

**ATTACHMENT TO THE INSTRUCTION AND
MAINTENANCE MANUAL**

DESIGNS AND DETAILS

**ALTERNATIVE DIRECT DIAPHRAGM
PUMP WITH SPRING RETURN**

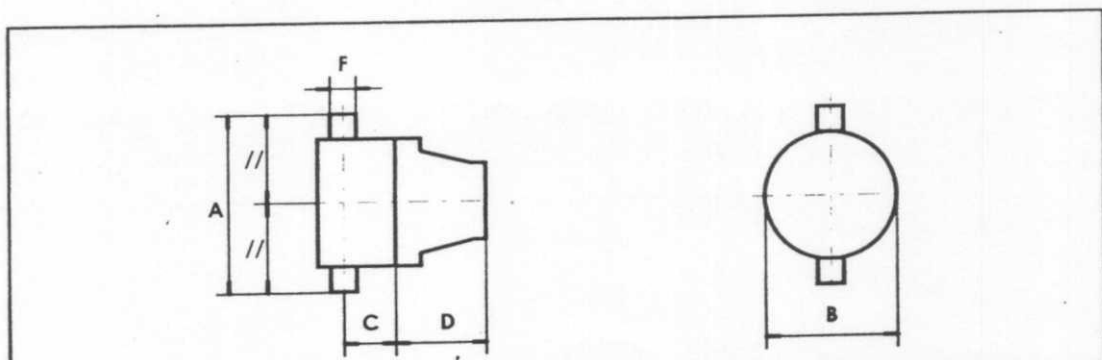
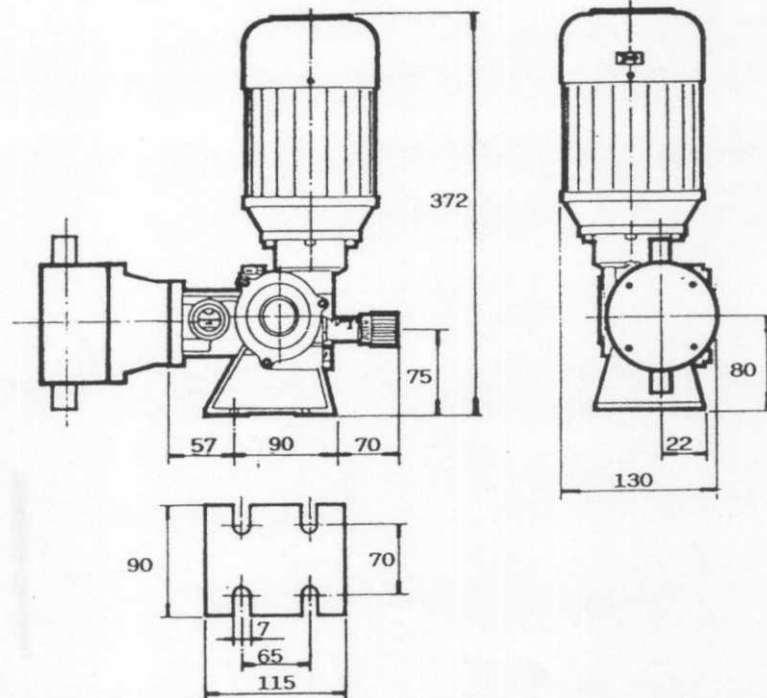
SERIES: "D"

**Models: D 050N - D 100N D
101N - D 121N**



DESIGN DRAWING

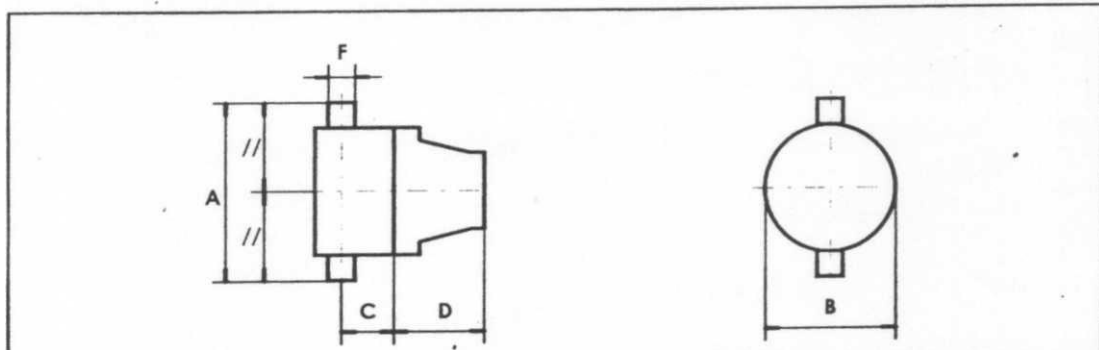
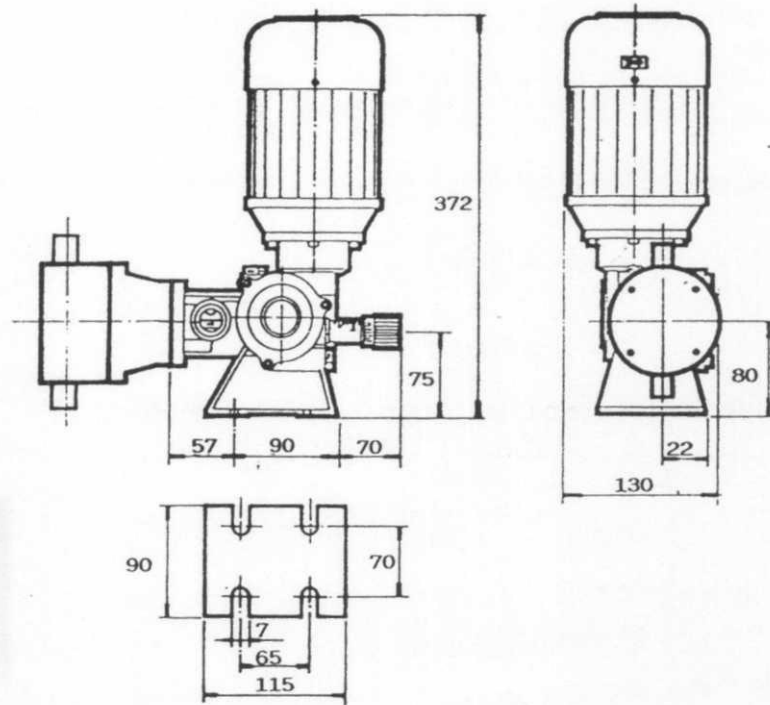
Pump series: D 050N



Modello <i>Model</i>	Esecuzione 11 / <i>Execution 11</i>					Esecuzione 13 / <i>Execution 13</i>				
	A	B	C	D	F - tipo valv.	A	B	C	D	F - tipo valv.
D 050N - 30	128	70	17	66	1/2" Gm - AB 3	120	76	16	66	1/2" Gm - AB 3
D 050N - 50	140	85	13	70	1/2" Gm - AB 5	153	100	15	68	1/2" Gm - AB 5

DESIGN DRAWING

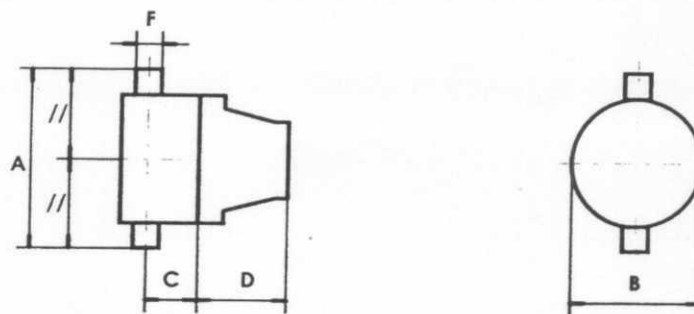
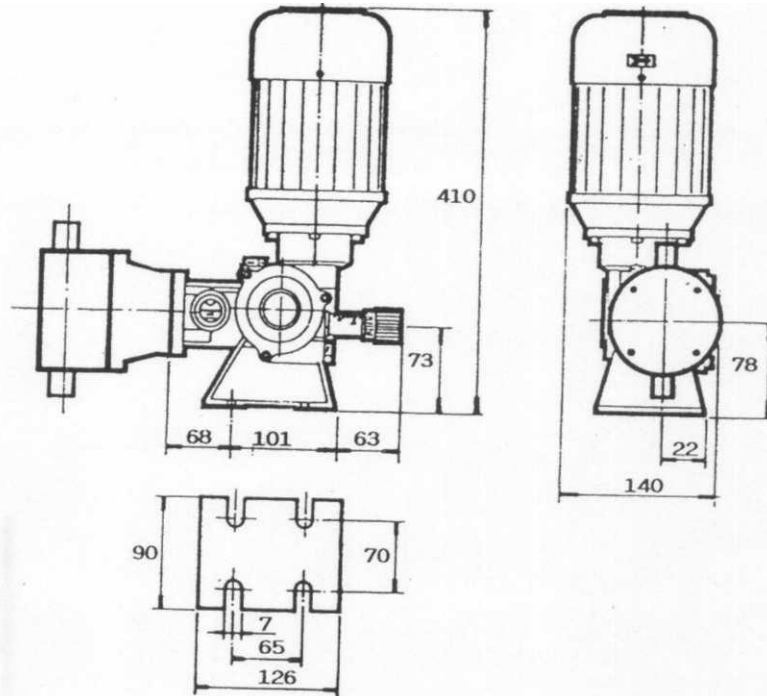
Pump series: D 100N



Modello Model/	Esecuzione 11 / <i>Execution 11</i>					Esecuzione 13 / <i>Execution 13</i>				
	A	B	C	D	F - tipo valv.	A	B	C	D	F - tipo valv.
D 100N-70	170	120	13	55	1/2" Gm - AB 8	232	130	19	55	1/2" Gm - AB 8
D 100N-90	204	140	21	54	3/4" Gm - AB 11	205	140	23	54	3/4" Gm - AB 11
D100N-105	212	150	21	54	3/4" Gm - AB 13	220	155	23	54	3/4" Gm - AB 13
D100N-120	280	170	27	56	1" Gm - AB 17	280	180	31	56	1" Gm - AB 17

DESIGN DRAWING

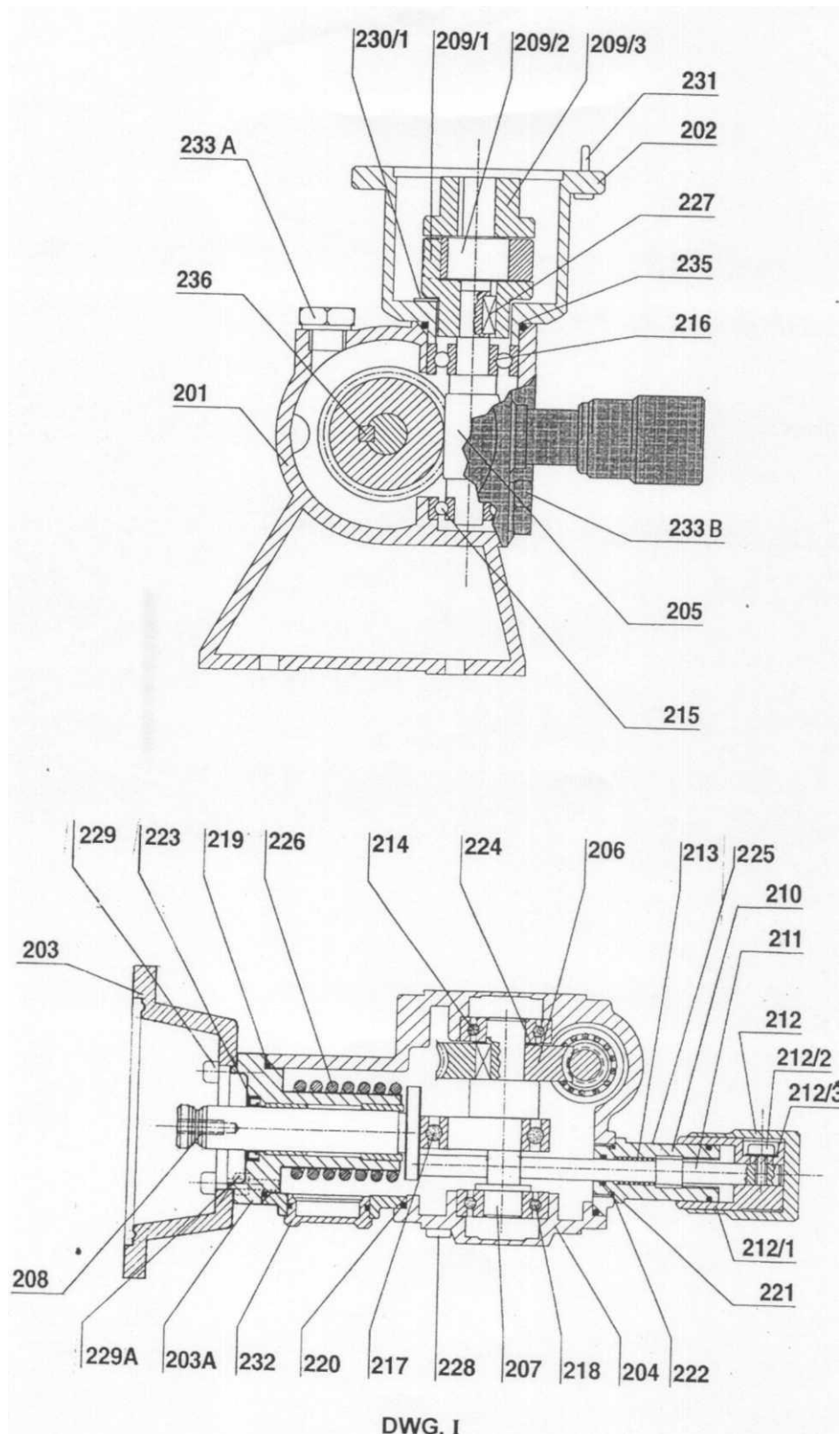
Pump series: D101N-D121N



Modello Model	E secuzione 11 / <i>Execution 11</i>					Esecuzione 13/ <i>Execution 13</i>				
	A	B	C	D	F - tipo valv.	A	B	C	D	F - tipo valv.
D101N-70	170	120	13	55	1/2" Gm - AB 8	232	130	20	55	1/2" Gm - AB 8
D101N-90	204	140	21	54	1/2" Gm - AB 11	205	140	23	54	1/2" Gm - AB 11
D 101N- 105	212	150	21	54	1/2" Gm - AB 13	220	155	23	54	1/2" Gm - AB 13
D101N-120	280	170	27	56	1" Gm - AB 17	280	180	32	56	1" Gm - AB 17
D121N-120	280	170	27	56	1" Gm - AB 17	280	180	32	56	1" Gm - AB 17

SECTIONAL DESIGN OF THE PUMP BODY Pump

series: D 050N - D 100N - D 101N - D 121N



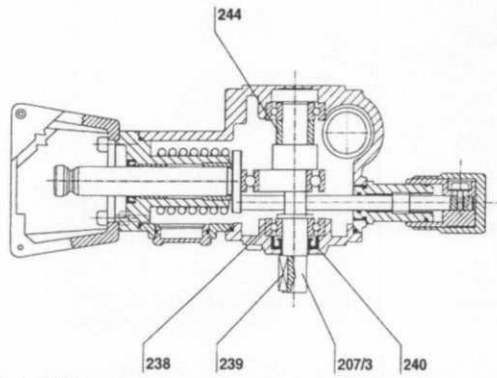
NOMENCLATURE FOR THE SECTIONAL DESIGN OF THE PUMP BODY

Pump series: D 050N - D 100N - D 101N - D 121N

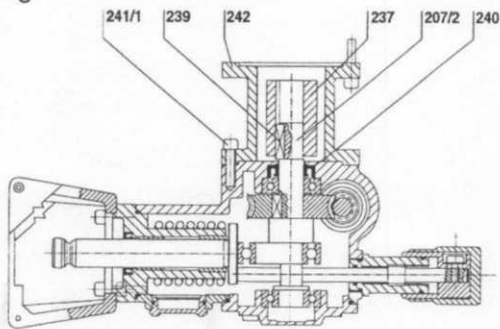
NOMENCLATURE DWG.I	
ITEM	DENOMINATION
201	<i>Pump body</i>
202	<i>Motor support housing</i>
203	<i>Head support housing</i>
203/A	<i>Ram support</i>
204	<i>Cover</i>
205	<i>Worm screw</i>
206	<i>Worm wheel</i>
207	<i>Shaft</i>
208	<i>Ram</i>
209/1	<i>Elastic joint (bottom)</i>
209/2	<i>Star</i>
209/3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

MULTIPLE - HEAD SECTIONAL DRAWING

Duble heads pump left (dwg. VI + dwg VIII).

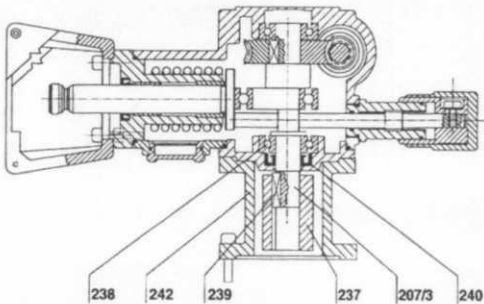


dwg. VI

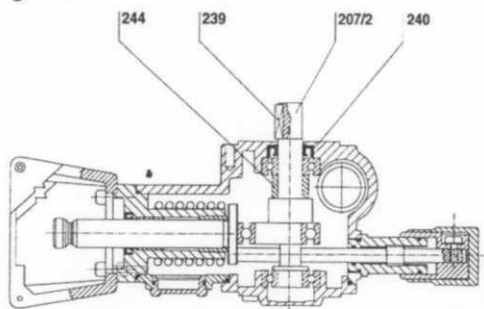


dwg. VIII

Duble heads pump right (dwg. VII + dwg. III).

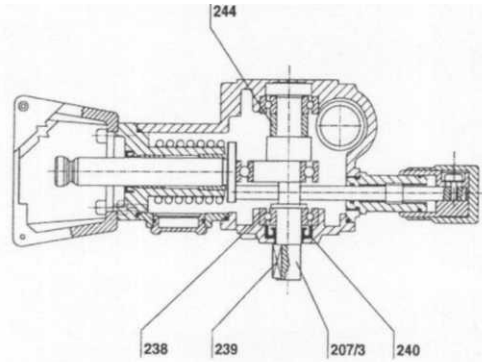


dwg. VII

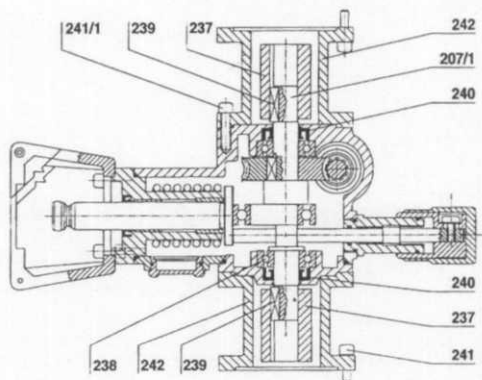


dwg. III

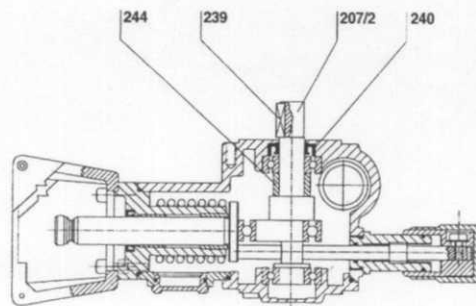
Triple heads pump (.dwg V + fig. III + dwg. VI)



dwg. VI



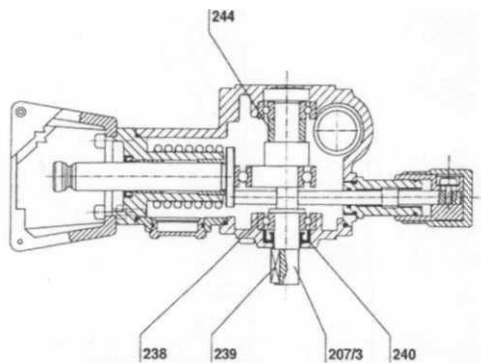
dwg. V



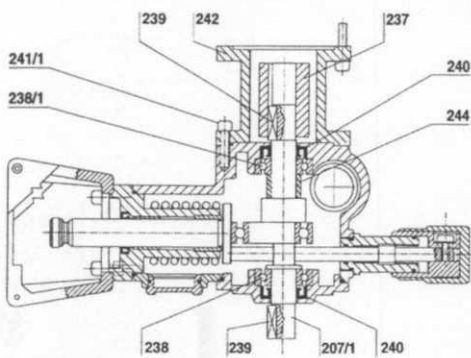
dwg. III

Dwg.	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

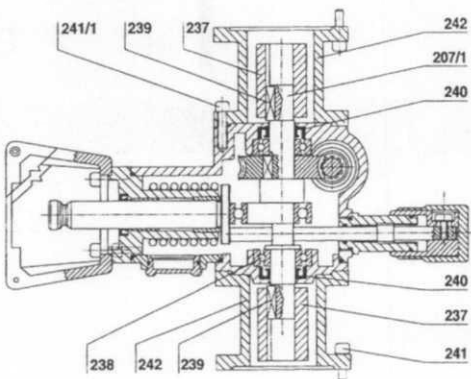
Quadruple heads pump (dwg. V +
dwg III + dwg. IV + dwg. VI).



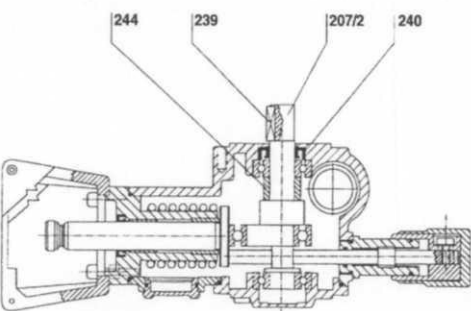
dwg. VI



dwg. IV

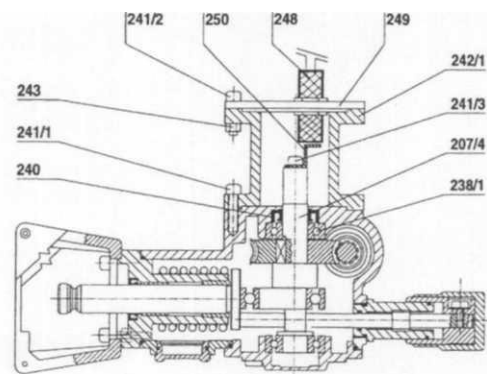


dwg. V



dwg. III

Impulse generator (dwg.



dwg. II

DWG	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

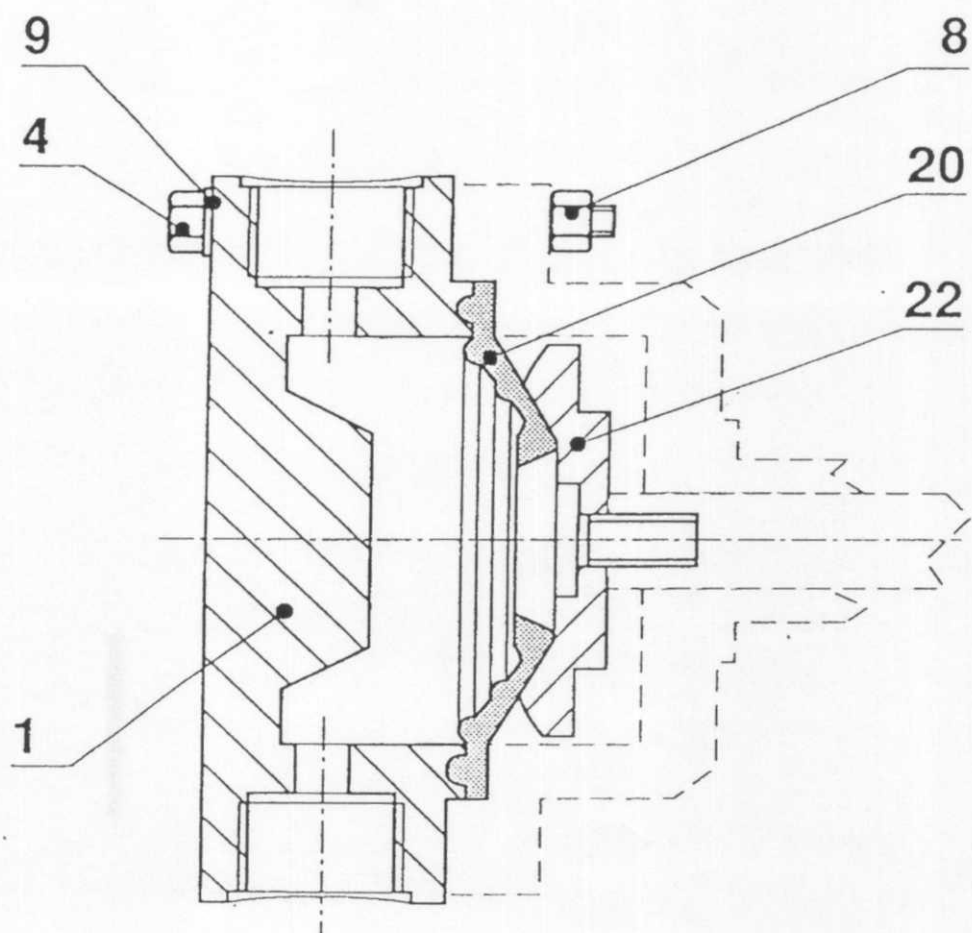
ITEM	DENOMINATION
207/1	Shaft with double extensions
207/2	Shaft with left extension
207/3	Shaft with right extension
207/4	Shaft
237	Joint
238	Ball bearings for right part of cam
238/1	Ball bearings for left part of cam
239	Key
240	Grommet
241	Screw
241/1	Screw
241/2	Screw
241/3	Screw
242	Housing
242/1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

NOTE:

For the unlabeled parts, see the dwg. I

SECTIONAL DESIGN OF THE PUMPING HEADS

Pump series: D 050N - D 100N - D 101N - D 121N



Dwg.

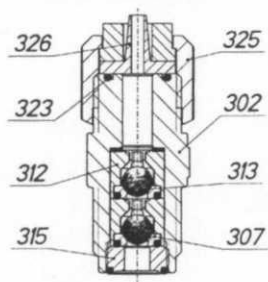
NOMENCLATURE	
ITEM	DENOMINATION
1	<i>Head body</i>
4	<i>Nut</i>
8	<i>Screw</i>
9	<i>Washer</i>
20	<i>Diaphragm</i>
22	<i>Diaphragm shield</i>

PLASTIC VALVES SECTIONAL DRAWINGS

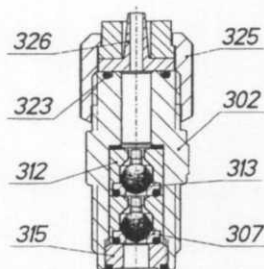
Pump series: **D 050N - 30**

D 050N - 50

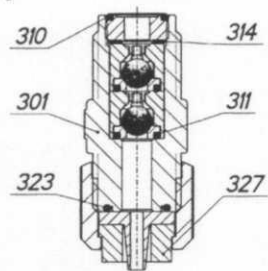
Installazione standard



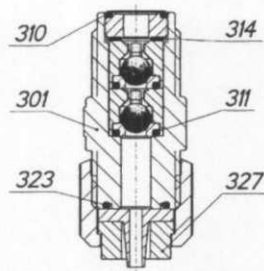
DELIVERY



AB 3 - NDV



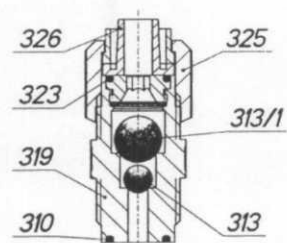
SUCTION



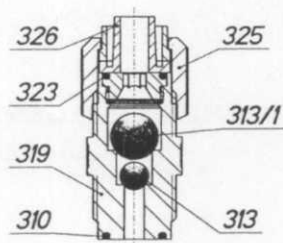
AB 5 - NDV

METALLIC VALVES SECTIONAL DRAWINGS

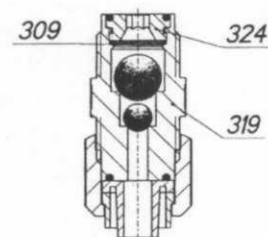
Installazione standard



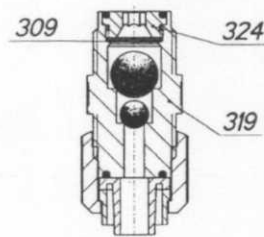
DELIVERY



AB 3 - NDV



SUCTION



AB 5 - NDV

ITEM	DENOMINATION	ITEM	DENOMINATION
301	Suction housing	314	Flat Gasket
302	Delivery housing	315	Locking bush
307	Valve seat	319	Double valve housing
310	O-Ring gasket	323	O-Ring gasket
311	O-Ring gasket	324	Gasket support
312	Valve guide	325	Tube lock nut
313	Ball	326	Hose expander
313/1	Ball	327	Tube nut

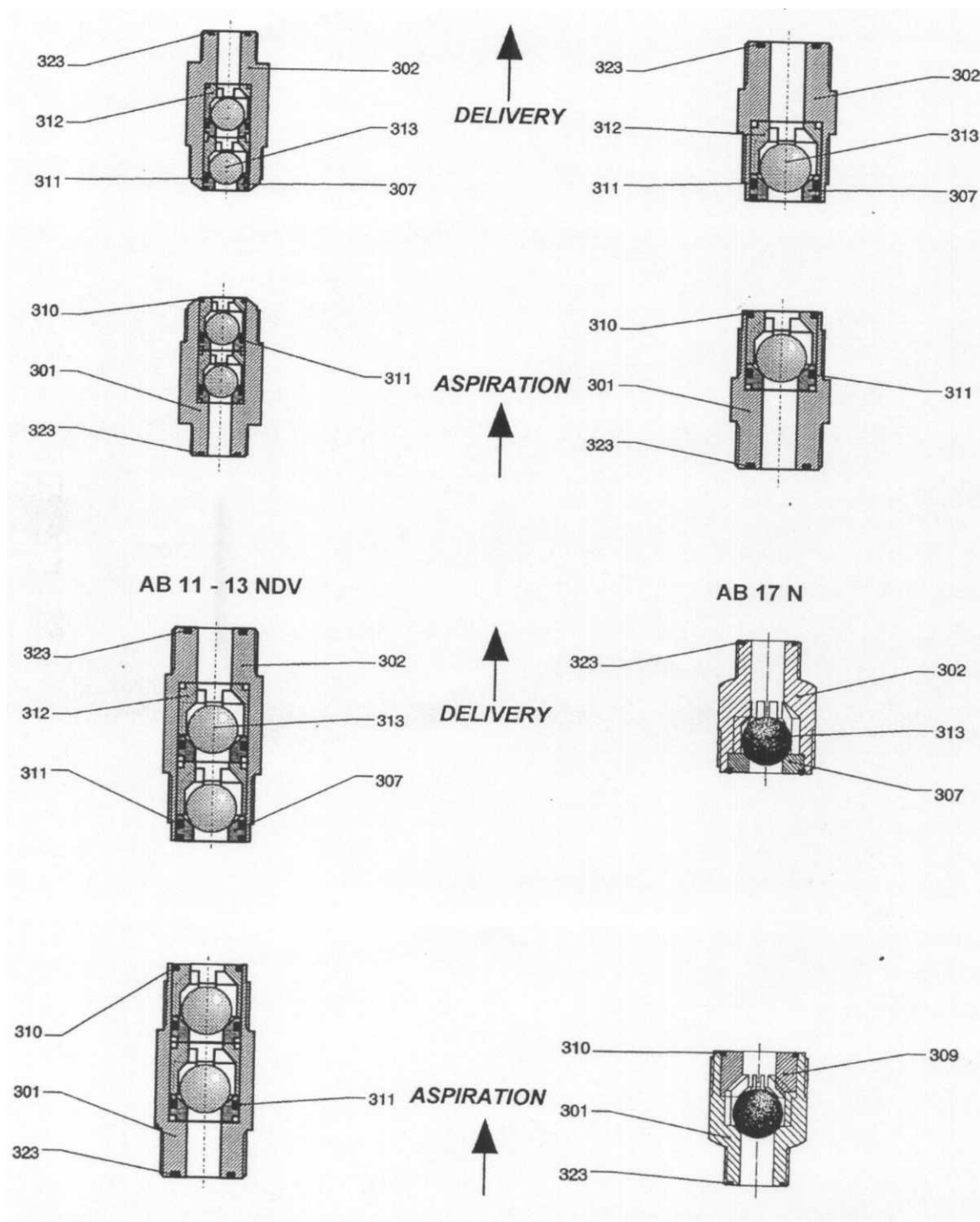
PLASTIC VALVES SECTIONAL DRAWINGS Pump

series: D 100N - D 101N - D 121N

Installazione standard

AB 8
NDV

AB 11 -13 NDV



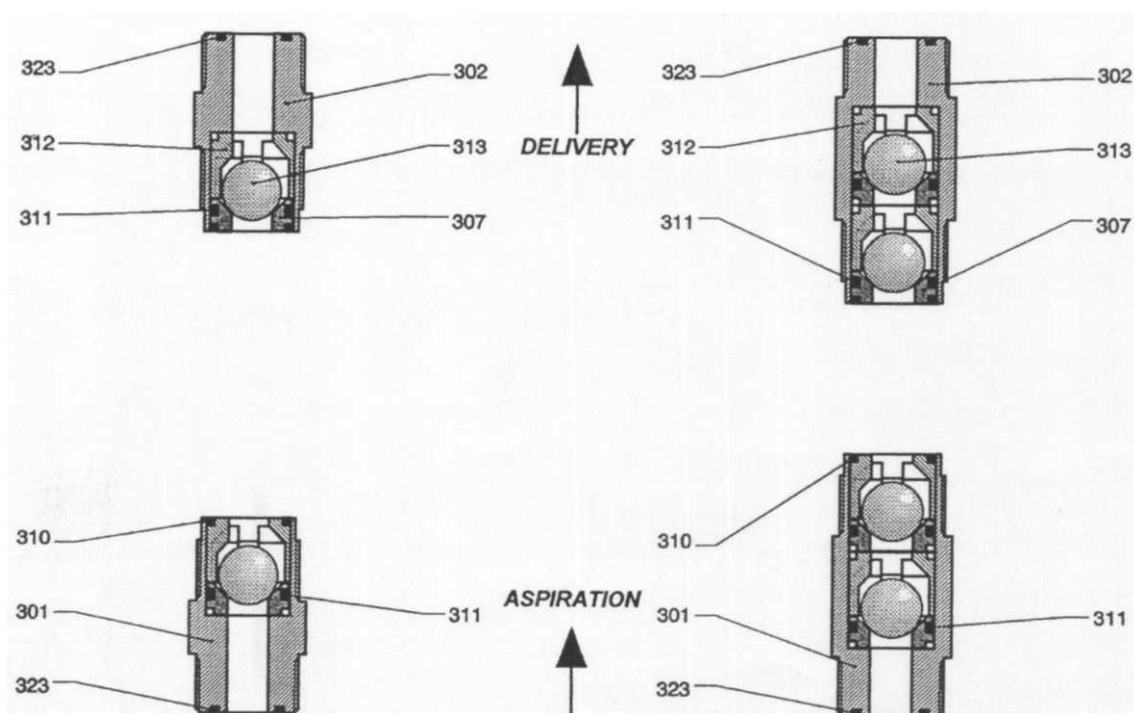
METALLIC VALVES SECTIONAL DRAWINGS

Pumpseries: D 100N - D 101N - D 121N

Installazione standard

AB 8 N
AB 11 -13 N
AB 17 N

AB 8 NDV
AB 11 -13 NDV
AB 17 NDV



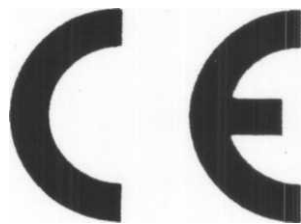
NOMENCLATURE	
ITEM	DENOMINATION
301	<i>Aspiration valve container</i>
302	<i>Delivery valve container</i>
307	<i>Valve seat</i>
309	<i>Height limiter</i>
310	<i>Gasket</i>
311	<i>Gasket</i>
312	<i>Guide sphere</i>
313	<i>Sphere</i>
314	<i>Gasket</i>
315	<i>Bush</i>
323	<i>Gasket</i>
324	<i>Gasket seat</i>

INSTRUTION AND MAINTENANCE MANUAL

**ALTERNATIVE DIRECT DIAPHRAGM DOSAGING
PUMP WITH SPRING RETURN**

SERIES: "D"

**MODELS: D 050N - D 100N
D101N-D121N**



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ATTACHMENT: DESIGNS AND DETAILS

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.)

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 D 050N

Diameter of the membrane mm	Strokes / min		Maximum load		Maximum pressure	
	50 Hz c/min	60 Hz c/min	50 Hz l/h	60 Hz l/h	met. material bar	plastic mat bar
30	35	42	4	4,8	10	14
	58	70	6	7,2	10	14
	96	116	11	13,2	10	14
	116	/	14	/	10	14
50	35	42	12	14,4	10	10
	58	70	20	24	10	10
	96	116	33	39,6	10	10
	116	/	43	/	10	10

Tab. II: Series, D 100N

Diameter of the membrane	Strokes / min		Maximum load		Maximum pressure	
	50 Hz	60 Hz	50 Hz	60 Hz	met. material	plastic mat
mm	<i>c/min</i>	<i>c/min</i>	l/h	l/h	bar	bar
70	35	42	45	54	5	5
	58	70	75	90	5	5
	96	116	124	150	5	5
	116	/	150	/	5	5
90	35	42	69	82,8	3	3
	58	70	115	138	3	3
	96	116	190	230	3	∞
	116	/	230	/	3	3
105	35	42	94	112,3	1,5	1,5
	58	70	156	187	1,5	1,5
	96	116	258	298	1,5	1,5
	116	/	298	/	1,5	1,5
120	35	42	106	127,4	1,5	1,5
	58	70	177	212	1,5	1,5
	96	116	292	374	1,5	1,5
	116	/	374	/	1,5	1,5

Tab. III: Series D 101N

Diameter of the membrane	Strokes / min		Maximum load		Maximum pressure	
	50 Hz	60 Hz	50 Hz	60 Hz	met. material	plastic mat
mm	<i>c/min</i>	<i>c/min</i>	l/h	l/h	bar	bar
70	70	84	90	108	∞	8
	96	116	123	147	8	8
	120	/	154	/	8	8
	70	84	148	177	5	5
90	96	116	202	242	5	5
	120	/	255	/	5	5
	70	84	201	241	3	3
105	96	116	275	330	3	3
	120	/	331	/	3	3
	70	84	225	270	∞	∞
120	96	116	308	370	3	3
	120	/	408	/	3	3

Tab. III: Series D 121N

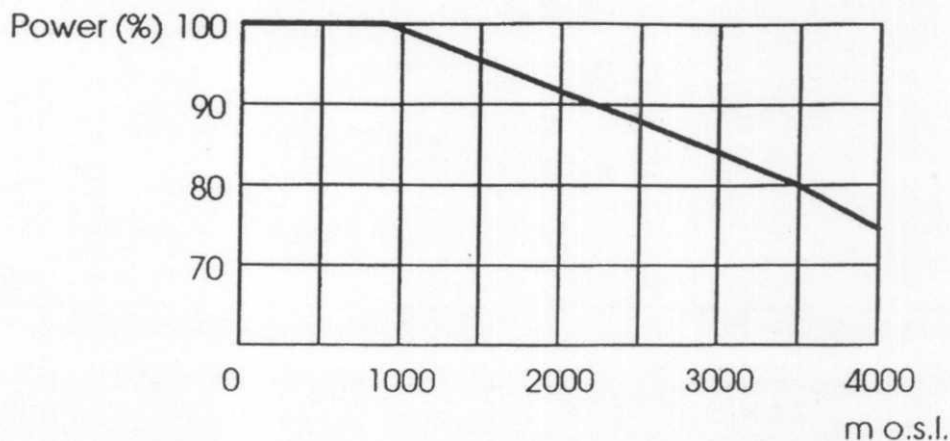
Diameter of the membrane	Strokes / min		Maximum load		Maximum pressure	
	50 Hz	60 Hz	50 Hz	60 Hz	met. material	plastic mat
mm	<i>c/min</i>	<i>c/min</i>	l/h	l/h	bar	bar
120	70	84	320	384	3	3
	96	116	430	516	∞	3
	120	/	570	/	3	3

The reported maximum loads are only theoretic, the actual value depends on the efficiency.
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

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

addressed by the IEC 34-1 (69) norms which regulated motor production.

- This machine is designed for dosing clean or unclean liquids. This machine is also suitable when:



3 INTENDED AND UNINTENDED USE

- > 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

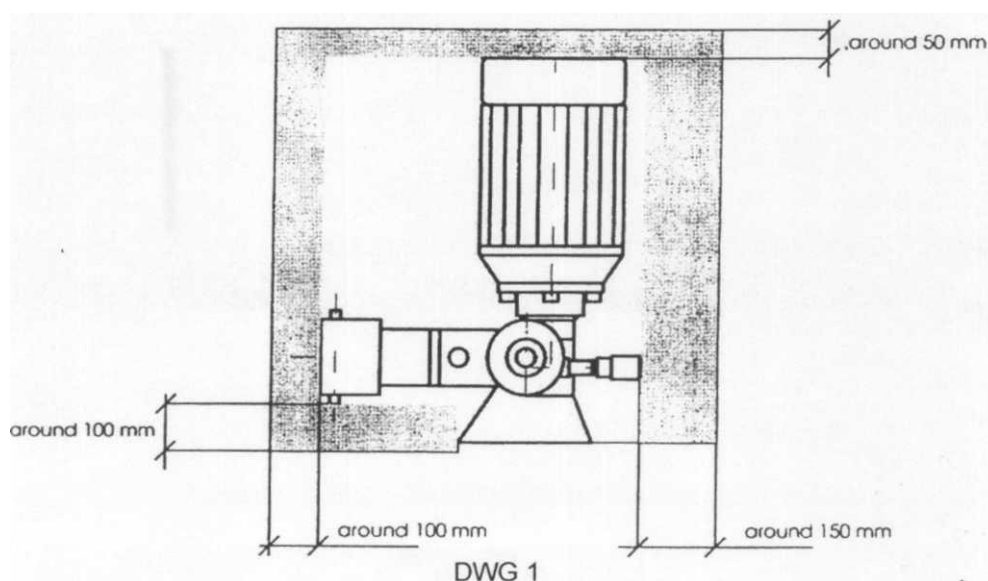
The machine must always be transported in a vertical position, never horizontally. Since the client chooses the shipper "on its own", these two parties (the client and the shipper) are responsible for transportation.

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.



- 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

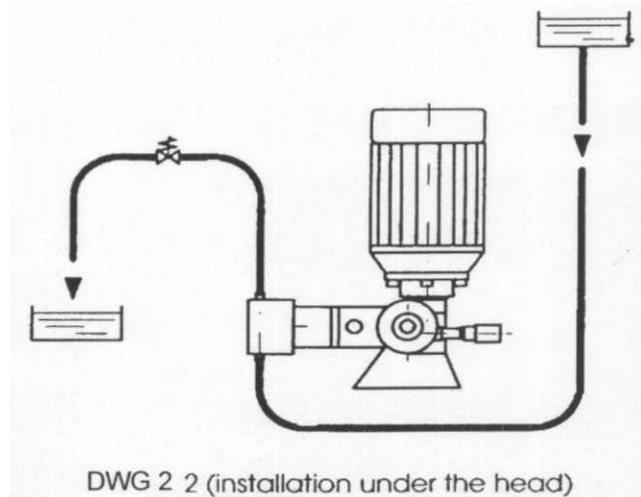
The following describes the steps necessary to properly position the machine:

- 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.



- **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:

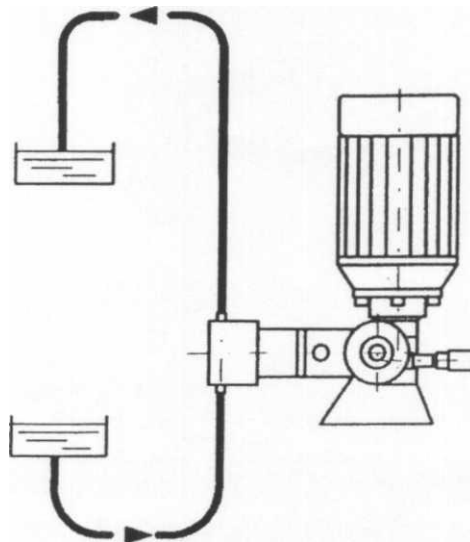
$$\text{NPSH}_{\text{Installation}} > \text{NPSH}_{\text{pump}}$$

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
 γ = Specific weight



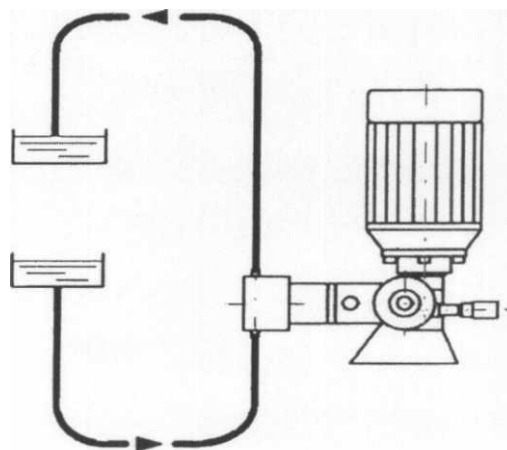
DWG 3 (Installation over the head)

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:

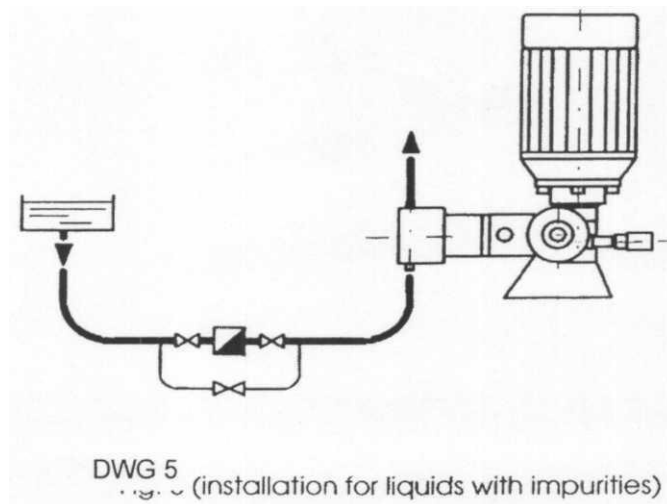
- > Small aspiration head;
- > delivery head greater than that in aspiration.



DWG 4 (the ideal installation)

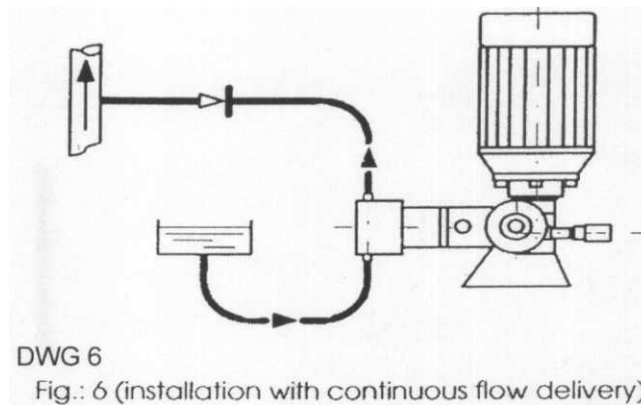
- **Installation for dosing liquids that could contain impurities**

The following must be considered in installing the pump properly. Use an adequate aspiration filter with filter mesh between 0.1 and 1 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.



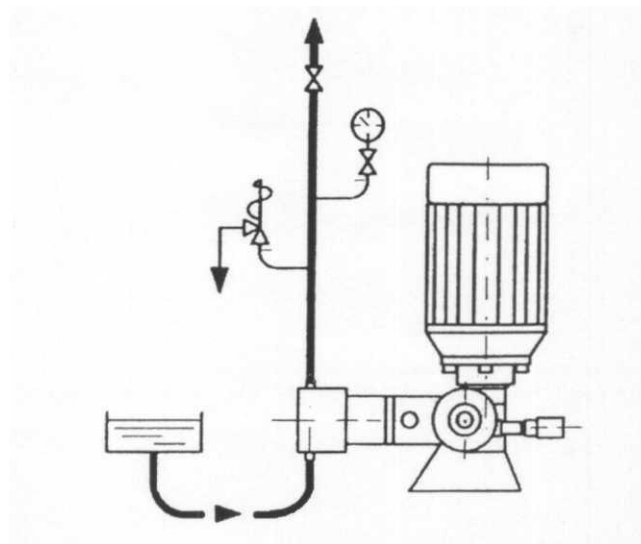
Installation with delivery in a continuous flow tube

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



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 maneuvering 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.

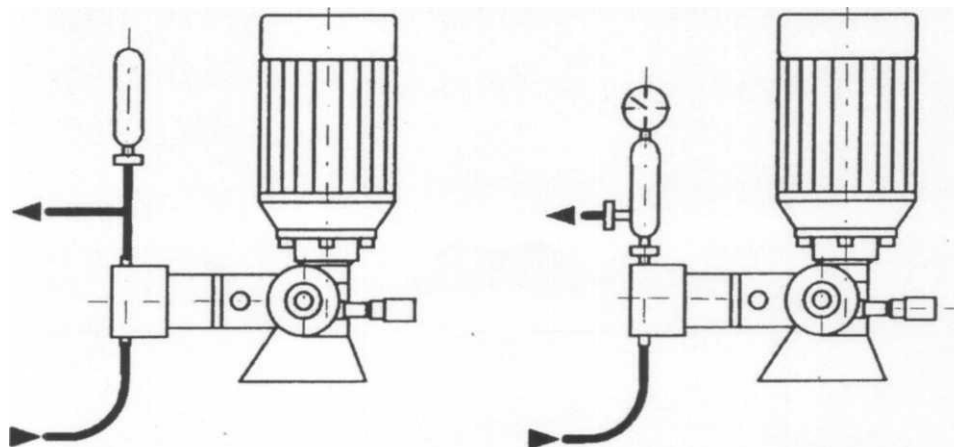


DWG 7 (installation of a safety valve and gauge)

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.



DWG 8 (installation with plenum surge damper)

7 ASSEMBLY AND DISASSEMBLY

7.1 Assembly

Given the nature of closing 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

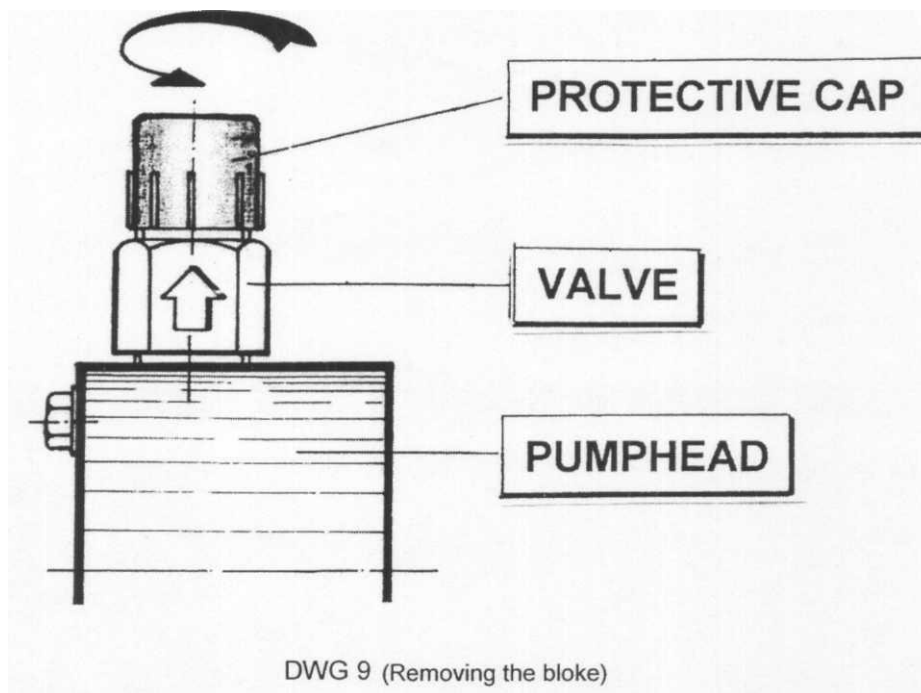
8.1 Checking the Machine for Damage

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.



8.3 Filling the pump and gear box with oil

All pumps come without lubricates thus making it necessary to fill the pump body with oil before potting the machine into gear.

The amont of oil to put into the pump body is shown below:

Table: V

Pump type	Amount of Oil (ml)
D 050N - D 100N	150 approx.
D101N-D121N	300 approx.

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:

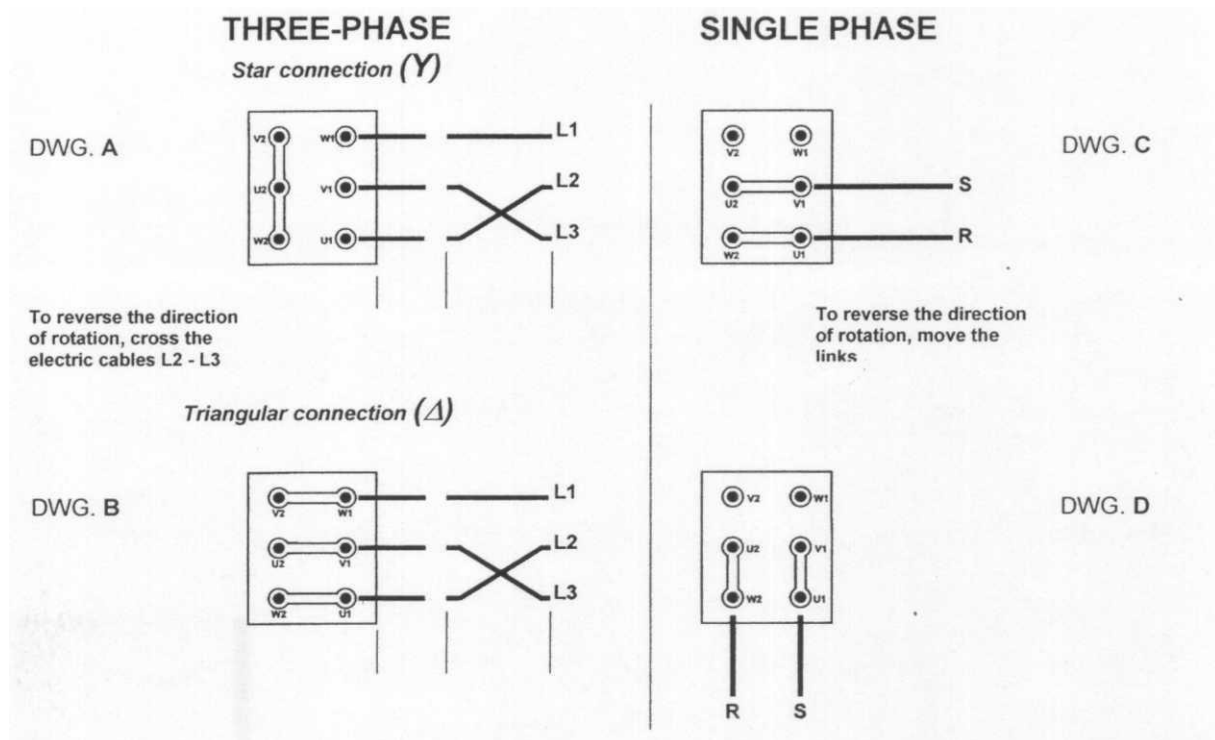
Shell	Spirax HD 85 W 140
Esso	Gear Oil GX 85 W 140
Agip	Rofra MP 85 W 140
Mobil	Mobilube HD 85 W 140
BP	NypogearEP 85 W 140
IP	PontiaxHD85 W140

The oils must be changed after the first 500 hours of operation and every 3000 hours thereafter.

8.4 Connecting the electric motor to external power sources

the connection of electric motor to an external power source may be of the star type (Y) or

DWG. 10 Scheme for attachment to electrical power



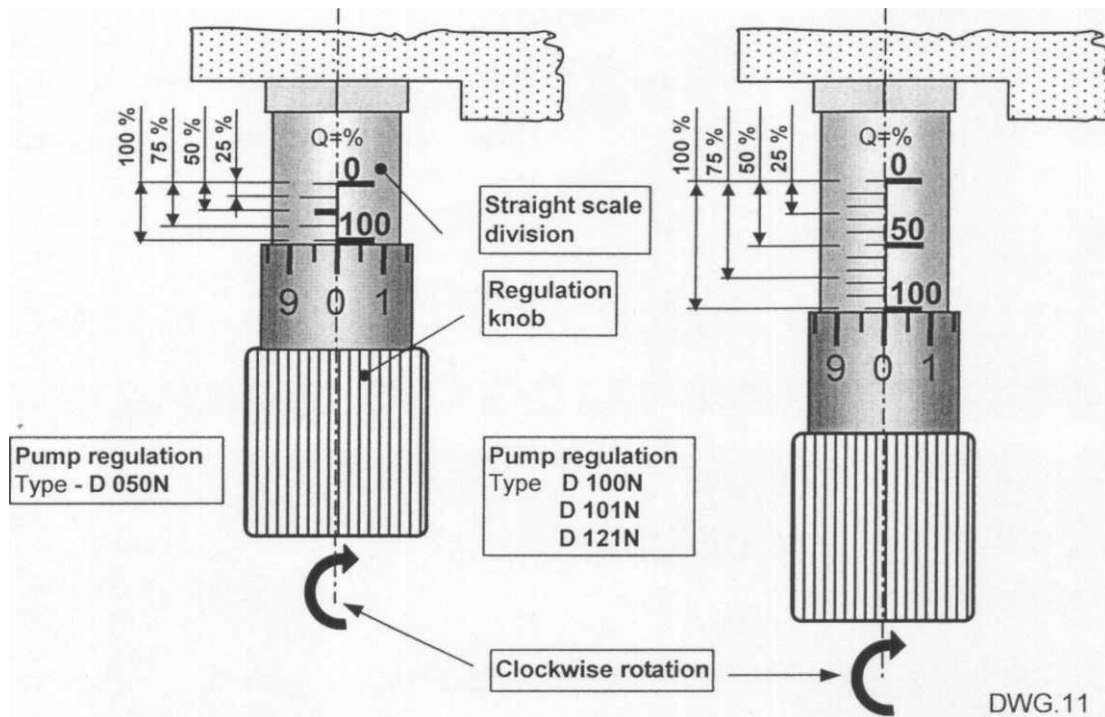
9 REGULATION AND ADJUSTMENT

9.1 Adjusting the Machine

Pump capacity adjustment from 100% to 0% is obtained by twisting clockwise the regulation knob and therefore moving it forward on its axis of rotation; this shortens the piston stroke, then reducing the pump capacity.

The regulation knob is provided with a circular graduated scale dividing each complete twist in 10 parts, each representing 1/50 or 1/100 (depending on the installed pump type) of maximum capacity. The regulation knob may be twisted 5 or 10 times maximum, depending on the installed pump type. On the rotation axis there is a straight graduated scale, divided into 5 or 10 parts, representing the piston stroke; each part of this scale is equivalent to 1/5 or 1/10 of maximum capacity (see tables n^o. I, II, III, IV, page 4 -5 of this manual).

Pump capacity adjustment parameters				
Pump type	Knob total turns	Knob total turns	Straight scale division	Division percentage
D050N	5	1:50	1:5	25%
D 100N	10	1:100	1:10	10%
D 101N	10	1:100	1:10	10%
D 121N	10	1:100	1:10	10%

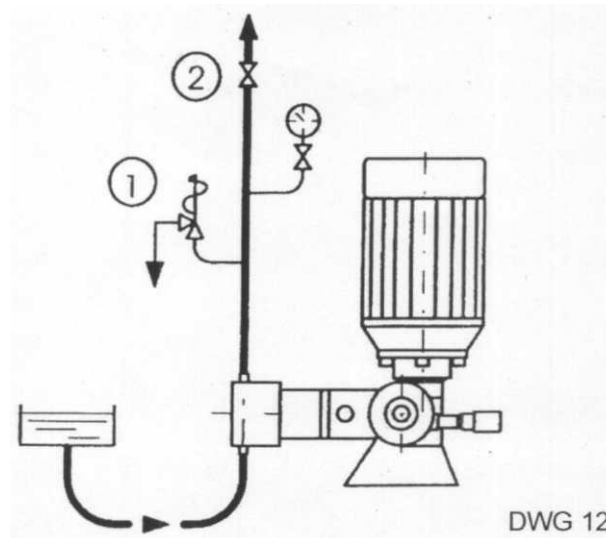


When there is a servo control, other adjustment procedures are

9.2 Adjusting Accessory Devices: Safety Valves

Follow the steps below to correctly calibrate a safety valve:

- Install the safety valve as shown below (DWG 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.



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

MACHINE 10.1 Control Devices

The machines 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 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 tables for spare parts:
- 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 give 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 263) "Guide for evaluation of human exposure to whole-body vibration" .

Table. VIII/a: phonometric investigation

Models D 050N - D 100N		
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

Models D101N-D121N		
» 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. VI

Series D 050N - D 100N - D-101N - D 121N		
Design n.	Item	Common name
Dwg. I - pag. 5 manual attachment	223	Ram gasket
Dwg. 9 - pag. 9 manual attachment	226	Movement spring
*	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.

Table. IX: vibration analysis (vibration acceleration

Frequency Hz	Models					
	D050N		D 100N		D101N-D121N	
	dB(A)	m/s ²	dB(A)	m/s ²	dB(A)	m/s ²
1.00	//	//	//	//	68.9	0.0028
1.25	//	//	//	//	69.6	0.0030
1.60	//	//	//	//	69.4	0.0030
2.00	//	//	//	//	71.8	0.0039
2.50	//	//	//	//	66.1	0.0020
3.15	//	//	//	//	70.1	0.0032
4.00	69.3	0.0029	69.3	0.0029	86.7	0.0216
5.00	62.1	0.0013	62.1	0.0013	71.1	0.0036
6.30	70.3	0.0033	70.3	0.0033	76.8	0.0069
8.00	82.3	0.0130	82.3	0.0130	93.3	0.0462
10.00	92.2	0.0407	92.2	0.0407	84.1	0.0160
12.50	81.8	0.0123	81.8	0.0123	86.8	0.0219
16.00	77.6	0.0076	77.6	0.0076	88.7	0.0272
20.00	77.6	0.0076	77.6	0.0076	83.8	0.0155
25.00	86.4	0.0209	86.4	0.0209	89.1	0.0285
31.50	81.1	0.0114	81.1	0.0114	91.1	0.0359
40.00	81.2	0.0115	81.2	0.0115	96.8	0.0692
50.00	86.6	0.0214	86.6	0.0214	100.0	0.1000
63.00	86.8	0.0219	86.8	0.0219	93.7	0.0484
80.00	94.6	0.0537	94.6	0.0537	96.9	0.0700

More detailed information is available upon

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.

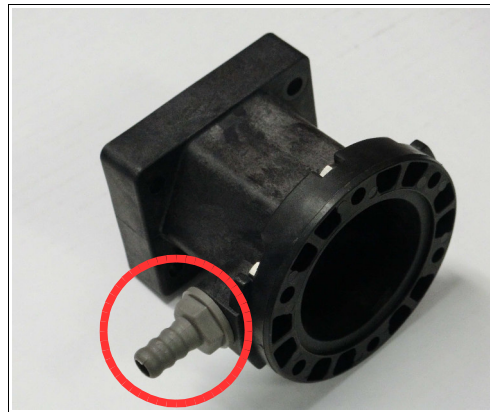
Appendix:

Drainage hole



Typ:

D100N – 105
D100N – 120
D101N – 105
D101N – 120



Serie D Modell:

D50N – 30
D50N – 50
D100N – 70
D100N – 90
D101N – 70
D101N – 90

Function:

In membrane fraction dosing liquid can flow controls or are derived.