Sp = clamp, Lo = unclamp

Design:

Cylinder housing made of steel. Piston and pivot bolts are made from tempered steel, hardened and nitrided. Metal wiper to protect the dirt wiper is integrated into the housing. Supply scope includes hinge pins, tension plates, fastening screws but not clamping levers. The threaded connections are suitable for restrictor check valves no. 6916-12-XX. **To achieve a controlled clamping sequence, there is the option of screwing the sequence valve 6918-XX-XXX directly into the threaded connection.** Oil supply via threaded connection or oil channel in the fixture body.

Application:

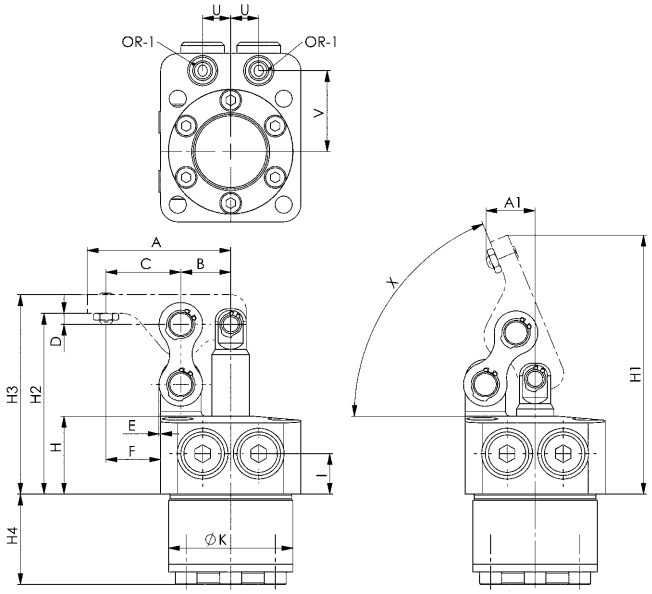
Link clamps are used in clamping fixtures in which workpieces must be freely accessible and loaded from above. Particularly suitable for clamping in clamping pockets.

Features:

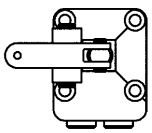
Top flange version, the horizontal centre axis at the standard lever and the pressure point on the workpiece lie in one plane. This prevents relative movement on the workpiece.

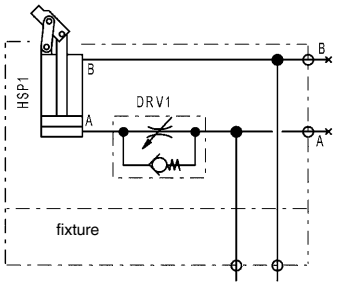
Note:

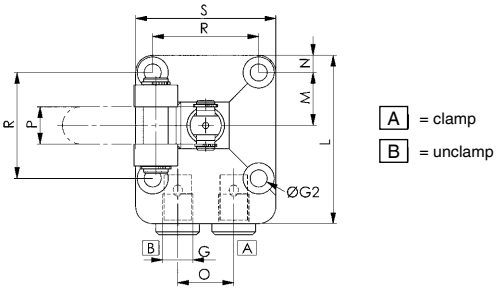
Maximum travel speed 0.5 m/s. The volumetric flow can be regulated via the restrictor check valve
The B to C leverage on the clamping levers is 1 to 1.5!
In the design of blank levers, deviations which lead to higher clamping forces are permitted only in exceptional cases. For sizes 32 and 45, screws with strength class 12.9 must be used.



Installation direction of the clamping arm:







Dimensions:

Order no.	Article no.	A	A1	B	C	D	E	F	G	H	H1	H2	H3	H4	I	dia. K	L	M	N	P	O	R	S	U	V	X	ØG2	OR-1 O-ring Order No.
327569	6942KK-25L	46,00	15,8	16,0	24,0	3,5	0,5	17,5	G1/8	25	83	58,0	64,0	29,0	13	39,9	54	17,0	5,5	12,0	18	34	45	9	26,0	67,5	5,5	161810
328500	6942KK-32L	60,50	16,0	21,0	31,5	3,0	1,5	22,5	G1/8	28	95	66,5	74,5	32,0	13	47,9	61	20,0	5,5	13,5	22	40	51	11	30,0	76,8	5,5	161810
328518	6942KK-38L	60,50	16,0	21,0	31,5	3,0	1,5	22,5	G1/8	28	106	72,0	81,0	37,0	13	54,9	69	23,5	6,5	16,0	24	47	60	12	33,5	72,9	6,8	161810
328609	6942KK-45L	71,00	18,7	24,5	37,0	3,0	2,5	26,5	G1/4	30	124	82,0	96,0	43,5	14	64,9	81	27,5	7,5	19,0	30	55	70	15	39,5	72,9	6,8	161810
552014	6942KK-56L	86,00	30,2	30,0	45,0	3,0	2,5	32,5	G1/4	35	140	89,0	105,0	47,0	14	74,9	94,5	31,5	11,0	22,0	32	63	85	16	45,0	67,5	8,7	161810

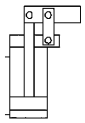
Subject to technical alterations.

No. 6942KK-**R

CAD

Link clamp

double acting, clamp arm right,
max. operating pressure 100 bar,
min. operating pressure 15 bar.





Order no.	Article no.	Clamping force at 100 bar [kN]	Piston force at 100 bar [kN]	Clamping stroke [mm]	Total stroke [mm]	Extra stroke [mm]	Vol. Sp [cm³]	Vol. Lo [cm³]	eff. piston area Sp [cm²]	eff. piston area Lo [cm²]	Md max. [Nm]	Weight [g]
327585	6942KK-25R	3,2	4,9	17,5	19,0	1,5	8,6	6,6	4,9	3,8	6,0	752
328526	6942KK-32R	5,3	8,0	22,5	24,0	1,5	16,5	13,3	8,0	6,5	7,6	1098
328534	6942KK-38R	7,5	11,3	24,5	26,0	1,5	27,8	22,9	11,3	9,3	11,0	1549
328625	6942KK-45R	10,5	15,9	28,0	29,5	1,5	44,5	35,8	15,9	12,8	13,0	2362
552013	6942KK-56R	17,0	25,5	33,0	34,5	1,5	84,2	71,7	25,5	21,7	28,0	3565

Sp = clamp, Lo = unclamp

Design:

Cylinder housing made of steel. Piston and pivot bolts are made from tempered steel, hardened and nitrided. Metal wiper to protect the dirt wiper is integrated into the housing. Supply scope includes hinge pins, tension plates, fastening screws but not clamping levers. The threaded connections are suitable for restrictor check valves no. 6916-12-XX. **To achieve a controlled clamping sequence, there is the option of screwing the sequence valve 6918-XX-XXX directly into the threaded connection.** Oil supply via threaded connection or oil channel in the fixture body.

Application:

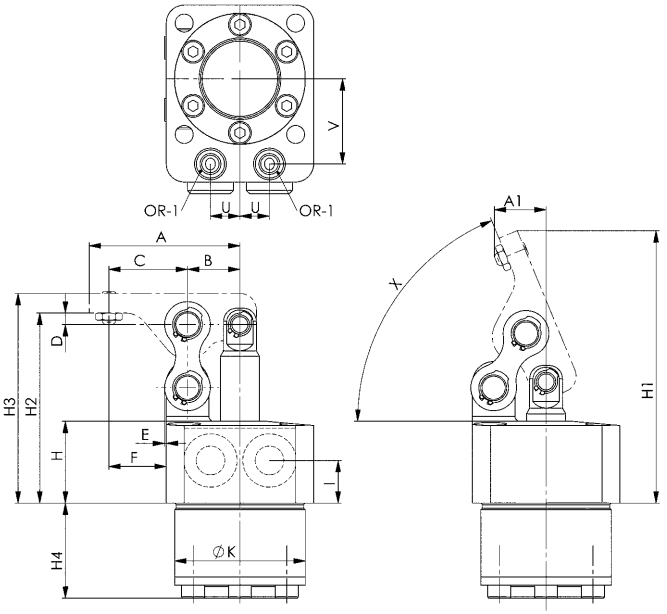
Link clamps are used in clamping fixtures in which workpieces must be freely accessible and loaded from above. Particularly suitable for clamping in clamping pockets.

Features:

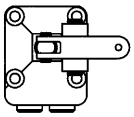
Top flange version, the horizontal centre axis at the standard lever and the pressure point on the workpiece lie in one plane. This prevents relative movement on the workpiece.

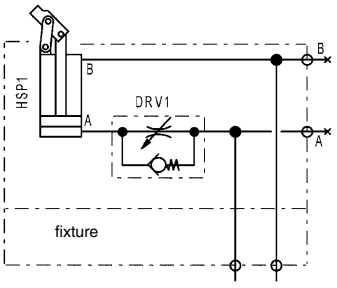
Note:

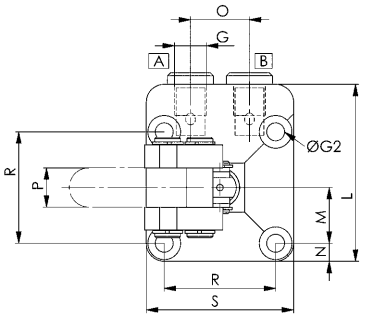
Maximum travel speed 0.5 m/s. The volumetric flow can be regulated via the restrictor check valve
The B to C leverage on the clamping levers is 1 to 1.5!
In the design of blank levers, deviations which lead to higher clamping forces are permitted only in exceptional cases. For sizes 32 and 45, screws with strength class 12.9 must be used.



Installation direction of the clamping arm:







A = clamp
B = unclamp

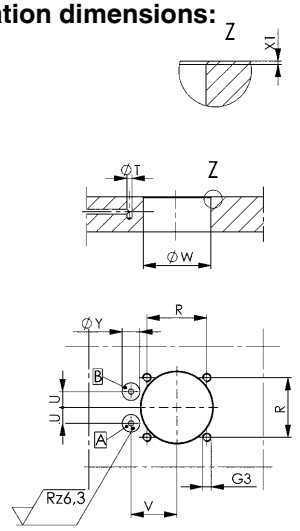
Dimensions:

Order no.	Article no.	A	A1	B	C	D	E	F	G	H	H1	H2	H3	H4	I	dia. K	L	M	N	P	O	R	S	U	V	X	ØG2	OR-1 O-ring Order No.
327585	6942KK-25R	46,00	15,8	16,0	24,0	3,5	0,5	17,5	G1/8	25	83	58,0	64,0	29,0	13	39,9	54	17,0	5,5	12,0	18	34	45	9	26,0	67,5	5,5	161810
328526	6942KK-32R	53,25	13,7	18,5	28,0	3,5	2,0	21,0	G1/8	28	95	66,5	74,5	32,0	13	47,9	61	20,0	5,5	13,5	22	40	51	11	30,0	76,8	5,5	161810
328534	6942KK-38R	60,50	16,0	21,0	31,5	3,0	1,5	22,5	G1/8	28	106	72,0	81,0	37,0	13	54,9	69	23,5	6,5	16,0	24	47	60	12	33,5	72,9	6,8	161810
328625	6942KK-45R	71,00	18,7	24,5	37,0	3,0	2,5	26,5	G1/4	30	124	82,0	96,0	43,5	14	64,9	81	27,5	7,5	19,0	30	55	70	15	39,5	72,9	6,8	161810
552013	6942KK-56R	86,00	30,2	30,0	45,0	3,0	2,5	32,5	G1/4	35	140	89,0	105,0	47,0	14	74,9	94,5	31,5	11,0	22,0	32	63	85	16	45,0	67,5	8,7	161810

Subject to technical alterations.

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Installation dimensions:



Order no.	Article no.	G3 x depth	R ±0,2	dia. T	U	V	dia. W	X1	dia. Y x max. depth
327486	6942KK-25	M5 x 13	34	3	9	26,0	40,5	0,5 x 45°	10 x 0,1
328484	6942KK-32	M5 x 13	40	3	11	30,0	48,5	0,5 x 45°	10 x 0,1
328492	6942KK-38	M6 x 14	47	3	12	33,5	55,5	0,5 x 45°	10 x 0,1
328583	6942KK-45	M6 x 13	55	3	15	39,5	65,5	0,5 x 45°	10 x 0,1
552012	6942KK-56	M8 x 17	63	3	16	45,0	75,5	0,5 x 45°	10 x 0,1
327569	6942KK-25L	M5 x 13	34	3	9	26,0	40,5	0,5 x 45°	10 x 0,1
328500	6942KK-32L	M5 x 13	40	3	11	30,0	48,5	0,5 x 45°	10 x 0,1
328518	6942KK-38L	M6 x 14	47	3	12	33,5	55,5	0,5 x 45°	10 x 0,1
328609	6942KK-45L	M6 x 13	55	3	15	39,5	65,5	0,5 x 45°	10 x 0,1
552014	6942KK-56L	M8 x 17	63	3	16	45,0	75,5	0,5 x 45°	10 x 0,1
327585	6942KK-25R	M5 x 13	34	3	9	26,0	40,5	0,5 x 45°	10 x 0,1
328526	6942KK-32R	M5 x 13	40	3	11	30,0	48,5	0,5 x 45°	10 x 0,1
328534	6942KK-38R	M6 x 13	55	3	12	33,5	55,5	0,5 x 45°	10 x 0,1
328625	6942KK-45R	M6 x 13	55	3	15	39,5	65,5	0,5 x 45°	10 x 0,1
552013	6942KK-56R	M8 x 17	63	3	16	45,0	75,5	0,5 x 45°	10 x 0,1

No. 6942KL-xx-04

Clamping arm



CAD

Order no.	Article no.	Piston force F5 at 100 bar [kN]	Clamping force F1 at 100 bar [kN]	B	C	dia. D	dia. E	G	H	H7	K	L	N	O	P	R	SW	SW1	Weight [g]
326850	6942KL-25-04	4,9	3,2	16,0	24,0	8	6	50,0	6	0,5	9,5	51,00	26,2	M4	12,0	6,00	2,0	7	46
328542	6942KL-32-04	8,0	5,3	18,5	28,0	10	8	50,0	8	0,5	11,5	59,25	30,2	M4	13,5	6,75	2,0	7	76
328559	6942KL-38-04	11,3	7,5	21,0	31,5	12	10	47,5	9	0,0	12,0	67,50	34,9	M5	16,0	8,00	2,5	8	99
328641	6942KL-45-04	15,9	10,5	24,5	37,0	16	12	52,5	14	1,0	17,0	80,00	39,6	M6	19,0	9,50	3,0	10	195
552015	6942KL-56-04	25,5	17,0	30,0	45,0	16	12	52,5	16	1,0	19,0	96,00	48,6	M8	22,0	9,50	4,0	13	311

Design:

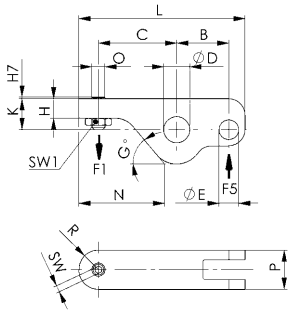
Hardened, tempered and burnished steel. Supplied with compression screw.

Application:

For link clamp 6942KK.

Note:

Clamping pressure, leverage, flow volume and clamp arm weight must always be observed.



No. 6942KR-xx-14

Clamping arm blank



CAD

Order no.	Article no.	B	C	dia. D	dia. E	G	K	L	N	P	Weight [g]
326975	6942KR-25-14	16,0	44	8	6	50,0	9,5	65,0	40,3	12,0	64
328567	6942KR-32-14	18,5	50	10	8	50,0	12,5	74,5	46,3	13,5	101
328575	6942KR-38-14	21,0	58	12	10	47,5	12,0	86,0	53,4	16,0	130
328666	6942KR-45-14	24,5	68	16	12	52,5	14,0	101,5	61,1	19,0	222
552016	6942KR-56-14	30,0	70	16	12	52,5	19,0	110,0	62,6	22,0	377

Design:

Hardened, tempered and burnished steel.

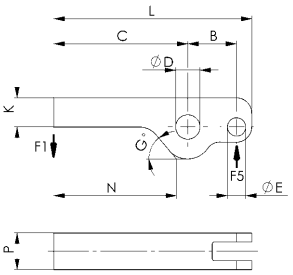
Application:

For link clamp 6942KK.

Note:

Clamping pressure, leverage, flow volume and clamp arm weight must always be observed.

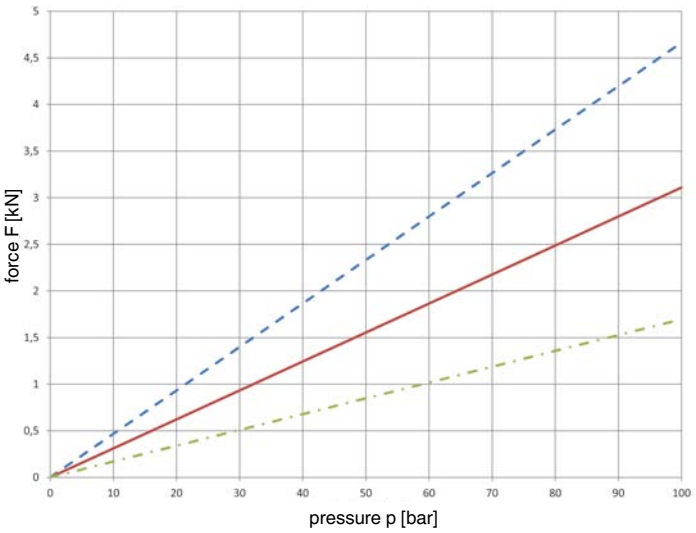
Formula to determine the clamping force F1:
Clamping force = F1 [kN], piston force = F5 [kN], operating lever = B [mm], load lever = C [mm]
F1 = F5 x B / C



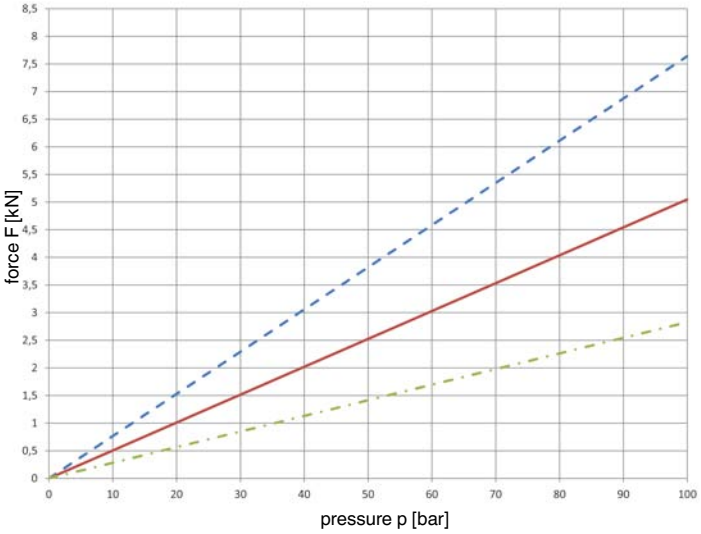
Subject to technical alterations.

Diagrams:

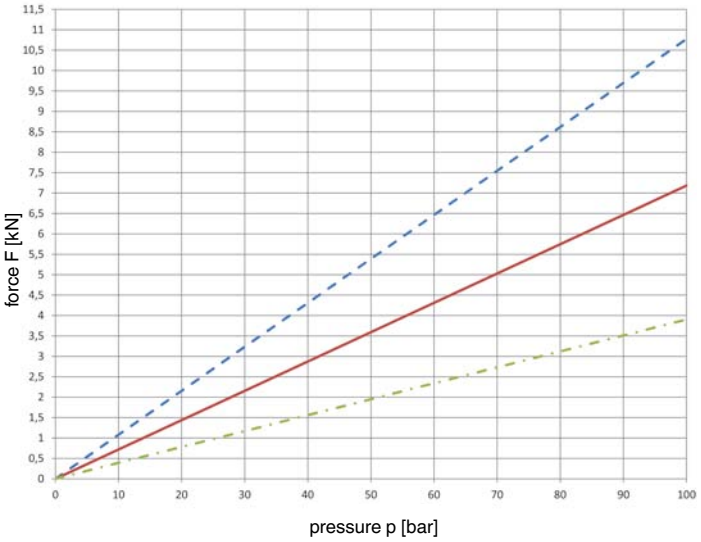
6942KK-25, -25R, -25L



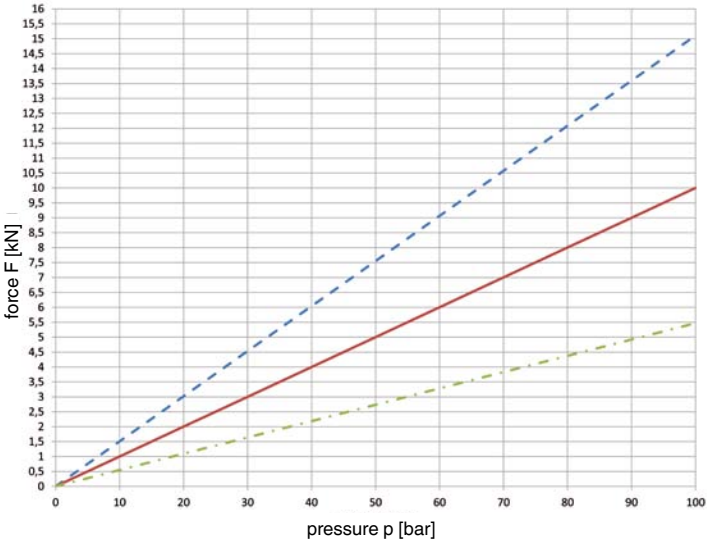
6942KK-32, -32R, -32L



6942KK-38, -38R, -38L

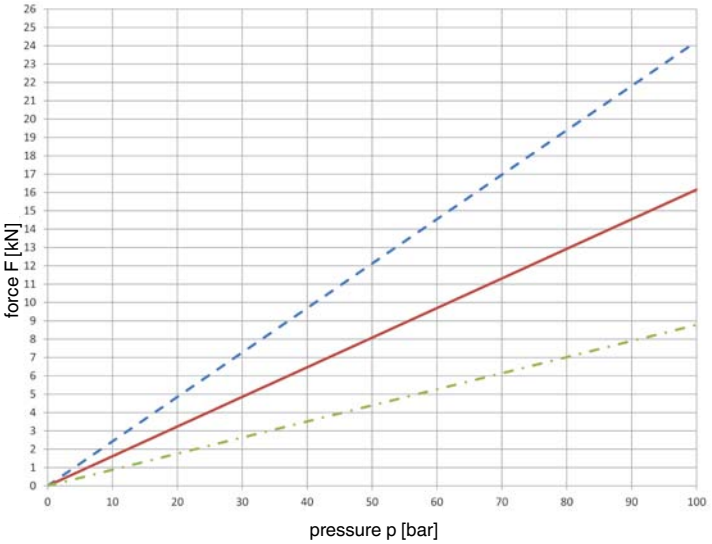


6942KK-45, -45R, -45L



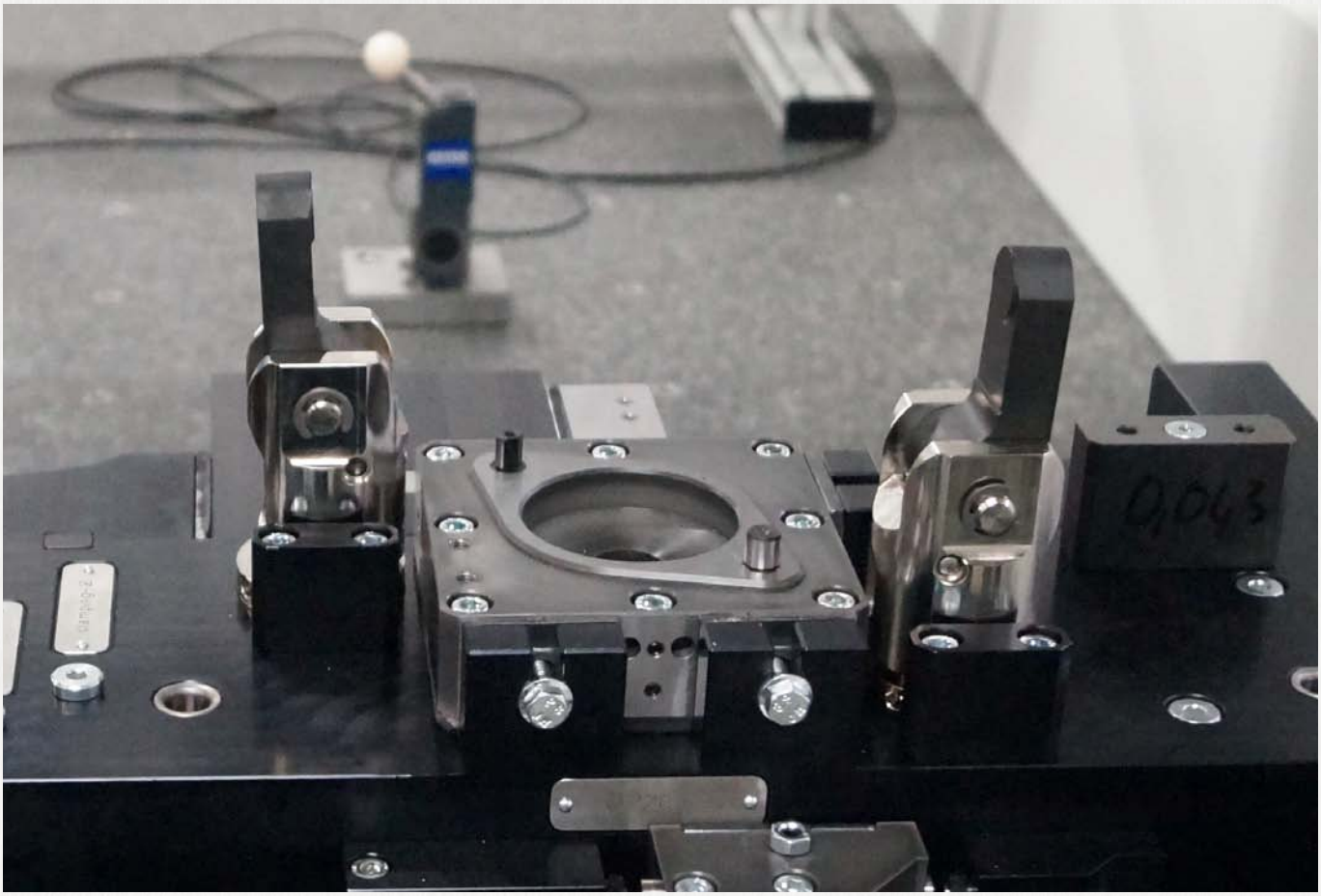
- hydraulic force
- clamping arm clamping force
- clamping arm blank clamping force

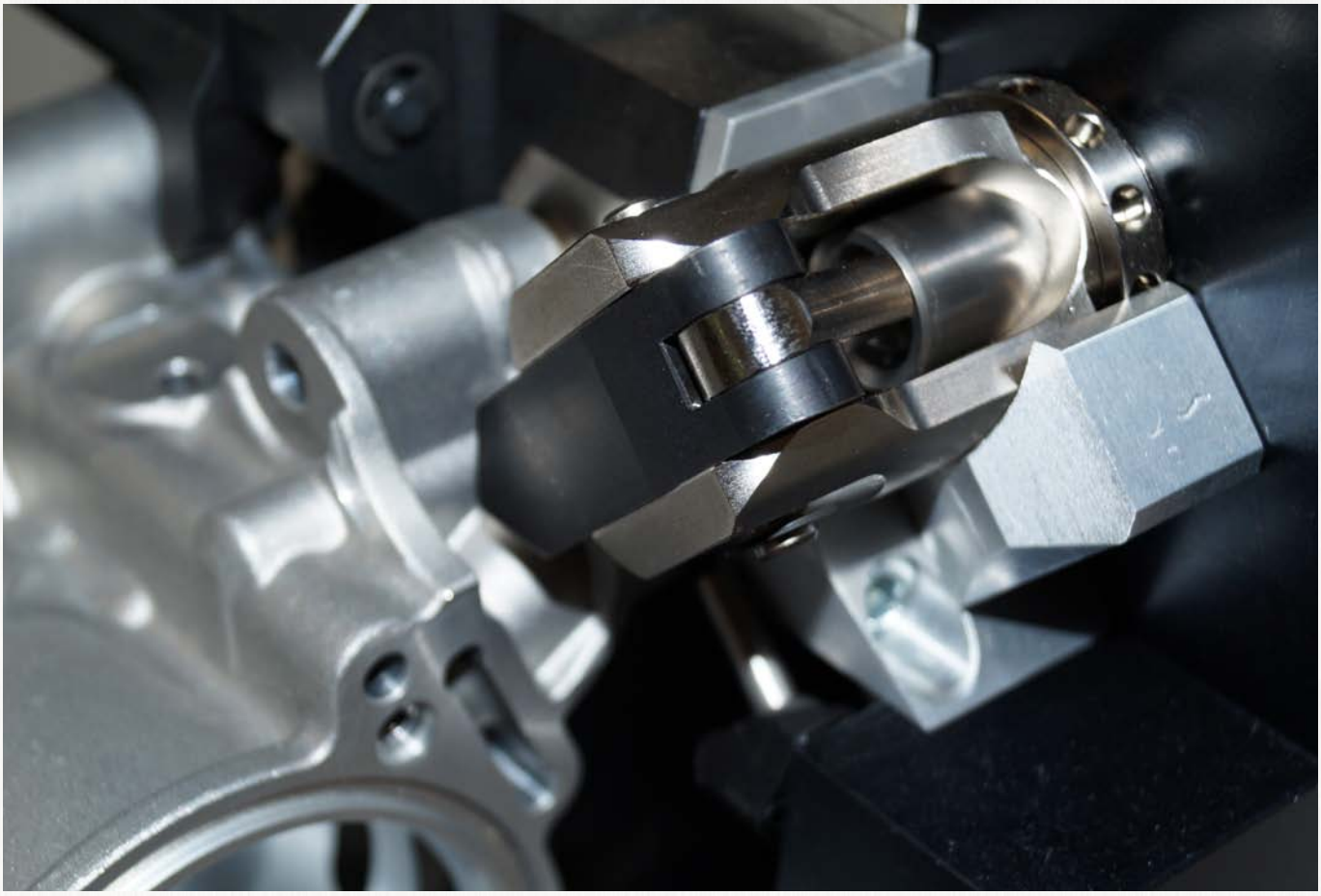
6942KK-56, -56R, -56L



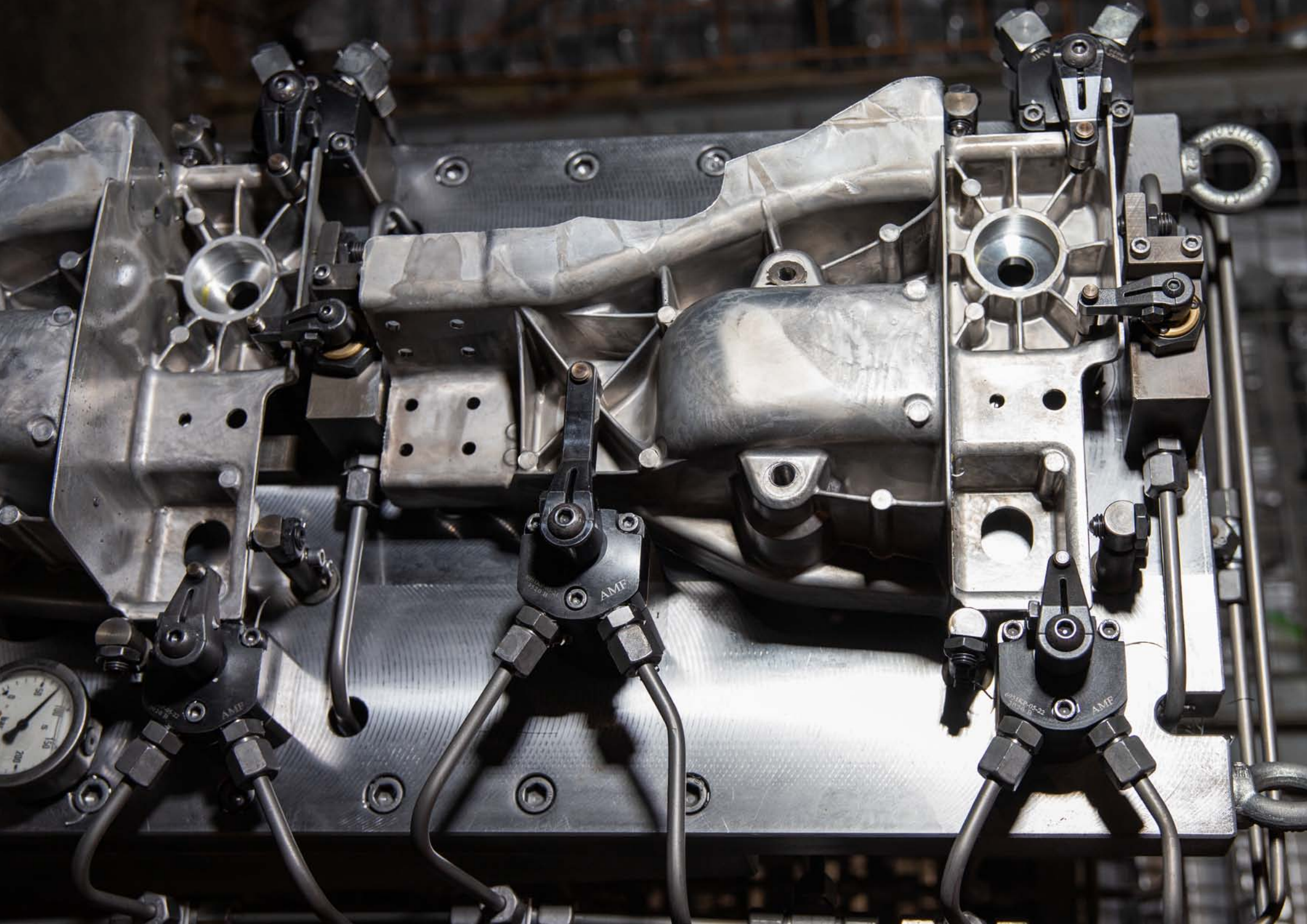
Subject to technical alterations.

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Subject to technical alterations.


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LOW PRESSURE SUPPORT ELEMENTS FOR STRESS-FREE CLAMPING AND LOW-VIBRATION MACHINING

- supporting force up to 10 kN
- observe safety factor for supporting force
- operating pressure up to 70 bar
- pistons with internal thread
- wipers to protect against contamination
- oil supply via threaded port or oil channel in the fixture body
- various design variants:
  screw-in version
  top flange version

PRODUCT OVERVIEW:

Type	Supporting force [kN]	Supporting stroke [mm]	Contact force spring	No. of models	Operating mode
6944KH	3,0 - 10,0	6,5 - 10,0	2,2 - 6,7 N	4	single acting
6944KH	3,0 - 10,0	6,5 - 10,0	3,7 - 13,6 N	4	single acting
6944EH	3,0 - 10,0	6,5 - 10,0	2,2 - 6,7 N	4	single acting
6944EH	3,0 - 10,0	6,5 - 10,0	3,7 - 13,6 N	4	single acting

PRODUCT EXAMPLES:

NO. 6944KH



> supporting force: 3 - 10 kN

NO. 6944EH



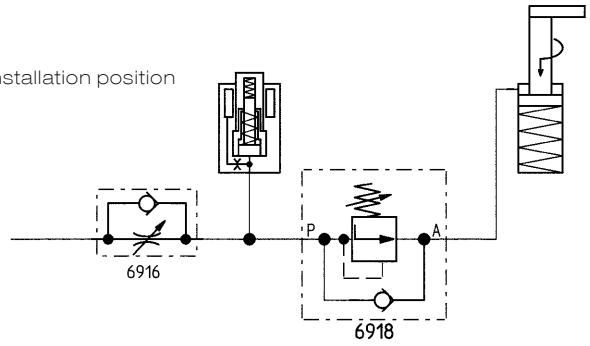
> supporting force: 3 - 10 kN

LOW PRESSURE SUPPORT ELEMENTS –
TECHNICAL INFORMATION

OPERATING PRESSURE:
To achieve a guaranteed clamping function, the min. operating pressure must not be fallen below.
The highest clamping force is achieved at max. operating pressure.

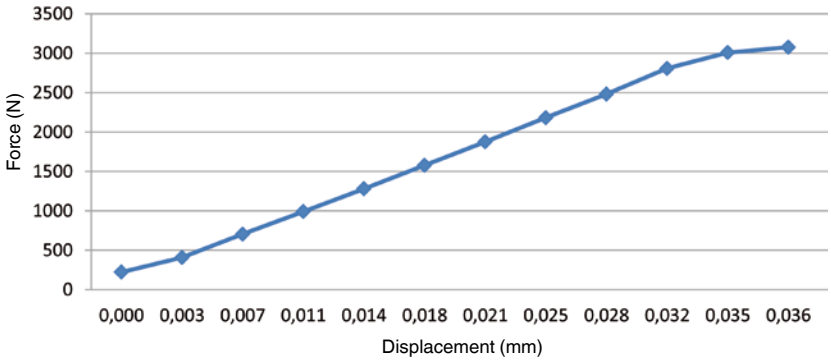
CONTACT FORCE:
The spring-loaded contact force is at its greatest at a min. distance between the installation position and workpiece.

SHEAR FORCES:
Support elements only absorb forces in axial direction of the piston.
If shear forces occur, the support element is damaged.
The function of the support element can no longer be guaranteed.



VOLUME FLOW:
The permissible volume flow must not be exceeded. The permitted volume flow can be controlled with a throttle/check valve. If the volume flow is too high, the oil pressure increases so quickly that the anchor is clamped before it is on the workpiece. If several support elements are used, the permissible volume flow is the total of the individually permissible volume flows.

ELASTIC CHANGE IN LENGTH:
Just like any steel component, the support elements also have an elastic behaviour.
During heavy loading, a setting behaviour occurs.



VENTING:
Support elements only need a very small oil volume. Since the hydraulic oil in the connection line hardly moves, careful venting is necessary. Air in the oil can prolong the clamping time considerably.
If venting is not carried out properly, a diesel effect may occur and destroy the support element. Always vent at low pressure.

DIESEL EFFECT:
If petroleum containing air bubbles is compressed very quickly, the bubbles will be heated so strongly that a self-ignition of the air/gas mixture could occur. As a result, a very high pressure and temperature increase occurs locally, which could also damage seals as well as cause accelerated ageing of the oil.

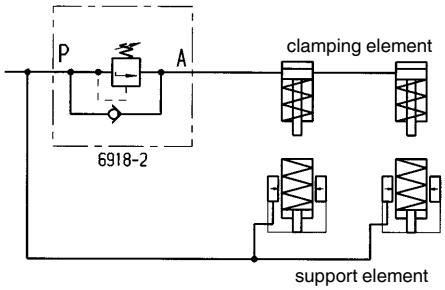
SPRING SPACE VENTILATION:
The free loading and venting of the spring spaces must be ensured.
The pressure connection must be protected or arrayed properly so no coolant is taken in.
Failure to observe this can lead to malfunctions.

COOLANT AND SHAVINGS:
Support elements should normally be protected against shavings and cooling water.



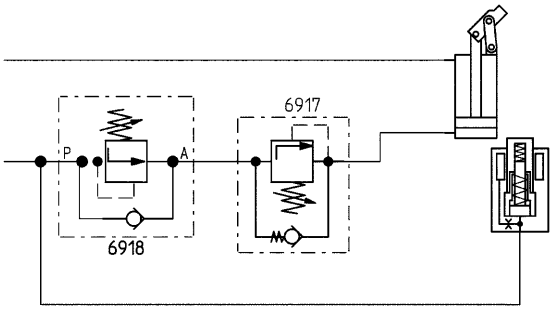
CONTROLLING THE CLAMPING SEQUENCE:

The sequence of supports and clamps must be controlled time-dependent or pressure-dependent. This can be done using a sequence valve 6918 or supply valve 6918-80-10.



PRESSURE REDUCTION OF THE CLAMPING ELEMENTS:

The pressure in the clamping circuit is reduced with a pressure control seat valve 6917.



SUPPORTING FORCE:

The permissible loading force of support elements must always be regulated so that the clamping force of the clamping elements used and the static and dynamic machining forces can be absorbed safely. Permissible loading force minus clamping force minus safety reserve results in the possible machining force.

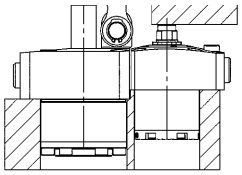
If the total number of occuring forces exceeds the permissible loading force, the anchor of the support element will be pressed backwards thereby damaging the support element.

The supporting force should always be at least twice as high as the clamping force.

COMBINATIONS OF SUPPORT ELEMENT WITH LINK CLAMP

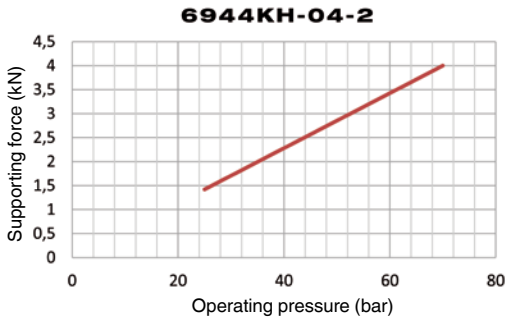
Example of support element 6944KH-04-2 and link clamp 6942KK-32 with standard clamping arm

	min. operating pressure [bar]	max. operating pressure [bar]	max. supporting force [kN]	Clamping force at 70 bar [kN]	Clamping force at 38 bar [kN]
support element	25	70	4,0	-	-
link clamp	15	100	-	3,71	2,0



POSSIBLE MACHINING FORCE AT 70 BAR:

perm. loading force	=	4,0 kN
minus clamping force	=	2,0 kN
arithmetic machining force	≤	2,0 kN
perm. machining force max.	≤	2,0 kN



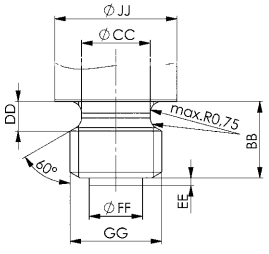
NOTE:

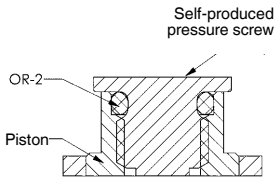
The clamping pressure for the link clamp 6942KK must be reduced to approx. 38 bar. The permissible supporting forces in the diagram are static. Vibrations occuring during the machining could be far higher. For these cases, a large reserve must be included.

SET SCREWS:

Support elements must never be operated without set screws, since penetrating dirt and cooling water impair the function. Most support elements are fitted with a set screw as standard.

When using special set screws, make sure that the set screws are tempered and designed slightly ball-shaped. Set screws with a tip or fluting should not be used. Special set screws can jeopardise the function of return stroke of the support pin and the spring-loaded system. During in-house production, please manufacture according to our specifications.

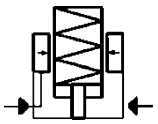




No. 6944KH

Support Element, top-flange-mounting

Normally retracted. Hydraulic advanced. Spring force for contact, max. operating pressure 70 bar, min. operating pressure 25 bar.





Order no.	Article no.	Contact force F1 [N]	Support force at 70 bar [kN]	Stroke H [mm]	Vol. [cm³]	Md 1 max. [Nm]	Q max. [l/min]	Weight [g]
552204	6944KH-03-2	2,8 - 3,8	3,0	6,5	0,8	5,4	2,5	430
559180	6944KH-03-5	3,7 - 5,5	3,0	6,5	0,8	5,4	2,5	430
552205	6944KH-04-2	3,6 - 5,6	4,0	8,0	1,4	10,0	2,5	545
559181	6944KH-04-5	4,7 - 7,8	4,0	8,0	1,4	10,0	2,5	545
552206	6944KH-05-2	4,7 - 7,8	5,5	8,0	1,5	16,5	2,5	708
559182	6944KH-05-5	6,2 - 11,0	5,5	8,0	1,5	16,5	2,5	708
552207	6944KH-10-2	5,8 - 9,7	10,0	10,0	1,8	30,0	2,5	1029
559183	6944KH-10-5	7,9 - 13,6	10,0	10,0	1,8	30,0	2,5	1029

Design:

Body made from steel, tempered and burnished. Support pin with internal thread case hardened and ground. Wiper to protect against dirt and cooling water. Oil supply via threaded connection or oil channel in the fixture body.

Application:

The support element is used as an extra support to prevent sagging and vibration of a workpiece.

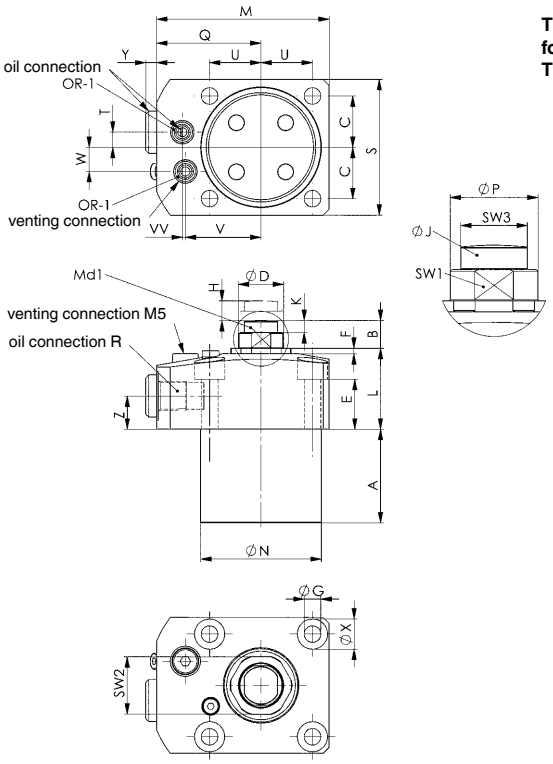
Features:

Element with high load capacity and low height. Oil pressure: The plunger is retracted in the normal position. When pressure is applied, the support pin advances with a weak spring-applied force against the inserted workpiece. The spring force varies with the pin stroke. As the hydraulic pressure rises, the support pin is hydraulically clamped. When the pressure is released, the support pin returns to the normal position. Very high support force ensures optimum manufacturing quality.

Note:

The support pin must be protected against the entry of dirt and splash water by a set screw. When putting into operation, make sure that the hydraulic system is vented perfectly. Failure to do so can cause destruction of the clamping element by the escaping diesel effect. The vent hole must be connected. No coolant must be sucked through this.

The supporting force should be matched to the clamping force in order to absorb machining forces.
The supporting force should always be at least twice as high as the clamping force.



Dimensions:

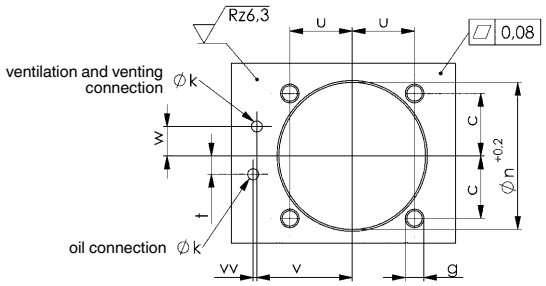
Order no.	Article no.	A	B	C	dia. D	E	F	dia. G	dia. J	K	L	M	dia. N	dia. P	Q	R	S	T	U	V	W	dia. X	Y	Z	SW1	SW2	SW3	VV	OR-1 O-ring Order No.
552204	6944KH-03-2	21,0	9,0	11,5	10	19,0	1,7	4,5	9,0	3,0	28	50,0	29,9	9,5	30,5	G1/8	34	3	15,0	20,5	7	8	3,6	11	8	13	8	-	161802
559180	6944KH-03-5	21,0	9,0	11,5	10	19,0	1,7	4,5	9,0	3,0	28	50,0	29,9	9,5	30,5	G1/8	34	3	15,0	20,5	7	8	3,6	11	8	13	8	-	161802
552205	6944KH-04-2	27,5	10,5	15,7	12	18,0	1,7	4,5	11,5	3,5	25	52,0	35,9	11,5	32,0	G1/8	40	5	15,7	23,5	8	8	3,6	11	10	15	10	-	161802
559181	6944KH-04-5	27,5	10,5	15,7	12	18,0	1,7	4,5	11,5	3,5	25	52,0	35,9	11,5	32,0	G1/8	40	5	15,7	23,5	8	8	3,6	11	10	15	10	-	161802
552206	6944KH-05-2	31,0	11,0	17,0	15	16,5	1,8	5,5	12,5	4,0	25	57,0	39,9	14,5	34,5	G1/8	45	5	17,0	26,0	8	10	3,6	11	13	19	11	1	161802
559182	6944KH-05-5	31,0	11,0	17,0	15	16,5	1,8	5,5	12,5	4,0	25	57,0	39,9	14,5	34,5	G1/8	45	5	17,0	26,0	8	10	3,6	11	13	19	11	1	161802
552207	6944KH-10-2	39,0	11,0	20,0	16	16,5	1,8	5,5	12,5	4,0	25	64,5	47,9	15,5	39,0	G1/8	51	-	20,0	30,0	11	10	3,6	11	13	21	11	2	161802
559183	6944KH-10-5	39,0	11,0	20,0	16	16,5	1,8	5,5	12,5	4,0	25	64,5	47,9	15,5	39,0	G1/8	51	-	20,0	30,0	11	10	3,6	11	13	21	11	2	161802

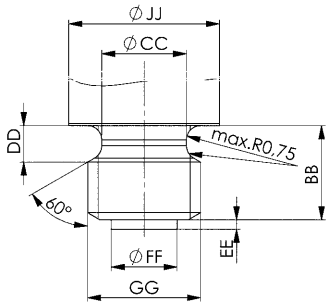
Subject to technical alterations.

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Installation dimensions:

Order no.	Article no.	c	g	dia. k	dia. n	t	u	v	w	vv
552204	6944KH-03-2	11,5	M4	3	30	3	15,0	20,5	7	-
559180	6944KH-03-5	11,5	M4	3	30	3	15,0	20,5	7	-
552205	6944KH-04-2	15,7	M4	3	36	5	15,7	23,5	8	-
559181	6944KH-04-5	15,7	M4	3	36	5	15,7	23,5	8	-
552206	6944KH-05-2	17,0	M5	3	40	5	17,0	26,0	8	1
559182	6944KH-05-5	17,0	M5	3	40	5	17,0	26,0	8	1
552207	6944KH-10-2	17,5	M5	3	48	-	20,0	30,0	11	2
559183	6944KH-10-5	17,5	M5	3	48	-	20,0	30,0	11	2





Production dimensions with self-production of the clamping screw:

Order no.	Article no.	BB	dia. CC	DD	EE	dia. FF	GG	dia. JJ	OR-2 O-ring Order No.	max. permitted weight of the set screw [g]
552204	6944KH-03-2	5,0	4,5	1,93	0,5	3,5	M6	9,0	552155	85
559180	6944KH-03-5	5,0	4,5	1,93	0,5	3,5	M6	9,0	552155	110
552205	6944KH-04-2	4,8	6,2	1,8	0,7	4,9	M8	11,5	552245	110
559181	6944KH-04-5	4,8	6,2	1,8	0,7	4,9	M8	11,5	552245	140
552206	6944KH-05-2	9,0	8,2	2,5	1,0	5,9	M10	12,5	552174	140
559182	6944KH-05-5	9,0	8,2	2,5	1,0	5,9	M10	12,5	552174	185
552207	6944KH-10-2	9,0	8,2	2,5	1,0	5,9	M10	12,5	552174	175
559183	6944KH-10-5	9,0	8,2	2,5	1,0	5,9	M10	12,5	552174	235

Always consider the permitted total weight of the set screw for in-house production.

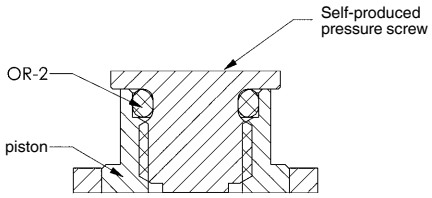
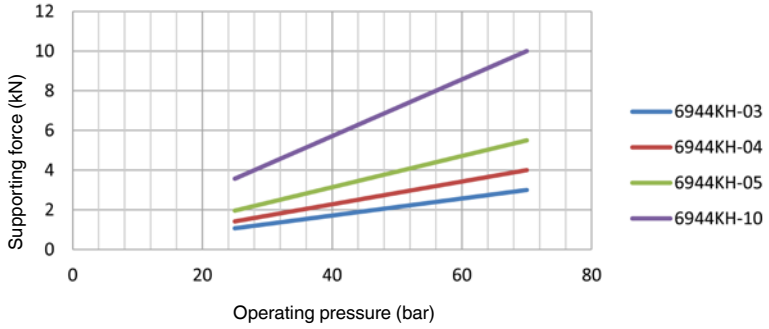


Diagram:



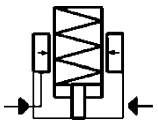
CAD

Subject to technical alterations.

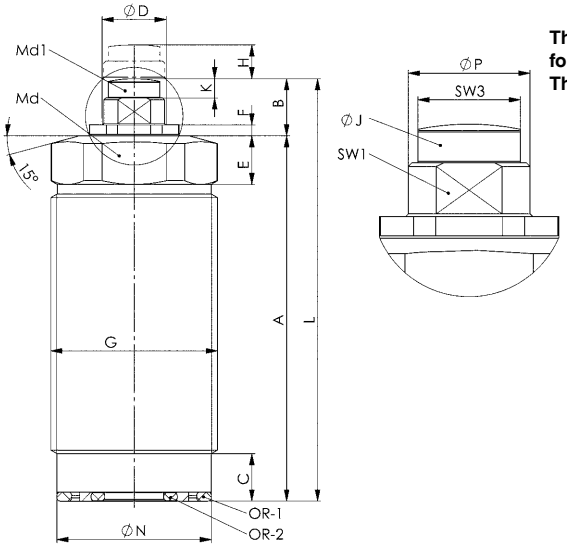
No. 6944EH

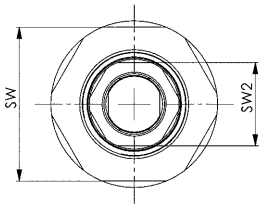
Support Element, cartridge flange

Normally retracted. Hydraulic advanced. Spring force for contact, max. operating pressure 70 bar, min. operating pressure 25 bar.









Order no.	Article no.	Contact force F1 [N]	Support force at 70 bar [kN]	Stroke H [mm]	Vol. [cm³]	Md max. [Nm]	Md 1 max. [Nm]	Q max. [l/min]	Weight [g]
552200	6944EH-03-2	2,8 - 3,8	3,0	6,5	0,8	32	5,4	2,5	198
559184	6944EH-03-5	3,7 - 5,5	3,0	6,5	0,8	32	5,4	2,5	198
552201	6944EH-04-2	3,6 - 5,6	4,0	8,0	1,4	50	10,0	2,5	280
559185	6944EH-04-5	4,7 - 7,8	4,0	8,0	1,4	50	10,0	2,5	280
552202	6944EH-05-2	4,7 - 7,8	5,5	8,0	1,5	63	16,5	2,5	378
559186	6944EH-05-5	6,2 - 11,0	5,5	8,0	1,5	63	16,5	2,5	378
552203	6944EH-10-2	5,8 - 9,7	10,0	10,0	1,8	80	30,0	2,5	719
559187	6944EH-10-5	7,9 - 13,6	10,0	10,0	1,8	80	30,0	2,5	719

Design:

Body made from steel, tempered and burnished. Support pin with internal thread case hardened and ground. Wiper to protect against dirt and cooling water. Oil supply via oil channel in fixture body.

Application:

The support element is used as an extra support to prevent sagging and vibration of a workpiece.

Features:

Element with high load capacity and low height. Oil pressure: The plunger is retracted in the normal position. When pressure is applied, the support pin advances with a weak spring-applied force against the inserted workpiece. The spring force varies with the pin stroke. As the hydraulic pressure rises, the support pin is hydraulically clamped. When the pressure is released, the support pin returns to the normal position. Very high support force ensures optimum manufacturing quality.

Note:

The support pin must be protected against the entry of dirt and splash water by a set screw. When putting into operation, make sure that the hydraulic system is vented perfectly. Failure to do so can cause destruction of the clamping element by the escaping diesel effect. The vent hole must be connected. No coolant must be sucked through this.

The supporting force should be matched to the clamping force in order to absorb machining forces.
The supporting force should always be at least twice as high as the clamping force.

Dimensions:

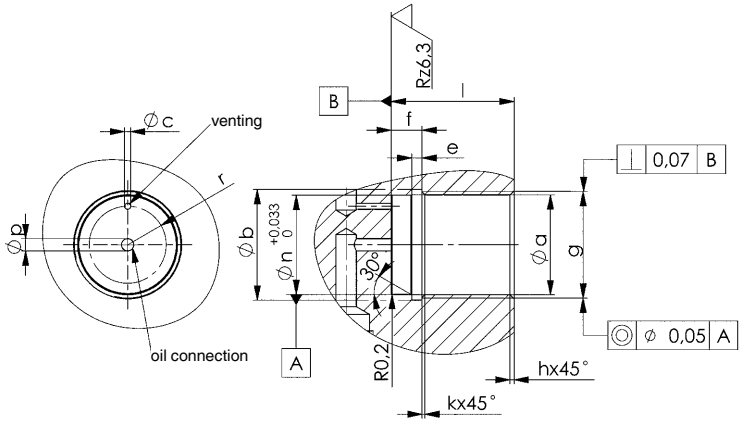
Order no.	Article no.	A	B	C	dia. D	E	F	G	dia. J	K	L	dia. N	dia. P	SW	SW1	SW2	SW3	OR-1 O-ring Order No.	OR-2 O-ring Order No.
552200	6944EH-03-2	57	9,0	7,4	10	7,6	1,7	M26 x 1,5	9,0	3,0	66,0	24,1	9,5	24	8	13	8	552156	552153
559184	6944EH-03-5	57	9,0	7,4	10	7,6	1,7	M26 x 1,5	9,0	3,0	66,0	24,1	9,5	24	8	13	8	552156	552153
552201	6944EH-04-2	62	10,5	9,4	12	10,3	1,7	M30 x 1,5	11,5	3,5	72,5	28,2	11,5	27	10	15	10	159400	128660
559185	6944EH-04-5	62	10,5	9,4	12	10,3	1,7	M30 x 1,5	11,5	3,5	72,5	28,2	11,5	27	10	15	10	159400	128660
552202	6944EH-05-2	58	11,0	8,4	15	8,3	1,8	M36 x 1,5	12,5	4,0	69,0	34,2	14,5	32	13	19	11	552469	175216
559186	6944EH-05-5	58	11,0	8,4	15	8,3	1,8	M36 x 1,5	12,5	4,0	69,0	34,2	14,5	32	13	19	11	552469	175216
552203	6944EH-10-2	71	11,0	9,0	16	11,0	1,8	M45 x 1,5	12,5	4,0	82,0	43,1	15,5	41	13	21	11	552612	240309
559187	6944EH-10-5	71	11,0	9,0	16	11,0	1,8	M45 x 1,5	12,5	4,0	82,0	43,1	15,5	41	13	21	11	552612	240309

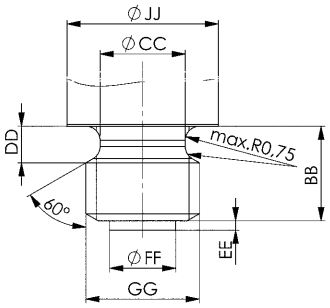
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Installation dimensions:

Order no.	Article no.	dia. a	dia. b	Øc max.	e	f	g	h	k	l	dia. n	Øp max.	r
552200	6944EH-03-2	24,5	27	2,5	3	8,5	M26 x 1,5	1	0,7	16-47	24,2	8	9,4
559184	6944EH-03-5	24,5	27	2,5	3	8,5	M26 x 1,5	1	0,7	16-47	24,2	8	9,4
552201	6944EH-04-2	28,5	31	2,5	3	11,0	M30 x 1,5	1	0,7	17-50	28,3	10	10,9
559185	6944EH-04-5	28,5	31	2,5	3	11,0	M30 x 1,5	1	0,7	17-50	28,3	10	10,9
552202	6944EH-05-2	34,5	37	4,5	3	10,5	M36 x 1,5	1	0,7	18-48	34,3	10	13,5
559186	6944EH-05-5	34,5	37	4,5	3	10,5	M36 x 1,5	1	0,7	18-48	34,3	10	13,5
552203	6944EH-10-2	43,5	46	5,0	3	10,5	M45 x 1,5	1	0,7	21-58	43,2	12	17,0
559187	6944EH-10-5	43,5	46	5,0	3	10,5	M45 x 1,5	1	0,7	21-58	43,2	12	17,0





Production dimensions with self-production of the clamping screw:

Order no.	Article no.	BB	dia. CC	DD	EE	dia. FF	GG	dia. JJ	OR-3 O-ring Order No.	max. permitted weight of the set screw [g]
552200	6944EH-03-2	5,0	4,5	1,93	0,5	3,5	M6	9,0	552155	85
559184	6944EH-03-5	5,0	4,5	1,93	0,5	3,5	M6	9,0	552155	110
552201	6944EH-04-2	4,8	6,2	1,8	0,7	4,9	M8	11,5	552245	110
559185	6944EH-04-5	4,8	6,2	1,8	0,7	4,9	M8	11,5	552245	140
552202	6944EH-05-2	9,0	8,2	2,5	1,0	5,9	M10	12,5	552174	140
559186	6944EH-05-5	9,0	8,2	2,5	1,0	5,9	M10	12,5	552174	185
552203	6944EH-10-2	9,0	8,2	2,5	1,0	5,9	M10	12,5	552174	175
559187	6944EH-10-5	9,0	8,2	2,5	1,0	5,9	M10	12,5	552174	235

Always consider the permitted total weight of the set screw for in-house production.

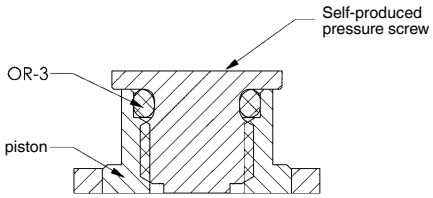
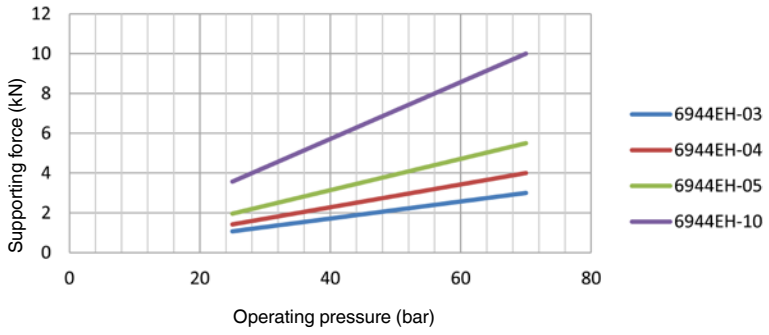
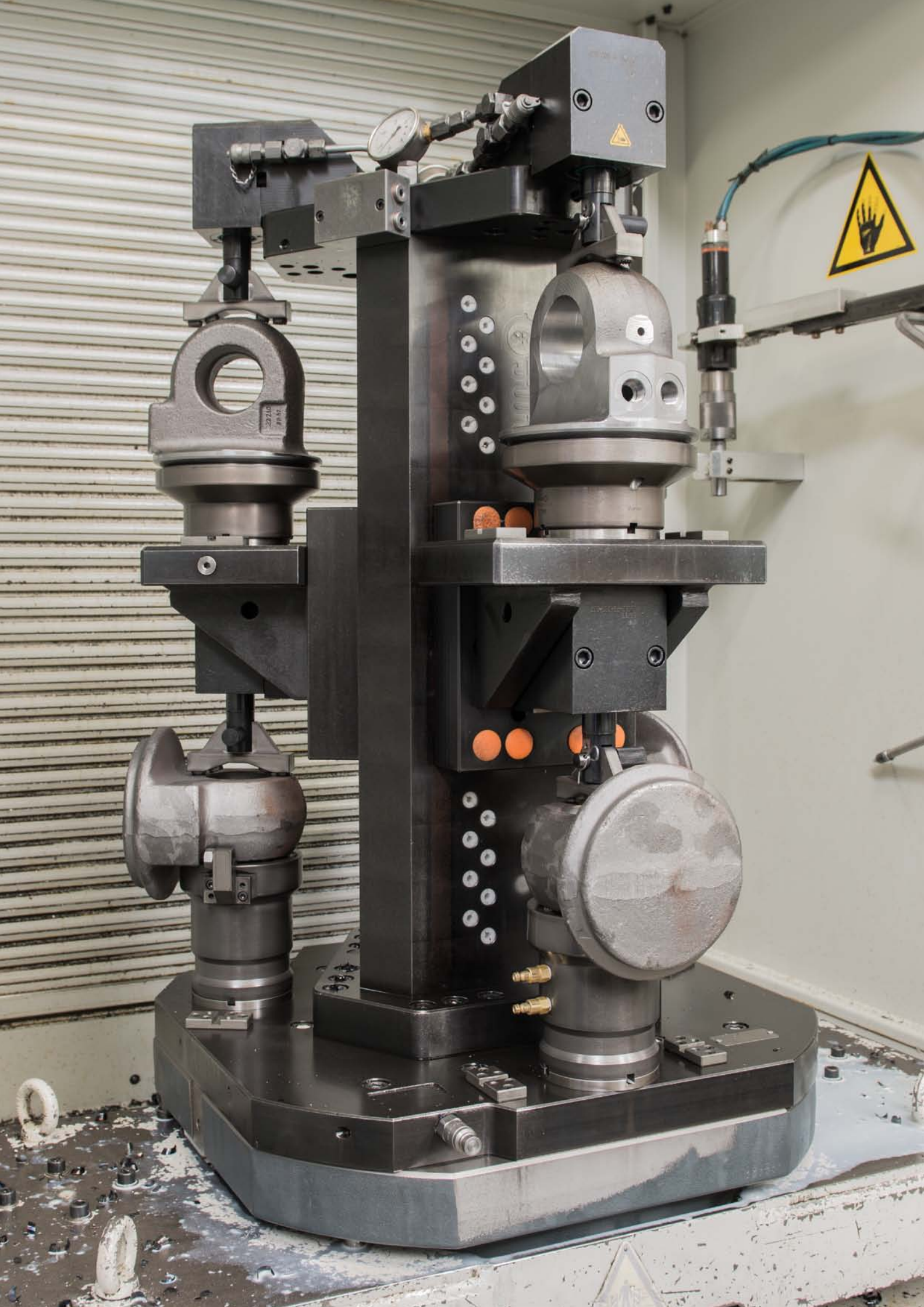


Diagram:



CAD

Subject to technical alterations.



ACCESSORIES –
VALVES FOR PRESSURE REGULATION AND SEQUENCE CONTROL

- **PRESSURE CONTROL SEAT VALVES**
- **SEQUENCE VALVES**
- **PRESSURE RELIEF VALVES**
- **SUPPLY VALVES**
- **DELAY VALVES**

PRODUCT OVERVIEW:

Type	Designation	Operating pressure min. - max. [bar]	Setting pressure min. - max. [bar]	Setting range [s]	No. of models	Oil connection
6917-1	Pressure reducing valve	40 - 400	20 - 370	-	1	o-ring
6917R/F	Pressure control seat valve	40 - 500	8 - 380	-	4	thread / o-ring
6917E	Pressure control seat valve	40 - 500	8 - 380	-	4	screw-in thread
6918	Sequence valve	500	8 - 500	-	10	thread / o-ring
6918-30/-40	Sequence valve	350	20 - 270	-	6	screw-in thread
6918-10	Pressure relief valve	30 - 500	30 - 500	-	2	thread
6918-80-10	Sequence valve	40 - 250	-	1-10	1	o-ring
6918-100/-110	Delay valve	35 - 350	-	3-7	2	o-ring / thread

PRODUCT EXAMPLES:

NO. 6917-1 AND 6917E



> holding force: 0,5 kN
> clamping stroke: 12,0 mm

NO. 6918 AND 6918-3



> holding force: 0,3 kN
> clamping stroke: 7,5 mm

NO. 6918-80-10 AND 6918-100

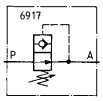


> holding force: 0,78 kN
> clamping range: 2 - 10 mm

No. 6917-1

Pressure Reducing Valve

for O-ring connection,
max. operating pressure 400 bar,
min. operating pressure 40 bar.





Order no.	Article no.	NG	Input pressure at P max. [bar]	Adjust. pressure at A min. [bar]	Adjust. pressure at A max. [bar]	Q [l/min]	OR-1 O-ring Order No.	Weight [g]
69179	6917-1	6	400	20	370	5	161810	1085

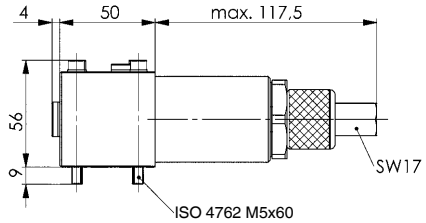
Design:

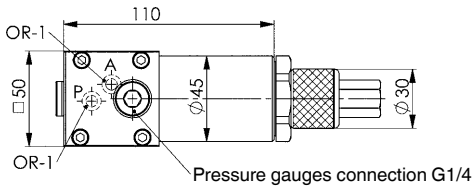
Cylinder body made of steel, phosphatized. Remaining parts made of tempering steel. Valve seat and piston are hardened and ground. This valve is leak free.

Application:

The stop valve shuts the flow from P to A when the pressure set A is reached. It opens when the pressure at A falls below the set value (e.g. through leakage).

1. Single-circuit system: The pressure reducing valve is used in a hydraulic circuit, where part of the cylinders are only to receive a reduced pressure (e.g. to prevent distortion of the workpieces or for positioning).
2. Dual-circuit system: If two working circuits are to be operated with different pressures from a single pump unit, the pressure of one circuit must be reduced by inserting a pressure reducing valve.





CAD

See hole pattern below!

No. 6917A-1

Connecting Plate

for pressure reducing valve.



Order no.	Article no.	L x W x H	Connection	Weight [g]
69211	6917A-1	50 x 50 x 25	G1/4	450

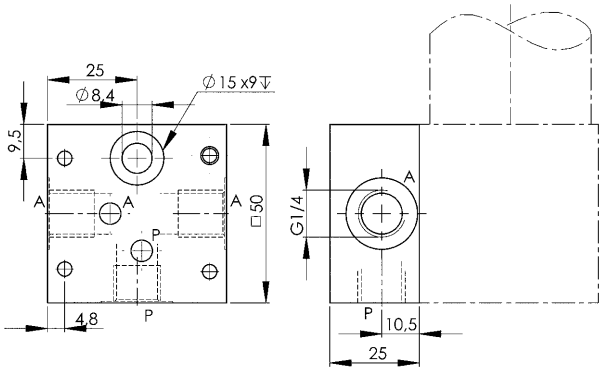
Design:

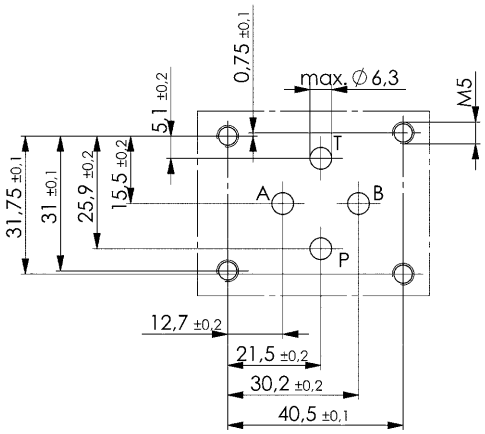
Tempering steel, phosphatized.

Application:

For pipe connection of pressure reducing valve No. 6917-1.

Hole pattern shape A nominal size 6 according to DIN 24340 T2:





CAD

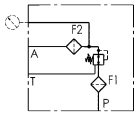
Subject to technical alterations.

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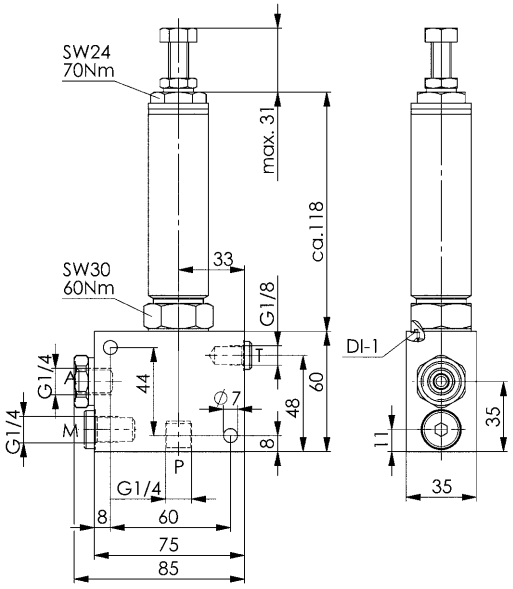
No. 6917R

Pressure control seat valve

for pipe fitting G1/4,
max. operating pressure 500 bar,
min. operating pressure 40 bar.







Order no.	Article no.	Input pressure at P max. [bar]	Adjust. pressure at A min.[bar]	Adjust. pressure at A max. [bar]	Q [l/min]	DI-1 Seal Order No.	Return line press. at T [bar]	Weight [g]
326405	6917R-5-130	500	8	130	5	407205	≤ 20	1860
326421	6917R-5-380	500	30	380	5	407205	≤ 20	1860

Design:

Leak-oil-free 3-way pressure regulating valve as piping valve in seat design, directly actuated.
With additional oversteer compensation (integrated pressure-limitation function).
The valve mainly consists of three parts:
the valve accommodating body with the P, T and A connections in G ¼, the clamp-in valve with inlet filtering and the additional filter element in the A-channel.
P is the inlet and A is the outlet of the valve. T is the tank connection and must be discharged to the tank separately or in a common line.

Application:

The pressure regulating valve is normally open.
With changing, higher input pressure, it maintains the output pressure largely constant. As soon as the set pressure is reached at the consumer, the valve closes and is leak-proof.
If the pressure between the valve output and the consumer rises above the set overload value, the excess pressure is reduced over the third connection (T-connection).

The valve can be used in front of a directional control valve in the P-channel or behind a directional control valve in the A and/or B-channel.

Features:

The controlled pressure and overload pressure are set simultaneously with an adjusting screw. The overload pressure is always about 10 bar above the regulation pressure.
Protection against outside force and puncturing of the valve.
The valve flow regulates P to A.
The inlet P and outlet A are each protected against coarse contamination by a filter element with the nominal filter mesh of 100 µm.
The pressure regulating function is avoided in the opposite direction (from A to P).
Pressure is adjusted with an adjusting screw.
To set and read the pressure, a pressure display device must be installed at the valve outlet.
The pressure setting can be sealed.

Note:

Observe mounting instructions.
Replacement part: filter insert, Order No. 326678

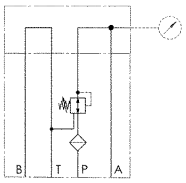
CAD

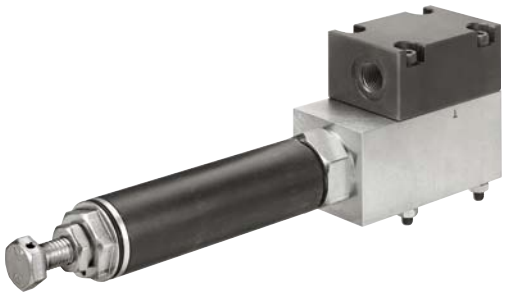
Subject to technical alterations.

No. 6917F

Pressure control seat valve

for O-ring connection,
max. operating pressure 500 bar,
min. operating pressure 40 bar.





Order no.	Article no.	NG	Input pressure at P max. [bar]	Adjust. pressure at A min. [bar]	Adjust. pressure at A max. [bar]	Q [l/min]	Return line press. at T [bar]	DI-1 Seal Order No.	OR-1 O-ring Order No.	Weight [g]
326504	6917F-3-130	6	500	8	130	6	≤ 20	407205	493478	2100
326785	6917F-3-380	6	500	30	380	12	≤ 20	407205	493478	2100

Design:

Leak-oil-free 3-way pressure regulating valve as flange valve in seat design, directly actuated.
With additional oversteer compensation (integrated pressure-limitation function).
The valve mainly consists of three parts:
the spacer plate with the standard hole pattern of NG 6, CETOP 3, the reversing plate and the clamp-in valve. The clamp-in valve is seated in the reversing plate in the P-channel. The oil flow is redirected from the valve inlet P1 to the valve outlet P2 in the reversing plate from P2 to A.
The channels P, T and A must always be present on the opposite flange surface.
The dimensions are recorded in the standards DIN 24340-Form A, CETOP R 35 H and ISO 4401.

Application:

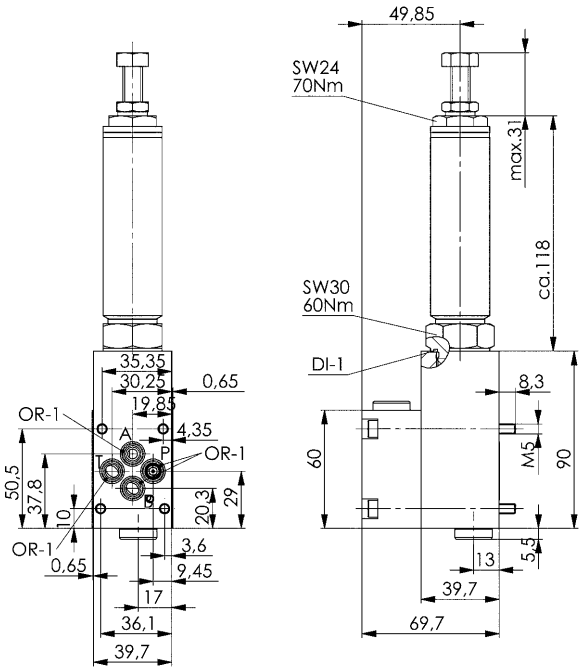
The pressure regulating valve is normally open.
With changing, higher input pressure, it maintains the output pressure largely constant. As soon as the set pressure is reached at the consumer, the valve closes and is sealed leak-proof.
If the pressure between the valve output and the consumer rises above the set overload value, the excess pressure is reduced over the third connection (T-connection).
The valve can be used in front of a directional control valve in the P-channel or behind a directional control valve in the A and/or B-channel.

Features:

The controlled pressure and overload pressure are set simultaneously with an adjusting screw. The overload pressure is always about 10 bar above the regulation pressure.
Protection against outside force and puncturing of the valve.
The valve flow regulates P1 to P2.
The inlet P1 is protected against coarse contamination by a filter element with the nominal filter mesh of 100 µm.
In the opposite direction (from P2 to P1), the valve can be flowed through freely.
To set and read the pressure, a pressure display device must be installed at the valve outlet.
Pressure is adjusted with an adjusting screw.
The pressure setting can be sealed.

Note:

Observe mounting instructions.



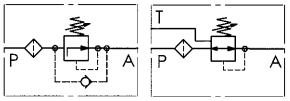
CAD

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No. 6917E

Pressure control seat valve

screw-in type,
max. operating pressure 500 bar,
min. operating pressure 40 bar.





Order no.	Article no.	Input pressure at P max. [bar]	Adjust. pressure at A min. bar]	Adjust. pressure at A max. [bar]	Q [l/min]	Return line press. at T [bar]	DI-1 Seal Order No.	Weight [g]
492330	6917E-2-130	500	8	130	6	-	407205	752
326462	6917E-3-130	500	8	130	6	≤ 20	407205	780
326686	6917E-2-380	500	30	380	12	-	407205	752
326488	6917E-3-380	500	30	380	12	≤ 20	407205	780

Design:

Leak-oil-free 2-way or 3-way pressure regulating valve as clamp-in valve in seat design, directly actuated. For the 3-way pressure regulating valve, with additional oversteer compensation (integrated pressure-limitation function).
Screw-in thread M24 x 1.5.

Application:

The pressure regulating valve is normally open. With changing, higher input pressure, it maintains the output pressure largely constant. As soon as the set pressure is reached at the consumer, the valve closes and is sealed leak-proof. If the pressure between the valve output and the consumer rises above the set overload value, the excess pressure is reduced over the third connection (T-connection). The valve can be used in front of a directional control valve in the P-channel or behind a directional control valve in the A and/or B-channel.The additional tank connection for the 3-way valve must always be planned.

Features:

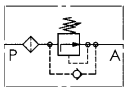
For the 3-way valve, the controlled pressure and overload pressure are set simultaneously with an adjusting screw. The overload pressure is always about 10 bar above the regulation pressure. Protection against outside force and puncturing of the valve.

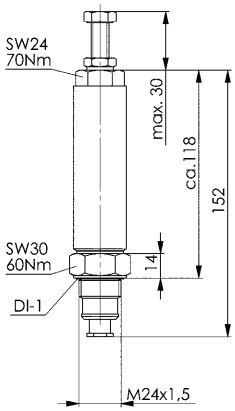
The valve flow regulates P to A. The inlet P is protected against coarse contamination by a filter element with the nominal filter mesh of 100 µm. In the opposite direction at the valve (from A to P), the valve can be flowed through freely. To set and read the pressure, a pressure display device must be installed at the valve outlet. Pressure is adjusted with an adjusting screw. The pressure setting can be sealed.

Note:

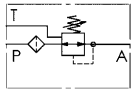
Observe mounting instructions.

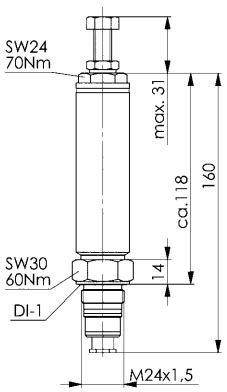
6917E-2



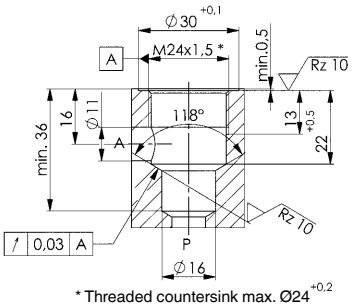


6917E-3

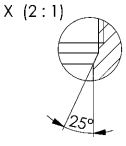


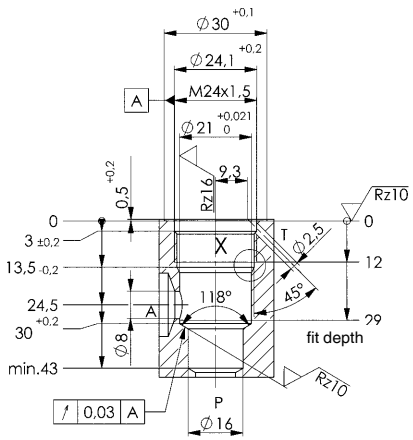


Installation dimensions:



* Threaded countersink max. Ø24 +0,2





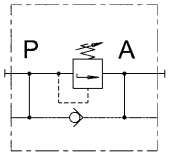
CAD

Subject to technical alterations.

No. 6918

Sequence Valve

6918-3 for O-ring connection,
6918-12 for O-ring connection,
6918-4 connection combination (pipeline),
6918-5 connection combination (pipeline).
Static overload capacity ~1.5xp max.





Order no.	Article no.	min. operating pressure [bar]	max. operating pressure [bar]	Q [l/min]	Direction of flow	Ambient temp. [°C]	Visco-sity [cSt]	OR-1 O-ring Order No.	Weight [g]
66100	6918-3	30	500	20	P-A	-40 - +80	10-500	173096	750
326983	6918-12	16	160	20	P-A	-40 - +80	10-500	173096	750
320135	6918-4	30	500	20	P-A	-40 - +80	10-500	173096	750
320143	6918-5	30	500	20	P-A	-40 - +80	10-500	173096	750

Design:

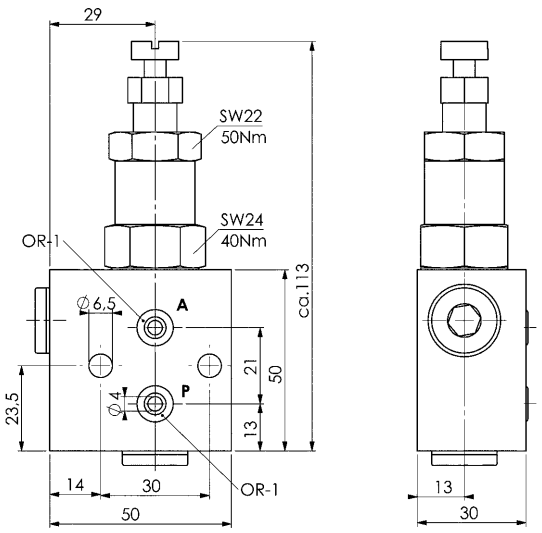
Steel body, nitrided. Sealing nut galvanized. All functional components hardened and ground. For sequence valve 6918-3 and 6918-12, the oil is supplied via conduits drilled in the clamping device. The following valves are required for combining several sequence valves:
6918-3 inlet valve
6918-4 series valve
6918-5 end-of-line valve
The oil is supplied via a threaded connection.

Application:

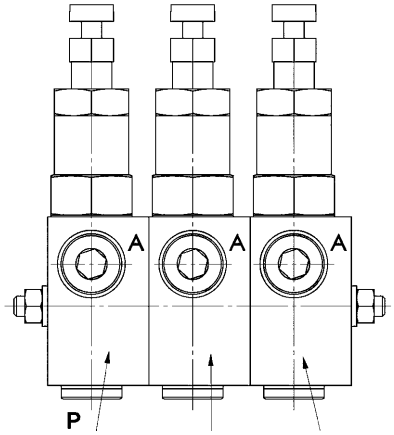
The pressure sequence valve is used in cases where another consumer is connected to the circuit after a set pressure has been reached. If several sequence valves are employed in the circuit, please note that the pressure in this circuit always adjusts to the last pressure stage.
For this type, the switching pressure remains largely constant, regardless of the outflow pressure on the outlet side (cylinder side).

Note:

During disassembly of the pressure control valve, first loosen SW 24 then SW 22. Installation is carried out in reverse order with the specified tightening torque. Increasing the preload of the compression spring by turning the slotted screw results in a greater pressure difference between P and A. The fastening bolts are not supplied as standard.



Application example:

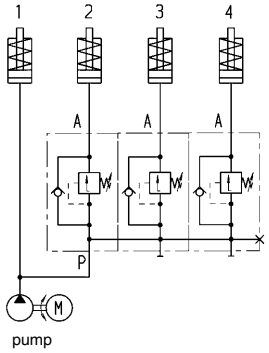


6918-3 / 66100 6918-4 / 320135 6918-5 / 320143

CAD

Hydraulic diagram:

Preferably perform sequential control in parallel.



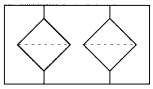
Subject to technical alterations.

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No. 6918F

Filter plate

CAD





Order no.	Article no.	max. pressure range [bar]	Filteration [µm]	OR-1 O-ring Order No.	Weight [g]
562093	6918F-100	400	100	466334	65

Design:

Filter plate and filter sleeve made of aluminium, surfaces black anodised. Filter plates made of metal mesh.

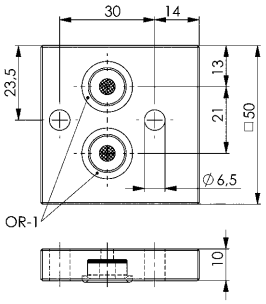
Application:

Used to protect the sequential valve 6918-3 and 6918-12 from contamination in clamping devices.

Note:

If a finer strainer is required, this can be easily replaced. The finer the filter selected, the greater the flow resistance.

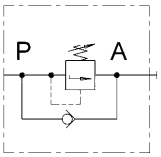
Replacement filter:
Filter, plug-in design 25 µm, order no. 562203
Filter, plug-in design 40 µm, order no. 562204
Filter, plug-in design 100 µm, order no. 562205



No. 6918

Sequence Valve

for pipeline connection.
Static overload capacity ~1.5xp max.





Order no.	Article no.	min. operating pressure [bar]	max. operating pressure [bar]	Q [l/min]	Direction of flow	Ambient temp. [°C]	Viscosity [cSt]	Weight [g]
325068	6918-6	8	80	20	P-A	-40 - +80	10-500	750
326306	6918-11	16	160	20	P-A	-40 - +80	10-500	750
60517	6918-2	30	500	20	P-A	-40 - +80	10-500	750

Design:

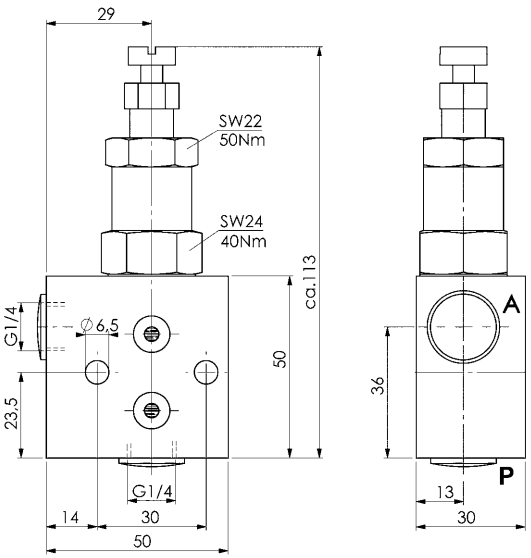
Steel body, nitrided. Sealing nut galvanized. All functional components hardened and ground. Oil supply via threaded port.

Application:

The pressure sequence valve is used in cases where another consumer is connected to the circuit after a set pressure has been reached. If several sequence valves are employed in the circuit, please note that the pressure in this circuit always adjusts to the last pressure stage.
For this type, the switching pressure remains largely constant, regardless of the outflow pressure on the outlet side (cylinder side).

Note:

For disassembly of the pressure valve please release first SW (AF) 24, then SW 22. For assembly please use reverse sequence and observe max. seating torque. The pressure difference between P and A depends on the preload of the adjustment spring.



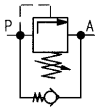
Subject to technical alterations.

No. 6918-XX-XXX

CAD

Sequence valve, threaded design

Max. operating pressure 350 bar.





Order no.	Article no.	Setting pressure set at factory [bar]	Setting range at A [bar]	L max.	B	C	dia. E	F	G	SW	SW1	SW2	Md max. [Nm]	Md 1 max. [Nm]	Q max. [l/min]	Weight [g]
562224	6918-30-50	50	20 - 60	28,0	15,16	20,3	17,5	5,6	G1/8	16	14	4	16	7	3,8	37
562225	6918-30-100	100	35 - 150	28,0	15,16	20,3	17,5	5,6	G1/8	16	14	4	16	7	3,8	37
562226	6918-30-200	200	125 - 275	31,7	15,16	24,0	17,5	5,6	G1/8	16	14	4	16	7	3,8	45
562227	6918-40-50	50	20 - 55	34,5	18,72	27,4	21,0	5,0	G1/4	19	17	4	27	7	3,8	68
562228	6918-40-100	100	35 - 150	34,5	18,72	27,4	21,0	5,0	G1/4	19	17	4	27	7	3,8	72
562229	6918-40-200	200	125 - 275	31,8	18,72	24,6	21,0	5,0	G1/4	19	17	4	27	7	3,8	72

Design:

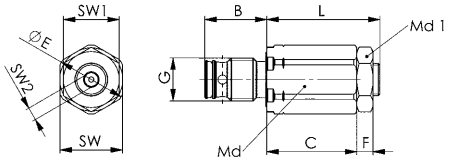
Housing from steel, hardened and burnished.

Application:

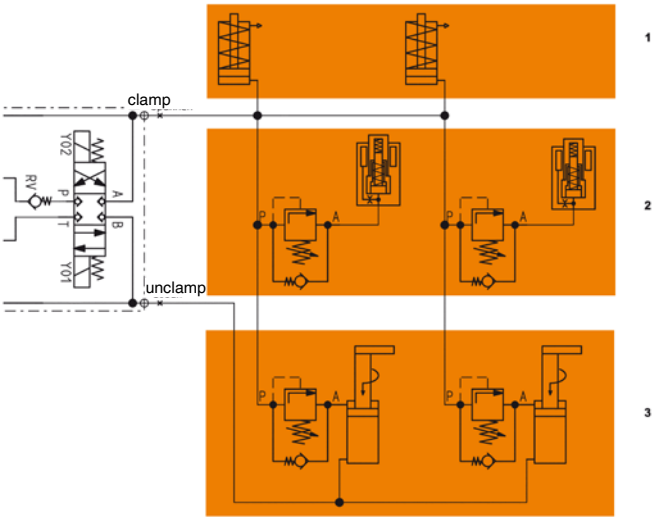
The sequence valve is used in cases where another consumer is connected to the circuit after a set pressure has been reached. The sequence valve ensures a controlled clamping sequence. Once a defined pressure is reached, another hydraulic circuit is opened.

Note:

The sequence valve can be screwed directly into the threaded connection for the swing clamp top flange and base flange types 6951KP, 6951FP, 6941KP and link clamp 6942KK, and with support elements for flange design 6964H and 6964HS. The oil must be supplied via the O-ring connection. The sequence valve can be screwed directly into fixtures as well.



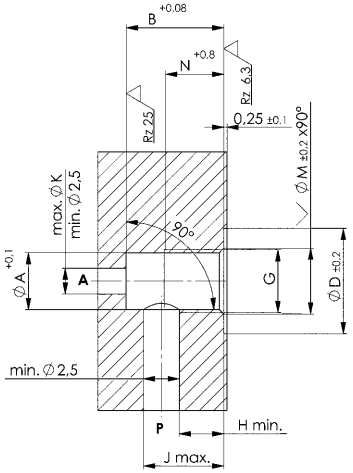
Hydraulic diagram:



Clamping sequence:
1. single-acting cylinder
2. support element
3. swing clamp

Installation dimensions:

Order no.	Article no.	dia. A	B +0.08	dia. D	G	H min.	J max.	K max.	dia. M	N
562224	6918-30-50	8,8	15,16	16,5	G1/8	6	12,83	7	9,9	8,5
562225	6918-30-100	8,8	15,16	16,5	G1/8	6	12,83	7	9,9	8,5
562226	6918-30-200	8,8	15,16	16,5	G1/8	6	12,83	7	9,9	8,5
562227	6918-40-50	11,9	18,72	21,5	G1/4	10	16,39	10	13,3	12,5
562228	6918-40-100	11,9	18,72	21,5	G1/4	10	16,39	10	13,3	12,5
562229	6918-40-200	11,9	18,72	21,5	G1/4	10	16,39	10	13,3	12,5



Subject to technical alterations.

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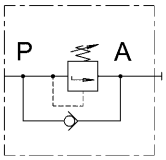
No. 6918

Sequence Valve

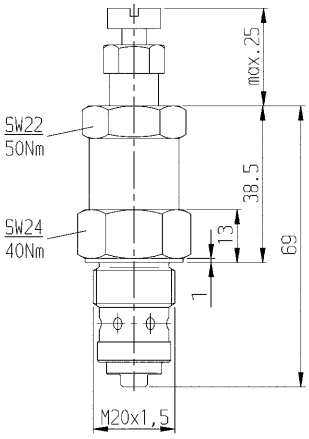
cartridge flange
Possible statically overload ~1,5xp max.

CAD

Order no.	Article no.	min. operating pressure [bar]	max. operating pressure [bar]	Q [l/min]	Direction of flow	Ambient temp. [°C]	Viscosity [cSt]	Weight [g]
408401	6918-2-02-03	8	80	20	P-A	-40 - +80	10-500	150
325118	6918-2-02-04	16	160	20	P-A	-40 - +80	10-500	150
320366	6918-2-02-02	30	500	20	P-A	-40 - +80	10-500	150







Design:

Steel housing, nitrided. Sealing nut galvanized. All functional components hardened and ground. Balls out of roller bearing steel.

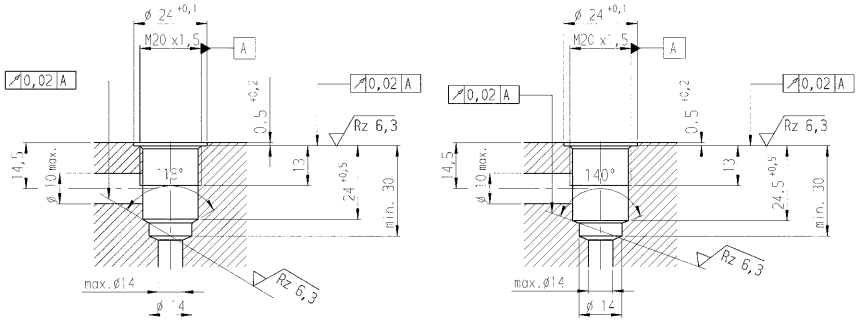
Application:

The pressure sequence valve is used where another hydraulic system or another consumer should be activated after achieving a specified pressure. If a curcuit is designed with several sequence valves, it must be observed that the pressure in this circuit is always adhisted in the last respective pressure stage. The switching pressure for this type, irrespective of the pressure on the output side (consumer side) remains largely constant.

Note:

For disassembly of the pressure valve please release first SW (AF) 24, then SW 22. For assembly please use reverse sequence and observe max. seating torque. The pressure difference between P and A depends on the preload of the adjustment spring.

Installation dimensions:

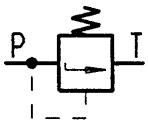


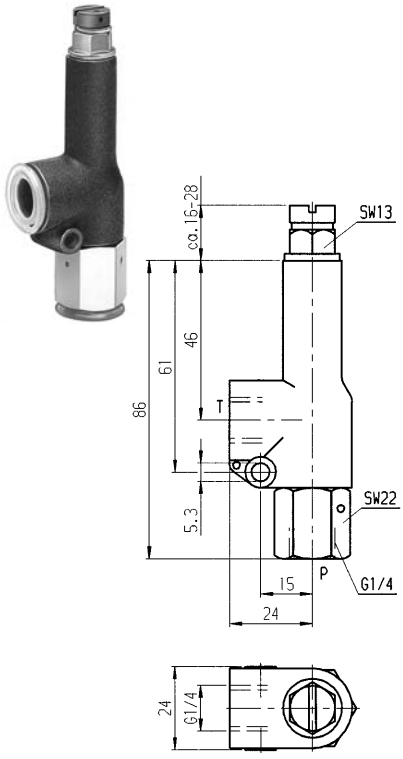
No. 6918-10

Pressure Relief Valve

for pipeline installation

Order no.	Article no.	min. operating pressure [bar]	max. operating pressure [bar]	max. pressure in T [bar]	Q [l/min]	Ambient temp. [°C]	Viscosity [cSt]	Weight [g]
288225	6918-10-001	30	160	20	20	-40 - +80	10-500	200
65375	6918-10	100	500	500	20	-40 - +80	10-500	200





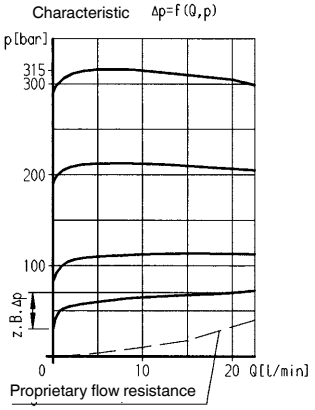
Design:

For 6918-10-001 housing made of zinc, for 6918-10 housing made of ductile iron.
Control piston made of steel, hardened. Can be sealed on setting spindle.

Application:

The pressure relief valve is used to protect against exceeding the maximum permissible pressure for the system (safety valve) or to limit operating pressures. Once the set pressure is reached, the valve opens, the excess liquid in the system flows back into the tank via the T line of the pressure relief valve. The pressure relief valve is not suitable for the protection of pressure equipment as defined by the PED 97/23 / EC.

Diagram:

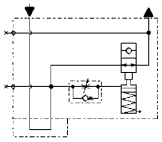


Subject to technical alterations.

No. 6918-100

Delay valve

For O-ring connection, for the release clamping circuit, max. operating pressure 350 bar, min. operating pressure 35 bar.





CAD

Order no.	Article no.	Setting range *** for the delay [s]	Q max. [l/min]	Filter mesh [µm]	OR-1 O-ring Order No.	Weight [g]
556992	6918-100	3-7	11,4	25	474429	1970

*** The duration of the delay can vary, depending on the viscosity of the oil in the application. This statement is valid with ISO 32 Oil.

Design:

Delay valve with NG 6. The hole pattern is not standardised.
Valve housing made of steel, interior parts made of stainless steel.
The fastening bolts M6x60 (order no. 115634) are not supplied as standard.
Oil supply via oil channel in fixture body.

Application:

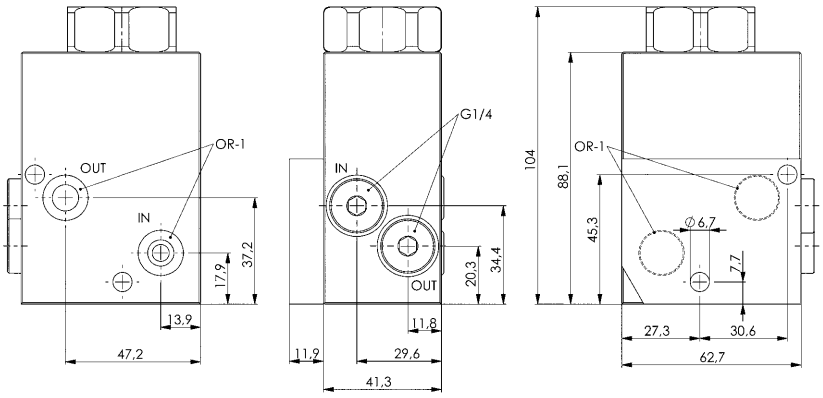
With this valve, unclamping of selected components can be delayed during the release process.
The delay can be achieved within a circuit.
A parallel circuit with several delay valves is possible.

Features:

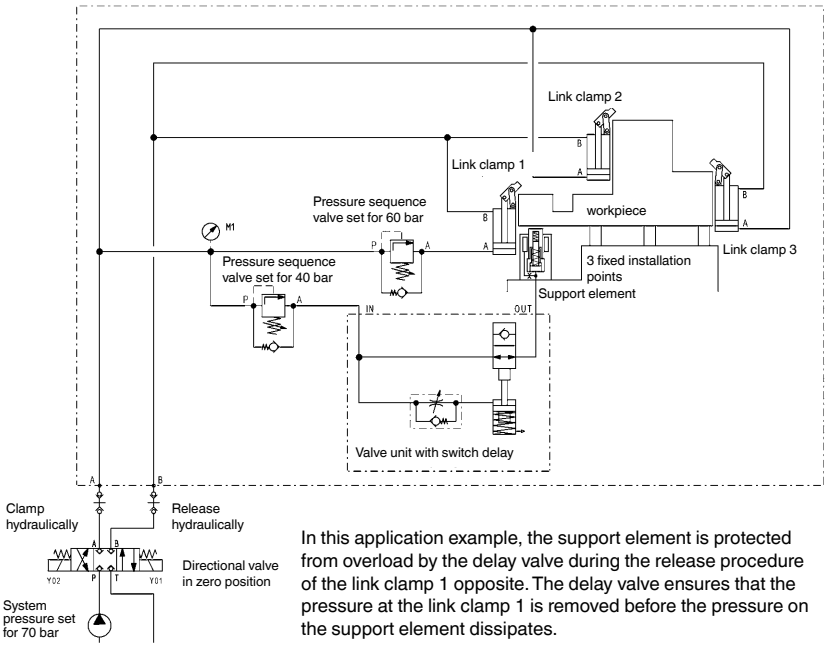
In the release process, hydraulic clamping and support elements or workpieces can be protected from overload. The consumers can be selectively controlled through a controlled sequence of the pressure reduction in the clamping circuit.

Note:

Observe installation instructions with construction notes for the fixture manufacturer. The flange surface of the fixture must have an evenness of 0.08 and a surface quality of Rz 6.3.



Application example:



In this application example, the support element is protected from overload by the delay valve during the release procedure of the link clamp 1 opposite. The delay valve ensures that the pressure at the link clamp 1 is removed before the pressure on the support element dissipates.

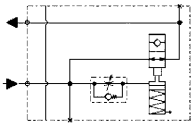
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No. 6918-110

Delay valve

For pipeline connection, for the release clamping circuit,
max. operating pressure 350 bar,
min. operating pressure 35 bar.



CAD

Order no.	Article no.	Setting range *** for the delay [s]	Q max. [l/min]	Filter mesh [µm]	Weight [g]
556993	6918-110	3-7	11,4	25	1700

*** The duration of the delay can vary, depending on the viscosity of the oil in the application. This statement is valid with ISO 32 Oil.



Design:

Valve housing made of steel, interior parts made of stainless steel.
The fastening bolts M6x50 (order no. 448456) are not supplied as standard.
Oil supply via threaded connection G 1/4.

Application:

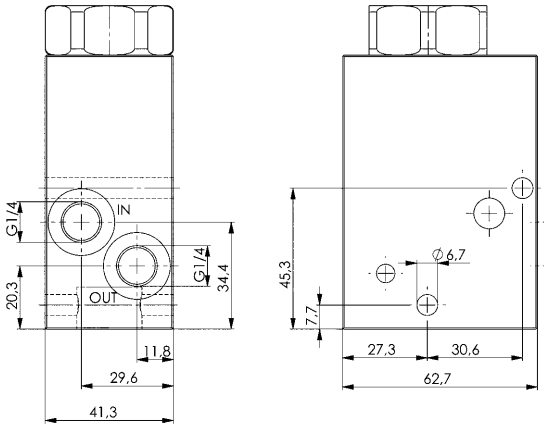
With this valve, unclamping of selected components can be delayed during the release process.
The delay can be achieved within a circuit.
A parallel circuit with several delay valves is possible.

Features:

In the release process, hydraulic clamping and support elements or workpieces can be protected from overload. The consumers can be selectively controlled through a controlled sequence of the pressure reduction in the clamping circuit.

Note:

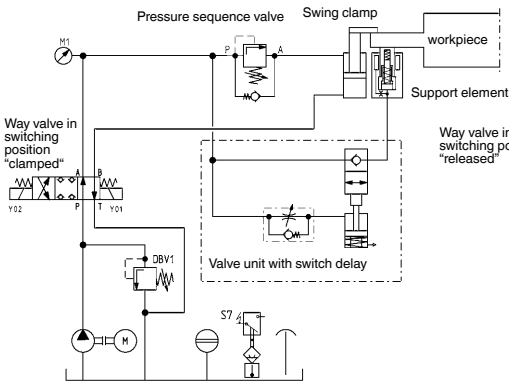
Observe installation instructions with construction notes for the fixture manufacturer.



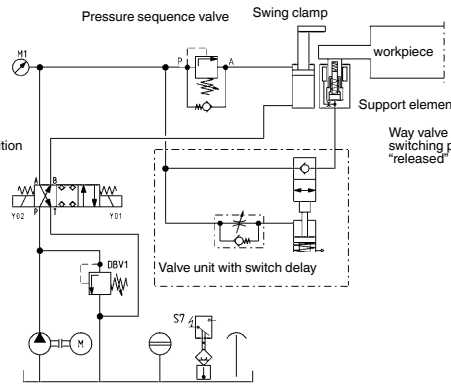
Application example:

In this application example, the support element is protected from overload during release by the delay valve during the release procedure of the swing clamp opposite. The delay valve ensures that the pressure at the swing clamp is removed before the pressure on the support element dissipates.

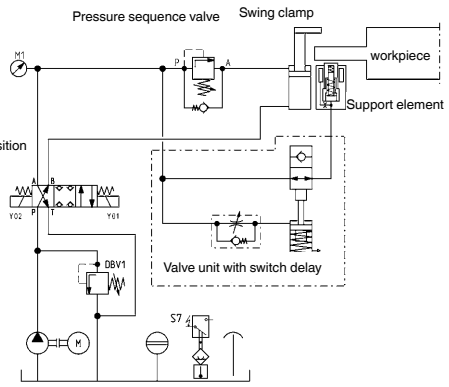
clamped



release step 1



release step 2

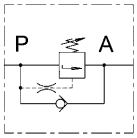


Subject to technical alterations.

No. 6918-80-10

Sequence valve

for O-ring joint, Pressure-time delayed,
max. operating pressure 250 bar,
min. operating pressure 40 bar.





Order no.	Article no.	Q [l/min]	Delay setting range [s]	Direction of flow	OR-1 O-ring Order No.	Weight [g]
326280	6918-80-10	8	1-10	P-A	161810	1500

Design:

Cylinder body made of steel, burnished. Connection diagram, NW 5, is not standardised. Hardened control piston and check valve.
Oil supply takes place through drilled channels in the clamping device.

Application:

The adjustable switch delay permits a time-dependent switching sequence of hydraulic elements within a hydraulic circuit, independent of the hydraulic pressure. The valve can be operated from 40 bar to max. 250 bar.
A parallel or series circuit of several valves is possible. The compact size permits the valve to be flanged directly to the clamping fixture. If the valve should be connected to a pipeline, an adapter plate is available.

Features:

The hydraulic oil at the valve is guided in the body from the connection P through a throttle to a differential piston. At the same time, the hydraulic pressure is present at an integrated check valve, which blocks the flow to the connection A. Depending on the setting of the setting screw, the differential piston moves forward in a specific time and opens a check valve. This releases the flow from connection P to connection A, and the following hydraulic components are supplied with compressed oil.
If the hydraulic pressure is removed, a spring returns the differential piston to the initial position. The hydraulic oil flowing out is guided through a check valve to the connection P.

Note:

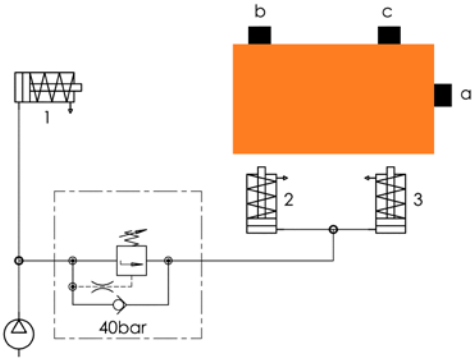
Observe installation instructions with construction notes for the fixture manufacturer.
Operating pressure, volume flow, temperature and viscosity can result in changes to the switching sequence. The valve may be used up to a system pressure of maximum 250 bar. The switching intervals should be greater than 10 sec. to guarantee proper function.

Clamping procedure:

1. Cylinder 1 presses workpiece against stop a.
2. Valve opens A-line after the set time 1-10 sec.
3. Cylinder 2 and 3 run out with a time delay and press workpiece against stops b and c.

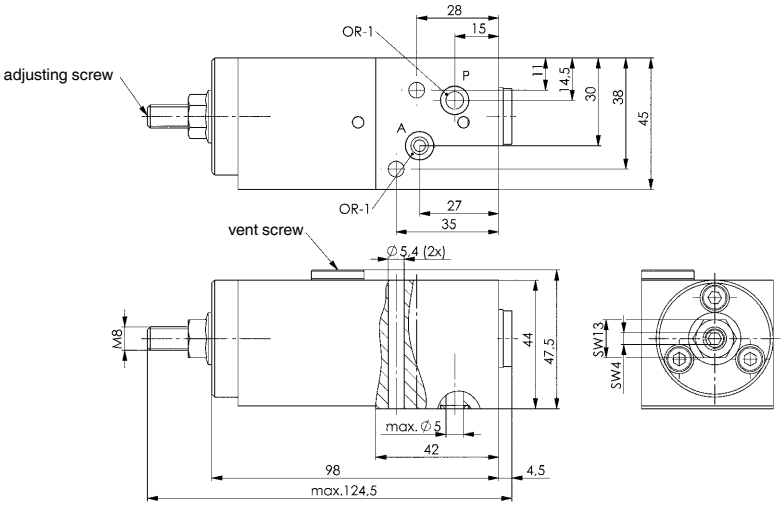
Hydraulic diagram:

Sequential control as parallel circuit



CAD





No. 6918A-80-10

Connecting plate



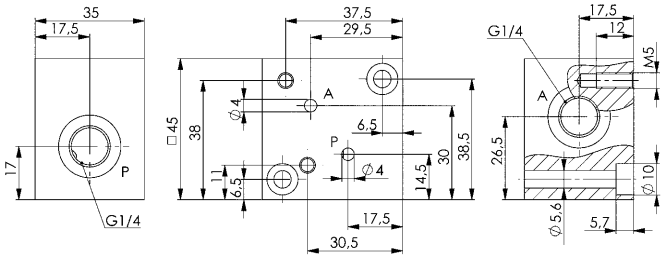
Order no.	Article no.	L x W x H	Connection	Weight [g]
327692	6918A-80-10	45x45x35	2 x G1/4	495

Design:

Steel, TEM-deburred and phosphated.

Application:

For line connection of sequence valve 6918-80-10.
Reduction for M5 screw for fastening on the fixture.



CAD



Subject to technical alterations.

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ACCESSORIES –
FOR DETERMINING THE DIRECTION OF THE OIL FLOW AND PRESSURE MONITORING

> **MANUAL SEAT VALVES**

> **DIRECTIONAL SEAT VALVES**

> **PRESSURE SWITCHES**

PRODUCT OVERVIEW:

Type	Designation	Operating pressure min. - max. [bar]	Version	Actuation	No. of models	Oil connection
6910-10/-11	Manual seat valve	10 - 500	2/2-way seat valve 3/2-way seat valve	manual	2	o-ring
6910-06	Seat valve	10 - 500	3/2-way seat valve	electrical	2	o-ring
6910-06	Seat valve	10 - 450	3/2-way seat valve	electrical	2	o-ring
6910A-07 6911A-07	Seat valve	10 - 400	3/3-way seat valve 4/3-way seat valve	electrical	1 1	o-ring
6982E	Electronic pressure switch	0 - 400	-	electrical	5	thread
6982E	Electronic pressure switch	0 - 600	-	electrical	2	thread
6982	Piston pressure switch	10 - 450	-	mechanical	2	o-ring
6982	Piston pressure switch	12 - 630	-	mechanical	4	o-ring

PRODUCT EXAMPLES:

NO. 6910-10 AND 6910-06-07



> max. operating pressure: 500 bar

NO. 6910A-07-01



> max. operating pressure: 400 bar

NO. 6982E AND 6982

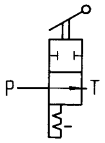


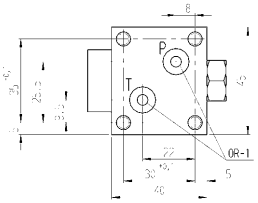
> max. operating pressure: 630 bar

No. 6910-10

Manual Seat Valve, 2/2-Way

for O-ring joint,
max. operating pressure 500 bar,
min. operating pressure 10 bar.





Order no.	Article no.	Q [l/min]	Viscosity [cSt]	Ambient temp. [°C]	Switching torque [N cm]	Switching stroke [mm]	Switching angle	OR-1 O-ring Order No.	Weight [g]
181214	6910-10	12	10-500	-40 - +80	63	3,5	90°	161554	400

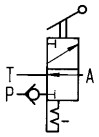
Application:

By means of the 2/2 manual way seat valve an oil channel can be closed or opened.

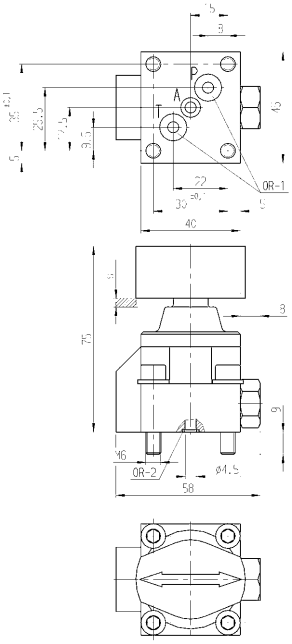
No. 6910-11

Manual Seat Valve, 3/2-Way

for O-ring joint,
max. operating pressure 500 bar,
min. operating pressure 10 bar.







Order no.	Article no.	Q [l/min]	Viscosity [cSt]	Ambient temp. [°C]	Switching torque [N cm]	Switching stroke [mm]	Swit-ching angle	OR-1 O-ring Order No.	OR-2 O-ring Order No.	Weight [g]
114298	6910-11	12	10-500	-40 - +80	63	3,5	90°	161554	338327	400

Application:

The 3/2 manual way seat valve allows to determine the direction of oil flow.

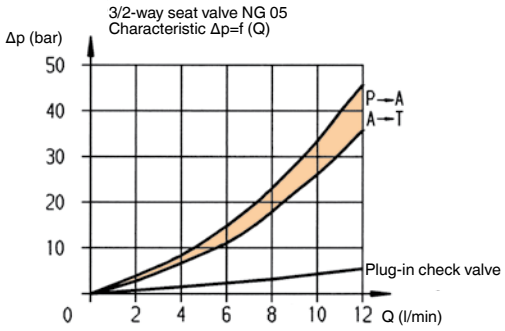
Features:

Hermetic sealing by ball seats. Sealing of the oil channels of the valve base with O-rings. The seat valve has completely hydraulic pressure compensation and negative switching.

Note:

The direction of flow has to be the direction of the arrow according to the symbol. The position of installation is optional. Hydraulic oil HLP or HLPD according to DIN 51524 Part 2.

Diagram:



CAD

CAD

No. 6910A-05

Connection Plate



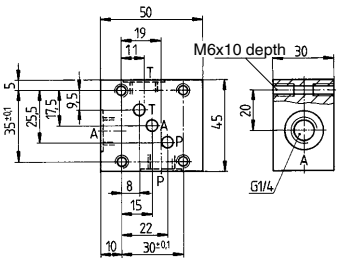
Order no.	Article no.	L x W x H	Connection	Weight [g]
60335	6910A-05	50x45x30	3 x G1/4	450

Design:

Tempering steel, TEM deburred and phosphatized.

Application:

For pipe connection in combination with
- 3/2-way seat valve no. 6910-06-06
- 2/2-way manual seat valve no. 6910-10
- 3/2-way manual seat valve no. 6910-11.



CAD

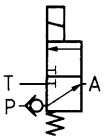
Subject to technical alterations.

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No. 6910-06-06

Seat Valve, 3/2-Way

for O-ring joint,
max. operating pressure 500 bar,
min. operating pressure 10 bar.



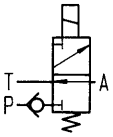
Order no.	Article no.	Q [l/min]	Viscosity [cSt]	Weight [g]
564577	6910-06-06	12	10-500	840

Order no.	Article no.	Ambient temp. [°C]	U [V DC]	P [W]	Switching time on/off [ms]	Ed to 40°C [%]	Switching frequency per hour	Ingress protection	OR-1 O-ring Order No.	OR-2 O-ring Order No.
564577	6910-06-06	-40 - +80	24	23	100/50	100	2000	IP 65	161554	338327

No. 6910-06-07

Seat Valve, 3/2-Way

for O-ring joint,
max. operating pressure 500 bar,
min. operating pressure 10 bar.





Order no.	Article no.	Q [l/min]	Viscosity [cSt]	Weight [g]
564578	6910-06-07	12	10-500	840

Order no.	Article no.	Ambient temp. [°C]	U [V DC]	P [W]	Switching time on/off [ms]	Ed to 40°C [%]	Switching frequency per hour	Ingress protection	OR-1 O-ring Order No.	OR-2 O-ring Order No.
564578	6910-06-07	-40 - +80	24	23	100/50	100	2000	IP 65	161554	338327

Design:

The ball, being the essential control element, is pressed either by a magnet or a spring onto the hardened ball seats. The blocked flow direction is thus hermetically shut off. The magnets work with or without a diverter lever and are designed and checked to VDE 0580. The seat valve has a manual emergency actuator. A check valve is incorporated in channel P. The magnetic coils can be pivoted through 360° across an infinitely variable range.

Application:

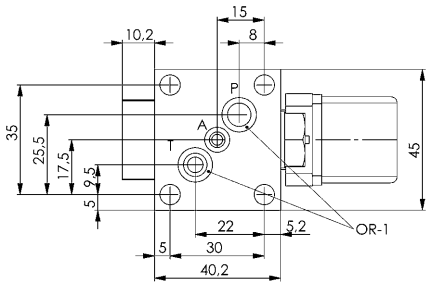
The 3/2-way seat valve is used to determine the direction of oil flow. These valves are mainly used for direct control of single-acting cylinders.

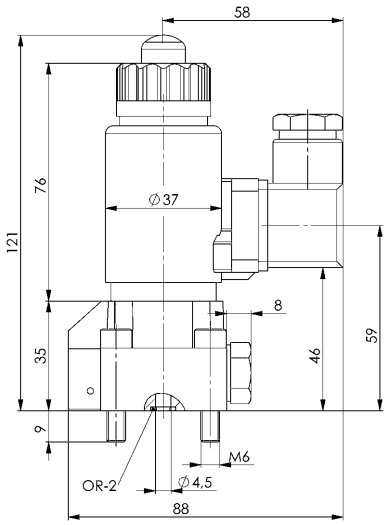
Features:

Hermetic sealing by ball seats. Sealing of the oil channels of the valve base with O-rings. The seat valve has completely hydraulic pressure compensation and negative switching.

Note:

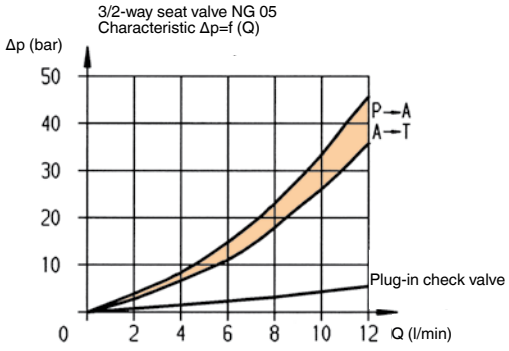
The direction of flow must be the direction of the arrow according to the symbol. The position of installation is optional. Hydraulic oil HLP or HLPD according DIN 51524 part 2.





Dimensions apply on both sides.

Diagram:

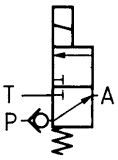


Subject to technical alterations.

No. 6910-06-04

Seat Valve, 3/2-Way

for O-ring joint,
max. operating pressure 450 bar,
min. operating pressure 10 bar.



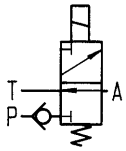
Order no.	Article no.	NG	Q [l/min]	Viscosity [cSt]	Weight [g]
276824	6910-06-04	4	8	10-200	600

Order no.	Article no.	Ambient temp. [°C]	U [V DC]	P [W]	Switching time on/off [ms]	Ed to 40°C [%]	Switching frequency per hour	Ingress protection
276824	6910-06-04	-40 - +80	24	24	70/50	100	2000	IP 65

No. 6910-06-05

Seat Valve, 3/2-Way

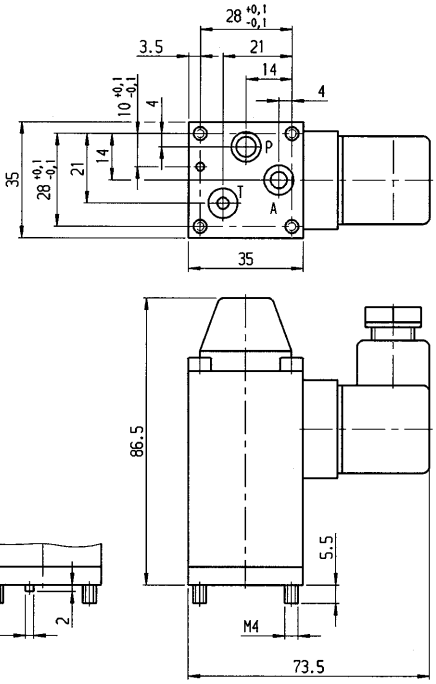
for O-ring joint,
max. operating pressure 450 bar,
min. operating pressure 10 bar.



Order no.	Article no.	NG	Q [l/min]	Viscosity [cSt]	Weight [g]
65391	6910-06-05	4	8	10-200	600

Order no.	Article no.	Ambient temp. [°C]	U [V DC]	P [W]	Switching time on/off [ms]	Ed to 40°C [%]	Switching frequency per hour	Ingress protection
65391	6910-06-05	-40 - +80	24	24	70/50	100	2000	IP 65





Dimensions apply on both sides.

CAD

CAD

Design:

The ball, being the essential control element, is pressed either by a magnet or a spring onto the hardened ball seats. The blocked flow direction is thus hermetically shut off. The magnets work with or without a shift lever and are designed and checked to VDE 0580. The seat valve has a manual emergency actuator. A check valve is incorporated in channel P.

Application:

The 3/2-way seat valve is used to determine the direction of oil flow. These valves are mainly used for direct control of single-acting cylinders.

Features:

Hermetic sealing by ball seats. Sealing of the oil channels of the valve base with O-rings. The seat valve has completely hydraulic pressure compensation and negative switching.

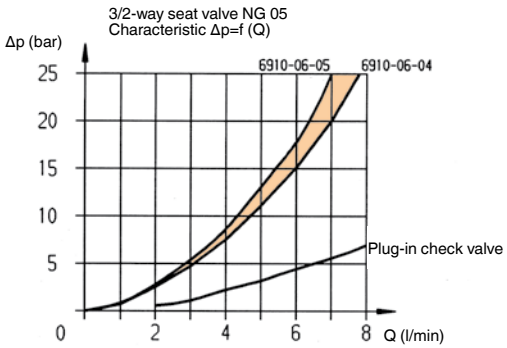
Note:

The direction of flow must be the direction of the arrow according to the symbol. The position of installation is optional. Hydraulic oil HLP or HLPD according DIN 51524 part 2.

On request:

Directional seat valve with control voltage 230 V AC 50/60 Hz.

Diagram:



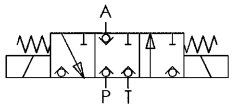
Subject to technical alterations.

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No. 6910A-07-02

Seat Valve, 3/3-Way

for O-ring joint,
max. operating pressure 400 bar,
min. operating pressure 10 bar.



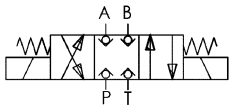
Order no.	Article no.	NG	Q [l/min]	OR-1 O-ring Order No.	Viscosity [cSt]	U [V DC]	Weight [g]
322073	6910A-07-02	6	20	493478	10-500	24	2356

Order no.	Article no.	Ambient temp. [°C]	P [W]	Switching time on/off [ms]	Ed to 35°C [%]	Switching frequency per hour	Ingress protection
322073	6910A-07-02	-40 - +80	27,6	100/50	100	2000	IP67

No. 6911A-07-01

Seat Valve, 4/3-Way

for O-ring joint,
max. operating pressure 400 bar,
min. operating pressure 10 bar.



Order no.	Article no.	NG	Q [l/min]	OR-1 O-ring Order No.	Viscosity [cSt]	U [V DC]	Weight [g]
322065	6911A-07-01	6	20	493478	10-500	24	2356

Order no.	Article no.	Ambient temp. [°C]	P [W]	Switching time on/off [ms]	Ed to 35°C [%]	Switching frequency per hour	Ingress protection
322065	6911A-07-01	-40 - +80	27,6	100/50	100	2000	IP67



Design:

Oil-leak-free, sealed directional seat valves with standard mounting face NG 6. The hole pattern is standardised at the national, European and international levels. The dimensions are recorded in the standards DIN 24340-Form A, CETOP R 35 H and ISO 4401. The valves are actuated electromagnetically. The device socket as per DIN / EN 175301-803 is included in the scope of delivery.

Application:

The 3/3 and 4/3 directional seat valves determine the direction of oil flow. These valves are mainly used for direct control of single-acting and double-acting consumers.

Features:

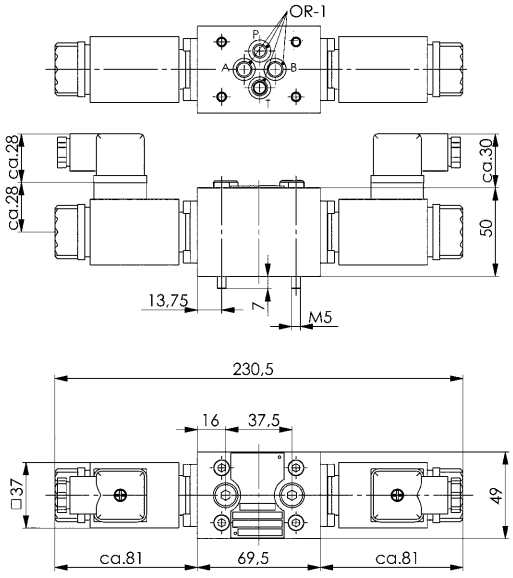
With electrically current-free magnets, the valves take the closed neutral position. All connections are hermetically sealed due to the seat design.
If both magnets are energised simultaneously, this creates a fourth switch position in which all connections are connected to the tank line and are thus pressure-free. In this switch position, the consumer lines can be easily coupled.
A ball check valve is also inserted in the P-channel. This check valve prevents an undesired pressure compensation in the case of circuit overlaps. The seal between the valves and the counter-flange surfaces is made with O rings.

Note:

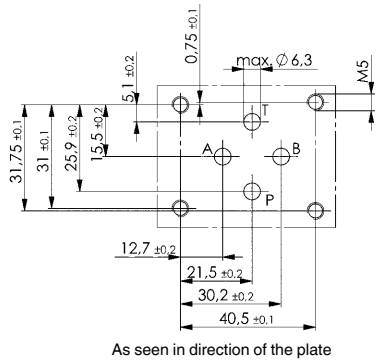
Spare part: Plug-in check valve, order no. 402156

On request:

Directional seat valve with control voltage 230 V AC 50/60 Hz.



Hole pattern shape A nominal size 6 according to DIN 24340 T2:



As seen in direction of the plate

CAD

CAD

Subject to technical alterations.

No. 6982E

Electronic pressure switch



Order no.	Article no.	Measuring range [bar]	Switchpoint [bar]	Reset point (RP) [bar]	Minimum distance between RP and SP [bar]	Md max. [Nm]	Weight [g]
327445	6982E-11-025	0-25	0,5-25	0,25-24,75	0,25	17-20	70
327395	6982E-12-040	0-40	0,8-40	0,4-39,2	0,40	17-20	70
327403	6982E-13-100	0-100	2,0-100	1,0-99	1,00	17-20	70
327411	6982E-14-250	0-250	5,0-250	2,5-247,5	2,50	17-20	70
327429	6982E-15-400	0-400	8,0-400	4,0-396	4,00	17-20	70

Design:

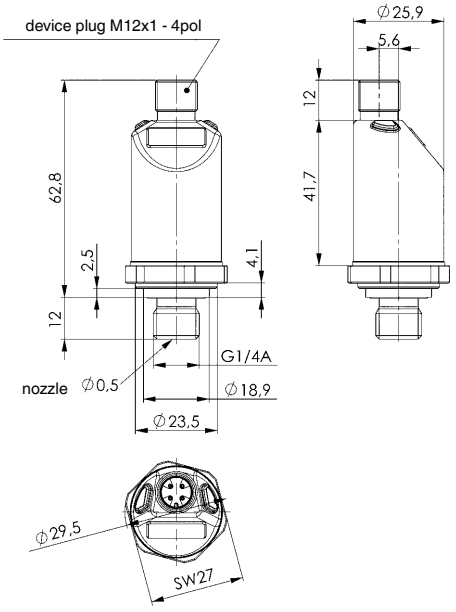
Compact electronic pressure switch with integrated 4-digit display. With two independent switching points and reverse switching points..
Stainless steel measuring cell with thin film DMS (expansion measuring strips).
Screw-in thread G¼ A – DIN 3852-E, 2 switch outputs.

Application:

For the electronic-hydraulic pressure monitoring in pump units and in circuits of hydraulic clamping devices.

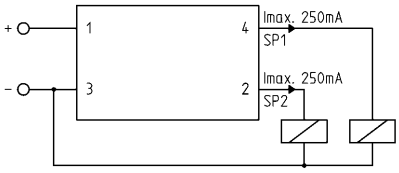
Features:

The four-digit digital display can depict the pressure in bar, psi or MPa.
Switching points and switch-back hystereses can be set independently. Switch-on and reset delay can be set from 0 to 99.9 seconds.
Adjustable display: current pressure, peak pressure value or to switching point 1 or switching point 2.
Simple handling via key programming.



Pin assignment:

Version with 2 switch outputs
pin plug 4-pol.M12x1



Dimensions:

Order no.	Article no.	Operating temperature [°C]	Power supply [V DC]	PNP-output switching current [A]	Response time [ms]	Reproducibility [%]	Accuracy as per DIN 16086 [%]	Protection class to DIN 40050
327445	6982E-11-025	-15 - +70	9,6-32	0,25	10	±0,5% FS max.	±1,0% FS max.	IP 67
327395	6982E-12-040	-15 - +70	9,6-32	0,25	10	±0,5% FS max.	±1,0% FS max.	IP 67
327403	6982E-13-100	-15 - +70	9,6-32	0,25	10	±0,5% FS max.	±1,0% FS max.	IP 67
327411	6982E-14-250	-15 - +70	9,6-32	0,25	10	±0,5% FS max.	±1,0% FS max.	IP 67
327429	6982E-15-400	-15 - +70	9,6-32	0,25	10	±0,5% FS max.	±1,0% FS max.	IP 67

Subject to technical alterations.

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No. 6982E

Electronic pressure switch



Order no.	Article no.	Measuring range [bar]	Switchpoint [bar]	Hysteresis [bar]	Operating temperature [°C]	Md max. [Nm]	Weight [g]
326967	6982E-02	0-250	9,5-250	3-247,5	-25 - +80	20	120
326447	6982E-01	0-600	9-600	3-594	-25 - +80	20	120

Design:

Compact electronic pressure switch with integrated 4-digit digital display for pressure measurement in the high-pressure range.
Stainless steel measuring cell with thin-film strain gauge. Screw-in thread G¼ A – DIN 3852-E, 2 switch outputs.

Application:

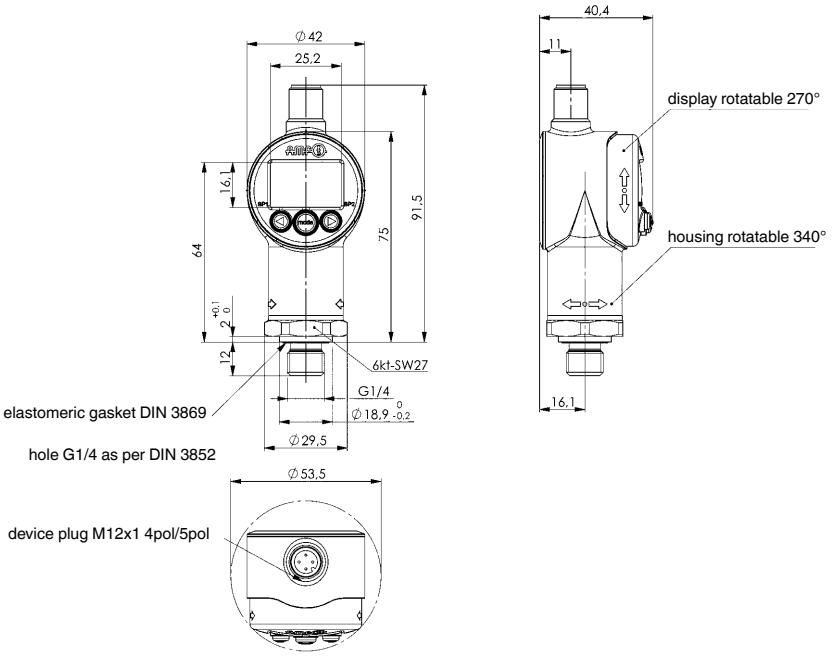
For the electronic-hydraulic pressure monitoring in pump units and in circuits of hydraulic clamping devices.

Features:

Display rotatable in two axes. As a result, the device can be oriented optimally in almost every mounting position. The four-digit digital display can depict the pressure in bar, psi or MPa.
Switching points and switch-back hystereses can be set dependently. Switch-on and reset delay can be set from 0 to 99.9 seconds.
Adjustable display: current pressure, peak pressure value or to switching point 1 or switching point 2.
Simple handling via key programming.

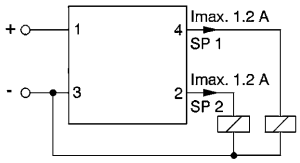
Dimensions:

Order no.	Article no.	Power supply [V DC]	PNP-output switching current [A]	Response time [ms]	Reproducibility [%]	Accuracy as per DIN 16086 [%]	Protection class to DIN 40050
326967	6982E-02	18-35	1,2	10	±0,25 FS max.	±0,5 FS typ.	IP65
326447	6982E-01	18-35	1,2	10	±0,25 FS max.	±0,5 FS typ.	IP65



Pin assignment:

Version with 2 switch outputs
pin plug 4-pol.M12x1



CAD

No. 6982E-01-L

Round connector

Order no.	Article no.	Thread	Number of poles [St]	Line length [m]	Weight [g]
498709	6982E-01-L	M12x1	4	1,5	100

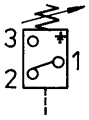


Subject to technical alterations.

No. 6982

Piston Pressure Switch

electric-hydraulic





Order no.	Article no.	Operating pressure [bar]	Temp. [°C]	Ingress protection	Switching frequency [1/min]	Voltage	OR-1 O-ring Order No.	Weight [g]
176040	6982-04	10-100	-20 - +80	IP65	100	30V - 250V = 5A	457499	330
176214	6982-02	40-450	-20 - +80	IP65	100	30V - 250V = 5A	457499	330

Design:

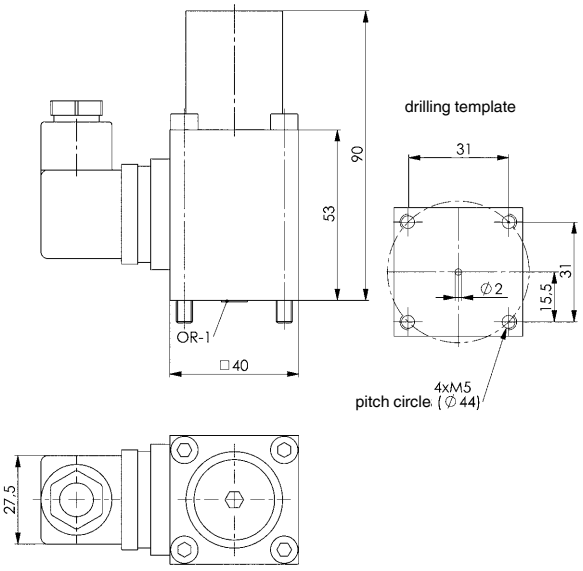
Microswitch. Design: Spring-loaded piston.

Application:

For electric-hydraulic pressure monitoring of a clamping circuit. The piston pressure switch can be mounted onto an adapter plate for tube connection.

Note:

Any built in position possible.



CAD

No. 6982-02-01

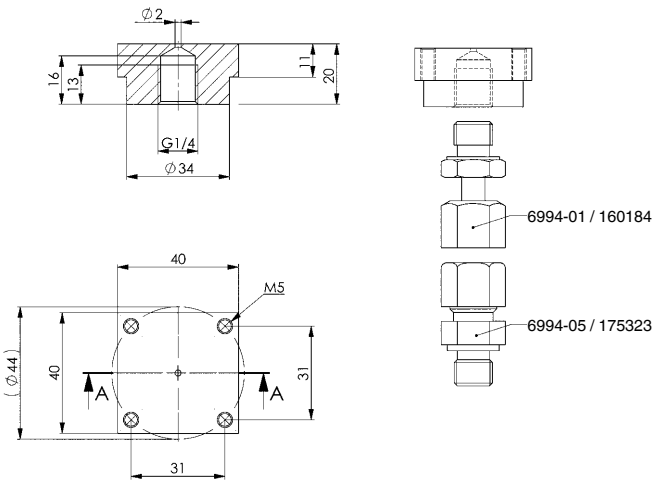
Connection Plate

Order no.	Article no.	Weight [g]
60780	6982-02-01	185

Application:

For connecting pressure switch 6982-02 and 6982-04.





CAD

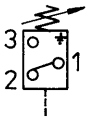
Subject to technical alterations.

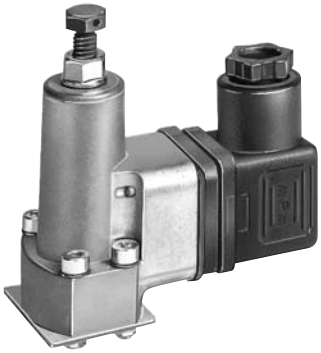
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No. 6982

Piston Pressure Switch

electric-hydraulic





Order no.	Article no.	Operating pressure [bar]	Temp. [°C]	Ingress protection	Switching frequency [1/min]	Voltage	OR-1 O-ring Order No.	Weight [g]
492256	6982-07	12-170	-20 - +80	IP65	30	12V - 230V = 4A	161810	300
136291	6982-06	20-210	-20 - +80	IP65	30	12V - 230V = 4A	161810	300
402610	6982-08	100-400	-20 - +80	IP65	30	12V - 230V = 4A	161810	300
276881	6982-05	200-630	-20 - +80	IP65	30	12V - 230V = 4A	161802	300

Design:

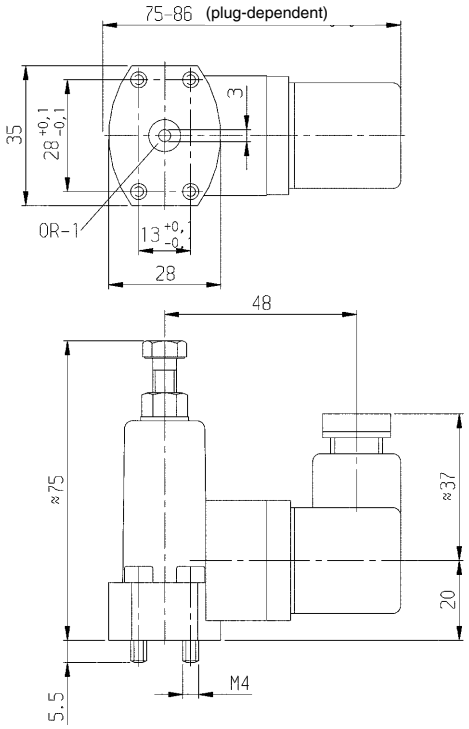
Microswitch. Design: Spring-loaded piston.

Application:

For electric-hydraulic pressure monitoring of a clamping circuit. The piston pressure switch can be mounted onto an adapter plate for tube connection.

Note:

Any built in position possible.



CAD

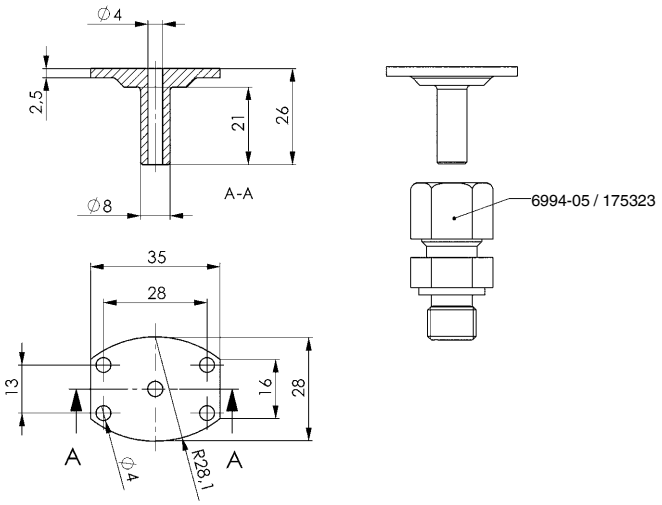
No. 6982-05-01

Flange with pipe socket

for piston pressure switch No. 6982-05, -06, -07 and -08.

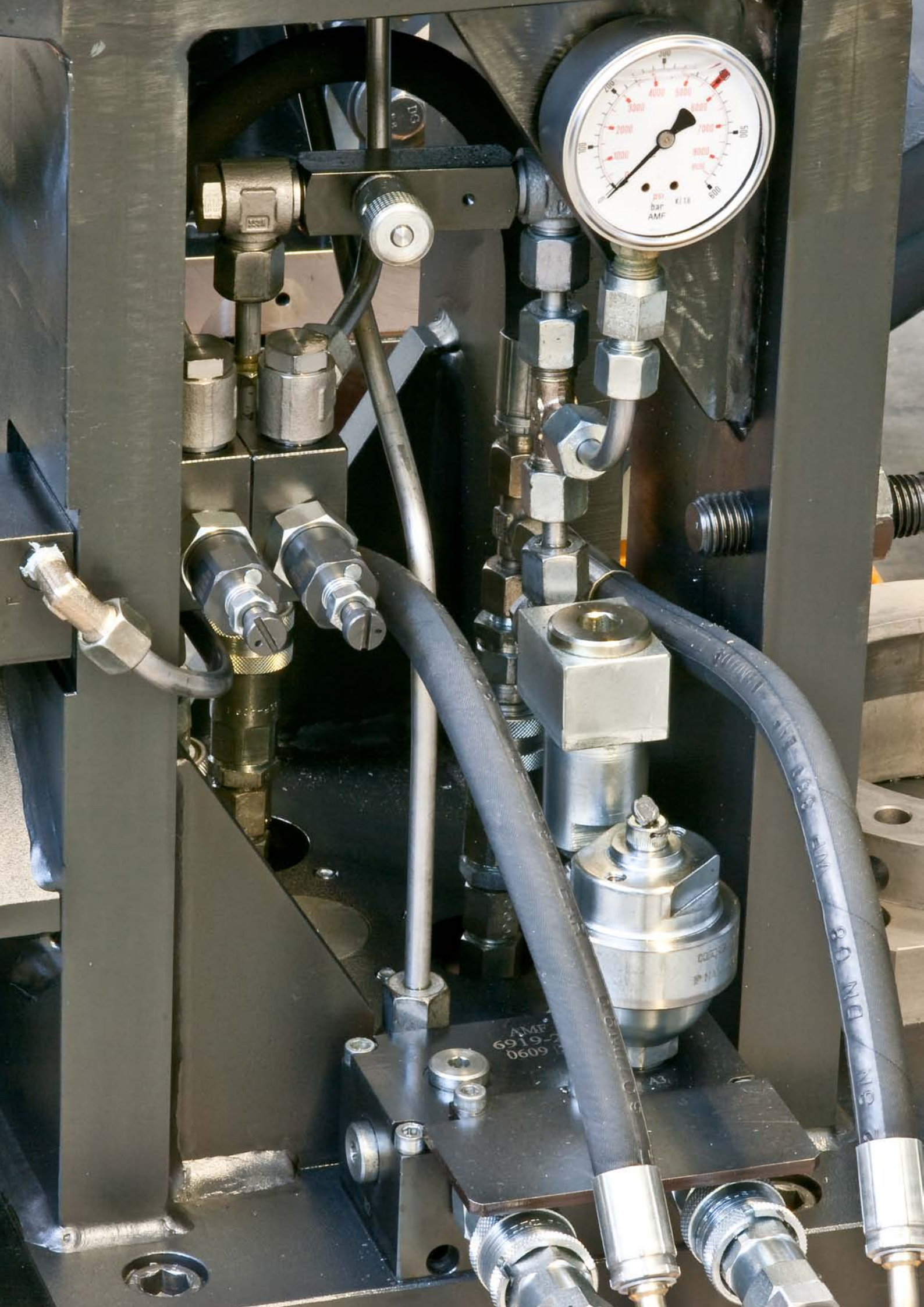
Order no.	Article no.	Weight [g]
497636	6982-05-01	36





CAD

Subject to technical alterations.


bar
AMF

ACCESSORIES –
VALVES FOR CHANGING DIRECTION AND VOLUME FLOW CONTROL

- > **CHECK VALVES (HYDR. UNLOCKABLE)**
- > **SHUTTLE VALVES**
- > **THROTTLE/CHECK VALVES**
- > **SHUT-OFF VALVES**

PRODUCT OVERVIEW:

Type	Designation	Max. operating pressure [bar]	Q [l/min.]	Differential pressure [bar]	No. of models	Oil connection
6916-04	Line check valve	630	12	3	1	pipe
6916-05/-06	Threaded check valve	630	12	3	2	thread / pipe
6916-07	Shuttle valve	630	18	12	1	pipe
6916-08	Check valve	700	15	8	1	thread
6916-08-10	Check valve	700	20	-	1	o-ring
6916-09	Throttle/Check valve	400	15	-	1	thread
6916-10	Throttle/Check valve	400	18	-	1	thread
6916-11	Shut-off valve	600	18	-	1	thread
6916-12	Check valve	350	5,7	-	2	screw-in

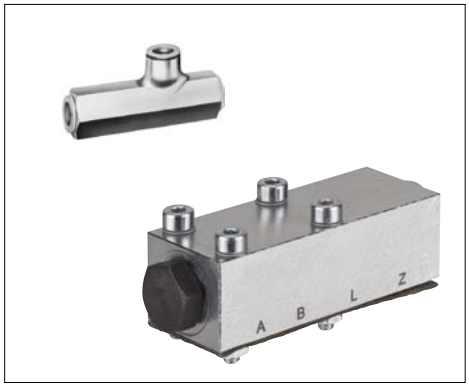
PRODUCT EXAMPLES:

NO. 6916-04 AND 6916-07



> max. operating pressure: 630 bar

NO. 6916-08 AND 6916-08-10



> max. operating pressure: 700 bar

NO. 6916-09 AND 6916-12



> max. operating pressure: 400 bar

No. 6916-04

Line Check Valve

max. operating pressure 630 bar.





CAD

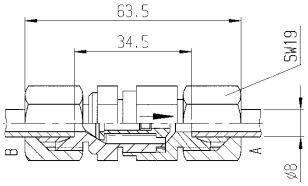
Order no.	Article no.	Q [l/min]	Differenz p at flow [bar]	Ambient temp. [°C]	Aperture pressure [bar]	Weight [g]
62885	6916-04	12	3	-20 - +90	1	110

Design:

Housing made of steel, surface galvanized. Sealing cone spring loaded with O-ring sealing. Seals made of Perbunan.

Note:

The direction of flow is indicated on the hex nut housing by means of an arrow. The pipe connection is sealed by means of a cutting ring.



No. 6916-05/06

Threaded Check Valve

max. operating pressure 630 bar.





CAD

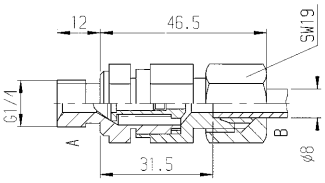
Order no.	Article no.	Q [l/min]	Direction of flow	Differenz p at flow [bar]	Ambient temp. [°C]	Aperture pressure [bar]	Weight [g]
62901	6916-05	12	A - B	3	-20 - +90	1	95
62968	6916-06	12	B - A	3	-20 - +90	1	95

Design:

Housing made of steel, surface galvanized. Sealing cone spring loaded with O-ring sealing. Sealings made of Perbunan.

Note:

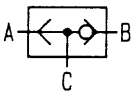
The direction of flow is indicated on the hex nut housing by means of an arrow. On the threaded side sealing is done by means of a sealing edge and on the pipe side the valve is sealed by means of a cutting ring.



No. 6916-07

Shuttle Valve

max. operating pressure 630 bar.





CAD

Order no.	Article no.	Q [l/min]	Direction of flow	Differenz p at flow [bar]	Ambient temp. [°C]	Weight [g]
62984	6916-07	18	A-C / B-C	12	-20 - +100	160

Design:

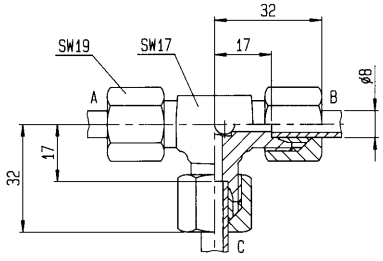
Housing made of steel, surface galvanized. Ball seat valve type.

Application:

By means of two input connections which can be shut and an output connection the alternating valve connects A or B with C according to the present pressurized line; the other connection is closed by means of a ball.

Note:

Attention: The hydraulic line empties itself when not under pressure. The pipe connection is sealed by means of a cutting ring.



Subject to technical alterations.

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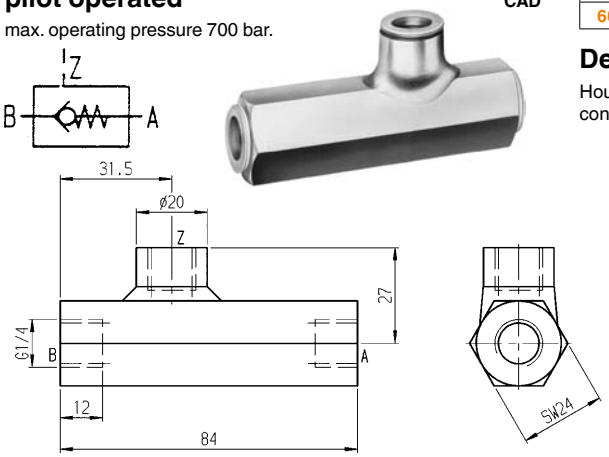
No. 6916-08

Check valve, hydraulically pilot operated

max. operating pressure 700 bar.

CAD

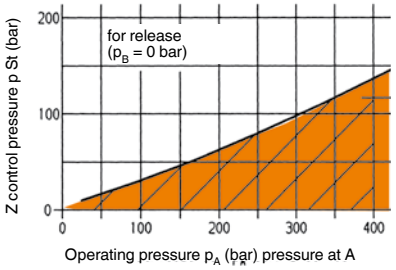
Order no.	Article no.	Q [l/min]	Differenz p at flow [bar]	Releasing ratio PA(B) / PZ	Ambient temp. [°C]	Aperture pressure [bar]	Weight [g]
60491	6916-08	15	8	2,7	-30 - +80	0,2 - 0,3	400



Design:

Housing made of steel, surface galvanized. Spring-loaded ball acting as a valve element. The control connection is damped by a throttle.

Diagram:



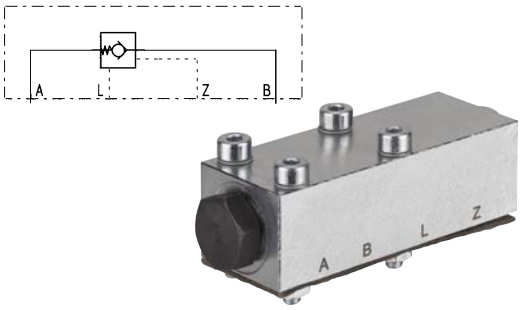
No. 6916-08-10

Check valve, pilot operated

for O-ring connection,
max. operating pressure 700 bar.

CAD

Order no.	Article no.	Q [l/min]	Releasing ratio PA(B) / PZ	Ambient temp. [°C]	OR-1 O-ring Order No.	OR-2 O-ring Order No.	Weight [g]
339374	6916-08-10	20	3	-40 - +80	183335	457499	300



Design:

Complete with four fastening bolts M4 x 25 - 8.8. Spring-loaded ball seat valve for plate assembly, leak oil free. Components made of steel. The connection channels must be self-produced using connection plates. Sealing is with O-rings.
Nomenclature of the connection ducts:
A = consumer, B = pump side, Z = control, L = leak oil (relief of the vacuum piston chamber)

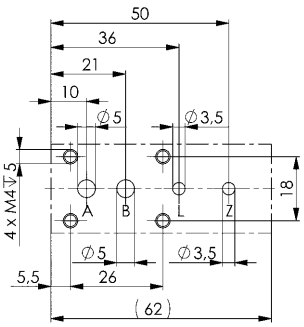
Application:

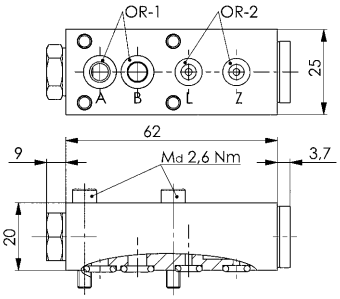
For unhindered flow in one direction and blocked flow in the other direction. The blocked direction can be controlled via a control connection. The valve is used for the leak oil-free pressure maintenance on hydraulic consumers in combination with leak oil-containing directional spool valves or leak oil-containing media penetrations.

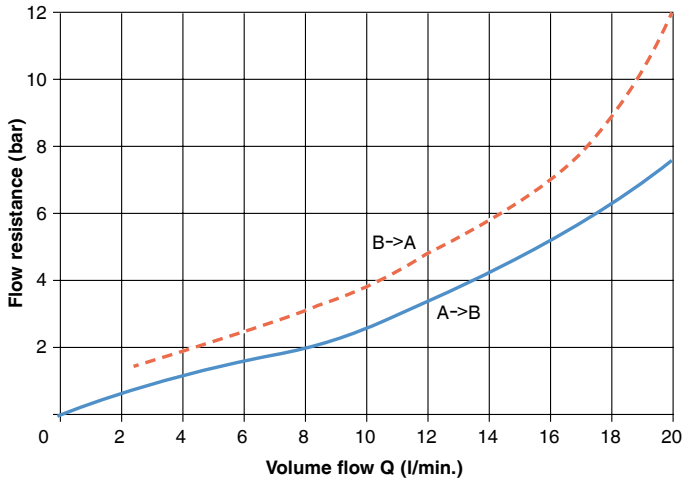
Note:

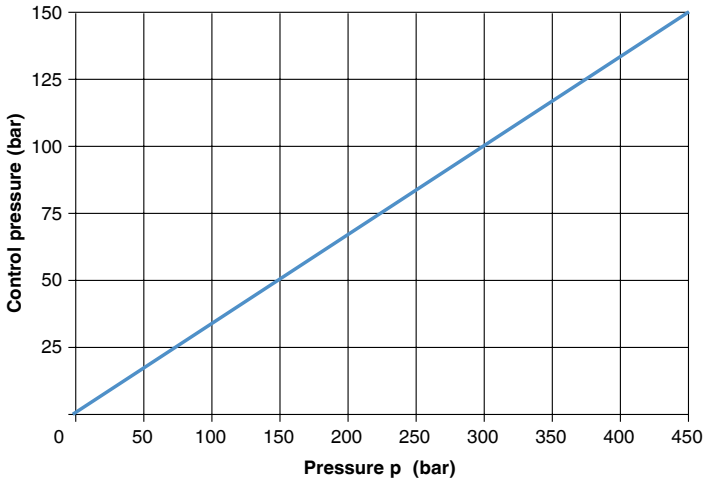
Max. perm. pressure at connections A, B = 700 bar, Z = 250 bar. Connection L must be positioned without pressure relative to tank. The minimum pressure for keeping the connection open is calculated from the formula pst = a x Δp + b x pB + c!
Coefficients for valve 6916-08-10: a = 0.235 / b =0.03 / c = 4.8!
Δp = Flow resistance and pB = pressure at connection B, see diagrams.

Drilling template device:







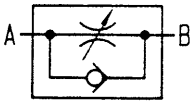


Subject to technical alterations.

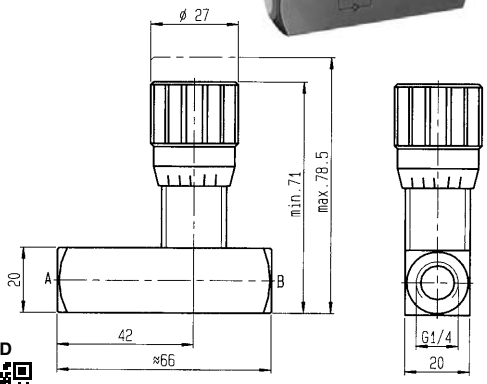
No. 6916-09

Throttle/Check Valve

max. operating pressure 400 bar.







CAD

Order no.	Article no.	Q [l/min]	Throttle direction	Ambient temp. [°C]	Aperture pressure [bar]	Weight [g]
62992	6916-09	15	A - B	-20 - +80	0,35	250

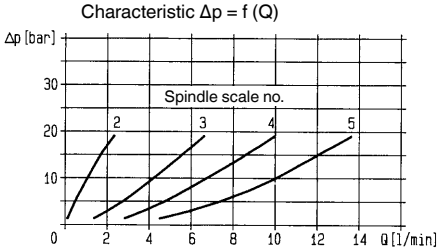
Design:

Housing made of steel, galvanized. Adjusting knob made of AL, ribbed. Needle throttle.

Note:

Easy setting by scaled spindle and adjusting knob.

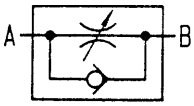
Diagram:



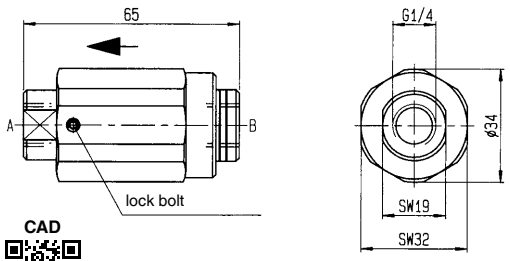
No. 6916-10

Throttle/Check Valve

max. operating pressure 400 bar.







CAD

Order no.	Article no.	Q [l/min]	Throttle direction	Ambient temp. [°C]	Aperture pressure [bar]	Weight [g]
63008	6916-10	18	A - B	-30 - +80	3	290

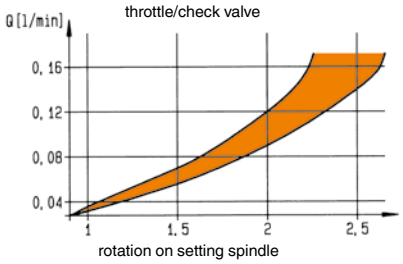
Design:

Housing made of steel, blued. Blued throttle socket.

Note:

A constant flow is achieved by means of the new oil dosing curves as from 0.04 l/min. The valve can be easily adjusted under high pressure.

Diagram:



No. 6916-11

Shut-off valve

max. operating pressure 500 bar.

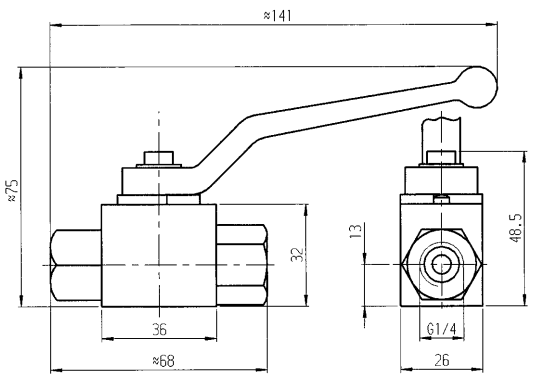




Order no.	Article no.	Oilflow bore DN (dia.)	Ambient temp. [°C]	Weight [g]
65326	6916-11	Ø 6	-20 - +100	350

Design:

Housing and functioning components made of steel. Seal of shaft made of NBR.



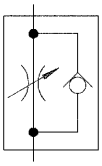
Subject to technical alterations.

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No. 6916-12

Throttle/Check Valve

cartridge flange
max. operating pressure 350 bar.





Order no.	Article no.	A max.	C	D	dia. E	SW	Md max. [Nm]	Q max. [l/min]	G	Weight [g]
326579	6916-12-01	20,7	11,1	15,16	15,9	14	27	5,7	G1/8	47
326611	6916-12-04	20,9	11,2	18,72	21,0	19	47	5,7	G1/4	47

Design:

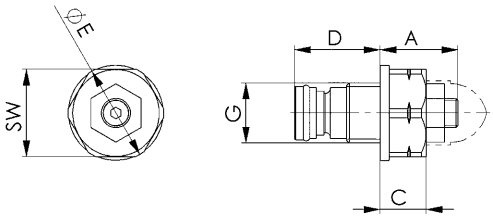
Housing made of steel, hardened and blued. Compact size.

Application:

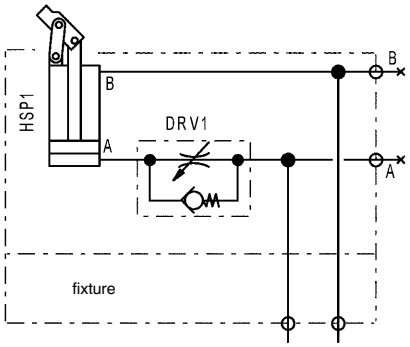
For single and double-acting loads. The traversing speed can be set by controlling the flow.

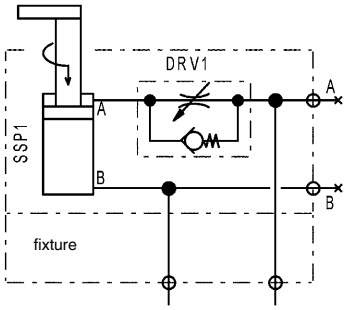
Note:

The screw-in throttle check valve is screwed into the installation bore.
The upstream pressure relief valve in the hydraulic control guarantees to drain the surplus volume.
The throttle check valves should preferably be used for feed control.
Return flow control poses the risk of excess pressure.

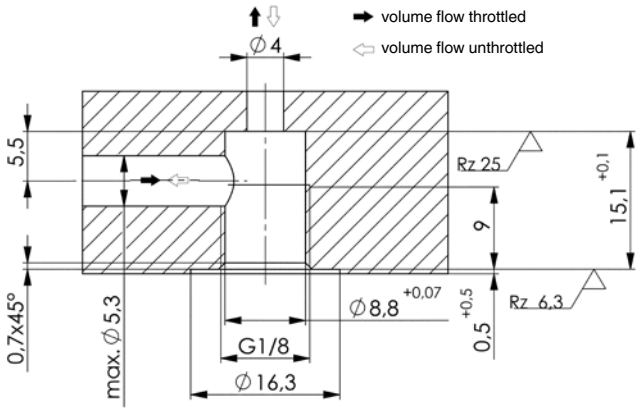


Application examples for feed controls:

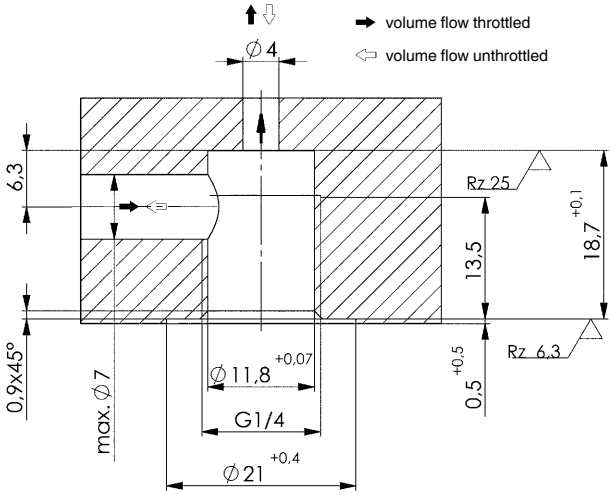




Installation dimensions 6916-12-01:

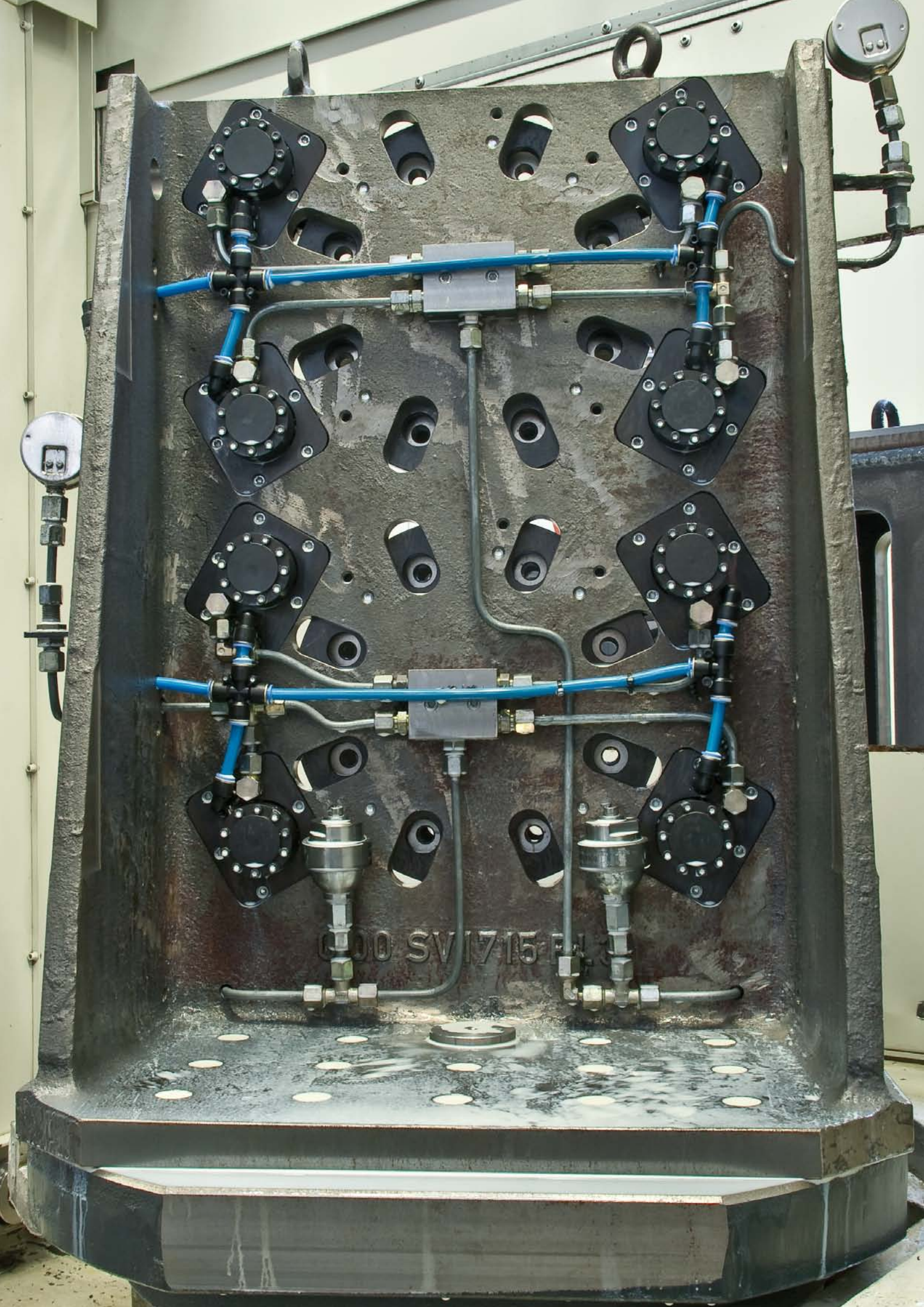


Installation dimensions 6916-12-04:



CAD

Subject to technical alterations.



ACCESSORIES –
COUPLINGS FOR LOSS-FREE MEDIA TRANSMISSION

> **THREADED-COUPLING ELEMENTS**

> **BUILT-IN COUPLING ELEMENTS**

> **PLUG CONNECTIONS**

PRODUCT OVERVIEW:

Type	Designation	Max. operating pressure [bar]	Nominal bore	detachable under pressure	detachable pressure-free	No. of models
6989M	Coupling mechanism, threaded design	350 500	3 5	●	●	4
6989N	Coupling nipple, threaded design	350 500	3 5	●	●	4
6989ME	Coupling mechanism, installation design	350 500 300	3 5 8	●	●	6
6989NE	Coupling nipple, installation design	350 500 300	3 5 8	●	●	8
6989MA	Automatic coupling mechanism, threaded design	350	5	●	●	2
6989NA	Automatic coupling nipple, threaded design	350	5	●	●	2
6994S	Plug connection	500	3 - 16	-	-	6

PRODUCT EXAMPLES:

NO. 6989M AND 6989N



> max. operating pressure: 630 bar

NO. 6989ME AND 6989NE



> max. operating pressure: 700 bar

NO. 6989MA AND 6989NA

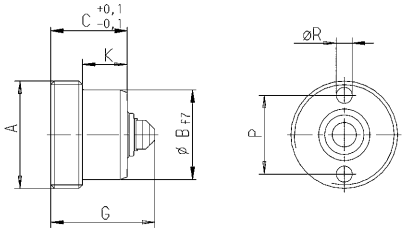


> max. operating pressure: 350 bar

No. 6989M

Coupling mechanism, threaded design





Order no.	Article no.	for coupling under pressure	for pressure-free coupling	Thread [A]	Nominal bore [NW]	max. operating pressure [bar]	Min. coupling force * (N)	Md [Nm]	Weight [g]
324491	6989M-05-001	●	-	M20x1,5	3	350	94	15	40
324517	6989M-06-002	-	●	M20x1,5	3	350	94	15	40
164970	6989M-10-001	●	-	M24x1,5	5	500	98	20	72
164996	6989M-20-002	-	●	M24x1,5	5	500	98	20	72

* At 0 bar

Design:

Cylinder body and internal parts made of stainless steel. Seals from NBR, Viton, POM and PU.

Application:

Couplings are used for the leakage-free connection of hydraulic oil supplies. The coupling elements are installed in a body. The sealing between coupling mechanism and nipple is axial, and installed in the coupling mechanism. If the seal is worn, it can be replaced. The coupling mechanism must always be used in combination with a nipple of the same system. Depending on the version, the couplings can be connected and disconnected at the maximum working pressure. When installed in a tank line, a coupling nipple with pressure relief must be selected. This limits the pressure that can be built up in the uncoupled state (for example due to internal leakage of the clamping elements) to approx 5 bar. When the two parts of the coupling are engaged, the pressure relief is no longer active.

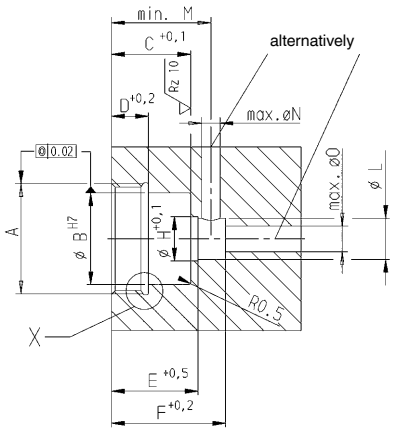
Features:

For connection, the coupling mechanism and nipple must be axially aligned. The bodies of the two parts must be guided when the axial sealing surfaces are ca. 2-3 mm apart. The radial position tolerance must not be exceeded. The separating force due to hydraulic pressure is given by the formula NW3: F [N] = 9,4 x p [bar], NW5: F [N] = 15,4 x p [bar]. This separating force must be countered by some external, mechanical means. The coupling mechanism must seal at the bottom of the hole in which it is installed. The mounting hole must be machined to the specified accuracy and surface finish.

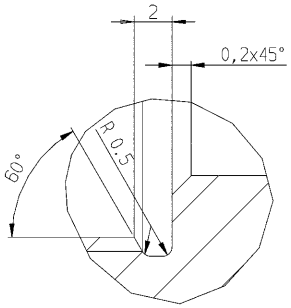
Note:

The axial sealing surfaces on the front must be protected from soiling. Because the coupling elements have smooth, uninterrupted sealing surfaces, the danger of them being soiled is reduced, and the ease with which the user can clean them before the coupling process is increased. Good results can be achieved by washing them off and blowing clean with compressed air.
Positioning tolerance in axial direction for all coupling elements: +0.5 mm.
Positioning tolerance in radial direction for coupling units: +/- 0.3 mm.
Permitted angle tolerance: +/- 1°.
Diagrams: coupling force and flow resistance, see under 6989N.
Installation tool for sealing ring:
Size 05 and 06 order no. 551864 / size 10 and 20 order no. 551865
Screw-in tool:
Size 05 and 06 order no. 552759 / Size 10 and 20 order no. 552760

Installation dimensions:



detail X



On request:

Other sizes available on request.

Dimensions:

Order no.	Article no.	dia. B	C	D	E *	F	G	ØH *	K	dia. L	M	N	dia. O	P	ØR
324491	6989M-05-001	18	21,5	10	-	31	29	-	13,5	11,2	28	5	7	15,5	2 x 2,6
324517	6989M-06-002	18	21,5	10	-	31	29	-	13,5	11,2	28	5	7	15,5	2 x 2,6
164970	6989M-10-001	22	21,5	10	23,5	31	29	12	12,5	11,2	28	5	7	18,5	4 x 2,8
164996	6989M-20-002	22	21,5	10	23,5	31	29	12	12,5	11,2	28	5	7	18,5	4 x 2,8

* Countersunk bore ØHxE only for NW 5



CAD

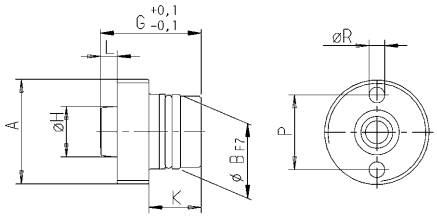
Subject to technical alterations.

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No. 6989N

Coupling nipple, threaded design





Order no.	Article no.	for coupling under pressure	for pressure-free coupling	Thread [A]	Nominal bore [NW]	max. operating pressure [bar]	Min. coupling force * (N)	Md [Nm]	Weight [g]
324509	6989N-05-001	●	-	M20x1,5	3	350	94	15	30
324525	6989N-06-002	-	●	M20x1,5	3	350	94	15	30
164962	6989N-10-001	●	-	M24x1,5	5	500	98	20	56
164988	6989N-20-002	-	●	M24x1,5	5	500	98	20	56

* At 0 bar

Design:

Cylinder body and internal parts made of stainless steel. Seals from NBR, Viton, POM and PU.

Application:

Couplings are used for the leakage-free connection of hydraulic oil supplies. The coupling elements are installed in a body. The sealing between coupling mechanism and nipple is axial, and installed in the coupling mechanism. If the seal is worn, it can be replaced. The coupling mechanism must always be used in combination with a nipple of the same system. Depending on the version, the couplings can be connected and disconnected at the maximum working pressure. When installed in a tank line, a coupling nipple with pressure relief must be selected. This limits the pressure that can be built up in the uncoupled state (for example due to internal leakage of the clamping elements) to approx 5 bar. When the two parts of the coupling are engaged, the pressure relief is no longer active.

Features:

For connection, the coupling mechanism and nipple must be axially aligned. The bodies of the two parts must be guided when the axial sealing surfaces are ca. 2-3 mm apart. The radial position tolerance must not be exceeded. The separating force due to hydraulic pressure is given by the formula NW3: F [N] = 9,4 x p [bar], NW5: F [N] = 15,4 x p [bar]. This separating force must be countered by some external, mechanical means. The mounting hole must be machined to the specified accuracy and surface finish.

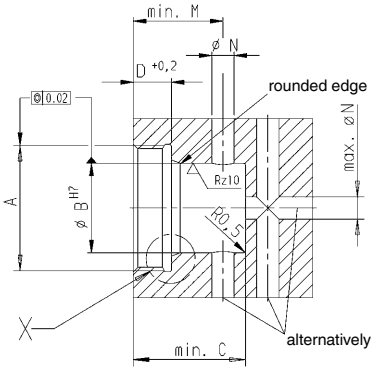
Note:

The axial sealing surfaces on the front must be protected from soiling. Because the coupling elements have smooth, uninterrupted sealing surfaces, the danger of them being soiled is reduced, and the ease with which the user can clean them before the coupling process is increased. Good results can be achieved by washing them off and blowing clean with compressed air.
Positioning tolerance in axial direction for all coupling elements: +0.5 mm.
Positioning tolerance in radial direction for coupling units: +/- 0.3 mm.
Permitted angle tolerance: +/- 1°.
Screw-in tool:
Size 05 and 06 order no. 552759 / size 10 and 20 order no. 552760

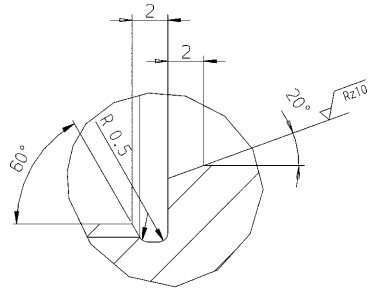
On request:

Other sizes available on request.

Installation dimensions:



detail X



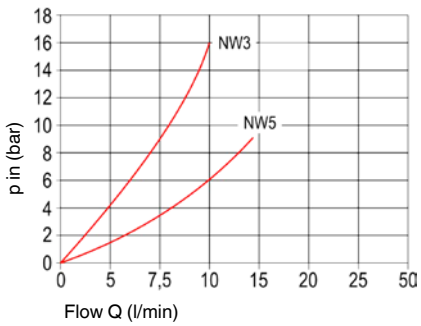
Dimensions:

Order no.	Article no.	dia. B	C	D	G	dia. H	K	L	M	dia. N	P	ØR
324509	6989N-05-001	16	23	8,4	25,9	9,8	13	4,5	19	5	15,5	2 x 2,6
324525	6989N-06-002	16	23	8,4	25,9	9,8	13	4,5	19	5	15,5	2 x 2,6
164962	6989N-10-001	20	25	8,5	27,0	13,5	14	4,5	19	5	18,5	4 x 2,8
164988	6989N-20-002	20	25	8,5	27,0	13,5	14	4,5	19	5	18,5	4 x 2,8

Diagrams:

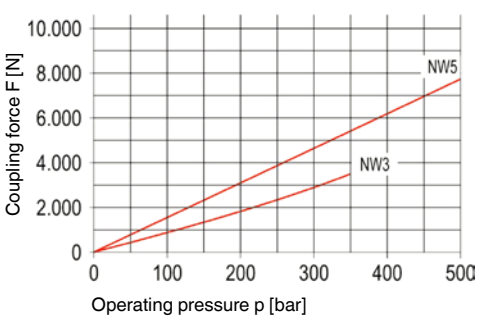
Flow resistance:

p-characteristic with HLP 22,
viscosity 34 cst



Coupling force:

NW3: F [N] = 9,4 x p [bar]
NW5: F [N] = 15,4 x p [bar]



CAD

Subject to technical alterations.

No. 6989ME

Coupling mechanism, installation design

Order no.	Article no.	for coupling under pressure	for pressure-free coupling	Nominal bore [NW]	max. operating pressure [bar]	Coupling stroke [mm]	Weight [g]
328823	6989ME-03-01	●	-	3	350	4,5	14
327965	6989ME-03-02	-	●	3	350	4,5	14
328591	6989ME-05-01	●	-	5	500	4,5	25
328617	6989ME-05-02	-	●	5	500	4,5	25
328633	6989ME-08-01	●	-	8	300	7,0	56
328658	6989ME-08-02	-	●	8	300	7,0	56



Design:

Cylinder body and internal parts made of stainless steel. Seals from NBR, Viton, POM and PU.

Application:

Couplings are used for the leakage-free connection of hydraulic oil supplies. The coupling elements are installed in a body. The sealing between coupling mechanism and nipple is axial, and installed in the coupling mechanism. If the seal is worn, it can be replaced. The coupling mechanism must always be used in combination with a nipple of the same system. Depending on the version, the couplings can be connected and disconnected at the maximum working pressure. When installed in a tank line, a coupling nipple with pressure relief must be selected. This limits the pressure that can be built up in the uncoupled state (for example due to internal leakage of the clamping elements) to approx 5 bar. When the two parts of the coupling are engaged, the pressure relief is no longer active.

Features:

For connection, the coupling mechanism and nipple must be axially aligned. The bodies of the two parts must be guided when the axial sealing surfaces are ca. 2-3 mm apart. The radial position tolerance must not be exceeded. The separating force due to hydraulic pressure is given by the formula NW3: F [N] = 9,4 x p [bar], NW5: F [N] = 15,4 x p [bar], NW8: F [N] = 31,4 x p [bar]. This separating force must be countered by some external, mechanical means. The coupling mechanism must seal at the bottom of the hole in which it is installed. The mounting hole must be machined to the specified accuracy and surface finish.

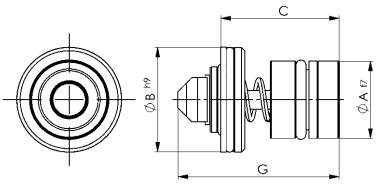
Note:

The axial sealing surfaces must be protected from dirt. Because the coupling elements have smooth, uninterrupted sealing surfaces, the danger of them collecting dirt is reduced, and the ease with which the user can clean them before the joint is made is increased. Good results can be achieved by washing them off and blowing clean with compressed air.
Positioning tolerance in axial direction for all coupling elements: +0.5 mm.
Positioning tolerance in radial direction for coupling elements: +/- 0.3 mm.
Permissible angle tolerance: +/- 1°.
Diagrams: Coupling force and flow resistance, see 6989N.

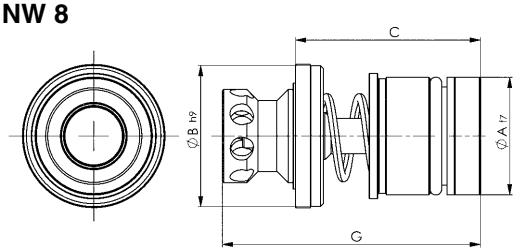
On request:

Other sizes available on request.

NW 3+5



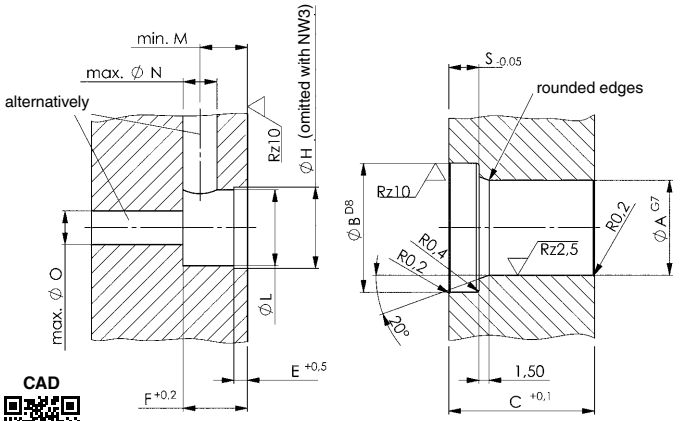
NW 8



Dimensions:

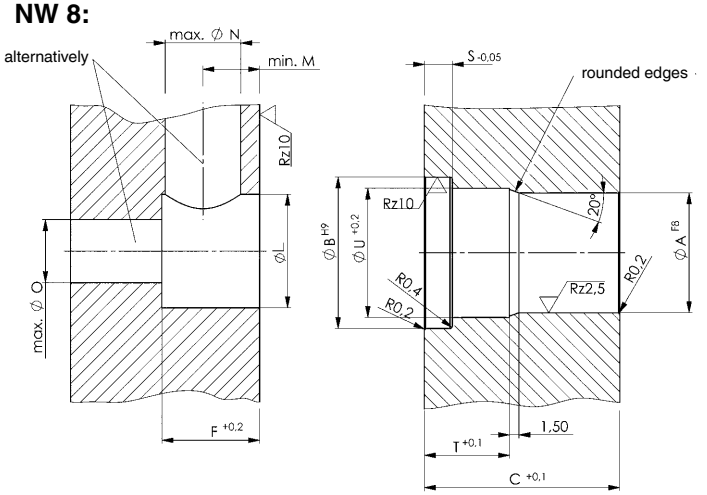
Order no.	Article no.	dia. A	dia. B	C	E	F	G	H +0,1	dia. L +0,1	M	dia. N	dia. O	S	T	dia. U
328823	6989ME-03-01	11	14	21,5	-	9,5	29	-	11,2	7	5	7	4,5	-	-
327965	6989ME-03-02	11	14	21,5	-	9,5	29	-	11,2	7	5	7	4,5	-	-
328591	6989ME-05-01	14	19	21,5	2	9,5	29	12	11,2	7	5	7	4,5	-	-
328617	6989ME-05-02	14	19	21,5	2	9,5	29	12	11,2	7	5	7	4,5	-	-
328633	6989ME-08-01	20	24	31,0	-	15,5	44	-	18,0	9	12	10	4,5	13,5	21,5
328658	6989ME-08-02	20	24	31,0	-	15,5	44	-	18,0	9	12	10	4,5	13,5	21,5

Einbaumaße NW 3+5:



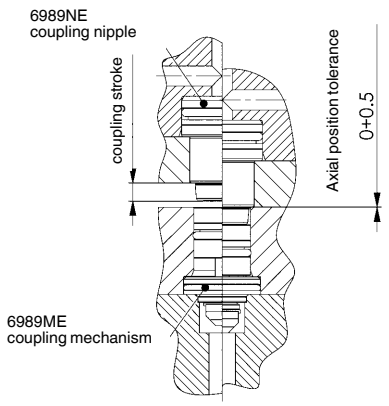
CAD

NW 8:

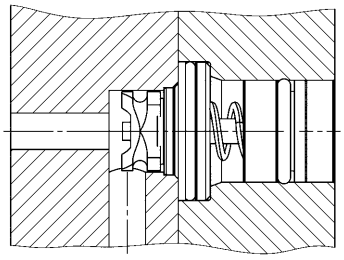


Subject to technical alterations.

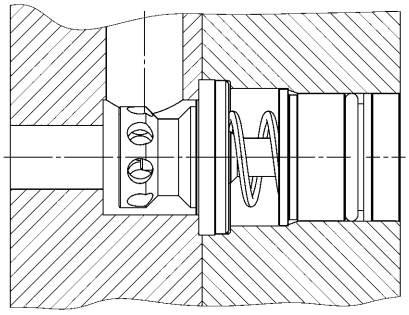
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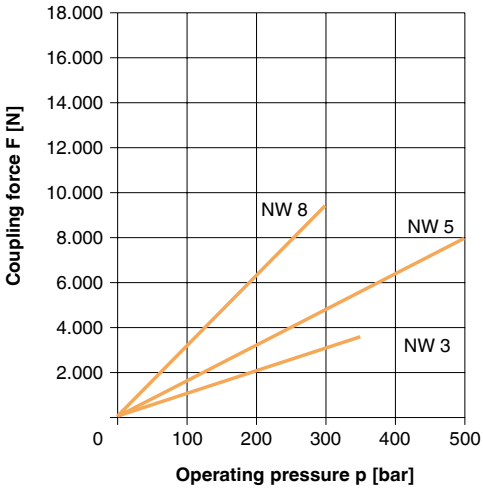
Installation example NW 3+5:



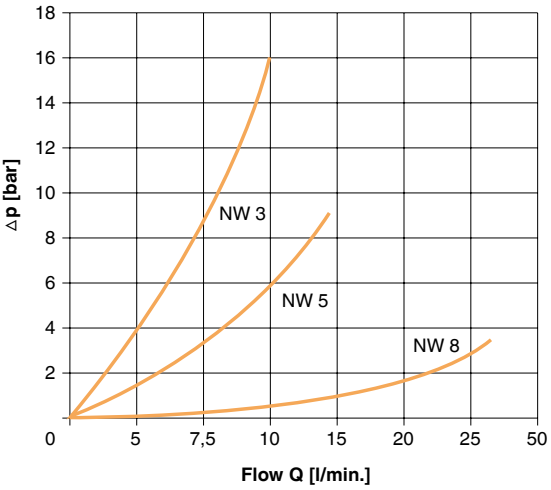
NW 8:



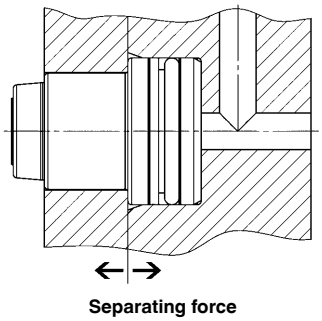
Coupling force:



Flow resistance:



Δp-characteristic with HLP 22, viscosity 34 cst



Separating force

Separating force:
NW 3 = F [N] = 9,4 x p [bar]
NW 5 = F [N] = 15,4 x p [bar]
NW 8 = F [N] = 31,4 x p [bar]



Subject to technical alterations.

No. 6989NE

Coupling nipple, installation design



Order no.	Article no.	for coupling under pressure	for pressure-free coupling	Nominal bore [NW]	max. operating pressure [bar]	Coupling stroke [mm]	Weight [g]
525188	6989NE-03-01	●	-	3	350	4,5	21
328674	6989NE-03-02	-	●	3	350	4,5	21
328690	6989NE-05-01	●	-	5	500	4,5	25
328450	6989NE-05-01-01	●	-	5	500	4,5	45
445049	6989NE-05-02	-	●	5	500	4,5	25
328757	6989NE-05-02-01	-	●	5	500	4,5	45
328716	6989NE-08-01	●	-	8	300	7,0	60
328732	6989NE-08-02	-	●	8	300	7,0	60

Design:

Cylinder body and internal parts made of stainless steel. Seals from NBR, Viton, POM and PU.

Application:

Couplings are used for the leakage-free connection of hydraulic oil supplies. The coupling elements are installed in a body. The sealing between coupling mechanism and nipple is axial, and installed in the coupling mechanism. If the seal is worn, it can be replaced. The coupling mechanism must always be used in combination with a nipple of the same system. Depending on the version, the couplings can be connected and disconnected at the maximum working pressure. When installed in a tank line, a coupling nipple with pressure relief must be selected. This limits the pressure that can be built up in the uncoupled state (for example due to internal leakage of the clamping elements) to approx 5 bar. When the two parts of the coupling are engaged, the pressure relief is no longer active.

Features:

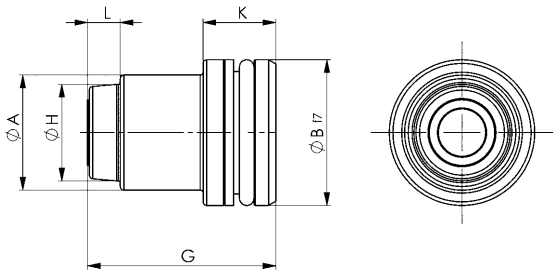
For connection, the coupling mechanism and nipple must be axially aligned. The bodies of the two parts must be guided when the axial sealing surfaces are ca. 2-3 mm apart. The radial position tolerance must not be exceeded. The separating force due to hydraulic pressure is given by the formula NW3: F [N] = 9,4 x p [bar], NW5: F [N] = 15,4 x p [bar], NW8: F [N] = 31,4 x p [bar]. This separating force must be countered by some external, mechanical means. The coupling mechanism must seal at the bottom of the hole in which it is installed. The mounting hole must be machined to the specified accuracy and surface finish.

Note:

The axial sealing surfaces must be protected from dirt. Because the coupling elements have smooth, uninterrupted sealing surfaces, the danger of them collecting dirt is reduced, and the ease with which the user can clean them before the joint is made is increased. Good results can be achieved by washing them off and blowing clean with compressed air.
Positioning tolerance in axial direction for all coupling elements: +0.5 mm.
Positioning tolerance in radial direction for coupling elements: +/- 0.3 mm.
Permissible angle tolerance: +/- 1°.

On request:

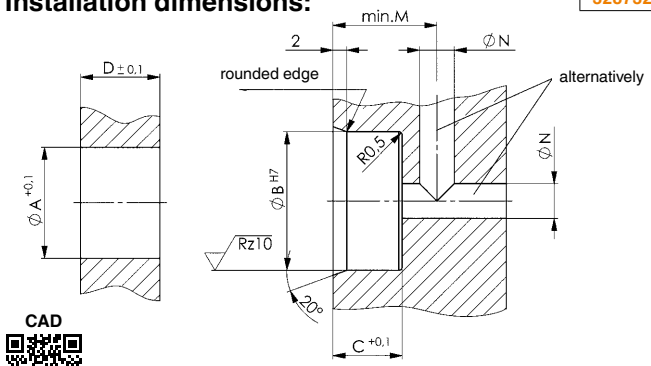
Other sizes available on request.



Dimensions:

Order no.	Article no.	dia. A	dia. B	C	D	G	dia. H	K	L	M	dia. N
525188	6989NE-03-01	13	16	10,0	11,4	25,9	9,8	10,0	4,5	15	5
328674	6989NE-03-02	13	16	10,0	11,4	25,9	9,8	10,0	4,5	15	5
328690	6989NE-05-01	16	20	10,0	11,4	26,0	13,5	10,0	4,5	15	5
328450	6989NE-05-01-01	16	20	16,5	17,0	38,1	13,5	16,5	4,5	22	5
445049	6989NE-05-02	16	20	10,0	11,4	26,0	13,5	10,0	4,5	15	5
328757	6989NE-05-02-01	16	20	16,5	17,0	38,1	13,5	16,5	4,5	22	5
328716	6989NE-08-01	21	24	9,0	15,0	31,4	18,5	9,0	7,4	15	10
328732	6989NE-08-02	21	24	9,0	15,0	31,4	18,5	9,0	7,4	15	10

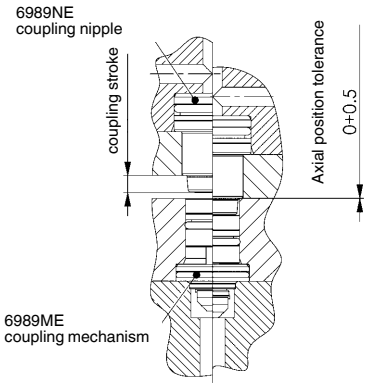
Installation dimensions:



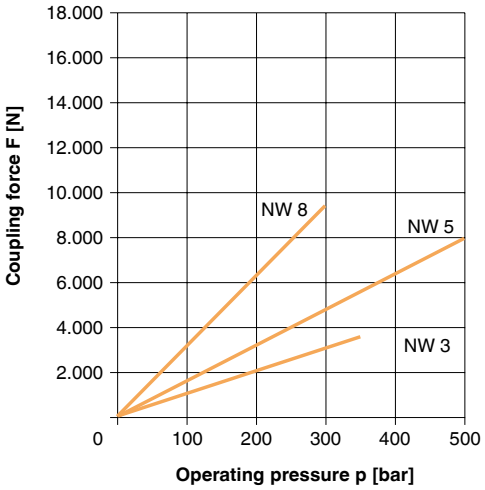
CAD

Subject to technical alterations.

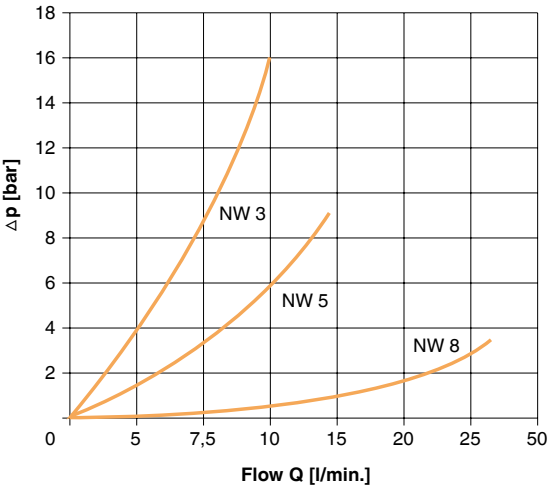
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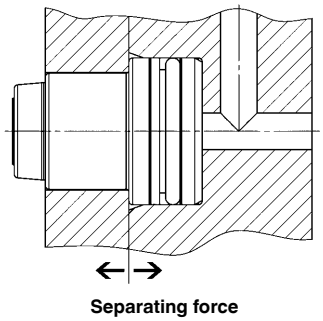
Coupling force:



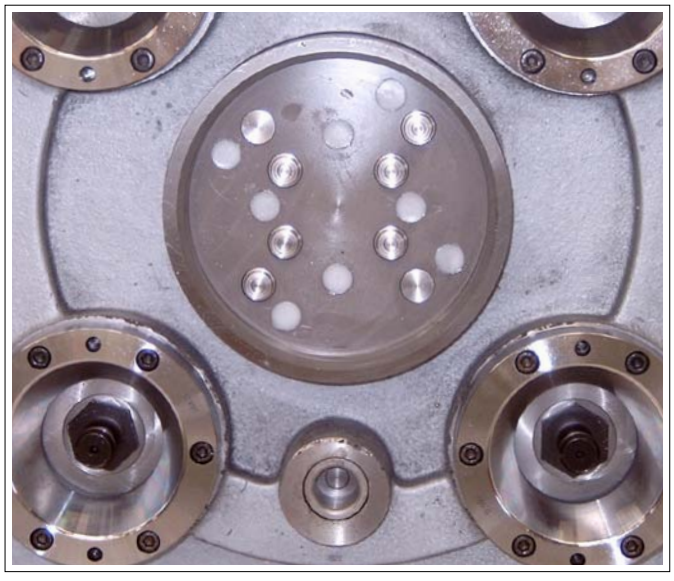
Flow resistance:

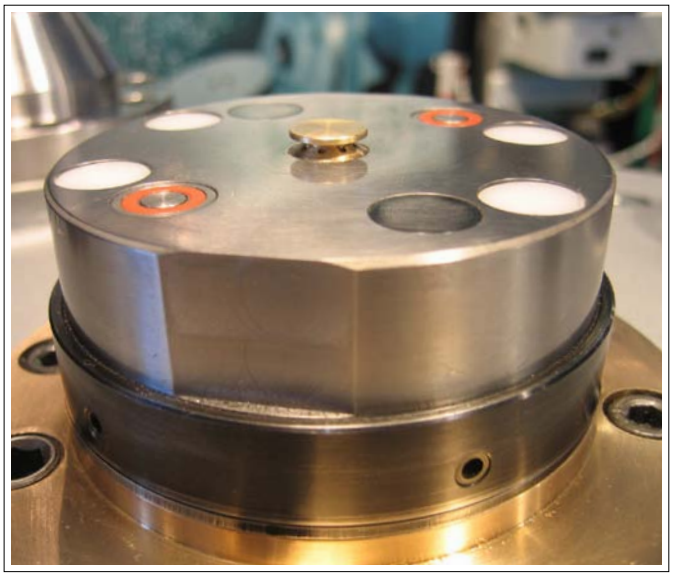


Δp-characteristic with HLP 22, viscosity 34 cst



Separating force:
NW 3 = F [N] = 9,4 x p [bar]
NW 5 = F [N] = 15,4 x p [bar]
NW 8 = F [N] = 31,4 x p [bar]





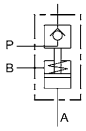
Subject to technical alterations.

No. 6989MA

Automatic coupling mechanism, threaded design

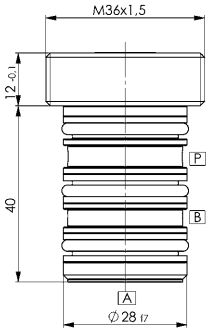
CAD

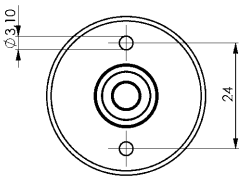
Order no.	Article no.	for coupling under pressure	for pressure-free coupling	Thread [A]	Nominal bore [NW]	max. operating pressure [bar]	max. coupling force [N]	Q max. [l/min]	Weight [g]
567056	6989MA-05-01	●	-	M36 x 1,5	5	350	5,39	12	206
567057	6989MA-05-02	-	●	M36 x 1,5	5	350	5,39	12	206



NEW!







Design:

Body and internal parts made of stainless steel. Seals made of NBR, Viton and FKM.

Application:

Couplings are used for the leakage-free connection of hydraulic oil supplies. The coupling elements are installed in a body. The sealing between coupling mechanism and nipple is axial, and installed in the coupling mechanism. If the seal is worn, it can be replaced. The coupling mechanism must always be used in combination with a nipple of the same system. Depending on the version, the couplings can be connected at the maximum operating pressure. The patented automatic coupling mechanism on the system connects coupling components and/or components without additional stroke. For example, the hydraulically actuated system dispenses with the lifting device otherwise needed on rotary tables of machine tools Shuttle tables or pallets can be coupled to the rotary table solely by radial movement.

Features:

Wherever no coupling stroke is possible, this coupling can be connected at a separate control pressure. The gap between coupling nipple and coupling mechanism can be between 0.6 and 1.0 mm. The faces of the coupling surfaces on coupling nipple and coupling mechanism are flat. The user can therefore position them for connection from any axial and/or radial position subject to compliance with the positioning tolerance. The coupling stroke is then performed by an integrated control piston A. It is possible to control individual couplings in a targeted manner. Control pressure A should be applied at the same pressure as medium pressure P. With control connection A depressurised, the coupling mechanism is always in its default position. The coupling force between coupling nipple and mechanism due to hydraulic pressure is given by the formula F [N] = 15.4 x p [bar] and must be applied in a force-locking or form-locking manner from the outside. The coupling mechanism should be operated in a dual-action manner.

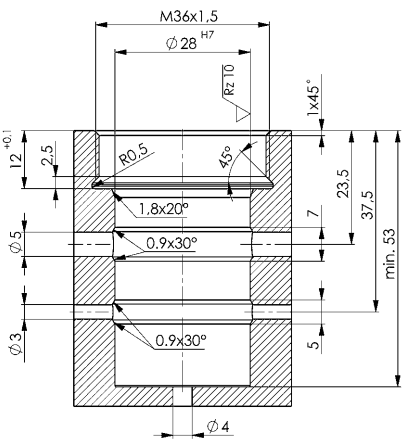
Advantage:

- no additional coupling stroke required
- can be connected without pressure
- targeted activation of individual couplings is possible
- coupling elements made of stainless materials.

Note:

The axial sealing surfaces on the front must be protected from soiling. Because the coupling elements have smooth, uninterrupted sealing surfaces, the danger of them being soiled is reduced, and the ease with which the user can clean them before the coupling process is increased. Good results can be achieved by washing them off and blowing clean with compressed air.
Spacing of nipple/mechanism: 0.8 mm +/- 0.2 mm
Positioning tolerance in radial direction with coupling elements: +/- 0.2 mm
Operating temperature: -10°C to +80°C
Assembly tool for sealing ring: Order no. 551864
Screw-in tool: Order no. 567094

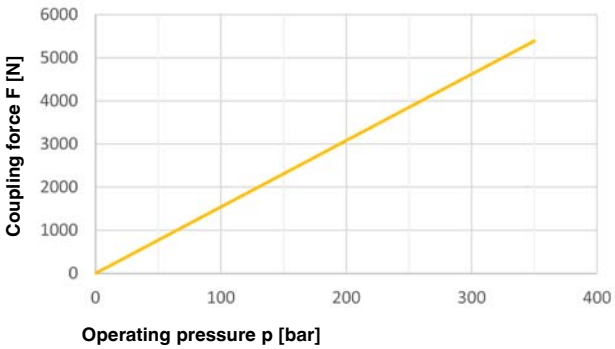
Installation dimensions:



Subject to technical alterations.

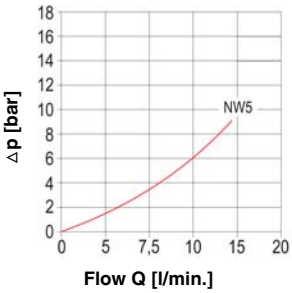
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Coupling force:



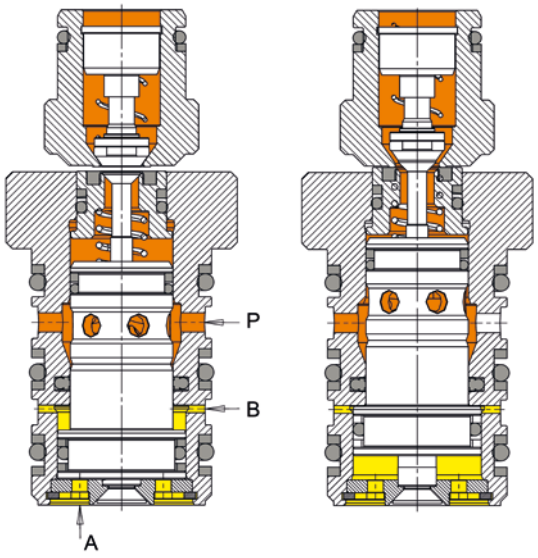
Separating force:
NW 5 = F [N] = 15,4 x p [bar]

Flow resistance:



Δp-characteristic with HLP 22, viscosity 34 cst

Operating principle:

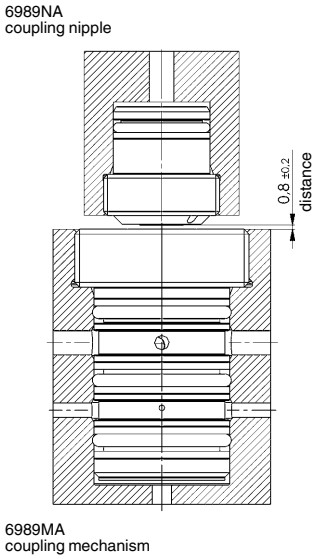


not actuated actuated

1. Control port B: Coupling mechanism in basic setting
2. Positioning of the coupling nipple for coupling mechanism, complying positioning tolerance
3. Control port A: A connection is established to the coupling nipple side.
4. Media pressure to connection P

A = Control pressure (extend)
B = Control pressure (retract)
P = Media pressure

Installation principle:





Subject to technical alterations.

No. 6989NA

Automatic coupling nipple, threaded design

NEW!



CAD

Order no.	Article no.	for coupling under pressure	for pressure-free coupling	Thread [A]	Nominal bore [NW]	max. operating pressure [bar]	max. coupling force [N]	Q max. [l/min]	Weight [g]
567058	6989NA-05-01	●	-	M24 x 1,5	5	350	5,39	12	50
567059	6989NA-05-02	-	●	M24 x 1,5	5	350	5,39	12	50

Design:

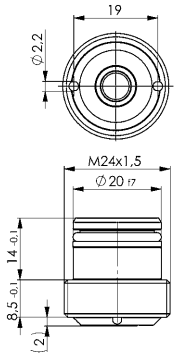
Body and internal parts made of stainless steel. Seals made of NBR, Viton and FKM.

Application:

Couplings are used for the leakage-free connection of hydraulic oil supplies. The coupling elements are installed in a body. The sealing between coupling mechanism and nipple is axial, and installed in the coupling mechanism. If the seal is worn, it can be replaced.
The coupling mechanism must always be used in combination with a nipple of the same system. Depending on the version, the couplings can be connected at the maximum operating pressure.
The patented automatic coupling mechanism on the system connects coupling components and/or components without additional stroke. For example, the hydraulically actuated system dispenses with the lifting device otherwise needed on rotary tables of machine tools Shuttle tables or pallets can be coupled to the rotary table solely by radial movement.

Features:

Wherever no coupling stroke is possible, this coupling can be connected at a separate control pressure. The gap between coupling nipple and coupling mechanism can be between 0.6 and 1.0 mm.
The faces of the coupling surfaces on coupling nipple and coupling mechanism are flat. The user can therefore position them for connection from any axial and/or radial position subject to compliance with the positioning tolerance. The coupling stroke is then performed by an integrated control piston A. It is possible to control individual couplings in a targeted manner. Control pressure A should be applied at the same pressure as medium pressure P. With control connection A depressurised, the coupling mechanism is always in its default position. The coupling force between coupling nipple and mechanism due to hydraulic pressure is given by the formula F [N] = 15.4 x p [bar] and must be applied in a force-locking or form-locking manner from the outside. The coupling mechanism should be operated in a dual-action manner.



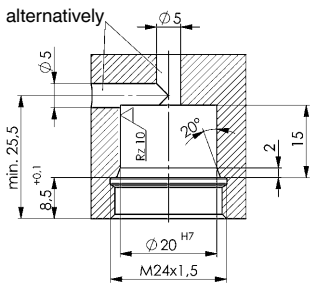
Advantage:

- no additional coupling stroke required
- can be connected without pressure
- targeted activation of individual couplings is possible
- coupling elements made of stainless materials.

Note:

The axial sealing surfaces on the front must be protected from soiling. Because the coupling elements have smooth, uninterrupted sealing surfaces, the danger of them being soiled is reduced, and the ease with which the user can clean them before the coupling process is increased. Good results can be achieved by washing them off and blowing clean with compressed air.
Spacing of nipple/mechanism: 0.8 mm +/- 0.2 mm
Positioning tolerance in radial direction with coupling elements: +/- 0.2 mm
Operating temperature: -10°C to +80°C
Screw in tool: Order no. 567095

Installation dimensions:



Subject to technical alterations.

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No. 6994S

Plug connection

max. operating pressure 500 bar.

CAD



Order no.	Article no.	Nominal bore [NW]	Ambient temp. [°C]	Weight [g]
554415	6994S-03	3	150	4
554416	6994S-05	5	150	6
554417	6994S-08	8	150	13
554418	6994S-10	10	150	20
554419	6994S-12	12	150	25
554420	6994S-16	16	150	30

Design:

Housing made from stainless steel , seals made from FKM.

Application:

For connecting two components at a short distance without using fittings.
They are designed for pipeline and screwless pressure oil connection.

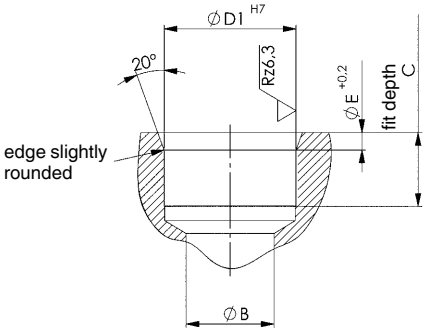
Note:

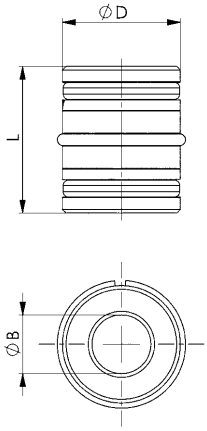
The axially effective hydraulic force must be absorbed from the outside by force-locking or form-fit. The force must be determined using the formula f. separating force F [N] = Factor x p [bar] (e.g. at NW3: F= 5 x p).

On request:

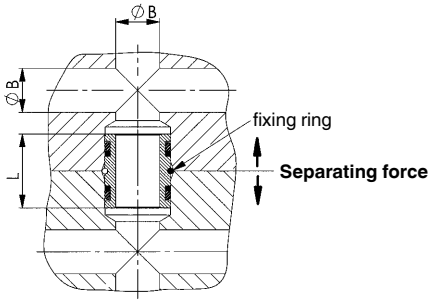
Special sizes are available on request.

Installation dimensions:





Installation example:



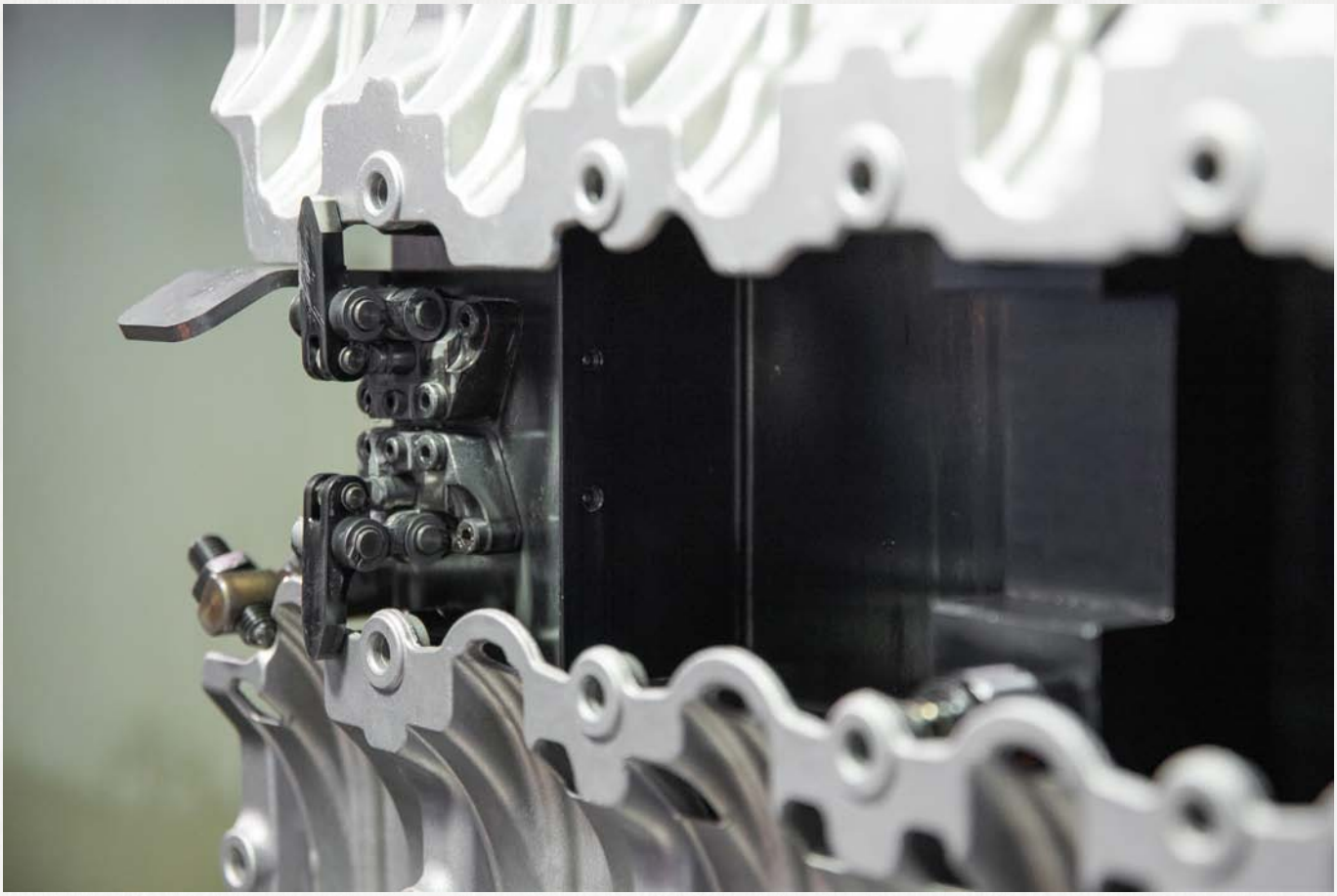
Separating force:

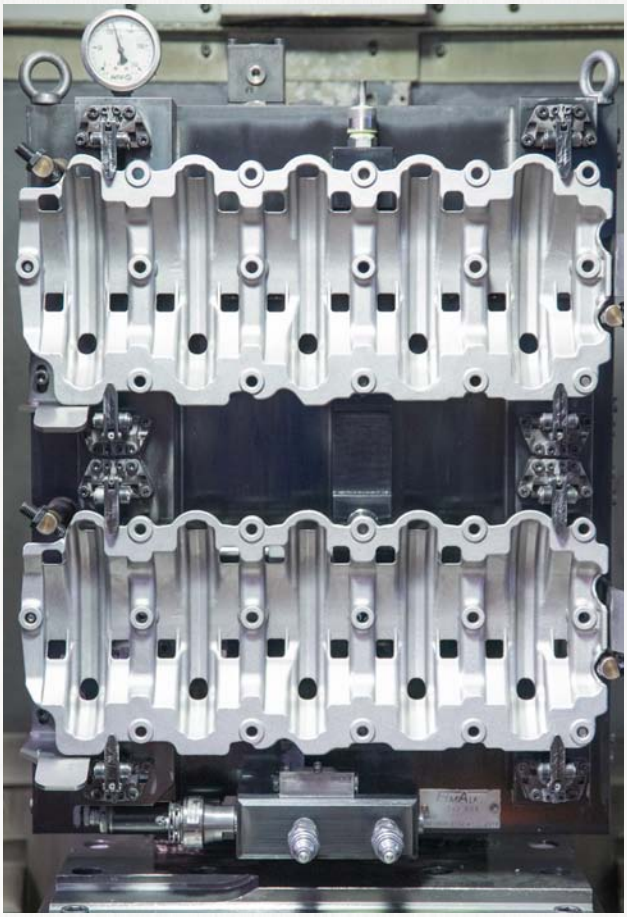
NW 3=F [N] = 5,0 x p [bar]
NW 5=F [N] = 7,9 x p [bar]
NW 8=F [N] = 15,4 x p [bar]
NW 10=F [N] = 20,1 x p [bar]
NW 12=F [N] = 25,5 x p [bar]
NW 16=F [N] = 38,0 x p [bar]

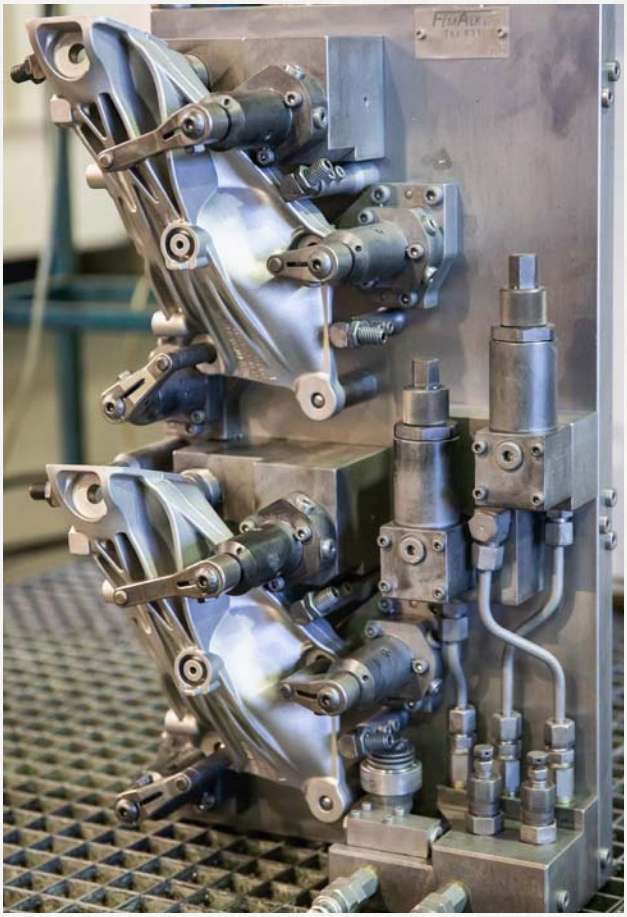
Dimensions:

Order no.	Article no.	dia. B	dia. D	L	C min.	dia. D1 H7	ØE +0.2
554415	6994S-03	3	8	12	6	8	1,5
554416	6994S-05	5	10	14	7	10	1,5
554417	6994S-08	8	14	16	8	14	1,5
554418	6994S-10	10	16	20	10	16	2,4
554419	6994S-12	12	18	20	10	18	2,4
554420	6994S-16	16	22	22	11	22	3,2

Subject to technical alterations.







Subject to technical alterations.

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ACCESSORIES –

FOR MEDIA TRANSMISSION OF ROTATING CLAMPING DEVICES AND CLAMPING DEVICES THAT HAVE TO BE SEPARATED BY THE PRESSURE GENERATOR AFTER THE CLAMPING OPERATION

- **ROTARY UNION, SINGLE PASSAGE**
- **ROTARY COUPLING, UNCONTROLLED AND CONTROLLED**
- **PALLET DECOUPLER BLOCK**
- **ACCUMULATOR**

PRODUCT OVERVIEW:

Type	Designation	Max. operating pressure [bar]	Nominal bore	Connections inputs	Connections outputs	No. of models	Oil connection
6991-01/-02	Swivel joint, single passage	400	4	1	1	2	thread / pipe
6991	Rotary coupling, uncontrolled	350	5	6	6	6	thread
6992H-11	Rotary coupling, controlled	350	5	1	9	3	thread
6992H-21	Rotary coupling, controlled	350	5	2	18	3	thread
6919-2	Pallet decoupler block	400	4	2	4	1	thread
6919-20	Pallet decoupler block	400	4	3	4	1	thread
6919S	Accumulator	500	-	1	-	2	thread

PRODUCT EXAMPLES:

NO. 6991-02 AND 6991



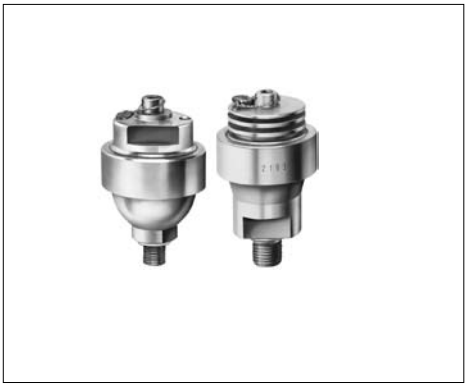
> max. operating pressure: 400 bar
> max. rpm 25 [1/min.]

NO. 6919-2 AND 6919-20



> max. operating pressure: 400 bar

NO. 6919S



> max. operating pressure: 500 bar

No. 6991-01

Axial Swivel Joint, single passage

max. operating pressure 400 bar.



Order no.	Article no.	NG	max. torque [Nm]	max. r.p.m. [1/min]	Md G1/4 [Nm]	Ambient temp. [°C]	Weight [g]
69088	6991-01	4	0,5	25	40	-30 - +80	140

Design:

Steel galvanized and yellow passivated. With union nut and cutting ring.

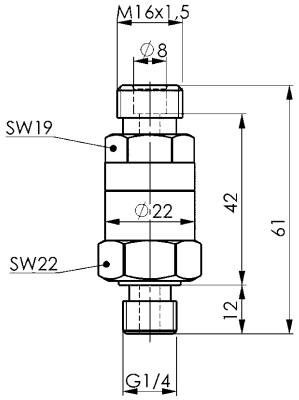
Application:

Rotary couplings are used to supply hydraulic oil to systems which can be rotaded and swivelled.

Note:

Please observe max. operating pressure and max. rpm. Thread G1/4 is sealed by means of a sealing edge according to DIN 3852 Part 2, form B.





CAD

No. 6991-02

Angle Swivel Joint, 90° single passage

max. operating pressure 400 bar.



Order no.	Article no.	NG	max. torque [Nm]	max. r.p.m. [1/min]	Md G1/4 [Nm]	Ambient temp. [°C]	Weight [g]
69104	6991-02	4	0,5	25	40	-30 - +80	180

Design:

Steel galvanized. With union nut and cutting ring.

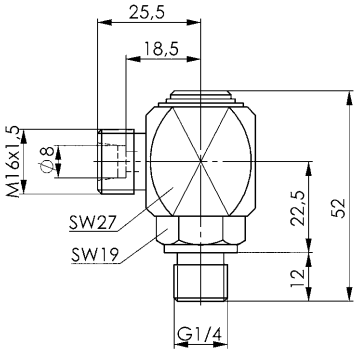
Application:

Rotary couplings are used to supply hydraulic oil to systems which can be rotaded and swivelled.

Note:

Please observe max. operating pressure and max. rpm. Thread G1/4 is sealed by means of a sealing edge according to DIN 3852 Part 2, form B.

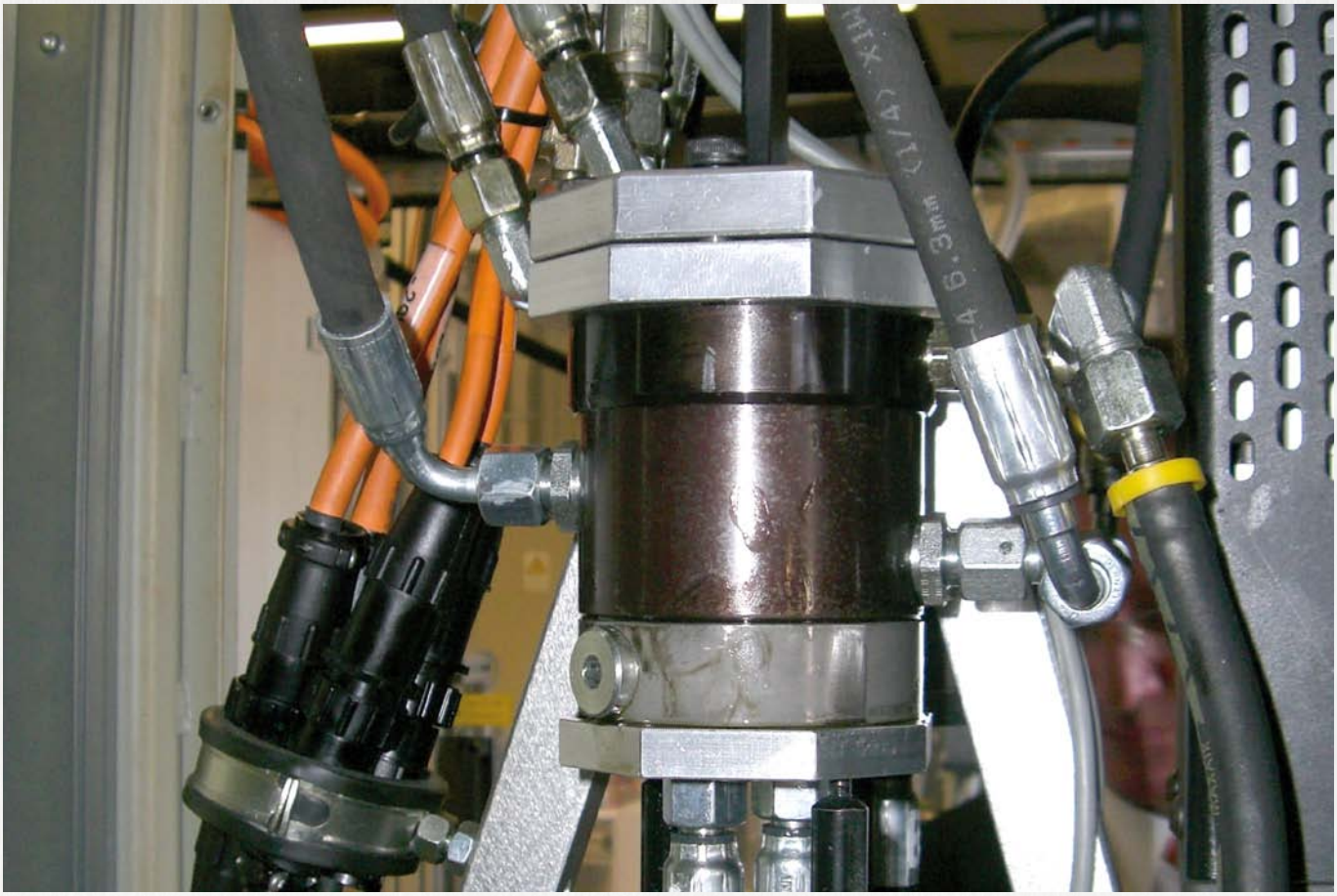


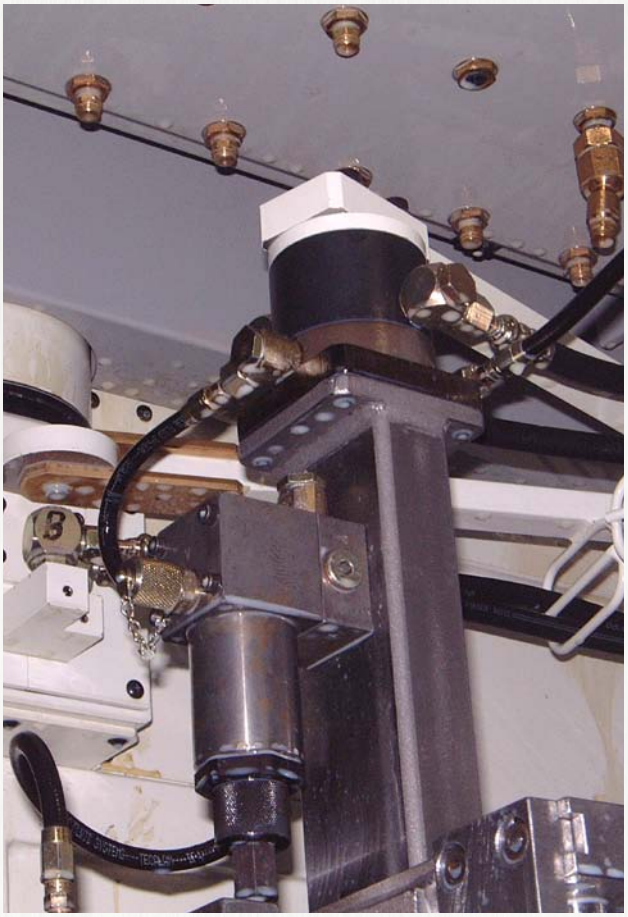


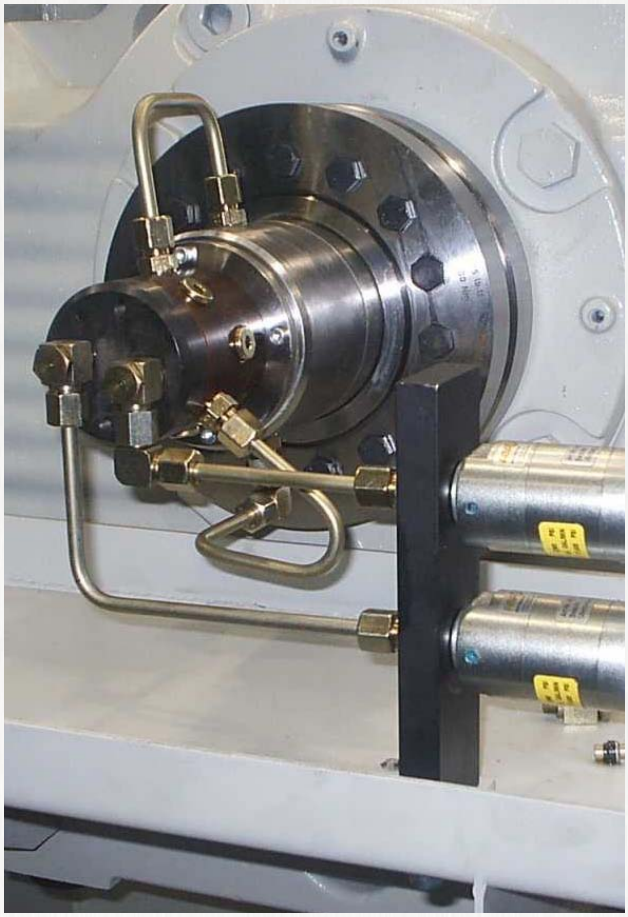
CAD

Subject to technical alterations.

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Subject to technical alterations.

No. 6991

Rotary coupling

overflow oil connection not included,
max. operating pressure 350 bar





Order no.	Article no.	Connections inputs	Connections outputs	Ambient temp. [°C]	Md max. [Nm]	max. r.p.m. [1/min]	NG	Weight [Kg]
334185	6991-20	2	2	-10 - +60	5,0	85	5	2,2
323451	6991-40	4	4	-10 - +60	7,5	48	5	3,8
323477	6991-60	6	6	-10 - +60	14,0	40	5	5,8

Design:

Rotary feed-through housing from spheroid graphite iron with radial oil connections 1/4“ thd. Rotary piston from nitrided, hardened steel with radial and face side oil connections 1/4“ thd. The reductions in the face side connections can be use as O-ring connection.

Application:

Rotary couplings transmit flows of hydraulic oil from a stationary machine component to a rotating one. They are located in the rotary axis of a rotating system. The rotary couplings are generally designed for hydraulic systems. To transmit air flows, they have to be filtered, oiled, and free of water. Single-acting and double-acting cylinders can be connected. Each cylinder channel requires a separate connection on the housing and on the rotor.

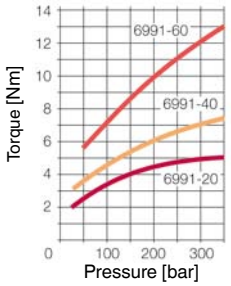
Features:

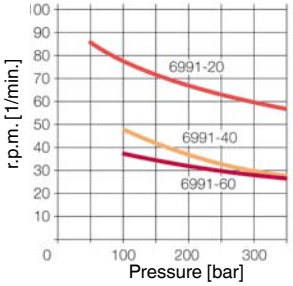
Because of the high-grade seal packages it is possible to operate at high pressures. Multistrand rotary oil couplings. Long service life. Compact design.

Note:

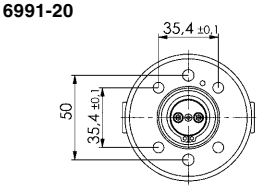
Max. pressure and max. rpm must not occur together. See diagrams.
The rotary couplings must be operated without bending forces. We recommend that you screw the rotating housing with the connections to the clamping fixtures and secure the rotary piston only against twisting. Do not introduce any bearing loads! The line connections to the rotary piston must always be made with hoses. The frictional resistance on the seals is pressure-dependent. This must be taken into account when calculating the drive torque for the rotary table. The rotary couplings are fundamentally designed for intermittent operation.
Special versions available on request. See diagrams for minimum and maximum load data.

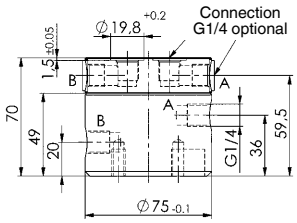
Diagrams:

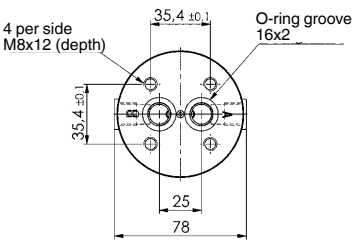




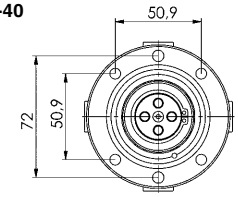
6991-20

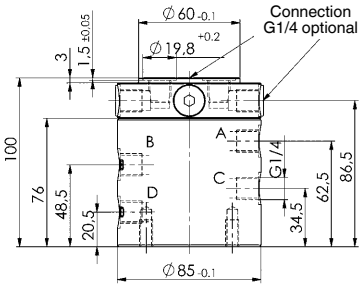


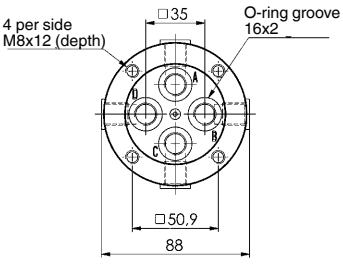




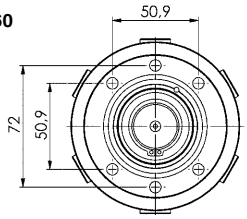
6991-40

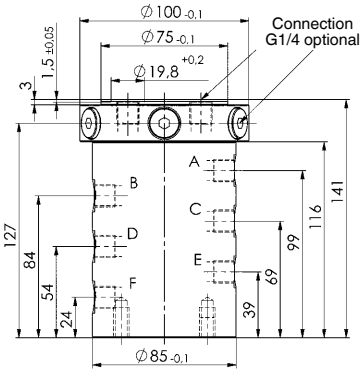


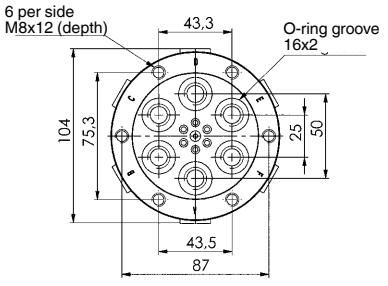




6991-60







CAD

Subject to technical alterations.

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No. 6991

Rotary coupling

with overflow oil connection,
max. operating pressure 350 bar





Order no.	Article no.	Connections inputs	Connections outputs	Ambient temp. [°C]	Md max. [Nm]	max. r.p.m. [1/min]	NG	Weight [Kg]
445536	6991-21	2	2	-10 - +60	5,0	85	5	2,5
323493	6991-41	4	4	-10 - +60	7,5	48	5	4,2
323519	6991-61	6	6	-10 - +60	14,0	40	5	6,2

Design:

Rotary feed-through housing from spheroid graphite iron with radial oil connections 1/4“ thd. Rotary piston from nitrided, hardened steel with radial and front oil connections 1/4“ thd. The reductions in the face side connections can be use as O-ring connection. Cover from hardened steel with radial 1/8“ thd. oil connection for leaked oil discharge.

Application:

Rotary couplings transmit flows of hydraulic oil from a stationary machine component to a rotating one. They are located in the rotary axis of a rotating system. The rotary couplings are generally designed for hydraulic systems. To transmit air flows, they have to be filtered, oiled, and free of water. Single-acting and double-acting cylinders can be connected. Each cylinder channel requires a separate connection on the housing and on the rotor.

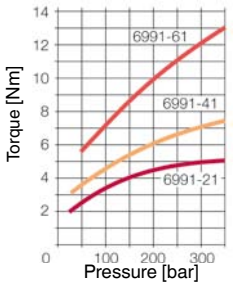
Features:

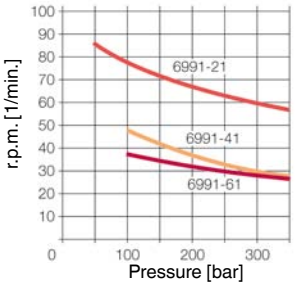
Because of the high-grade seal packages it is possible to operate at high pressures. Multistrand rotary oil couplings. Long service life. Compact design.

Note:

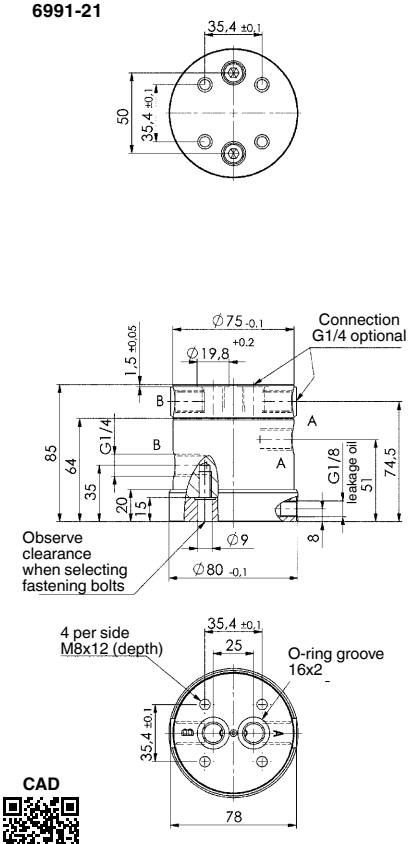
Max. pressure and max. rpm must not occur together. See diagrams.
The rotary couplings must be operated without bending forces. We recommend that you screw the rotating housing with the connections to the clamping fixtures and secure the rotary piston only against twisting. Do not introduce any bearing loads! The line connections to the rotary piston must always be made with hoses. The frictional resistance on the seals is pressure-dependent. This must be taken into account when calculating the drive torque for the rotary table. The rotary couplings are fundamentally designed for intermittent operation.
Special versions available on request. See diagrams for minimum and maximum load data.

Diagrams:

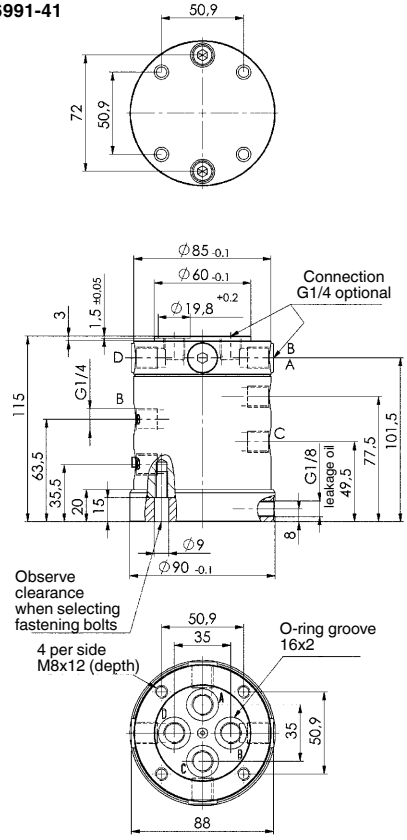




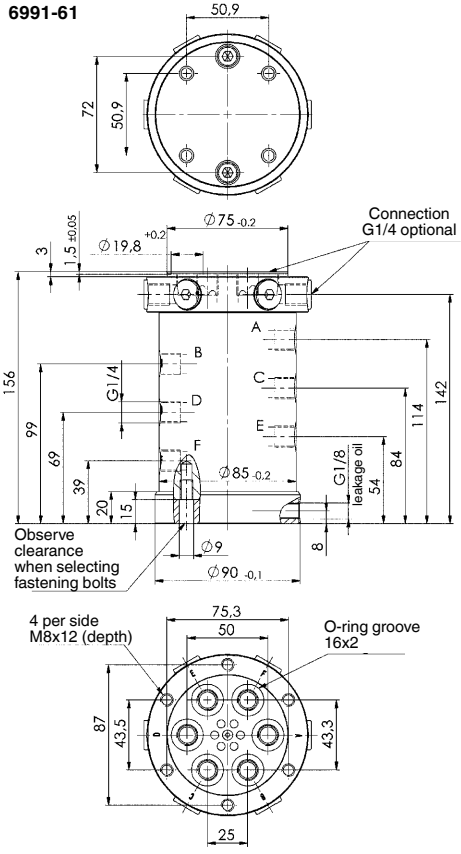
6991-21



6991-41



6991-61



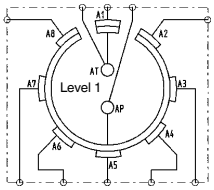
CAD

Subject to technical alterations.

No. 6992H-11

Rotary coupling

controlled, single-acting.
One loading and unloading station,
max. operating pressure 350 bar





Order no.	Article no.	Connections inputs loading	Connections inputs processing	Connections outputs loading	Connections outputs processing	Ambient temp. [°C]	Q max. [l/min]	NG	Weight [Kg]
324533	6992H-11-06	1	1	1	5	-10 - +60	8	5	3,6
324541	6992H-11-08	1	1	1	7	-10 - +60	8	5	3,5
324558	6992H-11-10	1	1	1	9	-10 - +60	8	5	3,5

Design:

Rotary feed-through housing from spheroid graphite iron with radial oil connections 1/4“ thd. Rotary piston from nitrided, hardened steel with radial and front oil connections 1/4“ thd. The reductions in the face side connections can be use as O-ring connections.

Application:

Rotary couplings transmit flows of hydraulic oil from a stationary machine component to a rotating one. They are located in the rotary axis of a rotating system. The controlled rotary couplings may only be operated with hydraulic oil. Types 6992H-11 are designed for single-acting cylinders. One loading/unloading station and 5, 7 or 9 processing stations can be connected.

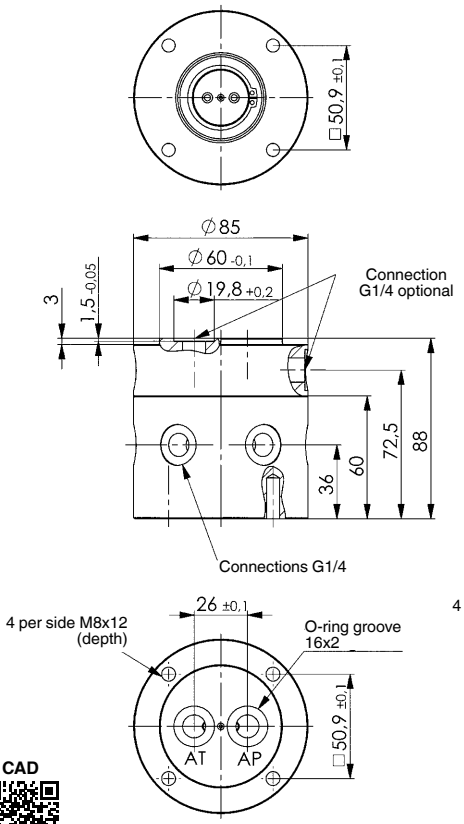
Features:

Rotary vane construction. Multiple hydraulic cylinders are supplied with hydraulic oil simultaneously. At the same time, a loading and/or unloading station can be controlled via directional valves for clamping and/or unclamping. High operating pressures due to high-quality components and seals. Compact design. Long service life.

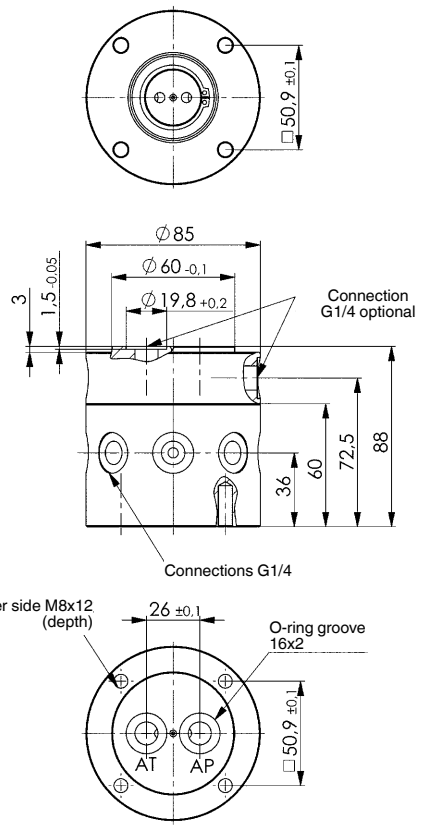
Note:

The controlled rotary couplings can only be used for cyclic operation or at very low rpms. The rotary couplings must be operated without bending forces. We recommend that you screw the rotating housing with the connections to the clamping fixtures, and to secure the rotary pistons only against twisting. Do not introduce any bearing loads! The connections to the rotary pistons must always be via hoses. At operating pressures above 200 bar oil losses occur when the loading and unloading station are unloaded; this can be compensated for using an accumulator. The accumulator that is selected must have the appropriate safety equipment and comply with the safety regulation of the country concerned. We recommend the use of directional seat valves for controlling the rotary couplings.

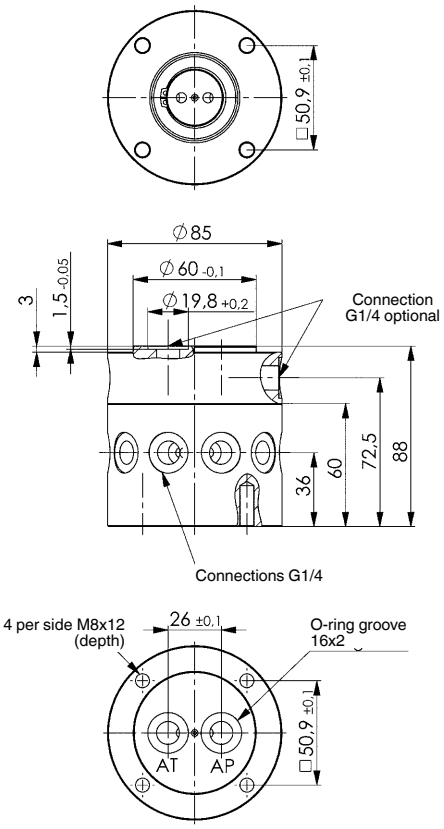
6992H-11-06



6992H-11-08



6992H-11-10

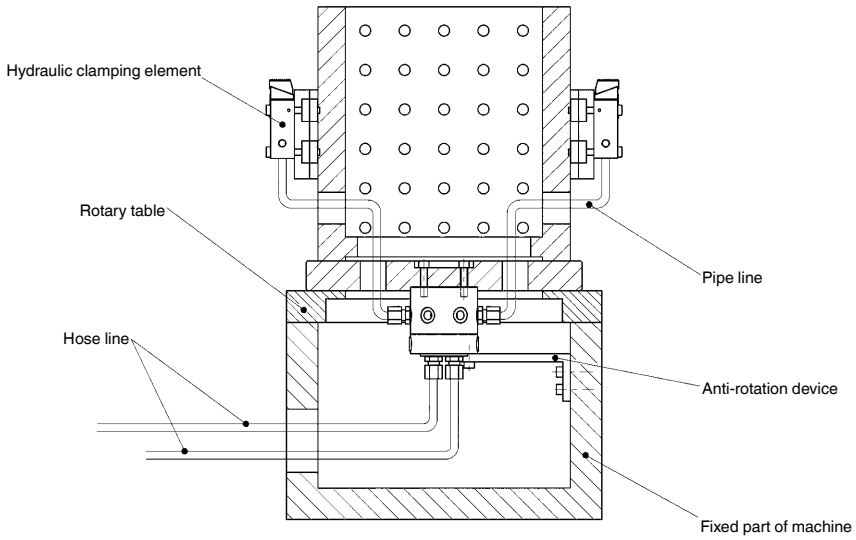


CAD

Subject to technical alterations.

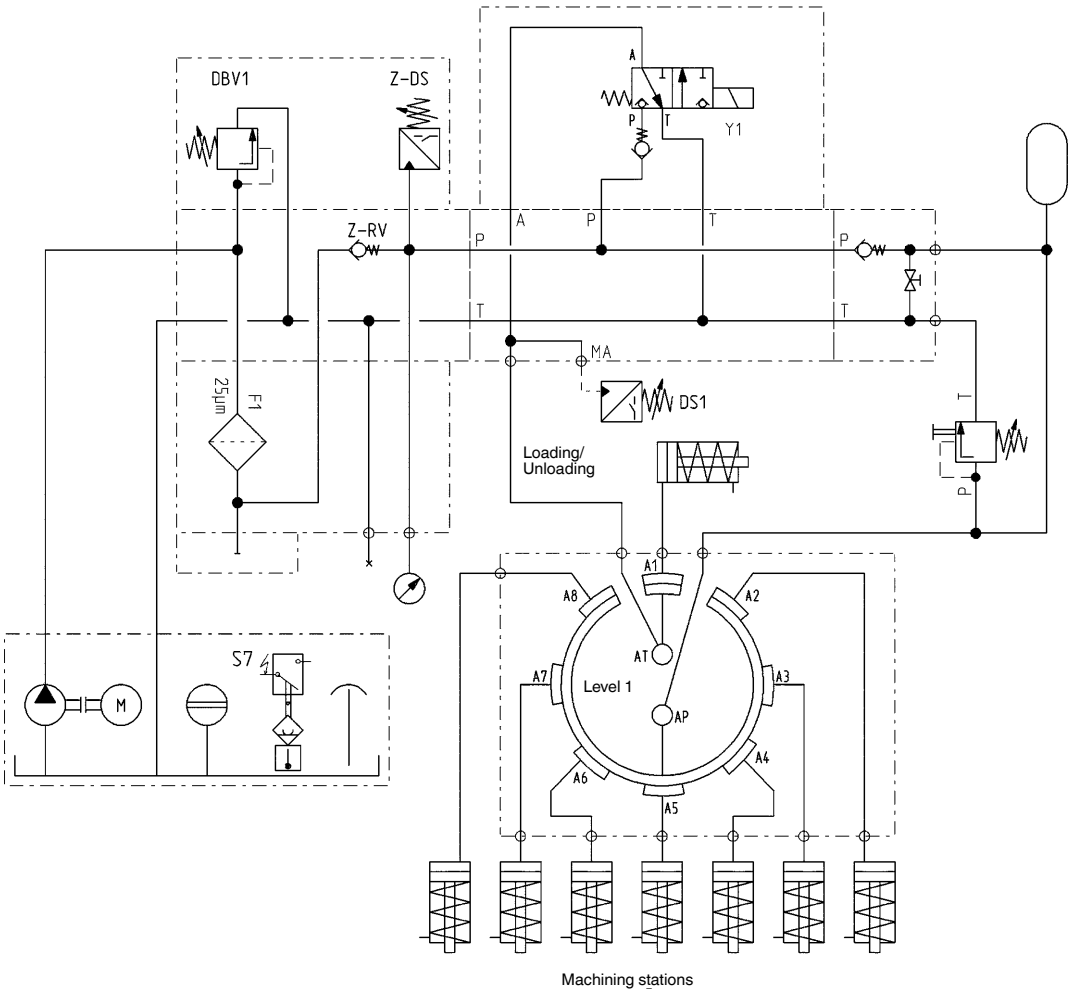
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Application example:



Example of schematic:

Rotary union single acting, controlled, 1 x loading, 7 x machining
The loading and unloading station is controlled by a 3/2 way valve. The machining stations are directly controlled by the pump. The separation of loading and unloading station and machining stations by the rotary union is not leakagefree. Leakage increases with pressure. A pressure accumulator can be used for leakage compensation. The next cycle must only be performed when the loading or unloading station is clamped.

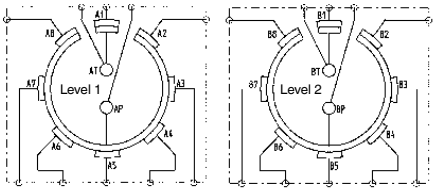


Subject to technical alterations.

No. 6992H-21

Rotary coupling

controlled, double-acting.
One loading and unloading station,
max. operating pressure 350 bar





Order no.	Article no.	Connections inputs loading	Connections inputs processing	Connections outputs loading	Connections outputs processing	Ambient temp. [°C]	Q max. [l/min]	NG	Weight [Kg]
324566	6992H-21-06	2	2	2	10	-10 - +60	8	5	4,1
324574	6992H-21-08	2	2	2	14	-10 - +60	8	5	4,0
324582	6992H-21-10	2	2	2	18	-10 - +60	8	5	3,9

Design:

Rotary feed-through housing from spheroid graphite iron with radial oil connections 1/4“ thd. Rotary piston from nitrided, hardened steel with radial and front oil connections 1/4“ thd. The reductions in the face side connections can be use as O-ring connections.

Application:

Rotary couplings transmit flows of hydraulic oil from a stationary machine component to a rotating one. They are located in the rotary axis of a rotating system. The controlled rotary couplings may only be operated with hydraulic oil. Types 6992H-21 are designed for double-acting cylinders. One double-acting loading/unloading station and 5, 7 or 9 double-acting processing stations can be connected.

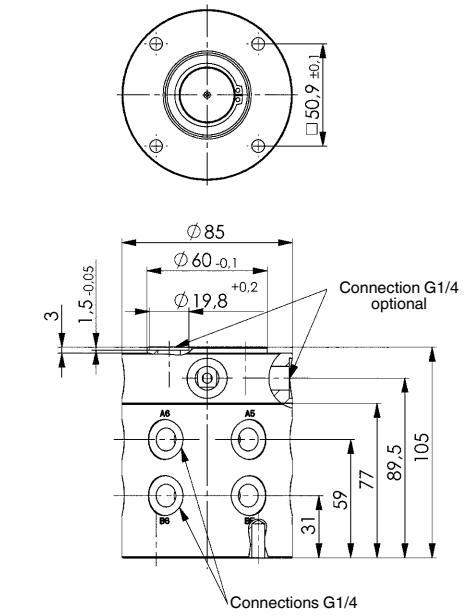
Features:

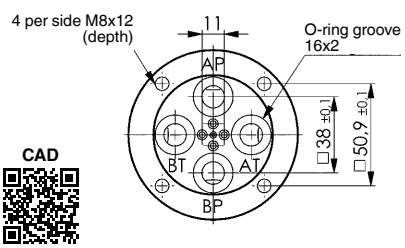
Rotary vane construction. Multiple hydraulic cylinders are supplied with hydraulic oil simultaneously. At the same time, a loading and/or unloading station can be controlled via directional valves for clamping and/or unclamping. High operating pressures due to high-quality components and seals. Compact design. Long service life.

Note:

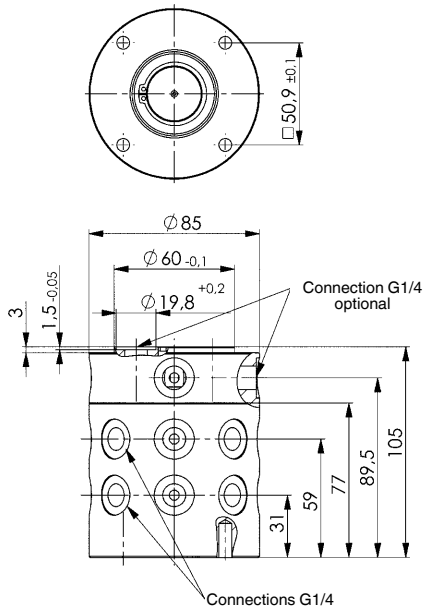
The controlled rotary couplings can only be used for cyclic operation or at very low rpms. The rotary couplings must be operated without bending forces. In contrast to the uncontrolled versions, we recommend that you screw the rotating housing with the connections to the clamping fixtures, and to secure the rotary pistons only against twisting. Do not introduce any bearing loads! The connections to the rotary pistons must always be via hoses. At operating pressures above 200 bar oil losses occur when the loading and unloading station are unloaded; this can be compensated for using an accumulator. The accumulator that is selected must have the appropriate safety equipment and comply with the safety regulation of the country concerned.
We recommend the use of directional seat valves for controlling the rotary couplings.

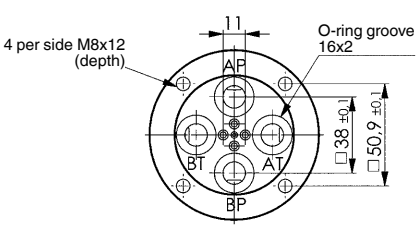
6992H-21-06



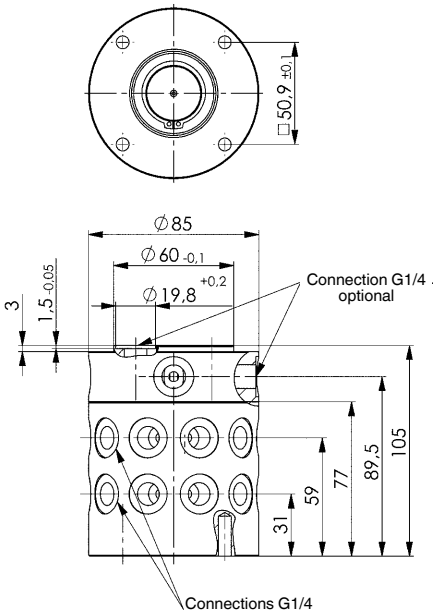


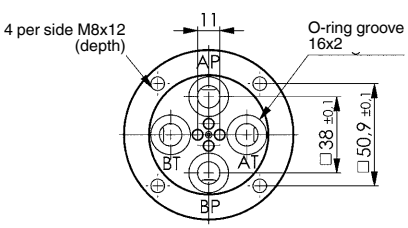
6992H-21-08





6992H-21-10



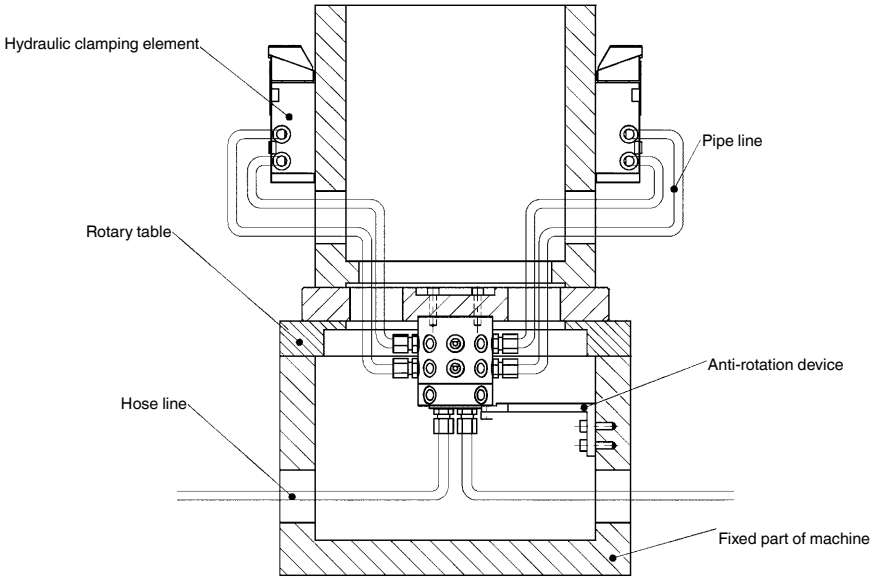


CAD

Subject to technical alterations.

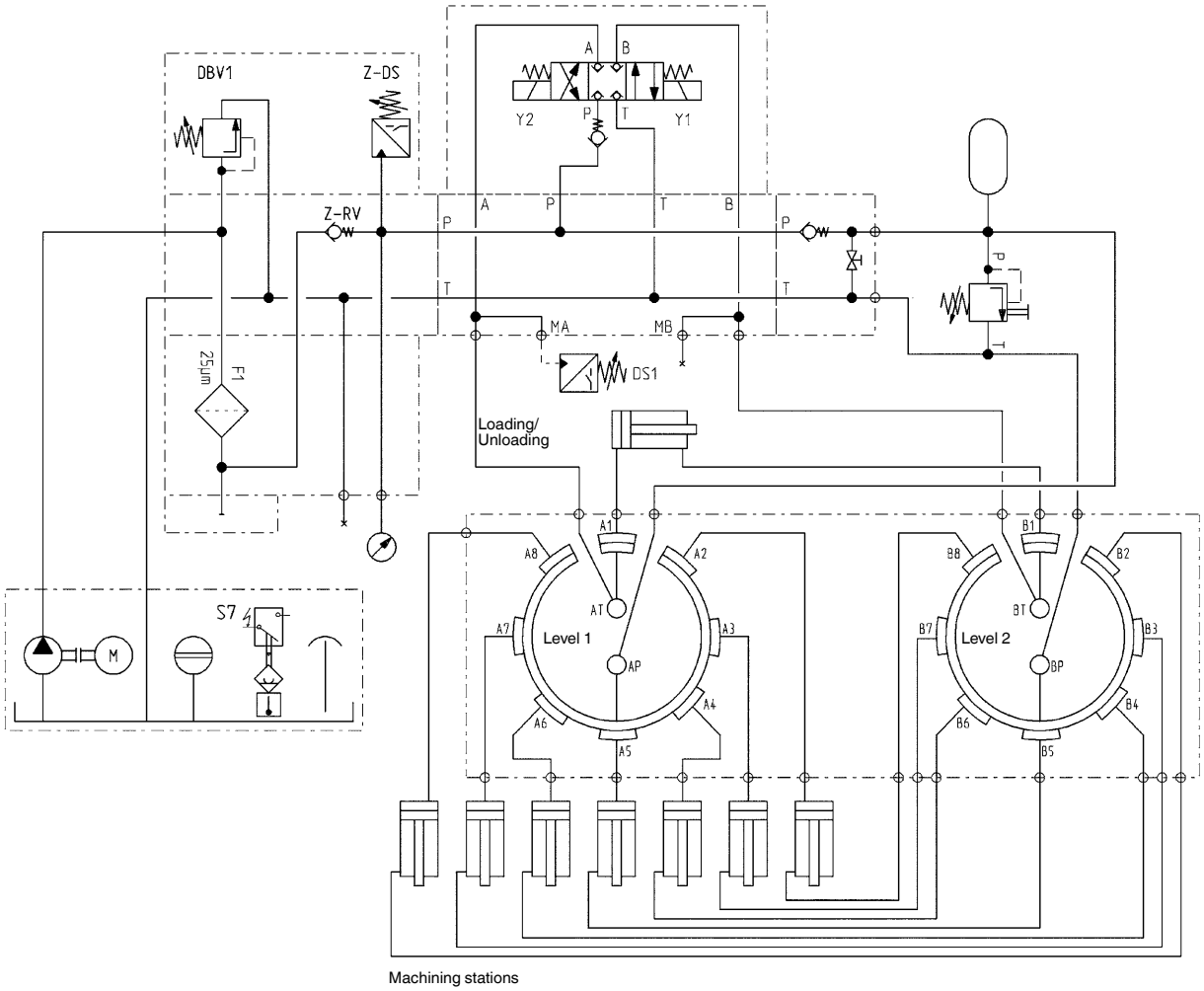
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Application example:



Example of schematic:

Rotary union double acting, controlled, 1 x loading, 7 x machining
The loading and unloading station is controlled by a 4/3 way valve. The machining stations are directly controlled by the pump. The separation of loading and unloading station and machining stations by the rotary union is not leakagefree. Leakage increases with pressure. A pressure accumulator can be used for leakage compensation. The next cycle must only be performed when the loading or unloading station is clamped.



Machining stations

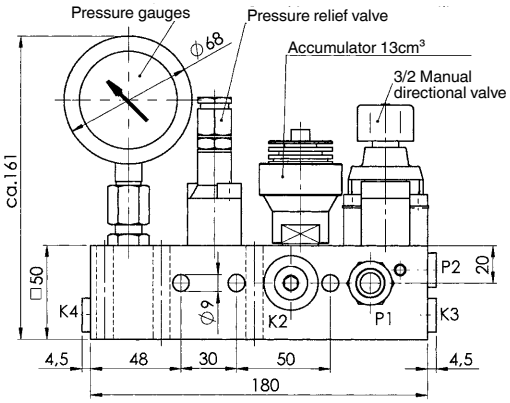
Subject to technical alterations.

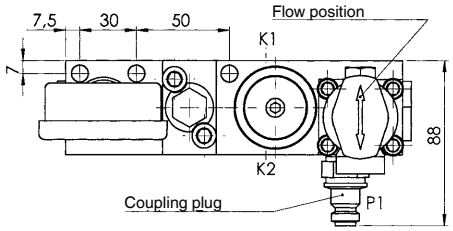
No. 6919-2

Pallet Decoupler Block

for single acting cylinders,
max. operating pressure 400 bar.







Order no.	Article no.	Set gas preload p0 [bar]	Reservoir volume [cm³]	NG	Q max. [l/min]	Connections inputs P1+P2	Connections outputs K1 to K4	Weight [g]
61168	6919-2	80*	13	4	7,5	G1/4	G1/4	4400

* Adjustable between 20 and 250 bar at works (on request).

Design:

- Distributor made of phosphatized steel
- 3/2-way manual seat valve
- Accumulator
- Pressure-relief valve set to 400 bar
- Pressure gauge (600 bar; nom. size 63; with glycerin damping)
- Coupling connector No. 6990 G1/4 S and fittings

Application:

The main application for the pallet decoupler block is to maintain pressure at fixtures which are disconnected from the pump unit during the machining process. For example on flexible machining centers with pallet changing systems. With tight hydraulic elements a loss in pressure shall be limited to 2 bar/h (see diagram). The integrated accumulator can compensate for a leakage-oil quantity of approx. 6 cm³ in the range from 150 to 400 bar. The pressure input is connected to P1 or P2 and observed by the pressure gauge.

1. Couple pump unit with pallet decoupler block.
2. Switch manual seat valve to flow.
3. Remove workpiece or insert a new.
4. Operate pump unit (clamp).
5. Once pressure has been built up (check at pressure gauge), the seat valve must be set to close.
6. Operate pump unit (unclamp).
7. The pump unit is uncoupled from the pallet decoupler block.

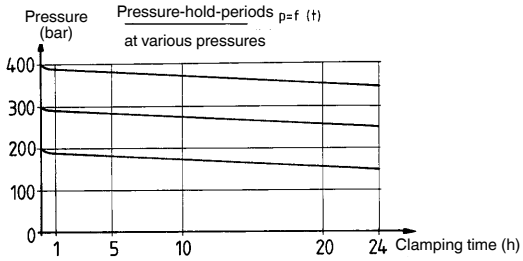
Features:

After disconnecting the pump unit the clamping fixture cannot be depressurized even by operating the seat valve. Compact design. Load outputs (K1 to K4).

Note:

1. If the seat valve is opened in the uncoupled condition, it cannot be coupled again. The seat valve must then be switched to close. Loosen the coupling connector SW (AF) to depressurize 22 and then tighten again.
2. The clamping point can also have pressure applied when the seat valve is set to close.

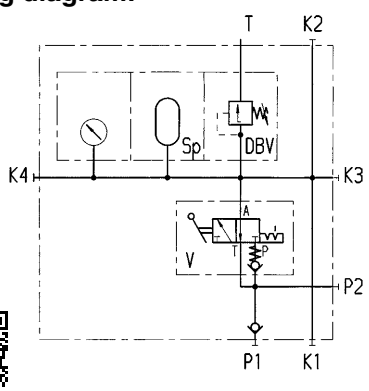
Diagram:



Wiring diagram symbols:

○	= Pressure gauges, Order no. 161414
SP	= Accumulator, Order no. 67645
DBV	= Pressure relief valve, Order no. 181222
V	= 3/2 Manual directional valve, Order no. 114298
K1–K4	= Pressure outputs (Threaded plug), Order no. 69419
P1	= Pressure input (Coupling plug), Order no. 69039
P2	= Pressure input (Threaded plug), Order no. 69419
T	= Release opening DBV

Wiring diagram:



CAD



Subject to technical alterations.

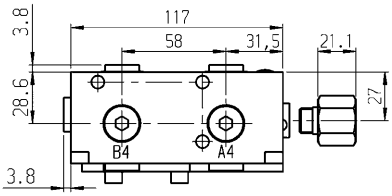
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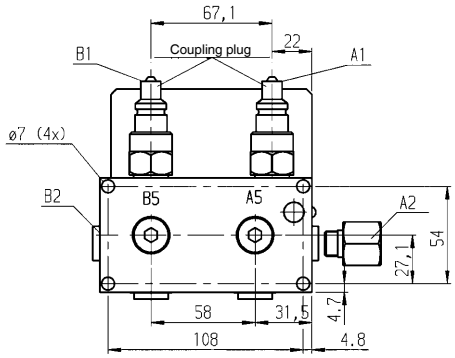
No. 6919-20

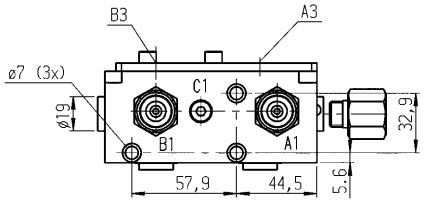
Pallet Decoupler Block

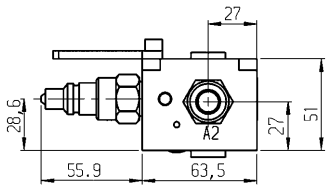
for double acting cylinders,
max. operating pressure 400 bar.











Order no.	Article no.	Q [l/min]	Outputs clamp A2 to A5	Outputs unclamp B2 to B5	Weight [g]
320002	6919-20	7,5	G1/4	G1/4	2572

Design:

Manifold made of steel, blued. Integrated, fixed set pressure relief valve. 4 connections for consumers, pressure tank and manometer. Including coupling connector No. 6919-20S, order no. 320010 and G1/4 adapter for connection A2. A filter is integrated in the forward and return line.

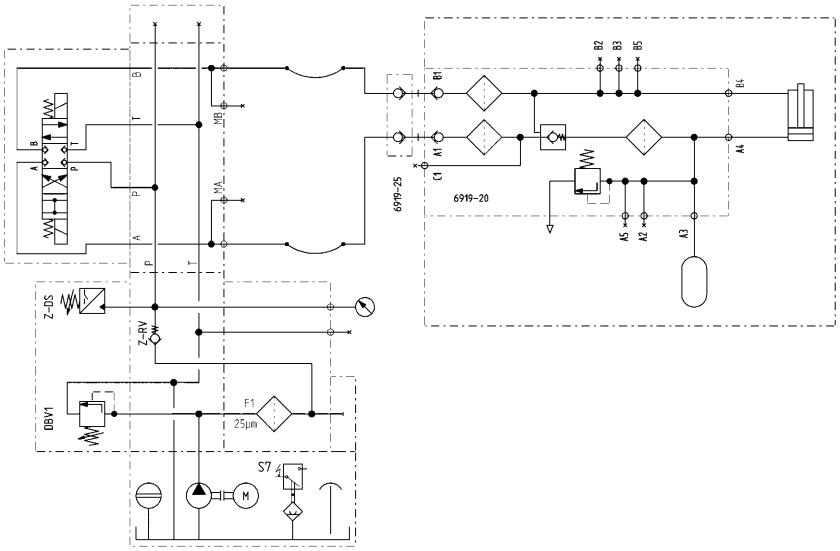
Application:

The main application for the pallet decoupler block is to maintain hydraulic pressure at fixtures which are disconnected from the pressure generator during the machining process. For example on flexible machining centers with pallet changing system. Possible small oil leakage are compensated in a particular pressure range by the attached accumulator. Please see technical details of the used accumulator (No. 6919-13 or No. 6919-40). During coupling clamping circuit and return drive circuit must be without pressure.

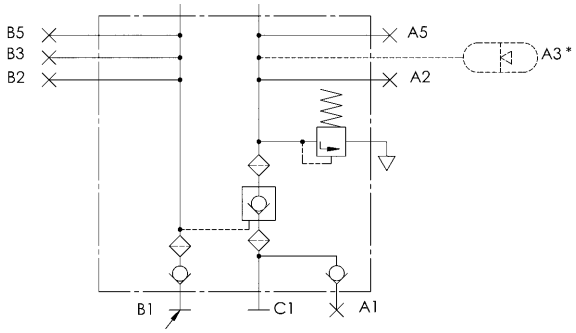
Note:

The use of an accumulator no. 6919S-013/040 in the clamping circuit is neccessary. For visual pressure observation, a pressure gauge no. 6983-1 shall be attached.

Hydraulic diagram:



Wiring diagram:



The pressure for unclamping must be at least 20% of the clamping pressure.

A3 * Pressure accumulator necessary for functioning.

CAD



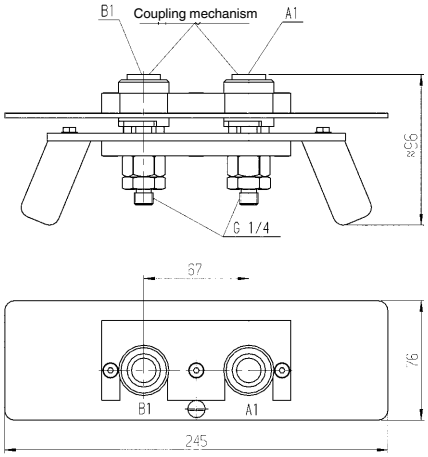
Subject to technical alterations.

No. 6919-25

Coupling Unit for Pallet Decoupler Block

max. operating pressure 400 bar.





CAD

Order no.	Article no.	Q [l/min]	Weight [g]
320028	6919-25	7,5	2200

Design:

The coupling unit consists out of two coupling mechanism No. 6919-25M, order no. 320036 for clamping and unclamping circuit. The coupling elements are mounted to an adapter with handle and disengaging mechanism.

Application:

The coupling unit is used to connect the oil supply with the pallet decoupler block No. 6919-20.

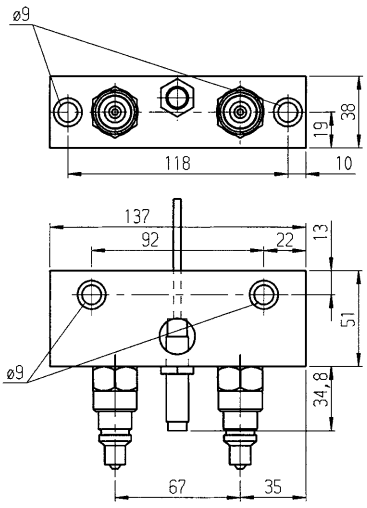
Features:

Simple handling due two hand operation. Interchanging of connections is impossible.

No. 6919-30

Store Station for Coupling Unit





CAD

Order no.	Article no.	Weight [g]
320044	6919-30	1837

Design:

Safety sensor switch integrated and coupling connector No. 6919-20S, order no. 320010.

Application:

The store station is used as holder for the coupling unit after decoupling from the pressure tank switch unit.

Features:

If used with your machine control, the signal of the safety sensor switch, can ensure that the fixture pallet cannot be moved before the coupling unit is disconnected and removed correctly from the pallet decoupler block.



Subject to technical alterations.

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No. 6919S

Accumulator

Order no.	Article no.	Reservoir volume [cm³]	Gas preload p 0 max. [bar]	Set gas preload p0 [bar]	max. permiss. over-pressure [bar]	Ambient temp. [°C]	Weight [g]
67645	6919S-013	13	250	80	500	-20 - +60	300
67637	6919S-040	40	250	80	400	-20 - +60	650

Design:

- Hydro diaphragm reservoir
- Filling gas = nitrogen, class 4.0
- Pressure fluid: hydraulic oil acc. to DIN 51524 Part 1 and 2; viscosity ISO VG 10 to ISO VG 68 acc. DIN ISO 3448.
- Thread G1/4 A, DIN ISO 228/1 with sealing edge.

Application:

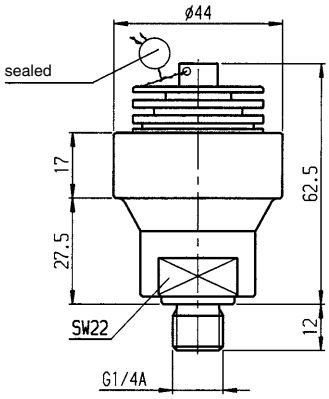
- For short-term compensation of oil losses in stand-by operation;
- to support during switching procedures in hydraulic circuits;
- to compensate for pressure peaks when switching valves;
- for compensation of volume changes of closed circuits in case of temperature changes.

Note:

The reservoirs are manufactured, checked and marked according the technical rules for pressure containers (TRB). Max. permissible operating pressure ratios p2 max : p1 max isothermal = 4:1 Max. permissible operating pressure ratios p2 max : p1 max adiabat = 3:1.

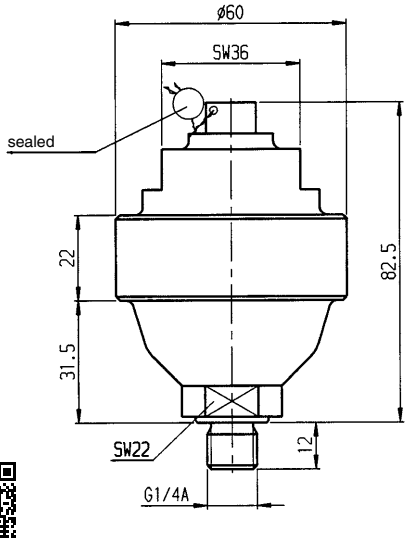
6919S-013





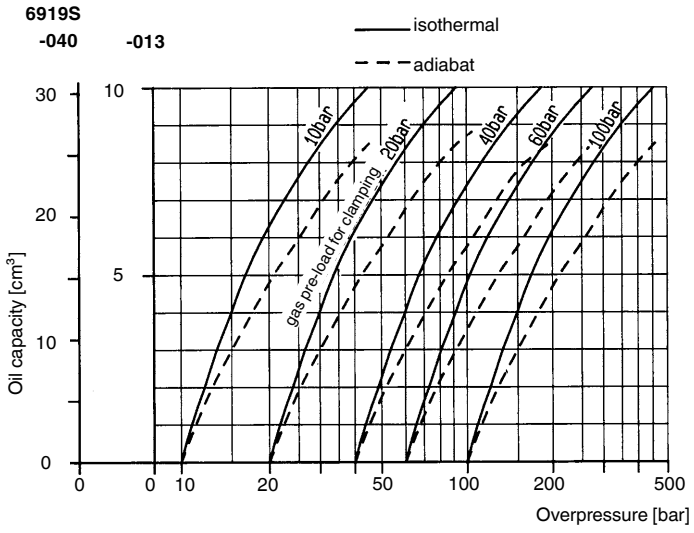
6919S-040





CAD

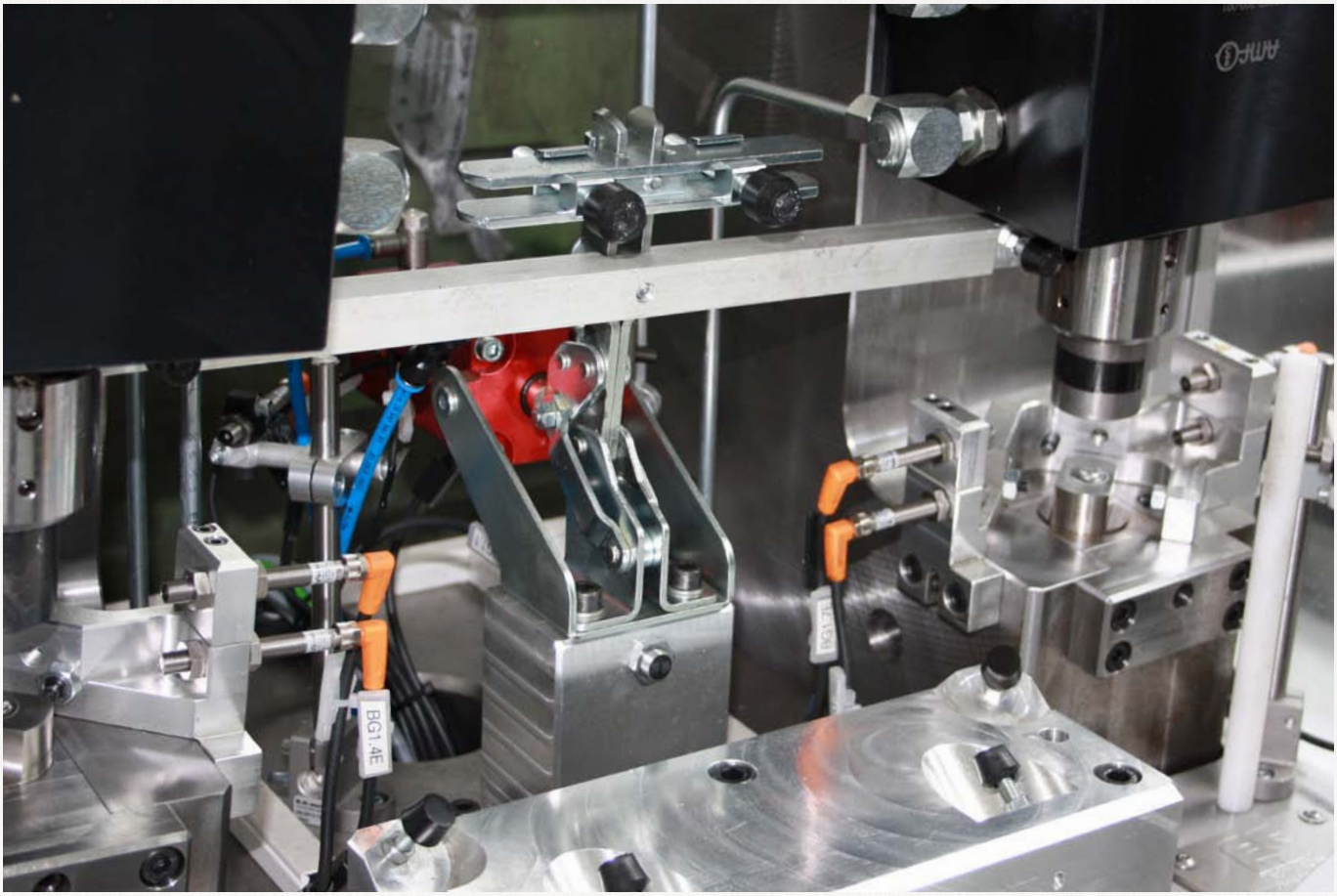
Diagram:





Subject to technical alterations.





Subject to technical alterations.

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ACCESSORIES –
FOR PROTECTING PRESSURE GENERATORS AND HYDRAULIC COMPONENTS

> **FILTER**

> **FILTER WITH RECTIFIER CIRCUIT**

> **PLUG-IN FILTER**

PRODUCT OVERVIEW:

Type	Designation	Max. operating pressure [bar]	Filteration [µm]	No. of models	Oil connection
6981	Filter	400	10, 25, 40	3	thread
6981E	Filter	400	10, 25, 40	3	thread
6981G	Filter with rectifier circuit	400	10, 25, 40	3	thread
6981	Filter, cartridge design	400	10, 25, 40	3	cartridge design
6981E	Filter, threaded design	500	10, 25, 40, 100	4	threaded design
6981P	Filter, cartridge design	250	25, 40, 100	3	cartridge design

PRODUCT EXAMPLES:

NO. 6981 AND 6981E



> max. operating pressure: 400 bar

NO. 6981G



> max. operating pressure: 400 bar

NO. 6981, 6981E AND 6981P

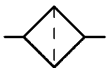


> max. operating pressure: 500 bar

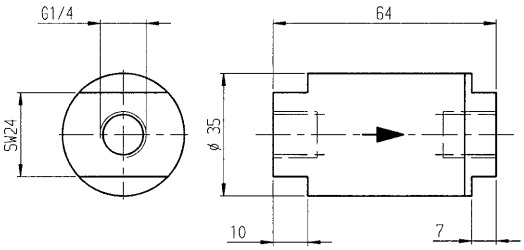
No. 6981

Filter

max. operating pressure 400 bar







Order no.	Article no.	Filteration [µm]	Weight [g]
63966	6981-10-G1/4	10	380
320051	6981-25-G1/4	25	380
320069	6981-40-G1/4	40	380

Design:

Housing out of steel, zinc plated. Filter insert out of stainless steel, with o-ring. Pre-filteration by filter disc. Filter insert out of wire web.

Application:

The Filters are used as on additional safety in order to protect the hydraulic componants in the oil circuit. The filter can be located direct in pipes, in front of distributors or in fittings. For example:
- 10 µm input Intensifier
- 25 µm input valves
- 40 µm input pump units or hydraulic cylinder

Note:

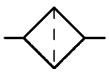
The smaller the filter that is chosen, the bigger the flow resistance will be.
The degree of filter soiling must be checked. Due to the design of the housing the exchange of the filter insert is simple. The direction of oil flow has to be considered. Can only be installed in P or T line.
The installation position is optional. The volume flow for filter inserts is illustrated by the diagram for filter 6981.
Spare part:
Filter insert 10 microns, order no. 320077
Filter insert 25 microns, order no. 320085
Filter insert 40 microns, order no. 320093

CAD

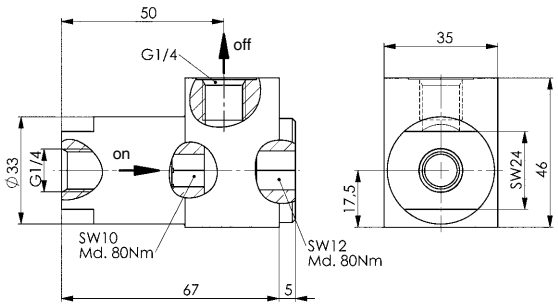
No. 6981E

Filter

max. operating pressure 400 bar.







Order no.	Article no.	Filteration [µm]	Weight [g]
323626	6981E-10-G1/4	10	540
323642	6981E-25-G1/4	25	540
323667	6981E-40-G1/4	40	540

Design:

Body made of steel, zinc-plated. Filter insert of aluminium. Filter material of pleated metal fibre felt.

Application:

The Filters are used as on additional safety in order to protect the hydraulic componants in the oil circuit. The filter can be located direct in pipes, in front of distributors or in fittings.
For example:
- 10 µm input Intensifier
- 25 µm input valves
- 40 µm input pump units or hydraulic cylinder.

Note:

The smaller the filter that is chosen, the bigger the flow resistance will be.
The degree of filter soiling must be checked. Due to the design of the housing the exchange of the filter insert is simple. The direction of oil flow has to be considered. Can only be installed in P or T line.
The installation position is optional. The volume flow for filter inserts is illustrated by the diagram for filter 6981.
Spare part:
Filter insert 10 microns, order no. 323683
Filter insert 25 microns, order no. 323709
Filter insert 40 microns, order no. 323725

CAD

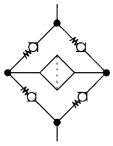
Subject to technical alterations.

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No. 6981G

Filter with rectifier circuit

max. operating pressure 400 bar.





Order no.	Article no.	Filteration [µm]	Weight [g]
321901	6981G-10-G1/4	10	1510
321927	6981G-25-G1/4	25	1510
321968	6981G-40-G1/4	40	1510

Design:

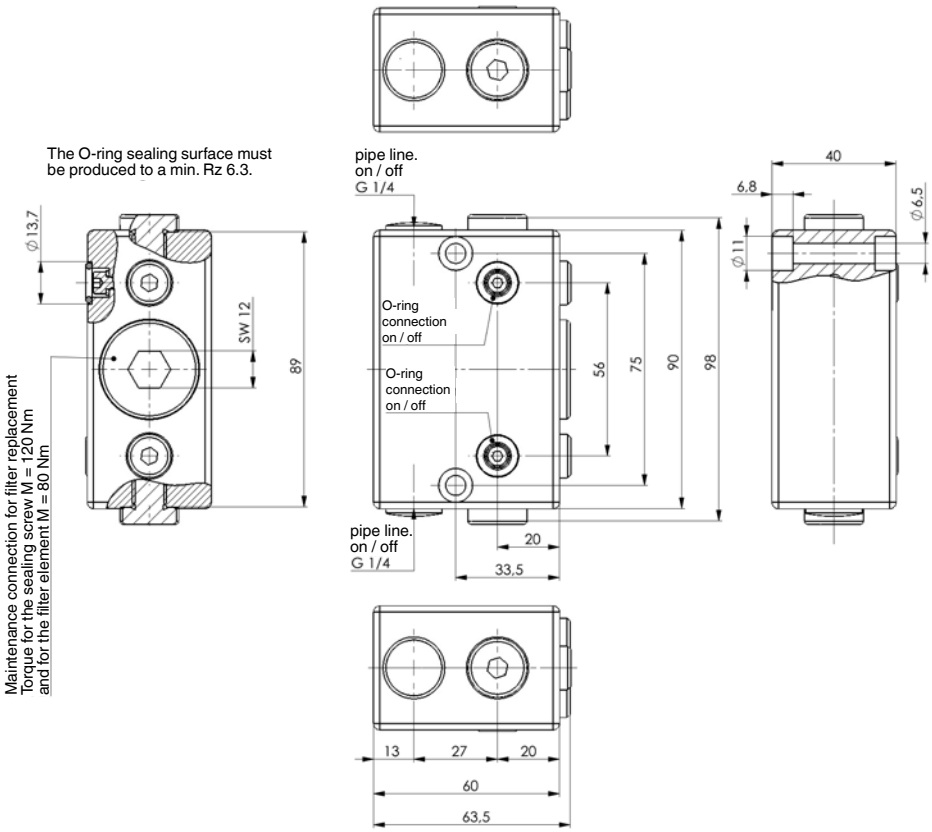
Body from zinc-plated steel. Filter insert from aluminium. Filter material from pleated metal fibre.

Application:

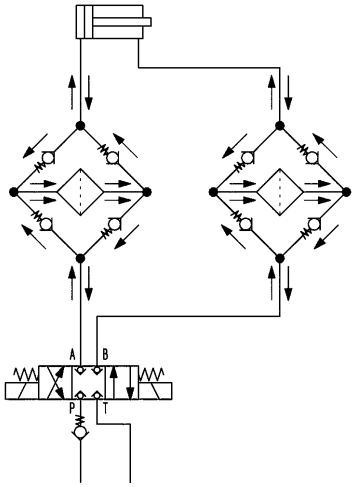
The filters are employed as additional and safety filters for protecting hydraulic components in the oil circuit. They can be used as a pipeline or mounted element with O-ring connection. The flow through these filters is always from outside to inside, regardless of whether they are in the flow or return circuit. This prevents the whirl-up of dirt particles on the filter element.

Note:

The finer the filter, the greater the flow resistance.
The degree of soiling must be checked and the filter elements replaced at regular intervals. The large threaded plug on the side must be removed to replace the filter element. The filter element can then be removed.
The entire installation position can be chosen freely!
Replacement part:
Filter insert 10 µm, Order No. 323683
Filter insert 25 µm, Order No. 323709
Filter insert 40 µm, Order No. 323725



Hydraulic diagram:



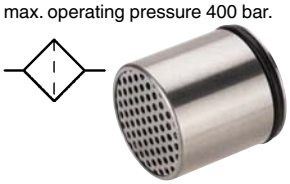
CAD

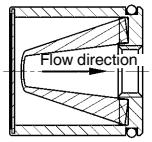
Subject to technical alterations.

No. 6981-XX

Filter, cartridge design

max. operating pressure 400 bar.





CAD

Order no.	Article no.	Filteration [µm]	Weight [g]
320077	6981-10-G1/4-1	10	10
320085	6981-25-G1/4-1	25	10
320093	6981-40-G1/4-1	40	10

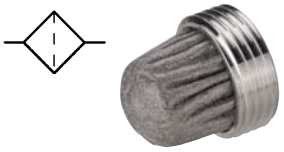
Note:

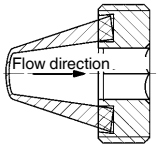
Replacement filter for 6981-XX-G1/4.

No. 6981E-XX

Filter, threaded design

max. operating pressure 400 bar.





CAD

Order no.	Article no.	Filteration [µm]	Weight [g]
323683	6981E-10	10	15
323709	6981E-25	25	15
323725	6981E-40	40	15

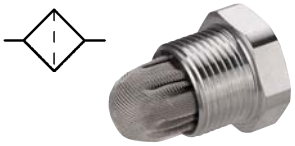
Note:

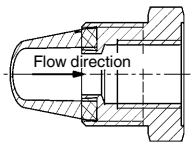
Replacement filter for 6981E-XX-G1/4 and 6981G-XX-G1/4.

No. 6981E-100

Filter, threaded design

max. operating pressure 500 bar.





CAD

Order no.	Article no.	Filteration [µm]	Weight [g]
326678	6981E-100-G1/4-1	100	14

Note:

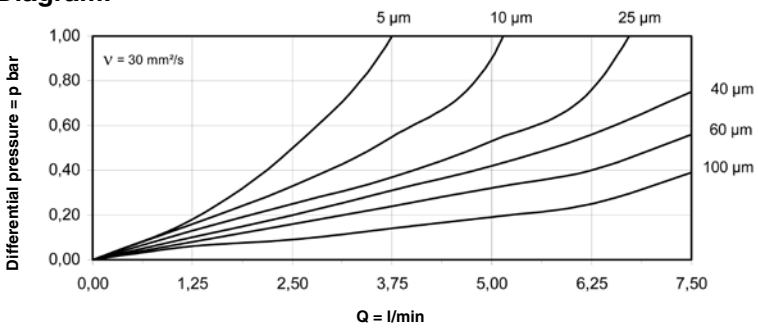
Replacement filter for 6917R-5-XX. Sealing ring included in scope of supply.

Filter 6981

Note:

The filters are employed as additional and safety filters for protecting hydraulic components in the oil circuit. The direction of flow must be in the direction of the arrow. The higher the degree of soiling, the higher the flow resistance. The degree of soiling shall be checked.

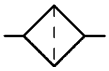
Diagram:



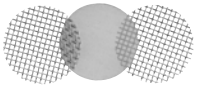
No. 6981P-XX

Filter, cartridge design

Q max. 20 l/min.







CAD

Order no.	Article no.	Filteration [µm]	max. operating pressure [bar]	OR-1 O-ring Order No.	Weight [g]
562203	6981P-25	25	250	466334	5,5
562204	6981P-40	40	250	466334	5,5
562205	6981P-100	100	400	466334	5,5

Design:

Filter sleeve made of aluminium, surfaces black anodised. Filter plates made of metal mesh.

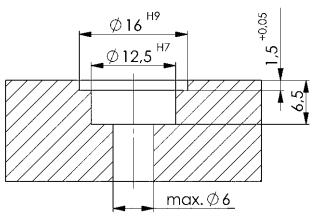
Application:

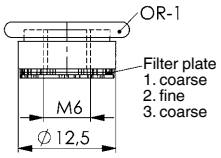
For protecting actuators and valves in clamping devices against contamination in the hydraulic fluid.

Note:

Always mount the fine filter plate between the two coarse filter plates. Can also be built into fixtures.
Filter is pressed in and cannot be reused.
The finer the filter selected, the greater the flow resistance.

Installation dimensions:





Subject to technical alterations.

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ACCESSORIES –
FOR PRESSURE MONITORING AND VENTING OF THE HYDRAULIC SYSTEM AS WELL AS SUPPORT CONTROL

- **MEASURING COUPLING FOR THREADED CONNECTION AND PIPE CONNECTION**
- **MEASURING HOSE**
- **ADAPTER FOR PRESSURE GAUGE CONNECTION**
- **SUPPORT CONTROL, PNEUMATIC**

PRODUCT OVERVIEW:

Type	Designation	Max. operating pressure [bar]	Length [mm]	Thread	Stroke [mm]	No. of models	Oil connection
6990-20-G 6990-20-R	Measuring coupling	630	-	G1/8 / G1/4 M16 x 1,5	-	3	thread pipe
6990-20-S	Measuring hose	630	400 / 1000	M16	-	2	thread
6990-20-M/-A	Adapter for pressure gauge connection	630	-	G1/4	-	2	thread
6984-20	Support control, pneumatic	12	-	M12 x 1,25	6	1	thread
6984-30	Support control, pneumatic	2	-	M16 x 1,5	5	1	thread

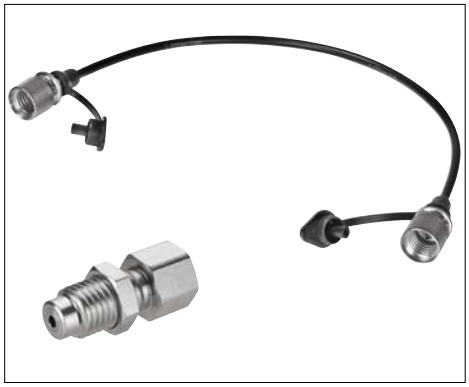
PRODUCT EXAMPLES:

NO. 6990-20-G AND 6990-20-R



> max. operating pressure: 630 bar

NO. 6990-20-S AND 6990-20-M



> max. operating pressure: 630 bar

NO. 6984-20 AND 6984-30



> max. operating pressure: 12 bar

No. 6990-20-G

Measuring coupling

for threaded connection.

CAD

Order no.	Article no.	Pressure max. [bar]	E	G	L	SW	Weight [g]
321893	6990-20-G1/8	400	8,0	G1/8	39	17	70
321877	6990-20-G1/4	630	12,0	G1/4	37	19	70

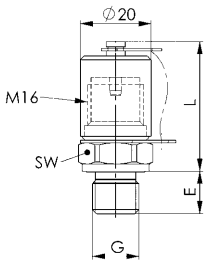


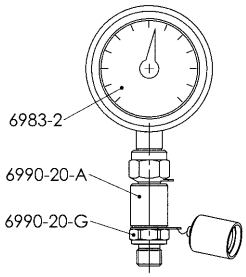
Application:

The measuring coupling is used for pressure monitoring or venting with the measuring hose.

Note:

Adaptation is possible under pressure up to max. 400 bar.





No. 6990-20-R

Measuring coupling

for pipe connection.

CAD

Order no.	Article no.	Pressure max. [bar]	dia. D	E	G	L	SW	SW1	Weight [g]
321984	6990-20-R	630	8	16,5	M16x1,5	35	17	19	70

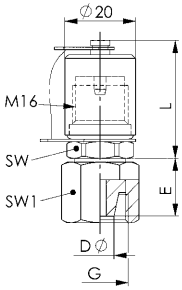


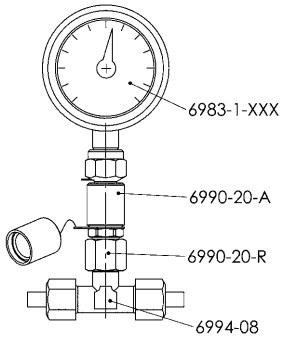
Application:

The measuring coupling is used for pressure monitoring or venting.

Note:

Adaptation is possible under pressure up to max. 400 bar.





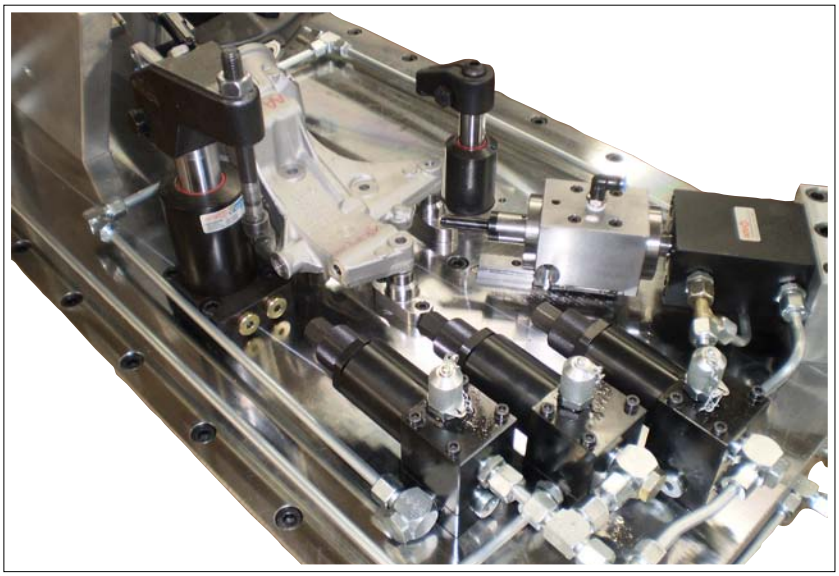
No. 6990-20-S

Measuring hose

max. operating pressure 630 bar,
max. dynamic operating pressure 500 bar.
Temperature -20 to +100 °C.

Order no.	Article no.	Inside dia. [mm]	Outside dia. [mm]	Length [mm]	Bending radius min. [mm]	Connection thread	Weight [g]
321919	6990-20-S400	2	5	400	20	M16	75
321935	6990-20-S1000	2	5	1000	20	M16	100





Subject to technical alterations.

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No. 6990-20-M

Adapter for pressure gauge connection

max. operating pressure 630 bar.



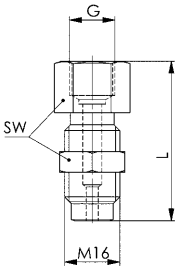
Order no.	Article no.	G	L	SW	Weight [g]
554600	6990-20-M	G1/4	46,5	19	74

Application:

Adapter for pressure gauge connection G1/4 on measuring hose.

Note:

Adaptation is possible under pressure up to max. 400 bar.





CAD

No. 6990-20-A

Adapter for pressure gauge connection

max. operating pressure 630 bar.



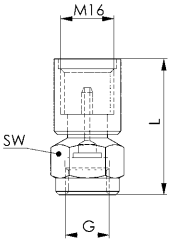
Order no.	Article no.	G	L	SW	Weight [g]
327353	6990-20-A	G1/4	41	19	75

Application:

Adapter for pressure gauge connection G1/4 on measuring coupling 6990-20-G.

Note:

Adaptation is possible under pressure up to max. 400 bar.



CAD

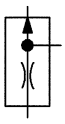
Subject to technical alterations.

No. 6984-20

Support control, pneumatic

CAD

Order no.	Article no.	Stroke max. [mm]	Input pressure [bar]	Md max. [Nm]	Spring force min. [N]	Spring force max. [N]	OR-1 O-ring Order No.	OR-2 O-ring Order No.	Weight [g]
562223	6984-20	6	1 - 12	5	4,3	20,7	559533	552174	26





Design:

Housing made of steel, hardened and honed. Piston hardened and ground. Compression spring from stainless steel. O-rings and springs supplied as standard.

Application:

The support control is used in fixtures where a signal indicating a correctly supported workpiece is required to enable machining. Lightweight workpieces should be clamped before being pressurised with compressed air. A precise air flow upstream of the pressure transducer is required for ensuring correct operation of the support control.

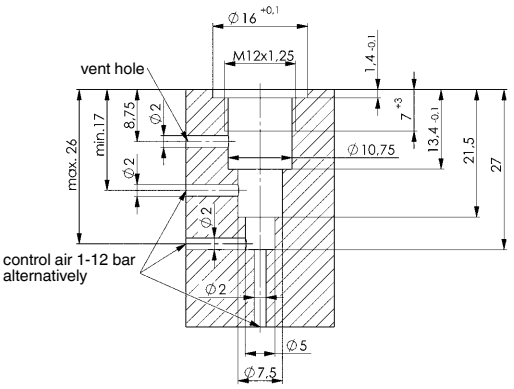
Features:

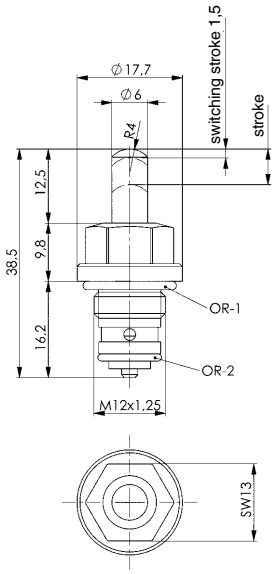
The support control works like a pneumatic back-pressure nozzle. The position is extended from its initial position by a pressure spring. Once applied, the air jet flows through the piston and the radial vent hole on the support control housing to outside. The discharge hole is sealed as soon as a workpiece is mounted and the piston is pushed downwards by min. 1.5 mm. A clamping stroke of 2-3 mm is recommended. The air flow backs up, the internal air pressure rises. The pressure value must be transferred to the control by an appropriate pressure signal converter. The system is relatively insensitive to fine chips.

Note:

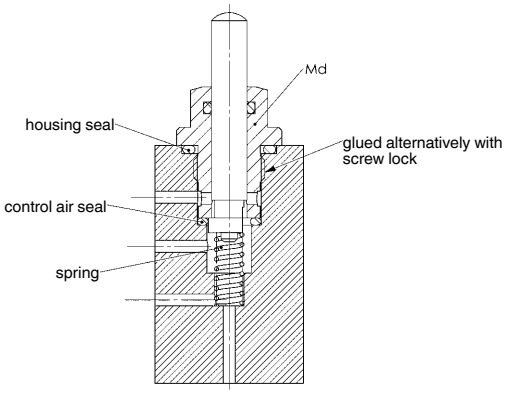
The pressure signal converter is not included in the supply scope.
Effective piston surface when nozzle is closed = 0.28 cm²
Piston force = piston surface x air pressure + spring force
The release pressure at the pressure signal must be set with an upstream volume flow control valve (e.g. throttle/check valve). Control air intake 1-12 bar. Observe max. tightening torque. After tightening, check that the piston moves smoothly. Loosen if necessary. Glue in the housing with screw lock (e.g. Loctite 638).

Installation dimensions:

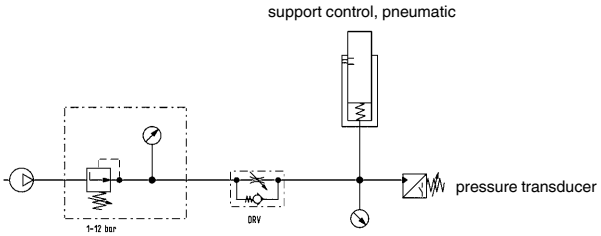




Application example:



Hydraulic diagram:

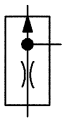


Subject to technical alterations.

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No. 6984-30

Support control, pneumatic





CAD

Order no.	Article no.	Stroke max. [mm]	Input pressure [bar]	Spring force min. [N]	Spring force max. [N]	Weight [g]
325217	6984-30	5	1 - 2	1,9	2,6	36

Design:

Housing from hardened and burnished steel. Pistons are tempered, nitrided and ground. Compression spring from stainless steel.

Application:

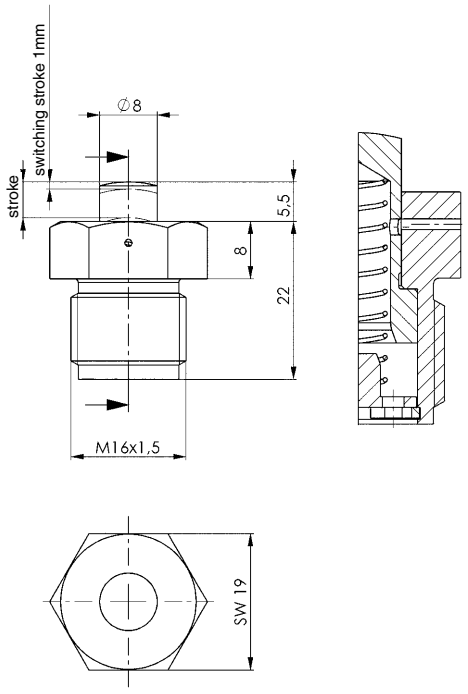
The support control is used in fixtures where a signal indicating a correctly supported workpiece is required to enable machining. Lightweight workpieces should be clamped before being pressurised with compressed air.

Features:

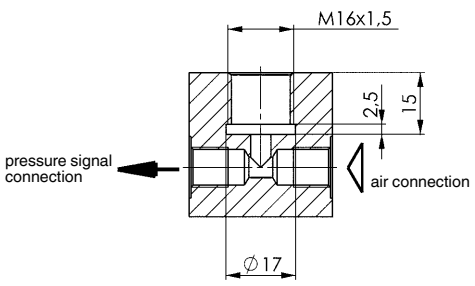
The support control works like a pneumatic back-pressure nozzle. The position is extended from its initial position by a pressure spring. Once applied, the air jet flows through the hollow piston and the radial discharge hole on the support control housing to outside. The discharge hole is sealed as soon as a workpiece is mounted and the piston is pushed downwards by min. 1 mm. The air flow backs up, the internal air pressure rises. The pressure value must be transferred to the control by an appropriate pressure signal converter. The system is relatively insensitive to fine chips.

Note:

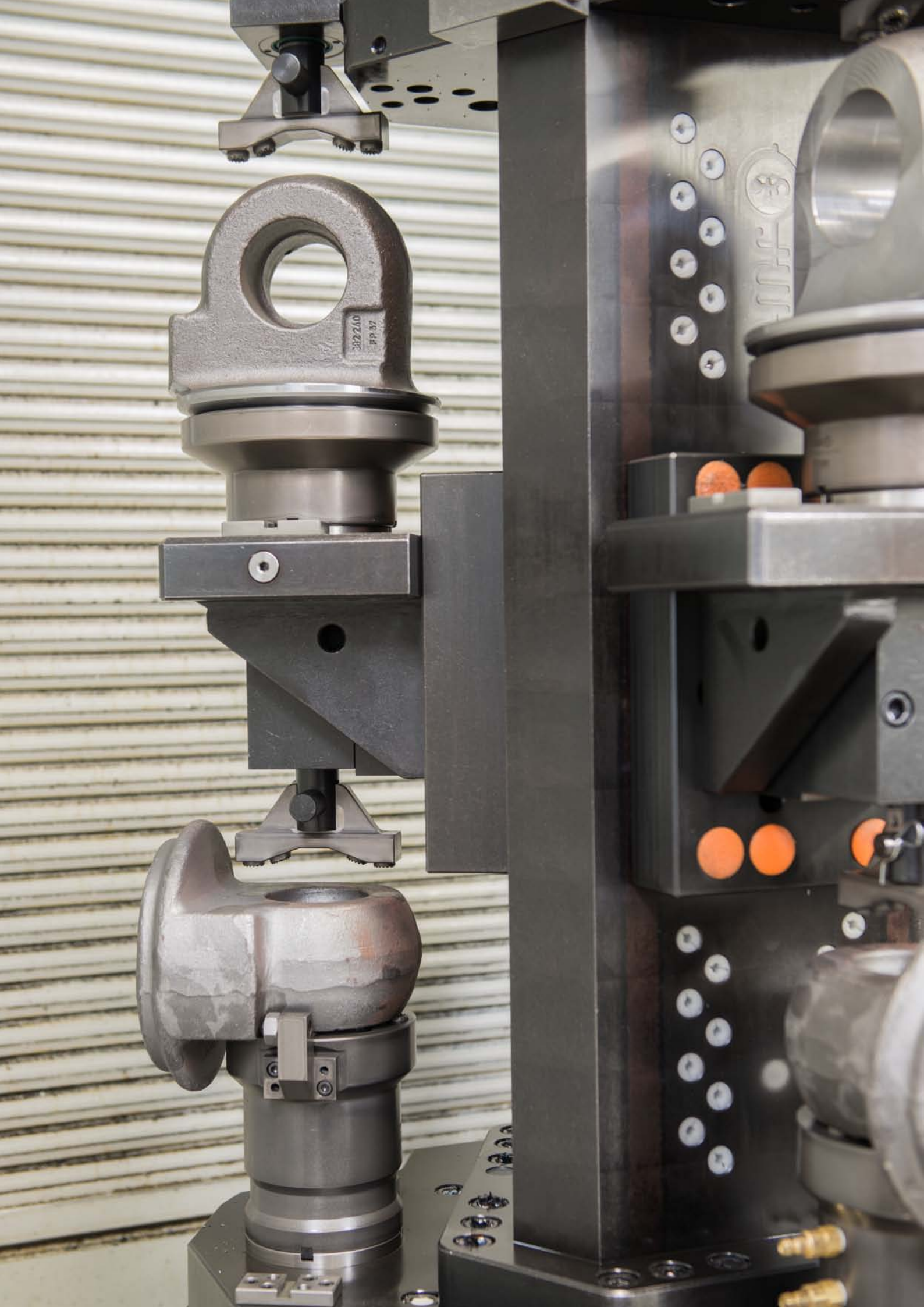
The pressure signal converter is not included in the supply scope.
Effective piston surface with closed nozzle = 0.95 cm^2
Piston force = piston surface x air pressure + spring force
Reduce the input pressure to 1 bar up to a maximum of 2 bar when the air duct is open, e.g. with a throttle check valve. When the air duct is closed, there is a dynamic pressure of approx. 3 bar.



Installation dimensions:



Subject to technical alterations.



ACCESSORIES –
HOSES AND PRESSURE GAUGES FOR A SECURE CONNECTION

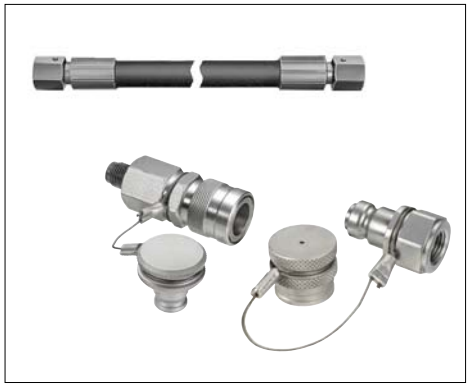
- **HIGH PRESSURE HOSES**
- **QUICK-RELEASE COUPLINGS**
- **PROTECTIVE CAPS FOR QUICK-RELEASE COUPLINGS**
- **HYDRAULIC OIL**
- **PRESSURE GAUGES**
- **MANIFOLDS WITH THREAD**

PRODUCT OVERVIEW:

Type	Designation	Max. operating pressure [bar]	Length min. / max. [mm]	Nominal bore NG	No. of models	Oil connection
6985 6985R	High pressure hose	400	300 / 3000	-	11	thread / pipe
6985K	High pressure hose with steel-wire interlace	500	300 / 3000	-	6	thread
6990	Quick disconnect coupler	400	-	4	6	thread
6990MK/SK	Al-protection MK/SK	-	-	-	2	protection
6906	Hydraulic oil	-	-	5 liters	1	-
6983	Pressure gauge	600	-	-	8	thread / o-ring
6988	Manifold	400	-	6	3	thread

PRODUCT EXAMPLES:

NO. 6985 AND 6990-G1/4 M+S



> max. operating pressure: 400 bar

NO. 6983B AND 6983G



> max. operating pressure: 400 bar

NO. 6988



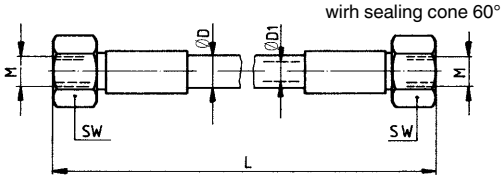
> max. operating pressure: 400 bar

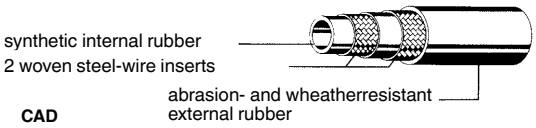
No. 6985

High Pressure Hose

max. operating pressure 400 bar.







CAD

Order no.	Article no.	Bending radius min. [mm]	dia. D [mm]	dia. D1 [mm]	L [mm]	M	SW [mm]	Weight [g]
174177	6985-300	100	15	6	300	M12x1,5	17	100
68510	6985-500	100	15	6	500	M12x1,5	17	300
68528	6985-800	100	15	6	800	M12x1,5	17	405
68536	6985-1250	100	15	6	1250	M12x1,5	17	570
68544	6985-2000	100	15	6	2000	M12x1,5	17	855

Design:

Steel fittings, galvanized and passivated.

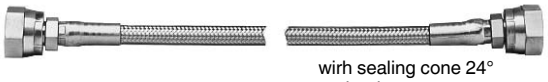
Note:

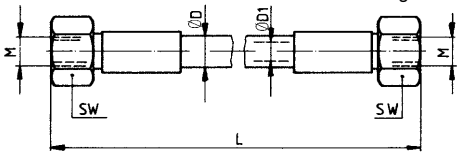
This high pressure hose is especially selected for clamping on machine tools. It contains two steel wire reinforcements which guarantee that there is no loss of oil even if the external rubber is damaged. The maximum service life must be 6 years but the maximum service life must not exceed 10 years. Date of manufacture (quarter/year) is printed on the hose. Serviceability must be assessed in accordance with established inspection criteria. See DIN 20066, section 5 for further details.

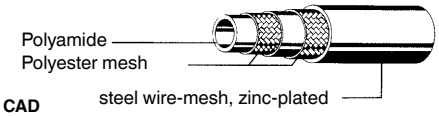
No. 6985K

High Pressure Hose with steel-wire interlace

Max. operating pressure dyn. at +50°C 500 bar







CAD

Order no.	Article no.	Bending radius min. [mm]	dia. D [mm]	dia. D1 [mm]	L [mm]	M	SW [mm]	Weight [g]
68551	6985K-300	35	9,4	4	300	M16x1,5	19	100
68569	6985K-500	35	9,4	4	500	M16x1,5	19	300
68577	6985K-800	35	9,4	4	800	M16x1,5	19	400
68585	6985K-1250	35	9,4	4	1250	M16x1,5	19	570
68593	6985K-2000	35	9,4	4	2000	M16x1,5	19	850
68601	6985K-3000	35	9,4	4	3000	M16x1,5	19	1200

Design:

Steel fittings, galvanized and passivated. Hose of synthetic material with steel-wire braid galvanized.

Application:

Insert hose and tighten with 1/4 turn maximum.

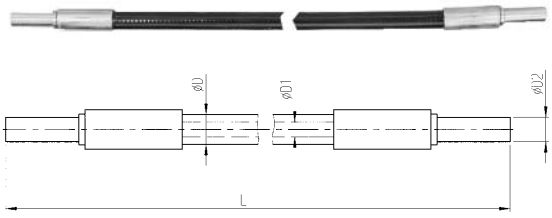
Note:

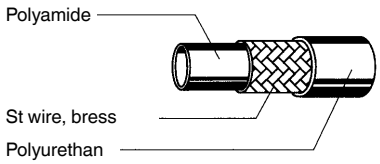
We recommend only using the 3-metre long high pressure hose for double-acting elements. Fitting suitable for pipe connection No. 6994. The maximum service life must be 6 years but the maximum service life must not exceed 10 years. Date of manufacture (quarter/year) is printed on the hose. Serviceability must be assessed in accordance with established inspection criteria. See DIN 20066, section 5 for further details.

No. 6985R

High Pressure Hose

Max. operating pressure dyn. at +50°C 375 bar.





CAD

Order no.	Article no.	Bending radius min. [mm]	dia. D [mm]	dia. D1 [mm]	dia. D2 [mm]	L [mm]	Weight [g]
63198	6985R-300	30	9,8	4,8	8	300	65
63206	6985R-500	30	9,8	4,8	8	500	90
63214	6985R-800	30	9,8	4,8	8	800	120
63222	6985R-1250	30	9,8	4,8	8	1250	180
63230	6985R-2000	30	9,8	4,8	8	2000	265
63248	6985R-3000	30	9,8	4,8	8	3000	380

Design:

Steel fitting, galvanized and passivated. Hose of synthetic material with high tensile brassed steel-wire braid.

Application:

Insert hose and tighten with 1/4 turn maximum.

Note:

We recommend only using the 3-metre long high pressure hose for double-acting elements. These high pressure hoses can be used directly in pipe connections. The maximum service life must be 6 years but the maximum service life must not exceed 10 years. Date of manufacture (quarter/year) is printed on the hose. Serviceability must be assessed in accordance with established inspection criteria. See DIN 20066, section 5 for further details.

Subject to technical alterations.

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No. 6990

Quick Disconnect Coupler

galvanized.
6990-G1/4 Sleeve and connector
6990-G1/4M Sleeve with external thread
6990-G1/4M IG sleeve with internal thread
6990-G1/4S connector
6990-G1/4BS dummy plug

Order no.	Article no.	Operating pressure [bar]	NG	Nominal flow [l/min]	SW [mm]	Md [Nm]	Weight [g]
69013	6990-G1/4	1000	2,5	6	22/24	40 - 50	250
69021	6990-G1/4M	1000	2,5	6	24	40 - 50	190
69062	6990-G1/4M-IG	1000	2,5	6	24	40 - 50	190
69039	6990-G1/4S	1000	2,5	6	22	40 - 50	60
69054	6990-G1/4BS	-	-	-	-	-	40
111518	6990-G1/4A	-	5	-	5	-	19

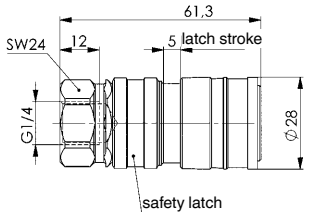


Design:

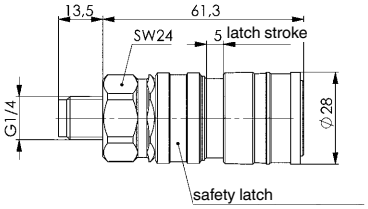
Galvanized housing. The socket and plug are locked automatically in uncoupled state. Plastic dust caps are supplied as standard for the socket and the plug.

Features:

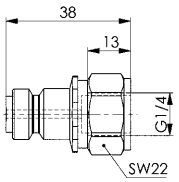
The hydraulic quick-release couplings for the high pressure area are easy to use, safe and reliable. It is a drip-free coupling that protects both the environment and the hydraulic system. The safety latch is standard and offers additional safety. It prevents accidental decoupling.



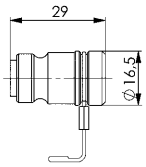
69062



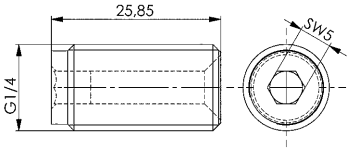
69021



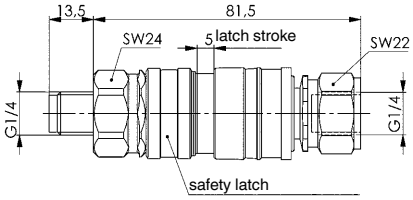
69039



69054



111518



69013

CAD

No. 6990MK/SK

Al Protection MK/SK

for quick-release coupling.
6990-G1/4MK Al protective cap for sleeve
6990-G1/4SK Al protective cap for connector

Order no.	Article no.	Weight [g]
65508	6990-G1/4MK	21
65524	6990-G1/4SK	14



Design:

Case from aluminium, with retainer.

Note:

Aluminium protective cap prevents contamination of sleeve and connector.

No. 6906

Hydraulic oil



Order no.	Contents [ml]	Weight [g]
464081	5000	4300

Design:

Hydraulic oil in plastic canister.

Application:

For all AMF pressure generators.

Subject to technical alterations.

No. 6983G

Pressure gauge, with housing

Threaded design.

CAD

Order no.	Article no.	max. pressure range [bar]	Md [Nm]	OR-1 O-ring Order No.	Weight [g]
562211	6983G-10-160	160	100	562534	635
562212	6983G-10-400	400	100	562534	635



Design:

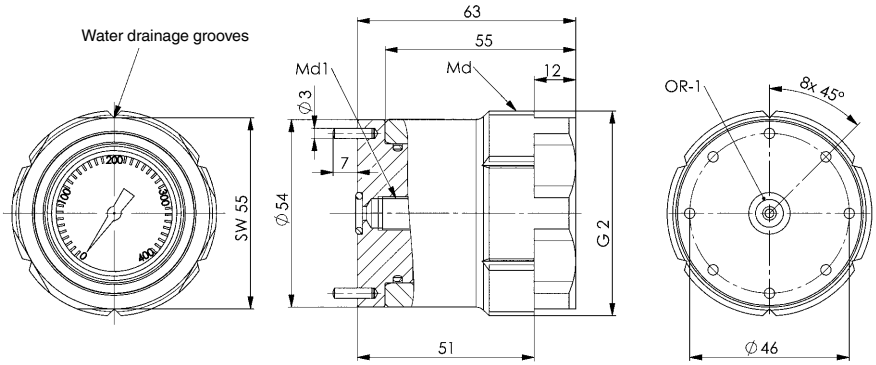
Steel housing burnished for screwing in, splash-proof by means of chip-resistant glass pane, with water drain notches.

Application:

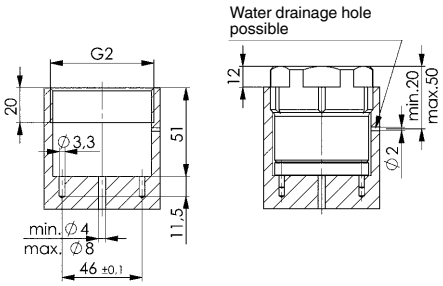
For quick, direct reading of hydraulic pressures in fixtures. Pressure gauge is protected by a chip-resistant glass pane. The structural shape prevents any accumulation of chips.

Note:

For screwing into the fixture with O-ring connection. Anti-rotation device by means of two pins. To align the display at an angle of 45°.



Installation dimensions:



No. 6983B

Pressure gauge, with housing

Block design.

CAD

Order no.	Article no.	max. pressure range [bar]	OR-1 O-ring Order No.	Screw (2 pieces)	Weight [g]
562213	6983B-10-160	160	321646	M8 x 75 (8.8)	1887
562214	6983B-10-400	400	321646	M8 x 75 (8.8)	1887



Design:

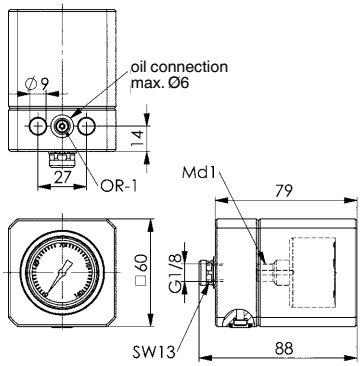
Steel housing, burnished, splash-proof by means of chip-resistant glass pane. Supplied as standard with O-ring, oil plugs and fastening bolts. Oil supply via threaded connection or oil channel in the fixture body.

Application:

For quick, direct reading of hydraulic pressures in fixtures. Pressure gauge is protected by a chip-resistant glass pane.

Note:

The bottom oil channel is plugged by a sealing washer and an M4 x 6 bolt. The display can be aligned freely with waf 13.



Subject to technical alterations.

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No. 6983

Gauge

Mark represents 400 bar,
6983-1 bottom connection,
6983-2 rear connection.







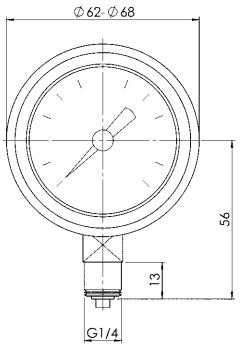
Order no.	Article no.	max. pressure range [bar]	Weight [g]
320648	6983-1-100	100	300
320655	6983-1-250	250	300
161414	6983-1-600	600	300
168575	6983-2	600	300

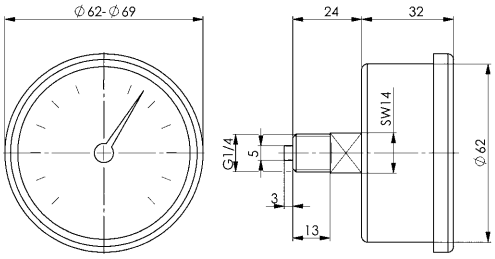
Design:

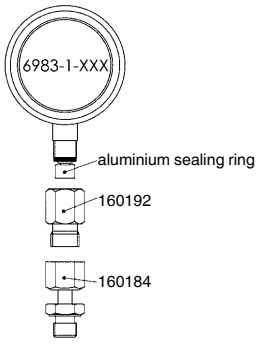
Complete with glycerin filling and aluminium sealing ring. Accuracy class 1.6.
Housing made of stainless steel, rust-free.

Note:

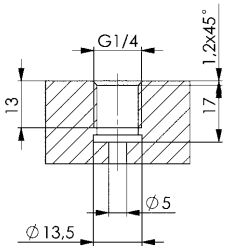
A combination of pipe fitting 6994-01 and 6994-02 can be used for the pipe connection.







Installation dimensions:



CAD

No. 6988

Manifold

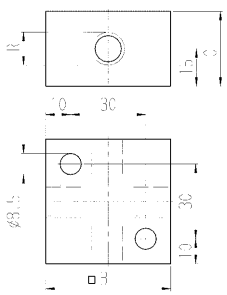


Order no.	Article no.	Operating pressure [bar]	NG	A	B	C	R	Oil connec-tions	Weight [g]
68825	6988-G1/4x4	400	6	-	50	30	G1/4	4	480
68817	6988-G1/4x6	400	6	200	50	30	G1/4	6	2025
560021	6988-G1/4x10	400	6	200	50	30	G1/4	10	1980

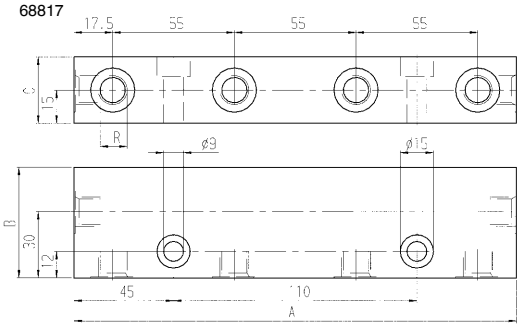
Design:

Housing from steel, burnished.

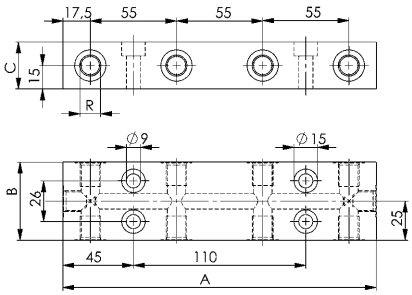
68825



68817

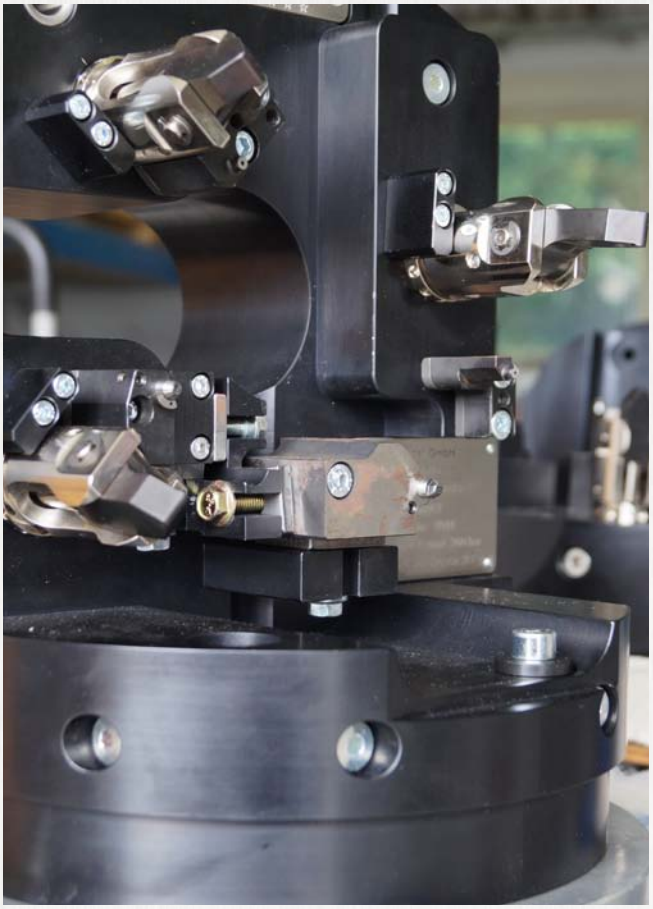


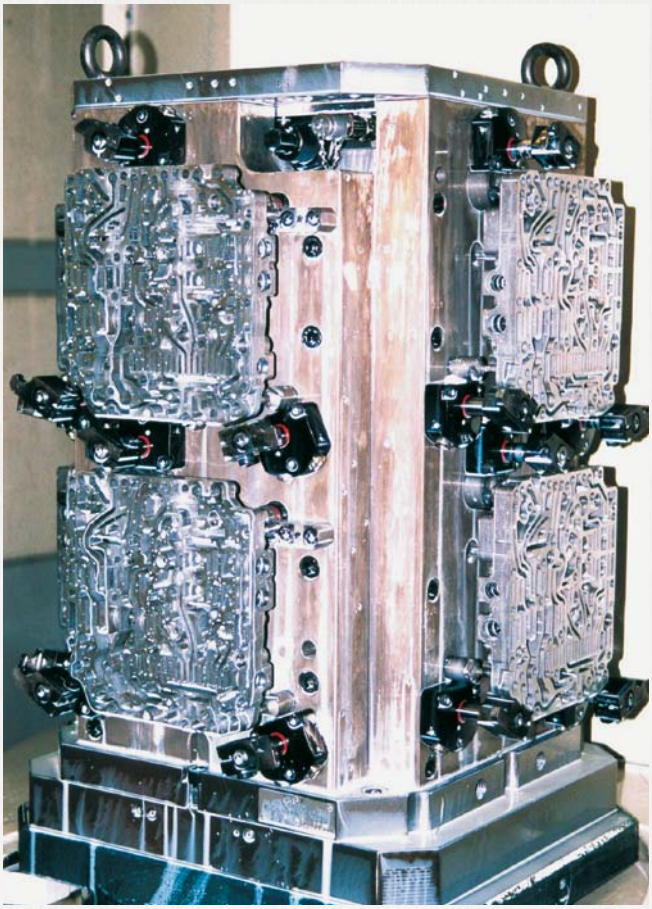
560021

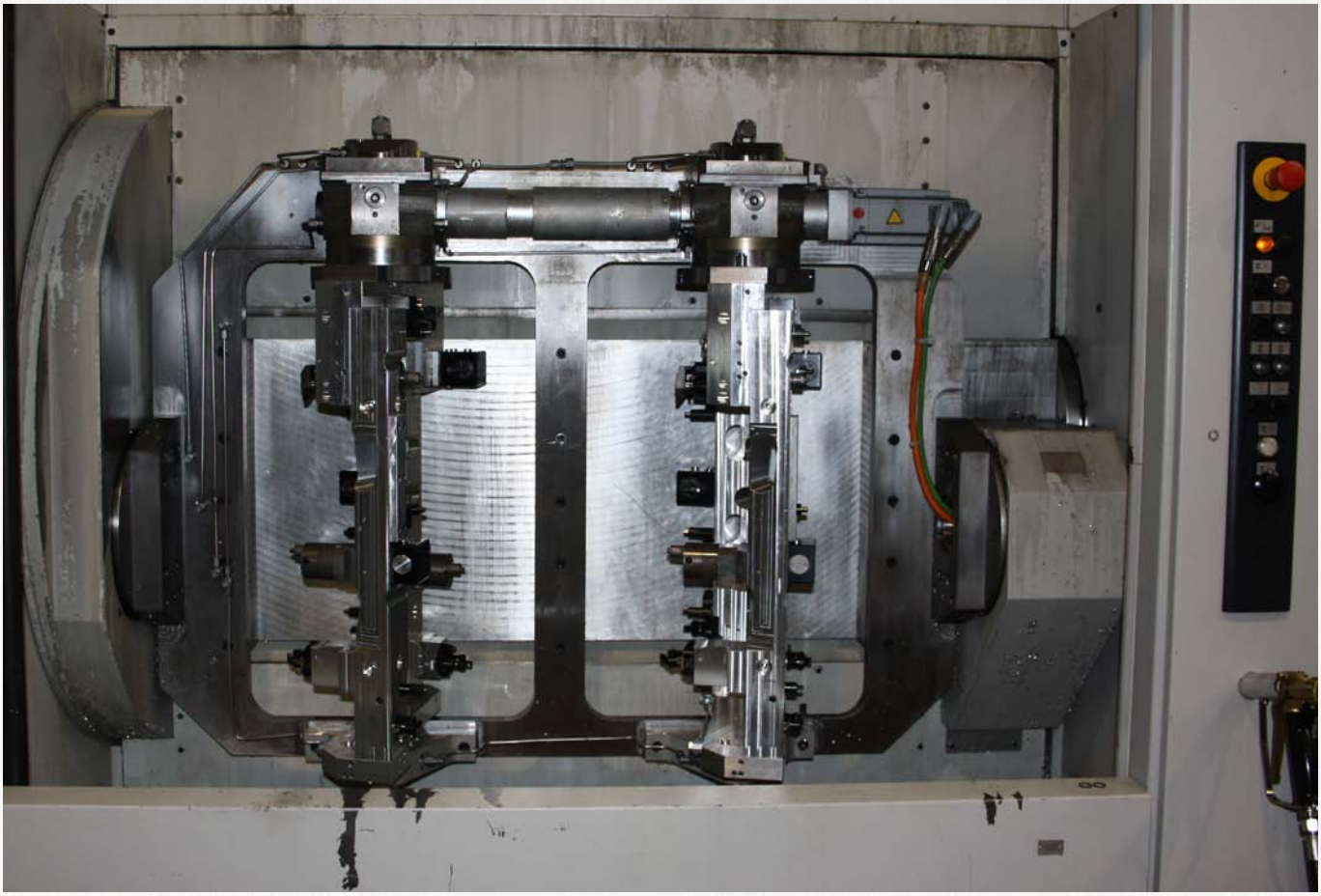


CAD

Subject to technical alterations.







Subject to technical alterations.

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ACCESSORIES –
SCREW CONNECTIONS FOR A SECURE FITTING

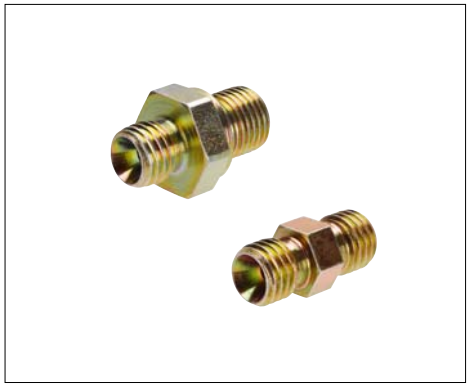
- **SCREW-IN FLANGES, CONNECTION JOURNALS AND TRANSITION PIECES**
- **THREADED PLUGS AND VENT SCREWS**
- **PIPE CONNECTIONS, HEAVY-DUTY SERIES**
- **PIPE CONNECTIONS, LIGHTWEIGHT SERIES**

PRODUCT OVERVIEW:

Type	Designation	Max. operating pressure [bar]	Length [mm]	Inside Ø	No. of models	Oil connection
6993	Screw-in flange	400	-	4	3	thread
6996	Adaptor	400	-	4	5	-
6997	Reducer	400	-	5	1	thread
908	Threaded plug	400	-	-	6	thread
DIN7603	Sealing ring	-	-	-	2	sealing ring
908S	Breather screw with filter	-	-	-	2	thread
908S-30	Vent screw	400	-	-	2	thread
6994	Pipe connections, heavy-duty series	630	-	4	14	thread / pipe
6994	Pipe connections, lightweight series	315	-	3	9	thread / pipe
6994	Hydraulic pipe	315 / 630	2000	3 / 4	2	pipe

PRODUCT EXAMPLES:

NO. 6993 AND 6993-M12X1,5



> max. operating pressure: 400 bar

DIN 7603 AND NO. 908S



> sealing ring

NO. 6994-03 AND 6994-09



> max. operating pressure: 630 bar

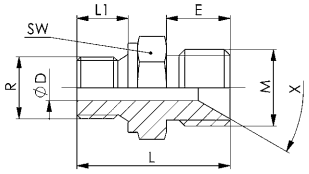
No. 6993

Screw-in flange

Zinc-plated.

CAD





Order no.	Article no.	R	L	L1	E	M	dia. D	SW	X°	max. operating pressure [bar]	Weight [g]
69302	6993-M12x1,5-G1/8	G1/8	24	8	10	M12 x 1,5	4	14	60	400	15
69328	6993-M12x1,5-G1/4	G1/4	30	12	10	M12 x 1,5	4	19	24	400	30

Design:

Seal on imperial thread with sealing edge in acc. with DIN 3852-2 Form B. Seal with sealing cone X in acc. with ISO 8434-1 (24° cone) or 8434-6 (60° cone). To seal the screw-in side, it is possible to use a copper seal, DIN 7603 Form A which prevents reflection of the screw-in hole.

Note:

Warning: Do not use Teflon tape! Copper seal 1/8 order no. 69815 Copper seal 1/4 order no. 69823

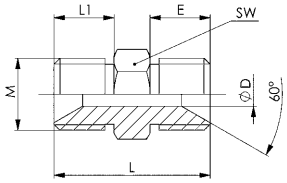
No. 6993-M12x1,5

Connection journal

Zinc-plated.

CAD





Order no.	Article no.	L	L1	E	M	dia. D	SW	max. operating pressure [bar]	Weight [g]
69344	6993-M12x1,5	30	11	11	M12 x 1,5	5	17	400	25

Design:

Seal with 60° sealing cone in acc. with ISO 8434-6.

Note:

Warning: Do not use Teflon tape!

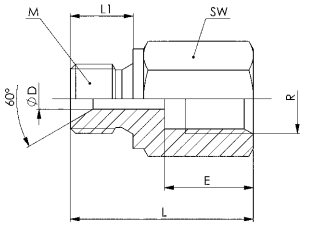
No. 6996

Adaptor

Zinc-plated.

CAD





Order no.	Article no.	R	L	L1	E	M	dia. D	SW	max. operating pressure [bar]	Weight [g]
69609	6996-G1/4-M12x1,5	G1/4	26	12	12	M12x1,5	4	19	400	30
69625	6996-G1/4-G1/8	G1/4	31	8	17	G1/8	3	19	400	38
69641	6996-G1/4-G1/4-35	G1/4	35	12	17	G1/4	4	19	400	44
160093	6996-G1/4-G1/4-59	G1/4	59	12	13	G1/4	4	19	400	100
153288	6996-M16/M12x1,5	M16x1,5	41	11	11	M12x1,5	4	22	400	85

Design:

Seal of transitional journal (external thread) in acc. with DIN 3852 Form A with sealing ring in acc. with DIN 7603 Form A. Seal: at end of hose or pipe connection with 60° sealing cone in acc. with ISO 8434-6.

Note:

Warning: Do not use Teflon tape! Copper seal 1/8 order no. 69815 Copper seal 1/4 order no. 69823

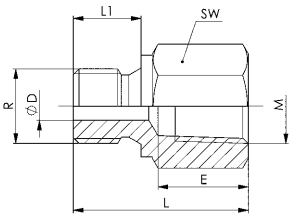
No. 6997

Reducer

Zinc-plated.

CAD





Order no.	Article no.	R	L	L1	E	M	dia. D	SW	max. operating pressure [bar]	Weight [g]
69666	6997-G1/4-1/4NPT	G1/4	31	12	15	1/4 NPT	5	19	400	38

Design:

Seal on reduction piece (external thread) in acc. with DIN 3852-2 Form A with sealing ring in acc. with DIN 7603 Form A. Seal on internal thread with conical NPT thread.

Note:

Warning: Do not use Teflon tape! Copper seal 1/4 order no. 69823

Subject to technical alterations.

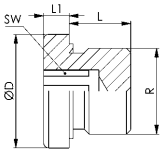
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No. 908G

Threaded plug with soft seal

Zinc-plated.





CAD

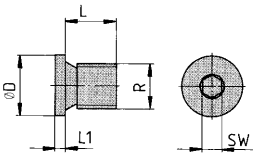
Order no.	Article no.	R	L	L1	dia. D	SW	max. operating pressure [bar]	Weight [g]
176693	908G-G1/8	G1/8	8	4	14	5	400	7
176719	908G-G1/4	G1/4	12	5	19	6	400	17
179952	908-M16x1,5	M16x1,5	12	5	22	8	400	24
176701	908-G3/8	G3/8	12	5	24	8	400	22

DIN 908

Threaded plug

Zinc-plated.





CAD

Order no.	Article no.	R	L	L1	dia. D	SW	Weight [g]
69393	908-G1/8	G1/8	8	3	14	5	6
69419	908-G1/4	G1/4	12	3	18	6	13

Design:

Sealing of threaded plug in acc. with DIN 3852-1 Form A with sealing ring in acc. with DIN 7603 Form A.

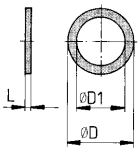
Note:

Warning: Do not use Teflon tape! Copper seal 1/8 order no. 69815 Copper seal 1/4 order no. 69823

DIN 7603

Shape A sealing ring Cu





CAD

Order no.	Article no.	L	dia. D	dia. D1	Weight [g]
69815	7603-Form A-G1/8	1,0	13,5	10,0	0,5
69823	7603-Form A-G1/4	1,5	18,0	13,5	1,0

Assembly example for high pressure hose with steel-wire interlace:

1) Hollow-rod cylinder 6920
2) Sealing ring DIN 7603A
3) Screw-in fitting 6994-05 without union nut
4) High pressure hose 6985K
5) Connector 6990-G1/4S
6) Sleeve 6990-G1/4M

Assembly example for high pressure hose:

1) Hollow-rod cylinder 6920
2) Sealing ring DIN 7603A
3) Screw-in flange 6993
4) High pressure hose 6985
5) Connector 6990-G1/4S
6) Sleeve 6990-G1/4M



CAD

Subject to technical alterations.

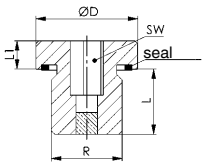
No. 908S

Breather screw with filter

Zinc-plated.

CAD





Order no.	Article no.	R	L	L1	dia. D	SW	Weight [g]
326389	908S-G1/8	G1/8	8	4	14	5	6
343632	908S-G1/4	G1/4	12	5	19	6	17

Design:

Vent screw with integrated soft seal and sintered bronze filter insert. Also for ventilation of the spring space.

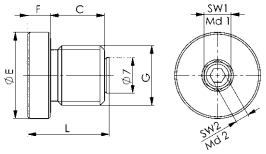
No. 908S-30-XXX

Vent screw

Max. operating pressure 400 bar.

CAD





Order no.	Article no.	C	dia. E	F	G	L	SW1	SW2	Md 1 [Nm]	Md 2 [Nm]	Weight [g]
563491	908S-30-G1/8	9	14,5	4	G1/8	14	6	3	20 - 22	5 - 7	8
563492	908S-30-G1/4	12	19,0	5	G1/4	18	6	3	28	5 - 7	18

Design:

Housing, socket bolt and seal element (metal sealing action) made of stainless steel, soft seal made of FKM.

Application:

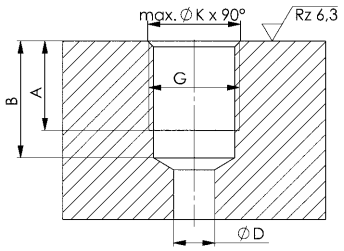
Vent screw for venting clamping devices and clamping elements. Compact and simple design or handling. Insensitive to external influences. Suitable for temperatures up to 150 °C. It is sufficient to open the vent screw by half a turn.

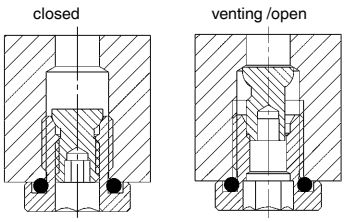
Note:

Only an Allen key **SW3** is required for bleeding. The inner vent screw is opened anticlockwise. Therefore, there is no risk of loosening the outer screw when closing. Observe torque specifications.

Installation dimensions:

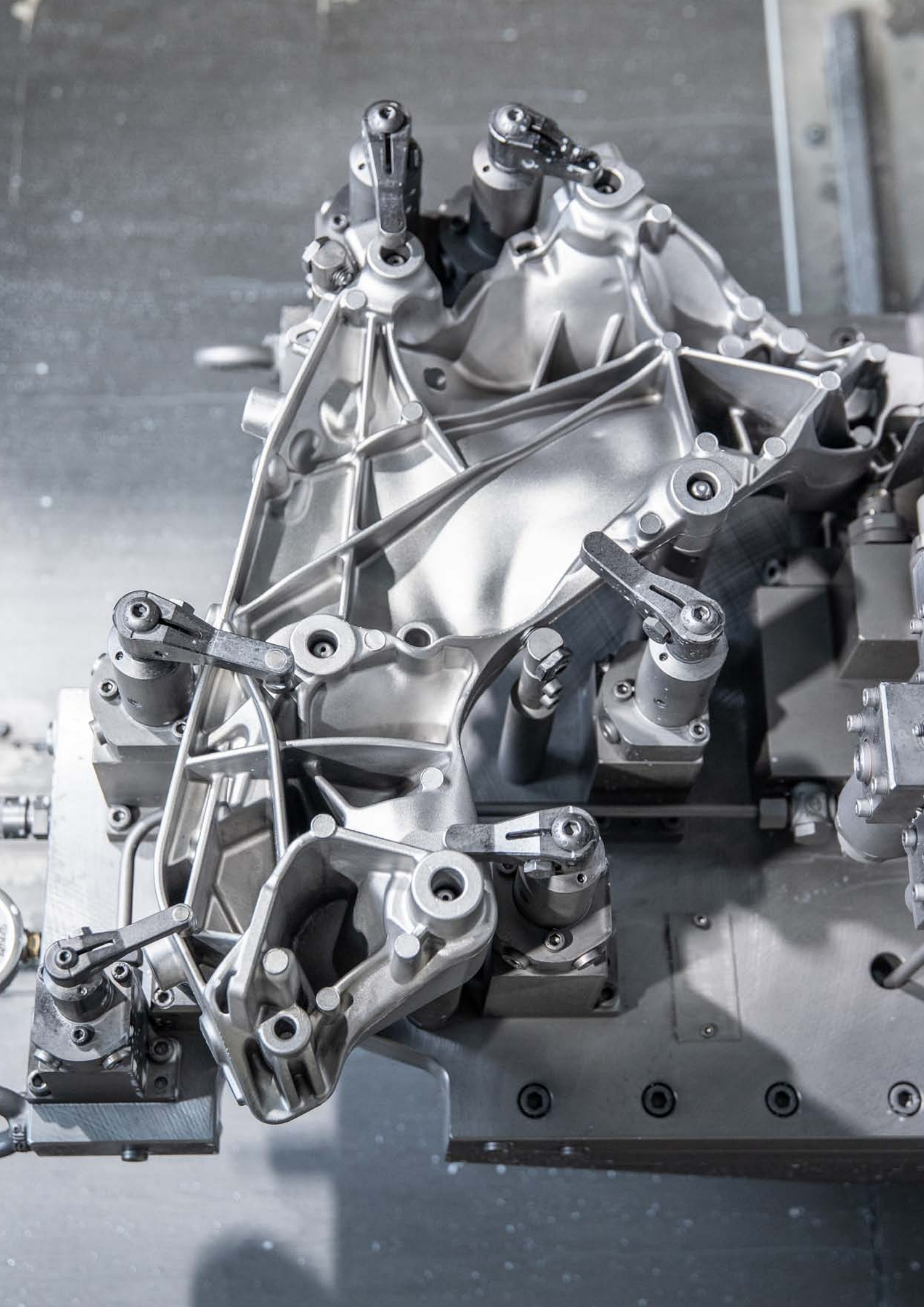
Order no.	Article no.	A	B min.	B max.	dia. D min.	dia. D max.	G	ØK max.
563491	908S-30-G1/8	11	12	15	1	6	G1/8	10,0
563492	908S-30-G1/4	13	14	17	1	6	G1/4	13,5





Subject to technical alterations.

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No. 6994-01

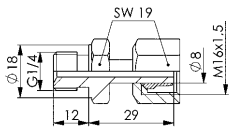
Screw-in fitting, straight, heavy-duty

for steel tubes with outer diameter 8 mm and internal diameter 4 mm, with olive ring.

CAD

Order no.	Article no.	max. operating pressure [bar]	Weight [g]
160184	6994-01	630	50





Design:

Pipe connection seal with cutting ring in acc. with ISO 8434-1 / DIN 2353. Sealing of external thread with sealing edge in acc. with DIN 3852-2 Form B. External thread can also be sealed with a copper seal in acc. with DIN 7603 Form A, making multiple use of the threaded bore possible.

Note:

Warning: Do not use Teflon tape! Copper seal 1/4 order no. 69823

No. 6994-02

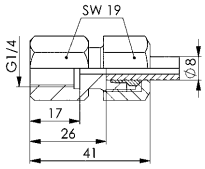
Screw-up fitting, straight, heavy-duty

for steel tubes with outer diameter 8 mm and internal diameter 4 mm, with olive ring.

CAD

Order no.	Article no.	max. operating pressure [bar]	Weight [g]
160192	6994-02	630	60





Design:

Pipe connection seal with cutting ring in acc. with ISO 8434-1 / DIN 2353. Threaded bore in acc. with DIN 3852-2 Form-X.

Note:

Warning: Do not use Teflon tape!

No. 6994-03

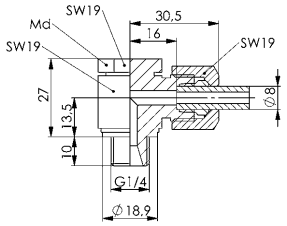
Pivoting fitting, angled, heavy-duty

for steel tubes with outer diameter 8 mm and internal diameter 4 mm, with olive ring.

CAD

Order no.	Article no.	max. operating pressure [bar]	Md max. [Nm]	Weight [g]
160358	6994-03	500	50	103





Design:

Pipe connection seal with cutting ring in acc. with ISO 8434-1 / DIN 2353. Seal on external thread with edge seal ring in acc. with EN ISO 228-1.

Note:

Warning: Do not use Teflon tape!

No. 6994-04

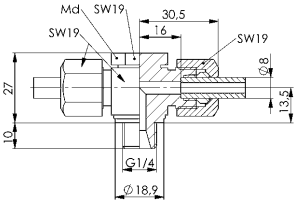
Pivoting T-fitting, heavy-duty

for steel tubes with outer diameter 8 mm and internal diameter 4 mm, with olive ring.

CAD

Order no.	Article no.	max. operating pressure [bar]	Md max. [Nm]	Weight [g]
170266	6994-04	500	50	122





Design:

Pipe connection seal with cutting ring in acc. with ISO 8434-1 / DIN 2353. Seal on external thread with edge seal ring in acc. with EN ISO 228-1.

Note:

Warning: Do not use Teflon tape!

No. 6994-05

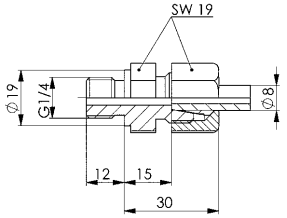
Screw-in fitting, straight, heavy-duty

for steel tubes with outer diameter 8 mm and internal diameter 4 mm, with olive ring.

CAD

Order no.	Article no.	max. operating pressure [bar]	Weight [g]
175323	6994-05	630	55





Design:

Pipe connection seal with cutting ring in acc. with ISO 8434-1 / DIN 2353. Sealing of external thread with sealing edge in acc. with DIN 3852-2 Form B. External thread can also be sealed with a copper seal in acc. with DIN 7603 Form A, making multiple use of the threaded bore possible.

Note:

Warning: Do not use Teflon tape! Copper seal 1/4 order no. 69823

Subject to technical alterations.

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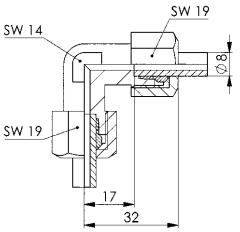
No. 6994-06

Fitting, angled, heavy-duty

for steel tubes with outer diameter 8 mm and internal diameter 4 mm, with olive ring.

CAD





Order no.	Article no.	max. operating pressure [bar]	Weight [g]
160366	6994-06	800	110

Design:

Pipe connection seal with cutting ring in acc. with ISO 8434-1 / DIN 2353.

Note:

Warning: Do not use Teflon tape!

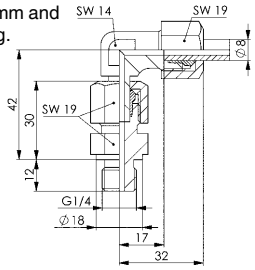
No. 6994-07

Fitting, angled, adjustable, heavy-duty

for steel tubes with outer diameter 8 mm and internal diameter 4 mm, with olive ring.

CAD





Order no.	Article no.	max. operating pressure [bar]	Weight [g]
160200	6994-07	800	125

Design:

Pipe connection seal with cutting ring in acc. with ISO 8434-1 / DIN 2353. Sealing of external thread with sealing edge in acc. with DIN 3852-2 Form B. External thread can also be sealed with a copper seal in acc. with DIN 7603 Form A, making multiple use of the threaded bore possible.

Note:

Warning: Do not use Teflon tape! Copper seal 1/4 order no. 69823

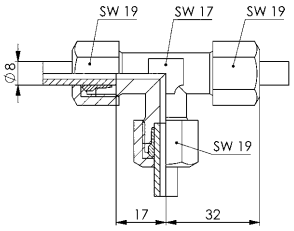
No. 6994-08

T-fitting, heavy-duty

for steel tubes with outer diameter 8 mm and internal diameter 4 mm, with olive ring.

CAD





Order no.	Article no.	max. operating pressure [bar]	Weight [g]
170258	6994-08	800	155

Design:

Pipe connection seal with cutting ring in acc. with ISO 8434-1 / DIN 2353.

Note:

Warning: Do not use Teflon tape!

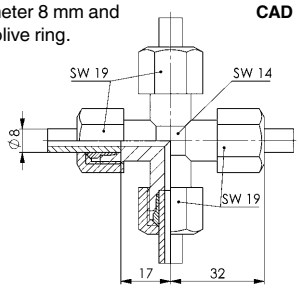
No. 6994-09

Cross-fitting, heavy-duty

for steel tubes with outer diameter 8 mm and internal diameter 4 mm, with olive ring.

CAD





Order no.	Article no.	max. operating pressure [bar]	Weight [g]
170308	6994-09	630	150

Design:

Pipe connection seal with cutting ring in acc. with ISO 8434-1 / DIN 2353.

Note:

Warning: Do not use Teflon tape!

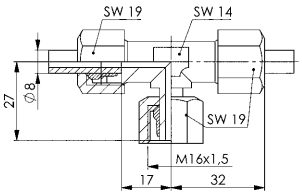
No. 6994-10

T-fitting, adjustable, heavy-duty

for steel tubes with outer diameter 8 mm and internal diameter 4 mm, with olive ring.

CAD





Order no.	Article no.	max. operating pressure [bar]	Weight [g]
170316	6994-10	630	120

Design:

Pipe connection seal with cutting ring in acc. with ISO 8434-1 / DIN 2353.

Note:

Warning: Do not use Teflon tape!

Subject to technical alterations.

No. 6994-11

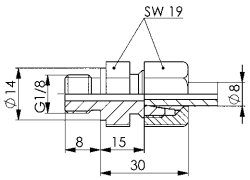
Screw-in fitting, straight, heavy-duty

for steel tubes with outer diameter 8 mm and internal diameter 4 mm, with olive ring.

CAD

Order no.	Article no.	max. operating pressure [bar]	Md max. [Nm]	Weight [g]
112714	6994-11	400	40	55





Design:

Pipe connection seal with cutting ring in acc. with ISO 8434-1 / DIN 2353. Sealing of external thread with sealing edge in acc. with DIN 3852-2 Form B. External thread can also be sealed with a copper seal in acc. with DIN 7603 Form A, making multiple use of the threaded bore possible.

Note:

Warning: Do not use Teflon tape! Copper seal 1/8 order no. 69815

No. 6994-12

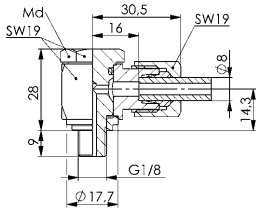
Pivoting fitting, angled, heavy-duty

for steel tubes with outer diameter 8 mm and internal diameter 4 mm, with olive ring.

CAD

Order no.	Article no.	max. operating pressure [bar]	Md max. [Nm]	Weight [g]
112961	6994-12	400	40	125





Design:

Pipe connection seal with cutting ring in acc. with ISO 8434-1 / DIN 2353. Seal on external thread with edge seal ring in acc. with EN ISO 228-1.

Note:

Warning: Do not use Teflon tape!

No. 6994-13

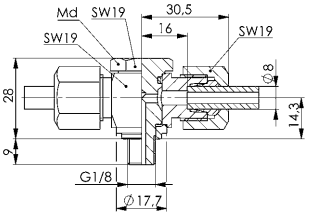
Pivoting T-fitting, heavy-duty

for steel tubes with outer diameter 8 mm and internal diameter 4 mm, with olive ring.

CAD

Order no.	Article no.	max. operating pressure [bar]	Md max. [Nm]	Weight [g]
116418	6994-13	400	40	150





Design:

Pipe connection seal with cutting ring in acc. with ISO 8434-1 / DIN 2353. Seal on external thread with edge seal ring in acc. with EN ISO 228-1.

Note:

Warning: Do not use Teflon tape!

No. 6994-14

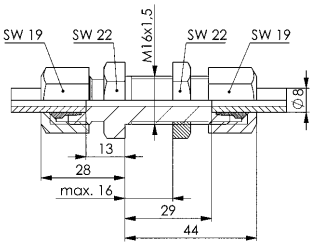
Bulkhead fitting, straight, heavy-duty

for steel tubes with outer diameter 8 mm and internal diameter 4 mm, with olive ring.

CAD

Order no.	Article no.	max. operating pressure [bar]	Weight [g]
131631	6994-14	800	130





Design:

Pipe connection seal with cutting ring in acc. with ISO 8434-1 / DIN 2353.

Note:

Warning: Do not use Teflon tape!

No. 6994-17

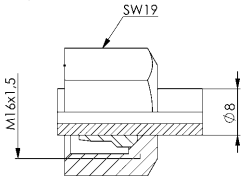
Union nut with cutting ring, heavy series

for steel tubes with outer diameter 8 mm and internal diameter 4 mm, with olive ring.

CAD

Order no.	Article no.	max. operating pressure [bar]	Weight [g]
184150	6994-17	800	23





Design:

Pipe connection seal in acc. with ISO 8434-1 / DIN 2353.

Note:

Warning: Do not use Teflon tape!

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No. 6994

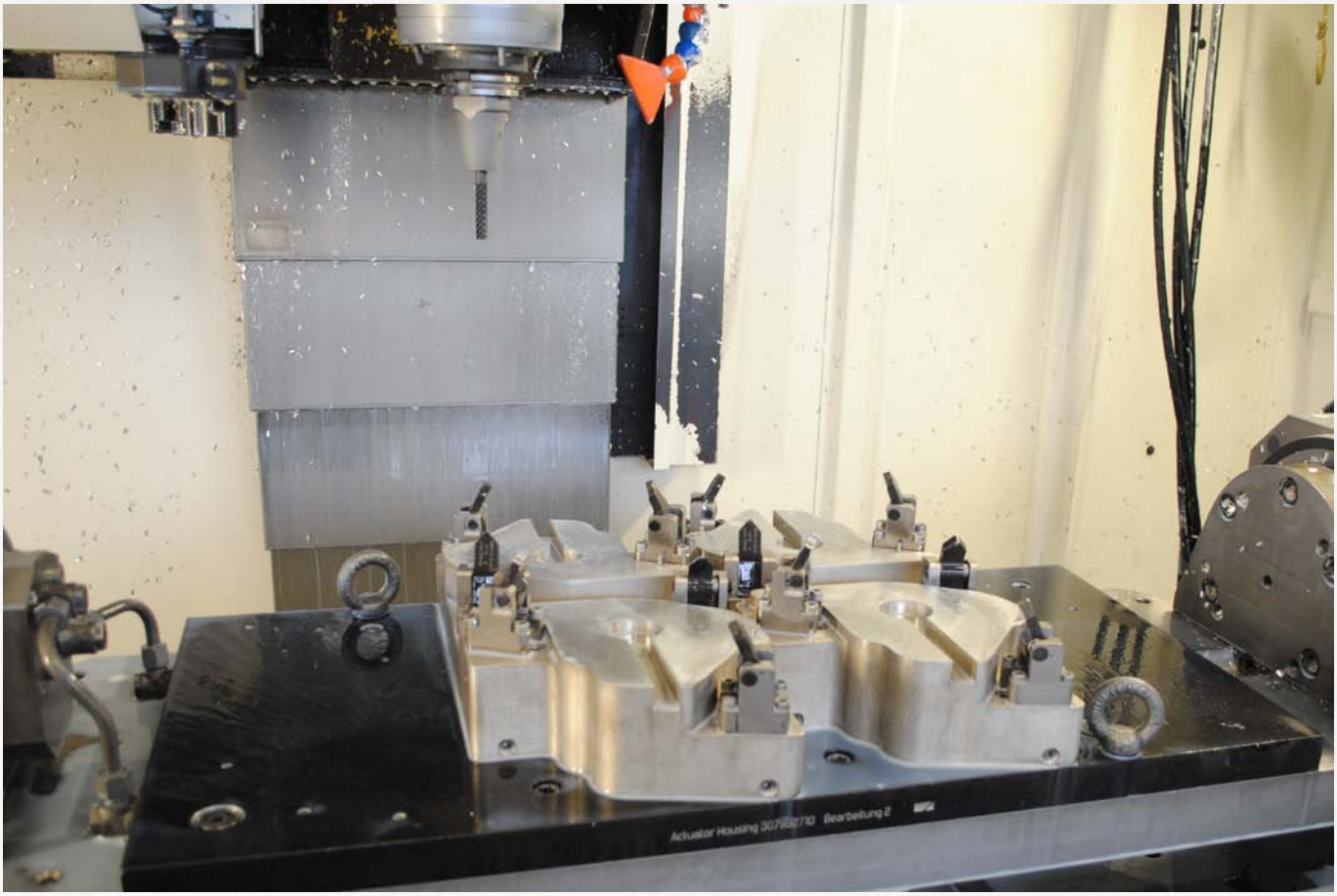
Hydraulic pipe



Order no.	Article no.	dia. [mm]	Length [m]	max. operating pressure [bar]	Weight [g]
320861	6994-25	6,0 x 1,5	2,0	315	335
122903	6994-30	8,0 x 2,0	2,0	500	600

Design:

Seamless hydraulic pipe, phosphated and oiled, from steel (fully killed) to DIN EN 10305, normalized, bright-annealed, cold-drawn.



Subject to technical alterations.

No. 6994-010

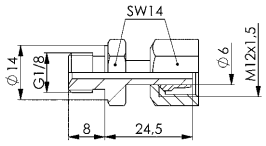
Screw-in fitting, straight, light duty

for steel tubes with outer diameter 6 mm and internal diameter 3 mm, with olive ring.

CAD

Order no.	Article no.	max. operating pressure [bar]	Weight [g]
320689	6994-010	315	25





Design:

Pipe connection seal with cutting ring in acc. with ISO 8434-1 / DIN 2353. Sealing of external thread with sealing edge in acc. with DIN 3852-2 Form B. External thread can also be sealed with a copper seal in acc. with DIN 7603 Form A, making multiple use of the threaded bore possible.

Note:

Warning: Do not use Teflon tape! Copper seal 1/8 order no. 69815

No. 6994-030

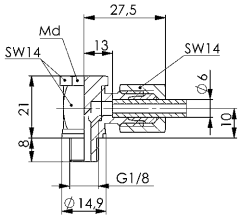
Pivoting fitting, angled, light duty

for steel tubes with outer diameter 6 mm and internal diameter 3 mm, with olive ring.

CAD

Order no.	Article no.	max. operating pressure [bar]	Md max. [Nm]	Weight [g]
320705	6994-030	315	40	74





Design:

Pipe connection seal with cutting ring in acc. with ISO 8434-1 / DIN 2353. Seal on external thread with edge seal ring in acc. with EN ISO 228-1.

Note:

Warning: Do not use Teflon tape!

No. 6994-040

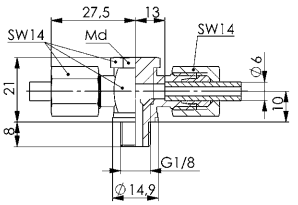
Pivoting T-fitting, light duty

for steel tubes with outer diameter 6 mm and internal diameter 3 mm, with olive ring.

CAD

Order no.	Article no.	max. operating pressure [bar]	Md max. [Nm]	Weight [g]
320721	6994-040	315	40	85





Design:

Pipe connection seal with cutting ring in acc. with ISO 8434-1 / DIN 2353. Seal on external thread with edge seal ring in acc. with EN ISO 228-1.

Note:

Warning: Do not use Teflon tape!

No. 6994-050

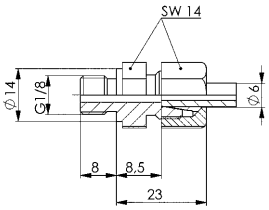
Screw-in fitting, straight, light duty

for steel tubes with outer diameter 6 mm and internal diameter 3 mm, with olive ring.

CAD

Order no.	Article no.	max. operating pressure [bar]	Weight [g]
320747	6994-050	315	25





Design:

Pipe connection seal with cutting ring in acc. with ISO 8434-1 / DIN 2353. Sealing of external thread with sealing edge in acc. with DIN 3852-2 Form B. External thread can also be sealed with a copper seal in acc. with DIN 7603 Form A, making multiple use of the threaded bore possible.

Note:

Warning: Do not use Teflon tape! Copper seal 1/8 order no. 69815

No. 6994-060

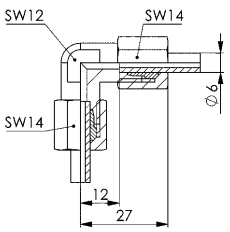
Fitting, angled, light duty

for steel tubes with outer diameter 6 mm and internal diameter 3 mm, with olive ring.

CAD

Order no.	Article no.	max. operating pressure [bar]	Weight [g]
320762	6994-060	315	51





Design:

Pipe connection seal with cutting ring in acc. with ISO 8434-1 / DIN 2353.

Note:

Warning: Do not use Teflon tape!

Subject to technical alterations.

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No. 6994-080

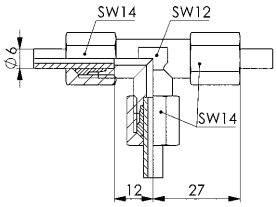
T-fitting, light duty

for steel tubes with outer diameter 6 mm and internal diameter 3 mm, with olive ring.

CAD

Order no.	Article no.	max. operating pressure [bar]	Weight [g]
320788	6994-080	315	71





Design:

Pipe connection seal with cutting ring in acc. with ISO 8434-1 / DIN 2353.

Note:

Warning: Do not use Teflon tape!

No. 6994-090

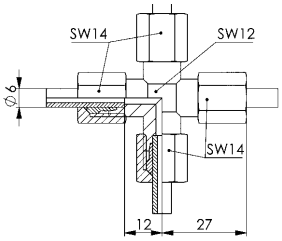
Cross-fitting, light duty

for steel tubes with outer diameter 6 mm and internal diameter 3 mm, with olive ring.

CAD

Order no.	Article no.	max. operating pressure [bar]	Weight [g]
320804	6994-090	315	77





Design:

Pipe connection seal with cutting ring in acc. with ISO 8434-1 / DIN 2353.

Note:

Warning: Do not use Teflon tape!

No. 6994-140

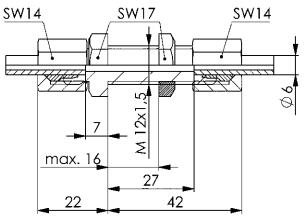
Bulkhead fitting, straight, light duty

for steel tubes with outer diameter 6 mm and internal diameter 3 mm, with olive ring.

CAD

Order no.	Article no.	max. operating pressure [bar]	Weight [g]
320820	6994-140	315	67





Design:

Pipe connection seal with cutting ring in acc. with ISO 8434-1 / DIN 2353.

Note:

Warning: Do not use Teflon tape!

No. 6994-150

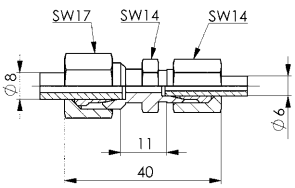
Adapter Plate, light duty

For steel pipes, external ø 6 or 8 mm, internal ø 3 or 4 mm, with cutting ring.

CAD

Order no.	Article no.	max. operating pressure [bar]	Weight [g]
320846	6994-150	315	42





Design:

Pipe connection seal with cutting ring in acc. with ISO 8434-1 / DIN 2353.

Note:

Warning: Do not use Teflon tape!

No. 6994-170

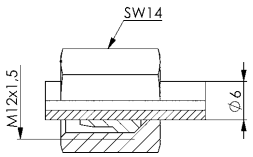
Union nut with cutting ring, light duty

for steel tubes with outer diameter 6 mm and internal diameter 3 mm, with olive ring.

CAD

Order no.	Article no.	max. operating pressure [bar]	Weight [g]
313361	6994-170	315	12





Design:

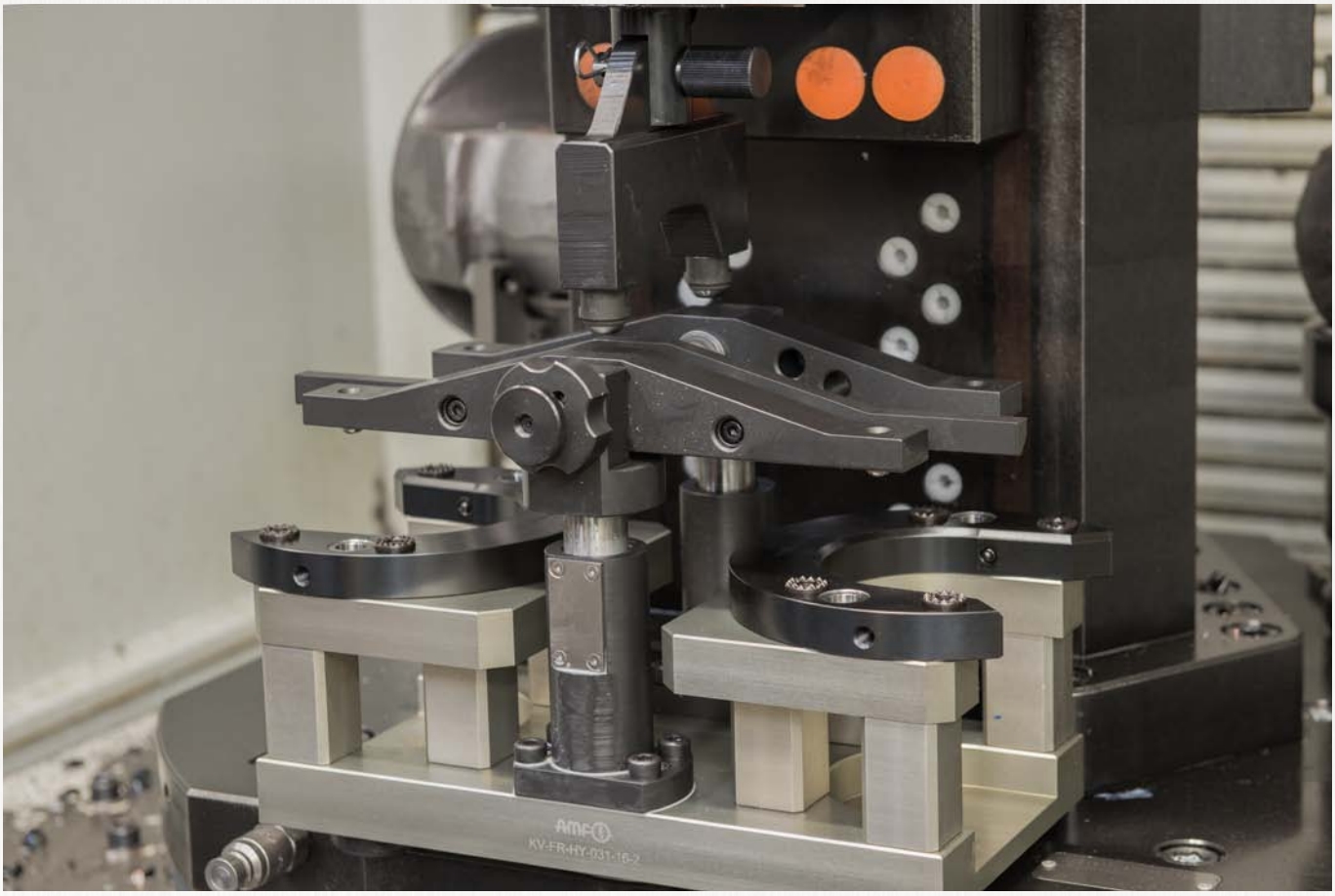
Pipe connection seal in acc. with ISO 8434-1 / DIN 2353.

Note:

Warning: Do not use Teflon tape!

Subject to technical alterations.





Subject to technical alterations.

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ACCESSORIES –
FOR HOLDING AND SECURING WORKPIECES AND SET SCREWS FOR SECURE CLAMPING

- **FAILOVER WITH BALL**
- **FAILOVER WITH ROLL**
- **SIDE THRUST PIECES WITH AND WITHOUT SEAL**
- **SET SCREWS**

PRODUCT OVERVIEW:

Type	Designation	Spring force [N]	Thread	No. of models	Design variants
6980MK	Failover with ball	52	M22 x 1,5	2	thread
6980FRX	Failover with roll	7 - 20	-	2	block
6380D	Side thrust pieces	10 - 300	-	15	cartridge
6940	Set screw, ball-shaped	-	M5 x M20	7	thread
7110	Set screw with ball	-	M8 - M20	20	thread

PRODUCT EXAMPLES:

NO. 6980MK AND 6980FRX



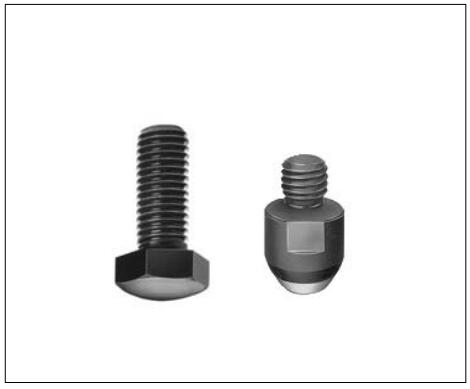
> spring force: 7-52 N

NO. 6380D



> spring force: 10 - 300 N

NO. 6940 AND 7110DK



> thread: M5 - M20

No. 6980FRX

Failover with roll

flanged.



CAD

Order no.	Article no.	Material roll steel	Material roll plastic	Deflection force [N]	Deflection angle max. [°]	Weight [g]
562208	6980FRS-16	●	-	7-20	24	258
562209	6980FRK-16	-	●	7-20	24	252

Design:

Housing and lever made of steel, burnished. Roller made of hardened steel or plastic

Application:

Workpieces are held in position before the clamping operation and prevented from falling out.

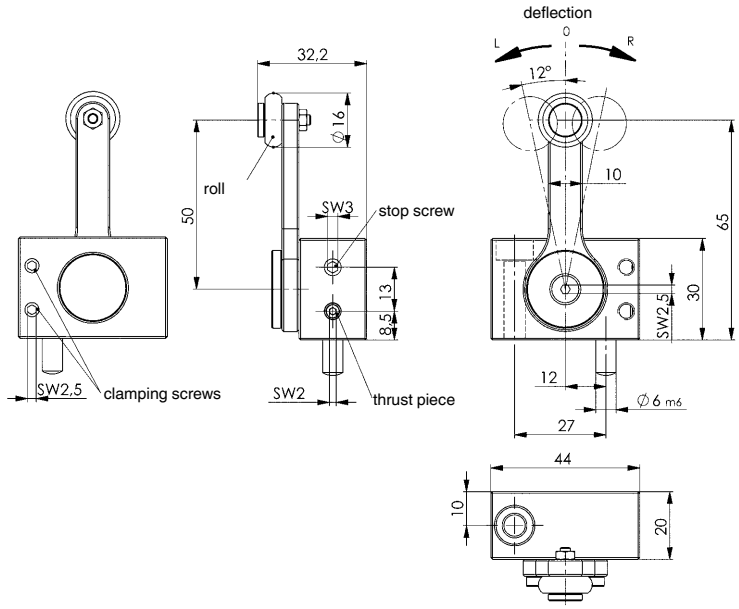
Features:

Countless variants are possible by combining the various mounting variants and deflection directions. Damage to the workpiece surface is prevented by using the roller.

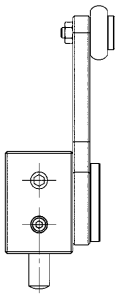
Note:

The deflection can be changed by altering the position of the stop screw with the thrust piece in the housing. The position is secured with the clamping screw. In the normal position, the lever is changeable by 90°.

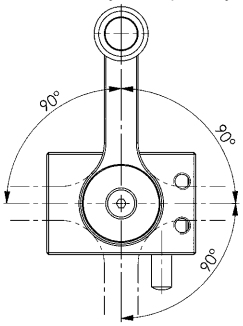
Replacement part:
Roller made of steel 6958FRS-16-06: order no. 562538
Roller made of plastic 6980FRK-16-06: order no. 562539



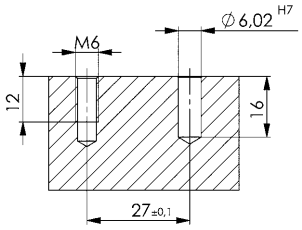
convertible: right lever



convertible: lever by 90° respectively



Installation dimensions:



Subject to technical alterations.

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No. 6980MK

Failover with ball

screwable.



CAD

Order no.	Article no.	dia. A	~P Spring force [N]	Screwing depth H min. [mm]	Screwing depth H max. [mm]	L	Weight [g]
562206	6980MK-08	8	52	9	15	64	66
562207	6980MK-10	10	52	9	15	64	69

Design:

Housing made of steel, burnished. Plunger hardened.

Application:

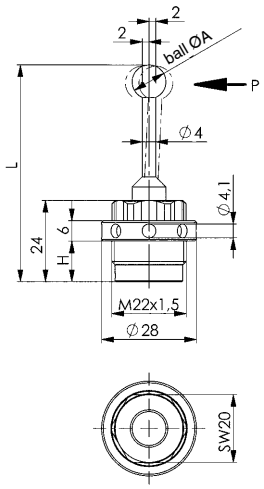
Workpieces are held in position before the clamping operation and prevented from falling out.

Features:

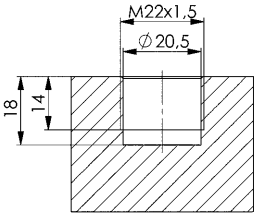
Thanks to the cylindrical shape, the screw-in failover can be used 360°. Fine adjustment by screwing in or unscrewing the failover.

Note:

Plungers can be individually designed in length and ball diameter and are available on request. For installation, use hook spanner order no 54916.



Installation dimensions:



Subject to technical alterations.

THE FIRST STEP FOR USE AND EMPLOYMENT OF SIDE THRUST PIECES:

> What is being positioned or clamped?
> Which side thrust pieces will be used?
> What size corresponds to the workpiece?
> What tolerance does the workpiece have?
> How large is the dimension Y? (Workpiece height)
> How large is the dimension X? (See table)
> Should the spring deflection be completely used?
> How is the coordinate dimension determined?

EXAMPLE: POSITIONING OR CLAMPING A PLATE 100 X 50 X 8 MM

Should the pin diameter be 5, 6 or 8 mm?

> If nothing may extend over the plate	5 mm
> If projection would not be a problem	6 or 8 mm
> If clamping will be done additionally	6 mm
> If drilling will be performed without additional clamping	8 mm

Length / width of the workpiece?

> Length = 100 +0/ -0.4 = medium dimension 99,8 mm
> Width = 50 +0,2/-0.2 = medium dimension 50,0 mm

Workpiece height Y?

The tolerance can be ignored

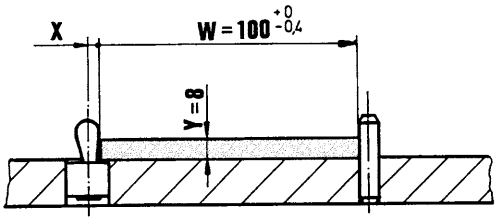
What force should be selected?

> For positioning tasks	30 - 60 N
> For clamping forces	90 - 150 N

Dimension X for side thrust pieces with steel spring?

> See table or formula below

.



W = workpiece (+/- tolerance)
- F = pre-tension
F = (-F) + (+F)

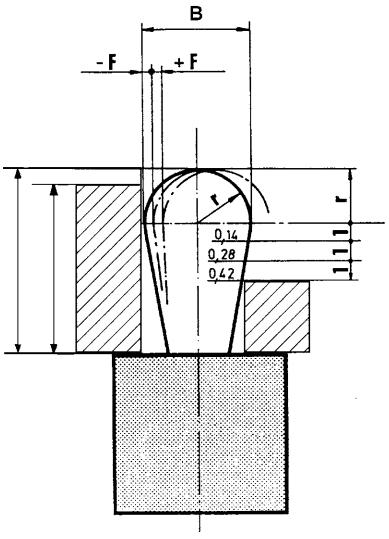
Y = workpiece height
+ F = clamping force (spring deflection for tolerance)
T = tolerance

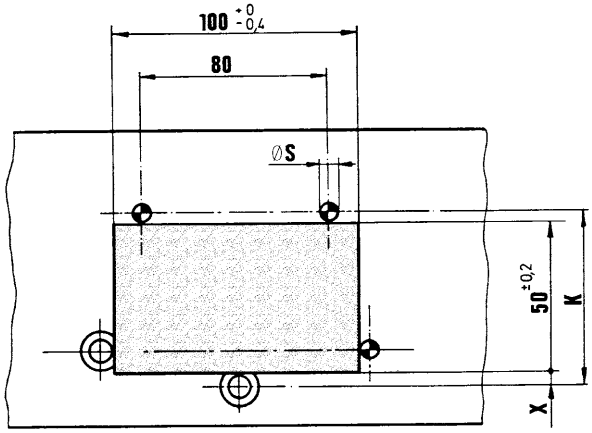
For workpieces that are higher than C minus r, the table values for dimension X or the formula X = B/2 - (-F) apply.

For workpieces that are smaller than C minus r, the table values for dimension X or the formula X = B/2 - (-F) - [(C - r - Y) x 0,123] apply.

Formula for coordinates:
K = W - T/2 + x + S/2

The table values are standard values that should ideally be checked using a sample clamping.





No. 6380D

Side thrust piece, with seal

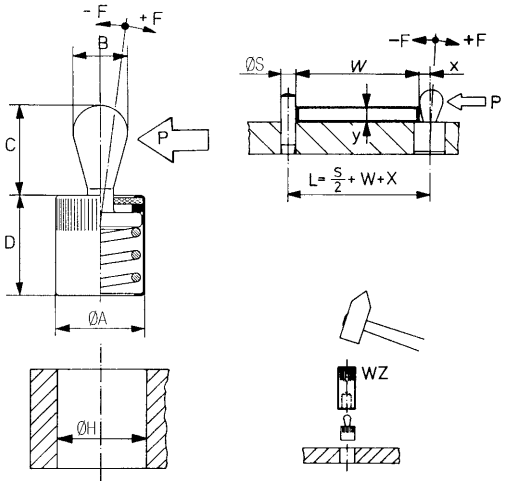
against chips and dirt.
Steel pin for clamping: hardened and galvanised
Sleeve: Aluminium



Order no.	dia. A	B	~P Spring force [N]	C	D -1	ØH H8	F	X	Tool 6380WZ	Weight [g]
373159	6	3	10	4	7	6	±0,5	0,9	03	0,6
373167	6	3	20	4	7	6	±0,5	0,9	03	0,6
373175	6	3	40	4	7	6	±0,5	0,9	03	0,7
373183	10	5	20	6	12	10	±0,8	1,6	05	2,7
373191	10	5	50	6	12	10	±0,8	1,6	05	2,9
373209	10	5	100	6	12	10	±0,8	1,6	05	2,9
373217	10	6	40	10	12	10	±1,0	1,8	06	3,1
373225	10	6	75	10	12	10	±1,0	1,8	06	3,6
373233	10	6	150	10	12	10	±1,0	1,8	06	3,7
373241	12	8	50	13	14	12	±1,3	2,6	08	3,9
373258	12	8	100	13	14	12	±1,3	2,6	08	7,1
373266	12	8	200	13	14	12	±1,3	2,6	08	7,3
373274	16	10	100	16	18	16	±1,6	3,2	10	7,6
373282	16	10	200	16	18	16	±1,6	3,2	10	15
373290	16	10	300	16	18	16	±1,6	3,2	10	15,4

Note:

With sealing for chip-producing operations with dirt, temperature-resistant up to 150°C.
Sealing: CR, black, 60 Shore. Installation by pressing in.



CAD

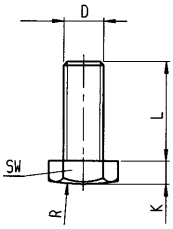
Subject to technical alterations.

No. 6940

Set screw, ball-shaped

Strength class 10.9





CAD

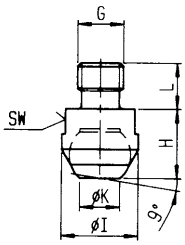
Order no.	Article no.	D x L	K	R	SW	Weight [g]
64014	6940-M5	M5x10	3,5	25	8	2,4
64022	6940-M6	M6x12	4,0	30	10	4,3
64030	6940-M8	M8x16	5,3	40	13	9,9
64048	6940-M10	M10x20	6,4	50	17	21,3
64055	6940-M12	M12x30	7,0	60	19	36,4
64063	6940-M16	M16x40	10,0	75	24	85,8
64071	6940-M20	M20x50	12,5	100	30	168

No. 7110DF

Set screw

with flat-faced ball, ribbed.





CAD

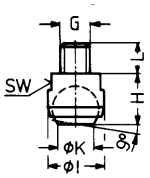
Order no.	Article no.	G x L	H	dia. I	dia. K	SW	Load [kN]	Weight [g]
425025	7110DF-08xM8	M8 x 8	13	13	7,2	11	18	13
273177	7110DF-10xM10	M10 x 10	18	20	10,5	17	25	40
86637	7110DF-12xM12	M12 x 12	18	20	10,5	17	25	43
86652	7110DF-16xM16	M16 x 16	27	30	20,0	20	90	150
86223	7110DF-20xM20	M20 x 20	35	50	34,5	41	165	486

No. 7110DK

Set screw

with flat-faced ball





CAD

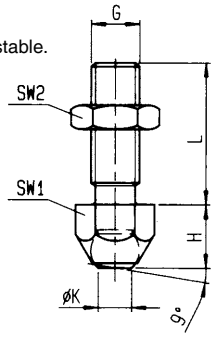
Order no.	Article no.	G x L	H	dia. I	dia. K	SW	Load [kN]	Weight [g]
285478	7110DK-08xM8	M8 x 8	13	13	7,2	11	10	13
285452	7110DK-10xM10	M10 x 10	18	20	10,5	17	25	40
77446	7110DK-12xM12	M12 x 12	18	20	10,5	17	25	43
77453	7110DK-16xM16	M16 x 16	27	30	20,0	20	90	150
76059	7110DK-20xM20	M20 x 20	35	50	34,5	41	165	486

No. 7110DH

Set screw

with flat-faced ball, ribbed, adjustable.





CAD

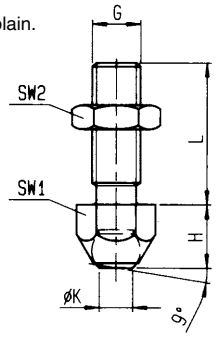
Order no.	Article no.	G x L	H	dia. K	SW1	SW2	Load [kN]	Weight [g]
87890	7110DH-08xM8	M8 x 25	11,6	5,5	13	13	8	20
87916	7110DH-10xM10	M10 x 30	15,7	8,6	17	17	8	44
87858	7110DH-12xM12	M12 x 35	15,7	8,6	17	19	15	56
87874	7110DH-16xM16	M16 x 40	20,7	10,5	24	24	25	128
83931	7110DH-20xM20	M20 x 50	27,3	20,0	30	30	90	274

No. 7110DI

Set screw

with flat-faced ball, adjustable, plain.





CAD

Order no.	Article no.	G x L	H	dia. K	SW1	SW2	Load [kN]	Weight [g]
87908	7110DI-8xM8	M8 x 25	11,6	5,5	13	13	8	20
87924	7110DI-10xM10	M10 x 30	15,7	8,6	17	17	8	44
87866	7110DI-12xM12	M12 x 35	15,7	8,6	17	19	15	56
87882	7110DI-16xM16	M16 x 40	20,7	10,5	24	24	25	128
83949	7110DI-20xM20	M20 x 50	27,3	20,0	30	30	90	274

Subject to technical alterations.

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NO. 6906P
> Pressure generators



NO. 6906PB**
> Pressure-generator accessories



NO. 6945-22-20
> Clamping bars



NO. 6945-22
> Spacer bars



NO. 6945-11-**
> Clamping heads



NO. 6946
> Wedge clamp



NO. 6945-28-**
> Clamping-stud holder



NO. 6945-15-10
> Clamping pistons, complete



NO. 6945-02-04
> Clamping stud



THE FOLLOWING SYSTEM ELEMENTS ARE USED TO MEET THE REQUIREMENTS

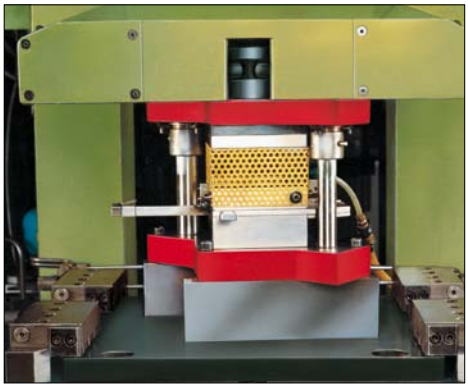
- Fixed clamping bars for press table and piston for the clamping of tools with common clamping edge heights and tool-pallet sizes (fig. 4, right-hand side).
- Clamping heads, sliding in T-groove, for holding tools for the press table and the piston (fig. 5, right-hand side).
- Hydraulic clamping devices at stud for the clamping of tools equipped with a clamping pin (fig. 6, right-hand side, and 1).
- Tool pallets (upon request) for tools
- Fixed pallets for each tool
- Interchangeable pallets, i.e. one pallet for several tools.
- Pump unit with 4 or 5 separate clamping circuits.

SAFETY WHEN USING CLAMPING HYDRAULICS

The pump device is equipped with 4 or 5 separate clamping circuits and additional pressure switches in all circuits. In addition, the oil level is monitored by a float switch (fig. 2). Pressure switch and float switch are connected in series in a terminal housing and are routed to the terminal rail of the device controller. Control and safety functions can be integrated into the machine controller via the 13-pin socket of the device controller. In case of a pressure-drop in one or more clamping circuits, or if the oil level is low, the press is shut down automatically.

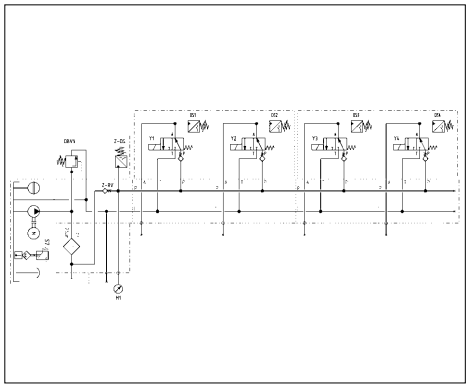
The hydraulic clamping elements are supplied diagonally at the table and at the piston by two independent and pressure-controlled clamping circuits (fig. 3).

FIGURE 1



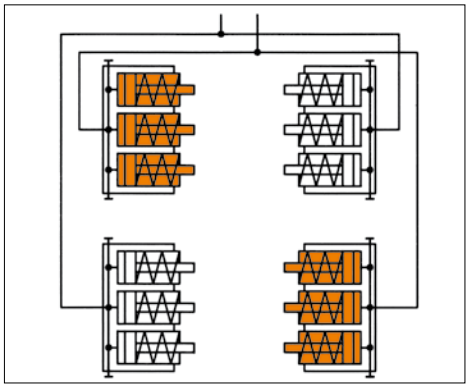
> Clamping strip on table and stud clamping on plunger

FIGURE 2



> Hydraulic diagram pressure generators

FIGURE 3



> Safety circuit

AMF has developed a „Hydraulic tool-clamping system for presses“ which reduces the set-up times of the press to the absolute minimum. The system is designed for „old“ as well as „new“ presses of various manufacturers. This system also takes into account the storage, transport and frequency of use of the tools.
The developments observed in non-cutting operations shows an increasing demand for smaller machining lots, which of course requires a sound economic, cost-effective, basis. Primary machining times and secondary set-up times must be minimized. In several instances, presses have reached their stroke-cycle limits for tools or workpieces. Accordingly, development is now focussed on the minimization of set-up times.

When converting a press to another product, down-times are inevitable for the following reasons:

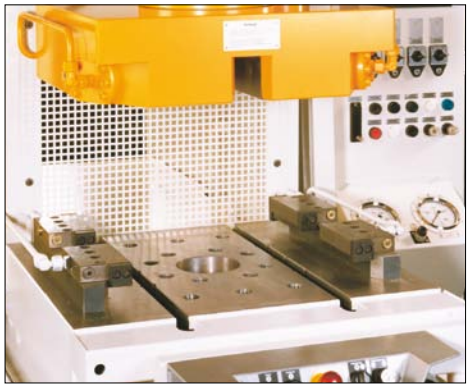
> removal of tool
> installation of new tool
> adjustment of press to new tool

The set-up of the press is has been reduced to a minimum by CNC control. What remains for optimization is the tool-changing time. This is where you may benefit from our products.

OUR „HYDRAULIC TOOL-CLAMPING SYSTEM FOR PRESSES“ MEETS THE FOLLOWING REQUIREMENTS:

> Safety is ensured, i.e. tool storage, transport and tool clamping comply with strict requirements.
> Various press types can be equipped.
> Solutions are available for already present as well as new press types.
> Set-up times are significantly reduced.
> Tool storage is controlled.
> The removal of tools from the rack, transport and insertion into the press are more efficient, safer and easier for the user.
> The system can be quickly installed at any press
> ... and is suitable for frequently used tools as well as for rarely used tools.

FIGURE 4



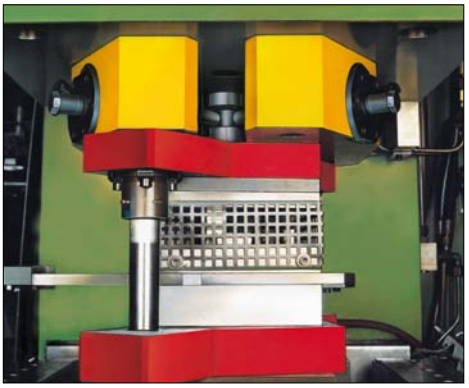
> Clamping bar

FIGURE 5



> Clamping head

FIGURE 6



> Clamping-stud holder

No. 6906P

Pump Unit

with 4 separate clamping circuits, single acting, max. operating pressure 400 bar.

Order no.	Article no.	Clamping circuits	Q [l/min]	Valve type	Matching control unit	Weight [Kg]
326702	6906P-64319	4	2,5	4 x 3/2 + DS	6906PB-4-4, 6906PB-4-5	65



Design:

Compact, plug-in pump unit, ready for electric and hydraulic operation. Complete with: pressure limiting valve and pressure switch, solenoid valve, pressure gauge, float switch, oil fill, electrical control with main switch, indicator lamps and flange sockets. Electrical connection complete with CEKON connector plug.

Application:

The pump unit is designed to operate hydraulic clamping systems.

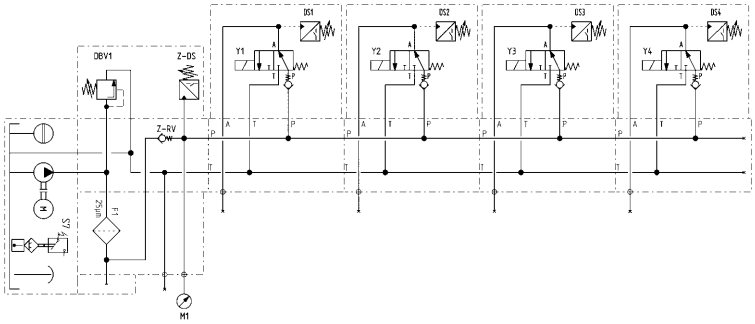
Features:

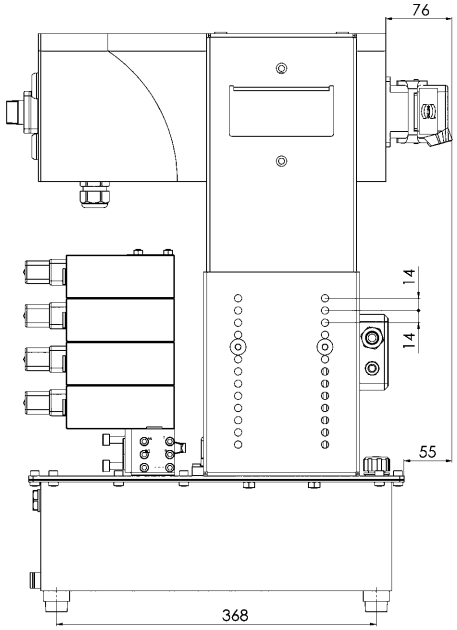
The radial piston pump is driven via an alternating current standard motor with the energy efficiency class IE3. The motor is protected against overload by a motor protection switch and a thermoelement. Each of the 4 clamping circuits is equipped with a 3/2 seat valve. Four pressure switches (DS) are attached externally for the external pressure monitoring. Pressure setting and pressure monitoring are accomplished via a pressure limiting valve (DBV) and an electronic pressure switch (EDS). The value set at the pressure limiting valve is stored with the Mode button on the pressure switch. This simultaneously sets the preprogrammed switch-off and switch-back point.
The pump unit operates intermittently. In the case of a pressure drop, the pump unit is activated automatically by the pressure switch. The clamping pressure is indicated using illuminated push buttons. The installed float switch switches off the pump in the case of low oil level and outputs an optical signal.

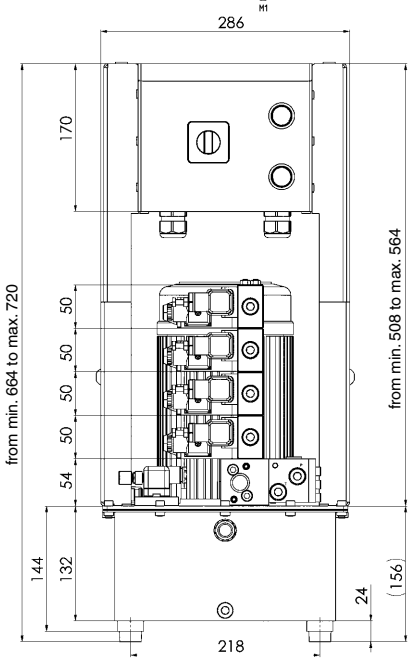
Note:

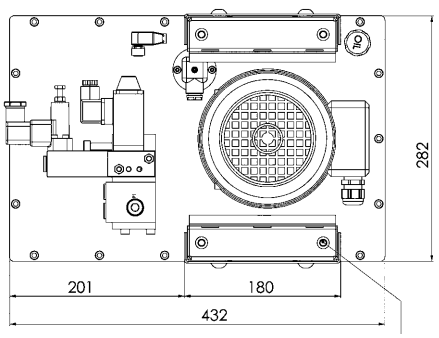
Pay attention to faultless venting during the connection of the elements. Pumping in the case of pressure drop must be made maximum 2x per minute. The unit must not operate continuously. To ensure safe hydraulic tool clamping, clamping at ram and table is carried out in each case by means of a separate clamping circuit. The four pressure switches DS1-DS4 are used to provide external pressure monitoring of the four clamping circuits. The machine is automatically switched off if pressure drops in one clamping circuit or in the case of lack of oil. The electrical connection between press controller and power unit must be performed by the customer.

Hydraulic diagram:









M8 thread for lifting devices

Subject to technical alterations.

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Pump Unit No. 6906P

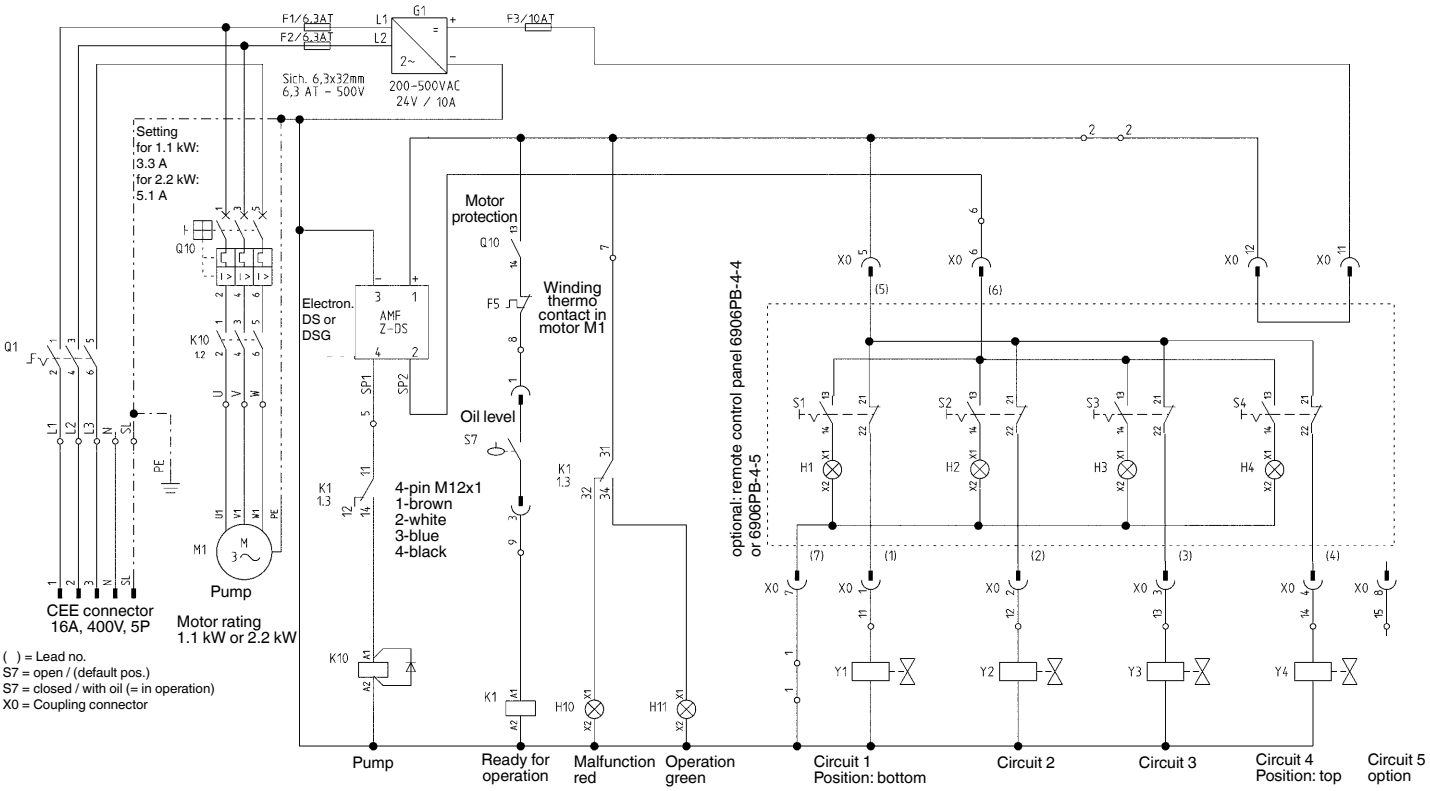
Hydraulic specifications:

Max. operating pressure	400 bar
Oil capacity, reservoir	ca. 10 litres
Oil capacity, usable	ca. 4 litres
Oil-flow rate	2,5 l/min.
Valve types	4x 3/2 seat valve and 4x pressure switch for external pressure monitoring
Hydraulic connection	thread G1/4
Noise level	max. 70 dB(A)
Ambient temp. range	–10° C to + 35° C
Position of use	upright
Pump design	radial-piston pump with 3 pistons
Load cycle	max. 500/h
Fluid	hydraulic oils HLP and HLPD according to DIN 51524 part 2
Oil recommendation	HLP 22 and HLPD 22 or HLP 32 and HLPD 32
Viscosity	ISO VG 22 and 32 DIN ISO 3448

Electrical specifications:

Nominal voltage	400 V/50 Hz three-phase
Control voltage	24 V DC
Valve voltage	24 V DC
Motor speed	2900 1/min.
Direction of rotation	any
Motor rating	1,1 kW
Motor type	three-phase standard motor
Nominal current	3 A
Fuse, supply line	16 A slow-blow
Fuse, control circuit	1 A primary, 4 A secondary
Electrical connection	Ölflex 100; 5«1,5 mm² 3 m with CEE connector 16 A 6 h
Protection class	IP 54
Duty cycle	max. 50 % intermittent operation
Operation type	Socket for remote control
Fill-level monitoring	Float switch

Wiring circuit of pump unit with 4 clamping circuits, remote control



( ) = Lead no.
S7 = open / (default pos.)
S7 = closed / with oil (= in operation)
X0 = Coupling connector

To increase safe handling of the clamped parts, the unit ready for operation and a clamping pressure query should be integrated with the processing machine.

Note: 1 to 4 circuits = directional seat valve clamped with power off

Subject to technical alterations.

No. 6906P

Pump Unit

with 5 separate clamping circuits, single acting,
max. operating pressure 400 bar

Order no.	Article no.	Clamping circuits	Q [l/min]	Valve type	Matching control unit	Weight [Kg]
326728	6906P-65319	5	2,5	4 x 3/2 +DS 1 x 3/2 +SV +DS	6906PB-6-4	71



Design:

Compact, plug-in pump unit, ready for electric and hydraulic operation. Complete with: pressure limiting valve and pressure switch, solenoid valve, pressure gauge, float switch, oil fill, electrical control with main switch, indicator lamps and flange sockets. Electrical connection complete with CEKON connector plug.

Application:

The pump unit is designed to operate hydraulic clamping systems. Clamping circuits 1 to 4 are for tool clamping, circuit 5 is for raising the hydraulic ball-roller strip.

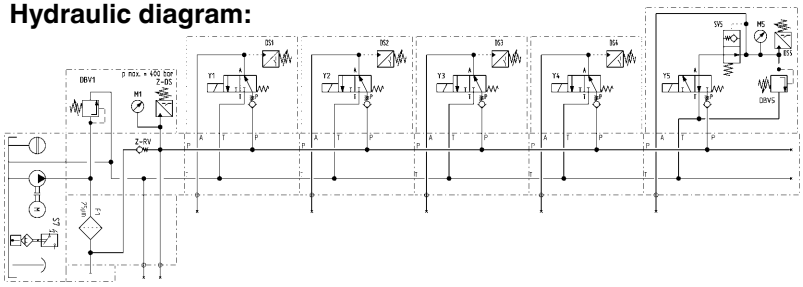
Features:

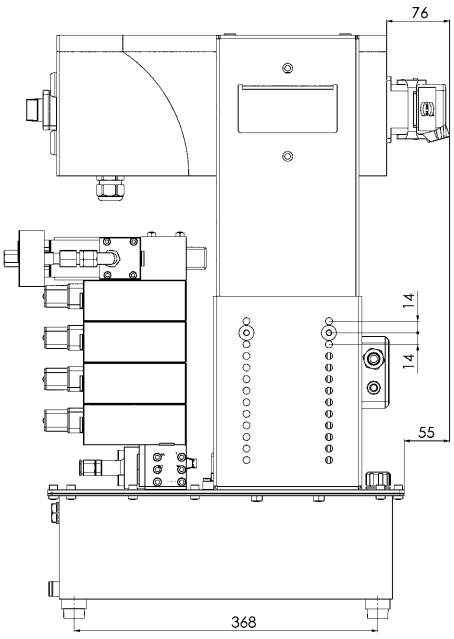
The radial piston pump is driven via an alternating current standard motor with the energy efficiency class IE3. The motor is protected against overload by a motor protection switch and a thermoelement. Each of the 4 clamping circuits is equipped with a 3/2 seat valve. Four pressure switches (DS) are attached externally for the external pressure monitoring. In the 5th circuit, there are a 3/2-way valve, normally open, a pressure-limiting valve, and a pressure switch. Pressure setting and pressure monitoring are accomplished via a pressure limiting valve (DBV) and an electronic pressure switch (EDS). The value set at the pressure limiting valve is stored with the Mode button on the pressure switch. This simultaneously sets the preprogrammed switch-off and switch-back point.
The pump unit operates intermittently. In the case of a pressure drop, the pump unit is activated automatically by the pressure switch. The clamping pressure is indicated using illuminated push buttons. The installed float switch switches off the pump in the case of low oil level and outputs an optical signal.

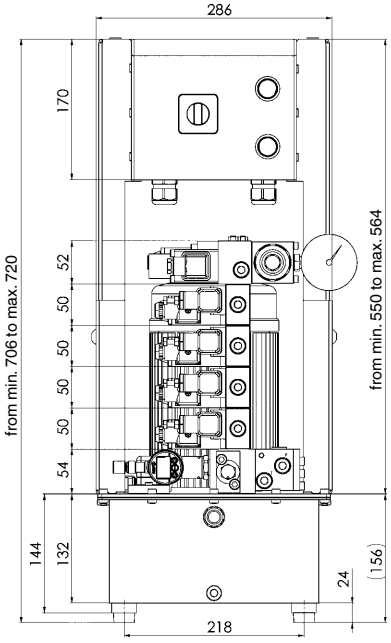
Note:

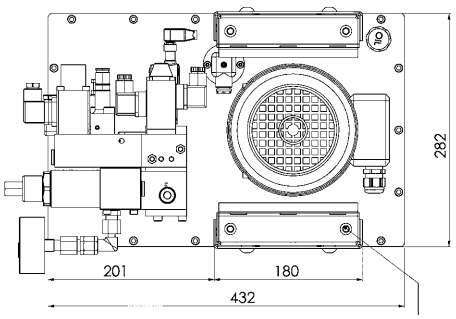
Pay attention to faultless venting during the connection of the elements. Pumping in the case of pressure drop must be made maximum 2x per minute. The unit must not operate continuously. To ensure safe hydraulic tool clamping, clamping at ram and table is carried out in each case by means of a separate clamping circuit. The four pressure switches DS1-DS4 are used to provide external pressure monitoring of the four clamping circuits. The machine is automatically switched off if pressure drops in one clamping circuit or in the case of lack of oil. The electrical connection between press controller and power unit must be performed by the customer.

Hydraulic diagram:









M8 thread for lifting devices

Subject to technical alterations.

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Pump unit No. 6906P

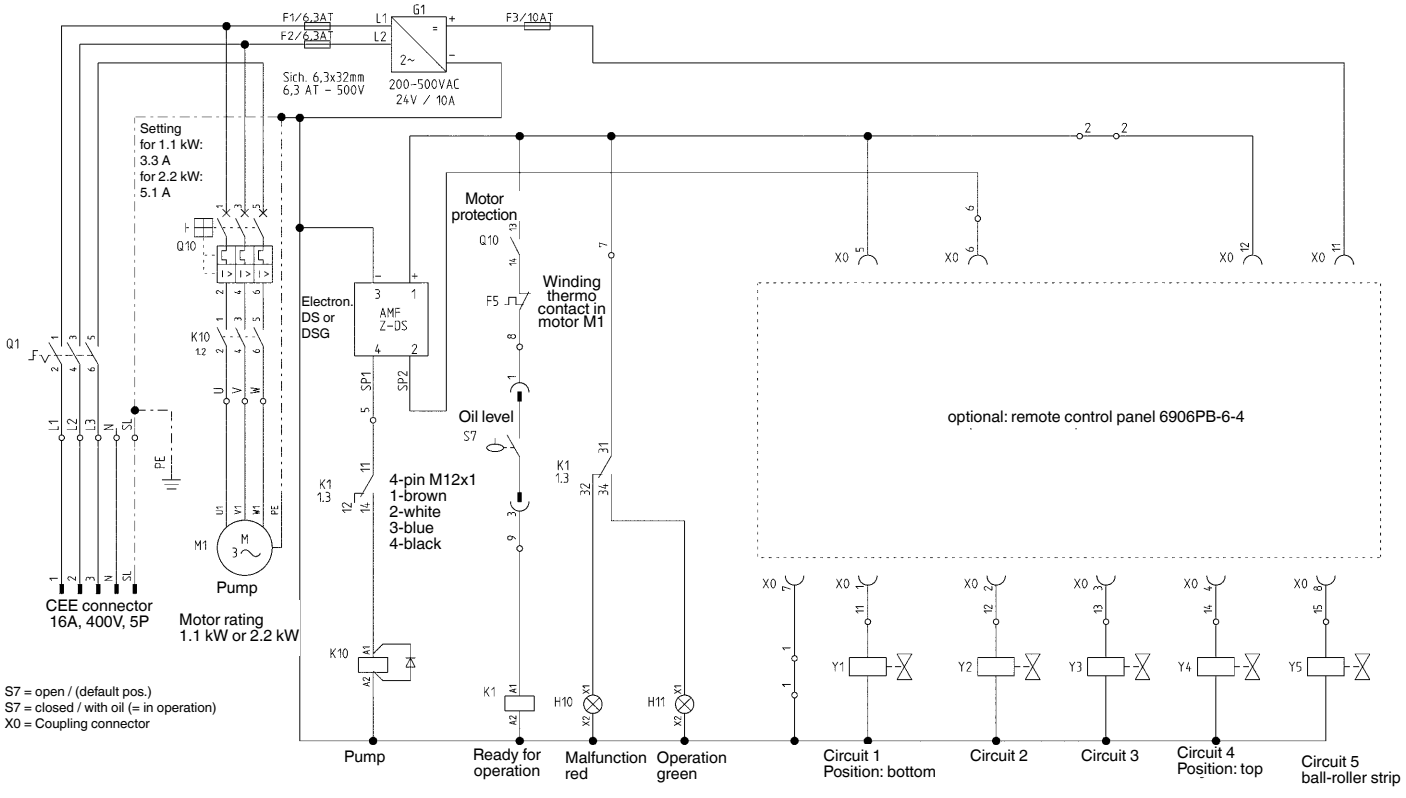
Hydraulic specifications:

Max. operating pressure	400 bar
Oil capacity, reservoir	ca. 10 litres
Oil capacity, usable	ca. 4 litres
Oil-flow rate	2,5 l/min.
Valve types clamping circuits 1-4	3/2 seat valve with pressure switch for external pressure monitoring
Valve types clamping circuit 5	3/2 seat valve, unclamped with power off, stop valve, pressure limiting valve and pressure switch for actuating the hydraulic ball-roller strips.
Hydraulic connection	thread G1/4
Noise level	max. 70 dB(A)
Ambient temp. range	–10° C to + 35° C
Position of use	upright
Pump design	radial-piston pump with 3 pistons
Load cycle	max. 500/h
Fluid	hydraulic oils HLP and HLPD according to DIN 51524 part 2
Oil recommendation	HLP 22 and HLPD 22 or HLP 32 and HLPD 32
Viscosity	ISO VG 22 and 32 DIN ISO 3448

Electrical specifications:

Nominal voltage	400 V/50 Hz three-phase
Control voltage	24 V DC
Valve voltage	24 V DC
Motor speed	2900 1/min.
Direction of rotation	any
Motor rating	1,1 kW
Motor type	three-phase standard motor
Nominal current	3 A
Fuse, supply line	16 A slow-blow
Fuse, control circuit	1 A primary, 4 A secondary
Electrical connection	Ölflex 100; 5«1,5 mm² 3 m with CEE connector 16 A 6 h
Protection class	IP 54
Duty cycle	max. 50 % intermittent operation
Operation type	Socket for remote control
Fill-level monitoring	Float switch

Wiring circuit of pump unit with 5 clamping circuits, remote control



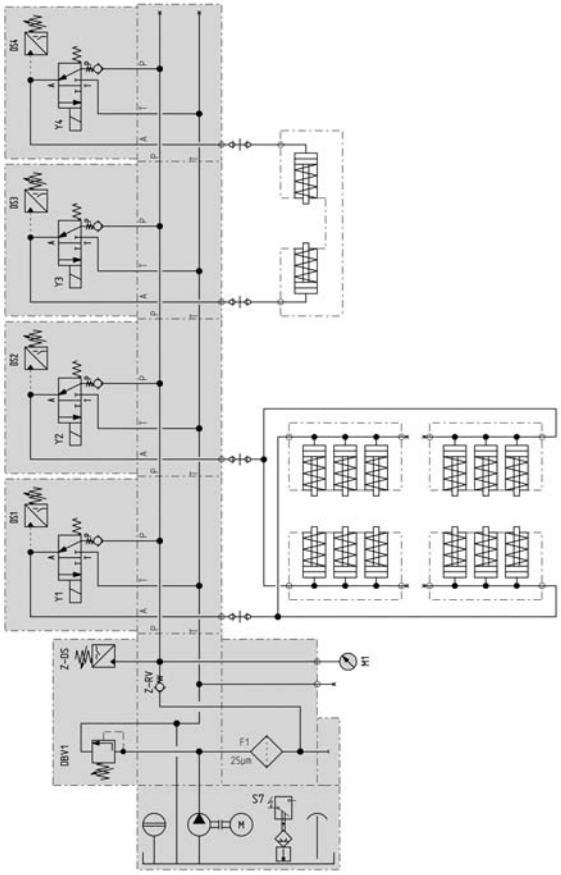
Note: 1 to 4 circuits = directional seat valve clamped with power off
5 circuit = directional seat valve unclamped with power off

To increase safe handling of the clamped parts, the unit ready for operation and a clamping pressure query should be integrated with the processing machine.

Subject to technical alterations.

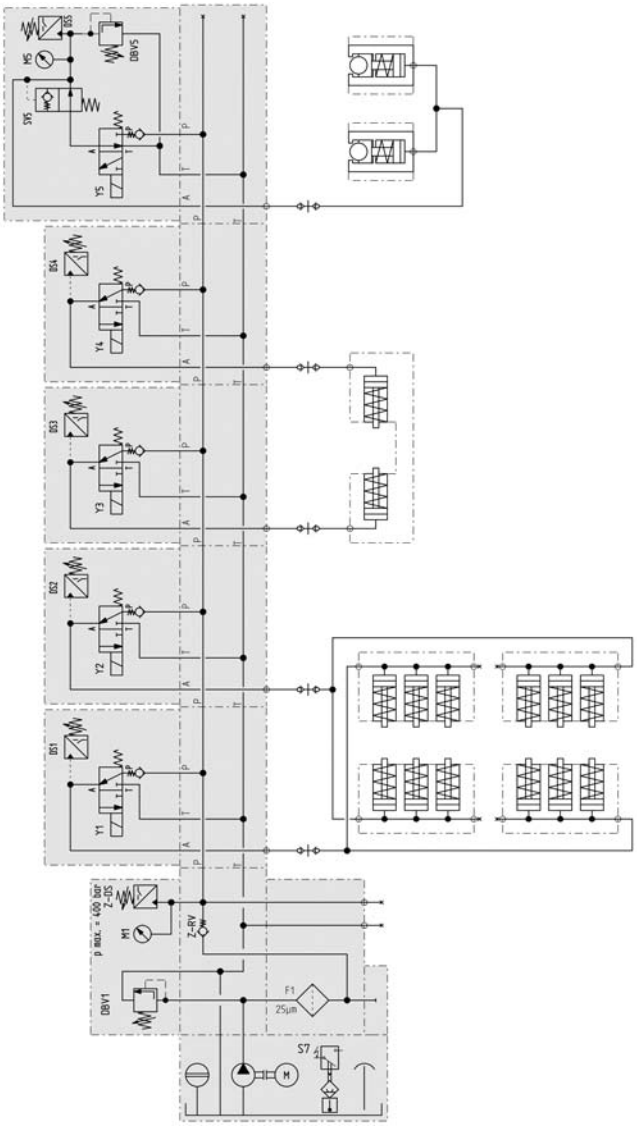
Wiring diagram for 4 clamping circuits

Pump unit with 4 clamping circuits for tool clamping at table and piston.



Wiring diagram for 5 clamping circuits

Pump unit with 5 clamping circuits for tool clamping at table and piston as well as additional actuation of the hydraulic ball-type roller bars.



Note:

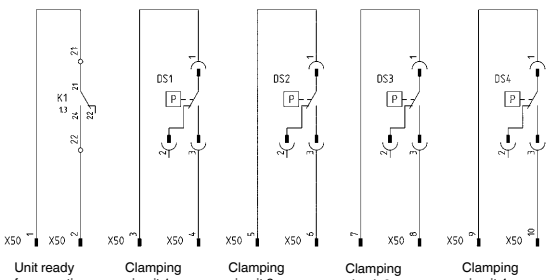
The pump unit must not start automatically when power supply is restored after a power failure. This does not apply to drive systems that may restart automatically without any risk of injury of operators or damage to the product to be processed. Note in accordance with VDE 0113-5.3: Safety in the event of power failure or pump unit failure.

Important note:

The external DS function of the pump unit can be integrated into the machine controller at the terminal housing by the operator. Ensure that the control circuit is correctly integrated into the machine controller!

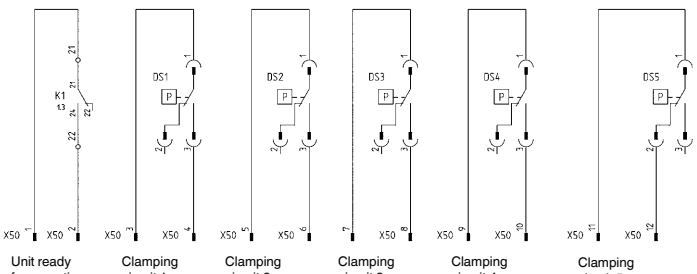
External monitoring of AMF pump unit and pressure switches by customer‘s machine control

Attention! External voltage of external machine control



max. electrical loading 250W, 1A

Attention! External voltage of external machine control



max. electrical loading 250W, 1A

Subject to technical alterations.

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No. 6906PB-4-4

Remote Control Switch with magnetic base

for 4 clamping circuits



CAD

Order no.	Article no.	Control voltage	Number of poles	L x W x H	Weight [g]
61663	6906PB-4-4	24 V =	13	160x75x75	2300

Design:

Compact polyester housing with magnetic base. Illuminated push buttons with screening, insert labels for clamping circuits, 1-4. 5 m cable with 13-pin coupling connector, protection class IP 65.

Application:

For pump unit No. 6906P-64319, Order no. 326702.

No. 6906PB-4-5

Remote Control Switch with magnetic base and safety cover

for 4 clamping circuits



CAD

Order no.	Article no.	Control voltage	Number of poles	L x W x H	Weight [g]
60392	6906PB-4-5	24 V =	13	160x75x75	2500

Design:

Compact polyester housing with magnetic base, safety hood with lock. Illuminated push buttons with screening, insert labels for clamping circuits, 1-4. 5 m cable with 13-pin coupling connector, protection class IP 65.

Application:

For pump unit No. 6906P-64319, Order no. 326702.

No. 6906PB-6-4

Remote Control Switch

for 5 clamping circuits



CAD

Order no.	Article no.	Control voltage	Number of poles	L x W x H	Weight [g]
253823	6906PB-6-4	24V =	13	230x75x75	1910

Design:

Compact polyester housing. Illuminated push-buttons with screening for clamping circuits 1-4 and insert labels. Push buttons for clamping (green) and releasing (red), without screening for clamping circuit 5. 5 m cable with 13-pin coupling connector, protection class IP 65.

Application:

For pump unit No. 6906P-65319, Order no. 326728.

Note:

Clamping circuits 1 to 4 are for operating hydraulic clamping elements, circuit 5 is for raising the hydraulic ball-roller strip. The controls are so arranged that unintentional operation of one of the clamping circuits automatically retracts the hydraulic ball-rollers.

No. 6906PBS-1-1

Coupling Plug, 13-pin

without plug screw, without current bridge.



Order no.	Article no.	Control voltage	Number of poles	Weight [g]
126326	6906PBS-1-1	24 V =	13	40

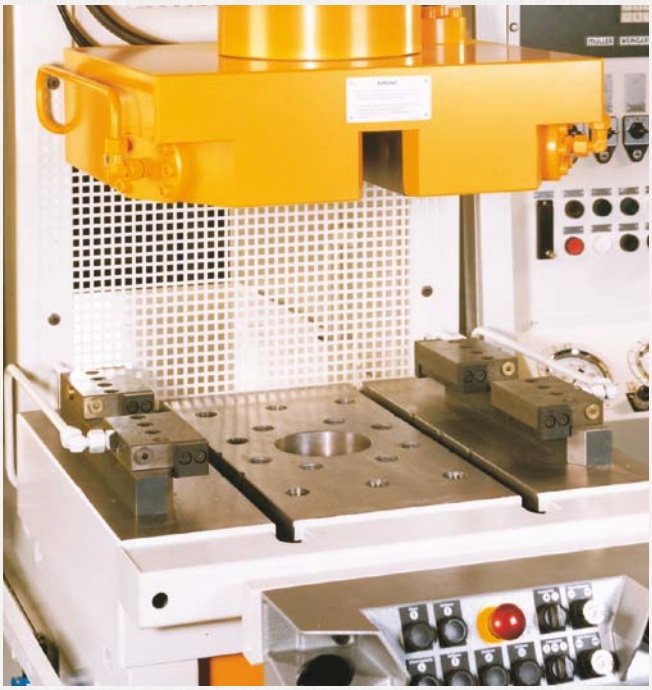
Design:

Glasfibre-reinforced plastic with plug screw rugged version IP 65.

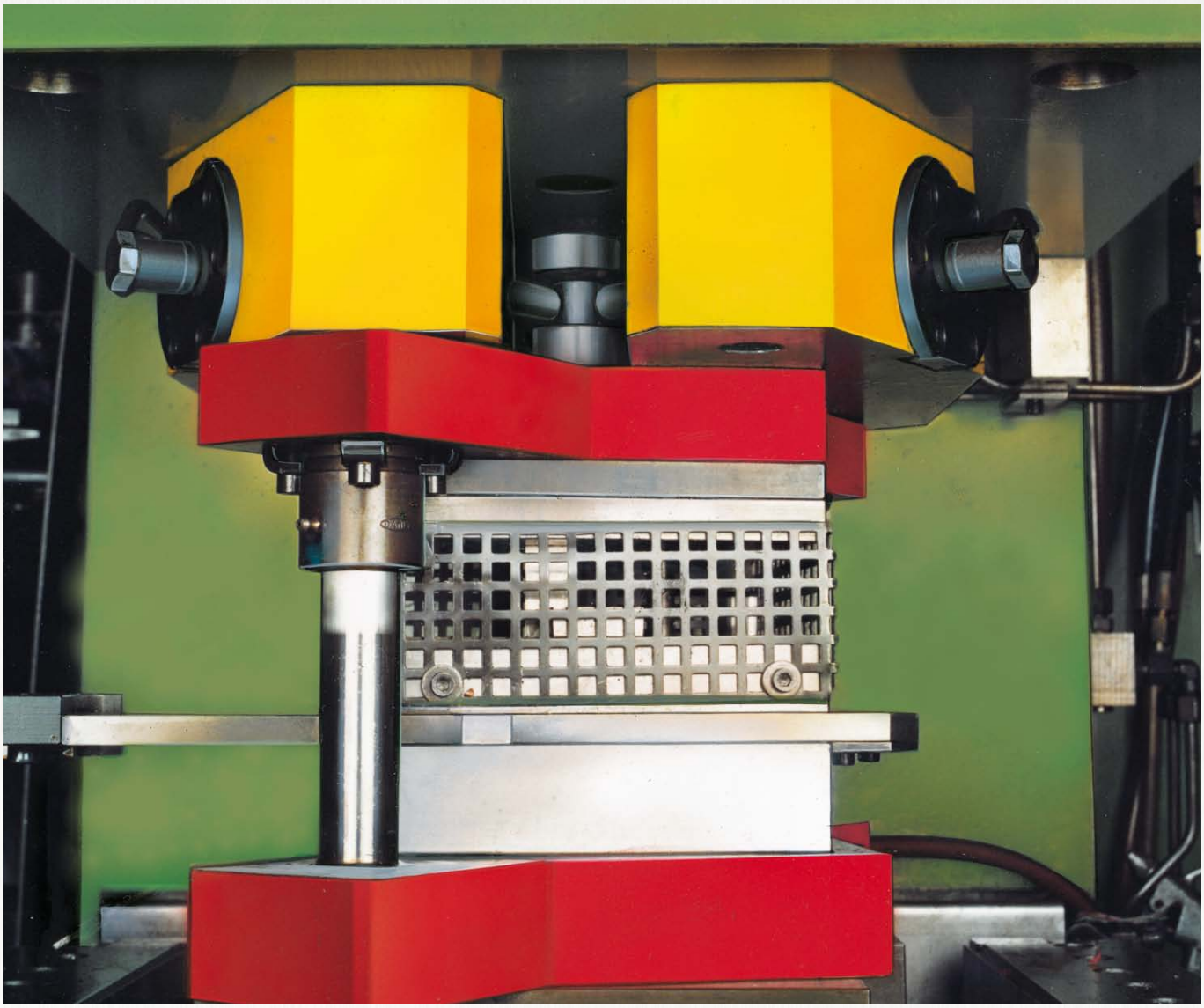
Application:

For connection directly to the machine control system. Suitable for pump unit and special units with 13-pin flange socket.

Subject to technical alterations.







Subject to technical alterations.

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No. 6945-22-20

Clamping Bar, short

single acting, with spring return,
max. operating pressure 400 bar, 1 clamping circuit.

Order no.	Article no.	Clamping force at 400 bar [kN]	Stroke [mm]	Vol. total [cm³]	min. spring force per piston [N]	Weight [g]
61085	6945-22-20-1x3	60	6	8,7	120	3000

Suitable spacer bars:



6945-22-04 6945-22-06 6945-22-07 6945-22-08



Design:

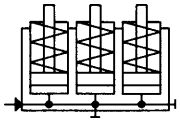
Cylinder body made of tempering steel, phosphated. Piston case-hardened and ground, built-in return spring, with stroke limitation.

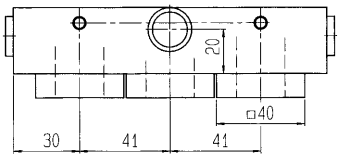
Application:

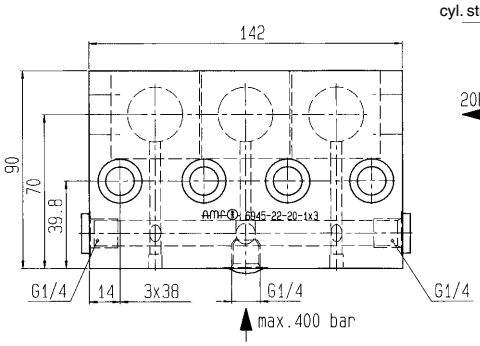
For quick clamping and unclamping on press table or ram. Suitable for workpieces with uniform clamping rim. The clamping bar is bolted with a spacer bar directly onto the press table or ram. Suitable spacer bars are No. 6945-22-04, -06, -07, -08.

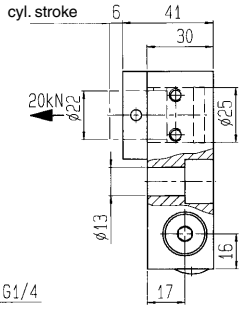
On request:

Special sizes available on request.



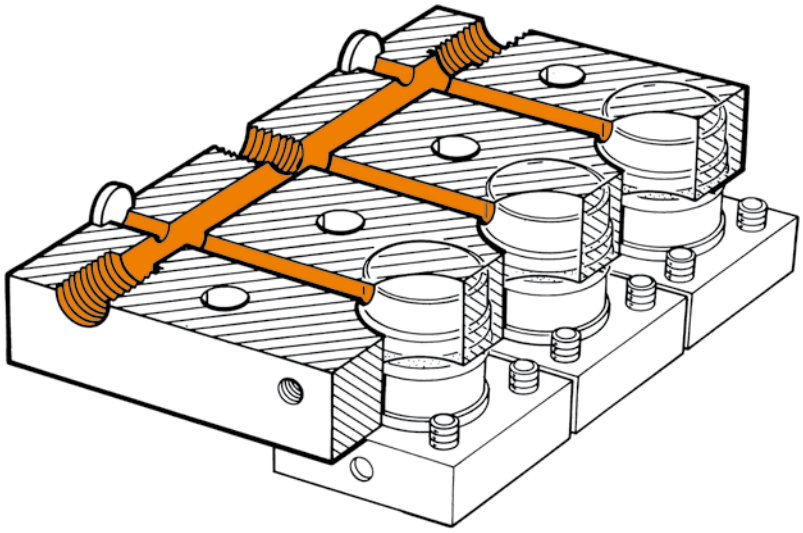






Sectional view:

Clamping strip 6945-22-20-1x3 with exchangeable clamping pistons.



CAD

Subject to technical alterations.

No. 6945-22-20

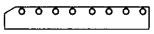
Clamping Bar, long

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



Order no.	Article no.	Clamping force at 400 bar [kN]	Stroke [mm]	Vol. total [cm³]	min. spring force per piston [N]	Weight [g]
61689	6945-22-20-2x3	2 x 60	6	17,4	120	6000
61630	6945-22-20-1x6	120	6	17,4	120	6000

Suitable spacer bar:



6945-22-07

Design:

Cylinder body made of tempering steel, phosphated. Piston case-hardened and ground, built-in return spring, with stroke limitation.

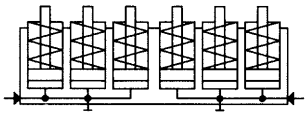
Application:

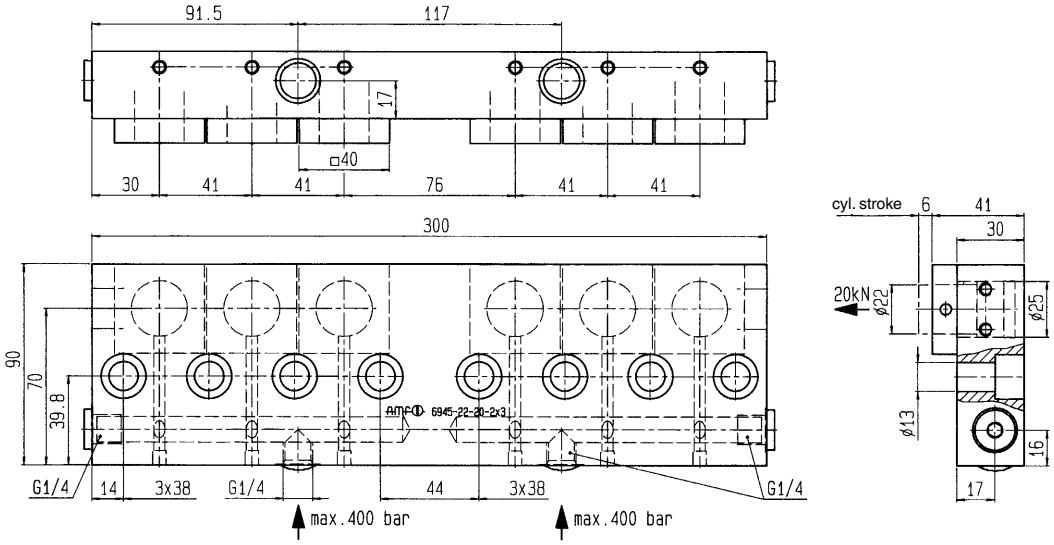
For quick clamping and unclamping on press table or ram. Suitable for workpieces with uniform clamping rim. The clamping bar is bolted with a spacer bar directly onto the press table or press ram. Suitable spacer bar is No. 6945-22-07.

On request:

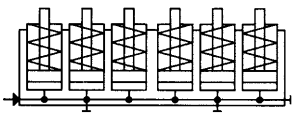
Special sizes available on request.

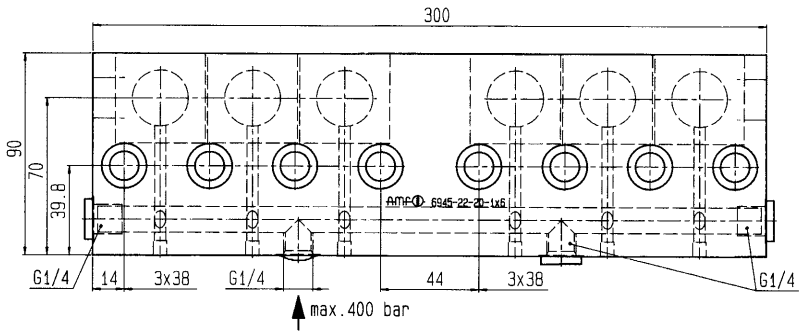
6945-22-20-2x3





6945-22-20-1x6





CAD

Subject to technical alterations.

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No. 6945-22-20

Clamping Bar, long

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

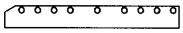


Order no.	Article no.	Clamping force at 400 bar [kN]	Stroke [mm]	Vol. total [cm³]	min. spring force per piston [N]	Weight [g]
61622	6945-22-20-2x4	2 x 80	6	23,2	120	8000
61697	6945-22-20-1x8	160	6	23,2	120	7840

Suitable spacer bars:



6945-22-06



6945-22-08

Design:

Cylinder body made of tempering steel, phosphated. Piston case-hardened and ground, built-in return spring, with stroke limitation.

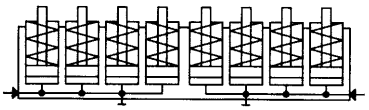
Application:

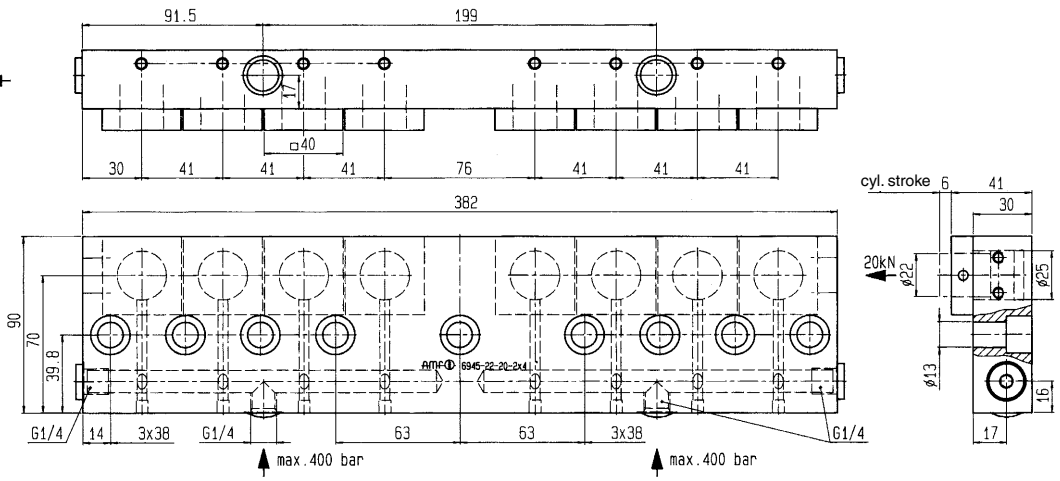
For quick clamping and unclamping on press table or ram. Suitable for workpieces with uniform clamping rim. The clamping bar is bolted with a spacer bar directly onto the press table or press ram. Suitable spacer bars are No. 6945-22-06 and 6945-22-08.

On request:

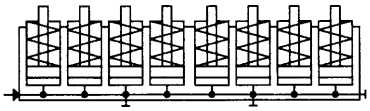
Special sizes available on request.

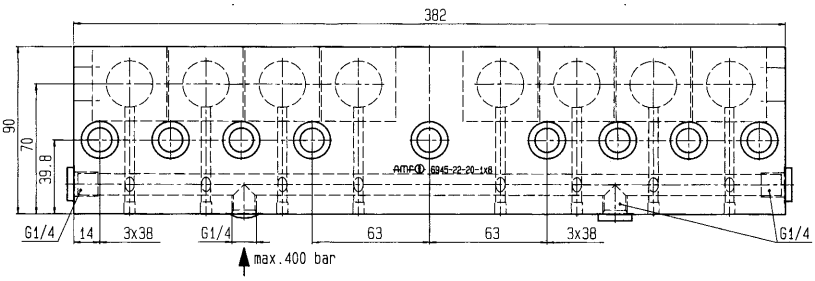
6945-22-20-2x4





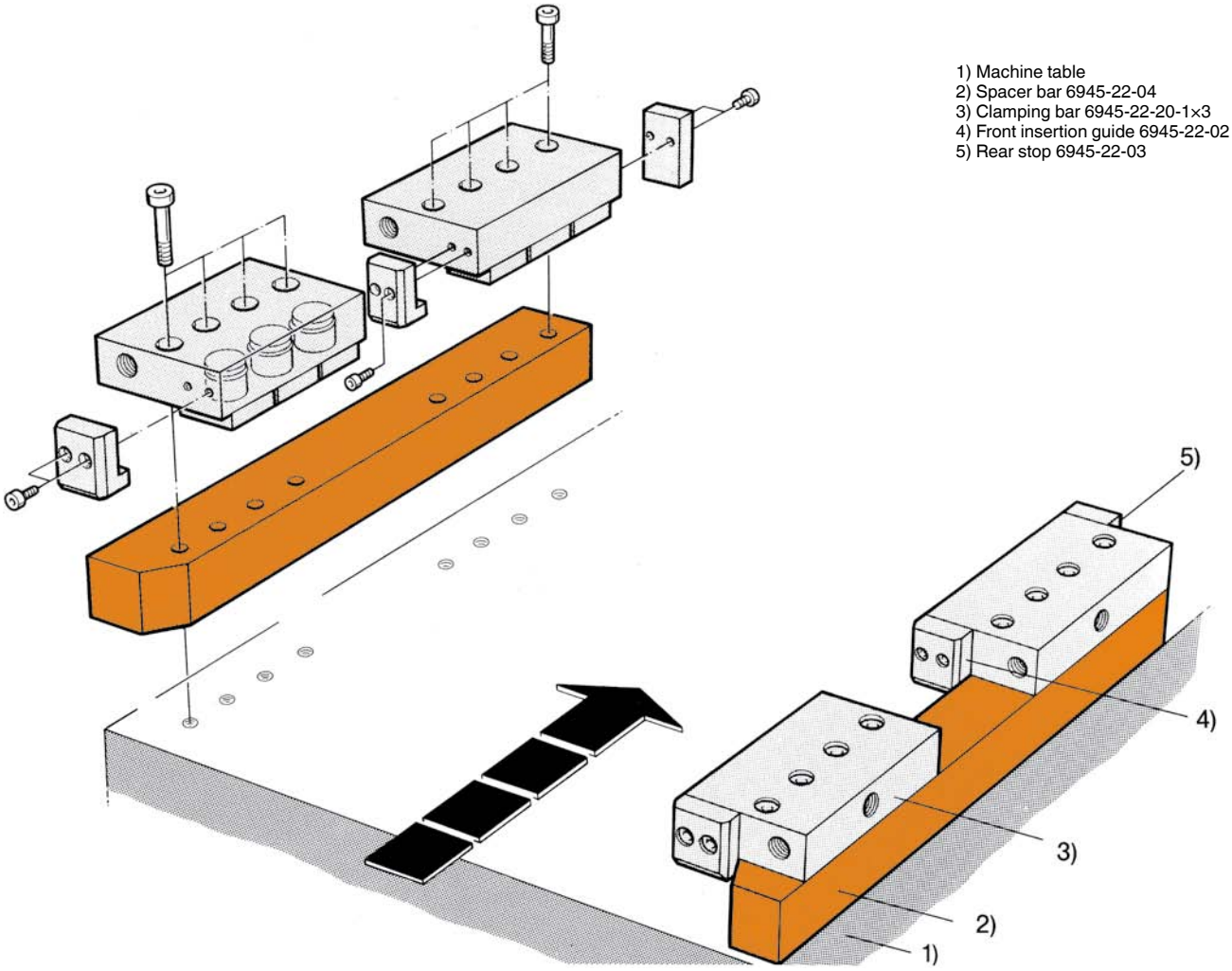
6945-22-20-1x8





CAD

Subject to technical alterations.



No. 6945-22-04

Spacer Bar

Order no.	Article no.	L x W x H	Weight [g]
61101	6945-22-04	425 x 50 x 44,5	7300



Design:

Tempering steel, phosphated. Tolerance of distance between holes ±0.2.

Application:

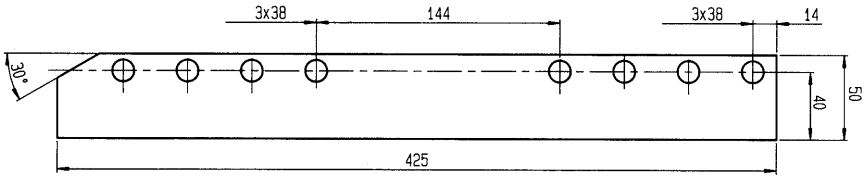
Spacer and guide bar for a clamping-rim or tool-pallet height of 30 mm.

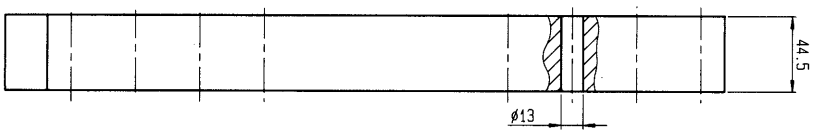
Note:

For clamping bar: No. 6945-22-20-1x3.

On request:

Special sizes available on request.





CAD

Subject to technical alterations.

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No. 6945-22-06

Spacer Bar



Order no.	Article no.	L x W x H	Weight [g]
61408	6945-22-06	167 x 50 x 44,5	2670

Design:

Tempering steel, phosphated. Tolerance of distance between holes ±0.2.

Application:

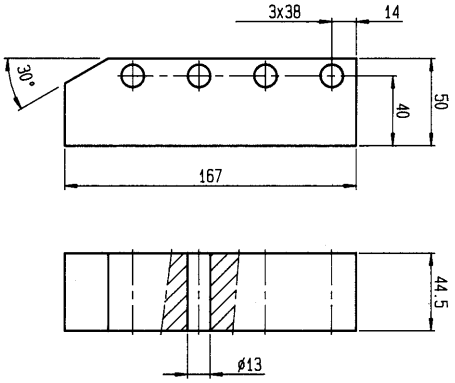
Spacer and guide bar for a clamping-rim or tool-pallet height of 30 mm.

Note:

For clamping bars:
- No. 6945-22-20-1x3
- No. 6945-22-20-2x4
- No. 6945-22-20-1x8

On request:

Special sizes available on request.



CAD

No. 6945-22-07

Spacer Bar



Order no.	Article no.	L x W x H	Weight [g]
61705	6945-22-07	325 x 50 x 44,5	5800

Design:

Tempering steel, phosphated. Tolerance of distance between holes ±0.2.

Application:

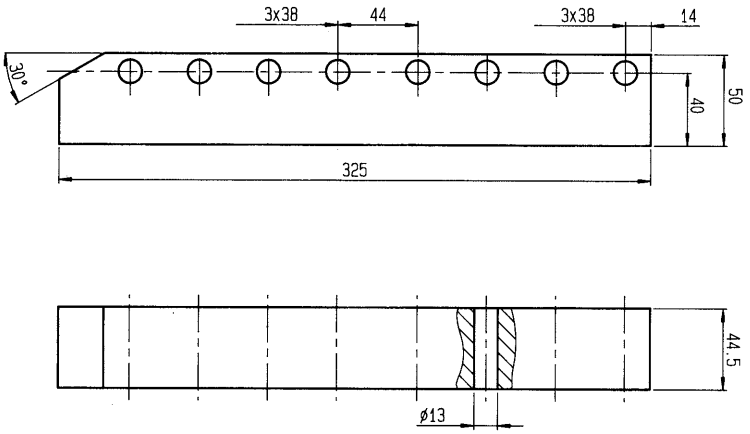
Spacer and guide bar for a clamping-rim or tool-pallet height of 30 mm.

Note:

For clamping bars:
- No. 6945-22-20-1x3
- No. 6945-22-20-2x3
- No. 6945-22-20-1x6

On request:

Special sizes available on request.



CAD

Subject to technical alterations.

No. 6945-22-08

Spacer Bar

Order no.	Article no.	L x W x H	Weight [g]
61713	6945-22-08	407 x 50 x 64	10500



Design:

Tempering steel, phosphated. Tolerance of distance between holes ±0.2.

Application:

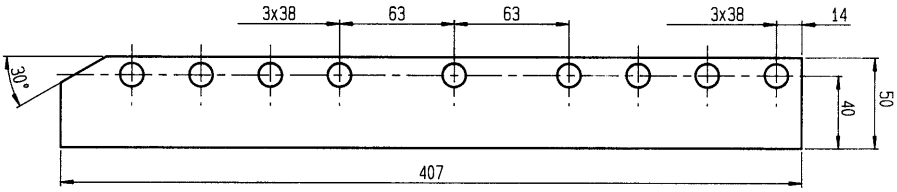
Spacer and guide bar for a clamping-rim or tool-pallet height of 50 mm.

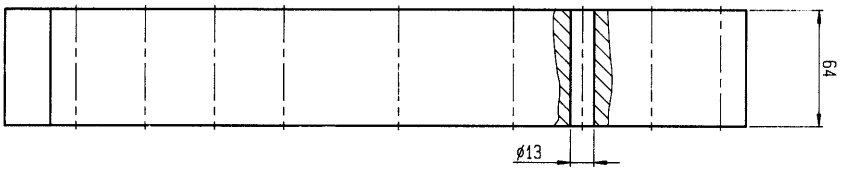
Note:

For clamping bars:
- No. 6945-22-20-1x3
- No. 6945-22-20-2x4
- No. 6945-22-20-1x8

On request:

Special sizes available on request.





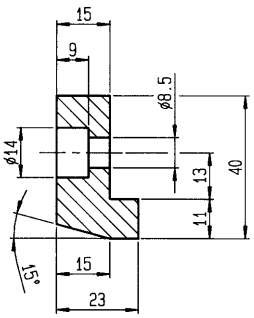
CAD

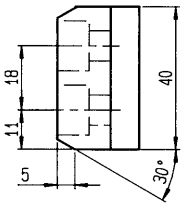
No. 6945-22-02

Front Insertion Guide

Order no.	Article no.	Weight [g]
61077	6945-22-02	300







CAD

Design:

Tempering steel, blued and hardened. Mounting bolts supplied.

Application:

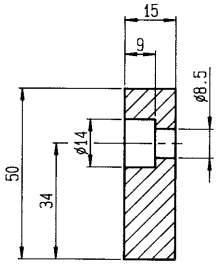
For safe guidance of die pallet into press. This guide protects the clamping pistons in the clamping bar.

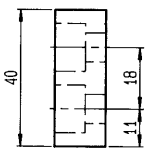
No. 6945-22-03

Rear Stop

Order no.	Article no.	Weight [g]
61093	6945-22-03	250







CAD

Design:

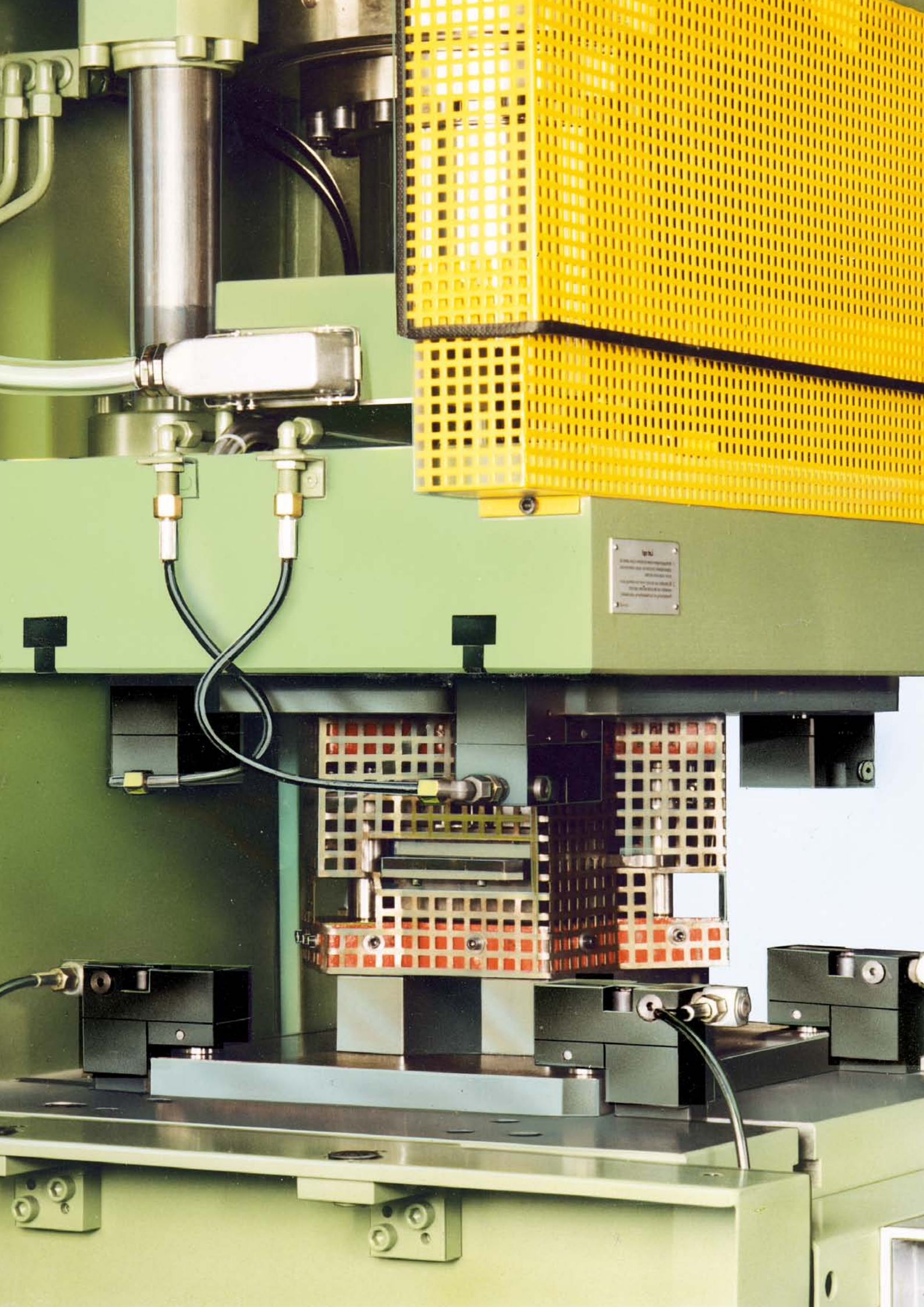
Tempering steel, blued and hardened. Mounting bolts supplied.

Application:

Stop for die pallet in the press.

Subject to technical alterations.

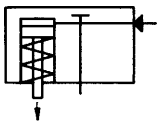
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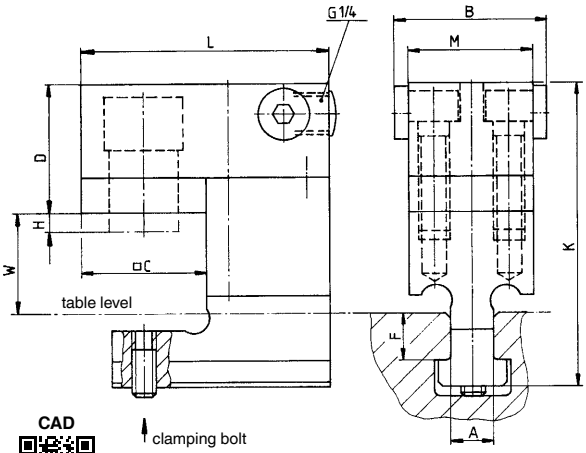
No. 6945-11

Clamping Head, complete with base

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







CAD

Order no.	Article no.	Clamping force at 400 bar [kN]	Stroke H [mm]	Vol. [cm³]	Spring force min. [N]	Weight [g]
61184	6945-11-20x14x30	20	6	2,9	120	1471
61416	6945-11-20x18x30	20	6	2,9	120	1581
61192	6945-11-32x18x30	32	8	6,4	260	2855
61424	6945-11-32x22x30	32	8	6,4	260	3095
61200	6945-11-63x22x30	63	10	16,0	580	4660
61432	6945-11-63x28x30	63	10	16,0	580	5080
64006	6945-11-94x28x50	94	12	28,5	920	10380

Design:

Cylinder body made of tempering steel, blued. Piston case-hardened and ground. Built-in return spring, complete with locating pin.

Application:

The clamping head is used to clamp press tools on the press table and ram. The unit is inserted into the T-slot and moved above the clamping spot at the tool to be clamped. The clamping heads of size 20-63kN are suitable for a clamping height of 29 mm. Size 94kN suits a clamping height of 50 mm. To adjust other clamping heights, spacer plates of 10 mm and 20 mm are available.

Features:

Small dimensions. The hydraulic oil supply can be connected to any of the three sides.

Note:

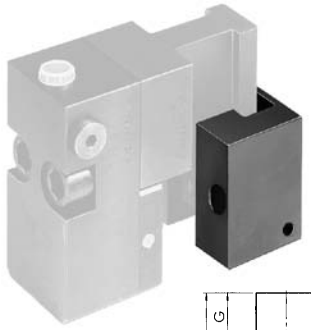
If a clamping head is retrofitted with an spacer plate, the locating pin must be removed from the lower part of clamping head. T-Slot dimension F has to be considered urgently.

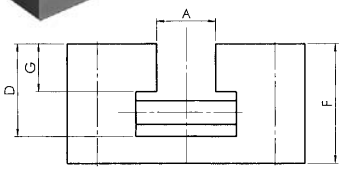
Dimensions:

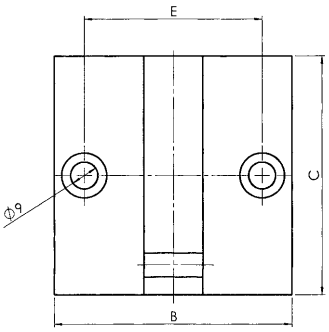
Order no.	Article no.	A	B	C	D	F	H	K	L	M	W
61184	6945-11-20x14x30	14	50	40	41,0	15	6	95,0	80	40	31
61416	6945-11-20x18x30	18	50	40	41,0	20	6	102,0	80	40	31
61192	6945-11-32x18x30	18	60	50	53,0	20	8	114,0	100	50	31
61424	6945-11-32x22x30	22	60	50	53,0	25	8	123,0	100	50	31
61200	6945-11-63x22x30	22	70	60	63,0	25	10	133,0	120	60	31
61432	6945-11-63x28x30	28	70	60	63,0	30	10	142,0	120	60	31
64006	6945-11-94x28x50	28	90	80x70	79,5	34	12	187,5	150	80	55

No. 6945-11

Holder for Clamping Head







CAD

Order no.	Article no.	A [mm]	for T-Slot	for Clamping Head	Weight [g]
110700	6945-11-006	16	14	6945-11-**x14x**	1600
110692	6945-11-005	20	18	6945-11-**x18x**	1550
255687	6945-11-003	24	22	6945-11-**x22x**	2120
255752	6945-11-004	30	28	6945-11-**x28x**	2090

Design:

Steel, blued.

Application:

For parking clamp head No. 6945-11-**-** during tool changing.

Note:

Untoleranced dimensions are to DIN ISO 2768 medium.

On request:

Special versions available on request.

Dimensions:

Order no.	Article no.	B	C	D	E	F	G
110700	6945-11-006	80	80	25	60	35	12
110692	6945-11-005	80	80	31	60	40	16
255687	6945-11-003	90	90	40	70	50	20
255752	6945-11-004	90	90	50	70	60	25

Subject to technical alterations.

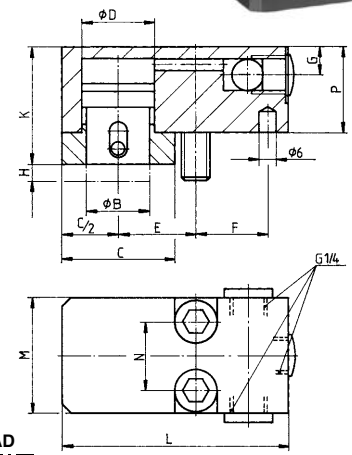
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No. 6945-11

Clamping Head

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





CAD

Order no.	Article no.	Clamping force at 400 bar [kN]	Stroke H [mm]	Vol. [cm³]	Screw (2 pieces)	Md max. [Nm]	Spring force min. [N]	Weight [g]
61218	6945-11-20	20	6	2,9	M10x35-10.9	65	120	790
61234	6945-11-32	32	8	6,4	M12x45-10.9	120	260	1625
60327	6945-11-63	63	10	16,0	M16x50- 8.8	200	580	2700
63990	6945-11-94	94	12	28,5	M20x70-12.9	670	920	5600

Design:

Cylinder body made of tempering steel, blued. Piston case-hardened and ground. Built-in return spring.

Application:

The upper part of the clamping head can be screwed on direct on clamping devices.

On request:

Special sizes available on request.

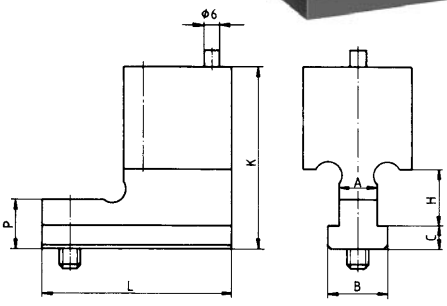
Dimensions:

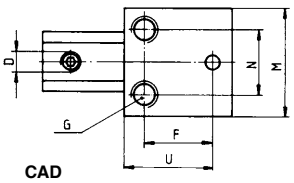
Order no.	Article no.	dia. B	C	dia. D	E	F	G	K	L	M	N	P
61218	6945-11-20	22	40	25	27	26	10	41,0	80	40	24	30
61234	6945-11-32	26	50	32	34	32	13	53,0	100	50	28	41
60327	6945-11-63	38	60	45	41	38	15	63,0	120	60	34	48
63990	6945-11-94	47	70	55	50	55	15	79,5	150	80	46	62

No. 6945-11

Base for Clamping Head







CAD

Order no.	Article no.	A [mm]	H [mm]	Weight [g]
61226	6945-11-20x14	14	25	680
61440	6945-11-20x18	18	25	790
61242	6945-11-32x18	18	25	1230
61457	6945-11-32x22	22	30	1470
60285	6945-11-63x22	22	30	1960
61465	6945-11-63x28	28	37	2380
60475	6945-11-94x28	28	36	4750

Design:

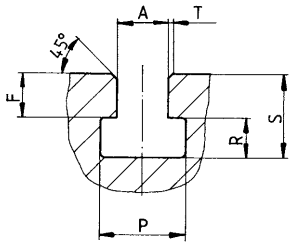
Tempering steel, blued. Complete with locating pin.

On request:

Special sizes available on request.

Dimensions:

Order no.	Article no.	B	C	D	F	G	K	L	M	N	P	U
61226	6945-11-20x14	22	8	M8	26	M10	65,0	70	40	24	18	32,7
61440	6945-11-20x18	28	10	M8	26	M10	72,0	70	40	24	24	32,7
61242	6945-11-32x18	28	10	M10	32	M12	73,0	90	50	28	24	40,4
61457	6945-11-32x22	35	14	M10	32	M12	82,0	90	50	28	32	40,4
60285	6945-11-63x22	35	14	M10	38	M16	85,0	110	60	34	32	48,3
61465	6945-11-63x28	44	18	M10	38	M16	94,0	110	60	34	40	48,3
60475	6945-11-94x28	44	19	M10	55	M20	125,5	140	80	46	47	69,0



Dimensions for T-slots in accordance with DIN 650:

A	F* min.	F* max.	P	R	S min.	S max.	T max.
14^{H8}	12	19	23^{+2}	9^{+2}	23	28	1,6
18^{H8}	16	24	30^{+2}	12^{+2}	30	36	1,6
22^{H8}	20	29	37^{+2}	16^{+2}	38	45	1,6
28^{H8}	26	36	46^{+2}	20^{+2}	48	56	1,6

* Please check this dimension on your machine

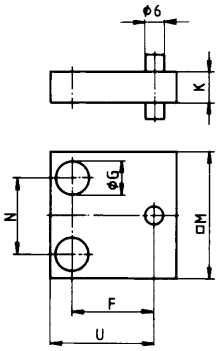
Subject to technical alterations.

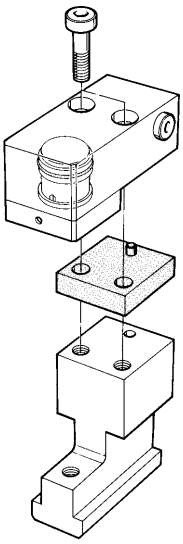
No. 6945-11

Adaptor Plate

CAD







Order no.	Article no.	Screw (2 pieces)	F	dia. G	K	M	N	U	Weight [g]
61259	6945-11-20-08-10	M10x45	26	11	10	40	24	32,7	190
61267	6945-11-20-08-20	M10x50	26	11	20	40	24	32,7	300
61275	6945-11-32-08-10	M12x50	32	13	10	50	28	40,4	290
61283	6945-11-32-08-20	M12x60	32	13	20	50	28	40,4	485
61291	6945-11-63-08-10	M16x60	38	17	10	60	34	48,3	500
61309	6945-11-63-08-20	M16x70	38	17	20	60	34	48,3	770
63503	6945-11-94-08-20	M20x85	55	21	20	80	46	69,0	1500

Design:

Tempering steel, blued, with locating pin and two mounting bolts ISO 4762.

Application:

The adapter plate is fitted between of the clamping head and it's base in order to obtain a different clamping height.

On request:

Special sizes available on request.

No. 6945-11

Clamping Piston, complete

CAD



Order no.	Article no.	Clamping force at 400 bar [kN]	Stroke [mm]	Vol. [cm³]	Weight [g]
61473	6945-11-20-10	20	6	2,9	220
61481	6945-11-32-10	32	8	6,4	400
61499	6945-11-63-10	63	10	16,0	730
64089	6945-11-94-10	94	12	28,5	1200

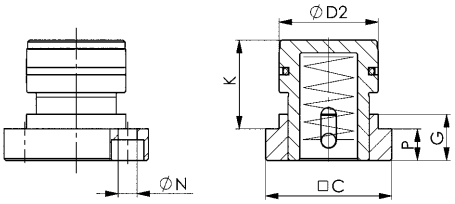
Design:

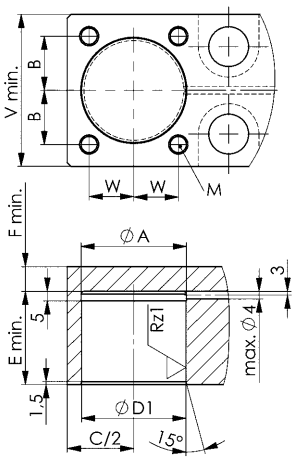
Hardened steel, piston case hardened and ground. Cover burnished. With mounting screws.

Application:

For simple retrofitting into existing fixture body. Suitable for clamping bar No. 6945-22-20-** and clamping head No. 6945-11-**.

Installation dimensions:





Dimensions:

Order no.	Article no.	dia. A	B ±0.1	C	dia. D1	dia. D2	E	F	G	K	dia. N	P	Screw (4 pieces)	Md max. [Nm]	M x depth	V	W
61473	6945-11-20-10	25,5	13,0	40	25 +0,033	25 -0,020/-0,041	26	4	14,0	26	6,6	11,0	M6 x 12- 8.8	10	M6 x 10	40	13
61481	6945-11-32-10	32,5	16,0	50	32 +0,039	32 -0,025/-0,050	33	7	15,0	33	8,4	12,0	M8 x 20- 8.8	25	M8 x 20	50	16
61499	6945-11-63-10	45,5	21,0	60	45 +0,039	45 -0,025/-0,050	39	9	20,0	39	8,4	15,0	M8 x 20- 10.9	36	M8 x 20	60	21
64089	6945-11-94-10	55,5	28,5	70	55 +0,046	55 -0,030/-0,060	49	13	25,5	49	10,4	17,5	M10 x 25- 12.9	79	M10 x 23	80	23

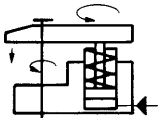
Subject to technical alterations.

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No. 6954

Swivel Clamping Strap, hydraulic clamping, mechanic unclamping

Single acting, with spring return,
max. operating pressure 250 bar.





CAD

Order no.	Article no.	A	Clamping height [mm]	Clamping stroke [mm]	Clamping force at 250 bar below [kN]	Clamping force at 250 bar centre [kN]	Clamping force at 250 bar top [kN]	Piston dia. [mm]	Vol. [cm³]	Spring force min. [N]	Weight [g]
65417	6954-14	14	40 - 80	0 - 5	30	26	24	32	4,8	150	3320
65433	6954-16	16	40 - 80	0 - 5	30	26	24	32	4,8	150	3320
65458	6954-18	18	40 - 80	0 - 5	30	26	24	32	4,8	150	3320
65474	6954-20	20	40 - 80	0 - 5	30	26	24	32	4,8	150	3320
65490	6954-22	22	40 - 80	0 - 5	30	26	24	32	4,8	150	3320

Design:

Clamp (with swivel lock), clamping bolt and sleeve tempered and blued. Cylinder body made of tempering steel, blued. Piston and piston rod case-hardened and ground. Wiper at piston rod, venting screw and sinter metal breather. Long piston guiding and Teflon guide ring at piston.

Application:

The swivel clamping strap is intended for the most frequently occurring tool clamping heights.

Features:

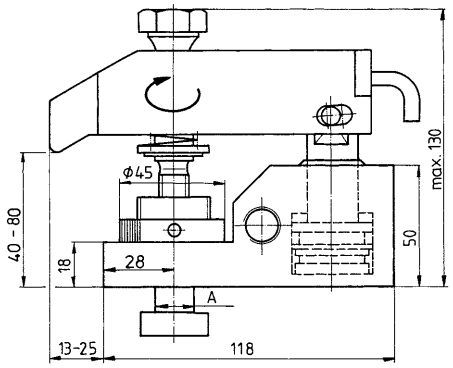
Large clamping range, fast height adjustmentto the required tool clamping edge height. The swivel clamping strap is inserted directly into the T-slot of the press. The workpiece can also be removed vertically upwards as the clamping bar can be swivelled away manually. The clamping bar is mechanically locked in the clamping position.

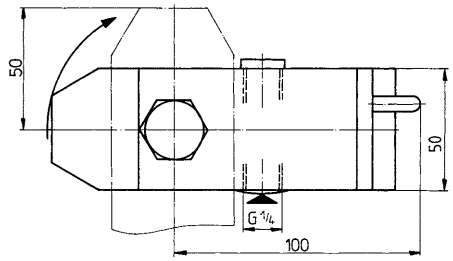
Note:

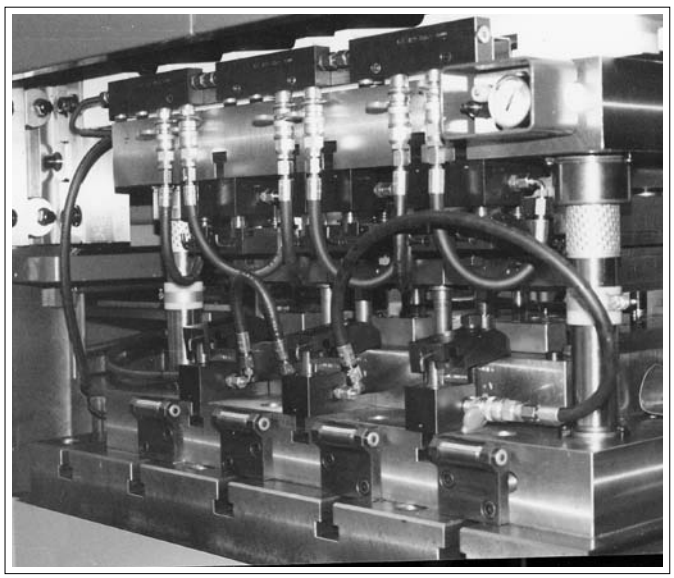
For single-acting cylinders, there is a risk of coolant being sucked through the breather port. In this case the cylinders have to be protected against the direct effect of coolant. The built in sinter metal breather should be protected. When placing into operation, ensure that all air is bled from the system.

On request:

Further sizes, specially made bases for bigger clamping heights and other T-slot sizes on request.







Subject to technical alterations.

Tool clamping for presses

Please fill in the following form so we can use your data to prepare an offer for the right clamping system for your individual requirements. We will respond as soon as possible.

Please use a copy of this page, do not remove it from the catalogue:

Company/address: .....

.....

Name/telephone: .....

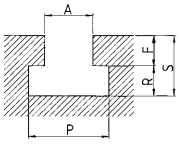
Dept.: .....

PRESS:

1. Manufacturer or press type .....
2. Pressing force .....
3. Max. stroke .....
4. Max. stroke rate .....
5. Closing height .....
6. Wiping force .....

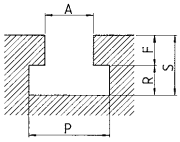
PRESS TABLE:

7. Table surface W × D .....
8. Table thickness .....
9. Table opening, if present .....
10. No. of T-grooves (table) .....
11. Pitch of T-grooves (table) .....
12. Dimensions of T-grooves (table) A= ..... F= ..... P= ..... R= ..... S= .....



PRESS PISTON:

13. Piston size W × D .....
14. No. of T-grooves (piston) .....
15. Pitch of T-grooves (piston) .....
16. Dimensions of T-grooves (piston) A= ..... F= ..... P= ..... R= ..... S= .....
17. Diameter of present clamping stud .....



TOOL:

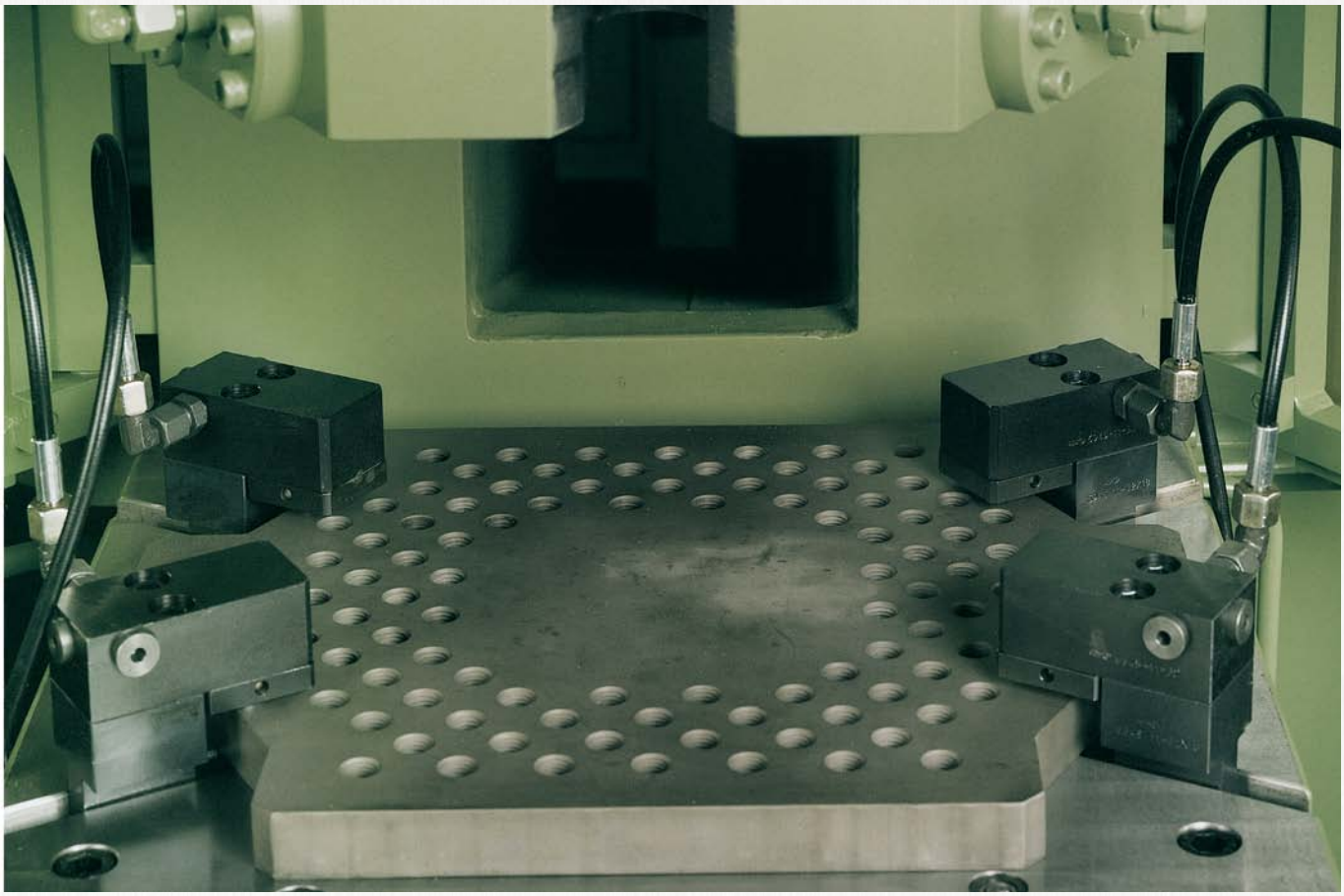
18. Maximum weight of upper tool part .....
19. Maximum weight of part .....
20. Thickness of tool base plates bottom/top .....
21. Minimum and maximum tool dimensions W x H x D .....
22. Important notes .....

.....

Subject to technical alterations.

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Subject to technical alterations.

No. 6946

Wedge clamp

double-acting
max. operating pressure 350 bar (400 bar*).

CAD



Order no.	Article no.	Clamping force [kN]	max. operating force [kN]	with positioning monitoring	without position monitoring	Weight [Kg]
325134	6946-25-I	25	36	-	●	2,6
325142	6946-25-B	25	36	●	-	2,6
325159	6946-50-L	50	72	-	●	6,1
325167	6946-50-B	50	72	●	-	6,1
325175	6946-100-L	100	145	-	●	11,5
325183	6946-100-B	100	145	●	-	11,5
325191	6946-160-L	160	230	-	●	23,0
325209	6946-160-B	160	230	●	-	23,0

Design:

Block cylinder housing from steel, burnished. Housing and clamping bolt tempered. Piston rod case hardened and ground. The fastening screws are included in the supply scope resistance 12.9.

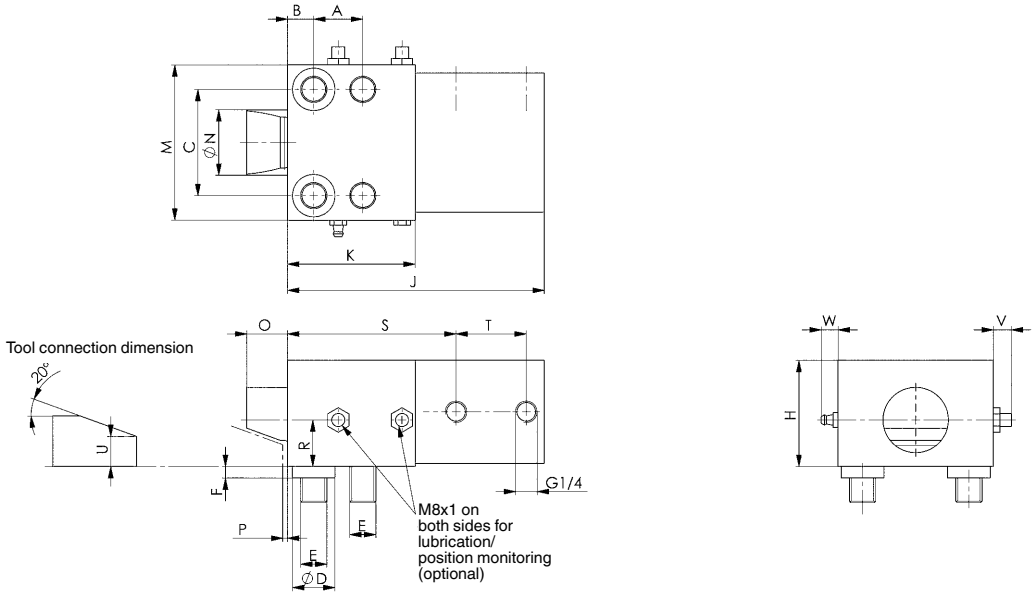
Application:

Wedge clamps are used for clamping the tools on presses and injection moulding machines. The clamping bolt clamps at a 20° diagonal to the tool, which results in a friction connection.

Note:

The maximum permitted load per clamp must not be exceeded. The clamping force acts vertically on the clamping point which applies very low sliding forces to the tool.

* When using fixing screws of 10.9 quality a maximum operating force of 400 bar is permitted. A mounting surface with corresponding thread resistance (at least corresponding to St 50) is required.



Dimensions:

Order no.	Article no.	A	B	C ±0,02	dia. D H8	E	F	H	J	K	M	dia. N	O	P	R	S	T	U	V	W	Screw (4 pieces)
325134	6946-25-I	24	14	48	18	M12	6	48	122	58	70	30	20	3	21,5	78	33	15	12	11	M12x60
325142	6946-25-B	24	14	48	18	M12	6	48	122	58	70	30	20	3	21,5	78	33	15	12	11	M12x60
325159	6946-50-L	30	16	65	26	M16	7	65	157	78	95	40	25	3	28,5	103	43	18	6	11	M16x70
325167	6946-50-B	30	16	65	26	M16	7	65	157	78	95	40	25	3	28,5	103	43	18	6	11	M16x70
325175	6946-100-L	38	20	85	30	M20	11	80	190	100	120	56	25	3	37,0	127	51	25	16	11	M20x90
325183	6946-100-B	38	20	85	30	M20	11	80	190	100	120	56	25	3	37,0	127	51	25	16	11	M20x90
325191	6946-160-L	50	25	106	35	M24	11	105	222	120	150	70	30	3	49,0	148	57	30	8	11	M24x120
325209	6946-160-B	50	25	106	35	M24	11	105	222	120	150	70	30	3	49,0	148	57	30	8	11	M24x120

Subject to technical alterations.

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No. 6945-28

Clamping Stud Holder, hydraulic

for direct attachment to ram.

CAD

Order no.	Article no.	max. operating pressure [bar]	Pull Force cylinder [kN]	Clamping stud dia. [mm]	Spring force min. [N]	Weight [Kg]
6163	6945-28-007	230	54	40	1200	47
61390	6945-28-010	400	94	50	1200	66



Design:

Cylinder body made of tempering steel. External, vertical surfaces painted yellow. Complete with two clamping pistons No. 6945-15-10 and cover plates.

Application:

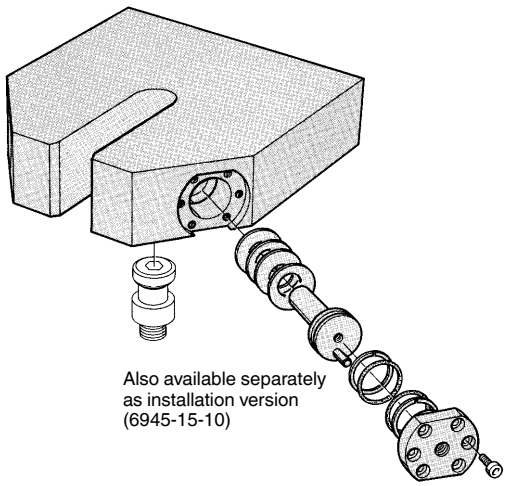
Clamping stud No. 6945-02-04-***, which is screwed into the tool, is gripped hydraulically when it has entered the opening in the clamping-pin chuck.

Note:

No DIN clamping studs must be used for the clamping stud holder. Mounting holes can be incorporated on request. Untoleranced dimensions are to DIN ISO 2768 medium.

On request:

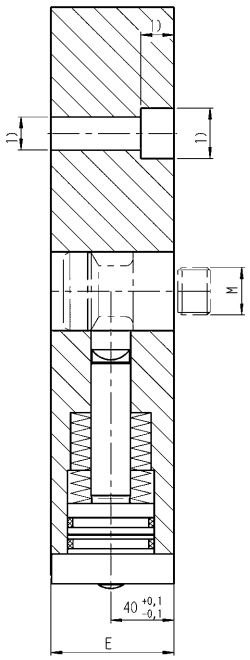
Special versions available on request.

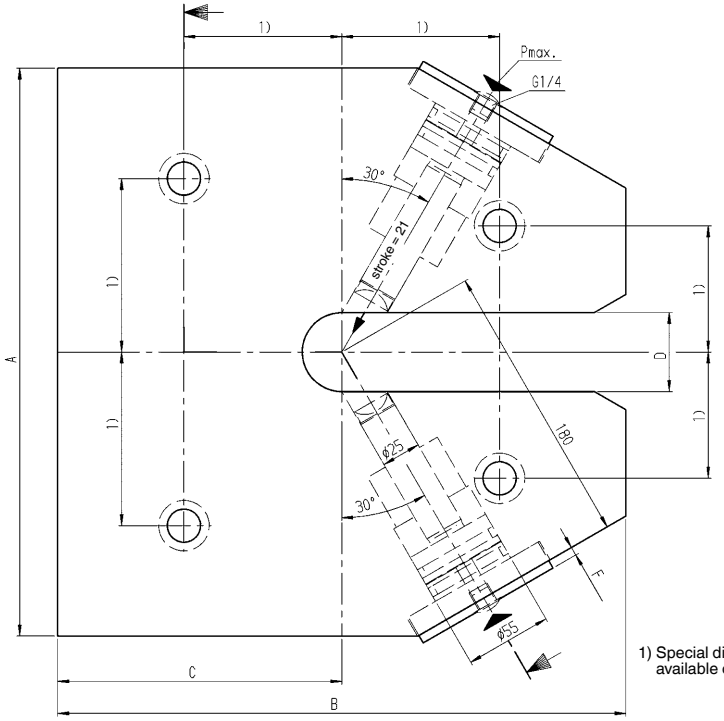


Also available separately as installation version (6945-15-10)

Dimensions:

Order no.	Article no.	A	B	C	D +0.1/+0.3	E	F	M
6163	6945-28-007	360	270	135	40	78	1,5	M24x1,5
61390	6945-28-010	360	360	180	50	78	5,5	M30x2,0





1) Special dimensions available on request

Subject to technical alterations.

No. 6945-15-10

Clamping Piston, complete

for stud clamping,
max. operating pressure 400 bar.



Order no.	Article no.	Screw (6 items)	Md max. [Nm]	OR-1 O-ring Order No.	Weight [g]
61382	6945-15-10	M10 x 25	50	188300	1700

Design:

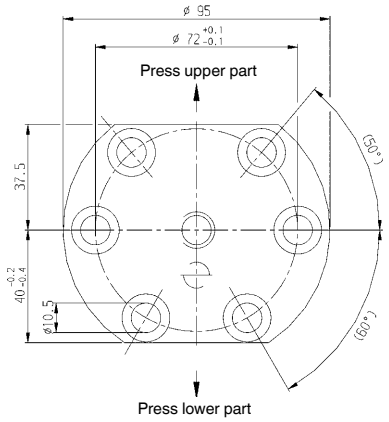
Hydraulic piston from hot workable steel, tempered and ground. Cover from hardened steel. Complete with disc springs, O-rings, support rings, dowel pin and fastening screws ISO 4762 resistance 8.8.

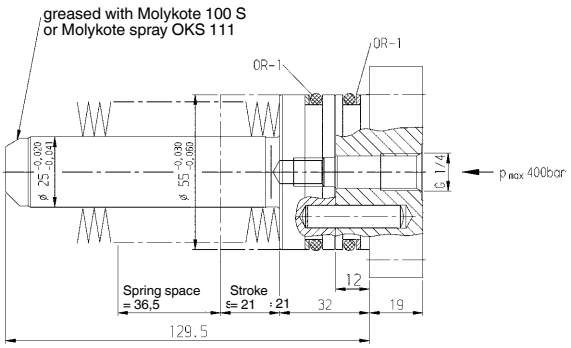
Application:

This clamping piston can be retrofitted to your original ram plate.

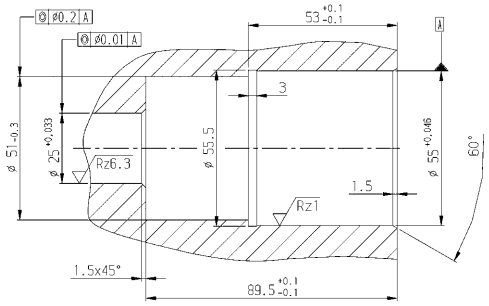
Note:

The use of clamping stud No. 6945-02-04-009 in combination with clamping piston set No. 6945-15-10 is restricted to a maximum operating pressure of 230 bar.





Installation dimensions:



CAD

No. 6945-02-04

Clamping Stud



Order no.	Article no.	dia. A	dia. D	M	Weight [g]
61671	6945-02-04-009	22	40	M24x1,5	760
61150	6945-02-04	32	50	M30x2,0	945

Design:

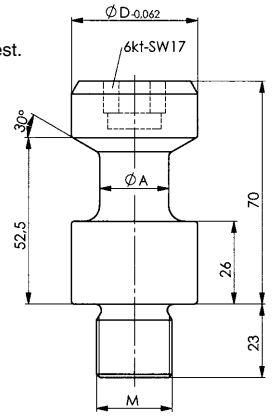
Tempering steel, tempered, inductively hardened clamping area.

Note:

Clamping stud does not conform to DIN, suitable only for use with our hydraulic stud clamping.

On request:

Special sizes available on request.



CAD

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Terms of Sale, Delivery and Payment

These Terms of Payment apply for companies, legal entities governed by public law and public law special funds. Our goods and services are supplied exclusively on the basis of the following conditions. Any deviating purchasing conditions of the customer not expressly recognised by us will not become part of the contract through acceptance of the order. By placing the order and accepting the goods we deliver, the customer confirms its consent to our terms and conditions.

1. Offer and contractual conclusion

All our offers are always subject to change without notice unless otherwise explicitly agreed. Our delivery contracts are based on the latest version of our catalogue. Dimension and weight values, as well as illustrations, drawings and data, are non-binding and can be changed by us at any time. Therefore, deviations cannot be ruled out and do not justify any compensation claims against us.
Orders are considered accepted only when confirmed by us in writing. If, for organisational reasons, the customer does not receive a separate confirmation upon the delivery of goods, the invoice shall also be deemed the order confirmation.

2. Prices

The prices are in EURO, ex-works, excluding VAT, packing, freight, postage and insurance. Unless otherwise agreed, our list prices valid on the day of delivery shall apply. For orders below 50 EUR goods net, we must make a minimum quantity surcharge of a 10 EURO for cost reasons.

3. Tool costs

Unless any other agreements have been reached, the tools fabricated for the purpose of executing the order shall remain our property in all cases, even if we have invoiced a tool cost component separately.

4. Payment

Unless otherwise stated on the invoice, the purchase price falls due for net payment within 30 days of the invoice date (without deduction of discount). Invoice amounts of below 50 EURO are due for payment immediately.
In case of payment default, we shall be entitled to charge default interest. The amount corresponds to our interest rate for current account credits at our main bank; the minimum however being 8 percentage points above the relevant base interest rate applied by the European Central Bank. Moreover, in case of default following written notice to the customer, we shall be entitled to cease to fulfil our obligations until payments are received.

5. No set-off

The customer can set-off only with legally confirmed or undisputed counterclaims.

6. Right of withdrawal in case of delayed acceptance or payment and insolvency

If the customer fails to accept the goods in due time, we shall be entitled to set a reasonable period of grace, after which we can dispose of the goods elsewhere and supply the customer on a reasonably longer term. Our rights to withdraw from the contract under the provisions of Section 326 BGB and demand damages for non-performance shall not be affected. If the customer fails to pay for the goods once payment is due, we shall be entitled, at the end of a reasonable period of grace we have set, to withdraw from the contract and demand the return of any goods already supplied. Section 323 BGB remains unaffected in all other cases.
If the customer applies for the opening of insolvency proceedings, we shall be entitled, prior to the ordering of security measures by the insolvency court, to withdraw from the contract and demand the immediate return of the goods.

7. Customer-specific fabrications/project fabrications (custom fabrications)

Customer-specific fabrications require binding information on design, quantity etc. in written form at the time of ordering. For manufacturing reasons, we reserve the right to supply up to 10% above or below the order quantity. Technical modifications or cancellations are subject to any costs incurred. The return of customer-specific fabrications is impossible.

8. Delivery and packaging, transfer of risk

The delivery date is non-binding; although stated to the best of our knowledge. It is subject to us receiving correct, defect-free and complete deliveries. The stated delivery dates relate to completion in the factory, starting on the day the order is accepted by us. Delivery is EXW (ex-works) in accordance with Incoterms 2010. Therefore, the costs are borne by the customer. The risk is transferred to the customer when the goods are passed to the person, company or facility nominated to execute the shipment. This applies also for partial deliveries, or if we have assumed responsibility for delivery and installation. The risk shall be transferred to the customer even in the case of delayed acceptance.
In the absence of specific shipping instructions, we shall proceed as we deem fit and without any obligation to the cheapest or most expedient method. The customer agrees that the order can also be delivered in parts, insofar as this is reasonable for the customer. We shall charge a 5 EURO processing free for shipping to third parties that we supply on behalf of the customer.
The packaging complies with the packaging ordinance. Disposable packaging shall be charged at cost price. The packaging cannot be taken back.

9. Performance impediment and/or impossibility

If we are hindered in the fulfilment of our obligation due to the onset of unforeseeable circumstances, which we are unable to avoid despite reasonable effort in relation to the nature of the circumstances (e.g. operational interruption, delay in the delivery of important raw materials, defects in the delivery), the delivery time shall be extended by a reasonable period, insofar as the supply of goods or services is not rendered unreasonably difficult or impossible.
If we have to accept that these circumstances are not only temporary, we shall be entitled to withdraw from the contract either in whole or in part.
If the supply of goods or services becomes impossible, the customer shall not be obliged to furnish its own contractual service. Section 275 BGB applies mutatis mutandis. If, however, the customer is solely or predominantly responsible for the circumstances that led to impossibility, it shall remain under an obligation to render the return service. The same applies if this circumstance occurs at a time when the customer is behind schedule with acceptance.

10. Samples/returns

Samples shall be provided only against payment. If samples or models are provided, a credit note shall be issued with the subsequent order if the order value is 125 EURO net or more. Goods can be returned only by agreement, although custom fabrications are excluded from such return.
In the case of returns for which we are not responsible (e.g. incorrect order), we shall charge a processing fee of 10%, the minimum value, however, being 7.50 EURO.

11. Retention of title

The goods shall remain our property unless full payment of all claims and/or until the cheques provided for this purpose are honoured. The itemisation of claims in an ongoing invoice, as well as balancing the account and the recognition thereof does not affect the retention of title. The customer is entitled to sell on the retained goods during the ordinary course of business. However, the customer is not permitted to pledge the goods or transfer them by way of security. It shall assign its claim ensuing from the selling on of the retained goods to us in advance. The customer shall be entitled to collect the claim to the extent that it has fulfilled its obligations towards us. At our request, the customer shall be obliged to state third-party debtors and we shall be entitled to report this and the assignment.

12. Property rights

We reserve property rights and copyrights to all contractual documents such as drafts, drawings, calculations and cost estimates. Such documents must not be reproduced or disclosed to third parties without our consent. Any rights to patents, utility models etc. reside solely with us, insofar as such patents have not yet been filed. Our products are allowed to be replicated only with our written consent.
If objects are fabricated according to drawings or samples, the customer shall warrant that any third party property rights are not infringed by manufacture or delivery. If a third party forbids manufacture and delivery on account of property rights, we shall be entitled to stop manufacture and delivery immediately. The customer shall be obliged to reimburse us with all costs incurred and indemnify us from third party compensation claims. Compensation claims by the customer are impossible.

13. Warranty

If the customer agrees with us a particular quality of the goods, we shall base this agreement on our technical delivery specifications. If we have to deliver according to customer drawings, specifications, samples etc., the customer shall assume the risk for suitability for the intended purpose. If, after the contract is concluded, the scope of goods or services is changed at the customer‘s request and this impairs the quality or suitability of the goods, claims for defects on the part of the customer shall be ruled out, insofar as such impairments are caused by the customer‘s requests for change.
The time at which the risk is transferred is decisive for the contractual state of the goods. Wear and tear of wearing parts caused by ordinary use does not constitute a defect. Claims for defects are ruled out in the following cases in particular: Unsuitable or improper use, incorrect installation and/or commissioning by the customer or third party, normal wear and tear, incorrect or negligent handling - in particular excessive use -, unsuitable equipment, replacement materials, chemical, electrochemical or electrical influences, unless such defects are caused by ourselves.
If the goods contain a defects, we shall provide, following a reasonable period of grace set by the customer, either a replacement or a repair as we deem fit. If such subsequent performance fails, the customer shall be entitled to either reduce the purchase price or withdraw from the contract. Any further warranty claims are ruled out. In case of negligible deviations from the agreed quality, no claims for defects shall be recognised.
The discovery of defects must be communicated to us immediately in writing. In the case of recognisable defects, however, within 10 days of acceptance, in the case of non-recognisable defects immediately after they become evident. The warranty is 12 months, starting with delivery of the goods ex-works.

14. Liability

With the exception of harm to life, body or health on account of a breach of duty by ourselves, our liability shall be limited to intent or gross negligence.

15. Place of fulfilment, place or jurisdiction and governing law

The place of fulfilment for all obligations ensuing from this contractual relationship is D-70734 Fellbach.
The place of jurisdiction for all legal disputes ensuing from the contractual relationship is the court responsible for the headquarters of Andreas Maier GmbH & Co. KG.
All disputes ensuing from the contract or regarding the validity thereof shall be finally decided by a court of arbitration in accordance with the Court of Arbitration Ordinance of the German Committee for Arbitration Court Procedures or the Conciliation and Arbitration Arrangement of the International Chamber of Commerce, recourse to ordinary courts of law being excluded. The legal dunning process, however, remains permissible.
German law shall govern (BGB and HGB). The applicability of the UN Convention on Contracts for the International Sale of Goods (CISG) is ruled out.

16. Severability clause

If individual provisions become legally invalid, the remaining provisions shall not be affected. The legally invalid provision shall be replaced by regulations that most closely reflect the economic purpose of the contract with reasonable consideration for the mutual interests. The publication of these Terms of Sale, Delivery and Payment renders all previous versions invalid. This does not apply for any contracts concluded prior to announcement.

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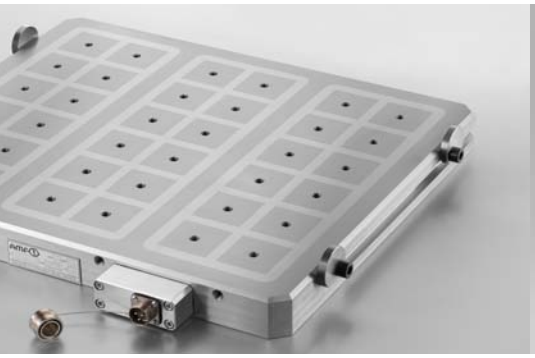
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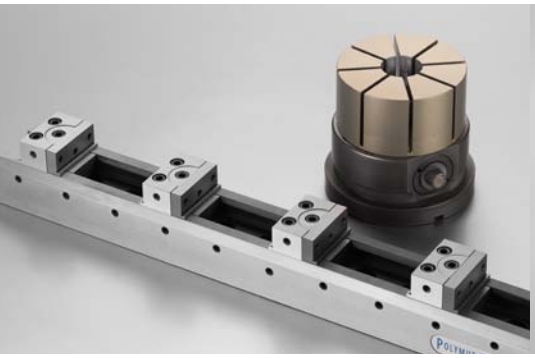
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