

INNOVATIONS 2013

MORE THAN 100 INNOVATIONS IN THE FIELDS OF:

- CASSETTE BUFFER MAGAZINES
- „ZERO-POINT“ CLAMPING SYSTEMS
- HYDRAULIC CLAMPING SYSTEM
- GRIPPERS
- AND MUCH MORE ...



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** AMF-Writer and AMF-Cleaner for automated labelling and cleaning via the tool spindle



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.

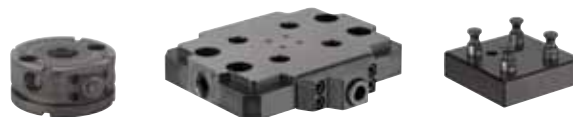
CASSETTE BUFFER MAGAZINE AND GRIPPER

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MECHANICAL ZERO-POINT CLAMPING SYSTEM

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MODULAR HEIGHT ADAPTER

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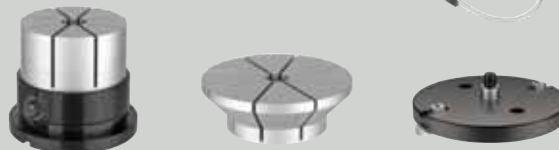
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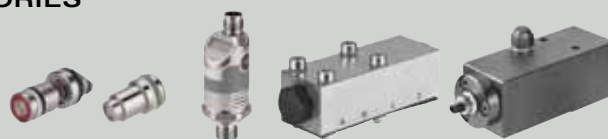
SWING, VERTICAL, CENTRING AND LOW PRESSURE LINK CLAMP

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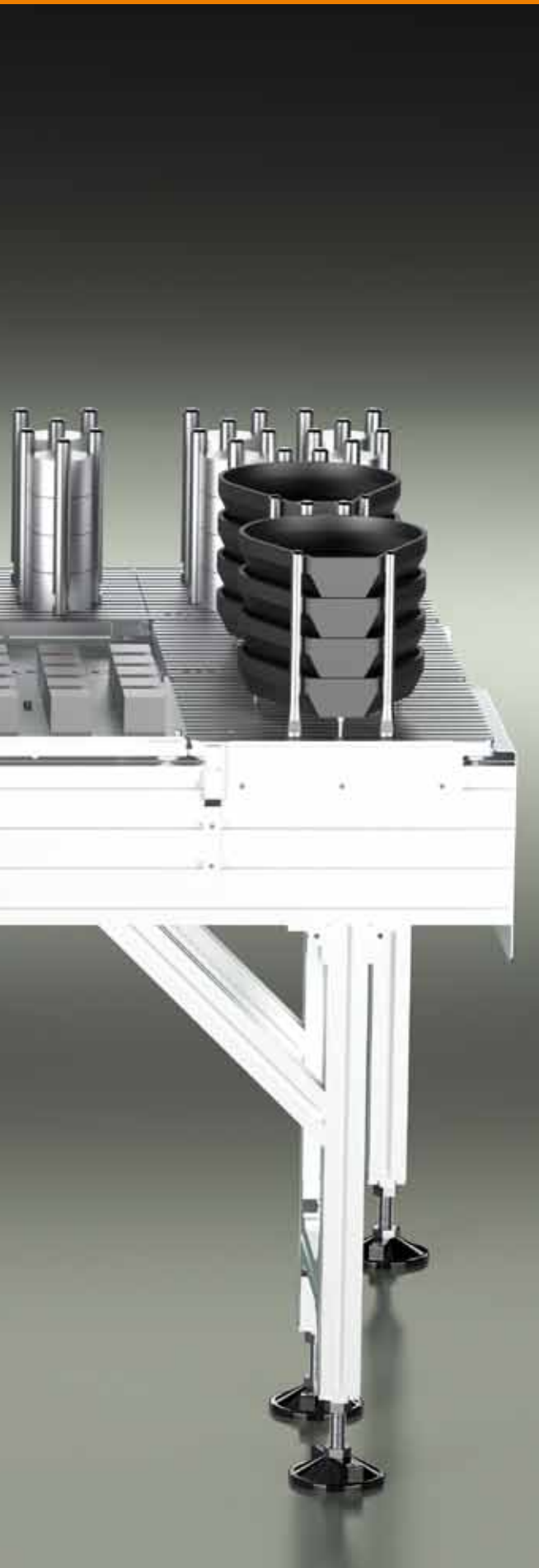


AMF-WRITER „SLIMLINE“

95







LOW-COST AUTOMATION FOR MACHINE TOOLS - CASSETTE BUFFER MAGAZINE AND GRIPPER FROM AMF

A perfect team. With the cassette buffer magazines and grippers from AMF, your machine tool will run by itself. Regardless of how many different workpieces, once it is set up, the tool works around the clock.

Here we offer you an efficient alternative to expensive robots or automation cells. Existing shift models can be supplemented simply and flexibly by one or more worker-free shifts. This dramatically increases your machine run time and makes your entire production more economical.

THE ADVANTAGES AT A GLANCE:

- > Economical and flexible automation solution
- > Production of different workpieces in one loading
- > Simple control by means of M-commands
- > Cassette buffer magazine serves as storage and/or transport unit
- > Combined application of various gripper types

Talk to us about it!



No. 1700KSS

Cassette buffer magazine

Workpiece storage system
for supply and feed of workpieces.

Order no.	Cassette size [mm]	No. of cassettes	Load bearing capacity per cassette [N]	Drive, pneumatic [bar]	Buffer speed [mm/s]	Control via M-commands max.	Weight [Kg]
529933	375 x 375	7	500	5	50 - 300	5	300
522375	500 x 500	7	500	5	50 - 300	5	350

Application:

Cassette buffer magazines are used to supply and feed unmachined parts and workpieces into the machine tool. These modular magazines are often positioned next to the machine.

They can, however, be integrated directly into machine tools.

They are especially suitable for flexibly interlinking machines.

By virtue of their attributes, the cassette buffer magazines are designed specifically for self-service by CNC machines, which depend on workpiece interchange within the movement range of the spindle. These magazines are suitable for both gantry machine centres, for cross-table machines and for machines with tables that execute entire movements in the X-axis.

These magazines are the ideal solution for shafts and cubic components, as well as for cast or moulded components.

Pallets or fixtures can also be stored. The permitted dimension of the components depends on the cassette size, which is largely freely selectable.

Features:

The cassette buffer magazine can be adapted to most space situations, since it can undergo practically any change of direction.

The magazine is populated with cassettes in such a way that one cassette pocket is free at all times. To introduce the components into the grip range of the machine tool, the cassette moves temporarily into the operating range of the spindle.

The protected cassette guide runs so smoothly that the magazine needs to be screened only at the transition point to the machine tool.

The result is an affordable solution which also allows access to the workpieces at all times.

The speed of the movements is preselectable.

The pneumatically-driven cassette buffer magazine is actuated by the machine control via 3 to 5 M commands.

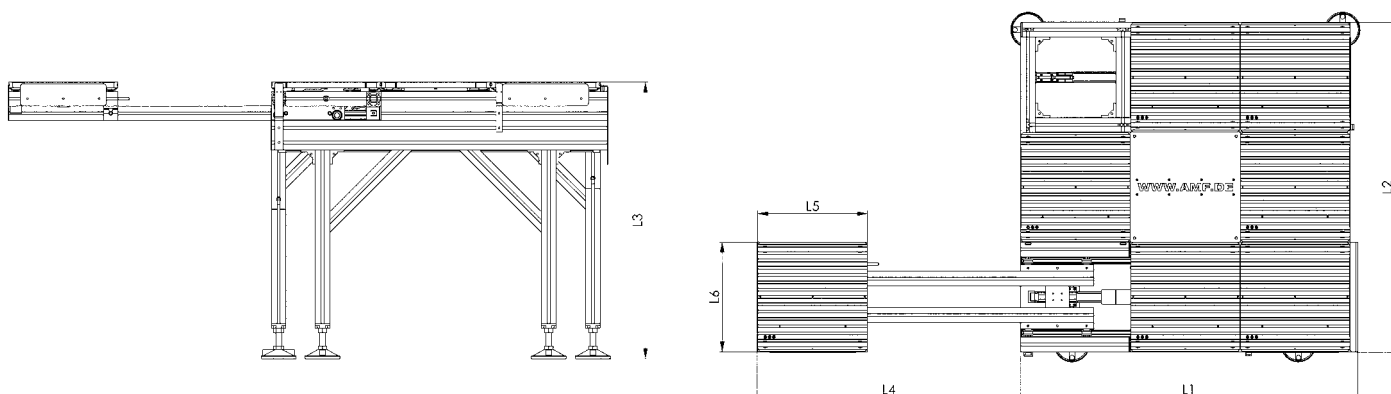
The components can be positioned on the cassette in a flat or a stacked arrangement. Masks or stack and stop elements are ideal for fastening.

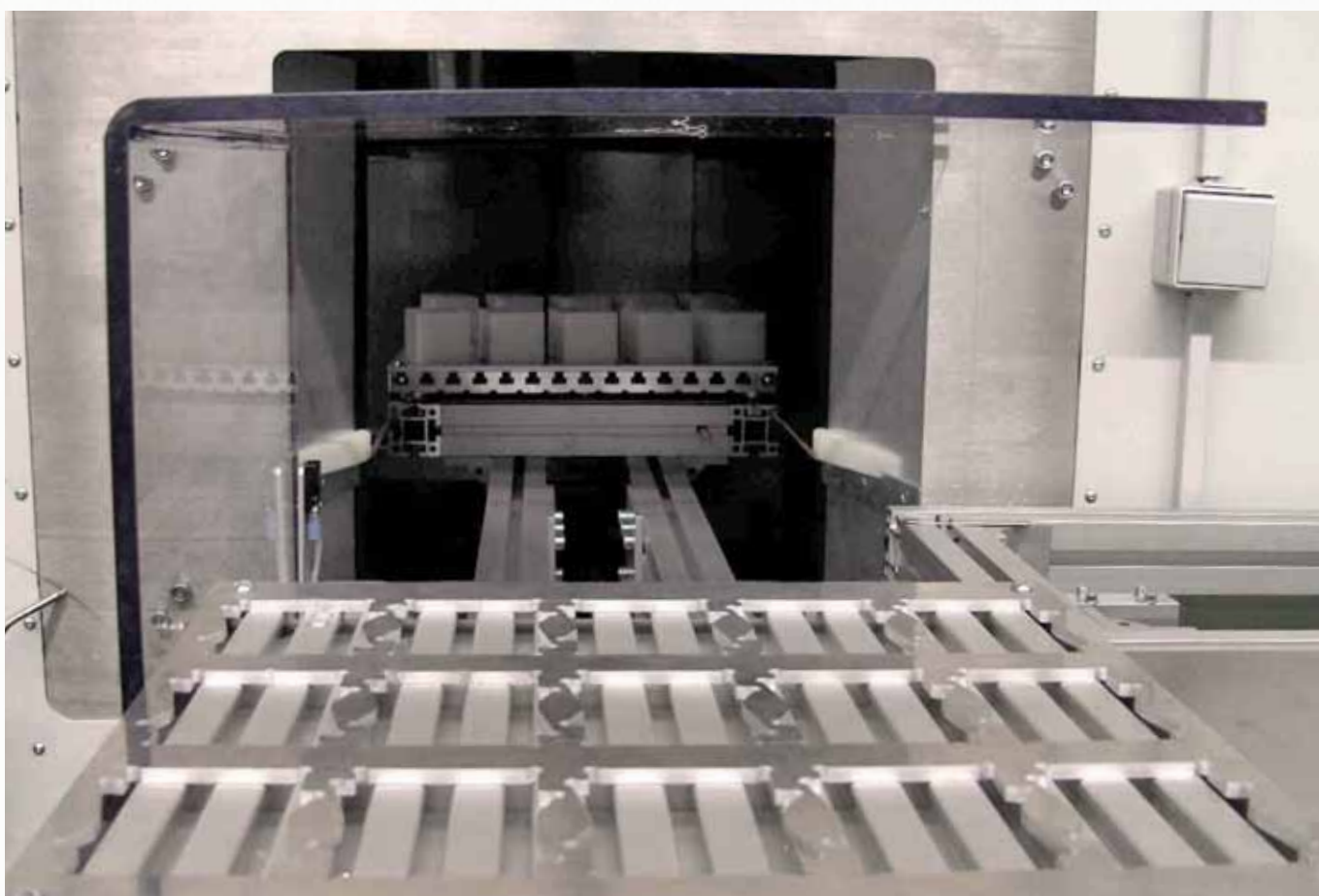
Advantage:

- Very high component stocking density
- Quick and simple component access
- Simple actuation via M-commands
- Highly-flexible in terms of shape and dimensions
- Suitable as a magazine and/or transport unit

Dimensions:

Order no.	Cassette loading height [mm]	Height adjustability [mm]	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	L5 [mm]	L6 [mm]
529933	300	100	1154	1128	900 - 1000	900	375	375
522375	300	100	1529	1503	900 - 1000	1275	500	500





No. 1610WG

Weldon gripper

Gripper for parts handling, suitable for tool machines with internal coolant supply (ICS)



Order no.	Tool fixture	Stroke H [mm]	Gripping force [N]	Max. workpiece weight [Kg]	Weight [g]
538066	SK40	23	-1600	60	3100
538082	SK50	23	-1600	60	3100
538108	HSK50	23	-1600	60	3200
538124	HSK63	23	-1600	60	3200

Application:

The Weldon gripper is used for inserting tools from one magazine or similar into a clamping device in a machine tool. The gripper is unloaded from the tool magazine and loaded into the machine spindle for this purpose.

Standard actuation is via compressed air. The actuation medium is routed through the machine spindle.

The medium flow can be used to close or open the gripper. The return movements occur under spring force.

Features:

Positioning compensation:

For the exact positioning of components, e.g. against stops, the handling tool is provided with resettable compensating elements. This solution, integrated into the tool, considerably eases the handling of unmachined parts or semi-finished products and relieves the machine spindle.

Overload protection:

To protect against costly repairs, the tool has safety devices which prevent spindle damage and expensive tool repairs in case of collision. The tool itself is provided with overload protection, which also permits an adjustable limitation of the gripping force.

Advantage:

- Affordable automation solution
- Suitable for the handling of diverse workpieces
- High gripping force
- Compensating function in X,Y, Z and C
- Overload protection against tool and machine spindle damage

Note:

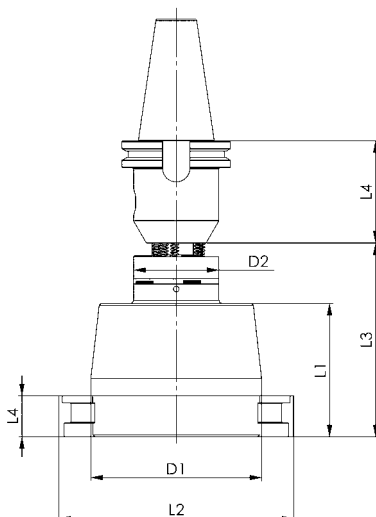
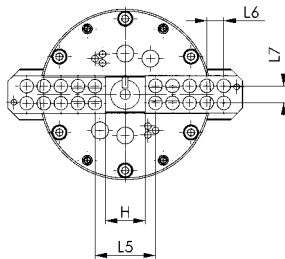
The length of the tool holder (dimension L4) can vary depending on version and manufacturer.

Grip inserts:

Not supplied as standard and must be ordered separately.

On request:

- Weldon grippers are available as both external and internal grippers.
- It is possible to integrate a gripper status check.
- Other sizes and versions are available.
- Version with cooling lubricant (CL) for opening and closing.



Dimensions:

Order no.	D1 [mm]	D2 [mm]	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	L5 [mm]	L6 [mm]	L7 [mm]
538066	100	50	78	80-220	113,5	60	35	10	10
538082	100	50	78	80-220	113,5	60	35	10	10
538108	100	50	78	80-220	113,5	80	35	10	10
538124	100	50	78	80-220	113,5	80	35	10	10

No. 1600

Gripper inserts for gripper - prism

Delivered in pairs.

Hardened steel with wear-resistant surface.

First side with horizontal and vertical prism, second side ribbed.



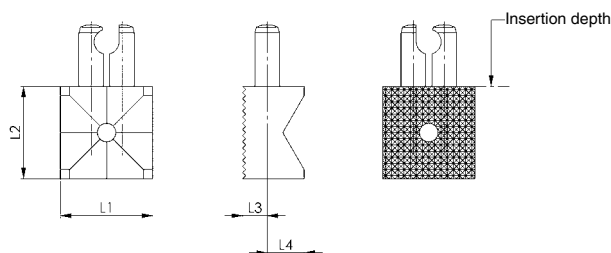
Order no.	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	Weight [g]
538140	30	30	8	12	200

Application:

For quick and safe part handling in the tool machine using the AMF Weldon gripper. The parts are mounted to the gripper carrier and mechanically secured.

Note:

The grip inserts are suitable for all AMF Weldon grippers. They can be adapted to the workpiece size concerned by displacement on the gripper carrier.



No. 1600

Gripper inserts for gripper - universal

Delivered in pairs.

Hardened steel with wear-resistant surface.

First side with four contact surface with ribbed surface, second side with four contact surfaces from soft plastic.



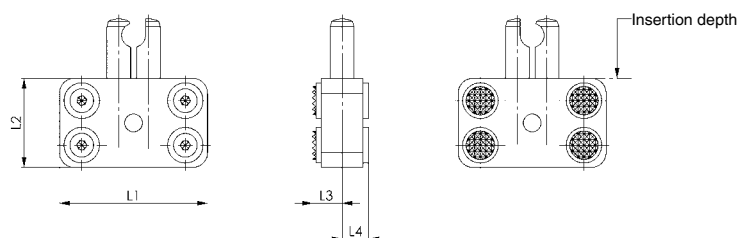
Order no.	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	Weight [g]
538181	50	30	10	9	220

Application:

For quick and safe part handling in the tool machine using the AMF Weldon gripper. The parts are mounted to the gripper carrier and mechanically secured.

Note:

The grip inserts are suitable for all AMF Weldon grippers. They can be adapted to the workpiece size concerned by displacement on the gripper carrier.



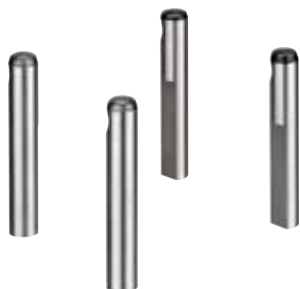
No. 1600

Gripper inserts for gripper - finger

Delivered in pairs.

Hardened steel with wear-resistant surface.

Hardened pin with flat clamping surface on one side.



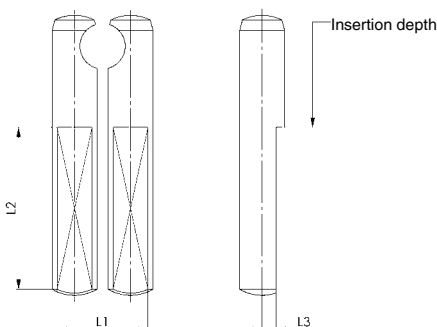
Order no.	L1 [mm]	L2 [mm]	L3 [mm]	Weight [g]
538165	16	29	2,5	70

Application:

For quick and safe part handling in the tool machine using the AMF Weldon gripper. The parts are mounted to the gripper carrier and mechanically secured.

Note:

The grip inserts are suitable for all AMF Weldon grippers. They can be adapted to the workpiece size concerned by displacement on the gripper carrier.



No. 6208M

Clamping module, mechanical

Mechanical opening and closing.
Quenched and tempered steel, plasma-nitrated.
Repeat accuracy 0.01 mm.



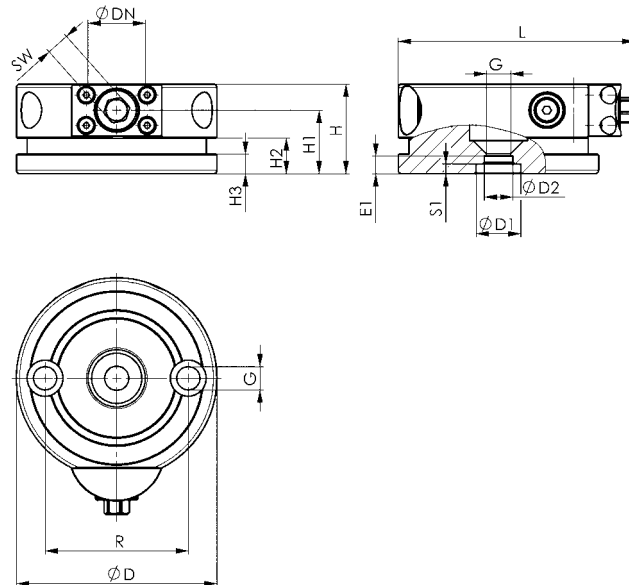
Order no.	Size	Pull-in/locking force up to [kN]	Holding force [kN]	Tightening torque [Nm]	Weight [g]
535617	K20	10	55	30	3330

Application:

Mechanical zero point clamping system for time-optimised clamping during cutting and non-cutting machining. Especially suitable for the modular design of clamping solutions via zero point clamping system.

Note:

The mechanical assembly clamping module has high retention, insertion and closing forces. The clamping module can be positioned on the machine table and fastened via mechanical clamping elements at the circumferential clamping edge. The positioning bore for marking sleeves and a through bore for fastening via M12 countersunk screw on the grid pallets are provided on the underside. The locating bore for the K20 clamping nipple is also already made in the module.



Dimensions:

Order no.	Size	dia. D	dia. D1 0/+0,01	dia. D2 F7	dia. DN	E1	G	H ± 0.01	H1	H2	H3	L	R	S1	SW
535617	K20	112	25	16	32	10	M12	50	36	20	11	132	80	5,5	13

No. 6208IM

Clamping module, mechanical, with indexing

Mechanical opening and closing.
Quenched and tempered steel, plasma-nitrated.
Repeat accuracy 0.01 mm.



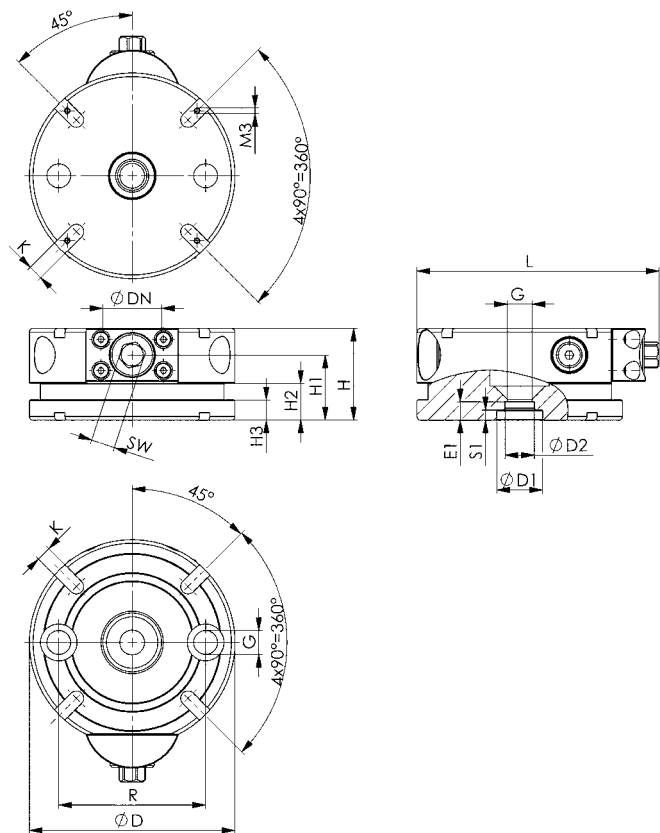
Order no.	Size	Pull-in/locking force up to [kN]	Holding force [kN]	Tightening torque [Nm]	Weight [g]
535633	K20	10	55	30	3295

Application:

Mechanical zero point clamping system with indexing grooves offset by 90° for time-optimised clamping during cutting and non-cutting machining.
Especially suitable for the modular design of clamping solutions via zero point clamping system.

Note:

The mechanical assembly clamping module with indexing grooves offset by 90° has high retention, insertion and closing forces.
The clamping module can be positioned on the machine table and fastened via mechanical clamping elements at the circumferential clamping edge.
The positioning bore for marking sleeves and a through bore for fastening via M12 countersunk screw on the grid pallets are provided on the underside. The locating bore for the K20 clamping nipple is also already made in the module.



Dimensions:

Order no.	Size	dia. D	dia. D1 0/+0,01	dia. D2 F7	dia. DN	E1	G	H ±0.01	H1	H2	H3	L	R	S1	SW
535633	K20	112	25	16	32	10	M12	50	35,5	20	11	132	80	5,5	13

No. 6207S4

4-point clamping station, mechanical

Case-hardened steel, plasma-nitrided.
Repetition accuracy 0.005 mm.
Mechanical opening and closing.

Order no.	Size	Pull-in/locking force up to [kN]	Holding force [kN]	Tightening torque [Nm]	Weight [g]
535658	52	6,5	50	20	3500

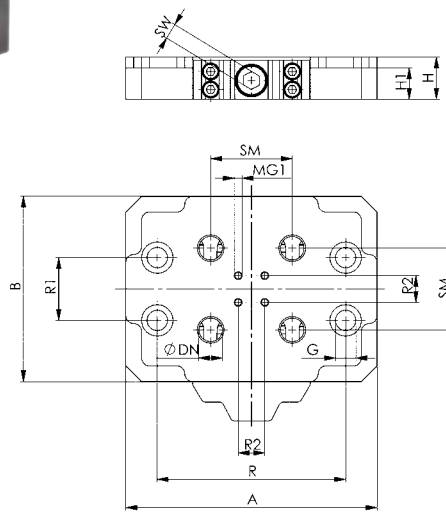
Application:

For quick, simple and time-optimised positioning and clamping of workpieces or fixtures on the machine table. Actuating the clamping screw opens or closes all four clamping points at the same time.

Extremely high retraction and retention forces are achieved thanks to the stable, high-quality design of this clamping station.

Note:

The 4-point clamping station is opened and closed using a WAF 13 hexagon wrench key. It can be fastened to the machine table either by the four M12 fastening bores or via mechanical clamping devices. A diverse range of suitable clamping devices for fastening can be found in our AMF Catalogue „Mechanical clamping elements“.



Dimensions:

Order no.	A	B	dia. DN	G	G1	H ±0.01	H1	R	R1	R2	SM	SW
535658	160	118	15	M12	M5	27	20	120	40	17	52	13



Subject to technical alterations.

No. 6207P4-52

Interchangeable pallet

Steel, burnished.
Complete with 4 clamping nipples.
Repeat accuracy 0.005 mm.



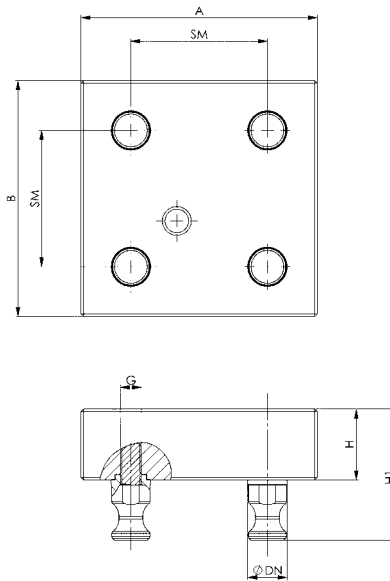
Order no.	Size	A	B	dia. DN	G	H	H1	SM	Weight [g]
535674	52	90	90	15	M8	27	50	52	1793

Application:

Workpieces or fixtures are mounted on the interchangeable plate and then positioned and clamped on the mechanical 4-point clamping station with order no. 535658. The interchangeable plate is populated during machining, thus permitting longer machine operation.

Note:

On request, we can incorporate mounting holes according to your specifications in the change pallet. The 4 clamping nipples are supplied as standard.



No. 6207ZN-15

Clamping nipple

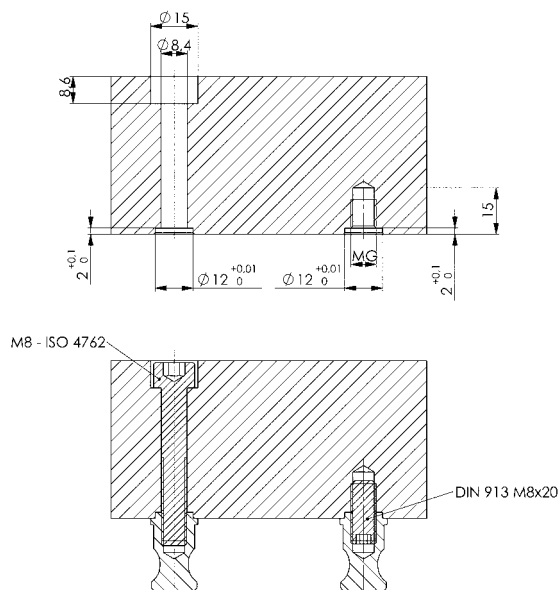
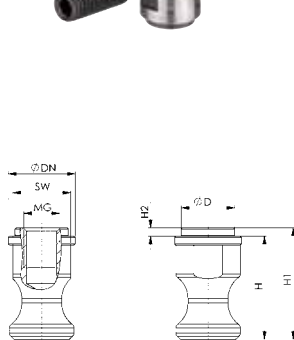
Tempered steel, burnished.



Order no.	Size	dia. D	dia. DN	G	H	H1	H2	SW	Weight [g]
535690	52	12	15	M8	23	25	2	13	21

Application:

Clamping nipples suitable for mechanical 4-point clamping station with order no. 535658. 4 clamping nipples are required for clamping on the 4-point clamping station. These nipples can, for example, be screwed into fixtures or into the workpieces themselves.



SIMPLY CLEVER COMBINATIONS - MODULAR HEIGHT ADAPTER FOR YOUR FLEXIBLE PRODUCTION

With the new modular height adapters from AMF, your production becomes even more flexible and economical.

Cleverly combined, you now have an efficient opportunity to adapt your production process more simply, flexibly and quickly to constantly changing requirements.

ASSEMBLY ELEMENT

INTERMEDIATE ELEMENTS

FOOT ELEMENTS

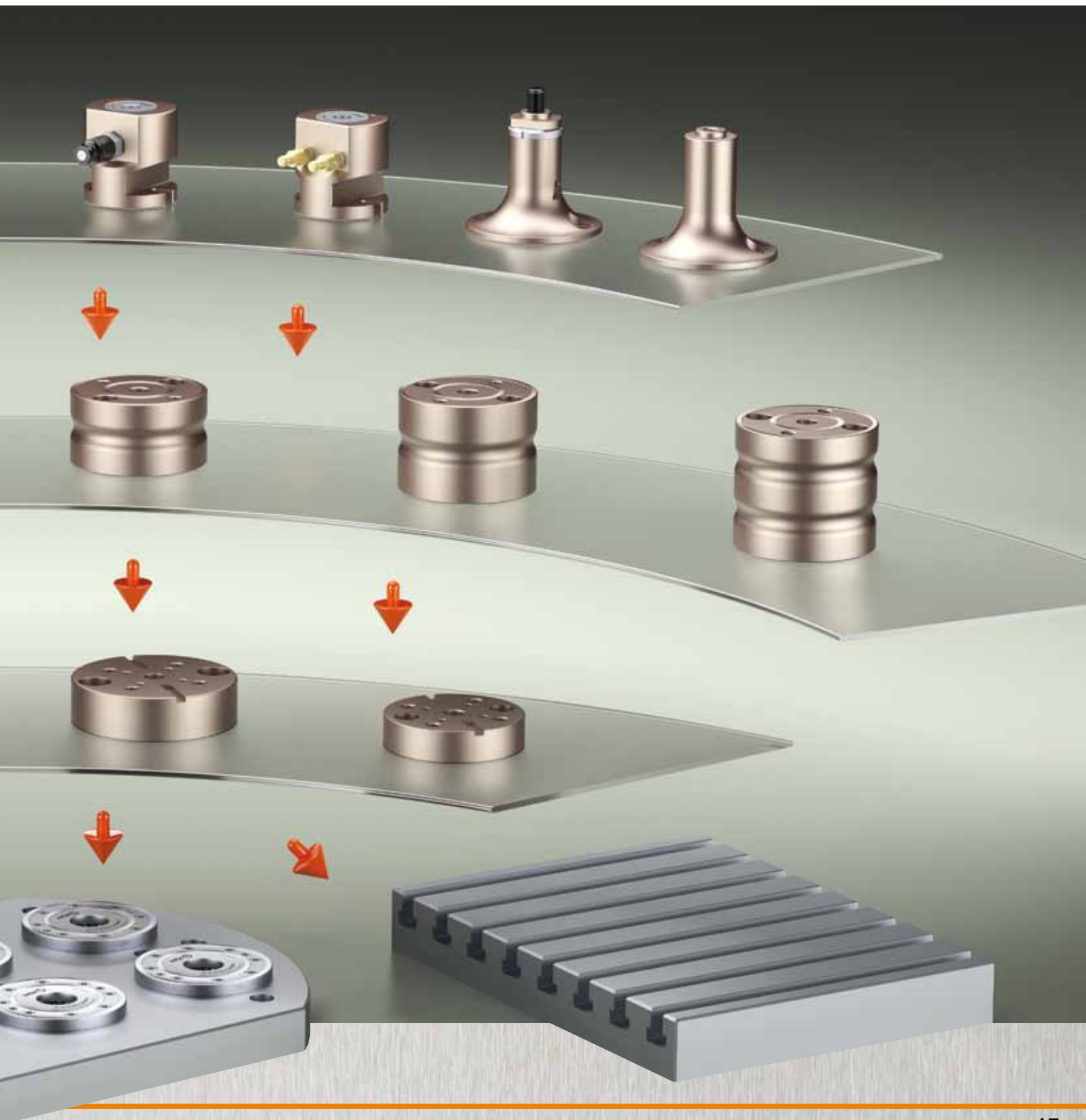
BASE ELEMENTS

The modular height adapters consist of three levels. The foot elements form the interface to the existing machine table. Building on this and with the use of intermediate elements, every clamping height can be achieved and, by combining different sizes, adapted flexibly to the contour of the workpiece.

Assembly elements with integrated zero point clamping modules of the AMF Zero Point system complete the adapters. Through this, the workpiece is clamped in a process-reliable way.

THE ADVANTAGES:

- > Simple direct clamping of the workpiece
- > Convenient 5-sided processing
- > Flexibly adaptable to every workpiece size and thickness
- > Freely selectable standard dimension



No. 6210Z

Intermediate element

Quenched and tempered steel, plasma-nitrated.



Order no.	Size	H ±0.01	Weight [g]
534487	K10	20	667
534503	K10	30	1012
534529	K10	40	1353
534545	K10	50	1698
534560	K10	60	2043
534586	K10	80	2731
534602	K10	100	3443
534628	K20	20	1394
534644	K20	30	2092
534669	K20	40	2800
534685	K20	50	3508
534701	K20	60	4225
534727	K20	80	5661
534743	K20	100	7012

Application:

The intermediate elements are used as height adapters for workpieces and clamping fixtures, and are mounted to the main elements. Workpieces are clamped by means of assembly elements. This clamping system can be used to move workpieces to the required machining height in the machine for 5-sided machining, or for the safe and quick clamping of workpieces with ledges and different clamping heights on the machine table.

Advantage:

Simple, quick and flexible clamping of complex workpiece contours on the machine table. Especially suitable for levelling workpieces or clamping fixtures at the necessary machine heights in the machine tool and for the reliable clamping of same.

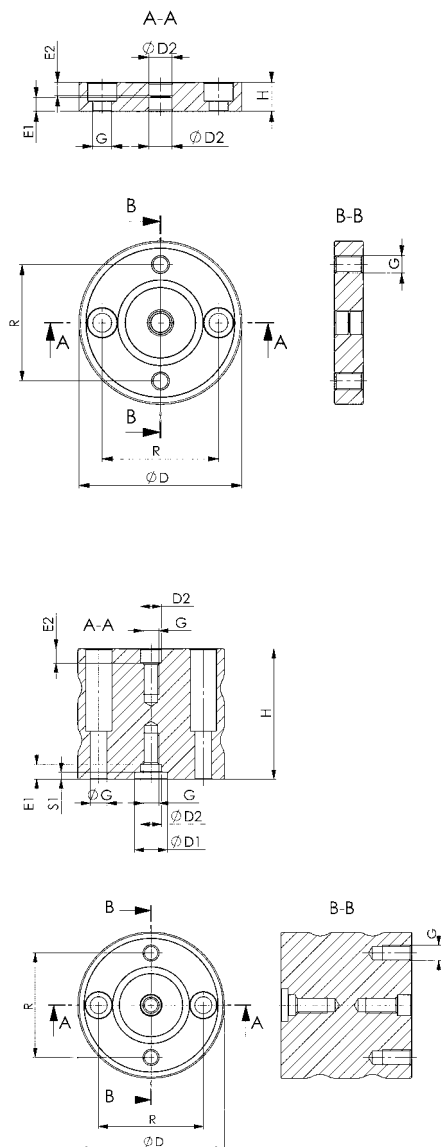
Note:

With the exception of overall heights H20 and 30, the locating bore for the clamping nipple, corresponding to size K10 and K20 is already made for the modification to zero point clamping modules.

If two or more intermediate elements are used, they can be axially aligned and then bolted using centering sleeves. The 2 screws are supplied as standard.

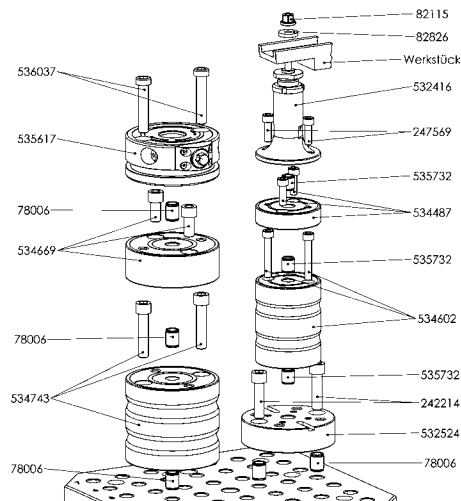
Order numbers for the centering sleeves:

- Size K10: Order no. 535732
- Size K20: Order no. 78006



Dimensions:

Order no.	Size	dia. D	dia. D1 H7	dia. D2	Screw DIN84 or ISO4762	E1	E2	G	K F6	R	S1
534487	K10	78	-	15	M8x30	5,0	13,0	M8	-	50	-
534503	K10	78	15	15	M8x30	5,0	13,0	M8	-	50	-
534529	K10	78	15	15	M8x30	5,0	13,0	M8	-	50	3,5
534545	K10	78	15	15	M8x50	5,0	13,0	M8	-	50	3,5
534560	K10	78	15	15	M8x50	5,0	13,0	M8	-	50	3,5
534586	K10	78	15	15	M8x50	5,0	13,0	M8	-	50	3,5
534602	K10	78	15	15	M8x50	5,0	13,0	M8	-	50	3,5
534628	K20	112	-	16	M12x25	9,5	9,25	M12	-	80	-
534644	K20	112	-	16	M12x25	11,5	11,25	M12	-	80	-
534669	K20	112	25	16	M12x25	11,5	11,25	M12	-	80	5,5
534685	K20	112	25	16	M12x55	11,5	11,25	M12	-	80	5,5
534701	K20	112	25	16	M12x55	11,5	11,25	M12	-	80	5,5
534727	K20	112	25	16	M12x55	11,5	11,25	M12	-	80	5,5
534743	K20	112	25	16	M12x55	11,5	11,25	M12	-	80	5,5



Subject to technical alterations.

No. 6210IZ

Intermediate element, with indexing

Quenched and tempered steel, plasma-nitrated.



Order no.	Size	H ±0.01	Weight [g]
531996	K10	20	632
532010	K10	30	987
532036	K10	40	1327
532051	K10	50	1651
532077	K10	60	2001
532093	K10	80	2713
532119	K10	100	3429
532135	K20	20	1361
532150	K20	30	2087
532176	K20	40	2788
532192	K20	50	3439
532218	K20	60	4165
532234	K20	80	5632
532242	K20	100	6980

Application:

The intermediate elements with indexing are used as height adapters for workpieces and clamping fixtures, and are mounted to the main elements. Workpieces are clamped by means of assembly elements.

This clamping system can be used to move workpieces to the required machining height in the machine for 5-sided machining, or for the safe and quick clamping of workpieces with ledges and different clamping heights on the machine table.

Thanks to the 4-point 90° indexing option, workpieces under strong machining forces can be secured to prevent radial distortion.

Advantage:

Simple, quick and flexible clamping of complex workpiece contours on the machine table. Especially suitable for levelling workpieces or clamping fixtures at the necessary machine heights in the machine tool and for the reliable clamping of same.

Note:

With the exception of overall heights H20 and 30, the locating bore for the clamping nipple, corresponding to size K10 and K20 is already made for the modification to zero point clamping modules.

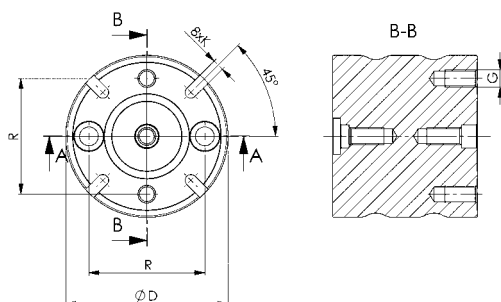
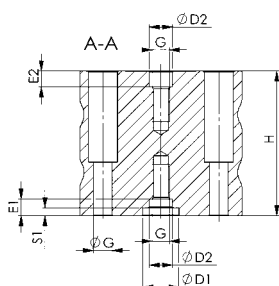
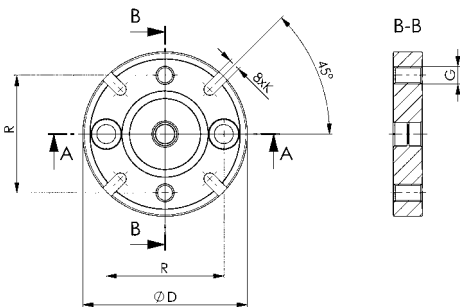
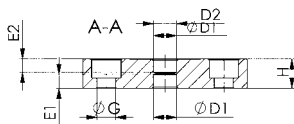
If two or more intermediate elements are used, they can be axially aligned and then bolted using centering sleeves. The 2 screws are supplied as standard.

Order numbers for the centering sleeves:

- Size K10: Order no. 535732

- Size K20: Order no. 78006

Slot nuts: Order no. 430264.



Dimensions:

Order no.	Size	dia. D	dia. D1 H7	dia. D2	Screw DIN84 or ISO4762	E1	E2	G	K F6	R	S1
531996	K10	78	-	15	M8x30	5,0	13,00	M8	8	50	-
532010	K10	78	-	15	M8x30	5,0	13,00	M8	8	50	-
532036	K10	78	-	15	M8x30	5,0	13,00	M8	8	50	3,5
532051	K10	78	-	15	M8x50	5,0	13,00	M8	8	50	3,5
532077	K10	78	-	15	M8x50	5,0	13,00	M8	8	50	3,5
532093	K10	78	-	15	M8x50	5,0	13,00	M8	8	50	3,5
532119	K10	78	-	15	M8x50	5,0	13,00	M8	8	50	3,5
532135	K20	112	-	16	M12x25	9,5	9,25	M12	8	80	-
532150	K20	112	-	16	M12x25	11,5	11,25	M12	8	80	-
532176	K20	112	25	16	M12x25	11,5	11,25	M12	8	80	5,5
532192	K20	112	25	16	M12x55	11,5	11,25	M12	8	80	5,5
532218	K20	112	25	16	M12x55	11,5	11,25	M12	8	80	5,5
532234	K20	112	25	16	M12x55	11,5	11,25	M12	8	80	5,5
532242	K20	112	25	16	M12x55	11,5	11,25	M12	8	80	5,5

Subject to technical alterations.

No. 6210IFR

Base element, with indexing for grid plates



Order no.	Size	H ±0.01	Weight [g]
532424	M12	30	2018
532440	M16	40	3881

Application:

The main element with indexing is positioned on grid plates M12 and M16 via a centering sleeve and then bolted. Intermediate elements or assembly elements can be adapted.

This clamping system can be used to move workpieces to the required machining height in the machine for 5-sided machining, or for the safe and quick clamping of workpieces with ledges and different clamping heights on the machine table.

Advantage:

Simple, quick and flexible clamping of complex workpiece contours on the machine table. Especially suitable for levelling workpieces or clamping fixtures at the necessary machine heights in the machine tool and for the reliable clamping of same.

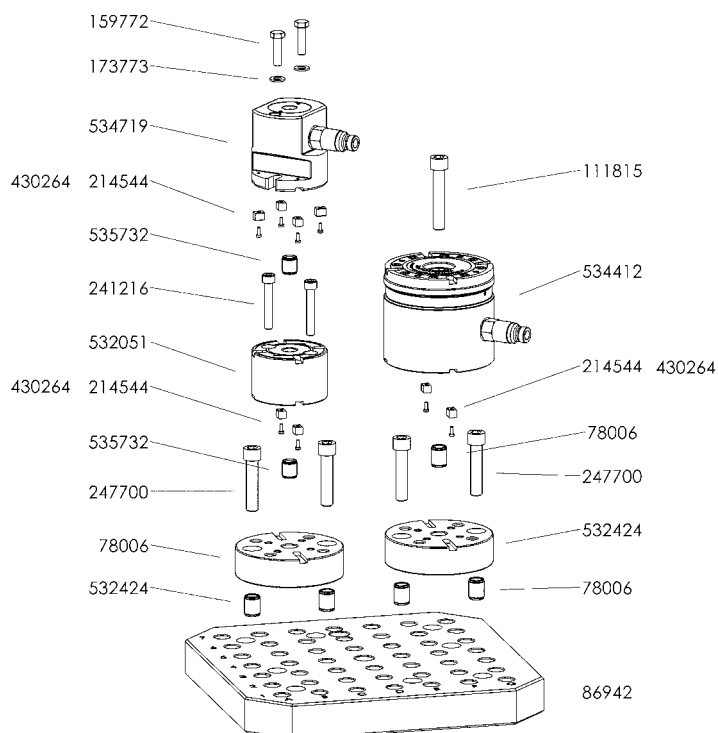
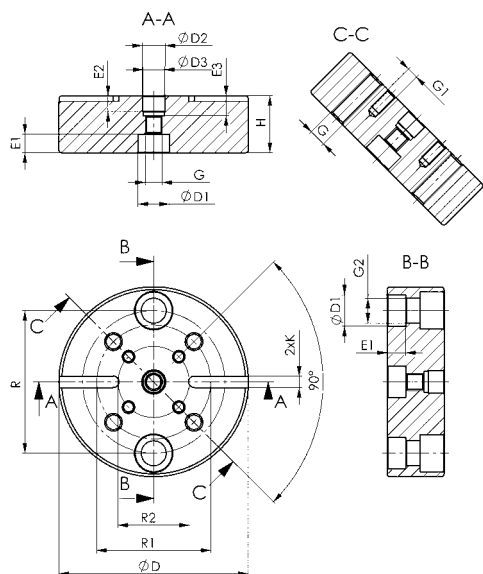
Note:

Order numbers for the centering sleeves:

- Ø15: Order no. 535732
- Ø16: Order no. 78006
- Ø22: Order no. 78238

Dimensions:

Order no.	Size	dia. D	dia. D1 H7	dia. D2	dia. D3	E1	E2	E3	G	G1	G2	K F6	R	R1	S1
532424	M12	112	16	16	15	9	11	14	M12	M8	M12	8	80	80	50
532440	M16	133	22	16	15	13	11	14	M12	M8	M16	8	100	80	50



Subject to technical alterations.

No. 6210FN

Base element for T-grooved plate



Order no.	Size	H ±0.01	Weight [g]
532465	M12	30	3681

Application:

The main element can be freely positioned and fastened on the grooved machine table at the circumferential clamping edge. Intermediate elements or assembly elements can be adapted. This clamping system can be used to move workpieces to the required machining height in the machine for 5-sided machining, or for the safe and quick clamping of workpieces with ledges and different clamping heights on the machine table.

Advantage:

Simple, quick and flexible clamping of complex workpiece contours on the machine table. Especially suitable for levelling workpieces or clamping fixtures at the necessary machine heights in the machine tool and for the reliable clamping of same.

Note:

Order numbers for the centering sleeves:

- Ø15: Order no. 535732

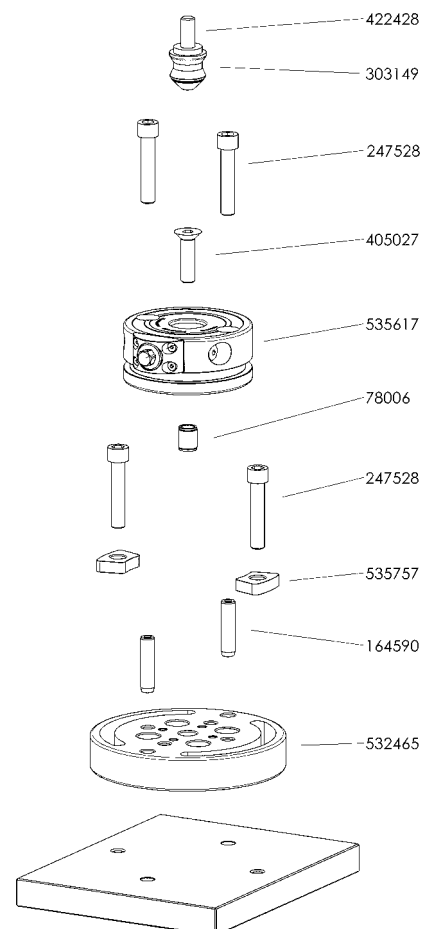
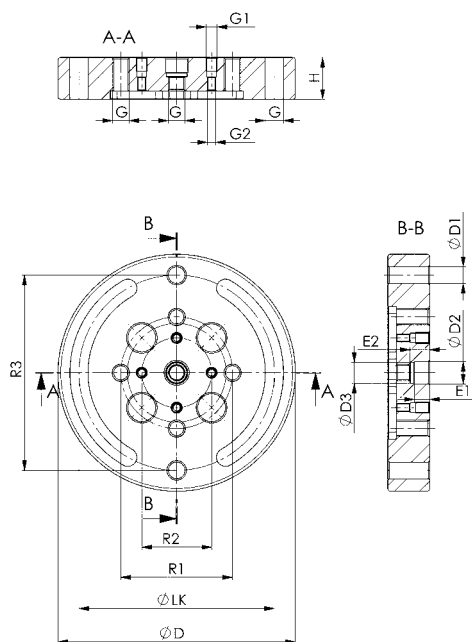
- Ø16: Order no. 78006

- Ø22: Order no. 78238

Clamping screw: Order no. 535757.

Dimensions:

Order no.	Size	dia. D	dia. D1 H7	dia. D2	dia. D3	E1	E2	G	G1	G2	dia. LK	R	R1	R2	R3 ±0,1	S1
532465	M12	170	12	16	15	11	14	M12	M8	M6	140	50	80	50	140	6



No. 6210FN-M12-01

Spring washer for groove adapter



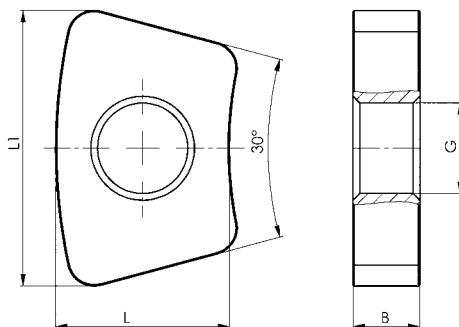
Order no.	Size	Weight [g]
535757	M12	62

Application:

The spring washer is used to securely fasten the base element for T-grooved plates with M12 cheese head screws onto the machine table.

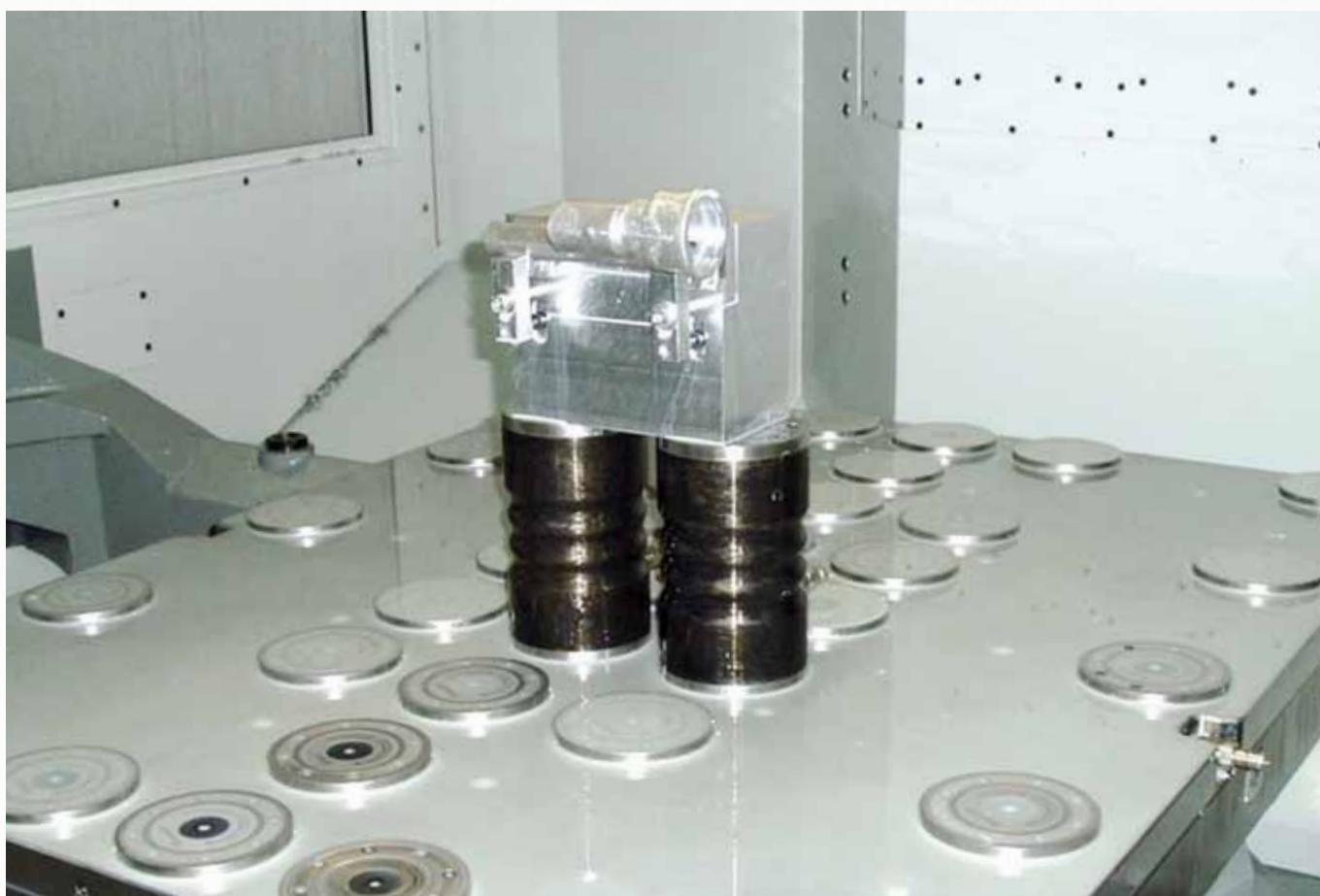
Note:

Suitable for base element for T-grooved plate Order no. 532465



Dimensions:

Order no.	Size	B	G	L	L1
535757	M12	10	M12	26	41



No. 6210A-20-10

Adapter reduction from K20 to K10



Order no.	Size	H ±0.01	Weight [g]
534750	K20 - K10	50	2923

Application:

The adapter element is used to reduce the intermediate element size K20 and K10.3 to size K10. Intermediate elements or assembly elements can be adapted.

This clamping system can be used to move workpieces to the required machining height in the machine for 5-sided machining, or for the safe and quick clamping of workpieces with ledges and different clamping heights on the machine table.

Advantage:

Simple, quick and flexible clamping of complex workpiece contours on the machine table. Especially suitable for levelling workpieces or clamping fixtures at the necessary machine heights in the machine tool and for the reliable clamping of same.

Note:

Order numbers for the centering sleeves:

- Ø15: Order no. 535732

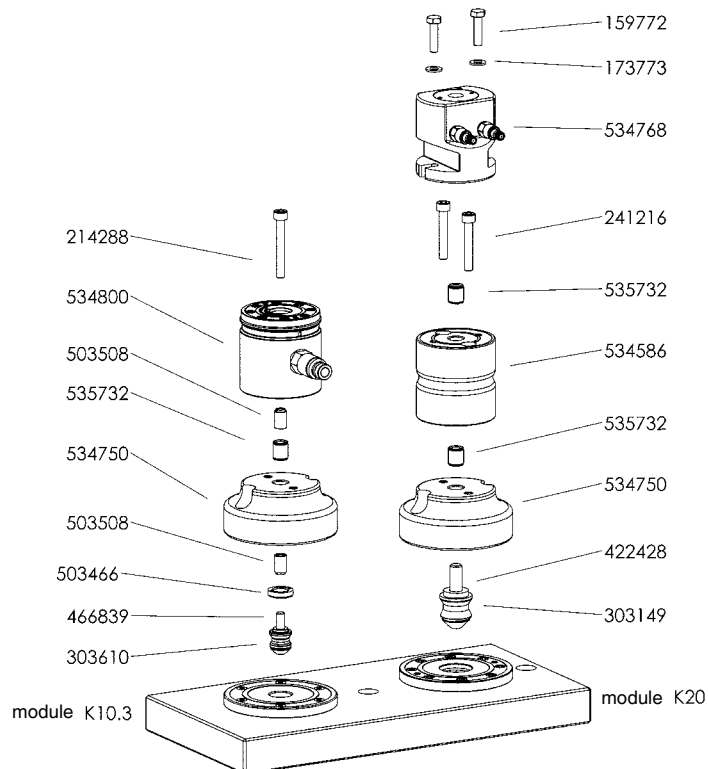
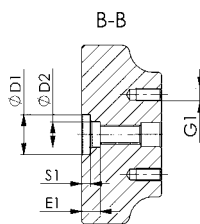
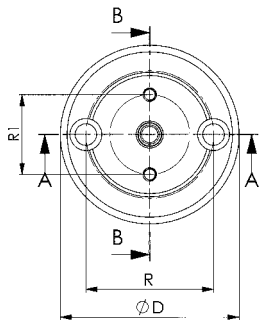
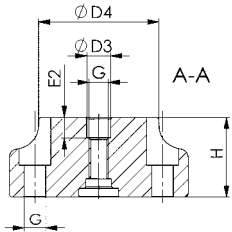
- Ø16: Order no. 78006

- Ø22: Order no. 78238

The fastening screws are supplied as standard.

Dimensions:

Order no.	Size	dia. D	dia. D1 H7	dia. D2	dia. D3	dia. D4	Screw DIN84 or ISO4762	E1	E2	G	G1	R	R1
534750	K20 - K10	112	25	16	15	78	M12x50	11,5	13	M12	M8	80	50



No. 6210IA-20-10

Adapter reduction from K20 to K10, with indexing



Order no.	Size	H ±0.01	Weight [g]
532499	K20 - K10	50	2892

Application:

The adapter element with indexing is used to reduce the intermediate element size K20 and K10.3 to size K10. Intermediate elements or assembly elements can be adapted.

This clamping system can be used to move workpieces to the required machining height in the machine for 5-sided machining, or for the safe and quick clamping of workpieces with ledges and different clamping heights on the machine table.

Thanks to the 4-point 90° indexing option, workpieces under strong machining forces can be secured to prevent radial distortion.

Advantage:

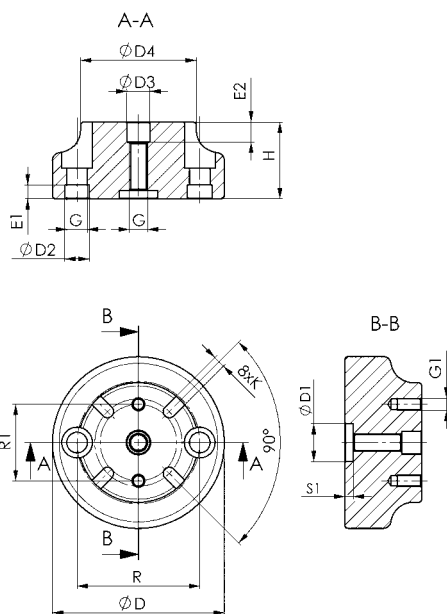
Simple, quick and flexible clamping of complex workpiece contours on the machine table. Especially suitable for levelling workpieces or clamping fixtures at the necessary machine heights in the machine tool and for the reliable clamping of same.

Note:

Order numbers for the centering sleeves:

- Ø15: Order no. 535732
- Ø16: Order no. 78006
- Ø22: Order no. 78238

Slot nuts: Order no. 430264.



Dimensions:

Order no.	Size	dia. D	dia. D1 H7	dia. D2	dia. D3	dia. D4	Screw DIN84 or ISO4762	E1	E2	G	G1	K F6	R	R1	S1
532499	K20 - K10	112	25	16	15	78	M12x50	9	13	M12	M8	8	80	50	5,5

No. 6210H-10-05

Adapter clamping module K5,
hydr. to K10



Order no.	Size	Pull-in/locking force up to	Holding force	Weight
		[kN]	[kN]	[g]
534776	K05	5	13	2328

Application:

The adapter element is used to reduce the intermediate element size K10 to the hydraulic clamping module K5. Workpieces or fixtures can be clamped with repeat accuracy directly onto the hydraulic clamping module K5 via clamping nipples.

This clamping system can be used to move workpieces to the required machining height in the machine for 5-sided machining, or for the safe and quick clamping of workpieces with ledges and different clamping heights on the machine table.

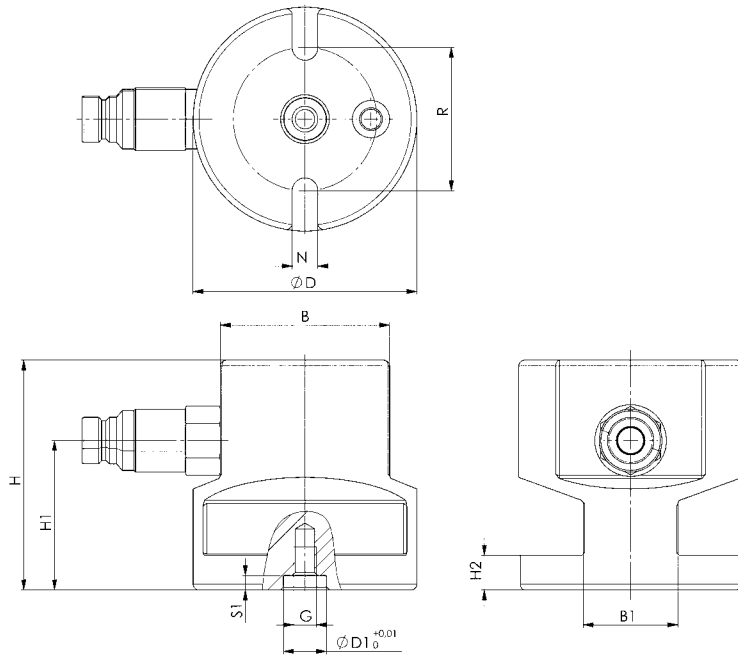
Advantage:

Simple, quick and flexible clamping of complex workpiece contours on the machine table. Especially suitable for levelling workpieces or clamping fixtures at the necessary machine heights in the machine tool and for the reliable clamping of same.

Note:

Order no. for the centering sleeve Ø 16 mm: 78006

The hydr. quick-release coupling, connector version, and the fastening screws are supplied as standard.



Dimensions:

Order no.	Size	B	B1	dia. D	dia. D1 H7	G	H ±0.01	H1	H2	N	R	S1
534776	K05	59	33	78	15	M8	80	52	12	8	50	5

No. 6210IH-10-05

**Adapter clamping module K5,
hydr. to K10, with indexing**



Order no.	Size	Pull-in/locking force up to	Holding force	Weight
		[kN]	[kN]	[g]
534719	K05	5	13	2318

Application:

The adapter element is used to reduce the intermediate element size K10 to the hydraulic clamping module K5. Workpieces or fixtures can be clamped with repeat accuracy directly onto the hydraulic clamping module K5 via clamping nipples.

This clamping system can be used to move workpieces to the required machining height in the machine for 5-sided machining, or for the safe and quick clamping of workpieces with ledges and different clamping heights on the machine table.

Thanks to the indexing option, workpieces under large machining forces can be secured to prevent radial distortion.

Advantage:

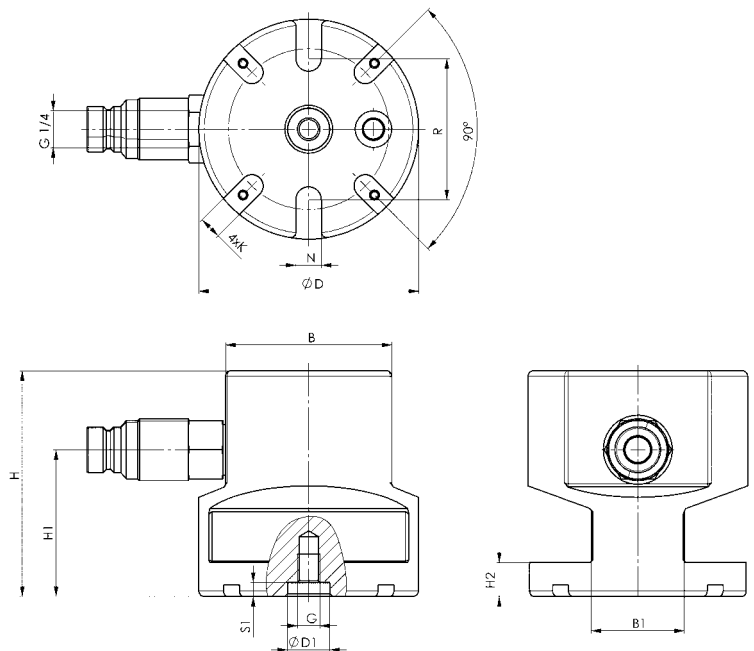
Simple, quick and flexible clamping of complex workpiece contours on the machine table. Especially suitable for levelling workpieces or clamping fixtures at the necessary machine heights in the machine tool and for the reliable clamping of same.

Note:

Order no. for the centering sleeve Ø 16 mm: 78006

Order no. for the slot nuts: 430264

The hydr. quick-release coupling, connector version, and the fastening screws are supplied as standard.



Dimensions:

Order no.	Size	B	B1	dia. D	dia. D1 H7	G	H ±0.01	H1	H2	K F6	N	R	S1
534719	K05	59	33	78	15	M8	80	52	12	8	9	50	5

No. 6210L-10-05

Adapter clamping module K5,
pneum. to K10



Order no.	Size	Pull-in/locking force up to	Holding force	Weight
		[kN]	[kN]	[g]
534768	K05	1,5	13	2272

Application:

The adapter element is used to reduce the intermediate element size K10 to the pneumatic clamping module K5. Workpieces or fixtures can be clamped with repeat accuracy directly onto the pneumatic clamping module K5 via clamping nipples.

This clamping system can be used to move workpieces to the required machining height in the machine for 5-sided machining, or for the safe and quick clamping of workpieces with ledges and different clamping heights on the machine table.

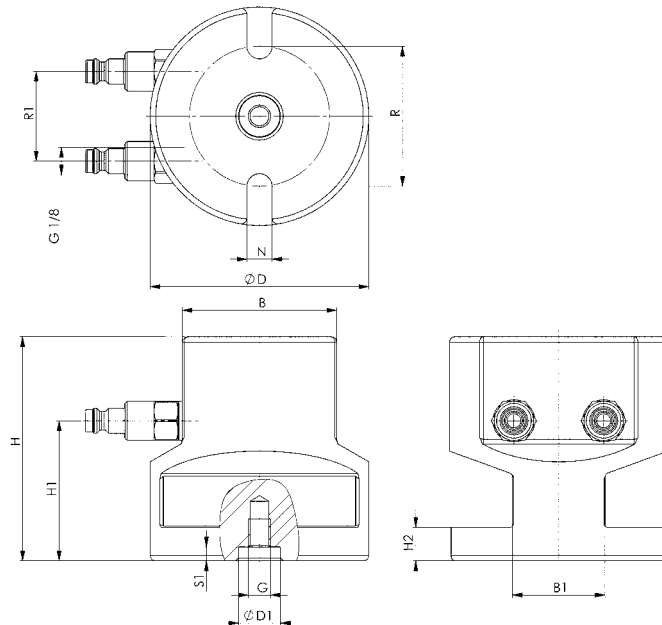
Advantage:

Simple, quick and flexible clamping of complex workpiece contours on the machine table. Especially suitable for levelling workpieces or clamping fixtures at the necessary machine heights in the machine tool and for the reliable clamping of same.

Note:

Order no. for the centering sleeve Ø 16 mm: 78006

The pneum. quick-release coupling, connector version, and the fastening screws are supplied as standard.



Dimensions:

Order no.	Size	B	B1	dia. D	dia. D1 H7	G	H ±0.01	H1	H2	N	R	R1	S1
534768	K05	59	33	78	15	M8	80	52	12	9	50	32	5

No. 6210IL-10-05

**Adapter clamping module K5,
pneum. to K10, with indexing**



Order no.	Size	Pull-in/locking force up to	Holding force	Weight
		[kN]	[kN]	[g]
532853	K05	1,5	13	2248

Application:

The adapter element is used to reduce the intermediate element size K10 to the pneumatic clamping module K5. Workpieces or fixtures can be clamped with repeat accuracy directly onto the pneumatic clamping module K5 via clamping nipples.

This clamping system can be used to move workpieces to the required machining height in the machine for 5-sided machining, or for the safe and quick clamping of workpieces with ledges and different clamping heights on the machine table.

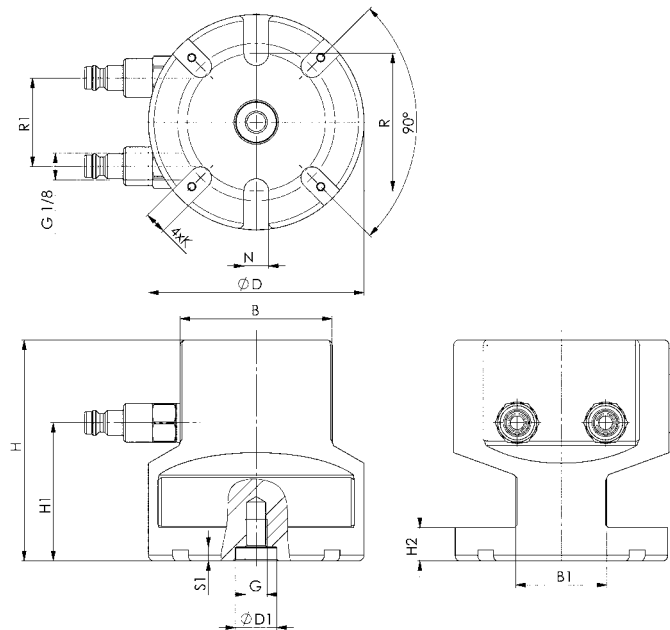
Advantage:

Simple, quick and flexible clamping of complex workpiece contours on the machine table. Especially suitable for levelling workpieces or clamping fixtures at the necessary machine heights in the machine tool and for the reliable clamping of same.

Note:

Order no. for the centering sleeve Ø 16 mm: 78006

The pneum. quick-release coupling, connector version, and the fastening screws are supplied as standard.



Dimensions:

Order no.	Size	B	B1	dia. D	dia. D1 H7	G	H ±0.01	H1	H2	K F6	N	R	R1	S1
532853	K05	59	33	78	15	M8	80	52	12	8	9	50	32	5

No. 6210H

Assembly element K10 and K20, hydraulic



Order no.	Size	Pull-in/locking force up to	Holding force	Weight
		[kN]	[kN]	[g]
534883	K10	10	25	2835
534800	K20	20	55	7311

Application:

The assembly element is used to clamp with repeat accuracy workpieces or fixtures directly onto the hydraulic clamping modules K10 or K20 via clamping nipples.

This clamping system can be used to move workpieces to the required machining height in the machine for 5-sided machining, or for the safe and quick clamping of workpieces with ledges and different clamping heights on the machine table.

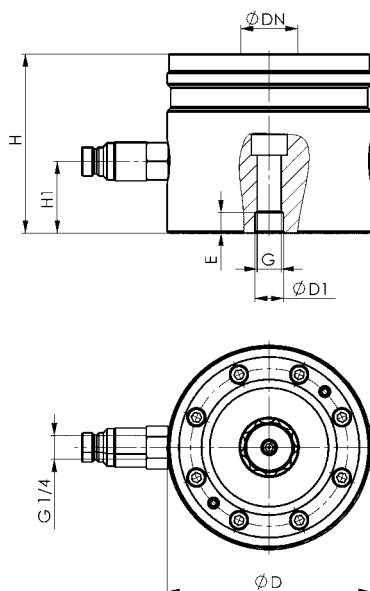
Advantage:

Simple, quick and flexible clamping of complex workpiece contours on the machine table. Especially suitable for levelling workpieces or clamping fixtures at the necessary machine heights in the machine tool and for the reliable clamping of same.

Note:

Order no. for the centering sleeve Ø 16 mm: 78006

The hydr. quick-release coupling, connector version, and the fastening screw are supplied as standard.



Dimensions:

Order no.	Size	dia. D	dia. D1 H7	dia. DN	E	G	H ±0.01	H1
534883	K10	80	15	22	11,25	M8	80	35
534800	K20	114	16	32	11,25	M12	100	40

No. 6210IH

Assembly element K20, hydraulic, with indexing



Order no.	Size	Pull-in/locking force up to	Holding force	Weight
		[kN]	[kN]	[g]
534412	K20	20	55	7154

Application:

The assembly element is used to clamp with repeat accuracy workpieces or fixtures directly onto the hydraulic clamping module K20 with 4-point indexing via clamping nipples.

This clamping system can be used to move workpieces to the required machining height in the machine for 5-sided machining, or for the safe and quick clamping of workpieces with ledges and different clamping heights on the machine table.

Advantage:

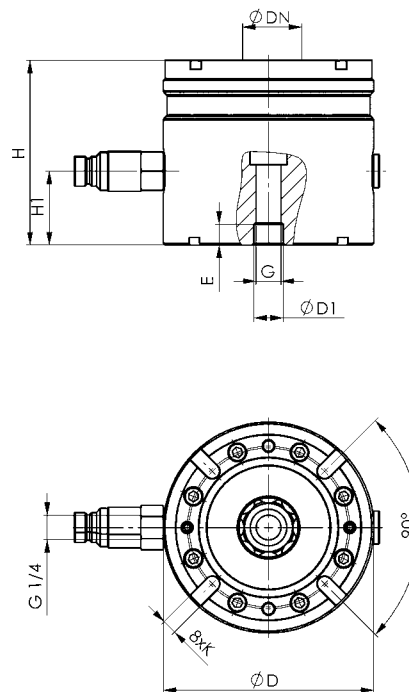
Simple, quick and flexible clamping of complex workpiece contours on the machine table. Especially suitable for levelling workpieces or clamping fixtures at the necessary machine heights in the machine tool and for the reliable clamping of same.

Note:

Order no. for the centering sleeve Ø 16 mm: 78006

Order no. for the slot nuts: 430264

The hydr. quick-release coupling, connector version, and the fastening screw are supplied as standard.



Dimensions:

Order no.	Size	dia. D	dia. D1 H7	dia. DN	E	E1	E2	G	H ±0.01	H1	K F6
534412	K20	114	16	32	11,25	4	5	M12	100	40	8

No. 6210L

Assembly element K10, K10.3 and K20, pneumatic



Order no.	Size	Pull-in/locking force up to	Holding force	Weight
		[kN]	[kN]	[g]
534925	K10	8	25	2720
534537	K10.3	10	25	7708
534842	K20	17	55	7185

Application:

The assembly element is used to clamp with repeat accuracy workpieces or fixtures directly onto the pneumatic clamping modules K10, K10.3 and K20 via clamping nipples.

This clamping system can be used to move workpieces to the required machining height in the machine for 5-sided machining, or for the safe and quick clamping of workpieces with ledges and different clamping heights on the machine table.

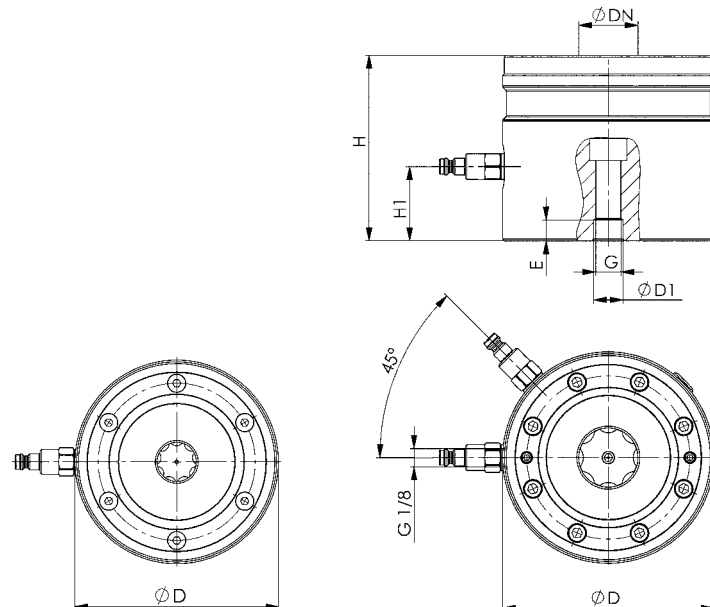
Advantage:

Simple, quick and flexible clamping of complex workpiece contours on the machine table. Especially suitable for levelling workpieces or clamping fixtures at the necessary machine heights in the machine tool and for the reliable clamping of same.

Note:

Order no. for the centering sleeve Ø 16 mm: 78006

The pneum. quick-release coupling, connector version, and the fastening screw are supplied as standard.



Dimensions:

Order no.	Size	dia. D	dia. D1 H7	dia. DN	E	G	H ±0.01	H1
534925	K10	80	15	22	11,25	M8	77	35
534537	K10.3	114	16	22	11,25	M12	100	40
534842	K20	114	16	32	11,25	M12	100	40

No. 6210IL

Assembly element K10.3 and K20, pneumatic, with indexing



Order no.	Size	Pull-in/locking force up to	Holding force	Weight
		[kN]	[kN]	[g]
534495	K10.3	10	25	7668
534453	K20	17	55	7162

Application:

The assembly element is used to clamp with repeat accuracy workpieces or fixtures directly onto the pneumatic clamping modules K10.3 and K20 via clamping nipples. This clamping system can be used to move workpieces to the required machining height in the machine for 5-sided machining, or for the safe and quick clamping of workpieces with ledges and different clamping heights on the machine table. Thanks to the 4-point 90° indexing option, workpieces under strong machining forces can be secured to prevent radial distortion.

Advantage:

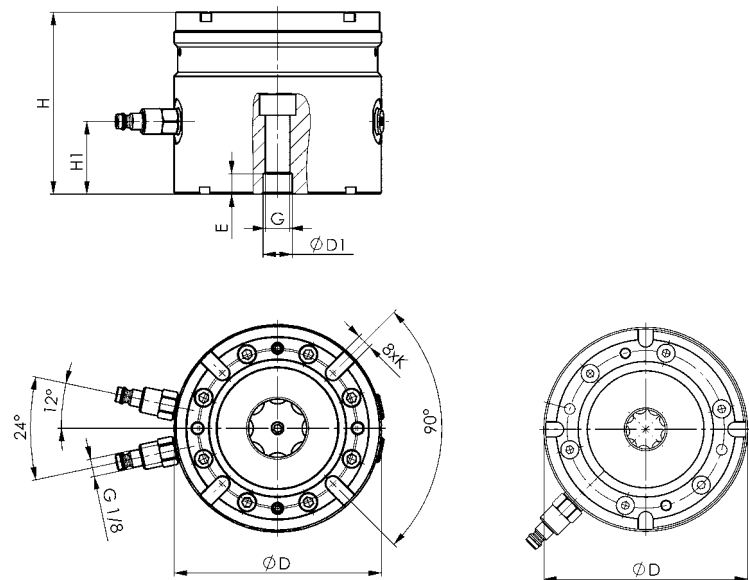
Simple, quick and flexible clamping of complex workpiece contours on the machine table. Especially suitable for levelling workpieces or clamping fixtures at the necessary machine heights in the machine tool and for the reliable clamping of same.

Note:

Order no. for the centering sleeve Ø 16 mm: 78006

Order no. for the slot nuts: 430264

The pneum. quick-release coupling, connector version, and the fastening screw are supplied as standard.

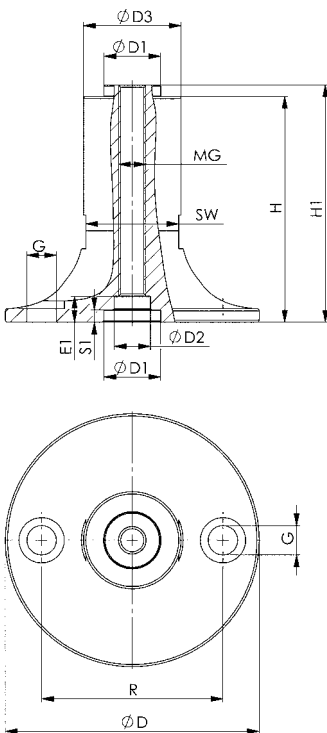


Dimensions:

Order no.	Size	dia. D	dia. D1 H7	dia. DN	E	E1	E2	G	H ±0.01	H1	K F6
534495	K10.3	114	16	22	11,25	4	5	M12	100	40	8
534453	K20	114	16	32	11,25	4	5	M12	100	40	8

No. 6210S

Support element, fixed



Order no.	Size	H $\pm 0,1$	Weight [g]
532390	K10-100	100	995
532374	K20-100	100	1790

Application:

The support element allows workpieces or fixtures to be received into the bore for the clamping nipple, K10 or K20 depending on the version, and clamped to the main or intermediate elements. This clamping system can be used to move workpieces to the required machining height in the machine for 5-sided machining, or for the safe and quick clamping of workpieces with ledges and different clamping heights on the machine table.

Advantage:

Simple, quick and flexible clamping of complex workpiece contours on the machine table. Especially suitable for levelling workpieces or clamping fixtures at the necessary machine heights in the machine tool and for the reliable clamping of same.

Note:

Order numbers for the centering sleeves:

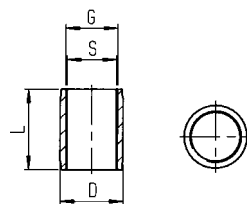
- $\phi 15$: Order no. 535732
- $\phi 16$: Order no. 78006
- $\phi 22$: Order no. 78238

Dimensions:

Order no.	Size	dia. D	dia. D1 H7	dia. D2	dia. D3	E1	G	H1	R
532390	K10-100	78	15	15	35	4,5	M8	103	50
532374	K20-100	112	25	16	43	11,5	M12	105	80

No. 6363-**-005

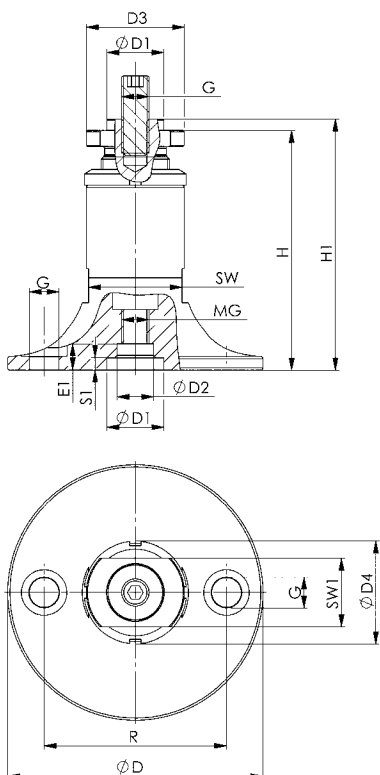
Centring sleeve, cylindrical



Order no.	Size	dia. D	G	L -0.2	dia. S	Weight [g]
78006	12	16 $+0,011/0$	R1/4	20,5	12,5	9
78238	16	22 $+0,015/+0,002$	M18	23	16,5	25

No. 6210S

Support element, adjustable ± 5 mm



Order no.	Size	H $\pm 0,1$	Weight [g]
532416	K10	95-105	974
532432	K20	95-105	2020

Application:

The adjustable support element allows workpieces or fixtures to be received into the bore for the clamping nipple, K10 or K20 depending on the version, and clamped to the main or intermediate elements. Thanks to the adjustment and counter option, the support element can be steplessly adapted to the workpiece contour by ± 5 mm.

This clamping system can be used to move workpieces to the required machining height in the machine for 5-sided machining, or for the safe and quick clamping of workpieces with ledges and different clamping heights on the machine table.

Advantage:

Simple, quick and flexible clamping of complex workpiece contours on the machine table. Especially suitable for levelling workpieces or clamping fixtures at the necessary machine heights in the machine tool and for the reliable clamping of same.

Note:

Order numbers for the centering sleeves:

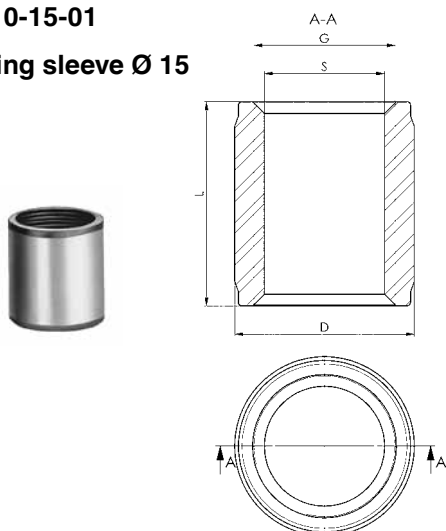
- Ø15: Order no. 535732
- Ø16: Order no. 78006
- Ø22: Order no. 78238

Dimensions:

Order no.	Size	dia. D	dia. D1 H7	dia. D2	dia. D3	dia. D4	E1	G	H1	R	S1	SW	SW1
532416	K10	78	15	15	35	38	4,5	M8	98-108	50	4,5	30	27
532432	K20	112	25	16	43	45	11,5	M12	100-110	80	5,5	41	30

No. 6210-15-01

Centering sleeve Ø 15



Order no.	Size	ØD $+0.011/0$	G	L	dia. S	Weight [g]
535732	15	15	M12	17,4	10,1	12

No. 6203L-02

Built-in clamping module, round, screw-in version

Pneumatic opening.
Opening operating pressure: min. 6 bar - max. 14 bar
Cover and piston hardened.
Repeatability < 0.02 mm.



NEW: shortened design

Order no.	Size	Pull-in/locking force up to	Holding force	Weight
		[N]	[N]	[g]
427286	K02	235	6000	48

Application:

Zero-point clamping system for set-up-time-optimized clamping with cutting and non-cutting processing in all areas, also in the food, pharmaceutical and chemical industry.

Note:

The installation clamping module has high holding, pull-in and locking forces. This is opened pneumatically (1) and mechanically locked through spring force. Subsequent uncoupling of the pressure lines is possible at all times (module is tensioned pressure-free).

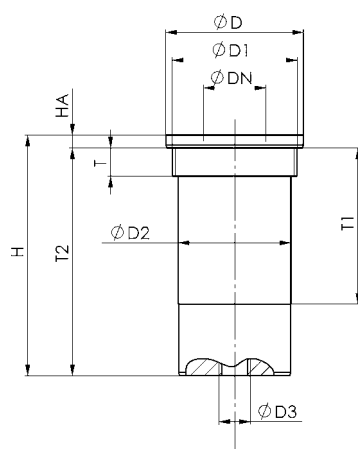
The clamping module has one connection:

1x pneum. opening (1).

For simple installation, we recommend the AMF face spanner under order no. 50914.

On request:

- Installation diagrams



Dimensions:

Order no.	Size	dia. D	dia. DN	dia. D1	dia. D2	dia. D3	H	HA	T	T1	T2
427286	K02	22	10	M20x1,5	18	M5	38,5	2,05	4,5	25	36,45



Subject to technical alterations.

No. 6203PS4-001

Interchangeable pallet

High-strength aluminium, anodised



Order no.	Size	A	B	S	SM	Weight [g]
533059	K02	98	98	20	60	530

Design:

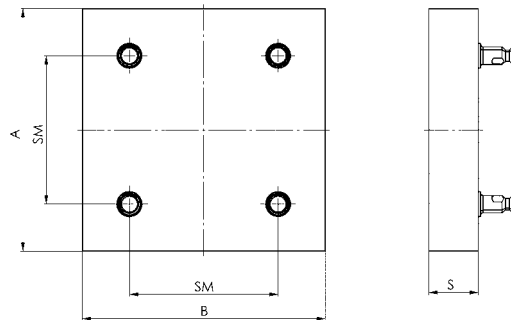
Interchangeable pallet for 4-point clamping station K02 with 4 clamping nipples.

Note:

On request, we can incorporate mounting holes according to your specifications in the change pallet.

On request:

Further dimensions, actual dimensions and number of clamping nipple tips.



No. 6203S4L-001

4-point clamping station

Main body: Aluminium, anodised

Repeat accuracy <0.02 mm

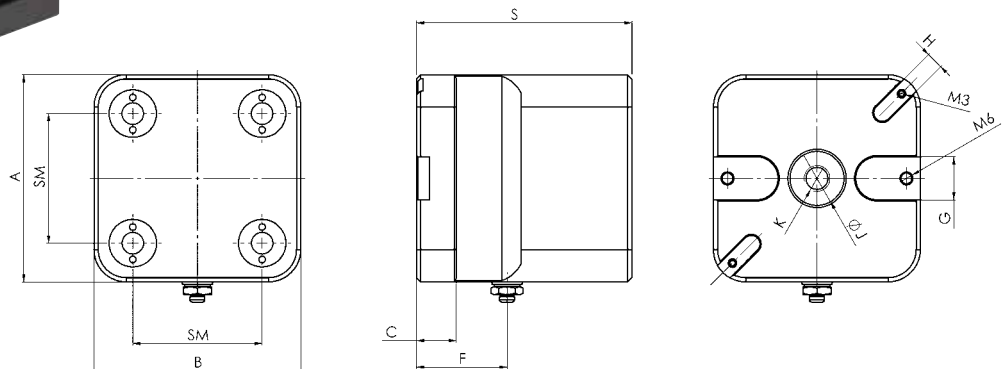


Order no.	Size	Pull-in/locking force up to [N]	Holding force [N]	Weight [g]
533034	K02	4 x 235	4 x 6000	2400

Design:

Pneumatic 4-point clamping station with air gun valve for quick opening and closing via air gun.

The clamping station has two clamping grooves on the side for fastening to the machine table. In addition, positioning grooves for aligning on the machine table are made on the underside. The holder for a K20 clamping nipple is also provided.



Dimensions:

Order no.	Size	A	B	C	F	G	H	dia. J	K	S	SM	S	SM
533034	K02	96	96	15	42	20	8	25	M12	100	60	100	60

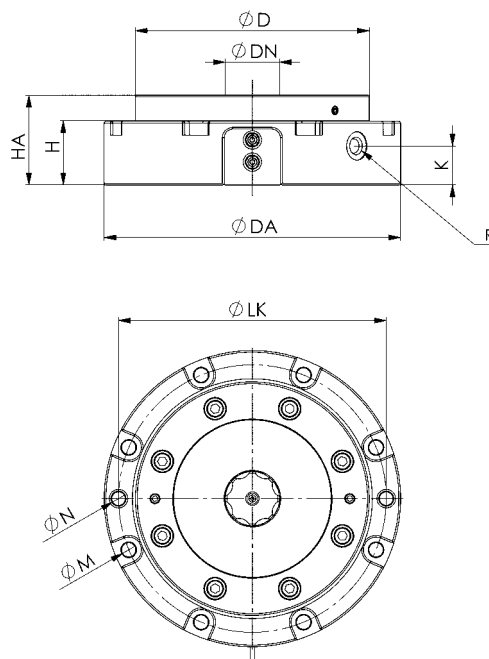
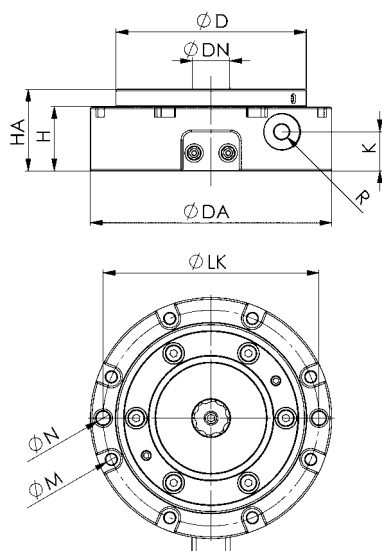
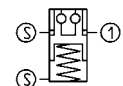
No. 6104L

Clamping module with sensor monitor and mounting flange

Pneumatic opening.
Opening operating pressure: min. 5 bar
Cover and piston hardened.
Flange housing: Aluminium
Repeat accuracy < 0.005 mm.



STAINLESS STEEL



Dimensions:

Order no.	Size	dia. DA	dia. D	dia. DN	H	HA	K	dia. LK	dia. M	dia. N H7	R
526574	K10.3	142	112	22	38	48	23	127	6,6	8	G1/8
526590	K20.3	175	138	32	38	53	23	158	8,4	8	G1/8

Application:

Zero point clamping system for automation solutions for time-optimised clamping during cutting and non-cutting machining in all sectors, as well as in the food, pharmaceutical and chemical industries.

Note:

The clamping module has two inductive sensors (connection type: connector S8, cable length 150 mm) for the status check (opened / locked). This is opened pneumatically (1) and mechanically locked through spring force. The pressure line can be subsequently decoupled at any time (module is clamped depressurised).

The clamping module has one connection: 1 x pneum. opening (1).

On request:

- Installation diagrams
- Further automation solutions.

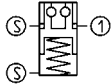
No. 6105L

Clamping module with sensor monitor and nipple sensing

Pneumatic opening.
Opening operating pressure: min. 5 bar
Cover and piston hardened.
Flange housing: Aluminium
Repeat accuracy < 0.005 mm.



STAINLESS STEEL



Order no.	Size	Pull-in/locking force up to	Holding force	Weight
		[kN]	[kN]	[Kg]
526616	K10.3	8	25	2,6

Application:

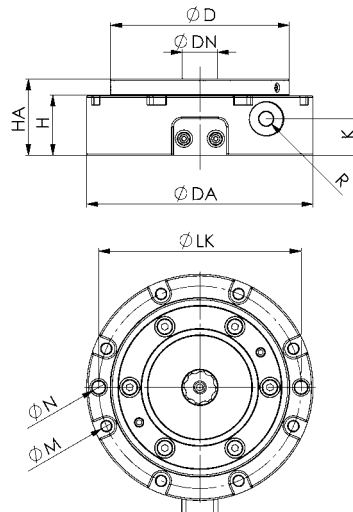
Zero point clamping system for automation solutions for time-optimised clamping during cutting and non-cutting machining in all sectors, as well as in the food, pharmaceutical and chemical industries.

Note:

The clamping module has two inductive sensors (connection type: connector S8, cable length 150 mm) for the status check for opened/locked and the presence of the clamping nipple. This is pneumatically opened (1) and mechanically locked by spring force. The pressure line can be subsequently decoupled at any time (module is clamped depressurised).
The clamping module has one connection: 1 x pneum. opening (1).

On request:

- Installation diagrams
- Further automation solutions.



Dimensions:

Order no.	Size	dia. DA	dia. D	dia. DN	H	HA	K	dia. LK	dia. M	dia. N H7	R
526616	K10.3	142	112	22	38	48	23	127	6,6	8	G1/8

No. 6106L

Clamping module with sensor monitor and nipple sensing

Pneumatic opening.

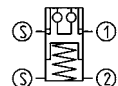
Opening operating pressure: min. 8 bar - max. 12 bar

Re-clamping operating pressure: min. 5 bar - max. 6 bar

Cover and piston hardened.

Flange housing: Aluminium

Repeat accuracy < 0.005 mm.



Order no.	Size	Pull-in/locking force up to	Holding force	Weight
		[kN]	[kN]	[Kg]
526632	K10	8	25	1,0

Application:

Zero point clamping system for automation solutions for time-optimised clamping during cutting and non-cutting machining in all sectors, as well as in the food, pharmaceutical and chemical industries.

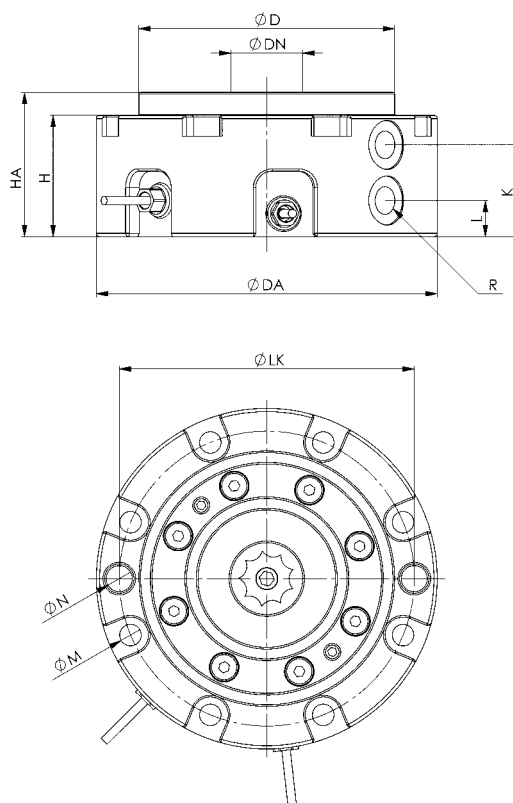
Note:

The clamping module has two inductive sensors (connection type: connector S8, cable length 150 mm) for the status check for opened/locked and the presence of the clamping nipple. This is pneumatically opened (1) and mechanically locked by spring force. The pressure line can be subsequently decoupled at any time (module is clamped depressurised).

The clamping module has two connections: 1 x pneum. opening (1) / 1 x pneum. re-clamping (turbo) (2).

On request:

- Installation diagrams
- Further automation solutions.



Dimensions:

Order no.	Size	dia. DA	dia. D	dia. DN	H	HA	K	dia. LK	dia. M	dia. N H7	R
526632	K10	104	78	22	37	44	28	90	6,6	8	G1/8

No. 6370ZN-10

Clamping nipple with colour marking for clamping module K10

Hardened, for clamping modules size K10.



Order no.	Size	dia. DN	dia. D1	dia. D2	H	H1	T	Weight [g]
430280	K10	22,0	15	8	19	16	3	30
430306	K10	22,0	15	8	19	16	3	30

Design:

Extremely wear-resistant surface coating.

Order no. 430280: Zero point nipple „Gold“, Order no. 430306: Slit nipple „Black“.

Application:

For simple, visual differentiation of the various clamping nipple types.

No. 6370ZN-20

Clamping nipple with colour marking for clamping module K20

Hardened, for clamping module size K20.



Order no.	Size	dia. DN	dia. D1	dia. D2	H	H1	T	Weight [g]
430322	K20	32,0	25	12	28	23	5	110
430348	K20	32,0	25	12	28	23	5	110

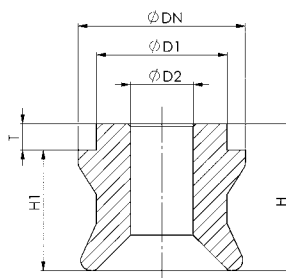
Design:

Extremely wear-resistant surface coating.

Order no. 430322: Zero point nipple „Gold“, Order no. 430348: Slit nipple „Black“

Application:

For simple, visual differentiation of the various clamping nipple types.



No. 6370ZN-20-029

Puller



Order no.	Size	Thread	Weight [g]
526517	K20	M10	150

Design:

Aluminium puller is suitable for AMF K20 clamping nipple.

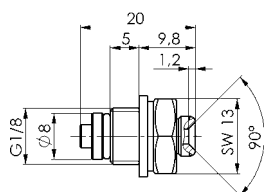
Application:

Clamping nipples can be simply and quickly removed from the workpiece or fixture. For this purpose, the K20 puller is mounted on a pin puller and the clamping nipples are pulled out without damaging the locating bore.

No. 6370ZSK-08

Air gun valve, pneumatic

Max. operating pressure 10 bar.



Order no.	Nominal bore [NW]	Nominal flow [l/min]	SW	Weight [g]
533075	2,5	240	13	10

Design:

Pneumatic air gun with integrated non-return valve.

Application:

For simple and quick opening of the pneumatic zero point clamping plates. When the air gun is positioned on the valve, the air pressure is released and then held by the non-return valve. Venting is effected by briefly and manually pushing the valve, which then resets under spring force.

On request:

- Installation diagrams

No. 6375M

Mechanical collet



Order no.	Clamping force max.* [kN]	Clamping stroke Ø [mm]	Max. tightening torque [Nm]	Weight [Kg]
533281	11	0,3	40	4,5

Design:

The main body is from burnished steel. The collet, which is supplied as standard, has a diameter of 99 mm and is made from anodised, high-strength aluminium. The mechanism in the main body is protected against dirt and coolant. Flanged base for fastening to the machine table. Provided on the underside is the holder for the AMF K20 Zero Point system as well as grooves for positioning on AMF Zero Point clamping modules with indexing.

Application:

For clamping complex workpiece contours for 5-sided machining in the machine tool. The collet is machined to the contours of the workpiece, with a minimum location depth of 2 mm. Because the clamping force is evenly applied to the component in a radial direction, the workpiece is clamped without distortion. The clamping force can be adjusted via the clamping screw, using a torque wrench for example. Consequently, especially suitable for thin-walled pipes and workpieces.

Thanks to the simple collet replacement, various workpieces can be quickly and safely clamped for 5-sided machining.

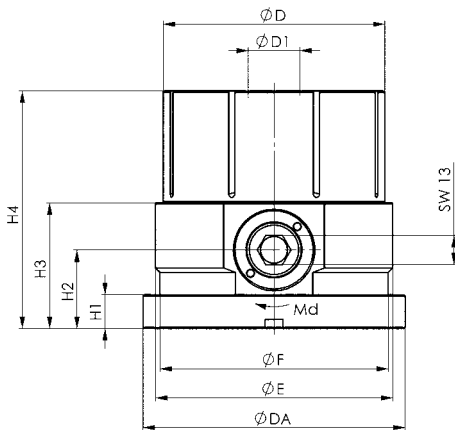
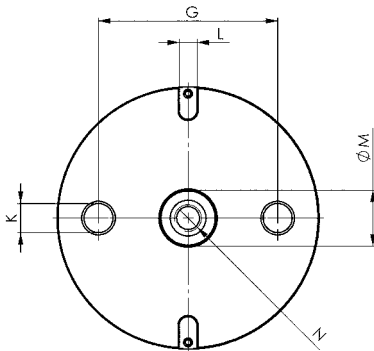
The collet can be milled off to 42 mm, allowing new workpiece contours to be introduced.

Note:

*The max. clamping force of 11kN is introduced into the collet in an axial direction, and does not describe the radial clamping force onto the component. This varies depending on the machining height on the collet.

Dimensions:

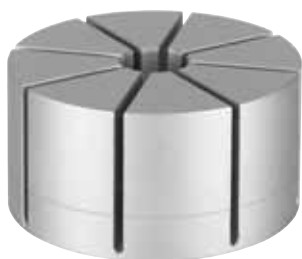
Order no.	dia. D	dia. D1	dia. DA	dia. E	dia. F	G	H1	H2	H3	H4	K	L	dia. M	N
533281	99	23	117	106	102	80	15	35	56	106	13	8 K7	25	M12



No. 6375Z-99

Collet, single

Material: High-strength aluminium
suitable for collet 6375M



Order no.	dia. D	dia. D1	Clamping stroke Ø [mm]	H	Weight [g]
428649	99	23	0,3	50	870

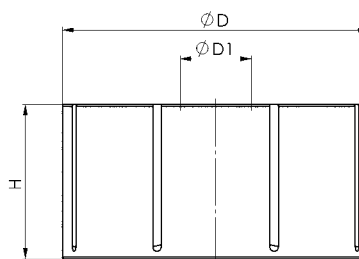
Design:

The 99 mm diameter collet is suitable for the collet element with order no. 533281. The collet is made from anodised, high-strength aluminium.

Application:

The collet is fastened to the main element by just one centrally applied screw, and is therefore quickly replaced. The workpiece contour is milled into the collet with a minimum clamping depth of 2 mm. Because the clamping force is evenly applied to the component in a radial direction, the workpiece is clamped without distortion.

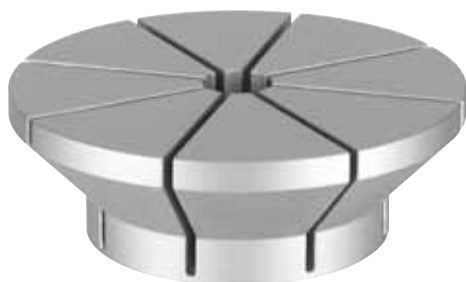
The collet can be milled off to 42 mm, allowing new workpiece contours to be introduced. The maximum workpiece diameter is 90 mm.



No. 6375Z-149

Collet, single

Material: High-strength aluminium
suitable for collet 6375M



Order no.	dia. D	dia. D1	dia. D2	Clamping stroke Ø [mm]	H	H1	Weight [g]
428656	149	23	99	0,3	50	10	870

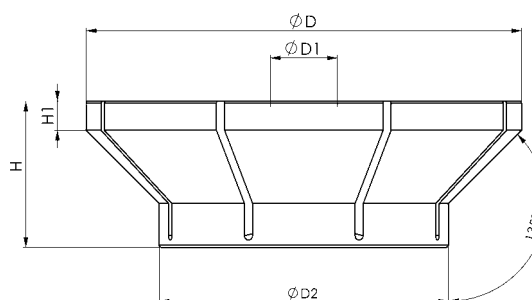
Design:

The 149 mm diameter collet is suitable for the collet element with order no. 533281. The collet is made from anodised, high-strength aluminium.

Application:

The collet is fastened to the main element by just one centrally applied screw, and is therefore quickly replaced. The workpiece contour is milled into the collet with a minimum clamping depth of 2 mm. Because the clamping force is evenly applied to the component in a radial direction, the workpiece is clamped without distortion.

The collet can be milled off to 20 mm, allowing new workpiece contours to be introduced. The maximum workpiece diameter is 140 mm.



No. 6375A

Adapter

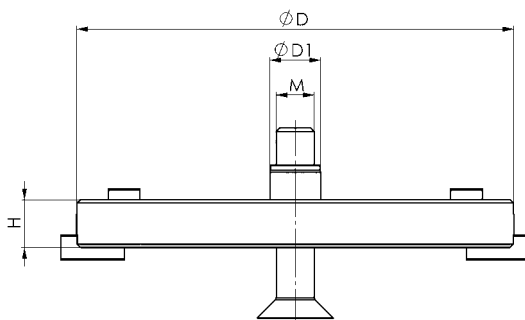
Order no.	dia. D	dia. D1	H ±0.01	M	Weight [Kg]
533018	138	16	15	M12	1,7

Design:

The adapter is made from burnished, high-quality steel. The precision slot nuts for indexing are supplied as standard.

Application:

The adapter is suitable for the collet element with order no. 533281 and is used to position the collet system on the AMF K20.3 Zero Point clamping system with indexing, order no. 428797.





- + Outstanding price-performance ratio
- + Drastically reduced tooling time
- + Immediate improvement of productivity
- + Repeat accuracy < 5µm
- + Stainless steel
- + Form fit



No. 6903

Hydraulic pressure booster

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



Order no.	Article no.	NG	Rato i	max. operating pressure ND [bar]	max. operating pressure HD [bar]	Q max. ND [l/min]	Q max. HD [l/min]	Weight [g]
328682	6903-30-15	6	1,5	200	300	8	1,0	2360
328708	6903-30-20	6	2,0	200	400	12	2,0	2360
328807	6903-30-28	6	2,8	178	500	15	2,2	2360
328727	6903-30-32	6	3,2	150	500	15	2,5	2360
328740	6930-30-40	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:

Flange version with O-ring seal.

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:

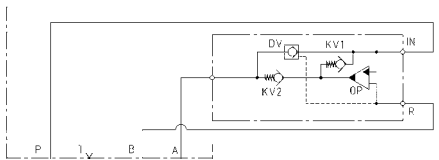
The most important functions are shown in the hydraulic circuit diagram (see below left). Oil is routed via the directional control valve to the IN connection and then flows unhindered through non-return valves KV1 and KV2, as well as through non-return valve DV in the high-pressure range A. Under these 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 directly actuated pressure valve.

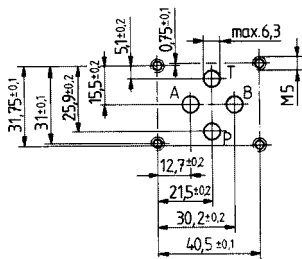
Note:

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.

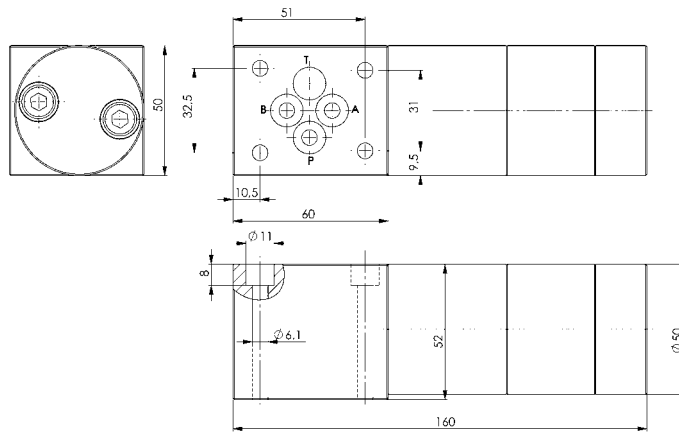
Hydraulic diagram:



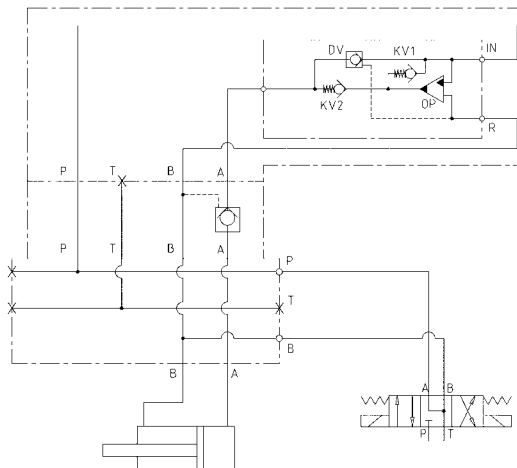
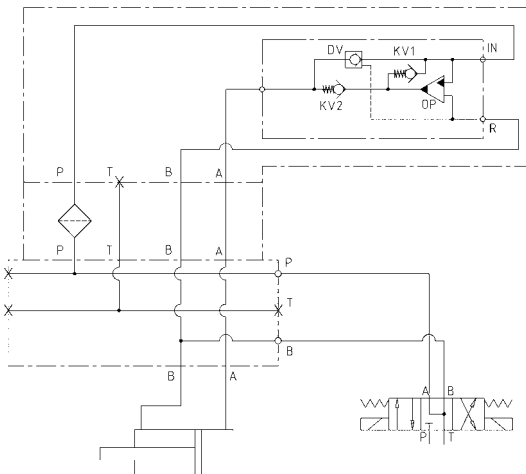
Hole pattern shape A nominal size 6:



As seen in direction of the plate.



Application examples:



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 will end and the amendment will enter 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:

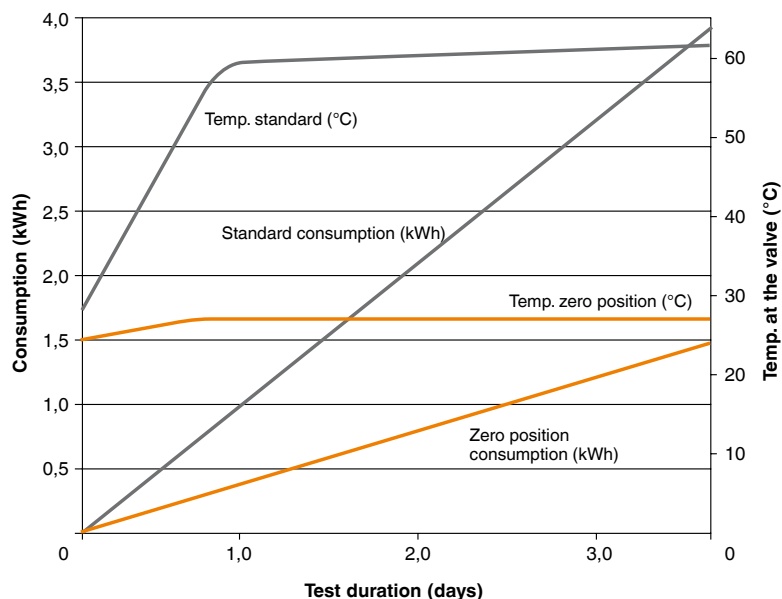
- > energy-saving operation thanks to optimised energy-saving motor
- > greater efficiency
- > ecological operation of the pump units
- > future-compatible operation, compliant with the 2017 standard.



THE DOUBLE ACTING SOLENOID VALVE RETURNS TO THE NEUTRAL POSITION AFTER COMPLETION OF THE CLAMPING OR UNCLAMPING PROCEDURE.

Advantages:

- > lower electricity consumption
- > lower temperature increase
- > no heat influence on the oil column in the distributors and consumers
- > no hazard to components due to excessive rise in pressure
- > no danger of injury from hand contact
- > no drop in magnetic force
- > longer useful life of the magnets



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	Electronic 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, energy-saving pump unit ready for connection, electrically and hydraulically operational. 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 plug, pressure filter with filter mesh of 25µm.

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.

- High safety standard achieved through use of the 4/3-way seat valve.
- Low electricity use
- No heat influence on pressure generators and consumers
- No undesired travel movements
- In case of voltage drop or contact problems, the valve falls into the hermetically sealed middle position.
- Easy triggering of external machine controllers or PLC controllers.

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:

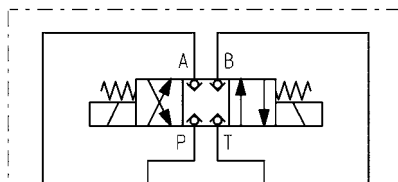
Ensure correct bleeding when connecting elements. In the event of a loss of pressure, subsequent pumping must not exceed a maximum of 2 times per minute. The pump unit must not run continuously.

On request:

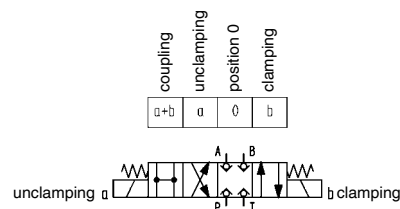
Two, three and four clamping circuits on request.

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

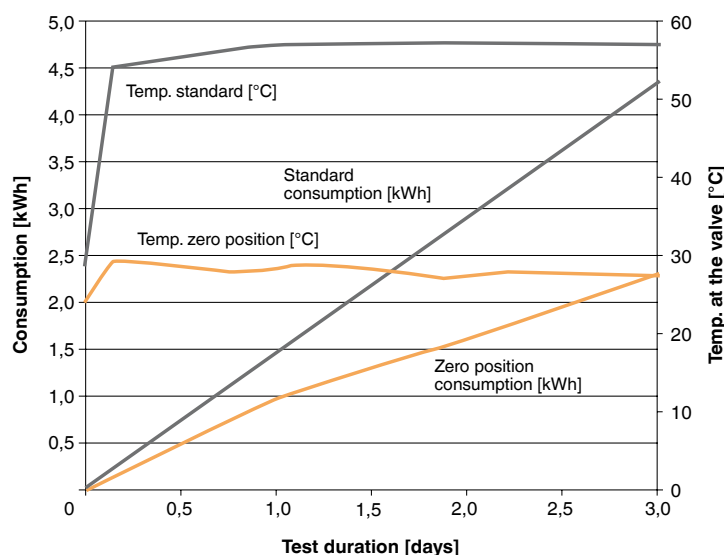
Hydraulic specifications:

Max. operating pressure	400 bar
Oil capacity, reservoir	10 litres
Oil capacity, usable	4 litres
Oil-flow rate	2,5 l/min
Valve type	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 type	radial-piston pump with 3 pistons
Load cycle	max. 500/h
Hydraulic 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

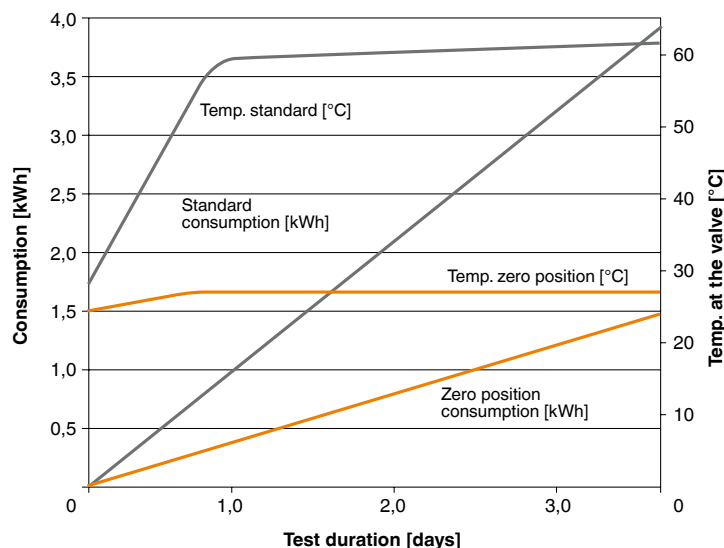
Electric specifications:

Nominal voltage	400 V/50 Hz three-phase
Control voltage	24 V DC
Valve voltage	24 V DC
Motor speed	2900 1/min
Sense of rotation	any
Motor rating	1,1 kW
Pump motor	Three-phase standard motor
Nominal current	3 A
Fuse, supply line	16 A slow-blow
Fuse, control line	2 A primary, 8 A secondary
Electric connection	Ölflex 100; 5x1,5 mm ² 3 m long and connector CEE 16 A 6 h
Protection class	IP 54
Duty cycle	max. 50% intermittent operation

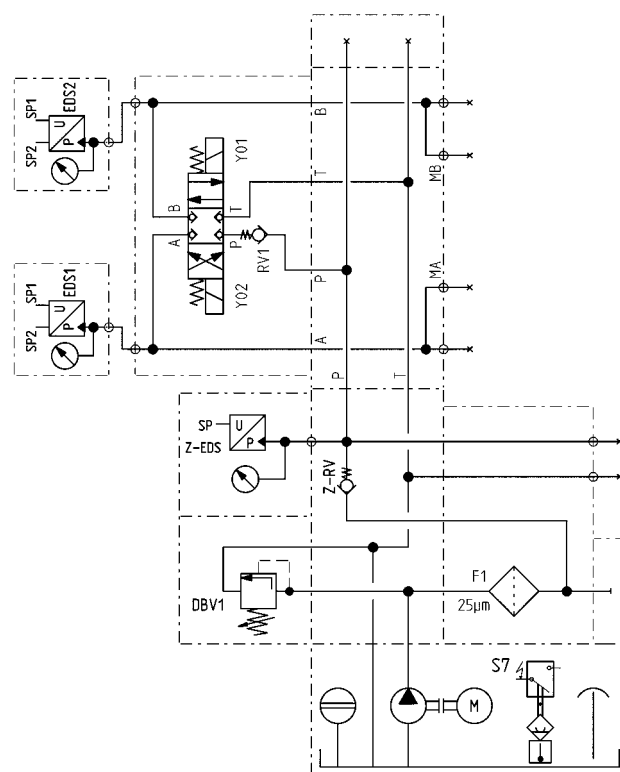
Cycle time 3 min.



Cycle time 10 min.



Hydraulic diagram:



No. 6926D

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 [cm³]	Vol. pull [cm³]	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 housing made of steel, blued. Piston and piston rod case-hardened and ground. Tandem sealing and wiper at piston rod. Piston rod with internal thread.

Features:

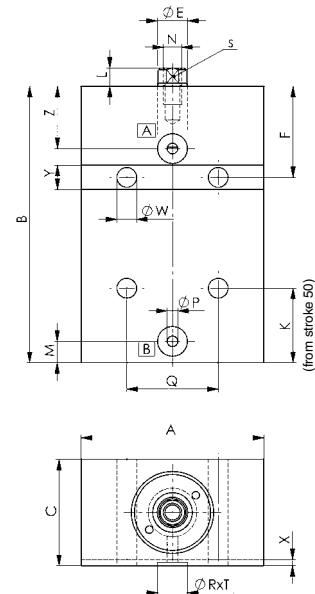
Universal mounting to fixtures through fastening holes.
Each cylinder size is available with three different strokes.

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	R x T	S	dia. W	X	Y	Z	o-ring
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	7x1,5
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	7x1,5
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	7x1,5
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	7x1,5
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	7x1,5
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	7x1,5
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	7x1,5
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	7x1,5
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	7x1,5
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	7x1,5
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	7x1,5
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	7x1,5
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	7x1,5
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	7x1,5
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	7x1,5
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	8x1,5
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	8x1,5
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	8x1,5
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	10x2,0
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	10x2,0
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	10x2,0

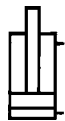


Subject to technical alterations.

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 [cm³]	Vol. pull [cm³]	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 housing made of steel, blued. Piston and piston rod case-hardened and ground. Tandem sealing and wiper at piston rod. Piston rod with internal thread.

Features:

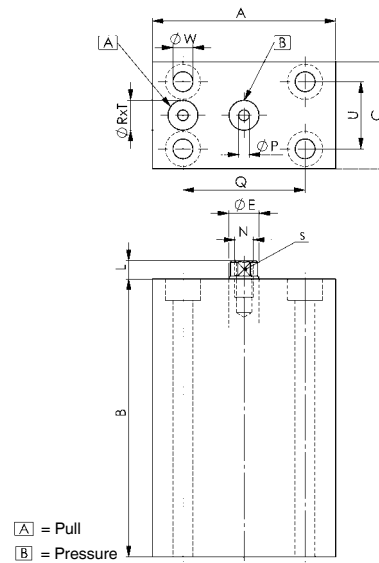
Universal mounting to fixtures through fastening holes.
Each cylinder size is available with three different strokes.

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	R x T	S	U	dia. W	o-ring
454793	6926D-8-20	60	56	35	10	6	M6x12	3,5	40	9,8x1,1	8	22	6,5	7x1,5
328286	6926D-8-21	60	91	35	10	6	M6x12	3,5	40	9,8x1,1	8	22	6,5	7x1,5
328302	6926D-8-25	60	144	35	10	6	M6x12	3,5	40	9,8x1,1	8	22	6,5	7x1,5
298521	6926D-12-20	60	61	35	14	7	M8x15	3,5	40	9,8x1,1	10	22	6,5	7x1,5
328377	6926D-12-21	60	95	35	14	7	M8x15	3,5	40	9,8x1,1	10	22	6,5	7x1,5
328328	6926D-12-25	60	148	35	14	7	M8x15	3,5	40	9,8x1,1	10	22	6,5	7x1,5
330522	6926D-20-20	65	64	45	16	7	M10x15	4,0	50	9,8x1,1	13	30	8,5	7x1,5
298513	6926D-20-21	65	94	45	16	7	M10x15	4,0	50	9,8x1,1	13	30	8,5	7x1,5
328344	6926D-20-25	65	144	45	16	7	M10x15	4,0	50	9,8x1,1	13	30	8,5	7x1,5
442319	6926D-32-20	75	75	55	20	10	M12x15	5,0	55	9,8x1,1	17	35	10,5	7x1,5
298497	6926D-32-21	75	100	55	20	10	M12x15	5,0	55	9,8x1,1	17	35	10,5	7x1,5
328369	6926D-32-25	75	150	55	20	10	M12x15	5,0	55	9,8x1,1	17	35	10,5	7x1,5
319517	6926D-50-20	85	79	63	25	10	M16x25	6,0	63	9,8x1,1	22	40	10,5	7x1,5
298307	6926D-50-21	85	104	63	25	10	M16x25	6,0	63	9,8x1,1	22	40	10,5	7x1,5
328385	6926D-50-25	85	154	63	25	10	M16x25	6,0	63	9,8x1,1	22	40	10,5	7x1,5
294884	6926D-78-20	100	90	75	32	10	M20x30	6,0	76	10,8x1,1	27	45	13,0	8x1,5
328401	6926D-78-21	100	115	75	32	10	M20x30	6,0	76	10,8x1,1	27	45	13,0	8x1,5
328427	6926D-78-25	100	165	75	32	10	M20x30	6,0	76	10,8x1,1	27	45	13,0	8x1,5
328443	6926D-125-20	125	102	95	40	14	M27x40	8,0	95	13,8x1,5	36	65	17,0	10x2,0
328468	6926D-125-21	125	135	95	40	14	M27x40	8,0	95	13,8x1,5	36	65	17,0	10x2,0
328138	6926D-125-25	125	172	95	40	14	M27x40	8,0	95	13,8x1,5	36	65	17,0	10x2,0



With friendly recommendation of HAAS technik GmbH, Ottenhöfen- Furschenbach

No. 6926D

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 [cm³]	Vol. pull [cm³]	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 housing made of steel, blued. Piston and piston rod case-hardened and ground. Tandem sealing and wiper at piston rod. Piston rod with internal thread.

Features:

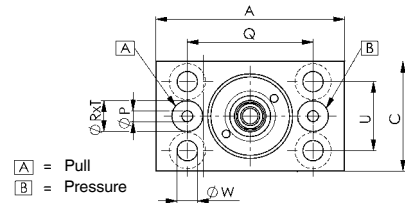
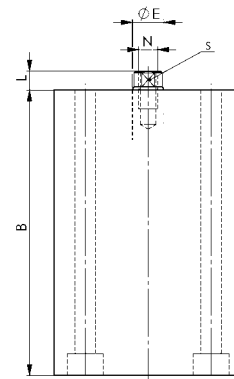
Universal mounting to fixtures through fastening holes.
Each cylinder size is available with three different strokes.

Note:

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

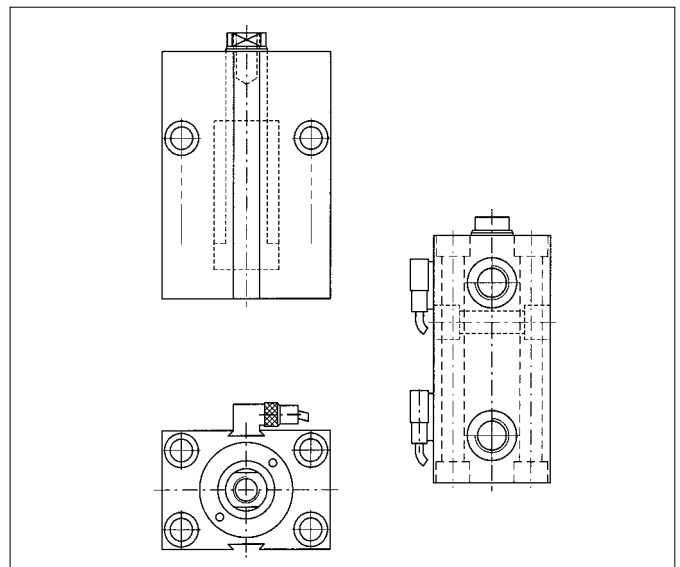
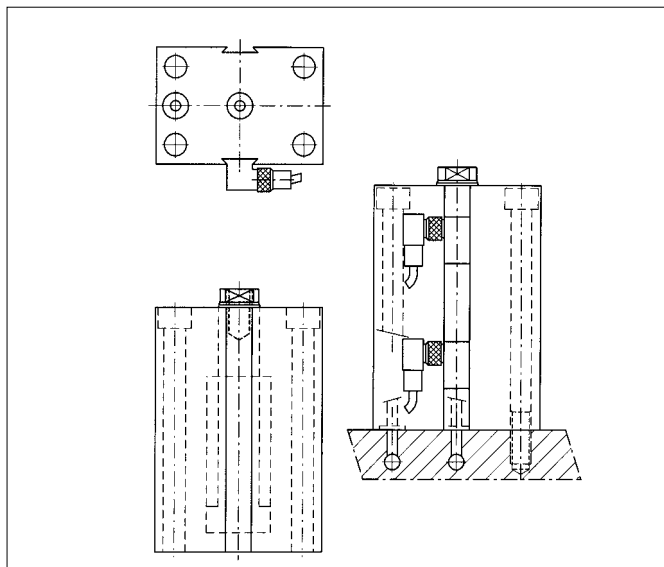
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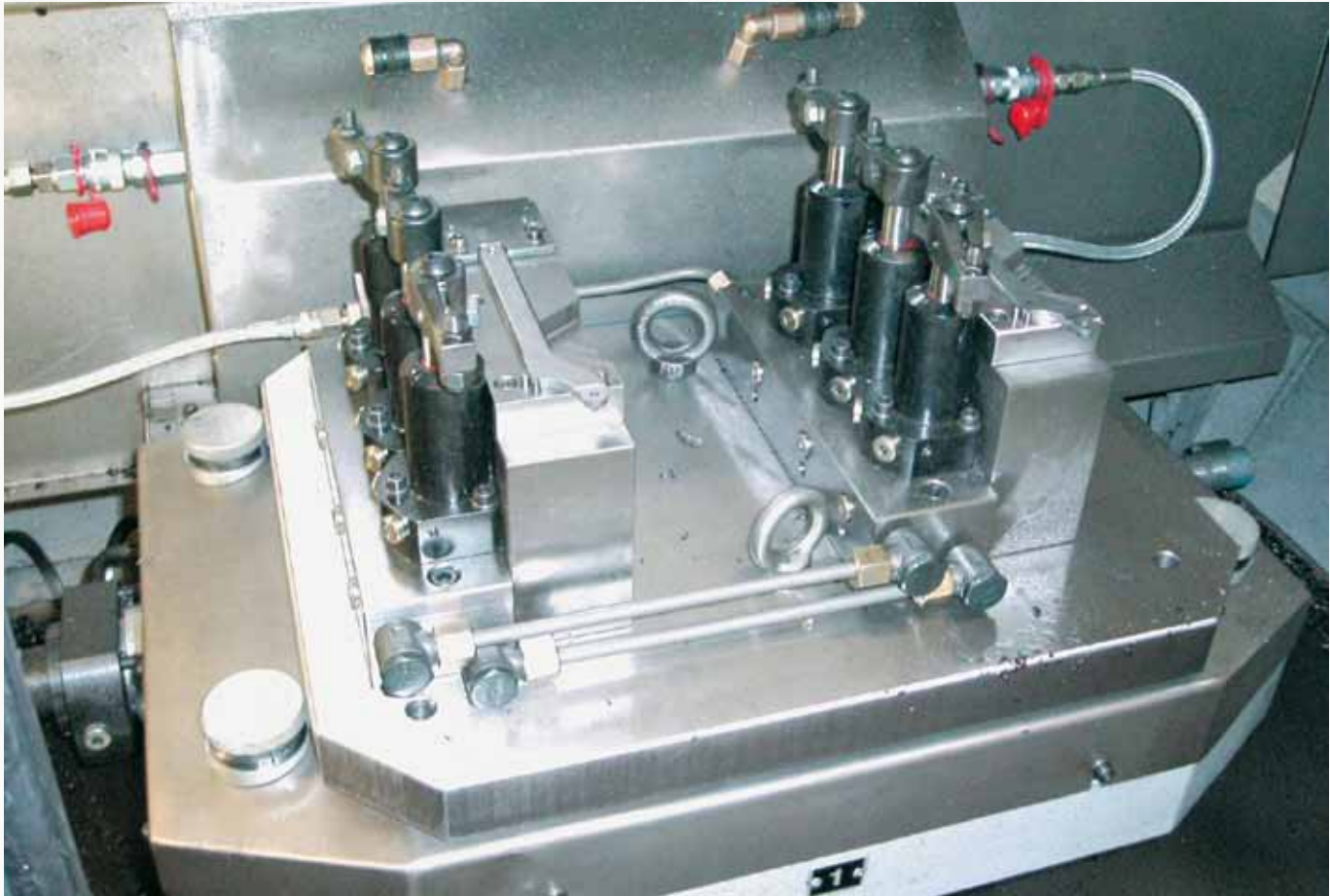
Special sizes are available on request.



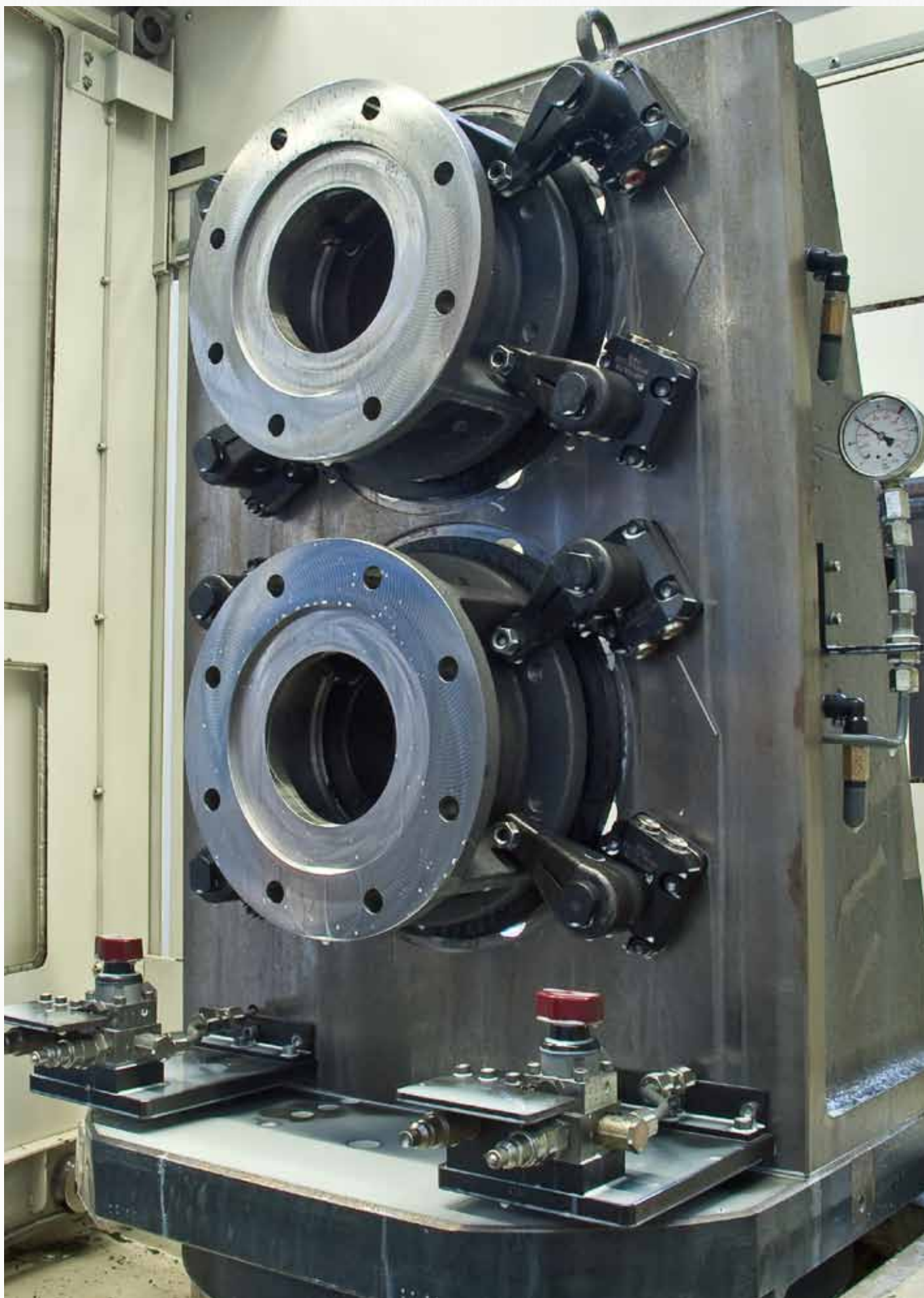
Dimensions:

Order no.	Article no.	A	B	C	dia. E	L	N x depth	dia. P	Q	R x T	S	U	dia. W	o-ring
349696	6926D-8-30	60	56	35	10	6	M6x12	3,5	40	9,8x1,1	8	22	6,5	7x1,5
477554	6926D-8-31	60	91	35	10	6	M6x12	3,5	40	9,8x1,1	8	22	6,5	7x1,5
328153	6926D-8-35	60	144	35	10	6	M6x12	3,5	40	9,8x1,1	8	22	6,5	7x1,5
461434	6926D-12-30	60	61	35	14	7	M8x15	3,5	40	9,8x1,1	10	22	6,5	7x1,5
328393	6926D-12-31	60	95	35	14	7	M8x15	3,5	40	9,8x1,1	10	22	6,5	7x1,5
328179	6926D-12-35	60	148	35	14	7	M8x15	3,5	40	9,8x1,1	10	22	6,5	7x1,5
299487	6926D-20-30	65	64	45	16	7	M10x15	4,0	50	9,8x1,1	13	30	8,5	7x1,5
347575	6926D-20-31	65	94	45	16	7	M10x15	4,0	50	9,8x1,1	13	30	8,5	7x1,5
328195	6926D-20-35	65	144	45	16	7	M10x15	4,0	50	9,8x1,1	13	30	8,5	7x1,5
299339	6926D-32-30	75	75	55	20	10	M12x15	5,0	55	9,8x1,1	17	35	10,5	7x1,5
452821	6926D-32-31	75	100	55	20	10	M12x15	5,0	55	9,8x1,1	17	35	10,5	7x1,5
454975	6926D-32-35	75	150	55	20	10	M12x15	5,0	55	9,8x1,1	17	35	10,5	7x1,5
456160	6926D-50-30	85	79	63	25	10	M16x25	6,0	63	9,8x1,1	22	40	10,5	7x1,5
328419	6926D-50-31	85	104	63	25	10	M16x25	6,0	63	9,8x1,1	22	40	10,5	7x1,5
328211	6926D-50-35	85	154	63	25	10	M16x25	6,0	63	9,8x1,1	22	40	10,5	7x1,5
489567	6926D-78-30	100	90	75	32	10	M20x30	6,0	76	10,8x1,1	27	45	13,0	8x1,5
334847	6926D-78-31	100	115	75	32	10	M20x30	6,0	76	10,8x1,1	27	45	13,0	8x1,5
328237	6926D-78-35	100	165	75	32	10	M20x30	6,0	76	10,8x1,1	27	45	13,0	8x1,5
328252	6926D-125-30	125	102	95	40	14	M27x40	8,0	95	13,8x1,5	36	65	17,0	10x2,0
328278	6926D-125-31	125	135	95	40	14	M27x40	8,0	95	13,8x1,5	36	65	17,0	10x2,0
328294	6926D-125-35	125	172	95	40	14	M27x40	8,0	95	13,8x1,5	36	65	17,0	10x2,0





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:

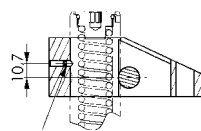
Clamping arm length, max. permissible flow rate Q_{max} (see diagram) and clamping arm weight must be observed! In case of a larger flow rates, a throttle/check valve must be connected upstream.

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

POSITIONING:

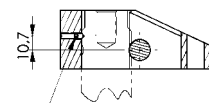
Positioning hole for clamp arm:

single-acting cylinder



Threaded stud

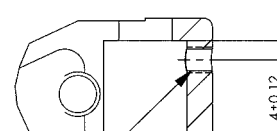
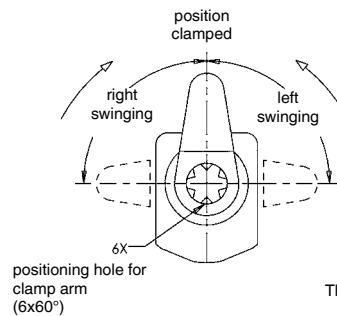
double-acting cylinder



Threaded stud

SWING DIRECTIONS:

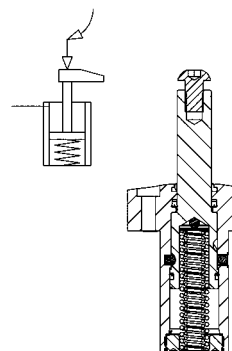
Positioning hole for clamp arm:



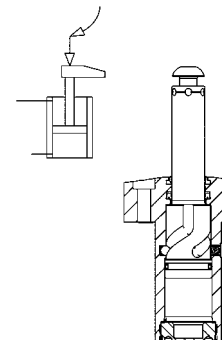
Threaded stud

DESIGNS:

single-acting cylinder

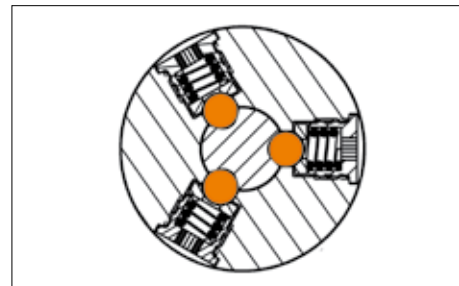
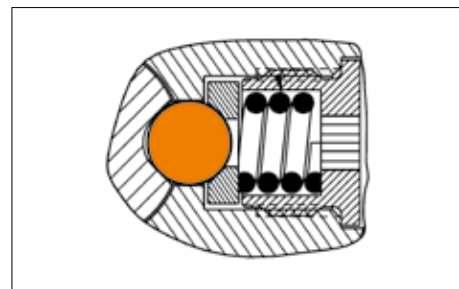


double-acting cylinder



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

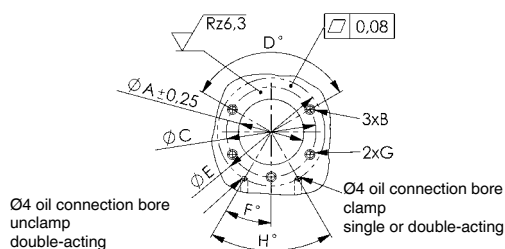
Type 21 = double-acting, right swinging

Type 22 = double-acting, left swinging

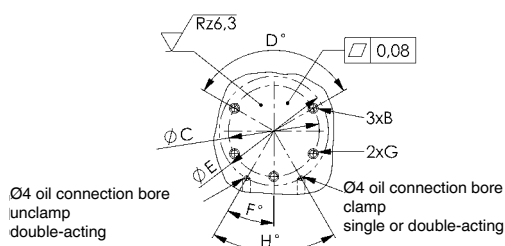
Clamping time and Q of the swing clamps 6951KP and FP

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
22,0	0,5	2,544	1,0	1,272
33,0	0,5	4,116	1,0	2,058

DRILLING TEMPLATE DEVICE:



Article no.	dia. A	B	dia. C	D°	dia. E	F°	G	H°
6951KP-02-XX	25,5	M5	40,0	120	42	30,0	-	60
6951KP-05-XX	36,5	M6	50,0	120	50	55,0	-	110
6951KP-11-XX	44,5	M8	59,4	90	62	22,5	M8	45

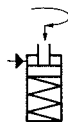


Article no.	B	dia. C	D°	dia. E	F°	G	H°
6951FP-02-XX	M5	40,0	120	42	30,0	-	60
6951FP-05-XX	M6	50,0	120	50	55,0	-	110
6951FP-11-XX	M8	59,4	90	62	22,5	M8	45

No. 6951KP

Swing clamp, top-flange-mounting, precision design

Single-acting,
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 [cm³]	eff. piston area Sp [cm²]	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:

Hardened and burnished steel cylinder barrels. Piston rod hardened and chrome plated.
Piston rod with internal thread and clamping arm positioning function. O-ring for flange seal.
Stripper on the piston rod. Single acting version with return spring from stainless steel. Clamp arm not supplied as standard.

Application:

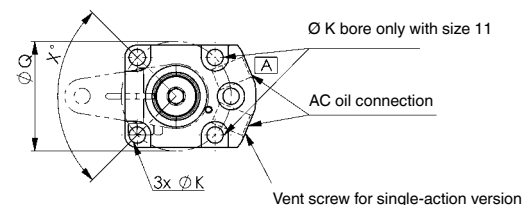
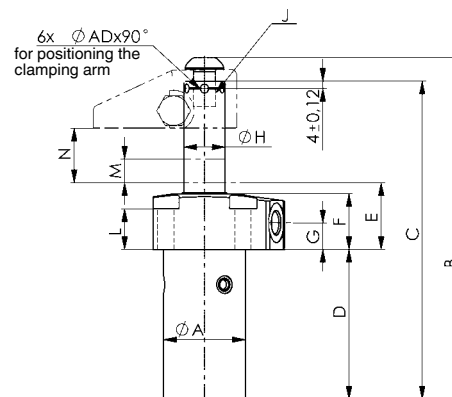
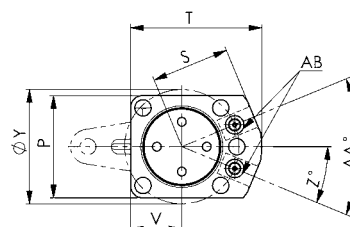
The swivel clamp is used in fixtures in which the workpiece must be freely accessible and inserted from above. Even workpieces with difficult shapes can be clamped using special clamp arms (available on request).

Features:

Each cylinder size is available for single or double-acting operation. Oil supply via threaded connection or oil channel in the fixture body. The swing motion employs a patented ball guide mechanism.

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. Replacement O-ring for flange connections 6951KP-02 and 6951KP-05 available under order no. 183608 for 6951KP-11 under order no. 173096. Other swivel angles are available on request.



[A] = clamping

Dimensions:

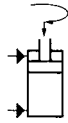
Order no.	Article no.	dia. A	B	C	D	E	F	G	dia. H	J x depth	dia. K	L	M	N	P	dia. Q	S	T	V	X°	dia. Y	Z°	AA°	AB o-ring	AC	AD
327734	6951KP-02-11	25,2	108	101,5	44,0	31,0	26	13,0	11,13	M6x7	3x6	18,0	5,5	14,0	45,0	40,0	31,0	47	15,5	120	42	30,0	60	Ø7,65x1,78	G1/8	3,2
327759	6951KP-02-12	25,2	108	101,5	44,0	31,0	26	13,0	11,13	M6x7	3x6	18,0	5,5	14,0	45,0	40,0	31,0	47	15,5	120	42	30,0	60	Ø7,65x1,78	G1/8	3,2
327767	6951KP-05-11	36,3	143	134,0	64,5	31,5	27	13,0	15,88	M10x12	3x7	17,8	8,0	20,0	57,0	50,0	33,5	54	19,0	120	50	55,0	110	Ø7,65x1,78	G1/8	4,8
327783	6951KP-05-12	36,3	143	134,0	64,5	31,5	27	13,0	15,88	M10x12	3x7	17,8	8,0	20,0	57,0	50,0	33,5	54	19,0	120	50	55,0	110	Ø7,65x1,78	G1/8	4,8
327809	6951KP-11-11	44,2	185	172,0	81,0	36,0	30	14,5	22,23	M12x13	5x9	22,1	13,0	29,5	55,5	59,5	42,0	71	27,5	90	62	22,5	45	Ø6,0x2,0	G1/4	4,8
327825	6951KP-11-12	44,2	185	172,0	81,0	36,0	30	14,5	22,23	M12x13	5x9	22,1	13,0	29,5	55,5	59,5	42,0	71	27,5	90	62	22,5	45	Ø6,0x2,0	G1/4	4,8

Subject to technical alterations.

No. 6951KP

Swing clamp, top-flange-mounting, precision design

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



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. **	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:

Hardened and burnished steel cylinder barrels. Piston rod hardened and chrome plated. Piston rod with internal thread and clamping arm positioning function. O-ring for flange seal. Stripper on the piston rod. Single acting version with return spring from stainless steel. Clamp arm not supplied as standard.

Application:

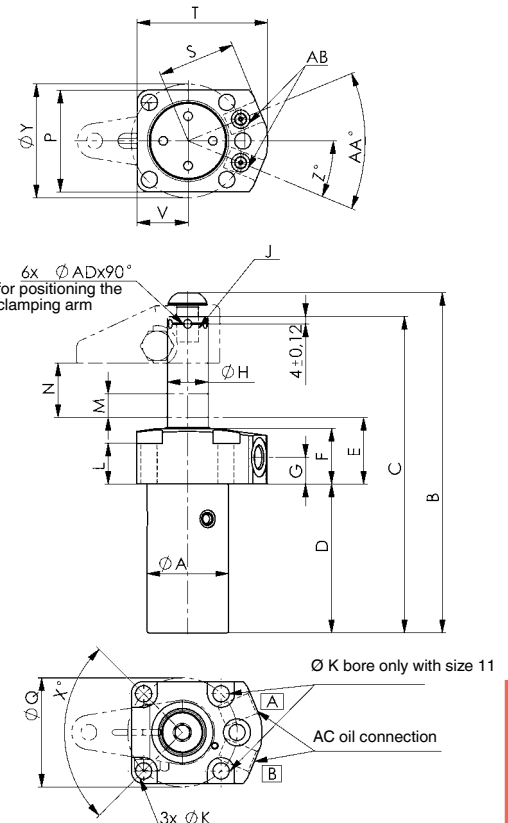
The swivel clamp is used in fixtures in which the workpiece must be freely accessible and inserted from above. Even workpieces with difficult shapes can be clamped using special clamp arms (available on request).

Features:

Each cylinder size is available for single or double-acting operation. Oil supply via threaded connection or oil channel in the fixture body. The swing motion employs a patented ball guide mechanism.

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. Replacement O-ring for flange connections 6951KP-02 and 6951KP-05 available under order no. 183608 for 6951KP-11 under order no. 173096. Other swivel angles are available on request.



[A] = clamping
[B] = unclamping

Dimensions:

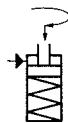
Order no.	Article no.	dia. A	B	C	D	E	F	G	dia. H	J x depth	dia. K	L	M	N	P	dia. Q	S	T	V	X°	dia. Y	Z°	AA°	AB o-ring	AC	AD
327841	6951KP-02-21	25,2	108	101,5	44,0	31,0	26	13,0	11,13	M6x7	3x6	18,0	5,5	14,0	45,0	40,0	31,0	47	15,5	120	42	30,0	60	Ø7,65x1,78	G1/8	3,2
327866	6951KP-02-22	25,2	108	101,5	44,0	31,0	26	13,0	11,13	M6x7	3x6	18,0	5,5	14,0	45,0	40,0	31,0	47	15,5	120	42	30,0	60	Ø7,65x1,78	G1/8	3,2
327882	6951KP-05-21	36,3	143	134,0	64,5	31,5	27	13,0	15,88	M10x12	3x7	17,8	8,0	20,0	57,0	50,0	33,5	54	19,0	120	50	55,0	110	Ø7,65x1,78	G1/8	4,8
327908	6951KP-05-22	36,3	143	134,0	64,5	31,5	27	13,0	15,88	M10x12	3x7	17,8	8,0	20,0	57,0	50,0	33,5	54	19,0	120	50	55,0	110	Ø7,65x1,78	G1/8	4,8
327924	6951KP-11-21	44,2	185	172,0	81,0	36,0	30	14,5	22,23	M12x13	5x9	22,1	13,0	29,5	55,5	59,5	42,0	71	27,5	90	62	22,5	45	Ø6,0x2,0	G1/4	4,8
327940	6951KP-11-22	44,2	185	172,0	81,0	36,0	30	14,5	22,23	M12x13	5x9	22,1	13,0	29,5	55,5	59,5	42,0	71	27,5	90	62	22,5	45	Ø6,0x2,0	G1/4	4,8

Subject to technical alterations.

No. 6951FP

Swing clamp, base-flange-mounting, precision design

Single-acting,
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 [cm³]	eff. piston area Sp [cm²]	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:

Hardened and burnished steel cylinder barrels. Piston rod hardened and chrome plated. Piston rod with internal thread and clamping arm positioning function. O-ring for flange seal. Stripper on the piston rod. Single acting version with return spring from stainless steel. Clamp arm not supplied as standard.

Application:

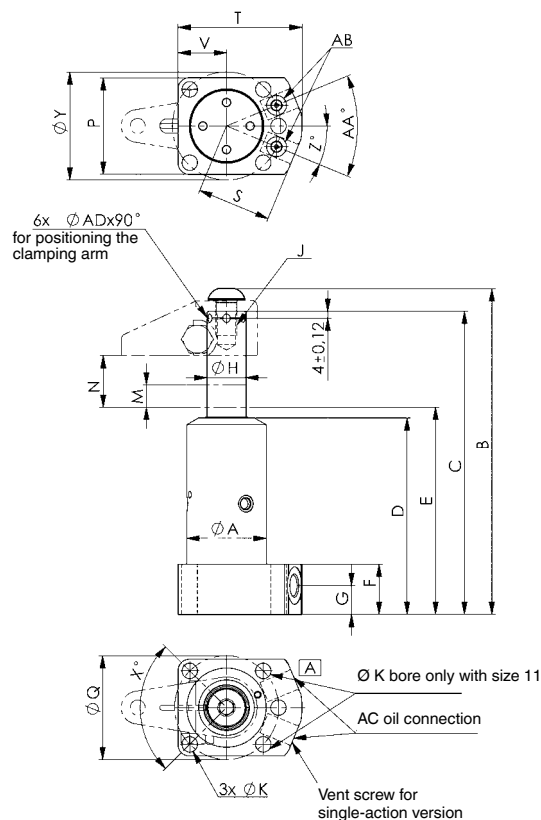
The swivel clamp is used in fixtures in which the workpiece must be freely accessible and inserted from above. Even workpieces with difficult shapes can be clamped using special clamp arms (available on request).

Features:

Each cylinder size is available for single or double-acting operation. Oil supply via threaded connection or oil channel in the fixture body. The swing motion employs a patented ball guide mechanism.

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. Replacement O-ring for flange connection is available under Order No. 183608. Other swivel angles are available on request.



[A] = clamping

Dimensions:

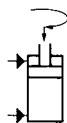
Order no.	Article no.	dia. A	B	C	D	E	F	G	dia. H	J x depth	dia. K	M	N	P	dia. Q	S	T	V	X°	dia. Y	Z°	AA°	AB o-ring	AC	AD
327775	6951FP-02-11	26,5	109,5	103,0	71,0	76,0	26,5	13,5	11,13	M6x7	6	5,5	14,0	45	40,0	31,0	47	15,5	120	42	30,0	60	Ø7,65x1,78	G1/8	3,2
327791	6951FP-02-12	26,5	109,5	103,0	71,0	76,0	26,5	13,5	11,13	M6x7	6	5,5	14,0	45	40,0	31,0	47	15,5	120	42	30,0	60	Ø7,65x1,78	G1/8	3,2
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	Ø7,65x1,78	G1/8	4,8
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	Ø7,65x1,78	G1/8	4,8
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	Ø7,65x1,78	G1/4	4,8
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	Ø7,65x1,78	G1/4	4,8

Subject to technical alterations.

No. 6951FP

Swing clamp, base-flange-mounting, precision design

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



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. **	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:

Hardened and burnished steel cylinder barrels. Piston rod hardened and chrome plated. Piston rod with internal thread and clamping arm positioning function. O-ring for flange seal. Stripper on the piston rod. Single acting version with return spring from stainless steel. Clamp arm not supplied as standard.

Application:

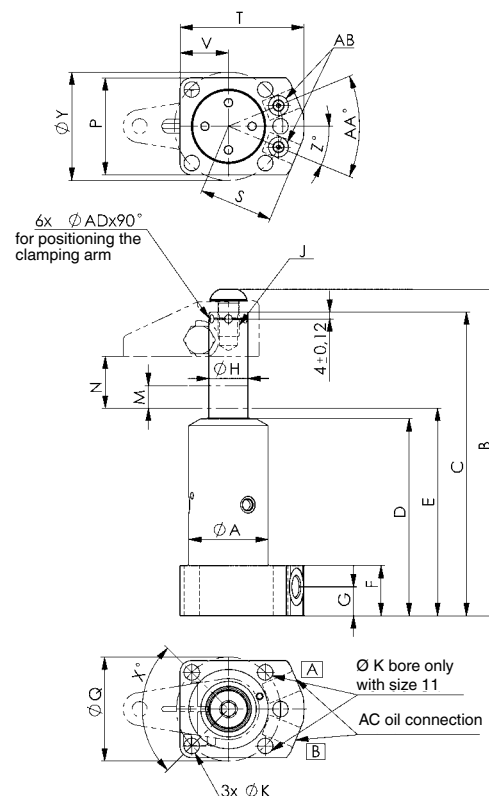
The swivel clamp is used in fixtures in which the workpiece must be freely accessible and inserted from above. Even workpieces with difficult shapes can be clamped using special clamp arms (available on request).

Features:

Each cylinder size is available for single or double-acting operation. Oil supply via threaded connection or oil channel in the fixture body. The swing motion employs a patented ball guide mechanism.

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. Replacement O-ring for flange connection is available under Order No. 183608. Other swivel angles are available on request.



[A] = clamping
[B] = unclamping

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°	AB o-ring	AC	AD
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	Ø7,65x1,78	G1/8	3,2
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	Ø7,65x1,78	G1/8	3,2
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	Ø7,65x1,78	G1/8	4,8
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	Ø7,65x1,78	G1/8	4,8
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	Ø7,65x1,78	G1/4	4,8
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	Ø7,65x1,78	G1/4	4,8

Subject to technical alterations.

No. 6951

Swing Clamp Arm, standard



Order no.	Article no.	for size	A	B	C	dia. E	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:

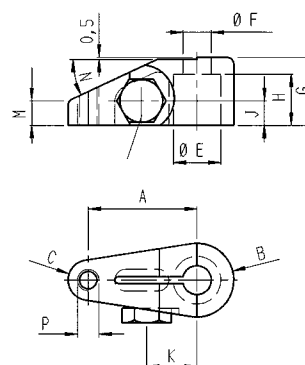
Tempered and blued steel.

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	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:

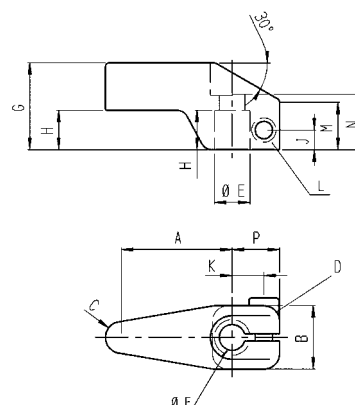
Tempered and blued steel.

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.



No. 6951

Swing Clamp Arm, long



Order no.	Article no.	for size	A	B	C	D	dia. E	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:

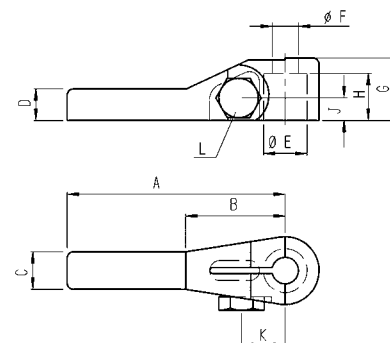
Tempered and blued steel.

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	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:

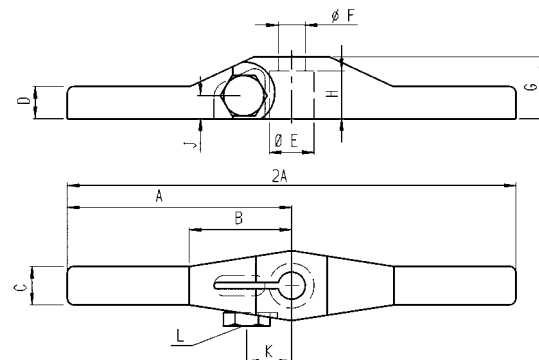
Tempered and blued steel.

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.



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:

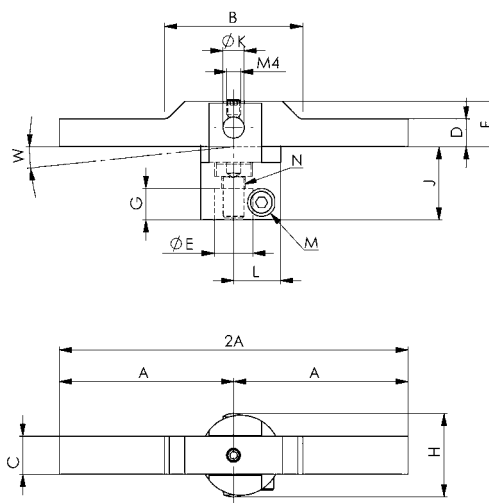
Steel, blued. Clamping arm tempered.

Application:

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

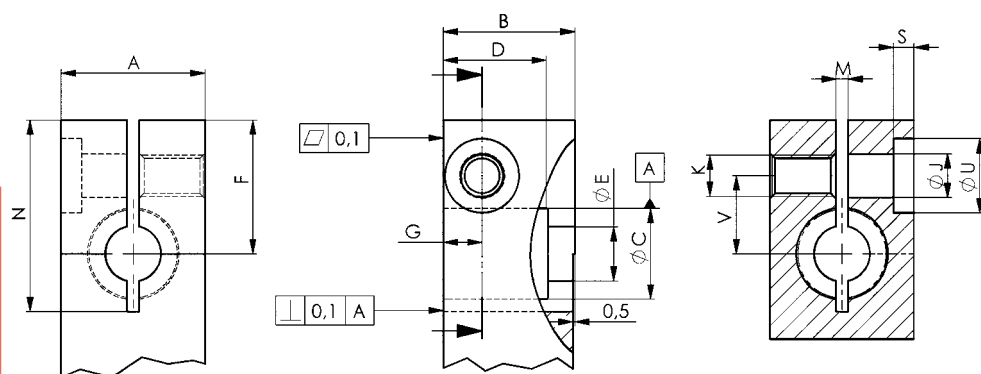
Note:

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 2968m

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.



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 NOTES:

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.

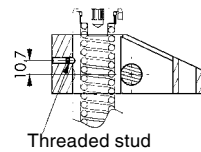
The motion of the swing clamp must not be obstructed. Clamping must only be done in the vertical stroke area.



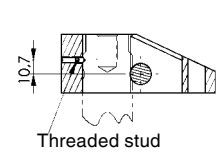
POSITIONING:

Positioning hole for clamp arm:

Single acting cylinder

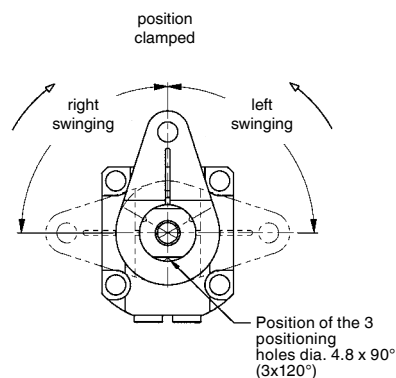


Double acting cylinder



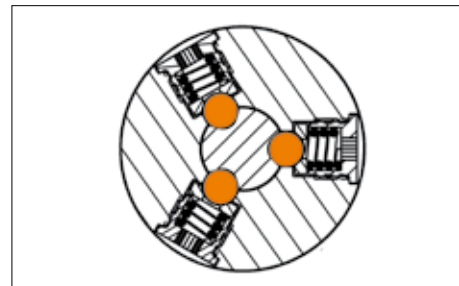
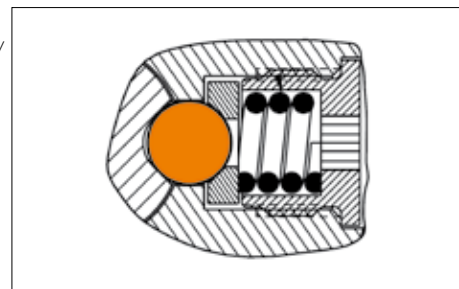
SWING DIRECTIONS:

Positioning hole for clamp arm:



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

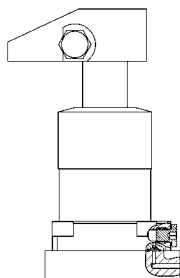
Type 22 = double-acting, left swinging

Type 210 = double-acting, right swinging, extended stroke

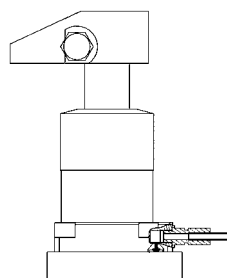
Type 220 = double-acting, left swinging, extended stroke

CONNECTION OPTIONS:

> O-ring connection



> Threaded connection



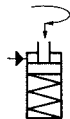
Clamping time and Q of the swing clamps 6951KP and FP

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.]
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
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,
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 [cm³]	effective piston area [cm²]	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 housing made of steel, hardened and blued. Piston rod case-hardened and chrome plated. Wiper at piston rod. Return spring made of stainless steel. Clamp arm not included.

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:

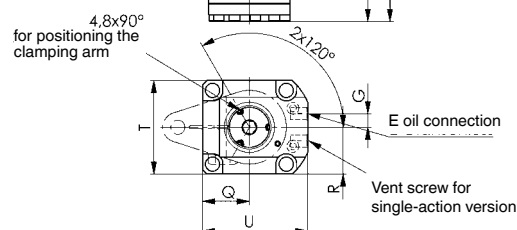
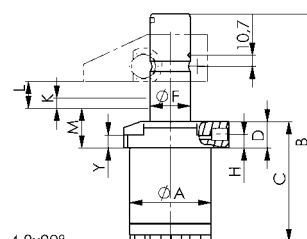
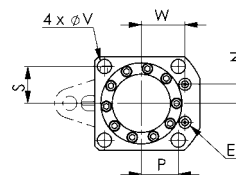
Oil supply via threaded connection or oil channel in the fixture body. The swing motion employs a ball guide mechanism.

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.

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

Replacement O-ring for flange connection is available under Order No. 183608. Other swivel angles are available on request.



Dimensions:

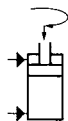
Order no.	Article no.	A	B	C	D	E	F	G	H	K	L	M	N	P	Q	R	S	T	U	V	W	Y	EE o-ring
327155	6951KP-22-11	62,8	196,0	104,5	25	G1/4	31,74	13	13	14,5	28	33,5	14,5	27,4	35,5	35,5	27,4	71	85,5	10,7	35,1	13,0	7,65x1,78
327163	6951KP-22-12	62,8	196,0	104,5	25	G1/4	31,74	13	13	14,5	28	33,5	14,5	27,4	35,5	35,5	27,4	71	85,5	10,7	35,1	13,0	7,65x1,78
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	7,65x1,78
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	7,65x1,78

Subject to technical alterations.

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 [cm³]	Vol. Lo [cm³]	eff. piston area Sp [cm²]	eff. piston area Lo [cm²]	Q max. [l/min]	Weight [g]
327197	6951KP-22-21	22	54	14,5	28,0	21,2	43,3	7,6	15,5	2,5	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:

Cylinder housing made of steel, hardened and blued. Piston rod case-hardened and chrome plated. Wiper at piston rod. Clamp arm not included.

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:

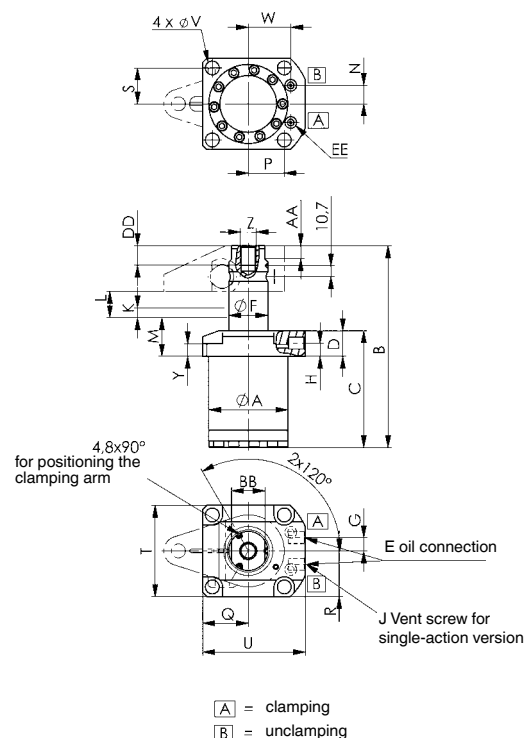
Oil supply via threaded connection or oil channel in the fixture body. The swing motion employs a ball guide mechanism.

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. 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.

Replacement O-ring for flange connection is available under Order No. 183608. Other swivel angles are available on request.



A = clamping
B = unclamping

Dimensions:

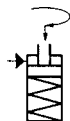
Order no.	Article no.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	Y	Z	AA	BB	DD	EE o-ring
327197	6951KP-22-21	62,8	185,5	104,5	25	G1/4	31,74	13	13	G1/4	14,5	28,0	33,5	14,5	27,4	35,5	35,5	27,4	71	85,5	10,7	35,1	13,0	M16	12,5	26,5	19	7,65x1,78
327205	6951KP-22-22	62,8	185,5	104,5	25	G1/4	31,74	13	13	G1/4	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	19	7,65x1,78
327213	6951KP-22-210**	62,8	220,5	122,0	25	G1/4	31,74	13	13	G1/4	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	19	7,65x1,78
327221	6951KP-22-220	62,8	220,5	122,0	25	G1/4	31,74	13	13	G1/4	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	19	7,65x1,78
327239	6951KP-33-21	77,0	196,5	114,0	25	G1/4	38,09	13	13	G1/4	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	19	7,65x1,78
327247	6951KP-33-22	77,0	196,5	114,0	25	G1/4	38,09	13	13	G1/4	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	19	7,65x1,78
327254	6951KP-33-210**	77,0	228,5	130,0	25	G1/4	38,09	13	13	G1/4	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	19	7,65x1,78
327262	6951KP-33-220**	77,0	228,5	130,0	25	G1/4	38,09	13	13	G1/4	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	19	7,65x1,78

Subject to technical alterations.

No. 6951FP

Swing Clamp, base-flange-mounting

single acting,
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 [cm³]	effective piston area [cm²]	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 housing made of steel, hardened and blued. Piston rod case-hardened and chrome plated. Wiper at piston rod. Return spring made of stainless steel. Clamp arm not included.

Application:

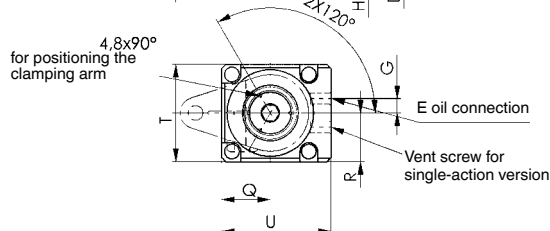
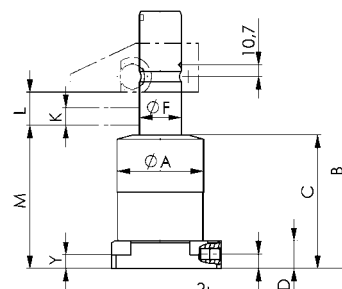
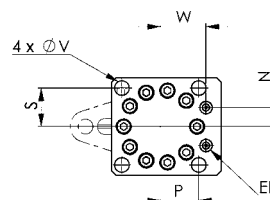
The swing clamp is used particularly in fixtures in which the workpieces must be freely accessible and placed from above. Workpieces with difficult shapes can also be clamped using special clamp arms (available on request).

Features:

Oil supply via threaded connection or oil channel in the fixture body. The swing motion employs a 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. To control the oil feed, the throttle/check valve no. 6916-12-04 can be optionally used. Replacement O-ring for flange connection available on request under Order No. 183608. Other swivel angles are available on request.



Dimensions:

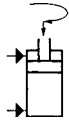
Order no.	Article no.	A	B	C	D	E	F	G	H	K	L	M	N	P	Q	R	S	T	U	V	W	Y	EE o-ring
327270	6951FP-22-11	62,8	204,0	112,0	25	G1/4	31,74	13	12,5	14,5	28	121,0	14,5	27,4	35,5	35,5	27,4	71	85,5	10,7	35,1	13,0	7,65x1,78
327288	6951FP-22-12	62,8	204,0	112,0	25	G1/4	31,74	13	12,5	14,5	28	121,0	14,5	27,4	35,5	35,5	27,4	71	85,5	10,7	35,1	13,0	7,65x1,78
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	7,65x1,78
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	7,65x1,78

Subject to technical alterations.

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 [cm³]	Vol. Lo [cm³]	eff. piston area Sp [cm²]	eff. piston area Lo [cm²]	Q max. [l/min]	Weight [g]
327312	6951FP-22-21	22	54	14,5	28	21,2	43,3	7,6	15,5	2,5	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 housing made of steel, hardened and blued. Piston rod case-hardened and chrome plated. Wiper at piston rod. Clamp arm not included.

Application:

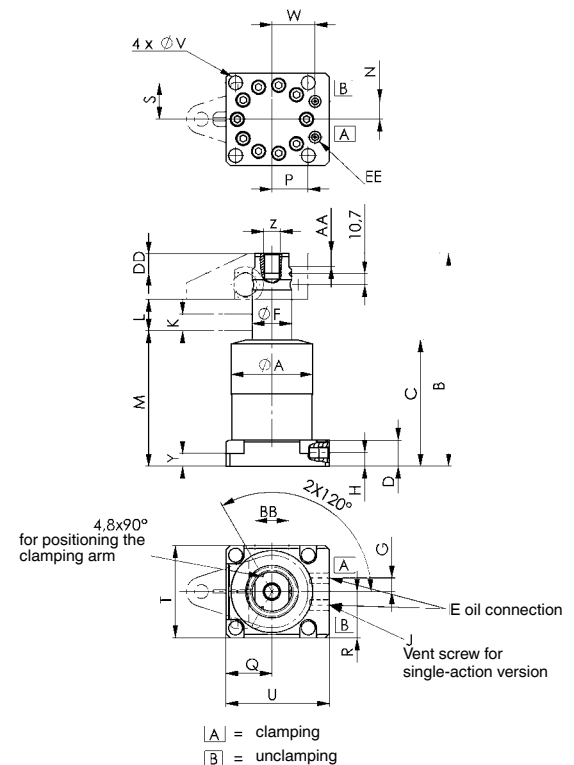
The swing clamp is used particularly in fixtures in which the workpieces must be freely accessible and placed from above. Workpieces with difficult shapes can also be clamped using special clamp arms (available on request).

Features:

Oil supply via threaded connection or oil channel in the fixture body. The swing motion employs a 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. 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. Replacement O-ring for flange connection available on request under Order No. 183608. Other swivel angles are available on request.



Dimensions:

Order no.	Article no.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	Y	Z	AA	BB	DD	EE o-ring
327312	6951FP-22-21	62,8	194	112,0	25	G1/4	31,74	13	12,5	G1/4	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	19	7,65x1,78
327320	6951FP-22-22	62,8	194	112,0	25	G1/4	31,74	13	12,5	G1/4	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	19	7,65x1,78
327338	6951FP-33-21	79,0	205	121,5	25	G1/4	38,09	13	13,0	G1/4	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	19	7,65x1,78
327346	6951FP-33-22	79,0	205	121,5	25	G1/4	38,09	13	13,0	G1/4	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	19	7,65x1,78

No. 6951N

Swing Clamp Arm, standard



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:

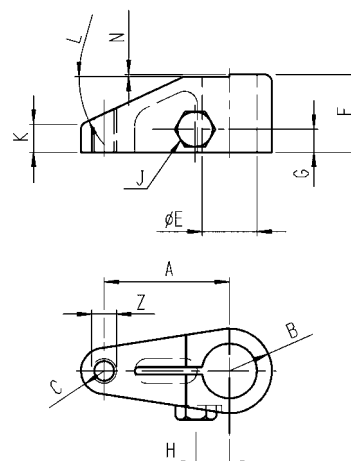
Tempered and blued steel.

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



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:

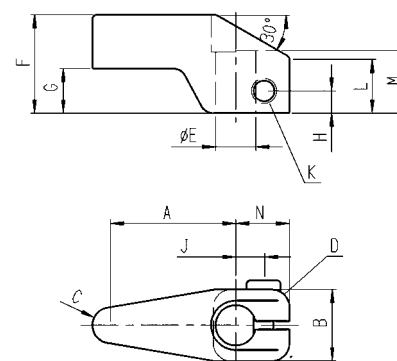
Tempered and blued steel.

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.



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:

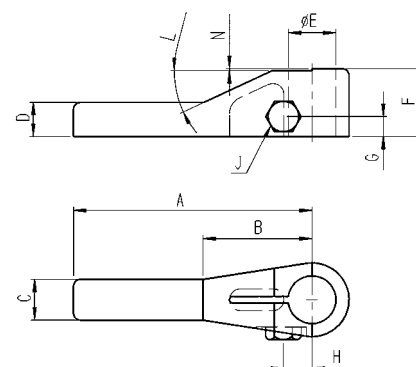
Tempered and blued steel.

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:

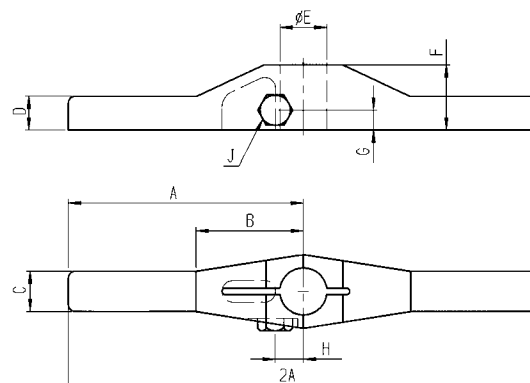
Tempered and blued steel.

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.



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:

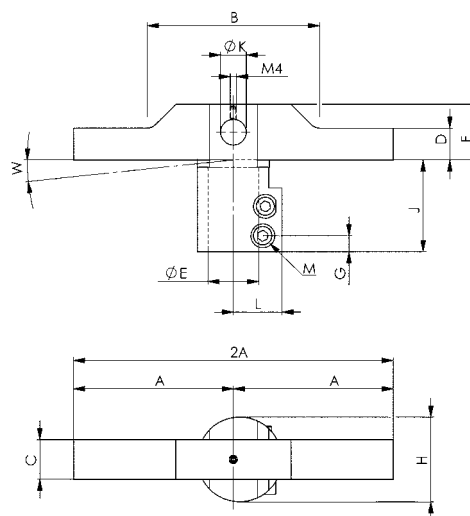
Steel, blued. Clamping arm tempered.

Application:

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

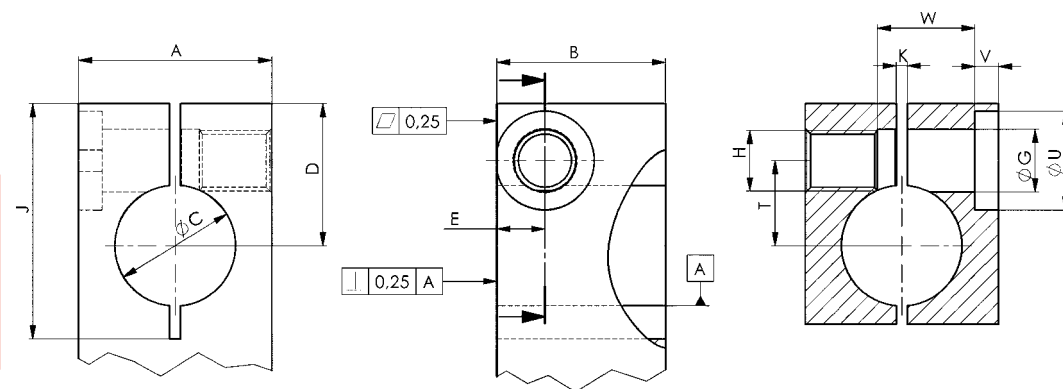
Note:

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 2968m

Important note:

Lever lengths and lever weights must be observed!

Dimensions table (proprietary manufacture)

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

Subject to technical alterations.

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

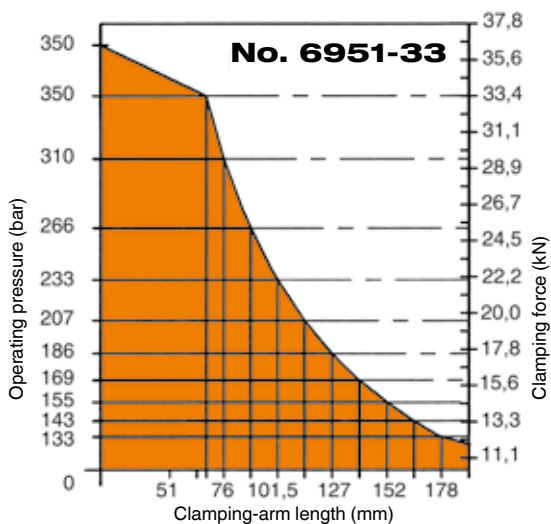
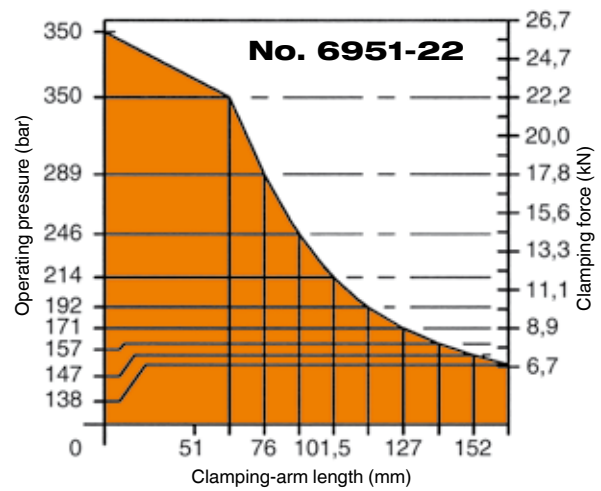
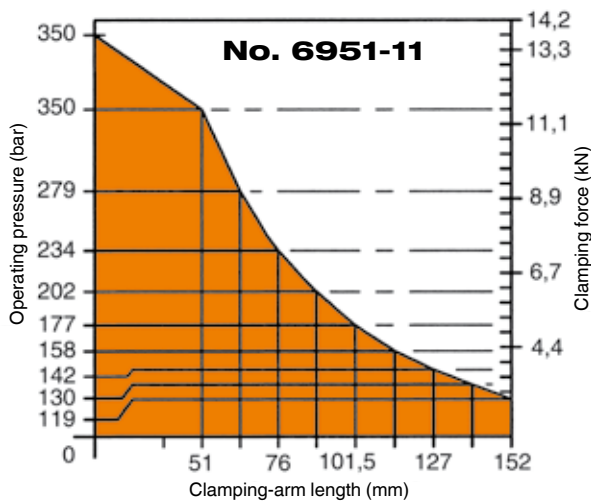
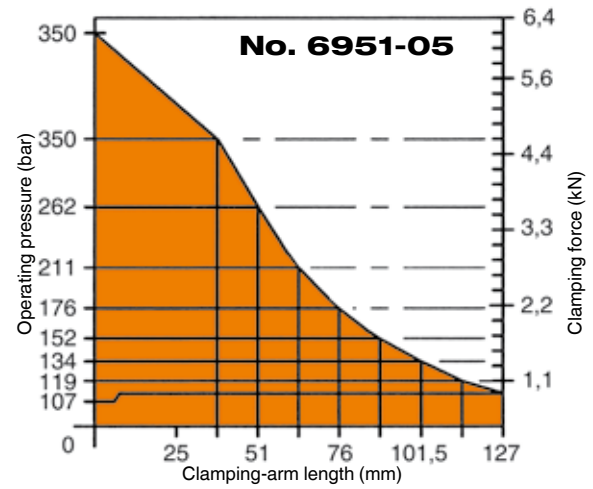
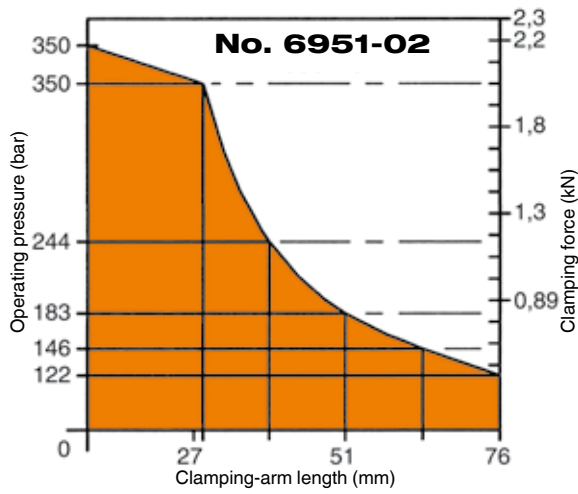
Size 33

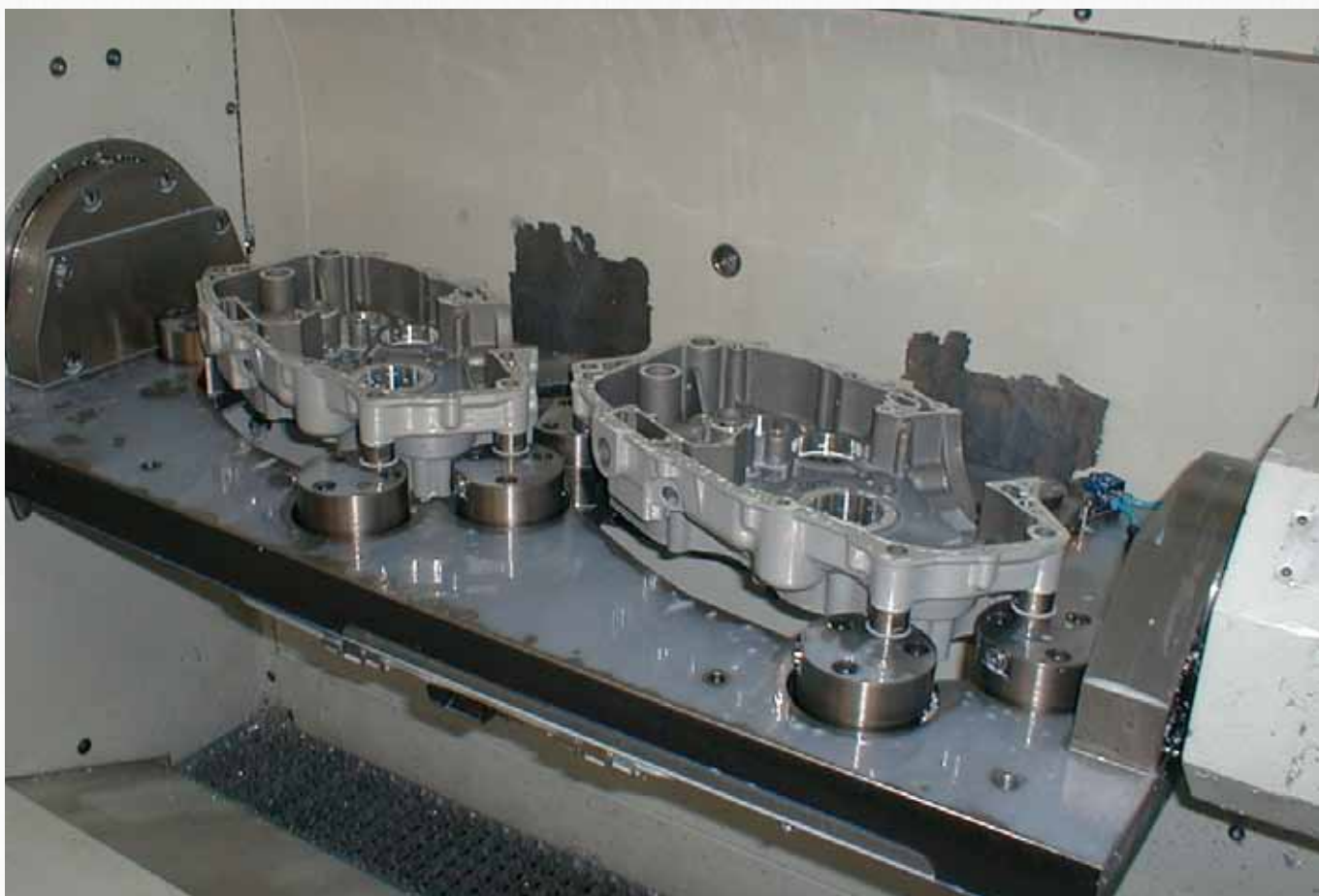
Clamping arm length	mm	68	101,5	178
Max. clamping pressure	bar	350	233	133
Clamping force	kN	33,4	22,2	12
Output flow	l/min.	2,5	1,7	1,0
Max. clamping-arm weight	g	3311		
Spring force*	N	1188		

* single-acting version

DIAGRAM DESCRIPTION:

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





No. 6958E-XX

Vertical clamp, cartridge flange

Double-acting,
max. operating pressure 250 bar,
min. operating pressure 20 bar



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

Sp = clamp, Lo = unclamp

Design:

Housing made of 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 unattached.

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.

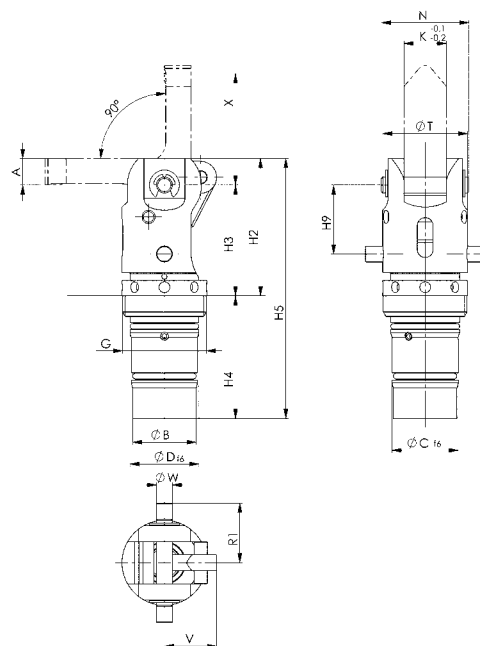
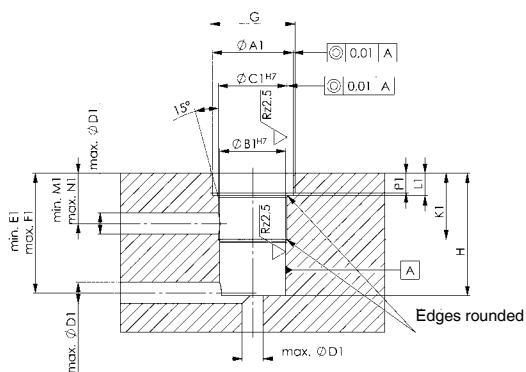
Note:

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.	A	dia. B	dia. C	dia. D	G	H2	H3	H4	H5	H9	K	N	R1	dia. T	V	dia. W
328013	6958E-20	10	24	25	26	M32x1,5	51,8	41,8	46,2	98	26	16	33,0	22,5	32	19,69	6
328039	6958E-30	15	36	37	38	M48x1,5	77,0	62,0	69,0	146	38	24	49,5	33,0	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	K1	L1	min. M1	max. N1	P1
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
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

Subject to technical alterations.

No. 6958E-XX-0X

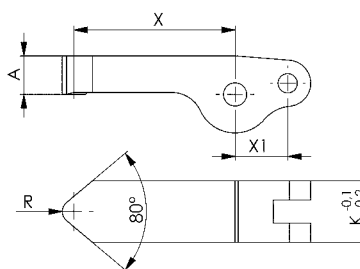
Steel clamping arm

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*	A	K	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

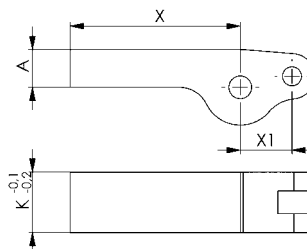
Clamping arm blank from steel

Unhardened steel,
for vertical clamps 6958E-XX



Order no.	Article no.	X	X1*	A	K	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°



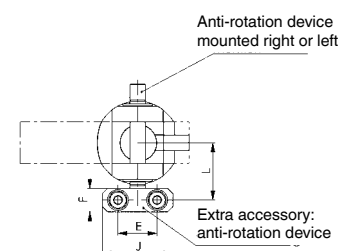
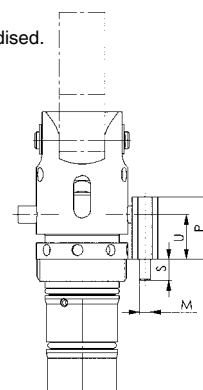
No. 6958E-XX-00-00

Anti-rotation device

Order no.	Article no.	E	F	J	L	M	P	S	U	Weight [g]
328963	6958E-20-00-00	15	9	27	22,0	M4	22	7	15,8	40
328989	6958E-30-00-00	25	15	40	31,5	M6	32	10	24,0	145

Design:

Made of aluminium, black anodised.

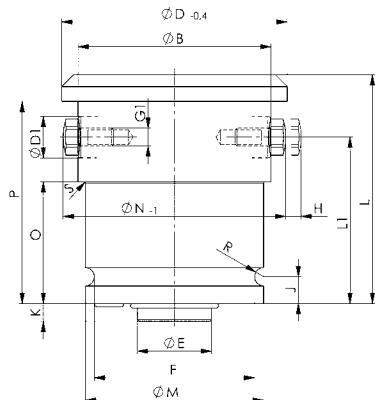
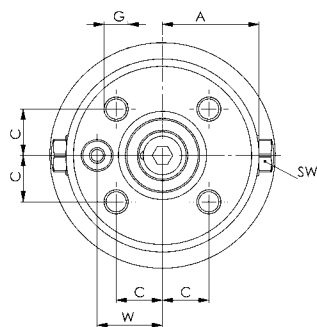


Subject to technical alterations.

No. 6974

Centring clamp with two clamping points

Double-acting,
max. operating pressure 250 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]
328799	6974-2054	3,2	8,0	2	54-62	4,0	±0,02	12	1754
328831	6974-2061	3,2	8,0	2	61-69	4,0	±0,02	12	1754
328864	6974-2068	3,2	8,0	2	68-76	4,0	±0,02	12	1754
327619	6974-2076	5,0	12,5	2	76-84	5,2	±0,02	14	1754
328872	6974-2083	5,0	12,5	2	83-91	5,2	±0,02	14	1754
328914	6974-2090	5,0	12,5	2	90-98	5,2	±0,02	14	1754

Design:

Double-acting centring clamp with two clamping points.
All components made of high-grade tempered and nitrated steel.

Application:

For centring and clamping workpieces with machined or cast holes, cutouts or penetrations.
Element screwed directly onto the fixture body, sealed with O-ring.

Features:

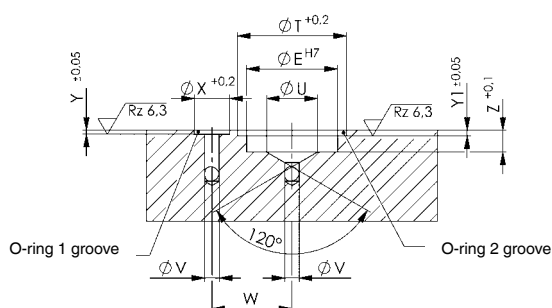
The centring clamp is fastened from below; oil is supplied through drilled channels in the fixture body.
If the centring clamp is fastened from above and oil supplied through conduits drilled in the fixture body, a connection plate for O-ring connection is needed.
If the centring clamp is fastened from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

Note:

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

On request:

Other sizes available on request.



O-ring

Order no.	Dimension [mm]	Weight [g]
409508	5x1,5	0,2
537985	17,17x1,78	0,2
161810	7x1,5	0,2
321265	26x2	0,2

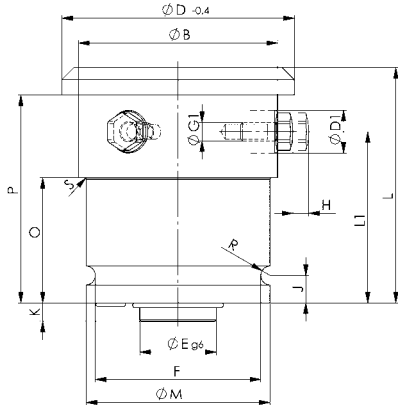
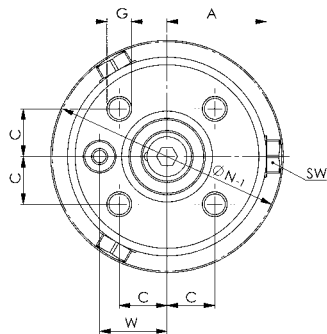
Dimensions:

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	O-ring 1	O-ring 2
328799	6974-2054	22,9	45	11,3	53,9	16	40	M6x12	M6	8	6	65	45	45	0	57	2,6	0	10	20,5	8	3	16,8	7,7	1,1	1,5	6	5x1,5	17,17x1,78
328831	6974-2061	22,9	45	11,3	60,9	16	40	M6x12	M6	8	6	65	45	45	0	57	2,6	0	10	20,5	8	3	16,8	7,7	1,1	1,5	6	5x1,5	17,17x1,78
328864	6974-2068	22,9	45	11,3	67,9	16	40	M6x12	M6	8	6	65	45	45	0	57	2,6	0	10	20,5	8	3	16,8	7,7	1,1	1,5	6	5x1,5	17,17x1,78
327619	6974-2076	32,5	65	15,6	75,9	25	54	M8x16	M6	9	6	77	56	60	41	68	3,1	0,5	11	30,0	14	4	22,0	9,8	1,1	1,5	6	7x1,5	26x2
328872	6974-2083	32,5	65	15,6	82,9	25	54	M8x16	M6	9	6	77	56	60	41	68	3,1	0,5	11	30,0	14	4	22,0	9,8	1,1	1,5	6	7x1,5	26x2
328914	6974-2090	32,5	65	15,6	89,9	25	54	M8x16	M6	9	6	77	56	60	41	68	3,1	0,5	11	30,0	14	4	22,0	9,8	1,1	1,5	6	7x1,5	26x2

No. 6974

Centring clamp with three clamping points

Double-acting,
max. operating pressure 250 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]
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

Design:

Double-acting centring clamp with three clamping points.
All components made of high-grade tempered and nitrated steel.

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.

To fasten the centring clamp by means of an O-ring connection or pipe connection, the connection plate no. 6974-XXXX-X is required.

Features:

If the centring clamp is fastened from below, oil is supplied through conduits drilled in the fixture body.
Pressure pieces are replaceable.

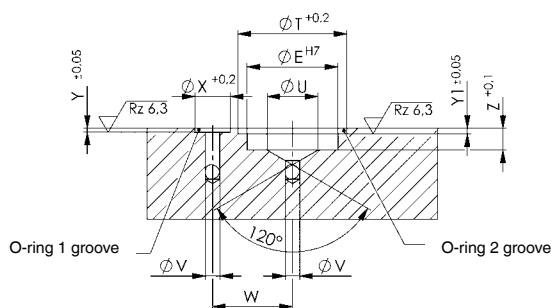
Note:

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.



O-ring

Order no.	Dimension [mm]	Weight [g]
409508	5x1,5	0,2
537985	17,17x1,78	0,2
161810	7x1,5	0,2
321265	26x2	0,2

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	O-ring 1	O-ring 2
328773	6974-3054	22,9	45	11,3	53,9	16	40	M6x12	M6	8	6	65	45	45	0	57	2,6	0	10	20,5	8	3	16,8	7,7	1,1	1,5	6	5x1,5	17,17x1,78
328815	6974-3061	22,9	45	11,3	60,9	16	40	M6x12	M6	8	6	65	45	45	0	57	2,6	0	10	20,5	8	3	16,8	7,7	1,1	1,5	6	5x1,5	17,17x1,78
328849	6974-3068	22,9	45	11,3	67,9	16	40	M6x12	M6	8	6	65	45	45	0	57	2,6	0	10	20,5	8	3	16,8	7,7	1,1	1,5	6	5x1,5	17,17x1,78
327593	6974-3076	32,5	65	15,6	75,9	25	54	M8x16	M6	9	6	77	56	60	41	68	3,1	0,5	11	30,0	14	4	22,0	9,8	1,1	1,5	6	7x1,5	26x2
328856	6974-3083	32,5	65	15,6	82,9	25	54	M8x16	M6	9	6	77	56	60	41	68	3,1	0,5	11	30,0	14	4	22,0	9,8	1,1	1,5	6	7x1,5	26x2
328898	6974-3090	32,5	65	15,6	89,9	25	54	M8x16	M6	9	6	77	56	60	41	68	3,1	0,5	11	30,0	14	4	22,0	8,8	1,1	1,5	6	7x1,5	26x2

No. 6974-XXXX-1

Connection plate for centring clamp

for O-ring connection

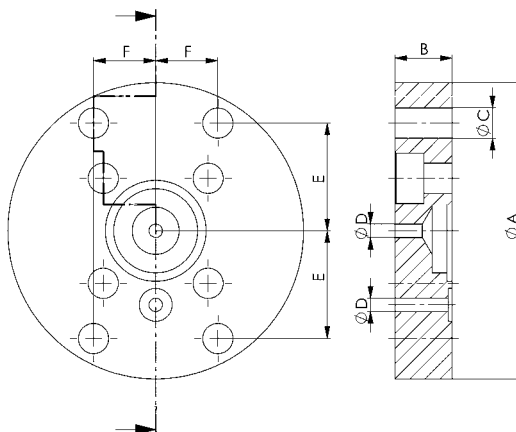
Order no.	Article no.	dia. Ax B [mm]	dia. C	dia. D	E	F	Screw (4 pieces)	Weight [g]
328971	6974-5476-1	68x15	6,6	3	24,2	14,0	M6x16	370
328997	6974-7698-1	88x17	9,0	4	32,0	18,5	M8x20	680

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.



No. 6974-XXXX-2

Connection plate for centring clamp

for pipeline connection

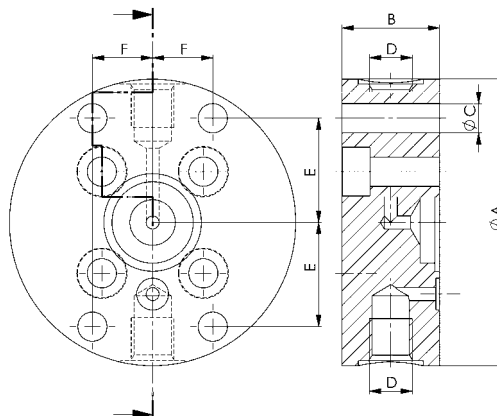
Order no.	Article no.	dia. Ax B [mm]	dia. C	dia. D	E	F	Screw (4 pieces)	Weight [g]
329011	6974-5476-2	68x30	6,6	G1/4	24,2	14,0	M6x35	725
329037	6974-7698-2	88x30	9,0	G1/4	32,0	18,5	M8x35	1210

Design:

Tempering steel, TEM-deburred and phosphatised.

Application:

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

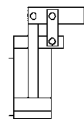




No. 6942KK

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 [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

Sp = clamp, Lo = unclamp

Design:

Cylinder housing made of steel. Piston and hinge pins from hardened, tempered and nitrided steel. Metal wiper integrated into the housing to protect the dirt. Improved Sealings. Scope of supply includes hinge pins, tension plates, fastening screws but not clamping arm. The threaded connections are suitable for throttle/check valves no. 6916-12-XX (flow control valves).

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:

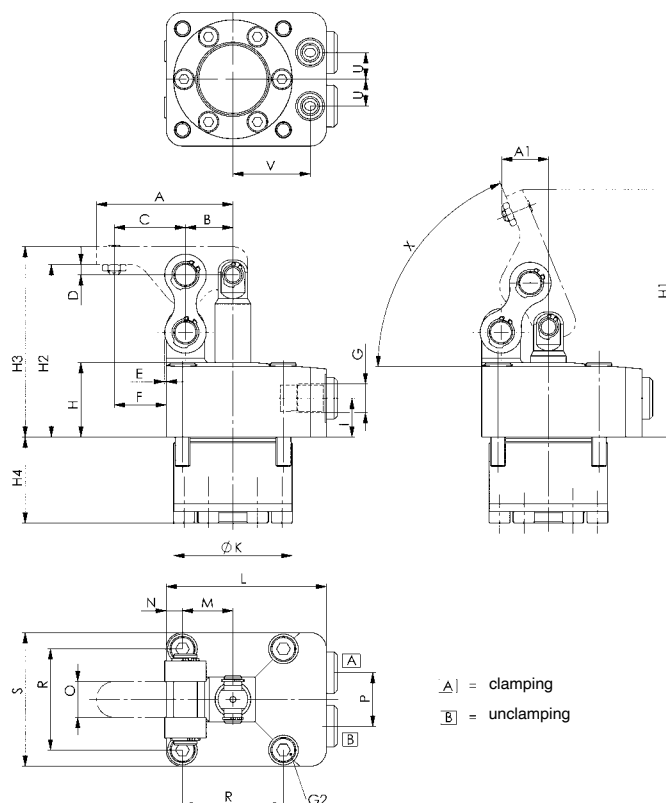
Top-flange version, hydraulic pressure supply through threaded ports on the rear side face, or through oil ports in the flat face with O-ring seals. The horizontal standard lever centre axis and the pressure point on the workpiece are always in one plane. This prevents relative movement on the workpiece.

Note:

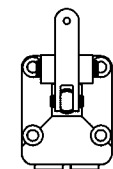
Maximum travel speed 0.5 m/s

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. With sizes 32 and 45, screws in strength class 12.9 must be used.



Installation direction of the clamping arm:



Dimensions:

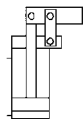
Order no.	Article no.	Piston rod dia. [mm]	Piston dia. [mm]	A	A1	B	C	D	E	F	G	G2	H	H1	H2	H3	H4	I	dia. K	L	M	N	O	P	R	S	U	V	X
327486	6942KK-25	12	25	46,00	15,8	16,0	24,0	3,5	0,5	17,5	G1/8	M5	25	83	58,0	64,0	29,0	13	39,9	54	17,0	5,5	12,0	18	34	45	9	26,0	67,5
328484	6942KK-32	14	32	53,25	13,7	18,5	28,0	3,5	2,0	21,0	G1/8	M5	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
328492	6942KK-38	16	38	60,50	16,0	21,0	31,5	3,0	1,5	22,5	G1/8	M6	28	106	72,0	81,0	37,0	13	54,9	69	23,5	6,5	16,0	24	47	650	12	33,5	72,9
328583	6942KK-45	20	45	71,00	18,7	24,5	37,0	3,0	2,5	26,5	G1/4	M6	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

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 [cm³]	Vol. Lo [cm³]	eff. piston area Sp [cm²]	eff. piston area Lo [cm²]	Md [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	6945KK-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

Sp = clamp, Lo = unclamp

Design:

Cylinder housing made of steel. Piston and hinge pins from hardened, tempered and nitrided steel. Metal wiper integrated into the housing to protect the dirt. Improved Sealings. Scope of supply includes hinge pins, tension plates, fastening screws but not clamping arm. The threaded connections are suitable for throttle/check valves no. 6916-12-XX (flow control valves).

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:

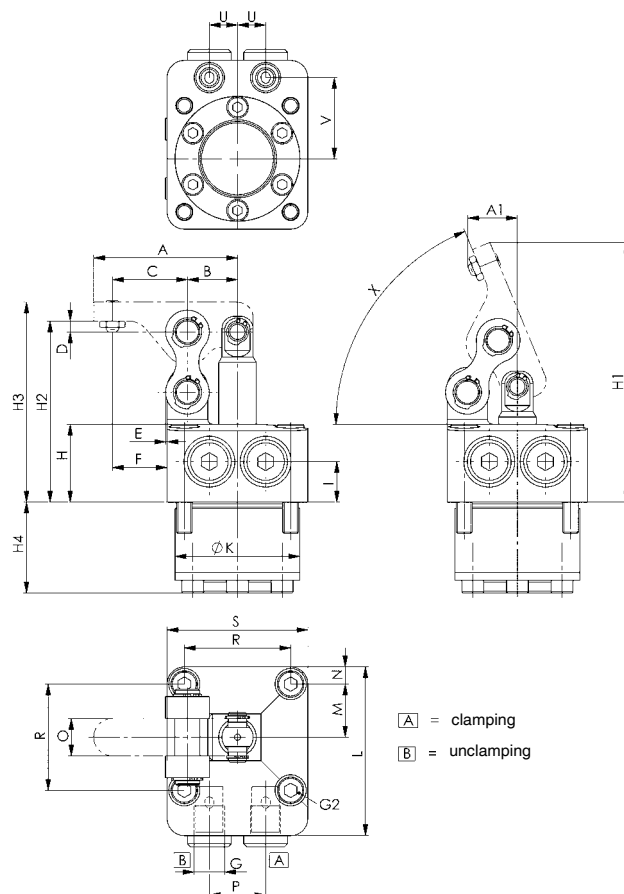
Top-flange version, hydraulic pressure supply through threaded ports on the rear side face, or through oil ports in the flat face with O-ring seals. The horizontal standard lever centre axis and the pressure point on the workpiece are always in one plane. This prevents relative movement on the workpiece.

Note:

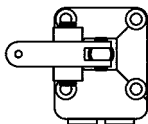
Maximum travel speed 0.5 m/s

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. With sizes 32 and 45, screws in strength class 12.9 must be used.



Installation direction of the clamping arm:



Dimensions:

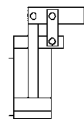
Order no.	Article no.	Piston rod dia. [mm]	Piston dia. [mm]	A	A1	B	C	D	E	F	G	G2	H	H1	H2	H3	H4	I	dia. K	L	M	N	O	P	R	S	U	V	X
327569	6942KK-25L	12	25	46,00	15,8	16,0	24,0	3,5	0,5	17,5	G1/8	M5	25	83	58,0	64,0	29,0	13	39,9	54	17,0	5,5	12,0	18	34	45	9	26,0	67,5
328500	6945KK-32L	14	32	60,50	16,0	21,0	31,5	3,0	1,5	22,5	G1/8	M5	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
328518	6942KK-38L	16	38	60,50	16,0	21,0	31,5	3,0	1,5	22,5	G1/8	M6	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
328609	6942KK-45L	20	45	71,00	18,7	24,5	37,0	3,0	2,5	26,5	G1/4	M6	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

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 [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	300
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

Sp = clamp, Lo = unclamp

Design:

Cylinder housing made of steel. Piston and hinge pins from hardened, tempered and nitrided steel. Metal wiper integrated into the housing to protect the dirt. Improved Sealings. Scope of supply includes hinge pins, tension plates, fastening screws but not clamping arm. The threaded connections are suitable for throttle/check valves no. 6916-12-XX (flow control valves).

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:

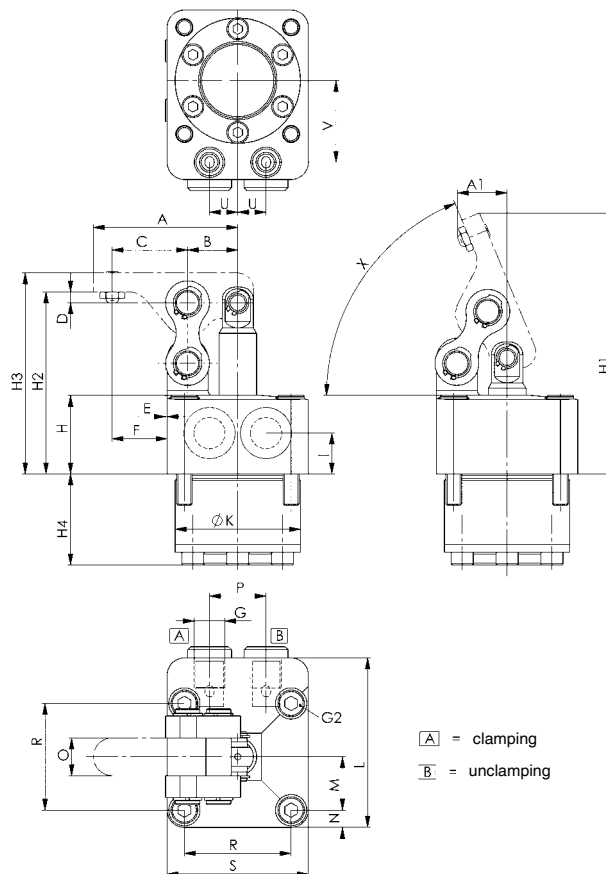
Top-flange version, hydraulic pressure supply through threaded ports on the rear side face, or through oil ports in the flat face with O-ring seals. The horizontal standard lever centre axis and the pressure point on the workpiece are always in one plane. This prevents relative movement on the workpiece.

Note:

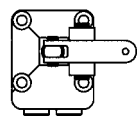
Maximum travel speed 0.5 m/s

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. With sizes 32 and 45, screws in strength class 12.9 must be used.



Installation direction of the clamping arm:

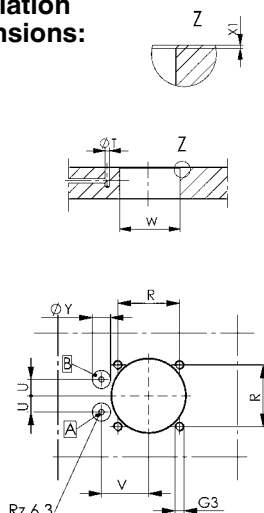


Dimensions:

Order no.	Article no.	Piston rod dia. [mm]	Piston dia. [mm]	A	A1	B	C	D	E	F	G	G2	H	H1	H2	H3	H4	I	dia. K	L	M	N	O	P	R	S	U	V	X
327585	6942KK-25R	12	25	46,00	15,8	16,0	24,0	3,5	0,5	17,5	G1/8	M5	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
328526	6942KK-32R	14	32	53,25	13,7	18,5	28,0	3,5	2,0	21,0	G1/8	M5	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
328534	6942KK-38R	16	38	60,50	16,0	21,0	31,5	3,0	1,5	22,5	G1/8	M6	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
328625	6942KK-45R	20	45	71,00	18,7	24,5	37,0	3,0	2,5	26,5	G1/4	M6	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

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
327494	6942KK-32	M5 x 13	40	3	11	30,0	48,5	0,5 x 45°	10 x 0,1
327502	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

Order no.	Article no.	G3 x depth	R ±0,2	dia. T	U	V	dia. W	X1	dia. Y x max. depth
327569	6942KK-25L	M5 x 13	34	3	9	26,0	40,5	0,5 x 45°	10 x 0,1
327528	6942KK-32L	M5 x 13	40	3	11	30,0	48,5	0,5 x 45°	10 x 0,1
327601	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

Order no.	Article no.	G3 x depth	R ±0,2	dia. T	U	V	dia. W	X1	dia. Y x max. depth
327585	6942KK-25R	M5 x 13	34	3	9	26,0	40,5	0,5 x 45°	10 x 0,1
327544	6942KK-32R	M5 x 13	40	3	11	30,0	48,5	0,5 x 45°	10 x 0,1
327627	6942KK-38R	M6 x 14	47	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

No. 6942KL-xx-04

Clamping arm

for link clamp no. 6942KK



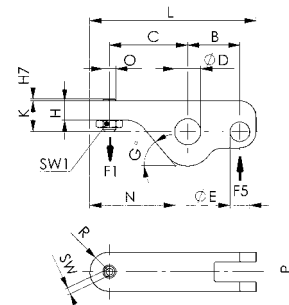
Order no.	Article no.	Piston force F5 at 100 bar [kN]	Clamping force F1 at 100 bar [kN]	B	C	dia. D	dia. E	G	H	H7	K	L	N	O	P	R	SW	SW1	Weight [g]
326850	6942KL-25-04	4,9	3,2	16,0	24,0	8	6	50,0	6	0,5	9,5	51,00	26,2	M4	12,0	6,00	2,0	7	46
328542	6942KL-32-04	8,0	5,3	18,5	28,0	10	8	50,0	8	0,5	11,5	59,25	30,2	M4	13,5	6,75	2,0	7	76
328559	6945KL-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

Design:

Hardened, tempered and burnished steel. Supplied with compression screw.

Note:

Lever ratios must be respected.



No. 6942KR-xx-04

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	6945KR-45-14	24,5	68	16	12	52,5	14,0	101,5	61,1	19,0	222

Design:

Hardened, tempered and burnished steel.

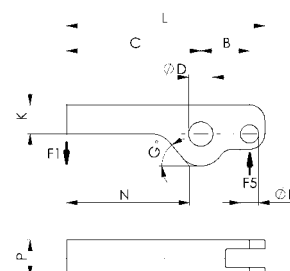
Note:

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. 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: +0.5 mm.

Positioning tolerance in radial direction for coupling elements: +/- 0.3 mm.

Permissible angle tolerance: +/- 1°.

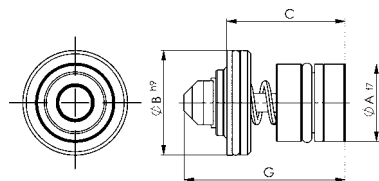
On request:

Other sizes available on request.

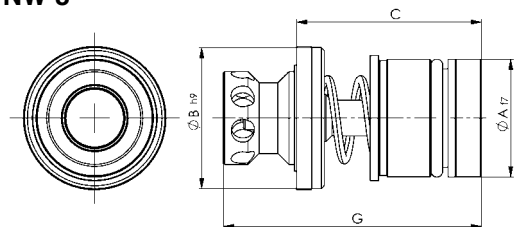
Dimensions:

Order no.	Article no.	dia. A	dia. B	C	E	F	G	H	dia. L	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

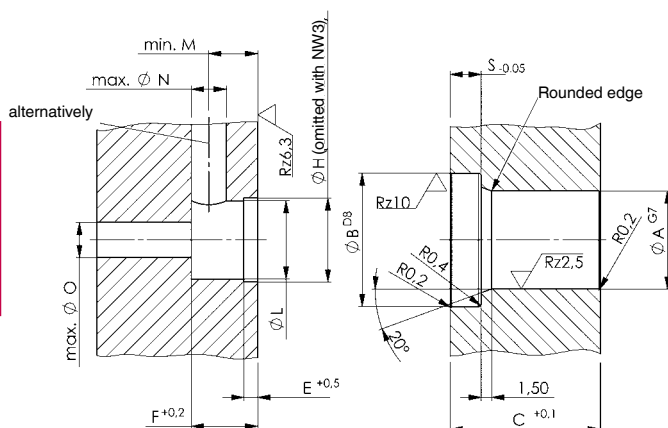
NW 3+5



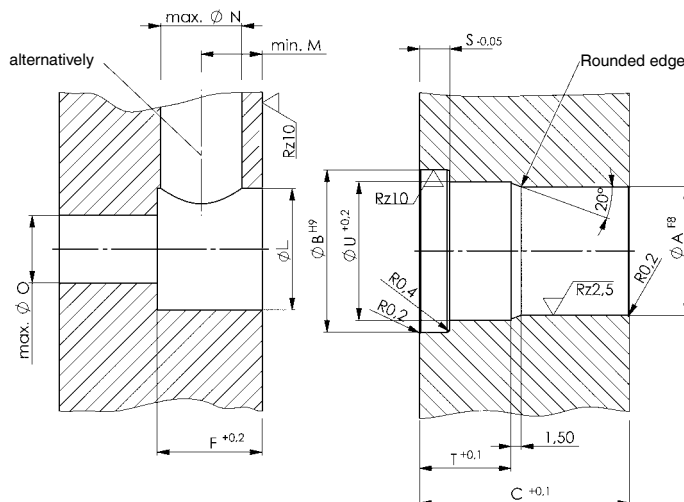
NW 8



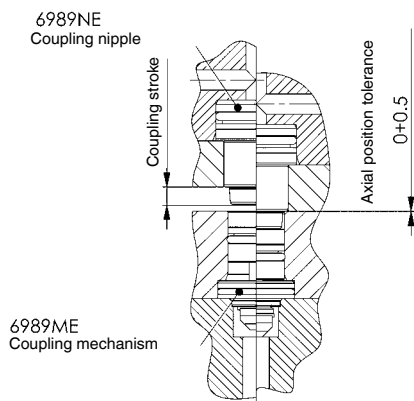
Installation dimensions NW 3+5



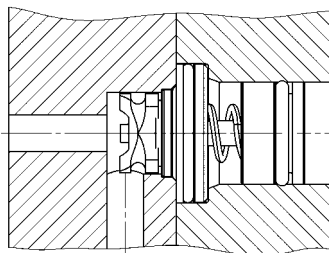
NW 8



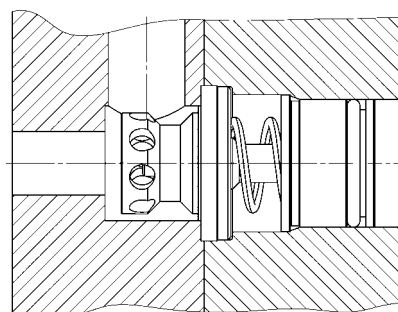
Subject to technical alterations.



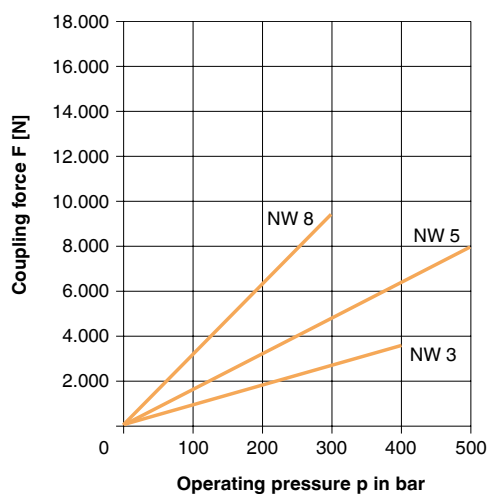
Installation example NW 3+5



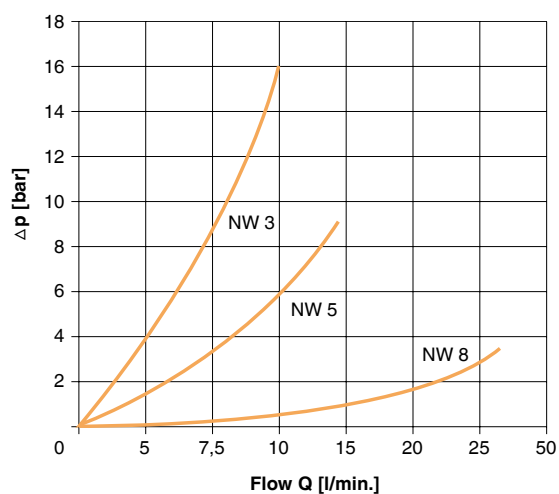
NW 8



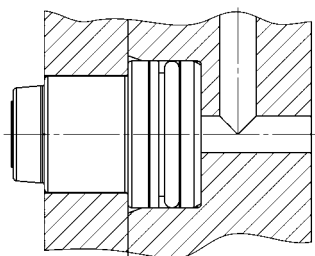
Coupling force:



Flow resistance:



Δp-Characteristic with HLP 22, Viscosity 34 cst



Separating force

Separating force:

NW 3 = F [N] = 9,4 x p [bar]
 NW 5 = F [N] = 15,4 x p [bar]
 NW 8 = F [N] = 31,4 x p [bar]



Subject to technical alterations.

No. 6989NE

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: $\pm 1^\circ$.

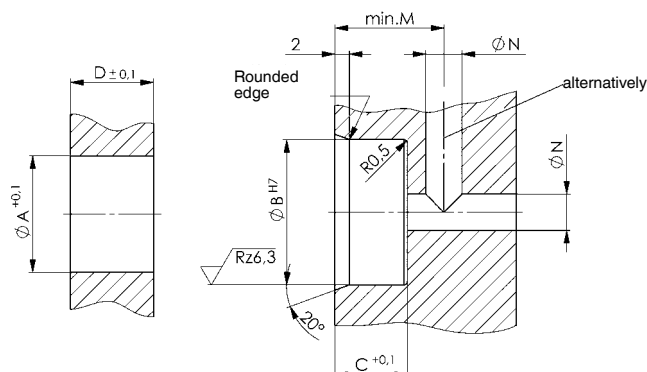
On request:

Other sizes available on request.

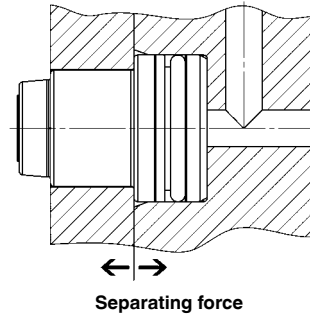
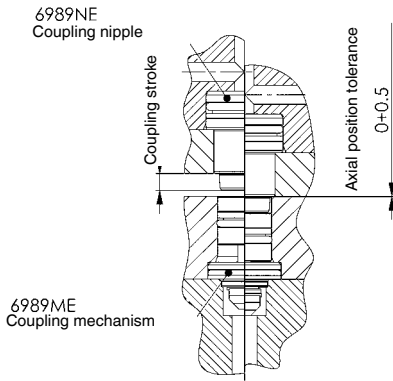
Dimensions:

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

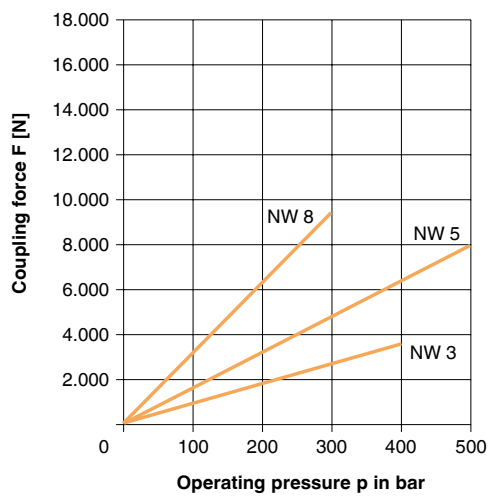


Subject to technical alterations.

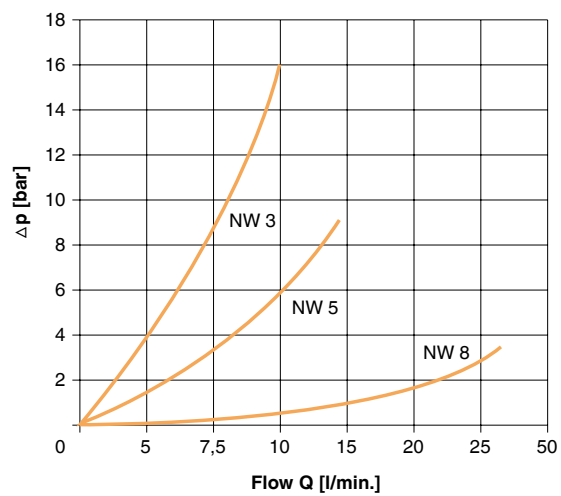


Separating force:
 NW 3 = $F [N] = 9,4 \times p [\text{bar}]$
 NW 5 = $F [N] = 15,4 \times p [\text{bar}]$
 NW 8 = $F [N] = 31,4 \times p [\text{bar}]$

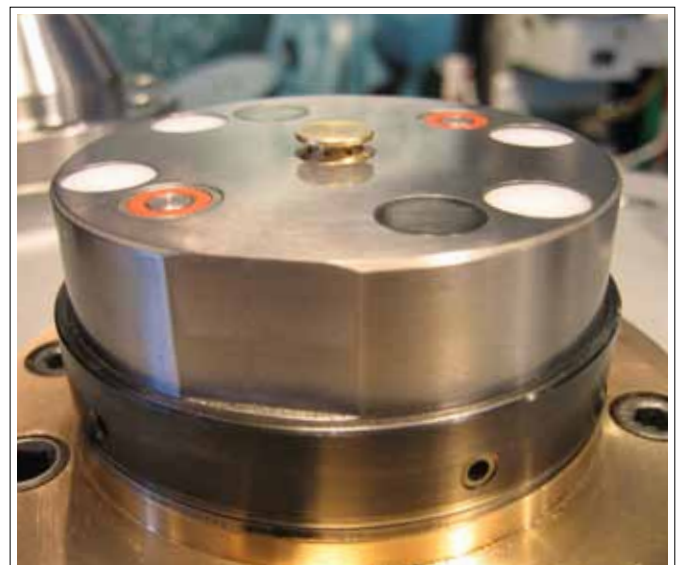
Coupling force:



Flow resistance:



Δp-Characteristic with HLP 22, Viscosity 34 cst

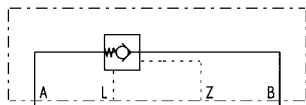


Subject to technical alterations.

No. 6916-08-10

Check valve, pilot operated

for O-ring connection,
max. operating pressure 700 bar.



Order no.	Article no.	Q [l/min]	Releasing ratio PA(B) / PZ	Ambient temp. [°C]	Weight [g]
339374	6916-08-10	20	3	-40 - +80	300

Design:

Sprung ball seat valve for plate assembly, leak oil free.

Components from steel.

The connection channels must be self-produced using connection plates.

Sealing is via O-rings.

Nomenclature of the connection channels :

A = consumer, B = Pump side, Z = control, L = leak oil (relief of the valve piston chamber)

Application:

For unhindered flow in one direction and blocked flow in the other direction. The blocked direction can be controlled via a control connection. The valve is used for the leak oil-free pressure maintenance on hydraulic consumers in combination with leak oil-containing directional spool valves or leak oil-containing media penetrations.

Note:

Max. permissible pressure at connections A, B, Z = 700 bar. Connection L must be depressurised to the tank.

The minimum pressure for keeping the connection open is calculated from the formula $p_{st} = a \times \Delta p + b \times p_B + c$!

Coefficients for valve 6916-08-10: $a = 0.235$ / $b = 0.03$ / $c = 4.8$!

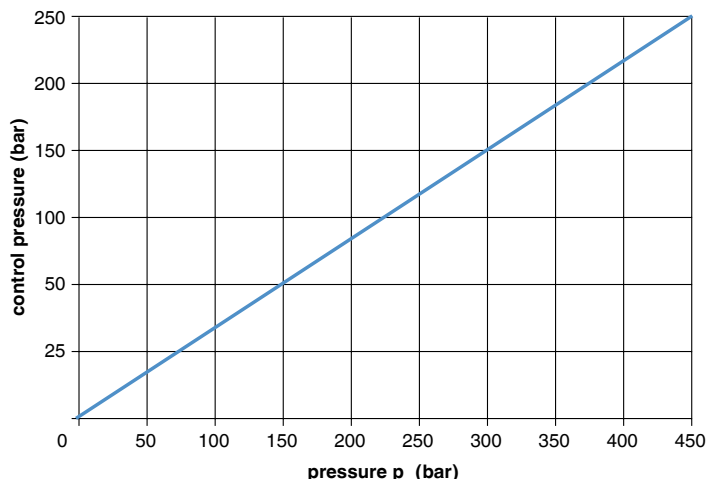
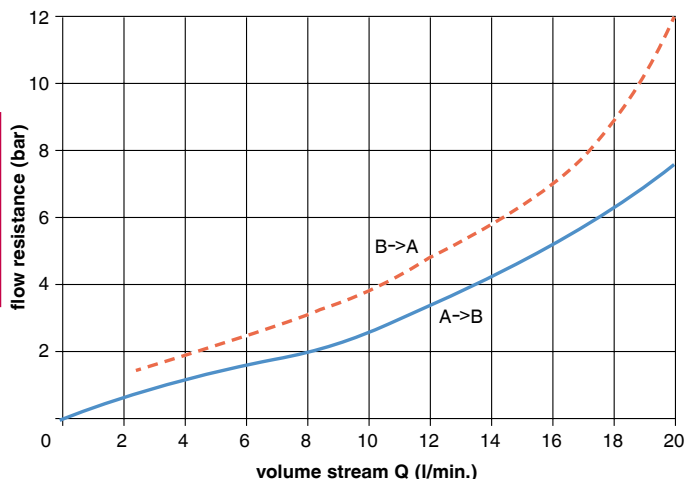
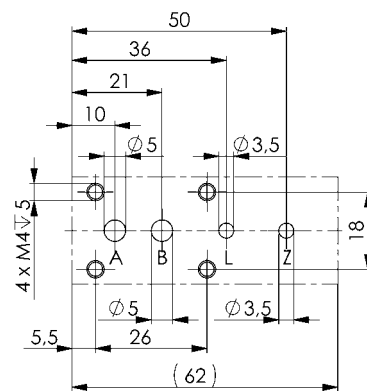
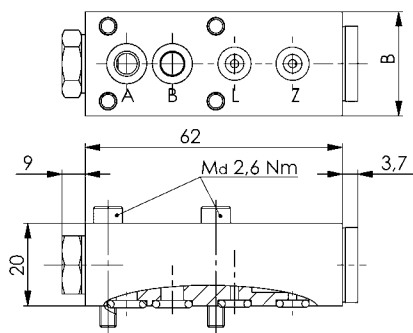
Δp = Flow resistance and p_B = pressure at connection B, see diagrams.

Replacement seal:

2 x O-ring 6.07x1.78 order no. 183335

2 x O-ring 4.47x1.78 order no. 457499

Drilling template device:

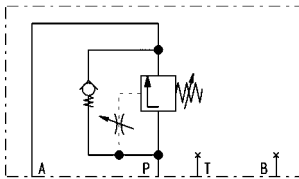


Subject to technical alterations.

No. 6918-80-10

Sequence valve

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

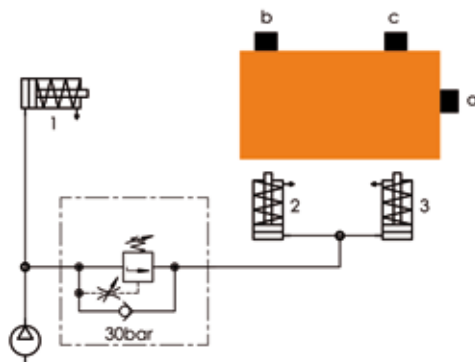


Clamping procedure:

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.

Wiring diagram:

Sequential control as parallel circuit.



Order no.	Article no.	Q [l/min]	Delay setting range [s]	Direction of flow	Weight [g]
326280	6918-80-10	8	1-10	P-A	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:

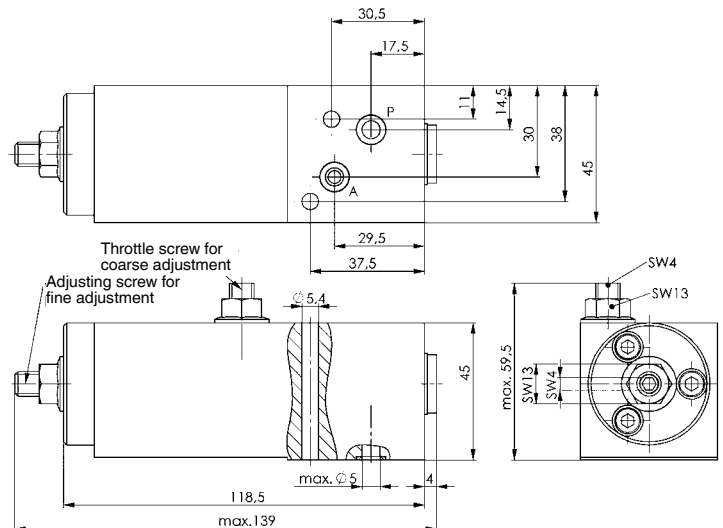
The compact shape makes it easier to mount on the clamping device. The hydraulic piston actuates the opening valve. Setting depends on the viscosity of the hydraulic oil. Viscosity depends on the pressure and temperature. The setting is valid for an operating mode. Pay attention to the pressure drop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

Note:

Observe mounting instructions with design notes for the fixture manufacturer.

Replacement seal:

2 O-rings 7x1.5 Order no. 161810



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

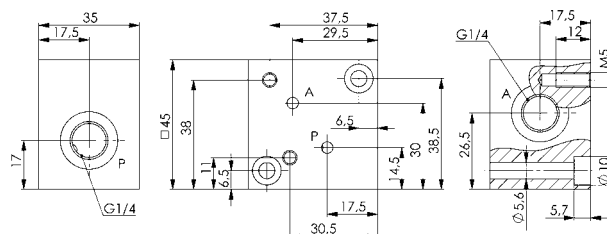
Design:

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. 6982E

Electronic pressure switch



Order no.	Article no.	Measuring range [bar]	Switchpoint [bar]	Reset point (RP) [bar]	Minimum distance between RP and SP [bar]	Tightening torque [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.

With 4-pole round plug M12 x 1 including supply lead with free end.

Application:

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

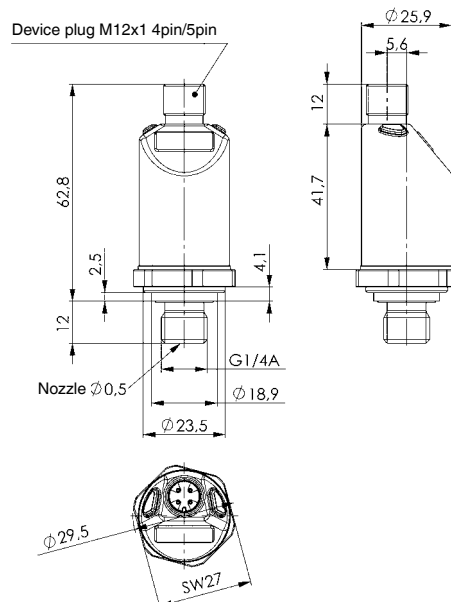
Features:

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.



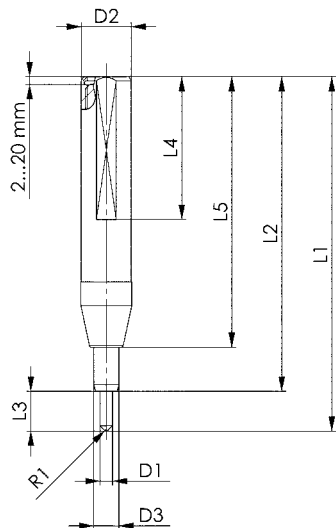
Dimensions:

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

No. 1440WSL

AMF-Writer Slimline

Marking tool,
suitable for 12 mm collets and Weldon holder.



Order no.	Needle	R1 [mm]	Speed [1/min]	Max. marking speed [m/min]	Weight [g]
535146	90R05	0,5	0-300	200	28
535161	90R03	0,3	0-300	200	28

Application:

The tool is especially suitable for marking in highly-constricted spaces.

Diverse materials such as aluminium, titanium, steel, bronze, copper, brass, plastics etc. can be marked.

There are 2 needle types to choose from.

- Needle 90R05 is optimally suited for marking with small font (font size of 2.5 mm legible) and medium line thickness on surfaces with a hardness of up to 55 HRC.

- Needle 90R03 is optimally suited for marking with small font (font size of 1.5 mm legible) and smaller, although deeper line thickness on surfaces with a hardness of up to 57HRC.

Workpiece unevenness of up to 3 mm is compensated. A marking speed of up to 200 m/min is possible, with permitted spindle rpms of 0-300. The workpiece surface can be machined either dry or wet.

Features:

The AMF Slimline writer has high-quality guides and a robust special needle. It has an outstanding narrow tip. Setting occurs steplessly via an inside screw, which can be adjusted using a hexagon wrench. Because this tool has to be removed from the holder in order to be set, it is optimally suited for large-scale production. The tool is preferably received into 12 mm collets or Weldon holders.

Advantage:

- High wear resistance
- Suitable for marking diverse materials
- Highly-compact design
- Narrow, long tip for constricted spaces (e.g. in grooves)

Dimensions:

Order no.	D1 [mm]	D2 [mm]	D3 [mm]	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	L5 [mm]
535146	3	12	6	85	76	9	34	65
535161	3	12	6	85	76	9	34	65



Subject to technical alterations.

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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

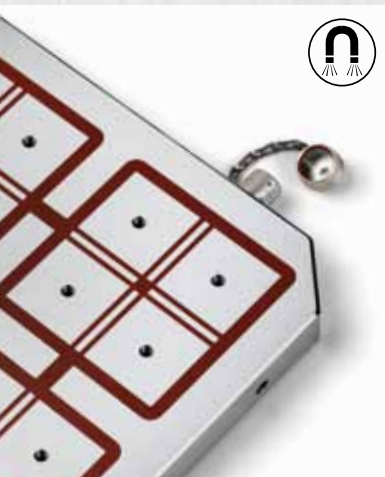
Samples will be charged. When goods have been sent for testing or as samples, we will credit you with the additional price against subsequent orders, as long as the net contract value is at least EUR 125.–. The return of goods is only possible with prior agreement. Customer specials may not be returned. 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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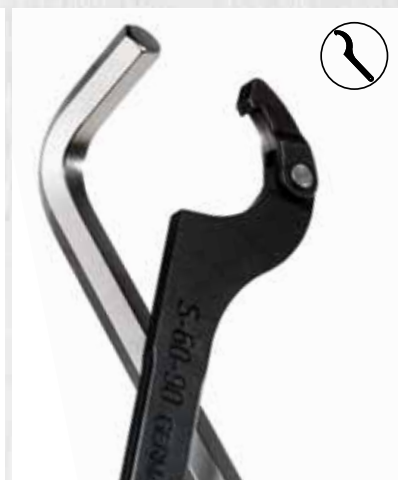
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