



Water Hydraulics

Products
Industries
Applications



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www.wepuko.com

Follow this link to get more detailed information on the solutions and products of Wepuko PAHNKE.

Dear Reader,

Water is environmentally friendly, available almost everywhere and inexpensive. It is a non-flammable hydraulic fluid. Due to its properties water is particularly suitable for certain applications.

Wepuko PAHNKE has been producing pumps for water hydraulic applications for more than 80 years. In addition, we have also had pumps for oil hydraulics in our product range for more than 50 years. This sets Wepuko PAHNKE apart from most of our competitors and allows our customers to choose between products for water or oil hydraulics from a single source.

The answer to the question which method is the better one often depends on which system the respective manufacturer offers. While the pure water hydraulics suppliers would rather emphasize the environmental friendliness of their medium, their competitors would instead emphasize the lower cost and the lower susceptibility to failure of oil hydraulics.

We know the demands of the industry first hand evidently we use our pumps as drives for the hydraulic forging presses of PAHNKE.

Our customers can rely on this: our advice is always neutral and based solely on the respective application and on your success.

The following pages will provide more information about our product portfolio and the numerous typical applications.



Horizontal triplex plunger pump from the year 1955.



Compact design pump unit for the press drive, equipped with our specialty: the pneumatic suction valve lifting device (PSVA).

Water Hydraulics: The modern classic

Triplex plunger pumps are the core piece of most of our water hydraulic units. Robust, efficient and easy to maintain, they operate around the clock in all kinds of industrial plants.



Plunger pumps

In the Water Hydraulics segment we supply pumps for descaling plants, press drives and other high-pressure applications. Whether individual pumps or complete customized units, we are always the right point of contact for all of your needs.

Special features of the Wepuko PAHNKE water hydraulic pumps and pump units:

- Use of highly wear resistant materials
- Optimized design
- Long operating life cycles
- Designed for continuous operation
- Very maintenance friendly

A conversion to water hydraulics is also an option in the modernization of plants. We will advise you gladly.

Triplex plunger pumps

At Wepuko PAHNKE triplex plunger pumps are used in water hydraulics.

Our plunger pumps basically consist of two main components: the damped-mounted and lubricated drive and the liquid part, consisting of three cylinders and the valve body.

Wepuko PAHNKE triplex plunger pumps are high-pressure horizontal plunger pumps in series. They can be designed for almost any pumpable medium. Three plungers are a good compromise between low pulsation and cost-efficient and maintenance-friendly design.

The housing of the power unit is in one piece in these high-performance machines, a compact and inexpensive solution.

Built-in pressure or wiper lubrication automatically supplies the engine parts with lubricating oil.



Our DP series pumps have a flow rate ranging from about 4 to 5000 l/min, pressures up to 1500 bar and a power range of 5 to 1600 kW. Higher performances and special designs are available on request.

The advantages of plunger pumps at a glance:

- Robust design
- Constantly displaced volumes, independent of the pressure
- Cost-efficient due to high efficiency (volumetric efficiency up to 98%)

Design features

At Wepuko PAHNKE we use the best materials. This is important to ensure quality and durability. In addition, our pumps are designed in a way that guarantees short downtimes and easy maintenance.

The crankshaft is made of high-quality forged steel and the sliding bearing of the connecting rod is made of special bearing metals. The crossheads made of special alloys, slide into special precision-machined (honed) guides.

The piston-cylinder unit is a technically perfect product in terms of ease of maintenance, reliability and durability.

The special design allows the piston-cylinder unit to be dismantled without removing the media-conducting lines:

the pressure collection channel is situated inside the one-piece pump body, necessitating only a few pressure-loaded outer seals on the valve section.

Pressure and suction valves can be dismantled without having to loosen media-conducting lines or remove the valve section.

Pump units

You can acquire our pumps not only as individual units but also as complete assemblies from a single source.

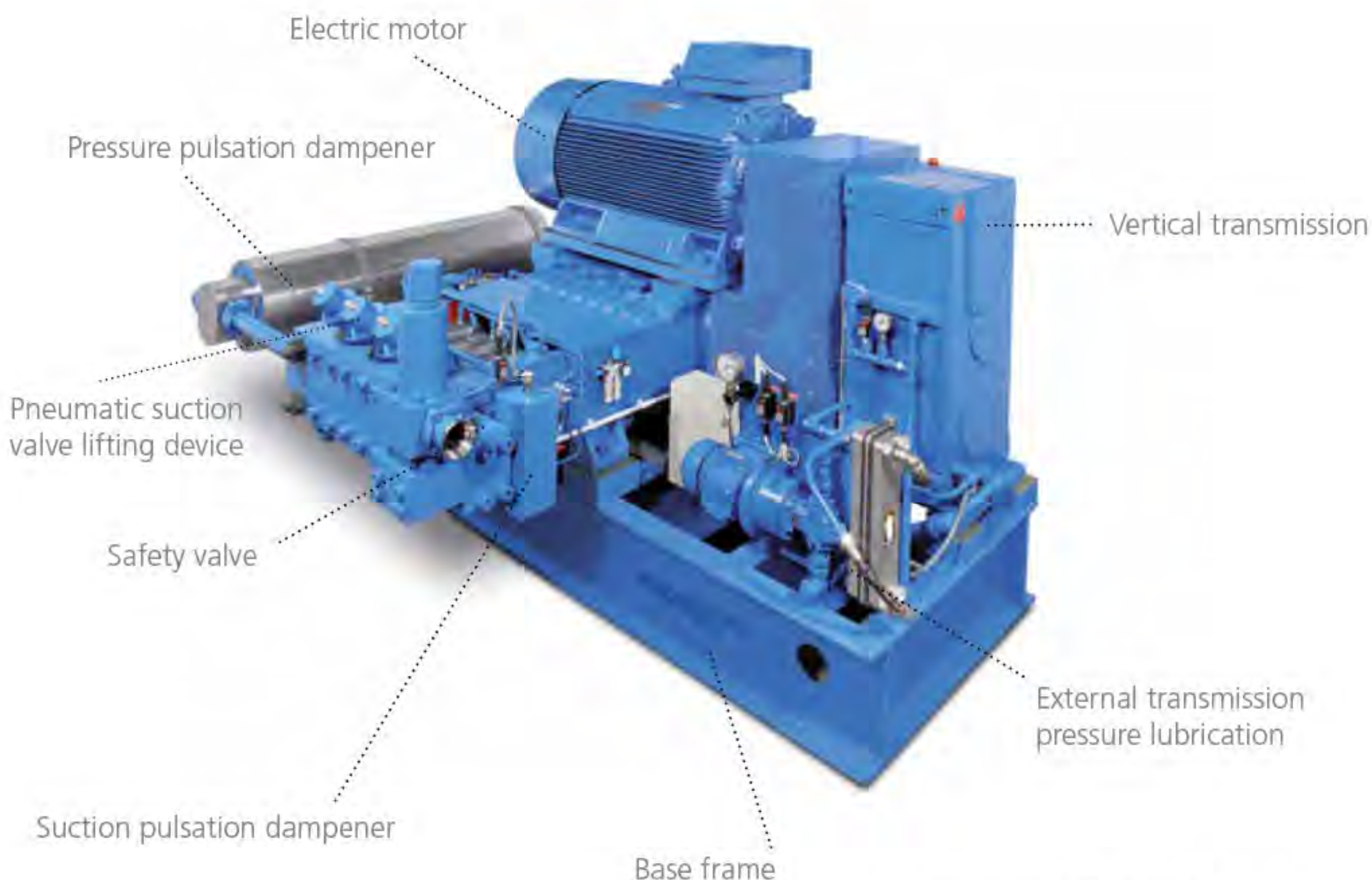
Our extensive experience plays a major role here. We assemble the main assemblies according to customer requirements. We tailor our equipment to meet the local conditions and the needs of our customers.

In the standard version the main components of triplex plunger pump, transmission and motor are installed side by side on one level with the couplings in between. This provides easy access for maintenance and repair.

We also supply a compact version with an extremely space-saving layout. In this version the drive motor is

mounted directly on the pump and connected by a vertical transmission. The design of this unit is unique.

We also offer a wide range of accessories, such as pulsation dampeners, circulation units and safety devices, as well as electronic monitoring and electric controls.



Compact version of the pump unit DP 212.



Pump units in a pressurized water system.



Several plunger pumps to drive an open die forging press.



Spray booth with spray ring for the descaling of billets.

Plants

Our systems are in use worldwide – wherever maximum reliability and durability are required.

The excellent quality of the components and their optimized design make the Wepuko PAHNKE pumps, power units and systems ideal for continuous three-shift operation. 24 hours a day, 365 days a year.

We supply complete systems for high-pressure applications. Below are a few examples:

Pressurized water systems

We supply pressurized water systems, which hold water and compressed air in great pressure vessels. The compressed air accumulates the energy and the water transfers the energy. The pressure accumulator is charged in the pauses between the operating cycles.

Pressure accumulators are especially suitable for applications with long cycle times. This is where they are the most efficient solution that brings significant cost savings with it.

Our pressure accumulators are used where energy is needed on short notice, for example in descaling and for driving hydraulic forging presses.

Water hydraulic press drives

Wepuko PAHNKE has been manufacturing water hydraulic press drives for industrial use for more than 80 years. A large field of application is in the steel and metal industry, but Wepuko PAHNKE water hydraulic press drives are also used in presses in the wood, rubber, plastics and automotive industry.

Descaling systems

Wepuko PAHNKE supplies complete descaling systems that are tailored to the requirements of customers.

Depending on the specified cycle times, descaling systems generally come in two versions: as pressurized water systems or as direct descaling systems.

Wepuko PAHNKE technology proves itself every day in more than 100 continuously operating descaling systems worldwide.

Our strength is in our profound industry knowledge. We manufacture hydraulic forging presses in house and know the demands and the high requirements of the industry.

→ We have made a name in the steel and metal, wood, rubber, plastics and automotive industries

Wepuko PAHNKE water hydraulic products are found in companies in different industries and sectors. For our customers we develop customized, innovative solutions for new installations and upgrades.



Steel and metal industry

Extremely long service life and the highest reliability of production plants are basic requirements in the steel and metal industry. Our products have been meeting these requirements dutifully for more than 80 years.

From individual pumps to complete hydraulic forging systems, our entire product range can be found in the steel and metal industry.



Wood industry

In the wood industry, our systems have proven to be highly reliable, for instance in the manufacture of wooden pallets. Ruggedness is also a must in the production of particle boards. Mostly used are the so-called continuous presses which produce endless chipboards that can be finished later.



Plastics industry

Especially when it comes to plastic, the end user is often not aware of the demands of the production process. In the plastics industry, our press drives and pumps are used for the production of a wide variety of molded parts, such as casings for fluorescent tubes.



Rubber industry

Many of the customers using our pumps and press drives are manufacturers of highly sophisticated technical rubber parts such as tires, floor mats, vibration dampeners or wheel suspensions for the automotive industry.



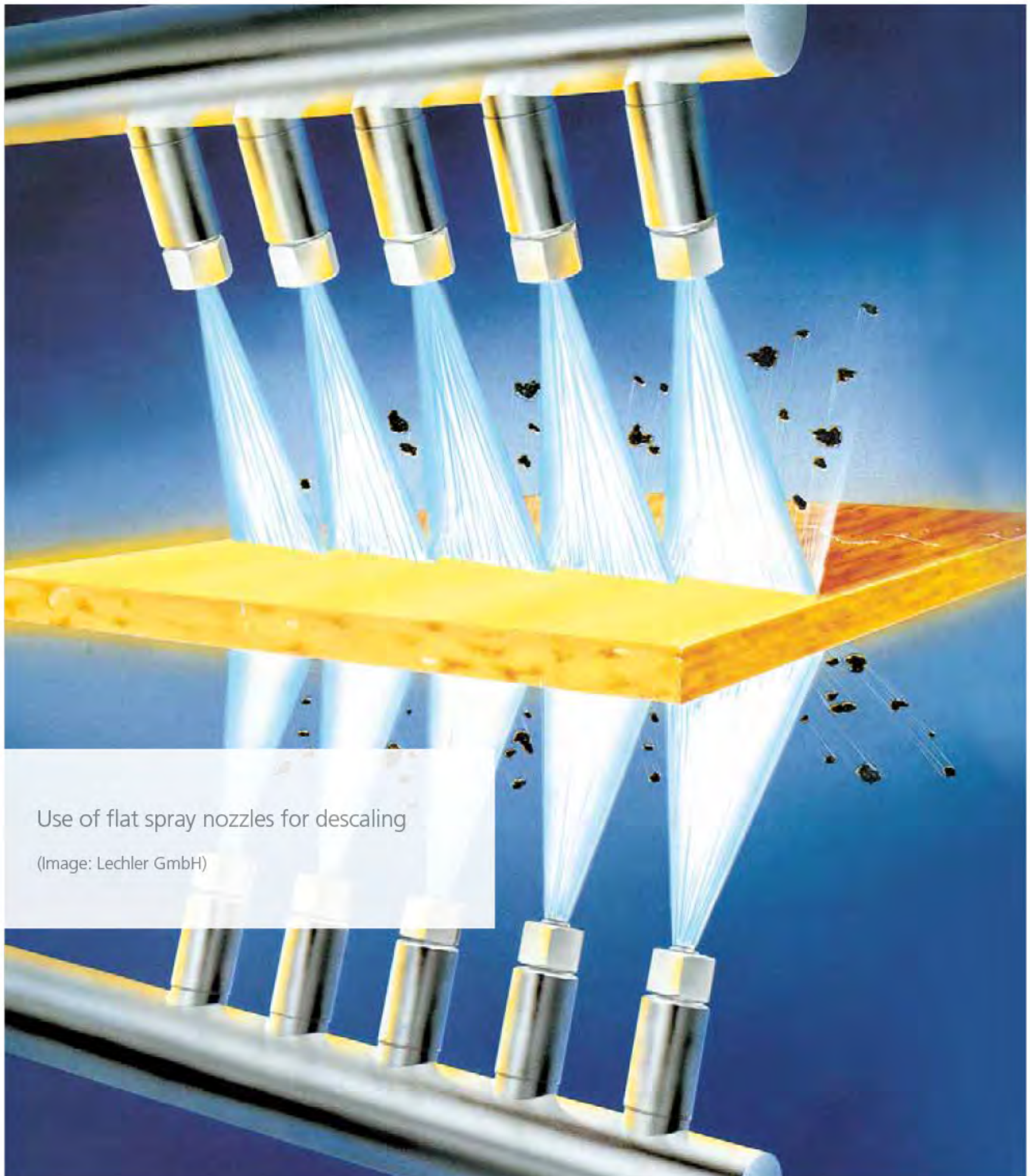
Automotive industry

Three-shift operation is the norm for suppliers in the automotive industry. The special quality of our products makes them particularly suitable in this regard. A great number of our pumps is used in deburring and cleaning equipment. Transmission housings and valve blocks receive their final finishing here, for example.

At Bosch, our high-pressure cleaning systems are used, among others, for cleaning and deburring aluminium and plastic parts, for example the mechanical parts of safety systems such as ABS.

Source of innovation: One medium – multiple applications

Descaling and saw cooling are just two examples in which we introduce the versatility of water as the working medium. At Wepuko PAHNKE we design and manufacture complete hydraulic systems and provide support throughout the entire process – from concept to commissioning.



Descaling

The reliability of our pumps that are used for descaling ensures the continuous operation of production lines. Wepuko PAHNKE is the brand of choice.

Our descaling systems are used locally and internationally; at Buderus in Wetzlar or Posco in Korea, for example.

The scale, or the oxides on the surface, is blasted from the hot steel with a jet of water. Wherever heated steel is shaped, a descaling system increases the quality of the components. At the same time the wear in the forming equipment is minimized.

Saw cooling

Wepuko PAHNKE supplies complete cleaning and cooling facilities for rolling mills. Hyundai in Korea is one of the companies where these are used. The quality of our products and the resulting high service life and cutting performance are essential factors in this regard.

Rolling mills finish their products such as profiles, pipes or merchant steel in standard lengths. High reliability and consistent performance are required, as well as simple maintenance, to ensure continuous operation.

Pressurized water systems

From the steel to the plastics and wood industry: our pumps are used in pressurized water systems of different industry sectors. With a pressure range between 200 and 350 bar, fatigue resistant and durable, they are designed for three-shift operation.

We integrate some of our pumps directly into the corresponding systems. Our pressurized water pumps are also used in press drives.



Typical pump unit for pressurized water systems (DP 212).



Pump unit DP 207 for the descaling of copper.



Dual pump unit DP 403 for saw cooling.

Industrial cleaning and deburring

Our pumps are used for cleaning and deburring at customers who, for example, manufacture motor housings from aluminium, making a significant contribution to the efficiency of the manufacturing processes.

Manufacturers such as INDA or Bosch put their trust in Wepuko PAHNKE pumps for their systems.

Cleaning and deburring take place in closed systems, which usually work in three shifts. The performance and reliability of the pump are therefore important, because pressure and the volume of water must be available around the clock.



Compact version of a pump unit DP 205 for mechanical cleaning and deburring of components.

Press drives

Our product range includes both water and oil hydraulics. As an experienced supplier and not bound to one system, we provide guaranteed application-oriented advice and find the best solution for our customers.

Water is environmentally friendly, inexpensive and as hydraulic medium non-flammable. Our water hydraulic pumps are proving themselves as press drives in all the relevant sectors and bring maximum performance in daily use to continuous operation processes.



Pump unit DP 209 for press drives.

Lubrication of hydrostatic bearings (Morgoil)

With more than 200 installations in all major companies worldwide, Wepuko PAHNKE pumps are used for the lubrication of hydrostatic bearings, for example at LY Steel in China.

This application places high demands on the performance and reliability of our pumps, because these bearings are lubricated at a very high pressure – up to 1500 bar. Our triplex plunger pumps press the lubricant in hot and cold rolling mills between the bearing surfaces, which require highest precision and running smoothness. This ensures the consistent quality of the rolled products.

Other applications

Was your application not listed? Over and above these examples, there are still various other applications for our pumps.

We will gladly advise you.



Pump unit DP 405 for the lubrication of hydrostatic bearings.

Special applications

One specific application of our pumps is hydrostatic pressure tests. Water is pumped into a container or a pipe in order to test it for any cracks or leaks, or to verify strengths.

Another field is in the cooling of tools. Milling heads and other tools are cooled with up to 600 bar. Our pumps are for example used at GKN Aerospace (formerly Volvo Aero), a Swedish manufacturer of aircraft engines and components for the aviation and aerospace industry.



Compact version of the pump unit DP 405 for the cooling of tools including booster pump and filters (suction side) and resonator for pressure pulsation dampening (pressure side).

→ Close to the market: Research and development

What does the market need? This question excites the developers at Wepuko PAHNKE. Their work involves creating solutions for special customer requirements and opening up new fields of application. Research and development, design and the entire production are located in Metzingen. This means all our competency is consolidated on one site.



Modern simulation tools such as FEM and CFD support the design process at Wepuko PAHNKE.

Innovation on-site

Research and development is of high priority for us. This is the only way to achieve our goal: reliable, sturdy and precise machinery.

Wepuko PAHNKE GmbH combines the knowledge and experience of two great companies: the history of Wepuko with over 80 years of experience with high-pressure plunger pumps and the history of PAHNKE Engineering with over 40 years of experience with hydraulic forging presses. The development team also benefits from the short and quick communication channels at the headquarters, when dealing with the challenges of tomorrow.

Presses and pumps are developed separately due to their product-specific properties. Nevertheless we focus on an intensive exchange of ideas and concepts between the departments. The result: coherent, optimized solutions for our customers.

All of our tests and development take place on our site in Metzingen. This is how we protect our unique knowledge and save time.

Quality standards

Our presses and pumps fulfill extreme requirements when it comes to load capacity and reliability. Many of our products are custom-made, designed precisely to fit the requirements of the customer.

For our prototypes and small series the planning and simulation phase is key. At Wepuko PAHNKE, we constantly reinvent our products for the needs of our customers.

Even small changes, for example in the dimensions, often have major effects on the occurring forces and material stresses. With fluid flow in complex geometries, avoiding cavitation is essential.

Virtual development processes are increasingly gaining importance; they secure high quality with short development times. They offer our customers transparency and security: in many cases, our customers actually receive an initial feasibility study and test calculations with their offer.

It goes without saying; our quality management system is certified in accordance with ISO 9001:2015.

Development with FEM

In order for the development to lead quickly and efficiently to a result, we use the latest simulation tools, the FEM (finite element method) to analyze mechanical stability and CFD (computational fluid dynamics) to inspect the fluid mechanics of components.

This allows us to calculate the mechanical and fluidic properties of individual components from the very first design step, to an optimized final design, leading to a highly efficient product.

Our test bench subjects the end product to an extensive test procedure allowing us to guarantee the requested product properties and total customer satisfaction.

→ We perform under high pressure... and we perform peerlessly!

Wepuko PAHNKE is the merger of two market leading, traditional companies: Wepuko, the specialist for high-pressure pumps and PAHNKE, the pioneer in the field of hydraulic forging presses. This mixture makes us unique and gives us significant advantages towards the competition.



Wepuko PAHNKE GmbH in Metzingen, Germany.

Wepuko PAHNKE is a German mechanical and systems engineering company, specialized in the design and manufacturing of high-pressure pumps and hydraulic forging presses, including their drives and controls. The company is a global leader in these fields. The range of pumps includes triplex plunger pumps and radial piston pumps with variable and constant displacement. Wepuko PAHNKE also develops and builds units and systems according to customer specifications. Furthermore, the company offers complete descaling systems.

Our solutions can be found in the oil and gas industry, chemical plants, power plants, heavy industry, steel mills and many other applications. Customers include: Otto Fuchs and Citic Heavy Industries in the Hydraulic Forging Presses and Oil Hydraulics sectors, SMS Meer, Vallourec & Mannesmann, Robert Bosch and ArcelorMittal in the Water Hydraulics sector and Shell, Petrobras, Petronas, Statoil, Gaz de France and Hyundai Heavy Industries in the Process Pumps sector.

The company was founded in 1932 by Fritz Thumm in Metzingen, South-West Germany. One of the company's many innovations was the introduction of large radial piston pumps with a very flexible control system and rapid flow direction reversal (1966).

After the takeover of Wepuko by the Pahnke family in 1996, the company was able to introduce the know-how of Hans-Joachim Pahnke, a pioneer in the field of open die forging presses. The outstanding innovations that Hans-Joachim Pahnke developed, include the first underfloor open die forging press featuring a two-pillar design (1956) and the **PAHNKE Modified Sinusoidal Direct drive (PMSD drive)** in 1975.

The largest hydraulic system in the world went into operation at Norheimo in China in 2009, and the world's strongest open die forging press by PAHNKE went into operation in 2011 at Citic Heavy Industries in China. Both using a Wepuko PAHNKE PMSD drive.

Today, the company is managed by Tanja Pahnke and remains a strong innovator in its fields. The Wepuko PAHNKE group includes companies in the USA, China and Russia. Wepuko PAHNKE also has a global presence with representatives in more than 70 countries.

Milestones

- 1932** Wepuko is founded in Metzingen by Fritz Thumm
- 1973** PAHNKE Engineering is founded in Düsseldorf by Hans-Joachim Pahnke, Fritz Thumm Jr. and Eric Koik
- 1996** Wepuko is taken over by the Pahnke family
- 2002** The products of the two companies are consolidated into one company
- 2011** Renamed to Wepuko PAHNKE

At home the world over: with our representatives in more than 70 countries



Process
Pumps



Hydraulic
Forging
Presses



Oil
Hydraulics



Water
Hydraulics



Service



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- Highlights:
- New development
 - Extremely compact
 - Energy efficient: Volumetric efficiency up to 98%
 - Low noise level
 - Easy maintenance
 - Extensive accessories, such as the pneumatic suction valve lifting device (PSVA)

DPX 105 | Technical data

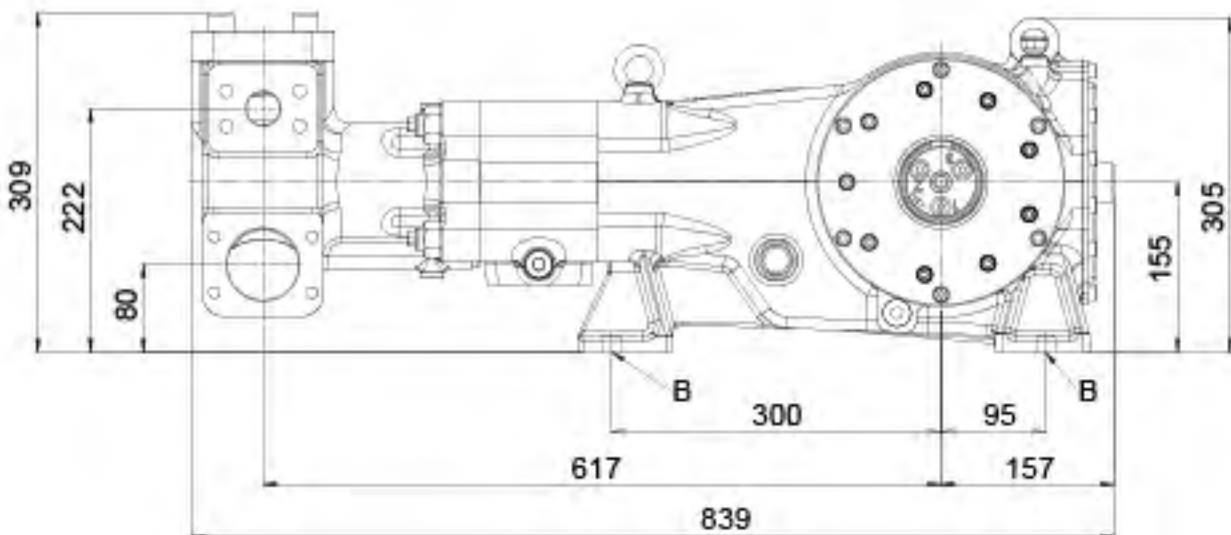
High-pressure triplex plunger pump

Nominal pressure (bar)	Plunger diameter (mm)	Effective volume flow (l / min)									
630	28	23	27	31	35	39	43	47	51	55	59
500	32	31	36	41	46	51	57	62	67	72	77
400	36	39	46	52	59	65	72	79	85	92	98
315	40	49	57	65	74	82	90	98	106	114	123
250	45	62	72	82	93	103	113	124	134	144	154
200	50	76	89	102	115	127	140	153	166	178	191
160	55	93	109	124	140	155	171	186	202	217	233
125	65	130	152	174	196	217	239	261	282	304	326

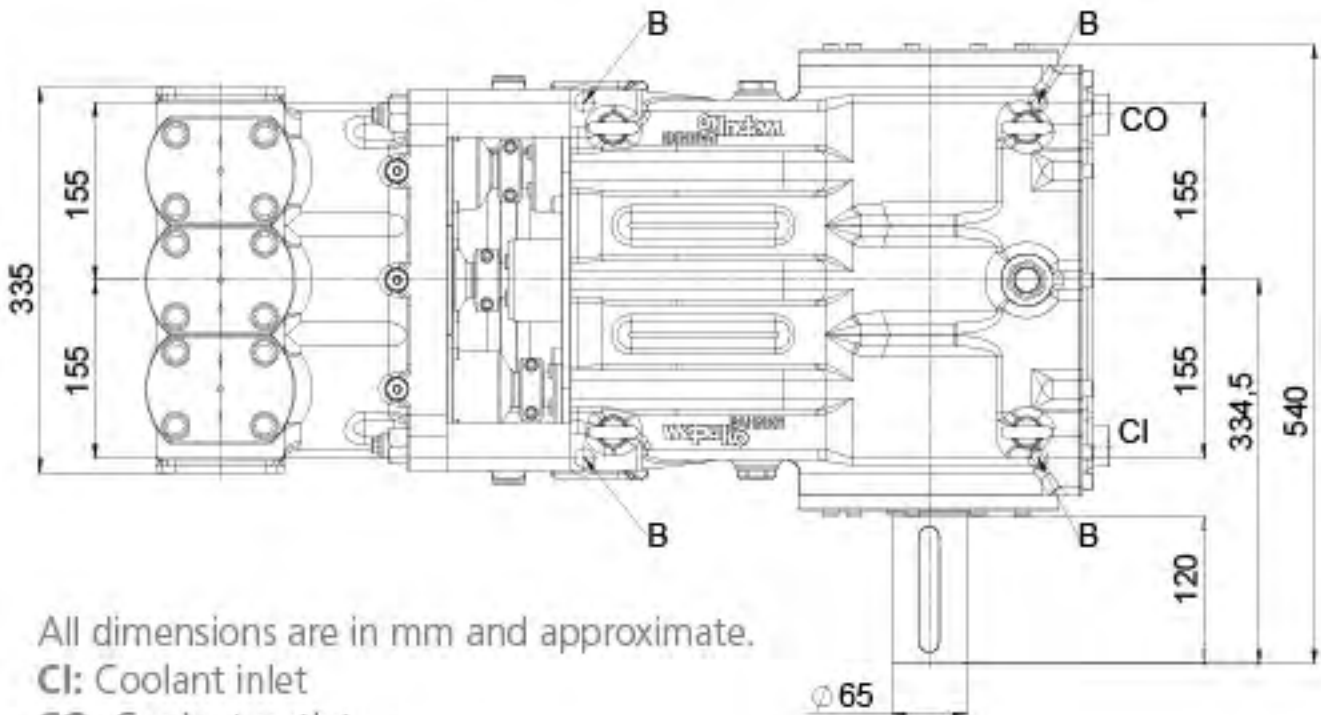
Pump speed (rpm)	300	350	400	450	500	550	600	650	700	750
Shaft power (kW)	29,2	34,0	38,9	43,7	48,6	53,5	58,3	63,2	68,1	72,9

The specified values are based on continuous operation and using water as a working medium. Further information and non-standard versions on request. All technical data is subject to change.

Weight: ca. 250 kg
Rod force: 48 kN
Stroke: 45 mm



Version with integrated water cooling and splash lubrication.

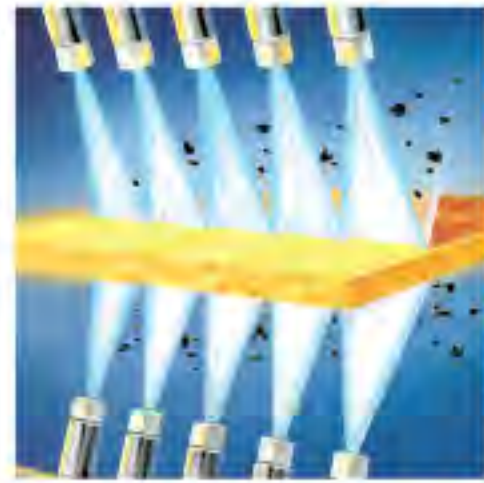


All dimensions are in mm and approximate.
CI: Coolant inlet
CO: Coolant outlet
B: 4x fixing hole diameter 17 mm

DPX 105-EN-171213. Subject to change without notice.

Application examples

- Hydraulic drives
- Descaling
- Industrial cleaning
- Deburring
- Hydroentanglement
- And many more applications



Descaling



Forging press drives

Is your application not mentioned here?

Please give us a call.
We'll be pleased to advise you.

Design features

- Extremely compact design
- Robust construction suitable for continuous and intermittent operation
- Pump head with integrated plunger-cylinder unit
- Easily accessible valve inserts
- Excellent suction capacity
- Plungers made of coated stainless steel, ceramic or other materials
- Low-maintenance drive unit
- Control range between 45 and 750 rpm at full load
- Start-up under load possible
- Self-adjusting, maintenance-free high-pressure seal
- Low-maintenance low-pressure seal
- Quick-release plunger clamp for rapid assembly and maintenance

Accessories

- Pneumatic suction valve lifting device (PSVA)
 - Safety valve
 - Recirculating valve
 - Pressure regulating valve
 - Gate valve
 - Non-return valve
 - Forced feed lubrication
 - Pulsation damper
 - Water or air cooling
 - Noise protection
 - Filter units
 - Pump controller
 - Diagnostic assistance
 - System accessories
- Further accessories on request



Air cooling and splash lubrication.
Up to 35 °C ambient temp.
Up to 35 kW / 450 rpm.*



Air cooling with fan and splash lubrication.
Up to 45 °C ambient temp.
Up to 65 kW / 650 rpm.*



Water cooling and splash lubrication.
Independent of ambient temp.
Up to 73 kW / 750 rpm.



Water cooling and forced feed lubrication.
Independent of ambient temp.
Up to 80 kW / 750 rpm.

* Higher ambient temperatures of up to 55 °C are possible at reduced rpm or intermittent operation.

Drive options

- Gearbox (horizontal, vertical or angular; with or without couplings)
- Compact gearbox
- Built-on gearbox
- V-belt drive
- Compact V-belt drive (vertical design)
- Direct drive (with or without frequency converter)

Possibility of various drive types (electric, Diesel, hydraulic etc.)

Contact



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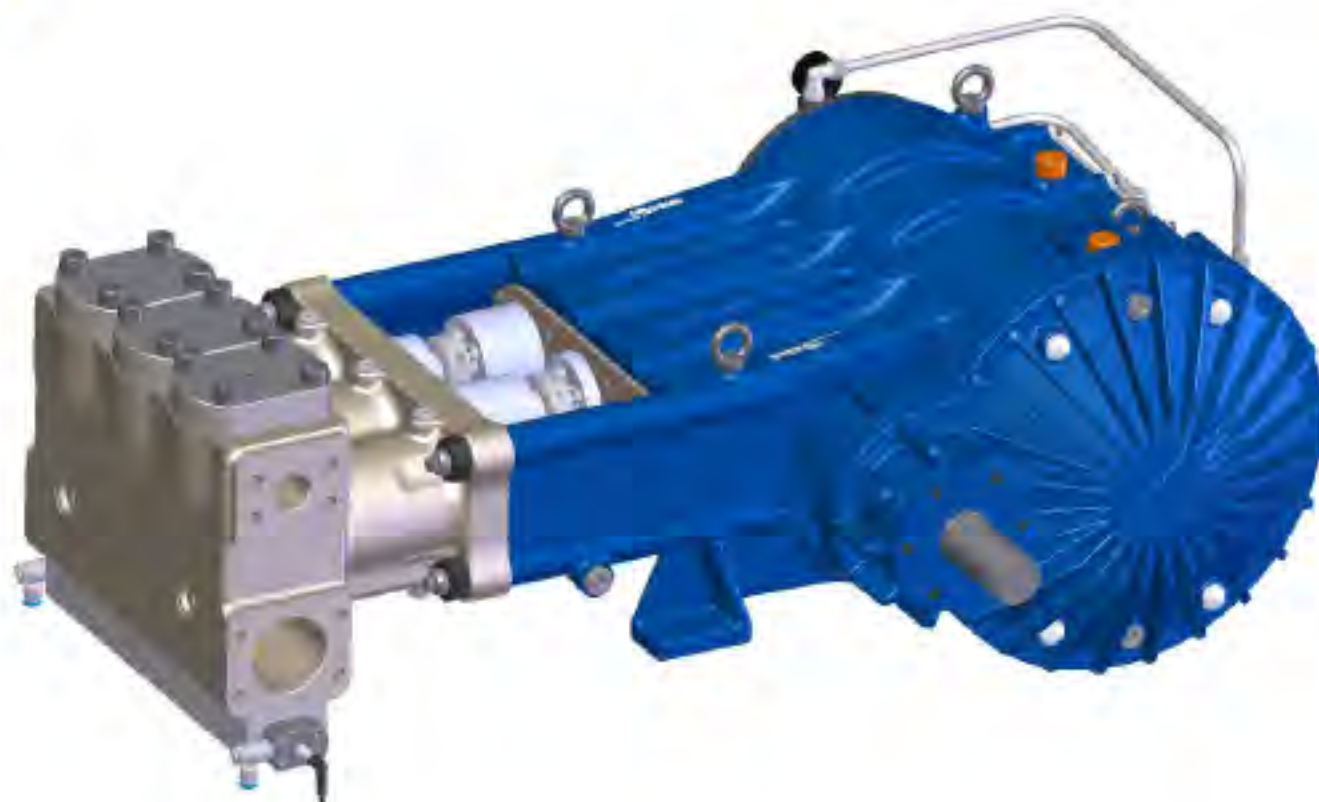
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High-pressure pumps

wepuKO PAHNKE

We perform under high pressure.



Highlights:

- New development
- Extremely compact
- Energy efficient: Volumetric efficiency up to 98%
- Low noise level
- Easy maintenance
- Extensive accessories, such as, the pneumatic suction valve lifting device (PSVA)

DPX 125 | Technical data

High pressure triplex plunger pump

Nominal pressure (bar)	Plunger diameter (mm)	Effective volume flow (l / min)							
630	50	89	111	133	155	177	202	246	271
500	55	108	135	162	189	216	243	270	302
400	60	129	162	194	226	259	291	323	355
315	65	152	190	228	266	304	343	380	418
250	75	203	254	305	356	407	457	508	559
200	85	262	327	393	458	523	589	654	720
160	95	329	411	493	576	658	740	822	905
125	110	442	553	664	774	885	995	1105	1215

Pump speed (rpm)	200	250	300	350	400	450	500	550
Shaft power (kW)	92	115	138	161	184	207	230	253

DPX125-EN- Subject to change without notice.

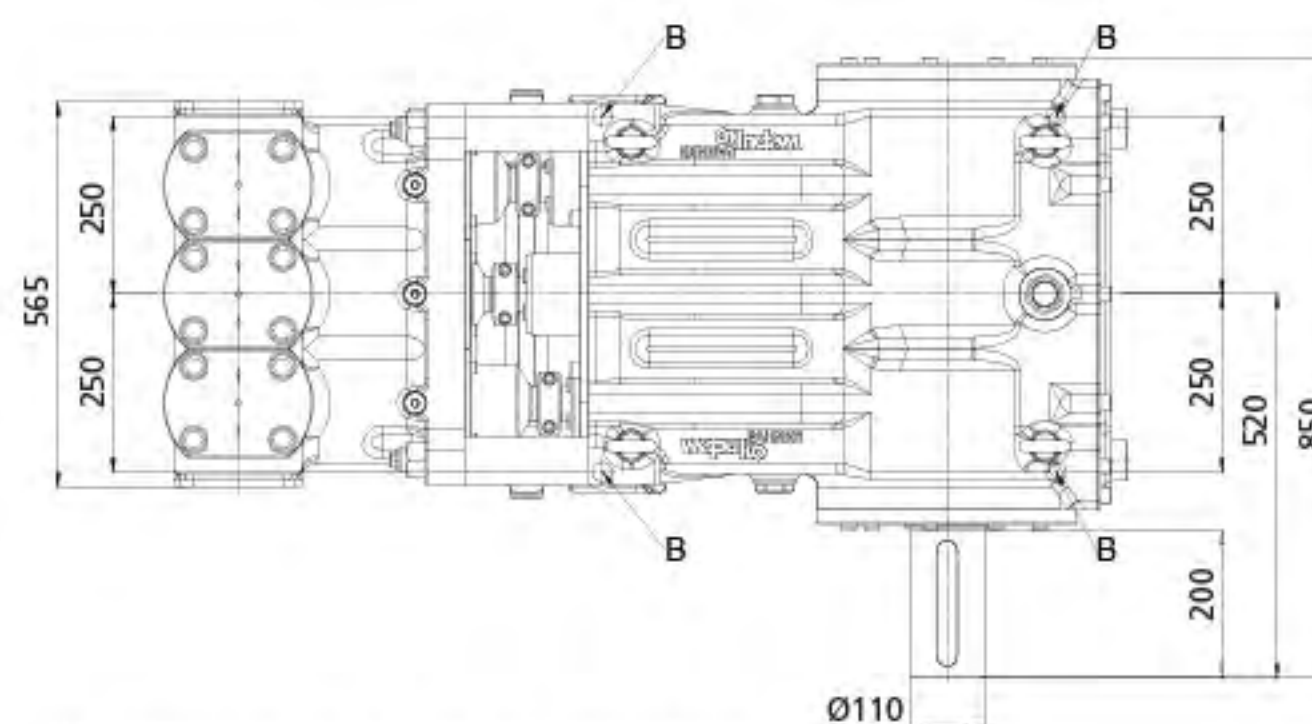
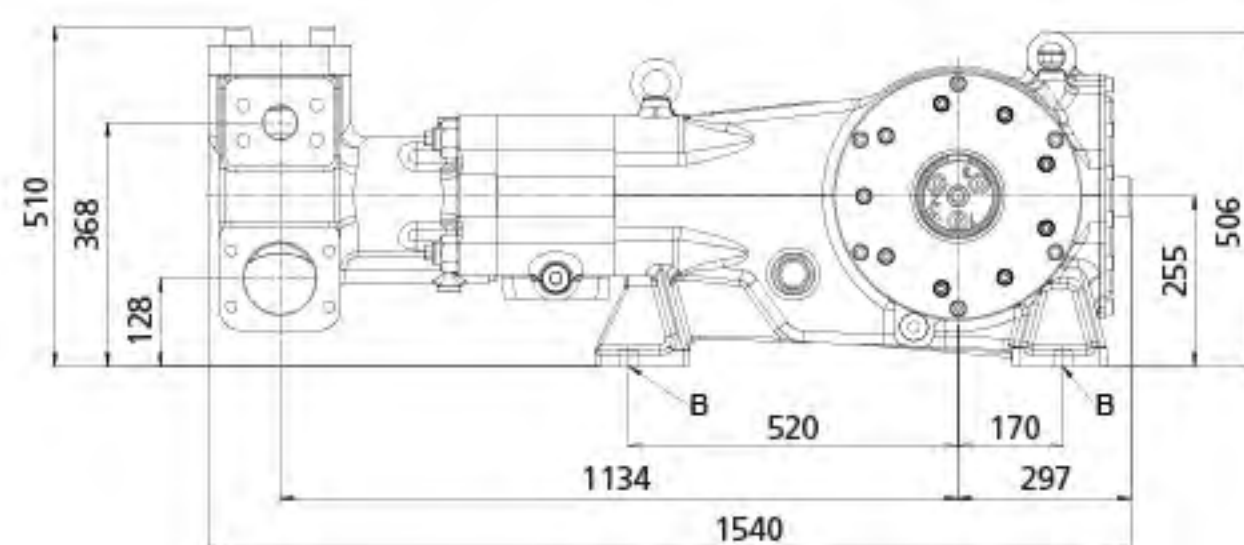
The specified values are based on continuous operation using water as a working medium. Further information and non-standard versions on request.

All technical data is subject to change.

Weight: ca. 1150 kg

Rod force: 115 kN

Stroke: 80 mm



All dimensions are in mm and approximate.

B: 4x fixing hole diameter 23 mm

Application examples

- Hydraulic drives
- Descaling
- Industrial cleaning
- Deburring
- Hydroentanglement
- and many more applications



Descaling



Forging press drives

Is your application not mentioned here?

Please give us a call. We'll be pleased to advise you!

Design features

- Extremely compact design
- Robust construction suitable for continuous and intermittent operation
- Pump head with integrated plunger-cylinder-unit
- Easily accessible valve inserts
- Excellent suction capacity
- Plunger made of coated stainless steel, ceramic or other materials
- Low maintenance drive unit
- Control range between 50 and 550 rpm at full load
- Start-up under load possible
- Self-adjusting, maintenance-free high-pressure seal
- Low-maintenance low-pressure seal
- Quick-release plunger clamp for rapid assembly and maintenance
- Water cooling and forced feed lubrication



Accessories

- | | | |
|---|-----------------------------|----------------------------------|
| ■ Pneumatic suction valve lifting device (PSVA) | ■ Safety valve | ■ Pump controller |
| ■ Pulsation damper | ■ Recirculating valve | ■ System accessories |
| ■ Noise protection | ■ Pressure regulating valve | ■ Diagnostic assistance |
| ■ Filter units | ■ Non-return valve | ■ Further accessories on request |
| | ■ Gate valve | |

Drive options

- Gear box (horizontal, vertical or angled; with or without couplings)
- Compact gearbox
- Built-on gearbox
- Torquemotor with frequency converter

Various drive types possible
(electric, diesel, hydraulic etc.)



Example - Pump unit with spur gear system

Contact



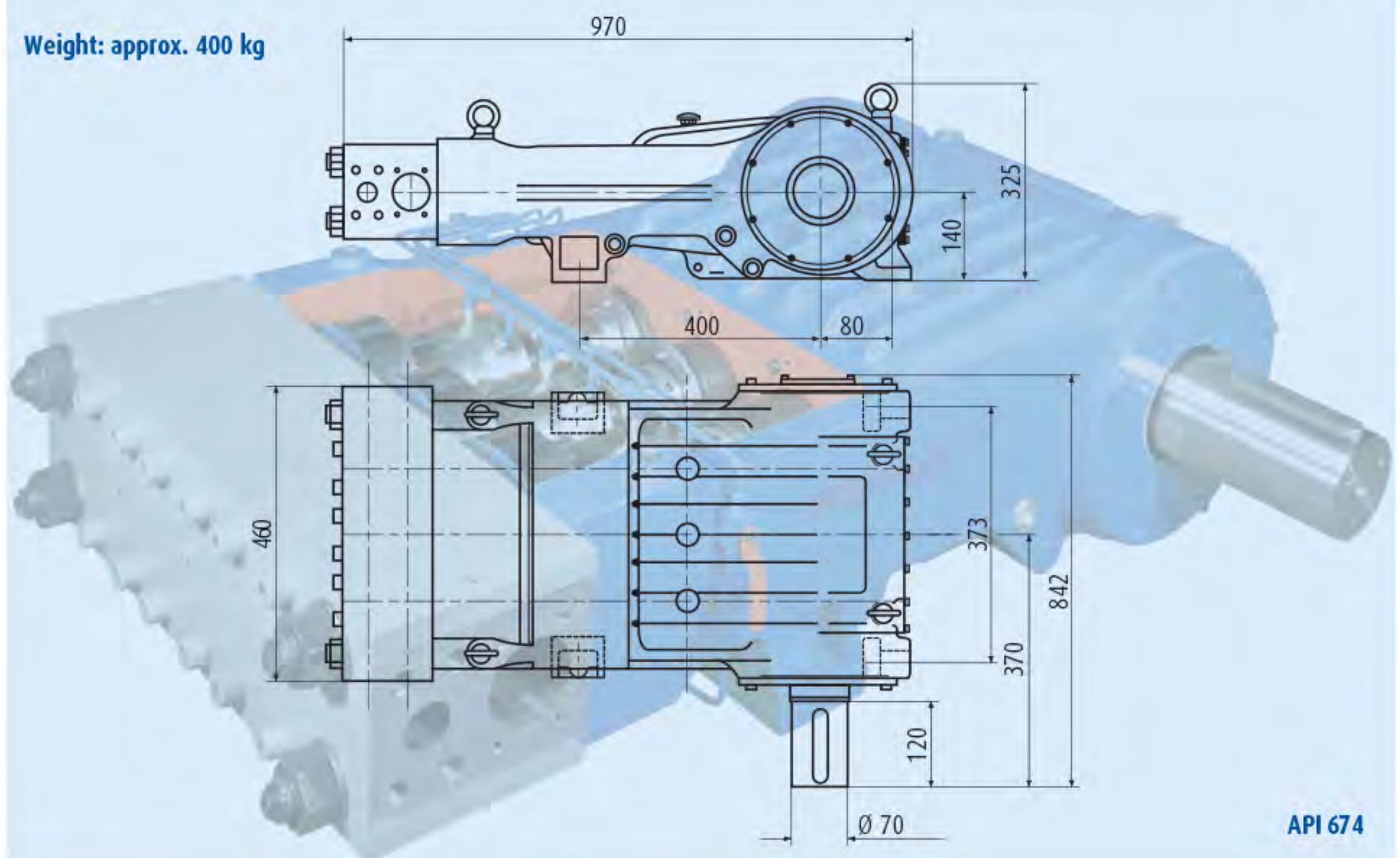
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TECHNICAL DATA OF HIGH-PRESSURE TRIPLEX PLUNGER PUMP DP205

Weight: approx. 400 kg



Nominal pressure (bar)	Effective volume flow (l/min)										
1000	11	13	14	16	18	20	22	25	28	31	35
800	16	18	20	23	25	28	31	35	39	44	49
630	19	21	24	26	30	33	37	41	46	51	58
500	25	28	31	35	39	43	48	54	60	68	*
400	31	36	40	40	44	50	55	62	69	*	*
320	39	45	49	55	62	69	76	85	94	106	119
250	50	57	63	71	78	87	97	108	120	135	152
200	62	71	77	87	97	108	121	135	150	169	*
160	75	85	94	106	119	132	147	165	*	*	*
Pump speed (rpm)	207	236	263	295	332	370	414	463	518	583	657
Maximum pump output (kW)	26	30	34	37	42	47	52	58	65	74	83

* on request

Dimensions approximate. Technical data subject to change.

The Wepuko horizontal high-pressure triplex plunger pump can be used for virtually any pumpable medium.

The required feed pressure in the standard design is 2 bar.

Other intake conditions and liquids on request.

The temperature limits for use range from -40°C to $+280^{\circ}\text{C}$.

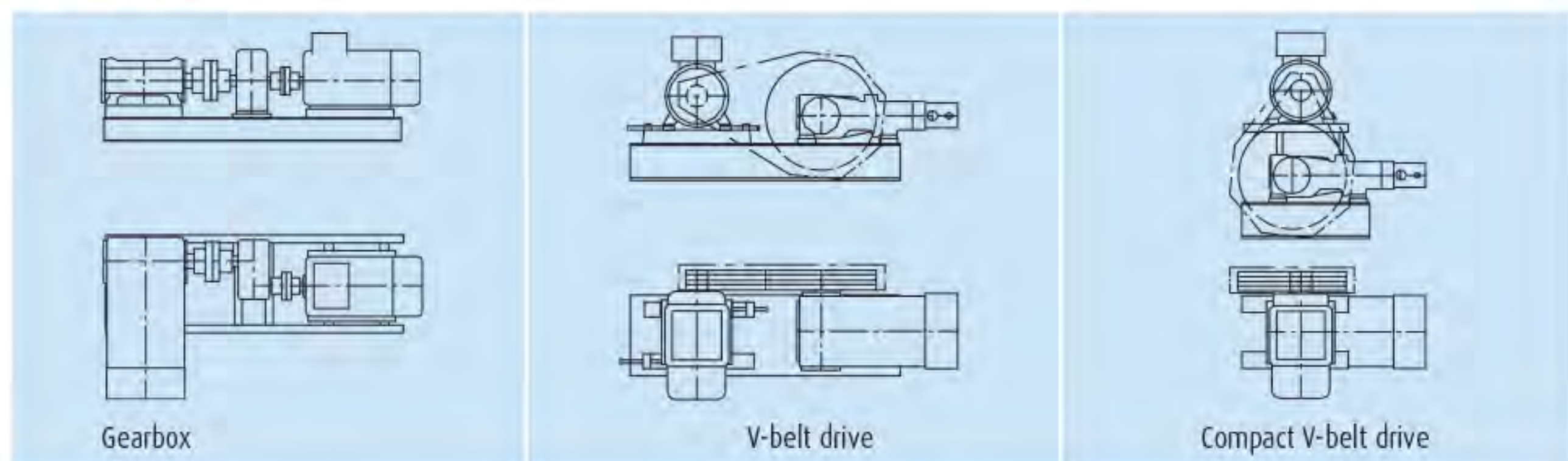
Design features

- Compact, rigid, low-vibration, noise-optimised drive housing.
- Integrated diagnostic aids possible on request.
- Low-maintenance drive with integrated or separate lubrication.
- Space-saving due to compact design.
- Compact, pre-assembled piston-cylinder unit for quick exchange.
- Possible valve versions: needle valve, central valve etc.
- For special applications, special valves, heating, cooling or flushing are available.
- ATEX models on request.

Accessories

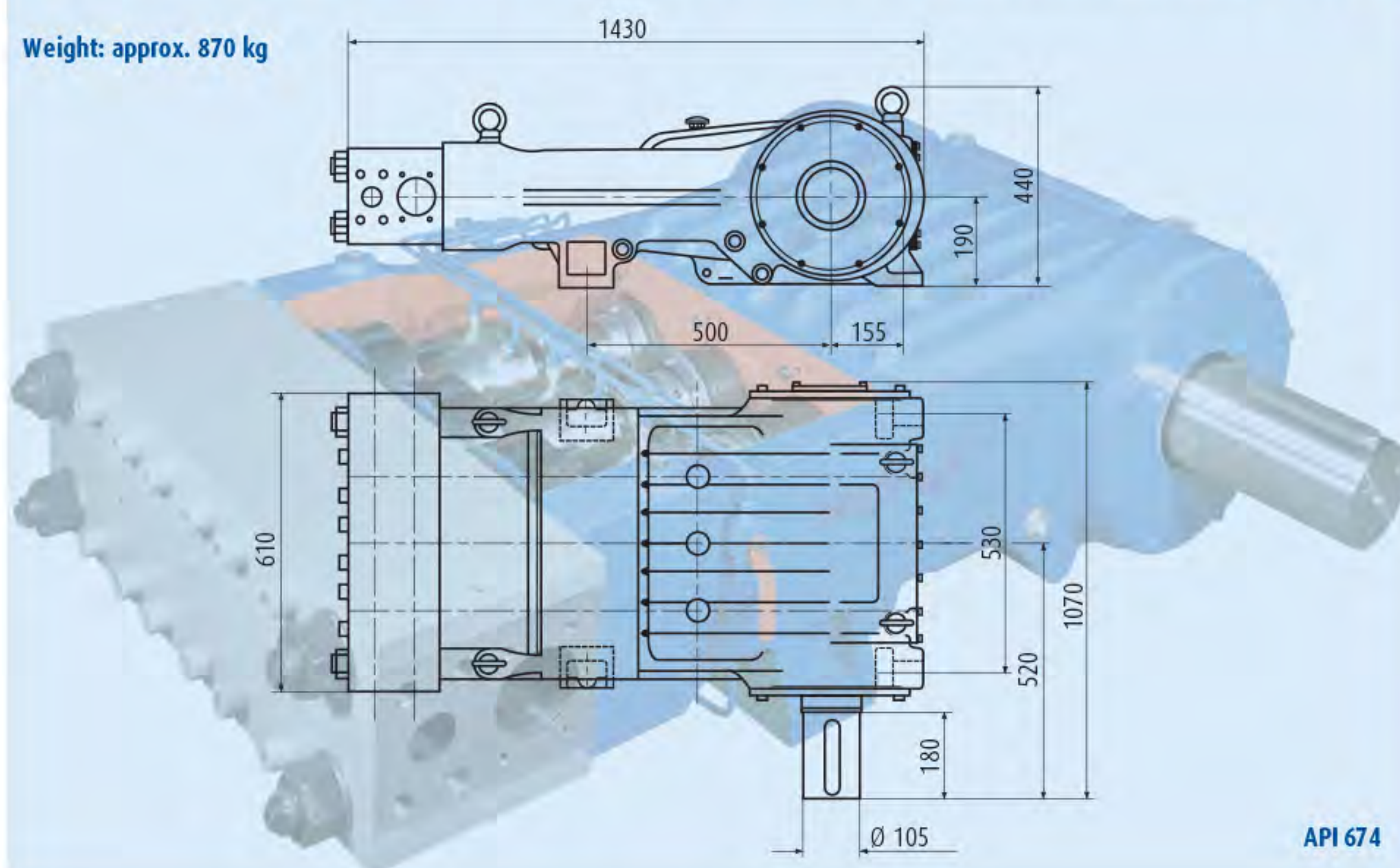
Safety valve
Shut-off valve
Non-return valve
Pressure regulating valve
Pneumatic circulation device
Separate force-feed lubrication
Pulsation damping measures
Pre-filling and filter units
Pump controllers
System accessories

Drive versions



TECHNICAL DATA OF HIGH-PRESSURE TRIPLEX PLUNGER PUMP DP207

Weight: approx. 870 kg



Nominal pressure (bar)	Effective volume flow (l/min)										
1000	29	31	34	38	44	48	54	62	67	75	87
800	38	40	45	50	57	63	71	81	88	89	115
630	47	50	56	62	71	78	88	101	110	122	143
500	60	64	71	80	91	100	113	129	140	156	*
400	74	80	89	99	114	125	141	161	175	*	*
320	91	98	108	121	139	153	168	191	209	232	272
250	128	137	153	167	191	210	236	270	293	328	383
200	150	161	174	195	224	246	277	317	344	384	450
160	193	207	230	257	295	324	366	418	*	*	*
Pump speed (rpm)	193	207	231	259	297	328	370	423	462	516	604
Maximum pump output (kW)	63	68	75	84	96	106	118	135	147	166	195

* on request

Dimensions approximate. Technical data subject to change.

The Wepuko horizontal high-pressure triplex plunger pump can be used for virtually any pumpable medium.

The required feed pressure in the standard design is 2 bar.

Other intake conditions and liquids on request.

The temperature limits for use range from -40°C to $+280^{\circ}\text{C}$.

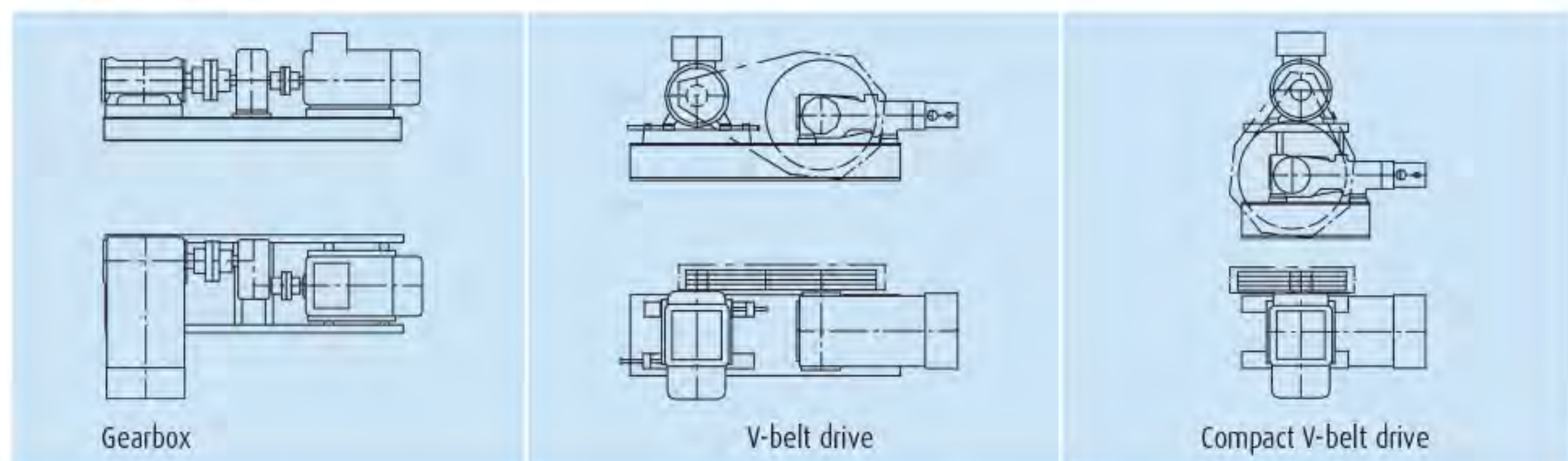
Design features

- Compact, rigid, low-vibration, noise-optimised drive housing.
- Integrated diagnostic aids possible on request.
- Low-maintenance drive with integrated or separate lubrication.
- Space-saving due to compact design.
- Compact, pre-assembled piston-cylinder unit for quick exchange.
- Possible valve versions: needle valve, central valve etc.
- For special applications, special valves, heating, cooling or flushing are available.
- ATEX models on request.

Accessories

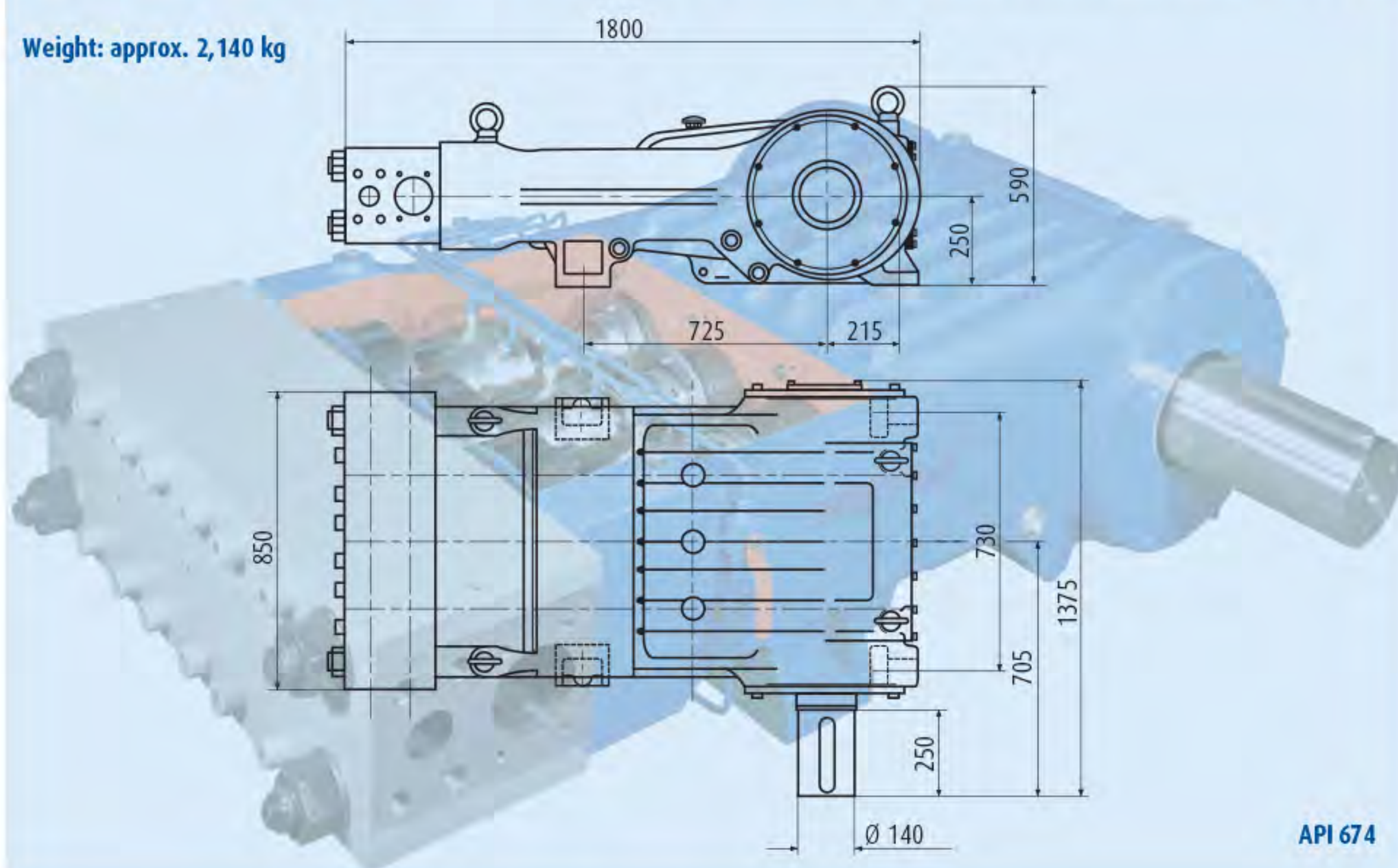
Safety valve
Shut-off valve
Non-return valve
Pressure regulating valve
Pneumatic circulation device
Separate force-feed lubrication
Pulsation damping measures
Pre-filling and filter units
Pump controllers
System accessories

Drive versions



TECHNICAL DATA OF HIGH-PRESSURE TRIPLEX PLUNGER PUMP DP209

Weight: approx. 2,140 kg



Nominal pressure (bar)	Effective volume flow (l/min)										
1000	61	72	80	89	96	110	123	134	144	170	*
800	77	90	100	112	121	138	155	168	*	*	*
630	97	114	127	142	153	176	196	213	230	270	302
500	137	160	179	200	216	248	277	300	324	381	426
400	161	188	210	234	253	290	324	352	380	447	*
320	212	248	277	309	333	383	417	452	488	574	642
250	271	317	355	395	415	477	533	579	625	726	812
200	338	395	431	480	518	595	665	714	771	907	1013
160	435	509	570	635	685	787	879	955	1031	*	*
Pump speed (rpm)	165	193	216	242	261	300	337	366	395	467	522
Maximum pump output (kW)	137	160	179	199	214	247	274	298	321	383	428

* on request

Dimensions approximate. Technical data subject to change.

The Wepuko horizontal high-pressure triplex plunger pump can be used for virtually any pumpable medium.

The required feed pressure in the standard design is 2 bar.

Other intake conditions and liquids on request.

The temperature limits for use range from -40°C to $+280^{\circ}\text{C}$.

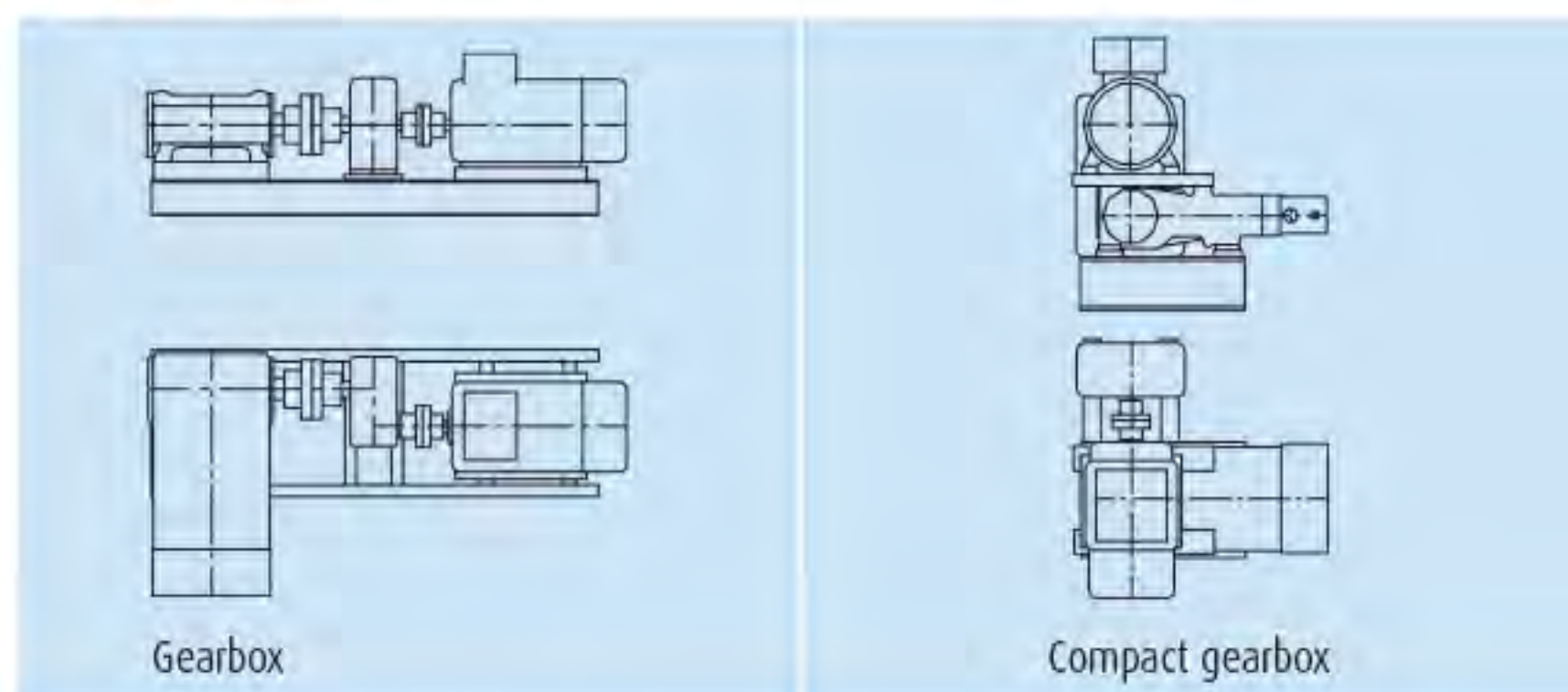
Design features

- Compact, rigid, low-vibration, noise-optimised drive housing.
- Integrated diagnostic aids possible on request.
- Low-maintenance drive with integrated or separate lubrication.
- Space-saving due to compact design.
- Compact, pre-assembled piston-cylinder unit for quick exchange.
- Possible valve versions: needle valve, central valve etc.
- For special applications, special valves, heating, cooling or flushing are available.
- ATEX models on request.

Accessories

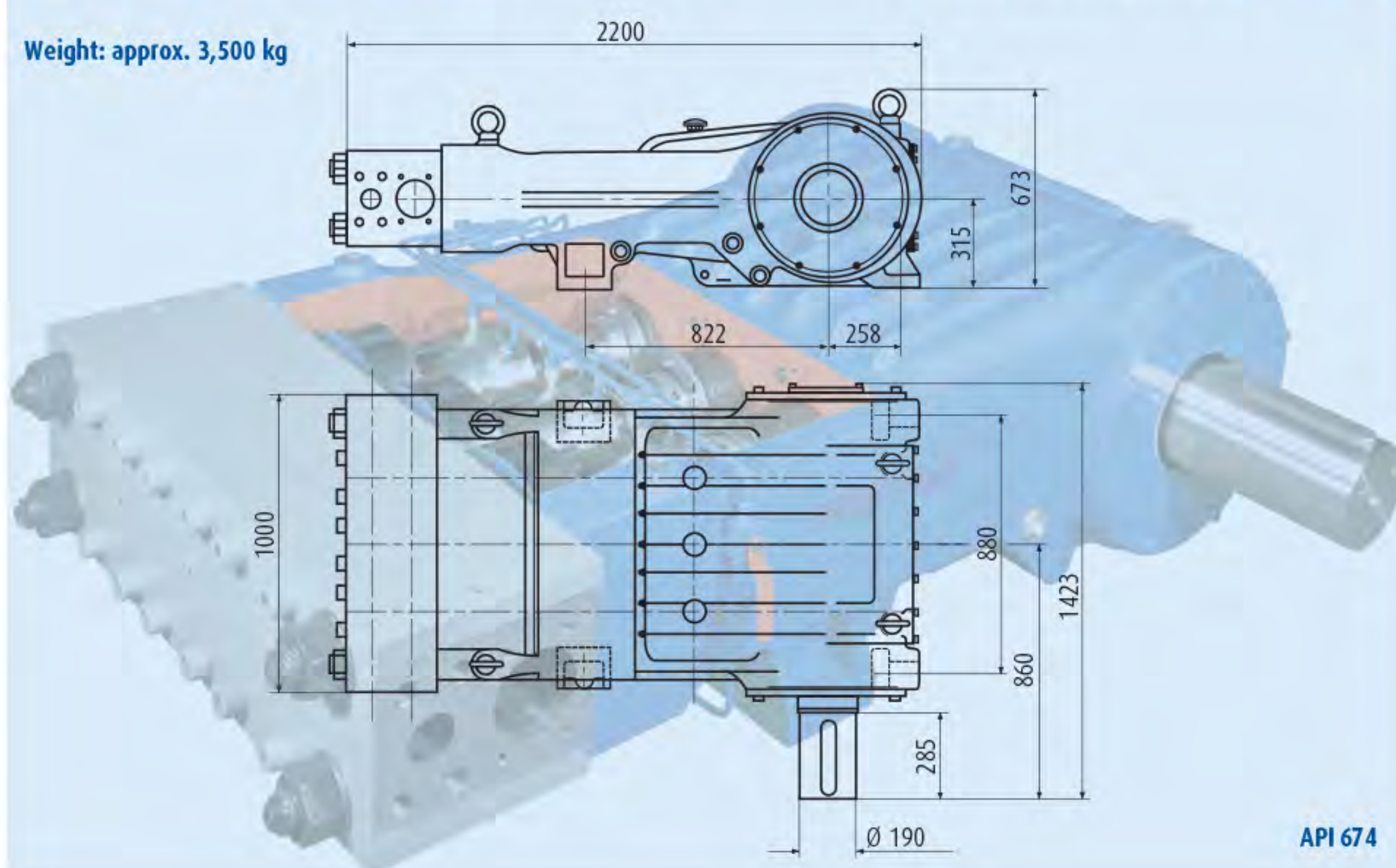
Safety valve
Shut-off valve
Non-return valve
Pressure regulating valve
Pneumatic circulation device
Separate force-feed lubrication
Pulsation damping measures
Pre-filling and filter units
Pump controllers
System accessories

Drive versions



TECHNICAL DATA OF HIGH-PRESSURE TRIPLEX PLUNGER PUMP DP212

Weight: approx. 3,500 kg



Nominal pressure (bar)	Effective volume flow (l/min)										
1000	136	152	171	191	216	242	270	300	337	377	425
800	163	182	205	229	259	291	324	360	404	*	*
630	222	248	279	312	352	396	451	501	560	631	711
500	290	323	365	407	467	522	585	650	727	819	923
400	368	410	465	523	590	659	739	821	918	1034	*
320	459	512	574	645	728	814	912	1013	1109	1249	1407
250	606	676	758	851	961	1074	1172	1302	1464	1623	1828
200	775	864	969	1089	1191	1338	1499	1648	1843	2076	2339
120	932	1039	1165	1309	1478	1651	1851	2056	2299	*	*
Pump speed (rpm)	148	165	186	209	236	265	297	330	371	418	471
Maximum pump output (kW)	291	324	366	406	459	515	571	635	714	813	916

* on request

Dimensions approximate. Technical data subject to change.

The Wepuko horizontal high-pressure triplex plunger pump can be used for virtually any pumpable medium.

The required feed pressure in the standard design is 2 bar.

Other intake conditions and liquids on request.

The temperature limits for use range from -40 °C to +280°C.

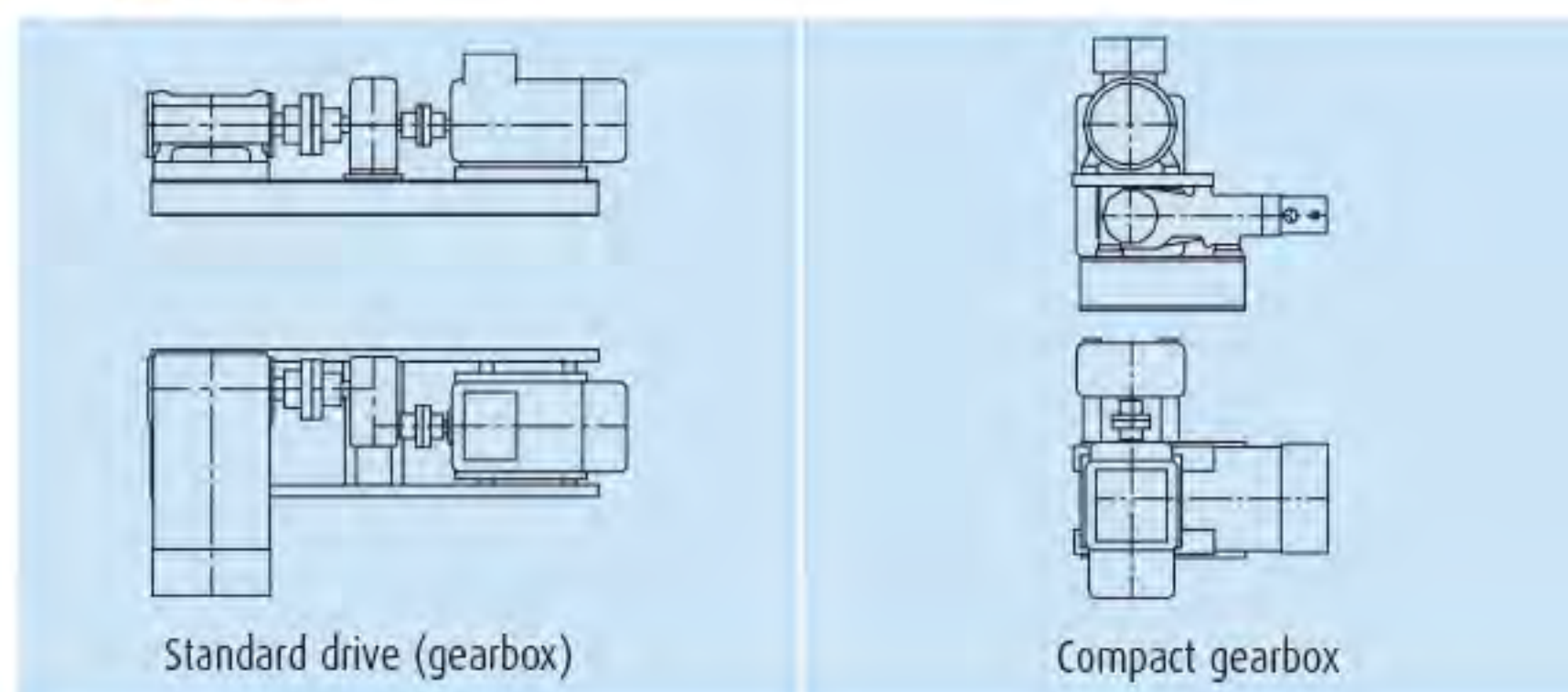
Design features

- Compact, rigid, low-vibration, noise-optimised drive housing.
- Integrated diagnostic aids possible on request.
- Low-maintenance drive with integrated or separate lubrication.
- Space-saving due to compact design.
- Compact, pre-assembled piston-cylinder unit for quick exchange.
- Possible valve versions: needle valve, central valve etc.
- For special applications, special valves, heating, cooling or flushing are available.
- ATEX models on request.

Accessories

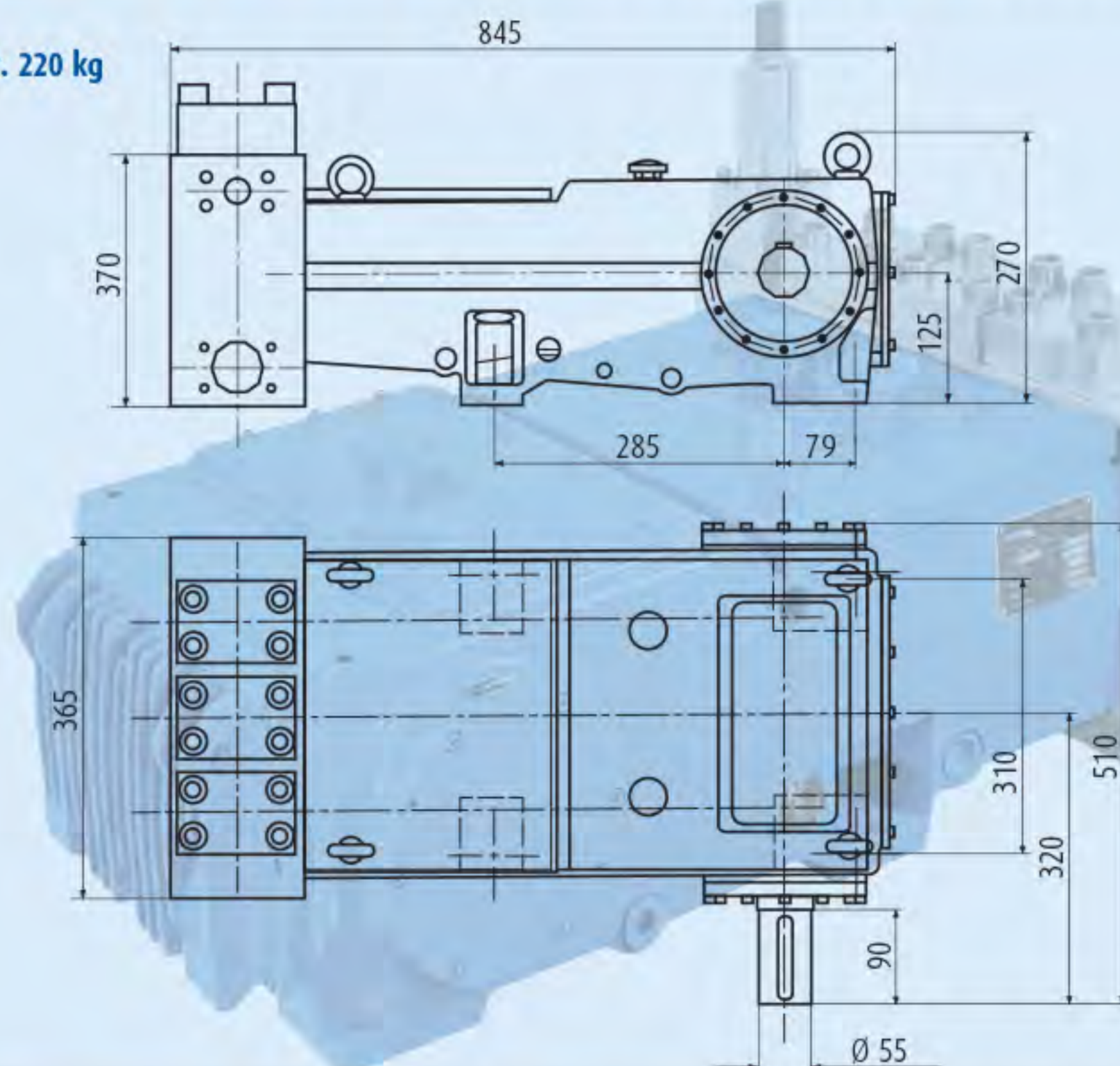
Safety valve
Shut-off valve
Non-return valve
Pressure regulating valve
Pneumatic circulation device
Separate force-feed lubrication
Pulsation damping measures
Pre-filling and filter units
Pump controllers
System accessories

Drive versions



TECHNICAL DATA OF HIGH-PRESSURE TRIPLEX PLUNGER PUMP DP403

Weight: approx. 220 kg



Nominal pressure (bar)	Effective volume flow (l/min)									
1000	5	5	6	6	7	8	9	10	11	12
800	6	7	7	8	9	10	11	13	14	16
630	7	8	9	10	12	13	14	16	18	20
500	9	10	12	13	14	16	18	20	22	25
400	11	13	14	15	17	19	22	24	27	30
315	15	17	19	21	24	27	30	34	37	42
250	18	20	23	25	28	31	35	39	44	49
200	23	26	29	32	36	40	45	51	57	64
160	29	33	37	41	46	52	58	65	72	81
125	36	41	46	51	57	64	72	80	89	100
Pump speed (rpm)	286	327	368	411	461	514	586	659	732	820
Maximum pump output (kW)	10	11	13	14	16	19	19	22	24	27

Dimensions approximate. Technical data subject to change.

The Wepuko horizontal high-pressure triplex plunger pump can be used for virtually any pumpable medium.

The required feed pressure in the standard design is 2 bar.

Other intake conditions and liquids on request.

The temperature limits for use range from -40°C to $+280^{\circ}\text{C}$.

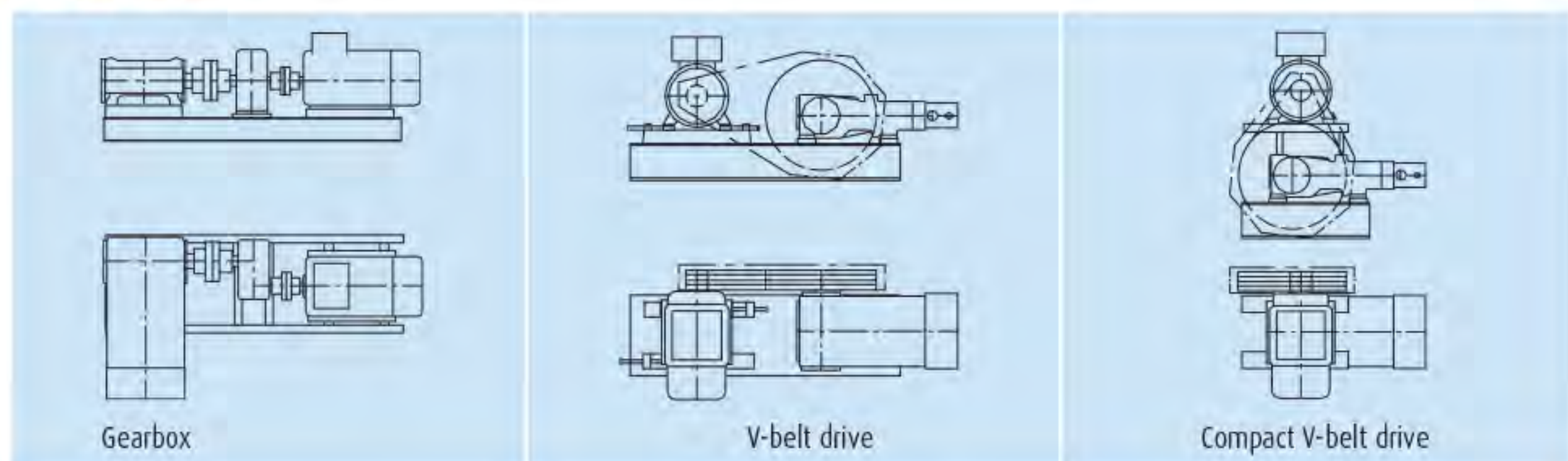
Design features

- Compact, rigid, low-vibration, noise-optimised drive housing.
- Integrated diagnostic aids possible on request.
- Low-maintenance drive with integrated or separate lubrication.
- Space-saving due to compact design.
- Compact, pre-assembled piston-cylinder unit for quick exchange.
- Possible valve versions: needle valve, central valve etc.
- For special applications, special valves, heating, cooling or flushing are available.
- ATEX models on request.

Accessories

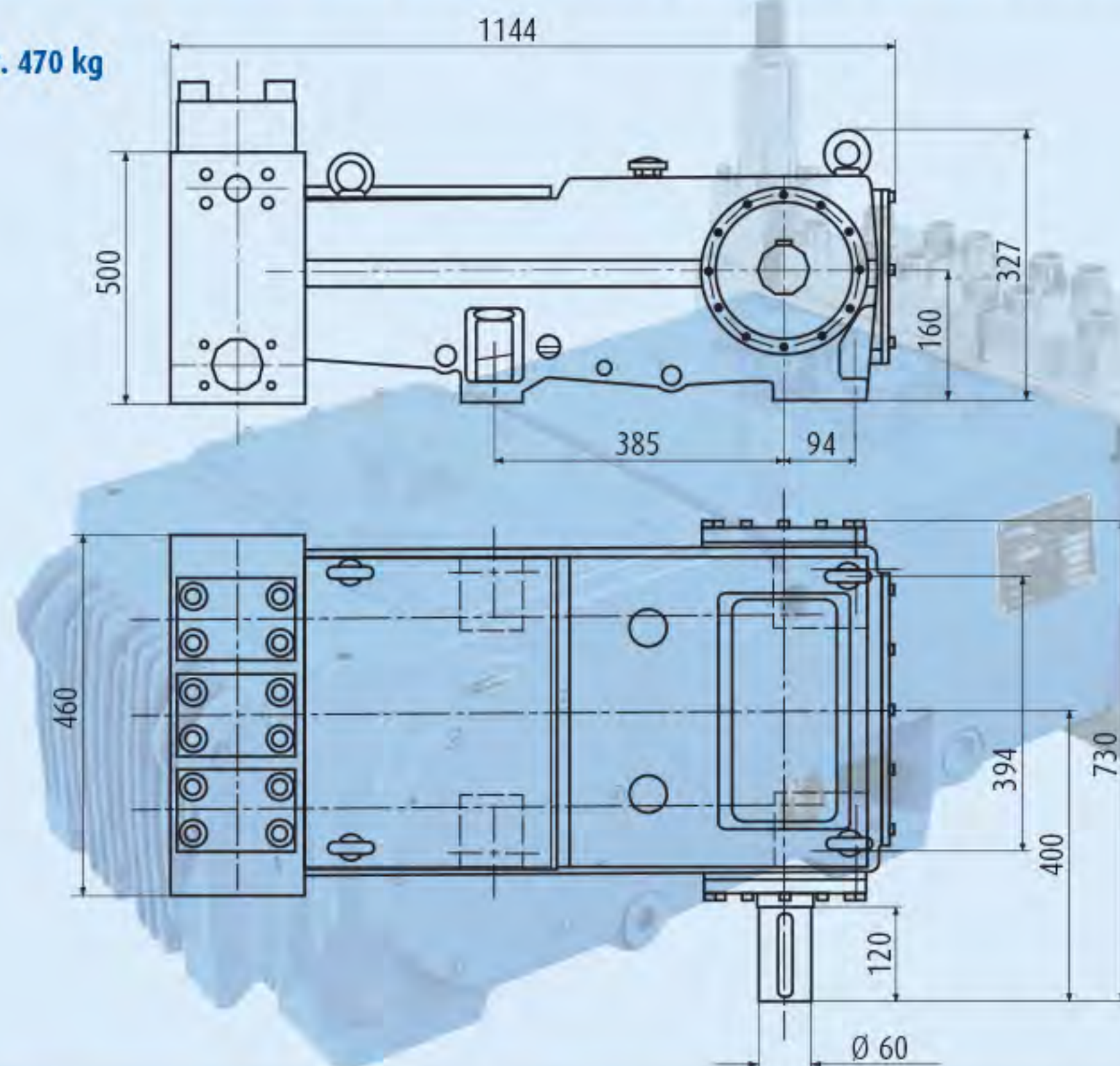
Safety valve
Shut-off valve
Non-return valve
Pressure regulating valve
Pneumatic circulation device
Separate force-feed lubrication
Pulsation damping measures
Pre-filling and filter units
Pump controllers
System accessories

Drive versions



TECHNICAL DATA OF HIGH-PRESSURE TRIPLEX PLUNGER PUMP DP405

Weight: approx. 470 kg



API 674

Nominal pressure (bar)	Effective volume flow (l/min)									
1000	13	15	16	18	20	23	25	28	31	35
800	16	18	20	22	24	27	30	34	37	42
630	22	25	28	31	34	38	42	47	53	59
500	26	29	32	36	40	44	49	55	61	68
400	34	38	42	47	52	58	64	72	80	90
315	43	48	53	60	66	74	81	91	101	114
250	53	59	66	75	82	92	102	114	126	142
200	67	75	84	94	104	116	128	144	160	180
160	84	93	104	117	130	145	160	179	199	225
125	100	113	126	142	157	175	194	217	241	272
Pump speed (rpm)	236	263	295	332	370	414	463	518	583	657
Maximum pump output (kW)	29	32	36	40	44	49	55	61	69	78

Dimensions approximate. Technical data subject to change.

The Wepuko horizontal high-pressure triplex plunger pump can be used for virtually any pumpable medium.

The required feed pressure in the standard design is 2 bar.

Other intake conditions and liquids on request.

The temperature limits for use range from -40°C to $+280^{\circ}\text{C}$.

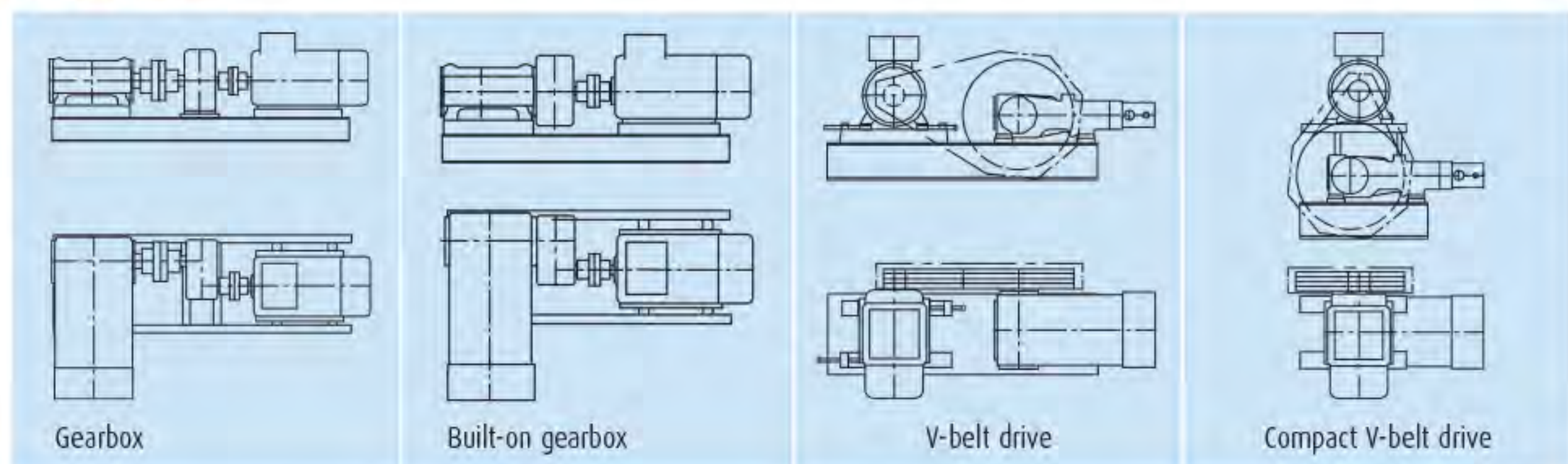
Design features

- Compact, rigid, low-vibration, noise-optimised drive housing.
- Integrated diagnostic aids possible on request.
- Low-maintenance drive with integrated or separate lubrication.
- Space-saving due to compact design.
- Compact, pre-assembled piston-cylinder unit for quick exchange.
- Possible valve versions: needle valve, central valve etc.
- For special applications, special valves, heating, cooling or flushing are available.
- ATEX models on request.

Accessories

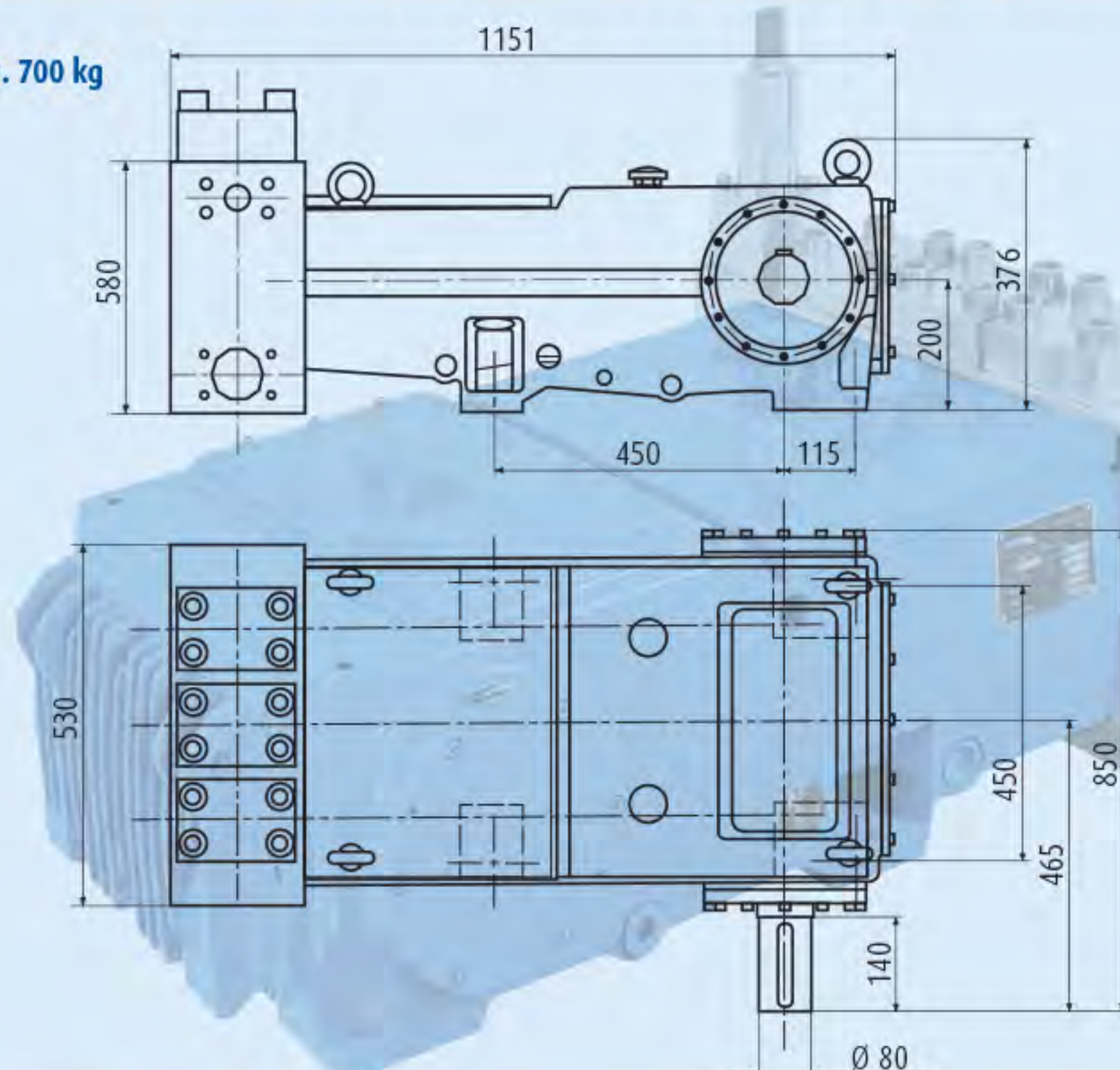
Safety valve
Shut-off valve
Non-return valve
Pressure regulating valve
Pneumatic circulation device
Separate force-feed lubrication
Pulsation damping measures
Pre-filling and filter units
Pump controllers
System accessories

Drive versions



TECHNICAL DATA OF HIGH-PRESSURE TRIPLEX PLUNGER PUMP DP406

Weight: approx. 700 kg



API 674

Nominal pressure (bar)	Effective volume flow (l/min)									
1000	24	27	30	34	38	43	48	53	58	68
800	28	32	35	40	44	50	56	61	68	79
630	37	41	46	52	58	65	74	81	89	104
500	47	52	59	66	73	83	93	102	113	132
400	59	65	73	82	91	103	117	127	141	164
315	74	82	92	104	116	130	147	161	178	208
250	92	103	115	129	144	163	184	201	222	259
200	111	124	139	156	174	197	222	243	268	314
160	157	175	196	221	246	277	314	343	379	443
125	182	203	228	256	285	322	364	397	439	514
Pump speed (rpm)	207	231	259	297	328	370	423	462	516	604
Maximum pump output (kW)	50	56	62	69	75	87	99	108	122	143

Dimensions approximate. Technical data subject to change.

The Wepuko horizontal high-pressure triplex plunger pump can be used for virtually any pumpable medium.

The required feed pressure in the standard design is 2 bar.

Other intake conditions and liquids on request.

The temperature limits for use range from -40°C to $+280^{\circ}\text{C}$.

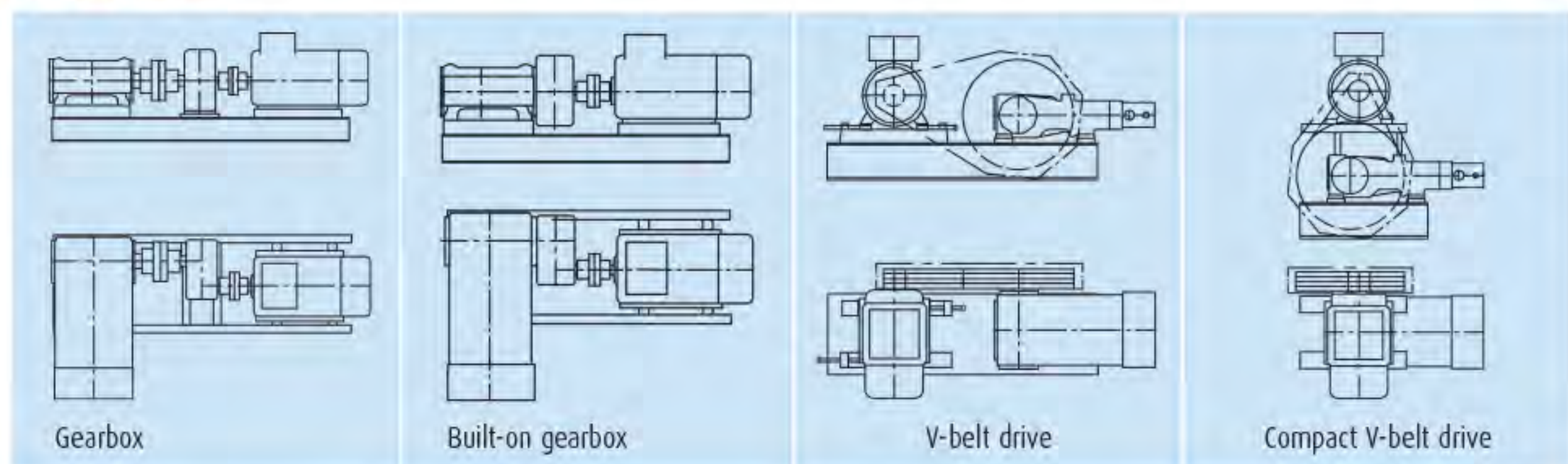
Design features

- Compact, rigid, low-vibration, noise-optimised drive housing.
- Integrated diagnostic aids possible on request.
- Low-maintenance drive with integrated or separate lubrication.
- Space-saving due to compact design.
- Compact, pre-assembled piston-cylinder unit for quick exchange.
- Possible valve versions: needle valve, central valve etc.
- For special applications, special valves, heating, cooling or flushing are available.
- ATEX models on request.

Accessories

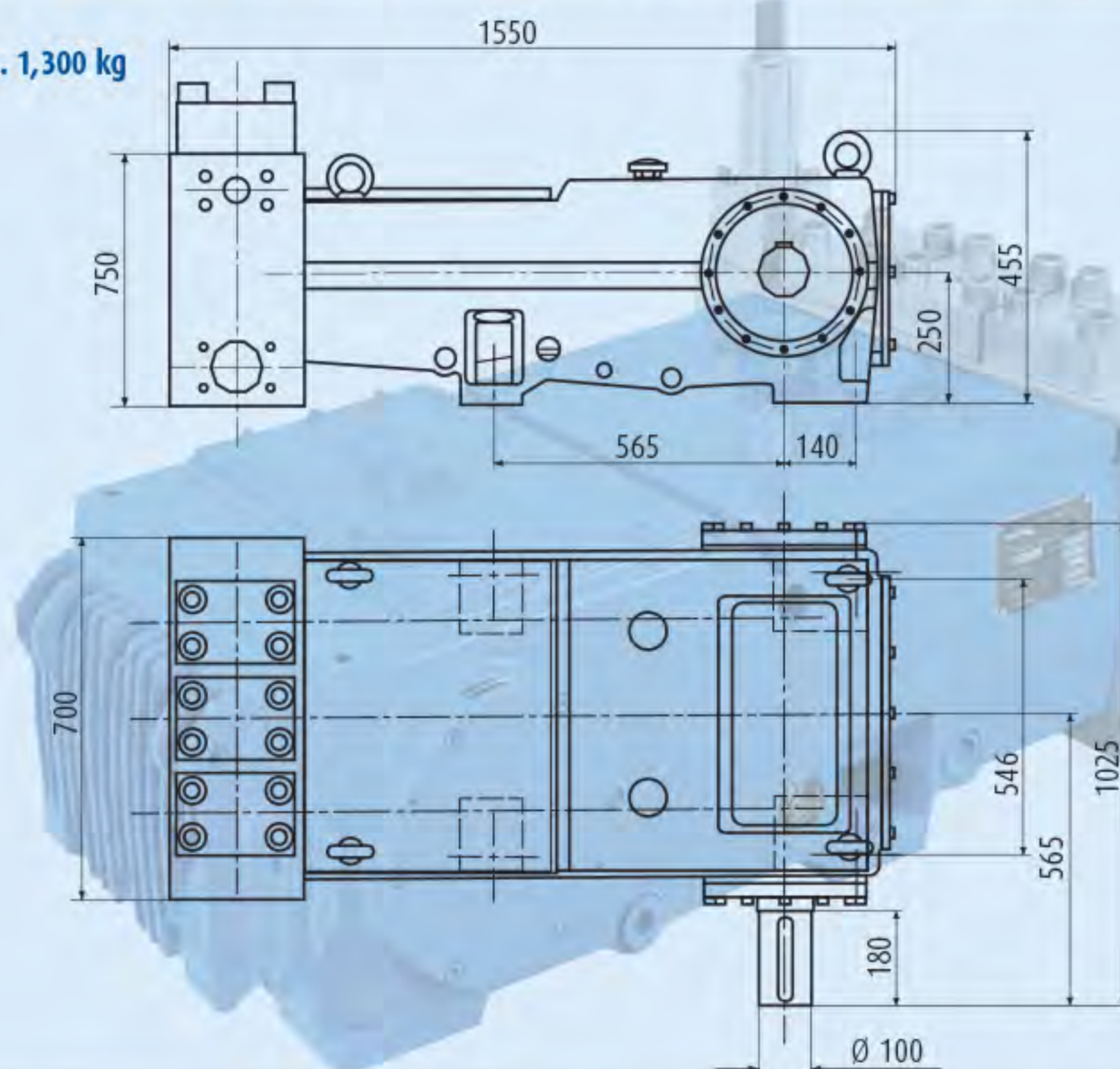
Safety valve
Shut-off valve
Non-return valve
Pressure regulating valve
Pneumatic circulation device
Separate force-feed lubrication
Pulsation damping measures
Pre-filling and filter units
Pump controllers
System accessories

Drive versions



TECHNICAL DATA OF HIGH-PRESSURE TRIPLEX PLUNGER PUMP DP408

Weight: approx. 1,300 kg



API 674

Nominal pressure (bar)	Effective volume flow (l/min)									
1000	43	48	54	58	66	74	81	86	102	113
800	55	61	68	74	84	94	102	109	129	144
630	68	76	85	82	105	117	126	136	161	178
500	86	96	108	116	132	148	161	172	203	225
400	107	120	134	145	165	185	201	212	251	280
315	130	145	163	175	201	224	243	259	307	339
250	183	205	229	247	281	316	343	366	433	479
200	212	237	266	287	329	366	398	425	502	555
160	280	313	351	378	435	483	525	560	662	733
125	354	396	444	479	550	611	664	717	838	927
Pump speed (rpm)	193	216	242	261	300	337	366	395	467	522
Maximum pump output (kW)	89	100	112	119	137	152	165	179	213	238

Dimensions approximate. Technical data subject to change.

The Wepuko horizontal high-pressure triplex plunger pump can be used for virtually any pumpable medium.

The required feed pressure in the standard design is 2 bar.

Other intake conditions and liquids on request.

The temperature limits for use range from -40 °C to +280°C.

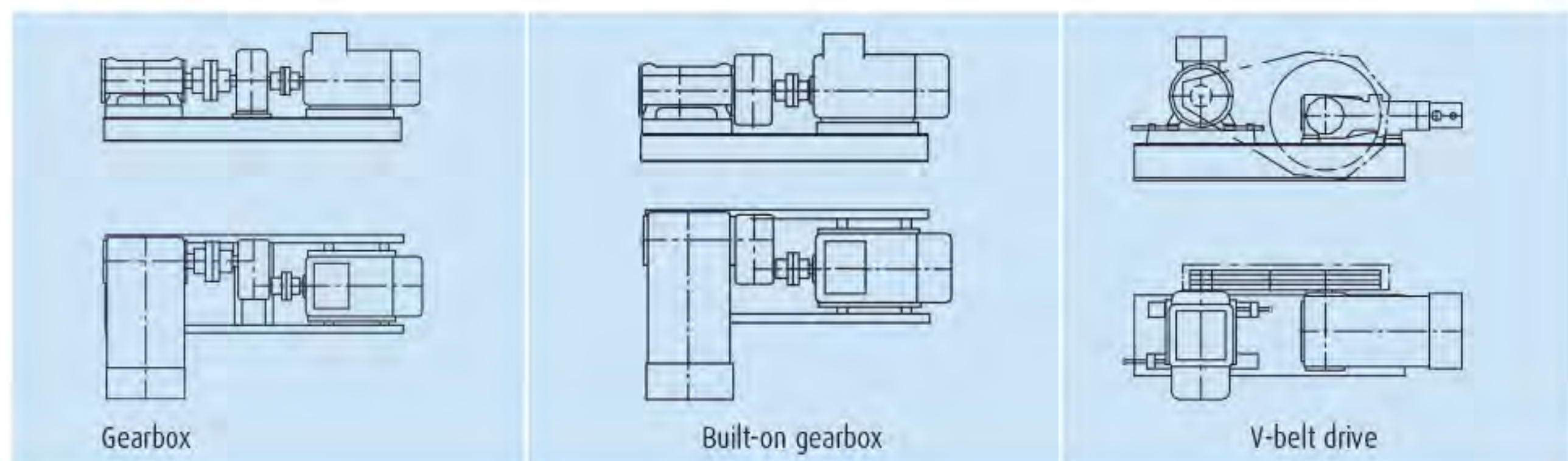
Design features

- Compact, rigid, low-vibration, noise-optimised drive housing.
- Integrated diagnostic aids possible on request.
- Low-maintenance drive with integrated or separate lubrication.
- Space-saving due to compact design.
- Compact, pre-assembled piston-cylinder unit for quick exchange.
- Possible valve versions: needle valve, central valve etc.
- For special applications, special valves, heating, cooling or flushing are available.
- ATEX models on request.

Accessories

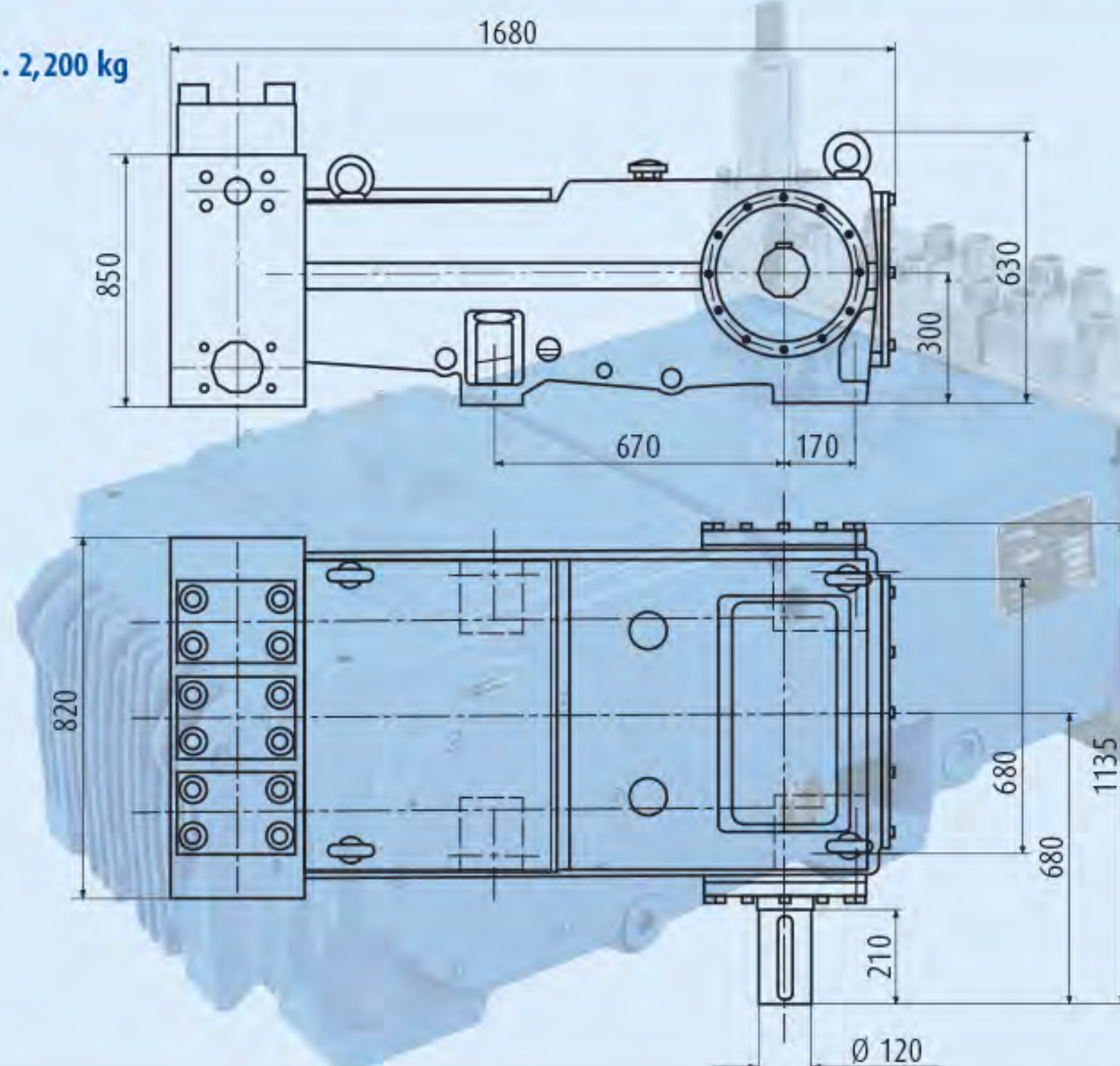
Safety valve
Shut-off valve
Non-return valve
Pressure regulating valve
Pneumatic circulation device
Separate force-feed lubrication
Pulsation damping measures
Pre-filling and filter units
Pump controllers
System accessories

Drive versions



TECHNICAL DATA OF HIGH-PRESSURE TRIPLEX PLUNGER PUMP DP410

Weight: approx. 2,200 kg



API 674

Nominal pressure (bar)	Effective volume flow (l/min)									
1000	73	82	92	104	115	129	142	160	178	200
800	92	104	116	131	146	163	180	202	225	253
630	115	129	145	164	182	204	224	252	281	316
500	139	156	175	198	220	247	271	305	339	382
400	196	220	248	279	310	348	382	430	479	540
315	227	255	287	324	360	403	443	498	555	626
250	299	337	379	428	475	532	585	658	733	826
200	378	426	479	541	601	674	740	832	928	1045
160	472	532	598	675	750	840	924	1039	1158	1304
125	571	643	723	816	907	1017	1118	1256	1401	1578
Pump speed (rpm)	165	186	209	236	265	297	330	371	418	471
Maximum pump output (kW)	153	170	191	213	239	265	295	331	377	425

Dimensions approximate. Technical data subject to change.

The Wepuko horizontal high-pressure triplex plunger pump can be used for virtually any pumpable medium.

The required feed pressure in the standard design is 2 bar.

Other intake conditions and liquids on request.

The temperature limits for use range from -40 °C to +280°C.

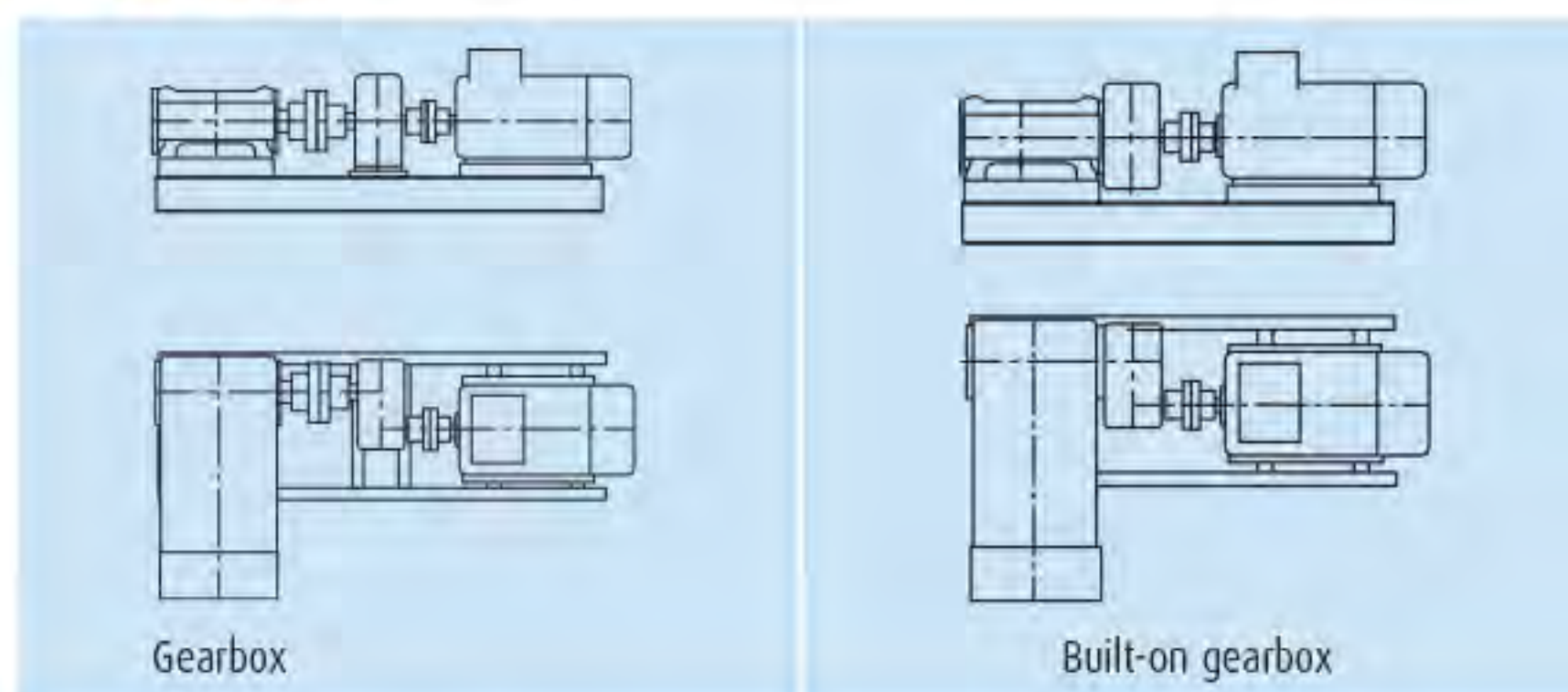
Design features

- Compact, rigid, low-vibration, noise-optimised drive housing.
- Integrated diagnostic aids possible on request.
- Low-maintenance drive with integrated or separate lubrication.
- Space-saving due to compact design.
- Compact, pre-assembled piston-cylinder unit for quick exchange.
- Possible valve versions: needle valve, central valve etc.
- For special applications, special valves, heating, cooling or flushing are available.
- ATEX models on request.

Accessories

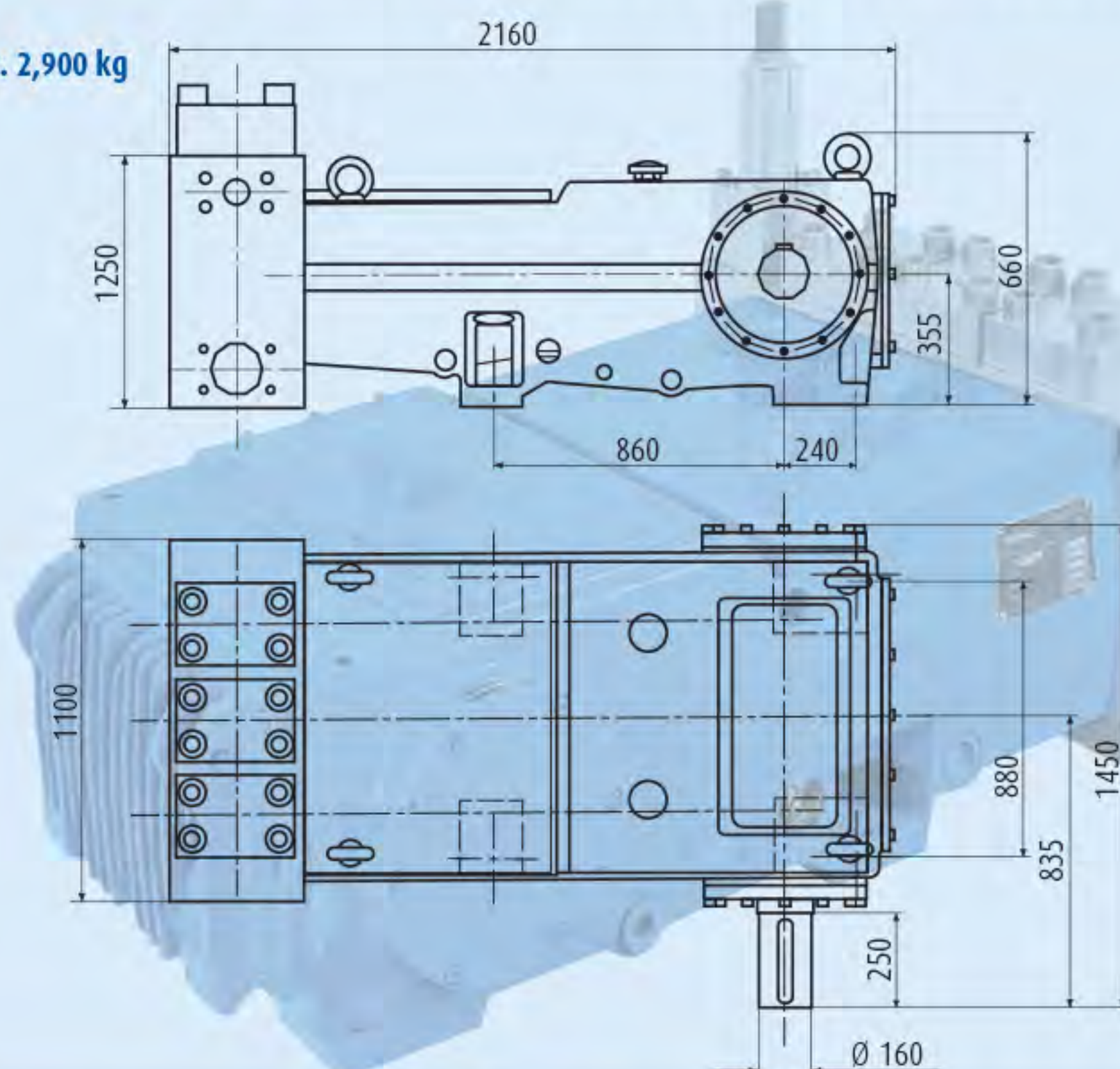
Safety valve
Shut-off valve
Non-return valve
Pressure regulating valve
Pneumatic circulation device
Separate force-feed lubrication
Pulsation damping measures
Pre-filling and filter units
Pump controllers
System accessories

Drive versions



TECHNICAL DATA OF HIGH-PRESSURE TRIPLEX PLUNGER PUMP DP412

Weight: approx. 2,900 kg



API 674

Nominal pressure (bar)	Effective volume flow (l/min)									
1000	130	145	163	184	205	230	255	283	315	355
800	157	175	198	222	248	278	309	343	381	429
630	189	211	238	267	298	335	371	412	459	517
500	257	287	323	363	406	456	506	561	624	703
400	299	333	375	421	471	529	586	651	724	816
315	383	427	482	541	605	679	753	836	930	1048
250	484	539	608	683	763	857	950	1056	1174	1323
200	649	723	815	916	1023	1149	1274	1415	1574	1774
160	780	869	980	1101	1230	1382	1532	1702	1894	2133
125	987	1100	1240	1393	1557	1748	1939	2145	2397	2700
100	1231	1372	1547	1738	1942	2181	2419	2688	2990	3369
Pump speed (rpm)	148	165	186	209	236	265	297	330	371	418
Maximum pump output (kW)	253	282	318	353	399	443	497	552	627	706

Dimensions approximate. Technical data subject to change.

The Wepuko horizontal high-pressure triplex plunger pump can be used for virtually any pumpable medium.

The required feed pressure in the standard design is 2 bar.

Other intake conditions and liquids on request.

The temperature limits for use range from -40 °C to +280°C.

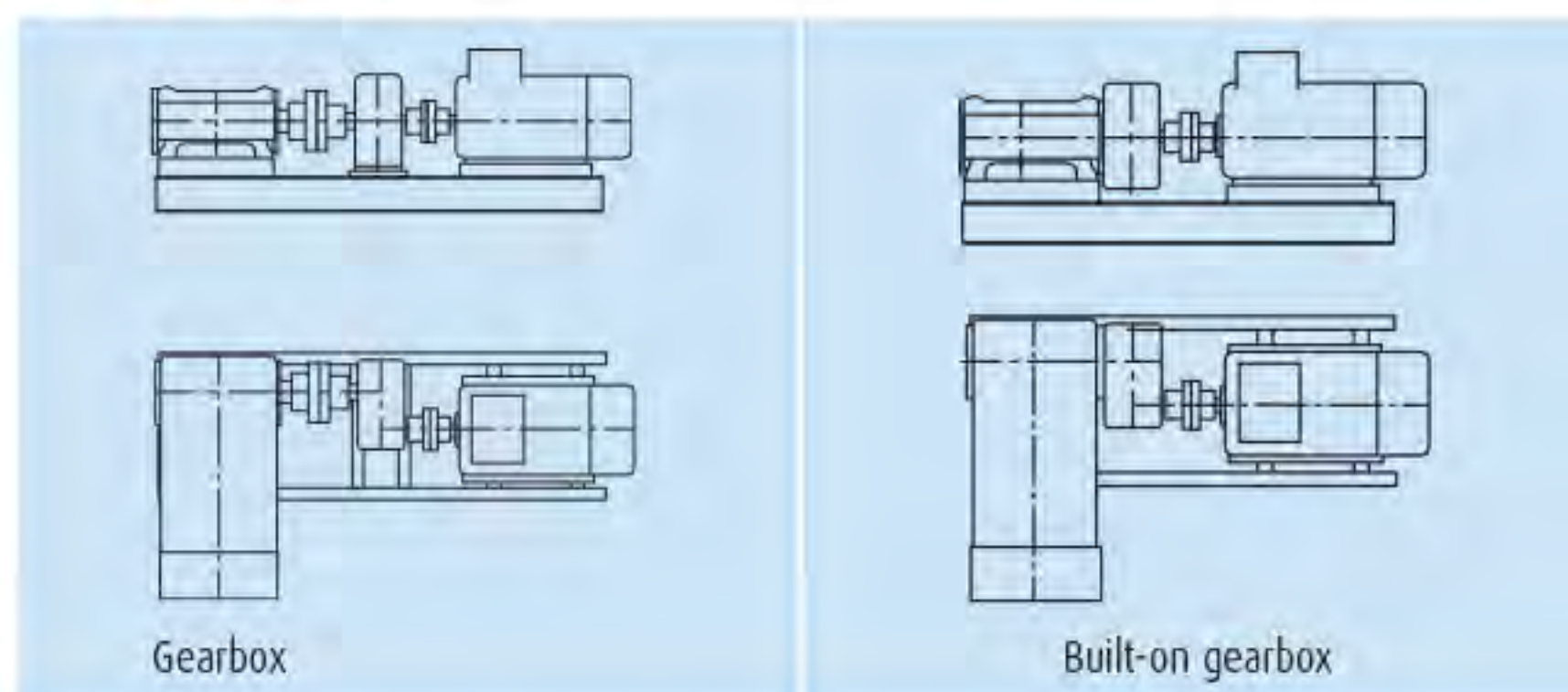
Design features

- Compact, rigid, low-vibration, noise-optimised drive housing.
- Integrated diagnostic aids possible on request.
- Low-maintenance drive with integrated or separate lubrication.
- Space-saving due to compact design.
- Compact, pre-assembled piston-cylinder unit for quick exchange.
- Possible valve versions: needle valve, central valve etc.
- For special applications, special valves, heating, cooling or flushing are available.
- ATEX models on request.

Accessories

Safety valve
Shut-off valve
Non-return valve
Pressure regulating valve
Pneumatic circulation device
Separate force-feed lubrication
Pulsation damping measures
Pre-filling and filter units
Pump controllers
System accessories

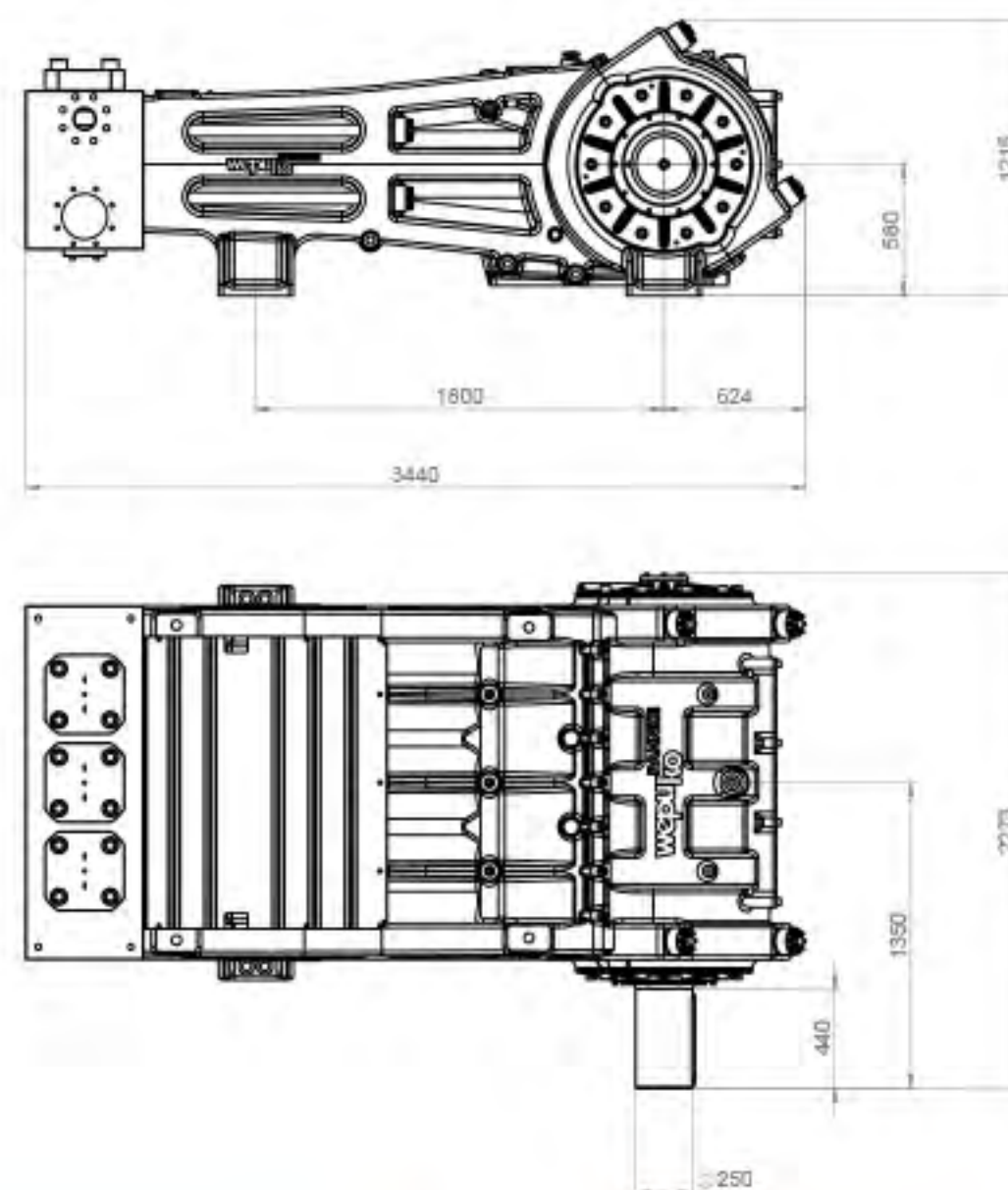
Drive versions



High-pressure pumps

wepu PAHNKE **ko**

We perform under high pressure.



Technical data **DP 532-250** High-pressure triplex plunger pump

Weight: approx. 15,5 t
API 674

Nominal pressure (bar)

Effective flow rate based on water (l / min)

575	*	*	*	*	*	*	*	*	*	*	*
520	677	725	781	846	923	1015	1129	1270	1354	*	*
480	740	793	854	925	1009	1110	1233	1388	1480	*	*
440	806	863	830	1007	1099	1209	1343	1510	1611	*	*
400	874	937	1009	1093	1192	1311	1457	1639	1749	*	*
380	946	1013	1091	1182	1290	1419	1576	1773	1891	*	*
350	1020	1093	1177	1275	1391	1530	1700	1912	2040	*	*
325	1097	1175	1265	1371	1495	1645	1828	2056	2193	*	*
280	1259	1349	1453	1574	1717	1888	2098	2360	2518	*	*
250	1433	1535	1653	1790	1953	2149	2387	2686	2865	*	*
200	1714	1836	1977	2142	2337	2570	2856	3213	3427	*	*
180	*	*	*	*	*	*	*	*	*	*	*
160	*	*	*	*	*	*	*	*	*	*	*
Pump speed (rpm)	100	107	115	125	136	150	167	188	200	238	268
Maximum pump output (kW)	644	683	827	788	860	946	1051	1182	1261	1501	1689

* on request

Dimensions approximate.
Subject to change without notice. All data and images non-binding.

- The Wepuko horizontal high-pressure triplex plunger pump can be used for virtually any pumpable medium.
- The required suction head in the standard design is 2 bar. Other suction conditions and liquids on request.
- The operating temperature ranges from -40 °C to +280°C.
- Rigid design for continuous operation.

Design features

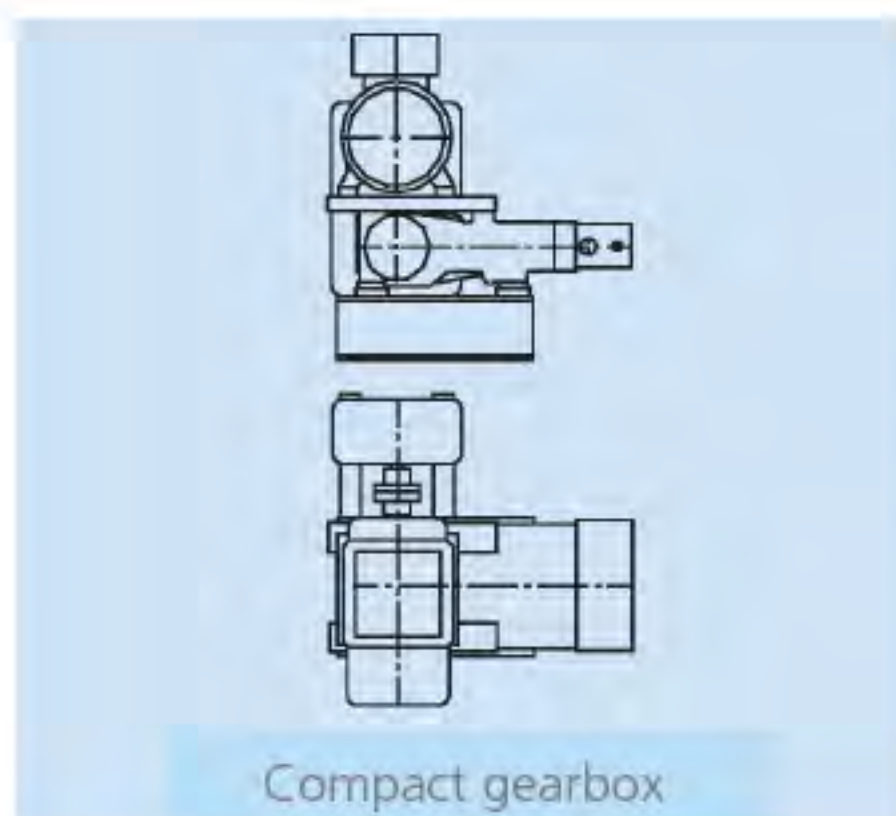
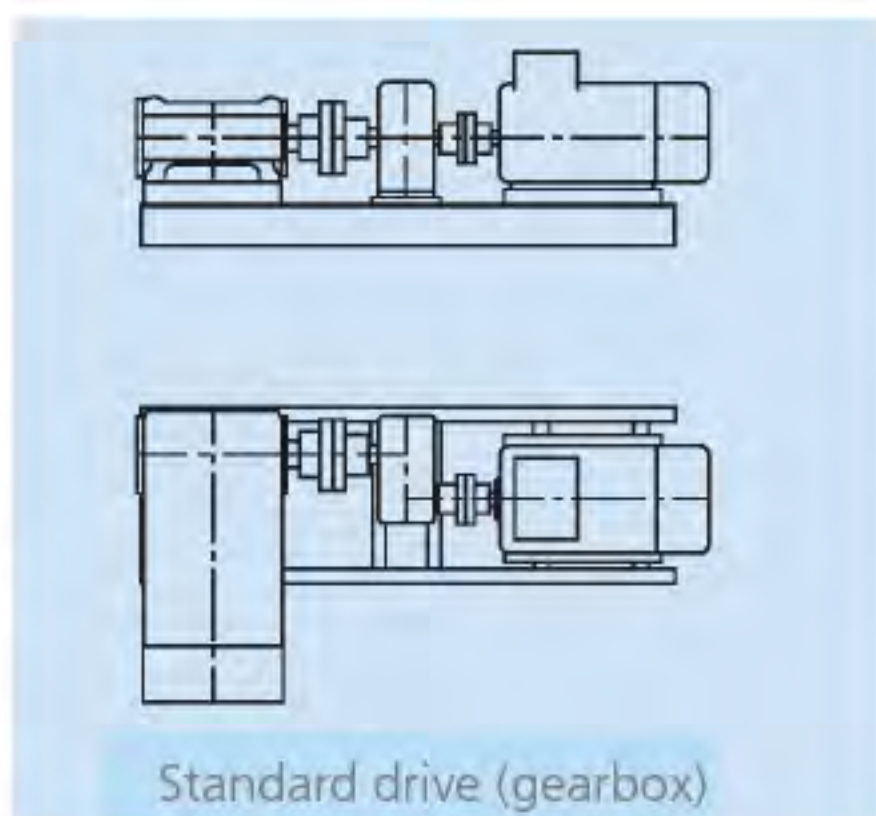
- Compact, rigid, low-vibration, noise-optimized drive end.
- Integrated diagnostic system on request.
- Low-maintenance drive-end with separate lubrication.
- Space-saving due to compact design.
- Compact, pre-assembled plunger-cylinder unit for quick exchange.
- Available valve types:
Inline valves, cone valves etc.
- For special applications, special valves, heating, cooling or flushing are available.
- ATEX design is available.



Accessoires

- | | |
|---|---|
| ■ Safety valve | ■ Pulsation dampeners (suction and discharge) |
| ■ Stop valve | ■ Boost and filter units |
| ■ Check valve | ■ Pump controllers |
| ■ Pneumatic operated circulation device | ■ System accessoires |

Drive versions



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All data and images non-binding.



We perform under high pressure.



Oil hydraulics



Products
Industries
Applications
Modernisation



Contents

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 - High-pressure valves
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 - Pumps with variable flow rate
 - Heavy machine drives
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- 20 **Modernisation**
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- 23 **About Wepuko PAHNKE**



www.wepuko.de

You can find more information about the products and solutions from Wepuko PAHNKE via this link.

Dear readers,

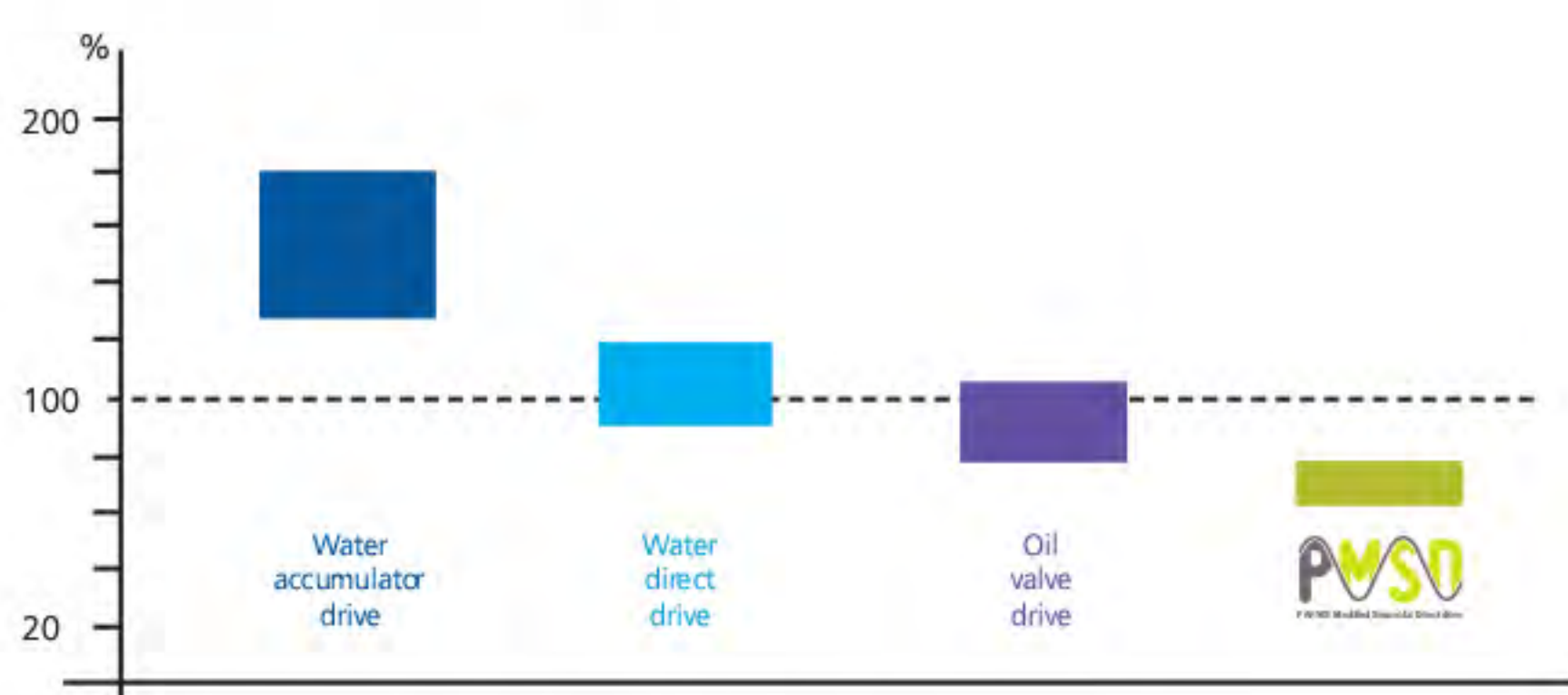
Oil hydraulics perfectly combine enormous power density, high dynamism and the ability to transfer huge forces in a compact system.

Oil hydraulic pumps from Wepuko are used wherever reliability and durability are called for in the toughest conditions. And for good reason. Each of our radial piston pumps is the product of 80 years of expertise and experience. These pumps are mostly used at pressures of 300 to 420 bar, and up to 1,000 bar in special applications.

As well as individual pumps, we also supply complete solutions for our customers, from small units to large hydraulic systems with up to 30 MW of installed power.

As a manufacturer of hydraulic forging presses, Wepuko PAHNKE knows the needs of the market inside out. Hans-Joachim Pahnke founded his press-making company PAHNKE Engineering in 1973. In 1975, he developed a revolutionary hydraulic drive system for presses: the PAHNKE Modified Sinusoidal Direct drive (PMSD).

To this day, this system continues to offer unrivalled precision and power combined with energy efficiency and low maintenance. For our customers, this means not only the best possible productivity and therefore profitability, but also a significant contribution to protecting the environment.



Relative energy consumption of different drive types for hydraulic forging presses



The first PMSD drive (1976) for a 5 MN forging press



10-RX-pump PMSD drive for a 53 MN open-die forging press at Union Electric (USA).

➤ From single high-pressure valves to complete drives with 30 MW of power: Wepuko PAHNKE is your partner for everything you need.



High-pressure valves

Our large, cartridge-style high-pressure valves are one of our signature products and also one of our most popular.

With a nominal diameter up to 80, operating pressures of up to 420 bar in the standard design and up to 630 bar in the special design are easily achievable. Our product range also includes filler valves up to 600 bar and a nominal diameter of 300. We can also supply several valve sizes as proportional valves with forced control.

We deliver our high-pressure valves in cooperation with our American sister company Wepuko PAHNKE Engineering.



RF series

Radial piston pumps

We have over 80 years of experience in high-pressure radial piston pumps, and offer pumps with both constant and variable flow rate.

Pumps with constant flow rate (RF and RH)

Thanks to their smart design, any well-trained mechanic will find it easy to service and repair these machines on site. Operating pressures of up to 450 bar are standard. We can also produce special pumps with up to 1,000 bar. Our customers value the excellent noise characteristics, high volumetric efficiency and low energy losses. Shaft drives make it possible to couple together pumps of different sizes.



RH series

Our pumps also stand out thanks to their long maintenance intervals. They can often go for over 50,000 operating hours without the need for repair.

Multi-row design leads to reduced bearing loads and therefore a longer bearing service life (up to 50,000 hours)

Robust design allows for operating pressures of up to 1,000 bar

Excellent noise characteristics thanks to suction slot/pressure valve combination

Impressive volumetric efficiency, even with thin pumping media

Easily replaceable internal components

Shaft drive enables tandem arrangement

No leakage line required



RV series



RX series



Pumps with variable flow rate (RX and RV)

Our RX and RV series of high-pressure radial piston pumps are the result of decades of experience and development. Our pumps work reliably at operating pressures of up to 450 bar in constant operation, with a service life of well over 30,000 hours and sometimes twice as much.

The flow direction can be varied and reversed on all of our variable pumps (4-quadrant operation).

A wide range of controllers are available to respond to any imaginable requirements. Today, the vast majority of users choose the highly precise servo controller, which can be electronically adjusted to any characteristic.

Our pumps can be adjusted quickly and operate with little noise or pulsation. They are fitted with 9 or 11 pistons depending on the pump type. The flow rates range from 40 l/min to 1,000 l/min.

Equilibrium of forces leads to reduced overall piston power

Very small lateral forces on the pistons due to small slide shoe tilting angle

Easy to reverse pump flow with short response times

No problems with piston retraction, as the pistons' centrifugal force ensures positive engagement between the piston, slide shoe and swivelling stroke ring

Short oil channel with wide cross-sections, even for 450 bar connections

Cleverly designed modular controller system covers every option for adjustment and control

Low-pulsation pumping and excellent noise characteristics thanks to 9 (RV) or 11-piston system (RX) and short flow of forces in the absorbing components

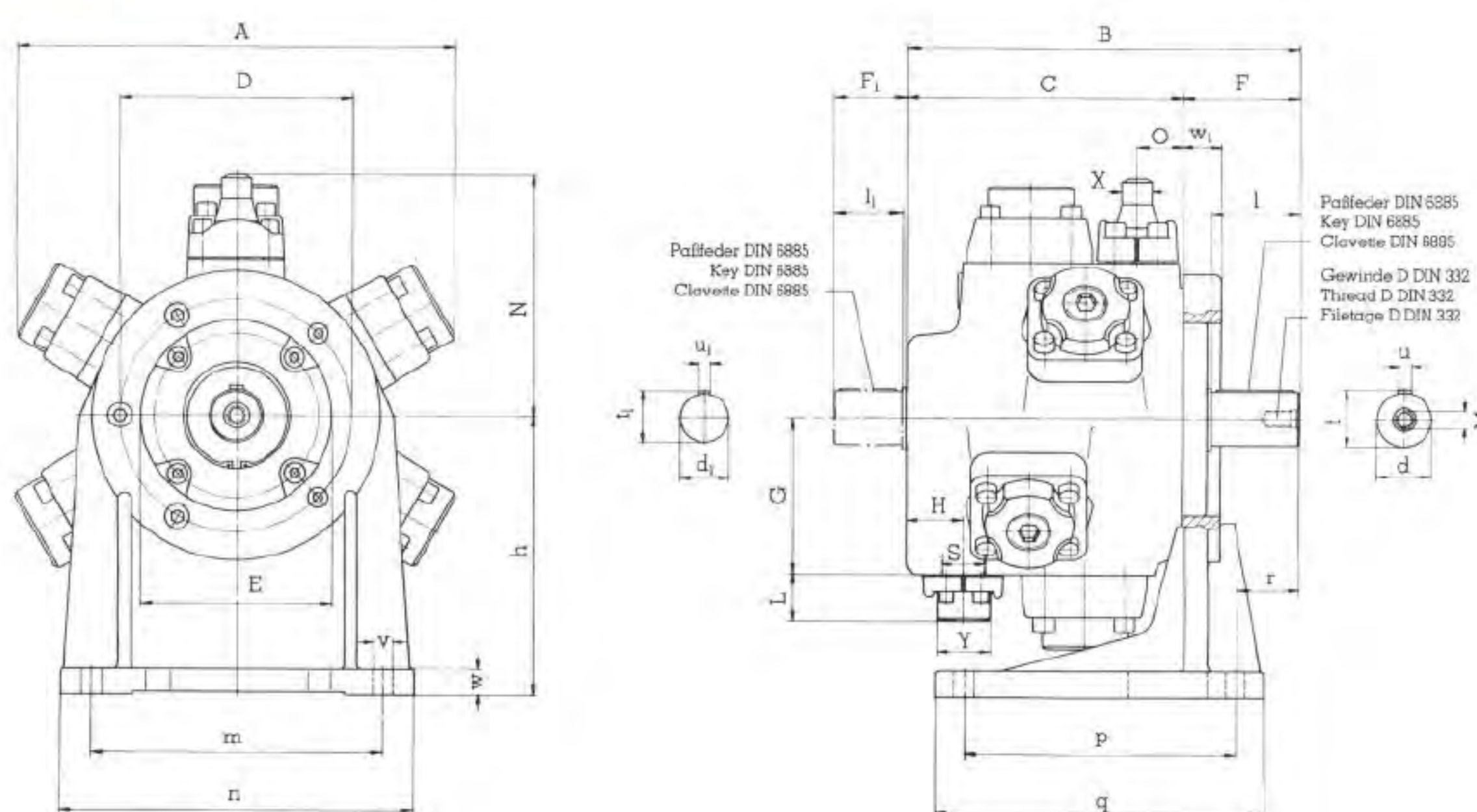
Drum design with anti-friction bearing leads to high mechanical efficiency (RX)

Technical data

RX Technical Data	Type	RX 160	RX 250	RX 360	RX 500
Geometric volume	cm ³ /U	350	505	750	1015
Geometric capacity at rated speed $n = 1000 \text{ min}^{-1}$	l/min	350	505	750	1015
Continuous Pressure acc. DIN 24312	bar	350			
Admissible working pressure for 50% displacement	bar	450			
Lubrication oil flow	l/min ca.	7	10	15	20
Minimum control time from 0 – 10 % stroke	ms	50	65	90	100
External leakage at $p_a = 315 \text{ bar}$ and 40 cSt	l/min ca.	30	40	60	80
Maximum speed	min ⁻¹	1800	1500	1200	1000
Moment of inertia	kgm ²	3,2	5,8	11,5	18,5
Weight	kg	680	930	1550	2150
Inlet pressure at low pressure connection P2		5-40 bar			
Inlet pressure at high pressure connection P1		5-450 bar			
Pressure liquid		Hydraulic Oil HLP according DIN 51524-2			
Pressure liquid viscosity		(40) 50-100 cSt recommendation ISO 68 at 40°C			
Allowable start viscosity at $p_e = 5 \text{ bar}$		500 cSt			
Pressure liquid temperature		10-60°C			
Filtration size acc. ISO 4406		19/16/13			
Drain flow pressure (casing pressure)		pressureless drain flow required			

RV Technical Data	Type	RV 150.1	RV 150.H	RV 250.1	RV 360.1
Geometric volume	cm ³ /U	97,7		167,0	242,0
Geometric capacity at rated speed $n = 1500$	l/min	146,0		250,0	363,0
Continuous Pressure acc. DIN 24312	bar	350	420	350	315
Required oil flow for casing flushing	l/min	8		10	14
Minimum control time from 0 - 100% stroke	ms	45		52	55
External leakage at $p_a = 315 \text{ bar}$ and 35 cSt	l/min	8,5		13	18
Speed range for self-priming operation (0,9 bar absolute)	min ⁻¹	500-1500		500-1500	500-1000
For pre-filling $p_e = 2 \text{ bar}$	min ⁻¹	200-1500			
Maximum allowable radial load at shaft end (flexible coupling required)	N	500		750	1000
Moment of inertia	kgm ²	0,0676		0,164	0,258
Weight	kg	150		207	300
Method of fastening		foot / flange		flange	foot / flange
Inlet Pressure		Continuous Pressure			
Pressure liquid		Hydraulic Oil HLP according DIN 51524-2			
Pressure liquid viscosity		20-75 cSt			
Allowable start viscosity at $p_e = 1 \text{ bar absolute}$		150 cSt			
Allowable start viscosity at $p_e = 2 \text{ bar absolute}$		400 cSt			
Pressure liquid temperature		10-65°C			
Filtration size acc. ISO 4406		19/16/13			
Drain flow pressure (casing pressure)		max. 2 bar absolute			

Main dimensions

RH
Main dimensions

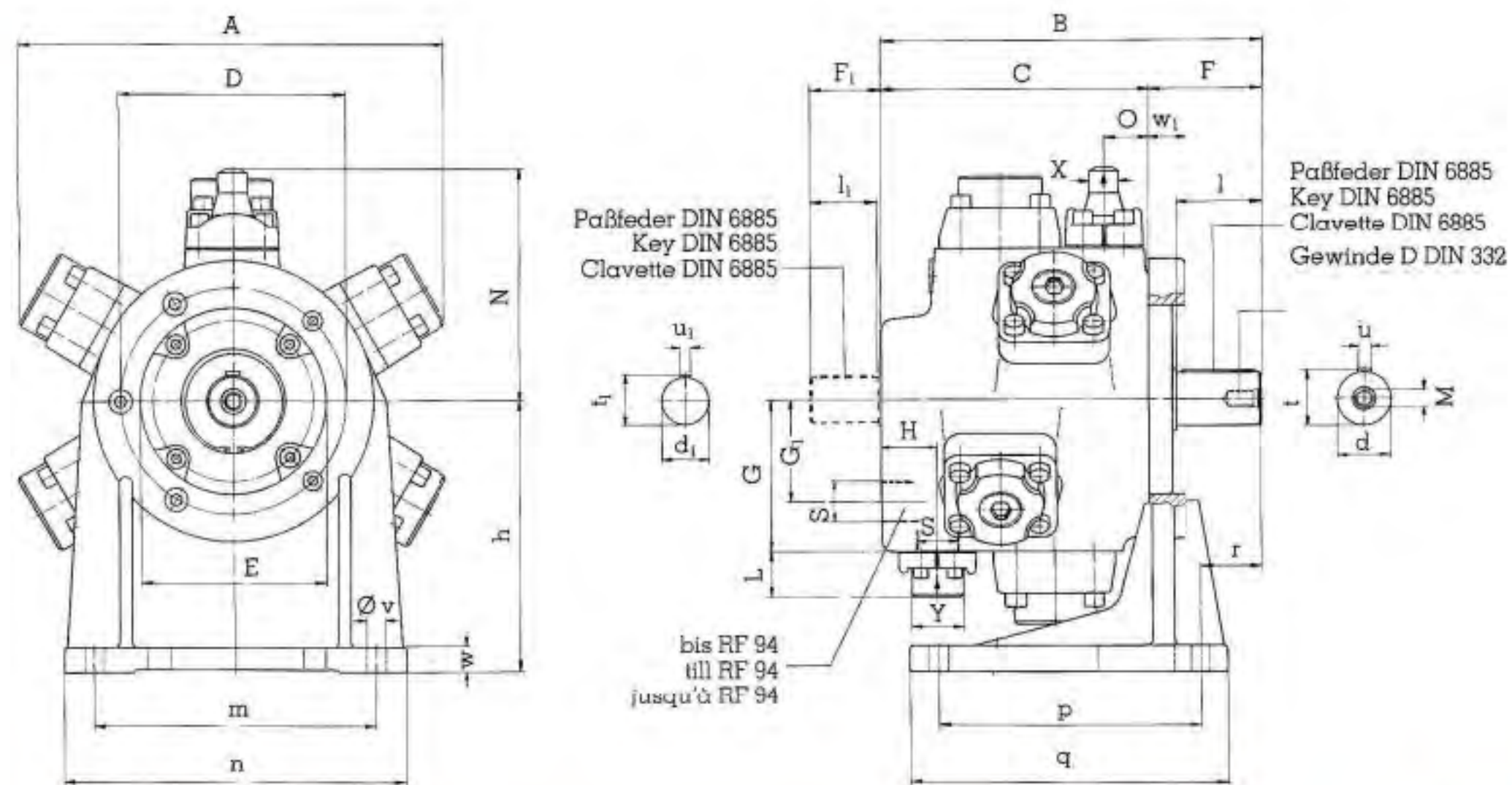
Pump foot and 2nd shaftend by request

Type	A	B	C	D	E	F	F ₁	G	H	L	M	N	O	S	X Pipe	Y Pipe
RH 21 RH 27	340	340	227	4 x M16 195	165	112	63	122	50	-	M 12	192	36	G 1¼"	10/20	-
RH 35 RH 45	360	340	227	4 x M16 195	165	112	63	122	50	-	M 12	208	36	G 1½"	12,5/25	-
RH 58 RH 75	500	463	327	4 x M20 275	230	138	90	185	68	57	M 16	285	54	-	16/34	41,5/48
RH 97 RH 125	520	463	327	4 x M20 275	230	138	90	185	68	57	M 16	285	54	-	20,4/42,4	52,8/60

Type	d	d ₁	h	l	l ₁	m	n	p	q	r	t	t ₁	u	u ₁	v	w	w ₁
RH 21 RH 27 RH 35 RH 45	45	38	265	82	58	260	320	250	300	52	48,5	41	14	10	18	22	25
RH 58 RH 75 RH 97 RH 125	65	55	330	105	82	350	420	320	390	75	69	59	18	16	27	30	45

RF

Main dimensions

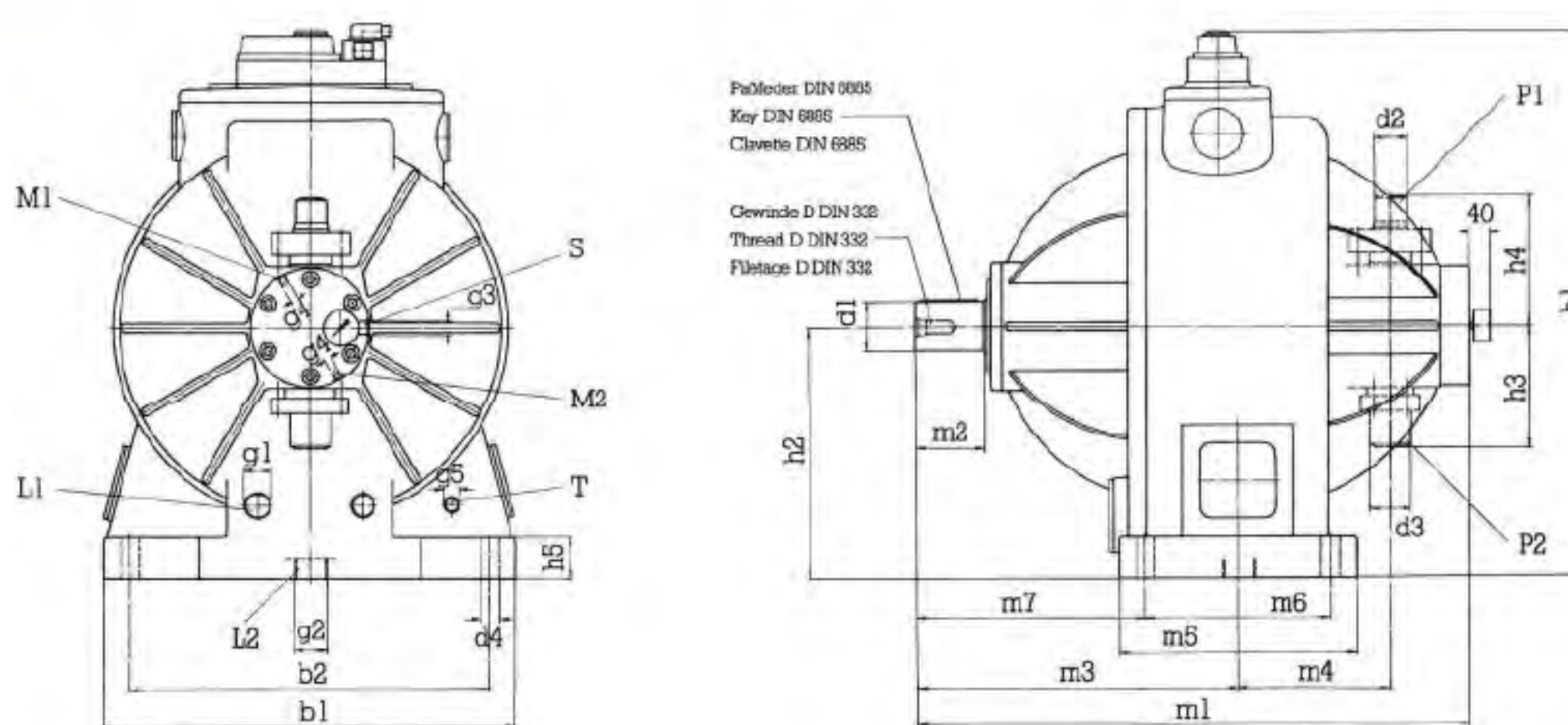


Type	A	B	C	D	E	F	F ₁	G	G ₁	H	L	M	N	O	S	X Pipe to 400 bar	X Pipe to 700 bar	Y Pipe
RF 15 RF 19	245	245	165	4 x M12 138	115	80	46	86	55	37	-	M 10	150	24	G ¾"	16/12	20/12	-
RF 24 RF 32	265	245	165	4 x M12 138	115	80	46	86	55	37	-	M 10	150	24	G 1"	16/12	20/12	-
RF 42 RF 56	340	340	227	4 x M16 195	165	112	63	122	80	50	-	M 12	192	36	G 1¼"	20/15	25/15	-
RF 70 RF 94	360	340	227	4 x M16 195	165	112	63	122	80	50	-	M 12	198	36	G 1½"	25/19	33,7/21	-
RF 121 RF 154	500	463	327	4 x M20 275	230	138	90	185	-	70	57	M 16	280	49	SAE Size 50	38/29	38-25,4	60,3x54,5
RF 202 RF 258	520	463	327	4 x M20 275	230	138	90	185	-	70	58	M 16	295	49	SAE Size 60	44,5/35,5	44,5/31,9	70/64,2
RF 330 RF 404 RF 516 RF 650	520	707	532	4 x M20 275	230	175	90	185	-	75	90	M 16	305	70	SAE Size 80	60,3/46,1	60,3/40,3	88,9/80,8
RF 1000	610	810	620	-	-	190	166	212	-	115	90	-	343	82	-	101,6/61,6	-	88,9/80,8

Type	d	d ₁	h	l	l ₁	m	n	p	q	r	t	t ₁	u	u ₁	Øv	w	w ₁
RF 15 RF 19 RF 24 RF 32	32	28	180	58	42	165	200	155	190	42	35	31	10	8	14	18	18
RF 42 RF 56 RF 70 RF 94	45	38	265	82	58	260	320	250	300	52	48,5	41	14	10	18	22	25
RF 121 RF 154 RF 202 RF 258 RF 330	65	55	330	105	82	350	420	320	390	75	69	59	18	16	27	30	45
RF 404 RF 516 RF 650	65	55	450	140	82	430	500	440	510	90	69	59	18	16	27	40	50
RF 1000	85	85	400	160	160	360	410	600	720	200	89,4	89,4	22	22	22	35	-

Main dimensions

RX Main dimensions



All dimensions in mm

P1 High pressure connection

P2 Low pressure connection

L1 Alternative drain connection

L2 Alternative drain connection

Low pressure connection P2 also available for high pressure application identical to P1 (refer to order key)

S Lubricating connection

M1 Measuring connection high pressure

M2 Measuring connection low pressure

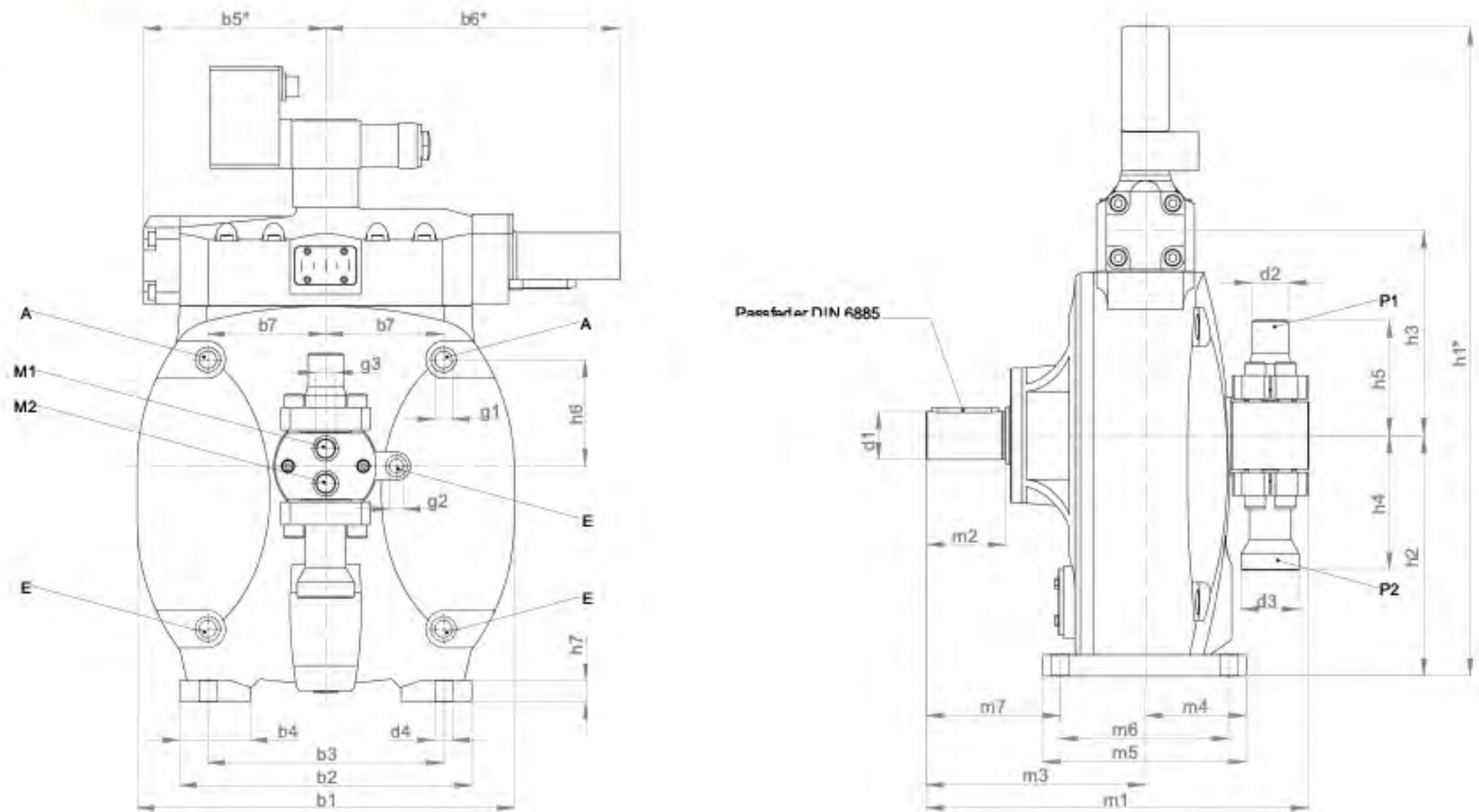
T Anschluß für Thermometer

Type	b1	b2	d1 _{k6}	d2	d3	d4	g1	g2	g3	g4	g5
RX 160	570	500	75	45/60	65/76	22	G1½"	G2"	G½"	G¼"	-
RX 250	780	680	90	50/76	65/75	33	G1½"	G2"	G¾"	G¼"	G½"
RX 360	920	800	100	58/89	78/96	33	G2"	G3"	G¾"	G¼"	G½"
RX 500	1000	850	110	60/89	100/118	39	G2"	G3"	G¾"	G¼"	G½"

Type	h1	h2	h3	h4	h5	m1	m2	m3	m4	m5	m6	m7
RX 160	750	365	225	225	60	680	105	370	240	290	220	275
RX 250	1025	475	240	255	75	1043	130	611	282	450	350	436
RX 360	1185	560	255	335	90	1275	180	755	355	600	480	515
RX 500	1258	605	265	350	100	1435	200	850	390	650	500	600

RV

Main dimensions



All dimensions in mm

P1 Pressure connection

P2 Suction connection

E Inlet for casing flushing
(always on the lowest point)

A selectable outlet for casing flushing

M1 Measuring connection discharge
(for regulation device 7-9)

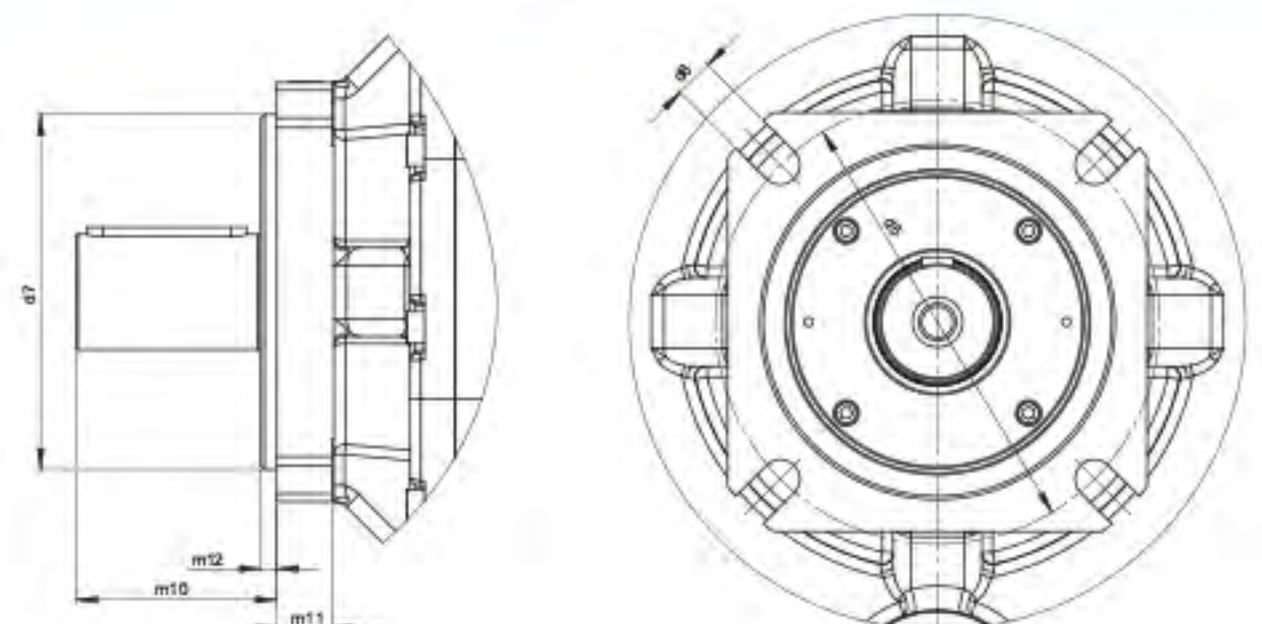
M2 Measuring connection suction

Type	b1	b2	b3	b4	b5	b6	b7	d1	d2	d3	d4	g1	g2	g3
RV 150	400	310	250	75	193	312	125	50	38/29	60,3/54,5	19	G1/2"	G3/8"	G1/2"
RV 150.H	400	310	250	75	193	312	125	55	48,3/26	48,3/26	19	G1/2"	G3/8"	G1/4"
RV 250	450	-	-	-	208	326	120	63	48,3/30	48,3/30	-	G3/4"	-	G1/4"
RV 360	480	450	360	90	208	326	155	65	45/34	60,5/50	23	G3/4"	G1/2"	G3/8"

Type	h1	h2	h3	h4	h5	h7	h8	m1	m2	m3	m4	m5	m6	m7
RV 150	675	250	213	138,5	118,5	113	22	400	82	227	130	211	175	140
RV 150.H	675	250	213	130	130	113	22	400	82	227	130	211	175	140
RV 250	725	268	243,5	143	143	120	-	502	-	279	173	-	-	-
RV 360	775	305	257,5	159	187,5	120	35	530	105	295	180	290	240	175

Flange version

Type	d5	d6	d7	m10	m11	m12
RV 150	200	18	160 h8	94,5	20	9
RV 250	200	18	160 h8	118	23	9
RV 360	250	22	200 h8	113	31	9



Control device

RX+RV

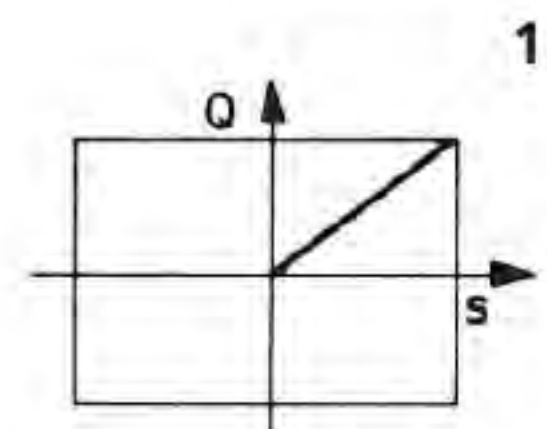
Fixed displacement

Pump with a constant, in stationary position by means of adjusting screw pre-selectable

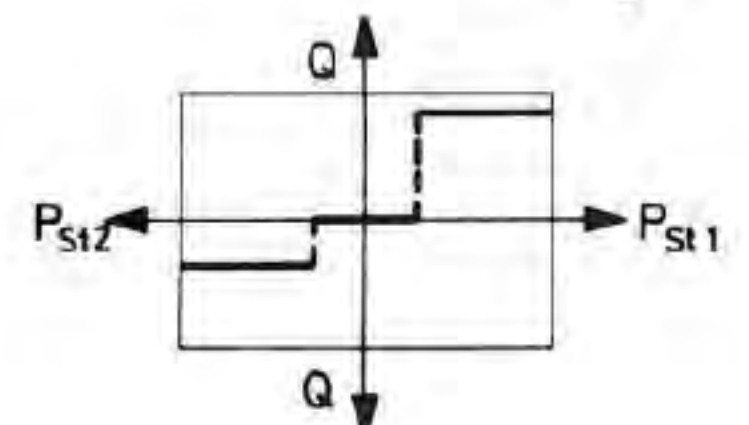
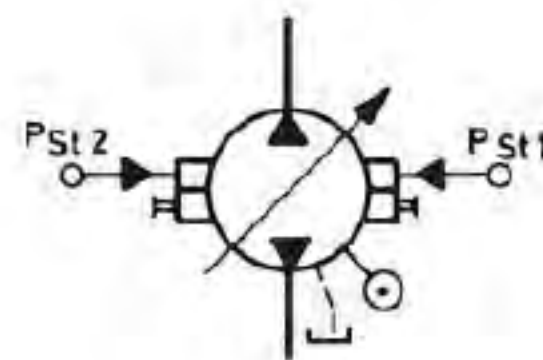
Symbols



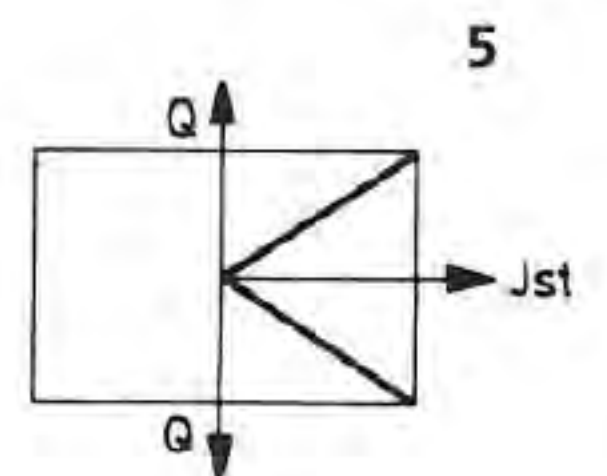
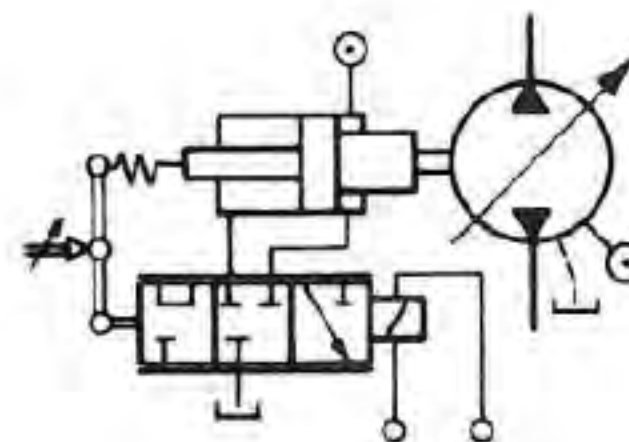
Control Curve

**Hydraulic Two-Position Control**

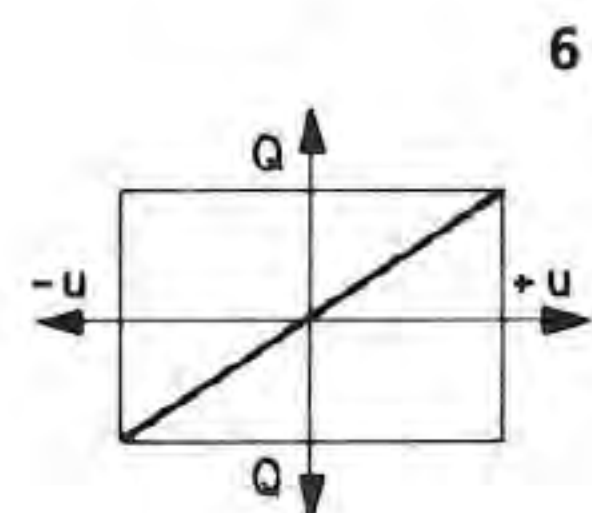
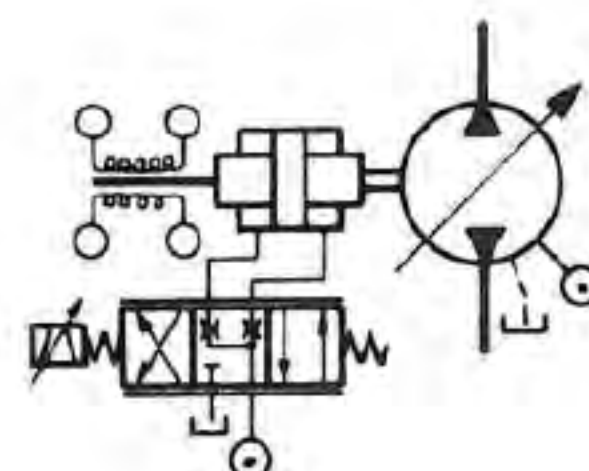
The pump can be controlled hydraulically by means of an external control to two different, through adjusting screws pre-selectable operating positions.

**Electro Hydraulic Proportional Control**

The pump can be controlled or reversed proportionally to a pre-selected precision control flow by means of regulating magnet.

**Electro Hydraulic Servo Control**

The pump can be controlled or reversed electro-hydraulically with high precision in proportion to a pre-selected control voltage.



Control device

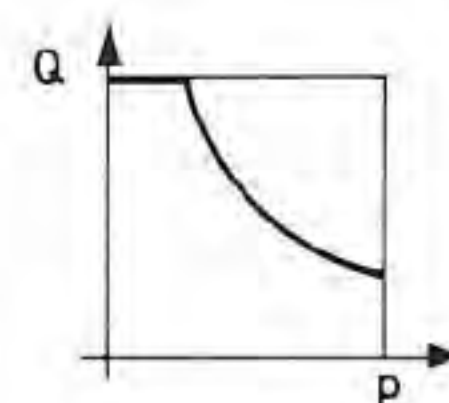
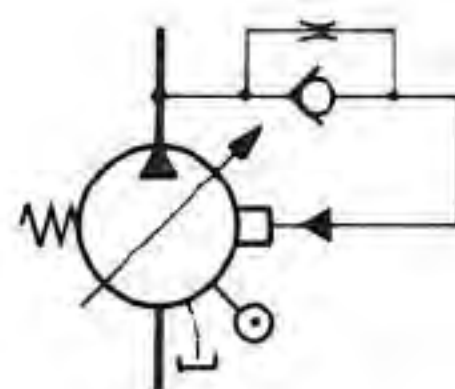
RX+RV

Symbols

Control Curve

Constant Flow Regulator

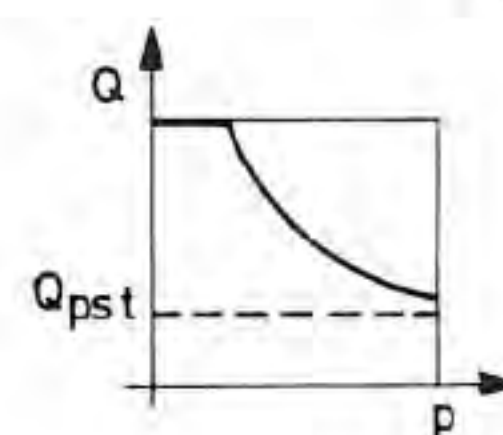
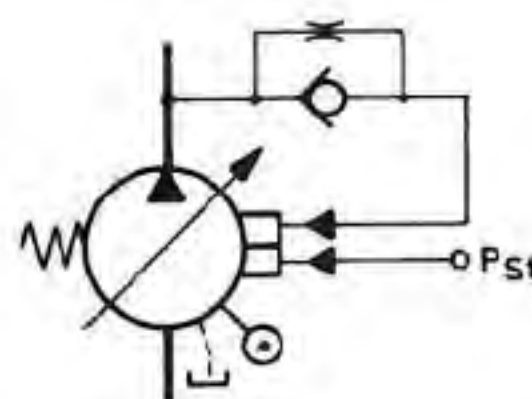
The pump regulates automatically the capacity depending upon the appropriate operating pressure so that the pre-selected driver rating remains constant.



7

Constant Flow Regular with Switching Possibility to a Minimum pumping Capacity

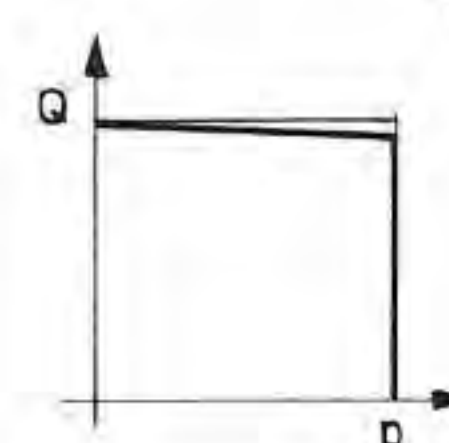
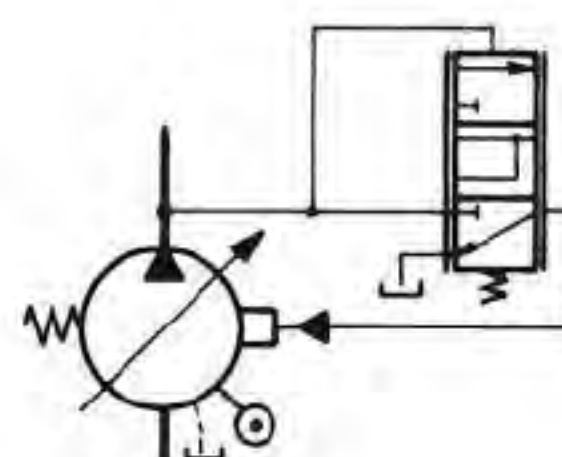
Regulator as described under 7. Pumping capacity can be additionally controlled to a pre-selected value by means of external control pressure.



8

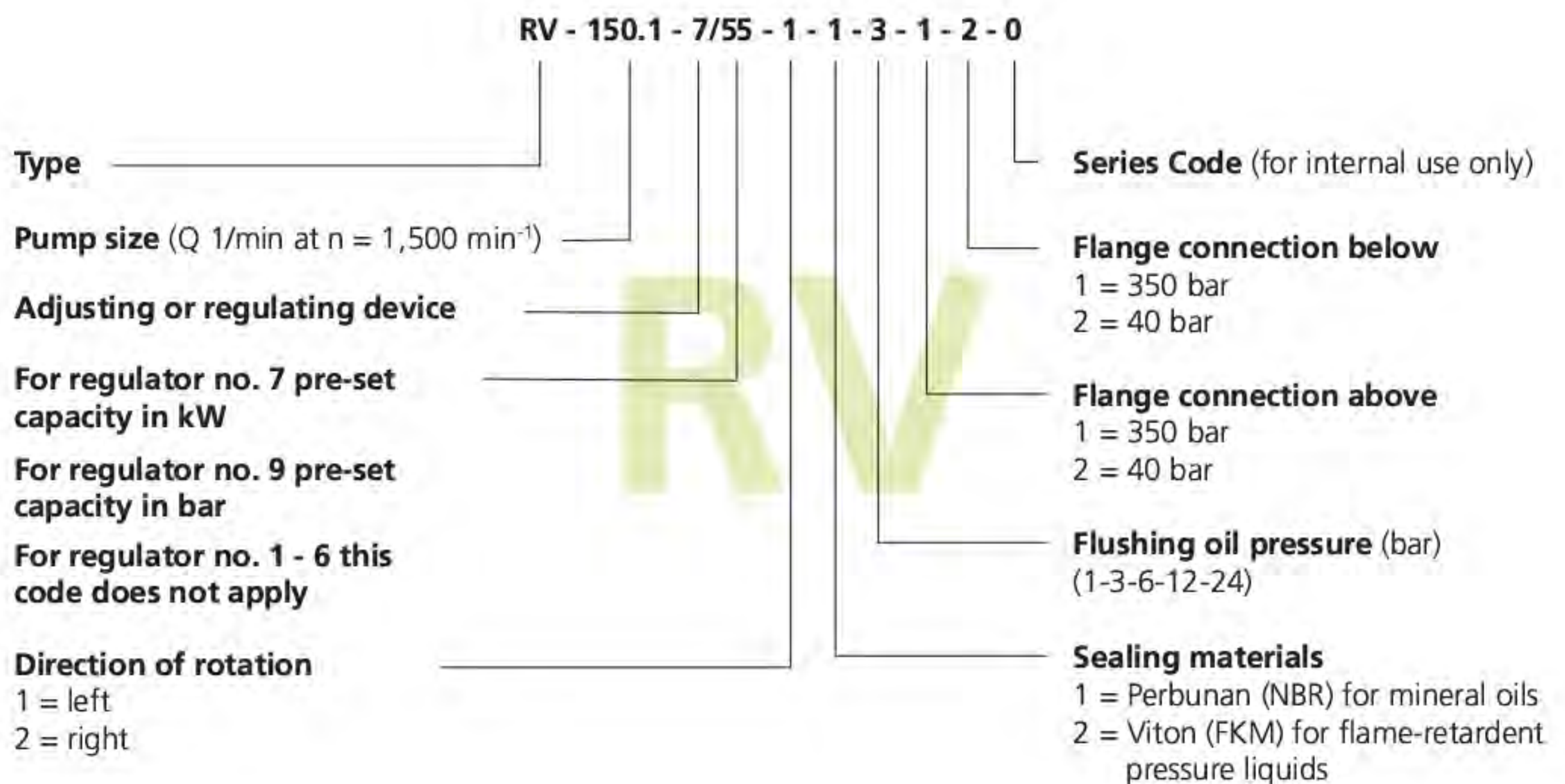
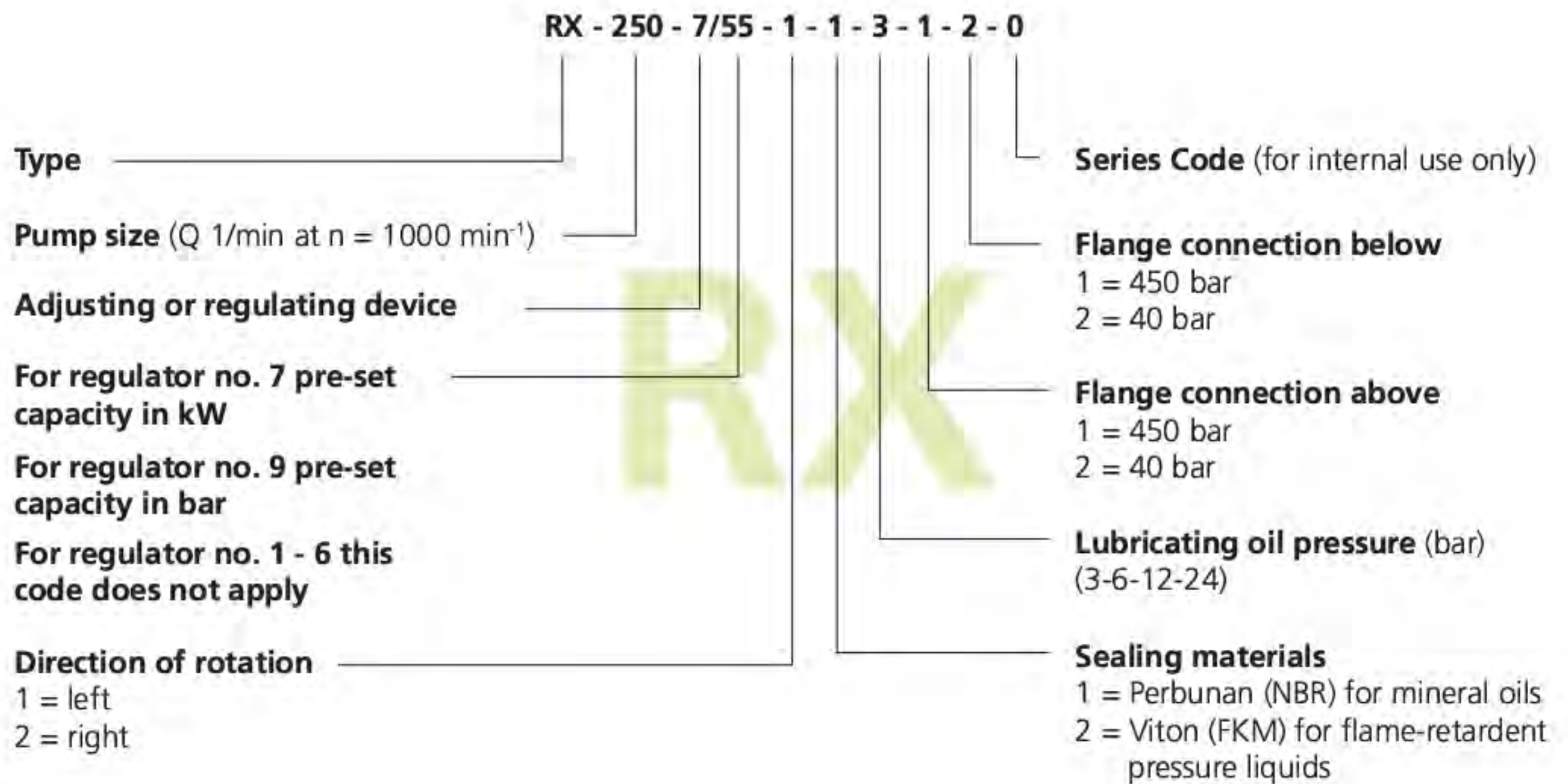
Constant Pressure Regulator

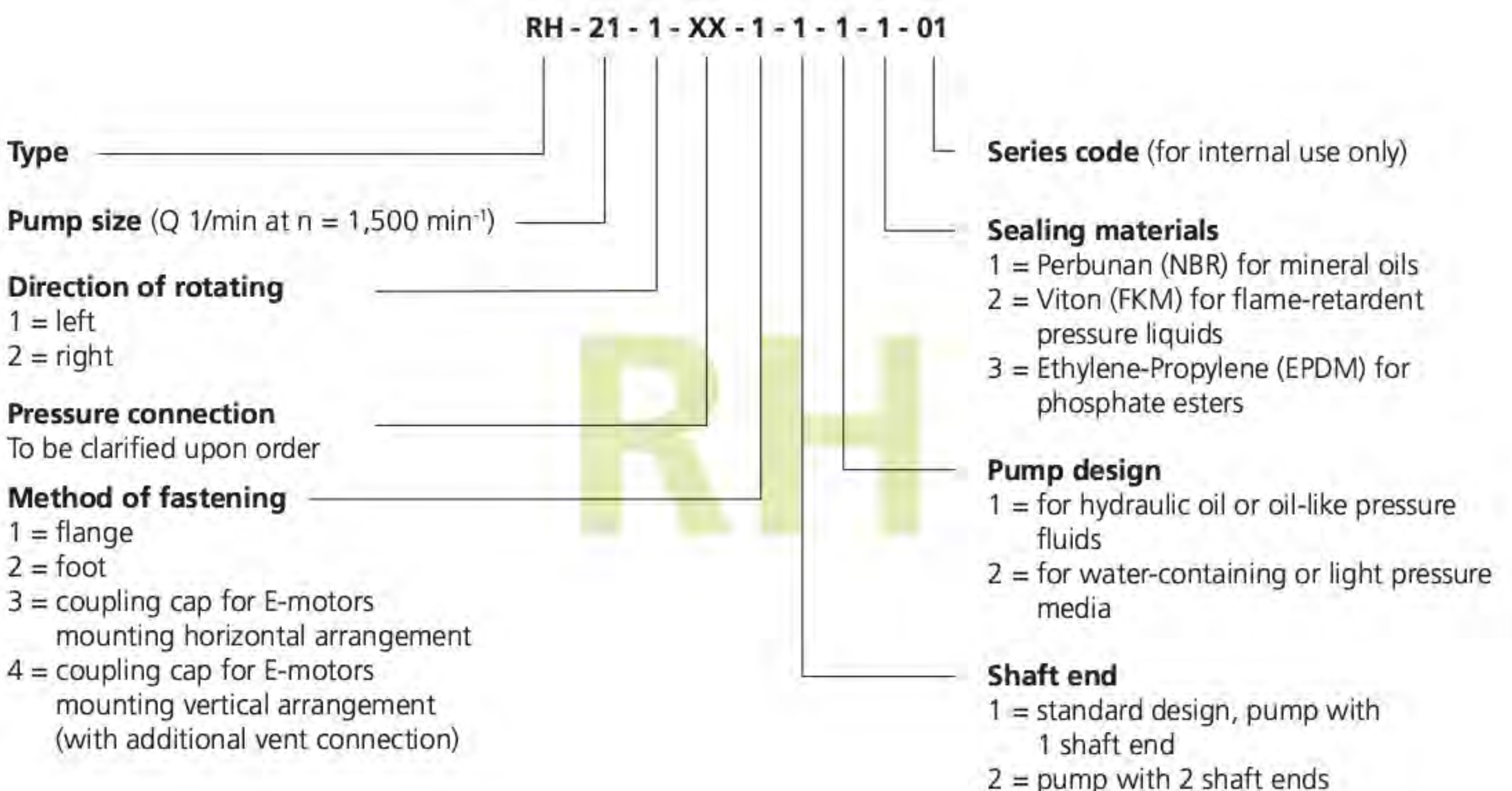
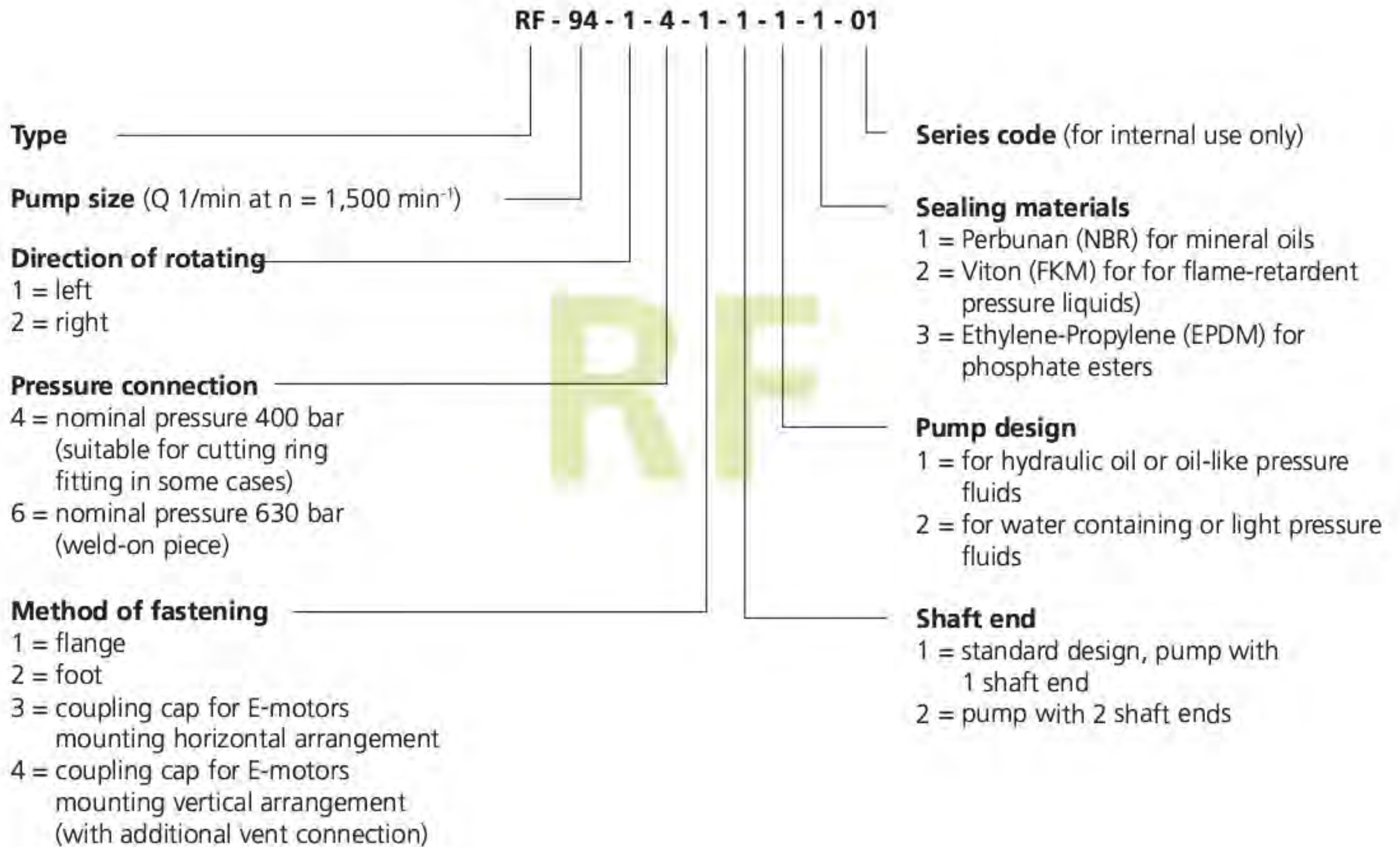
The pump regulates automatically after achieving a selectable pressure so that this can be kept constant, independent from the pumping capacity.



9

Ordering and data key







20-pump PMSD drive (RX 500) for a modern 185 MN press from PAHNKE.

Heavy machine drives and forging presses

From heavy forging presses, large closed-die forging presses and steel extruders to heavy ship hydraulics, our oil-hydraulic drive systems are designed to be reliable, durable and above all extremely energy efficient.

The core of our oil-hydraulic drives are our radial piston pumps, available with both constant (RF, RH) or variable flow rate (RX, RV).



8-RF-pump drive for the 10,000-tonne closed-die forging press at Standard Steel (USA)



2-pump PMSD drive for the special press at the Freiberg University of Technology prior to commissioning

PMSD drive

The PAHNKE Modified Sinusoidal Direct drive (PMSD) is a specialised press drive developed by PAHNKE Engineering and planned by Hans-Joachim Pahnke.

This drive requires no valves to control the press movement. Instead, it works with quickly adjustable high-pressure RX pumps to determine the force, speed and movement direction of the press. Due to the lack of shocks, the system is extremely quiet and incredibly reliable. The pumps in these systems can operate for over 30,000 hours without repair, sometimes well over 50,000.

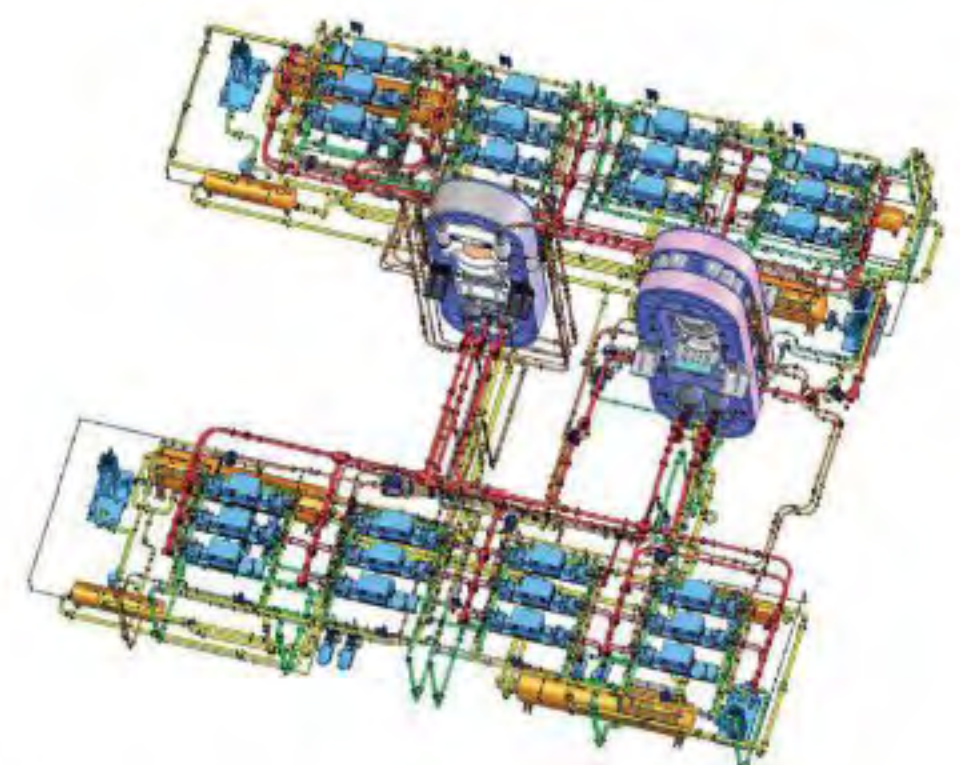
Another key advantage is the fact that this drive system requires much less energy than all comparable drives. Depending on the design, it can achieve an energy saving of 20% to 30% over other oil-hydraulic drives, and up to 60% compared to water-hydraulic drives (see graph in the introduction).

We used the PMSD drive as the basis for the 42-pump drive (RX 500), the most powerful hydraulic system in the world. With 30 MW of installed power, it is used to drive a 360 MN steel extractor and a 150 MN pre-forming press at Norheinco in China.

All new PAHNKE presses with hydraulic drives use PMSD technology.



PAHNKE Modified Sinusoidal Direct drive



42-pump PMSD drive (RX 500) in Norheinco, China

... Our pumps are used wherever customers need reliability and durability in the toughest conditions!





Industries and applications

General hydraulic systems

- Pressure intensifiers
- Pressure oil supply systems
- Direct drives for cylinders

Automotive industry

- Rubber presses

Mining

- Mining hydraulics

Construction

- Lift drives

Metal industry

- Forging presses
- Bending presses
- Slab shears
- Extruders
- Upsetting presses
- Particle board presses
- Packing presses
- Stripper cranes
- Stretching benches
- Forging manipulators
- Embossing machines
- Hydrostatic pipe testers
- Pulsation drives

Oil and gas

- Oil pump drives

Maritime

- Steering gear drive systems
- Rudder roll stabilisation drive (RRS drive)

Other industries

- Particle board presses
- Powder presses

Is your industry or application not on this list?
Then get in touch!

→ Systems modernisation: Creating and preserving value

Modernisation can be a sensible alternative in cases where purchasing a new system would not be financially viable. We fit unprofitable presses with modern drives, controls and improved transport systems to turn them into powerful units.

Goal

Many presses currently in operation have a service life of over 30 years. Even while countless new presses are currently being built, old presses are rarely scrapped. These old machines often struggle to meet the high standards demanded on the global markets, however. This applies to both the products themselves and the production processes, documentation and certifications.

Furthermore, the system's improved performance led to higher productivity.

Often, increasing the pressure for greater pressing force in hydraulic forging presses is a simple process.

Implementation

We use individually tailored modernisation measures to boost systems' performance, reliability and durability.

Replacing or converting mechanical parts makes it possible to install more precise guides with less need for maintenance, or extend the service life of cylinder seals from sometimes less than one year to up to ten.

Modernisation can offer several benefits:

- Increased machine availability
- Reduced auxiliary process times
- Improved machine parameters
- Reduced operating costs
- Lower required manpower
- Ability to expand product range
- Reduced maintenance requirement and better spare part availability

Wepuko PAHNKE has already successfully modernised many systems for its customers. For example, we modernised and expanded the oil-hydraulic drive at a forge in Germany. This resulted in a permanently higher availability of around 99% for the hydraulic system after modernisation, together with a 30% drop in energy consumption.



This modernised open-die forging press with three cylinders has the following technical data: Pressing force levels 18 MN (two-cylinder operation) and 27 MN (three-cylinder operation), upsetting force: 30 MN, drive 8 x RF 650 radial piston pumps with valve control.

A new, state-of-the-art electronic controller not only offers a greater range of options for precisely setting the controller or capturing data related to operations in quality, but also eliminates the problem of spare parts availability in this fast-moving industry.

Installing remote-controlled tool clamping and changing mechanisms, or faster moving tool tables, allows us to accelerate forging processes.

Significant performance improvements can also be achieved through modernising or expanding handling tools like forging manipulators, or by adding lifting and rotary tables for faster workpiece handling between forging processes.

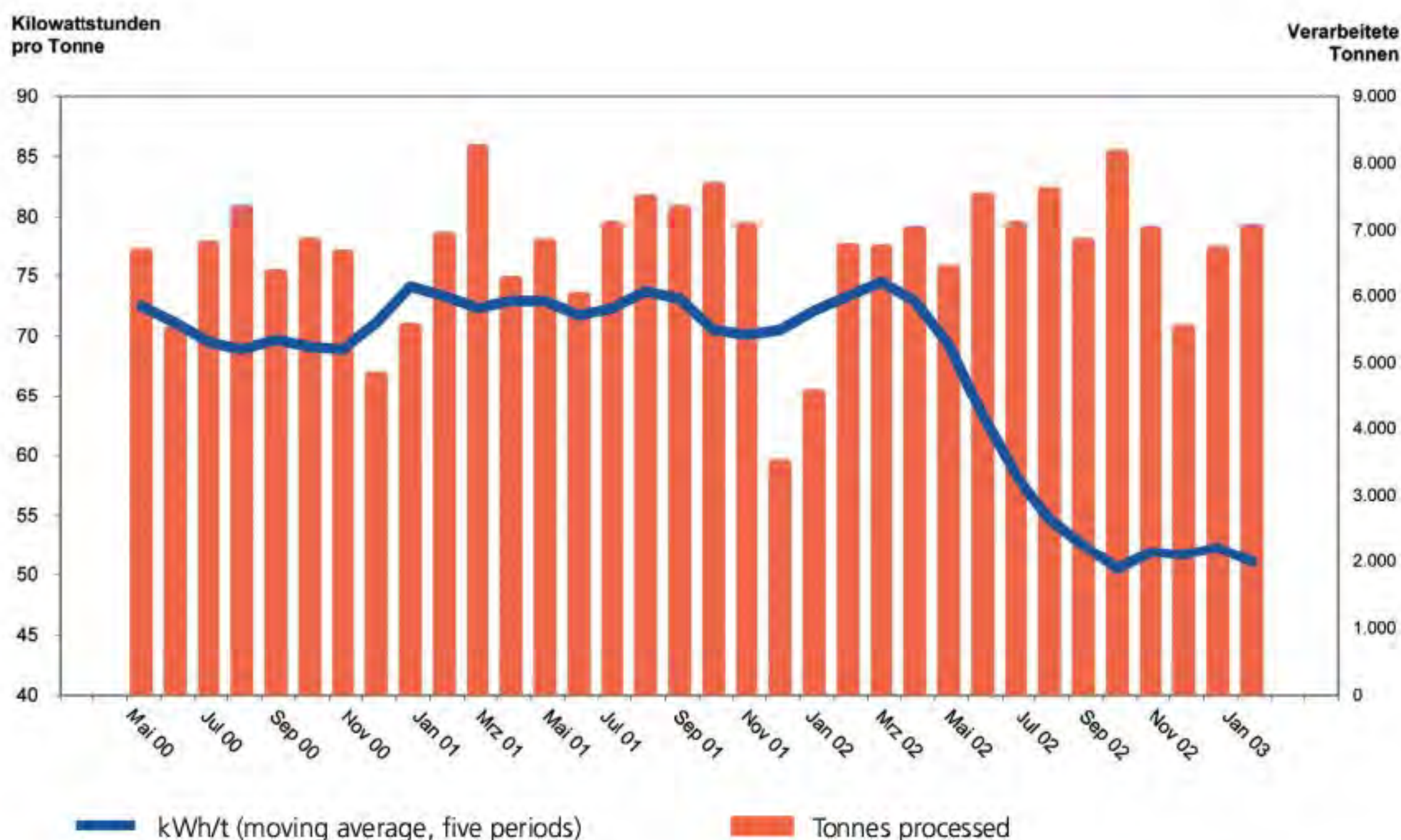
What we offer

We optimise machines and systems at the periphery of the forging press, such as furnaces, cranes and tool transport mechanisms.

What is the best option: modernisation or new purchase? Together, we take a close look at the current state of your systems and discuss your production goals. Our experienced experts will be able to tell you which measures are most effective.



Modern press controller from Wepuko PAHNKE



Output and energy consumption of a 55 MN open-die forging press before and after modernisation in 2002

➤ Research and development: Close to the market

What does the market need? This is the question that drives the developers at Wepuko PAHNKE. They work to create solutions for special customer requests or develop new areas of application. Both development and production are based in Metzingen, combining expertise at a single location.



Wepuko PAHNKE also uses modern simulation tools like FEM and CFD to support design processes.

Innovation on site

Research and development is extremely important to us, as it is the only way that we can achieve our goal of producing tough, reliable, and precise machines.

Wepuko PAHNKE GmbH combines the expertise and experience of two large companies. Wepuko has over 80 years of experience in high-pressure plunger pumps, while PAHNKE Engineering has amassed over 40 years of experience in hydraulic forging presses. The short distances at the company headquarters in Metzingen also makes developing the solutions for tomorrow's challenges easier.

Due to their specific properties, presses and pumps are developed separately. Despite this, we encourage our divisions to exchange knowledge and ideas. This results in consistent and optimised overall solutions for our customers.

All of our testing and development work is carried out in Metzingen. This helps us save time and protect our unique expertise.

Committed to quality

Our pumps and presses meet the toughest demands in terms of durability and reliability. Many of our products are custom made precisely to our customers' needs.

The planning and simulation phases are particularly important for prototypes or small batches. At Wepuko PAHNKE, we are constantly reinventing our products for our customers.

Even small changes to the dimensions, for example, can often have a major influence on the resulting forces and material stress. When it comes to flow cross sections and complex geometries, the priority is to prevent cavitation.

Virtual development procedures are becoming ever more important, as they ensure high quality with a short development time. They also offer our customers transparency and peace of mind. That is because in many cases, the customer receives a feasibility study and sample calculation with the initial offer.

As would be expected, our quality management system is certified to ISO 9001:2015.

Development with FEM

To ensure that development leads quickly and efficiently to a result, we use cutting-edge simulation tools. These are the finite element method (FEM) for analysing mechanical strength and computational fluid dynamics (CFD) for assessing the components' flow mechanics.

Right from the initial design, these tools allow us to investigate and optimise the flow mechanics from the individual part to the finished end product. The result is incredible efficiency.

We then subject the end product to a comprehensive series of tests on our test bench. This helps us guarantee the required product properties and ensure customer satisfaction.

We perform under high pressure, and that is what makes us unique.

Wepuko PAHNKE is the product of a merger between two historic market-leading businesses: Wepuko, the specialist for high-pressure pumps, and PAHNKE, the pioneer in hydraulic forging presses. This combination makes us unique and offers a number of decisive advantages over the competition.



Wepuko PAHNKE GmbH in Metzingen, Germany.

Wepuko PAHNKE GmbH is a mechanical and plant engineering company specialized in the development and production of high-pressure pumps and hydraulic forging presses, as well as their drives and control systems. In these fields, the company is acknowledged as an international market leader.

The pump product portfolio includes triplex plunger pumps and radial piston pumps with adjustable and constant flow rate. Wepuko PAHNKE also develops and produces customised units and systems to order. In addition, the company offers complete descaling plants. Wepuko PAHNKE solutions are used in the metal industry, the oil and gas sector, chemical companies and power stations. Customers include Otto Fuchs and Citic Heavy Industries for hydraulic presses and oil hydraulics, SMS Meer, Vallourec & Mannesmann, Robert Bosch and ArcelorMittal for water hydraulics, along with Shell, Petrobras, Petronas, Statoil, Gaz de France and Hyundai Heavy Industries for process pumps.

The company was founded in 1932 by Fritz Thumm in Metzingen in south-west Germany. One of the company's many innovations was the introduction of large radial piston pumps with high-speed control and flow rate reversal (1966).

The takeover of the business by the Pahnke family in 1996 allowed Hans-Joachim Pahnke, a pioneer in open-die forging presses, to apply his expertise. Among the outstanding innovations developed by Hans-Joachim Pahnke are the first open-die forging press with two-column design for underfloor installation (1956) and the **PAHNKE Modified Sinusoidal Direct** drive (PMSD drive) for forging presses (1975).

In 2009 the world's largest hydraulic system began operation at Norheinc in China, using a PMSD drive from Wepuko PAHNKE. This was followed in 2011 by the world's most powerful open-die forging press at Citic Heavy Industries in China.

Today, the company is managed by Tanja Pahnke and is among the innovators in its field. The Wepuko PAHNKE group includes companies in the USA, China and Russia. Wepuko PAHNKE also has a global presence with representatives in more than 70 countries.

Milestones

- 1932** Fritz Thumm founds Wepuko in Metzingen
- 1973** Hans-Joachim Pahnke, Fritz Thumm jr. and Eric Koik found PAHNKE Engineering in Düsseldorf
- 1996** The Pahnke family acquires Wepuko
- 2002** Both companies' products are merged in a single business
- 2011** Rebranding to Wepuko PAHNKE GmbH

At home around the world

We have representatives in over 70 countries worldwide



Process
pumps



Hydraulic
forging
presses



Oil hydraulics



Water
hydraulics



Service



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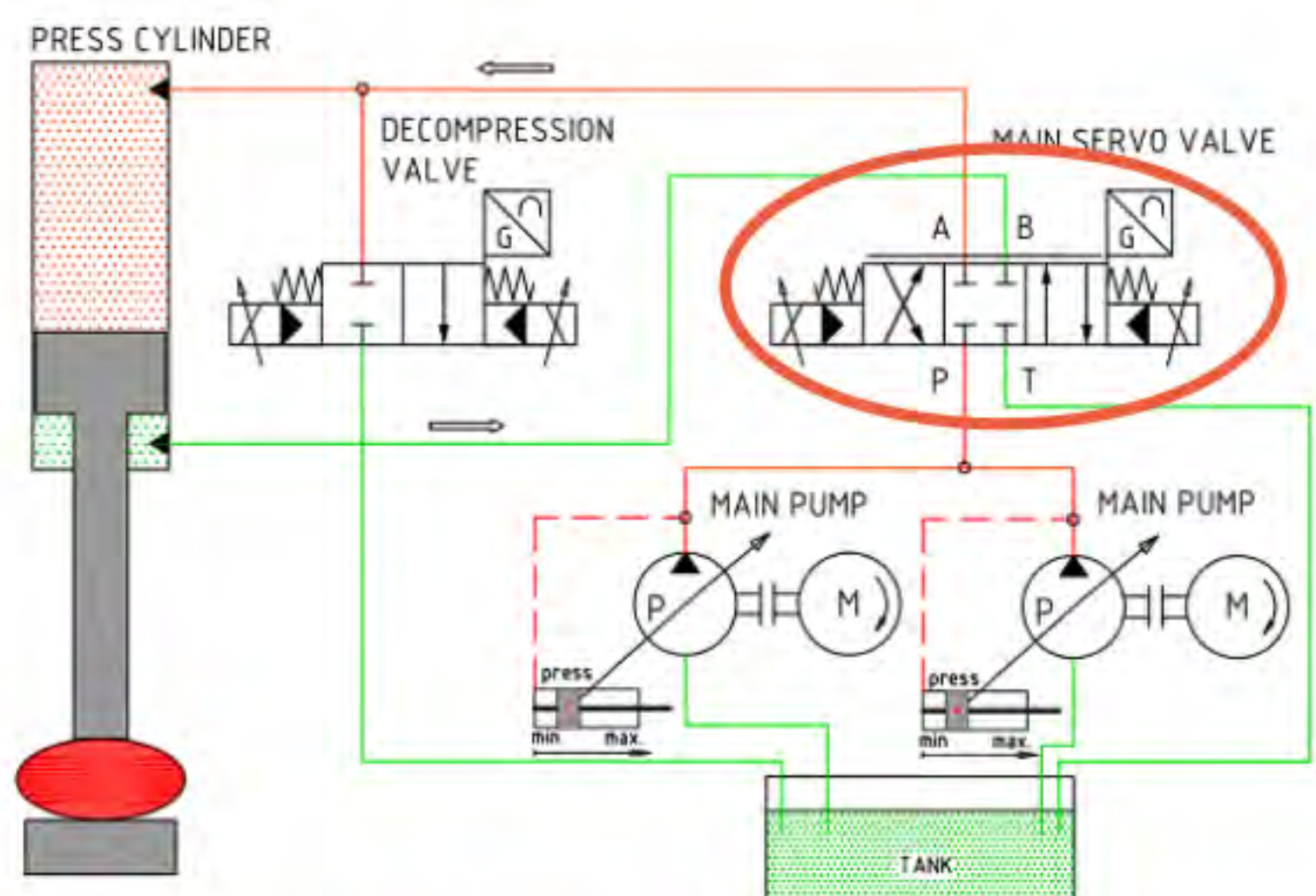
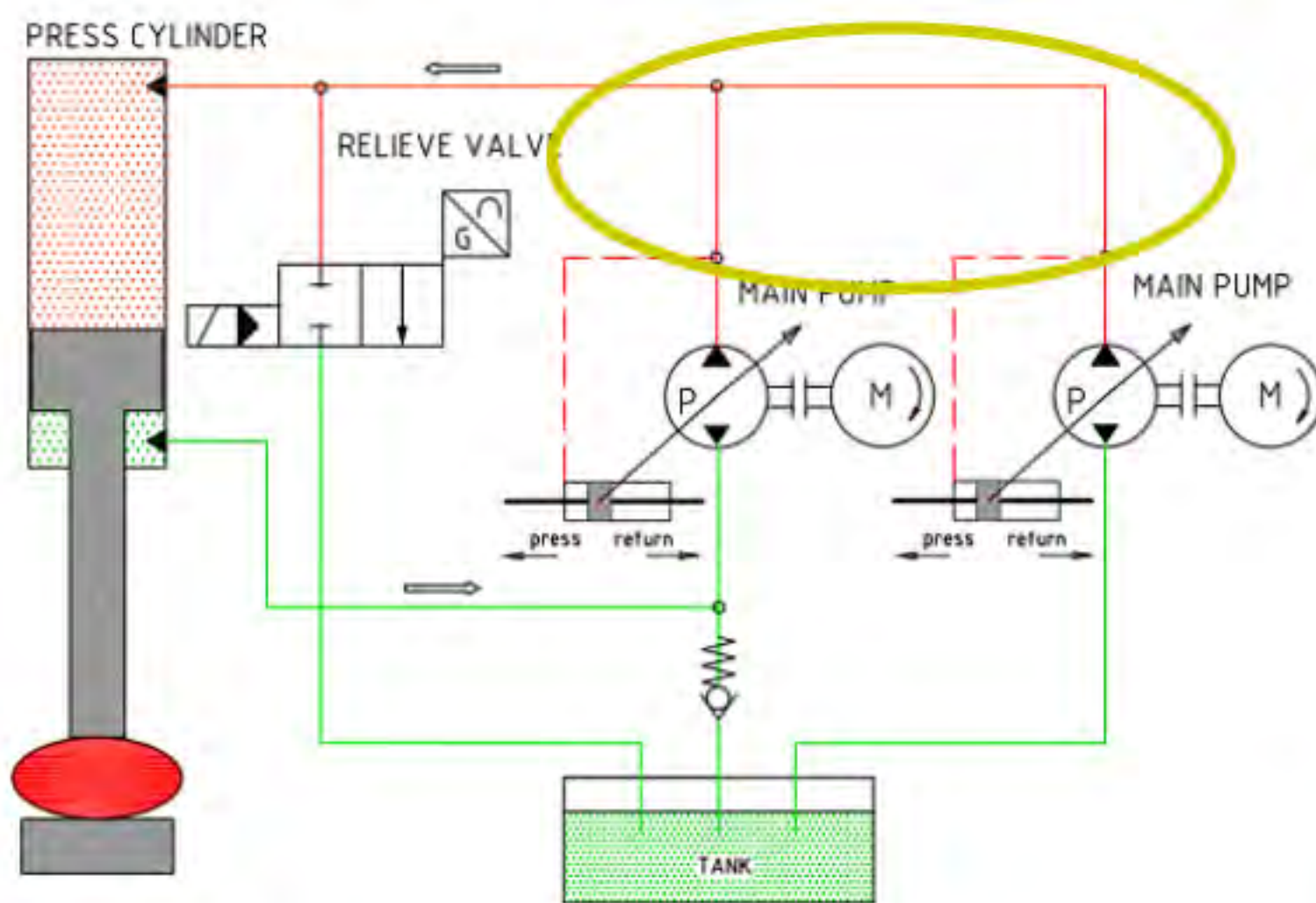
PAHNKE Modified Sinusoidal Direct drive

PMSD – Principle



PAHNKE Modified Sinusoidal Direct drive

- The **PMSD** drive has the main pumps directly connected to the main cylinders. **ALL press motions** are solely realized by the main pump controllers.
→ No throttle effect, but therefore **shock free and smooth forging**.
- The **PMSD** is an on-demand system.



press drive with forging valve

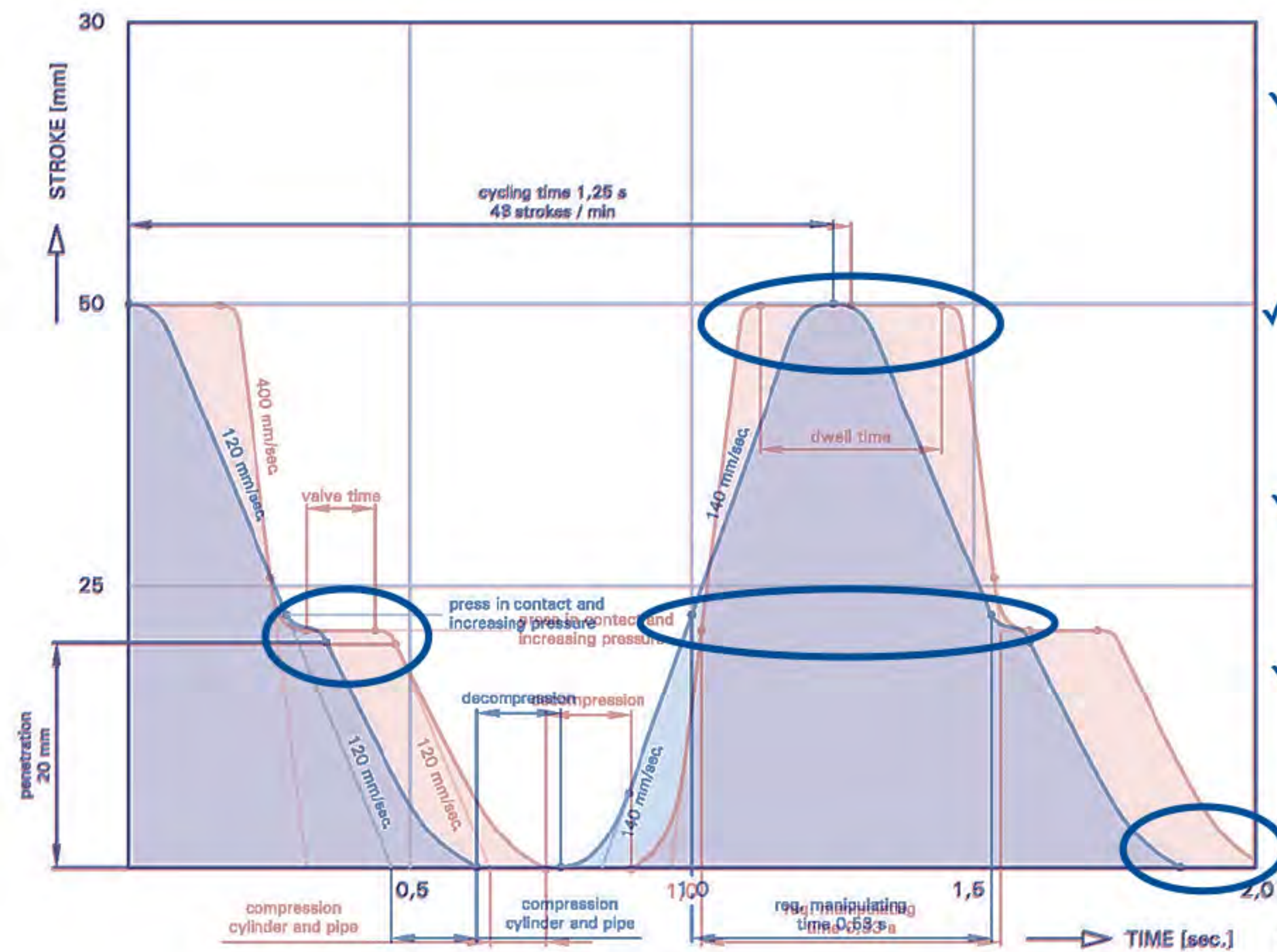
RX - Radial Piston Pump



PMSD

PAHNKE Modified Sinusoidal Direct drive

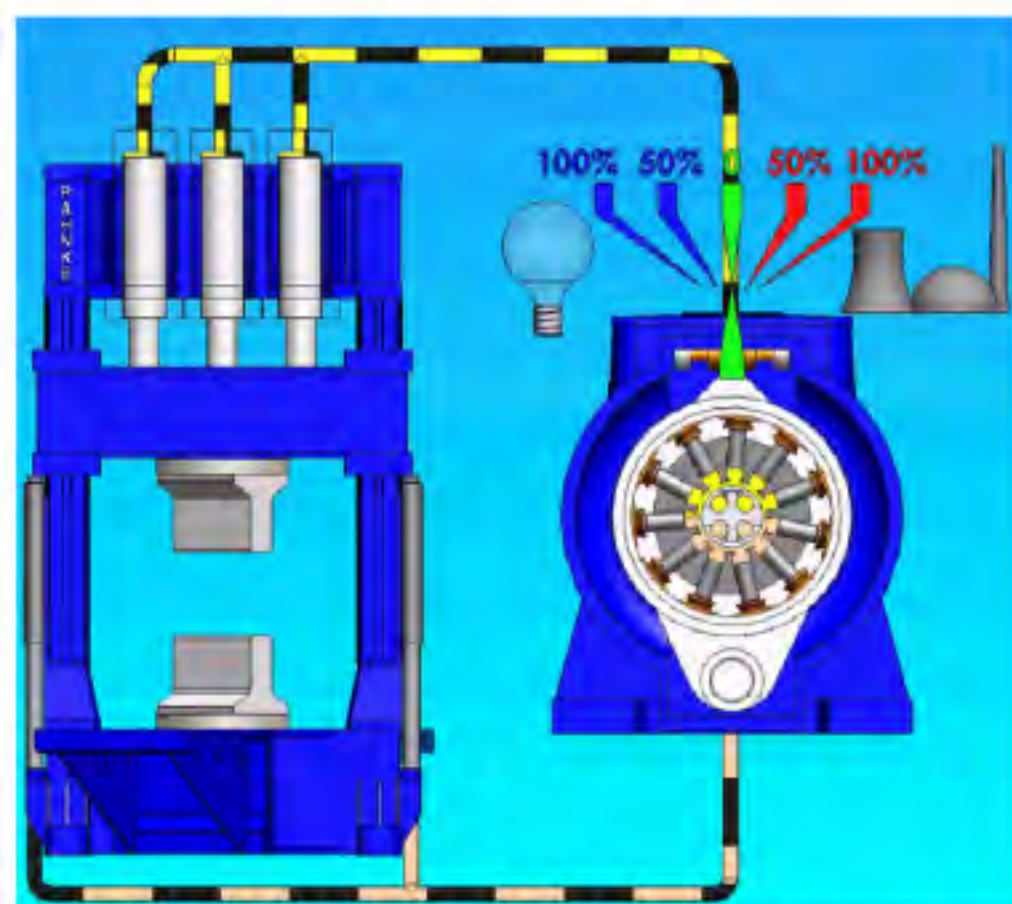
PMSD – Press Motion Comparisson



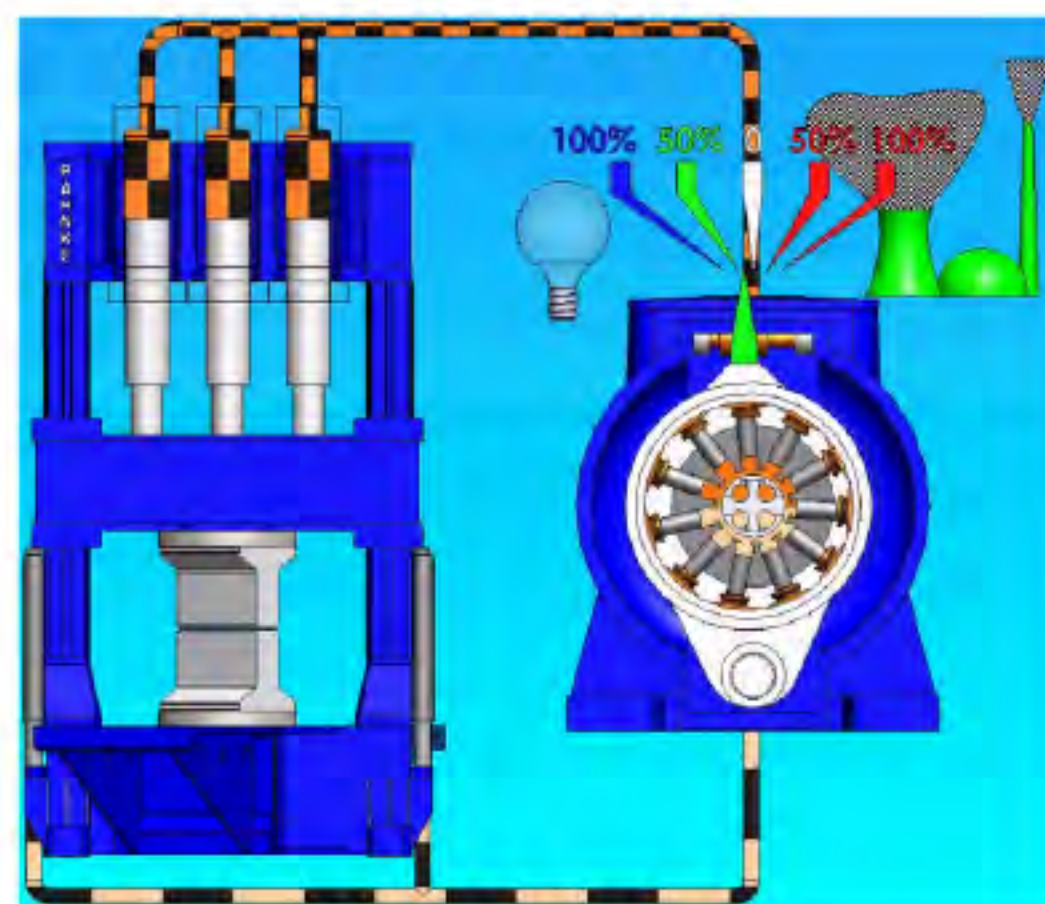
- ✓ quicker transition from approach into penetration.
- ✓ smoother motion between all steps.
- ✓ equal time window for manipulation
- ✓ faster than the conventional drive.

PMSD – RX pump – Press Motion

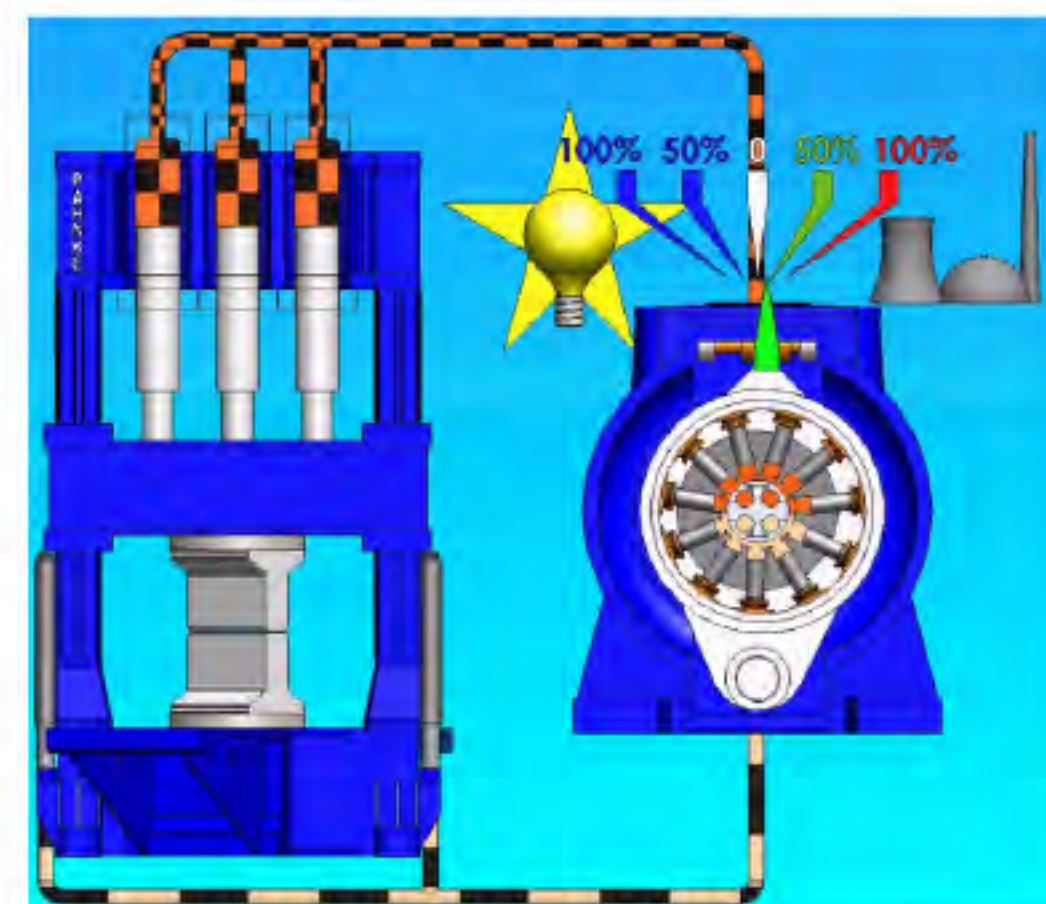
idle / approach



pressing

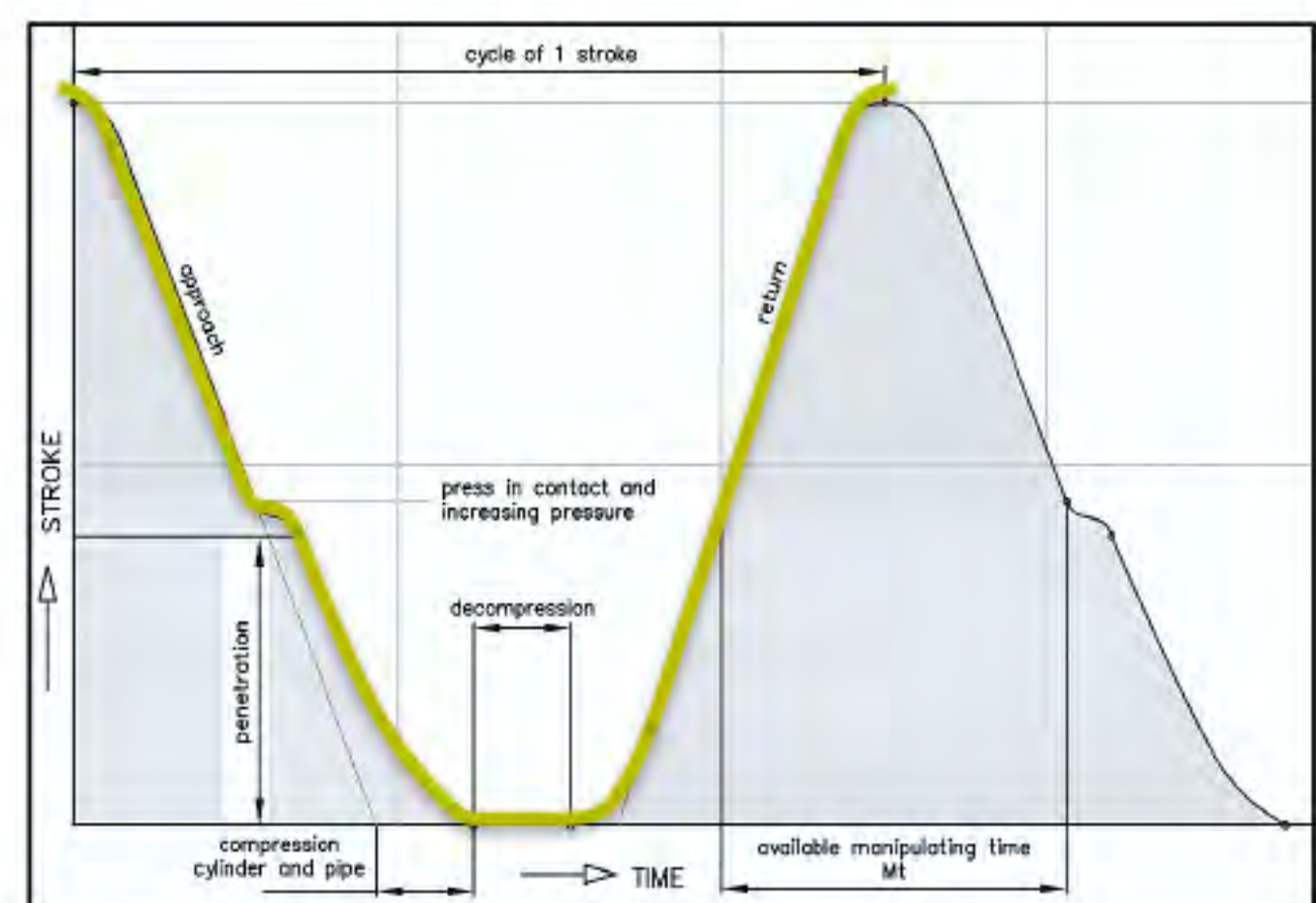


decompression / return



PMSD – Key Features and Benefits

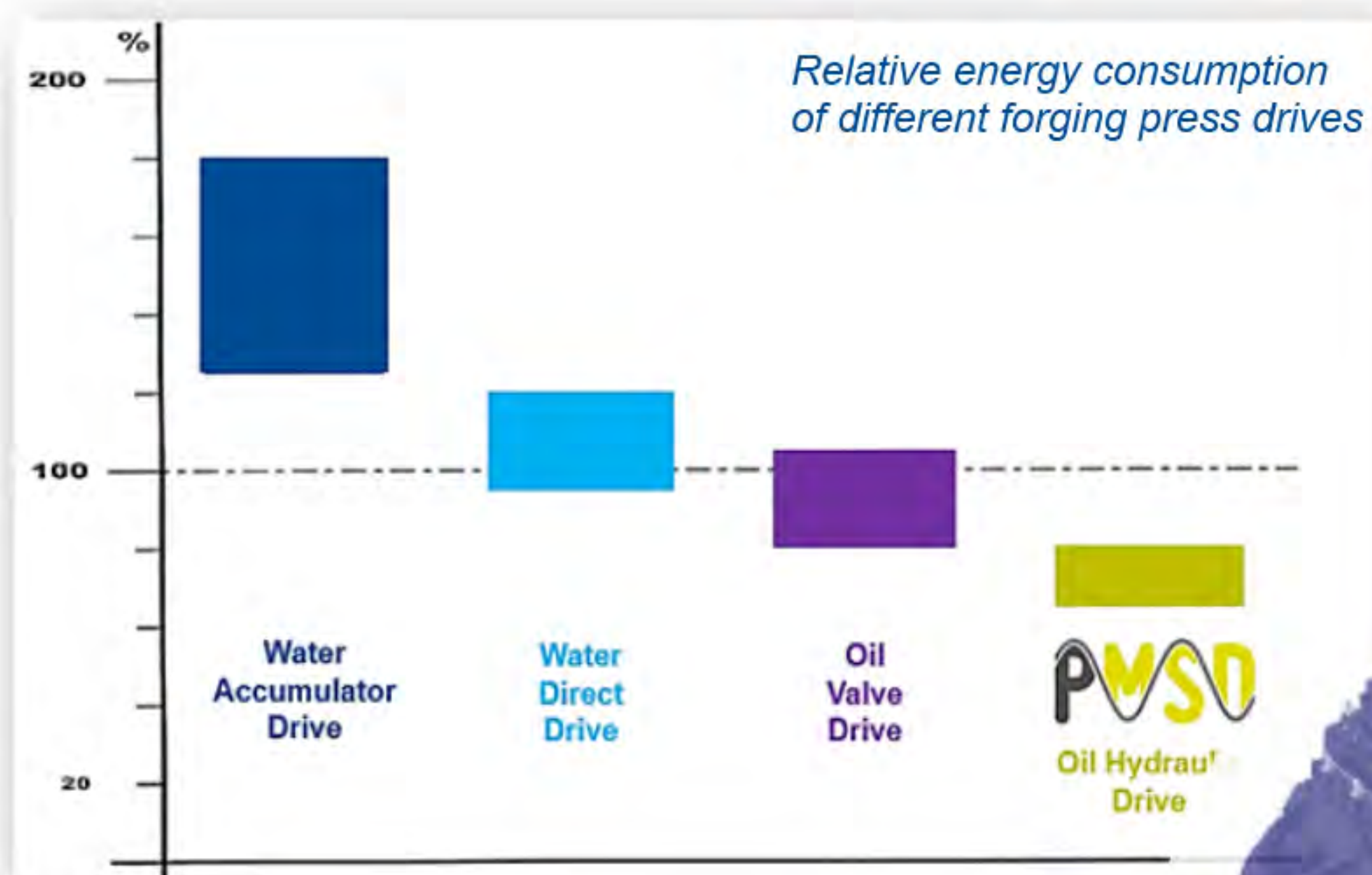
- The **PMSD** drive is directly controlling all press motions with the main pumps.
→ smooth press cycle (no hammering).
- On demand system.
- No reservoir needed on top or next to the press. Minimized Fire Hazard!
- Operating modes and frequency controlled auxiliary drive systems maximize energy saving for the operator.
- Energy saving by energy recovery during decompression.



PMSD— A MUST HAVE!

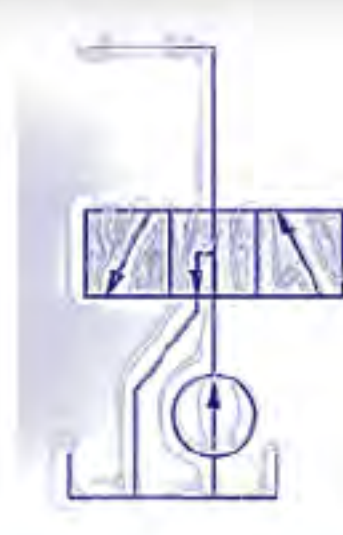
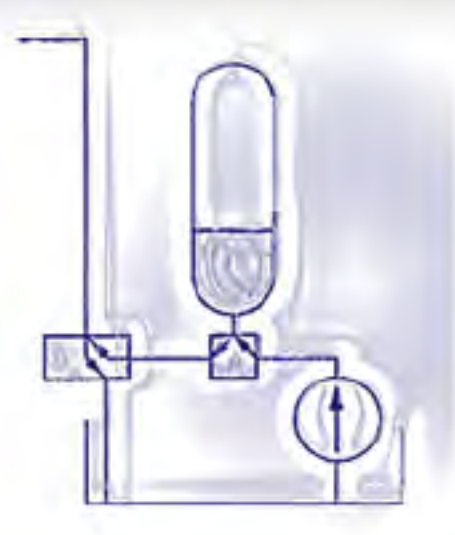
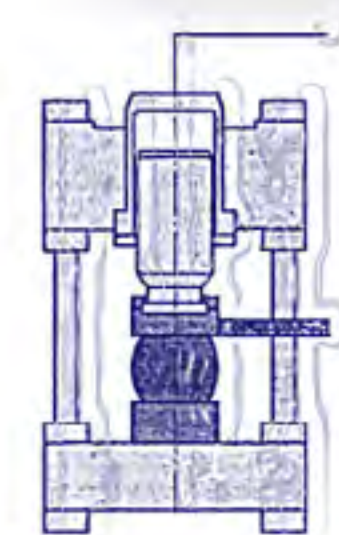
wepuko PAHNKE

We perform under high pressure.



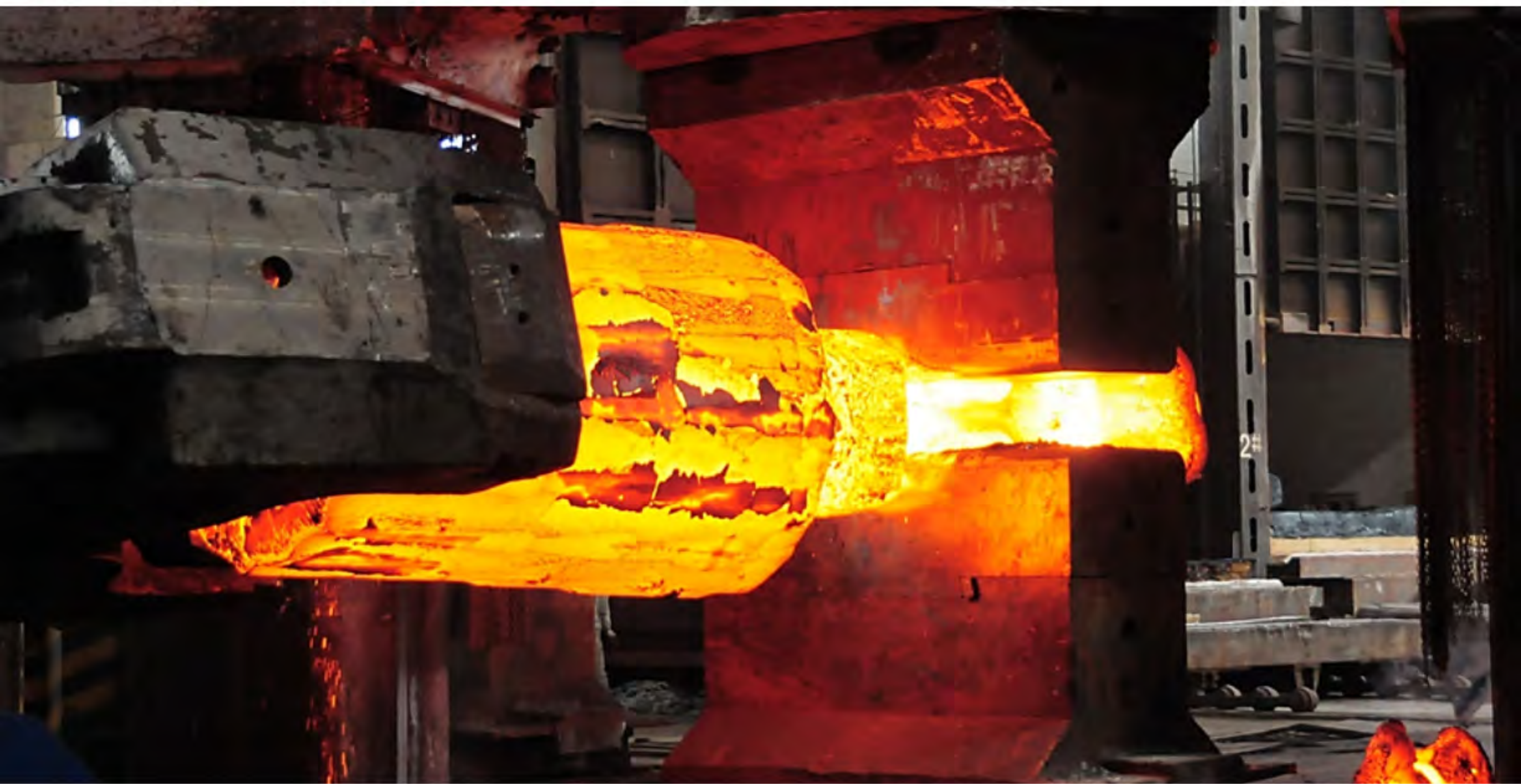
The **PMSD** drive is the only system that optimizes energy consumption to its maximum!

25% less energy consumption than an oil valve drive system!!!



PMSD
PAHNKE Modified Sinusoidal Direct drive

Thank you for your attention

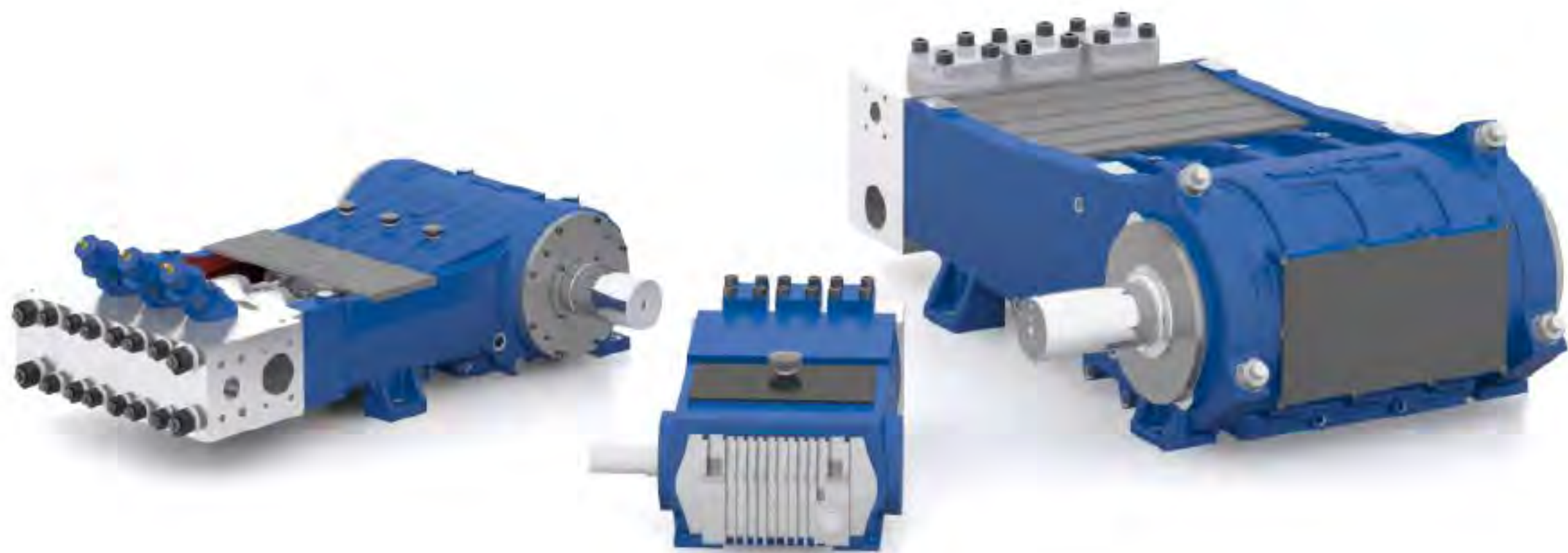


wepuko PAHNKE

We perform under high pressure.



Explanation of Wepuko DP Series



Components of the DP-Series:

Construction design:

Basically, the 3-Plunger Pump consists of two main components.

These components are:

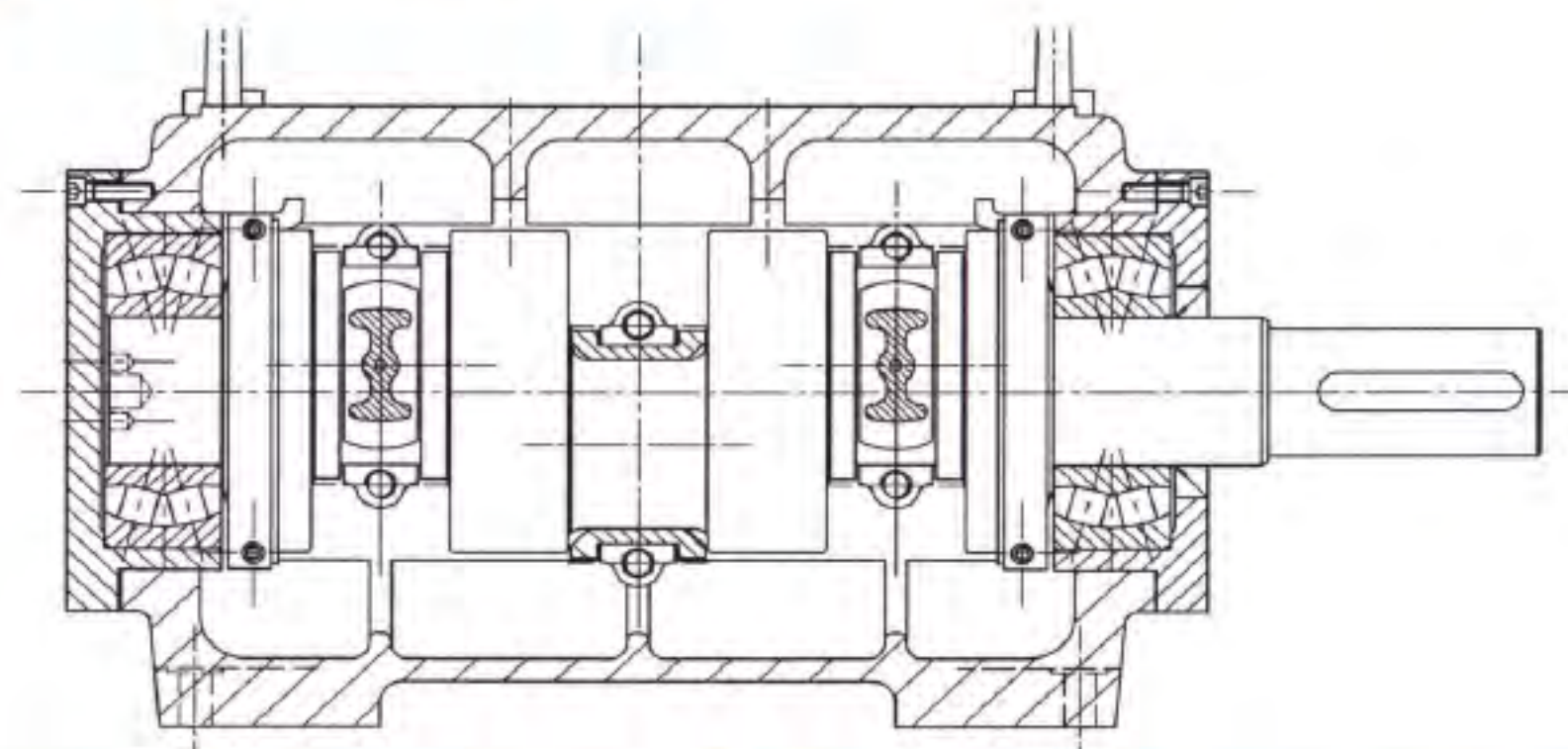
- Power end



Components of the DP-Series:

Power end:

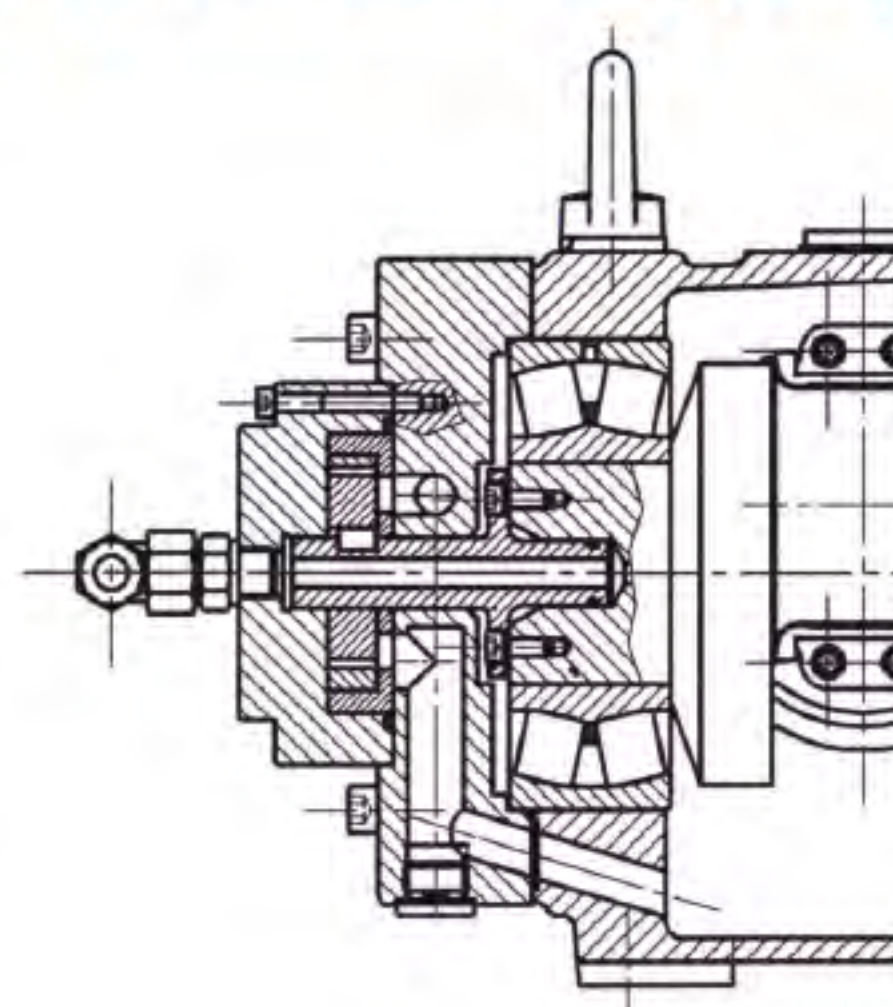
The power end of a 3-Plunger-Reciprocating Pump is similar in design to a 3-cylinder straight type automobile engine.



A special characteristic of power ends for Wepuko plunger pumps is their robust construction and low maintenance requirements. The kind of lubrication depends on the operation (speed control, suction head, etc.) power and place of installation.

Integrated Forced Feed Lubrication

-

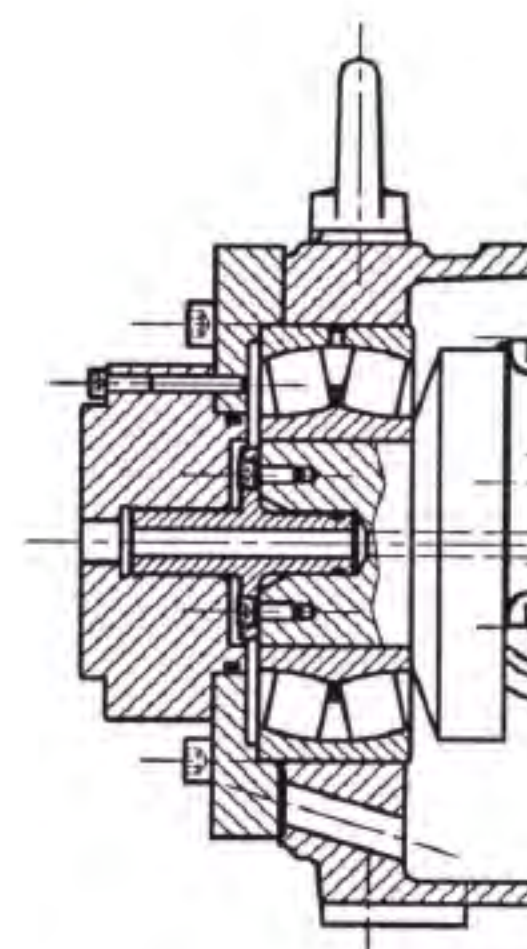
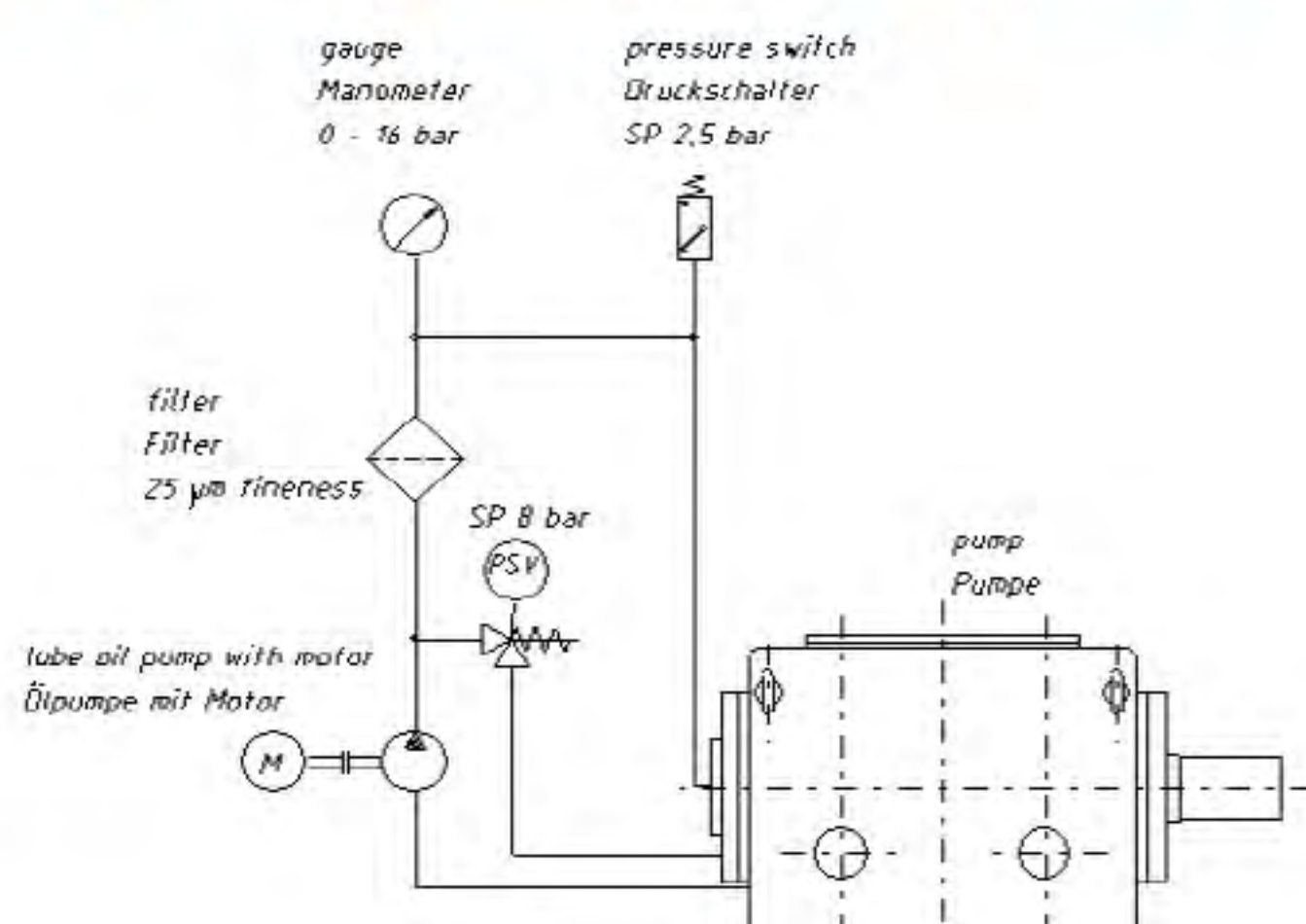


Components of the DP-Series:

Power end lubrication:

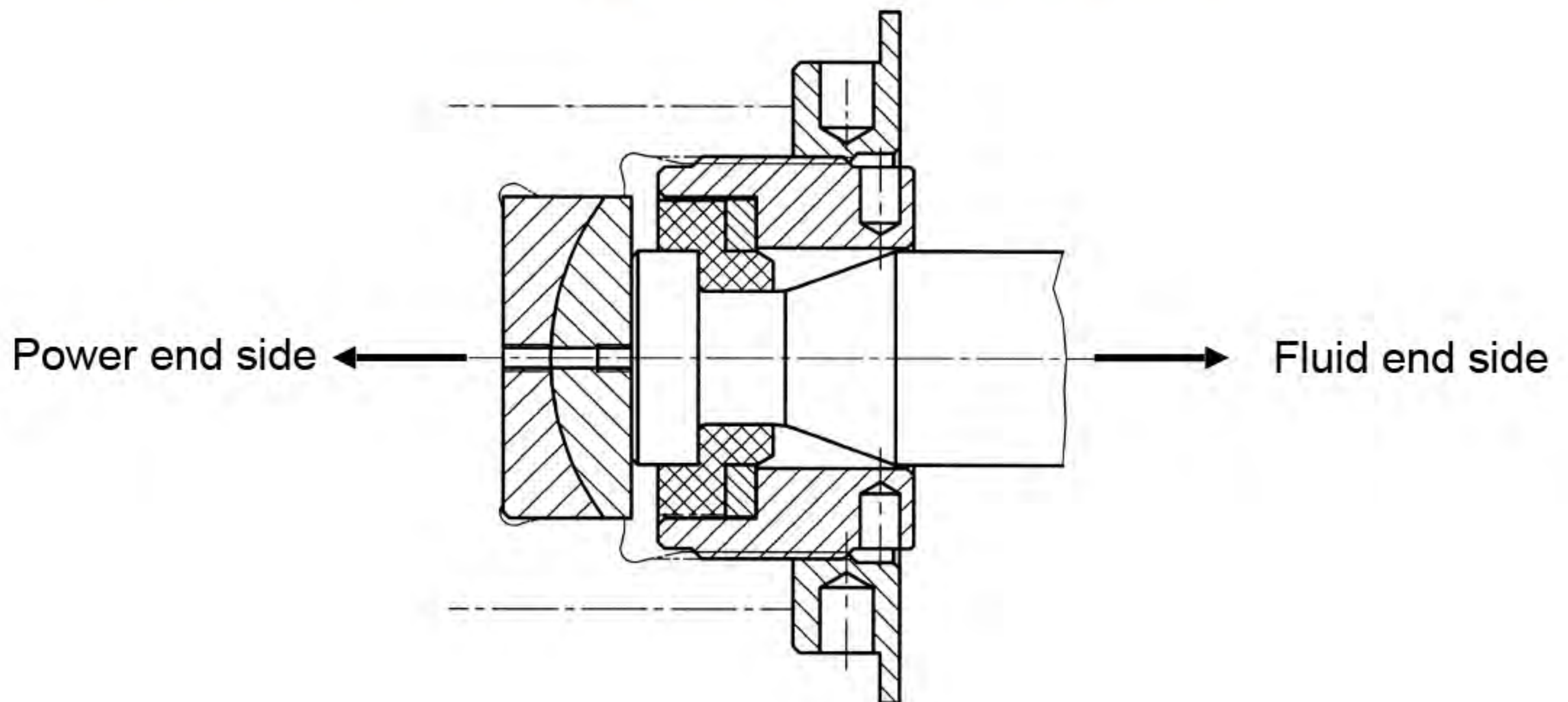
Separate Forced Feed Lubrication

- Constantly equal lubricating conditions, apart from temperature
- Independent of pump speed
- Pre-lubrication of power end is possible more safely
- Supervisory elements are applicable



Components of the DP-Series:

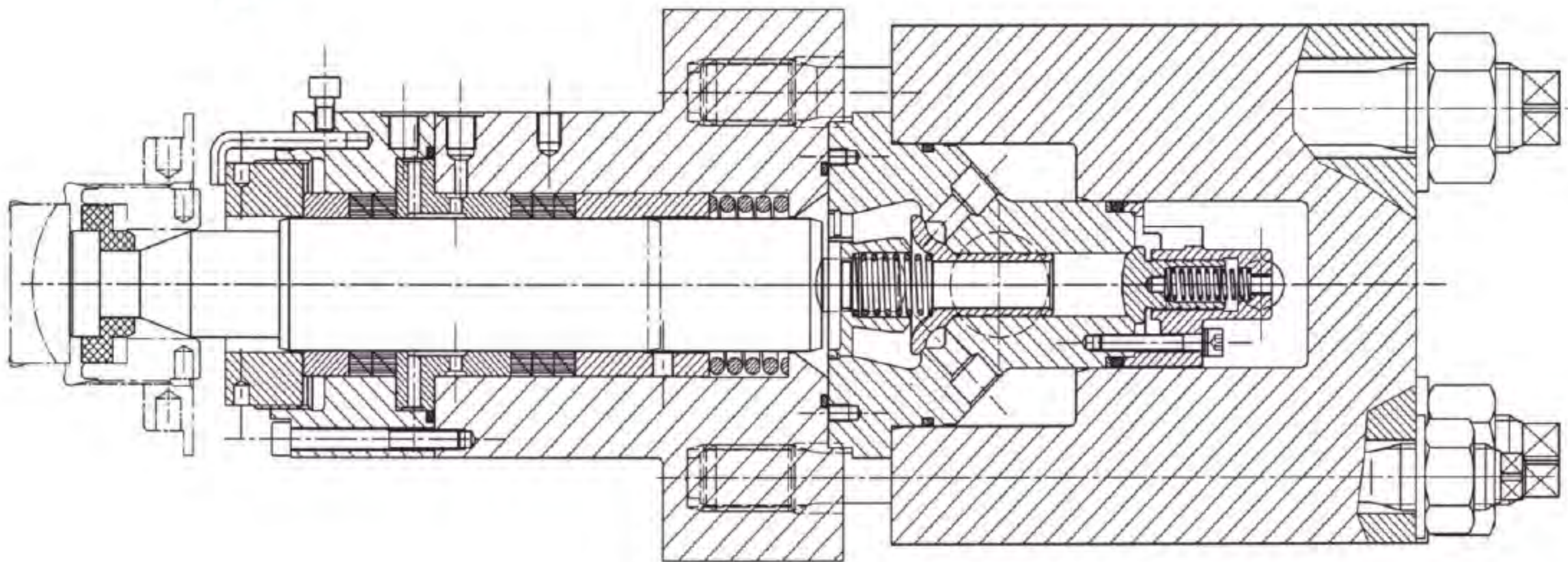
Connection between power end and fluid end:



Components of the DP-Series:

Fluid end:

- Plunger - Cylinder - Unit
- Valve body

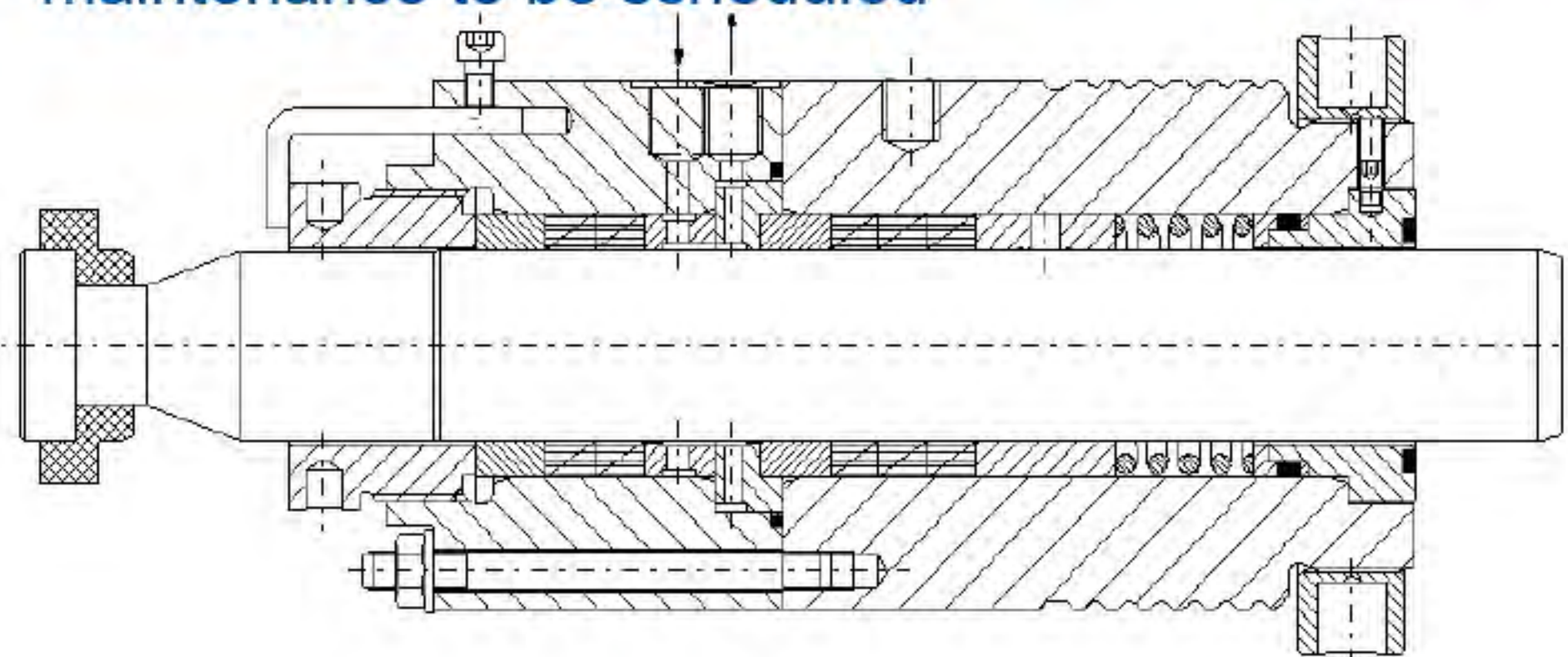


Components of the DP-Series:

Fluid end:

Plunger - Cylinder - Unit:

- the high pressure packing only requires maintenance after approx. 12 months in case of 3-shift operation (approx. 8000 h) depending on fluid quality.
- higher life time due to pressure relief of packing during suction stroke
- no running-dry by plunger flushing / leakage return to suction side
- maintenance to be scheduled



Components of the DP-Series:

Fluid end:

Plunger - Cylinder - Unit

Plunger sealing:

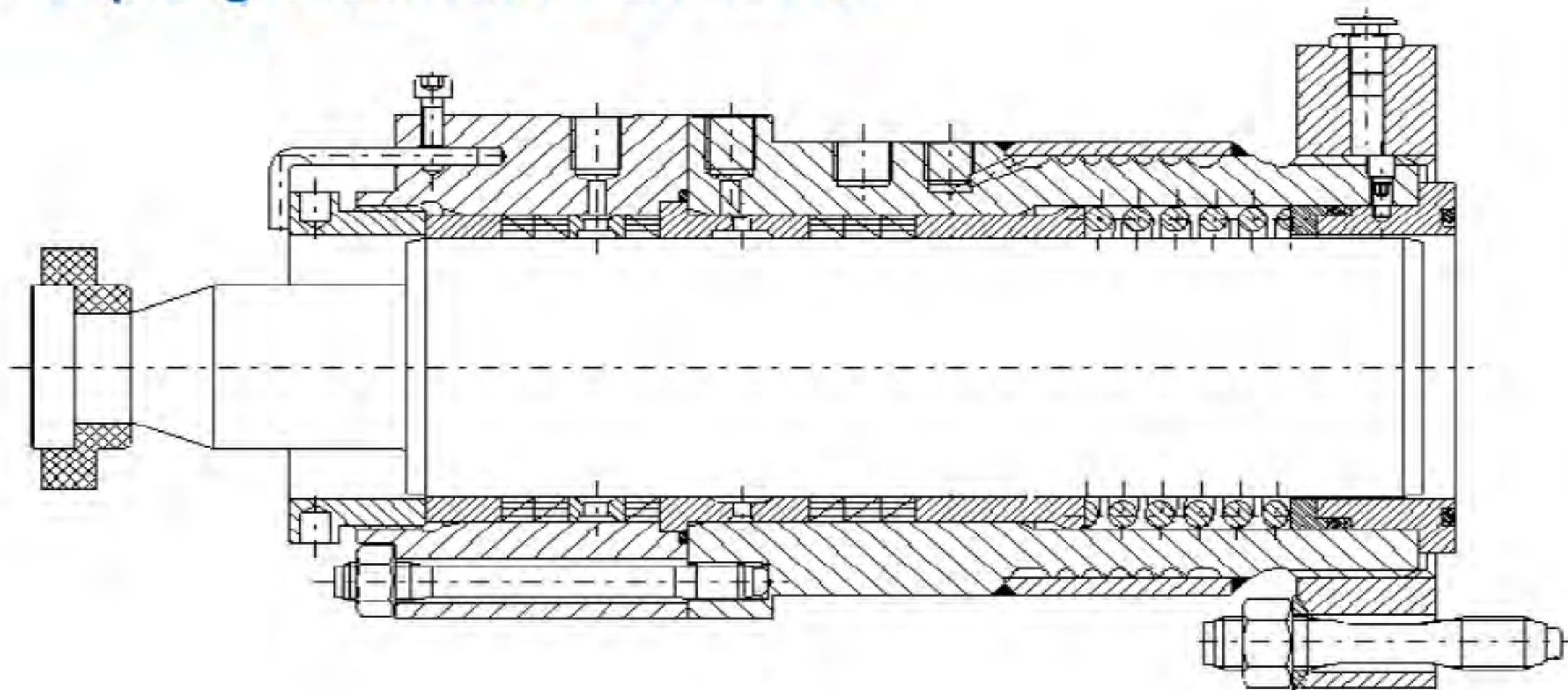


Components of the DP-Series:

Fluid end:

Plunger - Cylinder - Unit:

- with heating / cooling
- with leakage return
- with plunger lubrication connection

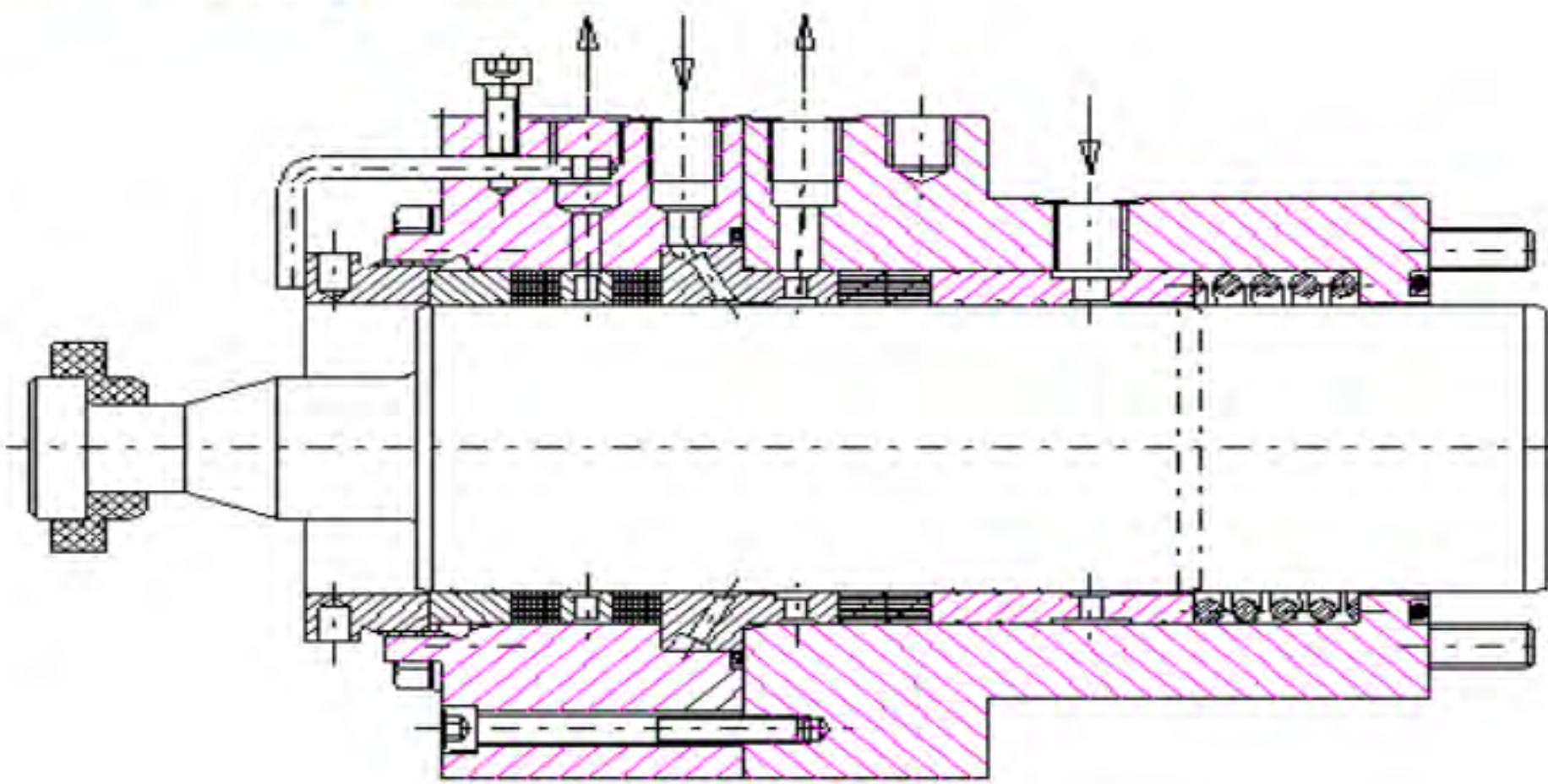


Components of the DP-Series:

Fluid end:

Plunger - Cylinder - Unit:

- with high or low pressure injection in front of high pressure packing
- with flushing
- with leakage return



Components of the DP-Series:

Fluid end:

Valve body:

The valve body is composed of a one-piece forged block. Material selection depends on application, fluid and operating pressure. Materials are exactly chosen for each application.

Quality and kind of fluid determines the valve type to be utilized.

The different designs of valves are:

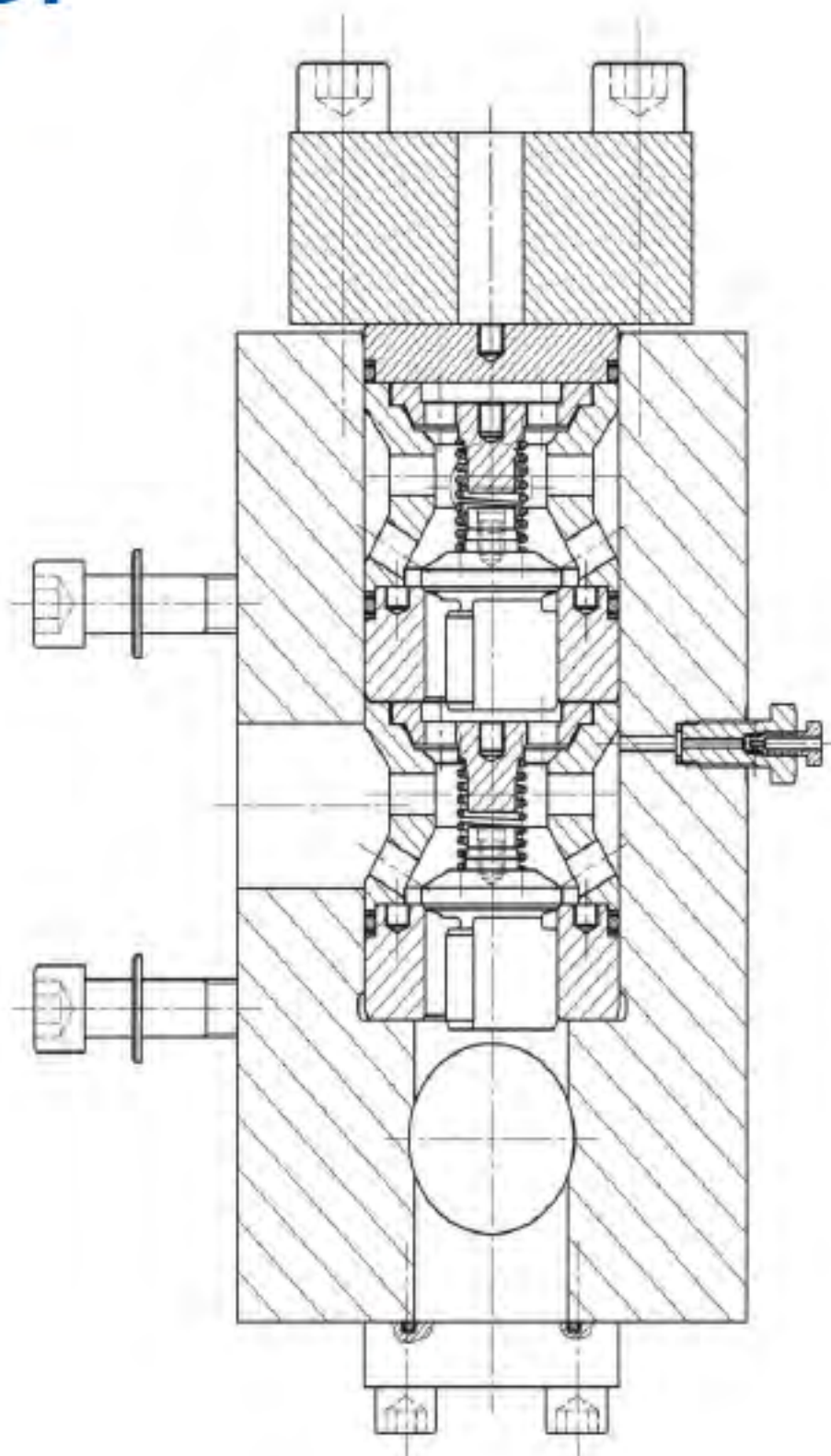
- Cone valves
- Plate valves
- Mushroom valves
- Ball valves
- Inline valves

Components of the DP-Series:

Fluid end:

Valve body:

•Cone valves

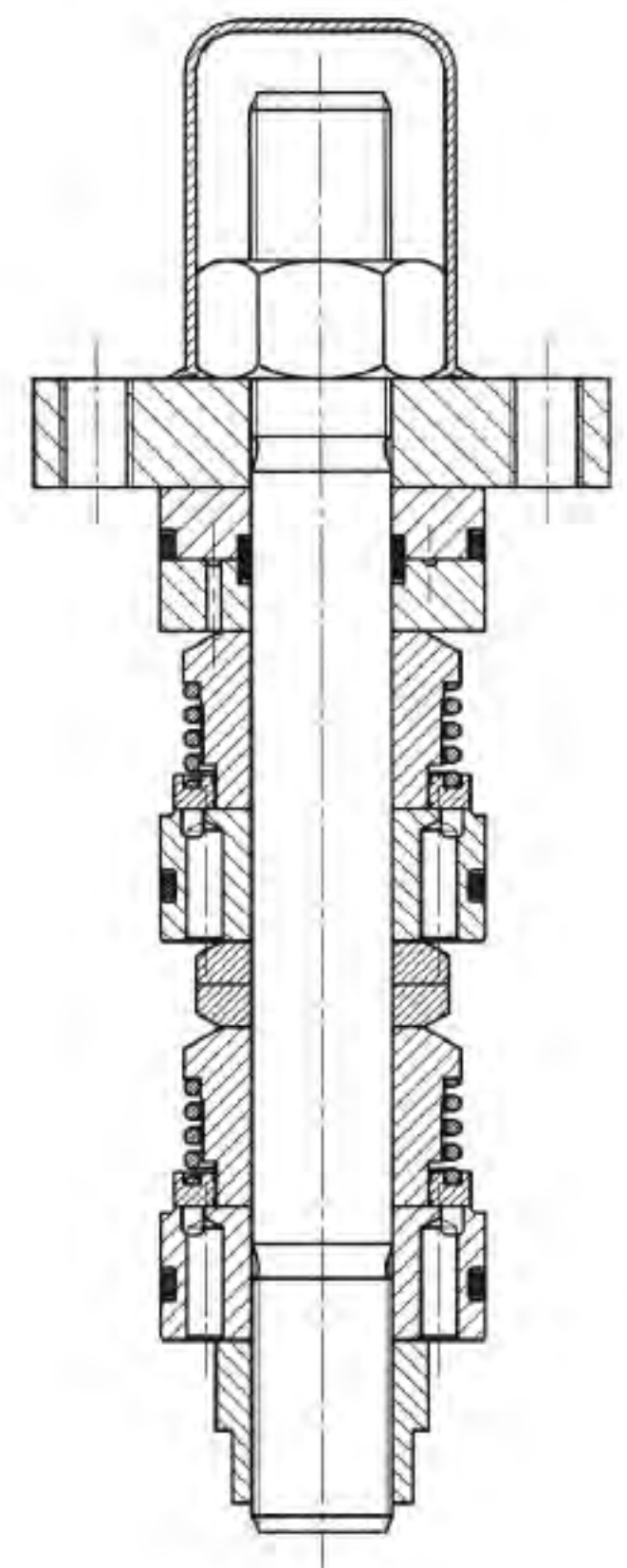
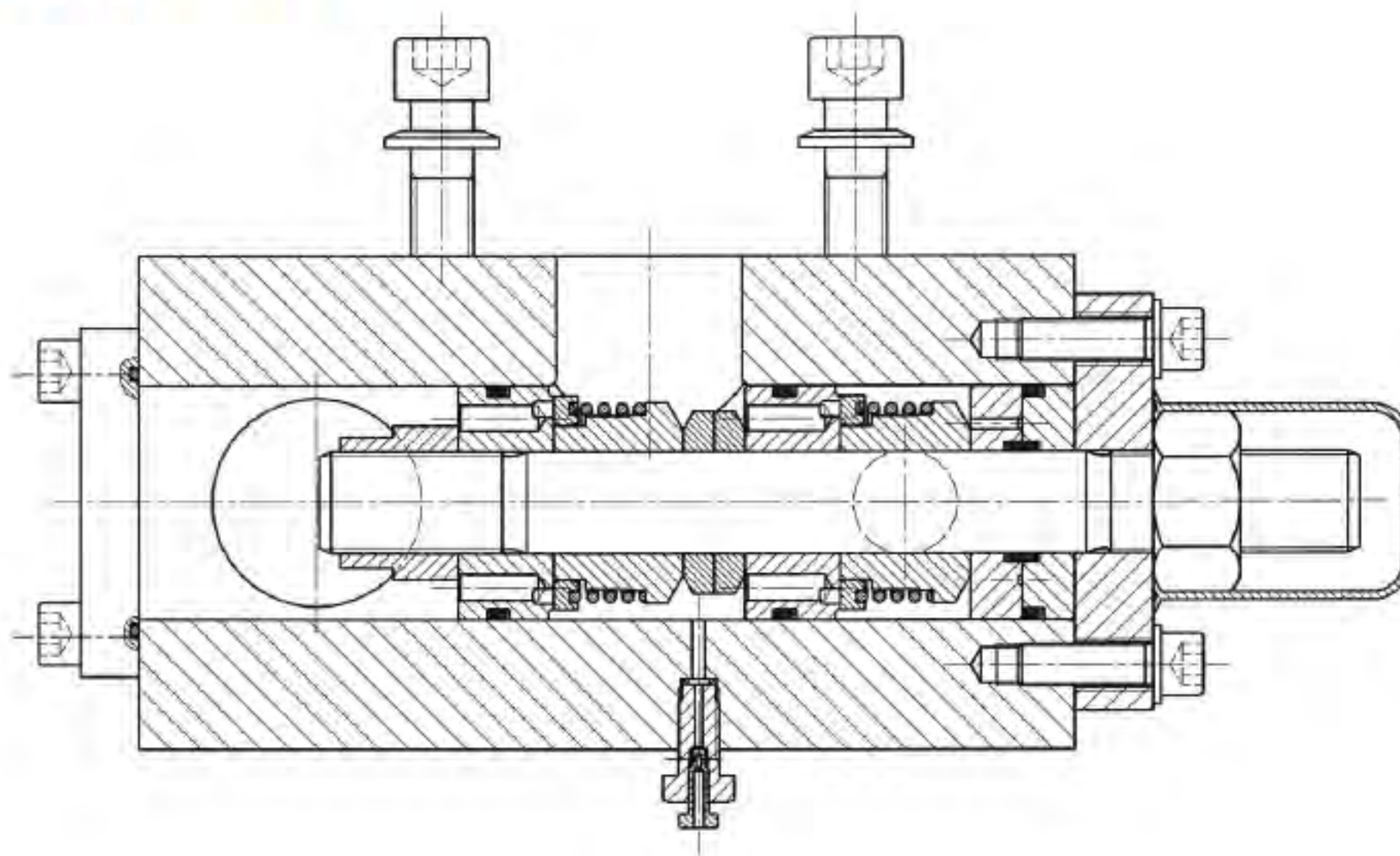


Components of the DP-Series:

Fluid end:

Valve body:

- Plate valves

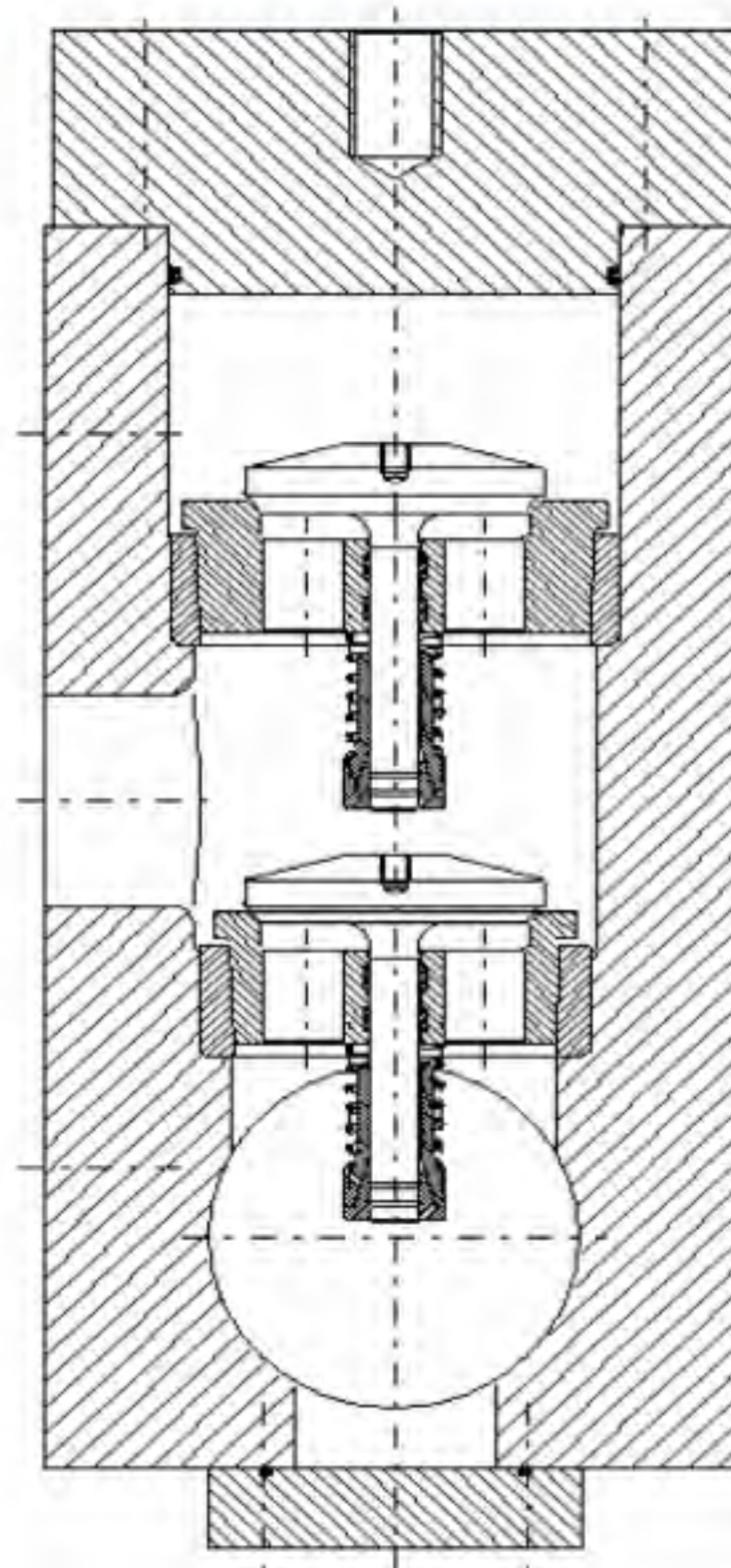


Components of the DP-Series:

Fluid end:

Valve body:

- Mushroom valves

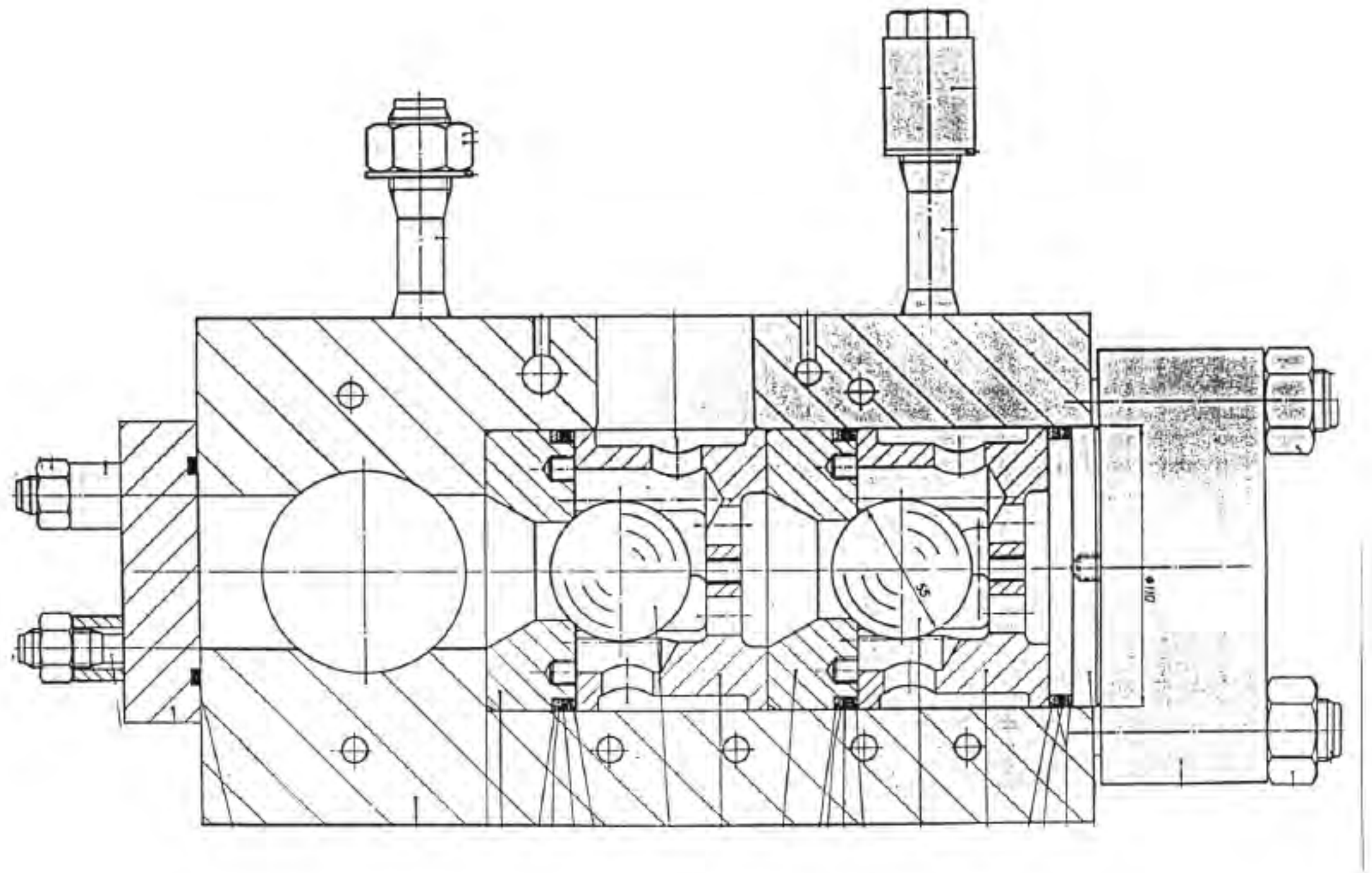


Components of the DP-Series:

Fluid end:

Valve body:

•Ball valves

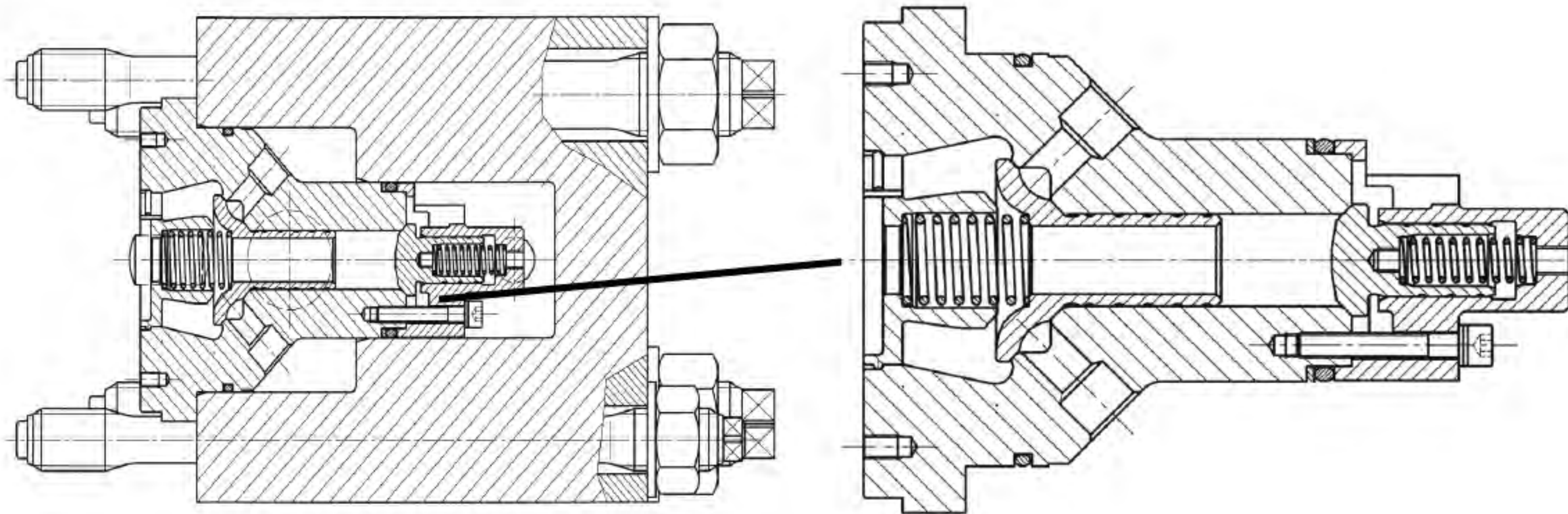


Components of the DP-Series:

Fluid end:

Valve body:

- Inline valves



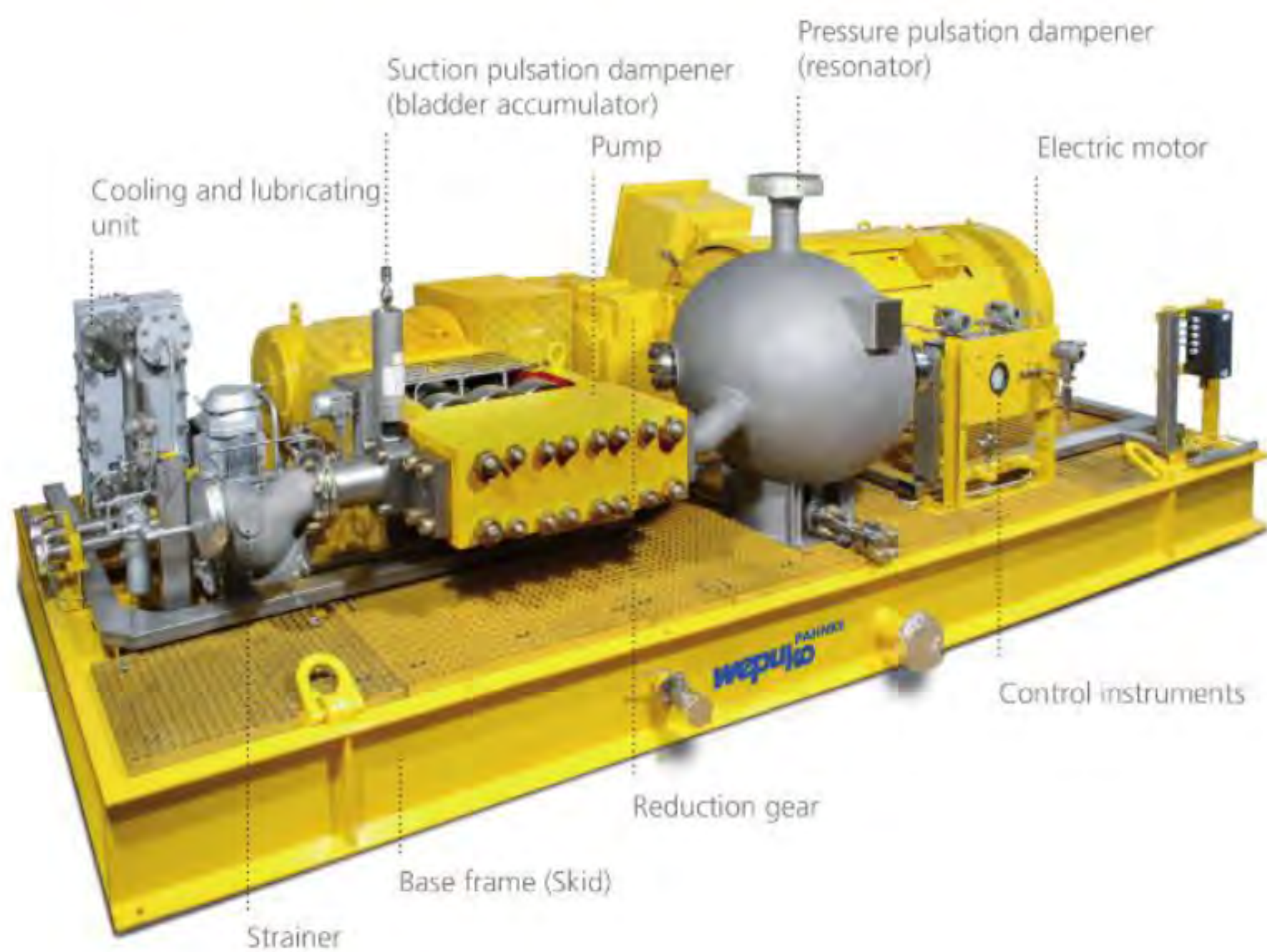
Components of the DP-Series:

Fluid end:

Application of the different valves:

Cone valves	Plate valves	Mushr. valves	Ball valves	Inline valves
Water Hydraulics Process Pumps	Water Hydraulics	Abrasive Fluids Slurry	Abrasive Fluids Slurry	Water Hydraulics Process Pumps
Pressure up to 400 bar (5,800 psi)	Pressure up to 250 bar (3,600 psi)	Pressure up to 250 bar (3,600 psi)	Pressure up to 1500 bar (22,000 psi)	Pressure up to 1500 bar (22,000 psi)

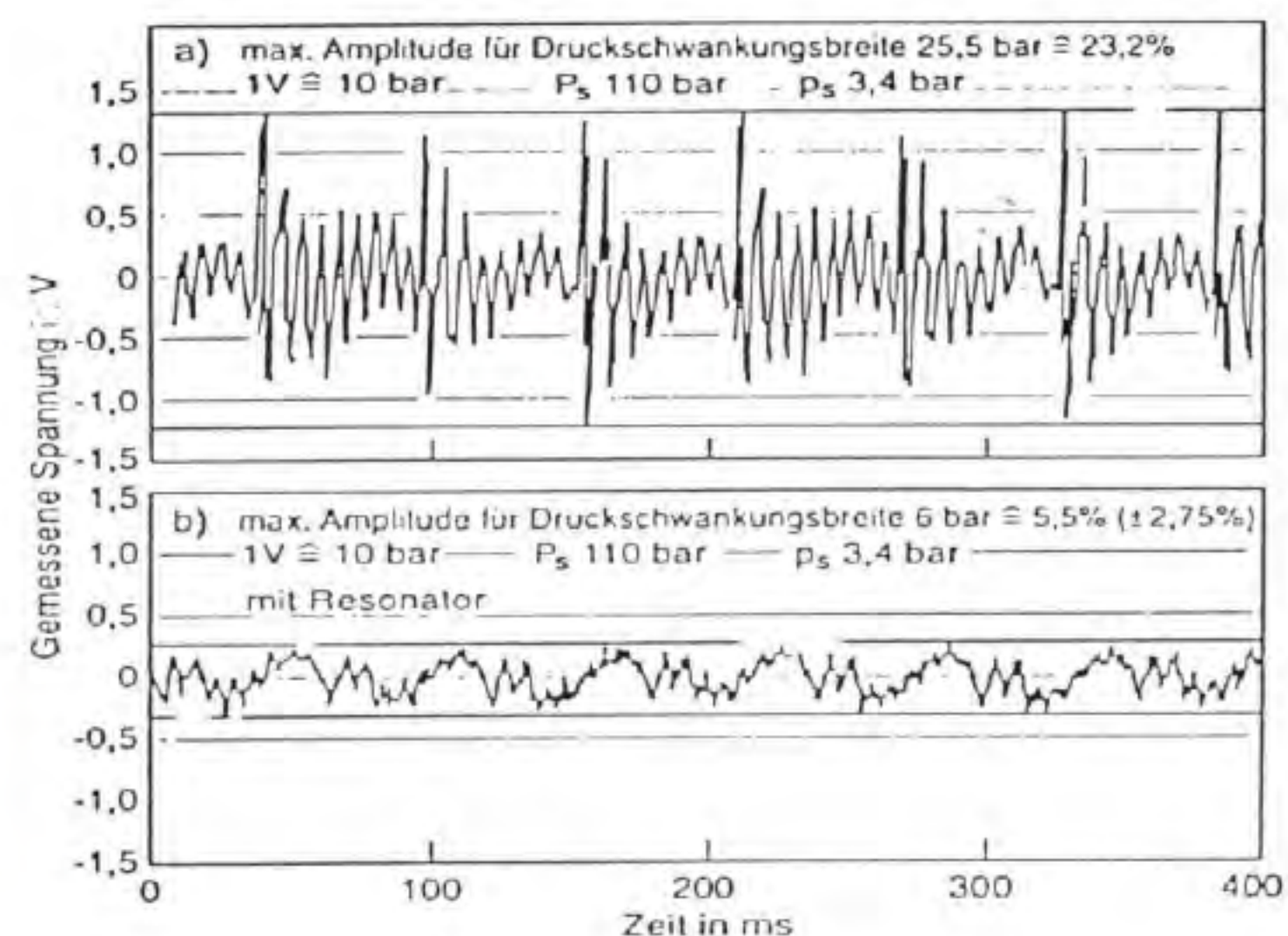
Example build of a process pump unit



Pulsation damping

Necessity of damping

- Vibration of piping (damage)
- Reduction of noise
- Increase of overall efficiency
- Increase of equipment life time
- Reduction of maintenance costs



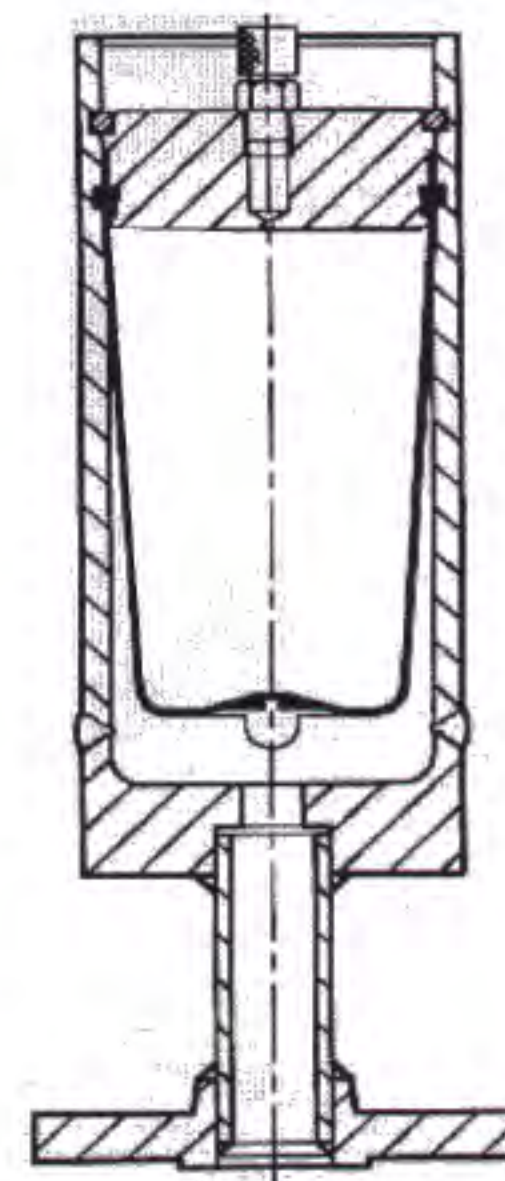
Pulsation damping

Possibilities of damping

- Pulsation dampener

Advantages:

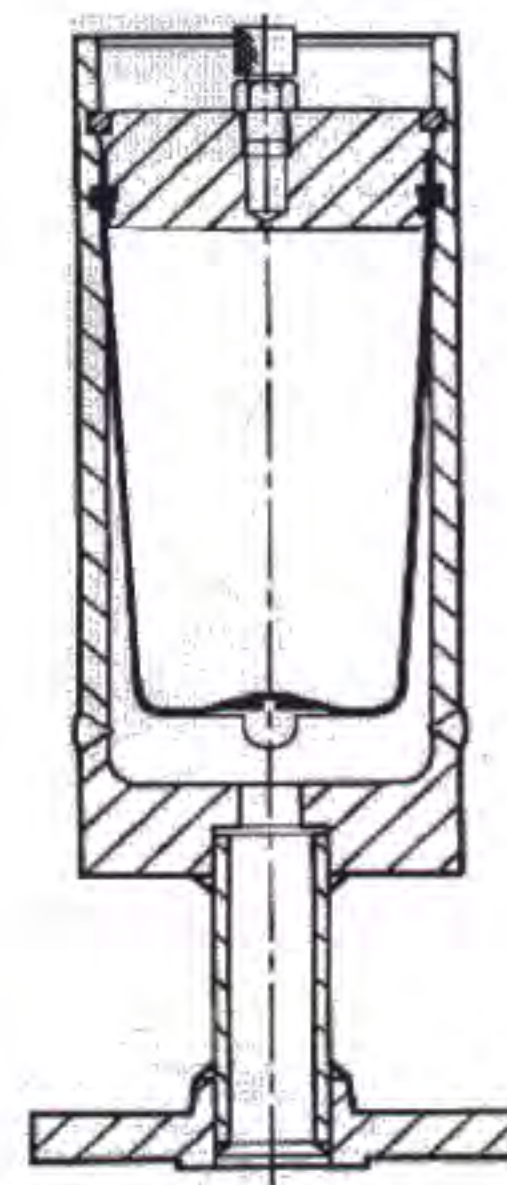
- cheap
- small in order to save space
- Design acc. to international Standards is possible (AD-TÜV, ASME, BS,)



Pulsation damping

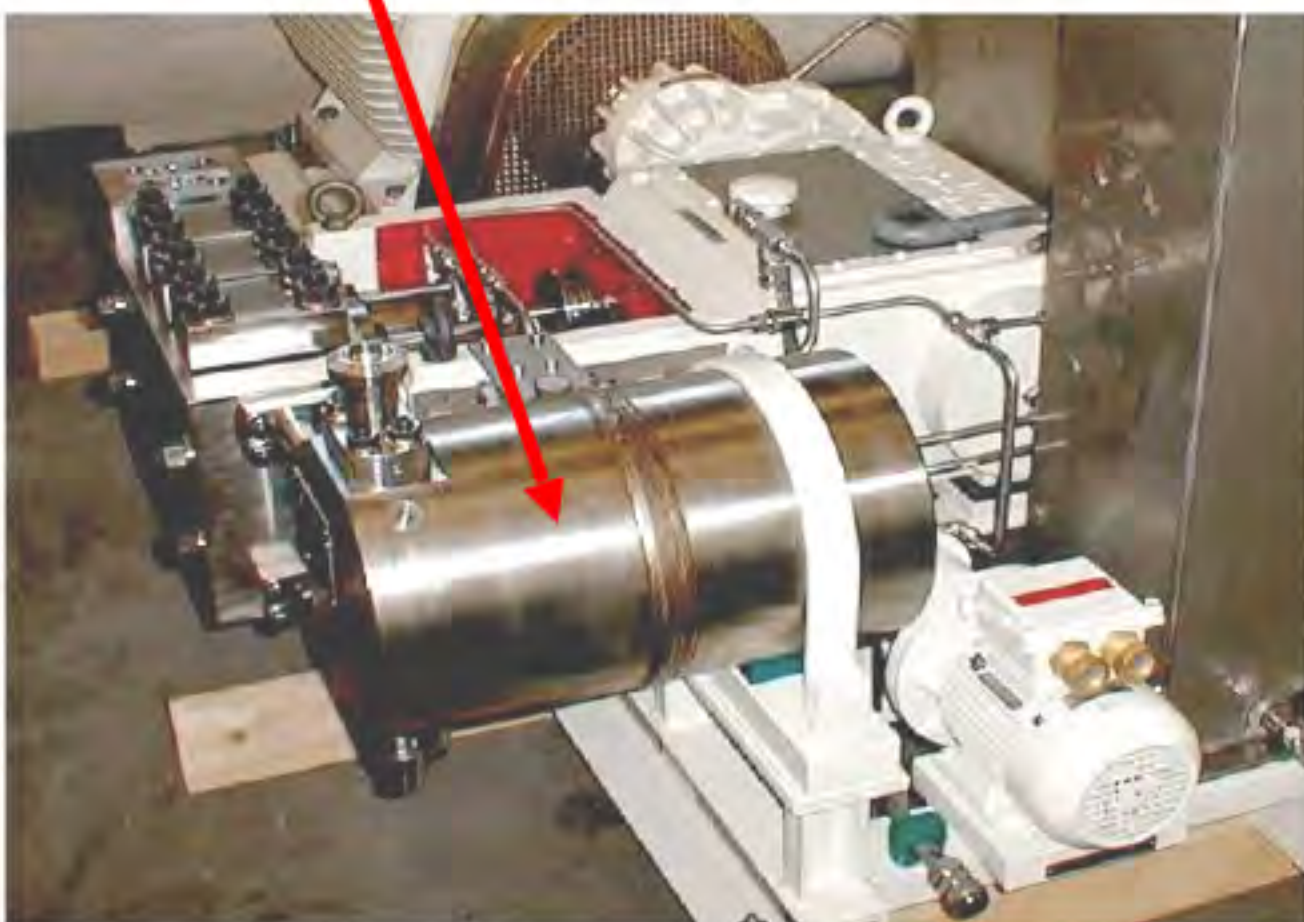
Disadvantages:

- Maintenance is necessary (Unit charging)
- The bladder is a wear part and must be renewed from time to time
- Abrasive components of the fluid can damage the bladder
- All frequencies cannot be damped with the pulsation damper
- Pulsation dampers are only able to work in a range of 40 to 100 % of the working pressure with heavy wear.

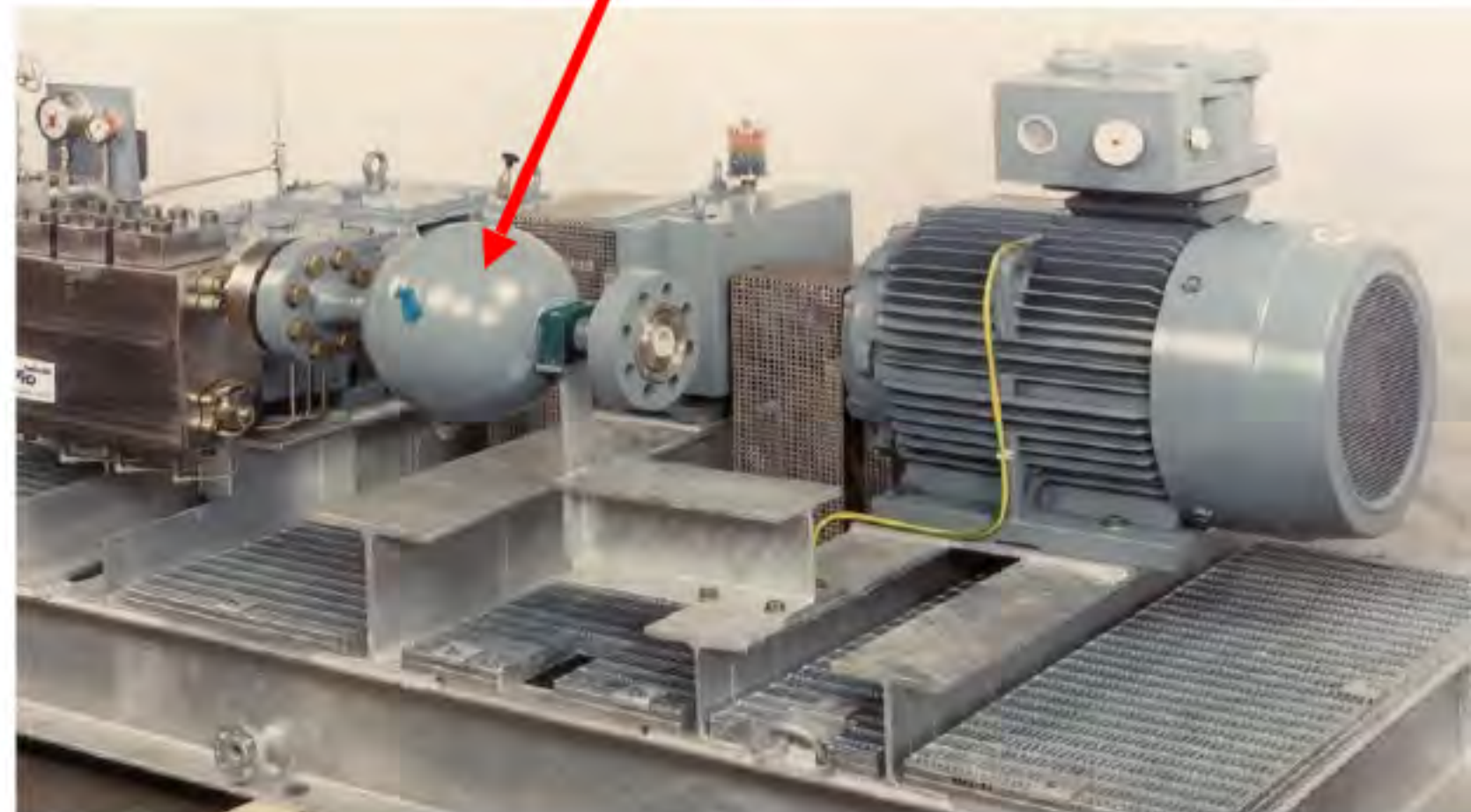


Pulsation damping Resonator

Resonator (Cylinder)



Ball-Resonator



Pulsation damping

Resonator

Disadvantages:

- More space required, due to the design
- Heavier
- Relatively high price

Pulsation damping

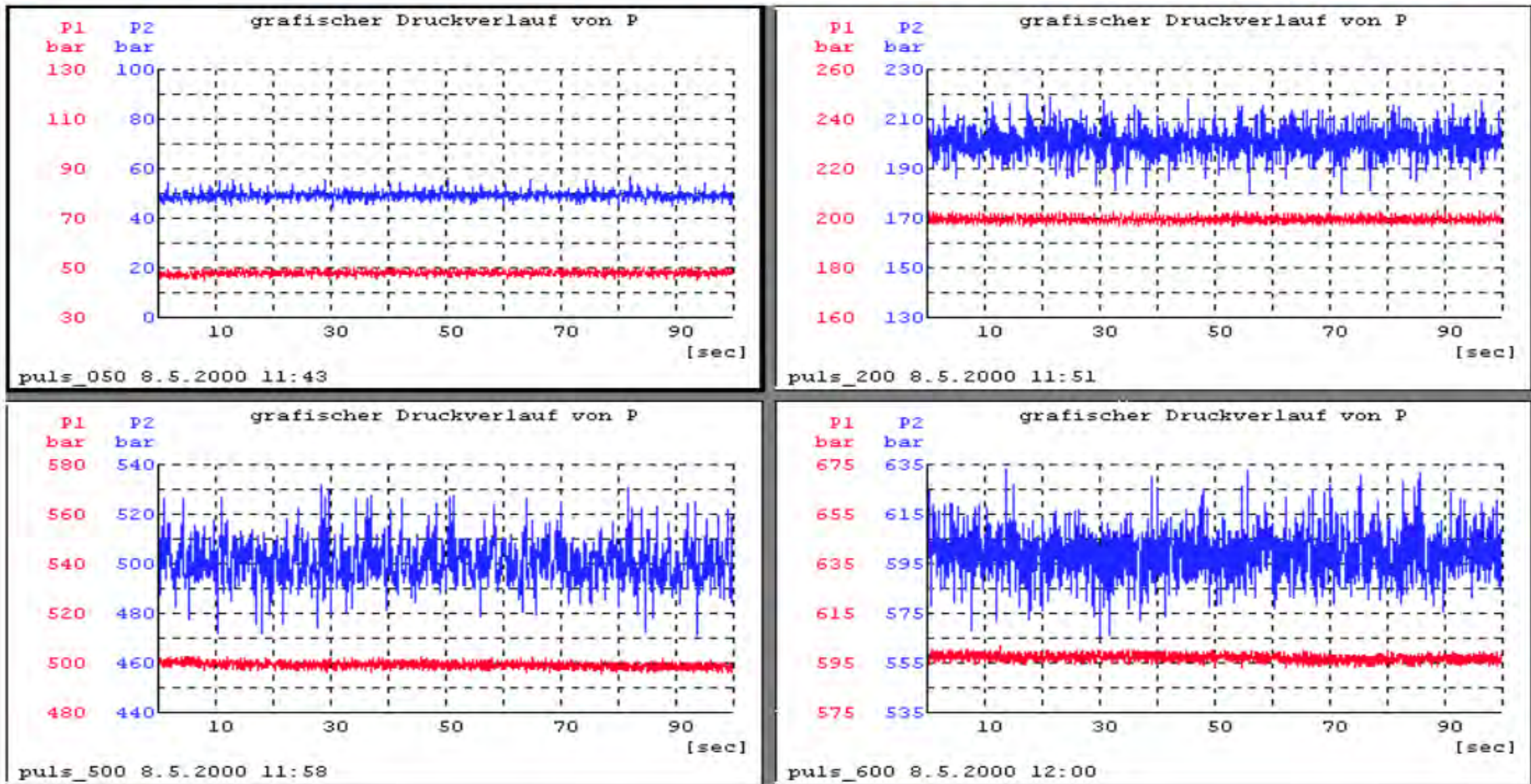
Resonator

Advantages:

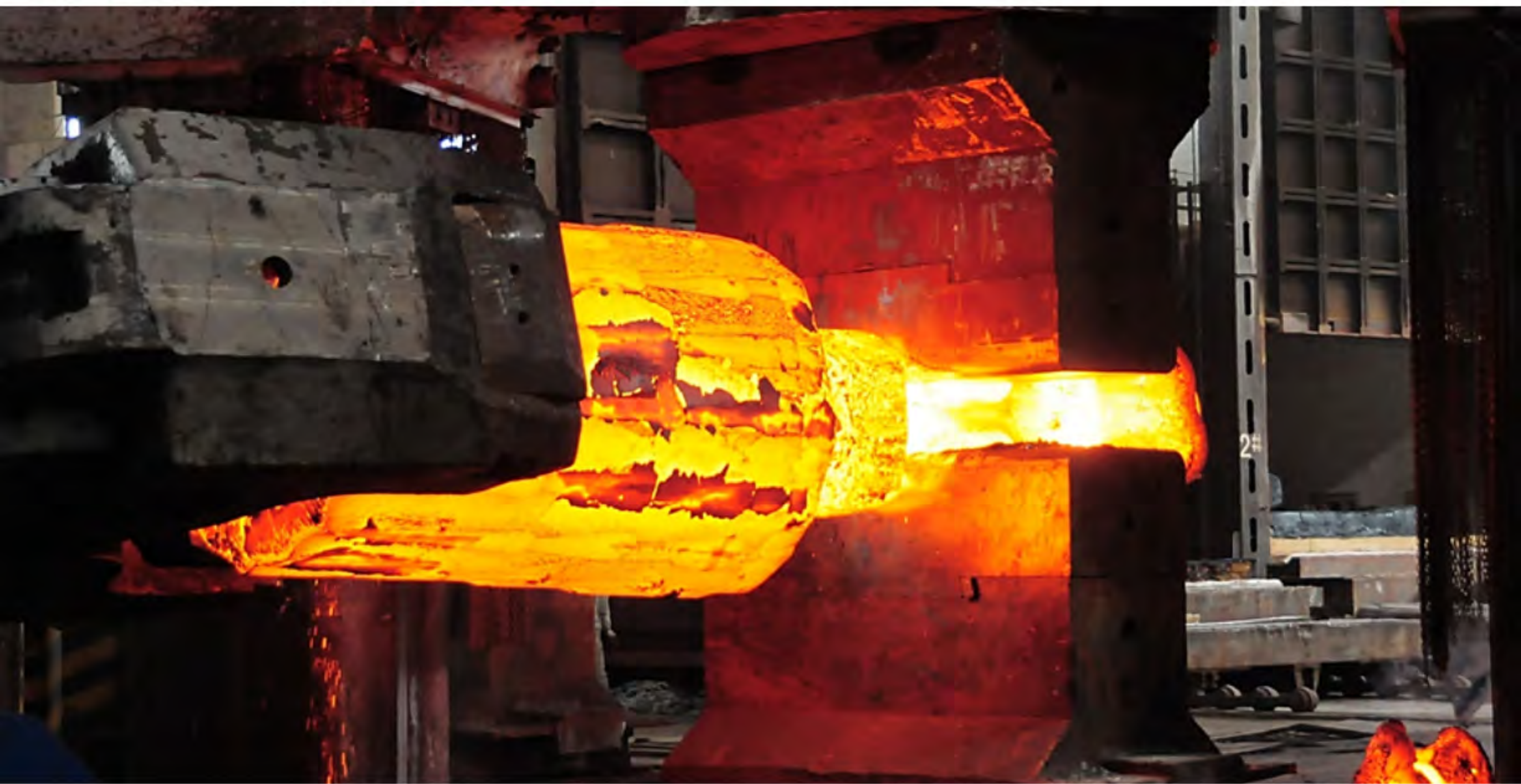
- Free of wear and maintenance
- Perfect damping of the pulsations at all frequencies, independent of pressure range
- Also at different pressures, damping is ensured
- The design can be according to the available space
- The design is possible according to all Standards (AD-TÜV, ASME, BS,)

Pulsation damping

Working of a Resonator at 50, 200, 500 and 600 bar at constant pump speed



Thank you for your attention





We perform under high pressure.



Process Pumps

Products
Industries
Applications



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 - Pump units from a single source
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 - Power plants
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- 8 **Applications**
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 - Injection pumps
 - Produced water
 - Fracking & well stimulation
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 - Boric acid pumps
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 - CO₂ applications
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 - Other applications
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www.wepuko.com

Follow this link to get more detailed information on the solutions and products of Wepuko PAHNKE.

Dear Reader,

The "Process Pumps" division is an important business sector for Wepuko PAHNKE. With sophisticated technology, specialized knowledge and skills of our engineers and the fast response of our service team, we consistently find the best solution to meet even the most challenging customer requirements.

Our high-pressure plunger pumps distinguish themselves with high durability and reliability. We establish the basis for trouble-free operation of process technology systems focusing on safety, reliability and economic efficiency. Wepuko PAHNKE is among the leading partners for customers in the oil and gas industry, power plants and other users with process technology systems.

The following pages will provide more information about our product portfolio and the numerous typical applications.

Typical media in the processing industry:

- | | | |
|--------------------------------|----------------------------|-------------------------------|
| ■ Methanol | ■ Propane, butane (liquid) | ■ Phosphates |
| ■ Ethanol | ■ Seawater | ■ Liquefied natural gas (LNG) |
| ■ Glycol (MEG, DEG, TEG) | ■ Brine | ■ Mixtures of media |
| ■ Hydrocarbons | ■ Contaminated water | |
| ■ Diesel | ■ Ammonia | |
| ■ Crude oil | ■ Acids and bases | |
| ■ Supercritical carbon dioxide | ■ Boric acid solutions | |



DP 212 pump unit for produced water injection.

Productivity made by Wepuko PAHNKE: Pumps and units

Robust and low-maintenance: Our process pumps are used in processing technology, the onshore and offshore industry and in power plant engineering. Whether pumps for all high-pressure applications or complete custom hydraulic units – we are the right partner for you.



High-pressure plunger pumps

Three models for diverse applications: The DP series of Wepuko PAHNKE pumps are horizontal triplex plunger pumps. They can be configured for just about any pumpable medium. Special materials for the fluid end and plunger seal design are selected to suit the medium. The fluid end can be equipped with cooling, heating or flushing, as required. The drive ends of the machines are designed with an integrated pressure- or wiper lubrication system.

Our pumps are used in chemical plants, in natural gas storage plants, in nuclear power plants, in drilling rigs, on oil platforms, in the food industry, in boiler feed systems, in hydrostatic slide bearing lubrication, in high-pressure cleaning systems, in drives for forging presses, in descaling systems and in press water systems.



Our DP series pumps have flow rates ranging from approx. 4 to 5000 l/min, pressures of up to 1500 bar, a performance range of 5 to 1600 kW and a fluid temperature range of -196 °C to +280 °C. Higher performances and special designs are available on request.

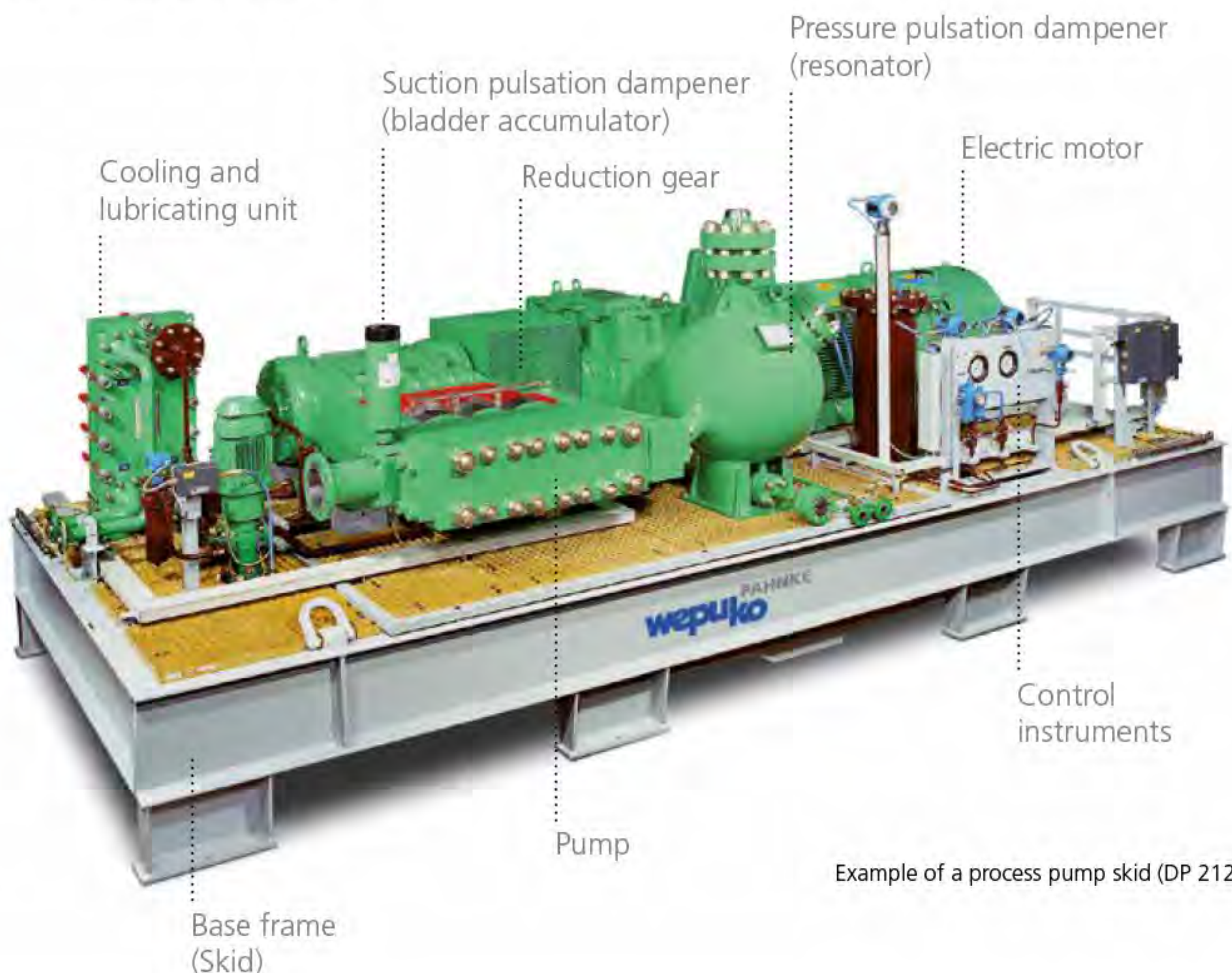
Pump units from a single source

Wepuko PAHNKE pump units are complete solutions for your special application. Customer specifications are precisely implemented for direct integration of the unit into the process system.

The illustration below depicts a typical pump unit for the oil and gas industry. Every unit is built upon a skid, onto which all other components are installed. The heart of the unit is the Wepuko high-pressure plunger pump,

which is connected to the drive (motor/transmission) by flexible couplings. The pump is integrated by pipeline connections into the system. The fluid is fed through a suction pulsation dampener, if requested by the customer, into the liquid head of the pump. Hence it is pressed by the oscillating motion of the plungers through the pressure pulsation dampener into the high-pressure pipe.

Components such as oil pressure lubrication, safety mechanisms and the monitoring and control electronics that are also mounted onto the skid complete the unit. We offer various special paint coatings to suit the conditions on site.



Example of a process pump skid (DP 212).

➤ Accepting challenges: New development and improvement for all industries

Almost every industry is continuously looking for plant components that perform better and operate more safely while decreasing in weight and size. We fulfill our customers' high expectations by constantly developing new pumps and improving our existing designs.



Oil and gas

Whether on an offshore platform in the North Sea, the icy tundra of Siberia or in the desert of the Persian Gulf, our pump units run 24 hours a day for nearly 365 days a year.

The oil and gas industry is probably the most demanding industry on this type of equipment. All units have to withstand harsh conditions and must be designed for high availability. Unforeseen downtimes can cause enormous costs. Our customers are looking for a smooth production and process flow. This is exactly what we focus on, when it comes to the selection of our pumps and components.

Pumping oil and gas also demands custom system designs developed specifically for each individual case. Standard requirements are optimum efficiency, compact design, quick and easy maintenance and excellent control dynamics. We meet all these requirements to precision.

Our products are in accordance with international standards, such as API (American Petroleum Institute), Hydraulic Institute (HI) and certainly customer specifications.



Refineries and petrochemicals

In the downstream sector certain processes are predestined for the use of high-pressure pumps. Wepuko PAHNKE high-pressure plunger pumps are a great choice for hydrocracking in the petrochemicals industry, for wash water pumps or even for feed water pumps.

In our designs we particularly pay attention to special explosion protection and to API 674 / ISO 13710 requirements.



Power plants

Safety does not allow a second chance – which is why Wepuko PAHNKE high-pressure plunger pumps are used not only in German nuclear power plants, but also in China, India and Russia. The reliability of our pumps is greatly valued – for example as cooling or feed pumps for the mechanical seals of emergency pumps or as boric acid injection pumps for the safety systems in pressurized-water reactors. Our quality assurance conforms to KTA 1401 and AVS D 100 / 50.

Our pumps are not only used in nuclear power plants, however: In conventional power plants, they are used as boiler feed water pumps, while in solar power plants, our pumps serve as feed water and recirculation pumps or condensate pumps. Operating temperatures in these applications reach up to 270 °C.



Other industries

Since our pumps are built to customer specifications, they can be used in countless other industries, such as the pharmaceutical, cryotechnology and the food industry. There, they are often used as feed pumps for liquid CO₂. Liquid CO₂ is used in extraction plants to obtain seasonings, aromas and other substances.

Responsibility and perspectives: Our pumps in use

Whether for fracking, gas drying, as injection pumps or for well service: Wepuko PAHNKE pumps are in continuous operation onshore and offshore. They guarantee a smooth production flow under all circumstances.

Well Service (onshore and offshore)

For well service operations, pipeline pigs are pushed through the inside of pipelines and risers. This is where our pumps step in. The medium pumped for this hydraulic task is typically diesel. Pigs can be used for various purposes. Mainly they serve for inspection for corrosion and cracks, cleaning the pipeline or to seal it off during repairs and maintenance.

Another well service application for our pumps is hydrostatic pressure testing of risers and pipelines, on platforms and FPSOs. The typical medium used in these cases is water, seawater or a water-glycol mixture.



DP 410-125 pump skid for well service (driven by a diesel engine).



DP 532-250 pump skid for well service.

Injection pumps (onshore and offshore)

As a precautionary measure, additives are injected into transportation conduits and pipelines. In such cases, our pumps inject methanol, ethanol or glycol in order to counteract hydrate formation and blockages.

Another application is to inject immediately before commencing the actual transportation operation; this prevents any water being present in the oil or gas and freezing onto the walls of the pipeline.

Additionally our pump units are designed to execute other functions such as hydrostatic pressure tests or hydraulic opening and closing of large valves.

Hydrocarbon condensate injection is another use for Wepuko PAHNKE pumps. The fluids are then re-injected into the well or directed back into the process.



DP 406-080 pump skid for
HC condensate injection.



MEG injection pump skid (DP 408-100 A/B).

Produced water

Produced water is re-injected in order to enhance and stabilize the production of the well or simply for the disposal of water. Extremely salty water which has been separated by an upstream process is most often continuously pumped under high pressure into wells. Again, our high-pressure plunger pumps prove their quality in this application. Designed in accordance with API 674 / ISO 13710, they fulfill the high standards of the petrochemical industry.



DP 410-125 pump skid for produced water injection (in service at OAO Tatneft).



Air cooled DP 212 pump skid with redundant lubrication oil system for produced water injection.

Fracking & well stimulation (onshore and offshore)

Our high-pressure plunger pumps are also used for fracking and well stimulation. In these processes, they pump mixtures of water and chemicals as well as acids and polymers with abrasive components into the well.

Under high pressures this fluid fractures the rock formations in order to expand the well and to optimize the yield. The process requires pressures of up to 1000 bar (about 14500 psi) and high flow rates. Our pumps have been successfully employed in these fields for many years – for example as offshore scale squeeze pumps on intervention vessels.

For well stimulation, several different methods are used to increase the production of an oil or gas well. This method is primarily used in the later life of a well, in order to avoid and delay a decline in production efficiency. In this matter Wepuko PAHNKE pumps ensure an increased recovery of the resources.



DP 212 pump skid for well stimulation.

Gas dehydration (Onshore and offshore)

For gas dehydration, our pump units are used for processing cold or hot glycol in a gas dehydration system.

Produced natural gas has a relatively high content of dissolved water and therefore a low calorific value. In the process dry glycol "rains" through the natural gas stream (like in a shower) and draws out the humidity. Due to its hygroscopic structure, the glycol absorbs the dissolved water. The saturated glycol is then dried and will be fed back into our pumps.

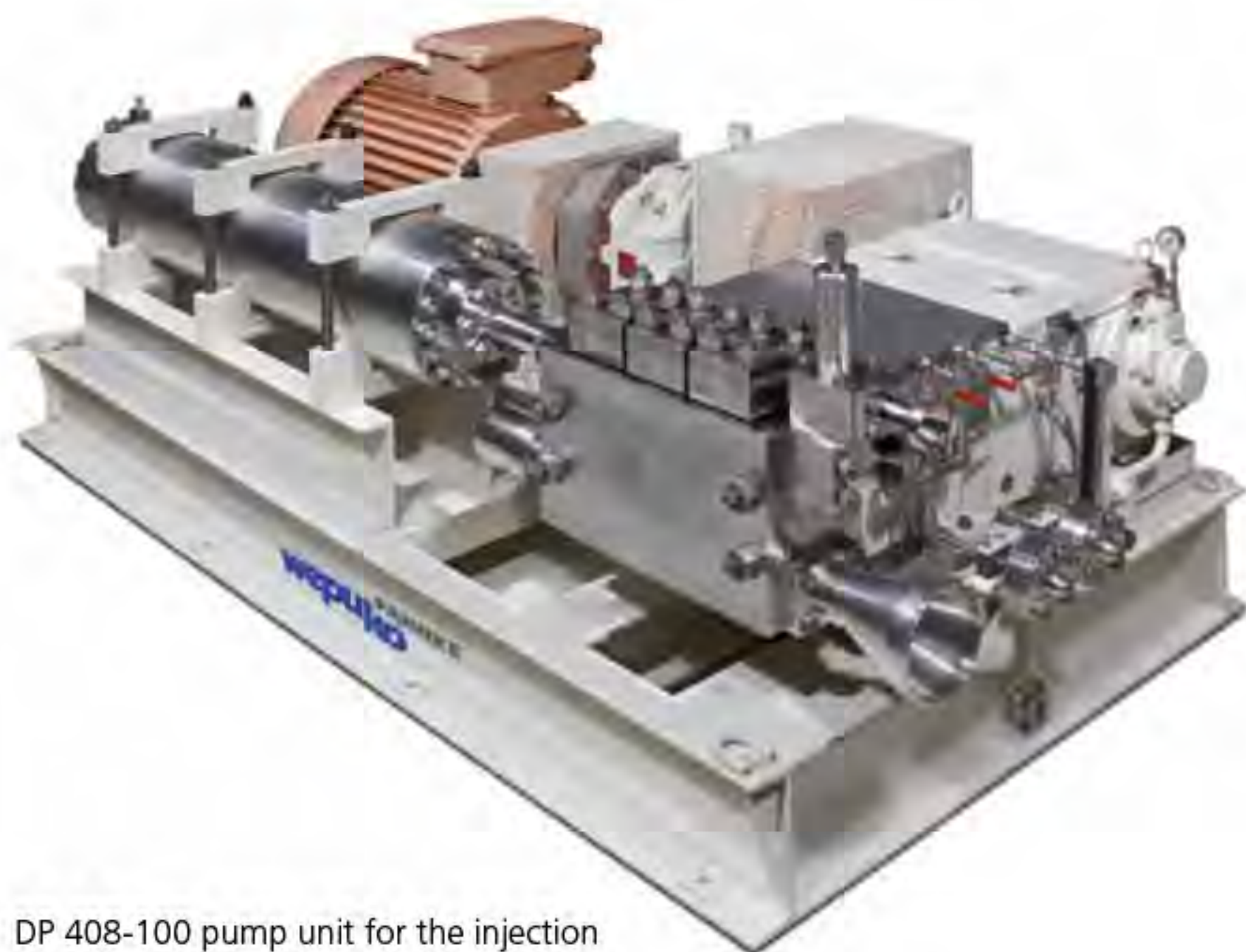


DP 403-035 pump unit in compact design for pumping glycol for gas dehydration.

Boric acid pumps

In nuclear power plants using a pressurized-water reactor, our pumps are used to inject boric acid into the reactor in emergency situations.

High reliability of the equipment is essential for such an application: Should any primary safety systems fail, such as the retraction or hydraulic drive of the control rods, then the pump injects a boron solution into the reactor. The boron, like the control rods, serves to absorb neutrons to stop the chain reaction.



DP 408-100 pump unit for the injection of boric acid. This unit is employed at the nuclear power plant Leningrad 2.

Boiler feed water pumps

Our plunger pumps are used in conventional power plants as primary pumps and as emergency backup feed water pumps. In smaller scale solar power plants they are installed as feed water and recirculation condensate pumps. Temperatures in these applications reach up to 270 °C, placing high demands on the material, seals and connecting elements.

Aside from the classical use as boiler feed water pumps, our pumps are used for other related applications such as enhanced oil recovery, for example. This is where various gas types are injected in order to force the oil to the surface and to minimize the viscosity of the crude oil.



DP 207 boiler feed water pump unit.

CO₂ applications

In the food industry, our plunger pumps are used for high-pressure extraction using supercritical carbon dioxide (CO₂). This carbon dioxide is used as a solvent that does not harm the product nor burdens the environment.

Environmental requirements in the refinery and power plant industry are becoming more stringent, making the compression of CO₂ increasingly more attractive.



DP 212 pump unit used for extraction applications with supercritical CO₂.

Cryotechnology

In cooperation with the low temperature specialist KRYTEM, we manufacture high-pressure plunger pumps for cryogenic liquids. The particular challenge in this technology is the selection of the materials for the components getting in contact with the fluid at -196 °C.



Pump unit for cryotechnology, developed in cooperation with KRYTEM.

Other applications

Have we not mentioned your application? There are many, many other applications for our process pumps other than those presented here. We would be happy to advise you!

Supported by:

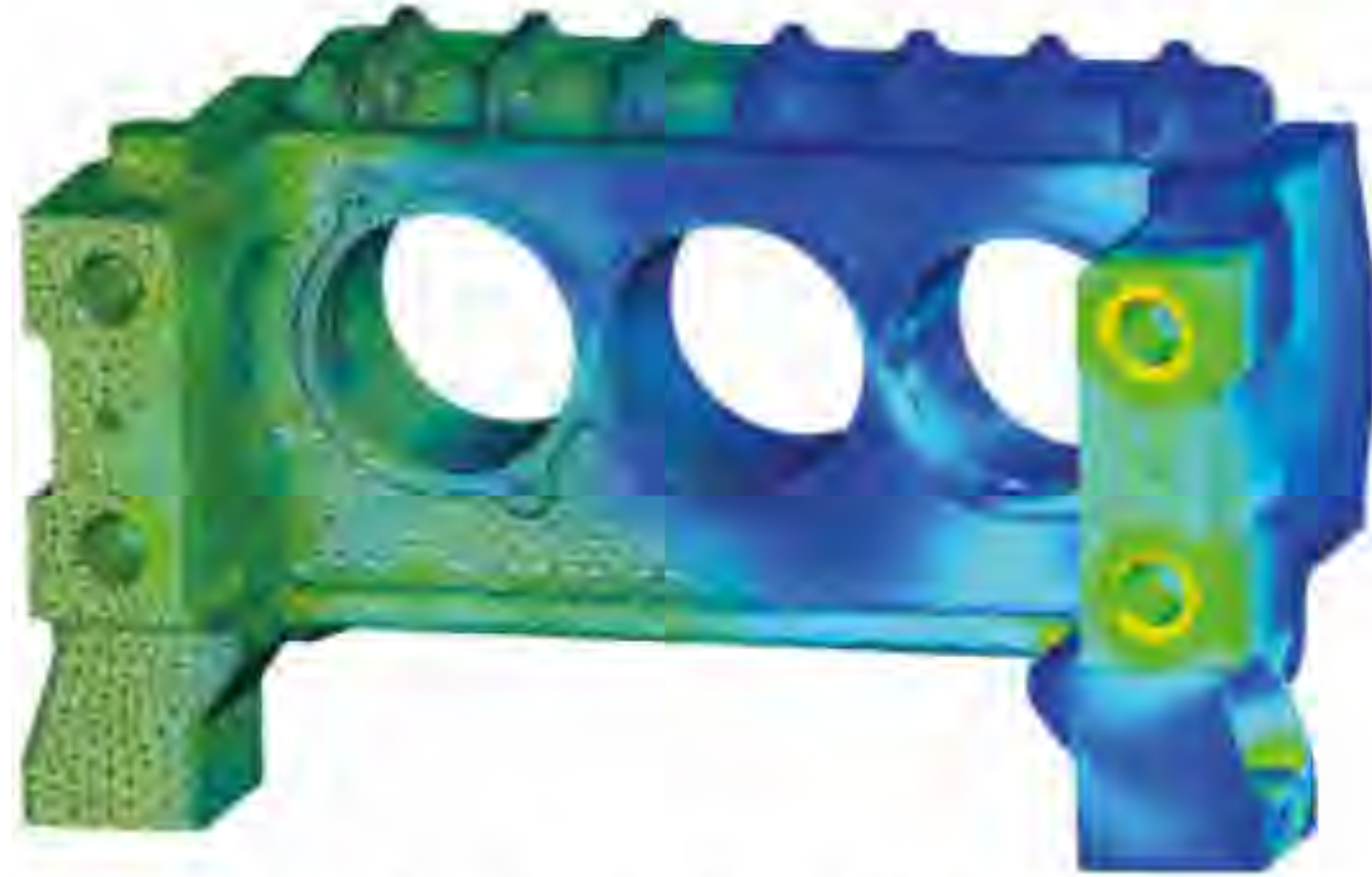


Federal Ministry
for Economic Affairs
and Energy

on the basis of a decision
by the German Bundestag

→ Close to the market: Research and development

What does the market need? This question excites the developers at Wepuko PAHNKE. Their work involves creating solutions for special customer requirements and opening up new fields of application. Research and development, design and the entire production are located in Metzingen. This means all our competency is consolidated on one site.



Modern simulation tools such as FEM and CFD support the design process at Wepuko PAHNKE.

Innovation on-site

Research and development is of high priority for us. This is the only way to achieve our goal: reliable, sturdy and precise machinery.

Wepuko PAHNKE GmbH combines the knowledge and experience of two great companies: the history of Wepuko with over 80 years of experience with high-pressure plunger pumps and the history of PAHNKE Engineering with over 40 years of experience with hydraulic forging presses. The development team also benefits from the short and quick communication channels at the headquarters, when dealing with the challenges of tomorrow.

Presses and pumps are developed separately due to their product-specific properties. Nevertheless we focus on an intensive exchange of ideas and concepts between the departments. The result: coherent, optimized solutions for our customers.

All of our tests and development take place on our site in Metzingen. This is how we protect our unique knowledge and save time.

Quality standards

Our presses and pumps fulfill extreme requirements when it comes to load capacity and reliability. Many of our products are custom-made, designed precisely to fit the requirements of the customer.

For our prototypes and small series the planning and simulation phase is key. At Wepuko PAHNKE, we constantly reinvent our products for the needs of our customers.

Even small changes, for example in the dimensions, often have major effects on the occurring forces and material stresses. With fluid flow in complex geometries, avoiding cavitation is essential.

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Our test bench subjects the end product to an extensive test procedure allowing us to guarantee the requested product properties and total customer satisfaction.

We perform under high pressure... and we perform peerlessly!

There's no one like us! Wepuko PAHNKE is the merger of two market leading, traditional companies: Wepuko, the specialist for high-pressure pumps and PAHNKE the pioneer in the field of hydraulic forging presses. This mixture makes us unique and gives us significant advantages over the competition.



Wepuko PAHNKE GmbH in Metzingen, Germany.

Wepuko PAHNKE is a German mechanical and systems engineering company, specialized in the design and manufacturing of high-pressure pumps and hydraulic forging presses, including their drives and controls. The company is a global leader in these fields. The range of pumps includes triplex plunger pumps and radial piston pumps with variable and constant displacement. Wepuko PAHNKE also develops and builds units and systems according to customer specifications. Furthermore, the company offers complete descaling systems.

Our solutions can be found in the oil and gas industry, chemical plants, power plants, heavy industry, steel mills and many other applications. Customers include: Otto Fuchs and Citic Heavy Industries in the Hydraulic Forging Presses and Oil Hydraulics sectors, SMS Meer, Vallourec & Mannesmann, Robert Bosch and ArcelorMittal in the Water Hydraulics sector and Shell, Petrobras, Petronas, Statoil, Gaz de France and Hyundai Heavy Industries in the Process Pumps sector.

The company was founded in 1932 by Fritz Thumm in Metzingen, South-West Germany. One of the company's many innovations was the introduction of large radial piston pumps with a very flexible control system and rapid flow direction reversal (1966).

After the takeover of Wepuko by the Pahnke family in 1996, the company was able to introduce the know-how of Hans-Joachim Pahnke and his son Michael Pahnke, both pioneers in the field of open die forging presses. The outstanding innovations that Hans-Joachim Pahnke developed, include the first underfloor open die forging press featuring a two-pillar design (1956) and the **PAHNKE Modified Sinusoidal Direct drive (PMSD drive)** in 1975. The largest hydraulic system in the world went into operation at Norheinco in China in 2009, and the world's strongest open die forging press by PAHNKE went into operation in 2011 at Citic Heavy Industries in China. Both using a Wepuko PAHNKE PMSD drive.

Today, the company is managed by Tanja Pahnke and remains a strong innovator in its fields. The Wepuko PAHNKE group includes companies in the USA, China and Russia. Wepuko PAHNKE also has a global presence with representatives in more than 70 countries.

Milestones

- | | |
|-------------|---|
| 1932 | Wepuko founded in Metzingen by Fritz Thumm |
| 1973 | PAHNKE Engineering is founded in Düsseldorf by Hans-Joachim Pahnke, Fritz Thumm Jr. and Eric Koik |
| 1996 | Wepuko is taken over by the Pahnke family |
| 2002 | The products of the two companies are consolidated into one company |
| 2011 | Renamed to Wepuko PAHNKE |

At home the world over: with our representatives in more than 70 countries



Process
Pumps



Hydraulic
Forging
Presses



Oil
Hydraulics



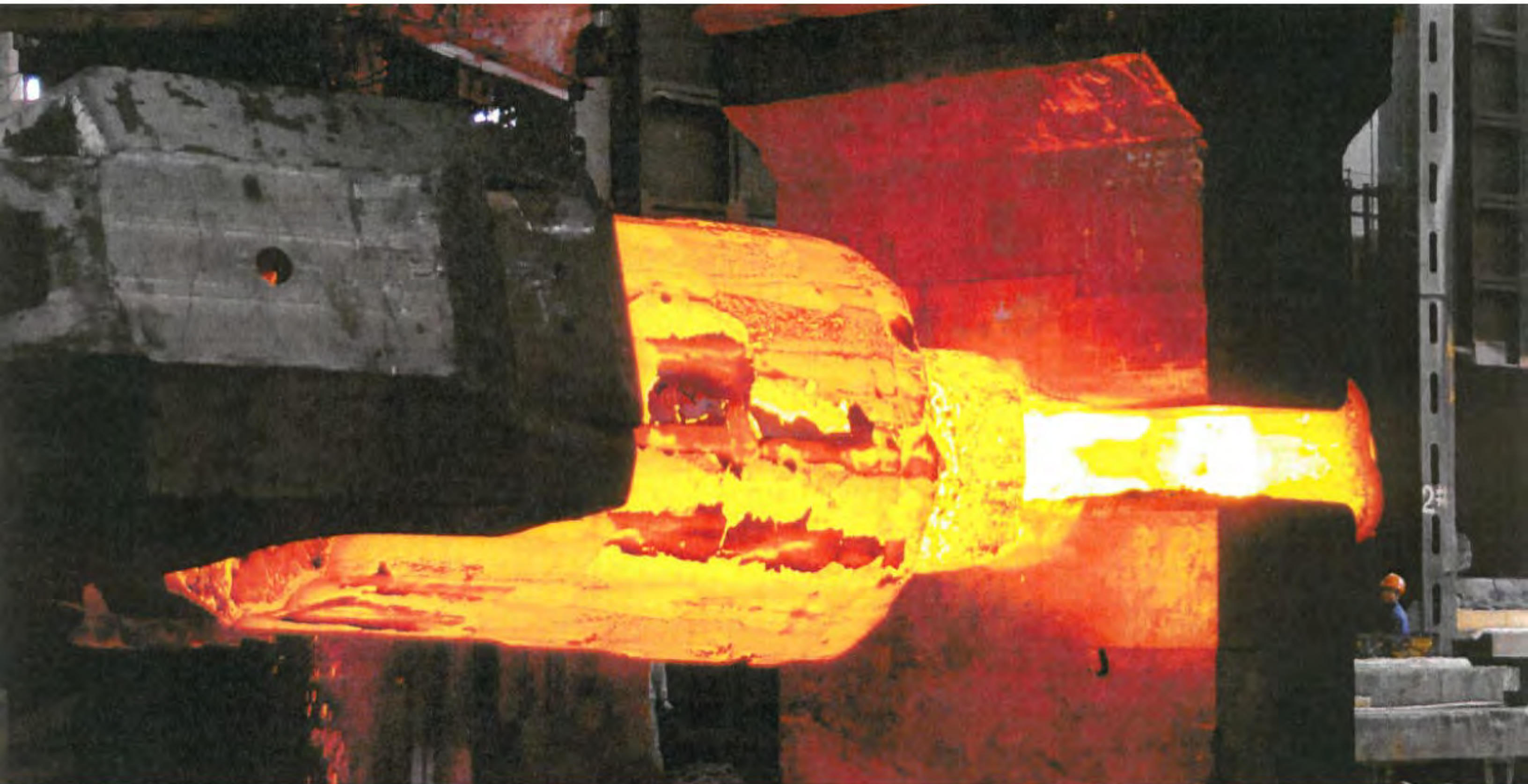
Water
Hydraulics



Service



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Hydraulic Forging Presses

Products
Industries
Applications
Modernization



Contents

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12	Industries Steel industry Titanium alloys and superalloys Light metal industry
14	Applications Bar steel and plate slabs Rollers and shafts Rings, discs, and special shapes Large die-forged parts Valve bodies
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www.wepuko.com

Follow this link to get more detailed information on the solutions and products of Wepuko PAHNKE.

Dear Reader,

For over 40 years, the name PAHNKE has been known worldwide for the most modern, productive, and high-quality hydraulic forging presses. Early on, Hans-Joachim Pahnke, the father of Michael Pahnke, developed revolutionary new concepts for the construction of open die forging presses. In 1956, he built the first two-column pull-down press for open die forging. His idea was soon imitated by other large press manufacturers all over the world.



1956: The first open die forging press with 10 MN press force built under the direction of Hans-Joachim Pahnke. A pull-down design with Z-shaped cross-heads.

During the 1960s, Hans-Joachim Pahnke improved his presses with a completely novel frame concept. The principles of this ingenious construction are still being used by all well-known press manufacturers today – and (of course) by us as well! We pursue this with absolute determination, as only in this way can we achieve highest product precision, maximum machine working life, and thus the best cost-benefit ratio for the user.



1976: The first PAHNKE press with the first PAHNKE Modified Sinusoidal Direct drive (PMSD drive). The press force of the pull-down open die press is 5 MN.

In 1996, the Pahnke family took over Wepuko Hydraulik, the supplier of the excellent radial piston pumps for the PMSD drive. In 2002, PAHNKE's press construction merged with the pump business of Wepuko.

It fills us with pride that we have been able to successfully continue the tradition and worldwide recognition for PAHNKE products created by Hans-Joachim Pahnke and his son Michael Pahnke.



2017: A 31,5-38 MN pull-down open die forging press from PAHNKE at CHW Forge in India. The press features a PMSD drive with 6 RX pumps.

Quality is strength: Hydraulic Forging Presses

At our company developers and engineers work together in interdisciplinary teams including mechanical, hydraulic and electronic experts. This ensures well thought-out, harmonious overall concepts for the main and ancillary units of our forging plants.



At 185 MN, this open die forging press in use at CITIC Heavy Industries, China, is the world's most powerful press of its type (Design: two columns, push-down)



Open die forging presses

Our scope of supply includes all presses and manipulators for the open die forging industry, with modern hydraulic drives and electronic control systems for automatic and programmed working between 5 MN and 185 MN.

For the open die forging industry we plan complete systems. We check and organize forging programs, select the required machines, calculate production time and costs, and provide economic viability calculations.



The new, quick-action open die forging press at OTTO FUCHS KG, Meinerzhagen, Germany, mainly forges products for aerospace applications and plant construction. The press force amounts to 30/36 MN. The press uses the **PAHNKE Modified Sinusoidal Direct drive (PMSD drive)** and was constructed in a two-column design.



Forging of titanium and super alloys is very demanding. Baoti in China uses the world's most powerful and fastest open die forging press in the titanium industry made by PAHNKE (80/100 MN press force, two columns, pull-down design). It's PMSD drive, highly intelligent control systems and sophisticated design secure Baoti's leading position.

Closed die forging presses

We plan, develop, and design every closed die press according to the individual specifications and requirements of our customers. Our experience ranges from 20 MN to 350 MN press force, from a precisely regulated creep speed (0.1 mm/s) to press speeds of 100 mm/s, from hot-isothermically pressed nickel alloys to meter-long aluminum parts for wide-bodied aircraft.



This high-performance closed die press with a press force of 300/350 MN is in use at Weber Metals, Inc., in the United States.



A typical product of a closed die press is this frame structure.



This closed die 110 MN press is located at Weber Metals, Inc., in the United States.

Special presses

PAHNKE special presses can be used for a wide variety of applications. They are used not only for serial production, but also for the creation of prototypes and research.

Some examples of special presses are:

- Piercing presses
- Steel extrusion presses
- Bending presses
- Straightening presses
- Multi-purpose presses
- Multi-cylinder presses
- Wheel presses
- Try-out presses

All presses can be equipped with manipulators for automation.

An important area of application is the manufacturing of high-pressure valve bodies for the gas-chemical and petrochemical industries, as well as parts for aerospace applications. Special presses are absolutely vital for the economic manufacturing of these components. Recesses and cavities can be pressed directly. This reduces the time in which the workpiece must be kept at the right temperature and uses less material.

One of our special presses is in use at the Technische Universität Freiberg (Technical University of Freiberg). Its versatile application in various material-forming methods makes it unique in the world.

In the area of massive forming:

- Open die forging
- Closed die forging
- Thixo forming
- Hot extrusion
- Cold extrusion
- Powder forming
- Hammer forging (drop hammer)

In the area of plate forming:

- Deep-drawing
- Press hardening
- Interior pressure forming



An example from the portfolio of Wepuko PAHNKE is this 20 MN multi-function press with force levels of 15 and 6 MN with installed isothermal forging tools.



This 200 MN multi-cylinder press manufactures forged valve bodies for use in the oil & gas industry.



This particularly versatile 10 MN multi-function press is used at the Technische Universität Freiberg.

Oil hydraulic drives for forging presses

Based on designs by Hans-Joachim Pahnke, PAHNKE Engineering developed the **PAHNKE Modified Sinusoidal Direct drive (PMSD drive)** especially for oil hydraulic press drives.

This drive does not need any valves for the control of the press movement, but uses Wepuko's quickly-controllable RX series high-pressure pumps to determine the press force, forming speed, and direction of movement of the press.



PAHNKE Modified Sinusoidal Direct drive

Wepuko PAHNKE radial piston pumps are the core element of a PMSD drive.

What's special about the PMSD drive:

- Particularly quiet running (shock-free)
- Extremely high reliability (at least 30,000, but in some cases even well over 50,000 operating hours without repair)
- Energy savings of more than 60 % in comparison to water hydraulic drives and between 20 and 30 % in comparison to other oil hydraulic drives.

Based on this drive, we have also designed the 42-pump PMSD drive (RX 500), the most powerful hydraulic plant in the world. With 30 MW installed power, it operates a 360 MN steel extrusion press and a 150 MN preforming press for Norheingo, China.



Part of the 20-pump PMSD drive (RX 500) of a 185 MN press.



16-pump PMSD drive (RX 500) of an 80/100 MN press.

Water hydraulic drives for forging presses

For over 50 years, we have had both oil and water hydraulics in our product range. This differentiates us from most of our competitors. Our dual-track strategy has long proven to be a great advantage – both for us and our customers.

What's special about water hydraulic drives for forging presses:

- Extremely environmentally friendly
- Water is not flammable
- Water is practically unlimited in its availability and thus an affordable medium
- Water drives continue to be widespread in the modernization of press plants

You can rely on this: our consulting is always system-neutral – we focus only on your success.

Only practical experience can determine which hydraulic variant is the best for you.



Pump assembly for the drive of an open die press. Pump type Wepuko PAHNKE DP 212.



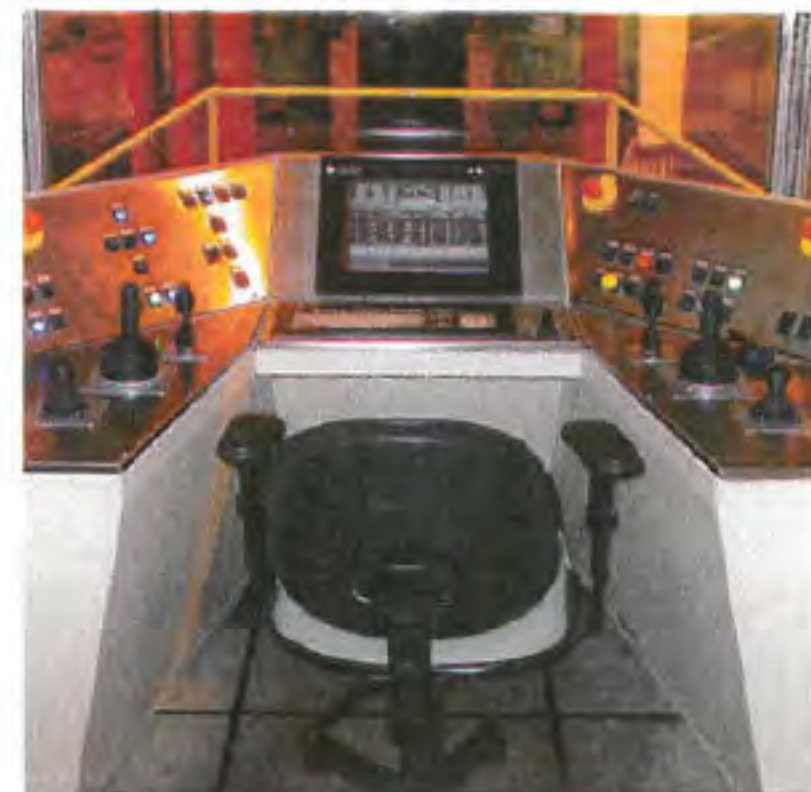
This Wepuko PAHNKE water hydraulic press drive is used at OFAR in Italy.

Press control systems

Our electronic press control systems are available for press plants, including those with integrated forging manipulators. The control systems, which we develop ourselves, are state-of-the-art (on a PLC basis). Features include: programmed forging, storage of QA data, PC-supported maintenance and system optimization.

We plan, develop, and supply:

- Simple, manual, or semi-automatic control systems
- Complex, fully automatic open and closed loop control systems
- Systems for the intelligent monitoring of machines and hydraulic plants
- Diagnostic systems with icons or plain-text messages
- Recording and processing of process data, operating data, and machine data



This is the control console of a 30 MN open die press in Brazil.



Control room for a 360 MN steel extrusion press and a 150 MN preforming press.

Forging manipulators

Rail-mounted forging manipulators are integrated with the press which creates an efficient plant unit. They enable the fast and precise positioning of the forgings and create the prerequisite for an automatic procedure with repeatable processes.

Our manipulators are also suited as guiding machines for the forging of heavy workpieces with crane support.



Wepuko PAHNKE forging manipulators enable the fast and precise positioning of heavy workpieces.

Ancillary units and accessories

Wepuko PAHNKE also provides many ancillary units and accessories for forging presses from a single source. Examples include forging manipulators, bogie cars, lifting rotary tables, quick-changing tool systems, integrated tool magazines, workpiece centering, tool lubrication, tool cooling, tool heating, tool manipulators, centering devices, and special forging tools.



Quick-changing tool system of an open die forging press.

Accepting challenges: new and further development in all industry sectors

Satisfied customers of PAHNKE forging plants can be found in all sectors of the metal-forming industry. This includes both the production of forging products in ferrous metals and alloys and the processing of non-ferrous metals.





Steel industry

In the steel industry, PAHNKE forging presses process products from simple construction steels to the highest alloyed metals. These products include roller bearing steels, low-temperature steels, heat-resistant steels, and, in particular, corrosion-resistant steels. Many forgings from the steel industry are also used in power plants, ship construction, or on- and offshore applications.



Titanium alloys and superalloys

An important area for forgings processed on hydraulic presses are products made from titanium alloys and super alloys. In the future, this sector will become even more important.

All over the world, numerous manufacturers create products from these materials using PAHNKE forging presses.

PAHNKE hydraulic presses used for production of titanium and super alloy forgings range from 6,3 MN to 100 MN for open die forging and from 20 MN to 500 MN for closed die forging.



Light metal industry

Even in the case of light metals, the properties of forged products, such as those made of aluminum or magnesium and their alloys, are becoming increasingly popular since considerably higher requirements can be met with less material expense.

Here, our forging machines function to some extent as preforming units (open die presses). Most frequently, however, they are used as closed die forging presses for vehicle parts or large forgings for aircraft construction.

➤ Arrowheads and plows: the entire spectrum of metalworking

For thousands of years, forged metal has been used wherever extremely high tensile strength and ductility are required. The speed at which materials and techniques change increases continuously – with hydraulic presses from Wepuko PAHNKE, you are always at the forefront of developments.





Bar steel and plate slabs

The most frequent forged products, both for steel and for non-ferrous metals, are round, square, or rectangular bars. For this purpose, PAHNKE supplies highly efficient, fast, and fully automated forging lines.



Rollers and shafts

For the production of rollers and shafts, the high precision and the fast, shock-free operation of the PAHNKE forging presses are valued features.



Rings, discs, and special shapes

With the PMSD drive, which can be very precisely controlled, rings, discs, and special shapes can be manufactured with ease using both manual and semiautomatic operation.



Large die-forged parts

Large hydraulic closed die forging presses create parts made of aluminum or titanium that are practically ready to install. Products manufactured on our presses are used worldwide in the construction of large aircraft and jet engines.



Valve bodies

Our multi-cylinder presses are specialized for the production of valve bodies, valve blocks, and similar formed steel parts made of high-alloy metals. Customers include the oil & gas industry, particularly for offshore or deep-sea applications.

Creating and preserving value: modernization of plants

Whenever the acquisition of a new plant would not be cost-effective, modernization is a sensible alternative. With modern drives, control systems, and improvements in handling, we convert unprofitable press plants into efficient ones.

Objective

Presses currently in operation often have a service life of more than 30 years. Even if new presses are being built, an old press is rarely scrapped. However, the high standards required in the global marketplace can no longer be achieved with these old presses. This applies to both the products themselves and the production processes, documentation, and certifications.

A number of advantages could make modernization a sensible alternative:

- Increase in the availability of the plant
- Reduction of the non-productive times
- Improvement of the machine parameters
- Reduction of the operating costs
- Reduction of the required workforce
- Possibility of expanding the product range
- Lower maintenance costs, better spare part availability

Wepuko PAHNKE has already performed numerous modernizations with great success for the users. For example: the modernization and expansion of the oil hydraulic drive at a German forge. After modernization the result was a permanently higher availability of about 99 % in regard to the hydraulic plant with a simultaneously lower

energy consumption of 30%. In addition, a higher productivity has been achieved by increasing the output of the plant.

Implementation

With selective modernization measures adapted to each individual case, we increase the efficiency, operating safety and service life of the plants.

For hydraulic forging presses, increasing the pressure to achieve a higher press force can be implemented without a problem in many cases.

By replacing or modifying mechanical parts, more precise, low-maintenance guides can be installed or the service life of cylinder seals can be extended from less than 1 to up to 10 years.

A new, state-of-the-art electronic control system offers not only many varied possibilities for the precise setting of these control systems or for the recording of



This modernized open die press with three cylinders has the following technical data: Press force levels 18 MN (two-cylinder operation) and 27 MN (three-cylinder operation), compressive force: 30 MN, drive 8 x RF 650 radial piston pumps with valve control system.

Our offer

important operating or quality data, but also eliminates the problem of spare parts that are no longer available in this fast moving sector.

By installing remote-controlled tool clamping and changing devices or faster-moving tool tables, we achieve an acceleration of the forging processes.

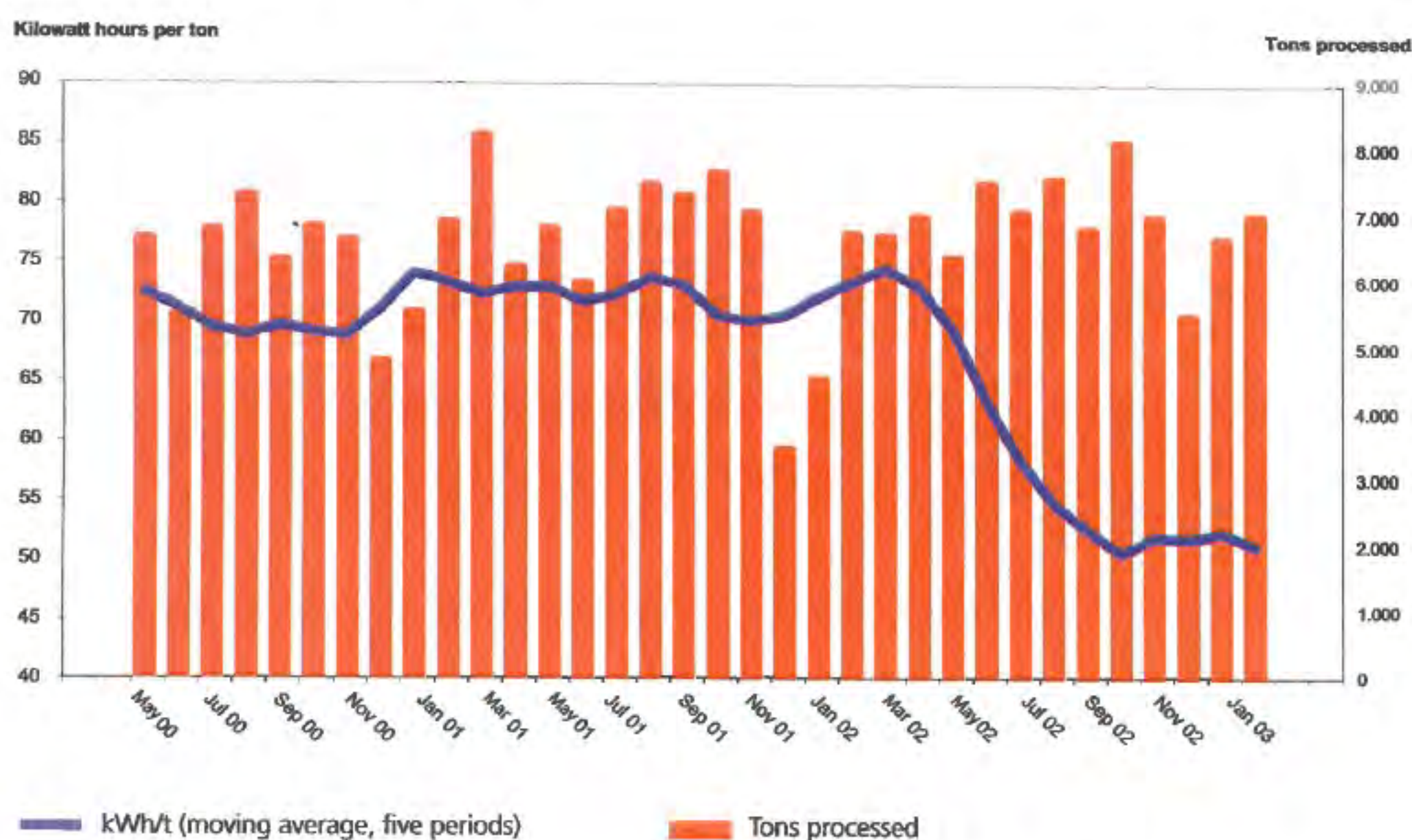
The modernization or expansion of the handling units like forging manipulators or the addition of lifting and rotary tables for the faster handling of forgings can result in a considerable increase in output.

We optimize the machines and plants in the periphery of forging presses, such as ovens, cranes, or tool conveyors.

Does it make more sense to modernize or to invest into new equipment? In an intensive discussion, we analyze the actual condition of your plants and talk about your production objectives. Our experienced experts will tell you which measures are appropriate.



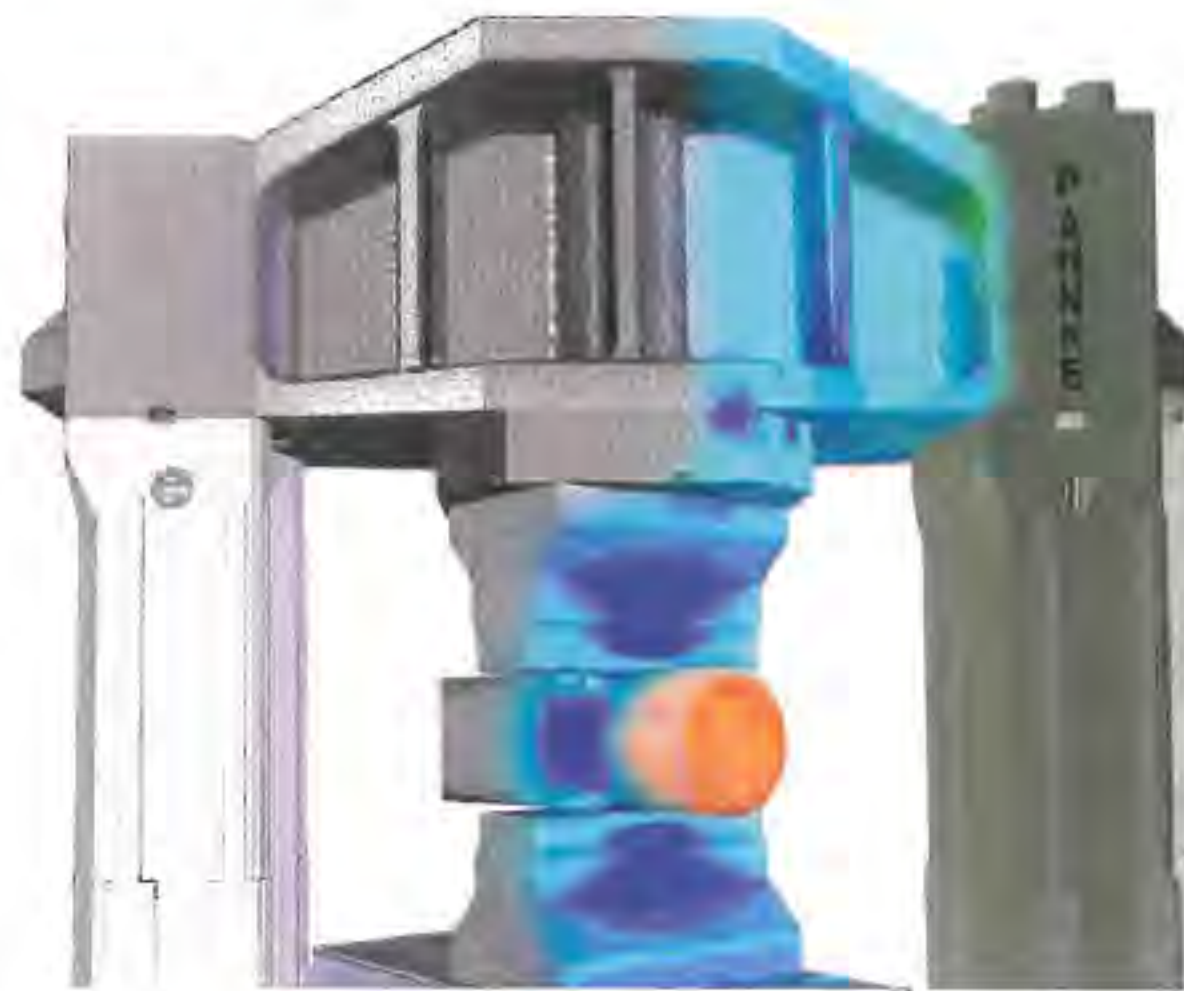
A modern press control system from Wepuko PAHNKE.



Output and energy consumption of a 55 MN open die forging press before and after modernization in 2002.

→ Close to the market: research and development

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Wepuko PAHNKE GmbH in Metzingen, Germany.

Wepuko PAHNKE is a German mechanical and systems engineering company, specialized in the design and manufacturing of high-pressure pumps and hydraulic forging presses, including their drives and controls. The company is a global leader in these fields. The range of pumps includes triplex plunger pumps and radial piston pumps with variable and constant displacement. Wepuko PAHNKE also develops and builds units and systems according to customer specifications. Furthermore, the company offers complete descaling systems.

Our solutions can be found in the oil and gas industry, chemical plants, power plants, heavy industry, steel mills and many other applications. Customers include: Otto Fuchs and Citic Heavy Industries in the Hydraulic Forging Presses and Oil Hydraulics sectors, SMS Meer, Vallourec & Mannesmann, Robert Bosch and ArcelorMittal in the Water Hydraulics sector and Shell, Petrobras, Petronas, Statoil, Gaz de France and Hyundai Heavy Industries in the Process Pumps sector.

The company was founded in 1932 by Fritz Thumm in Metzingen, South-West Germany. One of the company's many innovations was the introduction of large radial piston pumps with a very flexible control system and rapid flow direction reversal (1966).

After the takeover of Wepuko by the Pahnke family in 1996, the company was able to integrate the expertise of Hans-Joachim Pahnke and his son Michael Pahnke, both pioneers in the field of open die forging presses. The outstanding innovations that Hans-Joachim Pahnke developed, include the first underfloor open die forging press featuring a two-column design (1956) and the PAHNKE Modified Sinusoidal Direct drive (PMSD drive) in 1975.

The largest hydraulic system in the world went into operation at Norheimo in China in 2009, and the world's most powerful open die forging press by PAHNKE went into operation in 2011 at Citic Heavy Industries in China. Both using a PMSD drive.

Today, the company is managed by Tanja Pahnke and remains a strong innovator in its fields. The Wepuko PAHNKE group includes companies in the USA, China and Russia. Wepuko PAHNKE also has a global presence with representatives in more than 70 countries.

Milestones

- 1932** Wepuko is founded in Metzingen by Fritz Thumm
- 1973** PAHNKE Engineering is founded in Düsseldorf by Hans-Joachim Pahnke, Fritz Thumm Jr. and Eric Koik
- 1996** Wepuko is taken over by the Pahnke family
- 2002** The products of the two companies are consolidated into one company
- 2011** Renamed to Wepuko PAHNKE

At home the world over: with our representatives in more than 70 countries



Process
Pumps



Hydraulic
Forging
Presses



Oil
Hydraulics



Water
Hydraulics



Service



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