

**INSTRUCTION AND MAINTENANCE MANUAL**

**ALTERNATIVE FLUID DIAPHRAGM DOSAGE  
PUMP INTERPOSED WITH  
SPRING RETURN**

**SERIES: "B, BR and E"**

**Models: B-125N, B-175N, B-250N  
BR-125N, BR-175N, BR-250N  
E-125N, E-175N, E-250N**



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**Attachment: Designs and Details**

## **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;
  - ✎ The liquid contains especially toxic elements or solutions;
  - ✎ The liquid cannot come in contact with the atmosphere
- 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.)

### 1.2 Main Differences between Series B, BR, and E

The difference between Series B and BR pumps and Series E is that the oil chamber is made of a different material. In Series B and BR pumps it is made of a light alloy and in the Series E pumps it is made of PVC (*see the attached designs*). This difference limits the pressure that the machine can reach, in that the Series B and BR pumps can reach standard pressures of up to 20 BAR (using metal) while the Series E machines have a maximum pressure of 10 BAR (in any application). Tables I, II, III, IV, V e VI, which follow, should be read carefully.

The difference between Series B and Series BR is that the latter is equipped with a re- entry (or recirculation) valve for the interposed fluid.

## 2 IMPORTANT TECHNICAL DATA 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 B, BR, E-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
8	58	70	<b>1.5</b>	<b>1.8</b>	<b>20<sup>^</sup> (10)</b>	<b>10 (10)</b>
8	96	116	<b>2.4</b>	<b>3</b>	<b>20<sup>^</sup> (10)</b>	<b>10 (10)</b>
8	116	/	<b>3</b>	/	<b>20<sup>^</sup> (10)</b>	<b>10 (10)</b>
12	58	70	<b>4.5</b>	<b>5.4</b>	<b>20<sup>^</sup> (10)</b>	<b>10 (10)</b>
12	96	116	<b>7.4</b>	<b>9</b>	<b>20<sup>^</sup> (10)</b>	<b>10 (10)</b>
12	116	/	<b>9</b>	/	<b>20<sup>^</sup> (10)</b>	<b>10 (10)</b>
18	58	70	<b>11</b>	<b>13.2</b>	<b>20<sup>^</sup> (10)</b>	<b>10 (10)</b>
18	96	116	<b>18</b>	<b>22</b>	<b>20<sup>^</sup> (10)</b>	<b>10 (10)</b>
18	116	/	<b>22</b>	/	<b>20<sup>^</sup> (10)</b>	<b>10 (10)</b>
25	58	70	<b>21</b>	<b>25.2</b>	<b>20 (10)</b>	<b>10 (10)</b>
25	96	116	<b>34</b>	<b>42</b>	<b>20 (10)</b>	<b>10 (10)</b>
25	116	/	<b>42</b>	/	<b>20 (10)</b>	<b>10 (10)</b>
30	58	70	<b>30</b>	<b>36</b>	<b>14 (10)</b>	<b>10 (10)</b>
30	96	116	<b>49</b>	<b>60</b>	<b>14 (10)</b>	<b>10 (10)</b>
30	116	/	<b>60</b>	/	<b>14 (10)</b>	<b>10 (10)</b>
40	58	70	<b>54</b>	<b>64.8</b>	<b>8 (10)</b>	<b>8 (10)</b>
40	96	116	<b>89</b>	<b>108</b>	<b>8 (10)</b>	<b>8 (10)</b>
40	116	/	<b>108</b>	/	<b>8 (10)</b>	<b>8 (10)</b>

^: Higher values can be reached in non-series configurations  
 (): Values in parentheses are pressures for series E pumps

Tab. II: Series B, BR, E-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
8	70	84	<b>2.6</b>	<b>3.12</b>	<b>20<sup>^</sup> (10)</b>	<b>10 (10)</b>
8	96	116	<b>3.5</b>	<b>4.2</b>	<b>20<sup>^</sup> (10)</b>	<b>10 (10)</b>
8	120	/	<b>4.4</b>	/	<b>20<sup>^</sup> (10)</b>	<b>10 (10)</b>
12	70	84	<b>7.6</b>	<b>9.12</b>	<b>20<sup>^</sup> (10)</b>	<b>10 (10)</b>
12	96	116	<b>10.4</b>	<b>12.4</b>	<b>20<sup>^</sup> (10)</b>	<b>10 (10)</b>
12	120	/	<b>13</b>	/	<b>20<sup>^</sup> (10)</b>	<b>10 (10)</b>
18	70	84	<b>18</b>	<b>21.6</b>	<b>20<sup>^</sup> (10)</b>	<b>10 (10)</b>
18	96	116	<b>24</b>	<b>28.8</b>	<b>20<sup>^</sup> (10)</b>	<b>10 (10)</b>
18	120	/	<b>32</b>	/	<b>20<sup>^</sup> (10)</b>	<b>10 (10)</b>
25	70	84	<b>36</b>	<b>43.2</b>	<b>20 (10)</b>	<b>10 (10)</b>
25	96	116	<b>49</b>	<b>58.8</b>	<b>20 (10)</b>	<b>10 (10)</b>
25	120	/	<b>61</b>	/	<b>20 (10)</b>	<b>10 (10)</b>
30	70	84	<b>51</b>	<b>61.2</b>	<b>20 (10)</b>	<b>10 (10)</b>
30	96	116	<b>69</b>	<b>82.8</b>	<b>20 (10)</b>	<b>10 (10)</b>
30	120	/	<b>88</b>	/	<b>20 (10)</b>	<b>10 (10)</b>
40	70	84	<b>92</b>	<b>110.4</b>	<b>12 (10)</b>	<b>10 (10)</b>
40	96	116	<b>126</b>	<b>151.2</b>	<b>12 (10)</b>	<b>10 (10)</b>
40	120	/	<b>158</b>	/	<b>12 (10)</b>	<b>10 (10)</b>
50	70	84	<b>144</b>	<b>172.8</b>	<b>7.5 (7.5)</b>	<b>7.5 (7.5)</b>
50	96	116	<b>197</b>	<b>236.4</b>	<b>7.5 (7.5)</b>	<b>7.5 (7.5)</b>
50	120	/	<b>247</b>	/	<b>7.5 (7.5)</b>	<b>7.5 (7.5)</b>
55	70	84	<b>174</b>	<b>208.8</b>	<b>6.3 (6.3)</b>	<b>6.3 (6.3)</b>
55	96	116	<b>238</b>	<b>285.6</b>	<b>6.3 (6.3)</b>	<b>6.3 (6.3)</b>
55	120	/	<b>299</b>	/	<b>6.3 (6.3)</b>	<b>6.3 (6.3)</b>
65	70	84	<b>243</b>	<b>291.6</b>	<b>4.5 (4.5)</b>	<b>4.5 (4.5)</b>
65	96	116	<b>333</b>	<b>399.6</b>	<b>4.5 (4.5)</b>	<b>4.5 (4.5)</b>
65	120	/	<b>418</b>	/	<b>4.5 (4.5)</b>	<b>4.5 (4.5)</b>

^: Higher values can be reached in non-series configurations  
 (): Values in parentheses are pressures for series E pumps

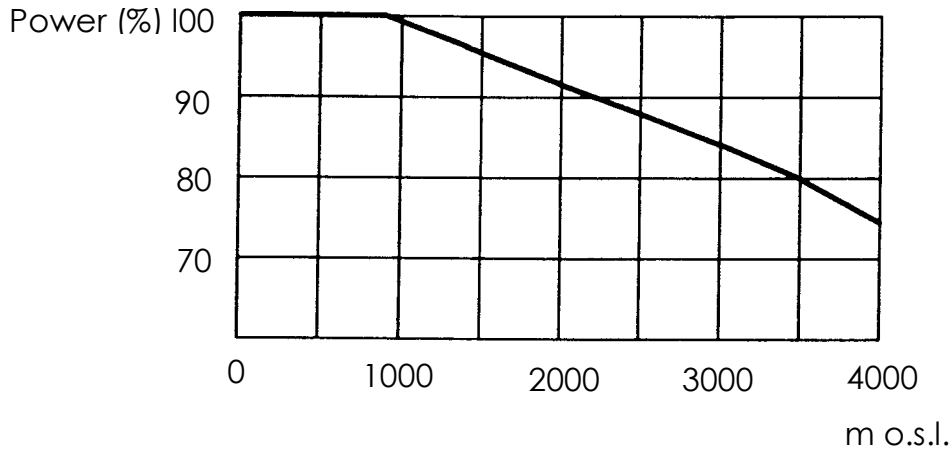
Tab. III: Series B, BR, E-250 pumps

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
40	56	67	<b>105</b>	<b>126</b>	<b>20 (10)</b>	<b>10 (10)</b>
40	96	116	<b>180</b>	<b>216</b>	<b>20 (10)</b>	<b>10 (10)</b>
40	112	/	<b>210</b>	/	<b>20 (10)</b>	<b>10 (10)</b>
50	56	67	<b>165</b>	<b>198</b>	<b>15 (10)</b>	<b>10 (10)</b>
50	96	116	<b>282</b>	<b>338</b>	<b>15 (10)</b>	<b>10 (10)</b>
50	112	/	<b>330</b>	/	<b>15 (10)</b>	<b>10 (10)</b>
55	56	67	<b>200</b>	<b>240</b>	<b>12.5 (10)</b>	<b>10 (10)</b>
55	96	116	<b>342</b>	<b>410</b>	<b>12.5 (10)</b>	<b>10 (10)</b>
55	112	/	<b>400</b>	/	<b>12.5 (10)</b>	<b>10 (10)</b>
65	56	67	<b>278</b>	<b>333</b>	<b>9 (9)</b>	<b>9 (9)</b>
65	96	116	<b>476</b>	<b>571</b>	<b>9 (9)</b>	<b>9 (9)</b>
65	112	/	<b>556</b>	/	<b>9 (9)</b>	<b>9 (9)</b>
75	56	67	<b>371</b>	<b>445</b>	<b>6.6 (6.5)</b>	<b>6.6 (6.5)</b>
75	96	116	<b>636</b>	<b>763</b>	<b>6.6 (6.5)</b>	<b>6.6 (6.5)</b>
75	112	/	<b>742</b>	/	<b>6.6 (6.5)</b>	<b>6.6 (6.5)</b>
90	56	67	<b>534</b>	<b>641</b>	<b>4.7 (4.5)</b>	<b>4.7 (4.5)</b>
90	96	116	<b>915</b>	<b>1098</b>	<b>4.7 (4.5)</b>	<b>4.7 (4.5)</b>
90	112	/	<b>1068</b>	/	<b>4.7 (4.5)</b>	<b>4.7 (4.5)</b>

^: 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 can 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;
  - The liquid contains especially toxic elements or solutions;
  - The liquid cannot come in contact with the atmosphere.
- 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.

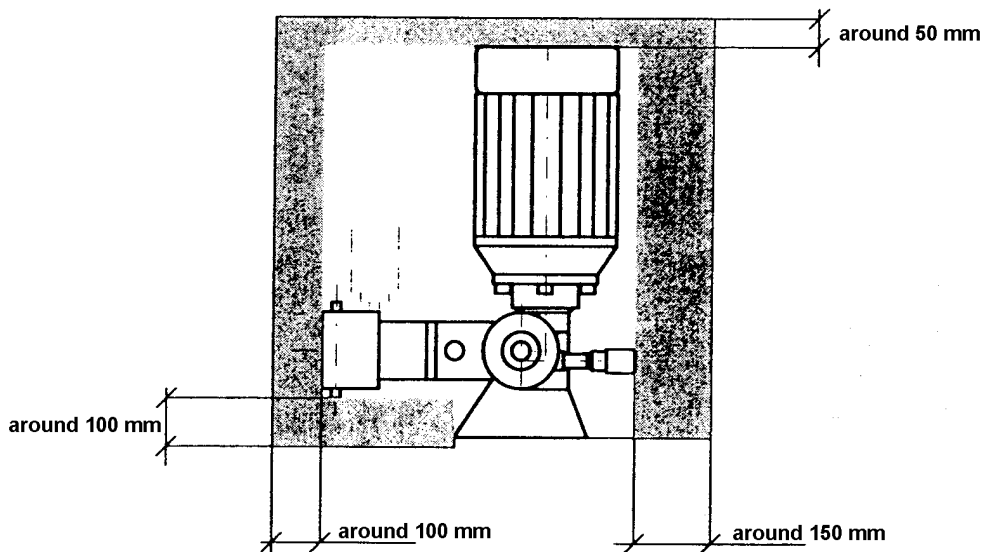


Fig. 1

- 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.

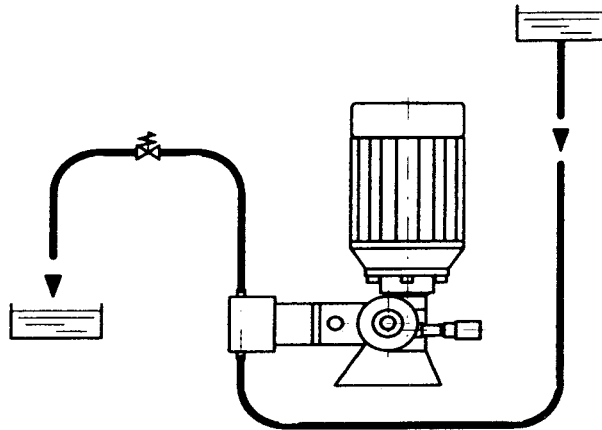


Fig. 2 (installation under the head)

- **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:

$$\text{NPSH Installation} > \text{NPSH}_{\text{pump}}$$

where NPSH is the positive net aspiration load.

The NPSH for the installation is derived as follows:

$$\text{NPSH}_{\text{imp.}} = P_b + \frac{P_c}{\gamma} - T_v - P_t$$

Where:  $P_b$  = Barometric pressure

$P_c$  = Pressure of the liquid column positive (+), negative (-)

$T_v$  = Vapor pressure of the liquid

$P_t$  = Load loss of the aspiration tubing

$\gamma$  = Specific weight

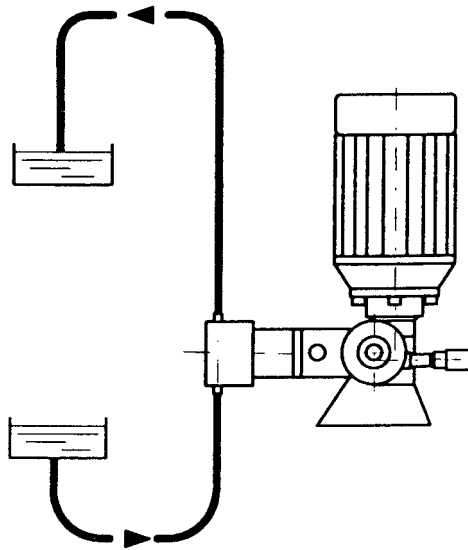


Fig. 3 (Installation over the head)

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.

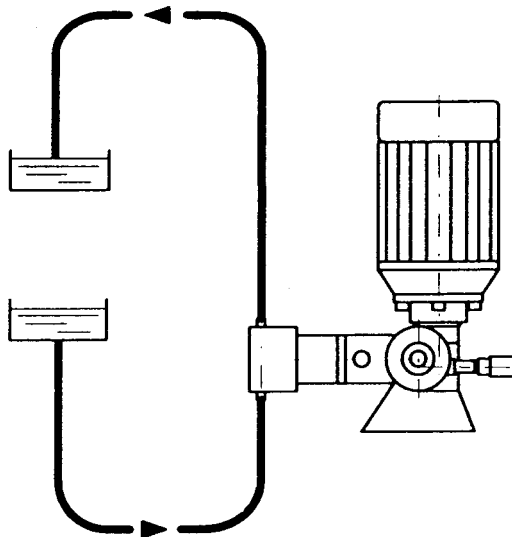


Fig. 4 (the ideal installation)

- **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 mm 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.

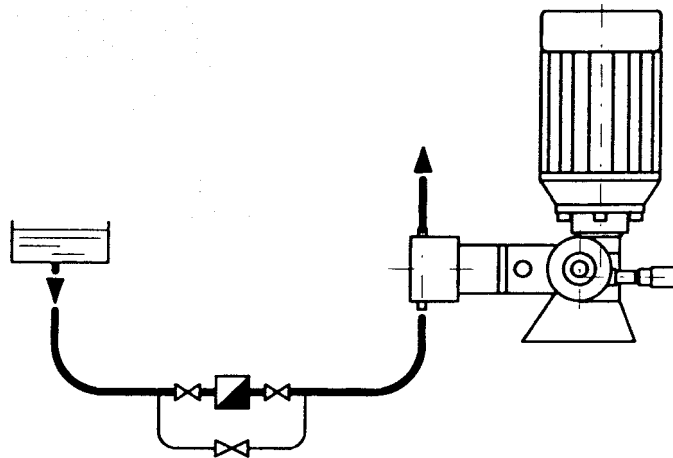


Fig. 5 (installation for liquids with impurities)

- **Installation with delivery in a continuous flow tube**

An on-off or "no return" valve must be installed near the entrance of the tube.

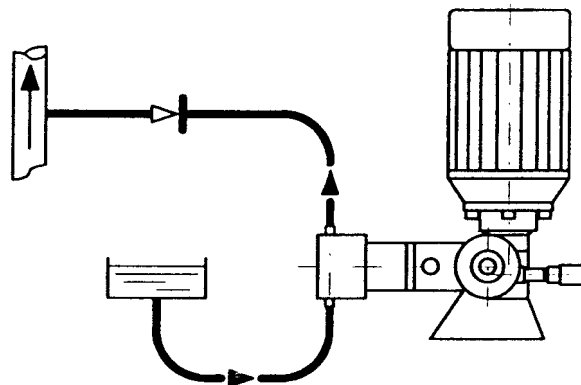


Fig.: 6 (installation with continuous flow delivery)

- **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.

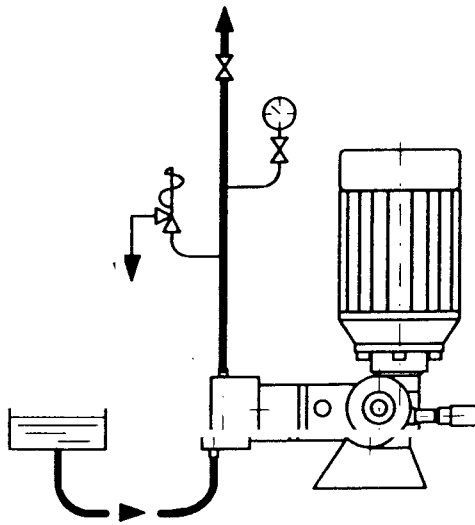


Fig. 7 (installation of a safety valve and gauge)

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.

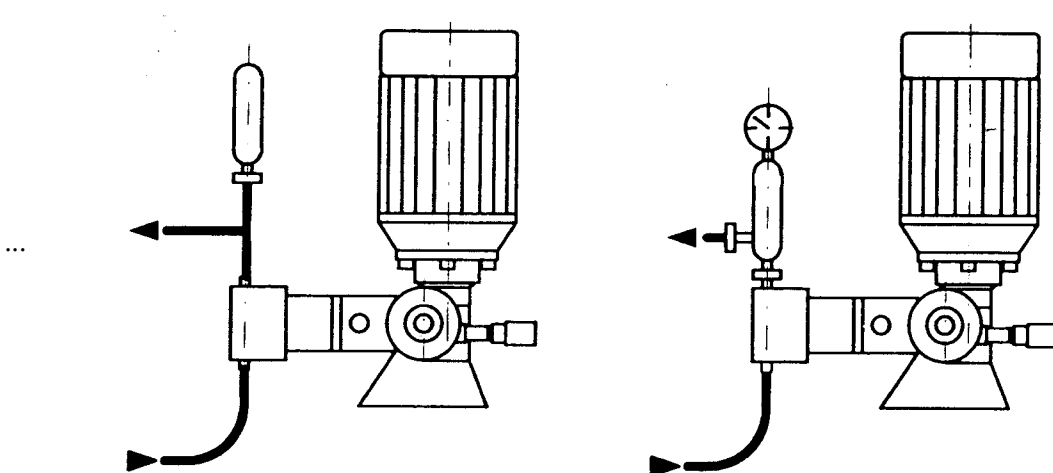


Fig. 8 (installation with plenum surge damper)

## 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 controls), to identify and promptly report any damage suffered during transport and movement. Always check the packaging for damages before opening.

### 8.2 Removing the Blocks

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

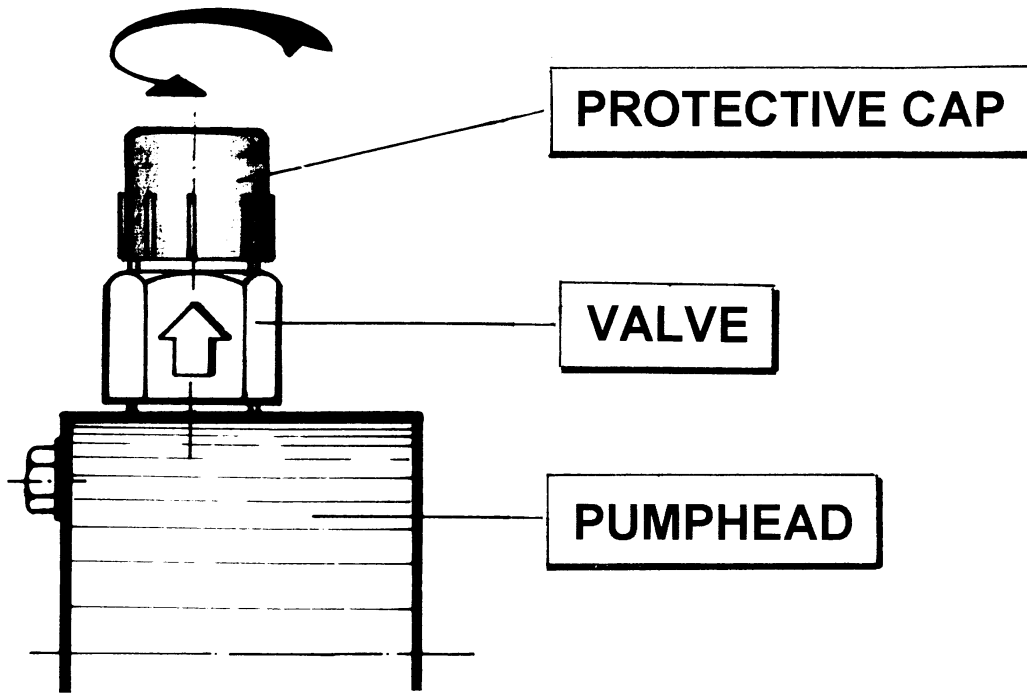


Fig. 9 (Removing the Block)

### 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: V

Pump type	Amount of Oil (ml)
B, BR, E-125	approx. 150
B, BR, E-175	approx. 300
B, BR, E-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 Filling the Oil Chamber

The amount of oil to put into the oil chamber is shown below:

Table: VI

<b>B-125 and B-175 Models</b>	
<b>Piston Ø</b>	<b>Amount of Oil</b>
<b>mm</b>	<b>cm<sup>3</sup></b>
8	72
12	72
18	108
25	101
30	106
40	190
50	390
55	397
65	430

<b>B-250 Models</b>	
<b>Piston Ø</b>	<b>Amount of Oil</b>
<b>mm</b>	<b>Cm<sup>3</sup></b>
50	350
55	443
65	950
75	918
90	863

<b>E-125 and E-175 Models</b>	
<b>Piston Ø</b>	<b>Amount of Oil</b>
<b>mm</b>	<b>cm<sup>3</sup></b>
8	44
12	43
18	54
25	93
30	85
40	150
50	410
55	399
65	373

<b>E-250 Models</b>	
<b>Piston Ø</b>	<b>Amount of Oil</b>
<b>Mm</b>	<b>cm<sup>3</sup></b>
50	400
55	385
65	900
75	861
90	793



Remember that the type of oil to be used has the following viscosity:

**1 or 2°E  
PHARMA**

- **Series B and E Pumps:**

- After installing the pump, make sure the head is completely empty of the fluid to be dosed.
- Turn the adjustment knob to 0%.
- Pour in the oil.
- Make sure that all air has escaped, gently tapping on the oil chamber to help it along.
- Add more oil until the chamber overflows
- Replace the cap and close.

- **Series BR Pumps**

Before adding oil, it is important that the pump is installed in its actual operating conditions (not running). A delivery gauge is necessary to monitor the oil filling operation and the subsequent operation of the pump.

For further details, see the "recirculation system" section of the attachment.

- Completely loosen the setting nut for the spring load on the recirculation valve (part 105 of attached design).
- Make sure that there is tension on the supply valve spring (part 109)
- Set the stroke length of the pump to around 50% and start the pump.
- Start pouring oil into the tank.
- Loosen the supply valve spring nut (part 112) until the valve stem begins to "pulse", which indicates that filling has begun.
- Continue pouring oil as long as the piston chamber needs it. The oil chamber is full when oil comes out of the relief valve. Then begin slowly closing the setting nut (part 105) of the spring of the valve itself until oil stops coming out. Bring the oil level to that indicated on the tank.
- Slowly tighten the supply valve nut (part 112) until the valve stops pulsing. It is important in this step not to go beyond the balance between the end of pulsing and the beginning of blockage.

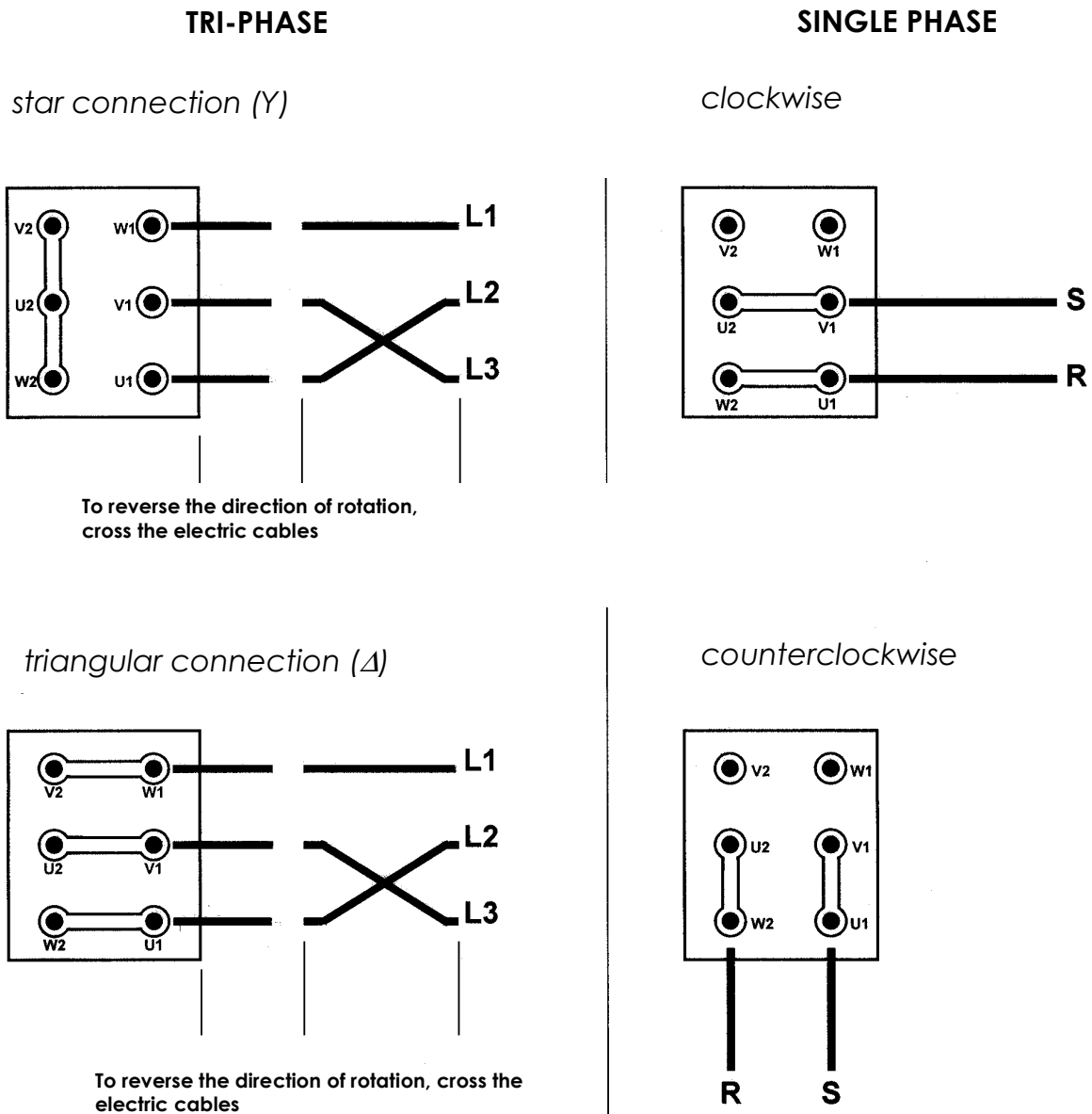
The objectives of these steps are to:

- Completely fill the oil chamber;
- Adjust the recovery valve to a pressure 1 to 2 Bars above operating pressure;
- Place the recovery valve in a equilibrium position between the oil chamber and the load spring of the valve itself;
- Then assure the proper oil level in the tank.

### 8.5 Hooking the Machine to External Power Sources

The electric motor to external power sources can be star (Y) or triangular. In any case, the illustration shows the hook-up configuration inside the terminal board of the motor.

Fig. 10: SCHEME FOR ATTACHMENT TO ELECTRICAL POWER



## 9 REGULATION AND ADJUSTMENT

### 9.1 Adjusting the Machine

The load is the only adjustment on the machine.

Regulating the load from a (zero) to the maximum load of the machine is done by turning the adjustment knob 10 turns (see *Figure 11*). The knob is divided into 10 parts each of which represents a variation of 1 : 100 of the pump's maximum load. As this knob is turned, it moves along its axis of rotation and its limb using a rectilinear divided into 10 equal parts. Each turn of the knob thus represents a rectilinear division on the vernier scale, and hence a variation of 1 : 10 of the maximum load of the pump.

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:

$$D = 100 \frac{Q_r}{Q_m}$$

Where: D = Number of divisions

Q<sub>r</sub> = Desired load (in l/h)

Q<sub>m</sub> = Maximum Load (in l/h)

Example:

To find to which setting the regulation knob must be set in order to have a load of 36 l/h, on a pump with a maximum load of 60 l/h (models B, BR, E-125 or B. BR, E-175)

$$D = 100 \frac{Q_r}{Q_m} \quad D = 100 \frac{36}{60} \quad 60 \text{ divisions}$$

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

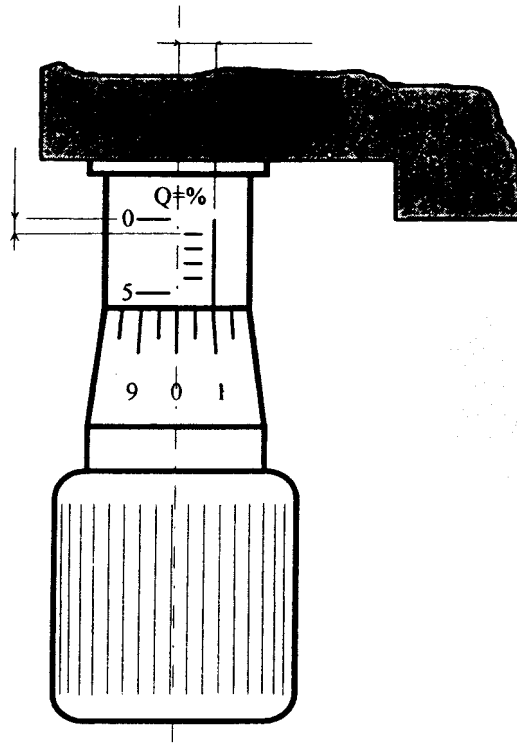


Fig 11

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.
- In addition, see the attached designs and sections.

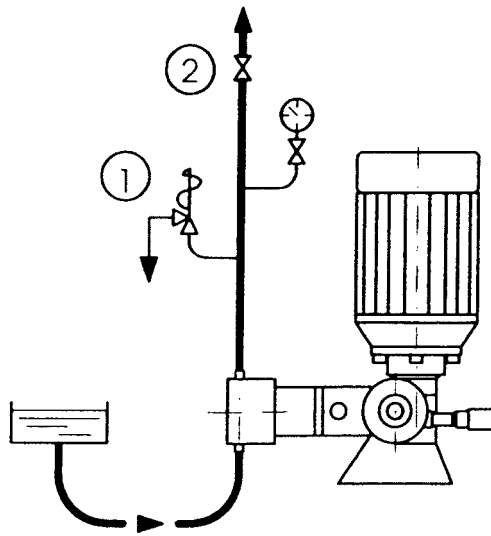


Fig. 12

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.

## 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 given to plastic materials, especially with regard to cracks, chinks, and breaks. The machine must be checked for pits, corrosion, and other signs of decay. Special attention 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**

<b>SERIES B, BR, E PUMPS</b>		
<b>Design n.</b>	<b>Position</b>	<b>Common name</b>
M-1.0	223	Ram gasket
M-1.0	226	Movement spring
*	2	Piston
*	3	Piston gasket set
*	20	Diaphragm
**	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 Organization) 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 X/a: Phonometric Investigation

<b>Model B, BR, E-125</b>		
<b>Condition of the Pump Under Pressure</b>		
<b>Maximum Sound Level Emitted</b>	<b>Average Surface Pressure Level</b>	<b>Sound Power Level</b>
<b>dB(A)</b>	<b>dB(A)</b>	<b>dB(A)</b>
71.7	67.9	71.4

Table X/b: Phonometric Investigation

<b>Model B, BR, E-175</b>		
<b>Condition of the Pump Under Pressure</b>		
<b>Maximum Sound Level Emitted</b>	<b>Average Surface Pressure Level</b>	<b>Sound Power Level</b>
<b>dB(A)</b>	<b>dB(A)</b>	<b>dB(A)</b>
76.6	73.2	76.7

Table X/c: Phonometric Investigation

<b>Model B, BR, E-250</b>		
<b>Condition of the Pump Under Pressure</b>		
<b>Maximum Sound Level Emitted</b>	<b>Average Surface Pressure Level</b>	<b>Sound Power Level</b>
<b>dB(A)</b>	<b>dB(A)</b>	<b>dB(A)</b>
79.3	75.6	79.1

Table X1: Vibration analysis (Vibration acceleration value)

Frequency	Models					
	Model B, BR, E-125		Model B, BR, E-175		Model B, BR, E-250	
Hz	dB	m/s <sup>2</sup>	dB	m/s <sup>2</sup>	dB	m/s <sup>2</sup>
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 made 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 FLUID DIAPHRAGM DOSAGE  
PUMP INTERPOSED WITH  
SPRING RETURN**

**SERIES: "B, BR and E"**

**Models: B-125N, B-175N, B-250N  
BR-125N, BR-175N, BR-250N  
E-125N, E-175N, E-250N**

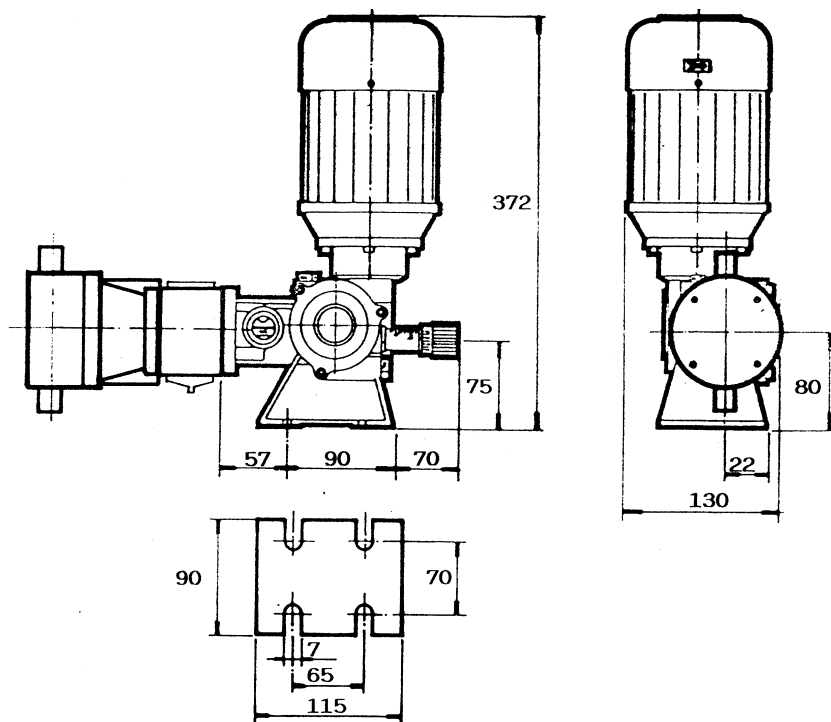


**DOSEURO**

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<http://www.doseuro.com>

## DESIGN DRAWING

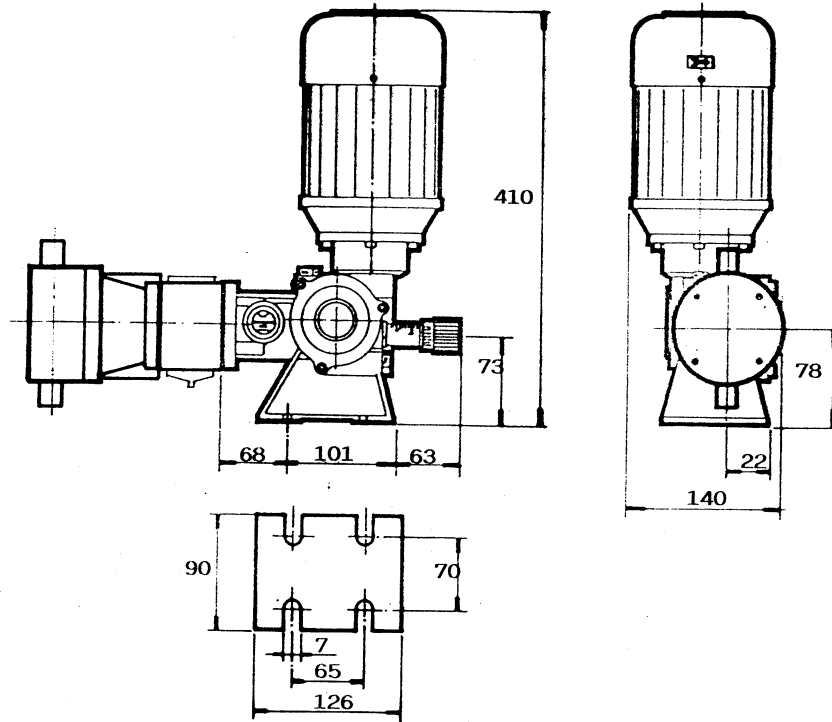
**pump series: B-125N**



Modello Model	Esecuzione 41 / Execution 41						Esecuzione 43 / Execution 43					
	A	B	C	D	E	F - tipo valv.	A	B	C	D	E	F - tipo valv.
B - 125N - 08	195	100	13,5	70	60	½" Gm - AB 3	164	110	18	70	60	½" Gm - AB 3
B - 125N - 12	195	100	13,5	70	60	½" Gm - AB 3	164	110	18	70	60	½" Gm - AB 3
B - 125N - 18	168	120	13,5	70	60	½" Gm - AB 5	184	130	18	70	60	½" Gm - AB 4
B - 125N - 25	168	120	13,5	70	60	½" Gm - AB 5	184	130	18	70	60	½" Gm - AB 5
B - 125N - 30	168	120	13,5	70	60	½" Gm - AB 6	214	130	20	70	60	½" Gm - AB 8
B - 125N - 40	180	130	13,5	70	60	½" Gm - AB 8	214	140	20	70	60	½" Gm - AB 8

## DESIGN DRAWING

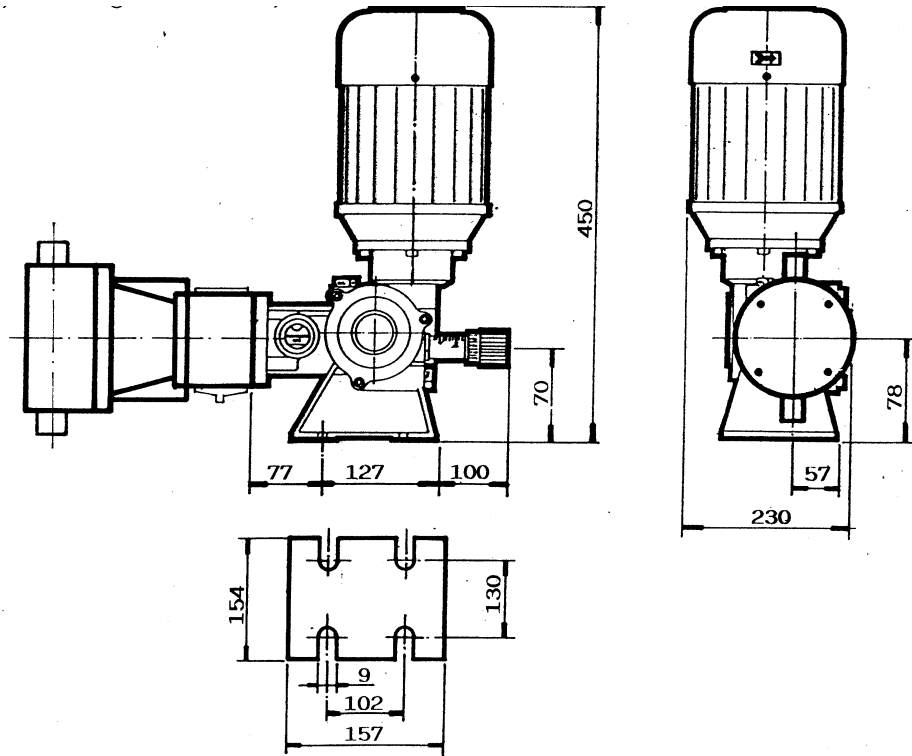
**pump series: B-175N**



Modello Model	Esecuzione 41 / Execution 41						Esecuzione 43 / Execution 43					
	A	B	C	D	E	F - tipo valv.	A	B	C	D	E	F - tipo valv.
B - 175N - 08	195	100	13,5	70	60	½" Gm - AB 3	164	110	18	70	60	½" Gm - AB 3
B - 175N - 12	195	100	13,5	70	60	½" Gm - AB 3	164	110	18	70	60	½" Gm - AB 3
B - 175N - 18	168	120	13,5	70	60	½" Gm - AB 5	184	130	18	70	60	½" Gm - AB 4
B - 175N - 25	168	120	13,5	70	60	½" Gm - AB 5	184	130	18	70	60	½" Gm - AB 5
B - 175N - 30	168	120	13,5	70	60	½" Gm - AB 6	214	130	20	70	60	½" Gm - AB 8
B - 175N - 40	180	130	13,5	70	60	½" Gm - AB 8	214	140	20	70	60	½" Gm - AB 8
B - 175N - 50	240	170	21	75	80	¾" Gm - AB 11	246	180	23	75	60	¾" Gm - AB 11
B - 175N - 55	240	170	21	84	80	¾" Gm - AB 13	246	180	23	84	80	¾" Gm - AB 13
B - 175N - 65	240	170	21	84	80	¾" Gm - AB 13	246	180	23	84	80	¾" Gm - AB 13

## DESIGN DRAWING

**pump series: B-250N**

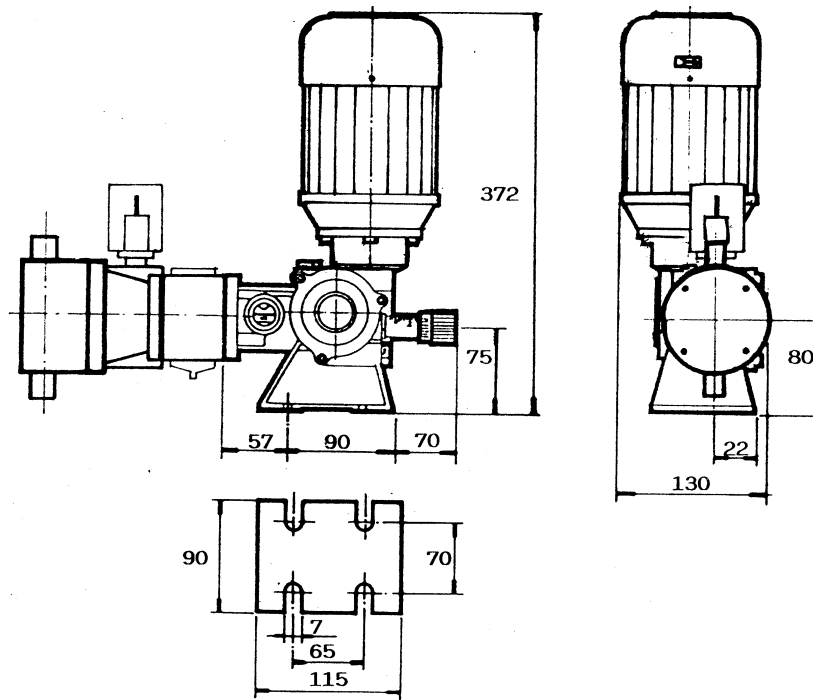


zona protetta  
protected zone

Modello Model	Esecuzione 41 / Execution 41						Esecuzione 43 / Execution 43					
	A	B	C	D	E	F - tipo valv.	A	B	C	D	E	F - tipo valv.
B - 250N - 40	238	170	21	80	74	3/4" Gm - AB 11	244	180	23	80	74	3/4" Gm - AB 11
B - 250N - 50	238	170	21	80	74	3/4" Gm - AB 13	244	180	23	80	74	3/4" Gm - AB 13
B - 250N - 55	238	170	21	80	84	3/4" Gm - AB 13	244	180	23	80	84	3/4" Gm - AB 13
B - 250N - 65	292	210	29	80	97	1" Gm - AB 17	310	220	32	80	97	1" Gm - AB 17
B - 250N - 75	292	210	29	80	97	1" Gm - AB 22	310	220	32	80	97	1" Gm - AB 22
B - 250N - 90	292	210	29	80	101	1" Gm - AB 22	310	220	32	80	101	1" Gm - AB 22

## DESIGN DRAWING

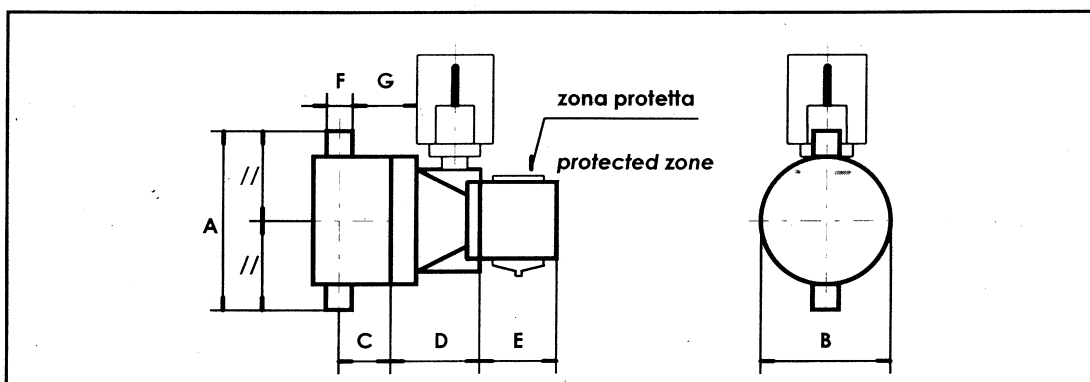
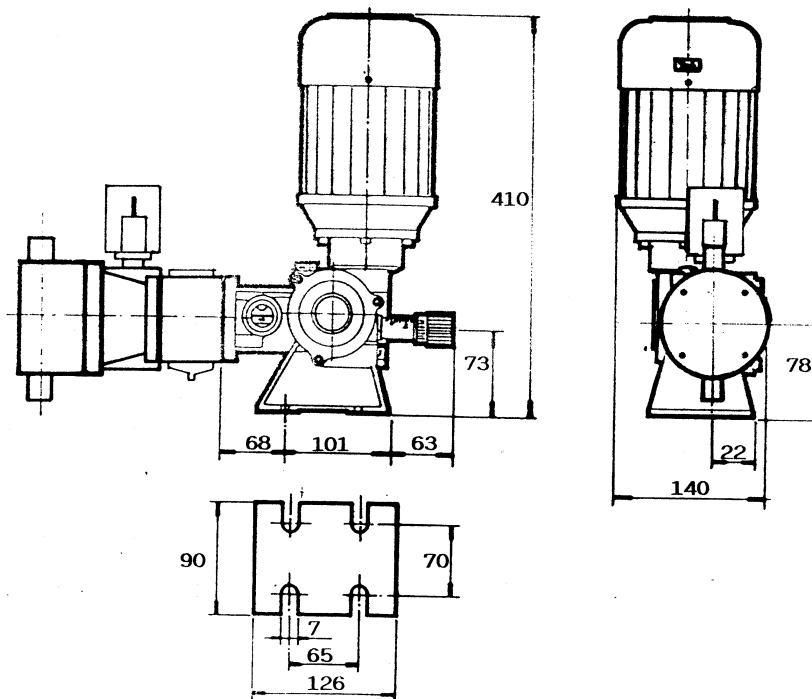
**pump series:            BR-125N**



Modello Model	Esecuzione 41 / Execution 41							Esecuzione 43 / Execution 43						
	A	B	C	D	E	G	F - tipo valv.	A	B	C	D	E	G	F - tipo valv.
BR - 125N - 08	195	100	13	78	60	34	½" Gm - AB 3	164	110	18	70	60	34	½" Gm - AB 3
BR - 125N - 12	195	100	13	78	60	34	½" Gm - AB 3	164	110	18	70	60	34	½" Gm - AB 3
BR - 125N - 18	168	120	13	79	60	35	½" Gm - AB 5	184	130	18	70	60	35	½" Gm - AB 4
BR - 125N - 25	168	120	13	79	60	35	½" Gm - AB 5	184	130	18	70	60	35	½" Gm - AB 5
BR - 125N - 30	168	120	13	79	60	35	½" Gm - AB 6	214	130	20	70	60	35	½" Gm - AB 8
BR - 125N - 40	180	130	13	84	60	41	½" Gm - AB 8	214	140	20	70	60	40	½" Gm - AB 8

## DESIGN DRAWING

**pump series: BR-175N**

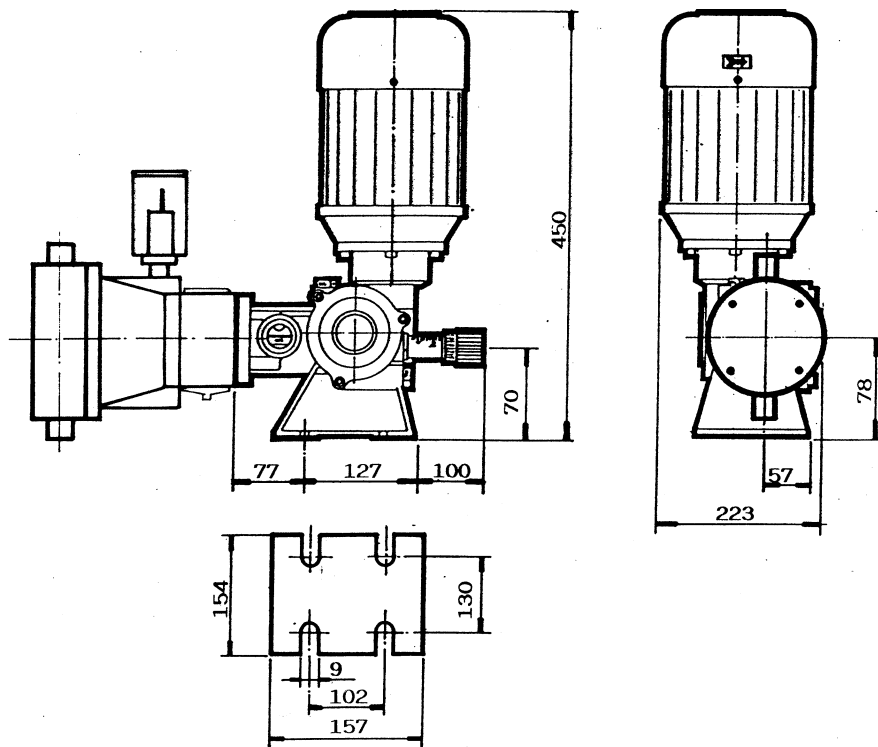


Modello Model	Esecuzione 41 / Execution 41							Esecuzione 43 / Execution 43						
	A	B	C	D	E	G	F - tipo valv.	A	B	C	D	E	G	F - tipo valv.
BR - 175N - 08	195	100	13	78	60	34	1/2" Gm - AB 3	164	110	18	70	60	34	1/2" Gm - AB 3
BR - 175N - 12	195	100	13	78	60	34	1/2" Gm - AB 3	164	110	18	70	60	34	1/2" Gm - AB 3
BR - 175N - 18	168	120	13	79	60	35	1/2" Gm - AB 5	184	130	18	70	60	35	1/2" Gm - AB 4
BR - 175N - 25	168	120	13	79	60	35	1/2" Gm - AB 5	184	130	18	70	60	35	1/2" Gm - AB 5
BR - 175N - 30	168	120	13	79	60	35	1/2" Gm - AB 6	214	130	20	70	60	35	1/2" Gm - AB 8
BR - 175N - 40	180	130	13	84	60	41	1/2" Gm - AB 8	214	140	20	70	60	40	1/2" Gm - AB 8
BR - 175N - 50	240	170	21	92	80	42	3/4" Gm - AB 11	246	180	23	92	80	42	3/4" Gm - AB 11
BR - 175N - 55	240	170	21	101	80	51	3/4" Gm - AB 13	246	180	23	101	80	51	3/4" Gm - AB 13
BR - 175N - 65	240	170	21	101	80	51	3/4" Gm - AB 13	246	180	23	101	80	51	3/4" Gm - AB 13



## DESIGN DRAWING

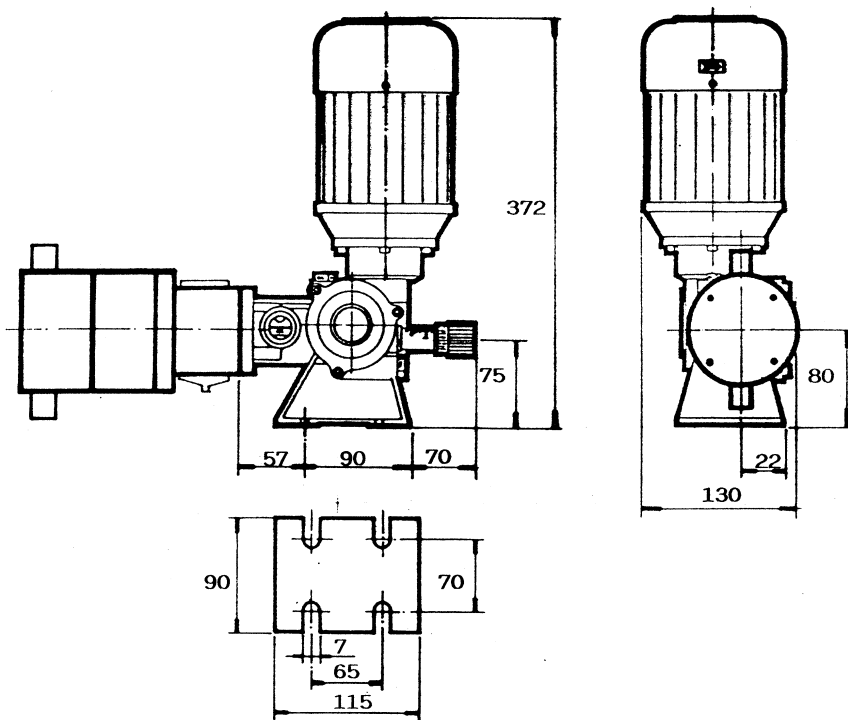
**pump series:            BR-250N**



Modello Model	Esecuzione 41 / Execution 41							Esecuzione 43 / Execution 43						
	A	B	C	D	E	G	F - tipo valv.	A	B	C	D	E	G	F - tipo valv.
BR - 250N - 40	238	170	21	80	91	21	3/4" Gm - AB 11	244	180	23	80	91	24	3/4" Gm - AB 11
BR - 250N - 50	238	170	21	80	91	21	3/4" Gm - AB 13	244	180	23	80	91	24	3/4" Gm - AB 13
BR - 250N - 55	238	170	21	80	101	21	3/4" Gm - AB 13	244	180	23	80	91	24	3/4" Gm - AB 13
BR - 250N - 65	292	210	29	80	115	42	1" Gm - AB 17	310	220	32	80	115	46	1" Gm - AB 17
BR - 250N - 75	292	210	29	80	115	42	1" Gm - AB 22	310	220	32	80	115	46	1" Gm - AB 22
BR - 250N - 90	292	210	29	80	119	42	1" Gm - AB 22	310	220	32	80	115	46	1" Gm - AB 22

## DESIGN DRAWING

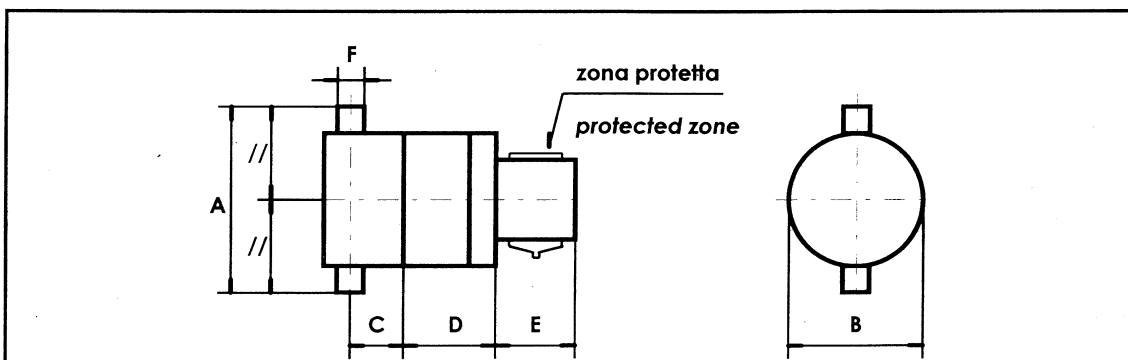
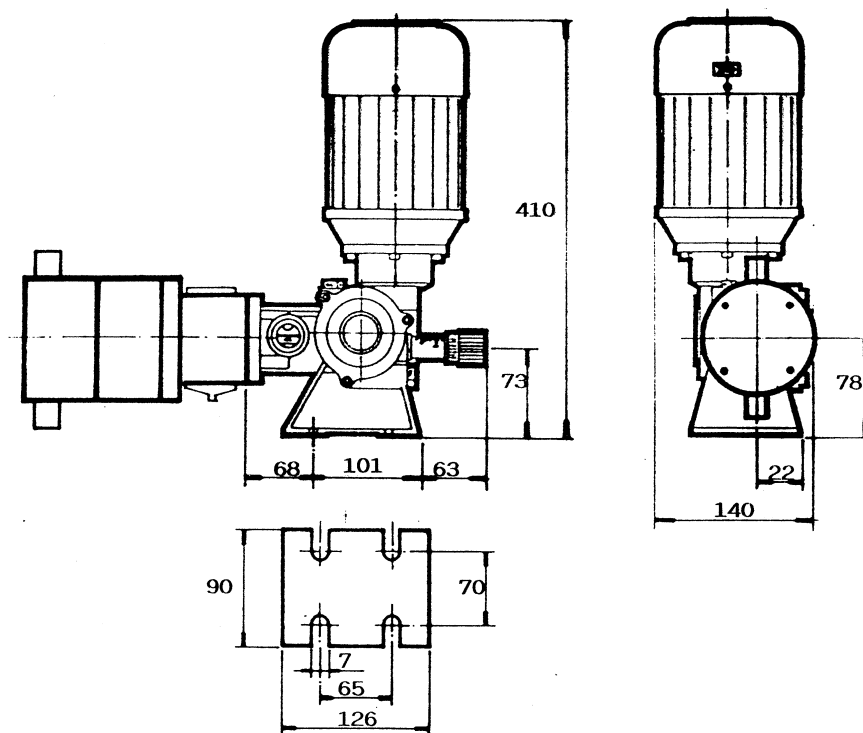
**pump series: E-125N**



Modello Model	Esecuzione 41 / Execution 41						Esecuzione 43 / Execution 43					
	A	B	C	D	E	F - tipo valv.	A	B	C	D	E	F - tipo valv.
E - 125N - 08	150	90	13	49	60	½" Gm - AB 3	150	90	17	49	60	½" Gm - AB 3
E - 125N - 12	168	110	13	48	60	½" Gm - AB 3	168	110	17	48	60	½" Gm - AB 3
E - 125N - 18	168	110	13	50	60	½" Gm - AB 5	168	110	17	50	60	½" Gm - AB 4
E - 125N - 25	190	130	13	53	60	½" Gm - AB 5	190	130	17	53	60	½" Gm - AB 5
E - 125N - 30	224	130	13	56	60	½" Gm - AB 6	224	130	20	56	60	½" Gm - AB 8
E - 125N - 40	234	144	13	56	60	½" Gm - AB 8	224	140	20	56	60	½" Gm - AB 8

## DESIGN DRAWING

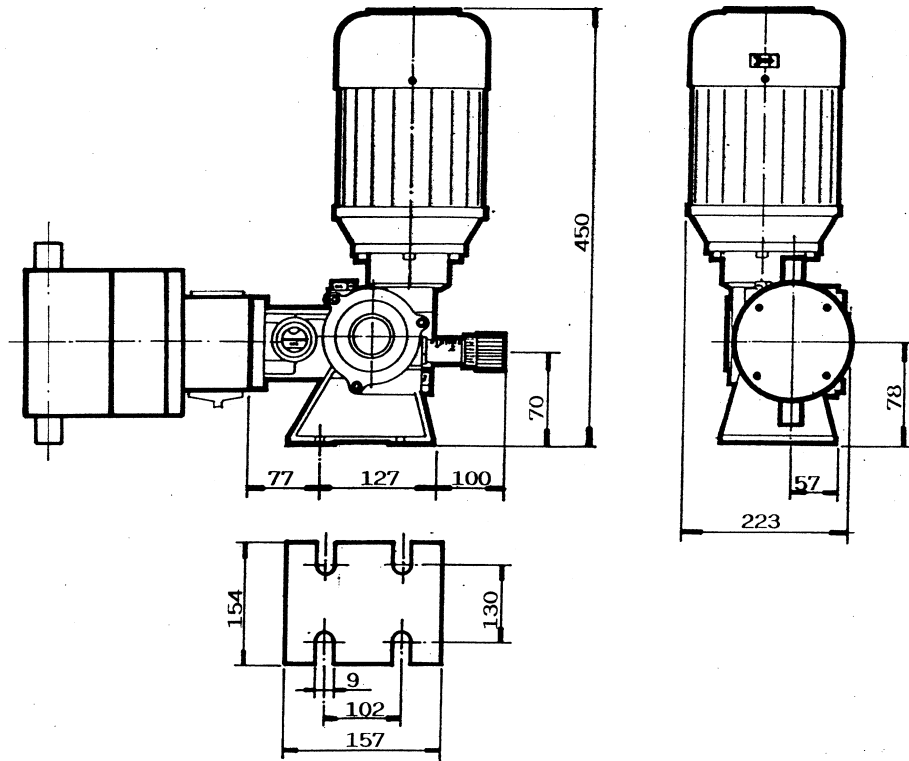
**pump series:** E-175N



Modello Model	Esecuzione 41 / Execution 41						Esecuzione 43 / Execution 43					
	A	B	C	D	E	F - tipo valv.	A	B	C	D	E	F - tipo valv.
E-175N-08	150	90	13	49	60	1/2" Gm - AB 3	150	90	17	49	60	1/2" Gm - AB 3
E-175N-12	168	110	13	48	60	1/2" Gm - AB 3	168	110	17	48	60	1/2" Gm - AB 3
E-175N-18	168	110	13	50	60	1/2" Gm - AB 5	168	110	17	50	60	1/2" Gm - AB 4
E-175N-25	190	130	13	53	60	1/2" Gm - AB 5	190	130	17	53	60	1/2" Gm - AB 5
E-175N-30	224	130	13	56	60	1/2" Gm - AB 6	224	130	20	56	60	1/2" Gm - AB 8
E-175N-40	234	144	13	56	60	1/2" Gm - AB 8	224	140	20	56	60	1/2" Gm - AB 8
E-175N-50	251	180	21	82	80	3/4" Gm - AB 11	240	180	21	75	80	3/4" Gm - AB 11
E-175N-55	251	180	21	87	80	3/4" Gm - AB 11	240	180	21	72	80	3/4" Gm - AB 11
E-175N-65	251	180	21	82	80	3/4" Gm - AB 11	240	180	21	72	80	3/4" Gm - AB 11

## DESIGN DRAWING

**pump series: E-250N**



Modello Model	Esecuzione 41 / Execution 41						Esecuzione 43 / Execution 43					
	A	B	C	D	E	F - tipo valv.	A	B	C	D	E	F - tipo valv.
E - 250N - 40	238	170	21	80	71	3/4" Gm - AB 11	244	180	23	80	74	3/4" Gm - AB 11
E - 250N - 50	238	170	21	80	75	3/4" Gm - AB 13	244	180	23	80	74	3/4" Gm - AB 13
E - 250N - 55	238	170	21	80	72	3/4" Gm - AB 13	244	180	23	80	84	3/4" Gm - AB 13
E - 250N - 65	292	210	29	80	82	1" Gm - AB 17	310	220	32	80	97	1" Gm - AB 17
E - 250N - 75	292	210	29	80	77	1" Gm - AB 22	310	220	32	80	97	1" Gm - AB 22
E - 250N - 90	292	210	29	80	82	1" Gm - AB 22	310	220	32	80	101	1" Gm - AB 22

### 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-250B, BR-250N, E-250N

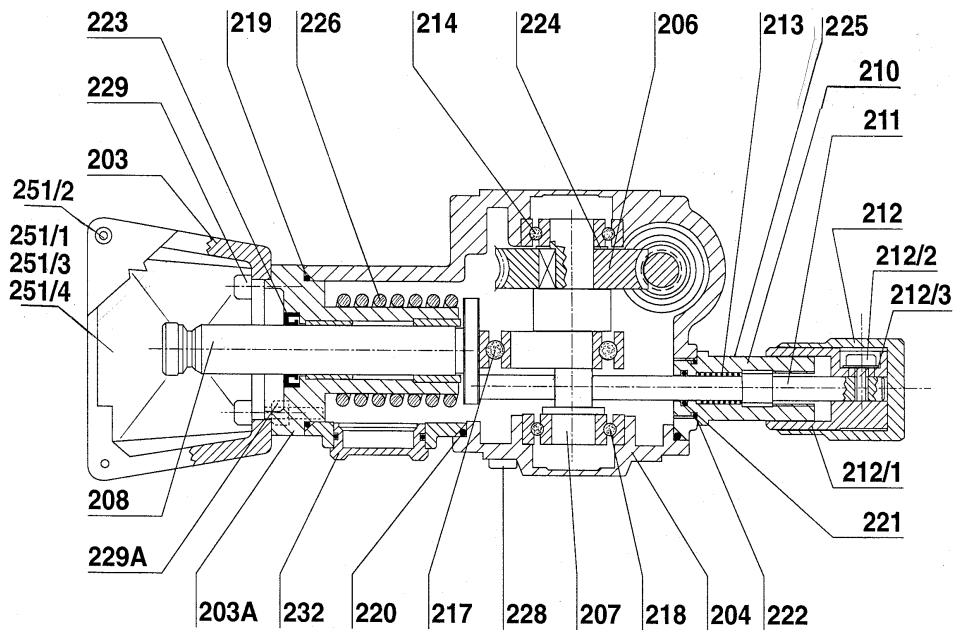
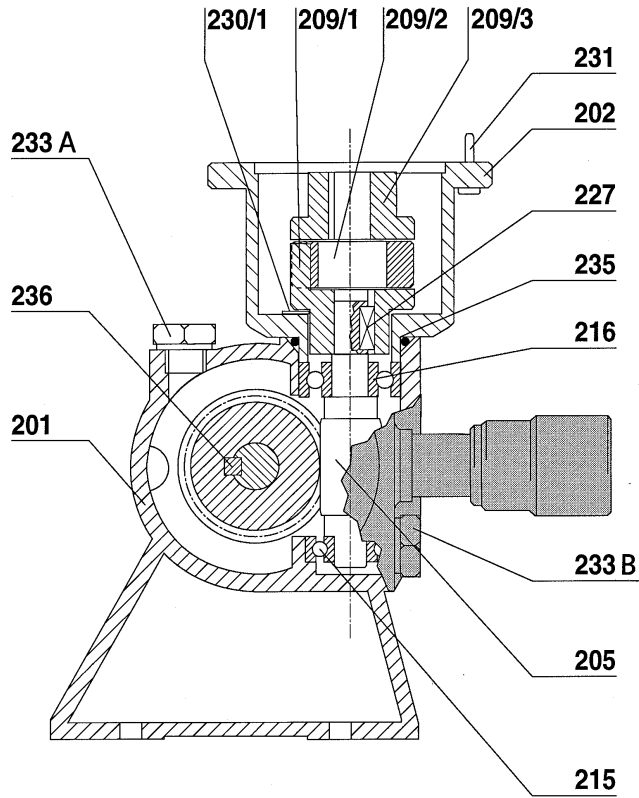


Fig. I

## 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)

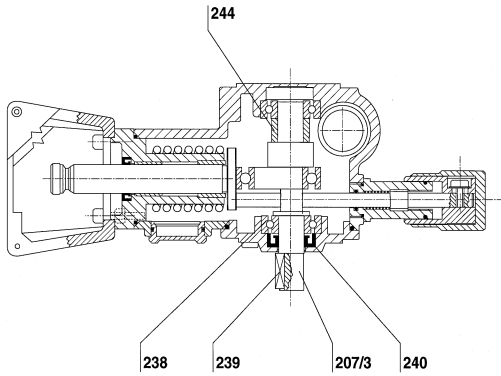


Fig. VI

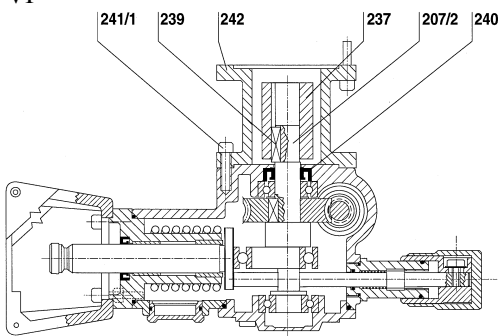


Fig. VIII

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

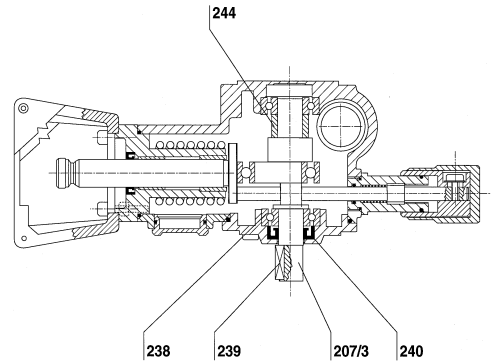


Fig. VI

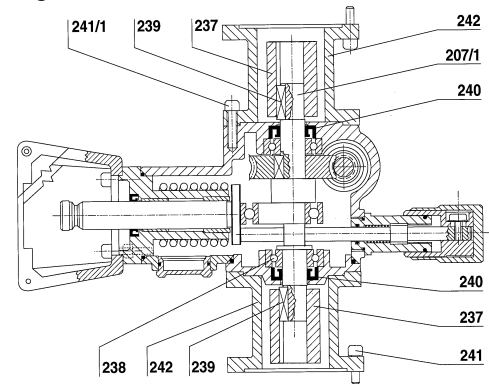


Fig. V

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

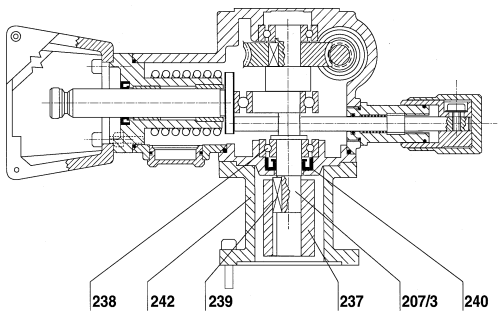


Fig. VII

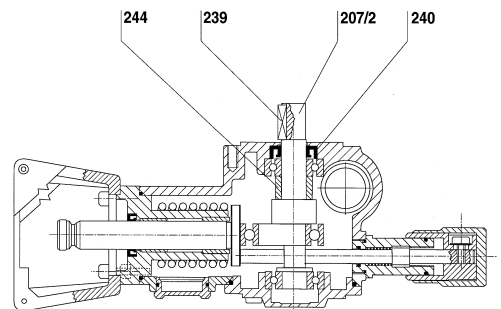


Fig. III

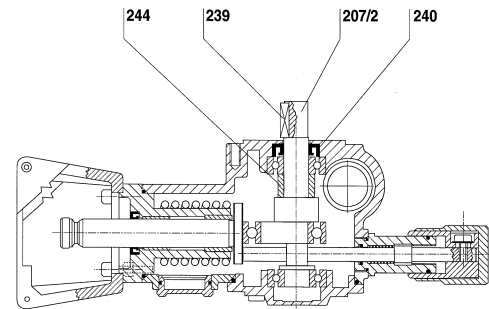


Fig. III

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).

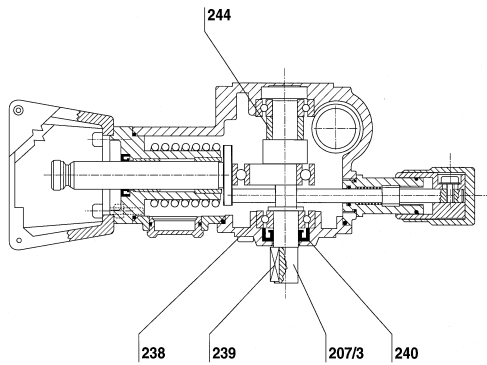


Fig. VI

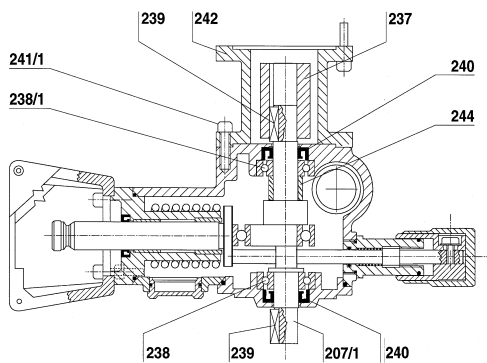


Fig. IV

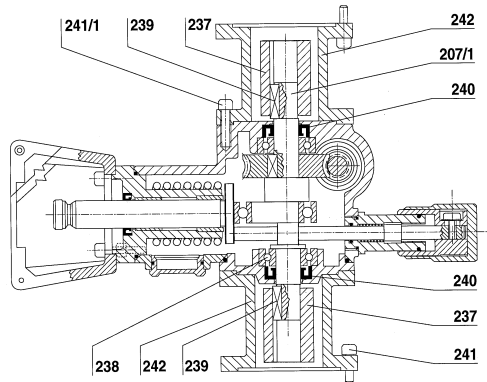


Fig. V

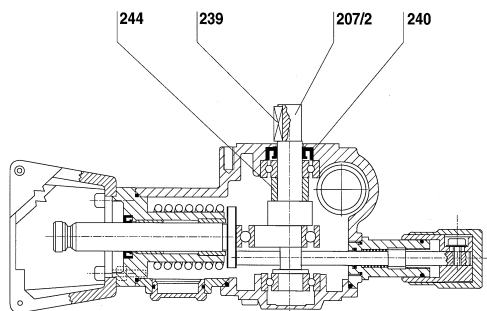


Fig. III

**Impulse generator (fig. II)**

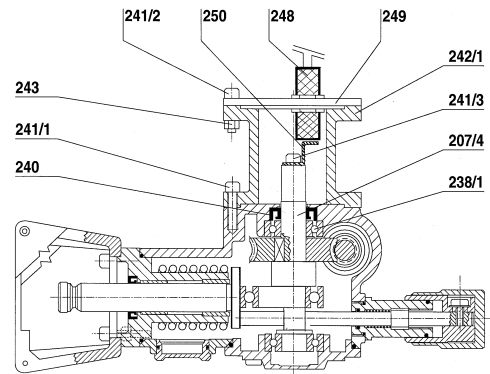


Fig. II

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

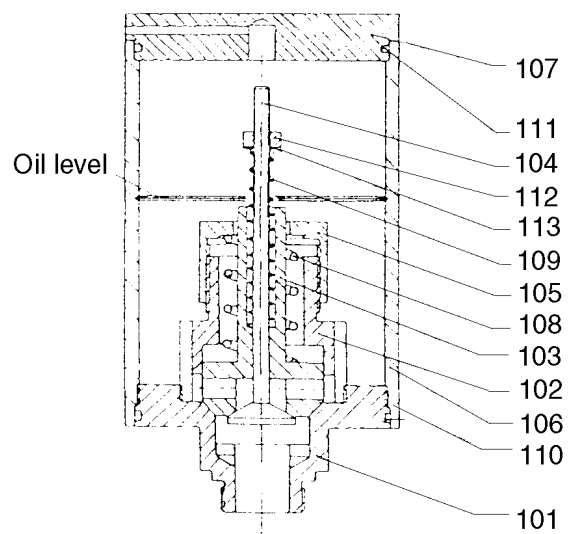
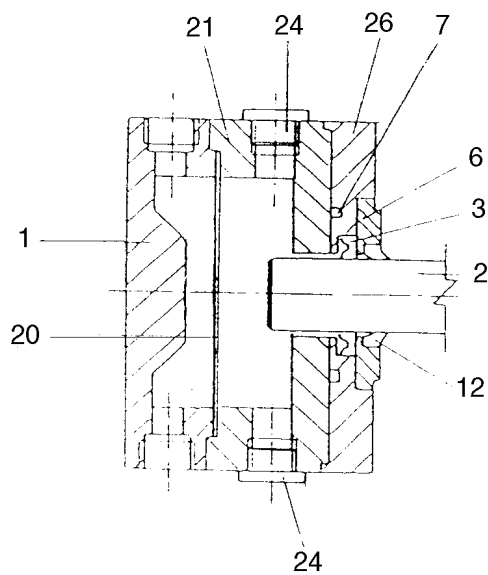
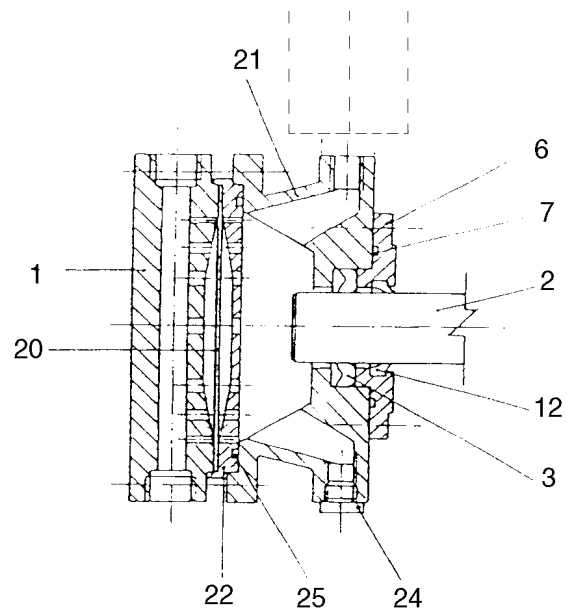
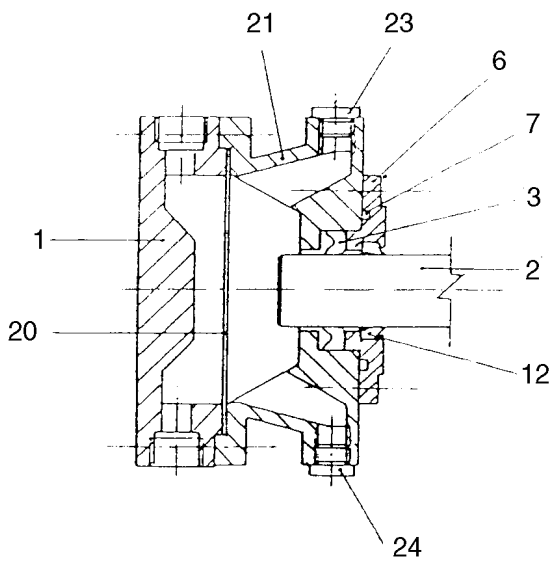
Item	NAME
207/1	Shaft with double extensions
207/2	Shaft with left extension
207/3	Shaft with right extension
207/4	Shaft
237	Joint
238	Ball bearings for right part of cam
238/1	Ball bearings for left part of cam
239	Key
240	Grommet
241	Screw
241/1	Screw
241/2	Screw
241/3	Screw
242	Housing
242/1	Housing
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 series:**      **B-125N, BR-125N, E-125N**  
                           **B-175N, BR-175N, E-175N**  
                           **B-250N, BR-250N, E-250N**



**LEGEND AND NOMENCLATURE OF THE SECTIONAL DESIGN OF THE PUMPING HEADS**  
 **pump series:            B-125N, BR-125N, E-125N**  
**B-175N, BR-175N, E-175N**  
**B-250N, BR-250N, E-250N**

<b>LEGEND</b>			
<b>Fig.</b>	<b>Pump series</b>	<b>Piston <math>\Phi</math></b>	<b>Material</b>
<b>1</b>	<b>B-125N, 175N, 250N</b>	<b>ALL</b>	<b>ALL</b>
<b>2</b>	<b>BR-125N, 175N, 250N</b>	<b>ALL</b>	<b>ALL</b>
<b>3</b>	<b>E-125N, 175N, 250N</b>	<b>ALL</b>	<b>ALL</b>
<b>4</b>	<b>BR-125N, 175N, 250N</b>	<b>ALL</b>	<b>ALL</b>

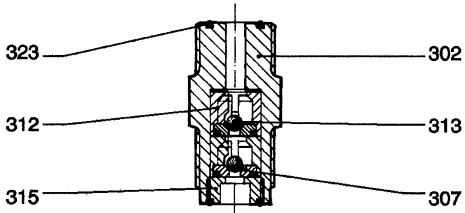
<b>NOMENCLATURE</b>	
<b>ITEM</b>	<b>NAME</b>
1	Head body
2	Piston
3	Piston gasket
6	Pre-gasket ring
7	OR gasket
12	Scraper ring
20	Diaphragm
21	Oil chamber
22	Diaphragm shield
23	Oil entry cap
24	Oil plug
25	Gasket
26	Pre-gasket disk

<b>NOMENCLATURE</b>	
<b>ITEM</b>	<b>NAME</b>
101	Support
102	Guide
103	Recirculation shutter
104	Recycle shutter
105	Ring nut
106	Container
107	Cover
108	Spring
109	Spring
110	Gasket
111	Gasket
112	Nut
113	Washer

PLASTIC VALVES SECTIONAL DRAWINGS

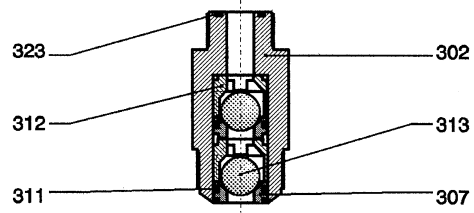
pump series: A-125N, B-125N, BR-125N, E-125N  
 A-175N, B-175N, BR-175N, E-175N

AB 3-DV, AB 4-DV, AB 5-DV

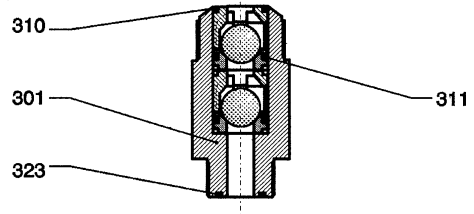
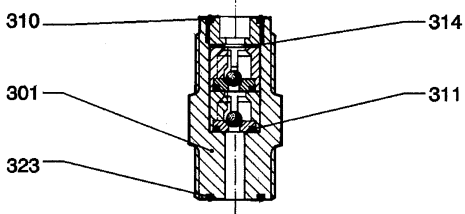


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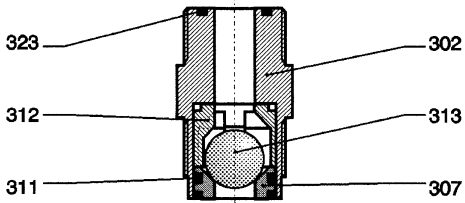
AB 8-DV



↑  
**ASPIRATION**

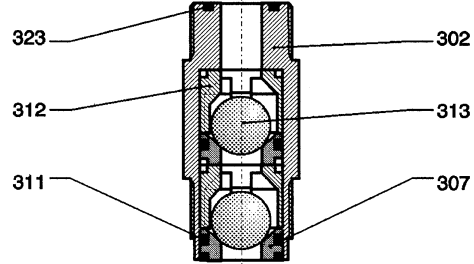


AB 11, AB 13

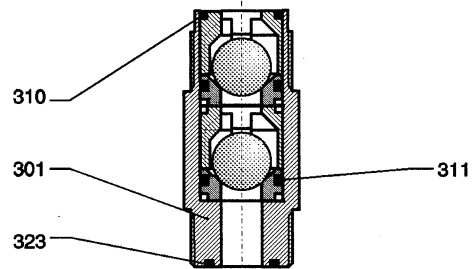
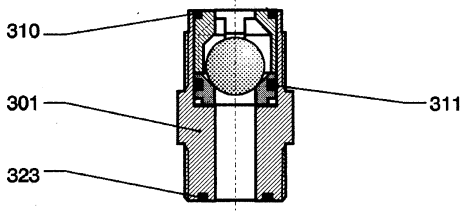


↑  
**DELIVERY**

AB 11-DV, AB 13-DV



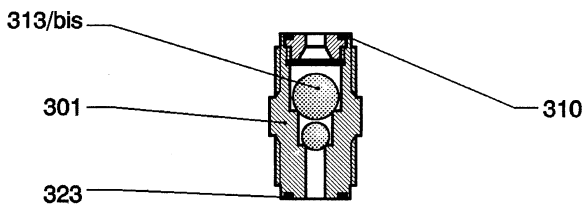
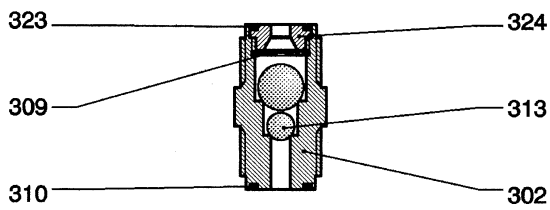
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**ASPIRATION**



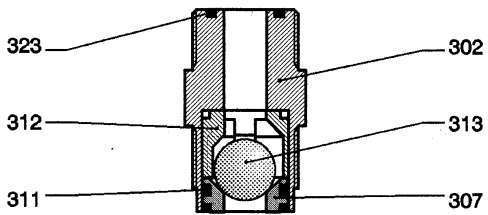
### METALLIC VALVES SECTIONAL DRAWINGS

**pump series:** A-125N, B-125N, BR-125N, E-125N  
 A-175N, B-175N, BR-175N, E-175N

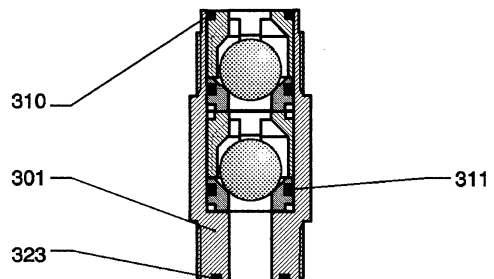
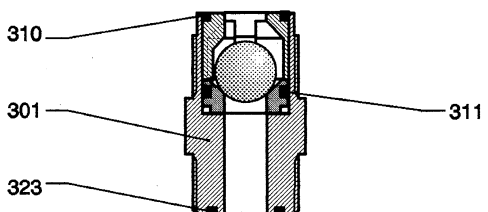
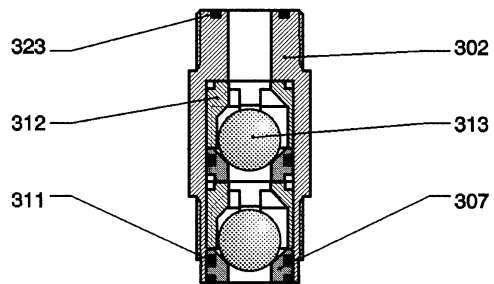
**AB 3-DV, AB 5-DV**



**AB 6, AB 8, AB 11, AB 13**

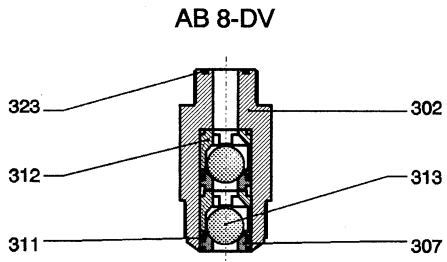


**AB 6DV, AB 8DV, AB 11DV, AB 13DV**

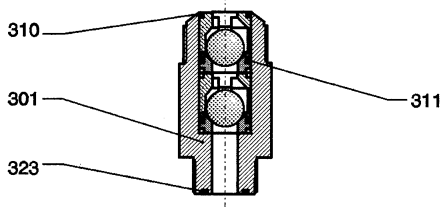
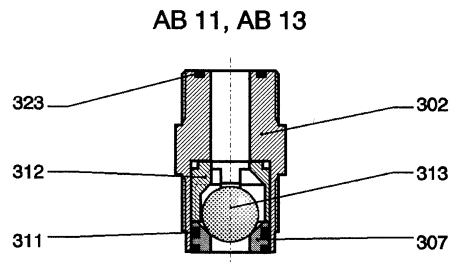


PLASTIC VALVES SECTIONAL DRAWINGS

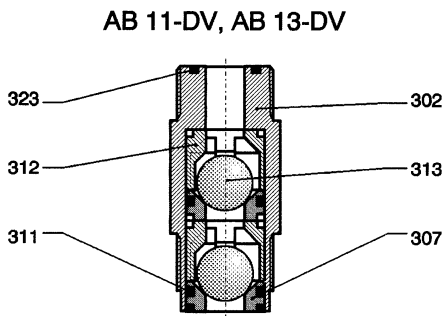
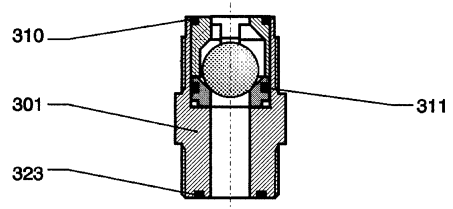
pump series: A-250N, B-250N, BR-250N, E-250N



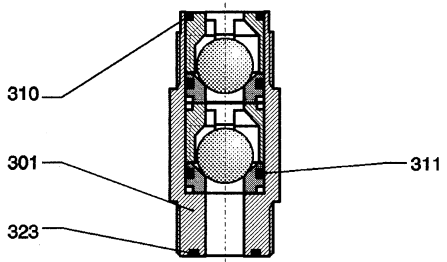
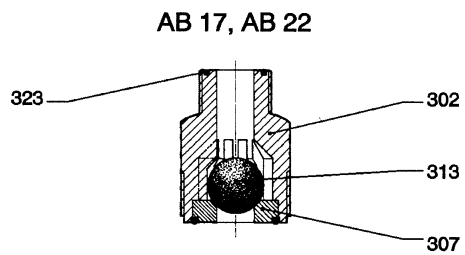
DELIVERY



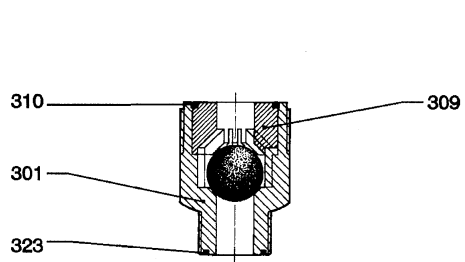
ASPIRATION



DELIVERY



ASPIRATION

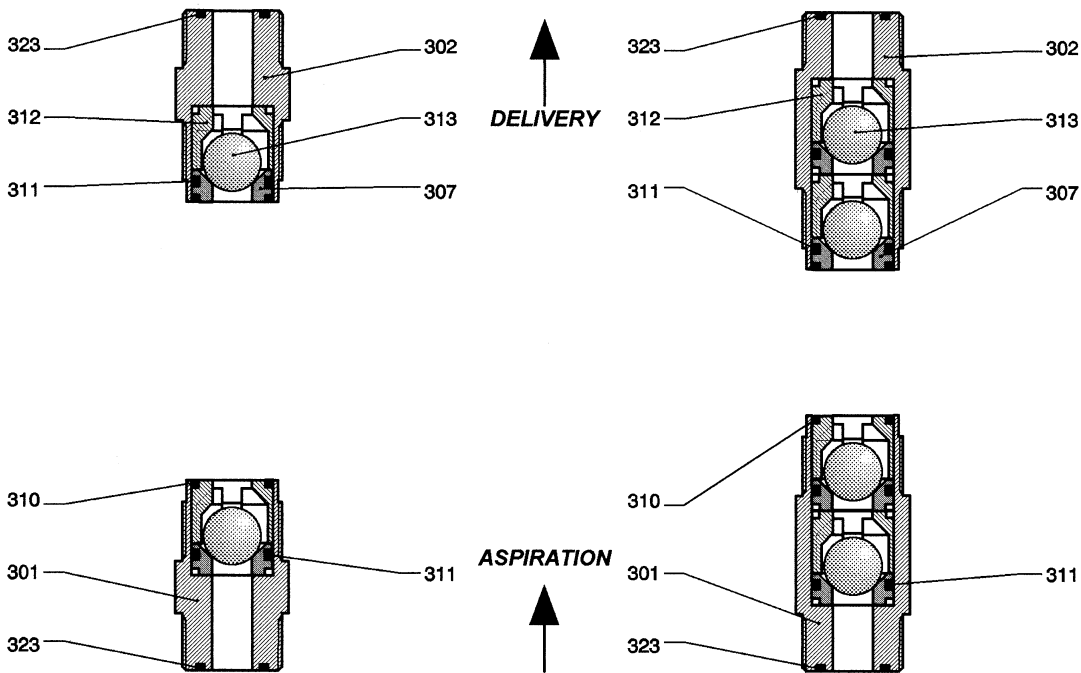


## METALLIC VALVES SECTIONAL DRAWINGS

**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