INSTRUCTION AND MAINTENANCE MANUAL

ALTERNATIVE PLUNGER DOSAGING PUMP WITH SPRING RETURN

SERIES: "A"

Models: A-125N, A-175N, A-250N

CE

DOSEURO

Via Cascina Crivella, 18 - I-20090 - Vimodrone (Milano) Italy
Tel.: ++39 02 27301324 - Fax: ++39 02 26700883
http://www.doseuro.com

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INTRODUCTION

This instruction and maintenance manual was drafted in compliance with the Machinery Directive 89/392 as modified by 91/368, 93/44 and 93/68.
It was also drafted in compliance with norm EN 292 1/2

TECHNICAL SUPPORT AND MAINTENANCE

The authorised companies for technical assistance under warranty and pumps' maintenance into the European Union can be reached calling the following number: Tel.: ++39-2-27301324

1 OVERVIEW OF THE MACHINE

Functional versatility and precision make Doseuro® dosage pumps well-adapted for any type of liquid dosing in any industrial sector or setting. Precision and dose reproducibility combined with quality construction materials make Doseuro® pumps extremely dependable.

1.1 Description

- The shape and dimensions of the machine and its accessories are given in the attachment.

- provided for the safety of the operators and service personnel. This is the only place from which the movement (i.e. the piston) *(see the attached design drawing)* is visible and can be accessed. Depending on the model, this cover is made of a single piece or two halves.

- This machine is designed for dosing clean or unclean liquids. This machine is also suitable when:
  - ↘ The liquid being pumped contains suspended solid or abrasive particles.
  - ↘ a liquid containing a suspension can still be pumped, in accordance with the machine's design limits and specifications, by adopting special technical measures such as continuous flushing of the plant's pistons and/or piping.
  - ↘ any leakage through the packaging gland due to normal wear will not create any risk to personnel or the environment.
  - ↘ particularly high temperatures will be reached.

- The machine has only one command mechanism (*see the attached design drawing)* which regulates the load. This adjustment, or command, can either be manual or. by request, the load can be remote controlled (*see the attached servo control)*.

- The specifications of the external power sources which deliver the best performance are determined by the user. These specifications must always be listed on the order (e.g. voltage, frequency, protection, area classifications, etc.)

2 IMPORTANT TECHNICAL INFORMATION ON THE MACHINE

2.1 Technical Specifications

The following table reports the technical data on the machine which must be followed by the user in order not to damage the machine and, more importantly, not to create conditions which could pose a danger to personnel.

Tab. I: Series A-125 Pumps

Piston D.	Strokes/min		Maximum load		Maximum pressure*	
	50 Hz	60 Hz	50 Hz	60 Hz	Metal material	Plastic material
mm	c/m	c/m	l/h	l/h	bar	bar
6	58	70	**0,8**	**1,0**	**20**	**10**
6	96	116	**1,3**	**1,6**	**20**	**10**
6	116	/	**1,6**	/	**20**	**10**
11	58	70	**4,0**	**4,8**	**20**	**10**
11	96	116	**6,0**	**8,0**	**20**	**10**
11	116	/	**8,0**	/	**20**	**10**
17	58	70	**10,0**	**12,0**	**20**	**10**
17	96	116	**16,0**	**20,0**	**20**	**10**
17	116	/	**20,0**	/	**20**	**10**
25	58	70	**22,0**	**26,4**	**20**	**10**
25	96	116	**36,0**	**44,0**	**20**	**10**
25	116	/	**44,0**	/	**20**	**10**
30	58	70	**31,0**	**37,2**	**14**	**10**
30	96	116	**51,0**	**62,0**	**14**	**10**
30	116	/	**62,0**	/	**14**	**10**
38	58	70	**50,0**	**60,0**	**9**	**9**
38	96	116	**82,0**	**100,0**	**9**	**9**
38	116	/	**100,0**	/	**9**	**9**
47	58	70	**78,0**	**93,6**	**5,5**	**5,5**
47	96	116	**129,0**	**156,0**	**5,5**	**5,5**
47	116	/	**156,0**	/	**5,5**	**5,5**

* Higher values can be reached in non-series configurations

Tab. II: Series A-175 Pumps

Piston D.	Strokes/min		Maximum load		Maximum pressure*	
	50 Hz	60 Hz	50 Hz	60 Hz	Metal material	Plastic material
mm	c/m	c/m	l/h	l/h	bar	bar
6	70	84	**1,3**	**1,56**	**20**	**10**
6	96	116	**1,8**	**2,11**	**20**	**10**
6	120	/	**2,2**	/	**20**	**10**
11	70	84	**6,0**	**7,2**	**20**	**10**
11	96	116	**8,0**	**9,6**	**20**	**10**
11	120	/	**10,0**	/	**20**	**10**
17	70	84	**17,0**	**20,4**	**20**	**10**
17	96	116	**24,0**	**28,0**	**20**	**10**
17	120	/	**30,0**	/	**20**	**10**
25	70	84	**37,0**	**44,4**	**20**	**10**
25	96	116	**51,0**	**61,4**	**20**	**10**
25	120	/	**64,0**	/	**20**	**10**
30	70	84	**52,0**	**62,4**	**20**	**10**
30	96	116	**72,0**	**86,0**	**20**	**10**
30	120	/	**90,0**	/	**20**	**10**
38	70	84	**83,0**	**99,6**	**13**	**10**
38	96	116	**115,0**	**138,0**	**13**	**10**
38	120	/	**144,0**	/	**13**	**10**
47	70	84	**130,0**	**156,0**	**8,5**	**8,5**
47	96	116	**180,0**	**216,0**	**8,5**	**8,5**
47	120	/	**226,0**	/	**8,5**	**8,5**
54	70	84	**168,0**	**201,6**	**6,5**	**6,5**
54	96	116	**232,0**	**278,0**	**6,5**	**6,5**
54	120	/	**290,0**	/	**6,5**	**6,5**
64	70	84	**236,0**	**283,2**	**4,5**	**4,5**
64	96	116	**232,0**	**391,0**	**4,5**	**4,5**
64	120	/	**408,0**	/	**4,5**	**4,5**

* Higher values can be reached in non-series configurations

Tab. III: Series A-250 Pumps

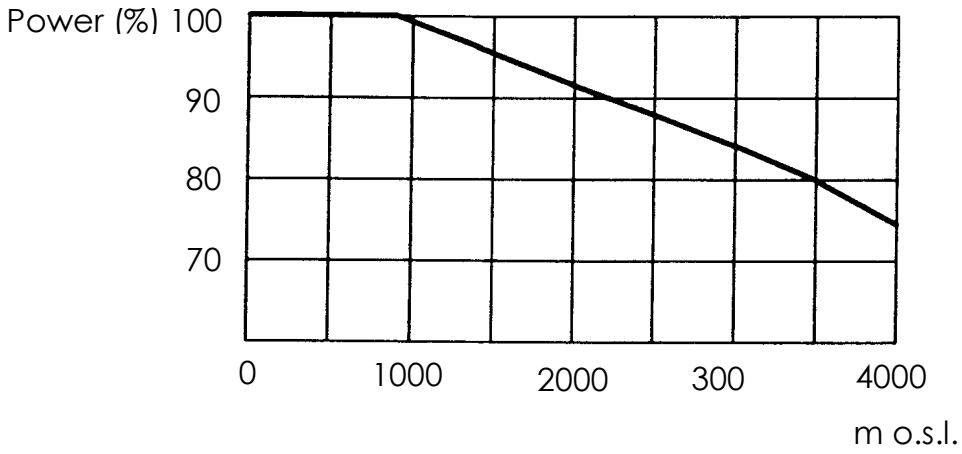
Piston D.	Strokes/min		Maximum load		Maximum pressure*	
	50 Hz	60 Hz	50 Hz	60 Hz	Metal material	Plastic material
mm	c/m	c/m	l/h	l/h	bar	bar
25	56	67	**43,0**	**51,6**	**20**	**10**
25	96	116	**73,0**	**88,0**	**20**	**10**
25	112	/	**86,0**	/	**20**	**10**
38	56	67	**96,0**	**115,2**	**20**	**10**
38	96	116	**164,0**	**197,5**	**20**	**10**
38	112	/	**192,0**	/	**20**	**10**
47	56	67	**150,0**	**180,0**	**17**	**10**
47	96	116	**257,0**	**308,0**	**17**	**10**
47	112	/	**300,0**	/	**17**	**10**
54	56	67	**192,0**	**230,4**	**13**	**10**
54	96	116	**329,0**	**397,0**	**13**	**10**
54	112	/	**384,0**	/	**13**	**10**
64	56	67	**266,0**	**319,2**	**9,5**	**9,5**
64	96	116	**456,0**	**547,2**	**9,5**	**9,5**
64	112	/	**532,0**	/	**9,5**	**9,5**
76	56	67	**383,0**	**459,6**	**6,5**	**6,5**
76	96	116	**656,0**	**787,8**	**6,5**	**6,5**
76	112	/	**766,0**	/	**6,5**	**6,5**
89	56	67	**521,0**	**625,2**	**4,8**	**4,8**
89	96	116	**893,0**	**1071,7**	**4,8**	**4,8**
89	112	/	**1042,0**	/	**4,8**	**4,8**

* Higher values can be reached in non-series configurations

✦

Various types of undesirable results can occur when the maximum values are exceeded.
The altimetric level can furthermore influence the performance of the machine because electric motors cam be quite sensitive to it. Above normal power is required at altitudes over 1000 meters. This is addressed by the IEC 34-1 (69) norms which regulated motor production.

Table IV: Electric motor power dispersion as a function of altimetric level



3 INTENDED AND UNINTENDED USE

- This machine is designed for dosing clean or unclean liquids. This machine is also suitable when:
  - ↘ The liquid being pumped contains suspended solid or abrasive particles.
  - ↘ any leaks through the packing gland due to normal wear will not adversely affect the safety of personnel or the environment.
  - ↘ particularly high pressures will be reached.

- The machine is not designed for use with fluids other than those designated:
- Example: A pump with a PVC head, designed to pump acidic solutions, and not be used to dose alkaline solutions or solvents, which will quickly corrode its parts beyond repair.

WHEN IN DOUBT, THE CLIENT SHOULD CONTACT OUR TECHNICAL OFFICE FOR FURTHER INFORMATION ON THE PUMP IN QUESTION AND ITS PROPER USE.

4 RESIDUAL RISKS

One type of residual risk could be leakage from the stuffing box (*see the attached design drawing),* in which case the user is recommended to pipe such leakage to a discharge.
Whenever breaks are found, the equipment should first be emptied and the head of the pump depressurized. A capillary cleaning should be done with the proper equipment (hoses) and the correct cleaners. Only after this should the pump be disassembled, keeping in mind that the operator must use proper protection (gloves, glasses, boots, overalls, etc.).

5 TRANSPORT, MOVEMENT. AND STORAGE

The machine must always be transported in a vertical position, never horizontally.
Since the client chooses the shipper "on its own", these two parties (the client and the shipper) are responsible for transportation.
Correct packaging must be provided for any type of shipment and it is understood that the client itself is free to define the shipment mode and type. The client is, in any case, always responsible for specifying the type of shipment (via land, sea. or air).
Pumps made of plastic must be stored in a dry, ventilated environment, away from heat sources and at a temperature between + 10°C and +30°C.

6 INSTALLATION

6.1 Machine Set-up

- Allow sufficient space (operating area) to be able to check and disassemble the pump, especially on the hydraulic side (head of the pump), and near the regulation knob.

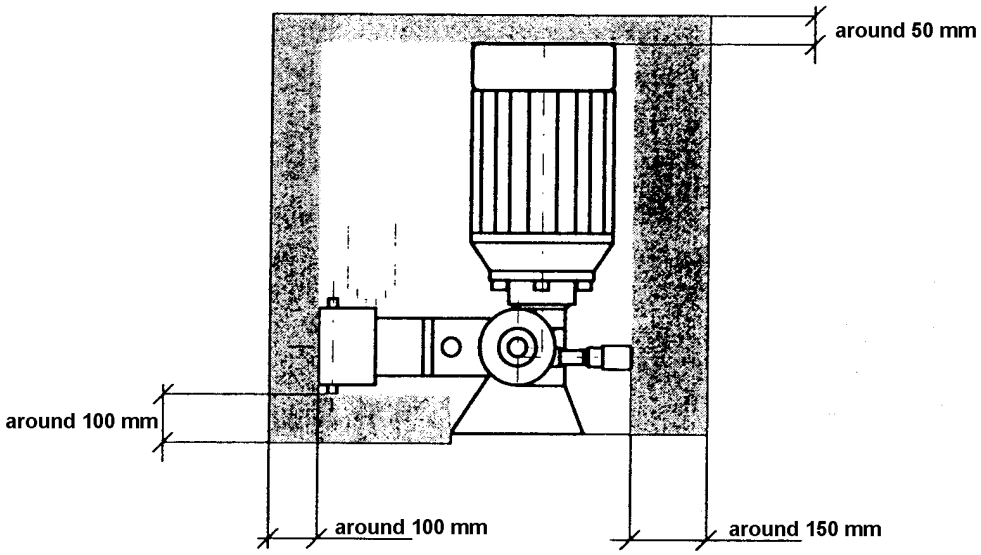


Fig.I

- Place the machine in a vertical position as shown in Figure 1 and on a sturdy resting place (made of metal, cement, etc.).

- If the pump must be installed outside, it is essential to provide adequate covering, especially if the pump is equipped with servo controls or other delicate accessories.

- Provide adequate drainage for the delivery tubing near the pump head in order to facilitate removing the pump from the installation. When pumps have vertical flanges, stub pipe fittings need to be added to facilitate disassembly.

- PVC pump heads can only work correctly at room temperature and with the dosing liquid from 0°C to +40°C. If necessary, provide adequate protection from direct sunlight and monitor the temperature of the liquid being dosed.

6.2 Tubing

The following describes recommendations that the user should consider in order for the machine to be installed and operate properly:

- The size of the tubing normally must be (especially for aspiration and handling viscous liquids) one size larger in diameter than the openings of the pump.

- The average velocity of the liquid in the tubing must not exceed 0.7 m/s for liquids in a viscosity range up to 100 cPs.

- Aspiration tubing must be kept to a minimum while making wide corners at each bend.

6.3 Positioning

The following describes the steps necessary to properly position the machine:

- Be sure the base is sturdy and well leveled and attach the pump securely **without creating tension on its axis**.

- Before connecting tubing to the pump attachments, the tubes should be washed to remove any extraneous matter there may be such as welding pellets, off-cuts from gaskets, etc.

- The tubing must be independently supported and cannot hang from the machine. Furthermore, the tubing must be attached in a way which accommodates dilation due to exposure to heat so as to not push against the head of the machine.

- It is always advisable to have double delivery flanges, one or more "T attachments" which can be used for mounting gauges, safety valves, and surge dampers.

- Make sure that the machine rotates freely by turning the fan on the motor by hand. Should the fan be blocked, check the positioning and the alignment.

- Make sure that the tubes are perfectly sealed and that the air is not entering in aspiration, which would hinder priming the machine.

6.4 Correct Installation

- **Installation with aspiration head not compensated by the delivery head (under the head)**

When the water level of the aspiration tank is located above the delivery tank, fluid flows from the aspiration tank to the delivery tank. To prevent the free passage of liquid due to gravity, a "back pressure" must be created using a valve calibrated at a pressure greater than the pressure of the aspiration head.

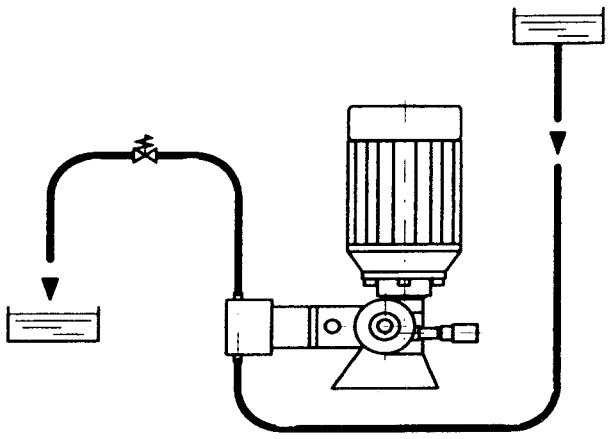


Fig. 2 (installation under the head)

- **Installation with negative aspiration head (under the head)**
  Since the NPSH value of the dosing pumps can vary depending on the operation of the head, the following condition must be met in order for the pump to operate properly:

  NPSH Installation > NPSH Pump

  where NPSH is the positive net aspiration load.

  The NPSH for the installation is derived as follows:

$$\textbf{NPSHimp.} = Pb \frac{Pc}{\gamma} - Tv - Pt$$

Where:
Pb = Barometric pressure
Pc = Pressure of the liquid column positive (+), negative (-)
Tv = Vapor pressure of the liquid
Pt = Load loss of the aspiration tubing
Y = Specific weight

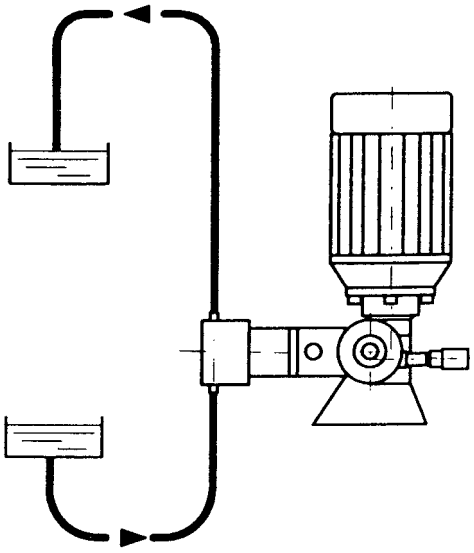


Fig. 3 (Installation over the head)

Note: For machines with low loads, the time the pump takes to refill the aspiration tubing in the priming phase must be taken into consideration.

- **The Ideal Installation**
  To perform an ideal installation, implement the following:
  - ↘ Small aspiration head.
  - ↘ delivery head greater than that in aspiration.

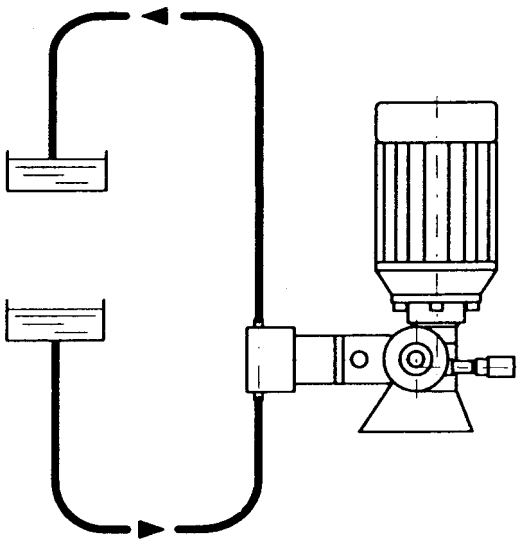


Fig. 4 (the ideal installation)

- **Installation for dosing liquids that could contain impurities**
  The following must be considered in installing the pump properly.
  Use an adequate aspiration filter with filter mesh between 0.1 and 1mm thick, depending on the size of the pump, and with net filtration surface 10 or 20 times the area of the aspiration tubing. Under difficult filtration conditions, where there is high viscosity or heavy impurity in the liquid, a basket filter having a larger surface area (100 times the area of the aspiration tube) which lasts longer is recommended. A larger surface area also significantly reduces load loss, which lowers the volumetric efficiency of the pump. It is therefore essential that vertical sections of the delivery tubing be avoided and that the head and tubing be cleaned immediately after each pause in operation.

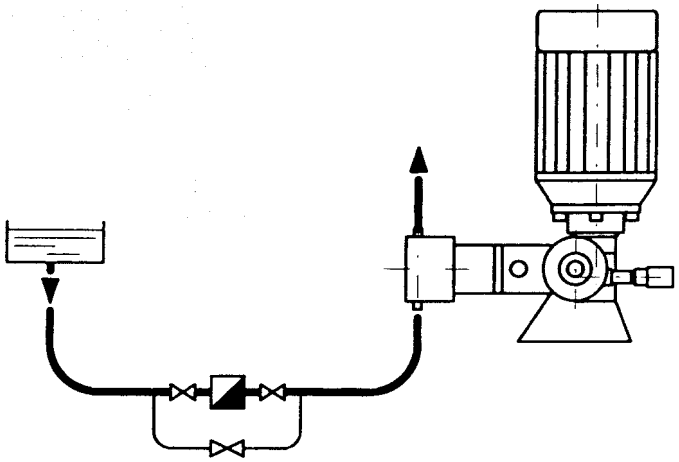


Fig. 5 (Installation for liquids with impurities)

- **Installation with delivery in a continuous flow tube**
  An on-off or "no return" valve must be installed near the entrance of the tube.

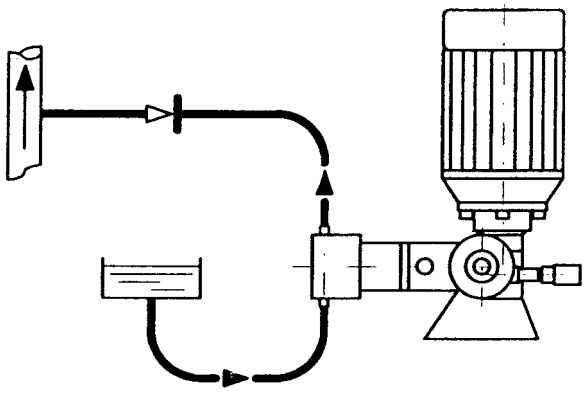


Fig.: 6 (installation with continuous flow delivery)

- **Installation of accessories: Security valve, gauge**
  Whenever valves are installed on the delivery tubing of the pump, or when the tubing is long and complex, or, still, when the dosage involves equipment under pressure, **it is essential** that a safety valve be installed. This valve serves to safeguard the pump, the tubing, and any accessories from manoeuvring errors or obstructions in the delivery tube. The discharge of the valve must be easily accessible in order to check the losses from the valve, and thus, the dosage precision. This discharge must be connected to the aspiration tank or to a drain installed by the technician.
  A gauge can verify that the installation is operating correctly and that the pressure is normal.

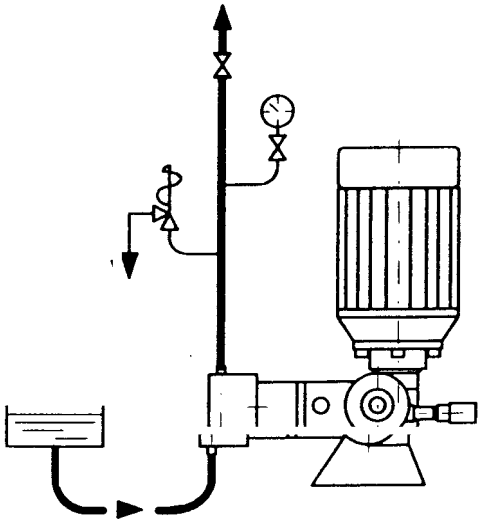


Fig. 7 (installation of a safety valve and gauge)

Note: The safety valve must always be installed on the delivery tubing between the pump and the first on-off valve, in any case, as close as possible to the head of the machine. It is also recommendable to install a gauge with a gauge-valve near the safety valve.

- **Installing accessories: Pneumatic accumulator or plenum surge damper**
  For alternative pumps, it is recommended that a plenum surge damper be installed immediately after the pump, especially for higher loads. It is indispensable for achieving a linear load. A surge damper is nonetheless recommended to prolong the life of the pump and to eliminate vibrations and inertia throughout the installation.

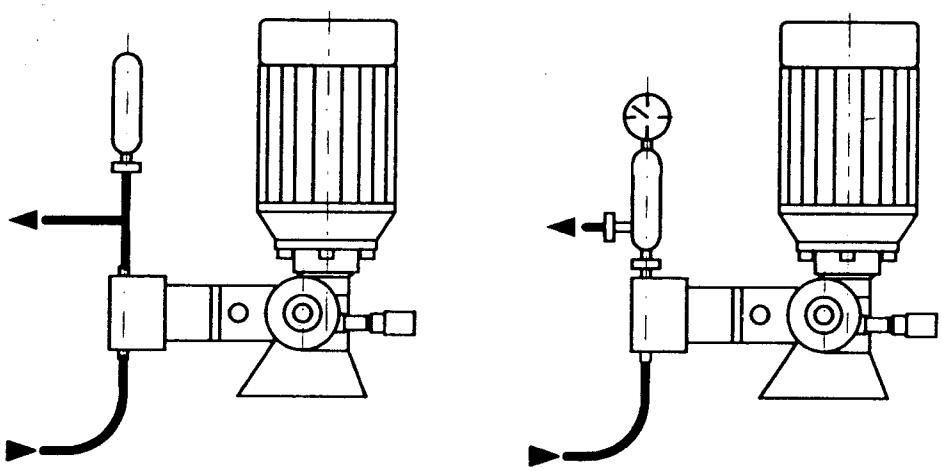


Fig. 8 (installation with plenum surge damper

7 ASSEMBLY AND DISASSEMBY

7.1 Assembly

Given the nature of dosing pumps, all machines normally come assembled.
For a clearer view, see the attachment which shows the parts of the movement along with the proper terminology in order to have a complete picture of the machine's components. These designs are indispensable in recognizing malfunctioning or defective parts. Other designs show the hydraulic parts (pump head and valves) for the same reasons listed above, and are found in the attachment as well.

7.2 Disassembly

To disassemble the machine or to place it in high altitudes. read the information given in Section 6.
Special attention must be paid for the possible presence of pressurized liquids. It is therefore necessary to "section" or "intercept" the tubing of the installation near the pump.

- **Disassembly of the machine's hydraulic parts (head and valves)**
  Disassembly of the pump head requires special care. The design for the specific section of the pump should be consulted before taking any action.
  The flat gaskets between the valves must be replaced after each disassembly, while the replacement of the O-ring gaskets is left to the discretion of the user .

Both the aspiration and delivery valves (see the valve attachment) always operate on a vertical axis (which must be maintained) due to the force of gravity. They are held to the seat as shown in the attachment (see the valve section). The valves are made with great precision and must be replaced, along with their seats, if they are dented. Always keep in mind that the valves must never be lubricated, but rather cleaned of any trace of lubricant which can cause blockages.

8 PREPARING THE MACHINE FOR START-UP

8.1 Checking the Machine for Damage

The user should perform a preventive check, especially of autonomous auxiliary equipment (servo control), to identify and promptly report any damage suffered during transport and movement.
Always check the packaging for damages before opening.

8.2 Removing the Bocks

Before installing the pump, the protective caps on aspiration and delivery holes of the valves must be removed

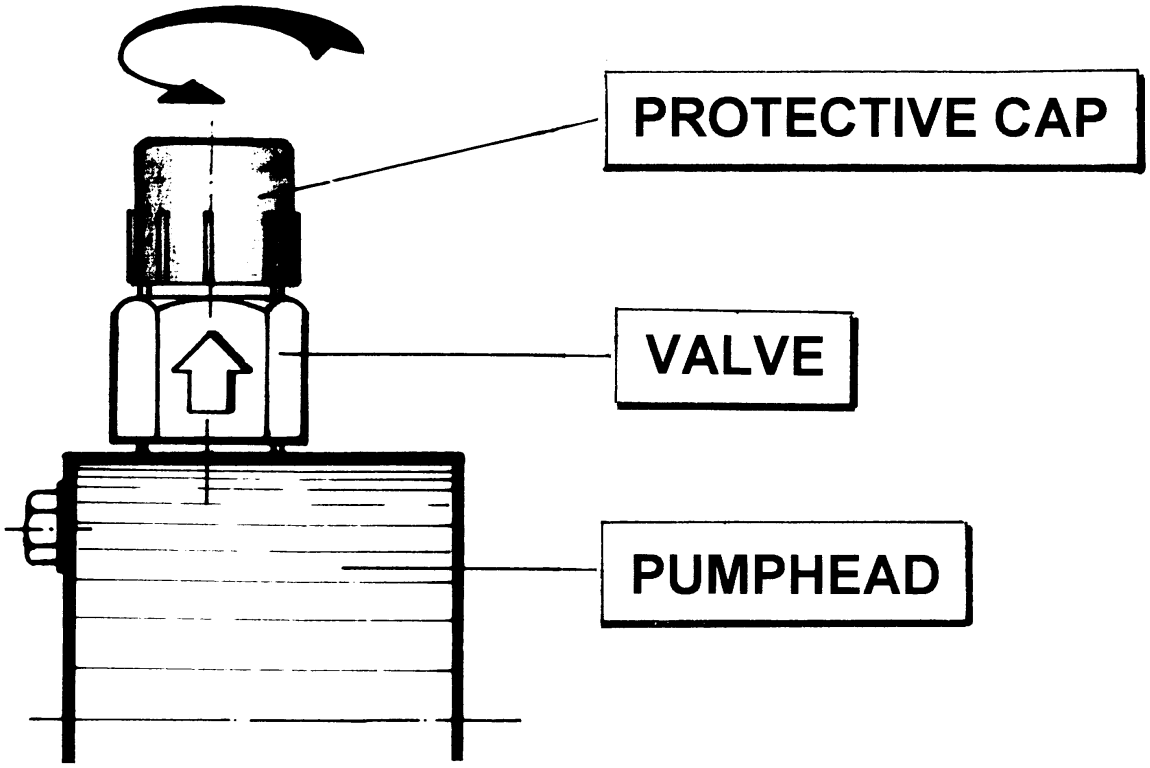


Fig. 9 (Removing the blocks)

8.3 Filling the Pump Case and Gear Box with Oil

All pumps come without lubricant thus making it necessary to fill the pump body with oil before putting the machine into gear.
The amount of oil to put into the pump body is shown below:

Table IV

Pump type	Amount of Oil (ml)
A-125	approx. 150
A-175	approx. 300
A-250	approx. 650

The type of oil to put into the pump body or gearbox is identified internationally by:

SAE 140 with viscosity 23°E (approx. 160 mPa-s)

There are several manufacturers for this oil:

Shell	Spirax HD 85 W 140
Esso	Gear Oil GX 85 W 140
Agip	Rofra MP 85 W 140
Mobil	Mobilube HD 85 W 140
BP	Nypogear EP 85 W 140
IP	Pontiax HD 85 W 140

The oil must be changed after the first 500 hours of operation, and every 3,000 hours thereafter.

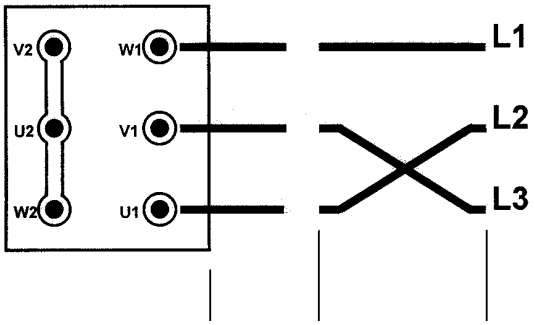
8.4 Connecting the machine to external power sources

The connection of the electric motor to an external power source may be of the star type (Y) or delta type (Δ). In all cases, the motor terminal board contains illustrated instructions for the mains connection.

Fig.10: SCHEME FOR ATTACHMENT TO ELECTRICAL POWER

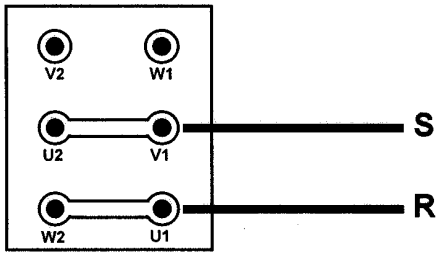
TRI-PHASE **SINGLE PHASE**

star connection (Y)

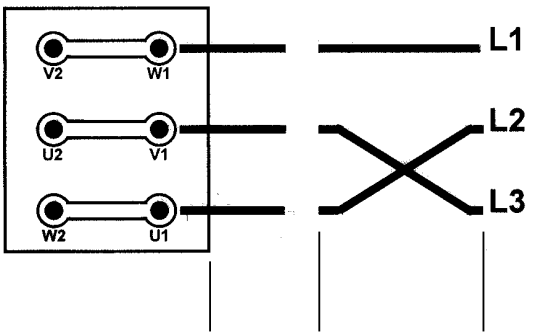


To reverse the direction of rotation, cross the electric cables

clockwise

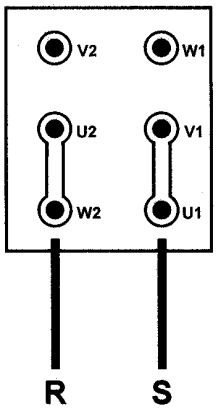


triangular connection (Δ)



To reverse the direction of rotation, cross the electric cables

counterclockwise



9 REGULATION AND ADJUSTMENT

9.1 Adjusting the Machine

The only adjustment required on the machine is the flowrate.
The adjustment of the machine's flowrate from 0 (zero) to maximum is carried out by rotating the regulation knob *(see Fig. 11)*then complete revolutions. The knob is divided into ten equal parts, with each division representing a variation of 1:100 of the pump's maximum flowrate. When the knob is rotated, it moves along its axis of rotation and its graduated edge engages a linear scale which is divided into 10 equal parts. Each revolution of the knob, therefore, corresponds to one linear division on the vernier and a variation of 1:10 of the pump's maximum flowrate.
To find the number of divisions to set the knob in order to achieve a certain load, first of all take the maximum load of the pump and apply the following:

$$D = 100 \frac{Qr}{Qm}$$

Where: D = Number of divisions
Qr = Desired load (in l/h)
Qm = Maximum load (in l/h)

Example:
In order to determine on which gaduation to position the regulating knob to pump at 36 l/h with a pump of maximum flowrate 60 l/h (model A-125 or A-175).

$$D = 100 \frac{Qr}{Qm} \qquad D = 100 \frac{36}{60} \qquad = 60 \text{ divisions}$$

The regulation knob must therefore be set to the 60th division, that is, as shown in the figure:

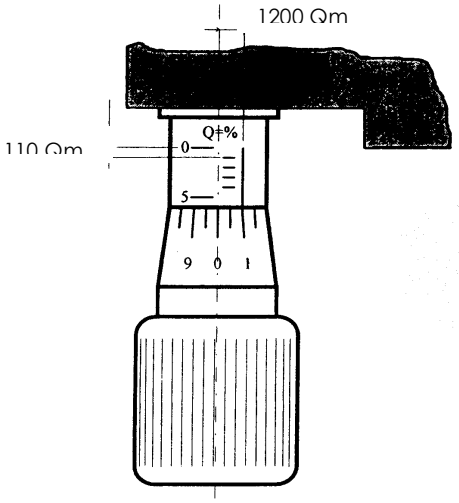


Fig. 11

When there are other controls, including servo controls, they must be calibrated to the input voltages and signals.
Complete documentation is attached for a pump equipped with a servo control.

9.2 Adjusting Accessory Devices: Safety Valves

Follow the steps below to correctly calibrate a safety valve:

- Install the safety valve as shown below *(Fig. 12)*.
- Loosen the calibration screw (Pos. 1).
- Start the pump and let it remove all air from the tubing.
- Close the on-off valve (Pos. 2).
- Slowly tighten the calibration screw (Pos. 1) of the safety valve until the desired pressure is shown on the pressure gauge.
- Open the on-off valve (Pos. 2).
- To check that the calibration was performed correctly, just close the on-off valve again (Pos. 2) and the pressure reading on the gauge must be the same as before. If this is not the case, it can be corrected with the calibration screw on the safety valve. (Pos. 1)
- In addition, see the attached designs and sections.

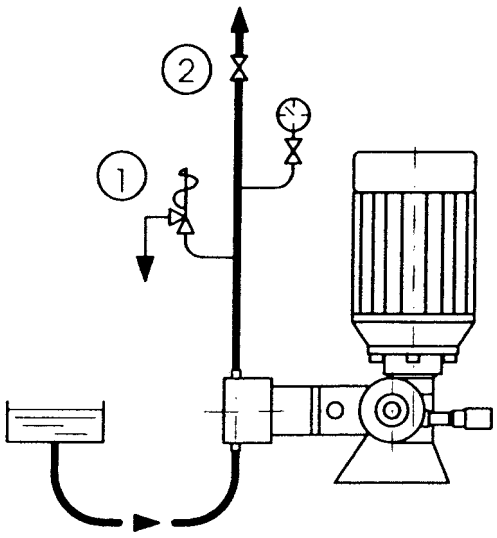


Fig .12

Note: The calibration pressure (opening setting or "click") is normally equal to :

Operating pressure + 10%

(Or at the user's discretion)

The maximum opening pressure is equal to: "Click" pressure + 15%.

10 START-UP AND USE OF THE MACHINE

10.1 Control Devices

The machine's control devices are shown in the designs *(see the attached design drawings in the section on the pump body and servo controls)*.
Remember that machines normally come equipped with only a manual control.
Upon request, an impulse generator can be provided with which the client can assemble these impulses and start and stop the pump automatically (these designs are attached only if the machine is equipped with an impulse generator).

10.2 Description of the Operations

Follow the steps below to put the machine in gear:

- Check that the oil level is between the proper markings. Pumps always come without oil.
- Check the electrical connections and that the motor rotates in the direction shown by the arrow on the fan cover of the motor.
- Make sure that the liquid to be dosed is not solidified and dried in the tubing.
- Make sure that all *on-off* valves along the path of the tubing are open.
- Start the machine for the first time with the lowest possible delivery pressure. Start the pump, therefore, with zero load and gradually increase it to the maximum load so that the tubing can be degassed quickly and safely.
- Dosing pumps are self-priming. Some priming difficulties can nevertheless arise in machines having small pistons or with high delivery pressures, or, still, back-pressure valves (if mounted directly above the delivery valve). These conditions can make it necessary to prime the pump by pouring liquid into the aspiration circuit and into the head of the pump itself.

10.3 Description of operations to carry out for pumps fitted with piston flushing

- Connect the piping as shown in the diagram below.
- Before starting the dosing, ensure that valve "A" is closed and valve "B" is open. Start the continuous flushing of the packing gland.
- Start-up the machine.
- When dosing is complete, before stopping the machine open valve "A", and immediately after close valve "B". Then allow the washwater to circulate for 3 to 4 minutes.
- Shut down the pump, allow the washwater to circulate until it is clear. This water must be drained into a tank for disposasl by the installer.
- Close valve "A", wash stuffing box, open valve "B".

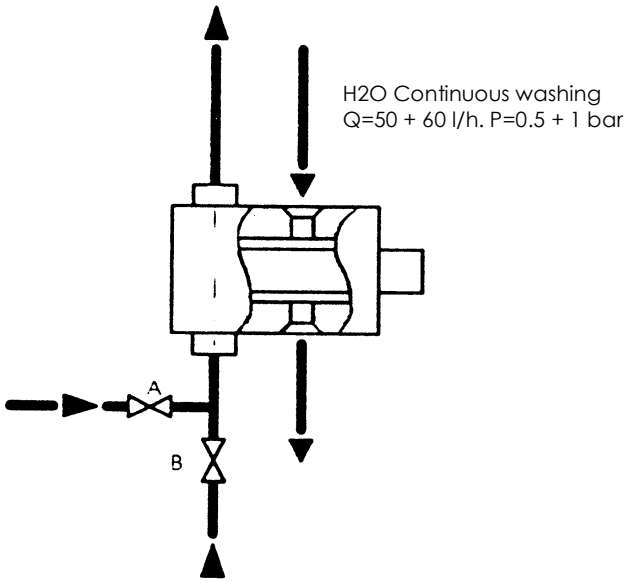


Fig. 13

11 Taking the Machine Out of Service

Before taking the machine out of service, a thorough cleaning is necessary using cleaners which are compatible with the hydraulic parts of the pump, since there can be toxic, caustic, or acidic liquid residues.
Attention must be given to the possible presence of pressurized liquids in the installation, in which case the tubing near the pump must be "sectioned-off".
Any legal requirements on the recycling and disposal of raw materials and the metal parts of the machine must also be taken into consideration.
If the machine must remain out of service for long periods, especially before the initial start-up, the body of the pump must be filled in order to cover the reduction gear, crank gears, as well as the pump head in special protective oil.

12 MAINTENANCE, ADJUSTMENT, AND REPAIR

WARNING:

Before performing maintenance procedures on a pump:

- The machine must be at rest and disconnected from all electrical power;
- The installation must be emptied of used liquids, or the tubes near the pump must be "sectioned-off" or "shut-off" using the on-off valve;
- The pump head must always be depressurized;
- The service personnel must wear proper protection such as gloves, mask, glasses, overalls, and anything else necessary to prevent the skin from coming in contact with the liquid being pumped.

◆

In order to maintain the safety, reliability, and performance of the machine over time, it must undergo maintenance which includes check, control, and replacement procedures.

- The checks and controls are essentially visual in nature. The internal and external parts of the machine must be checked for pits, corrosion, and other signs of decay. Special attention must be given to plastic materials, especially with regard to cracks, chinks, and breaks. These phenomena obviously require replacement of the affected parts.

- Parts subject to wear must be checked periodically. Check the following table for spare parts:

Tab. V

SERIES A-125, A-175, A-250 PUMPS		
Design n.	**Position**	**Common name**
M-1.0	223	Ram gasket
M-1.0	226	Movement spring
*	2	Piston
*	3	Piston gasket set
**	All	Complete aspiration valve group
**	All	Complete delivery valve group

* depends on the type of head (see attachment)

** depends on the type of valve (see attachment)

- The user is advised to schedule the checks prior to the initial start-up of the machine and keep the results in a separate register (Maintenance Register). The user can then set the optimum maintenance interval based on the results collected.

- Special attention must always be given to inspections of the diaphragm, which must be replaced at the first sign of aging and/or decay.

- The following anomalies or malfunctions are cause for extraordinary service procedures or an operational check-up or adjustment:

  - ↘ Valves blocked by impurities;
  - ↘ Worn valves;
  - ↘ Worn pistons or gaskets.

- The installation has filters. Service personnel are responsible for periodically cleaning the aspiration filters and replacing them when necessary.

- After repairs, the steps of Section 10.2 must be followed in order to put the machine back into service. Special attention should be given to the electrical power connections.

- When the user is not capable of performing ordinary or extraordinary maintenance, these procedures must be done by qualified personnel from Doseuro® or its authorized representative within the European Union.

- Replacement of worn parts is not very difficult in the vast majority of the cases, but the instructions given in the machine must be carefully followed *(see the attached designs)*.

Since check-ups, repairs, adjustments, and maintenance can pose danger to personnel due to the nature of the liquid being pumped, the following must be kept in mind :

- High temperatures can be encountered on the surfaces of motors as well as the hydraulic parts when they form a heating circuit, or when the pump is dosing high temperature liquids. Protective gloves should therefore be worn by service personnel. Furthermore, it is the responsibility of the installer to provide proper installation.

- In addition to the normal cautionary measures of which the user should already be aware (they are widely available), the installer and/or operator is advised that the floor of the installation should be industrial (incline, tile material, etc.). This protects the structures from any leaks of the liquid being pumped, either during operation or while performing maintenance on the machine.

13 NOISE AND VIBRATIONS PRODUCED BY THIS MACHINE OR BY ONE IDENTICAL

The results of phonometric measurements, taken on a machine identical to the one delivered to you, are reported below.

In the more general context of European Directive 89/392, this is provided to check the noise and vibration levels of the machine in question.
The verification methods are those given in ISO (International Standard Organizatinon) 3744 "Acoustics – Determination of sound power level of noise source – Engineering methods for free-field conditions over a reflecting plane", and in ISO 2631 "Guide for evaluation of human exposure to whole-body vibration".

Table VIII/a: Phonometric Investigation

Model A-125		
Condition of the Pump Under Pressure		
Maximum Sound Level Emitted	**Average Surface Pressure Level**	**Sound Power Level**
dB(A)	**dB(A)**	**dB(A)**
71.7	*67.9*	*71.4*

Table VIII/b: Phonometric Investigation

Model A-175		
Condition of the Pump Under Pressure		
Maximum Sound Level Emitted	**Average Surface Pressure Level**	**Sound Power Level**
dB(A)	**dB(A)**	**dB(A)**
76.6	*73.2*	*76.7*

Table VIII/c: Phonometric Investigation

Model A-250		
Condition of the Pump Under Pressure		
Maximum Sound Level Emitted	**Average Surface Pressure Level**	**Sound Power Level**
dB(A)	**dB(A)**	**dB(A)**
79.3	*75.6*	*79.1*

Table IX: Vibration analysis *(Vibration acceleration values)*

Frequency	**Models**					
	Model A-125		**Model A-175**		**Model A-250**	
Hz	**dB**	**m/s²**	**dB**	**m/s²**	**dB**	**m/s²**
1.00	//	//	68.9	0.0028	//	//
1.25	//	//	69.6	0.0030	//	//
1.60	//	//	69.4	0.0030	68.2	0.0026
2.00	//	//	71.8	0.0039	80.3	0.0104
2.50	//	//	66.1	0.0020	77.0	0.0071
3.15	//	//	70.1	0.0032	80.1	0.0101
4.00	69.3	0.0029	86.7	0.0216	85.0	0.0178
5.00	62.1	0.0013	71.1	0.0036	81.2	0.0115
6.30	70.3	0.0033	76.8	0.0069	82.8	0.0138
8.00	82.3	0.0130	93.3	0.0462	85.1	0.0180
10.00	92.2	0.0407	84.1	0.0160	91.1	0.0359
12.50	81.8	0.0123	86.8	0.0219	94.1	0.0507
16.00	77.6	0.0076	88.7	0.0272	93.1	0.0452
20.00	77.6	0.0076	83.8	0.0155	90.0	0.0316
25.00	86.4	0.0209	89.1	0.0285	97.3	0.0733
31.50	81.1	0.0114	91.1	0.0359	97.2	0.0724
40.00	81.2	0.0115	96.8	0.0692	95.5	0.0596
50.00	86.6	0.0214	100.0	0.1000	100.4	0.1047
63.00	86.8	0.0219	93.7	0.0484	100.8	0.1096
80.00	94.6	0.0537	96.9	0.0700	98.7	0.0861

More detailed information is available on request.

14 USING THE MACHINE IN AN EXPLOSIVE ATMOSPHERE

Since the machine is driven by an electrical motor, it is essential that the user specify. before delivery and in every case,. the type of atmosphere in which the machine will be located. These situations must always be taken into account to inform Doseuro® of the area classification values for installing the machine. It should be noted that flame-proof motors can normally be provided in any case.
Doseuro® assumes no responsibility for machines delivered with normal motors (and there is therefore no written warning on how to proceed correctly) and placed in explosive areas, thus posing possible danger to people and/or property.
A machine which must be located in an explosive area is not available with a servo control, which, at present, are not mode for such application. However, it is possible to use a pneumatic servo control.

15 DISPOSAL OF HARMFUL SUBSTANCES

The user is reminded that all liquids, harmful, toxic or otherwise, must be disposed of according to the laws in force.

ATTACHMENT TO THE
INSTRUCTION AND MAINTENANCE MANUAL

DESIGNS and DETAILS
ALTERNATIVE PLUNGER DOSAGING PUMP WITH SPRING RETURN

SERIES: "A"

Models: A-250N

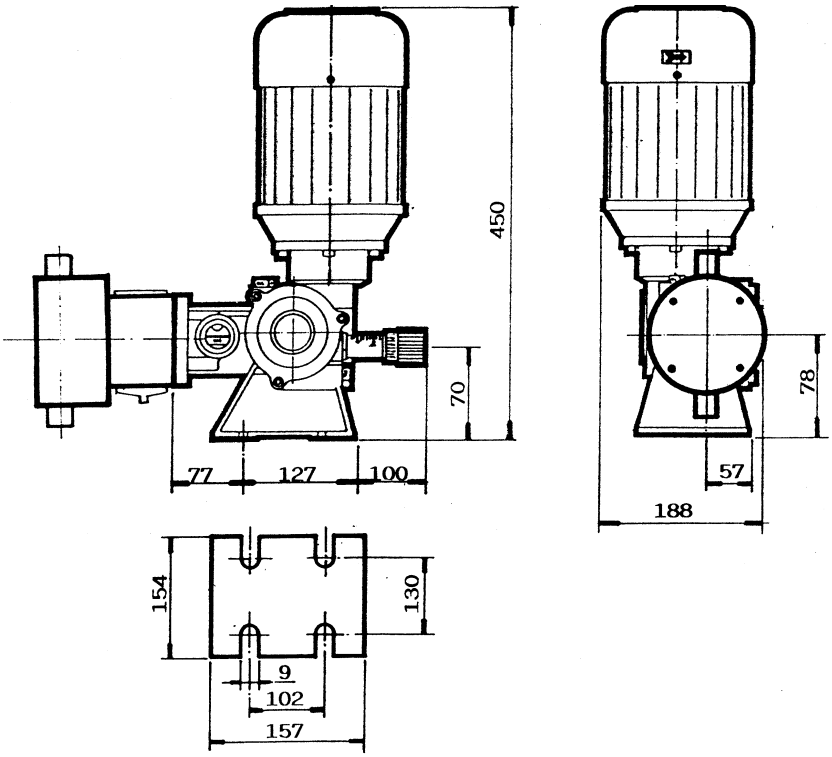
CE

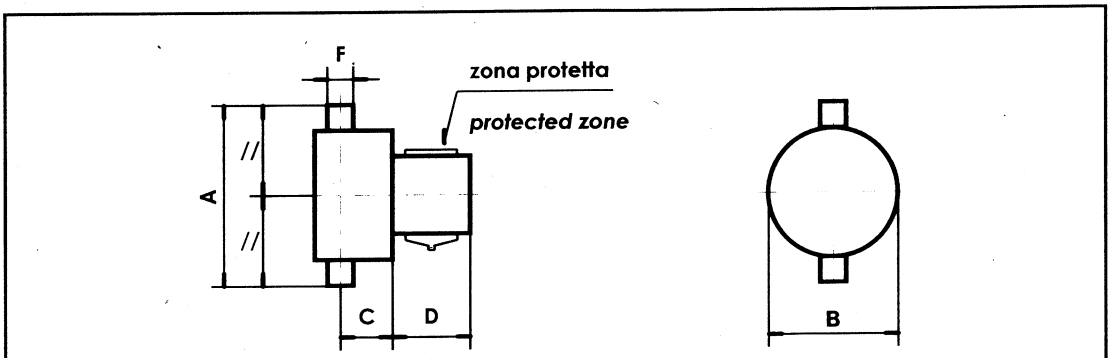
DOSEURO

Via Cascina Crivella, 18 - I-20090 - Vimodrone (Milano) Italy
Tel.: ++39 02 27301324 - Fax: ++39 02 26700883
http://www.doseuro.com

DESIGN DRAWING

pump series: **A-250N**





Modello *Model*	Esecuzione 11 / *Execution 11*					Esecuzione 13 / *Execution 13*				
	A	B	C	D	F – tipo valv.	A	B	C	D	F – tipo valv.
A – 250N – 25	152	105	28	80	½" Gm – AB 5	/	/	/	/	/
A – 250N – 30	152	105	28	80	½" Gm – AB 8	/	/	/	/	/
A – 250N – 38	152	105	45	80	½" Gm – AB 8	/	/	/	/	/
A – 250N – 47	173	105	45	80	¾" Gm – AB 13	180	120	45	80	¾" Gm – AB 13
A – 250N – 54	178	110	60	80	¾" Gm – AB 13	180	120	70	80	¾" Gm – AB 13
A – 250N – 64	202	120	60	80	1" Gm – AB 17	214	138	70	80	1" Gm – AB 17
A – 250N – 76	210	130	65	80	1" Gm – AB 22	214	138	70	80	1" Gm – AB 22
A – 250N – 89	220	140	66	80	1" Gm – AB 22	230	150	73	80	1" Gm – AB 22

SECTIONAL DESIGN OF THE PUMP BODY

pump series: **A-250N, B-250N, BR-250N, E-250N**

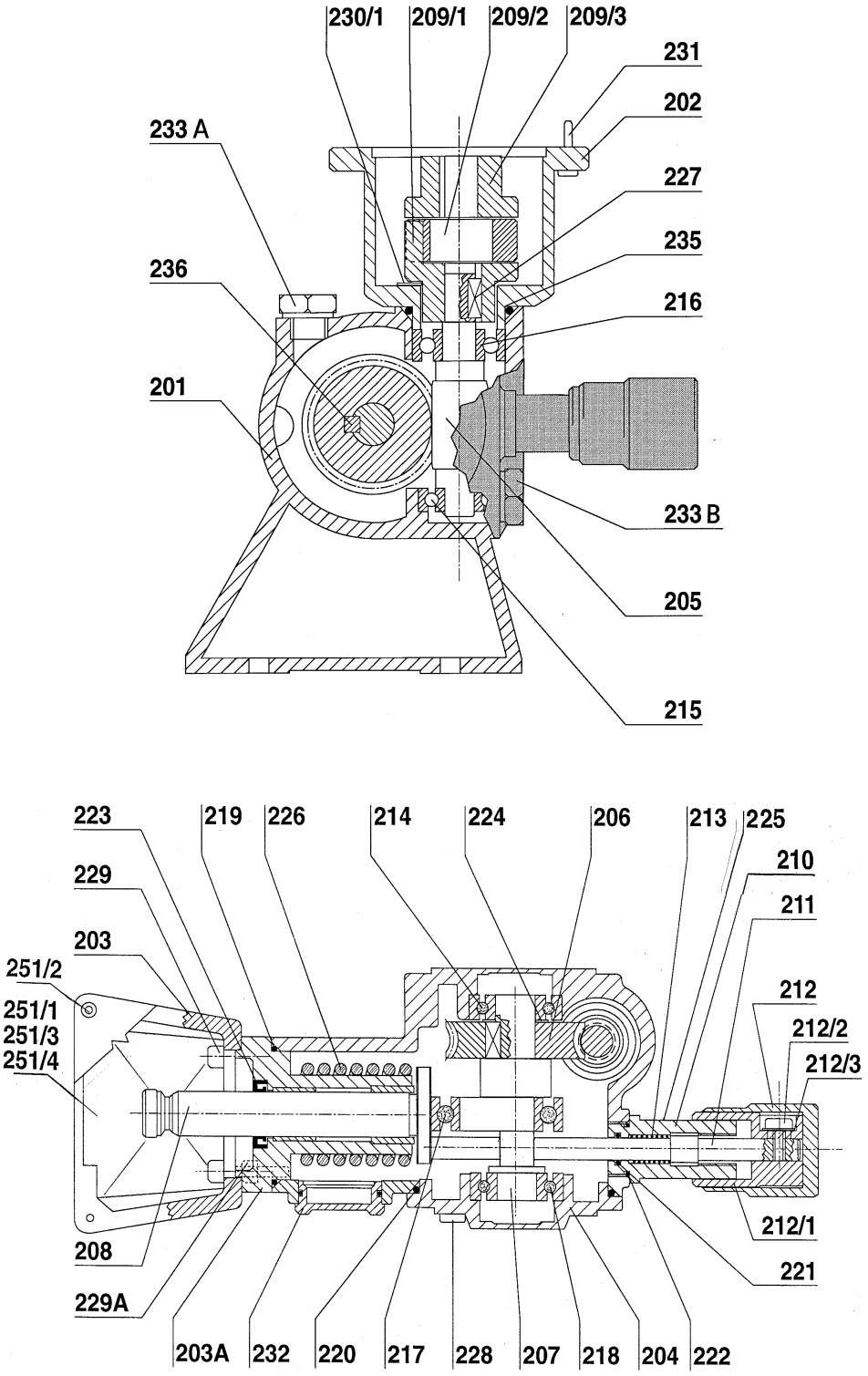


Fig. I

NOMENCLATURE FOR THE SECTIONAL DESIGN OF THE PUMP BODY
pump series: A-125N, B-125N, BR-125N, E-125N
A-175N, B-175N, BR-175N, E-175N
A-250N, B-250N, BR-250N, E-250N

NOMENCLATURE Fig. I	
ITEM	**NAME**
201	*Pump body*
202	*Motor support housing*
203	*Head support housing*
203/A	*Ram support*
204	*Cover*
205	*Worm screw*
206	*Worm wheel*
207	*Shaft*
208	*Ram*
209/1	*Elastic joint (bottom)*
209/2	*Star*
209/3	*Elastic joint (top)*
210	*Adjustment support*
211	*Adjustment screw*
212	*Knob*
212/1	*Internal semi-knob*
212/2	*Set screw*
212/3	*Washer*
213	*Adjustment screw spring*
214	*Shaft ball bearings*
215	*Worm screw ball bearings (bottom)*
216	*Worm screw ball bearings (top)*
217	*Cam ball bearings*
218	*Shaft ball bearings (cover side)*
219	*Ram support gasket*
220	*Cover gasket*
221	*Internal adjustment screw support gasket*
222	*External adjustment screw support gasket*
223	*Ram gasket*
224	*Spacer*
225	*Self-sticking label*
226	*Movement spring*
227	*Key*
228	*Cover screw*
229	*Ram support screw*
229/A	*Ram support screw*
230/1	*Motor support housing screw*
231	*Motor screw*
232	*Oil gauge*
233/A	*Oil entry cover*
233/B	*Oil exit cover*
235	*Motor support housing gasket*
236	*Key*
251/1	*Thread – forming self-tapping screw*
251/2	*"CE" protection cover (top)*
251/3	*"CE" protection cover (bottom)*
251/4	*House lock nut*

MULTIPLE – HEAD SECTIONAL DRAWING

Double heads pump left (fig. VI + fig. VIII).

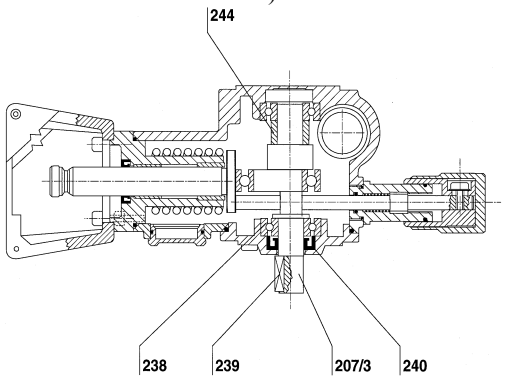


Fig. VI

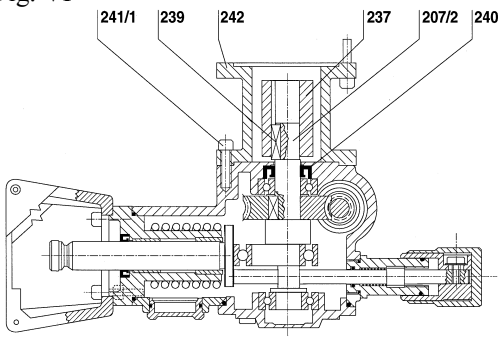


Fig. VIII

Double heads pump right (fig. VII + fig. III).

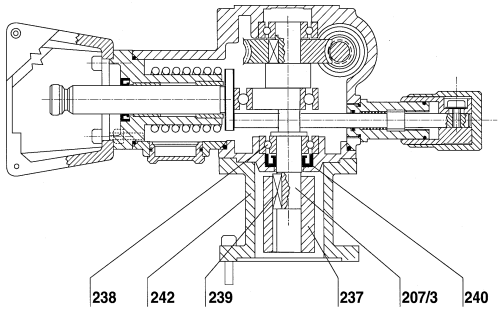


Fig. VII

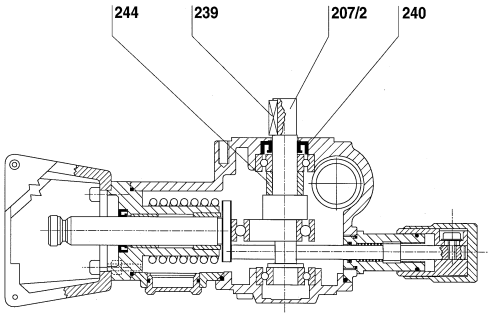


Fig. III

Triple heads pump (fig. V + fig. III + fig. VI).

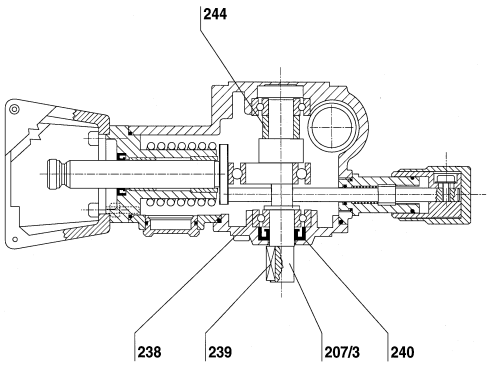


Fig. VI

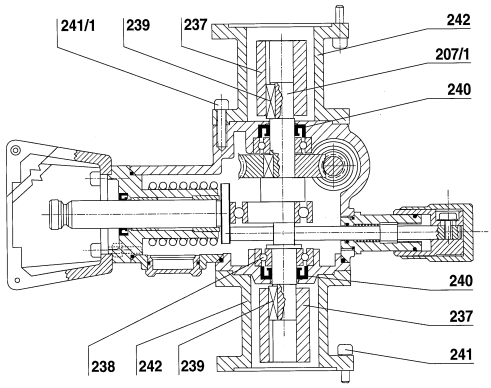


Fig. V

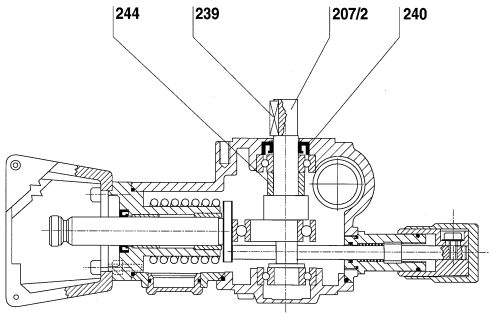


Fig. III

Fig.	APPLICATION
III	*Pump body right output*
V	*Principle pump body for multiple groups*
VI	*Pump body left output*
VII	*Principle pump body with right extension*
VIII	*Principle pump body with left extension*

Quadruple heads pump
(fig. V + fig. III + fig. IV + fig. VI).

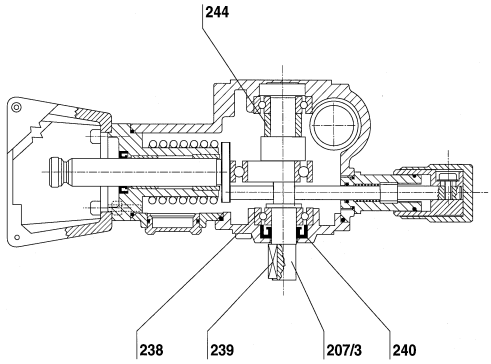


Fig. VI

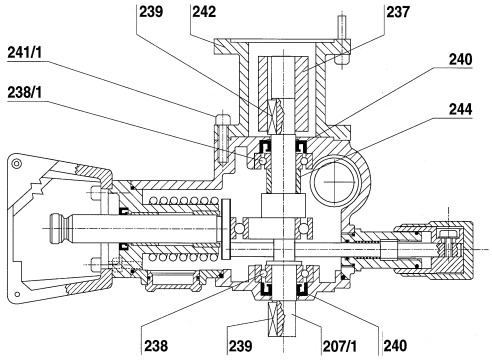


Fig. IV

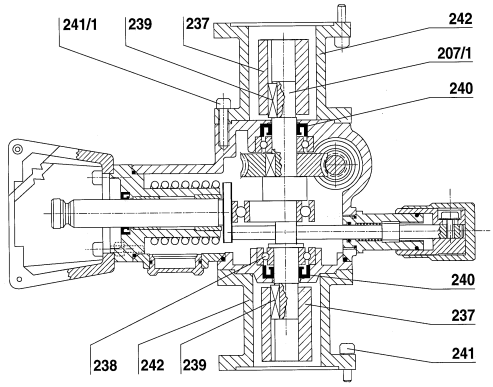


Fig. V

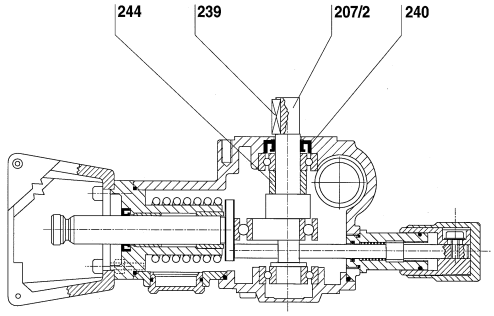


Fig. III

Impulse generator (fig. II)

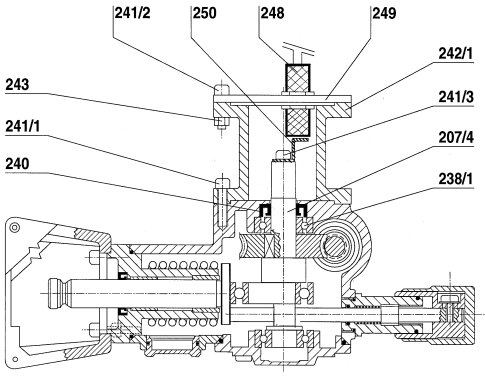


Fig. II

Fig.	APPLICATION
II	*Impulse generator*
III	*Pump body right output*
IV	*Intermediate pump body for multiple groups*
V	*Principle pump body for multiple groups*
VI	*Pump body left output*
VII	*Principle pump body with right extension*
VIII	*Principle pump body with left extension*

Item	NAME
207/1	*Shaft with double extensions*
207/2	*Shaft with left extension*
207/3	*Shaft with right extension*
207/4	*Shaft*
237	*Joint*
238	*Ball bearings for right part of cam*
238/1	*Ball bearings for left part of cam*
239	*Key*
240	*Grommet*
241	*Screw*
241/1	*Screw*
241/2	*Screw*
241/3	*Screw*
242	*Housing*
242/1	*Housing*
243	*Nut*
244	*Bushing (only for series 125N pumps)*
248	*Proximity switch*
249	*Cover*
250	*Contact*

NOTE:
For the unlabeled parts, see the Fig. I

SECTIONAL DESIGN OF THE PUMPING HEADS

pump serie: A-250N

FIG. 1

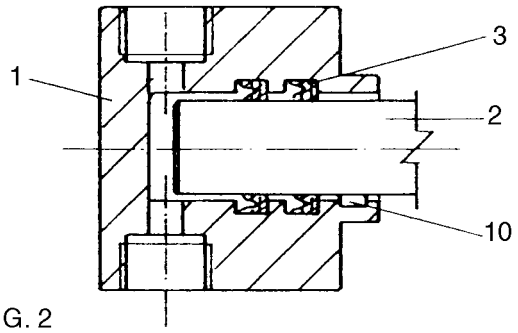


FIG. 2

FIG. 4

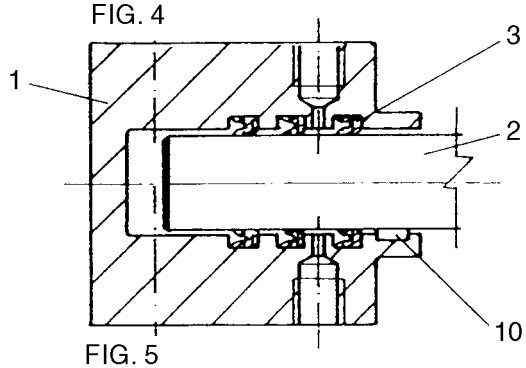


FIG. 5

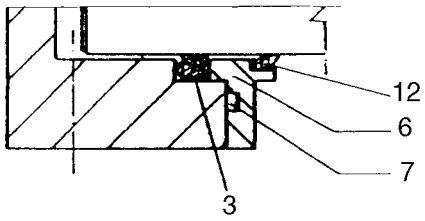
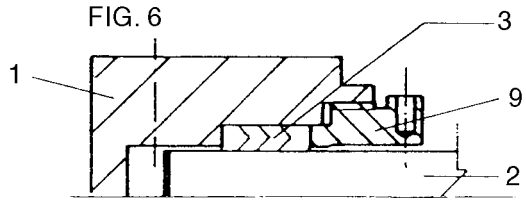


FIG. 3

FIG. 6



LEGEND AND NOMENCLATURE OF THE SECTIONAL DESIGN OF THE PUMPING HEADS

pump series: A-250N

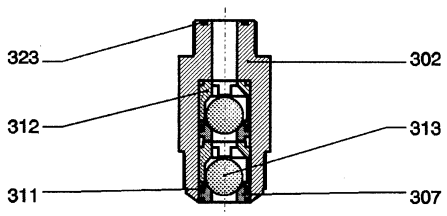
LEGEND			
Fig.	**Pump series**	**Piston**	**Material**
1	**A-250N**	**25, 38, 47**	**Metal**
2	**A-250N**	**47**	**Plastic**
3	**A-250N**	**54, 64, 76, 89**	**Metal**
4	**A-250N**	**25, 38, 25, 30**	**32**
5	**A-250N**	**25, 38, 47**	**Metal CL**
6	**A-250N**	**54, 64, 76, 89**	**Metal CL**
7	**A-250N**	**38, 47, 54, 64**	**21**

NOMENCLATURE	
ITEM	**NAME**
1	*Head body*
2	*Piston*
3	*Piston gasket*
5	*Intermediate ring*
6	*Pre-gasket ring*
7	*OR gasket*
9	*Ring nut*
10	*Pad*
12	*Scraper ring*

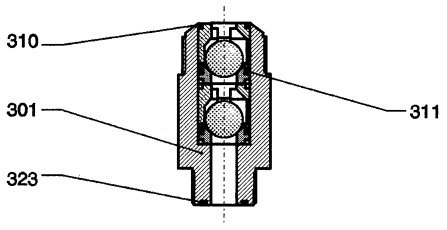
PLASTIC VALVES SECTIONAL DRAWINGS

pump series: **A-250N, B-250N, BR-250N, E-250N**

AB 8-DV

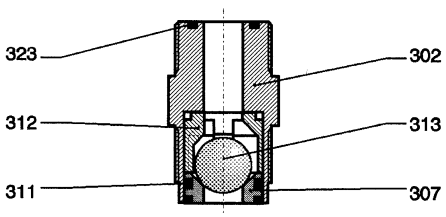


DELIVERY

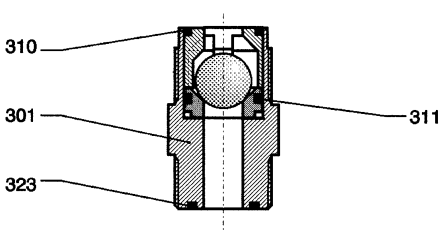


ASPIRATION

AB 11, AB 13

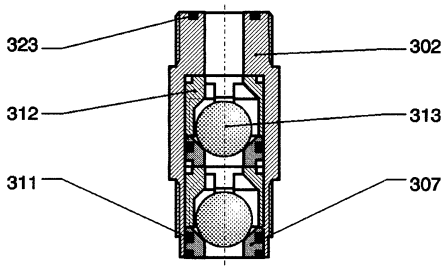


DELIVERY

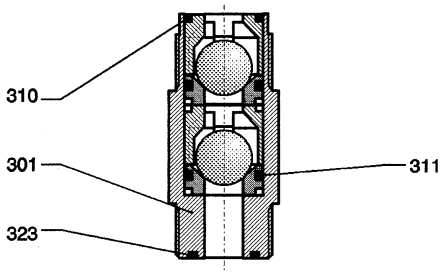


ASPIRATION

AB 11-DV, AB 13-DV

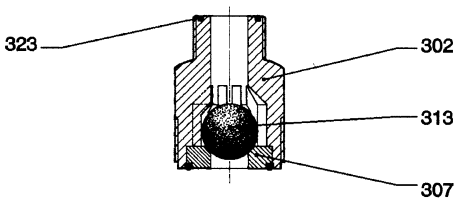


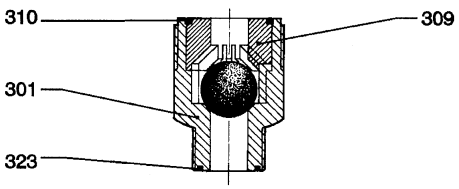
DELIVERY



ASPIRATION

AB 17, AB 22



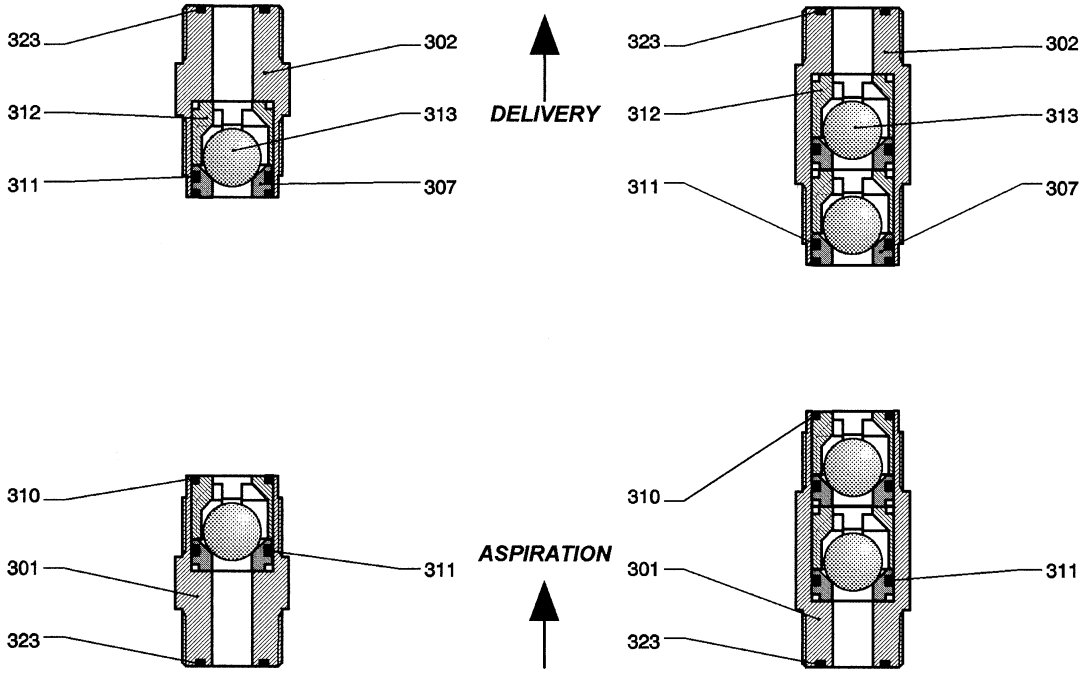


METALLIC VALVES SECTIONAL DRAWINGS

pump series: **A-250N, B-250N, BR-250N, E-250N**

AB 8, AB 11, AB 13
AB 17, AB 22

AB 8DV, AB 11DV, AB 13DV
AB 17DV, AB 22DV



NOMENCLATURE	
ITEM	**Name**
301	*Aspiration valve container*
302	*Delivery valve container*
307	*Valve seat*
309	*Height limiter*
310	*Gasket*
311	*Gasket*
312	*Guide sphere*
313	*Sphere*
314	*Gasket*
315	*Bush*
323	*Gasket*
324	*Gasket seat*