USER INFORMATION

KEEP FOR FUTURE USE

6000303E

Rev. C

B.8.20.60

CE

ND 85 20
ND 85 35
ND 85 50
ND 85 85
HD 50 20
HD 50 35
HD 50 50

2K device EcoMix ® 2000

GRACO N.V.
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3630 Maasmechelen - Belgium
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GRACO ®

REGULAR TESTING OF THE APPLIANCES

Test certificate No.	Test date	Person responsible	
		Company	Name

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

The operator must ensure that fluid spraying 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 fluid spraying 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 fluid spraying equipment.

1) A competent person is somebody that has sufficient knowledge in the field of fluid spraying 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 fluid spraying equipment.

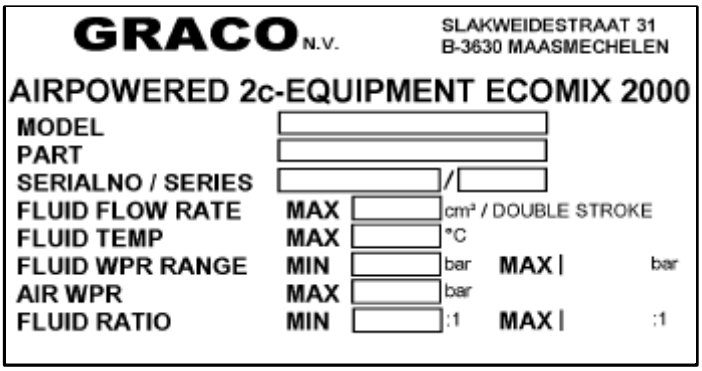
2) Written records (test results) can be for exemple test certificates.

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 requirements.

-Extract from: Arbeiten mit Flüssigkeitsstrahlern (VBG 87)
Issued on: 10th October 1993
§ 23 (1), (3) and (4)

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

ECOMIX 2000
BASIC VERSION, BASIC APPLIANCE, COMPLETE APPLIANCE


GRACO N.V.
SLAKWEIDESTRAAT 31
B-3630 MAASMECHELEN

AIRPOWERED 2c-EQUIPMENT ECOMIX 2000

MODEL					
PART					
SERIALNO / SERIES		/			
FLUID FLOW RATE	MAX		cm³ / DOUBLE STROKE		
FLUID TEMP	MAX		°C		
FLUID WPR RANGE	MIN		bar	MAX |	bar
AIR WPR	MAX		bar		
FLUID RATIO	MIN		:1	MAX |	:1

The original manufacturer's nameplate is on the 2K device.

Please compare all specifications and supplement, if necessary.

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

In this manual important information is marked with the following symbols:


Information affecting your safety


Important operational directions

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

CONTENTS OF USER INFORMATION

The following are included separately:
TEST CERTIFICATE (Final acceptance)
EC – DECLARATION OF CONFORMITY (to be attached to 2K device)
BRIEF OPERATING INSTRUCTIONS, WARNING SIGNS

CORRECT USE

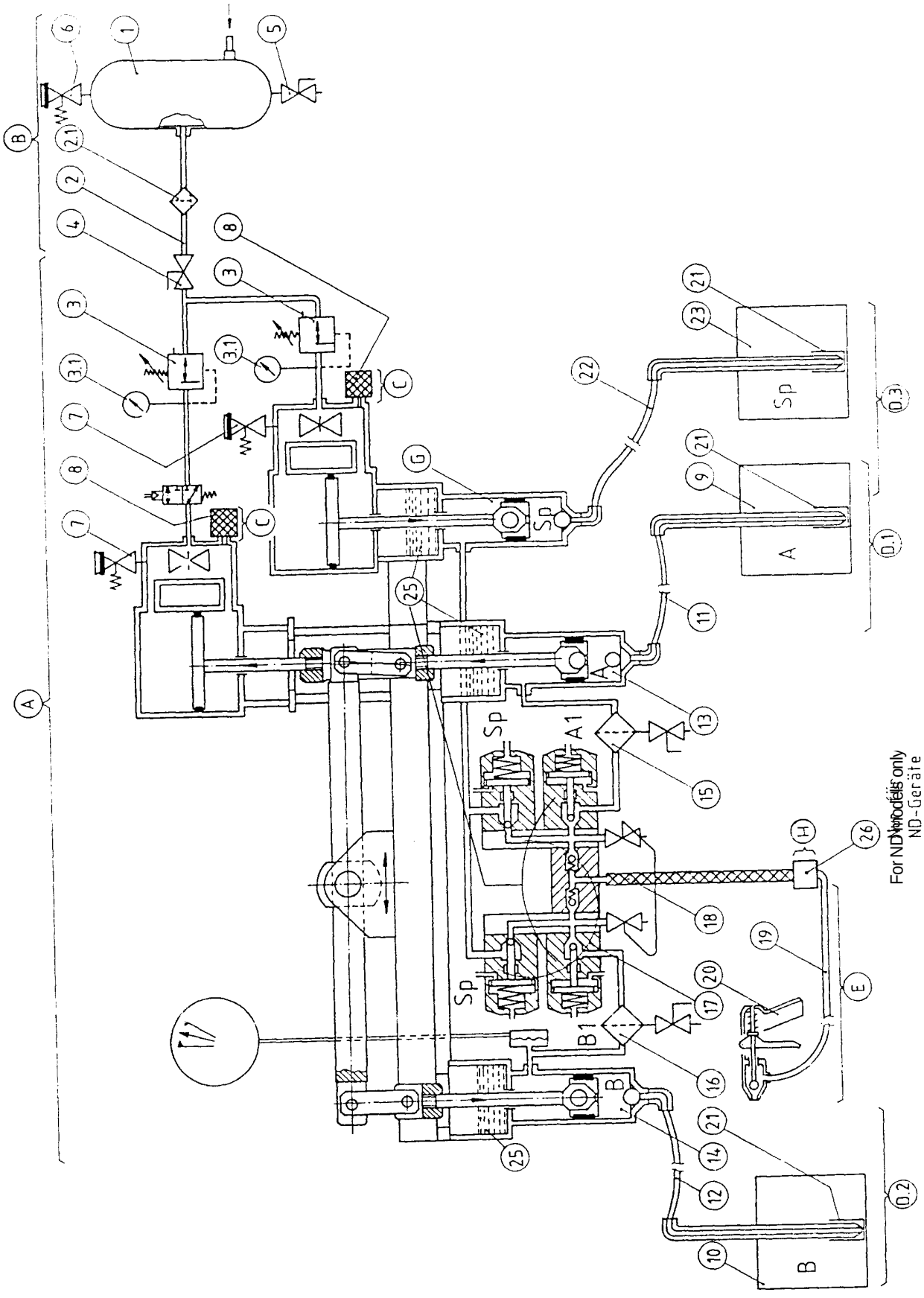
ECOMIX 2000 equipment is exclusively manufactured for common applications in surfacing technology, for spraying or discharging or similar work with 2K fluids.
Any other purpose above and beyond this is considered as incorrect use. We are not liable for any damage or injury resulting from this; the user will bear sole liability in such cases.
Correct use includes observing operating, maintenance and inspection conditions and regulations laid down by us.
The ECOMIX 2000 may only be operated, maintained and repaired by personnel familiar with, and trained to recognize the inherent dangers.
The relevant accident prevention regulations as well as safety and medical rules must be respected.
Unauthorized modifications to the appliance releases us from any liability for damages arising from this.
The user is responsible for the correct installation of the appliance.

FUNCTIONAL DIAGRAM

See figure on the page

- (A) 2K-DEVICE
- (B) COMPRESSED AIR SUPPLY
- (C) AIR EXHAUST SOUND SUPPRESSION
- (D) FLUID SUCTION SYSTEM
- (E) FLUID PRESSURE SYSTEM
- (F) SUPPORT (not shown)
- (G) FLUSHING PUMP
- (H) FLUID PRESSURE SYSTEM (ND MODELS ONLY) see page 33

(1)	Compressed air container	(9, 10, 23)	Fluid container
(2)	Pipeline or hose	(11, 12,	Suction pipe
(2.1)	Air filter	(13, 14)	Hydraulic unit
(3)	Pressure regulation valve	(15, 16)	High-pressure screen
(3.1)	Manometer	(17)	Valve unit
(4)	Ball valve	(18)	Static mixer
(5)	Ball valve	(19)	Hose line
(6)	Safety valve	(20)	Spray gun
(7)	Safety valve	(21)	Strainer
(8)	Silencer	(25)	Wet cup
		(26)	Pressure regulation valve with manifold for bursting disc


For ND-models only
ND-Geräte
Sp
A1
B1
A
B

DESCRIPTION OF FUNCTIONS

Compressed air is fed from a pressure tank ① to the 2K device Ⓐ via a tube or hose line ② and a pressure regulation valve ③, if possible through a separate air filter (2.1).
The air supply from the pressure tank to the 2K device can be interrupted by the ball valve ⑤.
The ball valve ④ is used to release condense manually, - an automatic moisture trap is recommended here.
The safety valve ⑥ protects the pressure tank against unacceptable air pressure increases (e.g. when heated).
Because it is required and the compressed air supply Ⓑ is usually not installed for the 2K device alone, the piston pump also features a safety valve ⑦.
During operation of the piston pump air motor, the compressed air escapes into the atmosphere via the silencer ⑧, thus relieving its pressure.
The fluids (A = base and B = hardener) are sucked out of the containers (A = ⑨ and B = ⑩) into the piston pump ⑬ and ⑭ through suction lines ⑪ and ⑫ and supplied separately under high pressure through the high-pressure screen ⑮ and ⑯ the valve unit ⑰ and the static mixer ⑱. Here they are mixed well and the fed over the hose line ⑲ to the spray gun ⑳.
The strainers ㉑ protect the 2K device against foreign substances that might have accidentally entered the fluid.

A wet cup (flushing agent tank) ㉕ is indispensable for hydraulic units
as well as for valve units of this design and is decisive for its installation.
If the equipment is not operated for a longer period of time (exceeding the processing time), it must be flushed from the valve unit ⑰ to the spray gun ⑳. This is done with the flushing pump Ⓖ along the suction line ㉒ from container ㉓.

During the flushing procedure the pressurized solvent is led to the valve unit ⑰, then to the mixer ⑱, along the suction line ⑲ to the spray gun ⑳.
The ND models have a pressure regulation valve with a manifold for a bursting disc ⑱ behind the mixer ㉖, that protects the hose line ⑲ and the spray gun ⑳ against overpressure.

EQUIPMENT COMPONENTS – IMPORTANT INFORMATION

The following components are required in an operational system:

Ⓐ THE 2K DEVICE

The functional description of the 2K device can be found in the corresponding section in the "Technical Product Description B. 8.20.60-P".

Ⓑ THE COMPRESSED AIR SUPPLY

The compressed air supply consists of the compressor, the pressure tank with moisture trap, possibly a compressed air drier and pipeline. The compressed air supply is generally already available to the user.

– When compressed air supply needs to be installed, the relevant accident prevention regulations, safety rules and user information must be respected, in particular the information supplied by the compressor manufacturer.

The connection between the 2K device and the compressed air line must be flexible to avoid rupture caused by vibration.

A hose line is most suitable

- Rated diameter DN16 or more
- Working pressure = maximum system pressure, preferably > 16 bar (for max. system pressure on the 2K device, see pages 22 and 23).
- Air and ambient temperatures -20° to +50 °C

In areas with a danger of explosion compressed air lines and hose lines must be electrically conductive to avoid electrostatic charging.

The pressure regulation valve and the manometer (3.1) in the functional diagram are part of the 2K device.

Every 2K device features a shut-off mechanism (a ball valve)

- This enables a quick and safe shut-off of the 2K device for operational breaks, maintenance work and in cases of errors.

⚠ The rule for ball valves: wings transverse to flow direction means that the line is shut off

Do not use PTFE tape hemp to seal connections, this leads to pressure regulation valve malfunction due to residue from the compressed air supply.

The following special requirements apply to the quality of the compressed air supplied to the 2K device.

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

In painting processes the compressed air must be free of substances (oil, silicone) that can lead to the formation of pits.

– This also applies to all components of the compressed air supply.

Ⓒ AIR EXHAUST SILENCER

The sound emission of an air powered 2K device is damaging to hearing in the absence of a silencer [> 115 dB(A)].
As there is a relation between sound absorption and the formation of ice on the air motor control system, the sound level cannot be reduced with a silencer as much as would be desired [not to 70 dB(A)].
All basic and complete ECOMIX 2000 systems are therefore fitted with correctly proportioned silencers.

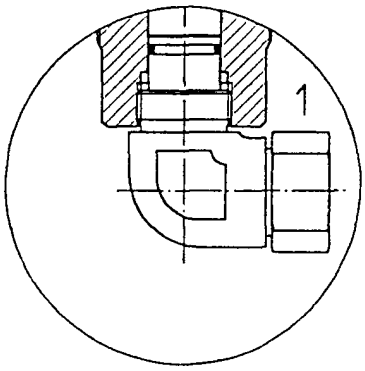
For detailed information on the sound pressure level, see the corresponding section in the "Technical Product Description B. 8.20.60-P"

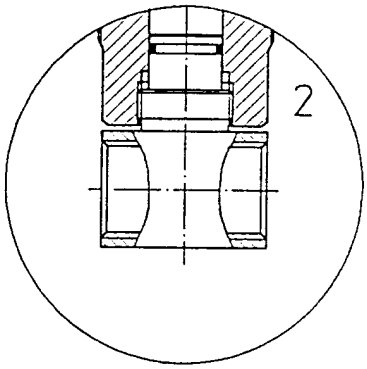
⚠ Do not remove the silencer of the flushing pump when the 2K equipment is operating.

- The necessity to wear hearing protection depends on the working pressure and the resulting sound pressure level.

Ⓓ FLUID SUCTION SYSTEM

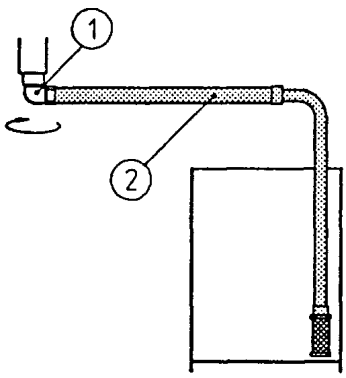
The suction connections of ECOMIX 2000 equipment are constructed to allow that a swivel unit (angular or T-shaped) and a connector can be screwed in.





Connection units 1 and 2 are used to connect the suction system, the suction line and the suction cup.

All wetted metal parts of the suction unit are made from austenitic stainless steel (- suitable for water-based paints).



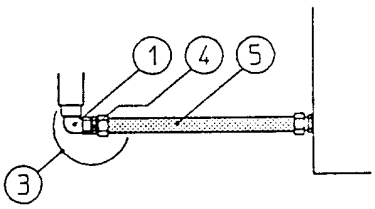
Most of the 2K devices are equipped with a connector ① and a suction system ② (suction hose, tube and suction sieve).
The swivel connector enhances the flexibility of the suction hose so an almost empty fluid container will not be turned over by the recoil force of the suction hose.

The diameter of the suction line is designed to enable suction of fluids with a kinematic viscosity of up to 750 mm²/s (cSt) by the 2K device 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 line as short as possible or a short suction hose with a larger diameter, or a suction cup.

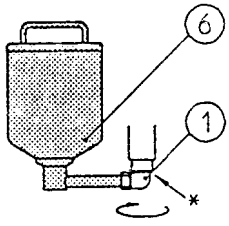
Specifications of suction assembly:

- Electrically conductive, maximum permissible resistance 3 x 10^4 Ohm/m (tested to ISO 8031) or leakage resistance to earth < 10^6 Ω•
  (- Suitable for use in locations with an explosion hazard.)
- The individual parts of the suction line are designed to withstand an overpressure of 12 bar
  (- suitable for suction heights of up to 8.5 m).
- The suction hose and the strainer are resistant to solvents commonly used in surface coating, and are silicone-free.
- Minimum rated width DN 19
- Fluid temperature 10 to 85 °C
- Mesh size of screen 1.8



In case of a fixed installation, the connection between the 2K device > fluid circulation line or between the 2K device > pressure tank must be flexible (- to avoid rupture caused by vibration).
The suction line ③ therefore consists of the connector ①, a nipple ④ and the smooth, stainless steel braided suction hose ⑤ and threaded connection on the side of the pressure tank. A threaded connection G 1/2 A with 60° sealing core is required.

⚠ The inlet pressure (pressure in a supply system, e.g. in the circulation line), acting on the hydraulic units and the suction line must not exceed 10 bar.



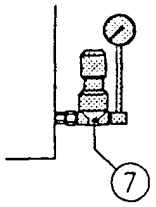
It is recommended to install a small <u>container</u> ⑥ to the connector ① on the hardener side to mix smaller amounts of fluid.
The container, the connector, the cover and the inserted screen are made of austenitic stainless steel (- suitable for water-based paints).

* The container can be protected with an additional burst disc (Part No. 76188 020002) against rupture by vibration.

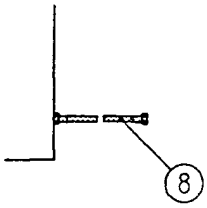
- The capacity of the container is 5 l
- Design certification for highly inflammable liquids of classes AI and AII is <u>not</u> required, since the container is made entirely from stainless steel.
- Suitable for use in areas with explosion hazards, because electrostatic charging cannot be generated.

Ⓔ FLUID PRESSURE SYSTEM

The fluid pressure system consists of the hose line and the discharge or spray gun. In some cases a pressure regulation valve has been installed as well.

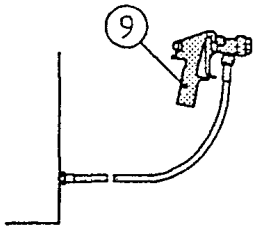


A pressure regulation valve ⑦ (mechanically or pneumatically controlled) can be fitted at the fluid outlet of the 2K device.
Follow the relevant user information.
If we supply the pressure-regulation valve, the user information has been provided.



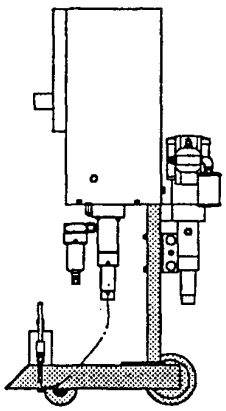
The hose line ⑧ connects the 2K device with the spray gun.
The hose line is connected to the 2K device without seal rings (sealed head screwed joint).
For surface coating applications, the hose line must have the following specifications:

- Electrically conductive, max. resistance $3 \bullet 10^4$ Ohm/m (tested to ISO 8031)
- The inside pipeline coating must be resistant to normal solvents, the outer coating resistant under certain conditions.
- Silicone-free
- Operating temperature -40 to +80 °C
- Complies with relevant standards (dimensioning, marking)
- The sealing head nipples of the hose fittings are made from austenitic stainless steel or zinc plated and yellow chrome plated steel.
- Working pressure must be higher than the pressure of the 2K device (approx. 250 bar)
- Connection thread normally G1/4.



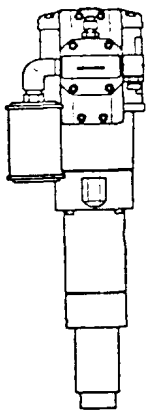
The nozzle or spray gun ⑨ is installed at the end of the hose line (thread size G 1/4).
Follow the relevant user information.
The user information has also been provided when we supplied the nozzle/spray gun.

Ⓕ SUPPORT



The equipment support (trolley) is a regular part of every 2K device.
The trolley has four wheels.
Since the trolley wheels cannot be locked, the floor surface must incline as little as possible. Secure with wedges, if necessary.
The wheels are not electrically conductive.
This means that the 2K device can only be used in locations with explosion hazards (i.e. Zone 1), when specific safety measures are taken. There are no objections to its use in Zone 2.
The label on the right is affixed to the trolley and refers to the guidelines to be respected.

Ⓖ THE FLUSHING PUMP

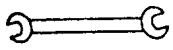
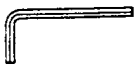
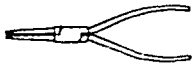
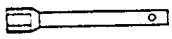
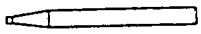


The flushing pump is a regular part of the 2K device.

It is supplied with the appropriate user information.

Pressure range 2K device	Flushing pump Model	User Information
ND	005.035-DP	See section B.8.20.60-E410
MD	020.035-DP	See section B.8.20.60-E410
HD	030.020-DP	See section B.8.20.60-E410

LIST OF TOOLS

 Double spanner DIN 895	 Allen Screw DIN 911	 Sickle spanner, adjustable	 Pliers DIN 5256-D	 Phillips screwdriver DIN 5262
7 x 8	3	Ø 35 up to Ø 60 Part No. 70620 100003	for retaining ring Ø 19 up to Ø 60	Gr. 2 (for thread M4)
8 x 10	4			
10 x 11	5	Ø 60 up to Ø 90 Part No. 70620 100004		
11 x 13	6			
12 x 14	8		 Tubular socket wrench DIN 659	 Screwdriver for slotted screws DIN 5265
13 x 17	10*			
17 x 19	14			
19 x 22	17			
22 x 24		 Bolts* Part No. 76161 057001	SW 12	Thread cutter 1.6 x 8 (for MS thread)
30 x 32				
32 x 36		* supplied with each 2K device		

INSTALLATION

The 2K device must be installed on an even surface that is strong enough.

Do not install in narrow, enclosed spaces.

(- danger of malfunction due to icing of the air motor control).

When installing in locations with an explosion hazard, zone 1, you should respect the guidelines for explosion prevention (EX-RL) ZH1/10 (chapter 2), as regards assembly materials.

⚠ The 2K device must not be transported with a hoist

VENTILATION OF THE WORK AREA

Must be provided.

GROUNDING

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

In accordance with the directive on "Static Electricity" ZH1/200, 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 by non-conductive parts.
The grounding connection must be tested for correct working conditions
by a qualified engineer.

– Grounding points on the appliances are appropriately marked: ⏚

Portable, conductive vessels or appliances that can be electrically charged must also be grounded
This is usually achieved by means of a flexible connection, secured e.g. by a clip.

– Do not use chains.

COMPRESSED AIR SUPPLY

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

– Also refer to page 5, "Quality of Compressed Air"

CONNECTIONS

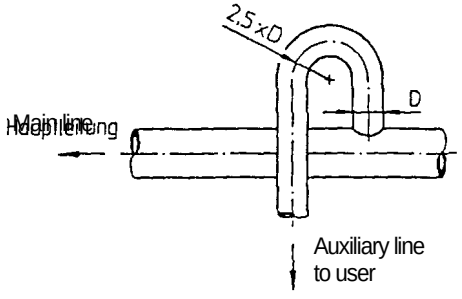
Compressed air line ◄► 2K device. Suction line ◄► 2K device.
Compressed air line ◄► 2K device
flexible and electrically conductive in locations with an explosion hazard.

– see pages 4 to 8

COMPRESSED AIR LINE

When a compressed air line needs to be installed, it must have a gradient of 3 to 5 mm per meter down to the compressed air tank or the moisture trap. When a branch line has to be installed from an existing compressed air line, it should connect above the line axis.

When installing curved metal airlines, they should be selected with a bend radius on the tube axis not smaller than 2.5x the outside diameter of the line.
- Plastic lines in locations with an explosion hazard must have a conducting resistance to earth of < 10^6 Ω.

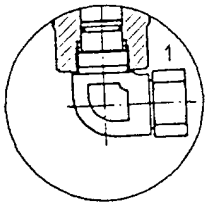


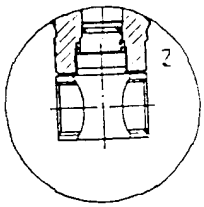
SILENCER

see page 6

– Check by hand that the silencer is fixed in position.

FLUID SUCTION UNIT





See pages 6 and 7

Screw the connection piece ① or ② into the piston pump as far as it will go.
Next, back it out 1 to 1.5 turns, to allow the device to swivel.

Respect the following when attaching the suction assembly to the connection ①:

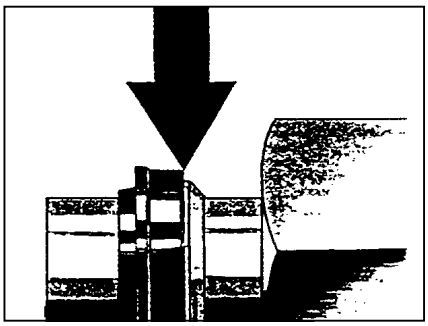
- Insert the tube end of the suction assembly into the connector and press it against the stop in the internal taper.

When the end of the tube does not touch the stop, the installation is incorrect.

- Continue until clear resistance is felt
  - Hold the connector.

Assembly check

Loosen union nut and check whether there is no clearance between the seal ring and the retaining ring. After loosening, the nut must be reassembled and tightened with the same tightening torque as was used in the initial assembly.
Hold the connector.



GENERAL ASSEMBLY INSTRUCTIONS

- Always use the recommended torque
- Grease thread lightly.
- Do not use PTFE tape or hemp
- Components not supplied by us must have dimensions that correspond to the specified dimensions of the 2K device.

– Follow the manufacturer’s instructions

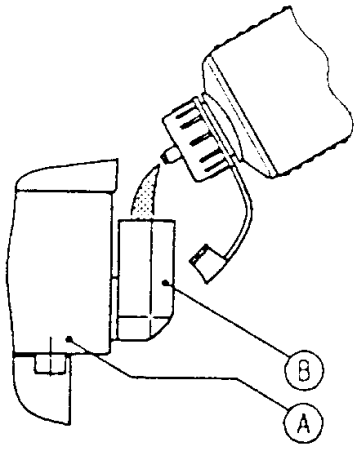
- Follow the manufacturer's assembly instructions when using cutting rings or double conical rings.

⚠ The wetted parts of the suction and pressure system should not have zinc-plated surfaces nor be made of aluminum when liquids are to be pumped that contain chlorinated hydrocarbons (halogenated hydrocarbons), e.g. trichloro-ethane or dichloromethane.

– Metal organic reactions can be generated which are explosive and extremely caustic.

START UP

FILLING THE WET CUP

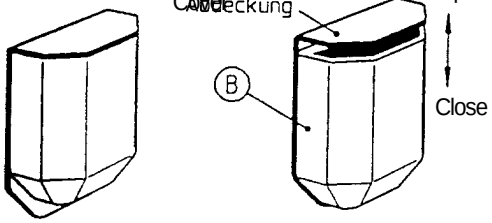


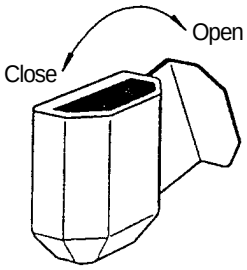
Fill the coupling housing Ⓐ up to the middle of the filling tube Ⓑ with solvent.

See manual 6000354 section B.13.50.01-B for the start up of the hydraulic valves

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

In 2K devices with covered filling tubes, the cap must be moved to the side first and returned to its original position after filling.





INSTALLING THE FILTER INSERT

The integrated filters of the 2K devices are supplied without inserts. The screen inserts (choice of mesh size depends on the nozzle used) must be fitted later.

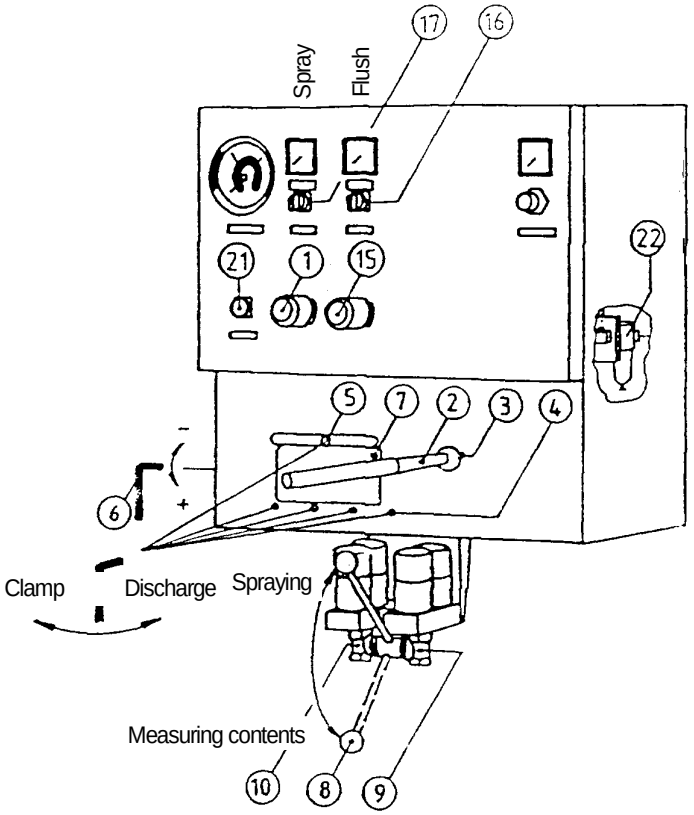
- Remove the union nut and take off filter housing. Place the filter insert over the support spring into the housing and re-install the housing.

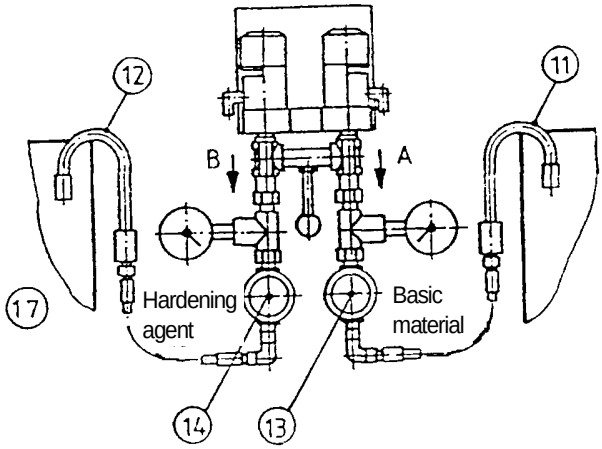
FLUSHING THE 2K DEVICE

Each every 2K device is factory-tested after assembly with 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 solvent (flushing agent).

The solvent must be compatible with the fluid to be processed later; we recommend that you consult the fluid supplier.

1. For the flushing procedure of the flushing pump (including the hydraulic valves) refer to the section “Flushing from the valve unit”
2. Flushing all the rest of the 2K device
   1. Suction installations “A” and “B” in solvent.
   2. Turn lever bearing in position “O” (mixing ration 1:1); adjustment, see page 15.
   3. Open fluid pressure valves ⑬ and ⑭, when installed (turn left).
   4. Hang discharge units ⑪ and ⑫ in an empty vessel.
   5. Engage the spray gun (without tip).
   6. Move the lever ⑧ of the hydraulic valve unit up to the “SPRAY” position – Run the device slowly (air pressure valve ① and “SPRAY” switch ON) until clear solvent is discharged from the gun. Move the lever ⑧ down to the “MEASURING CONTENT” position until the discharge units have been cleaned.





Remove the solvent from the equipment by air-drying into the drain containers using the suction installations “A” and “B”.

FLUSHING WITH THE FLUSHING PUMP

Flushing from the valve unit:

1. Suction installation of the flushing pump in solvent
2. Move the lever ⑧ up to the “SPRAY” position
3. Engage the spray gun (without tip)
4. Move “FLUSH” switch ⑯ to position “A”

Turn on the flushing pump using air regulation valve ⑮. Move the switch ⑯ to “B”, once the “A” system has been cleaned. Move the switch to the “O” position, once the “B” system has been cleaned.

Flushing the measuring installation:

1. Suction installation of the flushing pump in solvent
2. Move the lever ⑧ up to the “MEASURING” position
3. Hang discharge units ⑪ and ⑫ in an empty vessel
4. Open the fluid pressure valves, when installed (turn left) Flush sections “A” and “B” as described above.

STARTING UP THE 2K DEVICE

Because the AIR MOTOR OF THE 2K device works automatically with back pressure, it can only be started (i.e. fluid be conveyed) when fluid is discharged from the pressure system, e.g. by using the spraying equipment.

BLEEDING THE AIR FROM 2K DEVICE

The air that has entered the 2K device and the system after flushing must be thoroughly removed.
Move the lever ⑧ of the hydraulic valve unit down to the measurement position and return both discharge units to the container (circulation).
Start the bleeding by moving the “SPRAY” switch to the ON position and opening the “air” pressure valve ① slowly from its closed position, until the equipment runs slowly.
Bleed the system completely (reduce air pressure).
Finish by flushing the measuring installation, see above.

- Operate the 2K device without hydraulic counterpressure, until no more air is pumped.
  Finish by flushing the measuring installation, see above.

Bleeding the fluid hose (from the valve unit) and the spray unit without tip: Move the lever ⑧ of the hydraulic valve unit up to the “SPRAY” position and discharge the mixed material into an empty vessel. Start the equipment as described above.

- Spraying equipment without nozzle, discharge engaged, until no more air is discharged

PREPARING FOR SPRAYING

- Adjust spray unit, installing tip.

ADJUST (PLACE) THE PACKING

Slowly increase the fluid pressure to the maximum value. Operate the 2K device at this pressure for a short time. Then set the required working pressure.

- 2K device is ready for use

LOW AMBIENT TEMPERATURES

If starting up or operation is carried out at a 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 , part no. 6789257).
It is recommended to cover the device loosely with a plastic foil cover before operation (the protection of the brief operating instructions and the command devices against setting paint).

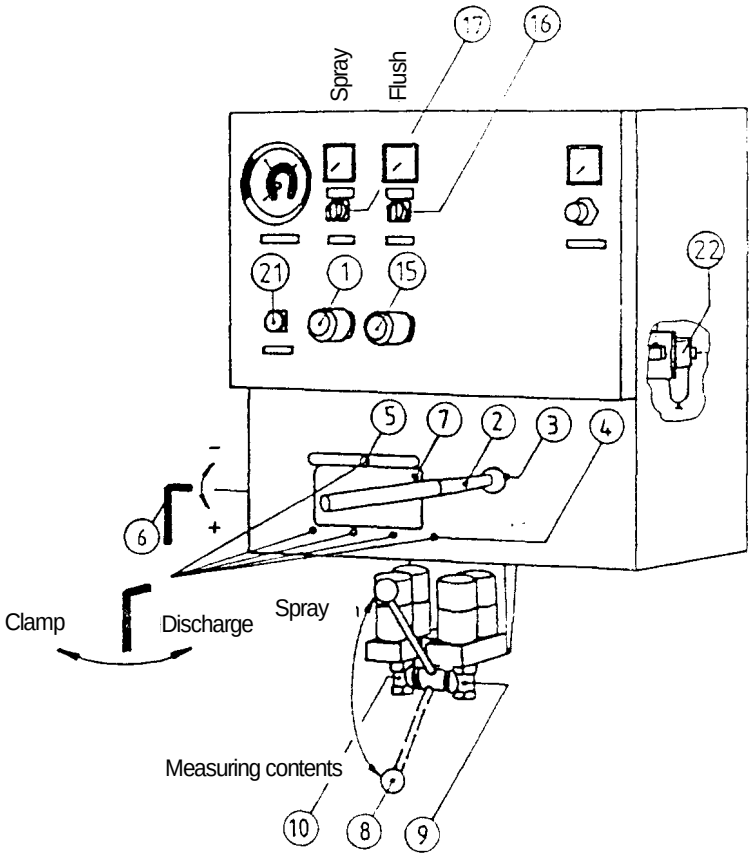
ADJUST THE MIXING RATIO

Run the device slowly and stop it at the end of its upward stroke (“SPRAY” switch “OFF”).

Insert the bolts ② into opening ③.

Run the machine slowly until the lever recess touches the bolt; switch off. To set the mixing ratios, loosen the retaining screws ④ (4 in all) and ⑤ (1 in all) one turn.

Set the lever bearing (see page 25) using the Allen screw ⑥ in accordance with the value table ⑦ (described on page 16) and tighten the cylinder screws ④ and ⑤. Pry up the bolts and pull them from the opening.

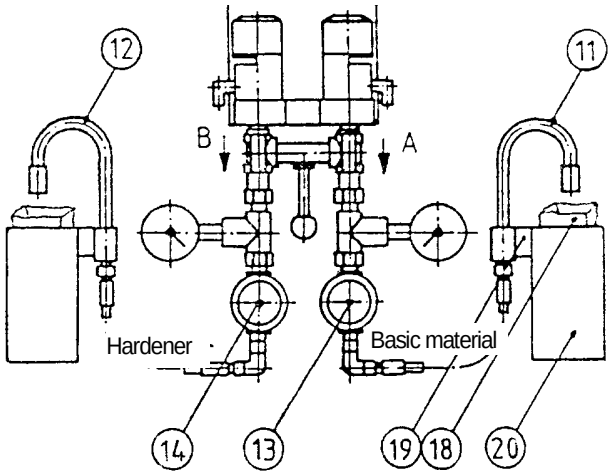


MEASURING

Basic condition:

The system up the closed spray gun, the fluid must be under maximum fluid pressure. To achieve this, move the lever ⑧ of the hydraulic valve unit up (SPRAY) and increase the fluid pressure.

Next, turn back the pressure regulation valve “Air” ① and move the lever down again (MEASURE).

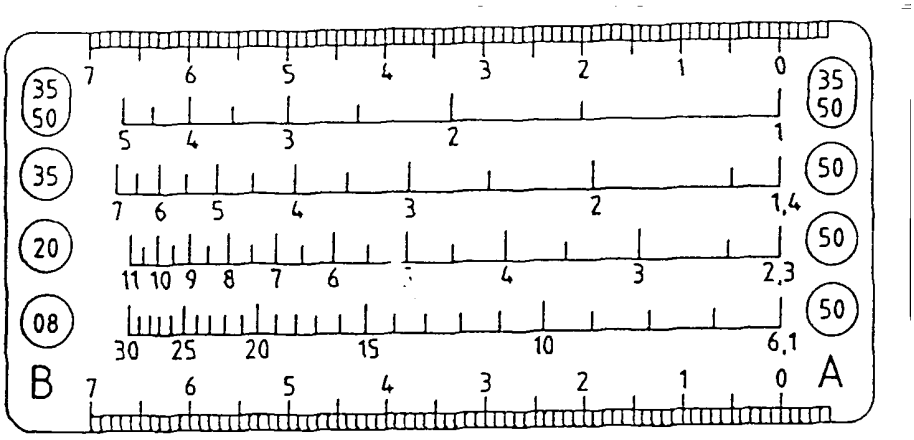


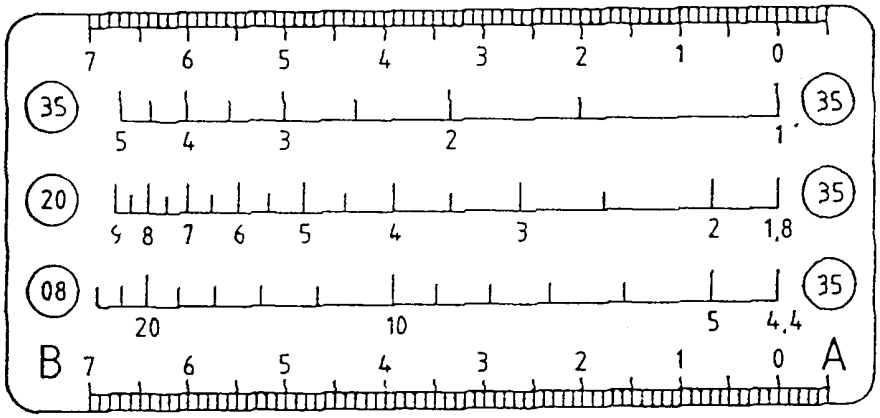
1. **Measuring with free discharge (standard version)**
   Hang discharge units ⑪ and ⑫ in containers with base material and hardener.
   Run the machine, set to approx. 15 double strokes per minute and stop it. (“SPRAY” switch to OFF).
   Insert measuring nozzle ⑱ in holder ⑳ and insert the discharge unit ⑪ and ⑫ in retainer ⑲. To measure,the devise must be engaged and disengaged with the “SPRAY” switch.
2. **Measuring under working pressure (special accessory)**
   Hang discharge units ⑪ and ⑫ in containers with base material and hardener.
   Run the machine slowly; increase the speed of the system by alternately using the “Air” pressure regulation valve ① and pressure regulation valves ⑬ and ⑭ (base material and hardener), until the operating conditions have been reached (maximum pressure and double stroke frequency).
   Switch off the device (“SPRAY” switch to OFF).
   Insert measuring nozzle ⑱ in holder ⑳ and insert the discharge units ⑪ and in retainer ⑫. To measure, the devise must be engaged and disengaged with the “SPRAY” switch.
   To prevent unauthorized use, the lever ⑲ can be removed (turn left) for safety reasons.

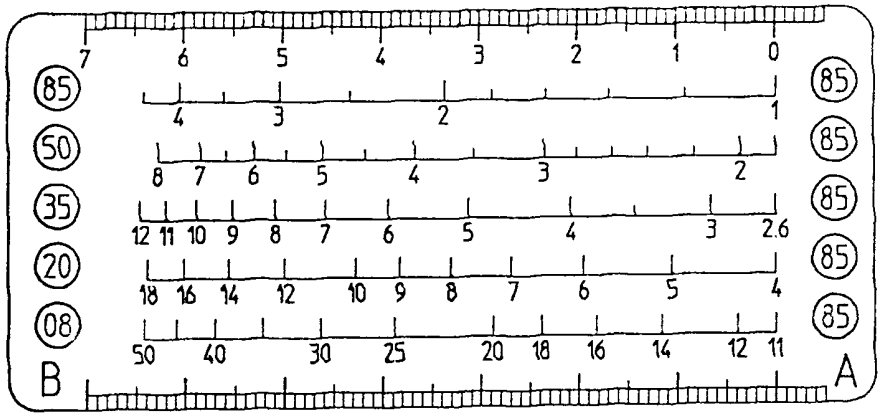
Flush the measuring section after the measurement.

APPROXIMATE VALUES (A GUIDE)

– for approximate setting of mixing ratios







The middle scales show the theoretical mixing ratios

Base material components (A) in accordance with the combinations of the displacement pump
Hardener components (B)

(specified in the matrix).

The upper and lower scales are auxiliary values and are used to ease renewed adjustment, e.g. after repair.

IMPORTANT INFORMATION CONCERNING STARTING UP AND OPERATION

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

The 2K device should only be operated dry for short periods of time under supervision and only 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 run the 2K device without wet cup (solvent in the gear housing and the hydraulic valves). - This will result in increased wear of the packing and a substantial reduction of the service life

- Continuous operation with high stroke frequency leads to extensive icing of control system (see technical product description B. 8.20.60-P, page 04).
  - Increased pulsation until the 2K device stalls.

- During operation, do not take the suction hose out of the fluid and push it back in.
  - If air enters the system, this will result in reduced painting results
  - Can lead to incorrect mixing ratios.

⚠ Never unscrew any parts from the flushing pump during operation e.g. the silencer.

⚠ Wear personal safety equipment (breathing apparatus, goggles, gloves, etc.), when working with fluid that has a health hazard.

⚠ Be aware of the rebound forces that are released (keep a tight grip on the gun, use a secured stand, work with care) when the spray system is activated.

⚠ Because of the risk of fluid injection into the skin, never place the spraying equipment (gun) directly on any part of the body (thumb, flat of the hand, etc.

⚠ Do not point the spray nozzle at people or animals.

⚠ Never run the 2K device without its guard. Danger of injury

Do not adjust the contact indicator of the manometer without reason.

OPERATION

(Also refer to manual 6000354 section B.13.50.01-B)

Start up Open ball valve for air pressure

Turn air pressure regulation valve "FLUSH" up to 3 or 7 bar respectively

Turn air pressure regulation valve "SPRAY" up to spraying pressure

Shut down

The section of the 2K device containing the mixed material (valve unit, mixer, fluid pressure hose, spray gun) must be flushed for longer stops (also refer to page 32) exceeding the processing time, overnight and during the weekend.

Turn the“SPRAY” switch to OFF

Engage the gun and press the "RESET" button (21 on page 13) until spraying pressure is reached.

Trigger the spray gun without the tip and flush, with the “FLUSH’ switch in position “A”, until clean solvent is discharged from the gun. Repeat the flushing procedure with the switch in position “B”.

Close the air pressure regulation valves for spraying and flushing. Close ball valve for air supply.

It is also recommended that the flushing agent is drained off and that the equipment is filled again when work recommences (the next day), provided it has not been contaminated.
In order to drain the detergent, turn the detergent filling connector to the left (max. 180°).
Return to the original position before pouring in the solvent.

Do not tighten with a tool (lever)

– Risk of breaking

When 2K devices are not used for a longer period (also refer to page 32), they must be flushed completely (including the suction hoses for the base fluid and the hardener with solvent). To prevent paint residue to settle, the solvent must be left in the 2K device during the period the device is not used. We recommend the use of a “ASE” phenol alkylsulphon acid ester or MESAMOL.

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

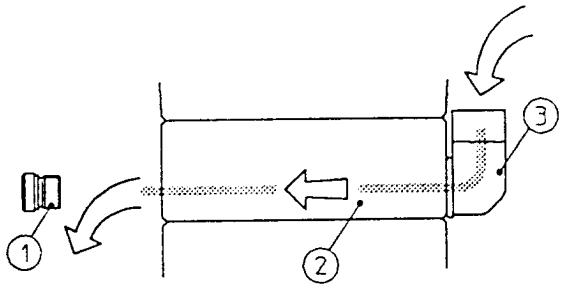
Do not use nitro thinners or solvents as flushing agents.

MAINTENANCE AND INSPECTION, REPAIR

MAINTENANCE AND INSPECTION

The ECOMIX 2000 2K devices require little maintenance

- Topple the anchor support forward – remove 2 screws – and check the solvent reservoir from above every week.
- The detergent should be replaced after discoloring or once every month
  - Drain through the drain plug ①
  - Flush the housing ② with detergent
  - Fill up to the center of the filling sleeve ③

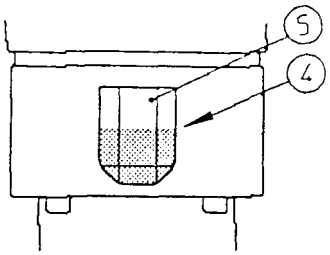


(for more information, refer to manual 6000354 section B.13.5O.01-B)

- 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. - Do not forget the fine filter (㉒ on page 13) for supply air in the device.
- When using anti-freeze (when operating at around 10 °C), replenish it after use.
- Empty filter PN500 regularly; - the upper parts will remain on the 2K device, clean all other parts thoroughly. Be careful with the diaphragms of the pressure sensor on the hardener side!
  - The cleaning interval depends on the process fluid or solvent and must be determined by the user.
- Check the performance of the safety valve in the 2K device once a year.
- Exceed the maximum permissible working pressure slightly (opening pressure up to 1.1 times the permissible working pressure).
- The power transmission of the hardener displacement pump is guided across several components, as a result of which clearances may have increased over time. This affects the mixing ratio negatively.
  Check regularly; correct the mixing ration, when required.
- The service life of the hose lines is adversely affected, i.e. shortened, by the environment (oxygen in air, temperature, light, etc.), even if they have been used correctly.
  Regular visual checks and occasional performance checks are recommended. As a precautionary measure, hose lines should be replaced by new ones at regular intervals determined by the user (- after 2 to 3 years).

⚠ Never at any time dismantle a 2K device which is under pressure.

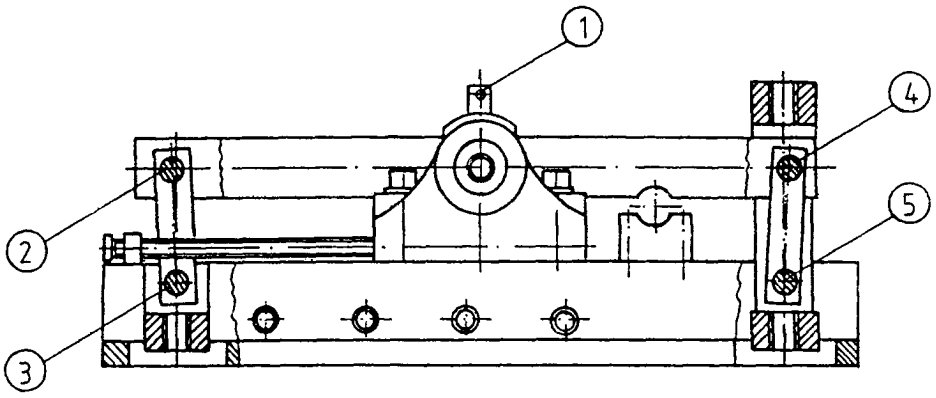
ECOMIX 2000 2K devices must be checked daily



- Check the solvent in the wet cup every day. The solvent level ④ must be visible in the filling sleeve ⑤, preferably in the center.
  When the solvent has visibly discolored, it must be changed.
  Discoloring can hardly be seen at the hardener side, so it must be changed more regularly here.
  – Refer to “Wet cups, solvents” on pages 12 and 18.
  (for more information, see manual 6000354 section B.13.50.01-B)
- A slowly rising solvent level while the equipment is running, is an indication of increasing wear of the piston rod packing (upper). If this happens, the 2K device must be checked more regularly (several times a day).
- If the solvent level is clearly rising between the daily checks while the equipment is running, the piston rod packing has worn to a degree that it must be replaced as soon as possible. - It is recommended to replace the lower piston rod packing at the same time.
- When, during the daily inspection, an increase of the pressure pulsation is detected, or engaging of the safety shut-off; this is generally caused by leaking valves for the base fluid or the hardener (wear or simply contaminated) – troubleshoot (refer to page 34, air motor ↑ and air motor ↓).
- When, during daily inspection, the sound of escaping air is heard from the silencer while the 2K device 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 slide and sliding seat should be replaced.

Lubrication

The bearing unit must be lubricated every month with commercially available lubes and greases.



Grease both bearing supports ① (supplied grease press).

Use lube for bearing points ② to ⑤

REPAIR

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

Use only genuine replacement parts. Our obligation to replace 2K 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 cutting tools.

Renew all removed seals.

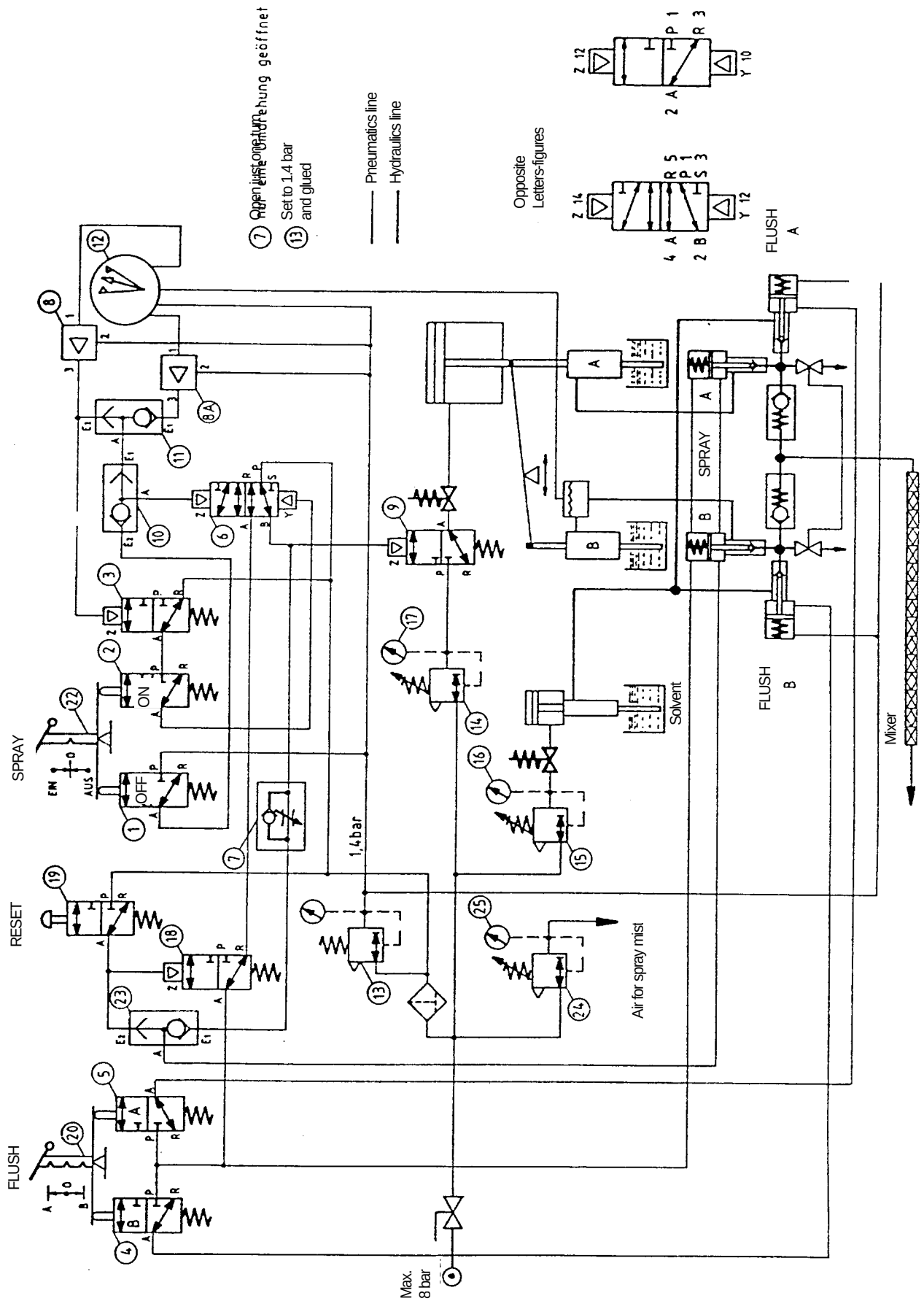
⚠ Lubricate all threads and fittings before assembly (grease lightly).

When using a sickle spanner, use the holes marked with “X“ (refer to pages 26 and 27) in the displacement pumps and in the PN500 screens (see page 9), - do not use a pipe wrench.

⚠ Shut off air pressure at the ball valve (at the inlet of the equipment) and relieve the device hydraulically before disassembly. See page 18 (shut down).

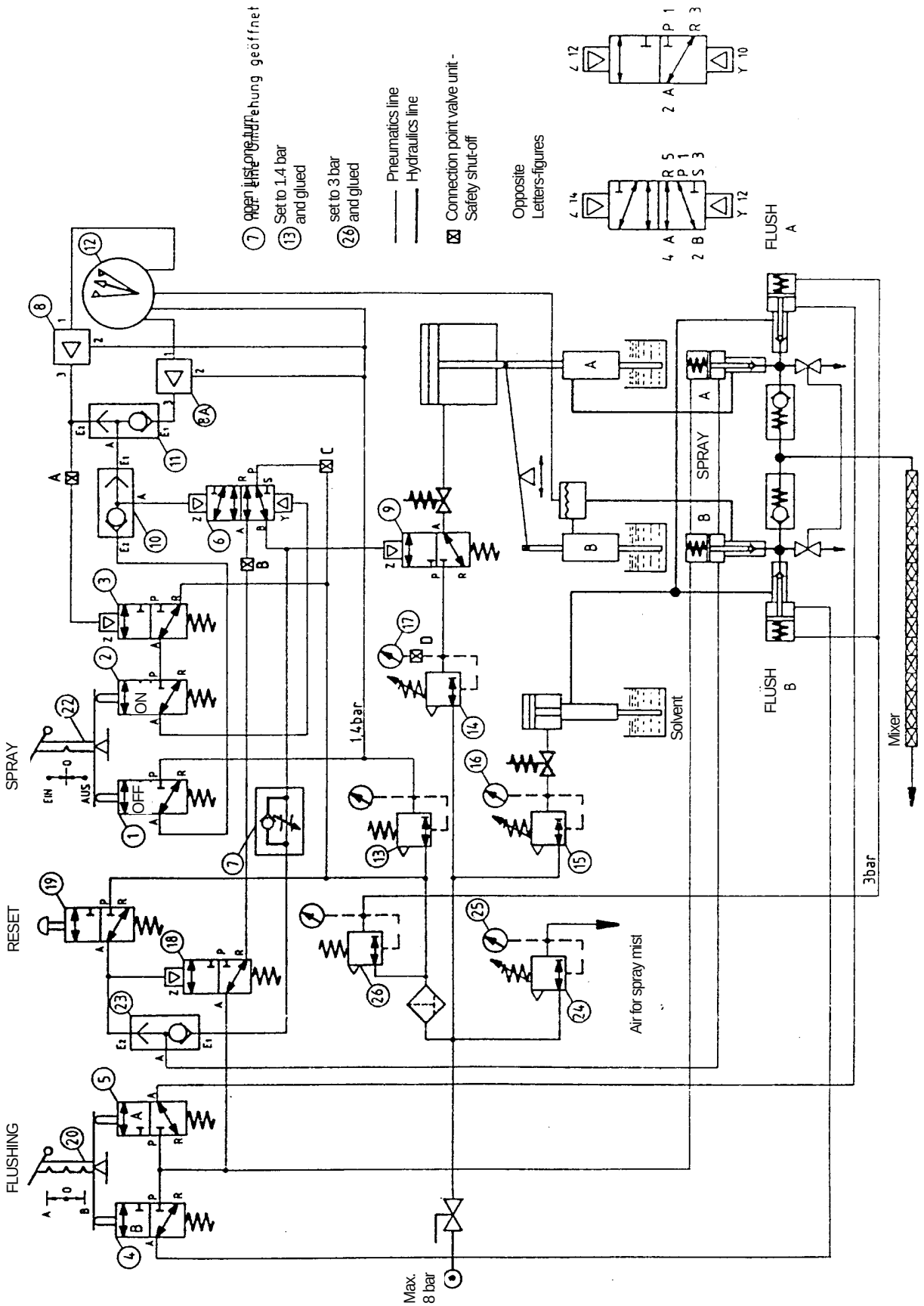
Pneumatic / hydraulic switching

2K-ND and MD

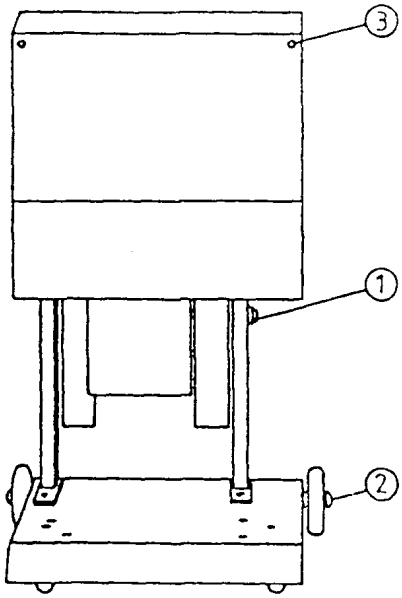


Pneumatic / hydraulic switching

2K-HD



Respect the following during repair and installation work:



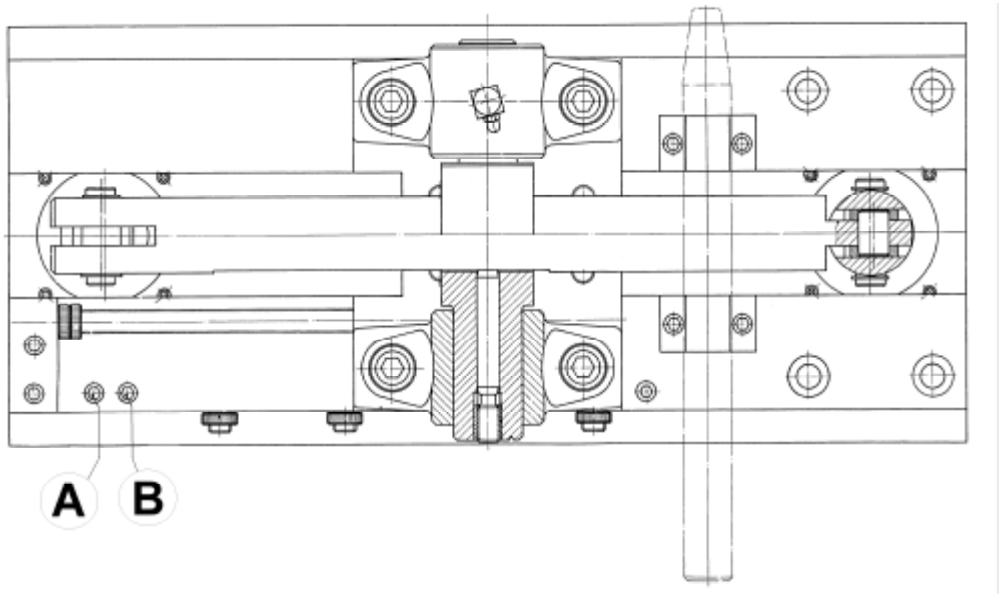
Grounding connection

Check of the grounding connection between the mobile support of the grounding clamp ⏚ ① and the axle ② or the armature support ③.
Measuring device: continuity tester (optical or acoustical)

Limiting the adjustment range (bearing unit)

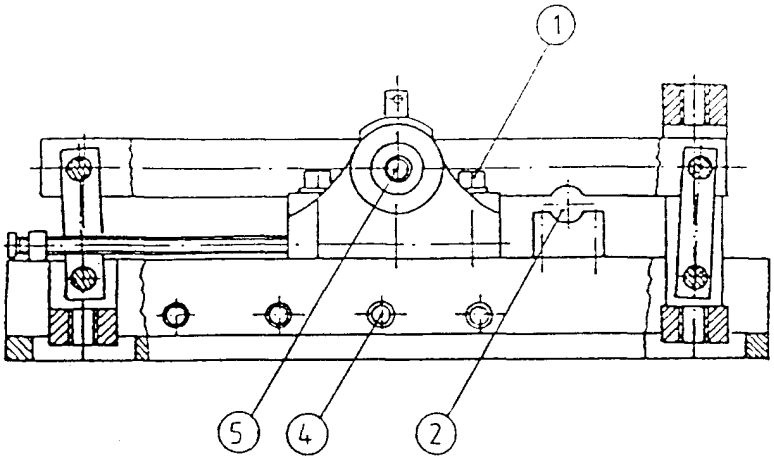
(Mix ratio)

Stop screw	
Position Ⓐ	Position Ⓑ
all models	only model
Except	HD 35 20 HD 35 35 HD 50 20 HD 50 25 HD 50 50



Locking the bearing unit

Respect the following when installing the bearing unit (balancing arm bearing):

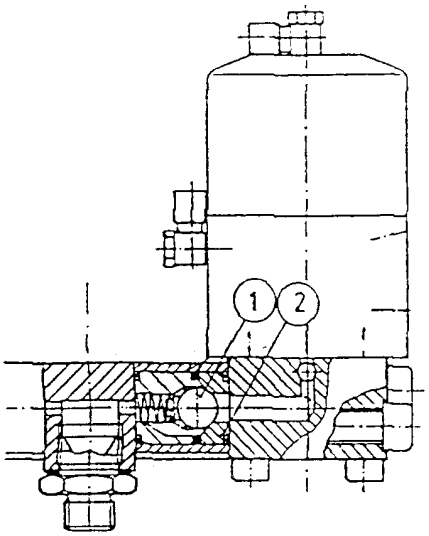


1. Position the balancing arm bearing in position “O” (mixing ration 1:1).
2. Screw in the 4 cylinder screws ① to attach both bearing blocks finger tight.
3. Tighten the screws (4 pieces) ④ and screw ⑤ while the bolts ②have been inserted (also refer to page 15).
4. Remove the bolts ② slowly while the equipment is slowly draining and tighten the 4 cylinder screws ① of both bearing blocks carefully to a torque of 86 Nm.

Valve unit

Observe great care when repairing the valve unit. When the check valve is leaking, it is always recommended to replace the valve ball ① and, when wear of the sealing surfaces is observed, always to replace the valve seat ② as well.

Always use new O-rings. Even the smallest leak can cause hardening of the fluid inside the valve unit.

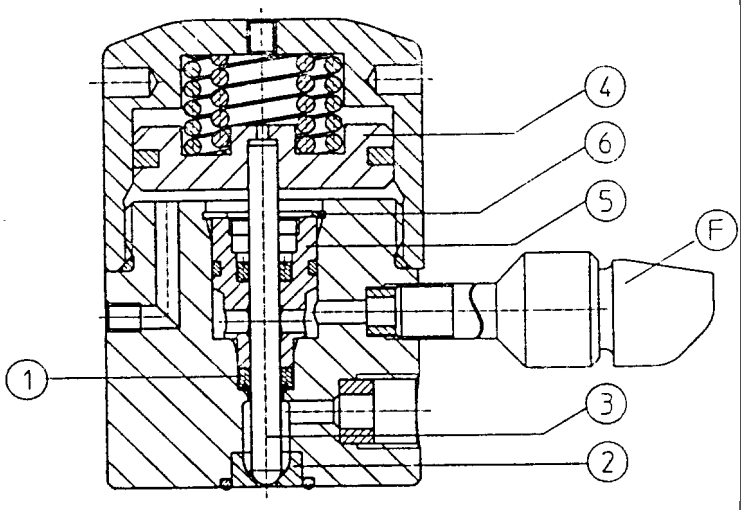


Hydraulic valve

To increase the service life of the lower valve sealing ① (recessed ring), the level indication Ⓕ must be filled with ASE or MESAMOLL up to its lower end.

When the valve seat ② is leaking, it must be replaced with the valve needle ③ and the piston disc ④ as an assembly. See replacement part sets: fluid valve (hardened steel).To replace the lower ring ①, pull out the sleeve ⑤ after first removing the spring ring ⑥using an M12 screw. Refer to manual 6000354 section B.13.50.01-B.

Lightly grease all contact surfaces of new sealing rings before installing them.

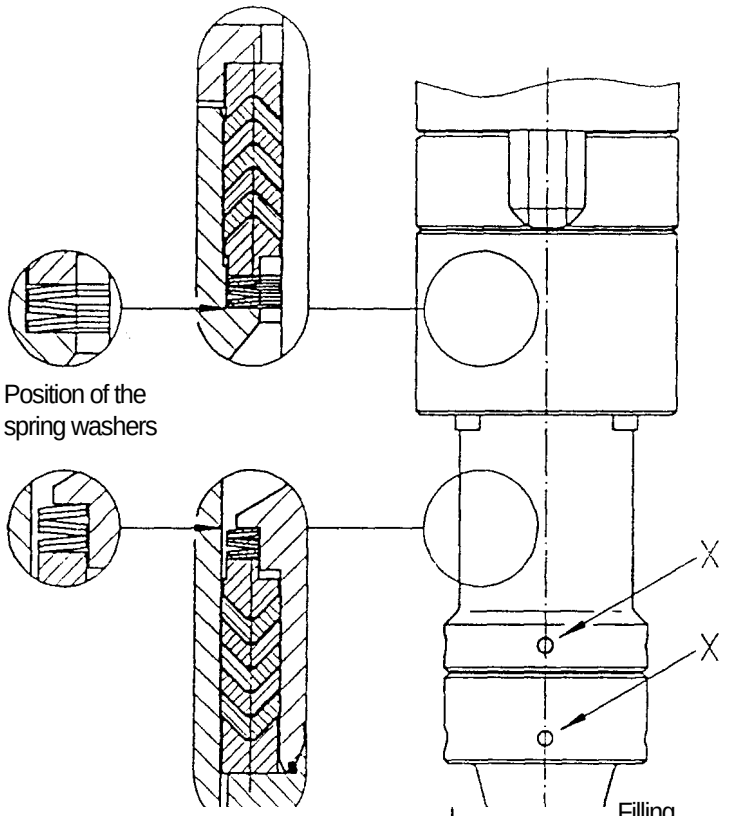


Displacement pump 000.085-DO

Replacing the packing

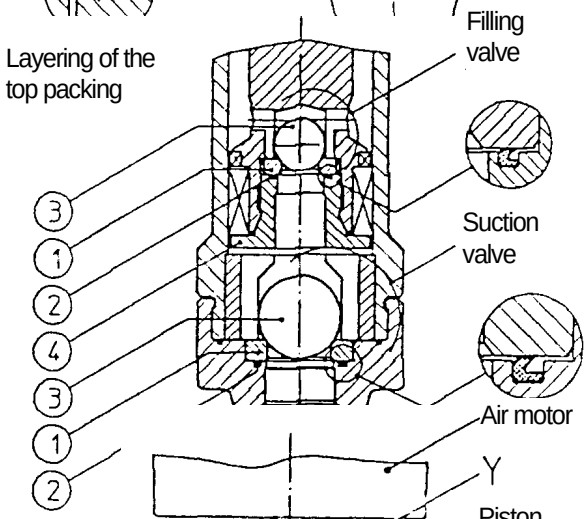
When replacing packing, note the exact position and the layering of the top packing and spring washers.

When the differential piston shows clear signs of wear (scoring, indentations) the piston must be replaced, too.



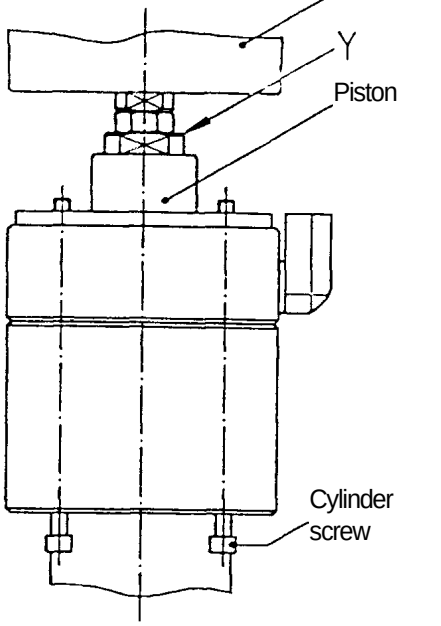
Replacing the valves

The valve seats ① can be turned over and replaced, if one side is worn.
If the profiled sealing rings ② underneath the seats are worn (clear deformation) they should be replaced. Care should be taken with the mounting position in this case.
Each new 2K device has one set of profiled sealing rings (separately supplied) for each hydraulic unit.
It is recommended to replace valve balls ③ with every service, to ensure trouble-free operation of the equipment.
(Pressure fluctuations and switching off)
The taper on the seat support ④ serves to lock in position during operation



When assembling, the seat support should be screwed in tightly, then loosened and re-tightened securely.

When loosening, it should be established whether the breakaway torque is clearly above the tightening torque. The running surface of the differential piston may <u>not</u> be used as a hold during disassembly and assembly of the filling valve. For technical reasons, the “Y“ key (area used for this) are located at the top end of the differential piston.
After loosening the cylinder screws (connection to the 2K device), access can be gained to the air motor.



Displacement pumps 000.020-DO; 000.035-DO; 000.050-DO

Replacing the packing

When replacing packing, note the exact position and the layering of the top packing and spring washers.

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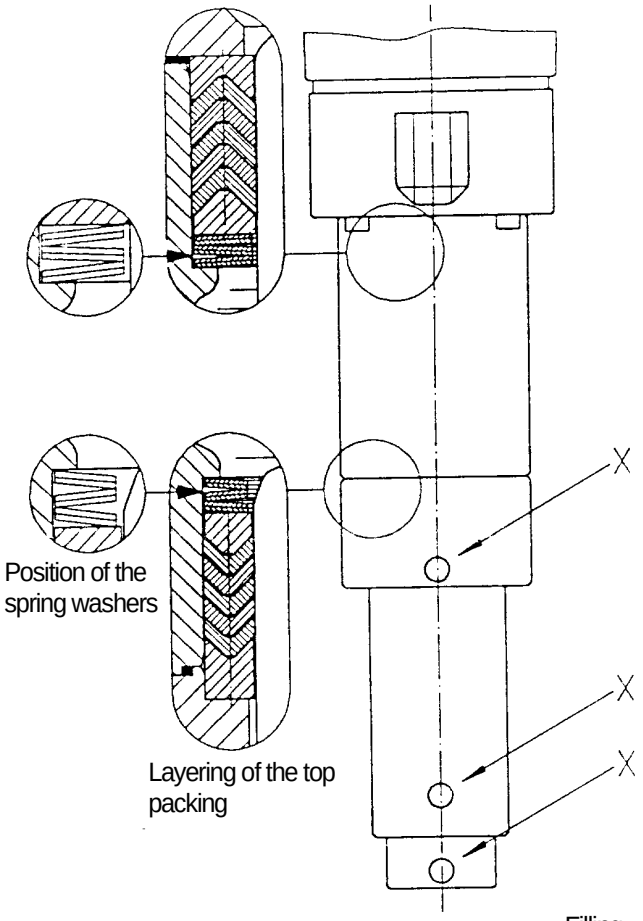

Replacing the valves

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(Pressure fluctuations and switching off)
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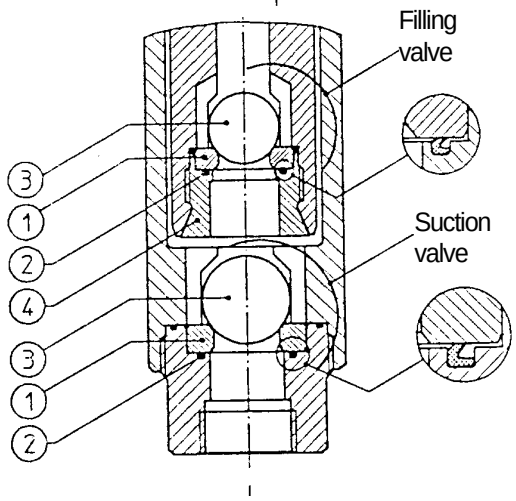

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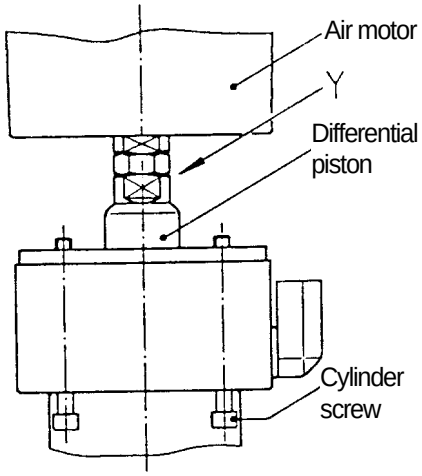
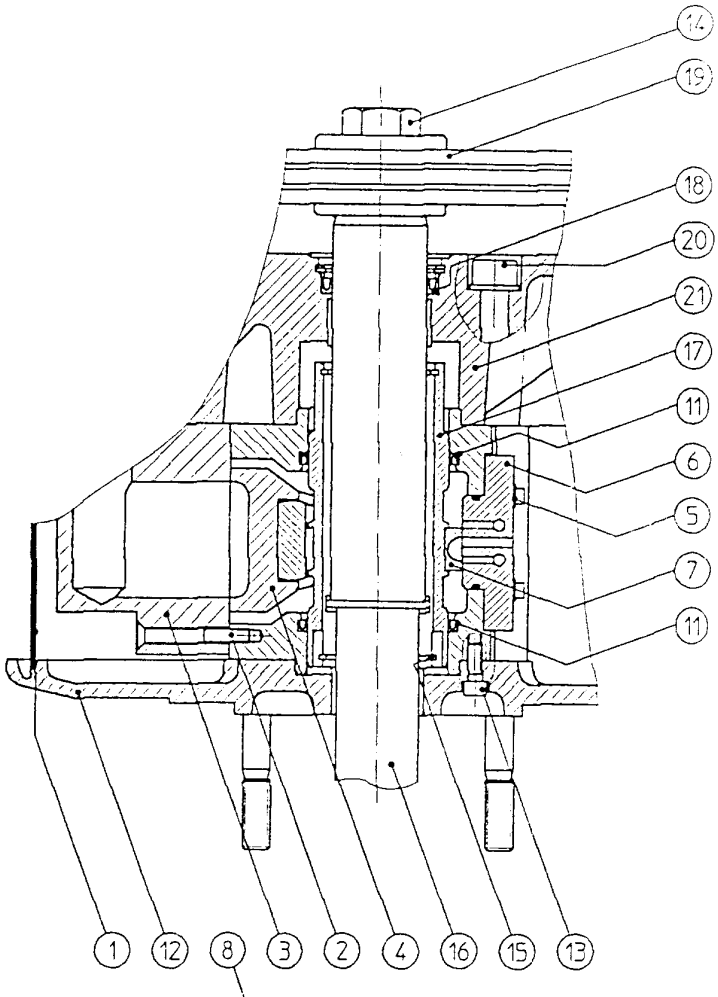


Replacing the flat slide and the slide seat of air motor D230 S70

- Remove the cover ①
- Loosen the flush-mounted screws ②
- Replace the slide seat ③ and the flat slide ④
  - Always replace as an assembly.

When assembling again, always tighten the flush-mounted screws ② before tightening the cylinder screws (not on picture) (alignment)



- Remove cylinder screws ⑤
- Replace the slide seat ⑥ and the flat slide ⑦ – replace as an assembly
  - Replace O-ring, when necessary.

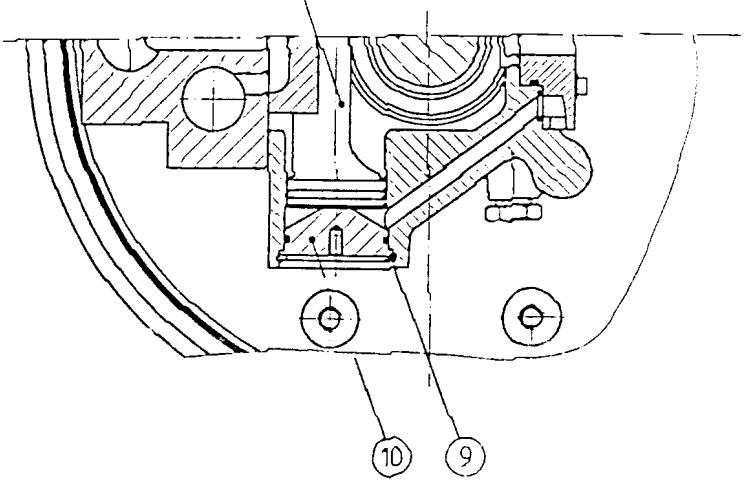
During this operation, the drive rod ⑧ must be checked for wear.
To do this:

- Remove retainer ring ⑨ and cover ⑩ from one side
- Press out the drive rod

Replace when worn.

Changing the recessed rings

If it's necessary to replace the recessed rings ⑪, the flat slide ④ ⑦, slide seat ③ ⑥ and drive rod ⑧ must be removed.
Next:



- Remove cylinder screws ⑫ and take out base ⑬
- Remove hex screw ⑭
- Remove retaining ring ⑮
- Pull out differential rod ⑯ and sleeve ⑰
- Remove the worn recessed rings
- Insert new recessed rings; do not use any sharp tools.

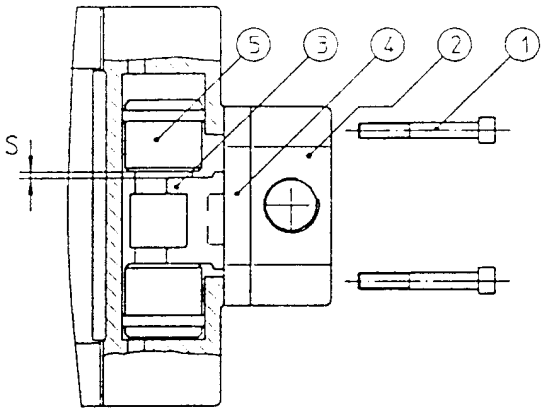
When the sealing ring ⑱ must be replaced:

- Remove the differential piston ⑲
- Remove the cylinder screws ⑳ and pull up the cylinder seat off the piston rod.

Lightly grease all seals and running surfaces before re-assembly.

Replacing the flat slide and the sliding plate of air motor D110 S70

- Remove cylinder screws ①
- Remove the connection piece ②
- Replace flat slide ③ and sliding plate ④



If on replacing the flat slide, it is found that between the drive pin ⑤ and the new flat slide, the gap "S" > 0.8, (wear of the drive pin) the drive pin must also be replaced.

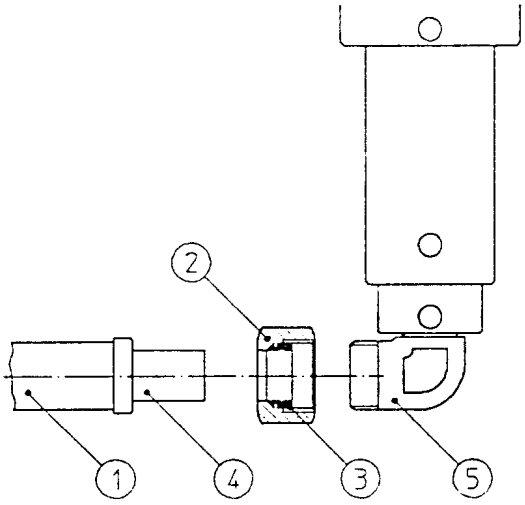
The rod is supplied installation-ready by us, with pre-tensioned piston rings. Do not disassemble.

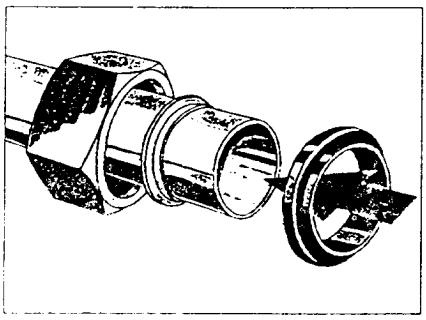
Replacing the suction unit

When the suction unit ① must be replaced, the union nut ② must be replaced along with it. (union nut with seal ring, Part No. 117323).

When the sealing ring ③ (Part No. 75188 097002), is defective, it can be pulled off the free tube end ② after loosening the union nut ④.

After this, slide the new seal ring ③ on the tube end, with the inner metal taper directed to the stop ring.





Mounting of the suction unit

- Insert the tube end into the connector ⑤ and press it against the stop in the internal taper.
- Tighten until clear resistance is felt.
- Hold the connector.
- Assembly check see page 11

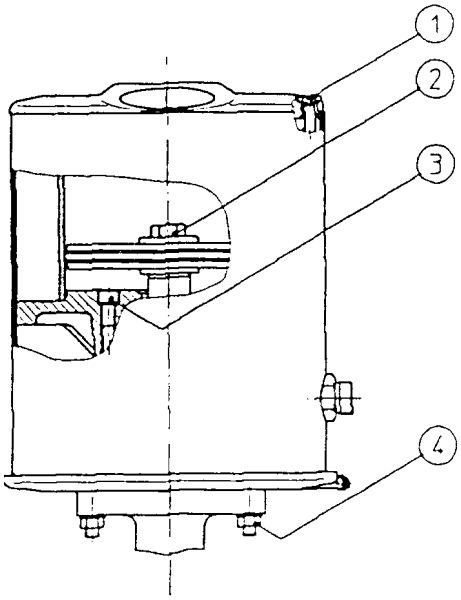
Threaded connections

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

TIGHTENING TORQUES

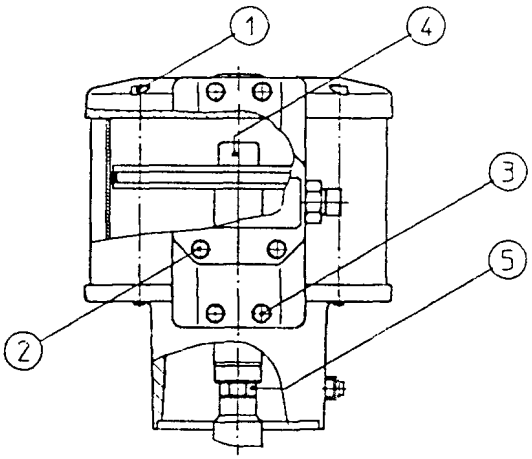
Air motor 2K model HD

Pos.	Air motor D230 S70
1	M 10 8.8 25 Nm
2	M 20 8.8 180 Nm
3	M 12 8.8 70 Nm
4	M 120 — Thread 12 — Material 70 Nm — Tightening torque

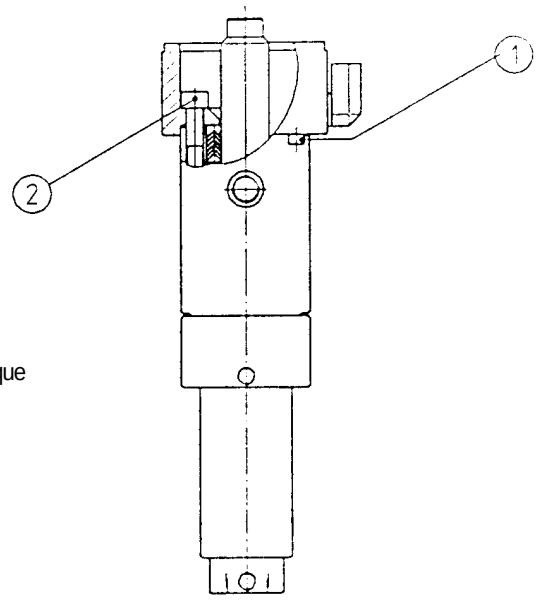


Air motor 2K models ND and MD

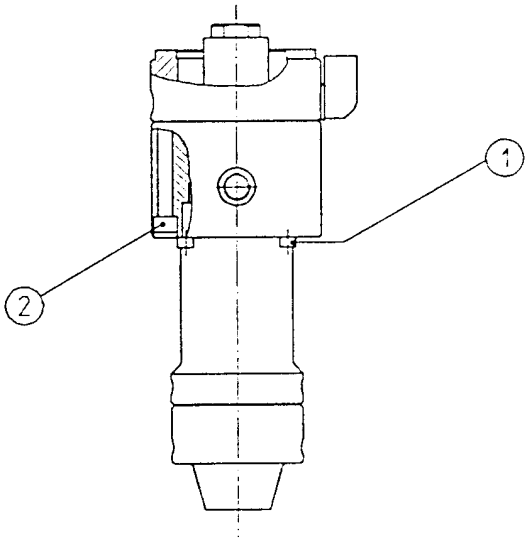
Pos.	Air motor D110 S70
1	M 6 10.9 9 Nm
2	M 6 8.8 9 Nm
3	M 6 8.8 7 Nm
4	M 16 8.8 160 Nm
5	M 14 x 1 — Thread 42CrMo4V — Material 60 Nm — Tightening torque



Pos.	Displacement pump	
1	000.020-DO	000.035-DO 000.050-DO
2	M 6 8.8 7 Nm	
3	M 8 10.9 30 Nm	M 10 — Thread 8.8 — Material 45 Nm — Tightening torque



Pos.	Displacement pump 000.085-DO
1	M 6 10.9 12 Nm
2	M 8 — Thread 8.8 — Material 25 Nm — Tightening torque



Thread	Hardness class		
	8.8	10.9	12.9
	Tightening torque		
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
M 10	50.0	73.0	86.0
M 12	86.0	125.0	145.0

The tightening torque as specified in the table above applies to all screws and nuts not referred to specifically.

SHUT DOWN

– FOR A SHORT PERIOD (although longer than the processing time)

- "SPRAY" switch to OFF
- Engage gun lock and remove tip
- "FLUSH" switch to "B"

  Continue flushing until clean solvent is discharged from the gun
- "FLUSH" switch to "A"

  Repeat the flushing procedure until clear solvent is discharged from the gun
- "FLUSH" switch to "O"; remove pistol for a short while to relieve the pressure.

Respect the correct order of the steps of the flushing procedure

- Shut compressed air ball valve at the input of the device.

– FOR A LONGER PERIOD, FOR THE HOLIDAY PERIOD

- Pull the suction hoses from the FLUID CONTAINER and the HARDENER and insert them in separate solvent containers.
- Remove the tip, engage the gun and empty the system until mainly clean solvent is discharged.
- Run the operational cycle for a few minutes (into the solvent container); change solvent and run the equipment again.
- Flush for a short while with the flushing pump in positions "B" and "A" as described above.
- Relieve the hydraulic pressure (engage the gun for an instant).
- Close the compressed air ball valve at the input of the device.
- Leave the device filled with solvent
- Fill wet cup and hydraulic valves.

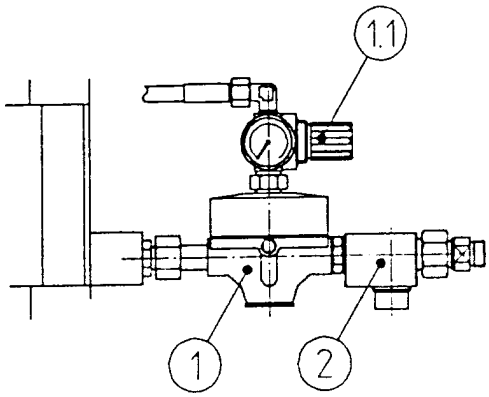
– FOR A LONG PERIOD

- Flush as described above. Pump out solvent
  (suck out with air via the suction hoses)
- Fill the device and the wet cup with ASE or MESAMOLL

THE SYSTEM COMPONENTS ONLY FOR ND MODELS - IMPORTANT INFORMATION

Ⓗ FLUID PRESSURE CONTROL SYSTEM

The fluid pressure control system consists of a pressure regulation valve P4-VP ① and a manifold with bursting disk ②.
The fluid pressure control system is installed in front of the fluid pressure system

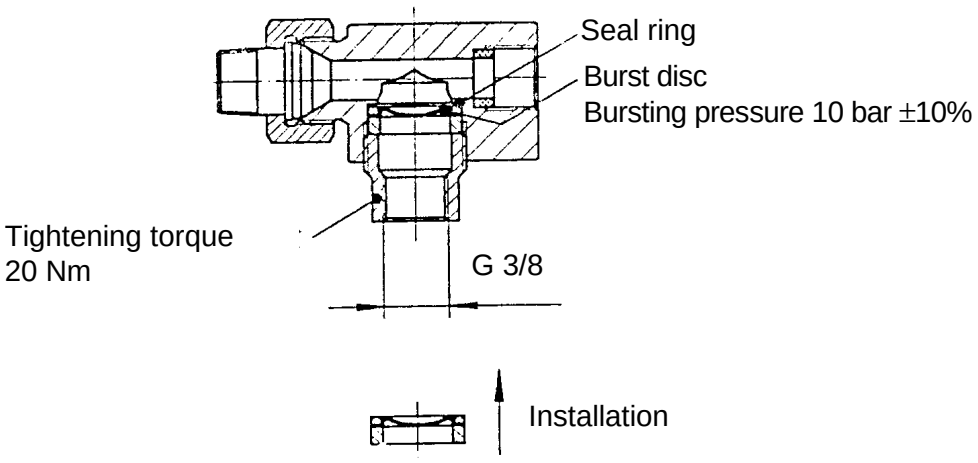


Choice of G 3/8 or G 1/4

The pressure regulation valve P4-VP ① controls a max. supply pressure of 40 bar up to 0.4 - 4 bar (for more information, see catalogue 09.2011). The control range 0.4 - 4 bar can be adjusted on the air pressure regulator (1.1) to a ratio of 1:1. 1 bar air pressure = 1 bar fluid pressure.
The air supply connector is located on the 2K device, pos. ⑤ on page 7 of the technical description of the product.

To protect the fluid pressure system, the manifold contains a burst disc that will break when a defect causes the fluid pressure to rise to 10 bar + 10%.

Each 2K device comes with a separately supplied burst disk with seal ring.
It is recommended always to have a spare burst disc ready (Part No. 79978 037001).



Respect the following when installing or replacing a burst disc:

⚠ Direct the outlet of the burst discs 2.2 so that the draining material can endanger neither persons nor equipment. It is possible to connect a hose.

⚠ Breaking the burst disc can generate recoil forces of approx. twice the breaking pressure. This should be taken into account with regard to the mounting or layout of other elements.

Clean the sealing surfaces before installation. Contamination can cause leakage.
Never mechanically modify the burst disc.

⚠ Handle the burst disc with the greatest care. Never use a damaged burst disc.

Corrosion and operational conditions can affect the service life. The burst disc should therefore be replaced periodically.

⚠ Observe the installation position of the burst disc.
Always install/replace the burst disc with the sealing rings as an assembly.

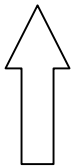
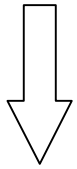
⚠ Screw in the burst disc unit finger tight first and subsequently to a torque of 20 Nm.

⚠ Relieve the pressure in the entire system before replacing a burst disc.

Depending on the time required for the replacement (see pressure time of 2K fluids), the entire system must be flushed before the burst disc is replaced.
Direct the outlet of the burst disc into an empty container.

⚠ Always respect the specified torque when replacing burst discs, because otherwise the bursting pressure of 10 bar + 10% will alter.

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
		Smaller diameter	Kinks in hose line Contaminated	Check lines Clean
Air motor	Runs irregularly Stroke frequency drops, stalls	Flat slide defective	Wear	Replace worn parts
		Icing	Compressed air too moist, stroke frequency too high Ambient temperature too low	Remove ice, change operating conditions
	Air escapes continually from air exit aperture	Flat slide or slide plate faulty	Foreign body has gained access	Replace defective fitting
Valve unit (hydr) Also refer to manual 6000354 section B.13.50.01-B	Fluid discharges from the solvent hole on the side	Ring does not seal	Wear	Replace defective fitting
Suction unit	Pump runs irregularly	Strainer clogged	Fluid contaminated	Clean strainer

Component group	Nature of defect	Defect symptoms	Possible cause	Counter measure
Displacement pumps A and B A = BASE FLUID B = HARDENER	Pressure fluctuations; suction not in order, operates irregularly		Air not properly removed	Bleed the equipment
		O-ring at suction connection damaged	Incorrect operation	Replace O-ring
Packing, upper	Fluid escapes at the piston rod	Packing defective		Replace worn parts
Differential piston		Scored running surface		
Air motor Lifting unit 	Pressure rises; safety shut-off engages	Filling valve A does not seal	Valve seat worn or contaminated	Replace worn parts or remove contamination
		Packing A do not seal	Wear	
	Pressure drops; safety shut-off engages	Suction valve B does not seal	Valve seat worn or contaminated	
		Upper packing B do not seal	Wear	
Air motor Lifting unit 	Pressure rises; safety shut-off engages	Suction valve A does not seal	Valve seat worn or contaminated	
		Upper packing A does not seal	Wear	
	Pressure drops; safety shut-off engages	Filling valve B does not seal	Valve seat worn or contaminated	
		Packing B do not seal	Wear	

NOTES

SELF-MONITORING

⚠ When ECOMIX 2000 devices are operated unsupervised, any dangerous situations can be prevented with the automatic self-monitoring feature.

Stop valves are very suitable. When a set limit value is exceeded (e.g. excessive stroke frequency as a result of a ruptured line), a stop valve will interrupt the compressed air supply to the 2K device.

MONITORING SYSTEM

 If the paint supply stalls on the ECOMIX 2000 equipment, a monitoring system will ensure that the processing time (pressure time) of the mixed material will not be exceeded.

GUIDELINES AND DIRECTIVES TO COMPLY WITH

VBG 23	Verarbeiten von Beschichtungsstoffen*
VBG 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*
Relevant publications	Gefährliche Arbeitsstoffe (Band 1 bis 5) Kühn; Birett Druckerei Laub GmbH, Elztal-Dallau

* Carl Heymanns Verlag KG, Luxemburger Str. 449, 50939 Cologne, Germany

USER INFORMATION

The user information about the ECOMIX 2000 program, in accordance with the sales catalogue 03.2060.

The user information - operating instructions- contains all necessary information.

The Technical Product Description B.6.20.44-P, and the Replacement Parts List are standard parts of every operating manual. For organizational reasons they are issued as separate documents.

Air-powered, automatic piston dosage devise for two components with static tube mixer, recommended for paints.

DESCRIPTION OF THE 2K DEVICE

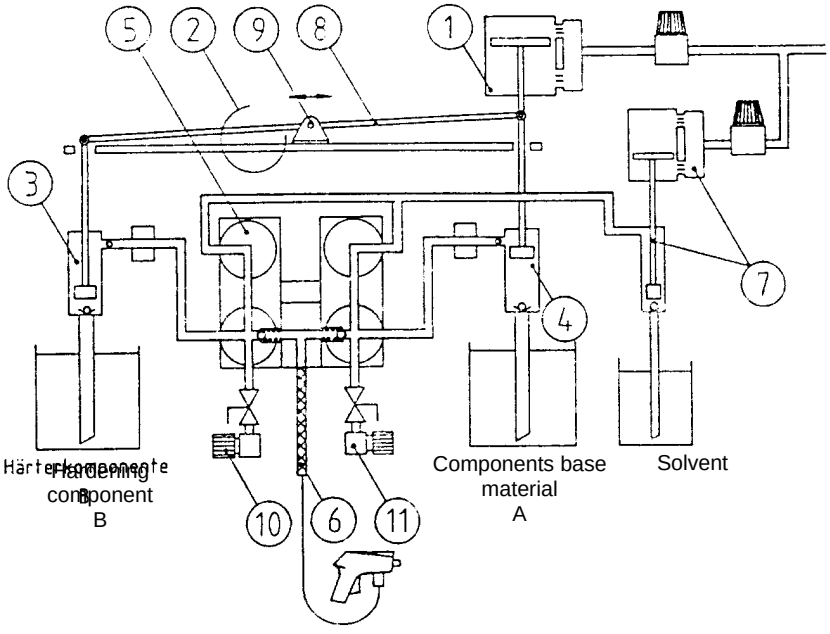
2K devices consist of an oscillating air motor ①, a bearing unit ②, lower pumps ③ and ④, a valve unit ⑤, a static tube mixer ⑥ and a piston or diaphragm pump ⑦ for flushing.

The lower pump for the base components (A) is directly connected to air motor, while the lower of the hardening components (B) is driven via a lever system ⑧.

The lever bearing ⑨ can be moved along a slide, which results in a continuous stroke adjustment of the lower pump for the hardener.

When the system operates, the base material and the hardening components are led separately by the valve unit to the static tube mixer and from here the well-mixed fluid is fed to the spray gun.

To ease operation, the valve-unit consists mainly of pneumatically operated hydraulic valves.



SUITABILITY, FLUID

APPLICATION BEHAVIOUR	SUITABILITY
Supply application	
Conveyance	++
Careful conveyance	–
Dosing	△
Suction behavior	
Automatic suction	++
Tendency to crystallize	
Adhere, stick	△
Deposit	–
Foam	+
Coagulate	–
Tendency to crystallize	–
MATERIAL	
Solids content	
none	++
low to 1 %	+△
medium 1 to 6 %	△ –
over 6 %	△ –
over 50 %	–
Gas content	++
Very low	++
Low	+
High	
Kinematic viscosity	
in mm / s	++
up to 500	++
500 to 750	+ up to ?
over 750	
Behavior	++
Neutral	++
Corrosive	△
Abrasive	△
Caustic	++
Toxic	++ [1)]
Flammable, danger classes AI, AII, AIII	

Pivot adjustment

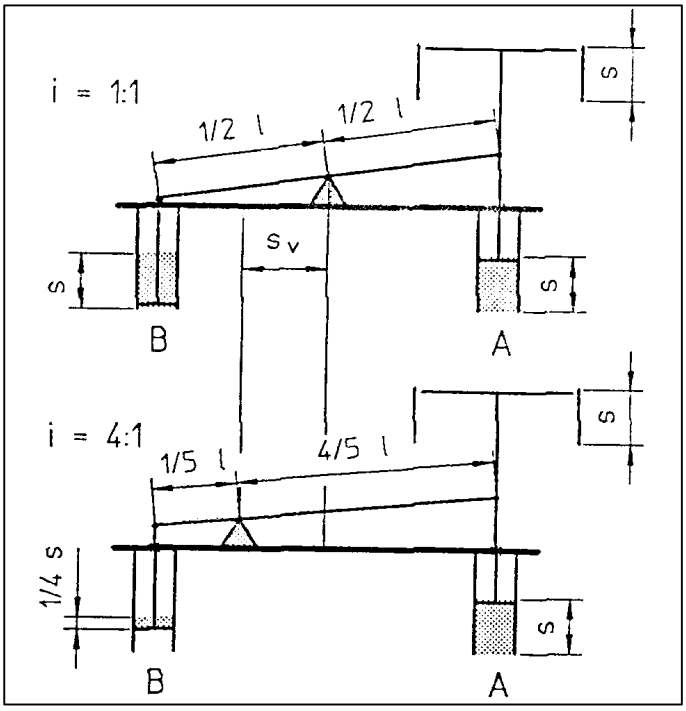
- Change of mechanical advantage of lever from 1:1 to 4:1
- Change of piston stroke at “B” from s to 1/4s.

i	=	Mechanical advantage of lever
l	=	Lever length
s	=	Stroke
s_v	=	Adjustment range
A	=	Base material
B	=	Hardener

++ highly suitable
+ suitable
△ suitable under certain conditions
– not suitable
? Application must be tested

[1)] Open system, grounded, constantly monitored, air supply shut off when not in operation.

Please consult us concerning strongly abrasive or aggressive (caustic) materials.



TECHNICAL DATA

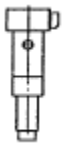
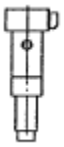
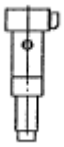
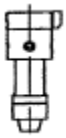
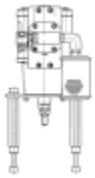
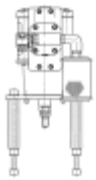
KEY TO DESIGNATION

2K device

N NN NN

- NN: Abbreviations lower pump B (hardener)
- NN: Abbreviations lower pump A (base material)
- N: Abbreviations (ND = low pressure, MD= middle pressure, HD= high pressure)

THE MODULES

LOWER PUMPS						
AIR MOTORS						
			000.020-DO	000.035-DO	000.050-DO	000.085-DO
		78015 107003				ND 85.20 ND 85.35 ND 85.50 ND 85.85
		78015 107003	MD 35.20 MD 35.35		MD 50.20 MD 50.35 MD 50.50	MD 85.20 MD 85.35 MD 85.50 MD 85.85
		78015 106003	HD 35.20 HD 35.35		HD 50.20 HD 50.35 HD 50.50	HD 85.20 HD 85.35 HD 85.50 HD 85.85

Detailed information about basic versions, basic devices, complete devices and article numbers can be found in sales catalogue 03.2060

LOWER PUMPS			
Abbreviation	Model	BASE MATERIAL Part No.	HARDENER Part No.
20	000.020-DO	-	245639
35	000.035-DO	245353	245640
50	000.050-DO	245352	245641
85	000.085-DO	78003 031002	78003 028006

DATA

2K device	Stroke frequency f in DH/min				Theoretical conversion		Theoretical mixing ratio		Air (Air motor)		FLUID				
	Continuous operation		Intermittent operation						Theor. Stroke vol.	Inlet pressure static	Working pressure, static in bar from… to …		Theor. Volume in cm³/DH		
	- Full load	- Part load	- Full load	- Part load	For mechanical advantage of lever		For mechanical advantage of lever		V_H	P	For mechanical advantage of lever		For mechanical advantage of lever		
					1:1	4:1	1:1	4:1	in l	in bar	1:1	4:1	1:1	4:1	
											Control pressure				
ND 85 20	9	12	16	20			4.06:1	16.23:1	0.64	1-7	MAX 4 bar		214.8	183.0	Low pressure
ND 85 35	9	12	16	20	-	-	2.63:1	10.54:1	0.64	1-7			237.8	188.7	
ND 85 50	9	12	16	20			1.86:1	7.46:1	0.64	1-7	Bursting pressure		264.8	195.5	
ND 85 85	9	12	16	20			1.00:1	4.00:1	0.64	1-7	MAX 10 bar ± 10%		344.8	215.5	
MD 35 20	9	12	16	20	11.8:1	16.8:1	1.54:1	6.16:1	0.64	1-5	55 - 49	8.0 - 66	107.9	76.0	
MD 35 35	9	12	16	20	9.8:1	15.6:1	1.00:1	4.00:1	0.64	1-5	3.0 - 40	5.5 - 62	130.8	81.7	
MD 50 20	9	12	16	20	9.5:1	12.4:1	2.17:1	8.70:1	0.64	1-6	3.0 - 48	4.0 - 65	134.9	103.0	Middle
MD 50 35	9	12	16	20	8.1:1	11.7:1	1.41:1	5.65:1	0.64	1-6	2.8 - 39	3.7 - 59	157.8	108.7	
MD 50 50	9	12	16	20	6.9:1	11.1:1	1.00:1	4.00:1	0.64	1-6	2.5 - 36	3.5 - 54	184.8	115.5	
MD 85 20	9	12	16	20	5.9:1	7.0:1	4.06:1	16.23:1	0.64	1-7	1.8 - 36	1.8- 40	214.8	183.0	
MD 85 35	9	12	16	20	5.4:1	6.8:1	2.63:1	10.54:1	0.64	1-7	1.6 - 31	1.8- 39	237.8	188.7	
MD 85 50	9	12	16	20	4.8:1	6.5:1	1.86:1	7.46:1	0.64	1-7	1.4 - 28	1.7- 38	264.8	195.5	
MD 85 85	9	12	16	20	3.7:1	5.9:1	1.00:1	4.00:1	0.64	1-7	1.4 - 22	1.6- 35	344.8	215.5	
HD 35 20	9	12	16	20	53.0:1	• 71.9:1	1.54:1	• 4.62:1	2.86	1-4	44 - 192	• 58 - 240	107.9	• 79.5	
HD 35 35	9	12	16	20	43.7:1	• 65.6:1	1.00:1	• 3.00:1	2.86	1-4	37 - 160	• 57 - 225	130.8	• 87.2	
HD 50 20	9	12	16	20	42.4:1	• 53.7:1	2.17:1	• 6.52:1	2.86	1-5	33 - 197	• 42 - 225	134.9	• 106.5	High
HD 50 35	9	12	16	20	36.3:1	• 50.1:1	1.41:1	• 4.23:1	2.86	1-5	31 - 165	• 41 - 220	157.8	• 114.2	
HD 50 50	9	12	16	20	31.0:1	• 46.5:1	1.00:1	• 3.00:1	2.86	1-5	28 - 143	• 38 - 200	184.8	• 123.2	
HD 85 20	9	12	16	20	26.6:1	31.3:1	4.06:1	16.23:1	2.86	1-4	21 - 94	24 - 107	214.8	183.0	
HD 85 35	9	12	16	20	24.0:1	30.3:1	2.63:1	10.54:1	2.86	1-5	18 - 107	22 - 129	237.8	188.7	
HD 85 50	9	12	16	20	21.6:1	29.3:1	1.86:1	7.46:1	2.86	1-5	16 - 101	19 - 123	264.8	195.5	
HD 85 85	9	12	16	20	16.6:1	26.5:1	1.00:1	4.00:1	2.86	1-5	12 - 84	17 - 115	344.8	215.5	

- Mechanical advantage of lever limited to 3:1

  When selecting a 2K device, it is recommended to select one with a mechanical advantage of lever of 1:1.

Maximum air pressure to 2K device = 8 bar

Min. air pressure to 2K device = 5.5 bar
Max. air pressure to 2K device = 8 bar
(See Operator manual, pages 22 and 23)

Air consumption

V_L	$= V_H \bullet f \bullet p \bullet 2,6$	in l/min
V_H	Stroke volume: see table above	
f	Actual stroke frequency	in DH/min
p	Actual air inlet pressure	in bar

Key:

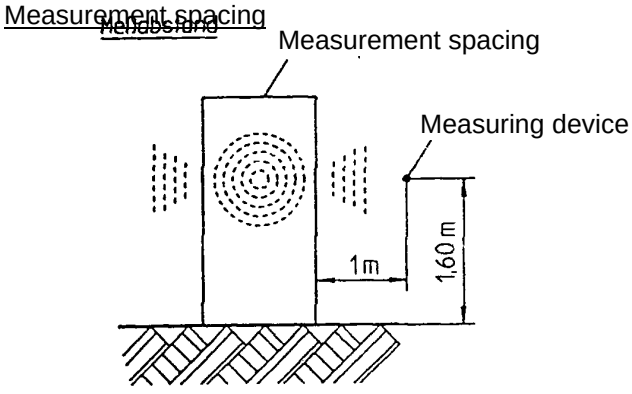
v	=	Flow rate
DH	=	Double stroke
i	=	Fluid pressure / Air inlet pressure

Max. suction height	7.8 m
Lowest operating temperature (without special measures)	10 °C
Max. fluid temperature (operating temperature)	80 °C

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

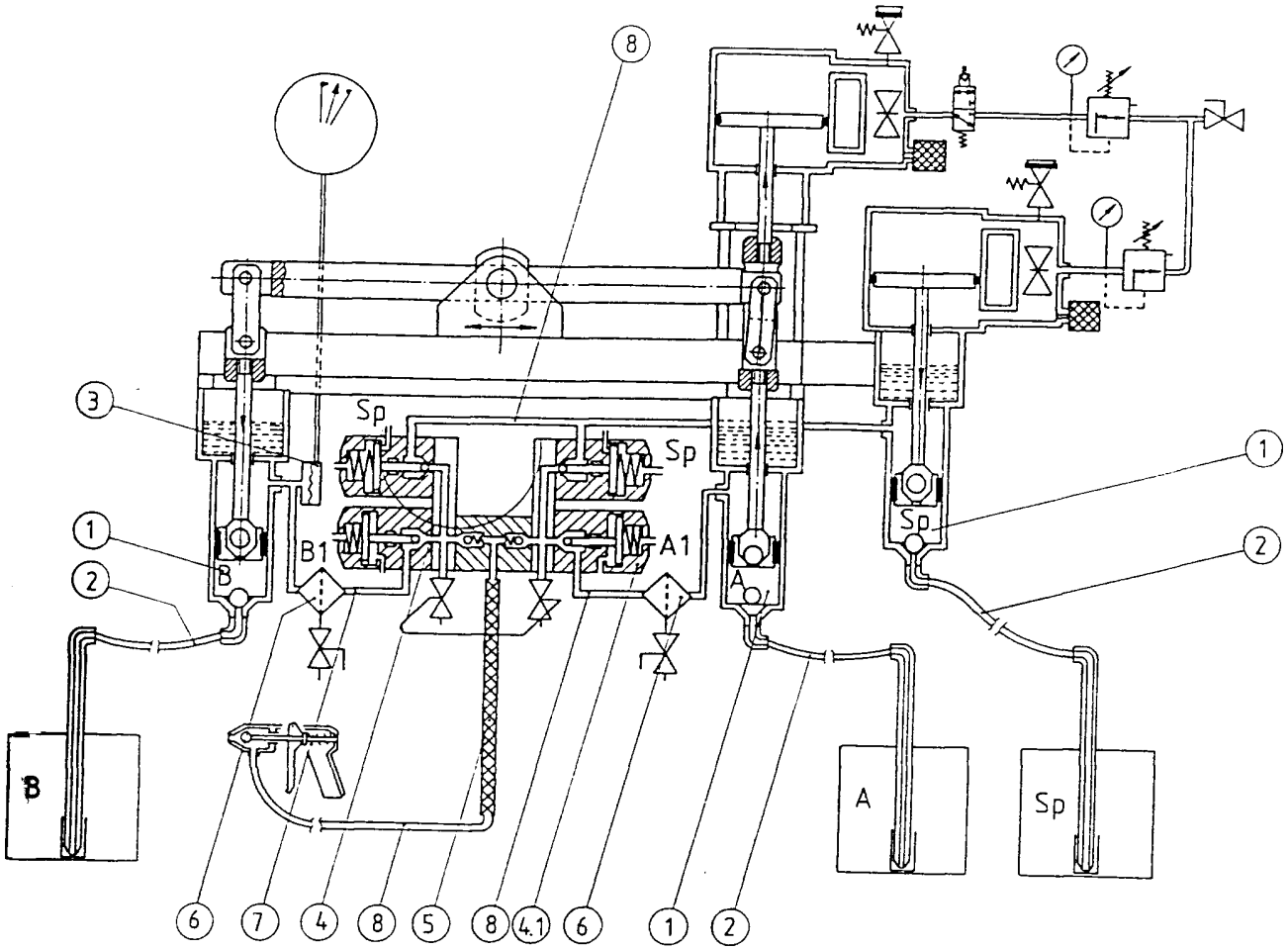
SOUND EMISSION

As the working places cannot be anticipated the highest possible sound level is shown.
For 2K devices ND, MD and HD it is 80 – 90 dB(A).



A warning plate has been fitted to the 2K device.

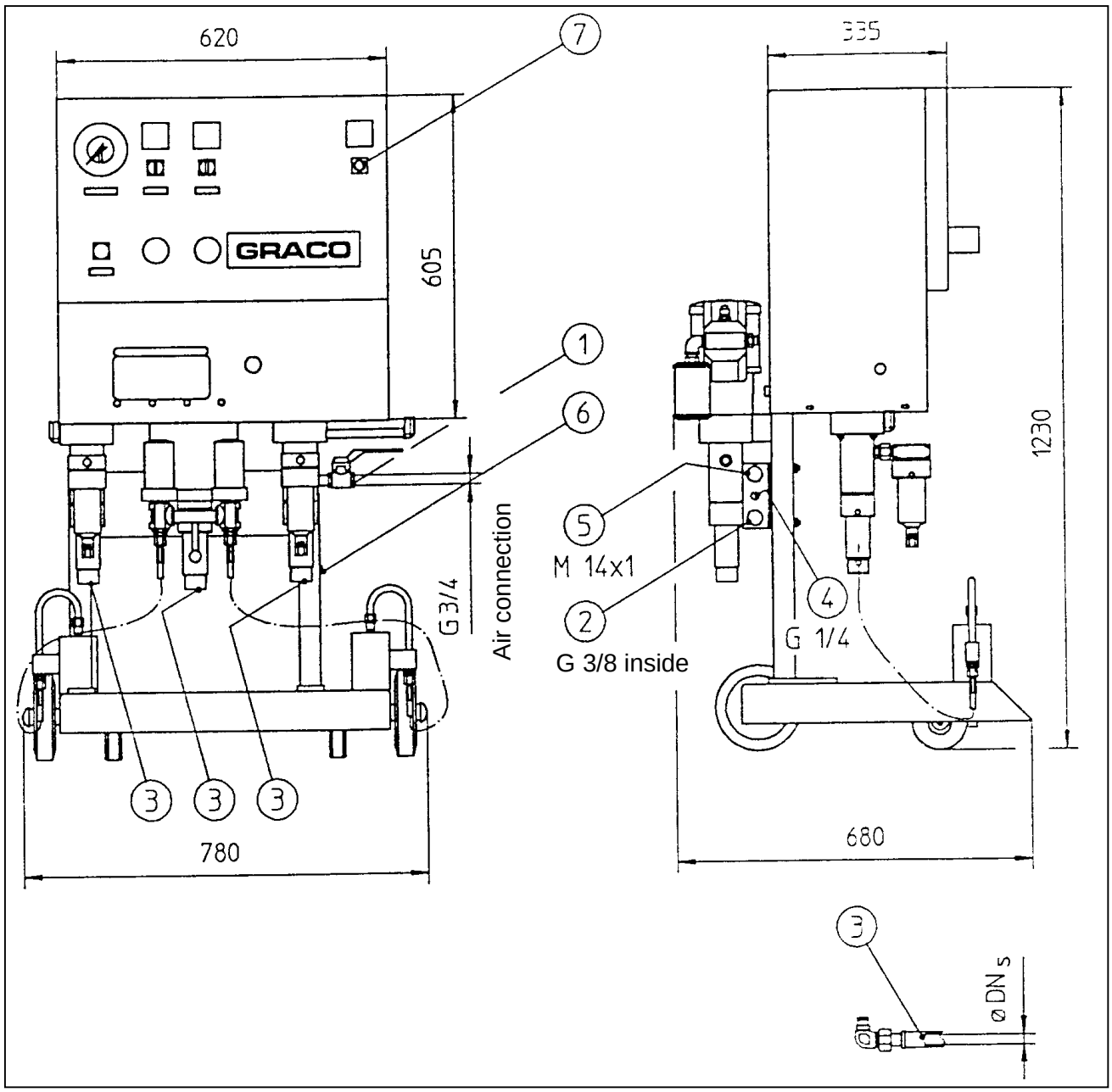
MATERIALS OF WETTED PARTS



①	**Lower pumps**		④	Pneumatic valve unit		⑤	Static tube mixer	
	Cylinder	SST 1.4305		Manifold	SST 1.4305		Manifold	SST 1.4305
	Differential piston	SST 1.4305 [1)]		Manifold support	SST 1.4305		Ring	PTFE
	Valve seat	Hardened steel[3)]		Valve housing	SST 1.4305		Screwed joint	SST 1.4305
	Ball	SST 1.4125		Ball guide	SST 1.4305		Static tube mixer	SST
	Seat support	SST 1.4305[2)]		Ball	SST 1.4034		Angular union	1.4571
	Thrust collar	SST 1.4305		Pressure spring	SST 1.4310		Bushing	POM C9020
	Support ring	SST 1.4305		Valve seat	Hardened steel	⑥	Screen	
	Spring washer	SST 1.4310		Spring washer	SST 1.4305		Filter housing	SST 1.4305
	Packing	PE/PTFE		O-ring	FPM		Connector	SST 1.4305
	Seal ring	PE		Angular union	SST 1.4571		Spring	SST 1.4305
	Profiled seal ring	PE		Connector	SST 1.4305		Connector	SST 1.4305
				Seal ring	SST 1.4571		Double nipple	SST 1.4305
②	**Suction unit**			Cylinder screw.	SST 1.4201		Seal ring	SST 1.4571
	Hose	Synth. rubber		Disk	PA66		O-ring	PTFE
	Hose sleeve	SST 1.4305	4.1	Hydraulic valve		⑦	Hose line	
	Suction tube	SST		Valve housing	SST 1.4571		Hose	PTFE
	Clamp	PA		Valve seat	Hardened steel[3)]		Seal nipple	SST 1.4305
	Filter insert	SST 1.4305/PA		Valve needle	Hardened steel[3)]			
	Connector	SST 1.4305		Bushing	SST 1.4305			
	O-ring	O- FPM		Bushing	POM			
	Seal ring	PA6		Grooved ring	PE	⑧	Hose line	
	Screwed joint	SST		O-ring	NBR		Hose	PA
							Seal nipple	SST 1.4305
③	**Pressure reducer**	SST 1.4571						

[1] chrome-plated [2] nickel-plated [3] containing nickel

DIMENSIONS, SCREW CONNECTION THREADS, RATED DIAMETER



①	Compressed air line	DN_L	≥ 16
②	Material pressure line	DN_D	≥ 6
③	Fluid suction lines	DN_S	≥ 19
④	Air mist connector	G 1 / 4	controlled by ⑦
⑤	Air connection	M 14x1	uncontrolled

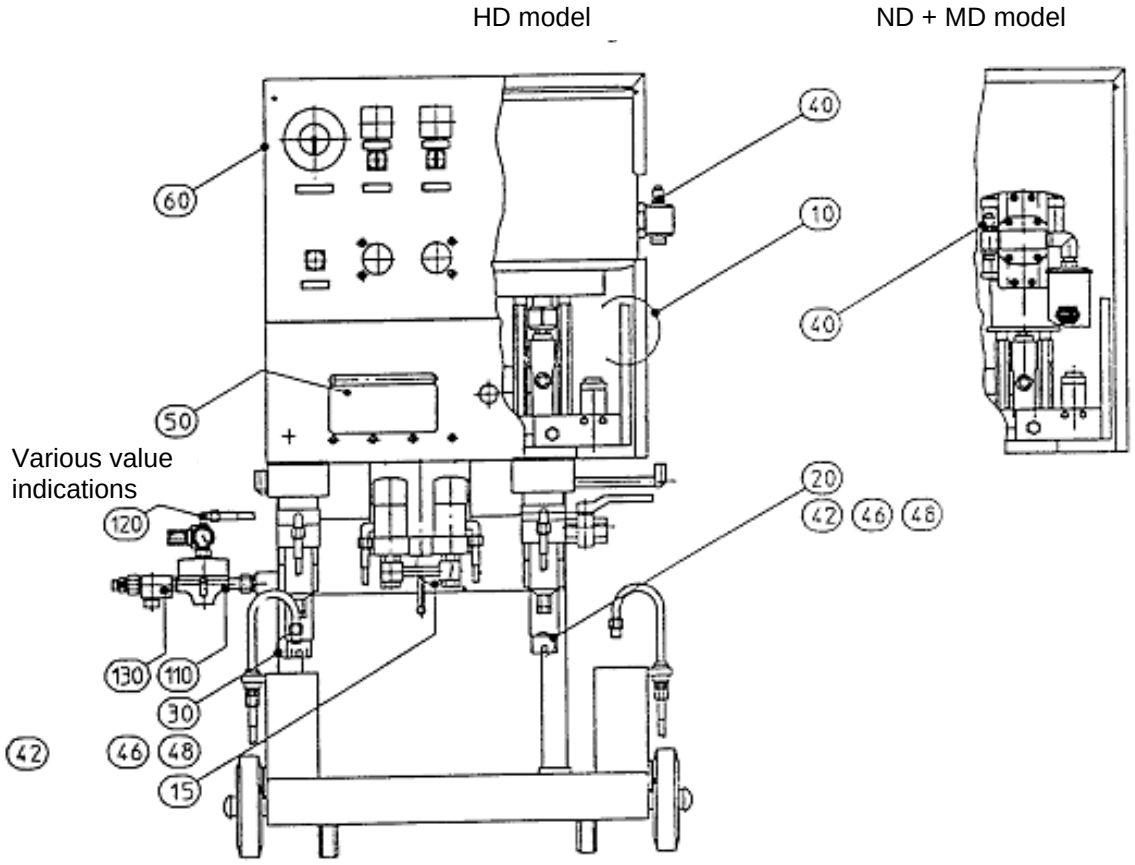
⑥ In areas with explosion hazards, the 2K device must be grounded; line connections must have a cross section of ≥ 4 mm².

Elastic connections
2K device air supply
2K device fluid container/ line required

NOTE

Relevant documentation Sales catalogue 03.2060

ECOMIX 2000
2K device



Pos. 42	- Threaded connector M 14 x M 14	Part No. 15A087
Pos. 46	- Cylinder screw M 6 x 70	Part No. 117083
Pos. 48	**- Cylinder screw M 6 x 125**	Part No. 117084
For 000.085-DO only		
Pos. 50	- Standard For 000.035-DO only (base fluid)	Part No. 76919 068001
	- Standard For 000.050-DO only (base fluid)	Part No. 76919 059001
	- Standard **For 000.085-DO only (base fluid)**	Part No. 76919 112001
The following positions apply to ND equipment only:		
Pos. 110	- Pressure control valve P4VP	Part No. 79635 060083
Pos. 120	- Angled union	Part No. 75214 006002
Pos. 130	- Manifold	Part No. 77245 001002

	2K device (basic model) Pos. 10	Lower pump (base fluid) Pos. 20	Lower pump (hardener) Pos. 30	Safety valve (G 1/4) Pos. 40
2K device (basic model)	Part No.			
ND 85 20 ND 85 35 85 50 85 85	ND 79201 001002			PN 7 117160
35 20 35 35				PN 5 75591 008015
MD 50 20 50 35 50 50	MD 79201 002003	000.0035-DO 245353 (§)	000.020-DO 245639 (&)	PN 6 117019
85 20 85 35 85 50 85 85		000.050-DO 245352 (#)	000.035-DO 245640 (§)	PN 7 117160
35 20 35 35		000.085-DO 78003 031002 (@)	000.050-DO 245641 (#)	PN 4 75591 008014
HD 50 20 HD 50 35 HD 50 50	HD 79201 003004		000.085-DO 78003 028006 (@)	PN 5 75591 008015
85 20				PN 4 75591 008014
85 35 85 50 85 85				PN 5 75591 008015

Lower pump hardener

Lower pump base fluid

(&) Refer to page 5 and 6 of this section for repair kit information and see manual 309462 for operation + repair and parts list

(§) Refer to page 5 and 7 of this section for repair kit information and see manual 309462 for operation + repair and parts list

(#) Refer to page 5 and 8 of this section for repair kit information and see manual 309462 for operation + repair and parts list

(@) Refer to page 9 and 10 of this section for repair kit information and see page 26 of section B.8.20.60-B for repair

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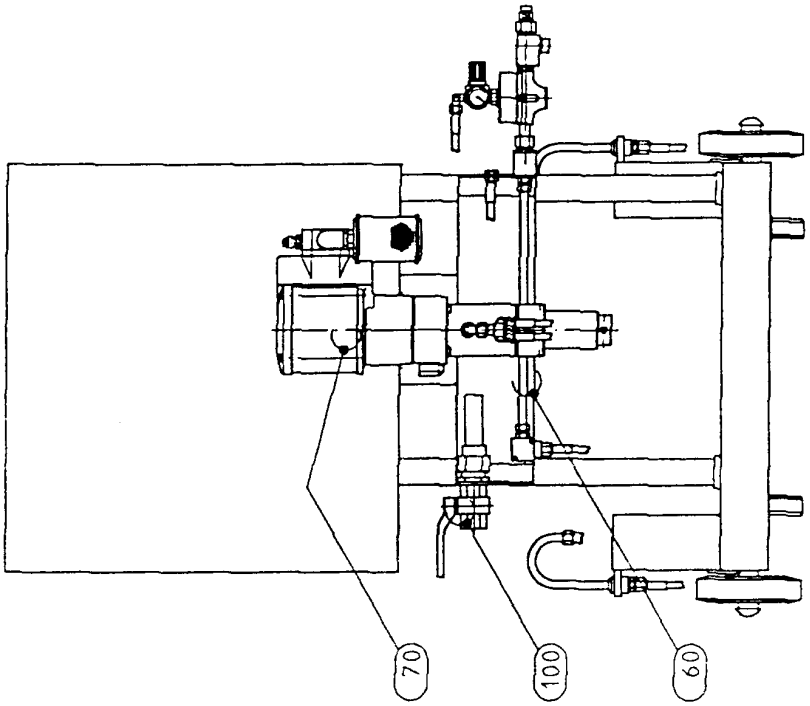
2K device (basic model)

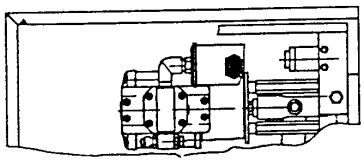
ND

MD

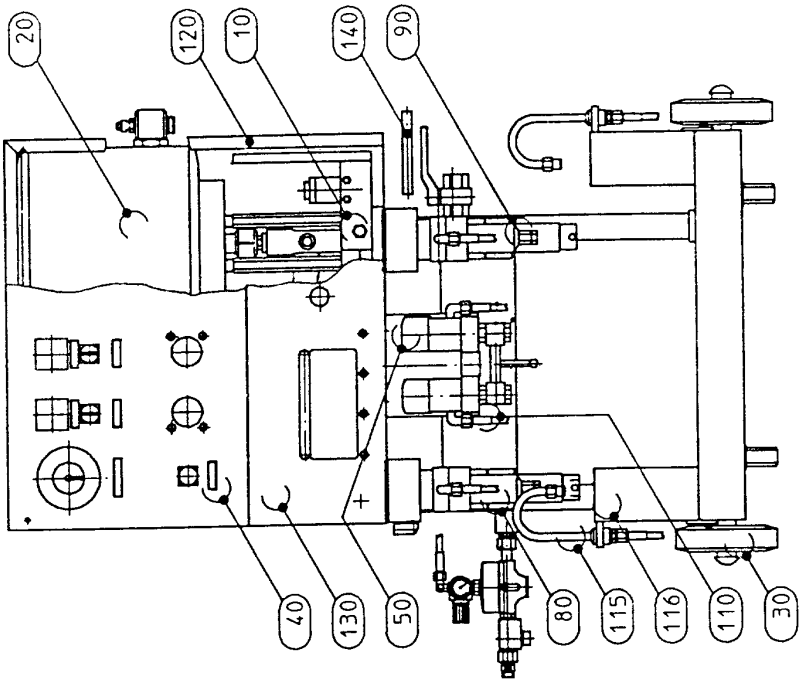
HD



ND + MD model



HD model



2K device (basic model)

Pos.	Pcs.	Description	Part No.		
			ND	MD	HD
10	1	Bearing unit	77329 002002		
20	1	Air motor	D110 S70 78015 107003 (§)		D230 S70 78015 106001 (@)
30	1	Trolley	77708 007002		
40	1	Anchor support	77765 003004		77765 003003
50	1	Valve unit	77580 016003		
60	1	Static tube mixer	77608 004002		
70	1	Piston pump	005.035-DP 79042 093002 (#)	020.035-DP 79042 093003 (#)	030.020-DP 79042 093004 (#)
80	1	Filter	77648 015002		
90	1	Filter	77648 016002		
100	1	Compressed air line	77523 004002		
110	1	Fluid line	77527 005002		
115	2	Fluid line	77527 006002		
116	2	Container	77653 030002		
120	1	Cover	76734 044002		
130	1	Casing	77738 012003		
140	1	Connector	76641 013003		
150	1	Bolts	76131 057001		
160	1	Press	74831 001050		
170	1	Screwdriver	70610 013001		

* Hose line from hardener Lower pump to valve unit Part No. 75844 017030

(§) Refer to document B.8.20.60-E210 of this section for drawing and parts list (see page 65 & 66)

(#) Refer to document B.8.20.60-E410 of this section for drawing and parts list (see page 67 & 68)

(@) Refer to page 12 and 13 of this section for repair kit information and see page 28 of section B.8.20.60-B for repair

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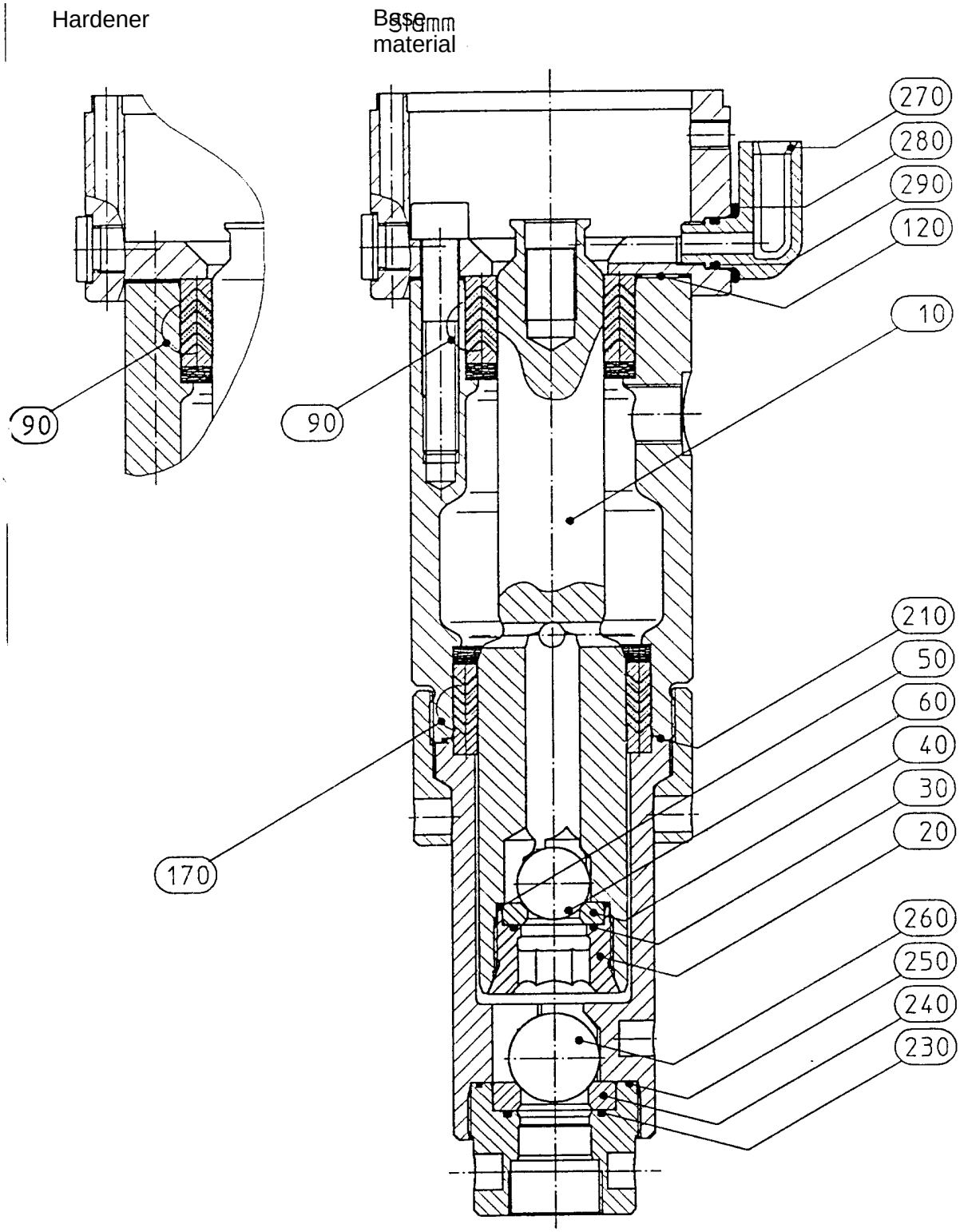
Lower pump	000.020-DO
Lower pump	000.035-DO
Lower pump	000.050-DO



Lower pump 000.020-DO

Replacement parts kit, seals for lower pump, base material				Part No. 233826
Pos. 90	1 pce	Packing stack	19.9x35.1x18.3	
Pos. 120	1 pce	Flat washer	D 63.5xT1	
Pos. 170	1 pce	Packing stack	27.7x40.1x16.1	
Pos. 210	1 pce	Seal ring	43.2x46x1.4	

Replacement parts kit, seals for lower pump, hardener				Part No. 79978 019001
Pos. 90	1 pce	Packing stack	19.9x35.1x16.8	
Pos. 120	1 pce	Flat washer	D 63.5xT1	
Pos. 170	1 pce	Packing stack	27.7x40.1x16.1	
Pos. 210	1 pce	Seal ring	43.2x36x1.5	

Replacement parts kit, filling valve lower pump				Part No. 233827
Pos. 30	1 pce	Profiled seal ring	13x16x1.9	
Pos. 40	1 pce	Valve seat	D 9	
Pos. 50	1 pce	Seal ring	17.8x20.2x2.2	
Pos. 60	1 pce	Ball	12 mm l	
Pos. 210	1 pce	Seal ring	43.2x46x1.4	

Replacement parts kit, suction valve lower pump				Part No. 233828
Pos. 230	1 pce	Profiled seal ring	16x19x1.9	
Pos. 240	1 pce	Valve seat	D 12	
Pos. 250	1 pce	Seal ring	25.6x28x1.3	
Pos. 260	1 pce	Ball	16 mm l	

Replacement parts kit, parts level indicator lower pump				Part No. 233829
Pos. 270	1 pce	Level indicator	for solvents	
Pos. 280	1 pce	O-ring	14x4B	
Pos. 290	1 pce	O-ring	10x2B	

Replacement parts kit, differential piston lower pump				Part No. 15A119
Pos. 10	1 pce	Differential piston	D 27.8/ D 20	

Replacement parts kit, seat support lower pump				Part No. 15A093
Pos. 20	1 pce	Seat support	M 22x1.5x23	

Lower pump 000.035-DO

Replacement parts kit, seals ower pump, base material			Part No. 233830	
Pos. 90	1 pce	Packing stack	24.5x42.7x19.2	
Pos. 120	1 pce	Flat washer	D 73.5xT1	
Pos. 170	1 pce	Packing stack	34.4x49.2x16.7	
Pos. 210	1 pce	Seal ring	53x55.8x1.4	

Replacement parts kit, seals lower pump, hardener			Part No. 79978 020001	
Pos. 90	1 pce	Packing stack	24.5x42.7x17.6	
Pos. 120	1 pce	Flat washer	D 73.5xT1	
Pos. 170	1 pce	Packing stack	34.4x49.2x16.7	
Pos. 210	1 pce	Seal ring	53x55.8x1.4	

Replacement parts kit, filling valve lower pump			Part No. 233831	
Pos. 30	1 pce	Profiled seal ring	16x19x1.9	
Pos. 40	1 pce	Valve seat	D 12	
Pos. 50	1 pce	Seal ring	21.8x25.2x2.2	
Pos. 60	1 pce	Ball	16 mm l	
Pos. 210	1 pce	Seal ring	53x55.8x1.4	

Replacement parts kit, suction valve lower pump			Part No. 233832	
Pos. 230	1 pce	Profiled seal ring	20x24x2.4	
Pos. 240	1 pce	Valve seat	D 14.5	
Pos. 250	1 pce	Seal ring	33.2x36x1.5	
Pos. 260	1 pce	Ball	20 mm l	

Replacement parts kit, level indicator lower pump			Part No. 233829	
Pos. 270	1 pce	Level indicator	for solvents	
Pos. 280	1 pce	O-ring	14x4B	
Pos. 290	1 pce	O-ring	10x2B	

Replacement parts kit, differential piston lower pump			Part No. 15A120	
Pos. 10	1 pce	Differential piston	D 34.5/ D 24.6	

Replacement parts kit, seat support lower pump			Part No. 15A094	
Pos. 20	1 pce	Seat support	M 27x1.5x24	

Lower pump 000.050-DO

Replacement parts kit, seals lower pump, base material			Part No. 233833	
Pos. 90	1 pce	Packing stack	29.1x47.1x19	
Pos. 120	1 pce	Flat washer	D 77.5xT1	
Pos. 170	1 pce	Packing stack	40.9x55.1x16.5	
Pos. 210	1 pce	Seal ring	58.5x61.3x1.4	

Replacement parts kit, seals lower pump, hardener			Part No. 79978 021001	
Pos. 90	1 pce	Packing stack	29.1x47.1x17.5	
Pos. 120	1 pce	Flat washer	D 77.5xT1	
Pos. 170	1 pce	Packing stack	40.9x55.1x16.5	
Pos. 210	1 pce	Seal ring	58.5x61.3x1.4	

Replacement parts kit, filling valve lower pump			Part No. 233834	
Pos. 30	1 pce	Profiled seal ring	20x24x2.4	
Pos. 40	1 pce	Valve seat	D 14.5	
Pos. 50	1 pce	Seal ring	27.8x31.2x2.2	
Pos. 60	1 pce	Ball	20 mm l	
Pos. 210	1 pce	Seal ring	58.5x61.3x1.4	

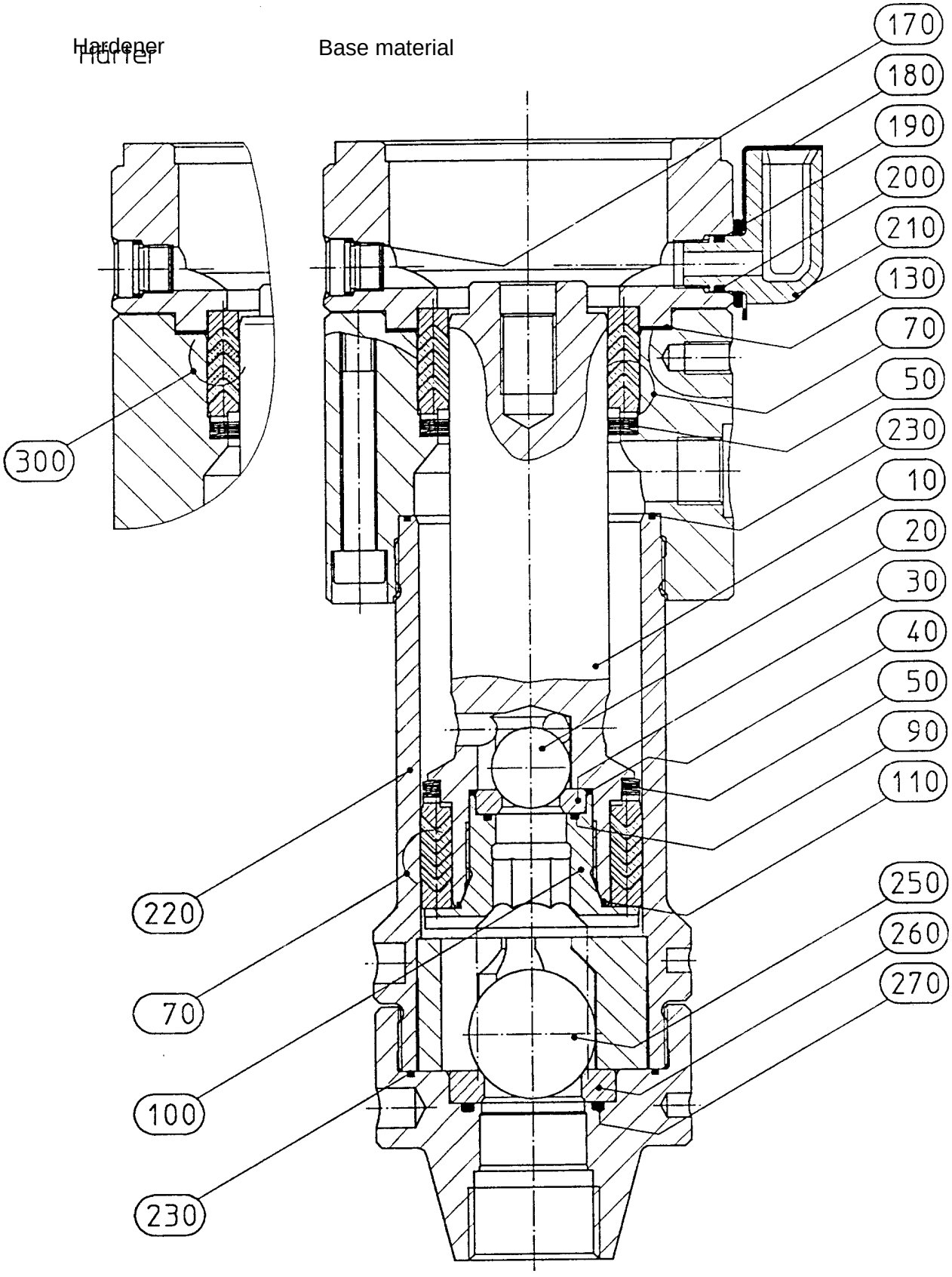
Replacement parts kit, suction valve lower pump			Part No. 233835	
Pos. 230	1 pce	Profiled seal ring	23x27x2.5	
Pos. 240	1 pce	Valve seat	D 18.5	
Pos. 250	1 pce	Seal ring	40.2x43x1.5	
Pos. 260	1 pce	Ball	25 mm l	

Replacement parts kit, level indicator lower pump			Part No. 233829	
Pos. 270	1 pce	Level indicator	for solvents	
Pos. 280	1 pce	O-ring	14x4B	
Pos. 290	1 pce	O-ring	10x2B	

Replacement parts kit, differential piston lower pump			Part No. 15A118	
Pos. 10	1 pce	Differential piston	D 41/ D 29.2	

Replacement parts kit, seat support lower pump			Part No. 15A095	
Pos. 20	1 pce	Seat support	M 33x1.5x24	

Lower pump 000.085-DO



Lower pump 000.085-DO

Replacement parts kit, seals lower pump, base material			Part No. 79978 906235	
Pos. 40	1 pce	Seal ring	27.8x31.2x2.2	
Pos. 70	2 pcs	Packing stack	39.9x56.1x18.4	
Pos. 90	1 pce	Profiled seal ring	20x24x2.4	
Pos. 110	1 pce	Seal ring	37.5x35.6x1.7	
Pos. 130	1 pce	Flat washer	D 71.5xT1	
Pos. 230	1 pce	Seal ring	63x60x1.5	

Replacement parts kit, seals lower pump, hardener			Part No. 79978 022001	
Pos. 40	1 pce	Seal ring	27.8x31.2x2.2	
Pos. 70	1 pce	Packing stack	39.9x56.1x18.4	
Pos. 90	1 pce	Profiled seal ring	20x24x2.4	
Pos. 110	1 pce	Seal ring	37.5x35.6x1.7	
Pos. 130	1 pce	Flat washer	D 71.5xT1	
Pos. 230	1 pce	Seal ring	63x60x1.5	
Pos. 300	1 pce	Packing stack	39.9x56.1x17	

Replacement parts kit, seal rings lower pump			Part No. 79978 906236	
Pos. 40	1 pce	Seal ring	27.8x31.2x2.2	
Pos. 90	1 pce	Profiled seal ring	20x24x2.4	
Pos. 110	1 pce	Seal ring	37.5x35.6x1.7	
Pos. 130	1 pce	Flat washer	D 71.5xT1	
Pos. 170	1 pce	Seal ring	14.3x12.3x2.5	
Pos. 230	2 pcs	Seal ring	63x60x1.5	
Pos. 270	1 pce	Profiled seal ring	30x36x2.9	

Replacement parts kit, filling valve lower pump			Part No. 79978 906237	
Pos. 20	1 pce	Ball	20 mm l	
Pos. 30	1 pce	Valve seat	D 14.5	
Pos. 40	1 pce	Seal ring	27.8x31.2x2.2	
Pos. 90	1 pce	Profiled seal ring	20x24x2.4	
Pos. 110	1 pce	Seal ring	37.5x35.6x1.7	

Replacement parts kit, suction valve lower pump			Part No. 79978 906238	
Pos. 230	1 pce	Seal ring	63x60x1.5	
Pos. 250	1 pce	Ball	31.75 mm l	
Pos. 260	1 pce	Valve seat	D 24.5	
Pos. 270	1 pce	Profiled seal ring	30x36x2.9	

Replacement parts kit, level indicator lower pump			Part No. 79978 906239	
Pos. 180	1 pce	V-plate	43x20x1x30	
Pos. 190	1 pce	O-ring	14x4B	
Pos. 200	1 pce	O-ring	10x2B	
Pos. 210	1 pce	Level indicator	for solvents	

Replacements parts kit, piston lower pump			Part No. 76592 067002	
Pos. 10	1 pce	Piston	Hyd. DN56	

Replacement parts, spring washer lower pump			Part No. 117075	
Pos. 50	12 pcs	Spring washer	54.6x46x1.6	

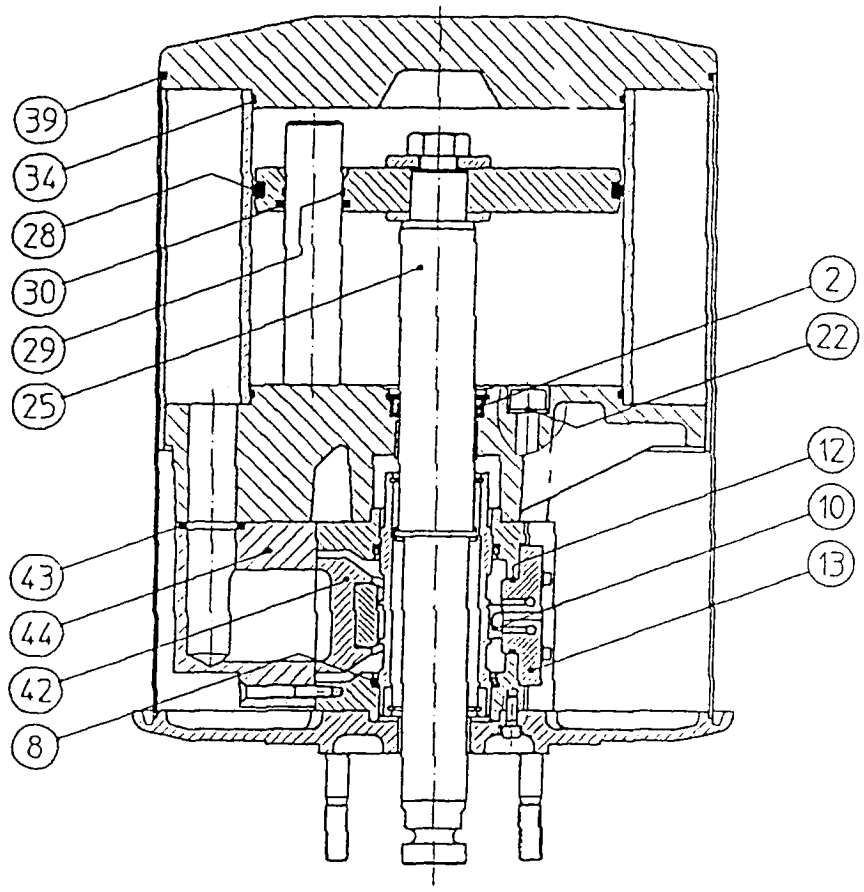
Replacement parts kit, seat support Lower pump			Part No. 76031 062002	
Pos. 100	1 pce	Seat support	M 33x1.5x33	

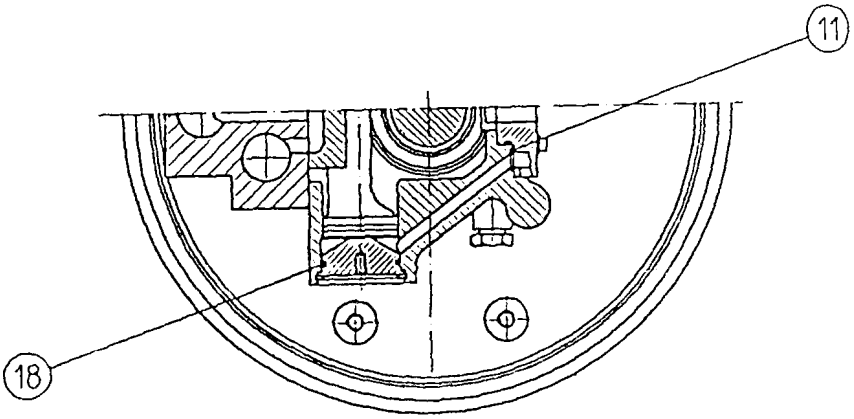
Replacement parts kit, cylinder Lower pump			Part No. 76570 032002	
Pos. 220	1 pce	Cylinder	D56 L138	

Note regarding Pos. 50:

The Part No. only refers to a single spring washer
When ordering replacement parts, please indicate the number of parts required.

Air motor D230 S70





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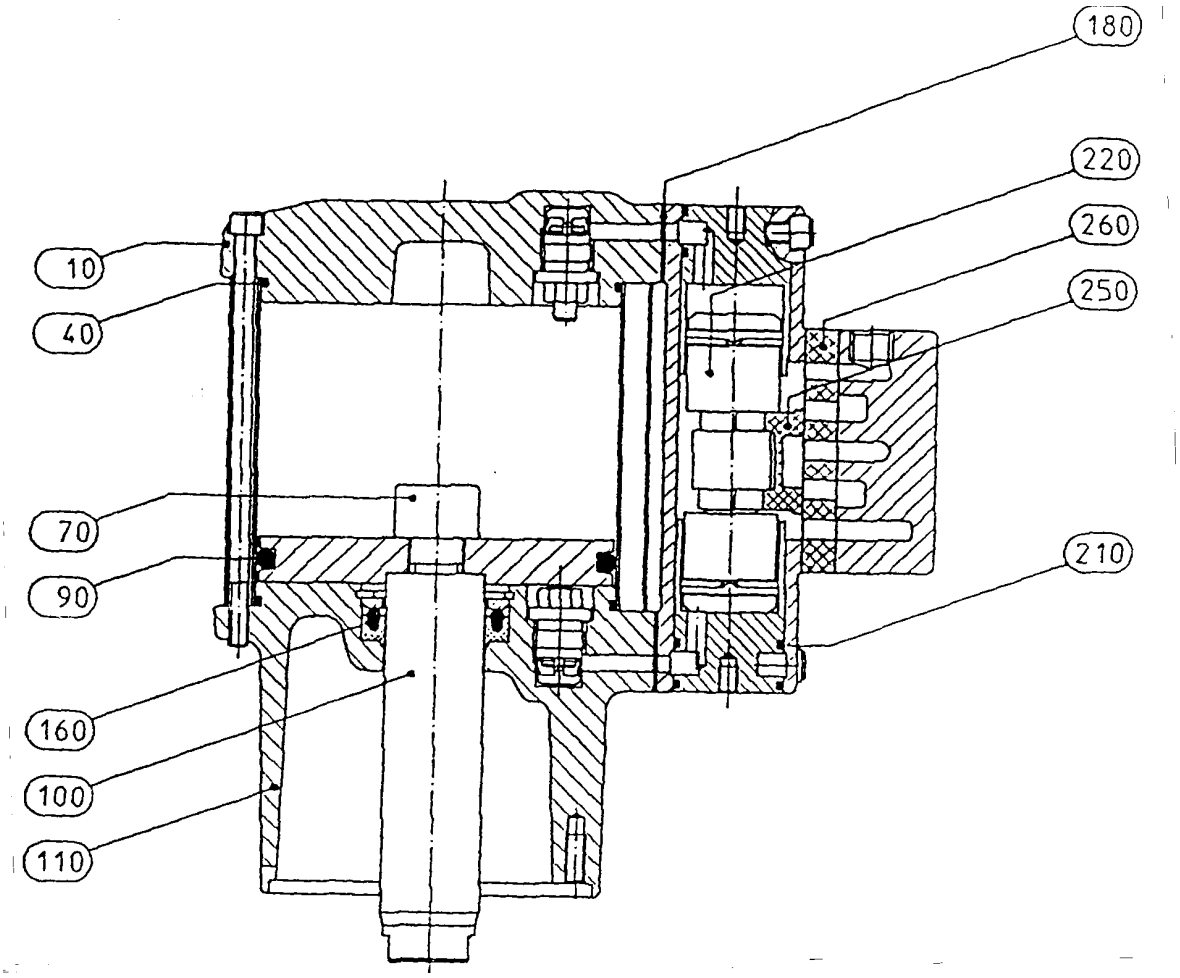
Air motor D230 S70

Replacement parts kit, air motor control			Part No. 79978 904501	
Pos. 8	2 pcs	Grooved ring	60x67.8x5	
Pos. 10	1 pce	Flat slide	24x19	
Pos. 11	2 pcs	O-ring	9x2 B	
Pos. 12	1 pce	O-ring	35x2.5 B	
Pos. 13	1 pce	Valve seat	-	
Pos. 18	2 pcs	O-ring	38x2 B	
Pos. 42	1 pce	Flat slide	62x45	
Pos. 43	3 pcs	X-ring	26.58x23.53	
Pos. 44	1 pce	Valve seat	-	

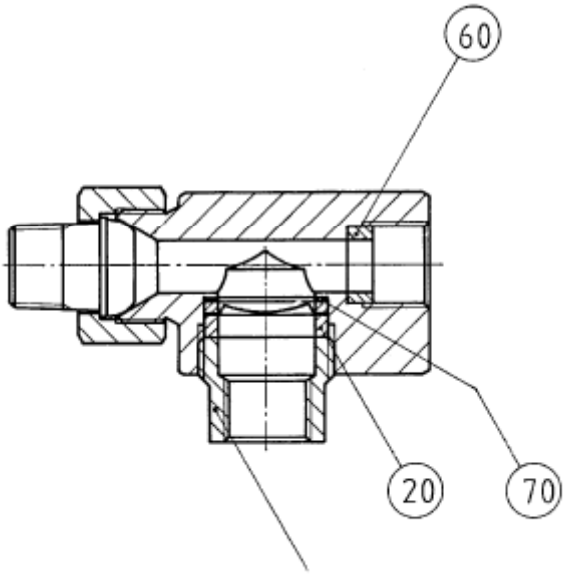
Replacement parts kit, air motor seals			Part No. 79978 904602	
Pos. 2	1 pce	Axial radial seal ring	D 40	
Pos. 22	4 pcs	Screw head seal	M 12	
Pos. 28	1 pce	O-ring	210x6 B	
Pos. 29	1 pce	Drive band	4x1.55x92	
Pos. 30	1 pce	Rod seal	D 30	
Pos. 34	2 pcs	O-ring	220x3 B	
Pos. 39	1 pce	O-ring	280x3 B	

Replacement parts kit, air motor piston rod			Part No. 76613 021003	
Pos. 25	1 pce	Piston rod	D 40 L287	

Air motor D110 S70



Manifold



Respect tightening torque of 20 Nm

F33.060.03 issued on 01.98

Air motor D110 S70

Replacement parts kit, air motor control			Part No. 233836	
Pos. 180	2 pcs	Flat washer	80x25x0.75	
Pos. 210	4 pcs	O-ring	30x2 B	
Pos. 220	1 pce	Drive rod assy.	-	
Pos. 250	1 pce	Flat slide	31.5x31.5	
Pos. 260	1 pce	Slide plate	Slide 31.5x31.5	Note assembly position !

Replacement parts kit, air motor seals			Part No. 233837	
Pos. 40	2 pcs	O-ring	100x3 B	
Pos. 90	1 pce	O-ring	100x5 B	
Pos. 160	1 pce	Grooved ring	G 30x45x12.5	
Pos. 180	2 pcs	Flat washer	80x25x0.75	

Replacement parts kit, air motor piston rod			Part No. 233838	
Pos. 10	1 pce	screw	M 16x30 PLAS	
Pos. 100	1 pce	Piston rod	D 30 L 121	

Replacement parts, air motor, housing top			Part No. 245362	
Pos. 10	1 pce	Housing top part	D 110	

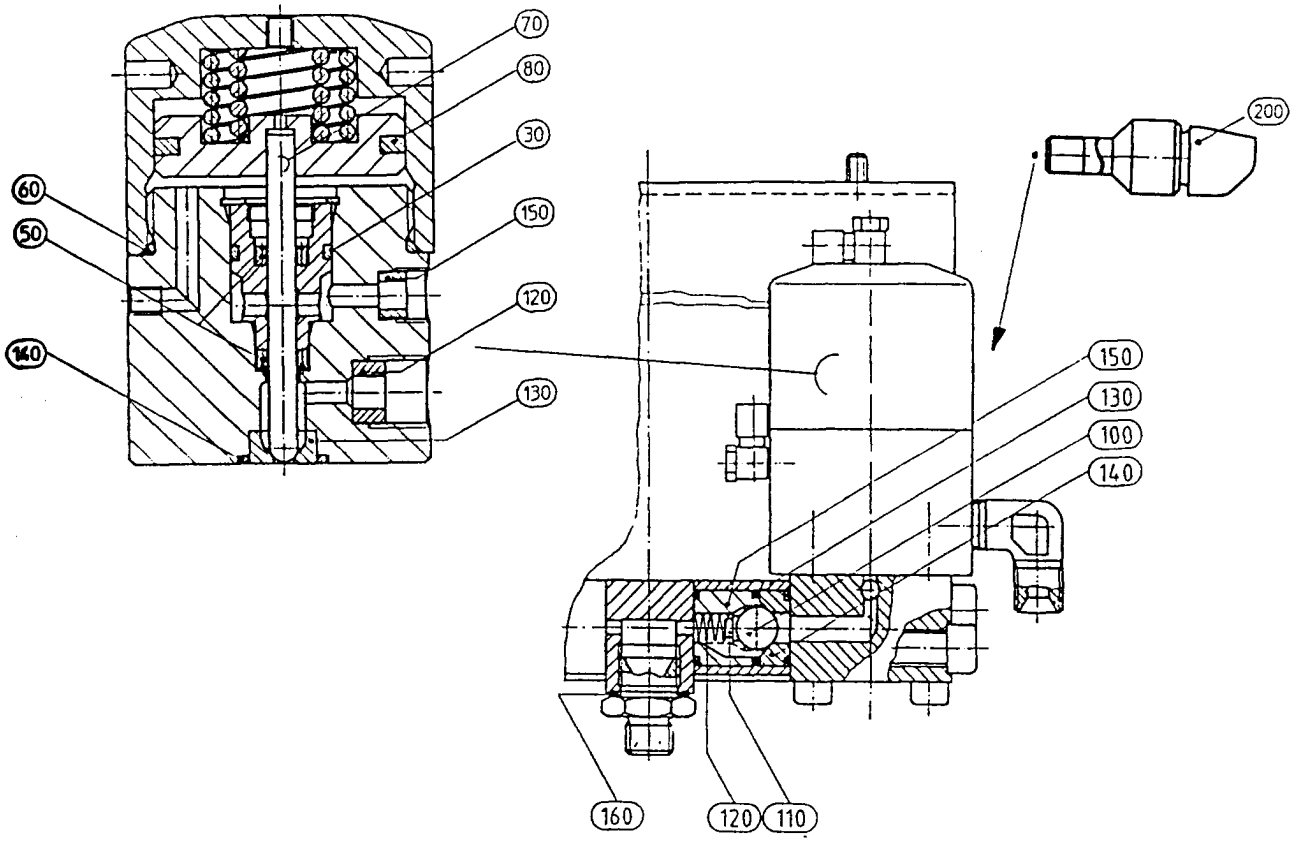
Replacement parts kit, air motor, housing bottom			Part No. 245360	
Pos. 110	1 pce	Housing bottom part	D 110	

Manifold

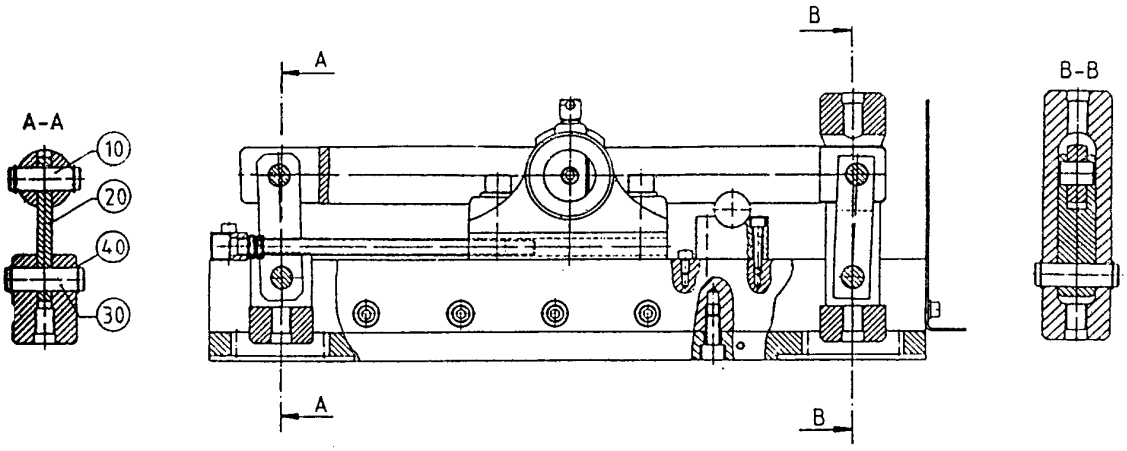
Replacement parts kit, burst disk			Part No. 79978 037001	
Pos. 20	1 pce	Burst disk	D23.75 H7 10 bar	
Pos. 70	1 pce	Disk	19.5x24x1	

Replacement parts, ring			Part No. 15A219	
Pos. 60	1 pce	Ring	10x14.8x5	

Valve unit



Bearing unit



F22.060.02 issued on 01.98

Valve unit

Replacement parts kit, check valve unit			Part No. 79978 910002	
Pos. 100	1 pce	Ball	11	
Pos. 110	1 pce	Spring washer	D 5.5	
Pos. 120	1 pce	Pressure spring	6.5x0.6x15.5	
Pos. 130	3 pcs	O-ring	16x2B	

Spare part, valve seat check valve			Part No. 76275 011001	
Pos. 140	1 pce	Valve seat	D 8	

Spare part, ball guide check valve			Part No. 76529 013001	
Pos. 150	1 pce	Ball guide	Ball 11	

The quantities always refer to one hydraulic valve or check valve.

Replacement parts kit, seals valve unit			Part No. 79978 910003	
Pos. 160	1 pce	Seal ring	A 17 x 21	
Pos. 170	2 pcs	Profiled seal ring	17x21x4	

Spare part, level indicator valve unit			Part No. 77875 002003	
Pos. 200	1 pce	Level indicator assy.	G1/8	

Replacement parts kit, seals hydraulic valve			Part No. 79978 584006	
Pos. 30	1 pce	O-ring	14x2 B	
Pos. 50	2 pcs	Grooved ring	5x9.5x3.35	
Pos. 60	1 pce	O-ring	42x2 B	
Pos. 80	1 pce	Piston seal	PK 45x2.8	
Pos. 120	1 pce	Seal ring	6x11.2x7	
Pos. 140	1 pce	O-ring	12x2 B	
Pos. 150	1 pce	Seal ring	5x7.5x5	

Replacement parts kit, fluid valve (hardened steel) hydraulic valve				Part No. 79978 5840
Pos. 30	1 pce	O-ring	14x2 B	
Pos. 50	2 pcs	Grooved ring	5x9.5x3.35	
Pos. 60	1 pce	O-ring	42x2 B	
Pos. 70	1 pce	Valve needle	D5 L62.5	
Pos. 80	1 pce	Piston seal	PK 45x2.8	
Pos. 130	1 pce	Valve seat	D3.5	
Pos. 140	1 pce	O-ring	12x2 B	

Adjustable bearing unit

Replacement parts kit, adjustable strip bearing unit			Part No. 79978 910004	
Pos. 10	1 pce	Bolts	16x51	
Pos. 20	1 pce	Strip	30x10x101.5	
Pos. 30	1 pce	Bolts	16x56	
Pos. 40	4 pcs	Retaining ring	16x1	

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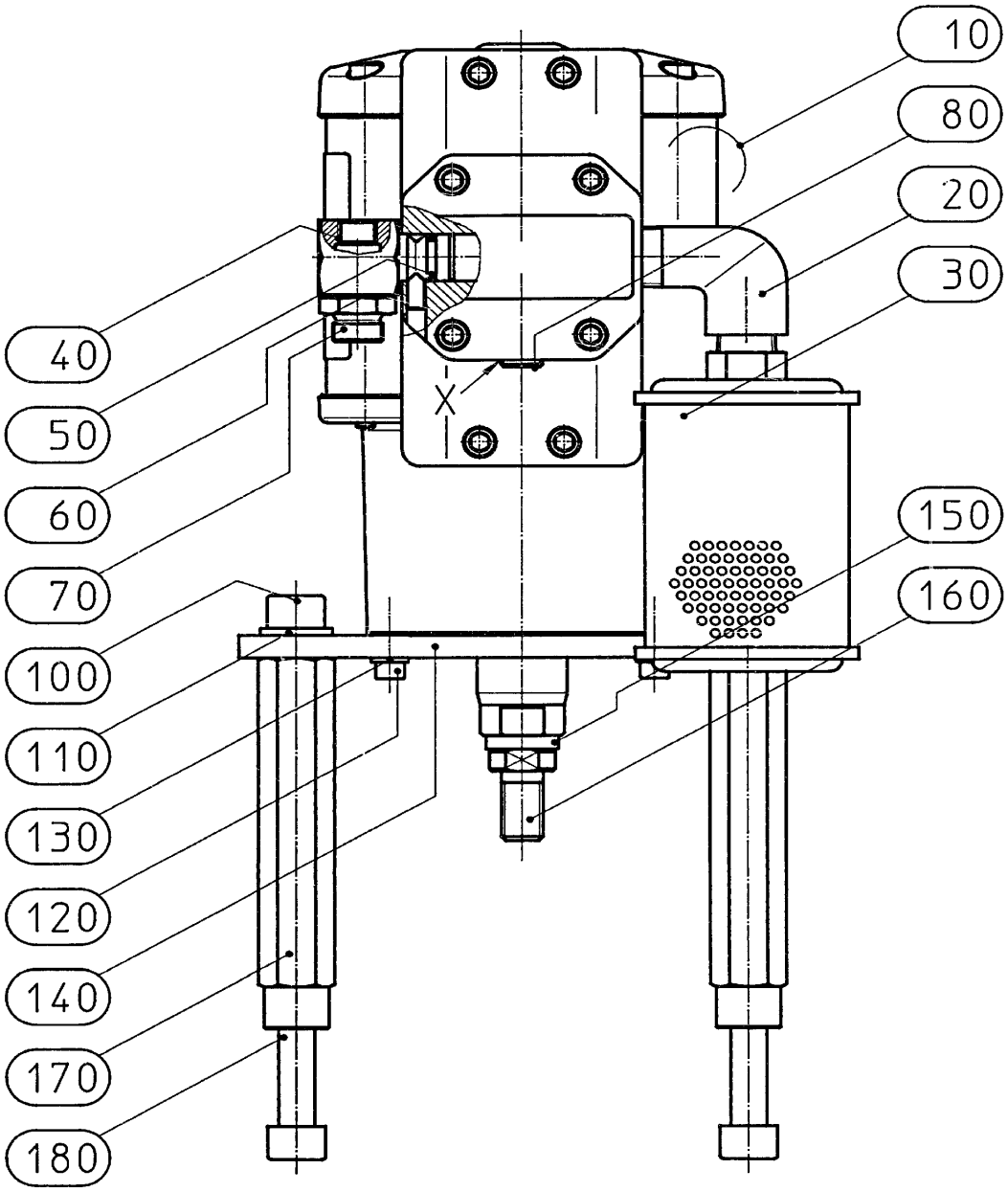
ECOMIX 2000 , 2K DEVICE

AIR MOTOR Complete Model 78015 107003



Note X : sealed with Loctite Nbr.572 and activator T

AIR MOTOR Complete Model 78015 107003

Ref. No	Qty	Part No	Description
10	1	245354	Air Motor
			see manual 309462 for operation , repair and parts
20	1	75214 135002	ELBOW , G 1/2 - R 1/2A
30	1	117237	MUFFLER
40	1	76741 133003	CONNECTION PIECE
50	1	117114	O - RING 12 x2 B
60	1	117001	SEAL , flat A 17 x 21
70	1	76639 029002	NIPPLE , reduction 10 - M26 x 1,5 - G 3/8
80	1	74034 019013	LOCING SCREW , R 1/4
100	4	74006 061033	SCREW , socket head M12 x 25
110	4	74094 014003	DISC B13
120	4	117029	SCREW SHCS , M6 x 25
130	4	75212 008035	LOCK WASHER S6
140	1	76270 002002	RECTANGLE FLANGE , 188 x 100 x 8
150	1	76094 035002	DISC 14,1 x 24 x 5
160	1	15A087	SCREW ; double ended M14 x 1 - M14 x 1
170	4	76835 053001	DISTANCE PIECE L122,5
180	4	74006 069033	SCREW , socket head M12 x 80

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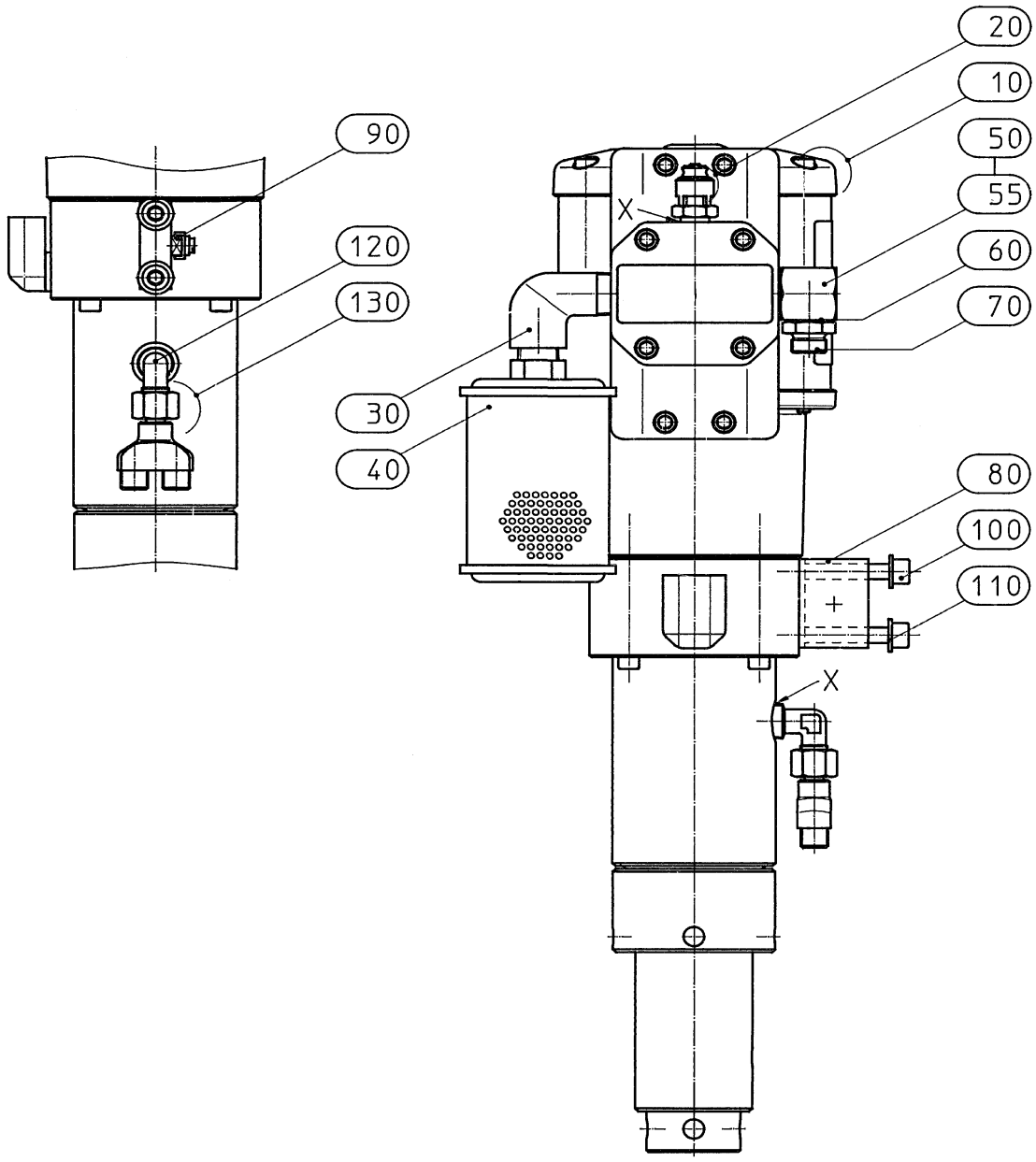
ECOMIX 2000 , 2K DEVICE

FLUSHING PUMP Model 79042 093002
FLUSHING PUMP Model 79042 093003
FLUSHING PUMP Model 79042 093004



X : use Loctite 572 and Activator T to seal ref. 120 into ref. 10

FLUSHING PUMP Model 79042 093002
FLUSHING PUMP Model 79042 093003
FLUSHING PUMP Model 79042 093004

Ref. No	Qty	Part No	Description
10	1	79034 009002	PISTON PUMP , complete used on 79042 093002
			see page 69 & 70 (B.8.20.60-E411) for parts
	1	233753	PISTON PUMP , complete used on 79042 093003
			see manual 309462 for operation , repair and parts
	1	233754	PISTON PUMP , complete used on 79042 093004
			see manual 309462 for operation , repair and parts
20	1	75591 008003	SAFETY VALVE , G 1/4 PN3
			used on 79042 093002 and 79042 093003
	1	79591 008005	SAFETY VALVE , G 1/4 PN7 used on 79042 093004
30	1	75214 135002	ELBOW , G 1/2 - G 1/2
40	1	117237	MUFFLER , G 1/2
50	1	76741 133002	CONNECTION PIECE
55	1	117114	O-RING , 12 x 2 B
60	1	117001	FLAT SEAL , A 17 x 21
70	1	76640 003001	NIPPLE , 8- G 3/8
80	1	76743 022001	CONNECTION PIECE
90	1	197677	TERMINAL GROUND
100	2	117128	SCREW SHCS , M8 x 50
110	2	74094 012003	DISC , B 8,4
120	1	75214 010001	ELBOW , R 3/8KEG-G 1/4
130	1	77741 103002	CONNECTION PIECE , complete

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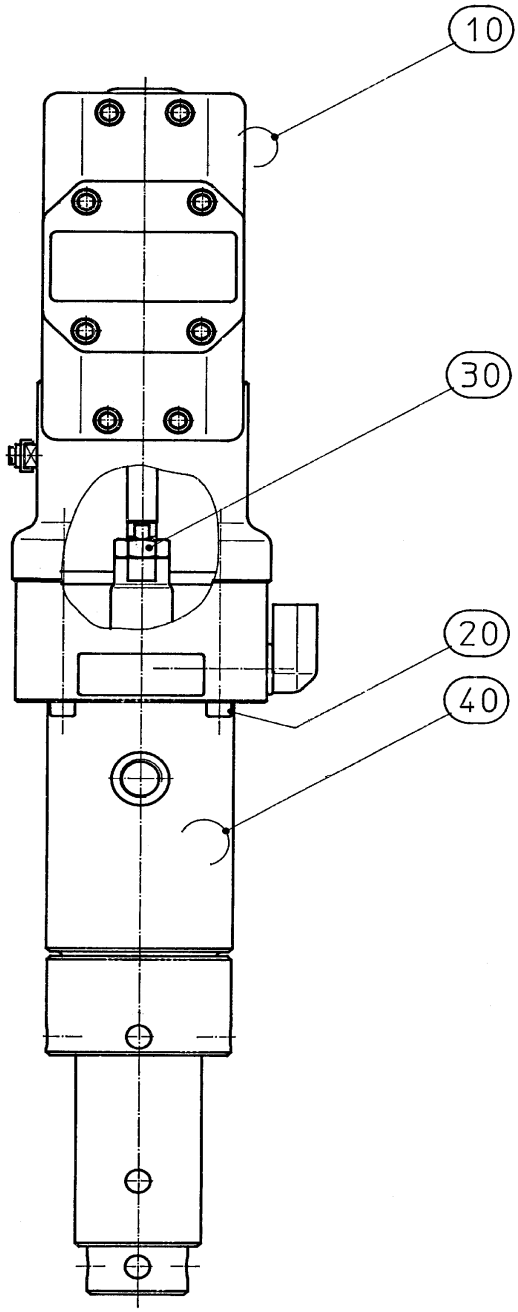
ECOMIX 2000 , 2K DEVICE

Piston PUMP Model 79034 009002



tightening torque for : ref. 20 7 Nm
ref. 30 30 Nm

Piston PUMP Model 79034 009002

Ref. No	Qty	Part No	Description
10	1	78015 004002	AIR MOTOR , complete D 60 S 70
			see page 71 & 72 (B.6.20.44-E1) for parts
20	4	117083	SCREW SHCS , M6 x 70
30	1	76742 013001	THREADED COUPLING , M8 x 1 - M14 x 1
40	1	245353	PUMP LOWER , D35
			see manual 309462 for operation , repair and parts

tightening torque for :	ref. 20	7 Nm
	ref. 30	30 Nm

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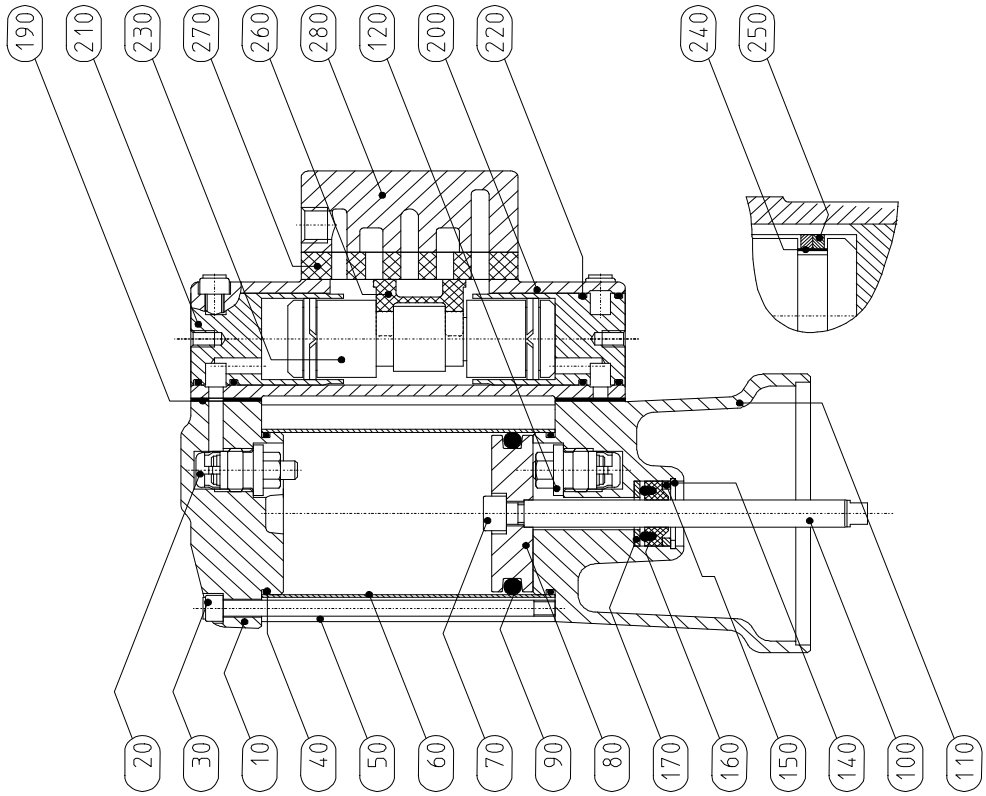
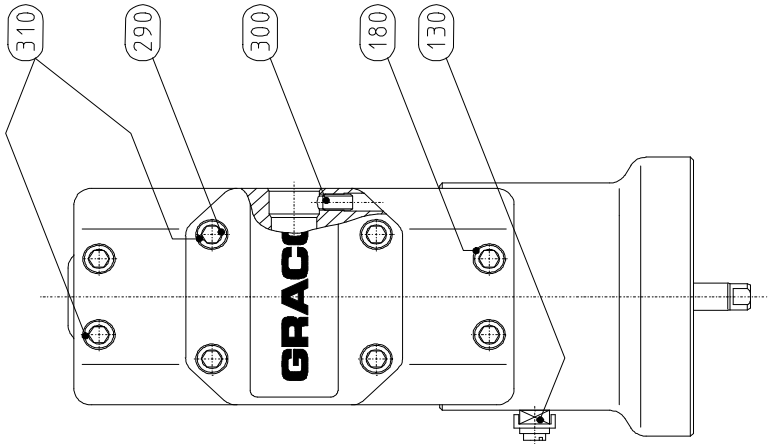
ECOMIX 2000 , 2K DEVICE

AIR MOTOR Model 78015 004002





ECOMIX 2000 , 2K DEVICE

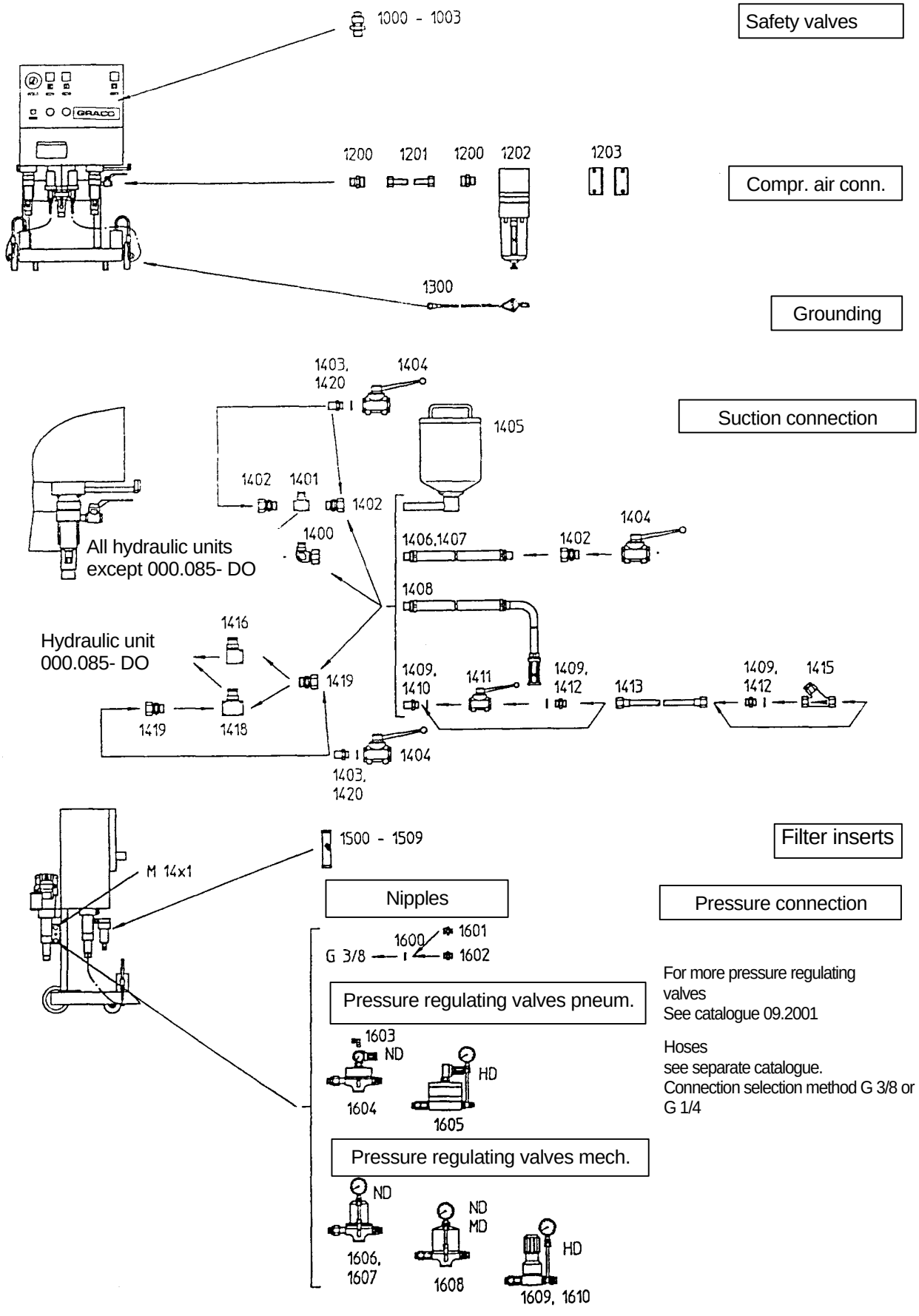
AIR MOTOR Model 78015 004002

Ref. No	Qty	Part No	Description
10	1	77536 033006	CYLINDER COVER D60 , complete contains ref. 20
20	1		Valve DN5 M16 x 1,5
30	2	117084	SCREW , socket head M6 x 125
40	2	?	O - RING 54 x 3 B
50	1	76737 001001	COVER D80
60	1	76570 030001	CYLINDER D60 L99
70	1	#	SCREW , socket head M8 x 20 PLAS
80	1	76594 008002	PISTON D60 x 14
90	1	?	O - RING 50 x 5 B
100	1	#	PISTON ROD D121 L131
110	1	77542 032002	CYLINDER BOTTOM PLATE D60 contains ref. 20
120	1		Valve DN5 M16 x 1,5
130	1	197677	GROUNDING CLAMP 6/4 QMM EX
140	1	74124 016000	SAFETY RING 24 x 1,2
150	1	76094 040001	DISC 16 x 23,9 x 3
160	1	?	U - CUP SEAL G12 x 24 x 7,5
170	1	76094 033001	DISC 12,2 x 23,9 x 3
180	4	117079	SCREW , socket head M6 x 50
190	2	<> ?	GASKET 80 x 25 x 0,75
200	1	15A110	SLIDE VALVE HOUSING , slider 31,5 x 31,5
210	2	15A056	BUSHING 30 x 34 x 52
220	4	<>	O - RING 30 x 2 B
230	1	<>	CARRIER ROD , complete
240	2	117070	CLAMPING RING D26,5
250	4	117053	PISTON RING 30 / 25 x 2,2
260	1	<>	SLIDE CUP 31,5 x 31,5
270	1	<>	SLIDE PLATE , slider 31,5 x 31,5
280	1	15A053	CONNECTION PIECE
290	4	117078	SCREW , socket head M6 x 45
300	1	117052	GRUB SCREW M6 x 12
310	10	75562 006005	LOCKING PLUG LAW2600 26-M6 B

<> These parts are included in Air valve repair kit 233836

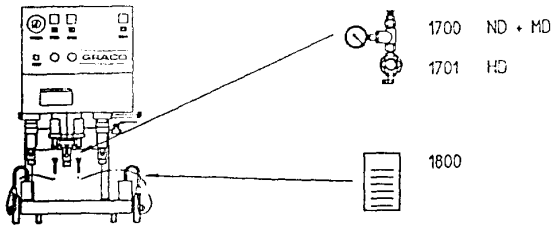
? These parts are included in Air motor seal repair kit 79978 904102

These parts are included in Air motor seal repair kit 79978 904105



For more pressure regulating valves
See catalogue 09.2001

Hoses
see separate catalogue.
Connection selection method G 3/8 or G 1/4



Pressure retaining valve for contents measuring

Measuring pipe

	Pos	Description	Material	Notes	Part No.
Safety valves	1000	Safety valve	-	G1/4 PN 4	75591 008014
	1001	Safety valve	-	G1/4 PN 5	75591 008015
	1002	Safety valve	-	G1/4 PN 6	117019
	1003	Safety valve	-	G1/4 PN 7	117160
Compr. air conn.	1200	Nipple reduction	-	19 - R 3/4 - M 30x2	76639 221001
	1201	Hose	-	DN 16 L2000 M 30x2	77840 029075
	1202	Filter	-	G 3/4 XF - 20	75660 009001
	1203	Mounting set	-	For regulator R 3/4	75650 009001
Grounding	1300	Grounding wire	-	-	73483 001011
Suction connections	1400	Nipple reduction	SST	M 26x1.5 x D22	233888
	1401	Nipple reduction	SST	M 26x1,5 - G 3/4 - G	77741 130002
	1402	Adapter union	SST	GE 22 – ZLR -ED	75204 010002
	1403	Nipple reduction	SST	16 - G 3/4 A - D 22	76639 116002
	1404	Ball valve	SST	PN 25 G 3/4	75601 001046
	1405	Cup	SST	5l - D22	245717
	1406	Suction hose	SST	D 22 DN 19 L1000	77848 035009
	1407	Suction hose	SST	D 22 DN 19 L1600	77848 035010
	1408	Suction hose	SST	D 22 W 1.8 L536	245724
	1409	Seal	SST	A 21 x 26	74188 017090
	1410	Nipple reduction	SST	15 - G 1/2 A - D 22	76639 114002
	1411	Ball valve	SST	PN 25 G 1/2	75601 001045
	1412	Nipple reduction	SST	12 - G 1/2	76640 006003
	1413	Hose line	SST	P 200/12 G 1/2	75844 017086
	1415	Strainer	SST	G 1/2 PN 40 - Mw	75647 013004
	1416	Nipple reduction	SST	G1 - G1	77741 141002
	1418	Nipple reduction	SST	G1 - G1	77741 130003
	1419	Adapter union	SST	GE 22 - ZLR 1 - ED	75204 010003
	1420	Seal	SST	A 27x32	74188 025090
Filter inserts	1500	Filter insert	SST	0.060 mesh No. 1	76648 045002
	1501	Filter insert	SST	0.075 mesh No. 2	76648 045004
	1502	Filter insert	SST	0.080 mesh No. 3	76648 045006
	1503	Filter insert	SST	0.090 mesh No. 4	76648 045008
	1504	Filter insert	SST	0.140 mesh No. 5	76648 045009
	1505	Filter insert	SST	0.190 mesh No. 6	76648 045010
	1506	Filter insert	SST	0.240 mesh No. 9	76648 045012
	1507	Filter insert	SST	0.320 mesh No. 12	76648 045014
	1508	Filter insert	SST	0.410 mesh No. 15	76648 045016
	1509	Filter insert	SST	0.530 mesh No. 20	76648 045018
Pressure connection	1600	Seal	SST	A 17 x 21	74188 015090
	1601	Nipple reduction	SST	6 - G 3/8 - G 1/4	76639 016003
	1602	Nipple reduction	SST	8 - G 3/8	76640 005001
	1603	Elbow	-	R 1/4 tap. - M 14x1	75214 006002
	1604	Pressure regulating valve	SST	P 10 - V P, 081	79635 003081
	1605	Pressure regulating valve	SST	P 200 - V P, 086	79637 007086
	1606	Pressure regulating valve	SST	P 10 - V M, 026	79635 004026
	1607	Pressure regulating valve	SST	P 20 - V M, 031	79635 010031
	1608	Pressure regulating valve	SST	P 50 - V M, 036	79635 011036
	1609	Pressure regulating valve	SST	P 100 - V M, 041	79637 012041
	1610	Pressure regulating valve	SST	P 200 - V M, 046	79637 012046
Pressure retaining valve for contents	1700	Discharge unit	SST	P 50 - RM ND+MD	78638 006003
	1701	Discharge unit	SST	P 200 - RM HD	78638 006002
Measuring pipe	1800	Measuring pipe	-	600 cm^3	70781 001001

Order Example

Please lay out each order as follows:

Designation	Pos. No.	Part No.	
Safety valve		1000	75591 008014

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 month 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 an 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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Subject to change

B.8.20.60 / 06.02 / 79990 007001 / D