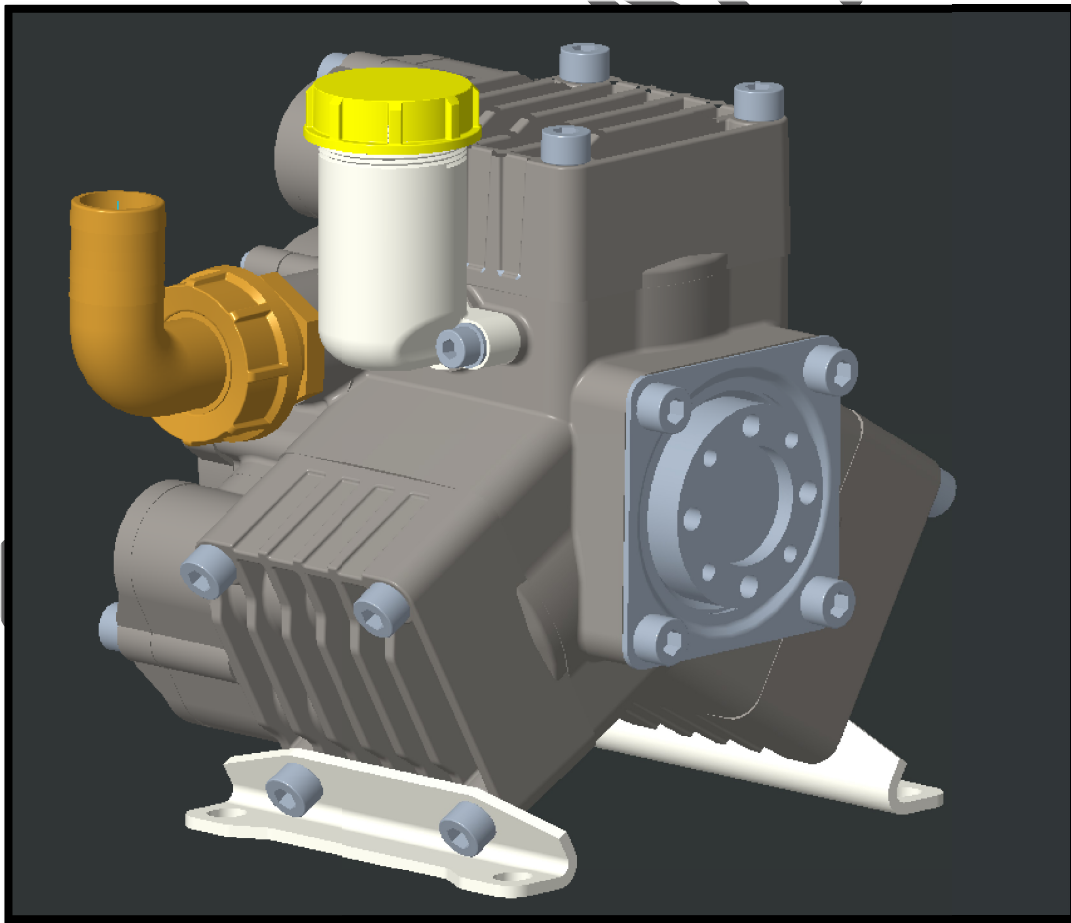




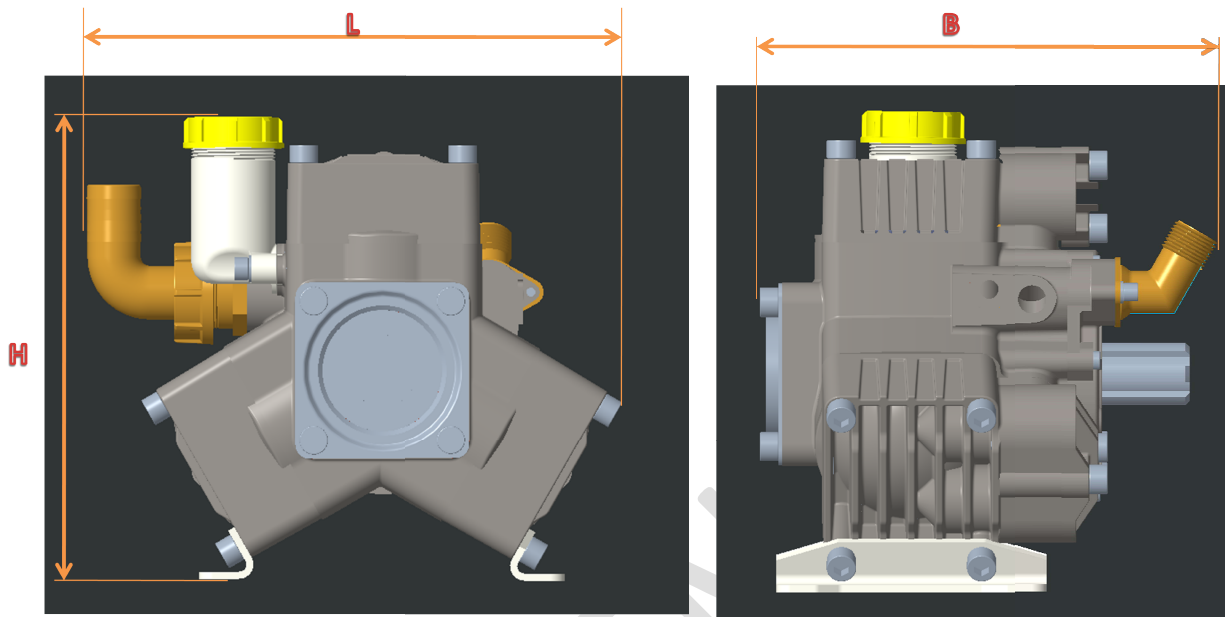
**CMD PUMP**  
Driven By Innovation

***OPERATING MANUAL OF PUMP***

**MODEL: PF-530**



## Dimensions



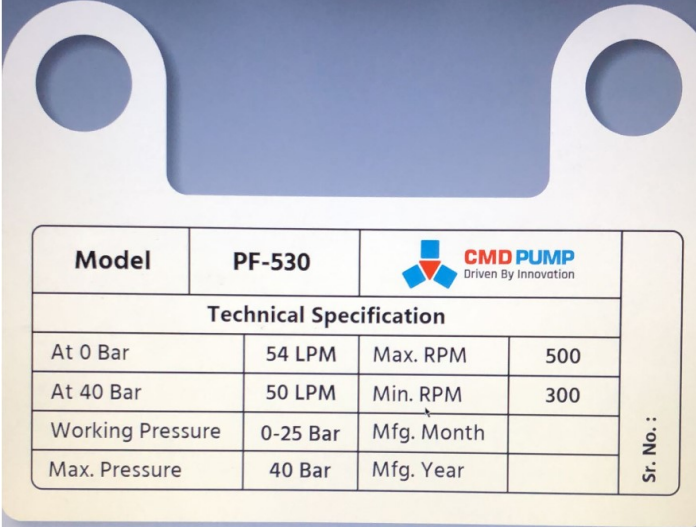
**L x W x H: 335 x 230 x 256 mm**


Specifications	PF 530
RPM	550 max.
Max. Power	4 kW
Weight	18.6 kg
Inlet	1-1/4"
Negative Pressure	Up to 3 meter
Max. Pressure	40 bar
Max. Temperature	60°
Oil Type	SAE 30
Oil capacity	0.7 L

### Performance chart:

RPM	400		450		500		550	
BAR	LPM	kW	LPM	kW	LPM	kW	LPM	kW
2	39.3	0.2	44.2	0.2	49.1	0.2	54	0.2
20	37.8	1.5	42.5	1.7	47.3	1.9	52	2
30	37.5	2.2	42.1	2.5	46.8	2.8	51.5	3
40	37.1	2.9	41.7	3.3	46.4	3.6	51	4

## NAME PLATE



<b>Model</b>	<b>PF-530</b>			<b>Sr. No. :</b>
<b>Technical Specification</b>				
At 0 Bar	54 LPM	Max. RPM	500	
At 40 Bar	50 LPM	Min. RPM	300	
Working Pressure	0-25 Bar	Mfg. Month		
Max. Pressure	40 Bar	Mfg. Year		

## **Table of Content:**

<b>Sr. No.</b>	<b>Content</b>	<b>Page no.</b>
1.1	SPECIAL SAFETY INSTRUCTIONS	5
1.2	Safety rules	5
1.3	Intended use	6
2.1	Installation instructions	6
2.2	Installation diagram	7
3.1	Use with agricultural machines	8
3.2	Suction and delivery circuits	9
3.3	Filter application	10
3.4	Suction head and negative inlet pressure	12
3.5	Tank filling devices	14
4.1	How to start the pump	15
4.2	How to stop the pump	16
4.3	Chemical attack and washing	16
4.4	Standstill periods	17
5	TROUBLES AND CURES	18
6.1	Routine maintenance	19
6.2	Extraordinary maintenance	19
6.3	How to replace the check valves	20
6.4	How to replace the diaphragms and change oil	21
6.5	Examples of diaphragms failures & causes	22
7	LIMITED WARRANTY	23

## 1.1 SPECIAL SAFETY INSTRUCTIONS



### WARNING!

- **Do not work** in the pump's range of action without wearing protective goggles and adequate safety clothing.
- **Make sure** that, besides the pressure regulator, the delivery circuit is fitted with a safety valve of an adequate capacity.
- **Make sure** that the pipes have been properly fixed before use. Check the connections.
- **Make sure** that all pipes are undamaged and free from dents.
- **Do not work** without disconnecting the power take off (stop the pump)..
- **Do not use** the pump for inflammable or explosive liquids like gasoline, kerosene, diesel oil, etc.
- **Do not use** the pump with liquids that are not compatible with the material the pump is made.
- **Do not use** the pump at pressures exceeding the allowed maximum values.
- **Do not operate** at a faster rotation speed than the one given on the pump label.
- **Install adequate protections** for all the moving parts, such as the shaft and pulleys.
- **Stop the pump**, relieve the pressure from the system and flush out the circuit with clean water before proceeding with any servicing work or inspections.
- **The pump must only be used** at temperatures between 7 and 60°C (45-140°F).
- **Do not use** liquids at temperatures exceeding 62°C or 145°F.
- **Do not disassemble** the pressure accumulator before having completely relieved the air in pressure through the relative valve.
- **Do not use** the pump for liquids intended for human or animal consumption.
- **Do not store** pumps that still contain dangerous liquid substances.

### 1.2 Safety rules:

The manufacturer should select the pump type according to the kind of liquid used and to the technical specifications (output, pressure) to fulfill.

The CMD pumps are designed with materials that are compatible with water and with the most of pesticides and herbicides currently on the market in the concentration recommended by the producers.

The pumps should be used only with liquids compatible with the pump component materials. Failure to follow this warning can result in injury and/or property damage.

The technical specifications of the pump (RPM, output, pressure) are shown on the label put on the pump. For more information refer to company directly.

The manufacturer should take care of the proper selection and correct size of the operation system to prevent possibly bodily injury.

Make certain that the electric, gasoline/diesel motors, or driven systems conform to the recommended performance, to prevent personal injury and environment damage.

The manufacturer should take a special care of the design and construction of the equipment, to prevent bodily injury, coming not from the pump, but from the design, construction or wrong use of the equipment.

### 1.3 Intended use:

The pump is exclusively designed for:

- Use with clean water at temperatures between +7°C and +60°C for non-food purposes.
- Use with chemical products such as fertilizers, weed killers, fungicides, etc., in a watery solution and always compatible with the materials the pump is made. (Remember that the diaphragms are normally made of BUNA – N and, on request, in DESMOPAN, VITON or HPS®, while the O-Rings are normally in NBR).

The pump cannot be used with:

- Watery solutions whose viscosity and density exceed those of water.
- Chemical solutions for which compatibility with the materials the pump is made is not known.
- Sea water or water with a high concentration of salt
- Fuels and lubricants of all kinds and types
- Inflammable liquids or liquefied gases
- Food-grade liquids
- Solvents and diluents of all kinds and types
- Paints of all kinds and types
- Liquids at temperatures lower than 7°C or higher than 60°C
- Liquids containing granules or solids in suspension

The pump must not be used for washing: persons, animals, electrical equipment, delicate objects, the pump itself or the system in which it is installed.

The pump must not be used in places where there are particular conditions, such as corrosive or explosive atmospheres, for example.

**All other use is considered improper.**

**CMD shall not be liable for any damage deriving from improper or incorrect use.**

### 2.1 Installation instructions.



#### WARNING!

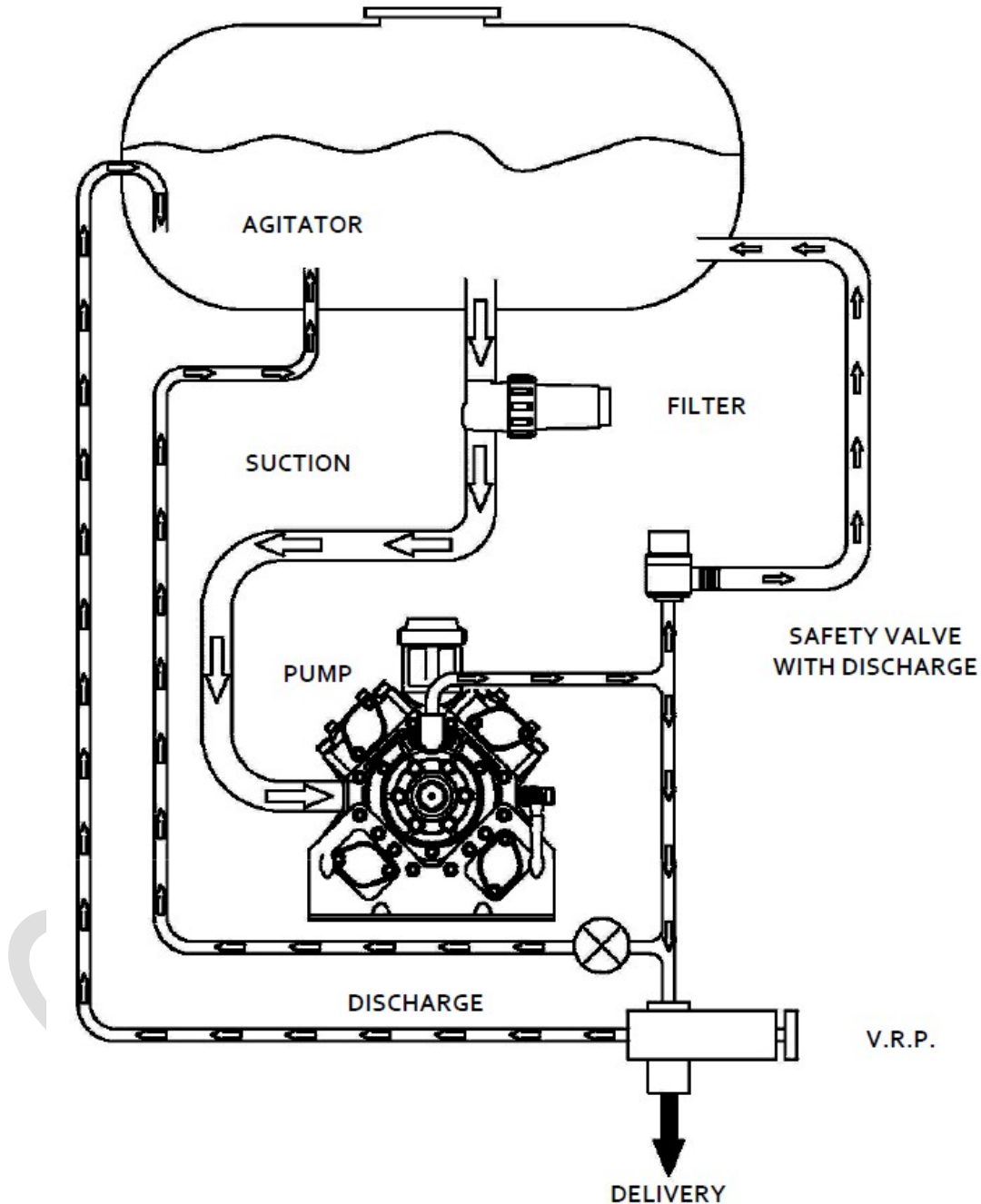
- Do not use the pump if it has been subjected to strong impact.
- Do not use the pump if there are evident oil leaks.
- Take great care when using the pump in places where there are moving vehicles that could crush or damage the delivery hose and spray gun.
- Pump should be installed perfectly lined up with the driven gears (pulleys, gearboxes, over gears etc.).
- Be sure that pump is attached to a strong base plate and anchor it with bolts sufficiently strong to hold it in place.
- Use suction, discharge and by-pass hoses of proper diameter, at least the same diameter as the pump hose barb or greater. Use spiral steel wire braid reinforced suction hose to prevent collapse. Use good quality hose clamps and tighten securely. **Use only components (hose, fittings, clamps etc.) Rated for max. Pressure rating of the pump.**
- Always remember to fit the safety cone on the transmission shaft so as to prevent persons from being injured.
- Since the pump is the displacement type, it must always be equipped with a pressure regulating valve.

Failure to follow the above information can result in malfunctions of the pump and will void the product warranty.

## 2.2 Installation diagram.

The diagram gives a simplified illustration of a typical diaphragm pump installation with a safety valve and pressure relief valve (VRP).

Note the correct route the water must take and the different sections of the connection pipes (see chapter entitled SUCTION AND DELIVERY CIRCUITS).



### 3.1 Use with agricultural machines

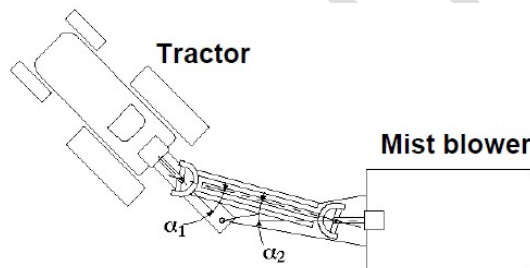


**WARNING!**

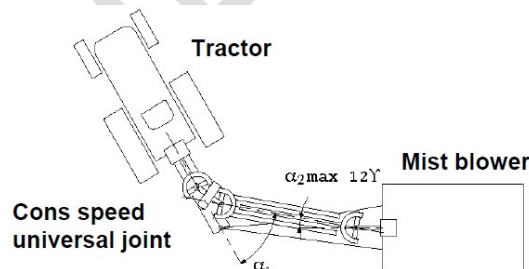
**All rotating parts must be protected. The tractor and pump guards form an integrated system with the cardan shaft guard. Carefully read the manual supplied with the cardan shaft.**

There are two possibilities of choosing the right type of cardan shaft and the way in which it is used:

1. If the cardan shaft is merely used to operate the pump, greater differences between the two joint angles ( $\alpha_1$  and  $\alpha_2$ ) can be accepted, thus a somewhat irregular motion, as illustrated in the specialized catalogues.
2. If the pump transmits the motion received from the cardan shaft to other devices (e.g. a fan driven by an overdrive) by means of a through shaft, the inertial masses involved in the motion can be considerable. In this case, the transmission only accepts very small speed oscillations so as to prevent parts from breaking. The following rules must be strictly respected in this sort of situation:
  - A shaft with two single joints can only be used when the difference between angles  $\alpha_1$  and  $\alpha_2$  is no more than  $12^\circ$ .



- If the difference between the two angles  $\alpha_1$  e  $\alpha_2$  is  $>12^\circ$ , use a cardan shaft with a constant speed universal joint and a single joint.



In this sort of situation, it is necessary to remember that the difference between angles  $\alpha_1$  e  $\alpha_2$  of the single joint must never exceed  $12^\circ$ . If this occurs, another constant speed universal joint must be added.

During the curve in operating conditions, cardan shafts lead to the creation of axial thrusts on the shafts to which they are connected. These forces may actually break parts of the pump. To keep them within acceptable limits, the entire cardan shaft, i.e. both the joints and the telescopic shafts, must be kept constantly lubricated, as described by the manufacturer.

In the maximum curve condition, also make sure that the cardan shaft never becomes completely closed, since this would certainly break parts of the mechanism.



### **3.2 Suction and delivery circuits**

The suction hose must be installed in such a way as to prevent air pockets from forming. Make sure that the hose is routed over the shortest possible distance. The diameter of the hose must be the same as that of the pipe fitting, hose must be fitted on down to the elbow and fastened with good quality clamps.

Always allow for a safety margin in relation to the hose length, so as to prevent the clamps from slipping off or loosening owing to vibrations from the system. **It is advisable to periodically check these connections, which could allow air to enter.** Air drawn in by the pump could cause faults and early failures of the diaphragms.

The hose must be able to bend without throttling the circuit. The ideal hose is the type with a steel coil, which is flexible while being light and able to maintain its shape.

All the threaded connections must be assembled with PTFE, specific adhesive or equivalent, so as to ensure a perfect seal.

If the route is direct, the dimensions of the pipes and pipe fittings must not be less than the diameter of the pipe fittings supplied with the pump. If elbows and/or three-way valves or similar must be installed, the circuit size must be increased in relation to their number.

**The clear passage (meaning the minimum diameter of the ball hole and not of the thread) of any three-way valves or equivalent, must not be less than the internal diameter of the pump suction pipe fitting.**

The manufacturer must take particular care when designing the delivery system so as to avoid danger hazards to persons caused, not by the pump, but by the way the system in which the pump is installed has been designed, constructed or improperly used.

To avoid excessive pressure in the manifold, make sure that the delivery hoses are adequately sized. In any case, they must be no smaller than the diameter of the pipe fitting supplied with the pump.

Only use components (hoses, pipe fittings, clamps, etc.) whose minimum characteristics are equal to the maximum pressure of the pump.

### 3.3 Filter application



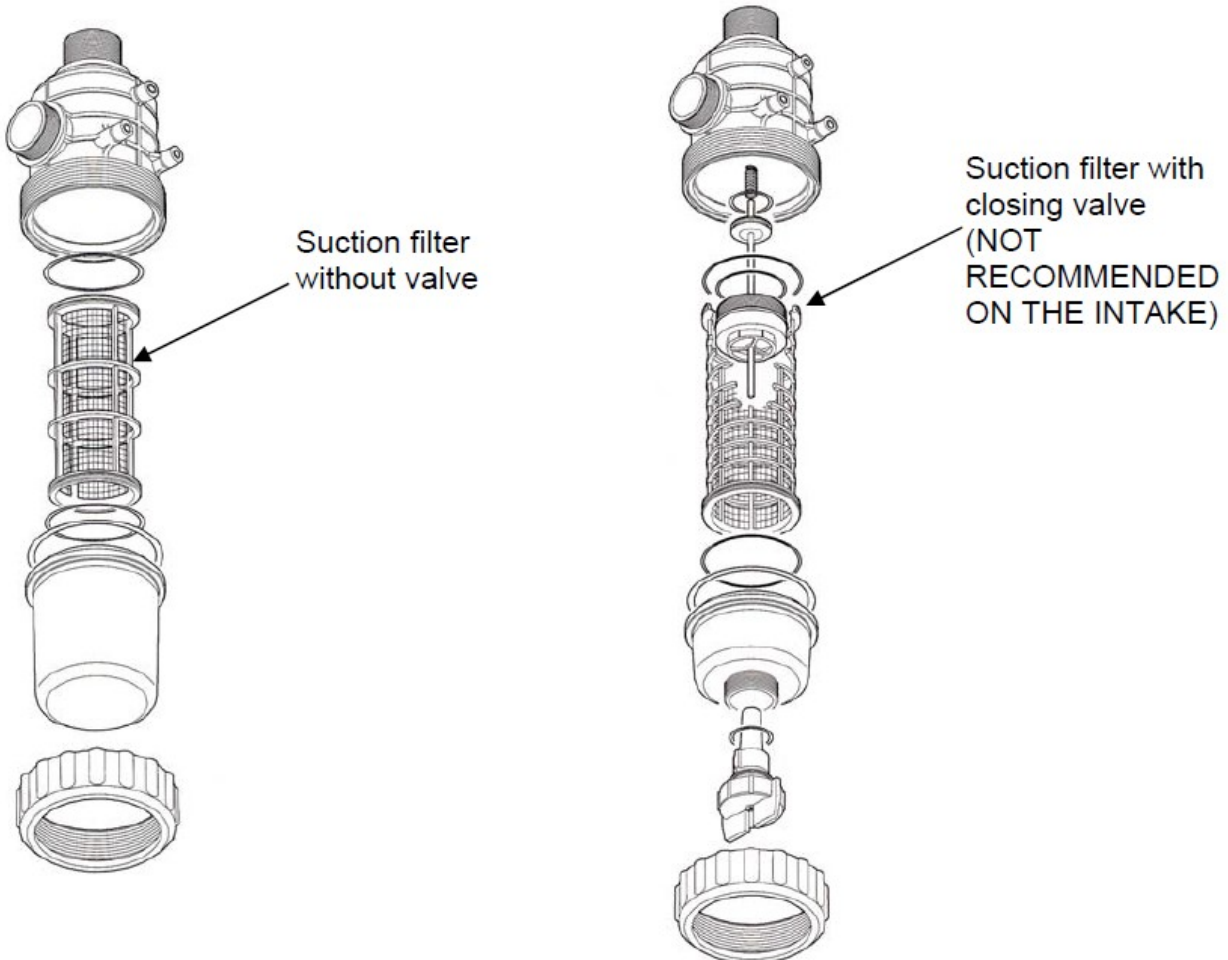
**Use of suction filters with closing valves of an inadequate capacity will immediately void the warranty.**

Never use on line filters (between the pump and the regulating valve) instead of suction filters (prior to the pump).

The on line filters must only be installed after the regulating valve, on the delivery line before the nozzles. Suction filters with automatic closing valve must be sized with an adequate capacity after inspection of the clear passage area, which must not be less than that of the pipe fitting supplied with the pump.

The filtering capacity of the suction filter must be at least two and a half times the pump flow rate, and the recommended diameter of the holes must be:

- 32 mesh for charging cartridge from the pump suction



The term MESH means the number of openings per linear inch of wire gauze. For example, a 32 MESH filter will have 32 holes per linear inch of the filter gauze.

If the MESH value is squared (e.g.  $32^2 = 1024$ ), the result is the number of holes per square inch. Thus, the greater the mesh value is, the greater the filtering capacity of the filter will be.

Always install 32 mesh cartridges and oversized filters if **chemicals in powder form or very thick fluids are used**, so as to allow for a greater safety margin against clogging during the treatments.

Remember that the best results are not always achieved by using a filter with a high MESH value.

For example, if water is drawn from a ditch with 80 MESH filter, the pump suction side could become very quickly clogged and throttled, thus preventing it from functioning correctly.

It is therefore advisable to use pump suction filters with a filtering capacity that is not particularly high, but correctly proportioned to the pumped fluid.

If a duct that completely empties the tank is used, make sure that the filter is serviced frequently, since the impurities that settle on the bottom could lead to clogging.

It is also advisable to affix stickers and notices in clearly visible places, so as to warn the user that the filter must be frequently serviced.

The filter cartridge must be cleaned whenever the tank is refilled. This ensures that the filtering surface is always in the best condition. Scaling or particularly thick products could settle and reduce the area where the liquid is able to flow through, thus throttling the passage.

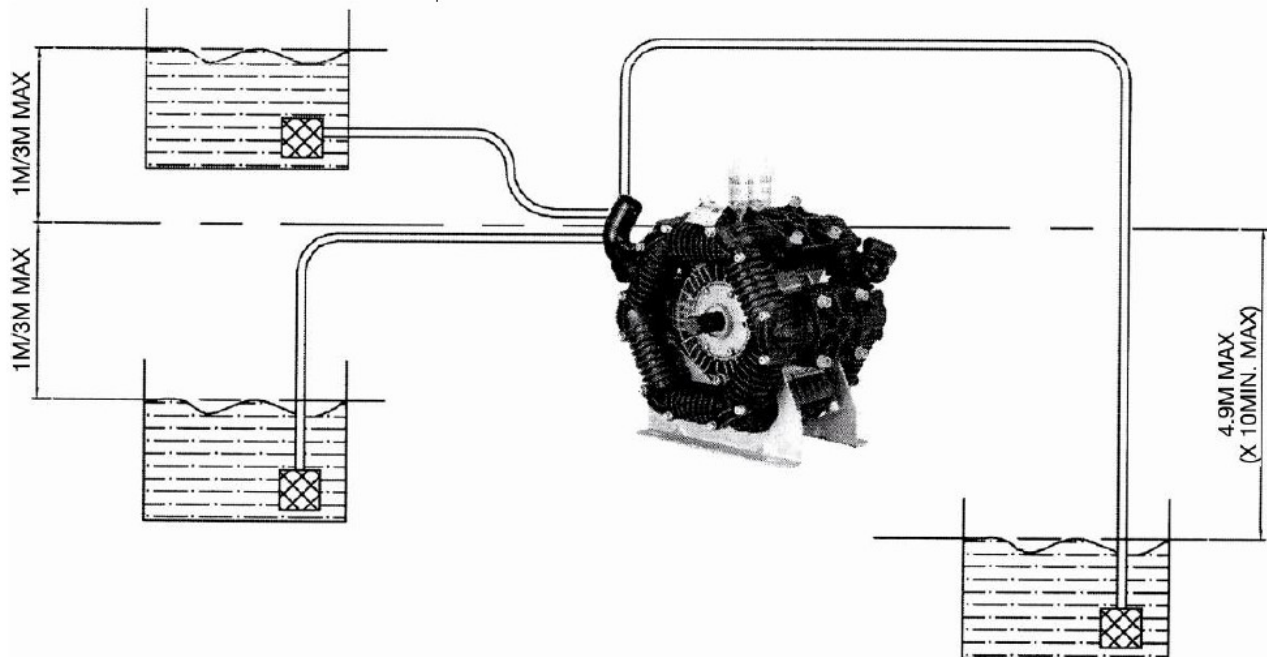
### 3.4 Suction head and negative inlet pressure



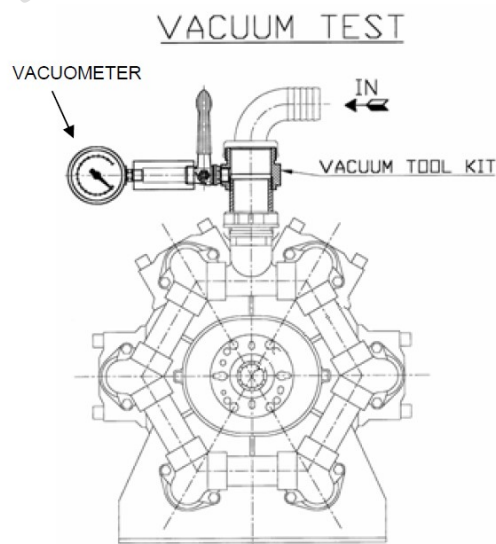
**WARNING!**

Use of the pump for filling the tank by sucking directly from considerable depths is strongly not recommended, because it prevents the pump from functioning correctly and shortens the life of the internal components.

If it is absolutely necessary to suck liquid from depth, don't exceed 3 meters, as indicated in the figure. In these conditions, use hoses of an adequate length with no elbows, better if already preloaded. However, it is worthwhile remembering that the pumping components could operate in a faulty way.



The negative inlet pressure in the pump represents the load losses in the suction circuit. In other words, the effort effectively accomplished by the pump in order to suck the liquid. The negative pressure can be measured with a special instrument, which can be supplied on request: VACUOMETER.



As shown in the figure, the Vacuum test kit consists of a pipe fitting, a tap and a vacuumeter assembled in series on the pump suction side.

Once the kit has been installed, and when the pump is operating correctly at the full rate allowed for the model in question, the vacuumeter will indicate the negative pressure (vacuum) to which the pump is subjected.

The maximum allowed negative inlet pressure is normally -0.25 bar (-187 mm/hg, -3.6 PSI), which increases by a maximum 10% when the maximum operating pressure of the pump is reached.

This value is the sum of the different factors in the suction circuit, which can be:

- Presence of narrow bends,
- Presence of accessories, like filters, three-way valves, etc.,
- Excessive difference in level (negatively) between the pump and the tank whence the liquid is sucked,
- Excessively long pipes,
- Clogged suction hoses.

If the negative pressure exceeds the values given above, the pump diaphragms will no longer be subjected to a standard distortion as in fig. 1, but to an abnormal distortion as shown in fig. 2, thus compromising the operation and, consequently, the life of the pump.

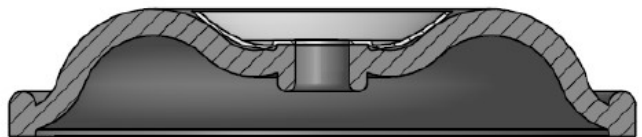
#### **CORRECT DISTORTION**

(fig.1)



#### **INCORRECT DISTORTION**

(fig.2)



A pad of oil normally forms between the piston and diaphragm, and supports the overlying pressure. This means that the diaphragm will never touch the piston, but will be protected and lubricated.

Excessive vacuum tends to increase this pad of oil, causing the diaphragm to stretch. It can even be pushed to touch the locking plate in an abnormal way, or even the head.

In this case, the oil in the tank may decrease and even disappear, without any sign of leak.

CMD declines all liability for improper use of the pump. Moreover, such action voids the warranty.

### 3.5 Tank filling devices



**WARNING!**

**It is not recommended to use the pump for filling the tank in negative pressure. Strictly comply with the rules listed below if such action is absolutely necessary.**

Remember to affix stickers and notices in clearly visible places in order to warn the user if use of a tank filling system is not envisaged.

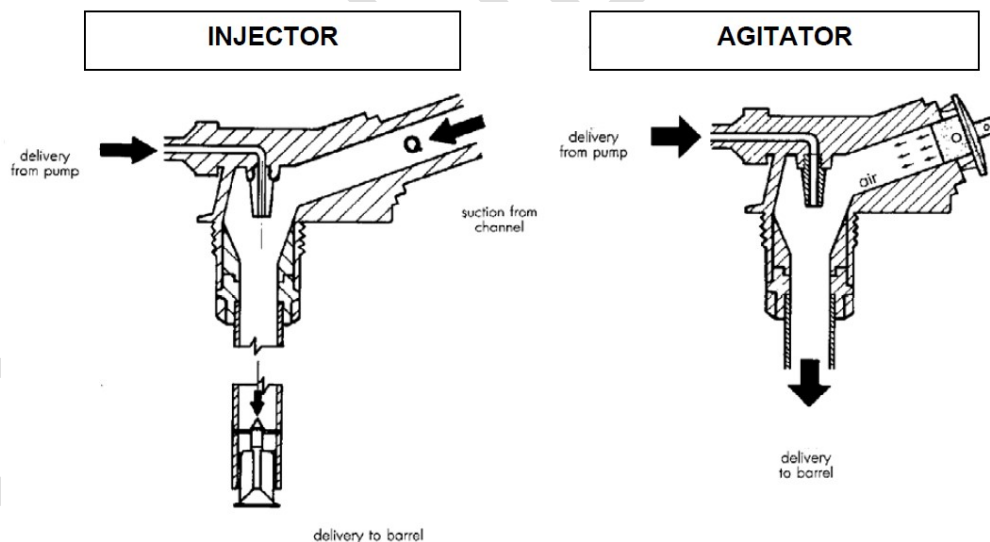
It is advisable to always use the hydro ejector with an adequately sized nozzle to fill the tank. This method will not compromise the operation of the pump over time.

The hydro ejector is an accessory that functions by bringing the pump to its maximum operating pressure so as to obtain the highest efficiency. It uses the Ventury principle to suck water for filling the tank.

It is always advisable to check and regulate the real operating pressure of the pump during the filling phase, so as to prevent the maximum allowed pressure value (shown on the pump label) from being exceeded.

Remember to affix stickers and notices in clearly visible places in order to warn the user if use of a tank filling system is not envisaged.

The hydro ejector, once it has finished filling the tank, can also be used for agitation of the chemical product in the tank of its machine.



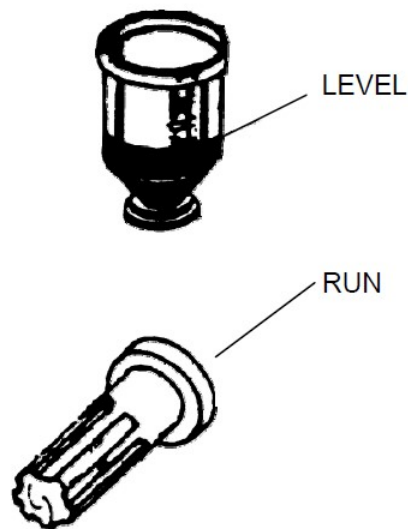
## 4. USE OF THE PUMP

### 4.1 How to start the pump

Refer to the documentation supplied with the control unit when carrying out the following operations.

Start the pump in compliance with the following instructions:

1. Reset the delivery pressure by means of the control unit, so as to bring it to the bypass position.
2. Allow the pump to run for a few minutes at low speed so that the pressure does not exceed  $\frac{3}{4}$  of its maximum value. This is very important, as it allows all the components in the pump to be correctly lubricated.
3. Increase the speed of the pump so that it is able to prime. Rotation speeds that exceed the maximum limit shown on the label will not improve the characteristics of the pump, but will cause unnecessary damage. Do not drop below the minimum revolution speed indicated on the label. **The manufacturer shall not be liable for damage caused by rotation speeds exceeding those indicated on the label.**
4. Set the control unit to the "Press" position.
5. Turn the knob of the control unit until the required pressure value has been reached.
6. During use, make sure that the oil level does not exceed the value indicated on the filler (Max level) or halfway up the filler itself when the pump is on pressure. Frequently check the color of the oil, which must not change from its initial condition. If this happens, stop the pump and contact a skilled Technician.



7. Check the pump pulsations and change the pressure of the accumulator if necessary, as described in the "PRELIMINARY OPERATIONS" section.

## 4.2 How to stop the pump

1. Reset the delivery pressure as described in point 1 of the paragraph "HOW TO START THE PUMP"
2. Stop the pump by reducing the revolutions to zero.

To prevent the pump from being damaged, it is essential to flush it out after use, by allowing it to operate with clean water for a few minutes and then to empty it.



**When you stop the pump, make sure that no pipe contains liquid under pressure.**

## 4.3 Chemical attack and washing

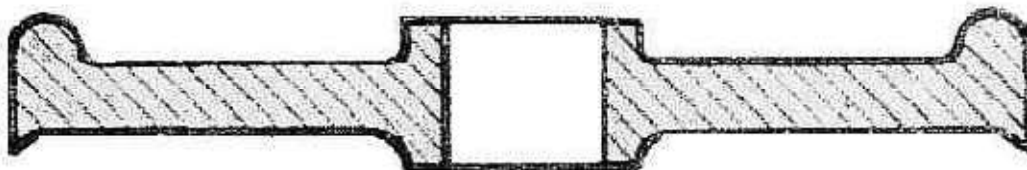
After the treatment, the system and the pump must be washed so as to ensure long life and efficiency. The tank must be emptied and the product placed in an appropriate container, then filled to a third with clean water, which must be allowed to circulate through the pump, at zero pressure.

However, there are systems which have a dedicated circuit for this service and for storing the clean water. In view of the aggressive nature of all the chemical products available on the market, negligent cleaning tends to deteriorate all the rubber and aluminum parts of the pump, regulator, hoses, etc., within a very short time. It also causes the valves to jam and clogs the nozzles.

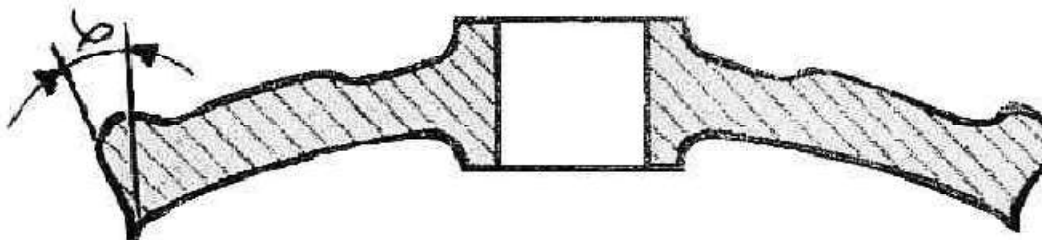
Various different types of diaphragm (Buna, Viton, Desmopan and HPS®) are available, and offer certain safeguards concerning the aggressive nature of the chemical products. Please contact our technical service for advice about how to choose the most suitable type in relation to the product used and/or if there are problems.

To prevent the diaphragms from rupturing, ask our technical service beforehand for information as to which type is the most compatible with the product to be used by the pump.

Shape of the standard diaphragm



Shape of the diaphragm after chemical attack





#### 4.4 Standstill periods



##### **WARNING!**

**Protect the pump from frost.**

If the pump is to remain idle for a long period of time, it must be completely emptied as described below:

1. Set the regulating valve in the by-pass position.
  2. Allow clean water to circulate around the pump for a few minutes. Mix an antifreeze liquid with the clean water if there is a risk of freezing.
  3. Allow the pump to suck up air until all the liquid it contains has been emptied out.
- Periodically (at the end of each operating season) inspect the pump and the components of the system (hoses, pipe fittings, connections, etc.). Replace all components that show signs of wear.

CONFIDENTIAL

## 5. TROUBLES AND CURES



**CAUTION!** Only skilled technicians are authorized to carry out special maintenance.

Troubles	Probable Cause	Cures
The pump fails to prime	<ul style="list-style-type: none"> <li>• Air sucked</li> <li>• Pressure adjusting valve in the "Press" position</li> </ul>	<ul style="list-style-type: none"> <li>• Check the suction circuit</li> <li>• Set the regulating valve in the "bypass" position.</li> </ul>
The pump doesn't reach the required pressure	<ul style="list-style-type: none"> <li>• Valves have worn seats</li> <li>• Suction hose with air pockets or irregular elbows</li> <li>• Worn nozzles or with wrong diameter</li> <li>• Clogged strainer</li> <li>• R.P.M. too slow</li> </ul>	<ul style="list-style-type: none"> <li>• Check valves</li> <li>• Check hose</li> <li>• check nozzle (see "PUMP SELECTION" section)</li> <li>• Clean strainer</li> <li>• Make sure that the pump RPM correspond to the value indicated on the label</li> </ul>
The pressure gauge Fluctuates The liquid flow is Irregular The pump is noisy	<ul style="list-style-type: none"> <li>• Pump is sucking air, or air hasn't been evacuated Completely</li> <li>• The pulsation dampener is flat.</li> <li>• One or more valves blocked</li> </ul>	<ul style="list-style-type: none"> <li>• Start the pump with the gun open to evacuate the air</li> <li>• Inflate the pulsation dampener</li> <li>• Clean or change valves</li> </ul>
Output drops and the pump is noisy	<ul style="list-style-type: none"> <li>• Oil level is too low</li> </ul>	<ul style="list-style-type: none"> <li>• Top up with oil to correct level (halfway of the sump),when pumps is operating.</li> </ul>
Oil comes out of the delivery side	<ul style="list-style-type: none"> <li>• One or more diaphragms are broken</li> </ul>	<ul style="list-style-type: none"> <li>• Replace the diaphragms as indicated in the section "HOW TO REPLACE THE DIAPHRAGMS AND PUMP OIL"</li> </ul>
Oil is changing its color into white	<ul style="list-style-type: none"> <li>• Diaphragms failures</li> </ul>	<ul style="list-style-type: none"> <li>• Replace the diaphragms as indicated in the section "HOW TO REPLACE THE DIAPHRAGMS AND PUMP OIL"</li> </ul>
Oil comes out from the oil seal of the shaft	<ul style="list-style-type: none"> <li>• Damaged or worn oil seal</li> <li>• Too much oil into the crankcase</li> </ul>	<ul style="list-style-type: none"> <li>• Replace the oil seal</li> <li>• Check the oil level and reset the correct one</li> </ul>

## 6. PUMP MAINTENANCE



### WARNING!

Cleaning and servicing work must only be carried out after the operations described in the chapter “HOW TO STOP THE PUMP” have terminated, i.e. none of the pipes must be full of liquid on pressure.

### 6.1 Routine maintenance

Carry out the Operations described in the section “HOW TO STOP THE PUMP” and comply with the instructions in the chart below.

SERVICING FREQUENCY	OPERATION
Whenever the pump is used	<ul style="list-style-type: none"><li>• Check the condition and level of the oil</li><li>• Check the suction filter and clean it if necessary</li></ul>
After every 50 hours service	<ul style="list-style-type: none"><li>• Check the inflation pressure of the accumulator</li><li>• Make sure that the suction circuit is in a perfect condition</li></ul>

### 6.2 Extraordinary maintenance

**Used oil must be disposed of in an adequate way and not discarded in the environment.**

Comply with the extraordinary maintenance operations described in the chart below.

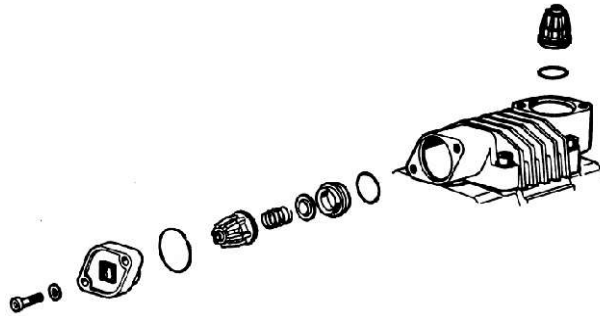
SERVICING FREQUENCY	OPERATION
After every 500 hours service or at the end of each season	<ul style="list-style-type: none"><li>• Replace the check valves</li><li>• Replace the diaphragms</li><li>• Change the oil</li></ul>

### 6.3 How to replace the check valves

All the nuts and bolts unscrewed in order to service the pump must be retightened to the required torque value with the proper torque wrench. Consult the charts in the spare parts catalogue for the required driving torque values.

Replace the check valves and relative O-rings as described below:

1. Remove the valve cover (or the manifold that closes the valves).
2. Remove the valves and check them for wear. Remove and check the O-rings as well.
3. Replace all parts as necessary.
4. Reassemble.
5. Repeat these operations for all the valves.



## 6.4 How to replace the diaphragms and change oil

The pumped liquid could damage the mechanical components if one or more of the diaphragms failed. The diaphragm failure is denoted by:

- The whitish color of the oil (water in the oil)
- Excessive oil consumption
- Sudden disappearance of the oil from the filler, thus from inside the pump.

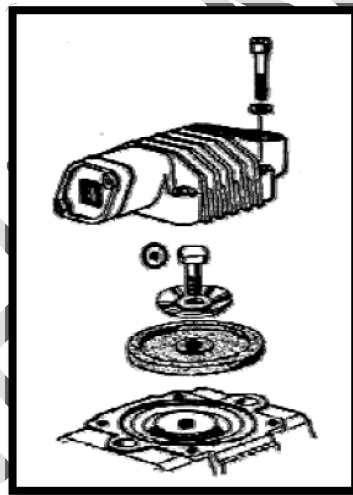
The diaphragm failure is frequently caused by:

- Throttling in the suction circuit (see paragraph “SUCTION HEAD AND NEGATIVE INLET PRESSURE”)
- Use of extremely aggressive chemicals.



### WARNING!

**All the nuts and bolts unscrewed in order to service the pump must be retightened to the required torque value with the proper torque wrench. Consult the charts in the spare parts catalogue for the required driving torque values.**



Replace the diaphragms and the oil as described below:

1. Disassemble the pump heads one by one.
2. Use a setscrew wrench to remove the diaphragm bolt and plate.
3. Remove the diaphragm.
4. Remove the piston sleeves, if necessary.
5. Allow all the oil in the pump to drain out.
6. Flush out the inside with diesel oil, depending on the state of wear
7. Fit the new diaphragms on the piston at half of its stroke. Insert the diaphragm edges into the groove along the circumference around the piston sleeves.
8. Use the proper wrench to tighten the bolt to the following torque values: M6x1 = 5N/m M8x1.25 = 12 N/m M10x1.25 = 25N/m
9. Fit the heads back in place and tighten the corresponding bolts.
10. Fill the pump with oil and, at the same time, turn the shaft manually.

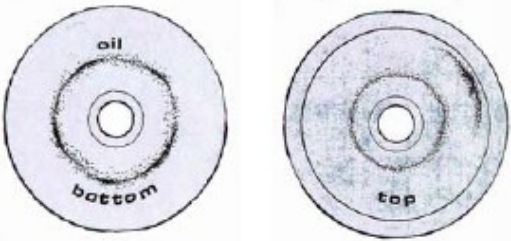



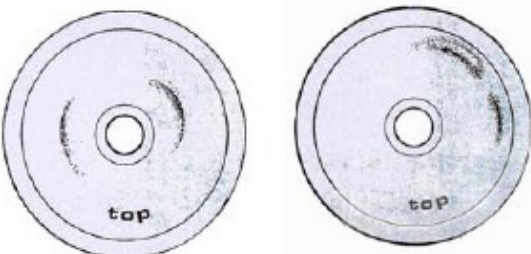


**WARNING!**

Too much oil creates pressure inside the crankcase, giving rise to possible leaks or rupturing the diaphragms owing to overpressure.

For pump models without the oil drain plug, periodic oil changing must be carried out when the pump components are checked for wear, we recommend at the end of each season or after every 500 hours service. The oil is drained out by disassembling a head and relative piston sleeve.

**6.5 Examples of diaphragms failures & causes**

	<p><b>CIRCULAR FRACTURE ON PISTON SIDE OF DIAPHRAGM WHICH IS SAME DIAMETER AS PISTON</b>  <b>POSSIBLE CAUSES:</b></p> <ol style="list-style-type: none"> <li>1. BLOW-BY BETWEEN PISTON AND SLEEVE</li> <li>2. SUCTION HAS TOO MUCH PRESSURE (EXCESSIVE HEAD)</li> <li>3. LOW PUMP RPM</li> <li>4. DELIVERY VALVE NOT SEALING</li> <li>5. LOW OIL LEVEL IN PUMP</li> </ol>
	<p><b>CHEMICAL INCOMPATIBLE WITH DIAPHRAGM MATERIAL</b>  <b>POSSIBLE CAUSES:</b></p> <ol style="list-style-type: none"> <li>1. FATIGUED AND WORN UNDERNEATH PISTON RETAINING DISC</li> <li>2. DIAPHRAGM SWOLLEN AND SOFT</li> <li>3. DIAPHRAGM SOFT AND SPONGY</li> <li>4. INCREASE IN EXTERNAL DIAMETER</li> </ol>
	<p><b>FRACTURE ON EXTERNAL DIAMETER, AND FATIGUE AND WORN UNDERNEATH PISTON RETAINING DISC</b>  <b>POSSIBLE CAUSES:</b></p> <ol style="list-style-type: none"> <li>1. FATIGUE BREAKAGE DIAPHRAGM WORN OUT</li> </ol>
	<p><b>A STRAIGHT FRACTURE</b>  <b>POSSIBLE CAUSES:</b></p> <ol style="list-style-type: none"> <li>1. INCORRECT AIR BLEEDING, AIR TRAPPED UNDER DIAPHRAGM</li> <li>2. BLOCKED SUCTION</li> </ol>
	<p><b>TWO SMALL FRACTURES CORRESPONDING TO VALVE POSITION</b>  <b>POSSIBLE CAUSES:</b></p> <ol style="list-style-type: none"> <li>1. RESTRICTED SUCTION</li> <li>2. PUMP RPM ABOVE SPECIFICATION</li> <li>3. SUCTION VALVE NOT SEALING</li> <li>4. CHEMICAL INCOMPATIBLE WITH DIAPHRAGM MATERIAL</li> </ol>

## 7. LIMITED WARRANTY

The liability of the manufacturer under the period of warranty (12 months from date of manufacturer's shipment) is limited to the replacement of the parts that, upon examination, appear in CMD's satisfaction to have been defective in material or workmanship. This warranty is valid only when the fault is ascertained by its technicians, it shall not apply to any pump which have been repaired or altered to adversely affect the performance or reliability of the pump. This warranty does not apply to malfunctions caused by fault or negligence of the buyer or third party, to the improper use of the pump, to failures reported to the manufacturer after the warranty period has expired, or to the normal wear of the component parts of the products such as seals, cups, O-Rings, valves, etc. Costs of labour, packages and transport are at the Buyer's charges. Products, after receipt of written factory approval, must be returned complete with all parts and not tampered.

Otherwise warranty is void.

This warranty is subject to the following conditions:

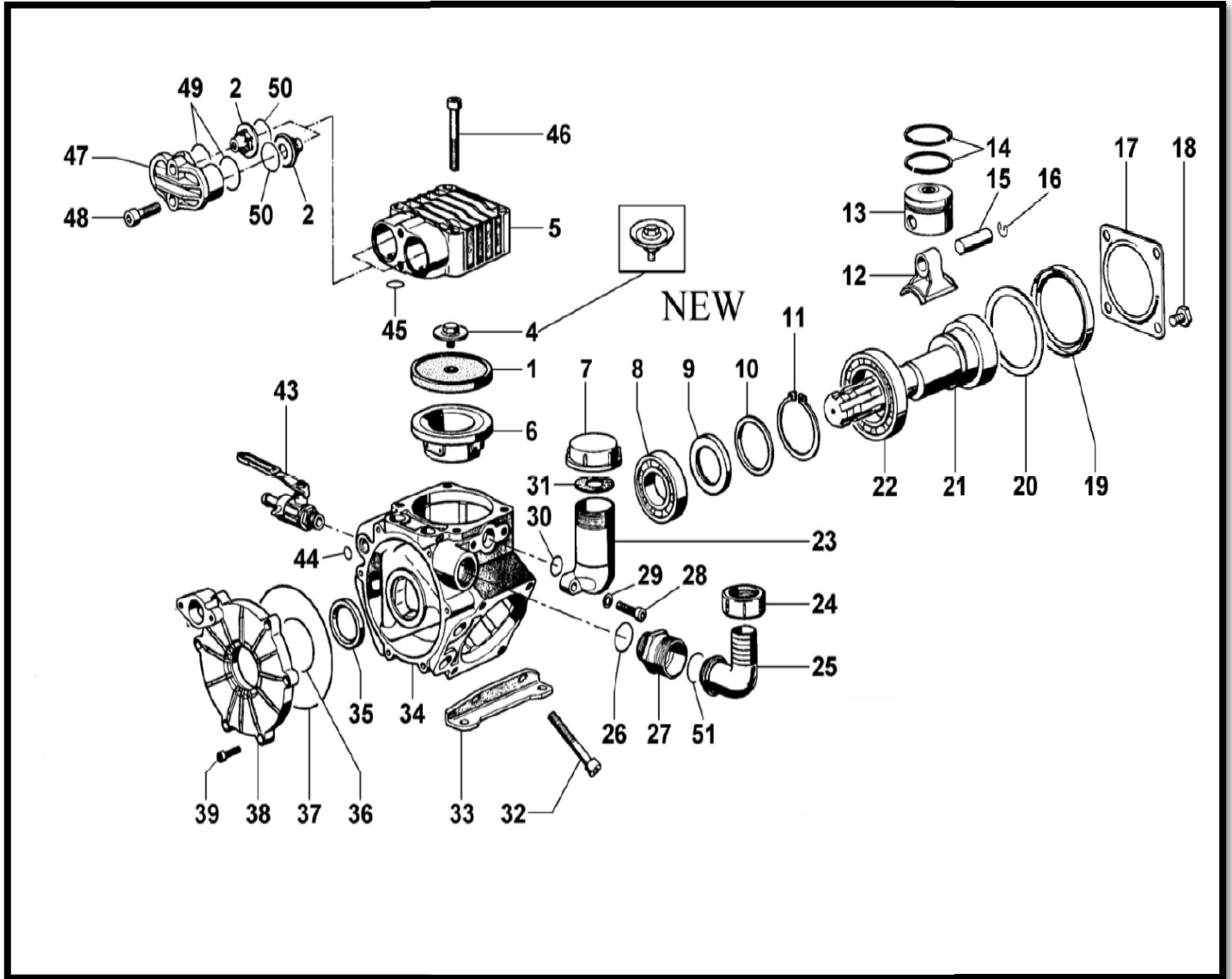
- Pump must be used within the specifications indicated in this manual and in the manual of the machine where the pump is installed. A safety valve must be correctly installed in the system.
- The warranty is void if pump is operating without oil in the crankcase.
- Protect pump from freezing. Do not store in area with freezing conditions. Drain completely of pumped fluid. Flush with antifreeze. Do not store or operate in excessively high temperature areas or without proper ventilation.
- The warranty is void if installation is not correct.
- The warranty is void if the recommended maintenance instructions are not observed.
- Different uses of the pump than the ones mentioned in the paragraph "Intended Use".
- The warranty is void if the pump use does not conform to the specific current safety standards and if the machine incorporating the pump is without CE marking.
- Use of non-original spare parts or even not suited for the pump model.

**USE OF OTHER THAN CMD PARTS VOIDS THE WARRANTY.**

**ANY PRODUCT MUST BE RETURNED FREE CMD FACTORY. PARTS RETURNED MUST HAVE FACTORY APPROVAL DOCUMENTATION PRIOR TO RETURN.**

# PART MANUAL OF PUMP

## MODEL: PF-530





Position	CODE	Description	Qty./machine
1	PF_30	PISTON DIAPHRAGM	3
2	PF_46	NRV	6
4	PF_33 & PF_29	KIT DIAPHRAGM WASHER/SCREW AISI SS-304	3
5	PF_23	TOP COVER	3
6	PF_27	PISTON COLLAR	3
7	PF_43	OIL FILLER CAP	1
8	PF_02	BEARING DIA.35x72x17	1
9	PF_25	BIG COLLAR FOR CONNECTING ROD	1
10	PF_44	SMALL COLLAR FOR CONNECTING ROD	1
11	PF_49	CIRCLIP DIA.55	1
12	PF_35	LIGHT ALLOY CONROD	3
13	PF_26	PISTON D.55	3
14	PF_50	PISTON RING	6
15	PF_14	PISTON PIN DIA.15	3
16	PF_51	RING DIA.15	6
17	PF_37	BIG SEAL COVER	1
18	PF_19	SCREW M10x16	4
19	PF_05	OIL SEAL DIA.68x90x10	1
20	PF_24	BIG SEAL SPACER	2
21	PF_32	CRANKSHAFT	1
22	PF_03	BEARING DIA.55x90x18	1
23	PF_42	OIL FILLER CUP	1
24	PF_39	WING NUT G.1"1/4	1
25	PF_40	90° ELBOW CONNECTOR DIA.30	1
26	PF_08	O-RING 2,62x29,82	1
27	PF_38	NIPPLES G.1"-G.1"1/4	1
28	PF_15	SCREW M8x30	2
29	PF_16	SMALL WASHER DIA.8,4x15x1,5	2
30	PF_09	O-RING 2,62x15,08	1
31	PF_45	OIL CUP GASKET	1
32	PF_17	SCREW M10X70	4
33	PF_36	MOUNTING BRACKETS	2
34	PF_31	MAIN HOUSING	1
35	PF_04	OIL SEAL DIA.35x47x7	1
36	PF_07	O-RING 2,62x50,47	1
37	PF_06	O-RING 2,62x120,32	1
38	PF_01	CRANKCASE COVER	1
39	PF_21	SCREW M6x25	6
43	PF_48	BLIND PLUG 1/2" WITH DOWTY SEAL/BALL VALVE	1

<b>Position</b>	<b>CODE</b>	<b>Description</b>	<b>Qty./machine</b>
44	PF_52	O-RING 2,62x18,72	1
45	PF_52	O-RING 2,62x18,72	6
46	PF_18	SCREW M10X65	8
47	PF_28	TOP BLIND	3
48	PF_20	SCREW M10x30 UNI5931	6
49	PF_12	O-RING 3,0x35	6
50	PF_08	O-RING 2,62x29,82	6
51	PF_13	O-RING 3,0x25	1

CONFIDENTIAL