USER INFORMATION 6000325E

KEEP FOR FUTURE USE Rev.A

B.6.15.52

008.430-DP
012.430-DP
018.430-DP

Saturn Piston pumps
– for highly viscous materials

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REGULAR TESTING OF THE APPLIANCES

Test certificate No.	Test date	Person responsible	
		Company	Name

Liquid spray equipment is intended in particular for surfacing (e.g. airless paint spraying equipment, two-component coating equipment).

The operator must ensure that liquid spray equipment is tested for proper operation after an operating pause of more than 6 months, and at least every 12 months by a competent person [1)].

The operator must ensure that the test results are properly recorded in writing for every liquid spray equipment [2)] and kept until the next test.

The operator must ensure that the test certificate is available at the place of use [3)] of the liquid spray equipment.

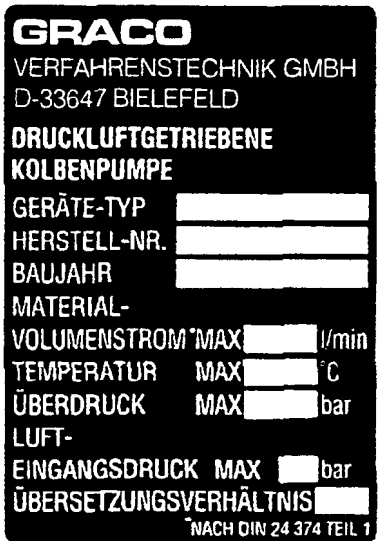
1) A competent person is somebody that has sufficient knowledge in the field of liquid spray equipment based on professional training and experience, and is sufficiently conversant with the relevant national health and safety regulations, accident prevention regulations, recommendations and generally accepted rules and industrial norms to evaluate liquid spray equipment.

2) Written records (test results) can, for example, be in the form of test certificates.

3) At the place of use, a copy of the test certificate or a test stamp on the appliance is considered as in compliance with the requirement.

-Extract from: Working with liquid spraying equipment (VBG 87)
Issued on: 10th October 1993
§ 23 (1), (3) and (4)

Implementation instructions VBG 87
to § 1 Para. 1 and to §23 Para. 1, Para. 3, Para. 4



The original manufacturer's nameplate can be found on the piston pump.

Read and understand the operator manual and the safety instructions before taking the pump into operation

Please compare all specifications and complete, if necessary.
In this manual important information is marked with the following symbols.

Directions involving your safety

Important operational directions

Ensure that all other users know and understand all safety directions.

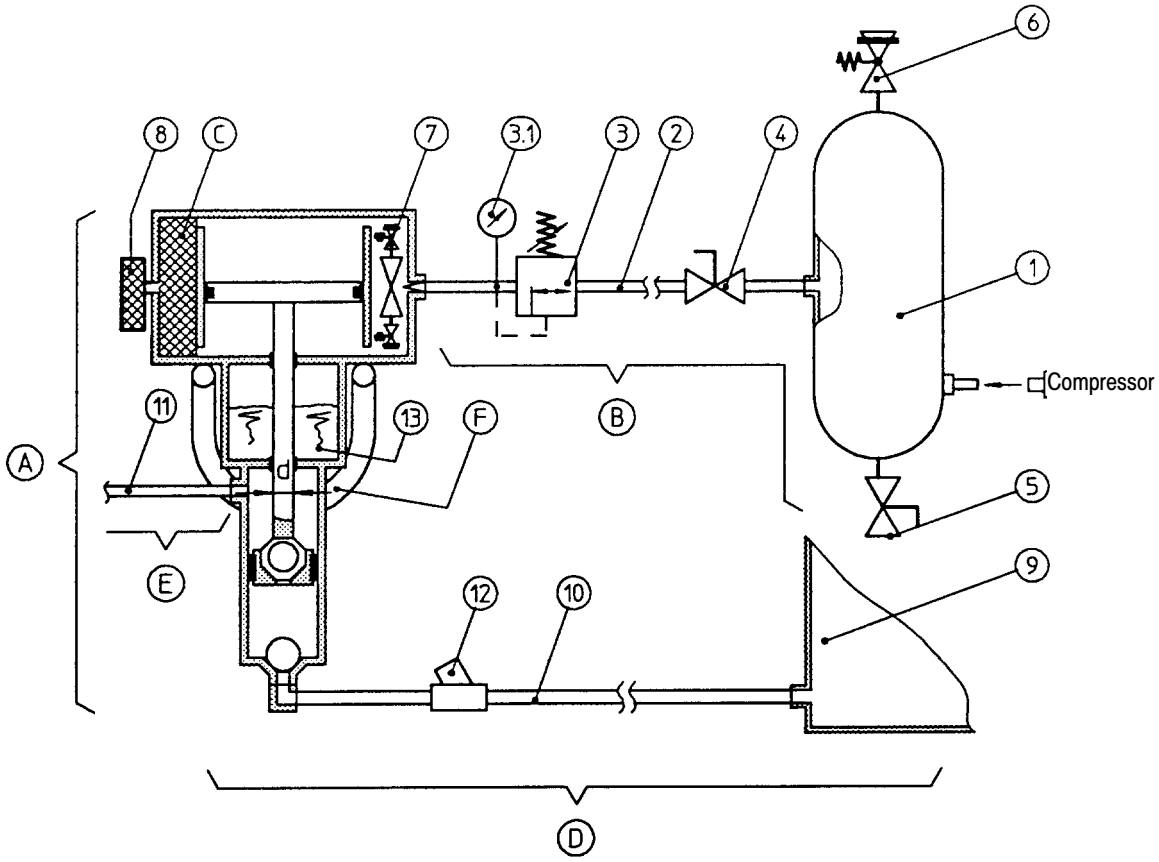
CONTENTS OF USER INFORMATION

CORRECT USE

Model ....430-DP piston pumps are exclusively manufactured for common applications in surfacing technology (to convey coatings or auxiliary agents or for spraying) or similar work.
Any other purpose above and beyond this is considered as incorrect use. We are not liable for any damage or injury resulting from this; the user will bear sole liability in such cases.

Correct use includes following the operating, maintenance and inspection conditions and regulations laid down by us.
Model ....430-DP piston pumps should only be operated, maintained and serviced by personnel familiar with, and trained to recognize its inherent dangers.
The relevant accident prevention regulations as well as safety and medical rules must be respected.
Unilateral changes to the appliance will cause us to waive our responsibility for any damage or injury caused.
The user is responsible for the correct installation of the appliance.

FUNCTIONAL DIAGRAM



A	PISTON PUMPS	D	FLUID SUCTION SYSTEM		
B	COMPRESSED AIR SUPPLY	E	FLUID PRESSURE SYSTEM		
C	AIR EXHAUST SOUND SUPPRESSION	F	APPLIANCE SUPPORT		
1	Compressed air container	5	Ball valve	10	Suction pipe
2	Pipeline or hose	6	Safety valve	11	Pipe / hose line
3	Pressure regulation valve	7	Safety valve	12	Strainer
3.1	Manometer	8	Additional silencer	13	Wet cup
4	Ball valve	9	Fluid container		

DESCRIPTION OF FUNCTIONS

The compressed air ① is supplied to the piston pump Ⓐ from a pressure tank through a tube or hose line ② and a pressure regulation valve ③. The air supply from the pressure tank to the piston pump can be interrupted by the ball valve ④.
The ball valve ⑤ is used to release condense manually (an automatic moisture trap is recommended here).
The safety valve ⑥ protects the pressure tank against inadmissible rises in air pressure (e.g. in the event of heating).
The piston pump also features a safety valve ⑦ (built into the air motor), because it is required and the compressed air supply Ⓑ is usually not installed for the piston pump alone.
During operation, compressed air escapes from the piston pump air motor into the atmosphere through the air exhaust sound absorber Ⓒ. This relieves the pressure.
The fluid (coating or auxiliary agents) is sucked out of a fluid container ⑨ into the piston pump through the suction line ⑩ and pumped under pressure along the pipe / hose line ⑪.
A strainer ⑫ protects the piston pump against foreign bodies that might have accidentally entered the fluid.
A wet cup ⑬ is indispensable for piston pumps of this design. The performance of the piston pump depends on it.

COMPONENT PARTS OF APPLIANCE – IMPORTANT INFORMATION

The following components are required in an operational system:

Ⓐ PISTON PUMP

See "Technical Description of Product B.6.20.89-P-GB", for more detailed information on the functional description of the piston pump.

Ⓑ THE COMPRESSED AIR SUPPLY

The compressed air supply consists of a compressor, a pressure tank with a moisture trap, an optional compressed air drier and a compressed air line.
The user generally provides the compressed air supply.

- If a compressed air supply must be installed the relevant accident prevention regulations, safety rules and user information, in particular information from the compressor manufacturer, must be applied.

There must be a flexible connection between the piston pump and the compressed air line (avoids ruptures caused by vibrations). A hose line is most suitable

- Rated diameter DN16 or more
- Working pressure = max. mains pressure, preferably (16 bar)
- Air and ambient temperatures -20° to +50 °C

Free from any substances that may interfere with paint spraying, like silicon
In areas with a danger of explosion compressed air lines and hose lines must be electrically conductive (- to avoid electrostatic charging).

In most cases, the pressure regulation valve is mounted directly to the piston pump.

- Efficient flow rate
  at 6 bar and 25m/s > 210 m^3/h
- Air inlet pressure 16 bar
- Air and ambient temperatures 0° C to 50° C

The pressure regulation valve can be situated between the hose line and the compressed air line.
The manometer – (3.1 in functional diagram) is negatively affected by the piston pump drive (air motor) as it causes strong pressure fluctuations.

- For that reason a dampened one is used
- Display range 0 to 16 bar

A shut-off mechanism (e.g. a ball valve) should always be installed between the pressure regulation valve and the hose line, or between the hose line and the compressed air line.

- This enables quick and safe switch-off of the piston pump for operational breaks, maintenance work and in cases of errors.
- Do not change the set value of the pressure regulator valve.
  - Rated pressure 25 to 50 bar
  - Material CuZn, nickel-plated

The rule for ball valves: wings transverse to flow direction = line is shut off

When sealing connections do not use PTFE tape hemp (- will result in pressure regulation valve malfunction due to residues from the compressed air supply).

There are no special requirements for the quality of the compressed air supplied to the piston pump.

- Condense and residue oil from the compressor are separated mechanically (pressure tank, compressed air filter)
- Lubrication of compressed air not necessary
- Temperature compressed air < 50°C

In painting processes the compressed air must be free of substances which could lead to the formation of craters (oil, silicone).

- This also applies to component parts of the compressed air supply.

Ⓒ AIR EXHAUST SOUND ABSORBER

The sound emissions of an air powered piston pump is damaging to hearing in the absence of a sound absorber [> 110 dB(A)]. Each piston pump is therefore fitted with an integrated silencer.
As there is a connection between sound absorption and the formation of ice on the piston pump control system, the sound level cannot be reduced with a silencer as much as would be desired [not to 70 dB(A)].

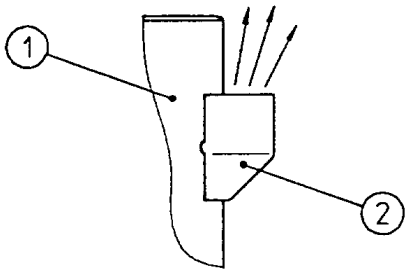
> For detailed information on the sound pressure level in the corresponding section in the "Technical Product Description B.6.15.52-P".

⚠ Do not use the piston pump without the sound absorbing components.

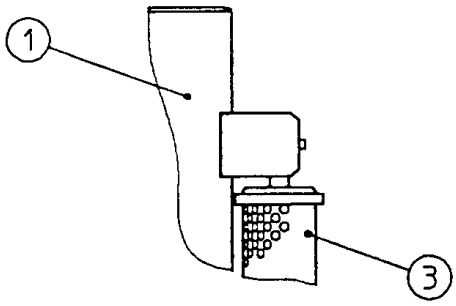
– The decision to wear hearing protection depends on the operating pressure and the resulting sound level.

Special measures are possible to reduce the sound level further.
The piston pump 008.430-DP ① can be fitted with an additional silencer.

Plate silencer
with exhaust air return ②



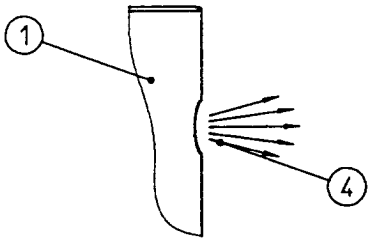
Additional
silencer ③



Do not exceed the stroke frequency of 8 DP/min (DP = double stroke), when an additional silencer ③ is used.

– Icing of the control system

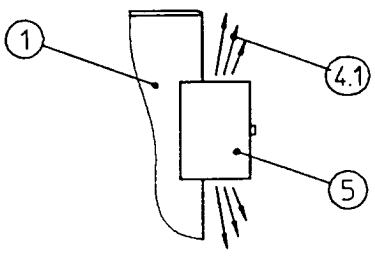
When the piston pump 008.430-DP is operated without an additional silencer, the exhaust outlet is not covered. The exhaust air ④ is discharged directly into the open air.



⚠ When installing this piston pump, ensure that the exhaust is not hazardous to people.

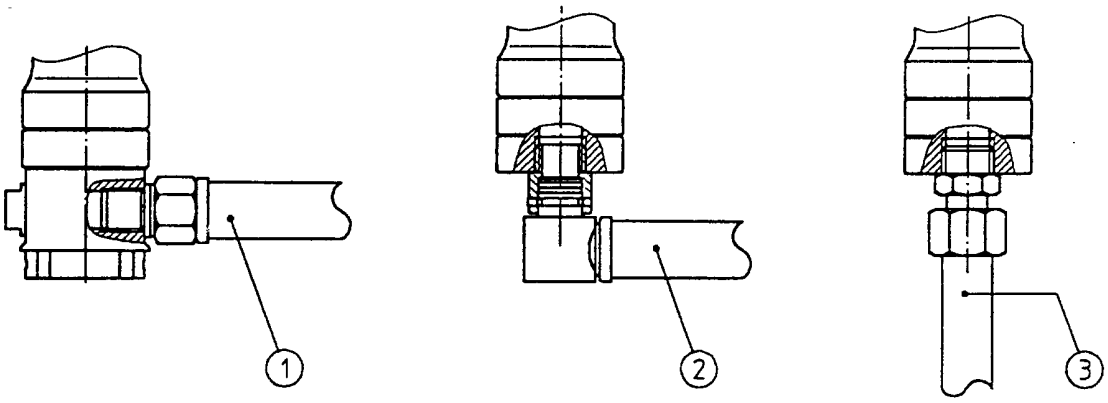
– e.g. with the exhaust opening direct to the wall.

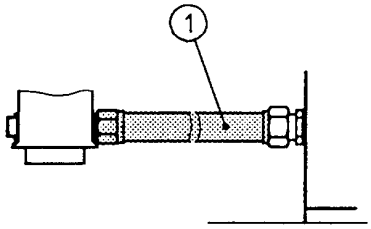
If this cannot be ensured, it is recommended that an exhaust diffuser ⑤ is installed. This weakens the power of the exhaust air (4.1) while it is directed into a direction that poses no dangers.



Ⓓ FLUID SUCTION SYSTEM

The suction connector of the Model ....430-DP piston pump is designed to enable the mounting of a suction line for installations ①, a pivoting suction line ② for containers or a threaded line for a suction tube ③.





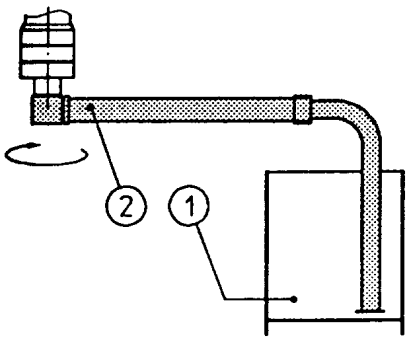
Most of the piston pumps are equipped with a suction line for systems.
The connection between the piston pump ↔ fluid circulating line or piston pump ↔ pressure tank must be flexible.
(- to avoid rupture caused by vibration).

The diameter of the suction line is designed to enable suction of fluids with a kinematic viscosity of up to 1000 mm^2/s (cSt) by the piston pump without difficulty.
A higher viscosity rating can result in reduced suction performance, or even interrupted suction, that can be identified by an increasing pressure drop during the change of direction (pulsating pressure).

– Measures for improvement are:
  keeping the suction hose as short as possible, a short suction hose with a larger diameter.

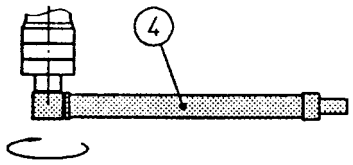
Specifications of the suction line:

- Electrically conductive, maximum permissible resistance $3 \bullet 10^4\ \Omega$/m (tested to ISO 8031) or leakage resistance to earth $< 10^6\ \Omega$.
  (- Suitable for use in locations with explosion hazards.)
- The individual parts of the suction system are designed to withstand an excess pressure of 8 bar
  (- Suitable for suction heights of up to 7.8 m).
- The suction hose and the wetted parts are resistant to solvents commonly used in surface coating, and silicone-free.
- Minimum rated width DN40
- Fluid temperature 10 °C to 85 °C



If the fluid is sucked from a vessel ① (e.g. a 200 l barrel), the piston pump should be fitted with a suction system ② (connector, suction hose, line and strainer).
The flexibility of the suction hose is increased by the pivoted suction fitting, so an emptied cask will not be turned over by the recoil force of the suction hose.
The mesh width of the strainer is 2 mm.

The ratings of the suction system correspond with those of the suction line for devices.



It is also possible to install a flexible suction line for devices ④ in the suction connector for a pivoting suction system. This allows alignment to the fluid container.

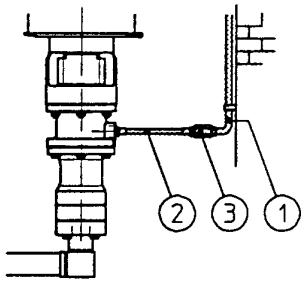
The ratings must correspond with those of the suction equipment.

⚠ The inlet pressure (pressure in a supply system, e.g. in the circulatory line), acting on the piston pump and the suction line must not exceed 8 bar.

Follow the manufacturer's instructions when assembling threaded line connections with suction tubes.

Ⓔ FLUID PRESSURE SYSTEM

In most cases, the fluid pressure connector at the piston pump will be connected to a tube ①. The connection must be flexible (- to avoid rupture caused by vibration).



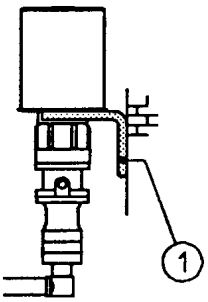
The ratings for the flexible pressure line ② are as follows:

- Working pressure (max. permissible working pressure (piston pump).
- Operating temperature 10°C to 90 °C
- For areas with explosion hazard: Electrically conductive (leakage resistance to earth > $10^6\Omega$)
- The following applies with regard to surface coating : resistant to normal solvents and silicone-free.

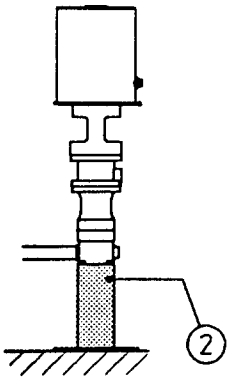
⚠ In a large fluid pressure system and in cases where the pressure system is influenced by heat (sun, heating systems, etc.) it is necessary to fit a suitable non-return valve ⑦ between the tube and the flexible pressure line (- to prevent damage caused by heat expansion).

Ⓕ APPLIANCE SUPPORT

The Model ....430-DP piston pump supports are a steel frame and the column.



The majority of piston pumps are secured to the wall of a building or a steel frame by a pipe bracket ① When dowels are used to secure a pump to a wall, the bore holes and the length of the screws must be in accordance with the manufacturer's instructions. When we have supplied the dowels and screws, they meet the specifications Technical Product Description B.17.90.01-P.



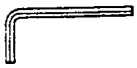
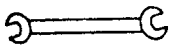
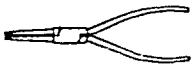
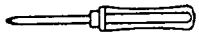
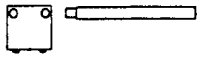
If no suitable support wall is available to which the piston can be secured, it can be mounted on a column ②. Please ensure that the mounting surface is stable and, if possible, does not incline.

⚠ Piston pumps on columns should not be installed standing free; they must be secured to the floor.

When the dowels and screws have been supplied by us, the following specifications apply:

- Drill diameter: 18 mm
- min. drill hole depth: 100 mm

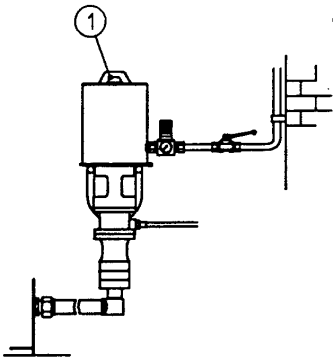
LIST OF TOOLS

Piston pump	 Allen Screw DIN 911	 Open-ended spanner DIN 895	 Pliers DIN 5256-D	 Phillips screwdriver DIN 5262	 Double-head wrench Part No. 70603 024001
008.430-DP	SW 3, SW 4, SW 5, SW 7, SW 10, SW 17	SW 10, SW 13 SW 19, SW 30, SW 36, SW 41, SW 55	for retaining ring Ø 19 to Ø 60	Gr. 2 (for M4 thread)	Special tool
012.430-DP 018.430-DP	SW 4, SW 5, SW 10				

Open-ended spanner DIN 895
SW 55/60 threaded tube G 1 1/2 (fluid suction system)

INSTALLATION

INSTALLATION AND MOUNTING



⚠ If a lifting appliance is used when installing the piston pump, ensure that the load is at no time transported over people's heads.
The lifting lug ① (Part No. 77251 108001) can be used as a transportation device. Never use standard commercially available eyebolts.
Install or fit the piston pumps in a vertical position.

- The installation surface or wall should be level and be able to hold the weight.
- Plugs and mounting hardware must have correct dimensions

Do not install in narrow, enclosed spaces like cabinets (- danger of malfunction due to icing of the air motor control). When the pump is installed in areas with explosion hazard, Zone 1, the guidelines for explosion prevention (EX-RL) ZH 1/10 (section E2) must be met regarding assembly aids.
Do not install piston pumps in zone 0 locations (containers).

VENTILATION OF THE WORK AREA

Must be provided.

GROUNDING

In areas with an explosion hazard, the appliances must be grounded.

– In accordance with the directive on "Static Electricity" ZH 1/200, the following applies:

The grounding connection must be mechanically resistant and corrosion-proof to withstand all conditions to which it may be subjected during operation. The conductors that establish the grounding should be connected to appliances and the earth by soldering, welding or stable screw fittings. Do not use chains. When making connections or during repair work, in particular to pipelines, ensure that the conductive path is not interrupted.

A qualified engineer must test the grounding connection for correct working conditions.

– Grounding points on the appliances are appropriately marked: ⏚

Movable, conducting vessels or appliances that could store an electric charge should also be grounded. This is usually achieved with a flexible connection that is secured, for example, with a clip.

– Chains may not be used.

COMPRESSED AIR SUPPLY

The compressor and compressed air storage container (pressure tank) must have adequate dimensions.

– Check
– See also page 4, "Quality of Compressed Air"

CONNECTIONS

Compressed air line ↔ to piston pump, suction line ↔ to piston pump, pressure line ↔ to piston pump flexible and electrically conductive in areas with an explosion hazard,

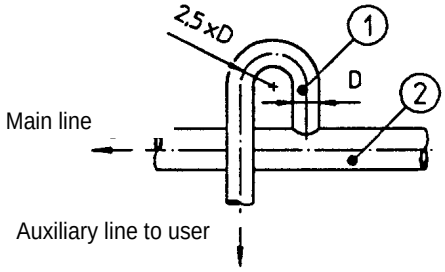
– See pages 3, 6 and 7

COMPRESSED AIR LINE

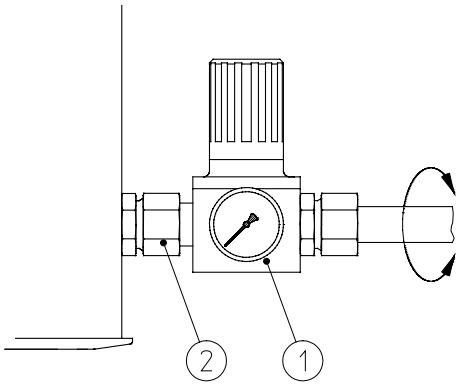
If a compressed air line must be laid, it must have a gradient of 3 to 5 mm per meter down to the compressed air tank or the moisture trap. If a branch line ① has to be made from an existing compressed air line ②, this should be carried out above the level of the pipe axis.

In the case of bends in metal air pipes these should be selected with a bend radius of the pipe axis not smaller than 2.5 x the pipe outside diameter.

– Plastic pipelines in areas with an explosion hazard must have a conducting resistance to earth of < 10^6 Ω.



COMPRESSED AIR CONTROL VALVE (PRESSURE REGULATION VALVE), MANOMETER AND BALL VALVE



See pages 3 and 4

If the pressure regulation valve ① is fitted to the piston pump it can be adjusted for easier reading of the manometer.

- Loosen union nut ②
- Adjust pressure regulation valve
- Tighten union nut

SILENCER

See page 5

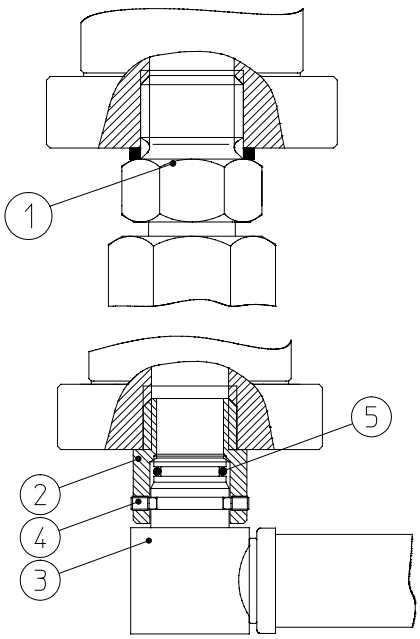
Check the mounting of the additional silencer.

FLUID SUCTION SYSTEM

see page 6

Wall-mounted piston pumps have been fitted with a threaded suction connector. This allows the mounting of a commercially available threaded line ①.

- Follow the manufacturer's instructions when assembling threaded connections.



A connector ② is screwed into the suction connector to connect a pivoting suction appliance (suction line for systems).

When the suction appliance (suction line) ③ is to be expanded, the threaded pins ④ should be backed out as far as possible until the suction appliance can be pulled out from underneath easily.

Do not damage the O-ring ⑤ Part No. 74186 056020 !

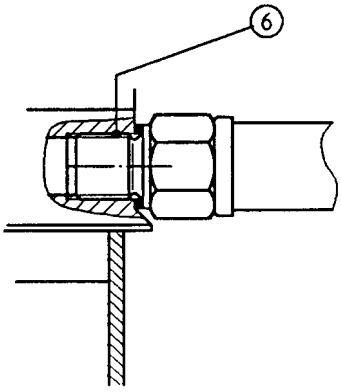
Check the O-ring for wear or damage before re-assembly and replace, if necessary.

Ensure that the threaded pins do not protrude into the mounting area when screwing in the suction appliance (suction line).

- When the O-ring is damaged, the piston pump may run unevenly and there may be considerable pressure variations.

Insert the suction appliance into the suction connection if the piston pump up to the connector stops and screws in the threaded pins.

- Do not tighten!



If the column-mounted model of the piston pump is used, the suction line for the system is screwed into threaded connector on the side ⑥.

The suction line can be mounted on either side of the piston pump.

The unused connector on the opposite side must be closed with the supplied cap screw.

FLUID PRESSURE SYSTEM

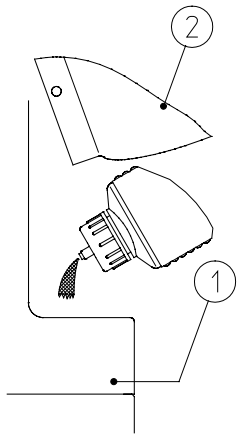
See page 7

GENERAL ASSEMBLY INSTRUCTIONS

- Always use recommended torque.
- Grease thread lightly.
- Do not use PTFE tape or hemp.
- Components not supplied by us must have dimensions that correspond to the given dimensions of the piston pump.
  - Follow the manufacturer's instructions
- Follow manufacturer's assembly instructions when using cutting rings or double conical rings.
- The parts in contact with the fluid in the suction and pressure system should not have a zinc-plated surface nor be made of aluminum if liquids are to be pumped which contain chlorinated hydrocarbons, e.g. trichloro-ethane or methylene chloride.
  - Metal organic reactions that can be explosive and extremely caustic may occur.

START-UP

FILLING THE WET CUP



Fill the wet cup ① with approx.100 cm^3 of flushing agent; fill with oil when the piston pump requires oil. Remove the casing ② temporarily to facilitate access.

Do not operate the piston pump without the casing.

Any detergent used must be compatible with materials to be used later; we recommend consulting your material supplier.

FLUSH THE PISTON PUMP

Each piston pump is tested in the works after assembly using an anti-corrosion liquid. It is necessary to flush out the rest of this liquid and any other contaminants that might have entered during installation thoroughly with detergent (flushing agent).
After flushing, the solvent must be removed thoroughly from the equipment (- tough not from the wet cup) This is done by air-drying.

– Air inlet pressure < 1 bar.

START-UP OF APPLIANCE / SYSTEM

Because the piston pump air motor works automatically with back pressure, it can only be started (i.e. fluid be supplied) when fluid is discharged from the pressure system, e.g. by using a spraying equipment.

Preparations

Ensure that the compressed air supply to the piston is shut off.

- Close the air motor pressure regulation valve; to do this, turn the adjustment cap anti-clockwise to its stop.

Ensure free fluid in the pressure system.

- Open all shut-off devices in the fluid pressure system.

Release the compressed air supply to the pressure regulation valve.

- Stop ball valve handle parallel to compressed air pipe
- Open ball valve in compressed air line.

BLEEDING THE APPLIANCE/SYSTEM

Any air remaining in the piston pump or the system must be removed completely.
Ensure that the material supply (suction line) is shut off.
Open the pressure regulation valve enough to ensure that the piston pump starts running slowly (air pressure approx. 0.5 bar).

- Operate the piston pump with low working pressure, until no more air is pumped.

ADJUST (SET) THE PACKING

Increase the fluid pressure slowly to the maximum level.
Operate the piston pump at this pressure for a short time.
Then set the required operating pressure.

- Appliance /system is ready for operation.
- After a week in operation, the upper packing must be re-tightened. See Maintenance, inspection and repair.

RETIGHTENING SCREWS

- Retighten the flanged lock screws to the required torque after another week in operation – Refer to Tightening torque, Pos. 9.

LOW AMBIENT TEMPERATURE

When the equipment is started-up or operated at ambient temperatures around 10 °C, the compressed air should be supplied with anti-freeze from a dosing apparatus (compressed air oilier). We recommend ethylene glycol, diluted, with high-pressure additives, 1000 ml, article no. 75682 114002.

IMPORTANT INFORMATION CONCERNING START-UP AND OPERATION

- Only work in well-ventilated areas
  in view of health hazards, fires and explosions.

The piston pump should only be operated dry for short periods of time under supervision and with low air inlet pressure. Dry operation after the fluid has passed through must be strictly avoided. It will damage or destroy important component parts.

Do not operate the piston pump without a liquid primer (detergent in the wet cup).

– This leads to increased packing wear and considerable reduction of the service life.

Continuous operation with high stroke frequency leads to increased icing of control system (see technical product description B. 6. 15.52-P, page 04).

– Increased pulsation until the piston pump stalls

During operation, do not take the suction hose out of the fluid and then immerse it again.

– If air enters the system, this will result in reduced painting results

Do not unscrew any parts of the piston pump during operation.

The removal of safety features (casing) can lead to injury during operation; therefore, ensure that all safety features are in place before start-up.

Personal safety equipment (breathing apparatus, goggles, gloves, etc.) must be worn when working with fluid that is dangerous to health.

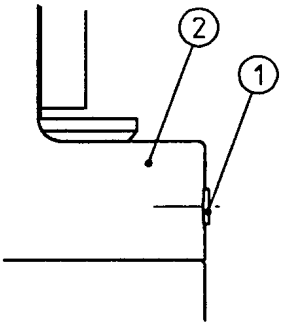
OPERATION

Piston pumps run automatically, i.e. during operational shutdown (no fluid drawn from fluid pressure system) no fluid is pumped.

If there is a slight leakage, however, pumping will start.

It is therefore recommended that the pump is disconnected from the air supply overnight or over the weekend and, if required, bleeding the system (after shutting off the compressed air supply) lowers the fluid pressure.

It is also recommended that the flushing agent is drained before a longer period of shutdown and refilled when work recommences, provided it has not yet been contaminated.



Loosen the cap screw ① from the wet cup ② to drain off the solvent. Screw back the screw immediately after having drained the solvent.

Fill with solvent again, when the system is taken into operation again. Before a long-term shutdown, e.g. before the holidays, paint conveying pumps must be flushed. To prevent paint residue in the pump from hardening, flushing agent should be left in the pump during the shutdown period.

We recommend using alkyl sulphon acidic ester, "ASE" phenol, as the flushing agent.

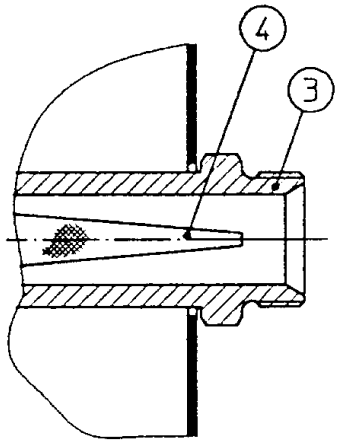
Please consult the fluid supplier about compatibility of the flushing agent.

Do not use nitro thinners or solvents as flushing agents.

MAINTENANCE AND INSPECTION, REPAIR

MAINTENANCE AND INSPECTION

Model ....430-DP piston pumps require little maintenance.



- To avoid increased wear of control components through contaminated compressed air, a strainer ③ has been integrated in the pressure line connector ④ of the piston pump.
  It should be cleaned regularly.
  - Simply screw out the compressed air connector.
- The flushing agent should be changed once a month or sooner if it is discolored.
  - Drain through the drain plug
  - Flush wet cup with solvent
  - Refill with approx.150m³ solvent.
- Condense should be drained from the pressure tank, filter or filter regulator daily if there is no automatic moisture drainage from the compressed air supply.
- When using anti-freeze (when operating at around 10°C), replenish it after use.
- Check the strainer on the suction side regularly.
  - The cleaning interval depends on the process fluid or solvent and must be determined by the user.
- Check the performance of the safety valves in the piston pump once a year. They have been installed in the air motor.
  For this, the max. working pressure must be slightly exceeded
  (opening pressure up to 1.1 • max. working pressure).
- The service life of the hose lines is adversely affected, and thus shortened, by surrounding influences (oxygen in air, temperature, light, etc.), even if correctly.
  It is recommended that they undergo regular visual checks and that their performance is occasionally checked.
  As a precaution, the hose lines should be replaced by new ones at intervals set by the operator (- after 2 to 3 years).

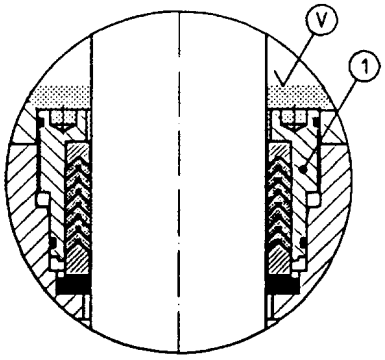
⚠ Do not carry out any dismantling work on a pressurized piston pump.

Visually check the piston pump / system every day.

The flushing agent in the wet cup should be checked daily. If the flushing agent is noticeably discolored it should be changed (see page 13).

Re-tightening packings

A slowly rising level Ⓥ of the flushing agent while the piston pump is running, is an indication that the piston rod packing is in an advanced state of wear (upper packing). Re-tightening them can extend their service life. To do this, stop the piston pump and relieve the pressure. Remove the casing (not shown) and re-tighten the threaded guide ① ¼ turn (use special tool, see List of Tools on page 8). If this is insufficient, it is possible to tighten it another ¼ turn after the pump has run again for a short while. Repeat this procedure until the packing seals completely.



Never overtighten the packing as a precautionary measure.
Overtightened packings wear prematurely.

If the packing cannot be adjusted any more or when the solvent level rises quickly, it has lost its sealing capacity and must be replaced as soon as possible.

– We recommend changing the lower piston packing at the same time.

When, during the daily inspection, a rise in pulsation or irregular running of the piston rod is observed the cause is likely to be filling valve wear (i.e. the valve in the piston). When the working pressure drops while the fluid pressure system is closed, the probable cause is a leaking suction valve. - In both cases the relevant valve should be replaced.

When, during daily inspection, the sound of escaping air is heard from the air outlet of the air motor while the piston pump is not running, this may be an indication of advanced wear of control components.

When the sound level increases in the course of a few days, the flat side(s) and close sliding seat(s) should be replaced.

REPAIR

⚠ Qualified engineers (VBG 87) must carry out repairs.

Use only genuine replacement parts. Our obligation to replace pumps or equipment is forfeited when non-genuine replacement parts are used (Product Liability Law of 15 December, 1989).

All parts that are to be re-used should be cleaned thoroughly after dismantling.

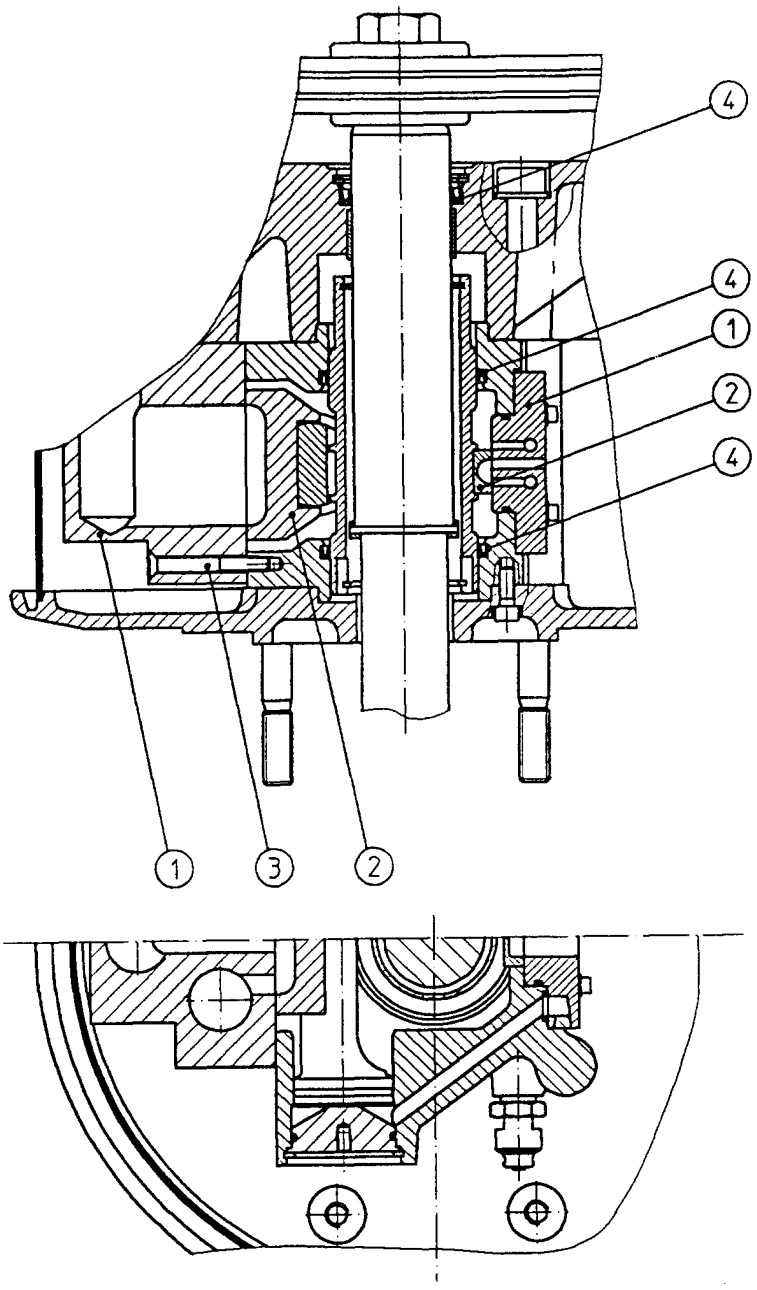
Do not damage sealing surfaces; do not throw parts around or hit them; do not use any sharp-edged tools.
Replace all removed seals by new ones.

Lubricate all threads and fittings before assembly (grease lightly).

⚠ Shut off the compressed air supply to the piston pump and relieve the pressure in the pump before disassembly.

Changing worn parts in air motor

The sliding seat ① and the corresponding flat slide ② should always be replaced by new ones together.
When one side is replaced, it is recommended to replace the other side at the same time, as experience has shown that they usually wear down equally.



The following applies to 008.430-DP piston pumps:

- When assembling the control system, tighten the countersunk screws ③ before tightening the cylinder screws (not shown) (- alignment)

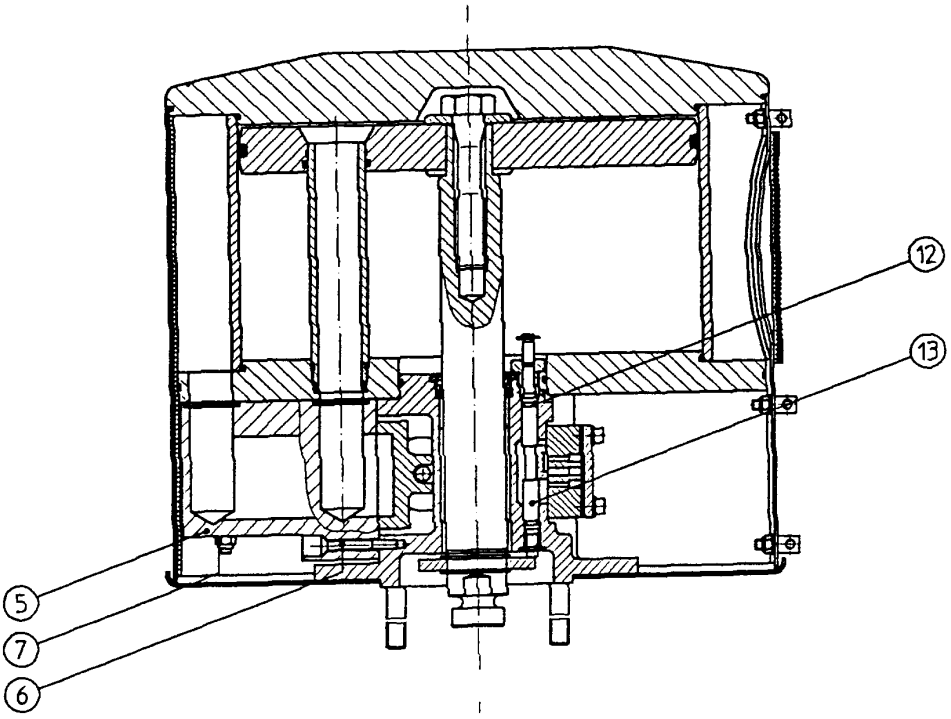
- Do not use any sharp tools (e.g. screwdrivers) when assembling the slotted rings ④ (and other seals).

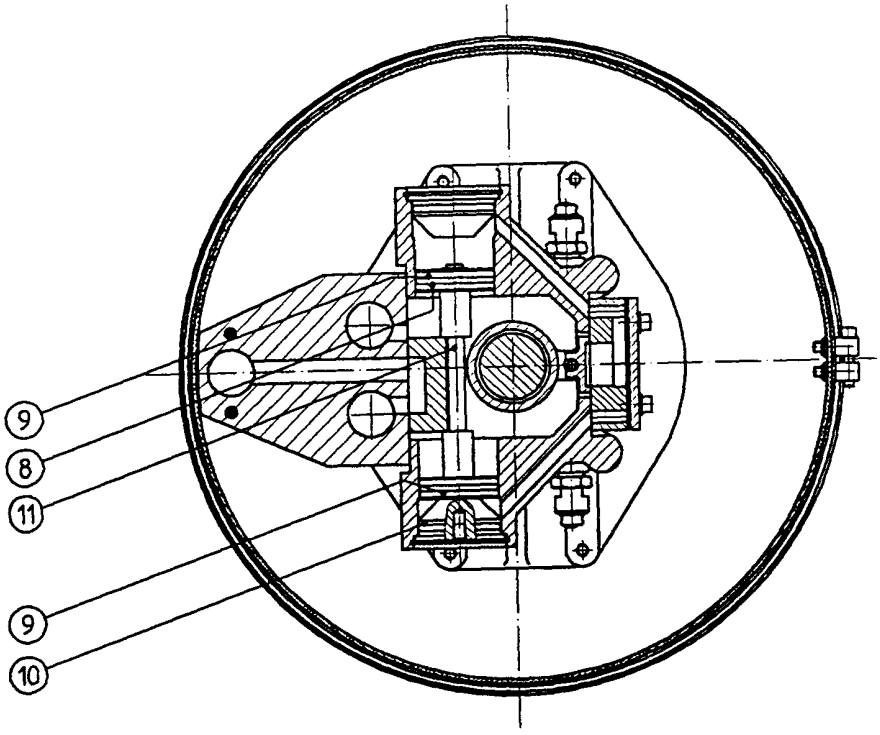
Danger of damage.

Piston pumps 012.430-DP and 018.430-DP (Refer to Techn. Product Description B.6.15.52-P, page 03) have been fitted with an air motor of the type shown on page 17).

- When assembling the slide seat ⑤, tighten the countersunk screws ⑥ first (torque to 6 Nm). Then tighten the safety nuts ⑦ only lightly (torque to 3 Nm).

- When the O-rings ⑧ are replaced, note that both ring pistons ⑨ must both be inserted into the housing from the outside.
  - Install a ring piston on the rod ⑪
  - Insert into the housing, rod first
  - Install the other ring piston from the other side.





- The procedure for changing the O-rings ⑫ is similar
  - Pull up the upper O-ring
  - Position the rod ⑬ with the free end first in the housing from above and push until the other O-ring can be fitted from below.

Replacing packing

- Remove casing ① and drain off flushing agent
- Disassemble gears ②. Remove and disassemble the hydraulic unit below the wet cup housing ③.

When replacing the packing, note the exact positions and the layering of the glands ④ and spring washers ⑤ carefully.

All packing stacks should be replaced as assemblies.

– Do not replace the stacks separately.

To replace the packing, the piston ⑥ can be pulled down out of the connector ⑦.

Then:

- Remove flange ⑧
- Remove ball guide ⑨
- Pull down piston ⑥ from the cylinder ⑩.
- Screw out threaded bushing ⑪ (use special tool, see List of Tools, page 8)
- Insert a new packing in the threaded bushing and screw it into the valve housing

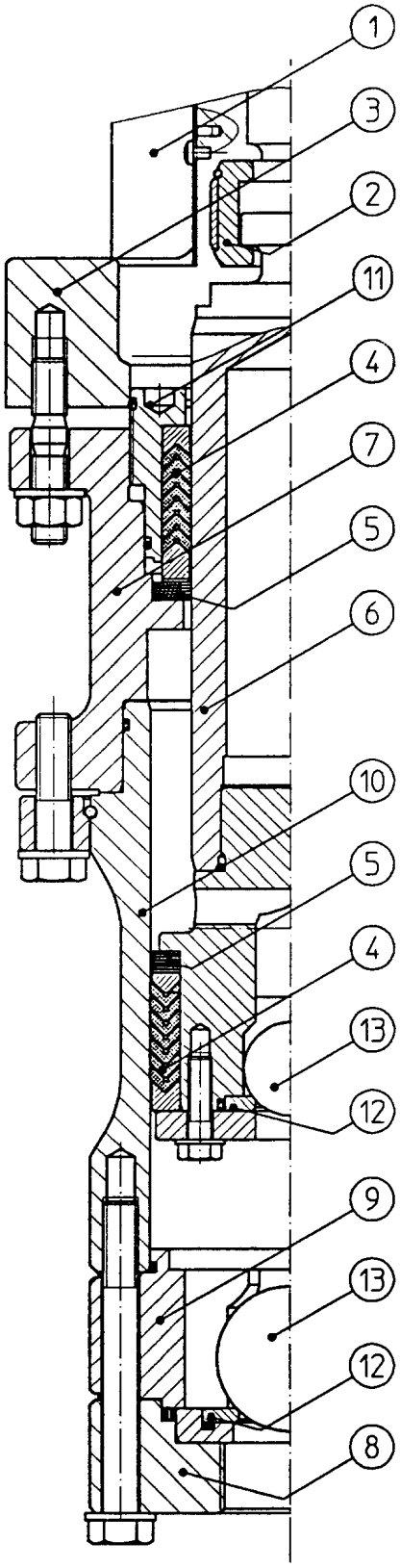
– Do not tighten

Mounting the lower packing

- Do not tighten the hex screws yet
- Insert pre-mounted piston into the cylinder. (slide up far enough so the coupling can be mounted)
- Tighten the hex screws crosswise and evenly to a torque of 20 Nm.

Tighten the threaded bushing and loosen it half a turn. Tighten the packing in accordance with the procedure used for re-tightening the packing (refer to page 15).

When the running surfaces of the piston rod and the cylinder show clear signs of wear (scoring, indentations) the piston must be replaced, too.



Replacing the valves

If one side of the valve seats ⑫ is worn, they can be turned over and reinstalled. Whether the valve balls ⑬ can be re-used, depends on how much they have worn. Because this is hard to assess, we recommend replacement of the valve balls.

– When highly aggressive materials are processed, the suction valve ball (technologically required in this system) may be affected by corrosion.

– As a rule, all exposed O-rings should be replaced before re-assembly.
  Do not use the running surfaces of the differential piston as a brace during maintenance or repair work.
  – Danger of damage.

Dismantling The Fluid Lines

See page 10

If the suction system (suction line) of the piston pump must be removed, it is recommended to purchase a new O-ring, Part No. 74186 056020, in advance.

It is recommended to purchase a new replacement seal, Part No. 75188 097004, before disassembly, if type GE 42-ZLR-ED threaded lines supplied by us are used (see Accessories and Replacement Parts).

Threaded Connections

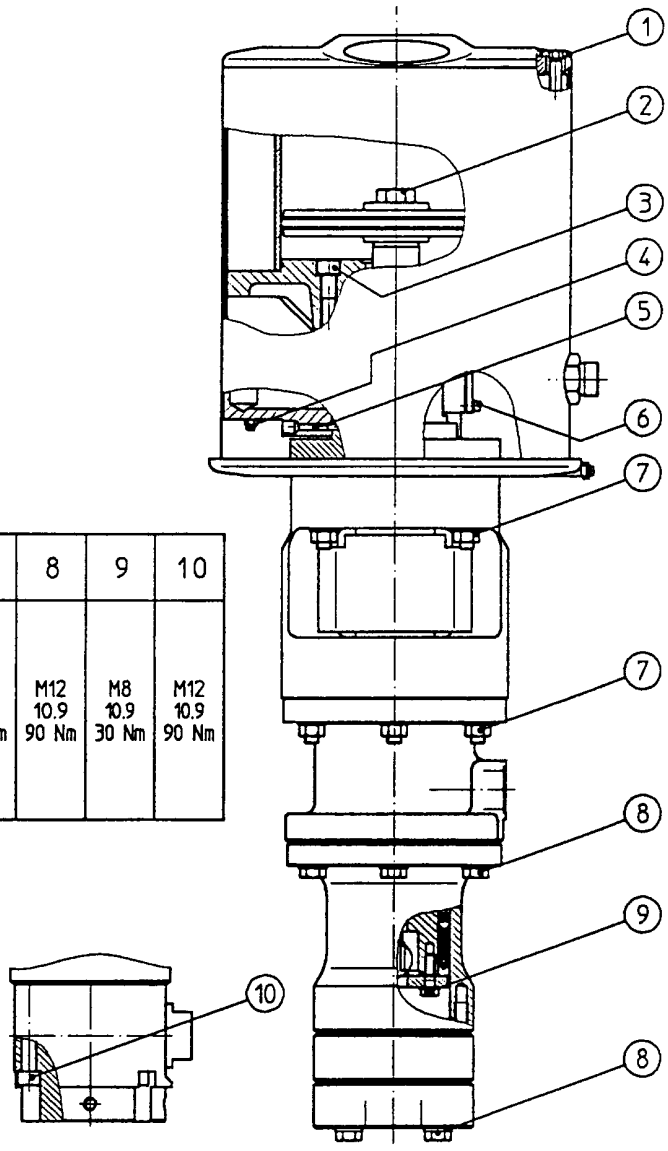
Do not exceed the tightening torque below when tightening the threaded connections.

TIGHTENING TORQUE

Model \ Pos.	1	2	3	4	5	6	7	8	9	10
008.430-DP	M10 8.8 25 Nm	M20 8.8 180 Nm	M10 8.8 70 Nm				M12 8 70 Nm	M12 10.9 90 Nm	M8 10.9 30 Nm	M12 10.9 90 Nm
012.430-DP	M10 8.8 45 Nm		M12 8.8 80 Nm	M6 10.9 3 Nm	M6 8.8 5 Nm	M6 8.8 7 Nm				
018.430-DP										

The torque values listed in the table below apply to all screws and nuts not referred to specifically.

Thread	Power class		
	8.8	10.9	12.9
	Tightening torque in Nm		
M 4	3,1	4,6	5,3
M 5	6,2	9,1	10,6
M 6	10,5	15,1	18,0
M 8	25,0	37,0	44,0
M10	50,0	73,0	86,0
M12	86,0	125,0	145,0



SHUT DOWN

The fluid pressure can increase under certain system conditions when the air motor pressure is relieved while the fluid pressure system is still pressurized.
Relieve the pressure of the piston pump (air and fluid) only by discharging fluid when the compressed air feed is shut off.

– FOR A SHORT PERIOD

- Shut off the compressed air supply
- Relieve pressure in the piston pump by discharging fluid (e.g. by using the spray gun)

– FOR A LONGER PERIOD, FOR THE COMPANY HOLIDAY PERIOD

- Flush piston pump well
- Leave solvent in the piston pump
  – The wet cup must be filled up to the middle of the filling connector.
- Shut off the compressed air supply
- Relieve pressure in the piston pump by discharging flushing agent (e.g. by engaging the spray gun)

– FOR A LONG PERIOD

- Flush piston pump thoroughly
- Pump solvent out of the piston pump
- Briefly run the piston pump empty at the lowest air pressure level
- Interrupt (screw off) the compressed air connection to the piston pump
- Empty the wet cup (- page 12)

Ensure that the piston is at the lowest end of its stroke when it is stopped, to prevent liquid residue drying on the piston rod.

ERROR ANALYSIS				
Component group	Nature of defect	Defect symptoms	Possible cause	Counter measure
Compressed Air Supply	Drop in fluid pressure	Heavy leakage	Defective fitting	Replace defective fitting
		Narrowing of cross section	Hose line pinched dirty fittings	Check lines clean fittings
Air motor, control	Irregular operation, stroke frequency drop, pump stalls	Icing	Compressed air too moist, stroke frequency too high, local temperature too low	Remove ice, change operating conditions
	Air escapes continually from the outlet hole of the air motor	Flat slide defective	Foreign body has gained access	Replace defective parts, check compressed air filter
Hydraulic section	Pressure fluctuations Suction not in order, runs irregularly		Air not properly removed	Bleed air from pump
		Leaks in suction system, connections have come loose	Supply is difficult, vibrations Damaged O-ring	Flexible connections between the pump and the suction system; replace O-ring
Suction valve	Pump does not stop during upwards stroke	Valve seat, - lower ball defective	Wear	Replace worn parts
Pressure valve	Pump does not stop in down stroke	Valve seat, - lower ball defective	Fluid contaminated	
Packing, upper	Fluid escapes at the piston rod	Packing defective		Replace worn parts
Lower packing	Pump does not stop during upwards stroke	Packing defective		
Suction system	Pump runs irregularly	Suction screen (dirt trap) is clogged		Clean strainer

NOTES

AUTOMATIC SUPERVISION

When piston pumps Model ....430-DP are operated unsupervised, dangerous situations may be avoided by using the automatic self-check feature.

A stop valve, is particularly suitable for this purpose as it interrupts (shuts off) the compressed air supply to the piston pump when the set limit is exceeded (e.g. due to excessive stroke frequency in case of a line breakage).

GUIDELINES AND DIRECTIVES TO COMPLY WITH

VBG 23	Verarbeiten von Beschichtungsstoffen*
VBF 23 DA	Durchführungsanweisungen zur Unfallverhütungsvorschrift „Verarbeiten von Beschichtungsstoffen“
VBG 87	Arbeiten mit Flüssigkeitsstrahlern*
VbF	Verordnung über brennbare Flüssigkeiten*
ZH1/10/EX-RL	Richtlinien für die Vermeidung der Gefahren durch explosionsfähige Atmosphäre mit Beispielsammlung Explosionsschutz-Richtlinien – (EX-RL)*
ZH1/200	Richtlinien für die Vermeidung von Zündgefahren infolge elektrostatischer Aufladungen*
ZH1/250	Sicherheitsregeln für elektrostatisches Versprühen von brennbaren flüssigen Beschichtungsstoffen mit Handsprüheinrichtungen*
ZH1/406	Richtlinien für Flüssigkeitsstrahler (Spritzgeräte)*
DruckbehV	Druckbehälterverordnung*
Merkblätter	Gefährliche Arbeitsstoffe (Band 1 bis 5) Kühn ; Birett Druckerei Laub Gmbh, Elztal-Dallau

*Carl Heymanns Verlag KG, Luxemburger Str. 449, 50939 Köln

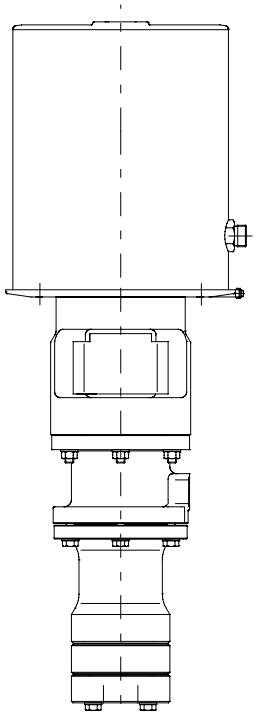
USER INFORMATION

The user information (operating instructions) contains all necessary information about the piston pumps ....430-DP programme, in accordance with sales catalogue 01.1552.

The Technical Product Description B.6.15.52-P, and the Replacement Parts List are standard parts of every operating manual. For organizational reasons they are issued as separate documents.

SATURN PISTON PUMPS
008.430-DP - 012.430-DP - 018.430-DPDP

Compressed air-operated, double acting piston pumps particularly for highly viscous coating materials and auxiliary agents.



DESCRIPTION OF THE PISTON PUMPS

The piston pumps consist of an oscillating air motor Ⓐ and a hydraulic section Ⓑ. The piston ① of the air motor is connected via the piston rod ② and the coupling ③ to the step piston ④ of the hydraulic section.

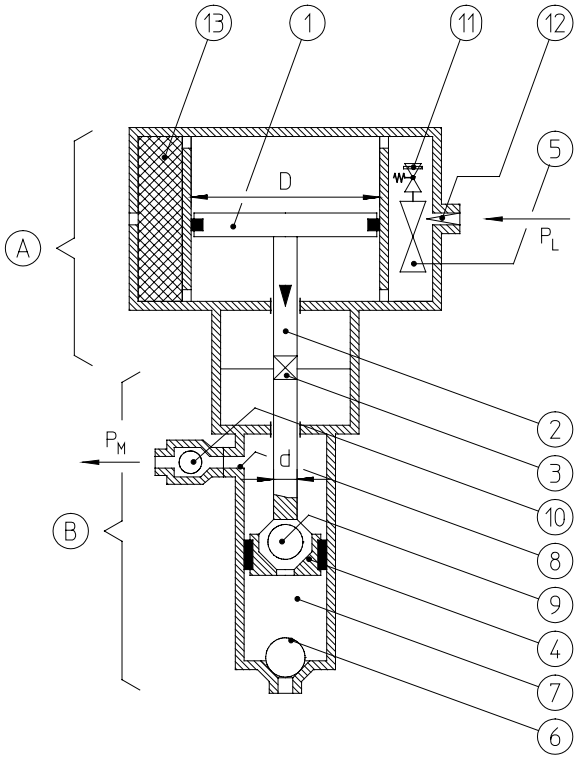
Compressed air is applied alternately to the piston via the control ⑤ that leads to the upwards and downwards strokes.

The ratio of the areas of the piston and the thinner part of the step piston determines the pressure transmission ratio [$D^2 : d^2$].

During the upwards stroke, the fluid to be transported is sucked through the suction valve ⑥ into the bottom part of the hydraulic cylinder ⑦ while the fluid in the top cylinder part leaves the pump under pressure at the pressure connection.

During the downwards stroke, the fluid under suction which is prevented from flowing backwards by the suction valve, is pressed into the top cylinder part and via the decant valve ⑨ and at the same time forced into the pressure system (pressure line) through the pressure connection.

The volume of fluid transported is the same for the upwards stroke and the downwards stroke.



When the pressure system is closed, the forces compensate each other [air pressure (p_L) x ring piston area (A_D) = fluid pressure (p_M) x Area of the thin section of the step piston (A_d)] and the pump is stationary.

When fluid is removed from the pressure system, the pump starts automatically. Even the smallest leakage is replaced by replenishment.

In the case of a large pressure system, a back pressure valve ⑩ must be fitted at the pressure outlet because of the naturally produced temperature fluctuations (pressure increase due to thermal expansion) – this also applies to heated spraying systems.

Safety valves ⑪ protect the piston pump and the pressure system in cases where the air inlet pressure exceeds its maximum permissible value.

The filter ⑫ in the air inlet ensures that no contamination enters into the pump control system from the compressed air system.

The integrated silencer ⑬ makes separate sound absorbers unnecessary.

SUITABILITY, MATERIAL

Material	Suitability
Neutral	highly suitable
Corrosive	not suitable
Abrasive	suitable under certain conditions
Acidic	not suitable
Inflammable [1)]	highly suitable
UV-hardening	suitable under certain conditions
Hardening agent	suitable under certain conditions

[1)] Hazard class AI, AII, AIII, Piston pump grounded.

In the case of strongly abrasive and aggressive materials, please contact us.

Kinematic viscosity in mm^2/s			Suitability
	up to	500	highly suitable
500	up to	750	highly suitable
750	up to	1000	highly suitable
	over	1000	suitable under certain conditions (must be tested)

Solids content	Suitability
Low	highly suitable
Low to 2%	suitable
Over 2%	must be tested

TECHNICAL DATA

KEY TO DESIGNATION

PISTON PUMPMODEL 018 .430 - D P W

PRESSURE RATING
018 = 18:1

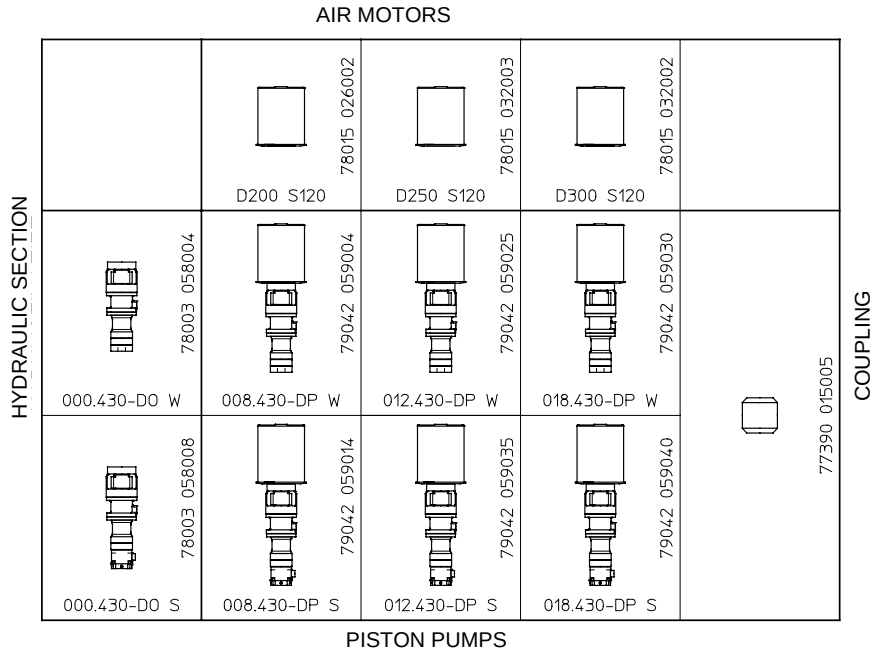
Fluid volume in cm^3 / stroke
430 = 430cm^3/stroke

Action: double-action oscillating

Drive: pneumatic

Appendix
W = Wall construction
S = Column construction

THE MODULES



DATA

Piston pump	Fluid volume [cm^3 /DH]	Theoretical transmission ratio I	Operating excess pressure max. permissible [bar]	Air Stroke volume V_H [l]
008.430-DP	860	8 : 1	56	3,65
012.430-DP		12 : 1	84	5,68
018.430-DP		18 : 1	126	8,27

Air inlet pressure min.	0,5	bar
Air inlet pressure max. perm.	7	bar
Operational temperature	10-80	°C
Suction height (pump empty)	2,5	m
Suction height (device full)	7,8	m

Key:

V = flow velocity

DH = double stroke

I = Fluid operating overpressure / Air inlet overpressure

V_H = Stroke volumes – see table above

F = Actual stroke frequency in DH/min

P = Actual air inlet overpressure in bar

In connection with a swivel suction unit, priming pressure must not be applied to the piston pumps.

Max. allowable stroke frequency in DH/min			
Continuous operation		Intermittent operation	
- Full load	- Part load	- Part load	- Full load
12	16	20	25

With piston pumps operating continuously (day and night operation), the stroke frequency should be reduced, special measures may be necessary to reduce the sound level.

Material volume flow max. in l/min *	v = 0.4 m/s		v = 0.7 m/s		v = 1.2 m/s	
	Stroke frequency in DH/min	Volume flow in l/min	Stroke frequency in DH/min	Volume flow in l/min	Stroke frequency in DH/min	Volume flow in l/min
21.5	12	10.3	18	15.5	24	20.6

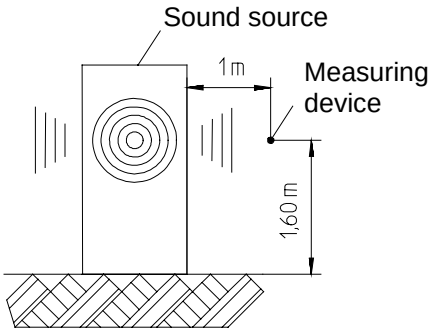
*) at 40 DH/min

When used for paint spraying: use silicone-free process materials (compressed air) and accessories only.

SOUND EMISSION

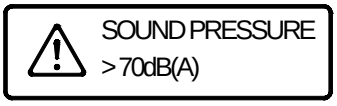
As the working places cannot be anticipated the highest possible sound level is shown.

Measurement spacing



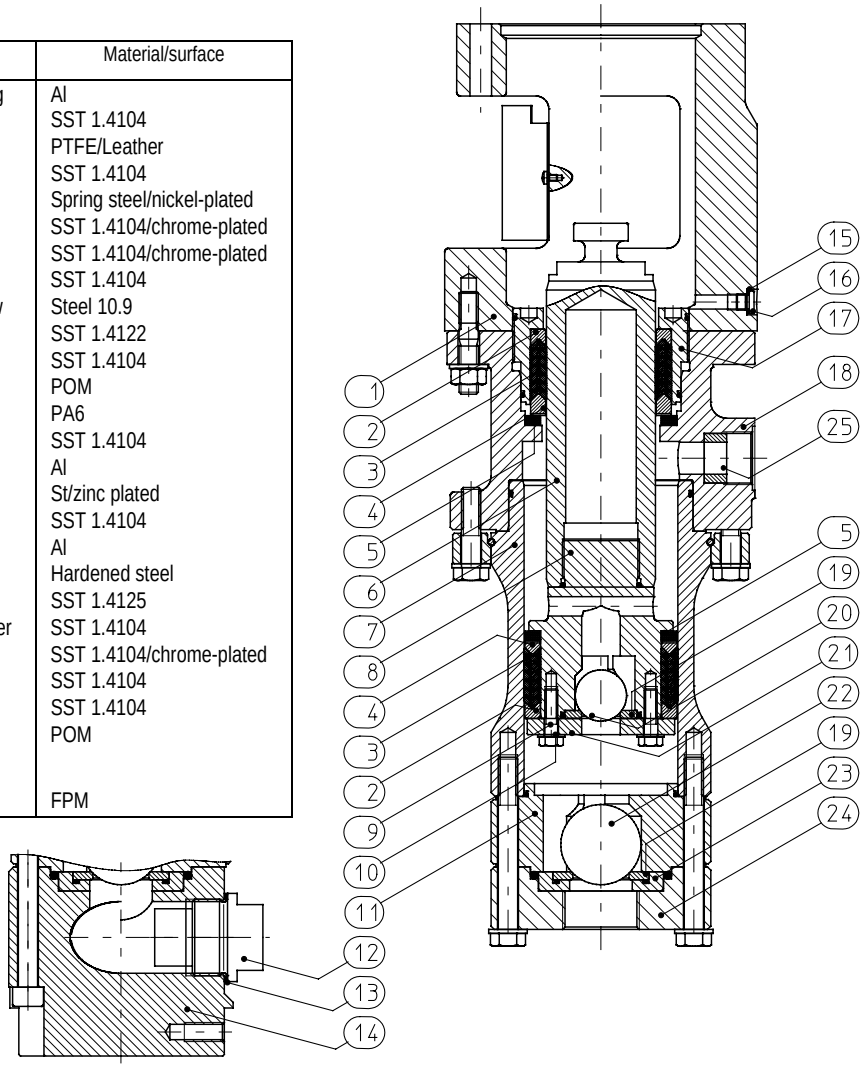
Piston pump	Air inlet overpressure in bar			
	2	4	6	7
008.430-DP	83	87	90	92
012.430-DP	77	82	85	87
018.430-DP	78	83	86	88
	Sound level in dB (A)			

A warning information sign is attached to the piston pump.

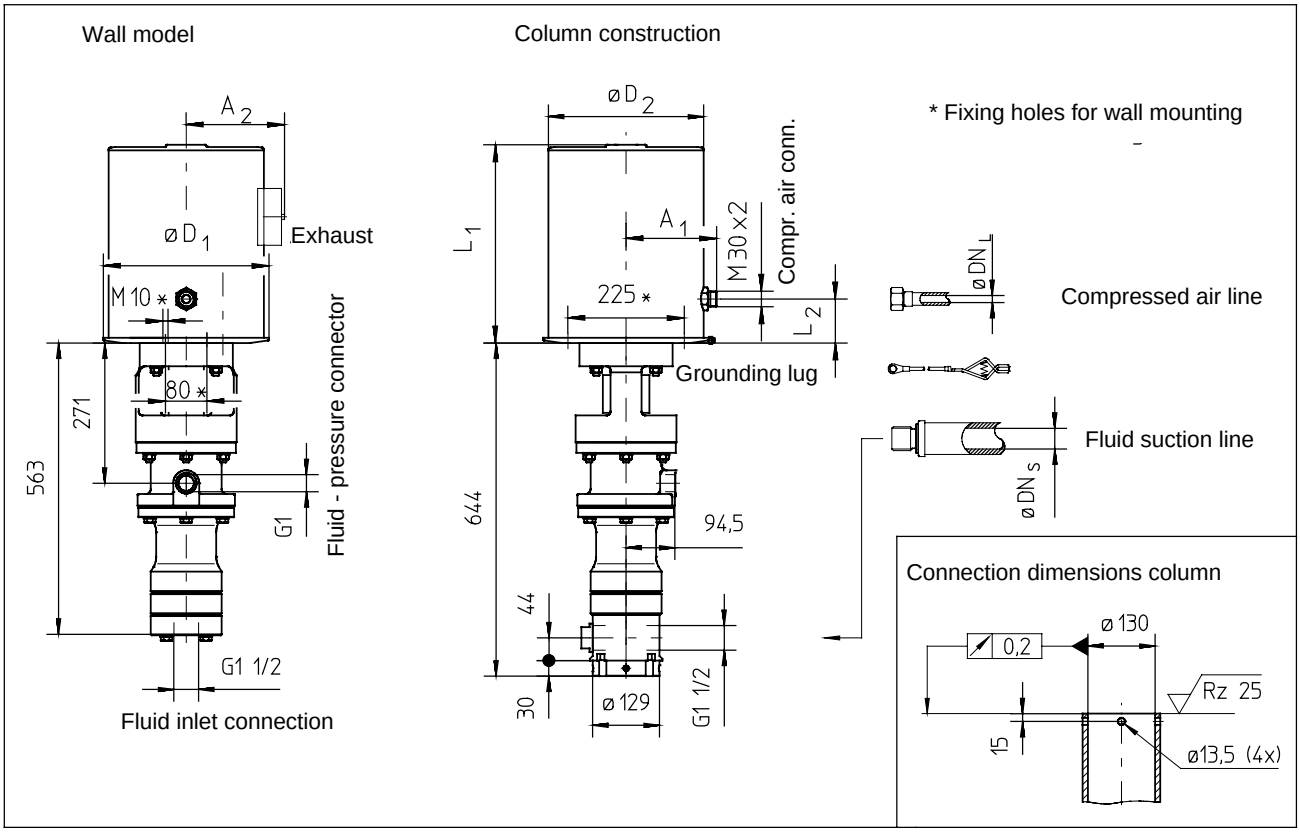


MATERIALS OF THE AREA IN CONTACT WITH THE FLUID MATERIAL

Pos.	Designation	Material/surface
1	Coupling housing	Al
2	Gland	SST 1.4104
3	Packing	PTFE/Leather
4	Support ring	SST 1.4104
5	Spring washer	Spring steel/nickel-plated
6	Piston rod	SST 1.4104/chrome-plated
7	Cylinder	SST 1.4104/chrome-plated
8	Piston	SST 1.4104
9	Hexagonal screw	Steel 10.9
10	Lock washer	SST 1.4122
11	Ball guide	SST 1.4104
12	Fixing screw	POM
13	Seal washer	PA6
14	Connector	SST 1.4104
15	Seal washer	Al
16	Fixing screw	St/zinc plated
17	Thread bush	SST 1.4104
18	Connector	Al
19	Valve seat	Hardened steel
20	Ball	SST 1.4125
21	Perforated washer	SST 1.4104
22	Ball	SST 1.4104/chrome-plated
23	Washer	SST 1.4104
24	Flange	SST 1.4104
25	Bush	POM
	O-Rings	FPM



DIMENSIONS, SCREW CONNECTION THREADS, RATED DIAMETER OF CONNECTIONS, MOUNTING POSITION



Piston pump	D_1	D_2	L_1	L_2	A_1	A_2
008.430-DP	320	300	383	85	175	190
012.430-DP	404	390	354	99	221	-
018.430-DP	404	390	354	99	221	-

Compressed air line	DN_L	≥	16
Fluid suction line	DN_S	≥	40
Suction tube	DN_{SR}	≥	38

Elastic connections

Piston pump – compressed air system

Piston pump – fluid container/line

necessary

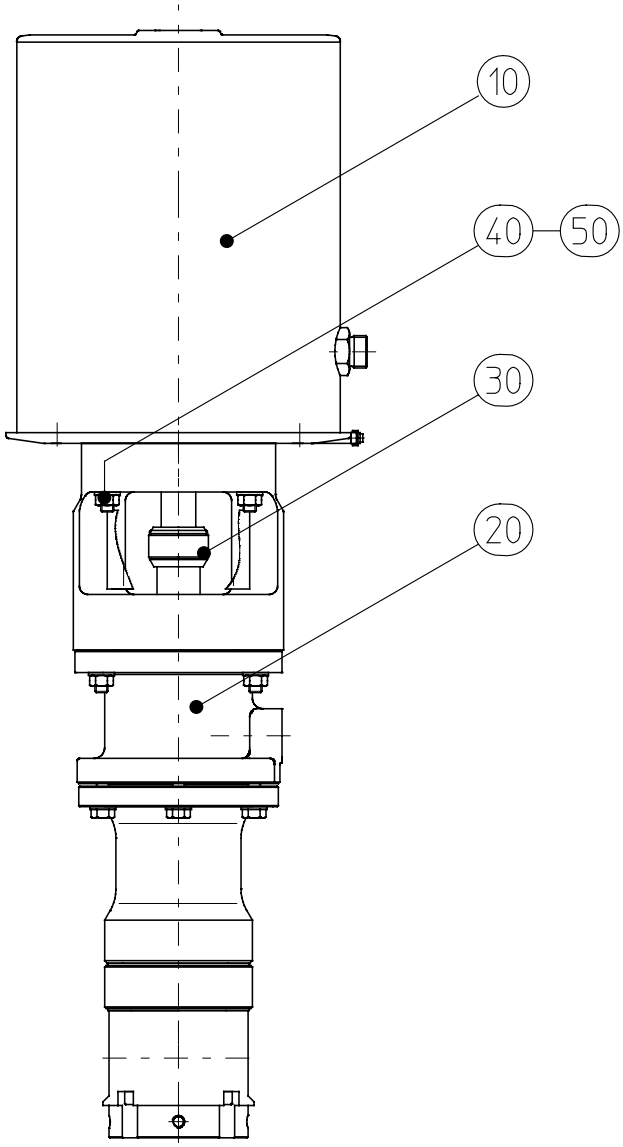
The piston pumps have ball valves that are not spring-loaded and therefore can only be operated in a vertical position or in a position slightly departing from the vertical.

NOTES

Relevant documentation: Sales catalogue 01.1552

GRACO

PISTON PUMPS SATURN
008.430-DP - 012.430-DP - 018.430-DP



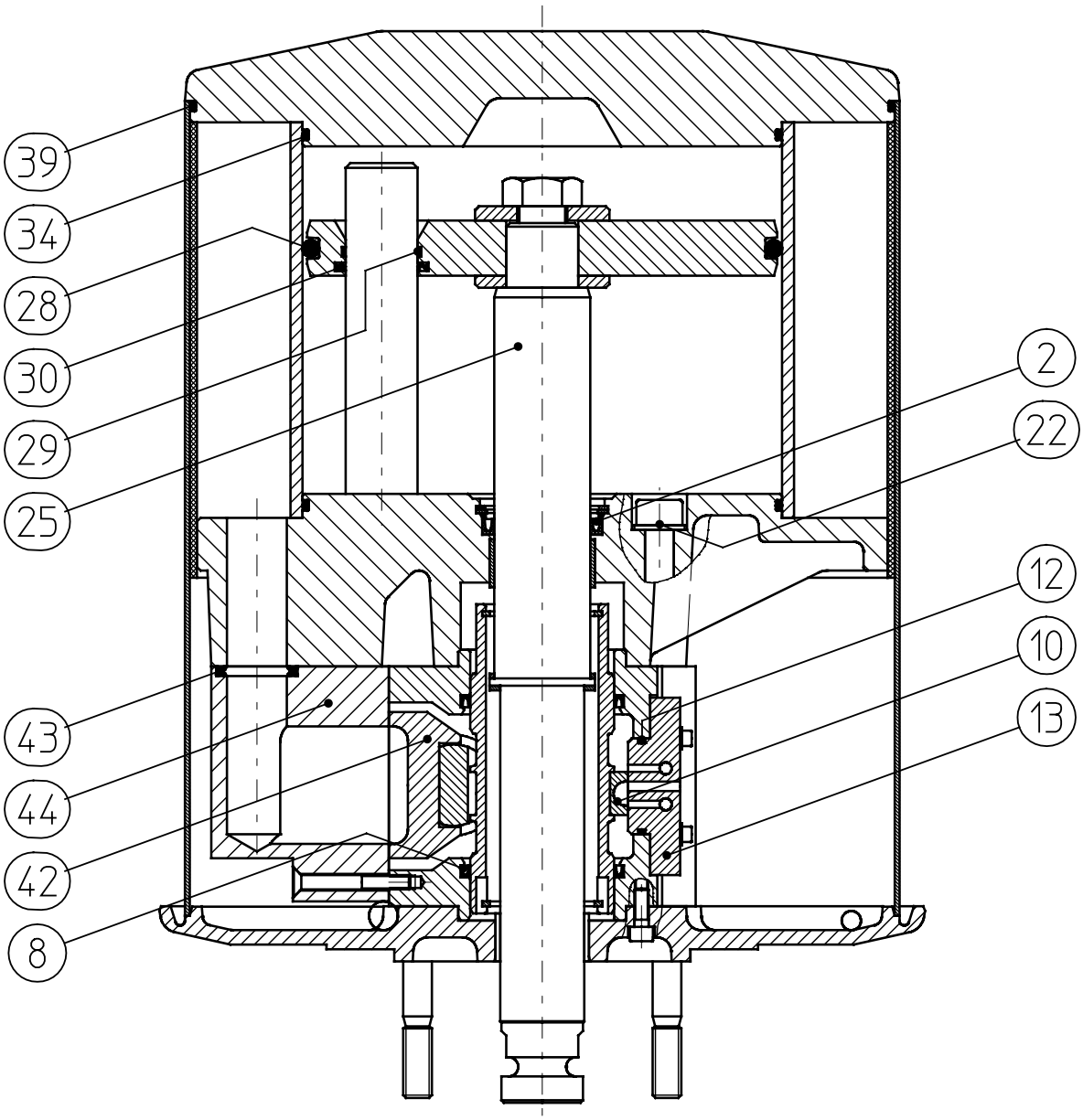
	Air motor Pos. 10	Hydraulic section Pos. 20	Coupling Pos. 30	Nut+washer Pos. 40 + 50
Piston pump		List No.	Article No.	
008.430-DP W	D200 S120 78015 026002	000.430-DO W 78003 058004	Split coupling 77390 015005	4 x M 12 74074 010023
008.430-DP S		000.430-DO S 78003 058008		
012.430-DP W	D250 S120 78015 032003	000.430-DO W 78003 058004		
012.430-DP S		000.430-DO S 78003 058008		4 x B 13 74094 014090
018.430-DP W	D300 S120 78015 032002	000.430-DO W 78003 058004		
018.430-DP S		000.430-DO S 78003 058008		

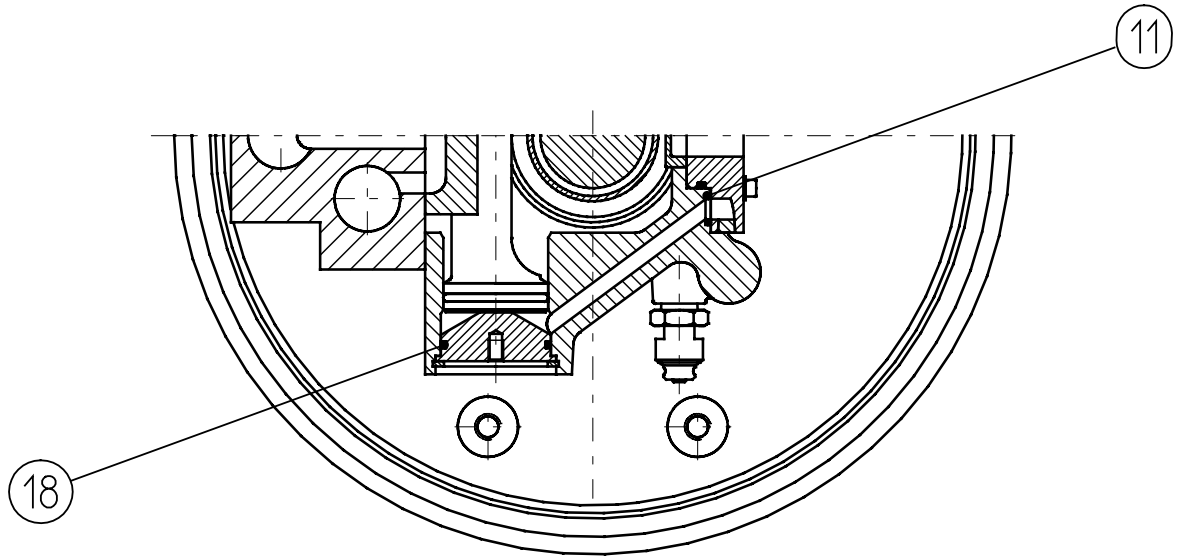
Subject to change

Prepared by 22.11.99 Hilse	USER INFORMATION - REPLACEMENT PARTS SET -	Issued 11.99
Checked by 22.11.99 Kuhn		B.6.15.52-EO

Note the protection mark in accordance with DIN 34

AIR MOTOR D200 S120





F22.060.02, issued on 01.98

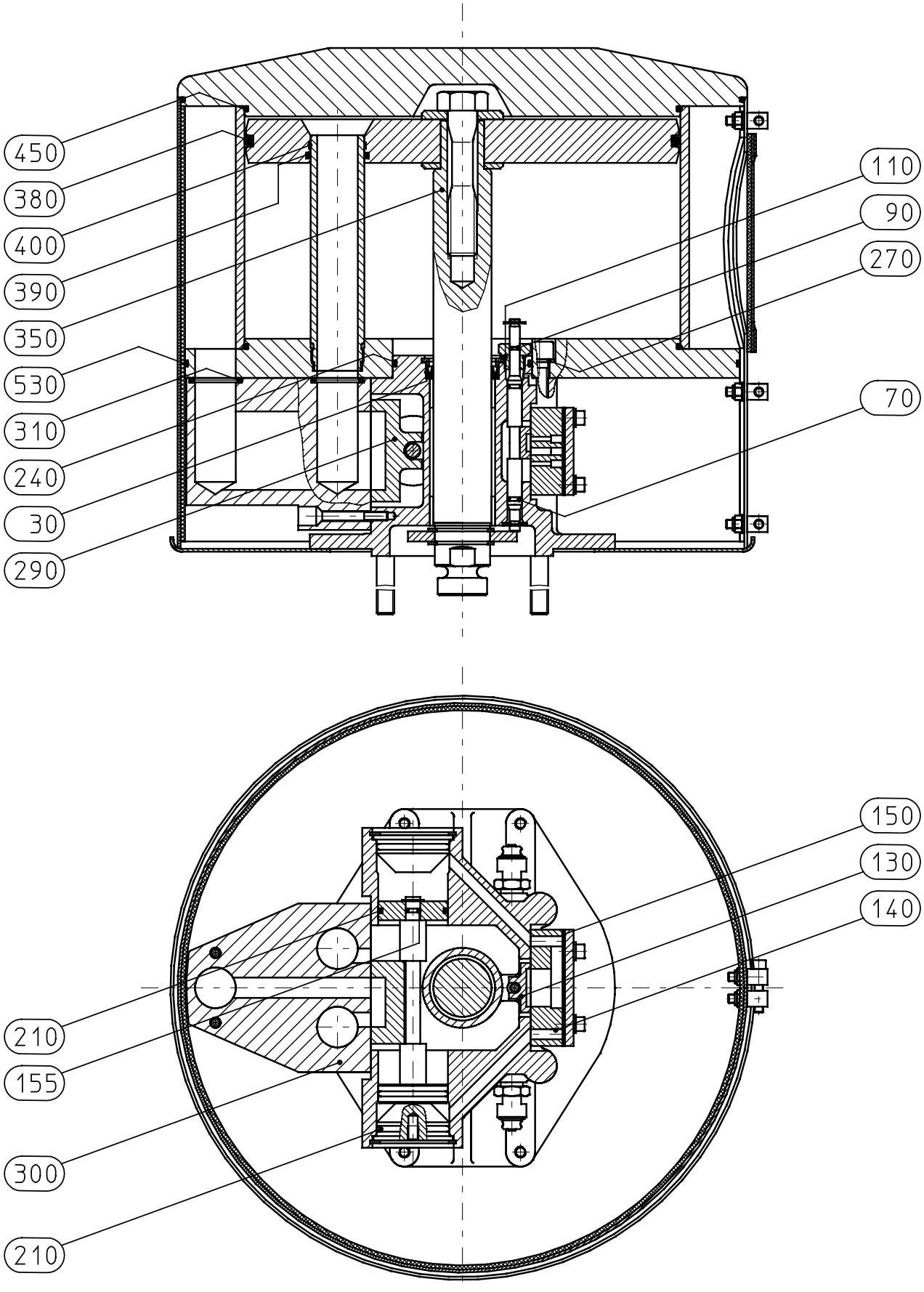
Replacement parts set, air motor control				Part No. 79978 904501
Pos. 8	2 off	Grooved ring	60 x 67.8 x 5	
Pos. 10	1 off	Flat slide	24 x 19	
Pos. 11	2 off	O-ring	9 x 2 B	
Pos. 12	1 off	O-ring	35 x 2.5 B	
Pos. 13	1 off.	Valve seat	-	
Pos. 18	2 off	O-ring	38 x 2 B	
Pos. 42	1 off	Flat slide	62 x 45	
Pos. 43	3 off	X-ring	26.58 x 3.53	
Pos. 44	1 off	Valve seat	-	

Replacement parts set, air motor seals				Part No. 79978 904502
Pos. 2	1 off	Axial-radial sealing ring	D 40	
Pos. 22	4 off	Screw head seal	M 12	
Pos. 28	1 off	O-ring	180 x 6 B	
Pos. 29	1 off	Guide bushing	4 x 1.55 x 92	
Pos. 30	1 off	Rod seal	D 30	
Pos. 34	2 off	O-ring	194 x 3 B	
Pos. 39	1 off	O-ring	290 x 3 B	

Single part, piston rod				Part No. 766 13 021002
Pos. 25	1 off	Piston rod	D40 L367	

AIR MOTOR D250 S120

D300 S120



AIR MOTOR D250 / D300 S120

Replacement parts set, air motor control				Part No. 79978 904785
Pos. 130	1 off	Flat slide	34 x 22	
Pos. 140	1 off	Valve seat	80 x 60	
Pos. 150	1 off	Flat packing	80 x 60 x 0.75	
Pos. 290	1 off	Flat slide	70 x 56	
Pos. 300	1 off	Valve seat	116 x 104 x 127	
Pos. 310	3 off	X-ring	29.75 x 3.53	
Pos. 530	2 off	O-ring	370 x 3 N	

Single part, piston rod				Part No. 766 13 022002
Pos. 350	1 off	Piston rod	D40 L335	

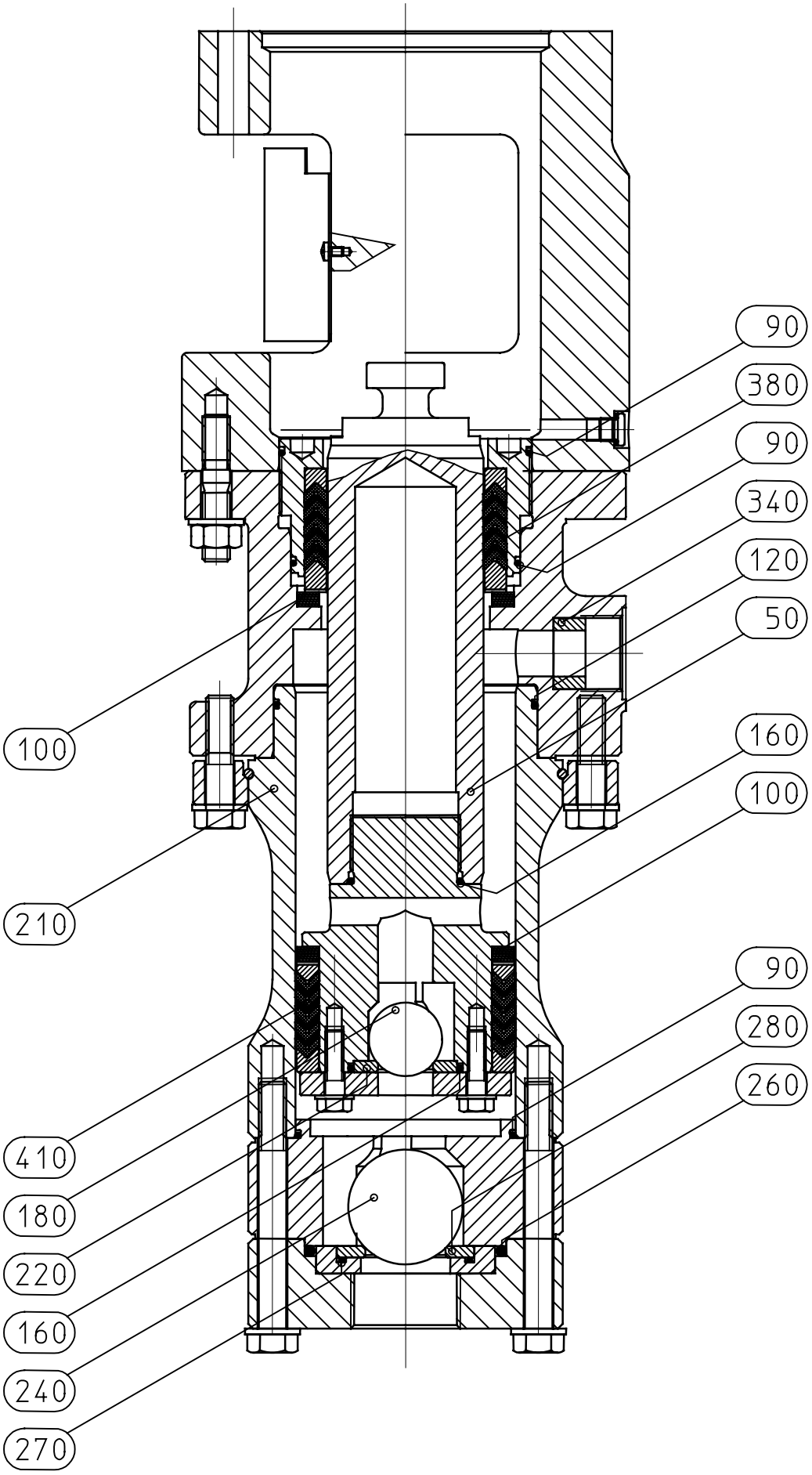
AIR MOTOR D250 S120

Replacement parts set, air motor seals				Part No. 79978 904786
Pos. 30	1 off	Axial-radial sealing ring	D 40	
Pos. 70	2 off	O-ring	7 x 1.5B	
Pos. 90	1 off	O-ring	4 x 1.2 B	
Pos. 110	1 off	O-ring	11 x 2B	
Pos. 155	2 off	O-ring	9 x 1.5B	
Pos. 210	4 off	O-ring	44 x 3B	
Pos. 240	1 off	O-ring	90 x 3B	
Pos. 270	4 off	Disk	13 x 24 x 2.5	
Pos. 380	1 off	O-ring	230 x 6B	
Pos. 390	1 off	X-ring	37,7 x 3,53	
Pos. 400	1 off	Guide bushing	4 x 1.55 x 120	
Pos. 450	2 off	O-ring	240 x 3B	

AIR MOTOR D300 S120

Replacement parts set, air motor seals				Part No. 79978 904787
Pos. 30	1 off	Axial-Radial sealing ring	D 40	
Pos. 70	2 off	O-ring	7 x 1.5B	
Pos. 90	1 off	O-ring	4 x 1.2B	
Pos. 110	1 off	O-ring	11 x 2B	
Pos. 155	2 off	O-ring	9 x 1.5B	
Pos. 210	4 off	O-ring	44 x 3B	
Pos. 240	1 off	O-ring	90 x 3B	
Pos. 270	4 off	Disk	13 x 24 x 2.5	
Pos. 380	1 off	O-ring	280 x 6B	
Pos. 390	1 off	X-ring	37.7 x 3.53	
Pos. 400	1 off	Guide bushing	4 x 1.55 x 120	
Pos. 450	2 off	O-ring	290 x 3B	

HYDRAULIC SECTION 000.430-DO



List of replacement parts, packing				Part No. 79978 031001
Pos. 90	3 off	O-ring	90 x 3B	
Pos. 160	1 off	O-ring	44 x 3 B	
Pos. 260	1 off	O-ring	78 x 5 B	
Pos. 270	1 off	O-ring	52 x 3 B	
Pos. 380	1 off	Packing complete	68 x 88 x 55.3	
Pos. 410	1 off	Packing complete	75.4 x 96 x 48.5	

List of replacement parts, O-Rings/seals				Part No. 79978 032001
Pos. 90	3 off	O-ring	90 x 3 B	
Pos. 120	1 off	O-ring	106 x 3 B	
Pos. 160	2 off	O-ring	44 x 3 B	
Pos. 260	1 off	O-ring	78 x 5 B	
Pos. 270	1 off	O-ring	52 x 3 B	
Pos. 340	1 off	Bush	20 x 30.3 x 14	

Replacement parts set, valve hydraulic section				Part No. 79978 033001
Pos. 120	1 off	O-ring	106 x 3 B	
Pos 160	1 off	O-ring	44 x 3 B	
Pos. 180	1 off	Ball	31.75 mm l	
Pos. 220	1 off	Valve seat	D 24	

Replacement parts set, suction valve hydraulic section				Part No. 79978 034001
Pos. 90	1 off	O-ring	90 x 3 B	
Pos. 240	1 off	Ball	50 mm	
Pos. 260	1 off	O-ring	78 x 5 B	
Pos. 270	1 off	O-ring	52 x 3 B	
Pos. 280	1 off	Valve seat	D 35	

Replacement parts set, piston rod hydraulics section				Part No. 79978 035001
Pos. 50	1 off	Piston rod	D68.01 L227	
Pos. 90	1 off	O-ring	90 x 3 B	
Pos. 120	1 off	O-ring	106 x 3 B	
Pos. 160	2 off	O-ring	44 x 3 B	

Replacement parts set, cylinder hydraulics section				Part No. 79978 036001
Pos. 90	1 off	O-ring	90 x 3 B	
Pos. 120	1 off	O-ring	106 x 3 B	
Pos. 210	1 off	Cylinder	D96 L197	

Single part, spring washer hydraulic section				Part No. 76312 053060
Pos. 100	12 off	Spring washer	94.5 x 75.5 x 1	

Note:

to Pos. 100: The article No. only refers to a single spring washer.

When ordering replacement parts, please indicate the number of parts required.

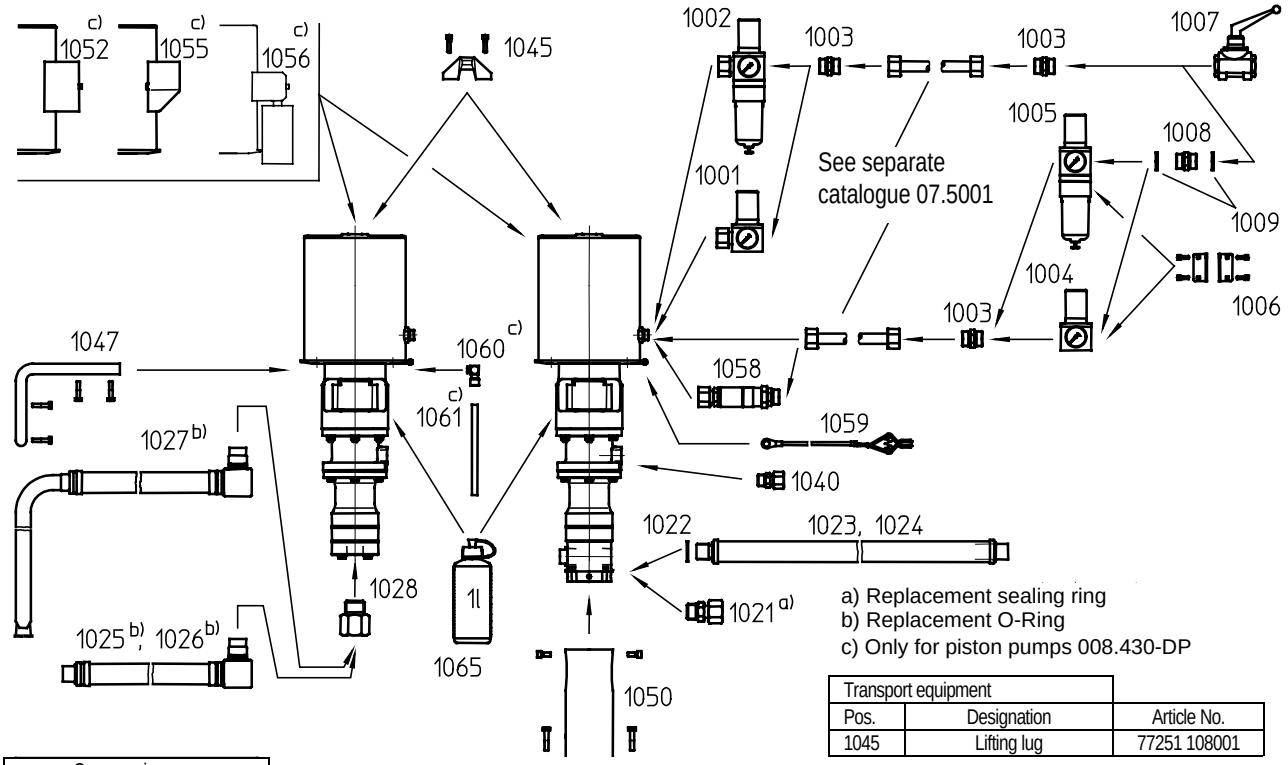
REPLACEMENT PISTON PUMPS
REPLACEMENT ACCESSORIES

(Sales Catalogue 01.1552- Extract)

The piston pumps in their basic version

Piston pump _____ - with safety valves
Type - with integrated silencer
W = wall construction - with air connector with
S = column construction integrated screen

Pos.	MODEL	Weight (kg)	Article No.
002	008.430-DP W	66	79042 059004
003	012.430-DP W	85	79042 059025
004	018.430-DP W	86	79042 059030
005	008.430-DP S	74.5	79042 059014
006	012.430-DP S	93.5	79042 059035
007	018.430-DP S	94.5	79042 059040



a) Replacement sealing ring
b) Replacement O-Ring
c) Only for piston pumps 008.430-DP

Compr. air conn.				
Pos.	Designation	Material	Notes	Article No.
1001	Compr. air conn.	-	M30x2 – G ¾	77522 032001
1002	Compr. air conn.	-	M30x2 – G3/4	77522 034002
1003	Connector	CrSt	M30x2-G3/4 tap.	76639 221001
1004	Compr. air conn.	-	G3/4	77522 028010
1005	Compr. air conn.	-	G3/4	77522 034003
1006	Elbow	St	Wall support	75650 009001
1007	Ball cock	-	PN 50 G3/4	75601 012005
1008	Connector	CrSt	16-G3/4	76640 008001
1009	Seal washer	Al	27x32	74188 025070

Suction connection				
Pos.	Designation	Material	Notes	Article No.
1021	Screwed joint	SST	GE 42 – ZLR ED	75204 010007
1022	Seal washer	PA	48x55	74188 059050
1023	Suction hose	SST	R11/2-D42-L1475	77848 030012
1024	Suction hose	SST	R11/2-D42-L1875	77848 030013
1025	Suction hose	SST	D48-D42-L1470	77848 014012
1026	Suction hose	SST	D48-D42-L1870	77848 014013
1027	Suction hose	SST	D48 200l container	77848 013025
1028	Connector	SST	G11/12–D48	76641 120002

Pressure connection				
Pos.	Designation	Material	Notes	Article No.
1040	Screwed joint	SST	GE 28-PLR	74204 090090

Order Example

Please lay out each order as follows:

Designation	Pos. No.	Article No.
Piston pump 008.430-DP W	002	79042 059004

Transport equipment		
Pos.	Designation	Article No.
1045	Lifting lug	77251 108001

Base fastening		
Pos.	Designation	Article No.
1050	Column	77656 01007

Air diffuser		
Pos.	Designation	Article No.
1052	Pipe cut-out	77809 008005

Additional silencer		
Pos.	Designation	Article No.
1055 1056	Plate silencer Further details on request	77666 003001

Switching off unit		
Pos.	Designation	Article No.
1058	Stop valve	78594 001003

Grounding		
Pos.	Designation	Article No.
1059	Ground wire	73483 001011

Condense drain		
Pos.	Designation	Article No.
1060	Plug connection	75202 001004
1061	Hose	70350 030012

Detergent		
Pos.	Designation	Article No.
1065	Bottle 1l	77682 001010

Note the protection mark in accordance with DIN 34

GRACO STANDARD WARRANTY

Graco warrants all equipment referenced in this document which is manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale by an authorized Graco distributor to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco´s written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the repaid return of equipment claimed to be defective to an authorized Graco distributor for verification of claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

THIS WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

Graco´s sole obligation and buyer´s sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale.

Graco does not extend its warranty to accessories, appliances, materials or components which are sold by Graco but are not manufactured by Graco and makes no guarantee, however implied, with regard to the brand capability and suitability for a certain purpose. These parts sold by Graco but not manufactured by Graco (such as electric motors, switches, hoses, etc.) are covered by the warranties of the respective manufacturers. Graco will support the buyer in enforcing any warranty claim with the proviso that in no event can Graco be made liable for indirect, incidental, special or consequential damages which arise from the supply of appliances by Graco under the conditions governed by these provisions, or the supply, performance or use of any products or other goods which are sold under the conditions governed by these provisions, whether as the result of breach of contract, breach of warranty, negligence on the part of Graco or for any other reason.

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B.6.15.52 / 11.99 / 79990 020001 / D