

HYDRAULIC CLAMPING SYSTEMS



WE GENERATE EXCITEMENT.

Since its founding by Andreas Maier in 1890, our company has lived through many exciting times. Today we are the leading manufacturer in Europe, supplying over 5,000 different products from the fields of clamping, hand tools and locks. With this extensive product range we can meet all of our customers' needs and requirements. But providing optimal quality means meeting the challenges at all levels: Expert consultation, modern team organisation, individual solutions (including special developments), flexibility in response to changing conditions, etc. And we ourselves find this so exciting that we look forward every day to shaping the market together with our employees and our customers – both now and in the future. That is something you can count on.

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** AMF 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** Marking and cleaning tools included in the AMF product range.



MANAGING DIRECTORS

> Johannes Maier
Volker Göbel



THE AMF SERVICE GUARANTEE

> Assuredly on the way to the top

5 Individual development

And if the product you need doesn't exist? Just ask us: We will find the best solution for you – whether it is a special version or a completely new development.

4 Warranty

We stand by our high quality standards. We handle customer complaints very liberally and without red tape – whenever possible even after the end of the warranty period.

3 Guaranteed quality standard

AMF stands for manufacturing in-house with the utmost care. A tradition we have upheld since 1890 – and naturally for many years now with a modern quality management system to ISO 9001.

2 Short delivery times

AMF's finished goods inventory with over 5,000 items guarantees a delivery readiness of 98%. You can also count on each warehouse item you order being shipped to you on the same day.

1 Service from genuine experts

„Different tasks, different solutions. In AMF's professional product range, you can find the right solution quickly and reliably: either from your local dealer or with help from the specialists in our teams. A phone call is all it takes.“

E Made in Germany

It goes without saying that our range of products is developed and manufactured by our team of employees in Germany.

PRESSURE GENERATORS

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CENTRING CLAMP MAXI

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CENTRING CLAMP MINI

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**SWING CLAMP,
CARTRIDGE FLANGE**

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**SUPPORT ELEMENT,
CARTRIDGE FLANGE**

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**SUPPORT ELEMENT,
TOP-FLANGE-MOUNTING**

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EINBAUAUSFÜHRUNG**

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PLUG CONNECTION

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VERTICAL CLAMP

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SWING CLAMP
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PUMP UNIT WITH ZERO POSITION
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SWING CLAMP
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BUILT-IN COUPLING MECHANISM
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MEASURING COUPLING

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ADAPTER FOR PRESSURE GAUGE CONNECTION

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RECOMMENDATIONS AND PARAMETERS OF OIL-HYDRAULIC DEVICES AND PLANTS.

GENERAL:

In this catalogue, parameters are published following the VDI Guidelines 3267 to 3284.

OIL RECOMMENDATION:

Oil temperature (°C)	designation to DIN 51 524	viscosity to DIN 51 519
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 cm³ per 1000 double strokes and 10 mm stroke (HLP 22)
 from 40 mm piston dia.:
 < 0.6 cm³ 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 31001, 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 2391 C. 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.

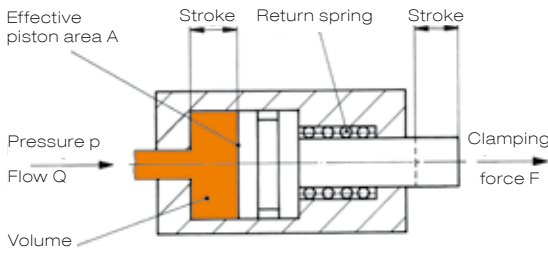
For double-acting elements, static pressures increases when load is applied to the rod side. Parts of the relatively large oil volume on the piston side cannot drain quickly enough. Static pressure does usually not affect the clamping elements.

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.

HYDRAULIC PARAMETERS, UNITS AND FORMULA SYMBOLS:



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/cm ² ≈ 1 atm. = 10 ⁵ N/m ² 1 Pa = 1 N/m ²
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 $\frac{cm^3}{s}$

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

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 [mm ²]	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 [cm ²]	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

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

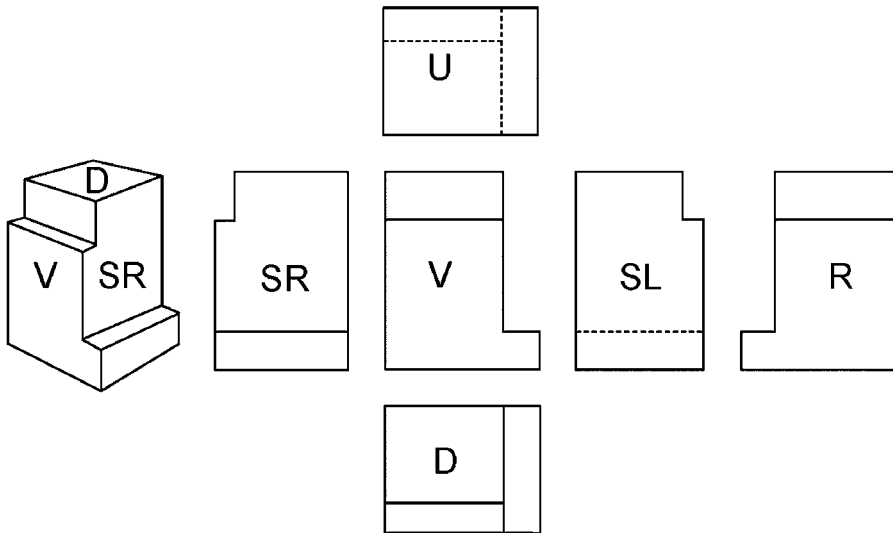
K = Kelvin °C = degree Celsius °F = degree Fahrenheit

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)!

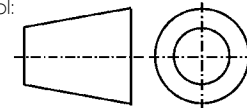
FIRST-ANGLE PROJECTION (DIN)



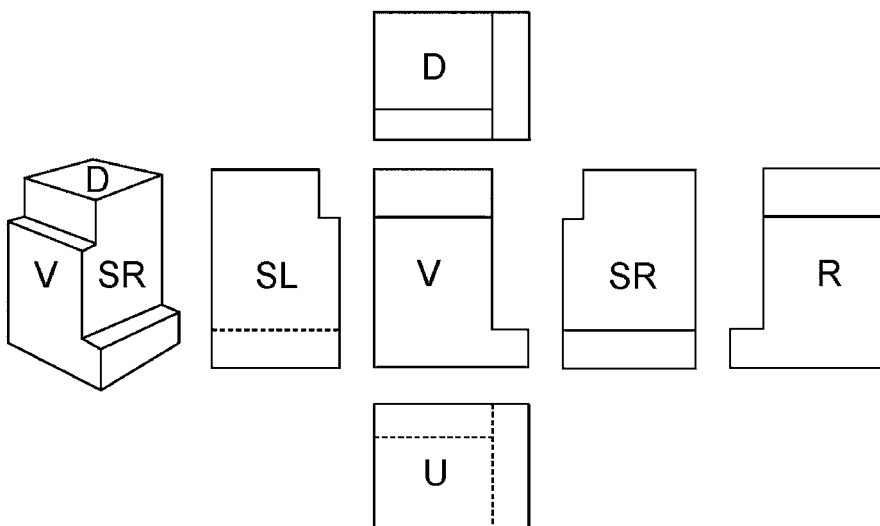
Location of other views in relation to front elevation, V:

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:



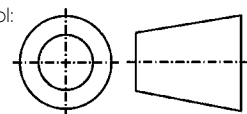
THIRD-ANGLE PROJECTION (ANSI / USA)



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.

PRESSURE GENERATORS: THE OPTIMAL SOLUTION FOR ANY APPLICATION!

- > 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	Operating pressure max. [bar]	Clamping circuits	Output-flow	effective oil volume [l]
6901	●	-	350	1	2,1 cm ³ / Rotation	0,026
6902	●	-	700	1	20 cm ³ / 1 cm ³ / stroke	0,3
6902	●	-	700	1	20 cm ³ / 2 cm ³ / 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. [cm ³]	stroke volume total [cm ³]	Md max. [Nm]	Weight [g]
67819	6901-10	350	2,1	26	50	1524
67835	6901-20	350	2,1	26	50	689

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 particularly 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 considerably by air content in the oil. Therefore the hydraulic system has to be carefully purged of air. An air bled 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.



No. 6901-10

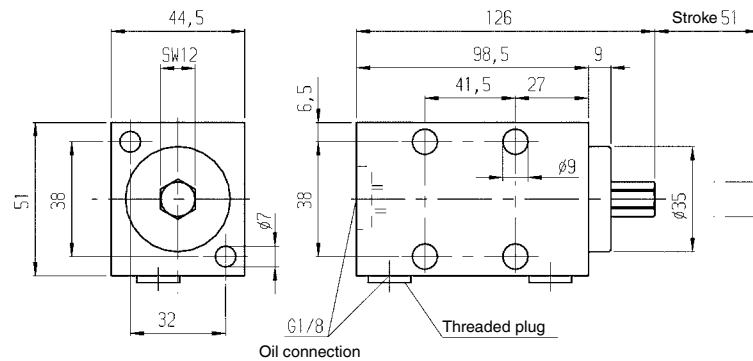


No. 6901-20

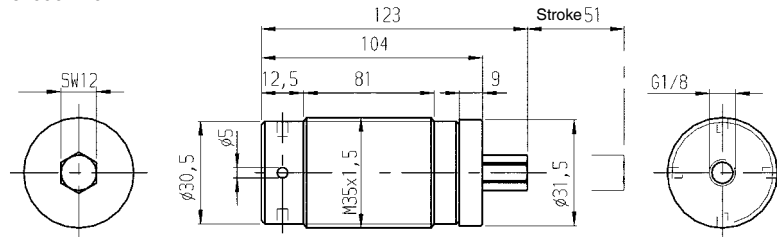
Clamping pressure in relation to torque:

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

No. 6901-10



No. 6901-20



CAD

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 [cm ³]	Displacement per stroke 2nd stage [cm ³]	Q usable [cm ³]	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.

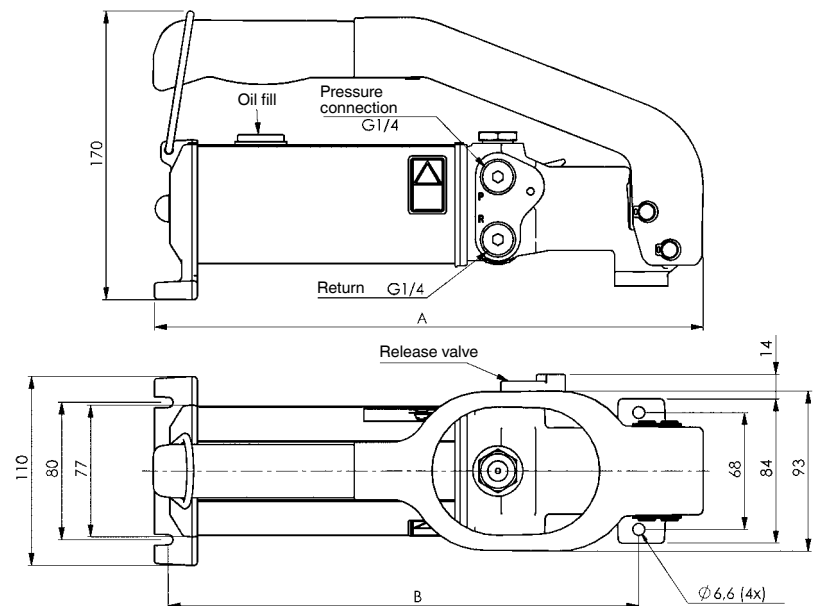
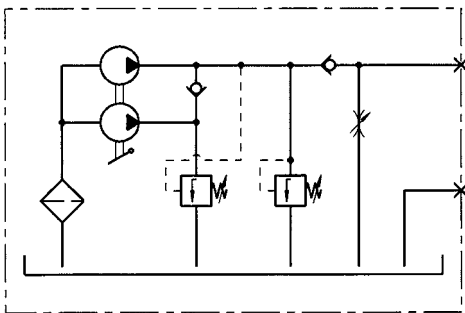
Application:

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.

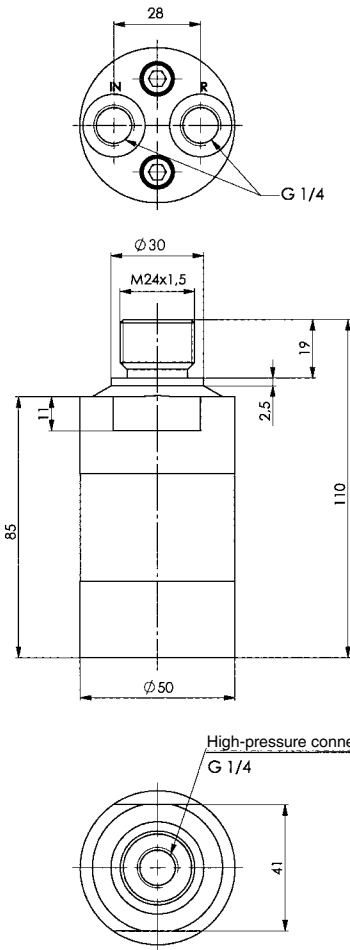
Hydraulic diagram:



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.

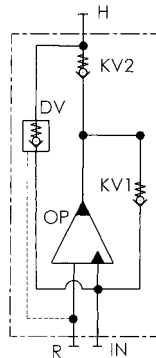
Note:

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.

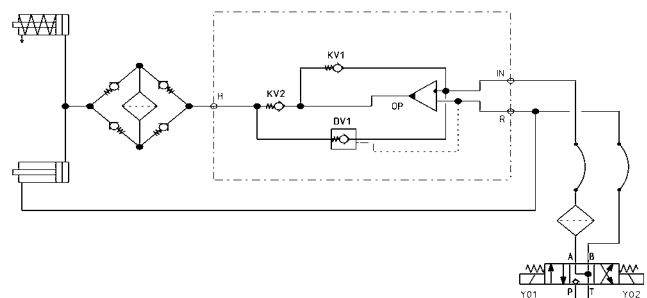
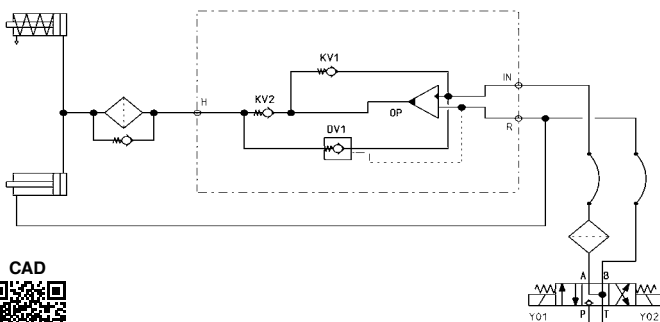
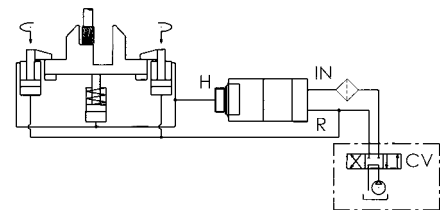
On request:

Manifold mounting and other sizes available on request.

Hydraulic diagram:



Application examples:



CAD

Subject to technical alterations.

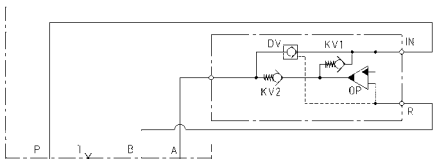
No. 6903

Hydraulic pressure booster

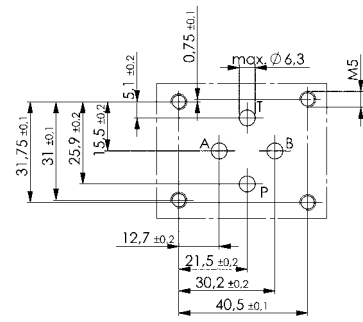
For O-ring connection,
max. operating pressure in outlet 500 bar,
min. operating pressure in inlet 20 bar



Hydraulic diagram:

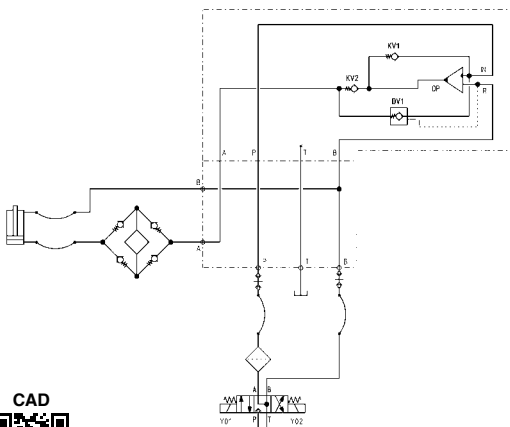


Hole pattern shape A nominal size 6:



As seen in direction of the plate.

Application examples:



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.

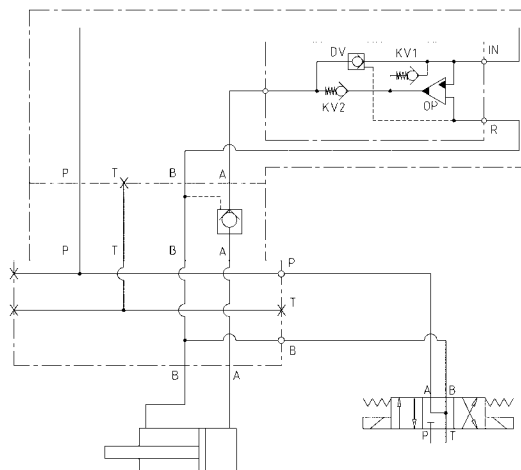
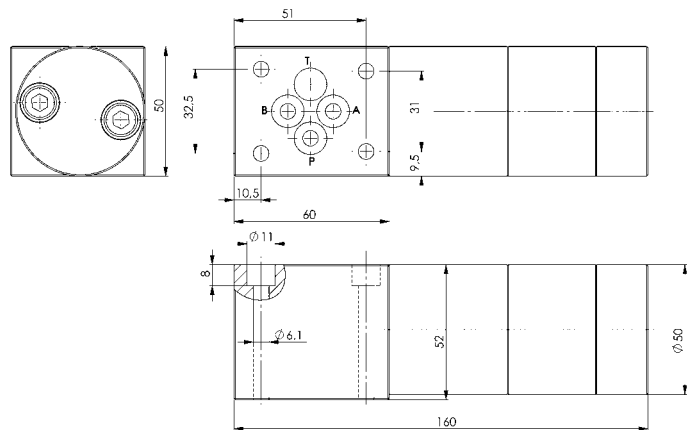
Features:

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 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.

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.



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. [cm ³ /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:

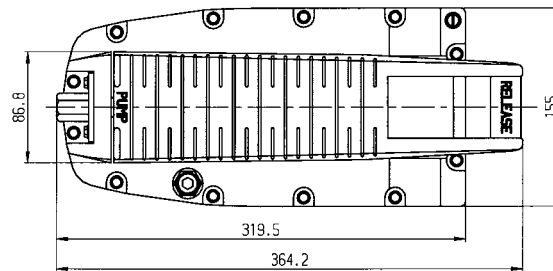
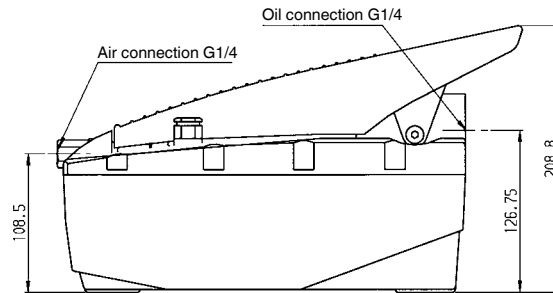
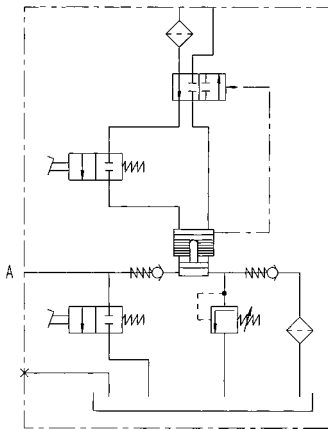
The large air/oil intensification ratio allows for high hydraulic pressures even with small air pressure. Low weight allows for mobile application. The pump can be mounted horizontally or vertically. Applications in hazardous environment is possible.

Note:

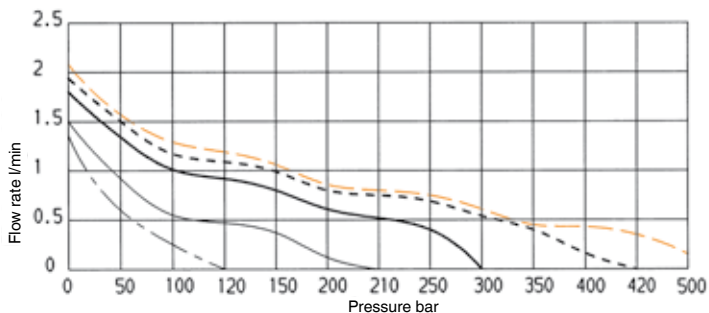
Optionally, pumps with other operating pressures are available upon request. Please observe proper venting of the single acting system.

All tolerances other than specified refer to DIN ISO 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

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. [cm ³ /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.

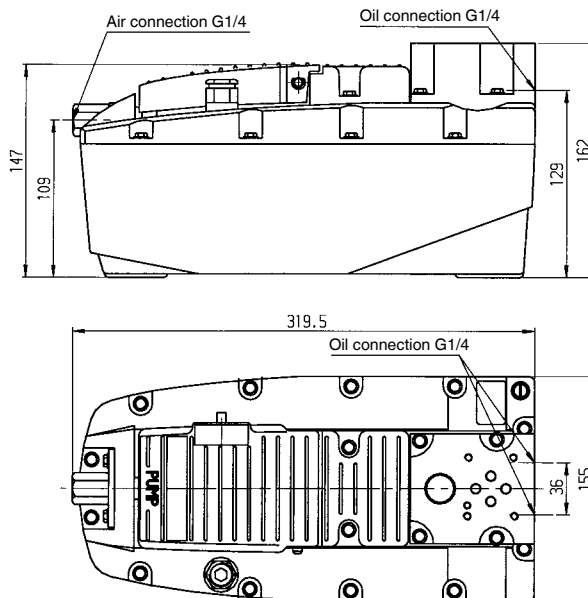
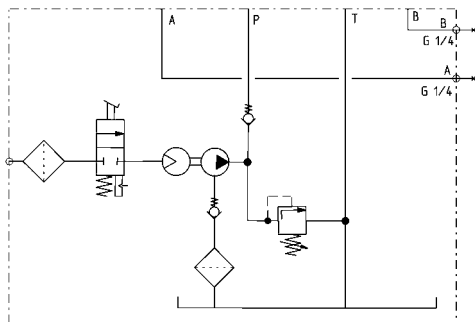
Features:

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. Applications in hazardous environment is possible.

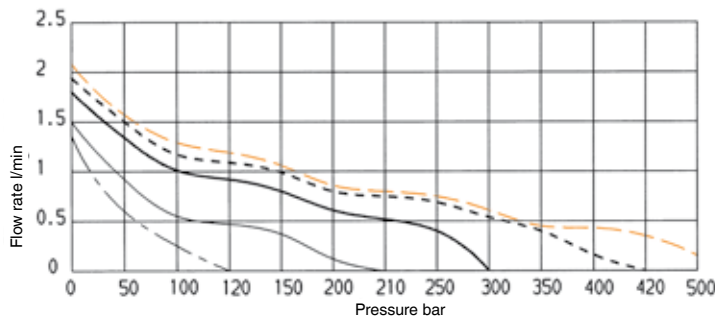
Note:

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 DIN ISO 2768 mittel (medium).

Hydraulic diagram:



Pressure/flow diagram:



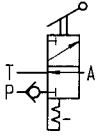
Air pressure:

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

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:

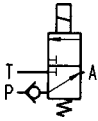
For single acting cylinders. CETOP 3 adaptation.



No. 6904-52

Seat Valve 3/2

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



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

Design:

Design: Seat valve
Type of actuation: electric

Application:

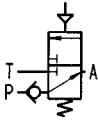
For single acting cylinders. CETOP 3 adaptation.



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:

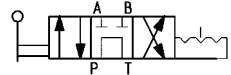
For single acting cylinders. CETOP 3 adaptation.



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]
326363	6904-59	6	30	380

Design:

Design: Piston valve
Type of actuation: manual

Application:

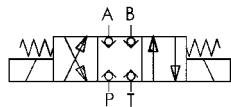
For double acting cylinders. CETOP 3 adaptation.



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]	Weight [g]
322065	6911A-07-01	6	20	2356

Application:

For double acting cylinders. CETOP 3 adaptation.

Note:

Further information can be found under Accessories/Valves.



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 No. 6904-20 or -25.

Subject to technical alterations.

FUTURE-COMPATIBLE AND ENVIRONMENTALLY CONSCIOUS

AMF PUMP UNITS ARE AHEAD OF THEIR TIME

FUTURE-COMPATIBLE THANKS TO ELECTRIC MOTORS WITH HIGHER ENERGY EFFICIENCY CLASSES

At the end of 2009, a new EU regulation was adopted that defined, among other things, new guidelines for the environmentally-friendly design of electric motors. The goal is to reduce energy consumption and thus also CO2 emissions. On 16th June 2011 the first stage of the transition period was ended and the amendment was entered into force; the second stage will follow in 2017.

Our electric motors already comply with these directives, and thus also comply with the energy efficiency classes that will be required in 2017.

This is attested by the „Pro Energy Efficiency Initiative“ seal.

The benefits at a glance:

- > energy-saving operation thanks to optimised energy-saving motor
- > greater efficiency
- > ecological operation of the pump units
- > future-compatible operation, compliant with the 2017 standard.



ENVIRONMENTALLY CONSCIOUS OPERATION WITH BIO OIL

Our new hydraulic pump units can be operated either with conventional mineral-based industrial oil, or with biodegradable industrial vegetable oil.

The advantages of bio oil:

- > energy savings of 20 - 30 %
- > lower noise level
- > longlife oil for longer oil change intervals
- > produced on the basis of renewable resources
- > highly biodegradable
- > not hazardous to waters
- > suitable for use in the food industry
- > approved by leading machine manufacturers

Please get in touch with us!



No. 6906

Pump unit

with pressure relief valve and electronic pressure switch, single- and double-acting, max. operating pressure 160 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.

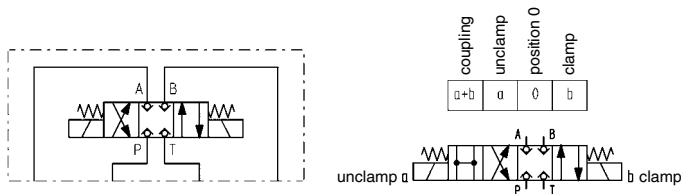
Valve combination: Pressure reduction and clamping pressure monitoring in certain clamping circuits. Pressure reduction for all subsequent clamping circuits. Pressure filter with filter mesh 10µm or 40 µm. Throttle valves for specified clamping circuits.

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.



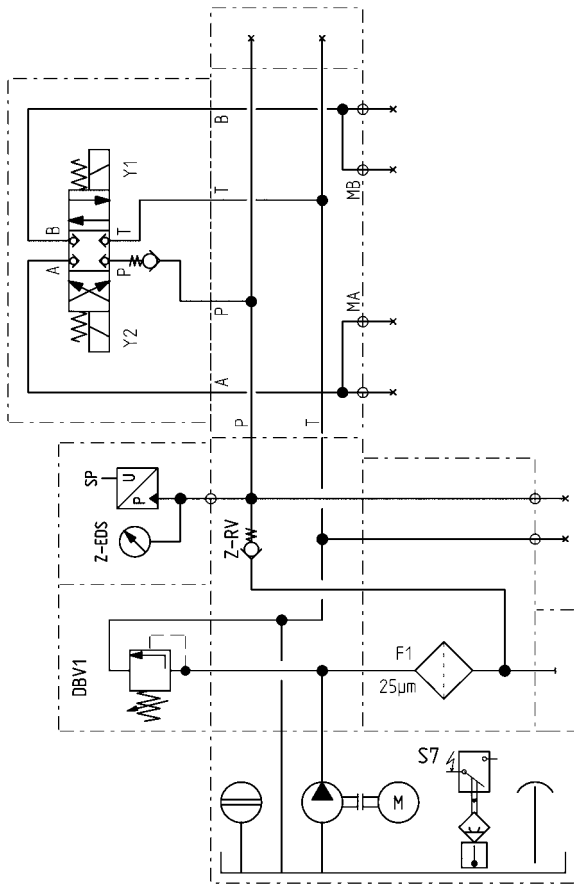
4/3-directional seat valve for single and double-acting consumers



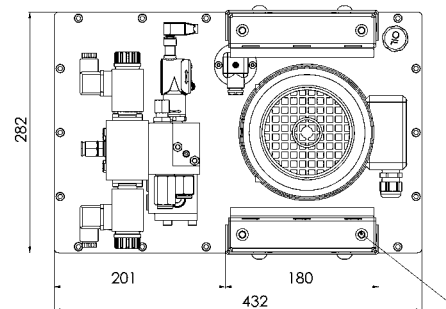
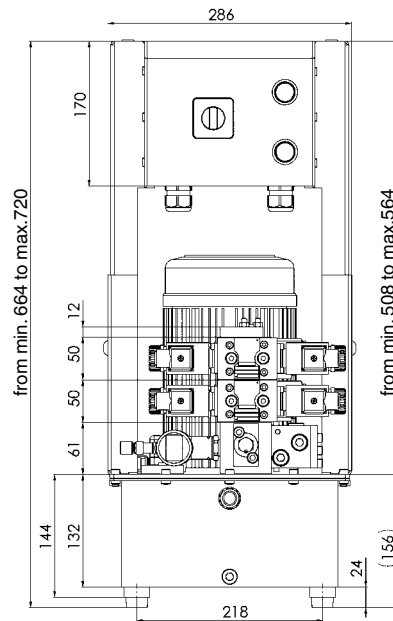
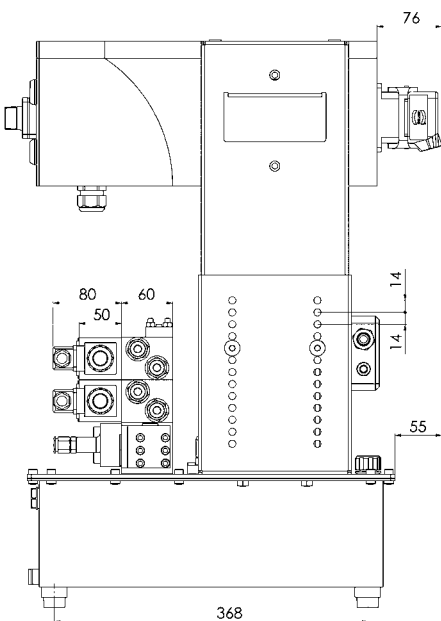
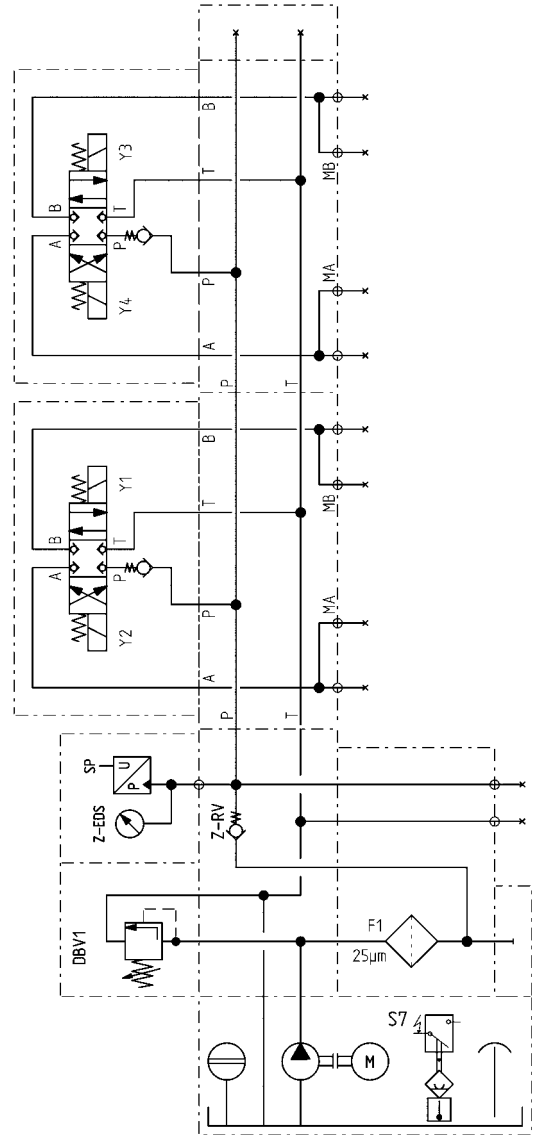
CAD

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.

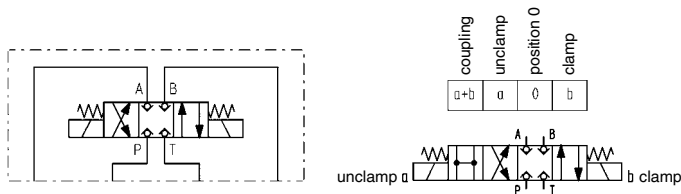
Valve combination: Pressure reduction and clamping pressure monitoring in certain clamping circuits. Pressure reduction for all subsequent clamping circuits. Pressure filter with filter mesh 10µm or 40 µm. Throttle valves for specified clamping circuits.

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.

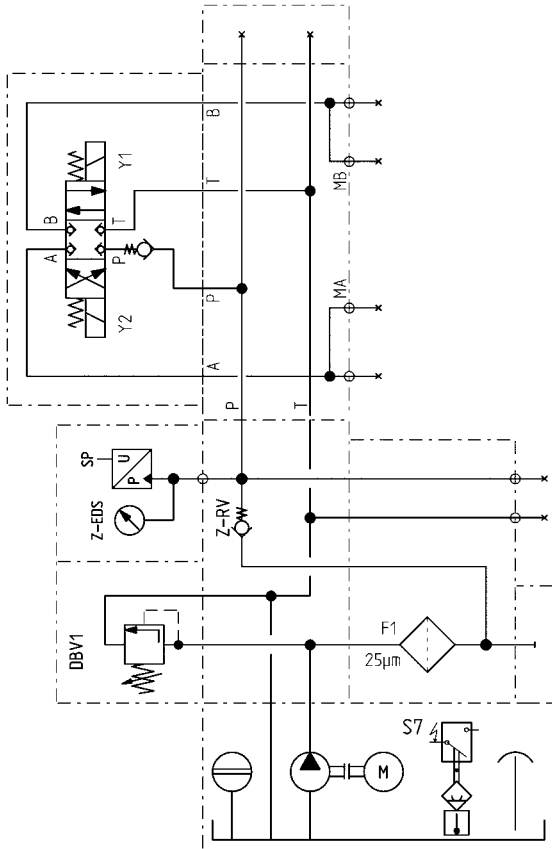


4/3-directional seat valve for single and double-acting consumers

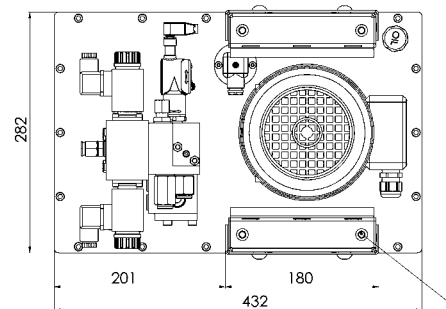
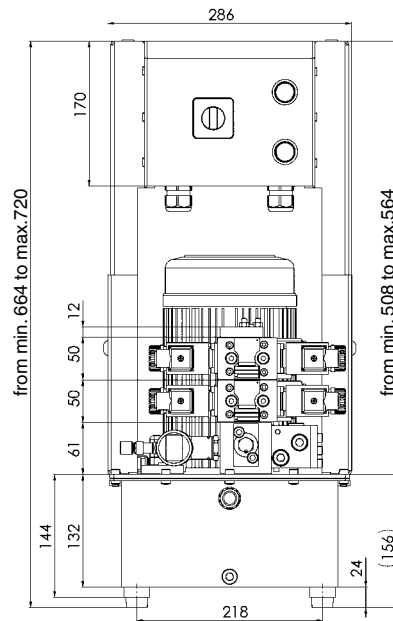
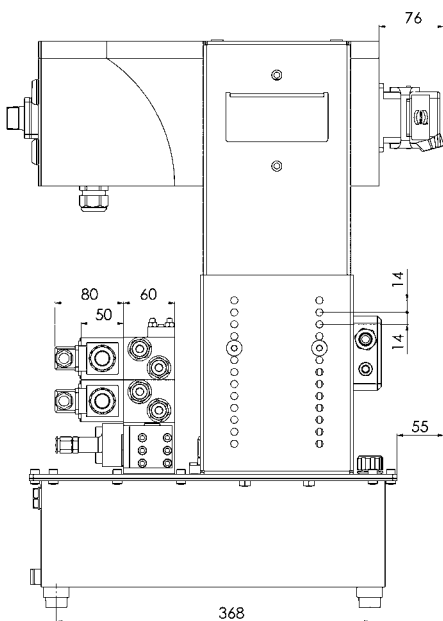
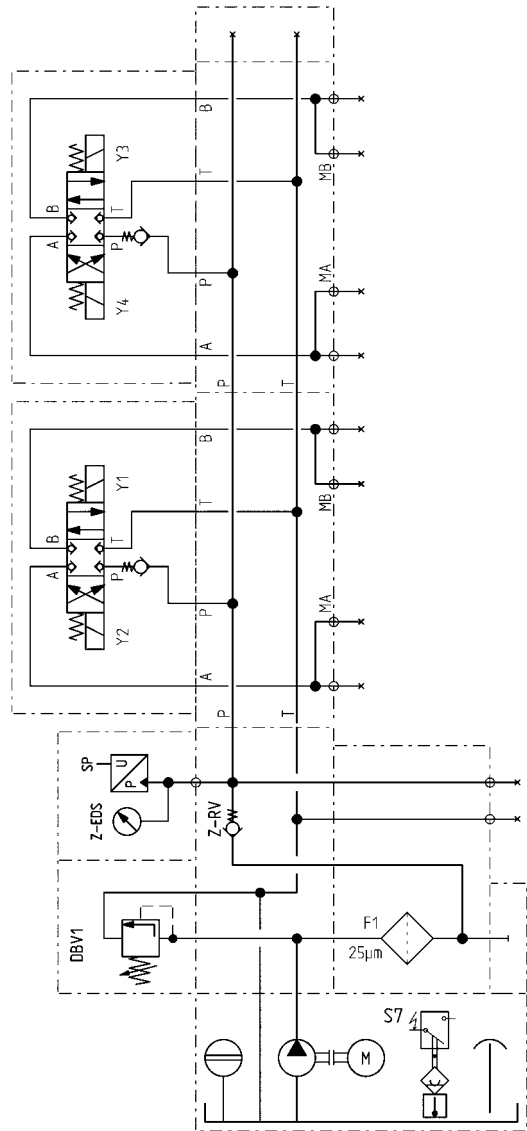


Hydraulic diagrams with DBV and EDS

1 Clamping circuit, double-acting



2 Clamping circuits, double-acting



M8 thread for lifting devices

Subject to technical alterations.



No. 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	●	160	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:

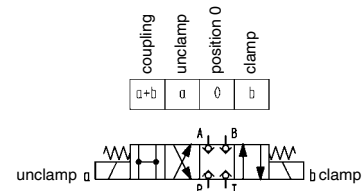
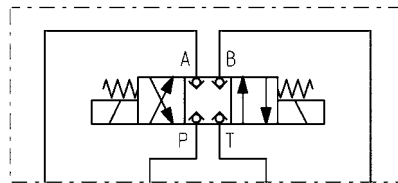
Ensure correct bleeding when connecting elements. In the event of a loss of pressure, subsequent pumping must not exceed a maximum of 2 times per minute. The pump unit must not run continuously.

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



Pump unit No. 6906N

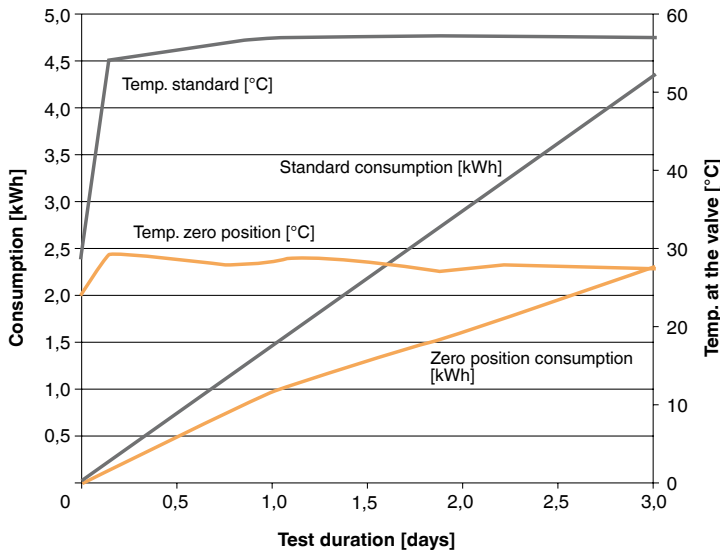
Hydraulic specifications:

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
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 51519

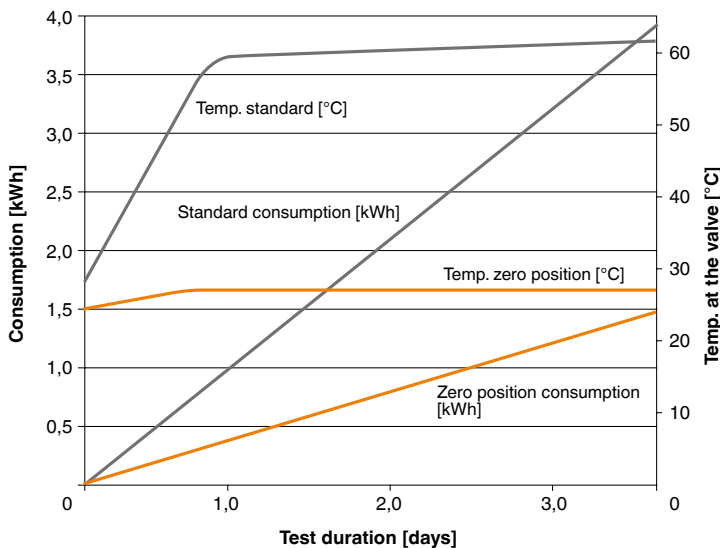
Electrical specifications:

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 mm ² 3 m with CEE connector 16 A 6
Protection class	IP 54
Duty cycle	max. 50 % intermittent operation

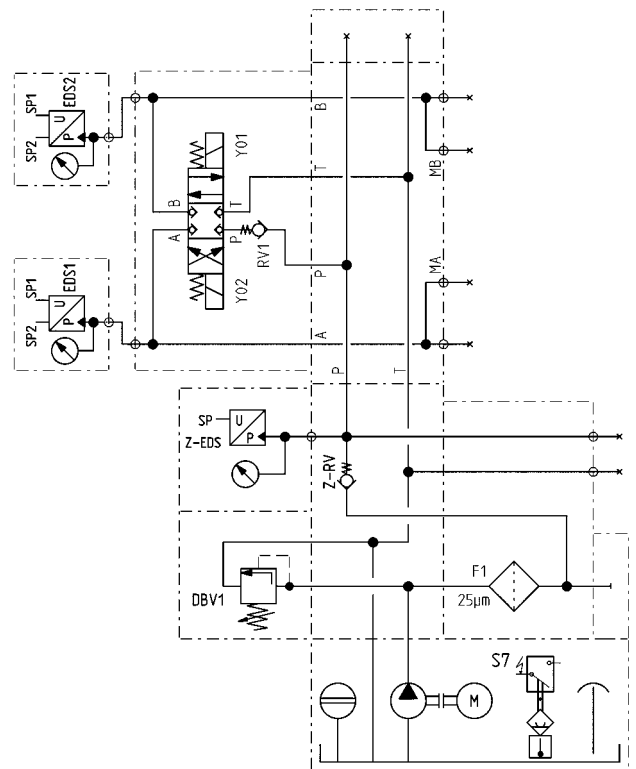
Cycle time 3 min.:



Cycle time 10 min.:



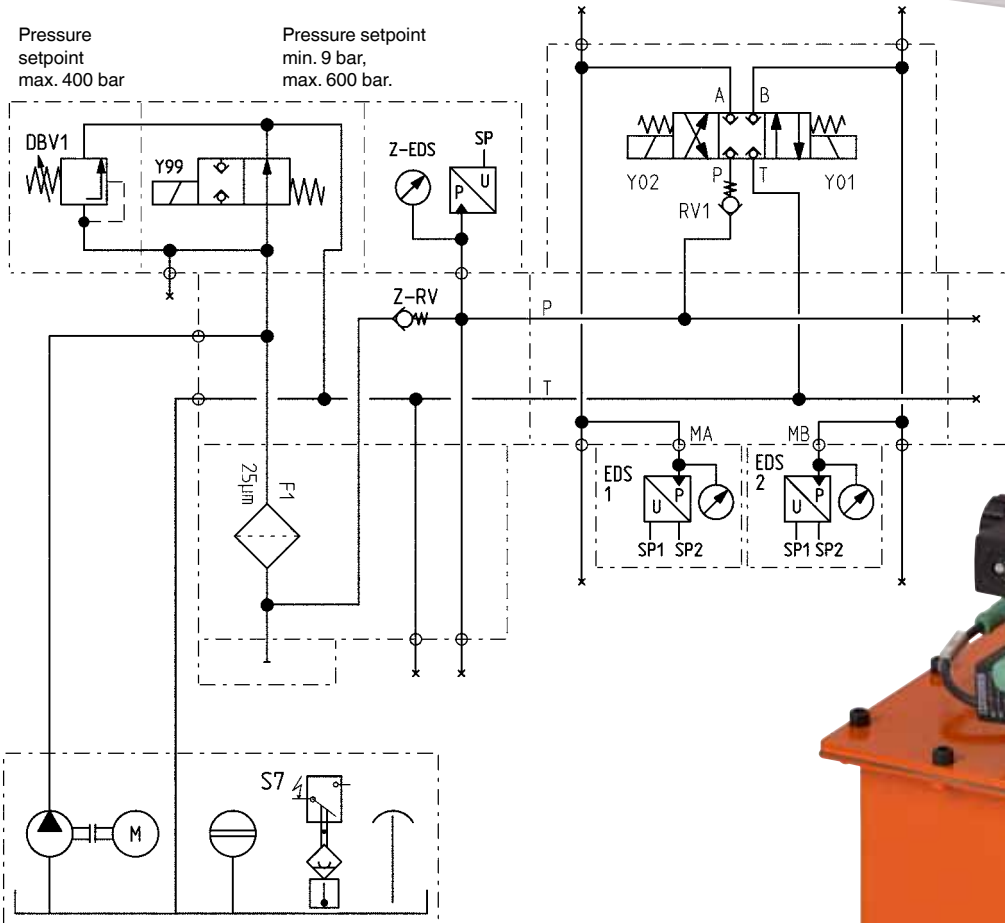
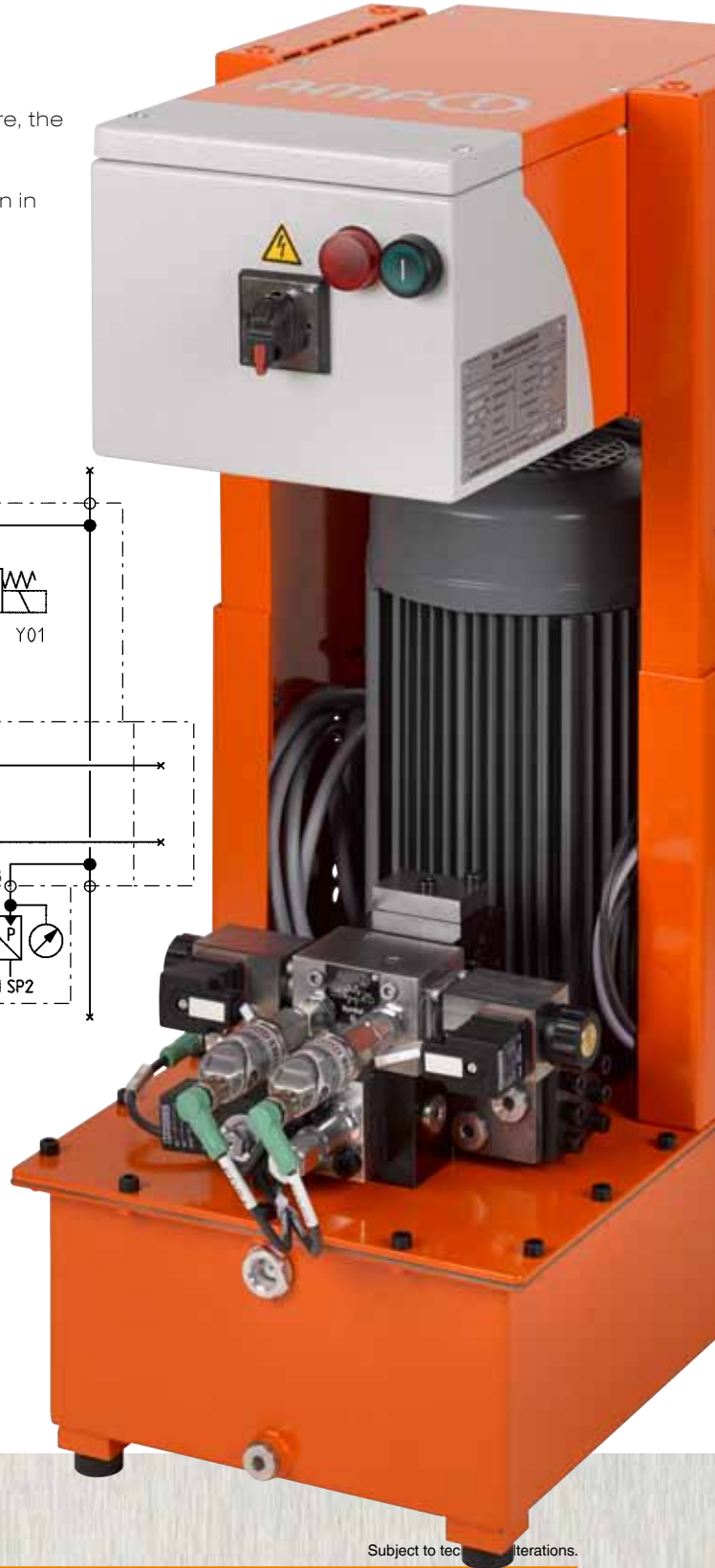
Hydraulic diagram:



6906D - PUMP UNIT FOR CONTINUOUS OPERATION (DEPRESSURIZED CIRCULATION)

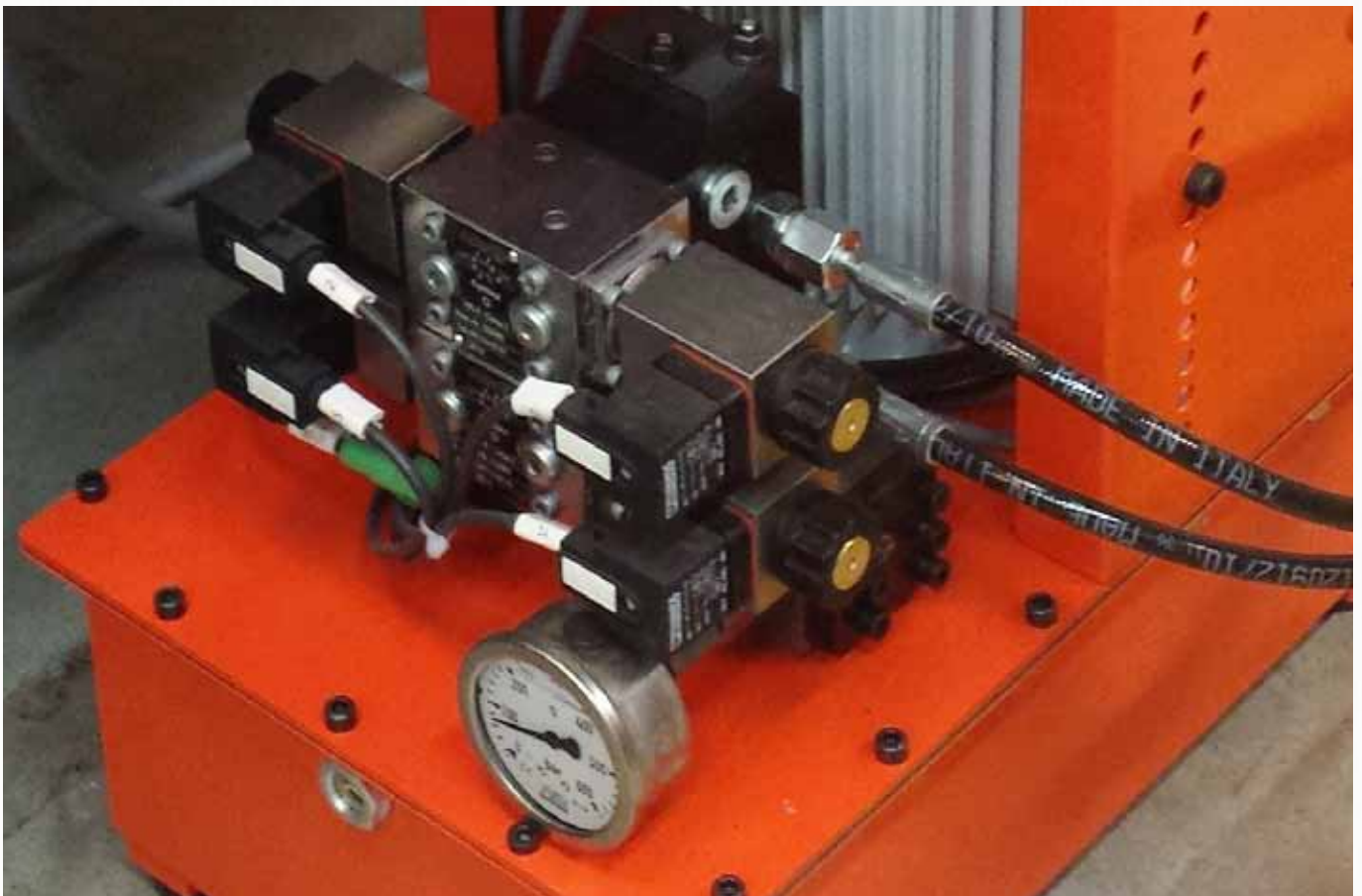
Advantages over shut-off operation:

- > Short cycle frequencies of less than 8 seconds are possible!
- > With continuous operation (depressurized circulation), the motor runs continuously at low load.
- > The pump generates only minimal pressure that approaches zero.
- > To build up the pressure, the 2/2 way seat valve (Y99) closes.
- > The 4/3 way seat valve (Y01 – Y02) is opened and actuates the load.
- > As soon as the pressure switch in the load line signals the set pressure, the 2/2 and 4/3 way seat valves return to the zero position.
- > The pressure on the load is maintained and the pump continues to run in depressurized circulation.



RPP 2.5 : Q = 2.5l/min, n = 2900 rpm
tank volume 10 dm³, P = 1.1 KW

Subject to technical iterations.



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:

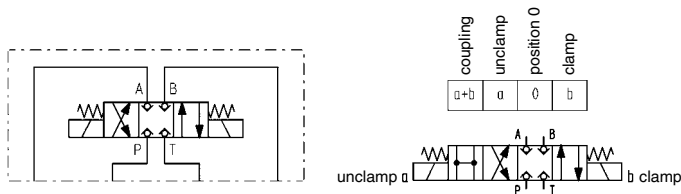
Clamping circuits: For up to 5 clamping circuits, there is an electrical controller. For more than 5 clamping circuits, there is no electrical controller.
Valve combination: Pressure reduction and clamping pressure monitoring in certain clamping circuits. Pressure reduction for all subsequent clamping 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.

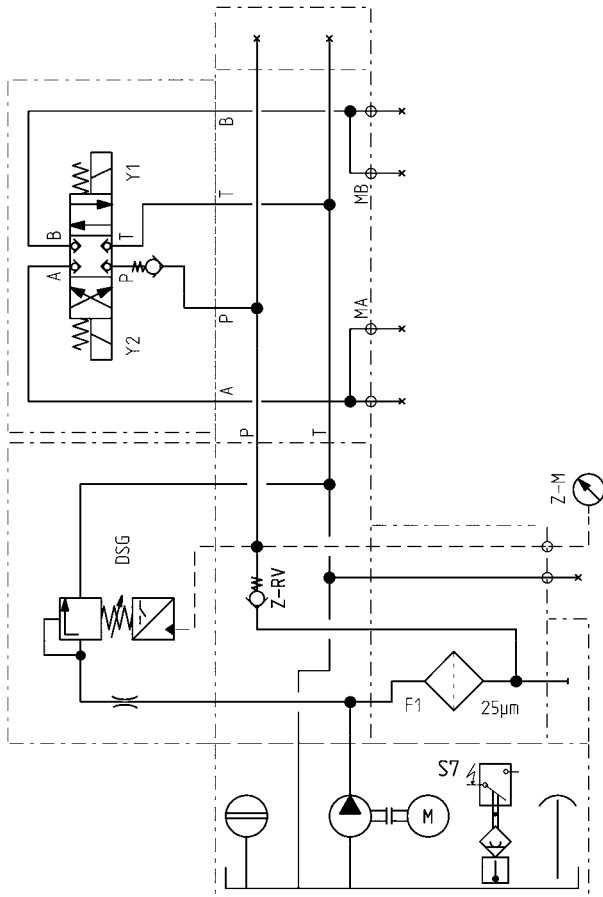


4/3-directional seat valve for single and double-acting consumers

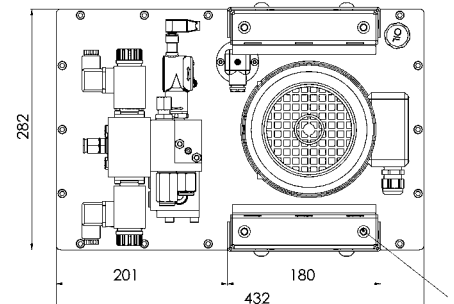
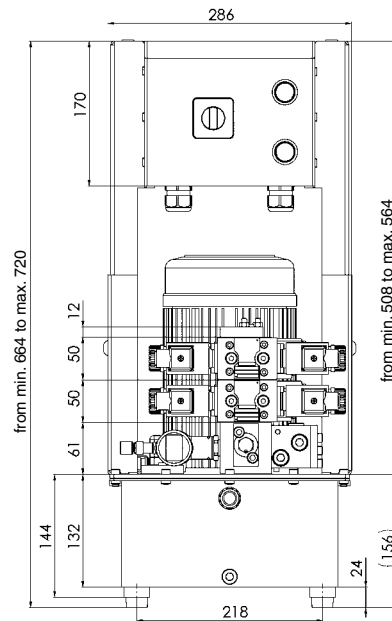
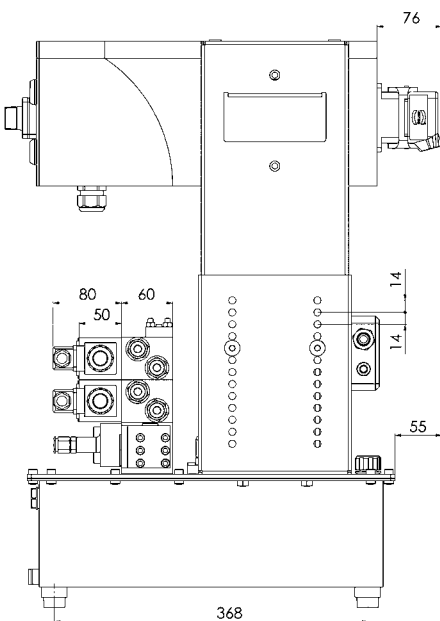
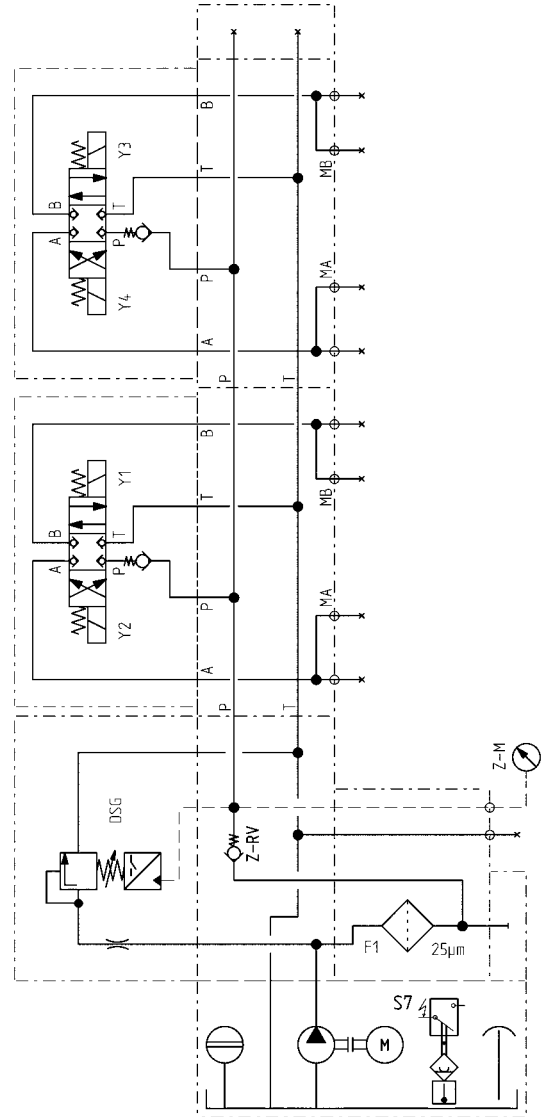


Hydraulic diagrams with DSG

1 Clamping circuit, double-acting



2 Clamping circuit, double-acting



M8 thread for lifting devices

Subject to technical alterations.

No. 6906 pump unit, 1 and 2 clamping circuits

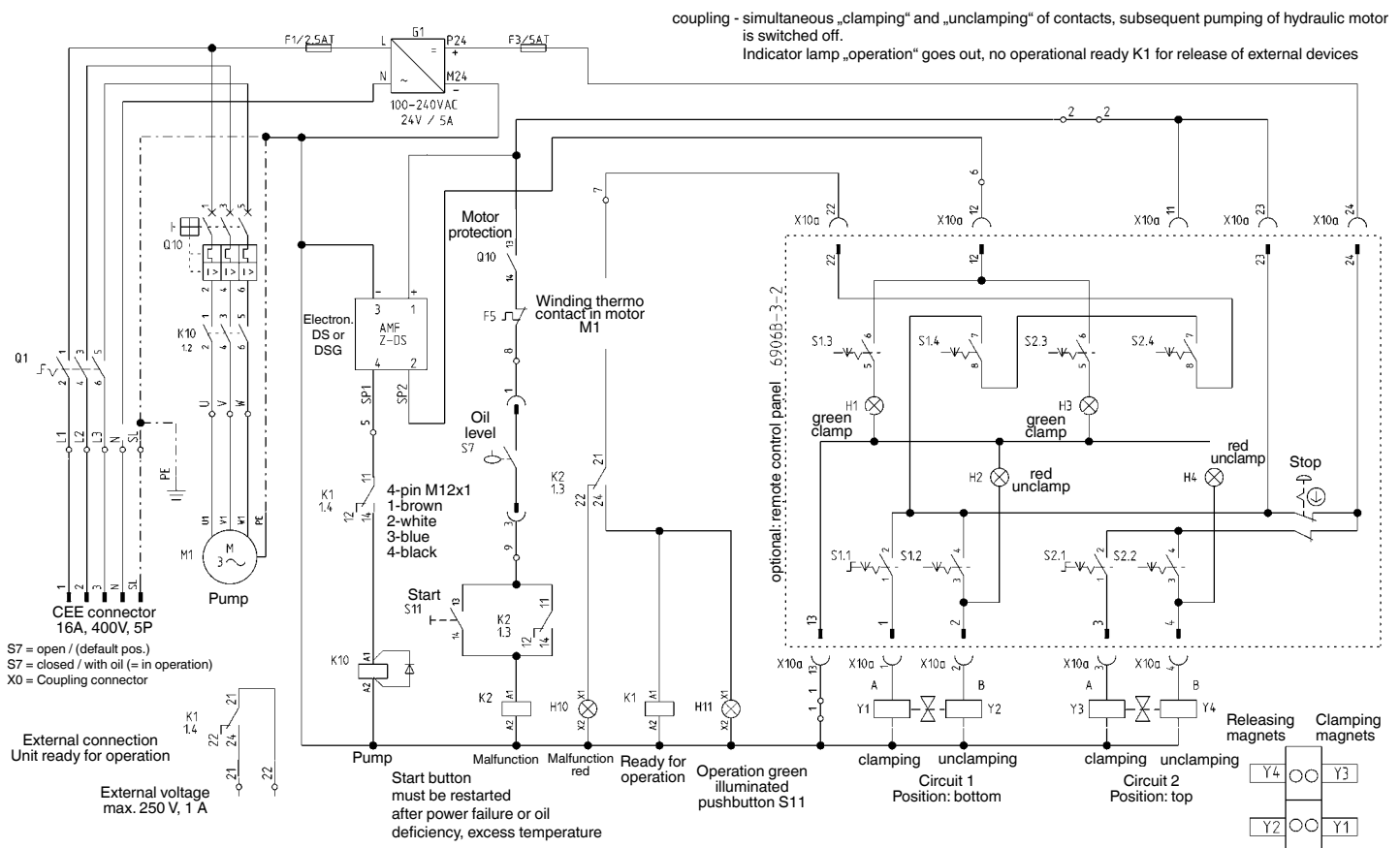
Hydraulic specifications:

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 51519

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 mm ² 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



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.

MODULAR PUMP UNIT NO. 6906

OPTIONS:

Tank volume: 10.0 litres

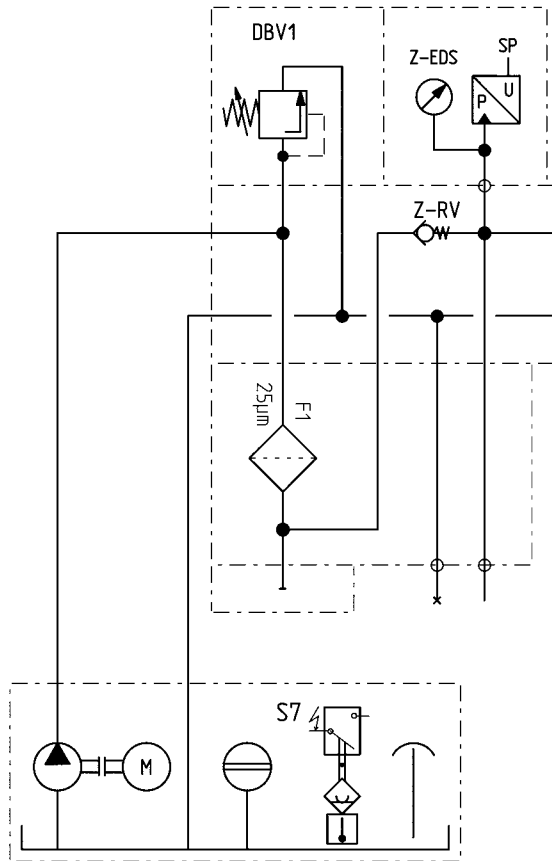
Oil capacity, usable: 4.0 litres

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 dm³, P = 1.1 kW

BASE UNIT



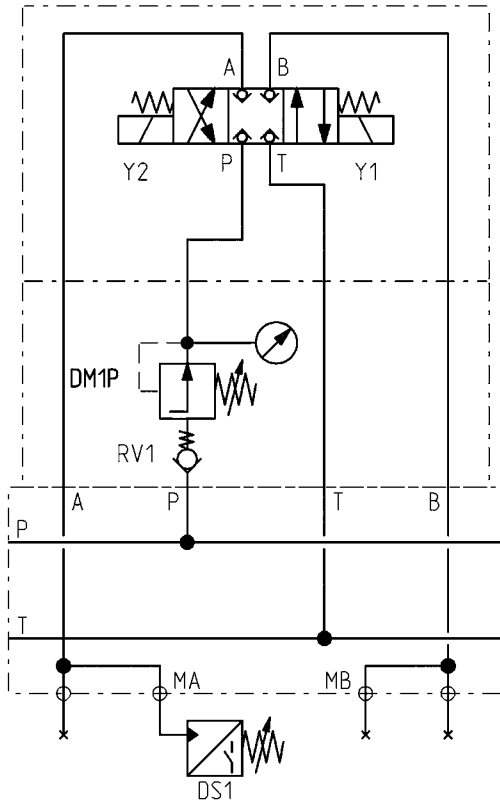
... WITH VALVES



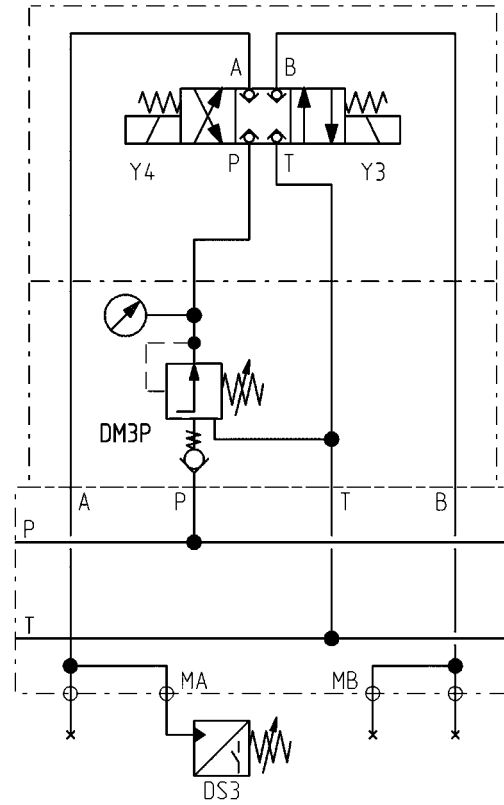
... WITH VALVES AND CONTROLLER



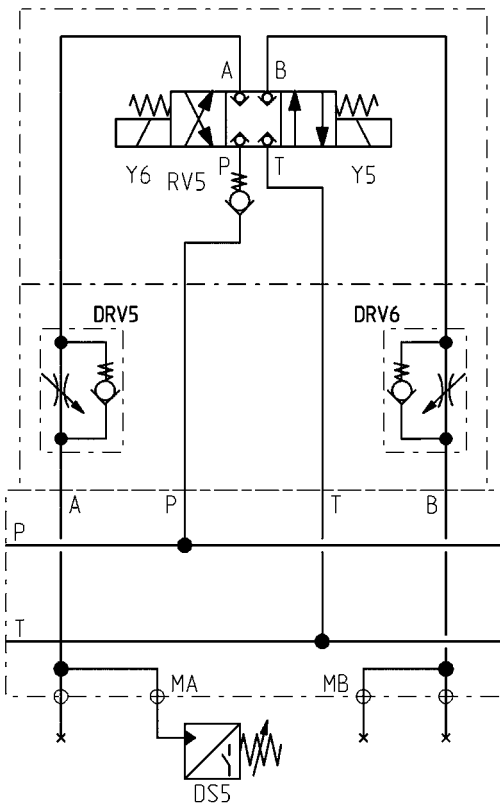
Spacer plates - pressure-control valve
Control function in P



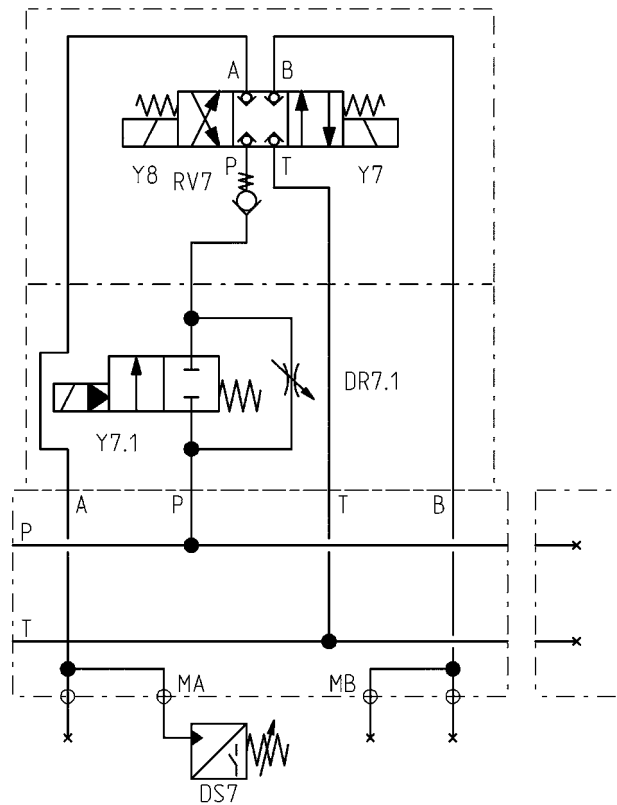
Spacer plates - 3-way pressure-control valve
Control function in P



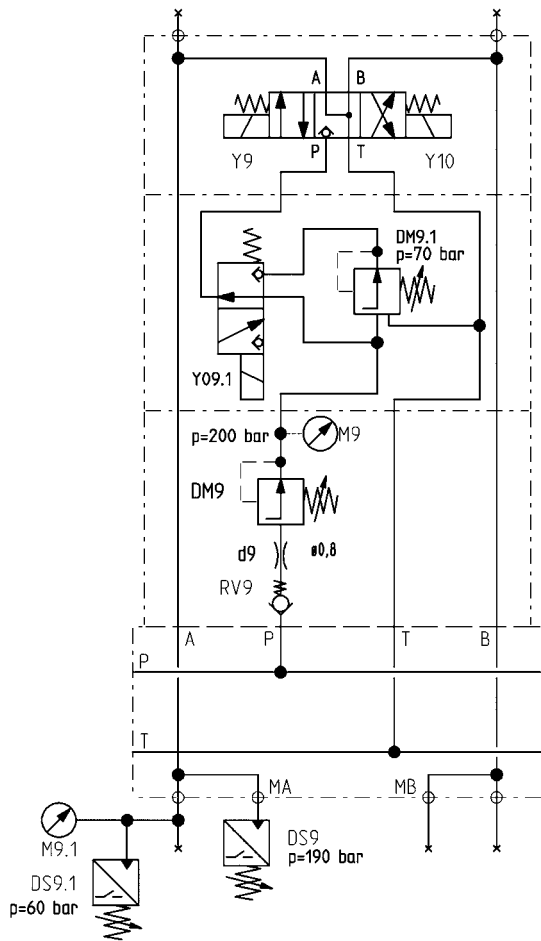
Spacer plates - twin-type
throttle check valve



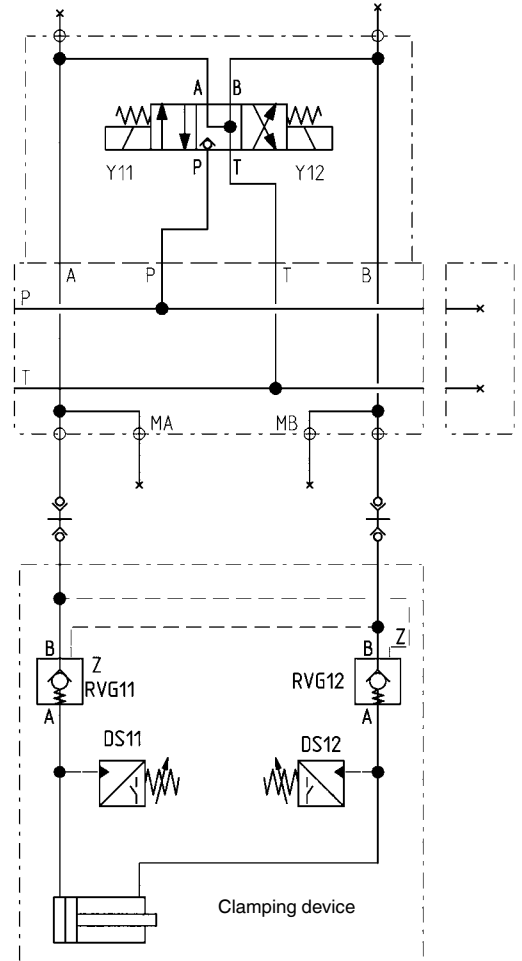
Spacer plate with connectable throttle
Function in P



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.

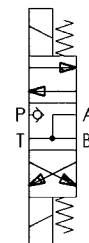
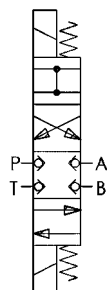
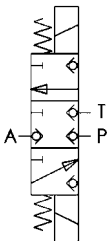


SPECIAL VALVES AVAILABLE ON REQUEST

NO. 6910A-07-02

NO. 6911A-07-01

NO. 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 and temperature.

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 and temperature.

No. 6906BS-4

Surface-mounted housing

with bush



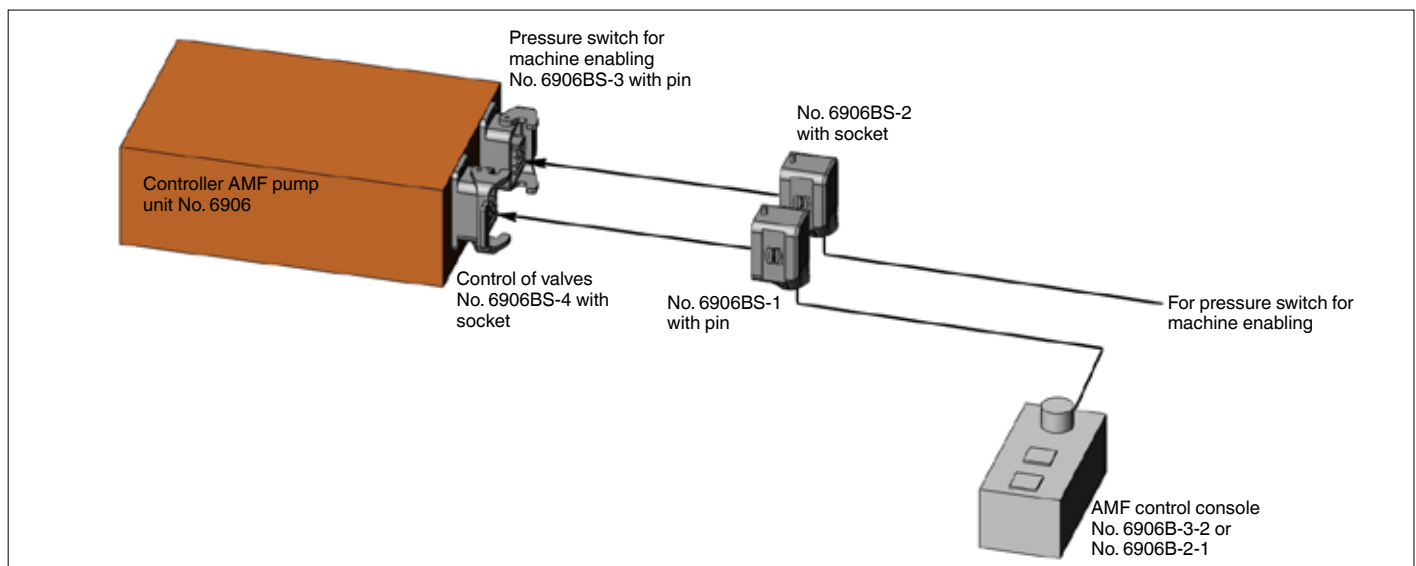
Order no.	Article no.	Control voltage	Number of poles	Weight [g]
66126	6906BS-4	24 V =	24	145

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.

No. 6906B-2-1

1-circuit remote control (rotary switch)

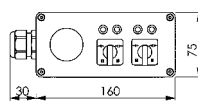
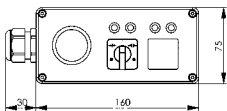
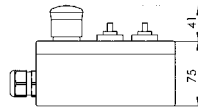
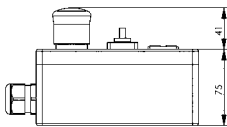
No. 6906B-3-2

2-circuit remote control (rotary switch)



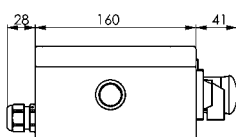
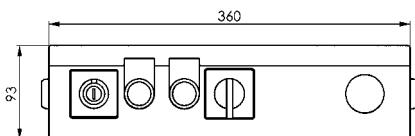
No. 6906B-2-1

No. 6906B-3-2



No. 6906BZH-2

Two-hand safety operator panel



Order no.	Article no.	Control voltage	Number of poles	Cable length	Weight
				[m]	[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 blocking 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.

Order no.	Article no.	Control voltage	Cable length	Weight
			[m]	[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 control panel function:

- 4/3-way directional seat valve with hermetically sealed zero position.

Alternatively, the combination of a 4/3-way valve where, in the zero position, A, B and T are connected and P is disabled, with at least one controlled non-return valve for the potentially-hazardous consumer line, or a controlled twin non-return 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.

Assembly:

Insert cable with plug into the connection for the remote control of the pump unit. Set the pressure switch to operate at about 75% of the pressure in the clamping circuit.

Operation:

Key switch for switching on and for switching over 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.

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
6921S	45,5 - 63,2	45,5 - 63,2	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

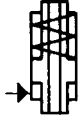


- > Clamping force: 20 - 53 kN
- > Cylinder housing: without external thread

No. 6920

Hollow Rod Cylinder

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



Order no.	Article no.	push-pull force at 100 bar [kN]	push-pull force at 400 bar [kN]	Stroke H [mm]	Vol. [cm ³]	effective piston area [cm ²]	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:

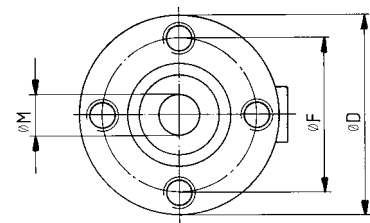
Completely sealed against contamination and chips by means of sinter metal breather and two wipers. Piston can be moved to its end stop. Oil connection at both ends, thus easy lining up in series.

Note:

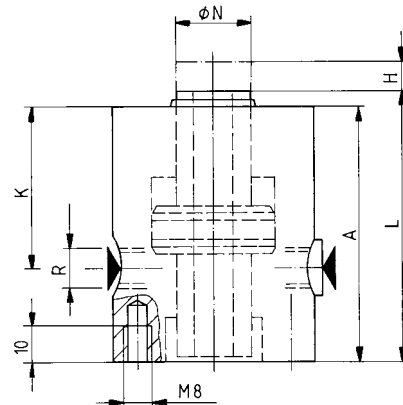
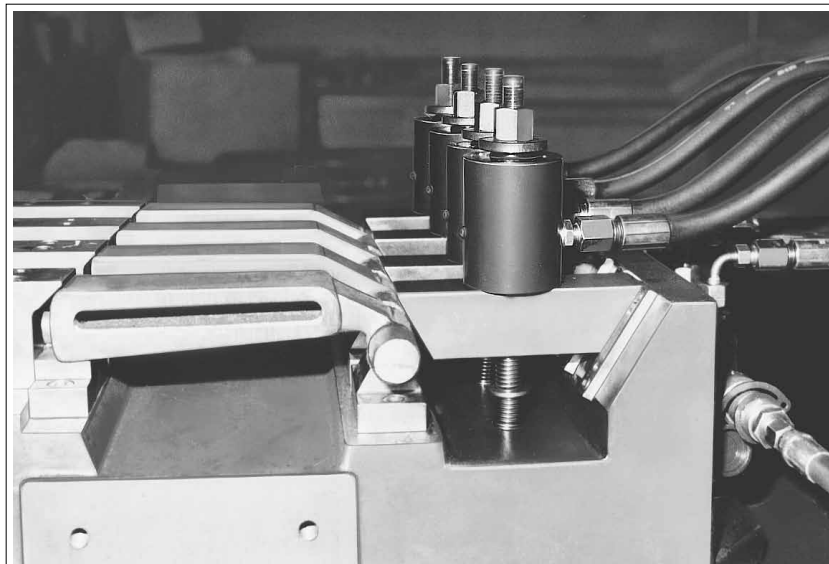
Cylinders are designed for use in combination with tempered bolts, material grade 8.8, e. g. DIN 787 and DIN 6379. Bolts matching the hole are recommended. For single acting cylinders there is risk of sucking in coolant during the return stroke. In this case the cylinders have to be protected against 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-piston cylinder no. 6920-50 in milling device for link lever.



Subject to technical alterations.

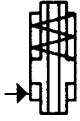
No. 6920G

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. [cm ³]	effective piston area [cm ²]	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:

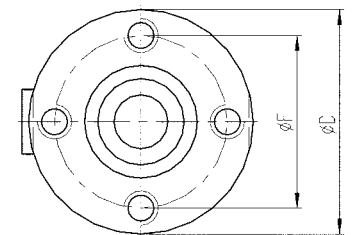
Completely sealed against contamination and chips by means of sinter metal breather and two wipers. Piston can be moved to its end stop. Oil connection at both ends, thus easy lining up in series.

Note:

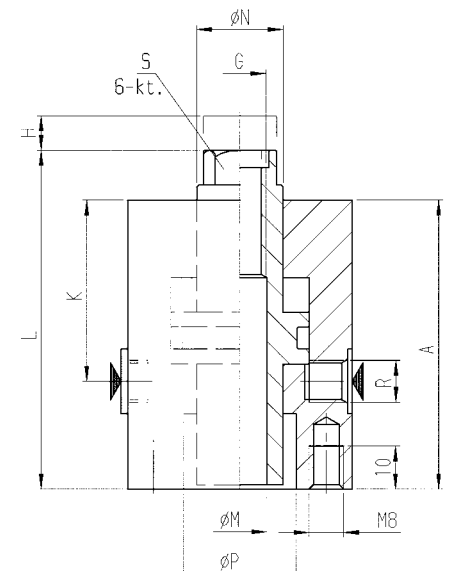
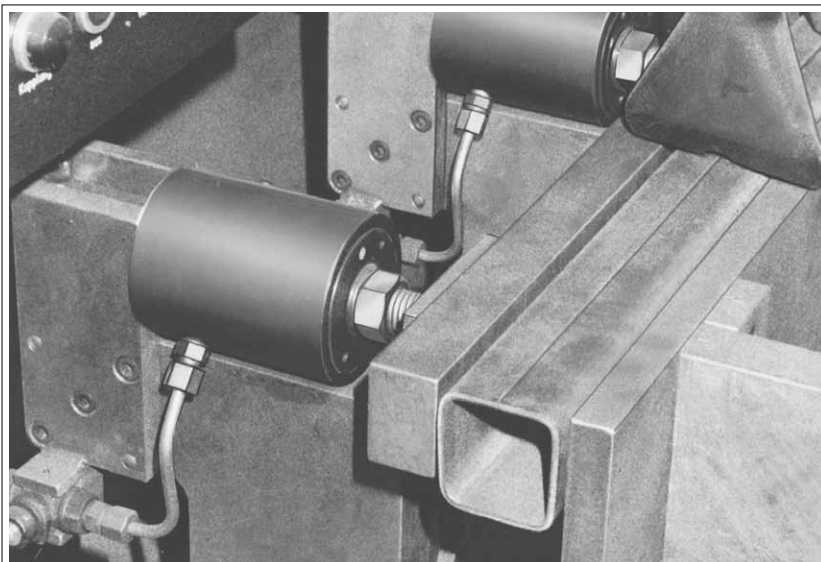
Cylinder size 20 to 50 are designed for use in combination with tempered bolts, material grade 8.8. For size 80 and 125 bolts of material grade 12.9 must be used. For single acting cylinders there is risk of sucking in coolant during the return stroke. In this case the cylinders have to be protected 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-piston cylinder no. 6920G-125 in powder welding system for clamping of U-profile panels.

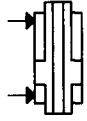


Subject to technical alterations.

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 [cm ³]	Vol. RH [cm ³]	effektive piston area VH [cm ²]	effektive piston area RH [cm ²]	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:

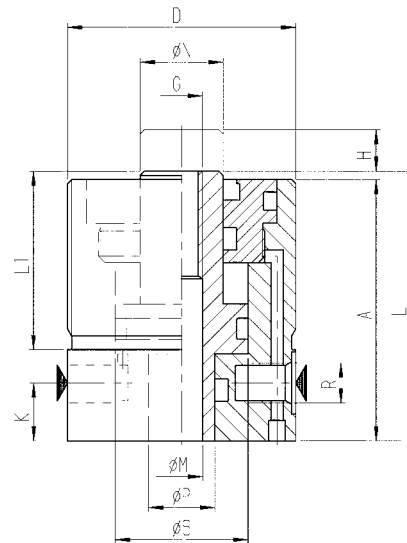
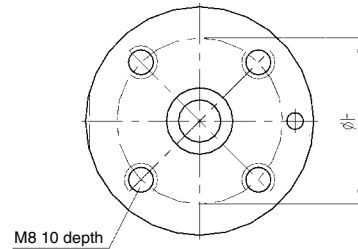
Cylinder barrel from steel, burnished. Piston case hardened and ground. Piston rod is supplied as standard with HC threads. If a piston rod with internal thread is desired, a HELI-COIL insert (diameter x1.5) is screwed into the HC thread. Oil supply via threaded port.

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:

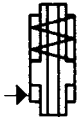
The HELI-COIL thread insert can be installed using a manual or automatic installation tool. The driving pin is used only for installation, and must subsequently be removed using a special pin-breaker. Without the HELI-COIL insert the piston through-hole has the value of the gap ØM (see dimensions table).

Subject to technical alterations.

No. 6921

Hollow Rod Cylinder

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



Order no.	Article no.	push-pull force at 100 bar [kN]	push-pull force at 400 bar [kN]	Stroke H [mm]	Vol. [cm ³]	effective piston area [cm ²]	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:

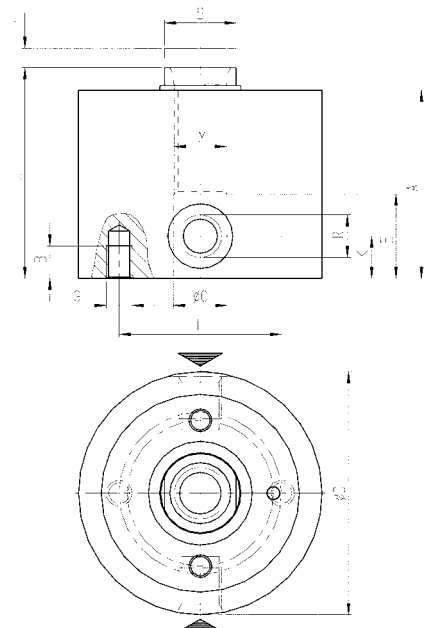
Protected against contamination and chips by a wiper. High forces in a small design.

Note:

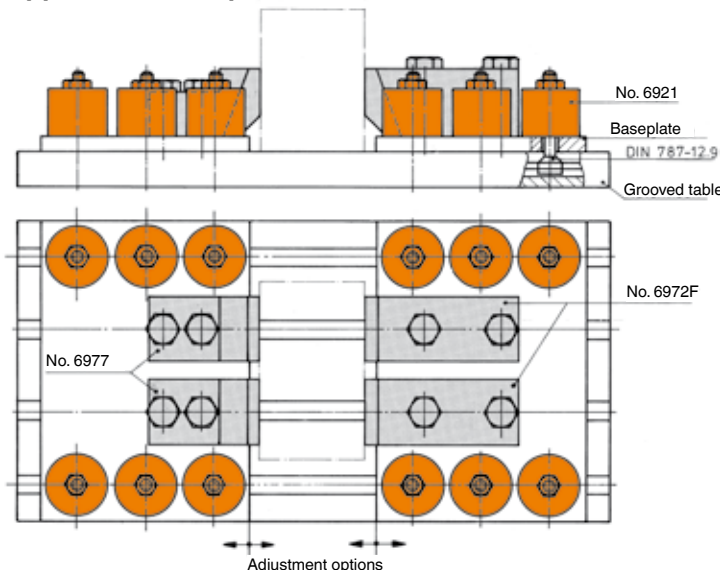
For single acting cylinders there is risk of sucking in coolant during the return stroke. In this case the cylinders have to be protected against the direct effect of coolant. The built in sinter metal breather should be protected.

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

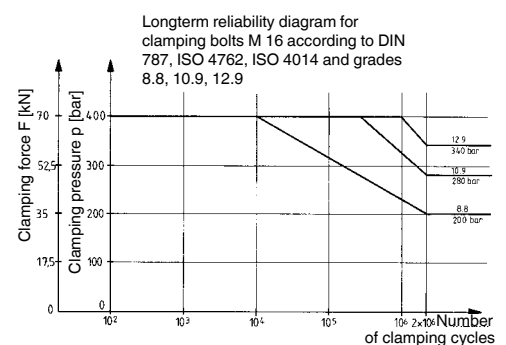


Application example:



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.



Order no.	Article no.	push-pull force VH 100 bar [kN]	push-pull force VH 350 bar [kN]	Stroke B [mm]	Vol. [cm ³]	effective piston area [cm ²]	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:

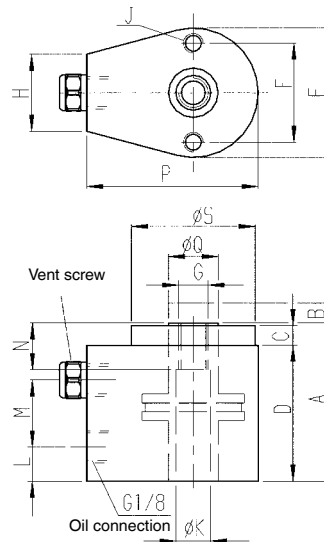
Particularly suitable to retrofit existing mechanical fixtures for hydraulic actuation. The hollow cylinder can be operated as push or pull cylinder. Universal cylinder for clamping, pushing, locking and punching.

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 sucking 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:

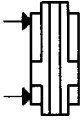
Order no.	Article no.	A	C	D	E	F	G	H	J x depth	dia. K	L	M	N	P	dia. Q	dia. S
67850	6935-20	51,0	7,0	43,5	41,5	32	M10	28,5	M6x6	10,5	12	20,5	15	55	16,0	39,5
67876	6935-30	63,5	7,0	56,5	49,5	36	M12	24,5	M8x8	13,5	18	25,5	15	62	19,0	47,5
67892	6935-53	76,0	9,5	66,0	64,5	50	M16	25,0	M10x13	16,5	23	30,0	18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

Subject to technical alterations.

No. 6935D

Hollow Rod Cylinder with internal thread

Double-acting,
max. operating pressure 350 bar.



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]	Stroke 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:

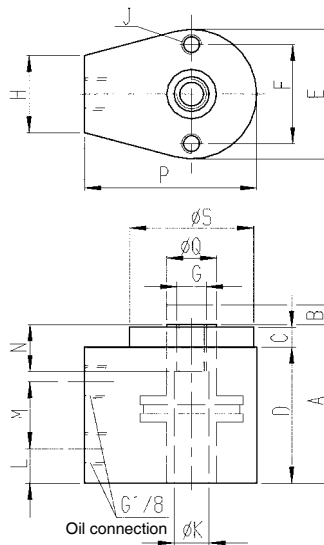
Particularly suitable to retrofit existing mechanical fixtures for hydraulic actuation. The hollow cylinder can be operated as push or pull cylinder. Universal cylinder for clamping, pushing, locking and punching.

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 sucking 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.

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

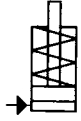


- > Clamping force: 17,8 - 39,9 kN
- > Cylinder housing: nitrided, with fine thread

No. 6924

Built-In Cylinder

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



Order no.	Article no.	Push force at 100 bar [kN]	Push force at 400 bar [kN]	Stroke H [mm]	Vol. [cm ³]	Piston dia. [mm]	Piston area [cm ²]	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:

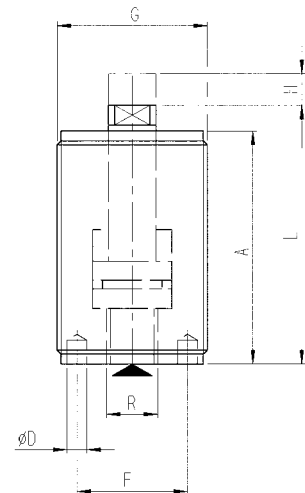
Suitable for converting mechanical to hydraulic clamping devices. The built-in cylinder is inserted in through holes and counter screwed at both ends with grooved nuts. General-purpose clamping element for clamping, pushing, pressing, riveting and punching.

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 required by two flange nuts. Fast attachment of fixture elements and thrust pieces the piston thread.

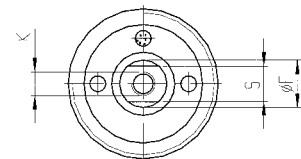
Note:

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



No. 6925

Built-In Cylinder

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



CAD



No. 6925-04



No. 6925-10

Order no.	Article no.	Push force at 100 bar [kN]	Push force at 350 bar [kN]	Stroke C [mm]	Vol. [cm ³]	Piston area [cm ²]	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:

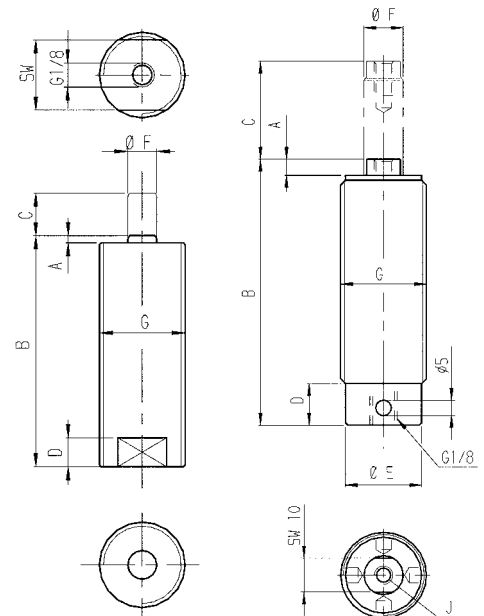
Cylinder barrel from steel, hardened and burnished. Piston and piston rod case hardened and ground. Piston rod with internal thread. Wiper at piston rod. Cylinder barrel with metric fine thread for locknut to DIN 70852. Return spring from stainless steel. Oil supply via threaded port.

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.



No. 6925-04

No. 6925-10

Dimensions:

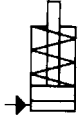
Order no.	Article no.	A	B	D	dia. E	dia. F	G	J x depth	SW
67975	6925-04-1	1,5	51,0	6,5	-	6,5	M20x1,5	-	16
67991	6925-04-2	1,5	65,5	6,5	-	6,5	M20x1,5	-	16
68015	6925-04-3	1,5	83,0	6,5	-	6,5	M20x1,5	-	16
68031	6925-10-1	6,5	55,5	12,5	24,5	12,5	M28x1,5	M6x11	-
67801	6925-10-2	6,5	68,5	12,5	24,5	12,5	M28x1,5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



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:

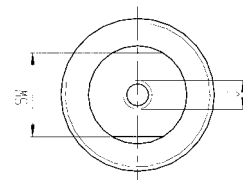
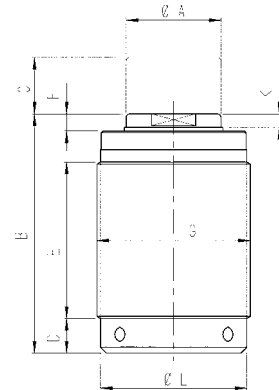
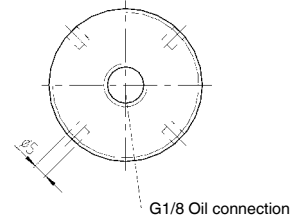
Suitable to convert mechanical fixtures into hydraulic operated. The built-in cylinder can easily be mounted and adjusted into fixture walls by flange nuts. Universal cylinder for clamping, pushing, locking, rivetting and punching.

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.

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 [cm ³]	Vol. RH [cm ³]	Piston area VH [cm ²]	Piston area RH [cm ²]	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:

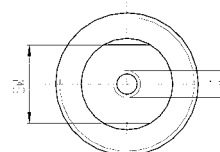
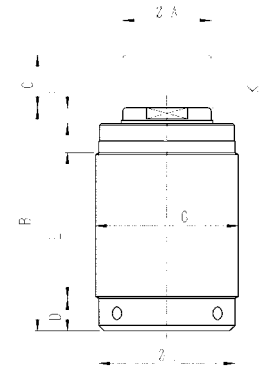
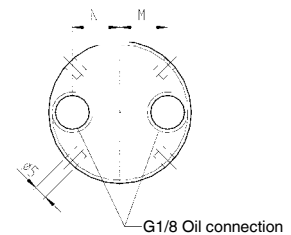
Suitable to convert mechanical fixtures into hydraulic operated. The built-in cylinder can easily be mounted and adjusted into fixture walls by flange nuts. Universal cylinder for clamping, pushing, locking, rivetting and punching.

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



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

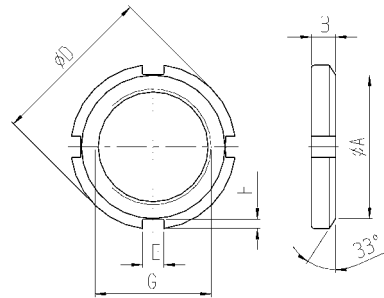
* not to DIN

Design:

Steel, zinc-plated.

Application:

The flange nuts hold cylinders in the required position.



Subject to technical alterations.

THREADED CYLINDERS - SPACE-SAVING 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

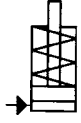
No. 6929-03

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. [cm ³]	Stroke H [mm]	Piston dia. [mm]	Piston area [cm ²]	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:

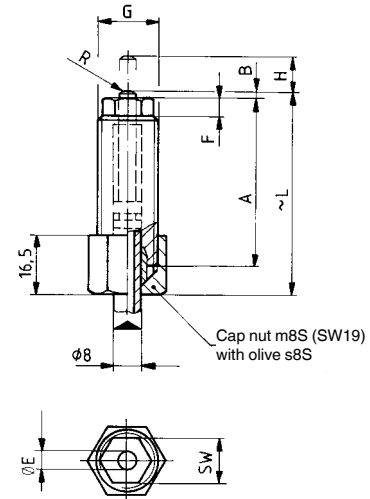
Hoses or tubes can be directly screwed onto the threaded cylinders.

Note:

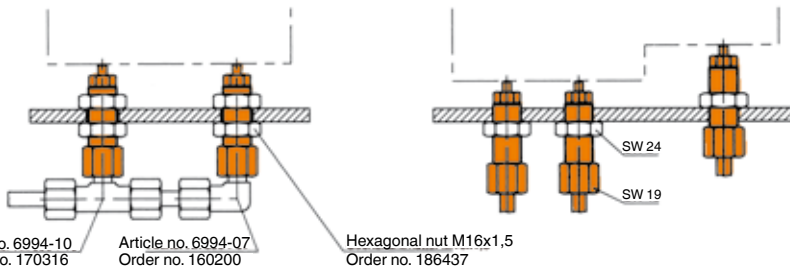
Pistons of these cylinders must not be loaded in retracted position. Care for protection against aggressive lubricants and coolants. As the cylinder has no stop for the tube, the preassembly of the cutting ring has to be effected by means of a hardened pre-mounting tool. Due to the construction size, 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



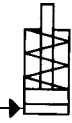
Application examples No. 6929-03:



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. [cm ³]	Piston dia. [mm]	Piston area [cm ²]	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:

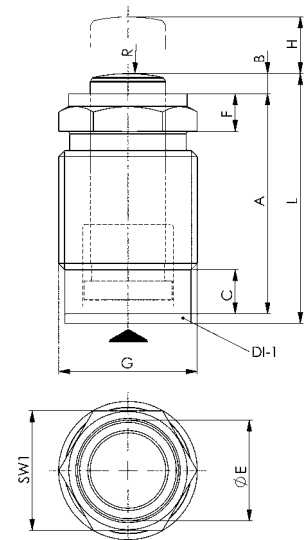
These threaded cylinders can be used in all types of clamping fixtures. Ideal for pressure bars for tolerance compensation in multiple-workpiece clamping fixtures, and for positioning, holding or ejecting, and clamping workpieces.

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:

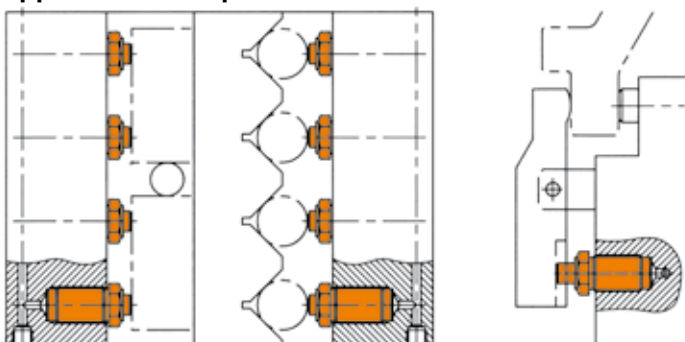
Pistons of these cylinders must not be loaded in retracted position. Care for protection against aggressive lubricants and coolants. The sealing surface of the mounting hole to the thread must be at a right angle and even. For sizes 02x05 and 02x10, a internal stop for the piston is not possible due 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.



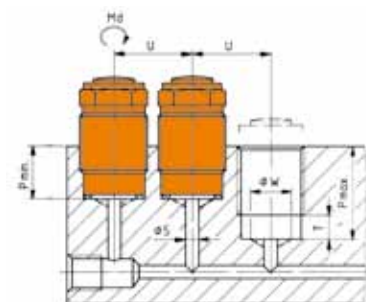
Dimensions:

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:

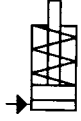


Subject to technical alterations.

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. [cm ³]	Piston dia. [mm]	Piston area [cm ²]	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:

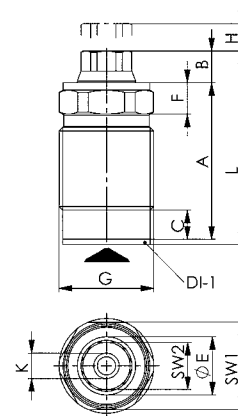
These threaded cylinders can be used in all types of clamping fixtures. Ideal for pressure bars for tolerance compensation in multiple-workpiece clamping fixtures, and for positioning, holding or ejecting, and clamping workpieces.

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:

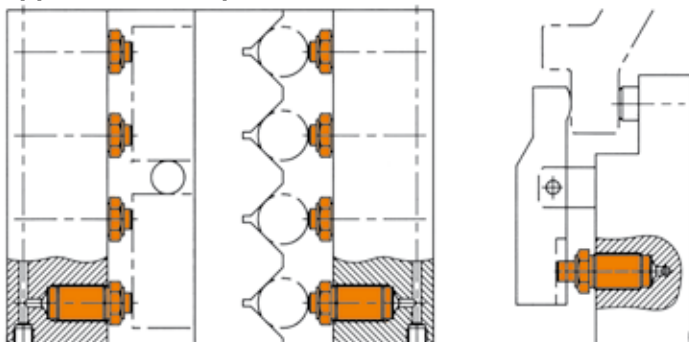
Pistons of these cylinders must not be loaded in retracted position. Care for protection against aggressive lubricants and coolants. The sealing surface of the mounting hole to the thread must be at a right angle and even.



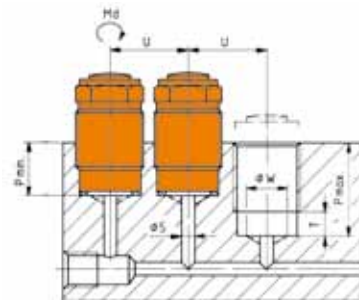
Dimensions:

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:

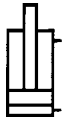


Subject to technical alterations.

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.

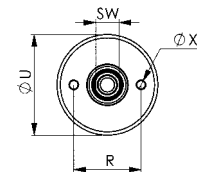
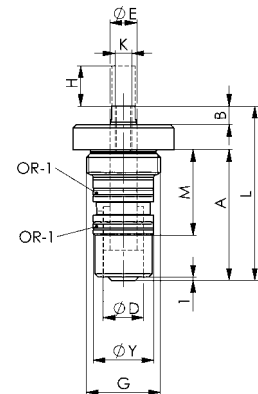
Two-piece body makes it easier to change the piston-rod seal. Housing seals against the surface of the hole sleeve. For sizes 05 and 08, there is additional sealing between the housing head and the fixture body.

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

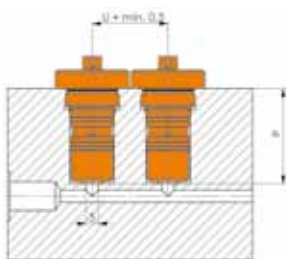
Can be supplied on request for higher pressures and temperatures.



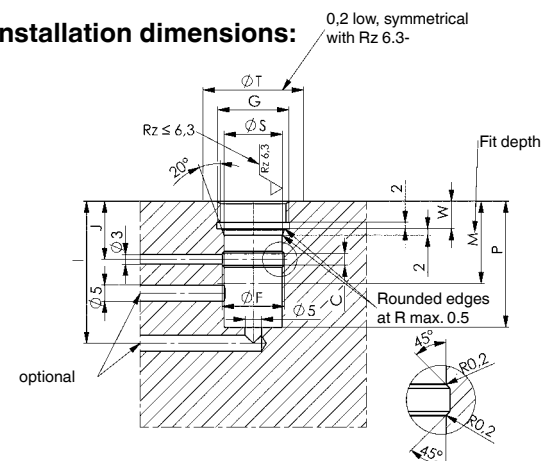
Dimensions:

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	32	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	320091
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.

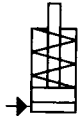
No. 6932

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. [cm ³]	Piston area [cm ²]	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:

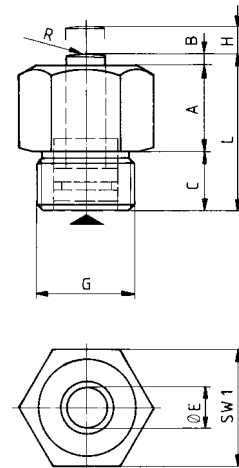
Ideal for clamping bars for tolerance compensation in multiple fixtures and for positioning, clamping or discharging workpieces.

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:

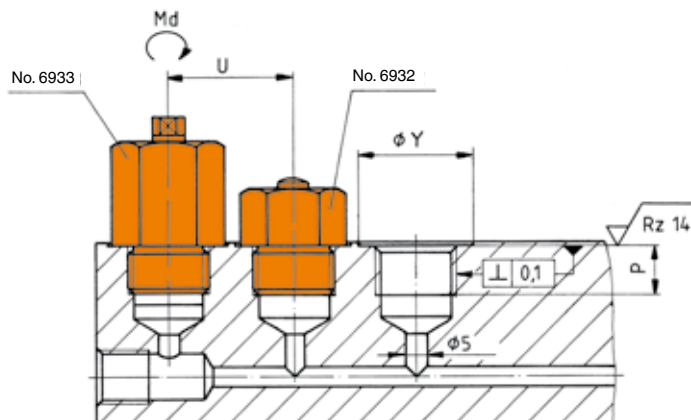
The screw-in cylinders cannot be loaded in the retracted position. For single acting cylinder types, there is a risk of sucking in liquid. The cylinders must be protected against direct penetration of cutting and cooling liquids. The built-in sintered bronze filter should be protected by appropriate 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:

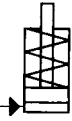


Subject to technical alterations.

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. [cm ³]	Piston dia. [mm]	Piston area [cm ²]	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:

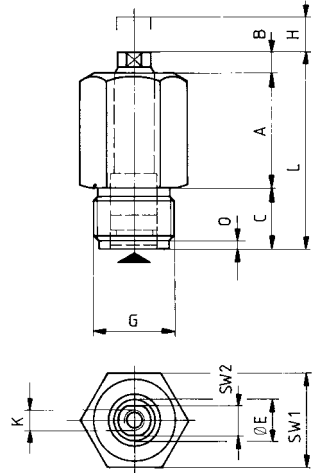
Ideal for clamping bars for tolerance compensation in multiple fixtures and for positioning, clamping or discharging workpieces.

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:

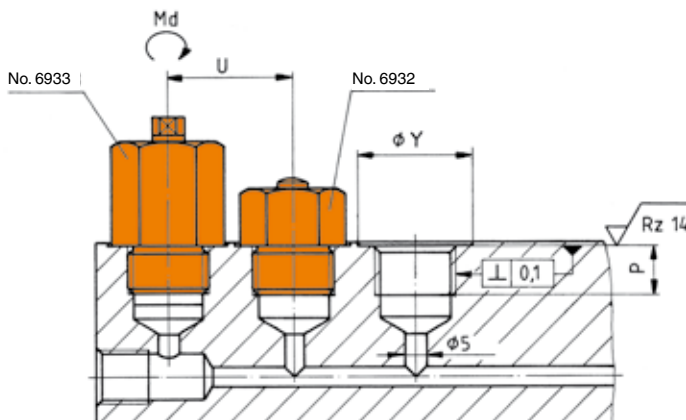
The screw-in cylinders cannot be loaded in the retracted position. For single acting cylinder types, there is a risk of sucking in liquid. The cylinders must be protected against direct penetration of cutting and cooling liquids. The built-in sintered bronze filter should be protected by appropriate 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:

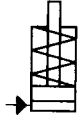


Subject to technical alterations.

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. [cm ³]	Piston area [cm ²]	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:

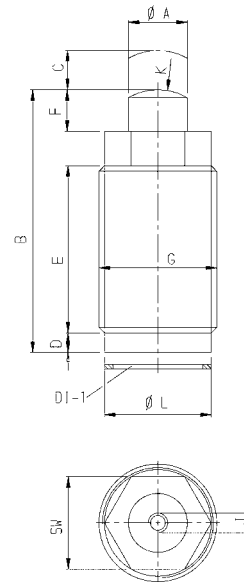
Threaded cylinders are designed for space saving installation at fixtures. Universal clamping cylinder for clamping, pushing, locking and positioning.

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.



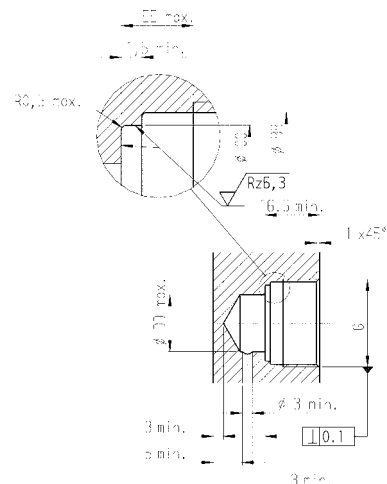
Dimensions:

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

Installation dimensions:



Subject to technical alterations.

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

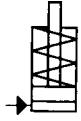
No. 6926

Block Cylinder

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



CAD



Order no.	Article no.	Push force at 100 bar	Push force at 500 bar	Stroke H [mm]	Vol. [cm ³]	Piston dia. [mm]	Piston area [cm ²]	Spring force min. [N]	Weight [g]
		[kN]	[kN]						
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:

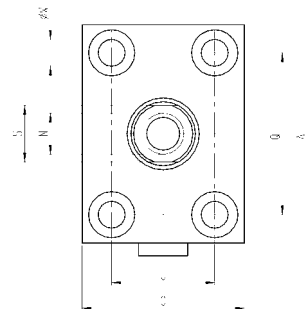
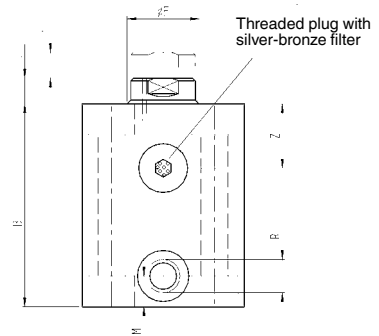
Universal mounting by means of mounting holes. Each cylinder size is available with two different strokes.

Note:

For single acting cylinders there is risk of sucking in coolant during return stroke. In this case the sinter metal breather shall be piped to a clean, protected area. Further sizes are available on request. For applications above 160 bar operating pressure, cylinders must be tenon-blocked at slot or being backed up at cylinder body. For fixing screws must be strength class 12.9. All tolerances other than specified refer to DIN ISO 2768 medium.

On request:

Special sizes are available on request.



Dimensions:

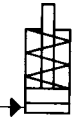
Order no.	Article no.	A	B	C	dia. E	L	M	N x depth	Q	R	S	U	dia. W	Z
63354	6926-8-001	60	56	35	10	6	11	M6x12	40	G1/4	8	22	6,5	17
63362	6926-8-002	60	91	35	10	6	11	M6x12	40	G1/4	8	22	6,5	17
63370	6926-12-001	60	61	35	14	7	11	M8x15	40	G1/4	10	22	6,5	17
63388	6926-12-002	60	95	35	14	7	11	M8x15	40	G1/4	10	22	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.

No. 6926

Block Cylinder

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



Order no.	Article no.	Push force at 100 bar	Push force at 500 bar	Stroke H	Vol.	Piston dia.	Piston area	Spring force min.	Weight
		[kN]	[kN]	[mm]	[cm ³]	[mm]	[cm ²]	[N]	[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.

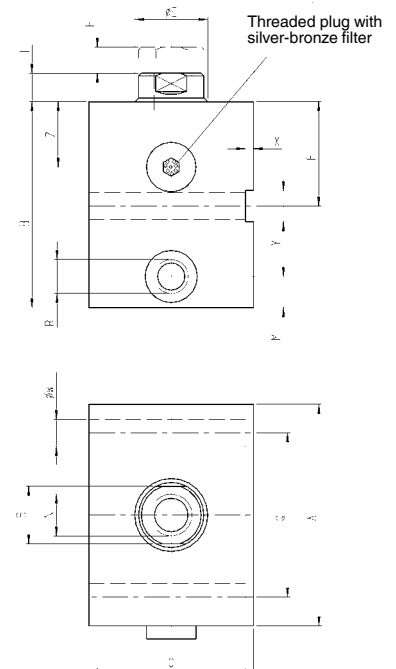
Note:

For single acting cylinders there is risk of sucking in coolant during 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. For fixing screws must be strength class 12.9.

All tolerances other than specified refer 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

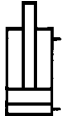
Subject to technical alterations.

No. 6926D



Block Cylinder

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



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.

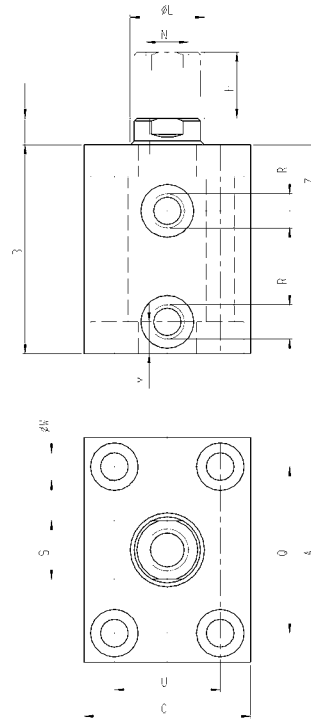
Note:

For applications above 160 bar operating pressure, cylinders must be tenon-blocked at slot or being backed up at cylinder body. For fixing screws must be strength class 12.9. All tolerances other than specified refer 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	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



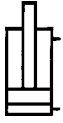
Subject to technical alterations.

No. 6926D



Block Cylinder

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



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:

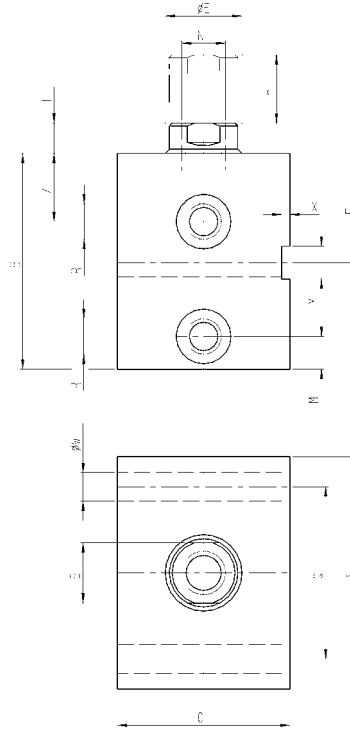
Universal mounting to fixtures through fastening holes. Each cylinder size is available with three different strokes.

Note:

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 body. For fixing screws must be strength class 12.9. All tolerances other than specified refer 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
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.

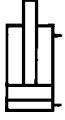
No. 6926D



CAD

Block cylinder with O-ring connection on 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]
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.

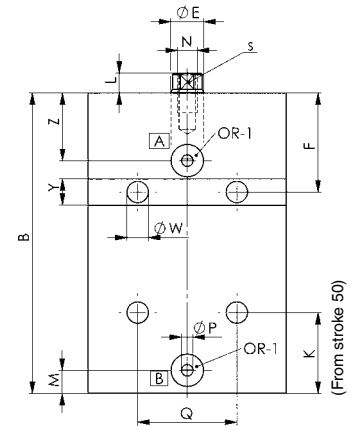
Each cylinder size is available with three different strokes.

Note:

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 body. For fixing screws must be strength class 12.9. All tolerances other than specified refer to DIN ISO 2768 medium.

On request:

Special sizes are available on request.



A = Pull
B = Pressure

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



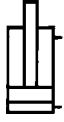
Subject to technical alterations.

No. 6926D



Block cylinder with O-ring connection on base

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



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:

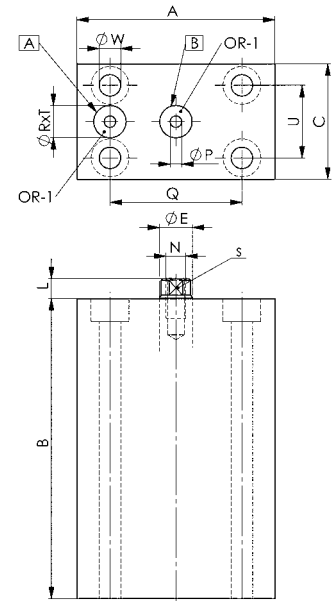
Universal mounting to fixtures through fastening holes.
Each cylinder size is available with three different strokes.

Note:

For fixing screws must be strength class 12.9. All tolerances other than specified refer to DIN ISO 2768 medium.

On request:

Special sizes are available on request.



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



Subject to technical alterations.

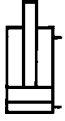
No. 6926D



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.

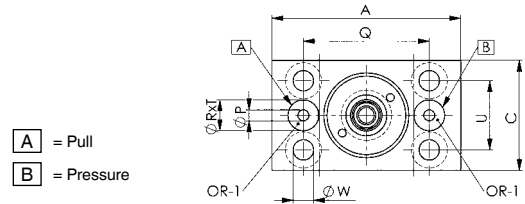
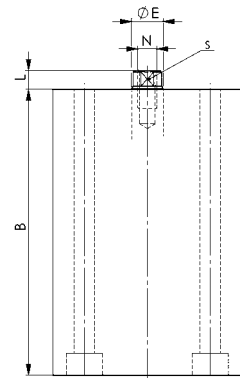
Each cylinder size is available with three different strokes.

Note:

For fixing screws must be strength class 12.9. All tolerances other than specified refer to DIN ISO 2768 medium.

On request:

Special sizes are available on request.



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

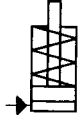


Subject to technical alterations.

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]	Stroke B [mm]	Vol. [cm ³]	Piston area [cm ²]	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:

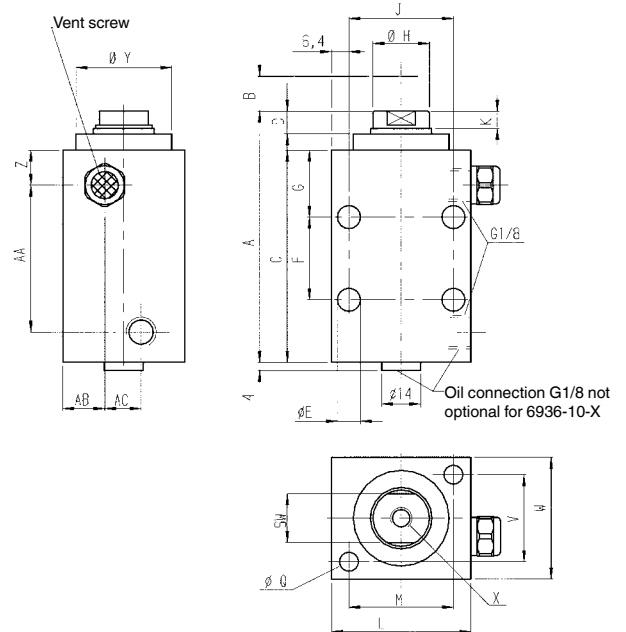
Universal mounting. Universal block cylinder for e.g. clamping, pushing, locking, rivetting.

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 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. For applications above 160 bar operating pressure, cylinders must be tenon-blocked at slot or being backed up at cylinder body. For fixing screws must be strength class 12.9.



Dimensions:

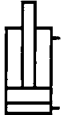
Order no.	Article no.	A	C	D	dia. E	F	G	dia. H	J	K	L	M	dia. Q	SW	V	W	X x depth	dia. Y	Z	AA	AB	AC
68023	6936-10-1	60,0	46,5	7,5	7	-	23,5	12,2	33,5	5,5	51,0	33,5	7	11	16,0	28,5	M6x11	27,0	9,5	28,0	9,5	-
68049	6936-10-2	79,0	66,0	7,5	7	-	23,5	12,2	33,5	5,5	51,0	33,5	7	11	16,0	28,5	M6x11	27,0	9,5	47,0	9,5	-
68056	6936-18-1	71,0	57,0	8,0	9	-	26,5	20,1	38,0	6,5	51,0	38,0	7	17	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	7	17	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	7	17	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	9	25	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	9	25	35,5	51,0	M12x13	44,5	12,5	41,0	8,0	17,5

Subject to technical alterations.

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]	Stroke B [mm]	Vol. VH [cm ³]	Piston area VH [cm ²]	Piston area RH [cm ²]	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:

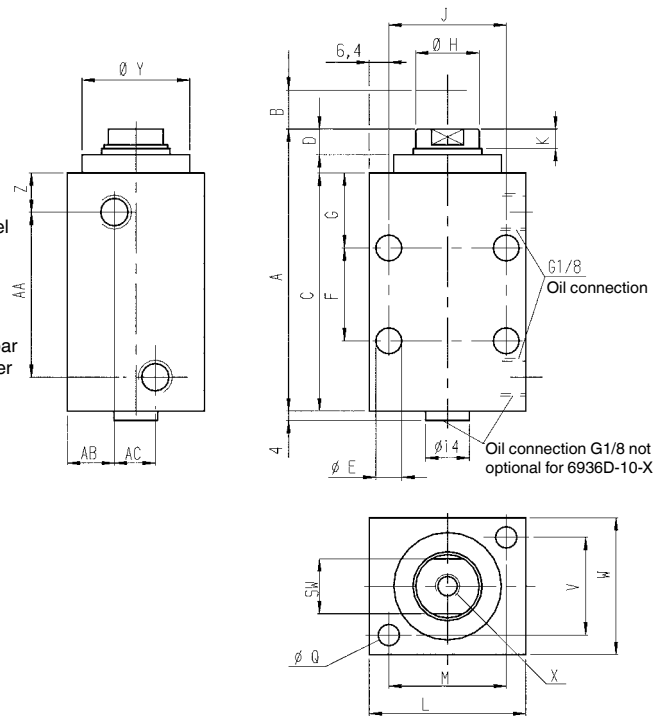
Universal mounting to equipment using mounting holes. Universal element clamping, pressurising, riveting and punching.

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:

The system has to be completely vented during installation. For applications above 160 bar operating pressure, cylinders must be tenon-blocked at slot or being backed up at cylinder body. For fixing screws must be strength class 12.9.



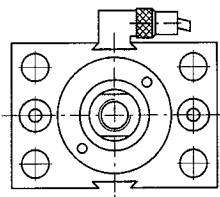
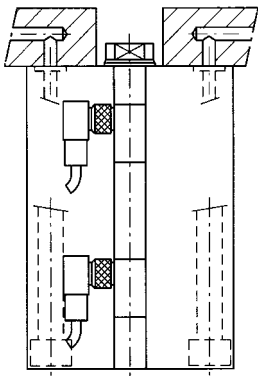
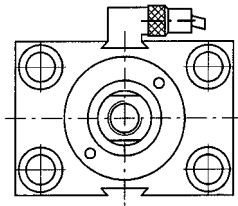
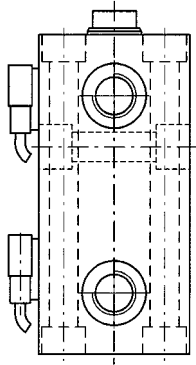
Dimensions:

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
68155	6936D-10-1	60,0	46,5	7,5	7	-	23,5	12,2	33,5	5,5	51,0	33,5	7	11	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	7	11	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	7	17	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	7	17	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	7	17	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	9	25	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	9	25	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	9	25	35,5	51,0	M12x13	44,5	12,5	70,0	8,0	17,5

Subject to technical alterations.

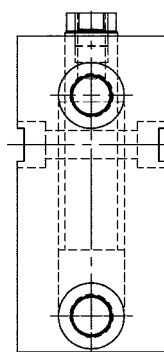
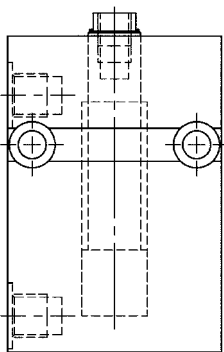
Available upon request. Block cylinders with O-ring- or threaded connection as special variant, double-acting, aluminium housing. With individually-adjustable magnetic sensors for position monitoring, and transverse or axial mounting holes.

Block cylinders with 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.



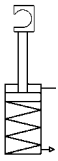
DESIGN:

- 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:

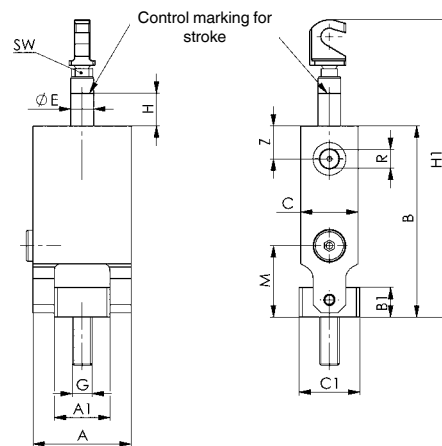
Cylinder barrel from steel, burnished. Piston and piston rod case hardened and ground. Wiper at piston rod. Piston rod with internal thread. Oil supply via threaded port.

Application:

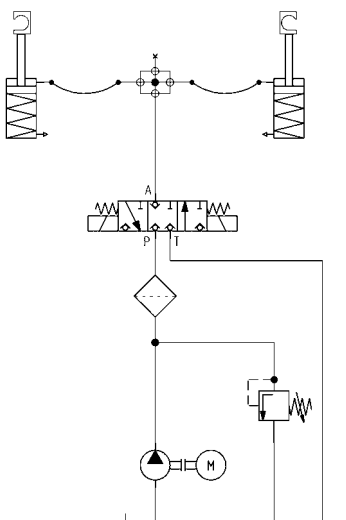
For tensioning primarily cylindrical parts - on both the machine table and clamping plates. The chain length and clamping force are preset on the counter catch using knurled nuts. The hook end is then placed under hydraulic pressure to tension the chain. The control marking on the piston rod marks the 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	161,5-181,5	43,5	10	20
325399	6926Z-16	75	44	154,0	25	55	37	20	205,0-235,0	54,0	17	25
326959	6926ZL-16	75	44	164,0	25	55	37	20	215,0-255,0	54,0	17	25



Subject to technical alterations.



No. 6540

Chain clamping set

Tensioning hook and take-up unit are hardened and tempered. Chain is made of alloy steel. Please order mounting for T-slots (No. 6541) separately.

Consisting of:

- Tensioning hook
 - Clamp chain protection set
 - Take-up unit
 - 4 different lengths of chain
 - 4 connecting links with split pins
 - 6 plastic clip elements (for workpiece protection)
- Total length M12 = 1108 mm
Total length M16 = 1145 mm

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:

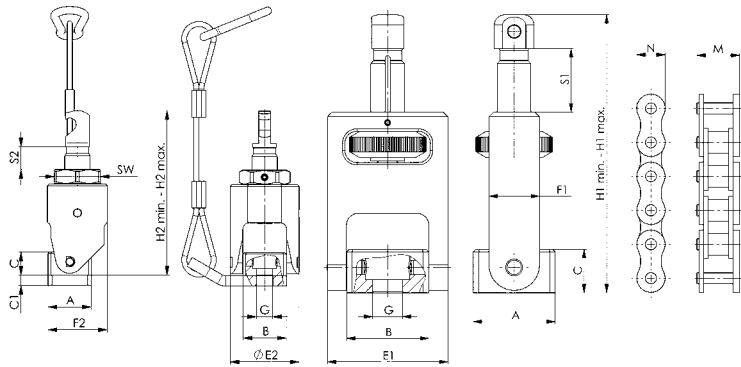
- Uniform pressure distribution reduces workpiece deformation.
- Workpiece can be protected by plastic pressure pads inserted in the chain links.
- Large range of adjustment (tensioning stroke) at take-up unit and tensioning hook.

Note:

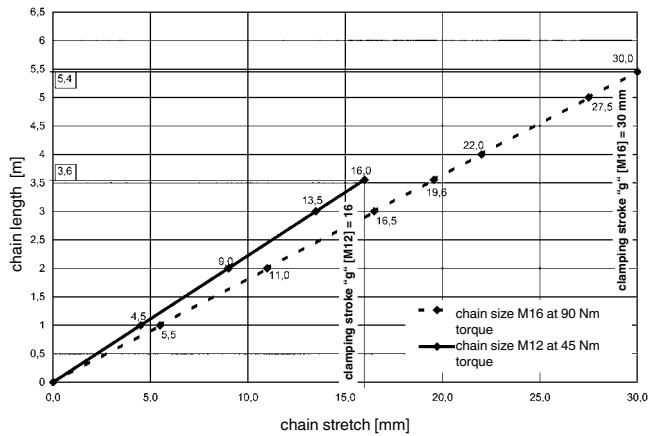
For larger clamping tasks, the clamping hooks, counterholders and clamping chains of size M20 and M24 are used.



CAD



Chain stretch at specified torques



Dimensions:

Order no.	A	B	C	E1	F1	H1 min.	H1 max.	Clamping stroke S1	E2	F2	H2 min.	H2 max.	Clamping stroke S2	M	N	SW
87601	34	34	18	50	21	90	115	26	54	46,5	111	129	18	20	15	36
87627	37	44	25	64	29	119	155	37	70	61,5	139	170	31	33	21	46



Subject to technical alterations.

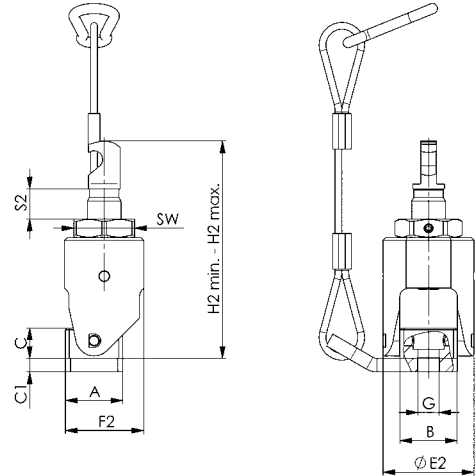
No. 6540H

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	M12	14, 16, 18	M12	45	15	36	853
374959	M16	18, 20, 22, 24	M16	90	40	46	1902
376517	M20	22-28	M20	190	75	65	6037
376533	M24	28-36	M24	300	120	65	6040



Dimensions:

Order no.	Size	A	B	C	E2	F2	H2 min.	H2 max.	Clamping stroke S2
374934	M12	34	34	18	54	47	111,0	129	18
374959	M16	37	44	25	70	62	139	170,0	31
376517	M20	58	64	41	98	86	217	271,5	55
376533	M24	58	64	41	98	86	223	284	61

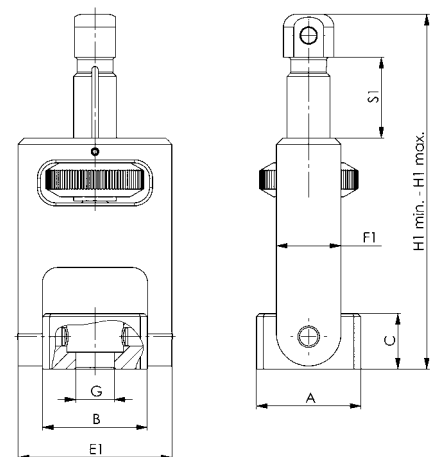


No. 6540G

Counter catch



Order no.	Size	Slot	G	S1 Stroke	max. possible clamping force [kN]	Weight [g]
374710	M12	14, 16, 18	M12	26,0	15	553
374728	M16	18, 20, 22, 24	M16	37,0	40	1235
376657	M20	22-28	M20	43,5	75	4088
376632	M24	28-36	M24	43,5	120	4145



Dimensions:

Order no.	Size	A	B	C	E1	F1	H1 min.	H1 max.
374710	M12	34	34	18	50	21	90	115,0
374728	M16	37	44	25	64	29	119	155,0
376657	M20	58	64	41	91	48	176	219,5
376632	M24	58	64	41	91	48	184	227,5

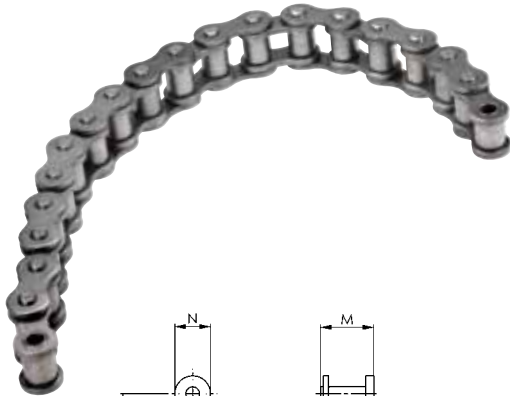


Subject to technical alterations.

No. 6540K

Roller chain

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



Order no.	Size	max. possible clamping force [kN]	L	M	N	Weight [g]
374736	M12	15	125	20	15	114
374744	M12	15	250	20	15	228
374751	M12	15	500	20	15	455
374769	M12	15	1000	20	15	910
374777	M16	40	125	33	21	335
374785	M16	40	250	33	21	670
374793	M16	40	500	33	21	1340
374801	M16	40	1000	33	21	2680
376673	M20	75	1000	43	25	3720
376699	M20	75	1500	43	25	5580
376715	M20	75	2000	43	25	7440
376723	M24	120	1000	55	34	7050
376749	M24	120	1500	55	34	10575
376764	M24	120	2000	55	34	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	M12	15	280
376129	M16	40	350
376491	M20	75	1313
376558	M24	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	M12	10	0,5
374843	M16	10	1,0
376822	M20	10	2,2
376848	M24	10	6,5

No. 6540V

Connecting links with spring cotter pin



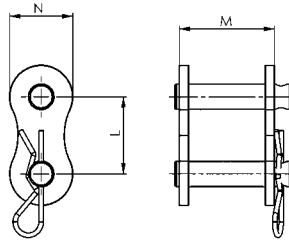
Order no.	Size	L	M	N	max. possible clamping force [kN]	Weight [g]
374819	M12	15,9	13,4	14,4	15	15
374827	M16	25,4	25,4	21,0	40	67
376780	M20	31,75	30,0	25,5	75	113
376806	M24	38,1	40,0	32,5	120	274

Application:

The connecting links are used for joining two chains together.

Advantage:

Chains simple and quick to combine and replace.



No. 6540VS

Turnbuckle



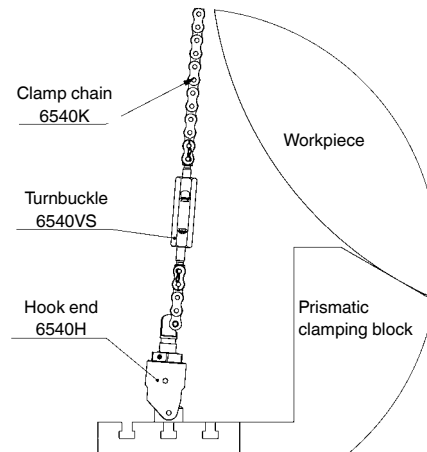
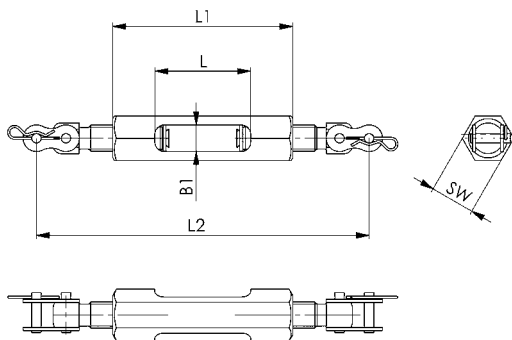
Order no.	Size	max. possible clamping force [kN]	L	L1	L2	B1	SW	Weight [g]
376459	M12	15	52	97	111 - 147	14	24	240
376616	M16	40	66	126	151 - 203	20	30	720
551514	M20	75	100	180	206 - 270	31	50	2222
551515	M24	120	105	180	214 - 284	31	50	3517

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



No. 6540S

Protective elements

for workpiece protection.
Packaging unit: 6 pcs.



Order no.	Size	Packaging unit [St]	Weight [g]
374850	M12	6	3
374868	M16	6	5
376574	M20	6	10
376590	M24	6	16

Application:

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

Advantage:

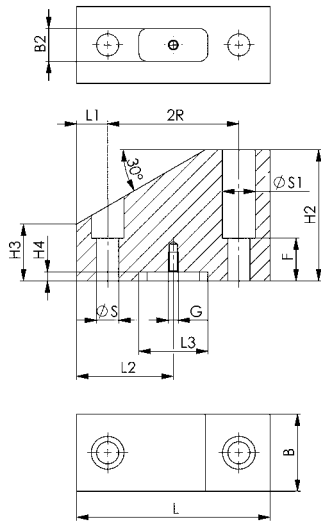
The workpiece surface is protected.

Subject to technical alterations.

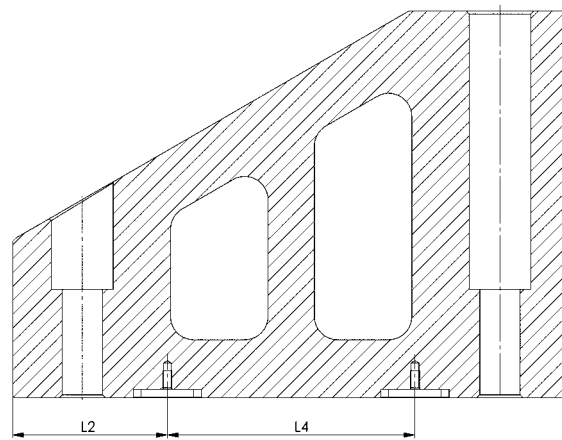
No. 6540P

Angle block, 120°

Tempered and burnished.



M12 - M16



M20 - M24



Order no.	Size	2R	B	B2	F	G	H2	H3	H4	L	L1	L2	L3	L4	dia. S	dia. S1	Weight [g]
375568	M12	80	47	20	26	M6	80	35	5,5	118	19	59	42	0	13,5	20	2499
375584	M16	100	47	20	33	M6	100	44	5,5	148	24	74	44	0	17,5	26	3833
35121	M20	270	78	20	70	M6	250	102	5,5	360	45	100	44	160	22,0	33	31976
35162	M24	270	78	20	70	M6	250	102	5,5	360	45	100	44	160	26,0	40	36715

Advantage:

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

The clamping prisms can also be used for simple clamping on the AMF clamping plates using grid holes.

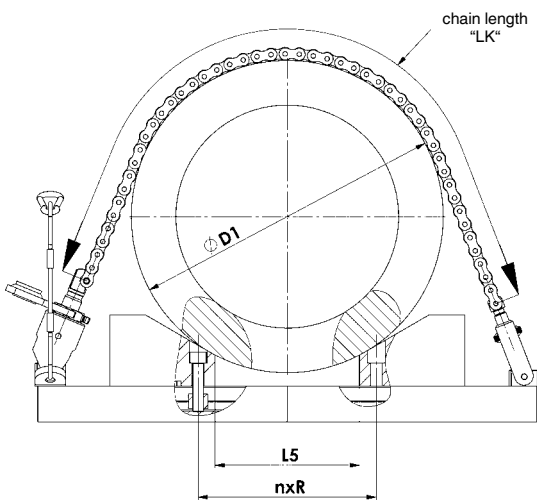
Note:

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.

Prisms for the sizes M20 and M24 are available on request.

On request:

Special versions are available on request.



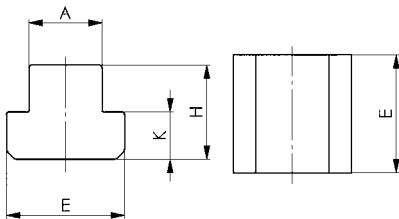
Order no.	n x R [m] Clearance of angle blocks	Ø D1 [mm]	chain length LK [mm] (x) = Number of links	L5
375568	1 x 40 = 40	190 - 280	413 (26) - 635 (40)	2
	2 x 40 = 80	250 - 360	540 (34) - 826 (52)	42
	3 x 40 = 120	270 - 440	603 (38) - 1048 (66)	82
	4 x 40 = 160	300 - 520	635 (40) - 1238 (78)	122
	5 x 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.

No. 6541

Fixtures for T-nuts

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.	D x Slot	A	E	H	K	Weight [g]
84251	M12 x 14	13,7	22	16	8	60
84269	M12 x 16	15,7	25	18	9	80
84277	M12 x 18	17,7	28	20	10	105
84285	M16 x 18	17,7	28	20	10	115
84293	M16 x 20	19,7	32	24	12	170
84343	M16 x 22	21,7	35	28	14	240
84350	M16 x 24	23,7	40	32	16	335
376483	M12x14 *	13,7	22	16	8	88
376509	M12x16 *	15,7	25	18	9	114
376525	M12x18 *	17,7	28	20	10	141
376541	M16x18 *	17,7	28	20	10	189
376566	M16x20 *	19,7	32	24	12	248
376582	M16x22 *	21,7	35	28	14	305
376608	M16x24 *	23,7	40	32	16	407

* For use of the protection set no. 6540KS

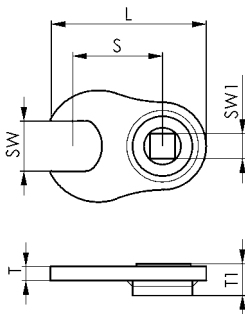
Note:

For clamping hooks and counterholders of sizes M20 and M24, fasteners for T-grooves are available on request.

No. 902Md

Open-ended spanner with torque wrench socket

for clamping nuts. Drive 1/2" square socket with ball-engagement groove. Special steel, hardened and zinc-plated.



Order no.	SW	L	S	SW1 [Zoll]	T	T1	Weight [g]
52506	25	78	45	1/2	6	16	170
52514	36	101	60	1/2	7	16	255
52522	46	108	60	1/2	8	16	340

Advantage:

Controlled tightening prevents damage to spindle changing tools on a machine.

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.

PUSH-PULL CYLINDERS FOR INDIVIDUAL CLAMPING APPLICATIONS

- > 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

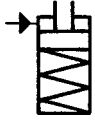


- > Pull force: 2,2 - 40 kN
- > Connection type: O-ring or threaded port

No. 6927B

Pull Cylinder, block type

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



Order no.	Article no.	Pull force at 350 bar		Stoke B [mm]	Vol. pull [cm ³]	Piston area pull [cm ²]	Weight [g]
		[kN]					
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:

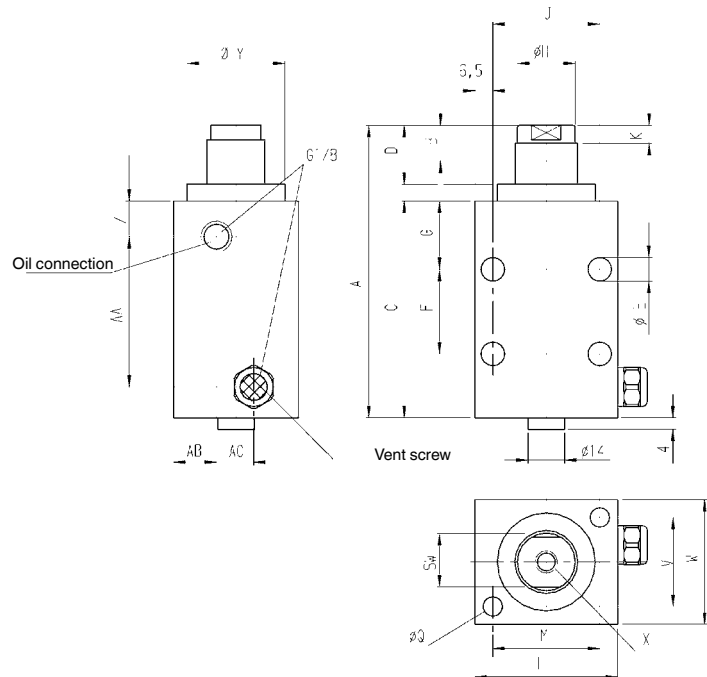
Universal pull cylinder for various applications.

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	9	-	26,5	20,1	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	9	41	26,5	20,1	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	9	-	26,5	28,2	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	9	41	26,5	28,2	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.



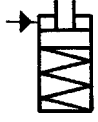
No. 6951KZ

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		Stroke [mm]	Vol. pull [cm ³]	Q max. [l/min]	Weight [g]
		[kN]					
66498	6951KZ-02-10	2,2		14,5	0,92	0,165	372
66530	6951KZ-05-10	6,6		20,0	3,82	0,40	903
66571	6951KZ-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.

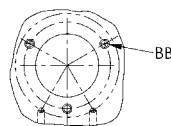
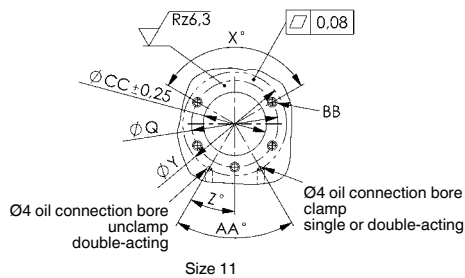
Features:

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.

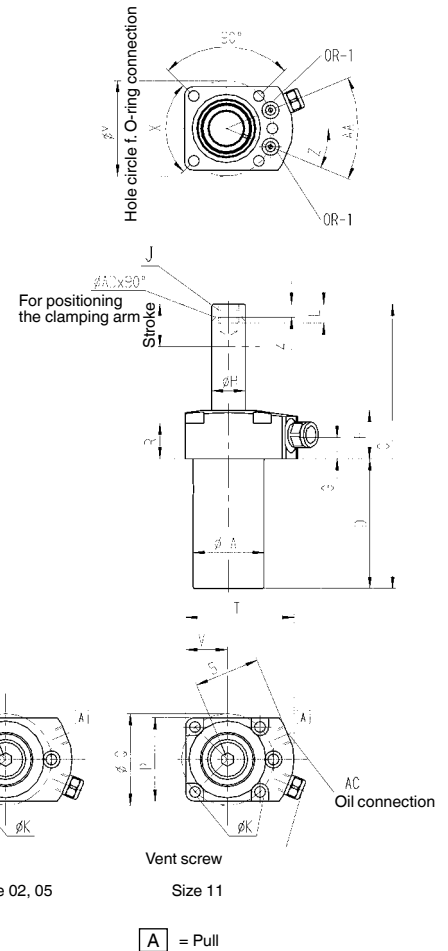
Note:

The piston is guided, therefore, the max. permissible 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:



Size 02, 05



Dimensions:

Order no.	Article no.	dia. A	C	D	F	G	dia. H	J	dia. K	L	P	dia. Q	R	S	T	V	X°	dia. Y	Z°	AA°	AC	ØAD	BB	dia. CC	OR-1 O-ring Order No.
66498	6951KZ-02-10	25,2	101,5	45,0	25	12,0	11,13	M6	6	7	45	40,0	18,0	31,0	47	15,5	120	42	30,0	60	G1/8	3,2	M5	25,5	183608
66530	6951KZ-05-10	36,3	134,0	66,5	25	11,0	15,88	M10	7	12	57	50,0	17,8	33,5	54	19,0	120	50	55,0	110	G1/8	4,8	M6	36,5	183608
66571	6951KZ-11-10	44,2	172,0	81,0	30	14,5	22,23	M12	9	13	55	59,4	22,1	42,0	71	27,5	90	62	22,5	45	G1/4	4,8	M8	44,5	183608

Subject to technical alterations.

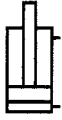
No. 6951KZ

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	Pull force at 350 bar	Stroke	Vol. push	Vol. pull	Q max.	Weight
		[kN]	[kN]		[cm ³]	[cm ³]		
66514	6951KZ-02-20	5,6	2,2	14,5	2,3	0,92	0,165	372
66555	6951KZ-05-20	13,5	6,6	20,0	7,8	3,82	0,40	903
66597	6951KZ-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.

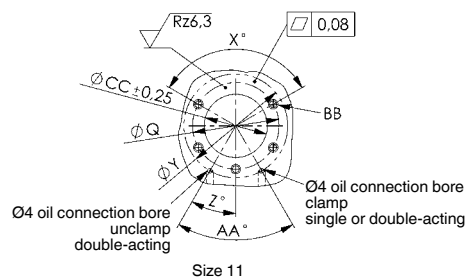
Features:

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.

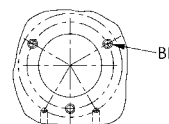
Note:

The piston stroke 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.

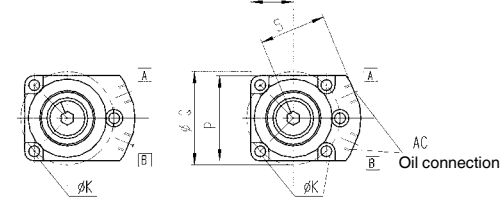
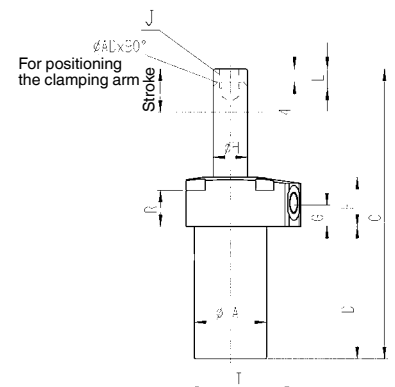
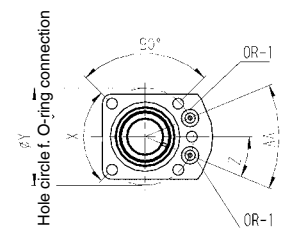
Drilling template device:



Size 11



Size 02, 05



Size 02, 05

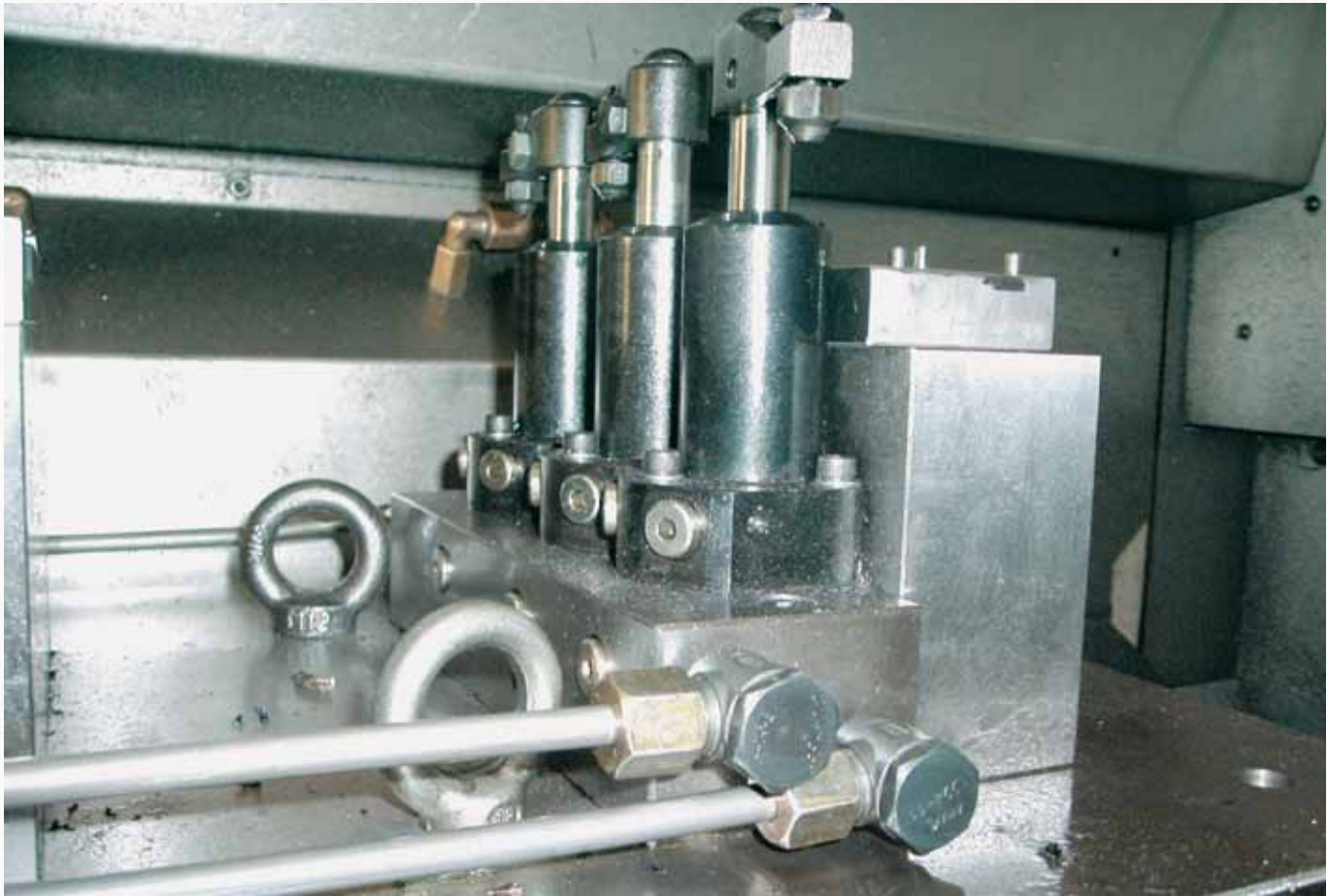
Size 11

A = Pull
B = Pressure

Dimensions:

Order no.	Article no.	dia. A	C	D	F	G	dia. H	J	dia. K	L	P	dia. Q	R	S	T	V	X°	dia. Y	Z°	AA°	AC	ØAD	BB	dia. CC	OR-1 O-ring Order No.
66514	6951KZ-02-20	25,2	101,5	45,0	25	12,0	11,13	M6	6	7	45	40,0	18,0	31,0	47	15,5	120	42	30,0	60	G1/8	3,2	M5	25,5	183608
66555	6951KZ-05-20	36,3	134,0	66,5	25	11,0	15,88	M10	7	12	57	50,0	17,8	33,5	54	19,0	120	50	55,0	110	G1/8	4,8	M6	36,5	183608
66597	6951KZ-11-20	44,2	172,0	81,0	30	14,5	22,23	M12	9	13	55	59,4	22,1	42,0	71	27,5	90	62	22,5	45	G1/4	4,8	M8	44,5	183608

Subject to technical alterations.

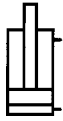


Subject to technical alterations.

No. 6951KZP

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

double acting,
max. operating pressure 350 bar,
min. operating pressure 52 bar.



CAD

Order no.	Article no.	Push force at 350 bar	Pull force at 350 bar	Stroke	Vol. push	Vol. pull	Q max.	Weight
		[kN]	[kN]		[cm ³]	[cm ³]		
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:

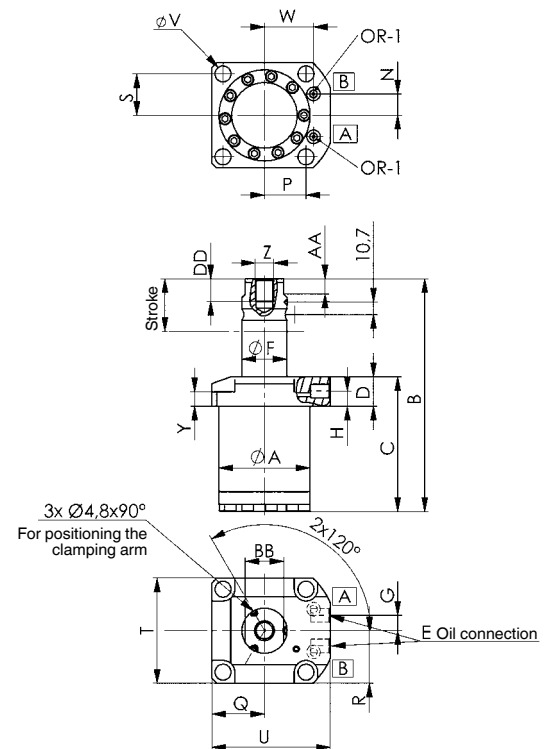
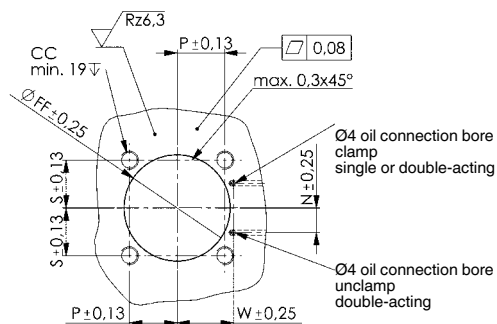
- Increase in the number of balls and slots to 3 to achieve a higher positioning accuracy and repetition accuracy. Also prolongs service life.
- More precise guidance
- contact force of balls into groove increased, thus guaranteeing highly-precise guidance over a long period of us.
- V-profile of the 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. permissible 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.

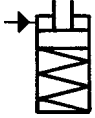
No. 6951FZ

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		Stroke [mm]	Vol. pull [cm ³]	Q max. [l/min]	Weight [g]
		[kN]	[kN]				
66480	6951FZ-02-10	2,2		14,5	0,92	0,165	463
66522	6951FZ-05-10	6,6		20,0	3,82	0,400	1150
66563	6951FZ-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:

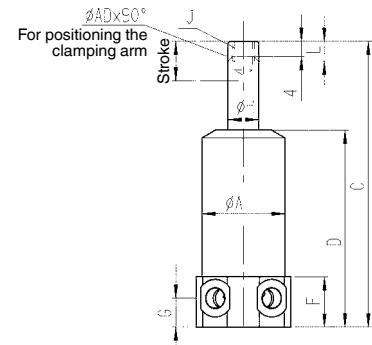
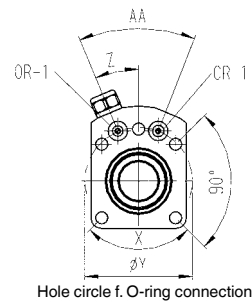
Universal Push-Pull Cylinder for various applications.

Features:

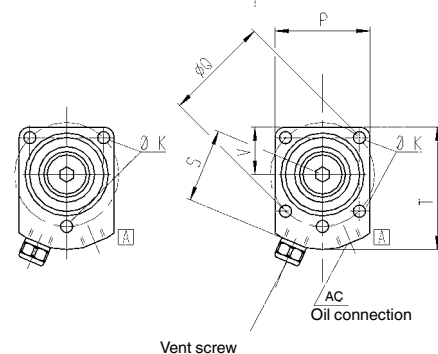
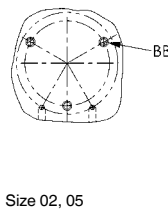
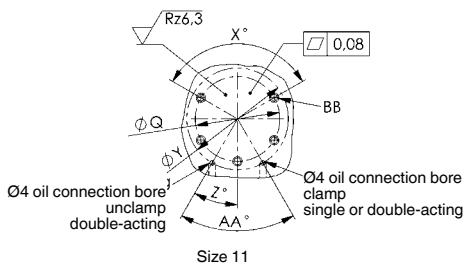
Each cylinder size is available for single or double-acting operation. Various thrust pieces can be attached in the tapped piston rod ends. Clamps can be attached, as with the swing clamps.

Note:

The piston is guided, therefore, the max. permissible 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:



[A] = Pull

Dimensions:

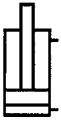
Order no.	Article no.	dia. A	C	D	F	G	dia. H	J	dia. K	L	P	dia. Q	S	T	V	X°	dia. Y	Z°	AA°	AC	ØAD	BB	OR-1 O-ring Order No.
66480	6951FZ-02-10	26,8	103	71,0	26,5	13,5	11,13	M6	6	10	45	40,0	31,0	47	15,5	120	42	30,0	60	G1/8	3,2	M5	183608
66522	6951FZ-05-10	38,0	135	92,5	25,0	15,0	15,88	M10	7	16	57	50,0	33,5	54	19,0	120	50	55,0	110	G1/8	4,8	M6	183608
66563	6951FZ-11-10	45,4	173	112,5	28,5	16,5	22,23	M12	9	19	55	59,4	42,0	71	27,5	90	62	22,5	45	G1/4	4,8	M8	183608

Subject to technical alterations.

No. 6951FZ

Push-Pull Cylinder, base-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	Pull force at 350 bar	Stroke	Vol. push	Vol. pull	Q max.	Weight
		[kN]	[kN]		[cm ³]	[cm ³]		
66506	6951FZ-02-20	5,6	2,2	14,5	2,3	0,92	0,165	463
66548	6951FZ-05-20	13,5	6,6	20,0	7,8	3,82	0,400	1150
66589	6951FZ-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:

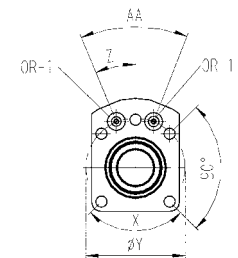
Universal Push-Pull Cylinder for various applications.

Features:

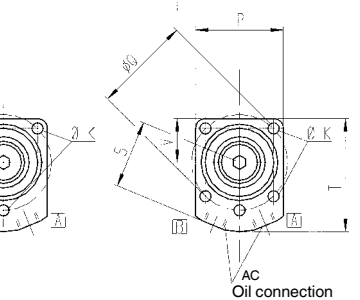
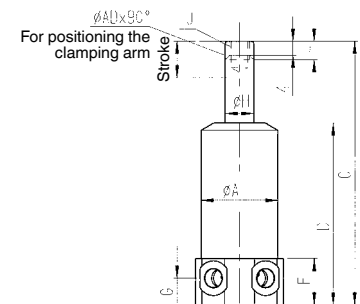
Each cylinder size is available for single or double-acting operation. Various thrust pieces can be attached in the tapped piston rod ends. Clamps can be attached, as with the swing clamps.

Note:

The piston stroke 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.



Hole circle f. O-ring connection

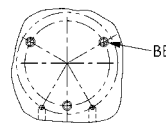
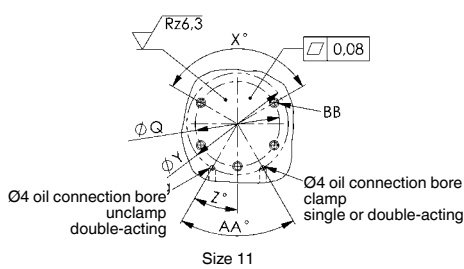


Size 02, 05

Size 11

- A = Pull
- B = Pressure

Drilling template device:



Size 02, 05

Dimensions:

Order no.	Article no.	dia. A	C	D	F	G	dia. H	J	dia. K	L	P	dia. Q	S	T	V	X°	dia. Y	Z°	AA°	AC	ØAD	BB	OR-1 O-ring Order No.
66506	6951FZ-02-20	26,8	103	71,0	26,5	13,5	11,13	M6	6	10	45	40,0	31,0	47	15,5	120	42	30,0	60	G1/8	3,2	M5	183608
66548	6951FZ-05-20	38,0	135	92,5	25,0	15,0	15,88	M10	7	16	57	50,0	33,5	54	19,0	120	50	55,0	110	G1/8	4,8	M6	183608
66589	6951FZ-11-20	45,4	173	112,5	28,5	16,5	22,23	M12	9	19	55	59,4	42,0	71	27,5	90	62	22,5	45	G1/4	4,8	M8	183608

Subject to technical alterations.



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 52 bar.



CAD



Order no.	Article no.	Push force at 350 bar	Pull force at 350 bar	Stroke	Vol. push	Vol. pull	Q max.	Weight
		[kN]	[kN]		[cm ³]	[cm ³]		
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.

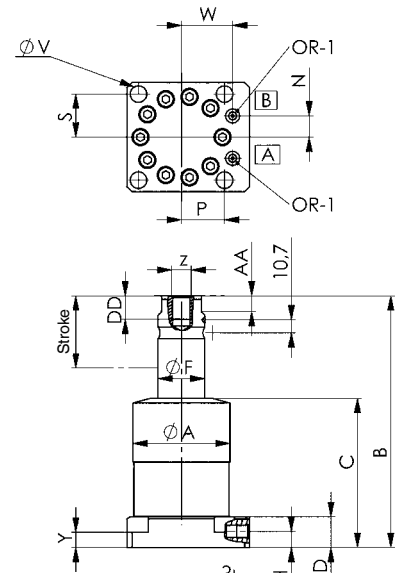
Advantage:

- 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.

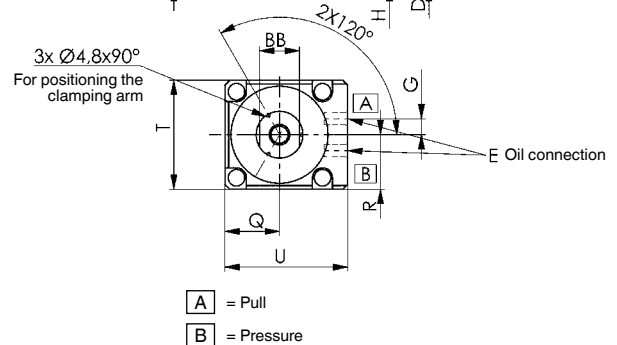
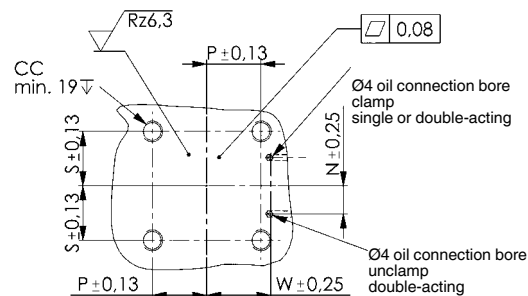
Note:

The piston is guided, therefore, the max. permissible 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	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.

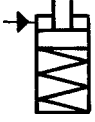
No. 6951GZ

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		Stroke	Vol. pull	Q max.	Weight
		[kN]	[mm]				
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:

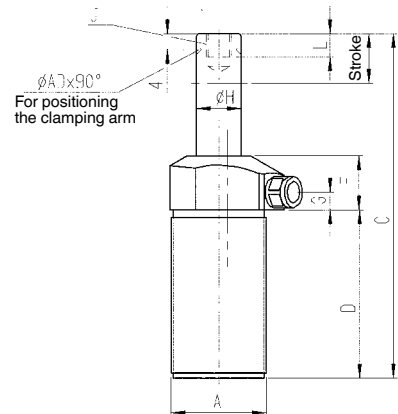
Universal Push-Pull Cylinder for various applications.

Features:

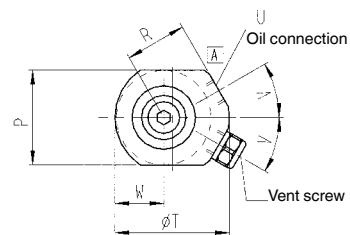
Each model is available for single or double acting operation. The internal thread at piston rod allows mounting of attachments like clamping arms and set screws.

Note:

The piston is guided, therefore, the max. permissible 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	L	P	R	dia. T	U	V	W	ØAD
66605	6951GZ-02-10	M28x1,5	102,0	51,0	19,0	6,5	11,13	M6	10	32,0	20,5	38,0	G1/8	25°	14,0	3,2
66670	6951GZ-05-10	M38x1,5	134,0	63,5	28,0	9,5	15,88	M10	16	38,0	26,0	47,5	G1/8	35°	19,5	4,8
66712	6951GZ-11-10	M48x1,5	172,0	83,0	28,0	9,0	22,23	M12	19	47,5	31,5	60,0	G1/4	30°	25,5	4,8

Subject to technical alterations.

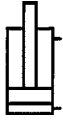
No. 6951GZ

Push-Pull Cylinder, thread-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 [cm ³]	Vol. pull [cm ³]	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:

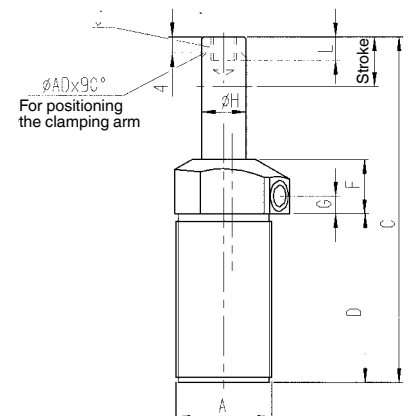
Universal Push-Pull Cylinder for various applications.

Features:

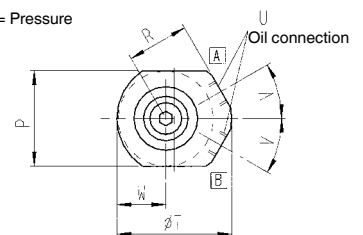
Each model is available for single or double acting operation. The internal thread at piston rod allows mounting of attachments like clamping arms and set screws.

Note:

The piston is guided, therefore, the max. permissible 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
- B** = Pressure



Dimensions:

Order no.	Article no.	A	C	D	F	G	dia. H	J	L	P	R	dia. T	U	V	W	ØAD
66613	6951GZ-02-20	M28x1,5	102,0	51,0	19,0	6,5	11,13	M6	10	32,0	20,5	38,0	G1/8	25°	14,0	3,2
66696	6951GZ-05-20	M38x1,5	134,0	63,5	28,0	9,5	15,88	M10	16	38,0	26,0	47,5	G1/8	35°	19,5	4,8
66795	6951GZ-05-200	M38x1,5	167,0	86,0	27,5	9,5	15,88	M10	16	38,0	26,0	47,5	G1/8	35°	19,5	4,8
66738	6951GZ-11-20	M48x1,5	172,0	83,0	28,0	9,0	22,23	M12	19	47,5	31,5	60,0	G1/4	30°	25,5	4,8
66928	6951GZ-11-200	M48x1,5	235,5	124,0	29,5	10,5	22,23	M12	19	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**

> **cartridge flange**

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

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

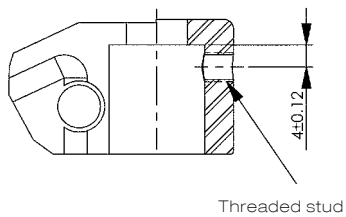
IMPORTANT NOTE:

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.

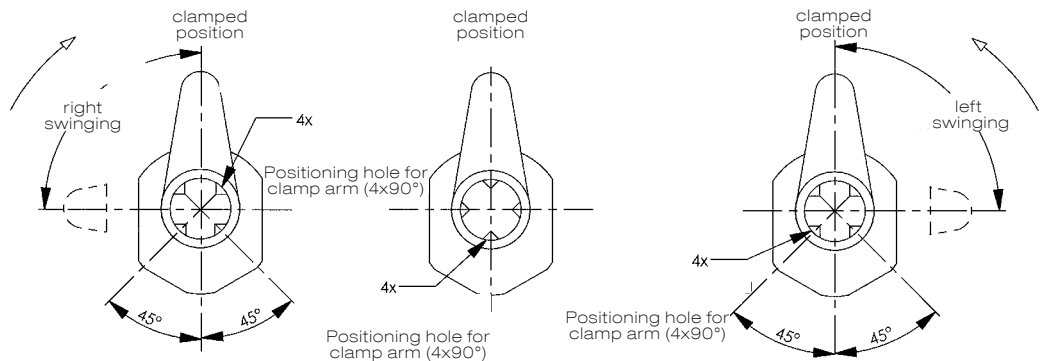
POSITIONING:

Positioning hole for clamp arm 6951G:



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 CLAMPS 6951G AND 6952E

Swing clamp clamping force [kN]	Clamp arm, standard		Clamp arm, long	
	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 2,0 to 11 kN
- > operating pressure 350 bar
- > easy change of swing direction (version 2 - 11 kN)
- > hardened and chrome-plated piston rod
- > nitrided body
- > oil supply via thread or installation hole
- > optimal size-to-clamping-force ratio
- > screw-in construction

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]	Cartridge flange	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
6952E	2	6,0	14,5	●	-	double acting

PRODUCT EXAMPLES:

NO. 6951G



NO. 6951G



NO. 6952E



> Piston tensile force: 2,2 - 13,9 kN

> Piston tensile force: 2,2 - 13,9 kN

> Piston tensile force: 2,0 kN

> Connection type: threaded connection

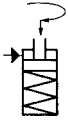
> Connection type: threaded connection

> Connection type: drilled oil channels

No. 6951G

Swing Clamp, thread-flange-mounting

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



Order no.	Article no.	Clamping force at 350 bar Sp* [kN]	Clamping stroke M [mm]	Total stroke N [mm]	Vol. Sp [cm ³]	eff. piston area Sp [cm ²]	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

Sp = clamp, Lo = unclamp

* Clamping forces with short clamping arm.

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. Single acting version with return spring from stainless steel. Supply scope does not include clamping arm. 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).

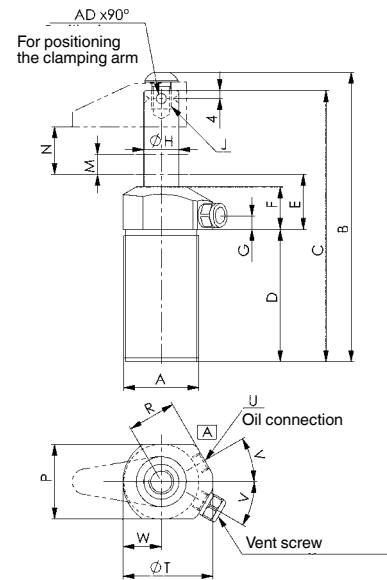
Features:

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. permissible 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 = clamping

Dimensions:

Order no.	Article no.	A	B	C	D	E	F	G	dia. H	J	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	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	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	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	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	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	47,5	31,5	60,0	G1/4	30°	25,5	4,8

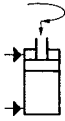
No. 6951G

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

Sp = clamp, Lo = unclamp

* Clamping forces with short clamping arm.

Design:

Cylinder barrel from steel, hardened and burnished. Piston rod hardened and chrome plated. Piston rod with internal thread and clamping arm positioning. Wiper at piston rod. Single acting version with return spring from stainless steel. Supply scope does not include clamping arm. Oil supply via threaded port.

Application:

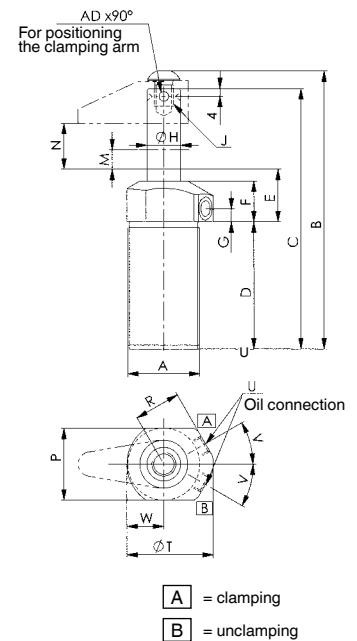
Swing clamps are used particularly in fixtures in which the workpiece must be freely accessible and placed from above. Workpieces with difficult shapes can also be clamped using special clamp arms (available on request).

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. permissible 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.



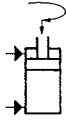
Dimensions:

Order no.	Article no.	A	B	C	D	E	F	G	dia. H	J	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	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	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	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	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	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	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	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	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	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	47,5	31,5	60,0	G1/4	30°	25,5	4,8

No. 6952E

Swing clamp, cartridge flange

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



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]
325886	6952E-02-21	2	0,92	2,46	0,63	1,7	100	6	14,5	0,165	355
325894	6952E-02-22	2	0,92	2,46	0,63	1,7	100	6	14,5	0,165	355

Sp = clamp, Lo = unclamp

* Clamping forces with short clamping arm.

Design:

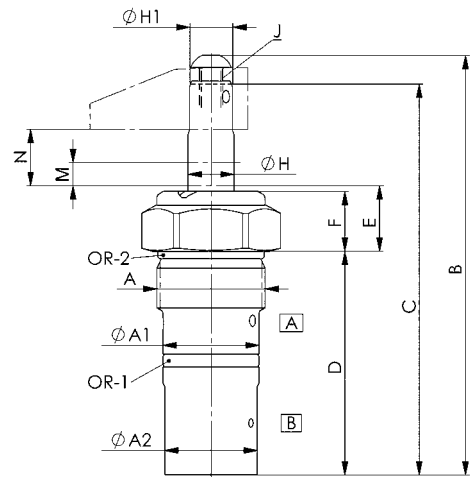
Cylinder barrel from steel, hardened and burnished. Piston rod case hardened and chrome plated. Piston rod with internal thread. Wiper at piston rod. Supply scope does not include clamping arm. Oil supply via oil channel in fixture body.

Application:

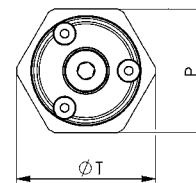
The swing clamp is used particularly in fixtures in which the workpieces must be freely accessible and placed from above. Workpieces with dedicated shapes can also be clamped using special clamp arms (available on request).

Note:

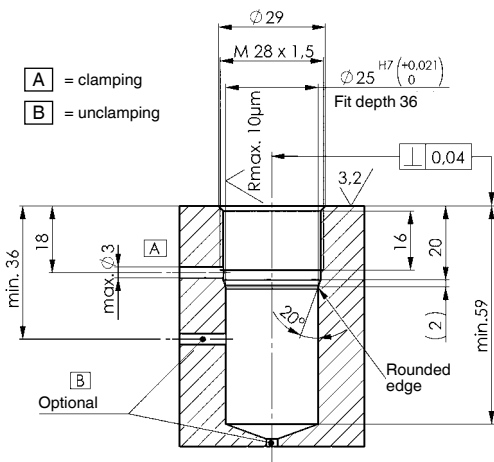
The piston is guided, and so the max. permissible oil flow rate Q max. as well as the clamp arm length and weight must be observed. When mounting accessories at the piston, no force may be applied to the piston. When placing into operation, ensure that all air is bled from the system.



- A** = clamping
- B** = unclamping



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.
325886	6952E-02-21	M28x1,5	25 f7	24	108,5	101,5	58	17	15,5	12	11,13	M6	SW32	36	409664	321166
325894	6952E-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.

SWING CLAMPS FOR DEMANDING CLAMPING APPLICATIONS

- > clamping force 2,0 to 33 kN
- > operating pressure 350 bar
- > precise swivel angle of 90°
- > hardened and chrome-plated piston rod
- > nitrided 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	Operating mode
6951FP 6951KP	2,0	5,5	14,5	●	●	single or double-acting
6951FP 6951KP	4,9	8,0	20,0	●	●	single or double-acting
6951FP 6951KP	11,6	13,0	29,5	●	●	single or double-acting
6951FP 6951KP	22,0	14,5 32,0	28,0 45,5	●	●	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. 6951KP



- > Piston tensile force: 2,0 - 33 kN
- > Connection type:
O-ring or threaded port

NO. 6951FP



- > 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

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

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

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

IMPORTANT NOTE:

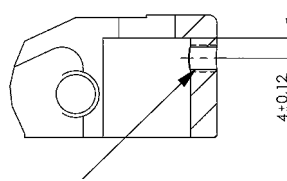
Clamping arm length, max. permissible flow rate Q_{max} and clamping arm weight must be observed! In case of a larger flow rates, a throttle/check valve must be connected upstream.

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



POSITIONING:

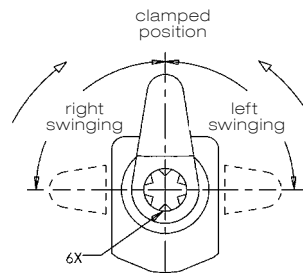
Positioning hole for clamp arm:



Threaded stud

SWING DIRECTIONS:

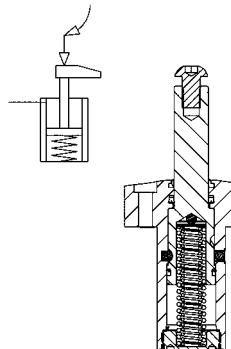
Positioning hole for clamp arm:



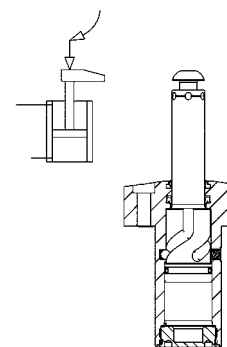
Positioning hole for clamp arm (6x60°)

DESIGNS:

Single acting cylinder

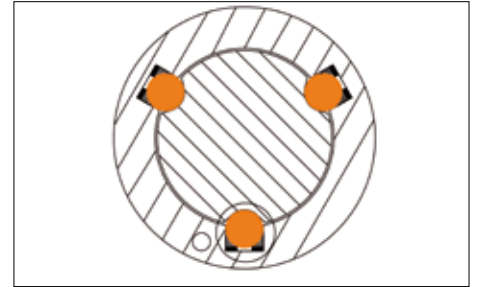
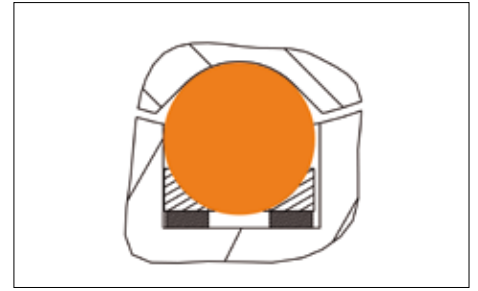


Double acting cylinder



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.
- > 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 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 6951KP AND FP

Swing clamp clamping force [kN]	Clamp arm, standard		Clamp arm, long	
	Min. allowed clamping time [sec.]	Q max. [l/min.]	Min. allowed clamping time [sec.]	Q max. [l/min.]
2,0	0,2	0,276	0,5	0,1100
4,9	0,3	0,764	0,7	0,327
11,6	0,4	1,785	0,8	0,893

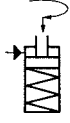


Subject to technical alterations.

No. 6951KP

Swing clamp, top-flange-mounting, precision design

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



Order no.	Article no.	Clamping force at 350 bar Sp* [kN]	Clamping stroke M [mm]	Total stroke N [mm]	Vol. Sp [cm ³]	eff. piston area Sp [cm ²]	Q max. **	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

Sp = clamping, Lo = unclamp

* Clamping task with clamping arm, standard

**Qmax. with clamping arm, standard

Design:

Cylinder barrel from steel, hardened and burnished. Piston rod hardened and chrome plated.

Piston rod with internal thread and clamping arm positioning. O-ring for flange seal.

Wiper at piston rod. Single acting version with 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 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.

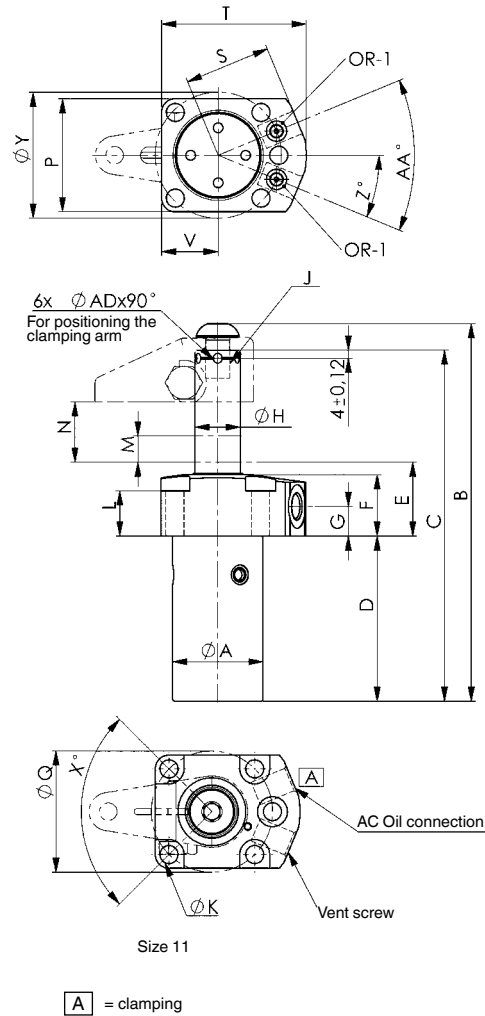
Note:

The piston stroke is executed with balls, respect Q max. volume flow. Clamping arm length and clamping arm weight must be strictly observed. When mounting accessories at the piston, no force may be applied to the piston. 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. Optionally, throttle non-return valve no. 6916-12-01 with G1/8 and 6916-12-04 with G1/4 can be used to throttle the oil supply. Other swivel angles are available on request.



CAD

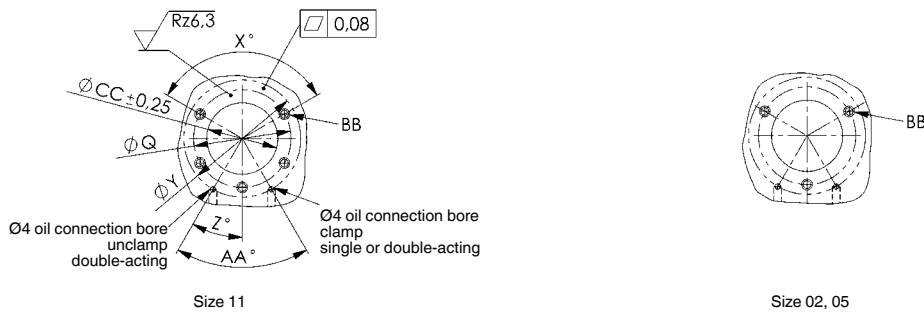
Subject to technical alterations.



Size 02, 05

Size 11

Drilling template device:



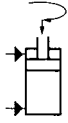
Dimensions:

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	M6	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

No. 6951KP

Swing clamp, top-flange-mounting, precision design

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



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. **	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
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

Sp = clamping, Lo = unclamp

* Clamping task with clamping arm, standard

**Qmax. with clamping arm, standard

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. Single acting version with 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 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.

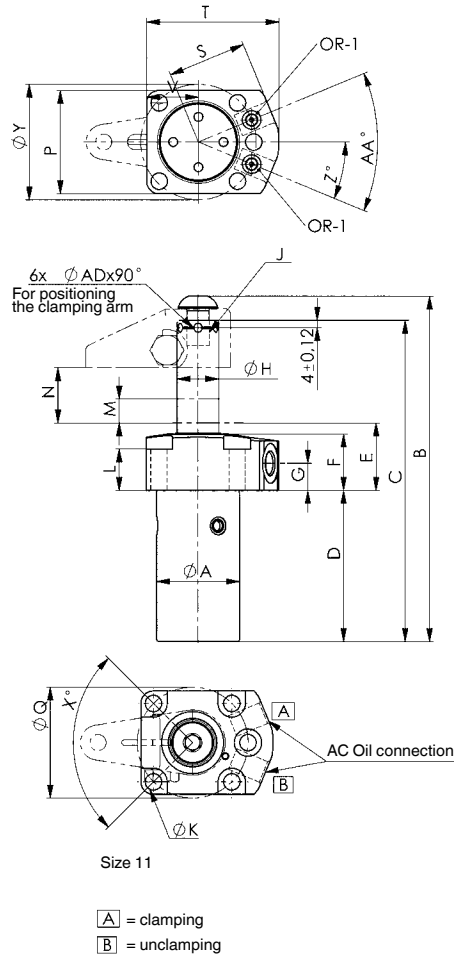
Note:

The piston stroke is executed with balls, respect Q max. volume flow. Clamping arm length and clamping arm weight must be strictly observed. When mounting accessories at the piston, no force may be applied to the piston. 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. Optionally, throttle non-return valve no. 6916-12-01 with G1/8 and 6916-12-04 with G1/4 can be used to throttle the oil supply. Other swivel angles are available on request.



CAD

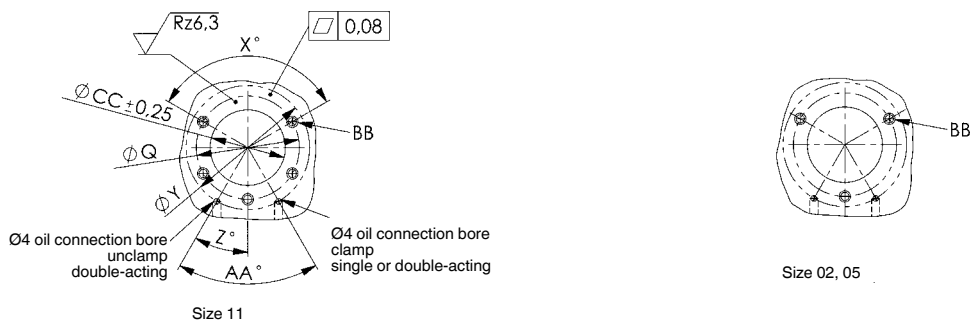
Subject to technical alterations.



Size 02, 05

Size 11

Drilling template device:



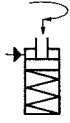
Dimensions:

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	ϕAD	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
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

No. 6951FP

Swing clamp, base-flange-mounting, precision design

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



Order no.	Article no.	Clamping force at 350 bar Sp* [kN]	Clamping stroke M [mm]	Total stroke N [mm]	Vol. Sp [cm ³]	eff. piston area Sp [cm ²]	Q max. **	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

Sp = clamping, Lo = unclamp

* Clamping task with clamping arm, standard

**Qmax. with clamping arm, standard

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. Single acting version with 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 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.

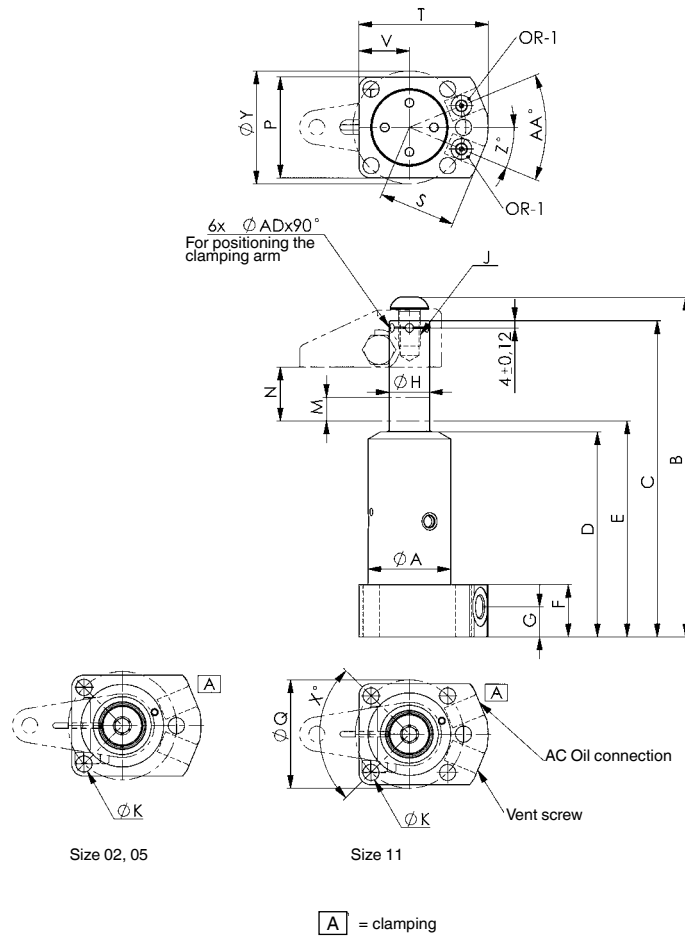
Note:

The piston stroke is executed with balls, respect Q max. volume flow. Clamping arm length and clamping arm weight must be strictly observed. When mounting accessories at the piston, no force may be applied to the piston. 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. Optionally, throttle non-return valve no. 6916-12-01 with G1/8 and 6916-12-04 with G1/4 can be used to throttle the oil supply. Other swivel angles are available on request.

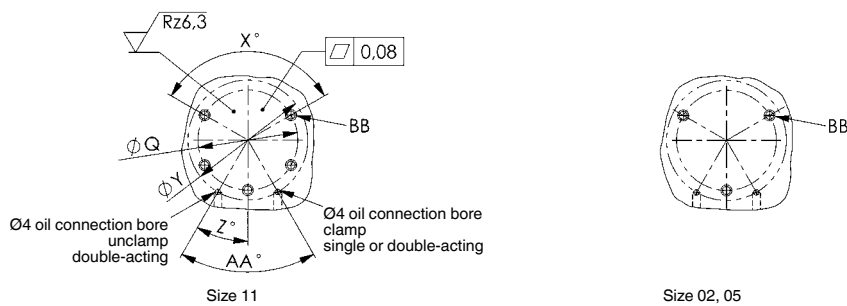


CAD

Subject to technical alterations.



Drilling template device:



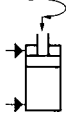
Dimensions:

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

No. 6951FP

Swing clamp, base-flange-mounting, precision design

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



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. **	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
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

Sp = clamping, Lo = unclamp

* Clamping task with clamping arm, standard

**Qmax. with clamping arm, standard

Design:

Cylinder barrel from steel, hardened and burnished. Piston rod hardened and chrome plated.

Piston rod with internal thread and clamping arm positioning. O-ring for flange seal.

Wiper at piston rod. Single acting version with 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 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.

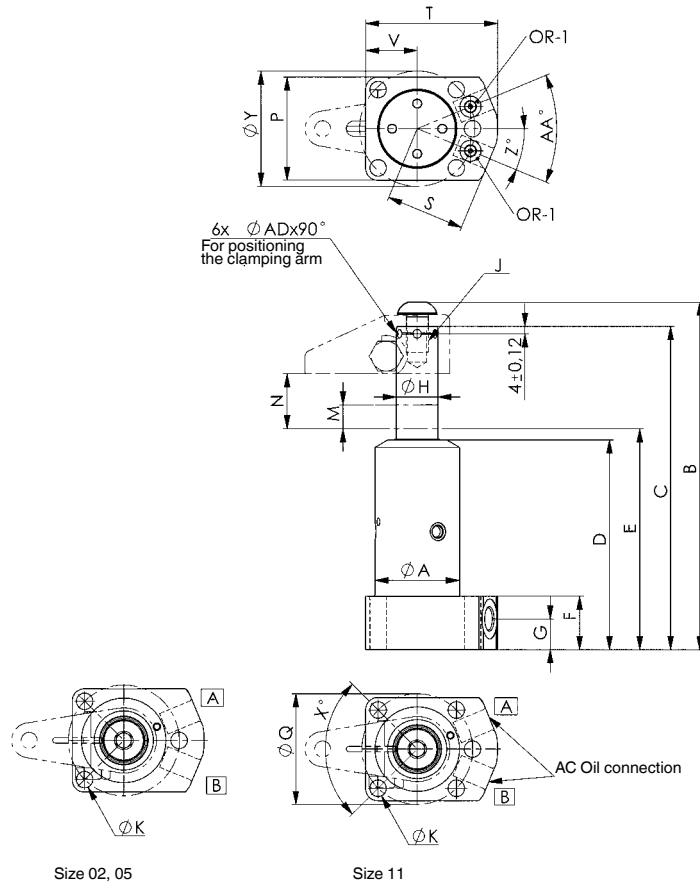
Note:

The piston stroke is executed with balls, respect Q max. volume flow. Clamping arm length and clamping arm weight must be strictly observed. When mounting accessories at the piston, no force may be applied to the piston. 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. Optionally, throttle non-return valve no. 6916-12-01 with G1/8 and 6916-12-04 with G1/4 can be used to throttle the oil supply. Other swivel angles are available on request.



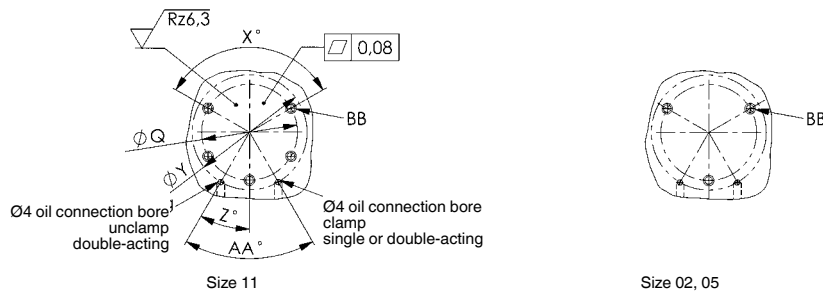
CAD

Subject to technical alterations.



- A** = clamping
- B** = unclamping

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
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

Subject to technical alterations.

No. 6951

Swing Clamp Arm, standard



Order no.	Article no.	for size	A	B	C	dia. E	dia. F	G	H	J	K	L	M	N	P	Weight [g]
68973	6951-02-27	6951xx-02-xx	27	9,5	4,5	11,13 +0,05	7,0	16	12,5	7,0	9,5	M6x1,00	6,5	22°	M6x1,00	44
68999	6951-05-38	6951xx-05-xx	38	12,5	6,5	15,89 +0,05	10,5	22	18,0	8,0	12,7	M8x1,25	7,5	25°	M8x1,25	109
69070	6951-11-51	6951xx-11-xx	51	17,5	9,5	22,24 +0,05	13,5	32	25,5	9,5	16,6	M10x1,25	12,0	25°	M10x1,50	299

Design:

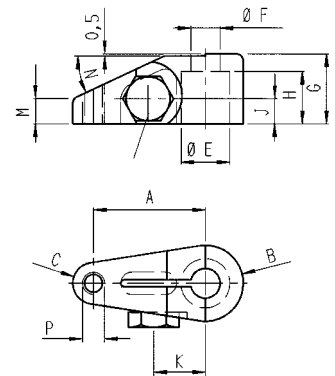
Tempered and blued steel.

Application:

For swing clamps No. 6951xx, size 02 to 11.

Note:

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



No. 6951

Swing Clamp Arm, upreach



Order no.	Article no.	for size	A	B	C	D	dia. E	dia. F	G	H	J	K	L	M	N	P	Weight [g]
69112	6951-02-32	6951xx-02-xx	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	6951xx-05-xx	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	6951xx-11-xx	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:

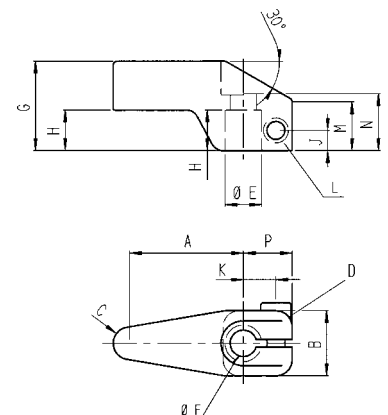
Tempered and blued steel.

Application:

For swing clamps No. 6951xx, size 02 to 11.

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



Order no.	Article no.	for size	A	B	C	D	dia. E	dia. F	G	H	J	K	L	Weight [g]
69229	6951-02-82	6951xx-02-xx	82,5	26,0	10,5	8,5	11,13 +0,05	7,0	16	12,5	7,0	9,5	M6x1,00	73
69245	6951-05-136	6951xx-05-xx	136,5	33,0	14,5	12,5	15,89 +0,05	10,5	22	18,0	8,0	12,7	M8x1,25	240
69260	6951-11-162	6951xx-11-xx	162,0	50,5	19,0	16,0	22,24 +0,05	13,5	32	25,5	9,5	16,6	M10x1,25	553

Design:

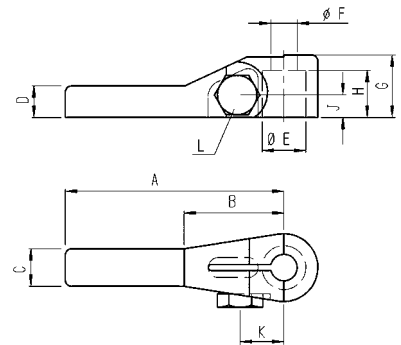
Tempered and blued steel.

Application:

For all swing clamps No. 6951xx, size 02 to 11 Clamping bars can be shortened to match the 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



Order no.	Article no.	for size	2A	B	C	D	dia. E	dia. F	G	H	J	K	L	Weight [g]
69252	6951-02-140	6951xx-02-xx	140	26,0	10,5	8,5	11,13 +0,05	7,0	16	12,5	7,0	9,5	M6x1,00	118
69278	6951-05-222	6951xx-05-xx	222	33,0	14,5	12,5	15,89 +0,05	10,5	22	18,0	8,0	12,7	M8x1,25	354
69294	6951-11-272	6951xx-11-xx	272	50,5	19,0	16,0	22,24 +0,05	13,5	32	25,5	9,5	16,6	M10x1,25	801

Design:

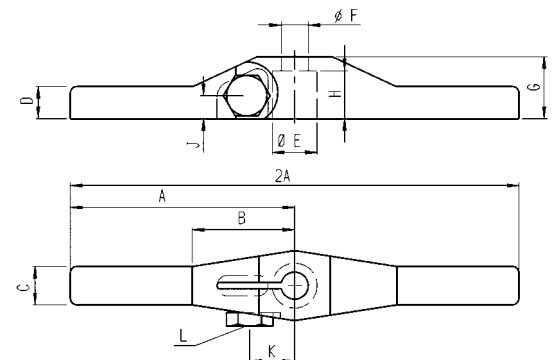
Tempered and blued steel.

Application:

For all swing clamps No. 6951xx, size 02 to 11. Clamping bars can be shortened to match the 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



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

Design:

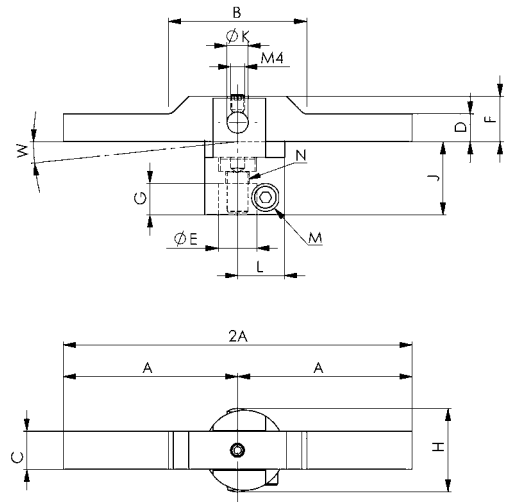
Steel, blued. Clamping arm tempered.

Application:

For all Series 6951 swing clamps. Used for clamping two workpieces with slightly different heights.

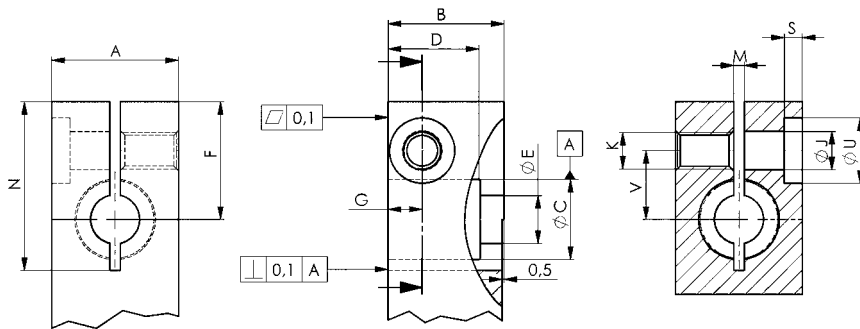
Note:

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

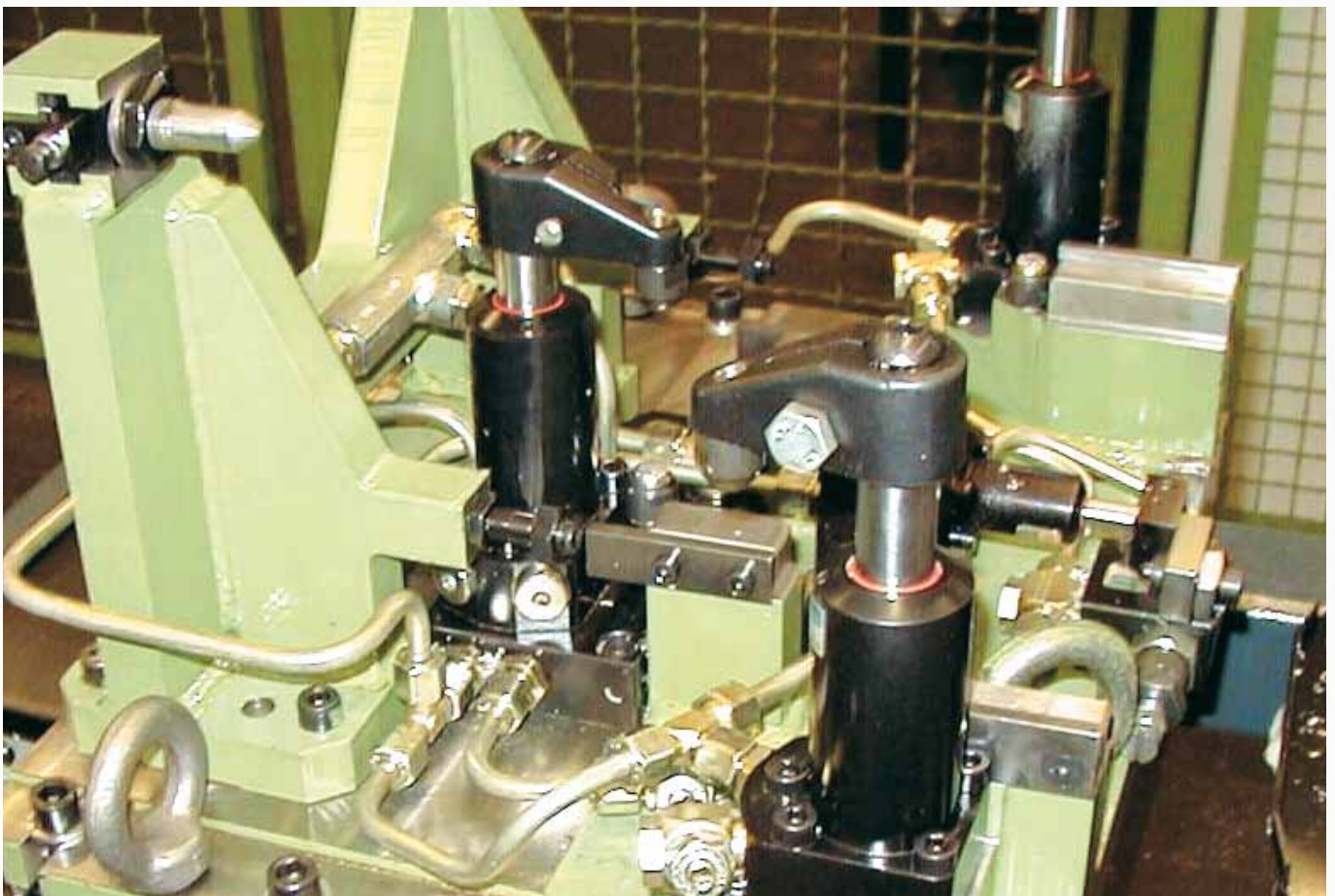
Important note:

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

Dimensions table (proprietary manufacture):

for size	A	B	ØC +0,05	D	ØE	F	G	ØJ	K	M	N	S	ØU	V
-02	19,0	16	11,151	12,70	7,0	22,5	7,0	6,4	M6	2,4	30,0	2	11	9,5
-05	25,5	22	15,913	18,03	11,0	27,5	8,8	8,5	M8	2,9	38,5	5	15	17,0
-11	35,0	32	22,263	25,40	13,5	32,5	12,0	10,5	M10	2,9	46,5	5	18	19,0

Subject to technical alterations.



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 patented ball-guide mechanism. Standard swivel angle is 90°.

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.

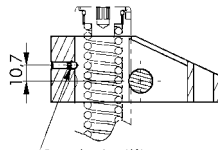


POSITIONING:

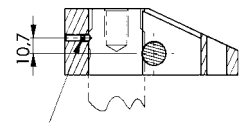
Positioning hole for clamp arm:

Single acting cylinder

Double acting cylinder



Threaded stud



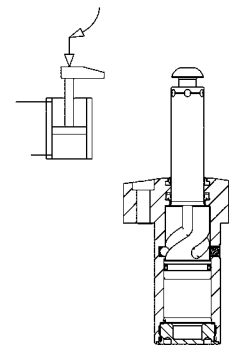
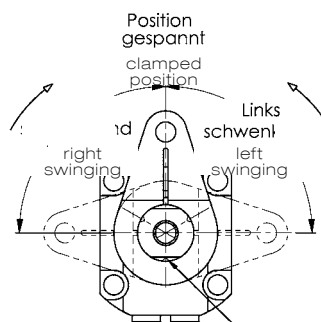
Threaded stud

SWING DIRECTIONS:

Positioning hole for clamp arm:

VERSIONE:

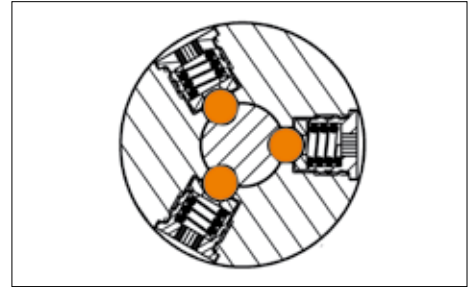
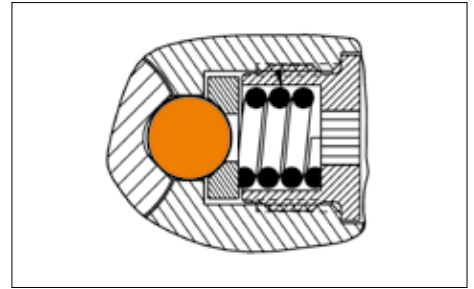
Double acting cylinder



3x Positioning holes
Ø4,8x90° (3x120°)

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

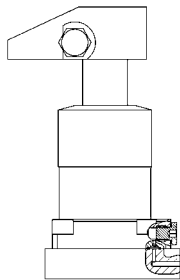
Type 22 = double acting, left swinging

Type 210 = double acting, right swinging, extended stroke

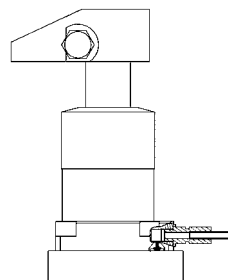
Type 220 = double acting, left swinging, extended stroke

CONNECTION OPTIONS:

> O-ring connection



> Threaded connection



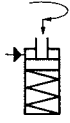
CLAMPING TIME AND Q OF THE SWING CLAMPS 6951KP AND FP

Swing clamp clamping force [kN]	Clamp arm, standard		Clamp arm, long	
	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

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



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

* Clamping forces with short clamping arm.

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 workpieces must 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.

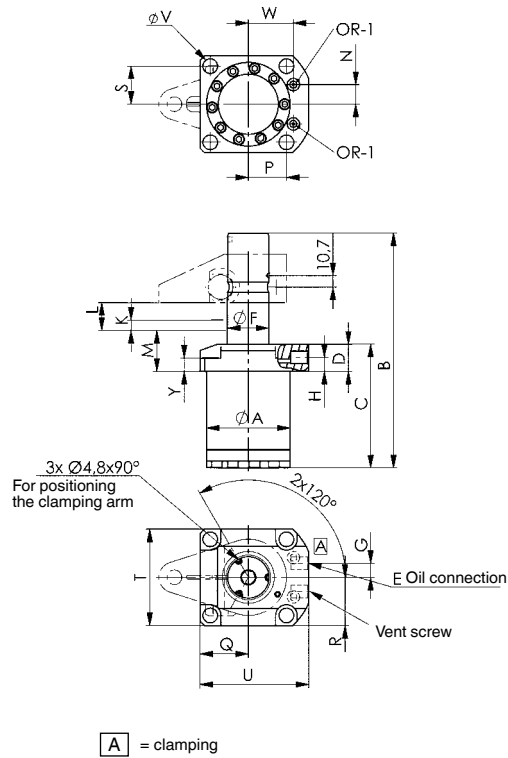
Note:

The piston is guided, and so the max. permissible 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. To control the oil feed, the throttle/check valve no. 6916-12-04 can be optionally used. Other swivel angles are available on request.

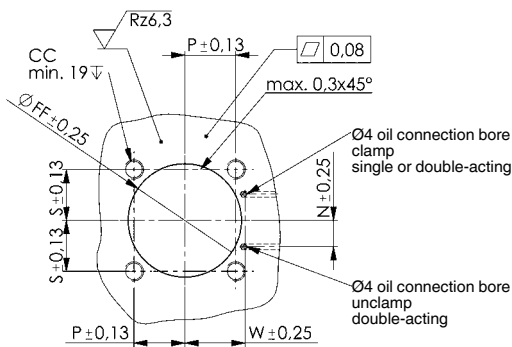


CAD

Subject to technical alterations.



Drilling template device:



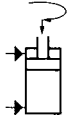
Dimensions:

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	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

No. 6951KP

Swing Clamp, top-flange-mounting

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



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 [cm ³]	Vol. Lo [cm ³]	eff. piston area Sp [cm ²]	eff. piston area Lo [cm ²]	Q max. [l/min]	Weight [g]
327197	6951KP-22-21	22	54	14,5	28,0	21,2	43,3	7,6	15,5	2,5	2590
327205	6951KP-22-22	22	54	14,5	28,0	21,2	43,3	7,6	15,5	2,5	2590
327213	6951KP-22-210**	22	54	32,0	45,5	34,9	71,3	7,6	15,5	2,5	2948
327221	6951KP-22-220	22	54	32,0	45,5	34,9	71,3	7,6	15,5	2,5	2948
327239	6951KP-33-21	33	80	16,0	30,0	34,3	68,4	11,4	22,8	2,5	4355
327247	6951KP-33-22	33	80	16,0	30,0	34,3	68,4	11,4	22,8	2,5	4355
327254	6951KP-33-210**	33	80	32,0	46,0	52,6	105,0	11,4	22,8	2,5	4881
327262	6951KP-33-220**	33	80	32,0	46,0	52,6	105,0	11,4	22,8	2,5	4881

Sp = clamp, Lo = unclamp

* Clamping forces with short clamping arm.

** Not a stock item!

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 workpieces must 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:

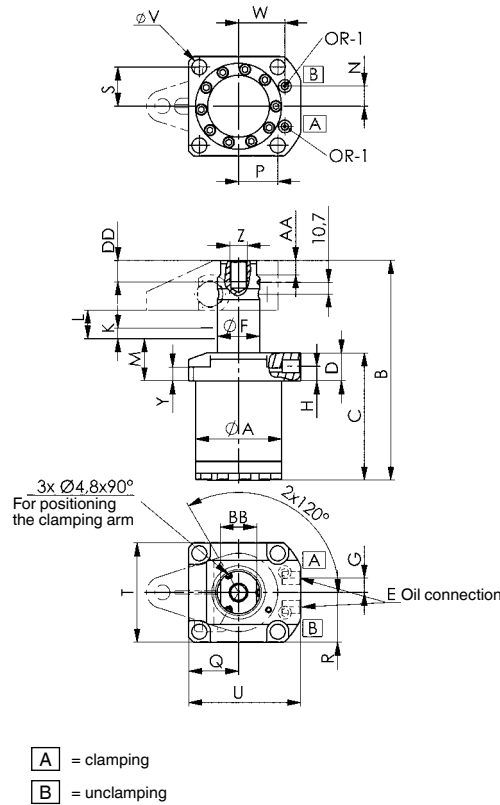
The piston is guided, and so the max. permissible oil flow rate Q max. as well as the clamping arm length and weight must be observed. When mounting accessories at the piston, no force may be applied to the piston. When installing, ensure that all air is bled from the system.

To control the oil feed, the throttle/check valve no. 6916-12-04 can be optionally used. Other swivel angles are available on request.

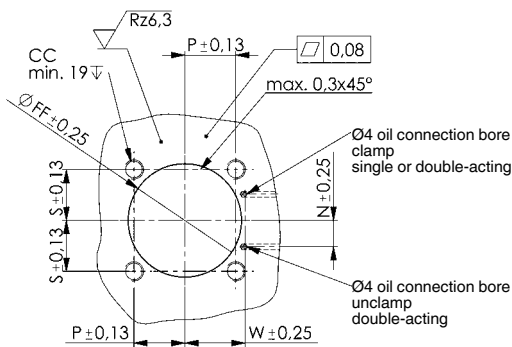


CAD

Subject to technical alterations.



Drilling template device:



Dimensions:

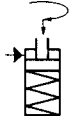
Order no.	Article no.	dia. A	B	C	D	E	dia. F	G	H	K	L	M	N	P	Q	R	S	T	U	dia. V	W	Y	Z	AA	BB	CC	DD	dia. FF	OR-1 O-ring Order No.
327197	6951KP-22-21	62,8	185,5	104,5	25	G1/4	31,74	13	13	14,5	28,0	33,5	14,5	27,4	35,5	35,5	27,4	71	85,5	10,7	35,1	13,0	M16	12,5	26,5	M10	19	63,4	183608
327205	6951KP-22-22	62,8	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

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



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

* Clamping forces with short clamping arm.

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 workpieces must 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.

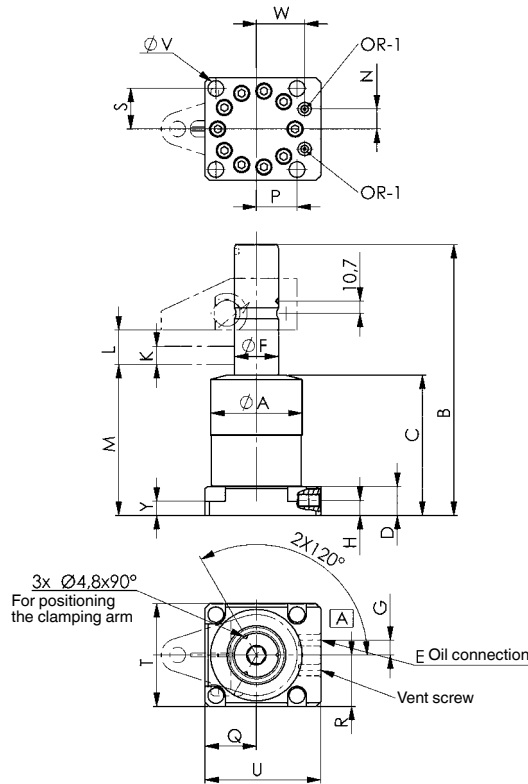
Note:

The piston is guided, and so the max. permissible 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. To control the oil feed, the throttle/check valve no. 6916-12-04 can be optionally used. Other swivel angles are available on request.



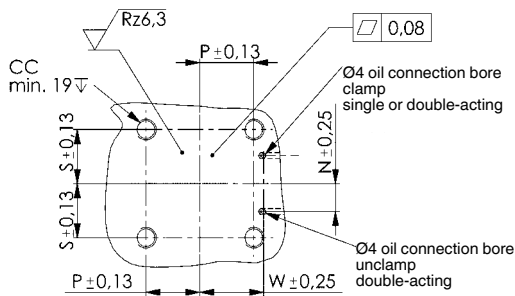
CAD

Subject to technical alterations.



A = clamping

Drilling template device:



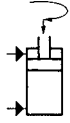
Dimensions:

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

No. 6951FP

Swing Clamp, base-flange-mounting

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



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 [cm ³]	Vol. Lo [cm ³]	eff. piston area Sp [cm ²]	eff. piston area Lo [cm ²]	Q max. [l/min]	Weight [g]
327312	6951FP-22-21	22	54	14,5	28	21,2	43,3	7,6	15,5	2,5	3070
327320	6951FP-22-22	22	54	14,5	28	21,2	43,3	7,6	15,5	2,5	3070
327338	6951FP-33-21	33	80	16,0	30	34,3	68,4	11,4	22,8	2,5	4854
327346	6951FP-33-22	33	80	16,0	30	34,3	68,4	11,4	22,8	2,5	4854

Sp = clamp, Lo = unclamp

* Clamping forces with short clamping arm.

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 workpieces must 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:

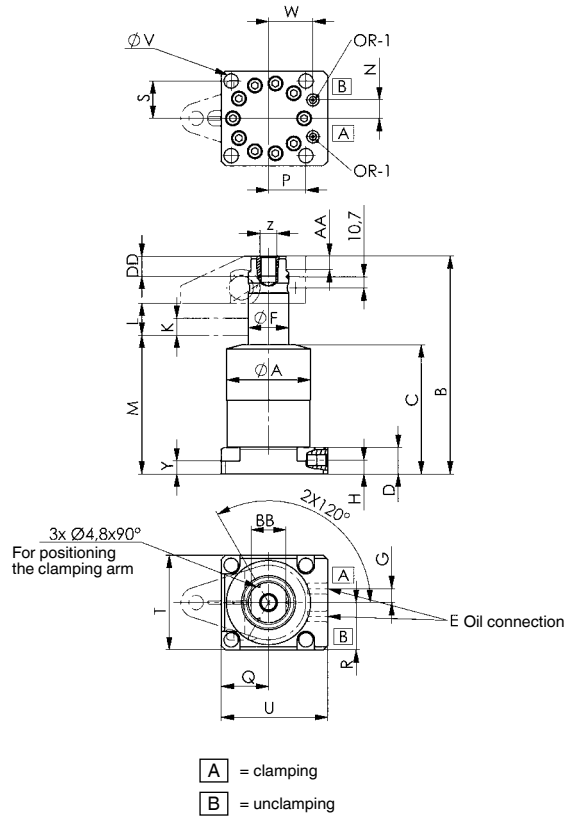
The piston is guided, and so the max. permissible oil flow rate Q max. as well as the clamping arm length and weight must be observed. When mounting accessories at the piston, no force may be applied to the piston. When installing, ensure that all air is bled from the system.

To control the oil feed, the throttle/check valve no. 6916-12-04 can be optionally used.

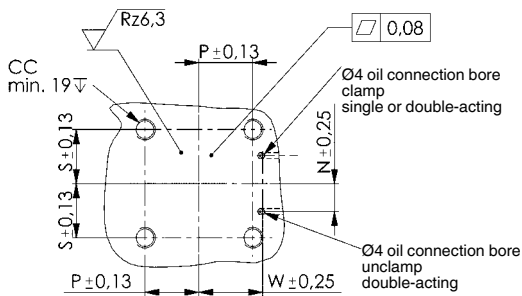
Other swivel angles are available on request.

CAD





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

No. 6951N

Swing Clamp Arm, standard



CAD



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

Design:

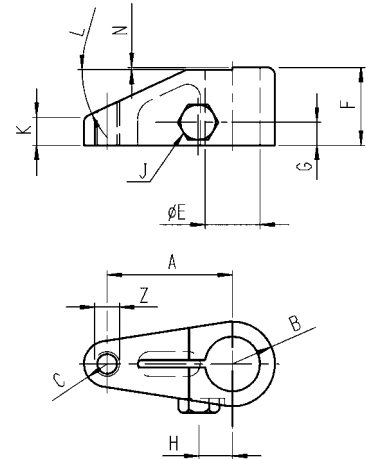
Tempered and blued steel.

Application:

For swing clamps No. 6951xx, size 22 and 33.

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.	for size	A	B	C	D	dia. E	F	G	H	J	K	L	M	N	Weight [g]
69500	6951N-22-76	6951xx-22-xx	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	6951xx-33-xx	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:

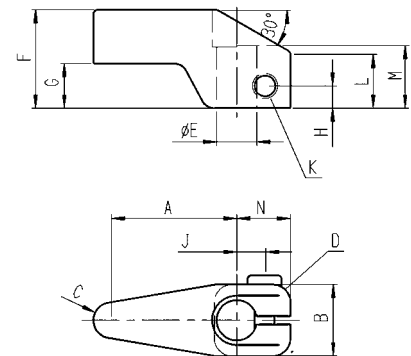
Tempered and blued steel.

Application:

For swing clamps No. 6951xx, size 22 and 33.

Note:

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



Subject to technical alterations.

No. 6951N

Swing Clamp Arm, long



Order no.	Article no.	for size	A	B	C	D	dia. E	F	G	H	J	N	L	Weight [g]
69161	6951N-22-165	6951xx-22-xx	165,0	70,5	28,5	19	31,75 +0,05	44,5	12,5	22,4	M16x1,5	0,05	25°	1161
60855	6951N-33-180	6951xx-33-xx	180,3	45,0	30,0	34	38,11 +0,05	44,5	14,2	25,5	M16x1,5	-	25°	1996

Design:

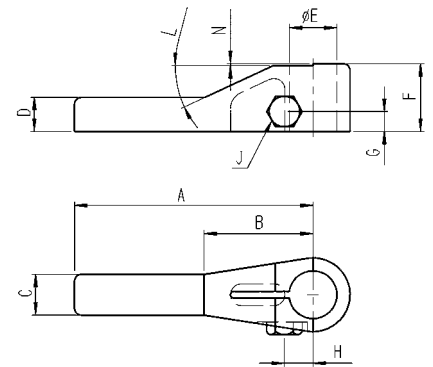
Tempered and blued steel.

Application:

For swing clamps No. 6951xx, size 22 and 33.

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



Order no.	Article no.	for size	A	2A	B	C	D	dia. E	F	G	H	J	Weight [g]
69526	6951N-22-280	6951xx-22-xx	140,0	280,0	70,5	28,5	19	31,75 +0,05	44,5	12,5	22,4	M16x1,5	1869
60863	6951N-33-360	6951xx-33-xx	180,3	360,7	44,6	30,0	34	38,11 +0,05	44,5	14,2	25,5	M16x1,5	3311

Design:

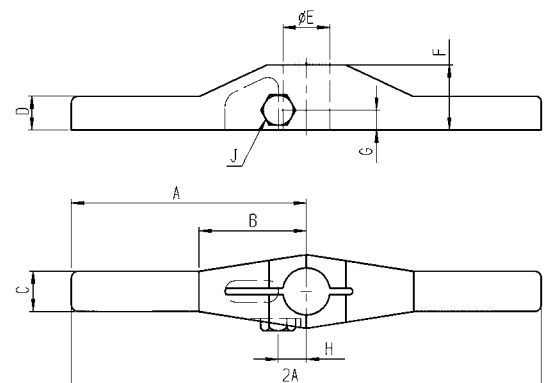
Tempered and blued steel.

Application:

For swing clamps No. 6951xx, size 22 and 33.

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



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

Design:

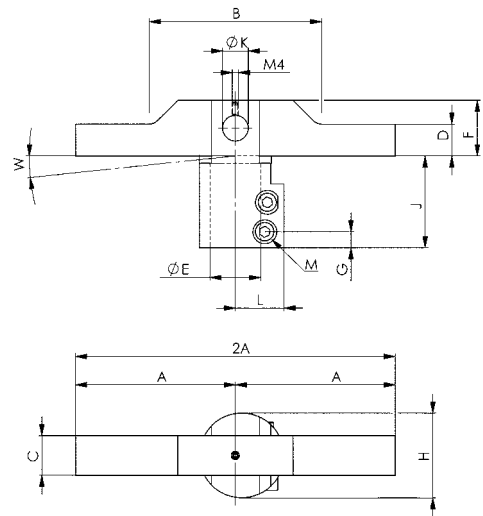
Steel, blued. Clamping arm tempered.

Application:

For all Series 6951xx, size 22 and 33 swing clamps. Used for clamping two workpieces with slightly different heights.

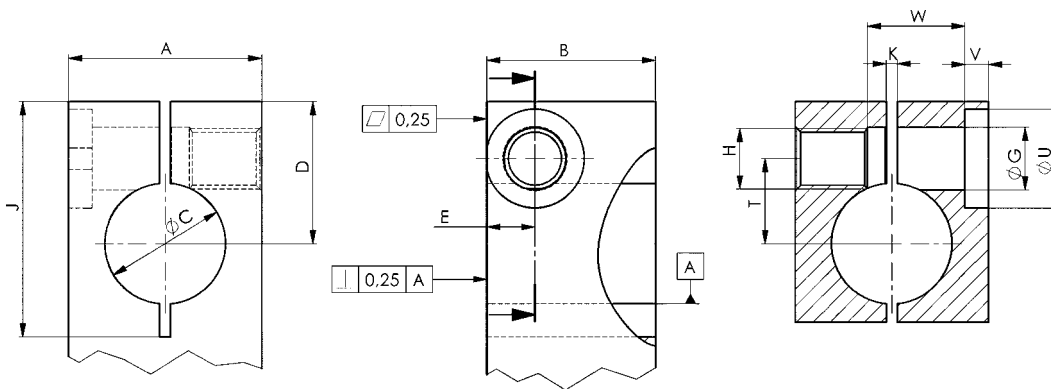
Note:

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):

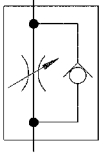
for size	A	B	$\varnothing C$ +0,025	D	E	$\varnothing G$	H	J	K	T	U	V	W
-22	51	44,5	31,775	37,4	12,5	16,5	M16x1,50-6H	59	2,93	22,4	26	6,2	25,7
-33	70	44,5	38,138	40,4	14,2	16,5	M16x1,50-6H	65	3,23	25,5	26	9,6	35,5

Subject to technical alterations.

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]	G	Weight [g]
326579	6916-12-01	20,7	11,1	15,16	15,9	14	27	G1/8	47
326611	6916-12-04	20,9	11,2	18,72	21,0	19	47	G1/4	47

Design:

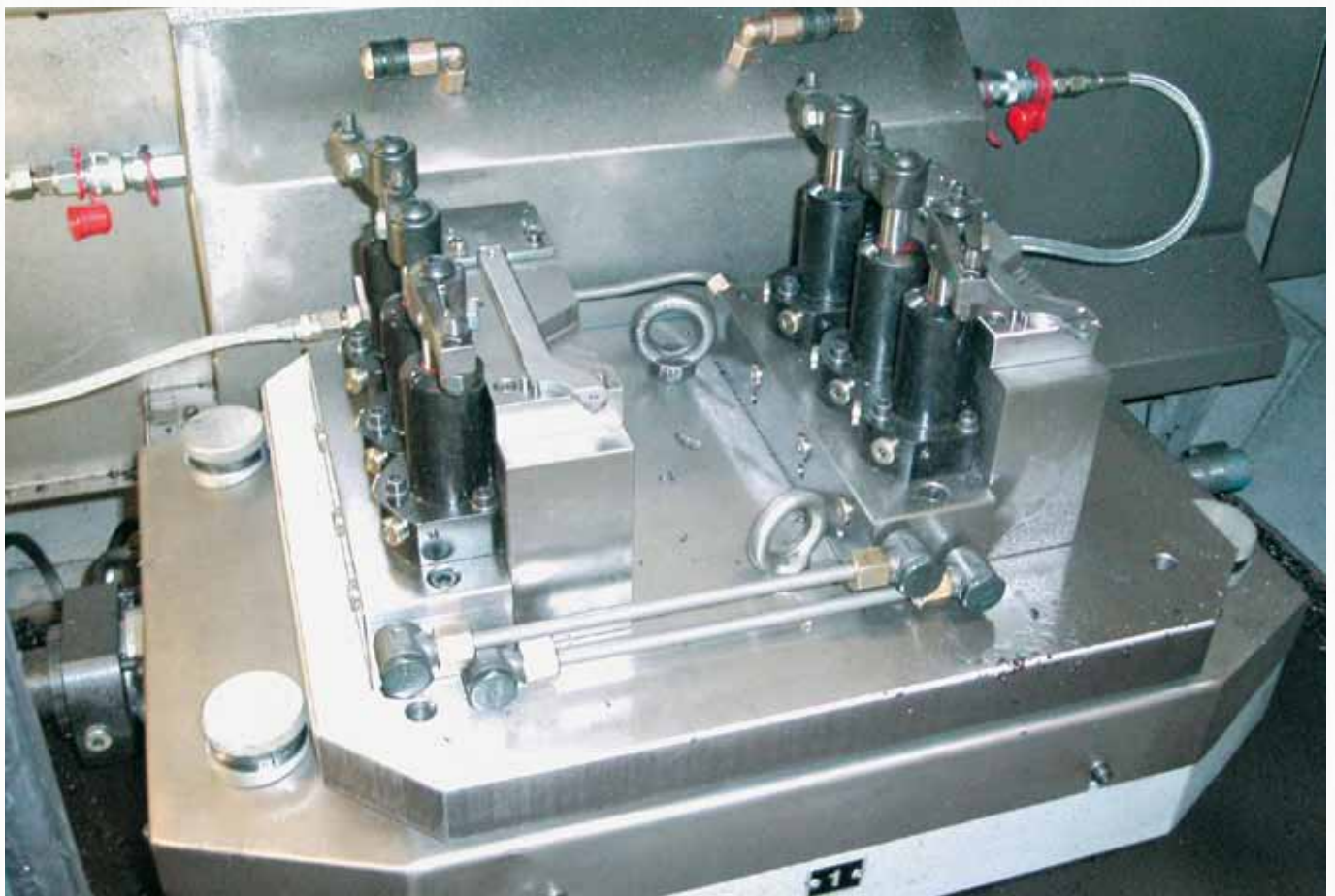
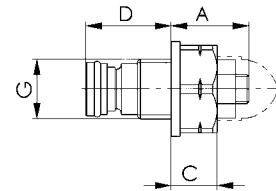
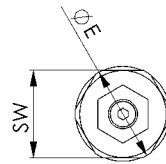
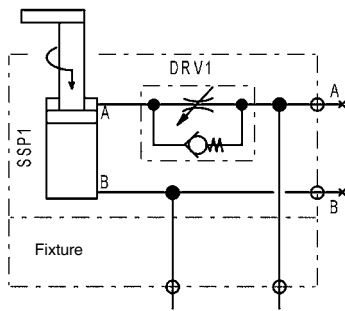
Housing made of steel, hardened and blued. Compact size.

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.



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.	0,165	0,1	0,1
Max. clamping-arm weight	g	118		
Spring force*	N	78		

* single-acting version

Size 05

Clamping arm length	mm	38	76	127
Max. clamping pressure	bar	350	176	107
Clamping force	kN	5	2,2	0,88
Output flow	l/min.	0,4	0,35	0,35
Max. clamping-arm weight	g	354		
Spring force*	N	210		

* single-acting version

Size 11

Clamping arm length	mm	51	101,5	152
Max. clamping pressure	bar	350	177	119
Clamping force	kN	11	5,1	3,0
Output flow	l/min.	1,64	1,3	1,3
Max. clamping-arm weight	g	807		
Spring force*	N	696		

* single-acting version

Size 22

Clamping arm length	mm	63,5	101,5	152
Max. clamping pressure	bar	350	192	138
Clamping force	kN	22	10	6,7
Output flow	l/min.	2,5	1,8	1,8
Max. clamping-arm weight	g	1869		
Spring force*	N	943		

* single-acting version

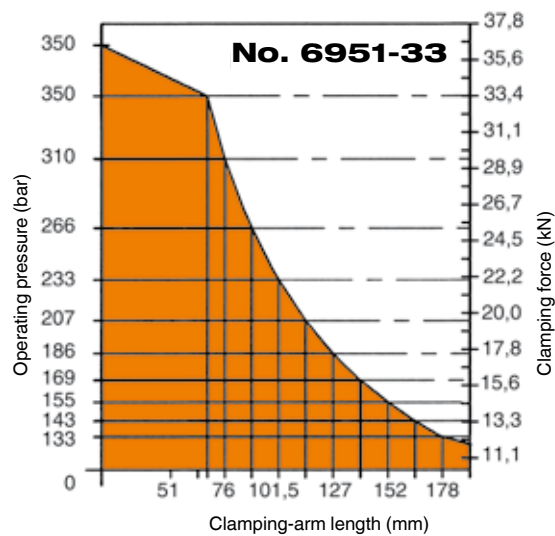
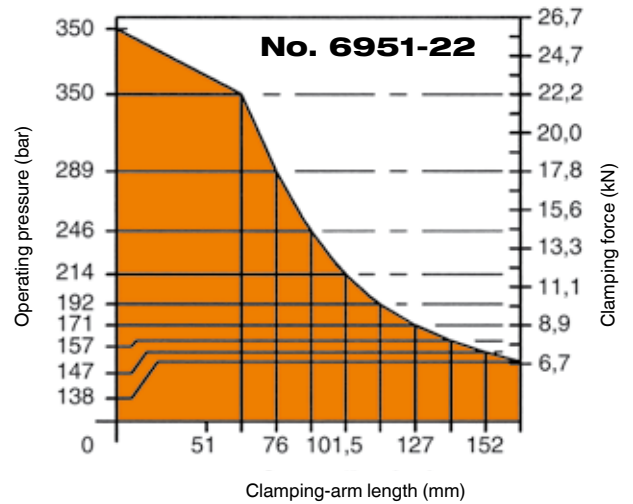
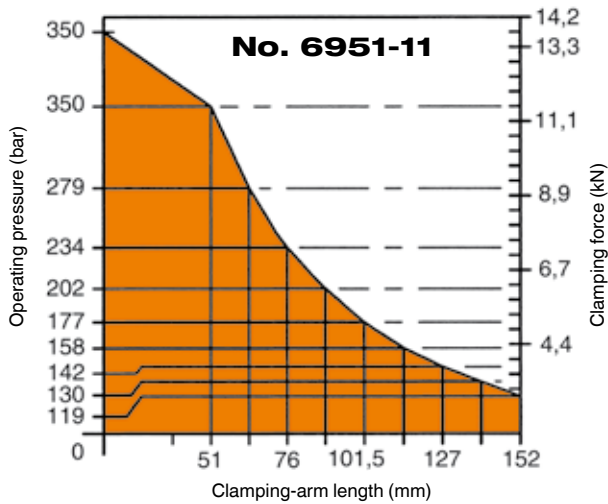
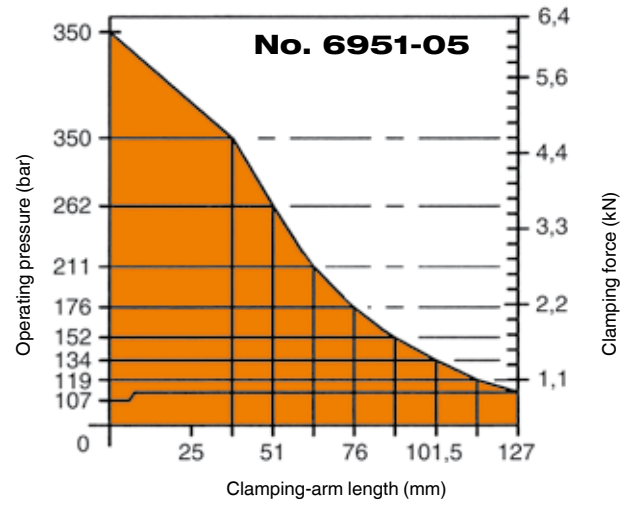
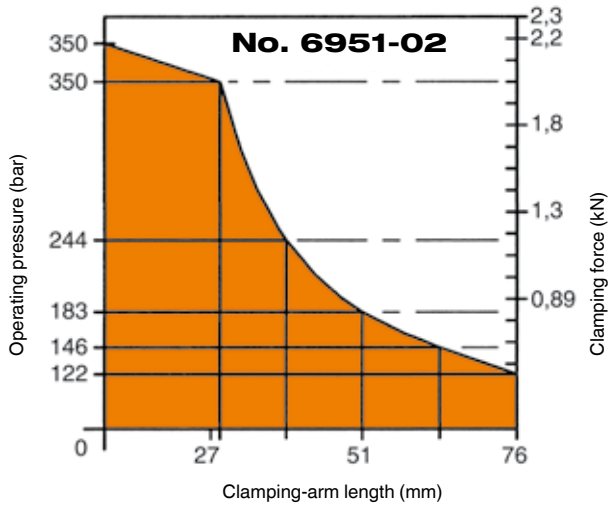
Size 33

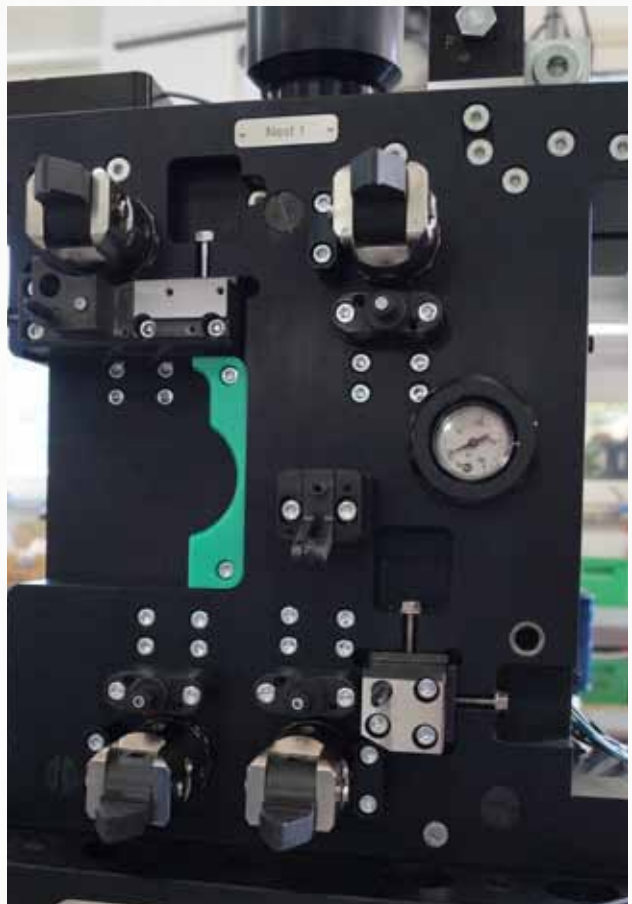
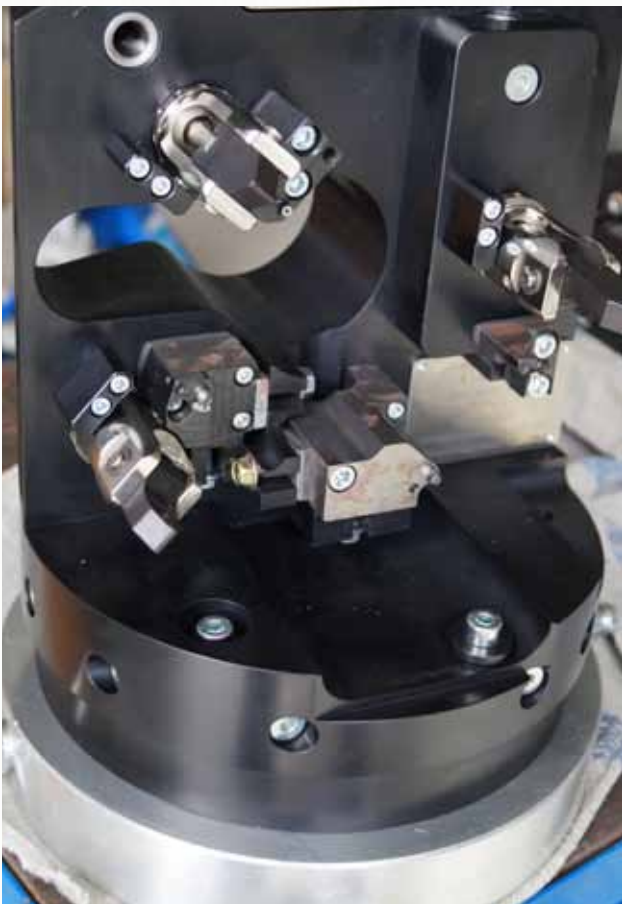
Clamping arm length	mm	68	101,5	178
Max. clamping pressure	bar	350	233	133
Clamping force	kN	33,4	22,2	12
Output flow	l/min.	2,5	1,7	1,0
Max. clamping-arm weight	g	3311		
Spring force*	N	1188		

* single-acting version

DIAGRAM DESCRIPTION:

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





VERTICAL AND LINK CLAMPS FOR DEMANDING TASKS

VERTICAL CLAMP

- > piston force up to 20,1 kN
- > pneumatic clamping control

LINK CLAMP

- > piston force up to 44,0 kN
- > chemically nitrided body
- > burnished 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	Piston force [kN]	No. of models	max. operating pressure [bar]	Operating mode
6958E	3,1 - 7,0	2	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
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. 6958E



- > Piston force: 3,1 - 7,0 kN
- > Connection type: drilled oil channels

NO. 6958AT



- > Piston force: 5 - 20 kN
- > Connection type: drilled oil channels or adapter with threaded connection

NO. 6959C

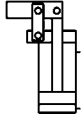


- > Piston force: 2,8 - 20,1 kN
- > Connection type: drilled oil channels or adapter with threaded connection

No. 6958E-XX

Vertical clamp, cartridge flange

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



Order no.	Article no.	Piston force F5 at 100 bar [kN]	Piston force F5 at 250 bar [kN]	Vol. Sp [cm ³]	Vol. Lo [cm ³]	Piston dia. [mm]	eff. piston area Sp [cm ²]	eff. piston area Lo [cm ²]	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

Sp = clamp, Lo = unclamp

Design:

Housing from steel, outside surface nickel-plated, piston rod hardened.
Housing with two holes for connection of anti-twist protection.
Two cylinder pins for anti-twist protection are 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.

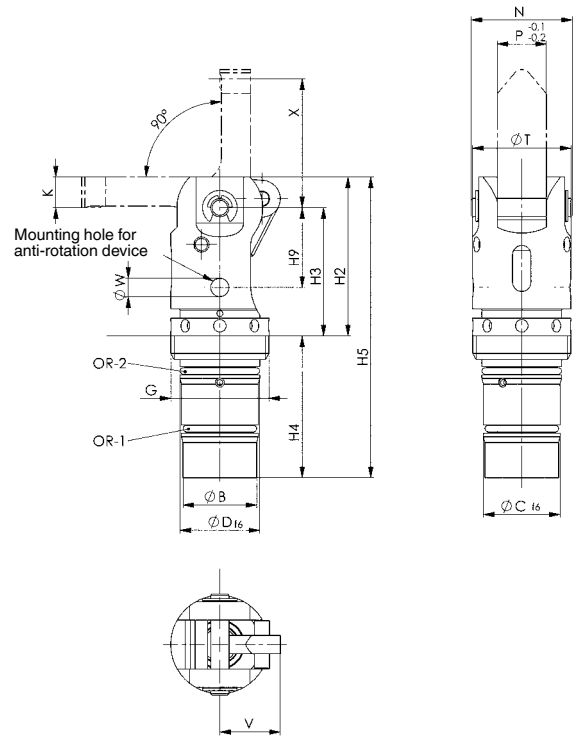
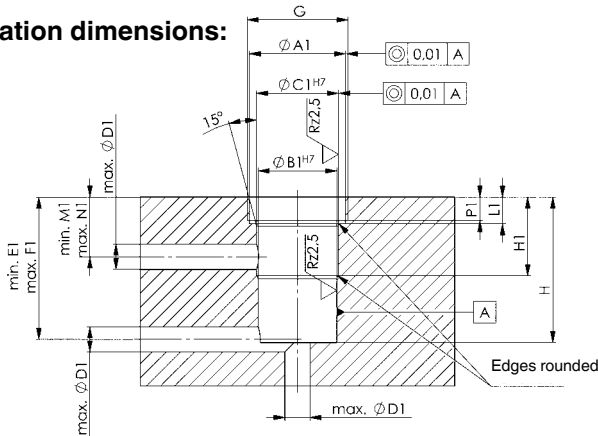
Note:

The insertion bevels for the seals must not have any sharp transitions.
Mill the thread up to the flat surface. Lubricate housing for mounting.

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	16	10	32	19,69	6
328039	6958E-30	36	37	38	M48x1,5	77,0	62,0	69,0	146	38	49,5	24	15	48	29,54	8

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	OR-1 O-ring Order No.	OR-2 O-ring Order No.
328013	6958E-20	30,5	25	26	8	45,2	47,2	M32x1,5	46,2	25	8,5	19,0	21,0	7,5	554575	554576
328039	6958E-30	46,5	37	38	10	68,0	70,0	M48x1,5	69,0	35	12,0	27,5	29,5	10,0	554577	554578

Subject to technical alterations.

No. 6958E-XX-0X

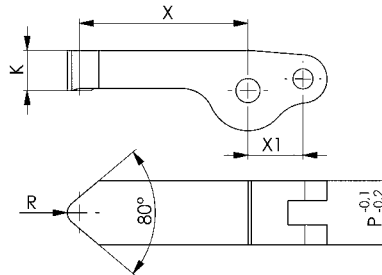
Steel clamping arm

Case-hardened steel,
for vertical clamps 6958E-XX



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	14	10	16	3	66
328070	6958E-20-00-02	1,11	2,72	35	14	10	16	3	74
328096	6958E-20-00-03	0,92	2,30	42	14	10	16	3	82
328062	6858E-30-00-01	3,19	7,96	41	21	15	24	5	215
328088	6958E-30-00-02	2,56	6,40	51	21	15	24	5	242
328104	6958E-30-00-03	2,14	5,35	61	21	15	24	5	270

*X1 = Lever length at 90°



No. 6958ER-XX-00

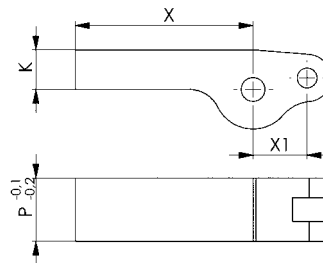
Clamping arm blank from steel

Unhardened steel,
for vertical clamps 6958E-XX



Order no.	Article no.	X	X1*	K	P	Weight [g]
328112	6958E-20-00	45	14	10	16	88
328120	6958E-30-00	66	21	15	24	287

*X1 = Lever length at 90°



No. 6958E-XX-00-00

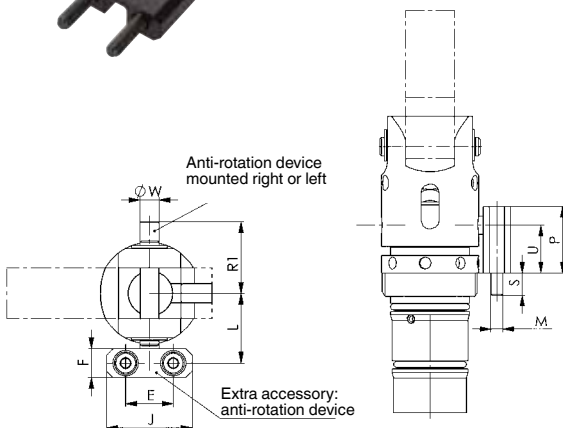
Anti-rotation device



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

Design:

Made of aluminium, black anodised.

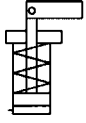


Subject to technical alterations.

No. 6958Sx-16

Vertical Clamp

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



No. 6958SU-16



No. 6958ST-16

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:

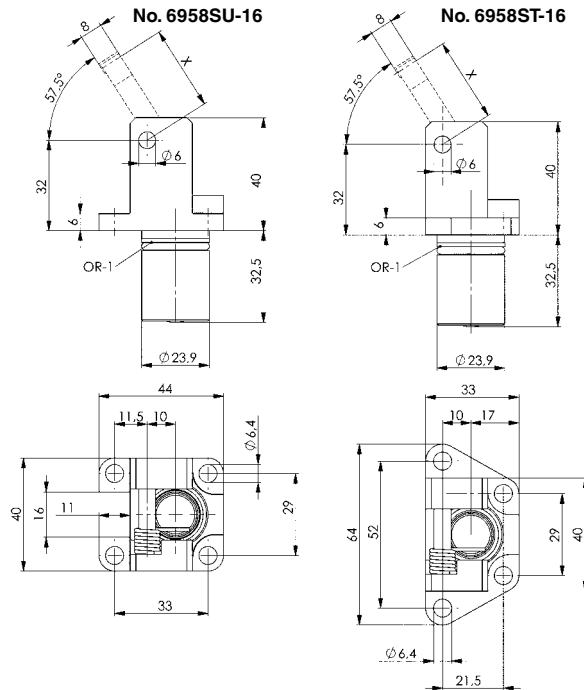
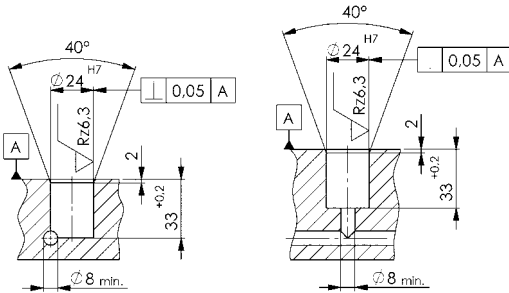
Small dimensions, can be installed closely spaced side-by-side. The clamping levers can be exchanged easily in the installed position.

Note:

Screws according to ISO4762 M6, strength class 12.9, lightly oiled, tightening torque $M_d = 18 \text{ Nm}$ 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.

Installation dimensions:

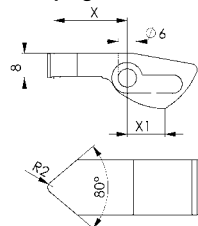


No. 6958S-16

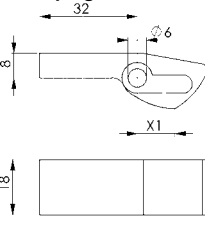
Clamp arm out of steel

Case hardened steel, for vertical clamp no. 6958Sx-16 max. operating pressure 350 bar.

Clamping arm



Clamping arm blank



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

No. 6958A-16

Clamp arm out of aluminium

For vertical clamp no. 6958Sx-16 max. operating pressure 100 bar.

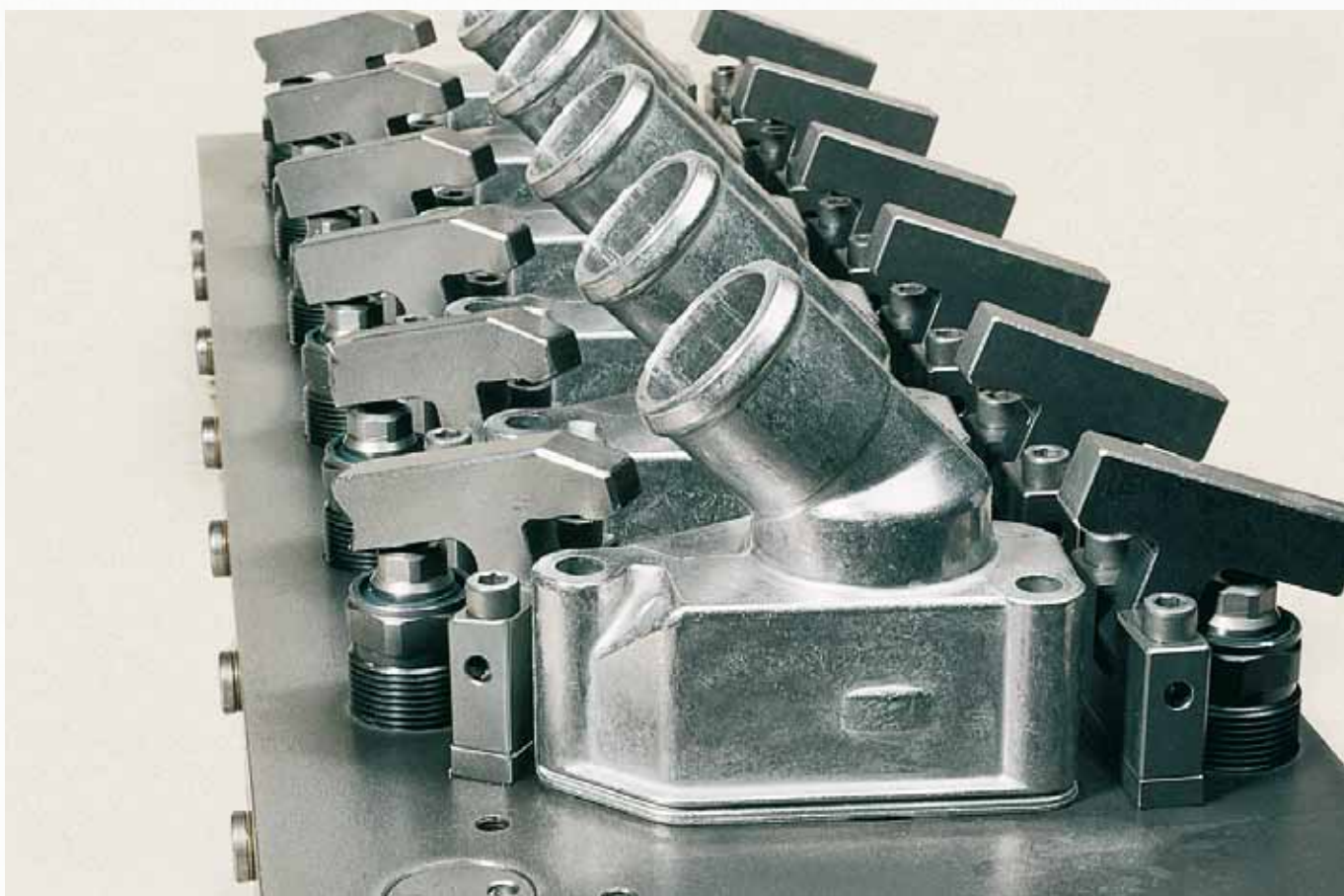
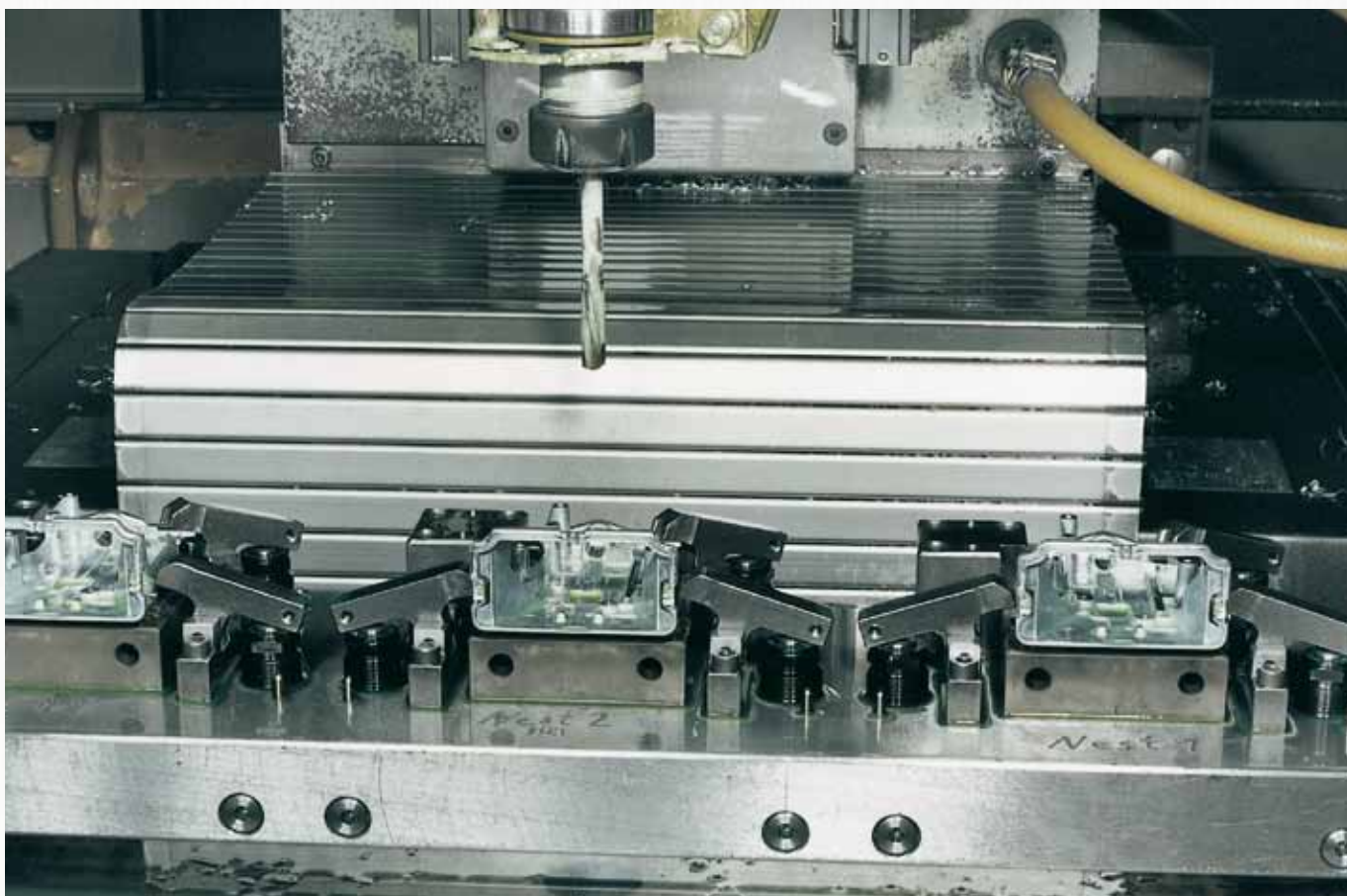


Order no.	Article no.	X	X1*	Clamping force at 100 bar [kN]	Weight [g]
320242	6958A-16-00-02	18	12	1,3	21
320267	6958A-16-00-03	24	12	1,0	23
320283	6958A-16-00-04	30	12	0,8	25
322453	6958A-16-00-05**	-	12	-	26

* X1 = level length at 90°

** Clamp arm blank

Subject to technical alterations.

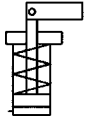


Subject to technical alterations.

No. 6958AU

Vertical Clamp

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



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]
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:

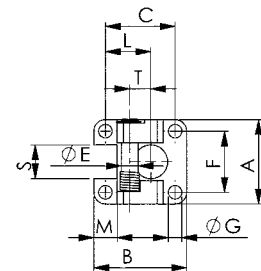
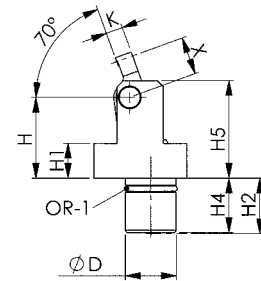
This vertical clamp can be used for clamping in cavities or in very tight spaces.

Features:

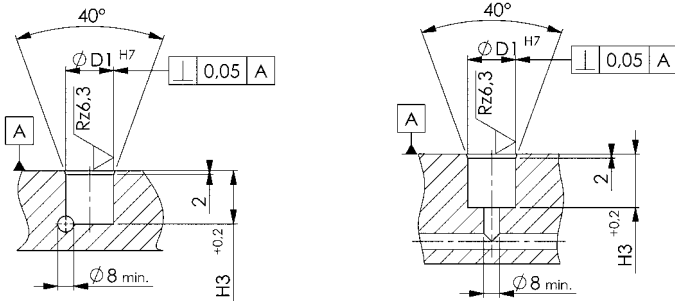
Small dimensions, can be installed closely spaced side-by-side. The clamping levers can be exchanged easily in the installed position.

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

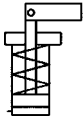
Dimension X, see clamping lever

Subject to technical alterations.

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:

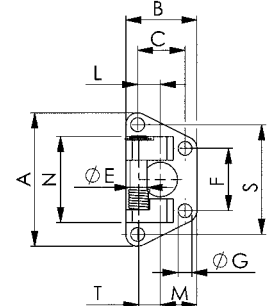
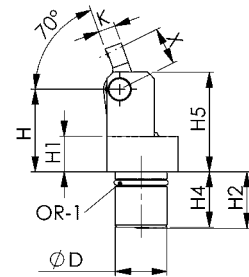
This vertical clamp can be used for clamping in cavities or in very tight spaces.

Features:

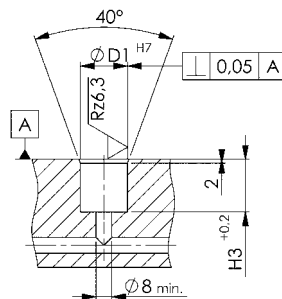
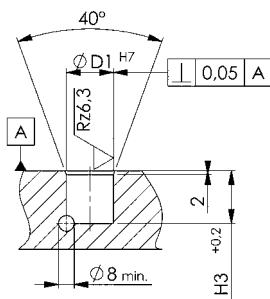
Small dimensions, can be installed closely spaced side-by-side. The clamping arms can be exchanged easily in the installed position.

Note:

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

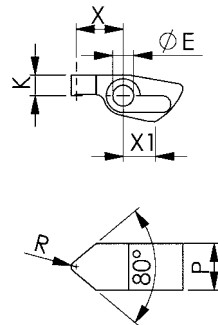
Clamp arm out of steel

Case hardened steel,
for vertical clamp no. 6958A
max. operating pressure 250 bar.



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°



CAD



No. 6958S

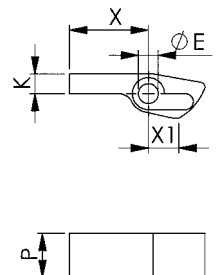
Clamp arm out of steel

Case hardened steel,
for vertical clamp no. 6958Ax,
max. operating pressure 250 bar.



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°



CAD



Subject to technical alterations.

No. 6958A

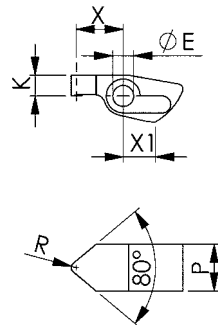
Clamp arm out of aluminium

For vertical clamp no. 6958Ax,
max. operating pressure 100 bar.



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°



CAD



No. 6958A

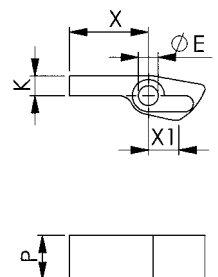
Clamp arm out of aluminium

For vertical clamp no. 6958Ax,
max. operating pressure 100 bar.



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°



CAD



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.

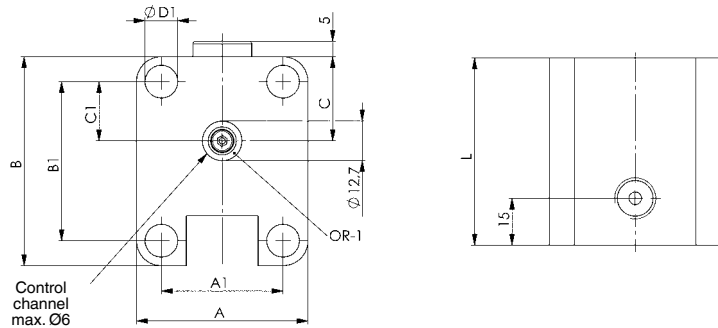
Supply scope includes O-ring dia.9x2, threaded plugs and fastening screws.

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.

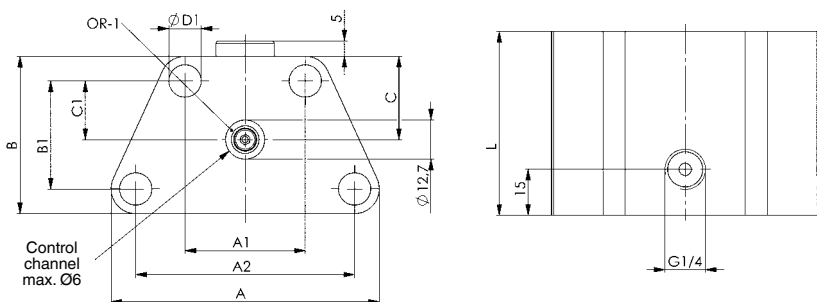
Supply scope includes O-ring dia.9x2, threaded plugs and fastening screws.

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



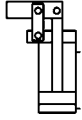
Subject to technical alterations.



No. 6958DU

Vertical Clamp

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



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]	Weight [g]
326272	6958DU-16	1,3	3,3	2,0	5,0	2,0	1,2	2,0	1,2	7,5	334
326314	6958DU-20	2,1	5,2	3,1	7,8	3,8	2,4	3,1	2,0	15,0	624
326371	6958DU-25	3,2	8,2	4,9	12,2	6,9	4,1	4,9	2,9	27,0	906
327536	6958DU-32	5,3	13,4	8,0	20,1	13,7	8,3	8,0	4,9	47,0	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 included in the supply scope. All components from hardened steel, tempered and burnished. Piston and hinge pins from hardened steel, tempered and nitrided. Metal wiper to protect the dirt wiper integrated into the housing. Compressed air nozzle for pneumatic clamping control from highly rigid plastic. Supply scope includes hinge pins, tension plates and compressed air nozzle, but not clamping levers. 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:

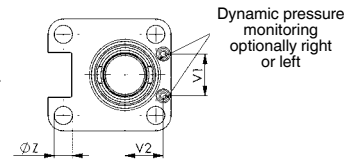
Small dimensions. Allows close side-by-side positioning. Clamping levers easy to change with built-in vertical clamp. The horizontal centre axis at the clamping lever and the pressure point on the workpiece lie in one plane. This prevents relative movement on the workpiece. To protect the O-rings sitting 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:

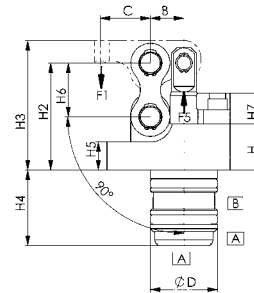
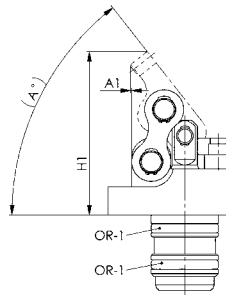
The signal converter is not included in the supply scope.

The lever ratio B to C is 1 to 1.5 for the standard levers!

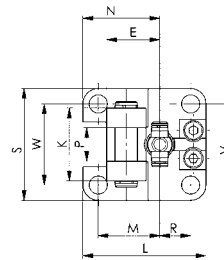
In preparing the blank levers, deviations that cause a higher clamping force are permitted only in exceptional cases.



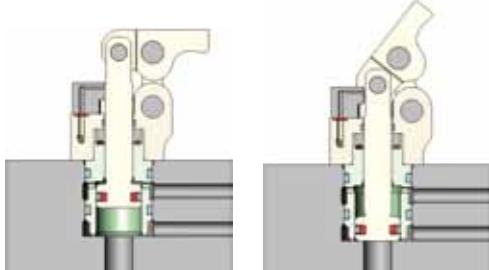
Dynamic pressure monitoring optionally right or left



A = clamping
B = unclamping



Dynamic pressure monitoring:



closed: clamped

open: unclamped

Dimensions:

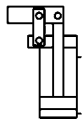
Order no.	Article no.	A	A1	B	C	E	dia. D	H	H1	H2	H3	H4	H5	H6	H7	K	L	M	N	P	R	S	V	V1	V2	W	ØZ	OR-1 O-ring Order No.
326272	6958DU-16	51,9	0,40	12	18,0	19,0	24	16,5	58,4	38,3	46,3	27,0	10	19,3	11	26	44	22	27,5	12	11	40	29	15	13,7	29	6,5	497461
326314	6958DU-20	54,0	1,25	14	21,0	23,0	30	20,3	73,2	49,0	59,0	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.

No. 6958DT

Vertical Clamp

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



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]	Weight [g]
553427	6958DT-12	0,7	1,8	1,1	2,8	0,9	0,5	1,1	0,6	2,7	175
326231	6958DT-16	1,3	3,3	2,0	5,0	2,0	1,2	2,0	1,2	7,5	365
326298	6958DT-20	2,1	5,2	3,1	7,8	3,8	2,4	3,1	2,0	15,0	386
326397	6958DT-25	3,2	8,2	4,9	12,2	6,9	4,1	4,9	2,9	27,0	1015
327510	6958DT-32	5,3	13,4	8,0	20,1	13,7	8,3	8,0	4,9	47,0	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 included in the supply scope. All components from hardened steel, tempered and burnished. Piston and hinge pins from hardened, tempered and nitrided steel. Metal wiper to protect the dirt wiper integrated into the housing. Compressed air nozzle for pneumatic clamping control from highly rigid plastic. Supply scope includes hinge pins, tension plates and compressed air nozzle, but not clamping levers. 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:

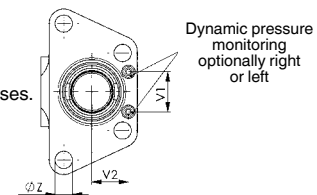
Small dimensions. Allows close side-by-side positioning. Clamping levers easy to change with built-in vertical clamp. The horizontal centre axis at the clamping lever and the pressure point on the workpiece lie in one plane. This prevents relative movement on the workpiece. To protect the O-rings sitting 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:

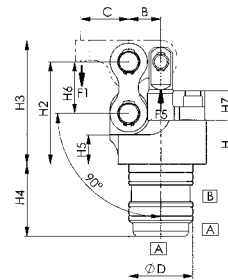
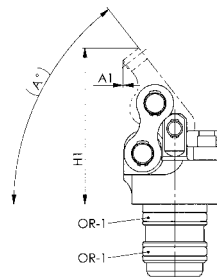
The signal converter is not included in the supply scope.

The lever ratio B to C is 1 to 1.5 for the standard levers!

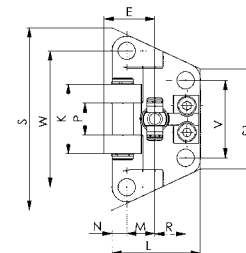
In preparing the blank levers, deviations that cause a higher clamping force are permitted only in exceptional cases.



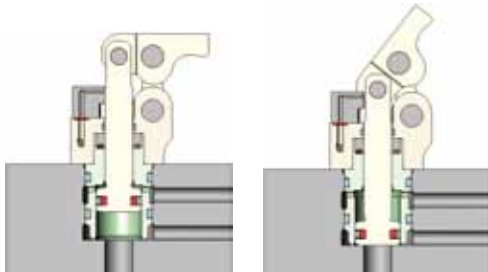
Dynamic pressure monitoring optionally right or left



A = clamping
B = unclamping



Dynamic pressure monitoring:



closed: clamped

open: unclamped

Dimensions:

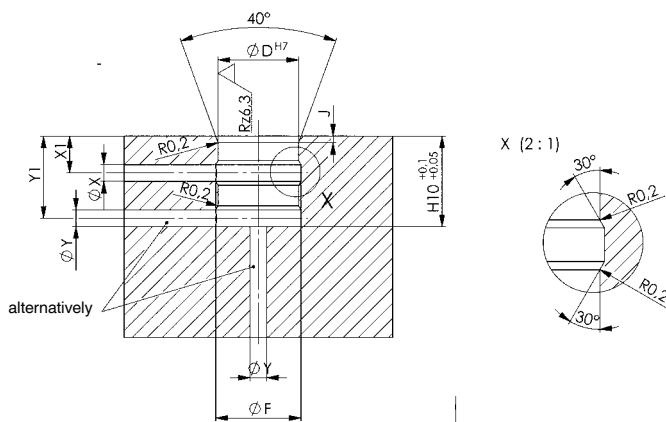
Order no.	Article no.	A	A1	B	C	E	dia. D	H	H1	H2	H3	H4	H5	H6	H7	K	L	M	N	P	R	S	S1	V	V1	V2	W	ØZ	OR-1 O-ring Order No.
553427	6958DT-12	49,5	0,13	10	15,0	17,0	18	13,5	47,7	31,0	38,0	22,0	7	16,0	12,2	20	28,5	10,0	4,5	10	8,5	50,1	23,55	20	7	11,4	36	4,5	409953
326231	6958DT-16	51,9	0,40	12	18,0	19,0	24	16,5	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.

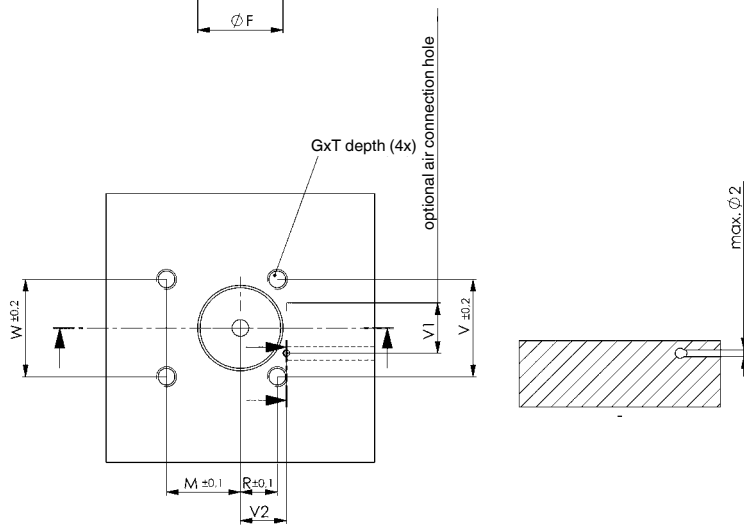
Installation dimensions:

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

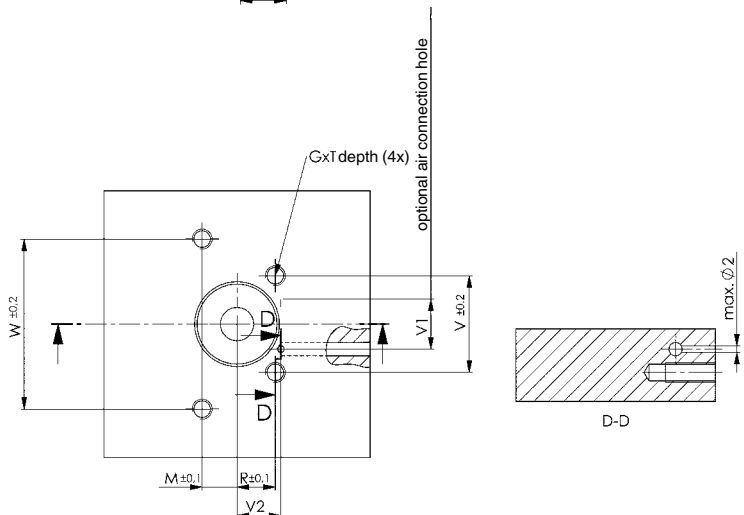
Order no.	Article no.	dia. D H7	dia. F	G x T	H10	J	M	R	V	V1	V2	W	dia. X	X1	dia. Y	Y1
553427	6958DT-12	18	19,4	M4x8	22,0	0,5	10,0	8,5	20	7	11,4	36	4	8	4	20,0
326231	6958DT-16	24	25,4	M6x15	27,0	2,0	10,5	11,5	29	15	13,7	51	5	11	5	24,5
326298	6958DT-20	30	31,4	M8x16	34,0	2,0	13,0	14,0	33	15	17,5	59	5	13	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



No. 6958DU



No. 6958DT



Subject to technical alterations.

No. 6958D-xx-04

Clamping arm

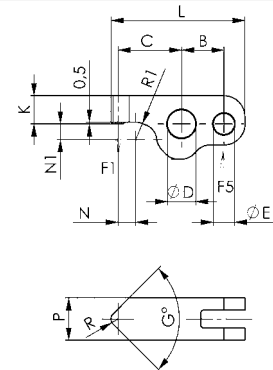
Tempering steel,
for link clamp no. 6958DU and no. 6958DT.



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

Note:

Lever ratios must be respected.



No. 6958DR

Clamping arm, blank

Tempering steel,
for link clamp no. 6958DU and no. 6958DT.



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

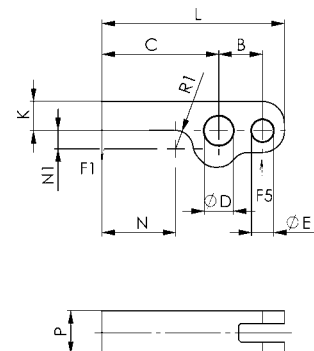
Note:

Lever ratios must be respected.

Formula for determining the clamping force F1:

Clamping force = F1 [kN], Piston force = F5 [kN], Operating lever = B [mm], Load lever = C [mm]

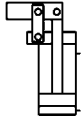
$$F1 = F5 \times B / C$$



No. 6959C

Link clamp

double-acting
max. operating pressure 250 bar,
min. operating pressure 25 bar.



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]	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.

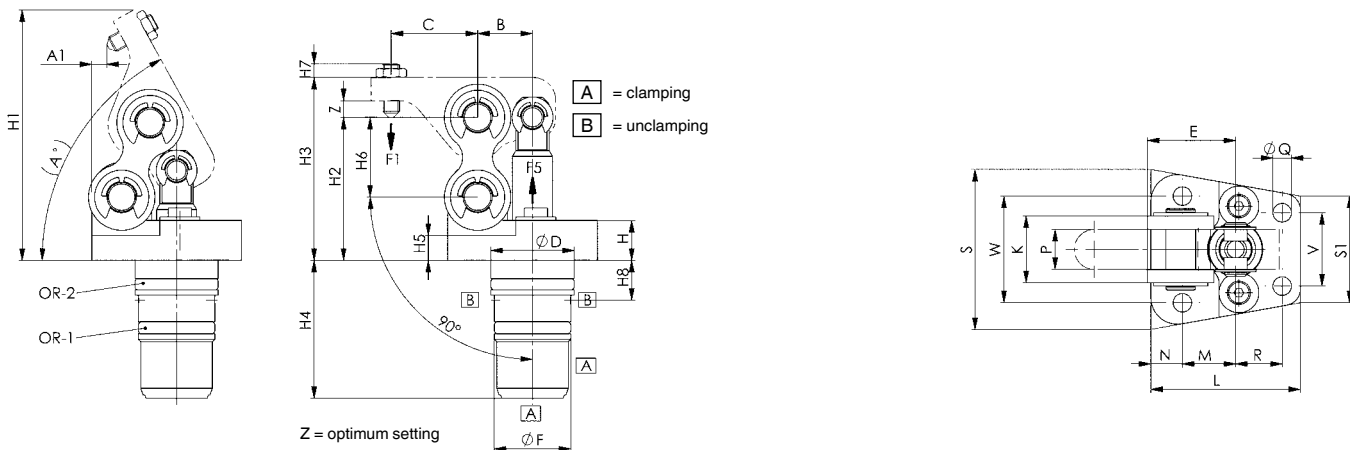
Features:

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 (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.

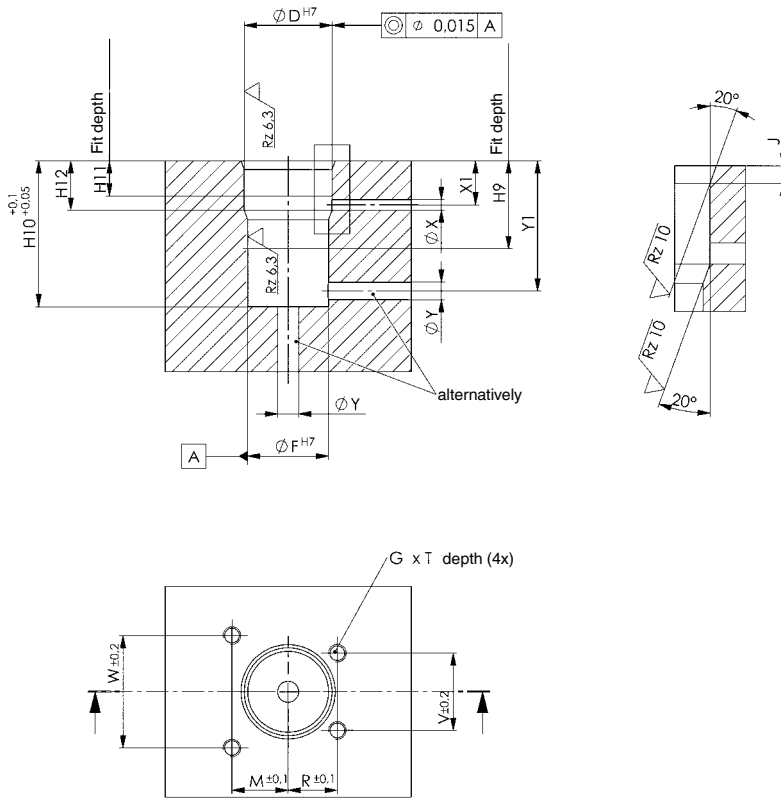


Dimensions:

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	36	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.

Installation dimensions:



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

for link clamp no. 6959C



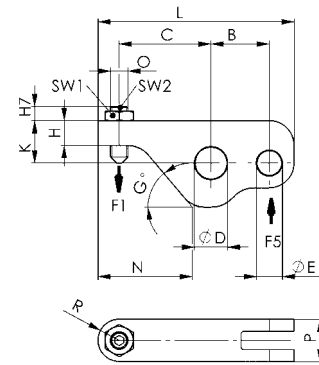
Order no.	Article no.	Clamping force F1 at 100 bar [kN]	Clamping force F1 at 250 bar [kN]	B	C	dia. D	dia. E	G	H	K	L	N	O	P	R	SW1	SW2	Weight [g]
325522	6959C-12-30	0,67	1,7	13,5	22	7	5	50°	4,5	8,5	45,5	20,8	M4	10	5,0	7	2,0	35
325225	6959C-16-30	1,2	3,1	16,5	26	9	7	50°	7,0	12,0	55,5	26,7	M5	12	6,0	8	2,5	70
325233	6959C-20-30	1,9	4,9	19,5	31	10	8	50°	8,0	13,0	65,0	32,4	M6	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	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	24	2x8	17	5,0	395

Design:

Hardened, tempered and burnished steel. Supply scope includes pressure screw.

Note:

Lever ratios must be respected.



No. 6959CR-xx-04

Clamping arm, blank

for link clamp no. 6959C



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.

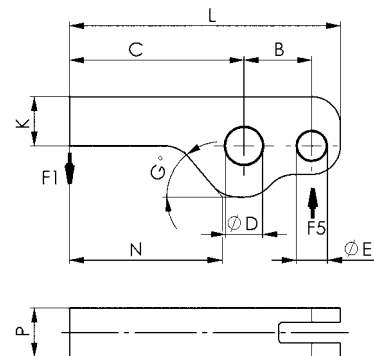
Note:

Lever ratios must be respected.

Formula for determining the clamping force F1:

Clamping force = F1 [kN], Piston force = F5 [kN], Operating lever = B [mm], Load lever = C [mm]

$$F1 = F5 \times B / C$$



Subject to technical alterations.

No. 6959C-xx-15-01

Surface-mounted block

with O-ring and threaded connection



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.

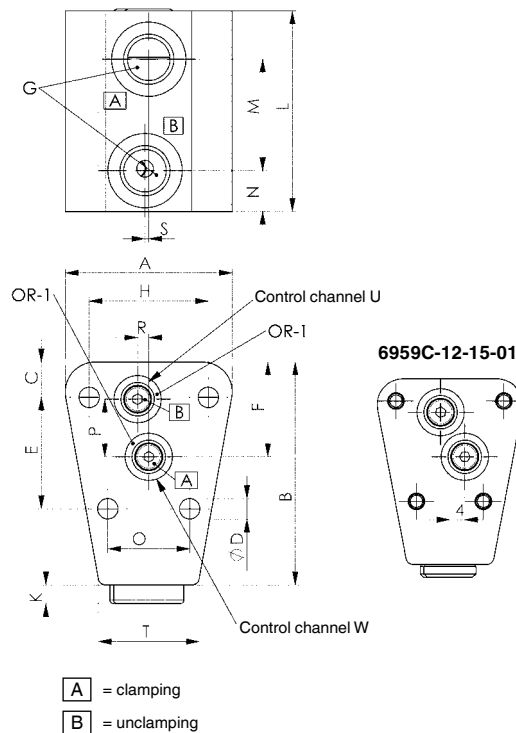
Application:

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.

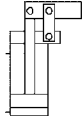
Other lengths available on request.



No. 6959KL

Link Clamp

double-acting
max. operating pressure 350 bar,
min. operating pressure 25 bar.



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]	Weight [g]
321695	6959KL-160	1,5	5,4	2,0	7,0	17,0	7,4	1,5	2,0	0,9	8,3	12	16	755
322057	6959KL-200	2,4	8,4	3,1	11,0	23,0	7,2	3,2	3,1	1,4	14,0	15	20	1876
321711	6959KL-250	3,8	13,2	4,9	17,2	26,5	13,0	6,3	4,9	2,4	35,0	18	25	2390
322032	6959KL-320	6,2	21,6	8,0	28,1	34,0	27,3	10,7	8,0	3,1	69,0	25	32	5320
322040	6959KL-400	9,7	33,8	12,6	44,0	43,0	54,0	27,6	12,6	6,4	120,0	28	40	8820

Sp = clamp, Lo = unclamp

* Clamping force when using standard clamping lever

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 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:

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.

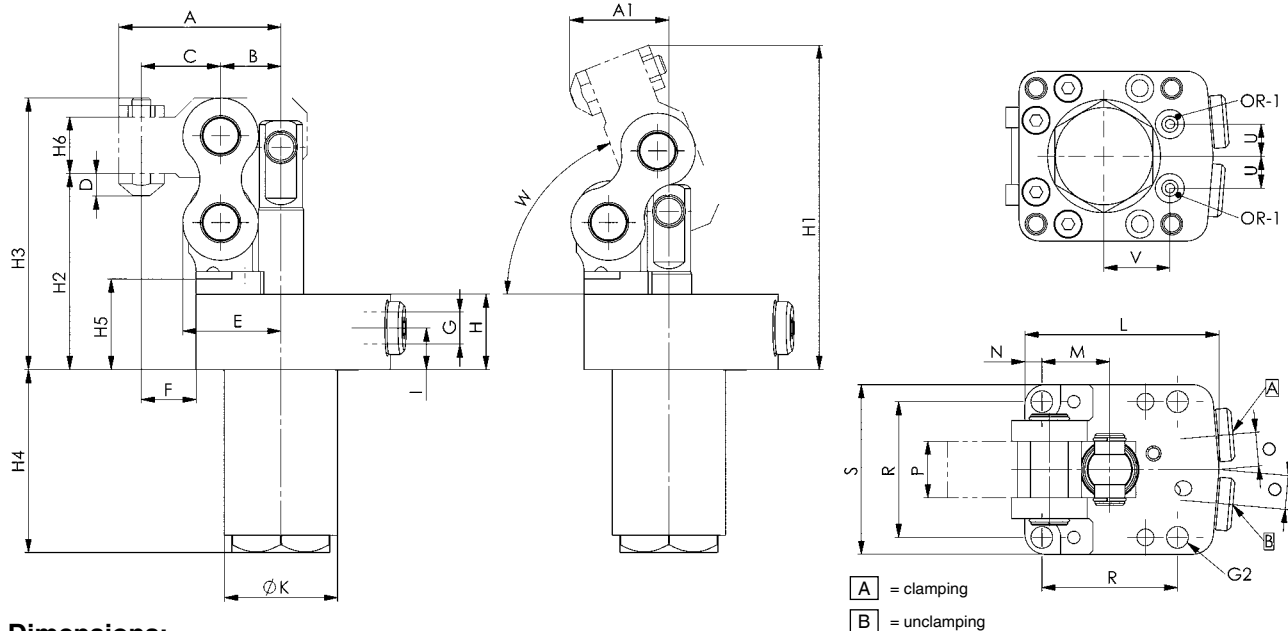
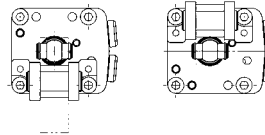
Features:

Top flange version, lever mechanism can be turned in the range of 180° in 90° steps. Special designs are possible.

Note:

Maximum speed of operation 0.5 m/s.

Proximity switch and electrical pressure-point monitoring can be supplied on request.

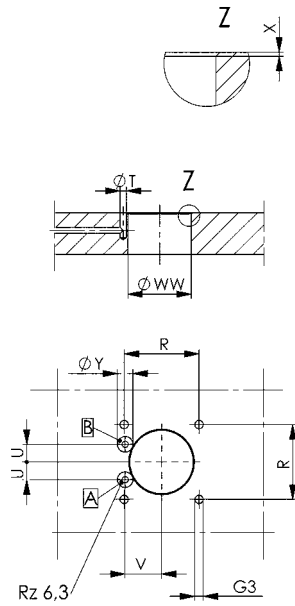


Dimensions:

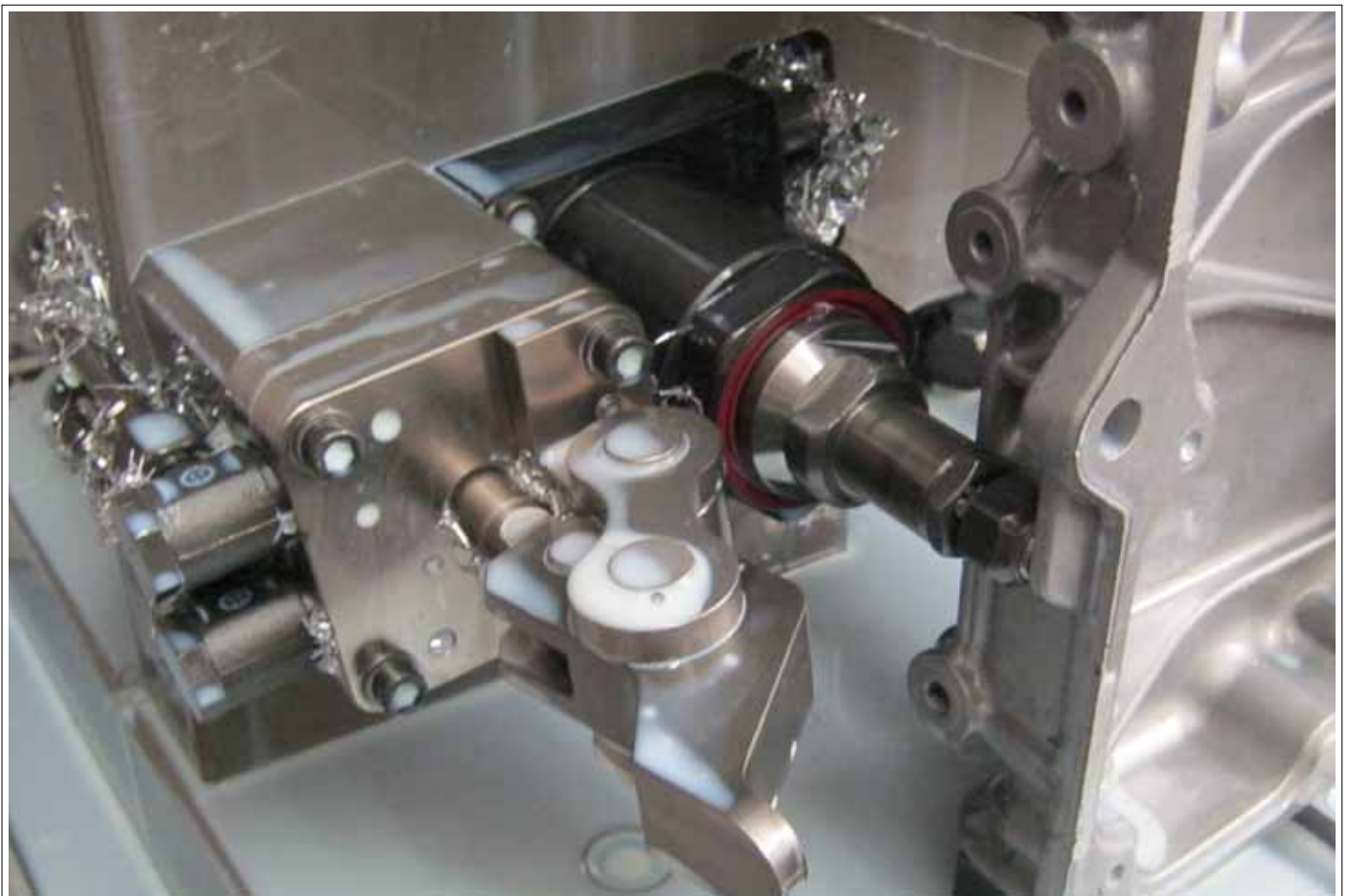
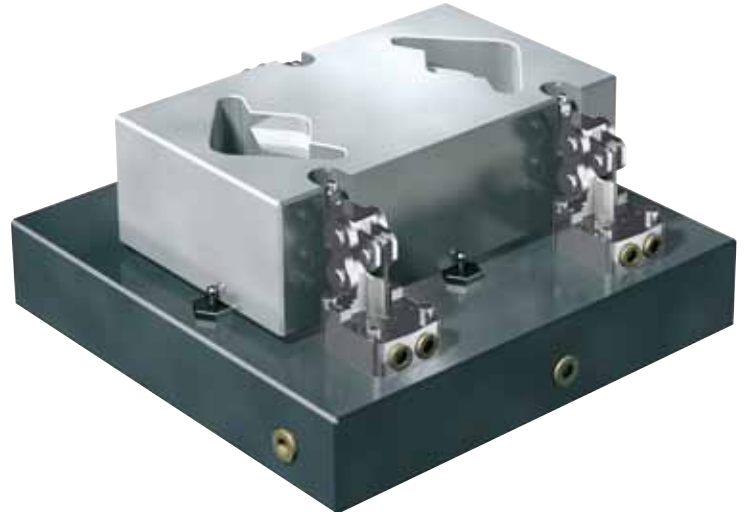
Order no.	Article no.	A	A1	B	C	D	E	F	G	H	H1	H2	H3	H4	H5	H6	I	dia. K	L	M	N	P	O	R	S	W	ØG2	U	V	OR-1 O-ring Order No.
321695	6959KL-160	43,0	26,3	16,0	21,0	6,0	26,0	14,5	G1/8	20	86,0	52	72	49	24	15	11,0	30	51,5	18	4,5	15	9	36	45	68,6°	5,8	8,5	17,5	409508
322057	6959KL-200	56,5	33,0	21,0	27,5	6,0	35,0	13,5	G1/4	26	120,5	72	103	60	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	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	83	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	96	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.

Installation dimensions:



Order no.	Article no.	G3 x depth	R $\pm 0,2$	dia. T	U	V	ϕWW	X	dia. Y x max. depth
321695	6959KL-160	M5 x 11	36	3,0	8,5	17,5	30,5	0,5 x 45°	8 x 0,1
322057	6959KL-200	M6 x 18	54	5,0	15,0	21,5	38,5	0,5 x 45°	13 x 0,1
321711	6959KL-250	M8 x 16	60	5,0	16,0	23,5	42,5	0,5 x 45°	13 x 0,1
322032	6959KL-320	M10x16	78	5,0	16,0	30,0	52,5	0,5 x 45°	13 x 0,1
322040	6959KL-400	M12x18	100	5,6	18,0	38,0	63,5	0,5 x 45°	13 x 0,1



Subject to technical alterations.

No. 6959KL-xx-30

Clamping arm, standard

for link clamp no. 6959KL



CAD

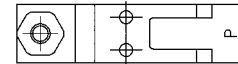
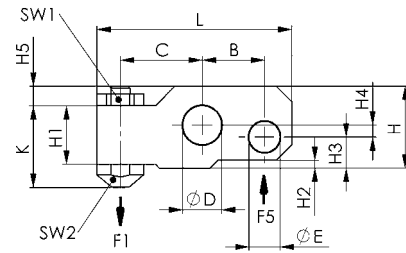
Order no.	Article no.	Clamping force F1 at 100 bar [kN]	Clamping force F1 at 350 bar [kN]	B	C	dia. D	dia. E	H	H1	H2	H3	H4	H5	K	L	P	SW1	SW2	Weight [g]
325241	6959KL-16-30	1,5	5,4	16,0	21,0	10	8	21	15	2	8	3	5	21	50	15	11	11	65
325266	6959KL-20-30	2,4	8,4	21,0	27,5	14	10	31	25	6	15	3	5	31	68	20	11	11	203
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.

Note:

Lever ratios must be respected.



No. 6959KR-xx-04

Clamping arm, blank

for link clamp No. 6959KL and No. 6959KB



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.

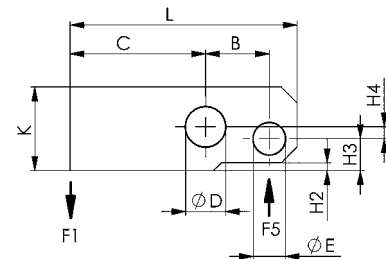
Note:

Lever ratios must be respected.

Formula for determining the clamping force F1:

Clamping force = F1 [kN], Piston force = F5 [kN], Operating lever = B [mm], Load lever = C [mm]

$$F1 = F5 \times B / C$$



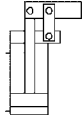
Subject to technical alterations.



No. 6959KB

Link Clamp

double-acting
max. operating pressure 350 bar,
min. operating pressure 25 bar.



NEW!



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]	Weight [g]
554667	6959KB-16	1,5	5,4	2,0	7,0	17,0	7,4	1,5	2,0	0,9	8,3	12	16	755
554668	6959KB-20	2,4	8,4	3,1	11,0	23,0	7,2	3,2	3,1	1,4	14,0	15	20	1876
554669	6959KB-25	3,8	13,2	4,9	17,2	26,5	13,0	6,3	4,9	2,4	35,0	18	25	2390
554670	6959KB-32	6,2	21,6	8,0	28,1	34,0	27,3	10,7	8,0	3,1	69,0	25	32	5320

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 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:

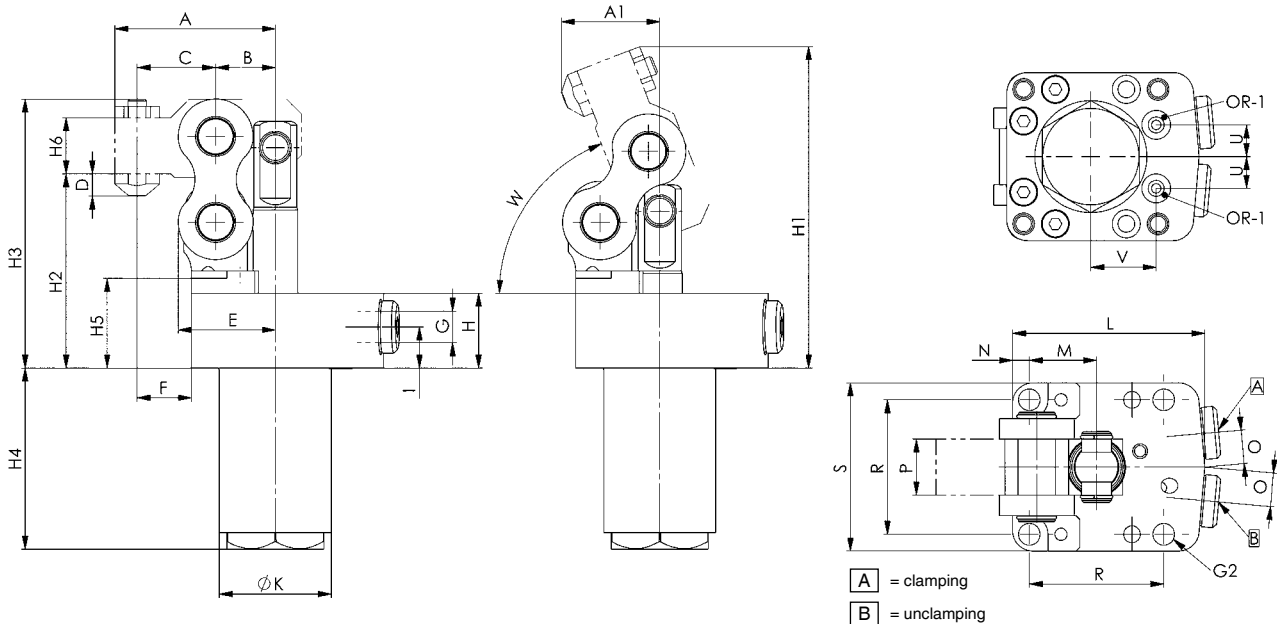
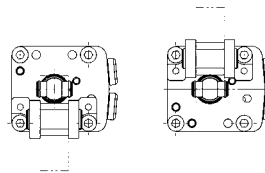
Link clamps are used in clamping fixtures in which workpieces must be freely accessible and loaded from above. Particularly suitable for clamping in clamping pockets.

Features:

Top flange version, lever mechanism can be turned in the range of 180° in 90° steps. Special designs are possible.

Note:

Maximum speed of operation 0.5 m/s.
Proximity switch and electrical pressure-point monitoring can be supplied on request.

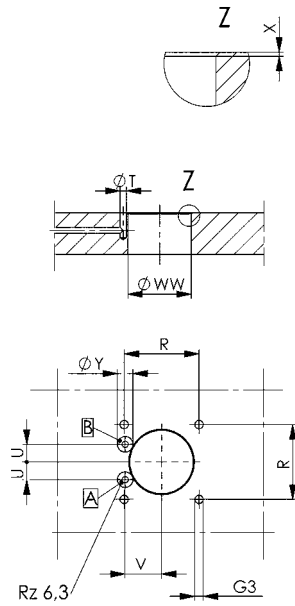


Dimensions:

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	49	24	15	11,0	30	51,5	18	4,5	15	9	36	45	68,6°	5,8	8,5	17,5	409508
554668	6959KB-20	56,5	33,0	21,0	27,5	6,0	35,0	13,5	G1/4	26	120,5	72	103	60	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	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	83	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.

Installation dimensions:



Order no.	Article no.	G3 x depth	R ±0,2	dia. T	U	V	ØWW	X	dia. Y x max. depth
554667	6959KB-16	M5 x 11	36	3,0	8,5	17,5	30,5	0,5 x 45°	8 x 0,1
554668	6959KB-20	M6 x 18	54	5,0	15,0	21,5	38,5	0,5 x 45°	13 x 0,1
554669	6959KB-25	M8 x 16	60	5,0	16,0	23,5	42,5	0,5 x 45°	13 x 0,1
554670	6959KB-32	M10 x 16	78	5,0	16,0	30,0	52,5	0,5 x 45°	13 x 0,1



Subject to technical alterations.

No. 6959KB-xx-30

Clamping arm, standard

for link clamp no. 6959KB



CAD

NEW!

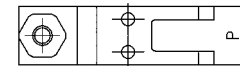
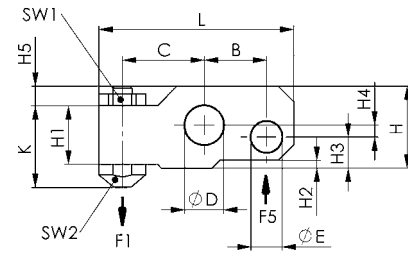
Order no.	Article no.	Clamping force F1 at 100 bar [kN]	Clamping force F1 at 350 bar [kN]	B	C	dia. D	dia. E	H	H1	H2	H3	H4	H5	K	L	P	SW1	SW2	Weight [g]
554671	6959KB-16-30	1,5	5,4	16,0	21,0	10	8	21	15	2	8	3	5	21	50	15	11	11	65
554673	6959KB-20-30	2,4	8,4	21,0	27,5	14	10	31	25	6	15	3	5	31	68	20	11	11	203
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.

Note:

Lever ratios must be respected.



No. 6959KR-xx-04

Clamping arm, blank

for link clamp No. 6959KL and No. 6959KB



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.

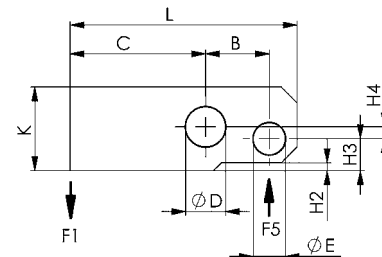
Note:

Lever ratios must be respected.

Formula for determining the clamping force F1:

Clamping force = F1 [kN], Piston force = F5 [kN], Operating lever = B [mm], Load lever = C [mm]

$$F1 = F5 \times B / C$$



Subject to technical alterations.

TOGGLE CLAMPS 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 thread

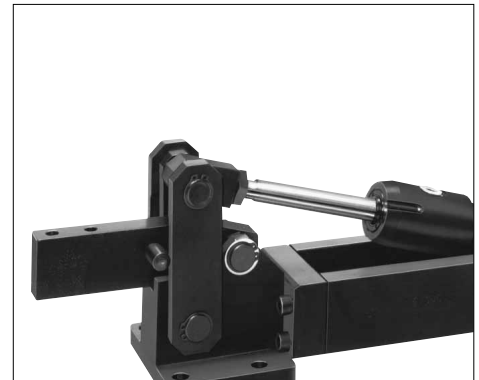
At continuous pressures below 80 bar, this must be stated on ordering as a different seal combination may need to be selected.

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

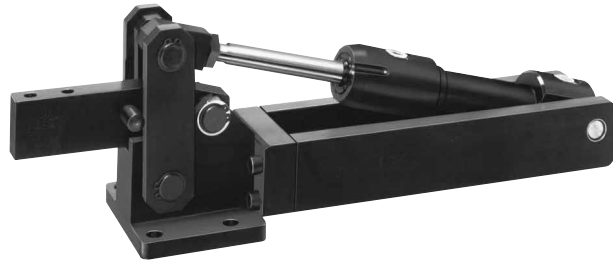
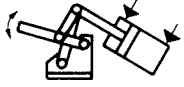


- > Clamping force: 6 - 22,7 kN
- > Connection type: threaded connection
- > Available upon request

No. 6960C

Toggle Clamp, hydraulic

double acting,
max. operating pressure 250 bar.



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 [cm ²]	Piston ring- surface A2 [cm ²]	Oil capacity forward [cm ³]	Oil capacity backward [cm ³]	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:

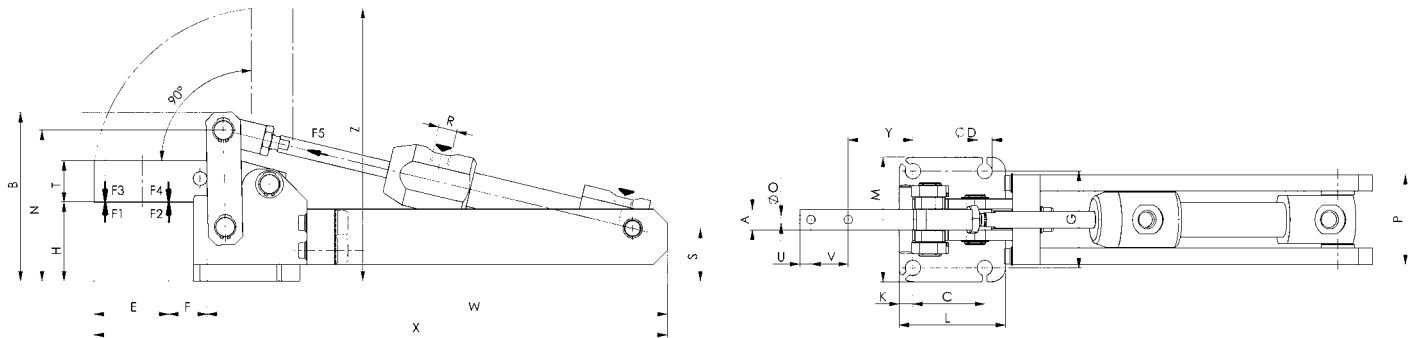
The clamp is particularly suitable for use in transfer and special-purpose machines. Any thrust pieces can be attached to the sturdy holding arm. With the differential circuit (see Fig. 2 below) the differential piston area A2 of the cylinder is directly connected to P of the pressure generator, while 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

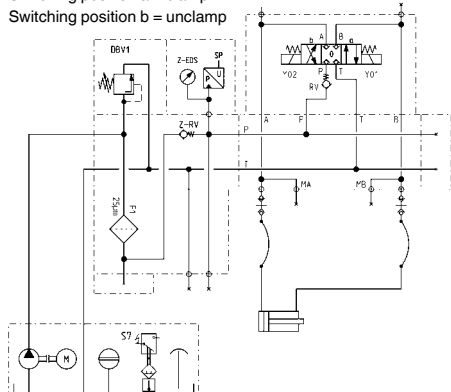


fig. 1

Switching position 0 = clamp with differential switching
Switching position a = unclamp

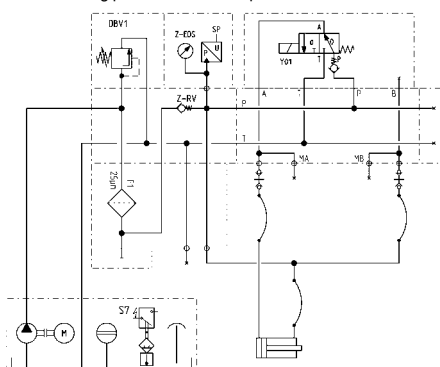


fig. 2

Subject to technical alterations.

PULL-DOWN CLAMPS FOR 3-SIDE OR 5-SIDE MACHINING

- > clamping force up to 50 kN
- > operating pressure up to 400 bar
- > lateral clamping
- > internal clamping
- > oil supply via oil channels in device body or threaded port
- > independently adjustable clamping travel and pull-down travel

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]	Spreading stroke [mm]	No. of models	Oil connection	Operating mode
6970	4,0 - 26,0	-	1,4 - 1,7	17	thread/O-ring	single acting
6970-xx-50	3,5 - 11,5	-	1,4	8	thread/O-ring	single acting
6970D	5,0	-	1,5	14	O-ring	double acting
6970D	9,5	-	1,5	14	O-ring	double acting
6972F	4,5 - 50,0	5 - 12	-	4	thread/O-ring	single acting
6972D	12,0 - 32,0	8 - 12	-	3	thread/O-ring	double acting
6973	8,9	5	-	2	thread/O-ring	single acting

PRODUCT EXAMPLES:

NO. 6970



- > Clamping force: 4 - 26 kN
- > Clamping inside bores for 4-side or 5-side machining
- > Nitrided body

NO. 6972F



- > Clamping force: 4,5 - 50 kN
- > Lateral clamping for 3-side machining

NO. 6973



- > Clamping force: 8,9 kN
- > Lateral clamping for 3-side machining
- > Nitrided body

No. 6970

Hydraulic Pull-Down Clamping Element, concentric

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]	dia. K [mm]	Clamping rim height min. [mm]	Permissible horizontal force [kN]	Radial force of sleeve segments [kN]	Weight [g]
63651	6970-09	4	8,8-9,7	6	1,2	12	2600
60293	6970-10	4	9,8-10,7	6	1,2	12	2600
60301	6970-11	10	10,8-11,9	8	3,0	30	2600
60319	6970-12	10	12,0-12,9	8	3,0	30	2600
63677	6970-13	10	13,0-13,9	8	3,0	30	2600
60418	6970-14	10	14,0-14,9	8	3,0	30	2600
60434	6970-15	26	15,0-15,9	9	7,7	77	2800
60525	6970-16	26	16,0-16,9	9	7,7	77	2800
60426	6970-17	26	17,0-17,9	9	7,7	77	2800
63693	6970-18	26	18,0-18,9	9	7,7	77	2800
60616	6970-19	26	19,0-19,9	9	7,7	77	2800
60715	6970-20	31	20,0-20,9	10	9,2	92	2900
60723	6970-21	31	21,0-21,9	10	9,2	92	2900
63719	6970-22	31	22,0-22,9	10	9,2	92	2900
60731	6970-23	31	23,0-23,9	10	9,2	92	2900
60376	6970-24	31	24,0-24,9	10	9,2	92	2900
60384	6970-25	31	25,0-25,9	10	9,2	92	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 $\varnothing 8$ H7 centring hole located on the underside of 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 pull-down clamping element 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 tensioning 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 tensioning 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 pull-down of approx. 0.2 mm.

The tensioning bolt has a pyramid shape for improved pre-centring of workpieces.

The pull-down clamping element also acts as contact surface for the workpiece. The workpiece contact surface is hard-metal coated ($\mu 0.3$), 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.

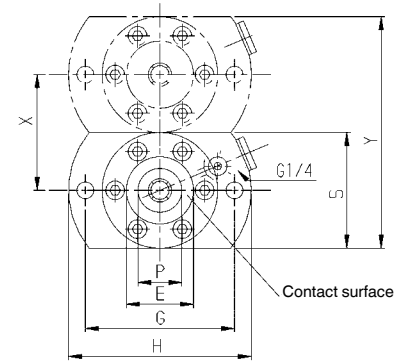
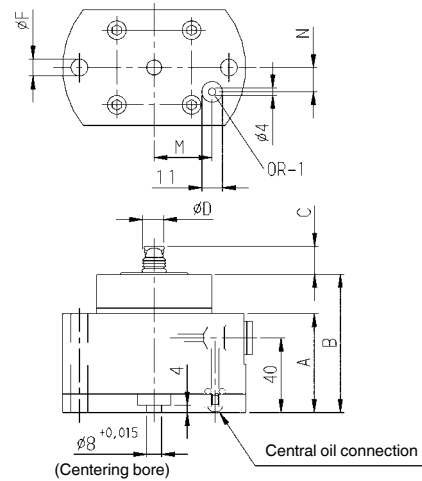
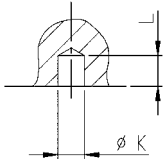
On request:

Pull-down clamp elements for other hole diameters available upon request.

CAD



Clamping hole in workpiece:



Dimensions:

Order no.	Article no.	Expansion of sleeve [mm]	Piston dia. [mm]	Vol. [cm ³]	Side load (unclamped) [N]	A	B ±0.01	C	dia. D	E	dia. F	G	H	L	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	10	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	10	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	15	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	15	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	15	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	15	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	17	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	17	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	17	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	17	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	17	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	17	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	17	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	17	35	15	28	62	62	124	260448
60731	6970-23	1,7	42	4,4	300	53	75	16	22,5	62	13	90	115	17	35	15	32	62	62	124	260448
60376	6970-24	1,7	42	4,4	300	53	75	16	23,5	62	13	90	115	17	35	15	32	62	62	124	260448
60384	6970-25	1,7	42	4,4	300	53	75	16	24,5	62	13	90	115	17	35	15	32	62	62	124	260448



Subject to technical alterations.

No. 6970

Hydraulic Pull-Down Clamping Element, 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]	dia. K [mm]	Clamping rim height min. [mm]	Weight [g]
63669	6970-07-50	3,5	6,8-7,7	6	2600
60798	6970-08-50	3,5	7,8-8,7	6	2600
63685	6970-09-50	5,3	8,8-9,7	7	2600
60814	6970-10-50	5,3	9,8-10,7	7	2800
63701	6970-11-50	8,5	10,8-11,7	8	2800
60830	6970-12-50	8,5	11,8-12,7	8	2800
63727	6970-13-50	11,5	12,8-13,7	9	2900
60822	6970-14-50	11,5	13,8-14,7	9	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 $\varnothing 8$ 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 pull-down clamping element 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 tensioning 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 tensioning 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 pull-down of approx. 0.2 mm.

The tensioning bolt has a pyramid shape for improved pre-centring of workpieces.

The pull-down clamping element also acts as contact surface for the workpiece. The workpiece contact surface is hard-metal coated ($\mu 0.3$), 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.

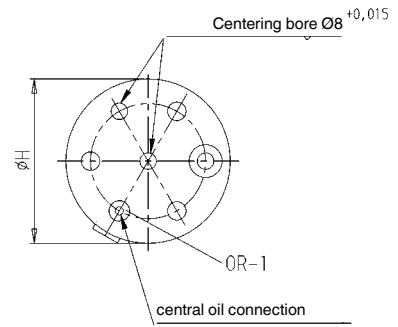
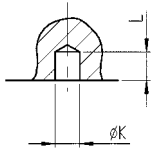
On request:

Pull-down clamp elements for other hole diameters available upon request.

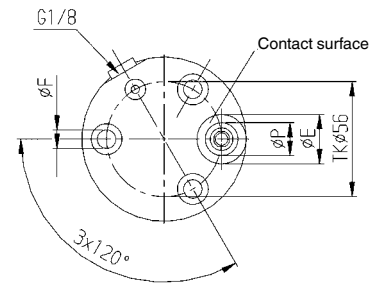
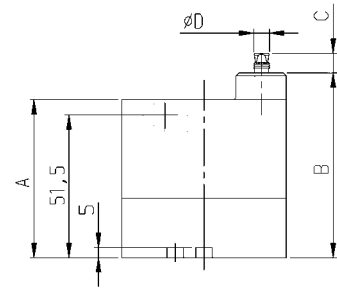
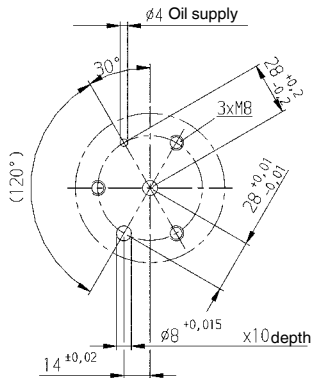
CAD



Clamping hole in workpiece:



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. [cm ³]	Side load (unclamped) [N]	A	B ±0.01	C	D	dia. E	dia. F	dia. H	L	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	10	15	260448
60798	6970-08-50	1,0	10	1,4	18	1,0	50	59	75	9,5	7,5	24	9	80	10	15	260448
63685	6970-09-50	1,5	15	1,4	22	1,5	80	59	75	9,5	8,5	24	9	80	10	15	260448
60814	6970-10-50	1,5	15	1,4	22	1,5	80	59	75	9,5	9,5	24	9	80	10	15	260448
63701	6970-11-50	2,5	25	1,4	28	2,5	120	59	75	12	10,5	24	9	80	13	19	260448
60830	6970-12-50	2,5	25	1,4	28	2,5	120	59	75	12	11,5	24	9	80	13	19	260448
63727	6970-13-50	3,5	35	1,4	32	3,2	150	59	75	12	12,5	24	9	80	13	19	260448
60822	6970-14-50	3,5	35	1,4	32	3,2	150	59	75	12	13,5	24	9	80	13	19	260448



Subject to technical alterations.

No. 6970D

Hydraulic pull-down spring clamp, eccentric

double acting,
max. operating pressure 250 bar,
min. operating pressure 40 bar.
Lateral compensation per clamp $\pm 0,25$ mm.



Order no.	Article no.	Clamping force vertical [kN]	dia. K [mm]	Clamping rim height min. for Al-alloy [mm]	Weight [g]
323410	6970D-06-60	5,0	5,9 - 6,3	7	1000
324384	6970D-065-60	5,0	6,4 - 6,8	7	1000
323436	6970D-07-60	5,0	6,9 - 7,3	7	1000
324400	6970D-075-60	5,0	7,4 - 7,8	7	1000
323444	6970D-08-60	5,0	7,9 - 8,3	8	1000
324392	6970D-085-60	5,0	8,4 - 8,8	8	1000
323469	6970D-09-60	5,0	8,9 - 9,8	8	1000
323485	6970D-10-60	5,0	9,9 - 10,8	8	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 $\text{Ø } 8 \text{ H7}$ 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 pull-down clamping element 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 tensioning 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 pull-down of approx. 0.2 mm.

The integrated air connection is for cleaning the clamping area. The blow-off can also be used as a mount check for blind holes.

The tensioning bolts have a sword-shape for improved pre-centring of workpieces. The complete clamping-segment / holding-bolt unit can be turned so that an optimal force flow toward the workpiece centre can be set and locked. Adjusting the clamping segments prevents overload of the clamping hole (spreading force) with a low clamping rim.

The pull-down clamping element is also the contact surface for the workpiece. The workpiece contact surface is hard-metal coated ($\mu 0.3$), 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:

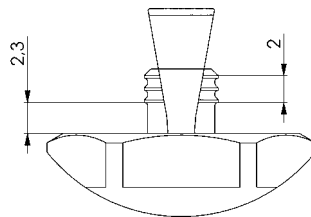
The lateral force when inserting the workpiece must not exceed the „lateral force“ table value. The radial force must be observed.

Please check with us for clamping hardened workpieces or those from GG / GGG.

On request:

Pull-down clamp elements for other hole diameters available upon request.

Upon request, a clamping control can be integrated, the pull-down movement opens the passage of a compressed air hole, thereby creating a pressure drop of approx. 2 bar, which can be evaluated as a clamping control.



CAD



Subject to technical alterations.

No. 6970D

Hydraulic pull-down spring clamp, eccentric

double acting,
max. operating pressure 250 bar,
min. operating pressure 40 bar.
Lateral compensation per clamp $\pm 0,25$ mm.



Order no.	Article no.	Clamping force vertical [kN]	dia. K [mm]	Clamping rim height min. for Al-alloy [mm]	Weight [g]
323501	6970D-11-60	9,5	10,9 - 11,8	9	2000
323527	6970D-12-60	9,5	11,9 - 12,8	9	2000
323543	6970D-13-60	9,5	12,9 - 13,8	9	2000
323568	6970D-14-60	9,5	13,9 - 14,8	10	2100
323584	6970D-15-60	9,5	14,9 - 15,8	10	2100
323600	6970D-16-60	9,5	15,9 - 16,8	10	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 $\varnothing 8$ 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 pull-down clamping element 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 tensioning 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 pull-down of approx. 0.2 mm.

The integrated air connection is for cleaning the clamping area. The blow-off can also be used as a mount check for blind holes.

The tensioning bolts have a sword-shape for improved pre-centring of workpieces. The complete clamping-segment / holding-bolt unit can be turned so that an optimal force flow toward the workpiece centre can be set and locked. Adjusting the clamping segments prevents overload of the clamping hole (spreading force) with a low clamping rim.

The pull-down clamping element is also the contact surface for the workpiece.

The workpiece contact surface is hard-metal coated ($\mu 0.3$), 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:

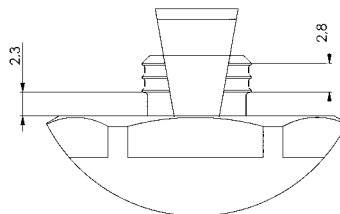
The lateral force when inserting the workpiece must not exceed the „lateral force“ table value. The radial force must be observed.

Please check with us for clamping hardened workpieces or those from GG / GGG.

On request:

Pull-down clamp elements for other hole diameters available upon request.

Upon request, a clamping control can be installed, the pull-down movement opens the passage of a compressed air hole, thereby creating a pressure drop of approx. 2 bar, which can be evaluated as a clamping control.



CAD



Subject to technical alterations.

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. [cm ³]	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:

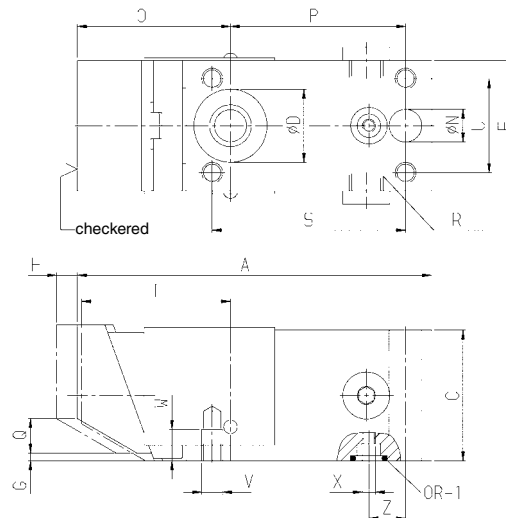
Horizontal and vertical movement is independent of each other (no locked coupling) giving a true pull-down effect. No raising of the clamping jaw, because the clamping bolt is right behind the jaw. Suitable for incorporation in fixtures. New design of jaw connection with rubber buffer ensures sliding 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	28,02 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.

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 [cm ³]	Vol. Lo [cm ³]	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.

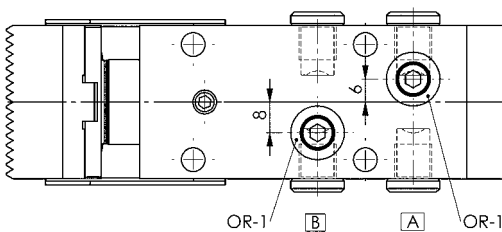
Features:

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.

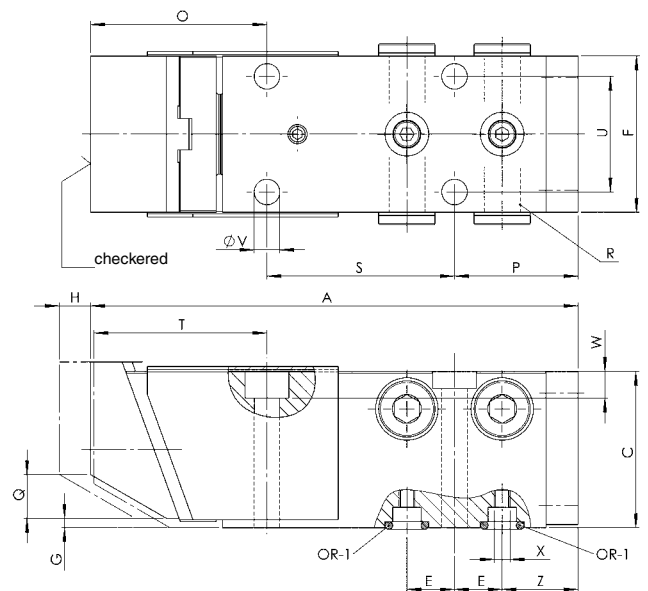
Note:

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.

No. 6972D-12



No. 6972D-20 and 6972D-32



Dimensions:

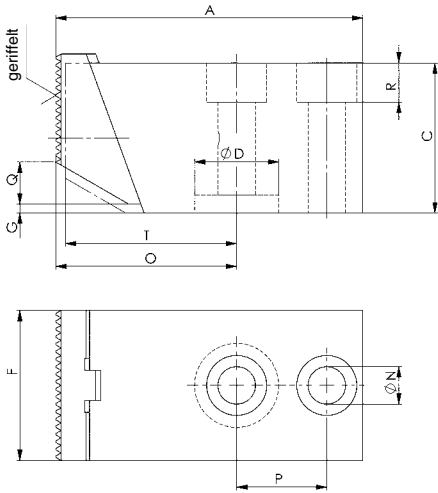
Order no.	Article no.	~A	C	E	F	G	H	O ±0,5	P	Q	R	S	T	U ±0,1	dia. V	W	X	Z	Screw (4 pieces)	OR-1 O-ring Order No.
320150	6972D-12	122	40	12,50	40	2	8	40,5	36,5	8,5	G1/8	45	39,5	30	6,2	7,0	M5	24,0	M6x50	114405
320168	6972D-20	156	50	15,25	50	3	10	56,5	39,5	14,0	G1/4	60	55,5	37	8,2	8,5	M5	24,3	M8x60	114405
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



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 $\varnothing D$ can be used for additional support or positioning.

Dimensions:

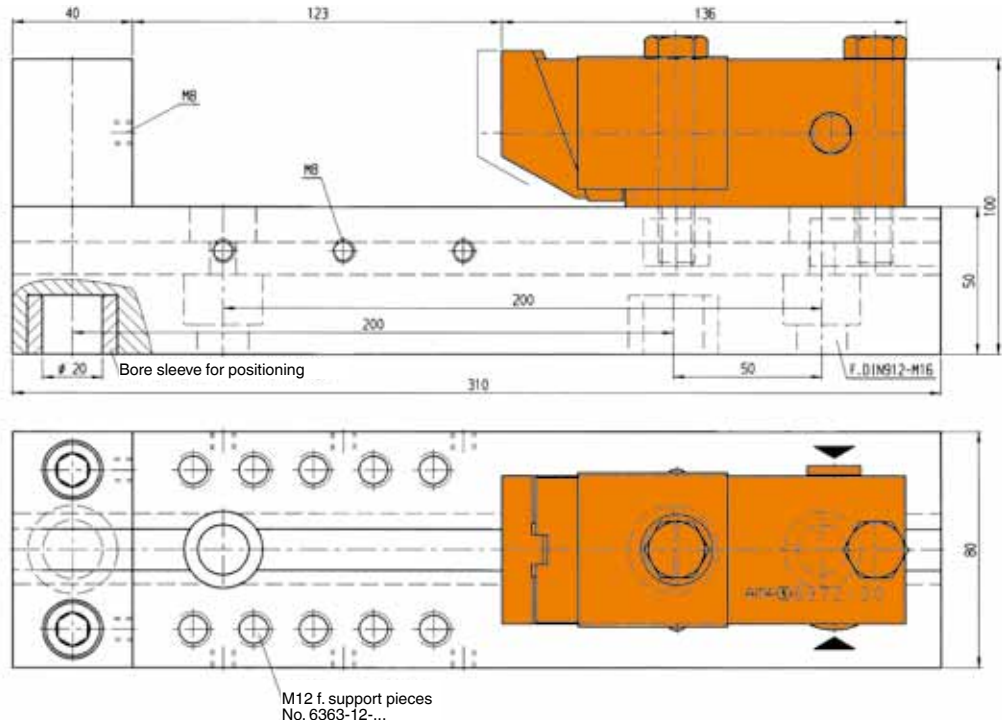
Order no.	Article no.	~A	C	$\varnothing D + 0.05 \times \text{depth}$	F	G	dia. N	$O \pm 0.5$	P	Q	R	T
67371	6977-05	79	30	-	30	2	8,5	42	26	3	8	41
67512	6977-20	102	50	28,02 x 6	50	3	12,5	60	30	14	13	59
67421	6977-32	114	65	32,02 x 6	65	3	16,5	62	37	17	18	61
67520	6977-50	133	80	40,02 x 8	80	3	20,5	68	46	19	23	67

CAD



Application example:

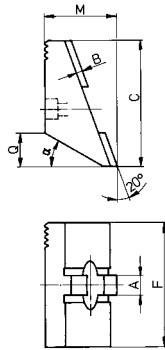
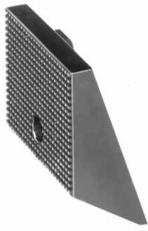
Pull-down clamp No. 6972F-20 as vice.



Subject to technical alterations.

No. 6972G

Clamping Jaws, serrated



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:

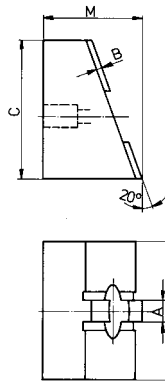
For all workpieces with normal clamping faces.

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



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:

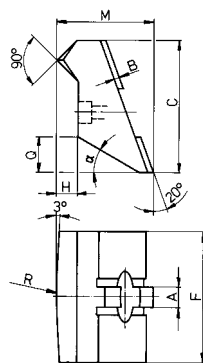
Tempering steel, unhardened, with smooth clamping surface.

Application:

These clamping jaws can be shaped into any clamping form or ground flush for sensitive workpieces.

No. 6972GR

Clamping Jaws, with clamping edge



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.

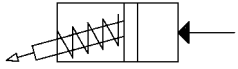


Subject to technical alterations.

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 [cm ²]	Vol. [cm ³]	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.

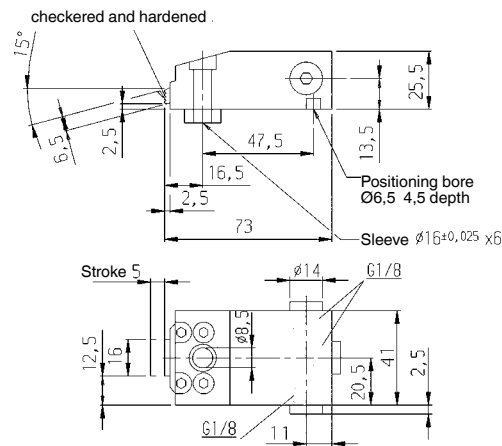
Features:

Small unit offering large clamping force.

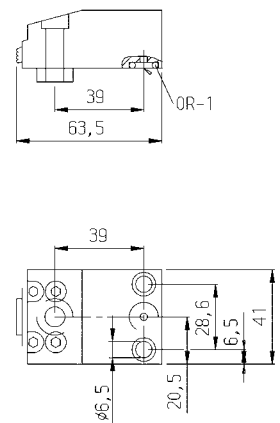
Note:

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.

No. 6973-09-1



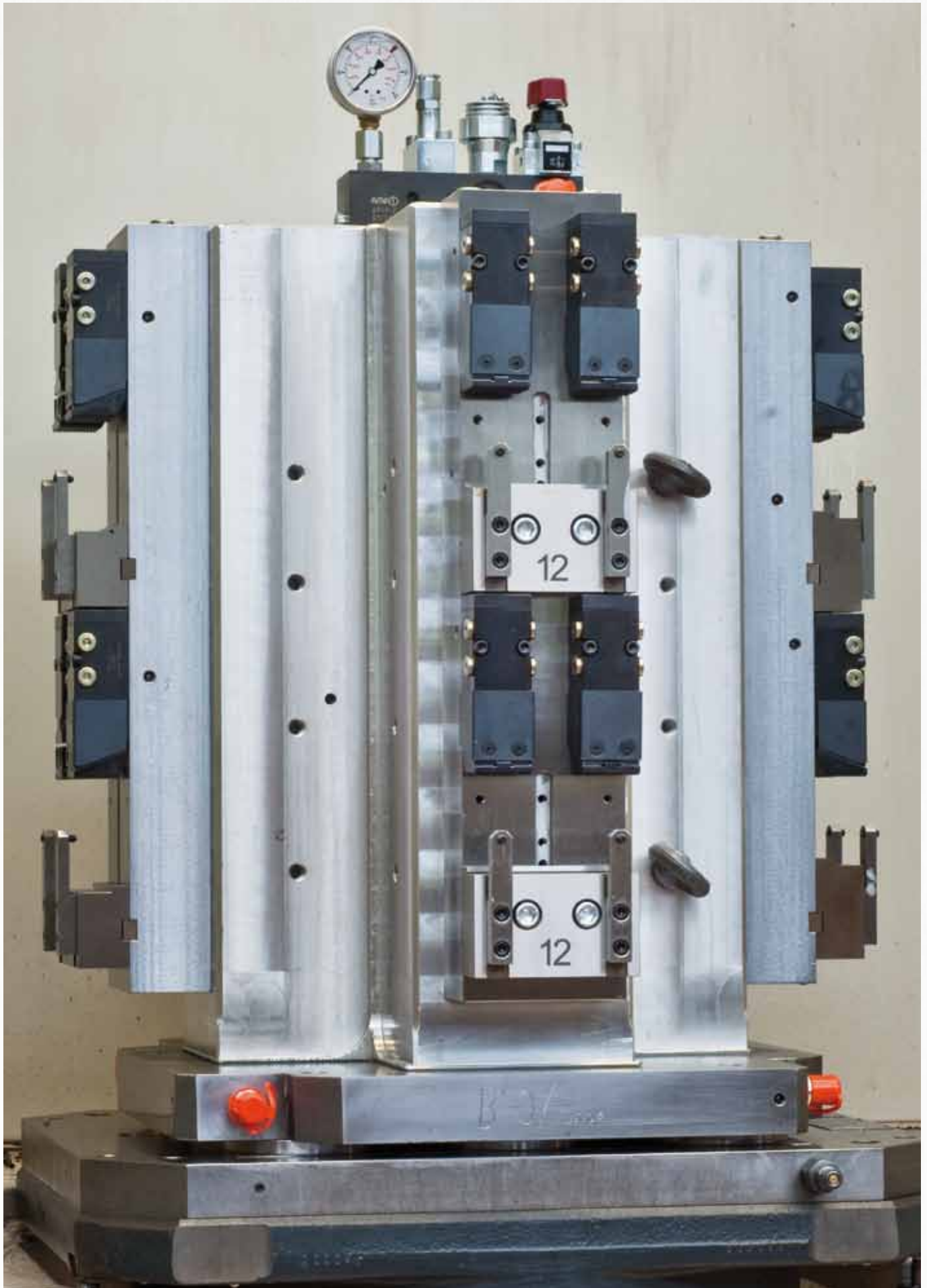
No. 6973-09-2



CAD



Subject to technical alterations.



Subject to technical alterations.



Subject to technical alterations.

CENTRING CLAMP WITH TWO OR THREE CLAMPING POINTS

- > clamping force up to 20 kN
- > operating pressure up to 250 bar
- > centring in holes
- > clamping in holes
- > oil supply via oil channels in device 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	10	3	2	9	double acting
6974-30XX - MINI	10	3	3	9	double acting
6974-20XX - MAXI	8 - 20	4 - 6,9	2	9	double acting
6974-30XX - MAXI	8 - 20	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

No. 6974

Centring clamp MINI with two clamping points

Double-acting,
max. operating pressure 250 bar,
min. operating pressure 10 bar.



CAD

Order no.	Article no.	Clamping force at 100 bar [kN]	Clamping force at 250 bar [kN]	Clamping points	Clamping Ø N-1	Stroke H [mm]	Repeatability [mm]	Bolt D1 [mm]	Weight [g]
329243	6974-2025	4,0	10,0	2	25-29	3,0	±0,02	12	440
329284	6974-2028	4,0	10,0	2	28-32	3,0	±0,02	12	447
329326	6974-2032	4,0	10,0	2	32-36	3,0	±0,02	12	456
329052	6974-2036	4,0	10,0	2	36-40	3,0	±0,02	12	574
329094	6974-2039	4,0	10,0	2	39-43	3,0	±0,02	12	590
329136	6974-2042	4,0	10,0	2	42-46	3,0	±0,02	12	604
329169	6974-2045	4,0	10,0	2	45-49	3,0	±0,02	12	620
329177	6974-2048	4,0	10,0	2	48-52	3,0	±0,02	12	635
329201	6974-2051	4,0	10,0	2	51-55	3,0	±0,02	12	652

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:

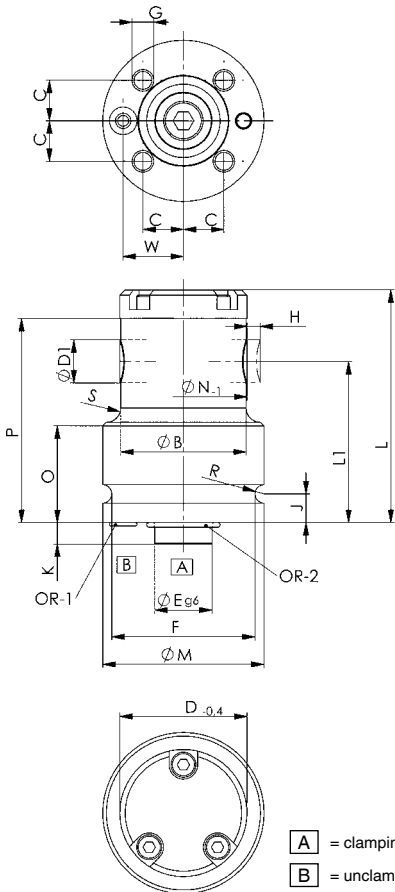
The centring clamp is fastened from below; oil is supplied through drilled channels in the fixture body. If the centring clamp is fastened from above and oil supplied through conduits drilled in the fixture body, a connection plate for O-ring connection is needed.
If the centring clamp is fastened from above and oil supplied through pipes, a connection plate for pipe connection is needed.

Note:

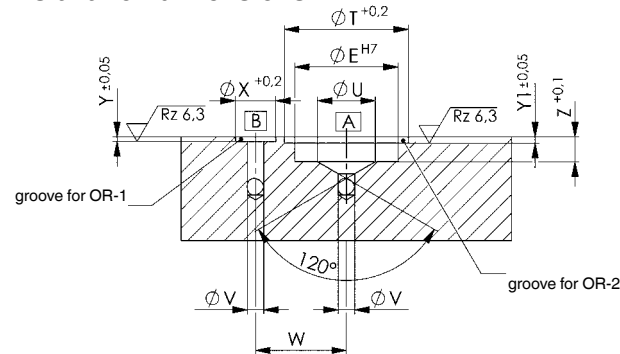
The practical combination of 2-point and 3-point elements can avoid over-determined clamping states. Unsuitable for use on lathes.

On request:

Other sizes available on request.



Installation dimensions:



Dimensions:

Order no.	Article no.	dia. B	C	dia. D -0,4	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	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	1,5	6	409508	537985
329284	6974-2028	24	11,3	27,5	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	1,5	6	409508	537985
329326	6974-2032	24	11,3	31,5	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	1,5	6	409508	537985
329052	6974-2036	35	11,3	35,5	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	1,5	6	409508	537985
329094	6974-2039	35	11,3	38,5	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	1,5	6	409508	537985
329136	6974-2042	35	11,3	41,5	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	1,5	6	409508	537985
329169	6974-2045	35	11,3	44,5	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	1,5	6	409508	537985
329177	6974-2048	35	11,3	47,5	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	1,5	6	409508	537985
329201	6974-2051	35	11,3	50,5	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	1,5	6	409508	537985

Subject to technical alterations.

No. 6974

Centring clamp MINI with three clamping points

Double-acting,
max. operating pressure 250 bar,
min. operating pressure 10 bar.



Order no.	Article no.	Clamping force at 100 bar [kN]	Clamping force at 250 bar [kN]	Clamping points	Clamping Ø N-1	Stroke H [mm]	Repeatability [mm]	Bolt Ø D1 [mm]	Weight [g]
329268	6974-3025	4,0	10,0	3	25-29	3,0	±0,02	12	441
329300	6974-3028	4,0	10,0	3	28-32	3,0	±0,02	12	449
329342	6974-3032	4,0	10,0	3	32-36	3,0	±0,02	12	460
329078	6974-3036	4,0	10,0	3	36-40	3,0	±0,02	12	575
329110	6974-3039	4,0	10,0	3	39-43	3,0	±0,02	12	591
329151	6974-3042	4,0	10,0	3	42-46	3,0	±0,02	12	607
329185	6974-3045	4,0	10,0	3	45-49	3,0	±0,02	12	624
329193	6974-3048	4,0	10,0	3	48-52	3,0	±0,02	12	641
329227	6974-3051	4,0	10,0	3	51-55	3,0	±0,02	12	660

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:

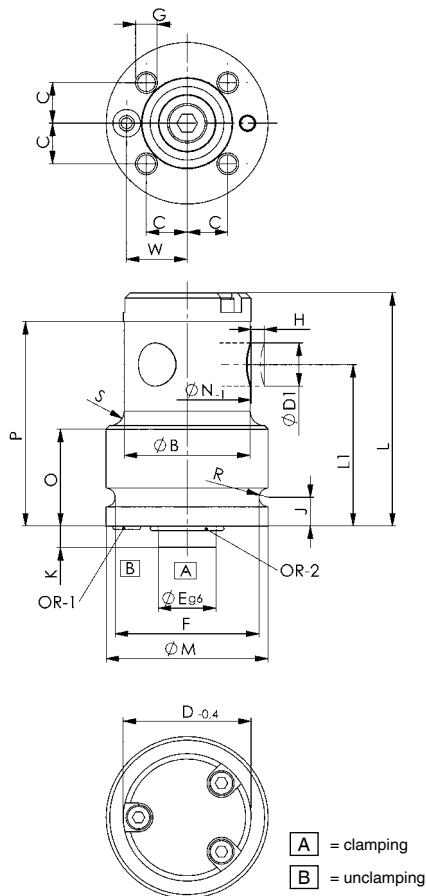
If the centring clamp is fastened from below, oil is supplied through conduits drilled in the fixture body.
If the centring clamp is fastened from above and oil supplied through conduits drilled in the fixture body, a connection plate for O-ring connection is needed.
If the centring clamp is fastened from above and oil supplied through pipes, a connection plate for pipe connection is needed.

Note:

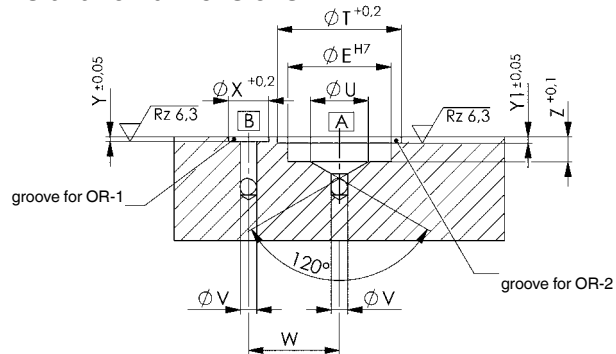
The practical combination of 2-point and 3-point elements can avoid over-determined clamping states. Unsuitable for use on lathes.

On request:

Other sizes available on request.



Installation dimensions:



Dimensions:

Order no.	Article no.	dia. B	C	dia. D -0.4	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	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	1,5	6	409508	537985
329300	6974-3028	24	11,3	27,5	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	1,5	6	409508	537985
329342	6974-3032	24	11,3	31,5	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	1,5	6	409508	537985
329078	6974-3036	35	11,3	35,5	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	1,5	6	409508	537985
329110	6974-3039	35	11,3	38,5	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	1,5	6	409508	537985
329151	6974-3042	35	11,3	41,5	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	1,5	6	409508	537985
329185	6974-3045	35	11,3	44,5	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	1,5	6	409508	537985
329193	6974-3048	35	11,3	47,5	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	1,5	6	409508	537985
329227	6974-3051	35	11,3	50,5	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	1,5	6	409508	537985

Subject to technical alterations.

No. 6974

Centring clamp MAXI with three clamping points

Double-acting,
max. operating pressure 250 bar,
min. operating pressure 10 bar.



CAD

Order no.	Article no.	Clamping force at 100 bar [kN]	Clamping force at 250 bar [kN]	Clamping points	Clamping Ø N-1	Stroke H [mm]	Repeat-ability [mm]	Bolt Ø D1 [mm]	Weight [g]
328773	6974-3054	3,2	8,0	3	54-62	4,0	±0,02	12	1754
328815	6974-3061	3,2	8,0	3	61-69	4,0	±0,02	12	1754
328849	6974-3068	3,2	8,0	3	68-76	4,0	±0,02	12	1754
327593	6974-3076	5,0	12,5	3	76-84	5,2	±0,02	14	1754
328856	6974-3083	5,0	12,5	3	83-91	5,2	±0,02	14	1754
328898	6974-3090	5,0	12,5	3	90-98	5,2	±0,02	14	1754
329003	6974-3098	8,0	20,0	3	98-109	6,9	±0,02	18	3432
329045	6974-3109	8,0	20,0	3	109-120	6,9	±0,02	18	3603
329086	6974-3119	8,0	20,0	3	119-130	6,9	±0,02	18	3773

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:

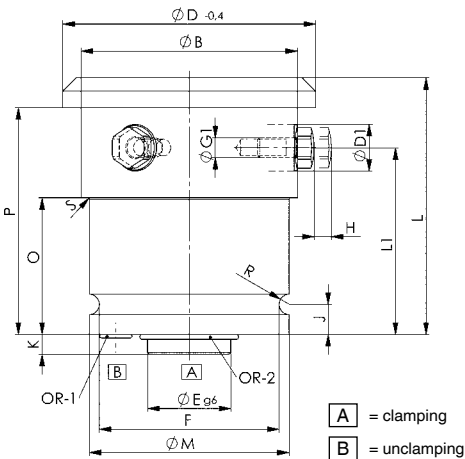
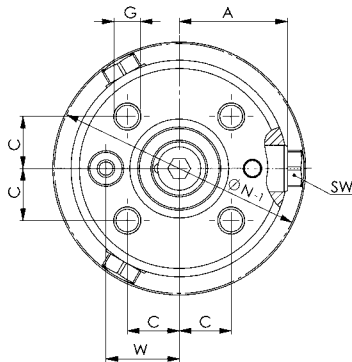
If the centring clamp is fastened from below, oil is supplied through conduits drilled in the fixture body.
If the centring clamp is fastened from above and oil supplied through conduits drilled in the fixture body, a connection plate for O-ring connection is needed.
If the centring clamp is fastened from above and oil supplied through pipes, a connection plate for pipe connection is needed. Pressure pieces are replaceable.

Note:

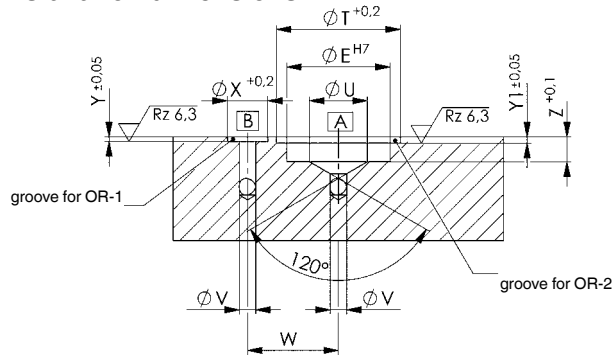
The practical combination of 2-point and 3-point elements can avoid over-determined clamping states. Unsuitable for use on lathes.

On request:

Other sizes available on request.



Installation dimensions:



Dimensions:

Order no.	Article no.	A	dia. B	C	dia. D -0,4	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	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	1,5	6	409508	537985
328815	6974-3061	22,9	45	11,3	60,9	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	1,5	6	409508	537985
328849	6974-3068	22,9	45	11,3	67,9	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	1,5	6	409508	537985
327593	6974-3076	32,5	65	15,6	75,9	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	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	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	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	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	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

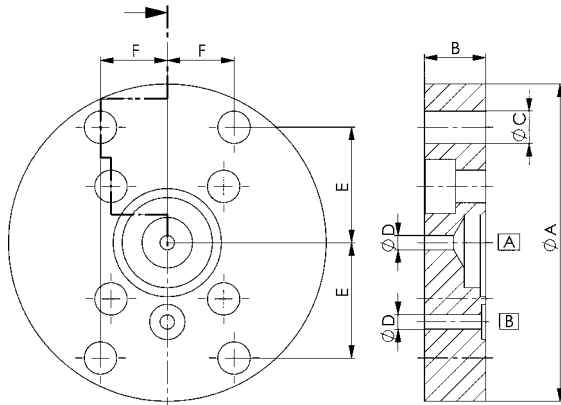
Order no.	Article no.	dia. AxB [mm]	dia. C	dia. D	E	F	Screw (4 pieces)	Weight [g]
328971	6974-5476-1	68x15	6,6	3	24,2	14,0	M6x16	370
328997	6974-7698-1	88x17	9,0	4	32,0	18,5	M8x20	680
329128	6974-98130-1	110x20	11,0	5	39,8	23,0	M10x25	1271

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.



A = clamping
B = unclamping



No. 6974-XXXX-2

Connection plate for centring clamp

for pipeline connection

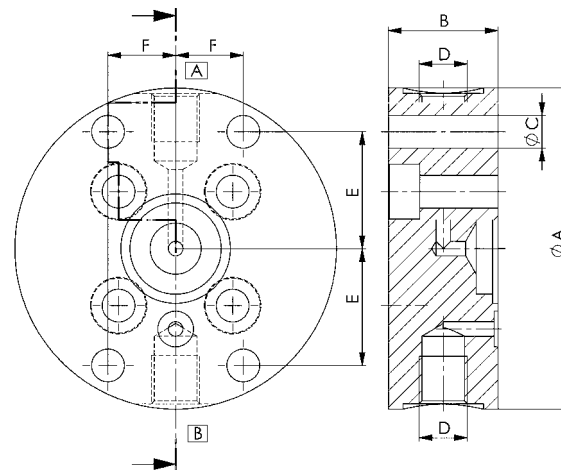
Order no.	Article no.	dia. AxB [mm]	dia. C	dia. D	E	F	Screw (4 pieces)	Weight [g]
329011	6974-5476-2	68x30	6,6	G1/4	24,2	14,0	M6x35	725
329037	6974-7698-2	88x30	9,0	G1/4	32,0	18,5	M8x35	1210
329144	6974-98130-2	110x30	11,0	G1/4	39,8	23,0	M10x35	1909

Design:

Tempering steel, TEM-deburred and phosphatised.

Application:

If the centring clamp is fastened from above and oil is supplied through pipes.



A = clamping
B = unclamping



Subject to technical alterations.

SUPPORT ELEMENTS FOR STRESS-FREE CLAMPING AND LOW-VIBRATION MACHINING

- > clamping force up to 50 kN
- > observe safety factor for supporting force.
- > operating pressure up to 400 bar
- > pistons with internal thread
- > wipers to protect against contamination
- > oil supply via oil channels in device body or via threaded port
- > various design variants:
 - block version
 - installation version
 - screw-in version
 - flange version

To be able to absorb machining forces, the supporting force should be matched to the clamping force.

Supporting force min. 2 x clamping force

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 - 17,0	6,5 - 12,5	hydraulic	5	single acting

PRODUCT EXAMPLES:

NO. 6961F



- > Supporting force: 8 - 20 kN
- > 3 design variants

NO. 6964F



- > Supporting force: 4,4 - 55,6 kN
- > 1 design variant

NO. 6964H



- > Supporting force: 4,4 - 17 kN
- > 2 design variants

SUPPORT ELEMENTS - TECHNICAL INFORMATION

OPERATING PRESSURE:

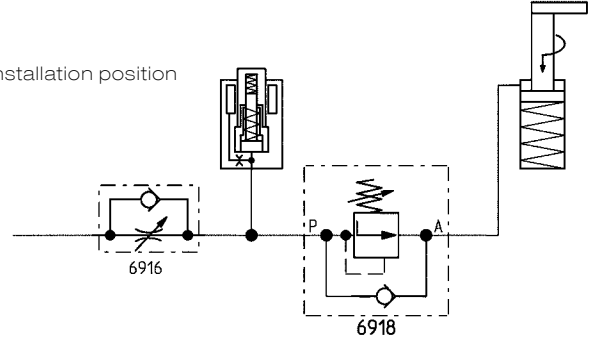
To achieve a guaranteed clamping function, the min. operating pressure must not be fallen below. The highest clamping force is achieved at max. operating pressure.

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.

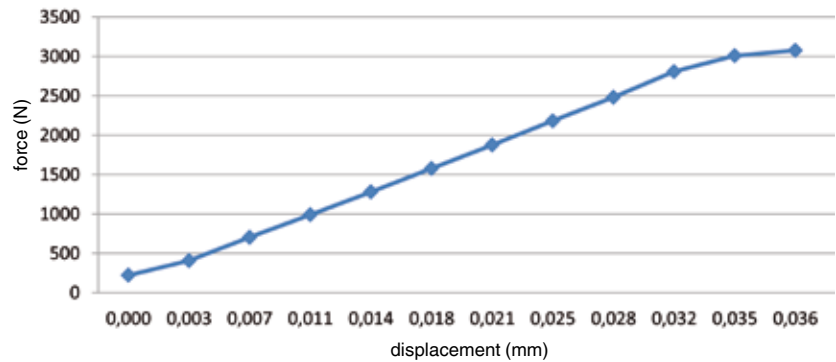


VOLUME FLOW:

The permissible volume flow must not be exceeded. The volume flow can be regulated 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 clamping sleeve. 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:

When using with spring design, there is risk of sucking in coolant. To avoid this, breather piping must be connected and moved to a protected area. Failure to observe this can lead to malfunctions.

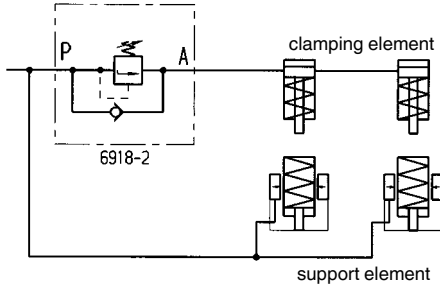
COOLANT AND SHAVINGS:

Support elements should normally be protected against shavings and cooling water.



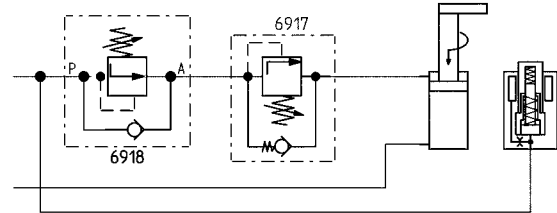
CONTROLLING THE CLAMPING SEQUENCE:

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.

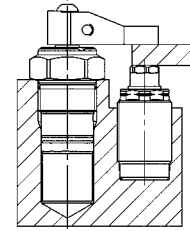
If the total number of occurring forces exceeds the permissible loading force, the anchor of the support element will be pressed backwards thereby damaging the support element.

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



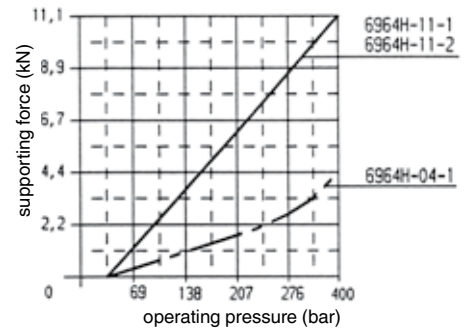
POSSIBLE MACHINING FORCE AT 350 BAR:

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:

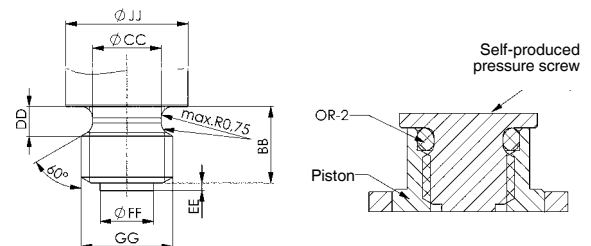
The permissible supporting forces in the diagram are static. Vibrations occurring during the machining could be far higher. For these cases, a large reserve must be included.



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.

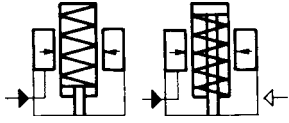
When using special set screws, make sure that the set screws are tempered and designed slightly ball-shaped. Set screws with a tip or fluting should not be used. In the case of a weight greater than approx. 100 grams, special set screws may impair the return stroke function of the support pin and spring-loaded 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 dependent 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 advisable 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 reducing 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.

Hydraulik-Schaltpläne:

fig. 1

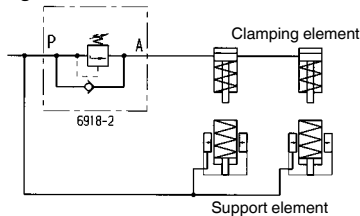
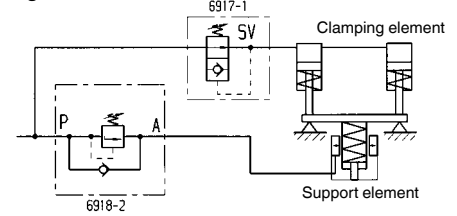


fig. 2



CAD

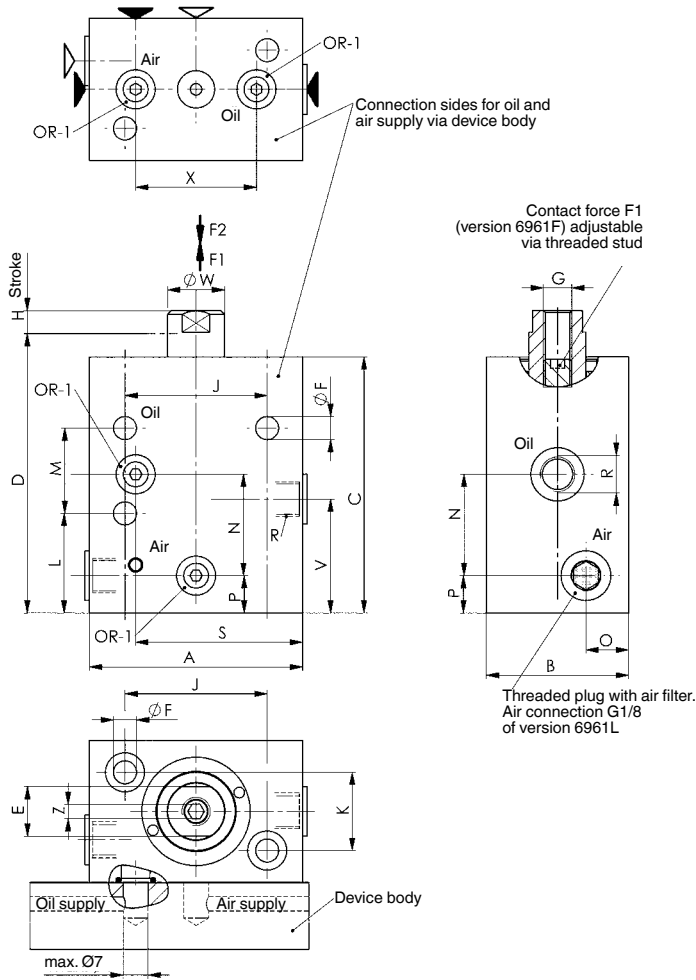
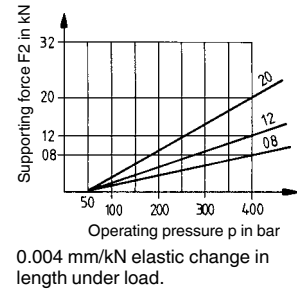


Diagram:



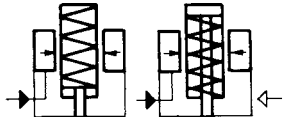
Dimensions:

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

No. 6962F/L

Support Element, cartridge flange

spring advanced or air advancing,
max. operating pressure 400 bar,
min. operating pressure 50 bar.



CAD

Order no.	Article no.	Contact force F1* [N]	Support force F2 [kN]	Stroke H [mm]	Vol. [cm ³]	Piston area [cm ²]	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 dependent 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 advisable 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 reducing valve no. 6917.

Features:

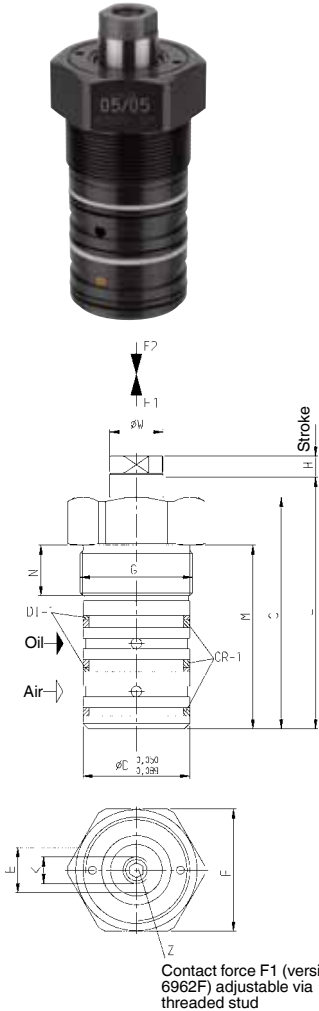
High resilience due to high operating pressure, matched to the forces of the clamping cylinder row. Smooth contacting of the workpiece by adjustable spring or pneumatic pressure. The threaded type allows the supporting element to be accommodated in fixtures in a space-saving manner. Easy attachment of 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.

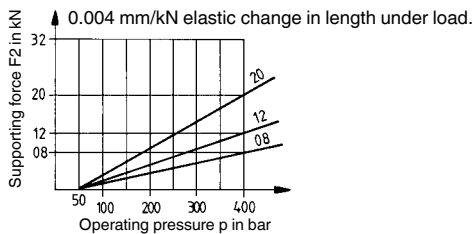
The supporting force should be matched to the clamping force in order to absorb machining forces.

The supporting force should always be at least twice as high as the clamping force.

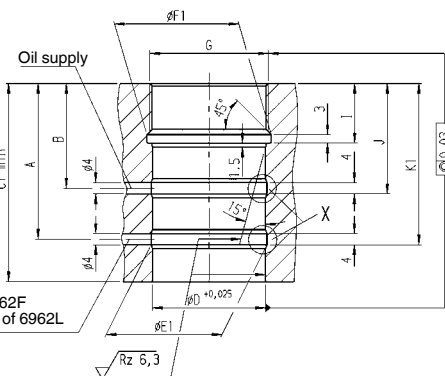


Contact force F1 (version 6962F) adjustable via threaded stud

Diagram:



Installation dimensions:



Detail X

Installation dimensions:

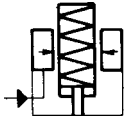
Order no.	Article no.	A	B	C1 min.	dia. D H7	dia. E1	dia. F1	G	I	J	K1	OR-1 O-ring Order No.	DI-1 Seal Order No.
65052	6962F-08	44,5	27,5	58	36	37	40	M38x1,5	14,5	29,5	46,5	110254	136192
65078	6962F-12	55,0	37,0	70	40	41	44	M42x1,5	21,0	39,0	57,0	173047	136200
65094	6962F-20	71,0	48,0	86	45	46	50	M48x1,5	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.

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. [cm ³]	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:

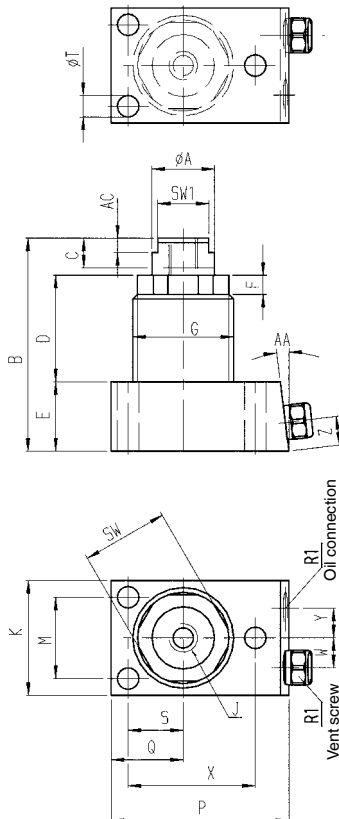
Element with high load capacity and low height. Spring extension: the plunger is normally extended. Variable spring setting permits sensitive adjustment of contact force.

Note:

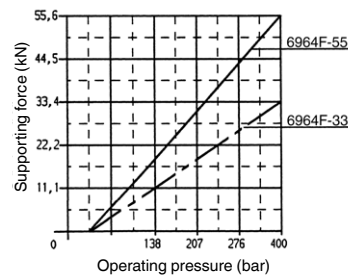
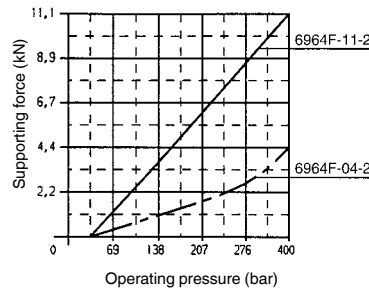
Support pin must be protected against the entry of dirt and splash water by fitting a set screw or plug. When placing into operation, ensure that all air is bled from the system. Failure to do so can cause destruction of the clamping element by the escaping diesel effect.

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:

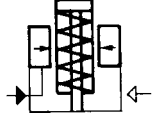
Order no.	Article no.	dia. A	B	D	E	F	G	SW	SW1	J x depth	K	M	P	Q	R1	S	dia. T	W	X	Y	Z	AA	AC
66852	6964F-04-2	16,0	56,0	25,0	24,0	5,5	M26x1,5	23	-	M8x7,5	33,5	24,5	44,5	17,5	G1/8	13,0	5,5	9	31,0	9	8,5	7°	-
66878	6964F-11-2	20,5	70,5	33,0	25,0	6,5	M35x1,5	30	-	M10x11,5	41,5	30,0	59,0	24,0	G1/8	18,0	7,0	10	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. [cm ³]	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 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:

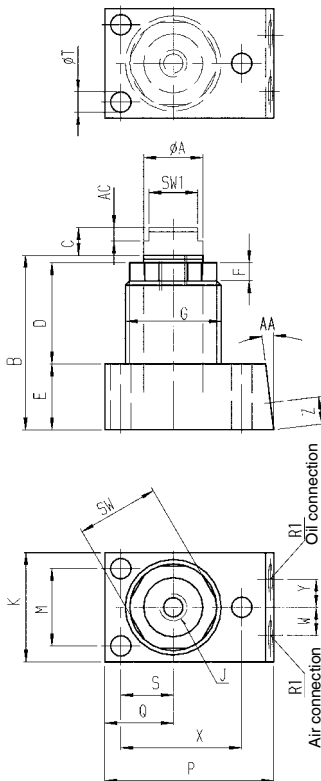
Element with high load capacity and low height. Pneumatic: the plunger is normally retracted. Sensitive adjustment of contact force by varying the air pressure.

Note:

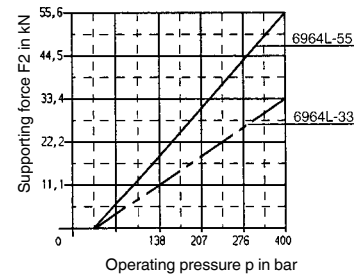
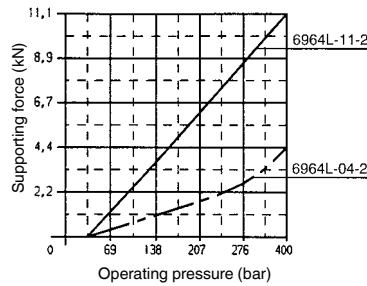
Support pin must be protected against the entry of dirt and splash water by fitting a set screw or plug. When placing into operation, ensure that all air is bled from the system. Failure to do so can cause destruction of the clamping element by the escaping diesel effect.

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:

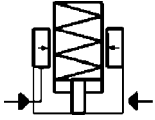
Order no.	Article no.	dia. A	B	D	E	F	G	SW	SW1	J x depth	K	M	P	Q	R1	S	dia. T	W	X	Y	Z	AA	AC
66936	6964L-04-2	16,0	49,5	25,0	24,0	5,5	M26x1,5	23	-	M6x7,5	33,5	24,5	44,5	17,5	G1/8	13,0	5,5	9	31,0	9	8,5	7°	-
66621	6964L-11-2	20,5	61	33,0	25,0	6,5	M35x1,5	30	-	M8x6,0	41,0	30,0	59,0	24,0	G1/8	18,0	7,0	10	43,0	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.

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.



CAD

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:

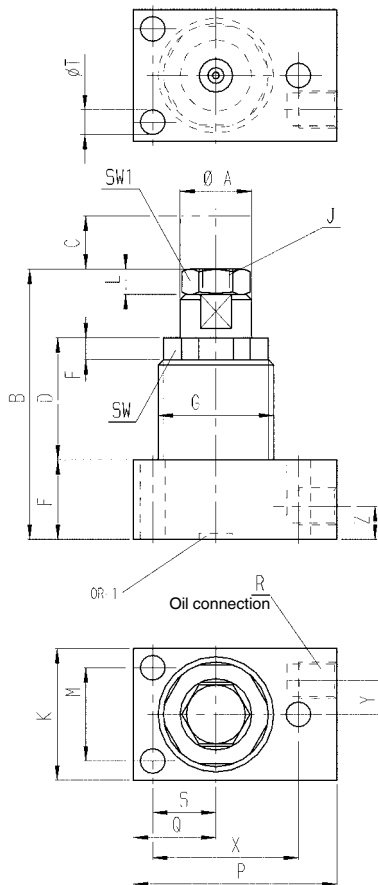
Element with high load capacity and low height. Hydraulic and spring: the plunger is normally retracted. When pressure is applied, the support pin advances with a weak spring-applied force to contact the workpiece. The spring force varies with the stroke. As the hydraulic pressure rises, the support 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:

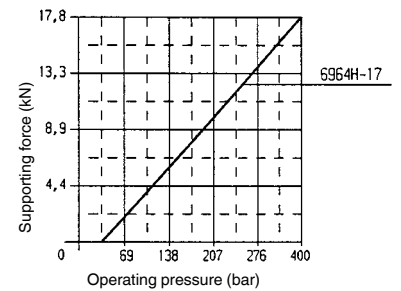
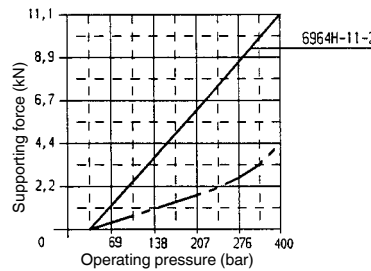
Support pin must be protected against the entry of dirt and splash water by fitting a set screw or plug. When placing into operation, ensure that all air is bled from the system. Failure to do so can cause destruction of the clamping element by the escaping diesel effect.

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.

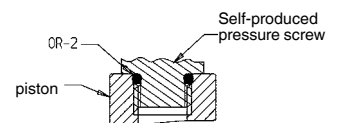
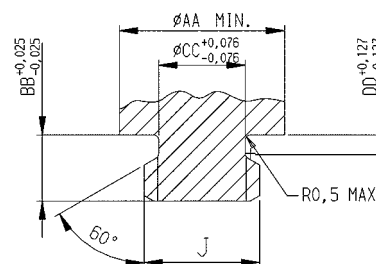


Diagrams:



0.004 mm/kN elastic change in length under load.

Production dimensions with self-production of the clamping screw for support element:



Dimensions:

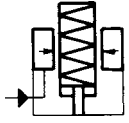
Order no.	Article no.	dia. A	B	D	E	F	G	SW	SW1	J x depth	K	L	M	P	Q	R	S	dia. T	X	Y	Z	ØAA	BB	dia. CC	DD	OR-1 O-ring Order No.	OR-2 O-ring Order No.
66746	6964H-11-2	20,5	82,5	34	31,5	9,0	M35x1,5	30	19	M12x6,5	41,5	5	30,2	58,5	24,0	G1/8	18,3	7,1	43,1	10,5	10,5	14,1	6,35	9,91	1,78	330803	335422
325878	6964H-17-3	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. 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. [cm ³]	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:

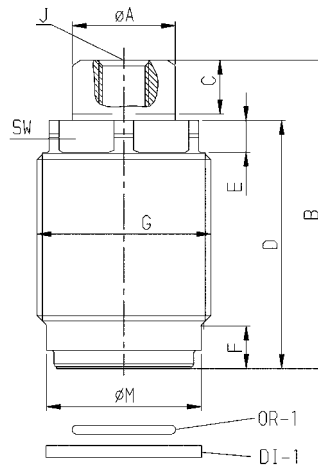
Element with high load capacity and low height. Spring extension: the plunger is normally extended. Variable spring setting permits sensitive adjustment of contact force.

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 x 1,5	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	479592

Subject to technical alterations.

Installation dimensions:

Order no.	Article no.	a	b	dia. c	dia. d	e	f	Øg	Øh	dia. k
165092	6964F-04-1	M26 x 1,5-6H	15,5	24,20 +0,025	24,5	5,7	7,0	7,5	20,4	1,6 ±0,1
165100	6964F-11-1	M35 x 1,5-6H	16,4	31,16 +0,075	33,5	6,7	8,0	14,0	26,5	1,6 ±0,3

Installation dimensions:

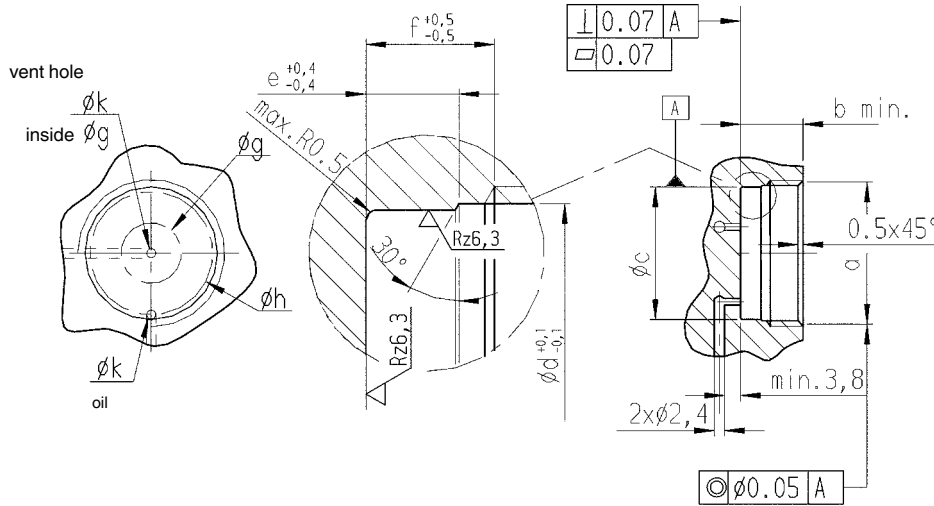
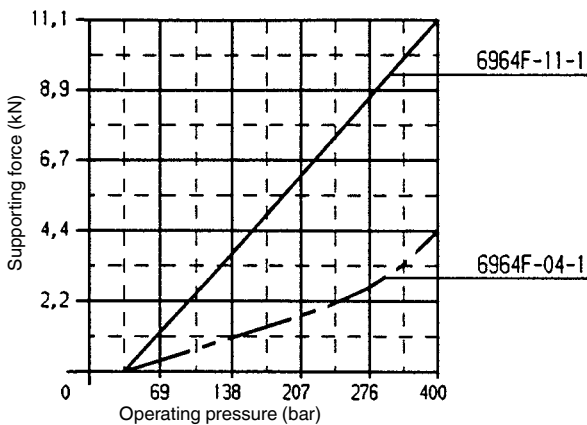


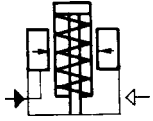
Diagram:



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. [cm ³]	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 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:

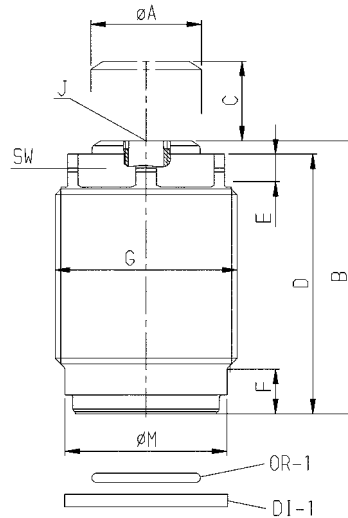
Element with high load capacity and low height. Pneumatic: the plunger is normally retracted. Sensitive adjustment of contact force by varying the air pressure.

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	479592

Subject to technical alterations.

Installation dimensions:

Order no.	Article no.	a	b	dia. c	dia. d	e	f	Øg	Øh	dia. k
165167	6964L-04-1	M26x1,5-6H	15,5	24,2 +0,025	24,5	5,7	7,0	7,5	20,4	1,6 ±0,1
165183	6964L-11-1	M35x1,5-6H	16,4	31,16 +0,075	33,5	6,7	8,0	14,0	26,5	1,6 ±0,3

Installation dimensions:

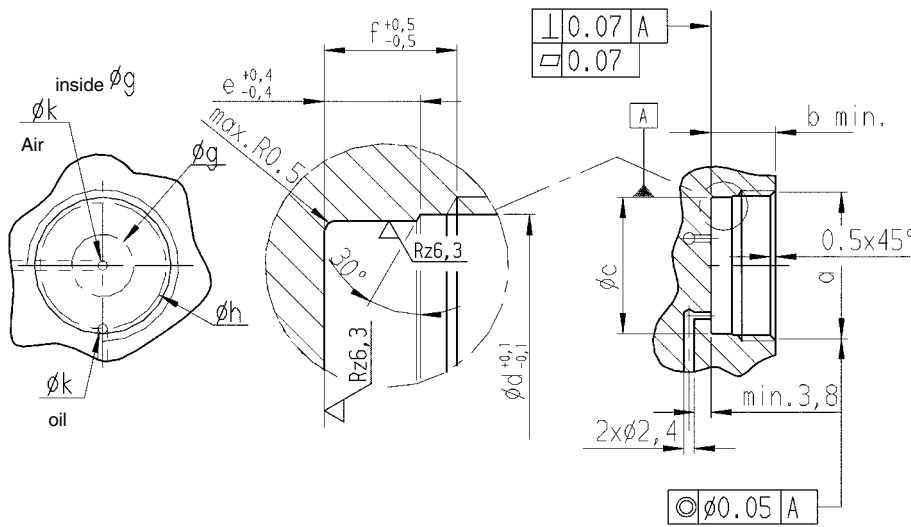
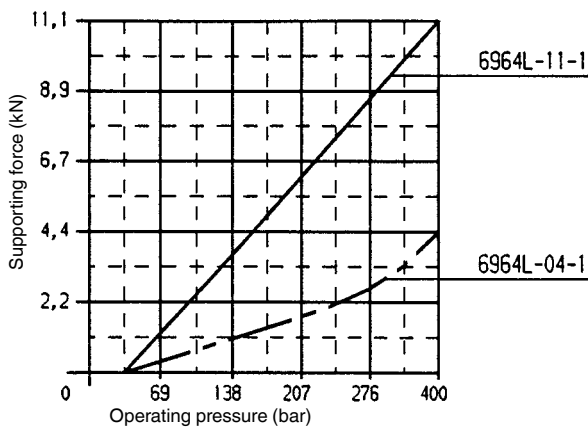


Diagram:



0.004 mm/kN elastic change in length under load.

No. 6964H

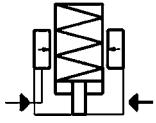
Support Element, cartridge flange

Normally retracted. Hydraulic advanced.
Spring force for contact,
max. operating pressure 350 bar,
min. operating pressure 50 bar.



CAD

Order no.	Article no.	Contact force F1 [N]	Support force at 350 bar [kN]	Stroke C [mm]	max. oil flow rate [l/min.]	Vol. [cm ³]	Md max. [Nm]	Weight [g]
165225	6964H-04-1	4,4-26,7	4,4	6,5	2,13	2,5	40,5	180
66720	6964H-11-1	13,5-44,5	11,0	6,5	2,13	3,0	54,0	380
165241	6964H-17-1	27,0-53,0	17,0	12,5	2,13	10,5	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:

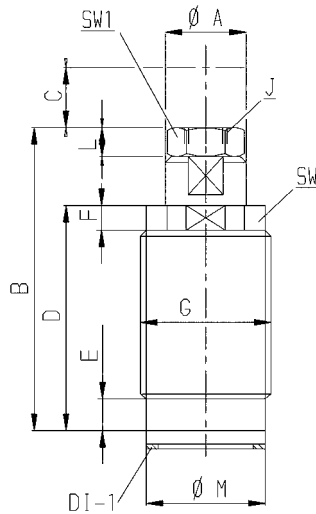
Element with high load capacity and low height. Hydraulic and spring: the plunger is normally retracted. When pressure is applied, the support pin advances with a weak spring-applied force to contact the workpiece. The spring force varies with the stroke. As the hydraulic pressure rises, the support 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:

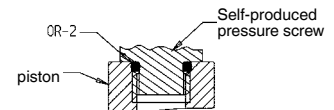
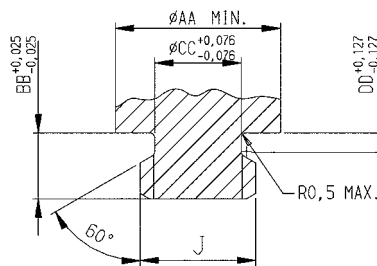
Support pin must be protected against the entry of dirt and splash water by fitting a set screw or plug. When placing into operation, ensure that all air is bled from the system. Failure to do so can cause destruction of the clamping element by the escaping diesel effect.

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.



Production dimensions with self-production of the clamping screw for support element:



Dimensions:

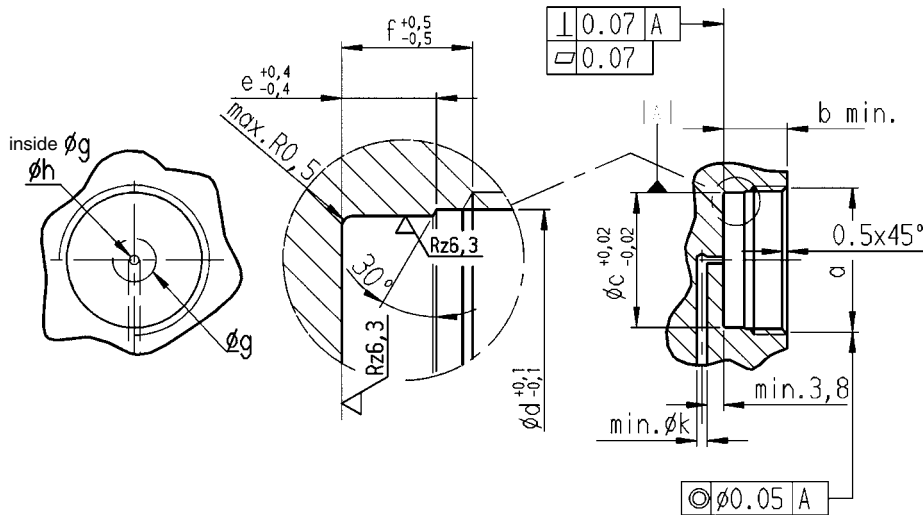
Order no.	Article no.	dia. A	B	D	E	F	G	J x depth	L	dia. M	SW	SW1	ØAA	BB	dia. CC	DD	OR-2 O-ring Order No.	DI-1 Seal Order No.
165225	6964H-04-1	16,0	53,5	42,5	7,0	5,5	M26x1,5	M8x5,0	3,5	23,3	23	13	9,75	5,00	6,05	1,19	181289	550124
66720	6964H-11-1	20,5	72,0	55	9,5	9,0	M35x1,5	M12x6,5	5,0	29,7	30	19	14,10	6,35	9,91	1,78	335422	550125
165241	6964H-17-1	38,0	72,5	55	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.

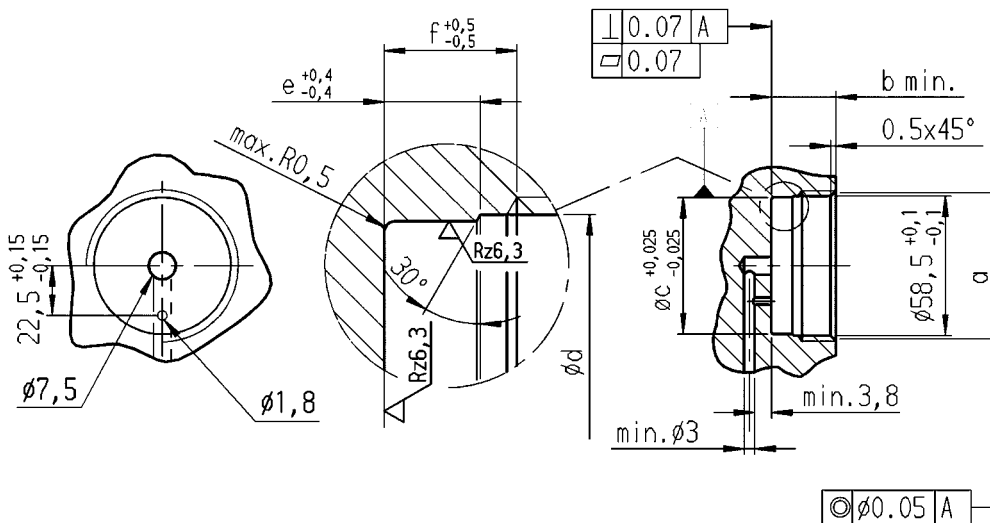
Installation dimensions:

Order no.	Article no.	a	b	dia. c	dia. d	e	f	Øg	Øh	dia. k
165225	6964H-04-1	M26x1,5-6H	14,5	23,44	24,5 ±0,1	4,5	6,0	7,5	1,6 ±0,3	2
66720	6964H-11-1	M35x1,5-6H	19,0	29,90	33,5 ±0,1	5,0	6,4	19,0	3,0	3
165241	6964H-17-1	M60x1,5-6H	15,0	55,00	58,5 ±0,1	4,0	5,3	-	-	-

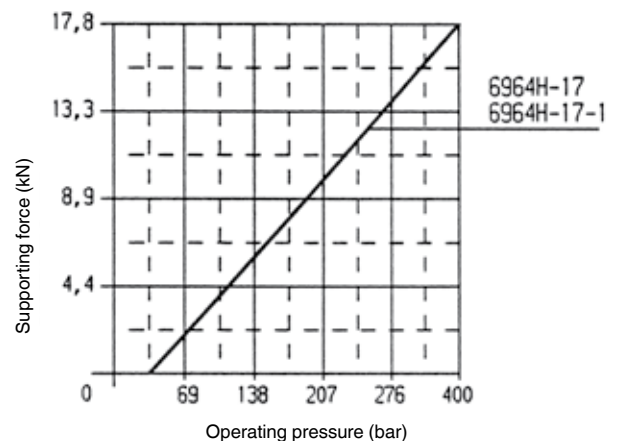
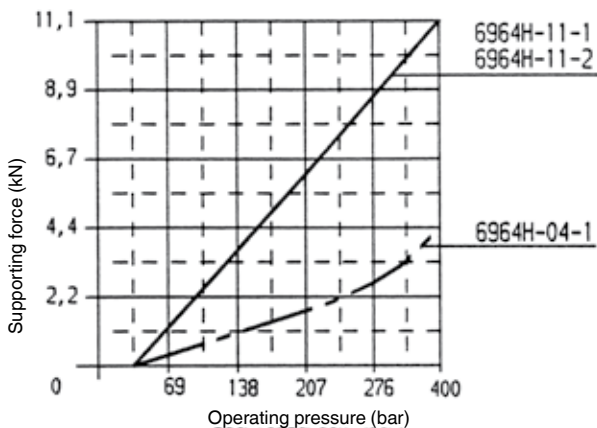
Installation dimensions No. 6964H-04-1 and -11-1:



Installation dimensions No. 6964H-17-1:



Diagrams:



0.004 mm/kN elastic change in length under load.

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!



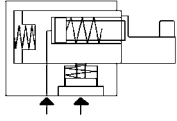
Subject to technical alterations.



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]	Clamping stroke [mm]	Compensating stroke [mm]	Pin dia.	OR-1 O-ring Order No.	Weight [g]
320333	6965-08-00	2	1	12	3	16,0*	550265	1675
320341	6965-08-01	2	1	12	3	5,5	550265	1675
320358	6965-08-02	2	1	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.

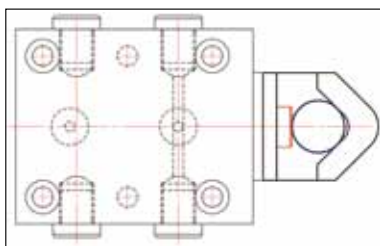
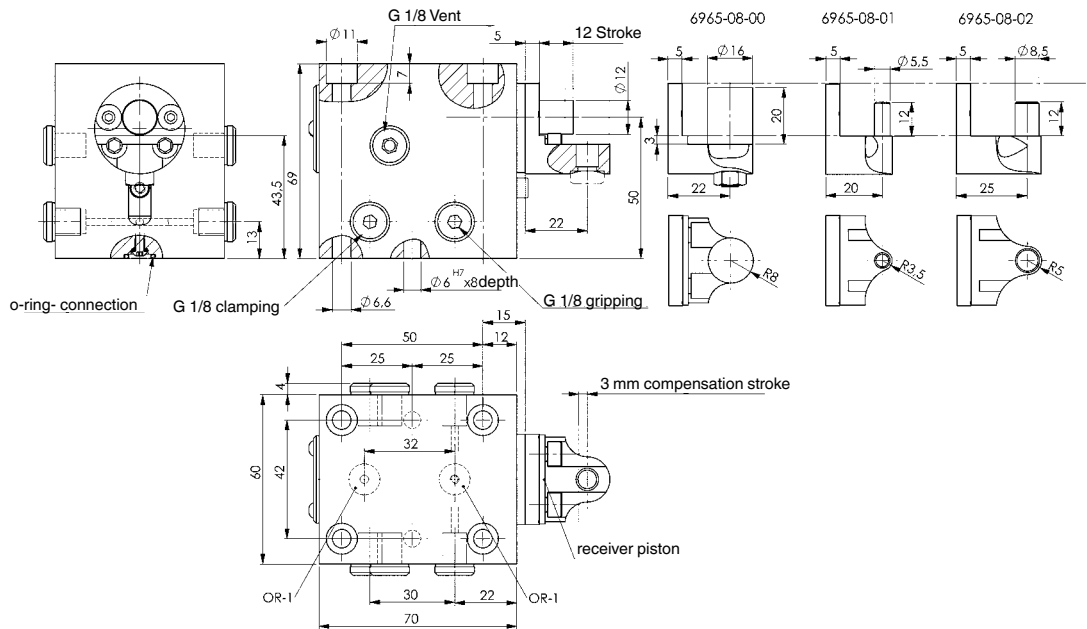
Features:

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.

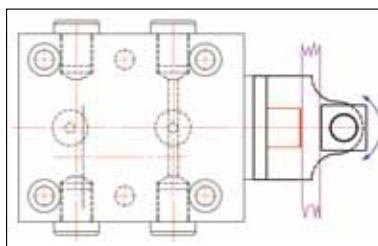
Note:

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.

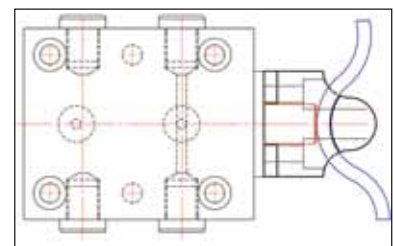
For single acting cylinders there is risk of sucking in coolant through the breather port. In such cases the breather port has to be piped to a clean protected area. The system has to be completely vented during installation.



Clamping of workpiece with moulded lugs.

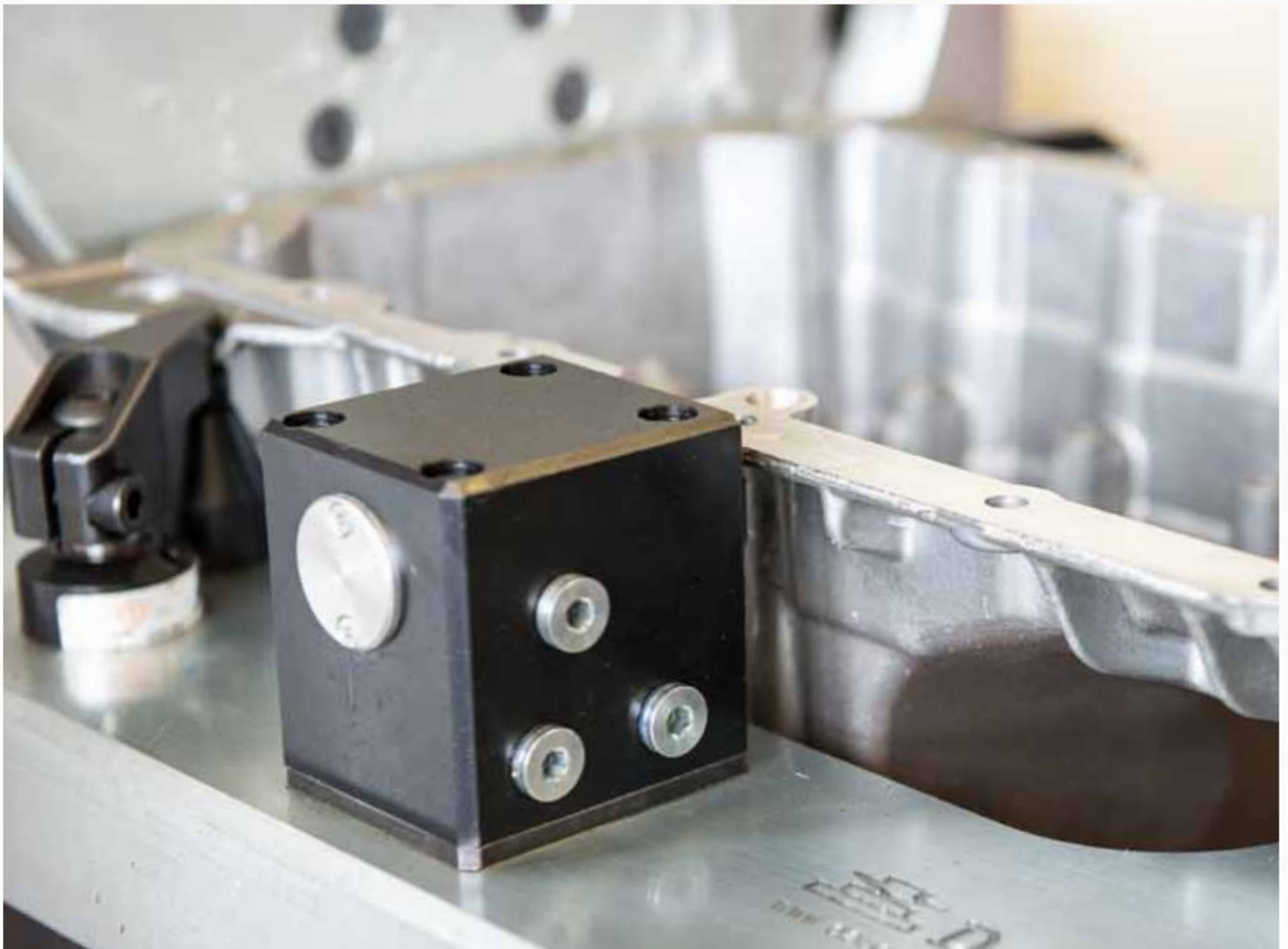


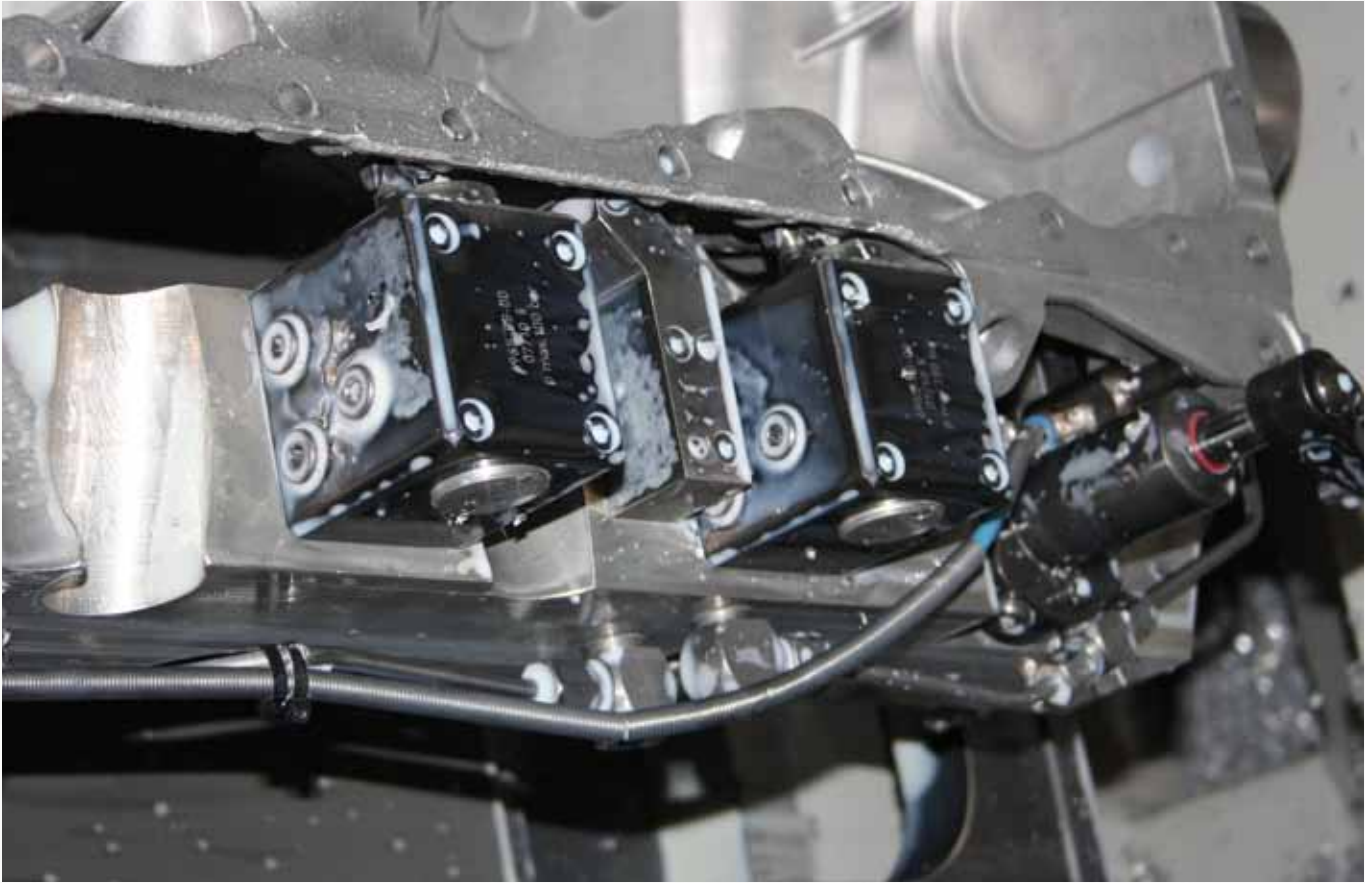
Clamping at heat fin.



Clamping to CAD-data geometry.

Subject to technical alterations.





Subject to technical alterations.

LOW-PRESSURE CLAMPING TECHNOLOGY

- > wipers to protect against contamination
- > oil supply via fixture body or threaded connection
- > single and double-acting variants

PRODUCT OVERVIEW:

Type	Piston force [kN]	Stroke [mm]	max. operating pressure [bar]	No. of models	Operating mode
6941K	4,0 - 19,8	8,5 - 12,5	70	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. 6941K



> Clamping force: 3,4 - 15,5 kN

NO. 6942KK



> Clamping force: 3,2 - 17 kN

NO. 6942KK-**L

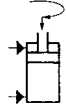


> Clamping force: 17 kN

No. 6941K

Swing Clamp

double acting,
max. operating pressure 70 bar,
min. operating pressure 15 bar.



Order no.	Article no.	Clamping force at 70 bar* [kN]	eff. piston area Sp [cm ²]	eff. piston area Lo [cm ²]	Clamping stroke [mm]	Total stroke [mm]	Vol. Sp [cm ³]	Vol. Lo [cm ³]	Q max. [l/min]	Weight [g]
326587	6941K-35-21	3,4	5,8	9,6	8,5	22	8,7	14,5	0,9	670
326603	6941K-35-22	3,4	5,8	9,6	8,5	22	8,7	14,5	0,9	670
326629	6941K-42-21	5,1	8,9	13,9	10,5	25	15,7	24,2	1,6	950
326645	6941K-42-22	5,1	8,9	13,9	10,5	25	15,7	24,2	1,6	950
326660	6941K-50-21	7,0	12,6	19,6	10,5	26	23,9	37,3	2,4	1400
326454	6941K-50-22	7,0	12,6	19,6	10,5	26	23,9	37,3	2,4	1400
326470	6941K-60-21	10,3	18,4	28,3	12,5	29	41,3	63,6	4,1	2100
326496	6941K-60-22	10,3	18,4	28,3	12,5	29	41,3	63,6	4,1	2100
326512	6941K-75-21	15,5	28,3	44,2	12,5	30	67,9	106,0	6,8	3350
326538	6941K-75-22	15,5	28,3	44,2	12,5	30	67,9	106,0	6,8	3350

Sp = clamp, Lo = unclamp

* Clamping force and volume flow specification with clamp arm no. 6941S.

Design:

Cylinder housing is from high-strength aluminium, red anodised. Piston rod case hardened and chrome plated. Wiper at piston rod. Integrated, adjustable restrictor. 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 workpieces must be freely accessible and loaded from above. Workpieces with difficult shapes can also be clamped using special clamp arms (available on request).

Features:

The swing motion employs a ball guide mechanism.

Note:

The swing clamps can be controlled via the pipe connections or via the channels on the front. In both cases, the existing O-rings must be used for sealing. A surface roughness of less than or equal to Rz 6.3 µm is necessary in the area of the O-rings for the flange surface on the customer's fixture.

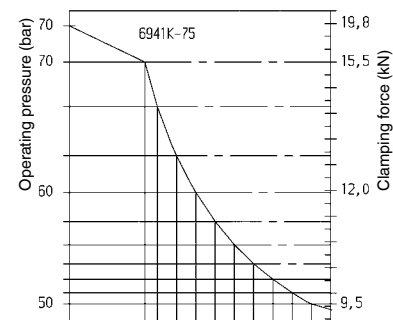
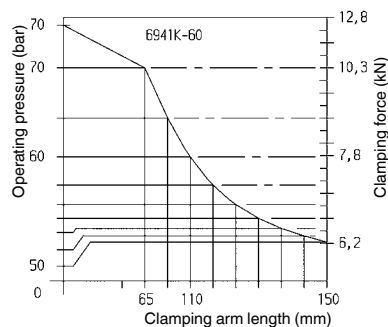
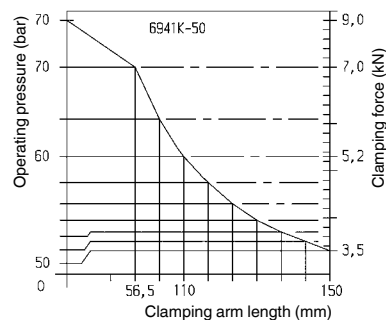
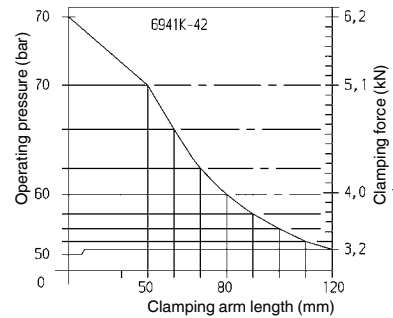
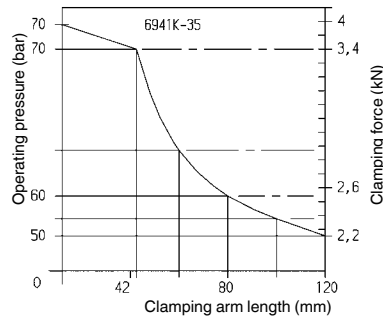
The piston is guided, and so the max. permissible oil flow rate Q max. as well as the clamp arm length and weight must be observed. When mounting accessories at the piston, no force may be applied to the piston. When placing into operation, ensure that all air is bled from the system.

Attention: By the use of the adjustable restrictor please consider a possible pressure intensification!

Operating temperature: 0° - 70° C, Swivel angle: 90° ±3°, Repeatability of the clamping position: ±0,5°.

Diagrams:

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

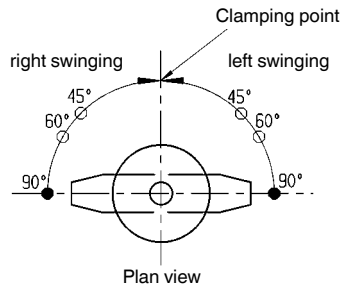


Subject to technical alterations.

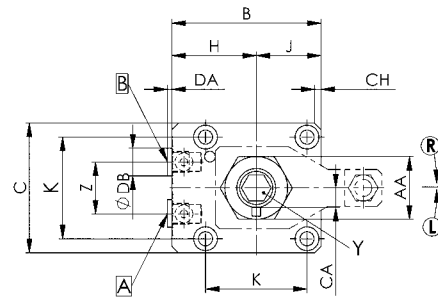
Code of types:

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

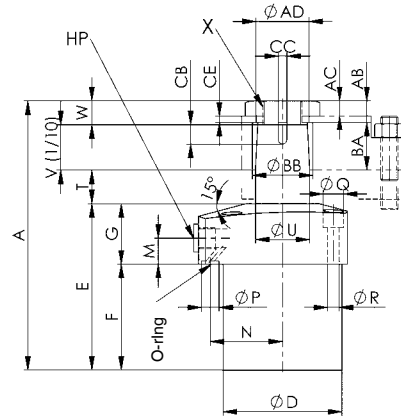
Swing directions:



- = Standard type
- = Special type



- A = clamping
- B = unclamping

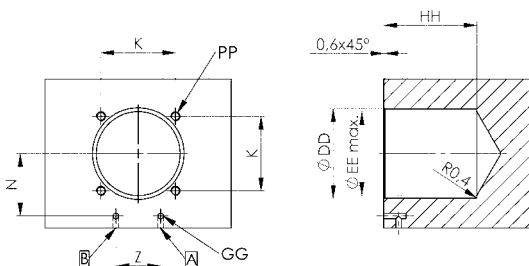


Dimensions:

Order no.	Article no.	A	B	C	ØD -0.1/-0.2	E	F	G	H	J	K	M	N	dia. P	dia. Q	ØR	T	dia. U	V	W	X	Y	Z
326587	6941K-35-21	134	61	51	48	80	52	28	35,5	25,5	40	13	30,0	3	9,5	5,5	30	22,0	14	11	M16x1,5	SW 8	22
326603	6941K-35-22	134	61	51	48	80	52	28	35,5	25,5	40	13	30,0	3	9,5	5,5	30	22,0	14	11	M16x1,5	SW 8	22
326629	6941K-42-21	146	69	60	55	87	59	28	39,0	30,0	47	12	33,5	3	11,0	6,8	27	25,0	20	12	M18x1,5	SW 8	24
326645	6941K-42-22	146	69	60	55	87	59	28	39,0	30,0	47	12	33,5	3	11,0	6,8	27	25,0	20	12	M18x1,5	SW 8	24
326660	6941K-50-21	153	81	70	65	93	63	30	46,0	35,0	55	13	39,5	5	11,0	6,8	28	30,0	20	12	M22x1,5	SW 8	30
326454	6941K-50-22	153	81	70	65	93	63	30	46,0	35,0	55	13	39,5	5	11,0	6,8	28	30,0	20	12	M22x1,5	SW 8	30
326470	6941K-60-21	179	92	80	75	108	71	37	52,0	40,0	63	16	45,0	5	14,0	9,0	31	35,5	26	14	M28x1,5	SW 8	32
326496	6941K-60-22	179	92	80	75	108	71	37	52,0	40,0	63	16	45,0	5	14,0	9,0	31	35,5	26	14	M28x1,5	SW 8	32
326512	6941K-75-21	192	107	95	90	114	74	40	59,5	47,5	75	16	52,5	5	17,5	11,0	32	45,0	32	14	M36x1,5	SW 8	37
326538	6941K-75-22	192	107	95	90	114	74	40	59,5	47,5	75	16	52,5	5	17,5	11,0	32	45,0	32	14	M36x1,5	SW 8	37

Order no.	Article no.	AA	AB	AC	ØAD	BA	ØBB H8	CA	CB	CC H8	CE	DA	dia. DB	CH	HP
326587	6941K-35-21	24	9	6	20,5	15	25	8	5,3	4	6,3	3,5	14	3x45°	G1/8
326603	6941K-35-22	24	9	6	20,5	15	25	8	5,3	4	6,3	3,5	14	3x45°	G1/8
326629	6941K-42-21	30	10	7	22,9	21	28	9	5,3	4	6,3	3,5	14	3x45°	G1/8
326645	6941K-42-22	30	10	7	22,9	21	28	9	5,3	4	6,3	3,5	14	3x45°	G1/8
326660	6941K-50-21	36	10	7	27,9	21	34	11	7,5	6	7,5	4,5	19	4x45°	G1/4
326454	6941K-50-22	36	10	7	27,9	21	34	11	7,5	6	7,5	4,5	19	4x45°	G1/4
326470	6941K-60-21	41	12	8	32,8	27	40	14	7,5	6	8,5	4,5	19	5x45°	G1/4
326496	6941K-60-22	41	12	8	32,8	27	40	14	7,5	6	8,5	4,5	19	5x45°	G1/4
326512	6941K-75-21	50	12	8	41,7	33	49	18	9,5	8	9,5	4,5	22	6x45°	G3/8
326538	6941K-75-22	50	12	8	41,7	33	49	18	9,5	8	9,5	4,5	22	6x45°	G3/8

Installation dimensions:



- A = clamping
- B = unclamping

Article no.	K	PP	ØDD +0,3/0	ØEE max.	N	Z	GG	HH
6941K-35-21	40	M 5	48	45	30,0	22	3	53
6941K-35-22	40	M 5	48	45	30,0	22	3	53
6941K-42-21	47	M 6	55	50	33,5	24	3	60
6941K-42-22	47	M 6	55	50	33,5	24	3	60
6941K-50-21	55	M 6	65	60	39,5	30	5	64
6941K-50-22	55	M 6	65	60	39,5	30	5	64
6941K-60-21	63	M 8	75	70	45,0	32	5	72
6941K-60-22	63	M 8	75	70	45,0	32	5	72
6941K-75-21	75	M10	90	85	52,5	37	5	75
6941K-75-22	75	M10	90	85	52,5	37	5	75

Subject to technical alterations.

No. 6941S

Clamping arm



Order no.	Article no.	Clamping force at 70 bar [kN]	A	B	C	D	E ±0,1	ØF H8	dia. G	H	J	K	L	M	N	P	Q	R	Weight [g]
323345	6941S-35-65	3,4	65,5	35	19	17,5	15	25	20,6 +0,15	28	12	13	42,0	8	M6	38	10	1x45°	180
323360	6941S-42-77	5,1	77,0	38	25	19,0	21	28	23,0 +0,15	34	17	17	50,0	10	M8	42	15	1x45°	310
323386	6941S-50-91	7,0	91,5	50	25	25,0	21	34	28,0 +0,15	40	19	22	56,5	12	M10	47	20	3x45°	480
323402	6941S-60-105	10,3	105,0	58	32	29,0	27	40	32,9 +0,20	47	22	25	65,0	16	M12	52	30	4x45°	810
323428	6941S-75-127	15,5	127,0	75	38	38,0	33	49	41,8 +0,20	53	27	31	75,0	16	M16	56	45	10x45°	1500

Design:

Tempered and blued steel.

Application:

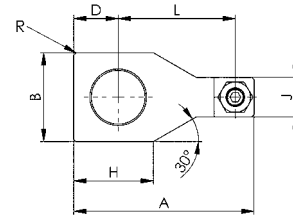
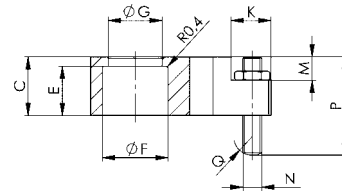
For Swing Clamp no. 6941K.

Note:

Clamping pressure, flow volume and clamp arm weight must be observed, see also installation notes at Swing Clamp no. 6941K.

On request:

Special designs available.



CAD



No. 6941R

Clamping arm blank



Order no.	Article no.	Clamping force at 70 bar* [kN]	A	B	C	D	E ±0,1	ØF H8	dia. G	Weight [g]
323246	6941R-35-95	3,4	95	35	19	17,5	15	25	20,6 +0,15	173
323261	6941R-42-100	5,1	100	38	25	19,0	21	28	23,0 +0,15	304
323287	6941R-50-120	7,0	120	50	25	25,0	21	34	28,0 +0,15	476
323303	6941R-60-125	10,3	125	58	32	29,0	27	40	32,9 +0,20	805
323329	6941R-75-180	15,5	180	75	38	38,0	33	49	41,8 +0,20	1443

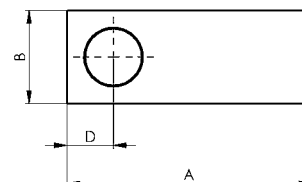
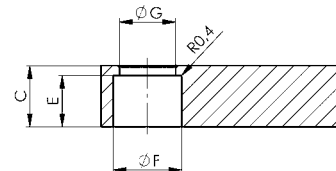
* Clamping force and volume flow specification with clamp arm no. 6941S.

Design:

Steel.

Application:

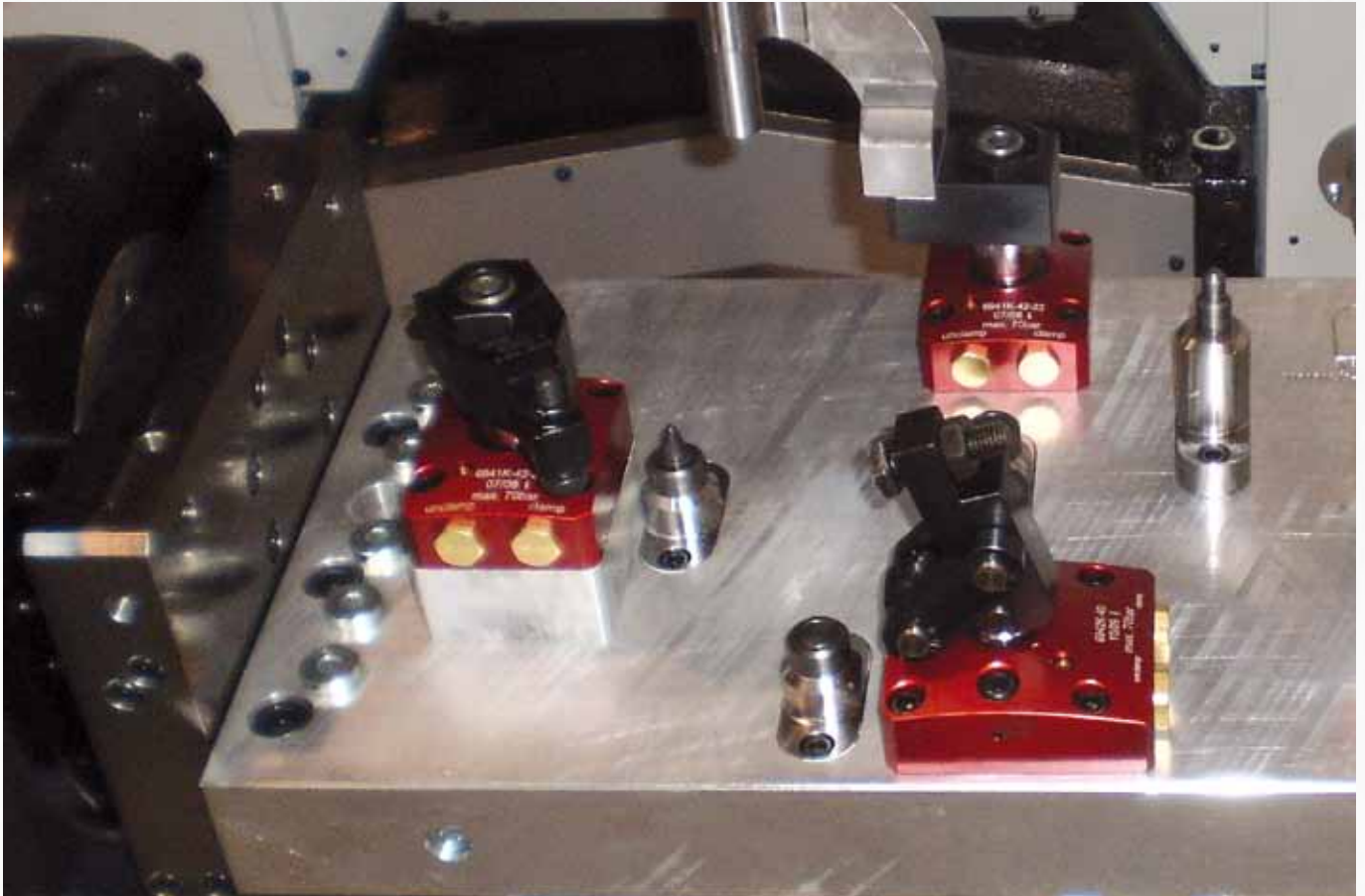
For Swing Clamp no. 6941K.



CAD



Subject to technical alterations.

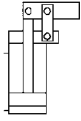


Subject to technical alterations.

No. 6942KK

Link clamp

double acting,
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 [cm ³]	Vol. Lo [cm ³]	eff. piston area Sp [cm ²]	eff. piston area Lo [cm ²]	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 from steel. Piston and hinge pins from hardened, tempered and nitrided steel. Metal wiper to protect the dirt wiper 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. 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:

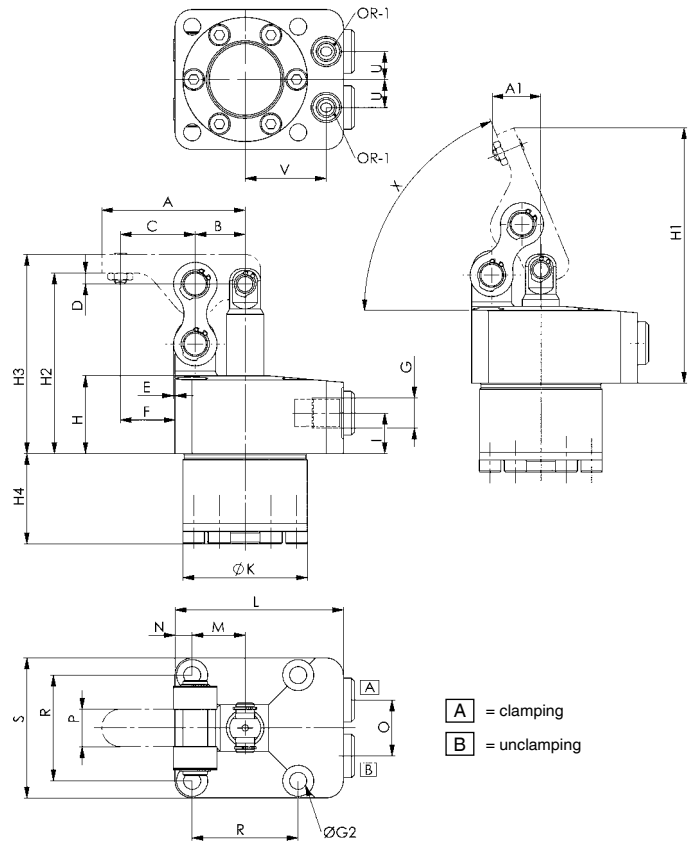
Top flange version, the horizontal centre axis at the standard lever and the pressure point on the workpiece lie in one plane. This prevents relative movement on the workpiece.

Note:

Maximum travel speed 0.5 m/s. The volumetric flow can be regulated via a restrictor check valve

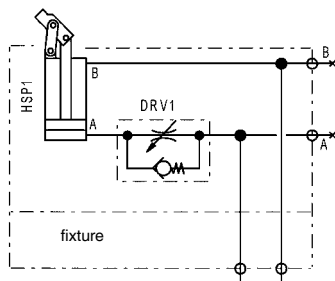
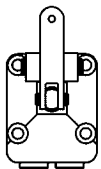
The B to C leverage on the clamping levers is 1 to 1.5!

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.



A = clamping
B = unclamping

Installation direction of the clamping arm:



Dimensions:

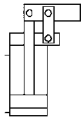
Order no.	Article no.	Piston rod dia. [mm]	Piston dia. [mm]	A	A1	B	C	D	E	F	G	H	H1	H2	H3	H4	I	dia. K	L	M	N	P	Q	R	S	U	V	X	ØG2	OR-1 O-ring Order No.
327486	6942KK-25	12	25	46,00	15,8	16,0	24,0	3,5	0,5	17,5	G1/8	25	83	58,0	64,0	29,0	13	39,9	54	17,0	5,5	12,0	18	34	45	9	26,0	67,5	5,5	161810
328484	6942KK-32	14	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	16	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	20	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	22	57	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-**L

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 [cm ³]	Vol. Lo [cm ³]	eff. piston area Sp [cm ²]	eff. piston area Lo [cm ²]	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 from steel. Piston and hinge pins from hardened steel, tempered and nitrided. Metal wiper to protect the dirt wiper 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. 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:

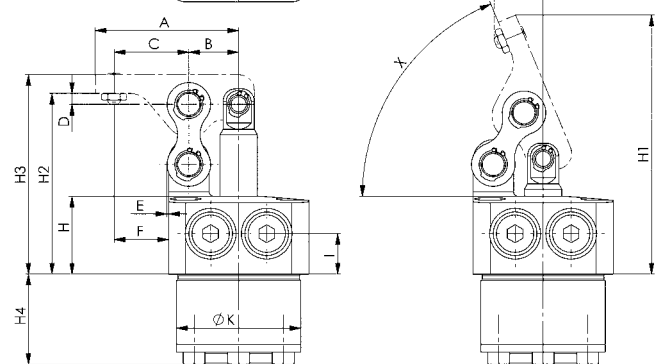
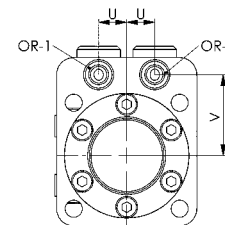
Top flange version, the horizontal centre axis at the standard lever and the pressure point on the workpiece lie in one plane. This prevents relative movement on the workpiece.

Note:

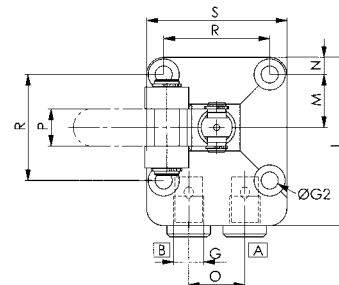
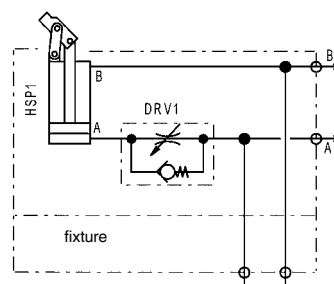
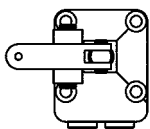
Maximum travel speed 0.5 m/s. The volumetric flow can be regulated via the restrictor check valve

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 = clamping
B = unclamping

Dimensions:

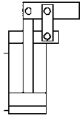
Order no.	Article no.	Piston rod dia. [mm]	Piston dia. [mm]	A	A1	B	C	D	E	F	G	H	H1	H2	H3	H4	I	dia. K	L	M	N	P	O	R	S	U	V	X	ØG2	OR-1 O-ring Order No.
327569	6942KK-25L	12	25	46,00	15,8	16,0	24,0	3,5	0,5	17,5	G1/8	25	83	58,0	64,0	29,0	13	39,9	54	17,0	5,5	12,0	18	34	45	9	26,0	67,5	5,5	161810
328500	6942KK-32L	14	32	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	16	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
328609	6942KK-45L	20	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
552014	6942KK-56L	22	57	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

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 from steel. Piston and hinge pins from hardened steel, tempered and nitrided. Metal wiper to protect the dirt wiper 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. 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:

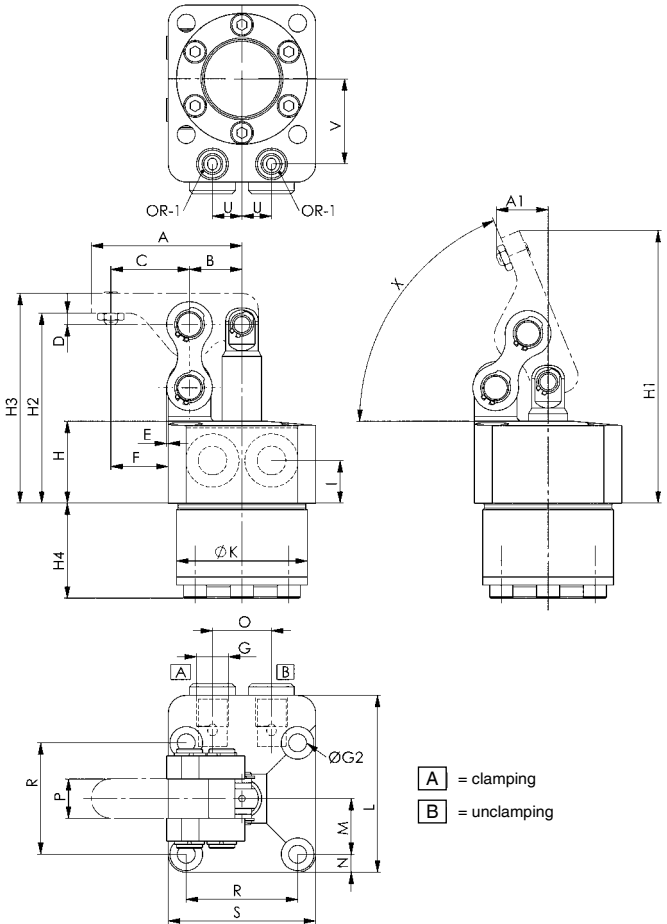
Top flange version, the horizontal centre axis at the standard lever and the pressure point on the workpiece lie in one plane. This prevents relative movement on the workpiece.

Note:

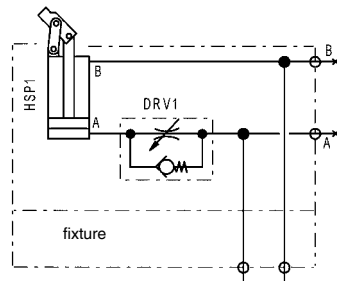
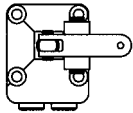
Maximum travel speed 0.5 m/s. The volumetric flow can be regulated via the restrictor check valve

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:

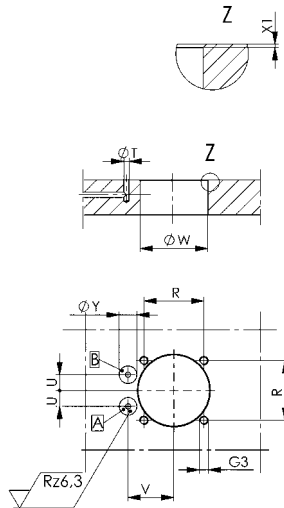


Dimensions:

Order no.	Article no.	Piston rod dia. [mm]	Piston dia. [mm]	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	12	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
328526	6942KK-32R	14	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
328534	6942KK-38R	16	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
328625	6942KK-45R	20	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
552013	6942KK-56R	22	57	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.

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

for link clamp no. 6942KK



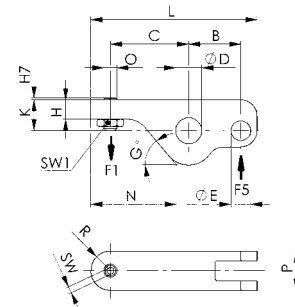
Order no.	Article no.	Piston force F5 at 100 bar [kN]	Clamping force F1 at 100 bar [kN]	B	C	dia. D	dia. E	G	H	H7	K	L	N	O	P	R	SW	SW1	Weight [g]
326850	6942KL-25-04	4,9	3,2	16,0	24,0	8	6	50,0	6	0,5	9,5	51,00	26,2	M4	12,0	6,00	2,0	7	46
328542	6942KL-32-04	8,0	5,3	18,5	28,0	10	8	50,0	8	0,5	11,5	59,25	30,2	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.

Note:

Lever ratios must be respected.



No. 6942KR-xx-14

Clamping arm blank

for link clamp no. 6942KK



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.

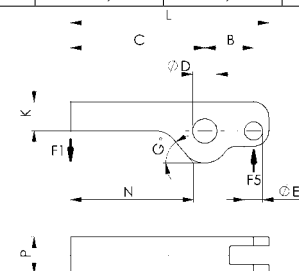
Note:

Lever ratios must be respected.

Formula for determining the clamping force F1:

Clamping force = F1 [kN], Piston force = F5 [kN], Operating lever = B [mm], Load lever = C [mm]

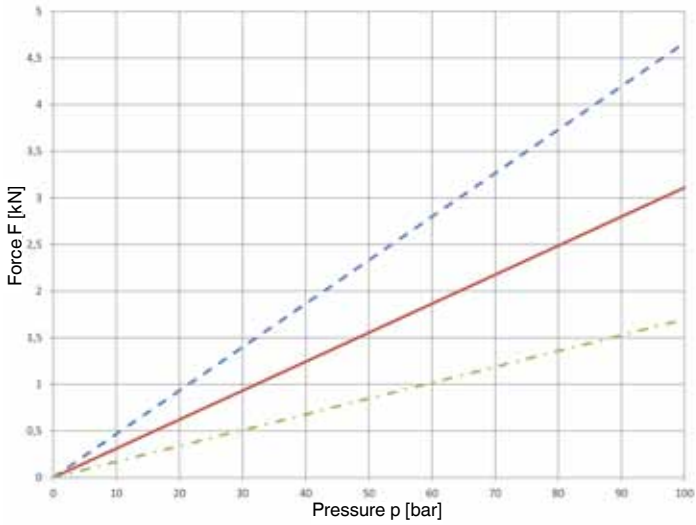
$$F1 = F5 \times B / C$$



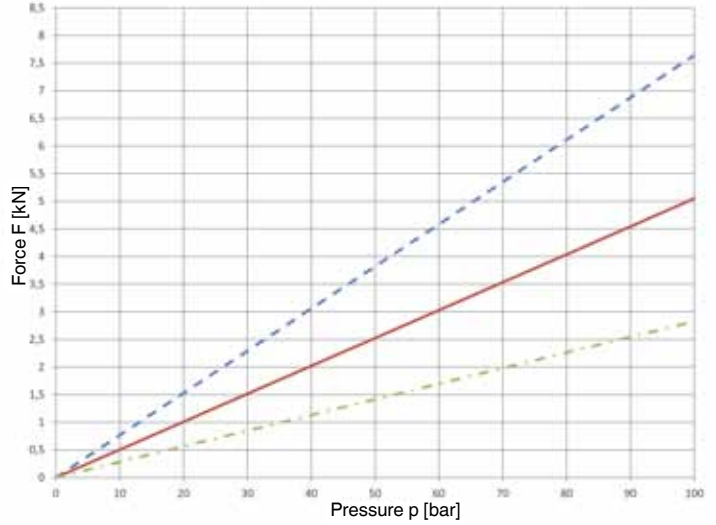
Subject to technical alterations.

Diagrams:

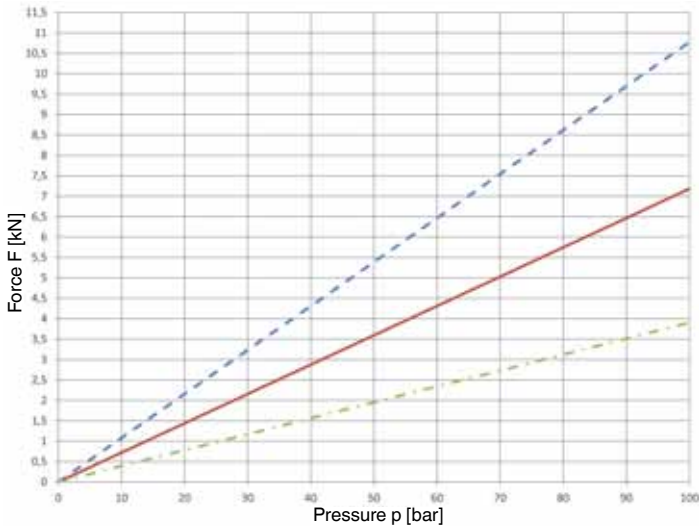
6942KK-25, -25R, -25L



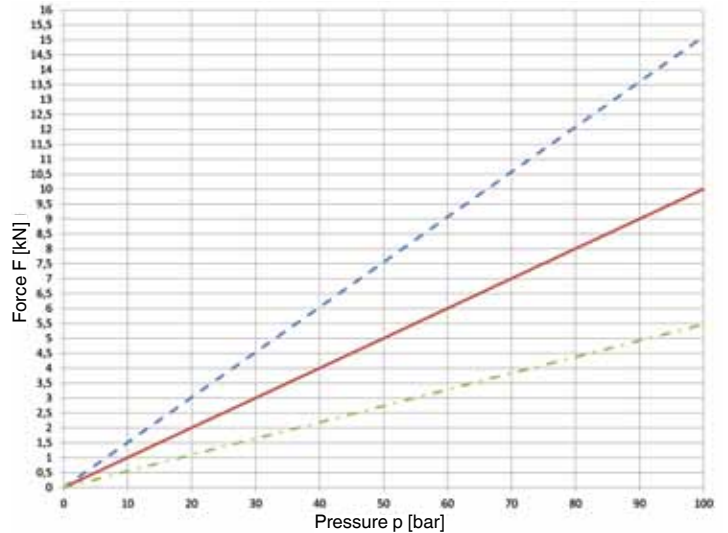
6942KK-32, -32R, -32L



6942KK-38, -38R, -38L

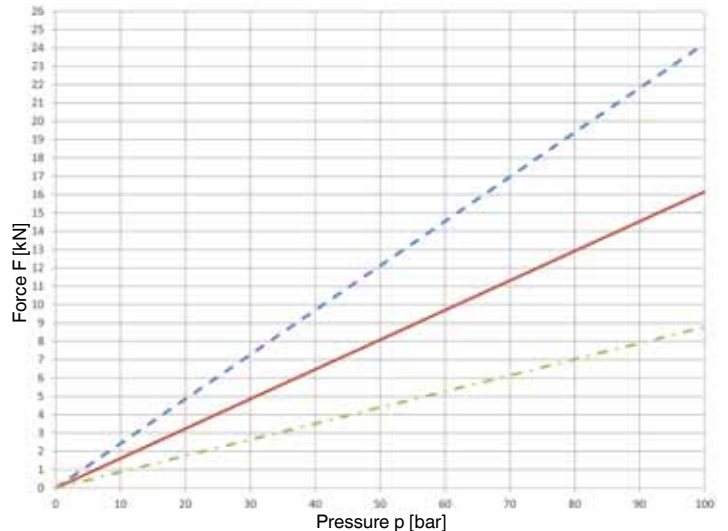


6942KK-45, -45R, -45L



- Hydr. force
- Clamping arm clamping force
- Clamping arm blank clamping force

6942KK-56, -56R, -56L



Subject to technical alterations.

LOW PRESSURE SUPPORT ELEMENTS FOR STRESS-FREE CLAMPING AND LOW-VIBRATION MACHINING

- > clamping 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 oil channels in device body or via threaded port
- > various design variants:
 - screw-in version
 - top flange version

PRODUCT OVERVIEW:

Type	Supporting force [kN]	Supporting stroke [mm]	Positioning	No. of models	Operating mode
6944EH	3,0 - 10,0	6,5 - 10,0	Spring	4	single-acting
6944KH	3,0 - 10,0	6,5 - 10,0	Spring	4	single-acting

PRODUCT EXAMPLES:

NO. 6944EH



> Supporting force: 3 - 10 kN

NO. 6944KH



> 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:

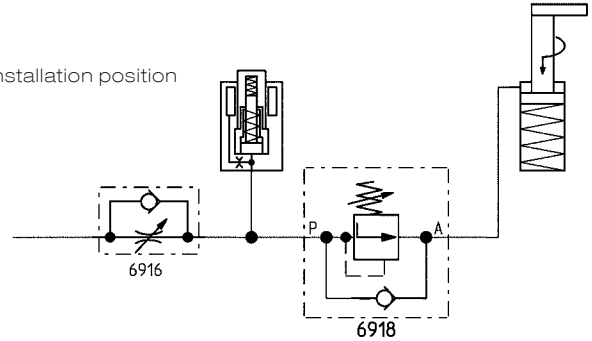
The spring-loaded contact force is at its greatest at a min. distance between the installation position and workpiece.

SHEAR FORCES:

Support elements only absorb forces in axial direction of the piston. If shear forces occur, the 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 volume flow can be regulated 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.

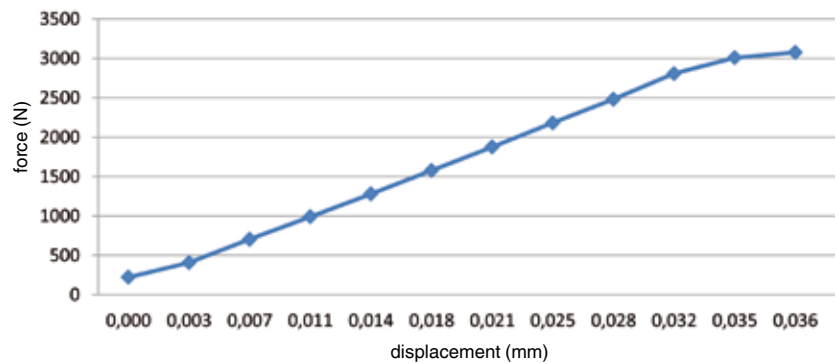


ELASTIC CHANGE IN LENGTH:

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 clamping sleeve. 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:

When using with spring design, there is risk of sucking in coolant. To avoid this, breather piping must be connected and moved to a protected area. Failure to observe this can lead to malfunctions.

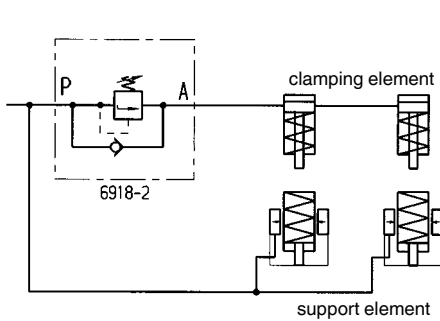
COOLANT AND SHAVINGS:

Support elements should normally be protected against shavings and cooling water.



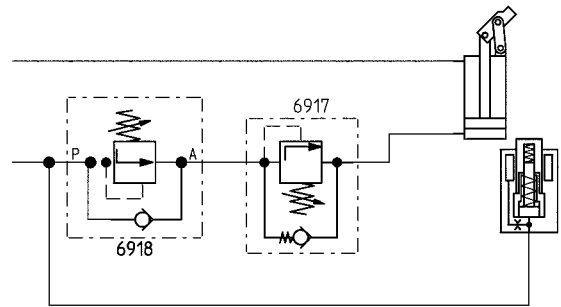
CONTROLLING THE CLAMPING SEQUENCE:

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.

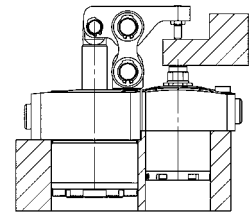
If the total number of occurring forces exceeds the permissible loading force, the anchor of the support element will be pressed backwards thereby damaging the support element.

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



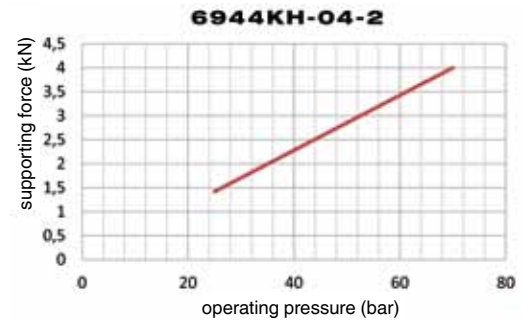
POSSIBLE MACHINING FORCE AT 70 BAR:

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:

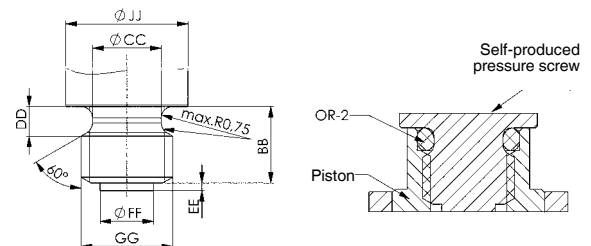
The clamping pressure for the link clamp 6942KK must be reduced to approx. 38 bar. The permissible supporting forces in the diagram are static. Vibrations occurring during the machining could be far higher. For these cases, a large reserve must be included.



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.

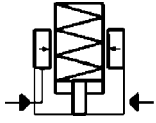
When using special set screws, make sure that the set screws are tempered and designed slightly ball-shaped. Set screws with a tip or fluting should not be used. In the case of a weight greater than approx. 100 grams, special set screws may impair the return stroke function of the support pin and spring-loaded 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.



NEW!



Order no.	Article no.	Contact force F1 [N]	Support force at 70 bar [kN]	Stroke H [mm]	Vol. [cm ³]	Md 1 max. [Nm]	Q max. [l/min]	Weight [g]
552204	6944KH-03-2	2,2 - 3,8	3,0	6,5	0,8	5,4	2,5	430
552205	6944KH-04-2	2,2 - 3,8	4,0	8,0	1,4	10,0	2,5	545
552206	6944KH-05-2	3,6 - 5,2	5,5	8,0	1,5	16,5	2,5	708
552207	6944KH-10-2	5,1 - 6,7	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:

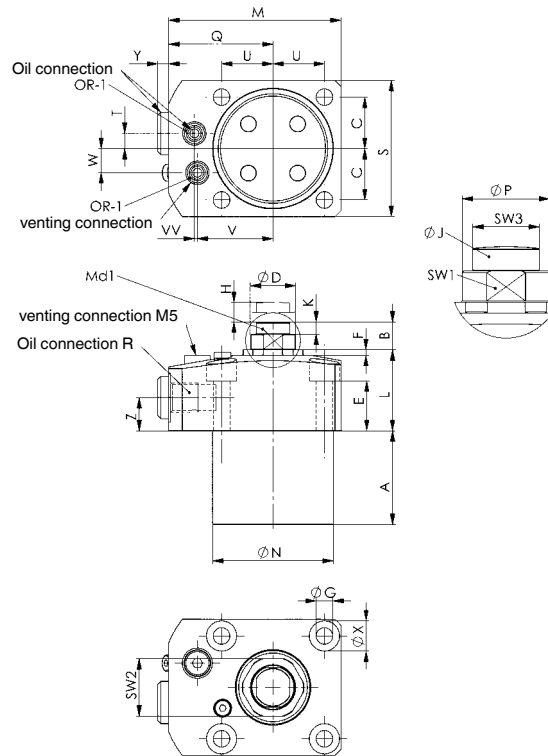
Element with high load capacity and low height. Oil pressure: The plunger is retracted in the normal position. When pressure is applied, the support pin advances with a weak spring-applied force against the inserted workpiece. The spring force varies with the pin stroke. As the hydraulic pressure rises, 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:

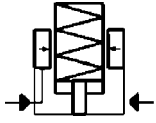
Order no.	Article no.	A	B	C	dia. D	E	F	dia. G	dia. J	K	L	M	dia. N	dia. P	Q	R	S	T	U	V	W	dia. X	Y	Z	SW1	SW2	SW3	VV	OR-1 O-ring Order No.
552204	6944KH-03-2	21,0	9,0	11,5	10	19,0	1,7	4,5	9,0	3,0	28	50,0	29,9	9,5	30,5	G1/8	34	3	15,0	20,5	7	8	3,6	11	8	13	8	-	161802
552205	6944KH-04-2	27,5	10,5	15,7	12	18,0	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
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
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

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.



NEW!



Order no.	Article no.	Contact force F1 [N]	Support force at 70 bar [kN]	Stroke H [mm]	Vol. [cm ³]	Md max. [Nm]	Md 1 max. [Nm]	Q max. [l/min]	Weight [g]
552200	6944EH-03-2	2,2 - 3,8	3,0	6,5	0,8	32	5,4	2,5	198
552201	6944EH-04-2	2,2 - 3,8	4,0	8,0	1,4	50	10,0	2,5	280
552202	6944EH-05-2	3,6 - 5,2	5,5	8,0	1,5	63	16,5	2,5	378
552203	6944EH-10-2	5,1 - 6,7	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:

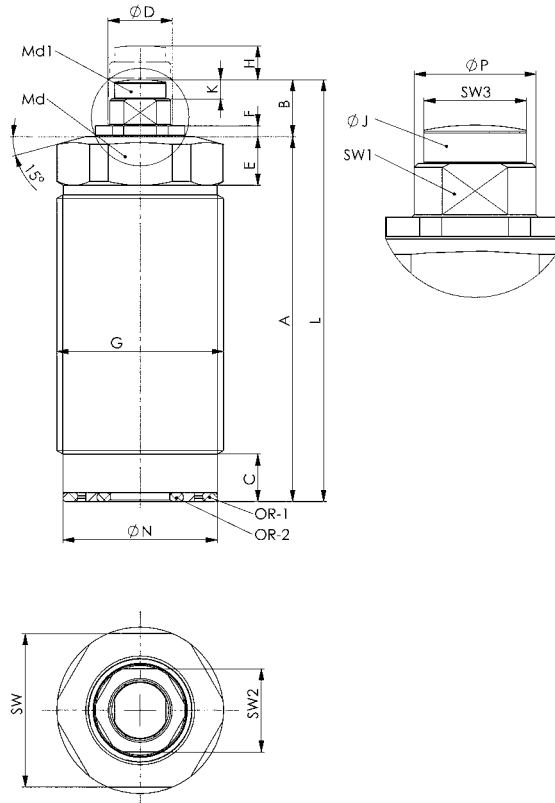
Element with high load capacity and low height. Oil pressure: The plunger is retracted in the normal position. When pressure is applied, the support pin advances with a weak spring-applied force against the inserted workpiece. The spring force varies with the pin stroke. As the hydraulic pressure rises, 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:

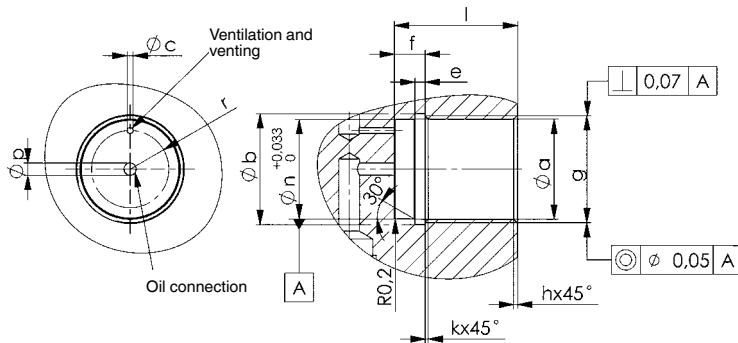
Order no.	Article no.	A	B	C	dia. D	E	F	G	dia. J	K	L	dia. N	dia. P	SW	SW1	SW2	SW3	OR-1 O-ring Order No.	OR-2 O-ring Order No.
552200	6944EH-03-2	57	9,0	7,4	10	7,6	1,7	M26 x 1,5	9,0	3,0	66,0	24,1	9,5	24	8	13	8	552156	552153
552201	6944EH-04-2	62	10,5	9,4	12	10,3	1,7	M30 x 1,5	11,5	3,5	72,5	28,2	11,5	27	10	15	10	159400	128660
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
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

Subject to technical alterations.

Installation dimensions and production dimensions with self-production of the clamping screw:

Order no.	Article no.	dia. a	dia. b	Øc max.	e	f	g	h	k	l	dia. n	Øp max.	r	BB	dia. CC	DD	EE	dia. FF	GG	dia. JJ	OR-3 O-ring Order No.
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	5,0	4,5	1,93	0,5	3,5	M6	9,0	552155
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	4,8	6,2	1,8	0,7	4,9	M8	11,5	552245
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	9,0	8,2	2,5	1,0	5,9	M10	12,5	552174
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	9,0	8,2	2,5	1,0	5,9	M10	12,5	552174

Installation dimensions:



Production dimensions with self-production of the clamping screw:

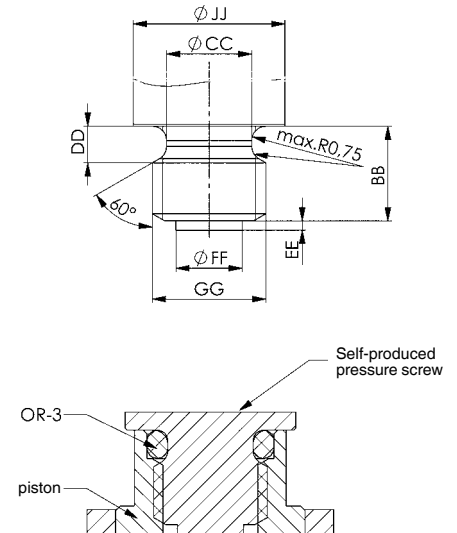
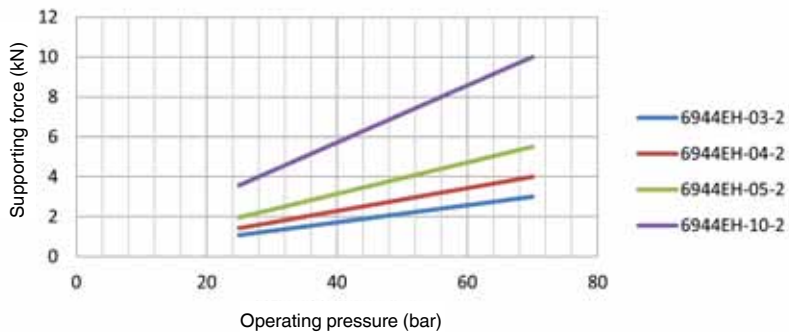


Diagram:





Subject to technical alterations.

NO. 6917 / 6918
 > Valves



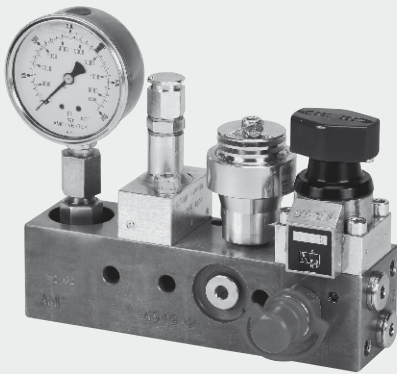
NO. 6982
 > Pressure switch



NO. 6991 / 6992
 > Rotary couplings



NO. 6919-2
 > Pallet decoupler block



NO. 6919S
 > Accumulator



NO. 6919-20 / 6919-25
 > Pallet decoupler block unit and coupling unit



NO. 6985 / 6990
 > High-pressure hoses and couplers



NO. 6988
 > Manifolds



NO. 6983
 > Pressure gauges



No. 6917-1

Pressure Reducing Valve

for O-ring joint,
max. operating pressure 400 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

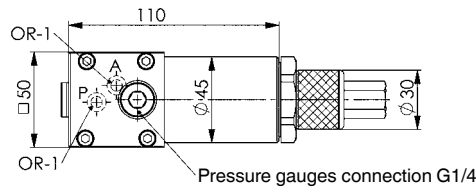
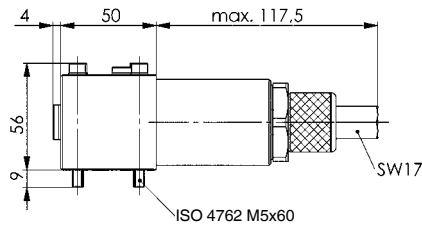
Design:

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).

- 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).
- 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

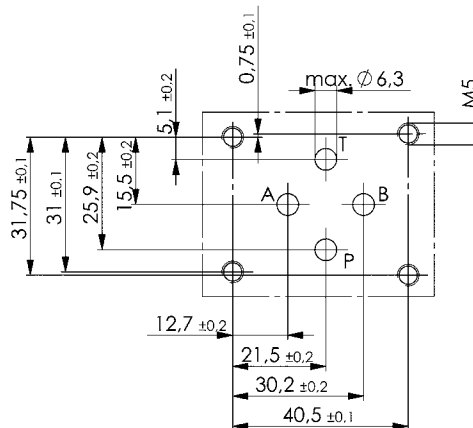
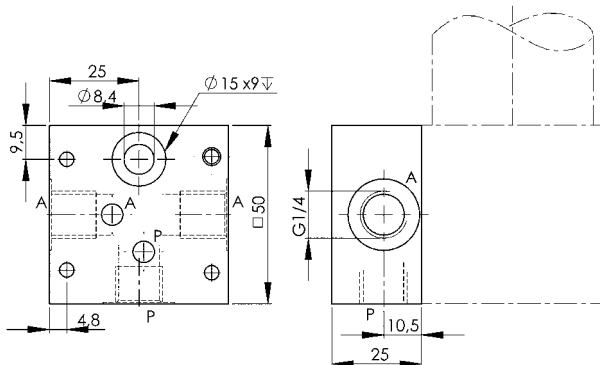
Design:

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

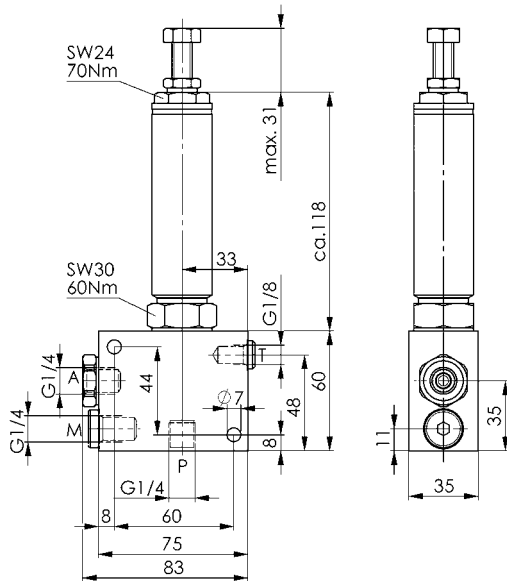
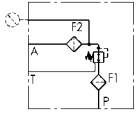


Subject to technical alterations.

No. 6917R

Pressure control seat valve

for pipe fitting G1/4,
max. operating pressure 500 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]	Weight [g]
326405	6917R-5-130	500	8	130	5	≤ 20	1860
326421	6917R-5-380	500	30	380	5	≤ 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 1/4, 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.

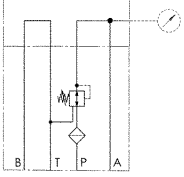
Replacement part: filter insert, Order No. 326678



No. 6917F

Pressure control seat valve

for O-ring joint,
max. operating pressure 500 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]	OR-1 O-ring Order No.	Weight [g]
326504	6917F-3-130	6	500	8	130	6	≤ 20	493478	2100
326785	6917F-3-380	6	500	30	380	12	≤ 20	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 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.

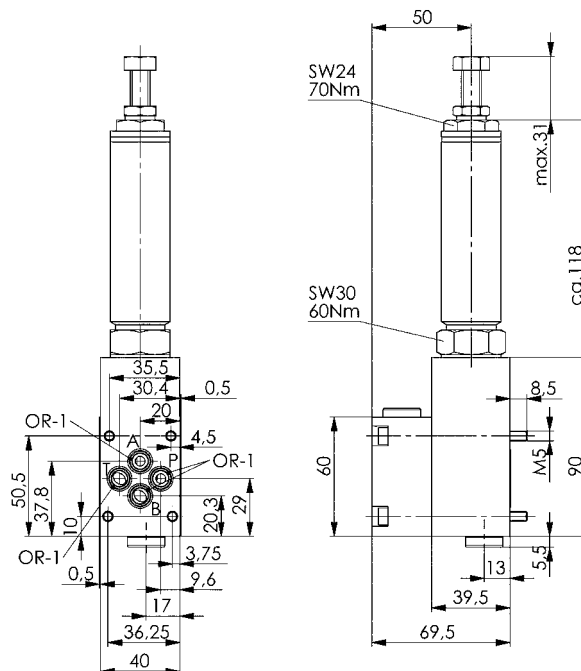
To set and read the pressure, a pressure display device must be installed at the valve outlet.

Pressure is adjusted with an adjusting screw.

The pressure setting can be sealed.

Note:

Observe mounting instructions.



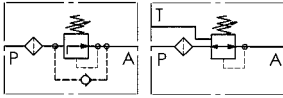
CAD

Subject to technical alterations.

No. 6917E

Pressure control seat valve

cartridge flange,
max. operating pressure 500 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]	Weight [g]
492330	6917E-2-130	500	8	130	6	-	752
326462	6917E-3-130	500	8	130	6	≤ 20	780
326686	6917E-2-380	500	30	380	12	-	752
326488	6917E-3-380	500	30	380	12	≤ 20	780

Design:

Leak-oil-free 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:

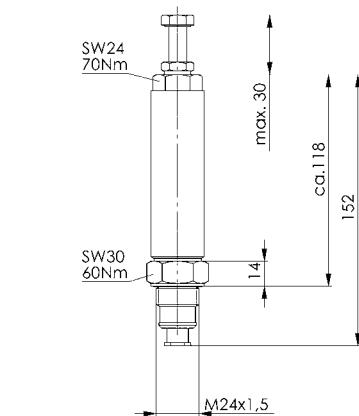
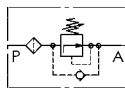
For the 3-way valve, the controlled pressure and overload pressure are set simultaneously with an adjusting screw. The overload pressure is always about 10 bar above the regulation pressure. Protection against outside force and puncturing of the valve.

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.

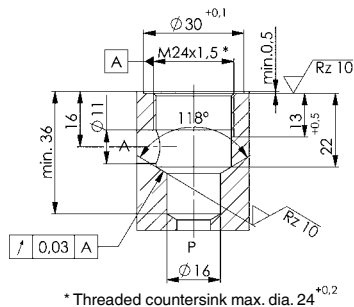
Note:

Observe mounting instructions.

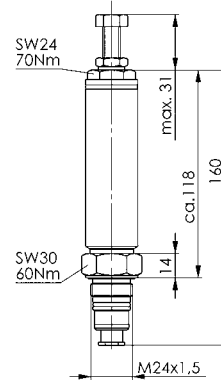
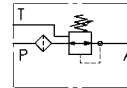
No. 6917E-2



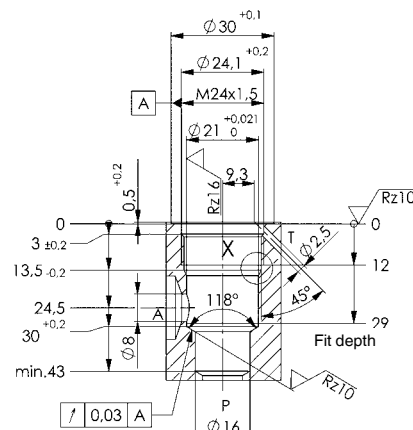
Installation dimensions



No. 6917E-3



Installation dimensions



No. 6918

Sequence Valve

6918-6 for pipe fitting G1/4,
 6918-11 for pipe fitting G1/4,
 6918-2 for pipe fitting G1/4,
 6918-3 for O-ring joint,
 6918-12 for O-ring joint,
 6918-4 fitting combination (pipe),
 6918-5 fitting combination (pipe).
 Possible statically overload ~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]	OR-1 O-ring Order No.	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
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 housing, nitrided. Sealing nut galvanized. All functional components hardened and ground. Balls out of roller bearing steel.

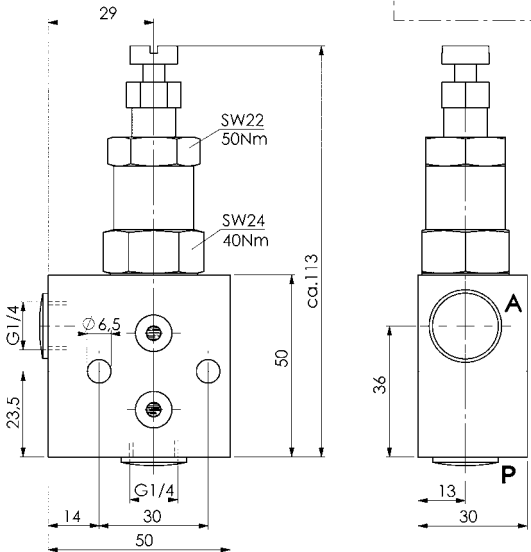
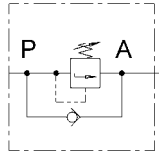
Application:

The pressure sequence valve is used where another hydraulic system or another consumer should be activated after achieving a specified pressure. If a circuit is designed with several sequence valves, it must be observed that the pressure in this circuit is always adjusted 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.

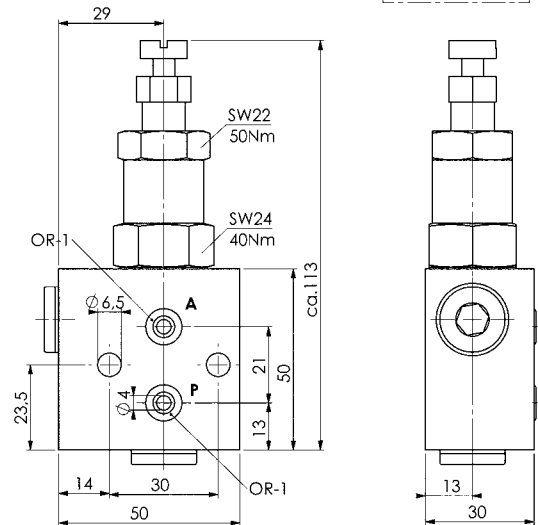
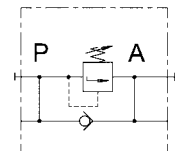
Note:

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.

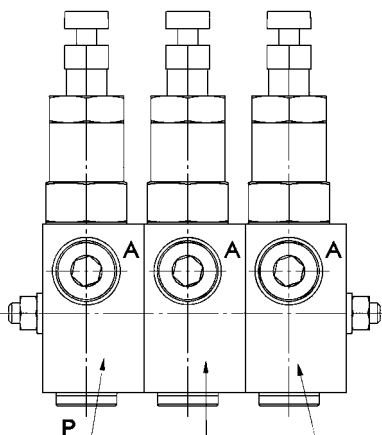
No. 6918-2
 No. 6918-6
 No. 6918-11



No. 6918-3
 No. 6918-12

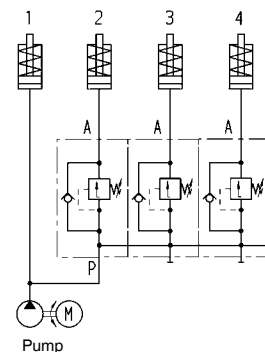


Application example:



No. 6918-3 Order no. 66100
 No. 6918-4 Order no. 320135
 No. 6918-5 Order no. 320143

Hydraulic diagram:

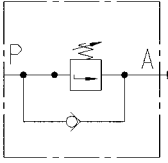


No. 6918

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:

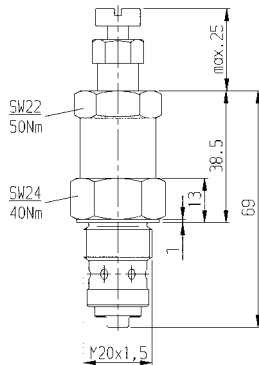
Steel housing, nitrided. Sealing nut galvanized. All functional components hardened and ground. Balls out of roller bearing steel.

Application:

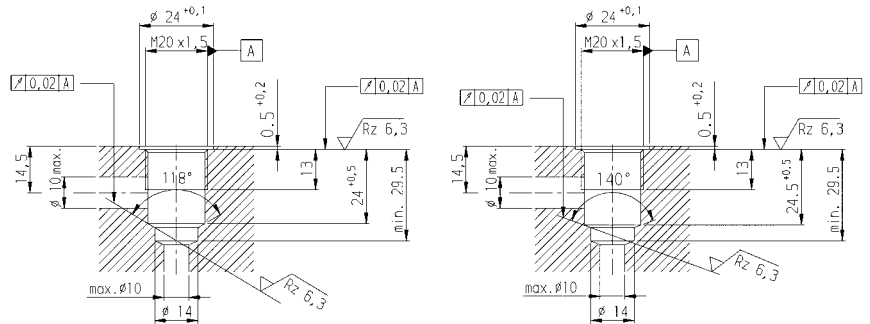
The pressure sequence valve is used where another hydraulic system or another consumer should be activated after achieving a specified pressure. If a circuit is designed with several sequence valves, it must be observed that the pressure in this circuit is always adjusted in the last respective pressure 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.



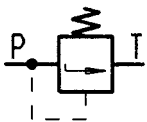
Installation dimensions:



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:

Nodular grey cast iron, body galvanized (6918-10-001) steel parts. Sealing of spindle is possible to ensure the set pressure.

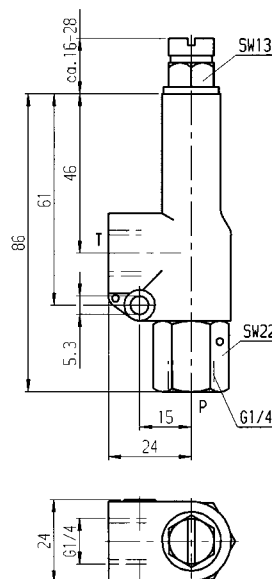
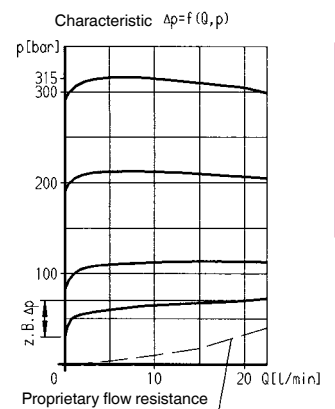


Diagram:

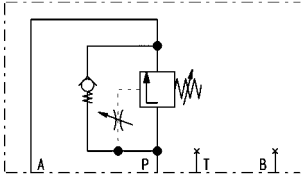


Subject to technical alterations.

No. 6918-80-10

Sequence valve

for O-ring joint, Pressure-time delayed,
max. operating pressure 250 bar,
min. operating pressure 30 bar.

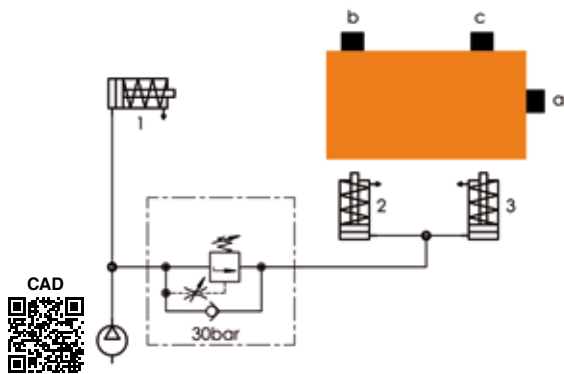


Clamping procedure:

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



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:

Sequence valve with NG 6. Hole pattern not standard.
The valve mainly consists of the housing, hydraulic piston, opening valve, throttle screw for coarse adjustment and the throttle screw for fine adjustment.
Oil supply takes place through drilled channels in the clamping device.

Application:

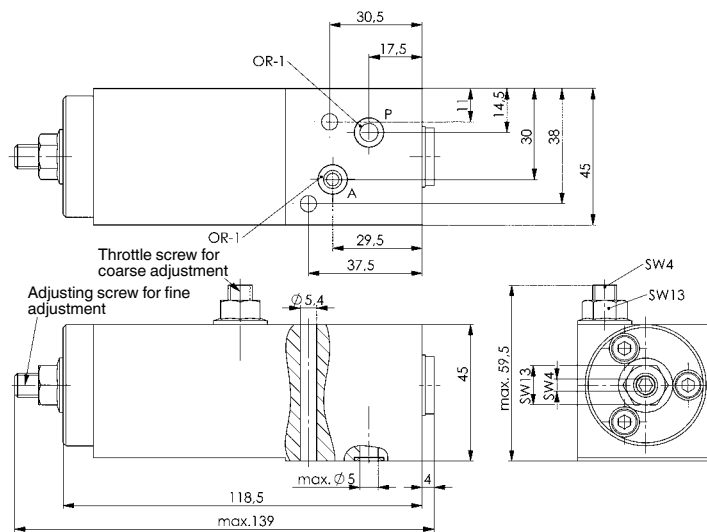
With this sequence valve with timer, pressure-independent switching sequences with a defined adjustable delay within a circuit can be achieved.
Parallel connection or series connection of several sequence valves is possible.

Features:

The compact shape makes it easier to mount on the clamping device. The hydraulic piston actuates the opening valve. Setting depends on the viscosity of the hydraulic oil. Viscosity depends on the pressure and temperature. The setting is valid for an operating mode. Pay attention to the pressure drop when the valve is opened.

Note:

Observe mounting instructions with design notes for the fixture manufacturer.



No. 6918A-80-10

Connecting plate



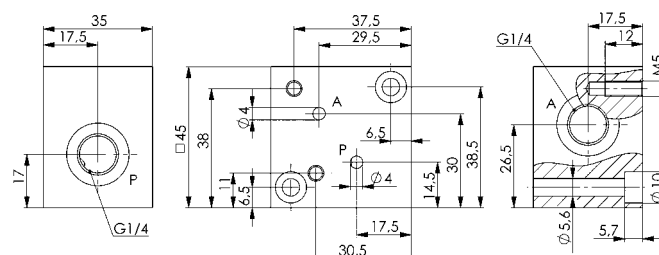
Order no.	Article no.	L x W x H	Connection	Weight [g]
327692	6918A-80-10	45x45x35	2 x G1/4	495

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.

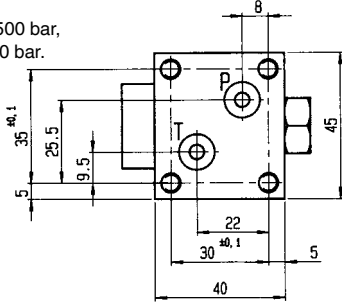
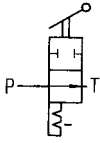


Subject to technical alterations.

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	Weight [g]
181214	6910-10	12	10-500	-40 - +80	63	3,5	90°	400

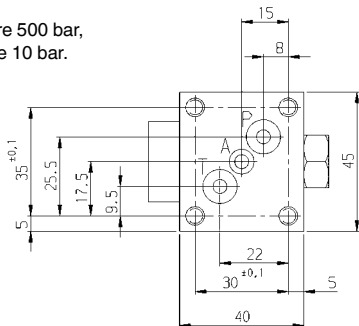
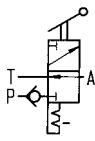
Application:

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]	Switching angle	Weight [g]
114298	6910-11	12	10-500	-40 - +80	63	3,5	90°	400

Application:

The 3/2 manual way seat valve allows to determine the direction of oil flow.

Features:

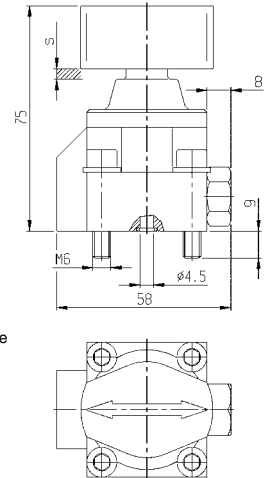
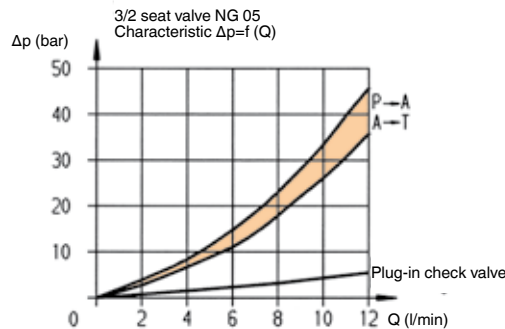
Hermetic sealing by ball seats. Sealing of the oil channels of the valve base with O-rings. The seat valve has completely hydraulic pressure compensation and negative switching.

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:



No. 6910A-05

Connection Plate



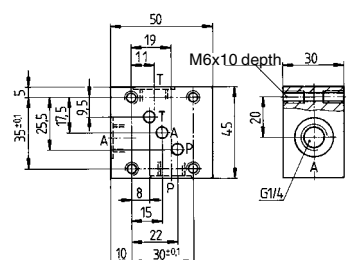
Order no.	Article no.	L x W x H	Connection	Weight [g]
60335	6910A-05	50x45x30	3 x G1/4	450

Design:

Tempering steel, TEM deburred and phosphatized.

Application:

- 3/2-way seat valve no. 6910-06-01
- 2/2-way manual seat valve no. 6910-10
- 3/2-way manual seat valve no. 6910-11.

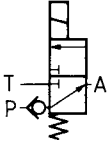


Subject to technical alterations.

No. 6910-06-01

Seat Valve, 3/2-Way

for O-ring joint,
max. operating pressure 500 bar,
min. operating pressure 10 bar.



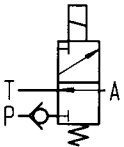
Order no.	Article no.	Q [l/min]	Viscosity [cSt]	Weight [g]
259168	6910-06-01	12	10-500	710

Order no.	Article no.	Ambient temp. [°C]	U [V DC]	P [W]	Switching time on/off [ms]	Ed to 35°C [%]	Switching frequency per hour	Code class
259168	6910-06-01	-40 - +80	24	20	100/50	100	2000	IP 54

No. 6910-06-02

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]
259226	6910-06-02	12	10-500	710

Order no.	Article no.	Ambient temp. [°C]	U [V DC]	P [W]	Switching time on/off [ms]	Ed to 35°C [%]	Switching frequency per hour	Code class
259226	6910-06-02	-40 - +80	24	20	100/50	100	2000	IP 54



Design:

The ball, being the essential control element, is pressed either by a solenoid or a spring onto the hardened ball seats. The blocked flow direction is thus hermetically shut off. The solenoids 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.

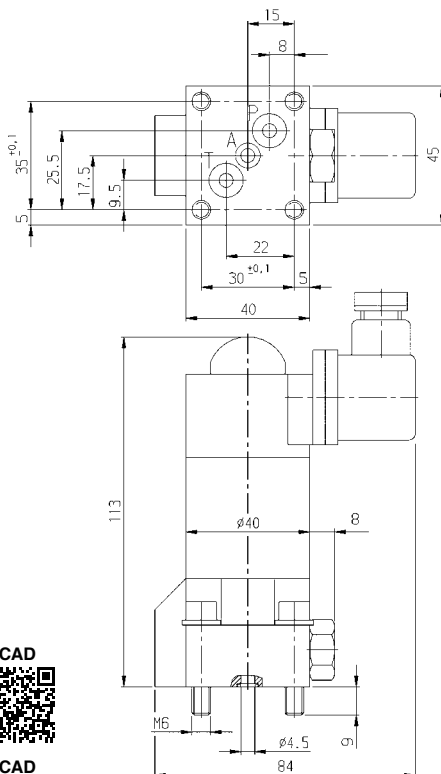
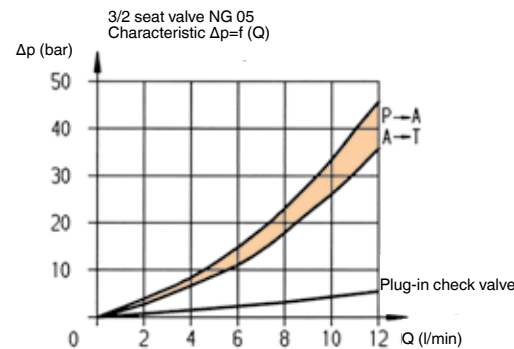
Note:

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:



Dimensions apply on both sides.

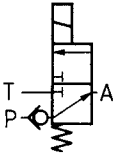


Subject to technical alterations.

No. 6910-06-04

Seat Valve, 3/2-Way

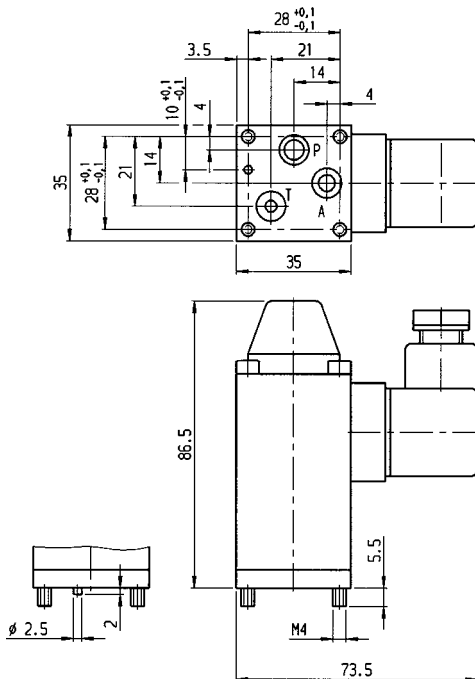
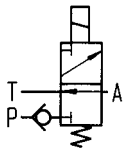
for O-ring joint,
max. operating pressure 450 bar,
min. operating pressure 10 bar.



No. 6910-06-05

Seat Valve, 3/2-Way

for O-ring joint,
max. operating pressure 450 bar,
min. operating pressure 10 bar.



Dimensions apply on both sides.



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	Code class
276824	6910-06-04	-40 - +80	24	24	70/50	100	2000	IP 65

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	Code class
65391	6910-06-05	-40 - +80	24	24	70/50	100	2000	IP 65

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.

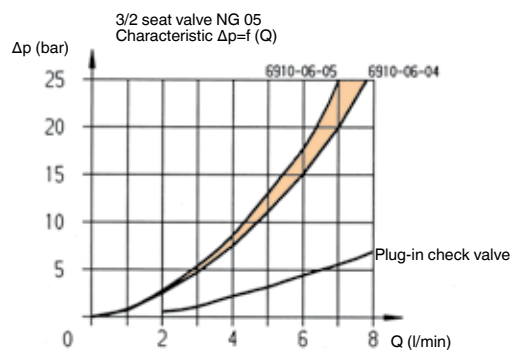
Note:

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 to DIN 51524 part 2.

On request:

Directional seat valve with control voltage 230 V AC 50/60 Hz.

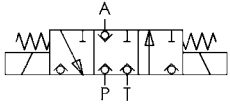
Diagram:



No. 6910A-07-02

Seat Valve, 3/3-Way

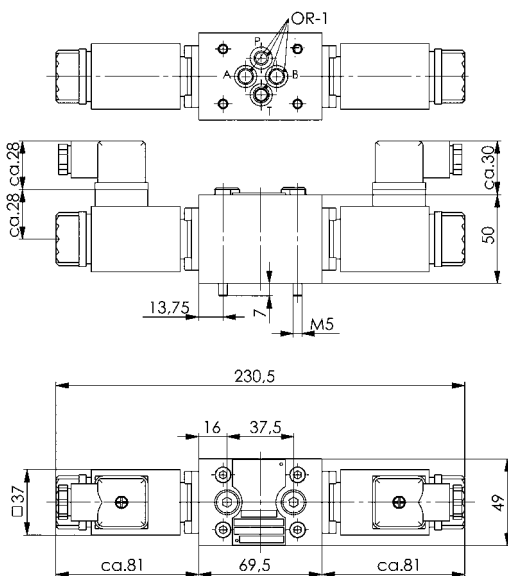
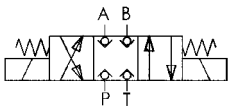
for O-ring joint,
max. operating pressure 400 bar,
min. operating pressure 10 bar.



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]
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	Code class
322073	6910A-07-02	-40 - +80	27,6	100/50	100	2000	IP67

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	Code class
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.

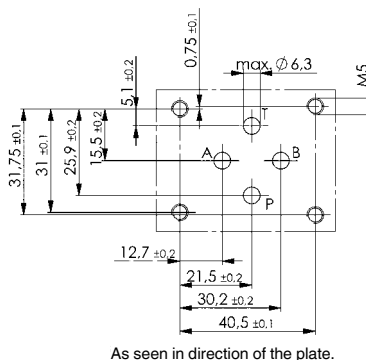
Note:

Spare part: Plug-in check valve, order no. 402156

On request:

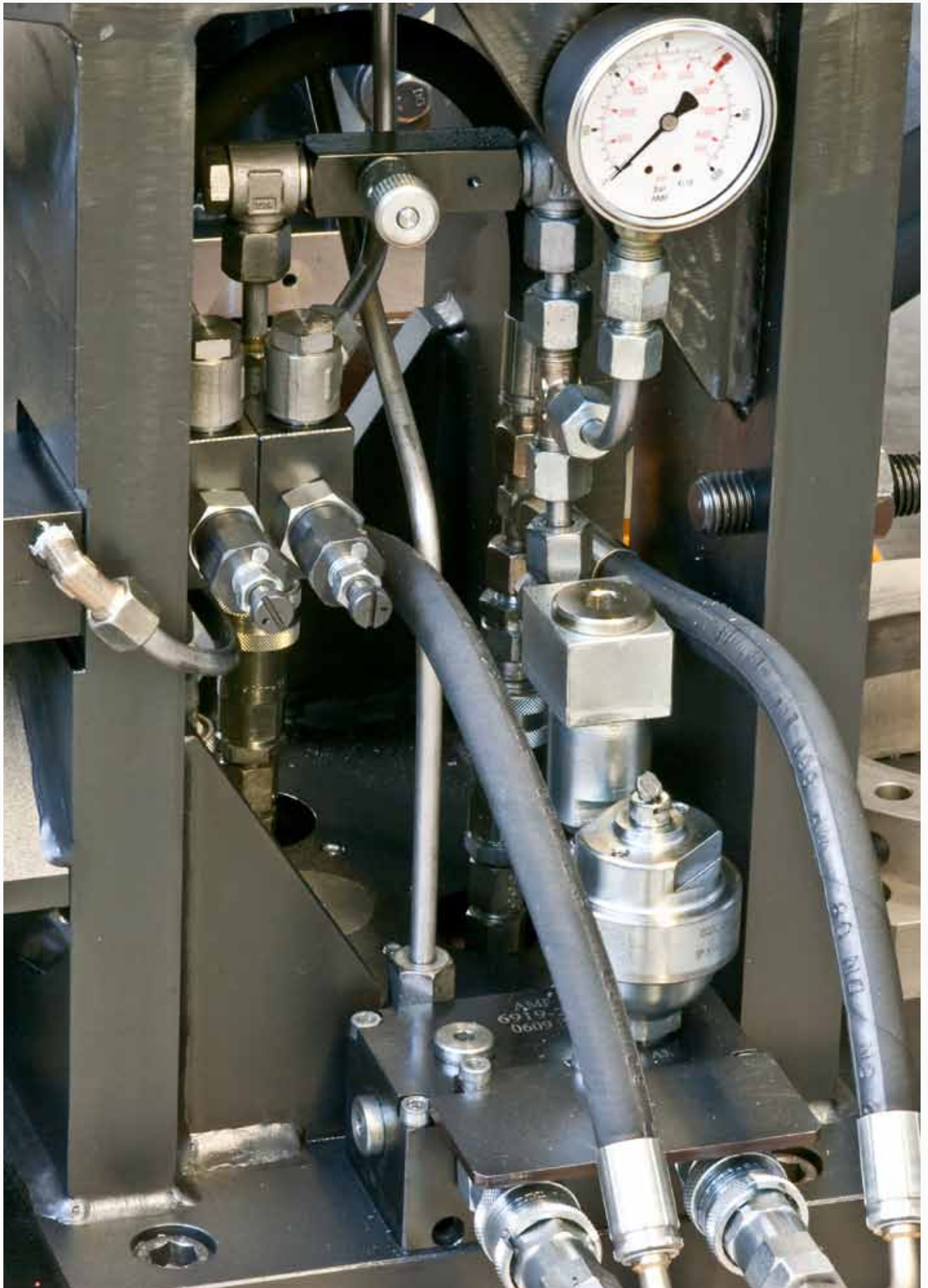
Directional seat valve with control voltage 230 V AC 50/60 Hz.

Hole pattern shape A nominal size 6 according to DIN 24340 T2:



As seen in direction of the plate.





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 G $\frac{1}{4}$ A – DIN 3852-E, 2 switch outputs.

Application:

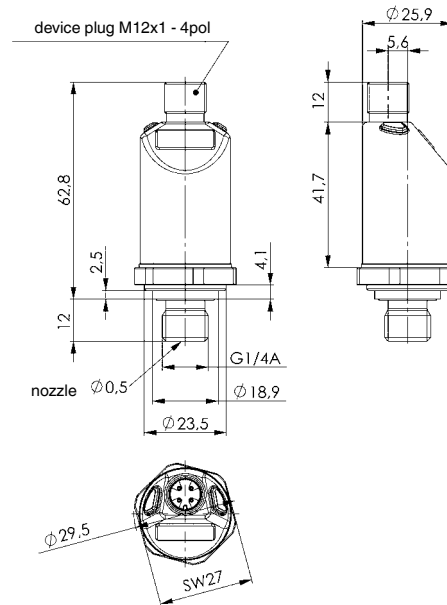
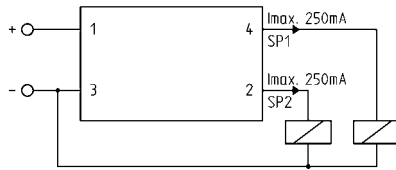
For the electronic-hydraulic pressure monitoring in pump units and in circuits of hydraulic clamping devices.

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.

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 G1/4 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.

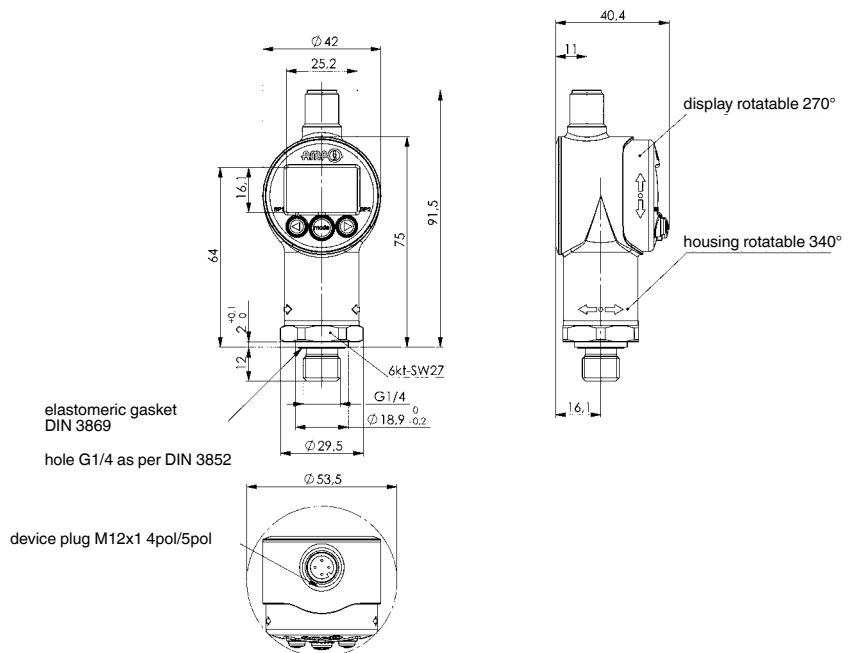
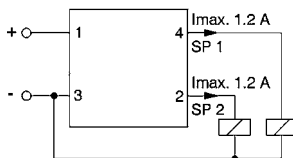
Adjustable display: current pressure, peak pressure value or to switching point 1 or switching point 2. Simple handling via key programming.

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



No. 6982E-01-L

Round connector

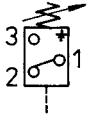


Order no.	Article no.	Thread	Number of poles [St]	Line length [m]	Weight [g]
498709	6982E-01-L	M12x1	4	1,5	100

No. 6982

Piston Pressure Switch

electric-hydraulic



Order no.	Article no.	Operating pressure [bar]	Temp. [°C]	Code class	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	IP 65	100	30V - 250V = 5A	457499	330

Design:

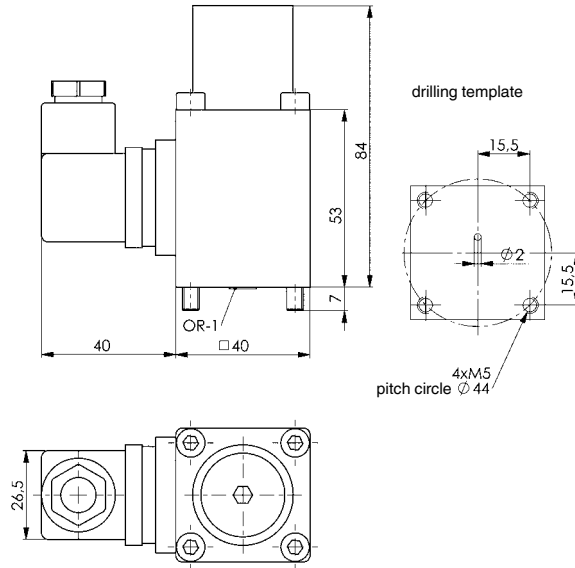
Microswitch. Design: Spring-loaded piston.

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

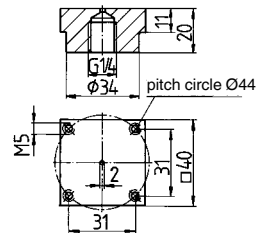
for piston pressure switch No. 6982-02 and -04.



Order no.	Article no.	Weight [g]
60780	6982-02-01	185

Application:

For connecting pressure switch No. 6982-02.



CAD

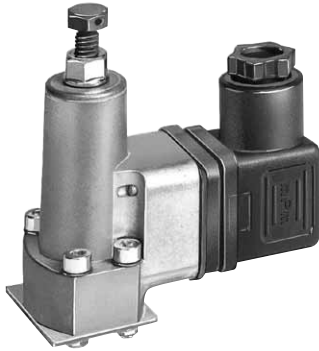
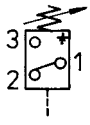


Subject to technical alterations.

No. 6982

Piston Pressure Switch

electric-hydraulic



Order no.	Article no.	Operating pressure [bar]	Temp. [°C]	Code class	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	IP 65	30	12V - 230V = 4A	161810	300
402610	6982-08	100-400	-20 - +80	IP 65	30	12V - 230V = 4A	161810	300
276881	6982-05	200-630	-20 - +80	IP 65	30	12V - 230V = 4A	161802	300

Design:

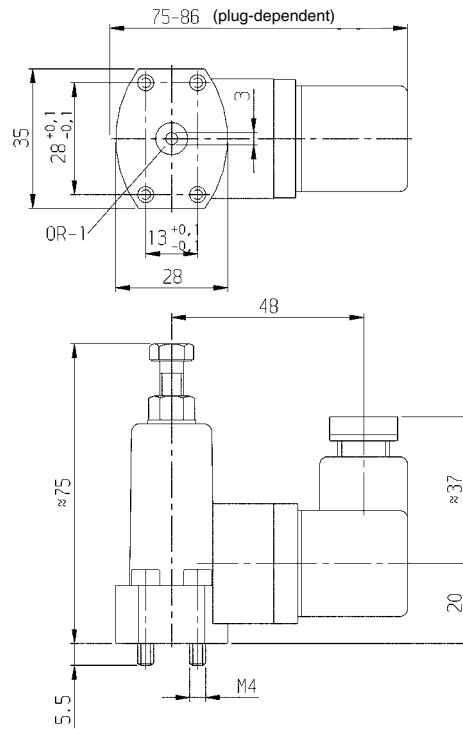
Microswitch. Design: Spring-loaded piston.

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.



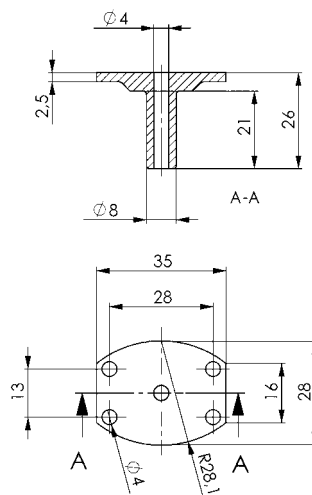
No. 6982-05-01

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

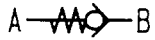


Subject to technical alterations.

No. 6916-04

Line Check Valve

max. operating pressure 630 bar.



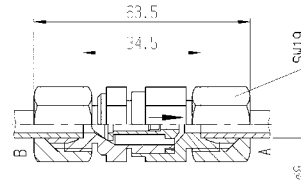
Order no.	Article no.	Q [l/min]	Differenz p at flow [bar]	Ambient temp. [°C]	Aperture pressure [bar]	Weight [g]
62885	6916-04	12	3	-20 - +90	1	110

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.



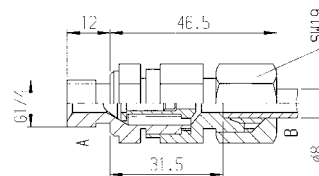
Order no.	Article no.	Q [l/min]	Direction of flow	Differenz p at flow [bar]	Ambient temp. [°C]	Aperture pressure [bar]	Weight [g]
62901	6916-05	12	A - B	3	-20 - +90	1	95
62968	6916-06	12	B - A	3	-20 - +90	1	95

Design:

Housing made of steel, surface galvanized. Sealing cone spring loaded with O-ring sealing. Sealings made of Perbunan.

Note:

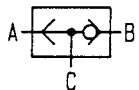
The direction of flow is indicated on the hex nut housing by means of an arrow. On the threaded side sealing is done by means of a sealing edge and on the pipe side the valve is sealed by means of a cutting ring.



No. 6916-07

Shuttle Valve

max. operating pressure 630 bar.



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:

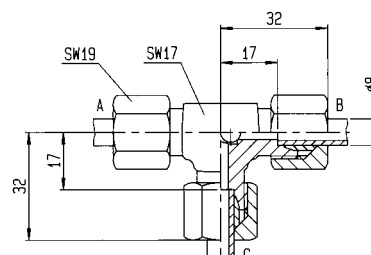
Housing made of steel, surface galvanized. Ball seat valve type.

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.

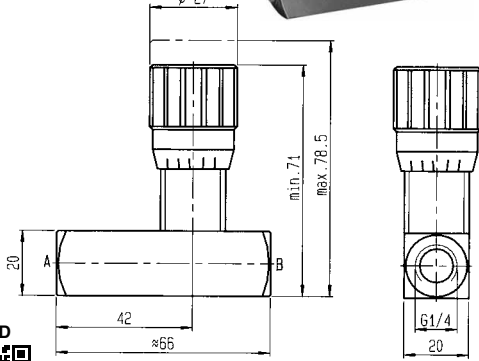
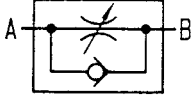


Subject to technical alterations.

No. 6916-09

Throttle/Check Valve

max. operating pressure 400 bar.



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

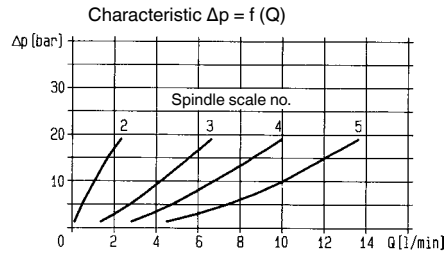
Design:

Housing made of steel, galvanized. Adjusting knob made of AL, ribbed. Needle throttle.

Note:

Easy setting by scaled spindle and adjusting knob.

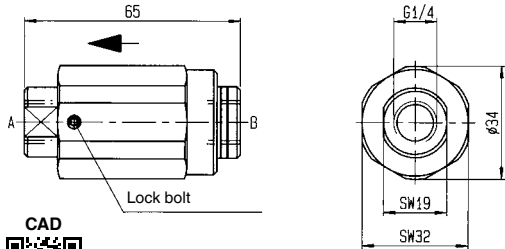
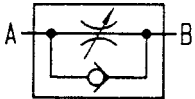
Diagram:



No. 6916-10

Throttle/Check Valve

max. operating pressure 400 bar.



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

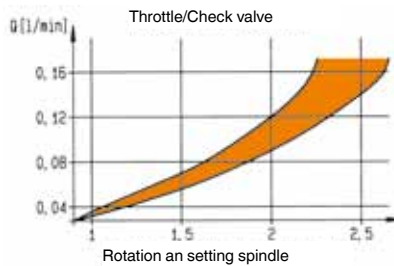
Design:

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

Ball-Valve

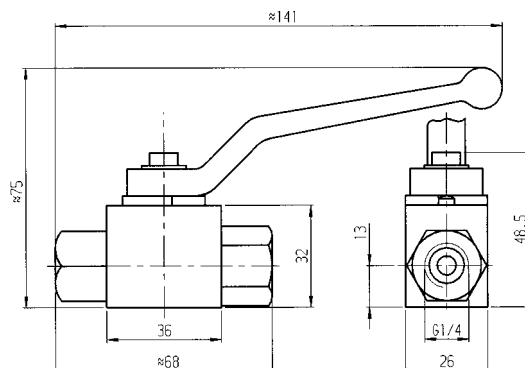
max. operating pressure 500 bar.



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.

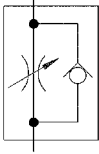


Subject to technical alterations.

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]	G	Weight [g]
326579	6916-12-01	20,7	11,1	15,16	15,9	14	27	G1/8	47
326611	6916-12-04	20,9	11,2	18,72	21,0	19	47	G1/4	47

Design:

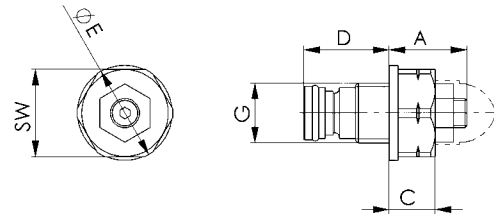
Housing made of steel, hardened and blued. Compact size.

Application:

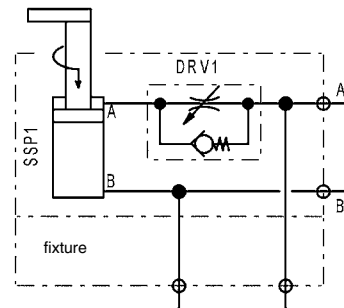
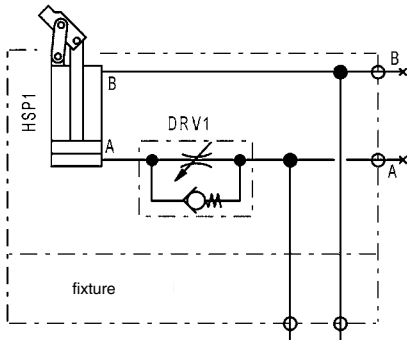
For single and double-acting loads. The traversing speed can be set by controlling the flow.

Note:

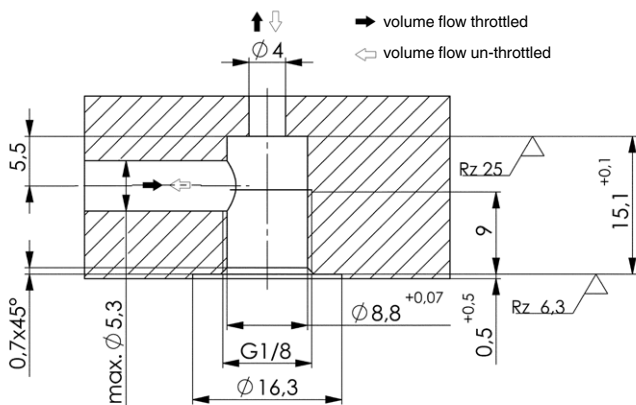
The screw-in throttle check valve is screwed into the installation bore.
The upstream pressure relief valve in the hydraulic control guarantees to drain the surplus volume.
The throttle check valves should preferably be used for feed control.
Return flow control poses the risk of excess pressure.



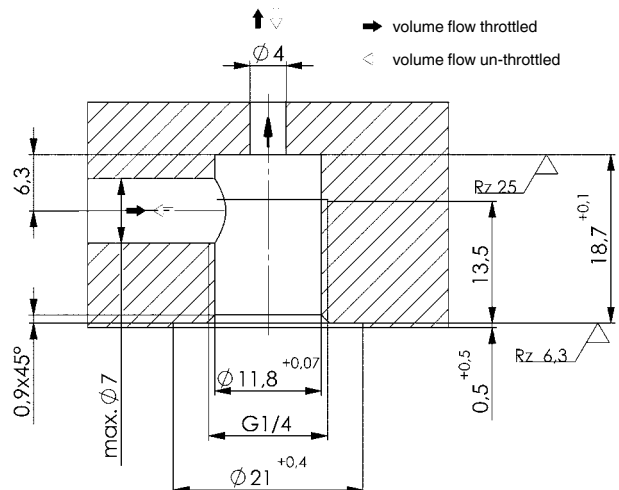
Application examples for feed controls:



Installation dimensions 6916-12-01:



Installation dimensions 6916-12-04:



Subject to technical alterations.

No. 6989M

Built-in coupling mechanism



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: $F [N] = 9,4 \times p [\text{bar}]$, NW5: $F [N] = 15,4 \times p [\text{bar}]$. 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°.

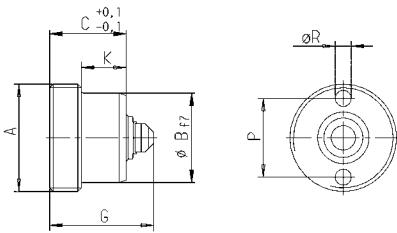
Diagrams: Coupling force and flow resistance, see 6989N.

On request:

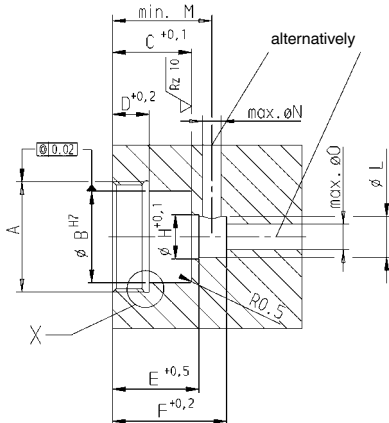
Other sizes available on request.

Dimensions:

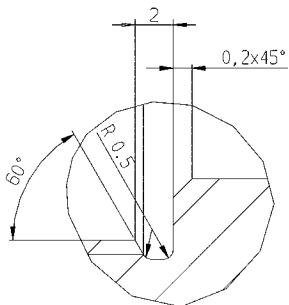
Order no.	Article no.	dia. B	C	D	E	F	G	dia. H	K	dia. L	M	N	dia. O	P	ØR
324491	6989M-05-001	18	21,5	10	23,5	31	29	12	12,5	11,2	28	5	7	15,5	2 x 2,6
324517	6989M-06-002	18	21,5	10	23,5	31	29	12	12,5	11,2	28	5	7	15,5	2 x 2,6
164970	6989M-10-001	22	21,5	10	23,5	31	29	12	12,5	11,2	28	5	7	18,5	4 x 2,8
164996	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



Installation dimensions:



detail X



CAD



Subject to technical alterations.

No. 6989ME

Built-in coupling mechanism



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: $F [N] = 9,4 \times p [\text{bar}]$, NW5: $F [N] = 15,4 \times p [\text{bar}]$, NW8: $F [N] = 31,4 \times p [\text{bar}]$. 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.

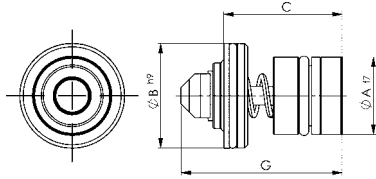
Positioning tolerance in axial direction for all coupling elements: $\pm 0,5 \text{ mm}$.

Positioning tolerance in radial direction for coupling elements: $\pm 0,3 \text{ mm}$.

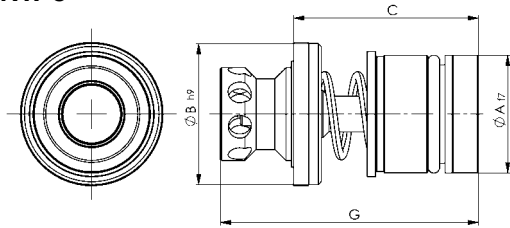
Permissible angle tolerance: $\pm 1^\circ$.

Diagrams: Coupling force and flow resistance, see 6989N.

NW 3+5



NW 8



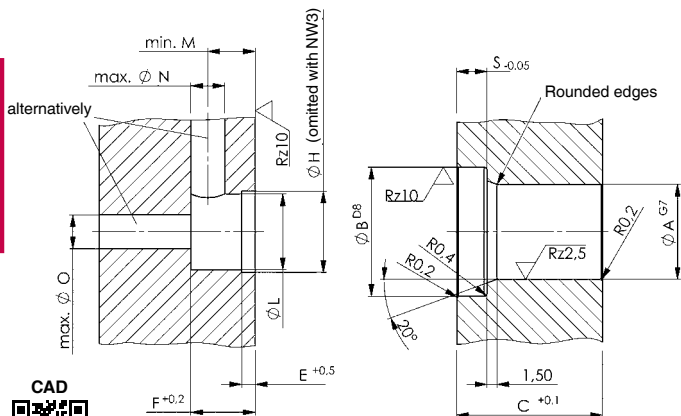
On request:

Other sizes available on request.

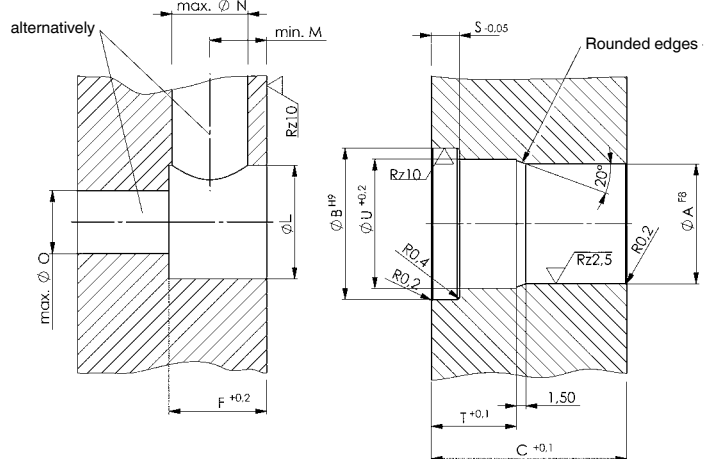
Dimensions:

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

Installation dimensions NW 3+5:

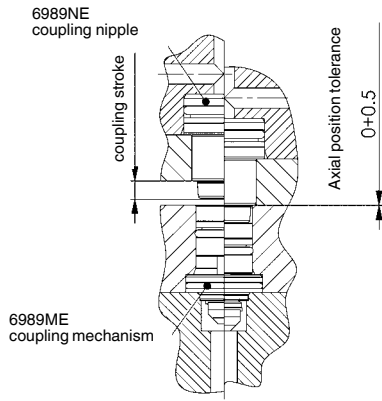


NW 8:

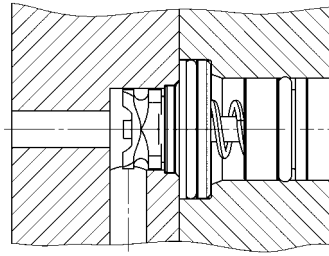


Subject to technical alterations.

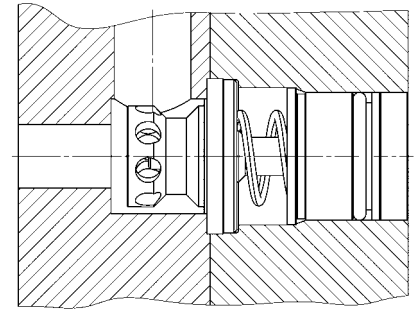




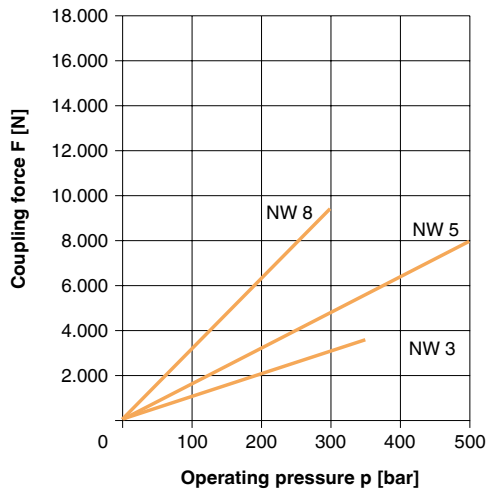
Installation example NW 3+5:



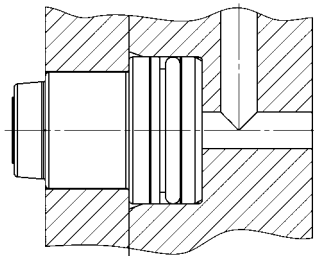
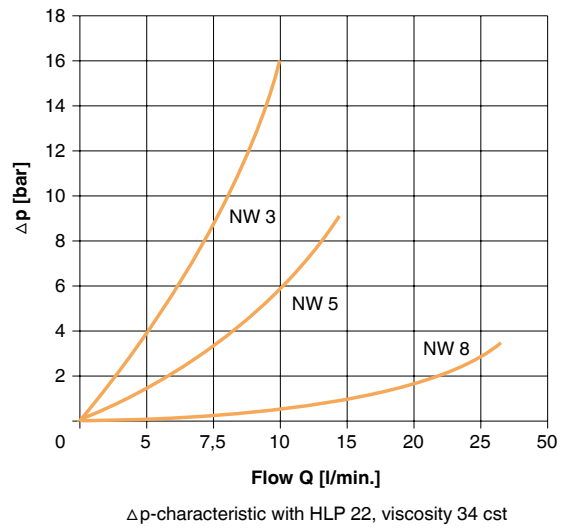
NW 8:



Coupling force:



Flow resistance:



Separating force

Separating force:
 NW 3 = $F [N] = 9,4 \times p [\text{bar}]$
 NW 5 = $F [N] = 15,4 \times p [\text{bar}]$
 NW 8 = $F [N] = 31,4 \times p [\text{bar}]$



Subject to technical alterations.

No. 6989NE

Built-in coupling nipple



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 $NW3: F [N] = 9,4 \times p [\text{bar}]$, $NW5: F [N] = 15,4 \times p [\text{bar}]$, $NW8: F [N] = 31,4 \times p [\text{bar}]$. 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.

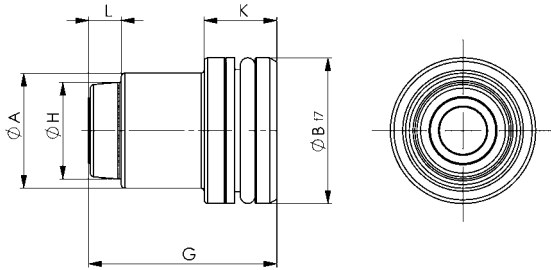
Note:

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: $\pm 0.5 \text{ mm}$.
Positioning tolerance in radial direction for coupling elements: $\pm 0.3 \text{ mm}$.
Permissible angle tolerance: $\pm 1^\circ$.

On request:

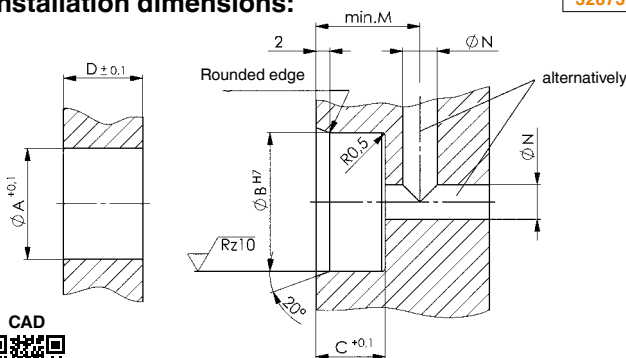
Other sizes available on request.



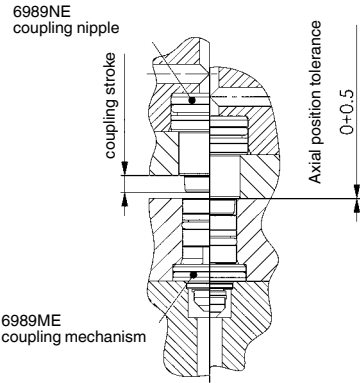
Dimensions:

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

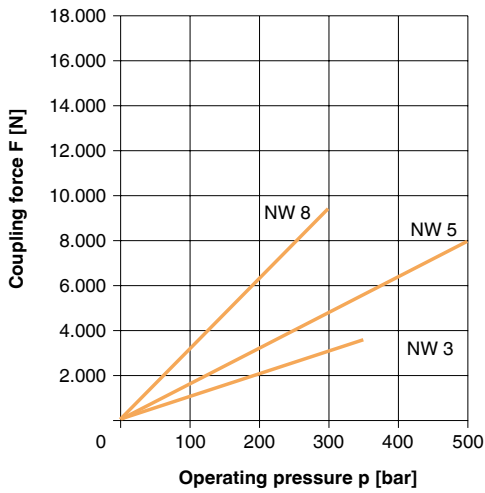
Installation dimensions:



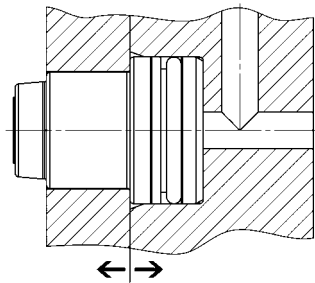
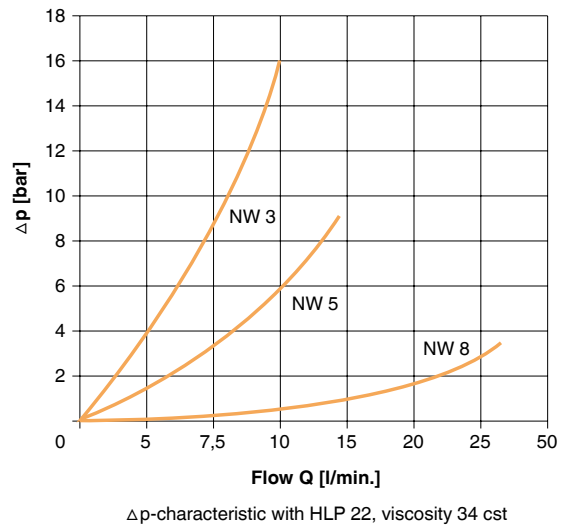
Subject to technical alterations.



Coupling force:

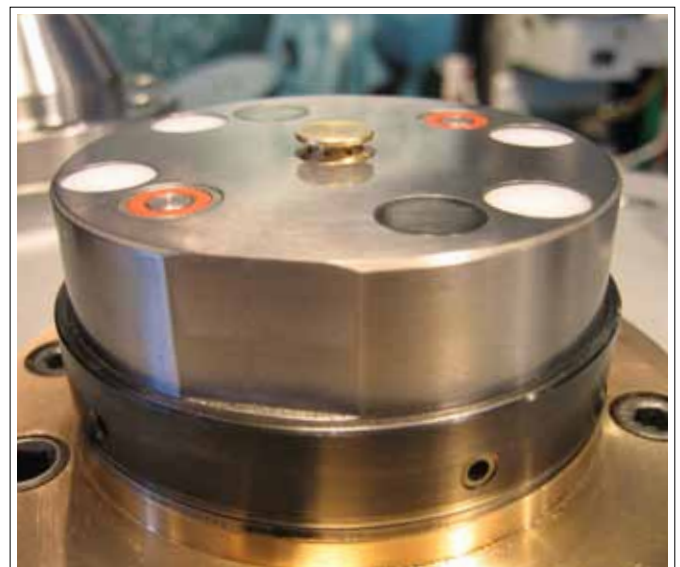


Flow resistance:



Separating force

Separating force:
 NW 3 = $F [N] = 9,4 \times p [\text{bar}]$
 NW 5 = $F [N] = 15,4 \times p [\text{bar}]$
 NW 8 = $F [N] = 31,4 \times p [\text{bar}]$



Subject to technical alterations.

No. 6994S

Plug connection

max. operating pressure 500 bar.

NEW!



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.

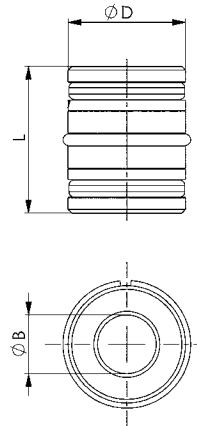
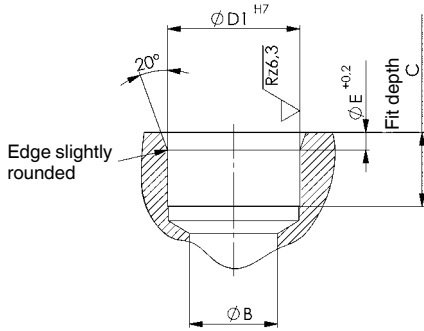
Note:

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 $F [N] = \text{Factor} \times p [\text{bar}]$ (e.g. at NW3: $F = 5 \times p$).

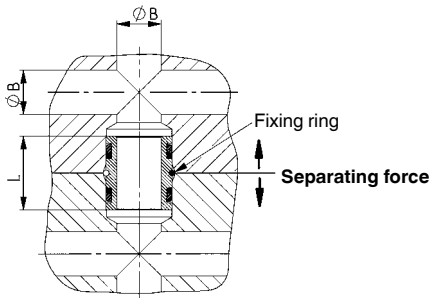
On request:

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.

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:

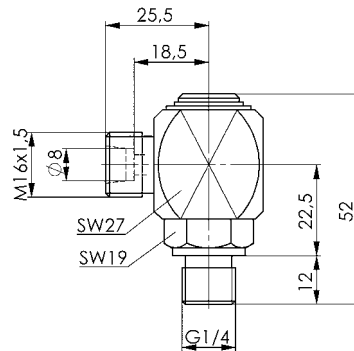
Steel galvanized. With union nut and cutting ring.

Application:

Rotary couplings are used to supply hydraulic oil to systems which can be rotated 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. 6991-01

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:

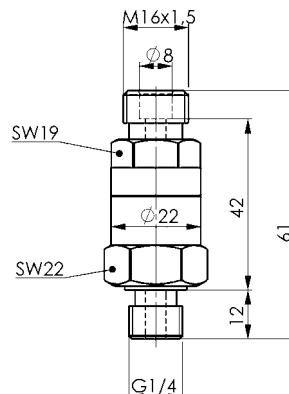
Steel galvanized and yellow passivated. With union nut and cutting ring.

Application:

Rotary couplings are used to supply hydraulic oil to systems which can be rotated 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.



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.

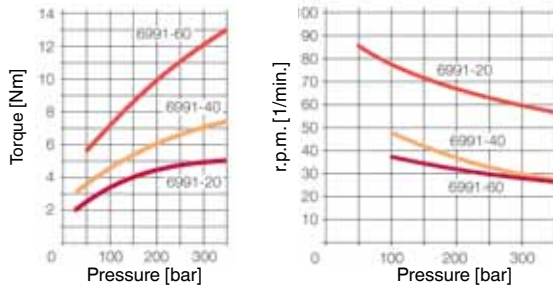
Note:

Max. pressure and max. rpm must not occur together. See diagrams.

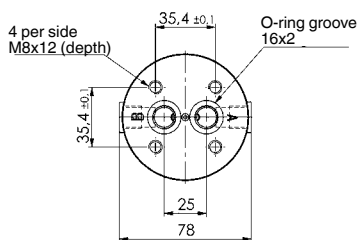
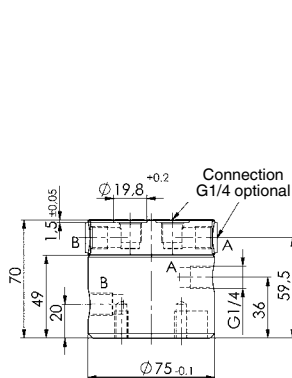
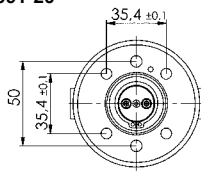
The rotary couplings must be operated without bending forces. We recommend that you screw the rotating housing with the connections to the clamping fixtures and secure the rotary piston only against twisting. Do not introduce any bearing loads! The line connections to the rotary piston must always be 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.

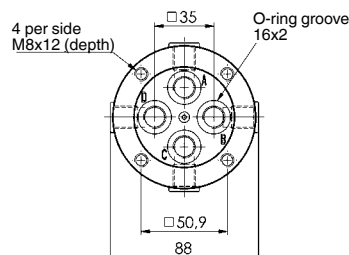
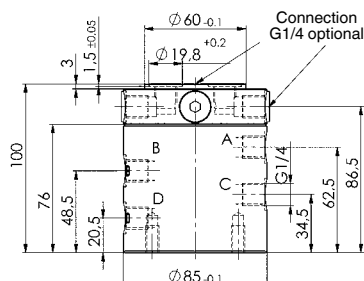
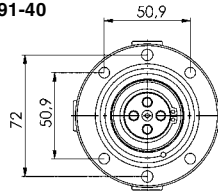
Diagrams:



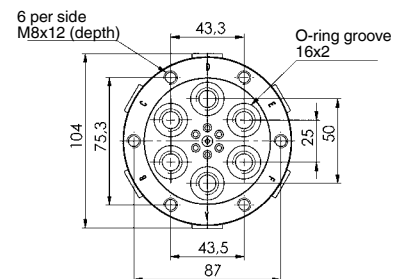
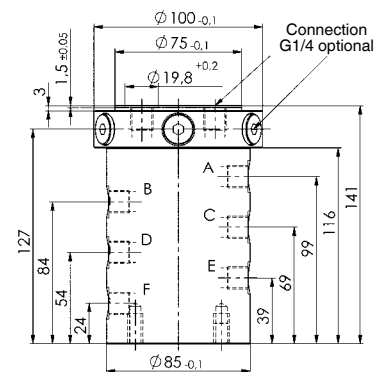
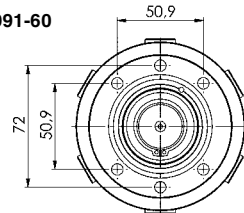
No. 6991-20



No. 6991-40



No. 6991-60



Subject to technical alterations.



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.

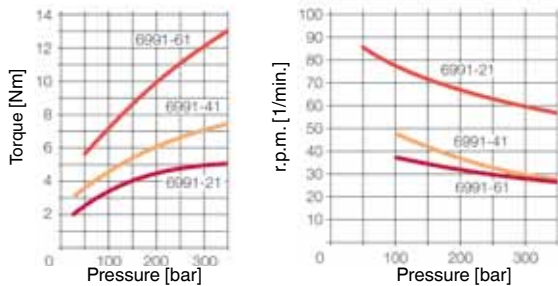
Features:

Because of the high-grade seal packages it is possible to operate at high pressures. Multistrand rotary oil couplings. Long service life. Compact design.

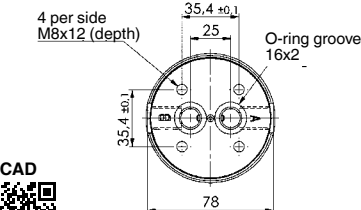
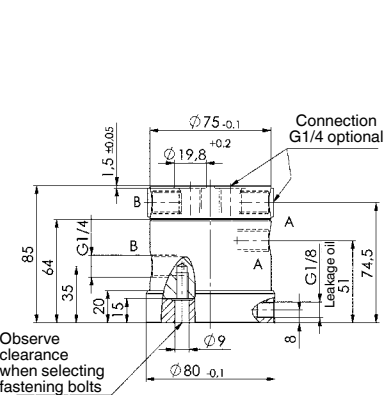
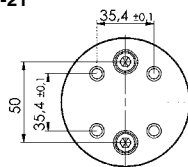
Note:

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.

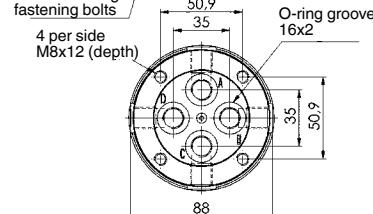
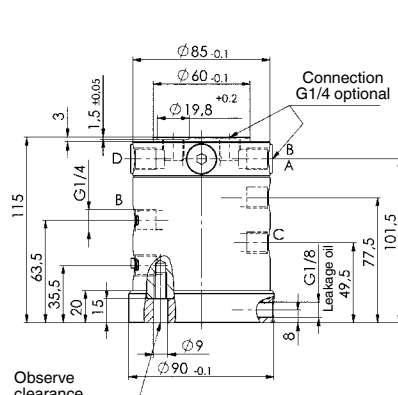
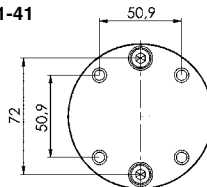
Diagrams:



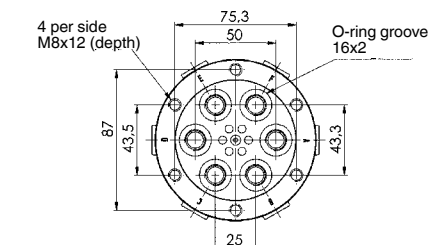
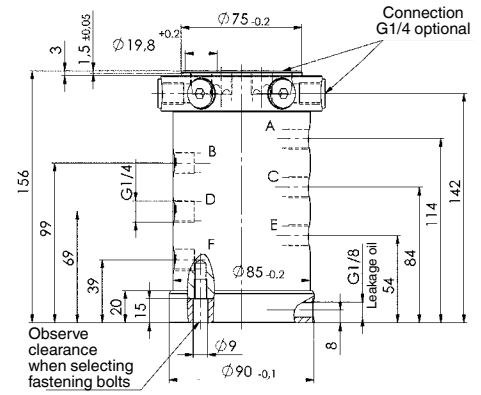
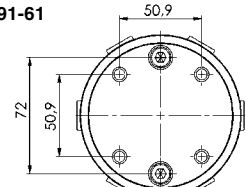
No. 6991-21



No. 6991-41



No. 6991-61

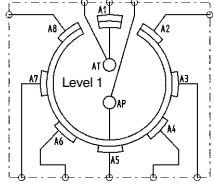


Subject to technical alterations.

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 used 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.

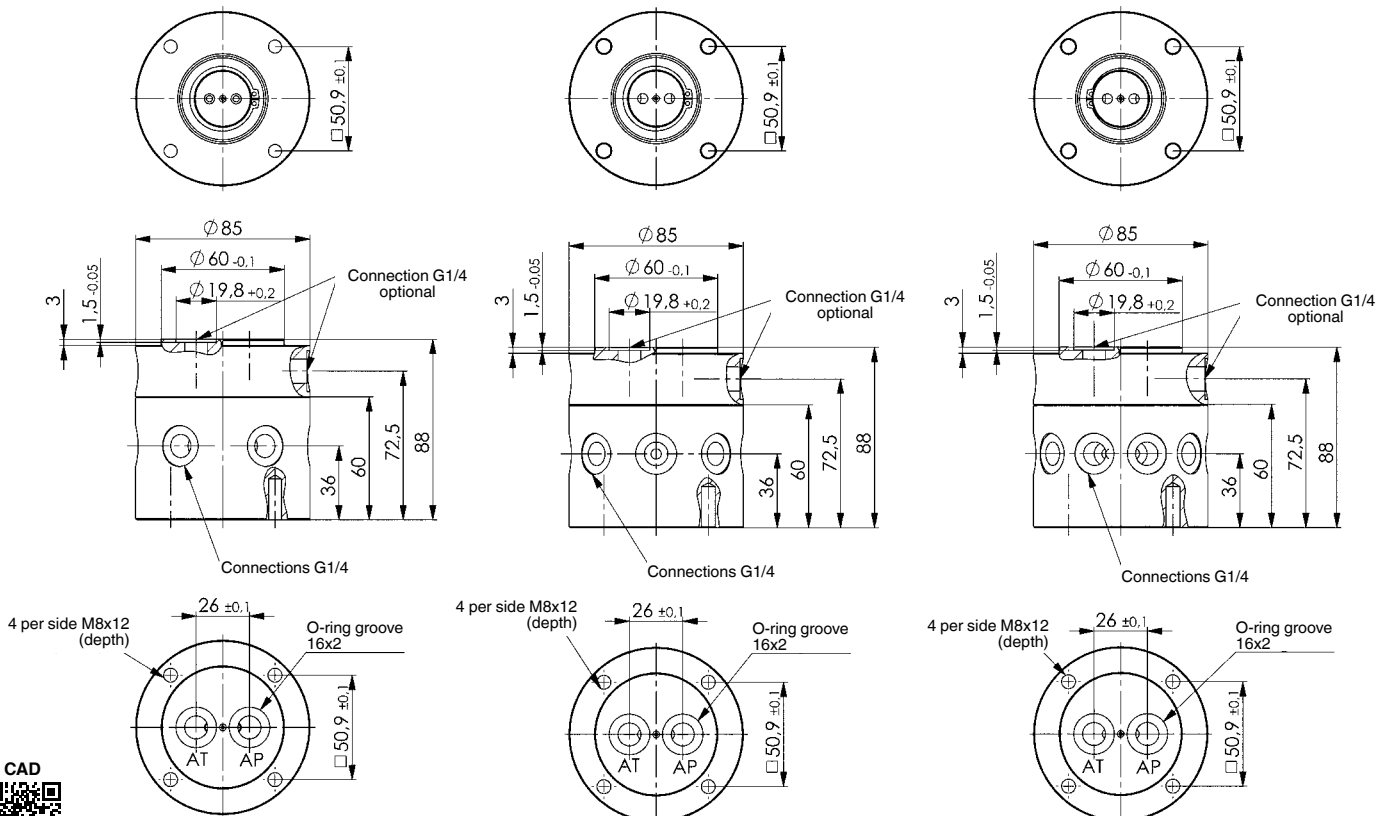
Note:

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.

No. 6992H-11-06

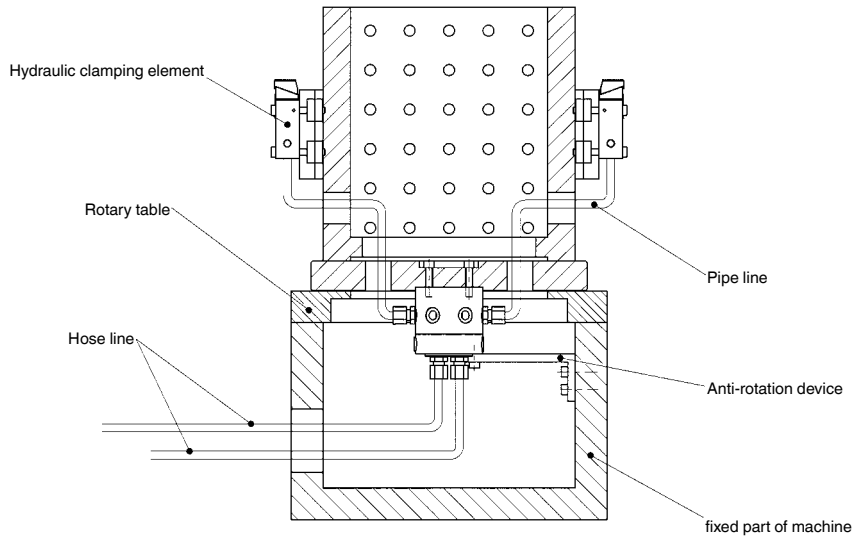
No. 6992H-11-08

No. 6992H-11-10



Subject to technical alterations.

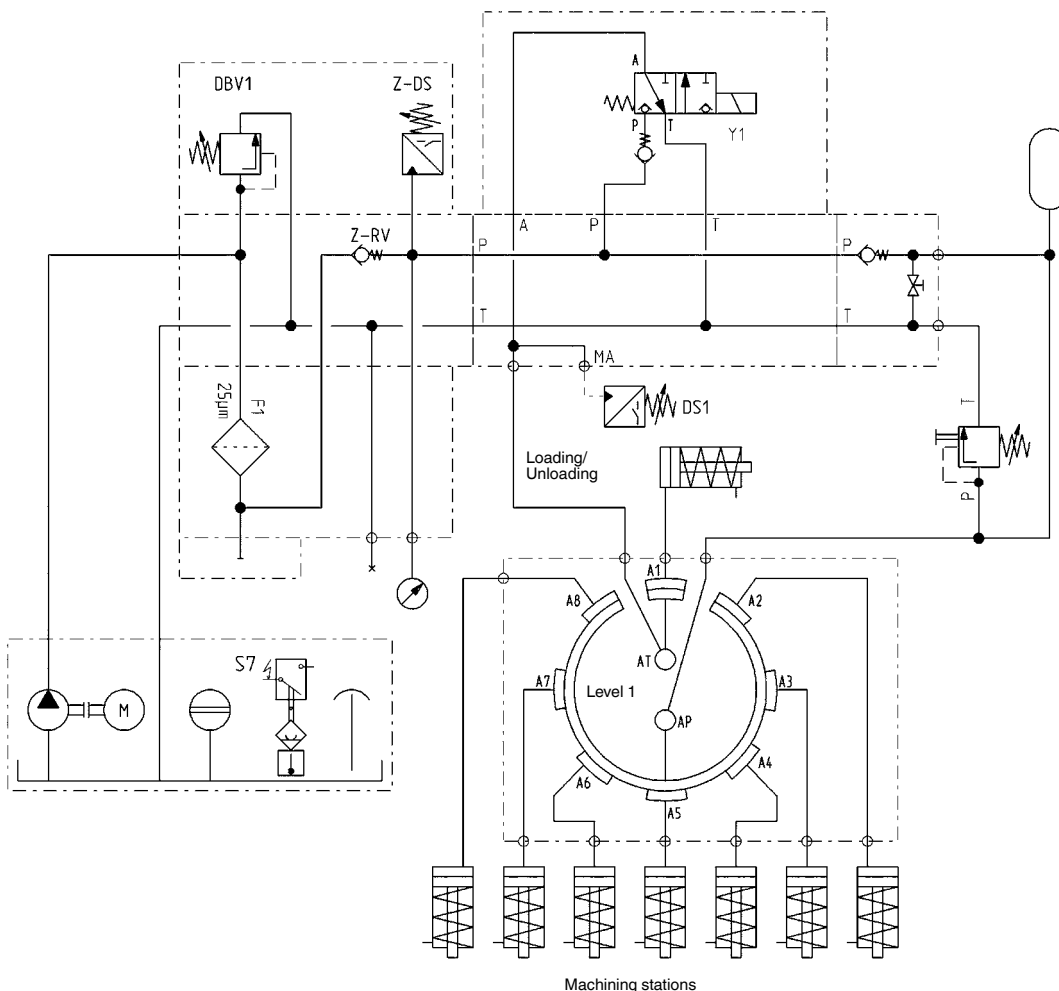
Application example:



Hydraulic diagram - example:

Example of schematic:

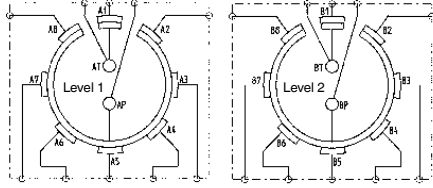
Rotary union ,ew', controlled, 1 x loading, 7 x machining
 The loading and unloading station is controlled by a 3/2 way valve. The machining stations are directly controlled by the pump. The separation of loading and unloading station and machining stations by the rotary union is not leakage-free. Leakage 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.



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 used 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.

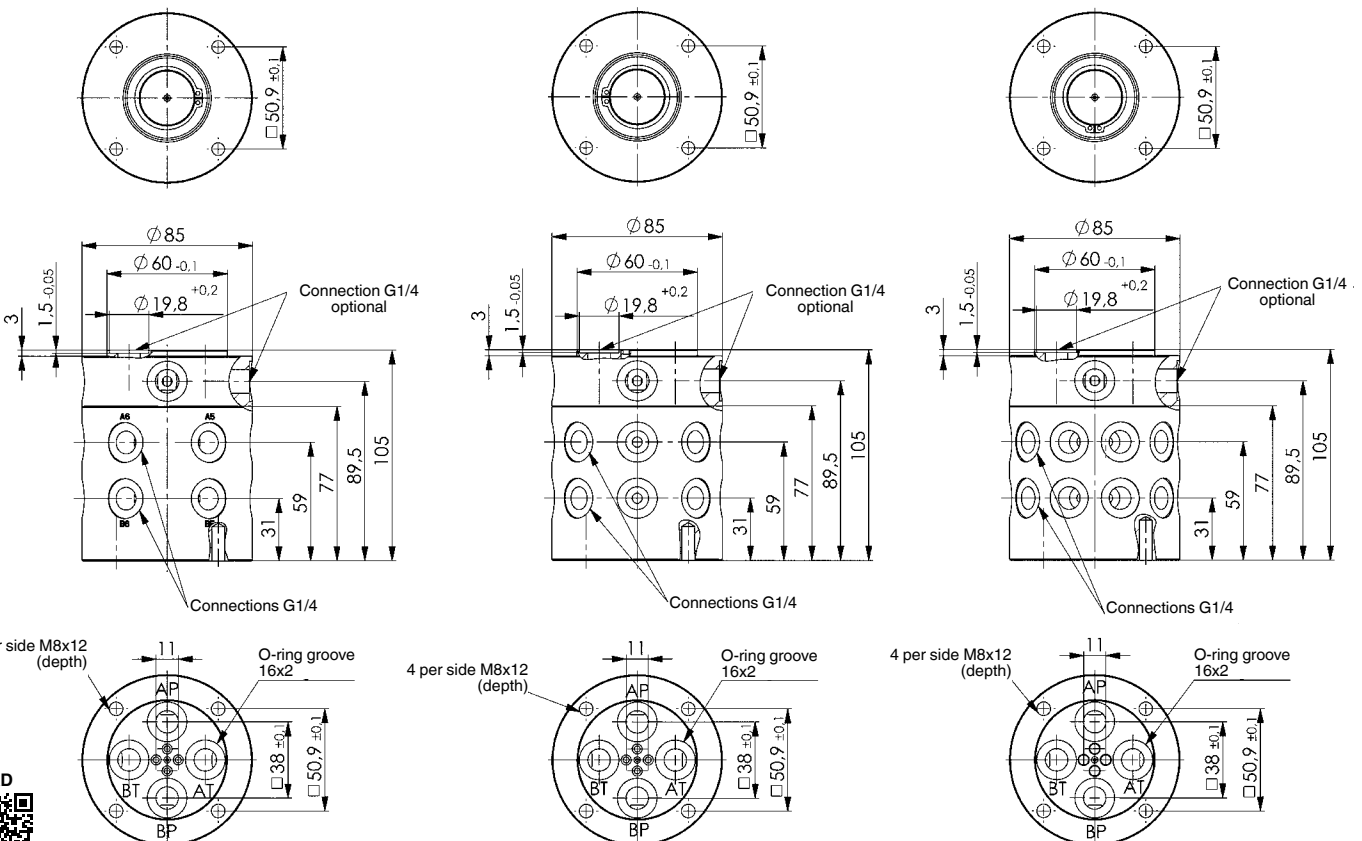
Note:

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.

No. 6992H-21-06

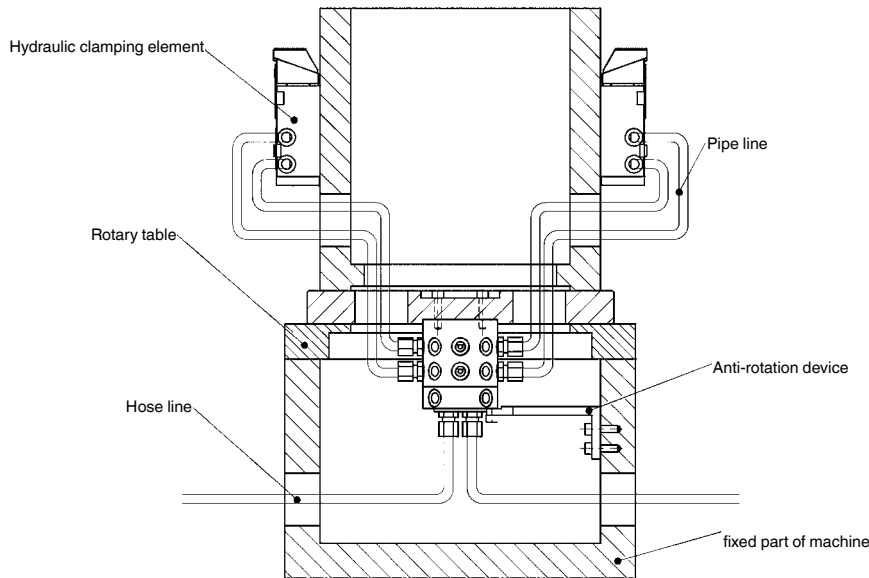
No. 6992H-21-08

No. 6992H-21-10



Subject to technical alterations.

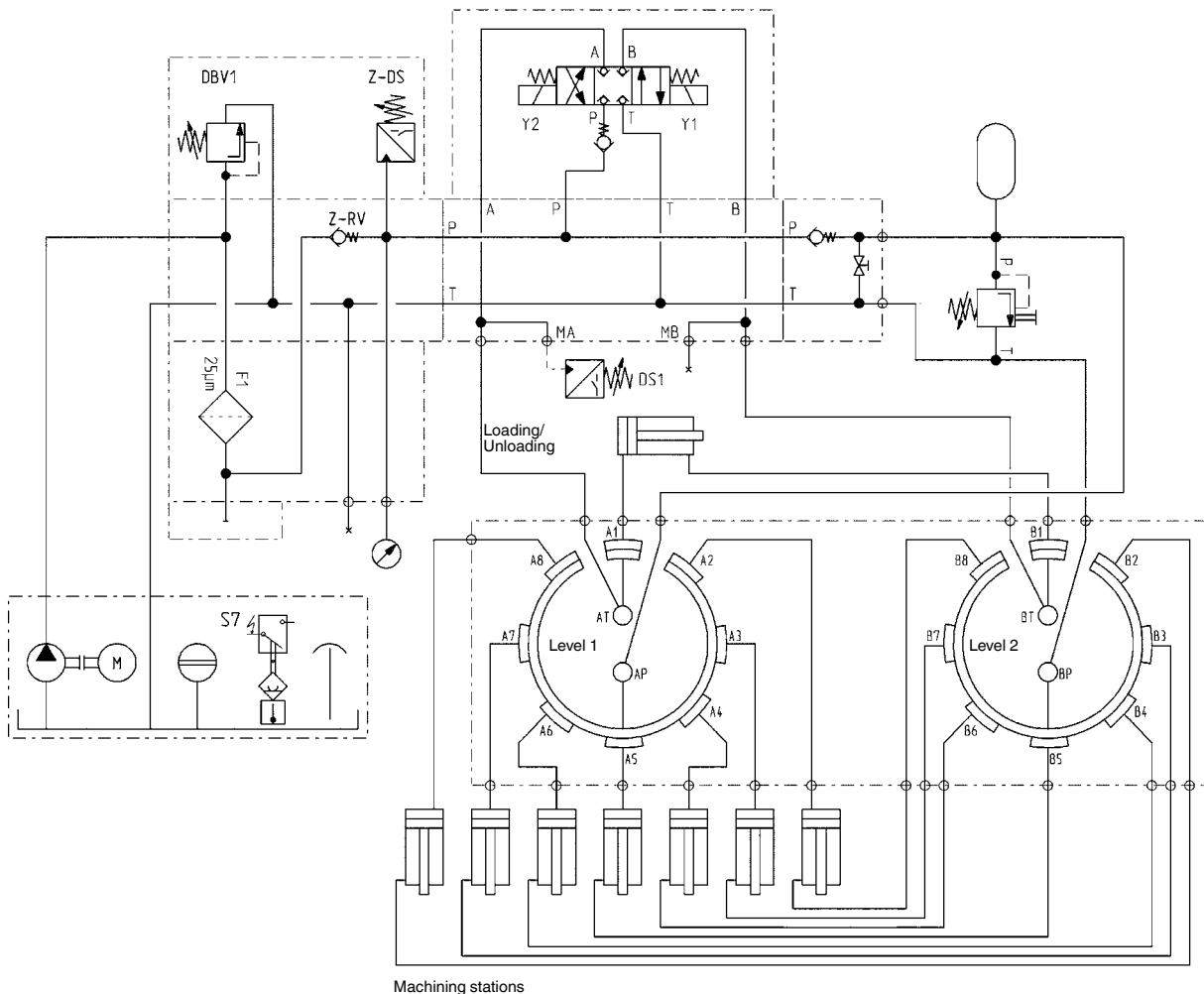
Application example:



Hydraulic diagram - example:

Example of schematic:

Rotary union ,ew', 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 leakage-free. 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.



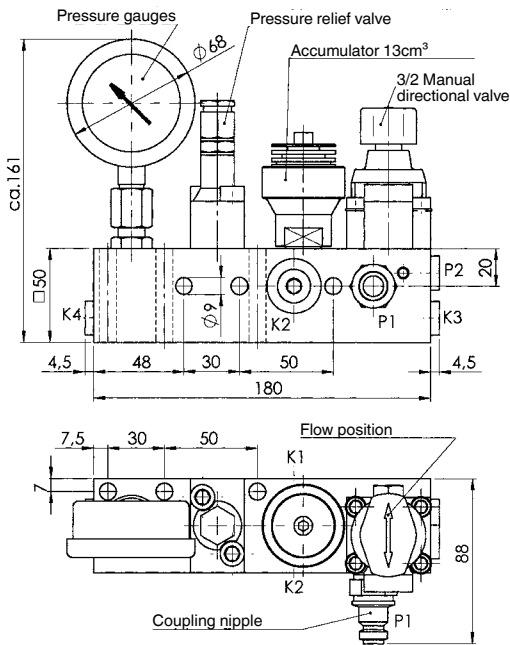
Machining stations

Subject to technical alterations.

No. 6919-2

Pallet Decoupler Block

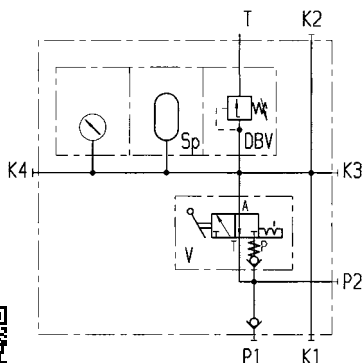
for single acting cylinders,
max. operating pressure 400 bar.



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 connection), Order no. 69039
- P2 = Pressure input (threaded plug), Order no. 69419
- T = Release opening DBV

Diagram:



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.

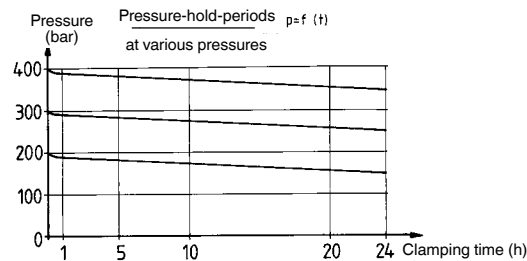
Features:

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:



Subject to technical alterations.

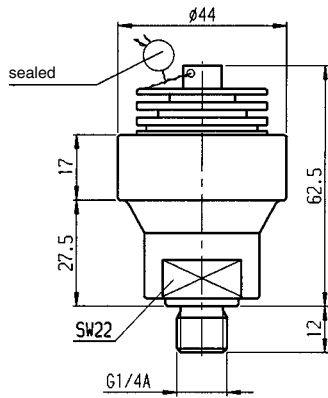


No. 6919S

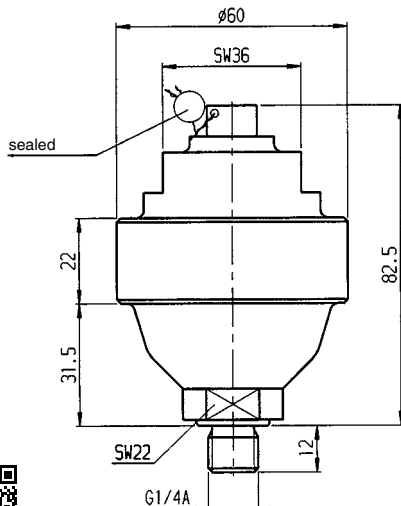
Accumulator



No. 6919S-013



No. 6919S-040



Order no.	Article no.	Reservoir volume [cm ³]	Gas preload p ₀ max. [bar]	Set gas preload p ₀ [bar]	max. perm. 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 51519.
- Thread G1/4 A, DIN ISO 228/1 with sealing edge.

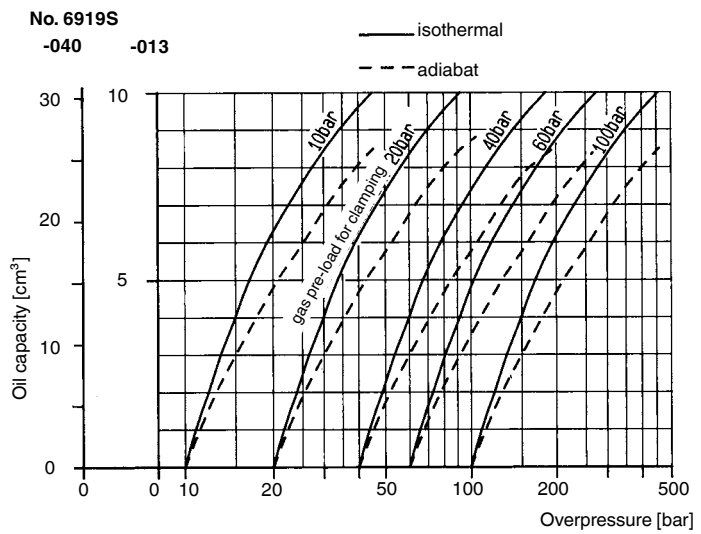
Application:

- 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 to 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 adiabatic = 3:1.

Diagram:



Subject to technical alterations.

No. 6919-20

Pallet Decoupler Block

for double acting cylinders,
max. operating pressure 400 bar.

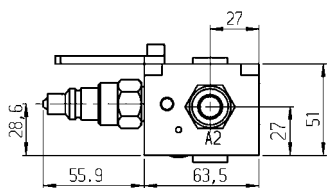
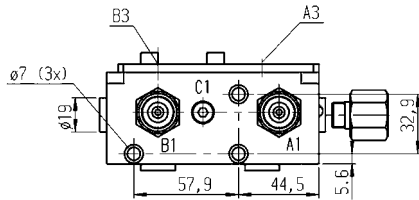
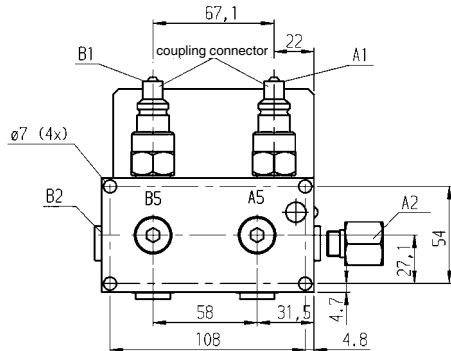
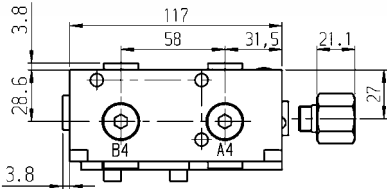
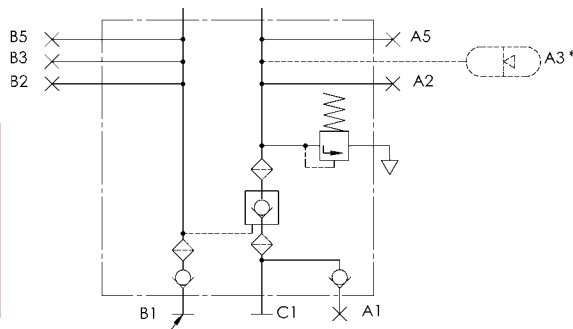


Diagram:



The pressure for unclamping must be at least 20% of the clamping pressure.

A3 * Pressure accumulator necessary for functioning.

CAD



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.

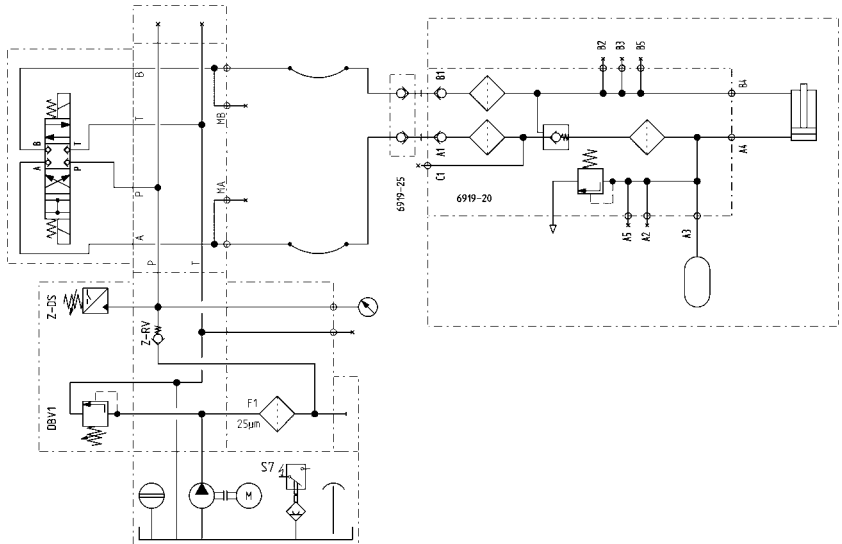
Application:

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 necessary. For visual pressure observation, a pressure gauge no. 6983-1 shall be attached.

Hydraulic diagram:

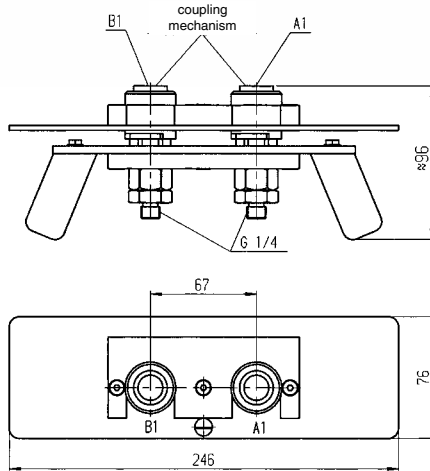


Subject to technical alterations.

No. 6919-25

Coupling Unit for Pallet Decoupler Block

max. operating pressure 400 bar.



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:

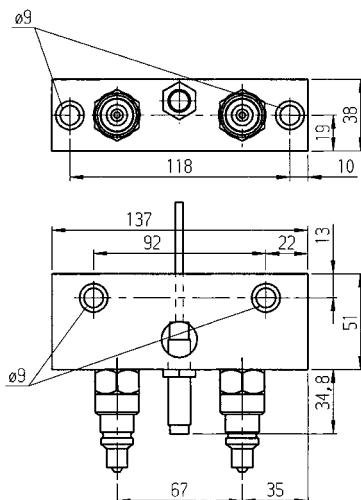
The coupling unit is used to connect the oil supply with the pallet decoupler block No. 6919-20.

Features:

Simple handling due two hand operation. Interchanging of connections is impossible.

No. 6919-30

Store Station for Coupling Unit



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:

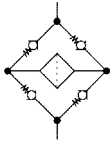
If used with your machine control, the signal of the safety sensor switch, can ensure that the fixture pallet cannot be moved before the coupling unit is disconnected and removed correctly from the pallet decoupler block.



Subject to technical alterations.

No. 6981G
Filter with rectifier circuit

max. operating pressure 400 bar.



Order no.	Article no.	Filteration	Weight [g]
		[μm]	
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.

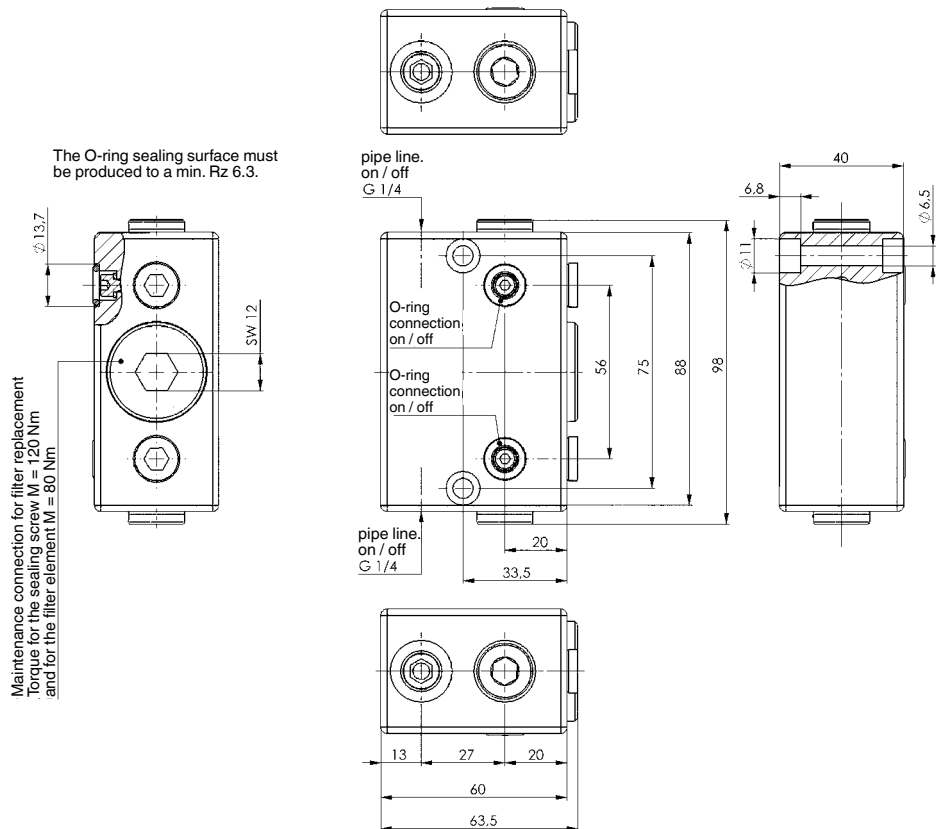
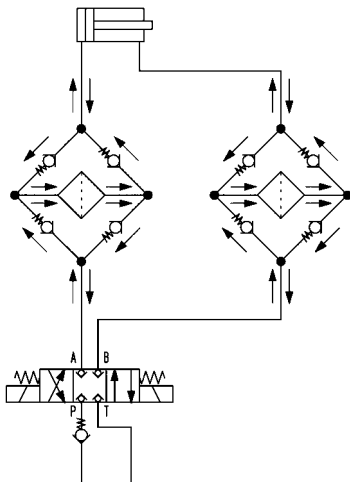
The entire installation position can be chosen freely!

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:


No. 6981-XX

Filter, cartridge design

max. operating pressure 400 bar.



Order no.	Article no.	Filteration	Weight
		[μm]	[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.



Order no.	Article no.	Filteration	Weight
		[μm]	[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-101

Filter, threaded design

max. operating pressure 500 bar.



Order no.	Article no.	Filteration	Weight
		[μm]	[g]
326678	6981E-100-G1/4-1	100	14

Note:

Replacement filter for 6917R-5-XX.



Subject to technical alterations.

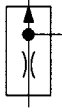


Subject to technical alterations.

No. 6984-30

Support control, pneumatic

max. operating pressure 10 bar.



Order no.	Article no.	Stroke max. [mm]	Spring force min. [N]	Spring force max. [N]	Weight [g]
325217	6984-30	5	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:

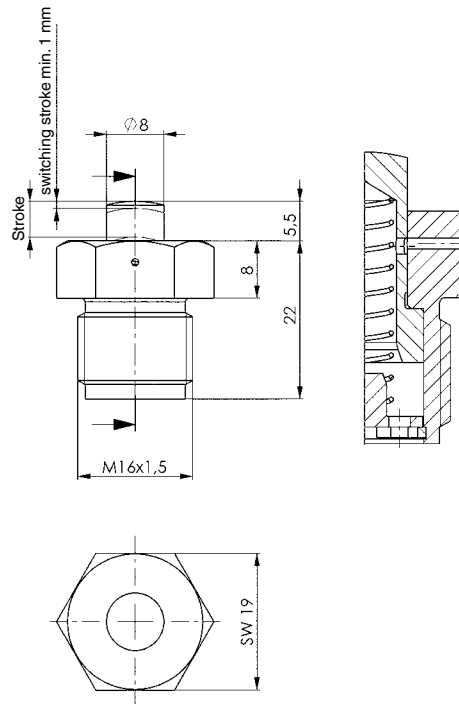
The support control works like a pneumatic back-pressure nozzle. The position is extended from its initial position by a pressure spring. Once applied, the air jet flows through the hollow piston and the radial discharge hole on the support control housing to outside. The discharge hole is sealed as 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:

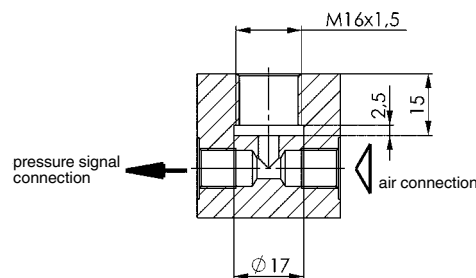
The pressure signal converter is not included in the supply scope.

Effective piston surface with closed nozzle = 0.95 cm²

Piston force = piston surface x air pressure + spring force



Installation dimensions:

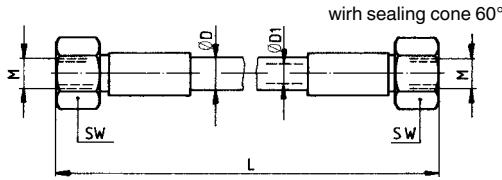


CAD

No. 6985

High Pressure Hose

max. operating pressure 400 bar.



synthetic internal rubber
2 woven steel-wire inserts



CAD



Order no.	Article no.	Test pressure [bar]	Bending radius min. [mm]	dia. D [mm]	dia. D1 [mm]	L [mm]	M	SW [mm]	Weight [g]
174177	6985-300	1000	100	15	6	300	M12x1,5	17	100
68510	6985-500	1000	100	15	6	500	M12x1,5	17	300
68528	6985-800	1000	100	15	6	800	M12x1,5	17	405
68536	6985-1250	1000	100	15	6	1250	M12x1,5	17	570
68544	6985-2000	1000	100	15	6	2000	M12x1,5	17	855

Design:

Steel fittings, galvanized and passivated.

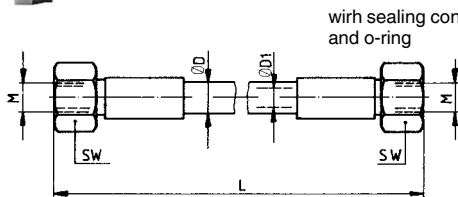
Note:

This high pressure hose is especially selected for clamping on machine tools. It contains two steelwire reinforcements which guarantee that there is no loss of oil even if the external rubber is damaged. The period of use of a hydraulic hose, including any storage period should not exceed six years. The serviceability must be assessed to fixed inspection criteria. See DIN 20066, Part 5 for further details.

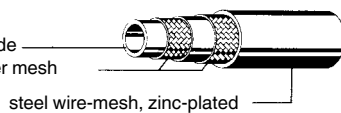
No. 6985K

High Pressure Hose with steel-wire interlace

Max. operating pressure dyn. at +50°C 500 bar



Polyamide
Polyester mesh



CAD



Order no.	Article no.	Test pressure [bar]	Bending radius min. [mm]	dia. D [mm]	dia. D1 [mm]	L [mm]	M	SW [mm]	Weight [g]
68551	6985K-300	960	35	9,4	4	300	M16x1,5	19	100
68569	6985K-500	960	35	9,4	4	500	M16x1,5	19	300
68577	6985K-800	960	35	9,4	4	800	M16x1,5	19	400
68585	6985K-1250	960	35	9,4	4	1250	M16x1,5	19	570
68593	6985K-2000	960	35	9,4	4	2000	M16x1,5	19	850
68601	6985K-3000	960	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.

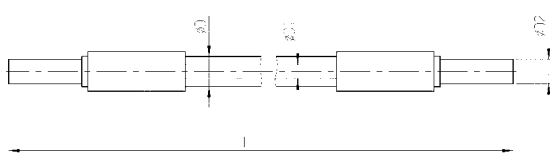
Note:

We recommend only using the 3-metre long high pressure hose for double-acting elements. Fitting suitable for pipe connection No. 6994. The period of use of a hydraulic hose, including any storage period, should not exceed six years. The serviceability must be assessed according to fixed inspection criteria. See DIN 20066, Section 5 for further details.

No. 6985R

High Pressure Hose

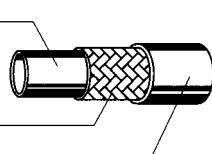
Max. operating pressure dyn. at +50°C 375 bar



Polyamide

St wire, brass

Polyurethan



CAD



Order no.	Test pressure [bar]	Bending radius min. [mm]	dia. D [mm]	dia. D1 [mm]	dia. D2 [mm]	L [mm]	Weight [g]
63198	750	30	9,8	4,8	8	300	65
63206	750	30	9,8	4,8	8	500	90
63214	750	30	9,8	4,8	8	800	120
63222	750	30	9,8	4,8	8	1250	180
63230	750	30	9,8	4,8	8	2000	265
63248	750	30	9,8	4,8	8	3000	380

Design:

Steel fitting, galvanized and passivated. Hose of synthetic material with high tensile brass steel-wire braid.

Application:

Insert hose and tighten with 1/4 turn maximum.

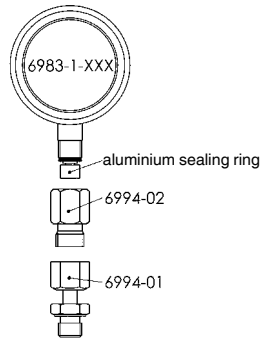
Note:

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 period of use of a hydraulic hose, including any storage period, should not exceed six years. The serviceability must be assessed according to fixed inspection criteria. See DIN 20066, Section 5 for further details.

No. 6983

Gauge

Mark represents 400 bar,
6983-1 bottom connection,
6983-2 rear connection.



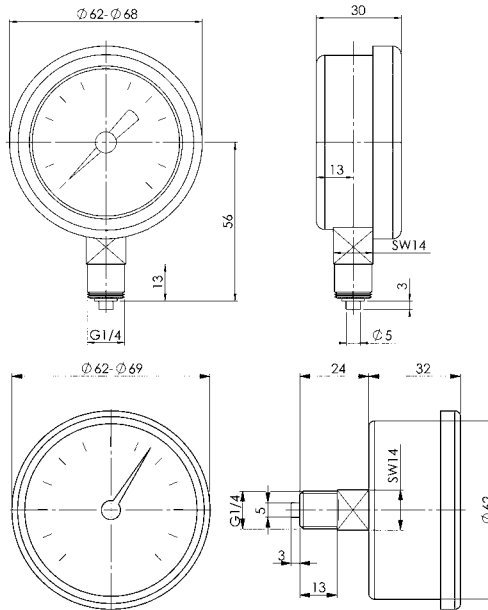
Order no.	Article no.	max. pressure range		Weight [g]
		[bar]		
320648	6983-1-100	100		300
320655	6983-1-250	250		300
161414	6983-1-600	600		300
168575	6983-2	600		300

Design:

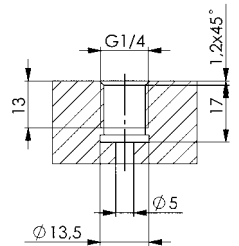
Complete with glycerin filling and aluminium sealing ring. Accuracy class 1.6. Housing no. 6983-1 made of special stainless steel, housing no. 6983-2 made of ABS.

Note:

A combination of pipe fitting 6994-01 and 6994-02 can be used for the pipe connection.



Installation dimensions:



No. 6906

Hydraulic oil



Order no.	Contents		Weight [g]
	[ml]		
464081	5000		4300

Design:

Hydraulic oil in plastic canister.

Application:

For all AMF pressure generators.



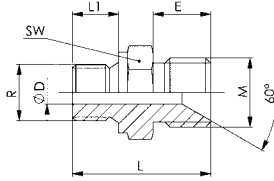
Subject to technical alterations.

No. 6993

Male/male adaptor, galvanized



CAD



Order no.	Article no.	R	L	L1	E	M	dia. D	SW	max. operating pressure [bar]	Weight [g]
69302	6993-M12x1,5-G1/8	G1/8	24	8	10	M12 x 1,5	4	14	400	15
69328	6993-M12x1,5-G1/4	G1/4	30	12	10	M12 x 1,5	4	19	400	30

Design:

Sealing according to DIN3852 form D by means of sealing ring DIN 7603 Form A and 60° sealing cone.

Note:

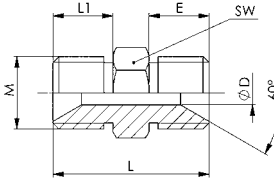
Warning: Do not use Teflon tape!

No. 6993-M12x1,5

Double connector, galvanized



CAD



Order no.	Article no.	L	L1	E	M	dia. D	SW	max. operating pressure [bar]	Weight [g]
69344	6993-M12x1,5	26	10	10	M12 x 1,5	4	13	400	15

Design:

Sealing according to DIN 3852 form D and 60° sealing cone.

Note:

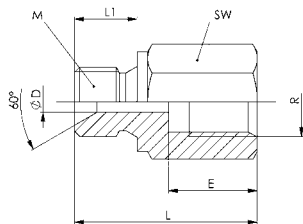
Warning: Do not use Teflon tape!

No. 6996

Adaptor, galvanized



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:

Sealing according to DIN3852 form D by means of sealing ring DIN 7603 Form A and 60° sealing cone.

Note:

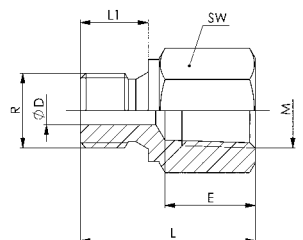
Warning: Do not use Teflon tape!

No. 6997

Reducer, galvanized



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:

Sealing by means of sealing ring DIN 7603 Form A.

Note:

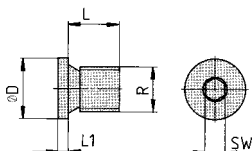
Warning: Do not use Teflon tape!

No. 908G

Screw plug, galvanized



CAD

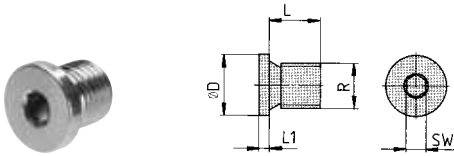


Order no.	Article no.	R	L	L1	dia. D	SW	max. operating pressure [bar]	Weight [g]
176693	908G-G1/8*	G1/8	8	4	14	5	400	7
176719	908G-G1/4*	G1/4	12	5	19	6	400	17

* with integrated rubber sealing

DIN 908

Screw plug, galvanized

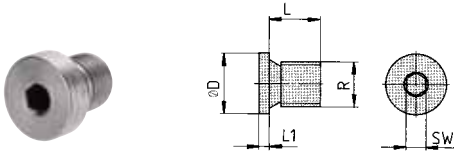


Order no.	Article no.	R	L	L1	dia. D	SW	max. operating pressure [bar]	Weight [g]
69393	908-G1/8	G1/8	8	3	14	5	400	6
69419	908-G1/4	G1/4	12	3	18	6	400	13
176701	908-G3/8*	G3/8	12	5	24	8	400	22
179952	908-M16x1,5*	M16x1,5	12	5	22	8	400	24

* with integrated rubber sealing

No. 908S

Vent screw, galvanized



Order no.	Article no.	R	L	L1	dia. D	SW	max. operating pressure [bar]	Weight [g]
326389	908S-G1/8*	G1/8	8	4	14	5	400	6
343632	908S-G1/4*	G1/4	12	5	19	6	400	17

* with integrated rubber sealing

DIN 7603

Shape A sealing ring Cu



Order no.	Article no.	L	dia. D	dia. D1	max. operating pressure [bar]	Weight [g]
69815	7603-Form A-G1/8	1,0	13,5	10,0	400	0,5
69823	7603-Form A-G1/4	1,5	18,0	13,5	400	1,0

Example of assembly:

- 1) Hollow-rod cylinder no. 6920
- 2) Seal DIN 7603A
- 3) Screw-in nipple no. 6993
- 4) High-pressure hose no. 6985
- 5) Connector no. 6990-G1/4S
- 6) Sleeve no. 6990-G1/4M



Subject to technical alterations.

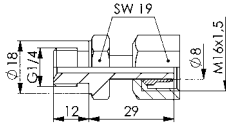
No. 6994-01

Screw-in fitting, straight, heavy-duty

for steel tubes with outer diameter 8 mm and internal diameter 4 mm, with olive ring.



Order no.	Article no.	max. operating pressure [bar]	Weight [g]
160184	6994-01	630	50



Design:

To DIN 3852 form B by sealing edge or by sealing edge ring and olive ring or O-ring.

Note:

Warning: Do not use Teflon tape!

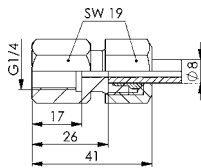
No. 6994-02

Screw-up fitting, straight, heavy-duty

for steel tubes with outer diameter 8 mm and internal diameter 4 mm, with olive ring.



Order no.	Article no.	max. operating pressure [bar]	Weight [g]
160192	6994-02	630	60



Design:

To DIN 3852 form B by sealing edge or by sealing edge ring and olive ring or O-ring.

Note:

Warning: Do not use Teflon tape!

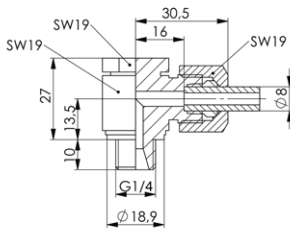
No. 6994-03

Pivoting fitting, angled, heavy-duty

for steel tubes with outer diameter 8 mm and internal diameter 4 mm, with olive ring.



Order no.	Article no.	max. operating pressure [bar]	Md max. [Nm]	Weight [g]
160358	6994-03	500	50	103



Design:

To DIN 3852 form B by sealing edge or by sealing edge ring and olive ring or O-ring.

Note:

Warning: Do not use Teflon tape!

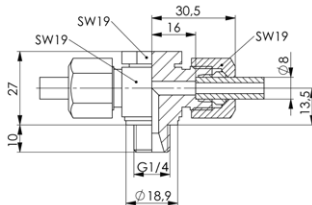
No. 6994-04

Pivoting T-fitting, heavy-duty

for steel tubes with outer diameter 8 mm and internal diameter 4 mm, with olive ring.



Order no.	Article no.	max. operating pressure [bar]	Md max. [Nm]	Weight [g]
170266	6994-04	500	50	122



Design:

To DIN 3852 form B by sealing edge or by sealing edge ring and olive ring or O-ring.

Note:

Warning: Do not use Teflon tape!

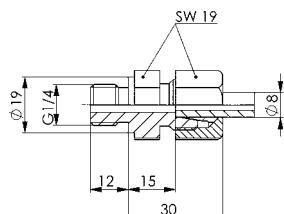
No. 6994-05

Screw-in fitting, straight, heavy-duty

for steel tubes with outer diameter 8 mm and internal diameter 4 mm, with olive ring.



Order no.	Article no.	max. operating pressure [bar]	Weight [g]
175323	6994-05	630	55



Design:

To DIN 3852 form B by sealing edge or by sealing edge ring and olive ring or O-ring.

Note:

Warning: Do not use Teflon tape!

No. 6994-06

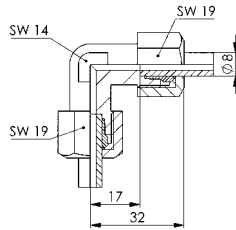
Fitting, angled, heavy-duty

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:

To DIN 3852 form B by sealing edge or by sealing edge ring and olive ring or O-ring.

Note:

Warning: Do not use Teflon tape!

No. 6994-07

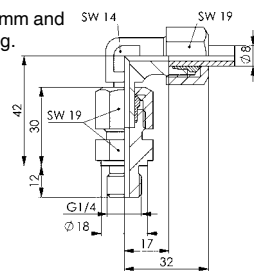
Fitting, angled, adjustable, heavy-duty

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:

To DIN 3852 form B by sealing edge or by sealing edge ring and olive ring or O-ring.

Note:

Warning: Do not use Teflon tape!

No. 6994-08

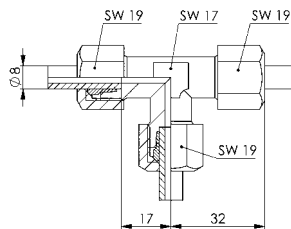
T-fitting, heavy-duty

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:

To DIN 3852 form B by sealing edge or by sealing edge ring and olive ring or O-ring.

Note:

Warning: Do not use Teflon tape!

No. 6994-09

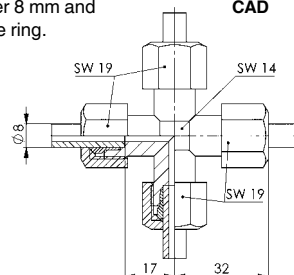
Cross-fitting, heavy-duty

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:

To DIN 3852 form B by sealing edge or by sealing edge ring and olive ring or O-ring.

Note:

Warning: Do not use Teflon tape!

No. 6994-10

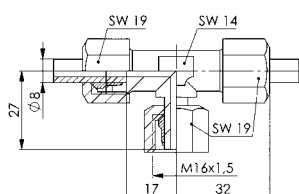
T-fitting, adjustable, heavy-duty

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:

To DIN 3852 form B by sealing edge or by sealing edge ring and olive ring or O-ring.

Note:

Warning: Do not use Teflon tape!

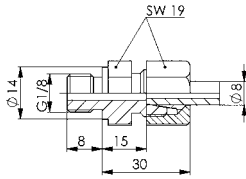
No. 6994-11

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:

To DIN 3852 form B by sealing edge or by sealing edge ring and olive ring or O-ring.

Note:

Warning: Do not use Teflon tape!

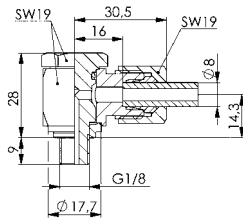
No. 6994-12

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:

To DIN 3852 form B by sealing edge or by sealing edge ring and olive ring or O-ring.

Note:

Warning: Do not use Teflon tape!

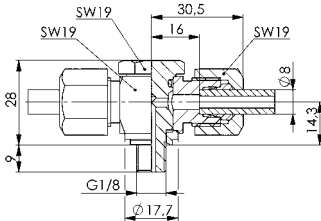
No. 6994-13

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:

To DIN 3852 form B by sealing edge or by sealing edge ring and olive ring or O-ring.

Note:

Warning: Do not use Teflon tape!

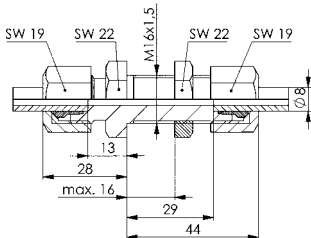
No. 6994-14

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:

To DIN 3852 form B by sealing edge or by sealing edge ring and olive ring or O-ring.

Note:

Warning: Do not use Teflon tape!

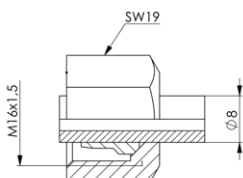
No. 6994-17

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:

According to DIN 3852 Form B by cutting ring.

Note:

Warning: Do not use Teflon tape!

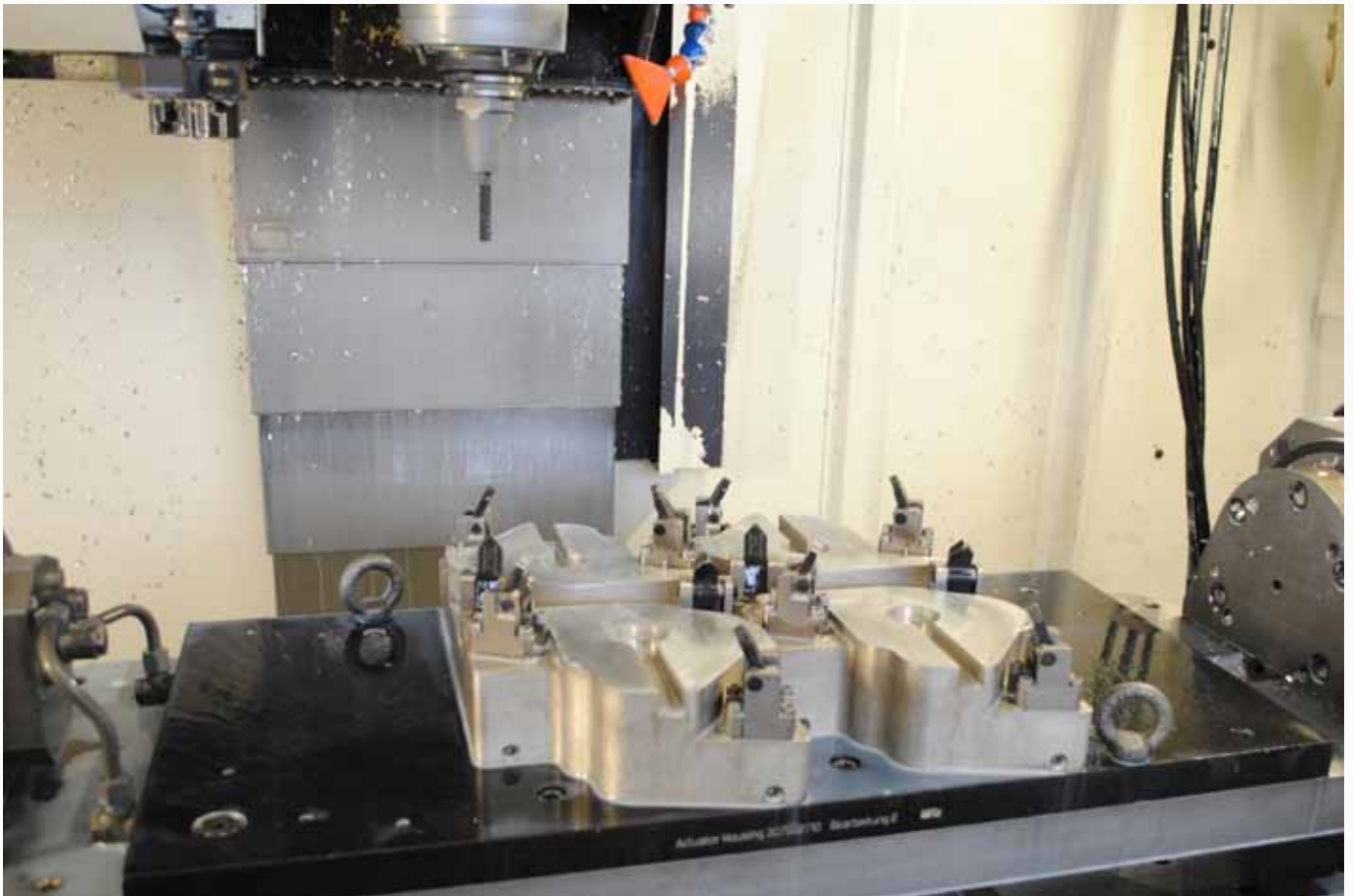
No. 6994

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 2391 C, normalized, bright-annealed, cold-drawn.



Subject to technical alterations.

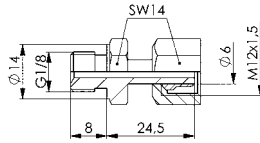
No. 6994-010

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:

To DIN 3852 form B by sealing edge or by sealing edge ring and olive ring or O-ring.

Note:

Warning: Do not use Teflon tape!

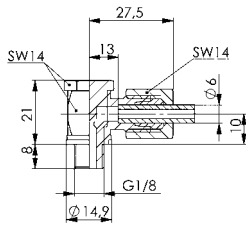
No. 6994-030

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]	Weight [g]
320705	6994-030	315	74

Design:

To DIN 3852 form B by sealing edge or by sealing edge ring and olive ring or O-ring.

Note:

Warning: Do not use Teflon tape!

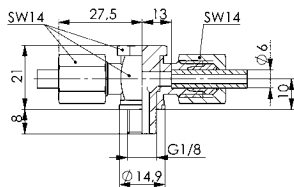
No. 6994-040

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]	Weight [g]
320721	6994-040	315	85

Design:

To DIN 3852 form B by sealing edge or by sealing edge ring and olive ring or O-ring.

Note:

Warning: Do not use Teflon tape!

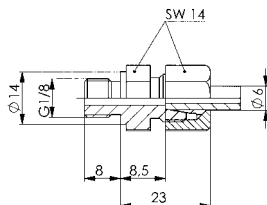
No. 6994-050

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:

To DIN 3852 form B by sealing edge or by sealing edge ring and olive ring or O-ring.

Note:

Warning: Do not use Teflon tape!

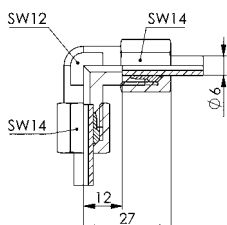
No. 6994-060

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:

To DIN 3852 form B by sealing edge or by sealing edge ring and olive ring or O-ring.

Note:

Warning: Do not use Teflon tape!

No. 6994-080

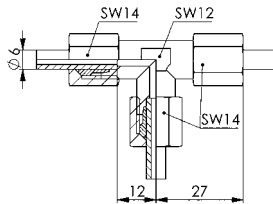
T-fitting, light duty

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:

To DIN 3852 form B by sealing edge or by sealing edge ring and olive ring or O-ring.

Note:

Warning: Do not use Teflon tape!

No. 6994-090

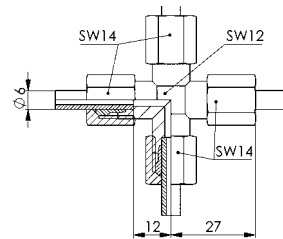
Cross-fitting, light duty

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:

To DIN 3852 form B by sealing edge or by sealing edge ring and olive ring or O-ring.

Note:

Warning: Do not use Teflon tape!

No. 6994-140

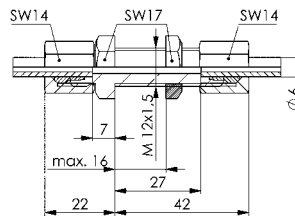
Bulkhead fitting, straight, light duty

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:

To DIN 3852 form B by sealing edge or by sealing edge ring and olive ring or O-ring.

Note:

Warning: Do not use Teflon tape!

No. 6994-150

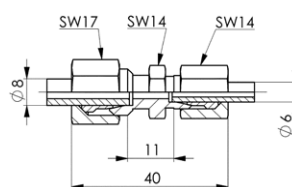
Adapter Plate, light duty

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]
320846	6994-150	315	42



Design:

To DIN 3852 form B by sealing edge or by sealing edge ring and olive ring or O-ring.

Note:

Warning: Do not use Teflon tape!

No. 6994-170

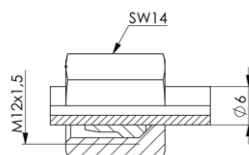
Union nut with cutting ring, light duty

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:

To DIN 3852 form B by sealing edge or by sealing edge ring and olive ring or O-ring.

Note:

Warning: Do not use Teflon tape!

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

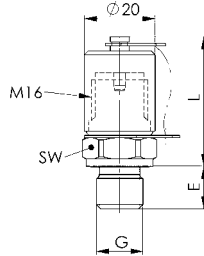


Application:

The measuring coupling is used for pressure monitoring or venting.

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

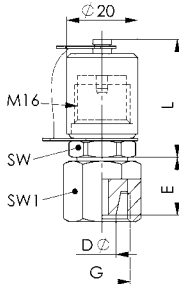


Application:

The measuring coupling is used for pressure monitoring or venting.

Note:

Adaptation is possible under pressure up to max. 400 bar.

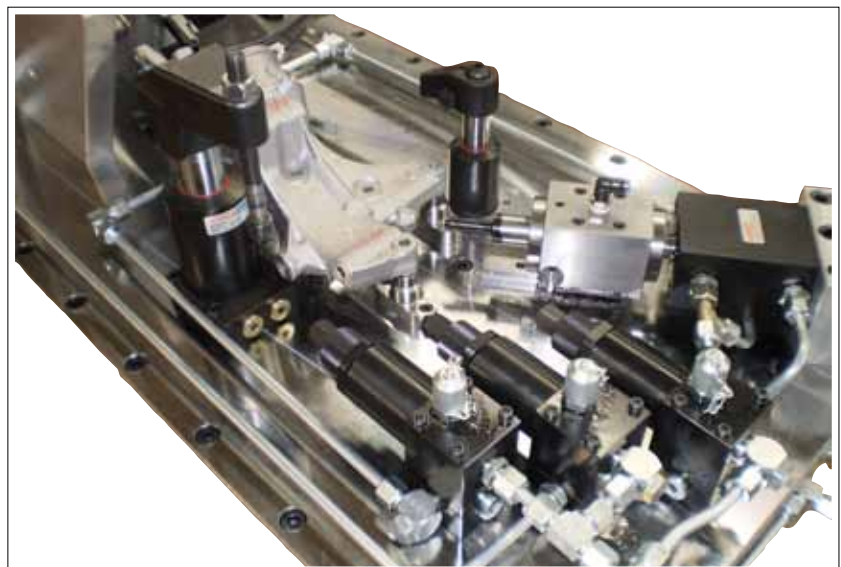


No. 6990-20-S

Measuring hose

max. operating pressure 630 bar.

Order no.	Article no.	Length [mm]	Connection thread	Weight [g]
321919	6990-20-S400	400	M16	75
321935	6990-20-S1000	1000	M16	100



Subject to technical alterations.

No. 6990-20-M

Adapter for pressure gauge connection

max. operating pressure 630 bar.

NEW!



CAD

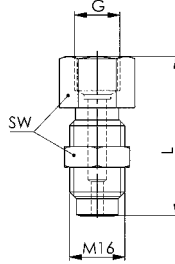
Order no.	Article no.	G	L	SW	Weight [g]
554600	6990-20-M	G1/4	46,5	19	74

Application:

Adapter for pressure gauge connection G1/4 on measuring hose.

Note:

Adaptation is possible under pressure up to max. 400 bar.



No. 6990-20-A

Adapter for pressure gauge connection

max. operating pressure 630 bar.



CAD

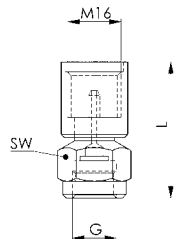
Order no.	Article no.	G	L	SW	Weight [g]
327353	6990-20-A	G1/4	41	19	75

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.



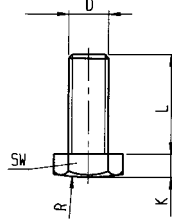


Subject to technical alterations.

No. 6940

Set screw, ball-shaped

Strength class 10.9

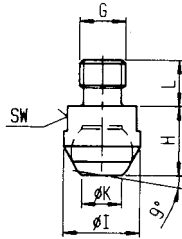


Order no.	Article no.	D x L	K	R	SW	Weight [g]
64014	6940-M5	M5x10	3,5	25	8	2,4
64022	6940-M6	M6x12	4,0	30	10	4,3
64030	6940-M8	M8x16	5,3	40	13	9,9
64048	6940-M10	M10x20	6,4	50	17	21,3
64055	6940-M12	M12x30	7,0	60	19	36,4
64063	6940-M16	M16x40	10,0	75	24	85,8
64071	6940-M20	M20x50	12,5	100	30	168

No. 7110DF

Set screw

with flat-faced ball, ribbed.

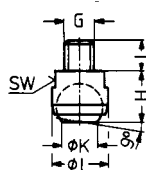


Order no.	Article no.	G x L	H	dia. I	dia. K	SW	Load [kN]	Weight [g]
425025	7110DF-08xM8	M8 x 8	13	13	7,2	11	18	13
273177	7110DF-10xM10	M10 x 10	18	20	10,5	17	25	40
86637	7110DF-12xM12	M12 x 12	18	20	10,5	17	25	43
86652	7110DF-16xM16	M16 x 16	27	30	20,0	20	90	150
86223	7110DF-20xM20	M20 x 20	35	50	34,5	41	165	486

No. 7110DK

Set screw

with flat-faced ball

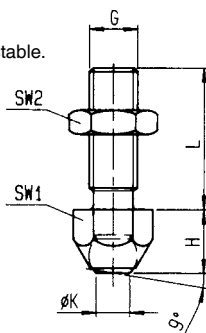


Order no.	Article no.	G x L	H	dia. I	dia. K	SW	Load [kN]	Weight [g]
285478	7110DK-08xM8	M8 x 8	13	13	7,2	11	10	13
285452	7110DK-10xM10	M10 x 10	18	20	10,5	17	25	40
77446	7110DK-12xM12	M12 x 12	18	20	10,5	17	25	43
77453	7110DK-16xM16	M16 x 16	27	30	20,0	20	90	150
76059	7110DK-20xM20	M20 x 20	35	50	34,5	41	165	486

No. 7110DH

Set screw

with flat-faced ball, ribbed, adjustable.

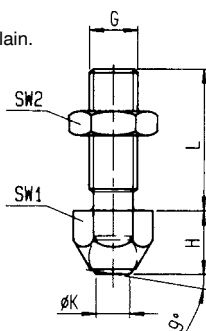


Order no.	Article no.	G x L	H	dia. K	SW1	SW2	Load [kN]	Weight [g]
87890	7110DH-08xM8	M8 x 25	11,6	5,5	13	13	8	20
87916	7110DH-10xM10	M10 x 30	15,7	8,6	17	17	8	44
87858	7110DH-12xM12	M12 x 35	15,7	8,6	17	19	15	56
87874	7110DH-16xM16	M16 x 40	20,7	10,5	24	24	25	128
83931	7110DH-20xM20	M20 x 50	27,3	20,0	30	30	90	274

No. 7110DI

Set screw

with flat-faced ball, adjustable, plain.



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.

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?

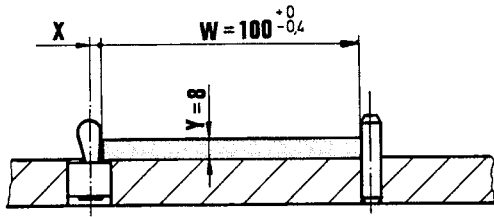
- > For positioning tasks 30 - 60 N
- > For clamping forces 90 - 150 N

Dimension X for side thrust pieces with plastic spring?

- > See table or formula below
- Size 05 X = 1,6 mm
- Size 06 X = 1,9 mm
- Size 08 X = 2,7 mm

Dimension X for side thrust pieces with steel spring?

- > See table or formula below
- > Note that F is larger and thus allows greater leeway



W = workpiece (+/- tolerance)
 -F = pre-tension
 F = (-F) + (+F)

Y = workpiece height
 +F = clamping force (spring deflection for tolerance)
 T = tolerance

FORMULAS:

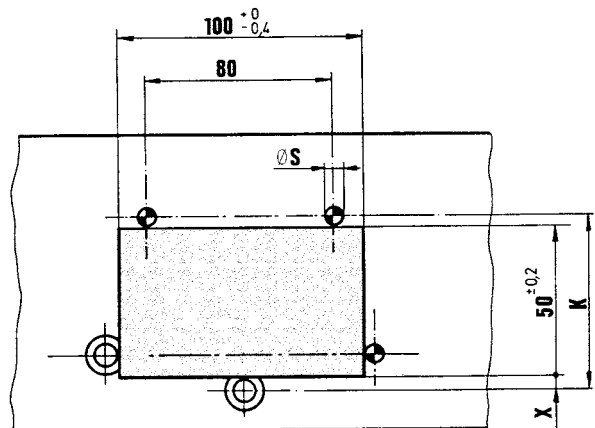
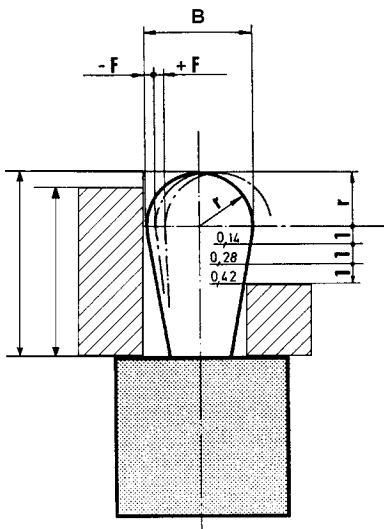
For workpieces that are higher than C minus r, the table values for dimension X or the formula $X = B/2 - (-F)$ apply.

For workpieces that are smaller than C minus r, the table values for dimension X or the formula $X = B/2 - (-F) - [(C - r - Y) \times 0,123]$ apply.

Formula for coordinates:

$$K = W - T/2 + x + S/2$$

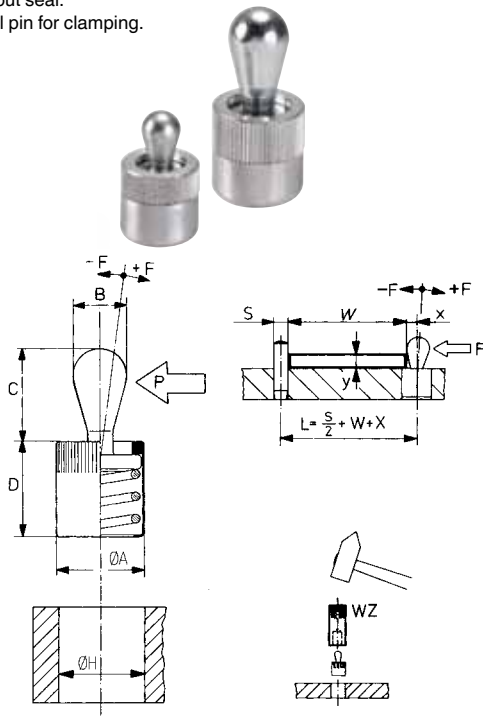
The table values are standard values that should ideally be checked using a sample clamping.



No. 6380

Lateral pressure pad

without seal.
Steel pin for clamping.



Order no.	dia. A	B	C	D-1	ØH H8	F	~P [N]	X	suitable tool	Weight [g]
373001	6	3	4,0	7	6	±0,5	10	0,9	03	0,6
373019	6	3	4,0	7	6	±0,5	20	0,9	03	0,6
373027	6	3	4,0	7	6	±0,5	40	0,9	03	0,7
373035	10	5	6,7	11	10	±0,8	20	1,6	05	2,6
373043	10	5	6,7	11	10	±0,8	50	1,6	05	2,9
373050	10	5	6,7	11	10	±0,8	100	1,6	05	3,1
373068	10	6	10,7	11	10	±1,0	40	1,8	06	3,6
373076	10	6	10,7	11	10	±1,0	75	1,8	06	3,6
373084	10	6	10,7	11	10	±1,0	150	1,8	06	3,9
373092	12	8	13,9	13	12	±1,3	50	2,6	08	7,0
373100	12	8	13,9	13	12	±1,3	100	2,6	08	7,2
373126	16	10	16,7	17	16	±1,6	100	3,2	10	15,0
373134	16	10	16,7	17	16	±1,6	200	3,2	10	15,4
373142	16	10	16,7	17	16	±1,6	300	3,2	10	15,8

Note:

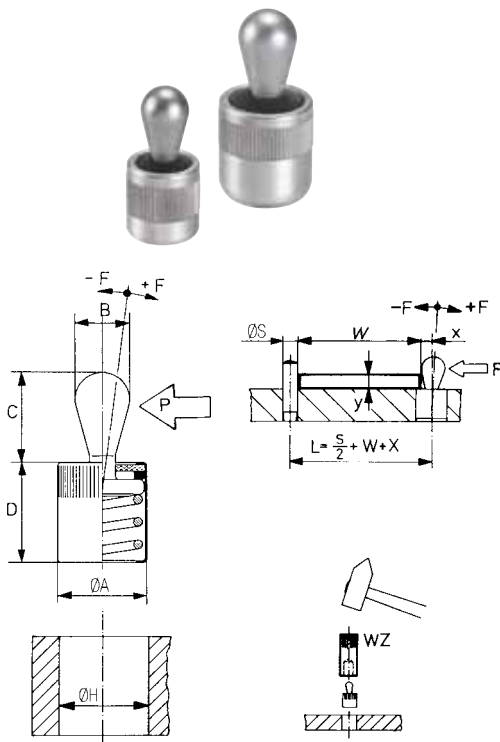
Without sealing for operations without dirt, temperature-resistant up to 250°C.
Installation by pressing in.



No. 6380D

Lateral pressure pad

with seal against chips and dirt.
Steel pin for clamping.

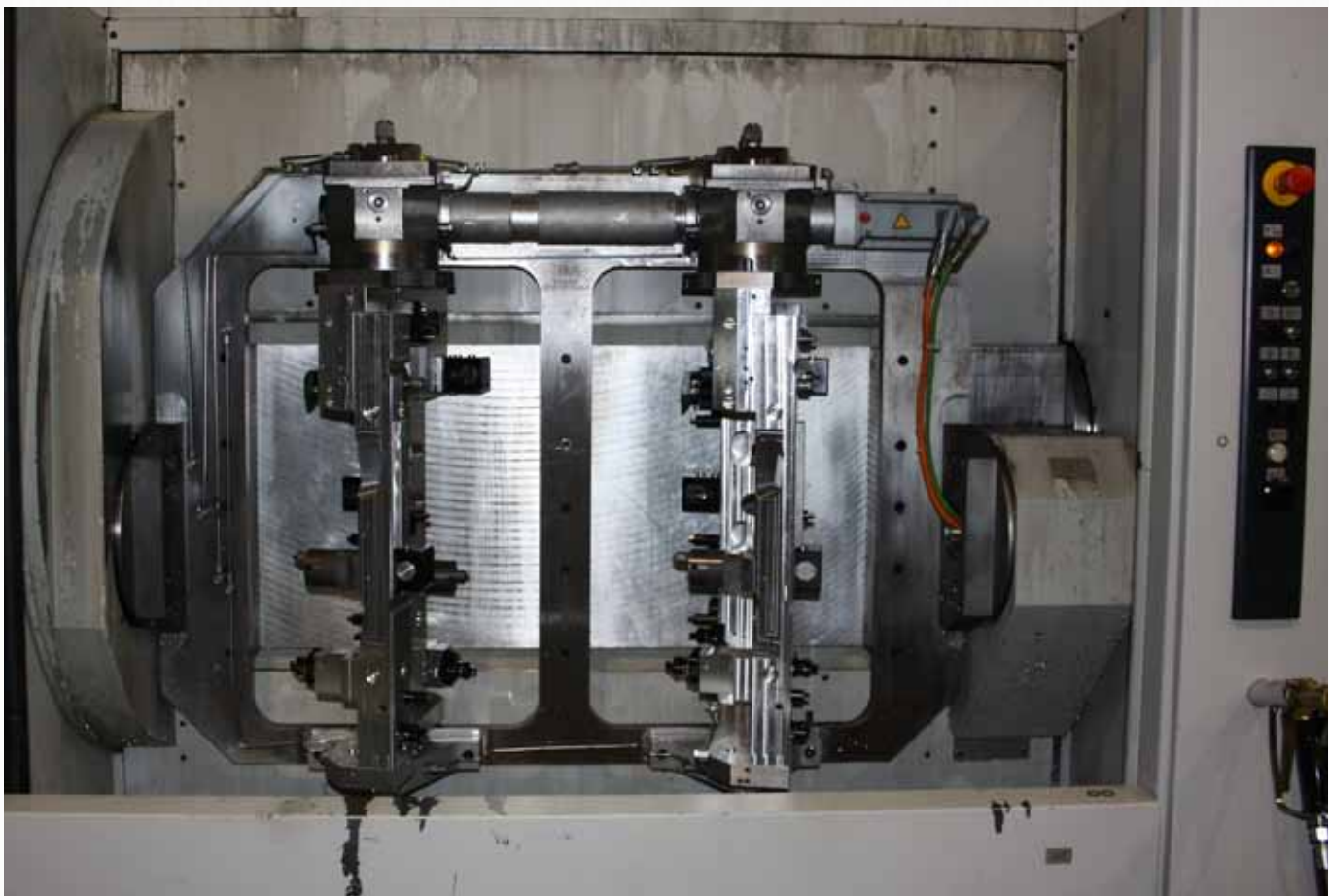
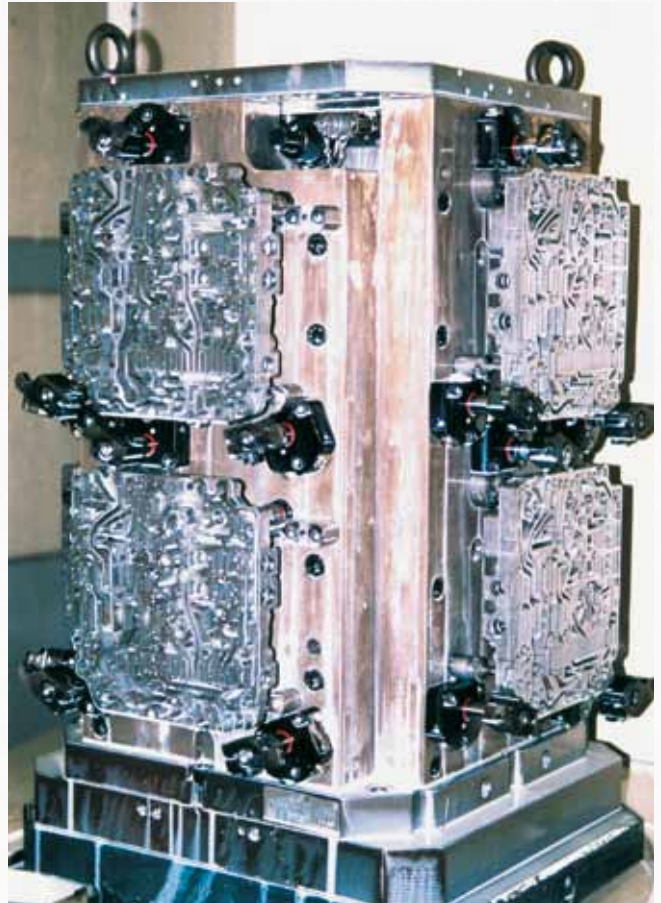


Order no.	dia. A	B	C	D-1	ØH H8	F	~P [N]	X	suitable tool	Weight [g]
373159	6	3	4	7	6	±0,5	10	0,9	03	0,6
373167	6	3	4	7	6	±0,5	20	0,9	03	0,6
373175	6	3	4	7	6	±0,5	40	0,9	03	0,7
373183	10	5	6	12	10	±0,8	20	1,6	05	2,7
373191	10	5	6	12	10	±0,8	50	1,6	05	2,9
373209	10	5	6	12	10	±0,8	100	1,6	05	2,9
373217	10	6	10	12	10	±1,0	40	1,8	06	3,1
373225	10	6	10	12	10	±1,0	75	1,8	06	3,6
373233	10	6	10	12	10	±1,0	150	1,8	06	3,7
373241	12	8	13	14	12	±1,3	50	2,6	08	3,9
373258	12	8	13	14	12	±1,3	100	2,6	08	7,1
373266	12	8	13	14	12	±1,3	200	2,6	08	7,3
373274	16	10	16	18	16	±1,6	100	3,2	10	7,6
373282	16	10	16	18	16	±1,6	200	3,2	10	15
373290	16	10	16	18	16	±1,6	300	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.





Subject to technical alterations.

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.

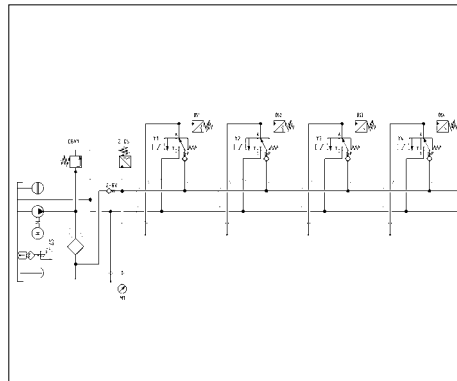
The hydraulic clamping elements are supplied diagonally at the table and at the piston by two independent and pressure-controlled clamping circuits (fig. 3).

FIGURE 1



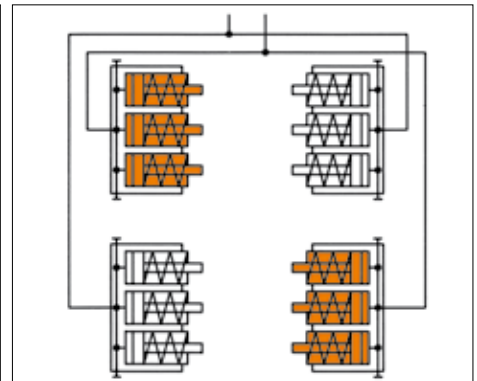
- > Clamping strip on table and stud clamping on plunger

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, ready to plug in pump unit, ready for operation electrically and hydraulically. Complete with pressure control unit, electromagnetic valve, manometer, float switch, oil filling. The electrical controller is equipped with main switch, indicator lamps and flange sockets, carrying handle and two-part protective hood. Electrical connection complete with CEKON connector.

Application:

The pump unit is designed to operate hydraulic clamping systems.

Features:

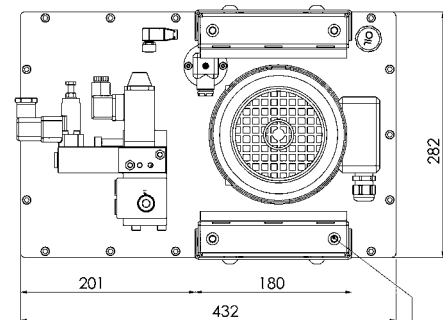
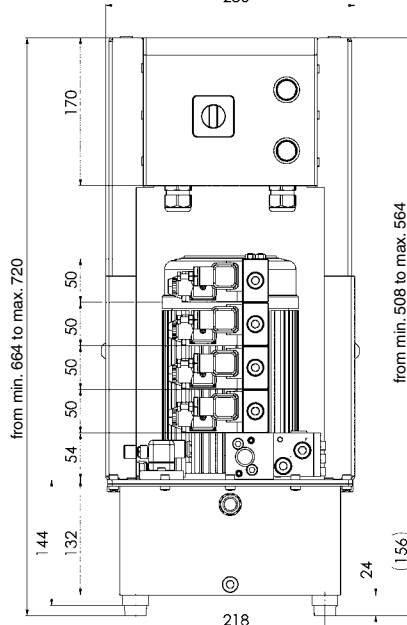
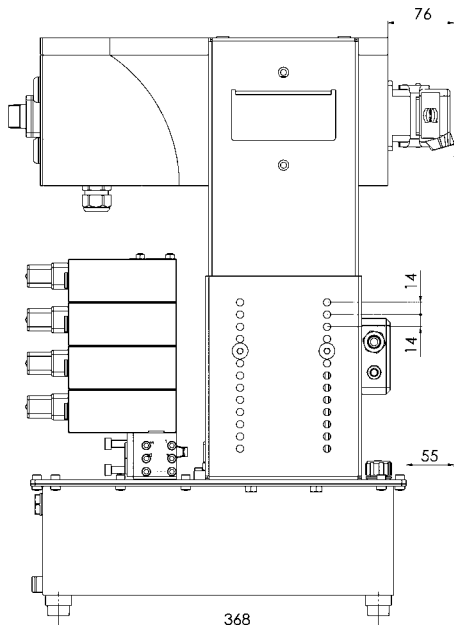
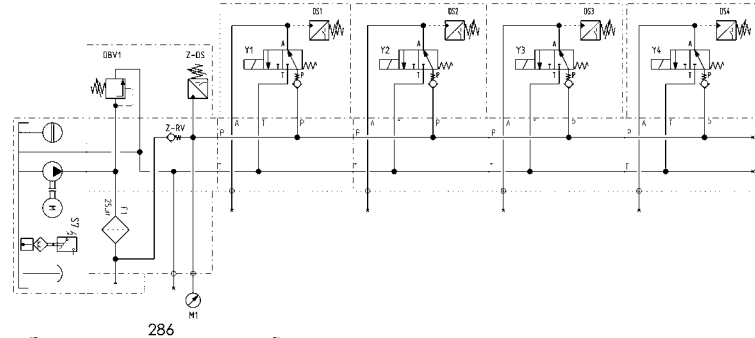
The radial piston pump is driven via an alternating current standard motor with the energy efficiency class IE3. The motor is protected against overload by a motor protection switch and a thermoelement. Each of the 4 clamping circuits is equipped with a 3/2 seat valve. Four pressure switches (DS) are 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.

Pump Unit No. 6906P

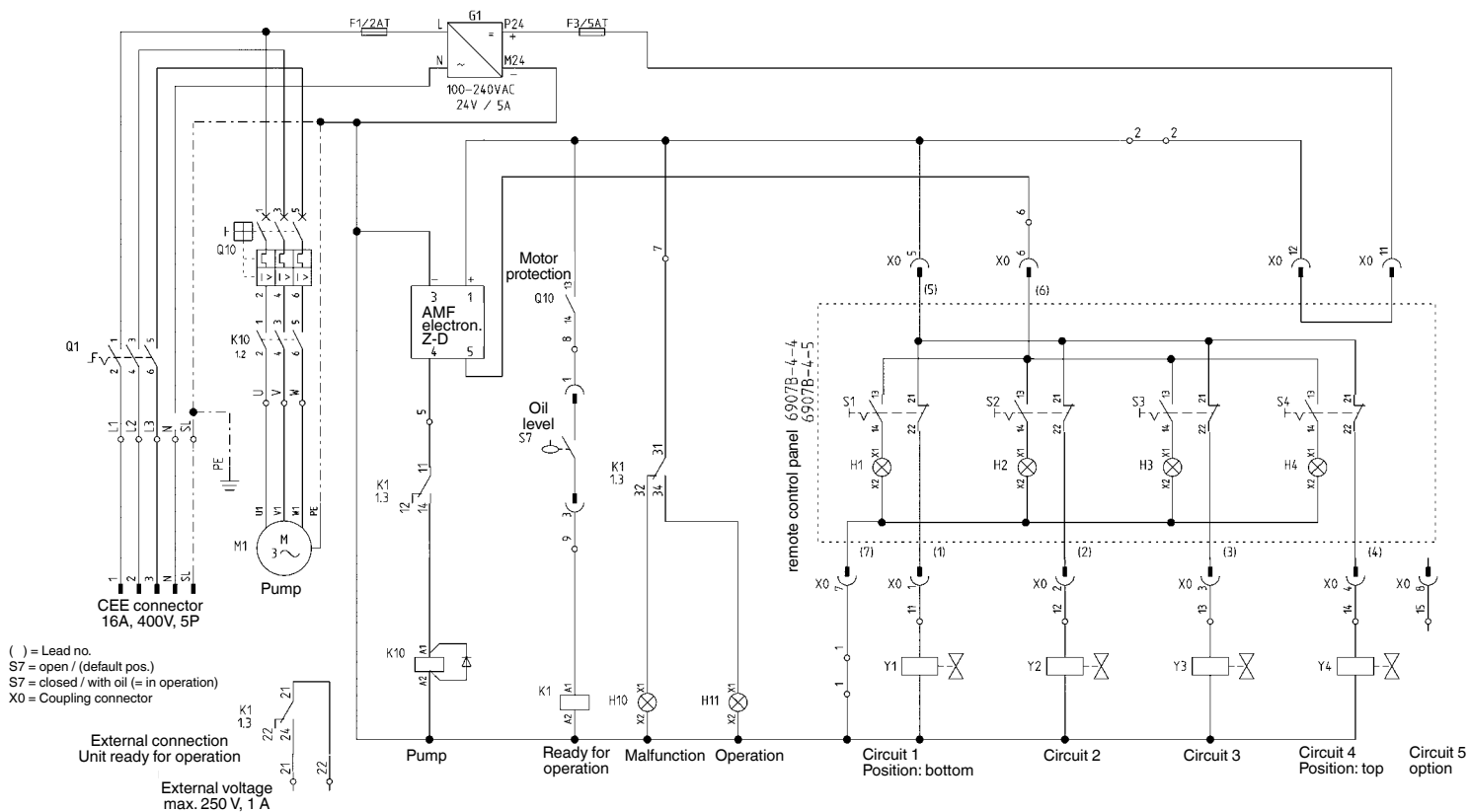
Hydraulic specifications:

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 51519

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; 5x1,5 mm ² 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



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.

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, ready to plug in pump unit, ready for operation electrically and hydraulically. Complete with pressure control unit, electromagnetic valve, manometer, float switch, oil filling. The electrical controller is equipped with main switch, indicator lamps and flange sockets, carrying handle and two-part protective hood. Electrical connection complete with CEKON connector.

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:

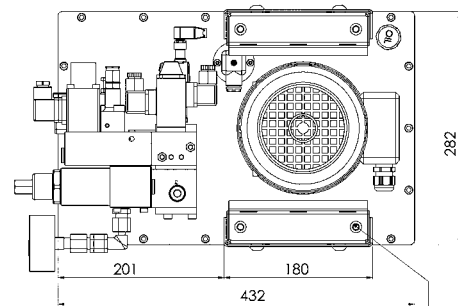
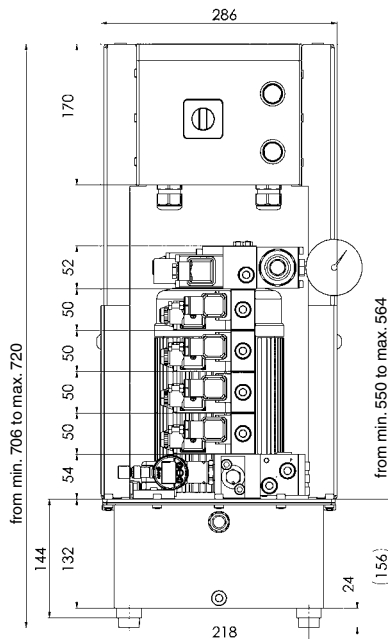
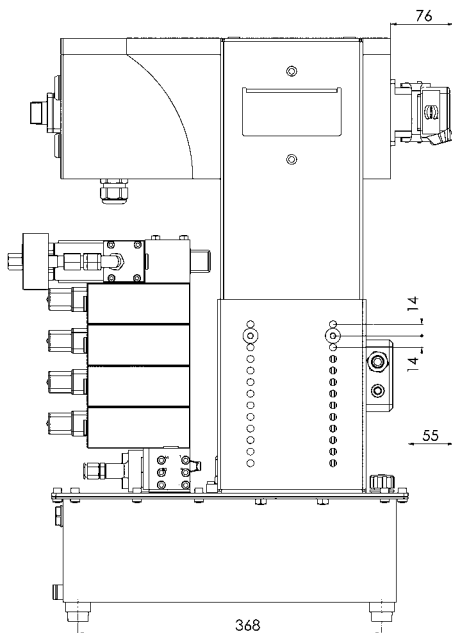
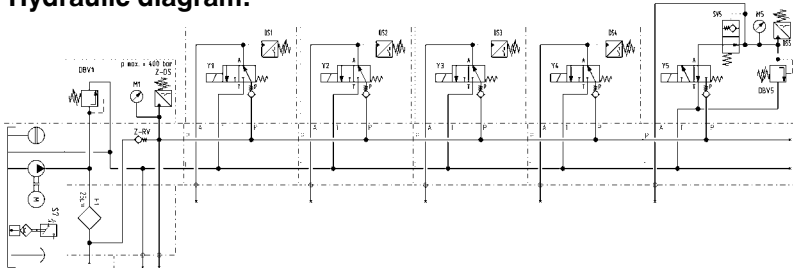
The radial piston pump is driven via an alternating current standard motor with the energy efficiency class IE3. The motor is protected against overload by a motor protection switch and a thermoelement. Each of the 4 clamping circuits is equipped with a 3/2 seat valve. Four pressure switches (DS) are 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.

Pump Unit No. 6906P

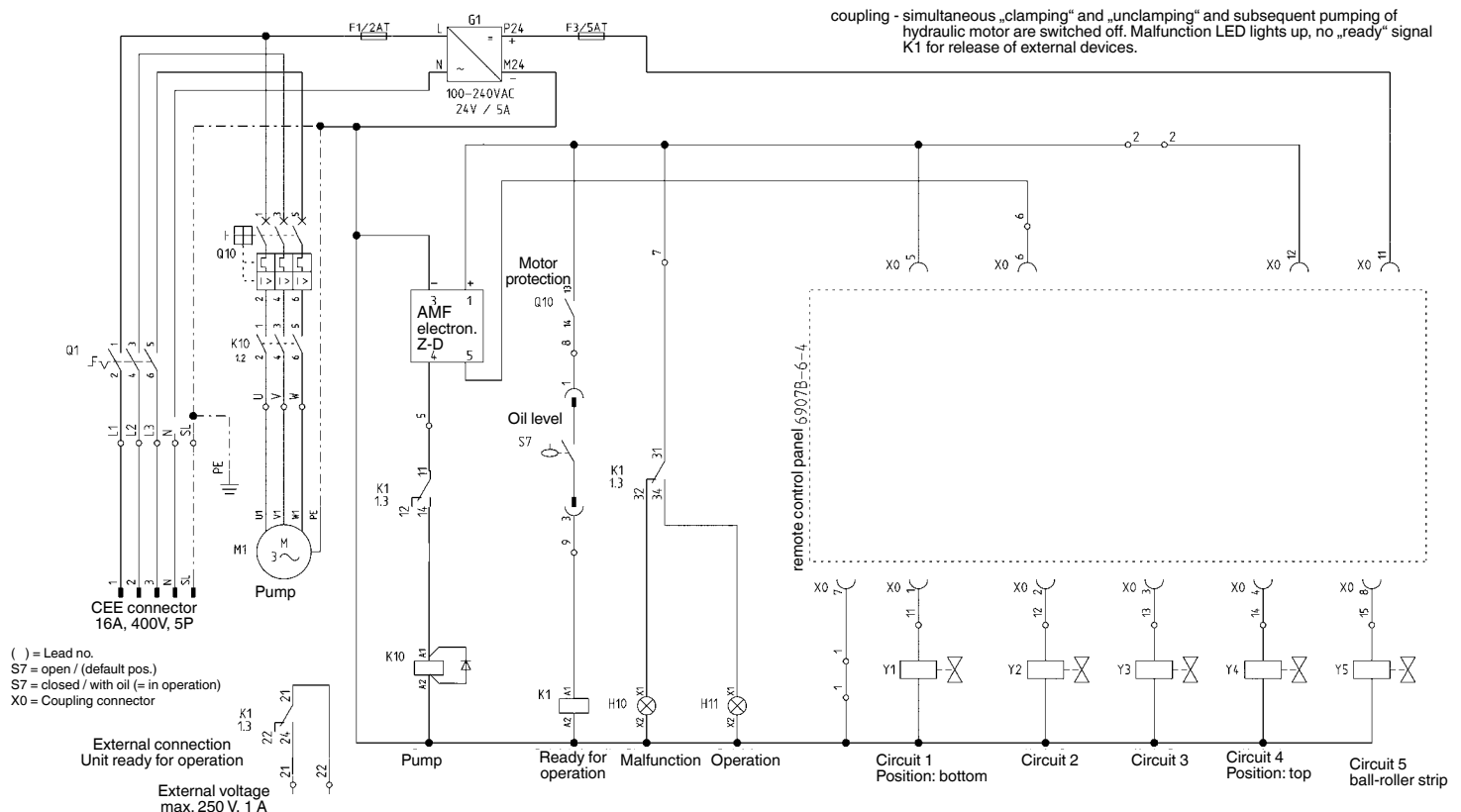
Hydraulic specifications:

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	3/2 seat valve with pressure switch for external pressure monitoring
clamping circuits 1-4	
Valve types	4x 3/2 seat valve, unclamped with power off, stop valve, pressure limiting valve and pressure switch for actuating the hydraulic ball-roller strips.
clamping circuit 5	
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 51519

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	Öflex 100; 5x1,5 mm ² 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

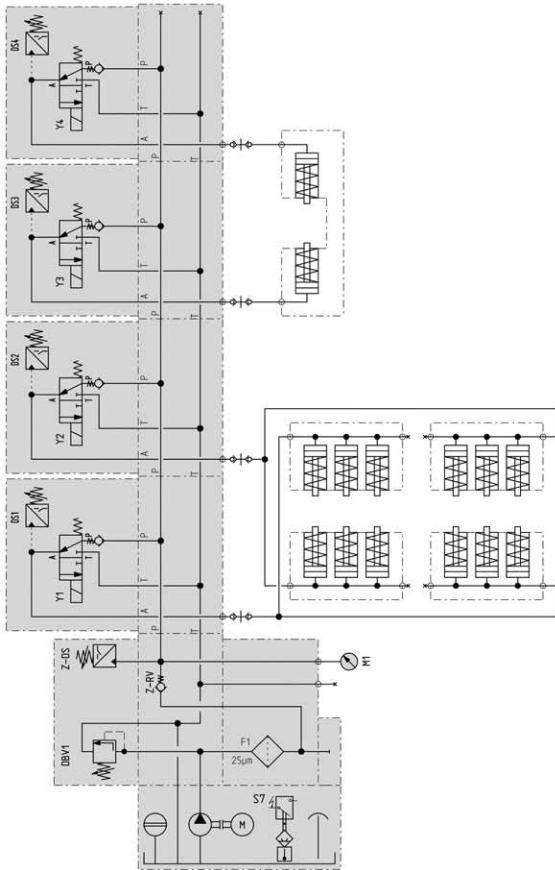
Wiring circuit of pump unit with 5 clamping circuits, remote control



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.

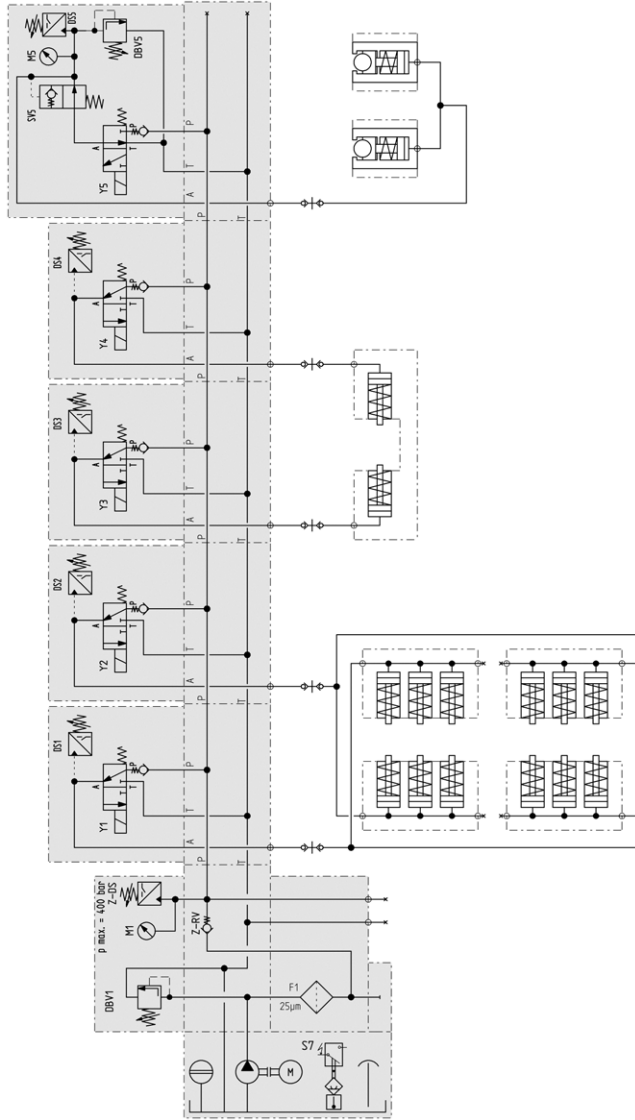
Wiring diagram for 4 clamping circuits

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:

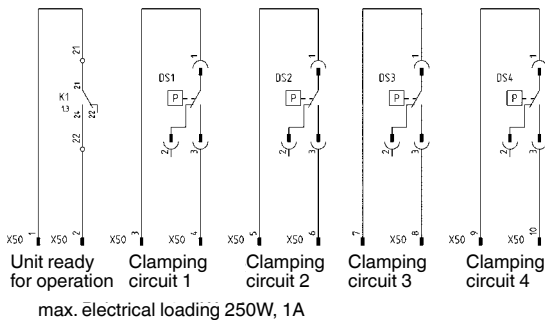
The pump unit must not start automatically when power supply is restored after a power failure. This does not apply to drive systems that may restart automatically without any risk of injury of operators or damage to the product to be processed. Note in accordance with VDE 0113-5.3: Safety in the event of power failure or pump unit failure.

Important note:

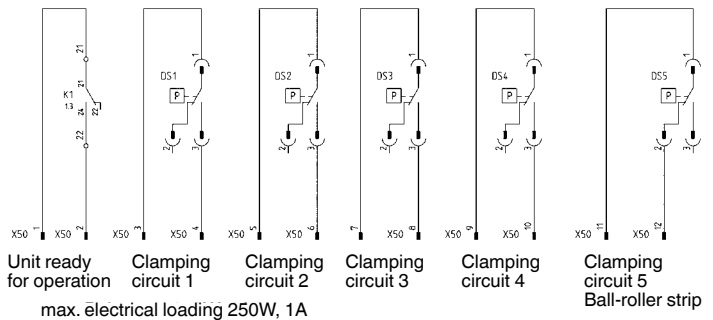
The external DS function of the pump unit can be integrated into the machine controller at the terminal housing by the operator. Ensure that the control circuit is correctly integrated into the machine controller!

External monitoring of AMF pump unit and pressure switches by customer's machine control

Attention! External voltage of external machine control



Attention! External voltage of external machine control



Subject to technical alterations.

No. 6906PB-4-4

Remote Control Switch with magnetic base

for 4 clamping circuits



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



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



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.



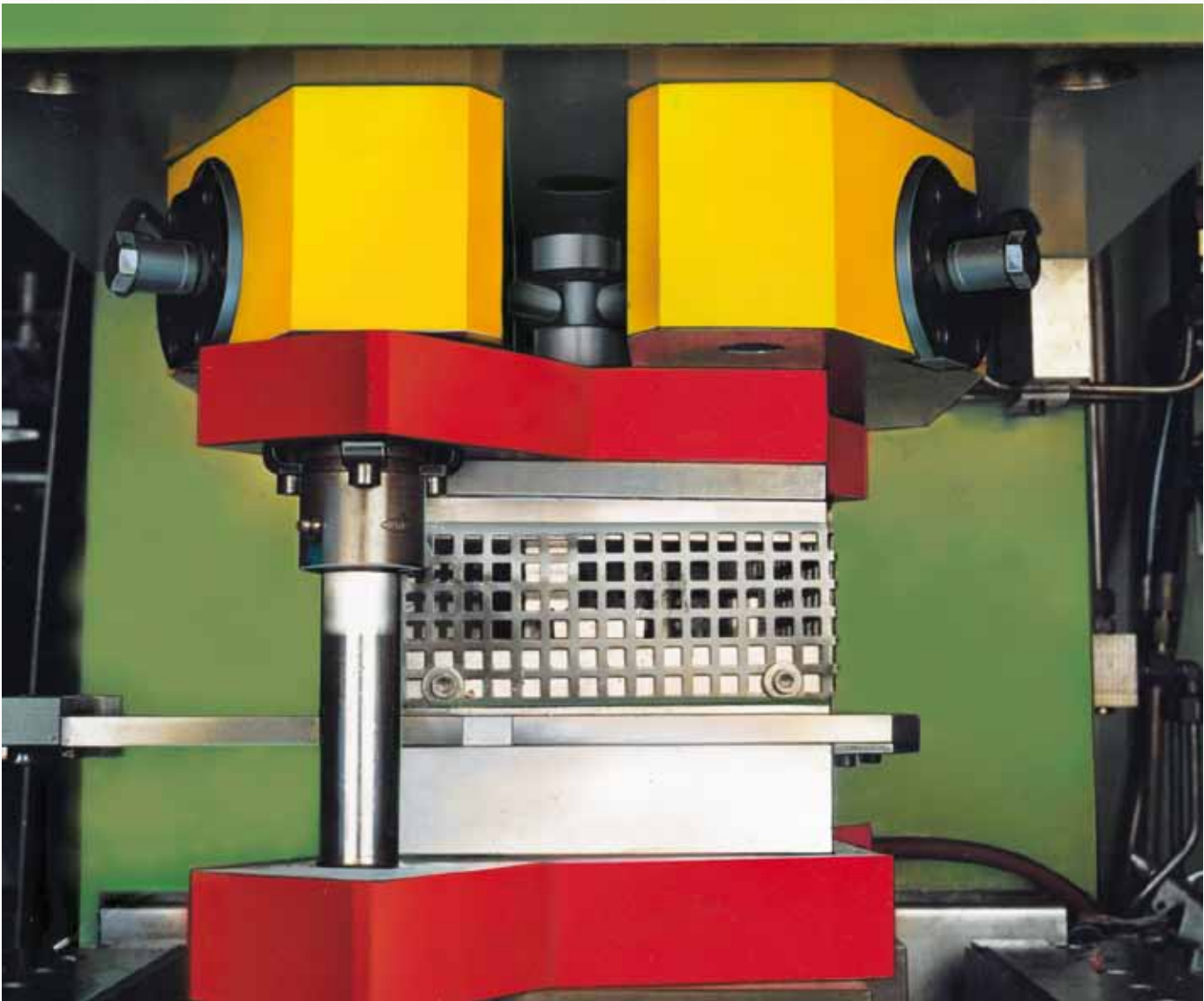
Order no.	Article no.	Control voltage	Number of poles	Weight [g]
126326	6906PBS-1-1	24 V =	13	40

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.

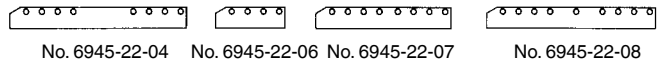
No. 6945-22-20

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 [cm ³]	min. spring force per piston [N]	Weight [g]
61085	6945-22-20-1x3	60	6	8,7	120	3000

Suitable spacer bars:



Design:

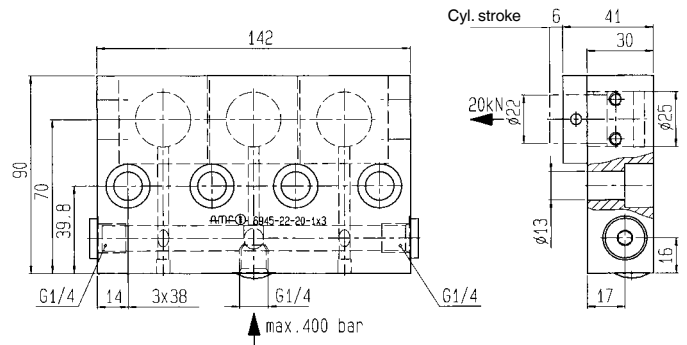
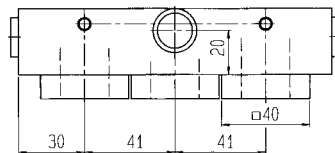
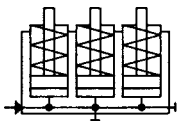
Cylinder body made of tempering steel, phosphated. Piston case-hardened and ground, built-in return spring, with stroke limitation.

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.

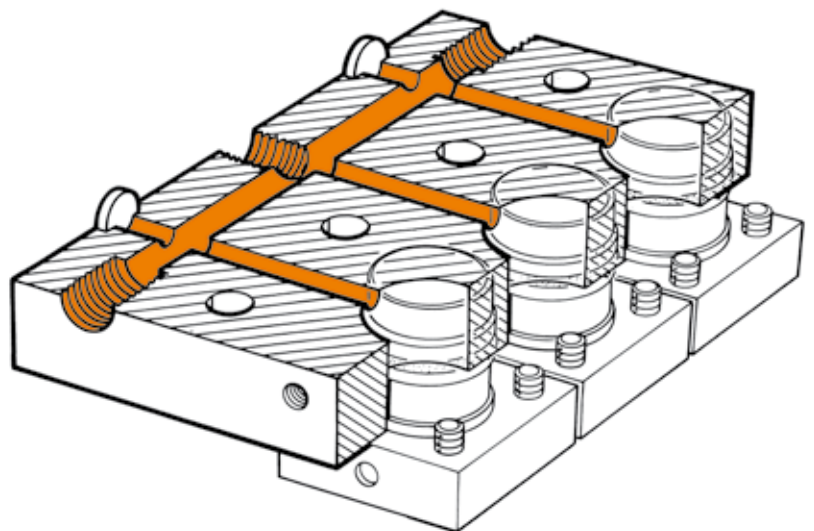
On request:

Special sizes available on request.



Sectional view:

Clamping strip no. 6945-22-20-1x3 with exchangeable clamping pistons



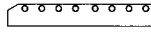
No. 6945-22-20

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 [cm ³]	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:



No. 6945-22-07

Design:

Cylinder body made of tempering steel, phosphated. Piston case-hardened and ground, built-in return spring, with stroke limitation.

Application:

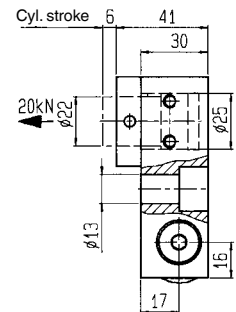
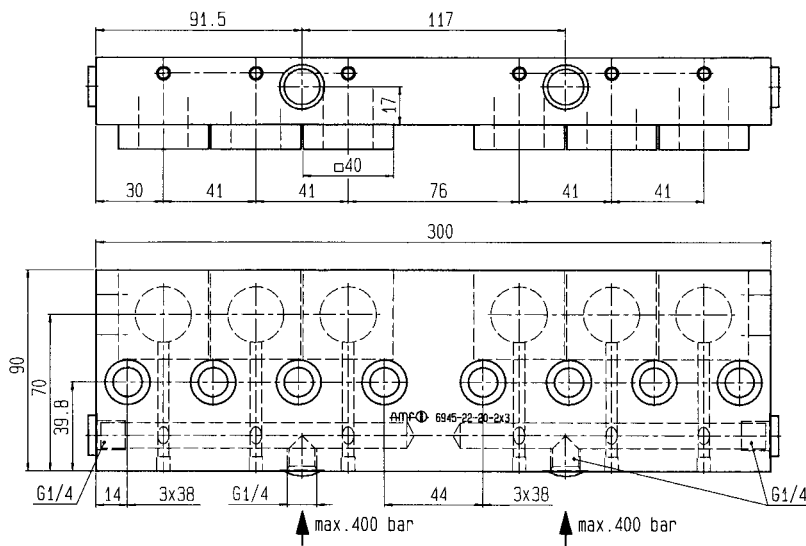
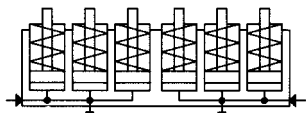
For quick clamping and unclamping on press table or ram. Suitable for workpieces with uniform clamping rim. The clamping bar is bolted with a spacer bar directly onto the press table or press ram. Suitable spacer bar is No. 6945-22-07.

On request:

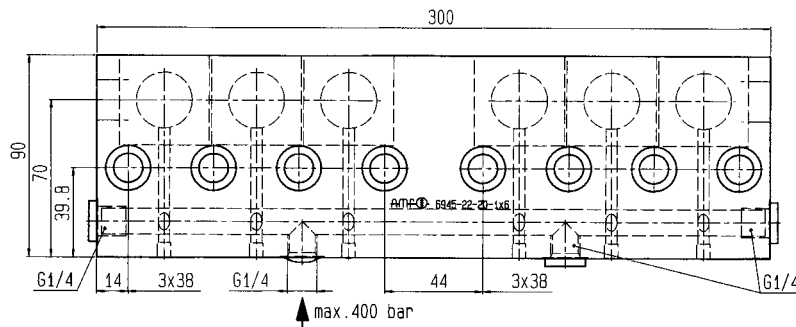
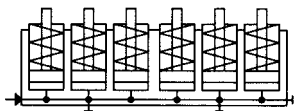
Special sizes available on request.



No. 6945-22-20-2x3



No. 6945-22-20-1x6



CAD

Subject to technical alterations.

No. 6945-22-20

Clamping Bar, long

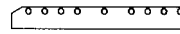
single acting, with spring return,
max. operating pressure 400 bar.

Order no.	Article no.	Clamping force at 400 bar [kN]	Stroke [mm]	Vol. total [cm ³]	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:



No. 6945-22-06



No. 6945-22-08

Design:

Cylinder body made of tempering steel, phosphated. Piston case-hardened and ground, built-in return spring, with stroke limitation.

Application:

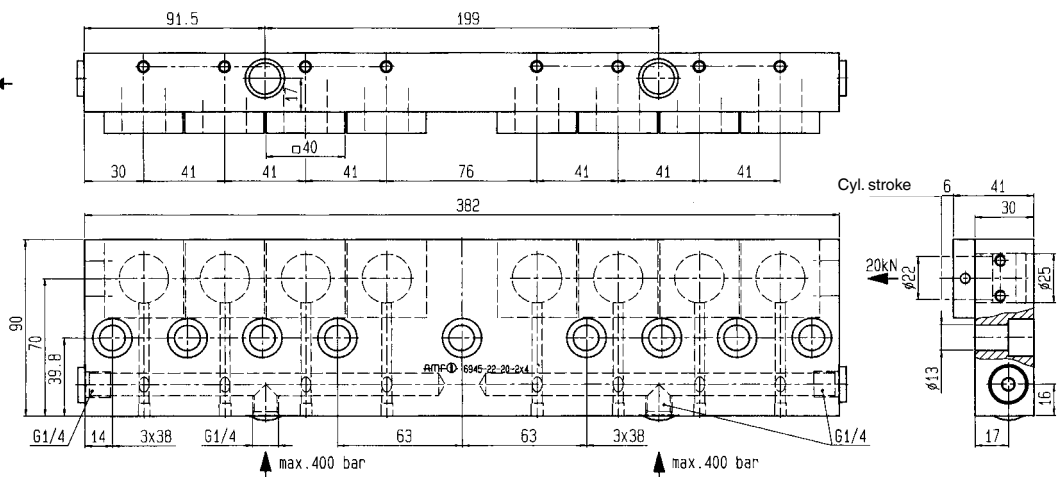
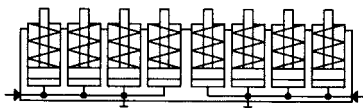
For quick clamping and unclamping on press table or ram. Suitable for workpieces with uniform clamping rim. The clamping bar is bolted with a spacer bar directly onto the press table or press ram. Suitable spacer bars are No. 6945-22-06 and 6945-22-08.

On request:

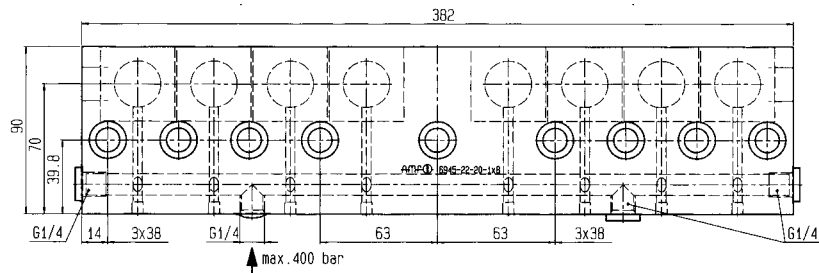
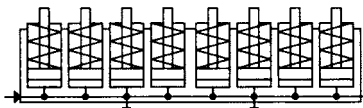
Special sizes available on request.

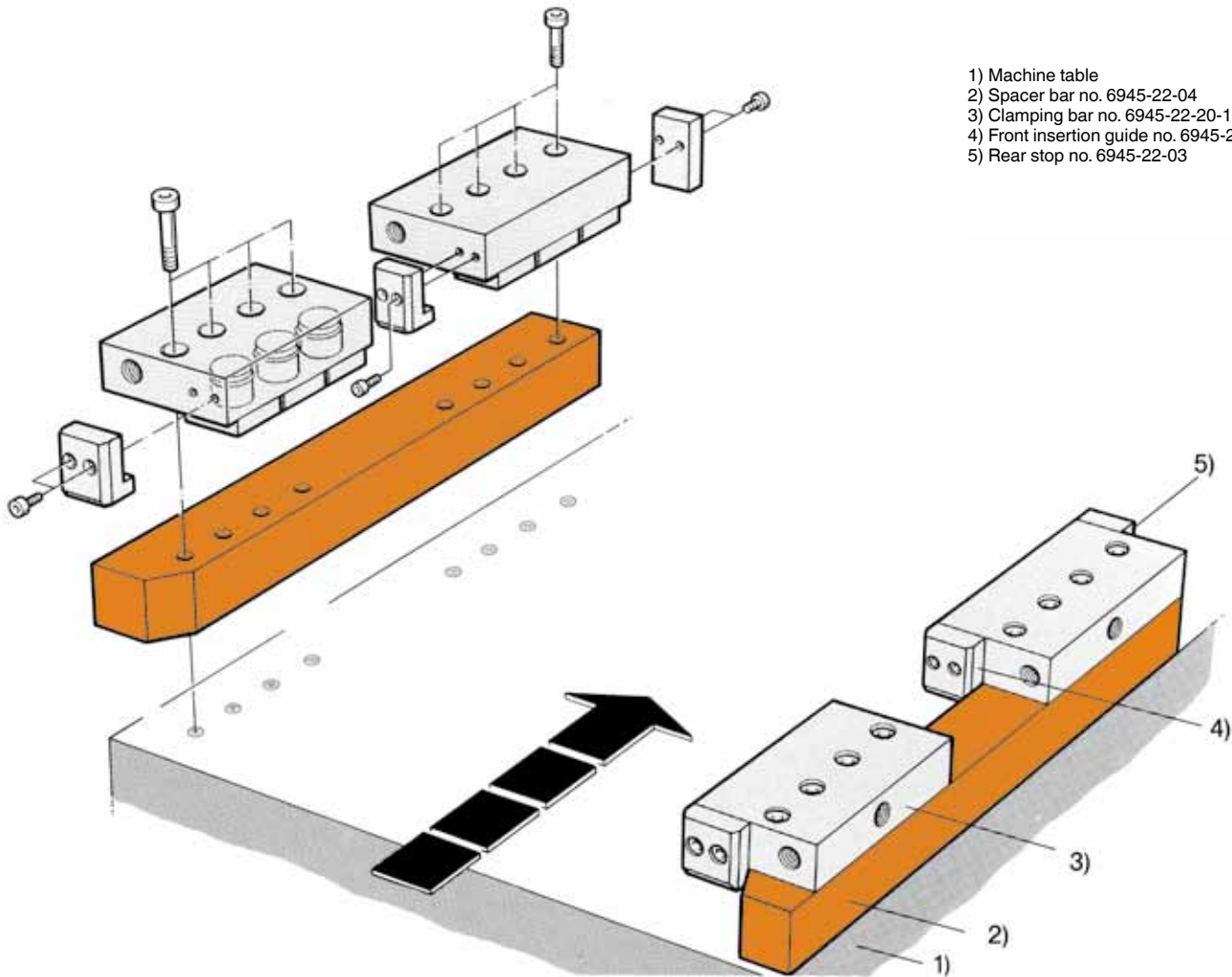


No. 6945-22-20-2x4



No. 6945-22-20-1x8





- 1) Machine table
- 2) Spacer bar no. 6945-22-04
- 3) Clamping bar no. 6945-22-20-1x3
- 4) Front insertion guide no. 6945-22-02
- 5) Rear stop no. 6945-22-03

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:

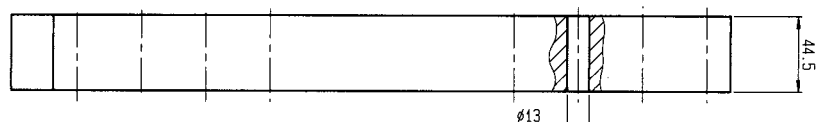
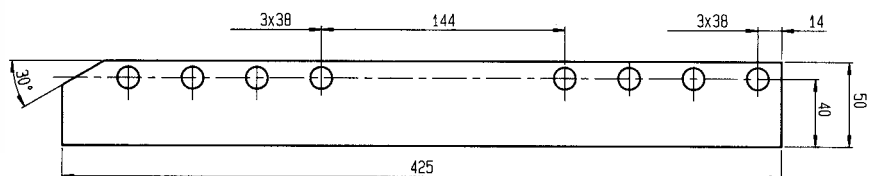
Spacer and guide bar for a clamping-rim or tool-pallet height of 30 mm.

Note:

For clamping bar: No. 6945-22-20-1x3.

On request:

Special sizes available on request.



Subject to technical alterations.



CAD

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:

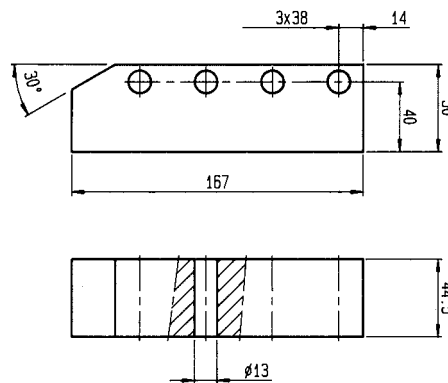
Spacer and guide bar for a clamping-rim or tool-pallet height of 30 mm.

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.



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:

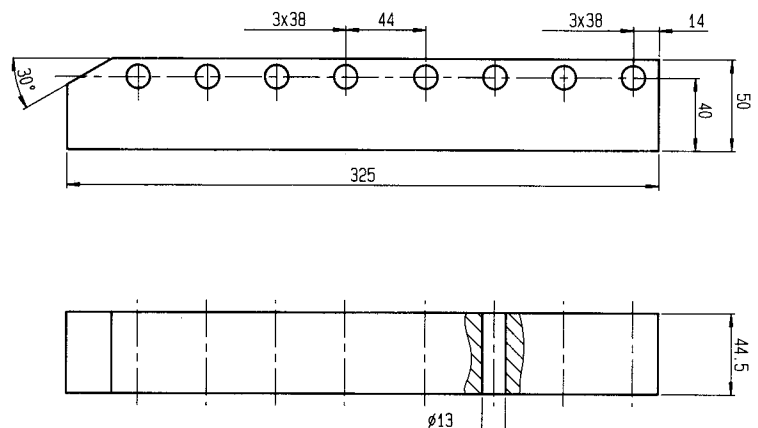
Spacer and guide bar for a clamping-rim or tool-pallet height of 30 mm.

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.



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:

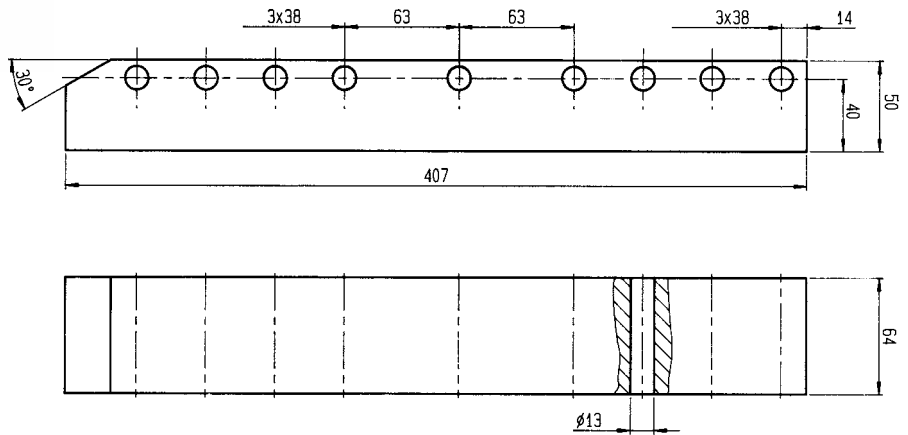
Spacer and guide bar for a clamping-rim or tool-pallet height of 50 mm.

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.

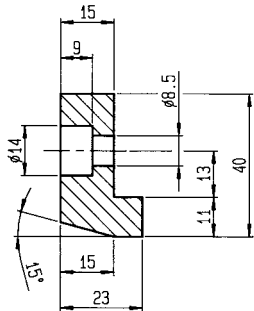


CAD



No. 6945-22-02

Front Insertion Guide



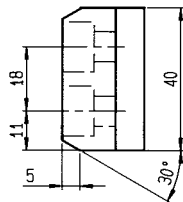
Order no.	Article no.	Weight [g]
61077	6945-22-02	300

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.

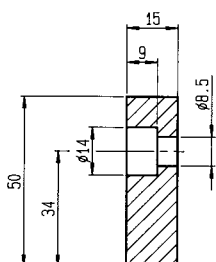


CAD



No. 6945-22-03

Rear Stop



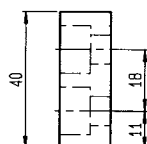
Order no.	Article no.	Weight [g]
61093	6945-22-03	250

Design:

Tempering steel, blued and hardened. Mounting bolts supplied.

Application:

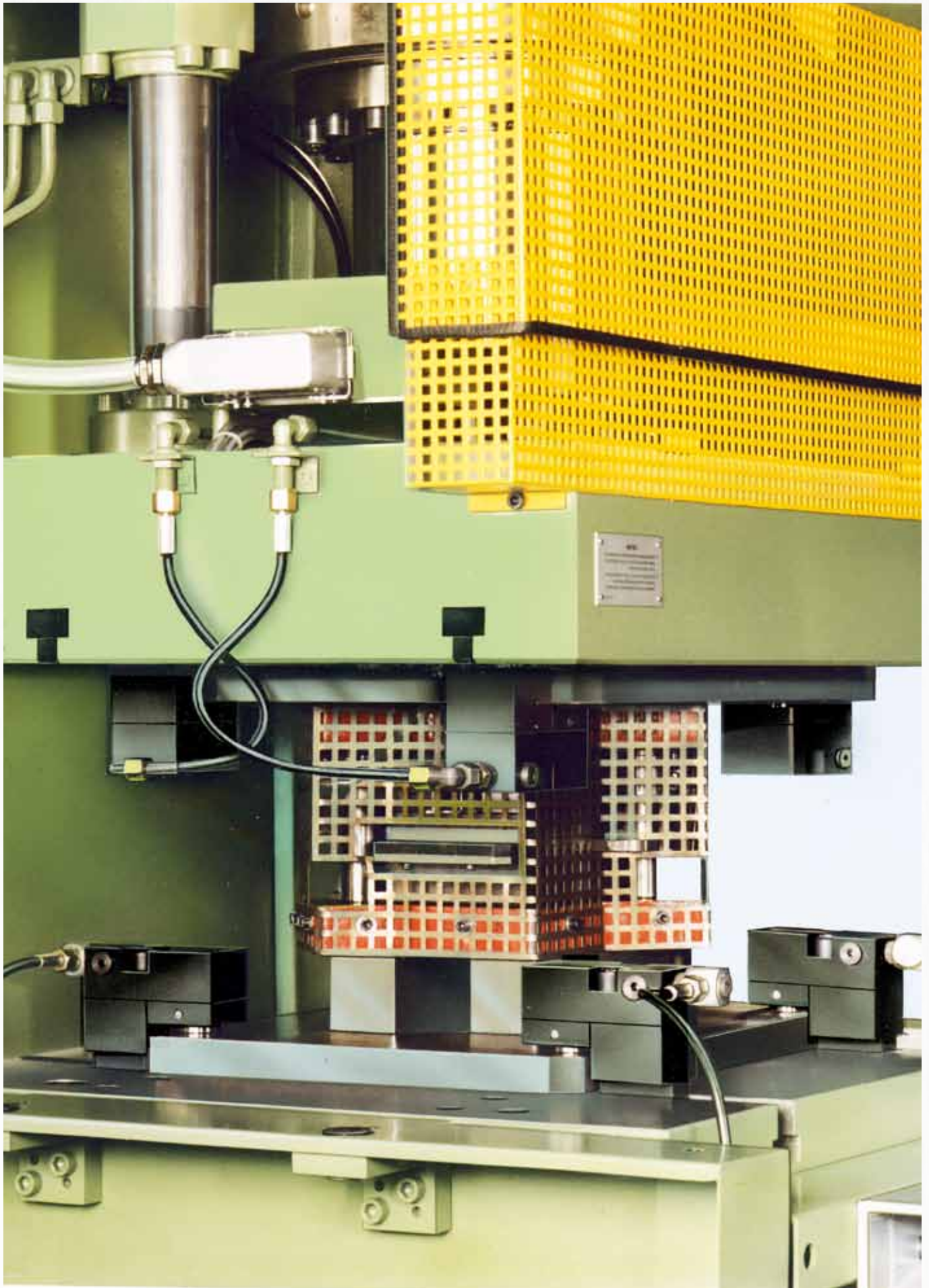
Stop for die pallet in the press.



CAD



Subject to technical alterations.

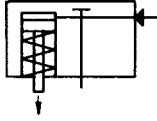


Subject to technical alterations.

No. 6945-11

Clamping Head, complete with base

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



Order no.	Article no.	Clamping force at 400 bar [kN]	Stroke H [mm]	Vol. [cm ³]	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:

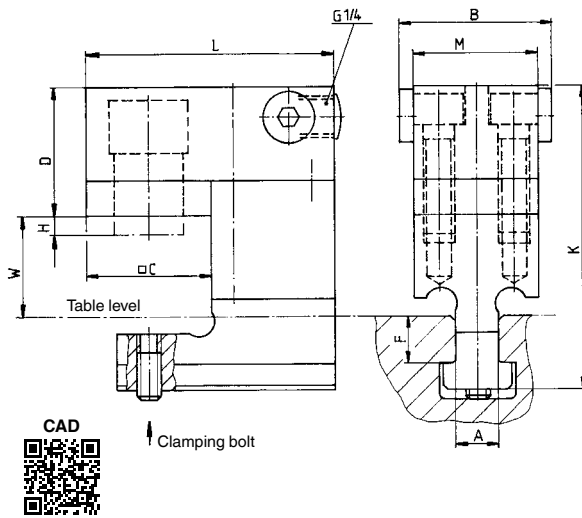
Small dimensions. The hydraulic oil supply can be connected to any of the three sides.

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.

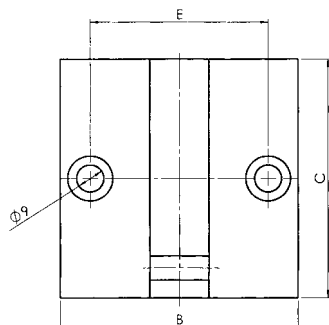
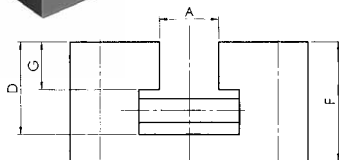
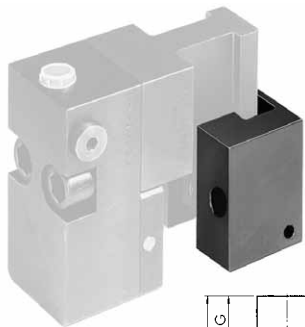
Dimensions:

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



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:

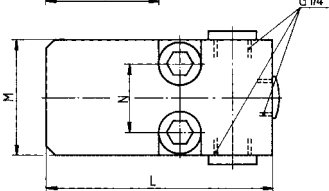
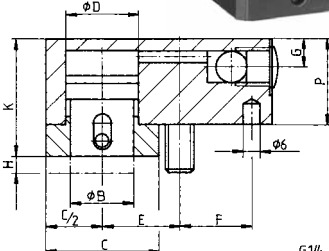
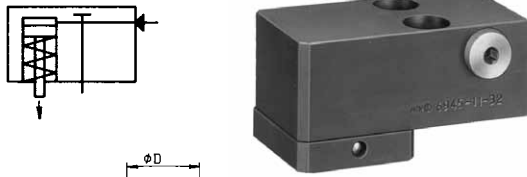
Order no.	Article no.	B	C	D	E	F	G
110700	6945-11-006	80	80	25	60	35	12
110692	6945-11-005	80	80	31	60	40	16
255687	6945-11-003	90	90	40	70	50	20
255752	6945-11-004	90	90	50	70	60	25

Subject to technical alterations.

No. 6945-11

Clamping Head

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



Order no.	Article no.	Clamping force at 400 bar [kN]	Stroke H [mm]	Vol. [cm ³]	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:

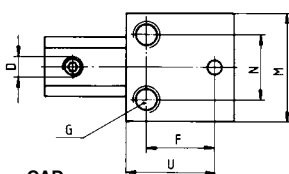
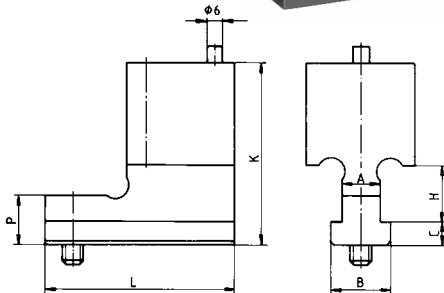
Special sizes available on request.

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



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.

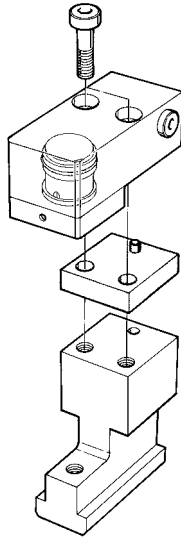
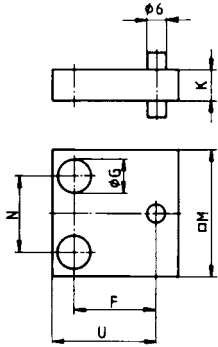
Subject to technical alterations.

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 adaptor plate is fitted between of the clamping head and it's base in order to obtain a different clamping height.

On request:

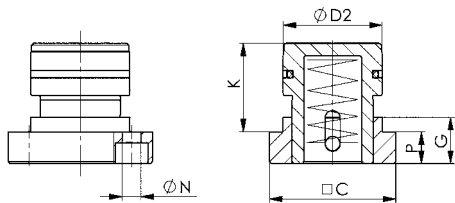
Special sizes available on request.

No. 6945-11

Clamping Piston, complete



CAD



Order no.	Article no.	Clamping force at 400 bar [kN]	Stroke [mm]	Vol. [cm ³]	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

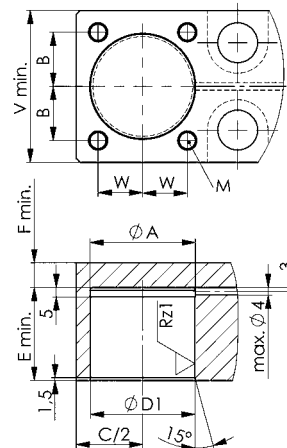
Design:

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:

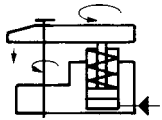
Order no.	Article no.	dia. A	B ±0.1	C	dia. D1	dia. D2	E	F	G	K	dia. N	P	Screw (4 pieces)	Md max. [Nm]	M x depth	V	W
61473	6945-11-20-10	25,5	13,0	40	25 +0,033	25 -0,020/-0,041	26	4	14,0	26	6,6	11,0	M6 x 12- 8.8	10	M6 x 10	40	13
61481	6945-11-32-10	32,5	16,0	50	32 +0,039	32 -0,025/-0,050	33	7	15,0	33	8,4	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.

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. [cm ³]	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:

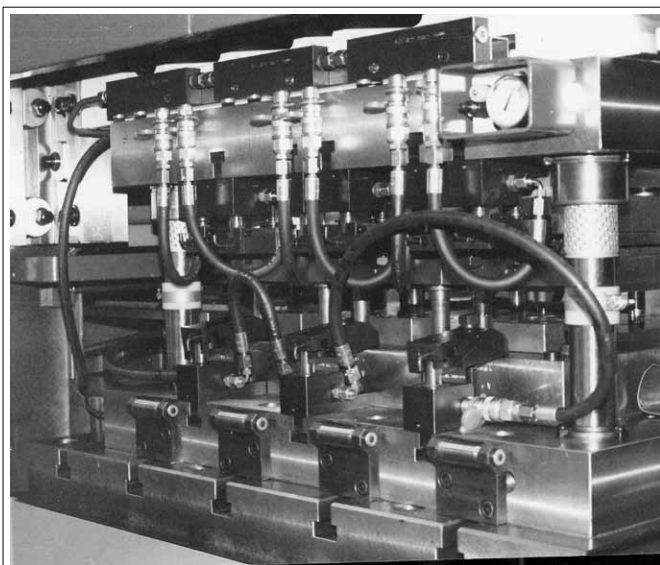
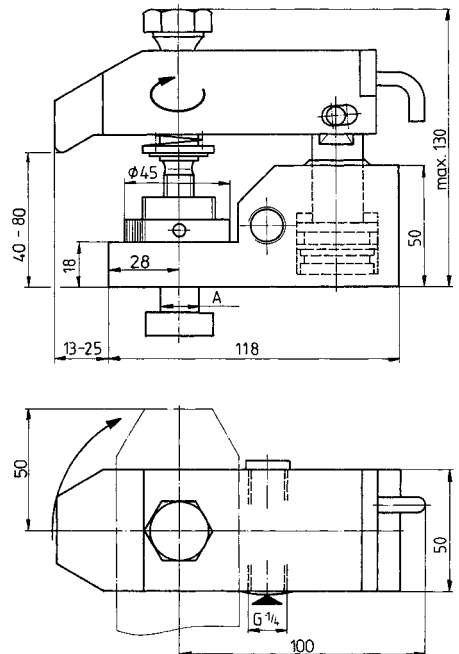
Large clamping range, fast height adjustment to the required tool clamping edge height. The swivel clamping strap is inserted directly into the T-slot of the press. The workpiece can also be removed vertically upwards as the clamping bar can be swivelled away manually. The clamping bar is mechanically 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.

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 | | 4. Max. stroke rate | |
| 2. Pressing force | | 5. Closing height | |
| 3. Max. stroke | | 6. Wiping force | |

PRESS TABLE:

7. Table surface W x D

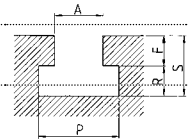
8. Table thickness

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=



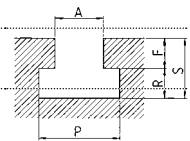
PRESS PISTON:

13. Piston size W x 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

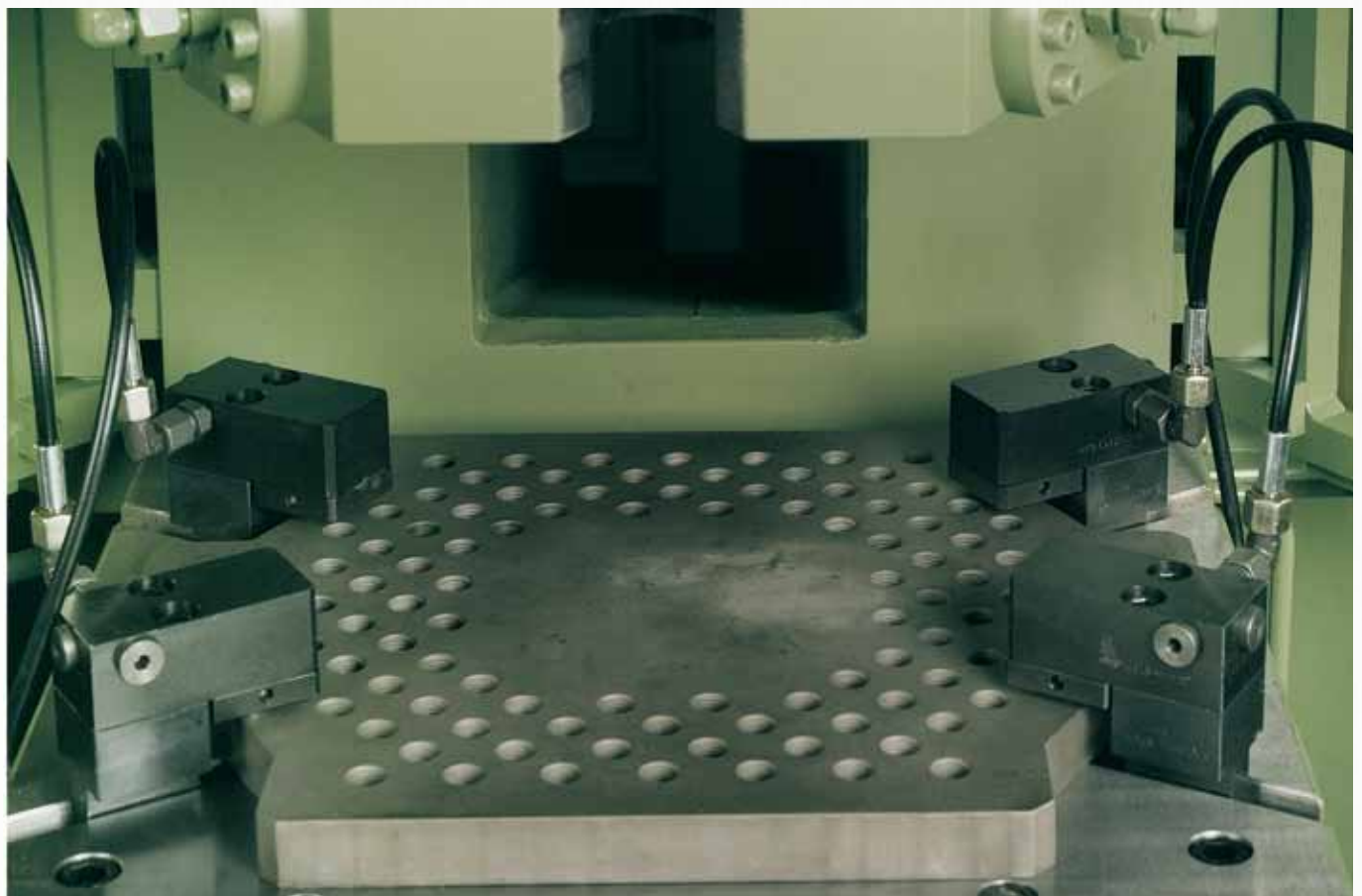
19. Maximum weight of part

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.



Subject to technical alterations.

No. 6946

Wedge clamp

double-acting
max. operating pressure 350 bar (400 bar*)



Order no.	Article no.	Clamping force [kN]	max. operating force [kN]	with positioning monitoring	without position monitoring	Weight [Kg]
325134	6946-25-L	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.

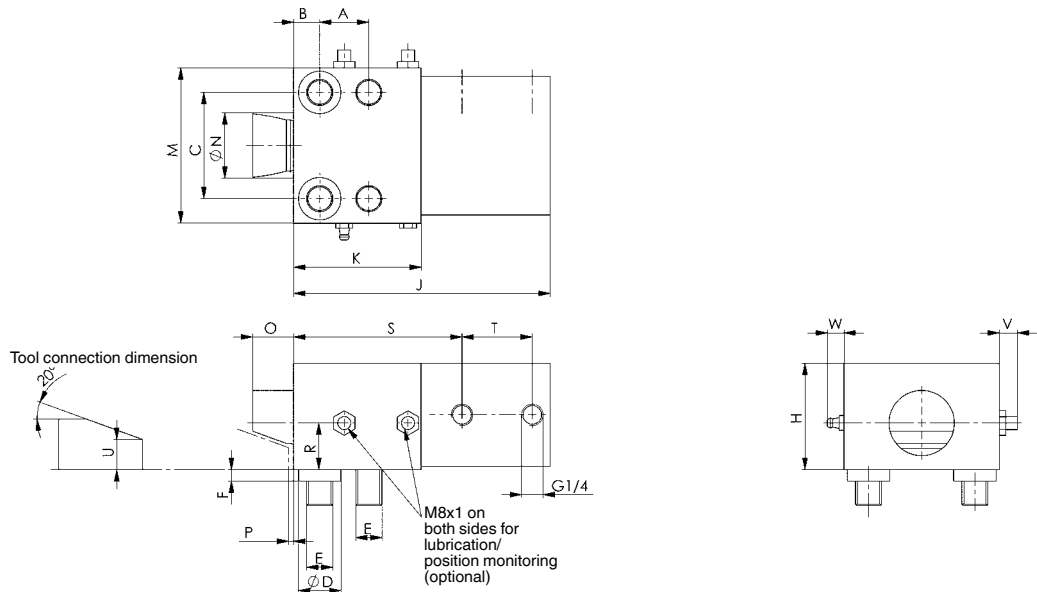
Application:

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-L	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.

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:

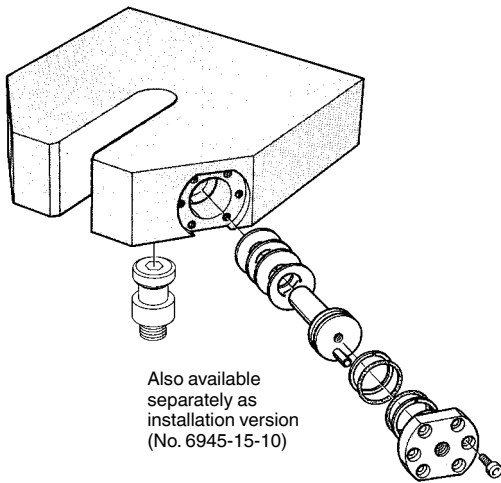
Clamping stud No. 6945-02-04-***, which is screwed into the tool, is gripped hydraulically when it has entered the opening in the clamping-pin chuck.

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:

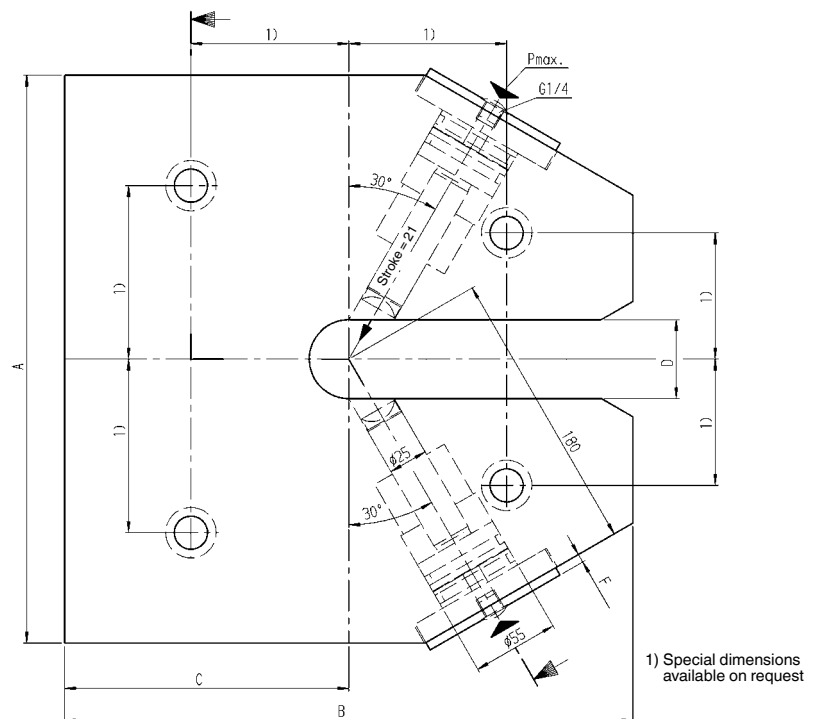
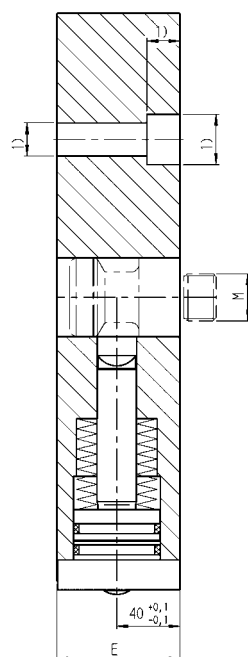
Special versions available on request.



Also available separately as installation version (No. 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



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:

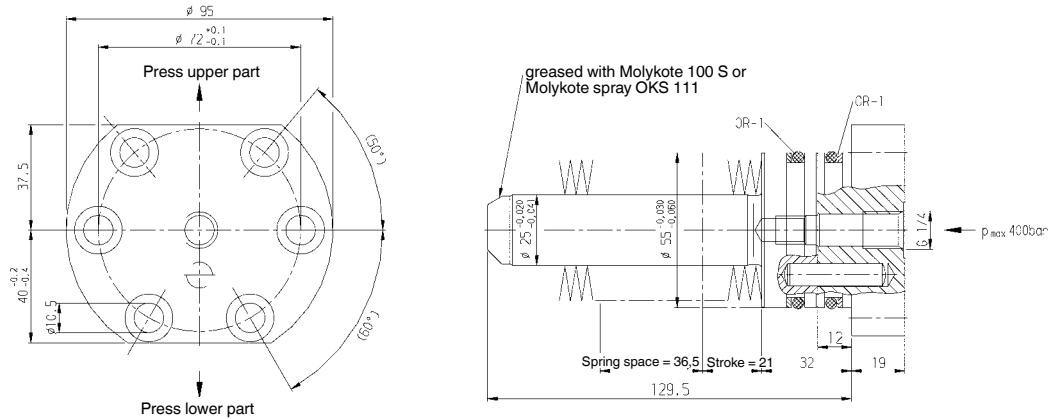
Hydraulic piston from hot workable steel, tempered and ground. Cover from hardened steel. Complete with disc springs, O-rings, support rings, dowel pin and fastening screws ISO 4762 resistance 8.8.

Application:

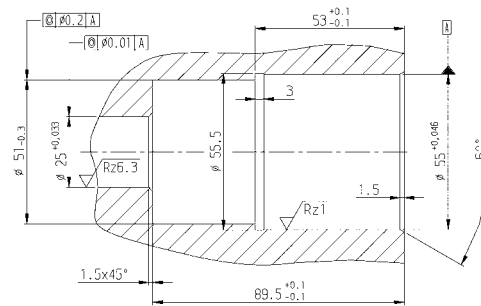
This clamping piston can be retrofitted to your original ram plate.

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:

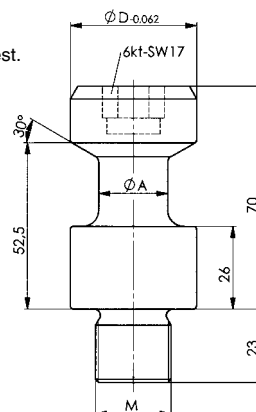
Tempering steel, tempered, inductively hardened clamping area.

Note:

Clamping stud does not conform to DIN, suitable only for use with our hydraulic stud clamping.

On request:

Special sizes available on request.



Subject to technical alterations.

CAD



DEMONSTRATION AND CONSULTING:

You have clamping challenge? We should like to show you - without any obligation - how the hydraulic products from our extensive range can be applied to provide a solution for your application challenge.

TRAINING:

In our own training and show rooms, qualified application engineers will demonstrate the diversity, benefits and special features of the AMF clamping hydraulics.

INSTRUCTION AND SUPPORT:

During the planning phase, but also before and after your purchase, our application engineers will support you with detailed instructions.

OUR OBJECTIVE = YOUR BENEFIT:

Significant reduction in your tooling and auxiliary processing times. Significant cost savings thanks to sound, expert advice, presentations and information.



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These conditions of sale apply to business conducted with companies, legal entities in the public sector, and legal entities with special budget in the public sector. Our deliveries and services are carried out exclusively on the basis of the conditions stated below. Deviating purchasing conditions of the buyer will not become part of the contract, not even through acceptance of the order, unless we have expressly accepted them.

1. Offer and entering into a contract

The basis of our delivery contracts is the latest edition of our catalogue. Orders are not considered as accepted until they have been confirmed by us in writing. When goods are supplied from stock and, for organisational reasons, you receive no separate confirmation, the invoice has the additional function of confirming the order. Details of dimensions and weights, and illustrations, drawings and data are not binding and may be changed by us at any time. Deviations cannot be excluded.

2. Prices

Prices are quoted in EUR ex-works excluding turnover tax, packing, freight, carriage, and insurance. Unless otherwise agreed, our list prices on the day of delivery apply. In order to cover our costs, orders under EUR 50.– net value are subject to a small order surcharge of EUR 10.–.

3. Delivery

Delivery delays are quoted to the best of our knowledge but without guarantee. Agreed delivery delays begin on the day we accept the order and refer to the completion of the goods in our works.

4. Transfer of risk

Risks are transferred to you when the goods are passed to a specific person, company, or organisation that is charged with the execution of carriage of the goods. This applies also to partial deliveries and when we have accepted the costs of carriage, delivery or erection. The risks are also transferred to you when you have defaulted on acceptance.

5. Dispatch

Goods are supplied ex-works. Dispatch is at your cost and risk. Scheduled, FOB, and CIF deliveries are also at your risk. In the absence of specific instructions concerning dispatch, we will arrange same as we think fit, but without accepting any responsibility for choosing the cheapest or most suitable method of dispatch. We make a handling charge of EUR 5.– if goods are sent at your request to a third party. You accept that your order can be supplied in partial deliveries insofar as this is reasonable.

6. Reservation of proprietary rights

Goods delivered remain our property until payment of all claims has been received in full or until redemption of cheques given in payment. The cancellation of individual positions in an open invoice and the drawing of a balance and its acceptance do not affect proprietary rights. You have the right to dispose of the goods as a normal commercial transaction, but you are forbidden to pawn, mortgage, or transfer ownership of them in settlement of a debt or debts. You surrender to us herewith your right to payment for goods for which we reserve our proprietary rights. You have the right to collect these payments as long as you meet your obligations to us. If we request it, you are obliged to name the third party and we have the right to publish this information and the transfer of rights.

7. Cancellation rights due to late payment or insolvency

If you do not pay for the goods by the time payment is due, and if you have not paid after expiry of a reasonable time limit set by us, we have the right to withdraw from the contract and demand the return of goods already supplied. Rights under § 323 BGB (BGB = German civil law code) remain otherwise unaffected. Application for the opening of insolvency proceedings gives us the right to withdraw from the contract and demand the immediate return of goods supplied before the bankruptcy court orders protective measures.

8. Packaging

Packages comply with the German packaging regulations (WO). Disposable packaging is charged at cost. The packaging is not returnable.

9. Tooling costs

In the absence of any agreement to the contrary, tooling made for the execution of an order remains our property in all cases. This applies even if we have made a charge for a proportion of the tooling costs.

10. Payment

Our invoices are payable net within 30 days of the date of the invoice, or with 2% discount if paid within 10 days. Invoices below EUR 50.– are payable immediately without discount. Our credit notes and your charges on us reduce the amount subject to discount.

Late payment entitles us to interest at the rate the bank charges us for a current account overdraft but at least 8 percent above the current base rate of the European Central Bank. If payment is overdue, we are entitled, after giving you notice in writing, to cease fulfilling our obligations under the contract until payment is received.

11. Offsetting exclusion

You can only offset payments with legally-established or unopposed counter claims.

12. Guarantee

If you come to an agreement with us on properties of the goods, we include this agreement in our technical specifications. If we have to supply to your drawings, specifications, samples, etc., you accept the risk associated with suitability for the intended purpose. The point in time at which risk is transferred is decisive for the contractual condition of the goods. The deterioration of parts subject to wear in the course of normal use does not constitute a defect. If the goods supplied are defective, we will – at our choice and within a reasonable time limit set by you – supply a replacement or repair the goods. If such repair or replacement is not satisfactory, you have the right to reduce the price or withdraw from the contract. Any further guarantee claims are excluded. Recognisable defects must be notified at the latest within 10 days of receipt and defects that are not recognisable must be notified as soon as they are discovered. The guarantee period is 24 months and starts with dispatch of the goods from our works.

13. Hindered or impossible performance

If we are prevented from meeting our obligation by some unforeseeable event (e.g. disruption of our plant, or delay in the delivery of important raw materials), which, in spite of taking all reasonable care appropriate to the circumstances of the case, we have been unable to avert, and it has become impossible to execute the delivery or service punctually, the delivery delay will be extended to an appropriate extent.

14. Liability

Except in the case of injury to life or limb, or damage to health caused by our breach of duty, we are only liable in the event of intent or culpable negligence on our part.

15. Customer specials

Orders for customer specials must be in writing and include binding details of execution, quantities etc. For technical reasons we reserve the right to supply 10% more or less than the quantity specified. If technical changes or cancellation are required, the costs incurred will be charged to the customer.

16. Deliveries of samples and return of goods

Samples will be charged. When goods have been sent for testing or as samples, we will credit you with the additional price against subsequent orders, as long as the net contract value is at least EUR 125.–. The return of goods is only possible with prior agreement. Customer specials may not be returned. For goods returned for reasons outside our responsibility (e.g. wrongly ordered), we charge 10% of the value of the goods but at least EUR 7.50, to cover administration costs.

17. Place of fulfilment, court of jurisdiction

The place of fulfilment for all obligations arising from this contract is D-70707 Fellbach. The court of jurisdiction for any legal dispute arising from this contract is D-71332 Waiblingen. (All disputes that arise from this contract or about its validity will be decided by a court of arbitration according to the Arbitration Rules of the German Committee for Arbitration Courts/Settlement and Arbitration Procedure of the International Chamber of Commerce. Such decisions will be final and normal legal procedures are excluded.) German law applies (BGB and HGB = civil and commercial codes). The application of UN purchasing law (CISG) is excluded.

18. Validity clause

If individual conditions should be found to be not legally valid, the remaining conditions continue to apply. The invalid conditions will be replaced by conditions which fulfil as closely as possible the commercial intent of the contract with reasonable consideration of the interests of both parties. With the publication of these Conditions for Sales, Deliveries and Payment, all previous versions become invalid. This does not apply to contracts agreed before publication.

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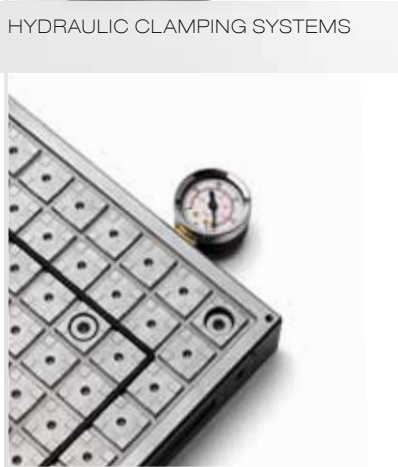
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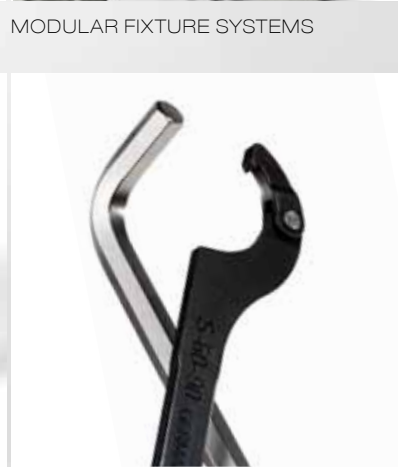
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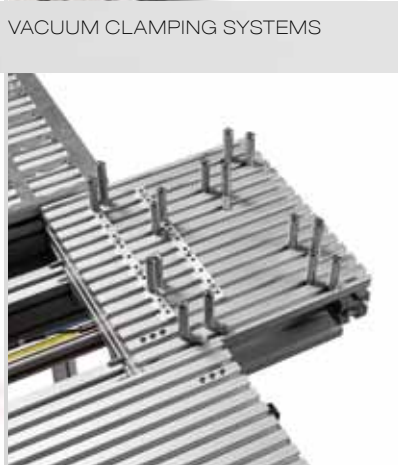
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