



Hydraulic diaphragm alternative dosing pump

2011 EDITION



General instructions

We thank you for choosing this product, carefully reading this manual before installing the dosing pump is recommended, paying careful attention to the safety warnings labelled using pictograms.

Following the standards and instructions contained allow for a safe use and appropriate interventions.

The use and maintenance manual is an integral part of the machine and personnel in charge of use and maintenance must be able to locate it easily, it is therefore necessary to keep it complete and in a safe area.

Technical assistance

Routine and extraordinary maintenance must take place in accordance with instructions contained in this manual. For any type of technical assistance and for requesting spare parts, directly contact the doseuro[®]S.r.l. headquarters, the reseller or the plant engineer, referring to the data from the plate on the pump:

- Pump model.
- ✓ Serial number.
- ✓ Year of manufacture.

If pump maintenance is not carried out in a manner that is conforming to the instructions provided, or in a way that is a prejudice to its integrity or modifies its characteristics, the manufacturer is no longer liable with regards to safety of persons and defective pump operation.

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Electric motors

As per standard, the pump is supplied with an electric motor conforming to the requirements contained in the customer order and compatible with the intended use.

The company doseuro[®]s.r.l., rejects any liability for damage caused by the motor and the pump when used in conditions that are different from those defined in the order.

If the motor is subcontracted from the customer, he must transmit related technical conformity documentation to doseuro[®]s.r.l. that declines any liability.

If the pump is supplied without the motor, doseuro[®]s.r.l. declines any liability resulting from an incorrect motor selection and installation, on the part of the customer.

Liability

Not following the instructions contained in this use and maintenance manual excuses the manufacturer from any liability.

For any information that is not included or cannot be inferred from the following pages, contacting doseuro[®]s.r.t. directly is recommended.



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Chapter 1 SIGNAGE USED

It is necessary to bring attention to the symbols used to highlight residual risks in this publication that are connected to intended pump use.

Here below we include pictograms whose shape and colour indicate the main warnings and the behaviour the operator must follow when the symbol indication is present, to carry out his functions in total safety.

	Safety signal characteristics							
Colour	Shape	meaning	Indications and clarifications					
Yellow, orange yellow	\land	Warning	Warns about being cautious, pay attention to mechanical risks or malfunction dangers of various nature present in work environments.					
Light blue		Limitation	Informs workers about personal protection equipment that one must use and particular behaviour that should be followed.					



Symbols

ATTENTION!

It means that not following the safety rules can cause slight injury to persons or damage to property.

DANGER!

It means that not following the safety rules can cause injury to persons or damage to property.

DANGER OF SERIOUS INJURY!

It means that not following the safety rules can cause serious injury to persons or great damage to property.

N.B. The following general instructions are only valid in combination with specific instructions for using motor dosing pumps and hydraulic accessories.





Before carrying out any type of intervention on the pump or the system, the operator must wear suitable protections according to current law regulation standards 81/08 and subsequent modifications for preventing contact with pumped liquid, such as:

Protective gloves, protection glasses, breathing masks, earmuffs or earplugs for the noise, protective suit, safety shoes.





Chapter 2 SAFETY STANDARDS DURING USE

The purpose of this section is to illustrate pump use with respect to essential safety standards. For dosing pump use, it is recommended for installer and operator to carefully read this section to be able to guarantee safety for operators and surrounding property.

DANGER OF SERIOUS INJURY!

The main risks connected with pump use are:

> MECHANICAL:

- Collision, compression of certain parts of the body, especially head and limbs.
- Falling objects.
- Dangerous vibrations, which may damage the operator, the machine and the environment it is installed in.
- Clothes accidentally being inserted into moving parts.
- Heat developed by pump operation or overheating.

> ELECTRICAL:

- Contact with power supply and distribution cables.
- Metal elements powered due to electrical malfunction.
- Static electricity.

Chapter 3 USE OF DOSING PUMPS

Intended use

Dosing pumps are used exclusively for dosing liquids, with the possibility of varying flow rate when needed.

	DANGER!
- · · ·	

Any other use outside of what is agreed upon with the sales office during the definition phase is not recognised by the manufacturer.

3.2

3.1

Pump description

The pump is made:

Movement:	Reduces the number of motor revolutions to the number that is necessary for dosing, transforming the rotary motion into alternate straight movement thanks to an eccentric shaft, with slide and return spring.
Movement transmission:	Aluminium flexible coupling.
Adjustment:	Piston stroke adjustment from "0%" to "100%" is obtained by rotating the handle on the screw that divides slide return, both with the pump stopped and while it is moving.
Hydraulic pump head:	It draws out liquid form the suction valve and pushes it through the discharge valve.
Electric motor:	Three-phase or single-phase CVE.
Manufactured shape:	V18 - class F insulation - protection IP 55 or greater.
Three-phase voltage:	220/240 V - 380/415 V - 50 Hz or 220/280 - 380/480V - 60 Hz.
Single-phase voltage:	230V - 50 Hz.
Body components:	Pressure die-cast aluminium.
Hydraulic parts:	Plastic or metal materials based on product compatibility.
External moving parts:	The slide is made using AISI 420 material, protection components and other accessories are in plastic material.



Identification plate

Each pump is identified by the serial number and the year of manufacture that can be detected from the specific plate applied to the pump.



3.3

The plate must be preserved so that all elements contained in it can be read. Use identification data included to request spare parts, technical information and assistance.

Considering its importance, the following warnings must be considered:

- ✓ Never remove the plate from the original position it was placed in.
- ✓ Do not modify or counterfeit technical data.
- ✓ Do not clean the plate using abrasive products in order to avoid ruining the data shown.



3.4

Usage conditions

The power of the motor installed on the pump is suitable for operation at less than 1000 above sea level and with room temperature between $+5^{\circ}$ C and $+40^{\circ}$ C.

If the pump is installed at an altitude of more than 1000 m A.S.L., motor power is inversely proportional to altitude, as shown in the diagram; during the purchasing phase it is necessary to consult our technical office.



3.5

Intended and unintended pump use

The range of applications the pump must be utilised for is that of dosing liquid substances that are compatible with design materials the pump is made of.

Before purchasing, the client must communicate in written form the liquid to be dosed and usage conditions

Example: Flow rate, room and liquid temperature, dosing pressure, liquid viscosity, if particles in suspension are present, and any material compatibility.

Based on this information, our sales office will establish the pump type and execute the pump head.



If the pump is to be used in other processed, different from those declared upon purchase, the customer must consult our technical office.

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3.5 Pump technical data

The tables containing technical data that is characteristic for each individual pump series are included here below, they must be respected by the user, in order to not damage the pump and especially create dangerous situations for maintenance personnel.



The pressures indicated in the tables must never be exceeded in order to avoid various kinds of problems, if it were to be necessary to work the pump at higher pressure levels, contact our technical office.

The actual flow rate value is based on viscosity, specific gravity of the liquid and related system load leaks, more obvious in the suction circuit.

The flow rate values are obtained at the pressure levels indicated in the tables, using water at 15÷20°C and the pump placed 30 cm above the free surface of the water.

FRE	QUENCY Hz	50	60	50	60	50	60	50	60	Мо	del B	D	iaphrag	m - Valv	'e
RED RAT	DUCTION TO	I (1	:40)	F (1	: 24)	C (1:	:14.5)	B (1	:12)	Max p bar (ressure Kg/cm²)	Ømm	AISI	PVC	Att. Ø
STR	OKES min/1'	35	42	58	70	96	116	116	1	AISI	PVC	Туре	Туре	Туре	G.m.
	B 125N - 8	/	/	1,5	1,8	2,4	3	3	/			50	AB 3	AC 3	1/2"
1	B 125N - 12	2,7	3,2	4,5	5,4	7,4	9	9	/	20		50	AB 3	AC 3	1/2"
ate	B 125N - 18	6,6	7,9	11	13	18	22	22	/	20	10		AB 5	AC 4	1/2"
N N	B 125N - 25	12	15	21	25	34	42	42	/			70	AB 5	AC 5	1/2"
0	B 125N - 30	18	22	30	36	49	60	60	/	14			AB 6	AC 8	1/2"
<u> </u>	B 125N - 40	33	39	54	65	89	108	108	/	8	8	90	AB 8	AC 8	1/2"

Characteristic data Model B 125N

Characteristic data Model B 175N

FR	EQUENCY Hz	50	60	50	60	50	60	Model B		Diaphragm - Valve				
RE RA	DUCTION TIO	UCTION O F (1:20) C (1:14.5) B (1:11) Max pressure bar (Kg/cm ²)		essure (g/cm²)	Ø mm	AISI	PVC	Att. Ø						
STROKES min/1'		70	84	96	116	120	1	AISI	PVC	Туре	Туре	Туре	G.m.	
	B 175N - 8	2,6	3,1	4,5	4,2	4,4	/			50	AB 3	AC 3	1/2"	
	B 175N - 12	7,6	9,1	10,4	12,4	13	/			50	AB 3	AC 3	1/2"	
٩	B 175N - 18	18	21,6	24	28,8	32	/	20	10		AB 5	AC 4	1/2"	
e	B 175N - 25	36	43,2	49	58,8	61	/		10	70	AB 6	AC 5	1/2"	
ца,	B 175N - 30	51	61,2	69	82,8	88	/				AB 6	AC 8	1/2"	
N No	B 175N - 40	92	111	126	151	158	/	12		90	AB 8	AC 8	1/2"	
Ē	B 175N - 50	144	173	197	236	247	/	7,5	7,5 6,3 4,5		AB 13	AC 13	3/4"	
	B 175N - 55	174	209	238	285	299	/	6,3		120	AB 13	AC 13	3/4"	
	B 175N - 65	243	291	333	399	418	/	4,5			AB 22	AC 22	1"	

Characteristic data Model B 250N

FR	EQUENCY Hz	50	60	50	60	50	60	Model B		Diaphragm - Valve			
REI RA	DUCTION TIO	F (1	:25)	C (1:	C (1:14.5) B (1:12.5) Max pressure bar (Kg/cm ²)		Ømm	AISI	PVC	Att. Ø			
STF	ROKES min/1'	56	67	96	116	112	/	AISI	PVC	Туре	Туре	Туре	G.m.
ſ	B 250N - 40	105	126	180	216	210	/	20			AB 11	AC 11	3/4"
1	B 250N - 50	165	198	282	338	330	/	15	10	120	AB 13	AC 13	3/4"
ate	B 250N - 55	200	240	342	410	400	/	12,5			AB 13	AC 13	3/4"
N N	B 250N - 65	278	333	476	571	556	/	9	9		AB 17	AC 17	1"
0	B 250N - 75	371	445	636	763	742	/	6,6	6,6	160	AB 22	AC 22	1"
	B 250N - 90	534	640	915	1098	1068	/	4,7	4,7		AB 22	AC 22	1"





Always keep the package vertical.

The pumps of this model are packages using an individual package, upon request; it is possible to create custom packaging.

As per standard, the customer chooses the carrier; the customer and the carrier will be responsible for transport.

4.1 Pump delivery

Verify package condition before opening it, because, if visibly damaged, the user must immediately contest the fact with the carrier **accepting the delivery with reservation**.

Subsequently, carefully verify its contents in order to locate and promptly communicate any damage resulting from transport or handling operations.

4.2 Lifting and handling

When lifting the package, the operator must evaluate container characteristics, the route to be taken or evaluate the need for other operators in order to better transport the load.



When lifting the package, even if the weights is light, it is best to use trolleys with minimum capacity that exceeds declared pump weight, including the packaging material. Personnel in charge of handling the load should wear protective gloves and safety shoes.

Material storing

If the pump were to remain out of service for long periods of time, especially before restarting, it is recommended to place the material safely inside its package and fill the gearbox with SAE 85W-140 oil in order to avoid oxidising of internal components.

It must be stored in a dry and aerated environment, far from heat sources and at a temperature between +5°C and +40°C.



4.3

INSTALLATION MANIPULATION

The manual contains all information necessary for installing the dosing pump, considering all aspects related to safety.





Before starting pump handling, it is necessary to verify:

- Efficiency of lifting equipment and their capacity.
- During pump lifting or movement operations, it is necessary to adopt all possible precautions in order to avoid dangerous movements that may cause accidents or damage to persons or property.





Chapter 6 PUMP INSTALLATION

The manual contains all information necessary for installing the dosing pump, considering all aspects related to safety.

Optimal operational conditions

- If the pump is installed in the open, an adequate protective roof is indispensable in order to avoid sunlight exposure or eventual infiltration by rain. Especially if it is equipped with a plastic pump head, servo controls or other delicate instrumentation.
- If the pump works in closed environments, an average lighting level is to be considered important for the safety of persons, work quality and the guarantee that symbols and markings are understood correctly.



6.1

Block removal

Before pump installation it is necessary to remove protective caps, located on the suction and discharge openings of the valves

If the pump remained out of service for a long period of time, before installation, it is recommended to verify that pump head screws have not loosened and that there are no oil leaks from the seal gaskets in the back portion of the piston, if necessary, proceed with replacement in order to avoid serious damage to property or injury to persons.



6.5 *Pump location*

Plan for sufficient space (minimum operational areas), to be able to easily inspect and calibrate the pump, or take apart the hydraulic part (valve and pump head).

- The pump must be set above a strong base (metal, cement, etc.) that is stable and properly levelled, avoiding tension on its axis.
- Avoid that piping along the path create bottlenecks and especially tension on the valve axis, caused by improper alignment.
- Remove any burrs from components and clean piping of any residues before assembly.
- It is best to position the pump under shot, with suction piping reduced to a minimum, adopting wide radius curves to favour entering on the part of the fluid to be pumped.

Chapter 7 CONNECTING THE PUMP TO SYSTEM PIPING

7.1

Connection to the suction pipe

Suggestions that the installer must follow for a correct installation are listed.



- Before connecting piping to pump connections, it is best to wash the piping to eliminate any extraneous object, weld drops, gasket shavings, etc.
- The length of suction piping must be reduced to a minimum and very linear, using wide radius curves.
- Avoid reverse slopes to help evacuate any air bubbles, make sure that there is a perfect seal in the piping, especially in suction, to avoid that the pump disengages.
- Suction piping and connections must be sized to the rated diameter immediately greater than that of the pump valve.





- Maximum fluid speed, in piping, **must not exceed 0.7 m/s** for fluids contained within a viscosity range up to 100 mPa (cPs).
- The piping must be properly supported so that the weight does not fall on the pump or create tension on the pump head.

Table for selecting internal piping diameter based on product viscosity and the number of pump strokes.

Liq	uids eq	uivalent to	Liquid with a v	viscosity equivalent to
Water +15°C			0 / 100 mPa (CP) - 20°E	100 / 300 mPa (CP) - 20 / 45°E
Strokes <i>min/</i> 1'		from 112 to 120	from 50 to 70	from 30 to 50
r	Ø 4	0 – 12	0-5	0-3
ete	Ø6	0 – 45	0 – 18	0-11
ľ h	Ø 8	0 - 96	0-40	0-23
dia e	Ø 10	0 – 220	0-90	0 – 53
pe rat	Ø 13	0 – 380	0 – 155	0 - 93
l pi	Ø 16	0 – 500	0-200	0 – 120
na Flc	Ø 20	0 – 700	0-280	0 – 170
Iter	Ø 25	0 – 1050	0 - 420	0 – 250
II	Ø 32	0 – 1200	0 - 480	0-290

EXAMPLES OF SUCTION PIPING CONNECTION

CORRECT APPLICATION

INCORRECT APPLICATION



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EXAMPLES OF SUCTION PIPING CONNECTION

CORRECT APPLICATION

INCORRECT APPLICATION



7.2 Discharge pipe connection

The correct completion of the path, and fastening the discharge pipe, is particularly important for good pump operation.

For this reason we will list some recommendations that the installer should comply with in order to achieve an efficient system.



- The path of the piping must be as linear as possible and supported independently, avoiding that any expansion caused by heat sources have an effect on the pump head.
- It is recommended to always plan for one or more "T fittings" in supply that can be used to install pressure gauges, safety relief valves and pulse dampeners.
- Always plan for a safety relief valve and a discharge circuit purge, in order to protect the system and make pump maintenance and start-up easier.

DISCHARGE PIPING CONNECTION EXAMPLE

CORRECT APPLICATION

INCORRECT APPLICATION



Chapter 8 INSTALLATION OF THE PULSATION DAMPENER DIAPHRAGM

Installation example

The use of the diaphragm installed on discharge right after the pump is recommended for each case.

The benefits that can be obtained are multiple: dosing rate with a more linear flow, elimination of vibrations along the entire line, protection from pressure spikes.

LEGEND

- 1) Pulsation dampener
- 2) Pressure gauge
- 3) Overflow or excess pressure valve
- 4) Sample removal or draining
- 5) 45° "Y" filter

8.1

- 6) Flow rate measurer
- 7) Counter-pressure valve

Chapter 9 LUBRICATION

ATTENTION!

Due to transport requirements, the pump is supplied without lubricant oil. Before starting, the operator must fill the oil, with the pump placed in its final position. Due to oil viscosity, it must be poured slowly so that it does not exceed the level indicated by the peep hole. The pump does not have any other points to be lubricated; therefore the oil quantity shown in the table is sufficient to guarantee proper lubrication.

Please handle the product carefully, using suitable protective clothing, especially when draining the oil contained in the body of the reducer.

The type of oil we recommend inserting in the reducer must have the following characteristics: high viscosity index and cold flowing defined with the abbreviation:

SAE 85 W-140 - viscosity cSt +40°C 328 - flash point +224°C Quantity of oil to be inserted in the pump body

Model	Q. of oil ml	1st oil change h	2nd oil change h
B 125N	150	500	3.000
B 175N	300	500	3.000
B 250N	650	500	3.000

A few brands and their abbreviations have been included as an example:

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





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Chapter 10 SOUND VIBRATION FROM THE PUMP

Results of sound level measurements carried out on standard pumps are included here below.

The resulting data is expressed in the tables, according to the general recommendation of European Directive 2006/42/CE the noise and vibration levels created by the various pump models have been verified

Verification methods are those contained in UNI EN ISO 3744:2009, Determination of sound power levels for noise sources by measuring acoustic pressure

Engineering method in a free reflecting field and in the ISO 2002/44/CE Directive on minimum safety and health limitation related to worker exposure to risks resulting from vibrations.

Table of the sound level pressure survey

Model B 125N							
	Pressured pump condition						
Maximum surface sound emission	Maximum surface sound emission Average level of pressure on the surface. Level of sound power						
dB(A) 71.7	dB(A) 67.9	dB(A) 71.4					

Model B 175N									
	Pressured pump condition								
Maximum surface sound emission	Maximum surface sound Average level of Level of emission pressure on the surface. sound power								
dB(A) 76.7	dB(A) 73.2	dB(A) 76.7							

Model B 250N						
Pressured pump condition						
Maximum surface sound emission	Average level of pressure on the surface.	Level of sound power				
dB(A) 79.3	dB(A) 75.6	dB(A) 79.1				

Chapter 11 ELECTRICAL CONNECTION

The installer must prepare a suitable differential circuit breaker disconnecting switch for the electrical line upstream from the pump and use cables with a suitable section for supporting maximum current absorbed by the motor.

11.1 Motor connection

Before connecting the motor, consult instructions contained on the terminal and verify that:

- Voltage and frequency of the power supply line correspond to those indicated on the motor plate.
- The earthing clamp is connected to the protective conductor.
- The motor rotation direction corresponds to the direction of the arrow placed on the fan cover.
- Being close to obstacles does not block correct motor ventilation and make maintenance and inspection operations difficult.



Specialised personnel must connect the power using extreme caution, with a network without power and according to safety requirements.

It is necessary to connect the pump to an efficient and controlled earthing line.



CONNECTION DIAGRAM OF MOTORS TO POWER SOURCES



Chapter 12 PUMP START-UP

12.1 Descript

Description of operations

The operations to be carried out to start-up the pump are the following:

- $\checkmark \qquad \text{Make sure that oil present in the pump is visible from the peep hole.}$
- Verify that the motor rotation direction is equivalent to the direction of the arrow placed on the fan cover.
- Check that the liquid being dosed has not solidified or frozen in the piping.
- Check that all interception valves along the piping are completely open, if the system was made using flexible piping, check if there are folds or bottlenecks.
- Initial start-up should be with minimum pressure and flow rate 0, (zero), increasing it gradually using the adjustment handle, until it reaches maximum pump flow rate, in order to favour air flow, quickly and safely.

Chapter 13 PUMP ADJUSTMENT

13.1 Stroke variation with manual system

The pump flow rate variation from 100% to 0% (zero) is obtained by rotating the adjustment knob clockwise, every rotation corresponds to 1/10 of piston stroke, and it can be verified on a vernier calliper.

There are 10 subdivisions on the handle, numbered 0 (zero) to 9 (nine), each one corresponds to 1/100 of the piston stroke.



Chapter 14 OPTIONAL EQUIPMENT

14.1

Stroke variation with servo control

□ Servo command

- If the pump is equipped with servo control, the above described adjustment procedure is no longer compatible.
- > It is therefore necessary to consult the manual supplied with the specific application.



14.2 Control with inductive proximity sensor

Inductive sensor

- The inductive proximity sensor is applied to the dosing pump to detect the number of pumps. For each pump, (equivalent to a rotation of the eccentric shaft) corresponds to an impulse issued by the inductive proximity sensor.
- The sensor is attached to the pump body using a bracket that, besides guaranteeing its seal, makes it possible to aim it in order to make connection to the equipment easier.
- It is therefore necessary to consult the manual supplied with the specific application.

Chapter 15 CALIBRATION OF ACCESSORY DEVICES

15.1 Overflow or excess pressure valve

The diagram represents the correct installation and then describes the sequence for calibrating your **overflow** or **excess pressure** valve.

- Loosen the calibration screw located on the top of the overflow or excess pressure valve (Pos. 1).
- Start the pump and allow all of the air to evacuate from the piping.
- Close the interception valve (Pos. 2).
- Slowly tighten the calibration screw of the overflow or excess pressure valve located on the top (Pos.1), until the pressure gauge (Pos.3) shows the pressure level the valve is to be calibrated at.
- Slowly open the interception valve (Pos. 2).
- In order to verify if calibration has been completed correctly, it is sufficient to close the interception valve once again (Pos. 2); pressure read on the gauge is the same as in the previous operation.



N.B. The valves are not calibrated, calibration percentages expressed are purely indicative, at the discretion of the installer in any case.

For operation with EXCESS PRESSURE or OVERFLOW - System pressure +15%.



The control and maintenance operation program is based on pump usage conditions. Proper maintenance makes it possible to obtain greater performance, greater life extension and constantly maintaining safety requirements.

16.1 Program maintenance interventions

In order to maintain the pump safe and with an output level over time, it must be subject to maintenance interventions that consist in visual verification operations.

• One must make sure that pump parts, external and internal, are not corroded or deteriorating (shrinkage, cracks, breakage). If these inconveniences are present, one must intervene by replacing worn parts.



• If the pump is used on particularly taxing applications, where the presence of aggressive or particularly abrasive liquids drastically reduces the life of gaskets or the valve unit, maintenance must be more frequent. In particular, if products with "**Crystallisation**" problems are present, once the pumping cycle is terminated, it is necessary to carry out continual washing in order to avoid that the product solidifies and damages the seal gaskets.

The table indicates parts that require routine maintenance intervention throughout the operational year.

Components to be verified						
Maintenance	Movement	Pump	head	Valve	e unit	Motor
period	Oil	Gaskets	Piston	Plastic	Metal	Absorption
Hours	500					
Every six months	Х	Х	X	Х	Х	Х
Yearly	Replacement					

16.2 Procedures for maintenance intervention

Before any intervention on the dosing pump or on piping, necessary precautions must be taken so that the pumped product, especially if toxic, does not create danger for surrounding personnel or elements.



BEFORE INTERVENTION, PERSONNEL MUST BE SURE THAT:

- > The pump is stopped and disconnected from the electrical supply mains.
- > The pump head and the system have been depressurised and emptied of any liquid.
- > The pump has reached a temperature level where it can be moved safely.

When taking apart heavy or large pieces, available lifting equipment must be suitable for the use.

Once it has been confirmed that such conditions are absent, accurately wash piping and pump components.

The "DRAWINGS AND PROSPECTUSES" manual includes the symbols identifying components that are most subject to wear and therefore require more frequent maintenance.

The replacement of interposed fluid must take place every time maintenance is carried out on the pump head.

16.3 Residual risks

• If it were to break, once the system has been emptied, one must depressurize the pump head, and carry out a capillary washing using suitable equipment (nozzle) and substances that are compatible with the product. Only after these steps it is possible to proceed taking apart the pump, without forgetting that the operator must wear all suitable protections (gloves, glasses, boots, suit, etc.).

Chapter 17 OPERATIONS TO BE CARRIED OUT ON THE PUMP HEAD

17.1 Periodical pump head checking

Due to negligence, it is possible that malfunctions or operational problems may occur that only require operational verification extraordinary maintenance.



When these anomalies are present, we recommend prompt intervention in order to avoid safety problems, flow rate and pump efficiency reduction.



The following type of verification is to be carried out:

- Periodic verification of the pump head must be completed in order to maintain pump safety and for a proper operation.
- Particular attention must be given if the installed pump head is plastic because it is more sensitive to temperature variations and assessment.
- ✓ Check that there are no oil leaks from the filling and drain plugs, from the diaphragm clamp or from the piston seal. A leak in any of these places may first cause a decrease in flow rate and then the diaphragm may break.
- Check that there are no leaks in the liquid dosed by the valves.



17.2 *Problems causes and solutions*

This chapter describes certain inconveniences that may occur during machine use. In the tables shown below, the user may find suggestions regarding the causes and solutions to be applied in order to resolve any inconveniences.



We suggest a few possible interventions: it is best to attempt resolving a problem starting from the easiest solutions. Never attempt a repair when unsure about what is being carried out: it may be possible to cause even more damage.

The authorised maintenance operations are those indicated in the "Program maintenance" chapter. Indications given in the item "SOLUTIONS" help with searching and locating the malfunction.

PROSPECTUS OF THE GREATEST OPERATIONAL PROBLEMS AND POSSIBLE SOLUTIONS					
PROBLEMS	CAUSES	SOLUTIONS			
Flow rate decrease and inability to reach pressure level	Oil leaking from the oil reservoir through the filling and drain plugs.	Loose plugs or damages gaskets, to be replaced.			
	Damaged piston seal gasket.	Replace seal gaskets.			
	Diaphragm clamp.	Tighten screws in the head pump			
	Impurities are trapped in the valve.	Remove the valves and clean impurities replace if needed.			
	Air intake in the oil reservoir through piston seals. Scratched piston	The suction piping is obstructed, the filte is clogged, have it cleaned.			
		Reconsider path and cross section of the piping.			
	The path of the piping is tortuous and there are bottlenecks, internal diameter of the pipe is smaller than the valve passage, insufficient pressure	Insufficient interposed fluid: bring the piston to the front 0% dead centre using the adjustment knob, remove the filling plug and top-up using interposed fluid, and reposition the plug.			
		Evaluate diaphragm condition and replace if needed.			
The fluid pumped has mixed with the oil in the oil reservoir	The diaphragm is broken	Evaluate the condition of components, if damaged. Replace: The diaphragm and any "OR", The oil reservoir, the piston, the seal gaskets. Carry out the loading procedure			
Air pockets forms in discharge piping, the pump disengages.	Along the suction line there are some air inputs. Excessive load losses in the suction piping, air leaking from the seal gaskets along the line.	Verify connections from the suction line. Verify diameter and route of piping.			

Chapter 18 REMOVAL OF PUMP HEAD AND DIAPHRAGM REPLACEMENT

In this series of pumps, the pump head is directly locked to the oil reservoir, therefore for any maintenance intervention to the various components the oil contained in the reservoir must be drained.

One must proceed as follows:

- Disconnect valve piping.
- Drain the oil reservoir by unscrewing the bottom plug; allow the product to drain into a container and dispose of the product according to regulations.
- Loosen the screws on the front of the pump head.
- Remove the pump head.
- Remove the diaphragm, if damaged, replace.

If the piston and the oil reservoir were to be damaged as a result of corrosion caused by the product being pumped, they should be replaced.

N.B.: Once maintenance operations have been completed, reassemble the components following the above mentioned operations in reverse order.





18.1 Removing and re-assembling the piston

The piston is blocked on the slide through two grub screws, one that is visible from the upper part, the other one hidden because in the lower part.

Proceed as follows to remove the piston:

After completing operations to remove the pump head and check the oil reservoir.

- Remove the guards.
- ✓ Loosen screws inside the lantern that block the oil reservoir.
- ✓ Remove the oil chamber.
- Remove the gasket holding ring from the piston, verify wear condition of the gasket and the piston, if necessary, and replace them.
- ✓ Unscrew the visible grub screw.
- ✓ Grab the piston, rotate it until the second grub screw is visible, and then unscrew it.

Once operations have been completed, re-assemble the components following the above mentioned operations in reverse order.



N.B.: the piston must be re-assembled paying careful attention to tightening both grub screws the same amount, so that piston is coaxial with the slide.



Chapter 19 LOADING THE OIL RESERVOIR

After completing maintenance operations and re-assembling pump head components, consult the table when filling the oil reservoir, in order to find the quantity of oil to be poured into it for correct operation; proceed as follow:

- Rotate the adjustment knob clockwise to bring the piston to the front dead centre (at 0% of the stroke). This operation can be made easier by supplying electrical power to the pump.
- Once the operation has been completed, if the pump was powered electrically, it must be shut off in order to operate safely.
- Fill the oil reservoir with oil until it reaches the surface where the cap rests, give slight taps with a rubber mallet to help evacuate any air bubbles that may have formed while filling, wait a few minutes and then top-up to the edge, tighten delicately the cap with the key.





QUANTITY OF OIL NECESSARY TO FILL THE OIL RESERVOIR IN cm ³				
Piston	SR Series			
Ømm	Mod. B 125N - B 175N	Mod. B 250N		
8	72	/		
12	72	/		
18	108	/		
25	101	/		
30	106	/		
40	190	405		
50	397	397		
55	390	390		
65	430	950		
75	/	918		
90	/	863		







Before starting the pump, the operator must verify that the system interception valves, previously closed to carry out maintenance, are opened.

Chapter 20 DECOMMISSIONING THE PUMP

If it were to be necessary to decommission the pump, it is important to follow a few fundamental rules for safeguarding the product and operating personnel.



Before dismissing, it is necessary to accurately wash using fluids that are compatible with the liquid pumped, because there may be residue of toxic, caustic, acid liquids or even sediments that may crystallise easily.

- Before removing the pump from the system, it is necessary to depressurise the system and allow liquid contained in the circuit to flow out, intercept the piping in proximity of the pump.
- Dispose of any residual substances or parts of the machine according to current regulation in force in order to guarantee operator safety and avoid negative effects on the environment.

Chapter 21 DISPOSING OF COMPONENTS AND TOXIC SUBSTANCES

It is recommended that the user separate materials and recycle according to National and Regional Laws regarding disposal, by entrusting the waste, after receiving an authorisation for temporary storage, to garbage disposal companies belonging to an authorised consortium.



In order to avoid that any residual risks related to environmental pollution remain, materials used for the production process, especially lubricant, must be collected and disposed of according to national laws.

Adequate recycling favours the re-use of materials which make up the equipment and helps to avoid possible negative effects on the environment.

It is best practice to wash components, as part of the reclamation process, before their disposal, in order to avoid contaminating the environment.



Chapter 22 REPAIR ACCOUNT MAINTENANCE

In most cases, replacing worn parts, does not constitute a great operational difficulty, before carrying out the intervention, the operator must consult drawings in the manual *(DESIGNS AND PROSPECTUSES)* manual and follow instructions contained in it.

If the malfunction were difficult to solve within an operational area, sending the pump to our workshop is recommended.

INVIOLABLE CONDITIONS FOR ACCEPTING ANYTHING UNDER A REPAIRS ACCOUNT IN OUR WORKSHOP ARE THE FOLLOWING.

22.1 Practical recommendations for pump reclamation.

- If waster is not recommended, use a liquid that is compatible with the product used.
- Remove both valve units from the pump head and wash them separately so that trapped residue does not remain. Place them in a bag.
- Position the pump in a pre-set position for collecting washing liquids, keeping at a proper distance, wash the pump using the reclamation fluid, passing it through the valve unit hole and allowing any deposits present to detach.
- Completely empty the oil contained in the body of the reducer.
- Stabilise the pump in suitable packaging material to avoid damage as a result transport by putting both valve units together.
- □ The customer must accompany the goods with a declaration that the material has been reclaimed to be handles safely.
- □ Before the shipment, the sender must contact our Sales Office (tel. 0227301324 fax 0226700883) that will send the specific module to be completed and sent with the pump, along with the sticker to be applied to the package.
- □ If we receive any material, were the above requirements were not followed, it will be returned and expenses will be charged.



Adopt suitable protection measures in order to guarantee operator safety and security and machine integrity, carefully choosing the most suitable reclamation fluid.

Chapter 23 USER INFORMATION

According to article 13 and Legislative Decree 25 July 2005, n. 151, Implementation of directives 2002/95/CE, 2002/96/CE, 2003/108/CE relative to the restriction of the use of certain hazardous substances in electrical equipment, as well as waste disposal.



The crossed out basket symbol on the apparatus indicates that at the end of functioning the product cannot be disposed of as if normal urban waste.

The user must send the equipment to the proper electronic waste separate collection centres.



Adequate recycling helps avoid possible negative effects on the environment and health, as well as favouring the re-use of materials which make up the apparatus.

Unlawful disposal of the product by the user will lead to the application of administrative sanctioning as stated in "article 255 of D.Lgs. n. 152/2006.





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